PTO/AIA/15 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	
First Named Inventor	Elad Barkan
Title	Wireless Internet System and Method
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. [✔] **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. [✔] **Applicant asserts small entity status.** See 37 CFR 1.27
3. [ ] **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. [✔] **Specification** [*Total Pages* 41] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. [✔] **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* 22]
6. **Inventor's Oath or Declaration** [*Total Pages* 1] *(including substitute statements under 37 CFR 1.64 and assignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. [ ] Newly executed (original or copy)
   b. [✔] A copy from a prior application (37 CFR 1.63(d))
7. [✔] **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (*Appendix*)
   [ ] Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** (*if applicable, items a. – c. are required*)
   a. [ ] Computer Readable Form (CRF)
   b. [ ] Specification Sequence Listing on:
      i. [ ] CD-ROM or CD-R (2 copies); or
      ii. [ ] Paper
   c. [ ] Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

ACCOMPANYING APPLICATION PAPERS

10. [ ] **Assignment Papers** (cover sheet & document(s)) Name of Assignee _____
11. [ ] **37 CFR 3.73(c) Statement** (*when there is an assignee*) [ ] **Power of Attorney**
12. [ ] **English Translation Document** (*if applicable*)
13. [ ] **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    [ ] Copies of citations attached
14. [ ] **Preliminary Amendment**
15. [ ] **Return Receipt Postcard** (*MPEP § 503*) (*Should be specifically itemized*)
16. [ ] **Certified Copy of Priority Document(s)** (*if foreign priority is claimed*)
17. [ ] **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. [✔] **Other:** Small Entity Statement

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

[ ] The address associated with Customer Number: _____ **OR** [ ] Correspondence address below

Name	Elad Barkan				
Address	12 Habanim St.				
City	Kfar Sirkin	State		Zip Code	49935
Country	IL	Telephone	972545204121	Email	moti@barkan.org

Signature	Elad Barkan	Date	Sep 9, 2013
Name (Print/Type)	Elad Barkan	Registration No. (Attorney/Agent)	

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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	
First Named Inventor	
Title	Wireless Internet System and Method
Express Mail Label No.	FEDEX 802207220447

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☐ **Fee Transmittal Form** (PTO/SB/17 or equivalent)
2. ☐ **Applicant asserts small entity status.** See 37 CFR 1.27
3. ☐ **Applicant certifies micro entity status.** See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.
4. ☐ **Specification** [*Total Pages* _____] Both the claims and abstract must start on a new page. *(See MPEP § 608.01(a) for information on the preferred arrangement)*
5. ☐ **Drawing(s)** (35 U.S.C. 113) [*Total Sheets* _____]
6. **Inventor's Oath or Declaration** [*Total Pages* _____] *(including substitute statements under 37 CFR 1.64 and c ssignments serving as an oath or declaration under 37 CFR 1.63(e))*
   a. ☐ Newly executed (original or copy)
   b. ☐ A copy from a prior application (37 CFR 1.63(d))
7. ☐ **Application Data Sheet** ** See note below.* See 37 CFR 1.76 (PTO/AIA/14 or equivalent)
8. **CD-ROM or CD-R** in duplicate, large table, or Computer Program (Appendix)
   ☐ Landscape Table on CD
9. **Nucleotide and/or Amino Acid Sequence Submission** *(if applicable, items a. – c. are required)*
   a. ☐ Computer Readable Form (CRF)
   b. ☐ Specification Sequence Listing on:
      i. ☐ CD-ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statements verifying identity of above copies

ADDRESS TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

ACCOMPANYING APPLICATION PAPERS

10. ☐ **Assignment Papers** (cover sheet & document(s)) Name of Assignee _____
11. ☐ **37 CFR 3.73(c) Statement** ☐ **Power of Attorney** *(when there is an assignee)*
12. ☐ **English Translation Document** *(if applicable)*
13. ☐ **Information Disclosure Statement** (PTO/SB/08 or PTO-1449)
    ☐ Copies of citations attached
14. ☐ **Preliminary Amendment**
15. ☐ **Return Receipt Postcard** *(MPEP § 503) (Should be specifically itemized)*
16. ☐ **Certified Copy of Priority Document(s)** *(if foreign priority is claimed)*
17. ☐ **Nonpublication Request** Under 35 U.S.C. 122(b)(2)(B)(i). Applicant must attach form PTO/SB/35 or equivalent.
18. ☐ **Other:** _____

***Note:** (1) Benefit claims under 37 CFR 1.78 and foreign priority claims under 1.55 **must** be included in an Application Data Sheet (ADS).
(2) For applications filed under 35 U.S.C. 111, the application must contain an ADS specifying the applicant if the applicant is an assignee, person to whom the inventor is under an obligation to assign, or person who otherwise shows sufficient proprietary interest in the matter. See 37 CFR 1.46(b).

19. CORRESPONDENCE ADDRESS

☐ The address associated with Customer Number: _____ **OR** ☐ Correspondence address below

Name					
Address					
City		State		Zip Code	
Country		Telephone		Email	

Signature	E. Barkan	Date	Sep 8 2013
Name (Print/Type)	ELAD BARKAN	Registration No. (Attorney/Agent)	

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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FEE TRANSMITTAL

	Complete if known	
	Application Number	
	Filing Date	Sep 9, 2013
☑ Applicant asserts small entity status. See 37 CFR 1.27.	First Named Inventor	Elad Barkan
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.	Examiner Name	
	Art Unit	
TOTAL AMOUNT OF PAYMENT ($) 340	Practitioner Docket No.	

METHOD OF PAYMENT (check all that apply)

☐ Check ☑ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☐ Deposit Account Deposit Account Number: _____ Deposit Account Name: _____

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☑ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☐ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☐ Credit any overpayment of fee(s)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)

	FILING FEES			SEARCH FEES			EXAMINATION FEES			
Application Type	U ($)	S ($)	M ($)	U ($)	S ($)	M ($)	U ($)	S ($)	M ($)	Fees Paid ($)
Utility	280	140*	70	600	300	150	720	360	180	140
Design	180	90	45	120	60	30	460	230	115	
Plant	180	90	45	380	190	95	580	290	145	
Reissue	280	140	70	600	300	150	2,160	1,080	540	
Provisional	260	130	65	0	0	0	0	0	0	

* The $140 small entity status filing fee for a utility application is further reduced to $70 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	Undiscounted Fee ($)	Small Entity Fee ($)	Micro Entity Fee ($)
Each claim over 20 (including Reissues)	80	40	20
Each independent claim over 3 (including Reissues)	420	210	105
Multiple dependent claims	780	390	195

Total Claims		Extra Claims	Fee ($)		Fee Paid ($)
1	-20 or HP =	_____ x	_____	=	_____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims		Extra Claims	Fee ($)		Fee Paid ($)
1	-3 or HP =	_____ x	_____	=	_____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	Fee ($)	Fee Paid ($)
	_____	0

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $400 ($200 for small entity) ($100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		Extra Sheets		Number of each additional 50 or fraction thereof		Fee ($)		Fee Paid ($)
63	- 100 =	_____	/ 50 =	_____ (round **up** to a whole number)	x	_____	=	0

4. OTHER FEE(S)

	Fees Paid ($)
Non-English specification, $130 fee (no small or micro entity discount)	
Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, $400 fee ($200 small or micro entity)	200
Other (e.g., late filing surcharge): _____	

SUBMITTED BY

Signature	Elad Barkan	Registration No. (Attorney/Agent)	Telephone 972545204121
Name (Print/Type)	Elad Barkan		Date Sep 9, 2013

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Document Code: IMIS

Notice of Fee Due

Application Number: 13/987881 date 09/13/2013

Fees are due for the application or document dated **09/11/2013** The payment was not collectable for the reason indicated below.

Note: If the fee due is for any of the filing fees, the surcharge for late payment of the filing fees is now due as well.

- ☐ Insufficient payment by check or money order.
- ☑ No authorization to charge a deposit account.
- ☐ Invalid deposit account number.
- ☐ User name not listed in deposit account _____ at _____:_____ (time).
- ☐ Insufficient funds in deposit account _____ at _____:_____ (time).
- ☑ Insufficient payment by credit card.
- ☐ Declined credit card _____:_____ (time).

Fee code(s) to be applied:	2111	$ 300
	2311	$ 360
		$
		$
		$
Amount in holding fee code:	1506	$
	1622/2622	$
	1206/2206	$
	1999	$

Total remaining due from applicant: **$ 660**

RAM Operator **HUONG**

Rev. 04/10/2013

PTO/AIA/14 (03-13)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Elad	Pinhas	Barkan	

Residence Information (Select One) ○ US Residency ◉ Non US Residency ○ Active US Military Service

City	Kfar Sirkin	State/Province		Country of Residence	IL

City		Country of Residence	

Mailing Address of Inventor:

Address 1	12 Habanim St.		
Address 2			
City	Kfar Sirkin	State/Province	
Postal Code	49935	Country	IL

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number			
Name 1	Elad Barkan	Name 2	
Address 1	12 Habanim St.		
Address 2			
City	Kfar Sirkin	State/Province	
Country	IL	Postal Code	49935
Phone Number	972545204121	Fax Number	97239332284
Email Address	moti@barkan.org	Add Email	Remove Email

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

Application Information:

Title of the Invention	Wireless Internet System and Method		
Attorney Docket Number		**Small Entity Status Claimed** ☒	
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	22	**Suggested Figure for Publication (if any)**	
Plant Submissions Only:			
Latin Name		**Variety Denomination Name**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number			

Prefix	Given Name	Middle Name	Family Name	Suffix	
					Remove
Registration Number					
Prefix	Given Name	Middle Name	Family Name	Suffix	
					Remove
Registration Number					

Additional Representative Information blocks may be generated within this form by selecting the **Add** button.

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	12/665'978	2009-12-22

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
PCT/IL2007/000244	IL	2007-02-22	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☒ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

PTO/AIA/14 (03-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◯ Assignee	◯ Legal Representative under 35 U.S.C. 117	◯ Joint Inventor
◯ Person to whom the inventor is obligated to assign.	◯ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :

If the Applicant is an Organization check here. ☐

Organization Name

Prefix	Given Name	Middle Name	Family Name	Suffix

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

Mailing Address Information For Applicant:			
Address 1	12 Habanim St.		
Address 2			
City	Kfar Sirkin	**State/Province**	
Country	IL	Postal Code	49935
Phone Number	972545204121	Fax Number	97239332284
Email Address	moti@barkan.org		

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee is an Organization check here. ☐

Organization Name				
Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Non-Applicant Assignee:			
Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the Add button.

PTO/AIA/14 (03-13)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	Elad Barkan			Date (YYYY-MM-DD)	2013-09-08
First Name	Elad	Last Name	Barkan	Registration Number	

Additional Signature may be generated within this form by selecting the Add button.

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	BARKAN Elad 12 Habanim St. Kfar Sirkin 49935 Israel	Examiner	Not Yet Assigned
Serial No:	Not Yet Assigned	Group Art Unit:	Not Yet Assigned
Filed:	Herewith		
Application No:	Not Yet Assigned		

Title: **WIRELESS INTERNET SYSTEM AND METHOD**

Filing Continuation Patent Application to Application 12/665,978

Commissioner for Patent

P.O.Bax 1450

Alexandria, VA 22313-1450

Dear Sir,

Enclosed is submission of a Continuation Patent Application to application number 12/665,978.

The filing contains the following documents:

1. A cover letter with amendments to the Specifications of Application 12/665,978. (3 Pages).
    a. Page 2 – Request for Priority time from previous Applications.
    b. Page 3 – Identifying the Claim for this Continuation Application.
2. The specifications for this new Continuation Patent Application (41 Pages).
    a. [note] Identical to Application 12/665,978.
3. The Abstract for this Continuation Patent Application (1 Page).
    a. [note] Identical to Application 12/665,978.

4. The Claims for this Continuation Patent Application (1 Page).
5. The Figures for this Continuation Patent Application (22 Pages).
    a. [note] Identical to Application 12/665,978.
6. Declaration for Utility Application PTO/AIA/01 (1 Page).
7. Application Data Sheet PTO/AIA/14 (6 Pages).
8. Utility Patent Application Transmittal PTO/AIA/15 (1 Page).
9. Fee Transmittal PTO/SB/17 (1 Page).
10. Credit Card Payment Form PTO-2038 (1Page).

It is believed that this submission of filing the Continuation Patent Application meets the entire requirements.

If there is a mistake or additional information is required, the Commissioner is being asked to communicate directly with the Inventor signed below at telephone number +(972)-54-520-4121 or by email: moti@barkan.org in order to correct any deficiency.

Sincerely,

Elad Barkan

Elad Barkan

WIRELESS INTERNET SYSTEM AND METHOD

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001]The present application is related to, and claims priority from, the provisional patent applications filed by the present applicant in U.S.A.: Application U.S. 60/775,321 filed on 22 Feb. 2006, and Application U.S. 60/794,135 filed on 24 Apr. 2006.

TECHNICAL FIELD

[0002]The present invention relates to a wireless Internet system and method, and more particularly to such systems for providing wireless Internet connection to roaming devices such as Portable computers, Laptops, PDAs and phones, and the deployment of such a system in a fast spreading manner (a viral-like method), in a client software-only manner such that the existing access points are not changed at all.

BACKGROUND ART

[0003]Currently, there is a growing number of WiFi public hot-spots (or Access Points--"AP"). These APs allow WiFi-enabled devices (which we refer to as STA) that are in their coverage area to Connect to the internet.

[0004]Some of the APs are operated as a business, service, or as part of a community, either with or without a charge to the STA's owner. Other APs are placed by individuals in their premises, but are not "locked", i.e., they are "open", allowing bypassing STAs to utilize them. Other APs placed by individuals are "locked" (or "closed"), thus not allowing passing STAs to utilize them.

[0005]As APs are being deployed in growing numbers, many individuals lock their APs for fear of unfair use of their network resources, and due to security concerns. For instance, there have been cases where a person places an open AP, and his neighbor uses this AP as its internet connection on a full-time basis without the consent of the first person, thus abusing and degrading the service of the first individual. In other cases, the neighbor hacked into the computer of the first person through the network. Thus, as time passes, most APs are either locked, or a payment is required to use them. Although the total number of APs and their area of coverage is growing fast, a larger percent of the APs are becoming locked and inaccessible to roaming STAs.

[0006]A prior art approach for allowing roaming customers to access the Internet is taken by Fon (www.fon.com). It allows individuals to download a new software into their APs, which makes their APs a pay-for-use APs for STAs that roam in their

vicinity, and in addition, they receive a username and password for free access to other APs which are operated by Fon or utilize their software. It also allows users to enjoy part of some of the payments made by other users to use the network. However, roaming STAs are forced either to find an open AP, find an AP for which they have an account, or pay for access in case there is a pay-for AP.

[0007]It is an aim of the current disclosure to provide a system and a method for deployment of APs for the purpose of connecting STAs to the Internet.

[0008]Roaming customers that connect to an AP are often far from the AP and have borderline reception conditions. As a result, the connection quality is very poor, and the user may experience a slow service or no service at all. It is another aim of the current disclosure to provide a system and a method for improving the connection quality for roaming STAs.

[0009]Another aspect of this invention refers to systems and methods for fast handovers in wireless networks such as 802.11 networks, specifically in un-managed wireless networks, and more particularly such systems and methods which allow extremely fast handovers in these networks without any changes to existing 802.11 base stations. The invention also concerns efficient performance with regards to power consumption, coverage, security, installation, capacity and availability of wireless networks such as 802.11.

[0010]The invention can achieve these goals without any change to the WiFi access point.

[0011]Currently, there is a growing number of WiFi public hot-spots (or Access Points--"AP"). These APs allow WiFi enabled devices (which we refer to as STA) that are in their coverage area to connect to the internet.

[0012]Some of the APs are operated as a business, service, or as part of a community, either with or without a charge to the STA's owner. Other APs are placed by individuals in their premises, but are not "locked", i.e., they allow bypassing STAs to utilize them. The cumulative connectivity provided by the APs is enormous and growing fast, thus, it is tempting to use this cumulative connectivity to compete with other wireless technologies. For example, it would be tempting to have a STA that looks like a cellular handset (i.e., a WiFi Handset, or WiFi Phone), where the WiFi handset uses the free connectivity to provide a "free" service that competes with or complements the cellular service.

[0013]One of the major difficulties of achieving this vision is that the coverage of a single WiFi AP is very small (about a few hundreds to a few thousands of square meters). When a user goes out of this area, his connectivity is lost. A natural naive approach to solve this problem is performing a handover (sometimes also called handoff) to another AP with a better radio connection to the user. Another approach is to have a handset which supports both WiFi and Cellular, and handover the conversation from WiFi to Cellular [See: WO 2004/036770], this way, WiFi extends the coverage of cellular, and conversation is handed over from WiFi to cellular, when there is no WiFi coverage. However, the problem of performing handover between one WiFi AP to another WiFi AP remains when appropriate cellular coverage is not

available (or there is no cooperation from the cellular company). The same idea applies when cellular is replaced by other access technology, such as satellite communications.

[0014]The concept of handover is taken from cellular networks. Handovers usually work well in managed networks, such as cellular networks, campuses, or office environment., where the entire network is usually owned by the same operator.

[0015]The network operator in many cases chooses to add cells where coverage or capacity are needed. In managed networks, the APs (or the cellular cells) are synchronized and communicate with each other through a backbone, and are usually controlled by some other network entity (e.g., BSC--base station controller in cellular systems). For example, the APs can communicate with each other, for example using the IEEE 802.11F protocol--the Inter-AP protocol, which involves a RADIUS (Remote Authentication Dial In User Service, see RFC 2138, 2865, and 2866) server.

[0016]The APs can also employ a radio resource management such as IEEE 802.11K, or fast roaming using IEEE 802.11R, etc. However, in unmanaged networks, the APs can be deployed by many unrelated entities, such as by private individuals.

[0017]There is usually no entity that synchronizes the APs. The APs can be manufactured by various manufacturers, use various security mechanisms etc. In unmanaged networks, the handovers are typically very slow, as in the process of handover, it takes time for the STA to re-connect to the internet in the new AP (and it must disconnect from the previous AP). In such a handover in an unmanaged network, the IP address often changes. Therefore, a mechanism such as mobile IP must be used (as described later). This mechanism is limited with respect to the frequency in which the IP address can change, and a large latency (disconnection time) may result during the handover process. During the latency, the STA cannot receive any incoming messages.

[0018]A handover process is typically composed of the station STA connecting to a new AP, and disconnecting from the old AP. If STA is connected in parallel to both AP the handover is called soft-handover, and if STA first abandons the old AP and then connects to the new AP, the handover is called a hard-handover. Soft handovers require the ability of STA to communicate in parallel with at least two APs.

[0019]The process of connecting to a new AP is usually composed of the following steps:

[0020]1. STA performs a scanning process to discover neighboring APs.

[0021]2. STA chooses a new AP, and performs authentication with the AP, in which the AP verifies that STA is allowed to access the AP.

[0022]3. If the authentication is successful, STA performs an association process, in which the AP acknowledges that STA is connected to it (association requires the AP to allocate resources to the STA, and the 802.11 standard allows up to 2007 STAs to be associated with an AP).

[0023]4. Once STA is associated with the AP, the STA makes sure that it has all the information that it requires to communicate over the internet, for example, it must have an IP address, and it must update servers that govern its location (such as Mobile IP, as discussed later). In some cases, the user should go through a second authentication procedure (usually with a RADIUS server). Many times, this procedure is performed over a web interface, which is called a Captive Portal.

[0024]When a captive portal is used by the AP, the user needs to surf into the captive portal and perform a log-in to connect his IP address to the Internet. In some implementations, the user's web browser is forwarded to the captive portal regardless of the internet site that it tries to surf into. Some APs allow the STA to surf in some limited number of internet sites before they complete the second authentication procedure (for example, if the AP is in an hotel, it might allow surfing into the hotel's website, or affiliated news web sites).

[0025]The procedure at the captive portal typically includes authentication, payment, or agreeing to terms of usage. Once the authentication is completed, the IP address of the STA is connected to the Internet (usually by reconfiguring the firewall that controls the communications of the AP). Each sub-process takes time to complete, resulting in a total delay of over several seconds to complete the entire process.

[0026]In managed networks, Step 4 can be performed once in a certain amount or time (or for a certain area), as moving between APs of the managed network does not necessarily change the parameters of the STA such as IP address etc. However, in un-managed networks (and sometimes also in managed networks), the STA must gain a new IP address and other parameters, usually through DHCP (Dynamic Host Configuration Protocol, see RFC 1541). Completing the DHCP protocol can take up to several seconds. Sometimes, obtaining an IP is not enough, and a second authentication is needed. In other cases, a proxy server or a Socks server should be set for the communication. The entire process can consume a few seconds, which are intolerable in a streaming two-way application such as a voice conversation.

[0027]Many protocols that are used in the Internet require that the IP address of the STA would remain fixed during communications (for example, TCP--Transport Control Protocol, see RFC 793). However, a handover might result in the change of the IP address. This change of IP address causes a break in the communication as the communication needs to be restarted.

[0028]One solution to this problem is provided by the Mobile IP standard (see RFC 2002): in this solution the STA updates a server with its current IP address, every time that the IP address changes. As a preparation for roaming, the server allocates to the STA (in addition to the STA's current IP address) an IP address that remains fixed, even when the real IP address of the STA changes. This fixed IP address is also known as a "care of" address. From this moment on, the STA keeps the server posted of the real IP address of the STA, and the STA can use (in its communications with the rest of the Internet) the "care of" address (or its home address) as if it was its own fixed address.

[0029]Any IP data packet that is sent to the care-of IP address is tunneled by the Mobile-IP server to the current IP address of the STA. For packets originating from

the STA to the Internet, the STA can tunnel the packets to the Mobile-IP server, which replaces the IP address with the care-of address. However, many times the STA can simply write its care-of IP address as the source address of the IP data packet, as many times, the source address of IP packets is not checked what-so-ever in the course of routing the IP data packet in the Internet.

[0030]The Mobile-IP solution can be applied as long as the handovers are not performed too often. However, it incurs the punishment of routing all incoming packets through a server, causing both an increased travel time for the data packets, as well as latency (or disconnection) for the time that the real IP address changed, but the server is not informed yet. If the round-trip-time of the packets between the STA and the server is longer than the time a STA stays with the same IP, this method fails, as by the time packets reach the reported location of the STA, the STA is already in another location.

[0031]For many applications, such as voice, it is of utmost importance to minimize the time spent on the handover process. The time consumed by the handover process is usually dominated by the scanning step (Step 1 as mentioned above), and by Step 4 (specifically in case of an unmanaged network). There are many solutions that address fast handovers in cellular networks, and a few solutions that address fast handovers in managed WiFi networks (for example, see: WO2004/054283, which reduces Step 1 (mentioned above) by selective scanning but requires modifying the AP). None of these solutions deal with the delay due to Step 4.

[0032]It is an object of this invention to provide very fast handovers even in unmanaged networks.

[0033]Another barrier for wireless applications is that WiFi coverage might exists, and security policy might allow the STA to connect, but the AP might be out of resources (for example, there are 2007 associated STAs, and therefore it has no resources left, or that it has a limited IP address space which was already allocated through DHCP, and it has no IP address to allocate). It is an object of this invention to provide a system and method that allows STAs to use the services of the AP even when some of its resources are exhausted.

[0034]Another barrier for many wireless applications is the complex configuration of wireless parameters of STA, especially the security parameters. A user that purchases a new STA and has an existing AP, might wish to configure his new STA to work with his AP. This configuration includes entering into the STA the encryption key and authentication key that would allow it to use the AP. Existing solutions require a change in the AP and STA, such that a special key can be pressed simultaneously at both ends to perform automatic configuration (like Buffalo INC's AirStation OneTouch Secure System--AOSS, or Broadcom's SecureEasySetup). Without such a solution, the user is usually forced to punch into his STA the security codes (which are typically long). The problem worsens when the STA moves between APs that use different security settings.

[0035]It is an object of this invention to provide for easy configuration on both levels: at the initial setup and while roaming.

[0036]Another barrier for many wireless applications is that WiFi coverage might exist, but it is locked and unavailable for use for the STA. It is an object of this invention to provide a solution for (legally) accessing locked APs.

[0037]Another problem with WiFi is that the WiFi protocol is not optimized for low battery consumption (compared to cellular protocols such as GSM). In current solutions, if the STA moves between APs and changes its IP, it must use mobile IP and inform an entity (server) in the network of its current IP (we refer to this process as "location update", as the STA updates the network entity of its location). Frequent location updates exhaust the STA's battery. Another problem with frequent location updates is that they create a heavy load on the network and on the network entities that manage and keep track of the STA's location.

[0038]The situation in WiFi is very different from the situation in cellular networks in two ways. Both of the ways cause an increase in the number of location updates in WiFi: First, in cellular network, the cells are typically much larger than a "cell" that is created by a WiFi AP. Therefore, in cellular networks, there are fewer transitions between cells, and hence less location updates. Second, cellular protocols allow defining a "location area" that encompasses several cells, and the STA is required to perform location update only when moving between location areas, and thus reducing the number of location updates. Current WiFi protocols are not built to support location areas.

[0039]It is an object of this invention to provide a method that reduces the number of location updates required for STAs while moving between APs.

[0040]It is an object of the current invention to provide solutions to the above mentioned problems, using both a centralized (server based) approach, and also by providing a method for performing the solutions using a distributed peer-to-peer network. Therefore, no huge servers and no large investments are required.

DISCLOSURE OF INVENTION

[0041]The invention is described by way of example, but it should be obvious to persons skilled in the art that many variations thereof may be implemented.

[0042]A novel aspect of the invention relating to the deployment of APs is that devices function at the same time as STAs and as APs. This allows a STA to also create a new AP for connecting other STAs to the Internet therethrough. It is known in the art that a STA wireless card can operate in one of two modes, STA or AP. The present inventor has found a way to activate a device simultaneously in both modes.

[0043]According to another novel aspect, a connecting STA can limit the set of Internet addresses or internet sites that other STAs which connect through it can access, but the set of allowed addresses includes a special web site from which other STAs can download the Vagabee.TM. software. Vagabee software includes the functionality of the software of the first STA, to open new APs and further spread the Vagabee.

[0044]Once the new STAs download and execute the Vagabee software, the first STA

detects that the software is running on the new STAs, and allows them a wider access to the internet. Therefore, new STAs must download and run the Vagabee software to get wide access to the internet. As the new STAs run Vagabee, they become APs in their own right and allow other STAs to download and connect through them to the internet in the current location of these STAs, as well as in any other location they go.

[0045]Another novel method of the present invention allows a STA to connect through two or more APs simultaneously. Thus, a STA can enjoy a more stable connection even if part of the connections are of borderline quality. Furthermore, more connections may achieve a broader connection to the Internet, or may balance its traffic such that each STA carry a lighter burden with regards to the extra bandwidth they carry due to a new STA.

[0046]Multiple connections also allow faster handovers, as if a STA is moving from one place to the other it can first establish a new connection and then the old connection is terminated, practically leaving the STA connected.

[0047]In a further development of the novel method, a laptop (the terms STA and laptops are interchangeable, we use laptop rather than STA as in the preferred embodiment these cases the STA would be a laptop) can connect with another laptop directly or through a STA, such that both enjoy the Internet connection of the other. As the internet connection is not used all the time (typical laptop uses on average a few percents of its maximum bandwidth), both laptops will experience a much faster connection to the Internet.

[0048]Another important issue is the security of the system. A Laptop might agree to act as an APs, but it does not agree to allow other STAs to access its inner network (i.e., the laptop owner wishes to allows these STAs to access the internet through its private network but does not allow them to access computers on its private network. Another security concern is that the new STAs may desire to prevent the first STA from tapping into their Communications, i.e., they do not want the first STA to be able to tap into communications that the first STA relays. The current disclosure provides novel method to deal with these two problems.

[0049]First, external STAs (new STAs) are not allowed access to computers in the inner network by having the first STA drop data packets from the external STAs that are designated to local IP addresses on the inner network. Second, a new STA's privacy is protected by tunneling its sensitive traffic to a trusted network site, and the new site accesses the Internet through his tunnel to the trusted network site which acts as a proxy for it.

[0050]An important issue is to prevent STAs from using other laptops for their primary network connection for a long period of time. A novel method detects that a STA is connected to the internet through the same laptop for a long period of time, and disconnects the STA. Alternatively, the STA has to pay to continue and use the network. The pricing can be such as to encourage the STA's user to purchase his own connection from an independent Internet Service Provider (ISP).

[0051]In yet another novel method, the software running on a laptop can replace the

commercial banners that appear in the web pages the laptop surfs into, as well as the web pages that connected STAs surf into. The banners can be stopped, replaced, and made specially targeted to the user, for example based on his location.

[0052]A further novel method is that the wireless internet coverage that is obtained using laptops can be used by devices such as wireless IP phones to make phone calls using the wireless internet coverage, cellular phones that have built-in WiFi connection, or digital cameras with WiFi that wish to upload the data stored in them. Other devices might include for example, radio or TV broadcast capabilities.

[0053]For example, Digital cameras might be equipped with WiFi. The owner of such a camera would like to upload his pictures from the camera to a server that stores the pictures on the Internet--the reasons for this may vary from being able to share the photos while on vacation with family members left at home, backup the pictures from the digital camera to the Internet server, or simply because the memory card on the camera is running out of space. A major problem is that to upload the pictures to the Internet may take a very long time, as pictures consume megabytes to store. In the novel method, the camera can send the photos to the laptop over WiFi (this connection is very fast), then disconnect and move on. Then, the laptop uploads the pictures to the Internet server (this process can take a long time as it involves uploading a lot of data), but the laptop owner would not feel it as a burden, since the pictures can be uploaded when his Internet connection is not used for other purposes.

[0054]Improvements to this method may include: The camera can encrypt the pictures so that the laptop owner cannot see them. The pictures can be still stored in the camera after being uploaded to the laptop, as the laptop might fail to upload them. The next time the camera connects to the Internet, it can check with the Internet server that the pictures arrived correctly to the server. If that is so, the pictures may be erased from the camera. Otherwise, the camera can re-transmit the pictures.

[0055]To have faster uploads, the camera can upload the pictures to several laptops that would upload the picture to the server.

[0056]Another novel method relates to configuring STAs to connect to a wireless network. The configuration, and especially the security configuration of STAs to connect to a wireless Internet connection such as WiFi is cumbersome and annoying to most users. Assume a STA belongs to the same user (or user group) of the owner of a laptop. Then, by a special logging into a website, the configuration of the laptop can be copied to the STA, thus configuring it to use the AP (i.e., allowing a connection without the laptop).

[0057]Another novel method allows devices with a trusted hardware to receive information that instructs them how to directly connect to AP, by providing them with the needed settings and security information.

[0058]One of the novel aspects of a very fast handover is to practically "almost complete" the process of the handover before it even started, possibly with the assistance of another STA that is already in the new AP's coverage (further details are described later).

[0059]Another novel aspect is that the same MAC address and IP address can actually be used by more than one STA. The differentiation between the STAs can be performed by using higher protocol identification, such as different port numbers (for example TCP ports), as detailed later.

[0060]It is useful for a station STA to know the identity of the adjacent APs that the STA might hand over to. The identity of an AP can be established in several ways, as disclosed herein. The SSID (Service Set ID) of the AP is usually broadcasted by the AP using periodical transmissions known as beacon. However, two adjacent AP may have the same SSID. In such a case, the MAC address of each AP is different, and APs can be differentiated based on their MAC address (which serves as a globally unique identification parameter). Some APs do not transmit beacon, and only respond when they are addressed using their SSID. In this case, a priory-knowledge is needed, see below.

[0061]Another aspect of the invention is for a STA to selectively scan for a neighboring AP in the following novel way. Assume that a STA scans to see if it can receive the beacon of a second AP, where the scanning will be performed exactly when the second AP is expected to transmit its beacon, therefore, the disconnection from the first AP will be minimal. The novel method consists of scanning and storing (in network entities) information about the relative time between adjacent APs, and their relative clock drift. This information is retrieved at the appropriate time such that the STA knows to wait for the beacon just before it is transmitted.

[0062]Another aspect of the invention is to prevent exhaustion of resources at the APs. GN keeps a pool of MAC addresses with associated IP address. Just before a STA enters the AP, GN sends it a MAC address and an IP address that are already associated with the AP. Therefore, the STA can connect even if the AP has no resources left for new STAs.

[0063]Another novel aspect of the invention is to save Battery Power and reduce network load by reducing the number of Location Updates in WiFi. A location update is the process in which a STA informs an entity in the network on its current location (the notification can take many forms, including opening a TCP connection, or sending UDP packets). In prior art for 802.11 networks, a location update is required whenever the IP address of the STA changes (for example, when moving between APs of different subnets)--even if the STA is idle (not transmitting or receiving data). The novel method allows to define a location area for WiFi, such that an idle STA needs to perform location update only when it moves between APs that belong to different location areas, but does not need to perform location update when it moves between APs of the same location area, even if its IP address changes. See further details later.

[0064]A pseudo-beacon is another aspect of the invention which allows reducing the number of Location Updates. It is a message that GN can periodically transmit in each AP. While some APs might permit a remote node to transmit a message in the AP, other APs might not allow it. In the novel method, a certain MAC address, IP address, and possibly a port number, are allocated in each AP for the purpose of pseudo-beacon transmission. Further details are described later.

[0065]Configuring the security in new STAs to work with an existing AP might be a tedious job, as the security (authentication/encryption) code might be very long as known in the art, and the user might need to punch it into the STA. A novel solution for easy configuration is disclosed. Unlike previous solutions, the novel method does not require changing the existing AP of the customer. In one embodiment, software is run on a personal computer of the user (that is already configured to access the WiFi). Then, the software establishes a secure channel with the STA, and copies the security information from the personal computer to the STA. In this way, the STA learns the security parameters. An authentication phase in which the STA is authenticated by the software or a remote server can be added before copying the security information.

[0066]In another embodiment, the customer first connects the STA by wire to its network (or alternatively, the STA first connects using a connection it establishes through an already connected device, such as a personal computer or laptop).

[0067]As the STA can receive and transmit signals on the wireless network and it is connected to the internet (through the other connection) at the same time, it tries to locate the web configuration of the AP on the wired network (most APs have a web interface). In most cases, it is an easy job for the STA, as either the STA can locate the AP as it is the default gateway of the wired network, or it can try to find its IP by performing RARP (Reverse Address Resolution Protocol) using the wireless MAC address of the AP (which it can see off-the-air). Further details are described later.

[0068]Another novel method for gaining access to locked networks is disclosed. While performing the above described easy setup (or at any other time), the user is prompted, if he wishes, to join a swapping service. The swapping service allows the user to gain access to many locked networks (the locked networks of the other users that joined the swapping service), in return he allows users to use his network for the purpose of connecting to the Internet. If the user agrees, the access parameters to his network (encryption key, MAC address, default gateway, etc.) are securely stored in the network (for example in GN, and a backup server). The security information will be securely sent directly into the hardware of other STAs, when they need to connect using his AP. Further details are described later.

[0069]Another novel aspect of the invention takes advantage of the fact that the wireless network is local in nature, as the APs are geographically adjacent. As a result, the methods that are disclosed can be implemented by many small devices on the Internet, each responsible for a geographic area. The devices form a peer-to-peer network that implement the methods, without the need to rely heavily on large servers.

[0070]Another novel aspect of the invention is to have a STA which has a capability of communicating in two or more channels in parallel. This capability can enable a STA to be connected to two APs in parallel without the need to implement sophisticated mechanisms that actually simulate this situation. Thus, a STA can connect with future APs while maintaining a connection through its serving APs. Being connected to two APs simultaneously allows greater bandwidth by utilizing two connections instead of one, and soft-handovers, i.e., the STA stays connected through one AP, while disconnecting from the second AP in the process of handover.

[0071]The new system and method refers, among others, to the following innovative features:

[0072]1. A viral-like fast spread method for the Vagabee.TM. software:

[0073]at the network level

[0074]at the already connected PC

[0075]at a connecting PC, already having the Vagabee software

[0076]at a connecting PC, not yet having the Vagabee software

[0077]details of the software package being loaded on a new computer: functions, operation, how installs, how spreads further away to other PCs.

[0078]2. Detail the viral spread method:

[0079]use of existing standards; "as is" or with modifications

[0080]method of reporting to user and getting a user's approval

[0081]interaction with firewall and antivirus programs in the PC

[0082]3. Vagabee in use, with flow charts:

[0083]manage communications with presently connected PCs

[0084]add new PC

[0085]remove a PC. Recover chain, reestablish communications when intermediary PC disconnects

[0086]resolve conflicts where there are several Vagabee systems in one area.

[0087]Method of operation, so the networks will not interfere with each other, rather they may assist each other and maybe provide backup functions.

[0088]Knowing the identity of adjacent APs and the location of STAs.

[0089]handoff to another local Vagabee network

[0090]4. Vagabee in use, system design:

[0091]workload on the various PCs in the chain (the workload increases as one moves closer to the AP, the Internet connection)

[0092]overhead, signaling and control, traffic control. Define signals, method of operation

[0093]permission to access more sites on the Internet after a new PC downloads and activates Vagabee--how implemented.

[0094]reliability issues

[0095]5. System design for various configurations

[0096]The basic assumptions greatly affect the performance of the network systems which may be formed:

[0097]a PC connects to only one additional PC

[0098]a PC may connect to one or two additional PCs

[0099]a PC may connect to more than two additional PCs

[0100]6. Bandwidth control

[0101]Bandwidth request and allocation. For the various PCs in the chain.

[0102]Methods for improved channel use. How is implemented.

[0103]7. Privacy issues--how the inner/outer areas are implemented.

[0104]Protection from viruses and eavesdropping, passwords protection, etc.

[0105]Damage control, Recovery from a virus attack.

[0106]This is a vital aspect of the new technology.

[0107]8. User control and supervision

[0108]the user of a PC decides whether to install Vagabee

[0109]the user of a PC decides whether to allow additional users to connect, with what parameters (bandwidth allocation, etc.)

[0110]incentives for a user to allow his computer to connect others.

[0111]the user allows or forbids additional users, according to circumstances--how important his present activity is, what is the quality and bandwidth allocated to that user (how much spare bandwidth there is)

[0112]9. Details of implementation--software

[0113]New software

[0114]Modified existing software

[0115]Method of use of existing software, standards

[0116]10. Functions, benefits to users--detail methods to implement them

[0117]free internet connection

[0118]enhanced bandwidth, reliability

[0119]provide additional services--locate gas stations, Pizza Hut, restaurants.

BRIEF DESCRIPTION OF DRAWINGS

[0120]FIGS. 1 and 2 illustrate a wireless system for connecting mobile devices to the Internet through an access point

[0121]FIG. 3 illustrates an expanded wireless system for connecting mobile devices to the internet through more than one access point

[0122]FIG. 4 details a method for fast spreading the Vagabee software by providing free wireless access to the Internet.

[0123]FIG. 5 details the dual mode connectivity of a STA also functioning as an AP with the Vagabee method and software

[0124]FIGS. 6A to 6F detail stages in a wireless network evolvement and spreading of the Vagabee software

[0125]FIG. 7 details a method addressing control and security aspects of the Vagabee spreading method

[0126]FIG. 8 details a method addressing coordination and control aspects of the Vagabee spreading method for the first, connecting STA

[0127]FIG. 9 details multi-AP, fast configuration setting and handover aspects of the Vagabee spreading method for the second, to be connected STA

[0128]FIG. 10 details multi-AP, fast secure configuration setting and redirection aspects of the Vagabee spreading method for the first, connecting STA

[0129]FIG. 11 details multi-AP and fast configuration setting aspects of the Vagabee spreading method for the second, to be connected STA

[0130]FIG. 12 illustrates a system including mobile stations (STAs) and their Access Points (APs), with one STA moving from the coverage of one AP to the coverage of another

[0131]FIG. 13 illustrates a wireless system facilitating handover and including a STA, a Governing Node (GN) and another user, Termination Node (TN)

[0132]FIG. 14 details the handover method

[0133]FIG. 15 details a method for implementing two connections with a STA.

[0134]FIG. 16 details a method for connecting other STAs

[0135]FIG. 17 details another method for connecting other STAs

[0136]FIG. 18 details a method for configuring other STAs to directly connect to the AP

[0137]FIG. 19 details another method for configuring other STAs to directly connect to the AP

[0138]FIG. 20 details yet another method for configuring other STAs to directly connect to the AP

BEST MODE FOR CARRYING OUT THE INVENTION

[0139]A preferred embodiment of the present invention will now be described by way of example and with reference to the accompanying drawings.

[0140]Dual Use Laptop Simultaneously Connected to the Internet and Serving as AP

[0141]FIGS. 1 and 2 illustrate a wireless system for connecting mobile devices to the Internet through an access point. It may use a novel method for performing the deployment of APs, i.e., the method that allows devices to function at the same time as STAs and as APs. For example, a laptop 11 is connected to the Internet through access point AP 10, and at the same time, laptop 11 shares its connection for other STAs by operating as an AP. Thus, other STAs 12 and 13 look at laptop 11 as an AP, and can connect through it to the Internet.

[0142]When laptop 11 is connected to AP 10 through a wired connection, it can simply set its wireless connection as an AP (Infrastructure mode). However, when laptop 11 is connected to AP 10 through a wireless connection, the situation is more complex. Disclosed is a novel method in which laptop 11 can be connected to AP 10 and serve as an AP using only a single wireless network card. Laptop 11 connects to AP 10 just like any other STA, and at the same time runs the protocol stack of an AP.

[0143]Laptop 11 uses the same channel as AP 10, and transmits a beacon message such that the beacon of AP 10 and the beacon of laptop 11 are expected not to collide in time. Laptop 11 derives and updates its internal clock from AP 10, but adds a constant delay (to make his beacon appear with a delay after AP 10).

[0144]In another embodiment, laptop 11 does not add a delay to the time of AP 10, but sets the beacon period to a value, such that the greatest common denominator (GCD) between its beacon period and the beacon period of AP 10 is the smallest that is possible. Such a choice of beacon period ensures minimal collisions between the beacons.

[0145]In the preferred embodiment, laptop 11 will run a Network Address Translation (NAT) and a DHCP server as part of his protocol stack. Running DHCP enables

laptop 11 to provide an Internet address to STAs that connect to it. Running a NAT allows laptop 11 to connect other STAs through it, while keeping conformance with regards to AP 10-To AP 10 all the communication appears to be originating form laptop 11.

[0146]The software package 31 may be contained in the laptop 11, or in the laptop 11 and the STA 12, for example.

[0147]Viral Spreading

[0148]Many networks suffer from the network effect in their infancy, in which the first users have no incentive to join the network. However, the network is of great value once many users are in the network.

[0149]The following method and system attracts the first users, and provide an increasing value as the network grows. The first very few laptops with the software are installed and deployed in key areas by the network initiator. The software running on the laptop 11 has functionality 31 as follows (explained through an example):

[0150]Laptop 11 acts as an AP and allows other STAs to connect to it. To further lure STAs, the SSID (Service Set Identification--this is the name of the network that users see when looking for an available network) can be set to "Free Internet" or another name that will attract roaming laptop users to log-into it while searching for wireless networks.

[0151]Assume a user using a laptop called STA 12 connects as described above. Once STA 12 is connected to the laptop 11 (laptop 11 serves as an AP), no matter which web site the user tries to enter, the software 31 on laptop 11 forwards the connection to a special web site 30. The web site 30 informs the user (STA 12) that, in order to use the free connection, it must install a software with functionality 31. The deal is that the user is allowed the free access at this location, but it is requested to share his own connection when he has one at his disposal. The user then downloads and installs the software with functionality 31 (See FIG. 1.B which shows software with functionality 31 running on STA 12. Once laptop 11 identifies that STA 12 has functionality 31 running, it allows it a wider access to the internet (or a full access to the public Internet).

[0152]Thus STA 12, which originally did not have functionality 31 running, but its user wished to connect to the internet, ended up with functionality 31 installed and running on STA 12, and the user received a working internet connection. When the user moves STA 12 to another area in which it connects directly to an AP (which might be locked), it shares its connection with other STAs, which are also motivated to install functionality 31. Thus, functionality 31 can spread quickly among STAs, and the total area that is served grows larger, where each additional STA spreads the network further.

[0153]Laptop 11 together with its software might need to use two different security parameters at the same time--one towards AP 10 (which might be locked), and open security towards other laptops--so they can connect with no security settings. Once functionality 31 is running, it can establish a secure connection with laptop 11 as a

secure layer on top of the fundamental insecure wireless.

[0154]Connection Through Multiple Access Points

[0155]Another novel method of the present disclosure allows STA 14 to connect simultaneously through two or more APs, see FIG. 3. For example, STA 14 connects through both laptop 11 and laptop 21 to the internet. Thus, STA 14 can enjoy a more stable connection even if both connections (through laptop 11 and 21) are in borderline quality. Furthermore, even in case the connections are not in borderline quality, they can be used to provide STA 14 a broader connection to the internet, or balance his traffic such that laptop 11 and laptop 21 carry a lighter burden per laptop with regards to the extra bandwidth they carry due to STA 14.

[0156]Multiple connections also allow handovers. When a STA is moving from one place to another, it can first establish a new connection and then the old connection is terminated, practically leaving the STA connected.

[0157]When laptop 11 and laptop 21 use the same WiFi channel, STA 14 connects to both laptops by creating two protocol stacks on the MAC (Media Access Control) layer. When laptop 11 and laptop 21 operate on different channels, STA 14 agrees with laptop 11 and laptop 21 on period of times in which laptop 11 sends packets to STA 14, and periods of time in which laptop 21 sends packets to STA 14. STA 14 makes sure that these periods of times do not overlap, thus, STA 14 sets the channel according to the period, such that it listens on the channel of the laptop that might transmit to it. If the laptop has packets pending for STA 14 it queues them for transmission in the transmission period.

[0158]In order to have a faster connection through the two (or more) connections, STA 14 downloads/uploads some of the information through one connection, and the rest through the other connection. For example, when downloading a web page, STA 14 can download the text through one connection, and download the images through the other connection.

[0159]In another embodiment a remote site 50 with a fast Internet connection acts as a proxy of STA 14. Incoming and outgoing packets are forwarded between STA 14 and remote site 50. The packets are sent using error-correction codes that allow reconstructing the data even if some packets are lost on one connection, but some packets reach the destination using the other connections. The role of remote site 50 can be assumed by a service provider, by computer with a software that the user installs in his premise, or by another user with high bandwidth.

[0160]When the STA moves from one location to another, new connections are being established, while other connections are being disconnected. However, as long as there is at least one active connection, the STA will stay connected to the Internet continuously and seamlessly.

[0161]Sharing Internet Connection Between Laptops

[0162]When laptops 21 and 11 are within radio (wireless) contact (or through the mitigation of other STAs), each laptop can treat the other as another connection at his

disposal. Thus, the maximum data rate available for each laptop can be significantly extended, much like the case with a STA connected to two laptops.

[0163]FIG. 4 details a method for fast spreading the Vagabee software by providing free wireless access to the Internet. The method includes:

[0164]a. First STA transmits "AP available" WIFI info 41

[0165]b. Info is presented to Guest 42

[0166]c. Guest chooses our AP? 43

[0167]d. Allow limited access to Guest including our Web site 44

[0168]e. Guest agrees to use our service? 45

[0169]f. Download connectivity software to Guest and activate it 46

[0170]g. Connect Guest to Internet and allow wider access 47

[0171]h. Guest transmits "AP available" info and further spreads our service 48

[0172]** End of method **

[0173]Note: It is not mandatory to perform all the above stages. The more important steps are 45-47 or any similar implementation.

[0174]FIG. 5 details the dual mode connectivity of a STA also functioning as an AP with the Vagabee method and software. The method includes:

[0175]a. First STA associates with an AP as a regular STA 411

[0176]b. First STA activates "AP" protocol stack with open security 412

[0177]c. Guest chooses our AP? 42

[0178]d Address translation to connect Guest to our Website 445

[0179]** End of method **

[0180]The above method has been implemented by the present inventor on a communication device using the Intel 2200 chipset, just as an example to show that it can be done. The present inventive approach and method may be used towards similar implementations with other communication devices.

[0181]FIGS. 6A to 6F detail stages in a wireless network evolvement and spreading of the Vagabee software, including:

[0182]FIG. 6A: There is a Laptop 11 connected to the internet by wireless through the access point AP 10.

[0183]FIG. 6B: The Laptop 11 also functions as AP using the Vagabee software, thus allowing free access for STA 12 through Laptop 11.

[0184]FIG. 6C: STA 12 joined the Vagabee group, created a new AP to also connect Laptop 121. A long chain can thus be formed.

[0185]FIG. 6D: each AP can connect several new devices, as illustrated here with Laptop 122.

[0186]FIG. 6E: a multi-AP network may be configured, with a plurality of devices being connected through both AP 10 and AP 20. A device such as Laptop 122 can be simultaneously connected through more than one AP to the internet.

[0187]FIG. 6F: As the initiated device Laptop 124 moves to another location and connects to AP 24 (maybe it has a license or privileged access there, while Latop 125 and STA 126 cannot connect directly to AP 24 due to distance or lack of security parameters), the Vagabee software in device 124 opens a free AP at that location, now being utilized by Laptop 125 and STA 126 to connect to the internet. At a separate location, AP 10 may still operate and connect STA 12, Laptop 121 etc.

[0188]Security

[0189]Another important issue is the security of the system. Consider a situation (shown in FIG. 2) in which laptop 11 agrees to act as an APs, but it does not agree to allow STA 13 and STA 14 to access his inner network (i.e., it allows STA 13 and STA 14 to access the internet through his network but does not allow them to access computers in his network. For example, a private server 40 should not be accessible to them). On the other hand, STA 13 wishes to use laptop's 11 network, but might not wish laptop 11 to be able to tap into the data that STA 13 exchanges with Internet servers. The current disclosure addresses these two problems using a novel method. First, external STAs are not allowed to access to the inner network by not allowing them to access to local IP addresses. Second, STA 13's privacy is protected by tunneling its sensitive traffic to a trusted network site 50, and STA 13 accesses the internet through its tunnel to the trusted network site 50, which acts as a proxy of STA 13.

[0190]To prevent STAs from accessing the inner network, laptop 11 blocks all traffic from the guest STAs to internal addresses (i.e., addresses that appear only in local networks and not in the public internet, such as 192.168.*.*, or 10.*.*.*, and 172.16.0.0-172.31.255.255). Another method, which can be applied independently, is to allow the connection if it is at least x hops into the Internet, where x is the maximum number of hops in the local network (which can be discovered by performing a traceroute command). Another method is to allow access to addresses which have an IP address with a different prefix, as internal networks typically have the same prefix on the IP address.

[0191]In another method, laptop 11 allow only packets to and from known servers such as trusted server 50 (i.e., white listing the allowed addresses).

[0192]To protect the privacy of STA while it is surfing, its traffic can be tunneled to a trusted network site 50, which acts as its proxy. The network site can be replaced by simply tunneling the connection to another node in the network, and switching the network node once in a while. The access to the remote nodes is made without identifying the STA, but only proving that it belongs to the group of STAs, thus, its privacy is preserved. The frequent switching of remote nodes eliminates the possibility that a remote node can gather a significant amount of private information from peeking into the communication. The list of available remote nodes can be kept by a directory service, which can be distributed in a peer-to-peer fashion.

[0193]In another embodiment, the remote node is a trusted computer installed by the user. Such a configuration has the added benefit that the user can access internal nodes in his own private network, effectively having a Virtual Private Network (VPN) with his home network.

[0194]FIG. 7 details control and security aspects of the Vagabee spreading method including:

[0195]a. First STA transmits "AP available" WIFI info 41

[0196]b. Info is presented to Guest 42

[0197]c. Guest has Vagabee software? 425

[0198]d. Guest agrees to use our service? 45

[0199]e. Download connectivity software to Guest and activate it 46

[0200]f. Connect Guest to Internet and allow wider access, excluding private servers/sites 472

[0201]g. Guest transmits "AP available" info and further spreads our service 48

[0202]h. Guest uses encryption and secure website to preserve privacy from connecting STA 481

[0203]i. Establish best route for all STAs 482 adaptive to changes in network.

[0204]Load balancing.

[0205]Connections thru multiple routes.

[0206]j. Connection time>Ts? 483

[0207]k. Disconnect/change connection 485

[0208]*** End of method ***

[0209]Note: Not all the steps above are mandatory; a method may implement only part of the steps in the above method.

[0210]Maintaining Fairness

[0211]It is desirable to avoid an unfair situation in which one user exploits the network by continuously using a connection without ever sharing a connection. If many users follow these lines, the network experience will degrade as there will be only a small number of laptops connected directly to APs. A novel mechanism detects that a STA is connected to the internet by noting that the same STA (using the same laptop) connects from the same small area (or through the same AP) for a long period of time (i.e., beyond a threshold). For example, this threshold can be set to two weeks. Once a STA passes the threshold, the functionality 31 notes the user that the threshold is reached.

[0212]The user is then required to move to another area or pay a small fee to continue and access the AP.

[0213]Functionality 31 may note the user when the threshold is being approached, even before it actually reaches it. It can then give a pre-warning to the user.

[0214]The laptop is identified through his account information, through the MAC address of his network card, and other machine-specific information, such as the serial number of the hard-disk.

[0215]FIG. 8 details coordination and control aspects of the Vagabee spreading method for the first, connecting STA, including:

[0216]a. First STA connects to AP in "AP" mode 412

[0217]b. Set wireless connection as "Ad-Hoc" using the same channel as the AP 413

[0218]c. Transmit beacon message at a delay after AP or set beacon period so as to minimize collisions 415

[0219]d. Act as AP for additional STAs, while preventing them access to its inner network 416

[0220]e. Replace commercial banners for own site and also for STAs connected to this STA 417

[0221]f. Security Option: Allow connection of connected STAs only if it is at least X hops into the Internet 418

[0222]g. Maintaining fairness: demand a connected STA to disconnect or move or pay after a predefined time 419

[0223]** End of method **

[0224]FIG. 9 details multi-AP, fast configuration setting and handover aspects of the Vagabee spreading method for the second, to be connected STA, including:

[0225]a. Connect through a first AP 481

[0226]b. Activate Vagabee to provide AP service to other STAs 482

[0227]c. Search for additional paths to 483 establish multiple simultaneous connections thru multiple APs

[0228]d. Copy configuration of connecting STA, 484 to gain direct access to the initial AP, or receive connecting instructions for STAs with trusted hardware

[0229]e. Preserve privacy using tunneling 485 to a trusted network site for sensitive traffic

[0230]f. Perform handover whenever necessary 486

[0231]g. When moving to a new location: 487 establishing a connection with available AP, Activate Vagabee to provide AP service to other STAs

[0232]h. Maintaining fairness: demand a connected STA 419 to disconnect or move or pay after a predefined time

[0233]i. Control over advertisements (optional)

[0234]*** End of method **

[0235]In a novel method hereby disclosed, the functionality 31 can scan the web pages that pass through it and block or replace the advertisements on the page depending on various data such as the user name, the user location, etc. The advertisements can be performed in collaboration with the web site that is being surfed into, or without.

[0236]Note: the functionality (or software module) 31 is an important part of the present method, a minimum requirement to allow Xiopea.TM. spreading. Moreover, module 31 need not include all the possible things that this functionality can include, rather just the bare minimum directed toward allowing a connection to a STA in return to supporting the spreading of the this software.

[0237]The site 30 can instruct functionality 31 as to which advertisements should be removed or changed, and which advertisements should be placed. New advertisements can also be added in places that there were no advertisements to begin with.

[0238]The software 31 running on laptop 11 can replace the commercial banners that appear in the web pages that laptop 11 surfs into, as well as the web pages that STA 13 surfs into. The banners can be stopped, replaced, and made specially targeted to the user, for example based on his location.

[0239]Configuration of Wireless Networks

[0240]An annoying task associated with wireless networks is the configuration of a

STA to work with a network. The security settings are especially annoying, and currently, many people avoid securing their network due to the cumbersome setting procedure.

[0241]A novel method is disclosed to perform easy configuration of a wireless settings. The method is composed of two parts, the first is establishing the settings for the first device, and the second part is establishing the settings for the rest of the devices. First part: Assume a user on laptop 11 is connected to his wireless AP 10. If AP 10 is not set to use encryption, the user can ask (or be offered) to secure his network. Functionality 31 automatically accesses the interface of AP 10 and configures it with security settings. Laptop 11 is also set with the security settings. The settings are also stored in an account in web site 30, for future use. Site 30 can also provide functionality 31 with the information on how to set the security setting on the specific model of AP 10.

[0242]Second part: When the user uses another device STA 12, he connects to the network through functionality 31 on laptop 11, which redirects him to web site 30. On the site, he can log-in using his account details. Web site 30, through functionality 31 which is running on laptop 11, discovers that the two devices (laptop 11 and STA 12) are both connected through AP 10, and both belong to the same user account. As a result, web site 30 offers the user to reconfigure STA 12 to work directly with AP 10. The user is advised to download functionality 31 to STA 12, and run it. Once functionality 31 is running on STA 12, it configures STA 12 with the settings of the network (which are retrieved from web site 30, or directly from laptop 11).

[0243]FIG. 10 details multi-AP, fast secure configuration setting and redirection aspects of the Vagabee spreading method for the first, connecting STA, including:

[0244]a. First STA connects to AP in "AP" mode 412

[0245]b. Establish settings for first STA: 511 configure AP with secure settings, set STA with secure settings.

[0246]Store settings in web site.

[0247]c. Redirect a connecting STA to the web site 512 to configure it with secure settings.

[0248]** End of method **

[0249]FIG. 11 details multi-AP and fast configuration setting aspects of the Vagabee spreading method for the second, to be connected STA, including:

[0250]a. Connect through a first/available AP 481

[0251]b. STA has secure sub-system trusted by the web site? 482

[0252]c. Web site allow it to retrieve the 483 settings of the network for direct connection

[0253]d. Both STAs use the same AP 484 and same user account?

[0254]e. Agrees to connect directly to AP? 485

[0255]f. Download functionality and activate it 486

[0256]g. Configure STA with the settings of the network 487

[0257]** End of method **

[0258]Many variations can follow to the above procedure, and should be clear to those skilled in the art. For example, the settings may be stored on laptop 11 instead on web site 30, the settings may be encrypted, and the sequence of events can be changed. The result is an easy configuration of the network by the user.

[0259]FIG. 12 illustrates the mobile stations (STA) with their covering Access Points (AP), where STA 11 is moving from the coverage of AP 31 to the coverage of AP 312. STA 12 is already in the coverage of AP 312, and another AP 313 has a coverage that intersects with both the coverage of AP 31 and AP 312.

[0260]A Network Infrastructure for Other Devices

[0261]Functionality 31 may allow devices that do not have the functionality 31 to access the network. Such a device receives a capability to be identified as eligible to access the network towards functionality 31, and it identifies as eligible to access towards functionality 31 on the laptop in order to gain access to the network. Such identification may include cryptographic means, such as a digital certificate signed by an appropriate certification authority (CA) which gives the device the capability to be identified. Alternatively, the devices can be identified based on their MAC address. A username/password can be added for additional security.

[0262]Configuration of Secure Devices

[0263]It might be desirable to allow a device to directly connect to an AP, rather than connect through a laptop. When devices have a secure sub-system, i.e., a sub-system that is trusted by web site 30, web site 30 may allow it to retrieve the settings of the network (assuming that they are stored on web site 30), and configure the device to use the network.

[0264]As the device has a trusted sub-system, the settings can be stored in the sub-system, such that they do not leak outside.

[0265]Alternatively, functionality 31 can reconfigure the AP to allow access to a roaming device.

[0266]Displaying the Coverage Map

[0267]A problem often faced by users that wish to connect through wireless internet is that they cannot connect to the internet in their current location because the coverage in their area is locked, and they do not have access rights. A novel method

and system helps users find the nearest location from which they can connect. Web site 30 holds a list of all access points from which users can successfully connect, together with all the list of APs from which are closed. The list includes the MAC address of each AP. Parts or all of this list can be downloaded in advance to a device, such as into laptop 11.

[0268]Then, laptop 11 uses the beacons of the APs which might be locked to determine its position (for example, www.SkyHookWireless.com uses beacons to determine the location of a STA). Then, laptop 11 can display on a map the location of the user, and the locations of near by access point in which it can connect to the internet. The user can then go to the nearby locations and connect to the Internet. The list in site 30 can be constantly updated by information that STAs receive.

[0269]In another embodiment, the list of APs in site 30 can also hold the probability that the AP is accessible. The probability can change if the access is provided by a laptop rather than an AP, and the laptop may be present or not. An area covered by several independent APs, each with low probability, results in an area with higher probability of accessibility in the intersection of these areas. The probability of accessibility can be depicted in the map shown to the user, for example, by different colors representing the different probabilities.

[0270]It is understood that the method and system in the present disclosure may be used for the transmission of voice, data, multimedia or a combination thereof.

[0271]Gathering Physical Location

[0272]To display a map of coverage, the real-world physical location of STAs needs to be known. A novel idea is to use STAs that are equipped with both GPS (Global Positioning System) and WiFi to report back to a server (for example, web server 20), a scanning result and the physical location in which the scan was performed. The server can extract the physical location of the fixed APs and store it in a database. At a later time, when a WiFi-equipped STA that lacks a GPS receiver performs a WiFi AP scan, it can report the results to the server, which can use the database to determine the physical location of the STA. This physical location can be used to provide location-based services.

[0273]Fast Handover

[0274]A novel aspect of very fast handover is to practically almost complete the process of the handover before it even started.

[0275]Consider an example depicted in FIGS. 12 and 13, in which STA 11 is in conversation with TN 41 (TN--Termination node, the node with which STA 11 communicates, shown in FIG. 13), and STA 11 is moving from AP 31 towards AP 32. Also assume that a node GN 21 (GN--Governing Node, a node that is non-exclusively responsible for the mobility management in a certain geographic area for a given time, shown in FIG. 13) is in contact with STA 11, and it is assisting STA 11 during the handover process. STA 11 currently has an IP address, which was allocated to it by AP 31.

[0276]To complete the handover, STA 11 should be associated with AP 32, have an IP address assigned by AP 32, complete any second authentication that is required, and have TN 41 be aware of the new IP address, so it can forward the conversation to the new location.

[0277]Note that in some scenarios (in some cases when there are firewalls or NAT devices between AP 32 and TN 41, the connection between STA 11 and TN 41 must be started from within AP 32 towards TN 41).

[0278]According to prior art, it appears that STA 11 cannot begin the handover process until it reaches the coverage of AP 32, since it cannot start the connection process. One novel solution (that requires changing the software of the AP) is to allow STA 11 to perform the connection process through the Internet, instead of performing it wirelessly. In this way, once STA 11 reaches radio connection with AP 32, it can start working immediately.

[0279]However, we are more interested in solutions where there is no need to change the AP. To achieve this goal, assume the existence of a non-moving STA 12 in the coverage of AP 32 (we will somewhat soften this assumption later). According to the present invention STA 12 is in contact with ON 21, and receives instructions to impersonate STA 11 towards AP 32 (we will later discuss how to make it possible), and complete a connection process with AP 32 on behalf of STA 11 (including authentication, association, receiving an IP address, performing any second authentication/log-in procedure, and perhaps even opening connections or "punching holes" in the firewall).

[0280]Then, STA 12 communicates these parameters to GN 21 (once the parameters are communicated, STA 12 can return to its real identity). GN 21 communicates the parameters to STA 11 (and perhaps to TN 41), and thus, STA 11 does no longer need to perform the connection process, and once it reaches the perimeter of the coverage (we will later discuss how to identify this situation) it can immediately use the new parameters and continue communications without any delay. STA 11 (or GN 21) can alert TN 41 before the handover, so it can start and send information packets to the new location.

[0281]TN 41 may send the information in parallel to the old and the new location, and cease transmitting to the old location once the handover is complete (e.g., when it receives information from STA 11 with its address from the new AP). STA 12 may even open a TCP (Transmission Control Protocol, as used in the Internet) connection or send a UDP (User Datagram Protocol) packet on behalf of STA 11, if required.

[0282]This connection may wait for STA 11 until it reaches AP 32. If there is a timeout on these connections (either due to protocol, or due to firewalls), STA 12 or other bypassing STAs can send and receive -keep-alive- messages on behalf of STA 11 (as is instructed by GN 21). The timeout for each AP can be discovered over time by trial and error (or by discovering the APs type), and storing this information in GN 21 for future use. ON 21 can notify the STAs on the value of the timeout.

[0283]How STA 12 can impersonate STA 11:

[0284]To understand how STA 12 can impersonate STA 11 towards AP 32, we must understand how identity is established in the network. The basic identity in the network is the physical address which is known as MAC Address (Media Access Control Address), which is globally unique. Each manufacturer is allocated a portion of the address space and allocates a unique MAC address to every network card (including WiFi network card) that it manufactures. Then, the manufacturer burns the allocated address into the network card. However, in most network cards, an application can (temporarily) change the MAC address of the card to another MAC address.

[0285]The MAC address is not used for end-to-end communications over the internet, but usually only for communications within the same physical network. For example, STA 12 communicates with AP 32 using MAC address, but GN 21 is not usually aware of the MAC address of STA 12. The MAC address is universally unique. We use the feature of temporarily changing the MAC address in the network cards in a novel way, allowing STA 12 to impersonate STA 11.

[0286]Therefore, in the instructions that GN 21 gives to STA 12, it mentions the MAC address of STA 11, so STA 12 can assume the MAC identity of STA 11. Then, STA 12 can complete the association with AP 32 (using the MAC address of STA 11)), in which it receives the Association ID (AID), and completes a DHCP protocol in which it receives an IP address to be used with the MAC of STA 11 while it is using AP 32. STA 12 can also perform a second authentication and log-in on behalf of STA 11.

[0287]STA 12 sends the connection information back to GN 21, which forwards it to STA 11. STA 12 can return to its original MAC address, but the allocated resources at AP 32 remain allocated, as from the point of view of AP 32, STA 11 is already connected and in coverage. In order to avoid losing messages that are sent to STA 12 during its impersonation to STA 11, it can either continue and listen using both its own MAC address and STA 11's MAC address, or it can issue a -power-save- mode command to its serving AP. The power save mode indicates the AP that the STA is sleeping for a while, in which time the AP is buffering the incoming data packets. Therefore, even if STA 12 is connected to the internet using another AP, it can issue a power-save mode command, possibly change the frequency, and perform the connection on behalf of STA 12. It can return to its serving AP once the connection is established, or pool for incoming messages once in a while.

[0288]First Softening of the Assumption that STA 12 is in the coverage of AP 32: What if STA 12 is not in the coverage of AP 32, and there is no other station in AP 32's coverage--The following process can be performed in advance, well before a handover is needed. GN 21 can ask (in advance) stations that pass through AP 32 to connect and receive an IP address from AP 32 using some MAC address. The MAC address is not necessarily the MAC address of STA 11, as the process is not specific to STA 11. The stations send the connection details to GN 21, which stores the AID, the MAC, the IP address and other connections details in a pool for future use.

[0289]The pool may even contain UDP or TCP connections, which may be kept alive by bypassing STAs (against timeouts of firewalls, Network Address Translator devices (NAT), and protocol timeouts). UDP and TCP connections in the pool are

targeted to some node in the network that can forward information for other nodes (for example TN 41). When a connection is required by some STA, the pool is queried, and a resource can be allocated and applied by a STA. As a result, a station might change its MAC address and IP address every time it moves between APs. If the station moves very fast between these access points, GN 21 can predict the direction in which the station is moving based on past movements, inform TN 41 of the possible future addresses.

[0290]Using this method, TN 41 can send data to the new address even before the station actually moved there. In some implementations of the APs and firewalls between AP 32 and TN 41 the STA must first send data before it can receive any data, otherwise, the firewall may block the incoming data, or a NAT (Network Address Translator) device might not know where to forward the data. The restriction, that the STA must be the first to send data, is usually required due to security policy that allows only outgoing connections, or due to NAT device that need to relate an internal IP address and port number with an external IP address and port number.

[0291]For example, in most NAT implementations a connection must be established from within the NATed zone (e.g., the AP coverage) towards the internet. Many firewalls also require that the connection is established from the private network towards the internet (rather than allowing incoming connections from the internet towards the private networks). In these cases, the data that TN 41 sends is not transmitted by AP 32 until the station reaches the access point and transmits information back to TN 41. Depending on the type of firewalls and NAT devices, TN 41 might be able to predict a port number to which it should send such messages before the first outgoing data packet is transmitted.

[0292]Another associated novel disclosure is that the same MAC address and IP address can actually be used by more than one STA. The differentiation between the STAs can be performed by using higher protocol identities such as different ports (for example TCP ports). Using the same MAC and IP address in more than one STA is not problematic for packets that are sent from the STA.

[0293]However, while receiving an incoming packet, only one STA should send an acknowledgement. As each STA knows the ports that are in use, it only acknowledges messages that are designated to it. GN 21 can coordinate between the STAs such that they do not use the same ports. For example, if there are at most n stations using the same MAC and IP address, station i will allocate port numbers that are equal to i modulo n. Another solution is to choose the port number at random. If each STA uses one port at random, according to the birthday paradox, port collisions occur with very low probability as long as the number of connections is smaller than about the square root of 65536 (i.e., when there are less than 256 connections using the same IP).

[0294]Another idea is to change the software at the AP such that it can communicate with GN 21 and perform the connection procedure on behalf of STA 11.

[0295]Knowing who are the adjacent APs and the location of a STA:

[0296]It is useful for a station STA 11 to know the identity of the adjacent APs that the station might hand over to. The identity of an AP can be established in several

ways: The SSID (Service Set ID) of the AP is usually broadcasted by the AP using periodical transmissions known as beacon. However, two adjacent AP may have the same SSID. In such a case, the MAC address of each AP is different, and APs can be differentiated based on their MAC address. Some APs do not transmit their SSID, but they still broadcast beacon messages with their MAC address. Even if the AP is locked and encrypted the MAC address is transmitted, and it is transmitted without any encryption. In this way, STA 11 can know the identity of adjacent APs, and infer its location.

[0297]Scanning by Idle STAs:

[0298]In a preferred embodiment, GN 21 collects information about APs which are adjacent. Idle stations (i.e. stations which are not in an intensive data transfer) can perform a scanning operation once in a while. As a result they learn the MAC address (and possibly the SSIDs) of the APs within radio reach. The STAs can then send this information to GN 21 which collects it. The idle STAs can also perform tests to check what is the accessibility parameters of an AP (e.g., is it an open and free AP, is it a locked AP and the password is available from GN 21, is it locked and there is no free access to the AP, is there a captive portal, does GN 21 have a username/password available for the captive portal, etc.). All this discovered information is sent to GN 21.

[0299]When handovers are performed, GN 21 takes note of the sequence of handovers that occur, and can learn common paths which are taken (for example, a road or a crosswalk might cause more likely paths than others).

[0300]It is very important that GN 21 knows in advance the AP to which STA 11 will be handed over to and when the handover will occur. Such a knowledge allows, for example, to alert TN 41 of the new location in advance. Gaining accuracy in the prediction of the handover (when and where) translates to better performance, as GN 21 needs to allocate a MAC address and an IP address to STA 11 in the new AP, and TN 41 might start to send data to the new location.

[0301]Therefore, knowing who the neighboring APs are, and their reception quality at STA 11 is very important.

[0302]Scanning by a Non-Idle STA

[0303]In principle, STA 11 can scan the surroundings once in a while and look for the beacons of adjacent APs, and thus measure the reception quality from each AP. However, such a scanning takes a lot of time (might even take couple of seconds for a full scan). Selective scanning for APs which are expected to be neighbors can reduce the scanning time, but it can still stay in the magnitude of a few hundred milliseconds. It is important to understand that during a contemporary scanning using current technology, STA 11 cannot receive or send messages from or to AP 31, which means that the scanning time must be reduced to reduce this disconnection time.

[0304]The novel disclosed method is that STA 11 will selectively scan for a neighboring AP in the following special way. Assume that STA 11 scans to see if it can receive the beacon of AP 33, where the scanning is performed exactly when the

AP 33 is expected to transmit its beacon. Therefore, the disconnection from AP 31 will be minimal. The problem is, however, that although the beacons are transmitted periodically, STA 11 does not know when a beacon is expected to be transmitted from AP 33. As the beacons are transmitted about every 102.4 ms (milliseconds); (many variations are possible), STA 11 might be forced to wait on average 51.2 ms, which is a prohibitively long time to wait.

[0305]STA 11 may also transmit a Probe message to force a beacon to be sent especially for it--but a probe message requires a transmission that has implication on battery life. Furthermore, for the purpose of location finding, STA 11 might wish to be able to receive beacons of APs that will not answer the probe (due to range, policies, etc.)

[0306]We can safely assume that other STAs visited the area of AP 33 before STA 11, and that they have reported the rate of the beacons of AP 33 (e.g., a beacon every 102.4 ms). A problem that remains is that the beacons are scheduled according to the internal clock of AP 33, which might tick at a different rate than other clocks (and clocks tend to tick at different rates). Moreover, the clock of the visiting STAs is probably not exactly synchronized with the clock of STA 11, which makes the process inaccurate.

[0307]That is, even if STA 11 knows that at a specific time according to some STA's internal clock a beacon was transmitted, STA 11 will not know how to translate this information to his clock, as the clocks are probably not synchronized to such great accuracy (network time synchronization services such as the network time protocol (NTP) cannot be more accurate than a couple of tens of milliseconds, where in this case we need an accuracy of around one millisecond). The following novel method allows accuracy of microseconds.

[0308]The novel approach for time synchronization is to rely on a relatively accurate clock already available to STA 11: The 802.11 standard requires each AP to transmit in its beacon its clock (referred to in the 802.11 standard as timestamp). This clock must be the internal clock of the AP at the time of transmission in units of microseconds. Therefore, STAs can specify the value of the clock of AP 33 in terms of the value of the clock at the adjacent AP 31.

[0309]By measuring the timestamp of AP 31 and AP 33 at two different times T311 and T312 (based on the clock of AP 31), in which the time value of AP 33 T331 and T332, respectively, it can be established with reasonable accuracy that AP 33 clock ticks approximately r33/31=(T332-T331)/(T312-T311) times for every clock tick of AP 31. At time T313 in the future, the clock of AP 33 can be estimated as T333=T332+(r33/31)(T313-T312). Similarly, at time T334 the clock of AP 31 can be estimated as T314=T312+(1/r33/31)(T334-T332).

[0310]Beacons are scheduled to transmission when the clock of the AP modulo the beacon interval is zero, where the beacon interval is measured in microseconds according to the clock of the AP, it is fixed for an AP, and the value of the beacon interval is transmitted in the beacon. Therefore, GN 21 stores the relation r33/31 together with T332 and T312 and the beacon interval of AP 33 and AP 31, and reports it to STA 11 such that it can extrapolate the time at AP 33 and infer the time of the

beacon transmission.

[0311]Once STA 11 succeeds in receiving a beacon from AP 33 it can report the times to GN 21, so that GN 21 can keep its time tracking accurate. Furthermore, the scanning allows GN 21 and STA 11 to make the best handover decisions based on the knowledge of the approximate location of STA 11 with respect to the neighboring APs.

[0312]A technical problem to be solved is that a STA can know the value T311 but cannot measure the value of T331 at exactly the same time of T311 as these values are carried on the beacons of APs, which are transmitted at different times.

[0313]A solution is to measure the time of AP 33 T331' at a time close to T331, and note the time difference between the two measurements according to the STA's internal timer. As the measurements are very close to each other, the clock drift between the STA's timer and AP 33's timer is negligible, and we can estimate that T331=T331'+timediff, where timediff is the time difference between the measurements of T331 and T331' according to the timer of the STA. If there is a large clock drift after all (although it is not expected), it can be corrected by calculating the r value between the clock at AP 33 and the STA in a similar way to the way done for APs.

[0314]The location of STA 11 can be deduced from the reception quality, the reception strength and the identity of the neighboring APs. This location information can be taken into account while performing handover decisions, as well as for location based services or for other network applications.

[0315]It should also be noted that in Frequency Hopping, knowing the time of the AP has another special importance, as the frequency that the AP works in might depend on the time.

[0316]FIG. 14 details a preferred embodiment of the handover method, including:

[0317]a. STA prepares in advance for a handover: 541

[0318]Assisted by another STA (or STAs)

[0319]Optional: use the same MAC and IP addresses in more than one STA

[0320]Learn the identity of adjacent APs

[0321]Measure beacon strength from other APs

[0322]b. GN supports handover: 542

[0323]GN keeps a pool of MAC and IP addresses

[0324]GN sends the addresses to STA just before it enters the AP

[0325]c. STA reduces the number of Location Updates 543 by only updating when

changing location area

[0326]d. GN transmits a pseudo-beacon including 544 MAC address, IP address, port number

[0327]e. Easy security configuration: 545

[0328]The AP of the customer is not changed

[0329]Establish secure channel with STA and Copy security information, or

[0330]Connect the STA initially by wire

[0331]f. Gain access to locked networks 546 by joining the Vagabee service

[0332]g. Maintain simultaneous communication with 547 more than one AP.

[0333]Update net configuration responsive to changing circumstances

[0334]** End of method **

[0335]FIG. 15 details a method for implementing two connections with a STA. The method includes:

[0336]a. Load BSS firmware to the NIC 415

[0337]b. Associate with AP using a first SSID 416

[0338]c. Load IBSS firmware to the NIC, but do not perform 417 dissociation from AP before loading the IBSS

[0339]d. Create an ad-hoe network using a second SSID 418

[0340]e. Communicate with AP and STA that connect to 419 the second SSID

[0341]** End of method **

[0342]FIG. 16 details a method for connecting other STAs, including:

[0343]a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0344]b. Allow other STAs to connect to the Internet by 492 allowing them to connect to the second SSID.

[0345]The first STA decrypts and encrypts data packets as needed based on the security parameters of the first and second SSID (or APs), and performs address translations and forward packets between the second and first SSID to facilitate this connection for other STAs.

[0346]** End of method **

[0347]FIG. 17 details another method for connecting other STAs, including:

[0348]a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0349]b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID. The limited access includes the ability to download a software that implements the current method.

[0350]The first STA decrypts and encrypts data packets as needed based on the security parameters of the first and second SSID (or APs), and performs address translations and forward packets between the second and first SSID to facilitate this limited connection for other STAs.

[0351]c. When the first STA detects that another STA 493 has a software (which implements the current method) installed, the first STA allows the other STA a wider access to the Internet.

[0352]** End of method **

[0353]FIG. 18 details a method for configuring other STAs to directly connect to the AP, including:

[0354]a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0355]b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID.

[0356]The limited access includes the ability to request an ability to access the first SSID directly, i.e. not through the second SSID and the first STA.

[0357]c. The first STA decrypts and encrypts data packets as needed based on the security parameters of the first and second SSID (or APs), and performs address translations and forward packets between the second and first SSID to facilitate this limited connection for other STAs.

[0358]d. Another STA requests an ability for direct access to 494 the first SSID

[0359]e. First STA prompts user: To 495 allow this access?

[0360]f. Security access parameters to access the first SSID are copied 496 from the first STA to the other STA

[0361]g. The other STA can access the first SSID directly 497

[0362]** End of method **

[0363]FIG. 19 details another method for configuring other STAs to directly connect to the AP, including:

[0364]a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0365]b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID.

[0366]c. First STA's user can view a list of 498 connected STAs and can choose to allow access directly through the first SSID to a chosen other STA

[0367]d. Security access parameters to access the first SSID are copied 496 from the first STA to the other STA

[0368]e. The other STA can access the first SSID directly 497

[0369]** End of method **

[0370]FIG. 20 details yet another method for configuring other STAs to directly connect to the AP, including:

[0371]a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0372]b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID.

[0373]c. Security access parameters to access the first SSID are copied 496 to the other STA

[0374]d. The other STA can access the first SSID directly 497

[0375]** End of method **

[0376]Preventing Exhaustion of Resources at the AP

[0377]As discussed in the "Background" section, each AP has a limited number of Association IDs (AID) and usually, even a smaller pool of IP addresses (available through DHCP). Once this number of resources is exhausted, the AP might not be able to serve new STAs. A situation where IP addresses are exhausted can happen very quickly: for example, consider an AP in a very busy location, where there are many STAs that connect to the AP only for a short period of time. Each STA performs the connection process and obtains an IP address using DHCP, but as it disconnects it might not release the IP address.

[0378]The pool of IP addresses in an unmanaged AP is usually limited to about 200 addresses, with many consumer APs supporting only tens of addresses. A device is assigned the IP address for a given period of time (known as the lease time). Many times, the lease time is set in a magnitude of days (although the granularity is

seconds), and in many other instances the lease time is set to a magnitude of hours. In such a situation the pool of IP addresses runs empty very fast.

[0379]However, in this disclosure for fast handovers, GN 21 keeps a pool of MAC addresses with associated IP address. Just before a STA enters the AP, GN 21 can send it a MAC address and an IP address that are already associated with the AP. Therefore, the STA can connect even if the AP has no resources left for new STAs. Combined with the above disclosure that allows several STAs to share the same MAC address and IP address, an AP can serve more APs than its IP resources, even above its limit on the number of associated STAs.

[0380]Saving Battery Power by Reducing Location Updates

[0381]A novel disclosure of this invention is a method to reduce the number of location updates that are needed in WiFi, when a STA is idle. A location update is the process in which a STA informs an entity in the network of the current location of the STA (the notification can take many forms, including opening a TCP connection, or sending UDP packets). In prior art for WiFi networks (with for example mobile IP, or SIP--Session Initiation Protocol), a location update is required whenever the IP address of the STA changes (for example, when moving between APs of different subnets)--even if the STA is idle.

[0382]The novel method allows defining a location area for WiFi, such that a STA needs to perform location update only when it moves between APs that belong to different location areas, but does not need to perform location update when it moves between APs of the same location area as long as it's idle.

[0383]We assume that the APs are divided into location areas, and for each location area there is a node in the network that is in charge of this location area. For example, assume GN 21 is in charge of a location area composed of AP 31, AP 32, and AP 33.

[0384]How does a STA know which AP belongs to the location area--Either GN 21 gives it a list of all the APs that belong to the location area, or GN 21 transmits a pseudo-beacon in each AP.

[0385]A pseudo-beacon is a novel disclosure of this invention. It is a message that GN 21 can periodically transmit in each AP. While some APs might permit a remote node to transmit a message in the AP, other APs might not allow it. In the novel method, a certain MAC address, IP address, and possibly port are allocated in each AP for the purpose of pseudo-beacon transmission. GN 21 asks some STA to open a connection using these resources to GN 21, and GN 21 sends the pseudo-beacon messages using this transmission. Each pseudo-beacon contains the parameters needed to listen to the pseudo-beacons in the adjacent APs. A STA that lacks these parameters can contact GN 21 and receive them.

[0386]From that moment on, the STA can move between APs in the same location area, and receive the parameters that are needed to listen to the pseudo-beacon from other pseudo beacons. For example, assume that STA 11 is located in AP 31 and is moving to AP 32. STA 11 listens to the pseudo-beacon at AP 31, and from the pseudo-beacon learns the parameters that are needed to listen to the pseudo-beacon of

AP 32. Thus, STA 11 can move to AP 32 without any transmission.

[0387]Which STAs of the stations in AP 31 should acknowledge the pseudo-beacon--Preferably, none. However, some firewalls require minimum rate of outgoing packets to maintain an open connection. In such a case, once in a while GN 21 sends on the pseudo-beacon a message that asks any station to send an acknowledgement with some probability p. The probability that GN 21 states should be accommodated to the expected number of stations in AP 31 (GN 21 might not exactly know how many STAs are in the AP). If no STA acknowledges the pseudo-beacon for over the needed time, and the timeout of firewalls stop the incoming messages, then no pseudo-beacons are transmitted. In this case, a roaming STA will contact GN 21 after a certain period of time of probing for the pseudo-beacon has passed (and no pseudo-beacon is seen). GN 21 can request the STA to reopen the connection for the pseudo-beacon transmission.

[0388]If the STA is in a session with TN 41 with many packets received (e.g., above a certain threshold), it is considered non-idle (which we also refer to as "In conversation") and is treated as described above in "Fast handover".

[0389]However, assume that STA 11 is in idle mode (e.g., incoming packets below a threshold), it can move between APs of the same location area without performing location update. When a node TN 41 wishes to send data to STA 11, STA 11 should change its state from idle to in conversation. TN 41 contacts GN 21 (TN 41 might be forwarded to GN 21 through a system such as dynamic DNS (Directory Name Service) or another method, such as a Distributed Hash Table--DHT, or a peer-to-peer network).

[0390]GN 21 sends a paging message for STA 11 on the pseudo-beacon of all the APs in the location area. As STA 11 listens to one of the pseudo-beacons, STA 11 will receive the paging message. Then, STA 11 responds preferably to GN 21 (or to TN 41, depending on what is written in the paging message) by initiating an outgoing connection as described below. It should be noted that GN 21 can first page for STA 11 in the APs that have a higher chance covering STA 11, and the paging can repeat several times until STA 11 replies.

[0391]When a STA is required to initiate an outgoing connection it can use a resource (MAC, IP, or TCP/UDP with port, user/password) that is listed as available on the pseudo-beacon or on the paging message, or it can request its own resources from the AP. If two (or more) STAs use the same resources for a connection at the same time, GN 21 will detect it, and in the acknowledge message (or second message of the TCP handshake) will announce the identity of the STA that it answers to. The other STA is required to initiate an outgoing connection again. Once a connection with GN 21 is established, GN 21 can allocate resources to the STA such that it moves to be in conversation status. One of the resources that are allocated is GN 21 attention to accompany the STA as it might need to perform handover to another AP.

[0392]It should be noted that the location areas can overlap, meaning a single AP can belong to more than one location area. Upon the policy of the network, STA 11 might be required to perform location update when it reaches such a APs, or it may just give helpful information. If possible, a STA might prefer to park on an AP that is within

the same location area as its current AP, such that a location update is avoided.

[0393]It should also be noted that there is a tradeoff between the overhead that is spent during paging and establishing the connection, and the overhead that is being spent to keep a steady connection for each AP. The optimal point on the tradeoff depends on the rate that the AP switches APs as well as on the number of packets it receives and sends.

[0394]Easy Configuration of STA

[0395]When purchasing a new STA, it is required to configure the STA with the security settings of the existing network (in case the network is secure). If the network is not secure, the new owner usually only needs to select his network from the list of available networks that is received by the wireless network card.

[0396]Configuring the security might be a tedious job, as the security (authentication/encryption) code might be very long as known in the art, which the user might need to punch in. A novel solution for easy configuration is disclosed. Unlike previous solutions, the novel method does not require changing the existing AP of the customer. In one embodiment, software is run on a personal computer of the user (that is already configured to access the WiFi). Then, the software establishes a secure channel with the STA, and copies the security information from the personal computer to the STA. In this way, the STA learns the security parameters.

[0397]In another embodiment, the customer first connects the STA by wire to its network (or alternatively, the STA first connects using a connection it establishes through an already connected device, such as a personal computer). As the STA can receive and transmit signals on the wireless network and it is connected to the internet (through the other connection) at the same time, it tries to locate the web configuration of the AP on the wired network (most APs have a web interface). In most cases, it is an easy job for the STA, as either the STA can locate the AP as it is the default gateway of the wired network, or it can try to find its IP by performing RARP (Reverse Address Resolution Protocol) using the wireless MAC address of the AP (which it can see off-the-air).

[0398]If none succeeds the STA can perform exhaustive search on commonly used IP addresses, or on very probable addresses, like all the IP addresses of the same subnet. Once the AP web interface is found, the STA tries to log into the AP. It can guess the default address or find it on a database that can be built on the web, with common default passwords for each manufacturer (the manufacturer and model will be usually sent by the AP during the web login process, or can be found out using the MAC address, which is unique per manufacturer). If the password for the AP cannot be guessed, the user is prompted for its password to complete the log-in. Then, the STA navigates to the security settings page and retrieves the password needed for the wireless network.

[0399]In the event that the procedure fails, the user is prompted for the security settings (which would happen without using the above method). For most common users and setups, the method succeeds (and for unsophisticated customers, who do not change the passwords--it succeeds in the majority of the cases). Thus, in the majority

of cases, the setup is made much simpler.

[0400]Once the STA has access to the setup of the AP, it can (with permission from the user), open holes or forward certain port to some IP address. This IP address and port can serve as way that GN 21 can send and broadcast the pseudo-beacon, without a STA first opening a connection from the AP, and without worrying about timeouts (provided that there are no other firewall between the AP and GN 21). Opened ports can also help during the fast handover, such that TN 41 can directly send packets to the new location without a need for STA 12 to open the connection.

[0401]In corporate settings, the company can set a special server which gives the configuration to the phone, over the network.

[0402]Gaining Access to Locked Networks

[0403]While performing the above easy setup (or at any other time), the user is prompted if he wishes to join a swapping service. The swapping service allows the user to gain access to many locked networks (the locked networks of the other users that joined the swapping service), in return that he allows users to use his network for the purpose of connecting to the Internet. If the user agrees, the access parameters to his network (encryption key, MAC address, default gateway, etc.) are securely stored in the network (for example in GN 21, and a backup server). The security information is securely sent directly into the hardware (or network card) of other STAs, when they need to connect using his AP.

[0404]As the security parameters are sent directly to the STA's network hardware, it can make sure that the communication that is established is designated outside the user's network, and will not jeopardize the computers on the user's network. Furthermore, GN 21 can monitor the amount of bandwidth that is consumed by visiting users, and to make sure their hardware limits the amount of used bandwidth such that the user does not experience a degradation of quality of his connection. Alternatively, the security information can be sent to the other STAs using other security measures, as known in the art.

[0405]In many scenarios it is enough to trust the software that runs on the STA to make sure all communications are targeted outside the user's network, such that it does not jeopardize the computers on the user's network, and limit bandwidth used by the STA.

[0406]The secrecy of the security parameters (such as the encryption key) can be cryptographically protected while on transit and storage, as known in the art.

[0407]Some APs limit the access of the subscribers by making sure that only specific MAC addresses connect to the network. As our methods as described above allow to use the same MAC address for several users, this specific MAC address can be used when using the network that restricts the use with specific MAC address.

[0408]In case a STA tries to connect to an AP with a captive portal, a special application on the STA is running and performs the authentication and log-in automatically. GN 21 can store typical portal appearances, such that it can guide the

STA on how to perform the authentication/log-in process. If the STA comes across a captive portal which is unknown or unexpected, it can locally store the web pages that it received from the captive portal and later transfer them to GN 21. GN 21 accumulates the reports and guides STAs how to log-in to the captive portal in the future. As part of the swapping service, GN 21 can store username/passwords to enable connection through the captive portal automatically.

[0409]Special Care for Data

[0410]The above description works well for both voice and data. TN 41 might be a mobile node as well, or a fixed node in the network. The transferred information between STA 11 and ON 21 can be voice, data, or their combination.

[0411]In case STA 11 wishes to communicate with a node that is not aware of the novel network, it can do so through a node that is aware of the network. For example, TN 41 can serve as a proxy for STA 11 (in a similar way to mobile IP). The node that is not aware of the network communicates with TN 41. TN 41 forward the information to STA 11. TN 41 can allocate an IP address (perhaps using NAT, or allocate ports using its own IP address) that will serve STA 11.

[0412]To balance the communication load, STA 11 can have several network nodes such as TN 41, TN 42 (not shown), etc, to be its proxies in parallel. In fact, the resulting connection between STA 11 and TN 41 can be seen as a layer 2 (MAC) connection, on top of which the communication is performed. In this setup, TN 41 serves as the default gateway of STA 11, and optionally can run a DHCP server and a NAT server.

[0413]Executing the Invention Over a Peer-to-Peer Network

[0414]Another novel aspect of the above novel methods takes advantage of the fact that the wireless network is local in nature, as the APs are geographically adjacent. The system and method as described in this disclosure allows GN 21 to be responsible over a small geographical area with little interaction with its neighbors. As a result, the methods that are disclosed can be implemented by many small devices forming a peer-to-peer network that implements the methods, without the need to rely heavily on large servers.

[0415]Many nodes GN 21, GN 22 (not shown), can each control a group of APs. To make the system grow "automatically", it is possible to give users a "base" that will act as their point of presence in the network. For example, the base can assume the role of TN 41 as a Mobile IP proxy. The base can connect to the wired network at the premises of the customer. Some bases will assume the role of a GN, where the GNs can be managed by either a network control center, or through peer-to-peer protocols.

[0416]In early stages of deployment of the system, when there is still a small number of GNs, each GN might need to cover a large number APs. A general server can back-up all information that the GNs hold. To avoid the situation, where a single GN needs to cover a huge number of APs with pseudo-beacons, the system might not use the pseudo-beacon mechanism (although, it should be noted that with moderate computing power and network resources, a GN might be able to cover a few

thousands of APs). In the worst case scenario of a peer-to-peer network, there is one base (GN) for each STA, and this GN act as the GN for the APs in the proximity of the STA.

[0417]When the STA moves, the coverage area in the responsibility of the GN moves with it. In this case, the GN can fetch information on neighboring APs from the general server. When GN abandons an AP, it can store the information it gathered about it in the general server, for later use by possibly other GNs. In a system which is not based on many small GNs, a large GN can assume the role of the smaller GNs.

[0418]It should be noted that it takes some time to gather the information on the APs (such as timing, default gateways, etc). However, once a single STA passes in an area, it obtains the needed information. This information is later stored in the GNs and general server, for the benefit of all STAs in the future.

[0419]If a STA needs to handover into an AP which has no STAs currently in it, it might not have the needed resources pre-allocated (such as an associated MAC address and IP address), and might therefore need to gain it by itself. However, in many cases the STA can obtain resources at one pass in the area, and these resources (such as IP address) will stay for the next pass in the area (which can be hours later).

[0420]An Alternate Fast Method for Connecting to an AP--Removing the Assumption on the Existence of STA 12 in the Coverage of the New AP

[0421]A possible drawback of the above method of fast handover is that it requires that the pool of resources that GN 21 holds should contain a valid IP address of the AP that STA is handing over to. If the DHCP lease time is long enough, having a valid IP might not be a problem, but on short lease times with only a few STAs roaming it is desirable to perform handovers even if there is no valid IP available in the pool. Unfortunately, a typical execution of the DHCP protocol can take several seconds to complete, which might be too long for a fast handover. Interestingly, we observe that many APs will forward information even if the IP that is being used was not allocated by DHCP.

[0422]Therefore, we disclose the following method:

[0423]Choose a MAC and associate it with the AP (or use an Associated MAC without an associated IP address), choose a random (but valid) IP address, and use it.

[0424]The STA must use the correct default gateway settings of the AP (these settings can be stored in GN 21). If the STA wishes to use DNS, it must have the DNS settings of the AP (which can be received from GN 21), or DNS services are provided through GN 21.

[0425]Choosing a valid IP at random results in a very low probability of colliding with another IP address that is used in the AP. Note, however, that the STA still needs to authenticate/log-in through the captive portal in case such portal exists.

[0426]Another method that can be used to quickly obtain an IP address, such that the IP address is not already allocated by the DHCP of the AP is disclosed. Most DHCP

implementations of AP send an ICMP (Internet Control Message Protocol) Echo Request (ping) before allocating an IP address, to make sure that it is unused. Therefore, STA can begin the DHCP protocol, then, wait for the ICMP echo request that the AP sends, and understand the IP that is going to be allocated to it.

[0427]Therefore, a STA can start using the IP address and respond to the ICMP echo request. It can then prematurely terminate the DHCP protocol (as it already got an IP). Alternatively, STA can use the IP address from the ICMP echo request without responding to it, and complete the DHCP process. If the IP address that is allocated during the DHCP is identical to the IP address (vast majority of cases), then STA simply saved time. Otherwise, it can move from the IP address of the ICMP echo request to the IP address that was allocated.

[0428]If no connection to GN 21 is available, the default gateway address can be guessed, as in the majority of the cases the default gateway address is one out of only a few addresses. Common addresses are: 192.168.1.1, 192.168.2.1, 10.0.0.1, etc.

[0429]Moreover, the default gateway is usually the AP itself. Its MAC address is known (as it is broadcasted in the beacon). Therefore, in most cases it is enough to forward packets to this MAC address (without knowing its IP address).

[0430]A STA with a Capability to Connect on Two Channels in Parallel

[0431]The present application discloses a STA which has a capability of communicating in two or more channels in parallel (for example, by using two wireless network cards). This capability can enable a STA to be connected to two APs in parallel without the need to implement sophisticated mechanisms that actually simulate this situation. Thus, a STA can connect with future AP while maintaining a connection through its serving APs. Being connected to two or more APs simultaneously allows greater bandwidth by utilizing two connections instead of one, and the performance of soft-handovers, i.e., the STA stays connected through one AP, while disconnecting from the second AP in the process of handover.

[0432]Fast Uploading of Digital Camera Pictures

[0433]Digital cameras might be equipped with WiFi. The owner of such a camera would like to upload his pictures from the camera to a server that stores the pictures on the Internet--the reasons for this may vary from being able to share the photos while on vacation with family members left at home, back up the pictures from the digital camera to the Internet server, or simply because the memory card on the camera is running out of space. A major problem is that to upload the pictures to the Internet may take a very long time, as pictures consume megabytes to store.

[0434]Solution: The camera sends the photos to a laptop over WiFi (this connection is very fast), then disconnects and the camera's user may move on. Then, the laptop uploads the pictures to the Internet server (this process can take a long time as it involves uploading a lot of data), but the laptop owner would not feel it as a burden, since the pictures can be uploaded when his Internet connection is not used for other purposes.

[0435]Method for Uploading Data Files

[0436]In a system with means for providing a wireless Internet connection to WiFi-enabled devices (STAs), a method for fast uploading of information from STAs to the Internet, comprises:

[0437]a. a first STA, such as a laptop computer, connects to the Internet;

[0438]b. a second STA, such as a camera, wirelessly connects to the first STA, and uploads the information using the fast and direct-wireless connection between the STAs;

[0439]c. The first STA temporarily stores the information;

[0440]d. The first STA uploads the information to the Internet through its backhaul.

[0441]** End of method **

[0442]Notes:

[0443]1. In the above method, the first STA may include for example a laptop or a personal computer, the second STA may include a digital camera or a digital video camera, and the information may include digital pictures or digital clips.

[0444]2. The second STA preferably disconnects from the first STA after completing to upload the information to the first STA, but before the first STA completes the upload of information to the Internet; the first STA completes the upload of information from its temporary storage.

[0445]3. An additional step in the above method may include the following:

[0446]e. at a later time, the second STA connects to the Internet and verifies that the information was uploaded correctly.

[0447]4. The information may be encrypted by the second STA before being transmitted.

[0448]It will be recognized that the foregoing is but one example of an apparatus and method within the scope of the present invention and that various modifications will occur to those skilled in the art upon reading the disclosure set forth hereinbefore.

* * * * *

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(12) **Patent Application Publication**

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(54) **WIRELESS INTERNET SYSTEM AND METHOD**

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(2), (4) Date: **Dec. 22, 2009**

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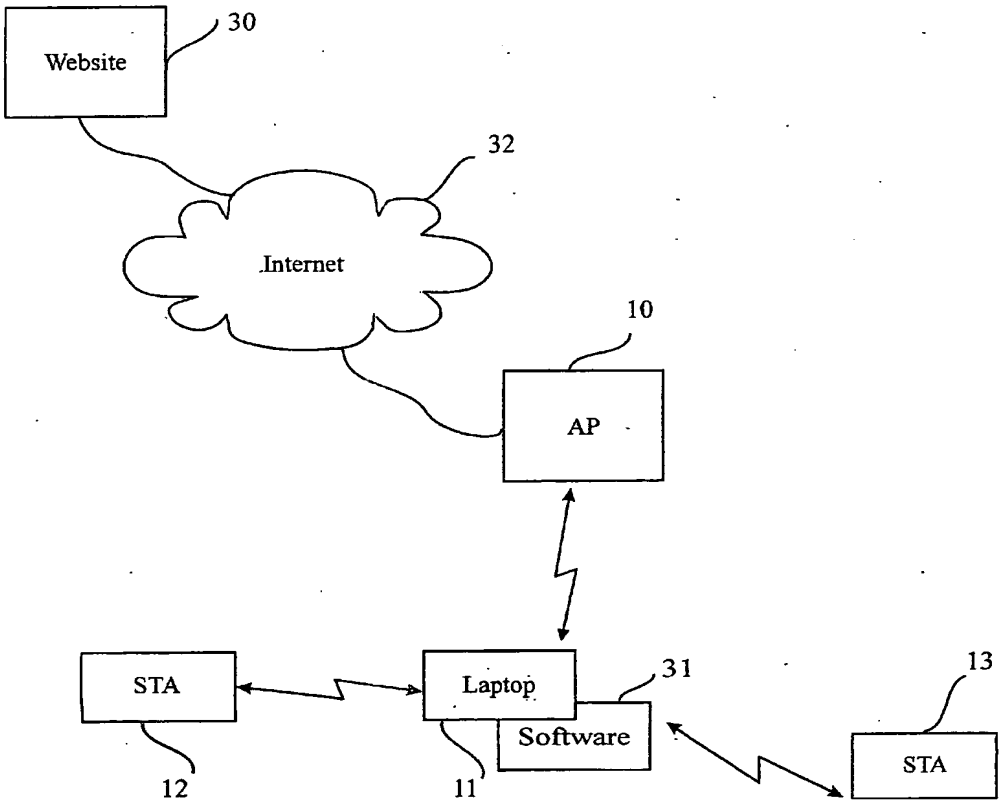
H04W 40/00 (2009.01)

(52) **U.S. Cl.** **370/328**

(57) **ABSTRACT**

A method for providing a wireless Internet connection to WiFi-enabled devices (STAs) comprising: wirelessly connecting a first STA to the Internet through a first AP with a first SSID; remaining connected to the first Access Point (AP), the first STA creates a software-based wireless AP with a second SSID for wirelessly connecting other STAs to the Internet through the first STA. A software module running on the first STA allows a second STA a wide access to the Internet only if the second STA has a copy of the software module running installed and active therein. A method for configuring STAs to connect to a wireless network, comprising: a customer first connects a STA by wire to its network; a software on the STA copies to the STA the security information gained through the wired connection, thus setting the security parameters for the STA.



Claims for the Continuation Patent Application

We Claim:

1. [New]

A computing device comprising:

a communication module adapted to:

(1) wirelessly connect said computing device to an IP based network via a first access point (AP) having a first AP Identification (APID); and

(2) wirelessly connect said computing device to other wireless enabled computing devices;

a user interface and display adapted to allow a user of the computing device to interact with other computing devices over the IP based network; and

an AP module adapted to:

(1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP having a second APID, distinct from the first APID, and provide the given device access to the network via the first AP; and

(2) tunnel data traffic from the given device, through the IP network, to a proxy server, such that the proxy server acts as a proxy of the given device - and the data traffic is secure from the first computing device and first AP; and

(3) the second APID is associated with the proxy server.

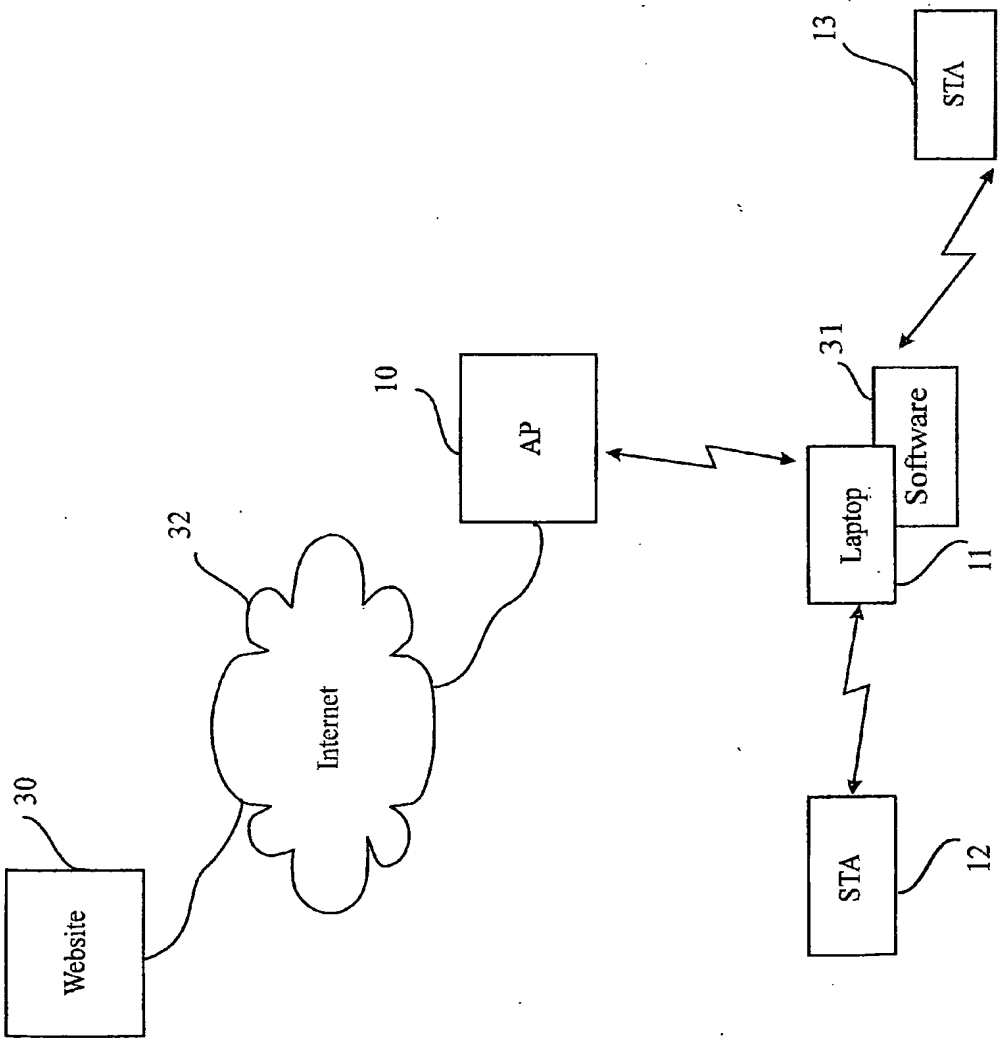

13
STA
31
Software
10
AP
Laptop
11
32
Internet
30
Website
STA
12

FIG. 1

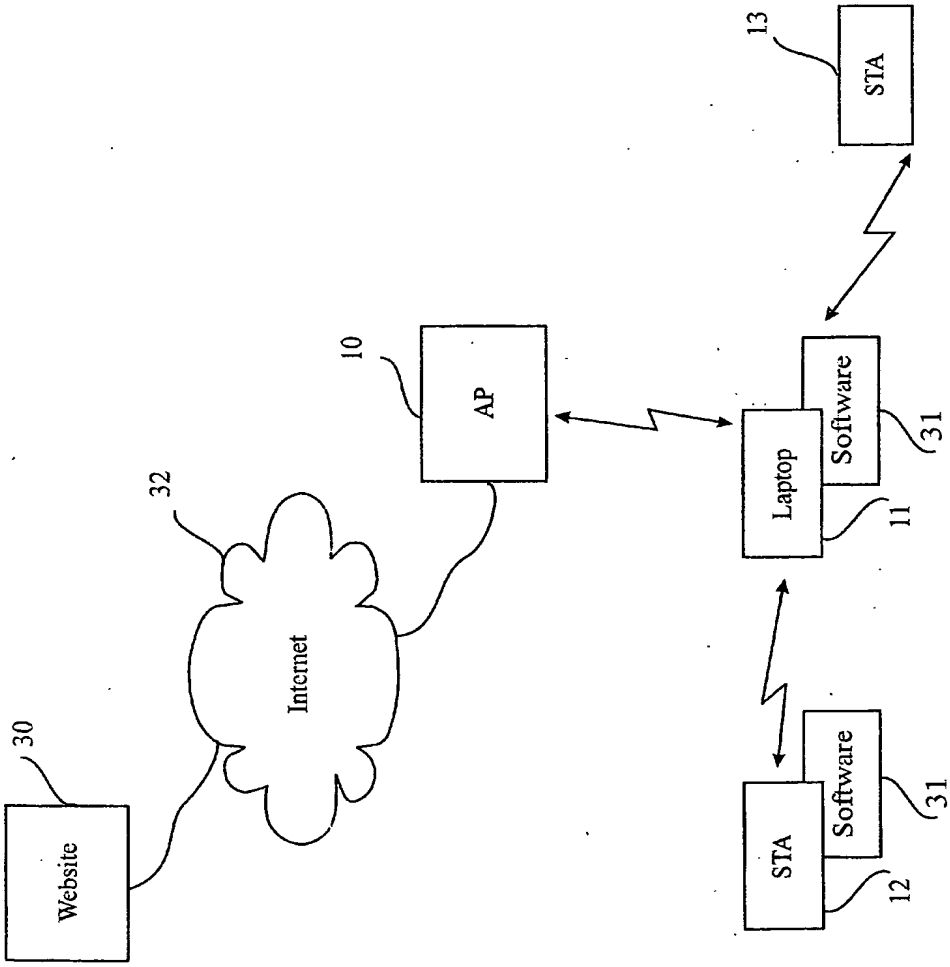

13
STA
10
AP
Software
31
Laptop
11
32
Internet
30
Website
STA
Software
31
12

FIG. 2

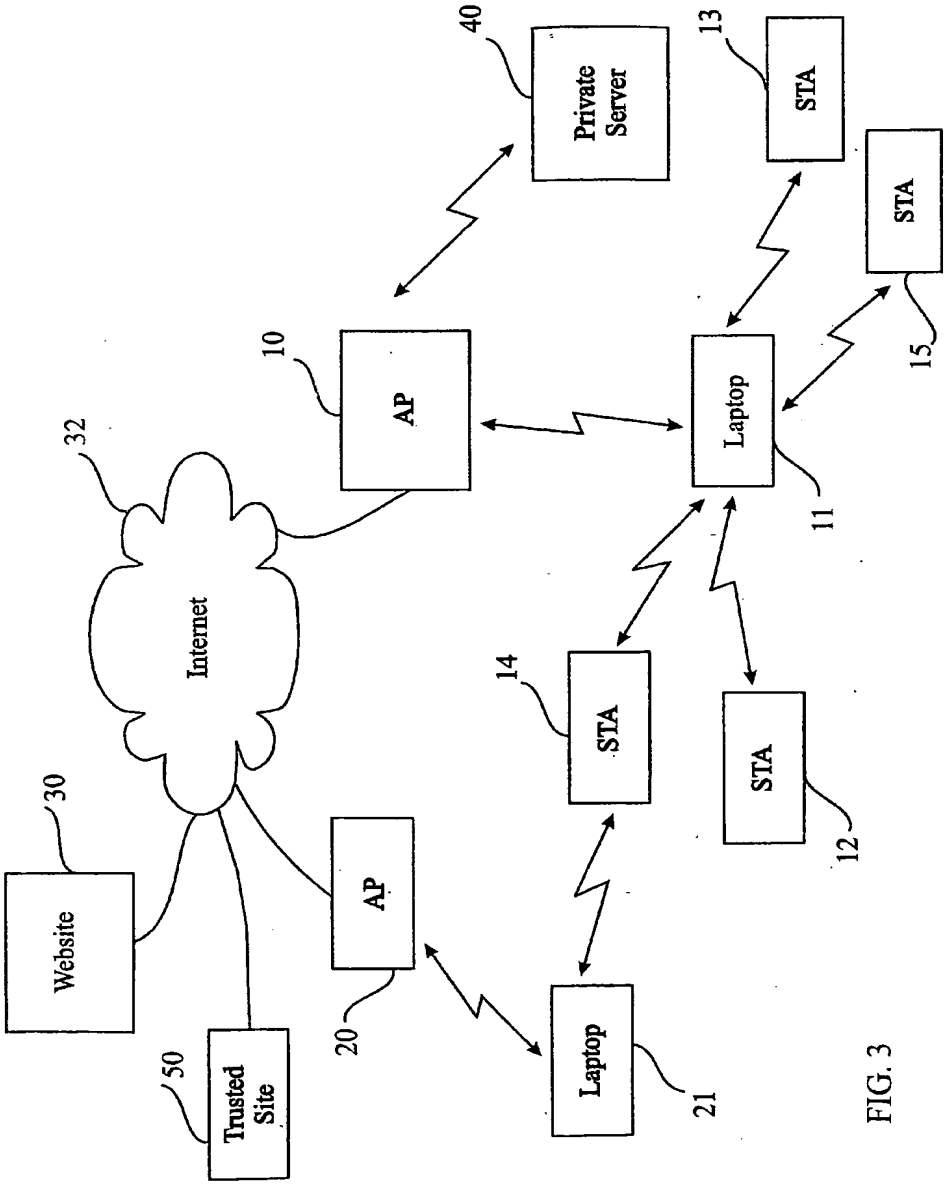

Private Server
40
STA
13
STA
AP
10
Laptop
15
32
11
Internet
STA
14
STA
12
30
AP
Website
20
Laptop
21
50
Trusted Site

FIG. 3

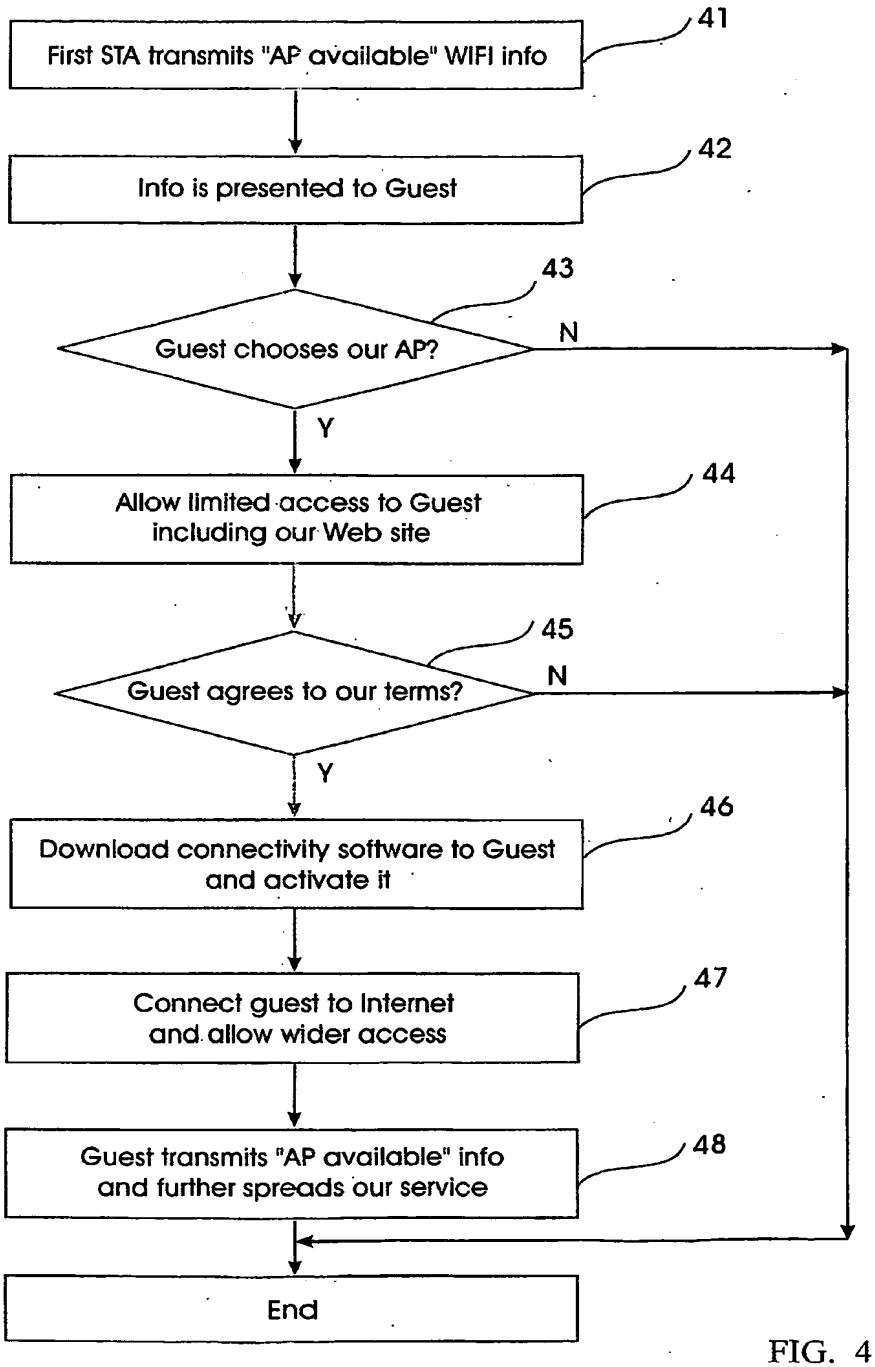

First STA transmits "AP available" WIFI info
41
Info is presented to Guest
42
Guest chooses our AP?
43
N
Y
Allow limited access to Guest including our Web site
44
Guest agrees to our terms?
45
N
Y
Download connectivity software to Guest and activate it
46
Connect guest to Internet and allow wider access
47
Guest transmits "AP available" info and further spreads our service
48
End

FIG. 4

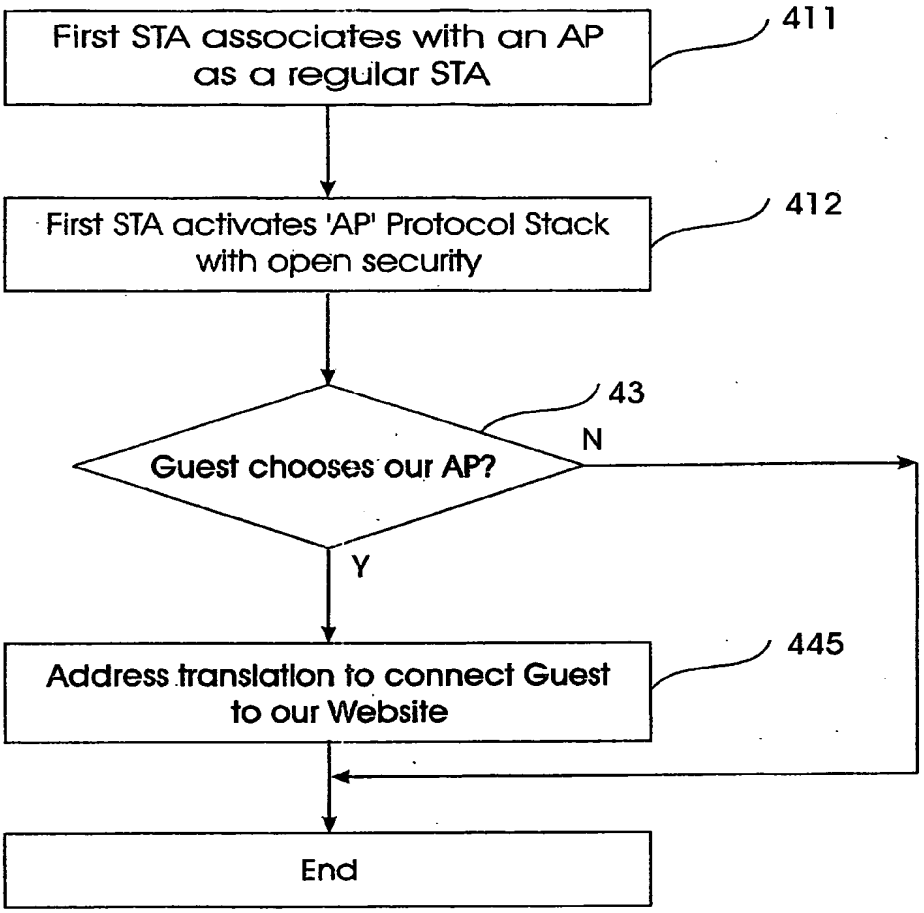

First STA associates with an AP as a regular STA
411
First STA activates 'AP' Protocol Stack with open security
412
Guest chooses our AP?
43
N
Y
Address translation to connect Guest to our Website
445
End

FIG. 5

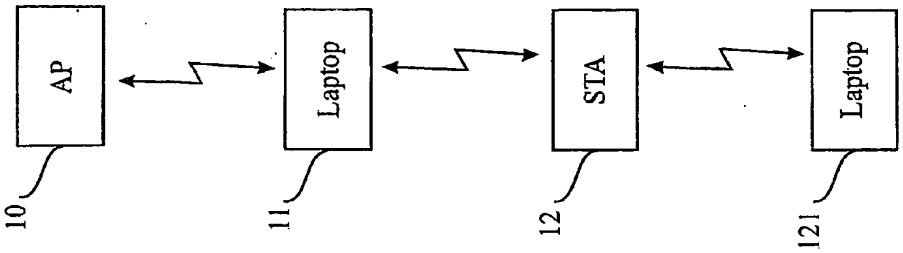


FIG. 6C

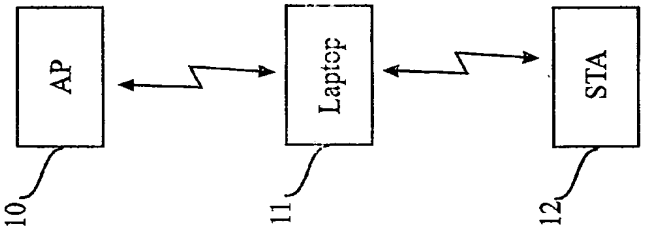


FIG. 6B

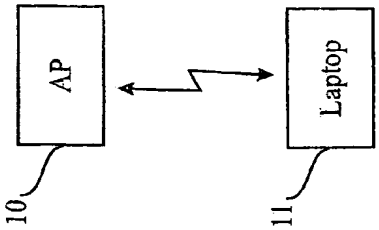


FIG. 6A

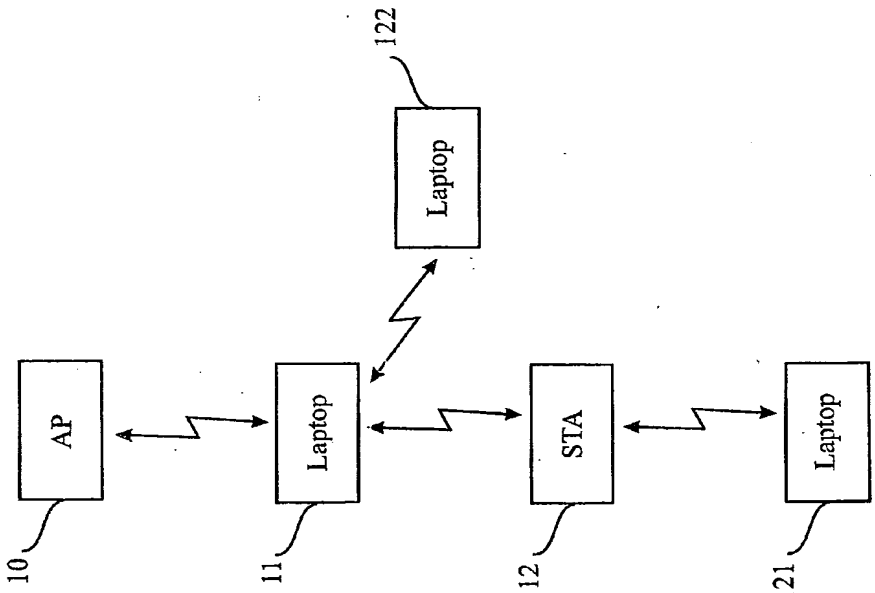


FIG. 6D

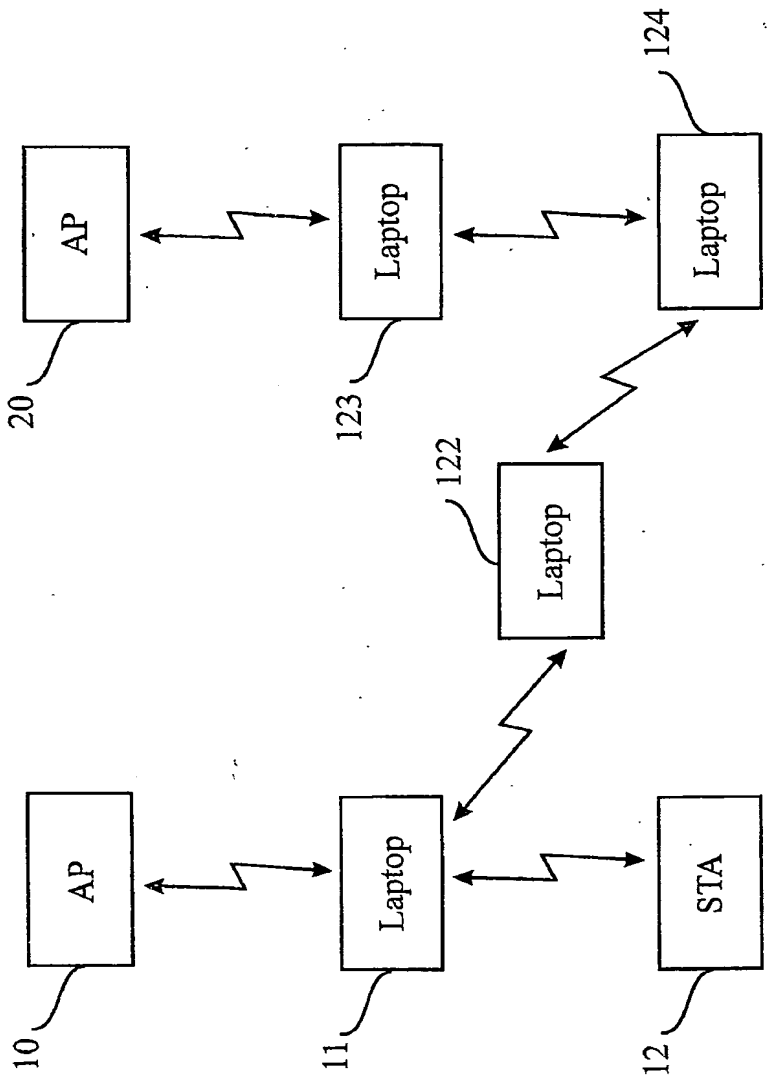


FIG. 6E

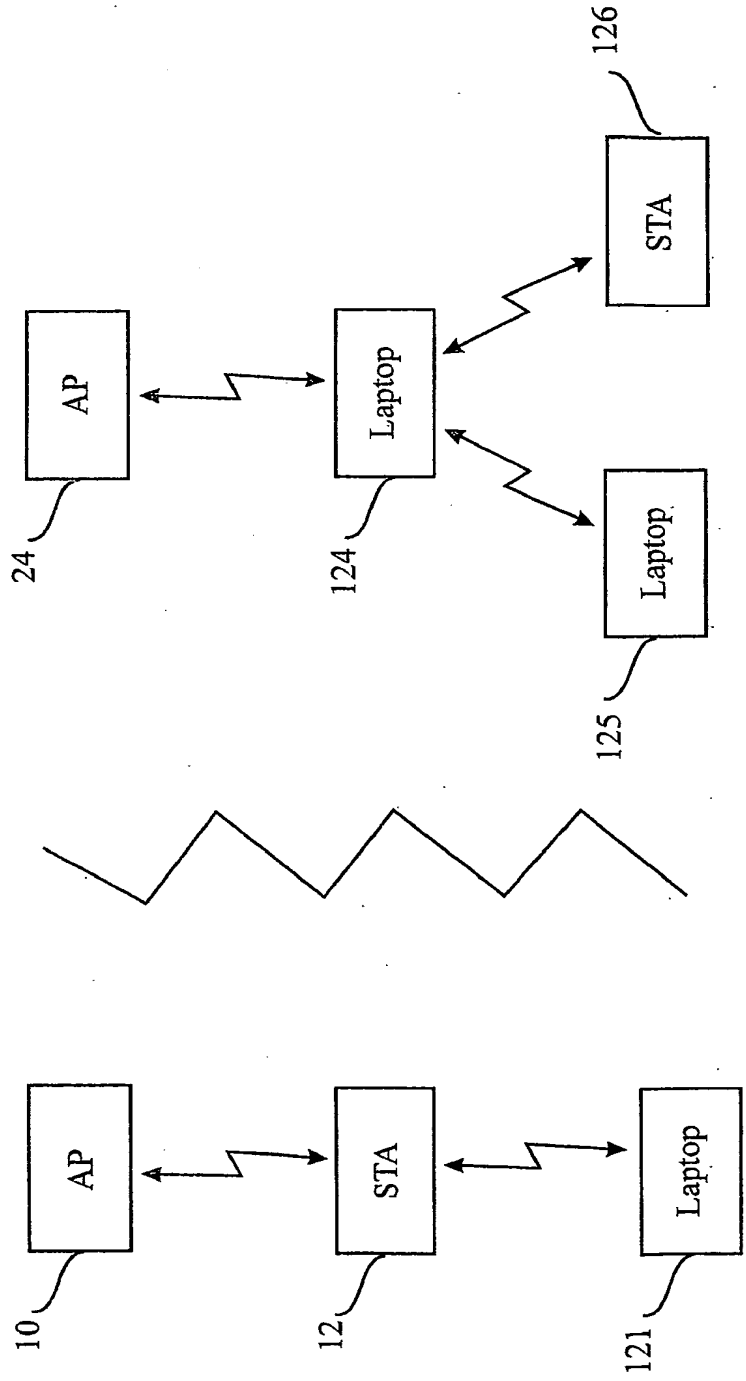


FIG. 6F

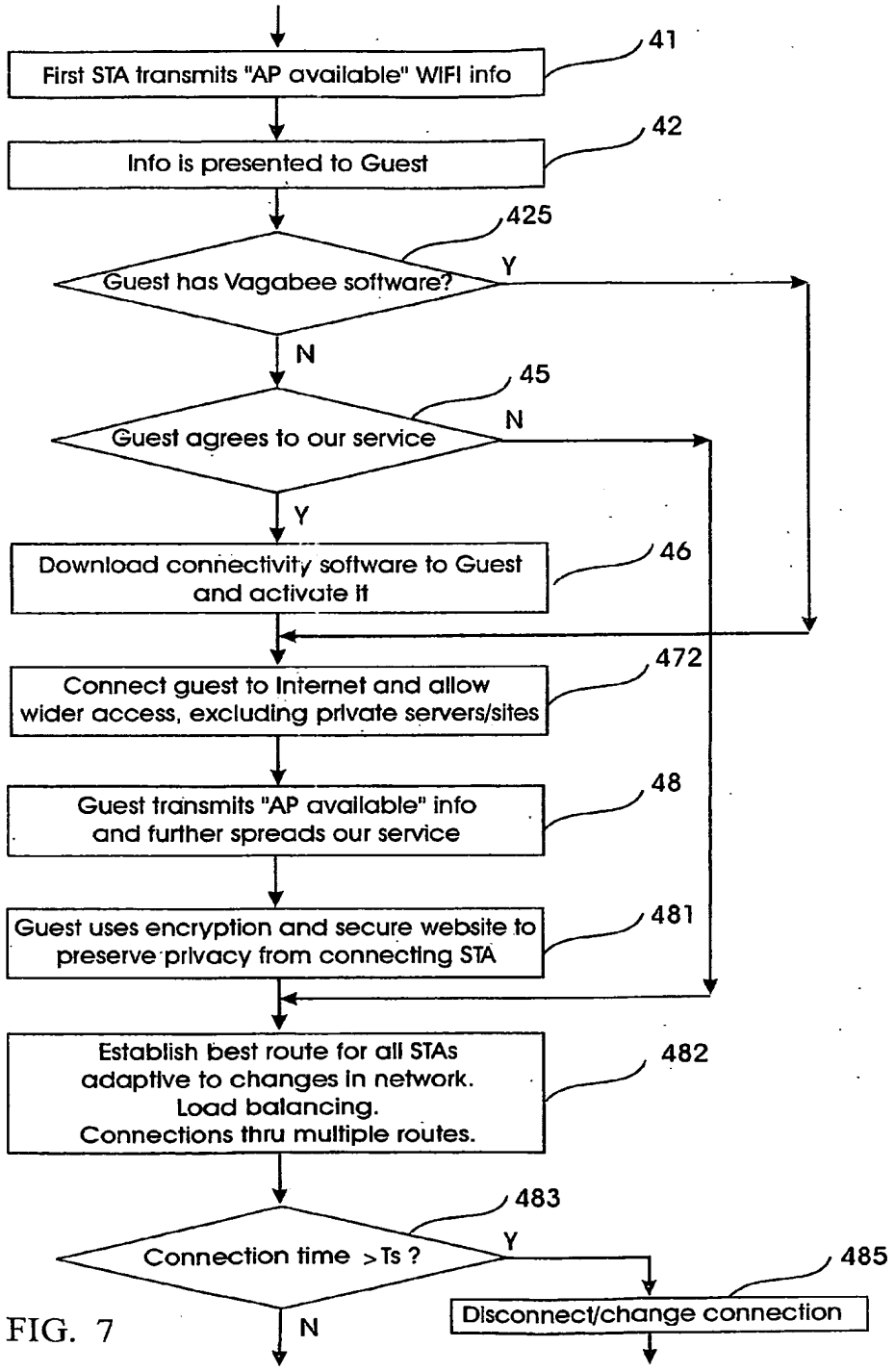

First STA transmits "AP available" WIFI info
41
Info is presented to Guest
42
Guest has Vagabee software?
425
Y
N
Guest agrees to our service
45
N
Y
Download connectivity software to Guest and activate it
46
Connect guest to Internet and allow wider access, excluding private servers/sites
472
Guest transmits "AP available" info and further spreads our service
48
Guest uses encryption and secure website to preserve privacy from connecting STA
481
Establish best route for all STAs adaptive to changes in network. Load balancing. Connections thru multiple routes.
482
Connection time > Ts ?
483
Y
N
Disconnect/change connection
485

FIG. 7

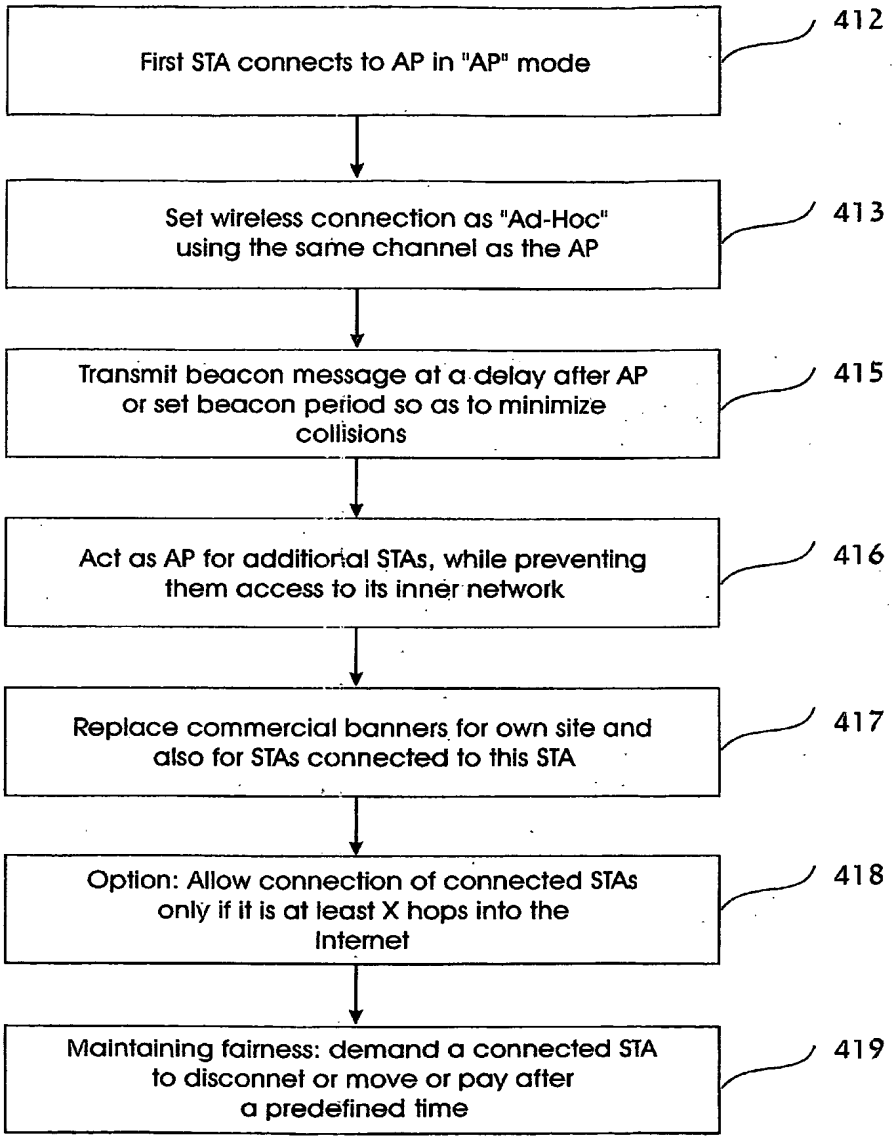

First STA connects to AP in "AP" mode
412
Set wireless connection as "Ad-Hoc" using the same channel as the AP
413
Transmit beacon message at a delay after AP or set beacon period so as to minimize collisions
415
Act as AP for additional STAs, while preventing them access to its inner network
416
Replace commercial banners for own site and also for STAs connected to this STA
417
Option: Allow connection of connected STAs only if it is at least X hops into the Internet
418
Maintaining fairness: demand a connected STA to disconnet or move or pay after a predefined time
419

FIG. 8

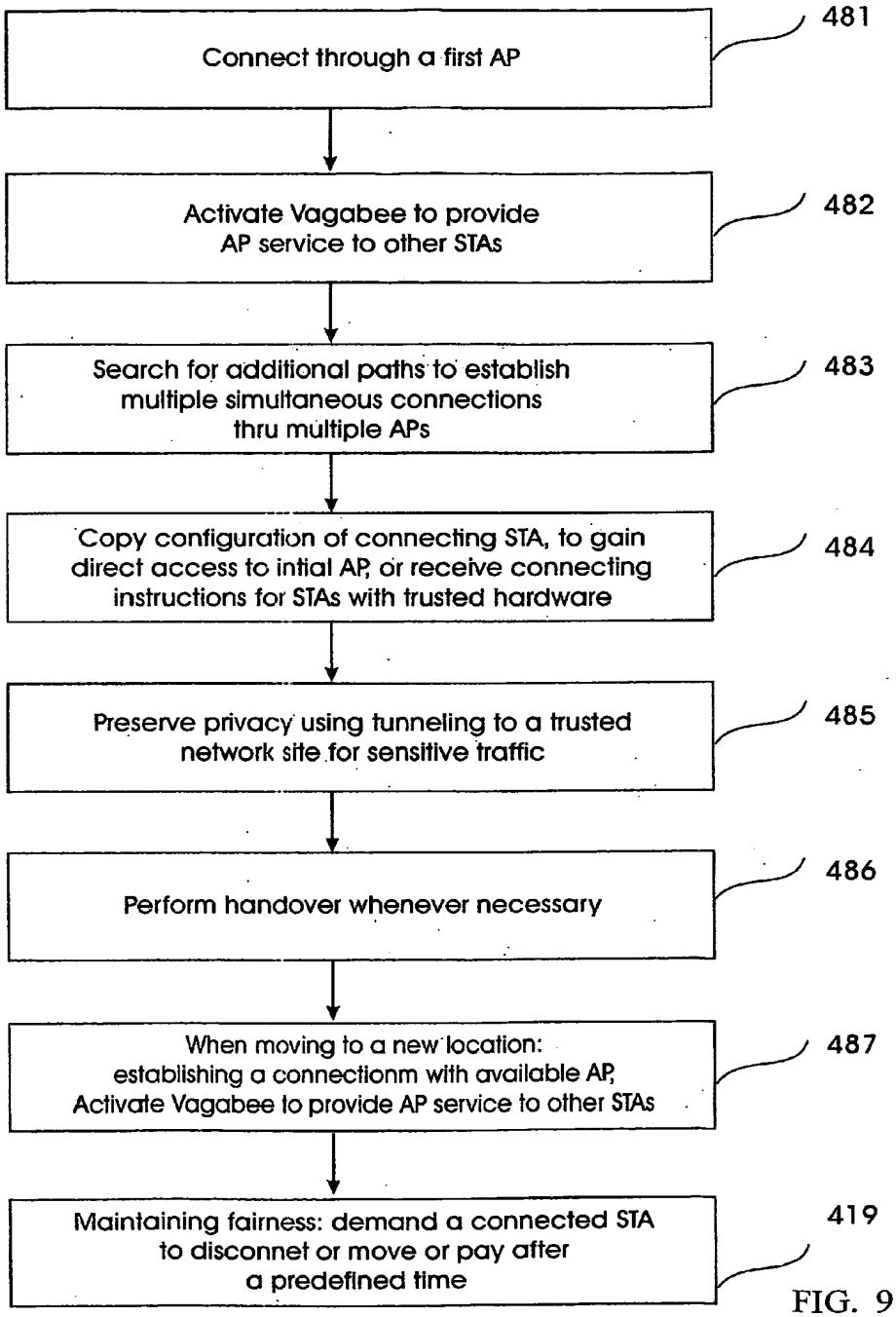

Connect through a first AP
481
Activate Vagabee to provide AP service to other STAs
482
Search for additional paths to establish multiple simultaneous connections thru multiple APs
483
Copy configuration of connecting STA, to gain direct access to intial AP, or receive connecting instructions for STAs with trusted hardware
484
Preserve privacy using tunneling to a trusted network site for sensitive traffic
485
Perform handover whenever necessary
486
When moving to a new location: establishing a connectionm with available AP, Activate Vagabee to provide AP service to other STAs
487
Maintaining fairness: demand a connected STA to disconnet or move or pay after a predefined time
419

FIG. 9

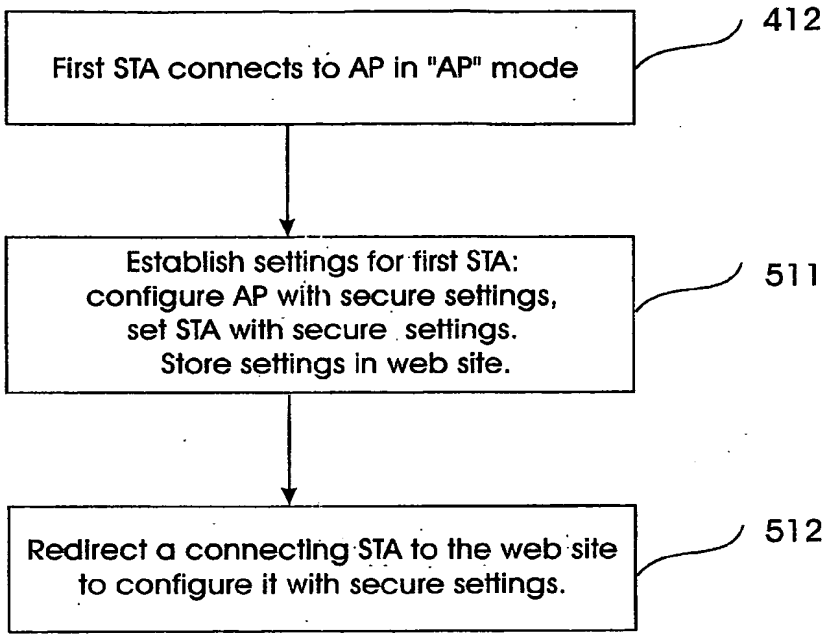

First STA connects to AP in "AP" mode
412
Establish settings for first STA:
configure AP with secure settings,
set STA with secure settings.
Store settings in web site.
511
Redirect a connecting STA to the web site
to configure it with secure settings.
512

FIG. 10

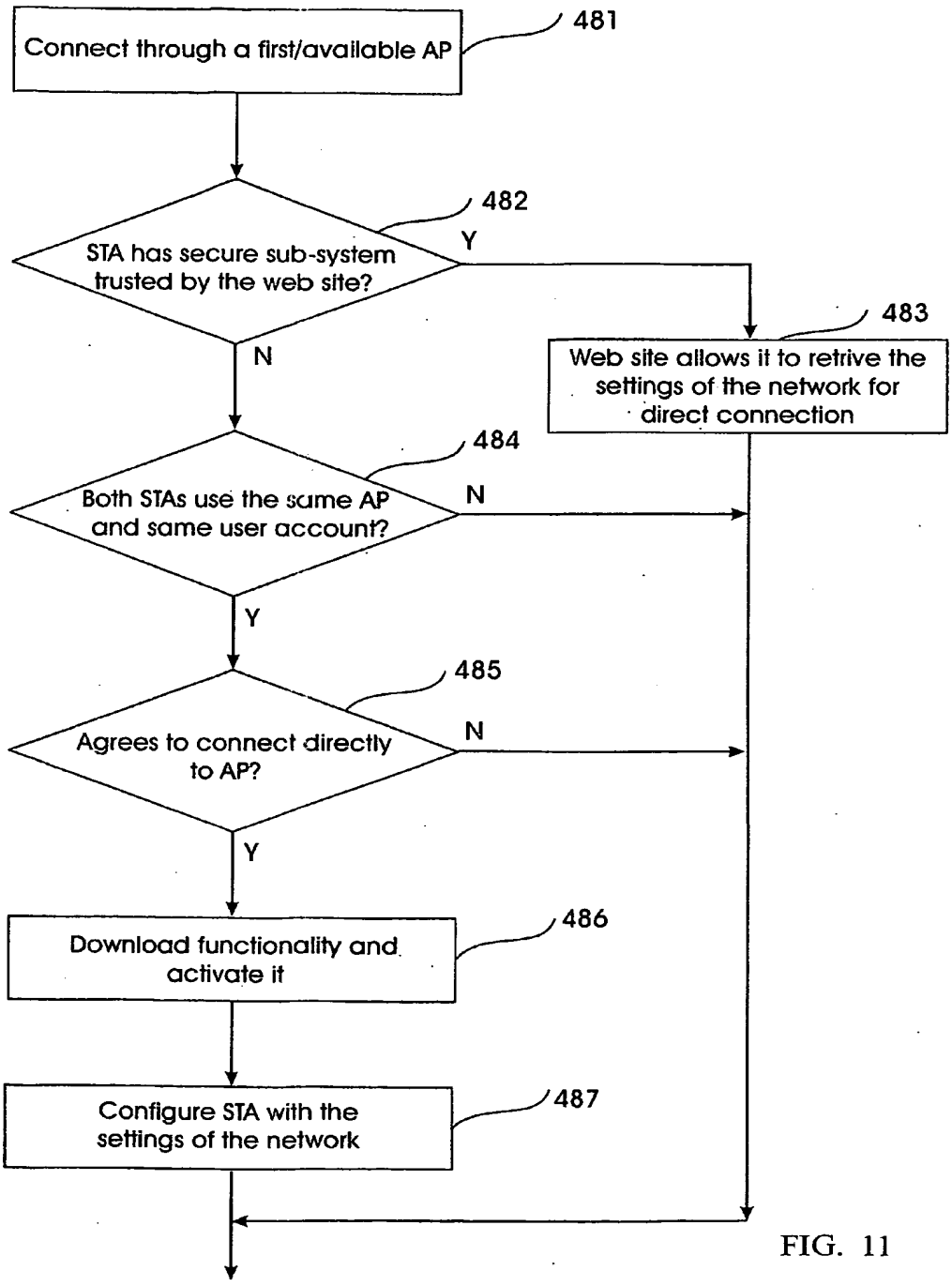

Connect through a first/available AP
481
STA has secure sub-system trusted by the web site?
482
Y
N
Web site allows it to retrive the settings of the network for direct connection
483
Both STAs use the same AP and same user account?
484
N
Y
Agrees to connect directly to AP?
485
N
Y
Download functionality and activate it
486
Configure STA with the settings of the network
487

FIG. 11

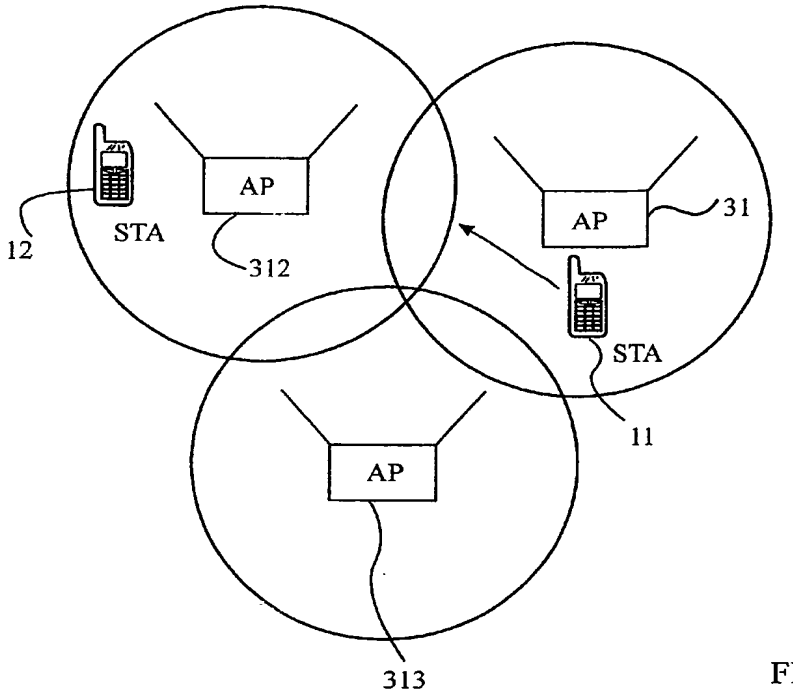

AP
STA
12
312
AP
31
STA
11
AP
313

FIG. 12

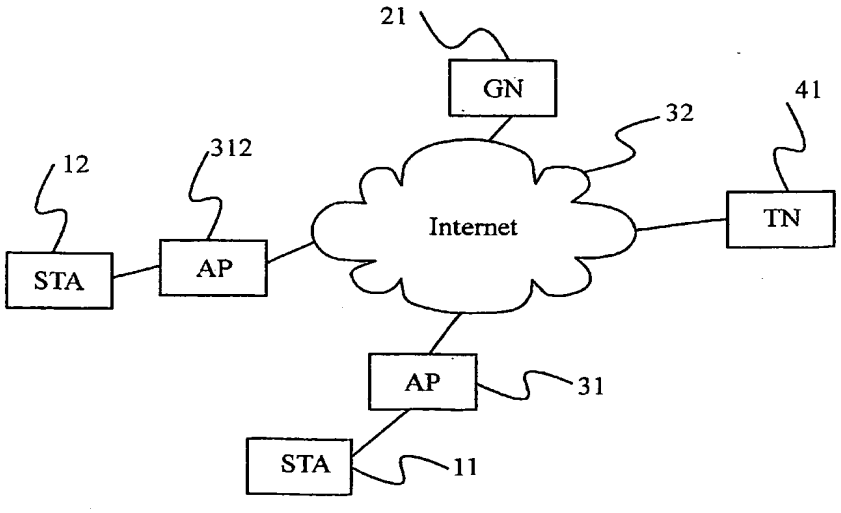

21
GN
41
32
12
312
Internet
TN
STA
AP
AP
31
STA
11

FIG. 13

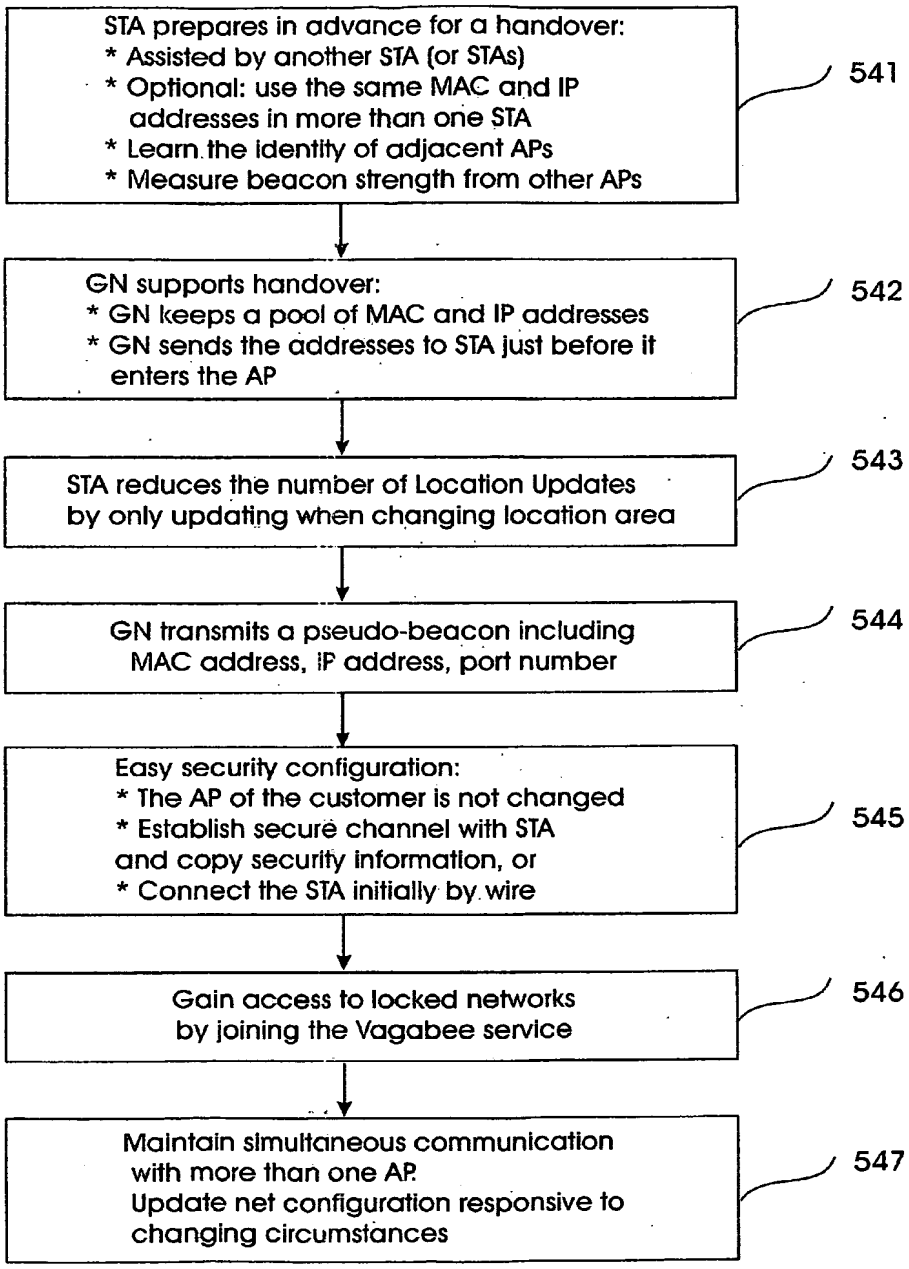

STA prepares in advance for a handover:
* Assisted by another STA (or STAs)
* Optional: use the same MAC and IP addresses in more than one STA
* Learn the identity of adjacent APs
* Measure beacon strength from other APs
541
GN supports handover:
* GN keeps a pool of MAC and IP addresses
* GN sends the addresses to STA just before it enters the AP
542
STA reduces the number of Location Updates by only updating when changing location area
543
GN transmits a pseudo-beacon including MAC address, IP address, port number
544
Easy security configuration:
* The AP of the customer is not changed
* Establish secure channel with STA and copy security information, or
* Connect the STA initially by wire
545
Gain access to locked networks by joining the Vagabee service
546
Maintain simultaneous communication with more than one AP.
Update net configuration responsive to changing circumstances
547

FIG. 14

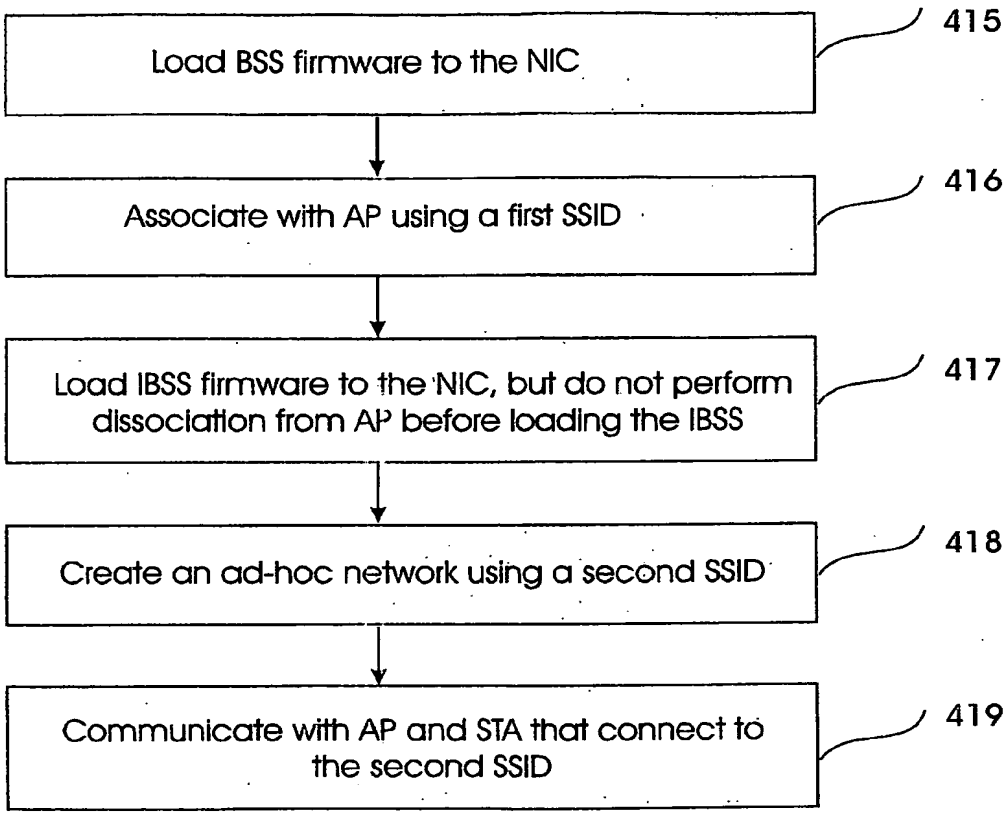

Load BSS firmware to the NIC
415
Associate with AP using a first SSID
416
Load IBSS firmware to the NIC, but do not perform dissociation from AP before loading the IBSS
417
Create an ad-hoc network using a second SSID
418
Communicate with AP and STA that connect to the second SSID
419

FIG. 15

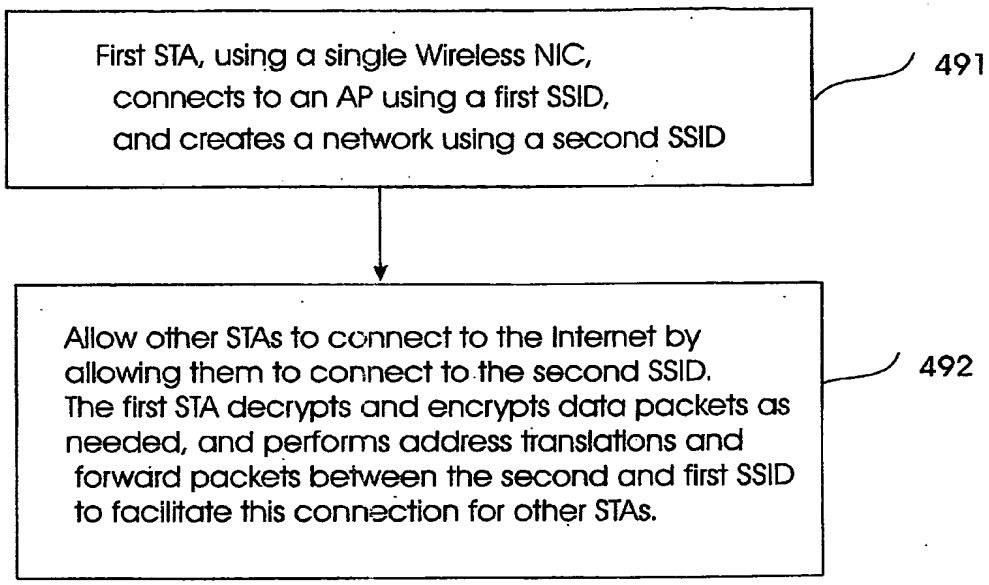

First STA, using a single Wireless NIC, connects to an AP using a first SSID, and creates a network using a second SSID
491
Allow other STAs to connect to the Internet by allowing them to connect to the second SSID. The first STA decrypts and encrypts data packets as needed, and performs address translations and forward packets between the second and first SSID to facilitate this connection for other STAs.
492

FIG. 16

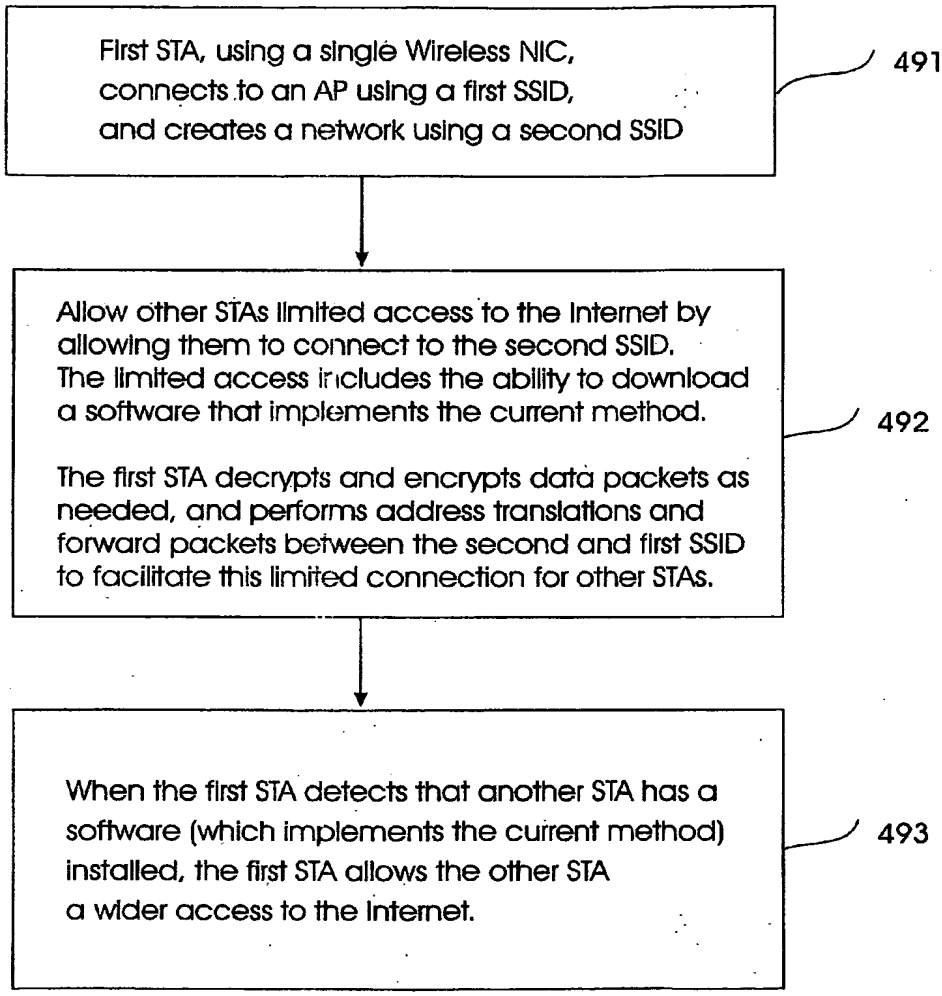

First STA, using a single Wireless NIC, connects to an AP using a first SSID, and creates a network using a second SSID
491
Allow other STAs limited access to the Internet by allowing them to connect to the second SSID. The limited access includes the ability to download a software that implements the current method.
The first STA decrypts and encrypts data packets as needed, and performs address translations and forward packets between the second and first SSID to facilitate this limited connection for other STAs.
492
When the first STA detects that another STA has a software (which implements the current method) installed, the first STA allows the other STA a wider access to the Internet.
493

FIG. 17

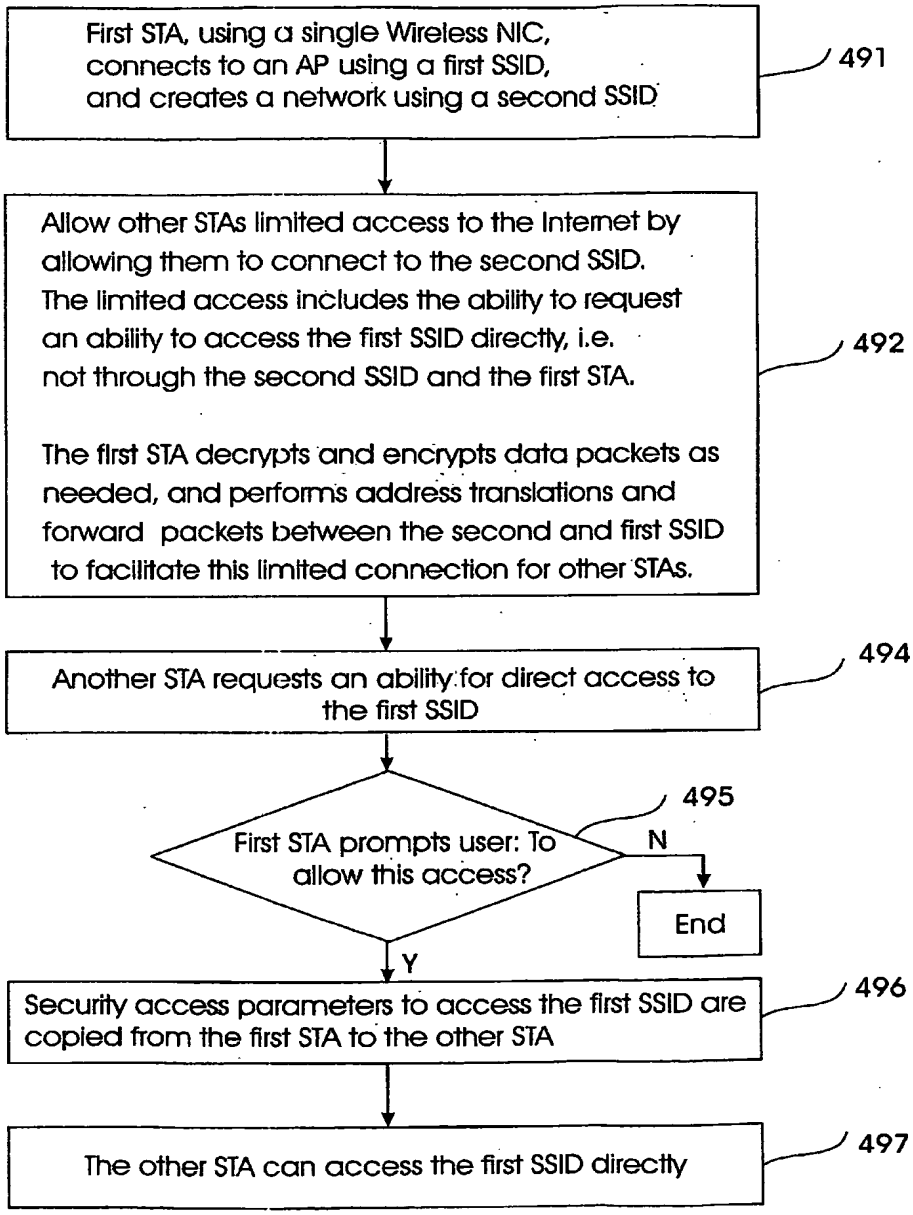

First STA, using a single Wireless NIC, connects to an AP using a first SSID, and creates a network using a second SSID
491
Allow other STAs limited access to the Internet by allowing them to connect to the second SSID. The limited access includes the ability to request an ability to access the first SSID directly, i.e. not through the second SSID and the first STA.
The first STA decrypts and encrypts data packets as needed, and performs address translations and forward packets between the second and first SSID to facilitate this limited connection for other STAs.
492
Another STA requests an ability for direct access to the first SSID
494
First STA prompts user: To allow this access?
495
N
End
Y
Security access parameters to access the first SSID are copied from the first STA to the other STA
496
The other STA can access the first SSID directly
497

FIG. 18

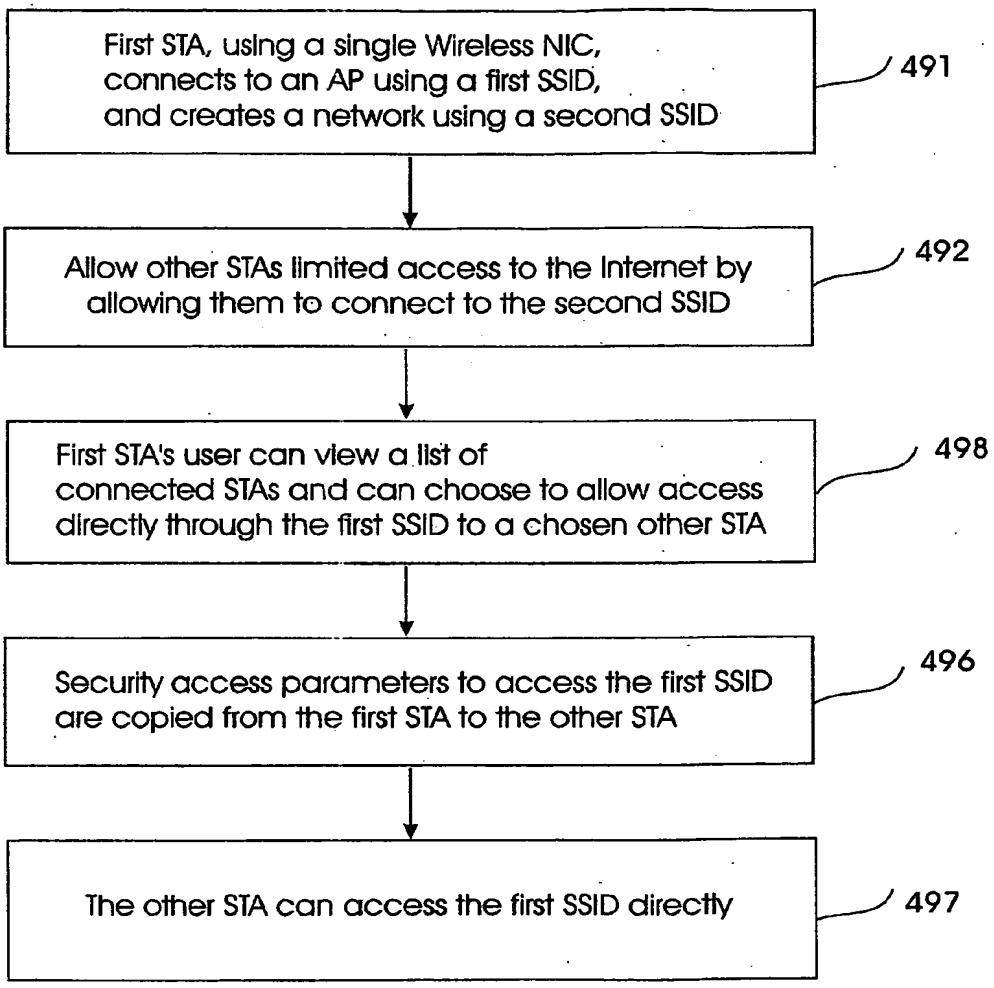

First STA, using a single Wireless NIC, connects to an AP using a first SSID, and creates a network using a second SSID
491
Allow other STAs limited access to the Internet by allowing them to connect to the second SSID
492
First STA's user can view a list of connected STAs and can choose to allow access directly through the first SSID to a chosen other STA
498
Security access parameters to access the first SSID are copied from the first STA to the other STA
496
The other STA can access the first SSID directly
497

FIG. 19

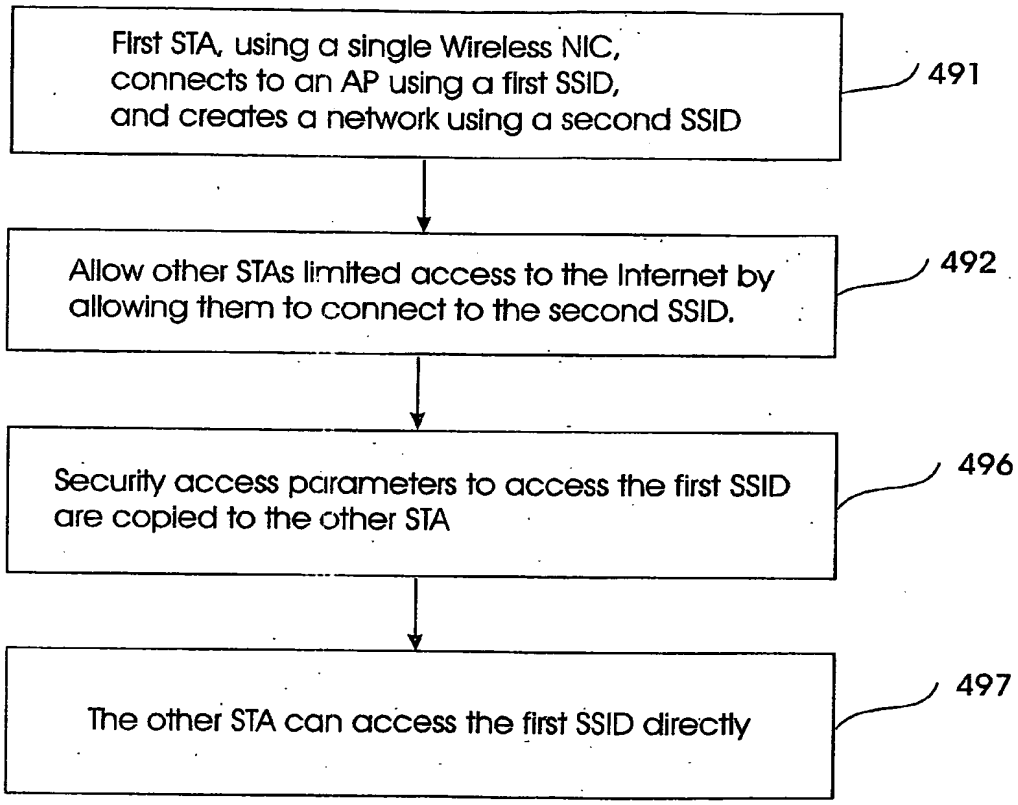

First STA, using a single Wireless NIC, connects to an AP using a first SSID, and creates a network using a second SSID
491
Allow other STAs limited access to the Internet by allowing them to connect to the second SSID.
492
Security access parameters to access the first SSID are copied to the other STA
496
The other STA can access the first SSID directly
497

FIG. 20

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	Wireless Internet System and Method

As the below named inventor, I hereby declare that:

This declaration is directed to:

- [■] The attached application, or
- [ ] United States application or PCT international application number _____ filed on _____.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Elad Barkan Date (Optional): Sep 9, 2013

Signature: Elad Barkan

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Assigned	BARKAN Elad	Examiner	Not Yet
	12 Habanim St.		
	Kfar Sirkin 49935		
	Israel		
Serial No: Assigned	Not Yet Assigned	Group Art Unit:	Not Yet
Filed:	Herewith		
International Application No:	PCT/IL2007/000244		
Title:	WIRELESS INTERNET SYSTEM AND METHOD		

PRELIMINARY AMENDMENT

Mail Stop Amendment

Commissioner for Patent

P.O.Bax 1450

Alexandria, VA 22313-1450

Dear Sir,

Enclosed is submission of a Continuation Patent Application to application number 12/665,978.

Prior to Examination, kindly amend the above identified 12/665,978 Application, that is being submitted in full for this Continuation Patent application as follows:

Amendments to the Specification begin on page 2 of this amendment.

Amendments to the Claims are reflected in the listings on page 3 of this amendment.

Amendments to the Specification

In the specifications as filed in Patent Application 12/665,978 which is enclosed in full as the basis for this Continuation Patent Application, please amend paragraph [0001] to read:

[0001] [Amended]: The present application is related to, and claims priority from, patent Application 12/665,978 filed on December 22, 2009 and the provisional patent applications filed by the present applicant in U.S.A.: Application U.S. 60/775,321 filed on 22 Feb. 2006, and Application U.S. 60/794,135 filed on 24 Apr. 2006.

All the remaining Specification of Application 12/665,978 is referenced in full for this currently filed Continuation Patent Application.

Amendments to the Claims

For this currently filed Continuation Patent Application, please amend the Claims of Patent Application 12/665,978 as follows:

Please cancel, without prejudice, all Claims of Application 12/665,978.

For this currently filed Continuation Patent Application please add the following Claim:

We Claim:

1. [New]

A computing device comprising:

a communication module adapted to:

(1) wirelessly connect said computing device to an IP based network via a first access point (AP) having a first AP Identification (APID); and

(2) wirelessly connect said computing device to other wireless enabled computing devices;

a user interface and display adapted to allow a user of the computing device to interact with other computing devices over the IP based network; and

an AP module adapted to:

(1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP having a second APID, distinct from the first APID, and provide the given device access to the network via the first AP; and

(2) tunnel data traffic from the given device, through the IP network, to a proxy server, such that the proxy server acts as a proxy of the given device - and the data traffic is secure from the first computing device and first AP; and

(3) the second APID is associated with the proxy server.

PATENT APPLICATION SERIAL NO._____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

09/13/2013 HVUONG1 00000013 13987881

01 FC:2011 140.00 OP
02 FC:2090 200.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2002- 489-267/69033

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/987,881	09/11/2013	2473	340		1	1

CONFIRMATION NO. 4557

Elad Barkan
12 Habanim St.
Kfar Sirkin, 49935
ISRAEL

FILING RECEIPT

OC00000064207298

Date Mailed: 10/09/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Applicant(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 12/665,978 12/22/2009 PAT 8559369

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
ISRAEL PCT/IL2007/000244 02/22/2007

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 10/03/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/987,881**

Projected Publication Date: To Be Determined - pending completion of Corrected Papers

Non-Publication Request: No

Early Publication Request: No
** **SMALL ENTITY** **

Title

Wireless internet system and method

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: Yes

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/987,881	09/11/2013	Elad Pinhas Barkan	

CONFIRMATION NO. 4557

Elad Barkan
12 Habanim St.
Kfar Sirkin, 49935
ISRAEL

FORMALITIES LETTER

OC000000064207299

Date Mailed: 10/09/2013

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Filing Date Granted

An application number and filing date have been accorded to this application. The application is informal since it does not comply with the regulations for the reason(s) indicated below. Applicant is given TWO MONTHS from the date of this Notice within which to correct the informalities indicated below. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

The required item(s) identified below must be timely submitted to avoid abandonment:

- A substitute specification in compliance with 37 CFR 1.52, 1.121(b)(3), and 1.125, is required. The substitute specification must be submitted with markings and be accompanied by a clean version (without markings) as set forth in 37 CFR 1.125(c) and a statement that the substitute specification contains no new matter (see 37 CFR 1.125(b)). The specification, claims, and/or abstract page(s) submitted is not acceptable and cannot be scanned or properly stored because:
  - The line spacing on the specification, claims, and/or abstract is not 1½ or double spaced (see 37 CFR 1.52(b)).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- A surcharge (for late submission of the basic filing fee, search fee, examination fee or inventor's oath or declaration) as set forth in 37 CFR 1.16(f) of $ **70** for a small entity in compliance with 37 CFR 1.27, must be submitted.

SUMMARY OF FEES DUE:

Total fee(s) required within **TWO MONTHS** from the date of this Notice is $ **730** for a small entity
- $ **70** Surcharge.
- The application search fee has not been paid. Applicant must submit $ **300** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit $ **360** to complete the examination fee for a small entity in compliance with 37 CFR 1.27.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web.
https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

/tnguyen/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/987,881

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE($)	FEE($)		RATE($)	FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	140		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	800		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Nov, 26, 2013

Applicant(s): BARKAN Elad
12 Habanim St.
Kfar Sirkin 49935
Israel

Examiner Not Yet Assigned

Application No: 13/987,881

Group Art Unit: 2473

Filed: Herewith

Title: WIRELESS INTERNET SYSTEM AND METHOD

PRELIMINARY AMENDMENT

Mail Stop Missing Parts

Commissioner for Patent

P.O.Bax 1450

Alexandria, VA 22313-1450

Dear Sir,

Enclosed is submission according to the requirements set forth in the NOTICE TO FILE CORRECTED APPLICATION PAPERS,

Date Mailed 10/09/2013.

Provided in this response are the following documents, which substitute the original documents, and comply with the sited regulation:

Specifications – 61 pages;

Abstract - 1 page;

Claims - 1 page

Statement according to 37 CFR 1.125(b).

Credit Card Payment Form for the total sum of $ 730.

12/03/2013 LNGUYEN1 00000003 13987881
01 FC:2111 300.00 OP
02 FC:2311 360.00 OP
03 FC:2051 70.00 OP

Statement

The applicant states that the substitute specifications contain no new matter.

Claims for Application Number 13/987,881

We Claim:

1. [New]

A computing device comprising:

a communication module adapted to:

(1) wirelessly connect said computing device to an IP based network via a first access point (AP) having a first AP Identification (APID); and

(2) wirelessly connect said computing device to other wireless enabled computing devices;

a user interface and display adapted to allow a user of the computing device to interact with other computing devices over the IP based network; and
an AP module adapted to:

(1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP having a second APID, distinct from the first APID, and provide the given device access to the network via the first AP; and

(2) tunnel data traffic from the given device, through the IP network, to a proxy server, such that the proxy server acts as a proxy of the given device - and the data traffic is secure from the first computing device and first AP; and

(3) the second APID is associated with the proxy server.

Abstract

A method for providing a wireless Internet connection to WiFi-enabled devices (STAs) comprising: wirelessly connecting a first STA to the Internet through a first AP with a first SSID; remaining connected to the first Access Point (AP), the first STA creates a software-based wireless AP with a second SSID for wirelessly connecting other STAs to the Internet through the first STA. A software module running on the first STA allows a second STA a wide access to the Internet only if the second STA has a copy of the software module running installed and active therein. A method for configuring STAs to connect to a wireless network, comprising: a customer first connects a STA by wire to its network; a software on the STA copied to the STA the security information gained through the wired connection, thus setting the security parameters for the STA.

WIRELESS INTERNET SYSTEM AND METHOD

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation application to patent application No. 12/665,978 now Patent US 8,559,369 which relates to, and claims priority from, the provisional patent applications filed by the present applicant in the U.S.A.: Application U.S. 60/775,321 filed on 22 Feb. 2006, and Application U.S. 60/794,135 filed on 24 Apr. 2006, all of which are hereby incorporated by reference in their entirely.

TECHNICAL FIELD

[0002] The present invention relates to a wireless Internet system and method, and more particularly to such systems for providing wireless Internet connection to roaming devices such as Portable computers, Laptops, PDAs and phones, and the deployment of such a system in a fast spreading manner (a viral-like method), in a client software-only manner such that the existing access points are not changed at all.

BACKGROUND ART

[0003] Currently, there is a growing number of WiFi public hot-spots (or Access Points--"AP"). These APs allow WiFi-enabled devices (which we refer to as STA) that are in their coverage area to Connect to the internet.

[0004] Some of the APs are operated as a business, service, or as part of a

community, either with or without a charge to the STA's owner. Other APs are placed by individuals in their premises, but are not "locked", i.e., they are "open", allowing bypassing STAs to utilize them. Other APs placed by individuals are "locked" (or "closed"), thus not allowing passing STAs to utilize them.

[0005] As APs are being deployed in growing numbers, many individuals lock their APs for fear of unfair use of their network resources, and due to security concerns. For instance, there have been cases where a person places an open AP, and his neighbor uses this AP as its internet connection on a full-time basis without the consent of the first person, thus abusing and degrading the service of the first individual. In other cases, the neighbor hacked into the computer of the first person through the network. Thus, as time passes, most APs are either locked, or a payment is required to use them. Although the total number of APs and their area of coverage is growing fast, a larger percent of the APs are becoming locked and inaccessible to roaming STAs.

[0006] A prior art approach for allowing roaming customers to access the Internet is taken by Fon (www.fon.com). It allows individuals to download a new software into their APs, which makes their APs a pay-for-use APs for STAs that roam in their vicinity, and in addition, they receive a username and password for free access to other APs which are operated by Fon or utilize their software. It also allows users to enjoy part of some of the payments made by other users to use the network. However, roaming STAs are forced either to find an open AP, find an AP for which they have an account, or pay for access in case there is a pay-for AP.

[0007] It is an aim of the current disclosure to provide a system and a method for deployment of APs for the purpose of connecting STAs to the Internet.

[0008] Roaming customers that connect to an AP are often far from the AP and have borderline reception conditions. As a result, the connection quality is very poor, and the user may experience a slow service or no service at all. It is another aim of the current disclosure to provide a system and a method for improving the connection quality for roaming STAs.

[0009] Another aspect of this invention refers to systems and methods for fast handovers in wireless networks such as 802.11 networks, specifically in un-managed wireless networks, and more particularly such systems and methods which allow extremely fast handovers in these networks without any changes to existing 802.11 base stations. The invention also concerns efficient performance with regards to power consumption, coverage, security, installation, capacity and availability of wireless networks such as 802.11.

[0010] The invention can achieve these goals without any change to the WiFi access point.

[0011] Currently, there is a growing number of WiFi public hot-spots (or Access Points--"AP"). These APs allow WiFi enabled devices (which we refer to as STA) that are in their coverage area to connect to the internet.

[0012] Some of the APs are operated as a business, service, or as part of a community, either with or without a charge to the STA's owner. Other APs are placed by individuals in their premises, but are not "locked", i.e., they allow bypassing STAs to utilize them. The cumulative connectivity provided by the APs is enormous and growing fast, thus, it is tempting to use this cumulative connectivity to compete with other wireless technologies. For example, it would be tempting to have a STA that looks like a cellular handset (i.e., a WiFi Handset, or WiFi Phone), where the WiFi handset uses the free connectivity to provide a "free" service that competes with or complements the cellular service.

[0013] One of the major difficulties of achieving this vision is that the coverage of a single WiFi AP is very small (about a few hundreds to a few thousands of square meters). When a user goes out of this area, his connectivity is lost. A natural naive approach to solve this problem is performing a handover (sometimes also called handoff) to another AP with a better radio connection to the user. Another approach is to have a handset which supports both WiFi and Cellular, and handover the conversation from WiFi to Cellular [See: WO 2004/036770], this way, WiFi extends the coverage of cellular, and conversation is handed over from WiFi to cellular, when there is no WiFi coverage. However, the problem of performing handover between

one WiFi AP to another WiFi AP remains when appropriate cellular coverage is not available (or there is no cooperation from the cellular company). The same idea applies when cellular is replaced by other access technology, such as satellite communications.

[0014] The concept of handover is taken from cellular networks. Handovers usually work well in managed networks, such as cellular networks, campuses, or office environment., where the entire network is usually owned by the same operator.

[0015] The network operator in many cases chooses to add cells where coverage or capacity are needed. In managed networks, the APs (or the cellular cells) are synchronized and communicate with each other through a backbone, and are usually controlled by some other network entity (e.g., BSC--base station controller in cellular systems). For example, the APs can communicate with each other, for example using the IEEE 802.11F protocol--the Inter-AP protocol, which involves a RADIUS (Remote Authentication Dial In User Service, see RFC 2138, 2865, and 2866) server.

[0016] The APs can also employ a radio resource management such as IEEE 802.11K, or fast roaming using IEEE 802.11R, etc. However, in unmanaged networks, the APs can be deployed by many unrelated entities, such as by private individuals.

[0017] There is usually no entity that synchronizes the APs. The APs can be manufactured by various manufacturers, use various security mechanisms etc. In unmanaged networks, the handovers are typically very slow, as in the process of handover, it takes time for the STA to re-connect to the internet in the new AP (and it must disconnect from the previous AP). In such a handover in an unmanaged network, the IP address often changes. Therefore, a mechanism such as mobile IP must be used (as described later). This mechanism is limited with respect to the frequency in which the IP address can change, and a large latency (disconnection time) may result during the handover process. During the latency, the STA cannot receive any incoming messages.

[0018] A handover process is typically composed of the station STA connecting to a

new AP, and disconnecting from the old AP. If STA is connected in parallel to both AP the handover is called soft-handover, and if STA first abandons the old AP and then connects to the new AP, the handover is called a hard-handover. Soft handovers require the ability of STA to communicate in parallel with at least two APs.

[0019] The process of connecting to a new AP is usually composed of the following steps:

[0020] 1. STA performs a scanning process to discover neighboring APs.

[0021] 2. STA chooses a new AP, and performs authentication with the AP, in which the AP verifies that STA is allowed to access the AP.

[0022] 3. If the authentication is successful, STA performs an association process, in which the AP acknowledges that STA is connected to it (association requires the AP to allocate resources to the STA, and the 802.11 standard allows up to 2007 STAs to be associated with an AP).

[0023] 4. Once STA is associated with the AP, the STA makes sure that it has all the information that it requires to communicate over the internet, for example, it must have an IP address, and it must update servers that govern its location (such as Mobile IP, as discussed later). In some cases, the user should go through a second authentication procedure (usually with a RADIUS server). Many times, this procedure is performed over a web interface, which is called a Captive Portal.

[0024] When a captive portal is used by the AP, the user needs to surf into the captive portal and perform a log-in to connect his IP address to the Internet. In some implementations, the user's web browser is forwarded to the captive portal regardless of the internet site that it tries to surf into. Some APs allow the STA to surf in some limited number of internet sites before they complete the second authentication procedure (for example, if the AP is in an hotel, it might allow surfing into the hotel's website, or affiliated news web sites).

[0025] The procedure at the captive portal typically includes authentication,

payment, or agreeing to terms of usage. Once the authentication is completed, the IP address of the STA is connected to the Internet (usually by reconfiguring the firewall that controls the communications of the AP). Each sub-process takes time to complete, resulting in a total delay of over several seconds to complete the entire process.

[0026] In managed networks, Step 4 can be performed once in a certain amount or time (or for a certain area), as moving between APs of the managed network does not necessarily change the parameters of the STA such as IP address etc. However, in un-managed networks (and sometimes also in managed networks), the STA must gain a new IP address and other parameters, usually through DHCP (Dynamic Host Configuration Protocol, see RFC 1541). Completing the DHCP protocol can take up to several seconds. Sometimes, obtaining an IP is not enough, and a second authentication is needed. In other cases, a proxy server or a Socks server should be set for the communication. The entire process can consume a few seconds, which are intolerable in a streaming two-way application such as a voice conversation.

[0027] Many protocols that are used in the Internet require that the IP address of the STA would remain fixed during communications (for example, TCP--Transport Control Protocol, see RFC 793). However, a handover might result in the change of the IP address. This change of IP address causes a break in the communication as the communication needs to be restarted.

[0028] One solution to this problem is provided by the Mobile IP standard (see RFC 2002): in this solution the STA updates a server with its current IP address, every time that the IP address changes. As a preparation for roaming, the server allocates to the STA (in addition to the STA's current IP address) an IP address that remains fixed, even when the real IP address of the STA changes. This fixed IP address is also known as a "care of" address. From this moment on, the STA keeps the server posted of the real IP address of the STA, and the STA can use (in its communications with the rest of the Internet) the "care of" address (or its home address) as if it was its own fixed address.

[0029] Any IP data packet that is sent to the care-of IP address is tunneled by the

Mobile-IP server to the current IP address of the STA. For packets originating from the STA to the Internet, the STA can tunnel the packets to the Mobile-IP server, which replaces the IP address with the care-of address. However, many times the STA can simply write its care-of IP address as the source address of the IP data packet, as many times, the source address of IP packets is not checked what-so-ever in the course of routing the IP data packet in the Internet.

[0030] The Mobile-IP solution can be applied as long as the handovers are not performed too often. However, it incurs the punishment of routing all incoming packets through a server, causing both an increased travel time for the data packets, as well as latency (or disconnection) for the time that the real IP address changed, but the server is not informed yet. If the round-trip-time of the packets between the STA and the server is longer than the time a STA stays with the same IP, this method fails, as by the time packets reach the reported location of the STA, the STA is already in another location.

[0031] For many applications, such as voice, it is of utmost importance to minimize the time spent on the handover process. The time consumed by the handover process is usually dominated by the scanning step (Step 1 as mentioned above), and by Step 4 (specifically in case of an unmanaged network). There are many solutions that address fast handovers in cellular networks, and a few solutions that address fast handovers in managed WiFi networks (for example, see: WO2004/054283, which reduces Step 1 (mentioned above) by selective scanning but requires modifying the AP). None of these solutions deal with the delay due to Step 4.

[0032] It is an object of this invention to provide very fast handovers even in unmanaged networks.

[0033] Another barrier for wireless applications is that WiFi coverage might exists, and security policy might allow the STA to connect, but the AP might be out of resources (for example, there are 2007 associated STAs, and therefore it has no resources left, or that it has a limited IP address space which was already allocated through DHCP, and it has no IP address to allocate). It is an object of this invention to provide a system and method that allows STAs to use the services of the AP even

when some of its resources are exhausted.

[0034] Another barrier for many wireless applications is the complex configuration of wireless parameters of STA, especially the security parameters. A user that purchases a new STA and has an existing AP, might wish to configure his new STA to work with his AP. This configuration includes entering into the STA the encryption key and authentication key that would allow it to use the AP. Existing solutions require a change in the AP and STA, such that a special key can be pressed simultaneously at both ends to perform automatic configuration (like Buffalo INC's AirStation OneTouch Secure System--AOSS, or Broadcom's SecureEasySetup). Without such a solution, the user is usually forced to punch into his STA the security codes (which are typically long). The problem worsens when the STA moves between APs that use different security settings.

[0035] It is an object of this invention to provide for easy configuration on both levels: at the initial setup and while roaming.

[0036] Another barrier for many wireless applications is that WiFi coverage might exist, but it is locked and unavailable for use for the STA. It is an object of this invention to provide a solution for (legally) accessing locked APs.

[0037] Another problem with WiFi is that the WiFi protocol is not optimized for low battery consumption (compared to cellular protocols such as GSM). In current solutions, if the STA moves between APs and changes its IP, it must use mobile IP and inform an entity (server) in the network of its current IP (we refer to this process as "location update", as the STA updates the network entity of its location). Frequent location updates exhaust the STA's battery. Another problem with frequent location updates is that they create a heavy load on the network and on the network entities that manage and keep track of the STA's location.

[0038] The situation in WiFi is very different from the situation in cellular networks in two ways. Both of the ways cause an increase in the number of location updates in WiFi: First, in cellular network, the cells are typically much larger than a "cell" that is created by a WiFi AP. Therefore, in cellular networks, there are fewer transitions

between cells, and hence less location updates. Second, cellular protocols allow defining a "location area" that encompasses several cells, and the STA is required to perform location update only when moving between location areas, and thus reducing the number of location updates. Current WiFi protocols are not built to support location areas.

[0039] It is an object of this invention to provide a method that reduces the number of location updates required for STAs while moving between APs.

[0040] It is an object of the current invention to provide solutions to the above mentioned problems, using both a centralized (server based) approach, and also by providing a method for performing the solutions using a distributed peer-to-peer network. Therefore, no huge servers and no large investments are required.

DISCLOSURE OF INVENTION

[0041] The invention is described by way of example, but it should be obvious to persons skilled in the art that many variations thereof may be implemented.

[0042] A novel aspect of the invention relating to the deployment of APs is that devices function at the same time as STAs and as APs. This allows a STA to also create a new AP for connecting other STAs to the Internet therethrough. It is known in the art that a STA wireless card can operate in one of two modes, STA or AP. The present inventor has found a way to activate a device simultaneously in both modes.

[0043] According to another novel aspect, a connecting STA can limit the set of Internet addresses or internet sites that other STAs which connect through it can access, but the set of allowed addresses includes a special web site from which other STAs can download the Vagabee.TM. software. Vagabee software includes the functionality of the software of the first STA, to open new APs and further spread the Vagabee.

[0044] Once the new STAs download and execute the Vagabee software, the first STA detects that the software is running on the new STAs, and allows them a wider

access to the internet. Therefore, new STAs must download and run the Vagabee software to get wide access to the internet. As the new STAs run Vagabee, they become APs in their own right and allow other STAs to download and connect through them to the internet in the current location of these STAs, as well as in any other location they go.

[0045] Another novel method of the present invention allows a STA to connect through two or more APs simultaneously. Thus, a STA can enjoy a more stable connection even if part of the connections are of borderline quality. Furthermore, more connections may achieve a broader connection to the Internet, or may balance its traffic such that each STA carry a lighter burden with regards to the extra bandwidth they carry due to a new STA.

[0046] Multiple connections also allow faster handovers, as if a STA is moving from one place to the other it can first establish a new connection and then the old connection is terminated, practically leaving the STA connected.

[0047] In a further development of the novel method, a laptop (the terms STA and laptops are interchangeable, we use laptop rather than STA as in the preferred embodiment these cases the STA would be a laptop) can connect with another laptop directly or through a STA, such that both enjoy the Internet connection of the other. As the internet connection is not used all the time (typical laptop uses on average a few percents of its maximum bandwidth), both laptops will experience a much faster connection to the Internet.

[0048] Another important issue is the security of the system. A Laptop might agree to act as an APs, but it does not agree to allow other STAs to access its inner network (i.e., the laptop owner wishes to allows these STAs to access the internet through its private network but does not allow them to access computers on its private network. Another security concern is that the new STAs may desire to prevent the first STA from tapping into their Communications, i.e., they do not want the first STA to be able to tap into communications that the first STA relays. The current disclosure provides novel method to deal with these two problems.

[0049] First, external STAs (new STAs) are not allowed access to computers in the inner network by having the first STA drop data packets from the external STAs that are designated to local IP addresses on the inner network. Second, a new STA's privacy is protected by tunneling its sensitive traffic to a trusted network site, and the new site accesses the Internet through his tunnel to the trusted network site which acts as a proxy for it.

[0050] An important issue is to prevent STAs from using other laptops for their primary network connection for a long period of time. A novel method detects that a STA is connected to the internet through the same laptop for a long period of time, and disconnects the STA. Alternatively, the STA has to pay to continue and use the network. The pricing can be such as to encourage the STA's user to purchase his own connection from an independent Internet Service Provider (ISP).

[0051] In yet another novel method, the software running on a laptop can replace the commercial banners that appear in the web pages the laptop surfs into, as well as the web pages that connected STAs surf into. The banners can be stopped, replaced, and made specially targeted to the user, for example based on his location.

[0052] A further novel method is that the wireless internet coverage that is obtained using laptops can be used by devices such as wireless IP phones to make phone calls using the wireless internet coverage, cellular phones that have built-in WiFi connection, or digital cameras with WiFi that wish to upload the data stored in them. Other devices might include for example, radio or TV broadcast capabilities.

[0053] For example, Digital cameras might be equipped with WiFi. The owner of such a camera would like to upload his pictures from the camera to a server that stores the pictures on the Internet--the reasons for this may vary from being able to share the photos while on vacation with family members left at home, backup the pictures from the digital camera to the Internet server, or simply because the memory card on the camera is running out of space. A major problem is that to upload the pictures to the Internet may take a very long time, as pictures consume megabytes to store. In the novel method, the camera can send the photos to the laptop over WiFi (this connection is very fast), then disconnect and move on. Then, the laptop uploads the

pictures to the Internet server (this process can take a long time as it involves uploading a lot of data), but the laptop owner would not feel it as a burden, since the pictures can be uploaded when his Internet connection is not used for other purposes.

[0054] Improvements to this method may include: The camera can encrypt the pictures so that the laptop owner cannot see them. The pictures can be still stored in the camera after being uploaded to the laptop, as the laptop might fail to upload them. The next time the camera connects to the Internet, it can check with the Internet server that the pictures arrived correctly to the server. If that is so, the pictures may be erased from the camera. Otherwise, the camera can re-transmit the pictures.

[0055] To have faster uploads, the camera can upload the pictures to several laptops that would upload the picture to the server.

[0056] Another novel method relates to configuring STAs to connect to a wireless network. The configuration, and especially the security configuration of STAs to connect to a wireless Internet connection such as WiFi is cumbersome and annoying to most users. Assume a STA belongs to the same user (or user group) of the owner of a laptop. Then, by a special logging into a website, the configuration of the laptop can be copied to the STA, thus configuring it to use the AP (i.e., allowing a connection without the laptop).

[0057] Another novel method allows devices with a trusted hardware to receive information that instructs them how to directly connect to AP, by providing them with the needed settings and security information.

[0058] One of the novel aspects of a very fast handover is to practically "almost complete" the process of the handover before it even started, possibly with the assistance of another STA that is already in the new AP's coverage (further details are described later).

[0059] Another novel aspect is that the same MAC address and IP address can actually be used by more than one STA. The differentiation between the STAs can be performed by using higher protocol identification, such as different port numbers (for

example TCP ports), as detailed later.

[0060] It is useful for a station STA to know the identity of the adjacent APs that the STA might hand over to. The identity of an AP can be established in several ways, as disclosed herein. The SSID (Service Set ID) of the AP is usually broadcasted by the AP using periodical transmissions known as beacon. However, two adjacent AP may have the same SSID. In such a case, the MAC address of each AP is different, and APs can be differentiated based on their MAC address (which serves as a globally unique identification parameter). Some APs do not transmit beacon, and only respond when they are addressed using their SSID. In this case, a priory-knowledge is needed, see below.

[0061] Another aspect of the invention is for a STA to selectively scan for a neighboring AP in the following novel way. Assume that a STA scans to see if it can receive the beacon of a second AP, where the scanning will be performed exactly when the second AP is expected to transmit its beacon, therefore, the disconnection from the first AP will be minimal. The novel method consists of scanning and storing (in network entities) information about the relative time between adjacent APs, and their relative clock drift. This information is retrieved at the appropriate time such that the STA knows to wait for the beacon just before it is transmitted.

[0062] Another aspect of the invention is to prevent exhaustion of resources at the APs. GN keeps a pool of MAC addresses with associated IP address. Just before a STA enters the AP, GN sends it a MAC address and an IP address that are already associated with the AP. Therefore, the STA can connect even if the AP has no resources left for new STAs.

[0063] Another novel aspect of the invention is to save Battery Power and reduce network load by reducing the number of Location Updates in WiFi. A location update is the process in which a STA informs an entity in the network on its current location (the notification can take many forms, including opening a TCP connection, or sending UDP packets). In prior art for 802.11 networks, a location update is required whenever the IP address of the STA changes (for example, when moving between APs of different subnets)--even if the STA is idle (not transmitting or receiving data).

The novel method allows to define a location area for WiFi, such that an idle STA needs to perform location update only when it moves between APs that belong to different location areas, but does not need to perform location update when it moves between APs of the same location area, even if its IP address changes. See further details later.

[0064] A pseudo-beacon is another aspect of the invention which allows reducing the number of Location Updates. It is a message that GN can periodically transmit in each AP. While some APs might permit a remote node to transmit a message in the AP, other APs might not allow it. In the novel method, a certain MAC address, IP address, and possibly a port number, are allocated in each AP for the purpose of pseudo-beacon transmission. Further details are described later.

[0065] Configuring the security in new STAs to work with an existing AP might be a tedious job, as the security (authentication/encryption) code might be very long as known in the art, and the user might need to punch it into the STA. A novel solution for easy configuration is disclosed. Unlike previous solutions, the novel method does not require changing the existing AP of the customer. In one embodiment, software is run on a personal computer of the user (that is already configured to access the WiFi). Then, the software establishes a secure channel with the STA, and copies the security information from the personal computer to the STA. In this way, the STA learns the security parameters. An authentication phase in which the STA is authenticated by the software or a remote server can be added before copying the security information.

[0066] In another embodiment, the customer first connects the STA by wire to its network (or alternatively, the STA first connects using a connection it establishes through an already connected device, such as a personal computer or laptop).

[0067] As the STA can receive and transmit signals on the wireless network and it is connected to the internet (through the other connection) at the same time, it tries to locate the web configuration of the AP on the wired network (most APs have a web interface). In most cases, it is an easy job for the STA, as either the STA can locate the AP as it is the default gateway of the wired network, or it can try to find its IP by performing RARP (Reverse Address Resolution Protocol) using the wireless MAC

address of the AP (which it can see off-the-air). Further details are described later.

[0068] Another novel method for gaining access to locked networks is disclosed. While performing the above described easy setup (or at any other time), the user is prompted, if he wishes, to join a swapping service. The swapping service allows the user to gain access to many locked networks (the locked networks of the other users that joined the swapping service), in return he allows users to use his network for the purpose of connecting to the Internet. If the user agrees, the access parameters to his network (encryption key, MAC address, default gateway, etc.) are securely stored in the network (for example in GN, and a backup server). The security information will be securely sent directly into the hardware of other STAs, when they need to connect using his AP. Further details are described later.

[0069] Another novel aspect of the invention takes advantage of the fact that the wireless network is local in nature, as the APs are geographically adjacent. As a result, the methods that are disclosed can be implemented by many small devices on the Internet, each responsible for a geographic area. The devices form a peer-to-peer network that implement the methods, without the need to rely heavily on large servers.

[0070] Another novel aspect of the invention is to have a STA which has a capability of communicating in two or more channels in parallel. This capability can enable a STA to be connected to two APs in parallel without the need to implement sophisticated mechanisms that actually simulate this situation. Thus, a STA can connect with future APs while maintaining a connection through its serving APs. Being connected to two APs simultaneously allows greater bandwidth by utilizing two connections instead of one, and soft-handovers, i.e., the STA stays connected through one AP, while disconnecting from the second AP in the process of handover.

[0071] The new system and method refers, among others, to the following innovative features:

[0072] 1. A viral-like fast spread method for the Vagabee.TM. software:

[0073] at the network level

[0074] at the already connected PC

[0075] at a connecting PC, already having the Vagabee software

[0076] at a connecting PC, not yet having the Vagabee software

[0077] details of the software package being loaded on a new computer: functions, operation, how installs, how spreads further away to other PCs.

[0078] 2. Detail the viral spread method:

[0079] use of existing standards; "as is" or with modifications

[0080] method of reporting to user and getting a user's approval

[0081] interaction with firewall and antivirus programs in the PC

[0082] 3. Vagabee in use, with flow charts:

[0083] manage communications with presently connected PCs

[0084] add new PC

[0085] remove a PC. Recover chain, reestablish communications when intermediary PC disconnects

[0086] resolve conflicts where there are several Vagabee systems in one area.

[0087] Method of operation, so the networks will not interfere with each other, rather they may assist each other and maybe provide backup functions.

[0088] Knowing the identity of adjacent APs and the location of STAs.

[0089] handoff to another local Vagabee network

[0090] 4. Vagabee in use, system design:

[0091] workload on the various PCs in the chain (the workload increases as one moves closer to the AP, the Internet connection)

[0092] overhead, signaling and control, traffic control. Define signals, method of operation

[0093] permission to access more sites on the Internet after a new PC downloads and activates Vagabee--how implemented.

[0094] reliability issues

[0095] 5. System design for various configurations

[0096] The basic assumptions greatly affect the performance of the network systems which may be formed:

[0097] a PC connects to only one additional PC

[0098] a PC may connect to one or two additional PCs

[0099] a PC may connect to more than two additional PCs

[0100] 6. Bandwidth control

[0101] Bandwidth request and allocation. For the various PCs in the chain.

[0102] Methods for improved channel use. How is implemented.

[0103] 7. Privacy issues--how the inner/outer areas are implemented.

[0104] Protection from viruses and eavesdropping, passwords protection, etc.

[0105] Damage control, Recovery from a virus attack.

[0106] This is a vital aspect of the new technology.

[0107] 8. User control and supervision

[0108] the user of a PC decides whether to install Vagabee

[0109] the user of a PC decides whether to allow additional users to connect, with what parameters (bandwidth allocation, etc.)

[0110] incentives for a user to allow his computer to connect others.

[0111] the user allows or forbids additional users, according to circumstances--how important his present activity is, what is the quality and bandwidth allocated to that user (how much spare bandwidth there is)

[0112] 9. Details of implementation--software

[0113] New software

[0114] Modified existing software

[0115] Method of use of existing software, standards

[0116] 10. Functions, benefits to users--detail methods to implement them

[0117] free internet connection

[0118] enhanced bandwidth, reliability

[0119] provide additional services--locate gas stations, Pizza Hut, restaurants.

BRIEF DESCRIPTION OF DRAWINGS

[0120] FIGS. 1 and 2 illustrate a wireless system for connecting mobile devices to the Internet through an access point

[0121] FIG. 3 illustrates an expanded wireless system for connecting mobile devices to the internet through more than one access point

[0122] FIG. 4 details a method for fast spreading the Vagabee software by providing free wireless access to the Internet.

[0123] FIG. 5 details the dual mode connectivity of a STA also functioning as an AP with the Vagabee method and software

[0124] FIGS. 6A to 6F detail stages in a wireless network evolvement and spreading of the Vagabee software

[0125] FIG. 7 details a method addressing control and security aspects of the Vagabee spreading method

[0126] FIG. 8 details a method addressing coordination and control aspects of the Vagabee spreading method for the first, connecting STA

[0127] FIG. 9 details multi-AP, fast configuration setting and handover aspects of the Vagabee spreading method for the second, to be connected STA

[0128] FIG. 10 details multi-AP, fast secure configuration setting and redirection aspects of the Vagabee spreading method for the first, connecting STA

[0129] FIG. 11 details multi-AP and fast configuration setting aspects of the Vagabee spreading method for the second, to be connected STA

[0130] FIG. 12 illustrates a system including mobile stations (STAs) and their Access Points (APs), with one STA moving from the coverage of one AP to the coverage of another

[0131] FIG. 13 illustrates a wireless system facilitating handover and including a STA, a Governing Node (GN) and another user, Termination Node (TN)

[0132] FIG. 14 details the handover method

[0133] FIG. 15 details a method for implementing two connections with a STA.

[0134] FIG. 16 details a method for connecting other STAs

[0135] FIG. 17 details another method for connecting other STAs

[0136] FIG. 18 details a method for configuring other STAs to directly connect to the AP

[0137] FIG. 19 details another method for configuring other STAs to directly connect to the AP

[0138] FIG. 20 details yet another method for configuring other STAs to directly connect to the AP

BEST MODE FOR CARRYING OUT THE INVENTION

[0139] A preferred embodiment of the present invention will now be described by way of example and with reference to the accompanying drawings.

[0140] Dual Use Laptop Simultaneously Connected to the Internet and Serving as AP

[0141] FIGS. 1 and 2 illustrate a wireless system for connecting mobile devices to the Internet through an access point. It may use a novel method for performing the

deployment of APs, i.e., the method that allows devices to function at the same time as STAs and as APs. For example, a laptop 11 is connected to the Internet through access point AP 10, and at the same time, laptop 11 shares its connection for other STAs by operating as an AP. Thus, other STAs 12 and 13 look at laptop 11 as an AP, and can connect through it to the Internet.

[0142] When laptop 11 is connected to AP 10 through a wired connection, it can simply set its wireless connection as an AP (Infrastructure mode). However, when laptop 11 is connected to AP 10 through a wireless connection, the situation is more complex. Disclosed is a novel method in which laptop 11 can be connected to AP 10 and serve as an AP using only a single wireless network card. Laptop 11 connects to AP 10 just like any other STA, and at the same time runs the protocol stack of an AP.

[0143] Laptop 11 uses the same channel as AP 10, and transmits a beacon message such that the beacon of AP 10 and the beacon of laptop 11 are expected not to collide in time. Laptop 11 derives and updates its internal clock from AP 10, but adds a constant delay (to make his beacon appear with a delay after AP 10).

[0144] In another embodiment, laptop 11 does not add a delay to the time of AP 10, but sets the beacon period to a value, such that the greatest common denominator (GCD) between its beacon period and the beacon period of AP 10 is the smallest that is possible. Such a choice of beacon period ensures minimal collisions between the beacons.

[0145] In the preferred embodiment, laptop 11 will run a Network Address Translation (NAT) and a DHCP server as part of his protocol stack. Running DHCP enables laptop 11 to provide an Internet address to STAs that connect to it. Running a NAT allows laptop 11 to connect other STAs through it, while keeping conformance with regards to AP 10-To AP 10 all the communication appears to be originating form laptop 11.

[0146] The software package 31 may be contained in the laptop 11, or in the laptop 11 and the STA 12, for example.

[0147] Viral Spreading

[0148] Many networks suffer from the network effect in their infancy, in which the first users have no incentive to join the network. However, the network is of great value once many users are in the network.

[0149] The following method and system attracts the first users, and provide an increasing value as the network grows. The first very few laptops with the software are installed and deployed in key areas by the network initiator. The software running on the laptop 11 has functionality 31 as follows (explained through an example):

[0150] Laptop 11 acts as an AP and allows other STAs to connect to it. To further lure STAs, the SSID (Service Set Identification--this is the name of the network that users see when looking for an available network) can be set to "Free Internet" or another name that will attract roaming laptop users to log-into it while searching for wireless networks.

[0151] Assume a user using a laptop called STA 12 connects as described above. Once STA 12 is connected to the laptop 11 (laptop 11 serves as an AP), no matter which web site the user tries to enter, the software 31 on laptop 11 forwards the connection to a special web site 30. The web site 30 informs the user (STA 12) that, in order to use the free connection, it must install a software with functionality 31. The deal is that the user is allowed the free access at this location, but it is requested to share his own connection when he has one at his disposal. The user then downloads and installs the software with functionality 31 (See FIG. 1.B which shows software with functionality 31 running on STA 12. Once laptop 11 identifies that STA 12 has functionality 31 running, it allows it a wider access to the internet (or a full access to the public Internet).

[0152] Thus STA 12, which originally did not have functionality 31 running, but its user wished to connect to the internet, ended up with functionality 31 installed and running on STA 12, and the user received a working internet connection. When the user moves STA 12 to another area in which it connects directly to an AP (which might be locked), it shares its connection with other STAs, which are also motivated

to install functionality 31. Thus, functionality 31 can spread quickly among STAs, and the total area that is served grows larger, where each additional STA spreads the network further.

[0153] Laptop 11 together with its software might need to use two different security parameters at the same time--one towards AP 10 (which might be locked), and open security towards other laptops--so they can connect with no security settings. Once functionality 31 is running, it can establish a secure connection with laptop 11 as a secure layer on top of the fundamental insecure wireless.

[0154] Connection Through Multiple Access Points

[0155] Another novel method of the present disclosure allows STA 14 to connect simultaneously through two or more APs, see FIG. 3. For example, STA 14 connects through both laptop 11 and laptop 21 to the internet. Thus, STA 14 can enjoy a more stable connection even if both connections (through laptop 11 and 21) are in borderline quality. Furthermore, even in case the connections are not in borderline quality, they can be used to provide STA 14 a broader connection to the internet, or balance his traffic such that laptop 11 and laptop 21 carry a lighter burden per laptop with regards to the extra bandwidth they carry due to STA 14.

[0156] Multiple connections also allow handovers. When a STA is moving from one place to another, it can first establish a new connection and then the old connection is terminated, practically leaving the STA connected.

[0157] When laptop 11 and laptop 21 use the same WiFi channel, STA 14 connects to both laptops by creating two protocol stacks on the MAC (Media Access Control) layer. When laptop 11 and laptop 21 operate on different channels, STA 14 agrees with laptop 11 and laptop 21 on period of times in which laptop 11 sends packets to STA 14, and periods of time in which laptop 21 sends packets to STA 14. STA 14 makes sure that these periods of times do not overlap, thus, STA 14 sets the channel according to the period, such that it listens on the channel of the laptop that might transmit to it. If the laptop has packets pending for STA 14 it queues them for transmission in the transmission period.

[0158] In order to have a faster connection through the two (or more) connections, STA 14 downloads/uploads some of the information through one connection, and the rest through the other connection. For example, when downloading a web page, STA 14 can download the text through one connection, and download the images through the other connection.

[0159] In another embodiment a remote site 50 with a fast Internet connection acts as a proxy of STA 14. Incoming and outgoing packets are forwarded between STA 14 and remote site 50. The packets are sent using error-correction codes that allow reconstructing the data even if some packets are lost on one connection, but some packets reach the destination using the other connections. The role of remote site 50 can be assumed by a service provider, by computer with a software that the user installs in his premise, or by another user with high bandwidth.

[0160] When the STA moves from one location to another, new connections are being established, while other connections are being disconnected. However, as long as there is at least one active connection, the STA will stay connected to the Internet continuously and seamlessly.

[0161] Sharing Internet Connection Between Laptops

[0162] When laptops 21 and 11 are within radio (wireless) contact (or through the mitigation of other STAs), each laptop can treat the other as another connection at his disposal. Thus, the maximum data rate available for each laptop can be significantly extended, much like the case with a STA connected to two laptops.

[0163] FIG. 4 details a method for fast spreading the Vagabee software by providing free wireless access to the Internet. The method includes:

[0164] a. First STA transmits "AP available" WIFI info 41

[0165] b. Info is presented to Guest 42

[0166] c. Guest chooses our AP? 43

[0167] d. Allow limited access to Guest including our Web site 44

[0168] e. Guest agrees to use our service? 45

[0169] f. Download connectivity software to Guest and activate it 46

[0170] g. Connect Guest to Internet and allow wider access 47

[0171] h. Guest transmits "AP available" info and further spreads our service 48

[0172] ** End of method **

[0173] Note: It is not mandatory to perform all the above stages. The more important steps are 45-47 or any similar implementation.

[0174] FIG. 5 details the dual mode connectivity of a STA also functioning as an AP with the Vagabee method and software. The method includes:

[0175] a. First STA associates with an AP as a regular STA 411

[0176] b. First STA activates "AP" protocol stack with open security 412

[0177] c. Guest chooses our AP? 42

[0178] d Address translation to connect Guest to our Website 445

[0179] ** End of method **

[0180] The above method has been implemented by the present inventor on a communication device using the Intel 2200 chipset, just as an example to show that it can be done. The present inventive approach and method may be used towards similar implementations with other communication devices.

[0181] FIGS. 6A to 6F detail stages in a wireless network evolvement and spreading of the Vagabee software, including:

[0182] FIG. 6A: There is a Laptop 11 connected to the internet by wireless through the access point AP 10.

[0183] FIG. 6B: The Laptop 11 also functions as AP using the Vagabee software, thus allowing free access for STA 12 through Laptop 11.

[0184] FIG. 6C: STA 12 joined the Vagabee group, created a new AP to also connect Laptop 121. A long chain can thus be formed.

[0185] FIG. 6D: each AP can connect several new devices, as illustrated here with Laptop 122.

[0186] FIG. 6E: a multi-AP network may be configured, with a plurality of devices being connected through both AP 10 and AP 20. A device such as Laptop 122 can be simultaneously connected through more than one AP to the internet.

[0187] FIG. 6F: As the initiated device Laptop 124 moves to another location and connects to AP 24 (maybe it has a license or privileged access there, while Latop 125 and STA 126 cannot connect directly to AP 24 due to distance or lack of security parameters), the Vagabee software in device 124 opens a free AP at that location, now being utilized by Laptop 125 and STA 126 to connect to the internet. At a separate location, AP 10 may still operate and connect STA 12, Laptop 121 etc.

[0188] Security

[0189] Another important issue is the security of the system. Consider a situation (shown in FIG. 2) in which laptop 11 agrees to act as an APs, but it does not agree to allow STA 13 and STA 14 to access his inner network (i.e., it allows STA 13 and STA 14 to access the internet through his network but does not allow them to access computers in his network. For example, a private server 40 should not be accessible to

them). On the other hand, STA 13 wishes to use laptop's 11 network, but might not wish laptop 11 to be able to tap into the data that STA 13 exchanges with Internet servers. The current disclosure addresses these two problems using a novel method. First, external STAs are not allowed to access to the inner network by not allowing them to access to local IP addresses. Second, STA 13's privacy is protected by tunneling its sensitive traffic to a trusted network site 50, and STA 13 accesses the internet through its tunnel to the trusted network site 50, which acts as a proxy of STA 13.

[0190] To prevent STAs from accessing the inner network, laptop 11 blocks all traffic from the guest STAs to internal addresses (i.e., addresses that appear only in local networks and not in the public internet, such as 192.168.*.*, or 10.*.*.*, and 172.16.0.0-172.31.255.255). Another method, which can be applied independently, is to allow the connection if it is at least x hops into the Internet, where x is the maximum number of hops in the local network (which can be discovered by performing a traceroute command). Another method is to allow access to addresses which have an IP address with a different prefix, as internal networks typically have the same prefix on the IP address.

[0191] In another method, laptop 11 allow only packets to and from known servers such as trusted server 50 (i.e., white listing the allowed addresses).

[0192] To protect the privacy of STA while it is surfing, its traffic can be tunneled to a trusted network site 50, which acts as its proxy. The network site can be replaced by simply tunneling the connection to another node in the network, and switching the network node once in a while. The access to the remote nodes is made without identifying the STA, but only proving that it belongs to the group of STAs, thus, its privacy is preserved. The frequent switching of remote nodes eliminates the possibility that a remote node can gather a significant amount of private information from peeking into the communication. The list of available remote nodes can be kept by a directory service, which can be distributed in a peer-to-peer fashion.

[0193] In another embodiment, the remote node is a trusted computer installed by the user. Such a configuration has the added benefit that the user can access internal

nodes in his own private network, effectively having a Virtual Private Network (VPN) with his home network.

[0194] FIG. 7 details control and security aspects of the Vagabee spreading method including:

[0195] a. First STA transmits "AP available" WIFI info 41

[0196] b. Info is presented to Guest 42

[0197] c. Guest has Vagabee software? 425

[0198] d. Guest agrees to use our service? 45

[0199] e. Download connectivity software to Guest and activate it 46

[0200] f. Connect Guest to Internet and allow wider access, excluding private servers/sites 472

[0201] g. Guest transmits "AP available" info and further spreads our service 48

[0202] h. Guest uses encryption and secure website to preserve privacy from connecting STA 481

[0203] i. Establish best route for all STAs 482 adaptive to changes in network.

[0204] Load balancing.

[0205] Connections thru multiple routes.

[0206] j. Connection time>Ts? 483

[0207] k. Disconnect/change connection 485

[0208] *** End of method ***

[0209] Note: Not all the steps above are mandatory; a method may implement only part of the steps in the above method.

[0210] Maintaining Fairness

[0211] It is desirable to avoid an unfair situation in which one user exploits the network by continuously using a connection without ever sharing a connection. If many users follow these lines, the network experience will degrade as there will be only a small number of laptops connected directly to APs. A novel mechanism detects that a STA is connected to the internet by noting that the same STA (using the same laptop) connects from the same small area (or through the same AP) for a long period of time (i.e., beyond a threshold). For example, this threshold can be set to two weeks. Once a STA passes the threshold, the functionality 31 notes the user that the threshold is reached.

[0212] The user is then required to move to another area or pay a small fee to continue and access the AP.

[0213] Functionality 31 may note the user when the threshold is being approached, even before it actually reaches it. It can then give a pre-warning to the user.

[0214] The laptop is identified through his account information, through the MAC address of his network card, and other machine-specific information, such as the serial number of the hard-disk.

[0215] FIG. 8 details coordination and control aspects of the Vagabee spreading method for the first, connecting STA, including:

[0216] a. First STA connects to AP in "AP" mode 412

[0217] b. Set wireless connection as "Ad-Hoc" using the same channel as the AP 413

[0218] c. Transmit beacon message at a delay after AP or set beacon period so as to minimize collisions 415

[0219] d. Act as AP for additional STAs, while preventing them access to its inner network 416

[0220] e. Replace commercial banners for own site and also for STAs connected to this STA 417

[0221] f. Security Option: Allow connection of connected STAs only if it is at least X hops into the Internet 418

[0222] g. Maintaining fairness: demand a connected STA to disconnect or move or pay after a predefined time 419

[0223] ** End of method **

[0224] FIG. 9 details multi-AP, fast configuration setting and handover aspects of the Vagabee spreading method for the second, to be connected STA, including:

[0225] a. Connect through a first AP 481

[0226] b. Activate Vagabee to provide AP service to other STAs 482

[0227] c. Search for additional paths to 483 establish multiple simultaneous connections thru multiple APs

[0228] d. Copy configuration of connecting STA, 484 to gain direct access to the initial AP, or receive connecting instructions for STAs with trusted hardware

[0229] e. Preserve privacy using tunneling 485 to a trusted network site for sensitive traffic

[0230] f. Perform handover whenever necessary 486

[0231] g. When moving to a new location: 487 establishing a connection with available AP, Activate Vagabee to provide AP service to other STAs

[0232] h. Maintaining fairness: demand a connected STA 419 to disconnect or move or pay after a predefined time

[0233] i. Control over advertisements (optional)

[0234] *** End of method **

[0235] In a novel method hereby disclosed, the functionality 31 can scan the web pages that pass through it and block or replace the advertisements on the page depending on various data such as the user name, the user location, etc. The advertisements can be performed in collaboration with the web site that is being surfed into, or without.

[0236] Note: the functionality (or software module) 31 is an important part of the present method, a minimum requirement to allow Xiopea.TM. spreading. Moreover, module 31 need not include all the possible things that this functionality can include, rather just the bare minimum directed toward allowing a connection to a STA in return to supporting the spreading of the this software.

[0237] The site 30 can instruct functionality 31 as to which advertisements should be removed or changed, and which advertisements should be placed. New advertisements can also be added in places that there were no advertisements to begin with.

[0238] The software 31 running on laptop 11 can replace the commercial banners that appear in the web pages that laptop 11 surfs into, as well as the web pages that STA 13 surfs into. The banners can be stopped, replaced, and made specially targeted to the user, for example based on his location.

[0239] Configuration of Wireless Networks

[0240] An annoying task associated with wireless networks is the configuration of a STA to work with a network. The security settings are especially annoying, and currently, many people avoid securing their network due to the cumbersome setting procedure.

[0241] A novel method is disclosed to perform easy configuration of a wireless settings. The method is composed of two parts, the first is establishing the settings for the first device, and the second part is establishing the settings for the rest of the devices. First part: Assume a user on laptop 11 is connected to his wireless AP 10. If AP 10 is not set to use encryption, the user can ask (or be offered) to secure his network. Functionality 31 automatically accesses the interface of AP 10 and configures it with security settings. Laptop 11 is also set with the security settings. The settings are also stored in an account in web site 30, for future use. Site 30 can also provide functionality 31 with the information on how to set the security setting on the specific model of AP 10.

[0242] Second part: When the user uses another device STA 12, he connects to the network through functionality 31 on laptop 11, which redirects him to web site 30. On the site, he can log-in using his account details. Web site 30, through functionality 31 which is running on laptop 11, discovers that the two devices (laptop 11 and STA 12) are both connected through AP 10, and both belong to the same user account. As a result, web site 30 offers the user to reconfigure STA 12 to work directly with AP 10. The user is advised to download functionality 31 to STA 12, and run it. Once functionality 31 is running on STA 12, it configures STA 12 with the settings of the network (which are retrieved from web site 30, or directly from laptop 11).

[0243] FIG. 10 details multi-AP, fast secure configuration setting and redirection aspects of the Vagabee spreading method for the first, connecting STA, including:

[0244] a. First STA connects to AP in "AP" mode 412

[0245] b. Establish settings for first STA: 511 configure AP with secure settings, set

STA with secure settings.

[0246] Store settings in web site.

[0247] c. Redirect a connecting STA to the web site 512 to configure it with secure settings.

[0248] ** End of method **

[0249] FIG. 11 details multi-AP and fast configuration setting aspects of the Vagabee spreading method for the second, to be connected STA, including:

[0250] a. Connect through a first/available AP 481

[0251] b. STA has secure sub-system trusted by the web site? 482

[0252] c. Web site allow it to retrieve the 483 settings of the network for direct connection

[0253] d. Both STAs use the same AP 484 and same user account?

[0254] e. Agrees to connect directly to AP? 485

[0255] f. Download functionality and activate it 486

[0256] g. Configure STA with the settings of the network 487

[0257] ** End of method **

[0258] Many variations can follow to the above procedure, and should be clear to those skilled in the art. For example, the settings may be stored on laptop 11 instead on web site 30, the settings may be encrypted, and the sequence of events can be changed. The result is an easy configuration of the network by the user.

[0259] FIG. 12 illustrates the mobile stations (STA) with their covering Access Points (AP), where STA 11 is moving from the coverage of AP 31 to the coverage of AP 312. STA 12 is already in the coverage of AP 312, and another AP 313 has a coverage that intersects with both the coverage of AP 31 and AP 312.

[0260] A Network Infrastructure for Other Devices

[0261] Functionality 31 may allow devices that do not have the functionality 31 to access the network. Such a device receives a capability to be identified as eligible to access the network towards functionality 31, and it identifies as eligible to access towards functionality 31 on the laptop in order to gain access to the network. Such identification may include cryptographic means, such as a digital certificate signed by an appropriate certification authority (CA) which gives the device the capability to be identified. Alternatively, the devices can be identified based on their MAC address. A username/password can be added for additional security.

[0262] Configuration of Secure Devices

[0263] It might be desirable to allow a device to directly connect to an AP, rather than connect through a laptop. When devices have a secure sub-system, i.e., a sub-system that is trusted by web site 30, web site 30 may allow it to retrieve the settings of the network (assuming that they are stored on web site 30), and configure the device to use the network.

[0264] As the device has a trusted sub-system, the settings can be stored in the sub-system, such that they do not leak outside.

[0265] Alternatively, functionality 31 can reconfigure the AP to allow access to a roaming device.

[0266] Displaying the Coverage Map

[0267] A problem often faced by users that wish to connect through wireless internet is that they cannot connect to the internet in their current location because the

coverage in their area is locked, and they do not have access rights. A novel method and system helps users find the nearest location from which they can connect. Web site 30 holds a list of all access points from which users can successfully connect, together with all the list of APs from which are closed. The list includes the MAC address of each AP. Parts or all of this list can be downloaded in advance to a device, such as into laptop 11.

[0268] Then, laptop 11 uses the beacons of the APs which might be locked to determine its position (for example, www.SkyHookWireless.com uses beacons to determine the location of a STA). Then, laptop 11 can display on a map the location of the user, and the locations of near by access point in which it can connect to the internet. The user can then go to the nearby locations and connect to the Internet. The list in site 30 can be constantly updated by information that STAs receive.

[0269] In another embodiment, the list of APs in site 30 can also hold the probability that the AP is accessible. The probability can change if the access is provided by a laptop rather than an AP, and the laptop may be present or not. An area covered by several independent APs, each with low probability, results in an area with higher probability of accessibility in the intersection of these areas. The probability of accessibility can be depicted in the map shown to the user, for example, by different colors representing the different probabilities.

[0270] It is understood that the method and system in the present disclosure may be used for the transmission of voice, data, multimedia or a combination thereof.

[0271] Gathering Physical Location

[0272] To display a map of coverage, the real-world physical location of STAs needs to be known. A novel idea is to use STAs that are equipped with both GPS (Global Positioning System) and WiFi to report back to a server (for example, web server 20), a scanning result and the physical location in which the scan was performed. The server can extract the physical location of the fixed APs and store it in a database. At a later time, when a WiFi-equipped STA that lacks a GPS receiver performs a WiFi AP scan, it can report the results to the server, which can use the

database to determine the physical location of the STA. This physical location can be used to provide location-based services.

[0273] Fast Handover

[0274] A novel aspect of very fast handover is to practically almost complete the process of the handover before it even started.

[0275] Consider an example depicted in FIGS. 12 and 13, in which STA 11 is in conversation with TN 41 (TN--Termination node, the node with which STA 11 communicates, shown in FIG. 13), and STA 11 is moving from AP 31 towards AP 32. Also assume that a node GN 21 (GN--Governing Node, a node that is non-exclusively responsible for the mobility management in a certain geographic area for a given time, shown in FIG. 13) is in contact with STA 11, and it is assisting STA 11 during the handover process. STA 11 currently has an IP address, which was allocated to it by AP 31.

[0276] To complete the handover, STA 11 should be associated with AP 32, have an IP address assigned by AP 32, complete any second authentication that is required, and have TN 41 be aware of the new IP address, so it can forward the conversation to the new location.

[0277] Note that in some scenarios (in some cases when there are firewalls or NAT devices between AP 32 and TN 41, the connection between STA 11 and TN 41 must be started from within AP 32 towards TN 41).

[0278] According to prior art, it appears that STA 11 cannot begin the handover process until it reaches the coverage of AP 32, since it cannot start the connection process. One novel solution (that requires changing the software of the AP) is to allow STA 11 to perform the connection process through the Internet, instead of performing it wirelessly. In this way, once STA 11 reaches radio connection with AP 32, it can start working immediately.

[0279] However, we are more interested in solutions where there is no need to

change the AP. To achieve this goal, assume the existence of a non-moving STA 12 in the coverage of AP 32 (we will somewhat soften this assumption later). According to the present invention STA 12 is in contact with ON 21, and receives instructions to impersonate STA 11 towards AP 32 (we will later discuss how to make it possible), and complete a connection process with AP 32 on behalf of STA 11 (including authentication, association, receiving an IP address, performing any second authentication/log-in procedure, and perhaps even opening connections or "punching holes" in the firewall).

[0280] Then, STA 12 communicates these parameters to GN 21 (once the parameters are communicated, STA 12 can return to its real identity). GN 21 communicates the parameters to STA 11 (and perhaps to TN 41), and thus, STA 11 does no longer need to perform the connection process, and once it reaches the perimeter of the coverage (we will later discuss how to identify this situation) it can immediately use the new parameters and continue communications without any delay. STA 11 (or GN 21) can alert TN 41 before the handover, so it can start and send information packets to the new location.

[0281] TN 41 may send the information in parallel to the old and the new location, and cease transmitting to the old location once the handover is complete (e.g., when it receives information from STA 11 with its address from the new AP). STA 12 may even open a TCP (Transmission Control Protocol, as used in the Internet) connection or send a UDP (User Datagram Protocol) packet on behalf of STA 11, if required.

[0282] This connection may wait for STA 11 until it reaches AP 32. If there is a timeout on these connections (either due to protocol, or due to firewalls), STA 12 or other bypassing STAs can send and receive -keep-alive- messages on behalf of STA 11 (as is instructed by GN 21). The timeout for each AP can be discovered over time by trial and error (or by discovering the APs type), and storing this information in GN 21 for future use. ON 21 can notify the STAs on the value of the timeout.

[0283] How STA 12 can impersonate STA 11:

[0284] To understand how STA 12 can impersonate STA 11 towards AP 32, we

must understand how identity is established in the network. The basic identity in the network is the physical address which is known as MAC Address (Media Access Control Address), which is globally unique. Each manufacturer is allocated a portion of the address space and allocates a unique MAC address to every network card (including WiFi network card) that it manufactures. Then, the manufacturer burns the allocated address into the network card. However, in most network cards, an application can (temporarily) change the MAC address of the card to another MAC address.

[0285] The MAC address is not used for end-to-end communications over the internet, but usually only for communications within the same physical network. For example, STA 12 communicates with AP 32 using MAC address, but GN 21 is not usually aware of the MAC address of STA 12. The MAC address is universally unique. We use the feature of temporarily changing the MAC address in the network cards in a novel way, allowing STA 12 to impersonate STA 11.

[0286] Therefore, in the instructions that GN 21 gives to STA 12, it mentions the MAC address of STA 11, so STA 12 can assume the MAC identity of STA 11. Then, STA 12 can complete the association with AP 32 (using the MAC address of STA 11)), in which it receives the Association ID (AID), and completes a DHCP protocol in which it receives an IP address to be used with the MAC of STA 11 while it is using AP 32. STA 12 can also perform a second authentication and log-in on behalf of STA 11.

[0287] STA 12 sends the connection information back to GN 21, which forwards it to STA 11. STA 12 can return to its original MAC address, but the allocated resources at AP 32 remain allocated, as from the point of view of AP 32, STA 11 is already connected and in coverage. In order to avoid losing messages that are sent to STA 12 during its impersonation to STA 11, it can either continue and listen using both its own MAC address and STA 11's MAC address, or it can issue a -power-save- mode command to its serving AP. The power save mode indicates the AP that the STA is sleeping for a while, in which time the AP is buffering the incoming data packets. Therefore, even if STA 12 is connected to the internet using another AP, it can issue a power-save mode command, possibly change the frequency, and perform the

connection on behalf of STA 12. It can return to its serving AP once the connection is established, or pool for incoming messages once in a while.

[0288] First Softening of the Assumption that STA 12 is in the coverage of AP 32: What if STA 12 is not in the coverage of AP 32, and there is no other station in AP 32's coverage--The following process can be performed in advance, well before a handover is needed. GN 21 can ask (in advance) stations that pass through AP 32 to connect and receive an IP address from AP 32 using some MAC address. The MAC address is not necessarily the MAC address of STA 11, as the process is not specific to STA 11. The stations send the connection details to GN 21, which stores the AID, the MAC, the IP address and other connections details in a pool for future use.

[0289] The pool may even contain UDP or TCP connections, which may be kept alive by bypassing STAs (against timeouts of firewalls, Network Address Translator devices (NAT), and protocol timeouts). UDP and TCP connections in the pool are targeted to some node in the network that can forward information for other nodes (for example TN 41). When a connection is required by some STA, the pool is queried, and a resource can be allocated and applied by a STA. As a result, a station might change its MAC address and IP address every time it moves between APs. If the station moves very fast between these access points, GN 21 can predict the direction in which the station is moving based on past movements, inform TN 41 of the possible future addresses.

[0290] Using this method, TN 41 can send data to the new address even before the station actually moved there. In some implementations of the APs and firewalls between AP 32 and TN 41 the STA must first send data before it can receive any data, otherwise, the firewall may block the incoming data, or a NAT (Network Address Translator) device might not know where to forward the data. The restriction, that the STA must be the first to send data, is usually required due to security policy that allows only outgoing connections, or due to NAT device that need to relate an internal IP address and port number with an external IP address and port number.

[0291] For example, in most NAT implementations a connection must be established from within the NATed zone (e.g., the AP coverage) towards the internet.

Many firewalls also require that the connection is established from the private network towards the internet (rather than allowing incoming connections from the internet towards the private networks). In these cases, the data that TN 41 sends is not transmitted by AP 32 until the station reaches the access point and transmits information back to TN 41. Depending on the type of firewalls and NAT devices, TN 41 might be able to predict a port number to which it should send such messages before the first outgoing data packet is transmitted.

[0292] Another associated novel disclosure is that the same MAC address and IP address can actually be used by more than one STA. The differentiation between the STAs can be performed by using higher protocol identities such as different ports (for example TCP ports). Using the same MAC and IP address in more than one STA is not problematic for packets that are sent from the STA.

[0293] However, while receiving an incoming packet, only one STA should send an acknowledgement. As each STA knows the ports that are in use, it only acknowledges messages that are designated to it. GN 21 can coordinate between the STAs such that they do not use the same ports. For example, if there are at most n stations using the same MAC and IP address, station i will allocate port numbers that are equal to i modulo n. Another solution is to choose the port number at random. If each STA uses one port at random, according to the birthday paradox, port collisions occur with very low probability as long as the number of connections is smaller than about the square root of 65536 (i.e., when there are less than 256 connections using the same IP).

[0294] Another idea is to change the software at the AP such that it can communicate with GN 21 and perform the connection procedure on behalf of STA 11.

[0295] Knowing who are the adjacent APs and the location of a STA:

[0296] It is useful for a station STA 11 to know the identity of the adjacent APs that the station might hand over to. The identity of an AP can be established in several ways: The SSID (Service Set ID) of the AP is usually broadcasted by the AP using periodical transmissions known as beacon. However, two adjacent AP may have the

same SSID. In such a case, the MAC address of each AP is different, and APs can be differentiated based on their MAC address. Some APs do not transmit their SSID, but they still broadcast beacon messages with their MAC address. Even if the AP is locked and encrypted the MAC address is transmitted, and it is transmitted without any encryption. In this way, STA 11 can know the identity of adjacent APs, and infer its location.

[0297] Scanning by Idle STAs:

[0298] In a preferred embodiment, GN 21 collects information about APs which are adjacent. Idle stations (i.e. stations which are not in an intensive data transfer) can perform a scanning operation once in a while. As a result they learn the MAC address (and possibly the SSIDs) of the APs within radio reach. The STAs can then send this information to GN 21 which collects it. The idle STAs can also perform tests to check what is the accessibility parameters of an AP (e.g., is it an open and free AP, is it a locked AP and the password is available from GN 21, is it locked and there is no free access to the AP, is there a captive portal, does GN 21 have a username/password available for the captive portal, etc.). All this discovered information is sent to GN 21.

[0299] When handovers are performed, GN 21 takes note of the sequence of handovers that occur, and can learn common paths which are taken (for example, a road or a crosswalk might cause more likely paths than others).

[0300] It is very important that GN 21 knows in advance the AP to which STA 11 will be handed over to and when the handover will occur. Such a knowledge allows, for example, to alert TN 41 of the new location in advance. Gaining accuracy in the prediction of the handover (when and where) translates to better performance, as GN 21 needs to allocate a MAC address and an IP address to STA 11 in the new AP, and TN 41 might start to send data to the new location.

[0301] Therefore, knowing who the neighboring APs are, and their reception quality at STA 11 is very important.

[0302] Scanning by a Non-Idle STA

[0303] In principle, STA 11 can scan the surroundings once in a while and look for the beacons of adjacent APs, and thus measure the reception quality from each AP. However, such a scanning takes a lot of time (might even take couple of seconds for a full scan). Selective scanning for APs which are expected to be neighbors can reduce the scanning time, but it can still stay in the magnitude of a few hundred milliseconds. It is important to understand that during a contemporary scanning using current technology, STA 11 cannot receive or send messages from or to AP 31, which means that the scanning time must be reduced to reduce this disconnection time.

[0304] The novel disclosed method is that STA 11 will selectively scan for a neighboring AP in the following special way. Assume that STA 11 scans to see if it can receive the beacon of AP 33, where the scanning is performed exactly when the AP 33 is expected to transmit its beacon. Therefore, the disconnection from AP 31 will be minimal. The problem is, however, that although the beacons are transmitted periodically, STA 11 does not know when a beacon is expected to be transmitted from AP 33. As the beacons are transmitted about every 102.4 ms (milliseconds); (many variations are possible), STA 11 might be forced to wait on average 51.2 ms, which is a prohibitively long time to wait.

[0305] STA 11 may also transmit a Probe message to force a beacon to be sent especially for it--but a probe message requires a transmission that has implication on battery life. Furthermore, for the purpose of location finding, STA 11 might wish to be able to receive beacons of APs that will not answer the probe (due to range, policies, etc.)

[0306] We can safely assume that other STAs visited the area of AP 33 before STA 11, and that they have reported the rate of the beacons of AP 33 (e.g., a beacon every 102.4 ms). A problem that remains is that the beacons are scheduled according to the internal clock of AP 33, which might tick at a different rate than other clocks (and clocks tend to tick at different rates). Moreover, the clock of the visiting STAs is probably not exactly synchronized with the clock of STA 11, which makes the process inaccurate.

[0307] That is, even if STA 11 knows that at a specific time according to some STA's internal clock a beacon was transmitted, STA 11 will not know how to translate this information to his clock, as the clocks are probably not synchronized to such great accuracy (network time synchronization services such as the network time protocol (NTP) cannot be more accurate than a couple of tens of milliseconds, where in this case we need an accuracy of around one millisecond). The following novel method allows accuracy of microseconds.

[0308] The novel approach for time synchronization is to rely on a relatively accurate clock already available to STA 11: The 802.11 standard requires each AP to transmit in its beacon its clock (referred to in the 802.11 standard as timestamp). This clock must be the internal clock of the AP at the time of transmission in units of microseconds. Therefore, STAs can specify the value of the clock of AP 33 in terms of the value of the clock at the adjacent AP 31.

[0309] By measuring the timestamp of AP 31 and AP 33 at two different times T311 and T312 (based on the clock of AP 31), in which the time value of AP 33 T331 and T332, respectively, it can be established with reasonable accuracy that AP 33 clock ticks approximately r33/31=(T332-T331)/(T312-T311) times for every clock tick of AP 31. At time T313 in the future, the clock of AP 33 can be estimated as T333=T332+(r33/31)(T313-T312). Similarly, at time T334 the clock of AP 31 can be estimated as T314=T312+(1/r33/31)(T334-T332).

[0310] Beacons are scheduled to transmission when the clock of the AP modulo the beacon interval is zero, where the beacon interval is measured in microseconds according to the clock of the AP, it is fixed for an AP, and the value of the beacon interval is transmitted in the beacon. Therefore, GN 21 stores the relation r33/31 together with T332 and T312 and the beacon interval of AP 33 and AP 31, and reports it to STA 11 such that it can extrapolate the time at AP 33 and infer the time of the beacon transmission.

[0311] Once STA 11 succeeds in receiving a beacon from AP 33 it can report the times to GN 21, so that GN 21 can keep its time tracking accurate. Furthermore, the

scanning allows GN 21 and STA 11 to make the best handover decisions based on the knowledge of the approximate location of STA 11 with respect to the neighboring APs.

[0312] A technical problem to be solved is that a STA can know the value T311 but cannot measure the value of T331 at exactly the same time of T311 as these values are carried on the beacons of APs, which are transmitted at different times.

[0313] A solution is to measure the time of AP 33 T331' at a time close to T331, and note the time difference between the two measurements according to the STA's internal timer. As the measurements are very close to each other, the clock drift between the STA's timer and AP 33's timer is negligible, and we can estimate that T331=T331'+timediff, where timediff is the time difference between the measurements of T331 and T331' according to the timer of the STA. If there is a large clock drift after all (although it is not expected), it can be corrected by calculating the r value between the clock at AP 33 and the STA in a similar way to the way done for APs.

[0314] The location of STA 11 can be deduced from the reception quality, the reception strength and the identity of the neighboring APs. This location information can be taken into account while performing handover decisions, as well as for location based services or for other network applications.

[0315] It should also be noted that in Frequency Hopping, knowing the time of the AP has another special importance, as the frequency that the AP works in might depend on the time.

[0316] FIG. 14 details a preferred embodiment of the handover method, including:

[0317] a. STA prepares in advance for a handover: 541

[0318] Assisted by another STA (or STAs)

[0319] Optional: use the same MAC and IP addresses in more than one STA

[0320] Learn the identity of adjacent APs

[0321] Measure beacon strength from other APs

[0322] b. GN supports handover: 542

[0323] GN keeps a pool of MAC and IP addresses

[0324] GN sends the addresses to STA just before it enters the AP

[0325] c. STA reduces the number of Location Updates 543 by only updating when changing location area

[0326] d. GN transmits a pseudo-beacon including 544 MAC address, IP address, port number

[0327] e. Easy security configuration: 545

[0328] The AP of the customer is not changed

[0329] Establish secure channel with STA and Copy security information, or

[0330] Connect the STA initially by wire

[0331] f. Gain access to locked networks 546 by joining the Vagabee service

[0332] g. Maintain simultaneous communication with 547 more than one AP.

[0333] Update net configuration responsive to changing circumstances

[0334] ** End of method **

[0335] FIG. 15 details a method for implementing two connections with a STA. The

method includes:

[0336] a. Load BSS firmware to the NIC 415

[0337] b. Associate with AP using a first SSID 416

[0338] c. Load IBSS firmware to the NIC, but do not perform 417 dissociation from AP before loading the IBSS

[0339] d. Create an ad-hoe network using a second SSID 418

[0340] e. Communicate with AP and STA that connect to 419 the second SSID

[0341] ** End of method **

[0342] FIG. 16 details a method for connecting other STAs, including:

[0343] a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0344] b. Allow other STAs to connect to the Internet by 492 allowing them to connect to the second SSID.

[0345] The first STA decrypts and encrypts data packets as needed based on the security parameters of the first and second SSID (or APs), and performs address translations and forward packets between the second and first SSID to facilitate this connection for other STAs.

[0346] ** End of method **

[0347] FIG. 17 details another method for connecting other STAs, including:

[0348] a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0349] b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID. The limited access includes the ability to download a software that implements the current method.

[0350] The first STA decrypts and encrypts data packets as needed based on the security parameters of the first and second SSID (or APs), and performs address translations and forward packets between the second and first SSID to facilitate this limited connection for other STAs.

[0351] c. When the first STA detects that another STA 493 has a software (which implements the current method) installed, the first STA allows the other STA a wider access to the Internet.

[0352] ** End of method **

[0353] FIG. 18 details a method for configuring other STAs to directly connect to the AP, including:

[0354] a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0355] b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID.

[0356] The limited access includes the ability to request an ability to access the first SSID directly, i.e. not through the second SSID and the first STA.

[0357] c. The first STA decrypts and encrypts data packets as needed based on the security parameters of the first and second SSID (or APs), and performs address translations and forward packets between the second and first SSID to facilitate this limited connection for other STAs.

[0358] d. Another STA requests an ability for direct access to 494 the first SSID

[0359] e. First STA prompts user: To 495 allow this access?

[0360] f. Security access parameters to access the first SSID are copied 496 from the first STA to the other STA

[0361] g. The other STA can access the first SSID directly 497

[0362] ** End of method **

[0363] FIG. 19 details another method for configuring other STAs to directly connect to the AP, including:

[0364] a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0365] b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID.

[0366] c. First STA's user can view a list of 498 connected STAs and can choose to allow access directly through the first SSID to a chosen other STA

[0367] d. Security access parameters to access the first SSID are copied 496 from the first STA to the other STA

[0368] e. The other STA can access the first SSID directly 497

[0369] ** End of method **

[0370] FIG. 20 details yet another method for configuring other STAs to directly connect to the AP, including:

[0371] a. First STA, using a single Wireless NIC, 491 connects to an AP using a first SSID, and creates a network using a second SSID

[0372] b. Allow other STAs limited access to the Internet by 492 allowing them to connect to the second SSID.

[0373] c. Security access parameters to access the first SSID are copied 496 to the other STA

[0374] d. The other STA can access the first SSID directly 497

[0375] ** End of method **

[0376] Preventing Exhaustion of Resources at the AP

[0377] As discussed in the "Background" section, each AP has a limited number of Association IDs (AID) and usually, even a smaller pool of IP addresses (available through DHCP). Once this number of resources is exhausted, the AP might not be able to serve new STAs. A situation where IP addresses are exhausted can happen very quickly: for example, consider an AP in a very busy location, where there are many STAs that connect to the AP only for a short period of time. Each STA performs the connection process and obtains an IP address using DHCP, but as it disconnects it might not release the IP address.

[0378] The pool of IP addresses in an unmanaged AP is usually limited to about 200 addresses, with many consumer APs supporting only tens of addresses. A device is assigned the IP address for a given period of time (known as the lease time). Many times, the lease time is set in a magnitude of days (although the granularity is seconds), and in many other instances the lease time is set to a magnitude of hours. In such a situation the pool of IP addresses runs empty very fast.

[0379] However, in this disclosure for fast handovers, GN 21 keeps a pool of MAC addresses with associated IP address. Just before a STA enters the AP, GN 21 can send it a MAC address and an IP address that are already associated with the AP. Therefore, the STA can connect even if the AP has no resources left for new STAs. Combined with the above disclosure that allows several STAs to share the same MAC

address and IP address, an AP can serve more APs than its IP resources, even above its limit on the number of associated STAs.

[0380] Saving Battery Power by Reducing Location Updates

[0381] A novel disclosure of this invention is a method to reduce the number of location updates that are needed in WiFi, when a STA is idle. A location update is the process in which a STA informs an entity in the network of the current location of the STA (the notification can take many forms, including opening a TCP connection, or sending UDP packets). In prior art for WiFi networks (with for example mobile IP, or SIP--Session Initiation Protocol), a location update is required whenever the IP address of the STA changes (for example, when moving between APs of different subnets)--even if the STA is idle.

[0382] The novel method allows defining a location area for WiFi, such that a STA needs to perform location update only when it moves between APs that belong to different location areas, but does not need to perform location update when it moves between APs of the same location area as long as it's idle.

[0383] We assume that the APs are divided into location areas, and for each location area there is a node in the network that is in charge of this location area. For example, assume GN 21 is in charge of a location area composed of AP 31, AP 32, and AP 33.

[0384] How does a STA know which AP belongs to the location area--Either GN 21 gives it a list of all the APs that belong to the location area, or GN 21 transmits a pseudo-beacon in each AP.

[0385] A pseudo-beacon is a novel disclosure of this invention. It is a message that GN 21 can periodically transmit in each AP. While some APs might permit a remote node to transmit a message in the AP, other APs might not allow it. In the novel method, a certain MAC address, IP address, and possibly port are allocated in each AP for the purpose of pseudo-beacon transmission. GN 21 asks some STA to open a connection using these resources to GN 21, and GN 21 sends the pseudo-beacon messages using this transmission. Each pseudo-beacon contains the parameters

needed to listen to the pseudo-beacons in the adjacent APs. A STA that lacks these parameters can contact GN 21 and receive them.

[0386] From that moment on, the STA can move between APs in the same location area, and receive the parameters that are needed to listen to the pseudo-beacon from other pseudo beacons. For example, assume that STA 11 is located in AP 31 and is moving to AP 32. STA 11 listens to the pseudo-beacon at AP 31, and from the pseudo-beacon learns the parameters that are needed to listen to the pseudo-beacon of AP 32. Thus, STA 11 can move to AP 32 without any transmission.

[0387] Which STAs of the stations in AP 31 should acknowledge the pseudo-beacon--Preferably, none. However, some firewalls require minimum rate of outgoing packets to maintain an open connection. In such a case, once in a while GN 21 sends on the pseudo-beacon a message that asks any station to send an acknowledgement with some probability p. The probability that GN 21 states should be accommodated to the expected number of stations in AP 31 (GN 21 might not exactly know how many STAs are in the AP). If no STA acknowledges the pseudo-beacon for over the needed time, and the timeout of firewalls stop the incoming messages, then no pseudo-beacons are transmitted. In this case, a roaming STA will contact GN 21 after a certain period of time of probing for the pseudo-beacon has passed (and no pseudo-beacon is seen). GN 21 can request the STA to reopen the connection for the pseudo-beacon transmission.

[0388] If the STA is in a session with TN 41 with many packets received (e.g., above a certain threshold), it is considered non-idle (which we also refer to as "In conversation") and is treated as described above in "Fast handover".

[0389] However, assume that STA 11 is in idle mode (e.g., incoming packets below a threshold), it can move between APs of the same location area without performing location update. When a node TN 41 wishes to send data to STA 11, STA 11 should change its state from idle to in conversation. TN 41 contacts GN 21 (TN 41 might be forwarded to GN 21 through a system such as dynamic DNS (Directory Name Service) or another method, such as a Distributed Hash Table--DHT, or a peer-to-peer network).

[0390] GN 21 sends a paging message for STA 11 on the pseudo-beacon of all the APs in the location area. As STA 11 listens to one of the pseudo-beacons, STA 11 will receive the paging message. Then, STA 11 responds preferably to GN 21 (or to TN 41, depending on what is written in the paging message) by initiating an outgoing connection as described below. It should be noted that GN 21 can first page for STA 11 in the APs that have a higher chance covering STA 11, and the paging can repeat several times until STA 11 replies.

[0391] When a STA is required to initiate an outgoing connection it can use a resource (MAC, IP, or TCP/UDP with port, user/password) that is listed as available on the pseudo-beacon or on the paging message, or it can request its own resources from the AP. If two (or more) STAs use the same resources for a connection at the same time, GN 21 will detect it, and in the acknowledge message (or second message of the TCP handshake) will announce the identity of the STA that it answers to. The other STA is required to initiate an outgoing connection again. Once a connection with GN 21 is established, GN 21 can allocate resources to the STA such that it moves to be in conversation status. One of the resources that are allocated is GN 21 attention to accompany the STA as it might need to perform handover to another AP.

[0392] It should be noted that the location areas can overlap, meaning a single AP can belong to more than one location area. Upon the policy of the network, STA 11 might be required to perform location update when it reaches such a APs, or it may just give helpful information. If possible, a STA might prefer to park on an AP that is within the same location area as its current AP, such that a location update is avoided.

[0393] It should also be noted that there is a tradeoff between the overhead that is spent during paging and establishing the connection, and the overhead that is being spent to keep a steady connection for each AP. The optimal point on the tradeoff depends on the rate that the AP switches APs as well as on the number of packets it receives and sends.

[0394] Easy Configuration of STA

[0395] When purchasing a new STA, it is required to configure the STA with the security settings of the existing network (in case the network is secure). If the network is not secure, the new owner usually only needs to select his network from the list of available networks that is received by the wireless network card.

[0396] Configuring the security might be a tedious job, as the security (authentication/encryption) code might be very long as known in the art, which the user might need to punch in. A novel solution for easy configuration is disclosed. Unlike previous solutions, the novel method does not require changing the existing AP of the customer. In one embodiment, software is run on a personal computer of the user (that is already configured to access the WiFi). Then, the software establishes a secure channel with the STA, and copies the security information from the personal computer to the STA. In this way, the STA learns the security parameters.

[0397] In another embodiment, the customer first connects the STA by wire to its network (or alternatively, the STA first connects using a connection it establishes through an already connected device, such as a personal computer). As the STA can receive and transmit signals on the wireless network and it is connected to the internet (through the other connection) at the same time, it tries to locate the web configuration of the AP on the wired network (most APs have a web interface). In most cases, it is an easy job for the STA, as either the STA can locate the AP as it is the default gateway of the wired network, or it can try to find its IP by performing RARP (Reverse Address Resolution Protocol) using the wireless MAC address of the AP (which it can see off-the-air).

[0398] If none succeeds the STA can perform exhaustive search on commonly used IP addresses, or on very probable addresses, like all the IP addresses of the same subnet. Once the AP web interface is found, the STA tries to log into the AP. It can guess the default address or find it on a database that can be built on the web, with common default passwords for each manufacturer (the manufacturer and model will be usually sent by the AP during the web login process, or can be found out using the MAC address, which is unique per manufacturer). If the password for the AP cannot be guessed, the user is prompted for its password to complete the log-in. Then, the STA navigates to the security settings page and retrieves the password needed for the

wireless network.

[0399] In the event that the procedure fails, the user is prompted for the security settings (which would happen without using the above method). For most common users and setups, the method succeeds (and for unsophisticated customers, who do not change the passwords--it succeeds in the majority of the cases). Thus, in the majority of cases, the setup is made much simpler.

[0400] Once the STA has access to the setup of the AP, it can (with permission from the user), open holes or forward certain port to some IP address. This IP address and port can serve as way that GN 21 can send and broadcast the pseudo-beacon, without a STA first opening a connection from the AP, and without worrying about timeouts (provided that there are no other firewall between the AP and GN 21). Opened ports can also help during the fast handover, such that TN 41 can directly send packets to the new location without a need for STA 12 to open the connection.

[0401] In corporate settings, the company can set a special server which gives the configuration to the phone, over the network.

[0402] Gaining Access to Locked Networks

[0403] While performing the above easy setup (or at any other time), the user is prompted if he wishes to join a swapping service. The swapping service allows the user to gain access to many locked networks (the locked networks of the other users that joined the swapping service), in return that he allows users to use his network for the purpose of connecting to the Internet. If the user agrees, the access parameters to his network (encryption key, MAC address, default gateway, etc.) are securely stored in the network (for example in GN 21, and a backup server). The security information is securely sent directly into the hardware (or network card) of other STAs, when they need to connect using his AP.

[0404] As the security parameters are sent directly to the STA's network hardware, it can make sure that the communication that is established is designated outside the user's network, and will not jeopardize the computers on the user's network.

Furthermore, GN 21 can monitor the amount of bandwidth that is consumed by visiting users, and to make sure their hardware limits the amount of used bandwidth such that the user does not experience a degradation of quality of his connection. Alternatively, the security information can be sent to the other STAs using other security measures, as known in the art.

[0405] In many scenarios it is enough to trust the software that runs on the STA to make sure all communications are targeted outside the user's network, such that it does not jeopardize the computers on the user's network, and limit bandwidth used by the STA.

[0406] The secrecy of the security parameters (such as the encryption key) can be cryptographically protected while on transit and storage, as known in the art.

[0407] Some APs limit the access of the subscribers by making sure that only specific MAC addresses connect to the network. As our methods as described above allow to use the same MAC address for several users, this specific MAC address can be used when using the network that restricts the use with specific MAC address.

[0408] In case a STA tries to connect to an AP with a captive portal, a special application on the STA is running and performs the authentication and log-in automatically. GN 21 can store typical portal appearances, such that it can guide the STA on how to perform the authentication/log-in process. If the STA comes across a captive portal which is unknown or unexpected, it can locally store the web pages that it received from the captive portal and later transfer them to GN 21. GN 21 accumulates the reports and guides STAs how to log-in to the captive portal in the future. As part of the swapping service, GN 21 can store username/passwords to enable connection through the captive portal automatically.

[0409] Special Care for Data

[0410] The above description works well for both voice and data. TN 41 might be a mobile node as well, or a fixed node in the network. The transferred information between STA 11 and ON 21 can be voice, data, or their combination.

[0411] In case STA 11 wishes to communicate with a node that is not aware of the novel network, it can do so through a node that is aware of the network. For example, TN 41 can serve as a proxy for STA 11 (in a similar way to mobile IP). The node that is not aware of the network communicates with TN 41. TN 41 forward the information to STA 11. TN 41 can allocate an IP address (perhaps using NAT, or allocate ports using its own IP address) that will serve STA 11.

[0412] To balance the communication load, STA 11 can have several network nodes such as TN 41, TN 42 (not shown), etc, to be its proxies in parallel. In fact, the resulting connection between STA 11 and TN 41 can be seen as a layer 2 (MAC) connection, on top of which the communication is performed. In this setup, TN 41 serves as the default gateway of STA 11, and optionally can run a DHCP server and a NAT server.

[0413] Executing the Invention Over a Peer-to-Peer Network

[0414] Another novel aspect of the above novel methods takes advantage of the fact that the wireless network is local in nature, as the APs are geographically adjacent. The system and method as described in this disclosure allows GN 21 to be responsible over a small geographical area with little interaction with its neighbors. As a result, the methods that are disclosed can be implemented by many small devices forming a peer-to-peer network that implements the methods, without the need to rely heavily on large servers.

[0415] Many nodes GN 21, GN 22 (not shown), can each control a group of APs. To make the system grow "automatically", it is possible to give users a "base" that will act as their point of presence in the network. For example, the base can assume the role of TN 41 as a Mobile IP proxy. The base can connect to the wired network at the premises of the customer. Some bases will assume the role of a GN, where the GNs can be managed by either a network control center, or through peer-to-peer protocols.

[0416] In early stages of deployment of the system, when there is still a small

number of GNs, each GN might need to cover a large number APs. A general server can back-up all information that the GNs hold. To avoid the situation, where a single GN needs to cover a huge number of APs with pseudo-beacons, the system might not use the pseudo-beacon mechanism (although, it should be noted that with moderate computing power and network resources, a GN might be able to cover a few thousands of APs). In the worst case scenario of a peer-to-peer network, there is one base (GN) for each STA, and this GN act as the GN for the APs in the proximity of the STA.

[0417] When the STA moves, the coverage area in the responsibility of the GN moves with it. In this case, the GN can fetch information on neighboring APs from the general server. When GN abandons an AP, it can store the information it gathered about it in the general server, for later use by possibly other GNs. In a system which is not based on many small GNs, a large GN can assume the role of the smaller GNs.

[0418] It should be noted that it takes some time to gather the information on the APs (such as timing, default gateways, etc). However, once a single STA passes in an area, it obtains the needed information. This information is later stored in the GNs and general server, for the benefit of all STAs in the future.

[0419] If a STA needs to handover into an AP which has no STAs currently in it, it might not have the needed resources pre-allocated (such as an associated MAC address and IP address), and might therefore need to gain it by itself. However, in many cases the STA can obtain resources at one pass in the area, and these resources (such as IP address) will stay for the next pass in the area (which can be hours later).

[0420] An Alternate Fast Method for Connecting to an AP--Removing the Assumption on the Existence of STA 12 in the Coverage of the New AP

[0421] A possible drawback of the above method of fast handover is that it requires that the pool of resources that GN 21 holds should contain a valid IP address of the AP that STA is handing over to. If the DHCP lease time is long enough, having a valid IP might not be a problem, but on short lease times with only a few STAs roaming it is desirable to perform handovers even if there is no valid IP available in

the pool. Unfortunately, a typical execution of the DHCP protocol can take several seconds to complete, which might be too long for a fast handover. Interestingly, we observe that many APs will forward information even if the IP that is being used was not allocated by DHCP.

[0422] Therefore, we disclose the following method:

[0423] Choose a MAC and associate it with the AP (or use an Associated MAC without an associated IP address), choose a random (but valid) IP address, and use it.

[0424] The STA must use the correct default gateway settings of the AP (these settings can be stored in GN 21). If the STA wishes to use DNS, it must have the DNS settings of the AP (which can be received from GN 21), or DNS services are provided through GN 21.

[0425] Choosing a valid IP at random results in a very low probability of colliding with another IP address that is used in the AP. Note, however, that the STA still needs to authenticate/log-in through the captive portal in case such portal exists.

[0426] Another method that can be used to quickly obtain an IP address, such that the IP address is not already allocated by the DHCP of the AP is disclosed. Most DHCP implementations of AP send an ICMP (Internet Control Message Protocol) Echo Request (ping) before allocating an IP address, to make sure that it is unused. Therefore, STA can begin the DHCP protocol, then, wait for the ICMP echo request that the AP sends, and understand the IP that is going to be allocated to it.

[0427] Therefore, a STA can start using the IP address and respond to the ICMP echo request. It can then prematurely terminate the DHCP protocol (as it already got an IP). Alternatively, STA can use the IP address from the ICMP echo request without responding to it, and complete the DHCP process. If the IP address that is allocated during the DHCP is identical to the IP address (vast majority of cases), then STA simply saved time. Otherwise, it can move from the IP address of the ICMP echo request to the IP address that was allocated.

[0428] If no connection to GN 21 is available, the default gateway address can be guessed, as in the majority of the cases the default gateway address is one out of only a few addresses. Common addresses are: 192.168.1.1, 192.168.2.1, 10.0.0.1, etc.

[0429] Moreover, the default gateway is usually the AP itself. Its MAC address is known (as it is broadcasted in the beacon). Therefore, in most cases it is enough to forward packets to this MAC address (without knowing its IP address).

[0430] A STA with a Capability to Connect on Two Channels in Parallel

[0431] The present application discloses a STA which has a capability of communicating in two or more channels in parallel (for example, by using two wireless network cards). This capability can enable a STA to be connected to two APs in parallel without the need to implement sophisticated mechanisms that actually simulate this situation. Thus, a STA can connect with future AP while maintaining a connection through its serving APs. Being connected to two or more APs simultaneously allows greater bandwidth by utilizing two connections instead of one, and the performance of soft-handovers, i.e., the STA stays connected through one AP, while disconnecting from the second AP in the process of handover.

[0432] Fast Uploading of Digital Camera Pictures

[0433] Digital cameras might be equipped with WiFi. The owner of such a camera would like to upload his pictures from the camera to a server that stores the pictures on the Internet--the reasons for this may vary from being able to share the photos while on vacation with family members left at home, back up the pictures from the digital camera to the Internet server, or simply because the memory card on the camera is running out of space. A major problem is that to upload the pictures to the Internet may take a very long time, as pictures consume megabytes to store.

[0434] Solution: The camera sends the photos to a laptop over WiFi (this connection is very fast), then disconnects and the camera's user may move on. Then, the laptop uploads the pictures to the Internet server (this process can take a long time as it involves uploading a lot of data), but the laptop owner would not feel it as a burden,

since the pictures can be uploaded when his Internet connection is not used for other purposes.

[0435] Method for Uploading Data Files

[0436] In a system with means for providing a wireless Internet connection to WiFi-enabled devices (STAs), a method for fast uploading of information from STAs to the Internet, comprises:

[0437] a. a first STA, such as a laptop computer, connects to the Internet;

[0438] b. a second STA, such as a camera, wirelessly connects to the first STA, and uploads the information using the fast and direct-wireless connection between the STAs;

[0439] c. The first STA temporarily stores the information;

[0440] d. The first STA uploads the information to the Internet through its backhaul.

[0441] ** End of method **

[0442] Notes:

[0443] 1. In the above method, the first STA may include for example a laptop or a personal computer, the second STA may include a digital camera or a digital video camera, and the information may include digital pictures or digital clips.

[0444] 2. The second STA preferably disconnects from the first STA after completing to upload the information to the first STA, but before the first STA completes the upload of information to the Internet; the first STA completes the upload of information from its temporary storage.

[0445] 3. An additional step in the above method may include the following:

[0446] e. at a later time, the second STA connects to the Internet and verifies that the information was uploaded correctly.

[0447] 4. The information may be encrypted by the second STA before being transmitted.

[0448] It will be recognized that the foregoing is but one example of an apparatus and method within the scope of the present invention and that various modifications will occur to those skilled in the art upon reading the disclosure set forth hereinbefore.

* * * * *

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/987,881	Filing Date 09/11/2013	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	12/02/2013	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 1	Minus	** 20	= 0	X $40 =	0
	Independent (37 CFR 1.16(h))	* 1	Minus	***3	= 0	X $210 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LDRC
/PAMELA ROGERS/

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/987,881

APPLICATION AS FILED - PART I

	(Column 1)	(Column 2)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE($)	FEE($)		RATE($)	FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	140		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	1 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	800		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/987,881	09/11/2013	2473	1070		1	1

CONFIRMATION NO. 4557

UPDATED FILING RECEIPT

Elad Barkan
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Kfar Sirkin, 49935
ISRAEL

OC000000065469199

Date Mailed: 12/16/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Applicant(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 12/665,978 12/22/2009 PAT 8559369

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
ISRAEL PCT/IL2007/000244 02/22/2007

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If Required, Foreign Filing License Granted: 10/03/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/987,881**

Projected Publication Date: 03/27/2014

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****

Title

Wireless internet system and method

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: Yes

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/987,881	09/11/2013	Elad Pinhas Barkan	

CONFIRMATION NO. 4557

PUBLICATION NOTICE

Elad Barkan
12 Habanim St.
Kfar Sirkin, 49935
ISRAEL

Title: Wireless internet system and method

Publication No.US-2014-0086101-A1
Publication Date:03/27/2014

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan		4557

7590 06/05/2014

Elad Barkan
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EXAMINER	
KIZOU, HASSAN	

ART UNIT	PAPER NUMBER
2472	

MAIL DATE	DELIVERY MODE
06/05/2014	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
13/987,881	11 September, 2013	BARKAN, ELAD PINHAS	

Elad Barkan
12 Habanim St.
Kfar Sirkin, 49935

EXAMINER	
ANTHONY LOVER	
ART UNIT	PAPER
OPIM	20140603

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

Attached is a communication to applicant explaining that the instant application is being identified as a pre-AIA application despite applicant's statement under 37 CFR 1.55 or 1.78 made in the instant application, either on the Application Data Sheet (ADS) or in an otherwise filed paper.

PTO-90C (Rev.04-03)

Application Identified as a Pre-AIA Application Despite the 37 CFR 1.55 or 1.78 Statement of Record

The statement under 37 CFR 1.55 or 1.78 ("the 1.55/1.78 statement") and the domestic benefit/national stage information in this application conflict as to whether this application is to be examined under the AIA (First Inventor to File) or pre-AIA (First to Invent) law.

This application, with a filing date on or after March 16, 2013, contains the 1.55/1.78 statement indicating that this application should be examined under the AIA (First Inventor to File). This statement was either (1) on the Application Data Sheet (ADS) by virtue of the 1.55/1.78 statement for AIA (First Inventor to File) Transition Applications check box being selected or (2) in an otherwise filed paper. The 1.55/1.78 statement provided:

> This application * * * contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.

However, this application is separately identified in the Domestic Benefit/National Stage Information section of the ADS as a continuation (CON) or divisional (DIV) of an application filed before March 16, 2013, indicating that this application should be examined under pre-AIA (First to Invent) law because it does not contain, or did not contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013. DUE TO THIS APPLICATION BEING IDENTIFIED AS A CONTINUATION OR DIVISIONAL OF AN APPLICATION FILED BEFORE MARCH 16, 2013, THIS APPLICATION IS BEING IDENTIFIED AS A PRE-AIA (FIRST TO INVENT) APPLICATION DESPITE THE 1.55/1.78 STATEMENT OF RECORD.

Accordingly, this application is/will be examined under pre-AIA (First to Invent) law; all forthcoming Office actions on the merits will be labeled "**AIA (First Inventor to File) Status: No**" (see upper right box on form PTOL-37/37D and/or PTOL-326/326AE).

Moreover, if applicant has received any Office action on the merits, which identified the instant application as "**AIA (First Inventor to File) Status**: **Yes**," said Status information was in error and is hereby corrected to "**No**" to indicate that that the present application is a pre-AIA (First to Invent) application.

NO RESPONSE TO THIS COMMUNICATION IS REQUIRED UNLESS APPLICANT BELIEVES THAT THE APPLICATION CONTAINS, OR EVER CONTAINED A CLAIM TO A CLAIMED INVENTION HAVING AN EFFECTIVE FILING DATE ON OR AFTER MARCH 16, 2013 AND IS AN AIA (FIRST INVENTOR TO FILE) APPLICATION.

If applicant believes that the application is an AIA (First Inventor to File) application, applicant must file a corrected ADS (with appropriate markings as set forth in 37 CFR 1.76(c)(2)) identifying the instant application as a **continuation-in-part (CIP)** application in the Domestic Benefit/National Stage Information section of the ADS and request in writing that the application

be examined under the AIA (First Inventor to File) because the identification of the application as a CON/DIV application on filing was an error. IN THIS SITUATION, APPLICANT'S RESPONSE IS DUE WITHIN TWO MONTHS OF THE MAILING DATE OF THIS COMMUNICATION; THE RESPONSE PERIOD IS NOT EXTENDABLE UNDER 37 CFR 1.136.

Questions regarding this communication may be directed to a TC AIA Specialist as appropriate.

Technology Center	TC AIA Specialist	Contact Information
1600, 1700, 2900	Kathleen Bragdon	(571) 272-0931
2100, 2400	Christopher Grant	(571) 272-7294
2600, 2800	Cassandra Spyrou	(571) 272-1624
3600, 3700	Tom Hughes	(571) 272-4357

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan		4557

7590 07/08/2014

Elad Barkan
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EXAMINER	
SHARMA, GAUTAM	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
07/08/2014	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 13/987,881	Applicant(s) BARKAN, ELAD PINHAS	
	Examiner GAUTAM SHARMA	Art Unit 2467	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09/11/2013*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *09/11/2013* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☒ All b)☐ Some** c)☐ None of the:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

DETAILED ACTION

1. The present application is being examined under the pre-AIA first to invent provisions.

2. Claim 1 is pending.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form should be used. A

web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

1. Claim 1 is rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1of U.S. Patent No. 8,559,369 in view of secondary art in view of Meier et al, Patent No.6,950,628, hereinafter known as Meier.

1. **As to claim 1,** although the conflicting claims are not identical, they are not patentably distinct from each other because it would have been obvious to one having an ordinary skill in the art at the time of the invention to derive the invention as claimed from claim 1 of in view of Meier. The instant application and Parent Patent map accordingly:

Patent No. 8,559,369	*Instant application*
1. A computing device comprising: a communication module adapted to: (1) wirelessly connect said computing device to an IP based network via a first wireless access point (AP) having a first AP Identification (APID); and (2) wirelessly communicate with other wireless enabled computing devices ; a user interface and display adapted to allow a user of said computing device to interact with destinations over the	*1. A computing device comprising: a communication module adapted to: (1) wirelessly connect said computing device to an IP based network via a first access point (AP) having a first AP Identification (APID); and (2) wirelessly connect said computing device to other wireless enabled computing devices; a user interface and display adapted to allow a user of the computing device to interact with other computing*

IP based network, through the first wireless AP, using a first public IP address; and an AP module adapted to: (1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP having a second APID, distinct from the first APID, and provide the given device access to the network via the first AP; and (2) tunnel data traffic from the given device, through said computing device, through the first AP, through the IP network, to a proxy server, such that the proxy server acts as a proxy of the given device and the data traffic is secure from said computing device and first AP and the given device operates on the network with a public IP address distinct from the first public IP address.	*devices over the IP based network; and an AP module adapted to: (1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP having a second APID, distinct from the first APID, and provide the given device access to the network via the first AP; and (2) tunnel data traffic from the given device, through the IP network, to a proxy server, such that the proxy server acts as a proxy of the given device - and the data traffic is secure from the first computing device and first AP;* ***and (3) the second APID is associated with the proxy server.***

2. U.S. Patent #8,559,369 does not disclose however Volpano discloses ***and (3) the second APID is associated with the proxy server*** (Meier, Figure 1-5, setting tunnel traffic with proxy server and associated SSID).

1. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of U.S. Patent #8,559,369 to include the limitations of ***and (3) the second APID is associated with the proxy server*** as taught by Meier. Proxy server for VLAN traffic is commonly employed in the art for secure routing.

Claim Rejections - 35 USC § 103

2. The following is a quotation of pre-AIA 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under pre-AIA 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

2. **Claim 1 is rejected** under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Shu et al, application No. 2005/0078624 hereinafter known as Shu and further in view of Volpano et al application No. 2004/0141617, hereinafter known as Volpano and further in view of Meier et al, Patent No.6,950,628, hereinafter known as Meier.

3. **As to claim 1,** Shu discloses a *computing device comprising: a communication module adapted to: (1) wirelessly connect said computing device to an IP based network via a first access point (AP) having a first AP Identification (APID); and (2) wirelessly connect said computing device to other wireless enabled computing devices;* (Shu, Figure 1- figure 4, station (i.e. PC0) device connecting to broadband while also running software AP for connecting other stations). *a user interface and display adapted to allow a user of the computing device to interact with other computing devices over the IP based network* (Shu, [0029], PDA, LAPTOP, Cell phone

embodiment of stations (PC), The devices commonly comprise display in the art with software access to connect to networks or other devices)*;* Shu discloses *and an AP module adapted to: (1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP, distinct from the first APID, and provide the given device access to the network via the first AP*(Shu, Figure 1- figure 4, station (i.e. PC0) device connecting to broadband while also running software AP for connecting other stations)*;* **Shu does not expressly disclos**e *a second AP having a second APID* however Volpano disclose a *second AP having a second APID* (Volpano figure 3, [0025]-[0028], creating virtual AP's with associated Identifiers SSID for the AP's).

4. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shu to include the limitations of *second AP having a second APID* as taught by Volpano. AP's in the art commonly comprise individual identifiers (SSID) for stations to associate with an AP.

5. **Further as to claim 1,** Shu does not disclose however Volpano discloses *and (2) tunnel data traffic from the given device, through the IP network and the data traffic is secure from the first computing device and first AP* (Volpano, [0022], [0051-[0055], creating VLAN for private, secure communication as common in the art, [0059-[0063], encryption and decryption .

6. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shu to include the limitations of *and (2) tunnel data traffic from the given device, through the IP network and the data traffic is secure from the first computing device and first AP* as taught by Volpano. Virtual LANs are commonly in the art to enable private and secure communication through encryption/decryption processes for a particular set of user or stations.

7. **Also as to claim 1**, Shu and Volpano do not expressly disclose a proxy server for a given device however Meier disclose *a proxy server, such that the proxy server acts as a proxy of the given device and (3) the second APID is associated with the proxy server* (Meier, Figure 1-5, setting tunnel traffic with proxy server and associated SSID).

4. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Shu and Volpano to include the limitations of *a proxy server, such that the proxy server acts as a proxy of the given device and (3) the second APID is associated with the proxy server* as taught by Meier. Proxy server for VLAN traffic is commonly employed in the art for secure routing.

Art Made of Record

- Karaoguz et al., Application No. US-2007/0121839 A1 05-2007
- Waisman-Diamond, Martin Varsavsky , Application No. US-2007/0242657 A1 10-2007
- Barkan, Elad , Application No. US-2010/0296441 A1 11-2010
- Lee et al., Application No. US-2005/0220048 A1 10-2005
- Raverdy et al., Application No. US-2005/0223086 A1 10-2005
- Louks et al., Application No. US-2006/0135206 A1 06-2006
- Kalavade et al., Application No. US-2003/0051041 A1 03-2003
- Jones, Adrian, Application No. US-2007/0215684 A1 09-2007
- Mondragon, Oscar A. , Application No. US-2002/0103879 A1 08-2002
- Anton et al. , Application No. US-2007/0124802 A1 05-2007
- Urera, Marco Antonio, Application No. US-2002/0078059 A1 06-2002
- Turanyi et al. , Application No. US-2003/0228868 A1 12-2003
- Kim et al. , Application No. US-2004/0042596 A1 03-2004
- Abhishek et al. , Application No. US-2004/0103278 A1 05-2004
- Raverdy et al. , Application No. US-2005/0220106 A1 10-2005

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GAUTAM SHARMA whose telephone number is (571)270-7182. The examiner can normally be reached on Monday thru Friday, 9:30 AM - 6:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan A. Phillips can be reached on 571-272-3940. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. S./

Examiner, Art Unit 2467

/HASSAN PHILLIPS/

Supervisory Patent Examiner, Art Unit 2467

Notice of References Cited	Application/Control No. 13/987,881	Applicant(s)/Patent Under Reexamination BARKAN, ELAD PINHAS	
	Examiner GAUTAM SHARMA	Art Unit 2467	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2002/0078059 A1	06-2002	Urera, Marco Antonio	707/100
*	B	US-2002/0103879 A1	08-2002	Mondragon, Oscar A.	709/218
*	C	US-2003/0051041 A1	03-2003	Kalavade et al.	709/229
*	D	US-2003/0228868 A1	12-2003	Turanyi et al.	455/432.1
*	E	US-2004/0042596 A1	03-2004	Kim et al.	379/112.01
*	F	US-2004/0103278 A1	05-2004	Abhishek et al.	713/160
*	G	US-2004/0141617 A1	07-2004	Volpano, Dennis Michael	380/270
*	H	US-2005/0078624 A1	04-2005	Shu et al.	370/328
*	I	US-6,950,628 B1	09-2005	Meier et al.	455/41.2
*	J	US-2005/0220106 A1	10-2005	Raverdy et al.	370/392
*	K	US-2005/0220048 A1	10-2005	Lee et al.	370/328
*	L	US-2005/0223086 A1	10-2005	Raverdy et al.	709/220
*	M	US-2006/0135206 A1	06-2006	Louks et al.	455/557

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 13/987,881	Applicant(s)/Patent Under Reexamination BARKAN, ELAD PINHAS	
	Examiner GAUTAM SHARMA	Art Unit 2467	Page 2 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-2007/0121839 A1	05-2007	Karaoguz et al.	379/114.1
*	B	US-2007/0124802 A1	05-2007	Anton et al.	726/003
*	C	US-2007/0215684 A1	09-2007	Jones, Adrian	235/375
*	D	US-2007/0242657 A1	10-2007	Waisman-Diamond, Martin Varsavsky	370/352
*	E	US-2010/0296441 A1	11-2010	Barkan, Elad	370/328
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	P					
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	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
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	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13987881	BARKAN, ELAD PINHAS
	Examiner	Art Unit
	GAUTAM SHARMA	2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/27/2014								
	1	✓								

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CONFIRMATION NO. 4557

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
13/987,881	09/11/2013	370	2467	

APPLICANTS

INVENTORS

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

**** CONTINUING DATA ********************************

This application is a CON of 12/665,978 12/22/2009 PAT 8559369

**** FOREIGN APPLICATIONS ********************************

ISRAEL PCT/IL2007/000244 02/22/2007

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **

10/03/2013

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /GAUTAM SHARMA/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		ISRAEL	22	1	1

ADDRESS

Elad Barkan
12 Habanim St.
Kfar Sirkin, 49935
ISRAEL

TITLE

Wireless internet system and method

FILING FEE RECEIVED		
1070	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"20100296441"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S2	5	"8000276"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S3	1	"8000276".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S4	11293	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S5	0	"vagabee$4" or "fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S6	0	"fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S7	39532	(sta or "ue" or "ms" or "at" or mobile or equipment) with (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) with (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S8	1526	(sta or "ue" or "ms" or "at" or mobile or equipment) near2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) near2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S9	253	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or	US-PGPUB;	OR	ON	2013/02/22 17:10

		provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	USPAT; USOCR; EPO; JPO			
S10	1	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S11	8	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S12	393	((distribut$4) near3 (wi$1fi or hotspot))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S13	2	((distribut$4) near3 (wi$1fi or hotspot)) with (software)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S14	4	("20030119537" | "20040003133" | "7284062" | "20040133689").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S15	2393	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S16	191	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth) same (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S17	191	((peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)) same (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S18	179	(wi$1fi or "wifi" or bluetooth) near1 (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S19	15	Barkan-elad.in.	US-PGPUB;	OR	ON	2013/02/22 17:10

			USPAT; USOCR; EPO; JPO			
S20	0	("cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S21	0	("pda" or laptop) adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S22	5	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3 (provid$4 or implement$4 or broadcast$4 or advertis$6) near3 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S23	441	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near2 (relay) with (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S24	594	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near5(relay) near5 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S25	354	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3(relay) near3 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S26	55	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 ("as a" or serves or serving or provid$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S27	11957	(distribut$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S28	2775	(distribut$4) adj1 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S29	53	(distribut$4) adj1 (wi$1fi or hotspot)	US-PGPUB;	OR	ON	2013/02/22 17:10

			USPAT; USOCR; EPO; JPO			
S30	120	(distribut$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S31	11505	"fon"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S32	122	"fon" and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S33	122	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S34	9	("fon.com." or "www.fon.com" or foneros)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S35	1379	ipass	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S36	20	ipass and (wi$1fi and hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S37	50	ipass and (wi$1fi OR hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S38	11	jones-adrian.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S39	1	("2007/0215684").URPN.	USPAT	OR	ON	2013/02/22 17:10

S40	6	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	USPAT	OR	ON	2013/02/22 17:10
S41	2	("20040158618" | "20040042596" | "20040158618").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S42	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S43	159	(shared or sharing) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S44	2455	(virtual or software or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S45	896	(virtual or software$1based or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S46	527	(virtual or software$1based or "software$1defined") near1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S47	85	fon.as.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10

S48	434	(virtual or software$1based or "software$1defined") adj2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S49	300	(virtual or software$1based or "software$1defined") adj ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S50	300	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S51	3	(wi$1fi or hotspot or internet) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S52	0	(wi$1fi or hotspot) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S53	3	(wi$1fi or hotspot) with Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S54	1315	(((timer or time) or (limit$4 or based)) with (wi$1fi or wireless or internet) with free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S55	188	(((timer or time) or (limit$4 or based)) near5 (wi$1fi or wireless or internet) near5 free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S56	74	(((timer or time) or (limit$4 or based)) near5 (wi$1fi or wireless) near5 free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S57	1314	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10

S58	75	(wi$1fi or wireless) near3 free near3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S59	24	free adj2 (wi$1fi or wireless) adj3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S60	28	free adj2 (internet) adj2(software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S61	28	free adj2 (internet) adj2 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S62	131	free adj2 (wi$1fi or wireless) adj2 (access)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S63	3133	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/22 17:10
S64	26	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$ or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$ or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-$ or US-20050147084-$).did.	US-PGPUB	OR	ON	2013/02/26 17:12
S65	9	S64 and proxy	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:12
S66	7	S64 and proxy and (vlan or "virtual" or tunnel)	US-PGPUB; USPAT; USOCR;	OR	ON	2013/02/26 17:37

			EPO; JPO			
S67	2	S64 and (proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:39
S68	9916	(proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:40
S69	5903	(proxy with (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:40
S70	11	(proxy with (vlan or tunnel)) with (apid or ssid)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:40
S71	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:43
S72	1	S70 and S71	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:43
S73	27	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$ or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$ or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-$ or US-20050147084-$).did. or (US-6950628-$).did.	US-PGPUB; USPAT	OR	ON	2013/02/26 17:58

S74	14	S73 and ("user interface" or "ui" or "display")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:58
S75	6	S73 and (acknowledge or "ack/nack" or "ack" or "nack" or "nak")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/02/26 17:59
S76	3281	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:10
S77	12016	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:10
S78	3290	370/351.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:10
S79	10084	370/389.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:10
S80	9754	370/392.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:10
S82	1775	370/395.1.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11
S83	1345	370/395.2.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11
S84	1233	370/395.4.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11

S85	576	370/396.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11
S86	928	370/397.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11
S87	365	370/398.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11
S88	502	370/399.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11
S90	16	barkan-elad.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:11
S91	263	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:12
S92	124	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:12
S93	329	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:12
S94	17378	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:14
S95	977	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm. and (proxy).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:14

S96	1365	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S97	9	S95 and S76	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S98	66	S95 and S77	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S99	3	S95 and S78	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S100	23	S95 and S79	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S101	12	S95 and S80	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S102	0	S95 and S82	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S103	0	S95 and S84	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S104	7	S95 and S83	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:15
S105	0	S95 and S84	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16

S106	1	S95 and S85	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S107	0	S95 and S86	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S108	0	S95 and S88	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S109	1	S95 and S90	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S110	12	S96 and S76	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S111	12	S96 and S76	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S112	37	S96 and S77	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S113	1	S96 and S78	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S114	9	S96 and S79	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S115	9	S96 and S80	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16

S116	0	S96 and S81	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S117	0	S96 and S82	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S118	1	S96 and S83	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S119	4	S96 and S84	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S120	2	S96 and S85	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S121	0	S96 and S86	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S122	0	S96 and S87	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S123	0	S96 and S88	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S124	0	S96 and S89	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16
S125	1	S96 and S90	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:16

S126	134	S94 and S76	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S127	718	S94 and S77	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S128	91	S94 and S78	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S129	236	S94 and S79	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S130	135	S94 and S80	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S131	28	S94 and S82	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S132	41	S94 and S83	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S133	6	S94 and S84	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S134	7	S94 and S85	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S135	7	S94 and S86	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36

S136	7	S94 and S87	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S137	3	S94 and S88	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S138	0	S94 and S89	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S139	3	S94 and S90	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:36
S140	1324	(sta or "ue" or "ms" or "at" or mobile or equipment or station or wtru).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4 or serv$4 or manag$4).clm. and (wi$1fi or internet or hotspot).clm. and (proxy).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:39
S141	10	S140 and S76	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S142	92	S140 and S77	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S143	7	S140 and S78	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S144	31	S140 and S79	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S145	22	S140 and S80	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41

S146	1	S140 and S82	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S147	7	S140 and S83	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S148	0	S140 and S84	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S149	1	S140 and S85	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S150	2	S140 and S86	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S151	0	S140 and S87	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S152	0	S140 and S88	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S153	0	S140 and S89	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S154	1	S140 and S90	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2013/06/06 14:41
S185	2	"20100296441"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13

S186	47	"8000276"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S187	1	"8000276".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S188	15221	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S189	0	"vagabee$4" or "fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S190	0	"fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S191	52161	(sta or "ue" or "ms" or "at" or mobile or equipment) with (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) with (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S192	1936	(sta or "ue" or "ms" or "at" or mobile or equipment) near2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) near2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S193	308	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S194	1	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S195	13	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13

S196	673	((distribut$4) near3 (wi$1fi or hotspot))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S197	3	((distribut$4) near3 (wi$1fi or hotspot)) with (software)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S198	4	("20030119537" | "20040003133" | "7284062" | "20040133689").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S199	3651	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S200	263	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth) same (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S201	263	((peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)) same (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S202	241	(wi$1fi or "wifi" or bluetooth) near1 (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S203	18	Barkan-elad.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S204	1	("cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S205	0	("pda" or laptop) adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13

S206	10	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3 (provid$4 or implement$4 or broadcast$4 or advertis$6) near3 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S207	702	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near2 (relay) with (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S208	935	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near5(relay) near5 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S209	562	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3(relay) near3 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S210	73	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 ("as a" or serves or serving or provid$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S211	13981	(distribut$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S212	3222	(distribut$4) adj1 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S213	76	(distribut$4) adj1 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S214	271	(distribut$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S215	11670	"fon"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13

S216	132	"fon" and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S217	132	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S218	13	("fon.com." or "www.fon.com" or foneros)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S219	1412	ipass	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S220	29	ipass and (wi$1fi and hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S221	66	ipass and (wi$1fi OR hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S222	12	jones-adrian.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S223	2	("2007/0215684").URPN.	USPAT	OR	ON	2014/06/27 13:13
S224	6	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	USPAT	OR	ON	2014/06/27 13:13
S225	2	("20040158618" | "20040042596" | "20040158618").PN.	US-PGPUB; USPAT; USOCR;	OR	ON	2014/06/27 13:13

			EPO; JPO			
S226	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S227	262	(shared or sharing) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S228	3059	(virtual or software or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S229	1186	(virtual or software$1based or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S230	712	(virtual or software$1based or "software$1defined") near1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S231	87	fon.as.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S232	607	(virtual or software$1based or "software$1defined") adj2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S233	421	(virtual or software$1based or "software$1defined") adj ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S234	421	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR;	OR	ON	2014/06/27 13:13

			EPO; JPO			
S235	3	(wi$1fi or hotspot or internet) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S236	0	(wi$1fi or hotspot) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S237	3	(wi$1fi or hotspot) with Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S238	1593	(((timer or time) or (limit$4 or based)) with (wi$1fi or wireless or internet) with free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S239	228	(((timer or time) or (limit$4 or based)) near5 (wi$1fi or wireless or internet) near5 free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S240	92	(((timer or time) or (limit$4 or based)) near5 (wi$1fi or wireless) near5 free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S241	1553	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S242	90	(wi$1fi or wireless) near3 free near3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S243	29	free adj2 (wi$1fi or wireless) adj3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S244	31	free adj2 (internet) adj2(software or application)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/06/27 13:13

			EPO; JPO			
S245	31	free adj2 (internet) adj2 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S246	193	free adj2 (wi$1fi or wireless) adj2 (access)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S247	3885	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S248	26	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$ or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$ or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-$ or US-20050147084-$).did.	US-PGPUB	OR	ON	2014/06/27 13:13
S249	9	S248 and proxy	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S250	7	S248 and proxy and (vlan or "virtual" or tunnel)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S251	2	S248 and (proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S252	12721	(proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S253	7481	(proxy with (vlan or "virtual" or tunnel))	US-PGPUB;	OR	ON	2014/06/27 13:13

			USPAT; USOCR; EPO; JPO			
S254	12	(proxy with (vlan or tunnel)) with (apid or ssid)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S255	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S256	1	S254 and S255	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S257	27	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$ or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$ or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-$ or US-20050147084-$).did. or (US-6950628-$).did.	US-PGPUB; USPAT	OR	ON	2014/06/27 13:13
S258	14	S257 and ("user interface" or "ui" or "display")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S259	6	S257 and (acknowledge or "ack/nack" or "ack" or "nack" or "nak")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S260	3885	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S261	15221	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S262	3619	370/351.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S263	11055	370/389.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S264	10888	370/392.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S265	1843	370/395.1.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S266	1492	370/395.2.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S267	1343	370/395.4.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S268	623	370/396.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S269	985	370/397.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S270	378	370/398.ccls.	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S271	531	370/399.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S272	18	barkan-elad.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S273	308	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S274	132	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S275	421	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S276	20583	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S277	1152	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm. and (proxy).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S278	1553	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S279	9	S277 and S260	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S280	89	S277 and S261	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S281	7	S277 and S262	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S282	28	S277 and S263	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S283	13	S277 and S264	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S284	0	S277 and S265	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S285	0	S277 and S267	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S286	9	S277 and S266	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S287	0	S277 and S267	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S288	1	S277 and S268	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S289	0	S277 and S269	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S290	0	S277 and S271	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S291	1	S277 and S272	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S292	13	S278 and S260	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S293	13	S278 and S260	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S294	45	S278 and S261	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S295	2	S278 and S262	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S296	10	S278 and S263	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S297	11	S278 and S264	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S298	0	370/395.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S299	0	S278 and S298	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S300	1	S278 and S265	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S301	2	S278 and S266	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S302	6	S278 and S267	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S303	3	S278 and S268	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S304	1	S278 and S269	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S305	1	S278 and S270	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S306	1	S278 and S271	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S307	0	barkan-ehud.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S308	0	S278 and S307	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S309	2	S278 and S272	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S310	151	S276 and S260	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S311	902	S276 and S261	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S312	106	S276 and S262	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S313	257	S276 and S263	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S314	153	S276 and S264	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S315	30	S276 and S265	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S316	47	S276 and S266	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S317	7	S276 and S267	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S318	7	S276 and S268	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S319	10	S276 and S269	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S320	7	S276 and S270	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S321	4	S276 and S271	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S322	0	S276 and S307	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S323	4	S276 and S272	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S324	1576	(sta or "ue" or "ms" or "at" or mobile or equipment or station or wtru).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4 or serv$4 or manag$4).clm. and (wi$1fi or internet or hotspot).clm. and (proxy).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S325	13	S324 and S260	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S326	123	S324 and S261	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S327	14	S324 and S262	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S328	39	S324 and S263	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S329	24	S324 and S264	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S330	2	S324 and S265	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:13

			JPO			
S331	11	S324 and S266	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S332	1	S324 and S267	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S333	2	S324 and S268	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S334	3	S324 and S269	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S335	1	S324 and S270	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S336	1	S324 and S271	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S337	0	S324 and S307	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S338	2	S324 and S272	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S339	8255	H04W84/18.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:13
S340	7543	H04W84/12.cpc.	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:14

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S341	5252	H04W80/04.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:14
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S343	6660	H04W88/08.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:14
S344	314	H04L65/00.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:15
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S346	4025	H04L45/02.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:15
S347	2843	H04L45/04.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:15
S348	1012	H04L12/56.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:15
S349	0	H04L2012/56.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:15
S350	111	H04L29/0653.cpc.	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:15

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S355	1328	H04L2012/5679.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:17
S356	40	H04L47/50.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:17
S357	17	H04L47/622.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:17
S358	0	H04L29/255.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:17
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S360	10	H04L2012/5609.cpc.	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/06/27 13:17

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S363	427	H04L47/621.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:18
S364	170	H04L2012/5621.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:19
S366	146	H04L2012/5624.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:19
S367	0	H04L2012/5601.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:20
S368	315	H04L49/256.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:20
S369	427	H04L47/621.cpc.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:23
S370	3	"12665978"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/06/27 13:35

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp

S155	1742	370/310.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:13
S156	5603	370/328.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:13
S157	2174	370/351.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:37
S158	1742	370/310.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:37
S159	5603	370/328.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:37
S160	5646	370/389.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:37
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S162	1185	370/395.1.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:37
S163	909	370/395.2.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:37
S164	841	370/395.4.ccls.	USPAT; UPAD	OR	ON	2013/06/06 14:37
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S400	1	S387 and S385	USPAT; UPAD	OR	ON	2014/06/27 13:13

6/ 27/ 2014 4:34:59 PM
C:\ Users\ gsharma\ Documents\ EAST\ Workspaces\ 13987881.wsp

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13987881	BARKAN, ELAD PINHAS
	Examiner	Art Unit
	GAUTAM SHARMA	2467

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search	6/27/2014	Gautam Sharma
Inventor Search	6/27/2014	Gautam Sharma
Classification Search: USPC Search (370/310,328,351,389,392,.395.1,395.4,396,397,398,399)	6/27/2014	Gautam Sharma
Classification Search: CPC Search (H04W 84/18, 84/12, 80/04, 88/06, 88/08)	6/27/2014	Gautam Sharma
Classification Search: CPC Search (H04L 65/00, 45/00, 45/02, 45/04, 12/56, 2012/56, 29/0653, 29/06095, 49/3009, 49/309, 45/74, 2012/5679, 47/50, 47/622, 29/255, 12/5601, 2012/5609, 49/256, 49/1553, 47/621, 2012/5621, 2012/5624, 2012/5601, 49/256)	6/27/2014	Gautam Sharma

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT	Docket Number (Optional) 0023-002001

In re Application of: Elad Barkan

Application No.: 13/987,881

Filed: September 11, 2013

For: Wireless Internet System and Method

The applicant, Elad Pinhas Barkan, owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 8559369 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

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2. ☑ The undersigned is an attorney or agent of record. Reg. No. 43,849

/Spencer C. Patterson/ — Signature
December 8, 2014 — Date

Spencer C. Patterson — Typed or printed name

Attorney for Applicant — Title
214-396-8600 — Telephone Number

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Application Number	Filing Date
13/987,881	9/11/2013

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☑ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

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SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature	Elad Barkan	Date (Optional)	11/27/2014
Name	Elad Pinhas Barkan		
Title			

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13987881
Filing Date	2013-09-11
First Named Inventor	Elad Pinhas Barkan
Art Unit	2467
Examiner Name	Gautam Sharma
Attorney Docket Number	0023-002001

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7239865	B2	2007-07-03	Dyck et al.	
	2	7346025	B2	2008-03-18	Bryson	
	3	7382771	B2	2008-06-03	Leblanc et al.	
	4	7668545	B2	2010-02-23	Dyck et al.	
	5	7860032	B2	2010-12-28	Abrol et al.	
	6	7877081	B2	2011-01-25	Sharma et al.	
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	Application Number	13987881
	Filing Date	2013-09-11
	First Named Inventor	Elad Pinhas Barkan
	Art Unit	2467
	Examiner Name	Gautam Sharma
	Attorney Docket Number	0023-002001

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030165128	A1	2003-09-04	Sisodia et al.	
	2	20040116120	A1	2004-06-17	Gallagher et al.	
	3	20040203836	A1	2004-10-14	Gorday et al.	
	4	20040221046	A1	2004-11-04	Heinonen et al.	
	5	20050030940	A1	2005-02-10	Abrol et al.	
	6	20050286476	A1	2005-12-29	Crosswy et al.	
	7	20060126565	A1	2006-06-15	Shaheen	
	8	20060153133	A1	2006-07-13	Zhong	
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	Filing Date	2013-09-11
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	Art Unit	2467
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	13987881
	Filing Date	2013-09-11
	First Named Inventor	Elad Pinhas Barkan
	Art Unit	2467
	Examiner Name	Gautam Sharma
	Attorney Docket Number	0023-002001

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Spencer C. Patterson/	Date (YYYY-MM-DD)	2014-12-08
Name/Print	Spencer C. Patterson	Registration Number	43849

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Electronic Patent Application Fee Transmittal

Application Number:	13987881
Filing Date:	11-Sep-2013
Title of Invention:	Wireless internet system and method
First Named Inventor/Applicant Name:	Elad Pinhas Barkan
Filer:	Spencer Chase Patterson/Densie Wilson
Attorney Docket Number:	

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Claims in excess of 20	2202	48	40	1920
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 2 months with $0 paid	2252	1	300	300
Miscellaneous:				
Submission- Information Disclosure Stmt	2806	1	90	90
Statutory or Terminal Disclaimer	1814	1	160	160
		Total in USD ($)		**2470**

Electronic Acknowledgement Receipt

EFS ID:	20898920
Application Number:	13987881
International Application Number:	
Confirmation Number:	4557
Title of Invention:	Wireless internet system and method
First Named Inventor/Applicant Name:	Elad Pinhas Barkan
Correspondence Address:	Elad Barkan - 12 Habanim St. - Kfar Sirkin - 49935 IL 972545204121 moti@barkan.org
Filer:	Spencer Chase Patterson/Densie Wilson
Filer Authorized By:	Spencer Chase Patterson
Attorney Docket Number:	
Receipt Date:	08-DEC-2014
Filing Date:	11-SEP-2013
Time Stamp:	18:21:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

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Warnings:					
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2		response.pdf	67040 6b14f4cdd019230289c80f988e9ac0114f79f62a	yes	16

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Specification	2	3
Claims	4	14
Applicant Arguments/Remarks Made in an Amendment	15	16

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3	Terminal Disclaimer Filed	disclaimer.pdf	160631 9f366bff90f61a7234d2ca82b9f0c4ca5191041d	no	2
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4	Information Disclosure Statement (IDS) Form (SB08)	IDS.pdf	612551 3135a050b2f7790983f251ed648e5ab0b78a17db	no	5
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5	Fee Worksheet (SB06)	fee-info.pdf	34895 4f3890980bc70c6980ae59bc963355ec62d3683e	no	2

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Elad Barkan	Art Unit :	2467
Serial No.	:	13/987,881	Examiner :	Gautam Sharma
Filed	:	September 11, 2013	Conf. No. :	4557
Title:	:	WIRELESS INTERNET SYSTEM AND METHOD		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO OFFICE ACTION DATED JULY 8, 2014

Please amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims, which begin on page 3 of this paper.

Remarks begin on page 15 of this paper.

Amendments to the Specification:

Please replace paragraph [0279] with the following amended paragraph:

[0279] However, we are more interested in solutions where there is no need to change the AP. To achieve this goal, assume the existence of a non-moving STA 12 in the coverage of AP 32 (we will somewhat soften this assumption later). According to the present invention STA 12 is in contact with [[ON]]GN 21, and receives instructions to impersonate STA 11 towards AP 32 (we will later discuss how to make it possible), and complete a connection process with AP 32 on behalf of STA 11 (including authentication, association, receiving an IP address, performing any second authentication/log-in procedure, and perhaps even opening connections or "punching holes" in the firewall).

Please replace paragraph [0282] with the following amended paragraph:

[0282] This connection may wait for STA 11 until it reaches AP 32. If there is a timeout on these connections (either due to protocol, or due to firewalls), STA 12 or other bypassing STAs can send and receive--keep-alive--messages on behalf of STA 11 (as is instructed by GN 20. The timeout for each AP can be discovered over time by trial and error (or by discovering the APs type), and storing this information in GN 21 for future use. [[ON]]GN 21 can notify the STAs on the value of the timeout.

Please replace paragraph [0410] with the following amended paragraph:

[0410] The above description: works well for both voice and data. TN 41 might be a mobile node as well, or a fixed node in the network. The transferred information between STA 11 and [[ON]]GN 21 can be voice, data, or their combination.

Please replace paragraph [0411] with the following amended paragraph:

[0411] In case STA 11 wishes to communicate with a node that is not aware of the novel network, it can do so through a node that is aware of the network. For example, TN 41 can serve as a proxy for STA 11 (in a similar way to mobile IP). The node that is not aware of the network communicates with TN 41. TN 41 ~~forward~~forwards the information to STA 11. TN 41 can

allocate an IP address (perhaps using NAT, or allocate ports using its own IP address) that will serve STA 11.

Please replace paragraph [0411] with the following amended paragraph:

[0421] A possible drawback of the above method of fast handover is that it requires that the pool of resources that [[ON]]GN 21 holds should contain a valid IP address of the AP that STA is handing over to. If the DHCP lease time is long enough, having a valid IP might not be a problem, but on short lease times with only a few STAs roaming it is desirable to perform handovers even if there is no valid IP available in the pool. Unfortunately, a typical execution of the DHCP protocol can take several seconds to complete, which might be too long for a fast handover. Interestingly, we observe that many APs will forward information even if the IP that is being used was not allocated by DHCP.

Amendments to the Claims:

This listing of the claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A computing device comprising:

[[a]]at least one communication module adapted to:

(1) wirelessly connect said computing device to an IP based network via a first wireless access point (AP) having a first AP Identification (APID); and

(2) wirelessly ~~connect said computing device to~~ communicate with other wireless enabled computing devices;

a user interface and display adapted to allow a user of said computing device to interact with ~~other computing devices~~ destinations over the IP based network, through the first wireless AP, using a first public IP address associated with the computing device; and

an AP module adapted to:

(1) provide a given device of the other wireless enabled computing devices with access to the IP based network by causing said computing device to serve the given device as a second AP having a second APID, distinct from the first APID, and provide the given device access to the network via the first AP; and

(2) tunnel data traffic from the given device, through said computing device, through the first AP, through the IP network, to a proxy server, such that the proxy server acts as a proxy of the given device and the data traffic is secure from said computing device and first AP and the given device operates on the network using a second public IP address distinct from the first public IP address, with the second public IP address associated with the given device~~; and~~

~~(3) the second APID is associated with the proxy server~~.

2. (New) The computing device of claim 1 wherein the second APID is associated with the proxy server.

3. (New) The computing device of claim 1 wherein the AP module is adapted to tunnel data traffic from the given device through said computing device, through the first AP, through the IP network, to a proxy server in response to at least activating data service for the given device through a captive portal web interface.

4. (New) The computing device of claim 1 wherein the first wireless AP is included in a cellular telephone network.

5. (New) The computing device of claim 4 wherein the first wireless AP is a cellular cell.

6. (New) The computing device of claim 1 wherein the AP module is controlled by a network entity in a cellular system.

7. (New) The computing device of claim 1 wherein the first wireless AP and the second wireless AP use different wireless communication protocols.

8. (New) The computing device of claim 1 wherein the first wireless AP is included in a terrestrial wireless network.

9. (New) The computing device of claim 1 wherein the proxy server acts as a proxy of the given device for the given device to interact with destinations over the IP based network.

10. (New) The computing device of claim 1 wherein the AP module is adapted to prevent data packets destined for the user interface and display from being accessed by the given device.

11. (New) The computing device of claim 1 wherein the AP module is adapted to disconnect the given device after a predetermined period.

12. (New) The computing device of claim 1 wherein the second public IP address is shared by the given device with at least one other device of the other wireless enabled computing devices.

13. (New) The computing device of claim 12 wherein data packets destined for each of the given device and the at least one other device are differentiated using different port numbers.

14. (New) The computing device of claim 1 wherein the AP module is adapted to prevent the given device from accessing internal IP addresses associated with the computing device.

15. (New) The computing device of claim 1 wherein the AP module is adapted to restrict the given device from accessing a predetermined set of IP addresses.

16. (New) A system comprising:

a first wireless access point (AP) connected to an IP based network, the first wireless AP having a first AP Identification (APID);

a proxy server connected to the IP based network and adapted to act as a proxy of at least a subset of computing devices that connect via the first wireless AP; and

a first computing device having a user interface, wherein the first computing device is adapted to:

wirelessly connect to the IP based network via the first wireless AP;

wirelessly communicate with other wireless enabled computing devices;

enable a user of the first computing device to interact, through the user interface, with destinations over the IP based network, through the first wireless AP, using a first public IP address associated with the first computing device;

provide a second computing device of the other wireless enabled computing devices with access to the IP based network by causing the first computing device to serve the second computing device as a second AP having a second APID, distinct from the first APID, and provide the second computing device access to the IP based network via the first AP; and

tunnel data traffic from the second computing device, through the first computing device, through the first AP, through the IP network, to the proxy server, wherein the proxy server acts as a proxy of the second computing device and the data traffic is secure from the first computing device and the first AP and the second computing device operates on the IP based network using a second public IP address distinct from the first public IP address, with the second public IP address associated with the second computing device.

17. (New) The system of claim 16 wherein the first computing device is further adapted to:

provide a third computing device of the other wireless enabled computing devices with access to the IP based network by causing the first computing device to serve the third computing device as the second AP having the second APID, distinct from the first APID, and provide the third computing device access to the IP based network via the first AP; and

tunnel data traffic from the third computing device, through the first computing device, through the first AP, through the IP network, to the proxy server, wherein the proxy server acts as a proxy of the third computing device and the data traffic is secure from the first computing device and the first AP and the third computing device operates on the IP based network using a third public IP address distinct from the first public IP address, with the third public IP address associated with the third computing device.

18. (New) The system of claim 16 wherein the second APID is associated with the proxy server.

19. (New) The system of claim 16 wherein the proxy server acts as a proxy of the second computing device for the second computing device to interact with destinations over the IP based network.

20. (New) The system of claim 16 wherein the second computing device connects to the IP based network through a third AP having a third APID, distinct from the first APID and the second APID, concurrently with connecting to the IP based network through the second AP.

21. (New) The system of claim 16 wherein the first computing device is adapted to prevent data packets destined for the user interface from being accessed by the second computing device.

22. (New) The system of claim 16 wherein the first computing device is adapted to disconnect the second computing device from the second AP after a predetermined period.

23. (New) The system of claim 16 wherein the proxy server allocates the second public IP address for the second computing device and forwards data packets destined for the second public IP address to a current IP address associated with the second computing device, wherein the current IP address is distinct from the first public IP address and the second public IP address.

24. (New) The system of claim 23 wherein the proxy server replaces the current IP address with the second public IP address in data packets destined for other servers on the IP based network, wherein the data packets are tunneled from the second computing device, through the first computing device, through the first AP, through the IP network, to the proxy server.

25. (New) The system of claim 23 wherein the proxy server updates the current IP address associated with the second computing device in response to the second computing device connecting through a different AP.

26. (New) The system of claim 16 wherein the first computing device is adapted to tunnel data traffic from the second computing device through the first computing device, through the first AP, through the IP network, to a proxy server in response to at least activating data service for the second computing device through a captive portal web interface.

27. (New) The system of claim 16 wherein the first wireless AP is included in a cellular telephone network.

28. (New) The system of claim 27 wherein the first wireless AP is a cellular cell.

29. (New) The system of claim 16 wherein the second AP is controlled, at least in part, by a network entity in a cellular system.

30. (New) The system of claim 16 wherein the first wireless AP and the second wireless AP use different wireless communication protocols.

31. (New) The system of claim 16 wherein the first wireless AP is included in a terrestrial wireless network.

32. (New) The system of claim 16 wherein the second computing device is further adapted to provide a third wireless enabled computing device with access to destinations on the IP based network by causing the second computing device to serve the third device as a third AP having a third APID, distinct from the first APID and from the second APID, and provide the third device access to the IP based network via the second AP using the connection between the first computing device and the IP based network through the first AP.

33. (New) The system of claim 32 wherein the second computing device restricts destinations on the IP based network accessible by the third device.

34. (New) The system of claim 16 wherein the tunneled data traffic includes data packets for use in conducting a IP based phone call.

35. (New) The system of claim 16 wherein the tunneled data traffic includes data packets representing data to be uploaded to a remote server from the second computing device.

36. (New) The system of claim 16 wherein data packets received by the second computing device from a destination through the proxy server, through the IP network, through the first AP, through the first computing device, through the second AP include at least one of a picture, video, or audio.

37. (New) The system of claim 16 wherein the second public IP address is shared by the second computing device with at least one other device of the other wireless enabled computing devices.

38. (New) The system of claim 37 wherein data packets destined for each of the second computing device and the at least one other device are differentiated using different port numbers.

39. (New) The system of claim 16 wherein the first computing device is adapted to prevent the second computing device from accessing internal IP addresses associated with the first computing device.

40. (New) The system of claim 16 wherein the first computing device is adapted to restrict the second computing device from accessing a predetermined set of IP addresses.

41. (New) The system of claim 16 wherein the proxy server provides a dynamic host configuration protocol (DHCP) service that assigns an IP address for the second computing device.

42. (New) The system of claim 16 wherein the proxy server provides a network address translation (NAT) service that translates IP addresses for the second computing device.

43. (New) A method comprising:

wirelessly connecting a first computing device to an IP based network via a first wireless access point (AP) having a first AP Identification (APID), wherein the first computing device wirelessly communicates with other wireless enabled computing devices;

enabling a user of the first computing device to interact, through a user interface of the first computing device, with destinations over the IP based network, through the first wireless AP, using a first public IP address associated with the first computing device;

providing a second computing device of the other wireless enabled computing devices with access to the IP based network via the first wireless AP by causing the first computing device to serve the second computing device as a second AP having a second APID, distinct from the first APID, and provide the second computing device access to the IP based network via the first AP; and

tunneling data traffic from the second computing device, through the first computing device, through the first AP, through the IP network, to a proxy server, wherein the proxy server acts as a proxy of the second computing device and the data traffic is secure from the first computing device and the first AP and the second computing device operates on the IP based network using a second public IP address distinct from the first public IP address, with the second public IP address associated with the second computing device.

44. (New) The method of claim 43 further comprising:

allocating, by the proxy server, the second public IP address for the second computing device; and

forwarding data packets destined for the second public IP address to a current IP address associated with the second computing device, wherein the current IP address is distinct from the first public IP address and the second public IP address.

45. (New) The method of claim 44 further comprising:

replacing, by the proxy server, the current IP address with the second public IP address in data packets destined for other servers on the IP based network, wherein the data packets are

tunneled from the second computing device, through the first computing device, through the first AP, through the IP network, to the proxy server.

46. (New) The method of claim 44 further comprising updating, by the proxy server, the current IP address associated with the second computing device in response to the second computing device connecting through a different AP.

47. (New) The method of claim 43 wherein the second APID is associated with the proxy server.

48. (New) The method of claim 43 further comprising tunneling data traffic from the second computing device through the first computing device, through the first AP, through the IP network, to a proxy server in response to at least activating data service for the second computing device through a captive portal web interface.

49. (New) The method of claim 43 wherein the first wireless AP is included in a cellular telephone network.

50. (New) The method of claim 49 wherein the first wireless AP is a cellular cell.

51. (New) The method of claim 43 wherein tunneling data traffic is controlled, at least in part, by a network entity in a cellular system.

52. (New) The method of claim 43 wherein the first wireless AP and the second wireless AP use different wireless communication protocols.

53. (New) The method of claim 43 wherein the first wireless AP is included in a terrestrial wireless network.

54. (New) The method of claim 43 further comprising providing, by the second computing device, a third wireless enabled computing device with access to destinations on the IP based network by causing the second computing device to serve the third device as a third AP having a third APID, distinct from the first APID and from the second APID, and provide the third device access to the IP based network via the second AP using the connection between the first computing device and the IP based network through the first AP.

55. (New) The method of claim 54 further comprising restricting destinations on the IP based network accessible by the third device.

56. (New) The method of claim 43 wherein the proxy server acts as a proxy of the second computing device for the second computing device to interact with destinations over the IP based network.

57. (New) The method of claim 43 wherein the second computing device connects to the IP based network through a third AP having a third APID, distinct from the first APID and the second APID, concurrently with connecting to the IP based network through the second AP.

58. (New) The method of claim 43 further comprising preventing data packets destined for the user interface from being accessed by the second computing device.

59. (New) The method of claim 43 further comprising disconnecting the second computing device after a predetermined period.

60. (New) The method of claim 43 wherein the tunneled data traffic includes data packets for use in conducting a IP based phone call.

61. (New) The method of claim 43 wherein the tunneled data traffic includes data packets representing data to be uploaded to a remote server from the second computing device.

62. (New) The method of claim 43 wherein data packets received by the second computing device from a destination through the proxy server, through the IP network, through the first AP, through the first computing device, through the second AP include at least one of a picture, video, or audio.

63. (New) The method of claim 43 wherein the second public IP address is shared by the second computing device with at least one other device of the other wireless enabled computing devices.

64. (New) The method of claim 63 wherein data packets destined for each of the second computing device and the at least one other device are differentiated using different port numbers.

65. (New) The method of claim 43 further comprising preventing the second computing device from accessing internal IP addresses associated with the first computing device.

66. (New) The method of claim 43 further comprising restricting the second computing device from accessing a predetermined set of IP addresses.

67. (New) The method of claim 43 wherein the proxy server provides a dynamic host configuration protocol (DHCP) service that assigns an IP address for the second computing device.

68. (New) The method of claim 43 wherein the proxy server provides a network address translation (NAT) service that translates IP addresses for the second computing device.

REMARKS

The foregoing amendments and the following remarks are submitted in response to the Office Action mailed July 8, 2014 ("Office Action"). Claim 1 was pending in the Application as of the date of the Office Action, and claim 1 was rejected in the Office Action. Claim 1 is amended as set forth above. New claims 2-68 are added. No new matter is added by way of these amendments. Thus, claims 1-68 are now pending. Applicant respectfully requests reconsideration and favorable action in this case.

Examiner Interview

The Applicant appreciates the courtesy of a telephonic interview conducted on December 4, 2014 between the undersigned Applicant's representative, Examiner Gautam Sharma, and Examiner Hassan Phillips. During the interview, Applicant's representative provided a brief overview of the proposed amendments to independent claim 1 and the proposed new independent claims. The Examiners agreed that the proposed amendments distinguish the claims from the cited references. Applicant's representative also expressed an intent to file a terminal disclaimer.

Nonstatutory Double Patenting Rejection

Claim 1 stands rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 8,559,369 in view of secondary art in view of Meier et al, Patent No. 6,950,628 ("Meier"). As noted in the Office Action, the nonstatutory double patenting rejection can be overcome by filing a terminal disclaimer. A terminal disclaimer is submitted concurrently with this response. Accordingly, Applicant respectfully requests that the nonstatutory double patenting rejection be withdrawn.

Claim Rejections - 35 U.S.C. §103

Claim 1 stands rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Shu et al., Application Publication No. 2005/0078624, and further in view of Volpano et al. Application Publication No. 200410141617, and further in view of Meier et al., Patent No. 6,950,628. As discussed, at least in part, during the interview, the combination of references fails

to disclose or suggest at least a computing device comprising an AP module adapted to tunnel data traffic from a given device, through said computing device, through a first AP (through which the computing device wirelessly connects to an IP based network using a first public IP address associated with the computing device), through the IP network, to a proxy server such that the proxy server acts as a proxy of the given device and the data traffic is secure from said computing device and first AP and the given device operates on the network using a second public IP address distinct from the first public IP address, with the second public IP address associated with the given device. For at least the foregoing reasons, claim 1 as amended is allowable over the cited references, and Applicant respectfully requests that the rejection of claim 1 be withdrawn.

CONCLUSION

An earnest attempt to place this case in condition for allowance has been made. It is believed that all of the pending claims have been addressed. It is noted that the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment. For the foregoing reasons, and for other reasons clearly apparent, full allowance of all Claims is respectfully requested.

Respectfully submitted,

Date: December 8, 2014

/Spencer C. Patterson/

Spencer C. Patterson
Reg. No. 43,849

Customer Number 123077
Spencer C. Patterson, P.C.
Telephone: (214) 396-8600
Facsimile: (214) 988-0775

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 13/987,881	Filing Date 09/11/2013	☐ To be Mailed

ENTITY: ☐ LARGE ☒ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT **12/08/2014**

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 68	Minus	** 20	= 48	X $40 =	1920
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $210 =	0
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	**1920**

AMENDMENT

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))						
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
					TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
/NICOLLE L. SCRIVNER/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan		4557

7590 12/09/2014

Elad Barkan
12 Habanim St.
Kfar Sirkin, 49935
ISRAEL

EXAMINER	
SHARMA, GAUTAM	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
12/09/2014	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Applicant-Initiated Interview Summary	Application No.	Applicant(s)	
	13/987,881	BARKAN, ELAD PINHAS	
	Examiner	Art Unit	
	GAUTAM SHARMA	2467	

All participants (applicant, applicant's representative, PTO personnel):

(1) *GAUTAM SHARMA*.

(2) *Hassan Phillips*.

(3) *Spencer Patterson*.

(4) _____.

Date of Interview: *05 December 2014*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☒ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☒103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1*.

Identification of prior art discussed: *yes*.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Examiner and applicant's representative discussed proposed amendments to the claims to advance prosecution of the application. Amendments to the claims added limitations to match claim language to parent application that was subsequently approved for allowance. Examiner agreed the proposed amendments overcome prior art rejection of the application. Examiner, upon filing of response with amendments and arguments, will update prior art search and provided feedback. Examiner will also take into consideration of IDS to be submitted with the response. No agreement was reached on allowability .

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/G. S./ Examiner, Art Unit 2467	/HASSAN PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
13/987,881	09/11/2013	Elad Pinhas Barkan	

CONFIRMATION NO. 4557

123077
Spencer C. Patterson, P.C.
4849 Greenville Ave., Suite 1490
Dallas, TX 75206

POA ACCEPTANCE LETTER

OC000000072347048

Date Mailed: 12/12/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/08/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/zabraha/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	13/987,881	BARKAN, ELAD PINHAS	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 12/8/14	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

ANDRE ROBINSON

U.S. Patent and Trademark Office

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

123077 7590 01/02/2015

Spencer C. Patterson, P.C.
4849 Greenville Ave., Suite 1490
Dallas, TX 75206

EXAMINER
SHARMA, GAUTAM

ART UNIT	PAPER NUMBER
2467	

DATE MAILED: 01/02/2015

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan		4557

TITLE OF INVENTION: Wireless internet system and method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0	$0	$480	04/02/2015

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

123077 7590 01/02/2015
Spencer C. Patterson, P.C.
4849 Greenville Ave., Suite 1490
Dallas, TX 75206

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan		4557

TITLE OF INVENTION: Wireless internet system and method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0	$0	$480	04/02/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHARMA, GAUTAM	2467	370-328000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ❑ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan		4557

123077 7590 01/02/2015

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4849 Greenville Ave., Suite 1490
Dallas, TX 75206

EXAMINER	
SHARMA, GAUTAM	

ART UNIT	PAPER NUMBER
2467	

DATE MAILED: 01/02/2015

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 13/987,881	Applicant(s) BARKAN, ELAD PINHAS	
	Examiner GAUTAM SHARMA	Art Unit 2467	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *12/08/2014*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-68*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov .
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☒ All b) ☐ Some *c) ☐ None of the:
   1. ☒ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 12/08/2014
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/G. S./ Examiner, Art Unit 2467	/HASSAN PHILLIPS/ Supervisory Patent Examiner, Art Unit 2467

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13987881	BARKAN, ELAD PINHAS
	Examiner	Art Unit
	GAUTAM SHARMA	2467

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
EAST Search	6/27/2014	Gautam Sharma
Inventor Search	6/27/2014	Gautam Sharma
Classification Search: USPC Search (370/310,328,351,389,392,.395.1,395.4,396,397,398,399)	6/27/2014	Gautam Sharma
Classification Search: CPC Search (H04W 84/18, 84/12, 80/04, 88/06, 88/08)	6/27/2014	Gautam Sharma
Classification Search: CPC Search (H04L 65/00, 45/00, 45/02, 45/04, 12/56, 2012/56, 29/0653, 29/06095, 49/3009, 49/309, 45/74, 2012/5679, 47/50, 47/622, 29/255, 12/5601, 2012/5609, 49/256, 49/1553, 47/621, 2012/5621, 2012/5624, 2012/5601, 49/256)	6/27/2014	Gautam Sharma
EAST Search	12/22/2014	Gautam Sharma
Inventor Search	12/22/2014	Gautam Sharma
Classification Search: USPC Search (370/310,328,351,389,392,.395.1,395.4,396,397,398,399)	12/22/2014	Gautam Sharma
Classification Search: CPC Search (H04W 84/18, 84/12, 80/04, 88/06, 88/08)	12/22/2014	Gautam Sharma

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
Classification Search: CPC Search (H04L 65/00, 45/00, 45/02, 45/04, 12/56, 2012/56, 29/0653, 29/06095, 49/3009, 49/309, 45/74, 2012/5679, 47/50, 47/622, 29/255, 12/5601, 2012/5609, 49/256, 49/1553, 47/621, 2012/5621, 2012/5624, 2012/5601, 49/256)	12/22/2014	Gautam Sharma

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**
370	310,328,351,389,392,.395.1,395.4,396,397,398,399	12/22/2014	Gautam Sharma
H04W	84/18, 84/12, 80/04, 88/06, 88/08	12/22/2014	Gautam Sharma
H04L	65/00, 45/00, 45/02, 45/04, 12/56, 2012/56, 29/0653, 29/06095, 49/3009, 49/309, 45/74, 2012/5679, 47/50, 47/622, 29/255, 12/5601, 2012/5609, 49/256, 49/1553, 47/621, 2012/5621, 2012/5624, 2012/5601, 49/256	12/22/2014	Gautam Sharma

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	13987881
Filing Date	2013-09-11
First Named Inventor	Elad Pinhas Barkan
Art Unit	2467
Examiner Name	Gautam Sharma
Attorney Docket Number	0023-002001

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7239865	B2	2007-07-03	Dyck et al.	
	2	7346025	B2	2008-03-18	Bryson	
	3	7382771	B2	2008-06-03	Leblanc et al.	
	4	7668545	B2	2010-02-23	Dyck et al.	
	5	7860032	B2	2010-12-28	Abrol et al.	
	6	7877081	B2	2011-01-25	Sharma et al.	
	7	8559369	B2	2013-10-15	Barkan	

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Receipt date: 12/08/2014

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	13987881 13987881 - GAU: 2467
Filing Date	2013-09-11
First Named Inventor	Elad Pinhas Barkan
Art Unit	2467
Examiner Name	Gautam Sharma
Attorney Docket Number	0023-002001

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20030165128	A1	2003-09-04	Sisodia et al.	
	2	20040116120	A1	2004-06-17	Gallagher et al.	
	3	20040203836	A1	2004-10-14	Gorday et al.	
	4	20040221046	A1	2004-11-04	Heinonen et al.	
	5	20050030940	A1	2005-02-10	Abrol et al.	
	6	20050286476	A1	2005-12-29	Crosswy et al.	
	7	20060126565	A1	2006-06-15	Shaheen	
	8	20060153133	A1	2006-07-13	Zhong	
	9	20070160023	A1	2007-07-12	Wittmann	

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Receipt date: 12/08/2014	Application Number	13987881	13987881 - GAU: 2467
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	2013-09-11	
	First Named Inventor	Elad Pinhas Barkan	
	Art Unit	2467	
	Examiner Name	Gautam Sharma	
	Attorney Docket Number	0023-002001	

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1							☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/Gautam Sharma/	Date Considered	12/22/2014

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.S./

Receipt date: 12/08/2014	Application Number	13987881	13987881 - GAU: 2467
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99)**	Filing Date	2013-09-11	
	First Named Inventor	Elad Pinhas Barkan	
	Art Unit	2467	
	Examiner Name	Gautam Sharma	
	Attorney Docket Number	0023-002001	

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☒ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Spencer C. Patterson/	Date (YYYY-MM-DD)	2014-12-08
Name/Print	Spencer C. Patterson	Registration Number	43849

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.S./

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /G.S./

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13987881	BARKAN, ELAD PINHAS
	Examiner	Art Unit
	GAUTAM SHARMA	2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/27/2014								
	1	=								
	2	=								
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	4	=								
	5	=								
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	34	=								
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	13987881	BARKAN, ELAD PINHAS
	Examiner	Art Unit
	GAUTAM SHARMA	2467

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	06/27/2014								
	37	=								
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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S403	34	("20070121839" | "20070242657" | "20100296441" | "20040116120" | "20060126565" | "20070160023" | "7877081" | "20050220048" | "20050223086" | "20060135206" | "20040221046" | "20050030940" | "20050286476" | "20060153133" | "7346025" | "20030051041" | "20070215684" | "8559369" | "20040203836" | "7382771" | "7860032" | "20020103879" | "20040141617" | "20050078624" | "20070124802" | "6950628" | "20030165128" | "20020078059" | "20030228868" | "20040042596" | "20040103278" | "20050220106" | "7239865" | "7668545").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:05
S404	2	"20100296441"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S405	63	"8000276"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S406	16642	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S407	0	"vagabee$4" or "fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S408	0	"fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S409	57524	(sta or "ue" or "ms" or "at" or mobile or equipment) with (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) with (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/12/22 16:23

			EPO; JPO			
S410	2125	(sta or "ue" or "ms" or "at" or mobile or equipment) near2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) near2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S411	343	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S412	3	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S413	17	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S414	766	((distribut$4) near3 (wi$1fi or hotspot))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S415	4	((distribut$4) near3 (wi$1fi or hotspot)) with (software)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S416	4	("20030119537" | "20040003133" | "7284062" | "20040133689").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S417	4431	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S418	308	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth) same (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S419	308	((peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)) same (shared or distributed)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/12/22 16:23

			EPO; JPO			
S420	272	(wi$1fi or "wifi" or bluetooth) near1 (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S421	18	Barkan-elad.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S422	1	("cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S423	0	("pda" or laptop) adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S424	11	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3 (provid$4 or implement$4 or broadcast$4 or advertis$6) near3 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S425	823	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near2 (relay) with (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S426	1097	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near5(relay) near5 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S427	663	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3(relay) near3 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S428	84	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 ("as a" or serves or serving or provid$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S429	14707	(distribut$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/12/22 16:23

			EPO; JPO			
S430	3402	(distribut$4) adj1 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S431	85	(distribut$4) adj1 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S432	306	(distribut$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S433	11735	"fon"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S434	141	"fon" and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S435	141	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S436	16	("fon.com." or "www.fon.com" or foneros)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S437	1434	ipass	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S438	32	ipass and (wi$1fi and hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S439	74	ipass and (wi$1fi OR hotspot)	US-PGPUB; USPAT; USOCR;	OR	ON	2014/12/22 16:23

			EPO; JPO			
S440	13	jones-adrian.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S441	2	("2007/0215684").URPN.	USPAT	OR	ON	2014/12/22 16:23
S442	6	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	USPAT	OR	ON	2014/12/22 16:23
S443	2	("20040158618" | "20040042596" | "20040158618").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S444	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S445	307	(shared or sharing) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S446	3306	(virtual or software or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S447	1292	(virtual or software$1based or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S448	778	(virtual or software$1based or	US-	OR	ON	2014/12/22

		"software$1defined") near1 ("bss" or "ap" or "access point")	PGPUB; USPAT; USOCR; EPO; JPO			16:23
S449	89	fon.as.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S450	674	(virtual or software$1based or "software$1defined") adj2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S451	466	(virtual or software$1based or "software$1defined") adj ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S452	466	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S453	3	(wi$1fi or hotspot or internet) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S454	0	(wi$1fi or hotspot) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S455	3	(wi$1fi or hotspot) with Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S456	1701	(((timer or time) or (limit$4 or based)) with (wi$1fi or wireless or internet) with free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S457	251	(((timer or time) or (limit$4 or based)) near5 (wi$1fi or wireless or internet) near5 free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S458	107	(((timer or time) or (limit$4 or based))	US-	OR	ON	2014/12/22

		near5 (wi$1fi or wireless) near5 free) same (software or application)	PGPUB; USPAT; USOCR; EPO; JPO			16:23
S459	1659	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S460	101	(wi$1fi or wireless) near3 free near3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S461	32	free adj2 (wi$1fi or wireless) adj3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S462	31	free adj2 (internet) adj2(software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S463	31	free adj2 (internet) adj2 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S464	216	free adj2 (wi$1fi or wireless) adj2 (access)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S465	4146	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S466	26	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$ or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$ or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-	US-PGPUB	OR	ON	2014/12/22 16:23

		$ or US-20050147084-$).did.				
S467	9	S466 and proxy	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S468	7	S466 and proxy and (vlan or "virtual" or tunnel)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S469	2	S466 and (proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S470	14010	(proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S471	8222	(proxy with (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S472	12	(proxy with (vlan or tunnel)) with (apid or ssid)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S473	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S474	1	S472 and S473	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S475	27	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$	US-PGPUB; USPAT	OR	ON	2014/12/22 16:23

		or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$ or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-$ or US-20050147084-$).did. or (US-6950628-$).did.				
S476	14	S475 and ("user interface" or "ui" or "display")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S477	6	S475 and (acknowledge or "ack/nack" or "ack" or "nack" or "nak")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S478	4146	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S479	16642	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S480	3785	370/351.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S481	11486	370/389.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S482	11498	370/392.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S483	1868	370/395.1.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S484	1548	370/395.2.ccls.	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S485	1395	370/395.4.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S486	648	370/396.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S487	1008	370/397.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S488	389	370/398.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S489	540	370/399.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S490	18	barkan-elad.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S491	343	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S492	141	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S493	466	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S494	22200	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or	US-PGPUB;	OR	ON	2014/12/22 16:23

		broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm.	USPAT; USOCR; EPO; JPO			
S495	1231	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm. and (proxy).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S496	1659	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S497	10	S495 and S478	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S498	96	S495 and S479	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S499	7	S495 and S480	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S500	30	S495 and S481	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S501	15	S495 and S482	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S502	0	S495 and S483	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S503	0	S495 and S485	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S504	9	S495 and S484	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S505	0	S495 and S485	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S506	1	S495 and S486	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S507	0	S495 and S487	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S508	0	S495 and S489	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S509	1	S495 and S490	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S510	14	S496 and S478	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S511	14	S496 and S478	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S512	49	S496 and S479	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S513	2	S496 and S480	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S514	10	S496 and S481	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S515	11	S496 and S482	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S516	0	370/395.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S517	0	S496 and S516	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S518	1	S496 and S483	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S519	2	S496 and S484	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S520	6	S496 and S485	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S521	3	S496 and S486	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S522	1	S496 and S487	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S523	1	S496 and S488	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S524	1	S496 and S489	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S525	0	barkan-ehud.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S526	0	S496 and S525	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S527	2	S496 and S490	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S528	159	S494 and S478	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S529	968	S494 and S479	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S530	109	S494 and S480	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S531	265	S494 and S481	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S532	168	S494 and S482	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S533	32	S494 and S483	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S534	49	S494 and S484	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S535	7	S494 and S485	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S536	7	S494 and S486	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S537	10	S494 and S487	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S538	7	S494 and S488	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S539	4	S494 and S489	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S540	0	S494 and S525	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S541	4	S494 and S490	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S542	1686	(sta or "ue" or "ms" or "at" or mobile or equipment or station or wtru).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4 or serv$4 or manag$4).clm. and (wi$1fi or internet or hotspot).clm. and (proxy).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S543	14	S542 and S478	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S544	132	S542 and S479	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S545	14	S542 and S480	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S546	41	S542 and S481	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S547	27	S542 and S482	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S548	2	S542 and S483	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S549	11	S542 and S484	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S550	1	S542 and S485	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S551	2	S542 and S486	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S552	3	S542 and S487	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S553	1	S542 and S488	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S554	1	S542 and S489	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S555	0	S542 and S525	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S556	2	S542 and S490	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S557	2	"20100296441"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S558	63	"8000276"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S559	1	"8000276".pn.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S560	16642	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S561	0	"vagabee$4" or "fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S562	0	"fon.com"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S563	57524	(sta or "ue" or "ms" or "at" or mobile or equipment) with (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) with (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S564	2125	(sta or "ue" or "ms" or "at" or mobile or equipment) near2 (acting or broadcast$4	US-PGPUB;	OR	ON	2014/12/22 16:23

		or provid$4 or initiat$4 or implement$4) near2 (wi$1fi or internet or hotspot)	USPAT; USOCR; EPO; JPO			
S565	343	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S566	3	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S567	17	(sta or "ue" or "ms" or "at" or mobile or equipment or "pda" or "laptop") adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S568	766	((distribut$4) near3 (wi$1fi or hotspot))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S569	4	((distribut$4) near3 (wi$1fi or hotspot)) with (software)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S570	4	("20030119537" | "20040003133" | "7284062" | "20040133689").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S571	4431	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S572	308	(peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth) same (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S573	308	((peer$1to$1peer or "p2p" or "peer-peer") with (wi$1fi or "wifi" or bluetooth)) same (shared or distributed)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S574	272	(wi$1fi or "wifi" or bluetooth) near1 (shared or distributed)	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S575	18	Barkan-elad.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S576	1	("cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S577	0	("pda" or laptop) adj2 (provid$4 or implement$4 or broadcast$4 or advertis$6) adj2 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S578	11	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3 (provid$4 or implement$4 or broadcast$4 or advertis$6) near3 ("wi$1fi" or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S579	823	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near2 (relay) with (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S580	1097	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near5(relay) near5 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S581	663	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") near3(relay) near3 (data or traffic or internet or wi$1fi)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S582	84	("pda" or laptop or "cell phone" or "user equipment" or "ue" or "sta" or "wtru") adj2 ("as a" or serves or serving or provid$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S583	14707	(distribut$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S584	3402	(distribut$4) adj1 (wi$1fi or internet or hotspot)	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S585	85	(distribut$4) adj1 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S586	306	(distribut$4) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S587	11735	"fon"	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S588	141	"fon" and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S589	141	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S590	16	("fon.com." or "www.fon.com" or foneros)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S591	1434	ipass	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S592	32	ipass and (wi$1fi and hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S593	74	ipass and (wi$1fi OR hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S594	13	jones-adrian.in.	US-PGPUB;	OR	ON	2014/12/22 16:23

			USPAT; USOCR; EPO; JPO			
S595	2	("2007/0215684").URPN.	USPAT	OR	ON	2014/12/22 16:23
S596	6	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	USPAT	OR	ON	2014/12/22 16:23
S597	2	("20040158618" | "20040042596" | "20040158618").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S598	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S599	307	(shared or sharing) adj2 (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S600	3306	(virtual or software or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S601	1292	(virtual or software$1based or "software$1defined") near2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:23
S602	778	(virtual or software$1based or "software$1defined") near1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/12/22 16:24

			JPO			
S603	89	fon.as.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S604	674	(virtual or software$1based or "software$1defined") adj2 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S605	466	(virtual or software$1based or "software$1defined") adj ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S606	466	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S607	3	(wi$1fi or hotspot or internet) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S608	0	(wi$1fi or hotspot) near1 Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S609	3	(wi$1fi or hotspot) with Pyramid	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S610	1701	(((timer or time) or (limit$4 or based)) with (wi$1fi or wireless or internet) with free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S611	251	(((timer or time) or (limit$4 or based)) near5 (wi$1fi or wireless or internet) near5 free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S612	107	(((timer or time) or (limit$4 or based)) near5 (wi$1fi or wireless) near5 free) same (software or application)	US-PGPUB; USPAT; USOCR; EPO;	OR	ON	2014/12/22 16:24

			JPO			
S613	1659	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S614	101	(wi$1fi or wireless) near3 free near3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S615	32	free adj2 (wi$1fi or wireless) adj3 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S616	31	free adj2 (internet) adj2(software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S617	31	free adj2 (internet) adj2 (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S618	216	free adj2 (wi$1fi or wireless) adj2 (access)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S619	4146	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S620	26	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$ or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$ or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-$ or US-20050147084-$).did.	US-PGPUB	OR	ON	2014/12/22 16:24
S621	9	S620 and proxy	US-PGPUB; USPAT;	OR	ON	2014/12/22 16:24

			USOCR; EPO; JPO			
S622	7	S620 and proxy and (vlan or "virtual" or tunnel)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S623	2	S620 and (proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S624	14010	(proxy same (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S625	8222	(proxy with (vlan or "virtual" or tunnel))	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S626	12	(proxy with (vlan or tunnel)) with (apid or ssid)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S627	24	("6934530" | "20040052223" | "20060041931" | "20040052223" | "20040141617" | "6991575" | "20050204037" | "20050223086" | "20050250448" | "20050021781" | "20030051041" | "20050260972" | "20030051041" | "20050050352" | "20060223527" | "6795700" | "6957069" | "20040133687" | "20050220106" | "20050232242" | "6950628" | "20050233740" | "20050232283" | "6957086" | "20010053683" | "20070008885").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S628	1	S626 and S627	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S629	27	(US-20100296441-$ or US-20030228868-$ or US-20060135206-$ or US-20070124802-$ or US-20080101290-$ or US-20050223086-$ or US-20070121839-$ or US-20070140163-$ or US-20070180136-$ or US-20070183383-$ or US-20050220106-$ or US-20070242657-$ or US-20060236378-$ or US-20070124490-$ or US-20070215684-$ or US-20070054654-$	US-PGPUB; USPAT	OR	ON	2014/12/22 16:24

		or US-20040042596-$ or US-20030051041-$ or US-20040141617-$ or US-20040103278-$ or US-20050078624-$ or US-20050220048-$ or US-20030171989-$ or US-20020078059-$ or US-20020103879-$ or US-20050147084-$).did. or (US-6950628-$).did.				
S630	14	S629 and ("user interface" or "ui" or "display")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S631	6	S629 and (acknowledge or "ack/nack" or "ack" or "nack" or "nak")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S632	4146	370/310.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S633	16642	370/328.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S634	3785	370/351.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S635	11486	370/389.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S636	11498	370/392.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S637	1868	370/395.1.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S638	1548	370/395.2.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24

S639	1395	370/395.4.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S640	648	370/396.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S641	1008	370/397.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S642	389	370/398.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S643	540	370/399.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S644	18	barkan-elad.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S645	343	(sta or "ue" or "ms" or "at" or mobile or equipment) adj2 (acting or broadcast$4 or provid$4 or initiat$4 or implement$4) adj2 (wi$1fi or internet or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S646	141	("fon" or "fon.com." or "www.fon.com" or foneros) and (wi$1fi or hotspot)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S647	466	(virtual or software$1based or "software$1defined") adj1 ("bss" or "ap" or "access point")	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S648	22200	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24

S649	1231	(sta or "ue" or "ms" or "at" or mobile or equipment).clm. and (acting or broadcast$4 or provid$4 or initiat$4 or implement$4).clm. and (wi$1fi or internet or hotspot).clm. and (proxy).clm.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S650	1659	(wi$1fi or wireless) with free with (software or application)	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S651	10	S649 and S632	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S652	96	S649 and S633	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S653	7	S649 and S634	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S654	30	S649 and S635	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S655	15	S649 and S636	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S656	0	S649 and S637	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S657	0	S649 and S639	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S658	9	S649 and S638	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24

S659	0	S649 and S639	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S660	1	S649 and S640	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S661	0	S649 and S641	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S662	0	S649 and S643	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S663	1	S649 and S644	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S664	14	S650 and S632	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S665	14	S650 and S632	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S666	49	S650 and S633	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S667	2	S650 and S634	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S668	10	S650 and S635	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24

S669	11	S650 and S636	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S670	0	370/395.ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S671	0	S650 and S670	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S672	1	S650 and S637	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S673	2	S650 and S638	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S674	6	S650 and S639	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S675	3	S650 and S640	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S676	1	S650 and S641	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S677	1	S650 and S642	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S678	1	S650 and S643	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24

S679	0	barkan-ehud.in.	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S680	0	S650 and S679	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S681	2	S650 and S644	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S682	159	S648 and S632	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
S683	968	S648 and S633	US-PGPUB; USPAT; USOCR; EPO; JPO	OR	ON	2014/12/22 16:24
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EAST Search History (Interference)

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S746	2654	370/351.ccls.	USPAT; UPAD	OR	ON	2014/12/22 16:23
S747	2512	370/310.ccls.	USPAT; UPAD	OR	ON	2014/12/22 16:23
S748	8712	370/328.ccls.	USPAT; UPAD	OR	ON	2014/12/22 16:23
S749	6805	370/389.ccls.	USPAT; UPAD	OR	ON	2014/12/22 16:23
S750	6005	370/392.ccls.	USPAT; UPAD	OR	ON	2014/12/22 16:23
S751	1273	370/395.1.ccls.	USPAT; UPAD	OR	ON	2014/12/22 16:23
S752	1111	370/395.2.ccls.	USPAT; UPAD	OR	ON	2014/12/22 16:23
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12/ 22/ 2014 5:12:40 PM
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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13987881	BARKAN, ELAD PINHAS
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

CPC						
Symbol					**Type**	**Version**
H04W		76	/	022	F	2013-01-01
H04W		12	/	08	I	2013-01-01
H04W		80	/	00	A	2013-01-01
H04W		84	/	10	A	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

/GAUTAM SHARMA/ Examiner.Art Unit 2467 (Assistant Examiner)	12/22/2014 (Date)	**Total Claims Allowed:** 68	
/HASSAN PHILLIPS/ Supervisory Patent Examiner.Art Unit 2467 (Primary Examiner)	12/23/2014 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13987881	BARKAN, ELAD PINHAS
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
370	328	H	0	4	W	88 / 04 (2009.0)						
CROSS REFERENCE(S)												
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											
370	310											

/GAUTAM SHARMA/ Examiner.Art Unit 2467 (Assistant Examiner)	12/22/2014 (Date)	**Total Claims Allowed:** 68	
/HASSAN PHILLIPS/ Supervisory Patent Examiner.Art Unit 2467 (Primary Examiner)	12/23/2014 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	13987881	BARKAN, ELAD PINHAS
	Examiner	**Art Unit**
	GAUTAM SHARMA	2467

☒ Claims renumbered in the same order as presented by applicant ☐ CPA ☒ T.D. ☐ R.1.47

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7	7	23	23	39	39	55	55								
8	8	24	24	40	40	56	56								
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14	14	30	30	46	46	62	62								
15	15	31	31	47	47	63	63								
16	16	32	32	48	48	64	64								

/GAUTAM SHARMA/ Examiner.Art Unit 2467 (Assistant Examiner)	12/22/2014 (Date)	**Total Claims Allowed:** 68	
/HASSAN PHILLIPS/ Supervisory Patent Examiner.Art Unit 2467 (Primary Examiner)	12/23/2014 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

U.S. Patent and Trademark Office

Part of Paper No. 20141222

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Elad Barkan	Art Unit :	2467
Serial No. :	13/987,881	Examiner :	Gautam Sharma
Filed :	September 11, 2013	Conf. No. :	4557
Title: :	WIRELESS INTERNET SYSTEM AND METHOD		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT PURSUANT TO 37 CFR §1.312

Please amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this paper.

Remarks begin on page 3 of this paper.

Amendments to the Specification:

Please amend paragraph [0001] as follows:

The present application claims priority to and is a continuation ~~application to patent application Ser.~~ of U.S. Patent Application Serial No. 12/665,978, filed December 22, 2009, now U.S. Pat. No. 8,559,369, which is a national stage entry of PCT/IL07/00244, filed February 22, 2007, which ~~relates to, and~~ claims priority from~~, the~~ provisional ~~patent applications filed by the present applicant in the U.S.A.: Application~~ U.S. Patent Application Serial No. 60/775,321 filed on ~~22 Feb.~~ February 22, 2006, and provisional U.S. Patent Application Serial No. 60/794, 135 filed on ~~24 Apr.~~ April 24, 2006, all of which are hereby incorporated by reference in their entirety~~entirely~~.

Please delete paragraph [0411] and replace it with the following paragraph:

[0411] In case STA 11 wishes to communicate with a node that is not aware of the novel network, it can do so through a node that is aware of the network. For example, TN 41 can serve as a proxy for STA 11 (in a similar way to mobile IP). The node that is not aware of the network communicates with TN 41. TN 41 forwards the information to STA 11. TN 41 can allocate an IP address (perhaps using NAT, or allocate ports using its own IP address) that will serve STA 11.

Please delete paragraph [0421] and replace it with the following paragraph:

[0421] A possible drawback of the above method of fast handover is that it requires that the pool of resources that GN 21 holds should contain a valid IP address of the AP that STA is handing over to. If the DHCP lease time is long enough, having a valid IP might not be a problem, but on short lease times with only a few STAs roaming it is desirable to perform handovers even if there is no valid IP available in the pool. Unfortunately, a typical execution of the DHCP protocol can take several seconds to complete, which might be too long for a fast handover. Interestingly, we observe that many APs will forward information even if the IP that is being used was not allocated by DHCP.

REMARKS

The foregoing amendments and the following remarks are submitted pursuant to 37 CFR § 1.312. The amendments to paragraph [0001] are primarily made to explicitly include a claim of priority to the PCT application, of which the parent application to this application was a national stage entry application. The amendments to paragraphs [0411] and [0421] are presented out of an abundance of caution due to a typographical error in the prior response. In particular, that response presented amendments intended for paragraph [0421] but the response inadvertently referenced paragraph [0411]. Thus, the above amendments are simply intended to ensure that paragraphs [0411] and [0421] are correct in the application file.

Date: March 23, 2015

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Facsimile: (214) 988-0775

SUPPLEMENTAL APPLICATION DATA SHEET

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	13/987881
Title of Invention		

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City		State/Province		Country of Residence	

Mailing Address of Inventor:

Address 1	
Address 2	

City		State/Province	
Postal Code		Country i	

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number			
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention			
Attorney Docket Number		Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)		Suggested Figure for Publication (if any)	

Filing By Reference :

PTO/AIA/14 (12-13)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number			

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the application number blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	12/665978	2009-12-22
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
12665978	a 371 of international	PCT/IL2007/000244	2007-02-22
Prior Application Status	Expired		Remove

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/IL2007/000244	Claims benefit of provisional	60775321	2006-02-22
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
PCT/IL2007/000244	Claims benefit of provisional	60794135	2006-04-24

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(d). When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(h)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
~~PCT/IL2007/000244~~	~~IL~~	~~2007-02-22~~	

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

PTO/AIA/14 (12-13)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor :	

If the Applicant is an Organization check here. ☒

Organization Name	

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	

PTO/AIA/14 (12-13)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

Email Address	

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication . An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Signature	/Spencer C. Patterson/			Date (YYYY-MM-DD)	2015-03-23
First Name	Spencer C.	Last Name	Patterson	Registration Number	43849

Additional Signature may be generated within this form by selecting the Add button.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	
	Application Number	
Title of Invention		

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent C o o p eration Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Acknowledgement Receipt

EFS ID:	21894386
Application Number:	13987881
International Application Number:	
Confirmation Number:	4557
Title of Invention:	Wireless internet system and method
First Named Inventor/Applicant Name:	Elad Pinhas Barkan
Customer Number:	123077
Filer:	Spencer Chase Patterson/Denise Wilson
Filer Authorized By:	Spencer Chase Patterson
Attorney Docket Number:	0023-002001
Receipt Date:	26-MAR-2015
Filing Date:	11-SEP-2013
Time Stamp:	23:05:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment after Notice of Allowance (Rule 312)	002001-312Amd.pdf	22151 2a9eda5ce088a51243eadb1f15366690eb98f220	no	3

Warnings:	
Information:	

2	Application Data Sheet	002001-ads.pdf	540608 07a67513e0a0f63c5f4322e30eb2e4ef4748018d	no	7

Warnings:	
Information:	
This is not an USPTO supplied ADS fillable form	
Total Files Size (in bytes):	562759

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

123077 7590 01/02/2015
Spencer C. Patterson, P.C.
4849 Greenville Ave., Suite 1490
Dallas, TX 75206

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

via EFS-Web - Denise Wilson	(Depositor's name)
/Denise Wilson/	(Signature)
March 31, 2015	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan		4557

TITLE OF INVENTION: Wireless internet system and method

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0	$0	$480	04/02/2015

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHARMA, GAUTAM	2467	370-328000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 Spencer C. Patterson
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: Barkan Wireless Access Technologies, L.P.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): Allen, Texas

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☒ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ☐ A check is enclosed.
- ☒ Payment by credit card. ~~Form PTO-2038 is attached.~~
- ☐ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
  NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
  NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ☐ Applicant changing to regular undiscounted fee status.
  NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Spencer C. Patterson/ Date March 31, 2015
Typed or printed name Spencer C. Patterson Registration No. 43,849

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Elad Barkan	Art Unit :	2467
Serial No. :	13/987,881	Examiner :	Gautam Sharma
Filed :	September 11, 2013	Conf. No. :	4557
Title: :	WIRELESS INTERNET SYSTEM AND METHOD		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST TO CORRECT FILING RECEIPT

Applicant requests a corrected filing receipt to include the priority claim to provisional U.S. Patent Application Serial No. 60/775,321 filed on February 22, 2006, and provisional U.S. Patent Application Serial No. 60/794,135 filed on April 24, 2006. The requested changes are reflected on the attached marked up filing receipt. A copy of the first page of the specification, which includes a claim of priority to the two provisional applications is attached.

The application as filed included an Application Data Sheet with a priority claim to the parent application (Ser. No. 12/665,978) and to the PCT application (PCT/IL07/00244). Both of these priority claims were noted on the filing receipt mailed on October 9, 2013 and the filing receipt mailed on December 16, 2013. The specification of the application as filed, at paragraph [0001], further included the following statement:

> The present application is a continuation application to patent application Ser. No. 12/665,978 now U.S. Pat. No. 8,559,369 which relates to, and *claims priority from, the provisional patent applications filed by the present applicant in the U.S.A.: Application U.S. 60/775,321 filed on 22 Feb. 2006, and Application U.S. 60/794, 135 filed on 24 Apr. 2006, all of which are hereby incorporated by reference in their entirely.*

(emphasis added). Thus, the specification of the application included a claim of priority to provisional U.S. Patent Application Serial No. 60/775,321 filed on February 22, 2006, and provisional U.S. Patent Application Serial No. 60/794,135 filed on April 24, 2006, although the Application Data Sheet omitted the claim of priority to the provisional applications. The last phrase of paragraph [0001] also incorporated by reference U.S.

Pat. No. 8,559,369, which also includes a claim of priority to the same two provisional applications at col. 1, lines 7-12.

Based on the foregoing, Applicant respectfully requests that the Office issue a corrected filing receipt that includes a claim of priority to provisional U.S. Patent Application Serial No. 60/775,321 filed on February 22, 2006, and provisional U.S. Patent Application Serial No. 60/794,135 filed on April 24, 2006. Applicant previously submitted, on March 26, 2015, a Supplemental Application Data Sheet reflecting the priority claim to the provisional applications.

Date: March 31, 2015

/Spencer C. Patterson/
Spencer C. Patterson
Reg. No. 43,849

Customer Number 123077
Spencer C. Patterson, P.C.
Telephone: (214) 396-8600
Facsimile: (214) 988-0775

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/987,881	09/11/2013	2473	1070		1	1

CONFIRMATION NO. 4557

UPDATED FILING RECEIPT

Elad Barkan
12 Habanim St.
Kfar Sirkin, 49935
ISRAEL

OC00000065469199

Date Mailed: 12/16/2013

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Applicant(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 12/665,978 12/22/2009 PAT 8559369

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)

ISRAEL PCT/IL2007/000244 02/22/2007

which claims benefit of US 60/794,135 04/24/2006
which claims benefit of US 60/772,321 02/22/2006

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 10/03/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/987,881**

Projected Publication Date: 03/27/2014

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****

WIRELESS INTERNET SYSTEM AND METHOD

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001]The present application is related to, and claims priority from, the provisional patent applications filed by the present applicant in U.S.A.: Application U.S. 60/775,321 filed on 22 Feb. 2006, and Application U.S. 60/794,135 filed on 24 Apr. 2006.

TECHNICAL FIELD

[0002]The present invention relates to a wireless Internet system and method, and more particularly to such systems for providing wireless Internet connection to roaming devices such as Portable computers, Laptops, PDAs and phones, and the deployment of such a system in a fast spreading manner (a viral-like method), in a client software-only manner such that the existing access points are not changed at all.

BACKGROUND ART

[0003]Currently, there is a growing number of WiFi public hot-spots (or Access Points--"AP"). These APs allow WiFi-enabled devices (which we refer to as STA) that are in their coverage area to Connect to the internet.

[0004]Some of the APs are operated as a business, service, or as part of a community, either with or without a charge to the STA's owner. Other APs are placed by individuals in their premises, but are not "locked", i.e., they are "open", allowing bypassing STAs to utilize them. Other APs placed by individuals are "locked" (or "closed"), thus not allowing passing STAs to utilize them.

[0005]As APs are being deployed in growing numbers, many individuals lock their APs for fear of unfair use of their network resources, and due to security concerns. For instance, there have been cases where a person places an open AP, and his neighbor uses this AP as its internet connection on a full-time basis without the consent of the first person, thus abusing and degrading the service of the first individual. In other cases, the neighbor hacked into the computer of the first person through the network. Thus, as time passes, most APs are either locked, or a payment is required to use them. Although the total number of APs and their area of coverage is growing fast, a larger percent of the APs are becoming locked and inaccessible to roaming STAs.

[0006]A prior art approach for allowing roaming customers to access the Internet is taken by Fon (www.fon.com). It allows individuals to download a new software into their APs, which makes their APs a pay-for-use APs for STAs that roam in their

Electronic Patent Application Fee Transmittal

Application Number:	13987881
Filing Date:	11-Sep-2013
Title of Invention:	Wireless internet system and method
First Named Inventor/Applicant Name:	Elad Pinhas Barkan
Filer:	Spencer Chase Patterson/Denise Wilson
Attorney Docket Number:	0023-002001

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl Issue Fee	2501	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**480**

Electronic Acknowledgement Receipt

EFS ID:	21936064
Application Number:	13987881
International Application Number:	
Confirmation Number:	4557
Title of Invention:	Wireless internet system and method
First Named Inventor/Applicant Name:	Elad Pinhas Barkan
Customer Number:	123077
Filer:	Spencer Chase Patterson/Denise Wilson
Filer Authorized By:	Spencer Chase Patterson
Attorney Docket Number:	0023-002001
Receipt Date:	31-MAR-2015
Filing Date:	11-SEP-2013
Time Stamp:	22:56:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$480
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	issue-fee.pdf	997695 4fd3c055263994bdee23aaaf90b7c5e0257e76bb	no	1
Warnings:					
Information:					
2	Request for Corrected Filing Receipt	Request.pdf	570211 1feffe8242077d00d29e8067993e71f9445e56b9	no	4
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	29941 9fef7d277f24796dc38afc3995ec0d61a2d3ca9a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1597847		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant :	Elad Barkan	Art Unit :	2467
Serial No. :	13/987,881	Examiner :	Gautam Sharma
Filed :	September 11, 2013	Conf. No. :	4557
Title: :	WIRELESS INTERNET SYSTEM AND METHOD		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT PURSUANT TO 37 CFR §1.312

Please amend the above-identified application as follows:

Amendments to the Specification begin on page 2 of this paper.

Remarks begin on page 3 of this paper.

Amendments submitted 03/26/2015 are entered.
G.S.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	09/11/2013	Elad Pinhas Barkan	0023-002001	4557

123077 7590 04/02/2015

Spencer C. Patterson, P.C.
4849 Greenville Ave., Suite 1490
Dallas, TX 75206

EXAMINER	
SHARMA, GAUTAM	

ART UNIT	PAPER NUMBER
2467	

MAIL DATE	DELIVERY MODE
04/02/2015	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Response to Rule 312 Communication	Application No.	Applicant(s)
	13/987,881	BARKAN, ELAD PINHAS
	Examiner	Art Unit
	GAUTAM SHARMA	2467

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

1. ☒ The amendment filed on *26 March 2015* under 37 CFR 1.312 has been considered, and has been:

a) ☒ entered.

b) ☐ entered as directed to matters of form not affecting the scope of the invention.

c) ☐ disapproved because the amendment was filed after the payment of the issue fee.
Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

d) ☐ disapproved. See explanation below.

e) ☐ entered in part. See explanation below.

/HASSAN PHILLIPS/
Supervisory Patent Examiner, Art Unit 2467

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
13/987,881	09/11/2013	2467	2990	0023-002001	1	1

CONFIRMATION NO. 4557

CORRECTED FILING RECEIPT

123077
Spencer C. Patterson, P.C.
4849 Greenville Ave., Suite 1490
Dallas, TX 75206

Date Mailed: 04/24/2015

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Applicant(s)

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

Power of Attorney: The patent practitioners associated with Customer Number 123077

Domestic Priority data as claimed by applicant

This application is a CON of 12/665,978 12/22/2009 PAT 8559369
which is a 371 of PCT/IL2007/000244 02/22/2007
which claims benefit of 60/775,321 02/22/2006
and claims benefit of 60/794,135 04/24/2006

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access - A proper **Authorization to Permit Access to Application by Participating Offices** (PTO/SB/39 or its equivalent) has been received by the USPTO.

If Required, Foreign Filing License Granted: 10/03/2013
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 13/987,881**
Projected Publication Date: Not Applicable
Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

Wireless internet system and method

Preliminary Class

370

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: Yes

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/987,881	05/26/2015	9042306	0023-002001	4557

123077 7590 05/06/2015

Spencer C. Patterson, P.C.
4849 Greenville Ave., Suite 1490
Dallas, TX 75206

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Elad Pinhas Barkan, Kfar Sirkin, ISRAEL;

AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas (Marshall Division) on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:16-cv-00063	1/19/2016	for the Eastern District of Texas (Marshall Division)

PLAINTIFF	DEFENDANT
Barkan Wireless Technologies, L.P.	T-Mobile US, Inc. T-Mobile USA, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	9,042,306	5/26/2015	Barkan Wireless Technologies, L.P.
2	8,559,369	10/15/2013	Barkan Wireless Technologies, L.P.
3			
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas (Marshall Division) on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:16-cv-00063	1/19/2016	for the Eastern District of Texas (Marshall Division)

PLAINTIFF	DEFENDANT
Barkan Wireless Technologies, L.P.	T-Mobile US, Inc. T-Mobile USA, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court for the Eastern District of Texas (Marshall Division) on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
2:16-cv-00063	1/19/2016	for the Eastern District of Texas (Marshall Division)

PLAINTIFF	DEFENDANT
[AMENDED] Barkan Wireless Access Technologies, L.P.	T-Mobile US, Inc. T-Mobile USA, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	9,042,306	5/26/2015	Barkan Wireless Access Technologies, L.P.
2	8,559,369	10/15/2013	Barkan Wireless Access Technologies, L.P.
3			
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5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**