

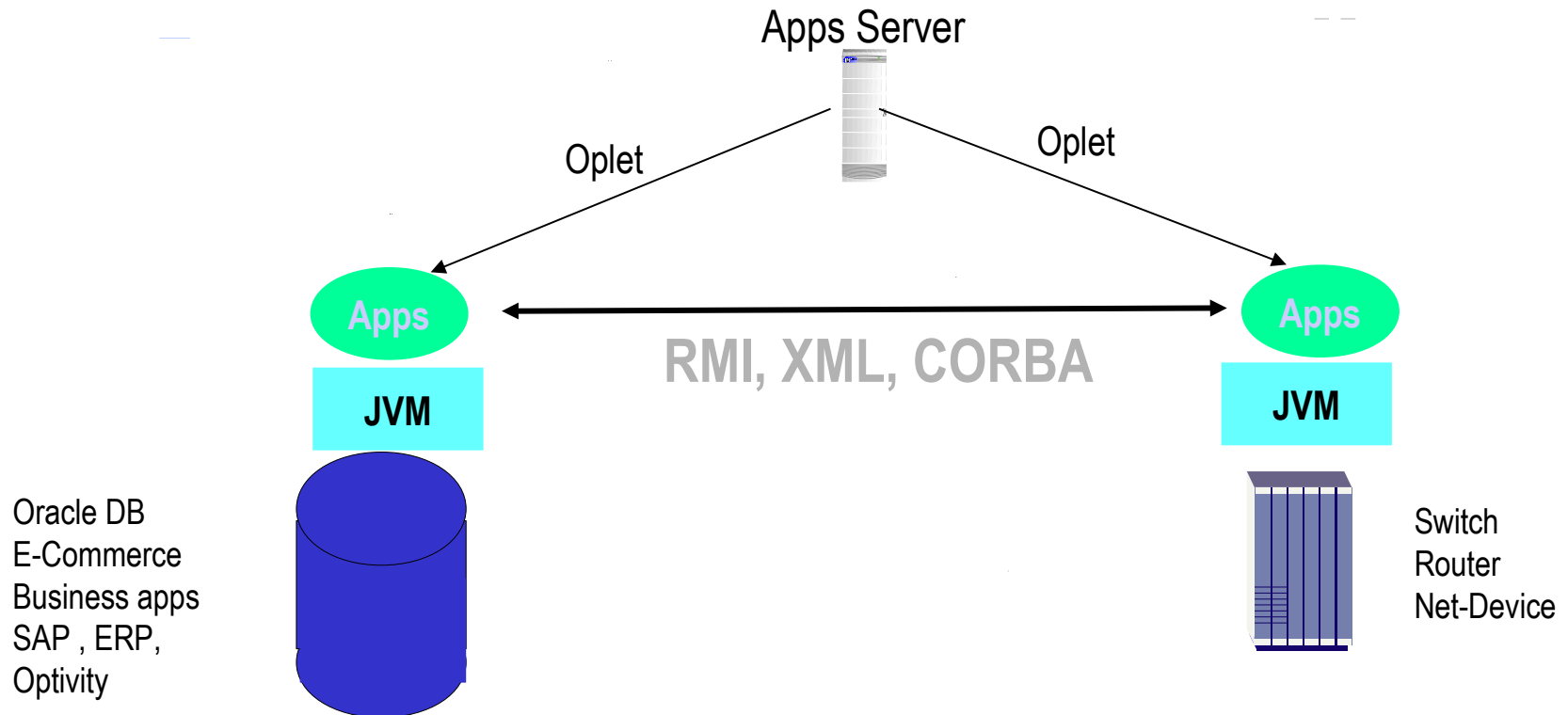
Open Innovation via Java-enabled Network Devices

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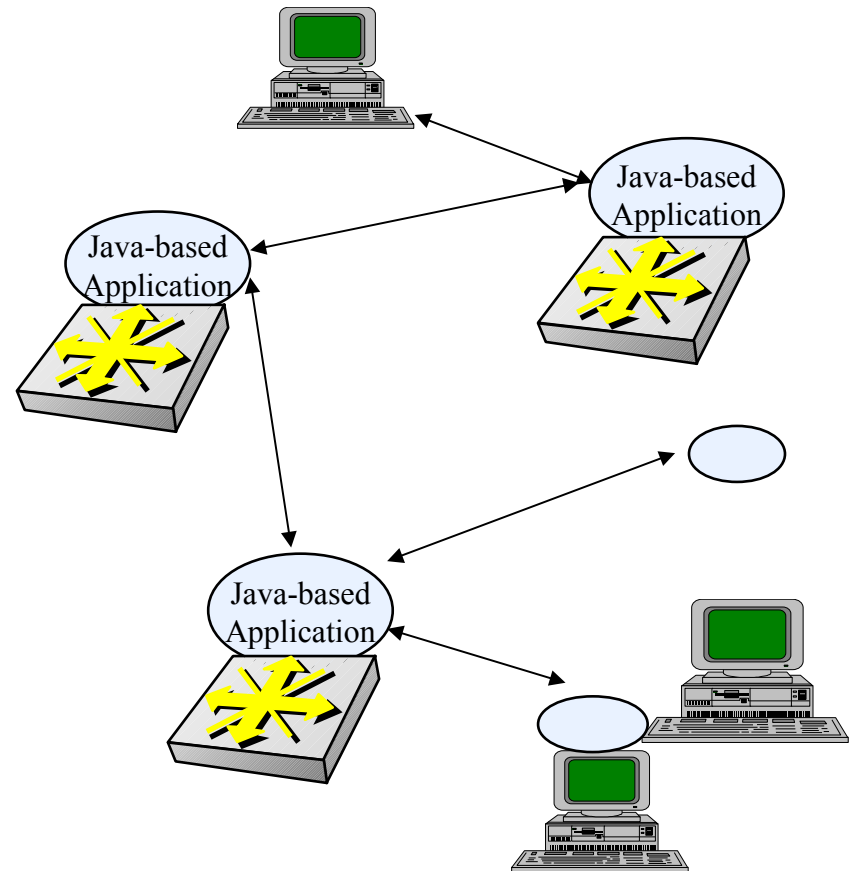
Collaboration with Business Applications

- New paradigm of distributed applications
- Network devices collaborating with business applications
- Application aware routing



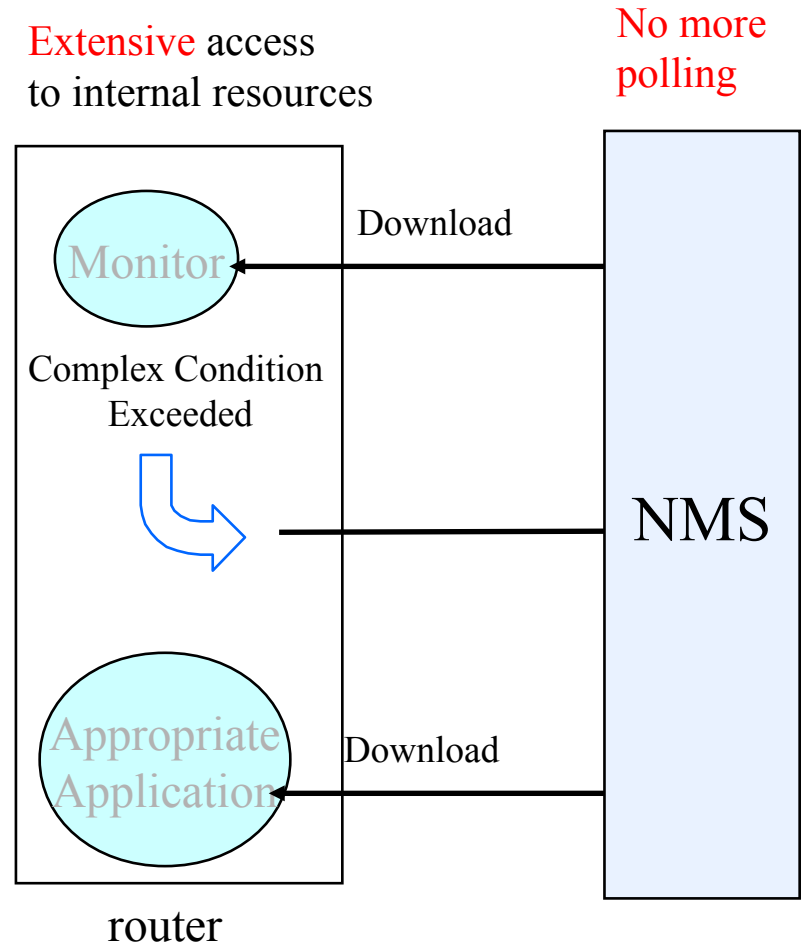
Server Collaboration

- Supports **distributed** computing applications in which network devices participate
 - router to router
 - server to router
- Supports **Intelligent Agents**
- Supports **Mobile Agents**



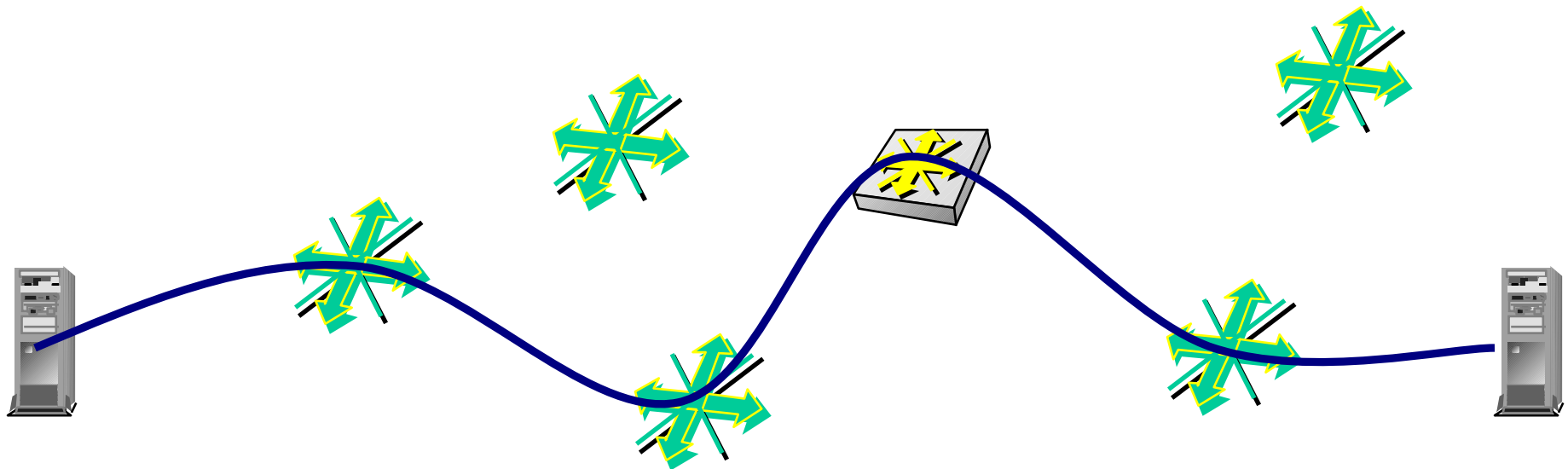
Active Network Management

- Download Oplet Service to the device.
- Monitor MIB variables
 - Might be complex conditions
 - Trend analysis
 - DiffServ, RMON-II, etc... MIBs
- Report “events” to NMS
 - drop rate, packets/second
- Allow Service to take action
- Download application
- Adjust parameters based on direction from NMS



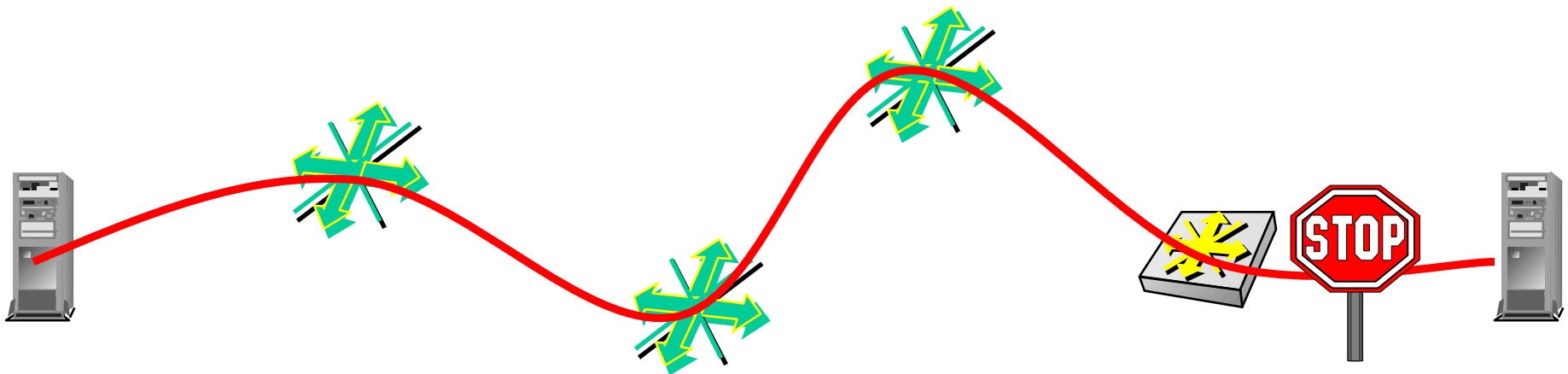
Diagnostic Mobile Agents

- Automatic trace-route from edge router where problem exists.
 - Each node reached generates a report to NMS
 - Trace-route code “moves” to next node in path
 - Mobile agents identify router health
 - Create logs for NMS

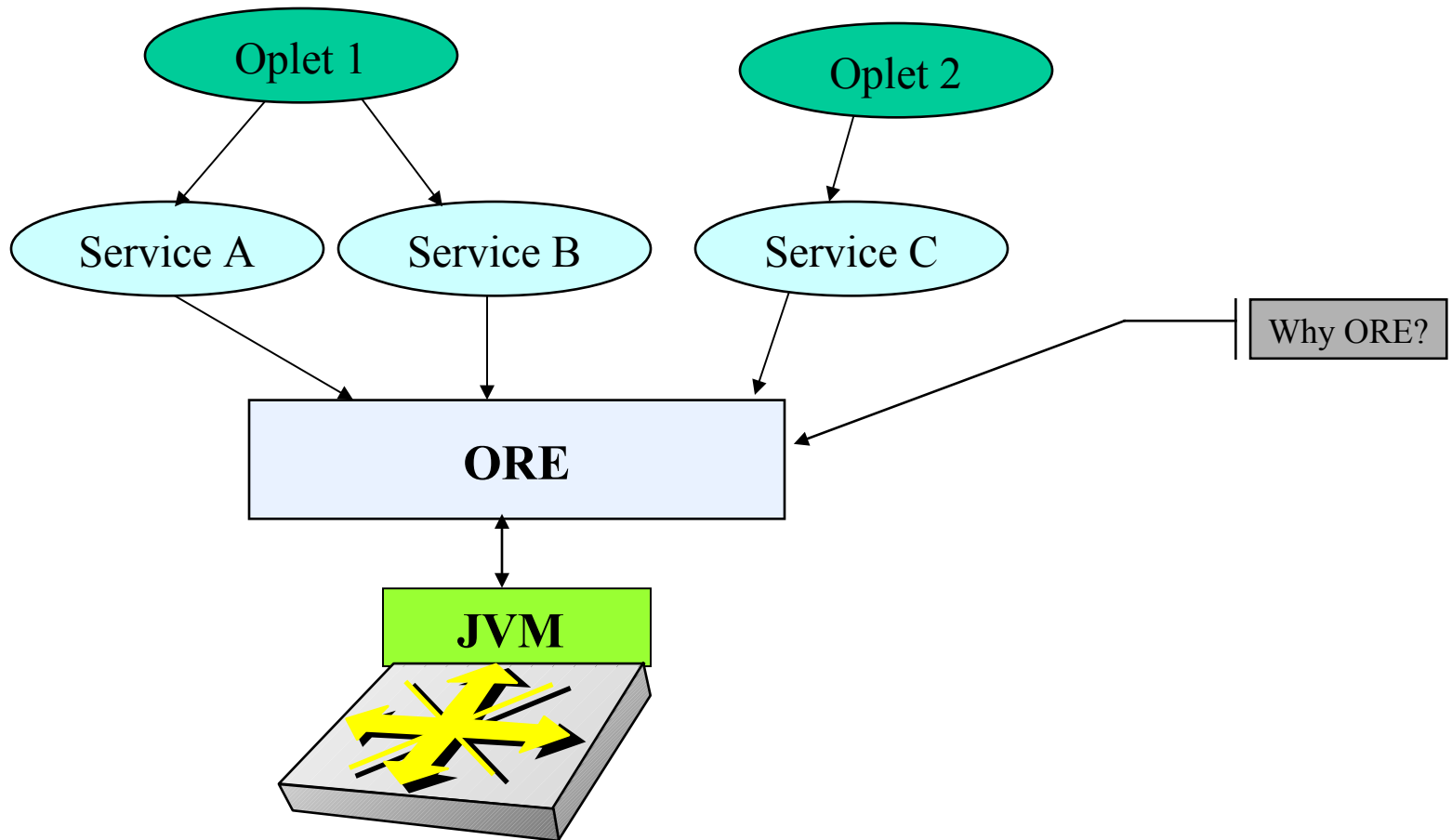


Active Intrusion Detection

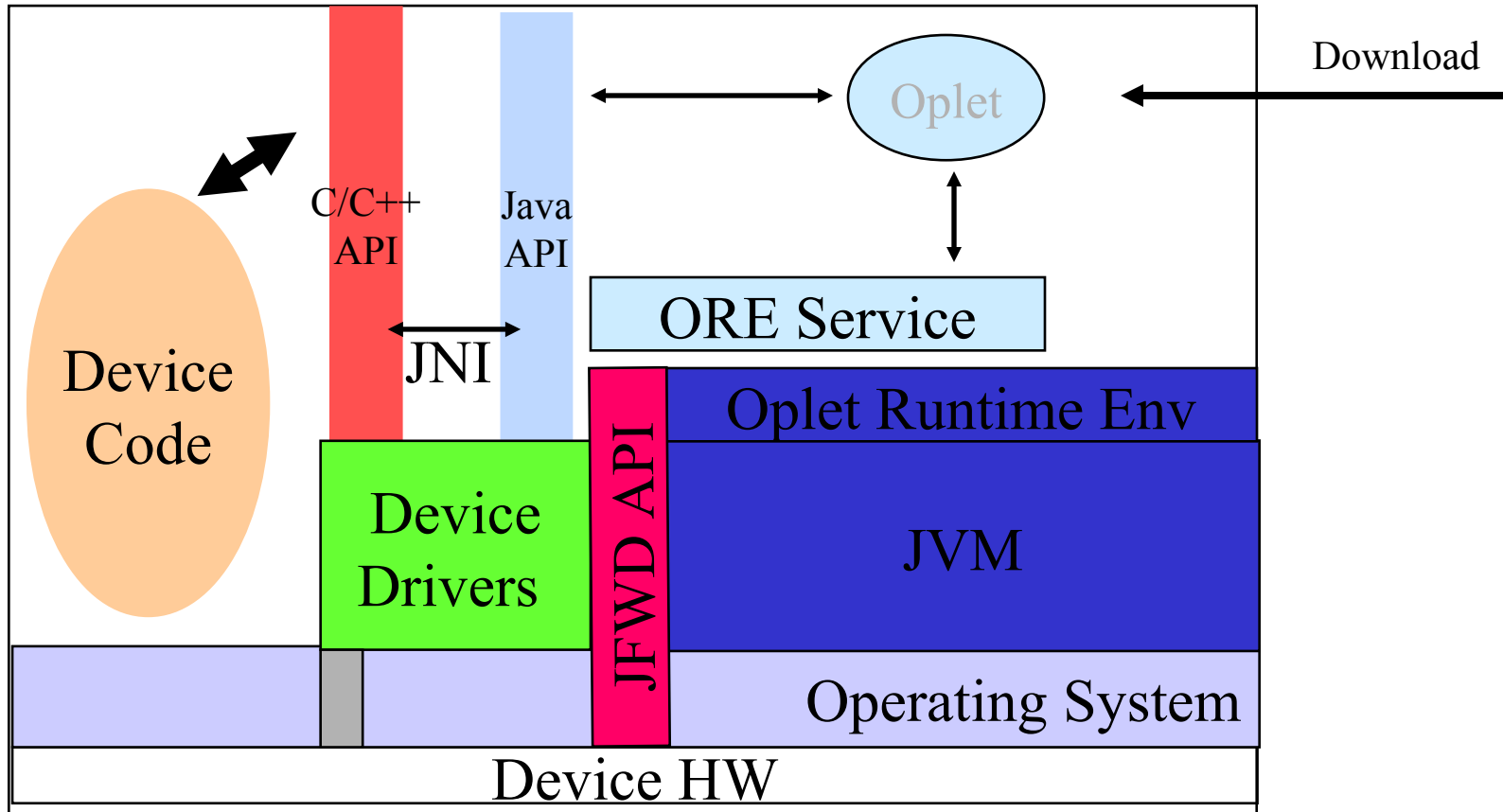
- Intruder is identified by Intrusion Detection software
- Intruder signature is identified
- Mobile agent is dispatched in direction of intruder (based on physical port of entry)
- Mobile agent “chases” intruder and terminates him (shuts down link, reboot host, notify NMS)



ORE - Oplet Run-time Environment

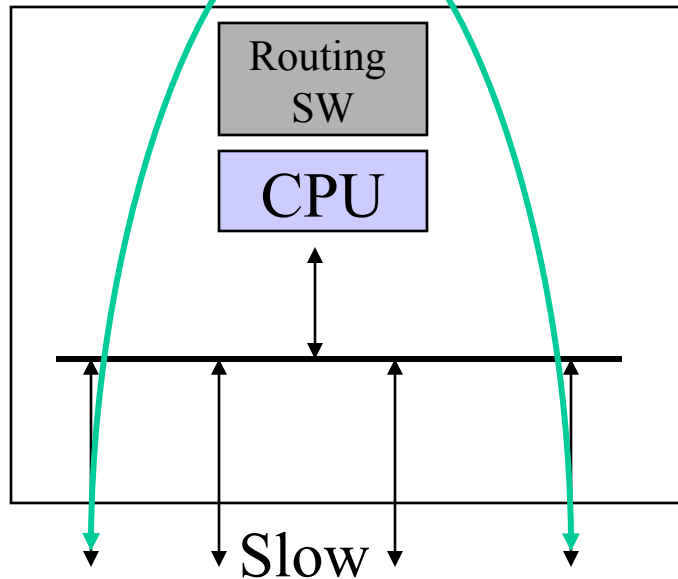


Java-enabled Device Architecture

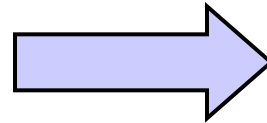


Separation of Control and Forwarding Planes

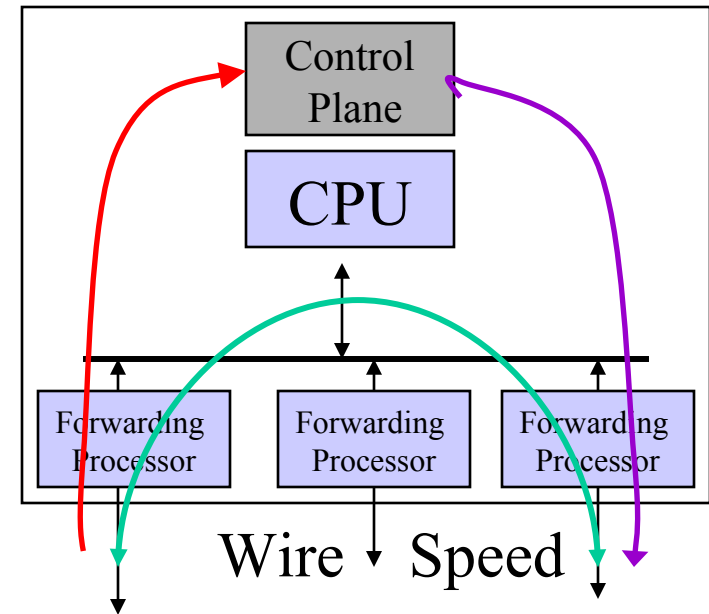
Centralized, CPU-based Router



Control + Forwarding Functions combined

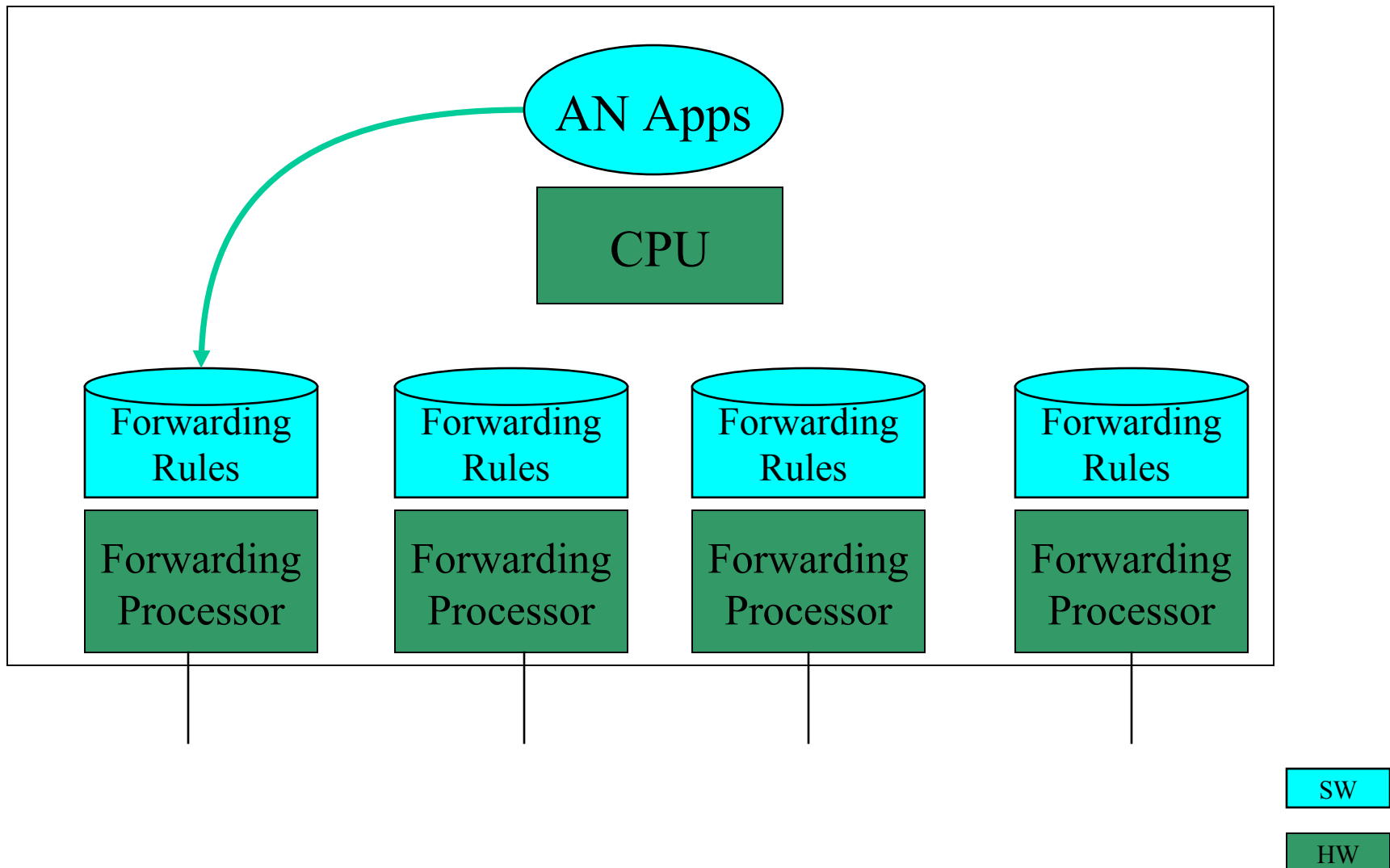


Forwarding-Processors based Router

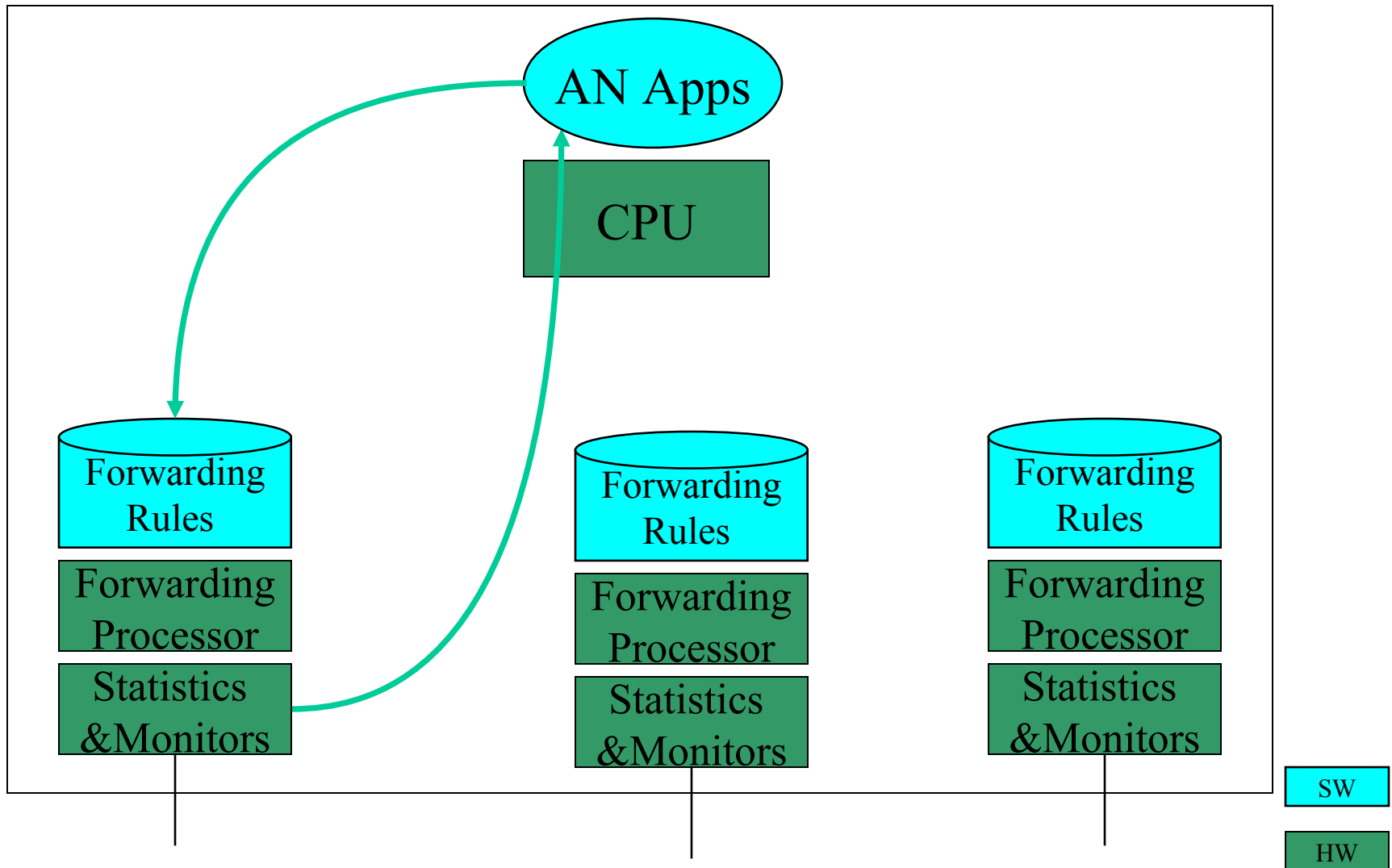


Control separated From forwarding

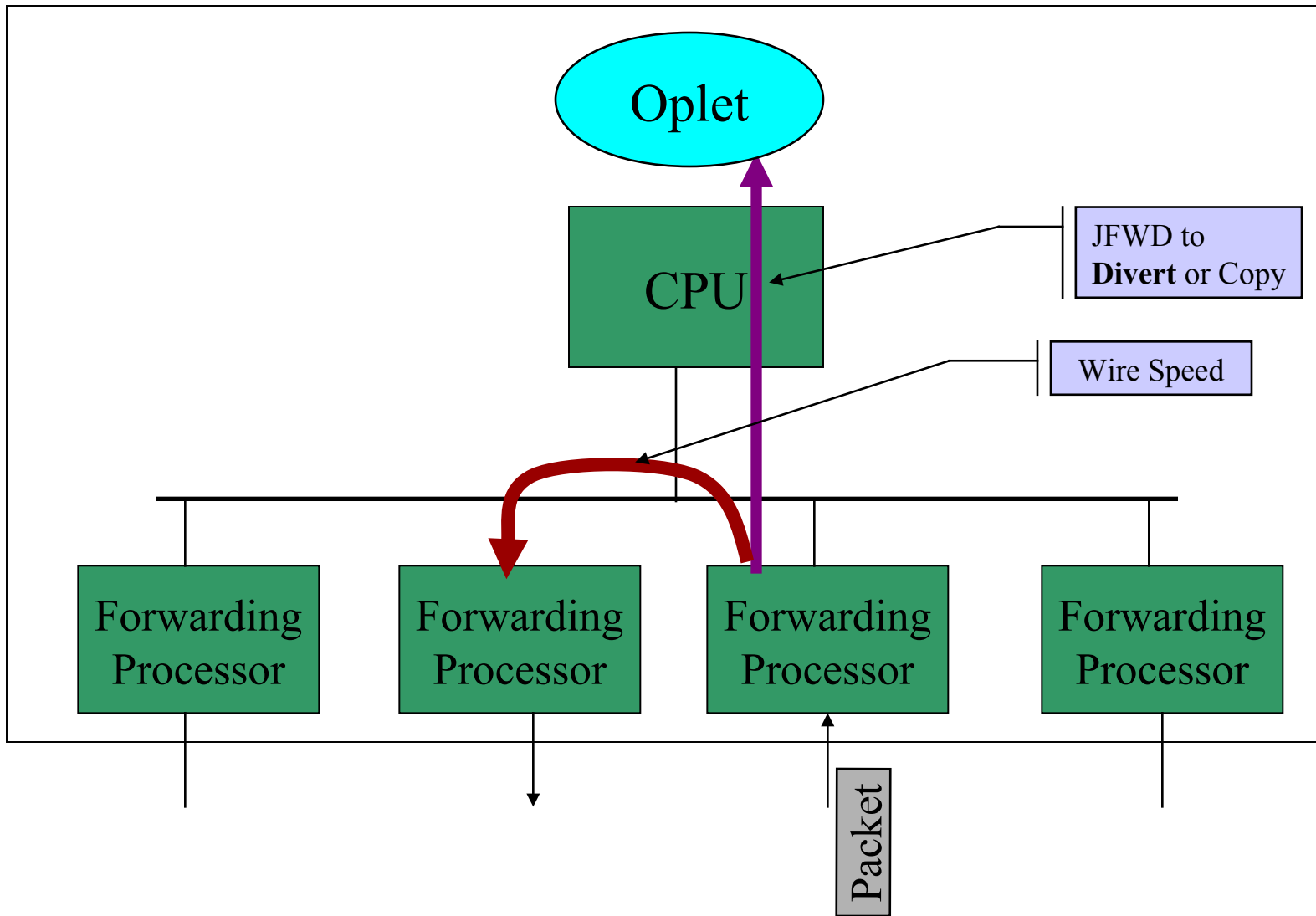
Dynamic Configuration of Forwarding Rules



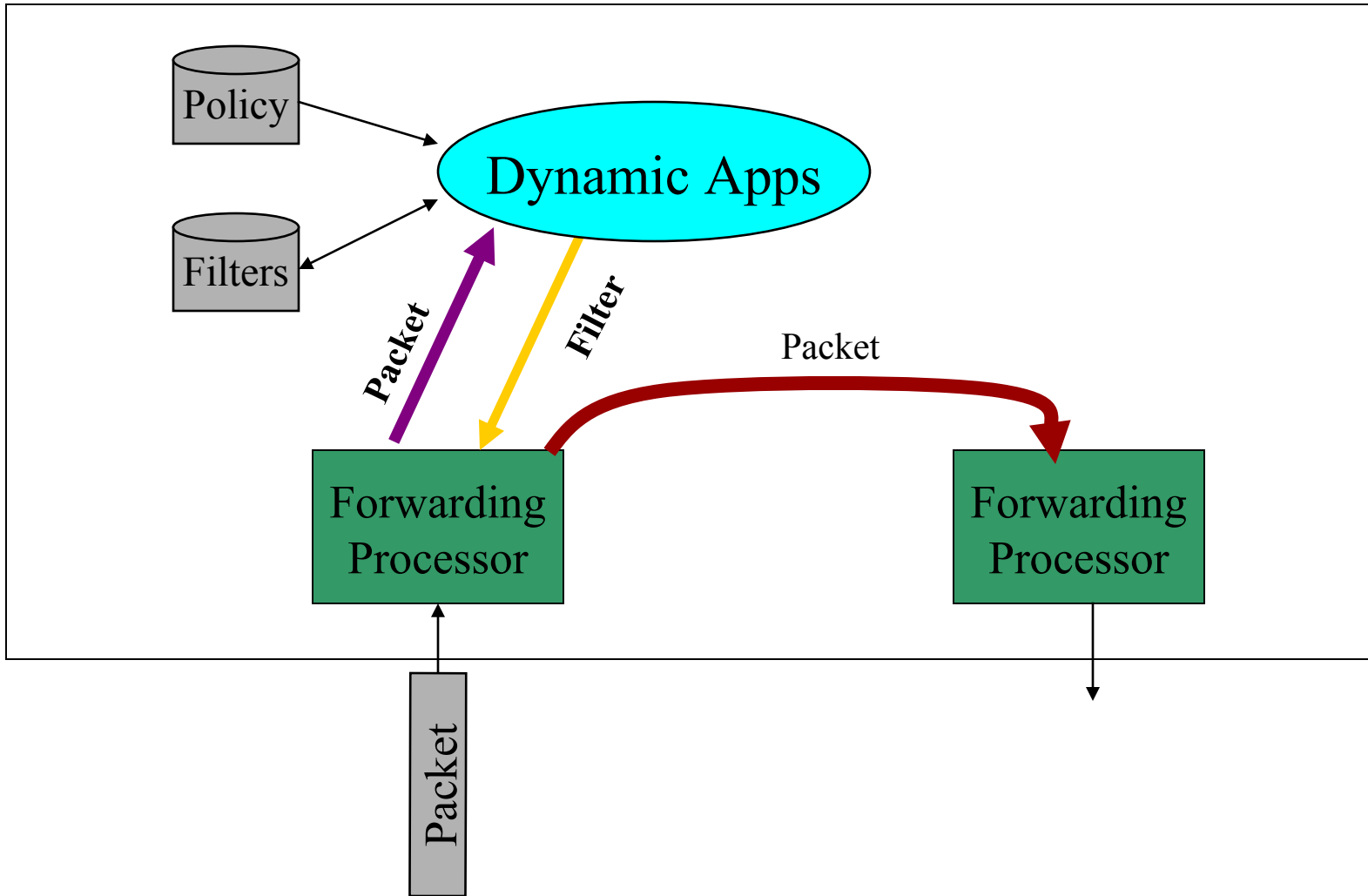
Real-time forwarding Stats and Monitors



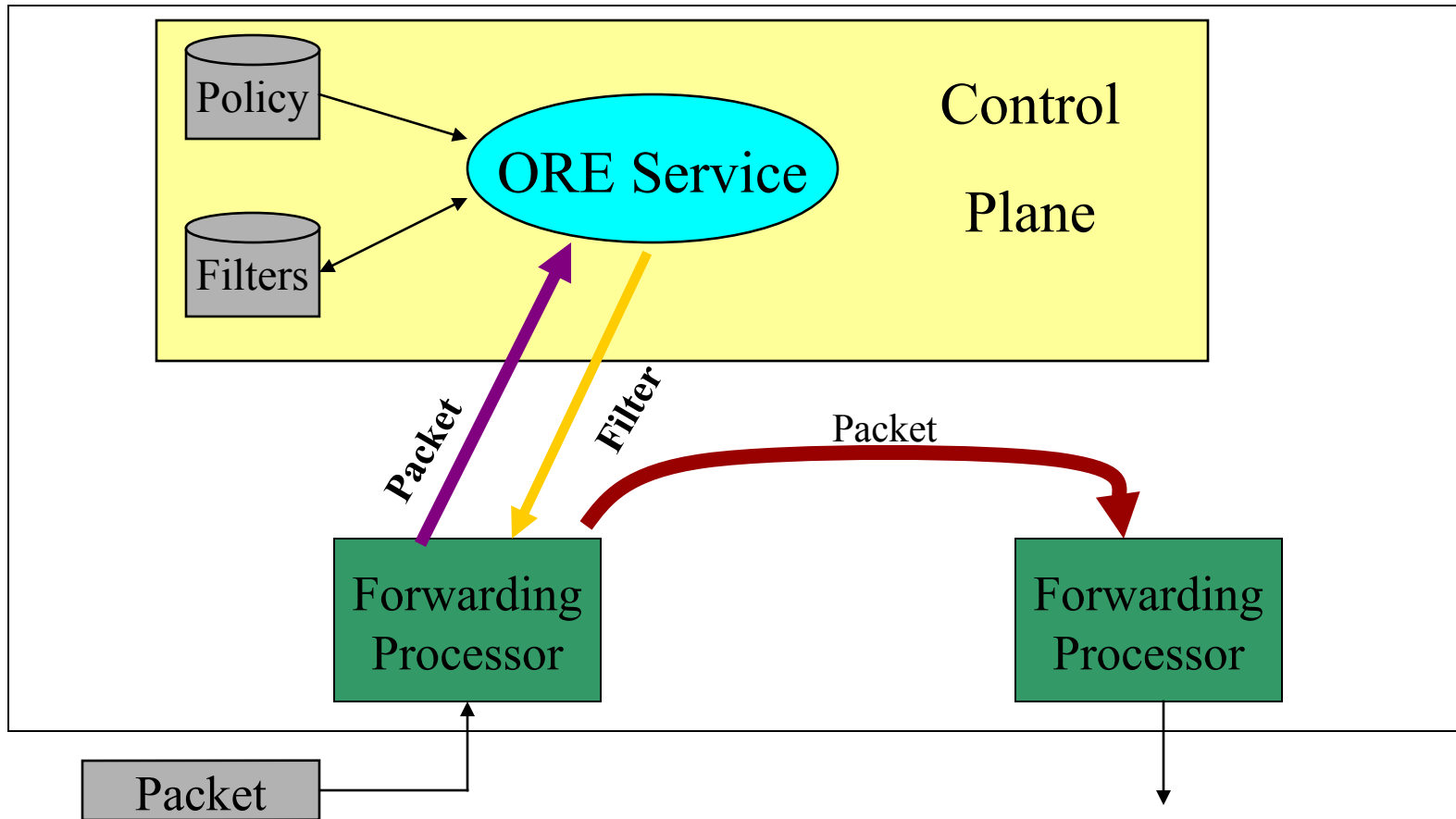
Packet Capture



Dynamic - On the Fly Configuration



Dynamic DiffServ Classification



- Sample packets, set filters to modify DS-byte for Per-Hop-Behavior modification