

Application Delivery Using SDN

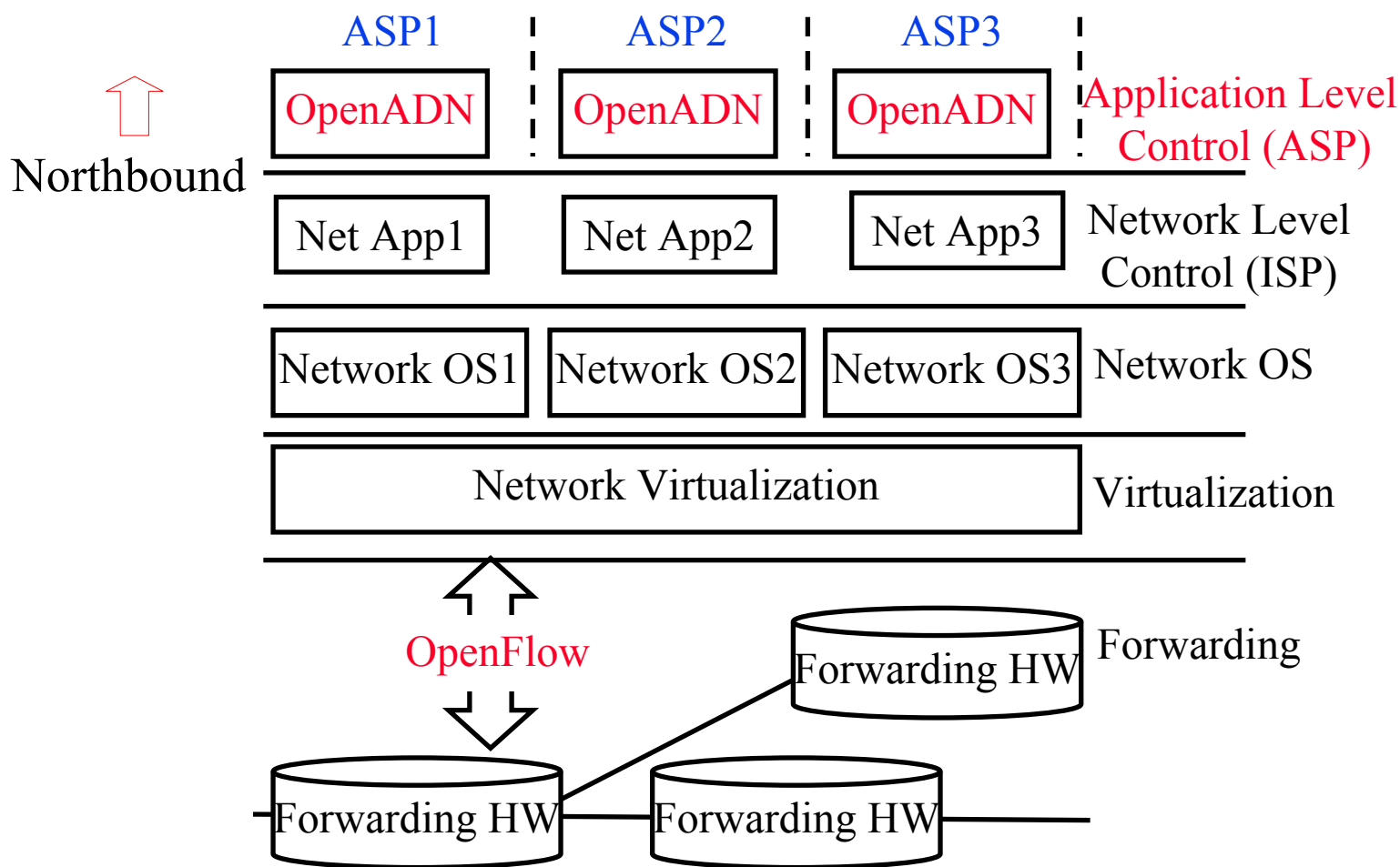


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These slides and audio/video recordings are available at:
http://www.cse.wustl.edu/~jain/talks/sdn_gc12.htm

SDN's Layered Abstraction



- SDN provides standardized mechanisms for distribution of control information

Trend: Explosion of Mobile Apps and Clouds



- ❑ All top 50 Internet sites are services [Alexa]
- ❑ Almost all services are now mobile apps: Google, Facebook, Bank of America, ...
- ❑ Almost all services need to be global (World is flat)
- ❑ Almost all services use cloud computing (Easy management)

Networks need to support efficient service setup and delivery

Ref: Top 500 sites on the web, <http://www.alexa.com/topsites>

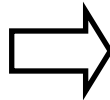
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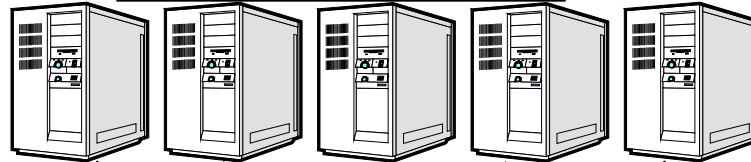
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Service Center Evolution

1. Single Server



2. Data Center



Load Balancers

SSL Off loaders

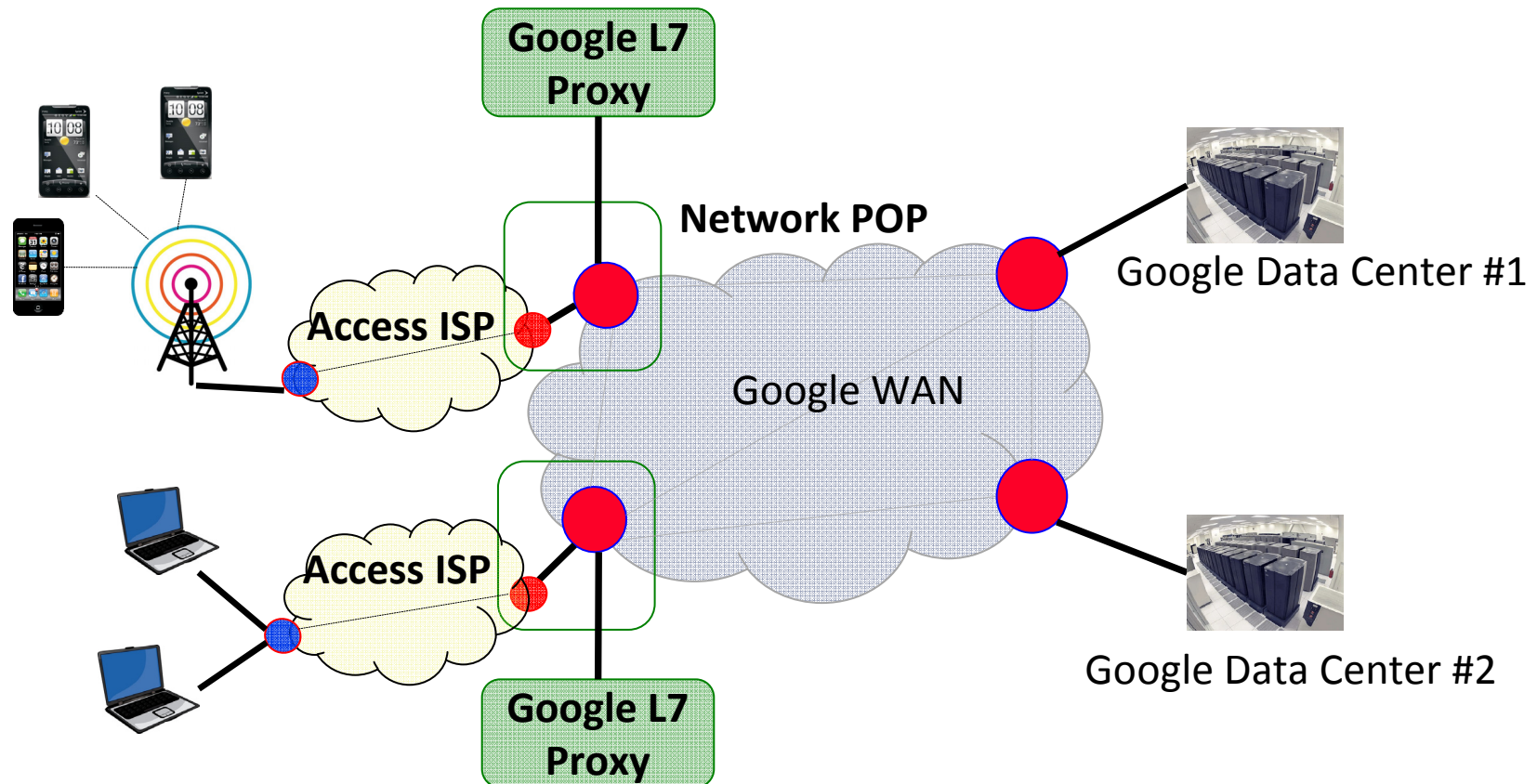
3. Global Clouds



Global Internet

Need to make the global Internet look like a data center

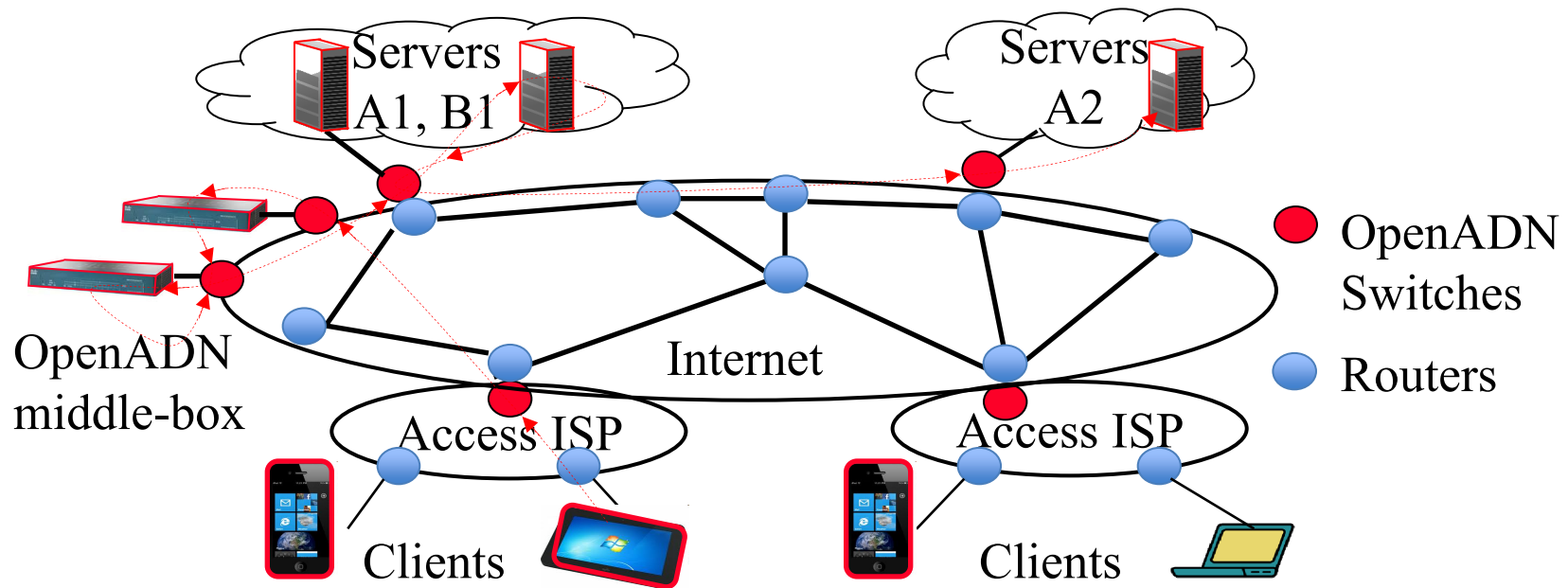
Google WAN



- ❑ Google appliances in Tier 3 ISPs
- ❑ Details of Google WAN are not public
- ❑ ISPs can not use it: L7 proxies require app msg reassembly

Our Solution: OpenADN

- Open Application Delivery Networking Platform
Platform = OpenADN aware clients, servers, switches, and middle-boxes
- Allows Application Service Providers (ASPs) to quickly setup services on Internet using cloud computing ⇒ Global datacenter



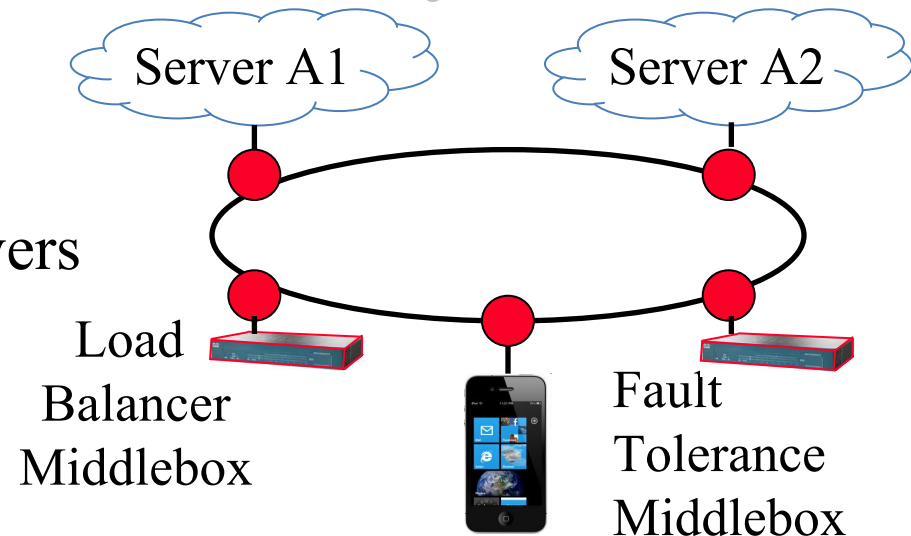
Resource Control

- ❑ ASPs keep complete control of their data.
ISP does not have to look at the application headers or data to enforce application level policies
- ❑ ISPs keep complete control of their equipment.
ASPs communicate their policies to ISP's control plane
- ❑ Middle boxes can be located anywhere on the global Internet
(Of course, performance is best when they are close by)
- ❑ ISPs own OpenADN switches and offer them as a service
- ❑ ASPs or ISPs can own OpenADN middle boxes
- ❑ No changes to the core Internet

Application Delivery

Message level:

- ❑ Server selection
- ❑ Load balancing between servers
- ❑ Fault tolerance
- ❑ Server mobility
- ❑ User Mobility
- ❑ Secure L5-L7 headers and data
- ❑ Middlebox services: Intrusion detection, Content based routers, application firewalls, ...
 - ❑ Control plane and data plane MBs
- ❑ Middlebox traversal sequence
- ❑ Message level policies
- ❑ TCP Splicing

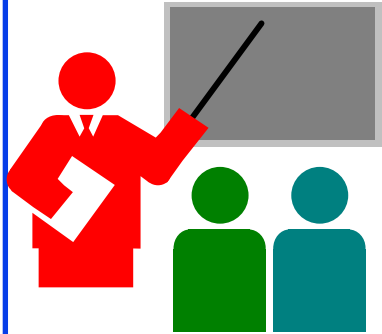


Key Features of OpenADN

1. Edge devices only.
Core network can be current TCP/IP based, OpenFlow or future SDN based
2. Coexistence (Backward compatibility):
Old on New. New on Old
3. Incremental Deployment
4. Economic Incentive for first adopters
5. Resource owners (ISPs) keep complete control over their resources



**Most versions of Ethernet followed these principles.
Many versions of IP did not.**



Summary

1. Knee of **mobile internet** paradigm shift
Explosion of Apps using cloud services
2. OpenADN appliances can provide ASPs networking services they need
3. OpenADN extends using best of OpenFlow, SDN, MPLS, ID/Locator Split, Cross-layer communications, middle box appliances
4. Keeps resource control under resource owners.
Can be implemented incrementally now
5. Trend is towards simplifying and standardizing router interfaces \Rightarrow Software defined networking

Application Delivery: Opportunity for ISP's