ICN Considerations for ISP's Existing Networks

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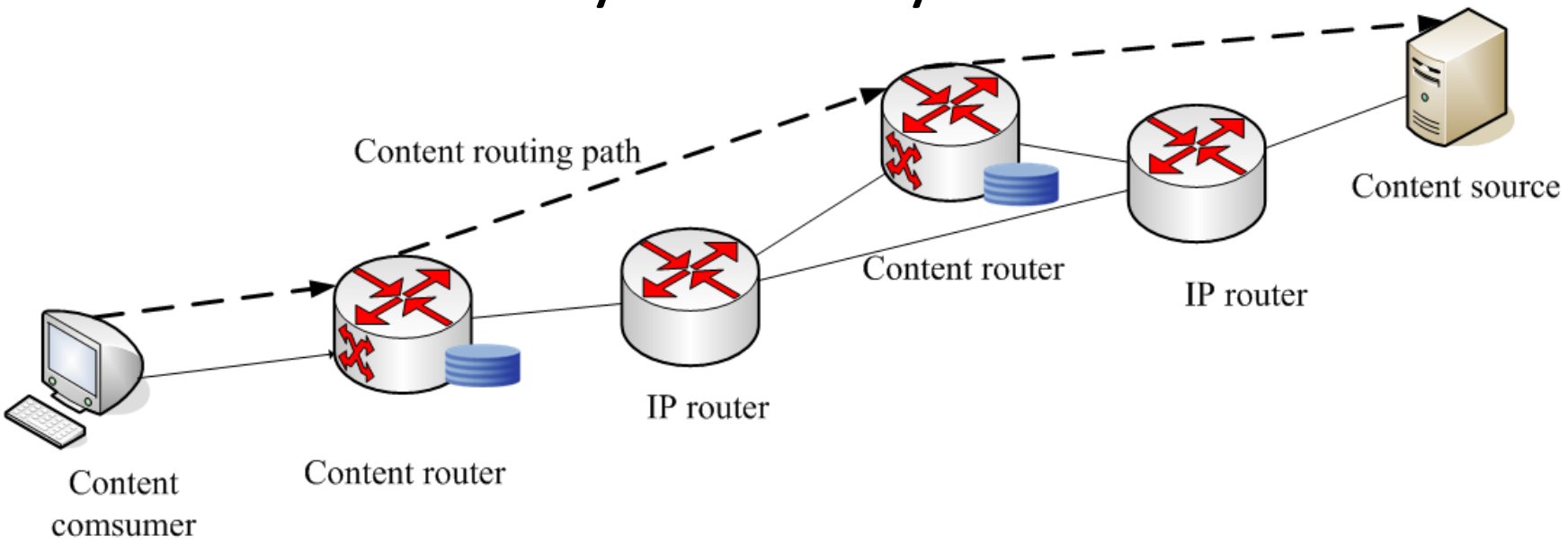
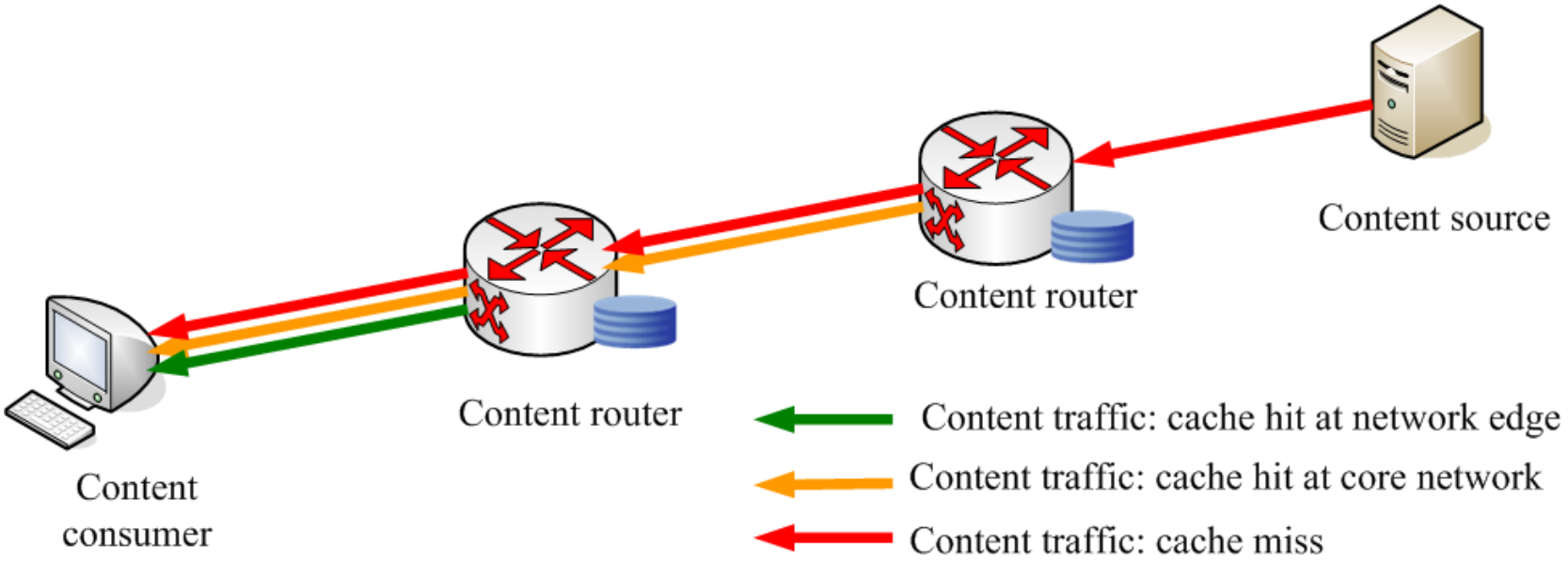
Deployment Considerations: ICN over layer-2 or layer-3?



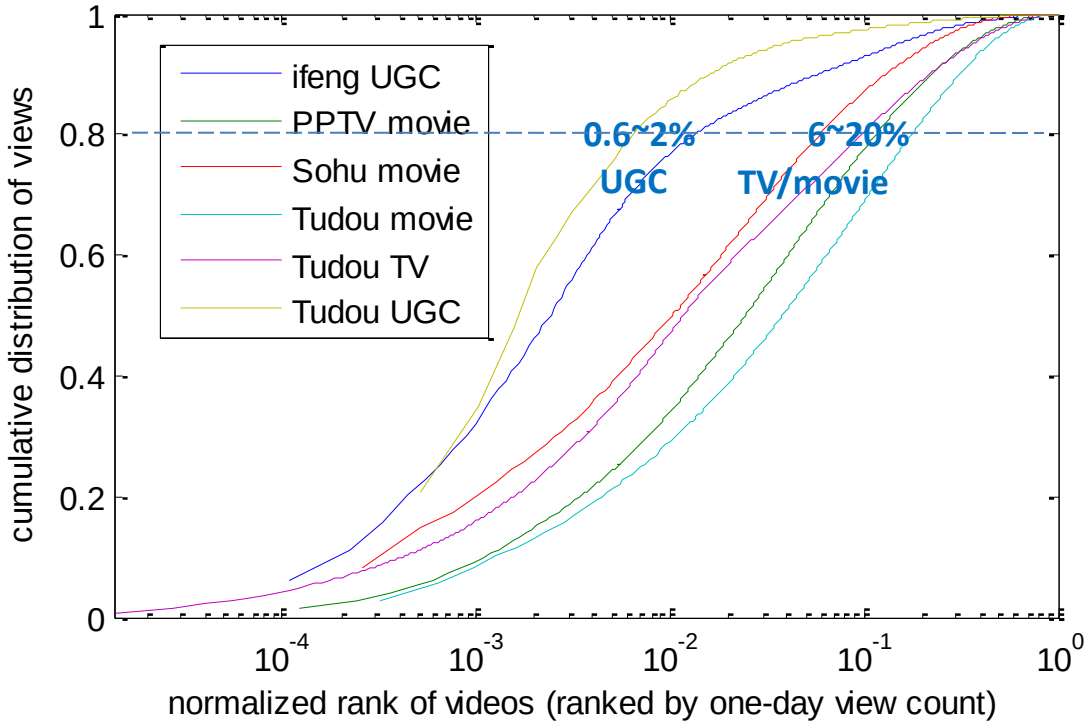
- ICN scenarios: Internet, ad hoc networks, DC, etc
- ISP's existing networks: ICN overlay over IP network
  - Incremental deployment allowed
  - No need to deploy content routers in the places where link cost is low and QoS is satisfied.
  - Fewer content router tiers: lower CAPEX and OPEX

Deployment Considerations:
Benefits of cache at network edge



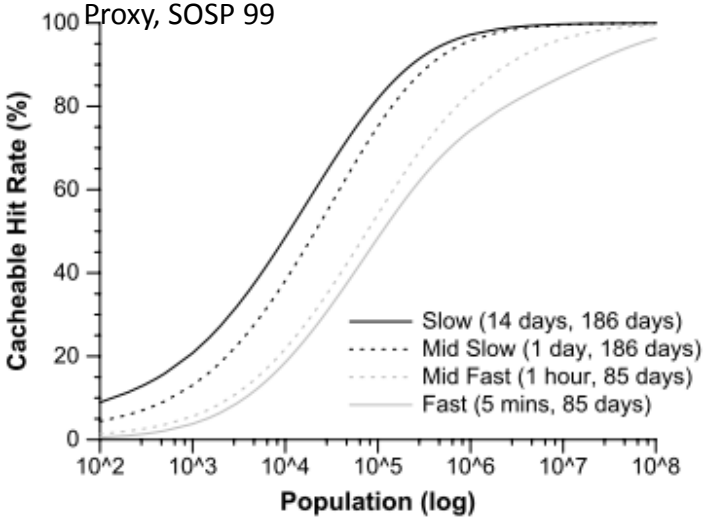
- earlier cache hit means better QoS and less link cost
- reducing the load of core content routers

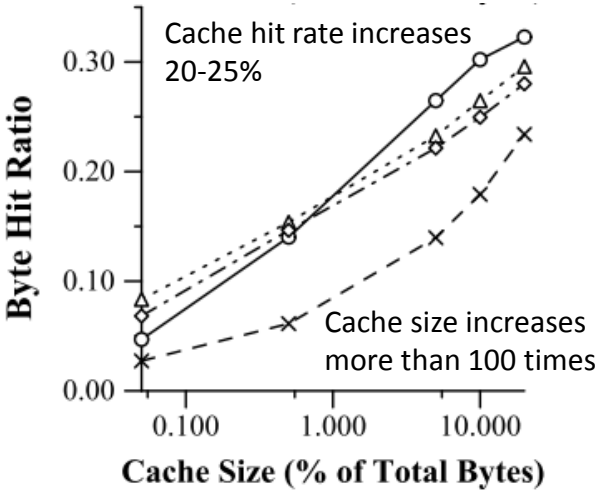
Deployment Considerations: benefit of cache in core networks



- high cache hit rate requires both large cache size and large user number
  - Only possible in the core network
  - DPI cache size today: 100s TB

On the Scale and Performance of Cooperative Web Proxy, SOSP 99





Web caching and Zipf-like distributions: Evidence and implications, Infocom 99.

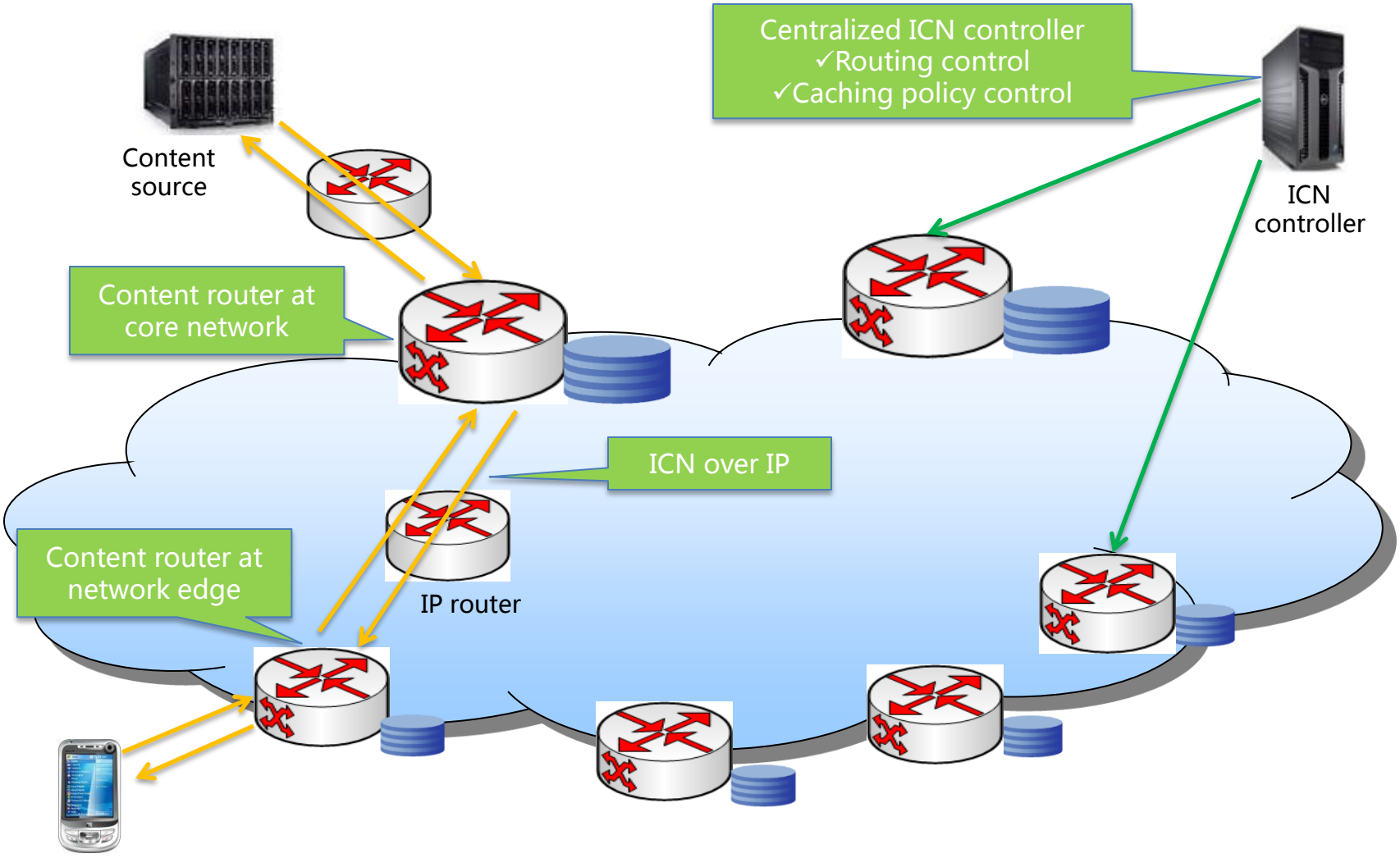
Routing and Caching Control

- Decentralized
  - Routing table populating: Content routers run routing protocols and routing algorithms
  - Cache replacement: content routers run replacement algorithm, e.g. LRU
- Centralized
  - Routing table populating: controller(s) collect topology data, generate routing tables and send routes to routers
  - Routing and Caching policies: controller(s) send policies to routers

Routing and caching policies

- To meet QoS requirement
  - an ISP may decide routing path and cache priority considering factors like content type, content popularity and the distance to the content source.
- To reduce link cost
  - an ISP may assign more cache resources for the contents passing through costly links by controlling routing path and/or cache priority
- To balance link load and cache load
- To provide better services
  - For paid users or paid content providers

Example of ICN inside ISP



Thank you!