
Next Generation Routers overview

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Syllabus

- ◆ markets
- ◆ tradeoffs
- ◆ actual needs

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Markets

- ◆ corporate vs. ISP
- ◆ LAN vs WAN
- ◆ default vs default free

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Corporate vs. ISP

- ◆ restricted routing table in most corporate
multi-homed can be an issue
- ◆ by-modal packet size
corporate - 64 & 1519
ISP - 64 & 576
- ◆ larger, multicampus, corporate \approx ISP

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LAN vs WAN

- ◆ interface types

 - LAN

 - Ethernet

 - token ring

 - FDDI

 - *some* ATM

 - WAN

 - high speed = ATM or SONET

 - may have frame relay in future

- ◆ frame size

 - WAN - may have to assume 4K packets

 - Ethernet LAN - 1518 max.

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Default vs Default Free

- ◆ routing table size

 - with default route = can be restricted size

 - w/o default needs full Internet size (50K)

 - plus many paths (*10)

- ◆ update frequency

 - Internet backbone updates peak > 100/sec

 - not forwarding engine issue but is a system issue

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Tradeoffs

- ◆ cache size
- ◆ routing table size
- ◆ lookup type
- ◆ "flow"-based "switching"

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Cache Size

- ◆ if cache-based & cache < routing table
 - easy overload
 - if cache load is expensive - real problems

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Routing Table Size

- ◆ if market is corporate (or small ISP) then restricted routing table is OK
- ◆ if market is default-free ISP - then need to deal with full routing table and full path table

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Lookup Type

- ◆ longest match
 - “normal” IP routing
 - look for longest prefix match
- ◆ 32 bit compare
 - preset host addresses as they are seen
- ◆ ???

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"Flow"-Based "Switching"

- ◆ set up "cut through" (faster) path at start of "flow" for rest of packets
- ◆ cost of setup needs to be amortized over length of flow
- ◆ TCP flows in the Internet are short
packet strings between hosts may be longer

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Actual Needs

- ◆ need is never as great as the hype
- ◆ remember its a mixed packet size world
- ◆ 100 Mb Ethernet (per port pair)
148,800 pps (64) but "only" 8120 pps at 1518
- ◆ the "right" thing
"all" > 512 byte packets that the media can deliver - forever
- ◆ but if its not perfect the competition will step on it anyway

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