

High Performance Routing

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High Performance Internet



- Based on new services and demand
 - Increased numbers and expectations of users
 - New high bandwidth services
 - Optical access and core speed and wavelengths
 - Multimedia Services
 - IP-based VPNs replacing legacy VPNs

Requirements for the High Performance Internet



- System-wide requirement
 - Core, Edge, Transport
 - Network devices should not be the bottleneck
- IP router architectures drive performance
 - Forwarding path
 - Scaling
 - Robustness
 - Routing Functionality
 - Subscriber Management

Forwarding path

- Router's ability to forward packets and value
 - Wire speed with small packets
 - Classification/Screening
 - Separate routing forwarding & classification, link & interface management, routing protocols.
- Why is this important?
 - QoS
 - multimedia services/VoIP, traffic engineering
 - Properly handle all priorities and classes
 - WAN IP performance mimic local area performance
 - Very large route table processing
 - Features like Multicast

Robust Protocol Support



■ Highly Scalable

- Very large routing table capacity
- deterministic, closed form, routing table lookup
- Not impacted by packet forwarding or link layer

■ Support very large networks

- Extremely large LSAs for BGP, OSPF
 - 20,000 LSAs/LSP, 100 adjacencies
 - 1.5M BGP prefixes, 500 external peers BGP
- Route Policies
 - rich & complete BGP policy support

MPLS

- Better use of bandwidth capability
 - fat pipes don't work if all traffic goes same way
- Traffic Engineering in core
 - Avoid “hot spots”
 - Engineer traffic between pairs of routers based on historic profiles
- VPNs
 - Standards-based VPNs
 - RFC 2547

Multicast



- Emerging as a real application
- Tunneled or overlay infrastructure today
 - Software distribution
 - In-Progress and On-Demand video
- Will stress the Edge