How will the Migration from IPv4 to IPv6 Impact Voice and Visual Communication ?

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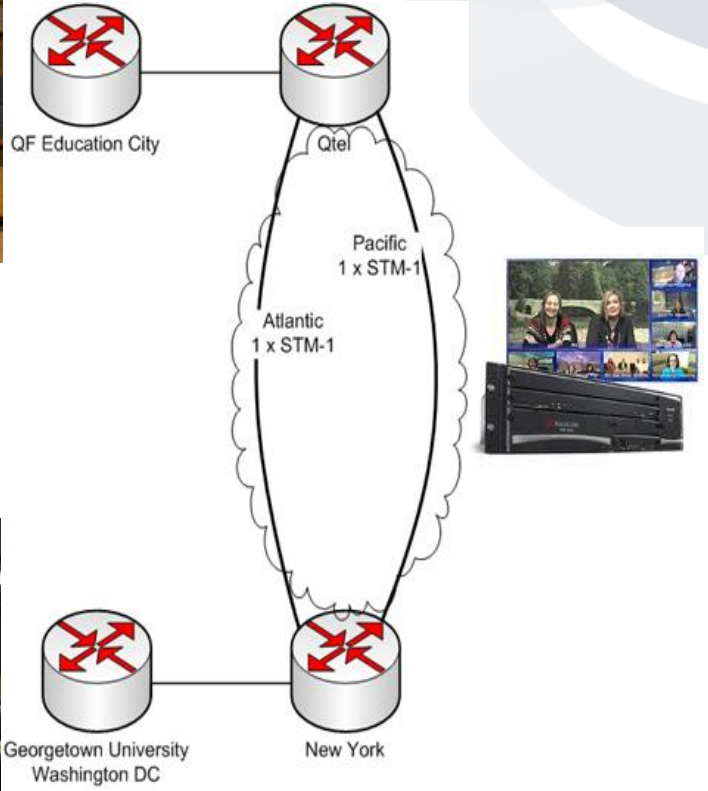
Agenda

- Introduction & standards
- Requirements for real time communications
- IPv4 limitations
- IPv6 benefits and potential
- Migration strategies and process
- Experience and trends
- Conclusion

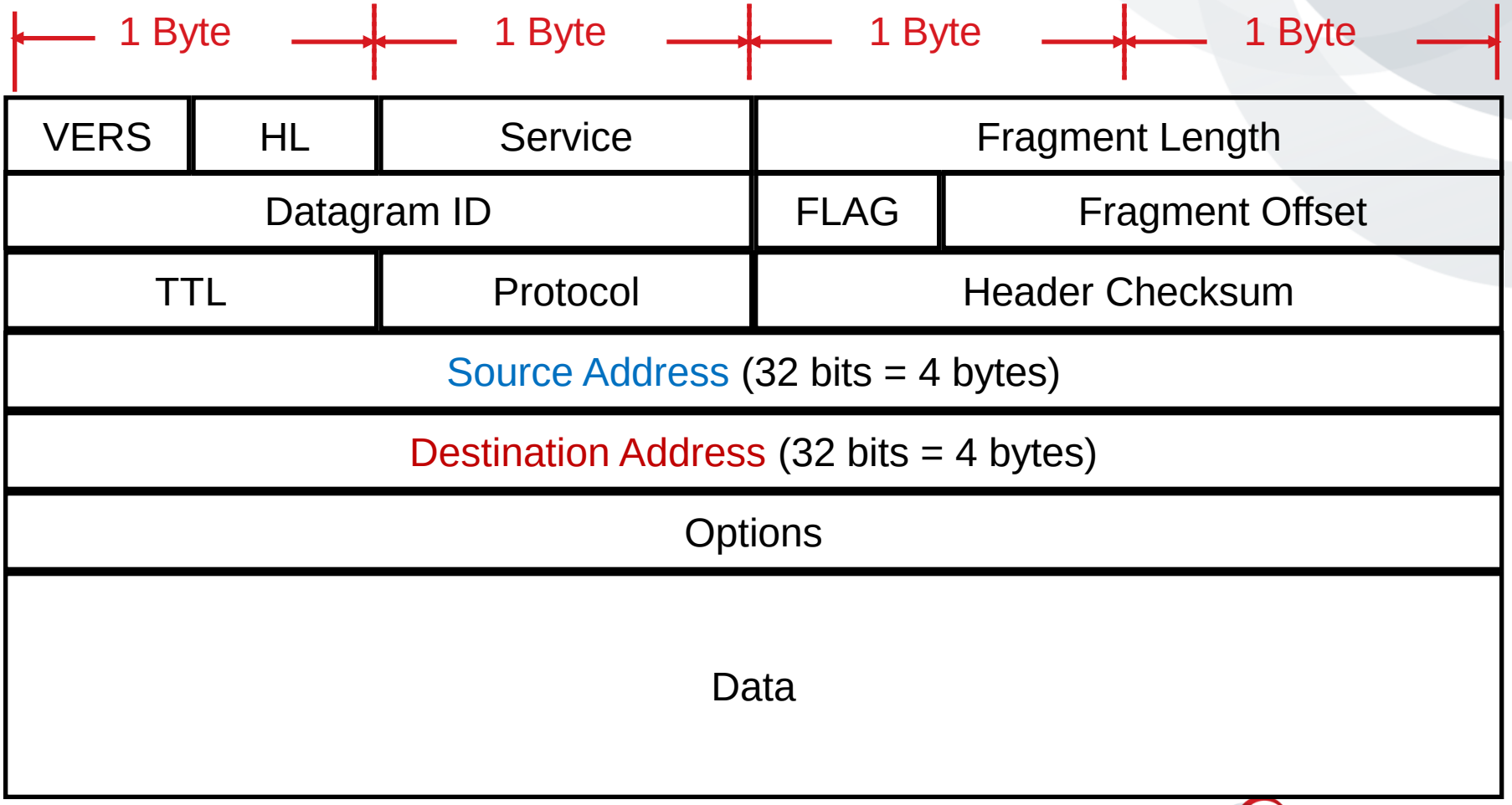
The connectivity challenge

Requirements for real time communications

- Jitter
- Latency < 150 ms
  - Encoding/decoding
  - Network devices
  - Network transit
- Voice & video – multiple streams
- Dynamic ports & well known ports

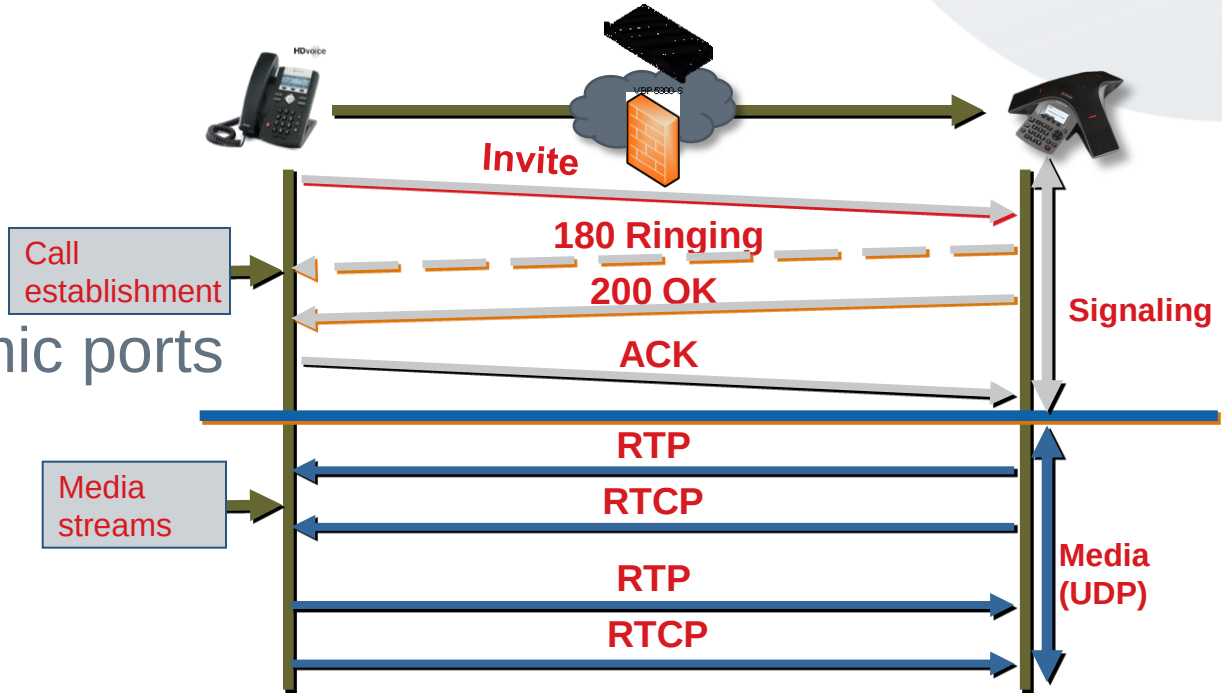


IPv4

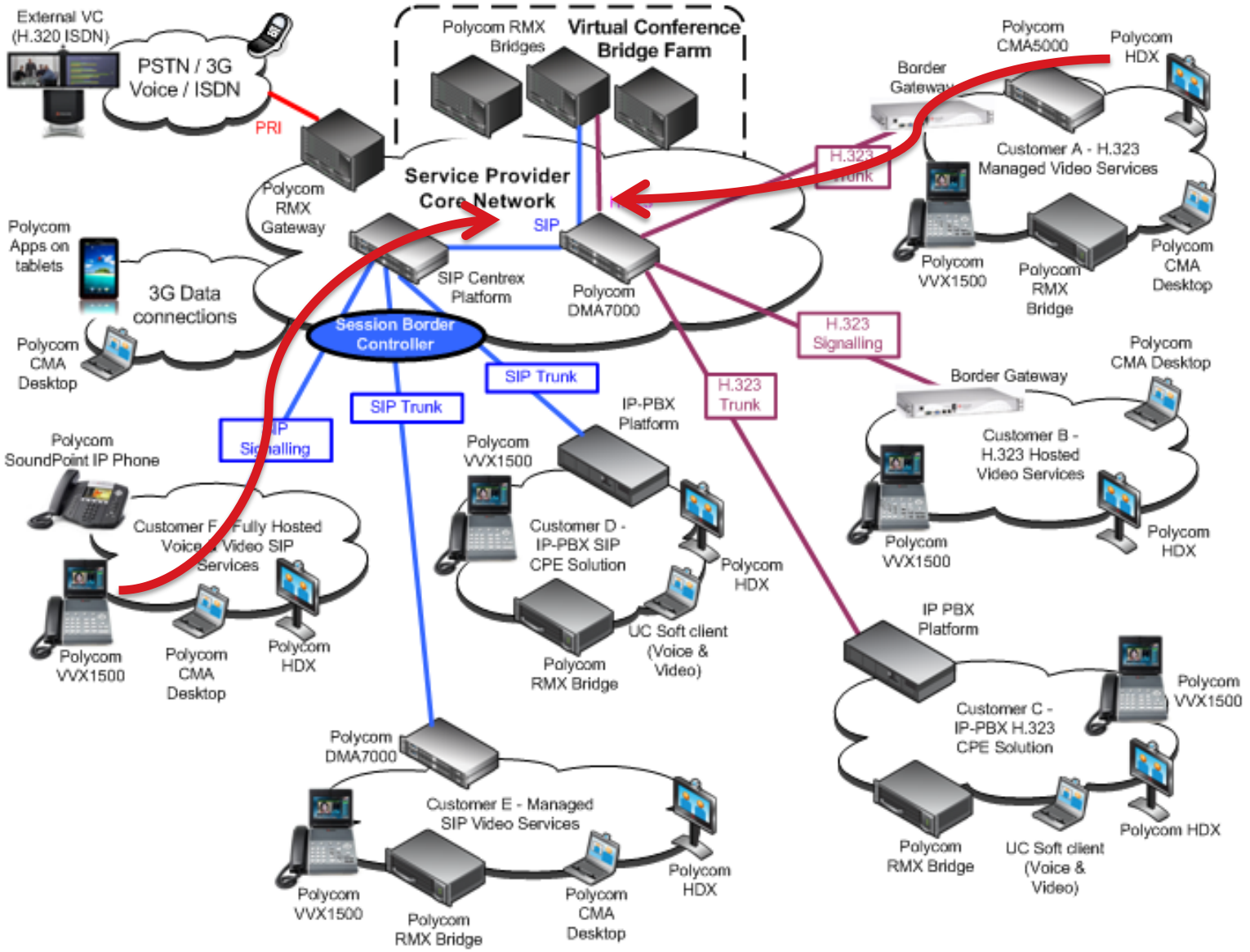


Limitations of IPv4

- NAT and multi-NAT traversal and PAT – address ‘expansion’ and security
- Development of SBC (Session Border Controllers) and ALG (Application Layer Gateways)
  - Incoming calls
  - Extension of dial plan
- Voice/Video – dynamic ports
  - Call signalling
  - Media streams
    - Voice ~ 2
    - Video ~ 4



Typical business to business call flow



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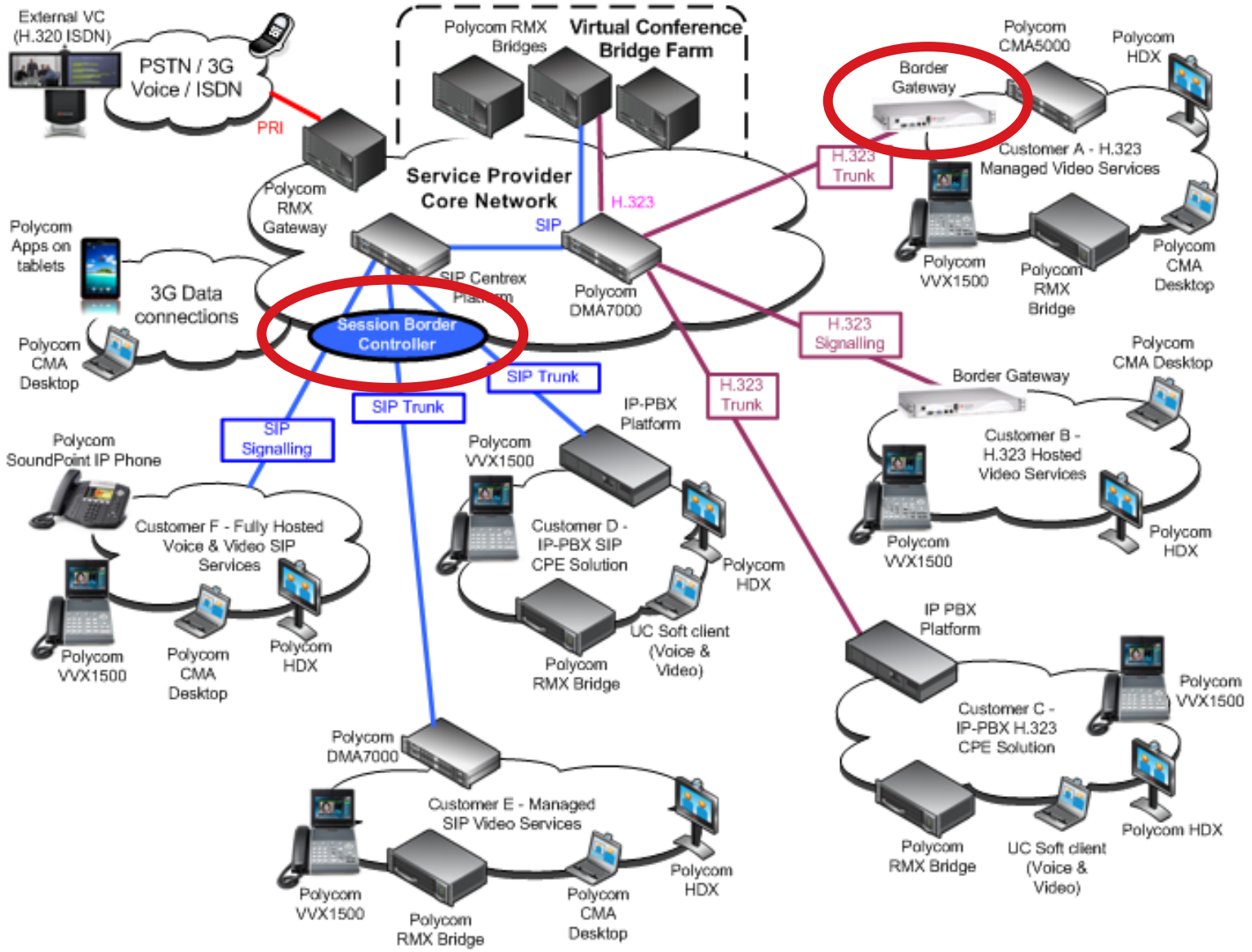

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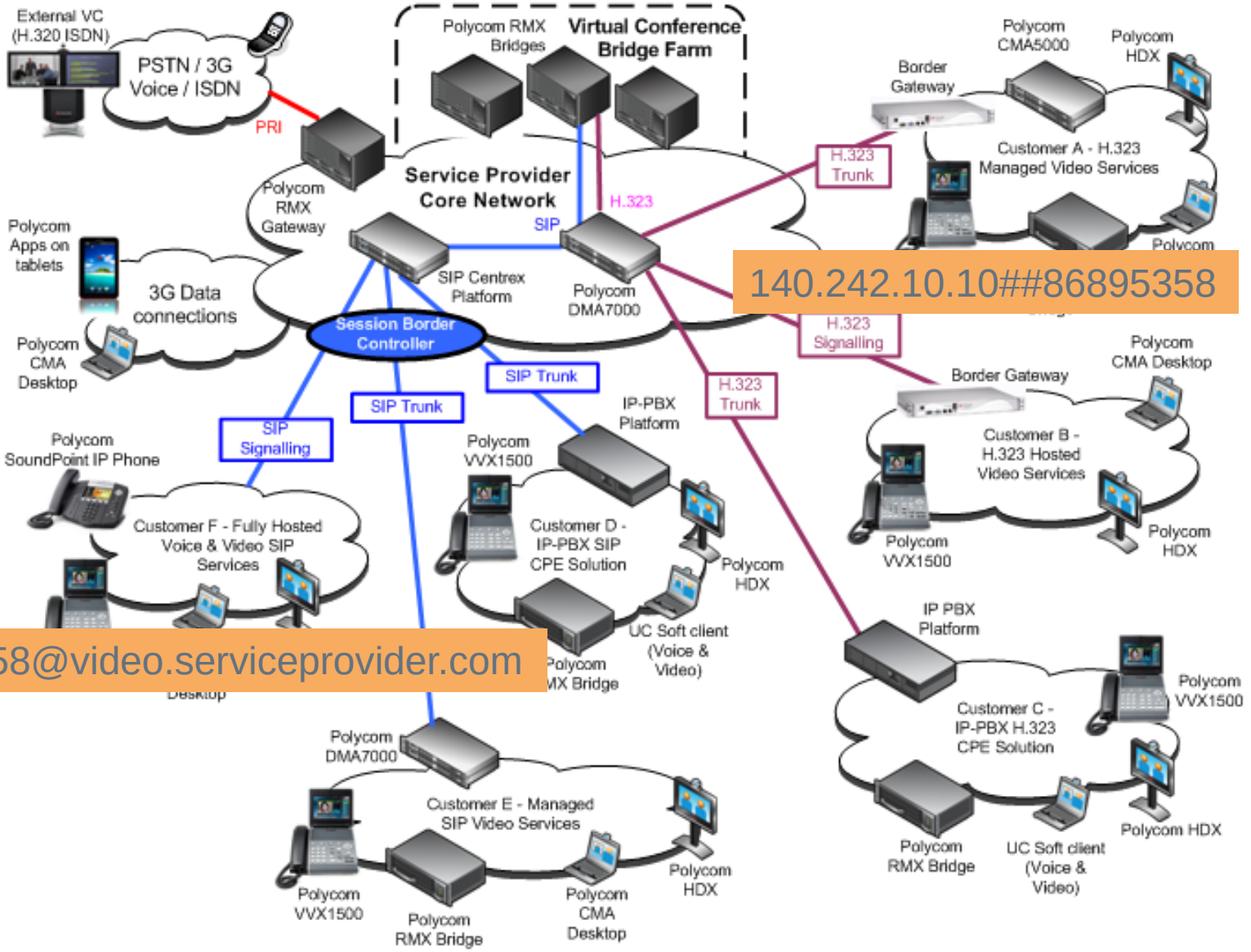
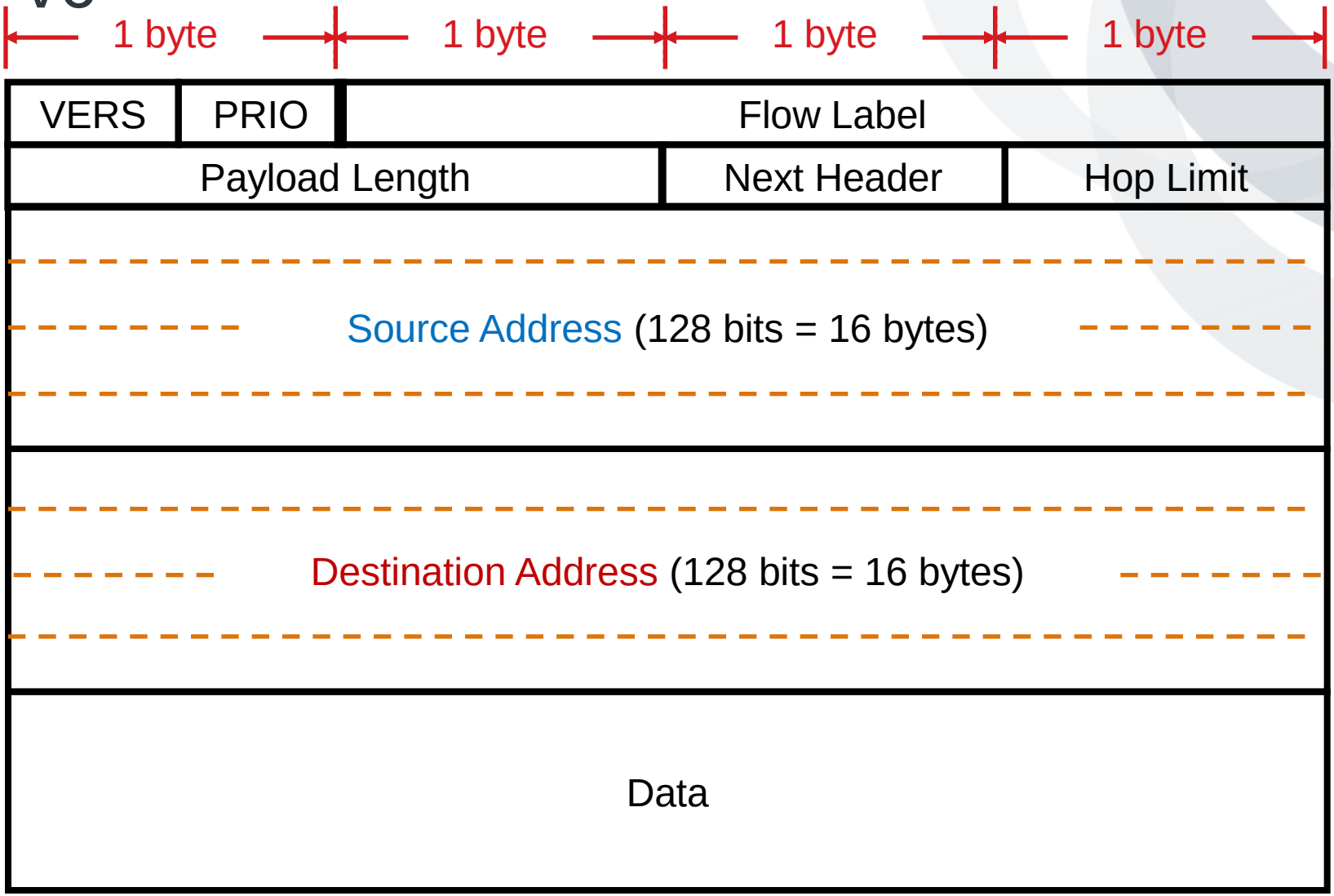


140.242.10.10##86895358

86895358@video.serviceprovider.com

IPv6



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IPv6 benefits

- Dramatically increased addressing space
- NAT/PAT process is eliminated
  - Better for real time communications
- Security – firewalls needed for stateful inspection
- Larger address fields → greater latency but simpler header structure should enable faster packet forwarding
- Flow label – offers possibility of resource reservation protocols
- QoS – IPv6 DiffServ implementation is same as IPv4

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IPv6 – Packet size & fragmentation

- Large packet size should benefit visual communications
  - Jumbogram…
  - Real time vs streaming (non-interactive comms)
- Intermediate fragmentation not allowed → drop packet and send ICMP.
  - Multiple retransmissions may be required before packet stream flows
  - Higher latency and can negatively affect user experience
  - Source fragmentation
- Path MTU discovery
  - Min MTU 1280 octets on all links

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Migration options

- Infrastructure to support IPv6 – deployment and replacement IPv4 will be a long time
- Transition mechanisms
  - Dual stack – media devices and infrastructure
  - Tunnelling – IPv6//IPv4 [RFC 6343 - 6 to 4 guidelines]
    - PMTUD Path MTU Discovery
    - Support for ICMPv6
  - Translation – dual-stack application-layer proxy server
  - Session Border Controllers
- Mixed networks
  - Call establishment may be protracted
  - Call establishment works but media streams don’t connect
  - Increased latency from tunnelling and translation

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Using SBC in the Transition to IPv6

- SBC hides all IP addressing from each “side”
- Core Voice and video over IP equipment does not see endpoint’s IP address and vice versa
- Voice/Video/IM/Presence/etc. “routing” is performed based on:
  - URI or username-based routing (e.g., E.164 or ENUM)
  - Domain-based routing
  - Trunk-group-based routing
  - Static routes (SIP routes, not IP routes)
- Control migration timeline
  - Gradually change core infrastructure
  - Gradually make endpoints IPv6-capable
  - Peer with IPv4 and connect IPv4 enterprises
  - Peer with IPv6 peers and connect IPv6 enterprise

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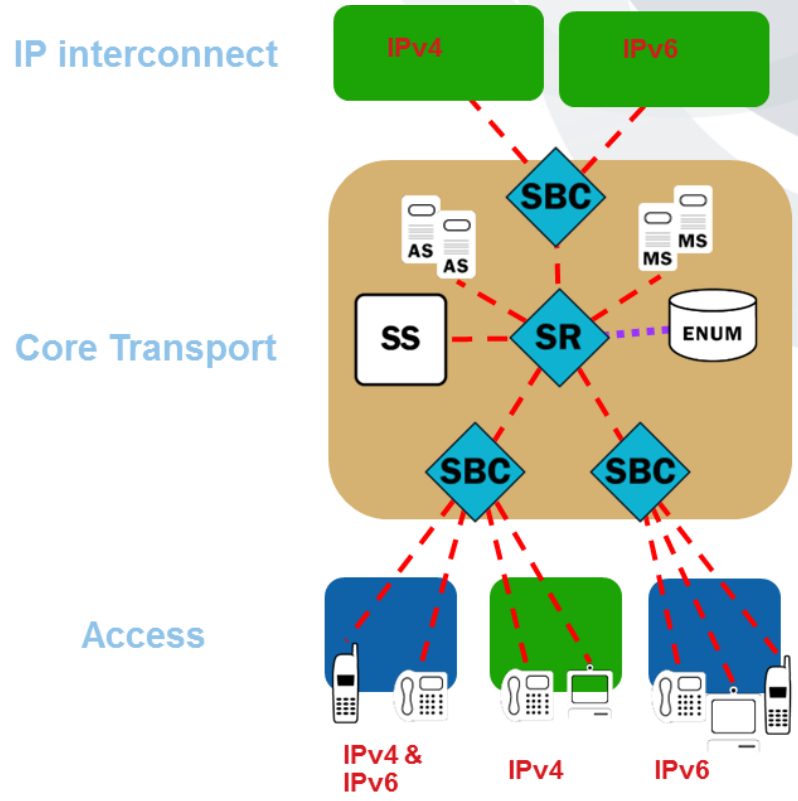
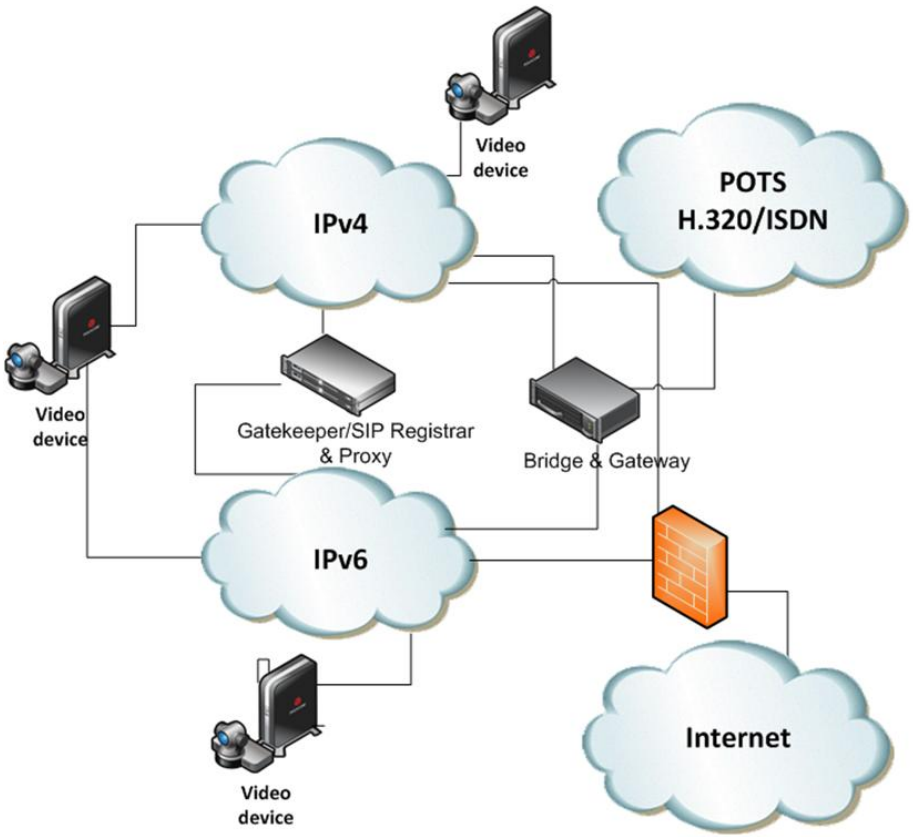
SBC – Deployment Architectures

- Any mixture is possible:
  - IPv6 endpoints connecting to IPv4 core
  - IPv4 endpoints connecting to IPv6 core
  - IPv4 & IPv6 endpoints connecting to an IPv4 or IPv6 core
  - IPv4 or IPv6 core connecting to IPv4 or IPv6 peers
- Operational requirements
  - Transport network between SBC and SIP/RTP next-hop must support the same address family



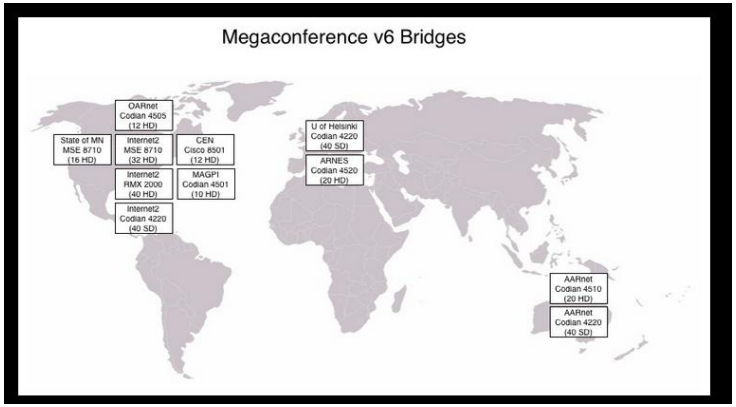
UC support for IPv6



- Video devices (including TelePresence) - dual stack
- UC infrastructure (call control, bridges & gateways)
- Bridge/gateway must support migration and protect investment
  - H.323
  - SIP
- Call control – H.323 GK & SIP Registrar & Proxy
  - IPv4 & 6 registration
  - IPv4/IPv6 proxy

IPv6 Megaconference – June 2012

- 49 total sites connected
- 24 IPv6 sites/25 IPv4 sites
- Endpoints from Cisco, Polycom, Lifesize, Grandstream, plus softclients



Example of what could be achieved: Personalized Bank Services Anytime, Anywhere

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Video Collaboration in action

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Conclusion

- Adoption/interest is coming from academic and public sector
- Consumer & mobility applications will drive wider adoption of IPv6
- Mixed IPv4 and IPv6 environment will be the norm .. IPv6 growing at the end point with IPv4 network fabric
- Impact on voice/video
  - Long term – beneficial with simpler homogeneous addressing structure
  - Medium term – migration will have challenges with intermediaries; tunnelling, translation and paths to call control plus reliability of media streams

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Reference links

- How will the migration from IPv4 to IPv6 impact voice and visual communications ? http://www.polycom.com/products/resources/white_papers/

- Megaconference v6 http://www.megaconference.org/

- Polycom http://www.polycom.com/

Thank you

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