



Wide Area Services & Technologies: *The VoIP over (Probably) MPLS Calculation*

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The way into enterprise VoIP



- The way into VoIP for many enterprises is an MPLS-based network service from a carrier
 - Classes of service – for real
 - Improved managed service products
- But while private lines, frame relay and ATM can, to a certain extent, be viewed as commodity products, MPLS products vary widely between service providers:
 - Number of classes of service available
 - Performance of different classes of service
 - Pricing/product structure
 - Use of “bursting” principles
 - Type and scope of SLAs

VoIP with MPLS: The preferred solution?



- Clear advantages
 - Provides any-to-any connectivity between sites and a guaranteed Quality of Service designed for voice traffic
 - MPLS providers will offer managed service in a way that essentially outsources call management and the IP interface, and limits required infrastructure investment
 - But many enterprises are using MPLS as a backbone for their own VoIP solution – managed in-house
- Clear challenges, too
 - Network upgrades required to ensure quality may dilute cost savings (e.g. additional costs for voice-quality CoS)
 - Additional recurring charges will apply for managed VoIP
 - Off-net usage may be priced in bundles of minutes but is essentially still usage-based

Look before you leap



- You have to know in advance the impact on *all* of your existing WAN and voice telecom contracts
- Moving to a VoIP/ IP Telephony solution could:
 - Lead to shortfalls in current contracts
 - Undermine traffic mix obligations
 - Affect future spend/commitments
 - Affect network bandwidth needs
 - For international deals, violate in-country restrictions and prohibitions

MPLS: Watch the marketing!



- Carriers use different product names for MPLS
 - IP-Enabled Frame Relay (AT&T)
 - Enhanced Virtual Private Network - EVPN (AT&T)
 - MISPNS – MPLS PNT (AT&T)
 - XVPN (AT&T and others)
 - Sprint Peerless IP
 - Private IP Service (MCI)
 - iQ Networking (Qwest)
 - IP VPN (BT Infonet and Equant)
 - Managed Network VPN Service (BellSouth ... er, AT&T)
- Some carriers have several versions of it
 - Product house, interoperability, service level challenges

MPLS: Key differences vs. legacy technology



- Any-to-any connectivity
 - No “virtual circuits” – a fully meshed VPN is standard
 - MPLS can be more cost effective than legacy networks that are partly meshed
 - The network can also be more resilient (shadow PVCs no longer needed)
- Class of Service (CoS) functionality
 - MPLS services typically have four to six Classes of Service designed to accommodate all traffic types – delay-insensitive data to real-time traffic
 - Although ATM has CoS capabilities, the MPLS CoS approach is greatly improved

Important design criteria

- MPLS requires a new network topology
 - Service providers need an explicit MPLS design, including for voice, against which to provide pricing quotes
- ATM, frame relay and private line topologies can't be directly translated into an MPLS topology
 - Bandwidth needs may need to be broken down by CoS
 - CoS throughput bandwidth needs to be included at hub-sites
 - It may be possible to reduce hub-site bandwidth requirements, and it may also be possible to flatten the network
 - Expected voice traffic affects all of this
- Result is that procurement needs to be handled in a somewhat different way than past enterprise networks – voice and/or data

Service level agreements



- MPLS requires closer evaluation of SLA metrics and measurements
 - Service level metrics should vary by class of service
 - VoIP metrics such as jitter may be required
 - Should be end-to-end, and not just PE router to PE router
- Key transport metrics
 - Access installation
 - MPLS port installation
 - MPLS CoS installation
 - Site-to-site packet delivery
 - Site-to-site round trip delay (latency)
 - Jitter
 - Site availability – not network availability

Major procurement dilemmas in getting the VoIP costs right in MPLS



- You most likely have an “unmanaged” (i.e. internally managed) data network now; many carriers press for managed MPLS
 - Adds rental/monitoring, management and MACD costs back to VoIP savings
 - Some carriers limit acceptable SLAs for MPLS voice CoS to their managed offerings ... or try to
- Competitively procuring MPLS is “unequal” compared to frame/ATM/private lines
 - Structuring request for specific MPLS rate element pricing is a science and an art
- Carrier network design is unusually key
 - Provider-edge density and diversity are crucial to reliability of voice (and data) service

Rate elements: Making a list, checking it twice



- Two ways of requesting pricing; using both is a good cross-check and keeps 'em honest
- First, for each location, get access, port and “throughput” (good generic term) charges
 - For throughput, ask across four classes of service, OK if they propose more
 - Use specific IETF terminology; e.g. voice class would be “CoS A (Real-time marked EF)”
 - Let them propose/define “Gold/Silver/Bronze” (or whatever their names are) – you using those terms unintentionally gives away negotiating leverage

Some do's and don'ts around real-time and other CoS



- Do:
 - Generally explain your intentions around using multiple CoS
 - Give the carriers plenty of information about your voice and data applications, including ERP and other software platforms, traffic volumes, performance expectations
 - Tell the carriers you expect more specific and better SLA specs as you go up the CoS ladder

Some do's and don'ts around real-time and other CoS



- Don't:
 - Commit in advance to actually using a specific CoS for a specific application; that's your choice after seeing the proposal/pricing, not theirs
 - Compromise on accepting sub-par proposals and SLAs if not a carrier-managed network
 - Get married to “convergence” as the principal or only reason for network migration

Understanding the port dilemma for some carriers



- Some MPLS carrier services also need to distinguish among “port types” for the pricing
 - Their pricing is based around the concept that differently-priced port “types” for the same port speed accommodates distinct mixes of classes of service
 - Key to understand if your intention is to use real-time CoS in a material way
 - Allow room for the proposal to price the port according to speed *and* type if it fits carrier methodology, while still requesting CoS-based throughput charges

Applying the cross-check



- Second, request a restatement of the price list according to port/throughput rather than per-location
 - Should match what is proposed per-location on these rate elements
 - This is a good check on whether the carrier can price the same CoS throughput charge (or, alternatively, a “port type” permitting a rigorous mix of CoS including real-time) at locations regionally/nationally
 - Also provides a sanity check on port density/diversity, location of PoPs, and sneaky backhaul charges not specifically labeled as such
 - Pricing could particularly get out of hand on real-time CoS if these checks are not in place, especially if the carrier proposes “outliers” where you intend to have much voice traffic (not as uncommon as you might think)

Gaining an upper hand on other possibly hidden costs



- Routing protocols
 - Carriers should specify support for EIGRP, OSPF, static routing, RIPv2, BGP ... and whether there is any specific user charge for any of this support
 - “Cost recovery” is inherent to the business and culture of telecom carriers, IP era or not
- Voice usage charges
 - Presumably what you’re trying to avoid with VoIP, but they have a funny way of creeping back in with carrier voice-over-data services
 - Off-net buckets can in effect be usage charges if tiered in a particular way
 - Voice per-call or per-lookup “feature” charges have a long legacy in call centers – watch for VoIP “feature” charges

What regulatory surcharges apply?



- Possibly an opportunity – it's all in the details
- The history of applying surcharges to FRASI (Frame Relay to ATM Interworking) and now hybrid IP services
- FCC June 2006 interim ruling on VoIP and universal service
- The more specifics in the proposal, the better – make them justify all surcharges

Enterprise-wide carrier services: IP Decision Time



- For enterprise IP, MPLS is not your only choice (believe it or not)
 - Gaining comfort with Internet access for a WAN backbone
 - New options for selecting MPLS only as a feature for critical sites with dedicated Internet access
 - But time is now more critical for an enterprise-wide decision
 - End of support for basic frame relay at Sprint
 - Pressure on other carriers via their network equipment vendor support cycles
- Related to the VoIP issue, likely to find yourself still trending in the MPLS direction
- Enterprise voice telecom management more key in decision-making than before

Doing nothing different is not much of an option



- Key theme: Scaling and sizing your procurement options for the situation
 - Not too much, not too little in terms of network services options presented in an RFP
 - Doing your internal due diligence in advance, getting buy-in to the approach is important in signaling to bidders that you are serious and have your act together
- Knowing your traffic takes on a whole new meaning
 - When do your contracts for transport, managed transport, local networks, equipment maintenance, various one-offs expire? Can you at least bring them more together?
- All that helps in setting you up for the best VoIP solution