

## VoIP: Meeting the Architecture Challenge

VoIP is on the rise, as more and more companies are deploying integrated communications platforms, unified messaging, and toll-bypass gateways to increase their competitive prowess. The problem is that many of these businesses are not spending the diligence to develop a VoIP architecture that matches the requirements of the proposed deployment. A solid VoIP architecture should identify the business requirements, the technical and operational elements needed to address those requirements, and any vendors needed to produce the missing pieces.

So when you put together your VoIP deployment plan, what do you need to consider? Some important questions you need to ask yourself are:


- What kind of shared resources will there be? Items such as unified messaging, music-on-hold, attendant operators, and PSTN trunks need to be considered.
- What is the WAN impact of centralizing vs. de-centralizing shared resources?
- What priority do you place on fault-tolerance?
- What are your user interface needs? Will there be legacy analog/digital phones, IP phones, softphones, or any/all of the above?
- Will the VoIP system be administered and managed in tandem with the legacy PBX systems?
- What are the best vendors to meet your requirements?

In order to develop a realistic budget assessment for upper management, you also need to determine the cost impact of the architecture you plan to deploy. What is the cost of each new network element? Will your recurring network operational expenses increase or decrease? (Given that you are now putting voice and data onto one platform, cost should decrease). What financial benefits will the new network deliver? All of this forecasting can help you make a compelling case for the architecture upgrades you need to make before deploying VoIP.

Once you begin deploying your new architecture, there are some problems to watch out for. These include IP network problems, equipment configuration and signaling problems and analog/TDM interface problems. Common symptoms of a network problem can include jitter, packet loss and an overall delay in packet transmission. Equipment configuration and signaling issues can have an overall performance impact, and a firewall or incorrectly configured router can block VoIP traffic. You must have the necessary bandwidth to support peak traffic volumes.

### Stop problems before they start.

Examine your current VPN and WAN capabilities, and look at current bandwidth availability. Now compare that to your current data traffic levels, and your estimated needs for voice traffic. Do you think



your network is up to the challenge, especially at the LAN/WAN boundary (this is a particularly vulnerable area)? Also, does your new infrastructure have the capacity to grow with your company?

Look at your LAN environment; especially how many hubs are present in your network. Analyze your Ethernet switch statistics for evidence of packet errors or excessive collisions. Any equipment shortcomings will need to be corrected before moving any further. The IEEE standard 802.1p/Q can be very helpful as it allows packet prioritization, giving voice frames higher priority than data frames.

### **Are planning to operate a VoIP/PBX Architecture?**

VoIP Architecture based PBXs and ACDs use gateway devices that convert calls from TDM to IP. Typically included in this setup are call control processors, IP phones, and the associated data communications infrastructure (routers, Ethernet switches, and cabling). This basic architecture comes in two separate formats: IP-enabled and IP-centric. The big differences between the two are where the TDM to IP conversion takes place, where supporting call center functions (such as queuing, queue slots, prompting, music on hold, and announcements) take place, and whether the CPU/common control and call control software resides in the TDM switching matrix, or on an external server.

### **Keep it reliable**

A fault and performance architecture should be always developed before deploying your VoIP environment. The industry preferred VoIP performance management architecture is based on RTCP XR (RFC3611) and related protocols. You must also consider the manageability in terms of the functionality required in IP end points and the protocols they use, as well as any conflicts between secure protocols and the access required by management tools. By following these guidelines, you should be able to start seeing how your VoIP architecture will take shape, and how it can provide reliable service years into the future.