


IGX 8400

Building the Bridge to New World Voice Networks



The consolidation of multiple networks and traffic types onto a single WAN backbone creates a large opportunity for substantial bandwidth cost savings and improvement of operations efficiency. For this reason, the convergence of voice and data networks is of major interest to large enterprises today. But the benefit does not stop there. Data/Voice convergence allows companies to preserve investments in legacy applications and lay a foundation for integrated IP-based applications such as packet voice, integrated call centers, inter-Web business-to-business services, secure extranet supply-chain management, Web hosting, and electronic commerce—all with the lowest achievable total cost of ownership.

While IP is rapidly becoming the established protocol of choice for multimedia applications, most networks today are inadequately equipped, or ineffectively designed to handle the explosive growth and dynamic nature of these emerging multimedia applications. Large-scale Corporations require an evolutionary approach to designing next-generation enterprise networks for multiservice applications. This includes a comprehensive set of multilayer IP and ATM switching solutions and advanced quality-of-service (QoS) mechanisms for enabling multimedia applications. In particular, network designers can leverage the price/performance benefits, extended reach, and any-to-any connectivity of IP and the multiservice capabilities and reliability of ATM for building next-generation enterprise networks. These networks consist of highly integrated Layer 3/ATM switches at the edge of the network that interface into a multiservice ATM backbone for data, voice and video convergence.

Voice Networking Across an ATM WAN

While a wide gulf does exist between old world equipment and architectures and New World implementations such as Cisco AVVID, the migration path moving forward is not a difficult one to navigate because Cisco has outlined an evolutionary 3-step approach wherein the New World integrates with, expands, and ultimately encompasses its old world counterpart.

Almost immediately, companies that consolidate voice and data networks can realize cost containment through simple toll bypass—using the WAN to carry long distance voice and fax calls between offices. The savings can justify the cost of consolidation projects and even fund new application development. More importantly, they can leverage their ongoing voice budget into a single budget that represents combined voice and data costs.

Even tighter integration of the voice network, and bigger cost savings can be achieved by allowing the WAN to become your transit PBX. With a WAN that understands telephony signaling and is capable of switching calls, companies can reduce capital expenses associated with traditional telephony networks. In addition, a packet-based network flattens the call-handling architecture, thereby switching calls more reliably and efficiently.



The final step is the creation of a converged network, where the WAN backbone and Public Switched Telephone Network (PSTN) are fused, and the old world of PBX equipment is no longer needed.

As the business climate changes, additional consolidation enables new capability and the network becomes both easier to manage and less expensive to build and operate. A multiservice network is easily extensible to add new capacity and features that protect today's investments and enable tomorrow's functionality.

The result? Companies are better positioned to compete because they have a flexible infrastructure that lets them respond quickly to market changes.

The Advantages of Multiservice ATM Networks

Multiservice ATM technology has become the market standard for meeting today's wide-area networking needs. The reasons are many—cost savings, better bandwidth management, the ability to guarantee QoS, and the ability to carry existing legacy applications while laying the foundation for emerging IP and multimedia applications. Companies that wish to ensure the most flexibility for the future are finding that ATM allows them to guarantee the high performance they need today while future-proofing the network against obsolescence.

Superior Bandwidth Management

While traditional networks provide dedicated bandwidth to specific applications, multiservice ATM dynamically allocates available bandwidth to any application that needs it. This management technique is called statistical multiplexing, and it ensures that bandwidth is used as efficiently as possible while still guaranteeing performance. The optimal ATM solution also includes technologies such as silence suppression for voice and repetitive pattern suppression for circuit data. These techniques enable a multiservice ATM network to conserve even more bandwidth. With this type of network, IT managers can gain up to 95 percent—or better—efficiency. ATM also maximizes expensive bandwidth utilization so that managers do not have to continually invest in bandwidth as traffic volumes increase.

Guaranteed Performance and Quality of Service

Mission-critical applications require available bandwidth and traffic prioritization. For these reasons, multiservice ATM has become the network technology of choice to guarantee QoS and reliability while maximizing bandwidth utilization. A multiservice ATM network improves network performance by efficiently using and sharing network resources. Techniques such as cell switching and sophisticated queuing techniques enable IT managers to guarantee QoS for a wide range of applications. This embedded intelligence provides better control over QoS while maximizing bandwidth utilization. ATM equipment that supports various classes of service enables IT managers to distinguish between types of traffic and handle each application uniquely. Application performance can be matched to users' needs and expectations while reducing costs and allowing for growth. Current service choices include:

- Constant bit rate (CBR)—Dedicated bandwidth for consistent delivery
- Available bit rate (ABR)—Ideal service class for TCP/IP, APPN, IPX/SPX, and LAN-to-LAN connections
- Variable bit rate (VBR)—Comes in two flavors, as VBR real-time (VBR-RT) for efficient voice and video transmission, and VBR non-real-time (VBR-NRT), which is like ABR without guaranteed delivery rates
- Unspecified bit rate (UBR)—The lowest QoS guarantee for data that is not time-critical (best-effort service)

As a result, multiservice ATM networks significantly reduce application delay that users experience, fairly allocate bandwidth to users based on their needs, increase network reliability by decreasing discarded data, and establishing predictable data patterns that increase overall performance.



Seamless Integration and Painless Migration

Motivated by today's new networking needs, companies are migrating to multiservice ATM infrastructures so that the network can deliver the projected performance benchmarks and prioritize traffic types within powerful enterprise-wide applications. For these reasons, companies look for a vendor who can seamlessly integrate multiservice ATM technology with existing and developing environments. The multiservice ATM solution must be able to simultaneously support TDM classes of service and legacy interfaces (X.25, circuit data, and voice), as well as native Frame Relay or ATM and IP. This scenario would enable a business to retain its investment in existing mission-critical applications, while providing growth to new applications. As business needs change and the network grows, the superior scalability of ATM ensures the ability to easily add applications, users, and technologies.

IGX 8400 Series Voice Products

IGX 8400 Series

The carrier-class IGX 8400 WAN switch is ideal for large enterprise networks with high availability, reliability and serviceability requirements. By integrating IOS technology, the future-proof IGX platform helps deliver a seamless migration towards New World technologies, such as Voice over IP (VoIP), Voice over ATM (VoATM) and Multi Protocol Label Switching (MPLS), for Cisco customers.

Universal Voice Module

The Universal Voice Module (UVM) is a high-performance voice module for Cisco IGX 8410, IGX 8420, and the IGX 8430 wide-area switches. The UVM is suitable for all enterprise and service provider voice applications and offers toll-quality voice and efficiently utilizes wide-area bandwidth. Bandwidth savings achieved through voice compression and silence suppression can be applied to bursty traffic and a higher number of voice channels per trunk.

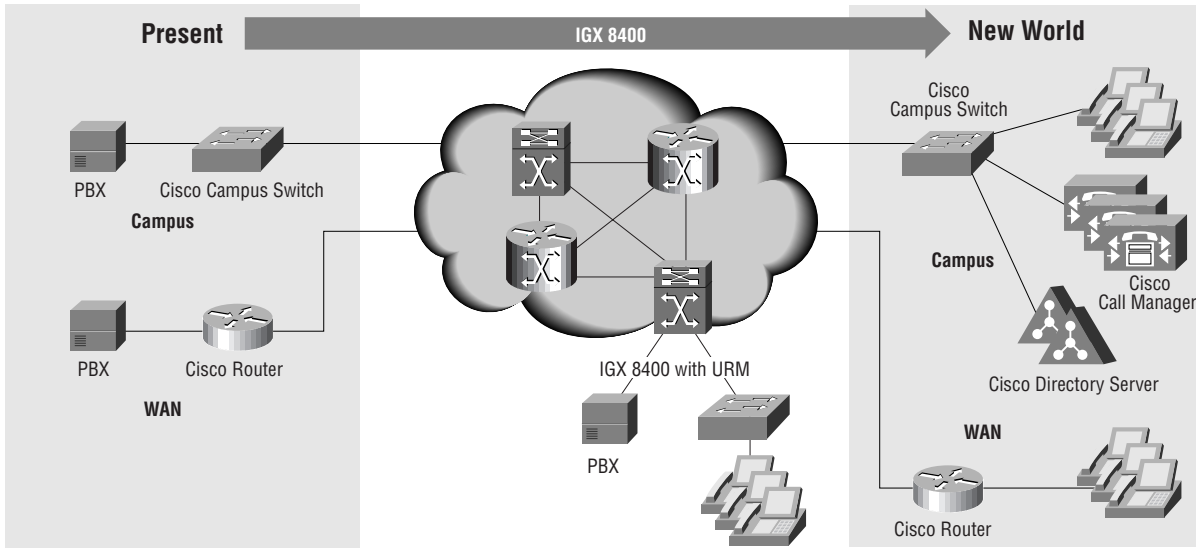
The UVM is ideally suited for networks where providing a cost-effective and highly scalable toll-bypass solution is the primary requirement. Each UVM features 1 CAS/CCS voice port (T1, E1 or J1).

Universal Router Module

Worldwide ATM WAN Enterprise Customers planning to support a full suite of IP voice and data services, including branch office to core site integration, can use the IGX plus its Universal Router Module (URM) at their core sites. The URM provides for end-to-end inter-operability with any Cisco IOS-based platform and thus expands the reach of voice switched networks.

An IGX supports a full suite of IP Services with the addition of the IGX-URM Universal Router Module and its associated Voice-enabled Back Card BC-URI-2FE2V-T1, or BC-URI-2FE2V-E1. Each back card features 2 CAS/CCS voice ports (T1 or E1) and 2 Fast Ethernet ports. The addition of a URM to an IGX allows scaling of multi-service over IP and IP routing applications, and enables the user to provision new branch integration services such as VoIP as well as to implement voice network switching with technologies such as H.323 and VoATM. URM also enables a zero-cost conversion from VoATM to VoIP infrastructures in one module.

Figure 1 Bridging toward New World voice with URM

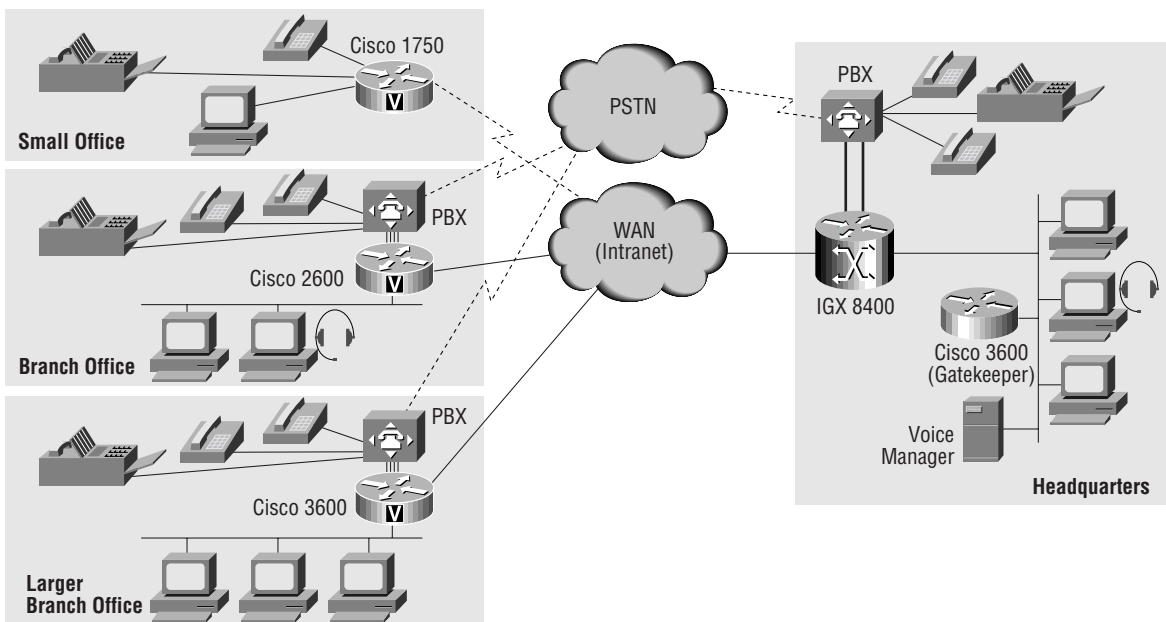


Cisco Provides the Industry’s Leading Multiservice ATM Solutions

Companies reaping the benefits of multiservice networking solutions from Cisco are more efficiently allocating bandwidth, prioritizing traffic, and allowing faster data access. Cisco solutions provide customers with a choice of voice-over-data transport technologies, including Voice-over-Frame Relay (VoFR), VoATM, and VoIP. Of these, Voice-over-IP is the only technology that supports the advanced, Web-based IP applications to the desktop characteristic of New World networking because it is the only option that operates at Layer 3, which is ubiquitous and end-to-end.

Businesses should consider their requirements carefully when selecting the most appropriate voice-over-data technology. In some cases, they may need a hybrid of transport technologies in different areas of the network. Cisco multiservice solutions make it possible to deploy hybrid networks and migrate to other technologies as needs change.

Figure 2 Fax and Voice over IP in the Enterprise



Today's next-generation multiservice ATM solutions from Cisco Systems connect all enterprise locations while integrating with existing routers and access devices to safely and cost-effectively support business-critical applications. Cisco IGX 8400 series wide-area switches provide a powerful multiservice backbone that enables businesses to consolidate data, voice, fax, and video traffic onto a single network. Integrated IP and ATM capabilities future-proof the enterprise network, supporting today's Frame Relay, SNA, leased-line, and Internet applications while providing a foundation for emerging IP-based applications such as virtual private networks (VPNs), intranets and extranets, voice over IP, video over IP, Web hosting, and electronic commerce. The IGX 8400 switches fully integrate with other Cisco LAN or branch office equipment (that is, customer premises equipment, or CPE) for an efficient, cost-effective end-to-end networking solution. As the leader in ATM, Frame Relay, traffic management, and QoS, Cisco provides today's businesses with the intelligent multiservice networks required to bridge the distance to the New World.



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