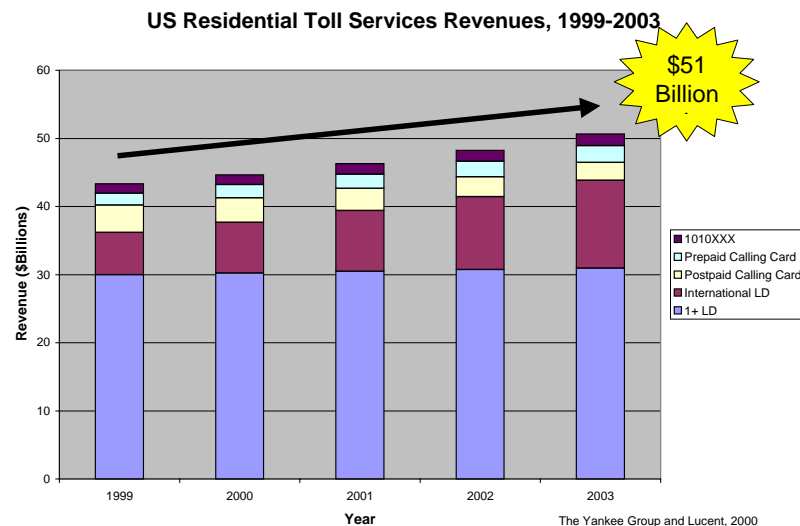




MultiVoice™ VoIP Solutions

Revenue Opportunities for Service Providers

In the fast-changing telecommunications landscape, industry analysts agree that voice over the Internet Protocol (VoIP) offers the greatest profit potential to service providers by offering traditional telco features with lower IP operational costs.



According to Gartner/Dataquest analyst William Hahn, “The Global Long Distance Market will grow to \$290B in 2003.”¹ This is a reliable indication of market capacity for the businesses that are ready to provide service. As part of the commitment to delivering leading-edge, carrier-class solutions, Lucent Technologies merges the speed and power of data networks with the quality and reliability of voice, with MultiVoice™ VoIP solutions for service providers.

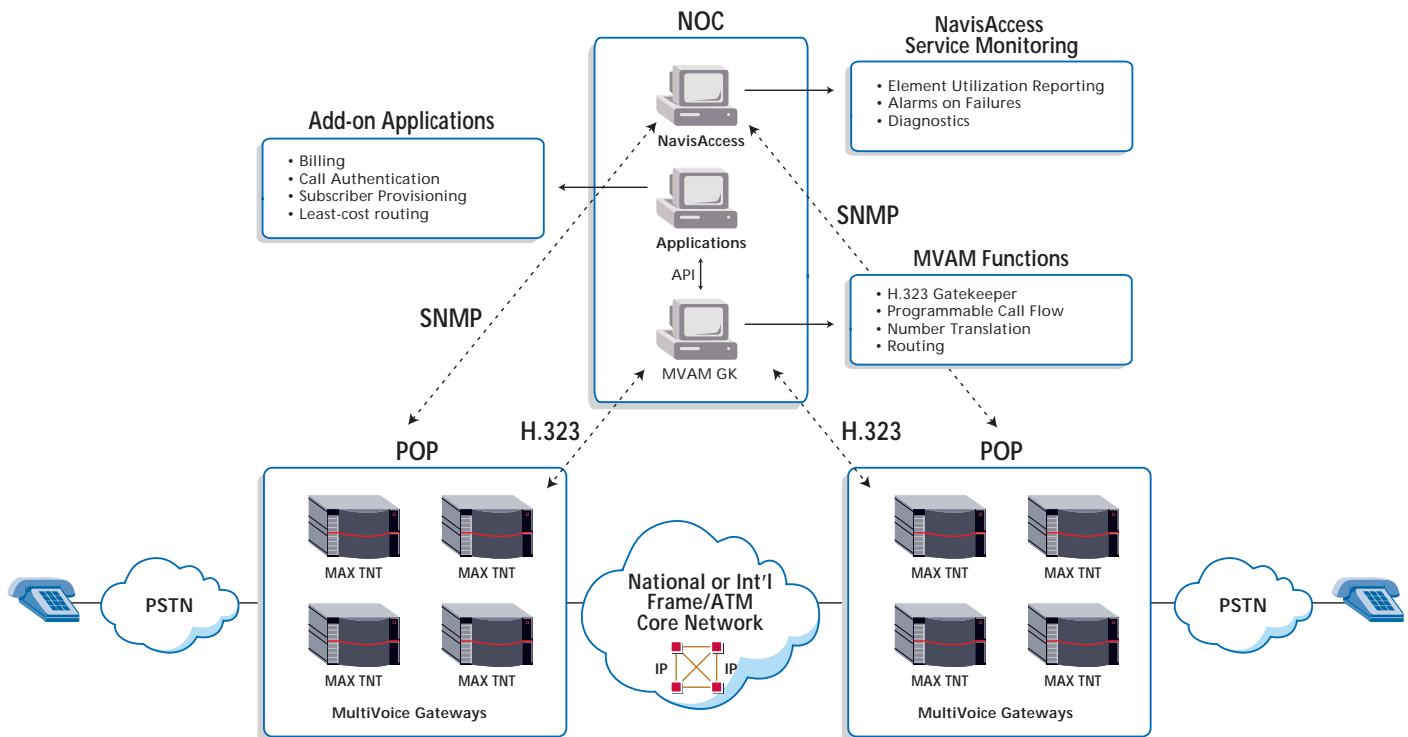
MultiVoice VoIP solutions let you offer an affordable alternative to the PSTN, by providing voice and fax calling over IP-based networks—such as the Internet, private intranets, and extranets—to customers virtually anywhere in the world.

MultiVoice VoIP is yet another breakthrough in the Lucent portfolio of solutions designed to help you build a next-generation network that generates revenue today and strategically positions you for tomorrow.

Lucent’s MultiVoice solutions enable—on a single network—traditional “1+” residential long distance as well as the services currently targeted by VoIP service providers, such as prepaid and postpaid calling cards and dial-around. By being able to offer the same suite of services, VoIP service providers can compete head-to-head with traditional interexchange carriers—and traditional carriers can reduce operating expenses by using a more cost-effective IP-based network.

¹ Source: Gartner/Dataquest analyst William Hahn, author of PSTN; and PSTN Services Market Worldwide Overview, 1994–2003, dated April 13, 2000.

Solution Elements



Sustaining a Competitive Advantage

Deploying a VoIP network based on Lucent's MultiVoice solutions provides several cost advantages over deploying a traditional circuit-based network. These advantages are realized both upfront and on an ongoing basis. Different advantages will appeal to different service providers based on their key concerns.

First of all, the initial capital outlay for a MultiVoice solution-based network can be made on a much more pay-as-you-grow basis due to the high scalability of the solution. For new service providers, this is an important advantage. It allows them to test the waters with voice without making substantial up-front investments. For Internet Service Providers who are already using the market leading Lucent MAX TNT Remote Access Concentrator, on which a key component of the MultiVoice solution is based, start-up costs are even lower.

In addition, with MultiVoice solutions service providers can deliver multiple voice services simultaneously over a single VoIP network, further reducing initial capital outlay and ongoing operating costs. This is a key advantage to new service providers who want to be able to offer a complete suite of services right from the start.

Finally, due to the inherent efficiencies of a "packet-based" network, ongoing costs for facilities can be substantially lower than for a circuit-based network. While this is a key advantage for any service provider, it is one of the most compelling reasons for a traditional interexchange carrier to move to this solution. Also, for service providers who are offering both voice and data services, this solution allows them to operate and maintain a single transport network.

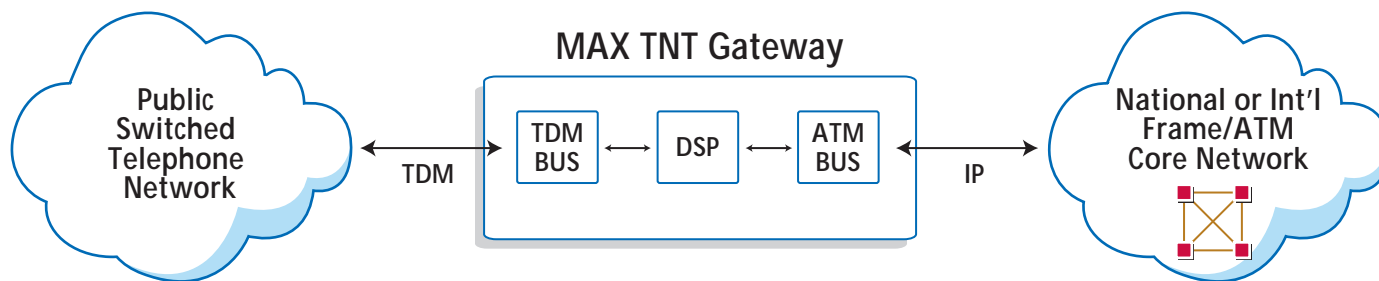
These sentiments are recognized by industry analysts: "Full integration of voice and data services will give network service providers the ability to deliver differentiated services more quickly and cost effectively. The ability to establish a single network for voice and data reduces costs, and the services integration permits a faster time to market for the service provider"—IDC, February 2000.

A Full Portfolio of Products Providing VoIP Solutions for Service Providers

Lucent Technologies MultiVoice VoIP solutions consist of the following elements:

1. MultiVoice Gateways, which bridge circuit and packet networks.
2. MultiVoice Access Manager (MVAM), which serves as an H.323 gatekeeper providing call control, including user authentication, routing, number translations, programmable call flows and call detail recording.
3. MVAM Applications Programming Interface (API), which provides a real-time interface to add-on applications from Lucent or a MultiVoice-approved third-party vendor. Primary applications provide billing and provisioning of subscribers as well as least-cost routing.
4. NavisAccess™, which provides network management and monitoring of network elements.
5. Lucent NetworkCareSM Services, which provide best-in-class customer support functions including network design, installation, and management.

Gateway Function



High Performance Gateway

The MultiVoice Gateway is based on the MAX/TNT™ family of access concentrators, which has an installed base of more than 80,000 systems and 20 million ports worldwide. The MAX TNT supports from 2 T1/E1 to 1 T3 (48 to 672 channels). It is a scalable, standards-based gateway that provides an interface between the PSTN and an IP-based network, enabling voice calls to hop on and off the packet network. The gateway incorporates DSP modules to provide the high-quality signal compression and low latencies required for voice and fax calling.

In addition, the Lucent True Access™ Operating System (TAOS) used in all MAX/TNT products provides reliable access routing and the worldwide circuit signaling support required for rapid deployment of global voice and data networks.

The MAX TNT gateway:

- Supports a variety of trunking and signaling options: T1/E1/T3, PRI, CAS, R2, Feature Group D.
- Provides flexible space and power requirements including NEBS Level 3 and ETSI requirements.
- Is approved for use in more than 40 countries.
- Can be operated as a dark site with remote monitoring and low maintenance requirements.
- Has an extensive list of more than 60 features enabling voice and fax services.

Gatekeeper Software for Call Management

The MultiVoice Access Manager (MVAM) is the call coordinator for voice/fax calls over an IP network, providing softswitch-like functionality. Serving as an H.323 gatekeeper it provides call control, including user authentication, routing,

number translations, and programmable call flows. Specifically, the MVAM:

- Manages the H.323 zone for a set of MultiVoice gateways and PC endpoints, up to 30,000 ports on one gatekeeper.
- Processes and records 50 calls per second.
- Supports a secondary MultiVoice Access Manager for redundancy.
- Enables communication among multiple MultiVoice Access Managers to connect calls between zones.
- Can be deployed on standard Windows NT¹ or Sun SOLARIS² platforms for maximum scalability, flexibility, and cost-effectiveness.
- Facilitates programmable call flows, based on individual call parameters such as DNIS or trunk group.
- Provides routing among gateways.
- Performs digit stripping and number translations for dialed long-distance and international calling.
- Supports an API used for communicating with third-party applications such as billing and accounting systems.

MVAM Applications Programming Interface and Add-on Applications

The MVAM API allows carriers to use third-party applications in their VoIP networks, primarily addressing subscriber billing and provisioning. In addition, it allows for value-added applications such as Least-Cost Routing. The MVAM API provides call events to the application in real-time, which supports advanced services such as prepaid calling card. It is an Object-Oriented C++ interface. Lucent provides the interface to various internal and external application providers.

Services Delivered by MultiVoice Networks

Service providers typically offer services to one of three market segments: consumers, businesses, or other carriers. The set of services provided in each of these segments is essentially the same, although the degree of functionality and sophistication of features varies among the segments. Lucent's MultiVoice access platforms give service providers a single solution for addressing the needs of all three segments. The set of services available includes:

- Single-stage presubscribed "1+" dialing for long distance—this replicates the user experience available today through interexchange carriers
- Single-stage "1010" dial-around for long distance
- Dual-stage dialing for long distance – users dial the gateway and are authenticated by either caller ID, PIN, or both
- Prepaid calling cards
- Postpaid calling cards

Clearinghouse Services

The Lucent MultiVoice product family also includes the MultiVoice Settlement-Ready VoIP Clearinghouse Solution, which brings together all of the components (hardware, software, professional services) needed to support carriers seeking to extend the reach of their VoIP networks. These carriers typically fall into one of two categories:

- Those who want to establish themselves as a clearinghouse for Internet Telephony Service Providers and next-generation telcos carrying voice and fax over IP networks
- Those looking to affiliate with an existing clearinghouse using OSP or the AT&T Harvester module.

A key component of this solution is the MultiVoice Settlements Engine.

¹ Windows NT is a registered trademark of Microsoft Corporation.

² Solaris is a registered trademark of Sun Microsystems.

NavisAccess and IP Navigator™ Network Management

With the Navis 5.0 network management system (NMS), including the Navis AccessWatch comprehensive reporting application, service providers can manage MultiVoice VoIP networks in real-time. AccessWatch lets carriers monitor physical resources, such as DSPs and slot cards. Fault, performance, and event monitoring can be based on VoIP statistics including jitter, delay/latency, and call rates. In addition, Navis NMS provides performance-level reporting in support of Service Level Agreements.

Quality of Service

Service providers can select Quality of Service (QoS) levels to fit their customers' requirements. MultiVoice solutions can be deployed on networks using Best Effort, Type of Service (ToS), and "Absolute QoS." In a Best Effort network, no QoS mechanisms are used. With ToS, the MultiVoice Gateway sets the ToS bit in the IP header, allowing the packet backbone to identify voice packets for different treatment. In an "Absolute QoS" network, provided by Lucent's IP Navigator and core switches such as the B-STDX 8000/9000, CBX 500 and GX 550, carriers can strictly ensure end-to-end QoS for voice calls.

End-to-End World-Class Support

Lucent Technologies brings the heritage of designing and building the world's highest quality, most reliable voice networks to data networking. With this proven expertise as well as the innovations of Bell Labs and strategic partnerships, Lucent Technologies is making today's converging network environment more reliable, less complex, and simpler to use and manage. Whenever a need arises for support, Lucent Technologies NetworkCare provides complete, end-to-end management of multivendor voice and data networks.

Sustaining a Competitive Advantage

VoIP's greater network efficiencies and scalability provide indisputable cost advantages over PSTN, as many major IP telephony service providers acknowledge.

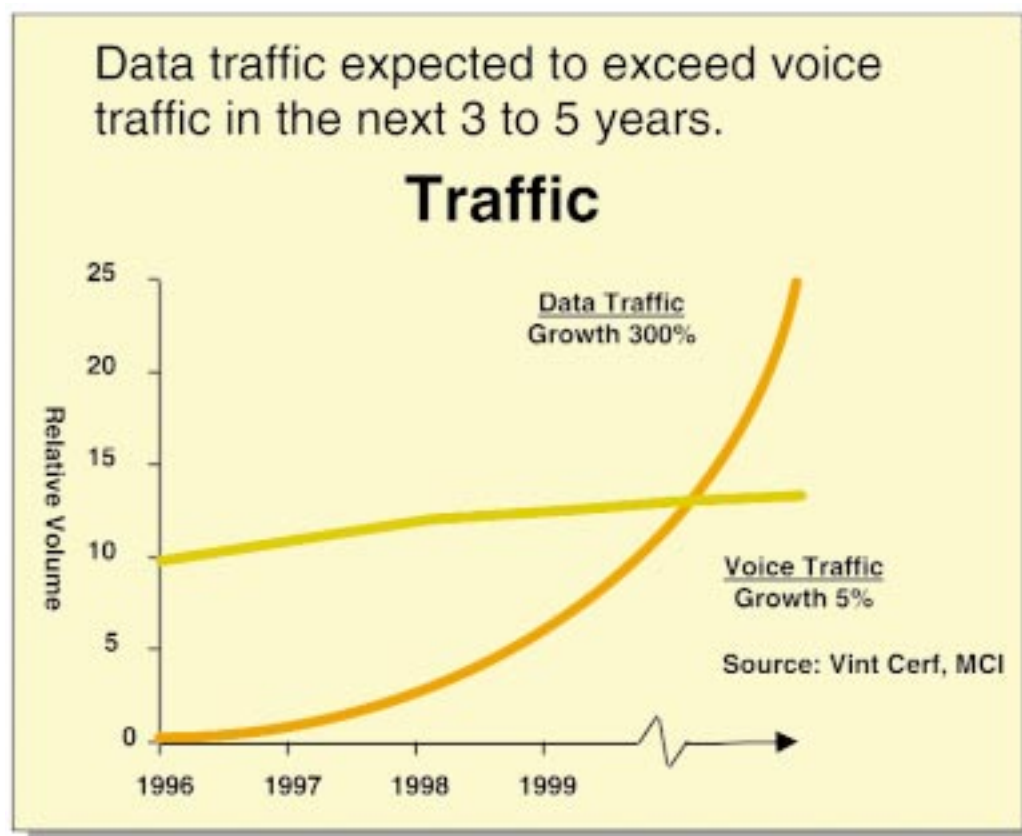
"We're in the middle of a fundamental change—the same as the telegraph to the telephone," noted James Crowe, Level 3 Communications, Inc., President and CEO.

"IP enjoys a 100-to-one cost advantage over switched network," Crowe said.

(Inter@ctive Week, January 19, 1998)

"Voice over the Internet is getting better and better," Frank Ianna, President of AT&T Network Services, told an Industry Analysts Meeting on March 2, 1999, noting that the plan is to get to zero investment in the circuit-switched 4ESS network.

The following chart shows that the volume of data traffic is expected to exceed voice traffic in the next three to five years. Because voice traffic is contributing a less significant percentage of the total, it makes sense for service providers to carry voice on their data networks using VoIP technologies as provided in Lucent's MultiVoice Solutions.



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