

transformation

White Paper
**The Superclass
carrier—Strategies for
VoIP deployment**

The move has begun to convert the world's circuit-switched voice infrastructure to Voice over IP (VoIP). However, the task of converting a multi-billion dollar network is a daunting task and must be planned with great care. Voice communication today is central to our society and our economy. Picking up a phone has become as common and as necessary as opening a door. It's critical to maintain the continuity of communications and the public confidence in the security and reliability of the public network.

Major advances in technology, however, bring more than just a cheaper way to do the status quo—they also bring opportunity. The convergence of voice, data, and multimedia opens the way for delivery of new services. These new services bring the promise of change to the way we communicate.

If the task of network transformation to VoIP is inevitable, how should carriers go about it? Where should they start? What should they look for in a solution? And where should the carriers themselves be headed to maximize the opportunities that emerge as a result of this transition?

Where the conversion starts

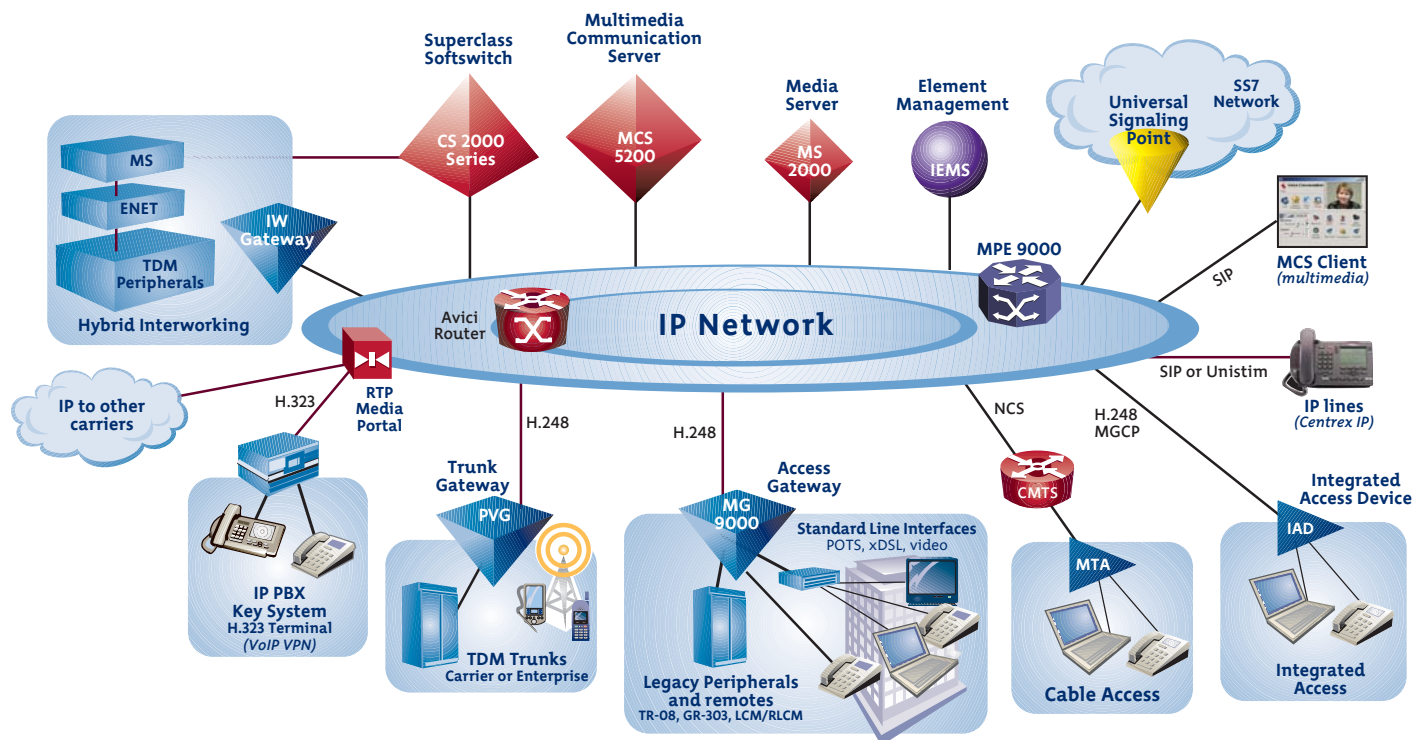
The conversion starts in the most obvious of places, that is, planned TDM capital that can be redirected toward a VoIP solution. Telecommunication carriers are like rental car companies in one sense. Rental car companies must plan capital to keep their fleet of cars current. This means that every year they must have the capital to replace a certain number of the cars in their fleet with new cars. This process ensures that older cars that are less attractive and lack the latest features are replaced. Voice carriers have a similar situation. In most networks, certain switches will have reached the end of their useful life and capital is planned to replace them. Redirecting this money to a VoIP transformation starts the process of conversion within the current capital budget.

Voice over IP can address other problems in the network, such as lack of central office facilities, while freeing up capital that may have been planned to address existing problems. Deploying VoIP access in the typical end office requires as much as 80 percent less space and can reduce power and HVAC requirements by up to 50 percent¹. In many cases, carriers have planned real estate or equipment upgrades to address space and/or power shortages. By redirecting this planned spending towards a transition to VoIP, facility costs and space requirements can be reduced.

Around the globe, carriers are realizing these advantages and seeking ways to create new opportunities. As space and power are made available in existing voice offices, this frees up space to provide for the delivery of potentially new revenue-generating services. These may include data access, data storage, video distribution, or multimedia services.

Another advantage of Voice over IP deployment is the ability to transition high-cost locations in the network and turn them into lower-cost locations. Small offices in less densely populated areas can cost carriers more per subscriber than larger offices. This is largely because in the TDM architecture network switches must be located within a certain distance of the subscriber. Prior to VoIP, the only solution for this problem has been the deployment of remote facilities. While functional, this type of architecture adds cost to the network and creates another layer of switching in the voice network.

¹ Nortel Networks business case analysis.



Packet networks eliminate boundaries and provide for secure, productive, and personalized communications.

By contrast, the distributed nature of a VoIP infrastructure allows network intelligence to be located over 1,000 miles from the access equipment. This allows many smaller offices (10 to 20 depending on subscriber density) to be controlled from a single VoIP communication server. It also allows for the elimination of that layer of equipment traditionally used to connect remotes into the end office. Carriers will find that as they select offices to upgrade to VoIP, many smaller offices will be candidates for elimination of the TDM switching facility for replacement by VoIP access. This greatly reduces the amount of equipment needed to be maintained, and can reduce overall operating costs.

The remote layer of the network is not the only layer of the traditional TDM hierarchy that can be eliminated. Large carriers have entire divisions devoted to operating and maintaining TDM equipment at the international gateway level, the national long distance level, and the tandem levels of the network. These layers, along with the end office and remote layers of the network, can be flattened into one or two layers. In TDM networks, every layer of the network requires trunking connections to the next layer, where the call is reswitched at that layer and trunked to the next layer. This process is simplified in a VoIP network where the call path is transmitted over the packet network from one access device directly to another without having to be reswitched—eliminating the need for multiple network layers. By eliminating network layers, VoIP network conversions can pay for themselves through reductions in operations and capital expenditures.

New services

As carriers redirect capital to a VoIP network, the packet network and improved network intelligence opens up a multitude of possibilities. Converging voice and data onto a single network infrastructure enables delivery of a new generation of services designed to bring increased functionality, mobility, and productivity to subscribers. But new services are not just a by-product of the move to a VoIP network. In many cases, these services are the primary reason for starting the transformation to VoIP.

VoIP networks can deliver voice connections wherever there is an IP connection. This means that IP phones can be deployed from network connections anywhere access is desired. For the consumer, this may mean second and third line service in the home provided by a DSL broadband connection. For the enterprise, this means Centrex business group services are available anywhere they can terminate a quality IP connection. With Centrex IP, the carrier can provide carrier-hosted business lines in offices or hotel rooms which have broadband access.

Network convergence, however, brings more than just access. A packet network enables the convergence of data and multimedia across the communications network—something that was not feasible in a TDM voice network. Multimedia communications is the integration of new media types within a communication session. These include voice, video (desktop video conferencing or events of interest), text, diagrams, web pages, interactive whiteboard drawings, or data files.

In today's global economy, businesses have evolved and become more geographically dispersed, while taking advantage of the reach offered by the Internet and of packet data networks. This has enabled regional offices to be located closer to the customer. At the same time, enterprises need not allocate valuable office space to accommodate contractors, while also supporting the communication needs of workers who may telecommute from home or while on the road. However, in this environment businesses are realizing that the PBX that for so long has tied office workers together when they were located at a single business location is today no longer a complete solution. With a distributed workforce, employees are often not in the same dial plan; each site must negotiate its own network access contracts. Employees' phone numbers do not follow them from work, to home, or while on the road for business travel. The Voice over IP Virtual Private Network (VoIP VPN) is a new service designed to address these problems. Voice over IP VPNs, managed from the communication server, can create a logical business group across all the sites and locations where workers are distributed. It ties together the PBX (or IP-PBX), Centrex (or Centrex IP) hosted lines, and data VPN services from multiple sites, and delivers service to each site over a single network connection. This enables employees, contractors, and business partners to communicate more effectively, making business more flexible and productive than before.

It is with the adoption of VoIP, and creation of new communication services, that we see the emergence of superclass carriers.

Superclass carriers

Superclass carriers are carriers that have moved beyond their traditional position as a local phone provider, a long distance provider, an access provider, a cable or satellite TV service provider, or an Internet Service Provider. Today's superclass carriers deliver converged communication services without boundaries.

Businesses and consumers are increasingly frustrated by the time and cost of going to several different suppliers and service providers for their communication services. This problem is referred to as "service provider fatigue." Even businesses that run their own PBX and data networks need carriers for data VPN interconnect private lines to connect their sites, local PSTN access, long distance access, and Internet access. Negotiating contracts with these multiple providers, and segregating the traffic for delivery to separate providers, is both time-consuming and costly.

Business and consumers have started looking for communication companies that provide these services in a single bundle—a single contract, a single bill, and ultimately a single high-speed packet pipe. But, not just any carrier can be a superclass carrier.

Superclass carriers have a number of characteristics in common which are required to meet the needs of the end-user customer:

- **Strategic architecture:** The ability to deliver content like local and long distance voice and data services anywhere the customer is located.
- **Enterprise presence:** The ability to deliver services to the enterprise whether local services are carrier-hosted or enterprise equipment-based.
- **Carrier-grade quality:** Businesses cannot tolerate low quality or unreliable service.
- **Comprehensive services:** The ability to deliver the complete set of existing services to the customers. Customers do not expect to downgrade or lose services.
- **New high-impact services:** It is new services that provide the impetus for customers to seek out new carriers. Customers are won or lost on key services.
- **Regulatory compliance:** Law enforcement, emergency, and lifeline services are entry-level requirements.

As voice over packet voice networks are deployed and the elements of voice, data, and multimedia services converge, a new communications system is emerging that is eliminating boundaries and providing a secure, productive, and personalized communication experience.

In the United States:

Nortel Networks
35 Davis Drive, Research Triangle Park, NC 27709 USA

In Canada:

Nortel Networks
8200 Dixie Road, Suite 100, Brampton, Ontario L6T 5P6 Canada

In Caribbean and Latin America:

Nortel Networks
1500 Concorde Terrace, Sunrise, FL 33323 USA

In Europe:

Nortel Networks
Maidenhead Office Park, Westacott Way, Maidenhead Berkshire SL6 3QH UK

In Asia Pacific:

Nortel Networks
Level 5, 495 Victoria Avenue, Chatswood, NSW, 2067, Australia, Phone: (61) 2 8870 5200

In Greater China:

Nortel Networks
Sun Dong An Plaza, 138 Wang Fu Jing Street, Beijing 100006, China, Phone: (86) 10 6528 8877

Nortel Networks is an industry leader and innovator focused on transforming how the world communicates and exchanges information. The company is supplying its service provider and enterprise customers with communications technology and infrastructure to enable value-added IP data, voice and multimedia services spanning Wireless Networks, Wireline Networks, Enterprise Networks, and Optical Networks. As a global company, Nortel Networks does business in more than 150 countries. More information about Nortel Networks can be found on the Web at:

www.nortelnetworks.com

For more information, contact your Nortel Networks representative, or call 1-800-4 NORTEL or 1-800-466-7835 from anywhere in North America.

*Nortel Networks, the Nortel Networks logo, and the globemark design are trademarks of Nortel Networks. All other trademarks are the property of their owners.

Copyright © 2004 Nortel Networks. All rights reserved. Information in this document is subject to change without notice. Nortel Networks assumes no responsibility for any errors that may appear in this document.

NN108863-061104

