**Magellan
Access Solutions**

Adrian Hatcher

Senior Product Manager, Magellan Access

The growing role of the corporate network in the ongoing drive for global competitiveness is fuelling the need to extend the reach of the network and drive for better and more cost-effective access solutions as part of an overall networking strategy.

Access requirements are quickly evolving and changing and Nortel understands that for business success, solutions to branch and remote access requirements are critical to an end-to-end network solution. Nortel is committed to building upon its proven successes in addressing these requirements through evolution of its product portfolio for both data and multimedia access needs.

The intended audience for this presentation is business managers, network planners and strategists from both service provider and enterprise customers.

About the presenter:

Adrian Hatcher graduated with a Bachelar of Science in Engineering from the University of Waterloo and an MBA from the University of Western Ontario. He has 10 years experience with Nortel's Multimedia Networks in various management positions including Network Implementation, R&D management, Marketing Communications and Alliance management. He is currently Senior Product Manager, Magellan Access, responsible for global product management and marketing of Magellan DPN-100 and access products.
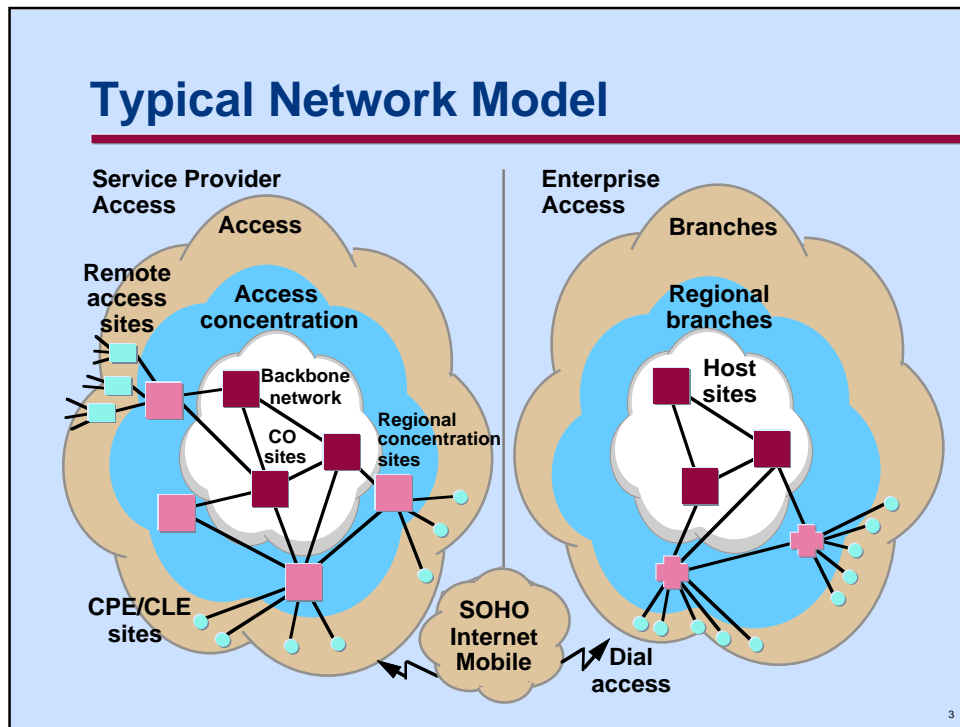
Agenda

- **Access Market Evolution**
- **Magellan Access Solutions**
- **Magellan's Access Products**

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This workshop will begin by examining a current typical network and the expected future evolution of the access environment. It will then present a view of end-user needs and how these influence the values of network providers and drive the need for change in network access solutions.

The next section of the workshop will focus on customer applications and how Magellan's access products can help provide solutions to a variety of access needs. In particular, three areas of key importance are discussed: SNA/LAN consolidation, remote LAN and Internet access, and multimedia network consolidation.

Recently introduced products and new product plans will be highlighted. Applications and environments that each element of the access product line is best suited for will be discussed. This will show how Magellan provides a wide range of access products to address differing network needs.

Typical Network Model

Service Provider Access

Access

Remote access sites

Access concentration

Backbone network

CO sites

Regional concentration sites

CPE/CLE sites

SOHO Internet Mobile

Enterprise Access

Branches

Regional branches

Host sites

Dial access

Access means different things to different people. Access may be thought of in three distinct ways:

- Service provider access - two different needs are included in this definition:

  - Remote access concentration refers to small network nodes that are located in remote sites and used to backhaul traffic to the regional concentration site

  - Branch access refers to situations where service providers offer CPE/CLE solutions for end-customer environments, such as financial institutions, health care centers, and service industry sites

- Enterprise access - the requirement to provide a consolidation device to support varying traffic needs within a branch office environment

- Dial access - the requirement is for remote access to service provider or enterprise networks to support a varying degree of end-user applications. Predominant applications include:

  - Mobile workforce access to corporate networks

  - Small office or work-at-home office (SOHO) access to corporate networks

  - Public Internet access

In general, both service provider and enterprise networks have a number of things in common.

Up to 90% of the sites in the network topology can be branch or CPE/CLE sites. Because the number of branch access devices in a network greatly exceeds the number of core backbone nodes, the access solution represents the largest and most costly portion of the entire network.

The connectivity and traffic flow in the network is usually hierarchical in nature, ie. branches are connected to the regional sites and communicate mainly with the directly connected regional site, or one or two central sites. The traffic to other regional sites is less and the traffic to other branch locations may be minimal.

Whereas the regional sites and central sites are normally connected in a mesh topology for highest reliability, network connections to the branch and remote access consolidation sites are different. Usually it is not economically feasible to have multiple connections so the site has a single connection to the closest regional site. Even as bandwidth costs are trending downward, these links are often limited to speeds of 56 kbit/s or 64 kbit/s. Branch availability and reliability then depend on a well designed dial-backup strategy using public facilities such as ISDN.

Today's Branch/CLE Environment

Opportunities to consolidate traffic and reduce cost
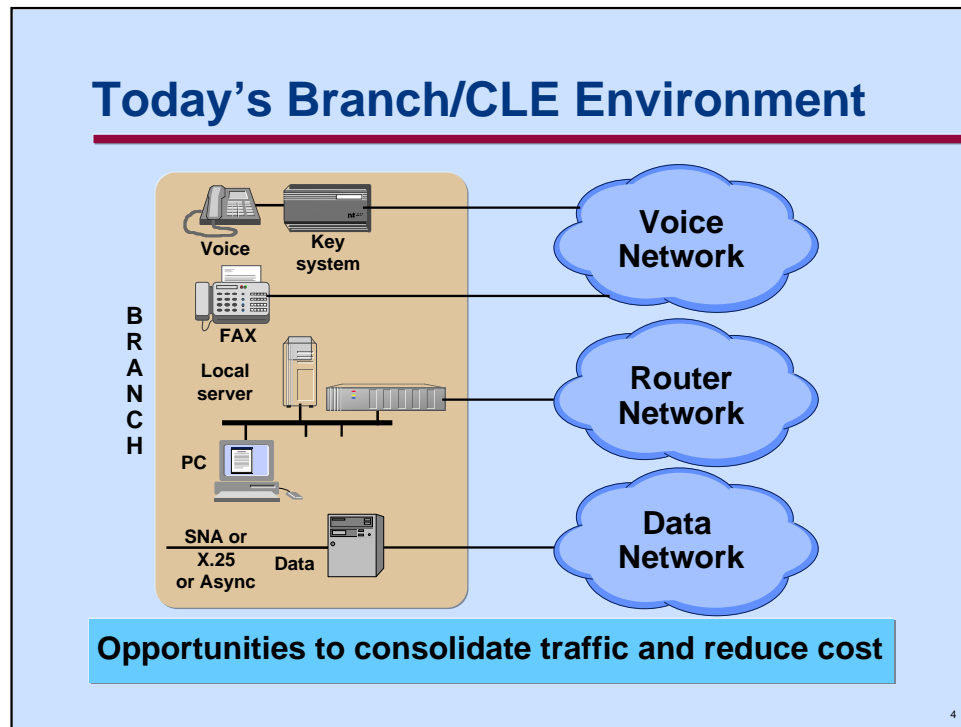
The branch is typically the first point of network access.   Today's branch or remote office needs access to traditional data networks, LAN or client/server applications, fax, voice, and in some cases even video. These are usually independent networks.

The existence of multiple overlapping networks, and in some cases, the relatively low utilization of these networks, provides opportunities for cost reduction through a combination of different network types. Network consolidation can reduce costs by eliminating and/or making more efficient use of facilities and equipment.

Standardization of technology and its configuration, management and support, through an end-to-end consolidated solution, can also help to make most efficient use of costly and scarce skilled resources and further reduce cost.

The critical feature set needed by a branch today is:

- support for traditional SNA/X.25/async protocols;

- support for LAN protocols;

- remote management for effective use of skilled personnel to operate, troubleshoot and configure the network;

- excellent traffic management to ensure all traffic types are handled with the appropriate degree of priority and delay;

- ability to use switched connections for backup and overflow;

- simple installation and maintenance; and

- low cost because of the number of branches that must be linked to the network.

The Branch of the Future
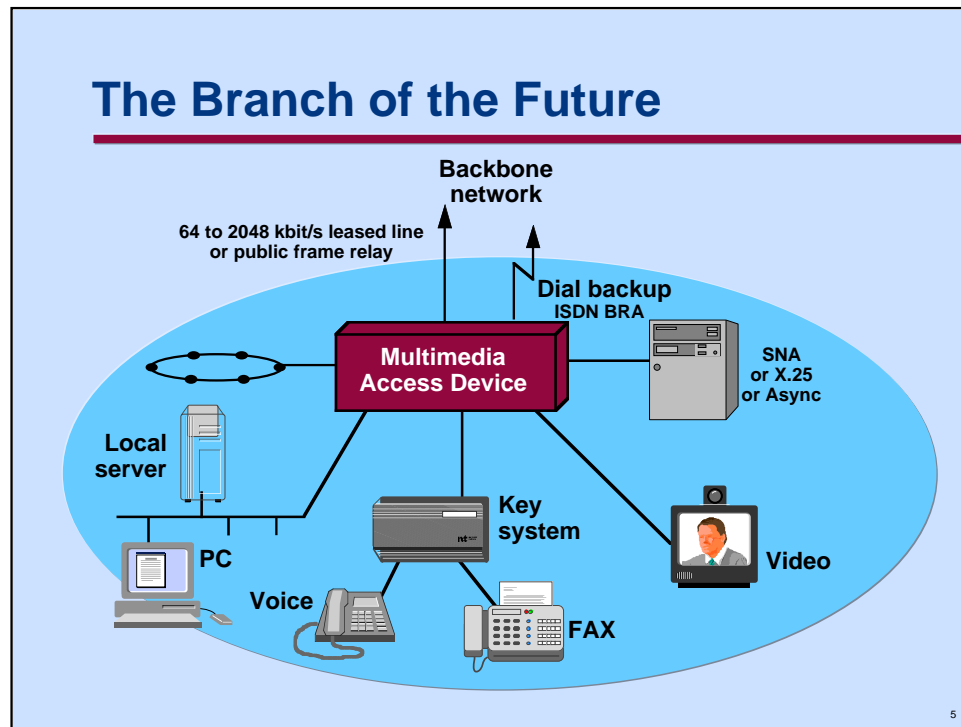
Nortel's vision of the branch environment of the future is one in which a single multimedia access platform will support branch end-users in a variety of application areas such as:

- telecommuting;

- educational services;

- health care services;

- financial services;

- dial-in services for remote LAN and Internet access; and

- retail/point of sale services.

The branch of the future will use a single multimedia access device that can accommodate all traffic types; traditional SNA/X.25/async data, LAN internetworking, voice and video. This device will be cost-effective for branch use, connecting to a regional site or backbone via leased line or public frame relay, and with an ISDN dial-up link for backup or bandwidth on demand.

The branch of the future will also have a clear evolution path. The multimedia access device will be based on a frame/cell implementation to ensure high quality multimedia traffic in frame-based networks now, yet have the ability to evolve to ATM networks in the future.
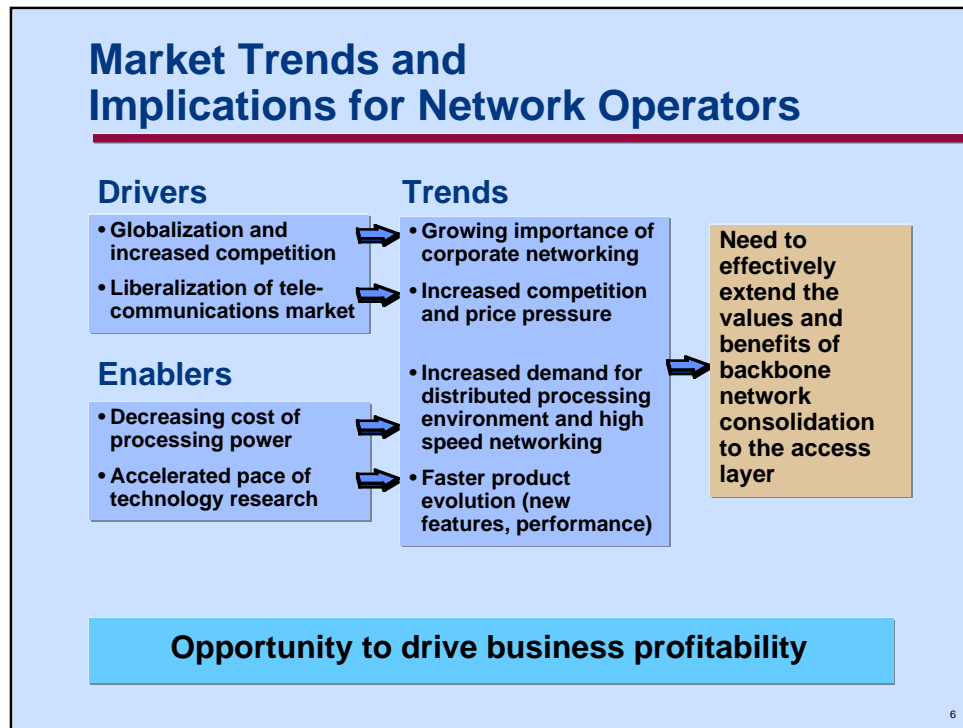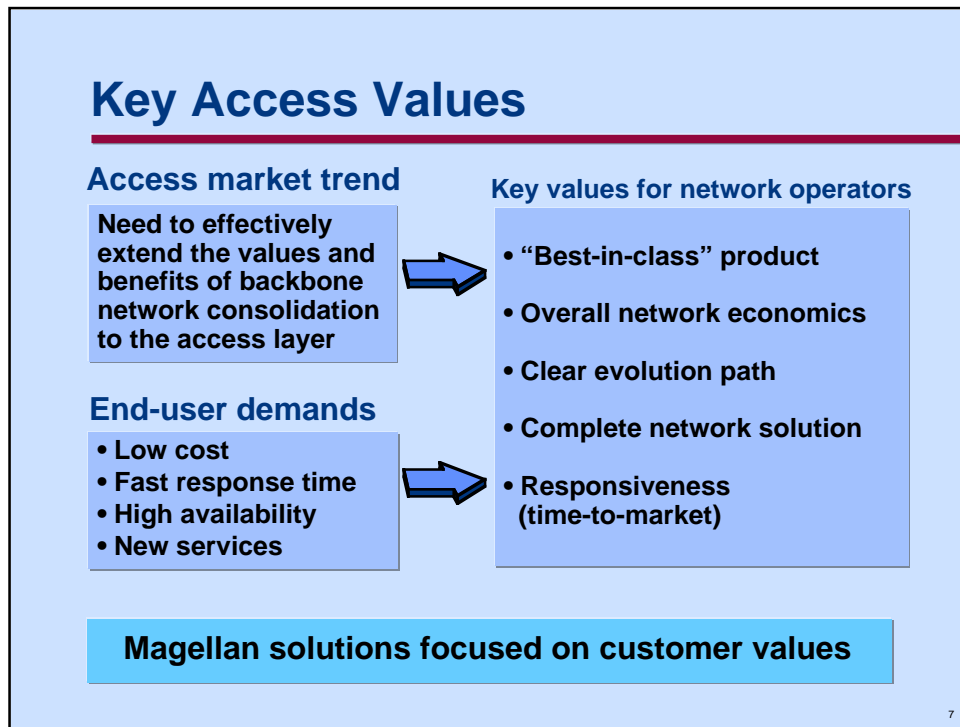
The ongoing drive for global competitiveness is causing every corporation to search for newer and better ways to serve its customers. As a result, the corporate network is growing in importance and is being used increasingly to support revenue generating applications. Finding ways to support new service offerings and to maximize efficiency of this now-essential resource through network and traffic consolidation is key.

The liberalization of telecommunications markets is opening up global markets to new players, resulting in stiffer competition and increased price pressure for all service providers. However, as the market is moving away from regulated private line services into unregulated enhanced data services, new revenue opportunities are opening for those who are able to support such services.

These market trends, and the increasing demand for distributed processing are driving the need for all network operators to extend the reach of the network to the branch and remote site level. The values and benefits of the backbone (eg. switching, network management, reliability and traffic consolidation) must be extended to the branch. Enabling this transition is the relative price to performance decrease in the cost of processing, and the accelerated pace of technology research, resulting in faster product introduction, new features and performance improvements. Product life cycle is correspondingly shorter. These factors mean that evolvability and investment protection—a clear evolution path—are key concerns for network operators.

The corporations that are successful in making this transition will have the opportunity to quickly deliver new and enhanced products and services to their customers. At the same time, they will reap the benefits of reduced overall networking costs and increased profits.

Key Access Values

Access market trend

Need to effectively extend the values and benefits of backbone network consolidation to the access layer

End-user demands

- **Low cost**
- **Fast response time**
- **High availability**
- **New services**

Key values for network operators

- **"Best-in-class" product**
- **Overall network economics**
- **Clear evolution path**
- **Complete network solution**
- **Responsiveness (time-to-market)**

Magellan solutions focused on customer values

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As indicated in the previous chart, market trends are driving a need to extend the network to the branch and remote site level. This need, combined with specific demands from end-users as to how their network should perform, dictates the values that are of greatest importance to the network operators servicing these end-users.
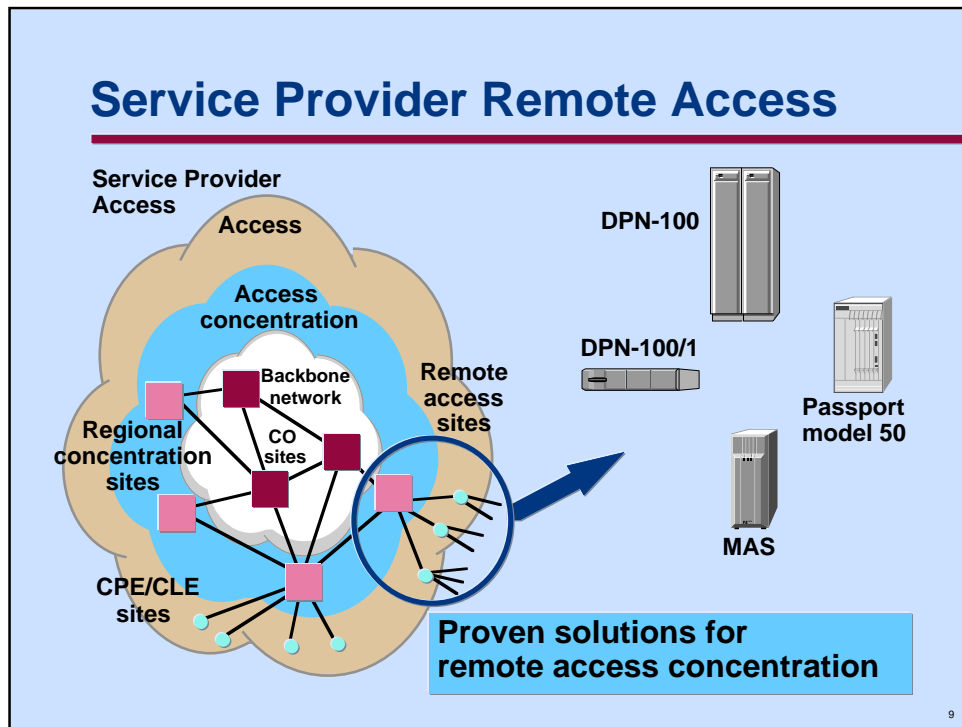
While end-user needs vary according to their business focus, there are a number of common elements which drive network operator values. Evolvability and investment protection—a clear evolution path—is a key concern for network operators because of increasingly short product lifecycles and the need to improve time to market. "Best-in-class" products and a supplier which can provide technical leadership and a complete network solution help the network operators to offer the competitive differentiation so vital to the end-user. Network solutions which are easy to implement, use, and maintain are key to achieving best overall network economics through efficient use of scarce skilled resources. Competition in the end-user's business is typically based on the variety and quality of service offerings—resulting in the need for a high degree of responsiveness and competitive differentiation.

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- **Magellan's Access Products**

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The first section of this presentation discussed current market trends and showed how these determine the values needed by network operators today, and in the future. This section will build on this theme to show how Magellan provides access solutions which supply these values.

Service Provider Remote Access

Service Provider Access

Access

Access concentration

Backbone network

CO sites

Regional concentration sites

Remote access sites

CPE/CLE sites

DPN-100

DPN-100/1

Passport model 50

MAS

Proven solutions for remote access concentration

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DPN-100 and Magellan Access Switch have traditionally delivered high value solutions for service provider remote access consolidation. More than 30,000 modules have been deployed in service provider networks around the world for exactly this purpose. Passport continues this tradition by providing backbone and regional concentration values, for multimedia traffic, in packages that can be economically used for remote access concentration.
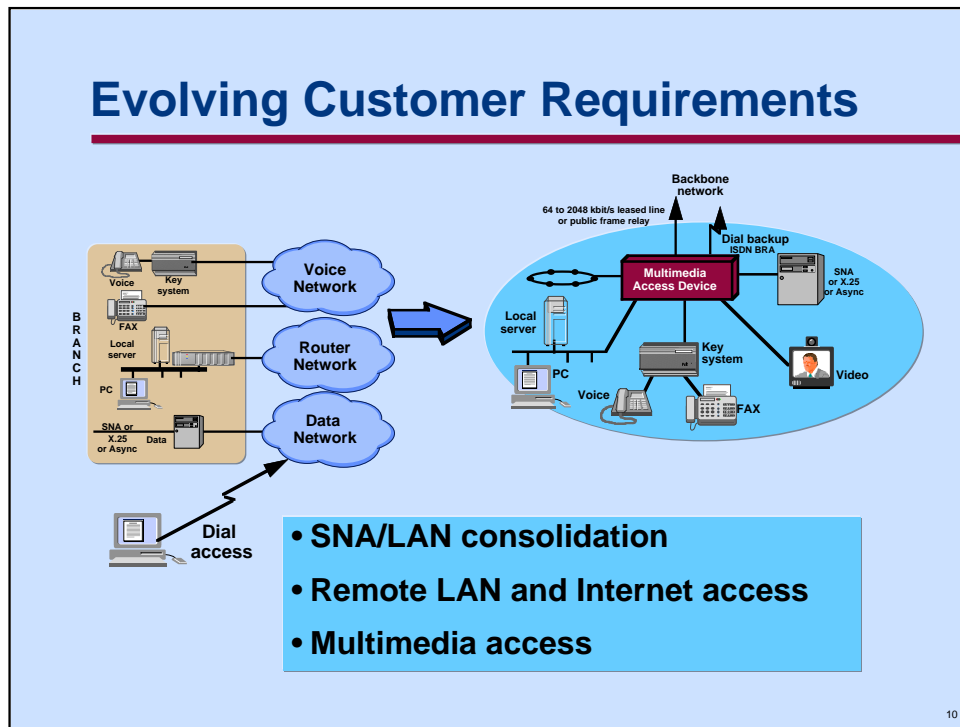
This workshop will look now at specific examples of access requirements that are evolving in today's market which also support the vision discussed earlier:

- SNA/LAN consolidation

- Remote LAN and Internet access

- Multimedia access

The driving forces behind each of these areas and the Magellan solutions that are available and planned to meet these requirements will be discussed.

SNA/LAN Consolidation Challenges

- **SNA applications are 'mission-critical'**
  - need to ensure revenue generating traffic not impacted
- **Growth of LAN-based traffic**
  - need to support distributed processing capabilities and information flow
- **SNA/LAN traffic incompatibilities**
  - differing bandwidth and delay characteristics

**Consolidation must deliver values and benefits to support both SNA and LAN**

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Network Managers are struggling to deal with the problem of SNA and LAN traffic integration. The truth is that SNA traffic and LAN traffic types aren't exactly a good match.

Currently, large corporate networks usually have a large installed base of SNA devices. In most cases it's "mission-critical", that is, revenue generating application traffic. Network managers depend on the highly reliable values of SNA networking to meet business requirements.

In addition, the growth of LAN-based traffic and the need for end-users to have distributed processing capabilities and distributed access to corporate applications is rapidly driving up the cost of developing, managing and maintaining independent networks.

To complicate matters, SNA transactions have minimal bandwidth requirements, but are sensitive to delays. LAN traffic has a wide range of bandwidth requirements and can tolerate significant network delays. If not kept in check, bursts of LAN traffic can easily choke off other types of traffic, especially low-bandwidth-sensitive SNA transactions.

These are the challenges that Magellan is addressing.
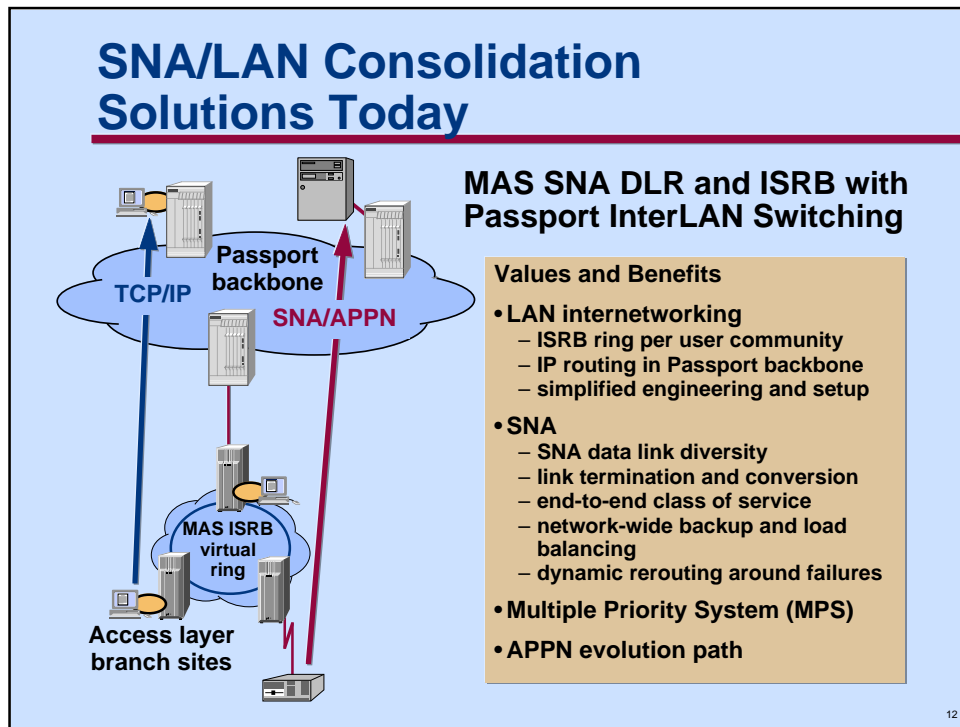
Magellan's DPN-100 and Magellan Access Switch-based SNA data link routing and ISRB token ring LAN switching services in conjunction with Passport InterLAN Switching are excellent solutions for consolidating both LAN and SNA traffic, while at the same time maintaining the unique and valuable characteristics of each traffic type.

The ISRB bridge/router feature overcomes the limitations of traditional bridges. It dynamically interconnects token ring LANs by creating a virtual ring between user groups at the branch layer of the network. Unlike traditional bridges, which do not provide traffic and flow control functions, ISRB provides filtering to limit broadcasts and a CIR/EIR capability that ensures that bursty traffic doesn't interfere with SNA class of service. ISRB doesn't have the same level of complexity of routing, hence it can be easily engineered, configured and set up. LAN IP traffic can be routed over ISRB directly to a regional Passport where Passport backbone IP routing carries the traffic across the network.

Magellan's proven SNA data link routing service (SNA TRPAD, XPAD) on DPN-100 and Magellan Access Switch provides "best-in-class" SNA support. At the branch, link consolidation combines multiple access devices with different link types and speeds to a single outgoing link, cutting costs and increasing efficiency by pooling network bandwidth and allocating it to applications that need it. With dynamic routing, a Magellan network will automatically re-route traffic around network failures, with an alternate route chosen based on the class of service of the traffic. User sessions are not disrupted nor is subsequent performance affected.

Multiple Priority System (MPS) ensures that expected performance levels are met. Classes of Service are based on traffic needs and this information is attached to an SNA frame as it enters the WAN so that intermediate nodes can quickly identify and meet class of service requirements.

Passport APPN network node provides an evolution path to APPN without impacting the installed DPN-100 and Magellan Access Switch base.
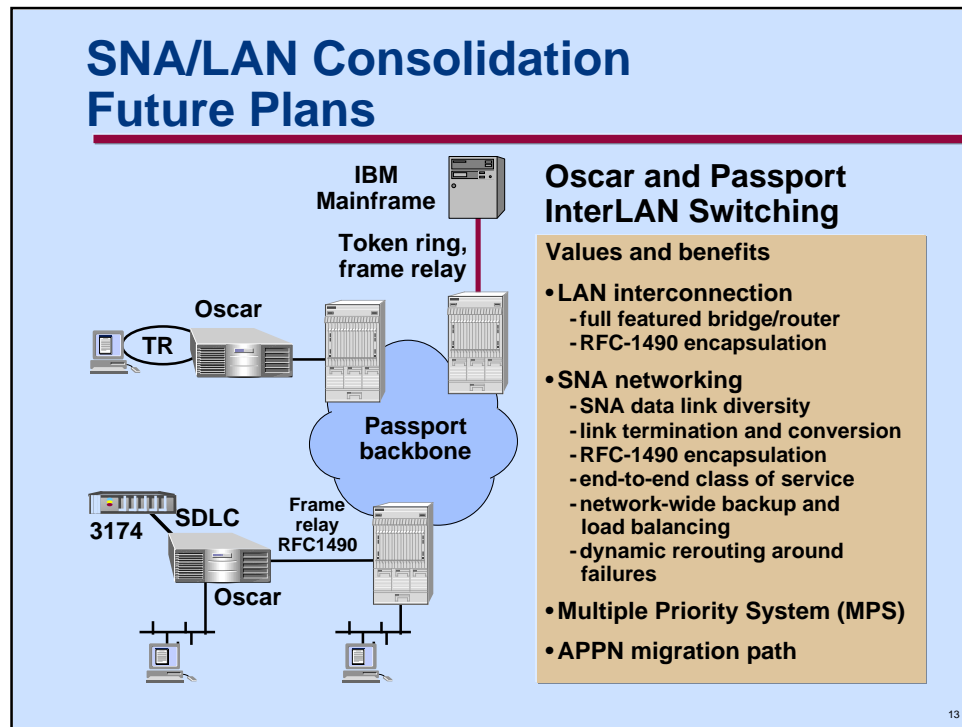
Future Magellan plans include the introduction of Oscar, a multimedia access device that supports both SNA and LAN traffic. More details of Oscar will be discussed later in this presentation.

Oscar provides for a frame relay standards-based means of integrating terminal-host and client server traffic by multiplexing protocols over a common wide area link. IBM's endorsement of frame relay as a native SNA data link validates this methodology of SNA transport. Standards for multiplexing different protocols over frame relay, i.e. RFC 1490, promise vendor interoperability. IBM has developed and promoted RFC 1490 extension boundary access node (BAN) allowing direct frame relay connectivity to a FEP (front end processor).

Oscar can provide branch access to Passport's APPN, DLUr (dependent logical unit requester) and SNA services by locally terminating LLC2 and SDLC traffic for transport over frame relay. While Oscar provides the branch connectivity, Passport provides high-performance, high-availability connections to multiple hosts. SNA/APPN traffic will be carried over Passport using RFC-1490 BAN to allow direct connection to IBM hosts using frame relay or token ring connected directly to Passport.

Oscar will support either a direct token ring or an ethernet LAN connection and will support full routing of LAN protocols including IP, IPX, Appletalk and Decnet. Passport and Oscar both support IP and IPX encapsulation over RFC 1490, OSPF and RIP, so interworking over the frame relay WAN connection is possible.

Remote LAN and Internet Access Challenges

- **End-user need for Internet on-ramp**
  - global electronic mail
  - business marketing and promotion tool
  - information
  - entertainment

- **Need to connect mobile workforces to corporate networks**
  - corporate communications
  - business databases, applications

- **Support for telecommuting**
 - work-at-home
  - productivity gains

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Staying competitive in today's business environment means finding not only new products and services to offer, but also new ways to sell existing products. This need has driven the rapid acceptance of the Internet as a business tool, a place where corporations can promote themselves and their products. The Internet also enables many new services in such areas as communications, information and entertainment. Explosive growth in the number of connected hosts is expected to continue as Internet service providers create dial-up access to these services for both business and home use.

With the current focus on global markets and emphasis on customer service, corporate workforces are becoming increasingly mobile. These workforces must have access to corporate information and applications and be able to communicate effectively while away from the office. Remote LAN access is becoming a vital business tool to permit efficiency and productivity of the mobile user.

Telecommuting is becoming extremely popular as corporations strive to improve employee productivity and work environment as well as minimize office costs. Telecommuting also has the potential to improve quality of life for many people as travelling time to and from the office is eliminated, commuter traffic may be reduced, and work hours may be more flexible. The telecommuter may be part-time (accessing the corporate network in the evenings or on weekends) or full-time, but the requirements are similar—the telecommuter needs access to the corporate LAN and all information and applications available at the office.

How to support these needs is the challenge that network providers face today.
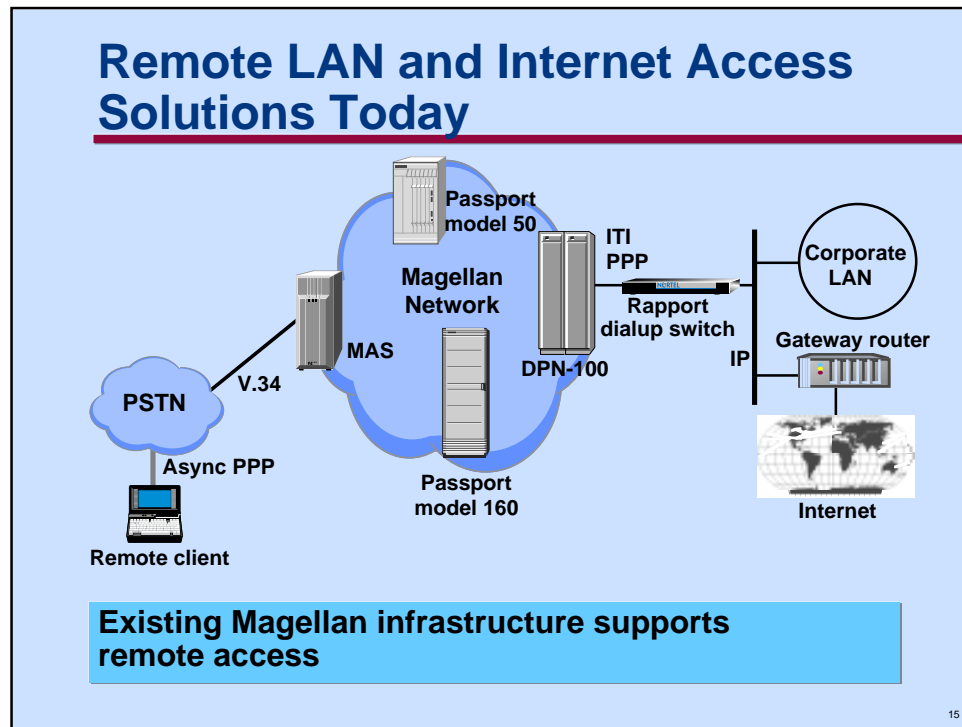
The diagram above shows how an existing DPN-100 and Passport infrastructure may be used to provide a solution to emerging needs for remote access to corporate LANs or the Internet.

The remote client (for example, a telecommuter working at home) connects to the DPN-100 network through the public switched telephone network, sending async PPP traffic through to a Magellan Access Switch or DPN-100 access module equipped with the MI-8 Integrated Modem PI (or via V.24 PIs and external modem) running the ITI service. This traffic is then sent through a DPN-100 or Passport backbone on to a Rapport dialup switch, which in turn connects into the corporate LAN or into a gateway router to the Internet.

This solution currently operates by capturing async PPP traffic entering the Magellan network and forwarding this traffic to the remote access server via ITI. An enhanced capability will be available in 4Q96 to deliver this traffic via DPN-100/MAS async PPP PAD. PPP PAD is designed to optimize the flow of PPP traffic through the DPN-100 network. For further details on PPP PAD, please refer to Steve Lappan's workshop: "DPN-100 Update: Evolving to Meet Customer Needs".

For existing Magellan customers, with a distributed access network based on DPN-100 or Magellan Access Switch modules, this approach provides a quick and effective way to deliver remote LAN access services with minimal new investment. It can be implemented with the Rapport dialup switch or other remote access server, providing immediate service and benefits to the corporation or service provider, and providing a clear evolution path for new applications and requirements. The solution also takes advantage of existing Magellan network benefits and capabilities, such as high-reliability, security, network user IDs and hunt groups.

Remote access traffic can be supported in the Magellan network without impacting existing network operations, and can be managed through existing network management systems.

Remote LAN and Internet Access Future Plans

Passport/Rapport dialup switch solution for high performance requirements
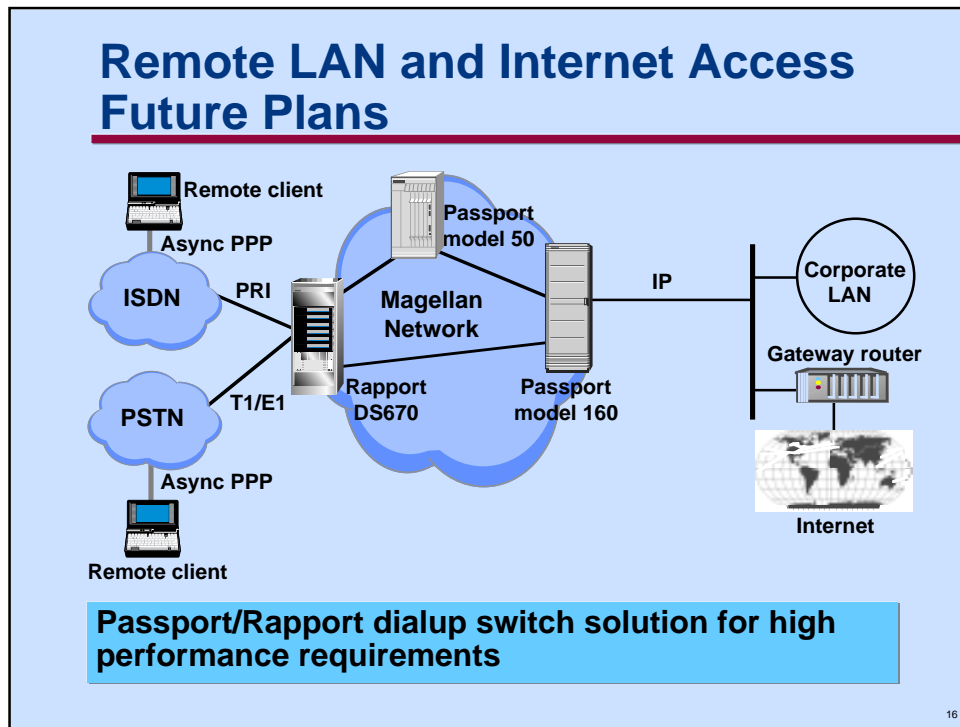
Magellan in conjunction with Nortel's Rapport dialup switch product line, is developing enhanced solutions for corporate LAN or Internet access. These solutions will be of most interest for supporting end-users who demand high-speed application support. The approach utilizes the Rapport dialup switch model 670 to access a Passport backbone network.

The Rapport dialup switch connects either through T1/E1 to the PSTN or through a primary rate interface to the ISDN network to concentrate dial-in traffic from multiple remote clients. This traffic is then sent through the network and then out to the corporate LAN or gateway router which is directly connected to Passport.

For more details on the Rapport dialup switch and Internet access solutions refer to Peter Brockmann's workshop entitled "Advanced Internet Solutions."

Multimedia Network Consolidation Challenges

- **Demand for solutions that support new applications and services**
  - multimedia kiosks for financial services
  - telecommuting and telework
  - high-performance access to global information sources

- **Demand for improved overall network economics**
  - bandwidth utilization
  - network consolidation
  - efficient use of scarce skilled resources

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The ability to cost-effectively integrate applications at the branch level and enable emerging services is the opportunity which will allow corporations to gain a competitive advantage. As enterprises globalize and grow leaner and more competitive, the implementation of new applications and services (eg. retailing through multimedia kiosks, video-based banking, telecommuting and telework, remote health care and distance learning) at the branch level will be key to business success. The challenge of network providers is to deliver the solutions that enable these services to be efficiently deployed.

The equal and unrelenting demand is to drive overall networking costs down. Networking solutions that optimize use of financial and people resources are critical. Improvements in capital costs, bandwidth utilization, networking facilities, installation, operation and maintenance of networks are equally important.

Magellan is focusing on delivering solutions to address these challenges.

Multimedia Network Consolidation Solutions Today

Magellan Access Integrator with Passport backbone
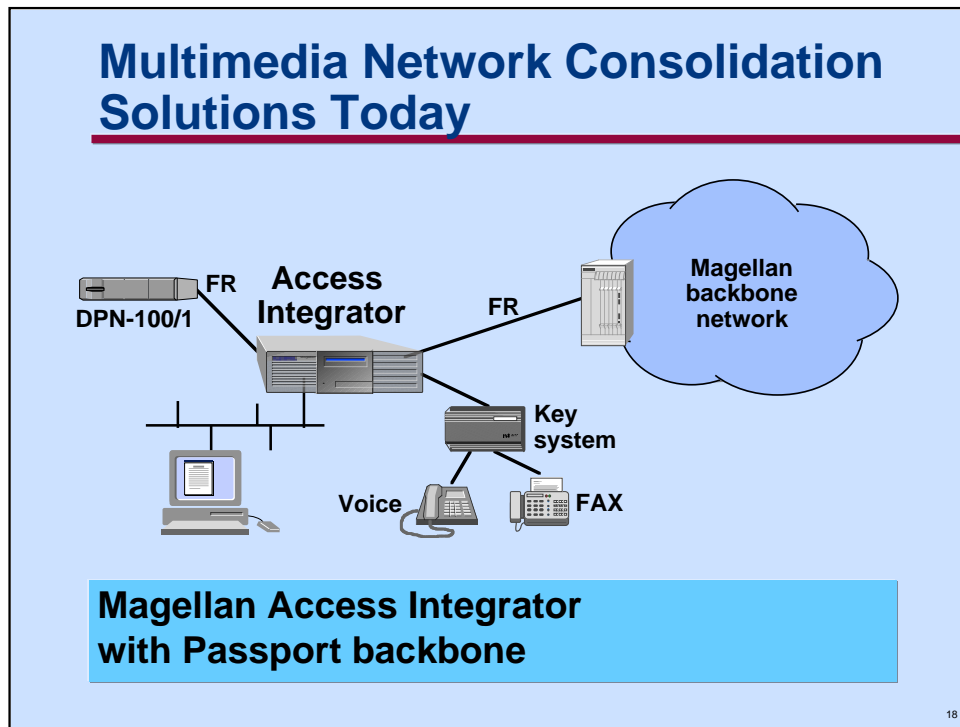
Nortel is pleased to introduce the newest member of its access family, the Magellan Access Integrator, which will be branded, sold and fully supported by Nortel through a distributorship agreement with a leading access vendor. Access Integrator brings the benefits of consolidating data, voice, fax and LAN traffic to networks using low cost n* 56/64 kbit/s services while reducing overall networking costs.

Magellan Access Integrator connects to a Magellan backbone over Passport frame relay connections. A Magellan solution with Magellan Access Integrator and Passport provides the following benefits:

Consolidation of traffic - Magellan Access Integrator provides access consolidation for branch requirements including voice, fax, LAN, and data services.

Bandwidth savings - Communications costs are reduced by using a single network link to the network for all the branch traffic. Further bandwidth savings are achieved by voice and data compression, fax demodulation and optimized LAN access protocols.

Standards-based - The Magellan Access Integrator connects to Passport over standard frame relay connections and makes use of SNMP, G.729 ACELP voice compression and LAN routing protocols.

Multimedia Network Consolidation Future Plans
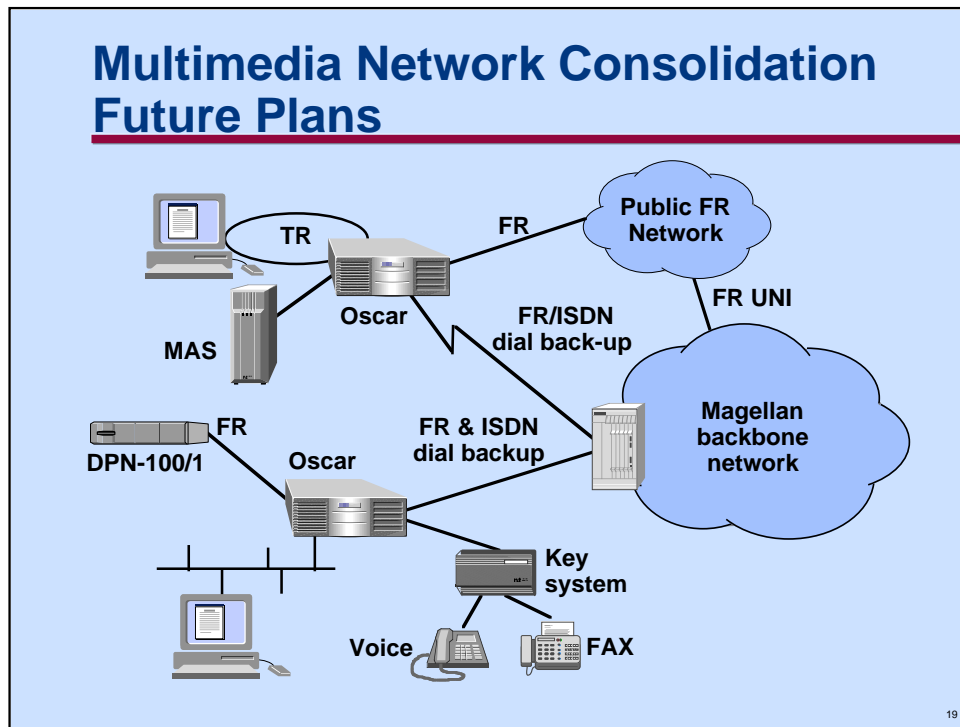
Nortel is working to provide enhanced solutions to address multimedia network consolidation requirements at the access layer of the network. Oscar is the project name for a new Magellan access product currently under development.

Oscar is optimized for branch applications requiring multiple traffic types, including LAN, voice, fax, and SNA/X.25/async data. The design of Oscar is flexible and provides for throughput upgrade options to support a T1 or E1 network link. The network link connection could be any speed from 56/64 kbit/s to T1/E1, with fractional T1/E1 supported in countries where such a service is offered.

All network links from Oscars to a regional Passport use frame relay with SVCs as the end-to-end transport protocol. A frame interrupt (frame/cell) capability is used to give priority to the delay-sensitive traffic such as voice and provides superior segmentation and delay characteristics for the multimedia traffic. Network links terminate on Passport T1/E1c functional processors (FPs), or V.35 FPs.

Oscar supports a single active network link connection. Upon failure of this single link Oscar will automatically re-dial a connection through the public switched telephone network (ISDN) to a homing Passport node. All services, including voice and fax, will be supported over the backup ISDN connection.

Oscar will be fully manageable by Magellan NMS to ensure common management elements and values as are available with Passport.

Multimedia Network Consolidation
Magellan Solution Values

Oscar provides high-value branch access for Passport networks

- **Consolidation of traffic**
- **Bandwidth savings**
- **Scalable**
- **Low-cost operation**
- **Integrated management**
- **Future proof architecture**

Extends Passport values to the branch

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Consolidation of traffic - Oscar provides access consolidation for branch requirements including voice, fax, video, LAN, SNA and data services. Passport traffic management and Multiple Priority System (MPS) extended to the branch, combined with a fault-tolerant Oscar design provides a reliable platform for the mission-critical multimedia branch applications.

Bandwidth savings - In addition to using a single network link from Oscar to the network for all the branch traffic, bandwidth savings are achieved by state-of-the-art voice and data compression, fax demodulation and optimized LAN access protocols.

Scalable - Oscar can be implemented cost-effectively in the access layer of a Passport network in quantities from tens to thousands.

Low cost operation - Oscar networking is based on switched virtual connections (SVCs) avoiding a large number of provisioned connections. Oscar makes best use of low-cost facilities including ISDN and public frame relay services. Remote management and configuration, dual software images and installation simplicity help minimize operational costs.

Integrated Magellan management - Distributed and scalable management from Magellan NMS extends the values offered in managing Passport and DPN-100 networks right down to the branch level. This allows effective provision of managed access services including VPNs.
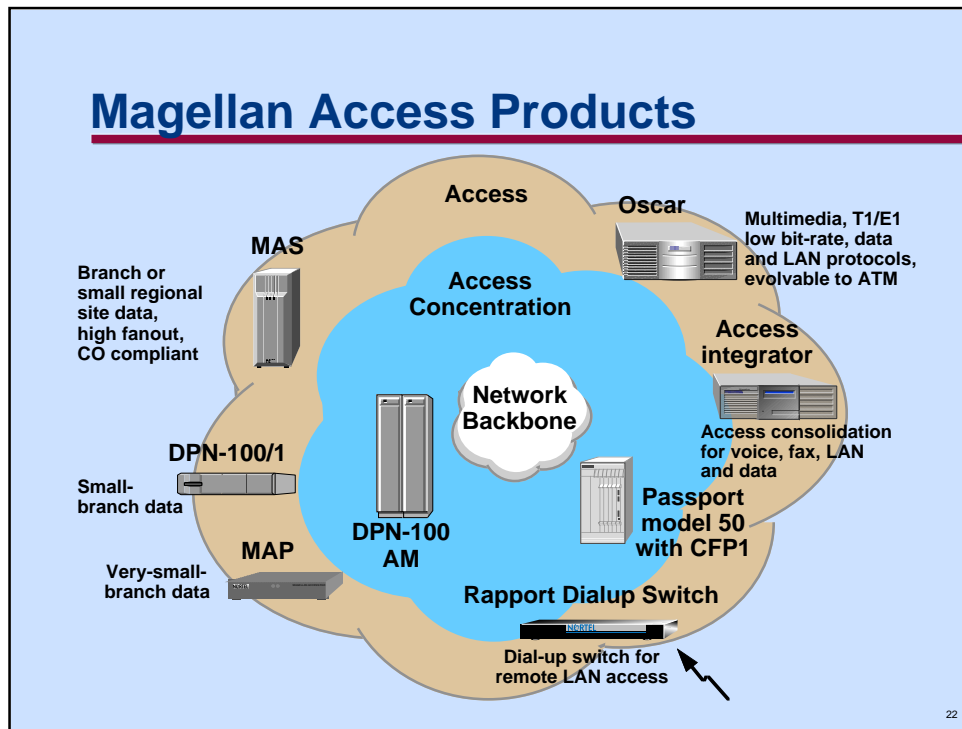
Future proof architecture - Oscar is much more than an access device for the current networking environment. Oscar is a platform specifically architected for future access requirements including ATM branch consolidation. Use of standards for voice and data networking, network management as well as an open development environment will allow fast time-to-market for new Oscar features.

Agenda

- • Access Market Evolution

- • Magellan Access Solutions

- • **Magellan's Access Products**

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The previous section examined several network solutions which highlighted specific Magellan products. This portion of the workshop will review the complete access product line-up, and discuss the specific applications and environments to which each product is best-suited.

Magellan Access Products

- Access
- Oscar — Multimedia, T1/E1 low bit-rate, data and LAN protocols, evolvable to ATM
- MAS — Branch or small regional site data, high fanout, CO compliant
- Access Concentration
- Access integrator — Access consolidation for voice, fax, LAN and data
- Network Backbone
- DPN-100/1 — Small-branch data
- DPN-100 AM
- Passport model 50 with CFP1
- MAP — Very-small-branch data
- Rapport Dialup Switch — Dial-up switch for remote LAN access

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Nortel has a range of products to meet different needs. This product line breadth provides the flexibility to mix and match products in either a service provider or enterprise environment, in order to provide an optimum solution for a diversity of network access needs. The following pages will discuss the individual elements of the access portfolio in detail.

Magellan Access PAD (MAP)

MAP

Available now

Global deployment: 300 units

NEW

- **Very-small-branch device for FR/SNA/X.25/async services**
- **Remote manageability and software download capability**
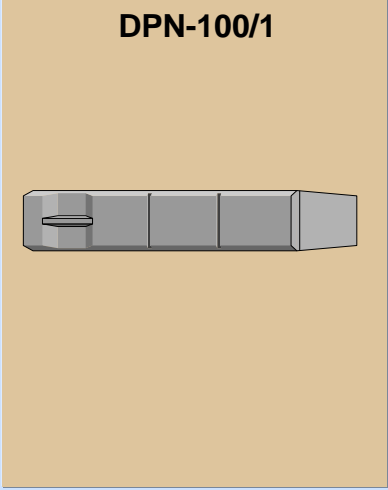- **Supports up to five ports**

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The Magellan Access PAD, or MAP, is a small access module in the Magellan family which offers switching capability at a competitive price. MAP is generally available and more than 300 units have been deployed to date.

MAP is functionally similar to the DPN-100/1 and is intended for sites requiring up to four access ports for frame relay/SNA/X.25/async protocols plus a single WAN netlink at speeds up to 64 kbit/s. It has frame relay access capability and can be used as a concentrator, for general access to a packet-switched network, or as a protocol converter—retaining the same capabilities of the original DPN-100/1 at a lower price entry point.

MAP is a fully integrated Magellan module supported by the Magellan network management system (NMS) platform. Configuration and remote software downloads can be managed from a central location.

The Magellan Access PAD is well suited to the requirements of retail outlets, banks, or any other small remote site requiring relatively low-speed data network access at a competitive price.

DPN-100/1

DPN-100/1

Global deployment: 14000+ units

• **Branch and remote access concentration device for FR/SNA/X.25/async services**

• **Remote manageability and software download capability**

• **Supports up to ten ports**

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The DPN-100/1 is the most widely deployed Magellan platform ever, with over 14,000 units shipped worldwide as of March 1996. It can be used to cost-effectively extend the reach of the DPN-100 network into smaller branch locations which have requirements for up to nine ports of FR/SNA/X.25/async protocols. It can be used as a concentrator, an access device for general access to a packet-switched network, or as a protocol converter. The DPN-100/1 is intended for use on customer premises and is equipped for desktop mounting.

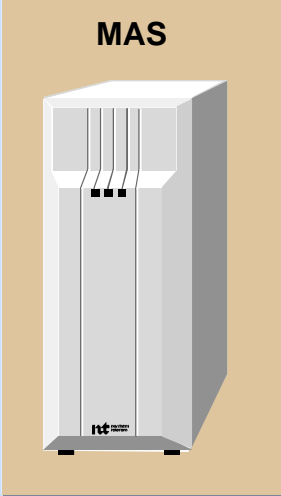The DPN-100/1 offers the following network and access ports:

- one V.35 port and nine V.24 ports, or
- two X.21 ports and eight V.24 ports

and supports frame relay, universal trunking protocol (UTP), X.25, X.25 Gateway, ITI, X.32, SNA, UTP dial backup links and bandwidth on demand.

The unit can be completely managed remotely via Magellan network management system (NMS), so there is no need for technically trained staff on site.

A cartridge using 'FLASH' technology was introduced in 1995 and has proven to be very popular with customers. This cartridge permits software download capability which allows timely delivery of new software features and upgrades.

Magellan Access Switch (MAS)

MAS

Global deployment:
12,000+ units

• **Branch and small regional site concentration for FR/SNA/X.25/async services**

• **Integrated modems**

• **High performance PE and T1/E1 connectivity**

• **Drop and insert for PBX/WAN integration**

• **Supports up to 32 ports**

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The Magellan Access Switch (MAS) provides efficient, reliable access termination, concentration and local data switching for both private and public applications. Installed in over 12,000 locations around the globe, MAS offers "best-in-class" multi-protocol support for a rich suite of traditional protocols and interfaces. MAS is well-suited to data consolidation applications which require support for traditional "mission-critical" protocols.

MAS performs mixed protocol switching and permits an efficient use of bandwidth over existing low-speed links to reduce overall branch networking costs. It is fully integrated into Magellan Passport and DPN-100 networks.
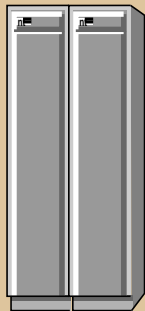
MAS supports up to 32 ports and is suitable for use in a central office environment. The Magellan Access Switch is suited for mission-critical applications with 99.998% availability and dial-backup network link capability.

The high performance processing element (HPPE) is now available for MAS; it is introduced as an alternative to the PE386 for customer applications with high- performance requirements. HPPE on MAS reduces CPU utilization resulting in approximately double the throughput for those configurations which had been bound by CPU utilization with PE386.

MAS also supports the enhanced primary rate PI (EPR PI), allowing direct T1/E1 connectivity to the MAS with either PE386 or HPPE. The EPR PI drop and insert capability permits T1/E1 bandwidth not used by the network link to be used by external equipment, such as a PBX, resulting in bandwidth/facilities savings.

The MI-8 integrated modem PI is now available for MAS, permitting integration of modem pools at the branch or central office location and providing a compact, integrated, managed solution with reduced cost and footprint.

DPN-100

DPN-100

Global deployment:
15,000+ DPN-100 shelves

- **Market-leading packet switching technology**

- **Support for rich suite of protocols**

- **High-reliability and availability for mission-critical applications**

- **High-fanout data consolidation for reduced facilities cost**

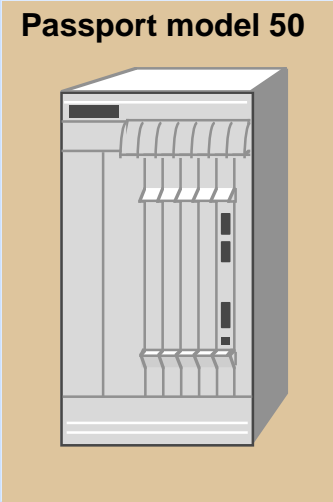- **Ongoing performance and application evolution**

26

The Magellan DPN-100 product line is a proven data networking system, providing organizations worldwide with affordable, highly-reliable packet and frame switching. Access modules (AMs) are the high-fanout interface between user access lines and the DPN-100 network, providing access protocol support, data concentration, local switching and virtual circuit control.

The DPN-100 AM is scalable—for example, two AM shelves can provide up to 200 access ports. Additional shelves may be added as required.

The DPN-100 platform is continuously being evolved to support the expanding performance and access needs of our customers. The high performance processing element (HPPE) and enhanced primary rate PIs for both T1 and E1 have been introduced to address customers' requirements for greater speed, more bandwidth and more effective use of facilities and equipment. Another recent enhancement to the platform is the MI-8 integrated modem PI which permits integration of modem pools at the branch or central office location—providing a compact, integrated, managed solution with reduced cost and footprint.

Passport model 50

Passport model 50

Global deployment: 500+

- **Passport model 50 for regional site concentration**

- **Passport model 50 with CFP1 for small regional and large branch sites (1Q97)**

- **Frame/cell-based flexible architecture**

- **Dynamic bandwidth management**

- **Graceful technology evolution**

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The Passport model 50 is a frame/cell-based switch designed to facilitate network consolidation in the enterprise and to facilitate the delivery of multiple services by service providers. It provides all the Passport capabilities in a smaller package supporting up to 32 ports, suitable for regional or large branch network sites.
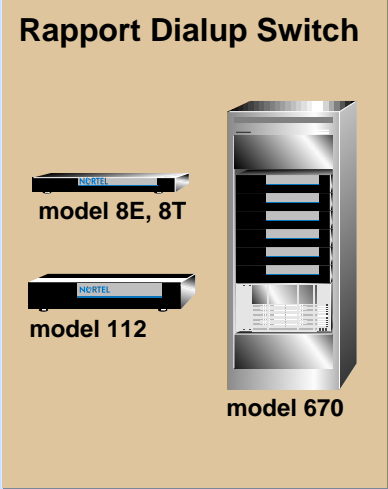
Passport architecture is designed for flexible response to a variety of traffic types. Its ability to switch frame- and cell-based traffic means that Passport can accommodate both traditional and LAN data, voice, and video, as well as ATM.

Dynamic bandwidth management provides the ability to manage different traffic types and allocate costly network resources based on application needs and business priorities, resulting in significant reductions in bandwidth consumption.

Further scalability of the Passport model 50 will be available in 1Q97 with the introduction of the control/functional processor type 1 (CFP1). The CFP1 is a single pack which combines the functions of multiple control and function processor packs, resulting in a lower price per port configuration of Passport model 50. The CFP1 provides complete interoperability of services and has an identical provisioning and operations interface.

For more information on the Passport model 50 and CFP1, please refer to David Hudson's presentation entitled "Passport Update".

The Rapport dialup switches extend the functionality of the remote access server into a high-performance, highly-scalable implementation which is suitable for major enterprise and service providers. The Rapport dialup switch provides a solution to meet the needs for both Internet access (for home, university, or research center) and enterprise remote access to corporate LANs (for mobile requirements, remote work center, or telecommuting).

The Rapport dialup switch portfolio is scalable, allowing smooth growth from eight to 672 simultaneous dialup users. The Rapport dialup switch can support high-performance data compression, header compression and other techniques that assure high levels of end-user satisfaction. A number of network-based access control options help protect against access by hackers and unauthorized personnel. The Rapport dialup switch supports SNMP-based management, allowing dialup switches and other network modules to be managed as an integrated system.

Access Integrator

**Magellan
Access Integrator**

Availability 2Q96

NEW

• **Multimedia access integrator**

• **Voice, fax, LAN and data
   consolidation**

• **Bandwidth consolidation through:**
   – **speech compression
      and silence suppression**
   – **automatic fax demodulation**
   – **data compression**

• **Range of solutions and options
   to meet different needs**

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The Magellan Access Integrator, described earlier, is the newest Magellan access product. Magellan Access Integrator provides immediate multimedia access solutions to enable new service offerings and bandwidth savings.

Magellan Access Family

Is the network requirement for: **Data**   or   **Multimedia**

Is the traffic type:
FR/SNA/X.25/async   **LAN/SNA**   **Remote LAN**

Fanout requirements:
Low   **High**

Oscar

Rapport Dial-up Switch

Oscar

Are the speed/fanout requirements:
Low ←→ **High**

Access Integrator

Passport model 50 with CFP1

MAP   **DPN-100/1**   **MAS**   **DPN-100**

Flexibility to choose the best solution

30
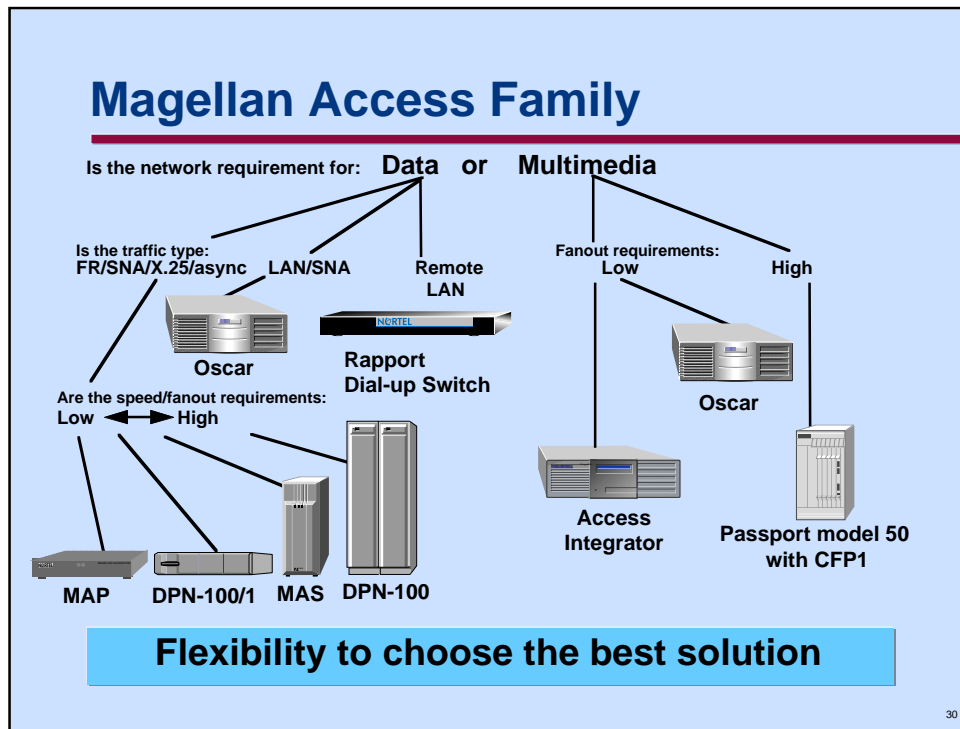
The Magellan access family has a wide range of products to suit diverse network requirements. This product breadth gives customers the flexibility to choose the solution most appropriate to their specific needs.

Summary

☑ **Magellan extends the values and benefits of backbone network consolidation to the access layer**

☑ **Magellan solutions focused on customer values**

☑ **Proven solutions for wide range of access requirements**

☑ **Flexibility to choose the best solution**

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The Magellan access family provides the flexibility to mix and match products to achieve the optimum solution for a diversity of network access needs. Nortel is committed to building upon its proven successes in addressing these requirements through evolution of its product portfolio for both data and multimedia access needs.

We will continue to work to provide solutions to branch and remote access requirements as part of end-to-end network solutions to help our customers achieve business success.

For additional information, the following sessions are recommended:

Workshops:

DPN-100 Update: Evolving to Meet Customer Needs   Steve Lappan

Multimedia Branch Access Solutions   Richard Mayer

Advanced Internet Solutions   Peter Brockmann

Magellan LAN Interconnection Products for the Enterprise   Tony Kourlas

Passport Update   David Hudson

Other:

Demonstrations   Demonstration Center

Magellan Access Solutions   Whiteboard Clinic