Multimedia Branch Access Solutions

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This workshop is the most technically detailed workshop dealing with the multimedia branch access products currently under development with the project name "Oscar". The presentation will describe the branch access environment and requirements for both service providers and enterprise networks. It will then discuss the Oscar products position within the Magellan family, details about features, functions, and availability, and some history of the project. This workshop will be of most use to network planners and product managers to understand how to use Oscar products in the access layer of Magellan networks and the values and benefits of such a solution.

About the presenter:

Richard Mayer graduated from Carleton University in Ottawa with a degree in Computer Systems Engineering. In 1984 he joined the Data Networks group of Nortel in technical support and operations activities. From 1988 to 1993, Richard was with the European Magellan organization in Frankfurt, Germany, in various positions involving product management, technical support, marketing and sales. In 1994, Richard returned to the Magellan product management group in Ottawa in a business development role, focusing on various Magellan and DPN-100 issues including opportunities in wireless networks. Currently Richard is the product manager for the multimedia branch access products featured in this workshop.

Agenda

- **Defining Multimedia Access**
- **Multimedia Access in the Magellan Portfolio**
- **Oscar Platform and Services Description**
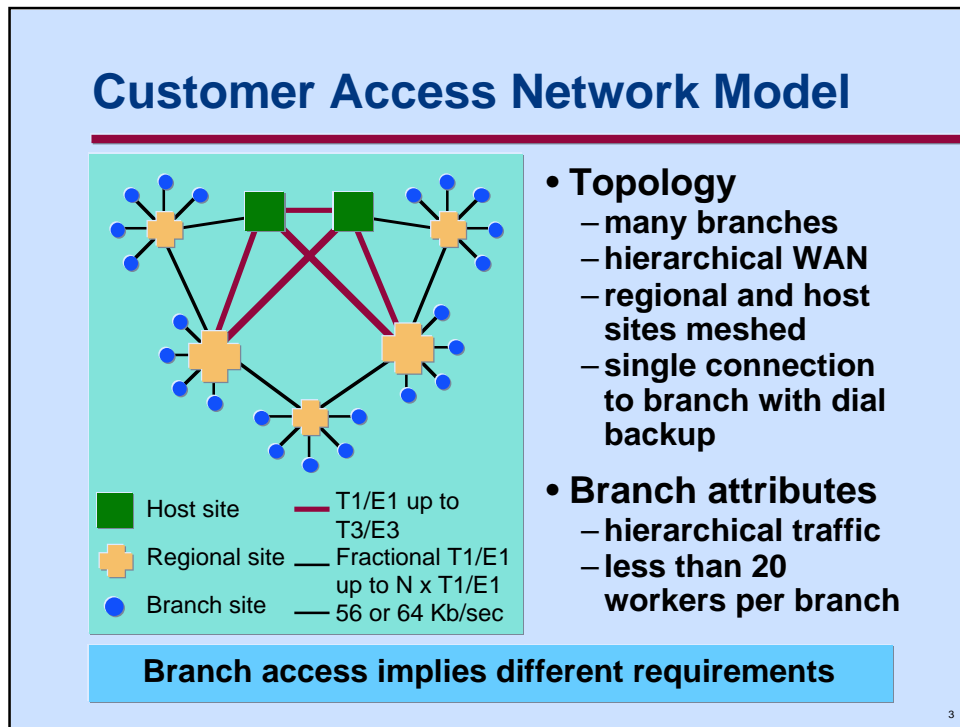- **Rollout**
- **Telefónica Presentation**

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This presentation will begin by defining multimedia access, the network model often found in branch environments, and the requirements associated with multimedia branch access consolidation. This will be followed by the strategy for Magellan multimedia branch access products for the optimal solution.

The next section of the presentation will discuss how multimedia access products fit in the Magellan portfolio and describe in detail the products under the project name Oscar including the features and services supported. The various branch applications and how Oscar can help provide solutions will be described together with the networking values offered.

Finally the schedule of Oscar availability will be presented.

Additionally, Rosa Bragado, of Telefónica, will talk briefly about plans and experiences with multimedia access and the cooperation on the Oscar project as a lead customer.

Finally there will be an opportunity for questions and discussion. If our time runs out, or there are additional questions or comments, please feel free to contact me at the e-mail address or telephone number provided on the cover page of this presentation.

Customer Access Network Model

- **Topology**
  - **many branches**
  - **hierarchical WAN**
  - **regional and host sites meshed**
  - **single connection to branch with dial backup**

- **Branch attributes**
  - **hierarchical traffic**
  - **less than 20 workers per branch**

|		
■ Host site	—	T1/E1 up to T3/E3
✚ Regional site	—	Fractional T1/E1 up to N x T1/E1
● Branch site	—	56 or 64 Kb/sec

Branch access implies different requirements

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When looking at the access layer of a multimedia network, there are some generalities to consider including some differences from the model that we often see with Passport or DPN-100 networks:

From the topology aspect, there typically are many more branches than regional or central sites in the network. Up to 90% of the sites in the network topology can be branch sites. The connectivity and traffic flow in such a network are usually hierarchical in nature, ie. branches are connected to the regional sites and communicate mainly with the directly connected regional site or to one or two central (typically host computer) sites. The traffic to other regional sites is less, and the traffic to other branch locations may be minimal, although peer-to-peer traffic may increase in the future with new applications such as video conferencing.

Whereas the regional sites and central sites are normally connected in a mesh topology for highest reliability, network connections to the branch are also typically different. Usually it is not economically feasible to have multiple connections to the branch, so the branch 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. With the tariffs and speeds offered by ISDN basic rate services in many parts of the world, ISDN plays an important role for backup strategies.

Branches also typically have less than 20 workers in a location. This also affects the number of connections and traffic volume that can be expected.

Today's Branch Environment

**Opportunities to consolidate traffic and reduce cost**
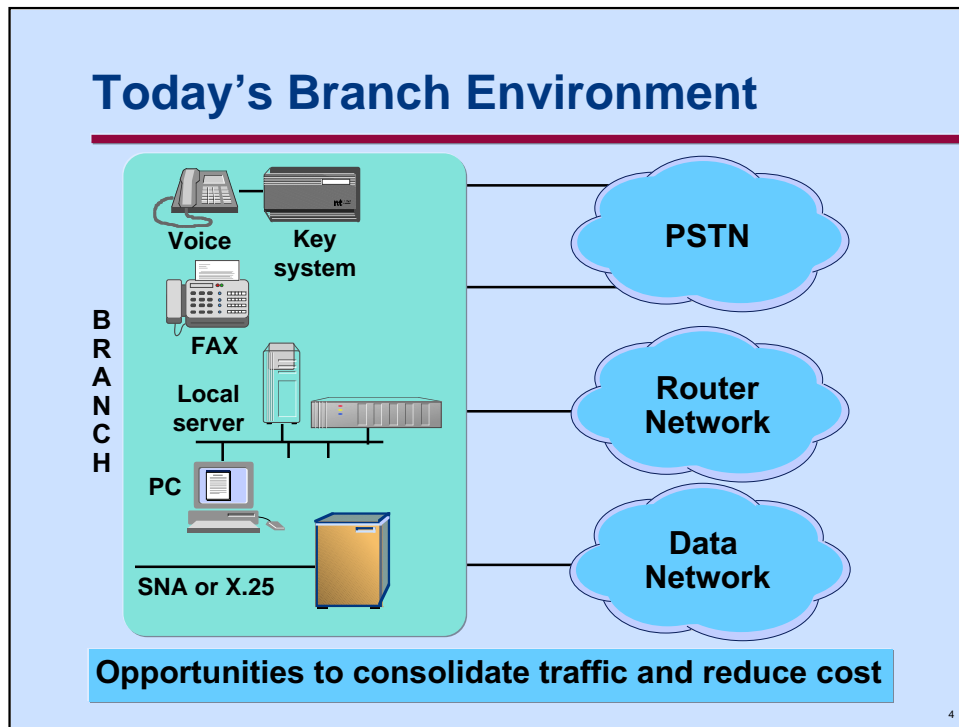
In today's branch environment, there are various types of traffic and services available. There are several reasons why consolidation of these traffic types may not have taken place and separate facilities and networks are used for each type:

Often data networks and voice networks have been built up by different organizations in the enterprise over different time frames. As LAN internetworking became an issue, often a router network with its own sets of facilities was built up in addition to the voice and data infrastructures.

Access products for various types of services have also developed over time with their own dynamics and market momentum. There are products which fill the needs of **data access**: low-end packet switches like DPN-100/1 or MAS, PADs (packet assemblers/ disassemblers) using X.25 as an infrastructure, and FRADs (frame relay access devices) using frame relay backbones; **voice access**: low-end multiplexers, using a leased line backbone, and key systems or access PBXs, which typically connect to the PSTN (Public Switched Telephone Network); and **LAN internetworking**: typically access routers.

The market for both access products and services is growing rapidly. But components of this market or service vehicles previously considered to be independent of each other are now converging into a single market segment. This is the convergence of markets for low-end packet switches, FRADs, PADs, sub T1 multiplexers and access routers. Passport has focused on and been extremely successful in network consolidation for backbone networks. What is required now is this consolidation right down to the branch.
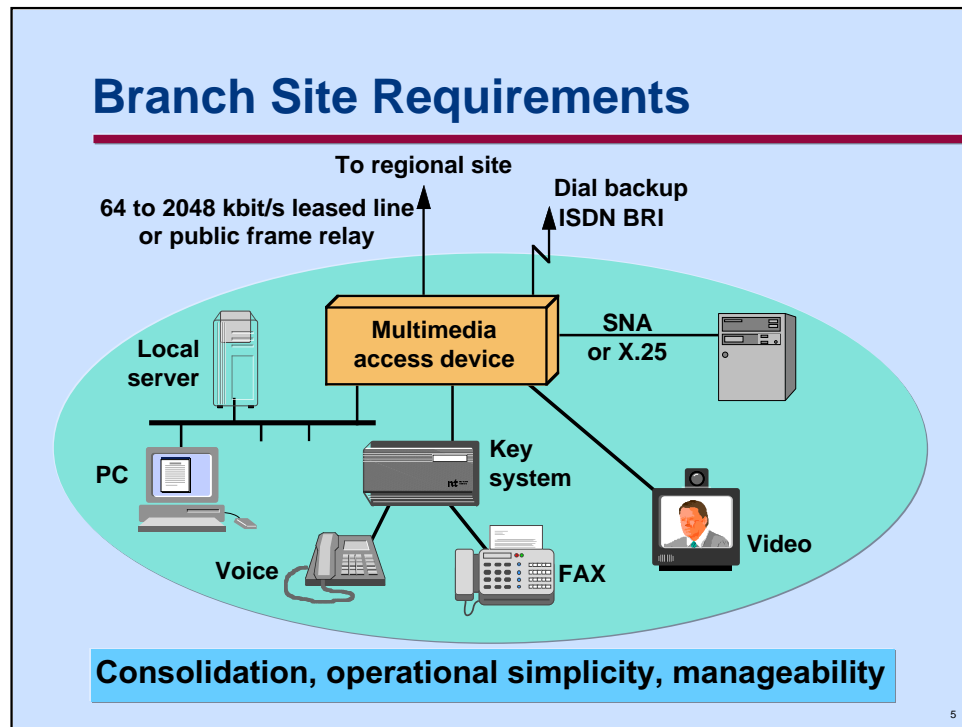
To consolidate the various traffic types at the branch level, the following features are required in a multimedia branch access device:

Services:

- Direct connection of both ethernet and token ring LANs with LAN internetworking and associated routing or preferably "access routing" mechanisms
- Both analog and digital voice interfaces with the possibility of both fax and video transportation and voice networking
- Data services such as SNA and frame relay are also required

Features:

- The device must offer traffic consolidation over a low-speed wide area link while offering an evolution path for higher speed access
- The wide area link should be leased line or using public services such as frame relay or ISDN basic rate interface (BRI)
- ISDN dial backup is required as a cost-effective reliability strategy
- The device must be SNMP-manageable and cost-effective

Technology:

- Data compression and good quality 8 kbit/s voice plus silence suppression are important to achieve the best bandwidth utilization
- Voice and data prioritization schemes are also key to quality service offerings
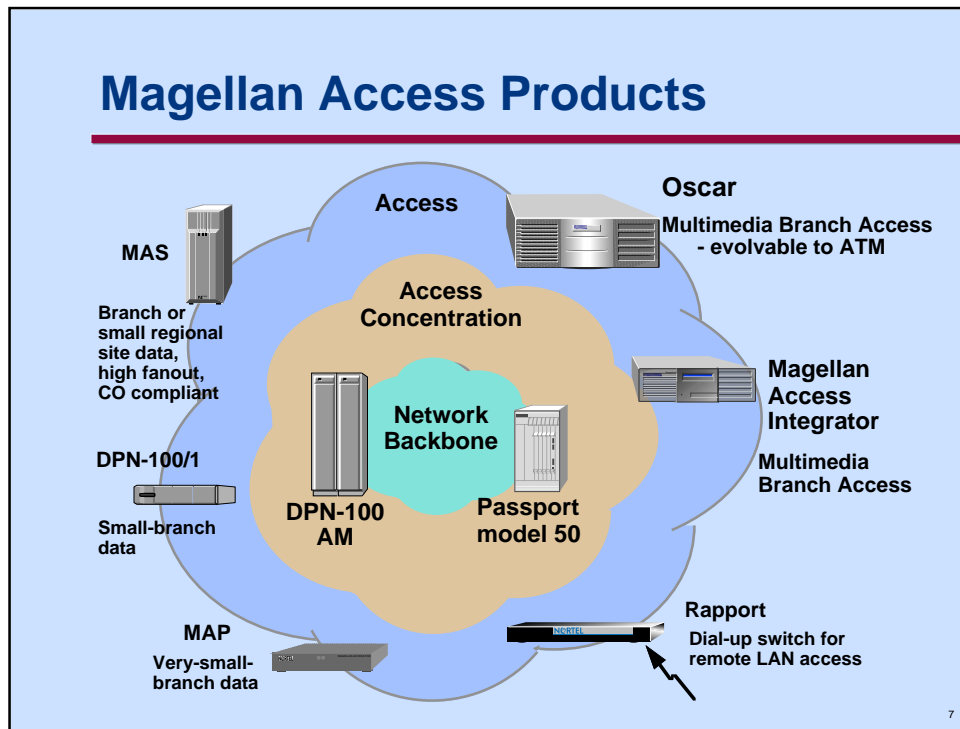- An access product that will meet todays needs and also be evolvable to ATM

Agenda

- Defining Multimedia Access

- **Multimedia Access in the Magellan Portfolio**

- Oscar Platform and Services Description

- Rollout

- Telefónica Presentation

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This section discusses the Oscar product's position within the Magellan product portfolio.

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.

Oscar fills a new position in the Magellan access portfolio and provides a platform for future access products.

Oscar is designed specifically as an access device for Passport networks. Passport has won an excellent reputation for addressing the network consolidation requirements of regional sites and for backbone networks. Oscar extends the values and services provided by Passport to the next layer in the network, namely to the branch.

Oscar relies on Passport to provide core transport and network functions. Oscar provides service adaption to allow multiple traffic types to be carried over the Passport backbone. The overall network solution relies on Passport network features such as switched virtual circuits (SVCs), closed user groups (CUGs), call redirection, hunt groups, traffic management, and the high availability and reliability of the backbone, to provide solutions for the mission-critical branch applications.

Magellan Access Integrator is a private labelled device designed to satisfy critical multimedia access needs.
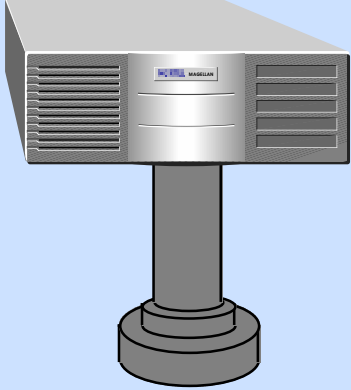
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This section details the Oscar product features and functions. Various solutions provided by Oscar are also described.

Introducing Oscar...

Oscar provides high value branch access for Passport networks

- **Consolidation of traffic**
- **Bandwidth savings**
- **Scaleable**
- **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 across a single network link. 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.

Scaleable - Oscar can be implemented cost-effectively in the access layer of a Passport network in quantities from tens to thousands benefiting from the Magellan experiences in large network implementation, management and operations.

Low cost operation - Oscar networking is based on switched virtual circuits (SVCs) avoiding a large number of provisioned connections. Oscar makes use of attractively tariffed 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 scaleable 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.
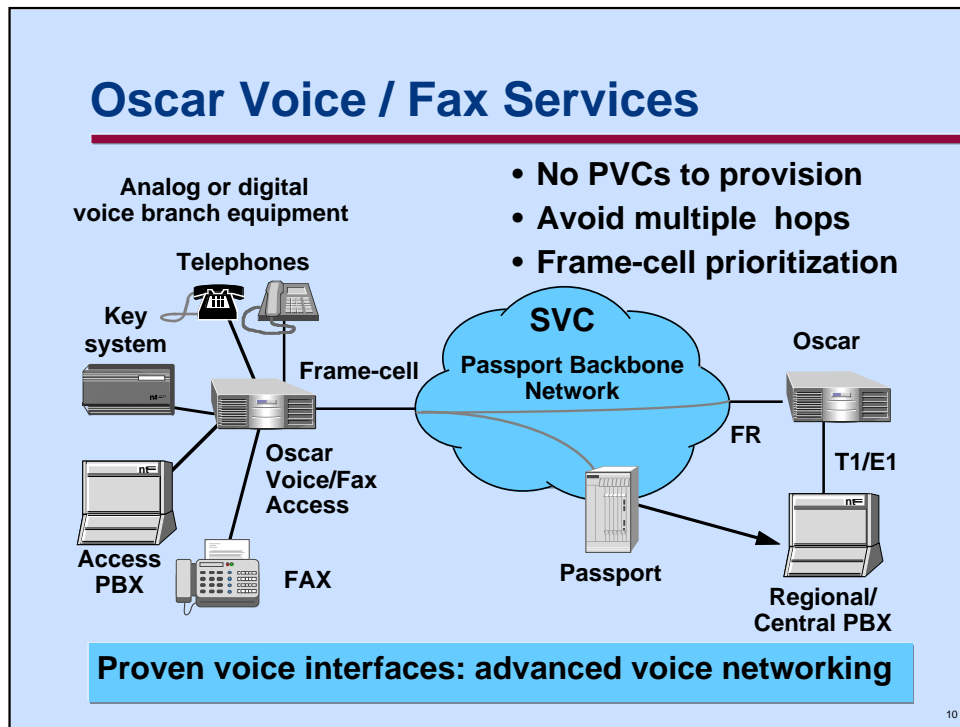
Where voice is required from the branch, Oscar supports both analog interfaces (FXO, FXS, E&M type I, II and V), or digital interfaces (BRI ISDN, T1, E1). Oscar will support BRI interfaces for branch PBX/key systems (Euro ISDN and 1.TR6).
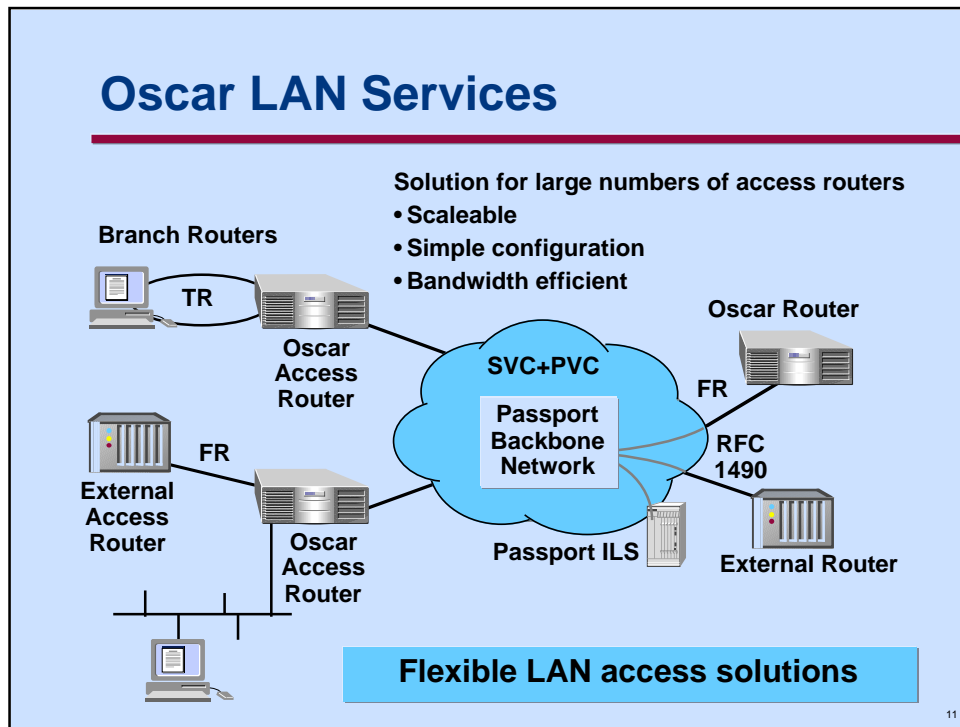
Voice compression at 8 kbit/s uses the ITU G.729 ACELP standard. This standard is becoming widely accepted in both wireless and enterprise environments because of its high voice quality and error tolerance. G.729 is a bit compatible voice compression which supports multiple compression/decompression hops better than 32 kbit/s ADPCM.

Fax demodulation will be supported at up to 9.6 kbit/s by demodulating the fax modem to baseband. Additional fax features include certain timers to allow a greater end-to-end delay or negotiating higher-speed fax modems such as a V.17 14.4 kbit/s model down to 9.6 kbit/s.

Additional voice features include echo cancellation and silence suppression. Various dial tones, ring and busy signals are also supported for country-specific conformance.

Oscar uses Passport SVCs for voice networking. This switched low bit rate architecture avoids multiple hops and their associated delays, avoids tandem PBX switching (with compression/decompression), reduces the number of central PBX voice channels required, and simplifies network operation by removing the need to configure PVCs. Hunt groups are used for reliable PBX connectivity.
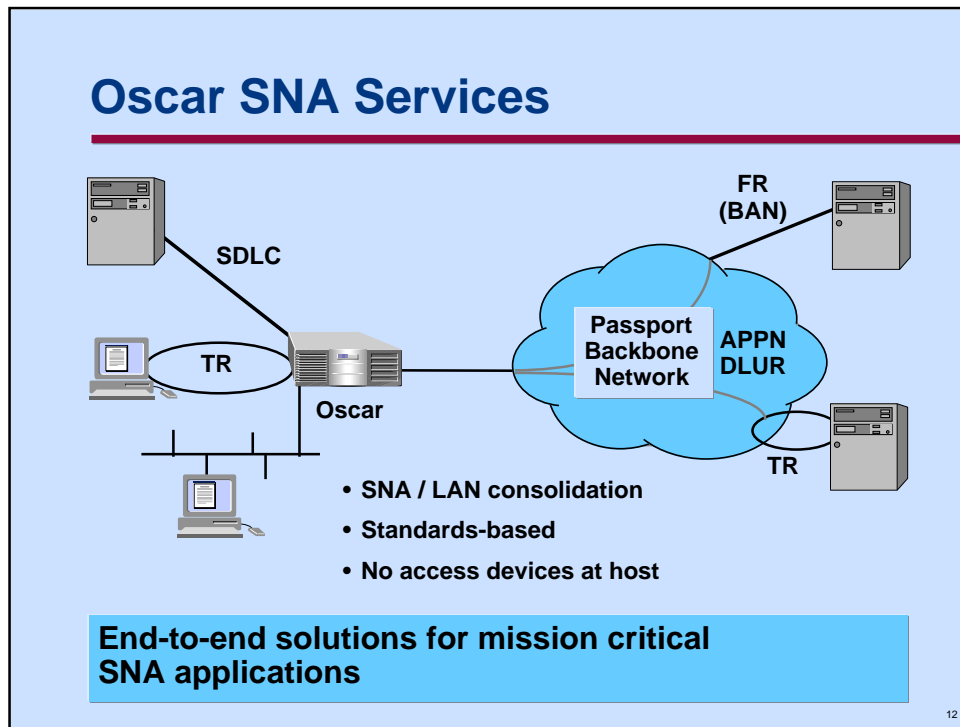
Both Passport and Oscar handle voice in a compressed packet format. Passport will support a switched voice service with Oscar interworking based on the Passport voice card evolution currently under development.

Oscar LAN Services

Solution for large numbers of access routers
- Scaleable
- Simple configuration
- Bandwidth efficient

Branch Routers

TR

Oscar Access Router

Oscar Router

SVC+PVC

FR

Passport Backbone Network

RFC 1490

FR

External Access Router

Oscar Access Router

Passport ILS

External Router

Flexible LAN access solutions

Two versions of Oscar will offer support for either a direct token ring or an ethernet LAN connection. Oscar will support full routing of LAN protocols including IP, IPX, Appletalk and Decnet for interoperability with external routers, as well as other benefits of a full routing configuration, such as redundancy. In addition Oscar will support an "access routing" protocol which is essentially a bridged protocol that recognizes IP ARP requests. After learning the destination, the protocol keeps a cache to allow local spoofing and thereby minimizes broadcasts. This access routing protocol, provides the benefits of easy branch configuration and minimizing network link utilization.

Passport InterLAN switching (ILS) is designed to be a high performance router. Passport ILS and Oscar both support IP and IPX encapsulation over RFC 1490, OSPF and RIP, so interworking over frame relay is supported. This applies also to third party routers which may already serve as backbone network routers. Existing access routers in the branch can be consolidated through Oscar using a frame relay DCE service.

The LAN access solution with Oscar is designed for scaleability, i.e. potentially thousands of access routers in the network. Therefore simplicity of configuration and operation are key values. Deciding on the access routing or full routing option will involve trade-offs of simplicity and bandwidth efficiency versus interoperability. Oscar will provide flexible implementations based on the customer environments and user requirements.

Oscar SNA Services

- SNA / LAN consolidation
- Standards-based
- No access devices at host

**End-to-end solutions for mission critical SNA applications**

Oscar builds on the successful SNA history of Magellan.

Corporations with SNA networks will want to leverage frame/cell-based technologies to cut costs, increase performance and consolidate LAN, SNA and voice networks, while building a platform for evolving multimedia applications. Corporations are replacing terminals with PCs and moving to distributed client-server platforms requiring APPC/APPN or LAN solutions or a combination of the two. The typical branch SNA applications are "mission-critical" and require a smooth evolution path which must preserve the investment in existing SNA infrastructure and SNA applications class of service requirements.

Frame relay provides for a 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 developed and promoted RFC-1490 extension BAN (Boundary Access Node) to allow direct frame relay connectivity to a FEP (Front End Processor).

Oscar can provide branch access to Passport APPN network node and DLUR (Dependent Logical Unit Requester) service by locally terminating LLC2 and SDLC traffic for transport over frame relay. While Oscar provides the branch connectivity, Passport provides high-performance, high-availability token ring connections to multiple hosts. This approach avoids having to duplicate APPN code on Oscar, and also allows customers with LU2 devices to benefit from the values associated with APPN networking. SNA 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. There is no need for an "access device" at the host site as is often the case with competitive access offerings.
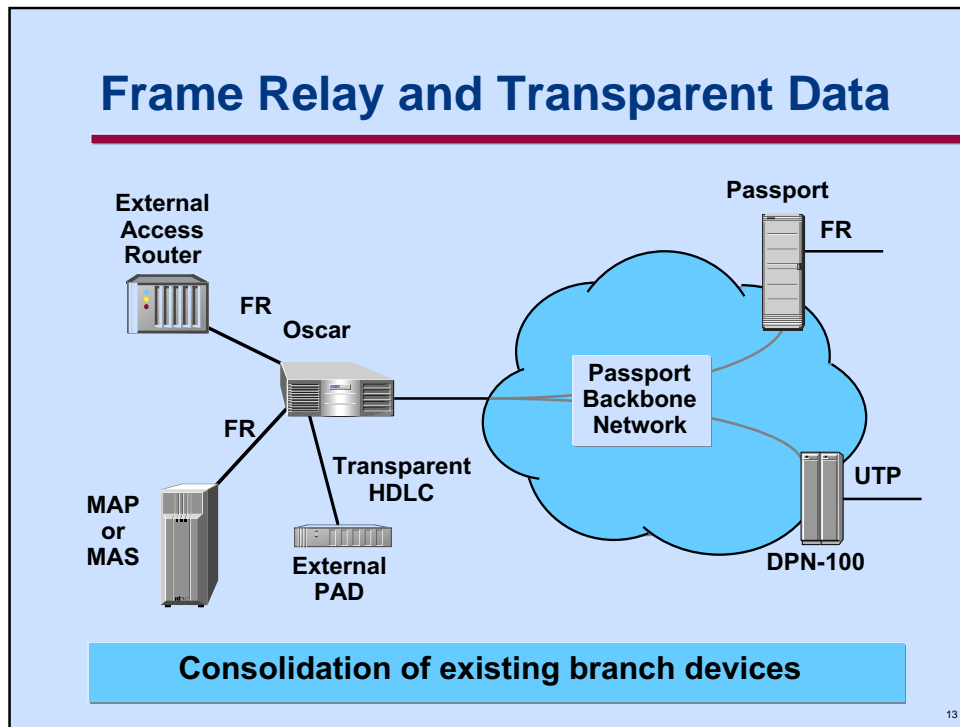
Frame relay – Oscar will provide a frame relay (DCE) access service for connection to an existing branch based frame relay device such as a branch router. The Oscar access frame relay DLCI will be mapped to a DLCI on the access trunk into Passport, and passed through to the Passport frame relay service. In this way the traffic from the existing branch device can be aggregated onto the access trunk along with other traffic, and terminate on a core router connected to Passport frame relay service elsewhere in the network.

DPN-100 – Similarly, in many existing customer situations we will find existing Magellan technology (DPN-100/1, MAS) located at the branch site. Oscar will backhaul the UTP (Universal Trunk Protocol) traffic using frame relay encapsulation and terminate the traffic on a DPN Gateway—a Passport software function. To both the branch DPN-100 device and the network-side DPN-100, the connection will function like a point-to-point UTP network link with all the associated benefits. In this fashion, the complete set of DPN-100-based data services can cost-effectively be provided in a branch in conjunction with Oscar.

Transparent services - Oscar will also provide transparent transport of other protocols for termination on Passport services. Such services could include X.25, for existing collocated PAD devices, or other X.25 data terminals.
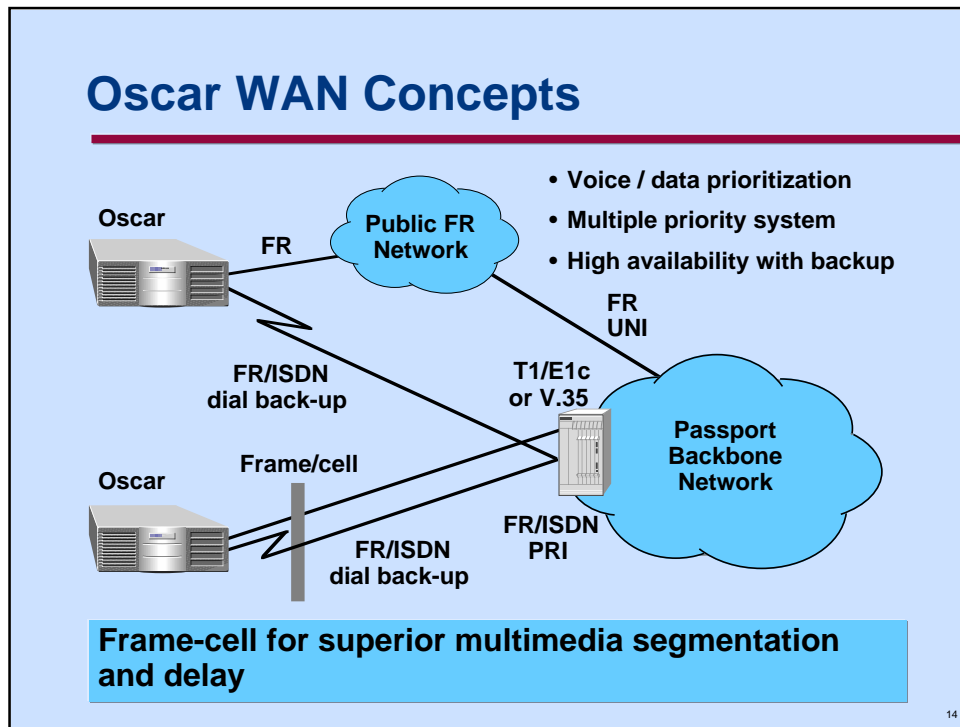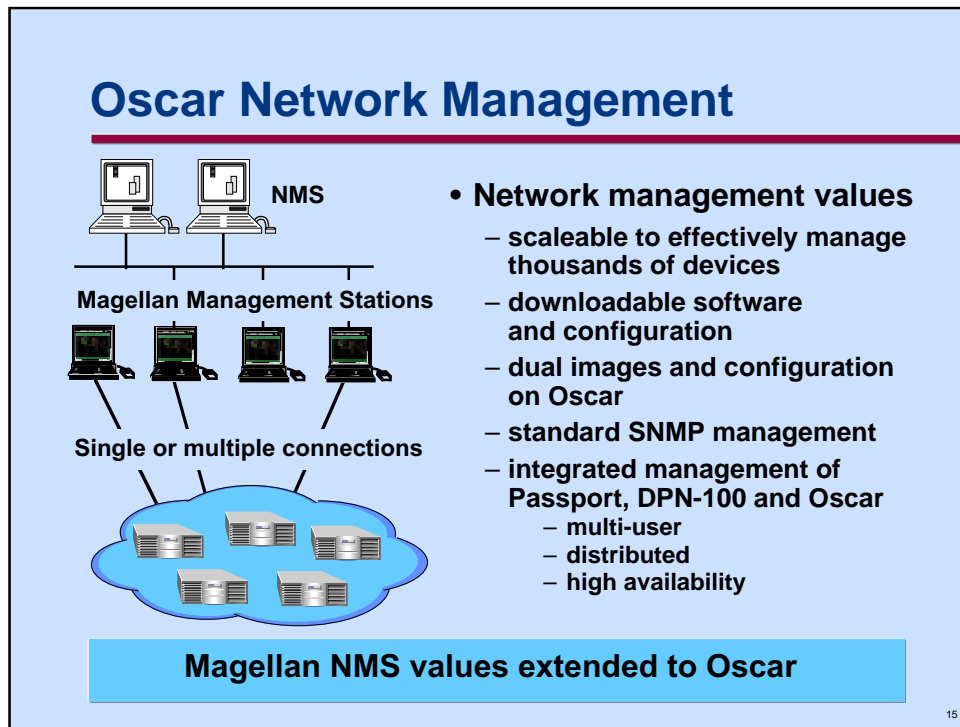
All network links from Oscars to a regional Passport use frame relay with SVCs as the end-to-end transport protocol. A frame interrupt (**frame/cell**) capability is used to give priority to the delay-sensitive traffic such as voice and provides superior segmentation and delay characteristics for the multimedia traffic. Key to this strategy is that the end-to-end protocol remains open standards -based, and is unaffected by the frame-cell which is only local in significance. However, it solves the problems currently faced by voice over frame relay. Network links terminate on Passport T1/E1c function processors (FPs), or V.35 FPs.

Oscar supports a single active network link connection. Upon failure of this single link Oscar will automatically dial an ISDN connection, using an integrated terminal adapter, to a homing Passport node. All services, including voice and fax, will be supported over the backup ISDN connection.

The ISDN backup will be connected to a Passport via a T1/E1c PRI frame relay FP currently under development. The bandwidth provided by the backup link (an ISDN B channel) need not be the same as that of the primary network link. For example the primary circuit could be 256 kbit/s while the backup is a 64 kbit/s B-channel. On establishing a backup ISDN connection to Passport, a branch Oscar will then re-establish the switched calls to the same destination to which it was previously connected.

The branch Oscar will continue to monitor the primary network link. When it returns to service, the backup ISDN link will be dropped, after all voice calls have been cleared, and connections re-established through the primary link.

Primary link alternatives: Where ISDN tariffs promote such usage, the primary link between an Oscar and a regional Passport may also be an ISDN B-channel. For data only Oscars, a public frame relay service (PVC) can be used as an alternative to a leased line as the primary link.

Oscar Network Management

NMS

Magellan Management Stations

Single or multiple connections

- **Network management values**
  - scaleable to effectively manage thousands of devices
  - downloadable software and configuration
  - dual images and configuration on Oscar
  - standard SNMP management
  - integrated management of Passport, DPN-100 and Oscar
    - multi-user
    - distributed
    - high availability

Magellan NMS values extended to Oscar

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Oscar's element management is based on an embedded SNMP agent. Oscar network management is based on the SNMP standards, with all network management traffic transported via the TCP/IP protocol suite. Oscar will be managed by the Magellan NMS with a high level of integration to provide a Magellan "look and feel" to fault management, provisioning, software distribution, performance management, and security.

NMS provides a comprehensive set of network management capabilities. Similar management capabilities are provided for Oscar, as for DPN-100 and Passport including: event based fault management, distributed configuration management, APIs, aggregate operator commands, etc.

The distributed architecture supports a large number of network elements. Networks with thousands of Oscars will be feasible. In addition, multiple management centers and multi-users each able to perform all functions, allow effective management of large networks as well as achieving high availability for the management system itself.

Oscar will support the download of a new software image, while the box is fully functional and connected to the network—both new and existing images can be stored in memory. Download of new images uses TFTP. Centralized software and configuration distribution reduces the cost of changes. The overall goal is simple implementation and deployment, as well as operation of large numbers of Oscar devices in a Magellan network.

Virtual private network (VPN), statistics, and accounting functions will be largely based on existing Magellan Passport capabilities. Oscar will be manageable by ServiceMonitor as part of a VPN /customer-managed service.

Integration into Magellan network management provides significant advantages to network operators over products which do not have an overall "network" management concept.
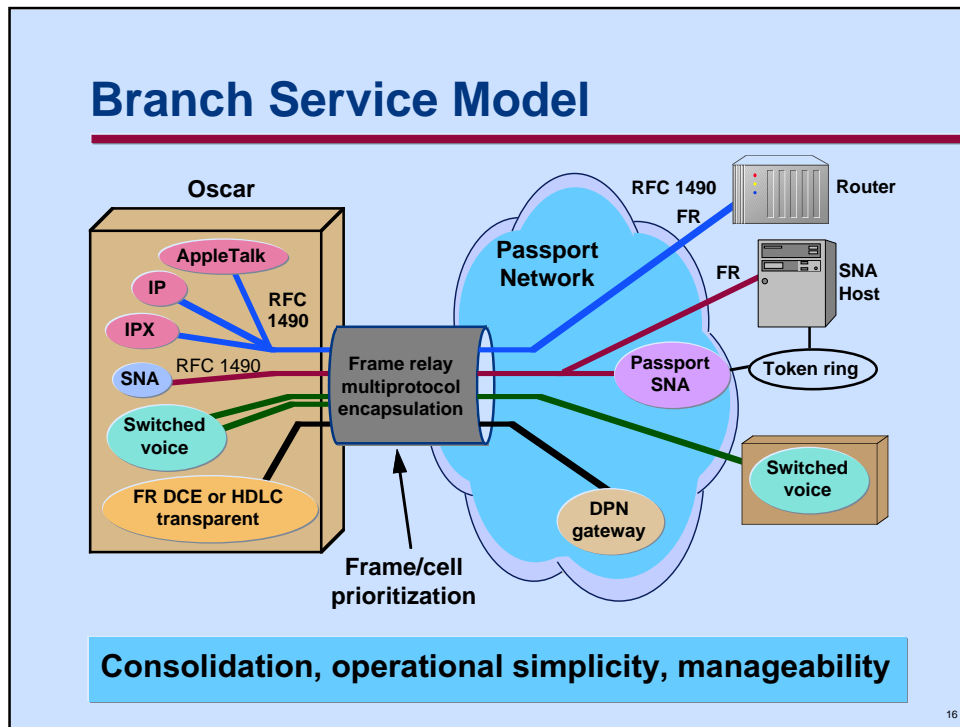
Voice and fax services - Oscar voice services include both analog and digital voice interfaces for telephones, key systems or PBXs and offer switched voice connections. Voice is processed with low bit rate voice compression (8 kbit/s) using the leading standard G.729 ACELP algorithm. Features include echo cancellation and silence suppression. Fax demodulation is offered at 9.6 kbit/s for maximum bandwidth savings.

LAN internetworking - Both ethernet and token ring LANs can be directly connected to Oscar. Oscar will support popular routing protocols including IP and IPX, as well as data compression and an optimized access routing protocol.

SNA services - SDLC/SNA serial interfaces will be offered as well as SNA over token ring or ethernet interworking with Passport frame relay or token ring SNA services.

Data services - A MAS (Magellan Access Switch), DPN-100/1, router, PAD or data terminal can be connected through the Oscar to Passport via transparent HDLC or frame relay.

Wide Area Network Link - The WAN connection from an Oscar to Passport will be based on the frame relay protocol. Underlying this protocol will be a proprietary frame-cell layer for interrupting frames which is well known to Passport users. Dial backup will use an integrated ISDN basic rate terminal adapter.

Network management - Oscar is an SNMP device fully manageable from Magellan NMS and will benefit from the Magellan large network management and VPN capabilities.

Architecture - Best utilization of Passport features includin ghunt groups, call redirection and closed user groups for high-value network services. Utilization of Passport frame relay switched virtual circuits (SVCs) simplifies operation and service provision.

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- **Rollout**
- **Telefónica Presentation**

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The rollout and availability of the Oscar products is discussed in this section.

Oscar Roll-out Plan

- **Magellan Access Integrator**   **now**
- **Oscar (ethernet version) beta trial**   **1Q97**
- **General availability**   **2Q97**
- **Oscar (token ring) beta Trial**   **2Q97**
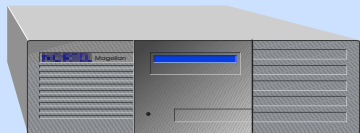- **General availability**   **3Q97**

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The ethernet version of Oscar is targeted for general availability in 2Q97. Beta release for field trial is targeted for 1Q97. The token ring version of Oscar, including the SNA services, is planned for one quarter after the Ethernet version.

A Nortel branded voice FRAD (ethernet version only) will be available for deployment during 1996. This is called the Magellan Access Integrator (MAI). The Magellan Access Integrator is intended to be for limited deployment until Oscar is available.

Magellan Access Integrator (MAI)

Availability 2Q96

Magellan Access Integrator

MAI provides immediate multimedia branch access for Passport networks

- **Consolidation of traffic**
- **Bandwidth savings**
- **Standards-based**
- **Proven technology**

World class product from a market leader

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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 multimedia access vendor. MAI offers the benefits of integrating data, voice, fax and LAN traffic to networks using low cost n*56/64 kbit/s services, and improve corporate communications while reducing networking costs.

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 from MAI 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 - MAI connects to Passport over standard frame relay connections and makes use of SNMP, G.729 ACELP voice compression and LAN routing protocols.

Proven technology -A large, global installed base of integration units with worldwide homologation.

MAI Features

- **Analog and digital voice interfaces**
- **G.729 ACELP voice compression**
- **Fax demodulation**
- **Ethernet LAN**
- **Frame relay DCE and network link**

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The following is a brief summary of Magellan Access Integrator specifications:

Voice interfaces: E&M (type I, II and V), FXS, FXO, BRI, T1/E1 for direct connection of telephones, PBXs or key systems. Analog voice cards support two interfaces per card. T1/E1 voice interfaces can be configured to support all channels.

Voice features: Voice compression using ITU G.729 ACELP at 8 kbit/s; silence suppression, echo cancellation, autocall, fax sharing, line sharing, various dial-tones, ring and busy signals are generated for regional conformance.

Fax demodulation: Group 3 Fax at 2.4 kbit/s to 9.6 kbit/s. Higher-speed fax machines will be negotiated down to 9.6 kbit/s. Auto fax detection for sharing lines between telephone and fax machine.

LAN interface: Ethernet - automatic port discovery for IEEE 802.3 AUI and UTP 10Base-T.

LAN routing: IP, IPX protocols are routed using RIP or bridging for others. Automatic and user-configurable filters. Data and header compression.

Management: PC-based management system and SNMP agent per device as well as local management interfaces. Remote software download and configuration to flash memory.

WAN link: Frame relay PVC at speeds up to T1/E1; standards-based; approved by public frame relay network providers. Optional integrated CSU/DSU.

Packaging: Three slot chassis and five-slot chassis.

Models: Four models, MAI 2k, 3k, 5k and 20k, are provided depending on fanout and performance.

Power options: AC and DC powering; redundant power supply options for five-slot chassis.

Oscar Summary

Oscar extends Passport values to the branch:

• **Consolidation of traffic**

• **Bandwidth savings**

• **Scaleable**

• **Low cost operation**

• **Integrated management**

• **Future proof architecture**

Voice, fax, video, LAN, SNA and data consolidation

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Oscar is another step in Nortel's continuing focus on networking. Oscar provides the vehicle to extend the values of Passport networks to the branch with a single vendor solution including support, training and documentation for an advanced networking solution.

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For additional information, the following sessions are recommended:

Workshops:

Magellan Access Solutions	Adrian Hatcher
Engineering Network Access Solutions	Recep Halici
Advanced Internet Solutions	Peter Brockmann
Magellan LAN Interconnection Products for the Enterprise	Tony Kourlas

Other:

Magellan Access Integrator demonstration	Demonstration Center
Magellan Access Solutions	Whiteboard clinic

Telefónica Introduction

Ms. Rosa Bragado,

**Manager, TTD Planning
and Development**

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One of our lead customers, Telefónica, TTD (Telefónica Transmisión de Datos) has been involved with the Oscar project since its inception. Telefónica shared with Nortel their requirements and aided in the vendor evaluation process and product concept phase.

Now it is my pleasure to introduce Ms. Rosa Bragado, Manager, TTD Planning and Development. Ms Bragado will tell us about the planned service offering of Telefónica; the involvement in the Oscar project; and the plans for introduction of Oscar products in the network.

TTD Multimedia Service
DESCRIPTION

TTD.- Planning & Development
Department

My name is Rosa Bragado, I work for the Planning and Development Department of Telefónica Transmisión de Datos (TTD), a subsidiary company of Telefónica de España, which will be part of UNISOURCE. Our main responsibility inside the company is to develop new services. This means to find or to develop the right technology to provide the services the company might demand. Right now, the Multimedia Service is an important goal for us.

In this presentation, we show you the ideas and experience of TTD in Multimedia Service, we shall present different scenarios in which we have to provide the service, and we shall give you which requirements the multimedia access equipment should comply with.

Agenda

■ *Multimedia Service Definition*

■ *Telefónica Data Network Infrastructure*

■ *Multimedia Service Analysis*

- *Customer Environmen*
- *1996 Solution*
- *Voice, Data & Management Requirements*
- *Access Mechanism Requirements*

■ *Evolution to ATM*

■ *Oscar platform.- TTD collaboration*

I shall start defining the service, giving you a brief description about the present Data Network Infrastructure, and then I shall make an analysis of the service and how we see the evolution to ATM. Finally, we shall describe how we see the TTD collaboration with Nortel in the Oscar project.

Multimedia Service.- Definition 1

The Service:
Is An Integrated Communication Service For Closed User Group Based On The Virtual Private Network Concept

The Goal:
Is to Offer Corporate Voice, Data & Video
· PABX Interconnection
· LAN Interconnection
· FR
· Legacy Data
· Video

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We are developing an Integrated Communication Service for a Closed User Group based on the Virtual Private Network Concept.

With this new service we would like to offer our customers Corporate Voice, Data and Video. By this we mean the interconnection of the customers PABX situated in different locations, the interconnection of the LANs, the possibility of using video communications between different customer buildings and, of course the ability to have Frame Relay service and the transport of Legacy Data all over the same Virtual Private Network.

Multimedia Service.- Definition 2

The Network:
Multimedia Network based on a proprietary
ATM solution moving towards standard ATM

Integration Element:
Single Integration Element As A Customer
Premises Equipment

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To offer this service we use a Multimedia Network type based on a proprietary ATM solution. We shall introduce the Network description later.

To be able to concentrate all types of traffic in the customer place we want to introduce at the customer premises a UNIQUE INTEGRATION ELEMENT that will work as the multimedia access device.

We have been selling Virtual Private Networks (VPN) in the Data environment for some time, and we see the Integrated Communication Service as the evolution of this previous Data service.
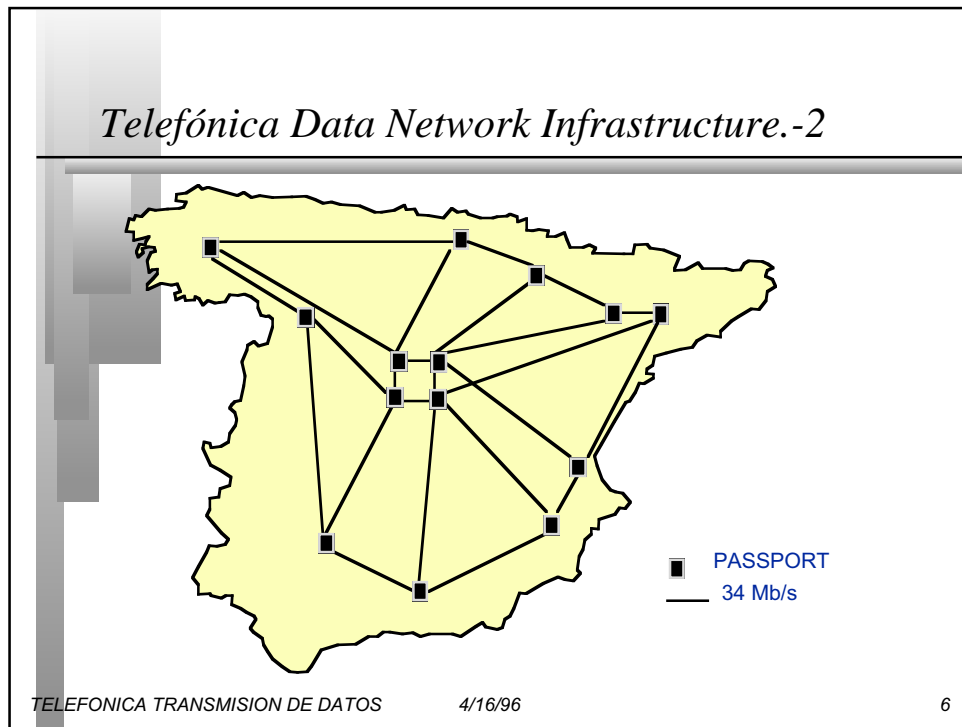

Telefónica Data Network Infrastructure.-1

· **TESYS (Basic Service)**

  (Telefónica Technology)

  - *Ports: 51.199*
  - *Customers: 3500*

· **RED UNO (Large Customers Service)**

  (Nortel Magellan Technology)

  - *Ports: 33.143 (930 FR)*
  - *Customers: 300*

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At the present moment Telefónica has two types of Data Services:

The **Basic Service** is based on   **TESYS**, a proprietary Telefónica technology. The number of nodes installed are 14 Tesys-B (pure transit nodes), 98 Tesys-5 Systems (transit and intermediate access nodes) and 2,253 T1 (access nodes). Under this service we have 3,500 customers with a total of 51,199 ports. This service is mainly oriented to medium/small customers.

The **RED-UNO service** is mainly oriented to the **Large Customers**. This service offers Virtual Private Network, a customer management system, periodical reports, etc. This service is based on Nortel Magellan Technology. The number of nodes installed are 14 Passport-160 and 2 Passport-50,   299 DPN-100 and a number of DPN-100/1 as CPEs . The PP nodes are used to do pure transit functions. The number of ports in use in this service are around 33,143 with approximately 930 FR ports. All these ports are distributed among 300 large customers.

Telefónica Data Network Infrastructure.-2

PASSPORT
34 Mb/s

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The rapid growth of the RED UNO Data service required introducing Passport technology in the backbone of the network.

The conjunction of the Passport technology and the excess of bandwidth (we have 34 Mb/s lines connecting the backbone Passports) give us the possibility to include new services (as voice, video, etc.) to reuse the network infrastructure.
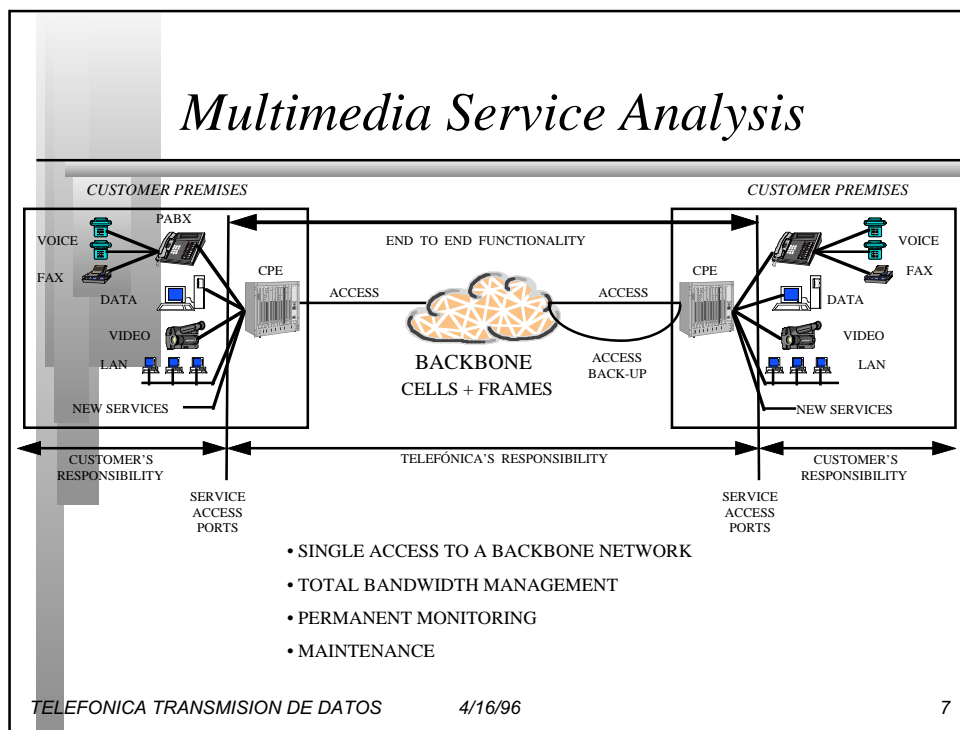
With the multimedia service we offer our customers a single access to the backbone network. We offer a total bandwidth management, a permanent monitoring of the systems involved in the service and the network, and a maintenance level similar to the offered in the RED UNO Data Service.

Customer Analysis.- Customer Size

SMALL CUSTOMERS:

- Branches with homogeneous interconnection (**mesh connection**)
- Central Site & Remote Branches (**Star connection**)

LARGE CUSTOMERS:

- Hierarchical interconnection

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There are some customers with a small number of branches distributed in the larger Spanish cities (5-10). Usually these customers need homogeneous interconnection between the different branches (mesh connection). These customers haven't got headquarters.

However, the majority are organized around a central site, where all the corporate communication systems are connected: (Hosts, LAN servers, PABX, ...).

Finally the biggest customers are organized hierarchically starting from the lowest end (small branches) and going through regional sites to main headquarters.

Customer Analysis.-Branch size

- *SMALL/MEDIUM SITES*.-
  Low Bandwidth Requirements
  (From 64 Kbps to 512 Kbps)
  Inhomogeneous
  (Different Functional Requirements)

- *BIG SITES*.-
  High Bandwidth Requirements
  (From 512 Kbps to 34 Mbps)
 Homogeneous
  (Similar Functional Requirements)

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Independently of the customer size, we distinguish two different type of branches:

- With low requirements in bandwidth (i.e. from 64 Kbps to 512 Kbps), and functionality (SMALL/MEDIUM SITES).
- With high requirements in bandwidth (from 512 Kbps to 34 Mbps), and functionality (BIG SITES).

While the Big Sites are homogeneous, the Small/Medium Sites are very inhomogeneous.

Customer Scenario.-Small/Medium Customer
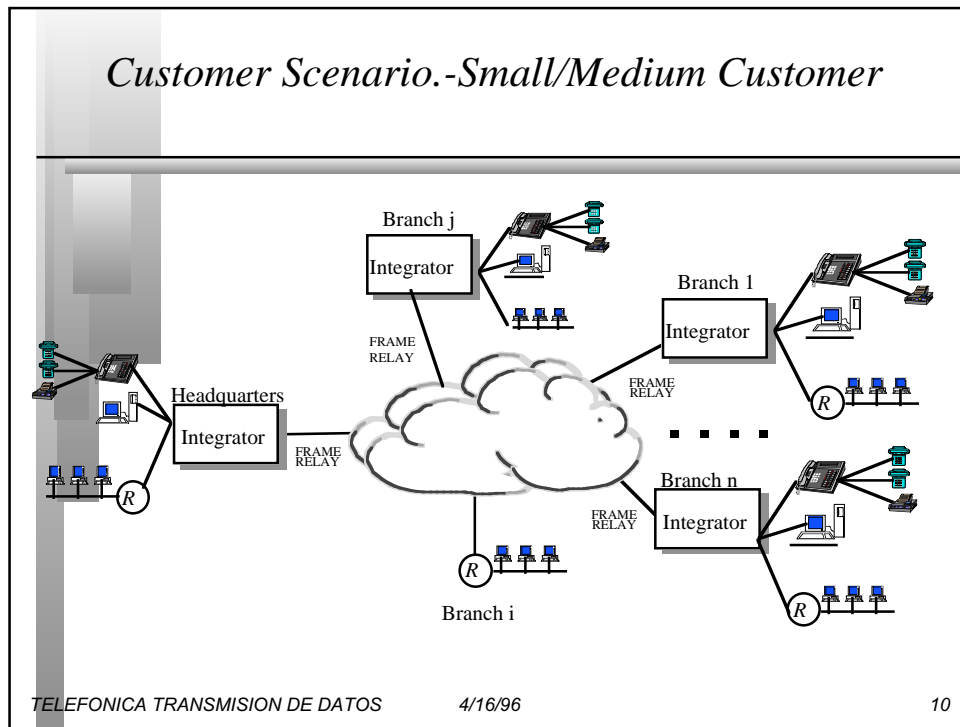
This slide shows the corporative network of a medium customer. This customer has a star connection between the remote branches to the Headquarters where the main PABX, the Host and the LAN Servers are located.

In this slide, we could see a number of branches with similar necessities (voice channels, FR traffic from the LANs and synchronous connections to a host). All these branches need Integrator equipment to carry all the different traffic types to the network in the most efficient way. There are also a branch with only FR traffic, in this case we do not see the necessity to include an Integrator equipment. There is another branch that does not have a router installed previously and connect the LAN traffic directly to the Integrator equipment. Depending on the branch size, some of them have digital or analog PABX, or even they only have a telephone or a Key System.
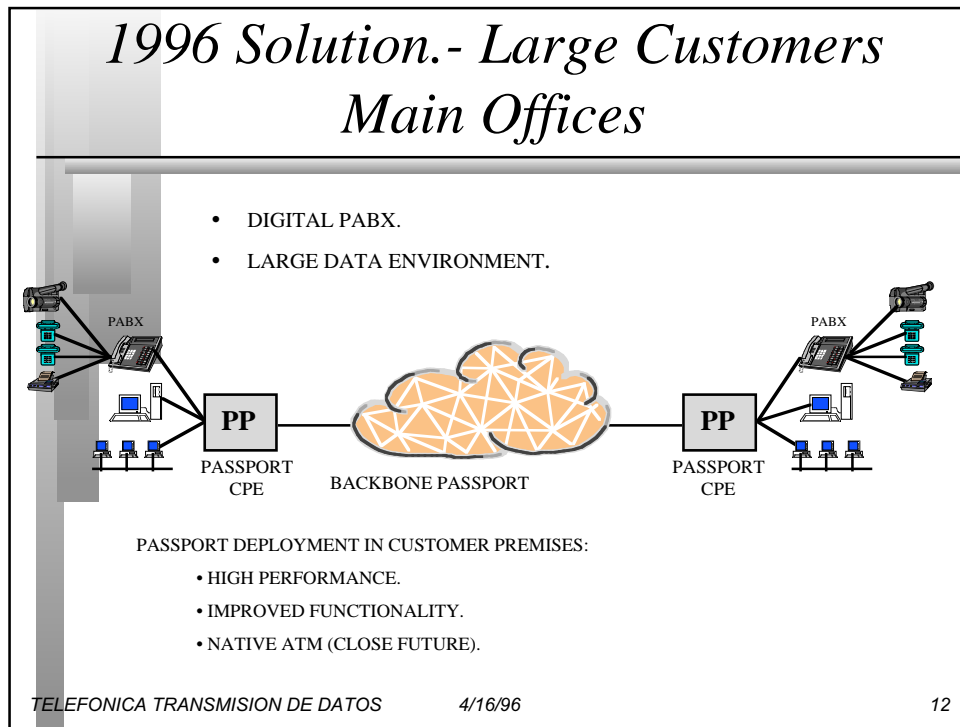
Finally in the Headquarters we need an Integrator able to cope with all the voice calls, LAN, synchronous and asynchronous traffic generated in the remote branches. Usually the Headquarters have a digital PABX.

Customer Scenario.-Large Customer
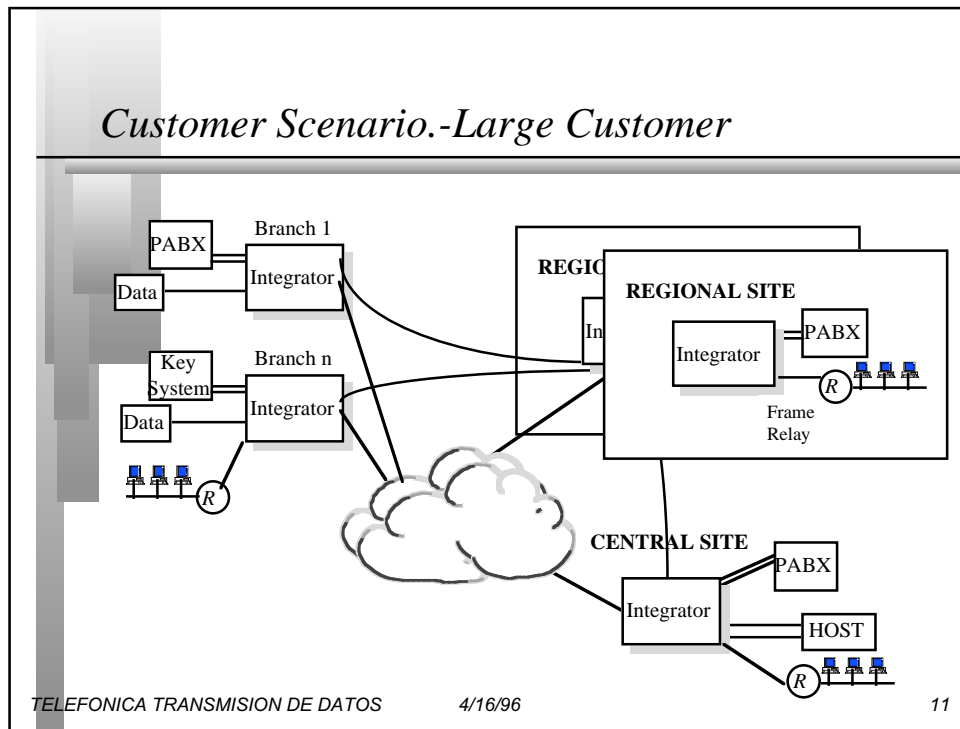
This slide shows the corporative network of a Large Customer. In it we see the hierarchical organization of this customer.

The sites are organized as Low End Sites, Regional Sites and Central Site. A number of Low End Sites are connected to a Regional Site. All the Regional Sites are directly connected to the Central Site or Headquarters. We see the subset of Low End Sites and its Regional Site as a small/medium customer corporative network.

In this kind of organization the main flux of traffic information goes from the Low End Sites via the Regional Sites to the Central Site. However, there is always some amount of traffic between the Low End Sites or the Regional sites.

1996 Solution.- Large Customers Main Offices

- DIGITAL PABX.
- LARGE DATA ENVIRONMENT.

PABX — PP — PASSPORT CPE — BACKBONE PASSPORT — PP — PASSPORT CPE — PABX

PASSPORT DEPLOYMENT IN CUSTOMER PREMISES:
- HIGH PERFORMANCE.
- IMPROVED FUNCTIONALITY.
- NATIVE ATM (CLOSE FUTURE).

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At the present moment Nortel has an *Integrator* solution for the Big Sites. This is Passport. During 1996 we are offering multimedia services to the Large Customers interconnecting their Regional Sites and the Central Site with Passport as a CPE equipment.

We need an alternative equipment to work as an integrator for medium and small offices. This new integrator should be able to interwork with Passport, either in the voice, LAN connection, FR or Legacy Data Services. We hope that this new element will be Oscar.

In the following slides we summarized the requirements Passport and Oscar would require in order to provide the functionality we would need in this multimedia service.

Voice Requirements

Voice Switching: Backbone network acting as a
　　　　　　　Virtual Tandem PBX
Signalling:　Digital CCS (Q.SIG, ISDN)
　　　　　　　CAS
　　　　　　　Analog E&M, FXS, FXO
　　　　　　　Interconnection Types:
　　　　　　　　Digital-Digital
　　　　　　　　Analog-Digital
　　　　　　　　Analog-Analog
Unique Numbering Plan
Voice Compression

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Data Requirements

- TRANSPORT SYNCHRONOUS & ASYNCHRONOUS PROTOCOLS

- FRAME RELAY PVC & SVC

- LAN INTERFACES

Management Requirements

MANAGEMENT SYSTEM FOR THE INTEGRATOR EQUIPMENT

Same As for Other Magellan Equipments (NMS)

Data Collection Management: Accounting & Statistics

VPN MANAGEMENT

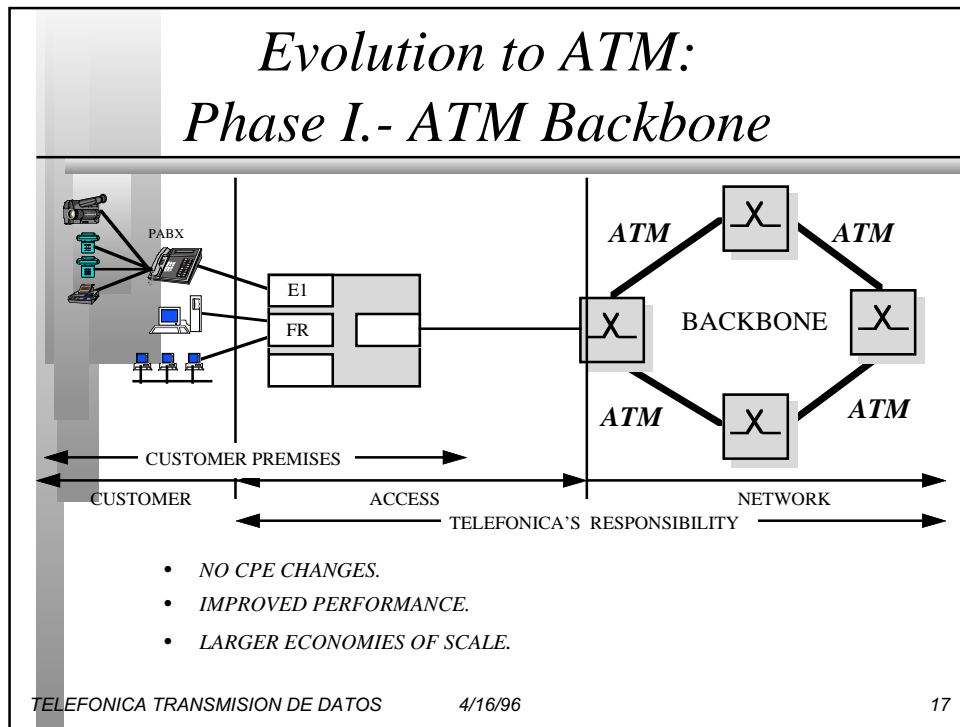The Customer Should be able to Manage The Multimedia
Service via the ServiceMonitor

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Access Mechanism

Alternatives

- *End to End Leased Lines*
- *Public Network Access Line*
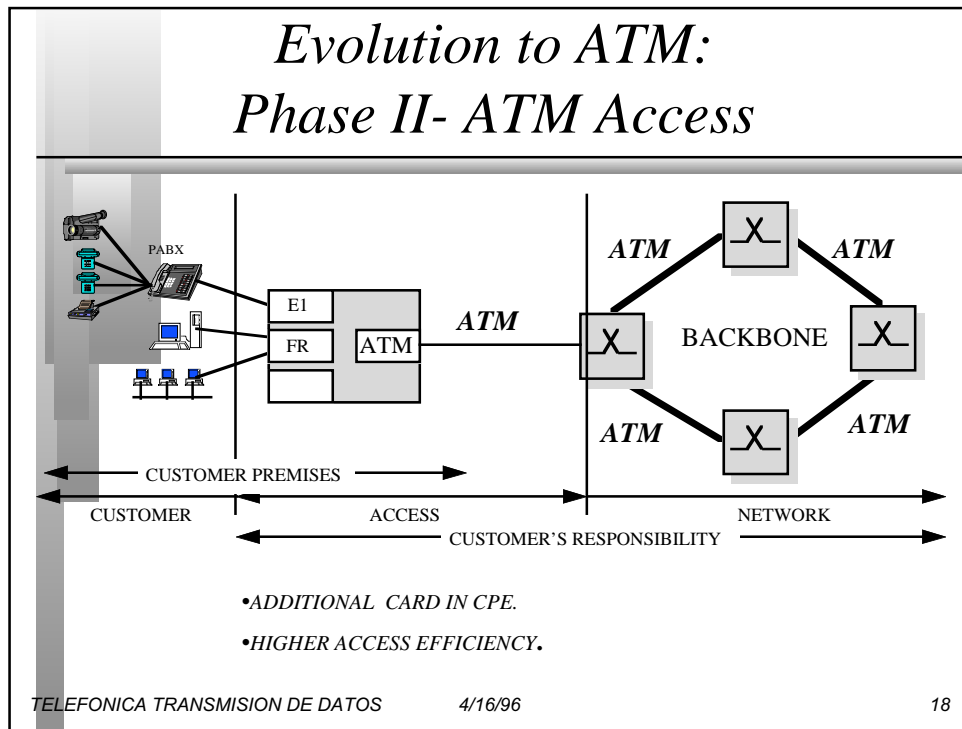- *ISDN main connection*

Added Functionality

- *ISDN Backup*
- *Bandwidth on demand as a complement*
    for any of the possible access types

Evolution to ATM:
Phase I.- ATM Backbone

CUSTOMER PREMISES

CUSTOMER   ACCESS   NETWORK

TELEFONICA'S RESPONSIBILITY

- *NO CPE CHANGES.*
- *IMPROVED PERFORMANCE.*
- *LARGER ECONOMIES OF SCALE.*

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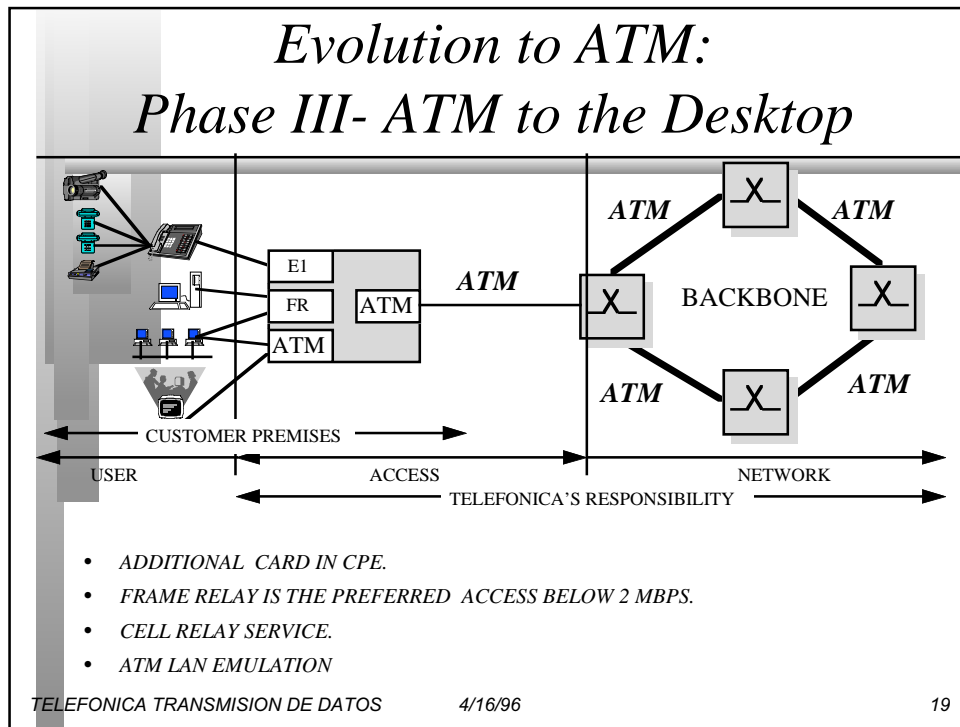
We see this multimedia service evolving towards ATM in the following way:

Firstly, without any changes in the customer environment, we could upgrade the service quality introducing ATM in the Backbone Network.

Evolution to ATM:
Phase II- ATM Access

ADDITIONAL CARD IN CPE.

HIGHER ACCESS EFFICIENCY.

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The next step in the evolution implies the introduction of an ATM interface in the Integrator equipment. This means higher access efficiency at the cost of introducing an ATM card in the CPE Integrator.

Evolution to ATM:
Phase III- ATM to the Desktop

- *ADDITIONAL CARD IN CPE.*
- *FRAME RELAY IS THE PREFERRED ACCESS BELOW 2 MBPS.*
- *CELL RELAY SERVICE.*
- *ATM LAN EMULATION*

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The last phase implies the introduction of ATM at the Desktop level. Adding an extra card in the CPE Integrator, we will provide an access ATM connection.

Oscar Platform.- TTD Collaboration

- Requirements Definition
- Trials participation
- Workshop/Meeting
- Feedback