



Magellan network management is offering additional management flexibility, with a significant increase in the tools, platforms, operating systems and switches supported. This presentation will introduce the Magellan management strategy, the products which support it, and how we believe these changes will affect your network.

About the presenter:

Dennis Cote is Senior Manager, Magellan Network Management, located in Ottawa Canada. He is responsible for product line management and marketing of Nortel's Magellan network management products. He has worked with Nortel for 17 years. His career with Nortel has included 13 years experience in all facets of network operations and engineering with Nortel's Global Enterprise Services organization, which is responsible for operating and evolving Nortel's worldwide voice/data/video networking infrastructure. For the last four years, Dennis has been one of the key resources in establishing network management directions for the Magellan portfolio, leveraging his hands-on experience in the management of data, voice and video networks.

Agenda

- **Influences on network management**
- Where networks are going...
- **Magellan strategy**
 - our solution
- **Summary**

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Over the years there have been many influences on the management of various types of networks and their associated hardware and software. This section of the workshop will detail today's influences, starting with Magellan's definition of network management, the increasing visibility of management in the operation of a network, and the direction of the market and standards groups.

What is Network Management?

- **Network management is the act of monitoring, analyzing and controlling the behaviors of networked systems**
- **The process of controlling a complex communications network to maximize its efficiency and productivity**

**Definition has stayed consistent,
Scope of what is being managed has changed**

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Management methodology has gone through many iterations over the years, but the definition has stayed fairly consistent. What has changed is the scope of what is being managed and its underlying technology. The complexity of managing a network has increased but there is a better understanding of the importance of this task and the overall benefits.

Why are Networks Important?

- **Fact:**
 - **networks and their applications are becoming indispensable tools**
 - enable productivity
 - profit center or enable profit center
 - **networks are supporting more applications and more users**
 - **trend is towards larger, more complex networks**

Networks are able to directly or indirectly...
Save \$ Generate \$ Save time \$

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In the past we thought of networks only as the communication portion of a computing environment. This has changed dramatically with the introduction of desktop workstations, distributed computing, multimedia services and integrated communication protocols such as ATM. These changes have enabled such benefits as increased productivity and improved methods of generating profits.

Regardless of the reasons, networks have grown almost exponentially in the number of users they support and their associated applications (ex. e-mail). The value of the network has also grown exponentially. This increased importance has made it necessary for operators and their managers to gain a better understanding of what is occurring in the network. The bottom line is that networks can directly or indirectly save time, save money and generate revenue. A solid network management system is a vital component to enable these benefits.

Why is Management Important?

- **Well-maintained networks make/save money and time**
- **Complex networks cannot be managed by human effort alone**
- **Network management costs are 20-50% of total information systems budget**
- **Costs of improper management can be many multiples of the IS budget**
- **Customers are acknowledging realities of network ownership**

Efficient management maximizes potential, minimizes cost

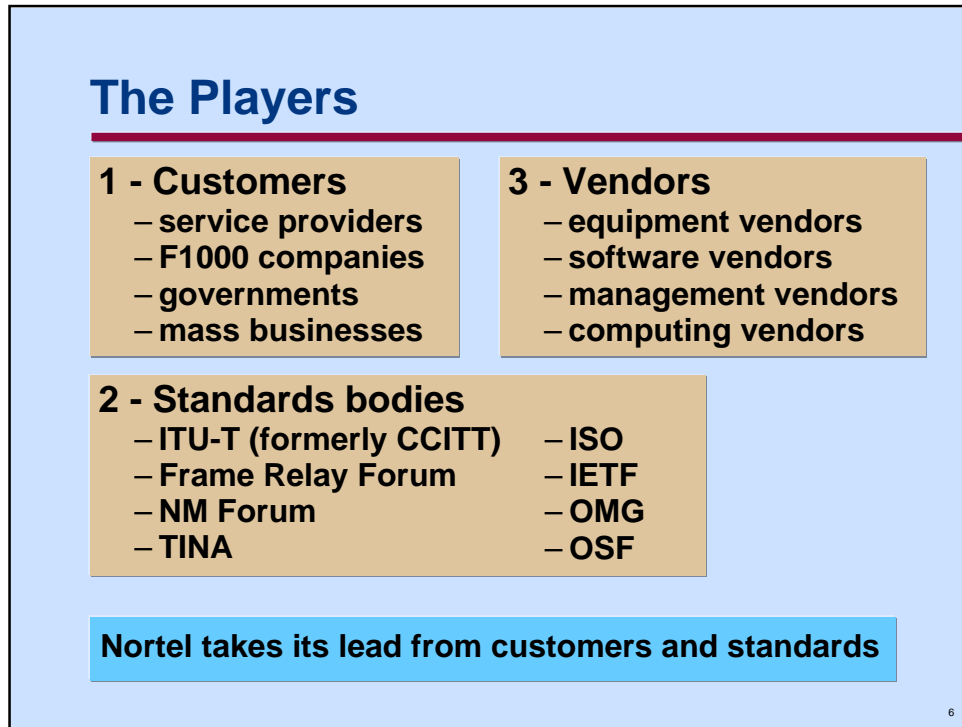
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Studies from various consultants have shown that the impact of managing a network can be up to 50% of the ongoing cost of running the network. In some organizations management costs can run into the millions. With this level of ongoing expense being incurred, it is to be expected that the executives in your organization look at every means to reduce this expenditure.

With the increased importance of networks, the role that network management plays and its importance has also grown. It has been proven that well-maintained networks can reduce the costs of running a network, thus influencing the bottom line. Network management does not only include human resources though, just adding people to manage a network is a costly endeavor and may not achieve the original goal of a well-maintained network.

Management systems play an integral role in the management of a network, whether it be to ensure that the network is always operational, quick identification of problems or planning the most cost-effective implementation of the network. Tools associated with management tasks can typically be more cost effective than having a team of operators or engineers tackling them. Add in the dynamics of increasing network size and complexity (and the speed with which these changes are occurring) and management tools become an undeniable need.

For example, if you are only utilizing 10% of a trunk, you are paying 10 times the required amount to move that traffic. Without effective network management tools, you may never recognize the symptoms or be able to effectively correct the problem of poor network performance.



The standards bodies:

ITU-T

- International Telecommunications Union - Telecommunications Standards Section (formerly CCITT)
- Working group 4 in charge of TMN (M.3000 series of standards)

ATM Forum

- Working group of ITU
- Creating M1, M2, M3, M4 & M5 management standards

TINA-C

- Telecommunications Information Network Architecture Consortium
- In charge of TINA specifications which is the evolution of both the TMN and INA (Bellcore) specifications

NMF

- Network Management Forum
- Attempts to create specifications which detail the real-world implementation of management standards

ISO

- International Organization for Standardization
- Home of the OSI (open systems interconnection) standards of which CMIP/CMISE is part of.

IETF

- Internet Engineering Task Force
- Owners of the IETF RFCs (request for comments) which specify SNMP and SNMP MIBs

OMG

- Object Management Group
- Group in charge of CORBA & IDL specification

OSF

- Open Software Foundation
- Group in charge of DCE / DPE

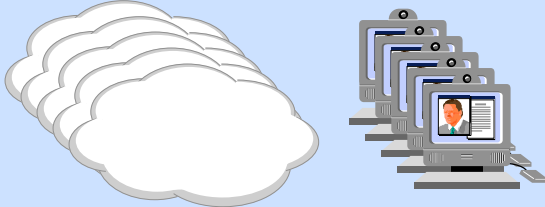
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Networks themselves are the primary influence on management requirements. Where networks are going will determine these requirements.

Legacy Networks...



- **Multiple networks**
 - backbone network
 - modem network
 - mainframe network
 - access network
- **Multiple management stations**
 - different vendors and/or equipment
 - multiple management locations

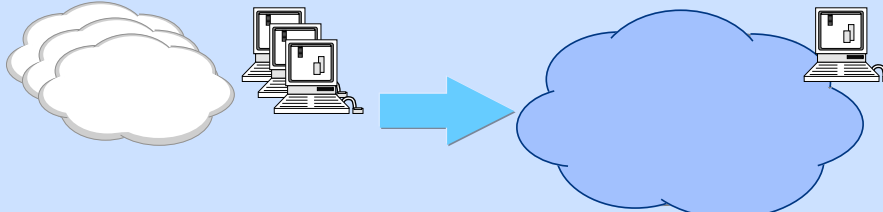
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For most organizations, multiple networks exist to support the various aspects of the business environment. Management of these networks can be complex due to:

- a management system per network type;
- multiple operators per network type; and
- geographically dispersed operators around the network.

Until recently, standards were not available to consolidate these management systems and begin the process of simplifying the management of a network.

Networks in Transition ...

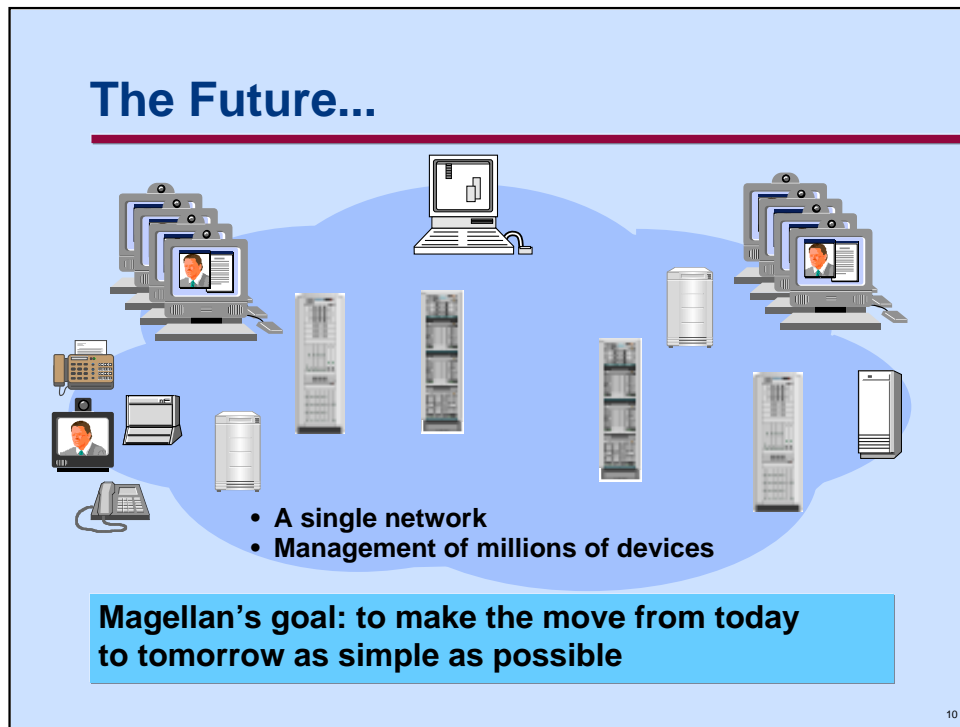


- **Multiple networks still exist but...**
 - they are decreasing in number
 - target is single-integrated-managed network
 - decreased costs
 - increased complexity

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Most networks are in a transition. With the move towards distributed processing a new communication method is introduced; routers utilizing TCP/IP. In some cases it is also possible to transition individual networks to this new communication method. For example, individual IBM and DEC networks can be migrated to this new networking infrastructure. This allows network owners to reduce their costs from a management perspective but it increases the complexity of what is now being managed. The complexity issue comes about due to the multiple traffic types that are running on the single network.

Other changes include the migration of existing networks to industry standard management platforms. From a management perspective, the transition which is happening today is far more complex than past and future management problems. The main question is whether or not it is possible to minimize the complexity associated with this transition?



Tomorrow is the nirvana from a networking technology and management perspective. With the world connected via ATM we have simplified the technology aspects associated with communicating devices. The underlying technology is the same with various adaptations to facilitate different types of data transport. From a management perspective the network operator no longer has to deal with SNA, DECnet, TCP/IP, IPX, TDM, etc.

The reality of the situation is that the amount of devices that a management system will have to manage could be a 1000 fold increase over today. Operators won't look at their networks as an SNA network and a TCP/IP network with attached devices, but as a video conferencing network, video-on-demand network or a financial systems network. Service views of the network will be key to managing these entities. This will not only improve the way you manage your network but also improve the service you offer your customers or end-users of this network.

By no means is this the final stage, but rather a re-defining of what is necessary to manage a network. The question which should be asked prior to this stage is what will my vendor do for me?

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Magellan Management Strategy

- **Deliver functionality on commercially available management platforms**
- **Maintain and evolve Magellan NMS**
- **Allow value-added functionality to be used in all platform environments**
- **Deliver published interfaces**
- **Implement applicable standards and market influences**

Delivering what customers need

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In the previous sections, the influences on managing a network were detailed. To match the direction, Magellan's management capability suite has to deliver the following:

- **Delivery of management functionality as part of commercially available platforms**

During 1996, Magellan OMS will be delivered, enabling customers to take advantage of a commercially available open platforms to manage Magellan equipment.

- **Maintain NMS for its industrial strength capability suite**

NMS has evolved over the years to manage some of the most complex data networks in the world. This capability suite is currently unmatched in the industry today.

- **Consolidate value-added functionality so that it can be utilized in the various management scenarios**

In the past, Magellan NMS has included a suite of functionality that addressed all basic and value-added management needs. With the introduction of Magellan OMS the same value-added management needs are required. Rather than re-invent this functionality, Magellan NMS will be packaged such that value-added functionality can be utilized regardless of the management scenario chosen.

- **Implement applicable standards and market influences**

This has always been part of Magellan's management strategy and this tradition will continue. The latest example being the move towards industry open platforms. Future demonstration will be with Nortel's TINA compliant implementation.

- **As the industry moves, deliver interfaces to support customer created applications.**

Magellan has always addressed the need to have a machine-to-machine interface. It started with DPN-100 and the MDI interface and continues today with standards-based interfaces.

Strategic Benefits...

- **Simplify move from yesterday's implementation to tomorrow's goal**
- **Minimize amount of change**
- **Ensure standards ideal is not encumbered by today's realities**
- **Enable customers to keep step with evolving management technologies**

Listen to and experience with our customers as they move

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Simplicity of evolution is the bottom line benefit of this strategy. By working with you, we can not only assist but also understand the impacts. We can help you react to the required changes by addressing your needs.

Components of the Strategy

- **Management platforms**
 - Magellan NMS
 - Magellan OMS
 - HP/OpenView
 - Cabletron Spectrum
 - IBM NetView/AIX
- **Value-added applications**
- **Customer Network Management**
 - ServiceMonitor

Addressing the needs of our customers

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The components of the strategy are as follows:

Management System: This includes the basic components of managing a network. Specifically this includes the fault and configuration components of managing a network. With the introduction of OMS the platform choices available to a network operator have expanded.

Value-Added Applications: Magellan has always delivered value-added functionality that assist-in the management of the network. Our current functionality can be utilized in your chosen environment. Data collection, for example, requires no specific platform for its operation. It can be implemented as a stand-alone system. However, if there are benefits to integrating some of this data, the interfaces are capable of supporting this requirement.

Customer Network Management: For the last seven years Magellan has delivered a customer network management capability for network operators to allow their end-users a view into the network. With the introduction of ServiceMonitor, this capability has evolved from a physical or component level view of the network into a more end-user service view of the network. In addition, this can also be utilized by customer primes to view the network from their user's perspective.

Magellan NMS



- **Advisor**
 - improving support of large networks
- **Expert Advisor**
- **Architect**
 - improve performance of DPN-100 provisioning
 - ‘point&click/drag&drop’ provisioning for Passport
- **Base**
 - Release 10 will be delivered on Solaris 2.5
 - will include support for the new multimedia access device (Oscar)

NMS manages DPN-100, MAS, Passport and Oscar

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Magellan NMS has been the mainstay of Magellan management for many years. Its evolution as a management system has been strongly influenced by customers requiring industrial strength management capabilities. Scalability is the overriding capability set that Magellan NMS offers, from both a network operator and a network element perspective. Examples of this include customers who:

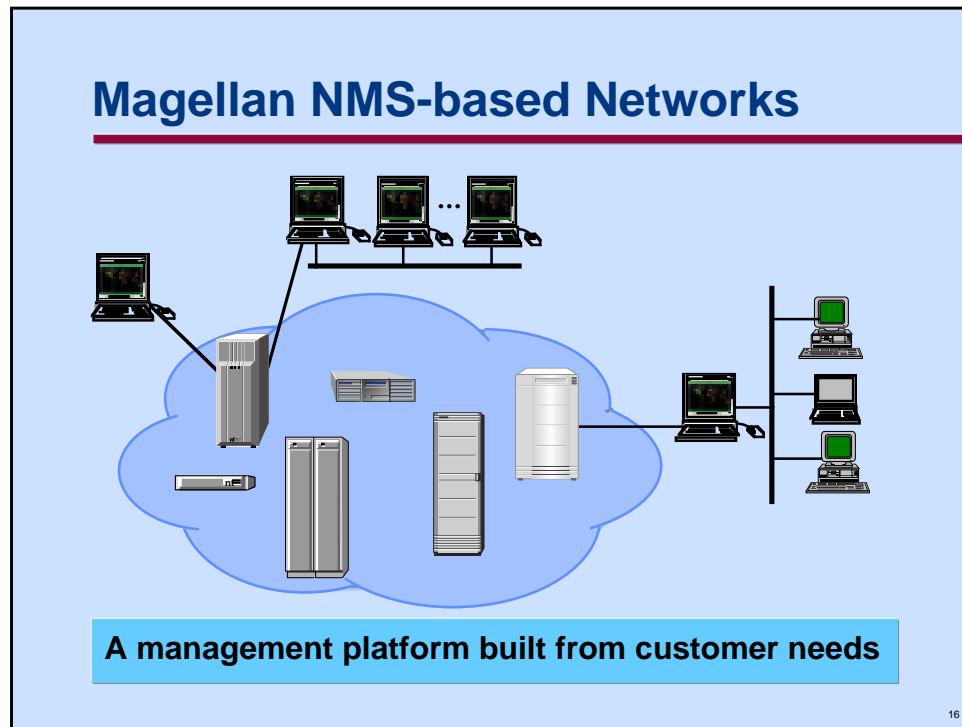
- have operators distributed around the world in 30 different management center ;
- have networks with thousands of devices and approximately 100,000 ports;
- have networks with thousands of ports all managed from a single workstation.

The costs and complexities of the above scenarios should not be discounted when looking at a management scenario. Magellan NMS has been optimized to deliver solutions to these types of networks.

The components of Magellan NMS include the following:

- Advisor tools
 - network viewer
 - component status display
 - component information viewer
 - command console
 - alarm display
 - performance viewer
- Expert Advisor
- Architect - a new “drag and drop” provisioning system will be included as part of Magellan NMS for Passport and Oscar.


Finally, Magellan NMS will be upgraded to Solaris 2.5 to take advantage of all the new Sun hardware and software capabilities such as the common desktop environment (CDE).



Magellan NMS has evolved over the years to be one of the most powerful management systems in the world. Its ability to scale from an operator and element perspective allow us to call it 'industrial strength'. This workhorse system has proven itself in many networking scenarios where the management of the network is a critical component of day-to-day operation.

This industrial strength capability will continue to be utilized with the management of the Oscar access device. Modelled scenarios demonstrate that this management system is the best solution for customers wishing this type of device.

Magellan OMS



- **DPN-100**
 - surveillance only during '96 on HP OpenView (Sun only)
- **Passport**
 - initial release this month
 - delivered on HP OpenView for Sun and HP platforms
 - additional platforms delivered during '96
 - Cabletron's Spectrum management system - Windows NT
 - this platform will also include Meridian 1 applications
 - IBM's NetView/AIX platform - RS6000
- **Vector**
 - available today on HP OpenView (both Sun & HP)
- **Concorde**
 - included in '97 on HP OpenView (HP only)
- **Oscar**
 - included in '97 on HP OpenView (both Sun & HP)
- **OMS base**
 - end-to-end provisioning applications during 96/97
 - integrated network display in '96

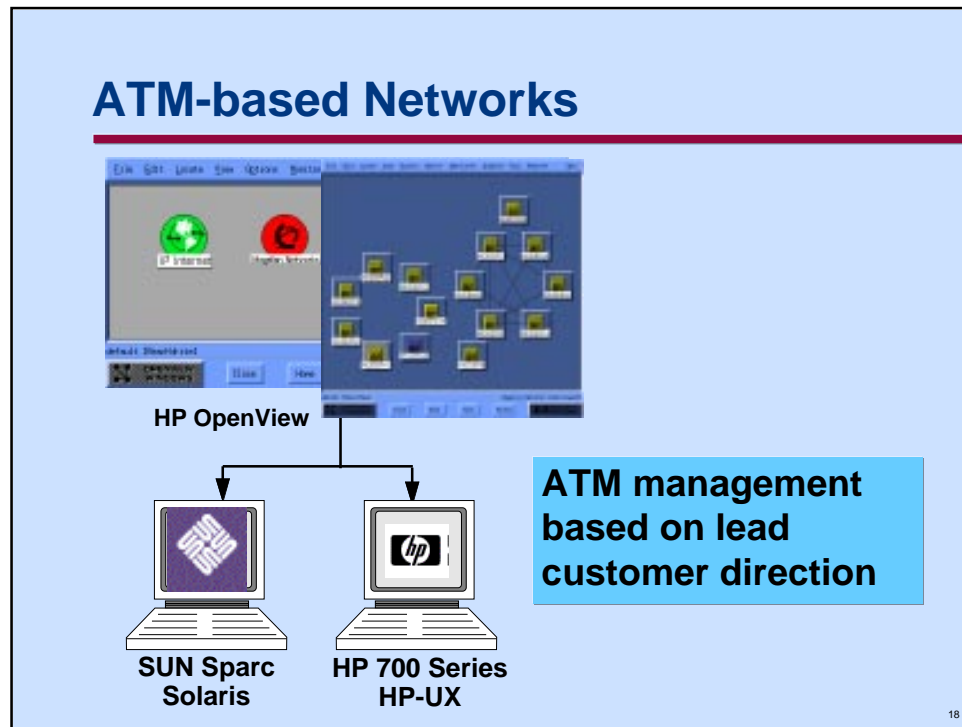
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Various components of Magellan OMS have been in trial with customers during 1995. OMS for Vector is currently in use with those customers who are utilizing Vector for their ATM networks. Last year we detailed how we would be trialing the new OMS for Passport with various customers to ensure delivery of the correct functionality. These trials were very successful in highlighting areas requiring further development, as well as confirming that the functionality we are delivering meets the needs of our customers. Feedback from these trials highlighted the new provisioning system for Passport as well as the computer-based training.

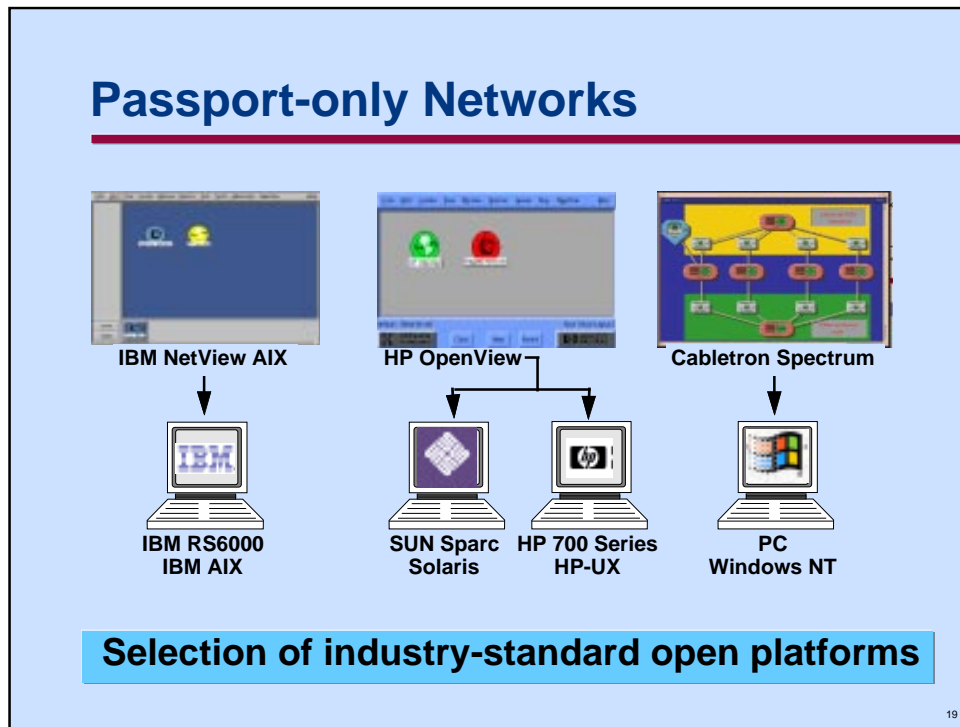
Based on specific demand customer by Passport-only customers, additional platforms have been added to Magellan OMS for Passport. The IBM NetView/AIX as well as the Cabletron Spectrum management platform will be introduced this year (the HP OpenView platform is currently available). Of particular interest with the Cabletron management system is the integration with the Meridian 1 management system. This system will be our first non-Unix based system. The Spectrum system as well as the Passport and Meridian applications will run on a Windows NT platform.

During 1996, DPN-100 will be added to the HP OpenView capability set. For DPN-100, Magellan OMS will provide 'first alert' capabilities in combination with the DPN-100 SNMP Proxy Agent. For Concorde, OMS will be the primary management system running on an HP/OpenView (General Availability is targeted for 1997).

Based on the method which HP OpenView operates, an integrated network display is available today. During 1996, Magellan will integrate the display of Magellan equipment automatically providing a visual view of switch connectivity and a status display of that connectivity. Additionally, end-to-end 'Service Provisioning' will be provided where applicable.



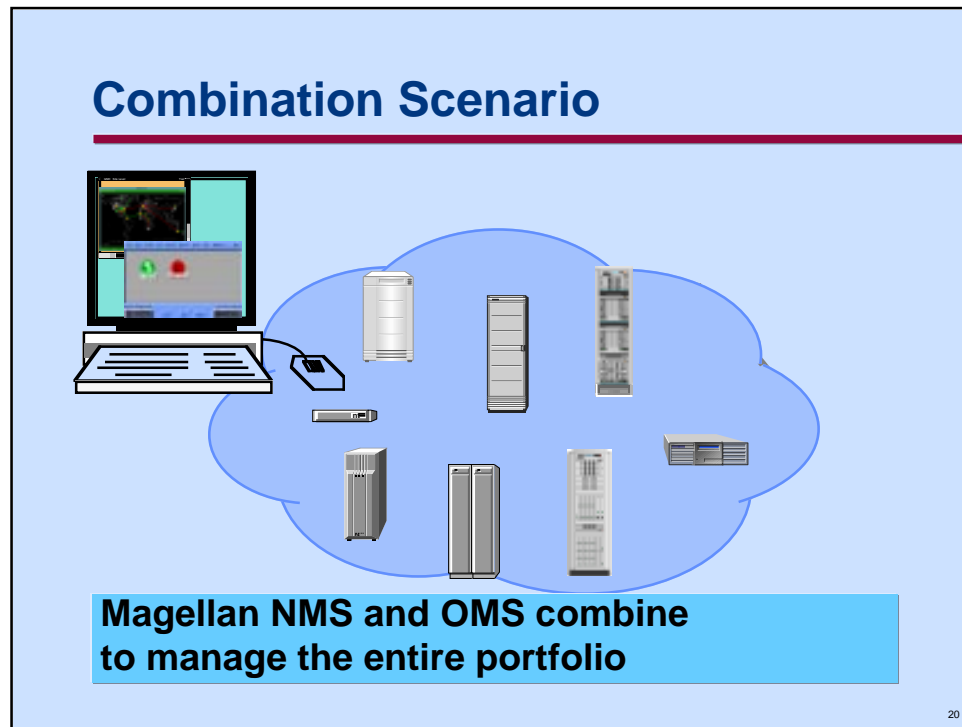
With ATM based networks, our lead customers have been demanding not only open interfaces but also applications based on leading commercially available management platforms. Currently HP dominates the management platform market, thus the reason that the majority of our ATM-based network elements reside on HP OpenView. For all platforms, the decision to provide the management of an individual element on a particular platform will be business dependant - in other words, based on volume customer demand.



In Passport-only networks we are addressing the situations and scenarios that the market and our customers demand. Each of these open platforms offers capabilities that individual customers are demanding. No other equipment vendor offering the capability set that Magellan delivers provides as complete a suite of commercially available management platforms as those offered by Magellan.

The Magellan-delivered capability set has been tailored to fit the platform, but the applications themselves are the same. This allows the network operator to choose the platform which best suits his/her needs.

At Inform '95, we detailed how Magellan had chosen HP & IBM with a third platform still to be determined. Cabletron has been selected for its capability sets targeted at the enterprise customer to manage Magellan Passport and Meridian 1. This suite of functionality will be delivered on Windows NT.



For customers who originated in a DPN-100 base and require ATM-based equipment, the management solution today is a combination of both Magellan NMS and OMS. These management systems would run together as two separate desktop applications atop Sun's common desktop environment.

In the future our expectation is that the capability sets available on Magellan NMS will be available on commercially available open platforms. Once this is the predominant situation, Magellan will be able to deliver the management of a DPN-100 based network on a commercially available platform.

Value-added Functionality

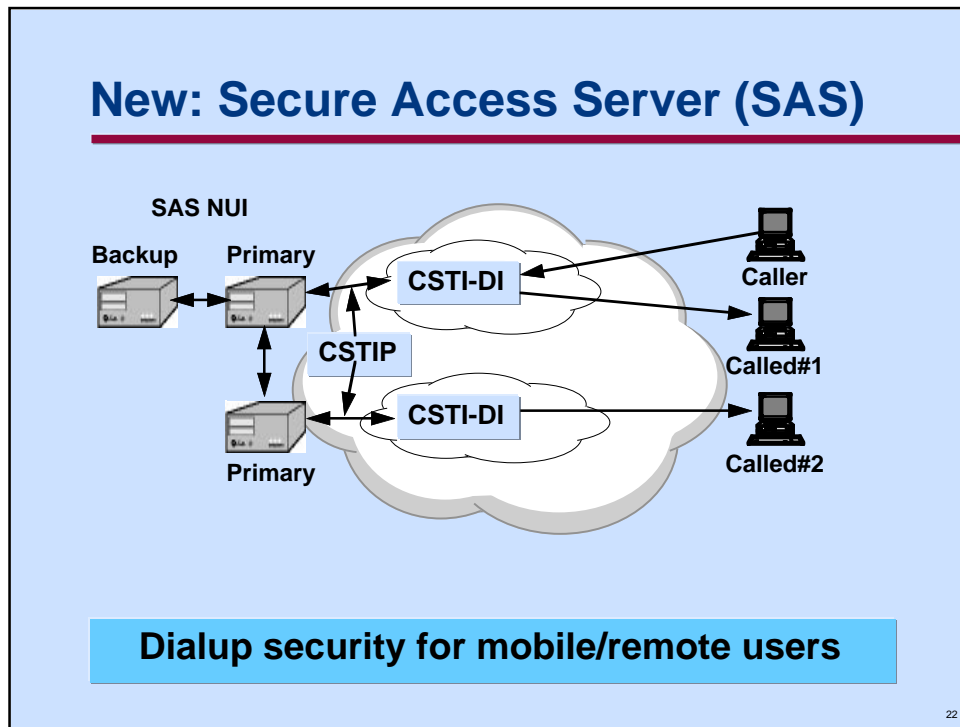
- **Wide range of interfaces**
ex: APIs, OSI Agent, etc.
- **Historical data collection**
ex: Accounting data, statistical data, alarms, etc.
- **Configuration tools**
ex: network reporting, backup and restore, etc.
- **Planning and analysis tools**
- **Dialup security**
– a new network dialup security capability

Functionality for any environment

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Historically, Magellan has offered a suite of value-added capabilities to assist in the management of a Magellan network of equipment. As we expand our product line, we are also actively updating our value-added tools to be utilized by these new network elements.

As described earlier, Magellan is also repackaging the value-added functionality. By repackaging this functionality a network operator can choose his/her desired network management platform and still take advantage of all the required toolsets to manage a network.



For dialup security on a DPN-100 or MAS network element, Magellan offers two types of security. With the VAX-based Off-Net NUI system, a network operator can offer dialup security via a basic userid and password.

With the secure access service (SAS), Magellan is offering an enhanced capability that matches the more stringent needs of dialup network operators. With SAS and the CSTI Protocol a network operator can deliver:

- Distributed databases for reliability and scalability
- Userid and password capabilities that can enforce password changing based on length of time or user initiation
- Closed user group access based on userid
- Domain name server address translation
- Administrator partitions based on customer grouping for customer control
- Comprehensive API for integration into current systems
- A migration utility to move from the current off-net NUI system to the new SAS system
- Sun Solaris 2.5 based operating system

Magellan ServiceMonitor

- **Simple to use**
 - focus on management of VPN services rather than equipment
 - reduces complexity for customer
- **Cost-effective**
 - PCs have lower cost than workstation
 - reduced service provider training and support costs
- **Supports international VPNs**
 - Magellan service provider co-operation for global customers
- **Compatible with multiple Magellan products**
 - DPN-100, Passport, Vector (R3)

A customer-driven solution

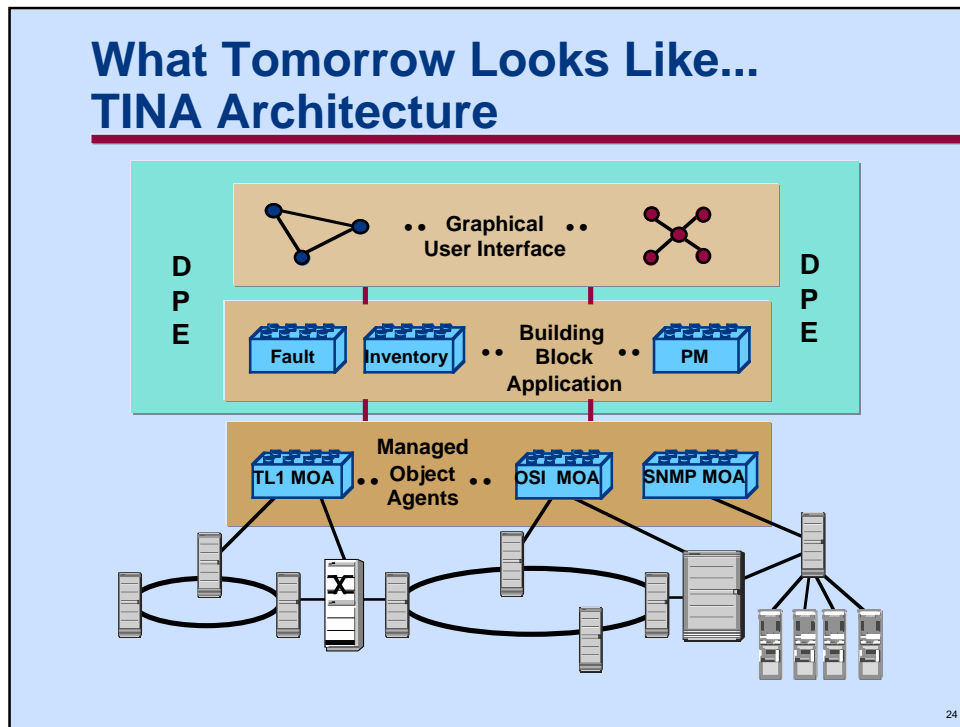
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With ServiceMonitor, Magellan is evolving its customer network management capabilities to a customer service management capability. Magellan has a history of providing capabilities to network operators that allow them to differentiate their service offering. Originally it was with a VT-100 view into the network via a customer defined DPN-NCS connection. The next step in the evolution was with Magellan NMS-CNM. With this capability, end-users of a network were given a graphical network view of their portion of the network.

The next evolutionary step in providing this type of functionality is a 'service' view of the network. Unlike previous iterations as well as other vendors current implementations, a service view is different from the physical view of the network. With a physical view, the end-user has to understand the technology they are utilizing as well as how their service is implemented on the technology. With a service view of their portion of the network, the management software hides the technology and only shows the service that the end-user is utilizing.

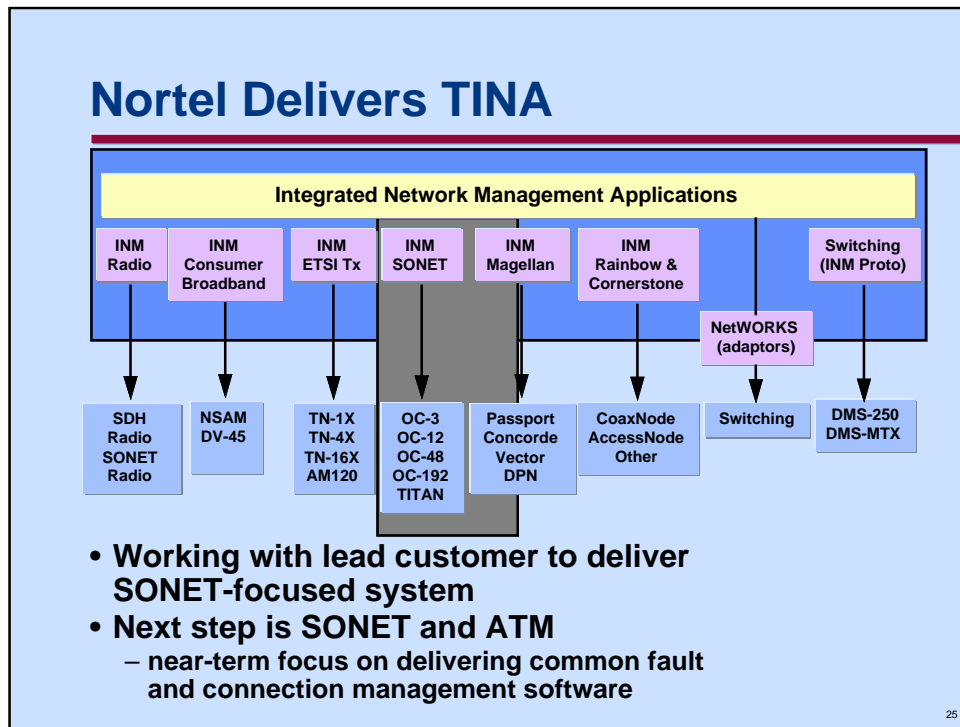
As problems occur with a particular customers service, the account prime associated with that customer can see what the customer is seeing. With ServiceMonitor the end-user and the account prime have a common view or reference point when discussing problems over the phone.

In addition to ServiceMonitor, the capability set available with our data collection tools can play a role in delivering historical data such that customer reports can be generated to monitor service level agreements.



Earlier, this presentation covered the influences on network management from both a network and standards perspective. The next evolutionary step in the management of a network is the TINA working groups implementation of network management. This standard is based on building blocks of functionality that will deliver TMN based management capabilities. These building blocks are based on the distributed computing environment (DPE) standards.

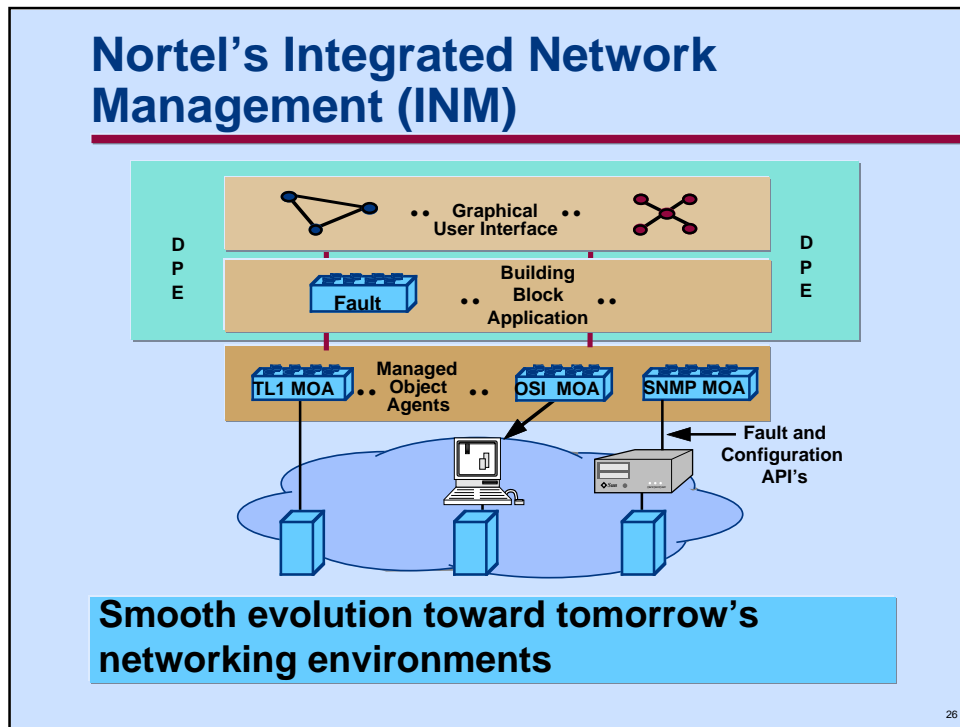
By implementing an INA-compliant architecture, network operators and vendors have a framework in which to work so that they can deliver all aspects of the TMN model of network management.



Nortel has identified TINA as the preferred infrastructure for the public network, broadband implementation of TMN. It utilizes the HP INA/DPE architecture for the management of the broadband portfolio.

Nortel has been working with several lead customers since late 1994 on a suite of INA consistent building blocks for the management of a SONET backbone network. The SONET building blocks provide INA open interfaces that allow creation of a broader service assurance solution set.

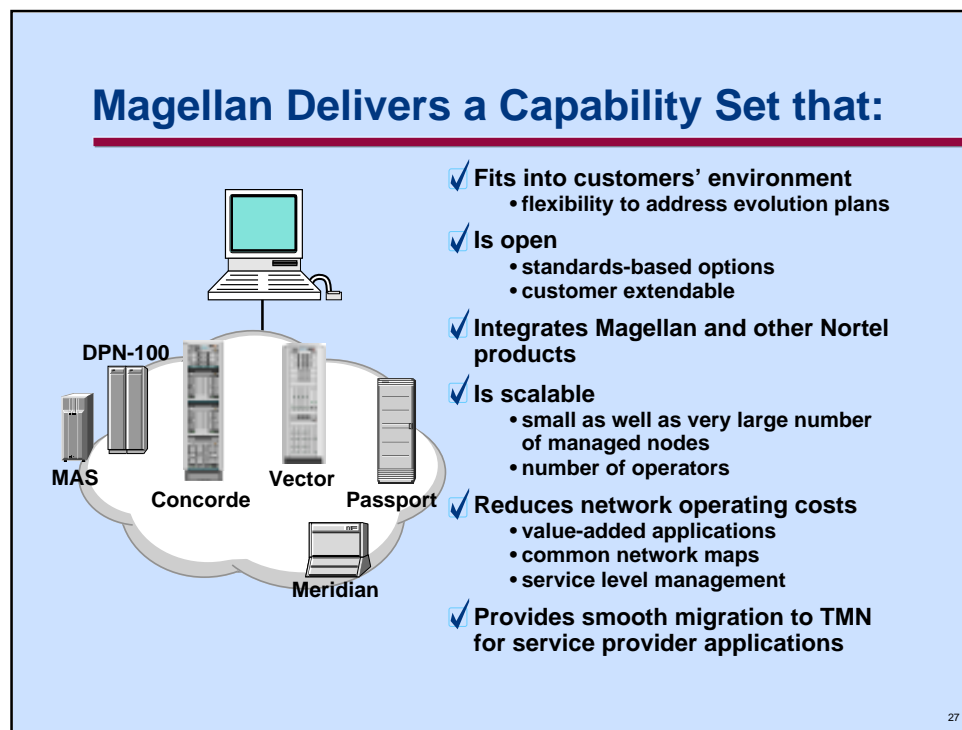
To ensure that today's 'open' solution evolves into tomorrow's environment, Nortel actively participates in industry forums, such as the Network Management Forum and ATM Forum, as well as standards committees like ITU and ANSI. Furthermore, Nortel is committed to delivering management products which operate on commercially available platforms, and support industry standard interfaces.



Nortel has initiated the integrated network management (INM) project focused on leveraging our existing TINA SONET initiative to address multi-product, multi-technology integration. Initially, this program will demonstrate integrated SONET/ATM fault management applications by the end of 1996. The implementation of a SONET/ATM TINA fault management application will capitalize on a SONET fault management building block, and a new ATM fault management building block to be introduced in parallel. Communications between these applications and Magellan's ATM products will be via a managed object agent (MOA) interface.

The diagram above represents our INA-based management infrastructure which delivers cross-product management using a distributed processing environment (DPE), and supports a suite of independent application building blocks. Integration with technology specific EMLs is accomplished using managed object agents (MOAs).

This MOA will interface to currently available interfaces that are part of the Magellan's management capability set. This allows us to ensure migration from yesterday to today to tomorrow networking environments can be accomplished with the least amount of disruption as possible.



For more information on Magellan management solutions, visit:

- **Workshops**

- Magellan Open Management: Fit and Flexibility
- Closing the Loop with Planning and Analysis
- Magellan ServiceMonitor: Customer Service Management for VPNs

- **Whiteboard clinics**

- talk to developers and product managers about your network management situation

- **Hands-on workshops**

- Secure Access Service Server
- Planning and Analysis Tools

- **Demonstration center**