



# Solutions Guide

Building a Better Network



## Executive Summary

This guide explains how the various Madge product lines work together to provide optimum solutions for a variety of customer networking requirements. This guide will present *Switching to ATM* migration strategies using Madge products in pure Ethernet and Token Ring environments and also in mixed networks. We will address practical strategies for migrating from shared to switched networks, from switched LANs to ATM, and also end-to-end ATM configurations. Finally, we will discuss network management, providing practical examples of how the Madge Network Management System helps network managers to keep switched networks under control from one end to the other.

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## Introduction

ATM is the networking technology of the future. Multimedia applications, the Internet and intranets will dramatically change the way businesses operate. Central to the successful implementation of these newer networked applications is ATM. The cell based transmission scheme and bandwidth allocation mechanisms of ATM make it a radically better solution for networked multimedia applications that require the integration of voice, video and data.

As organizations make the strategic decision to adopt switching and ATM as a long-term networking solution, they run smack into the uncertainties and complexities of building and managing switched networks - particularly those that combine switched LAN technology and ATM. As a result, more and more network managers are looking for someone who can help them navigate this new and uncertain terrain. To minimize risk and ensure a smooth migration, organizations are seeking out a single vendor who can provide everything, from the adapter card to the ATM switch to the management software - and make it work together from end to end.

That vendor is Madge Networks. At Madge, our strategy is to support large enterprises with best-of-class products and services from end-to-end as they migrate to ATM. To that end, we have taken the following steps:

- We have acquired industry-leading Ethernet switching technology. This, together with our traditional strength in Token Ring and our innovative ATM technology, has enabled us to deliver the most complete line of LAN switches in the industry. Our Collage<sup>™</sup>, LANswitch<sup>™</sup>, Visage<sup>™</sup>, and Smart Ringswitch<sup>™</sup> products are second to none for improving the performance of customer networks now, while providing connections to the ATM networks to come.
- We have continued to invest heavily in support and service for our customers. Our commitment to *Customer Support Without Limits* means solving problems when they arise as well as anticipating customer needs and helping them design networks that are future-ready.

This guide presents this broad and comprehensive range of products in a solution format. We can provide the one-stop-shopping and long-term partnership that so many organizations want. Madge is in the enviable position of being able to offer a coherent strategy for improving network performance today, with products that will continue to be productive components of the network tomorrow.

## Ethernet Solutions

### Migrating from Shared to Switched Networking

#### **Problem: Overloaded Ethernet segments**

The majority of today's LANs are based on Ethernet and Token Ring. There are a number of factors pushing these shared-media networks to their limits. One factor is the phenomenal growth in the number of network connections. There are simply more users on the network than ever before - and more users cause more congestion on the shared segment. Typically, organizations have alleviated this congestion by further segmenting the network. While this improved performance on each individual Ethernet segment, it put pressure on the backbone, which now had to handle transmissions between a multitude of separate LAN segments.

#### **Solution: Connect shared Ethernet segments to a switched backbone**

LAN switching technology enables administrators to upgrade the network in increments, without disrupting existing network infrastructure. The switch is like a multiport bridge, but without the latency, and with better scalability. Each port on the switch accommodates one Ethernet segment, workstation or server. Based on packet destination, the switch dynamically connects pairs of switch ports and physically switches the packet from one port to the other.

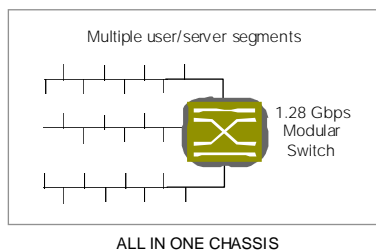
## Madge Option 1: Connect modular shared Ethernet to LANswitch

**Target:** Customers who have already invested in shared modular LET-36/20/10 hubs and want to improve network performance by moving to switching.

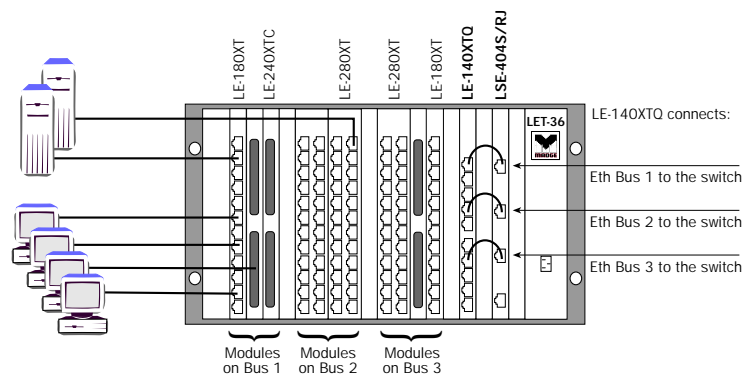
By inserting a LANswitch LSE-404S/RJ module into the hub chassis and connect existing 10BASE-T Ethernet segments to its four segment-switching ports, the customer immediately upgrades those segments from a 10 Mbps shared backbone to a 1.28 Gbps switched backbone. The result is a dramatic boost in network performance.

In the illustration below, an LE-140XTQ module connects all shared segments in the hub to the LANswitch LSE-404S segment switch. The LE-140XTQ can assign individual ports to any Ethernet bus segment on the backplane of the hub. In the configuration below, each port of the LE-140XTQ interfaces with a different backplane bus. These ports are then externally connected to the LSE-404S.

### Logical View



### Physical View



### The Madge Shopping List

- LET-36/20/10 Hubs
- LSE-404S/RJ Segment Switch (copper)
- LE-140XTQ 10-port Ethernet module with bus-port switching
- LE-180XT 12-port shared Ethernet module
- LE-280XT 24-port shared Ethernet module
- LE-240XTC 24-port shared Ethernet module (telco)

### Customer Benefits

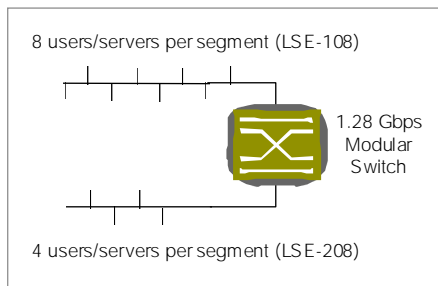
- Excellent cost/benefit ratio
- Adding a single module boosts backbone bandwidth from 10 Mbps to 1.28 Gbps
- Leverages customer investment in existing shared-media modules and hub chassis
- Shared and switched coexist in the hub so customer can introduce switching gradually

## Madge Option 2: Replace shared Ethernet modules with LANswitch modules

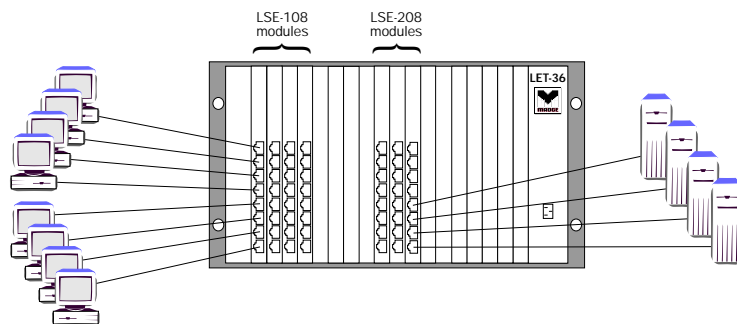
**Target:** Established LET-36/20/10 customers who want the benefits of switching, but can't afford or don't need to give every desktop a dedicated 10 Mbps switch connection. Also for new installations who want the flexibility of a modular solution.

A switched network will run much faster and support more users than its shared-media predecessor. The key is knowing how much bandwidth to allocate to each LAN or to each user. LANswitch LSE-208 and LSE-108 workgroup switches let you selectively give users the right amount of bandwidth, depending on how much they use and what they use it for. What's more, organizations can introduce switching incrementally, so they can spread the cost of the equipment over time. The LSE-108/208 modules support a fixed number of users per segment and dynamically allocate 10 Mbps between those users.

### Logical View



### Physical View



### The Madge Shopping List

- LET-36/20/10 Hubs
- LSE-108 Workgroup Switch
- LSE-208 Workgroup Switch

### Customer Benefits

- Guaranteed bandwidth for a fraction of the cost of a full switching solution
- Pay only for the bandwidth needed. Customer avoids expensive solutions that are overkill
- Leverages customer investment in existing LET-36/20/10 hubs
- Customer can introduce switching gradually since shared and switched coexist in the hub
- Fault tolerance for mission critical networks

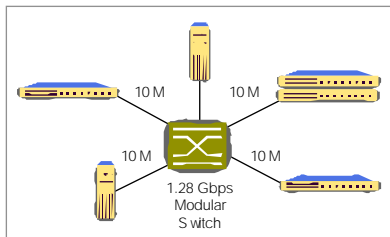


### Madge Option 3: Stackable shared to LANswitch

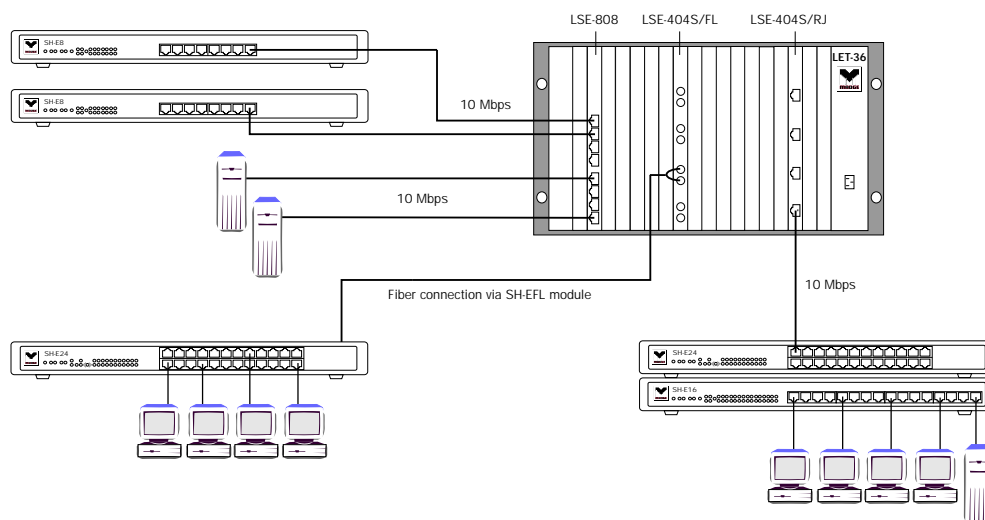
**Target:** Customers who already have LANstack™ hubs deployed throughout the network and want to upgrade backbone performance by moving to switching. The modular LANswitch backbone is ideal for larger installations that need a scalable, fault-tolerant backbone solution.

Eight-port LANstack hubs enjoy a dedicated 10 Mbps switch connection via the LSE-808 module, while larger clusters get backbone relief via LSE-404S segment switches.

#### Logical View



#### Physical View



#### The Madge Shopping List

- LET-36/20/10 Hubs
- LSE-404S/RJ Segment Switch (copper)
- LSE-404S/FL Segment Switch (fiber)
- LSE-808 Workgroup Switch
- LANstack SH-8/16/24 hubs
- SH-EFL fiber-optic backbone card

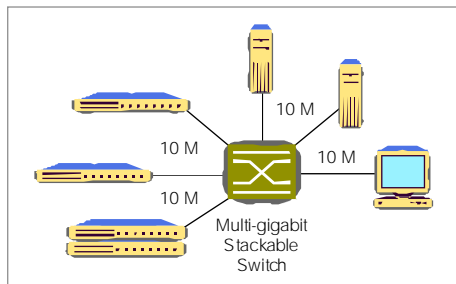
#### Customer Benefits

- Immediate boost in backbone performance from 10 Mbps shared to 1.28 Gbps switched
- Scalable backbone bandwidth allocation
- Leverages customer investment in existing LANstack hubs
- Gradual migration to switching spreads cost over time
- Fault-tolerance for mission critical networks

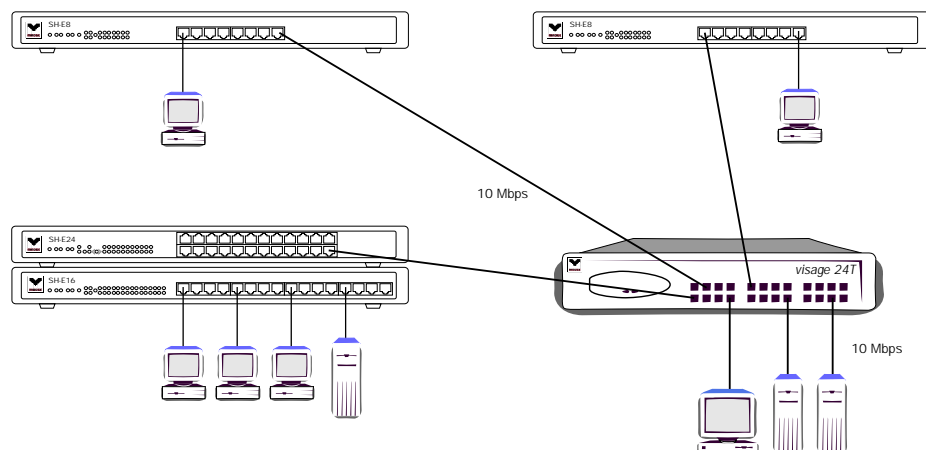
## Madge Option 4: Stackable shared to Visage

**Target:** Customers who already have LANstack hubs deployed throughout the network and prefer a full, non-modular (stackable) switching solution. Typically for smaller installations that do not need the multiprotocol support or capacity of a modular hub.

### Logical View



### Physical View



### The Madge Shopping List

- Visage 24T
- LANstack SH-8/16/24 hubs

### Customer Benefits

- Immediate boost in backbone performance from 10 Mbps shared to 1.28 Gbps switched
- Scalable backbone bandwidth allocation
- Leverages customer investment in existing LANstack hubs
- Gradual migration to switching lets customer spread investment over time

## **Implementing a Fully Switched Ethernet Network**

### **Problem: Congestion caused by networked applications**

The increased processing power of workstations and personal computers has fueled the use of more sophisticated applications collaborative computing, groupware (such as information sharing via Lotus Notes), company-wide databases, and client-server applications. Other factors that will hasten the abandonment of shared-media Ethernet is the trend toward multiservice networks, where the network supplies all services from simple data transfer to telephony and video.

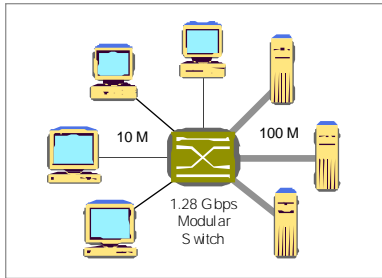
### **Solution: Give every desktop a switched network connection**

To support multiservice networking today, or to prepare current networks for future multiservice applications, network administrators will have to retire all repeater-based LANs and give every device its own connection to the switch.

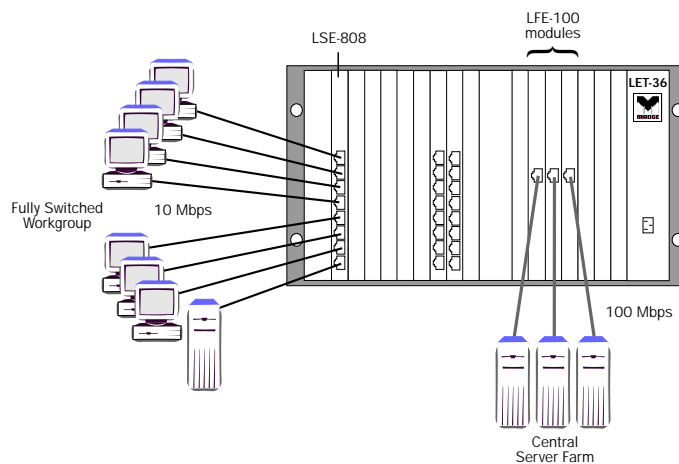
## Madge Option 1: Modular LANswitch solution

**Target:** Typically for new installations, and forward-looking customers who want the benefits of a fully switched network today, but are also planning for a future migration to ATM. A fully switched solution is especially good for first-time networks because they can bypass the shared-media technologies and go straight to switching.

### Logical View: Dedicated (private) Ethernet per user/server



### Physical View



### The Madge Shopping List

- LET-36/20/10 hubs
- LSE-808 Workgroup Switch
- LFE-100 Fast Ethernet Server Switch

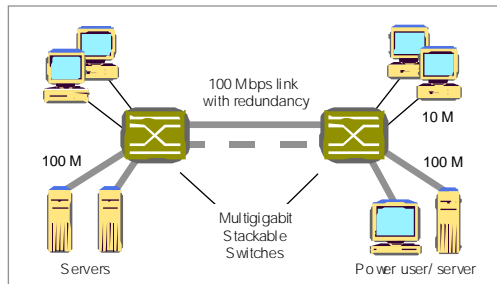
### Customer Benefits

- Eliminates server bottlenecks with 100 Mbps Fast Ethernet server links
- Fully scalable with no performance penalties
- More than enough bandwidth for multimedia applications (voice, video)
- Enables creation of VLANs for security and broadcast confinement
- Fault-tolerance for mission critical networks

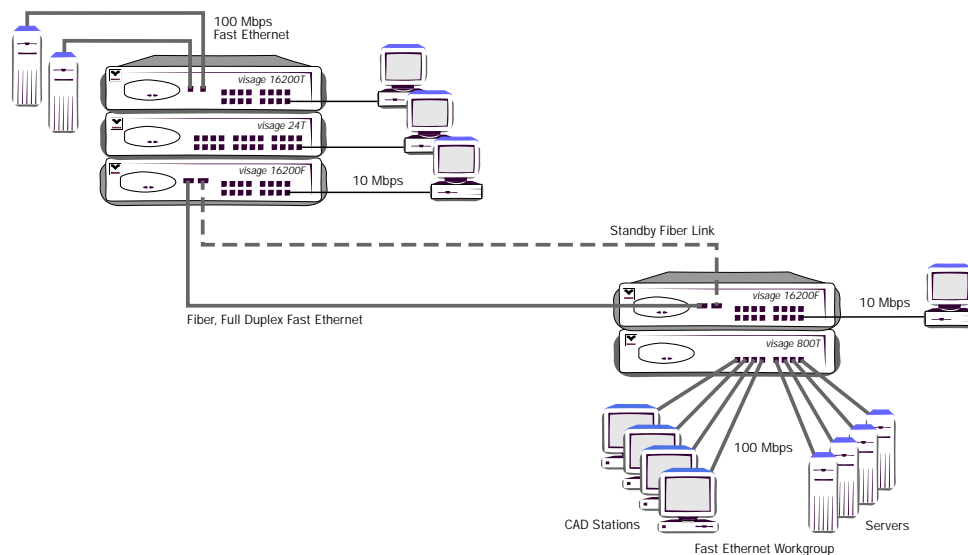
## Madge Option 2: Stackable Visage solution

**Target:** Visage is aimed at new installations who prefer the stackable framework, and customers who currently use stackables and want to upgrade to a fully switched network in the short term, but are also planning a future migration to ATM.

### Logical View: Dedicated (private) Ethernet per user/server



### Physical View



### The Madge Shopping List

- Visage 24T Ethernet Workgroup Switch
- Visage 16200T (copper Fast Ethernet)
- Visage 16200F (fiber Fast Ethernet)
- Visage 800T Fast Ethernet Workgroup Switch

### Customer Benefits

- Exceptionally cost-effective
- Plug'n'Play installation and operation
- Stackable and scalable with no performance penalties - room for future growth
- Eliminates server bottlenecks with 100 Mbps Fast Ethernet server links
- VLANs for security and broadcast confinement
- Fault-tolerance for mission critical networks

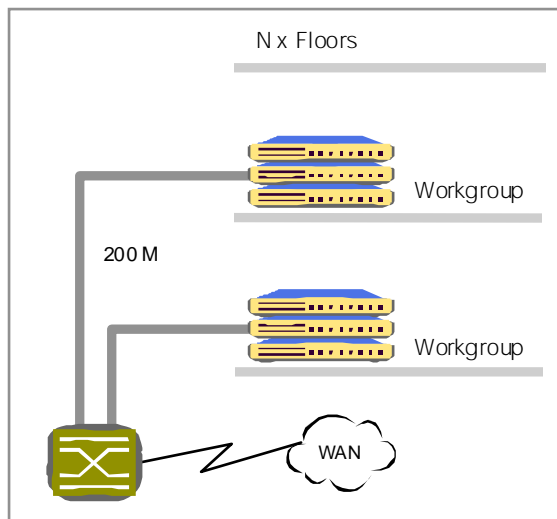
## Ethernet Switching Throughout the Building or Department

**Problem:** Finding a solution that is cost-effective without compromising on performance

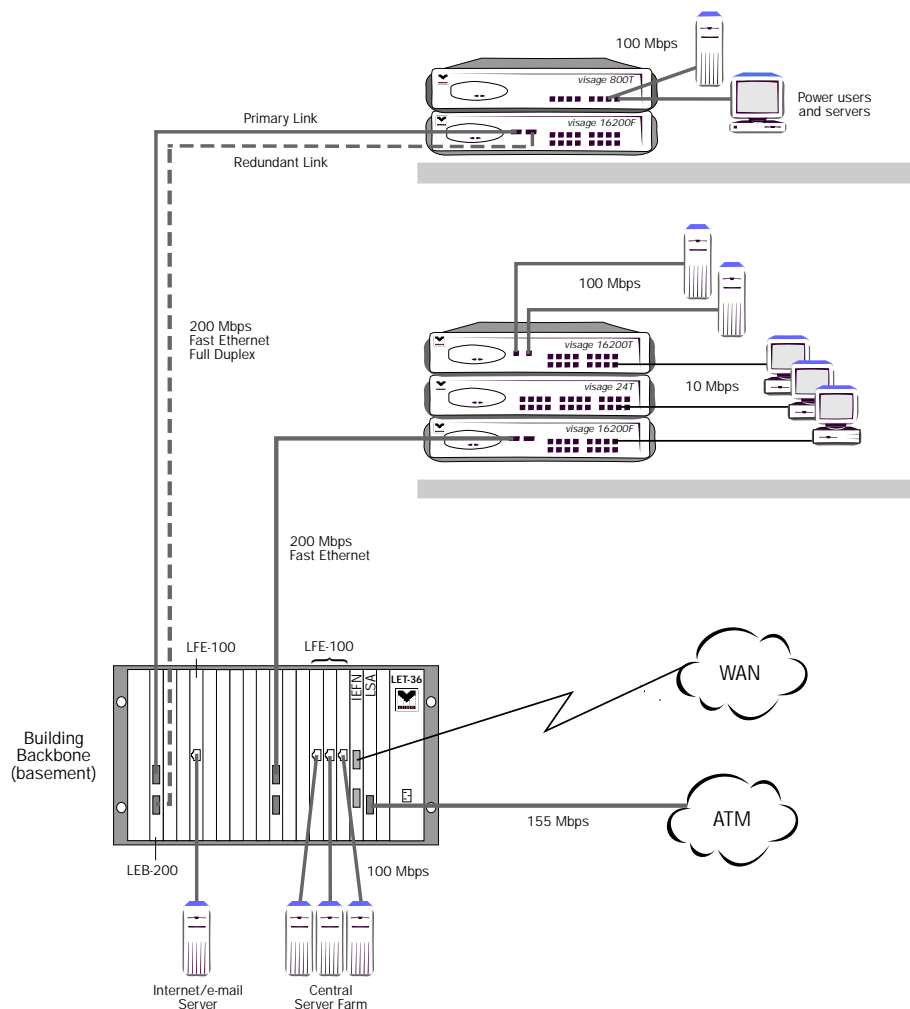
**Madge Solution:** LANswitch + Visage + ATM Access = best building solution

**Target:** This solution extends the fully switched configuration to encompass an entire building or department. It is applicable to new installations and to forward-looking customers who view switching as an important step in their long-term migration to ATM. Cost-effective Visage workgroups switches are deployed on each floor, with the resilient and fault tolerant LANswitch hub serving as the collapsed backbone in the basement.

### Logical View - Building Solution



## Physical View - Building Solution



### The Madge Shopping List

- LET-36/20/10
- LEB-200 (Fast Ethernet Backbone Module)
- Visage 16200F
- LANswitch LSA - ATM Access Switch
- IEFN - Ethernet Feeder Node

### Customer Benefits

- Cost-effective configuration on each level
- Fully scalable at all levels with no performance penalties
- No backbone bottlenecks
- Supports multimedia applications
- Define VLANs across the backbone for security and broadcast confinement
- End-to-end VLAN and priority implementation
- Fault-tolerance for mission-critical networks

## Switching Across the Ethernet Campus Network

**Problem: Congestion and bottlenecks on the campus backbone**

**Solution: Install a high-speed campus backbone.**

Currently, organizations have three practical options for high-speed backbones in their campus networks: FDDI, Fast Ethernet and ATM. The pros and cons of each solution will, to a great extent, determine the type of backbone that the customer selects.

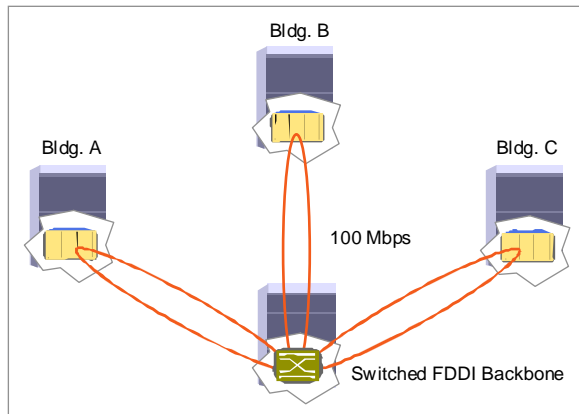
- FDDI is the most mature, accepted and tested of the fast networking topologies. With its ring architecture, it can deliver over 90% of its 100 Mbps of bandwidth for data. Also FDDI's dual ring makes it easy to create a fault-tolerant backbone. However, FDDI is still a shared medium.
- Fast Ethernet is only slightly more expensive than 10 Mbps Ethernet, and it can be implemented without changing the end-to-end infrastructure. With Fast Ethernet, there are no translation delays from the desktop to the backbone, and vice versa, making it ideal for data networks based on pure Ethernet.
- ATM is the only networking technology that is optimized for multiservice support. One of ATM's main advantages is its built-in mechanism for negotiating point-to-point connections with an assured quality of service. For the next few years, the majority of ATM applications will be in the backbone.



## Madge Option 1: Switched FDDI Campus Backbone

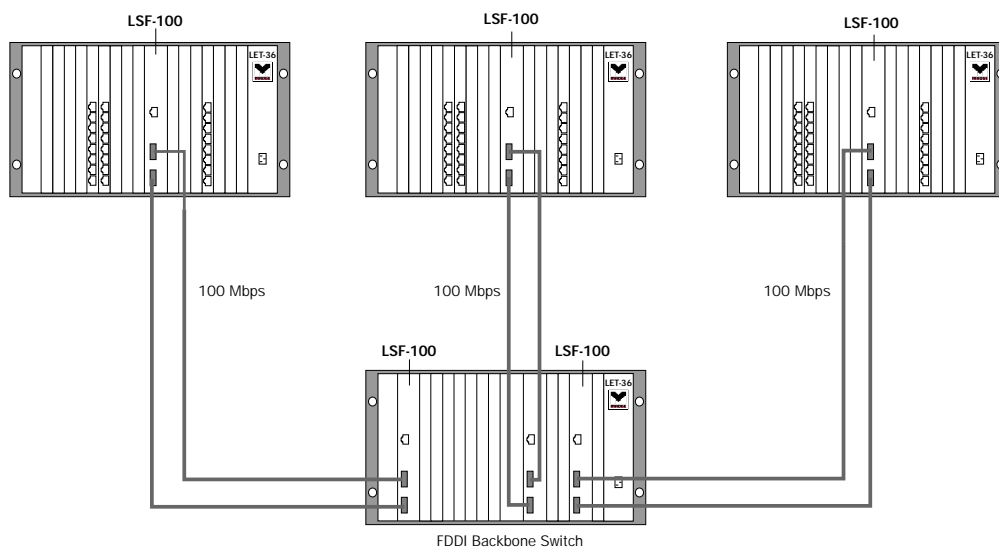
**Target:** Large organizations who already have FDDI infrastructure in place and prefer using FDDI because it is a mature and resilient backbone technology.

### Logical View



The LSF-100 module creates switched FDDI backbone connections between LANswitch hubs. The LSF-100 integrates easily into existing Ethernet/FDDI networks, and allows customers to preserve their investment in FDDI infrastructure.

### Physical View



### The Madge Shopping List

- LET-36 hub
- LANswitch LSF-100 FDDI Backbone Switch

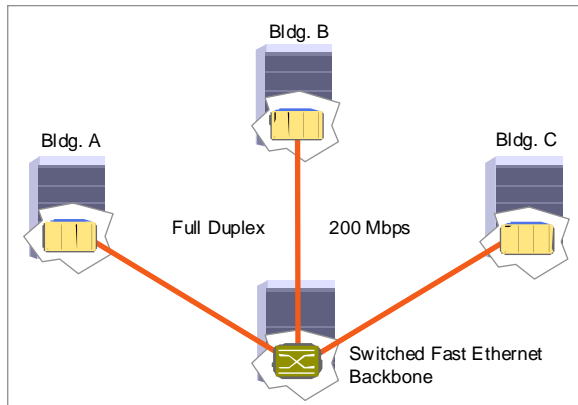
### Customer Benefits

- Preserves investment in existing wiring/ infrastructure
- Fully switched FDDI. Dedicated 100 Mbps rather than shared 100 Mbps between buildings
- Much higher performance compared to traditional FDDI backbones with routers
- Enables creation of VLANs across the backbone for security and broadcast confinement
- Fault-tolerance for mission-critical networks

## Madge Option 2: Switched Fast Ethernet Campus Backbone

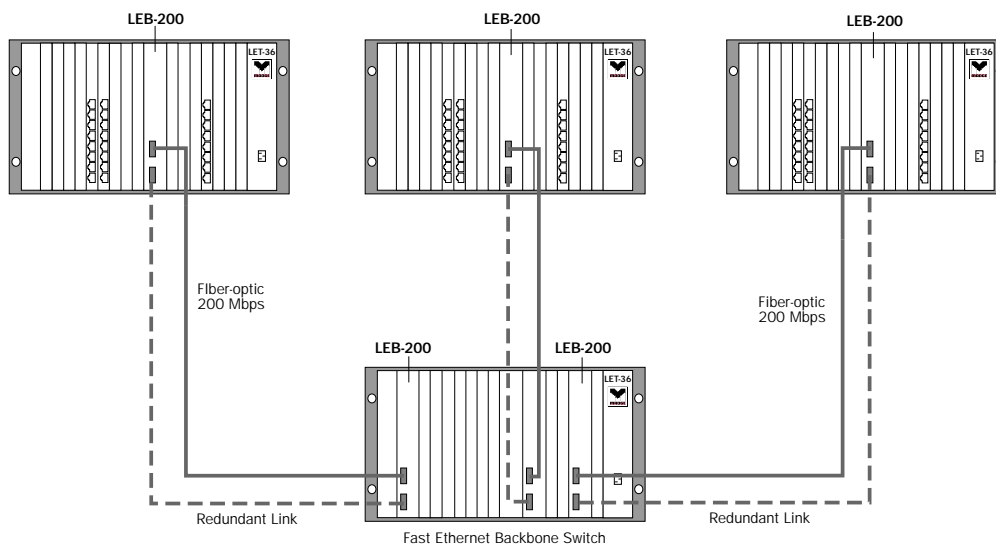
Target: New installations and pure Ethernet data networks.

### Logical View



The LEB-200 creates switched full duplex, Fast Ethernet backbone connections between LANswitch hubs. To make sure that backbone connections don't go down, the LEB-200 is equipped with a backup port that kicks in automatically upon failure of the primary connection.

### Physical View



### The Madge Shopping List

- LET-36 hub
- LEB-200 Fast Ethernet Inter-Switch Link

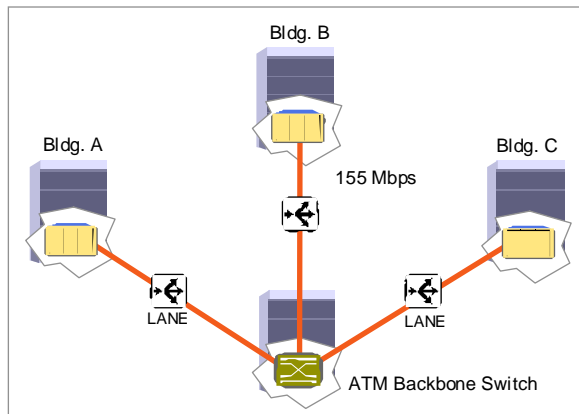
### Customer Benefits

- Eliminates backbone bottlenecks
- No translation required between clients and backbone
- 100BASE-FX (Fast Ethernet over fiber) for interference-free long-distance connections
- Enables creation of VLANs across the backbone for security and broadcast confinement
- Fault-tolerance for mission-critical networks

### Madge Option 3: ATM Campus Backbone

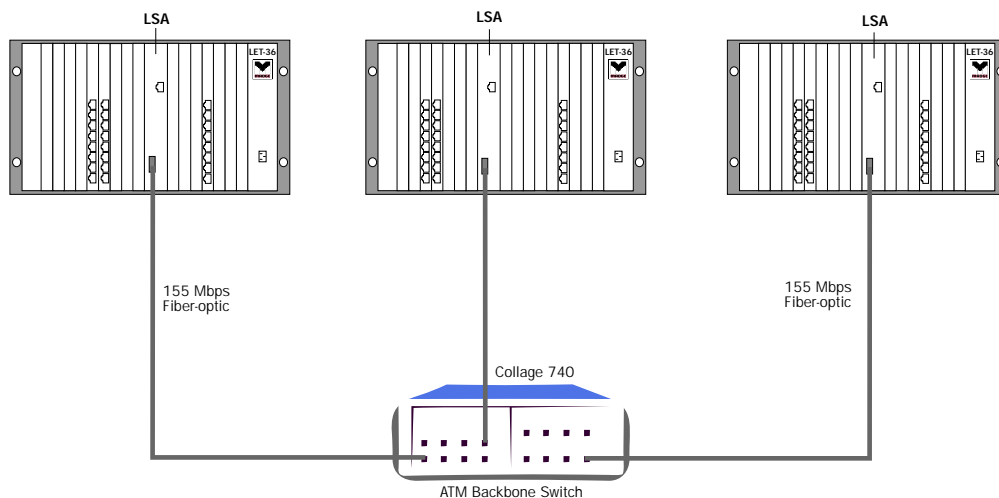
**Target:** For new installations that need multiservice support for data, voice and video, and forward looking customers for whom ATM in the backbone is the first step of a migration to a fully switched ATM network.

#### Logical View



The LANswitch LSA module provides ATM access for LAN users. One LSA module can connect the whole building to the ATM campus backbone. Standard-compliant LAN emulation assures smooth connectivity across the campus network. For the ATM backbone itself, Madge offers the Collage 740.

#### Physical View



#### The Madge Shopping List

- LET-36 hub
- LSA LANswitch to ATM Access Switch
- Collage 740 Backbone ATM Switch

#### Customer Benefits

- Smooth migration to ATM (protects investment)
- ATM backbone supports multiservices
- VLANs and QoS supported across the ATM backbone (end-to-end service)
- LSA supports ATM access for Ethernet, Token Ring and FDDI
- Fault-tolerance for mission-critical networks

## Token Ring Solutions

### Migrating from Shared to Switched Networking

#### Problem

Poor network performance due to congested rings combined with high delays through bridges and routers

#### Solution

Segment rings and interconnect the segments using high-performance switches. This will result in a dramatic improvement in network throughput and performance.

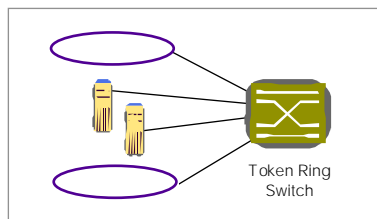
## Madge Option 1: SmartCAU, SmartRAM, and SmartLAM stackable hubs connected to Smart Ringswitch

The Smart Ringswitch together with Madge Stack™ provides a complete solution to Token Ring connectivity. The stackable technology is cost-effective and offers full flexibility for growth.

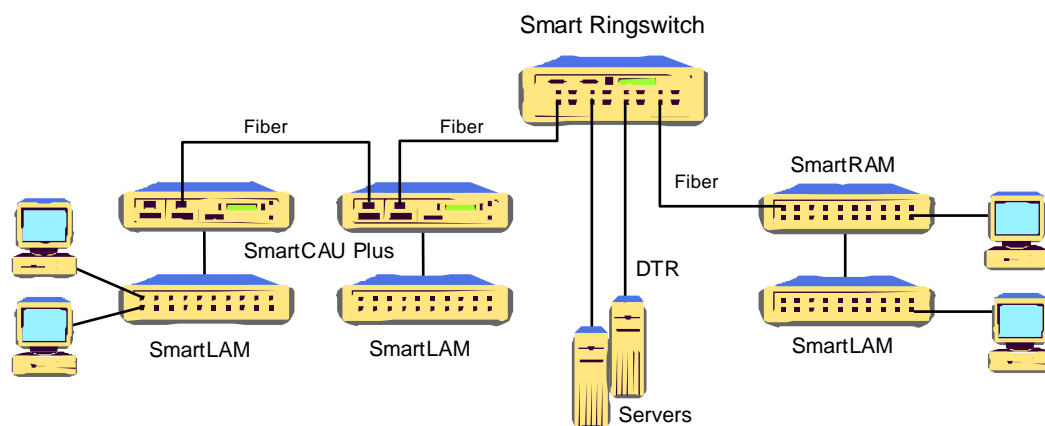
Madge Stack hubs, comprising SmartCAU™ Plus, SmartRAM™ and SmartLAM™ have a versatile and expandable range of options, including support for both UTP and STP media. By using the UTL Plus and FTL Plus modules, the hubs also offer full support for RI/RO and fiber-optic connectivity.

The Smart Ringswitch delivers high performance cut-through switching between the rings to eliminate backbone congestion. It also facilitates ring segmentation to relieve congestion in overloaded rings.

### Logical View



### Physical View



### The Madge Shopping List

- Smart Ringswitch
- SmartCAU Plus
- SmartRAM
- SmartLAM
- UTL Plus, FTL Plus

### Customer Benefits

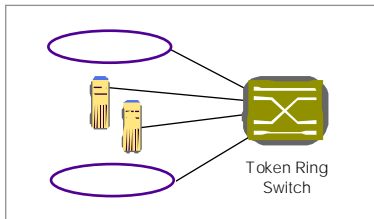
- Improves network performance
- Cost-effective stackable technology
- Maximizes investment in Token Ring technology

## Madge Option 2: Modular LANswitch hubs connected to Smart Ringswitch

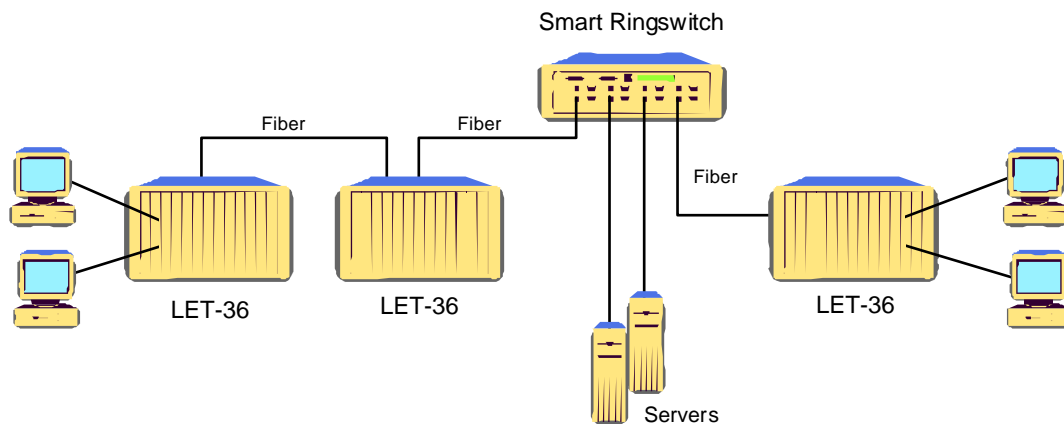
The Smart Ringswitch together with the LANswitch hub provides an alternative solution to Token Ring connectivity. The modular technology of the LANswitch hub provides a highly flexible and scalable solution with full support for UTP, STP, and fiber-optic media.

The Smart Ringswitch delivers high performance cut-through switching between the rings to eliminate backbone congestion. It also facilitates ring segmentation to relieve congestion in overloaded rings.

### Logical View



### Physical View



### The Madge Shopping List

- Smart Ringswitch
- LET-36/20/10 hubs
- LTR-104/SN, LTR-104/A MAU modules
- LTR-108/F Repeater module

### Customer Benefits

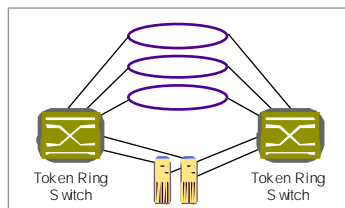
- Improves network performance
- Versatile, modular technology
- Maximizes investment in Token Ring technology

## Problem: Guaranteeing uptime for mission-critical networks

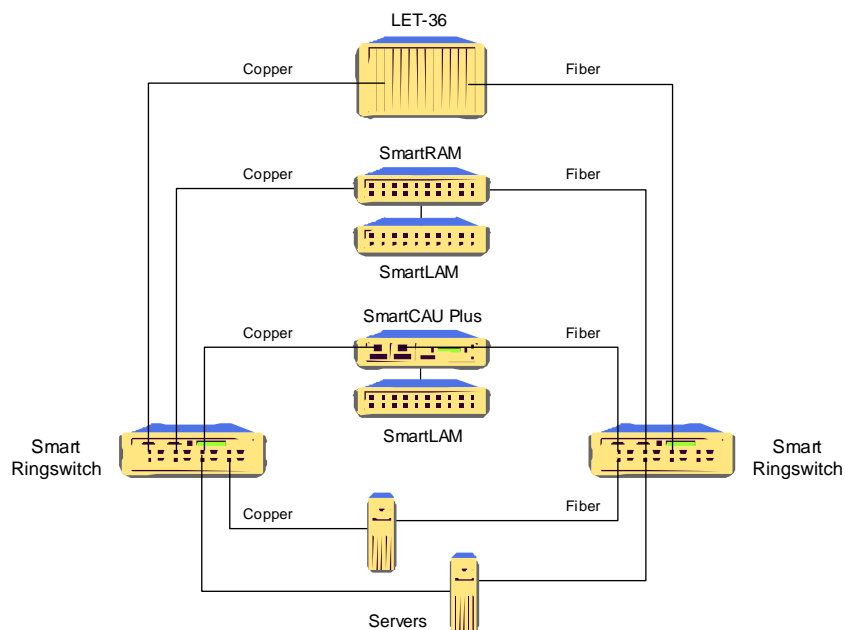
### Solution: Implement resilient topology

Today's highly competitive business networks need to be up and running around the clock, and therefore, must protect their networks against a variety of possible failures. In the example shown below, dual switches not only protect against switch failure, but also deliver backup in case of cable or power supply failure. In a source routed environment this solution has the added benefit of offering increased bandwidth with load sharing between the two switches, so the customer enjoys better performance and increased resilience.

#### Logical View



#### Physical View



#### The Madge Shopping List

- Smart Ringswitch
- LET-36/20/10 hubs
- LTR-104/SN, LTR-104/A MAU modules
- LTR-108/F Repeater module
- SmartCAU, SmartRAM, SmartLAM
- UTL Plus, FTL Plus

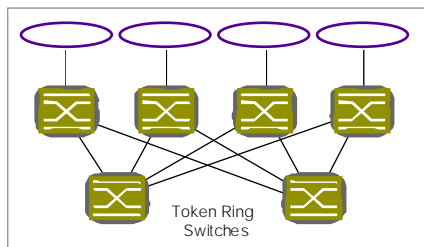
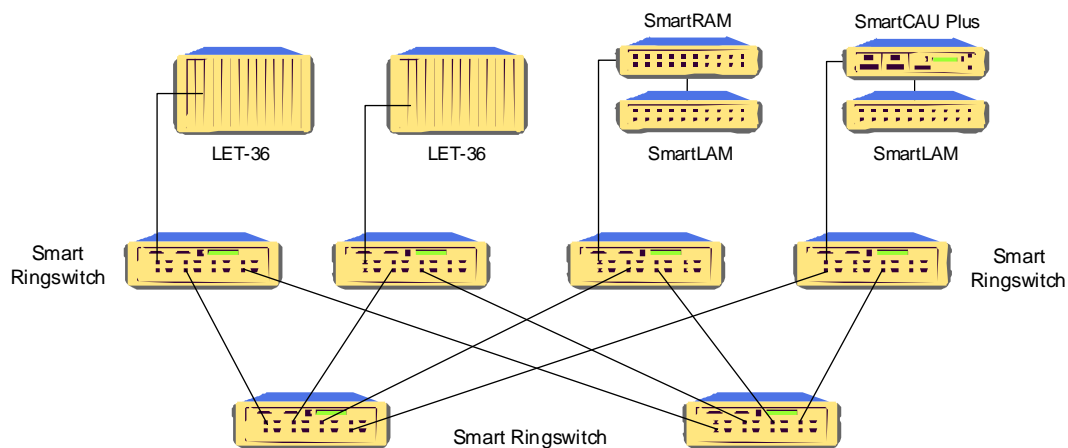
#### Customer Benefits

- Improves network performance
- Provides resilience against failures
- Increased capacity with load sharing
- Maximizes investment in Token Ring technology

**Problem: Large Token Ring installation requires a high port-count solution****Solution: Use multiple switches in a mesh configuration**

In large networks, multiple Smart Ringswitches can be connected together to provide switched solutions with high port-counts. By utilizing full duplex dedicated Token Ring as the interconnection technology, an extremely low delay solution is achieved. One or more 32Mbps links between the switches provides high capacity links and maintains the full benefit of low delay cut-through switching.

The example shown below uses a resilient topology to provide the high port-count required while at the same time providing a high degree of fault-tolerance. In a source routed environment, this solution has the added benefit of offering increased bandwidth with load sharing between the two switches, so the customer enjoys better performance and increased resilience.

**Logical View****Physical View****The Madge Shopping List**

- Smart Ringswitch
- LET-36/20/10 hubs
- LTR-104/SN, LTR-104/A MAU modules
- LTR-108/F Repeater module
- SmartCAU, SmartRAM, SmartLAM
- UTL Plus, FTL Plus

**Customer Benefits**

- Improves network performance
- High port-count switching
- Provides resilience against failures
- Maximizes investment in Token Ring technology



## Switching Across the Token Ring Campus Network

**Problem:** How to provide campus-wide access to key network resources

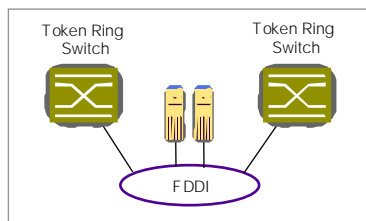
**Solution:** Use a high-speed campus backbone to link resources together

### Madge Option 1: Shared FDDI campus backbone

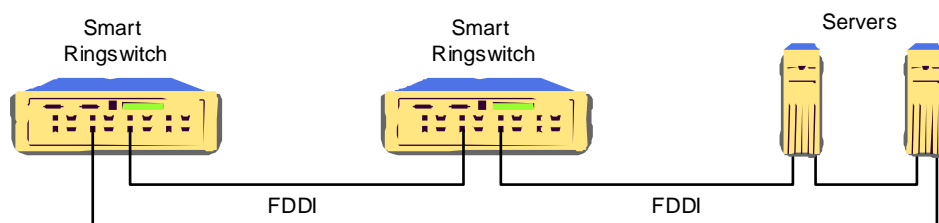
FDDI is the most mature, accepted and tested of the fast networking technologies. With its dual ring architecture, FDDI provides an inherently fault tolerant technique for interconnecting Smart Ringswitches. It also provides a fast medium for linking the Smart Ringswitch to key FDDI attached devices such as file servers.

In the example shown below, shared FDDI is used to interconnect Smart Ringswitches and key file servers. This provides 100 Mbps of bandwidth between the devices.

#### Logical View



#### Physical View



#### The Madge Shopping List

- Smart Ringswitch
- Smart Ringswitch FDDI module

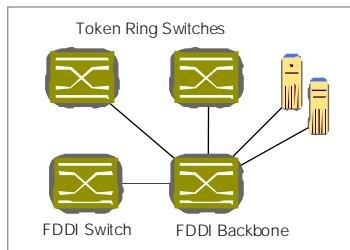
#### Customer Benefits

- Improves network performance
- Provides resilience against failures
- High-speed access to FDDI attached devices
- Maximizes investment in Token Ring technology

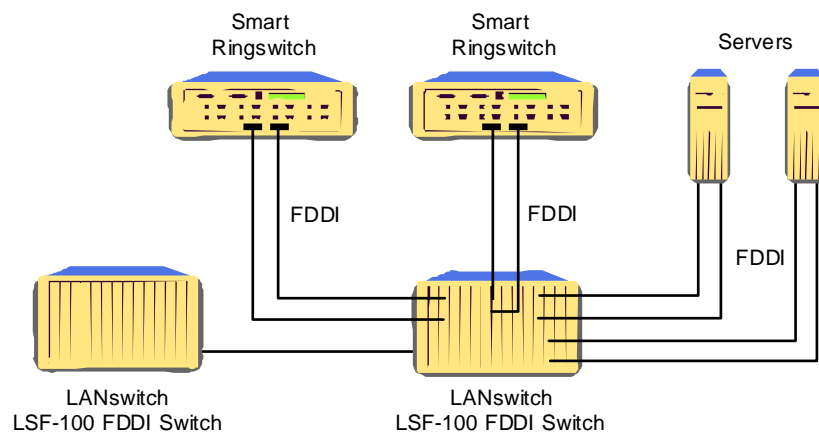
## Madge Option 2: Switched FDDI campus backbone

Switched FDDI provides 100 Mbps of bandwidth between devices. In the example shown below, the LANswitch hub and LSF-100 FDDI Switch modules are used to provide switched FDDI to a series of Smart Ringswitches and FDDI attached servers.

### Logical View



### Physical View



### The Madge Shopping List

- Smart Ringswitch
- Smart Ringswitch FDDI module
- LET-36/20/10 hubs
- LSF-100 FDDI Backbone Switch module

### Customer Benefits

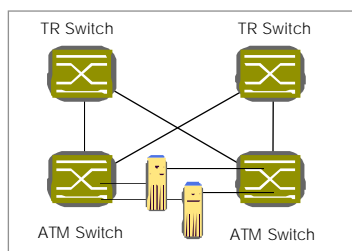
- Improves network performance
- Provides resilience against failures
- High-speed access to FDDI attached devices
- Maximizes investment in Token Ring technology

### Madge Option 3: ATM campus backbone

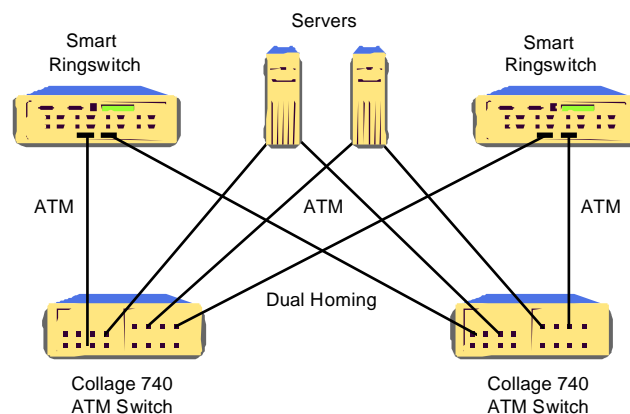
An ATM backbone provides the ultimate in backbone bandwidth and scalability with the knowledge that it is a long-term solution.

In the example shown below, Collage 740 ATM Switches are used to provide 155 Mbps of ATM connectivity to a series of Smart Ringswitches and ATM attached servers. Each Smart Ringswitch can be connected to two separate ATM switches to provide resilience against failure of the ATM switches, so the customer enjoys better performance and a high degree of fault-tolerance.

#### Logical View



#### Physical View



#### The Madge Shopping List

- Smart Ringswitch
- Collage 740 Backbone ATM Switch
- Collage 743 4-port 155 Mbps MMF Module
- PCI 155 ATM Adapter Card

#### Customer Benefits

- Improves network performance
- High-speed access to ATM attached devices
- Provides resilience against failures
- Maximizes investment in Token Ring technology

## Token Ring Adapters

### Madge Product Range

Client - Server Architectures					
Laptops / Notebooks	Legacy IBM Clients	General Purpose Clients	High End Clients	Workgroup Servers	Enterprise Servers
PCMCIA	Blue + PnP	Blue + PnP	Blue + PnP		
		Client PnP			
		AT Plus	AT Plus	AT Plus	
		PCI	PCI	PCI	PCI
			EISA	EISA	EISA
		MC16	MC16		
				MC32	MC32

### Problem: Optimize the ease-of-use and efficiency of new and legacy networked PCs

As the size and complexity of today's enterprise-wide networks increase, greater demands are placed on the network connection of client PCs. An inefficient client connection can prevent end-users from enjoying the optimized response times and performance delivered by an end-to-end switched network. The challenge for network administrators is to implement a cost effective and simple way to optimize the efficiency of the installed base of legacy 16-bit PCs, and at the same time, ensure the maximum effectiveness of the latest generation of new 32-bit PCs.

### Solution: Use standard network-wide client PC configuration

By defining standard end-user profiles and installation scripts for different user categories and PC types, network administrators can significantly reduce the complexity of managing large dispersed communities of network PCs. This approach facilitates moves, adds and changes to both existing and new networked PCs, and reduces the support overhead required to roll-out new network software and driver updates.

### Madge client adapters: the easy choice

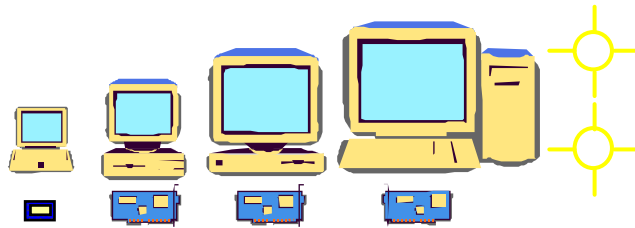
Madge adapters are designed to bring out the best in every networked desktop, irrespective of the PC platform, resident operating system, or applications running on users' desktops. Compatible with all popular client and server operating systems and PC environments, Madge adapters are the ideal choice for companies seeking a single source Token Ring solution end-to-end. Easy-to-use menu-based software can create a standard set-up for any networked PC and reduces the support overhead and complexity of managing large numbers of networked desktops.

All Madge adapters are shipped with a complete suite of network drivers and installation utilities that guarantee ease of installation and operation wherever they are used. Indeed, Madge provides ongoing software upgrades for its installed base to ensure that Madge adapters can support both evolving 32-bit desktops as well as established 16-bit legacy applications.

Madge Smart 16/4 Ringnodes provide the industry's broadest range of intelligent adapters for Token Ring networks, supported by a common suite of Smart LAN Support Software (LSS) network drivers and installation utilities that enable a standard network configuration script to be deployed network-wide, irrespective of the PC bus types used.

Madge Blue+™ adapters provide the unrivaled combination of excellent performance for ISA bus PCs and 100% compatibility with IBM LAN Support Program. Madge Fast Blue™ performance enhancing software allows customers to deploy a single high-throughput driver implementation for both Madge Blue and IBM shared memory adapters, with no impact to applications compatibility.

## Client PC Applications



### The Madge Shopping List - New Installations

- Smart 16/4 PCI Ringnode (bus master) (51-02)  
[For all high performance client/server applications]
- Smart 16/4 PCMCIA/PC Card Ringnode (20-00)  
[Robust, flexible network access for mobile users]
- Blue+ 16/4 ISA PnP adapter (62-04)  
[Ideal for all ISA PC applications]

### Customer Benefits

- Easy to install and easy to optimize
- Simplified deployment of new networked PCs
- Helps to reduce on-going support costs
- Enables the roll-out of standard client configurations
- Guaranteed interoperability with all major set-ups
- Optimized performance

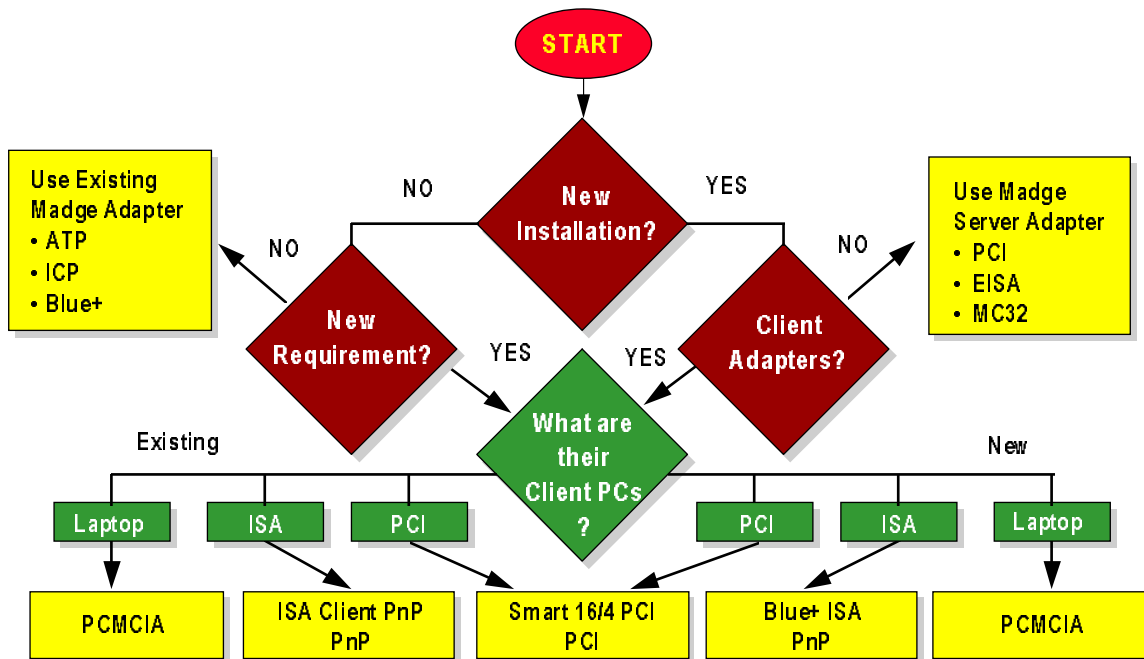
### The Madge Shopping List - Existing Installations

- Smart 16/4 AT Plus Ringnode (52-03)  
[Ultimate versatility for any ISA PC]
- Smart 16/4 ISA Client PnP Ringnode (22-04)  
[Easy installation for the latest ISA PCs]
- Smart 16/4 MC Ringnode (54-08)  
[Solution for Micro Channel bus PCs]

### Customer Benefits

- Single network driver support for all PC bus types
- Define standard client configurations using Madge Smart LAN Support Software (LSS)
- Broad range of conventional DOS memory saving options

## Choosing the right Token Ring client adapter



### Problem: Maximize efficiency and fault tolerance in new generation PC servers

From general purpose departmental PC servers to powerful RISC-based platforms, servers play a critical role in busy enterprise networks. Network administrators expect non-stop operation and require maximum efficiency from all system components in order to optimize network response times for end users and maximize application availability. Now more than ever, servers are pushing PC technology to new heights of sophistication and performance, as general purpose servers make way for the next generation of specialized, application-specific servers. With the advent of dedicated LAN technologies, server clustering, and multi-processor applications, it is clear that standard client adapters may not provide the performance required to support mission-critical servers.

### Solution: Deploy server-optimized network adapters

To meet the increasing demands on the network connections of the latest server platforms, it is important that single or multiple adapter configurations place a minimal load on a server's processor (CPU). This ensures that the necessary processing power is available to run network applications more efficiently. For example, adapters designed for servers commonly use a mechanism known as bus mastering as a highly efficient way for adapters to perform direct data transfers to and from PC system memory. This helps to reduce CPU utilization and free up system resources.

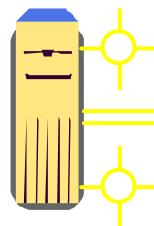
## Madge server adapters: the powerful choice

Madge server adapters optimize performance and application response times for a broad range of PC server platforms, including the popular variants of UNIX. Where additional fault-tolerance or load balancing are required, in addition to its unique adapter mirroring capability, Madge can provide excellent scalability with support of dedicated Token Ring connections and multi-processor configurations. Madge hardware and software work in harmony to enhance the efficiency of every server network connection. Madge server cards are designed to withstand even the most intense levels of network traffic and are compatible with the latest server operating environments.

The Madge **mirroring** feature allows a hot stand-by adapter to be deployed in NT and NetWare servers, in the event that either the primary adapter, its cable, or the attached hub port should fail. This ensures that the server stays up-and-running.

Madge server adapters can be easily upgraded to support the latest enhancement to Token Ring which enable full duplex 32 Mbps **Dedicated Token Ring** connections to a LAN switch. This is provided as a free backwards-compatible software upgrade.

## PC Server Applications



### The Madge Shopping List - All Installations

- Smart 16/4 PCI Ringnode (bus master) (51-02)  
[For all high performance client/server applications]
- Smart 16/4 EISA Ringnode (52-08)  
[Ultimate performance & efficiency for EISA bus PCs]
- Smart 16/4 MC32 Ringnode (54-09)  
[Ultimate performance & efficiency for Micro Channel applications]

### Customer Benefits

- Increased network throughput
- Reduced client/server response times
- Low processor overhead
- System scalability
- Fault tolerance
- Dedicated Token Ring ready

# ATM Solutions

## Connecting Legacy LANs with an ATM Backbone

### **Problem: Overloaded backbone adding congestion**

The vast majority of today's LANs are based on Ethernet and Token Ring technology. As these networks evolve to meet growing needs, a number of factors are putting pressure on the backbone of the network:

- As more users are connected to the network, shared LAN segments become more congested. To reduce this congestion, many organizations have segmented their network further and are now deploying LAN switches in increasing numbers. While this improves the performance on the individual segments, it puts pressure on the backbone which now has to handle transmissions between many LAN segments.
- The computing environment is moving away from mainframes and dumb terminals to PCs/workstations and client/server architectures. This has led to much higher traffic per user than in the past. The tendency to centralize the larger more powerful servers has caused much of this traffic to be directed over the backbone.
- Many companies are now seeking the benefits of information sharing technologies such as Lotus Notes and intranets to eliminate barriers to data access. This is changing the nature of LAN traffic from local-only to being more widely distributed - hence, more traffic is traversing the backbone of the network.

### **Solution: Add an ATM backbone with ATM access switches/modules and LAN emulation**

An ATM backbone provides the ultimate in backbone bandwidth and scalability today with the knowledge that it will handle multimedia traffic when required to in the future. Backbone ATM switching employs dedicated full-duplex 155 Mbps access as the baseline speed, with 622 Mbps and higher becoming available in the future. A typical ATM backbone switch with 16 ports of 155 Mbps ATM ports provides a 2.6 Gbps full duplex non-blocking collapsed backbone.

ATM's cell based transmission scheme also provides the lowest latency of any available LAN technology and has been designed to carry all types of network traffic using standard signaling protocols.

ATM access switches and LAN emulation provide the means to connect Ethernet or Token Ring LANs to ATM in a manner that is invisible to the users or the applications running on their machines. Access switches are an excellent way to add ATM to your network because they scale in a linear fashion. Each ATM access switch has its own processor, switch and ATM uplink, guaranteeing that no part of the system will be overextended. These small, self-contained units can be placed in the network where they're needed with an ATM uplink connecting them to the ATM backbone.

ATM access modules connect existing Ethernet or Token Ring switches to an ATM backbone without the need to purchase a new access switch. An ATM access module thus provides the simplest and most straightforward way to upgrade existing switches for connection to an ATM backbone.

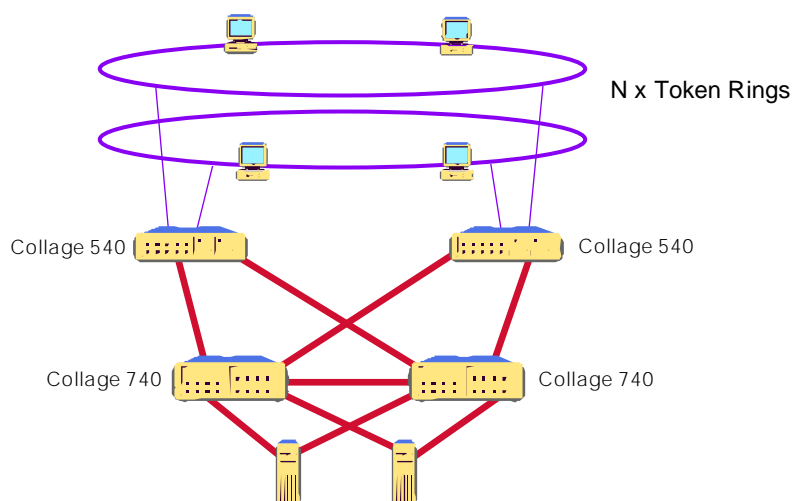


## Madge Option 1: Adding an ATM backbone to a Token Ring network

The Madge Collage family of ATM switches provide a complete, high-performance backbone solution for Token Ring networks. For this application, two members of the Collage family are recommended:

The **Collage 740** backbone ATM switch provides a 2.6 Gbps full duplex collapsed backbone with sixteen 155 Mbps ATM ports and is stackable for higher port densities. The Collage 740 comes with a powerful RISC CPU capable of processing the ATM forum protocols for signaling and able to run the LAN emulation servers for up to 16 emulated LANs. Two or more Collage 740 switches in the ATM backbone can provide enhanced resilience features such as full ATM switch redundancy and backup LAN emulation servers.

The **Collage 540** provides all you need to connect up to 10 Token Ring networks to an ATM backbone. Each Collage 540 has 10 Token Ring ports, available as either UTP or STP, and up to two 155 Mbps ATM ports in Multi-Mode Fiber (MMF), Single Mode Fiber (SMF) or Unshielded Twisted Pair (UTP). Token Ring to ATM resilience is easily provided by using two Collage 540's and providing a connection to each one from a Token Ring where required. For fast server access from any of the LAN segments, the servers should be placed directly on the ATM backbone using 155 Mbps ATM Network Interface Cards (NICs). Dual homing the servers with independent connections to separate ATM backbone switches, provides full resilience within the ATM network.



### The Madge Shopping List

- Collage 740 Backbone ATM Switch
- Collage 743 4-port 155 Mbps MMF module
- Collage 763 4-port 155 Mbps SMF module
- Collage 764 4-port 155 Mbps SMF/MMF module
- Collage 744 4-port 155 Mbps UTP module
- Collage 540 TR to ATM Access Switch
- Collage 541 Multimode Fiber ATM module
- Collage 542 Single mode Fiber ATM module
- Collage 543 UTP ATM module
- PCI 155 ATM Adapter Card

### Customer Benefits

- Improves network performance
- Faster server access
- Preserves investment in existing equipment
- Scalable, multimedia-ready backbone

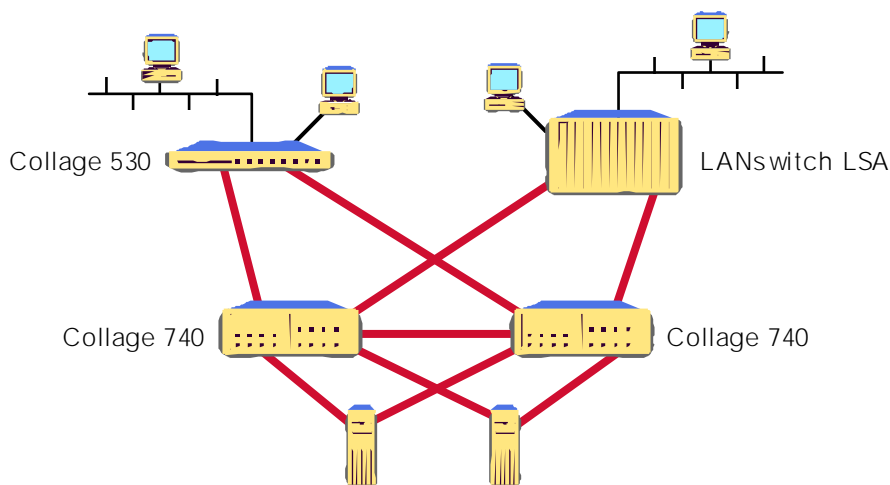
## Madge Option 2: Adding an ATM backbone to an Ethernet network

The Madge Collage family of ATM switches provide a complete, high performance backbone solution for Token Ring networks. For this application, two members of the Collage family are recommended:

The **Collage 740** backbone ATM switch provides a 2.6 Gbps full duplex collapsed backbone with sixteen 155 Mbps ATM ports and is stackable for higher port densities. The Collage 740 comes with a powerful RISC CPU capable of processing the ATM forum protocols for signaling and able to run the LAN emulation servers for up to 16 emulated LANs. Two or more Collage 740 switches in the ATM backbone can provide enhanced resilience features such as full ATM switch redundancy and backup LAN emulation servers.

The Collage 530 Ethernet to ATM access switch provides all you need to connect up to 16 Ethernet segments to an ATM backbone. Each Collage 530 has 16 Ethernet ports and up to two 155 Mbps ATM ports of Multi-Mode Fiber (MMF) or Single Mode Fiber (SMF). An alternative means of providing Ethernet to ATM connectivity is with the LANswitch, a chassis based modular switch with an ATM uplink using the LANswitch LSA module.

For fast server access from any of the LAN segments, the servers should be placed directly on the ATM backbone using 155 Mbps ATM Network Interface Cards (NICs). Dual homing the servers with independent connections to separate ATM backbone switches provides full resilience within the ATM network.



### The Madge Shopping List

- Collage 740 Backbone ATM Switch
- Collage 743 4-port 155 Mbps MMF module
- Collage 763 4-port 155 Mbps SMF module
- Collage 764 4-port 155 Mbps SMF/MMF module
- Collage 744 4-port 155 Mbps UTP module
- Collage 530 Ethernet to ATM Access Switch
- LET-36/20/10 Hub
- LSA LANswitch to ATM Access Switch
- PCI 155 ATM Adapter Cards

### Customer Benefits

- Improves network performance
- Faster server access
- Preserves investment in existing equipment
- Scalable, multimedia-ready backbone

## Large Backbone Configuration

### **Problem: High bandwidth needed, but FDDI and Routers are not fast enough**

Consider a large backbone in a new building serving around 2000 networked users distributed over 10 floors. The backbone should have sufficient performance for the next 3-5 years, which could be defined as the ability to handle a sustained traffic load of 2 Mbps per user (enough for a couple of video feeds and a live video conference) with rapid file transfer available in short bursts.

Such a network could be achieved using switched Ethernet, Token Ring or 25 Mbps ATM to the desktop. Each of these can deliver 2 Mbps of sustained data transfer and still have an additional capacity of 2-3 Mbytes per second (~16–24 Mbps ) for fast file transfer.

The backbone for such a network must be capable of providing 4 Gbps of sustained data transfer with an additional 2 Gbps for file transfer (this will allow rapid file transfer by 5% of the users at any one time). Since we are providing users with 2 Gbps of file access capacity we also need to add a similar capacity for file servers. Thus the backbone should have capacity of at least 6 Gbps. A backbone of this size is approximately 60 times faster than FDDI and far too fast for a router based solution. Total capacity per user uplink in the backbone is planned at 3 Mbps.

### **Solution: Mesh ATM switches to create a scalable, high-resilience backbone**

By meshing ATM switches to increase the number of ports available and add bandwidth, we can create a large backbone that is easily scaled upward to meet the likely demands of the future.

Deploying ATM switches in a meshed configuration brings the following advantages:

- Redundant, load sharing ATM connections to minimize bottlenecks
- Resilient ELAN services
- Additional CPU power for fast call set-up and additional protocol processing

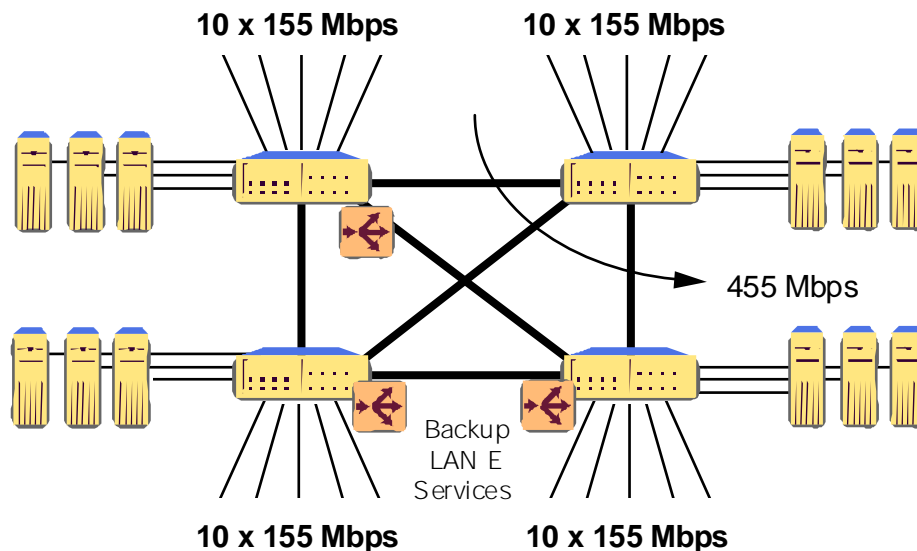
Using 155 Mbps ATM uplinks to the backbone from the workgroup switches on each floor means we can have around 50 users per uplink giving 4 ATM uplinks per floor, or a total of forty 155 Mbps uplinks for the building. To provide for 12 servers we need to add an additional twelve 155 Mbps ATM links giving a grand total of 52 ATM connections to the backbone switches.

### Madge Solution: Mesh ATM switches to create a scalable, high-resilience backbone

The Madge Collage 740 Backbone ATM switch provides a scalable high performance solution for backbone ATM networks in an easy-to-implement stackable manner. Each Collage 740 supports up to 16 ports of 155 Mbps ATM, each of which can be used as an ATM connection to a user/server or an inter-switch connection as required.

By meshing switches as shown in the diagram, the backbone ATM network will have resilient load sharing interswitch connections and backup LAN emulation servers. Another reason to use multiple ATM switches in a mesh is the increased processing power for fast call set-up and additional protocol processing. Moreover, servers can be located close to the switch that hosts the users, thereby minimizing switch hops and maximizing performance.

To 'size' the inter-switch connections correctly it is recommended to start with the basic configuration as shown using a single direct ATM connection between each switch. By monitoring the traffic between switches using Madge TrueView, it will be easy to see if any particular link is under stress at any time. Additional connections can then be added in parallel with that link to increase the capacity. If the load on a link increases significantly, it will be possible to upgrade that link to 622 Mbps ATM as required.



#### The Madge Shopping List

- Collage 740 Backbone ATM Switch
- Collage 743 4-port 155 Mbps MMF module
- Collage 763 4-port 155 Mbps SMF module
- Collage 764 4-port 155 Mbps SMF/MMF module
- Collage 744 4-port 155 Mbps UTP module
- Backup Power Supply
- PCI 155 ATM Adapter Cards

#### Customer Benefits

- Scalable, high-performance backbone
- True multimedia capabilities
- Resilient connections and LAN Emulation services
- Multiple CPUs for processing power

## Native ATM/Multiservice Networking

**Problem: Need to provide guaranteed performance and support multiple integrated services at the desktop**

### Guaranteed Performance Data Services at the Desktop

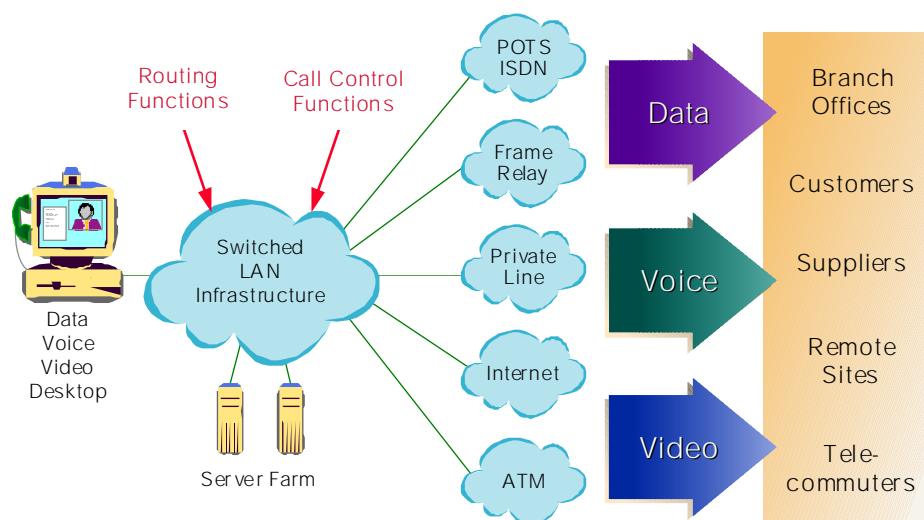
Traditional LANs (and LAN internetworks) give the same priority to all users regardless of the application they are using. As a result, time-critical business applications suffer from highly variable performance when they share a common infrastructure with bandwidth-hungry file transfers and Intranet Web browsers. Network planners have recognized that throwing bandwidth at the problem is costly and doesn't solve the problem. Fatter pipes soon fill up with more traffic, leading to another round of network upgrades.

### Video Services at the Desktop

More and more businesses are discovering the productivity gains and travel savings that can come from effective use of video-conferencing. However, today's room-based systems are often inconvenient and incompatible with spontaneity. Desktop video-conferencing is increasingly affordable, but today's networks don't support video – the LAN cannot provide real-time communications and the telephone network cannot provide the bandwidth. Most network planners agree that the idea of a third, ISDN-based network to every desktop to support the needs of video is impractical.

### Voice Services at the Desktop

The majority of desktops in large enterprises are equipped with two kinds of communications terminals – the PC and the telephone. These devices are supported by two entirely separate kinds of network connection: the PC is connected to a LAN, while the telephone is connected to a PBX. Each of these networks provides a single “service.” The telephone network delivers bi-directional streams of data at 64 kbps (typically digitally encoded voice) while the LAN delivers packets of data on a “best effort” basis. It is becoming clear that the single services delivered to our desktops respectively by LANs and telephone networks do not offer the best solution to current business needs, and will fall far short of meeting emerging needs.



### **Solution: Implement an end-to-end switched ATM network**

ATM is the only technology today that delivers real time quality of service characteristics for data, voice, and video applications in both the LAN and WAN. Moreover, an end-to-end ATM network provides the ultimate in network performance, scalability and manageability.

ATM is available with a number of different interface options that allow the same technology to be sized and scaled appropriately for different locations in the end-to-end network:

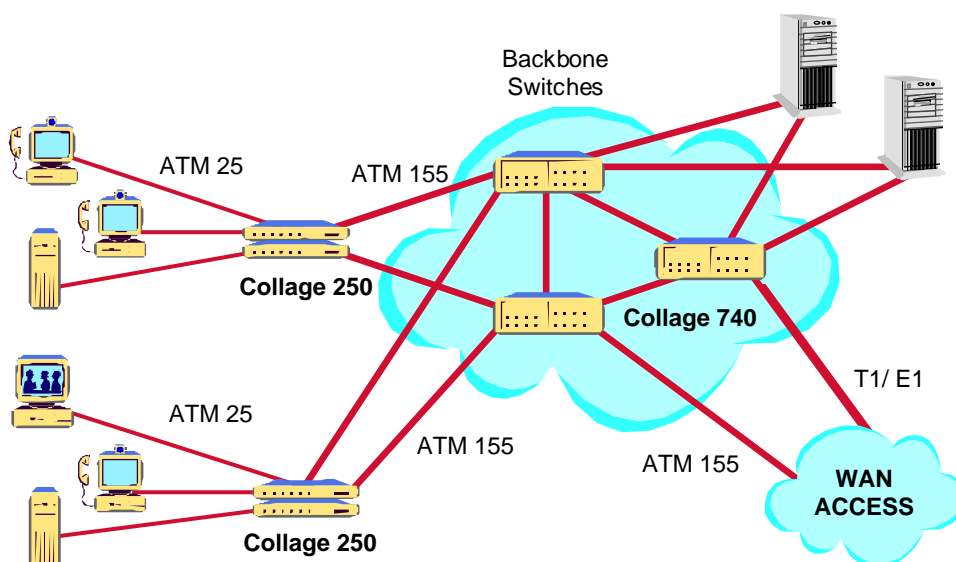
- T1/E1 links (1.544 and 2.048 Mbps ) are available for low cost public access connections across the Wide Area Network.
- 25 Mbps ATM links are suitable for desktop ATM connections, delivering sufficient sustained bandwidth for the majority of users, with enough bandwidth to allow for rapid file transfer.
- 155 Mbps ATM links are suitable for power users with high bandwidth requirements. They are also an excellent option for linking workgroup switches to ATM backbones. 155 Mbps ATM WAN links are rapidly becoming available for public ATM services.
- 622 Mbps ATM links are ideal for connections within an ATM backbone at both the campus and building level.

## Madge Solution: Implement an end-to-end ATM switched network with Collage

The Madge Collage family of ATM switches provide end-to-end switched ATM networking. For the end-user, the Collage 250 workgroup ATM Switch provides twelve 25 Mbps ATM connections with two expansion slots for 155 Mbps ATM uplinks and/or a stacking bus. The stacking bus allows up to twelve Collage 250s to be stacked together, providing up to 144 ports of 25 Mbps ATM. The Madge PCI 25 ATM adapters complement the Collage 250, providing throughput close to the theoretical maximum for 25 Mbps ATM. Adapters can also be used for local servers.

The Collage 740 Backbone ATM switch is easily deployed in a meshed configuration to create a large scalable ATM backbone with redundant links and LAN emulation resilience. Having several switches in a meshed configuration delivers additional processing power and provides mission-critical redundancy. Load sharing on the ATM connections reduces the potential for bottlenecks to occur in the network. The modular, stackable Collage 740 can support 155 Mbps (Multi Mode Fiber (MMF), Single Mode Fiber (SMF) and Unshielded Twisted Pair (UTP)), as well as T1/E1 and 622 Mbps ATM connections.

The Madge PCI 155 ATM Adapter cards deliver very high throughput in a server and can be dual homed for resilience, load sharing and additional capacity.



### The Madge Shopping List

- Collage 250 Workgroup ATM Switch
- Collage 215 155M fiber module
- Collage 740 Backbone ATM Switch
- Collage 743 4-port 155 Mbps MMF module
- Collage 763 4-port 155 Mbps SMF module
- Collage 764 4-port 155 Mbps SMF/MMF module
- Collage 744 4-port 155 Mbps UTP module
- Collage 741 4-port T1 module
- PCI 25 ATM Adapter Card
- PCI 155 ATM Adapter Card

### Customer Benefits

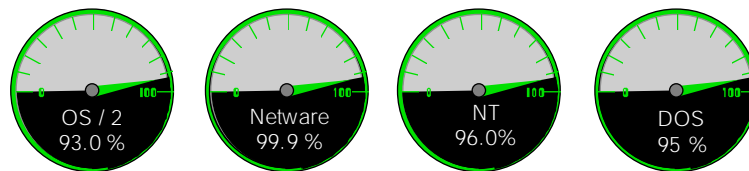
- One network for data, voice and video
- High-performance, scalable backbone
- Network extends across the WAN
- Fast server access

## ATM Adapters

### Problem: Choosing the right ATM client adapter

In combination with the high performance Madge Collage Family of ATM switches, Collage adapters bring the full benefits of ATM to the desktop at a breakthrough price. All Collage adapters benefit from a highly integrated Madge design that delivers affordable ATM to the desktop and enables the deployment of new business applications.

Madge adapters have the reputation of being among the fastest in the industry. With ATM, Madge has surpassed all expectations with “wire-speed” adapters, delivering sufficient bandwidth to the desktop to allow implementation of the most complex multimedia applications.



25Mbps - Percentage Line Utilization

### The Madge Shopping List

- Collage 25 PCI adapter (32-00)  
[The client adapter for affordable ATM at the desktop]
- Collage 155 PCI Client MMF adapter (32-05)  
[Ultimate ATM performance for client PCs]
- Collage 155 PCI Client Copper adapter (32-06)  
[Ultimate ATM performance for data-intensive applications using standard Category 5 cabling]

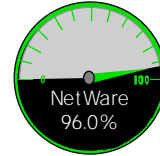
### Customer Benefits

- Enables the desktop for multiservice networking
- Optimized performance and service quality
- Investment protection with Madge LAN Emulation
- Fully compliant with ATM standards
- Guaranteed interoperability with all major set-ups



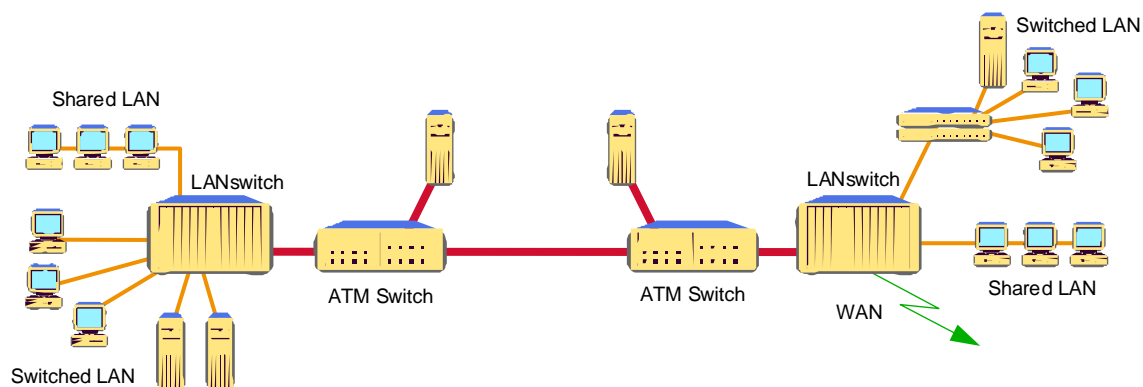
## Problem: Migrate servers to ATM

In a server environment, significant efficiency gains can be made by migrating the servers onto an ATM backbone and running the server connections at 155Mbps. In a NetWare environment, shown opposite, line utilization of almost 100% can be achieved. Windows NT, along with Windows 95 (a more CPU intensive operating system) can achieve line rates of 55% in a *single* CPU system. Flexible traffic shaping (from 2Kbps to 136Mbps) offers the ability to regulate transmission output to adhere to negotiated traffic speeds. Support for up to 1,024 virtual circuits easily meets the needs of the most demanding new business applications.



Ethernet and Token Ring clients can operate with applications running on ATM servers. Madge's industry-leading LAN Emulation software fully implements the ATM Forum Emulation Version 1.0 and offers an efficient solution to the problem of running current LAN software over ATM. Benefits of this approach include:

- more cost effective and manageable network design and topology, leading to reduced cost of ownership.
- servers that have been centralized, as part of a collapsed backbone topology are ready for ATM - just by changing the adapter!



### The Madge Shopping List

- Collage 155 PCI Copper adapter (32-01)  
Collage 155 PCI Fiber adapter (32-02)  
[Ultimate ATM performance for data-intensive applications using standard Category 5 and fiber cabling]
- Collage 155 EISA Fiber adapter (32-03)  
Collage 155 EISA Copper adapter (32-04)  
[Ultimate ATM performance for data-intensive applications using copper and fiber cabling]

### Customer Benefits

- Optimized performance and service quality
- Investment protection with Madge LAN Emulation
- Fully compliant with ATM standards
- Guaranteed interoperability with all major set-ups
- Prepares ground for native ATM applications



## Network Management Solutions

Madge is committed to delivering best of class, network management tools that make it easy to fully monitor and control the enterprise network from a single workstation. The goal is simple: to help organizations minimize network downtime, reduce overall operating costs and better plan for future change and growth.

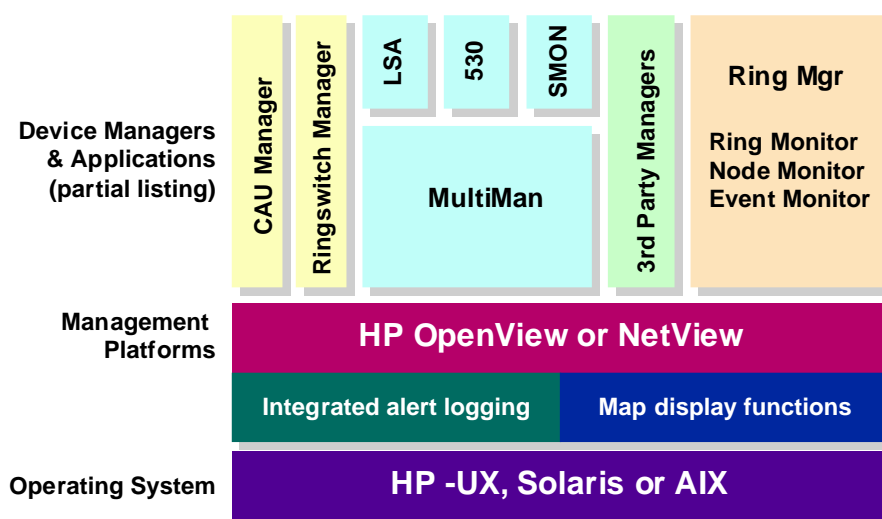
Madge designs every product with Network Management in mind - from basic operational and configuration management to sophisticated fault and performance monitoring. Madge's network management applications provide:

- Seamless integration with the leading open management platforms.
- Powerful microcode or hardware-based device agents.
- Graphical device managers based on SNMP.
- Advanced system management applications for end-to-end network management.

### Platforms

Open management platforms like HP OpenView and IBM NetView are found at the heart of most large network installations. These platforms allow network managers to run device managers and applications from different vendors on a single workstation. Madge network management applications are designed and tested to integrate seamlessly with these leading open platforms. This allows Madge to focus its efforts on developing superior device managers and management applications like SMON, and leave platform support, Alert/Error logging, and IP AutoDiscovery to the platform vendor. Open platform support enables customers to manage all Madge products (plus 3rd party products) from a single workstation.

Currently supported platforms are HP OpenView on Windows, HP-UX and Sun Solaris, and IBM NetView on AIX.



## Device Management

Madge TrueView and MultiMan management systems let network managers monitor and configure network devices from a central console. In terms of manageability, Madge products are divided into two broad categories: products that require a plug-in management agent module, and products that do not (agent is built-in).

### Hardware Agent Module Required

Madge hardware management agent modules plug directly into Madge modular LET-36/20/10 hubs, and act as a probe for the MultiMan Network Management System. Madge offers agent modules for Ethernet and Token Ring, as well as an Ethernet RMON probe and the one-of-a-kind LANswitch SMON agent.

In all cases, Madge management agents can configure any module in the hub or any hub in a LANstack cluster, regardless of LAN protocol. This means that a Madge Ethernet agent can configure and set up operational parameters not only on the Ethernet modules in the hub, but also on Token Ring, FDDI and LANswitch modules. However, hardware agent modules monitor a single LAN protocol only. For example, the NMA-RE Ethernet management agent can monitor activity on the hub's Ethernet LANs only. It cannot monitor Token Ring LANs in the same hub, even though it is able to configure and control Token Ring modules.

### Network Management Agent (NMA) Modules for LET-36/20/10 hubs

- NMA-II                Ethernet Management Agent
- NMA-36TR        Token Ring Management Agent
- NMA-RE            RISC-based Ethernet Management Agent
- NMA-RT            RISC-based Token Ring Management Agent
- NMA-RS            LANswitch SMON Management Agent

### Network Management Agent (NMA) Modules for Madge Stackable Hubs

- SH-EMA            LANstack Ethernet Management Agent
- Visage NMA        Visage SMON Management Agent

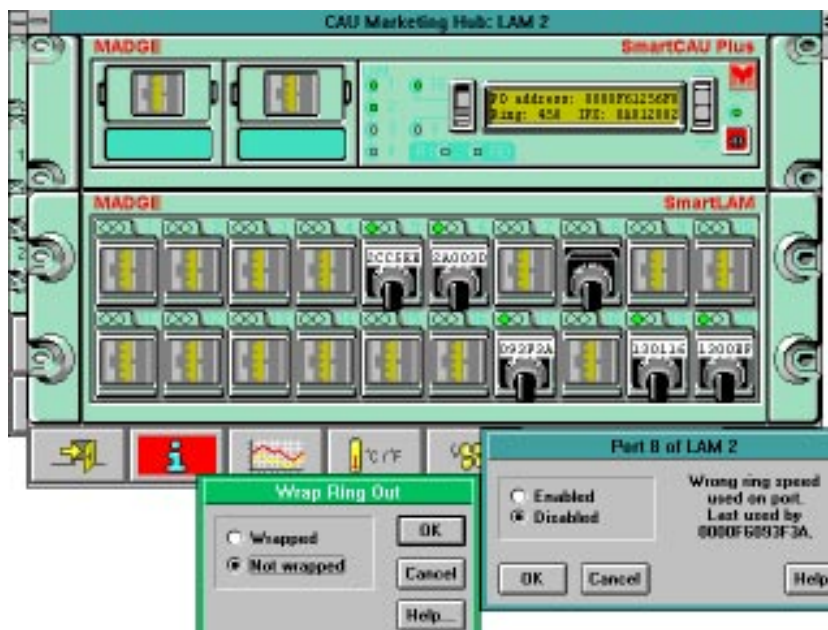
## No Hardware Agent Required - Token Ring Stackable and Collage products

Madge Stack hubs and switches, and Collage ATM backbone and access switches have Agent Microcode built into the product. This enables each device to be configured and monitored through easy-to-use Device Managers running on the network management station.

Manageable Token Ring hubs include: SmartCAU, SmartRAM and Smart Ringswitch

Manageable ATM hubs include: Collage 740, 540, 530 and Collage 250/280

Madge Device Managers display an accurate graphical representation of the device, allowing Network Managers to instantly visualize device status, easily check or change device configuration, and to rapidly respond to error conditions.



Implementing device management for Token Ring stackable and Collage products is easy:

- An Agent for standard device management is already built-in. (note: Advanced Agents can be purchased for functions such as RMON on the SmartCAU and Smart Ringswitch.)
- One copy of the Device Manager will allow Network Managers to control multiple devices.
- Madge Device Managers come in a variety of platform-specific versions (e.g., Collage Device Managers for HP OpenView/HP-UX)
- The SmartCAU, Smart Ringswitch, Collage 740, Collage 540 and Collage 250/280 ship with a Device Manager that can be run on Madge's own TrueView for Windows management platform. This gives network managers a graphical interface that can be used to set-up and configure the device straight "out of the box." TrueView for Windows is targeted for smaller networks that are made up of Madge devices only.

## System Management

### Managing the Switched Ethernet Network

Switches are typically found at the heart of an enterprise network, providing a fast and efficient junction between LAN segments or between clients and their servers. This central deployment strategy improves network performance by providing increased bandwidth where traffic flows are heaviest. However, just putting a switch in place does not guarantee optimal network performance. It is essential to monitor and analyze traffic flows in the switch in order to ensure that it is performing the way it should.

The central position of the switch has two implications for switch management:

1. Problems on a centrally located switch can affect the entire network, so monitoring the switch becomes vital to maintaining overall network health.
2. The central location of the switch makes it an ideal point for gathering information and monitoring the status of the entire network.

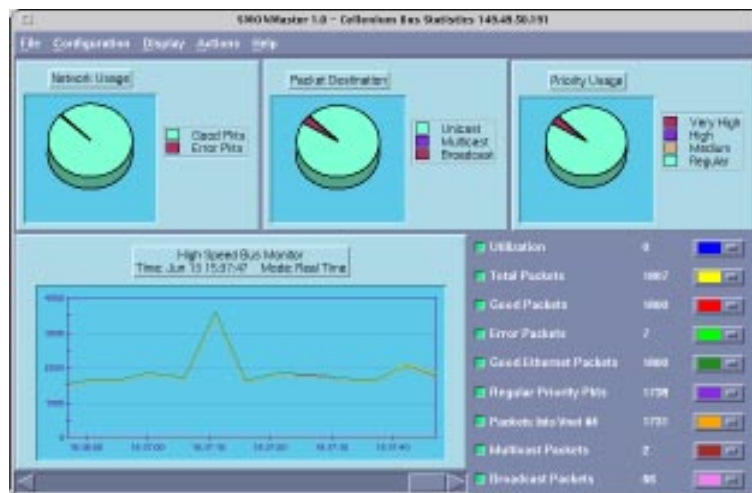
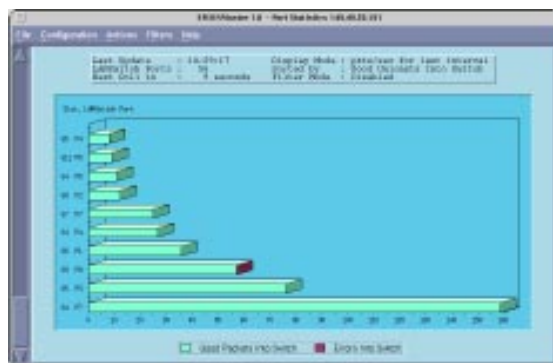
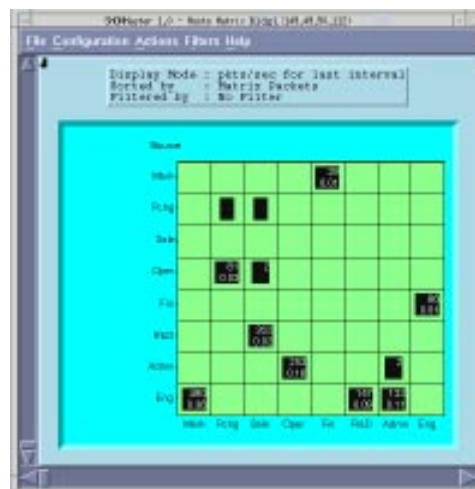
### SMON

Madge's LANswitch architecture is based on a Statistical Time Division Multiplexing bus which is called the Cellenium Bus. The Cellenium Bus resides on the backplane of the modular hub and has several distinct advantages for traffic monitoring, which solve the problems encountered by other switch architectures such as matrix and CPU-based systems.

- The Cellenium bus provides a centralized point from which *all* switch traffic may be monitored.
- The bus architecture makes it possible to passively monitor switch traffic as it traverses the bus. This method is similar to the way in which conventional shared-media buses are monitored. Through direct interface with the Cellenium bus, the SMON agent provides a global view of all LANswitch traffic in the hub, as well as session specific statistics.
- Passive monitoring eliminates the trade-off between switch monitoring capabilities and switch performance. Since the switch does not participate in the monitoring activities of the SMON agent, there is no conflict between monitoring and switch processing.
- Full monitoring is easier to implement with the LANswitch architecture. Instead of deploying some form of monitoring agent software at each switch port, a single SMON agent can monitor all switch activity for the entire hub.
- LANswitch modules do not perform "local switching". When a switch session occurs between two ports on the same LANswitch module, the session is not carried internally within the module, but is transmitted via the high-speed Cellenium Bus. Since all switch traffic travels over the Cellenium bus, network managers get a complete picture of *all* switch activity.

### LSE-PM

The LSE-PM LANswitch Port Monitor module lets you hook up traditional "sniffers" to the LANswitch hub. The LSE-PM captures packets on the Cellenium Bus and sends them to an attached packet analyzer or remote probe. The LSE-PM can be used together with Madge's NMA-RS SMON management agent to provide a complete picture of switched network traffic.

**SMON Main Menu****SMON Cellenium Bus Statistics****SMON Port Statistics****SMON Host Matrix****The Madge Shopping List**

- NMA-RS SMON Management agent
- SMONMaster (console application)
- MultiMan Network Management System (console application)

**Customer Benefits**

- Centralized, real-time monitoring of the 1.28 Gbps Cellenium Bus and all attached ports/hosts
- No performance penalty (passive monitoring)
- Powerful software application tools to pinpoint trouble
- Industry leading technology

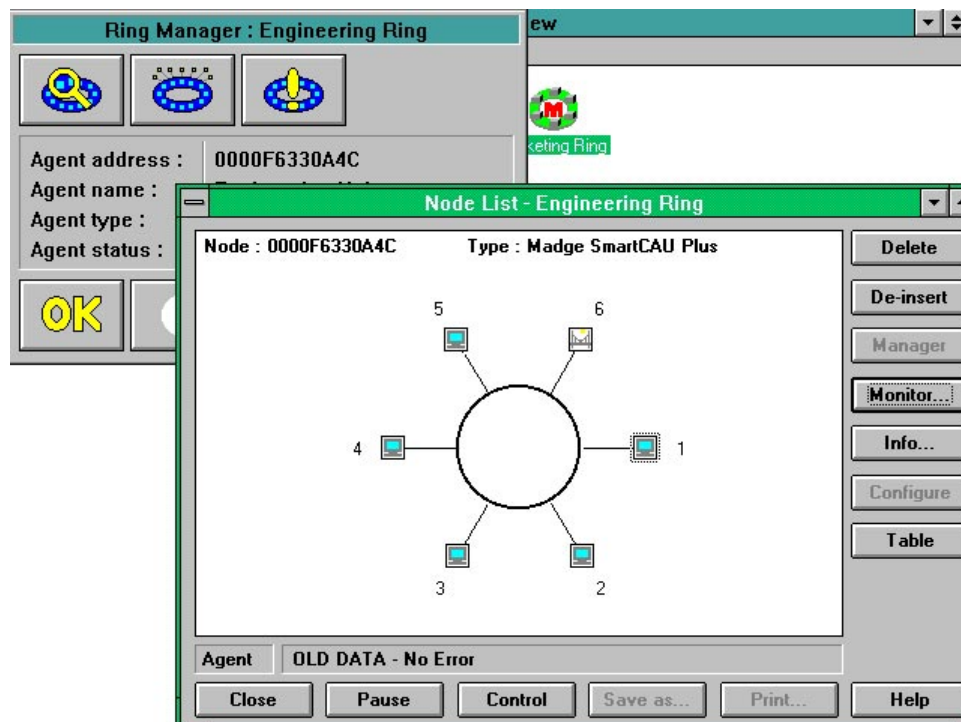
## Token Ring Fault and Performance Monitoring in Shared and Switched Networks

Madge **Ring Manager ver 4.0** can be used in conjunction with Advanced Agent<sup>1</sup> microcode embedded in Madge SmartCAUs, RAMs and Ringswitches to collect and present network managers with a wealth of invaluable MAC and RMON level statistics. Use of a software based probe makes Ring Manager a very cost-effective solution.

**Ring Manager** supports the key Token Ring RMON groups including promiscuous, MAC and node statistics. The real-time graphing supplied by Ring Manager gives network managers a meaningful picture of network health. To maintain network health, network managers can set thresholds and alerts, and can pin-point offending nodes through the use of MAC level ring topology mapping.

Ring Manager is fully integrated with Madge TrueView for Windows, and can also be integrated into open management environments.

### Ring Manager: MAC Level Ring Topology Mapping



<sup>1</sup> One Advanced Agent RMON license must be acquired for each ring to be monitored. Ring Manager includes one RMON Advanced Agent license for the SmartCAU.







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