Agenda
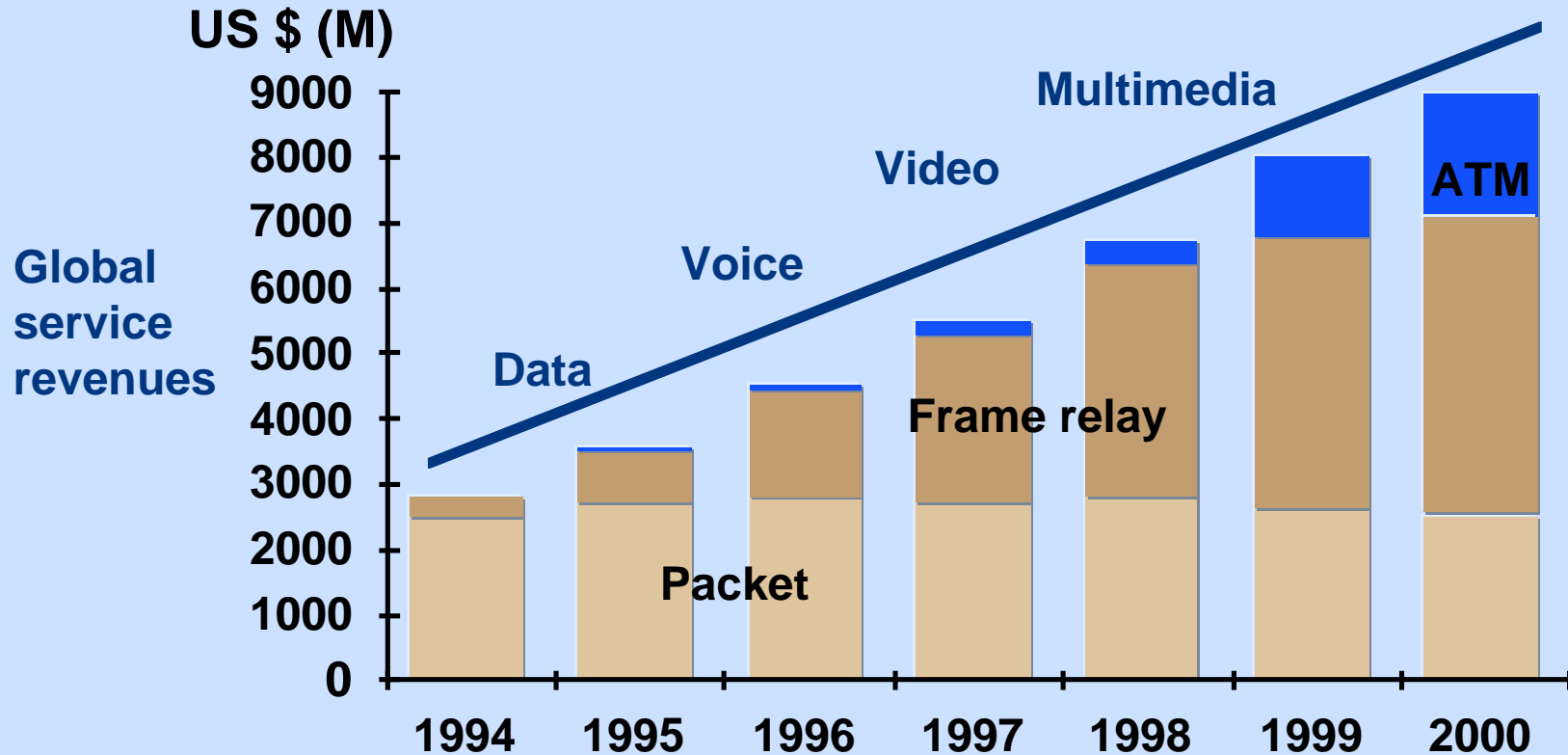
- **Market trends**

- **Nortel directions**

- **Service opportunities**

- **Cost reduction opportunities**

The Corporate Revolution

Intra-corporation   **Inter-corporation**

Empowerment

re-engineering   **globalization**

re-structuring   **partnerships**

downsizing   **virtual corporation**

Intranet   **Internet**
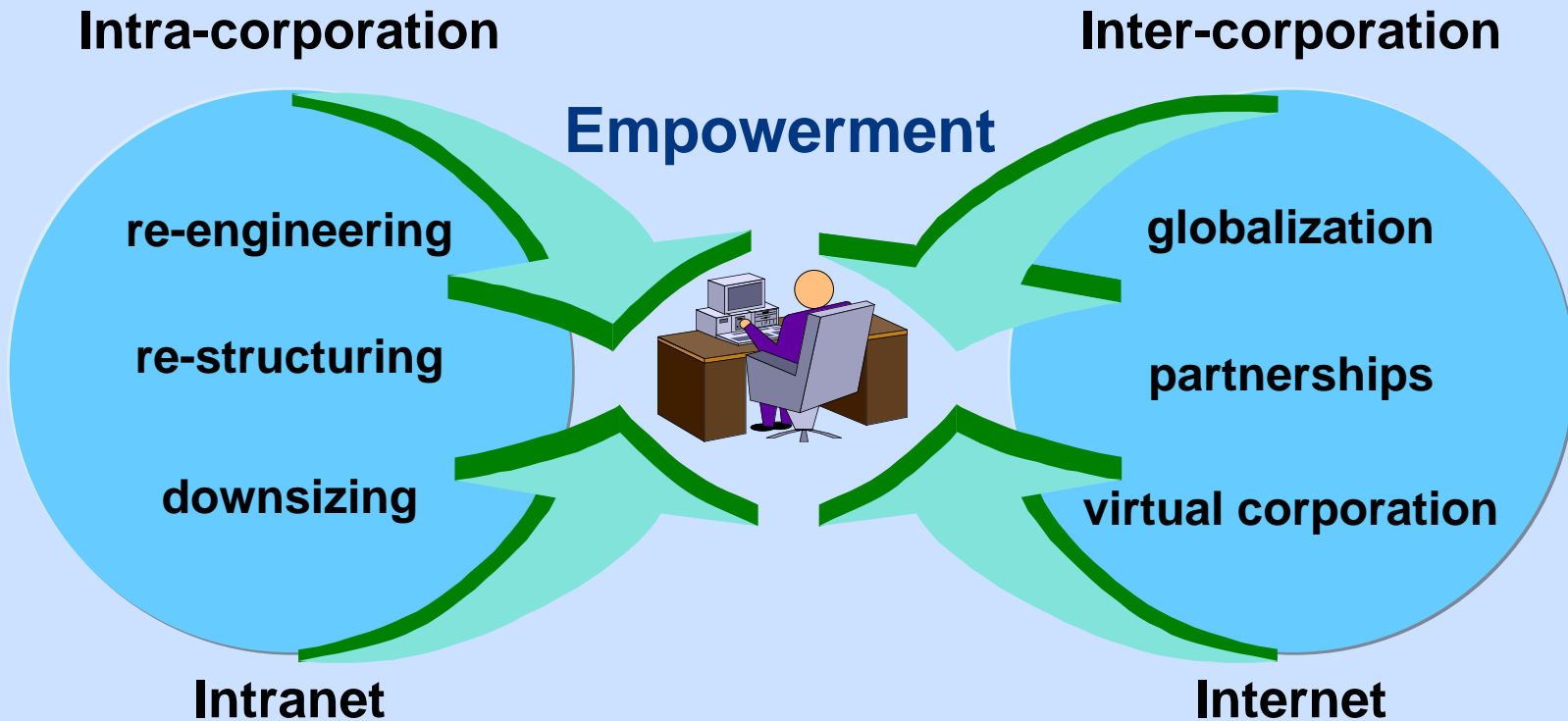
Data communications and the corporate revolution are inseparable

Rapid WAN Service Growth

US $ (M)

Global service revenues

Multimedia

Video

Voice

Data

Frame relay

Packet

ATM

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |

*Y-axis: 0, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000*

Reference: Vertical System Dec 95 (Frame & ATM) Data Communications Dec 95 (Packet)

Enormous opportunities – and challenges – ahead
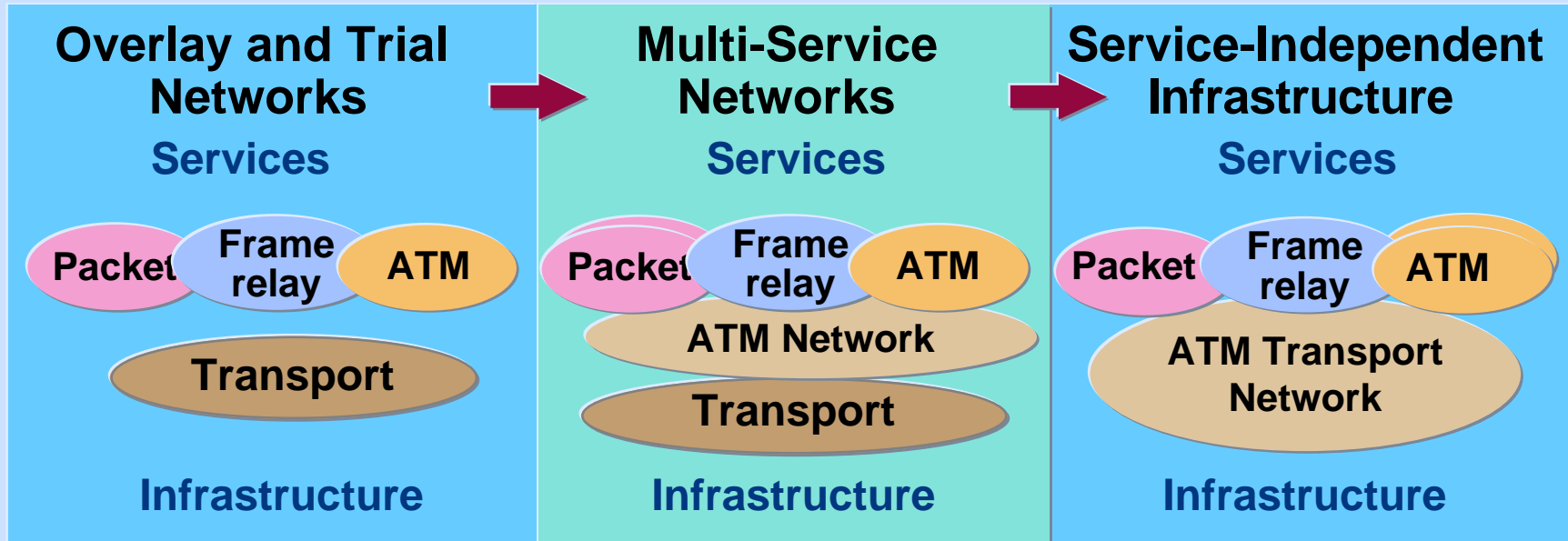
The Service Provider's Challenge

- **Rapid delivery of new services**

- **Competitive price/performance**

- **Minimal investment risks**

The Target Network

Services

Packet · Frame relay · Voice · Video · ATM

ATM Transport Network
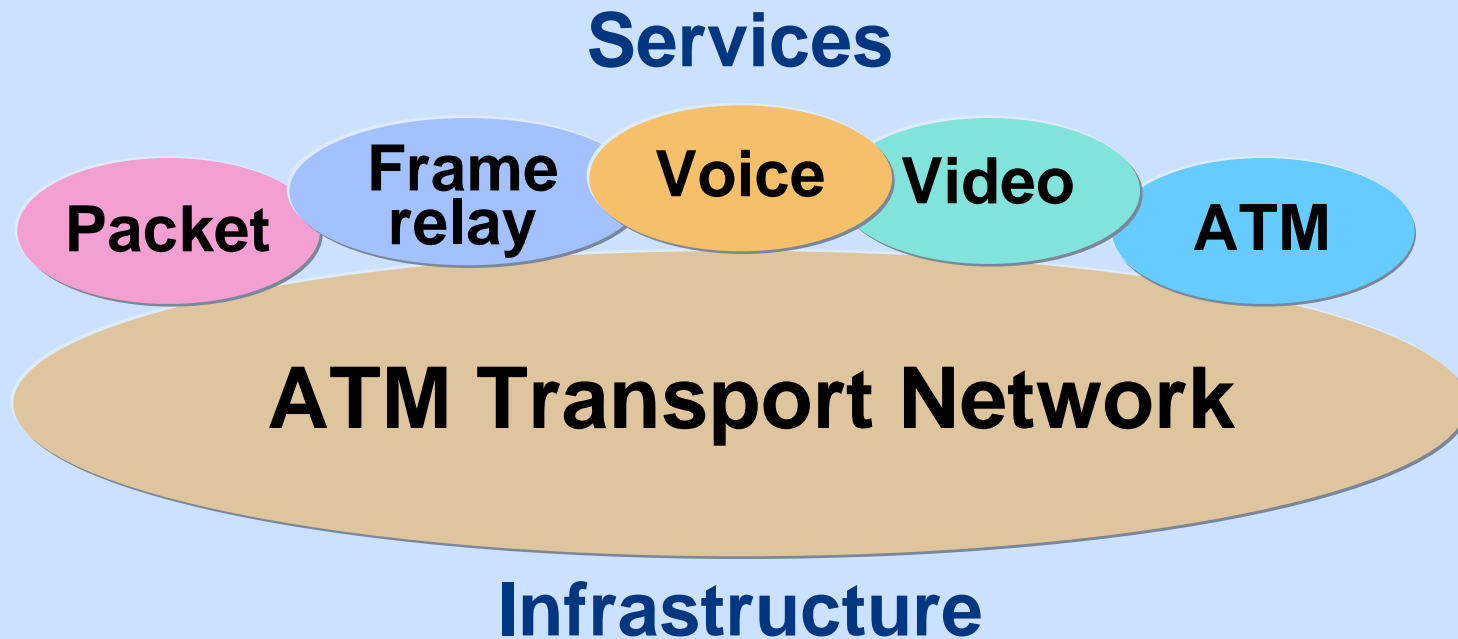
Infrastructure

A service-independent infrastructure

Service Network Evolution

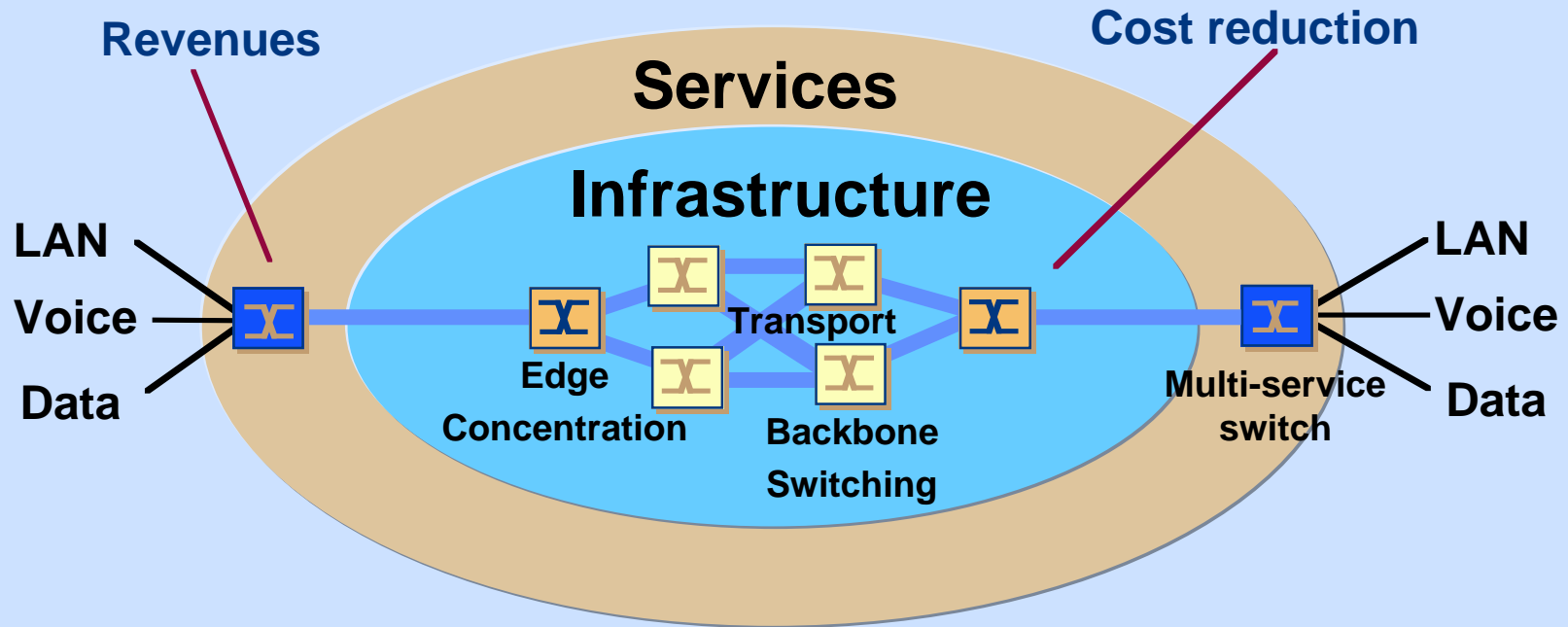| Overlay and Trial Networks	Multi-Service Networks	Service-Independent Infrastructure
Services	**Services**	**Services**
Packet Frame relay ATM	Packet Frame relay ATM	Packet Frame relay ATM
Transport	ATM Network Transport	ATM Transport Network
Infrastructure	**Infrastructure**	**Infrastructure**

New services introduction market share focus → Volume deployment cost reduction focus

Seamless evolution

The Network Architecture

Revenues

Cost reduction

Services

Infrastructure

LAN

Voice

Data

Edge
Concentration

Transport

Backbone
Switching

Multi-service
switch

LAN

Voice

Data

Standard components of the network

Service Migration Challenges

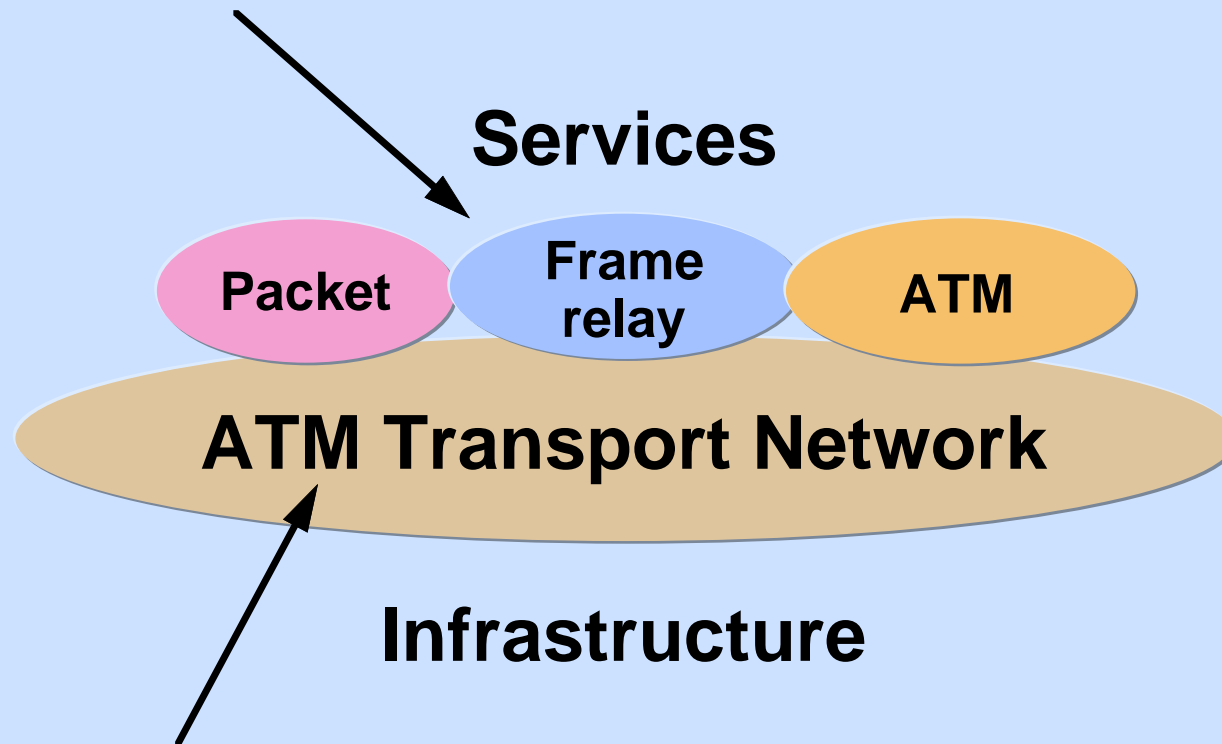| Challenges	Solutions
Packet	Proprietary
Frame Relay	RFC 1483/1490 ITU I.555
LANs	RFC 1483/1577 MPOA, LAN Emulation
Voice	VTOA
Video	MPEG-2

Standards progressing well

Agenda

- **Market trends**

- **Nortel directions**

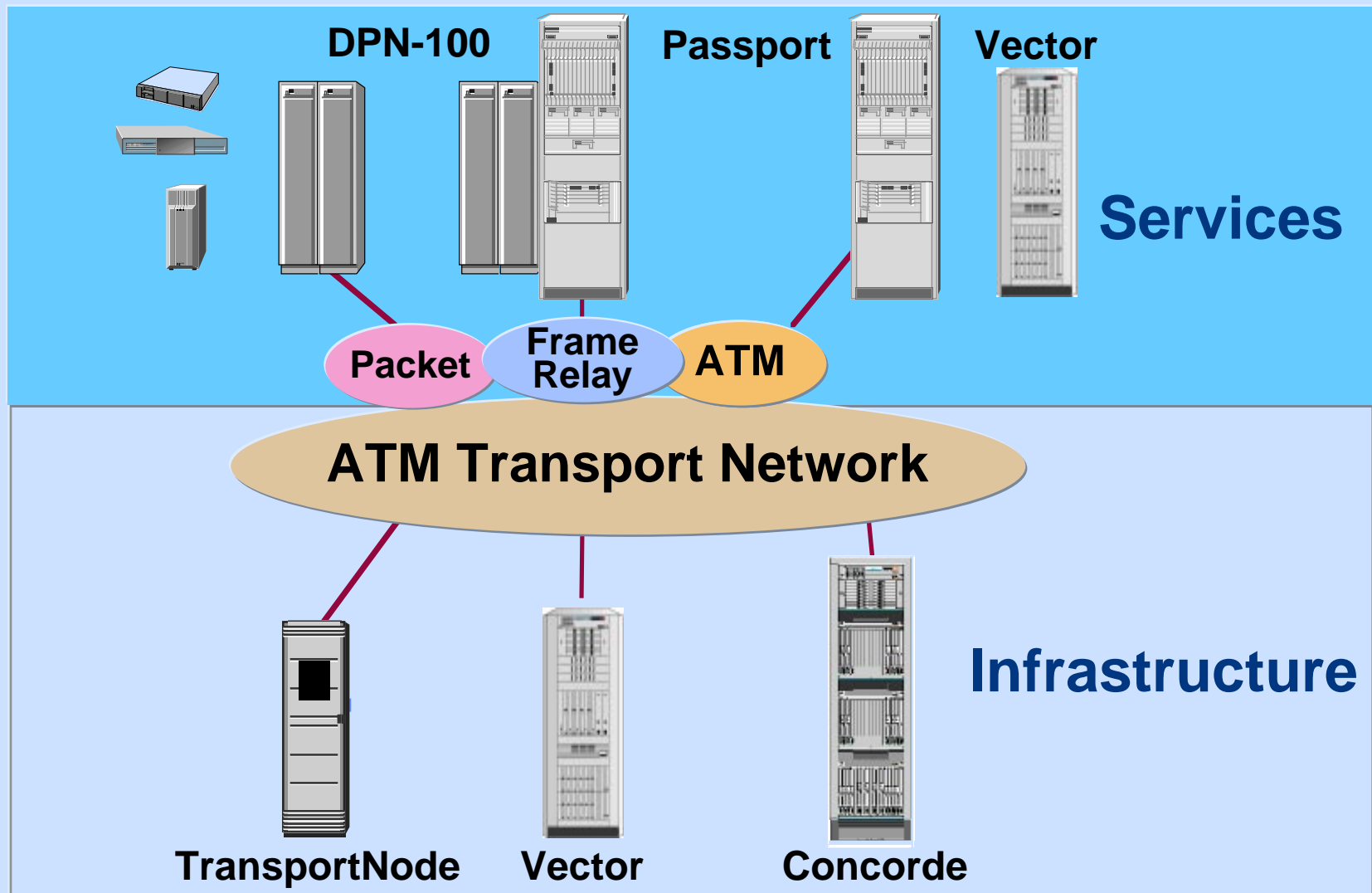- **Service opportunities**

- **Cost reduction opportunities**

Nortel's Goals

Increase your revenues by service expansion

Services

Packet **Frame relay** **ATM**

ATM Transport Network

Infrastructure

Reduce your costs by network consolidation

Nortel Product Fit

DPN-100 **Passport** **Vector**

Services

Packet **Frame Relay** ATM

ATM Transport Network

Infrastructure

TransportNode **Vector** **Concorde**
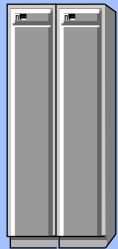
Nortel Magellan Products

First in Class

Packet
- First public packet network
- First 99.998% availability
- First ISDN packet handler
- First token ring host PAD
- First SNA dial-out

DPN-100

ATM Edge
- First ATM SVCs
- First early packet discard
- First smart buffers
- First soft PVCs
- First LAN CPE integration

Vector

Frame/ATM
- First ATM voice
- First FR SVCs
- First multimedia traffic class
- First FR DS3 access
- First FR realtime disaster recovery
- First FR egress accounting

Passport

ATM Backbone
- First ATM/SONET integration
- First distributed network architecture

Concorde

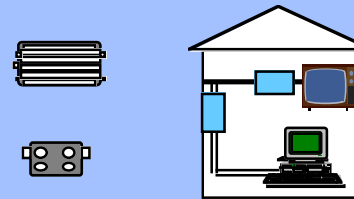# Technology firsts - your competitive edge

Expanding Nortel Services

Time to Market

Internet Access

Rapport
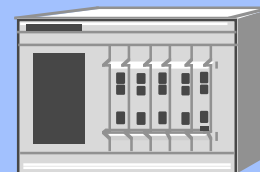
Residential Data

Cornerstone

Circuit Services

TransportNode

MPEG-2 Video

NSAM

New services - your competitive edge

Agenda

- **Market trends**

- **Nortel directions**

- **Service opportunities**

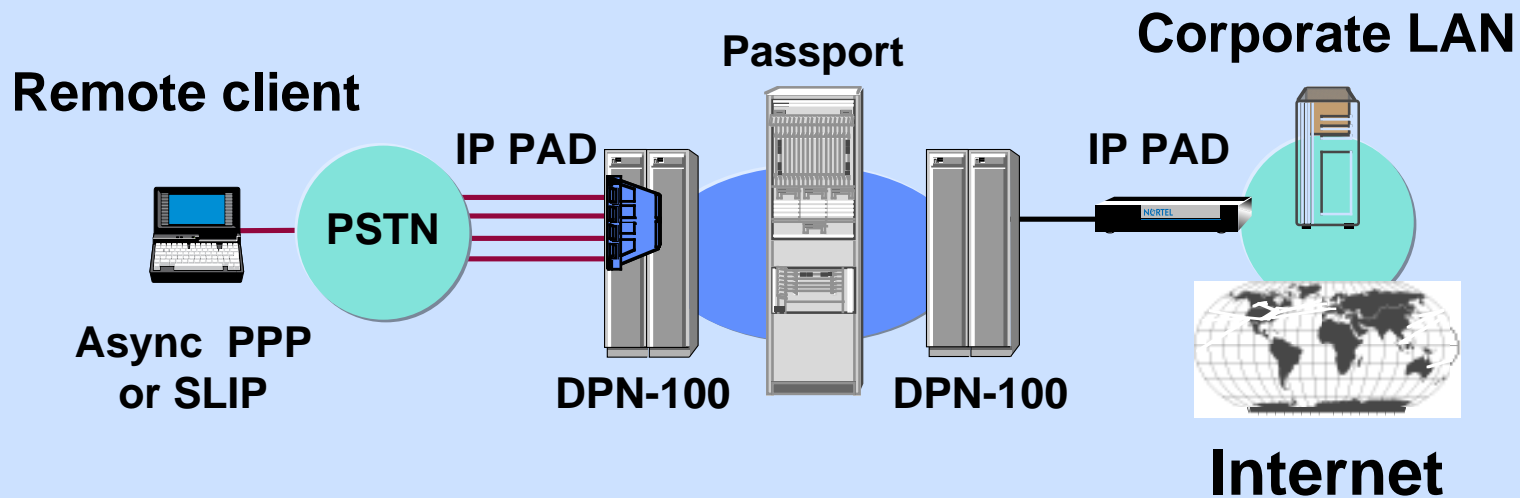- **Cost reduction opportunities**

"Data" Services

Revenue Growth

ATM cell relay
Frame relay
X.25
Legacy LAN
SNA

Voice
Video
Internet access
ATM LANs
Residential data
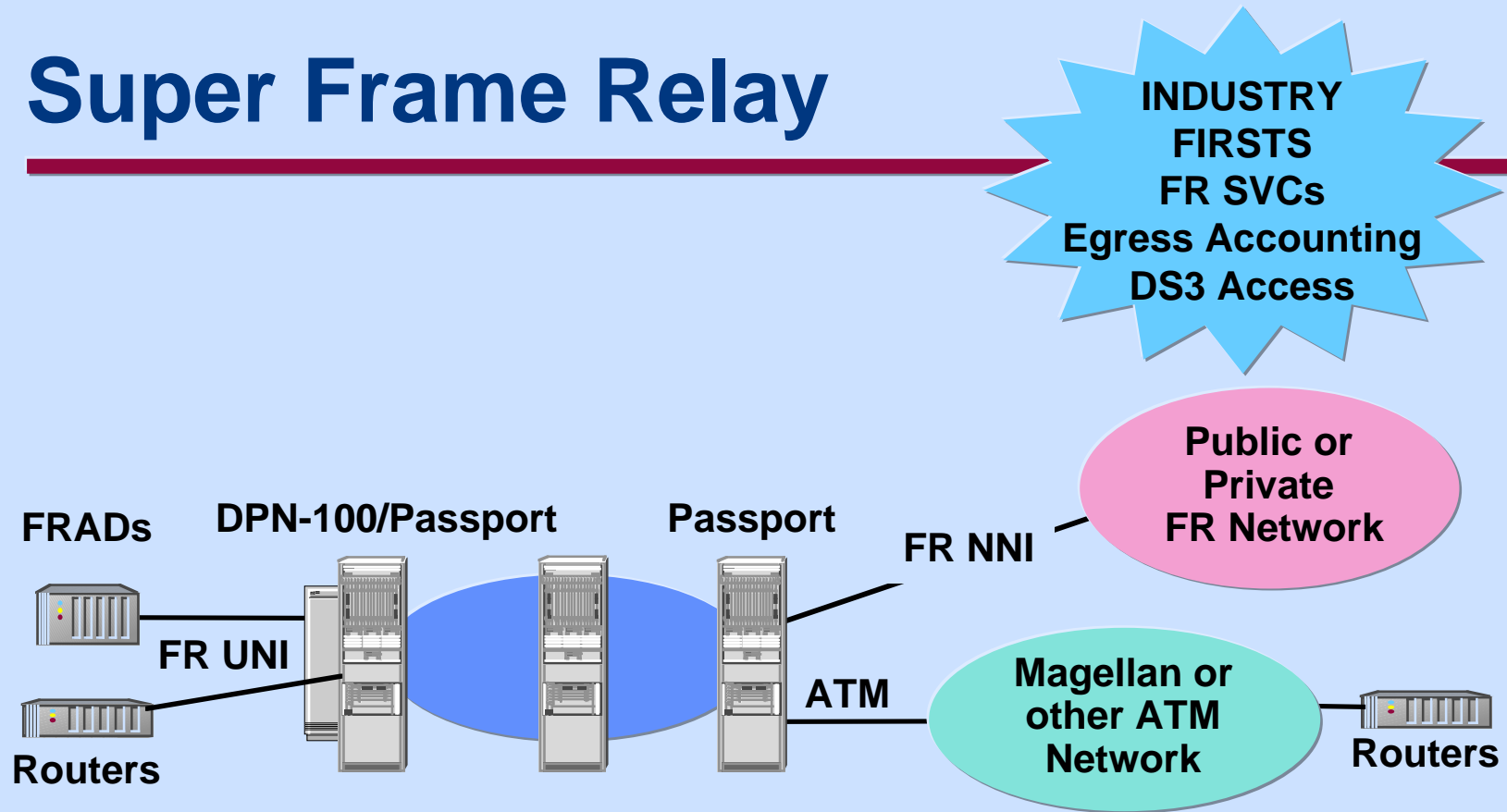
Nortel has a comprehensive data services portfolio

Extending Reach of Packet Services

Revenue Growth

Corporate LAN

Passport

Remote client

IP PAD

IP PAD

PSTN

Async PPP or SLIP

DPN-100

DPN-100

Internet

New services, extended reach, and Passport bring more value to the DPN-100 family

Super Frame Relay

INDUSTRY FIRSTS
FR SVCs
Egress Accounting
DS3 Access

Public or Private FR Network

FRADs   **DPN-100/Passport**   **Passport**

FR NNI

FR UNI

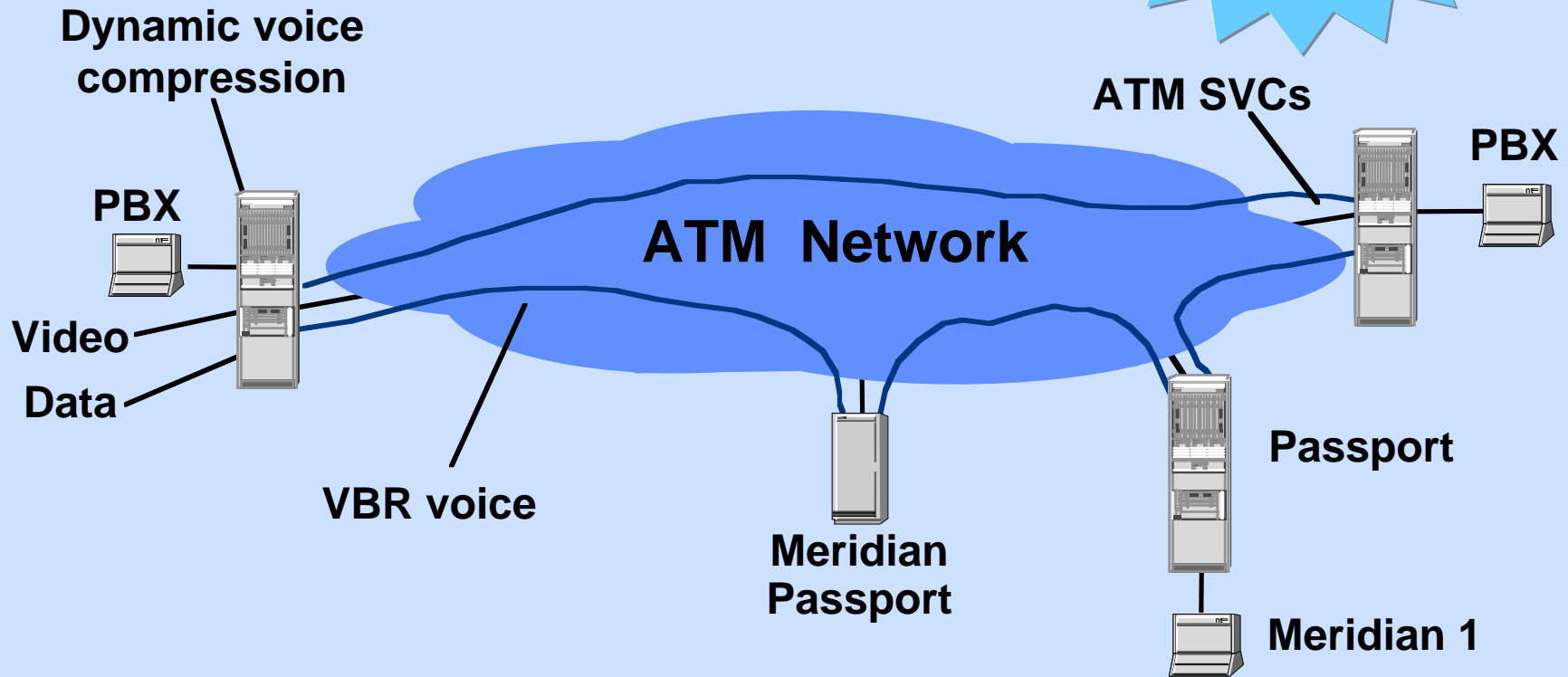**Routers**

Magellan or other ATM Network

ATM

Routers

New frame relay applications and cost-effective scalability to meet the demands of rapid growth

Voice VPN Services

Dynamic voice compression
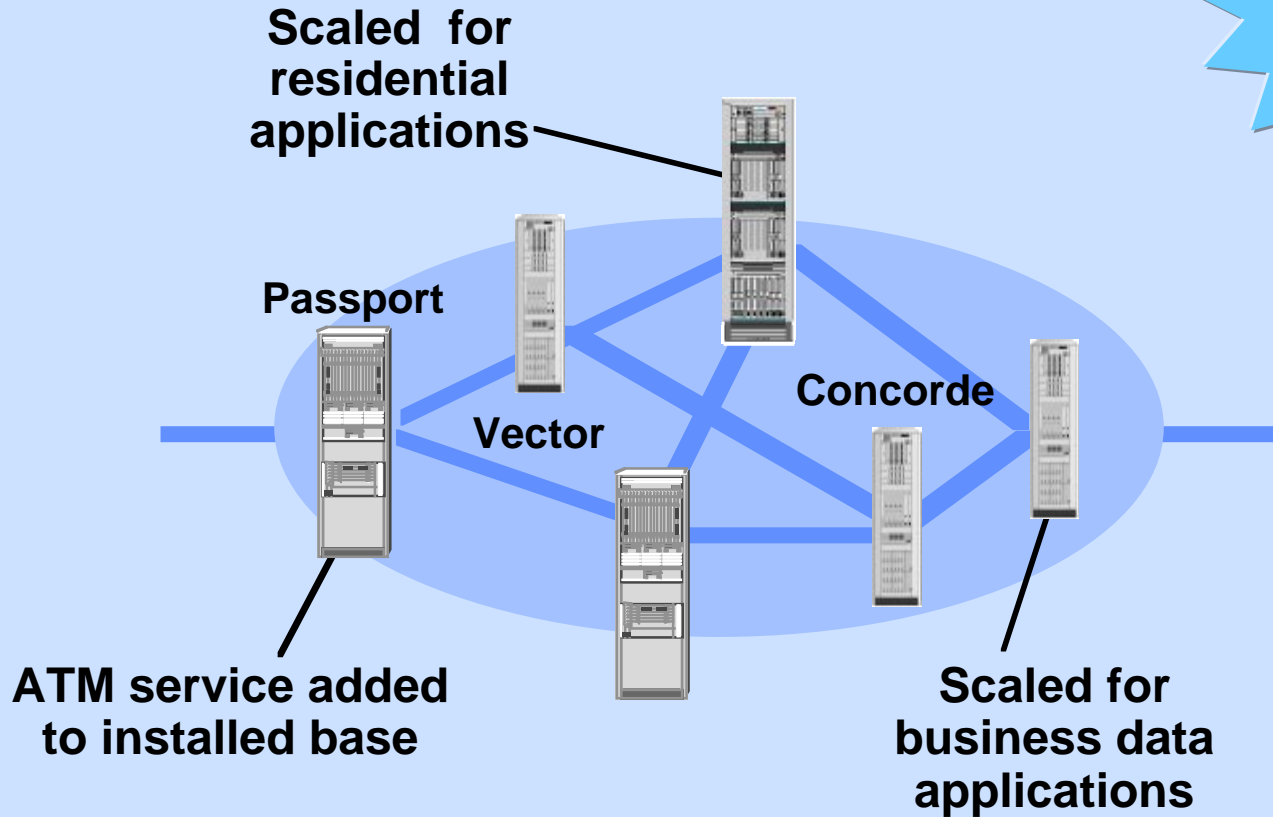
ATM SVCs

PBX

PBX

ATM Network

Video

Data

VBR voice

Passport

Meridian Passport

Meridian 1

True voice/video/data traffic consolidation

ATM Cell Relay Services

Scaled for residential applications

Passport

Vector

Concorde

ATM service added to installed base

Scaled for business data applications

Magellan ATM deployed globally today

LAN Managed Services

INDUSTRY Best Passport FORE Alliance

SNMP CMIP

NORTEL
NORTHERN TELECOM

Magellan OMS

FORE SYSTEMS

Legacy LANs

Token Ring

Ethernet

FDDI

Passport

Magellan Infrastructure

ATM LAN Emulation

ATM Workgroup

Desktops

Native LAN
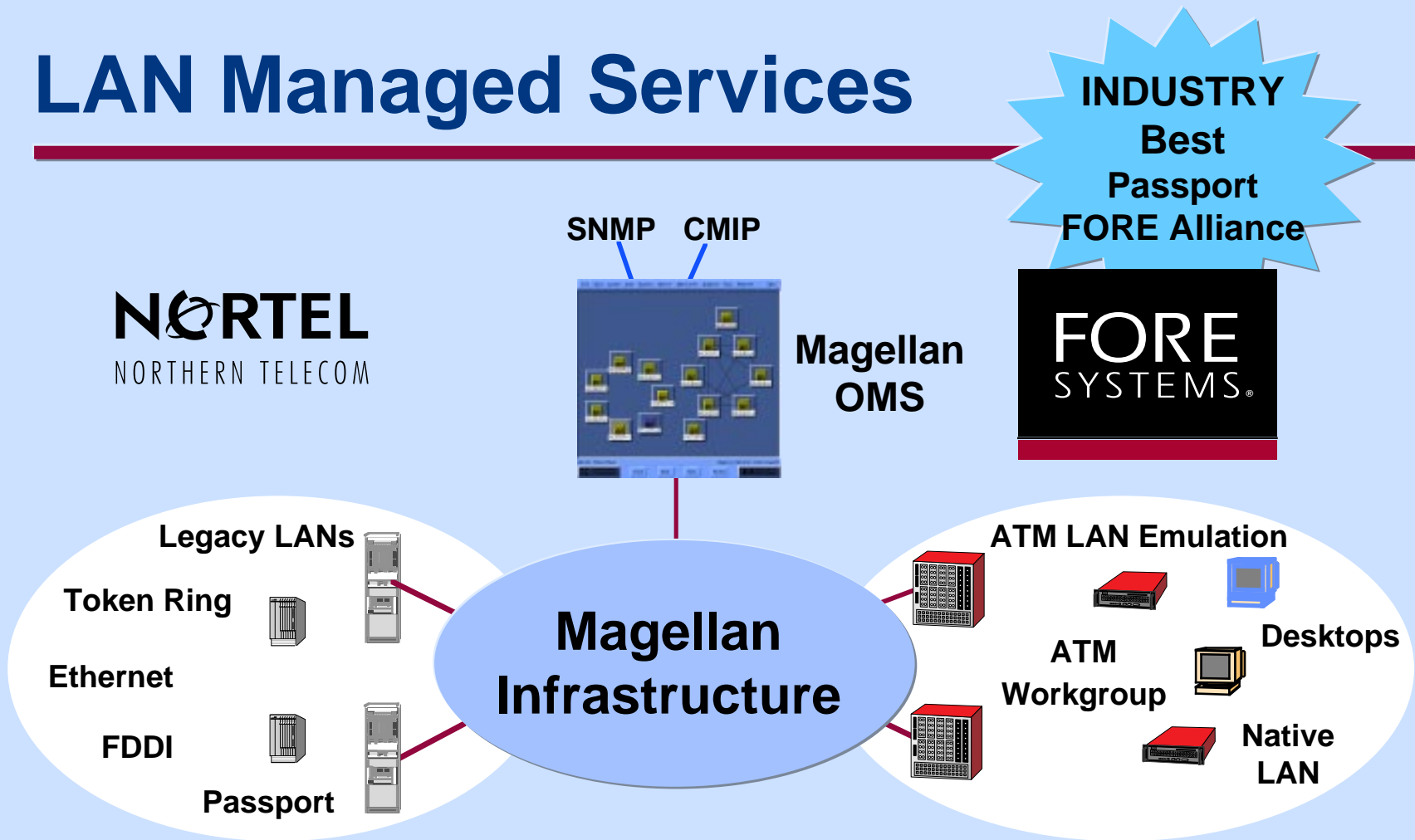
Seamless end-to-end operations for LAN-managed services

Wide Area Video Services

Video distribution

Business video conferencing

Magellan Infrastructure

Nortel

NSAM

MPEG-2

DV45

ATM UNI

ATM Multiplexor

Stored Video
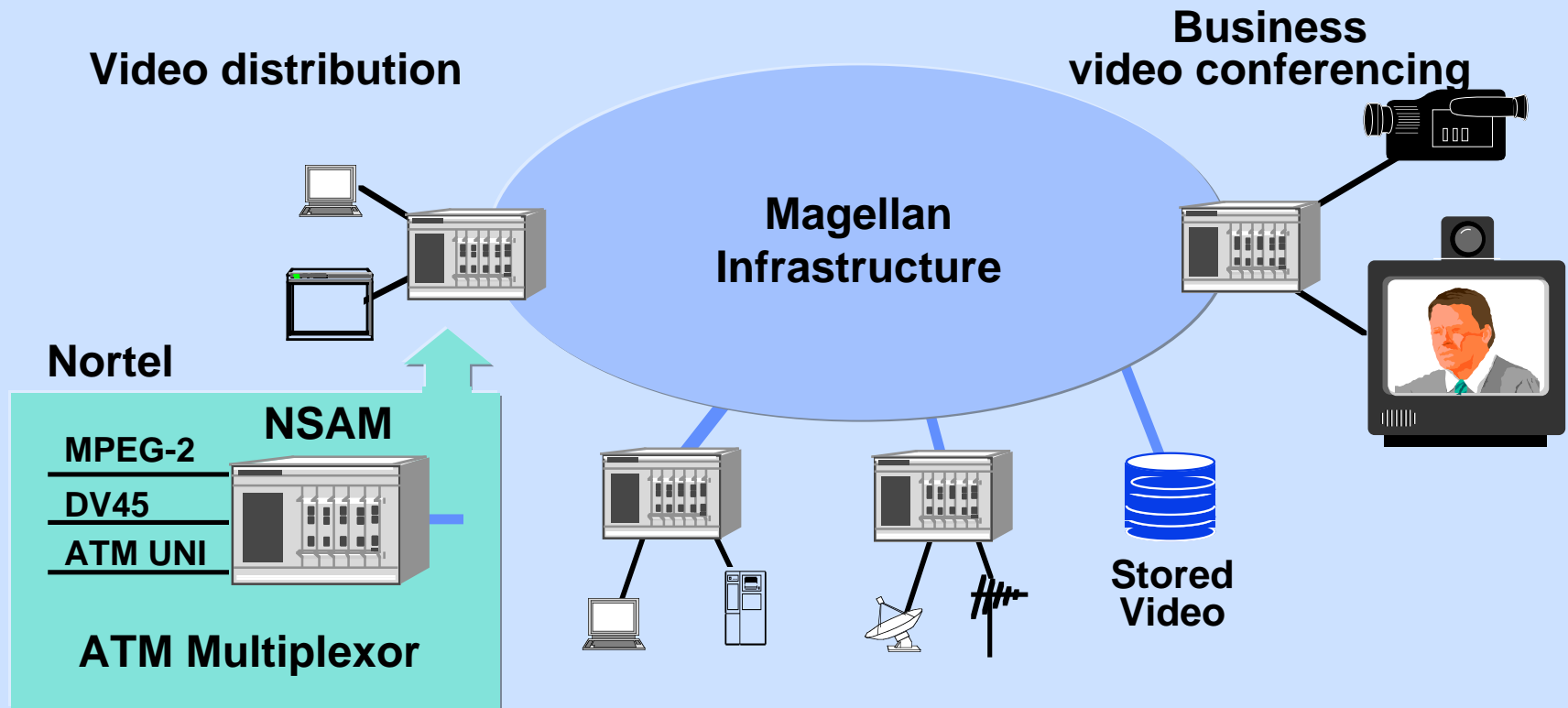
Nortel has solutions for video broadcasting, distribution, and conferencing services

Internet Access

Agent

Home user

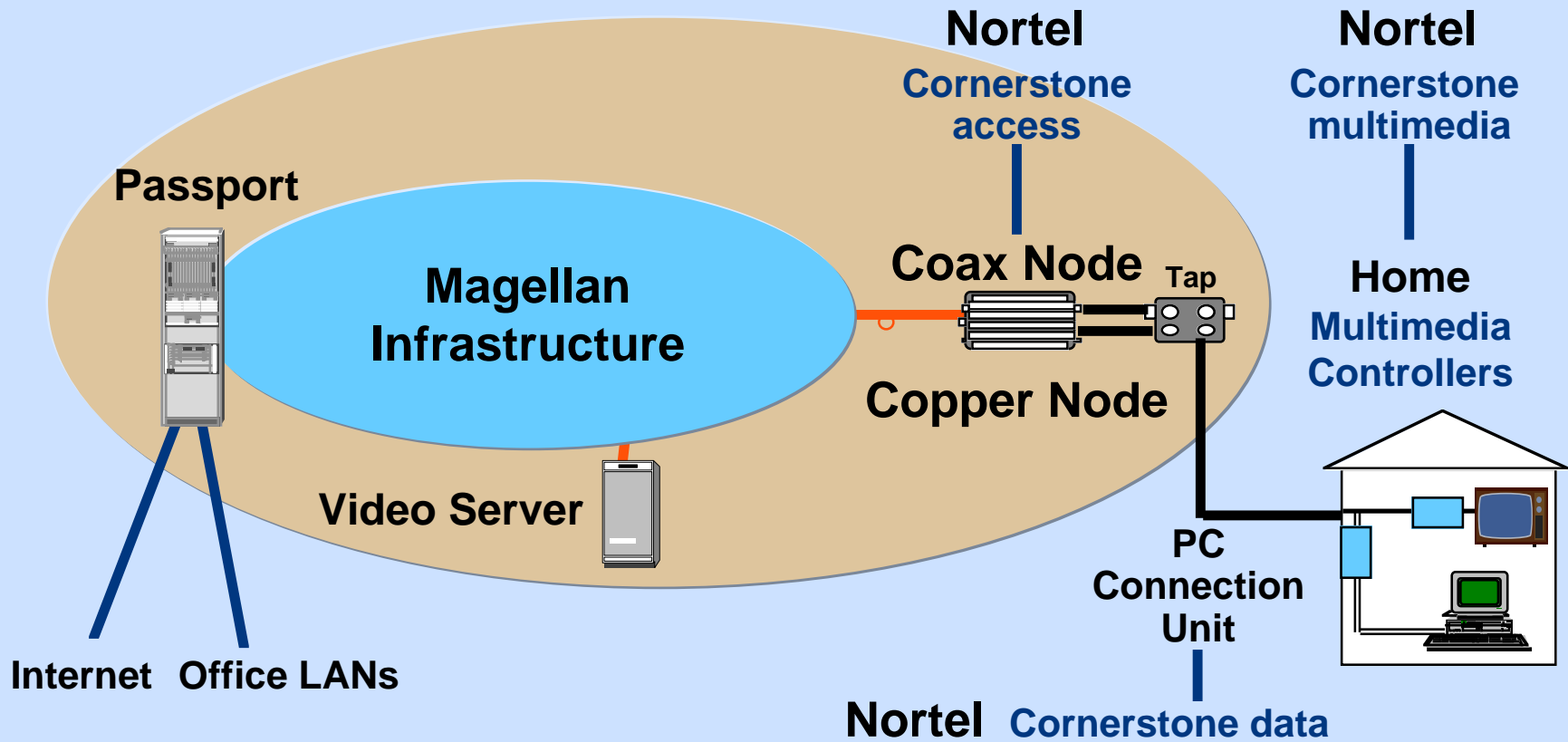**PSTN ISDN**

Student

Executives

Nortel

Rapport

FR or ATM
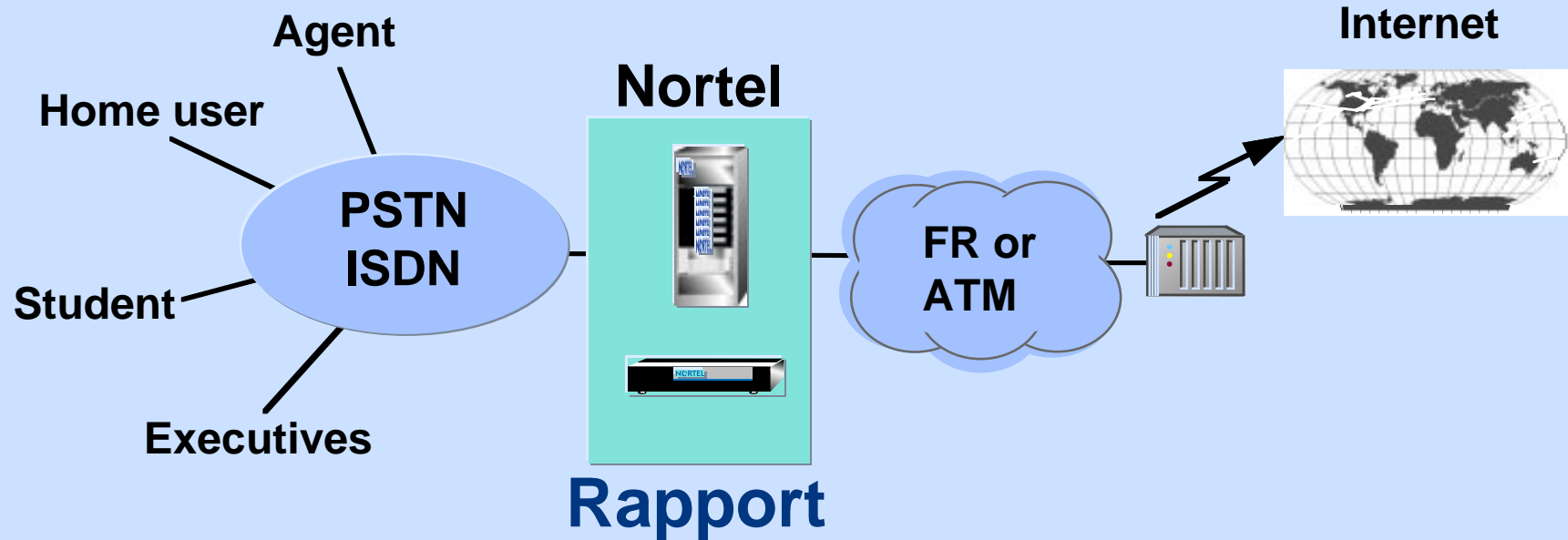
Internet

...access to Internet, making it easier, more secure and more reliable to use

Magellan Multimedia Access Vision

Passport

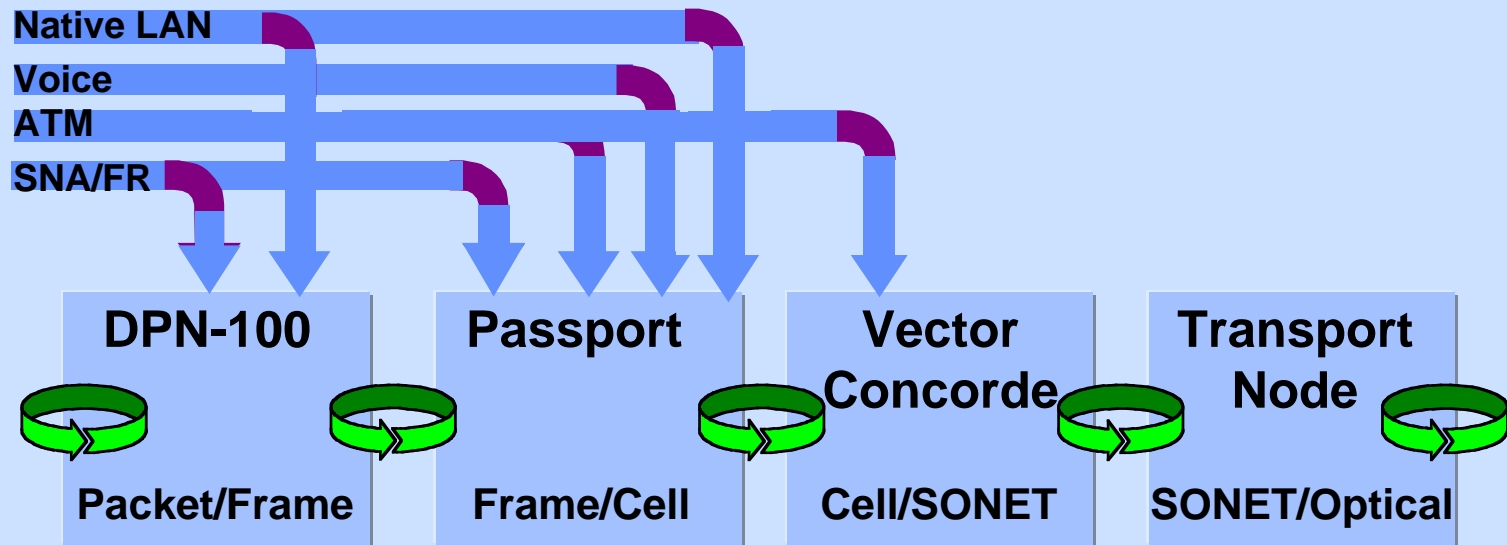**64 to 2048 kbit/s
leased line or
public frame relay**

Dial backup
ISDN BRA

MAS

**SNA
or X.25
or Async**

Oscar

DPN-100/1

**Local
Server**

MAP

**Key
system**

PC

Voice

Fax

Video
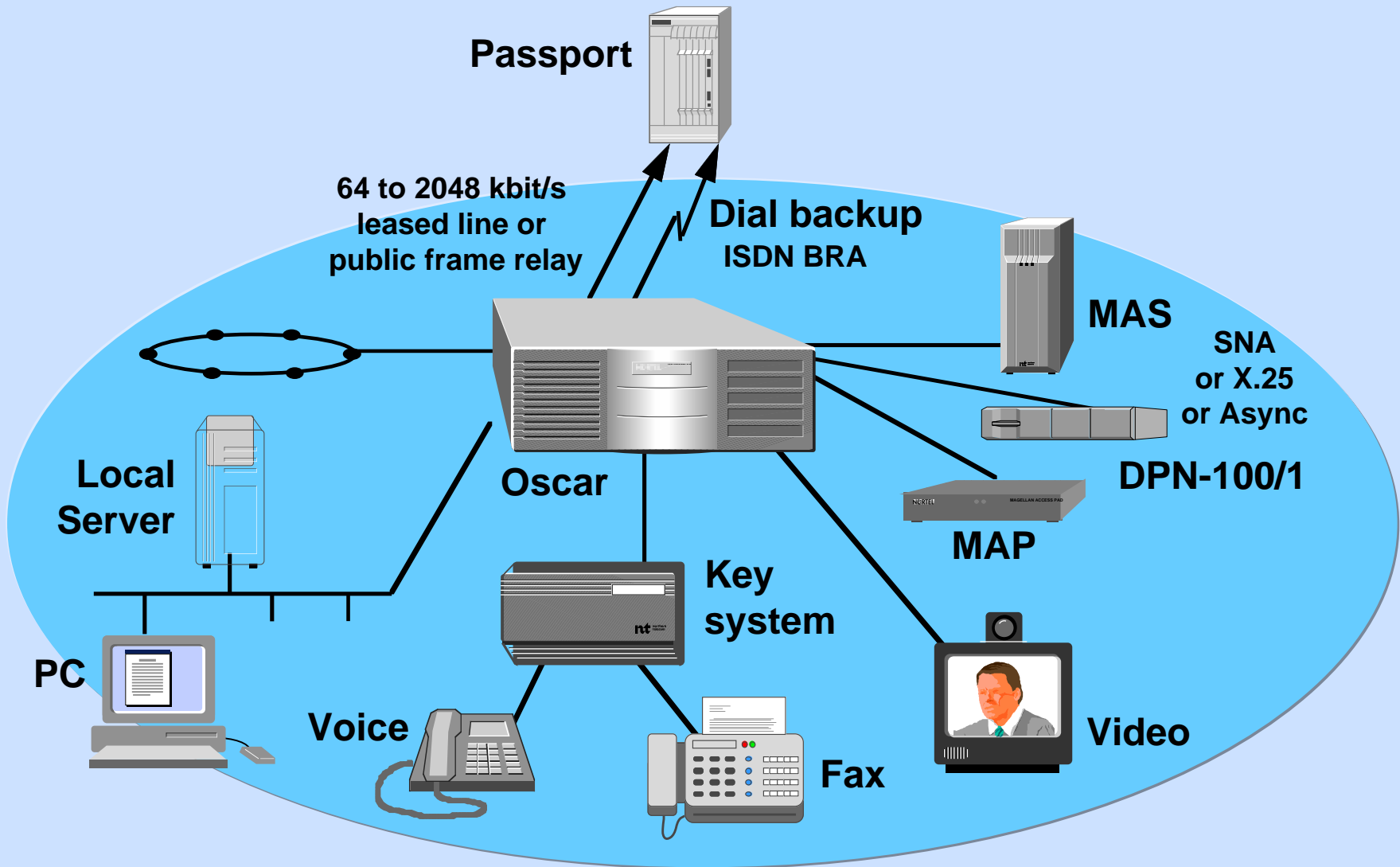
Residential Data Services

Passport

Magellan Infrastructure

Video Server

Internet **Office LANs**

Nortel **Cornerstone access**

Coax Node **Tap**

Copper Node

PC Connection Unit

Nortel **Cornerstone data**

Nortel **Cornerstone multimedia**

Home **Multimedia Controllers**

work@home.your living room.at 10 Mbit/s

Data Service Evolution

Seamless evolution capability unmatched in industry
Ready migration of Nortel services to new technologies

Native LAN
Voice
ATM
SNA/FR

DPN-100	Passport	Vector Concorde	Transport Node
Packet/Frame	Frame/Cell	Cell/SONET	SONET/Optical

**consistent routing, signalling, management**

Technology evolution brings new business opportunities with incremental investment and risk

Agenda

- **Market trends**

- **Nortel directions**
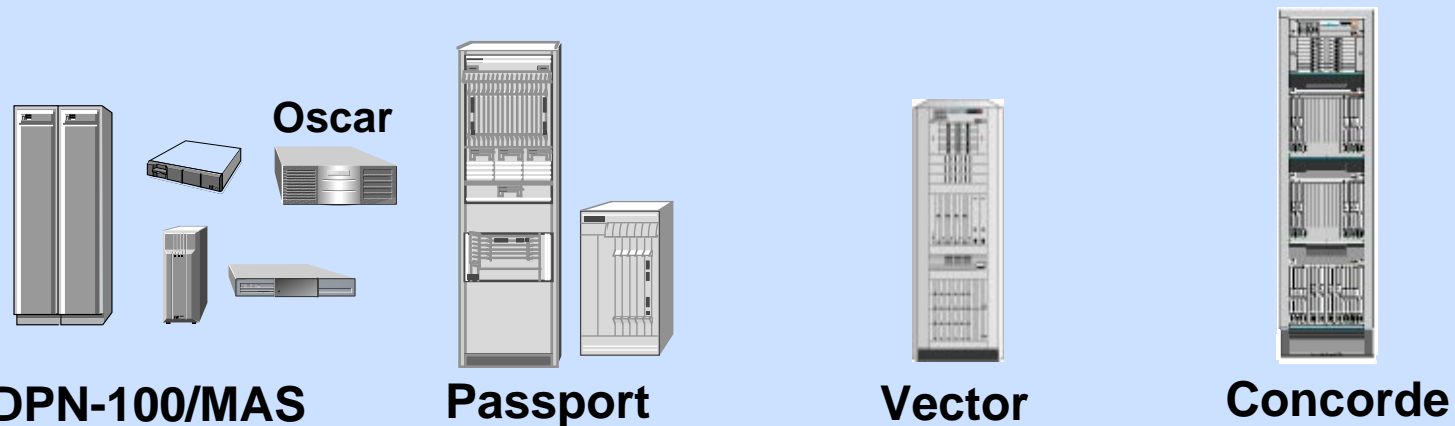
- **Service opportunities**

- **Cost reduction opportunities**

Infrastructure Solutions

Cost reduction

Services

Infrastructure

TransportNode

Vector

Passport CONCORDE CONCORDE Vector
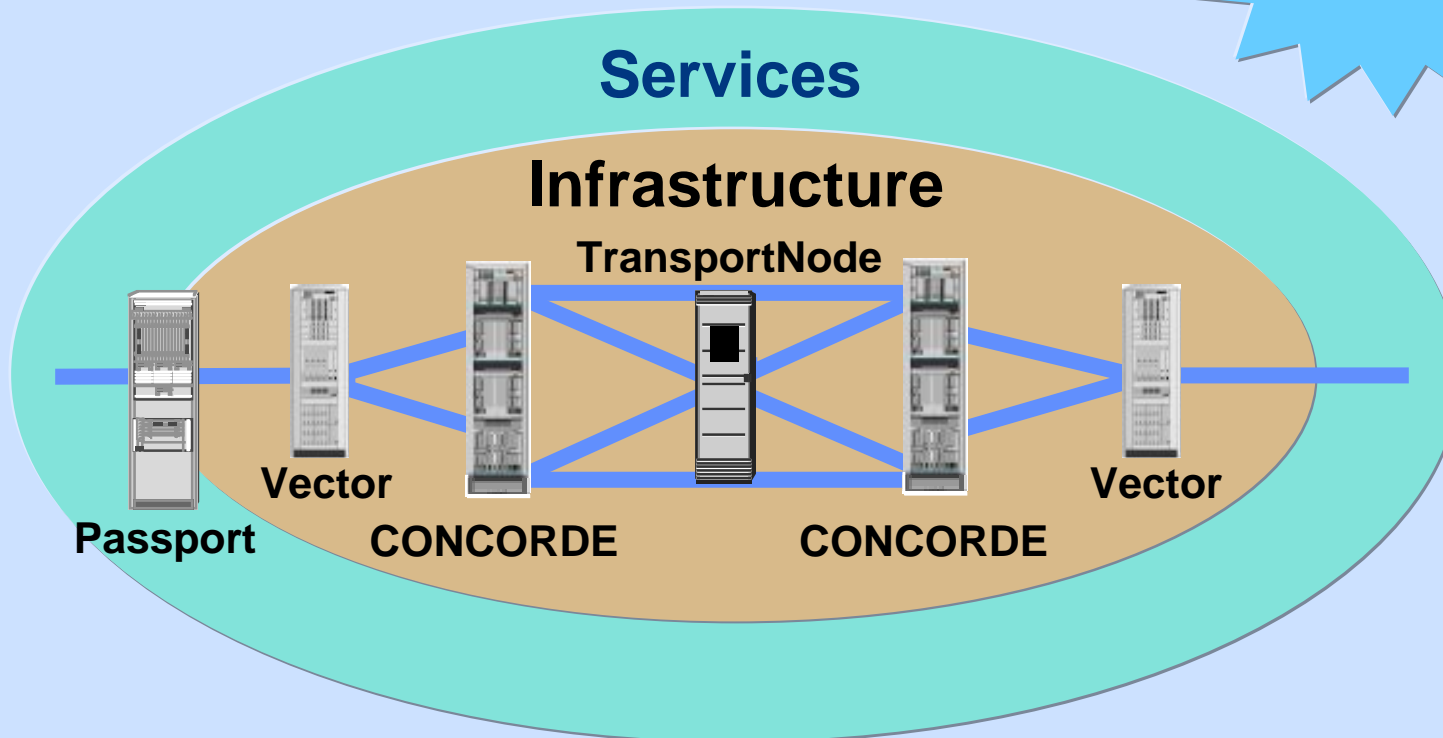
A common infrastructure for multiple services today, with flexibility for future needs

Scalability and Robustness

Oscar

DPN-100/MAS **Passport** **Vector** **Concorde**

Fully Scalable

- Capacity range up to 80 Gbit/s
- Very high fan-in
- Intelligent buffer management
- Distributed architecture
- Client-server management architecture

Unmatched Robustness

- No single point of failure
- Real time re-routing
- Hot swappable cards
- Billing redundancy
- NEBS and ETSI compliance

- **A few ports to hundreds of thousands of ports**
- **Up to 99.998% availability**

Service and Network Management

Applications

- Billing
- Performance data
- Network display and alerts
- End-to-end provisioning
- Service monitor
- VPN/CNM...

Benefits

- ✓ reduces network operating costs
- ✓ provides access via standard i/f
- ✓ uses open platforms
- ✓ integrates Nortel and alliance products
- ✓ is scalable for very large networks
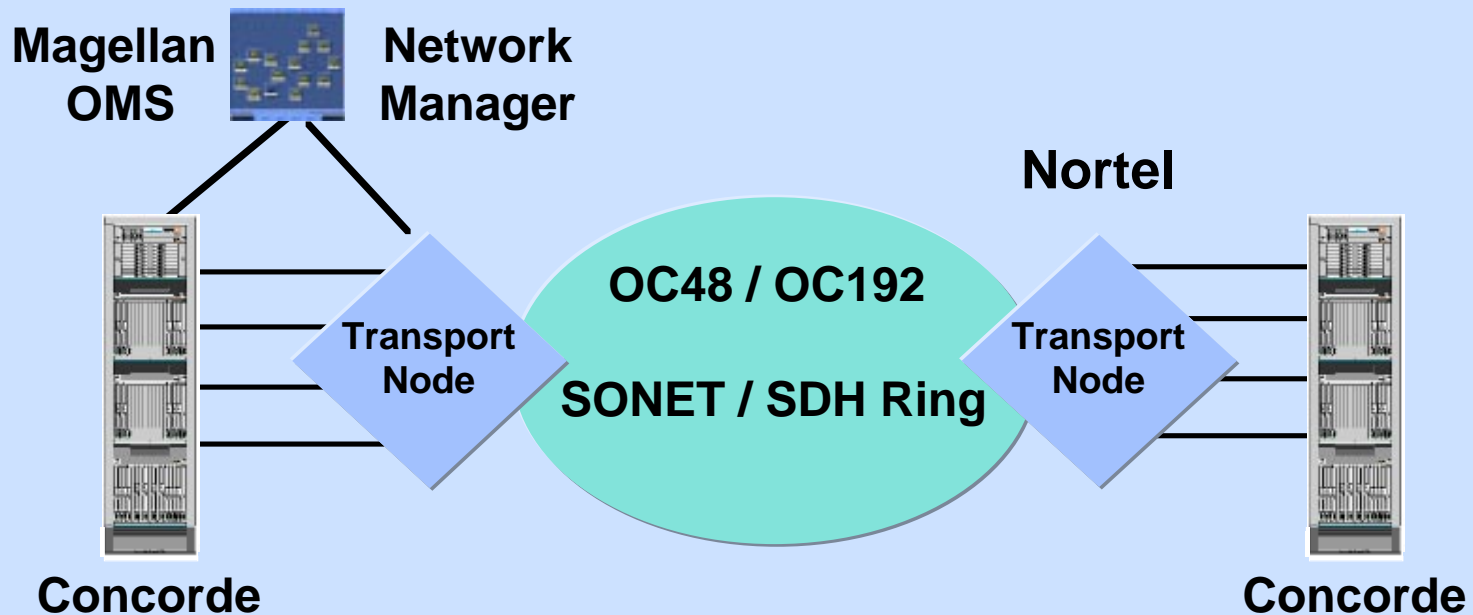- ✓ provides migration to INA & TMN

NMS	MAS DPN-100 Oscar Passport
OMS	Oscar Passport Rapport Vector Concorde

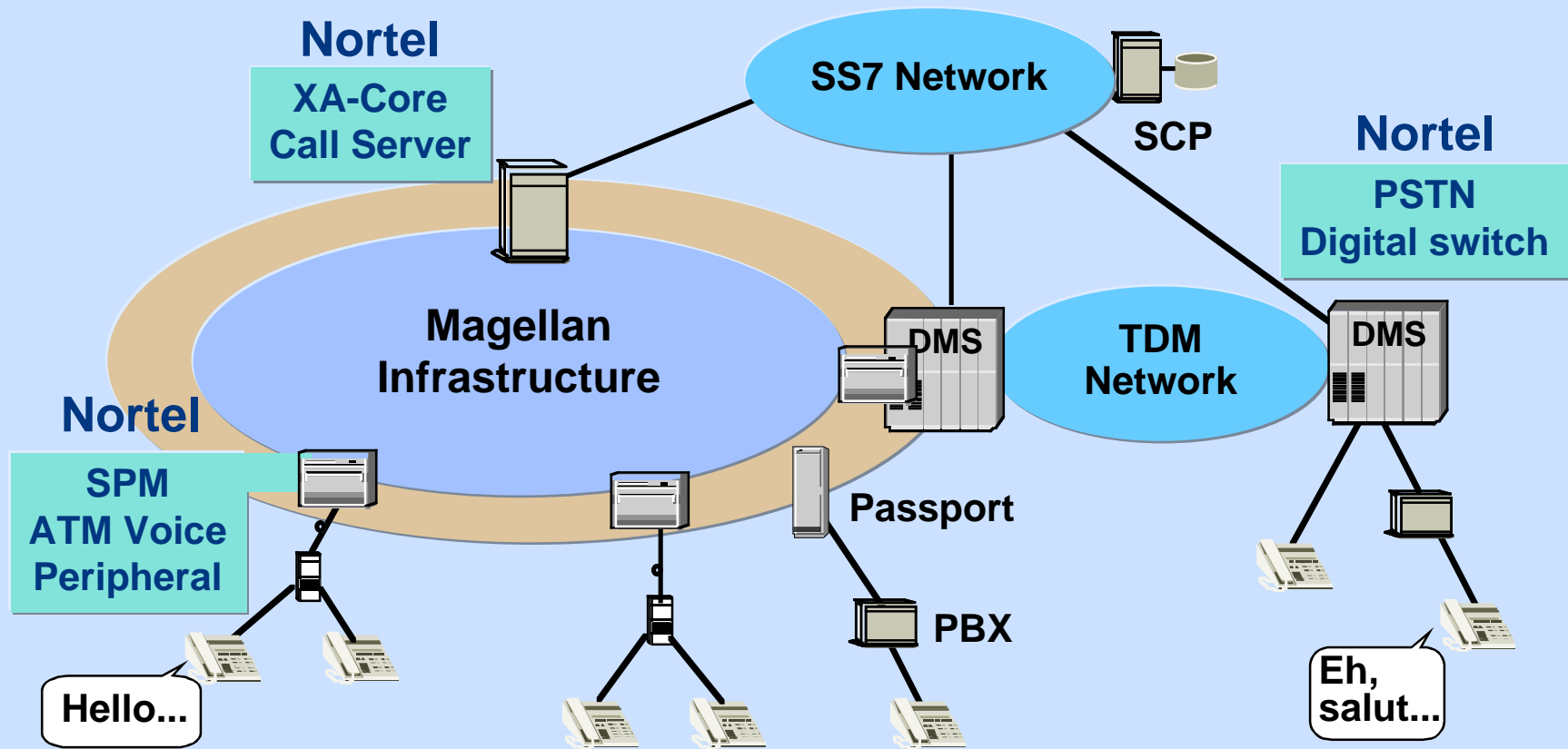## Service velocity and reduced costs

ATM/Transport Networks

- **Fiber costs reduced - fiber utilization optimized with ATM**
- **High service availability - full redundancy, SONET and ATM protection**
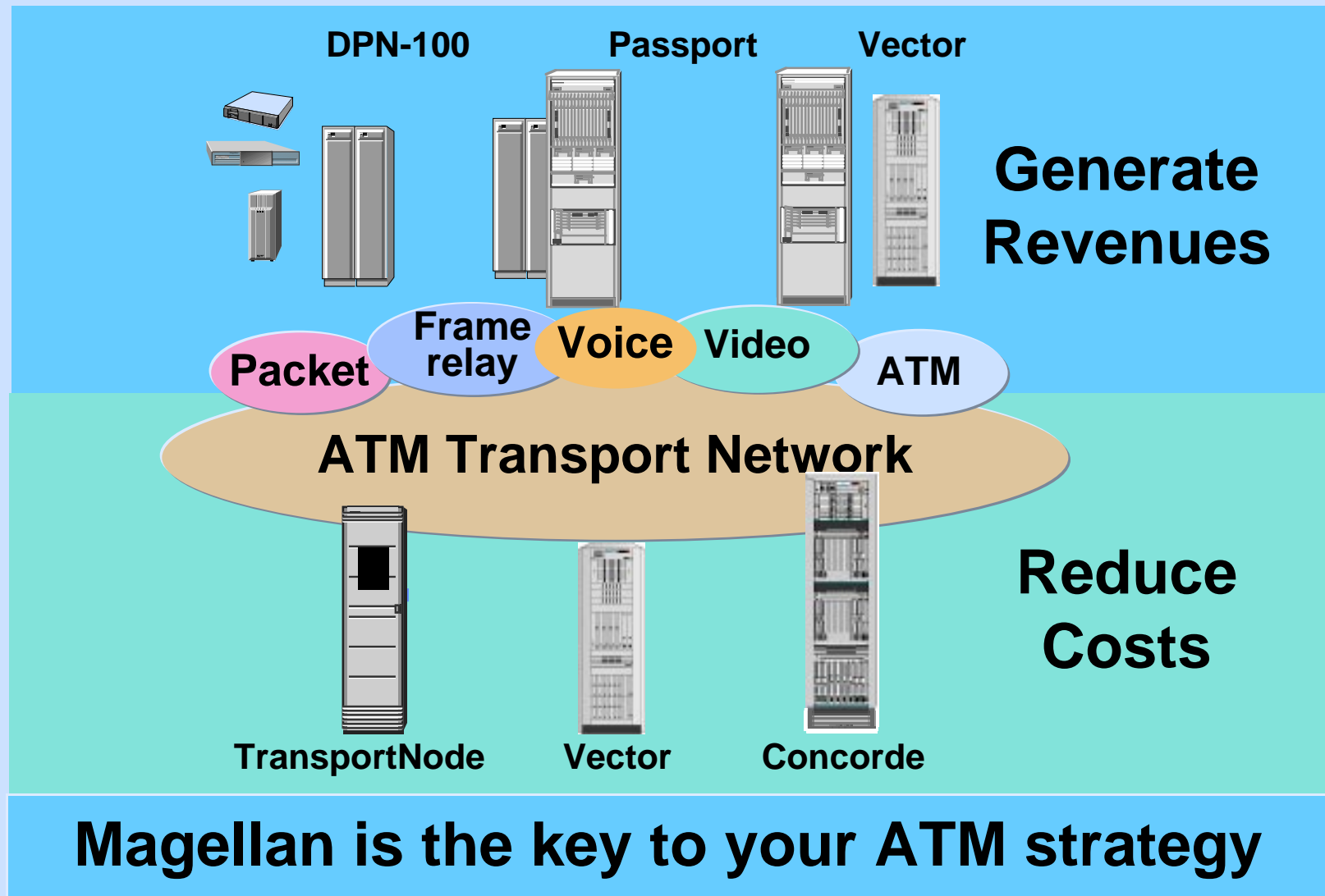- **Management costs reduced - common management system**

Magellan OMS   Network Manager

Nortel

Concorde

Transport Node

OC48 / OC192

SONET / SDH Ring

Transport Node

Concorde

ATM integration with SONET/SDH significantly reduces costs

PSTN Evolution to ATM

Nortel leadership: the ATM voice switch

Nortel Solutions

DPN-100 Passport Vector

Generate
Revenues

Packet   Frame relay   Voice   Video   ATM

ATM Transport Network

Reduce
Costs

TransportNode   Vector   Concorde

Magellan is the key to your ATM strategy

Nortel Commitment

Nortel believes that ATM will be the basis of a ubiquitous broadband multimedia network

Nortel will evolve its data, voice and video products to transition gracefully to the ultimate vision