At The

WORLDWIDE INTEROPERABILITY DEMONSTRATION

SUPERCOMM 2005
Alcatel 2004 facts and figures

- Sales at €12.3 billion
- Operating income at €978 million
- 12.9% of sales invested in R&D
- 56,000 employees in 130 countries

2004 Revenue in M Euros by Business Segment

- Fixed communications: 3,301
- Mobile communications: 5,131
- Private communications: 3,965

2004 Revenue by Region

- Western Europe: 42%
- North America: 15%
- Asia Pacific: 15%
- RoW: 28%
Alcatel joins OIF interoperability tests and demo

SuperComm booth 2005
OIF Demonstration – Control Plane Architecture

- **UNI-C** signals for Ethernet connection
- **UNI-N** creates SONET/SDH layer calls and connections to provide Ethernet Private Line service
- **E-NNI** provides routing topology and signaling for calls and connections
- Edge NEs provide interworking between vendor-specific I-NNI protocols and OIF UNI-N/E-NNI protocols

**Domains can be advertised as**
- Multiple exposed border nodes with virtual intra-domain links (vendor 1) or
- Single abstract node (vendor 2)
OIF Demonstration – Bearer Plane Architecture

- Edge NEs map Ethernet into SONET/SDH using GFP-F/VCAT/LCAS
- Client Ethernet services invoked by different methods
  - Control plane signaling and routing enables Ethernet Private Line (clients 1, 4)
  - VLAN tagging enables Ethernet Virtual Private Line, Virtual Private LAN and Internet Access/Virtual Trunking (clients 2, 3)
Ethernet over SONET/SDH - Benefits

**GFP (G.7041) - Generic Framing Procedure**
Adaptation layer for Ethernet frames over SDH VCs (VC12/3/4).

**VCAT (G.707) - Virtual Concatenation**
Ethernet frames utilize multiple SDH VCs.

**LCAS (G.7042) - Link Capacity Adjustment Scheme**
SDH bandwidth (multiple VCs) are provisioned hitless on-demand.

**Technology Benefits**
- Enabling p2p EoSDH services
- Premium SLA & Availability
- Secure Customer Space Segregation
- More Efficient Bandwidth Granularity (e.g. in 2Mb steps)
- On-demand bandwidth changes
- Fault resilience with diverse paths

**Logos**
- ALCATEL
- OIF (Optical Internetworking Forum)
Integrated Ethernet L2 Switching - Benefits

- Multipoint Services definition
- Basic self-healing mechanisms
- Logical Customer Space Segmentation per SDH resource
- Basic Class of Services definition by priorities
- Relative (non absolute) traffic prioritization

Technology Benefits

MAC Bridging/STP/RSTP

VLAN/S-VLAN

Class Priority Management
The 2005 OIF Worldwide Interoperability Demo unites these key technology areas in a multi-carrier/multi-vendor environment:

- Ethernet over SONET/SDH
- Ethernet layer 2 switching
- Optical control plane

Technology Benefits:

- Service activation
- Multi-layer resource control
- Resiliency mechanisms
- Topology discovery
- Path Selection
- Resource discovery
- Inventory management
- Control channel management

OIF UNI
OIF E-NNI
Alcatel role in Deutsche Telekom Labs (Berlin, Germany)

- Ethernet Services configuration
  - Private Line
  - Virtual Private Line
  - Virtual Private LAN
  - Internet Access

- Ethernet Aggregation
- Ethernet Switching
- Ethernet Access Multiplexing

- Ethernet Adaptation
  - GFP-F
  - VCAT
  - LCAS

- Integrated GMPLS control plane
- SDH Interface
- Crossconnect Function

- Other vendors' domain

- Alcatel 1678 Metro Core Connect

- Alcatel 1660 SM MSPP

- Universal Network Interface (UNI)
- Ethernet NIC (GbE)
- Ethernet Client role

- Alcatel Ethernet Client role
Alcatel role in Deutsche Telekom Labs (Berlin, Germany)

Virtual Private Line

Lucent MSPP Aggregator

Bandwidth: VC-4-1v, VC-4-3v, VC-4-4v

Alcatel MSPP Aggregator

Lucent

Alcatel 1660SM with ISA ES series

Application for Carriers
Business Customers
Virtual Private Lines

Alcatel role in Deutsche Telekom Labs (Berlin, Germany)
Alcatel role in Deutsche Telekom Labs (Berlin, Germany)

Virtual Private LAN

MSPP Switching

Alcatel 1660SM with ISA ES series

Application for Carriers
Business Customers
Virtual Private LAN

Bandwidth: VC-4-1v

ETH Aggr & switch Over MSPP

Business Customers
Alcatel role in Deutsche Telekom Labs (Berlin, Germany)

Trunking

Lucent

MSPP Aggregation

MSPP Aggregation

Bandwidth: VC-4-1v

VC-4-3v

ETH untagged

SDH/SONET untagged

ETH untagged

Alcatel 1678 Metro Core

Connect

Alcatel 1660SM with ISA-ES series

Application for Carriers

3-play Services

for Residential Customers

Alcatel

Lucent

GE

101

GE

102

ETH untagged

Access

Edge
Alcatel role in Verizon Labs (Waltham, MA)

- **Ethernet Services configuration**
  - Private Line with Ethernet Adaptation

- **Control Plane configuration**
  - All roles demonstrated: UNI-C, UNI-N, E-NNI, I-NNI

- ASON Control plane
- SONET Interface
- Crossconnect/ADM Function

Carrier Transport Network

Alcatel 1677 SONETLink

ETH Client role

other vendors' domain

OIF OPTICAL INTERNETWORKING FORUM
Alcatel role in Verizon Labs (Waltham, MA)

- 3 Control Planes instances to demonstrate multi-node domains
- Domain created as 3 exposed border nodes with virtual intra-domain links

Key Features:
- **1351 GMPLS Control Plane Manager**: signaling, routing, link management
- **1677 SONET Link**: ADM grooms traffic for connections across multi-layer, multi-vendor network in carriers’ labs
- **1696 Metro Span**: WDM with integrated optical layer management

Diagram Elements:
- **UNI**
- **GigE**
- **SONET**
- **ROADM**
- **Ethernet Client**
- **Control Plane**
- **Data Plane**

Other Vendors' Domain
Multi-Service Transport Platforms

Customer Access/Service Technology
- E1, E3, E4
- STM-1, STM-4, STM-16
- ATM
- Ethernet, GbE
- IP/MPLS
- ESCON, FICON
- Fibre Channel
- FDDI, DVB

Traffic Switching
- Layer 0/1
- Layer 2

Network Transmission

WDM/SDH/GE
2.5G/10G

Ethernet
MPLS
RPR

Visit: Alcatel 1660SM web page

Carrier grade by design

WDM SDH

must be carrier grade as well...

Visit: Alcatel 1660SM web page

OIF Optical Internetworking Forum
Intelligent Optical Network Platform

- ION networks based on 1678 Metro Core Connect (MCC) & 1677 SONET Link
  - Enhanced Flexibility
  - Optical Switching Layer
  - Improved Data-awareness
  - Layer 2 Switching Functions
  - Integrated Control Plane

- Future-proof SONET/SDH optical networking solutions that converge transport, Ethernet and MPLS carrier grade technologies to deliver new broadband IP applications to businesses and consumers.

Visit: Alcatel 1678MCC web page
Visit: Alcatel 1677SONETLink web page
Alcatel’s strong footprint in OIF history

and today... at OIF 2005
Alcatel: a Key Player in Technology Standards

350 Alcatel experts in more than 100 Standards Bodies
Key positions in: OIF, ITU, 3GPP, ETSI, ATIS, DSLF, IETF, CCSA, OMA, BCDF,…

Future Proofing and Security
Multivendor Interoperability
User Acceptance
CAPEX/OPEX Reduction
New Revenue Streams
Fast Time To Market

Program fully integrated into quality plans and product development cycles

Thought leadership in:
BB Access and Services
Business grade IP services
Fixed-mobile solutions
NGN & Applications
Data and Optics blend
Mobile networking

OIF OPTICAL INTERNETWORKING FORUM
Alcatel at OIF 2005 - Summary

- Alcatel has demonstrated each possible role in the demo
  - UNI-C, UNI-N, E-NNI
  - Single abstract node, multi exposed node domain models
  - Bearer plane EoS adaptation
  - VLAN-enabled Ethernet virtual services

- The features highlighted in this demonstration are essential for future IP/optical convergence
  - Carrier-grade IP services
  - Aggregation network for N-Play services
  - Business VPNs

- Alcatel is a leader in these areas
  - Standardization
  - Network interoperability
  - Rollout of ASON products
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Booth # 64022

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