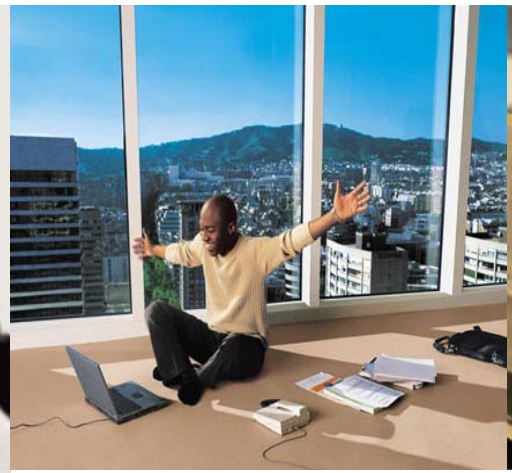
Optical Network Evolution
The General Purpose Transport Infrastructure


Ken Wirth

Vice President and General Manager

Optical Networking Group

July 30, 2003

Lucent Technologies
Bell Labs Innovations

What this Update is all about…

Lucent's Optical Networking Strategy remains the same as presented on previous occasions:

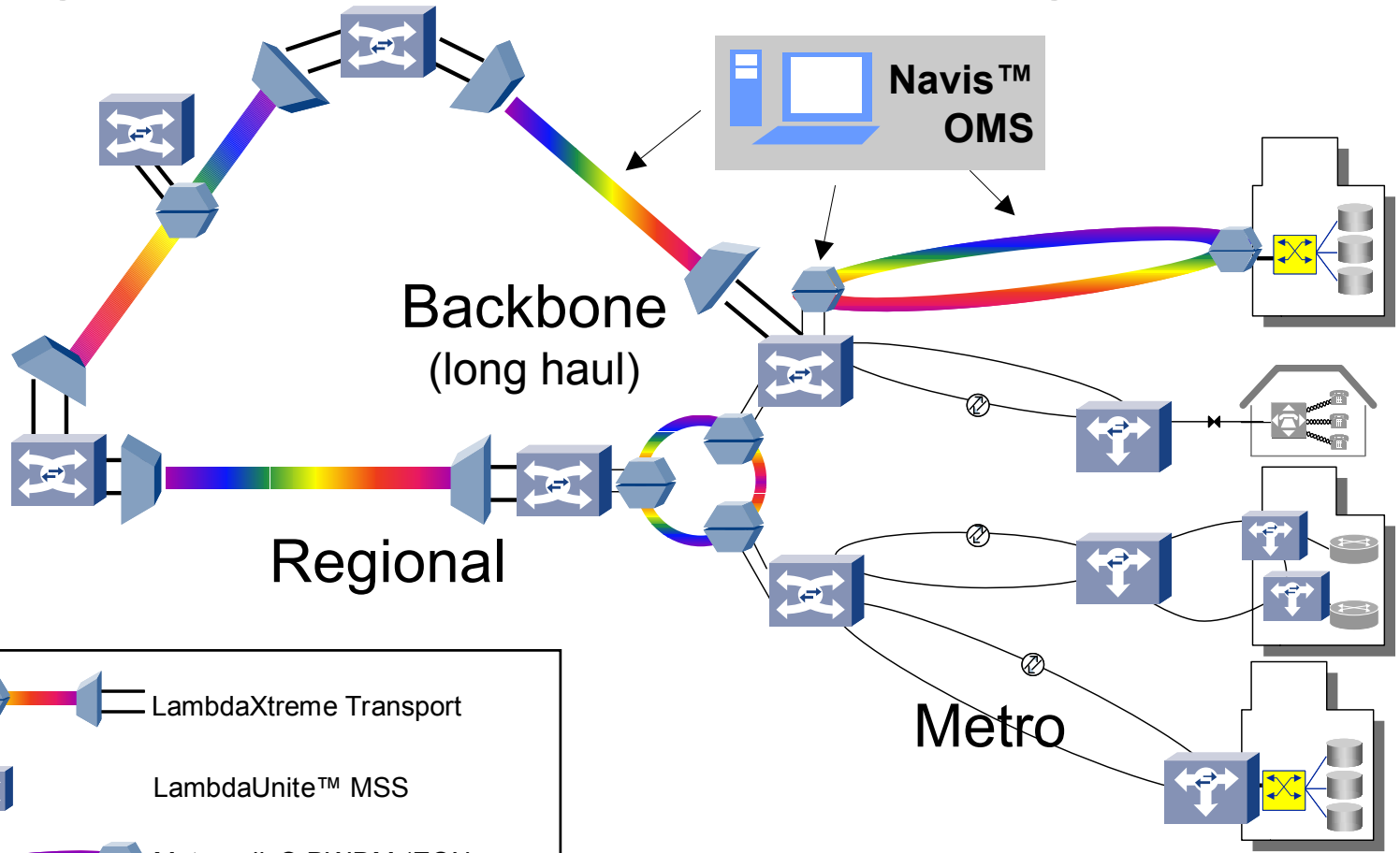
1. Continue to leverage our embedded base and our close relationships with the world's largest service providers.
2. Evolve the embedded base with new functionality to allow our customers to offer new systems without having to deploy overlay networks.

Our Optical Networking Strategy is focused on enabling what we call the "General Purpose Transport Infrastructure".

This call is an update on the progress we are making in executing on the above strategy. It is also an opportunity for you to ask us questions on how we see the optical networking market evolving.

The General Purpose Optical Network

Leverages SONET/SDH and DWDM in a Single Infrastructure



LambdaXtreme Transport

LambdaUnite™ MSS

Metropolis® DWDM (EON & WES)

Metropolis® MSPP

Solution for end-to-end Optical Infrastructure for multiple services

The General Purpose Optical Network

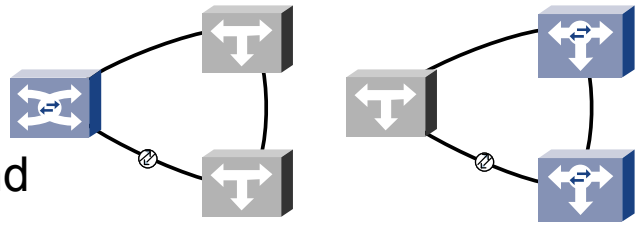
Integrates SONET/SDH and DWDM

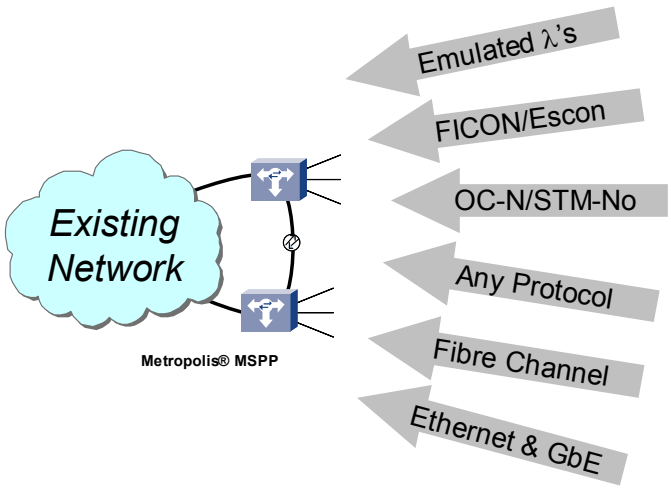
- Any Service Anywhere
  - Our goal is to allow service providers to carry all services (Data, Voice, Storage, etc.) over both SONET/SDH and DWDM
- Data Friendly
  - Continuously enhance our Ethernet service capabilities
  - Universal transport for all types of data
- Switched broadband, wideband, and Ethernet
- Simple Operations
  - Integrates into legacy
  - "Zero-Touch" Rapid provisioning
- Consolidate the Central Office
  - Distributed cross connect at the edge and high order cross connect in hub locations
  - This lowers CAPEX and OPEX
- Lower Cost than Legacy
  - Direct Ring terminations
  - Lower cost optical access to the edge
  - Support both mesh and rings on same Network Element (NE)
- Bottom line:
  - New services in existing networks
  - ***One*** reliable network
  - Lower CAPEX and OPEX

Leverage the Embedded Base

Our portfolio enhances existing networks

1 Adherence to SONET/SDH known reliability, operations, and interoperability



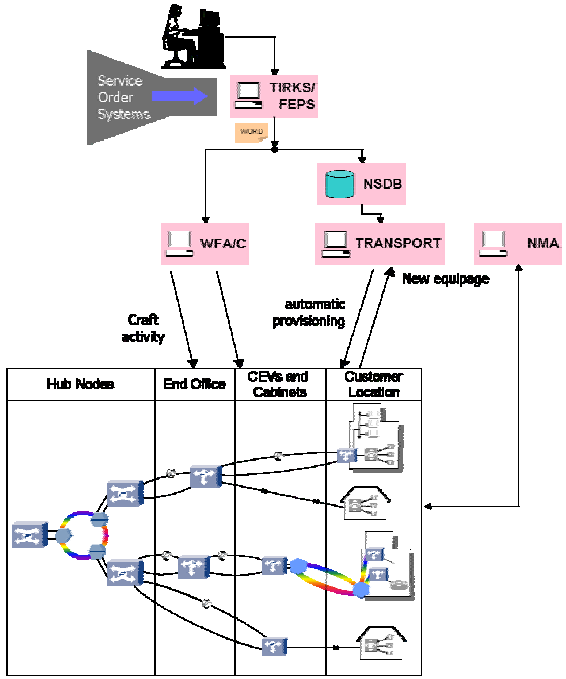


2 We support new services on existing networks

In the United States alone, our solutions have enabled 10 customers to add new services to their existing networks using the Metropolis DMX since January 1st.

Leverage the Embedded Base

Our portfolio enhances existing networks

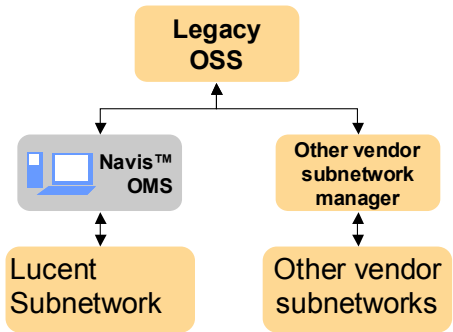


3

We integrate into the operations architecture of our largest customers (e.g. Telcordia for ILECs)

4

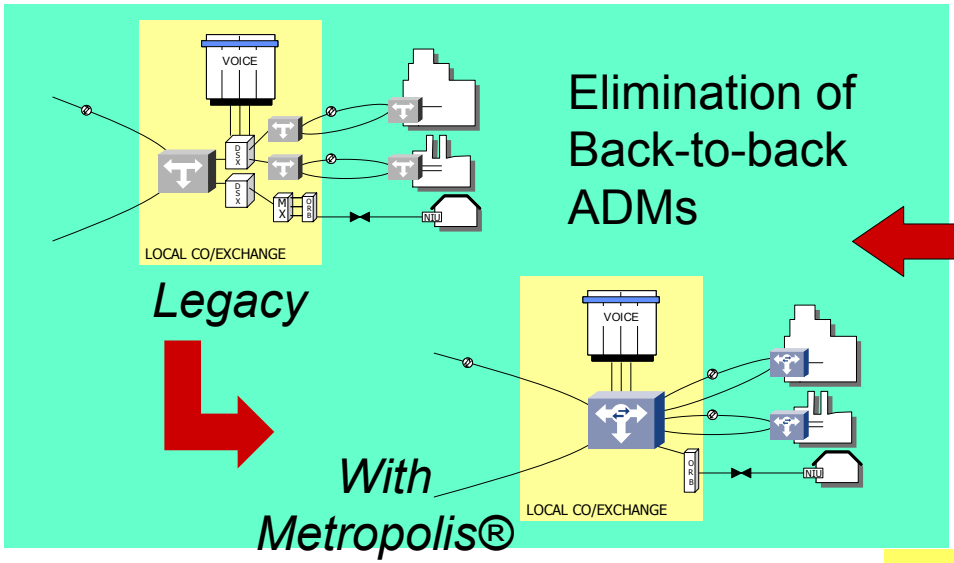
Our management solution integrates into our customers' operations environments



Our comprehensive investment in Network Management capabilities has won us contracts with many customers, like Deutsche Telekom, where we manage both Lucent and Alcatel network elements

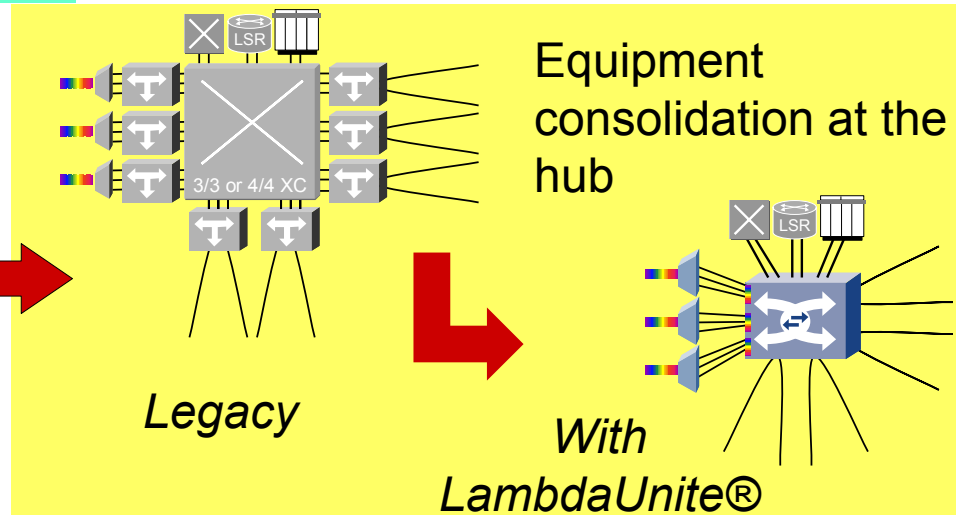
Minimize CAPEX and Optimize OPEX

…Lucent's new products consolidate the central office



At the edges of the network, MultiService Provisioning Platforms (MSPPs) collapse back-to-back ADMs and introduce more effective and efficient low-order/high-order switching

At the network hubs, cross-connects and ADMs are collapsed into a single NE



Minimize CAPEX and Optimize OPEX

...Network Management is a key piece of the solution

- ***Increase revenues***
  - From manual to automated provisioning and flow through
  - Provisioning time reduced from months to days or hours
  - Pulls forward revenue curve
  - Offers potential for service differentiation
- ***Significantly decrease operational staff***
  - Automated processes and centralized provisioning require less staff
  - System automatically "correlates" thousands of alarms to determine the root cause and reports that single problem to the user
  - System automatically updates databases with the current equipment inventory: makes records more accurate, eliminates mistakes, and saves time of operations staff
- ***Optimize Return on Capital Investment***
  - Planning tools using 'live' inventory; invest only in true bottlenecks
  - Automated flowback in carrier's inventory system; reduces manual mistakes, wasted capacity and capital expense

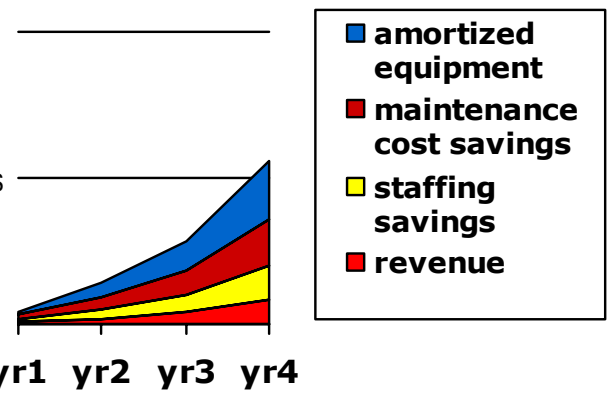
Income Statement

Revenue
Transport services

Expense
Operating costs
Staffing costs
Equip. running costs
Maintenance costs

Amortized Equipment

Profit



Lucent Has a Full Suite of Solutions

Lambda Family

LambdaUnite™ MSS



Multi service switching across core and metro networks

LambdaXtreme™ Transport



Low cost per Gb/km for long-haul and ultra-long haul 10G and 40G networks

Metropolis® Family

Metropolis® DMX and Metropolis® DMXpress Metropolis® DMXtend Access Multiplexers



Efficient TDM, cross-connect plus IP/Ethernet transport



Metropolis® Enhanced Optical Networking (EON)



Scales DWDM costs to metro market realities and supports ring DWDM



Secure GigE and SAN Services

OptiStar™ EdgeSwitch

Metropolis® ADM MultiService Mux (ADM)



Efficient TDM, cross-connect and IP/Ethernet transport

Metropolis® ADM Universal and ADM Compact



Effectively integrates cross-connect and SDH ADM functions

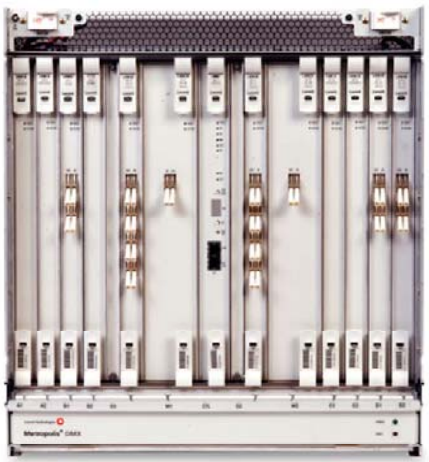
Metropolis® AM 1 Plus



SDH ADM for cost-efficient access applications

Navis™ Optical Management Solutions

Metropolis® DMX Family



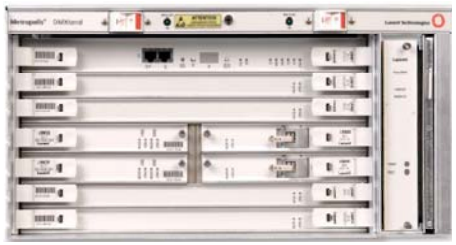
Metropolis® DMX

Central Offices
Large Enterprises
Small Metro Hubs



Metropolis® DMX*press*

Optical CPE
MTU Data, TDM over SONET



Metropolis® DMX*tend*

Loop &
Enterprise
Access



Metropolis® DMX*plore*

Lowest-cost TDM Access
For CPE Applications

- Next Generation SONET MSPPs
- A Product for every application – from CPE to IOF
- Reduces network complexity
- Use of standards leverages and evolves existing SONET infrastructure
- Expand service offerings to increase revenue
- Offer Ethernet on a “pay as you grow” approach

LambdaUnite™ MSS

Next-Generation Aggregation and Grooming Platform



- Next generation global SONET/SDH terminal
- Industry leading capacity/density
  - 320Gb capacity in ½ bay
  - 160Gb metro version introduced 03/03
  - In-service upgrade to 640Gb
  - Up to 1.28Tb in a single bay
- Optical interfaces from OC-3 to OC-768
- 1+1 APS, UPSR, 2F/4F BLSR, TOP
- Fully non-blocking STS-1 level grooming
- Targeted at Backbone Feeder and Metro Hub Applications
- Evolution to GMPLS Mesh Networking

Metropolis® ADM MultiService Mux

- New STM-16 and STM-64 ***Wideband/Broadband*** Multiplexer
  - Evolution of Wavestar® ADM 16/1 and ADM 16/1 Compact
  - Centralized low order cross connect (drop to E1)
- Next Generation Metro Transport
  - Adds new services to existing, confident and reliable SDH infrastructure
  - No need to invest in overlay networks
- Reducing Cost of Ownership
  - Common hardware with ADM 16/1 Compact
  - Full front access
  - 300 mm deep
  - Up to 4 systems in a ETSI Rack
  - Low power consumption
  - Hybrid Ethernet/SDH: TransLAN™



The Metropolis ADM puts SDH in a new light

Examples of Our Strategy at Work:

07.29.03: Lucent ships 3 millionth circuit pack for DDM-2000 Digital Multiplexer

- Laid out back to back the 3 million circuit packs would cover the distance from San Francisco to San Diego – about 500 miles!
- This product interoperates with the Metropolis DMX – which means that carriers can use existing DDM rings to deploy Ethernet Services
- The DMX uses the software code base from DDM – which means that carriers can lower CAPEX and OPEX without jeopardizing reliability

06.19.03: Lucent to build provincial backbone for Hunan Unicom

- This network includes our legacy multiplexer WaveStar ADM 16/1 as well as our newer products LambdaUnite and Metropolis ADM
- This customer will be able to upgrade its network in service from 2.5Gbps to 10Gbps and yet again to 40Gbps - all of this on the LambdaUnites that they are deploying today.

06.16.03: Lucent BusinessPartners sign 3 contracts for DMX

- This announcement was the 2nd this quarter with Lucent BusinessPartners winning business in the United States
- In the past 12 months our BusinessPartners have signed optical contracts in areas ranging from the rural United States to rural Indonesia – and from downtown Copenhagen to downtown Shanghai.

06.02.03: Lucent wins MSPP contract with BellSouth

- BellSouth will use the DMX for new revenue-generating services in the Metro network.