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The Multiservice Packet based Transport Network enables the Digital Services Delivery

Tunis, 21 Nov 2005
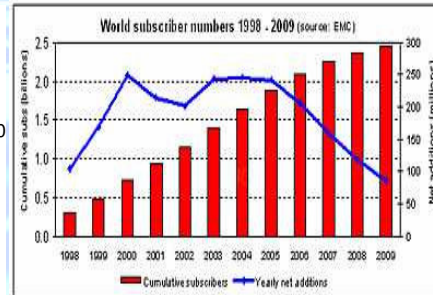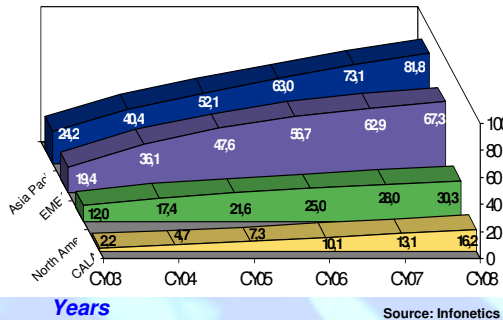
Mauro Filippi
Marketing Director
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Broadband services trend

Worldwide DSL Subscribers (MI) *Worldwide Mobile Subscribers (MI)*

Years

Source: Infonetics

Source: EMC

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1

Broadband web services:
"digital life" enabler

Entertainment
- Broadcast SDTV/HDTV
- Video on Demand
- Video/Audio Streaming and download
- Multi player interactive Gaming
- Gambling
- Mobile Video/Audio

Information
- Internet access
- E-shopping
- On-line booking
- Telemedicine
- M-commerce, cashless payments
- Location Based Services
- E-government
- On line learning
- Collaboration/Education

Communications
- Data & Voice convergence
- Fix-Mobile convergence
- Two-way video comms
- Unified Messaging
- Virtual Presence
- Homework

Home Management
- Utilities Management
- Home automation
- CCTV (Remote Surveillance)
- Door & Window monitoring
- Alarm monitoring
- Emergency & localization
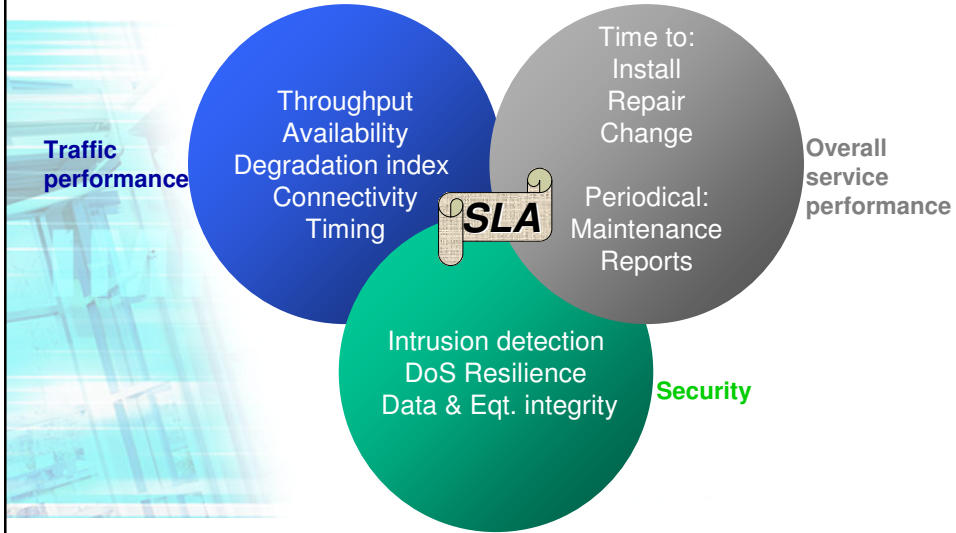
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Reliable services

- More and more services are delivered on IP in a competitive environment
- Reliability requirements of business and residential users are linked to the '***Quality of experience***'
  - user's 'expectation' for data services dominated by download time
  - voice and real time video reference: historical services (PSTN, aerial TV broadcast)
- The international standard bodies identify 6 classes of IP services on the basis of the availability target
- The spectrum of the services is so wide that the reliability index spans from 0.03 to 0.75 (IPLR)

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Match the customer expectation

Traffic performance

Throughput
Availability
Degradation index
Connectivity
Timing

SLA

Time to:
Install
Repair
Change

Periodical:
Maintenance
Reports

Overall service performance

Intrusion detection
DoS Resilience
Data & Eqt. integrity

Security

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The Multiservice Delivering Platform

MSPP

Core IP (G)MPLS

STM16
STM64

MSAN

Ethernet

NGSDH

WDM

Ethernet

NGSDH

WDM

Access Node

Metro Access Transport Network

MPLS CORE

NMS

PE

Ethernet

NGSDH

WDM

Backbone

MSAN

TDM CeS

ETN

WDM

10GBE

TDM CeS

ETN

WDM

IMS
Session Control & DBs

3G Node B,

Access Node

Metro Access Transport Network

Regional Transport Network

Core Transport Network

Application & Services

Server VOD

Access

Metro/Aggregation

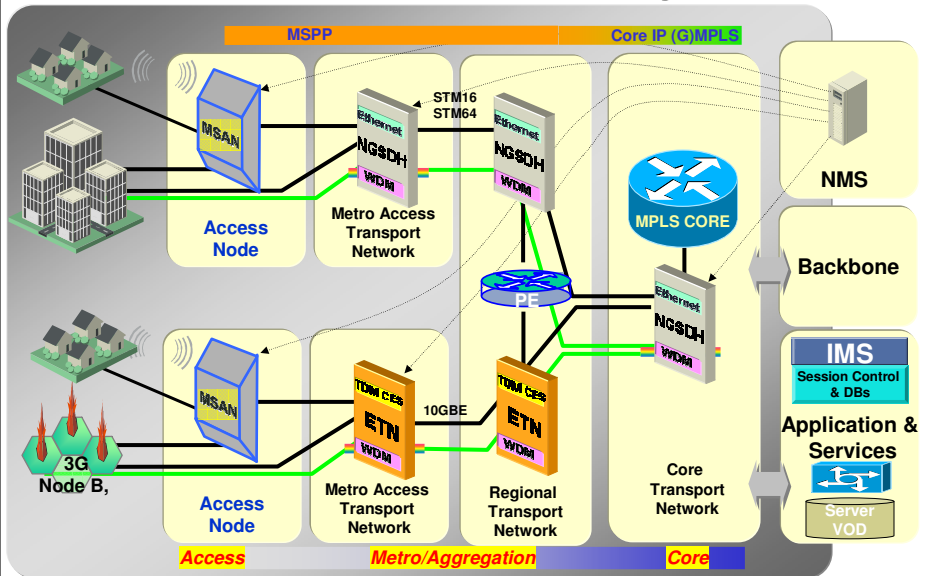*Core*

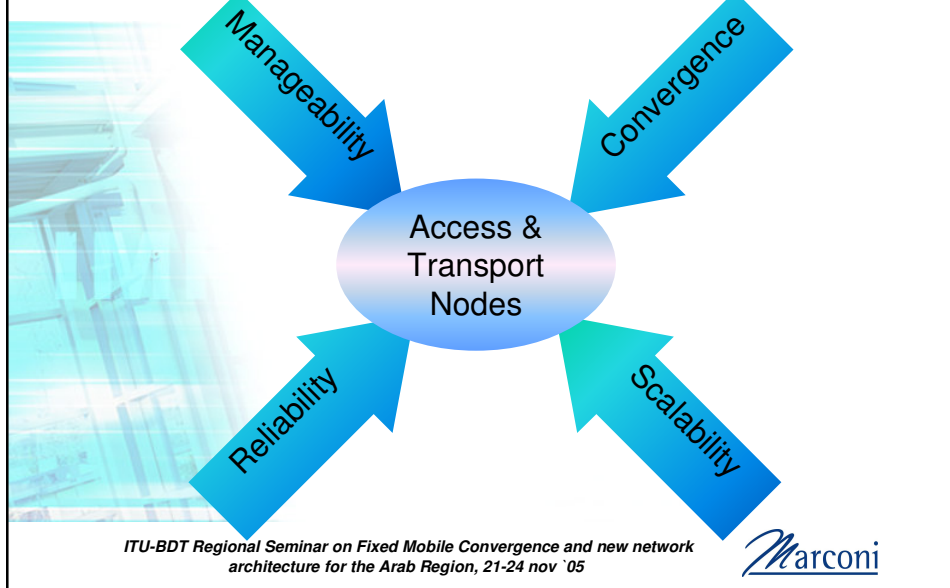*ITU-BDT Regional Seminar on Fixed Mobile Convergence and new network architecture for the Arab Region, 21-24 nov `05*

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The Corner Stones of an Excellent Transmission Network

Manageability

Convergence

Access & Transport Nodes

Reliability

Scalability

User traffic consumption

The evolving video coding and transmissions technologies will allow telecom operators, deploying most of the existing infrastructures, to distribute real broadband services to their customers.
Figures with user bandwidth in 20 to 25Mbps range are conceivable.

- **Near Term - 20Mbps**
  - **HDTV**   **1 x 12 Mbps**
  - **SDTV**   **1 x 4 Mbps**
  - **HSI**   **1 x 3.5 Mbps**
  - **Voice**   **2 x 0.128 Mbps**
  - **Video Tel.** **1 x 0.384 Mbps**

- **Further step – 24Mbps**
  - **HDTV**   **1 x 9 Mbps**
  - **SDTV**   **2 x 3 Mbps**
  - **HSI**   **1 x 8 Mbps**
  - **Voice**   **2 x 0.128 Mbps**
  - **Video Tel.** **1 x 0.75 Mbps**

Traffic profile examples

Broadband: the Giga-Capacity access

NxGE

Tributaries   Control

HDTV

HSI

Voice

IGMP
for imperceptible
zapping time

MPLS Label / VPLS

VLAN

ATM/Eth VLAN

Aggregator

AXH

IGMP,
DHCP relay
H.248,MGCP

QoS

*Scalability =
ready for unbound growth !*

1000 BB users with:

HDTV broadcast = 10 channels

SDTV broadcast = 20 channels

HDTV VoD =   5% of the user-channel

SDTV VoD = 10% of the user-channel
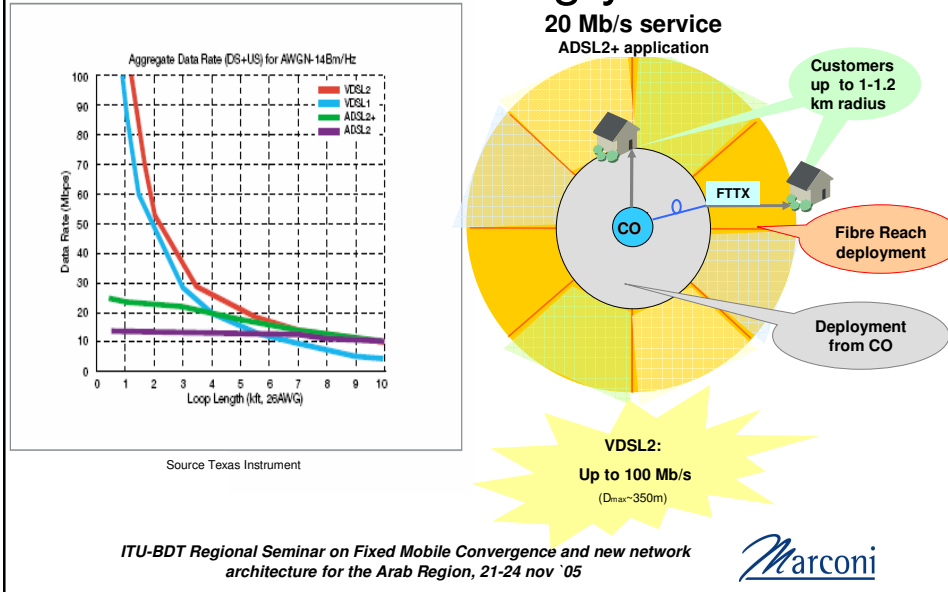
HSI = contention ratio 50:1

~ 1 GBE   N x GBE   10 GBE

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DSL enhancements:
for bandwidth hungry services

20 Mb/s service
ADSL2+ application

Aggregate Data Rate (DS+US) for AWGN-14Bm/Hz

VDSL2
VDSL1
ADSL2+
ADSL2

Data Rate (Mbps)

Loop Length (kft, 26AWG)

**Customers
up to 1-1.2
km radius**

FTTX

CO

**Fibre Reach
deployment**

**Deployment
from CO**

VDSL2:

Up to 100 Mb/s

$(D_{max} \sim 350m)$

Source Texas Instrument

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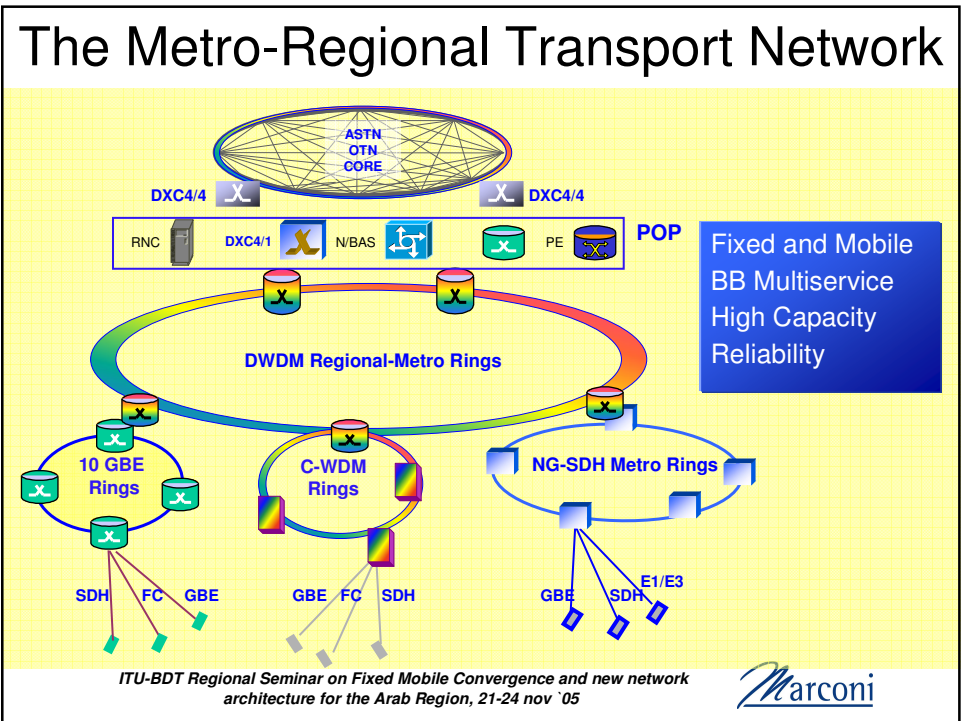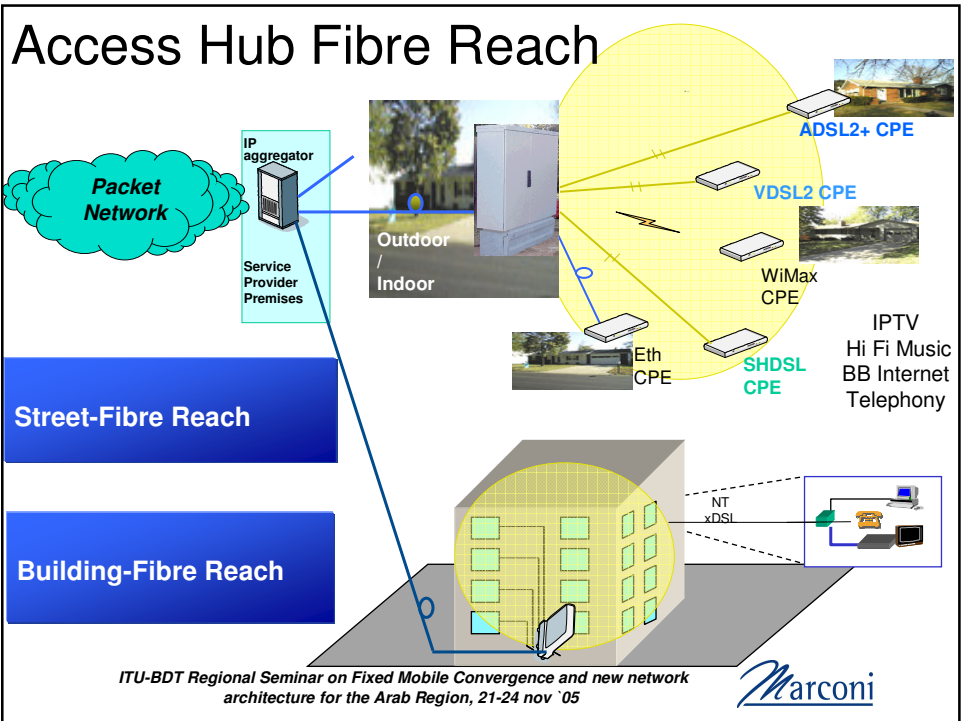architecture for the Arab Region, 21-24 nov `05*

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Access Hub Fibre Reach

Packet Network

IP aggregator

Service Provider Premises

Outdoor / Indoor

ADSL2+ CPE

VDSL2 CPE

WiMax CPE

Eth CPE

SHDSL CPE

IPTV
Hi Fi Music
BB Internet
Telephony

Street-Fibre Reach

Building-Fibre Reach

NT
xDSL

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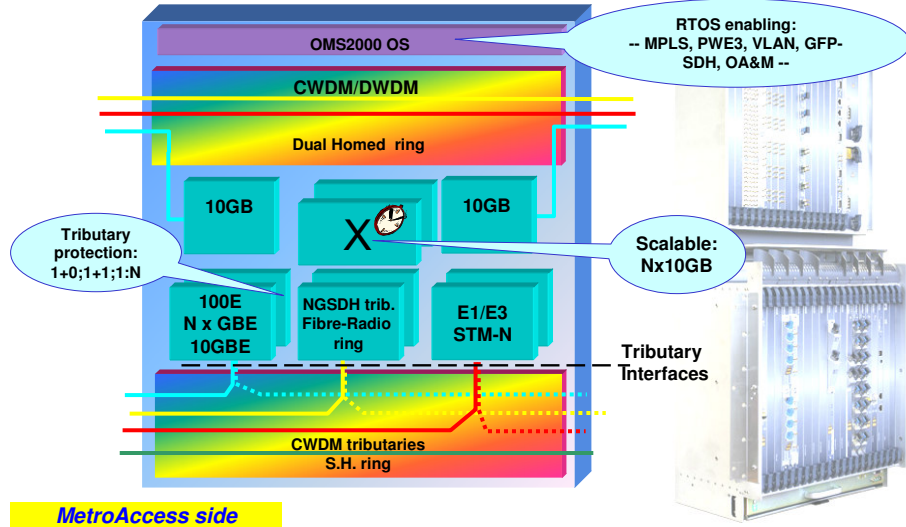
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The Metro-Regional Transport Network

ASTN OTN CORE

DXC4/4

DXC4/4

RNC

DXC4/1

N/BAS

PE

POP

Fixed and Mobile
BB Multiservice
High Capacity
Reliability

DWDM Regional-Metro Rings

10 GBE Rings

C-WDM Rings

NG-SDH Metro Rings

SDH FC GBE

GBE FC SDH

GBE SDH

E1/E3

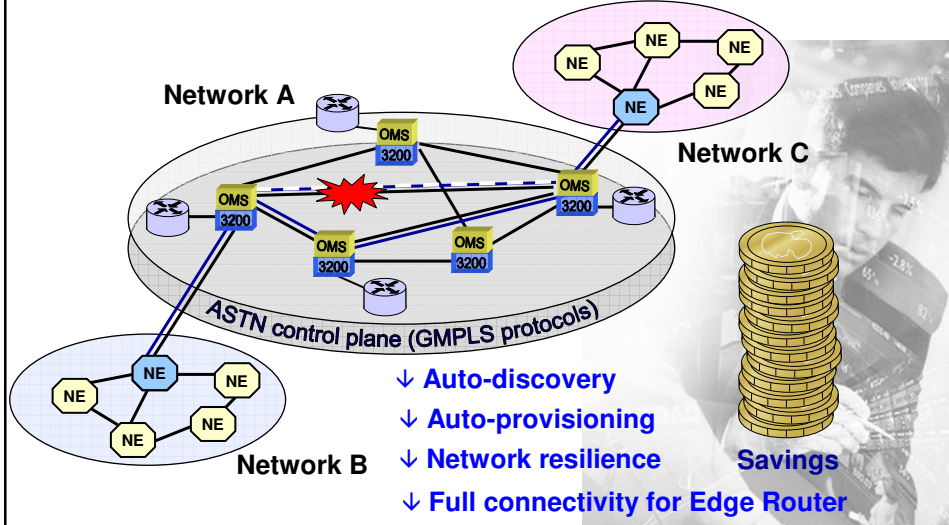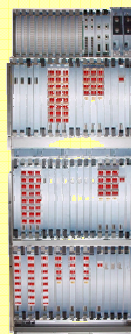*ITU-BDT Regional Seminar on Fixed Mobile Convergence and new network architecture for the Arab Region, 21-24 nov `05*

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The Metro Aggregation Node

MetroAggregation side

OMS2000 OS

CWDM/DWDM

Dual Homed ring

RTOS enabling:
-- MPLS, PWE3, VLAN, GFP-SDH, OA&M --

10GB   X   10GB

Tributary protection: 1+0;1+1;1:N

Scalable: Nx10GB

100E N x GBE 10GBE   NGSDH trib. Fibre-Radio ring   E1/E3 STM-N

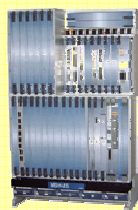Tributary Interfaces

CWDM tributaries S.H. ring

MetroAccess side

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ASTN Solution
Reducing Operator Expenditure

Network A

Network C

NE

OMS 3200   OMS 3200   OMS 3200   OMS 3200

ASTN control plane (GMPLS protocols)

NE
Network B

↓ **Auto-discovery**

↓ **Auto-provisioning**

↓ **Network resilience**   **Savings**

↓ **Full connectivity for Edge Router**

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OCS for a scalable ASTN

ASTN Control-Plane
DWDM integrated
OTN/SDH switch and tribs

In-service upgrade
2.5, 10 & 40 Gbit/s interf.
Ethernet ports and switch

From 80 Gb/s to 3 Tbit/s

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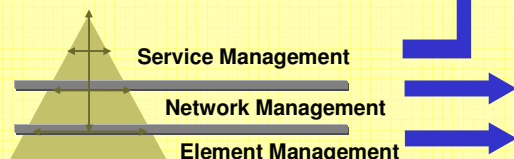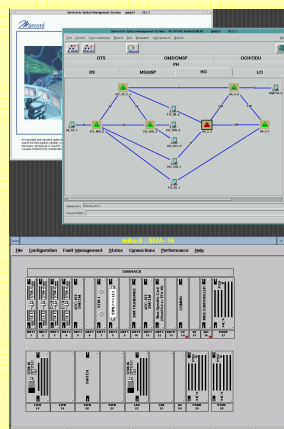*architecture for the Arab Region, 21-24 nov `05*

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Network Management System

Focussed Domain-Based Management

Cross Domain Integration and Billing

Fault tolerant and secure architecture

Service Management
Network Management
Element Management

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The Multiservice Packet based Transport Network

enables the Digital Services Delivery

THANKS

Tunis, 21 Nov 2005

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