

Case Study in Truly Converged Network

Rajiv Goel



Agenda



- Philippine Telecommunications Overview
- Business and Infrastructure Drivers
- How the Service Provider Evolved Its Network?
- Migration Strategies: Road to Truly Converged Networks
- Putting it all together

Philippine telecommunications key statistics



	2002	2003	2004	2005 (est)
Population (in millions)	80.7	82.1	83.5	85
Fixed Line	3.9%	3.9%	4.1%	4.2%
Mobile	19.0%	27.6%	40.0%	48.8%
Internet	4.4%	5.8%	7.5%	9.7%
Broadband	0.0%	0.0%	0.1%	0.1%

Note: Data taken from BMI: Philippines Telecommunications Report Q2 2005

- Liberalized telecom sector, multiple operators in an oligopoly market.
- Topographical difficulties hinder wireline network deployment across the country.
- Low GDP per capita (\$1,020) have limited the growth of PSTN and broadband services.
- In the Asian region, the Philippines rank 13th in Fixed Line, 9th in Mobile, and 10th in Internet penetration.

Case Study in True Network Convergence

Global Quest's Domestic Backbone



- 4 Diverse, High Capacity, High Speed National Transmission Networks
- GT Fiber Optic Backbone Network (320 Gbps)
- GT Palawan Microwave
- GT National Transmission Network
- TelicPhil Fiber Backbone

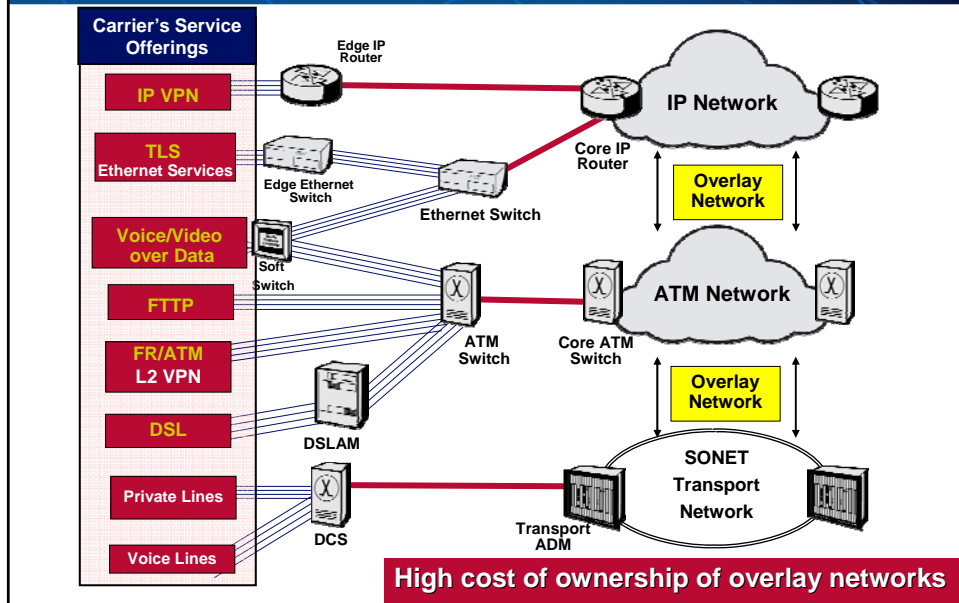
Over 4,000 Cell sites Nationwide

More than 200 Digital Data Nodes Nationwide



Case Study in True Network Convergence

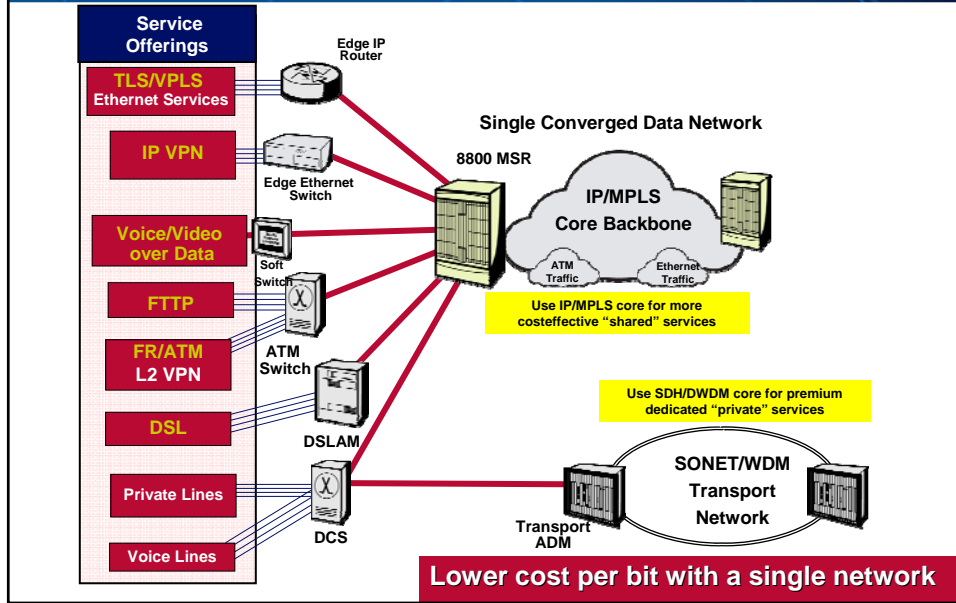
Where we were before ...



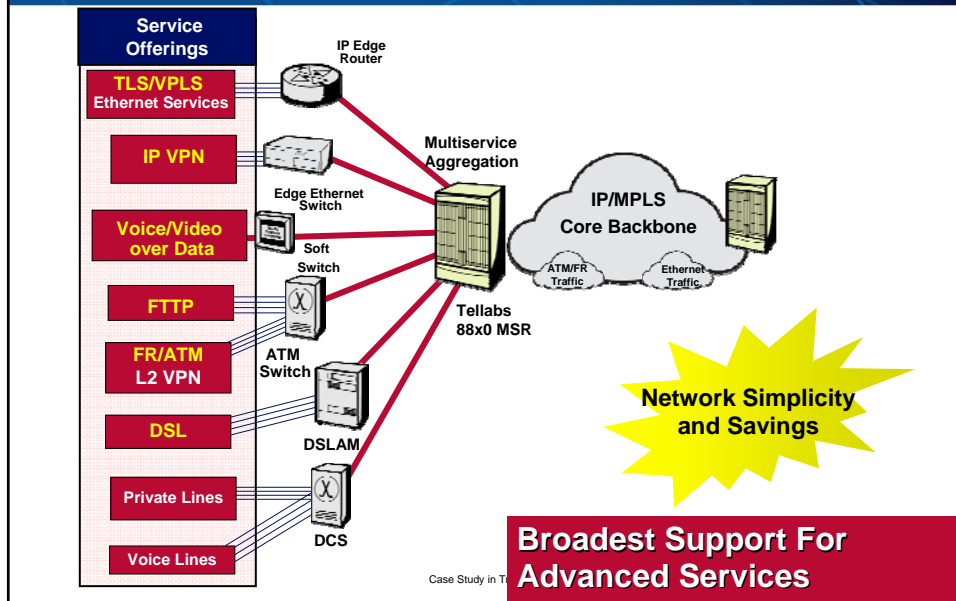
A brief history of our network evolution

- Evolution Stage 1: Roll-out DWDM optical network
 - Targeted for customers wanting higher bandwidth, multi-protocol support, and dedicated private connections
 - Implemented point-to-point Ethernet Over SDH services plus new applications in like storage networking (Escon, Ficon, Fiber Channel)
 - Enabled easy provisioning and upgrade of bandwidth
- Evolution Stage 2: Roll-out MSPP/Multi-service edge network
 - Any port any service advantage
 - Significantly simplifies network architecture (especially in the access)
 - Reduces costs to deliver services to the customer
 - New services in the pipeline – multi-site ethernet VPNs, international private ethernet lines

Where we are going ...



Seamless Migration to a Converged Network

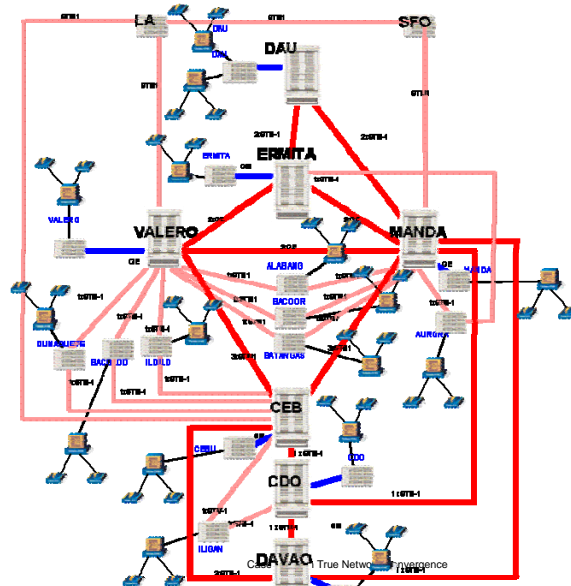


Services Offered

- **TDM (64kbps to 2Mbps)**
 - Access is via MSAE (Tellabs 8160)
- **FR (64kbps to 2M)**
 - Access is via MSAE (Tellabs 8160)
- **ATM (DS3, STM-1)**
 - Access is via BAX or Tellabs 6310/6320
- **IP Services**
 - IP-VPN for corporate
 - IP-VPN for infrastructure
 - Internet Access
 - Access via all technologies
- **Ethernet**
 - Point to point
 - Multipoint
 - Access via
 - MSAE (up to 2Mbps via Ethernet/FR bridged mode)
 - ATM DSLAM
 - IP DSLAM (future)
 - Optical Ethernet 10/100BT, GE, 10GE
 - EoSDH via BAX

Case Study in True Network Convergence

Core Network and Access Network Diagram

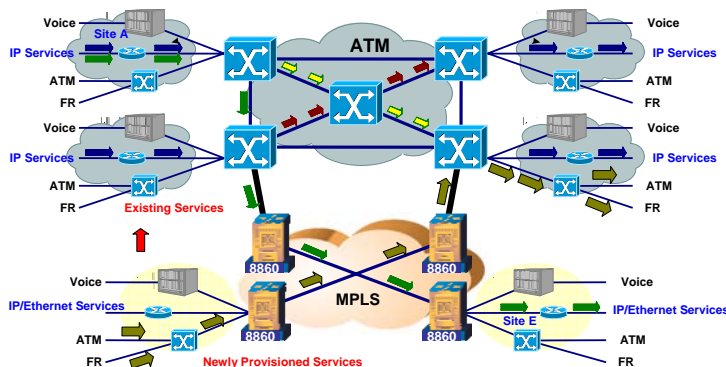


What is converged network?

- Any Service
 - FR, ATM (E1, DS3), IP-VPN, L2-VPN, Internet Access
- Consolidated network
 - Consolidate too many small or separate networks
- Infrastructure to allow new services whenever needed
- Meet the bandwidth, inter-operability, scalability, security, QoS and management needs of customer
- Any customer location can talk to any other customer location, regardless of difference in connectivity (ATM, Frame, Ethernet, TDM)
- Offer deterministic Quality of Service (QoS) controls to facilitate mission critical customer applications
- Optimize core transport for both existing and emerging services over a single MPLS network

Case Study in True Network Convergence

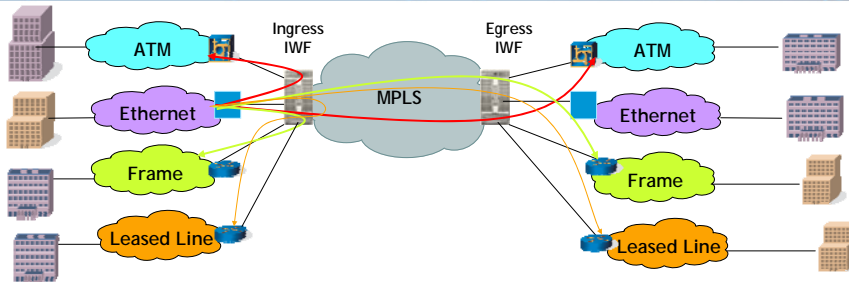
Legacy and Emerging Services: ATM + MPLS



- Gradually move services from ATM network to IP/MPLS network
- ATM switches gradually moved to Access or completely phased out
- Existing revenue generating services are not interrupted
- Can add Ethernet and RFC 2547 to their portfolio of service offerings

Case Study in True Network Convergence

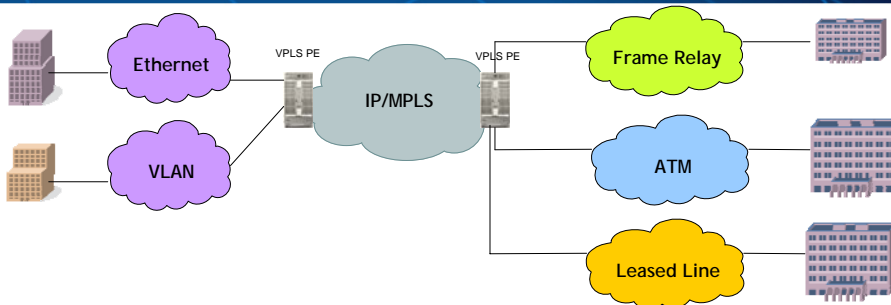
Service Migration 1: Point-to-Point VPN



- Routed Mode Service Interworking between FR Ethernet or ATM Ethernet allows the customers to
 - Chose which sites stay on lower speed FR, which migrates to Ethernet
 - Communications between FR sites and Ethernet sites are ensured @ L2 as opposed to L3.
 - Customer retains control of routing protocols as in FR/ATM VPN. Customers do not need to relinquish control of routing as in Layer 3 IP-VPN
 - It allows customers to migrate at their own pace to Ethernet
- Routed Mode Service Interworking between FR Ethernet or ATM Ethernet allows the Service Provider to
 - Selectively offer Ethernet services only @ sites where High Speed Ethernet access is available
 - Provide a service migration approach

Case Study in True Network Convergence

Service Migration 2: Multipoint-VPN



- Access to VPLS service needs to be as flexible as possible.
- It allows customers to
 - Have a mix and match of high and low speed access to a VPLS service
 - Small sites can use FR, Leased Line, DSL to access VPLS
 - Bigger sites can use high speed Ethernet to access VPLS
 - Customers control when each individual site needs to move to high speed Ethernet

Case Study in True Network Convergence

Our Vision:

Deliver to customers technology
that transforms the way the world communicates:

