SANOG

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Agenda

Telecom Scenario today

Technology drivers and choices

Bird side view of Services and Products

High level architecture to support triple play

Reliance deployment scenario – case study

Strengths, gaps and challenges in SANOG

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Today's Telecom Scenario - SANOG

Rapid change in Telecommunications – **Technology being no barrier to service / product definition and expansion**

- **Miniaturization and compactness in HARDWARE**
- **Feature rich and robust SOFTWARE**

Deregulation of Telecommunication rules

- **New service providers – Competition**
- **New services**
- **Cheaper and superior services – Technology and differentiation**
- **Deeper penetration**

Converged Networks for Voice, Data and Video with no compromise on reliability, availability, scalability,QoS and SLA

Leap frog on matured technology – **No legacy infrastructure and backward compatibility issue**

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Technology choices perspective

Switching

Wireline -   Packet Based (VoIP) to supplement / replace Circuit based (TDM)

Wireless -   GSM and CDMA (TDM with packet based approach)

Routing

IP / MPLS based system for supporting triple play

(Data – VPN and Internet, Video and Voice on the same pipe).

Single backbone for residential as well as enterprise segment.

Transmission –

Optical Fiber (SDH, DWDM)

Microwave and Satellite for remote coverage

Ethernet as Long haul transport?

Access Technologies

Fiber to the curb and Fiber to the Home concept

Ethernet as the main feeder to the customer. Wireless and WIFI?

LMDS for fast deployment

Alternatives of xDSL and HFC?

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WAN Drivers for New World networks

- **Emerging Applications are IP Centric (including mobile remote access)**

- **MPLS VPN with privacy / security , on low cost and efficient IP network enables ease of management and efficient usage of resources**

- **MPLS in the core enables robust service offering over current Layer 2 infrastructures with consolidation of Multi-service applications on the unified platform**

- **Performance and QoS Guarantees match the TDM leased line approach**
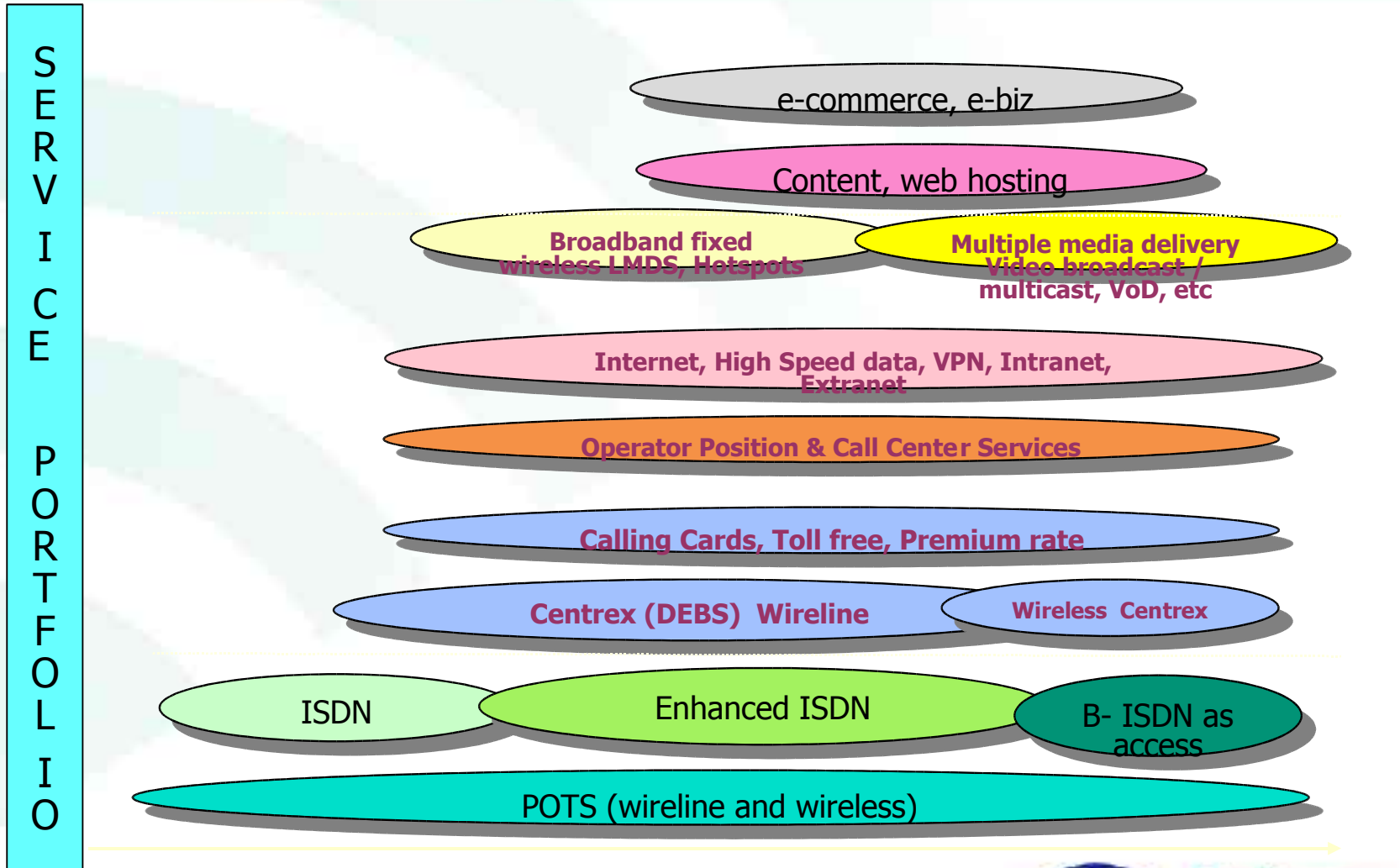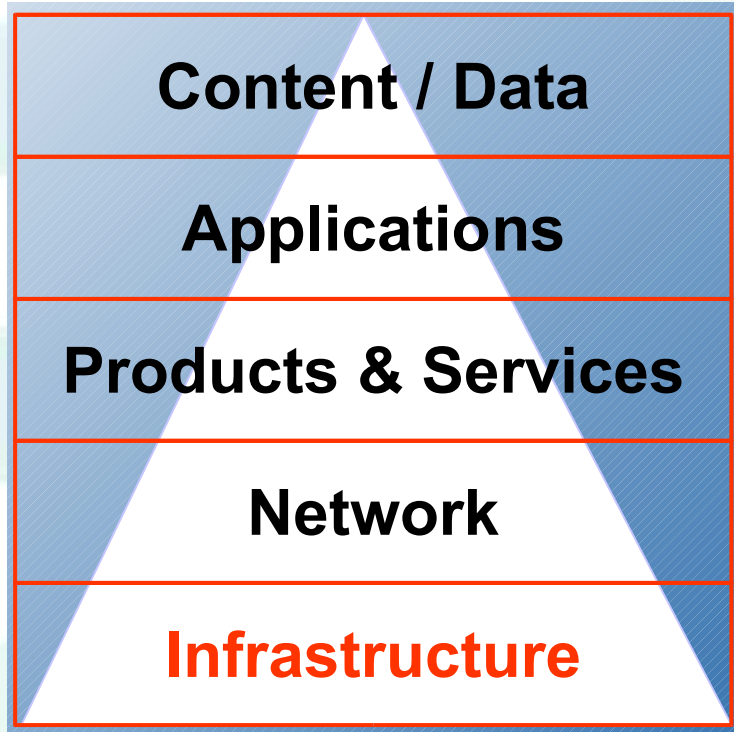
Scalability

Availability and Reliability

Flexibility

Efficiency and ease of management

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Vision in Action - Broadband Products

S E R V I C E   P O R T F O L I O

- e-commerce, e-biz
- Content, web hosting
- **Broadband fixed wireless LMDS, Hotspots**
- **Multiple media delivery Video broadcast / multicast, VoD, etc**
- **Internet, High Speed data, VPN, Intranet, Extranet**
- **Operator Position & Call Center Services**
- **Calling Cards, Toll free, Premium rate**
- **Centrex (DEBS) Wireline**
- **Wireless Centrex**
- ISDN
- Enhanced ISDN
- B- ISDN as access
- POTS (wireline and wireless)

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Product Service and Infrastructure Pyramid

Content / Data ▶ **Optic fiber backbone in core and access**

Applications ▶ **Data centers – Local content hosting**

Products & Services ▶ **Service delivery platform**

Network ▶ **Multi access core (Unified architecture)**

Infrastructure ▶ **Last mile access (FTTH/FTTC)**

Network of virtually unlimited capacity, built to carry multimedia information with unmatched speed and reliability

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Services Delivery : Challenges

Flexibility

User Interfaces

Network Interfaces

Efficiency
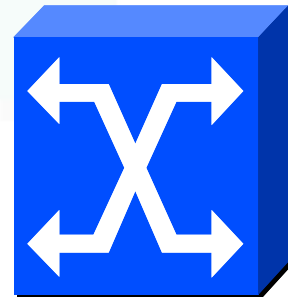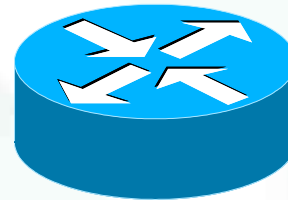
Video

Voice

Data

ATM
FR
IP
Ethernet
Legacy

QoS and SLA - Deterministic packet Loss, Delay & jitter

Mission:

Network should add many incremental differentiated services
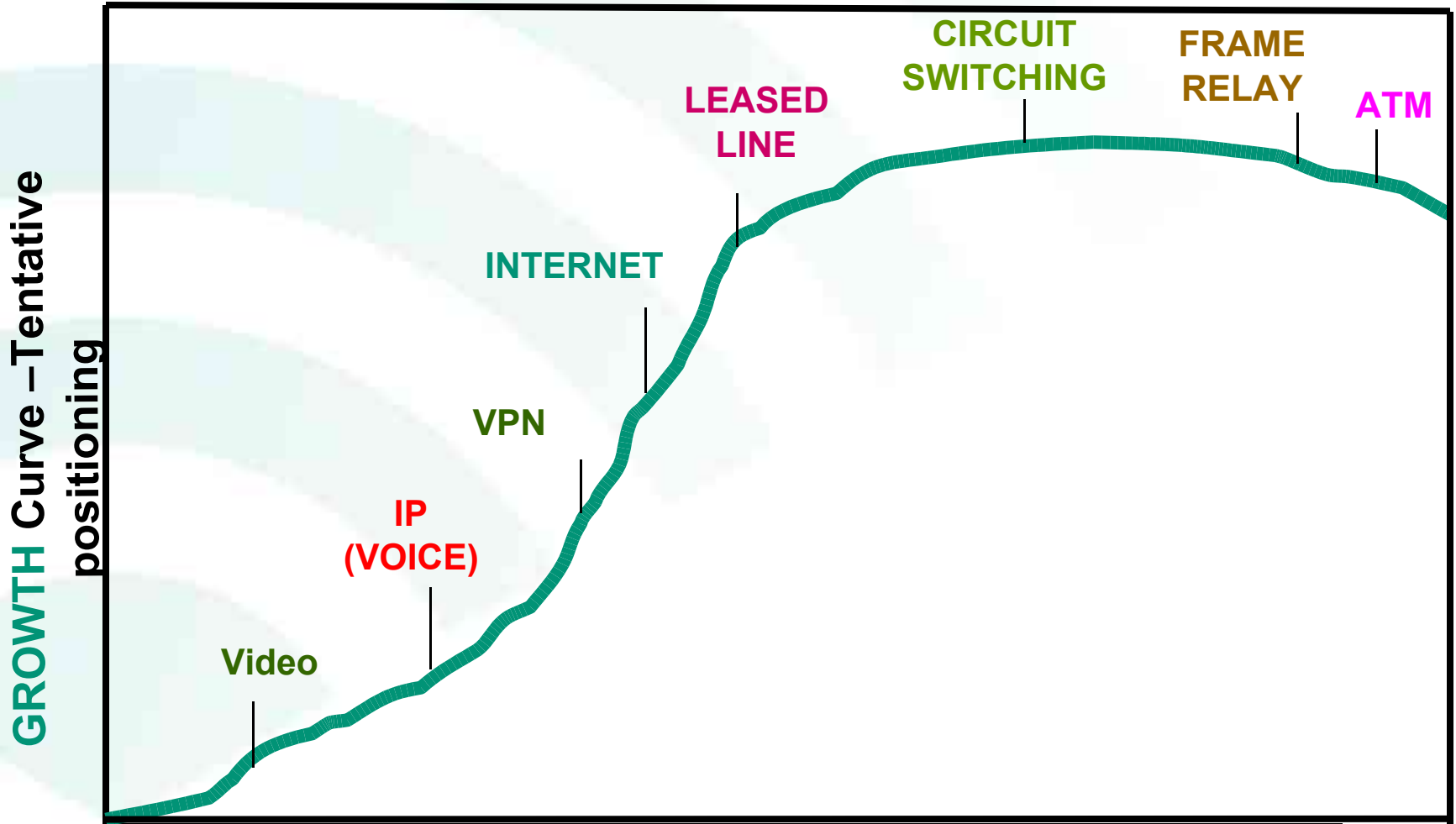
Maximum value add usage into minimum amounts of trunk bandwidth

No compromise on Quality and reliability parameters.

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TECHNOLOGY Maturity – perspective

GROWTH Curve –Tentative positioning

CIRCUIT SWITCHING

FRAME RELAY

ATM

LEASED LINE

INTERNET

VPN

IP (VOICE)

Video

LEVEL OF MATURITY OF DIFFERENT TECHNOLOGIES

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Layered Model

Services

Voice Services | Video services | Data Services | Value add, Cellular services | Operator Supplied | 3rd Party Supplied

Core Network

OSS and BSS | NMS /EMS

Internet

Backbone (IP/MPLS on Transport) M and T series Juniper routers

Gateways | PSTN

Control

Access Network(s)

GSM/ CDMA 2G, 3G | xDSL | Ethernet | Cable/WiFi | LMDS | Satellite

Subscribers

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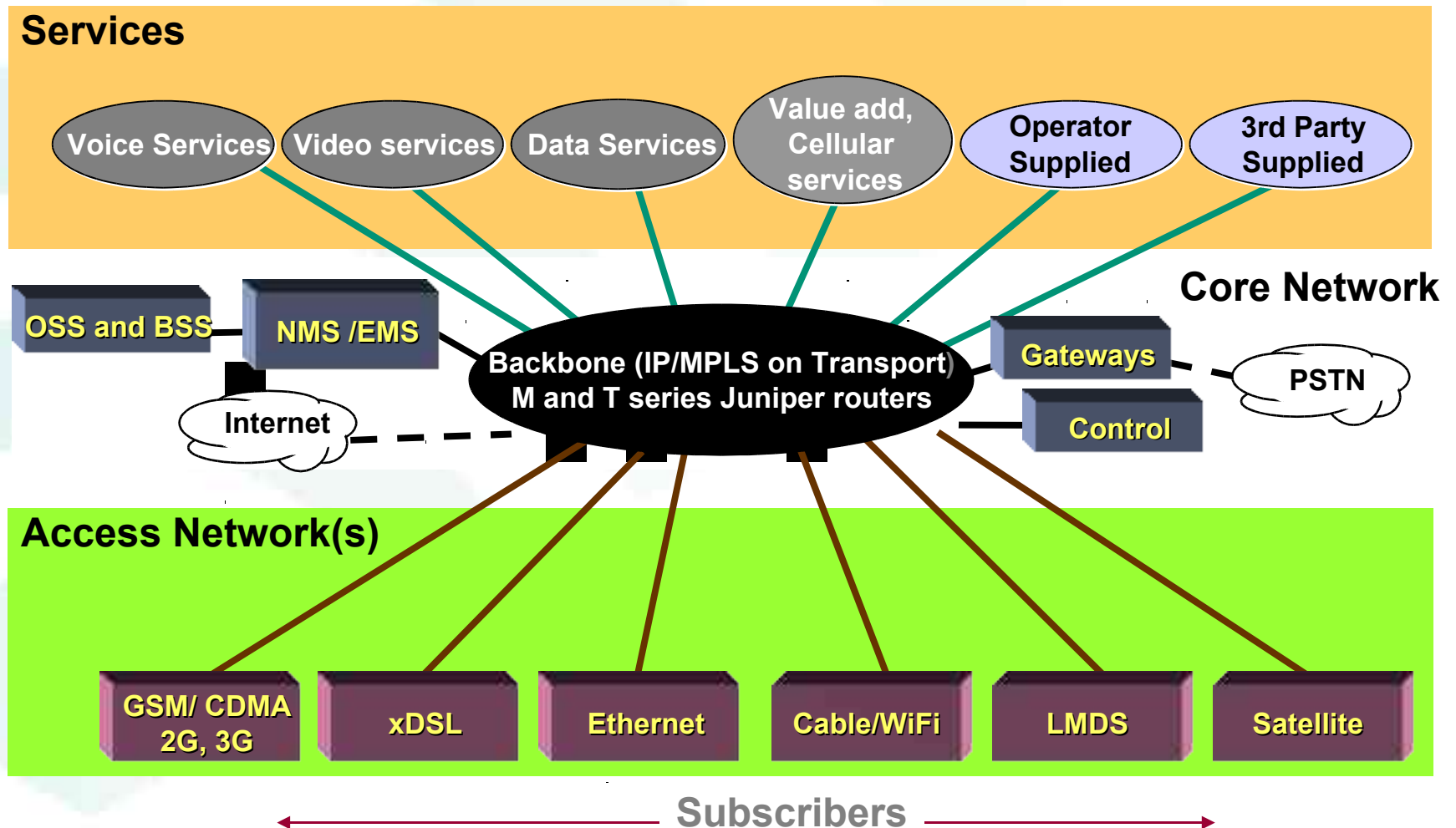
Network and Services - Evolution

Enterprise Broadband Services ←→ Market Segments ←→ Consumer Broadband Services

MPLS Enabled QoS Packet Core

Hosting

Content

Broadband RAS

Soft Switch

Video Conferencing

LMDS

xDSL

Access Technologies

xDSL

Metro Ethernet

Metro Ethernet

TDM/DLC

VPNs → Layer 2 VPNs IP VPNs

Voice → POTS VoIP Centrex

Internet Access

Video Conferencing → Direct Transient

Entertainment

Digital Broadcast TV
Video On Demand
Pay Per View
Interactive Gaming

Internet → Dial/Narrowband Broadband

POTS VoIP

Voice

IP Video Telephony

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Feeding the Core – Creating a Service Agnostic Access

1 G Ring

10 G Ring

10 G Ring

Bandwidth Accessible per subscriber: 64k to 1 GE Ethernet

Deployed in Top 6 Cities

Bandwidth Accessible per Building: 1Gig Ethernet

Potential for increase to: 10G Ethernet

Web World (Cyber café) across various cites on Metro Ethernet and Core

Backhaul Metro Ethernet Transport: 10 Gig Ethernet

Potential for increase to: Nx10G Ethernet

MPLS Enabled QoS Packet Core

Failover Protection: 50 msec

Native Ethernet End to End

Network based on IP/MPLS

10 G Ring

10 G Ring

Ethernet on dark fiber

Network capable of supporting advanced QoS

Capable of delivering secure and guaranteed layer 2 and layer 3 services to enterprises

1 G Ring

Cost effective solutions for consumer and enterprises

Multicast capable for efficient delivery of consumer services such as Broadcast TV
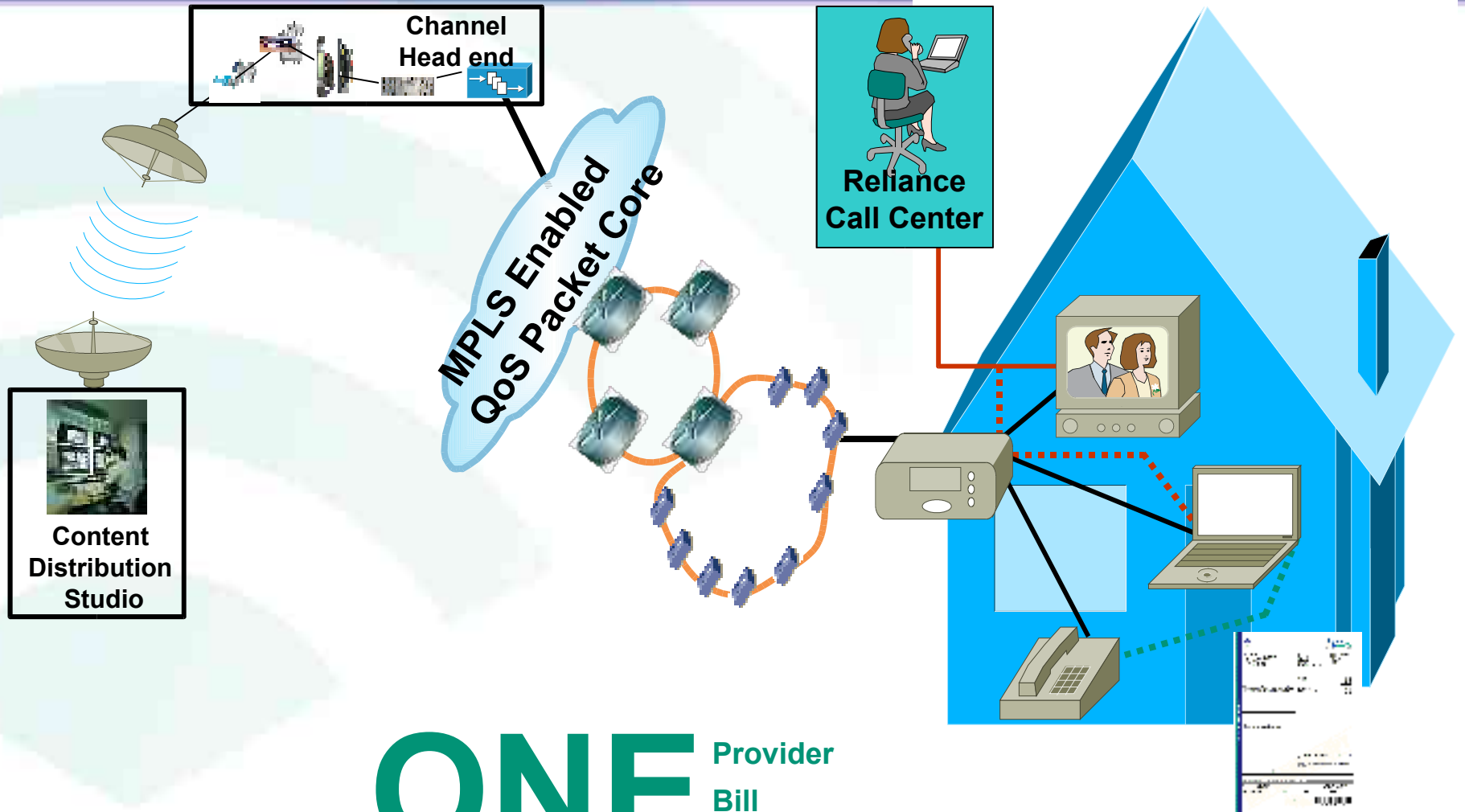
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Integrated Enterprise and Residential Data Services Network Infrastructure

Network capable of triple play services
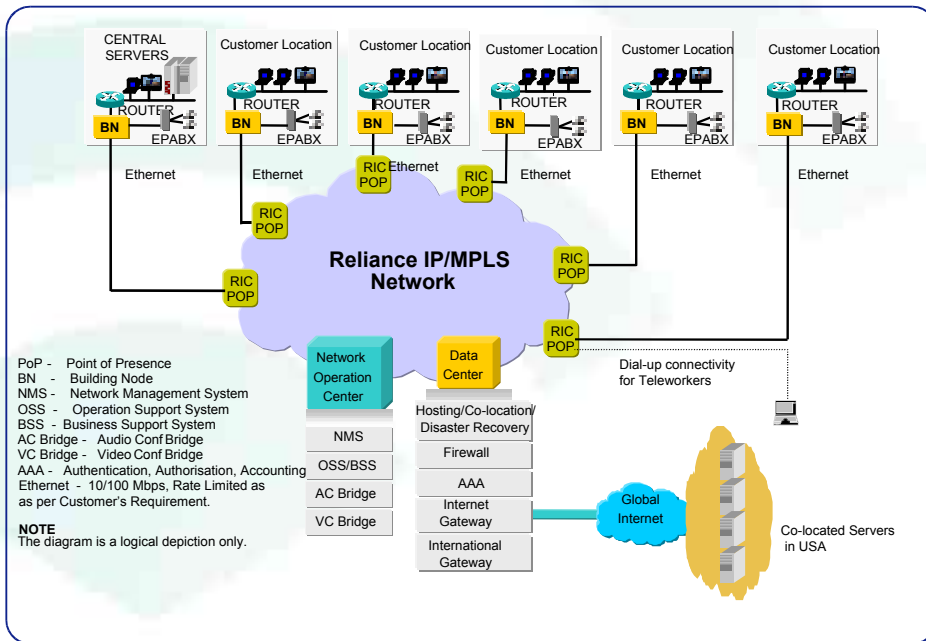
Creating a New Consumer Broadband Experience

Channel Head end

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MPLS Enabled QoS Packet Core

Content Distribution Studio

ONE Provider
Bill
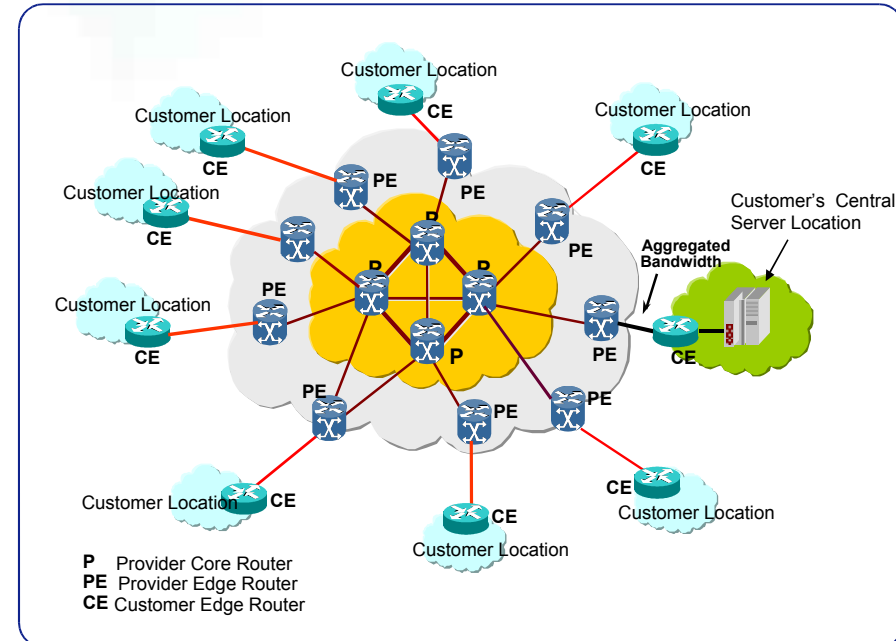Call Center

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IP-VPN Service

IP-VPN is a Managed, Business-Class Network Service providing Secure & Reliable IP Internetworking creating private secure network over Fiber Based Broadband Infrastructure

IP-VPN, A **MultiService** Platform

PoP - Point of Presence
BN - Building Node
NMS - Network Management System
OSS - Operation Support System
BSS - Business Support System
AC Bridge - Audio Conf Bridge
VC Bridge - Video Conf Bridge
AAA - Authentication, Authorisation, Accounting
Ethernet - 10/100 Mbps, Rate Limited as
as per Customer's Requirement.

NOTE
The diagram is a logical depiction only.

IP-VPN Topology

P Provider Core Router
PE Provider Edge Router
CE Customer Edge Router

Next Generation Communication Infrastructure

Wireless

- 3G wireless network – touching 10 Million within 15 months of operation
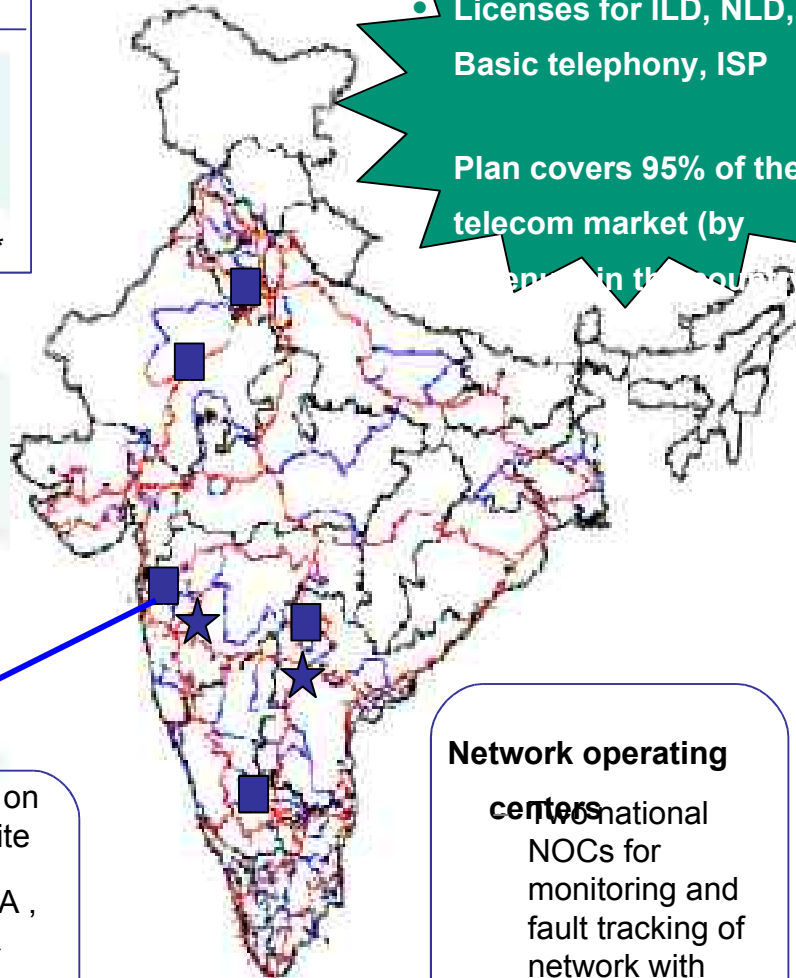
- Coverage in 673 towns*

Data centers
4 world class data centers over an area of 200,000 sq. ft.

International carriage

- Connectivity on fiber & satellite

- POPS at USA , UK,HK,HK & middle East

- Connectivity through FLAG

Licenses for ILD, NLD, Basic telephony, ISP

Plan covers 95% of the telecom market (by revenue in the country

Network operating centers
Two national NOCs for monitoring and fault tracking of network with full OSS / BSS functionality

Wireline

- Licenses in 18 out of 21 circles (>90% geographical areas) in the country

- Fiber to 1.7 million buildings in almost 200 towns, 200,000 buildings wired with Ethernet

- 1500 semi urban and rural towns serviced by CorDECT

National backbone

- 60,000 Km nationwide optical fiber backbone covering 226 locations,

- Each fiber capable of terabit capacity

- 6 ducts laid in the backbone

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Network the world with FLAG

- **Reliance has acquired 100% of FLAG**

- **Largest international acquisition in services sector by an Indian company**

- **Global Optical Fibre network of FLAG will**
  - **Complements Reliance's next generation digital network in India**
  - **Enable Reliance to effectively serve worldwide customers by offering end to end solutions across the world.**
  - **Providing Local – Global – Local connectivity**

- **FLAG network comprises of over 50,000 kms of undersea OF cable spanning four continents - connecting Asia, Europe, Middle East and USA.**

Strengths and gaps – South Asia

Strengths:

- English understanding manpower

- Huge market potential for growth

- Competition and de-regulation

- Can leverage on the matured technologies

Gaps and Challenges:

- Ability to absorb new technology and interwork with legacy

- Huge initial capital requirements

- Developing market base –Uncertainty

- Mindset change

Opportunities and Challenges – South Asia

Opportunities:

Direct interconnection for voice and Data services

Sharing of technical know-how and skills

Active role in standardization and global processes

Research and lab testing utilization

Centralized Network operation / Call centers

Challenges:

Bridging the gap between legacy and new technology

Developing local content and hosting

Synergies of different national and organizational

 goals and interests into unified goal

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