Wi-MAX

Wi-Max Project Roll Out Plan

```
                              Wi-MAX
                    /                        \
               Urban                      Rural
                                       (Procurement)
          /           \              /               \
  Procurement      Franchisee   Phase I (1000    Phase II (6863
                                   BTSs)             BTSs)
    /      \        /      \       /      \      /    |    |    \
```

| Kerala – IComm | Punjab – Huawei | Soma (Guj, MH AP) | EOI other Circles | HCL Info (592 BTS) – N + E | Gemini (408) – S+W | L1: - Gemini (Juniper) | L2: ZTE | L3: ICOMM | L4: Vipula - Alvarion |

A type (1000 BTS): 6 Circles

B Type (700 BTS): 6 Circles

C Type (500 BTS): 4 Circles
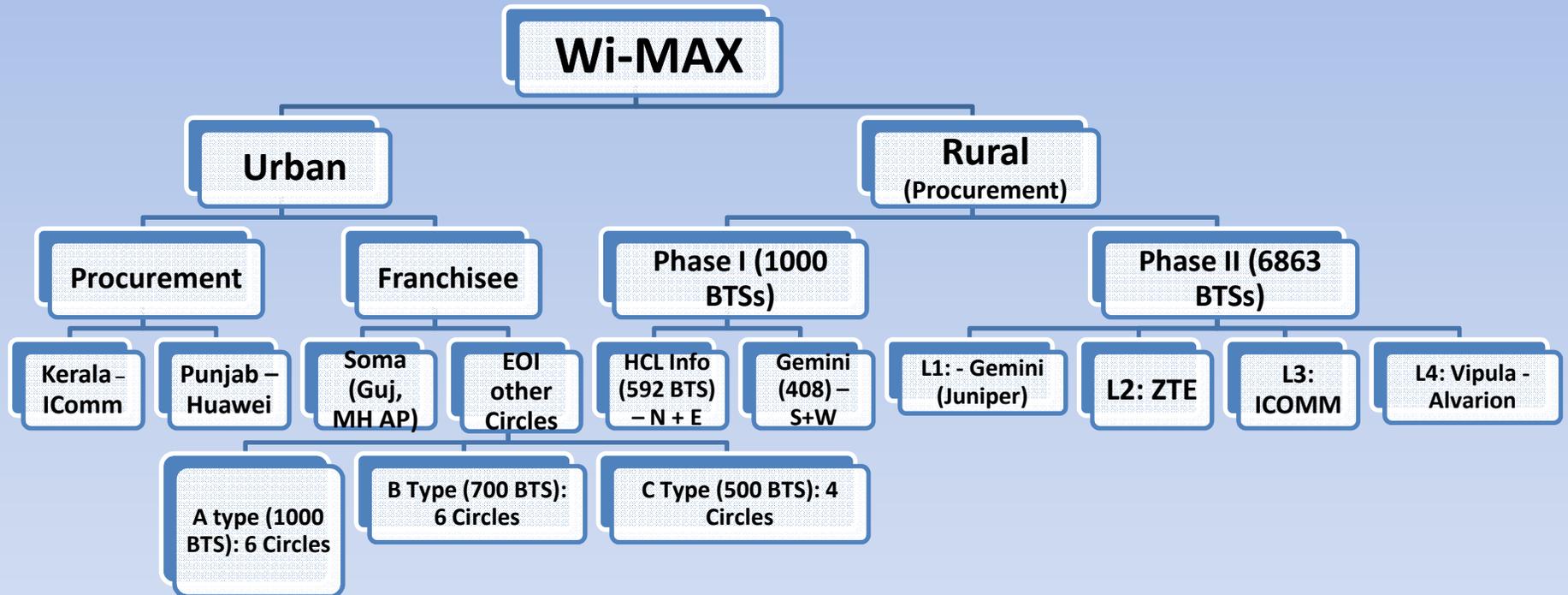
Key Concern Areas in the Wi-Max deployment

Predominantly Rural deployment

- Majority of the procurement based deployment is happening in Rural areas.
- Infrastructure will be established but what about Rural specific contents.

Urban Roll out is slow

- Franchisee based except in Kerala and Punjab
- Only 2500 customers in three states (GUJ, MH and AP)
- Three cities: Ahemdabad, Panjim and Vizag

Status of Pilot deployment

- *A 10 city pilot deployment on 802.1d technology was done*
- *What is the status of the pilot? How many customers?*

All this demand a progressive way of establishing Core connectivity.
2-2 .5 Mn Wi-Max user Is taken from the Core side

Initial Macro Level Planning of Wi-Max Network

- **1 ASN** = **100 BTS.**
  - 1 BTS (Capacity in No of customers) = **100**
- **No of ASNs across the Network** = **100**
- **BW between ASN and MPLS** = **1 Gbps**
- **Total Pipe** = **100 Gbps**
- **Current Avg utilization** = **7 kbps**
- **No of Users it can take** = **14 Mn**

Current Status:

- User Base = **2500**
- BW = **10 Mbps**

The MPLS connectivity is significantly high

Executive Summary of Wi-Max

Current connectivity is not in sync with the traffic.

- **The current plan of 100 ASNs provides 100 Gbps pipe towards MPLS . This will be a huge pipe with severe under loading.**
- **So, we need to follow a progressive approach**

Why you require more ASNs?

- **Either from the traffic perspective or from inter-operability**
- **The current 18 ASNs can cater from the traffic perspective for around 2 Mn Wi-Max user**
- **Thus the current plan of 100 ASNs has to be re-looked into.**
- **In case, few more ASNs are required from inter-op perspective (for new OEMs not part of initial 18), the number to be worked out purely from the traffic.**
- **These ASNs be deployed near the international Gateway Location (Mumbai, Chennai, Bangalore, Noida or Kolkatta) and aggregated with the existing ASNs**

Progressive Approach

- **Instead of deploying back-end infrastructure (ASN: 100 Nos) at one go, deploy as you grow.**
- **The current 18 ASNs can take care of 2 Mn users.**

GSM Network Traffic

Salient Points of GSM Network

Upto Phase IV, infrastructure is TDM based	• Upto Phase IV, a total of 36 Mn capacity deployed, TDM based • The connectivity is extended using TDM TAX circuits • In Phase VI, under Service equivalency, migration to IP based network is planned progressively.
IP Connectivity introduced at the Core Equipment Level in Ph V	• In Phase V, the IP connectivity was introduced at the level of Core equipments such as Media Gateway (MGW) • A separate MPLS infrastructure deployed / planned in each Zone • This will carry intra-Circle voice and intra-Circle signalling traffic
TDM / EoS used at the Access Network Level	• BTS / Node B – BSC / RNC is on E1s. • BSC / RNC – Media Gateway is on E1s • BSC / RNC – SGSN is on Ethernet over SDH (Point to Point)
Inter-Circle Call riding on NIB-II MPLS	• The inter-Circle voice traffic will ride on NIB-II MPLS along with inter-Circle signaling traffic for connectivity to SSTP. • The connectivity between NIB-II and GSM MPLS network is done at Gateway location per Circle. • 8 in NZ, 5 in EZ, 9 in SZ and 8 in WZ.
Data is handed at One per Zone	• The Data connectivity at GGSN – One per Zone • Kolkatta, Chandigarh, Pune and Chennai

Circle Wise GSM Connections (As on 31/10/09)

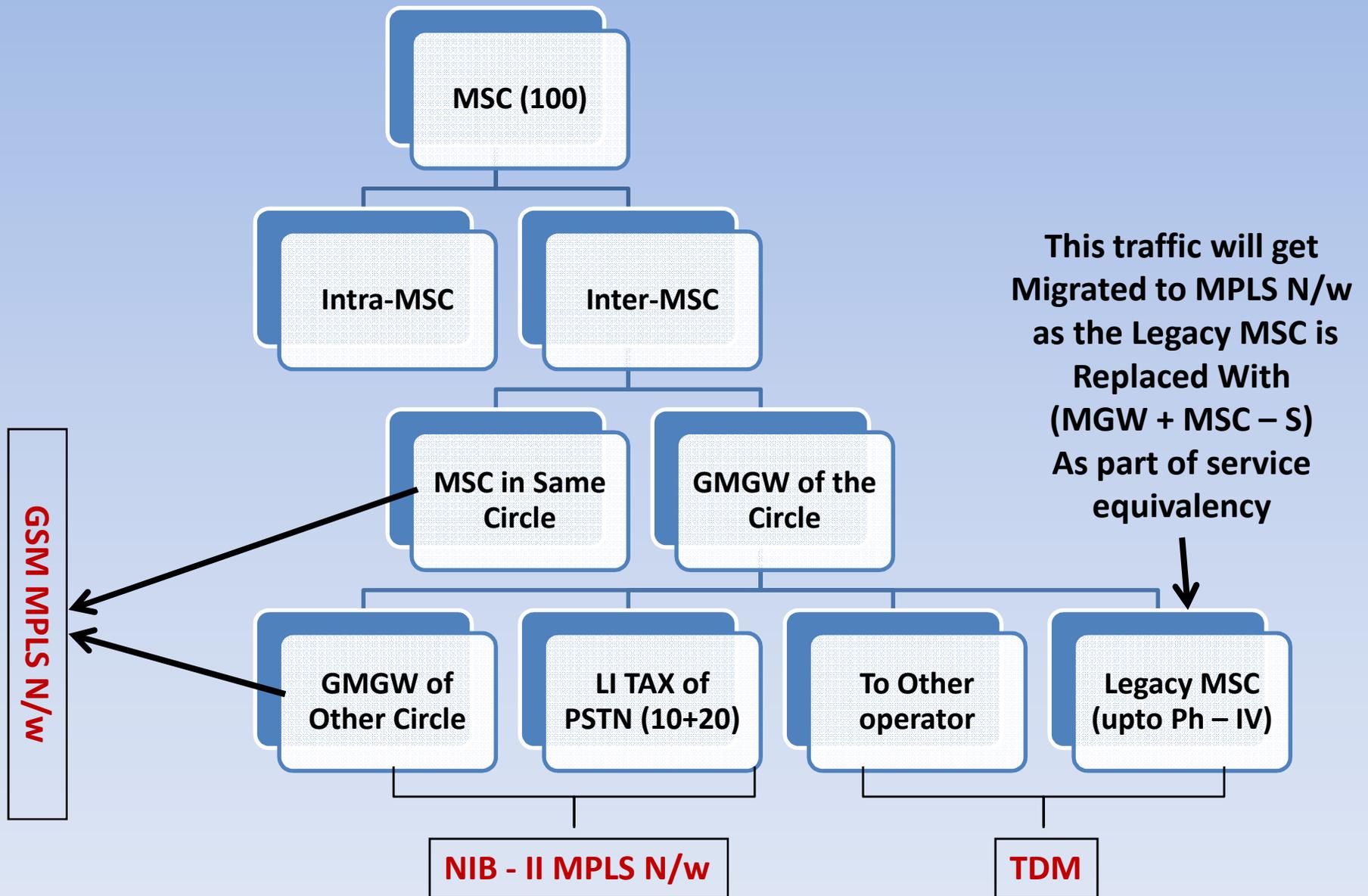| Circle*	GSM Conn	Circle	GSM Conn
A & N	0.09 Mn	MP	1.86 Mn
AP	3.86 Mn	Maharashtra	3.87 Mn
Assam	0.96 Mn	NE-I + II	0.766 Mn
Bihar	2.07 Mn	Orissa	1.845 Mn
Chattisgarh	0.83 Mn	Punjab	3.232 Mn
Gujarat	2.64 Mn	Rajasthan	3.247 Mn
Haryana	2.17 Mn	TN	3.763 Mn
HP	1.07 Mn	Uttaranchal	0.868 Mn
J&K	0.89 Mn	UP - East	6.544 Mn
Jharkhand	0.844 Mn	UP-West	1.853 Mn
Karnataka	2.866 Mn	West Bengal	1.914 Mn
Kerala	3.11 Mn	Kolkatta	1.653 Mn
		Chennai	1.15 Mn

IP Capacity:

- 9 Mn for South Zone

- 9 Mn for West Zone

- 13.5 Mn for N + E Zone

Note:
*: Source: CP&M Monthly DEL report

Total Connections: = 53.994 Mn
Capacity planned / deployed upto Ph V = 69.74 Mn (36 Mn TDM based)
Capacity Planned in Phase VI = 93 Mn

GSM Traffic Distribution

MSC (100)

Intra-MSC   Inter-MSC

MSC in Same Circle   GMGW of the Circle

GSM MPLS N/w

GMGW of Other Circle   LI TAX of PSTN (10+20)   To Other operator   Legacy MSC (upto Ph – IV)

This traffic will get Migrated to MPLS N/w as the Legacy MSC is Replaced With (MGW + MSC – S) As part of service equivalency

NIB - II MPLS N/w   TDM

Traffic Calculation (Voice) – For Ph V and onwards

Assumptions: (From Ph VI Tender)

- **Average traffic per customer**   **= 50 mErl**
  - Incoming   = 25 mErl
  - Outgoing   = 25 mErl
- **GSM – GSM**   **= 70%**
- **GSM – PSTN**   **= 10%**
- **PSTN – GSM**   **= 20%**

Traffic Calculation:

1. **Traffic from 1 Mn customers**   **= 50,000 Erlg**
2. **Traffic in IP (@ 70% utilization)**
   a) $50000 \times 50/(1000000 \times .7)$ **= 3.5 Gbps simplex**
         = 1.75 Gbps duplex
3. **Traffic distributed among GSM , NIB and TDM**
4. **Peak expected traffic in NIB Core around**   **= 0.8 Gbps full duplex**

Avg Throughput(GGSN - SGSN) in Mbps

Zone	Circle	Nov '08	Apr '09	Circle	Nov '08	Apr '09
South	AP	0.68	0.92	TN	0.73	1.25
	Kerala	1.51	2.76	CHTD	0.81	1.26
	Karnataka	1.08	1.58			
North	HR	0.88	0.58	UP E	6.31	11.7
	PB+HP+JK	21.71	23.24	UPW +UAL	6.29	10.32
	Rajasthan	4.9	2.82			
East	AS+NEI+NEII	4.53	3.99	WB+AN	6.04	-
	BR + JKND	2.11	2.66	CLTD	2.76	2.03
	OR	2.22	6.29			
West	MH	3.22	6.16	GJ	3.17	3.4
	MP + CHG	3.8	3.14			

As can be seen, Data Traffic is hardly anything at this instant.
The Loading of existing SGSN is low (Capacity = 100 Mbps)

Wireless Growth (In 09-10)*
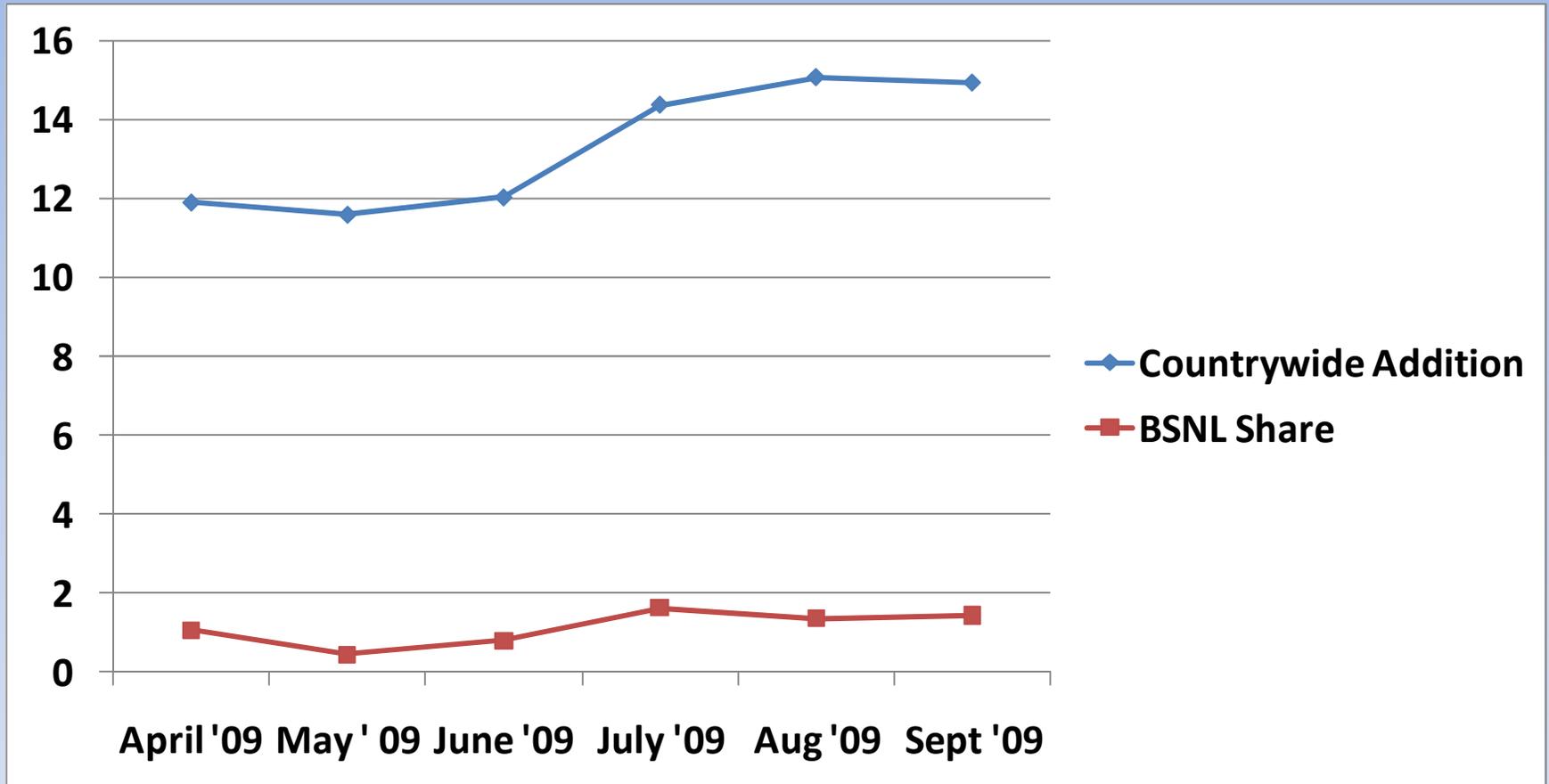
1. **Total of 79.92 Mn added in the last 6 months.**

2. **BSNL Share = 6.543 Mn, As %age = 8.1%**
3. **Average additions of 1.1 Mn per month in the Last 6 months**
4. **In 08- 09, BSNL share was 7%, 9.1 Mn out of 129.2 Mn (All lines)**

GSM - NIB-II MPLS Connectivity

Project	Zone	Vendor	IP Capacity	NIB-II MPLS	Remarks
Phase V	South	M/s Huawei	9 Mn	9 + 9 Gbps	
Phase V	West	M/s Alcatel	9 Mn	8 + 8 Gbps	
Phase V	North	M/s Ericsson	8 Mn	8+8 Gbps	1+1 GE at Chandigarh. Other 7 places at 2* STM-1
Phase V	East	M/s Ericsson	5.5 Mn	6+6 Gbps	2+1 GE at Kol. Other 4 places at 2 * STM-1

Note: - A 31 Gbps Pipe built up between GSM Network and NIB-II Network

- *The above connectivity can cater to 35 Mn customers on GSM IP platform under fully loaded condition.*
- *Provision is made for additional 35 Mn customers on GSM IP platform. (either expansion or under service equivalency).*
- *Further expansion in selected cities depending upon actual traffic.*

Executive Summary of the Recommendation - I

Optimize MPLS Deployment	• **No need for separate MPLS infrastructure as part of Phase VI.** • **Leverage on MPLS infrastructure as part of Phase V and NIB-II MPLS.**
IP Connectivity of Access Network (BTS / Node B – BSC / RNC – MSC / SGSN)	• **Presently the voice is on TDM and Data is on EoS.** • **The current packet connectivity on SDH shall be migrated to Packet based network progressively.** • **The same can be implemented using existing Metro Area Aggregation Network, as and when the same is planned.**
Data Traffic is negligible	• **The current GPRS / EDGE traffic is insignificant.** • **The same is expected to increase with launch of 3G** • **Focussed approach on 3G – Top few cities .**
Leverage on IP – TAX infrastructure	• **For connectivity to PSTN for new network, leverage on IP TAX.** • **Explore Usage of Media Gateway deployed as part of IP TAX.**

Leverage on Existing Infrastructure (GSM + IP TAX) for future expansion

Executive Summary of the Recommendation - II

North Zone

- **GSM MPLS Network of M/s Ericsson**
- **Connectivity with NIB-II MPLS at Chandigarh, Ambala, Jammu, Lucknow, Noida, Shimla, Jaipur and Jullundhur.**

East Zone

- GSM MPLS Network of M/s Ericsson
- **Connectivity with NIB-II MPLS at Kolkatta, Patna, Shillong, Guwahati and Sambalpur**

West Zone

- GSM MPLS Network of M/s Alcatel – M/s CISCO
- **Connectivity with NIB-II MPLS at Pune, Nagpur, Ahemdabad, Surat, Bhopal, Indore, Raipur and Durg (Parented to Raipur)**

South Zone

- GSM MPLS Network of M/s Huawei
- **Connectivity with NIB-II MPLS at Hyderabad, Vijayawada, BGL, Mysore, Chennai, Coimbatore, Ernakulem, Madurai and TVM**

The initial connectivity will be on 1+1 GE interface to be augmented to 2+1 GE depending on the traffic.

Other Networks

Connectivity to Other Access Networks

CDR Project

- Around 500 Routers are deployed covering all SSA.
- **Expected Peak loading around 30%. We can spare some Routers through consolidation.**
- These Routers are planned to be connected on STM-1 on dual mode basis
- Project delayed. Still in PoC Stage.
- **Focus on early commissioning of the same.**

SSTP

- SSTP Switches deployed in 24 cities
- The present connectivity is on Fast Ethernet Interface
- The same is planned to be connected on Gigabit Ethernet interface – **the peak traffic presently is only 20 Mbps.**

Ku band VSAT

- Connectivity with Ku-band Router at Bangalore
- The physical connectivity is through n*64 / E1 / FE
- One link per VPN customer is used between PE Router and Ku-band Router

CDMA PDSN

- One per Zone
- Connectivity on 1+1 GE interface

Tax NMS

- Routers / Switches at SSA connected on E1s
- Regional NMS connected on STM-1

Enterprise Users

Current Status

1.7 lakh Leased lines and 19,475 VPN Circuits

- Distribution of MPLS VPN Circuits
  - 44% are 64 kbps   25% are 128 kbps
  - 10% are 256 kbps   8% are 512 kbps
  - 8.5 % are > 1 Mbps

Huge Growth in Leased Line

- **40% increase in revenue with 30% decrease in tariif**
- **Revenue of Rs 960 Cr in 08-09 for LL / VPN.**
- **The revised fig for *09-10 is Rs 1650 Cr. Revenue in the first six months is Rs 620 Cr.***

Avg Revenue per Ckt is Rs 90,000 pm

- **This indicates majority of the circuit is 64 kbps and 128 kbps**

VPN Growth in the Last three Years – 700 ckts pm

- **19,255 circuits provisioned from Jan '06 to Dec ''08**
- **5,651 circuits provisioned from Jan '09 to Aug ''09**
- **Average monthly additions around 700 ckts pm**

VPN Loading in the top 25 cities are significant

- **25 Cities are there where Loading is > 35%**
- **58 Cities are there where Loading is < 20%**
- **Average Loading is 24% .**
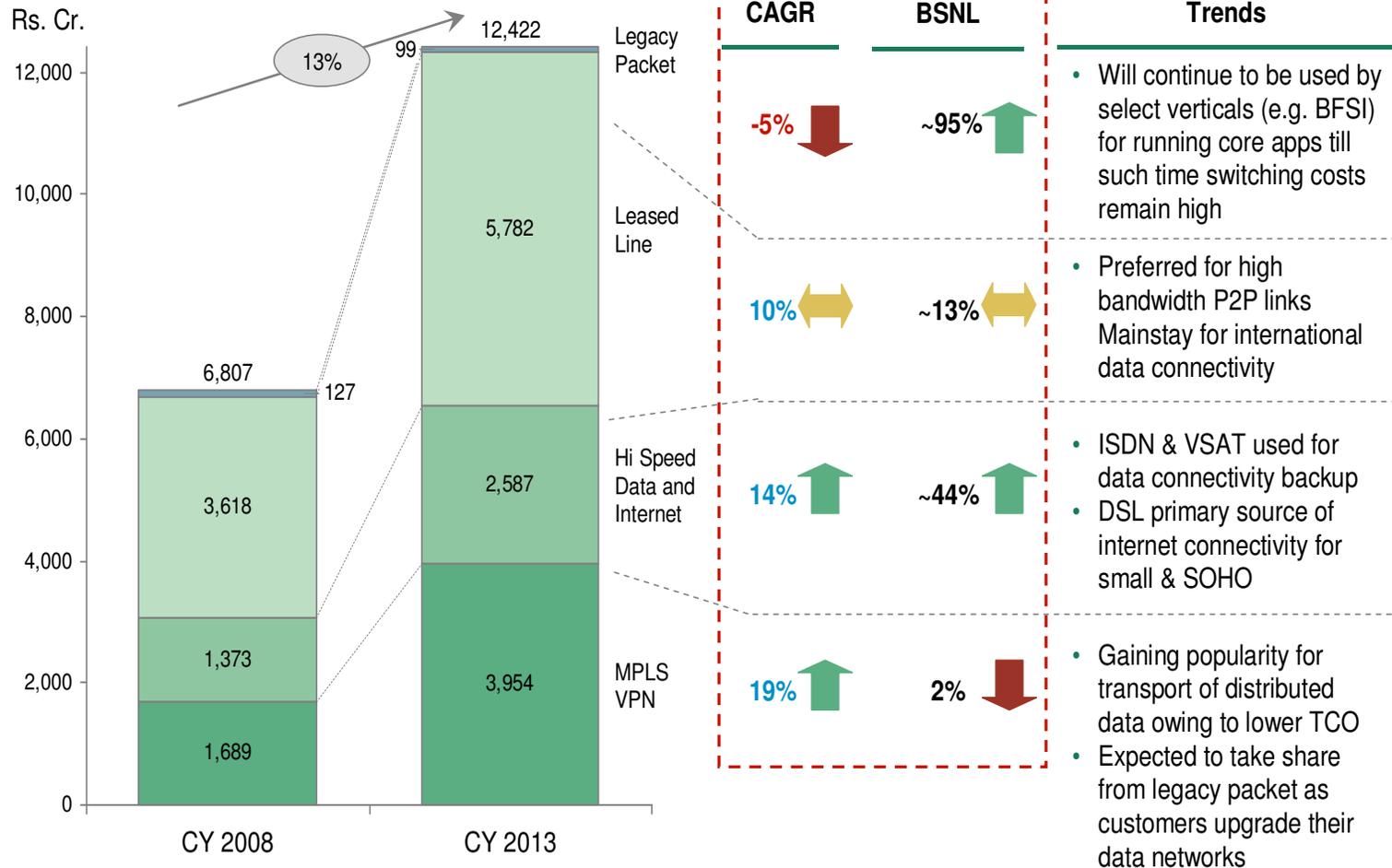
VPN Site Wise Loading – Top 25 Cities

Site Name	%age Loading	Site Name	%age Loading
Ahemdabad - 1	71.88	Bhubaneshwar	43.00
Bangalore - 1	71.33	Surat	42.04
Ernakulem - 1	68.97	Bangalore - 2	40.85
Hyderabad - 1	62.35	Hyderabad - 2	39.44
Mumbai - 1	61.08	Patna	39.18
Pune – 1	60.92	Jabalpur	37.91
Kolkatta - 1	59.57	Rajkot	37.55
Chennai - 1	59.46	Jaipur	37.14
Hubli	54.95	Ambala	36.81
Chennai - 2	54.04	Delhi - 1	36.36
Ahemdabad - 2	53.28	Gurgaon	35.92
Dehradun	49.45	Trichy	35.71
Mumbai - 2	49.30	Madurai	35.51
Ernakulem – 2	46.94	Mangalore	35.02
Chennai - 3	45.37	Noida	34.62
Coimbatore	43.68	Indore	33.47

Site Wise Loading – Bottom 26 Cities

Site Name	%age Loading	Site Name	%age Loading
Gwalior	11.43	Dhanbad	7.66
Patiala	11.43	Kharagpur	7.66
Ananthapur	11.11	Solapur	7.66
Alwar	11.11	Raichur	6.51
Trichur	10.99	Sagar	6.51
Nellore	10.73	Eluru	6.12
Amritsar	10.61	Sambalpur	5.36
Durgapur	10.44	Anand	4.6
Shillong	10.2	Mumbai – 3	3.98
Karvar	9.2	Dhule	3.83
Moradabad	9.2	Nanded	3.83
Jammu	8.98	Bangalore - 3	3.41
Jhansi	8.43	Ferozepur	3.3
Jamshedpur	8.24	Ahemdabad - 3	-
Palghat	8.24	Hyderabad - 3	-

Growth in the data market expected to be driven by MPLS VPN and High Speed Data & Internet (HSDI)

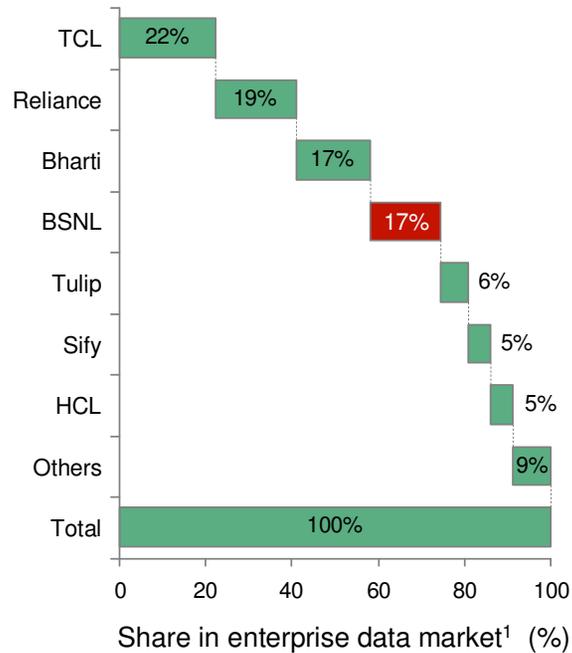**Enterprise data market break up by product (2008-13)**

Rs. Cr.

	CAGR	Share of BSNL	Trends
Legacy Packet	-5% ▼	~95% ▲	• Will continue to be used by select verticals (e.g. BFSI) for running core apps till such time switching costs remain high
Leased Line	10% ↔	~13% ↔	• Preferred for high bandwidth P2P links Mainstay for international data connectivity
Hi Speed Data and Internet	14% ▲	~44% ▲	• ISDN & VSAT used for data connectivity backup • DSL primary source of internet connectivity for small & SOHO
MPLS VPN	19% ▲	2% ▼	• Gaining popularity for transport of distributed data owing to lower TCO • Expected to take share from legacy packet as customers upgrade their data networks

Source: Frost & Sullivan, IDC, Gartner, Ovum, Analyst Reports, BCG analysis

BSNL is currently a strong player in the data market

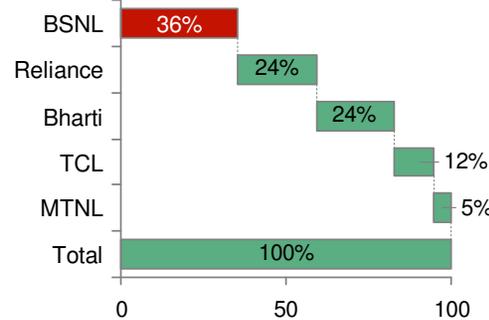## Owing to dominant share in the NPLC and HSDI markets

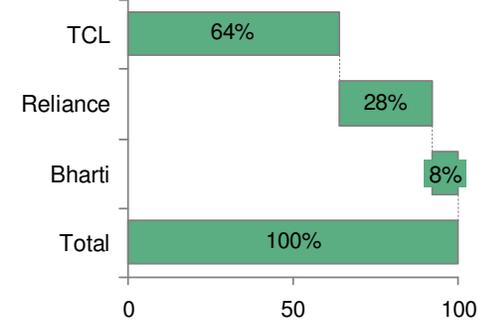### BSNL is the joint #3 player in the enterprise data services market

	Share in enterprise data market[1] (%)
TCL	22%
Reliance	19%
Bharti	17%
BSNL	17%
Tulip	6%
Sify	5%
HCL	5%
Others	9%
Total	100%

Share in enterprise data market[1] (%)

Predominant share in NPLC

BSNL	36%
Reliance	24%
Bharti	24%
TCL	12%
MTNL	5%
Total	100%

No presence in IPLC today

TCL	64%
Reliance	28%
Bharti	8%
Total	100%

HSDI dominance due to high fixed line penetration

BSNL	44%
Bharti	26%
Reliance	14%
TCL	11%
Others	6%
Total	100%

Negligible presence in MPLS VPN

Tulip	28%
Sify	22%
Reliance	21%
Bharti	12%
HCL	6%
TCL	5%
BSNL	2%
Others	4%
Total	100%

1. This denotes the share in the entire enterprise data services market – corporate + SMB
Note: Market shares for FY 2006-07
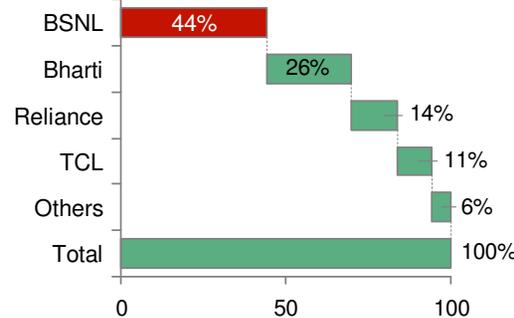Source: Frost & Sullivan, Analyst Reports, BCG analysis

Key points For the Enterprise Segment for VPN
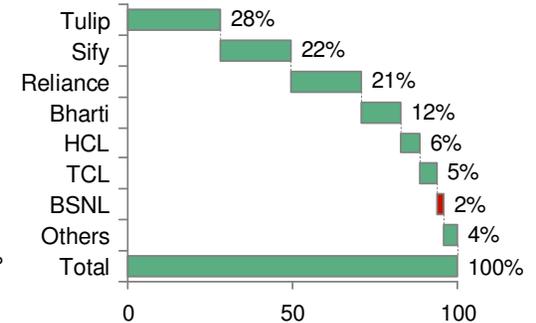
Future trend towards Ethernet and VPN

- More and More customers will demand Ethernet as the preferred interface
- MPLS VPN will be preferred over LL because of lower TCO. Customer need to be educated and convinced on the same.

Focus more on 2Mbps and above for VPN

- Presently most of the Circuits are 64 kbps and 128 kbps
- They require lot of intermediate elements such as MUX, MLLN equipment etc – Mtce issues
- Migrating to 2 Mbps will make implementation and maintenance smoother

No MAN in Delhi and Mumbai

- This results in very long last mile
- This even go upto 25-30 Km
- Multiple POPs in Delhi and Mumbai
- End-to-End infrastructure: Local lead, Tx back-haul + Router

Leverage on the MAN in Other Cities

- In Other cities, MAN has been built up as part of Multiplay project.
- Leverage on the same for provisioning of Ethernet connectivity

MPLS – MLLN: Complement Each Other

VIRTUAL

City A

City B

Other Cities

POP

PHYSICAL

City A

City B

Other Cities

POP
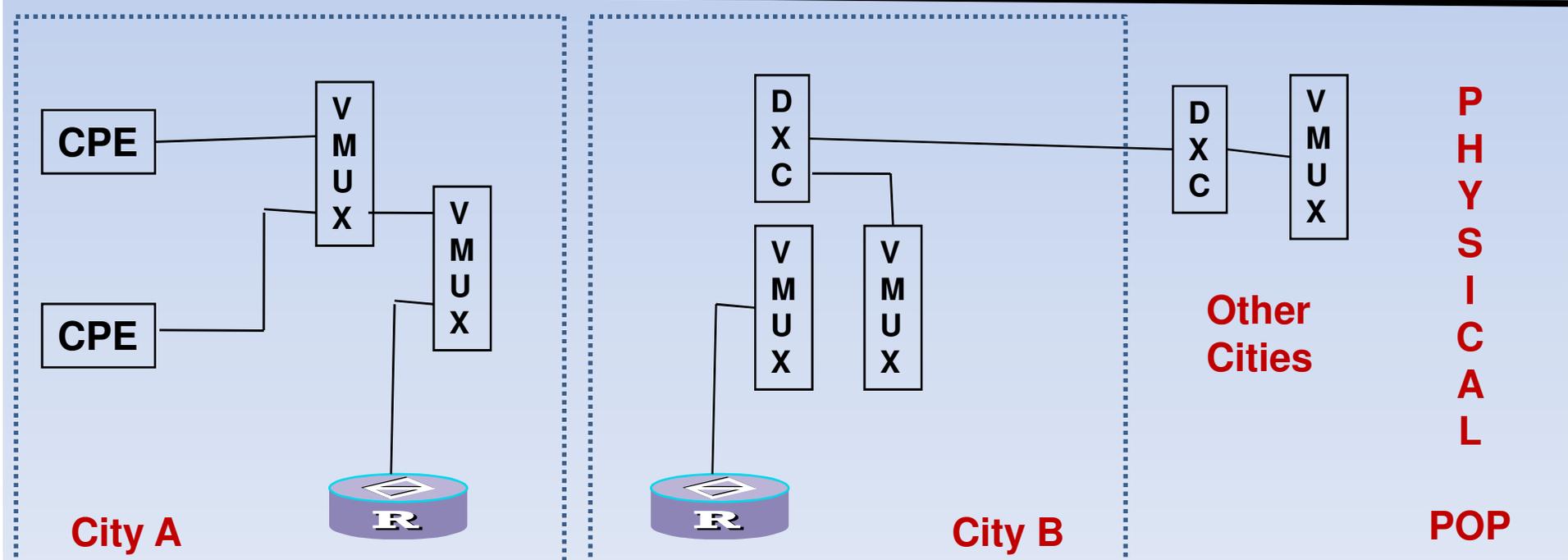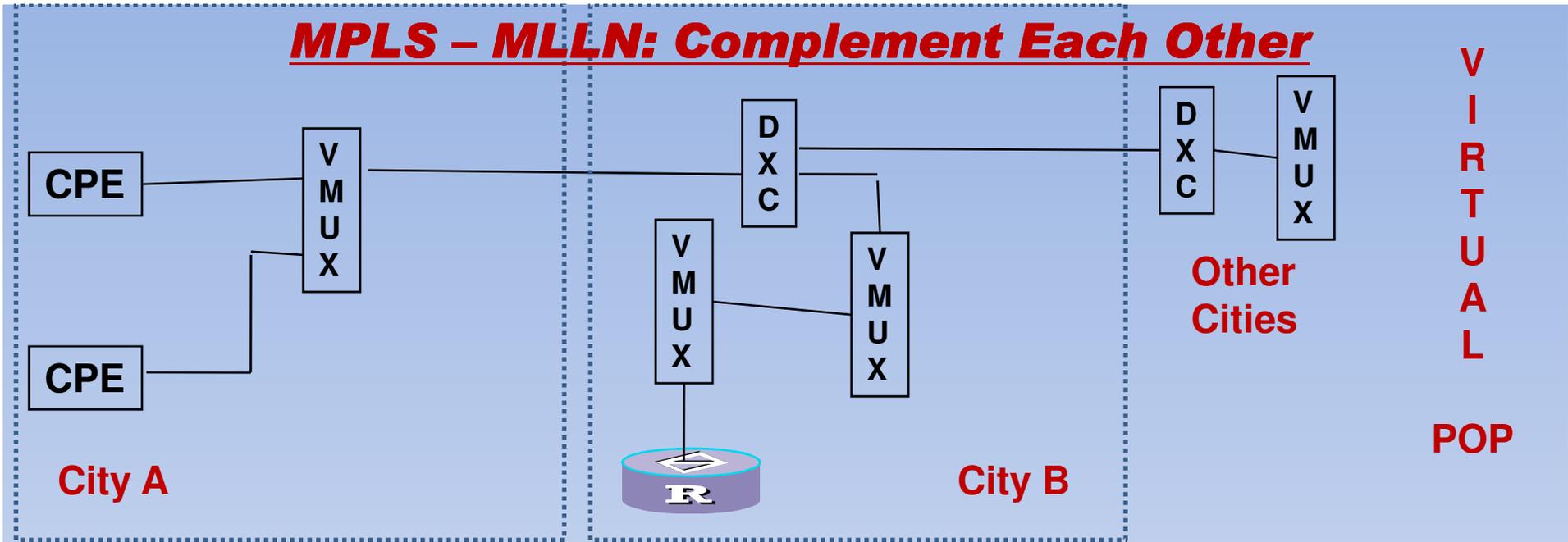
Virtual POP Vs Physical POP

Parameter	Virtual POP	Physical POP
Local Lead	Extended to nearest City (B) - Longer	Confined to City A itself - Shorter
MLLN Cost	From City A to City B on MLLN - higher	MLLN confined to City A only - Lesser
Back-haul Cost	Zero	Minimum 2 STM-1s
Router Cost	Zero	Around 26 lacs
Link performance	Same	Improved due to redundancy
Commissioning time	Similiar	Similiar
OPEX	Lesser	Higher – due to deployment of Router

Note:

1. **In both the models, the issue predominantly comes in the last mile. In case of Virtual POP, every VMUX is already connected with nearest DXC on E1 and practically there is no such maintenance issue once the link is commissioned.**
2. **The average loading of MLLN Network is 38% spanning 1800 SDCAs**

Additional POPs where LL is Around 1000 Circuits

Circles	POP Present	Addtl POP	Circles	POP Present	Addtl POP
AP	8	1 (Guntur)	NE – I	1	0
Assam	4	0	NE – II	0	0
Bihar	4	0	Orissa	3	0
Jharkhand	3	0	Punjab	7	0
Gujrat	5	0	Rajasthan	5	0
Haryana	3	1 (Karnal)	Tamilnadu	7	-
HP	1	0	UP-East	6	0
J&K	2	0	Up-West	6	0
Karnataka	7	0	Uttaranchal	2	0
Kerala	5	0	West Bengal	3	0
MP	5	0	Chennai TD	4	0
Chattisgarh	2	0	Kolkatta TD	4	0
Maharashtra	9	0			

Only two Cities are there where Additional POP may be required. Further - Delhi And Mumbai will require multiple POPs (4 each) for geographical diversity

Additional POPs where LL is Around 400 - 500 Circuits

Circles	POP Present	Addtl POP	Circles	POP Present	Addtl POP
AP	8	2 (Kurnool, NL)	NE – I	1	0
Assam	4	0	NE – II	0	0
Bihar	4	0	Orissa	3	0
Jharkhand	3	0	Punjab	7	2 (Bathinda, Pathankot)
Gujrat	5	0	Rajasthan	5	2 (Bikaner, Srigangangr)
Haryana	3	2 (Hissar, Rohtak)	Tamilnadu	7	-
HP	1	0	UP-East	6	0
J&K	2	0	Up-West	6	1 (Bareilly – 713)
Karnataka	7	2 (Shimoga, Tumkur)	Uttaranchal	2	1 (Nainital)
Kerala	5	5	West Bengal	3	1 (Asansol)
MP	5	0	Chennai TD	4	0
Chattisgarh	2	0	Kolkatta TD	4	0
Maharashtra	9	0			

Around 20 POPs additionally.. This makes the total no of Routers to 30.

Executive Recommendation for Enterprise User

Expansion in Top 20-25 Cities	• Expansion may have to be done in the existing 15-20 cities only. This can be done through re-arrangement of cards from smaller cities.
10 + 20 New POPs	• 10 POPs will be required predominantly at Mumbai and Delhi • 20 addtl POPs for Cities where LL is > 500 circuits for offering improved SLA to customer.
Leverage on MLLN infrastructure	• MLLN spans 1800 SDCAs with plan to cover remaining 800. • All MLLN Nodes are Virtual Nodes.
Deploy MAN in Delhi and Mumbai	• MAN has to be built up in Delhi and Mumbai • Technologies such as RPR / FTTX / Carrier Ethernet can be explored.
Leverage on existing MAN in Other 98 Cities	• In top 98 cities, leverage on the MAN deployed as part of Multiplay. • Phase III expansion to provision for Ethernet interface for enterprise user
DSL for Lower bandwidth	• DSL also can be positioned for providing VPN service in smaller cities and also for providing lower bandwidth. • *Each DSLAM acts as MPLS POP, more than 2000 cities*

Summary of Expansion

Details of Interface Requirement– A type Cities

Project	POI	Existing Interface per POI	A1 – DLI, MUM	A1 - 3	A2 - 3	A3 - 6	A4 – 10
Broadband	166 at 106 locations	2	0	10*1	6*1	4*1	2*1
GSM	29 locations	0	0	4	PN -4, Other - 2	2	RP, NGP, CBT, VYD, MYS, CHD,GWH, – 2, Other 0
IP TAX	20 locations*	2GE at CHN and DLI	2	2	2	2 , IND=0	RP,NGP,GWH,CBT = 2
Wi-Max	22 locations	0	0	2	2	2	RNC, GWH, CHD = 2, Other = 0
SSTP	24 locations	2*FE	2	2	2, PN=0	2, IND= 0	NGP,GWH, CBT = 2
CDR	104 loc	0		8*STM-1	8*STM-1	8*STM-1	8*STM-1

All interfaces in GE unless specified

Details of Interface Requirement – B type Cities

Project	POI	Existing Interface per POI	B1	B2
Broadband	166 at 106 locations	2	0	0
GSM	29 locations	0	SU,TVM,MYS, MD,BP ,JAM, NDA,= 2, Other 0	AMB, SMB,SML,
IP TAX	19 locations*	0	BP,Agra,Rajkot =2	Ambala, Cuttack = 2
Wi-Max		0	NDA, BP, TVM, LDH, AMR = 2, Other =0	Calicut, Trichur = 2, Other = 0
SSTP	24 locations	2 * FE	BP,Agra,Rajkot , JAM,Shillong =2	AMB, SHM, CUT, Dimapur = 2
CDR	104 locations	0	4*STM-1	4*STM-1

All interface in GE unless specified

Summary of Other Requirements

For Enterprise User

- Expansion in Top 15 – 20 cities through re-arrangement of cards.
- 10 + 20 new POPs
- Deployment of Metro Area Aggregation Network in Mumbai and Delhi to reduce last mile.
- Leveraging on existing RPR Metro Area Aggregation Network in top 98 cities

International Gateway router

- Required in Mumbai, Chennai and Bangalore.
- One high end Router already there.
- One more set of IGW – IGW PE Router per City may be required – Total 6 Routers.

Core Connectivity

- New Core Routers to be deployed in top 15-20 Cities with 10GE connectivity and nx10Ge with Bangalore, Mumbai and Chennai. Total routers = 30-40.
- Existing Core Routers to continue the way as it is.

Line of Action

Executive Summary of the Recommendation

For Internal User

- The interface requirement can be taken care by existing spare GE interface / Spare Slots.
- 6 Routers required for IGW to be deployed in Mumbai, Chennai and Bangalore

For Enterprise User

- Expansion in Top 15 – 20 cities through rearrangement of Cards.
- 10 + 20 new POPs

Core Connectivity

- New Core Routers to be deployed in 15-20 Cities with 10GE connectivity and nx10Ge with Bangalore, Mumbai and Chennai
- Existing Core Routers to continue the way as it is

Other Points

- Unification of Data Network.
- No separate deployment of MPLS network in GSM Phase VI
- Any expansion shall inevitably look into the loading of existing deployment.
- Optimization & Sharing to be an integral part of Planning

Proposal for MNGT

Cancellation of Existing Tender	• **There have been major changes in the Quantity / SOR.** • **So, cancel the existing tender**.
Reassess the Requirement after One Year	• **The current requirement has come down drastically in the wake of low traffic from different access network.** • **Reassess the traffic trend after one year (Dec ' 2010)**
Minor Expansion	• **Core Routers: 40 high end. Through tender** • **Edge Routers: Few routers / interfaces in the existing router can be purchased on existing vendor / RQ / leverage on CDR infrastructure.** • **Limit the number of OEMs to circumvent inter-op issue.**

Action Item

Business Strategy:

• BSNL has always been aggressive in pricing (Low Cost)

How do we sustain this Model

• With continuous fall in Tariffs , Operating Margin are severely impacted.

• To maintain Profitability, sustained effort in reducing Network cost is one of the key elements

BSNL

What needs to be done?

• Focus on BSNL Network instead of individual project or business vertical specific network .
• End-to-end visibility while planning
• Periodic assessment of utilization of network
• Nodal Cell: CNP cell for any IP / MPLS Network incl expansion on existing IP / MPLS network.

Optimization and Sharing

• Optimization & Sharing to be an integral part of any planning across business verticals.
• Optimize CAPEX and OPEX through sharing of Network & effective inventory Management. Build as you grow.

Step towards Integrated, Complementary and Value enhancement mode

THANK YOU

For Any Clarification, Pls Contact:

SANJEEV VERMA
DGM (CNP – IV)
Mob: 09868252429
sanjeevverma@bsnl.co.in