E1-E2 (EB)

Chapter 1

MLLN

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Drawback Of Traditional Leased Line Circuits

- No Intramedia in between. Grew from 64 kbps they have to jump over to 2 Mbps only.
- Data Cards support only upto 64 Kbps
- From Operator pt of view in case of Leased Line Circuit different boxes from different vendors so difficult to manage & control.
- No Centralized Monitoring or alarm or performance monitoring.
- Therefore we should have a control to all this, we are able to identify before the customer know which circuit has gone faulty. The solution to this is **MLLN**

MLLN Features:

- MLLN is an integrated, fully managed , multi service digital network platform through which service provider can offer a wide range of service at an optimal cost to business subscriber.
- Using NMS, MLLN can provide high speed Leased Line with improved QoS, high availability & reliability.
- Except for connecting the local lead to the MODEM all operations & maintenance is carried out through ROT (Remote Operating Terminal)
- 242 ROT upto 2003 and 178 new ROT installed after 2003
- NMS supports service provisioning, Network optimization, planning & service monitoring.
- System offers end to end circuit creation and modification, circuit loop testing & fault isolation, automatic rerouting of traffic in case of trunk failure, software programmability of NTU etc.
- Banking, Financial institution, Stock market, paper industry, broadcasting & Internet service Provider main customers for MLLN.

MLLN Advantages:

- 24 hrs Performance Monitoring of the circuit. (how much time circuit time up & down and the reason for down time e.g MODEM switch off or other reason)
- Circuit fault reports generated proactively.(Before customer know we should detect the fault & rectify it)

- On Demand the Bandwidth can be increased. (without changing the MODEM recreate the circuit with the same MODEM)
- Low lead time for new circuit provisioning. (Create & debug if any fault)
- Protection against the failure of the circuit (through recovery Management process either automatic or manually)
- Long drive on single copper pair.(for 64 kbps – 7 kms & for 2mbps – 3.5 kms)
- Centrally managed from ROT connected to the NMS

Application OF MLLN:

- Corporate high speed internet access through Broadband.
- LAN interconnection.
- Hotline connectivity for voice.
- Point to point connection for data circuit.
- point to multipoint connection.
- EPABX Interconnection.
- VPN on MLLN Network.

Extension of VPN (MPLS) to Customer.

Key Elements OF MLLN:

- MLLN Nodes
- Servers
- Workstations
- Networking Equipment

Others (Printers, UPS etc)

MLLN Nodes

- DXC (Digital Cross-Connect)
- VMUX (Versatile Multiplexer)
- NTU (Network Terminating Unit)
- NMS (Network Management System)
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Servers

- Database Server
- NMS Application Servers
- Billing and Accounting Servers
- Web Self Care Servers
- Proxy Servers
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Workstations

- Local Operator Terminals
- Remote Operator Terminals

Networking Equipment

- Router
- LAN Switch
- RAS
- Firewall
- Remote Operator Terminal Connectivity Equipment
- Grooming Mux at Main and DR Sites
- Connectivity equipments at Remote Sites

Others

- Un-interrupted power supply
- Printers
- Messaging System

Network Architecture:

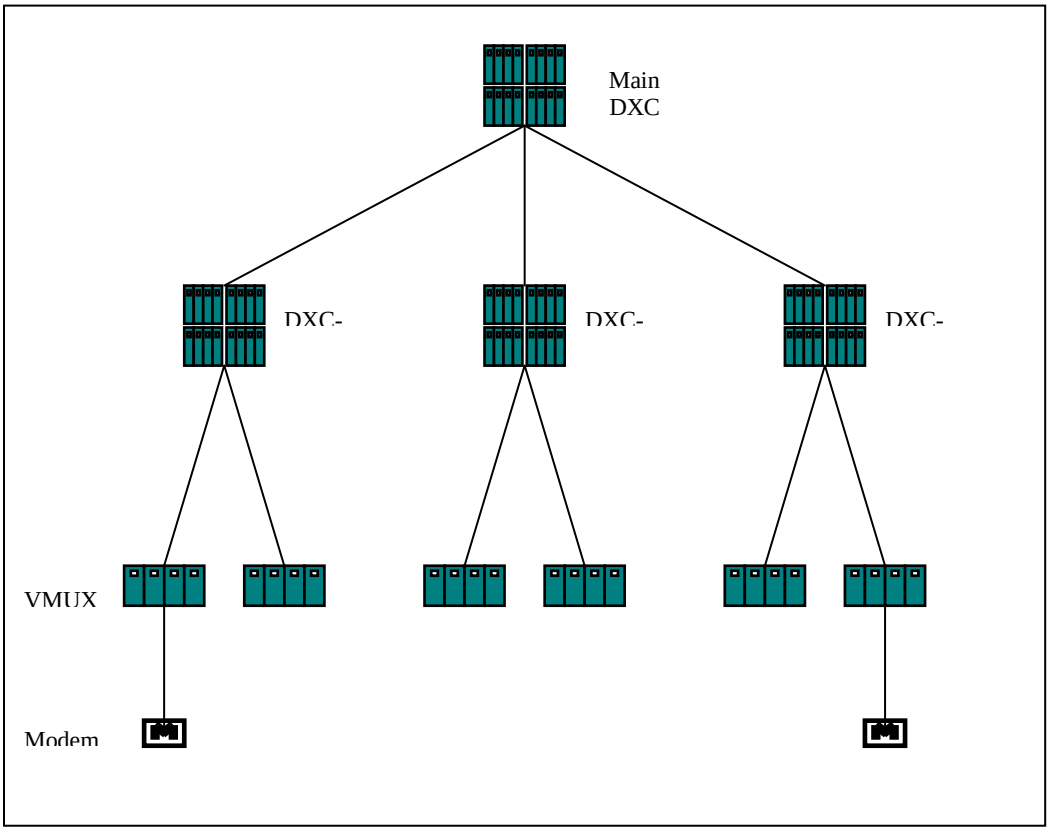

Fig. 1 Network Architecture of MLLN

DXC

Capacity

- DXC (64 ports upgradeable to 128 ports)
- DXC (96 ports upgradeable to 128 ports)
- DXC (128 ports upgradeable to 256 ports)
- DXC (256 ports)
- 1/0 cross-connect capability
- Non-Blocking Architecture

Redundancy

- Power Supply
- Switching Matrix
- Cross-connect Memory
- Expansion to be made possible by addition of cards only.
- Fully Managed from Centralized NMS

VMUX

Type - I, Type - II, Type - III with the configurations given below

	64 kbps	**N*64 kbps**	**E1 Links**
VMUX Type I	32	8	12
VMUX Type II	16	4	4
VMUX Type III	8	4	4

Expansion to be made possible on the same chassis by addition of cards

Type III VMUX

- 230V AC Powered
- -48V DC Powered

VMUX to be able to extend hotline circuits

- Point to point and Point to Multi-point circuit routing should be possible

HDSL Driving Distance:

- 3.5km at 2Mbps
- 5 km at 1Mbps
- 7km for 64/128kbps (at 0.5mm dia copper cable

NTU (Network Terminating Unit)

Capacity

- 64/128kbps NTU with V.35

- 64/128kbps NTU with G.703
- N x 64kbps NTU with V.35
- N x 64kbps NTU with G.703
- N x 64kbps NTU with Ethernet Interface
- Line Loop Testing as per ITU-T Rec V.54
- 64kbps NTU to work up to 128kbps
- N x 64kbps NTU to work up to 2Mbps
- NTU to send power off signal to the NMS at the time of NTU getting switched off.
- STU-160 works up to 128kbps
- CTU-S and CTU-R works up to 2Mbps on a single pair of copper
- All NTU's support V.54 line loop testing and support dying gasp to send power off signal at time of power off condition.

NMS (Network Management System)

- MLLN NMS
- Billing and Accounting System
- Web Self-care system
- We have offered Tellabs Network Manager Release 13 to meet the requirements
- MLLN NMS performs all the management functions on the network
- Supports regional partitioning and VPN capabilities
- Offered Performance Monitoring, Recovery, Reporting Packages
- Offered HP Open view and Cisco works which would reside on SNMP server for managing the servers and IT elements

1.1 Network Plan

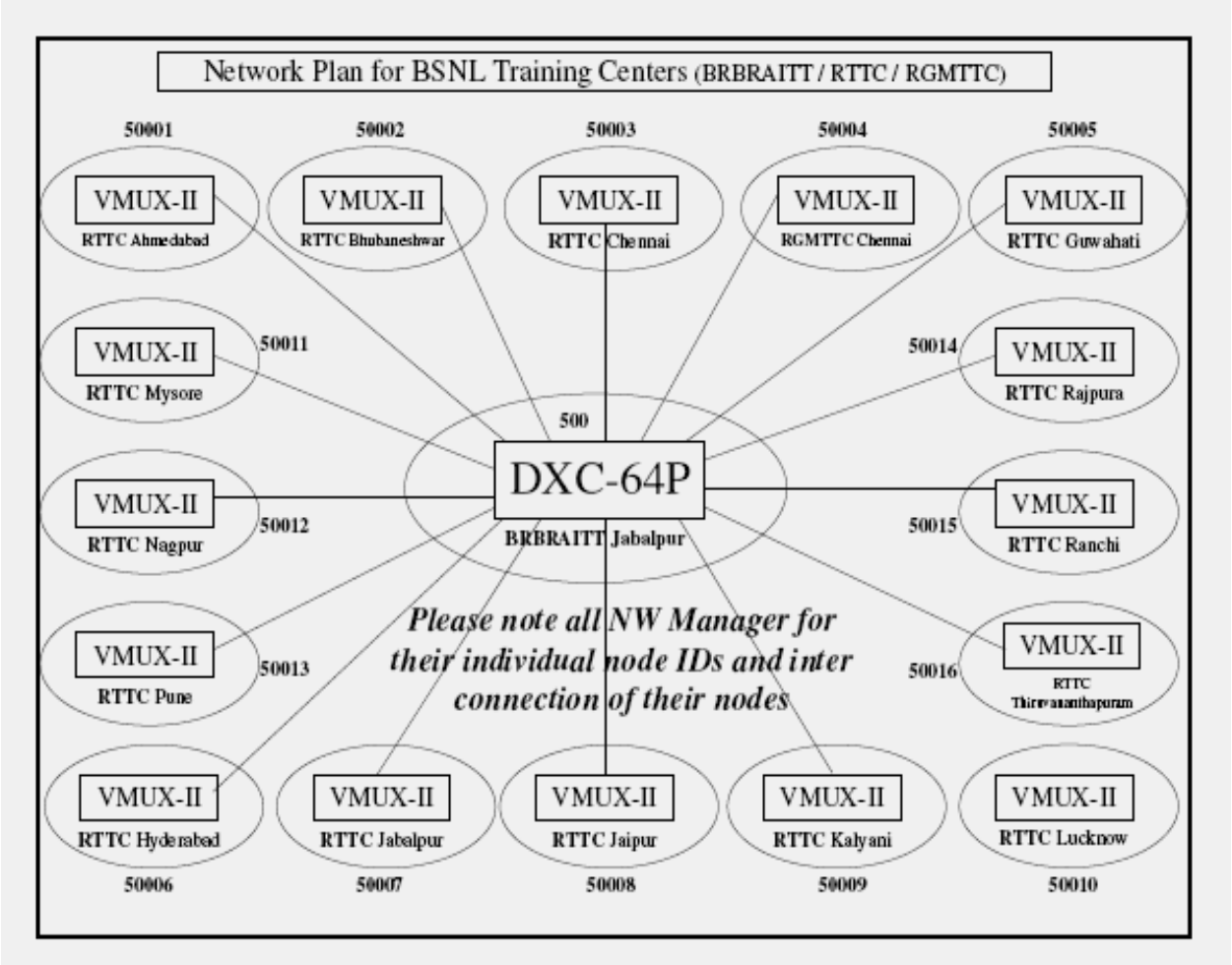

Fig. 2 Network Plan of Training centers

Different Nodes Used in MLLN

A node can be described as a digital multiplexer equipped with several trunk interfaces and as a digital cross-connect device equipped with several channel interfaces.

The cluster node is used in the network as a high capacity cross-connection device with several subracks. The basic nodes and midi nodes are used as flexible multiplexers or medium capacity cross-connect equipment. They have both one subrack.

The basic nodes or midi nodes are used if customer access to the network requires a lot of tributary port capacity. A basic node can also be used as a cross-connect device in the network (on consolidation level). A midi node is usually used as an access multiplexer. mini nodes are used as access multiplexers or low capacity cross-connect

equipment. micro nodes are used as small capacity cross-connection devices especially in mobile networks. network terminating units (NTUs) are used on customer premises. The accelerator node A111 combines PDH and SDH technologies to form a solution for interfacing customer access to backbone transport. The accelerator node A111 is an SDH access multiplexer with one or two 155 Mbit/s STM-1 aggregate electrical or optical interfaces.

Cluster Node:-

It is built in Master-slave architecture. The cluster node represents the largest node of the System. It is built in master-slave architecture. It consists of a master sub rack and 1 - 8 slave sub racks. Slave sub racks can be either double (32 unit slots), single (16 unit slots) or midi (8 unit slots) sub racks.

The maximum cross-connect port capacity of a cluster node is 8 * 64 Mbit/s = 512 Mbit/s = 256 * 2048 kbit/s port = 64 * 8448 kbit/s port. Each slave sub rack brings 64 Mbit/s to the cross-connect port capacity. The cluster node can be expanded without disturbing the existing traffic. The cluster node cross-connects at TS (64 kbit/s) level. The cluster node's master subrack is mechanically similar to the double subrack in the basic node. The difference is that the motherboard and bus extender cards are different.

Basic Node:-

The Basic Node is the basic building block of the system. (16 unit slot). It is used in local exchange or backbone networks or customer premises networks, depending on the needed services and application. The cross connect port capacity of a Basic node is 64 Mbps = 32*2048 kbps port = 8*8448 kbps port

Midi Node:-

It is a small size flexible access node for customer premises. Midi node has the same cross-connect functionality as the basic node (64 Mbps) One slot wide multifunctional interface unit XCG designed for the Midi node. Midi node supports mainly the same interface units as the basic node.

Mini Node:-

The mini node is a small cross-connect device, which can operate as either part of the network connected to the network manager or as a separate cross-connect device controlled and supervised locally. The mini node is functionally very close to the basic node. The main difference is that in the mini node the common units (Control Unit, Cross-connection Unit and Power Supply Unit) are integrated to the node.

The cross-connect port capacity of a mini node is 64 Mbit/s. It supports 2-4 interface modules with 1, 2, 5 or 10 interfaces each. Due to this limitation of the number

of interfaces, it is impossible to use all the cross-connection capacity available. The cross-connection capabilities of a mini node are the same as in SXU-A unit in a basic node. mini nodes can make cross-connections both at 64 kbit/s and 8 kbit/s level, the bit level cross-connection capacity is 95 TS and CAS cross-connection capacity is 32 TS. Typically mini nodes are used as an access level node in a network or as base station transmission equipment in mobile networks.

Questions

1) Name any four advantages of MLLN over leased line
2) Name four building blocks of MLLN
3) Name different types of NTUs used in MLLN
4) Name different types of MLLN nodes
5) Name any four applications of MLLN

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