TELECOM NEEDS OF POWER SECTOR

IN TUNE WITH TOMORROW

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TELECOM NEEDS OF POWER SECTOR

- NTPC has today established a fully Integrated Voice Video Data and Fax Network Across NTPC Locations and has adapted technological break through in Digital Technology since inception of high speed Communication Network .
- During 1975-1980’s the available communication facilities at all Power projects were Inadequate to meet the requirements of growing Information Flow-Plant locations near Coal Pit Heads.
- Many Locations did not had Telecom reach even from DOT/BSNL during that period. The only communication facility was wireless and telex.
- The Provision of Terrestrial/Leased Links were not feasible in those Remote Areas with the Pace of Project Execution targets.
- NTPC was therefore permitted to establish its Telecommunication Network Via Satcom-which also was Techno-Economically viable against Terrestrial/Leased Links.

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- NTPC since then has been Allocated Half Transponder & Satcom Network was Conceptualized in 1983 alongwith DOT
  - Phase I Network -6 Earth Stations & 5 Microwave links-Feb'1989-1990
  - Phase II & III Network –Additional 12 Earth Stations 1993-94
- Network Connectivity adopted was fully STAR Topology through NTPC's own Hub Station with SCPC/PAMA (Single Channel Per Carrier/Permanent Assigned Multiple Access) Technology.
- Configuration Setup

  1 No. INSAT Type A (11.5Meter Antenna) at Central Hub

  5 Nos. INSAT Type B (7.5 Meter Antennas) &

  5 Nos. of 2Ghz Microwave links with
- Data Channels Speed ranged/Varied from 19.2/56/64 kbps

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- MAN Connectivity for 5 Offices at Nehru Place & Scope Office. This was established with own Radio Links & Modem setup connectivity with data speed upto 19.2 Kbps during 1987-90.

Present Situation

- Network was further augmented for Mesh Connectivity in 2004 with MCPC/DAMA (Multi channel Per Carrier /Demand Assigned Multiple Access) Technology for-Site to Site Connectivity.
- Reduction of one hop/250ms latency.
- VSAT Terminals used now are 3.8Meter
- Total Satcom Links increased to 36 Nos.
- Data Speeds range from 512 Kbps to1Mbps
- Additional 9Mhz BW allocated to enhance speed/locations.
- Microwave Links Augmented to Canopy Based Setup (3 Nos). (Data speed enhanced from earlier 2/8 Mbps to 20 Mbps)

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Strengthening of Network 2002-2004

– Consolidation of Servers & Services (Internet & Email)
– As a Change Management Exercise/Implementation of ERP
– IT Security Setup

Consultant Recommendations

- Switch over to Lease Lines as an alternate to Satcom

NTPC Offices		-	2048 Kbps
Gas Plants	550	-	750 Kbps
Thermal Plants	1440	-	1880Kbps
Thermal & GAS	1660	-	2048Kbps
Super Thermal	1827	-	2048Kbps

- Implementation Scenario: -2006 - Service Provider - BSNL
  Options: - Leased Lines -Managed Lease Lines
  - MPLS/VPN Network

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- Network Setup is with Full Redundancy & Secured Access.
- Data Links and Bandwidth Speed

  Central Location - 34 Mbps With Route Diversity
  Plant Locations & RHqs - 2Mbps
  Inspection Offices - 256Kbps
  Corporate Office - 34Mbps/8Mbps
  DR Location - 16/34Mbps
- Data Center - Disaster Recovery Site

  Replication Links - 68/34 Mbps
  Connectivity for - 2x34 Mbps
  Application/Service Switching
- Availability of Network Infrastructure 99%plus.
- Near Site Data Center –Business Continuity Plan –dropped

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NTPC's Network reach today:

Augmented to Double Bandwidth 2010 -11

MPLS Connectivity	-	77 Locations
Managed MPLS	-	14 Locations
Leased Lines	-	11 Locations
Satcom Links	-	36 Locations
Radio Canopy	-	3 Locations
Ku Band Satcom Network	-	14 Locations

- MPLS - Primary Network
- Satcom - Secondary Network

Future Plans

- MPLS Links Alternate Service Provider (42)-2Mbps
- Data Center 16Mbps
- To Cover Balance Locations

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Additionally- Public Network Connectivity

Data Network evolved since 1988 with RABMN, NICNET, Computerised Telex- Machines, Wireless Systems, etc.

1. **Internet Bandwidth** (Started with 2x64 Kbps in 1996)
   Central Gateway setup at Corporate Office with Backup
   Present Capacity -122 Mbps - **Future Expansion Addl. 100**Mbps
   (At Scope Office – 2x11Mbps,1x22 Mbps, At Data Center Noida–6x12Mbps,2x10Mbps At Engg. Office Noida– 18Mbps, Disaster Recovery Site– 1x2Mbps, 1x4Mbps PMI and 2Mbps Broad Band at EDCs)
2. **ISDN & PRI Lines** (As backup, Setting up VC externally & for EPABX).
3. **Radio Trunking 600/800 MHz Plant** Locations.
4. **GPS Access** For Wagon Tracking
5. **Broadband Access- Security & Surveillance/Internet Kiosks**
6. **Telephone Landlines, Exchanges and Mobile Services.**
7. **Ku Band Connectivity for New Projects from BSNL.**

Business Applications/Areas

- Legacy Applications & Distributed Setup (1988- 2006)
- ERP-SAP with central Instance (2007)
- E-procurement, SRM and other application access via Internet.
- Unified/Fax E-Mail/Instant Messaging (2004)
- NTPC Websites/ Web Applications on Internet
- Internet Browsing /Webcast/Online banking/E-Payments.
- EPABX at All Plant/RHQ Locations for Land Line/RAX and on Satcom as direct voice communication on Sr. Executive Desks/Critical Fns
- Audio Conferencing
- Videoconferencing (45+ locations incl. Joint Ventures/Subsidiaries)
- On line Monitoring of Plant information
- Online Monitoring of Project Milestones/Status and Issues
- Mobile-SMS gateways and IVRS /VOIP
- Application/Mail access on Mobiles
- Security Setup (Server Updates, Remote access, Web Access, etc)
- Business Partner Networks (BHEL, EBSCO, CRSIL, etc.)
- Regulatory needs (EMS, DDCMS, AAQMS, etc).

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Ongoing Scenario:

- Major emphasis is on Security Strengthening of Internal network (IPS/Firewall/QOS)
- Enabling Encryption,
- Internet Augmentation to cover all desktops.
- Email services to cover all NTPC employees
- Webcast of Events
- Alternate Service Provider Network Implementation.
- Implementation of IPV6 and ISMS, etc.

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Telecom Needs today:

For Efficient and Quality Communication following points need to be addressed;

- Presence of other Service Providers in new Project areas, irrespective of Business Prospects as that grows automatically as soon as the Project reaches commissioning stage and locality changing to a developed area.(Avenues start with Mobiles, Internet, Telephones within a short period).
- Demand of Bandwidth and High Speed is ever increasing as the Network Overheads increase due to Complex Applications, Multimedia/Conferencing needs from Desktop, Security needs, etc.- Requires OFC Network laying/terminations.
- Fault Tolerant Telecom Network with In-built Redundancy and Stable infrastructure to avoid potential losses/Costs due to Network Outage.

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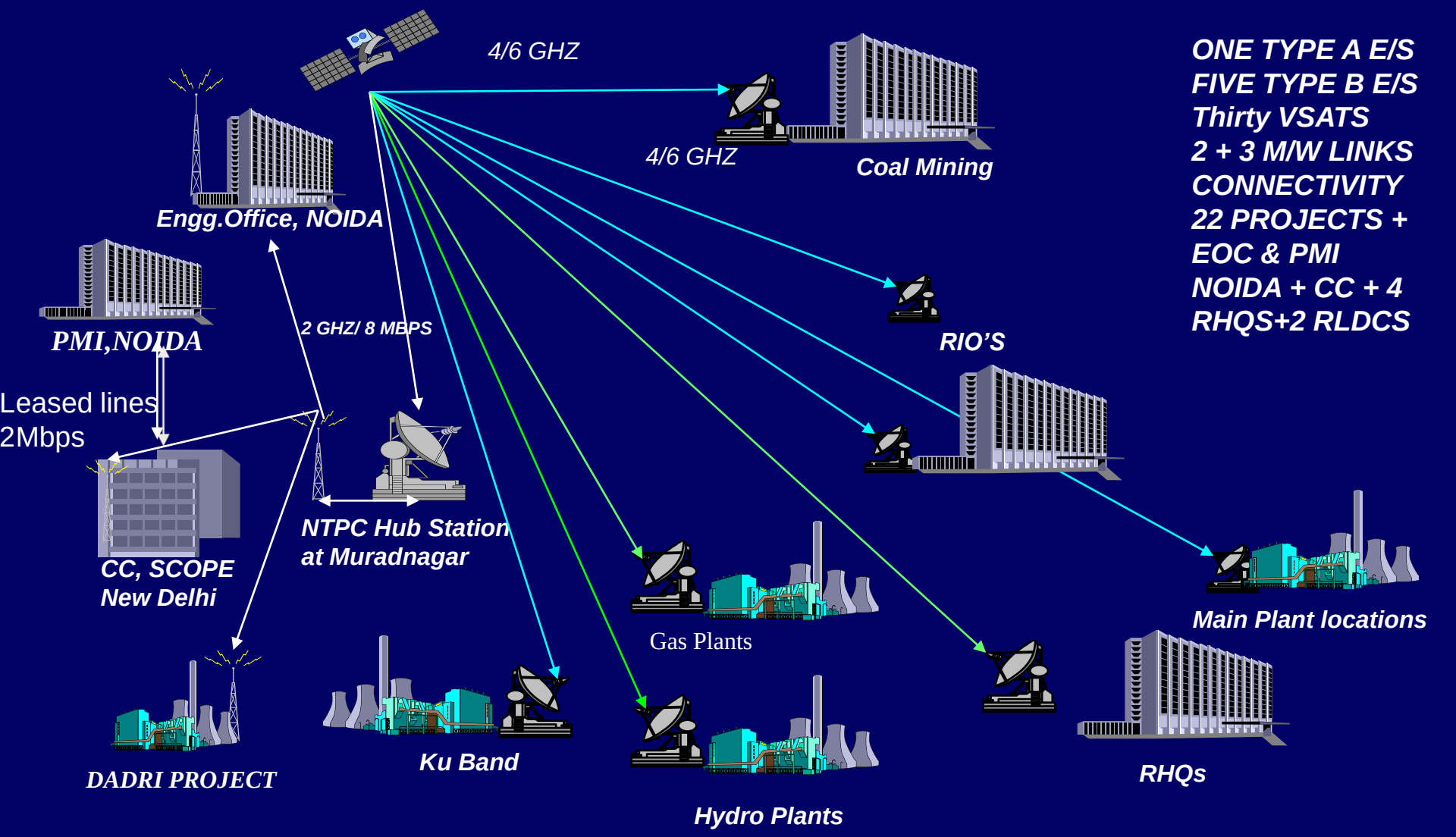
Telecom Needs today: *contd*-

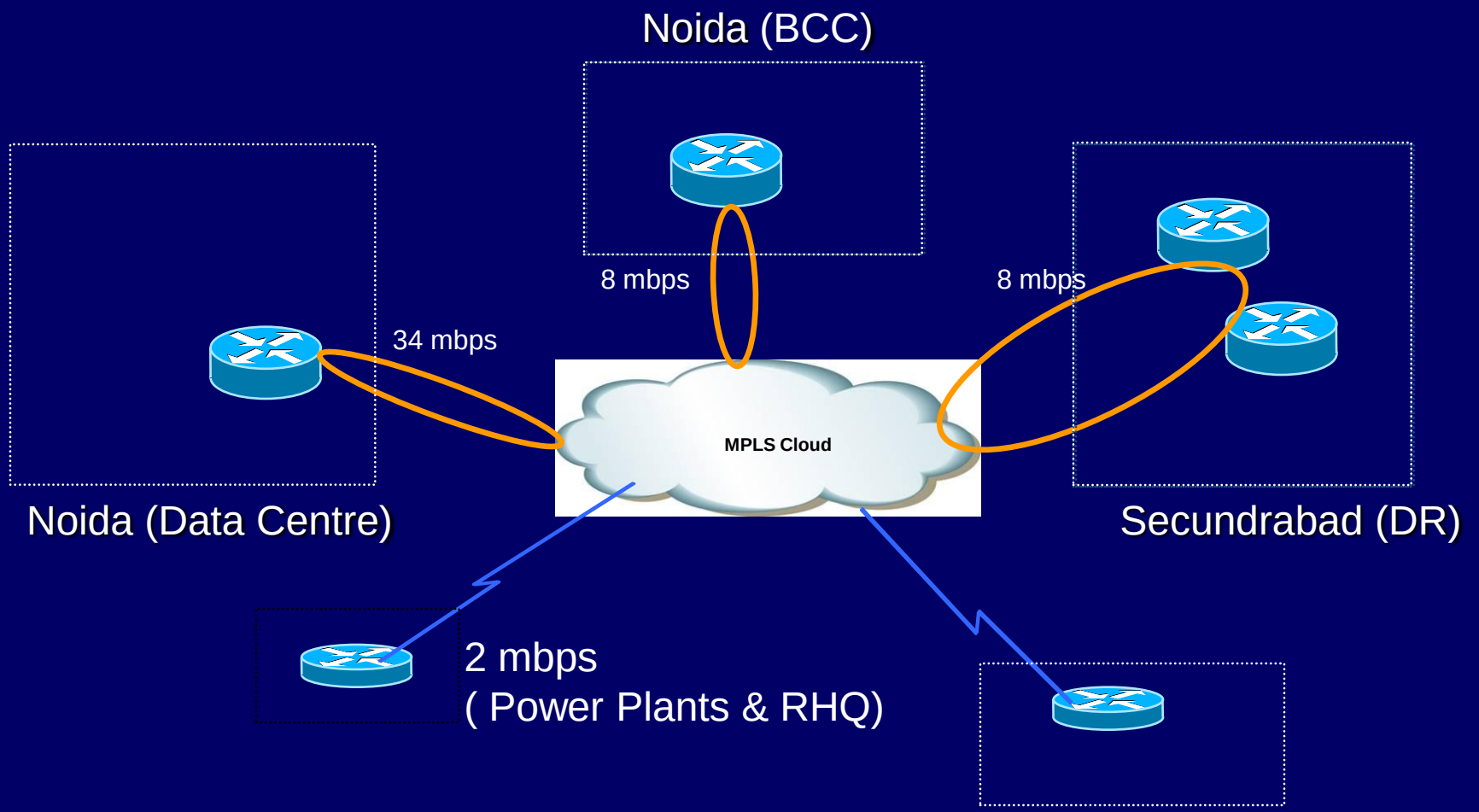
- Telecom Setup with High Network Availability, High Uptime, Min Latency/Packet Loss, Efficient Response time ,Secured setup, etc.
- To Improve restoration time upon total Blackout of Telecom Services if OFC gets Cut.
- SLA’s to be improved for Leased Lines/Managed Leased Lines considering early restoration, latency improvement and low packet errors, etc. and
- Central Coordination Cell for NOC, Complaint Logging, to monitor all types of Links/Services from the respective service providers.

Satellite Communication Network – NTPC Scenario

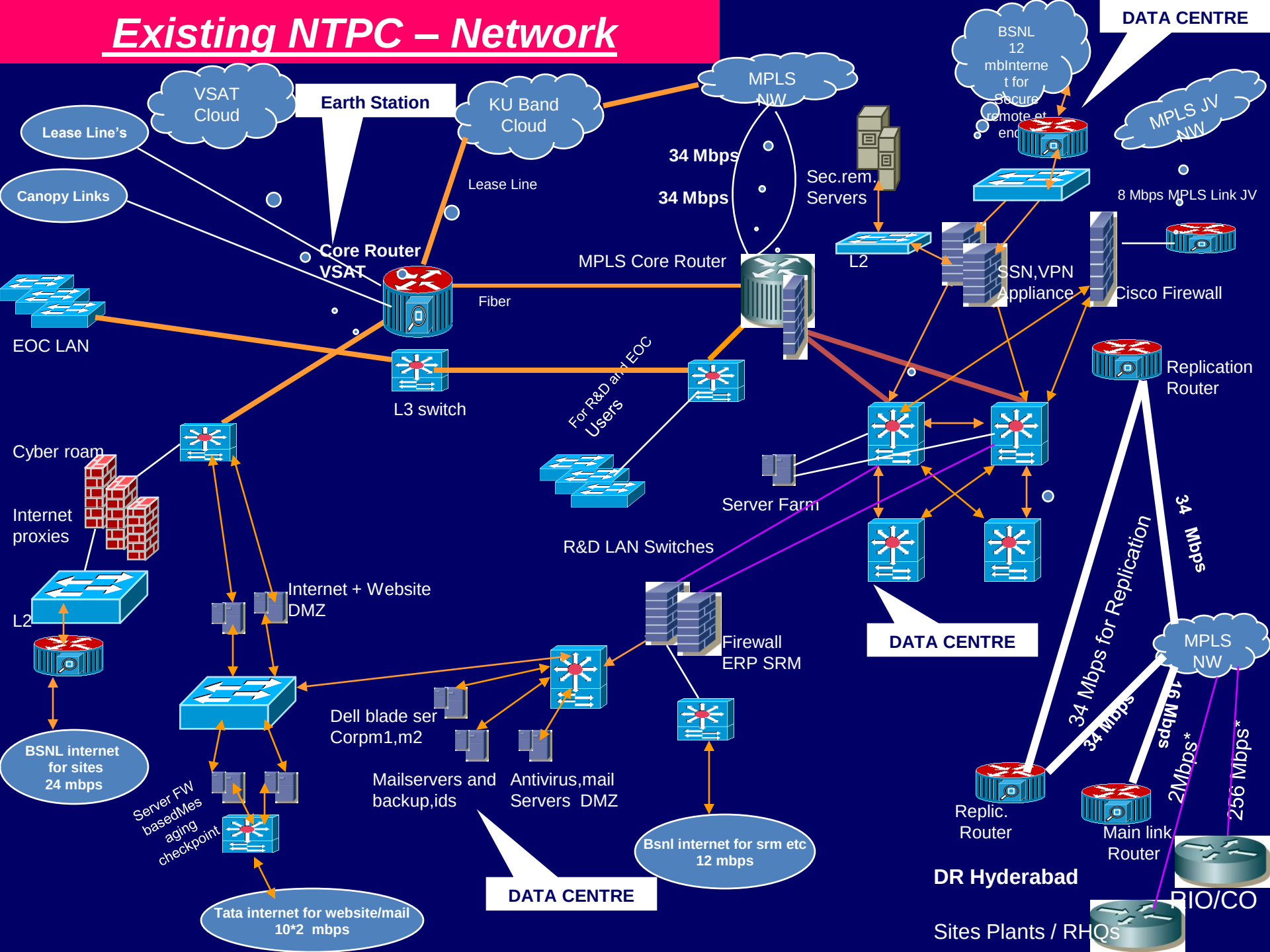


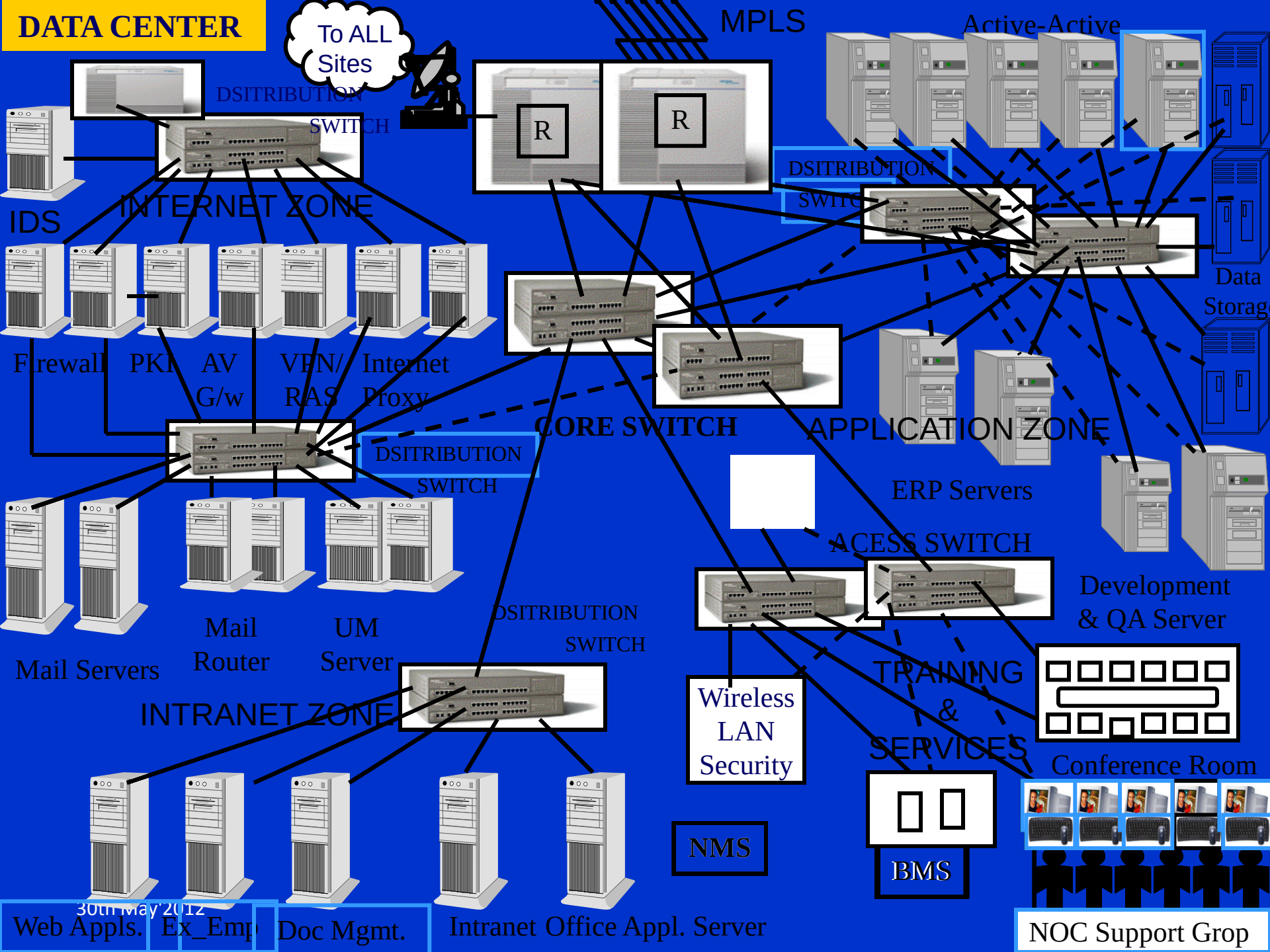
ONE TYPE A E/S
FIVE TYPE B E/S
Thirty VSATS
2 + 3 M/W LINKS
CONNECTIVITY
22 PROJECTS +
EOC & PMI
NOIDA + CC + 4
RHQS+2 RLDCS

WAN Connectivity Details –Initial Plan (based on BSNL's MPLS VPN)



Existing NTPC – Network




DATA CENTER
To ALL Sites
MPLS
Active-Active
DSITRIBUTION SWITCH
R
R
DSITRIBUTION SWITCH
IDS
INTERNET ZONE
Data Storag
Firewall
PKI
AV G/w
VPN/ RAS
Internet Proxy
CORE SWITCH
APPLICATION ZONE
DSITRIBUTION SWITCH
ERP Servers
ACESS SWITCH
Development & QA Server
Mail Servers
Mail Router
UM Server
DSITRIBUTION SWITCH
Wireless LAN Security
TRAINING & SERVICES
Conference Room
INTRANET ZONE
NMS
BMS
30th May 2012
Web Appls.
Ex_Emp
Doc Mgmt.
Intranet Office Appl. Server
NOC Support Grop

एनटीपीसी
NTPC
A Maharatna Company

Thank You

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