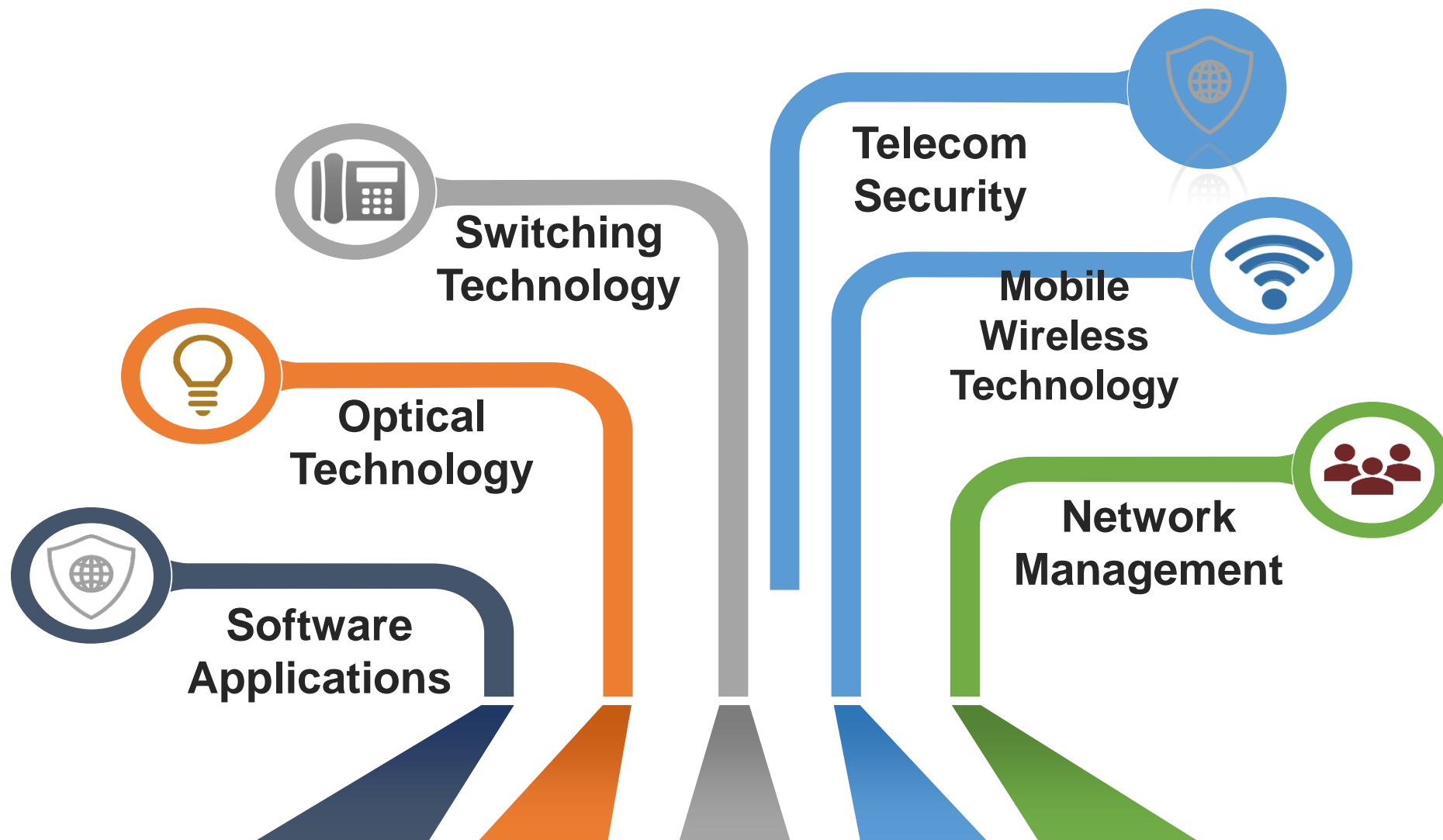


C-DOT's Indigenous Telecom Technologies and Solutions for ISPs

C-DOT Technologies

(A diverse Telecom Product Portfolio)



Products/Solutions at a Glance 1/2

Switching

- Routers & Switches
- Next Generation Digital Infrastructure (IP Exchanges, Soft switch, Media/Signaling Gateways, etc.)
- Data Center Equipment

Optical

- Access – Gigabit Passive Optical Network (GPON), XGSPON, NG-PON 2
- Core/Transport – Dense Wavelength Division Multiplexing (DWDM), Packet Optical Transport Platform (POTP)
- Network - Fiber Planning & Fault Localization Solutions

Wireless & Mobile

- 4G LTE, 4G LTE-Railways
- 5G Non Stand Alone (NSA) & 5G Stand Alone (SA)
- Wi-Fi solutions including Wi-Fi 6
- Wi-Fi solutions for rural areas (Solar Wi-Fi, Long Range Wi-Fi, Satellite Wi-Fi, PM-WANI, etc.)

Products/Solutions at a Glance 2/2

Security

- Quantum-Safe Encryptors
- Quantum Secure Video IP Phones
- Quantum Key Distribution (QKD)
- Cyber health monitoring & analytics
- Trusted Telecom Portal for NSCS
- Central Equipment Identity Register (CEIR)

Software Applications

- ITU-CAP Based Integrated Alert System for Disaster Management
- Network Management System (NMS)
- SAMVAD – Unified Secure Chat & Call Platform
- CDOTmeet--Secure Video-Conferencing solution
- Inter-operable IoT/M2M Platform
- AI based Solutions (Face Recognition, Object & Intrusion Detection, etc.)
- Augmented Reality (AR) based Way-Finder Solutions for Indoor Navigation

For ISP network



Core Networks

Core Router, DWDM
Internet Router,
Datacenter services

Enterprise Solutions

- GPON/Switches/Routers
- NMS/IMS
- QKD, PQC Encryptor
- Security solutions



Access/ Edge Networks

Access Switch,
GPON OLTs

Wireless & Mobile Networks

- Captive 4G
- Captive 5G
- Wi-Fi



Client Access Solutions

Enterprise
Solutions, Wireless
& Mobile networks,
Residential
Solutions

Residential Solutions

- ONTs
- Satellite Wi-Fi
- Long Range P2P WiFi
- WiFi AP



Optical Portfolio

Core Network

80 channel DWDM
100/200 Gbps per
wavelength
8/16 Tbps per fiber

Optical

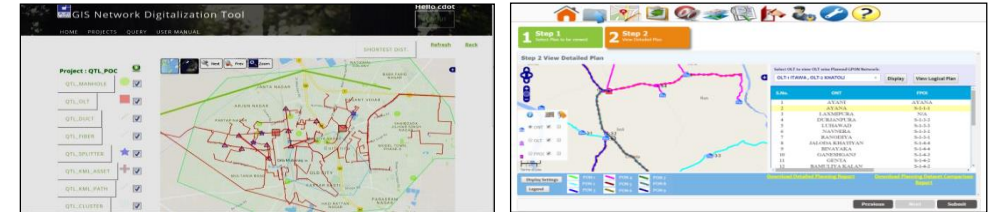


Access Network

- GPON
- XGS-PON
- NG-PON2



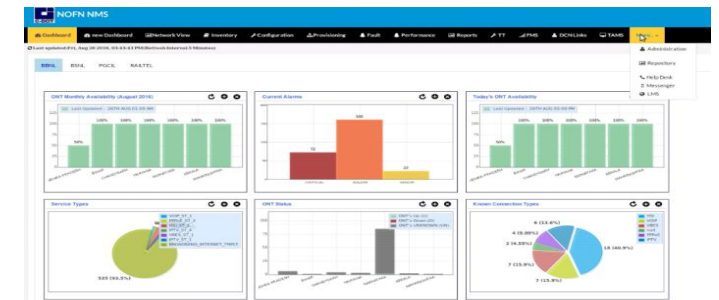
Fiber Planning Tools



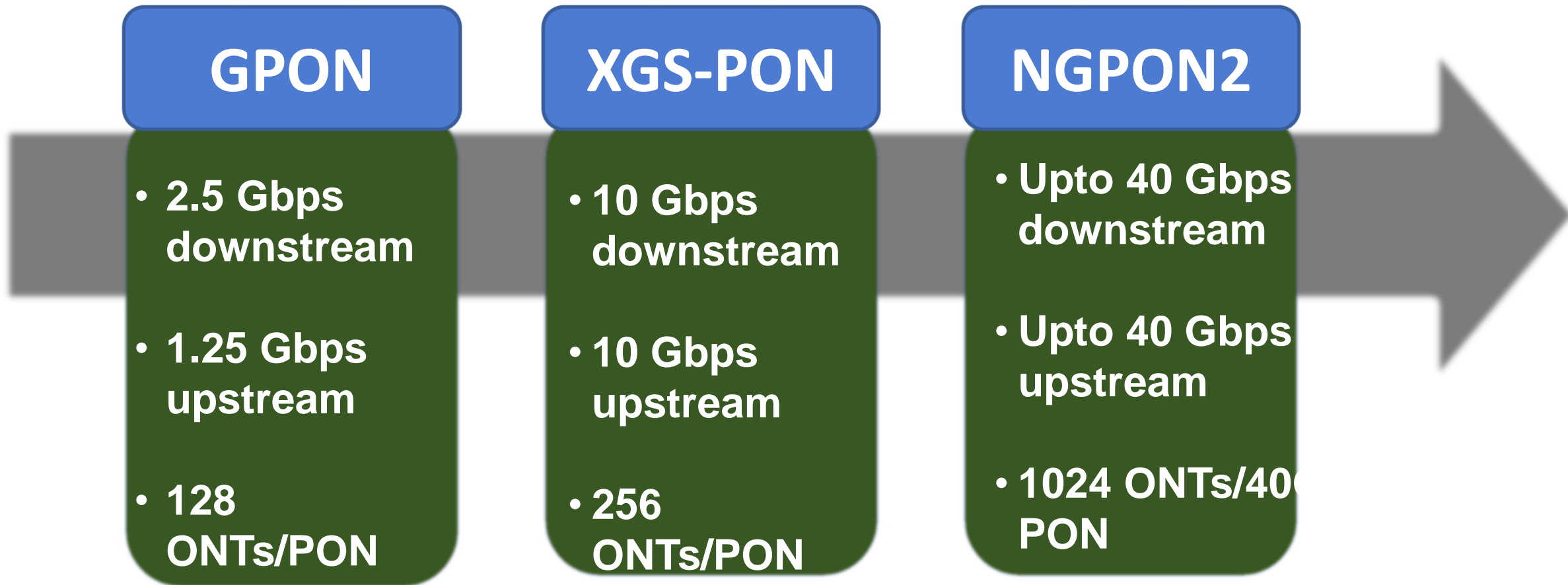
Fiber Fault Localization



Network Management Solution



Optical Access Network Solutions



ONTs for Access Network

GPON



Next Gen PON



Indigenous solutions at market competitive prices.
 Plug and Play configuration.

Variants with Ring protection also available.

Works efficiently in non-AC environment.

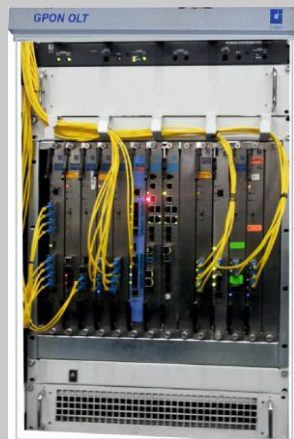
Available from multiple manufacturing partners

Multiple combination of configurations available as per ISP requirements:

- 10/100/1000 Base-T ports : 1/4/5
- POTS: 1/2
- USB
- WiFi 802.11 b/g/n/ac
- Dying Gasp support
- RF Video Port
- Support for ToD and 1PPS (for Synchronisation)

OLTs for Access Network

GPON



Chassis Solution



16 port Mini OLT



8 port Mini OLT



4 port Office OLT

Next Gen PON



Chassis Solution



4 port XGS Mini OLT

Indigenously designed and affordable solutions.

Available from multiple manufacturing partners

Chassis Based solutions

- **Cost-effective for large number of customers.**
 - **Supports variable PON configuration(4/8/16 ports per line card) to adapt to variety of ISP requirements.**
 - **Easy-expandability by adding PON line card, as the ISP customer base grow.**
 - **Easy upgrade to Next-Gen PON (Replace GPON Line card with XGS-PON Line card).**
 - **Coexistence of GPON and XGS-PON through same chassis and ODN.**
- Compact Office OLTs**
- **Cost-effective for densely populated customer base.**
 - **Available in multiple variants (4/8/16 ports).**
 - **Works in non-AC environment.**

Routing & Switching Products

Edge Network

L2 Switch- Throughput: 128 Gbps , 1G Electrical interfaces, 10 G Uplink interfaces



Branch Router(BRTR-10)- Throughput: 10 Gbps
1G (Optical), 1G Electrical, E1 (GFP) interfaces



Secure Router (strategic agencies) - Throughput: 56 Gbps , 1G (Optical), 1G Electrical interfaces, Hardware accelerated IPsec and MACSec



Aggregation/Core Network

Stack Terabit Router (STBR): CRAT-100/CRDT-100 -

Throughput: 960 Gbps



Data Centre Switch cum Router(CTX-2000) Throughput: 6.4 Tbps - 1G, 10G, 25G, 40G, 100G interfaces



- Advanced Data Centre Switch outer (CTX-3000)- Throughput: 25.6 Tbps



Deployment Scenarios

Network Layer	Customer Edge/ Customer Access	Aggregation	Core/ Super Core	Data Centre Leaf/Spine
C-DOT Products	Branch Router (BRTR-10) Secure Router (CRTR-210) L2/L3 Switch (CSX-100)	Secure Router (CRTR-210) Terabit Router (CRAT-100/CRDT-100)	Terabit Router (CRAT-100/CRDT-100) High Speed Router/DC Switch (CTX-2000) Advanced DC Switch cum Router (CTX-3000)	DC Switch cum Router (CTX-2000) Advanced DC Switch cum Router (CTX-3000)

Wi-Fi Solutions



- **TEJ-3600**(Outdoor/Indoor) **WiFi-6 Access Point** in 2.4GHz, 5GHz. Upto 3.6 Gbps which supports higher no. (4X compared to WiFi-5) of simultaneous users and comply IEEE 802.11 AX, 4x4 MIMO, WPA3
- **WAP** (WiFi-5) operates in 5GHz and 2.4GHz, 2x2 MIMO, upto 80 MHz channel Bandwidth, 128 user, 1.166 Gbps throughput, Rouge detection, RADIUS & VLAN support, IEEE 802.11 AC, WPA2
- **DOA** (WiFi-5 Dual Band Out Door) for out door application, 5/2.4GHz, throughput 866 Mbps, 2x2 MIMO, RADIUS & VLAN support, WPA2
- **WGR** (WiFi-5 Gigabit Router) operates in 5/2.4GHz, 2x2 MIMO, support 4 Ethernet ports, 128 concurrent users, IEEE 802.11 AC, WPA2
- **EAP** (WiFi-5 Access Point) operates in 5/2.4GHz, 2x2 MIMO, 256 concurrent user, 1.56 Gbps throughput, suitable for smart city, schools, outdoor Hotspot, 4 LAN port, WPA2

High Throughput Long Distance P2P Link



Telco
Operators



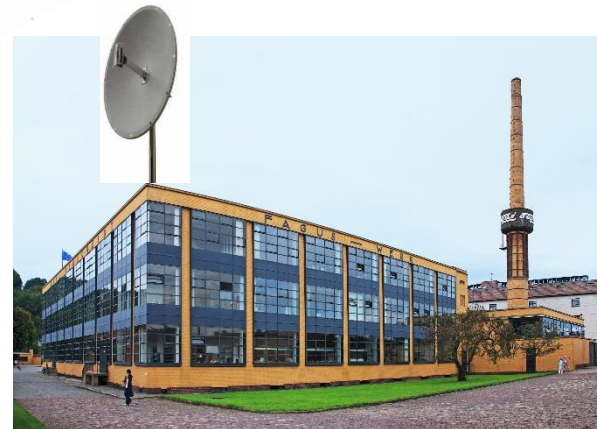
ISP Office

P2P Link 3.6Gbps

P2P Link 3.6Gbps



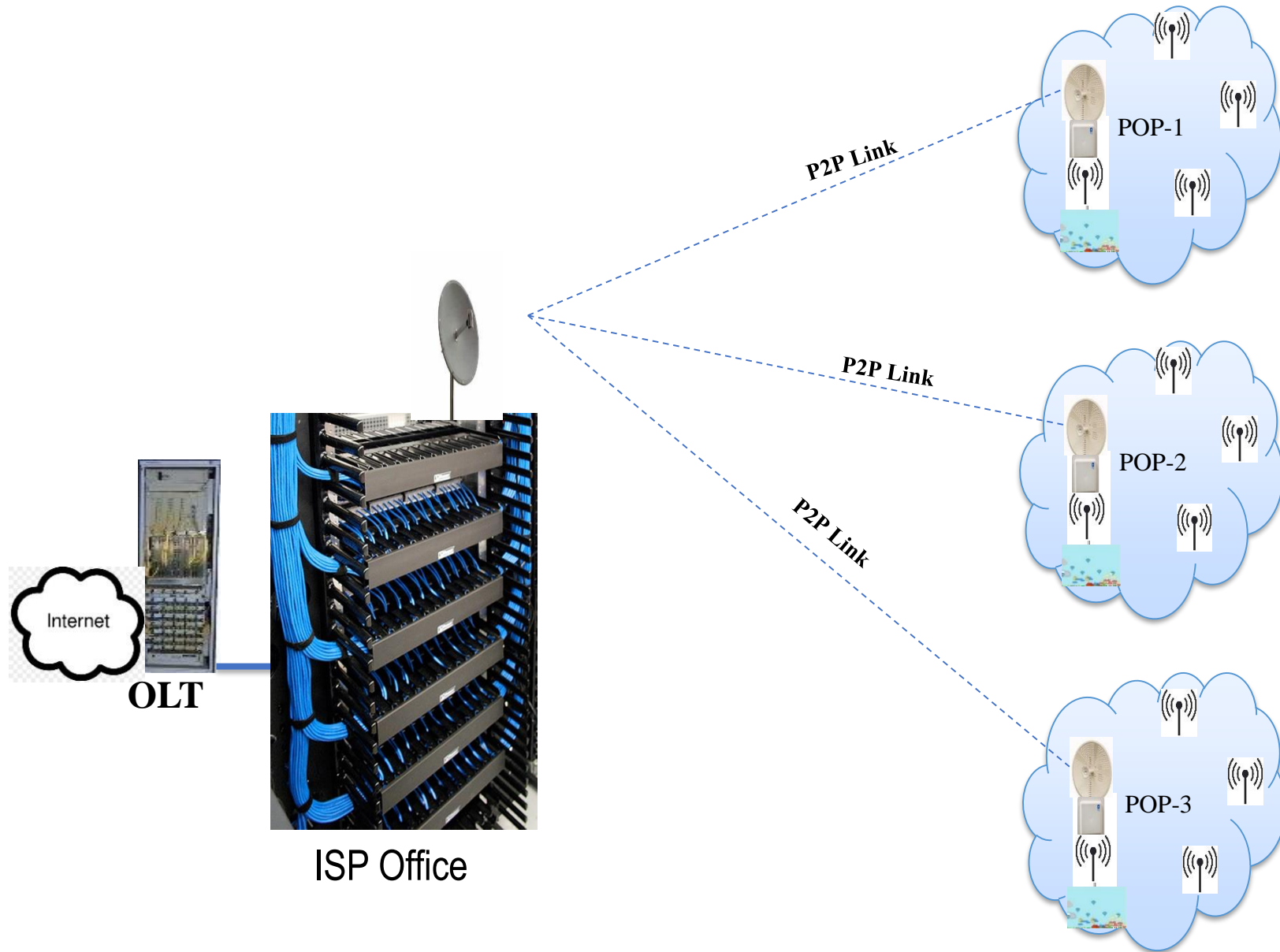
Corporate Office



Industrial Area

- TEJ-3600 (Wi-Fi-6) can provide long distance P2P link up to 3.6Gbps throughput
- Useful to connect corporate offices and Industrial Areas nearby City
- Using wi-fi hotspot connectivity extended to each floor area with WiFi-6/WiFi-5
- User management and Monitoring with AAA/EMS server

Extending Broadband through Wi-Fi to PoPs



- ISP Create many POP location as per business need from ISP Office
- Every POP location provide connectivity over fiber or P2MP link to clients
- Every POP location may create wi-fi outdoor/ indoor hotspot
- Useful for smart city, IOT connectivity
- Complete user management and monitoring with AAA/EMS

C-DOT Unified NMS

- Support Multi Vendor and Multi technology Cost effective Solutions
- Technologies like IP, MPLS, Radio, Satellite, GPON etc.
- Vendors like Cisco, Juniper, Bracode, Teja's, Alphion etc.
- Management of Telecom Assets (TAMS, Fibre Management)
- e-TOM standard Based solution like CRM(Customer Relation Management), Billing, Service Management, Resource Management. Provides end to end solutions to ISPs.
- Supports Mobile application on both android and iOS

Security solutions

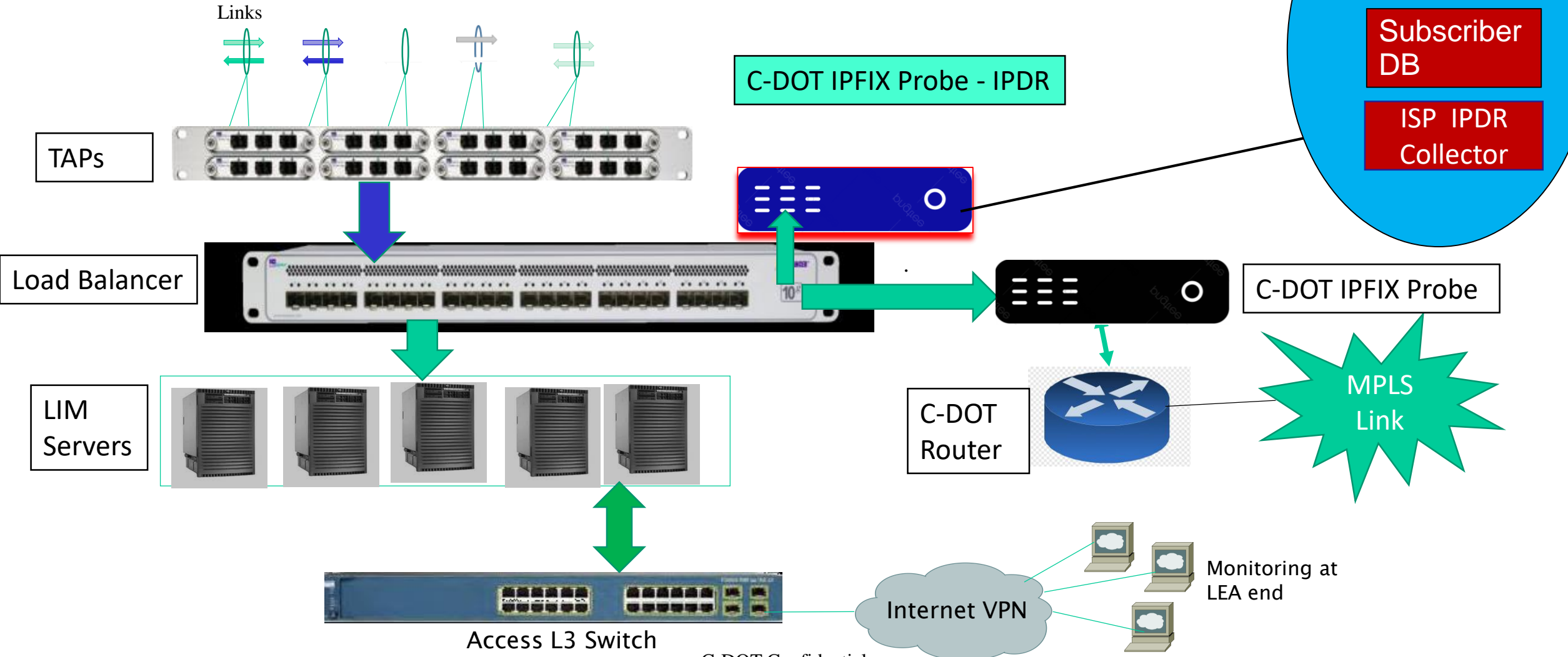
- C-DOT provides
 - Security solution for ISP Gateway
 - Security solution at Enterprise level

C-DOT IPDR Solution

An effective solution for maintaining IP Data Records (IPDR) for regulatory compliances

- IPDR data can be generated through IPFIX probes at ISP gateway locations using existing TAP / Load Balancer devices
- The installation of the Probe is independent of ISPs network devices and does not require any change in the configuration
- These flows can be collected on a server installed locally/remotely and saved in some directory on server as per pre-defined interval
- It does not store any data and exports the generated metadata in real time to IPFIX collectors
- Required IPDR records can be retrieved from saved flows by applying filters as and when required

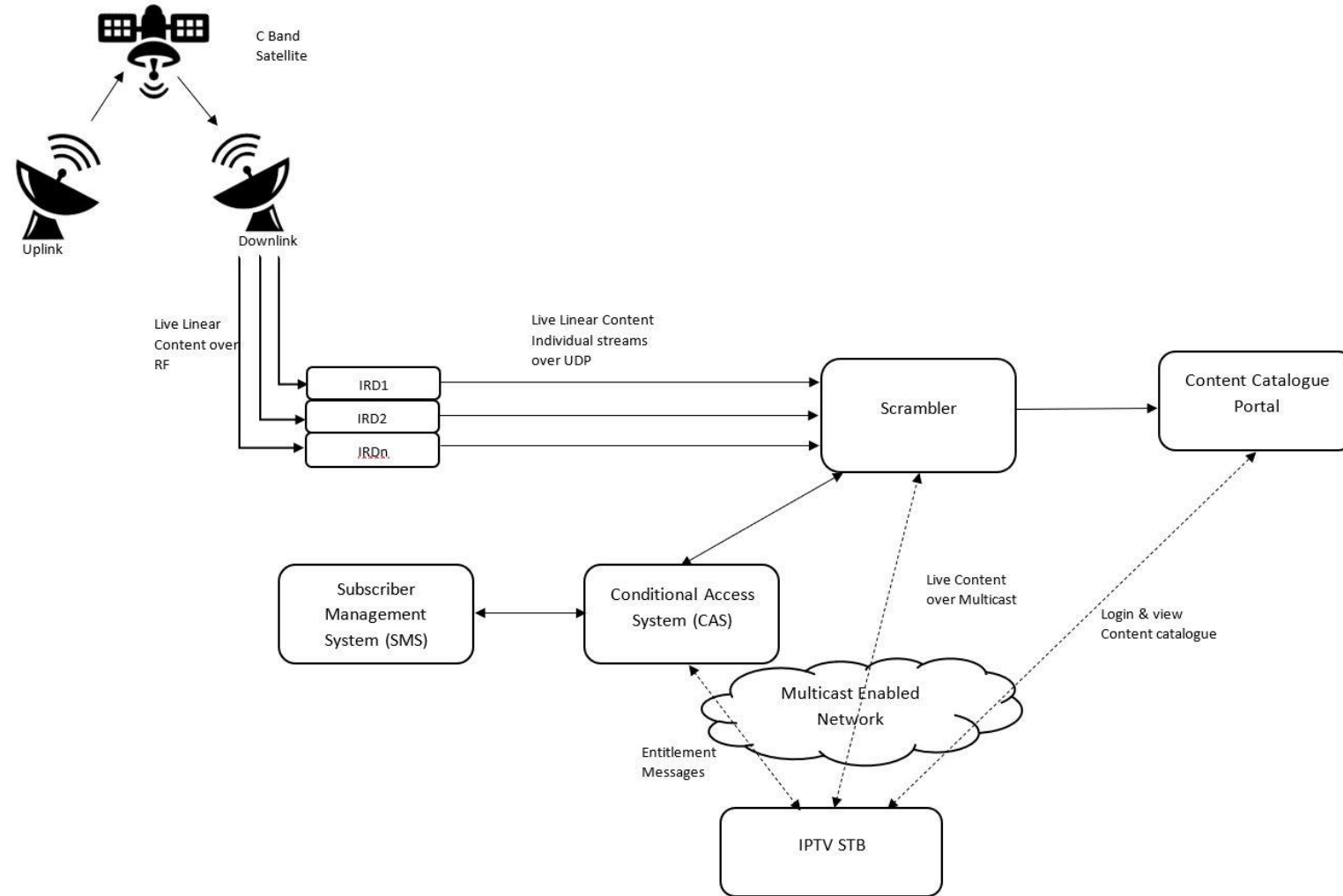
C-DOT IPFIX Probe Connectivity Diagram




IPTV Solution


- C-DOT's IPTV solution offers opportunity for ISPs to offer traditional broadcast TV services using their existing IP network.
- Bandwidth efficient and secure delivery of broadcast content
- State-of-the-art Conditional Access System and Subscriber Management System
- Compliance with TEC 57015:2022, TEC 57025:2022, TRAI interconnection regulations-2021
- Scalable and customizable as per customer's requirement
- IPTV App and CAS client can be ported to any android STB
- Can be integrated with OTT frameworks


ARCHITECTURE



Enterprise Solutions 

- ONTs/Switches/Routers
- NMS/IMS
- QKD, PQC Encryptor
- Endpoint Security Soln.
- SAMVAD, CDOTMeet

Wireless & Mobile Networks 

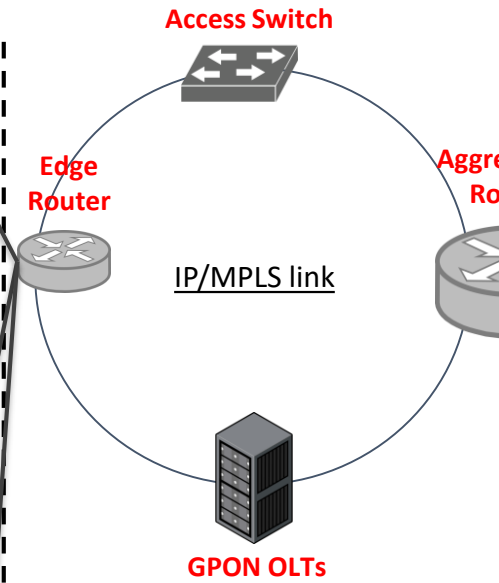
- 4G LTE
- 5G NSA & SA
- Wi-Fi 

Residential Solutions 

- ONTs
- Satellite Wi-Fi
- Long Range P2P
- Wi-Fi

C-DOT's solutions for ISPs across all Domains

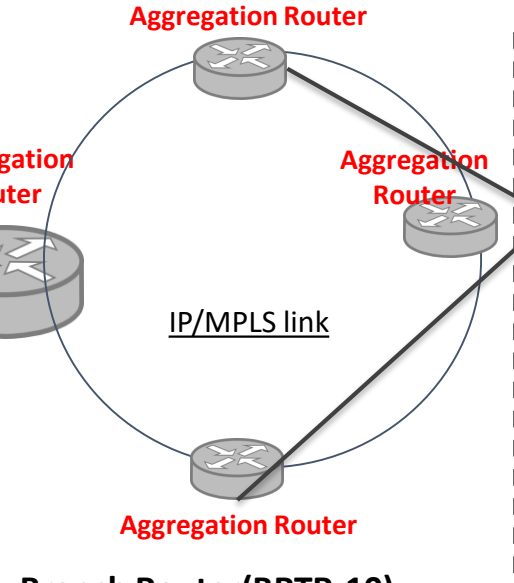
Client Access options



Optical Networks
 GPON / XGS-PON / NGPON2
 Optical Line Terminal (OLT)
 100 Gbps OFC Link System
 WDAN

Routing & Switching
L2 Switch- Throughput: **128 Gbps**, 1G Electrical interfaces, 10 G Uplink interfaces
Branch Router(BRTR-10)- Throughput: 10 Gbps, 1G (Optical), 1G Electrical, E1
Secure Router (strategic agencies) - Throughput: 56 Gbps, 1G interfaces, Hardware accelerated IPsec and MACSec

Access Layer

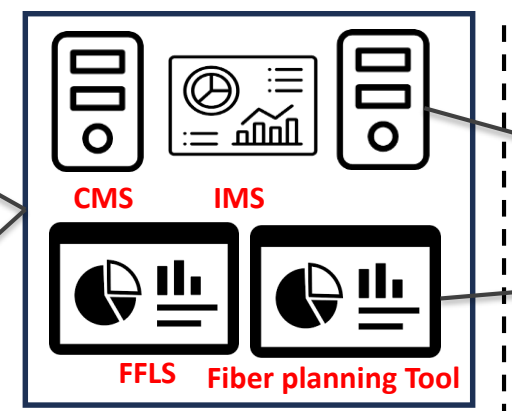


Branch Router(BRTR-10)- Throughput: 10 Gbps, 1G (Optical), 1G Electrical, E1 (GFP) interfaces

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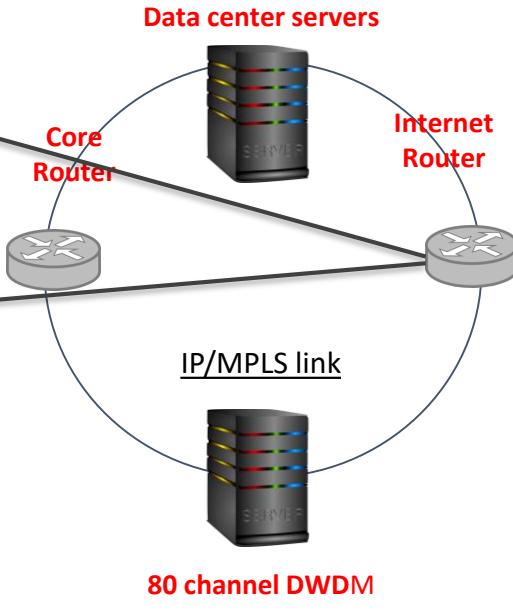
Aggregation Layer



Network Management System (NMS) - A unified & user-friendly platform for managing both Network Nodes and Services. Already used in BharatNet- National Optical Fiber Network

Internet Threat Monitoring, Analysis & Responsw- Near real-time cyber health monitoring, analysis and response at ISP level

Edge Layer



Stack Terabit Router (STBR) - CRAT-100/CRDT-100
 Throughput: 960 Gbps

Data Centre Switch cum Router(CTX-2000) -
 Throughput: 6.4 Tbps - 1G, 10G, 25G, 40G, 100G interfaces

Advanced Data Centre Switch Router (CTX-3000) -
 Throughput: 25.6 Tbps

Core Layer

Thank You