IP and Ethernet: Master and Slave?

TKK
Espoo, Finland
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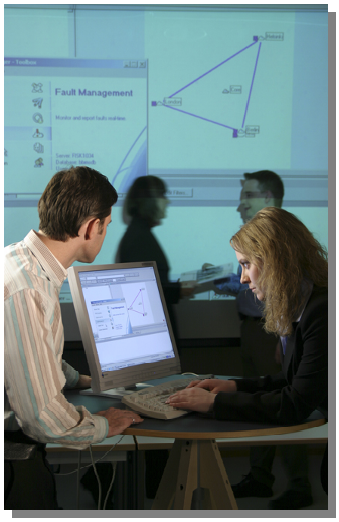
Outline

- Developing regional and access networks
  - Case Tellabs Oy
- Concepts
- Trends
- Implementation case
  - Tellabs 8600 managed network solution
- Summary



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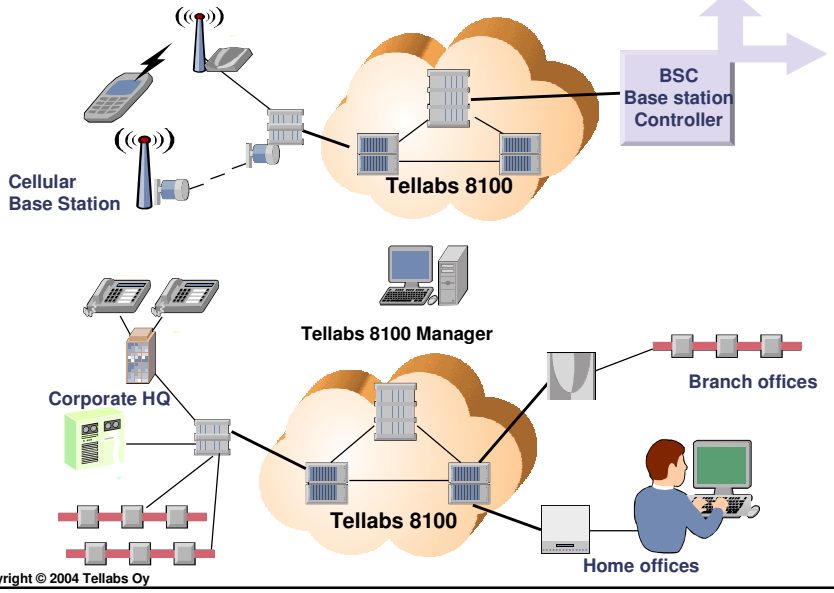
Developing regional and access networks
Case Tellabs Oy

Tellabs

- Tellabs worldwide
  - Turnover 980 MUSD in 2003, employees 3100
  - Headquarters in Naperville, Illinois, USA
  - Listed in NASDAQ
- Tellabs in Finland
  - 600 employees in Espoo and Oulu
  - Over 250 networks delivered in 100 countries
  - Products: Tellabs 8100 and 8600 telecommunication networks

Tellabs 8100 networks



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Concepts in regional and access networks

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Basic Terminology

Applications

IP

Ethernet and other technologies

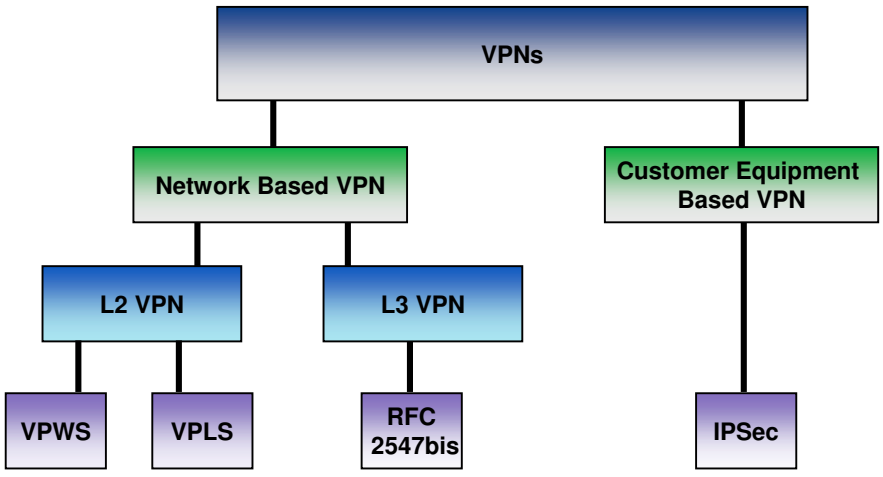
MPLS (Multiprotocol Label Switching)

- Hard QoS
- Traffic Engineering
- Reliability and Protection

Ethernet Header	MPLS Label	Layer 3 Header	Data

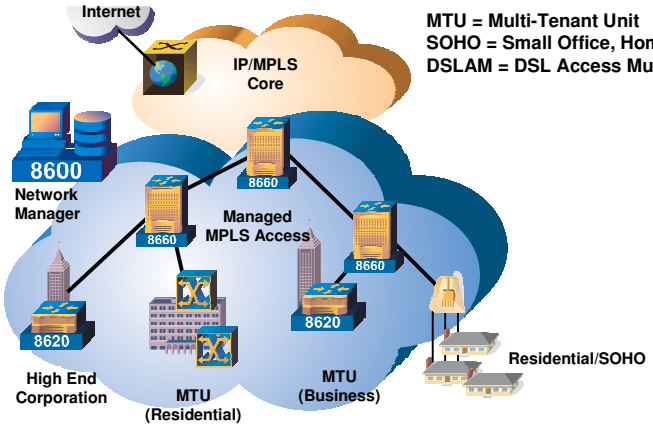
Ethernet Header	MPLS Label	Ethernet Header	Layer 3 Header	Data

Virtual Private Network Types (VPNs)



VPWS= Virtual Private Wire Service
VPLS = Virtual Private LAN Service

Application types

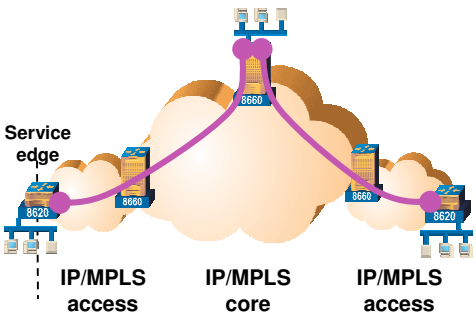


IP VPN
- RFC 2547bis

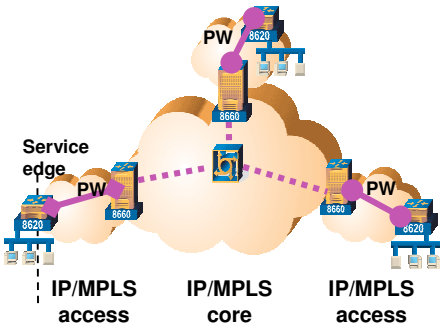
Ethernet Services
- Point-to-point VPWS
- Multipoint-to-multipoint VPLS

Broadband service aggregation
- MTU access
- DSLAM access

Ethernet services

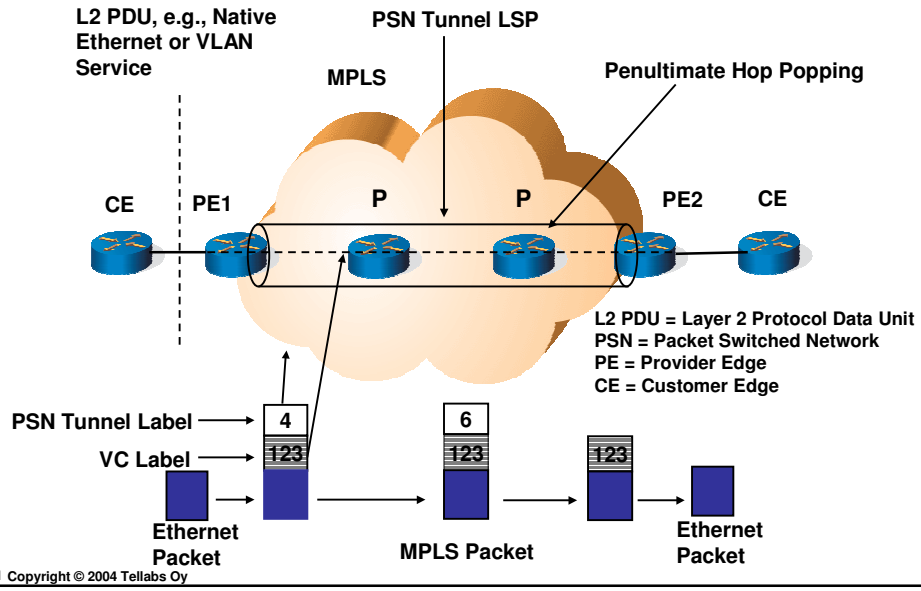


Virtual Private Wire (PWE3) Service

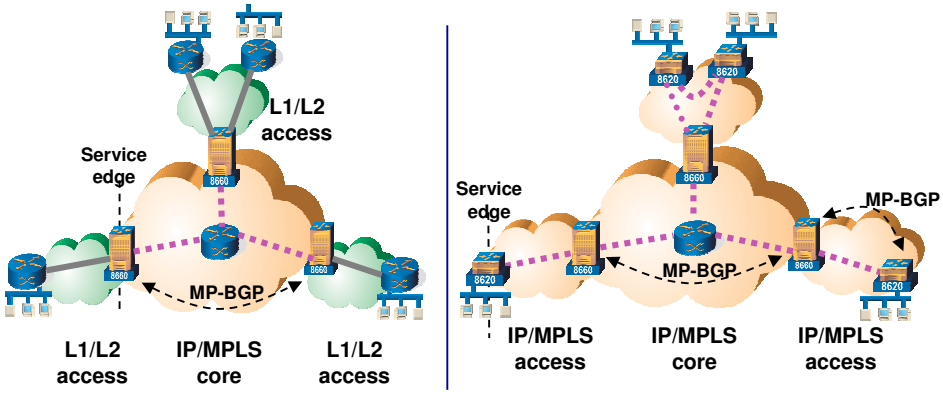


Virtual Private LAN Service

Virtual Private Wire Service (PWE3)
More Detailed



IP VPN services

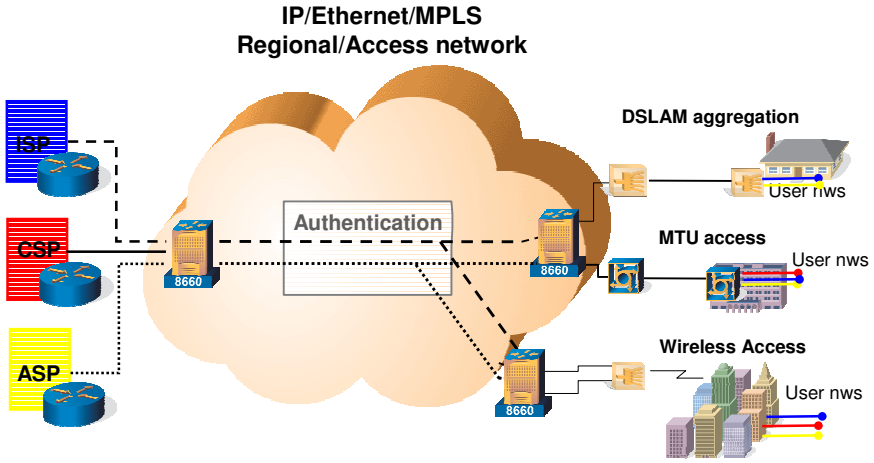


Standard RFC 2547bis model

Distributed RFC 2547bis model

Broadband service aggregation

DSLAM, MTU and WiFi access



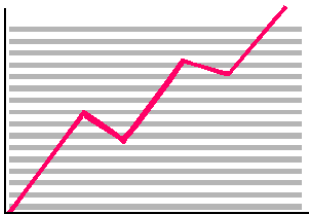
ISP = Internet Service Provider
CSP = Content Service Provider
ASP = Application Service Provider

MTU = Multi-Tenant Unit
DSLAM = DSL Access Multiplexer

Trends in regional and access networks

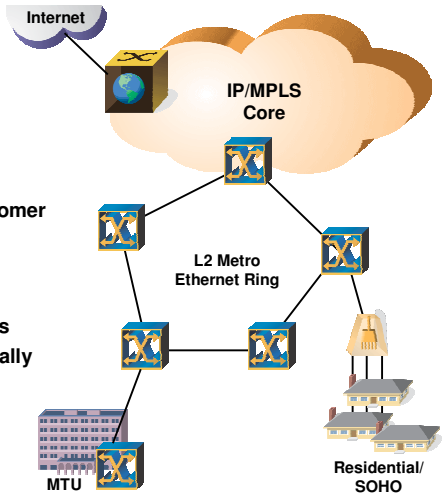
Traffic Trends

- Traffic growth 100% annually. This is due to residential broadband access.
- Digital media content and media convergence to accelerate
- Enterprise data has modest growth figures
- Cell based mobile traffic very limited compared to residential broadband
  - Mobile vs fixed
  - One or several handsets
- Pricing models are hard to change



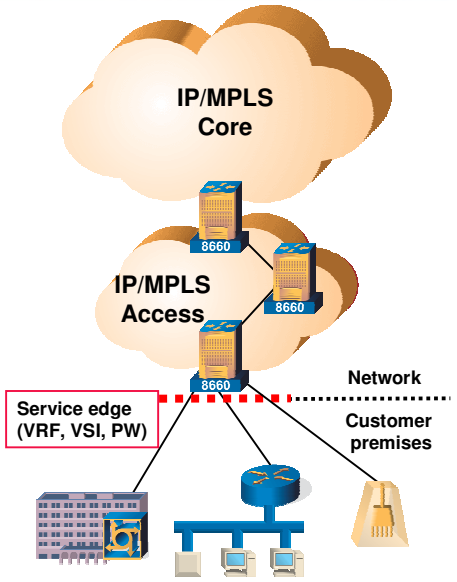
Current Metro Ethernet Networks

- Benefits for Operator
  - Well known technology
  - Ease of use
    - Plug-and-play
  - Cost-efficiency
    - Low-cost interface for the customer located equipment
    - On-demand bandwidth
  - Flexibility
    - One interface for many services
    - Bandwidth available incrementally
- Pain points
  - How to provide QoS
  - Scalability
  - Carrier-class quality



MPLS in Regional and Access Networks

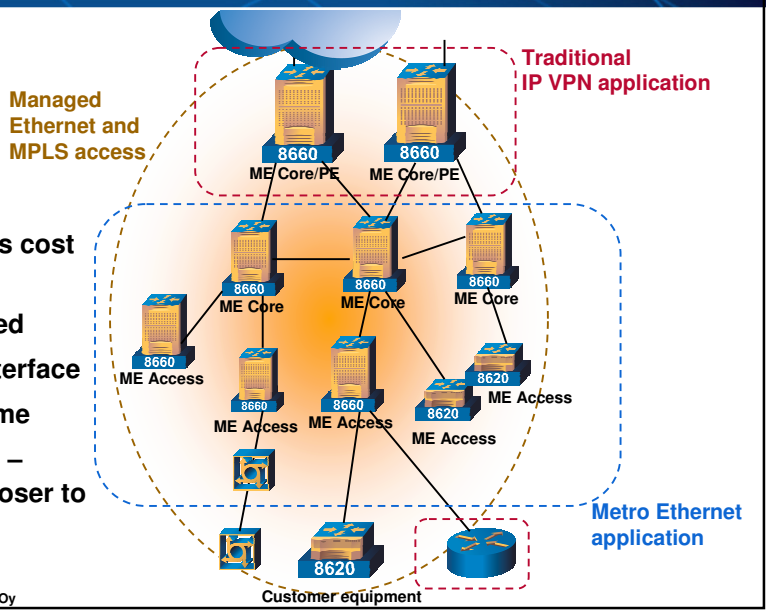
- Guaranteed service level
- Management of service
- Fast recovery operations
- Enabling management of capacity



VRF = Virtual Routing and Forwarding (table)
VSI = Virtual Switching Instance
PW = Private Wire / Pseudo Wire

Common Infrastructure

- The driver is cost efficiency
- Packet based
- Ethernet interface
- Fiber to home
- Intelligence – routing – closer to customer



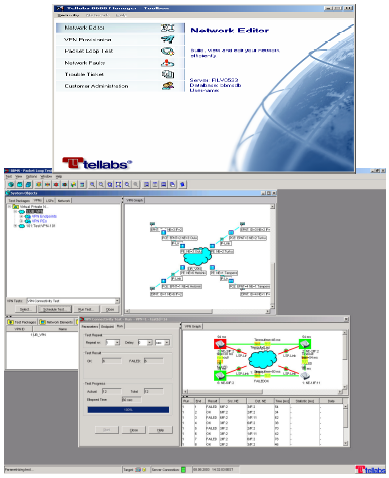
Implementation case
Tellabs 8600 managed network solution

Tellabs 8600 Network Components

> IP
> MPLS (Multiprotocol Label Switching)
> Ethernet

> Hardware based forwarding
> Sophisticated Quality of Service (QoS) features

> Best-In-Class network management enabling operational efficiency

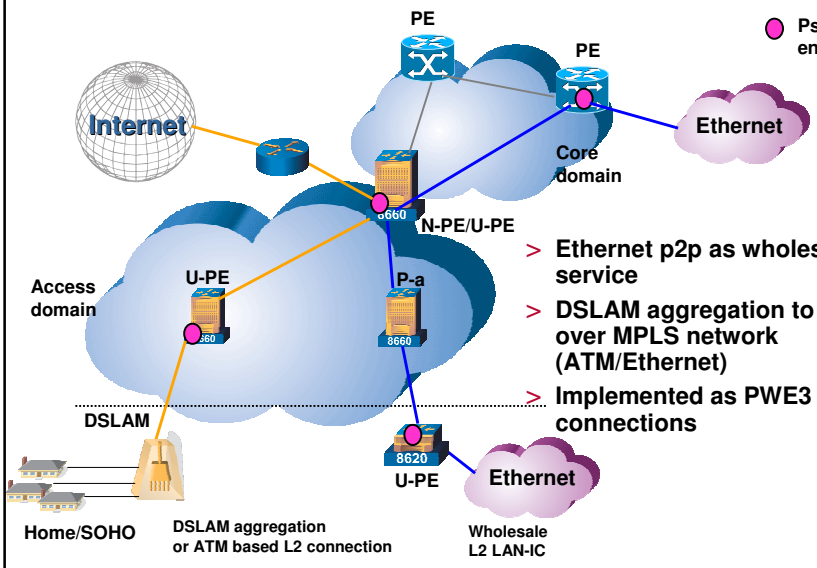


http://www.tellabs.com/products/8000/tellabs8600.shtml

Tellabs 8600 Key Facts

- Tellabs 8600 is a managed network solution for regional and access networks that cost-efficiently brings:
  - MPLS in the regional network level
  - Ethernet or MPLS in the access
- Optimizes the capex (capital expenses) and opex (operational expenses)
  - Pay-as-you grow model in network growth phase
  - Each network element and service managed through integrated Network Management System
- Facilitates migration from existing services to new packet based services

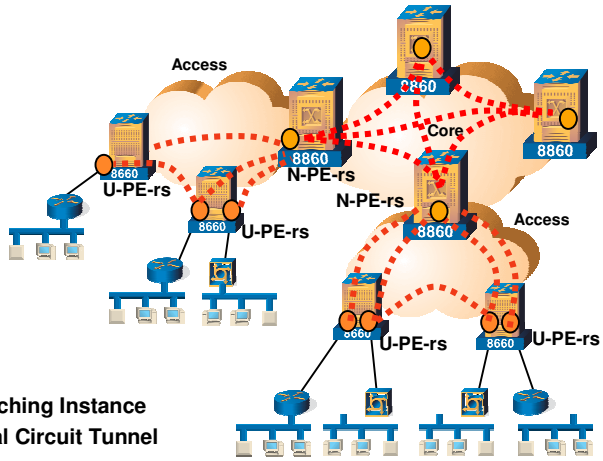
Virtual Private Wire Service



- Ethernet p2p as wholesale or retail service
- DSLAM aggregation to Internet over MPLS network (ATM/Ethernet)
- Implemented as PWE3 connections

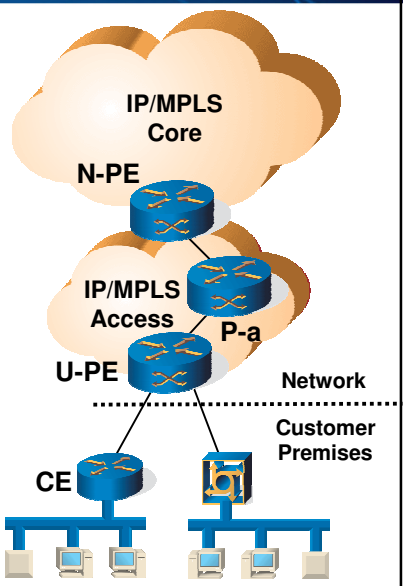
VPLS – Virtual Private LAN Service

- U-PE-rs and N-PE-rs are switching capable network provider edge routers

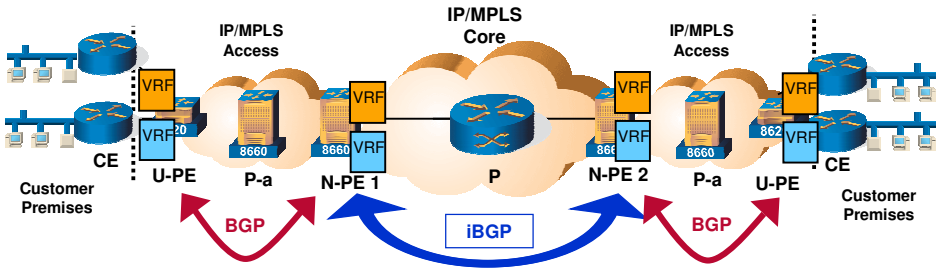


Router Roles in Distributed IP VPN Implementation

- N-PE Router
  - = Network Provider Edge
  - Edge of the core network (PE router)
  - Full IP/MPLS capability
- U-PE Router
  - = User-facing provider edge
  - Local exchange or POP (Point of Presence)
  - Full IP/MPLS capability
  - Also in customer premises
- P-a
  - IP/MPLS capable LSR in access network
  - No service end-points



Distributed IP VPN Implementation



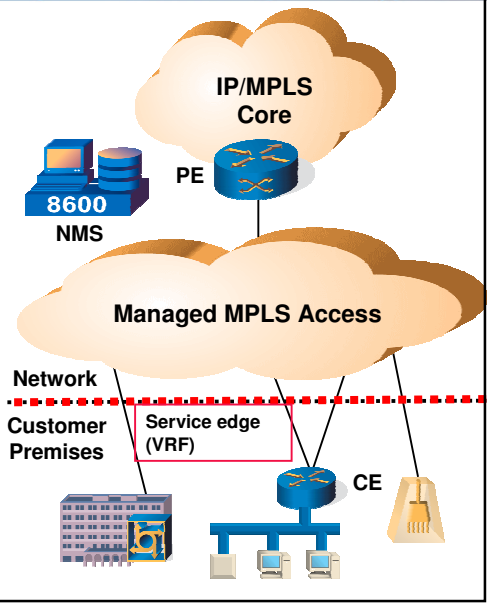
> Customer routing across core → BGP (Border Gateway Protocol)

> Customer routing across access → BGP for all customers in one BGP session

VRF = Virtual Routing and Forwarding (table)

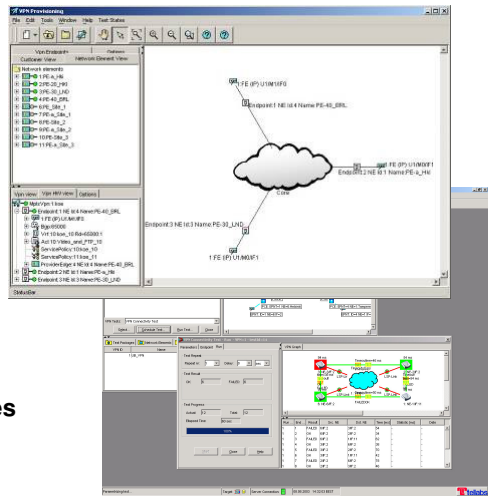
IP VPN Implementation with Tellabs 8600

> Tellabs 8600 Solution benefits
  > Hard quality of service in access
  > Network scalability
    > Routing
    > Operational efficiency
    > Cost-efficiency

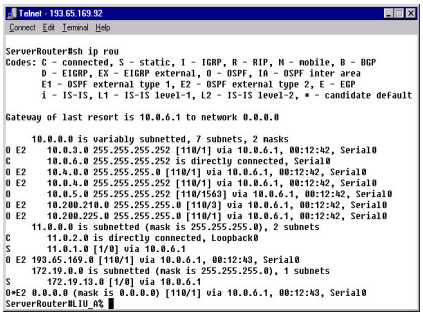


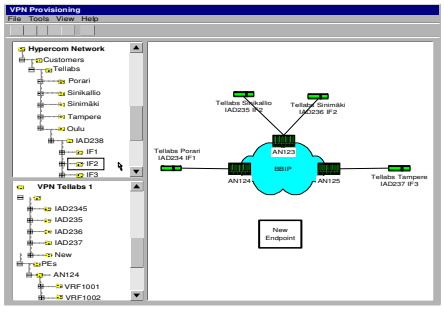
Tellabs 8600 - Easy and automated network and service management

- Main operational advantages
  - Point-and-click service provisioning
  - Automated VPN testing even with SLA (Service Level Agreement) parameters
  - Service level fault and performance monitoring
- Values
  - First time right
  - Fast service delivery
  - Proactive response to changes or faults
  - Automatic documentation of network configuration



Tellabs 8600 Managed Edge System User friendly management of service

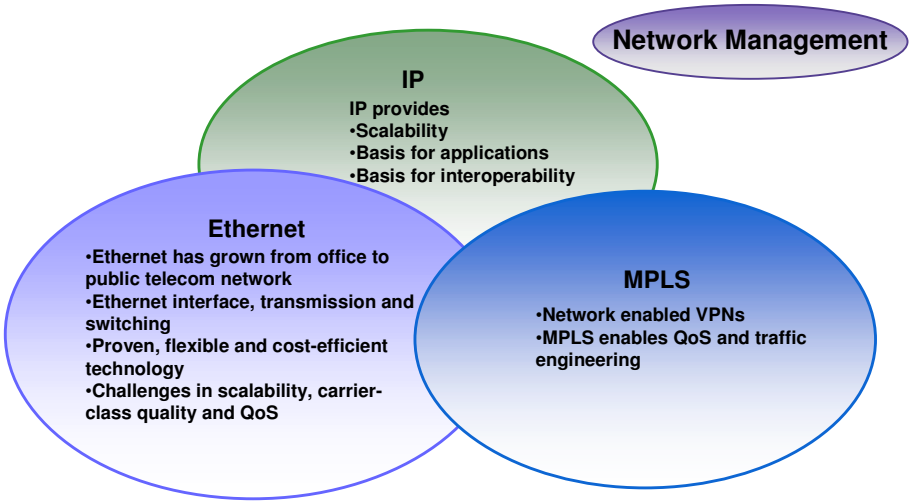




- Extensive use of CLI (Command line based)
- Management on element level
- Graphical and centralized network building
- Fully documented network

Easier and cost efficient way of building networks and services

Summary: IP, Ethernet and MPLS



Both IP and Ethernet have their roles

Our Vision

Deliver to customers technology that transforms the way the world communicates™.