



International Telecommunication Union

MPLS AS A BACKBONE NETWORK FOR BROADBAND WIRELESS ACCESS

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ITU-BDT Regional Seminal on Broadband wireless Access
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Outline of Presentation

- ✓ Background introduction
- ✓ MPLS architectural & functionality
- ✓ eMGW architectural & functionality
- ✓ Economic & social Benefit of bbwa
& Conclusion

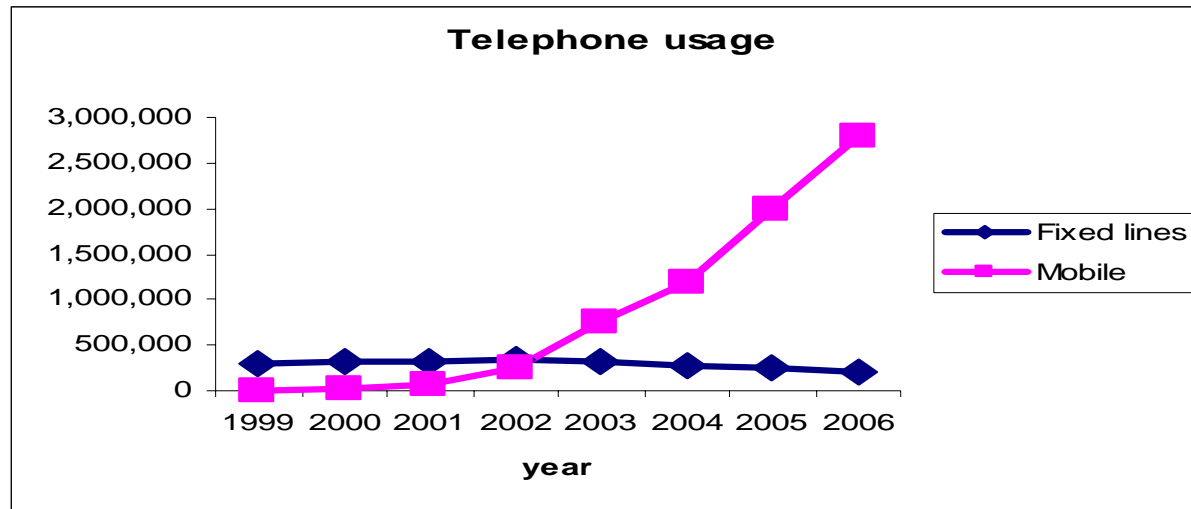
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Background introduction

- ❖ Competition between Mobile & Fixed lined Operators and the need to add value to the fixed line to be in business



- ❖ Introduction of Broadband services



Objectives of the Architecture and the Functionality of MPLS

- o To satisfy diverse VPN customer requirement taking into consideration that
- o Each customer has different security concern with a number of site at different location
- o Customers may be routing complex mission critical application with a defined traffic pattern and volumes
- o A service provider must therefore offer subscribers a portfolio that contains a number of different VPN service delivery models that can take care of the tradition VPN, Frame relay and ATM layer2 among others



The Basics of MPLS

- **MPLS stands for Multiple protocol label switching**
- **It could be defined as a mechanism that allows service providers to use their IP backbone to provide VPN services to their customers**
- **A VPN is a set of sites which share common routing information and whose connectivity is controlled by a collection of Policies**
- **The BGF element of MPLS is used to establish the virtual circuits and to forward VPN traffic across the backbone to remote VPN sites**

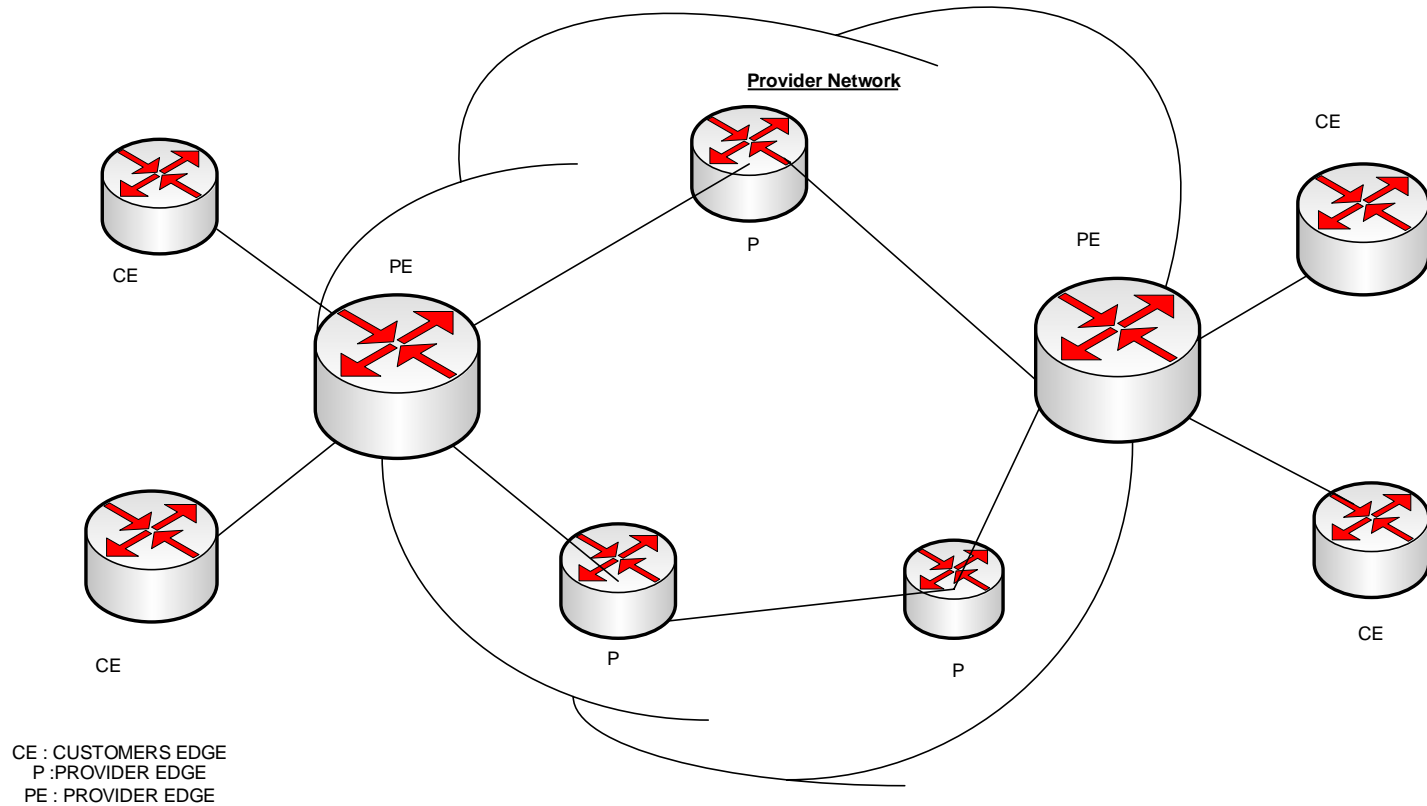


Primary objectives of the routing principles

- To make service very simple for customers to use even if they lack experience in IP routing
- To make the service scaleable and flexible to facilitate large scale deployment
- To allow the service provider to deliver a critical value added service that galvanizes customer loyalty.
- The main elements in MPLS network topology are;
- The customer's edge, Providers edge, Provider's routers and the virtual private network routing table.



MPLS NETWORK COMPONENT



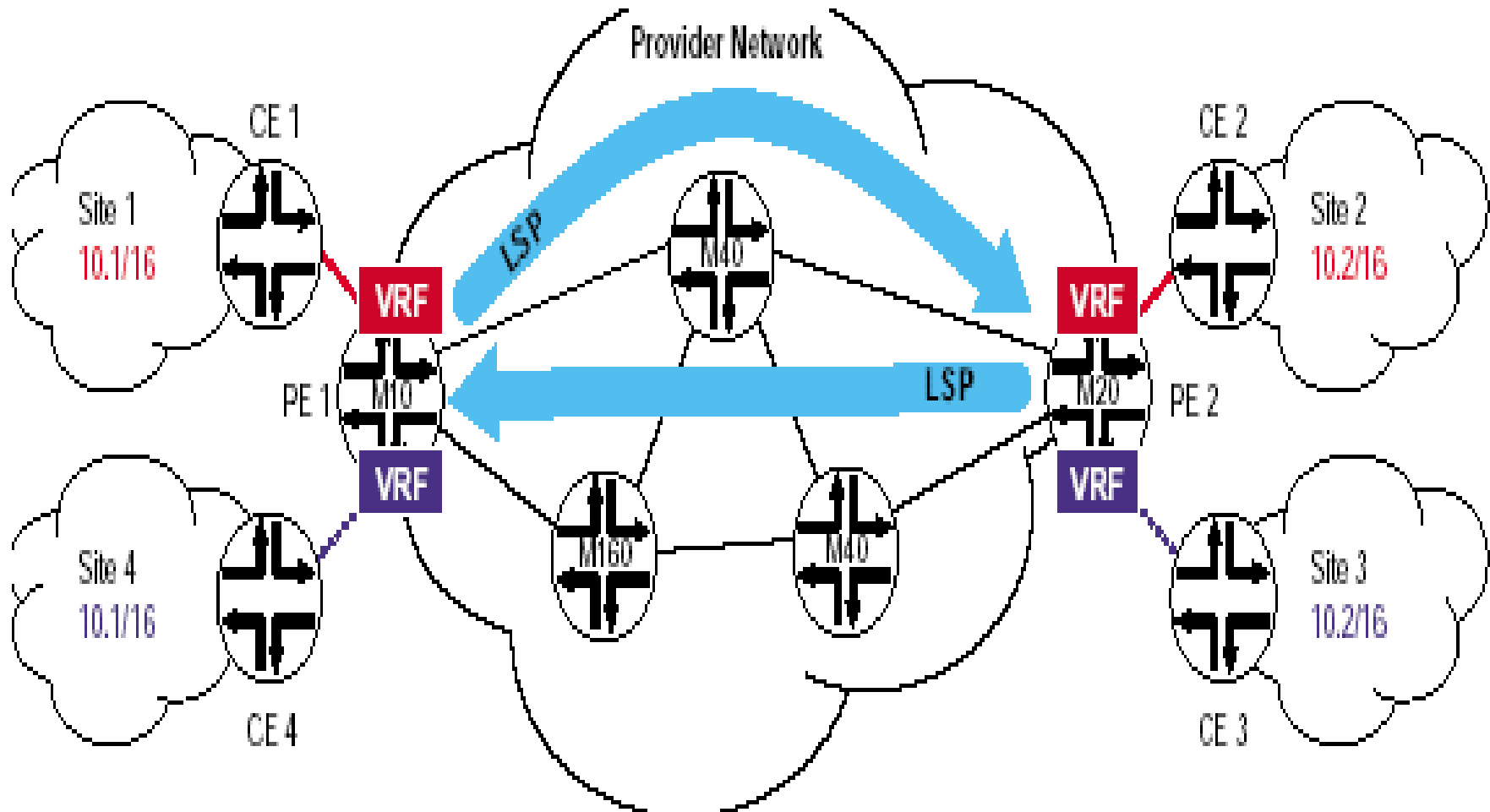


Data flow

- In order to use MPLS to forward VPN traffic across the providers backbone, LSP must be established between the providers Edge router that learns the route and the PE router that advertises the route.
- LSP could be established and maintained across the service provider's network using either LSP or RSVP
- To ensure multi vendor interoperability all PE and Providers routers are required to support LDP
- Routers use this label to make their forwarding decision
- The label is looked up in forward table which then determine the destination packet to be forward
- The label also determines new label to be used on outgoing packet



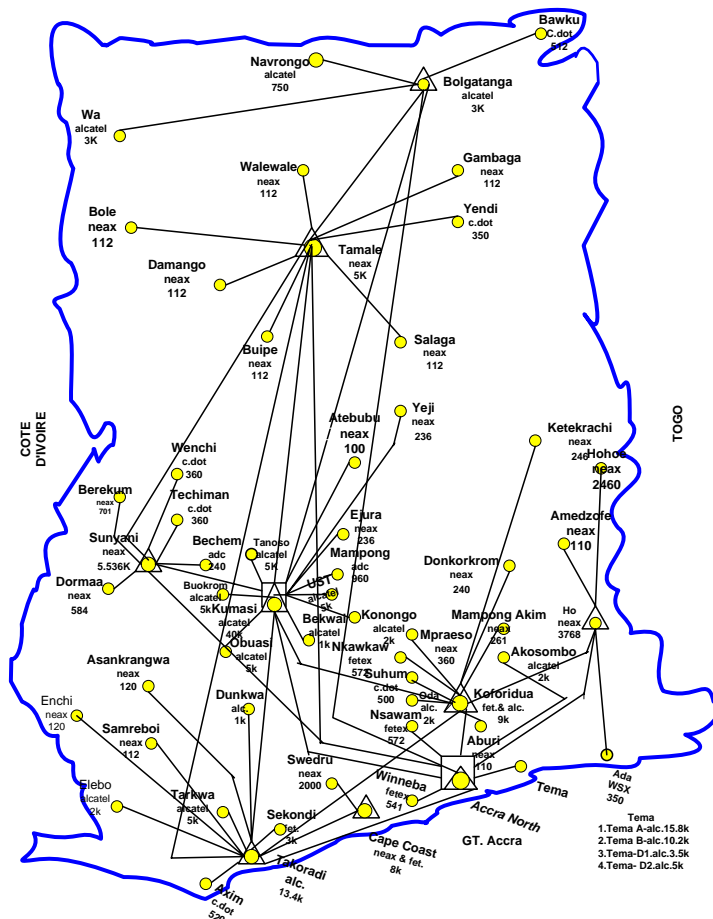
LSP ESTABLISHMENT



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Switches Countrywide



❖ The aim is to add broadband to all copper in all exchange area.

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Last mile using eMGW

- ❑ Emgw stands for enhance multi gain wireless
- ❑ The main elements of the eMGW are the
 - ❑ the base station controller, the base station Radio unit and the subscriber terminal unit.
- ❑ The main function of the Base station is to interface the switching equipment for the voice component of configuration
- ❑ It also links the 100 baseT for packet data to enable IMS proxy domain management
- ❑ The protocol used between the base station controller and the switch is V5.2



Basic Traffic calculations

- What is traffic ?
- Traffic could be defined as the product of the number of calls during a period of time and the their average holding times
- This could be expressed as;
- $A = S * Y / T$ where A is traffic;
- S is the calling rate ,Y is the holding time
- And T is the observation time normally one hour



Base station Radio unit

- Has an in built antenna
- Weather proof outdoor unit
- Remote power from the BSC
- The functionality include provision of radio coverage for the terminal unit
- Handles traffic of 8 channel of 64kps
- Or 16 channel 32kps
- Packet switch data up to a max of 510kps full duplex



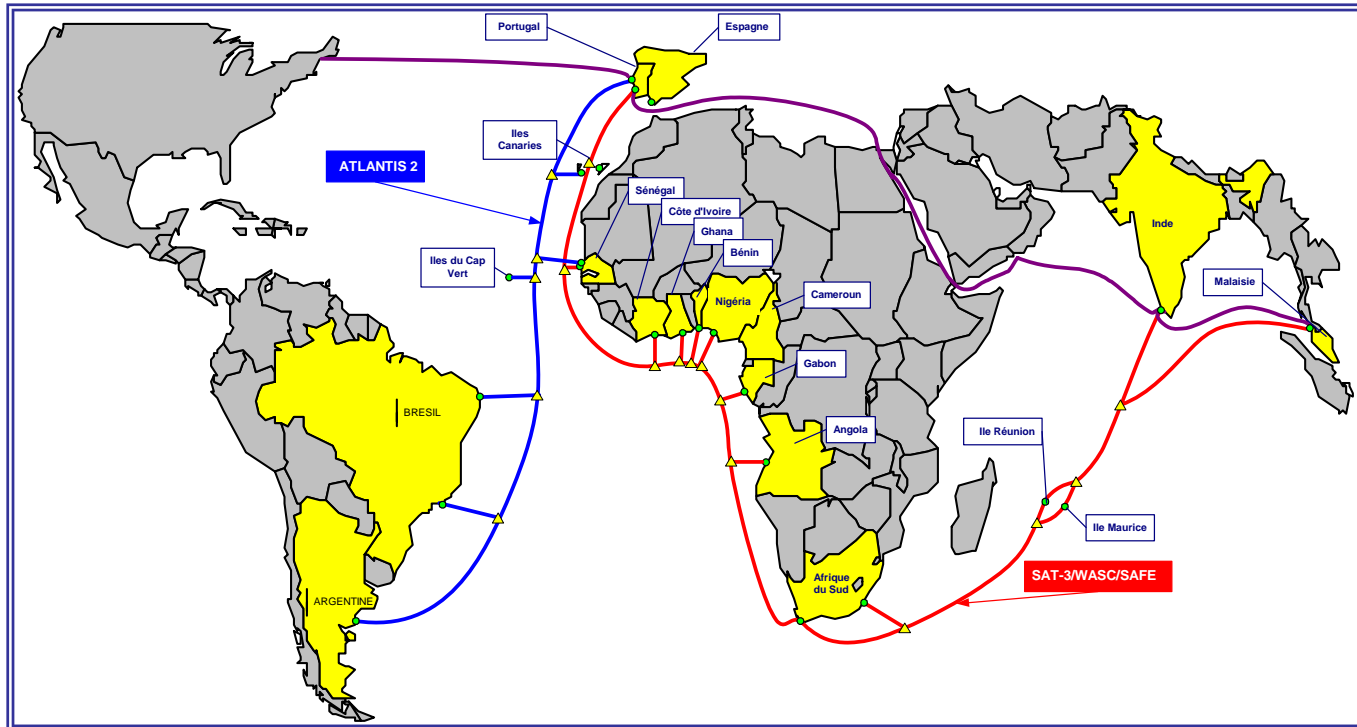
Site Dimension

No of bsrc	Traffic in Erlangs	Lines connected @0.07 erl
1	8.8	126
2	22	314
3	36.1	515
4	50.6	723
5	65.4	934
6	80.3	1147
8	110.6	1580

For example if the calling rate per cell site is 1000 calls per hour and the average holding time for each call is 90 s then by our definition traffic = $1000 * 90 / 3600$ which is 25erlang.



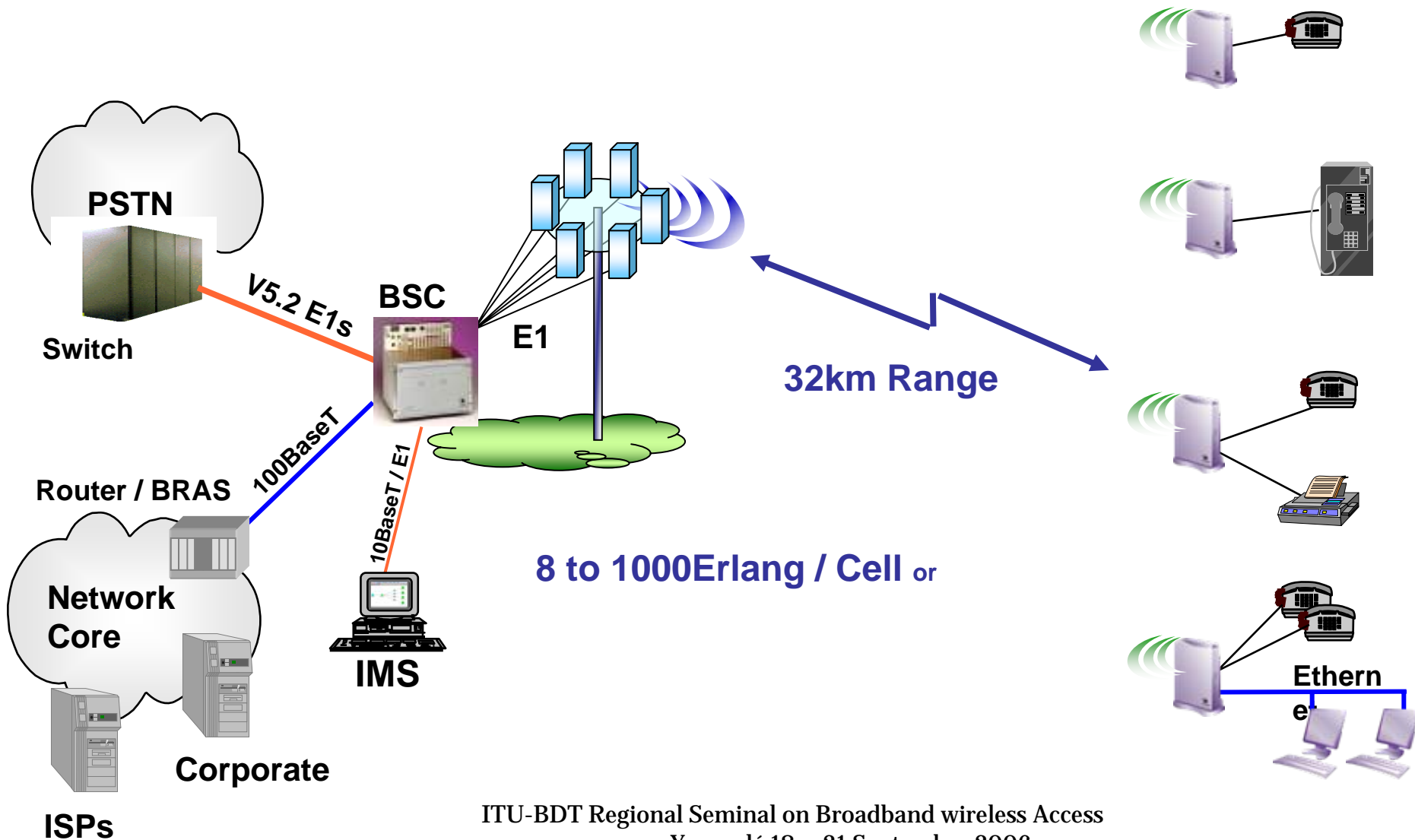
The International internet connectivity backbone



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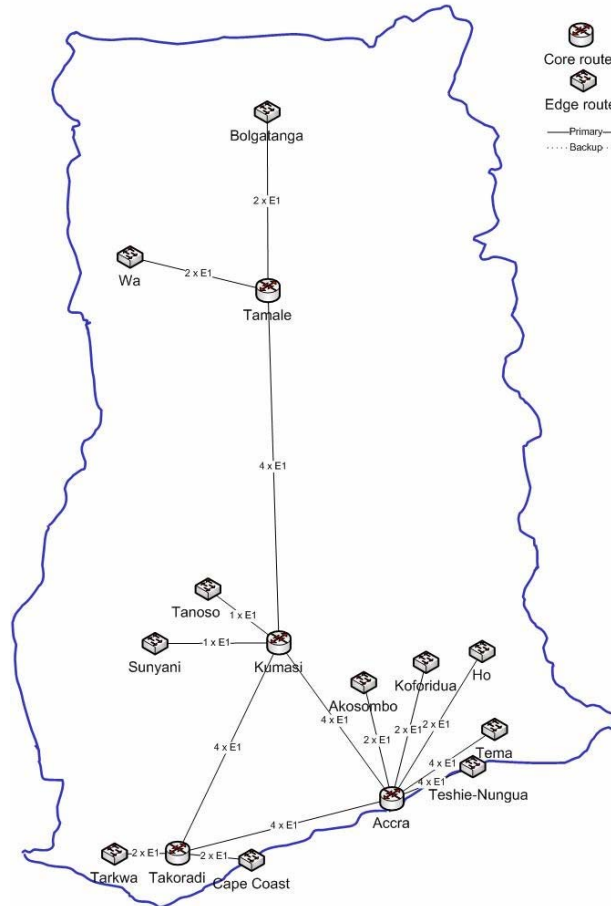


eMGW – System Setup





Current IP/MPLS Deployment



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Economic and Social Benefits Using MPLS

- The MPLS network could be used as back bone to serve a great number of customers
- Could be used to provide the traditional lease line.
- Is being used to network customers service point for various institution across the country
- Could be used to transport billing information to a centralized point
- Is being used to provided broadband services through out the country
- Encouraging entrepreneurship and job creation among the youth



Thanks for your attention !