



History of Internet in Bhutan

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APRICOT 2015
Fukuoka, Japan



History of Telecommunications Services

- Telecommunications services started in the country in 1963 as part of the the implementation of country first five year plan.
 - The first Step by Step exchange was inaugurated on 1st May 1965 at Phuentsholing.
- 3 separate networks were built and were not interconnected.
 - Western Bhutan linked the capital Thimphu to Phuentsholing,
 - Central Bhutan connected Trongsa to Gelephu,
 - Eastern net-work connected Trashigang to SamdrupJongkhar.
- The tele-communication exchanges were of electro-mechanical type known as Strowger system, using the long distance trunk physical lines, which were of the Open Wire Carrier System



History of Telecommunications Services

- ❑ In September 1993, the completion of the first phase of the National Telecommunications Development Plan (NTDP)
- ❑ In December 1993, phases two and three of the NTDP were completed
- ❑ In 1995 and 1996, the telecommunications services were expanded into more rural areas by using single channel VHF technology to connect more than 50 remote Basic Health Units and schools
- ❑ Phase 4 of the NTDP completed in 1997



Early Internet 1994

- ❑ 2400 bits second dial up services to ITU TIES (Telecommunication Information Exchange Service) in Geneva
- ❑ Gopher was the browser (there was no www) and PINE was the mail system (command based)
- ❑ This system was used to check in the ITU resources and also exchanges emails between ITU and its members
- ❑ International Telephony tariff was applied as it was a dial up services.

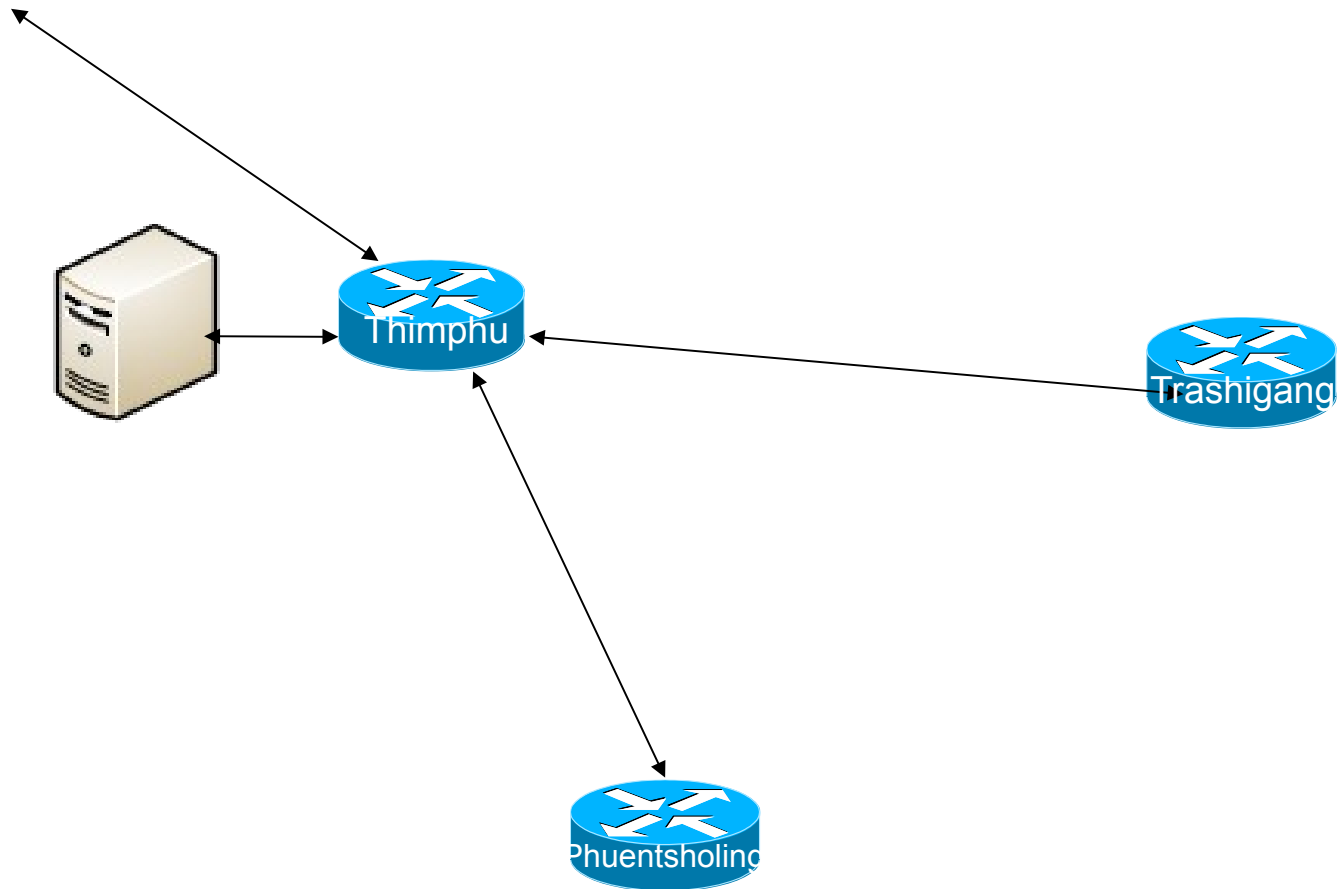


Intranet Project

- ❑ MOU signed between IDRC and MOC, RGOB in 1998.
- ❑ Total Grant CAD192,888.00 out of which recipient fund was CAD 46,310.00 and balance CAD167,170 was centrally administered fund.
- ❑ Objective of the Project was to build a National Intranet Infrastructure capable of providing Services like e-mail, FTP Database and Document access to subscriber with, in addition to International e-mail service.
- ❑ The project “Intranet” was funded by IDRC, Canada
- ❑ Division of Telecommunications, MoC was asked to implement the Intranet project.
- ❑ Data Unit, Project Division, DoT was entrusted the job.



Intranet Topology





Internet

- ❑ In April of 1999, Government issued an order to DoT MoC to make Internet available in the country by 2nd June 1999 giving DoT 3 months from start to finish.
- ❑ Project was funded by IDRC, UNDP/APDIP and RGoB.



APNIC Membership

- ❑ Required Internet resources, applied through fax to APNIC.
- ❑ Had to submit the application via email and we were setting up Internet; could not submit via fax.
- ❑ Managed to get a VSNL dial services in Calcutta, India and submitted the applications.
- ❑ 202.144.128.0/19 allotted to DrukNet/DoT from APNIC



Story of .bt

- Applied for .bt to IANA, .bt was already assigned to a Bhutanese (tour operator) and was operated by a firm in UK
 - Had to convince and transfer .bt legally to DoT, MoC on 20th May 1999.
- MoC then decided to let ITU operate .bt instead of BTNIC (operated by DoT)
- .bt transferred to BTNIC (BT) in 2006



Bhutan on the Net with Full IP (1999.06.09)

Countries:

Bhutan

Author:

sghuter@nsrc.org

Last Updated:

21-Oct-1999

```
Date: Tue, 11 June 1999 14:05:14 -0700 (PDT)
From: Steven G. Huter <sghuter@nsrc.org>
To: info-nets@rg.net
```

```
PING www.nic.bt (202.144.128.221): 56 data bytes
```

```
64 bytes from 202.144.128.221: icmp_seq=0 ttl=109 time=717.012 ms
64 bytes from 202.144.128.221: icmp_seq=1 ttl=109 time=715.914 ms
64 bytes from 202.144.128.221: icmp_seq=2 ttl=109 time=729.811 ms
64 bytes from 202.144.128.221: icmp_seq=3 ttl=109 time=714.909 ms
64 bytes from 202.144.128.221: icmp_seq=4 ttl=109 time=716.247 ms
64 bytes from 202.144.128.221: icmp_seq=5 ttl=109 time=714.459 ms
64 bytes from 202.144.128.221: icmp_seq=6 ttl=109 time=719.18 ms
```

```
^C
```

```
--- www.nic.bt ping statistics ---
```

```
8 packets transmitted, 7 packets received, 12% packet loss
round-trip min/avg/max = 714.459/718.218/729.811 ms
```

```
traceroute to www.nic.bt (202.144.128.221), 30 hops max, 40 byte packets
 1  cisco3-gw.uoregon.edu (128.223.32.1)  1.225 ms  1.174 ms  1.146 ms
```



Logo



DrukNet

- Palbheu or Endless Knot (one of the eight lucky signs (Trashi Ta Gye)
 - Nu.5000/- was the prize amount for the Logo
- New service under DoT and creating a brand of service under DoT (now BT)



Internet in Bhutan

- His Majesty's address to the nation on 2nd June 1999 at Changlingmithang Stadium, Thimphu, announced that the Bhutanese citizens can now avail Internet services
- “There are lots of good and bad information on the Internet and people should use judiciously”
- DrukNet services of DoT was officially inaugurated by Her Majesty Ashi Dorji Wangmo Wangchuck at the Royal Banquet Hall, Thimphu.



Foreword from Chairman, CCM, RGOB



དཔལ་ལྷན་འབྲུག་གཞི་རིམ་
ROYAL GOVERNMENT OF BHUTAN
THIMPHU



ཕུན་སེལ་གྲུབ་ཚོགས་ཀྱི་གཞི་རིམ་
Chairman of the Council of Ministers

FOREWORD

I would like to welcome you to Druknet, Bhutan's first Internet Service Provider. As we celebrate the 25th Anniversary of the Coronation of His Majesty the King, DrukNet is an attempt to provide to our people easy and convenient access to the exciting possibilities of the internet. His Majesty has always been deeply committed to the intellectual and cultural development of our society. DrukNet is, therefore, a fitting tribute to the glorious reign of His Majesty the King.

The opportunities presented by the internet are endless and should serve to bridge distances and forge understanding. The establishment of Druknet brings the world ever closer to Bhutan and is a truly historic event for a country which only less than four decades ago chose to emerge from its self-imposed isolation and embark on the process of socio-economic development. While the services provided by DrukNet will pose challenges to Bhutan as it continues to strive to maintain a balance between material and spiritual development, I am confident that the opportunities will far outweigh the disadvantages.

I wish you happy surfing on the net.

Tashi Delek !

(Jigmi Y. Thinley)



Bhutan Goes On-line: A Modern Folktale

- While Bhutan might have been cautious before adopting the Internet, once the decision was made the whole project was up and running in just three months.
- “When it did come, it came with a bang,” noted Sangey Tenzing, then Director of the Division of Telecommunications”

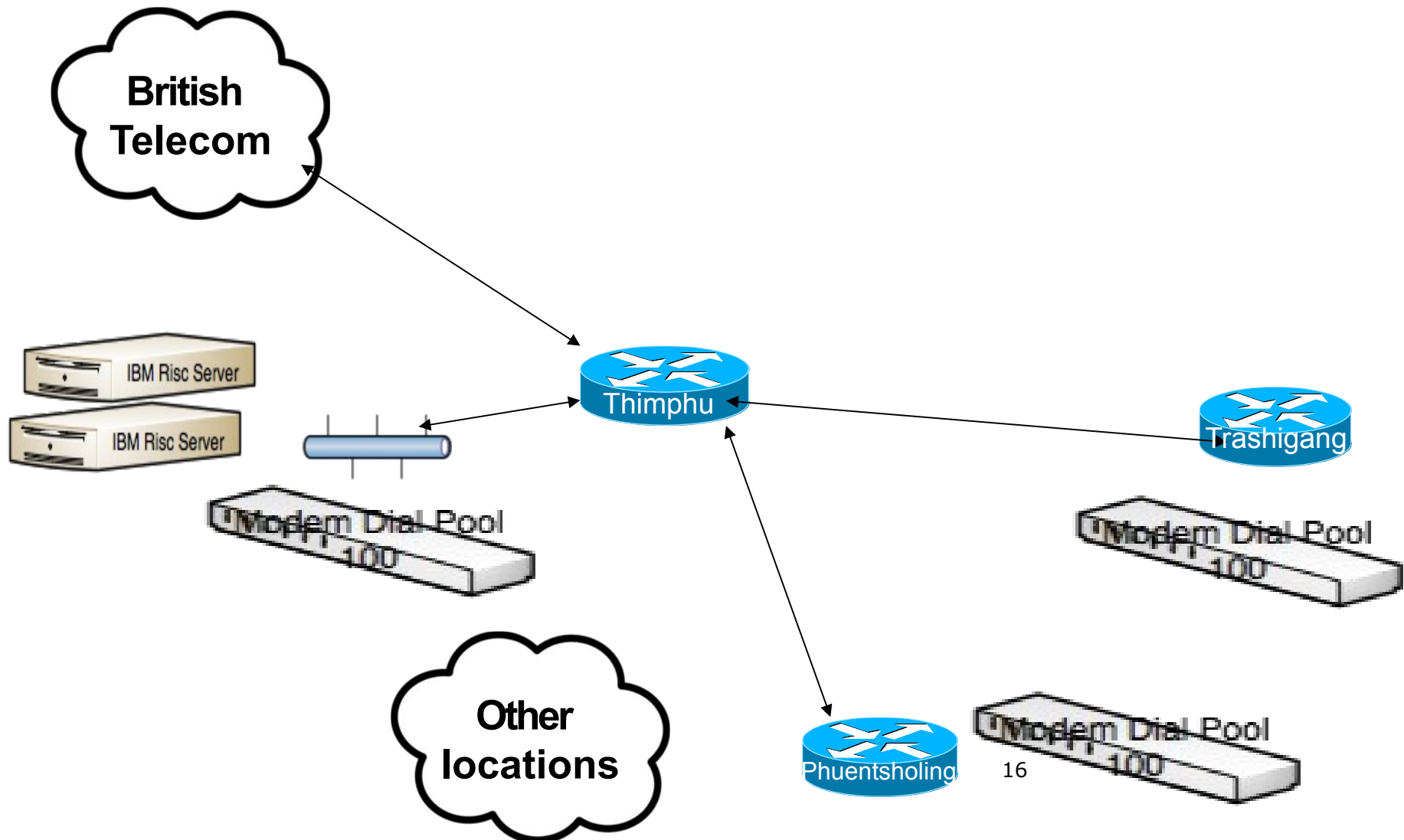


Bhutan Goes On-line: A Modern Folktale

- At the beginning, “the government was not suspicious about the Internet, [but] rather hesitant to get into something they didn't know anything about,” adds Thinley Dorji, the PAN-Bhutan Project Leader and Joint-Director of the Division of Telecommunications.
- “It sounded like too much of an unknown. Everyone was talking about it, the world was talking about it, but not many people knew much about it,” he says.
- “But now that we have it, we have to see that people use it and benefit from it. If people don't benefit from it I think it's just a white elephant — just a whole lot of computers strung together.”



Internet Topology in 1999



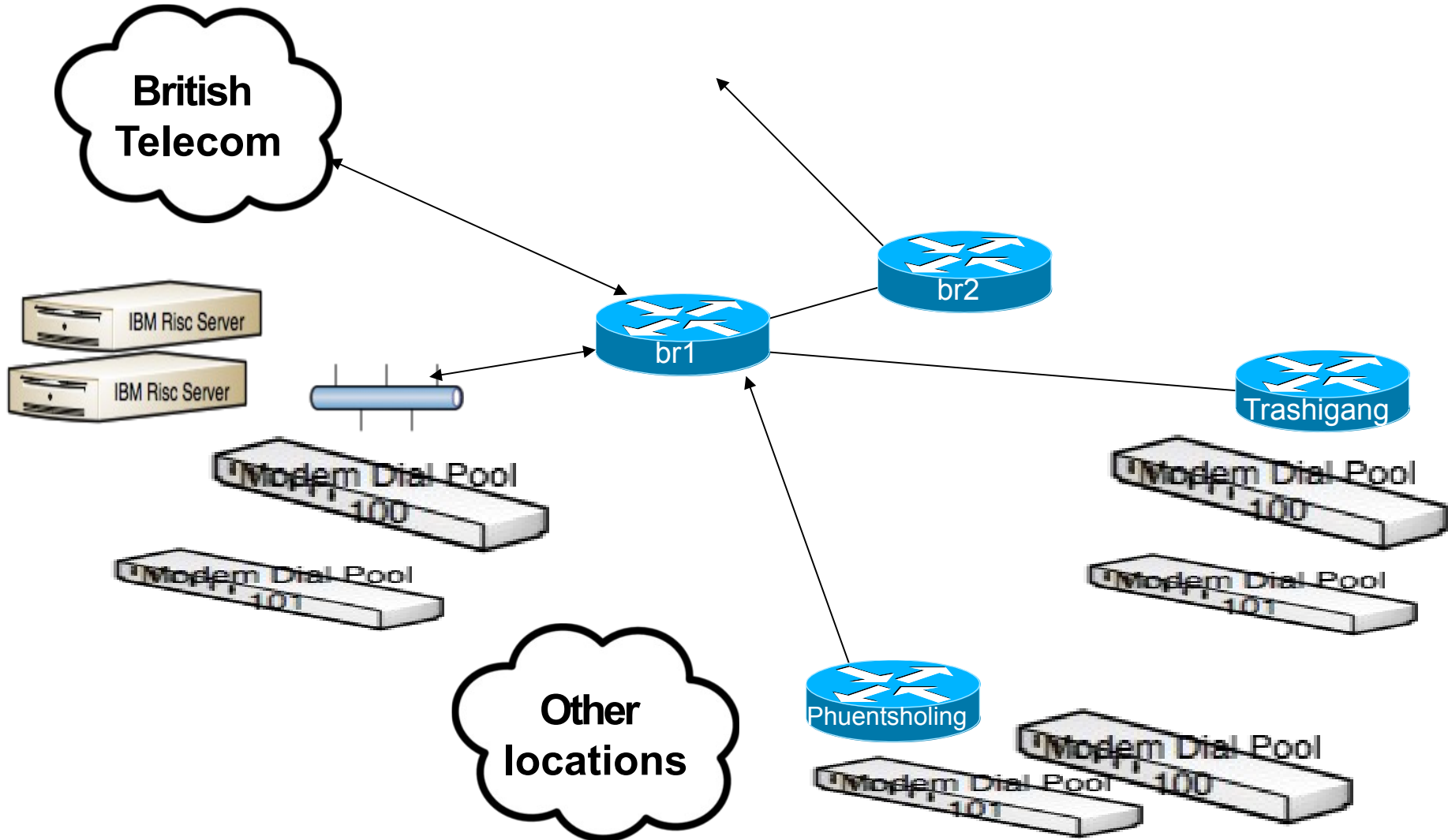


Thimphu PoP





Internet Topology in 2002





Early Internet Services

- Dial Up services (33.6Kbps)
 - 1999: Nu.2.50
 - 2006: Nu.0.43 to as low as Nu.0.17
- Lease Lines (Dedicated Circuits) 64 Kbits/s per month
 - 1999: Nu. 50,000/-
- Web Hosting
- Online Services



Internet to Schools

- To encourage Internet usage in schools, BT had taken many initiatives
 1. Free dial up access during weekends.
 2. Discounted Lease Line Tariff
 3. Provided Free laptops and Internet access to some very remote schools.



Early Online Services

DrukNet

[About Us](#)
[Contact Us](#)

DrukNet Accounts

[Online Usage](#)
[Webmail](#)
[Web Hosts](#)
[Newsletter](#)
[DrukNet Site Stats](#)

Visitor Services

[Bhutanese Music](#)
[Bhutanese Chat](#)
[E-Cards](#)
[Net-pals](#)
[Classifieds/Personal](#)
[Yellow Pages](#)

Forums

[The Great Debate](#)
[Bhutanese Abroad](#)
[Self Serve FAQ](#)
[FAQ on Bhutan](#)
[Discuss IT](#)
[Disclaimer](#)

Personal Home

[Register Homepage](#)
[Edit Homepage](#)
[Homepages](#)
[Info Newsletter](#)

Calendar

[Water Horse Year](#)

Coming Links

[Polls](#)
[Maintenance](#)
[What's New](#)
[Downloads](#)
[Leisure](#)

Tashi Delek!



Awareness Workshops

- ❑ Since Internet was new services, DoT had to spent lots of resources to ensure our customers were trained on the use of Internet and IT in general.
- ❑ DrukNet, Dept of Telecom with Royal Institute of Management conducted various Basics Internet, Web Designing training and also on how to use e-mail and Internet at RIM, Semtokha.
- ❑ DrukNet, Bhutan Telecom on its own conducted 3 days (2 sessions a day) basic hands on Training on basic use of e-mail and Internet.



Awareness Workshops

- DrukNet, Bhutan Telecom conducted 1 day practical hands training on Basic email and Internet Browsing to 20 Dzongdags (District Governors) who were in the capital to attend the National Assembly (Parliament)



Awareness Workshops

- ❑ Internet Access Project (Jointly funded by BT and UNDP held at Multipurpose community Center) at BT Office in Bumthang
 - Project Duration: 6 Months Project
- ❑ Target audience :
 - Drop out students, farmers, students, teacher, civil servants and members of business community.
- ❑ Subject Covered:
 - Windows 95/98 and Microsoft word, Excel and Configuring and basic trouble shooting of e-mail and Internet.
- ❑ Total people Trained: 422
- ❑ Total Usages: 273,538 minutes of Internet and e-mail



Impact of Internet

□Tele Medicine

- Funded By ITU,
- Location: Bumthang Hospital, Central Bhutan

□Services:

- Digitized X-ray could be send to Thimphu General Hospital to be reviewed by Radiologist
- Full X-ray (digitized) about 1.2 MB of size could be transmitted in less than 10 Minutes. The compressed X-ray was transmitted in about 1 minute with the quality being compromised.



Challenges Faced

- ❑ International Connectivity was on satellite and
- ❑ High Cost of Satellite Links + Per Mbps
- ❑ Lack of Local content
- ❑ Lack of skilled manpower.
- ❑ Nascent Internet users



Early Benefit of Internet

- ❑ Multi purpose Community Telecenter
- ❑ Established by BT at Bumthang town in 2000
- ❑ Services:
 1. Internet access (3 PCs) through lease line
 2. Fax Services
 3. Photocopy services
 4. Phone services



Early Complaints

- ❑ Proxy: 2nd June 1999 – 31st July 2002
 - 202.144.128.36 proxy.druknet.bt
 - X-Stop box whereby filters were updated on a daily basis from the company basically to filter pornography websites.
- ❑ Internet Services were down in the country whenever British Telecom carried out planned maintenance.
- ❑ Night users used to complain when we carried out maintenance during late night as they subscribed to night user packages



Early Complaints

- ❑ Password leakage complains
 - Major online campaigns were carried out on how to protect the dial up password.
 - An agency had a dial up bill of Nu.250,000.00 a month and after changing the password dropped to Nu.40,000.00 a month
- ❑ User playing around the configuration and deleting and asking for support
- ❑ A customer once wrote to BT stating that his computer had crashed after configuring for his dial up services and asking for a replacement.



Online Forum Complaints

Author: nonotmailnet
Date: 05-11-02 06:36

Hi Jichen Thinley and others,

I have been trying to solve this particular problem of accessing Hotmail through the http mail protocol using OE6 for a really long time now, and have looked at all the MS support stuff, the newsgroups and the MS Knowledge base. Looks like Shane has done the same and have come up with similar solutions, but none of them work. It is evident, as Sridhar and CybyDude say, that the problems are due to the proxy server setting in Druknet. More specifically, according to the MS Knowledge Base articles, some proxy servers do not support webDAV extensions -->

quoting MS Knowlege Base Article Q259133

CAUSE

Your local area network (LAN) or Internet service provider (ISP) proxy server or firewall does not recognize Web Distributed Authoring and Versioning (WebDAV) extensions. This prevents Hypertext Transfer Protocol (HTTP) e-mail messages from working correctly.

WORKAROUND

If you have manually configured your browser to use proxies, and you can still access the Web with proxy servers disabled, you may be able to exclude the HTTP mail servers from your proxy configuration.

However, if we use the 'workaround', and disable the proxy server, or add hotmail.com and msn.com to the list of addresses that should bypass the proxy server, then the problem is still not resolved and additionally, we cannot access the web through the browser or in the 2nd case we cannot access hotmail.com or msn.com through our browsers.

I was very interested and relieved to know that you are not having any problems using your OE to view Hotmail. Since you do seem to be from the staff at Druknet, I was curious to see if the settings of the computer that you used to check the hotmail is the same as the rest of the users who are having trouble. More specifically, do you also have to go through the proxy server or is that machine able to surf the web without going thru "proxy.druknet.net.bt" ? This would be enlightening to us I guess. And if your Hotmail did work through OE, then I guess it should do so for the other users in Bhutan and so we keep our hopes.

Hope you techies there at Druknet can figure out the problem and help a vast number of users who'd love the solution!!

Thanks

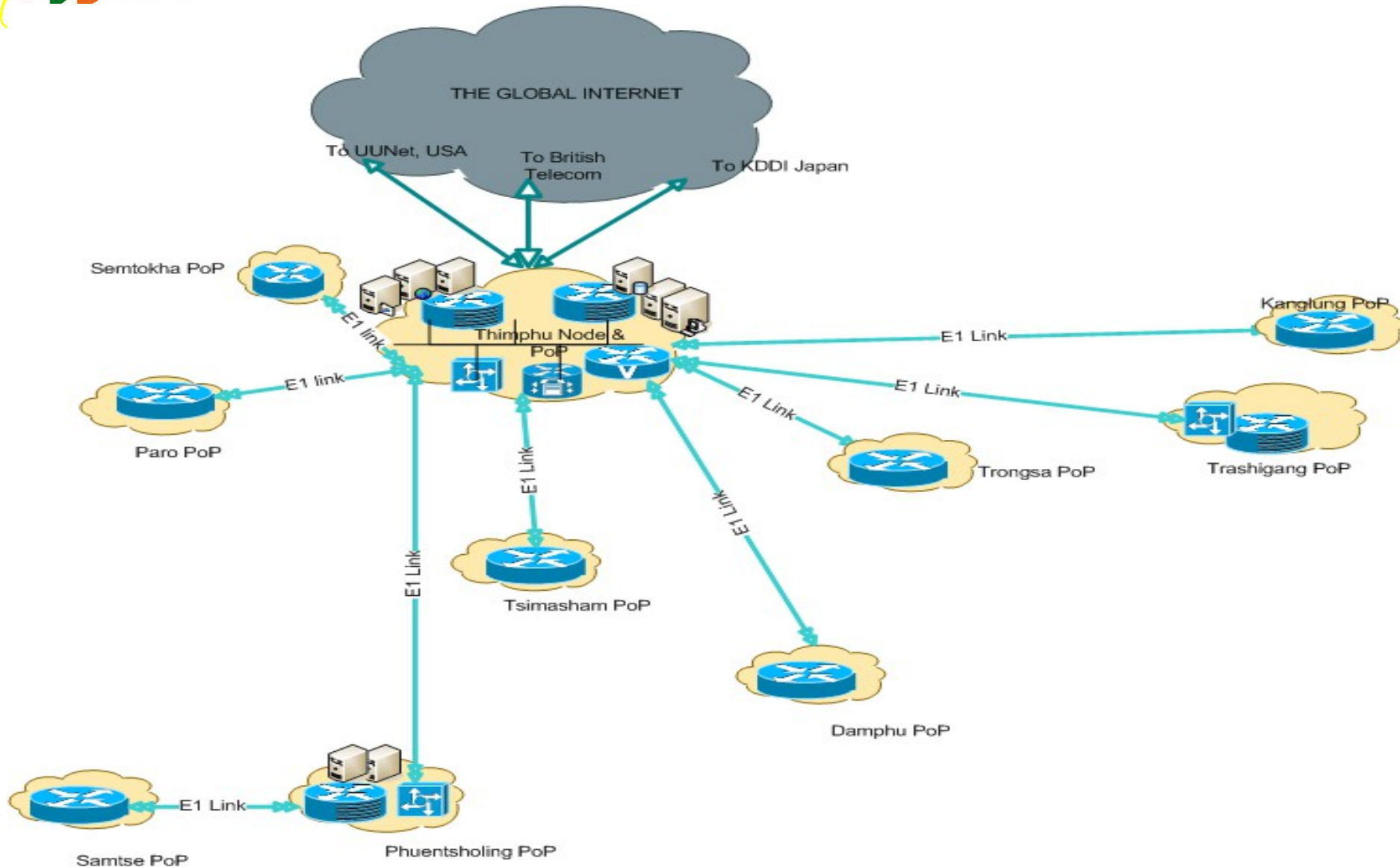


Early Popular Online Services

- ❑ The Great Debate/ Discussion forum
 - BT started online discussion forum whereby netizens could post their views and comments
 - Very successful and was later withdrawn and that gave birth to today's Kuensel online forum.
- ❑ Chat Services
 - DrukNet Chat Services was one of the popular services among internet users



Internet Topology 2007





Thimphu PoP 2007





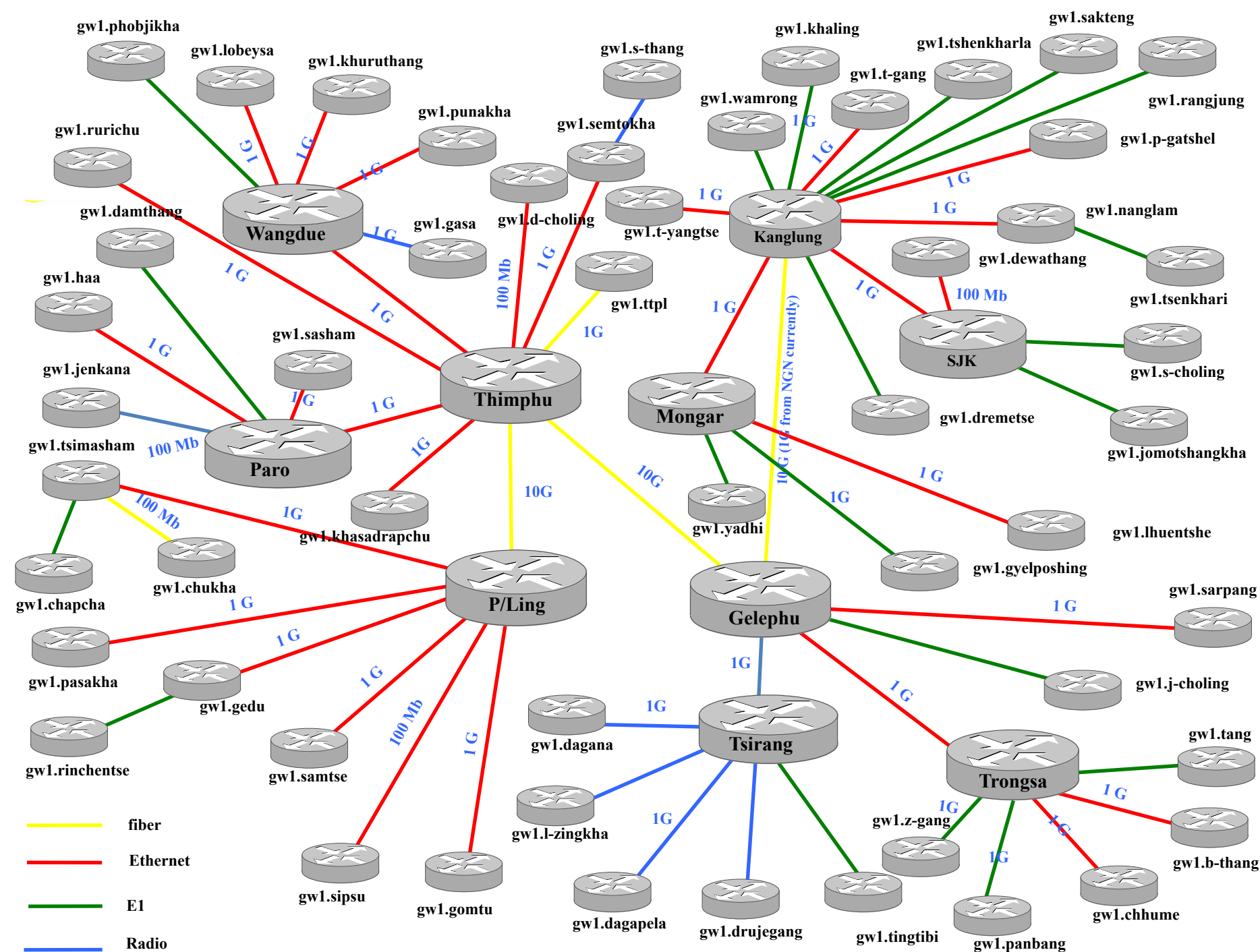
Competition on Internet Services

- ❑ Private ISPs were licensed and were operating from Thimphu.
- ❑ BT was promoting for an IX whereby local traffic remains local
- ❑ ADB came out with a SASEC Project whereby a regional IX will be setup at Siliguri, India and all the IX from Bhutan, Bangladesh, Nepal and India would exchange traffic.
 - Plan was to have a Fibre directly out to subsea access.
 - Many discussions took place since 2005 and it is still a work in progress



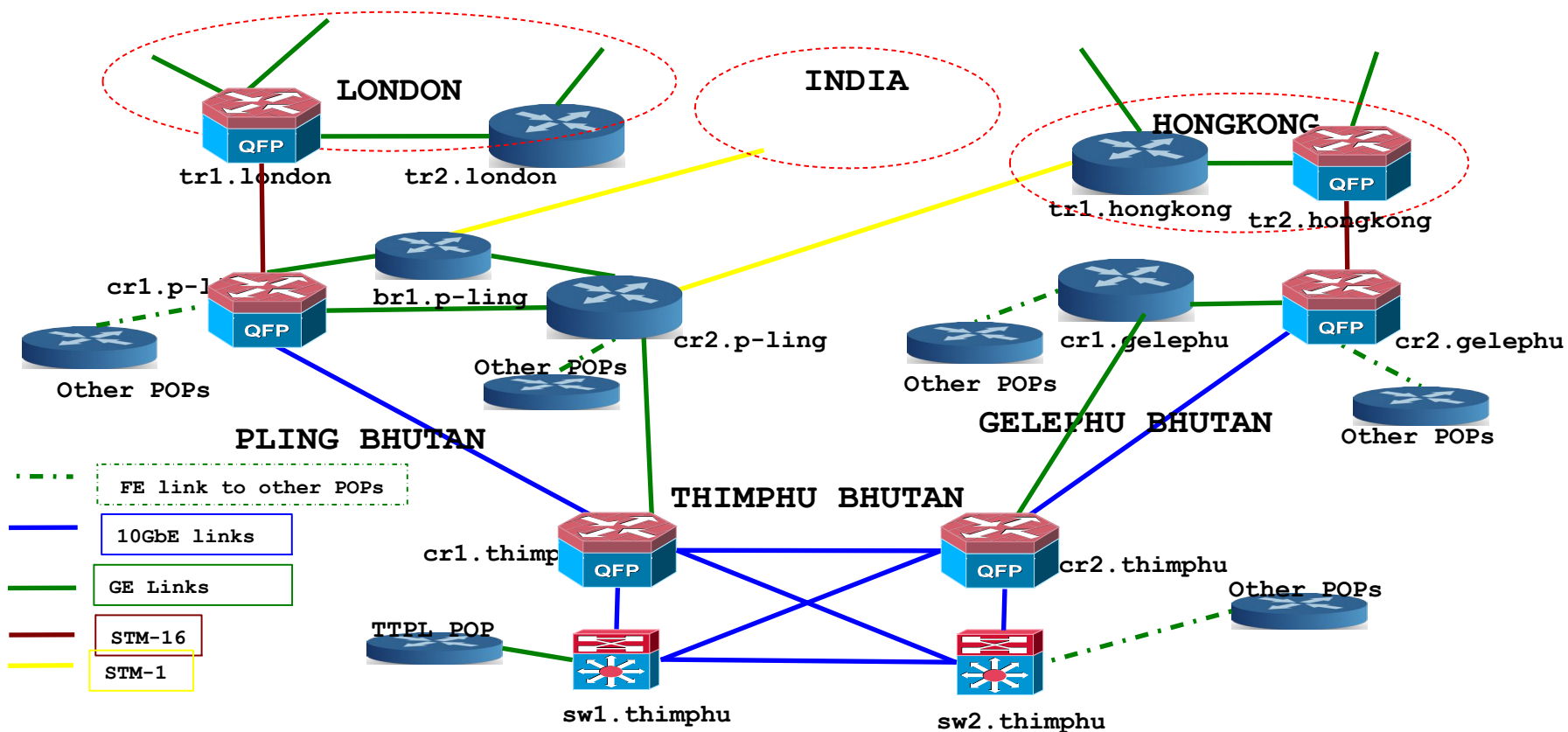
Satellite to Fibre

- BT had its first Internet access to Fibre in December 2007 with a bandwidth of DS3
 - Today this is 2.5Gps
- A PoP was established at LINX (London Internet exchange) for IP transit and peering
 - Transit from AboveNet
- A second PoP was established at Hong Kong with a bandwidth of 155Mbps
 - Today this is 2.5Gbps
 - Peering at HKIX and IP transit from NTT





Network Today





Last Mile Network

- For better last mile service delivery, following are being deployed extensively
- FTTH
 - As a trial to 30 Homes and has not taken off very well and mainly due to the cost of CPE
- FTTB
 - Deployed extensively in Thimphu
- FTTC
 - Deployed in other districts mainly to replace the Copper cables (primary side)



BT Data Center

- ❑ Located in Phuentsholing
- ❑ Tier III (concurrently maintainable)
- ❑ Inaugurated on 11th February 2015, by Prime Minister of Bhutan
- ❑ With the development of Internet in the country for last 15 years, BT Data Center will be providing Rack space and Cloud services trying to meet the demands of the Nation and beyond geographical boundaries of Bhutan.



Thank You