

DrukREN

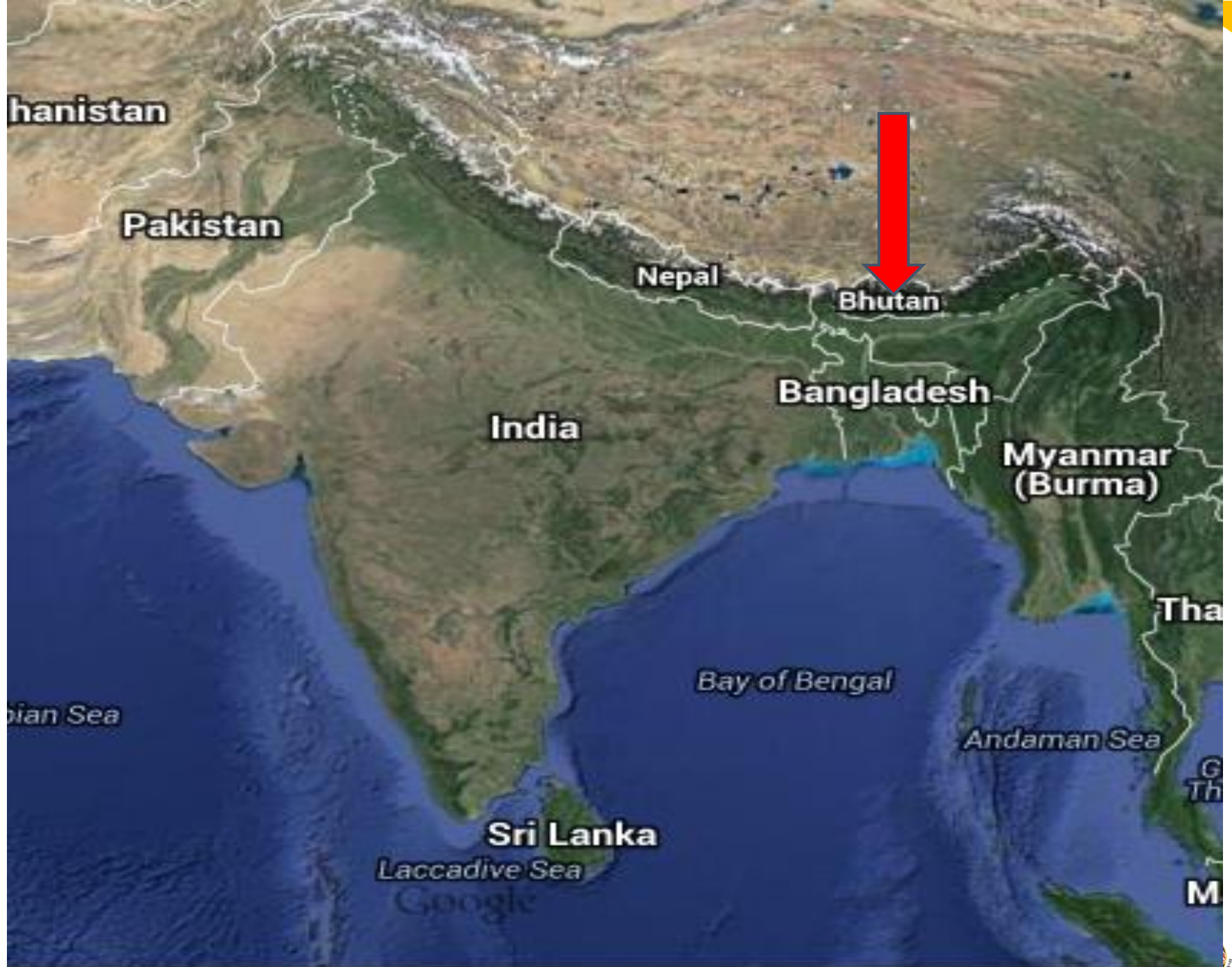
The Research and Education Network for Bhutan

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Overview

- Background: Bhutan
- ICT Initiatives in Bhutan: Bhutan-India Friendship
- NKN & Bhutan
- DrukREN Design
- Status
- High level design of DrukREN
 - Funding Model
 - Operational Model



Bhutan

- **Development Philosophy:** Gross National Happiness
- **Geography:** a mountainous country in the Himalayas
 - Total land mass: 38,394 sq km
 - 70% covered in forest
- **Population:** 0.7 million
 - >50% are youth

ICT Vision of RGOB

“To promote a green and self reliant economy sustained by an IT enabled knowledge society guided by the philosophy of Gross National Happiness”

ICT vision of RGoB: “An ICT enabled, Knowledge Society as a Foundation for Gross National Happiness”

ICT Initiatives in Bhutan: Bhutan-India Friendship

- National Broadband Master Plan Implementation Project
- Government Data Center
- Government Intranet
- DrukREN Project

NKN & Bhutan

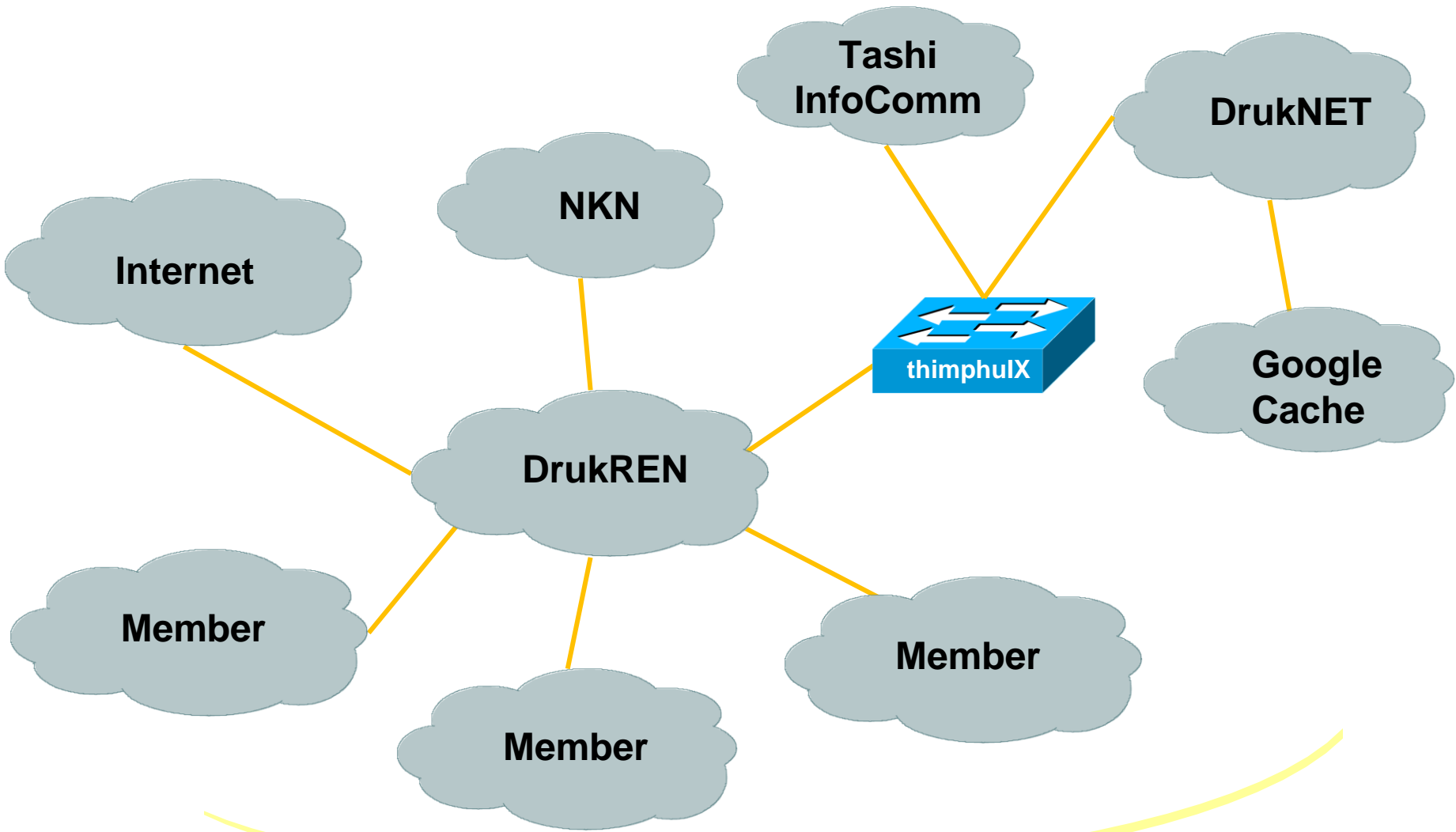
- MoU Signed between GoI & RGoB in 2009 for the development of ICT Sector in Bhutan
 - 1st Steering Committee Meeting for the Development of ICT in Bhutan 2010: Discussed on the DrukREN
- Bhutan to connect to NKN: NKN to waive off cost to connect DrukREN to NKN
- 1 gbps bandwidth

DrukREN Members

- Bhutan's National Research and Education Networks will connect:
 - Universities: Royal University of Bhutan & University of Medical Sciences of Bhutan
 - Colleges
 - Hospitals
- In the pipeline:
 - Tertiary & Further Education Institutes
 - Research Institutions
 - Schools
 - Museums
- To provide a dedicated high performance network infrastructure to a closed user group

DrukREN Design

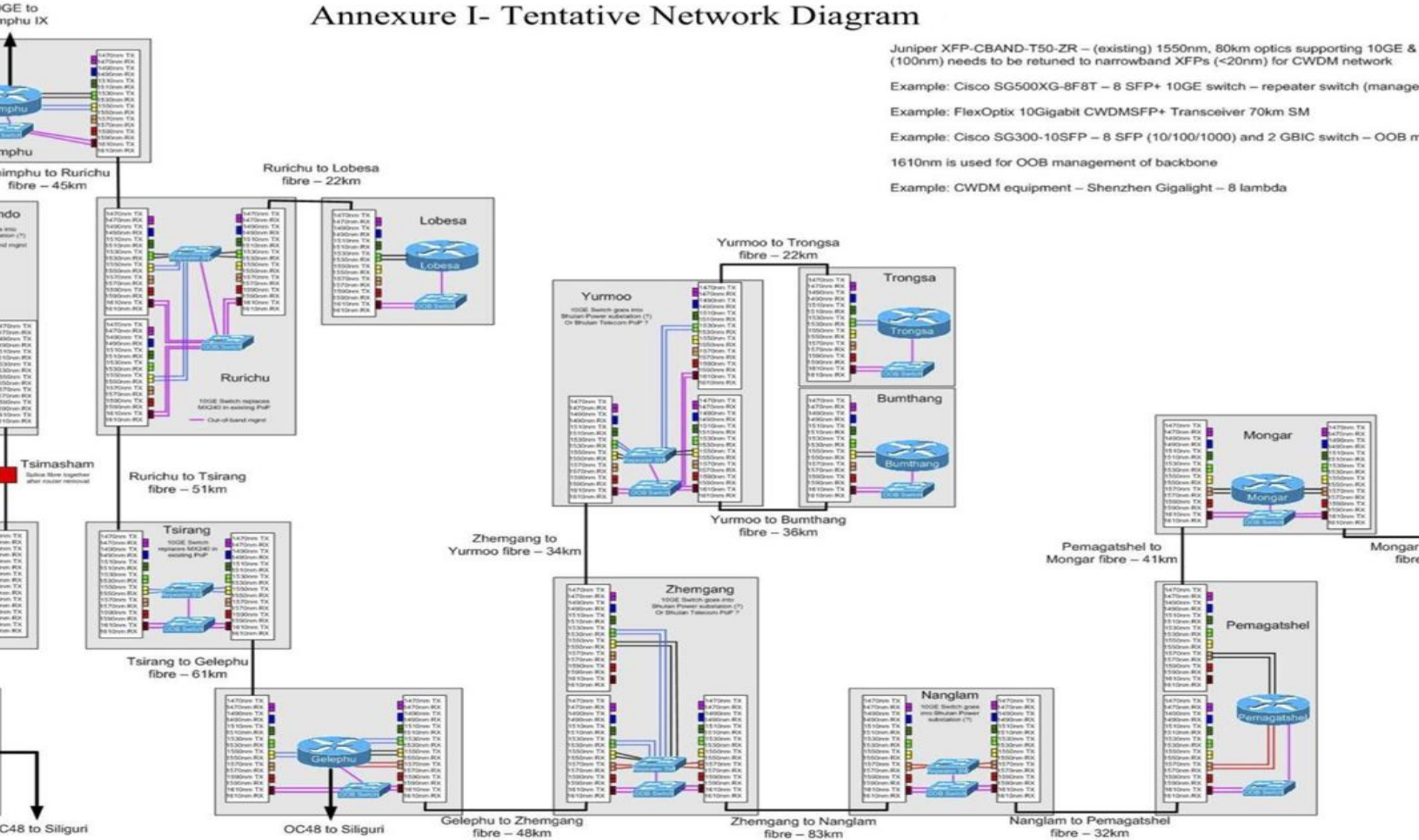
- Design: REN provides all Internet connectivity
 - The REN is the ISP (non-commercial)
 - And the REN provides the peering network
- Designed like an ISP
 - Same concept of Points of Presence
 - Routers, routing protocols, peering relationships
- Operated like an ISP
 - Executive management team from the membership
 - Small technical team to operate and grow the infrastructure



DrukREN Infrastructure

- Make use of National Fibre Network
- SASEC RN will have one pair of BSNL Fiber from Border Towns of Bhutan to Siliguri SASEC NOC
- Fibre backbone network
 - Operating at 10Gbps
 - Each participant connects to it
 - last mile connectivity from NFN termination to participant premises
 - Leveraging existing ISP infrastructure: 9 Colleges Already connected by Fiber
 - Extend fibre from NFN for hospitals

Annexure I- Tentative Network Diagram



DrukREN Status - where are we?

- DrukREN Network Designed
- Contract Awarded
- Connectivity to NKN
- Thimphu IXP: ISPs on board
- Campus Network Workshop organized in September. Funded by TEIN*CC

DrukREN Funding

- Operated on cost recovery basis
 - National REN is not-for-profit
 - Funding is used to grow the infrastructure
- Funding:
 - To build REN
 - Community/Stakeholder Ownership
 - To operate REN
 - Minimalist staffing Model
 - Costing Model
 - Tiered Bandwidth charge: Long Term Goal - To have enough to operate on its own

DrukREN Challenges

- Sustainable Business Model
- Fiber Connectivity from Bhutan to Siliguri NOC

Thank You

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