

The Story of btIX - History & Experiences



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Disclaimer

While the facts are facts, the views and experiences shared in the following slides are my own. Nothing expressed herein should be construed as views or opinions of the btIX community or the organization I work for.

●●● Internet in Bhutan: Timeline & Service Providers

DrukNet (Dept of Telecom), First ISP in Bhutan, June 1999

A 256 Kbps Satellite Link to UK (BT)

v.33 and V.34 modem days - v.90 was a luxury



Photo Courtesy: PFS Archives

●●● Internet in Bhutan: Timeline & Service Providers

First ISP Established by
Dept of Telecom, RGOB
Nationwide Coverage



1999

Another Private ISP
Limited Service Area
(No Longer in Business)



2005

Latest Entrant
Expanding to provide
Nationwide Coverage



2017



First Licensed
Private ISP
Limited Coverage



Private Telecom Operator
Mobile and Internet Services
Nationwide Coverage

●●● Internet in Bhutan: Other Network Players

Resellers (Datanet, Supernet, Bitcom) - Limited Service Areas

Other Network Operators

DrukREN



Internet in Bhutan: Current Market Profile



Population

735,553 *(PHCB, 2017)*

Bhutanese: 681,720



Telecom Operators

2 (Fixed - 1, MNO -2)



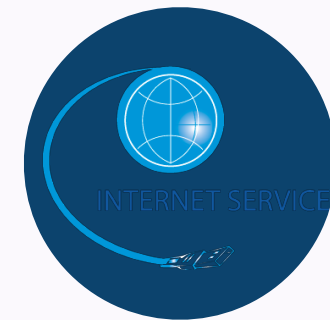
ISPs

8 *(BICMA, Sept 2018)*



International POIs

3 (Terrestrial)



Int'l IP Capacity

30 Gbps (As of Dec 2018)



International Providers

2 (TCL, Airtel)



Fixed Broadband

15,719 *(BICMA, Sept 2018)*



Leased Line Users

1,478 *(BICMA, Sept 2018)*

●●● Internet in Bhutan: Current Market Profile



Cellular Mobile
705,677 *(BICMA, Sept 2018)*



4G Connections
162,558 *(BICMA, Sept 2018)*



Smart Phones
77% *(TashiCell, Oct 2018)*



4G Capable Devices
65% *(TashiCell, Oct 2018)*



Mobile Broadband
602,719 *(BICMA, Sept 2018)*

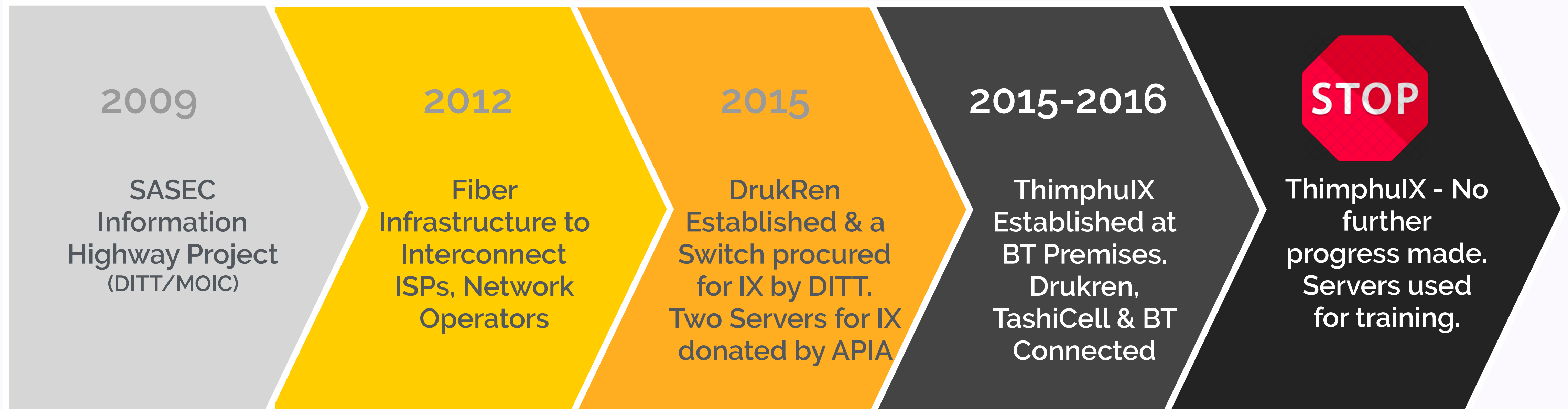


MBB Data
82% *(TashiCell, Oct 2018)*

●●● btIX History: The Need of an IX

- Challenges with Local Peering
- Increasing Local Content (e-Services, Apps)
- New Entrants in the market (GovNet, DrukRen, Nano)
- Local CDNs Caching Solution Vs. Traffic volumes

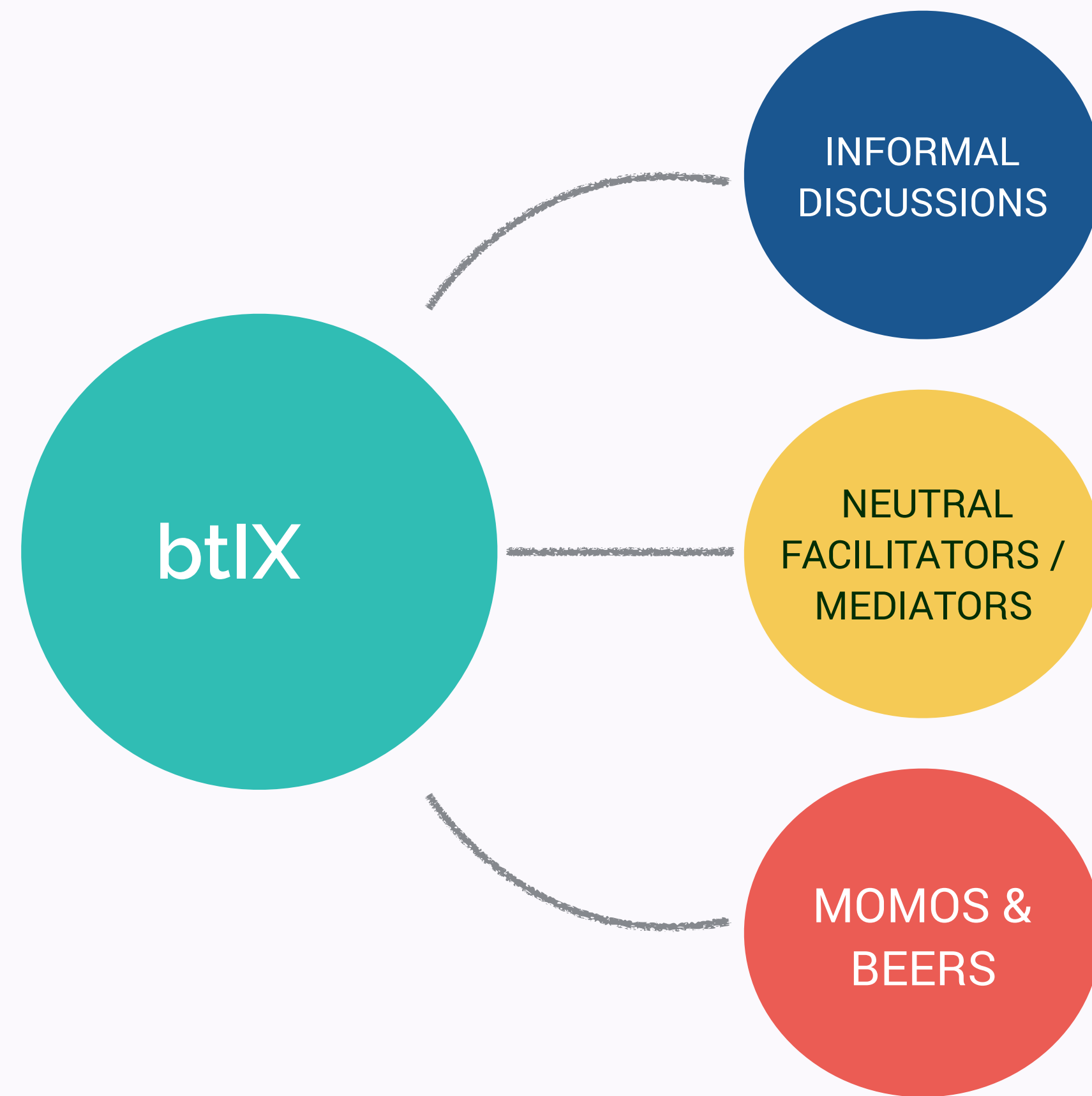
●●● btIX History : The Genesis of btIX



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The first attempt to establish an IX in Bhutan failed despite good intentions and efforts by many .

●●● btIX History: The Effort for an IX Continues..



Informal discussions helped in understanding individual ISPs views of an IX & also their hesitations, if any.

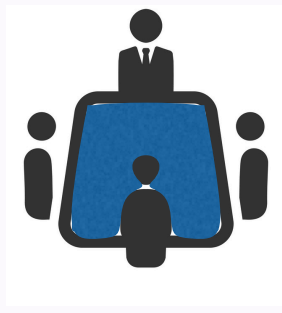


Involving neutral third parties as facilitators to sort out differences & reach a common goal



Sometimes a frank discussion over momos & beers was the only way forward

●●● btIX History: Second Attempt for an IX



Meetings, Schedules, & Shifting Goals (Sept to Dec 2017)

All Stakeholders Meet, Agreement on IX, Location, Membership, Fees, Association, Board Representatives from Stakeholders. IX to be operational by 11 Nov 2017. Multiple Meetings thereafter, aggressive schedules but the various soft launch dates passed by without result



Hurdles Along the Way

Inadequate Facilities for an IX at the "neutral" location - Power, Equipment Racks, Spare fiber pairs for connectivity, Access., IX Resources from APNIC and IX Legal Registration



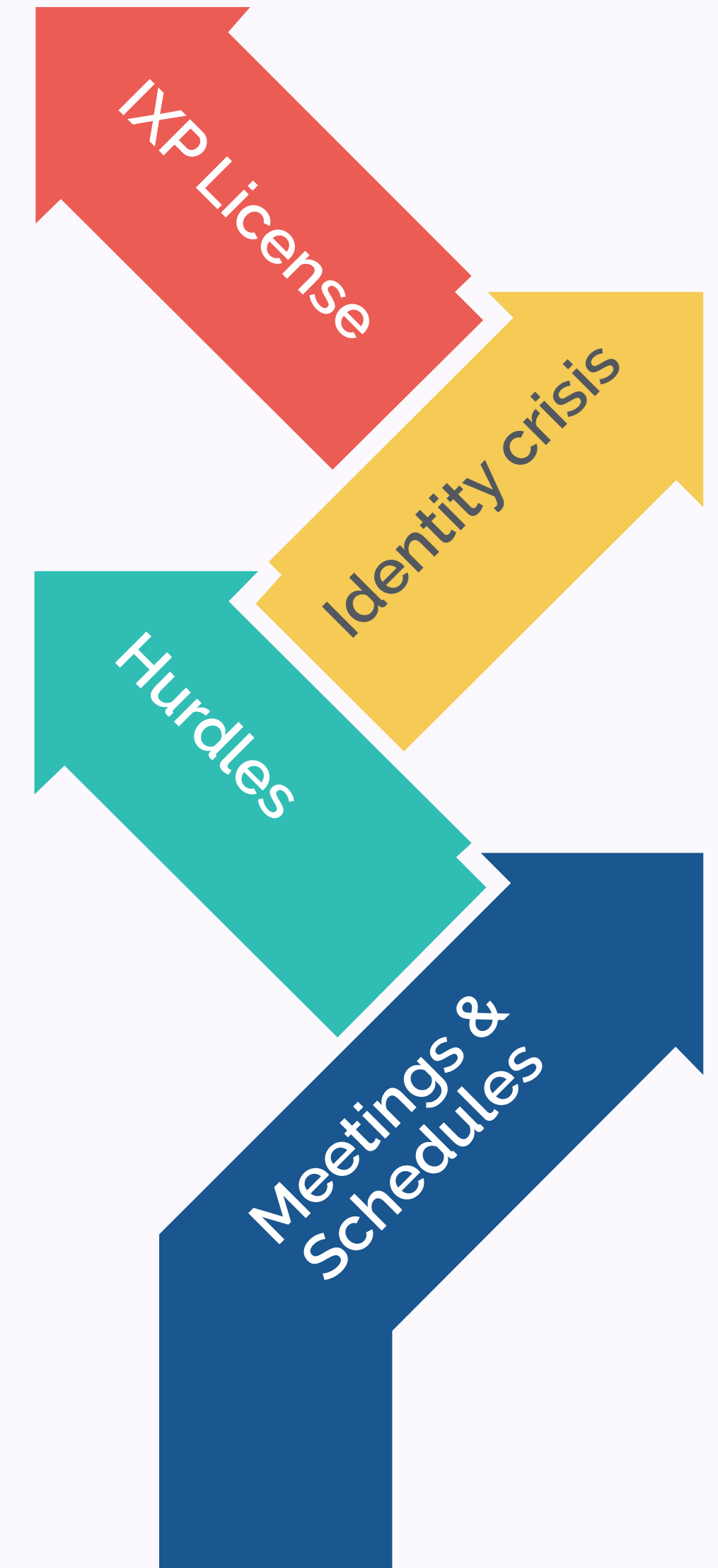
Identity Crisis (Jan to March 2018)

Search for having a legal identify for btIX - Required for everything from APNIC membership, TAX Payer Registration, Bank Account Opening, Equipment Import, etc. Evaluation of various Options. CSO, Trade Certificates, IX License and implications.



IXP Facility License (25 March 2018)

Proposal to BICMA, Briefing regulators / Policy Makers on IX benefits, grant of IX License



●●● btIX History: Second Attempt for an IX



Network Segregation (March -July 2018)

Need to segregate IX and Transit traffic. Evaluation of various options, Design Changes, & Additional Equipment, Implementation



btIX Association & New Requirements (July 2018)

Fading Enthusiasm about the IX, Continuously Changing Requirements of some Association Members, Issues of fees & payments. Some Members already exchanging traffic while some association members were reluctant to be connected.



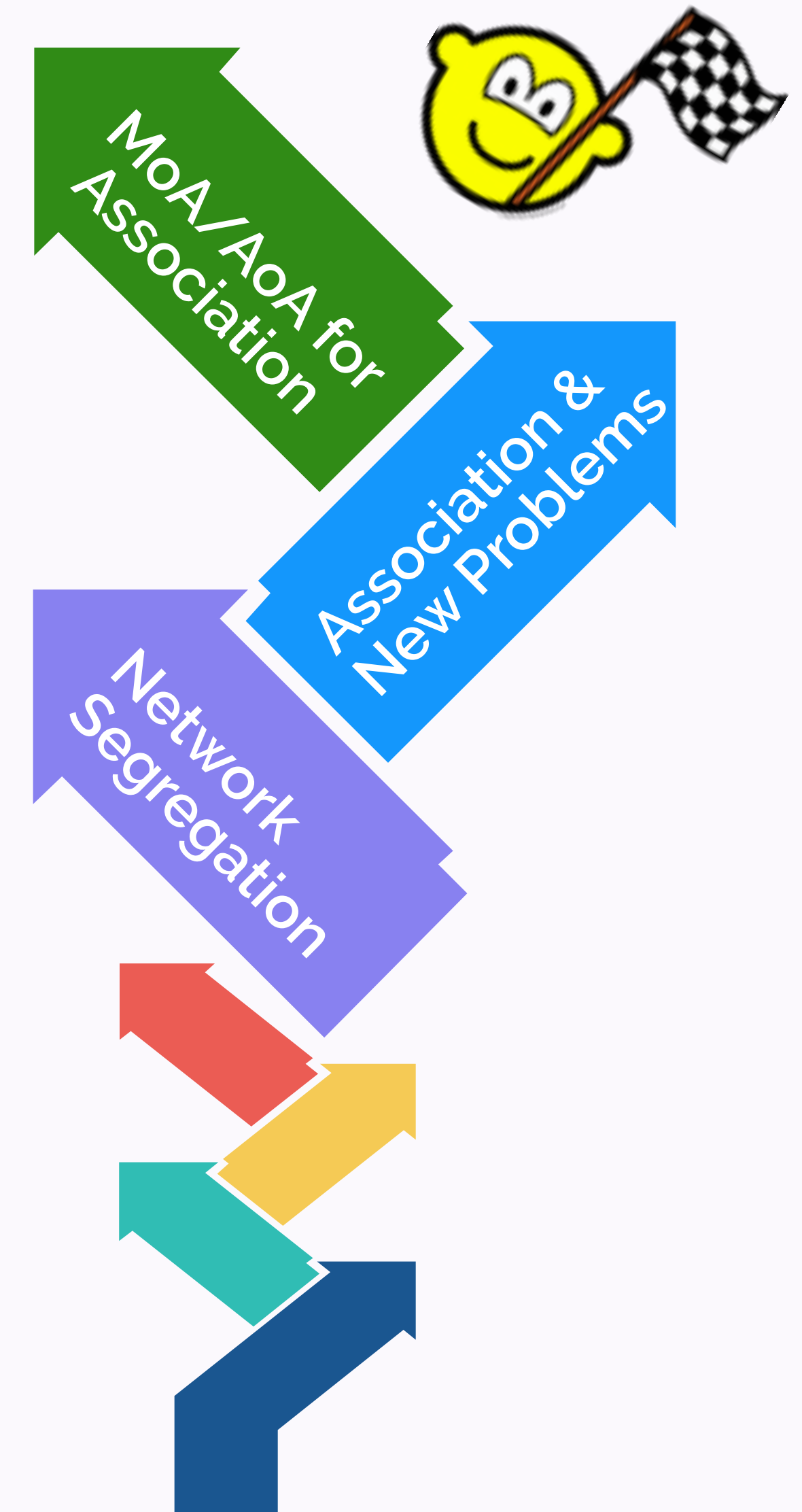
Formalizing the btIX Association (July - Sept 2018)

Drafting & Finalization of formal Association Documents - MoA & AoA but ratification delayed. Emergency Meeting and resolution to start btIX with or without some members



1 Sept 2018 - btIX Operational

All founding members of btIX Association get connected to IX except DrukCom due to connectivity issues. Ratification of MoA/AoA by CEOs / Heads of all Association Members only in October 2018.



●●● btIX Experience: Looking Back & Lessons Learned

Why Establishing an IX in Bhutan took 4+ Years?

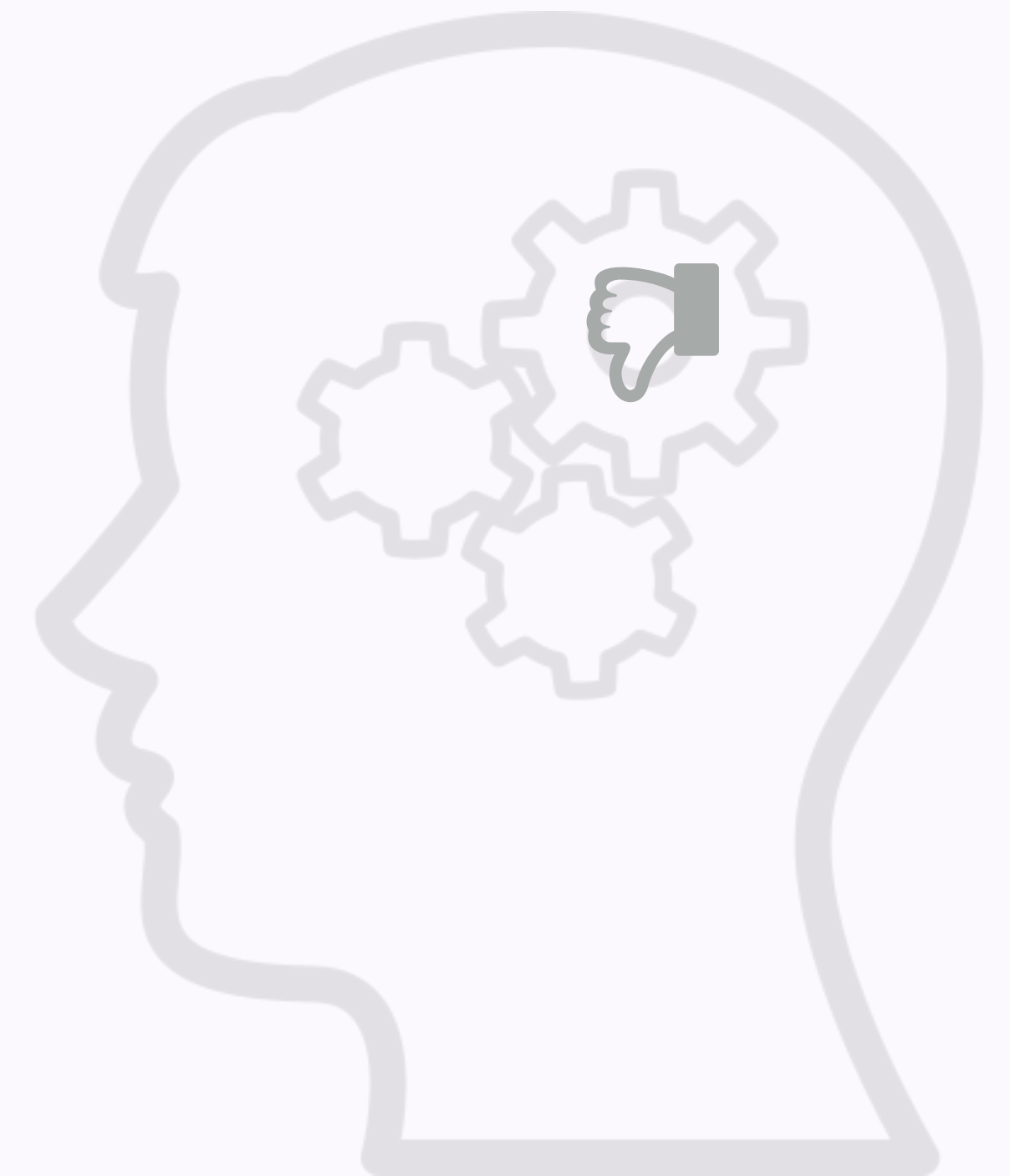
1. Market Factors: Small customer base, few ISPs or players.
2. Vast differences in ISPs' scale of operation, market share, & content
3. Market dominated by Telcos with PNI arrangements
4. Business Goals of prospective IX members vis-a-vis community spirit
5. Processes & Regulations



●●● btIX Experience: Looking Back & Lessons Learned

The Mistakes Made: ThimphuIX

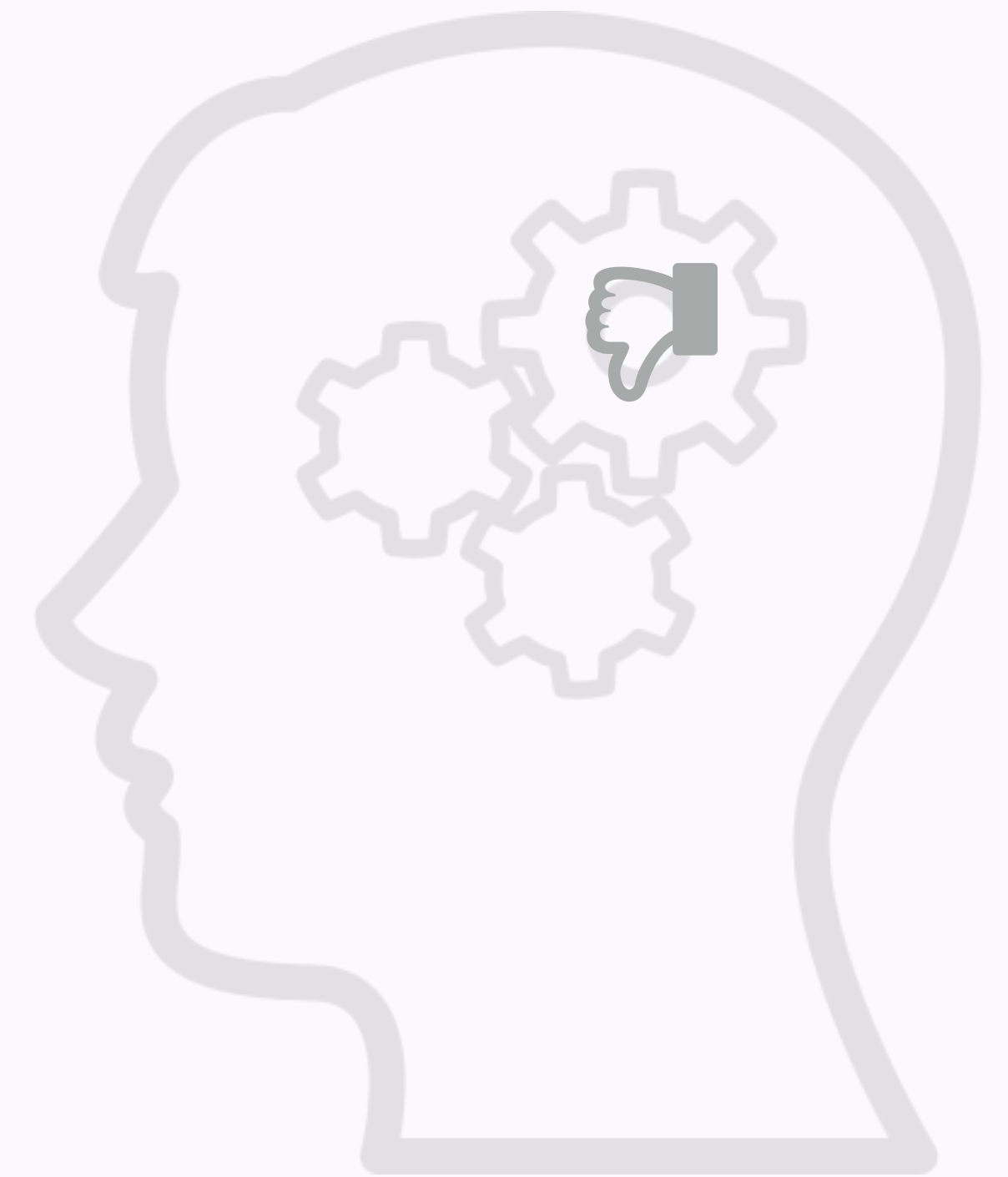
1. No Stakeholders Engagement - “If you build it, they will come”
2. No Ownership - DITT? BT?
3. Initiated by (DITT) as part of the SASEC Project - No Focus
4. Hosted & Operated by BT under compulsion?
5. Some say “Location” but I feel otherwise if there really was a “will”



●●● btIX Experience: Looking Back & Lessons Learned

The Mistakes Made: btIX

1. Assuming establishing an IX would be only (or mostly) technical works
2. Not considering local context and ground realities when setting schedules
3. Thinking that all stakeholders have to IX members to start an IX
4. Not formalizing the IX Association in the beginning
5. Not factoring the differences of structure, hierarchies & processes of different members in the community

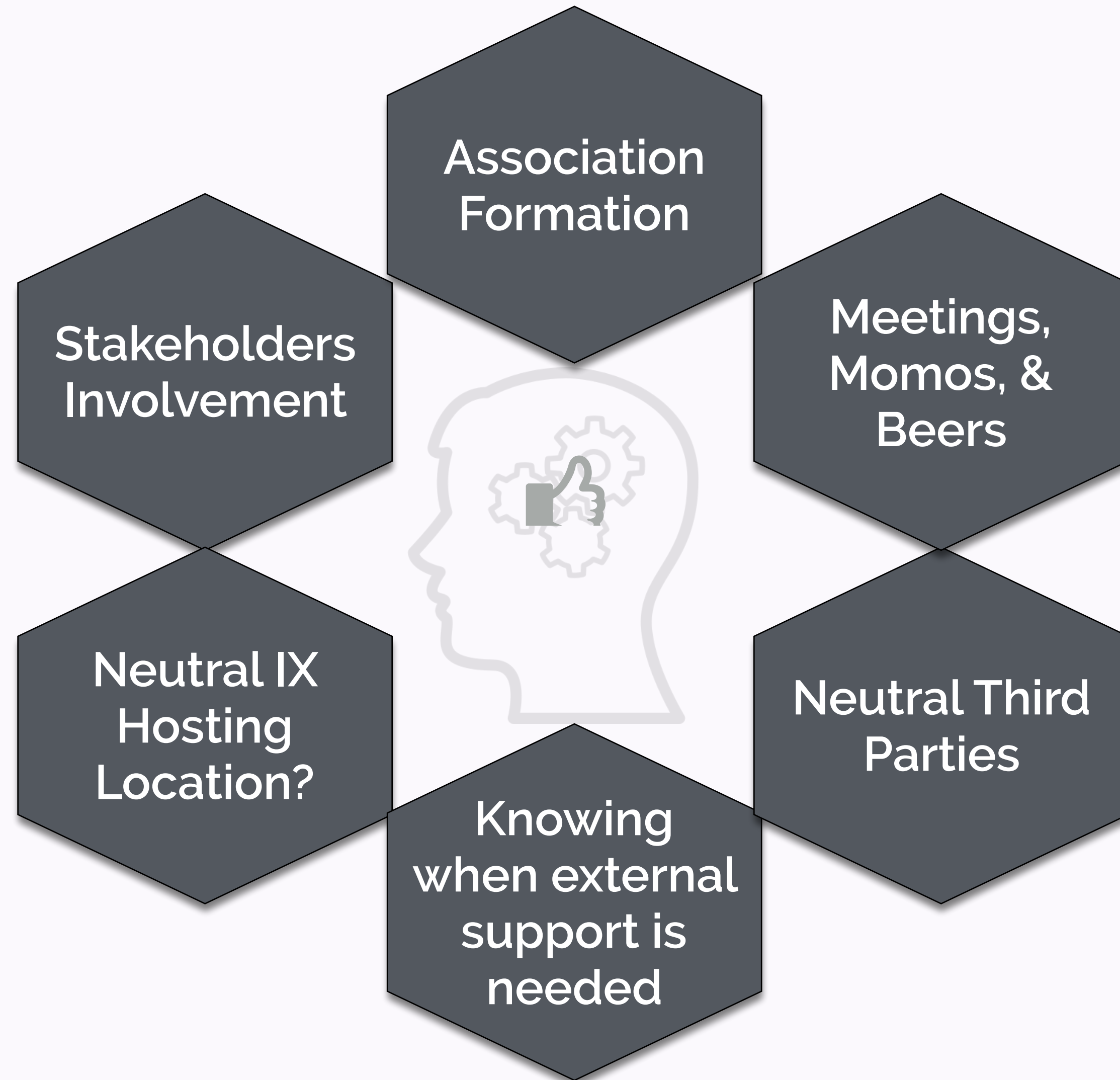
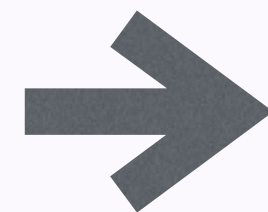


●●● btIX Experience: Looking Back & Lessons Learned

What has worked for btIX?

Many factors and right decisions, appropriate for local context, helped in making btIX possible in its second attempt.

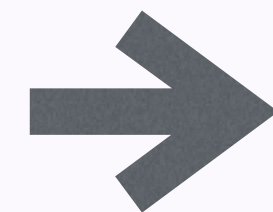
Right Approach



●●● btIX Experience: Looking Back & Lessons Learned

What has worked for btIX?

Right Initiatives





About btIX



1st IX in Bhutan

Licensed IXP.
L2 IX
First IX LAN at TTPL
Live from Sept 2018



Management

Managed by btIX Association
btIX Board for Major Decisions
Board elected from Members Reps
Elected Office Bearers



Policies

Neutral IX
Non-Profit based operations
Simple membership criteria

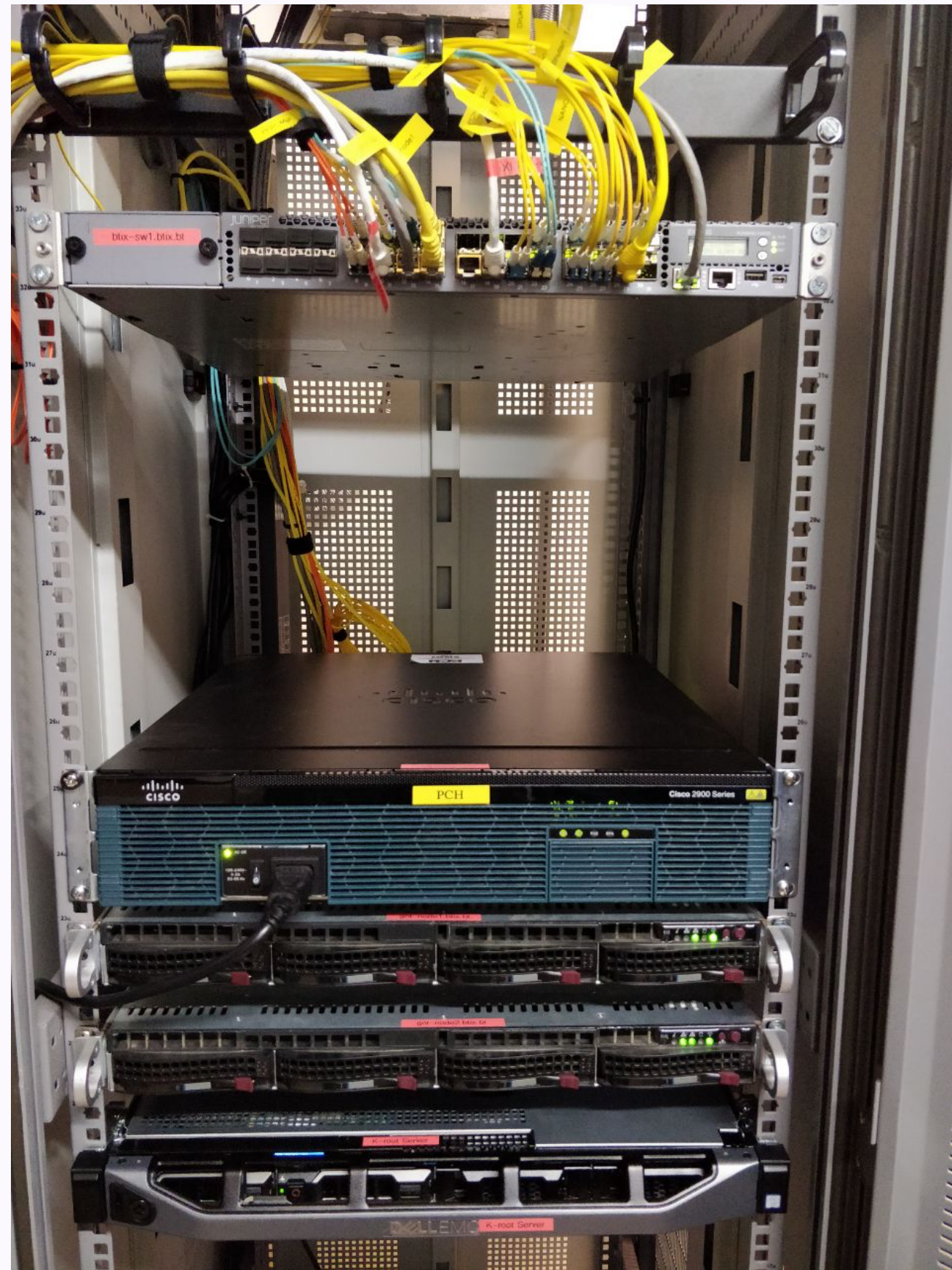


Finances

Expenses met from fees
Variable fees & decided at
AGM based on planned
activities

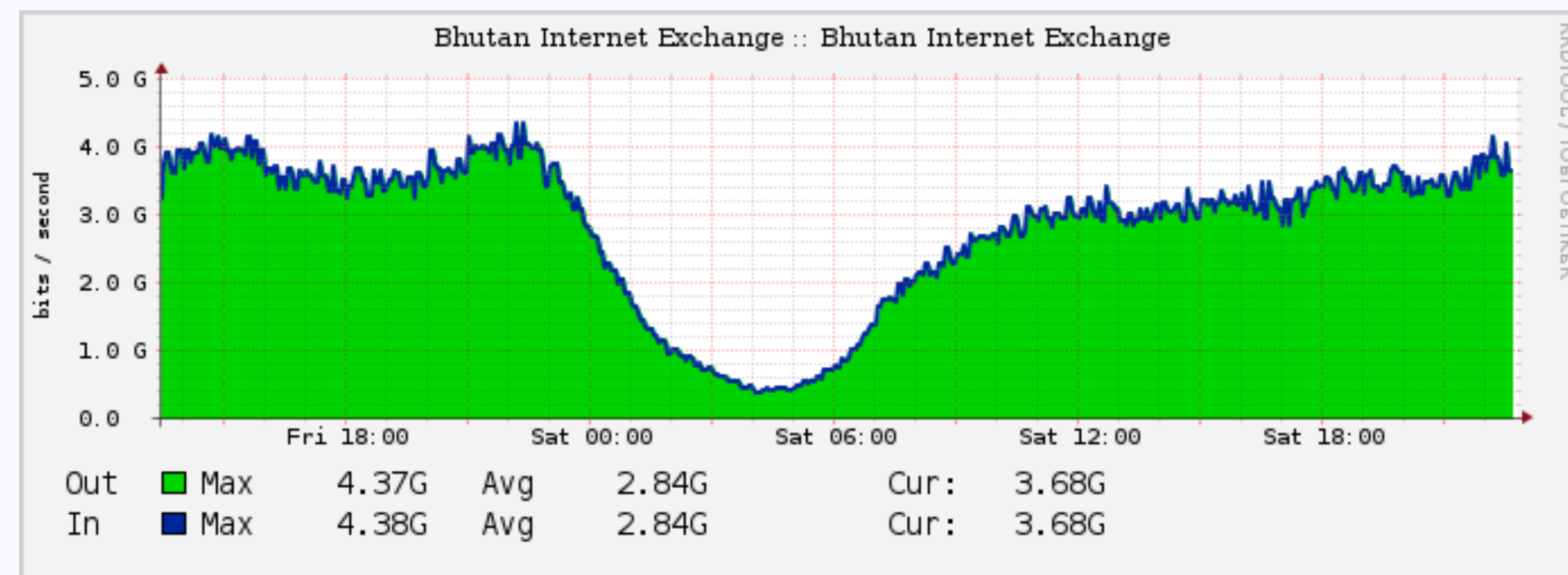
<https://www.btix.bt> for more info.

●●● btIX: Some Technical Stuff



- ▶ Juniper EX4550 Switch (1G / 10G)
- ▶ Ganeti Cluster - 2 Nodes presently running 10 VMs for various applications
- ▶ Tools: IXP Manager, Librenms with various plugins, sflowtools
- ▶ Self hosting of applications (web, mail, dns, mailing lists, etc)
- ▶ Route Server for MLP, RC for LG on the cards

- ☆ Members: 10 (7 Full, 3 Special)
- ☆ BLP Peering Mode (RS not ready)
- ☆ Mixture 1G & 10G Ports
- ☆ CDNs Cache feed by Members
- ☆ DNS Root Servers feed (K, & I)



Traffic Graph



That's All. Thank you.

Questions Welcome
