

Progress on AP-IS sub-regional initiatives

A Study for the IXP Implementation in CLMV Countries

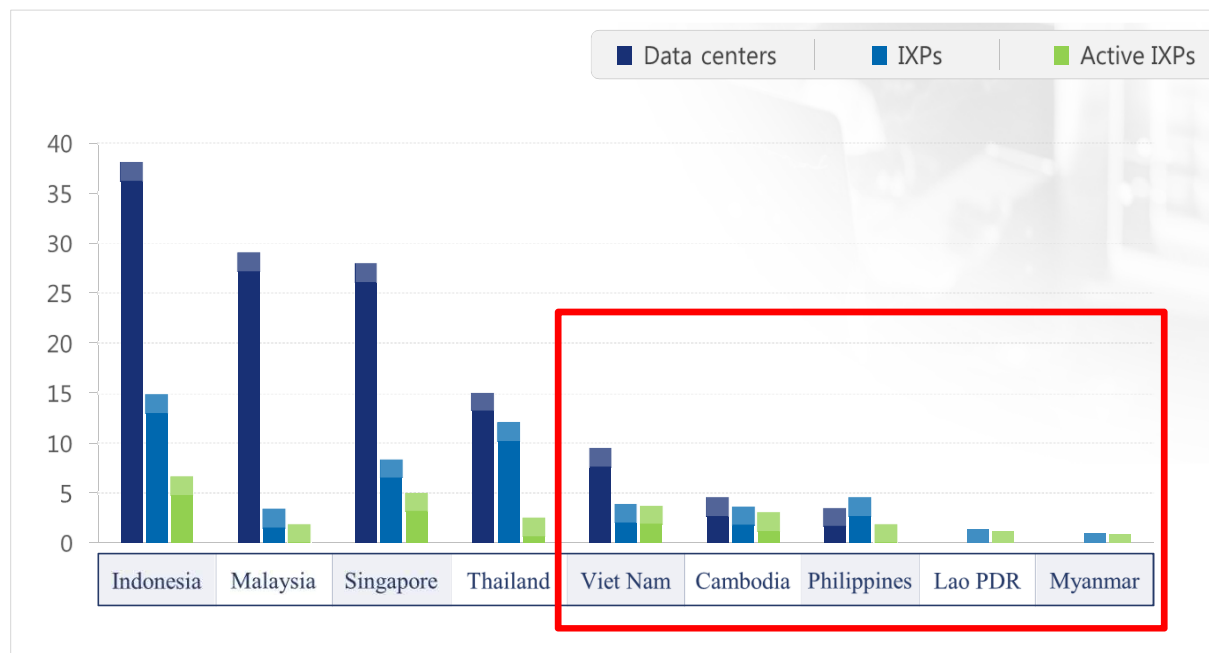
August 11, 2020

Yeong Ro, LEE



Status of IXPs In SEA

Number of Data centers and **Active** IXPs in SEA (2018)

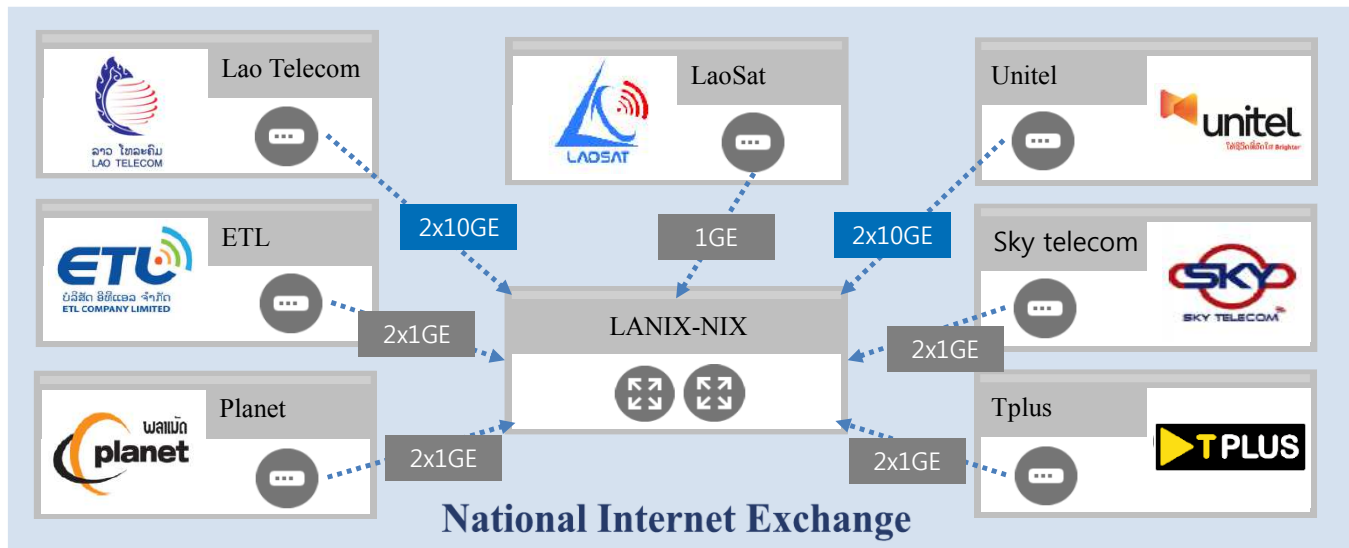


| Country | June 2017 | June 2018 | Net change | % change |
|-------------|-----------|-----------|------------|----------|
| Indonesia | 4 | 7 | 3 | 75 |
| Singapore | 4 | 5 | 1 | 25 |
| Viet Nam | 3 | 3 | 0 | 0 |
| Cambodia | 1 | 2 | 1 | 100 |
| Thailand | 1 | 2 | 1 | 100 |
| Malaysia | 0 | 1 | 1 | 100 |
| Philippines | 0 | 1 | 1 | 100 |
| Lao PDR | 1 | 1 | 0 | 0 |
| Myanmar | 0 | 1 | 1 | 100 |
| Brunei | 0 | 0 | 0 | 0 |

Source: Southeast Asia Going Digital: Connecting SMEs, 2019, OECD

Lao PDR Update

The Lao National Internet Center(LANIC) was established in 2010, it was found to be an IXP(named NIX) under the LANIC to transform Laos from a landlocked country into a land-linked country, but it is unclear that international Internet transit is carried out in the NIX



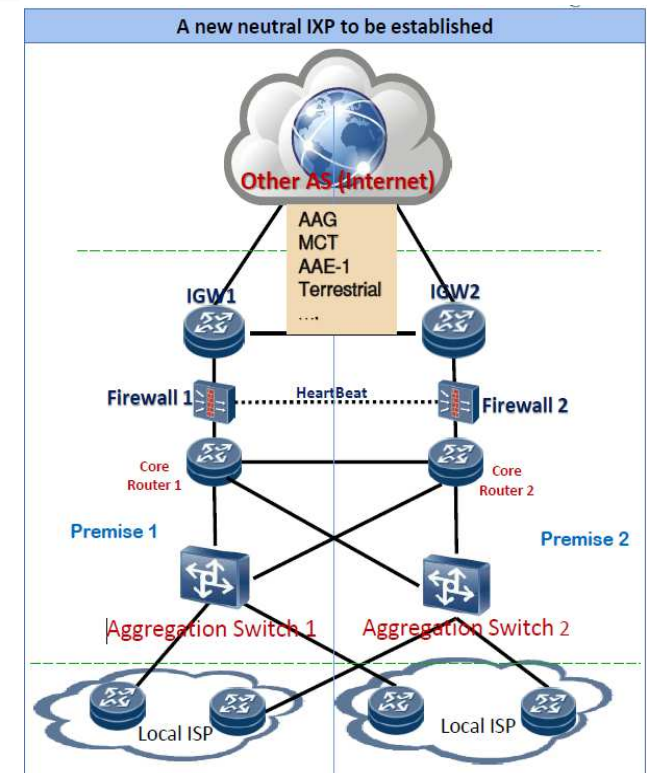
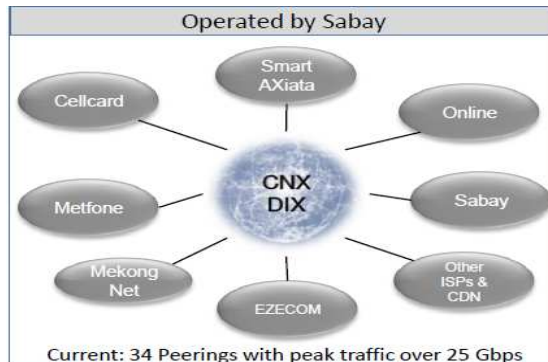
| Division | IXP | Operating Institution | Number of ISPs linked | Total Capacity |
|----------|-----------|-----------------------|-----------------------|----------------|
| Lao PDR | LANIX-NIX | LANIX | 7 | 49Gbps |

| Name | Connection | Interface |
|-------------|------------|-----------|
| Lao Telecom | 2 | 2x10GE |
| Unitel | 2 | 2x10GE |
| ETL | 2 | 2x1GE |
| Planet | 2 | 2x1GE |
| TPlus | 2 | 2x1GE |
| Sky Telecom | 2 | 2x1GE |
| LaoSat | 1 | 1GE |

Source : Saysomvang SOUVANNVONG,Soulisack PHOMMASAN, ChatoupholPHOUMIN, MPT, LANIC 09 July 2020

Cambodia Update

- There are 3 IXPs (CNX, DIX) and **a new neutral IXP to be established**
- Cambodia is supportive to establish the direct interconnectivity among CLMV (Cambodia to cross border connect with IXPs/ PoPs in Lao PDR, Thailand and Viet Nam) and establish the local IXP (**The new policy is being drafted**)
- Cambodia is interested in “Interlinkage among the IXPs in Cambodia” and the IXPs in the Region and Sub region and promoting more local content and local presence of large CDN (currently located in Hong Kong, Singapore)
- Cambodia plans to study on the implementation modality (PPP/leverage on existing infrastructure, USO, Other funding)



Source : Department of Telecommunication Regulation
Telecommunication Regulator of Cambodia (TRC)
July 2020, Virtual Meeting

Myanmar Update

Myanmar Internet Exchange was set up by a group of ISPs in September, 2017 as a neutral, industry owned association that provides IP peering facilities for its members

Posts and Telecommunications Department is being taken to establish **National Internet Exchange**

Government is striving to build up digital economy by upgrading all national sectors into digital one inviting international investments

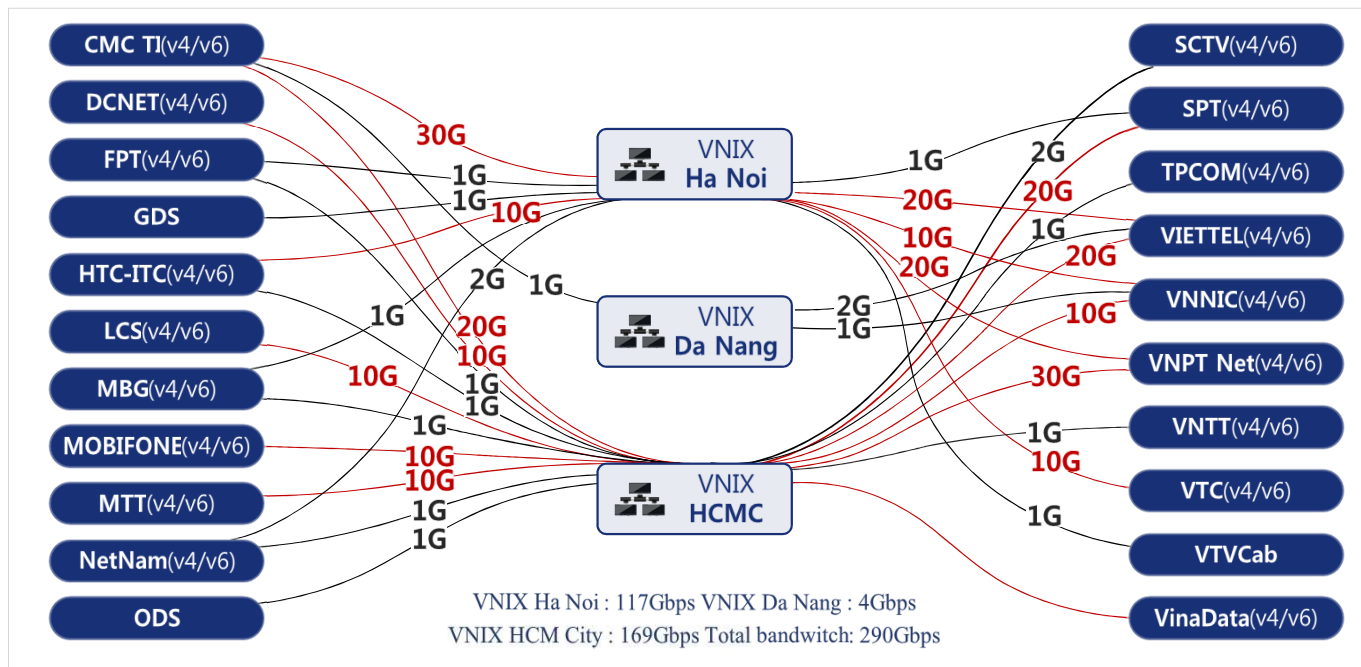
MMIX hosts 18 members

| Sr. | Member Name | Account | Member Type | ASN | Website |
|-----|--|---------|-------------|--------|---|
| 1 | AGB Communication Co., Ltd. | AGB | Principal | 134739 | http://www.agbcommunication.com |
| 2 | Amara Communications Co., Ltd | ACS | Principal | 132686 | http://www.ananda.com.mm |
| 3 | Facebook Inc | FBI | Affiliate | 63293 | http://www.facebook.com |
| 4 | Fortune Telecom Co., Ltd. | FTC | Principal | 135371 | http://www.fortunebb.com |
| 5 | Kinetic Myanmar Technology Co., Ltd. | KMT | Principal | 63998 | http://www.kineticmyanmar.com |
| 6 | Myanmar Information Highway Limited | MIH | Principal | 136780 | http://www.mih.com.mm |
| 7 | Myanmar Unilink Communication Co., Ltd. | UNL | Principal | 136480 | http://www.unilink.com.mm |
| 8 | NTT Myanmar Co., Ltd. | NTT | Principal | 134736 | http://www.ntt.com |
| 9 | RIPE NCC | RIPE | Affiliate | 25151 | https://www.ripe.net |
| 10 | Southeastasianet Technologies Myanmar Co., Ltd | STM | Principal | 132344 | http://seanetmsc.com |
| 11 | Telecom International Myanmar Co., Ltd.(Mytel) | TIM | Principal | 136255 | http://www.mytel.com.mm |
| 12 | Quantil Networks | WSU | Affiliate | 54994 | http://en.wangsu.com |
| 13 | Yatanarpon Teleport Public Co., Ltd | YTP | Principal | 131322 | http://www.ytp.com.mm |
| 14 | KBZ Gateway Co., Ltd. | KBZ | Associate | 135433 | http://www.kbzgateway.com |
| 15 | Marga Global Technology Co., Ltd. | MGT | Associate | 136474 | http://www.margaglobal.com |
| 16 | Myanmar Speed Net Co., Ltd. | SPN | Associate | 132100 | http://www.mmspeednet.com |
| 17 | True IDC Myanmar Co., Ltd | TIDC MM | Associate | 134137 | http://www.trueidc.com.mm |
| 18 | Myanmar Technology Gateway Co., Ltd | MTG | Associate | 135149 | http://www.mtg.com.mm |

Source : "Establishing Internet Exchange in Myanmar", Ministry of Transport and Communications
Posts and Telecommunications Department, Republic of the Union of Myanmar, 9.July.2020

Case : IXPs in Vietnam

Viet Nam has well structured IXPs system : three geographically separated IXPs in 3 provinces, but there is no links among IXPs



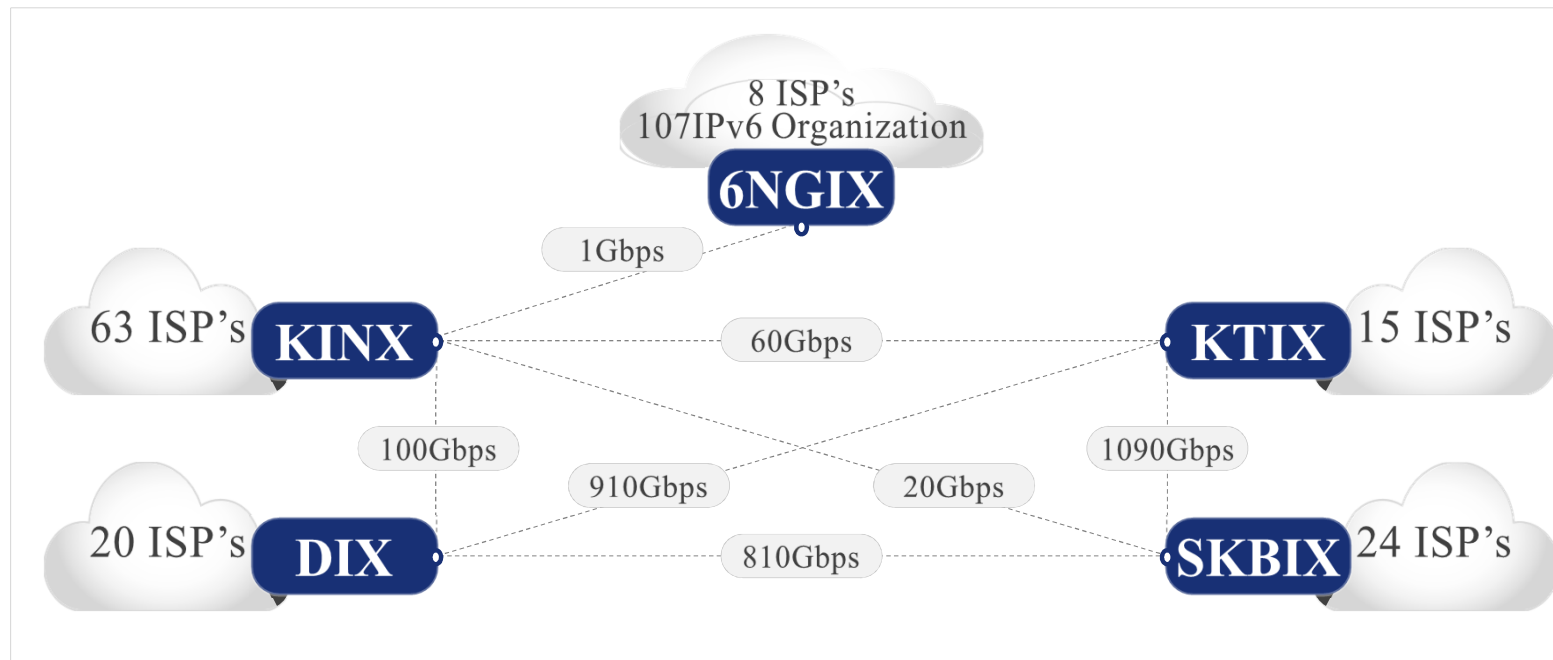
01
VNIX, hosted by VNIX System, is an internal system of VNNIC

02
No connection between each IXP Nodes and operated independently

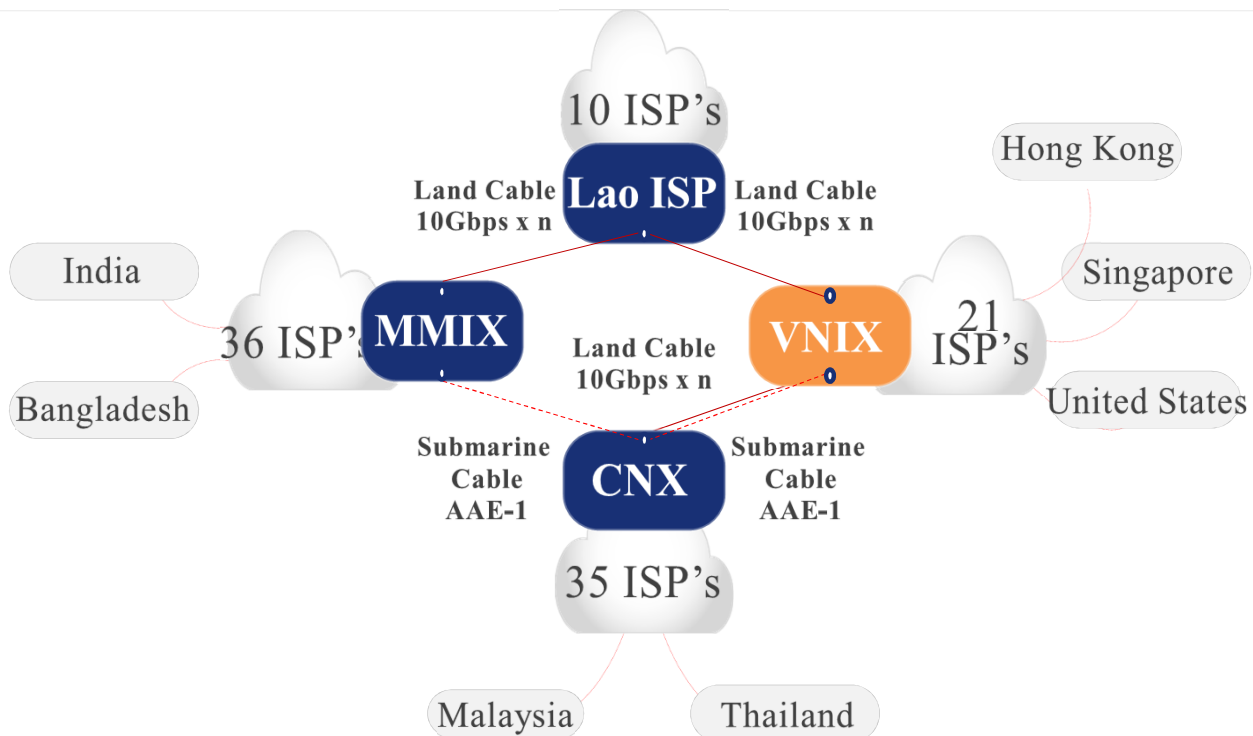
03
VNIX has two types of connection: N x 1Gbps/port, N x 10Gbps/port

Case : IXPs in Korea

In Korea, IXPs have been deployed since 1995, It consists of one carrier neutral IXP(KINX) and three carrier owned IXPs. All the IXP is inter-linked to provide one stop exchange service to the ISPs



IXP Modeling in CLMVs



Recommendation

- 01** Inter-country IXP topology to be a ring type
- 02** IXPs inter-connected with dedicated trunk in 10G increments according to traffic volume
- 03** IXPs collocated with the IDC and SDN systems in each hub city

Collocation of IXP with IDC and SDN



1

Improve network performance

2

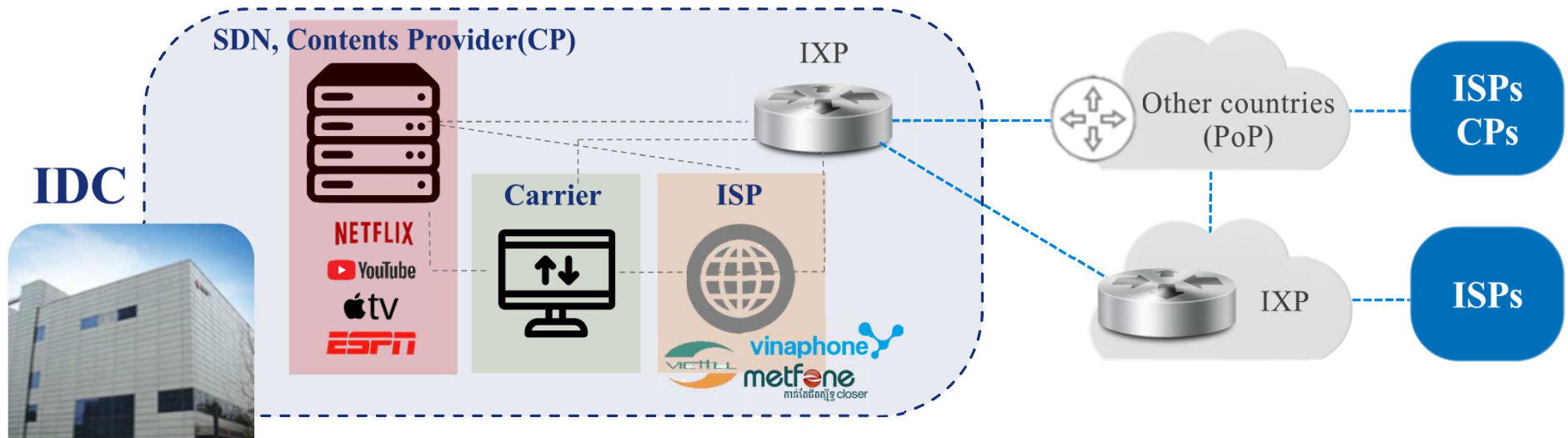
Improve network latency

3

Reduce traffic amount from/to the outside

4

Reduce transit cost by in-house traffic exchange



Estimated cost for the IDC and IXP Infra

In case of 1500 square meters, 1 basement level, 1 ground level, 500 racks, and 1 year construction period, normally USD18million could be required

| Section | Criteria for calculation | Cost(USD) |
|--------------------------|---|-------------------|
| Building | ♦ Basement, Ground Floor, 1500m ² | 4,000,000 |
| Interior | ♦ Tray, Electrical, Power, Interior, Server room, Constant Temperature and Humidity Equipment | 4,300,000 |
| Electrical | ♦ Generator, UPS, Battery, Automatic control system(FMS), Server Room Distribution Board, etc. | 4,630,000 |
| Fire | ♦ Leak detection, Fire extinguishing equipment, Access Floor, Physical Security, Entrance | 1,290,000 |
| Network, Security | ♦ Backbone Router, Backbone Switch, Workgroup Switch, Firewall, Optical cable construction | 3,200,000 |
| Management System | ♦ Network Monitoring, Server Monitoring, Hazardous Traffic Monitoring, Integrated Monitoring System, Interior | 1,230,000 |
| Total | | 18,650,000 |

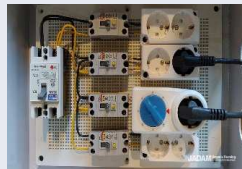
Building



Interior



Electric



Fire



Network



Management



Estimated cost for the establishment of IDC and IXP

| Description | Unit Price(USD) |
|---|-------------------------------------|
| 1 Building facility and System (excluding Operating Cost) | 18.5M |
| 2 Transport network cost per year | 1,4M per year |
| 3 In-House Wiring | 200 x N |
| Total(Infra + 1 year network Charge) | ≈ 20M(initial cost)+ 1.4M(per year) |

Building facility and System



Transport



In-House Wiring



Potential Opportunities



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(Lao PDR) The Lao National Internet Center(LANIC) was established in 2010, It was found to be an IXP(named NIX) under the LANIC to transform Laos from a landlocked country into a land-linked country, **but it is unclear that international Internet transit is carried out inside the NIX**

Need to elaborate to establish more IXPs and Inter-linked in CLMVs

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Summary and Way Forward

Establishment of IXPs with collocation of IDC and Inter-connectivity among IXPs in the region are recommended. Initial investment to build an IXP with IDC is estimated to be US\$ 20M

- There is in need of additional neutral IXPs in CLMV, and it is recommended to build IDC collocated with IXP
- There is in need of a regional body to discuss establishment of IXP/IDC and get consultation from funding organization
- There is in need of sub-regional level MOU among CLMV countries to secure direct inter-country connectivity to reduce cost and enhance quality of Internet



Thank you

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