



Emerging technologies and solutions for Peering and Interconnections.

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IPTP Networks - Introduction



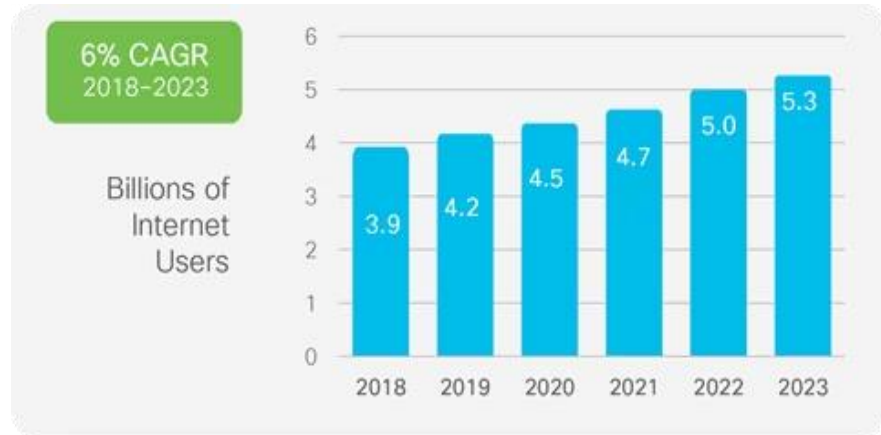


1. Internet 2023 Overview – Globally & APAC

1. Internet 2023 Overview - Globally & APAC

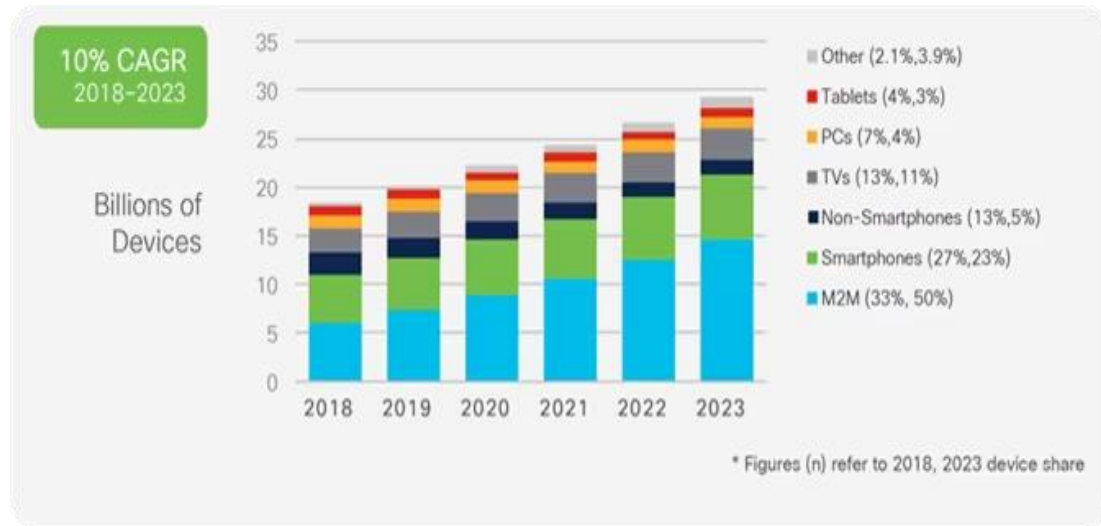
- ❖ The number of Internet users **globally** predicted to grow up to **5.3 billion** by 2023, according to the source.
- ❖ The compound annual growth rate for the whole period from 2018 to 2023 is **6%**.
- ❖ By 2023, **APAC** will have **3.1 billion** Internet users (**72%** of regional population), up from 2.1 billion (52% of regional population) in 2018.

Source: Cisco



In 2023, telecommunication services spending is expected to amount to **US\$1.48 trillion**, an increase of around **3.9%** on the previous year.

Internet Landscape Globally



1. **Over 70% of the global population will have mobile connectivity by 2023.** The total number of global mobile subscribers will grow to 5.7 billion (71 percent of population) by 2023.
2. **The number of devices connected to IP networks will be more than 3 times the global population by 2023.** There will be 3.6 networked devices per capita, making up 29.3 billion networked devices by 2023.

3. **5G devices and connections will be over 10% of global mobile devices and connections by 2023.** By 2023, global mobile devices will grow from 8.8 billion in 2018 to 13.1 billion by 2023 – 1.4 billion of those will be 5G capable.

Source: Cisco



1. Internet 2023 Overview in Vietnam

JAN
2023

OVERVIEW OF INTERNET USE

Essential indicators of internet adoption and use



Vietnam

Total
Internet
Users



77.3

MILLION

Internet Users
as a Percentage
of Total Population



79.1%

YoY: +6.6% (+489 BPS)

Year-on-Year change
in number of
internet users



+7.3%

+5.3 million

Average daily time
spent using the internet
by each internet user



6H 23M

-4.0% (-16 min)

Percentage of users
accessing the Internet
via mobile phones



94.5%

-1.4% (-130 PBS)

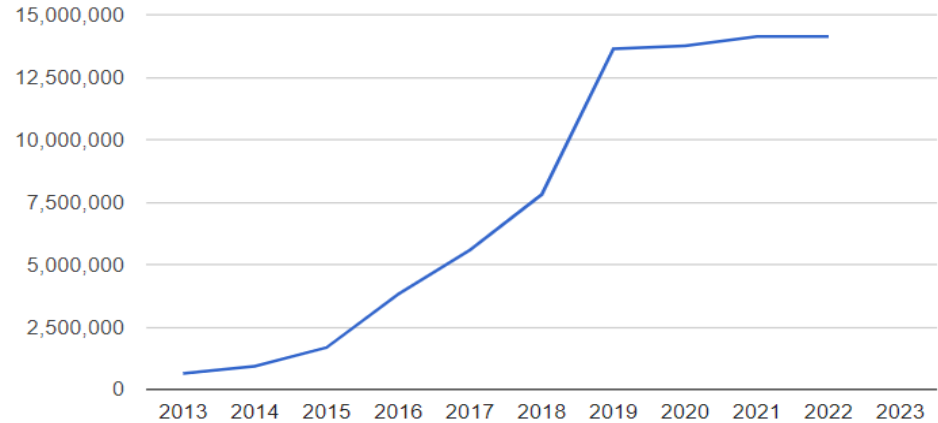
Traffic overview

- ❖ 2022 **International** capacity: ~14Tbps, 35% growth year-over-year
- ❖ 2022 **Domestic** capacity ~4.9Tbps, 30% growth year-over-year
- ❖ Major international **POPs**: Hong Kong and Singapore
- ❖ Peering vs IP Transit: 80%:20%
- ❖ **Issue**: there is a big gap between International and Domestic traffic
- ❖ **Internet Exchange**: VNIX
- ❖ **Domestic traffic**: is mostly delivered through direct paid peering by major ISPs, while **less than 5%** is via VNIX.

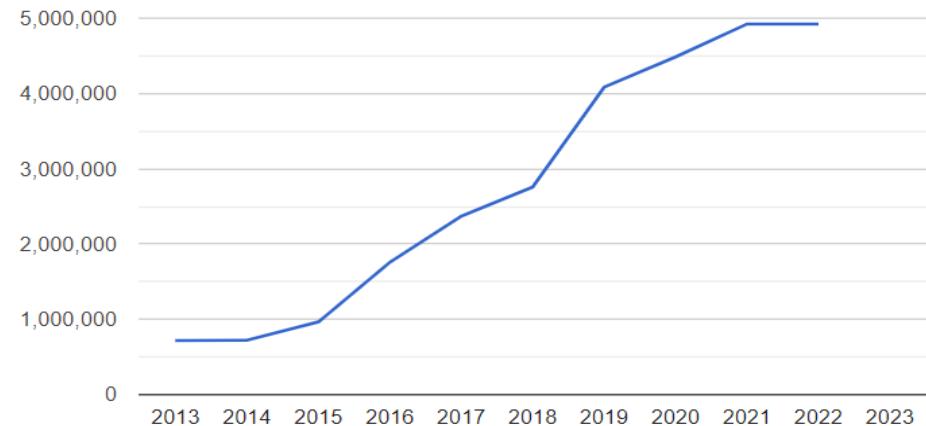
[Source](#): VIETNAM DIGITAL INFRASTRUCTURE LANDSCAPE

[Source](#): VNTA

Total international Internet connection capacity (Mbps)



Total domestic Internet connection capacity (Mbps)





2. Challenges in the industry

For ISPs in Vietnam

2. Challenges in the industry

- **Submarine cables outages** time to time creates Internet services degradation. Currently, there are 5 subsea cables (and 3 are planned ones).
 - However, earlier this year, 4 cables (AAE-1, AAG, APG, then the IA) have encountered issues, partially or fully disabling connections running through them.
 - A *VnExpress* survey from 30/1 - 6/2 of over 13,900 participants showed that 95% of them encountered slower Internet connections than usual.
 - These cables all span wide areas of the ocean, meaning fixing them cannot be done in a short time, and the reparation process is out of Vietnam's control.
 - [Source](#): VNexpress



2. Challenges in the industry



- ❑ **Security risks:** According to NCSC, Vietnam has seen a **45% increase** in cyber attacks in the first half of 2021. With Vietnam's digital economy forecast to reach \$57 billion by 2025, security experts also reveal that Cybersecurity risks will continue to increase in the coming years.
- ❑ **Attacks on the cloud:** The cloud computing market in Vietnam is still in an active development phase. However, the quality of **digital infrastructure here has not been developed** synchronously to be able to operate smoothly.
- ❑ **5G:** The development of 5G technology also leads to an increase in new hardware and software devices as well as new models and ways of administration. This leads to **security holes** for cybercriminals to destroy network infrastructure, cause disruption and reduce transmission quality.
- ❑ **Source:** Terralogic



2. Internet Segmentation or Fragmentation

3. Global Internet Segmentation or Fragmentation

- For decades, Internet growth has been impacted with Geo-political objectives. Many countries isolate their own National Internet within the borders, such as China Great Firewall as the first to pop-up in everyone's mind. But it is not the only one. There are very well-developed countries like South Korea, Singapore, UAE, Israel, Saudi Arabia, Cuba, North Korea, Iran, Russia, etc. are doing censorship and traffic filtering too.
- For end-users is practically means that they cannot have same experience while they are traveling abroad or cannot access well resources that located abroad.
- As for the streaming services, the list of film and movies you can watch are selected based on where you live. Some websites are only accessible in a specific country.





3. Solutions

Technologies for the development

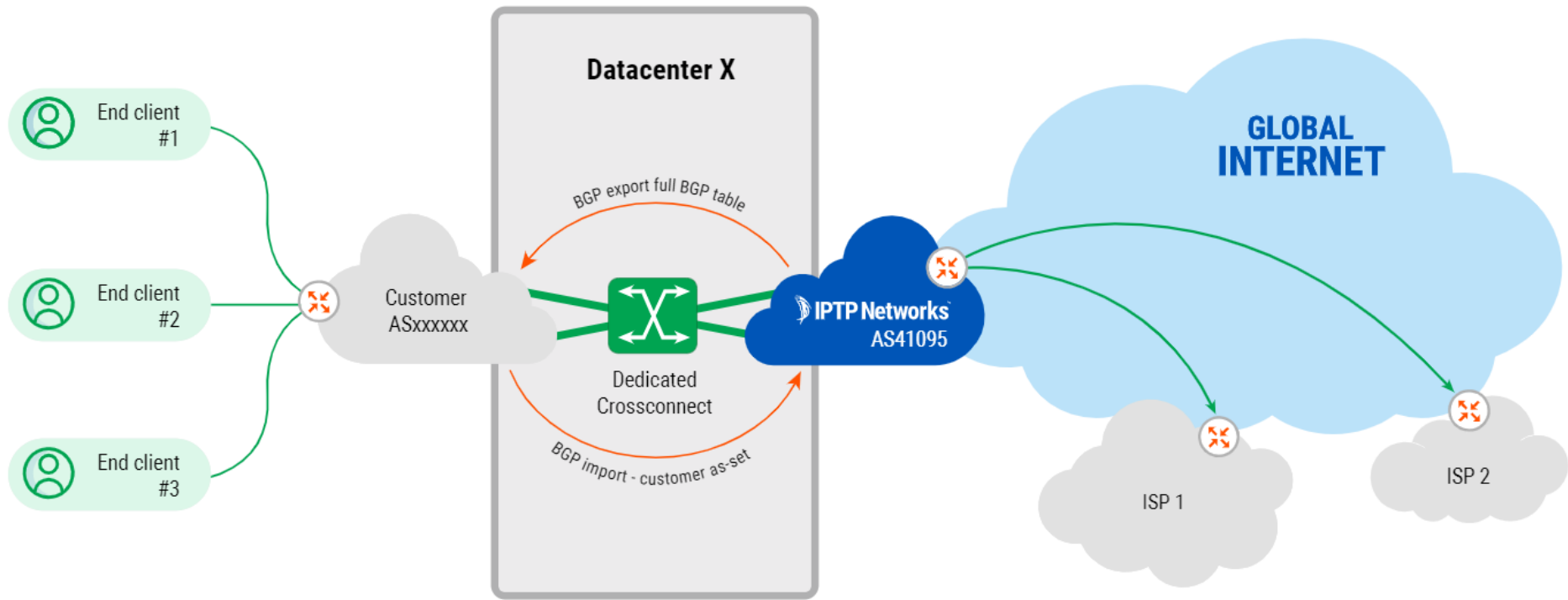


3. Technologies for the development

To improve Internet performance, there are solutions for ISPs and for End-Users.

- ❖ ISPs would prefer to select IP Transit from upstream provider that able to provide reliable and secure service. What can be more than that?
- ❖ The End-Users have not many options rather than just to change ISP provider. But is it true?
- ❖ We will look in further slides about IX Transit, Remote IX, Remote IP Transit, Remote IX Transit, Jumbo Platform and LAGBLASTER to understand what options are on a table.

3.1. ISPs - IP Transit



Total network capacity: 35Tbps+

Connection: 45+ IXes

Availability: 225+ PoPs worldwide



3.1. ISPs - IP Transit

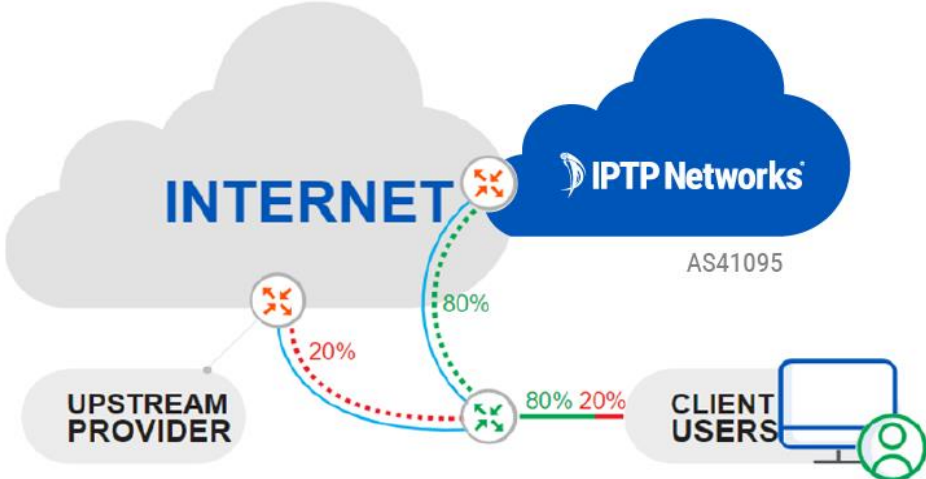
- We have established over **1500 BGP sessions** and are exchanging traffic with over 1000 Tier-2 and Tier-1 ISPs that actually provide **over 900 000 prefixes**, and effectively over 80% of traffic is going via peering links.
- **Application:** For businesses with **bandwidth-intensive operations**, IP Transit is the superior choice.
 - For businesses that require **continuous and reliable Internet connection**: healthcare, manufacturing, financial transactions, e-commerce, banking industries, or any latency/jitter sensitive real-time applications.
 - For companies that need to **transmit large amounts of data**, such as: 8-12K streaming, UHD video conferencing, eCommerce activities, etc.

3.1. ISPs - IX Transit

IX TRANSIT SCHEME

CAPTION:

- Cross connect
- IX transit IPTP
- IP transit from upstream provider

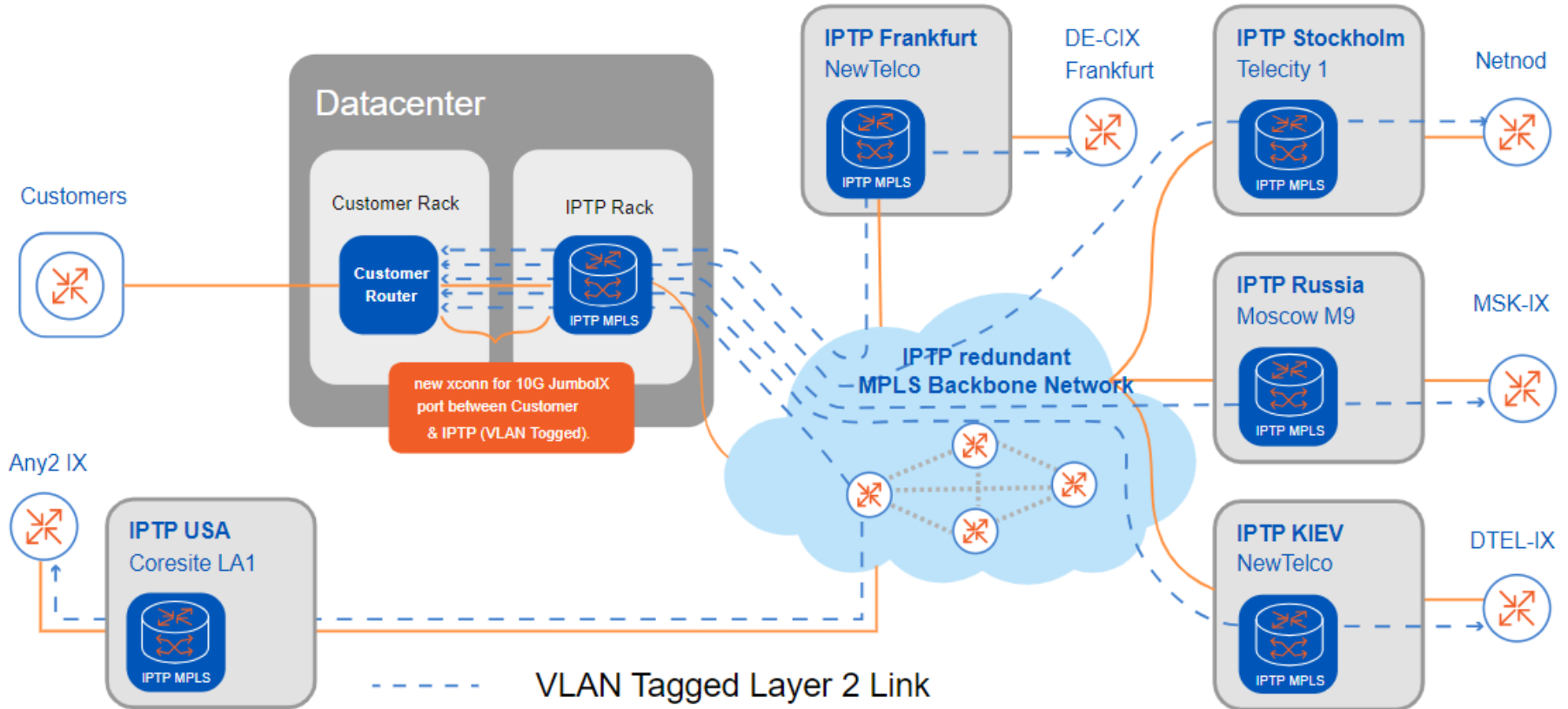




3.1. ISPs – IX Transit

- **IX Transit** is a unique **Layer-3 product** tailored for those ISPs and enterprises keen on optimizing their networks by themselves. **IX Transit** is basically a **partial IP Transit** with a rich **BGP community** set to manage outbound announcements and flexible filtering of the received prefixes.
- We are connected to all main international IXes, allowing users to reach a greater global coverage via major IX points and IPTP Networks' customers and partners.
- **Benefits:**
 - ✓ Lower latency for applications
 - ✓ Better costs in compare with own connectivity to IXPs
 - ✓ Introduction of new technologies (IPv6, RPKI, etc)

3.1. ISPs - Remote IX (Remote Peering)

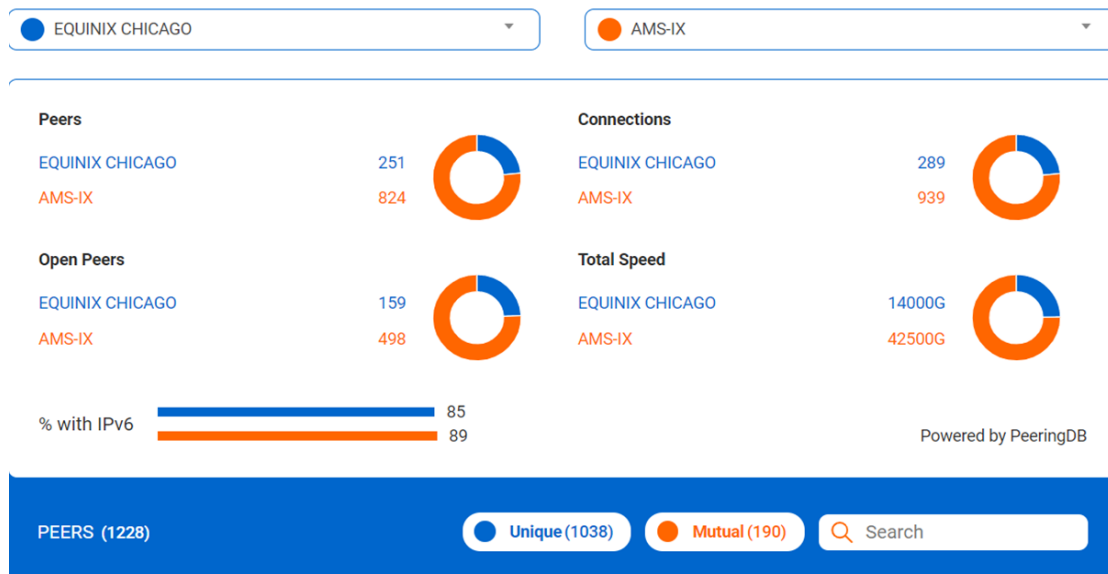


3.1. ISPs - Remote IX (Remote Peering)

- The uniqueness of IPTP Networks' **remote access to Internet Exchanges (IXes)** and private peers, via protected **L2 EoMPLS** backbones, is to provide an ultimate flexibility that will help you to create your own design and traffic engineering solutions from a single port.
- From one of our **232+ PoPs** worldwide, IPTP Networks is fully capable of assisting you to become a full member of **52+ largest IXes** (AMS-IX, CoreSite Any2, DE-CIX, EQ-IX, LINX, NetNod, MSK-IX, Piter-IX, Dtel-IX, BBIX, JPIX, JPNAP, JBIX, SH-IX and many more) with minimal financial efforts.
- Our **remote peering service** (Remote IX) not only could help your company in **strategy & deploying business plans** effectively but also **control budget** efficiently, while still ensures defining the **best low latency routes** via peering members.

IXP Compare tool: iptp.net/ixp

IXP COMPARE



- Create detailed graphic comparison between two Internet Exchanges.

Best Path tool: iptp.net/bp

Select from location: CMC, Hanoi, VN

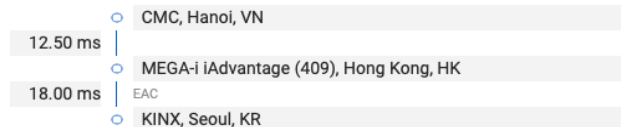
Select to location: KINX, Seoul, KR

Link Protection Node Protection Actual information only Avoid nodes in USA

Calcu

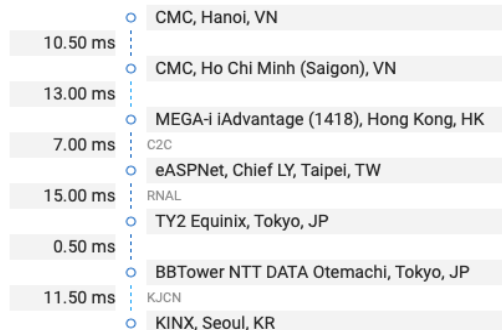
Primary path:

Latency: 30.5 ms (rtd: 61.00)
MTU: 8936



Diverse path:

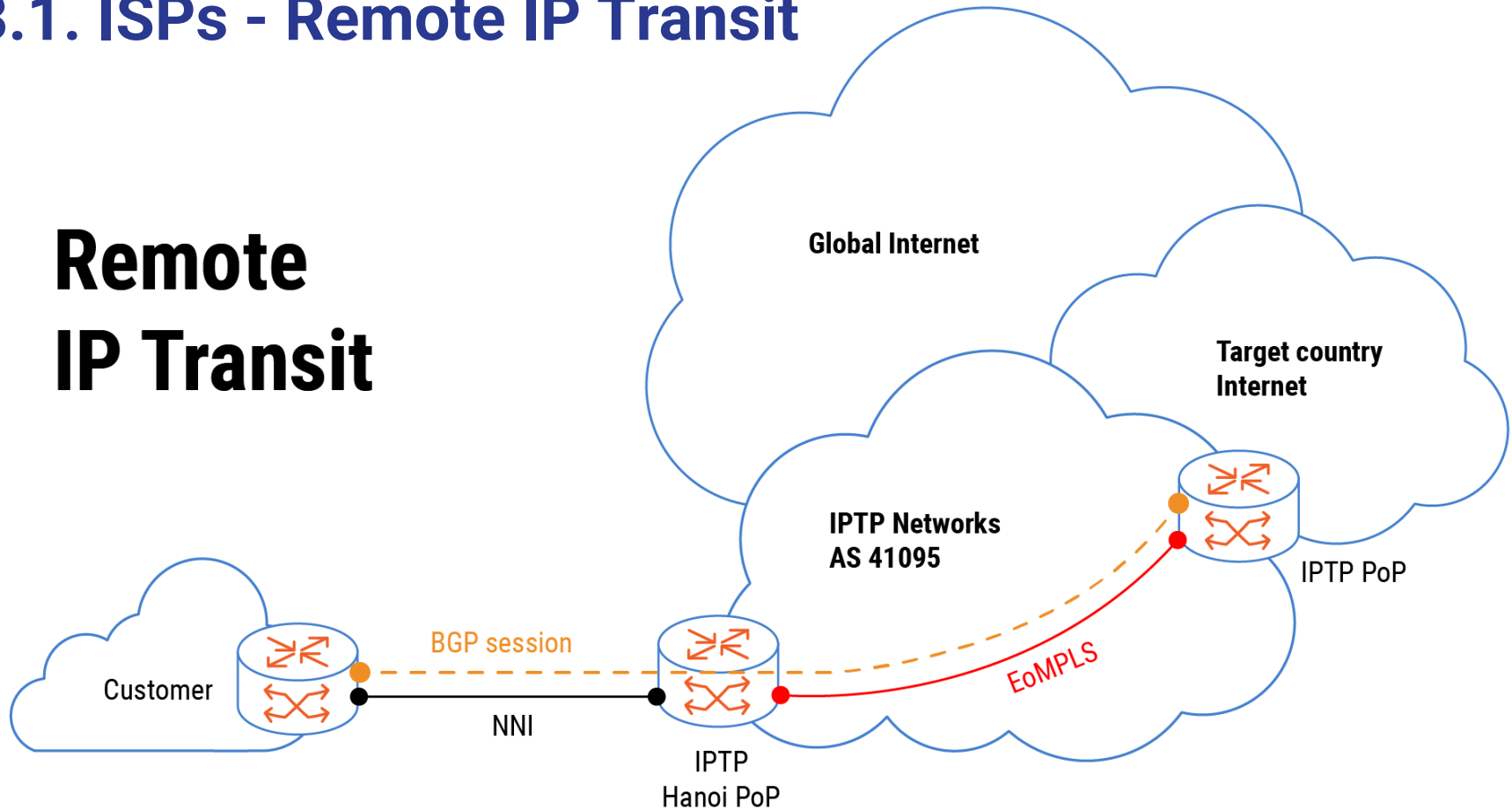
Latency: 57.5 ms (rtd: 115.00)
MTU: 8936



- Shows you latency and the best routing path between our points of presence

3.1. ISPs - Remote IP Transit

Remote IP Transit

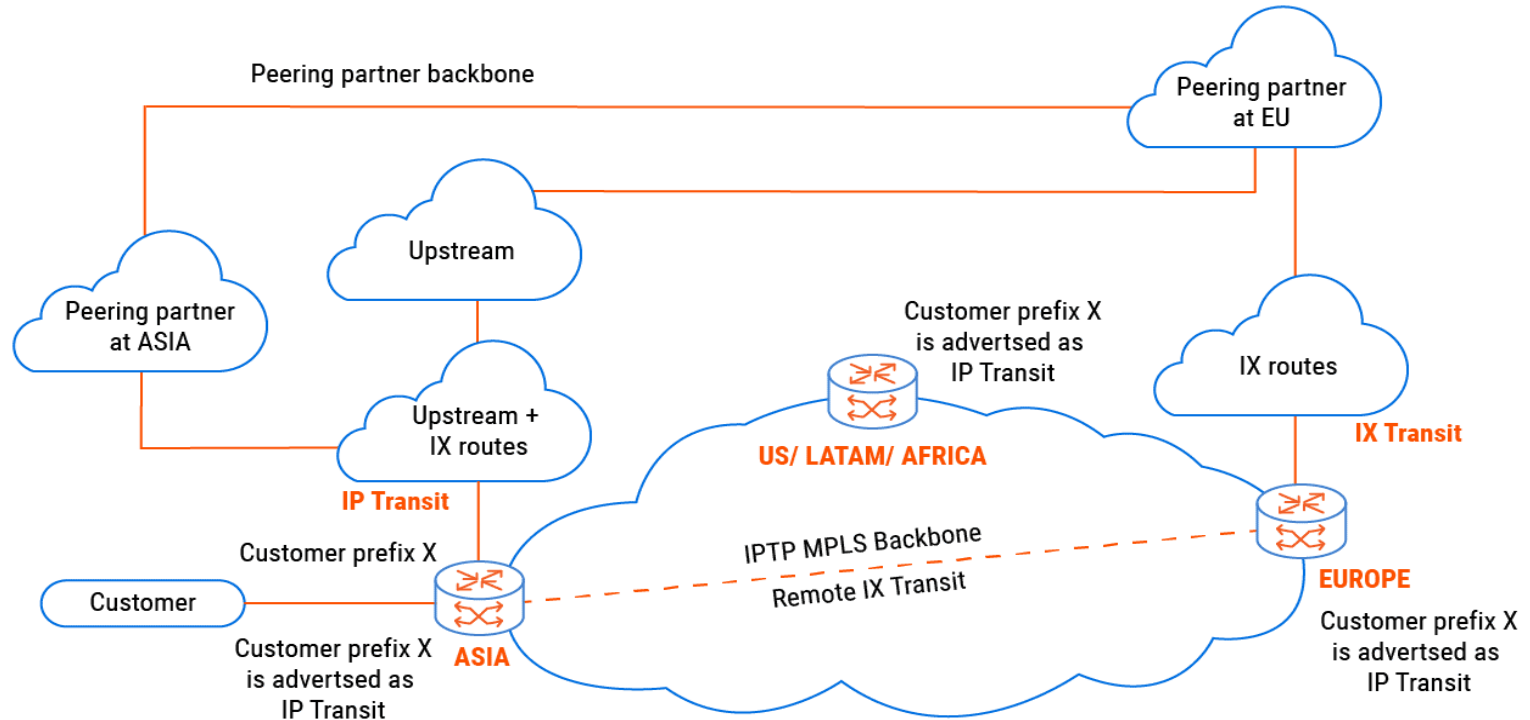


3.1. ISPs - Remote IP Transit

- **Remote IP transit** is a solution offered to companies who want to **maximize Internet connection** to a specific region or a country.
- Via our global MPLS network, you can easily start using our **Remote IP Transit** service, which provides the opportunity to connect to any of our on-net data centers all over the globe.
Advantages:
 - **No physical equipment** required remotely since you can use our global facilities to reach the desired locations. Using our **packet loss and jitter free low-latency** global backbone infrastructure to reach the destination of your interest via the most optimal route available.
 - **A single source for your international connectivity.** IPTP Networks as a service provider can make your business life easier by eliminating the need to manage multiple relationships with different ISPs.



3.1. ISPs - Remote IX Transit



3.1. ISPs - Remote IX Transit

- **Remote IX Transit** is an interconnection service type when a customer establishes a direct BGP session with IPTP Networks' router in other regions, rather than an interconnection location, for a partial BGP table.
- By connecting to remote IPTP Networks' routers, the customer gains access to regional routes received from IXes, Private Peers, and customers of IPTP Networks in those locations and customers' prefixes also advertised to those parties.
- However, to avoid loops via Remote IX Transit, it shall be used in conjunction with locally connected IP Transit or IX Transit at the interconnection point or customer market. Combining **Remote IX Transit** and **IP Transit** provides the solution to your requirement for **streamlined, rapid, and effortless connectivity**.

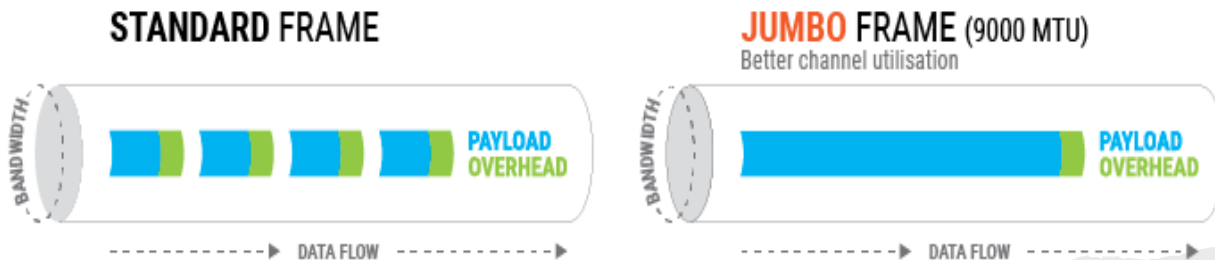
JUMBO PLATFORM

Jumbo Platform is a layer-2 interconnection solution providing a vast portfolio of direct, secure, and scalable connectivity services through a single Jumbo Platform Port that logically splits into multiple channels for different services, in similar manner to NNI.

In Jumbo Interconnection Platform, all available services are being provided via separate VLANs, plus, all members can reach leading network service and cloud providers across metros, nations, and continents.

Jumbo Interconnection Platform supports jumbo frame (up to 9000-byte MTU) capability. Jumbo frames enhances network performance by minimizing the overhead byte count and lessening the number of processed frames. It's ideal for large data transfers between two distant locations when both places use the same jumbo frame-capable provider.

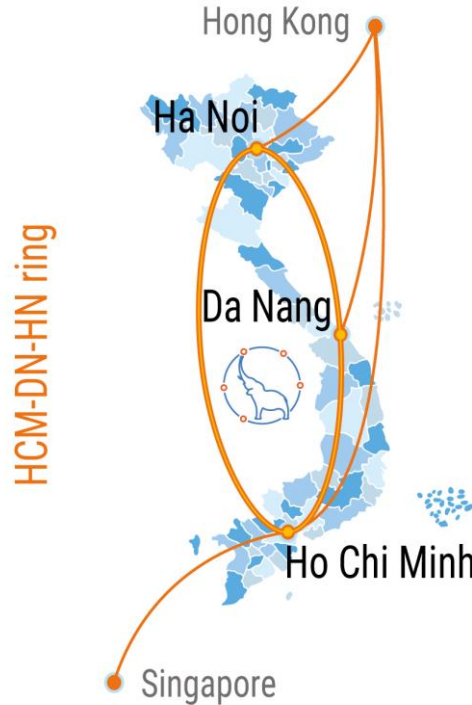
Jumbo Interconnection Platform services are delivered by leveraging IPTP's highly resilient 35+ Tbps private global backbone of 232 PoPs. Available in multiple locations around the world, it transports your data between different locations, allowing its members to obtain any available services and save cost.



JUMBO PLATFORM

Jumbo Interconnection Platform delivers direct access to IPTP's ecosystem:

Jumbo Interconnection Platform allows you to connect with leading ISPs, NSPs, IXPs, major cloud, CDNs, financial centres, enterprises and many other key partners and providers.



Jumbo Interconnection Platform available services:

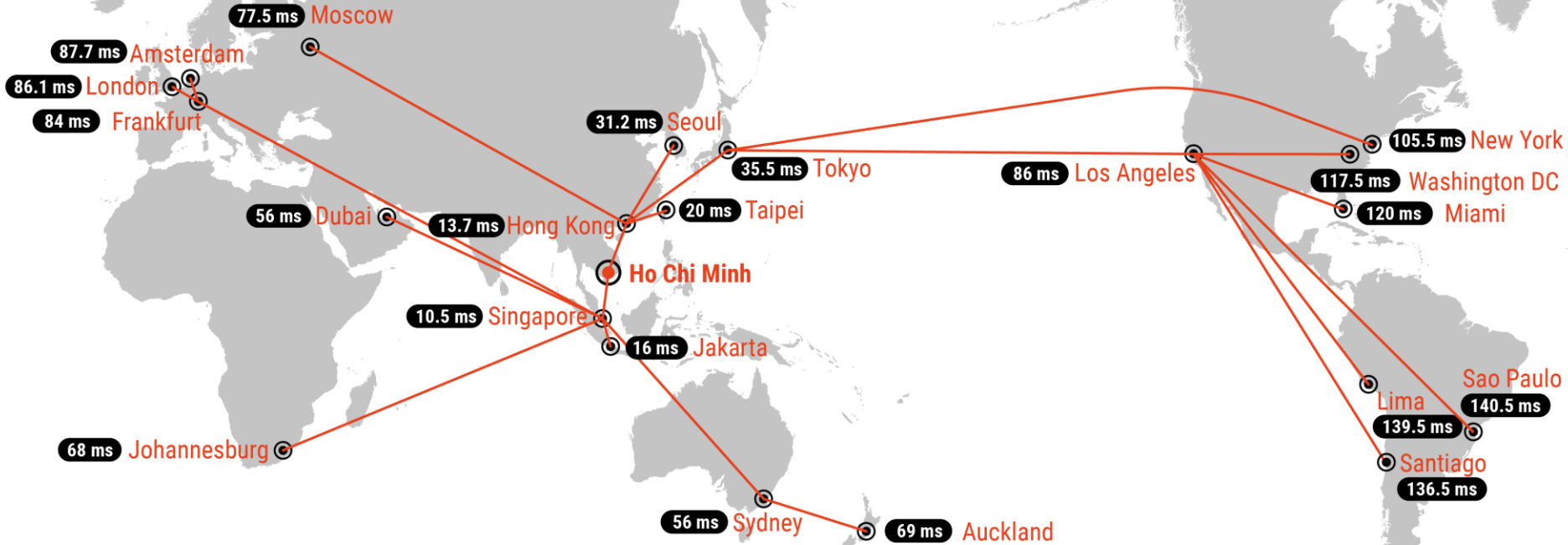
- Remote Peering at major regional and global Internet eXchanges
- Low Latency and Ultra Low Latency global transport• Connectivity services: MPLS, DIA, EoMPLS, EPL, IEPL/IPLC, etc.
- Direct connection to Cloud/ FOREX liquidity providers
- IP/IX transit included basic volumetric DDoS protection
- Virtual POP

3.2. End-Users - LAGBLASTER

- LAGBLASTER is a first-of-its-kind **Hybrid SD-WAN & MPLS** solution for accessing international resources via **IPTP Networks' low latency backbone**.
- To optimize latency to Internet destinations in specific countries, LAGBLASTER provides an IP address of the country you want to access in a manner of **Remote DIA**. Your traffic flows from your location to IPTP Networks' closest POP via SD-WAN and then through our MPLS service to selected destination, delivering an optimal latency and improved performance.
- LAGBLASTER **blasts away all lags** - reduces ping, minimizes jitter, eliminates packet reordering and congestion, and reduce close to zero packet loss using our optimized custom network routes.



BEST ROUTES



3.2. End-Users - LAGBLASTER

- LAGBLASTER is an **affordable solution** for real-time, latency-sensitive online activities globally such as gaming, video conferencing, live streaming, 8K broadcasting, and FOREX trading and other time-critical real-time users.
- By having sufficient terrestrial cables, LAGBLASTER and IPTP Networks can ensure customers a **fast and stable connection** from Vietnam to the rest of world, despite the submarine cables outages.
- The license is intelligently designed to automatically **split domestic and international routing** so users can access multiple contents simultaneously via a **management portal**.
 - Customers can access up to 5 different services in a 5 different locations at the same time.
 - Per Hours and monthly unlimited rates.

How LAGBLASTER works

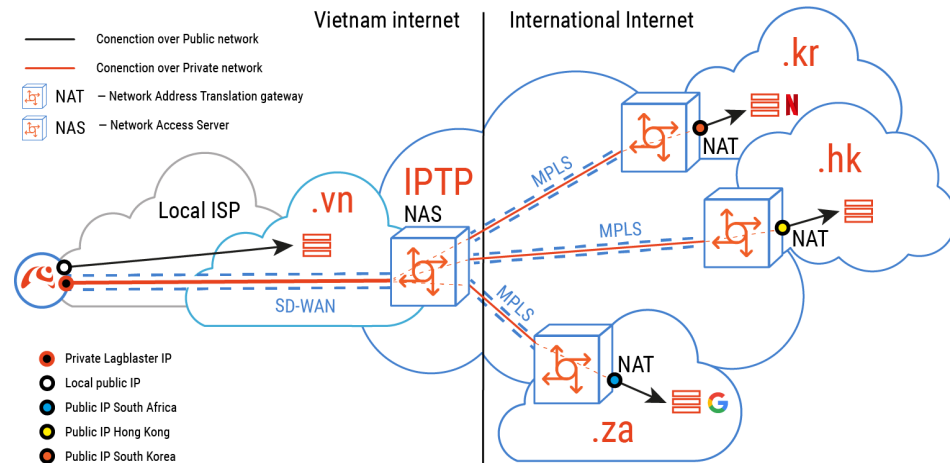
LAGBLASTER is a hybrid (SD-WAN & MPLS) Remote DIA solution.

LAGBLASTER users connect to desired IPTP NAS via SD-WAN technology and then establish a connection to designated IPTP NAT Gateway via MPLS transport. For instance, users in Vietnam establish SD-WAN-type connections via their local ISP's public IP address to the public IP address of IPTP Vietnam.

IPTP NAS is available in 3 regions, North (Hanoi), Central (Danang), and South (HCM), to get closer to the users in each region. This short-distance connectivity between LAGBLASTER users and IPTP NAS within Vietnam assures the best performance in that segment.

For example, within a city (HCM), a LAGBLASTER user, who is using VNPT Internet, only loses 2-3 ms to reach IPTP NAS. After reaching IPTP NAS via domestic Internet, the users' traffic will be fully carried on IPTP MPLS backbones to other countries and regions. These backbones are established via submarine and terrestrial cables connecting Viet Nam to the world.

Only the least affected and most stable submarine cables are included, so, whenever Vietnam's submarine cables have problems, LAGBLASTER users' connections are still safe and free of congestion & packet loss.



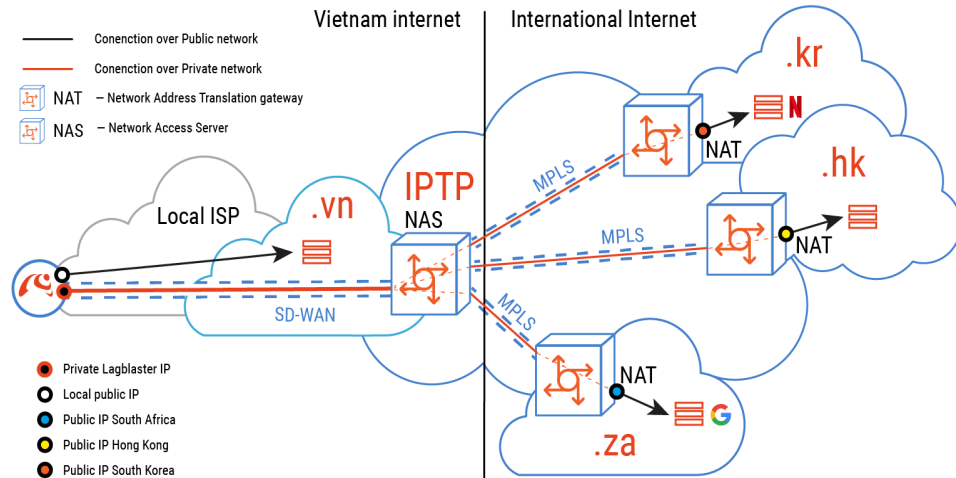
How LAGBLASTER works

At the destination country, we have NAT gateways that translate the source Private IP of the LAGBLASTER users to the destination country's IP address. It plays an important role in ensuring that our users have low latency and no packet loss and no jitter from Vietnam to other countries.

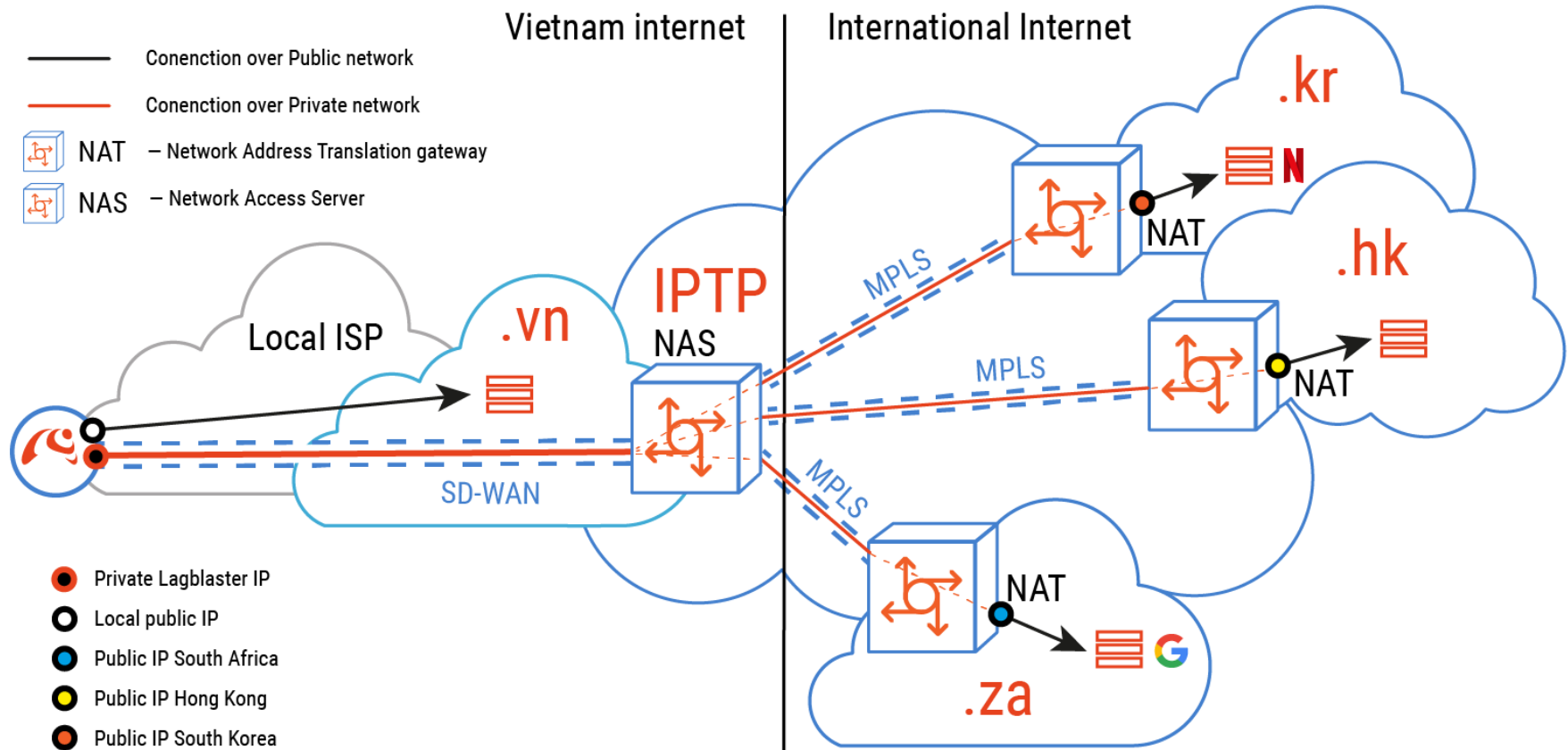
As the nature of the Internet and BGP, there are multiple paths to a specific prefix; and asymmetric routing happens in daily operations, leading to sub-optimal routing and high latency. With the destination's country IP address, traffic from LAGBLASTER users uses the domestic Internet of that country to reach the desired destination.

The reverse path from the destination to the IPTP's gateway should also use the domestic Internet of that country. This ensures symmetric routing and greatly helps optimize the path for LAGBLASTER users.

For example, if a LAGBLASTER user wants to connect to content in Korea, the traffic will pass through our clean and optimized MPLS links from Vietnam to Korea. In Korea, we have a NAT Gateway customer's Private IP address to a local Korean IP address. By using a Korean IP address as the source IP address, the path from our gateway to Korean content is optimized in a symmetric routing path via Korea's domestic Internet with low latency, no jitter, and no packet loss.



How LAGBLASTER works



LAGBLASTER

vs

Regular VPN

- 1) LAGBLASTER relies on a short segment of the domestic Internet, while the most segment of the connection paths are on clean and low-latency MPLS.
- 2) LAGBLASTER is similar to SD-WAN in being able to classify traffic by applications, such as Youtube, Facebook, KakaoTalk, etc., and route them to the desired destinations.
- 3) LAGBLASTER is able to route all the destination's prefixes of a country. For example, when you choose the "Main route" to be Johannesburg and "Traffic" as Only from the LAGBLASTER management portal, all traffic to South africa will be routed to Africa node, while others traffic continue to be routed via the local ISP.
- 4) LAGBLASTER separates international traffic and domestic traffic. Domestic traffic continues going through local ISPs, so it won't be sub-optimize when using local services.
- 5) LAGBLASTER does not move (teleporting) IP from the remote location to your local devices. Ping from the remote location to LAGBLASTER's remote IP would still be normal (only a few ms within the market)

- 1) VPN relies fully on the Internet, which might be affected by congestion and high latency from user's devices to VPN's servers.
- 2) VPN cannot distinguish services and route the traffic to right destinations.
- 3) VPN cannot do this.
- 4) VPN cannot do this. If we choose VPN's exit point as Singapore, the RTD might be over >40ms to get to tuoitre.com.vn from HCMC. But when using LAGBLASTER, the RTD is only <3ms.
- 5) Ping number in this case would increase a lot



IPTP Networks - Introduction



IPTP Networks

A better Network, not just a bigger one.



Managed Service Providers
(MSP)/System Integrator (SI)



Global Internet Service Provider (ISP)
(AS41095)



Telecom Infrastructure Services

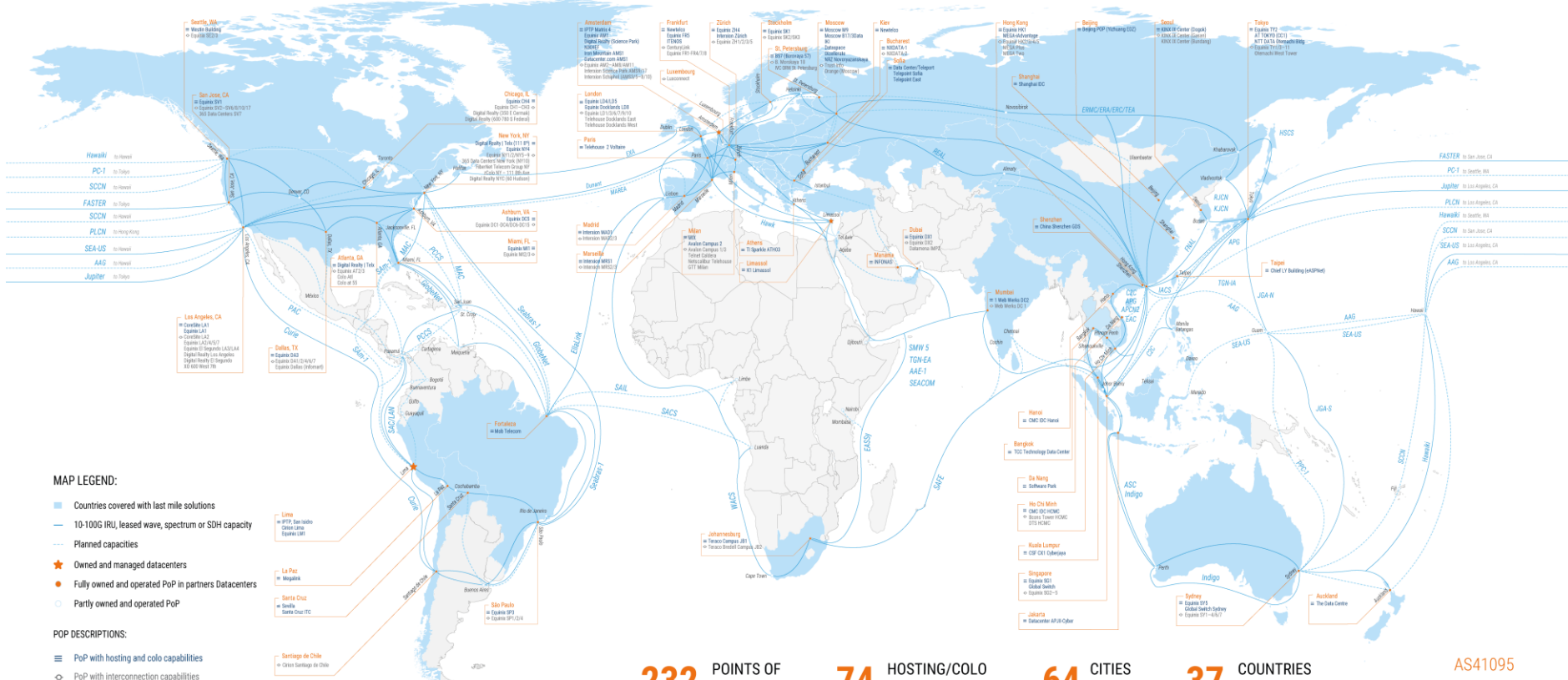


Software Development Company

- **27** years operated in the Global Market
- **10** offices worldwide
- **3** owned datacenters
 - Matrix 4 (Science Park, NL)
 - Kermia 1 (Limassol, CY)
 - San Isidro (Lima, PE)
- **232+** Points of Presence
- **75+** hosting/co-location facilities

Global Network and Points of Presence map

Link: iptp.net/map



- MAP LEGEND:**
- Countries covered with last mile solutions
 - 10-100G IRU, leased wave, spectrum or SDH capacity
 - Planned capacities
 - ★ Owned and managed datacenters
 - Fully owned and operated PoP in partners Datacenters
 - Partly owned and operated PoP
- POP DESCRIPTIONS:**
- ≡ PoP with hosting and colo capabilities
 - PoP with interconnection capabilities

232 POINTS OF PRESENCE **74** HOSTING/COLO FACILITIES **64** CITIES **37** COUNTRIES

AS41095
Contact us: sales@iptp.net



THANK YOU FOR YOUR LISTENING

More about IPTP Networks' products and services: iptp.vn

