

A large, semi-transparent graphic on the left side of the slide. It consists of a globe-like shape composed of light blue and green hexagonal cells, overlaid with a network of blue dots and lines representing a communication network. At the bottom center, there are two overlapping light pink triangles.

SERVICE OPTIMIZING SOLUTION

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OUTLINE

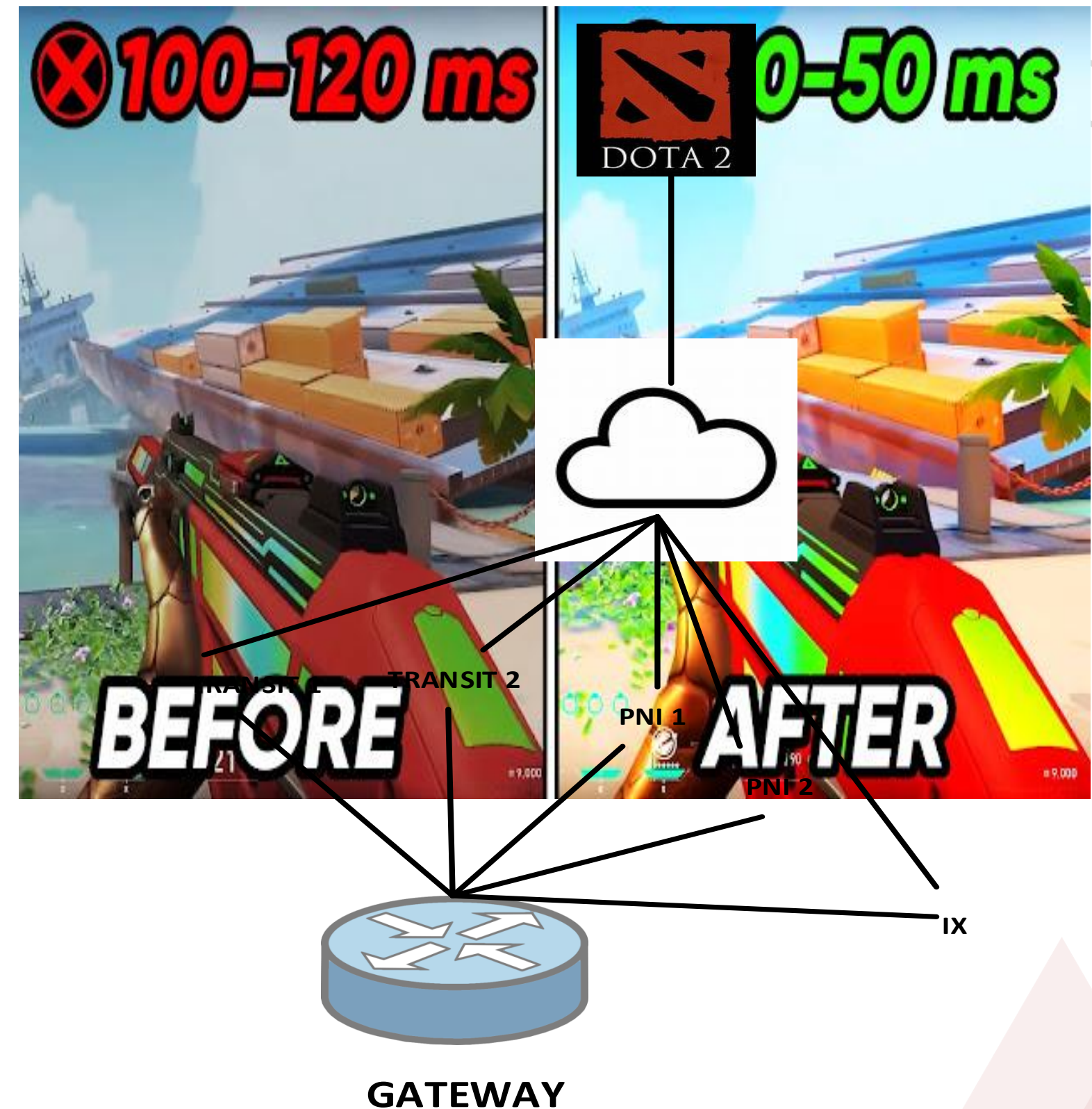
- 0 FACING PROBLEM**
- 1 DATA COLLECTION**
- 2 MONITOR SYSTEM**
- 3 OPTIMIZE SYSTEM**


PROBLEMS

- Increasing in report of service issues, high requirement
- Multiple PNI/Transit/IX
 - Evaluate quality of upstream
 - Which is best upstream for specific services ?

→ Easily in finding destination prefixes

→ Automatically optimize defined services

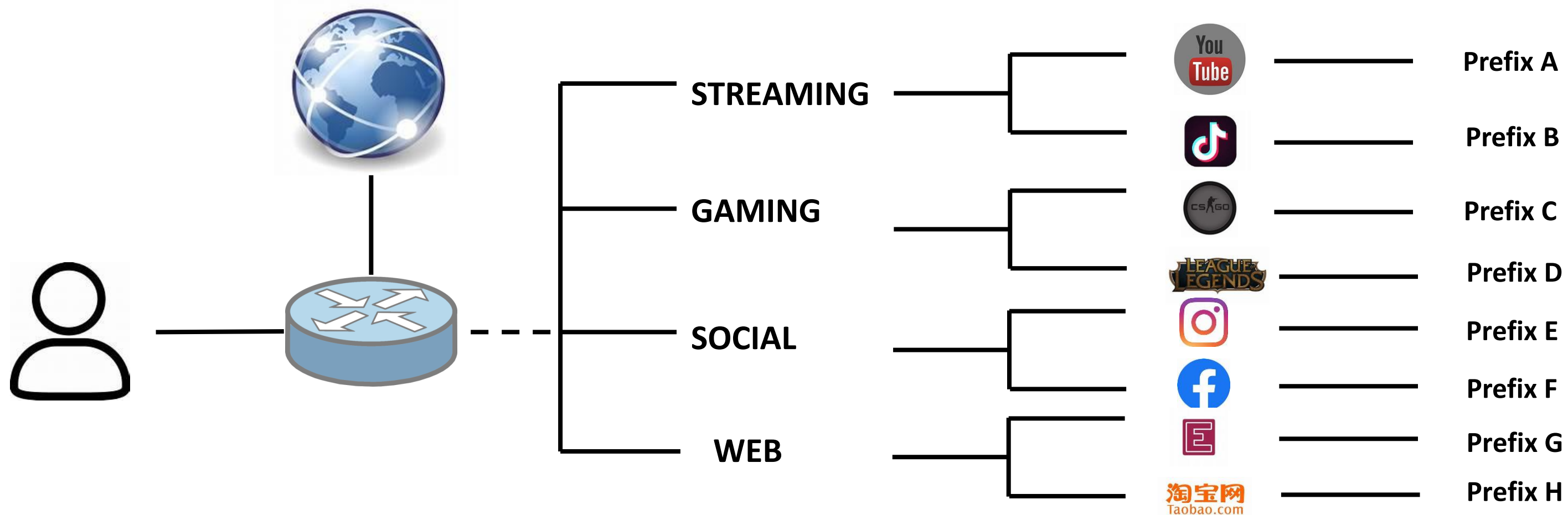


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1 DATA COLLECTION

1. Analyzing user's packets to collect data :

- *Services divided into categories*
- *Each category contains applications*
- *Each application have multiple prefixes*



2. Information Filtering :

- *Using analyze system to verify*
 - *Time using, connections, traffic, ...*
- *Crosscheck with public information from publisher*
- *Mannual*
 - *Wireshark, network monitoring, ...*

Warcraft III


Technical Support Forums

Region	IP Address
North America	137.221.106.69 137.221.106.169
Europe	37.244.28.40 37.244.28.140
Asia	117.52.35.75 117.52.35.175
China	223.252.226.100 223.252.226.200

Before you contact us or post on our forums about connection or latency issues, please have the following information available. This information will help us diagnose issues outside our network.

- Description of the problem, including affected games or services.
- Date and time the issue occurred.
- Your IP Address, ISP, and connection type.
- A traceroute and [pathping](#) performed when the issue occurs.
- An [MTR](#) test performed when the issue occurs.

> [Analyzing my Traceroute](#)

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1. Pi:

- *Running scripts to collect data*

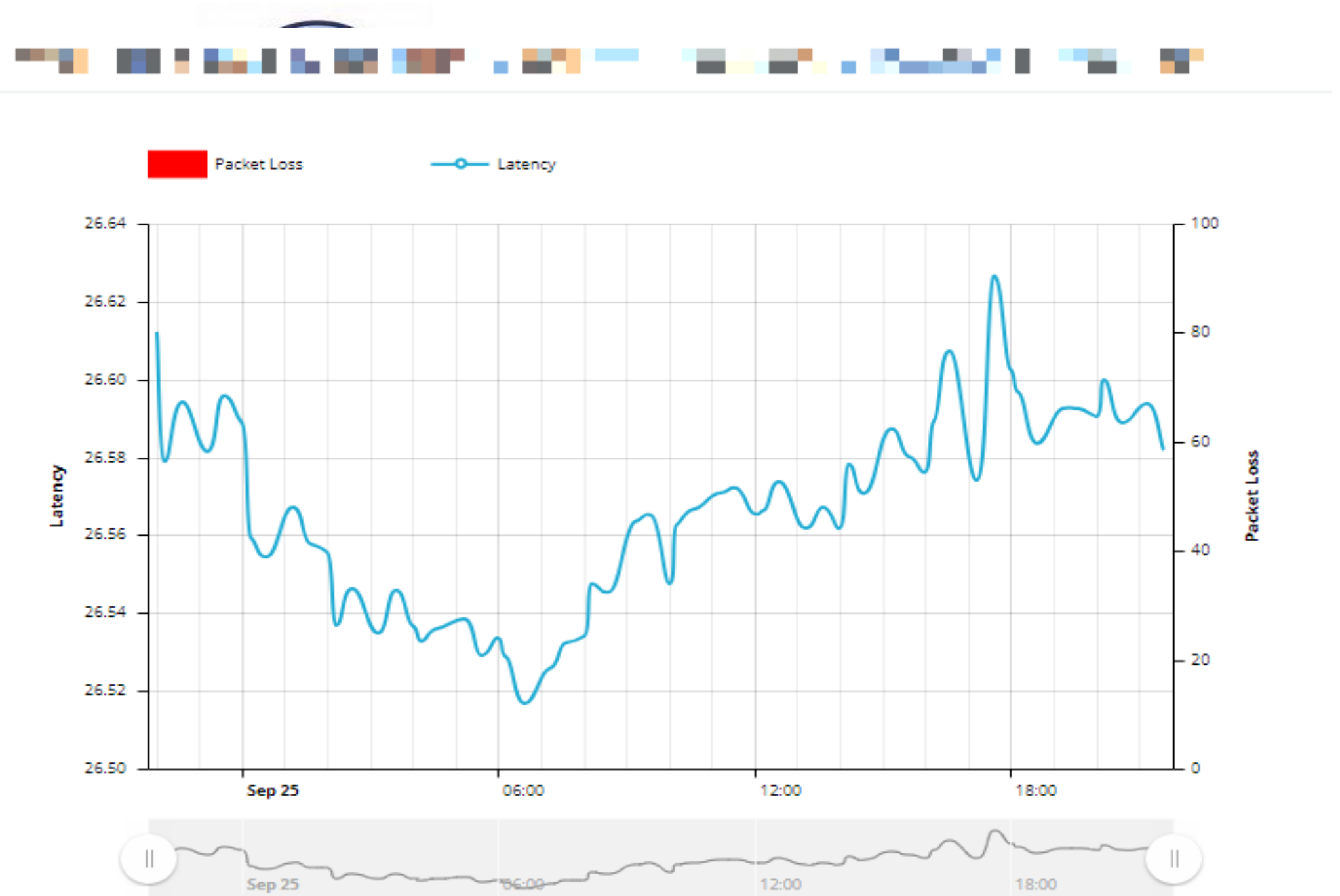
2. Quality assessment system :

- *Base on testing data to generate baseline for each service*
- *Create reports*



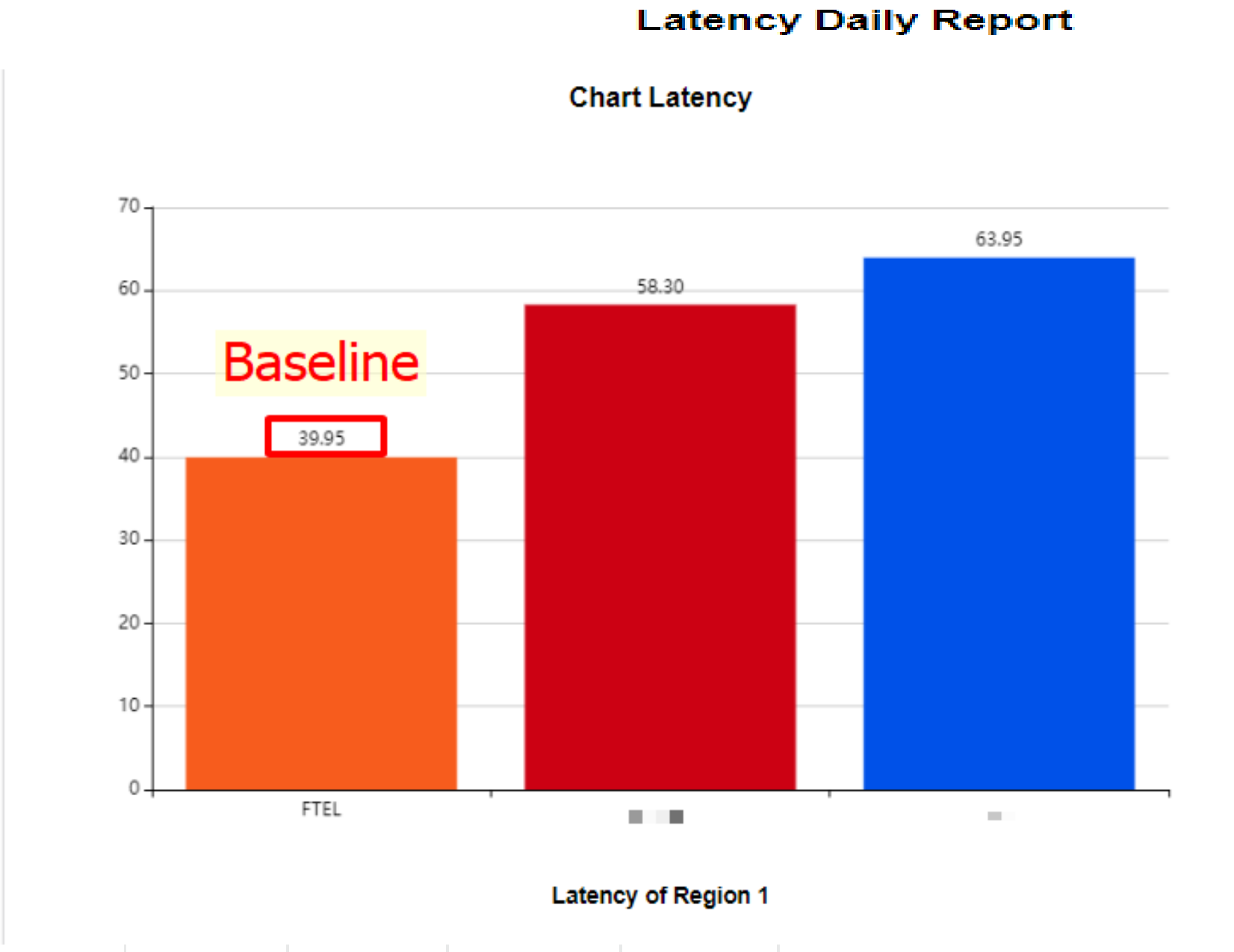
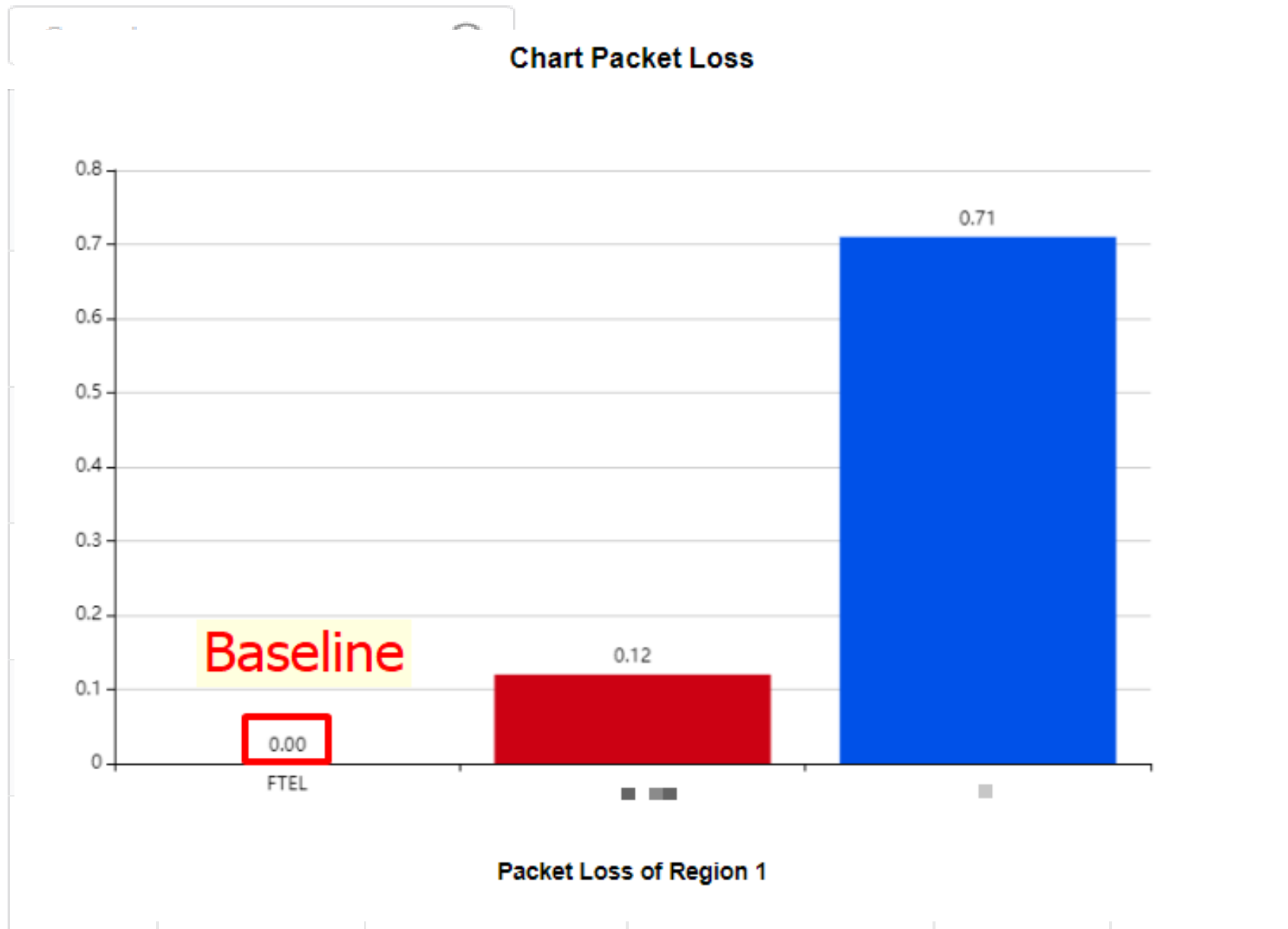
1. Pi:


- *Installed behind customer's modem, running specific scripts for certain service*
- *Represent for a customer*
- *Data is transmitted to central system for analyzing*



2. Quality assessment system :

- Summarized data is compared with other ISPs → Baseline
- Report generated everyday for bad services



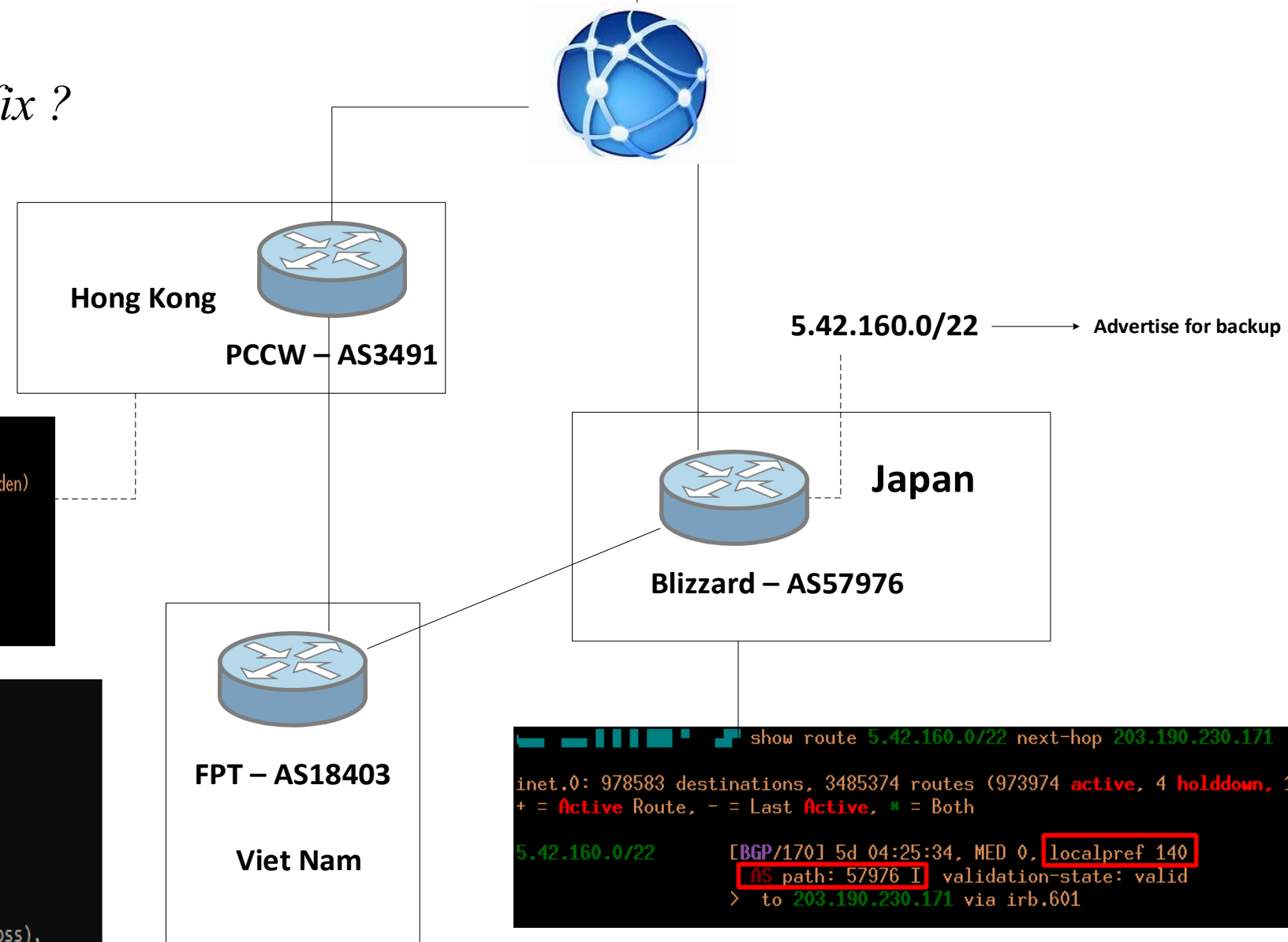
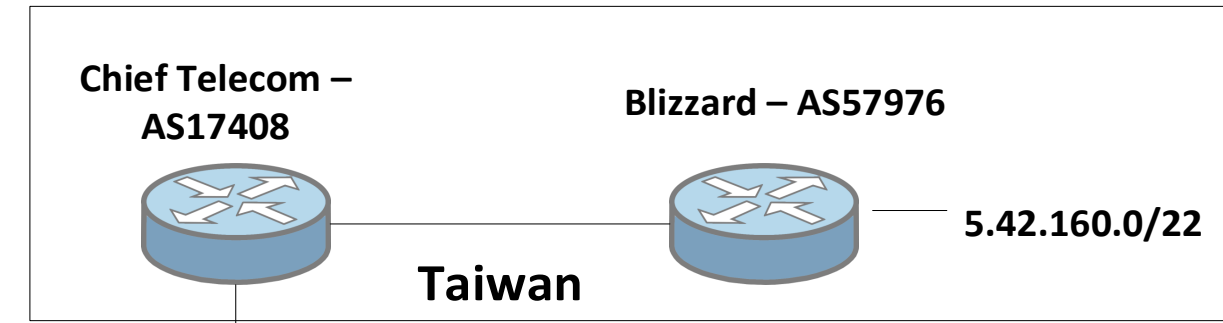
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3 OPTIMIZE SYSTEMCOLLECTION

- Destination : 5.42.160.0/22 – Location : Taiwan

- Route following by BGP lead to high latency

→ How can we detect which is the best upstream for prefix ?



```

show route 5.42.160.0/22
inet.0: 974657 destinations, 3684495 routes (972745 active, 10 holddown, 1008260 hidden)
+ = Active Route, - = Last Active, * = Both
5.42.160.0/22 * [BGP/170] 1w4d 07:55:00, MED 0, localpref 155
AS path: 3491 3462 17408 57976 I, validation-state: valid
> to 63.217.16.77 via ae2.856
    
```

```

C:\Users\HieuHT37>ping 5.42.160.129
Pinging 5.42.160.129 with 32 bytes of data:
Reply from 5.42.160.129: bytes=32 time=69ms TTL=237
Reply from 5.42.160.129: bytes=32 time=75ms TTL=237
Reply from 5.42.160.129: bytes=32 time=69ms TTL=237
Reply from 5.42.160.129: bytes=32 time=69ms TTL=237

Ping statistics for 5.42.160.129:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 69ms, Maximum = 75ms, Average = 70ms
    
```

```

show route 5.42.160.0/22 next-hop 203.190.230.171
inet.0: 978583 destinations, 3485374 routes (973974 active, 4 holddown, 164300 hidden)
+ = Active Route, - = Last Active, * = Both
5.42.160.0/22 [BGP/170] 5d 04:25:34, MED 0, localpref 140
AS path: 57976 I, validation-state: valid
> to 203.190.230.171 via irb.601
    
```

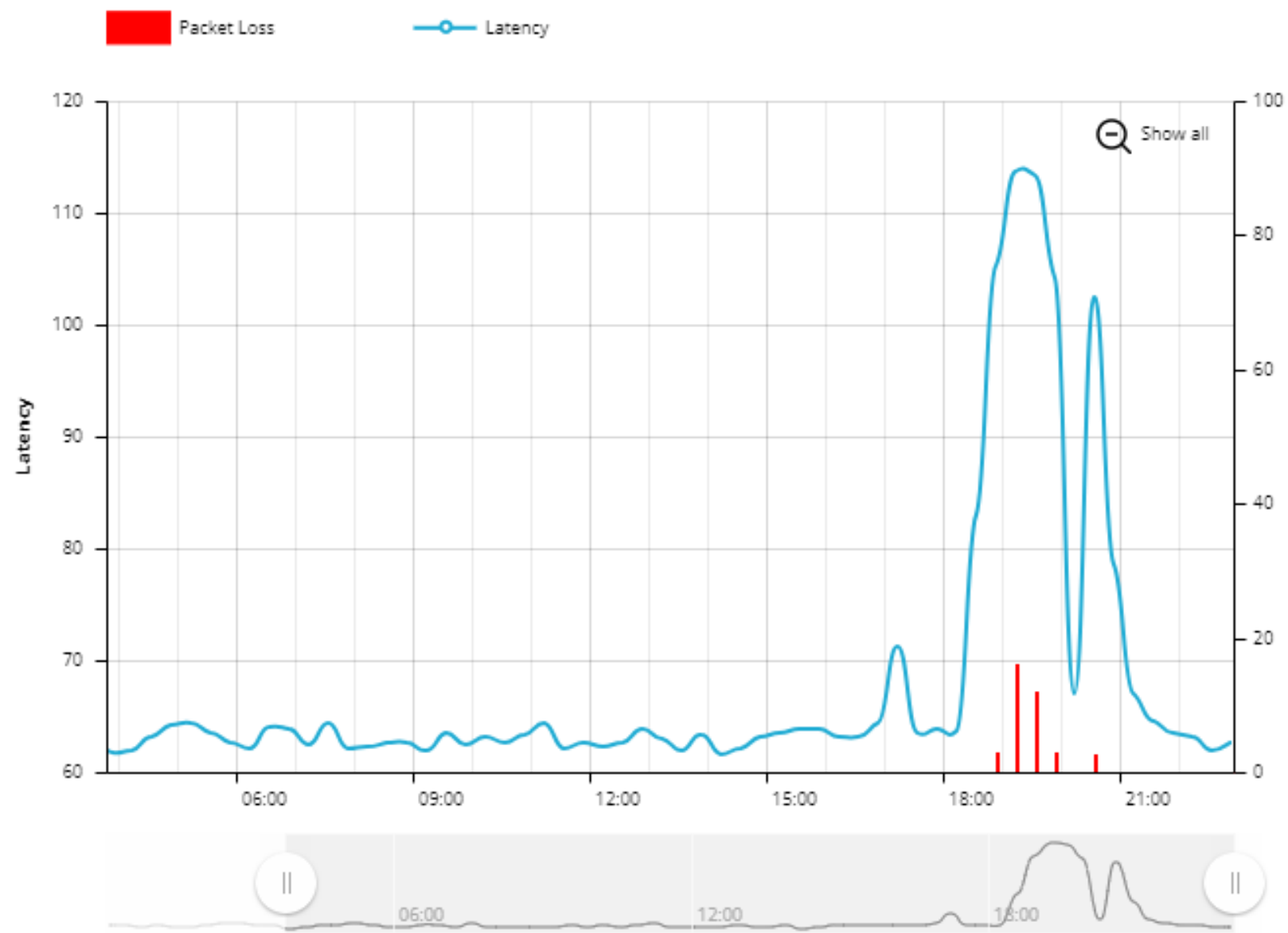
```

C:\Users\HieuHT37>ping 5.42.160.129
Pinging 5.42.160.129 with 32 bytes of data:
Reply from 5.42.160.129: bytes=32 time=116ms TTL=237
Reply from 5.42.160.129: bytes=32 time=116ms TTL=237
Reply from 5.42.160.129: bytes=32 time=116ms TTL=237
Reply from 5.42.160.129: bytes=32 time=124ms TTL=237

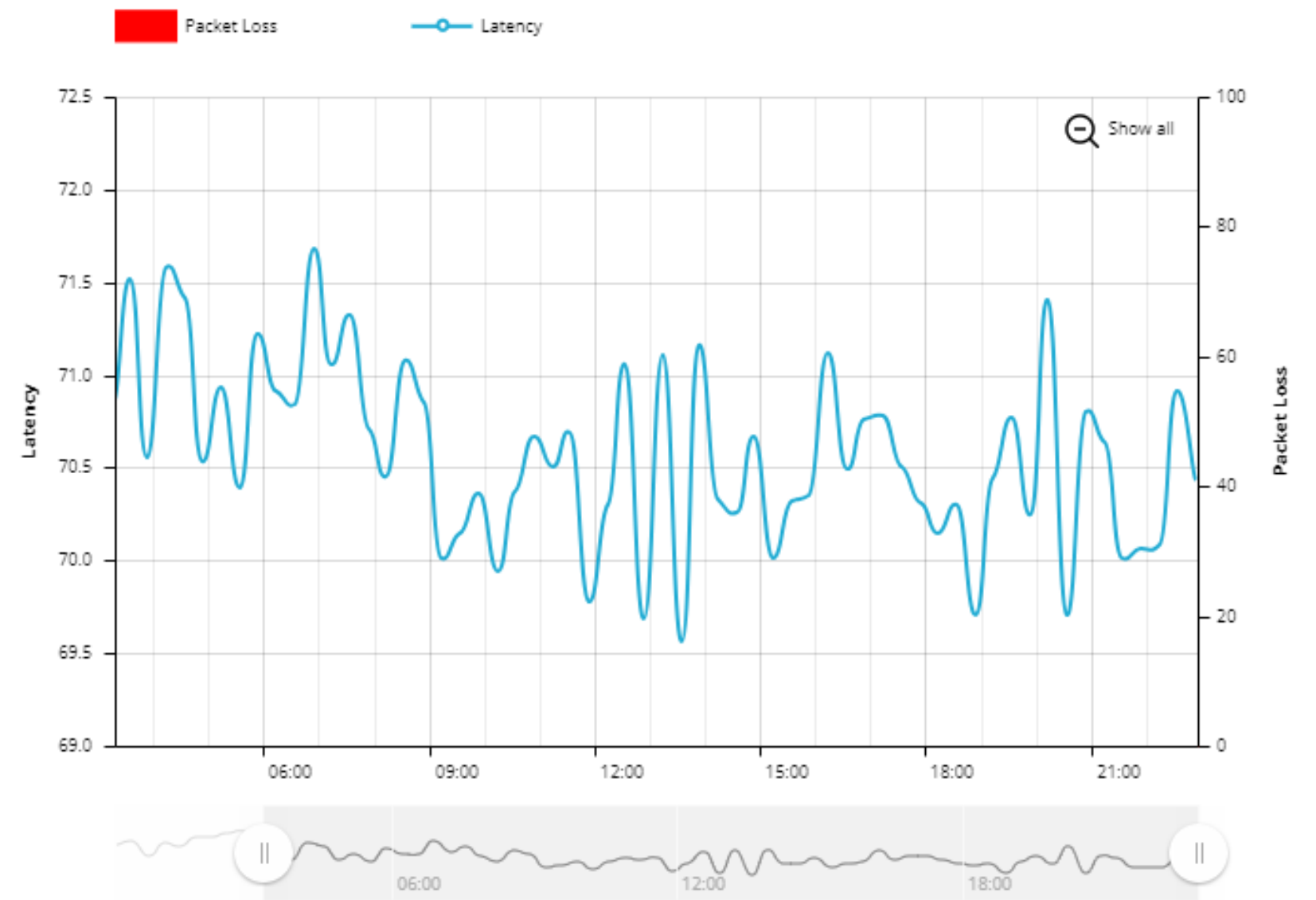
Ping statistics for 5.42.160.129:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 116ms, Maximum = 124ms, Average = 118ms
    
```

3 OPTIMIZE SYSTEM

- Transit not good all the time
- Each upstream is suitable for certain services



Transit A : Good latency but packet loss and high ping in peak time



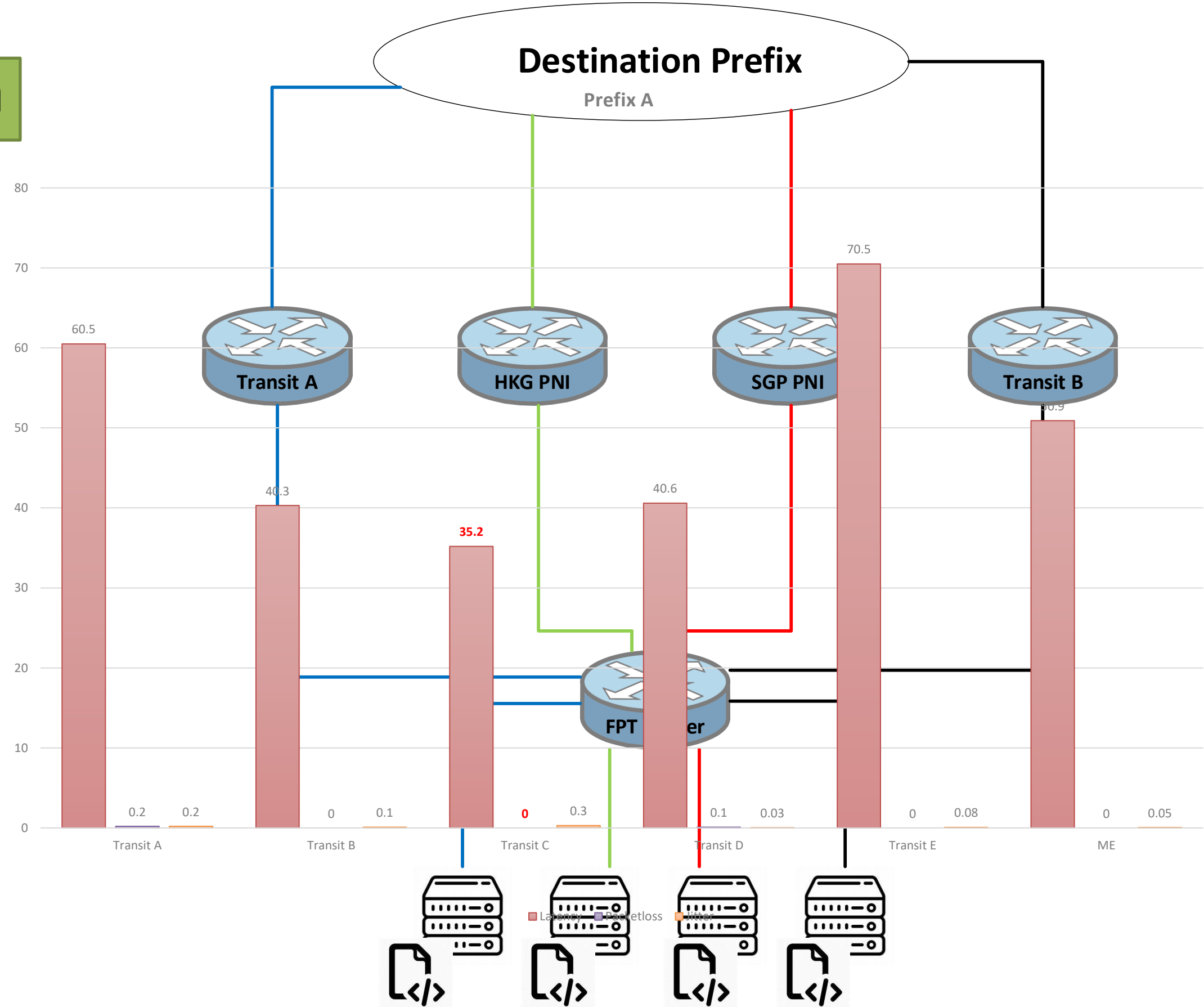
Transit B : Higher latency than Transit A but no packet loss and stable

3 OPTIMIZE SYSTEM

Upstream Measurement System

- Each prefix is measured by servers with different upstream
→ Real-time data
- Outbound and inbound are optimized to go through certain upstream
- Real-time data is used to suggest for best upstream base on specific service

→ Controller is deployed to automatically optimize the route

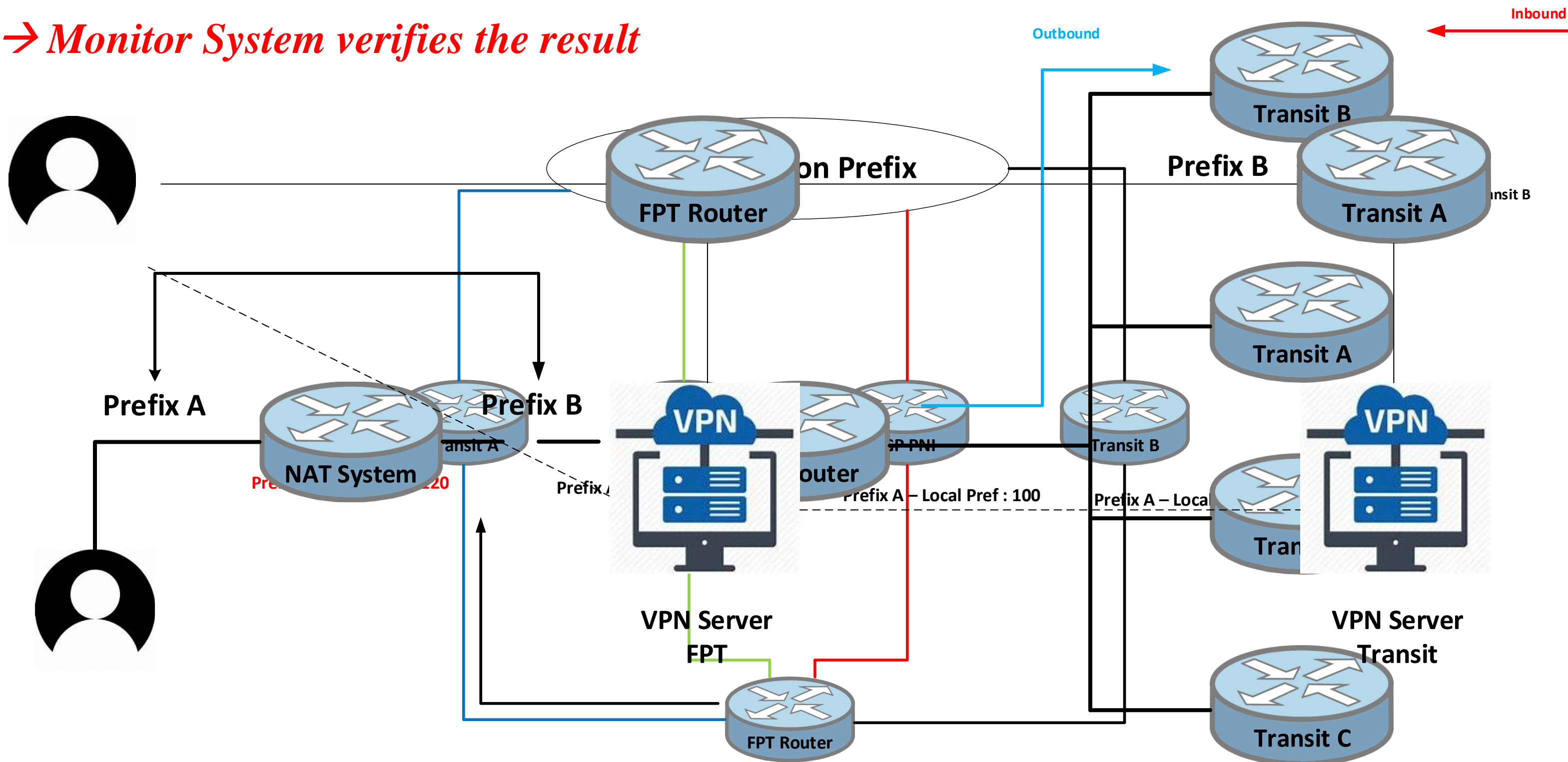


3 OPTIMIZE SYSTEM

OPTIMIZING METHODS

→ ~~NAT Server is used for some important prefix as a transit specific upstream~~

→ *Monitor System verifies the result*



THANK YOU

