Route Server at IXP
~ JPIX stats, present and getting ahead ~

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What we will talk here

- **I talk about present conditions in Route Server and discuss way to improve service.**

- **All IXPs want to make service level and quality better.**
  - **I hope this session will help to bring improvement.**

- **For all engineers getting involved Route Server service**
  - **ISPs, Router hardware vender, absolutely IXPs**

Agenda

1. **Introduction**
   - **What's Route Server at IXP?**
   - **Route Server Implementation**

2. **JPIX Route Servers**
   - **Introduction: JPIX**
   - **System Implementation**
   - **Stats**

3. **Route Server issues facing JPIX**

4. **Requirement for service from RS participants**

5. **Requirement for implementation from IXP**

6. **Request for Comments**

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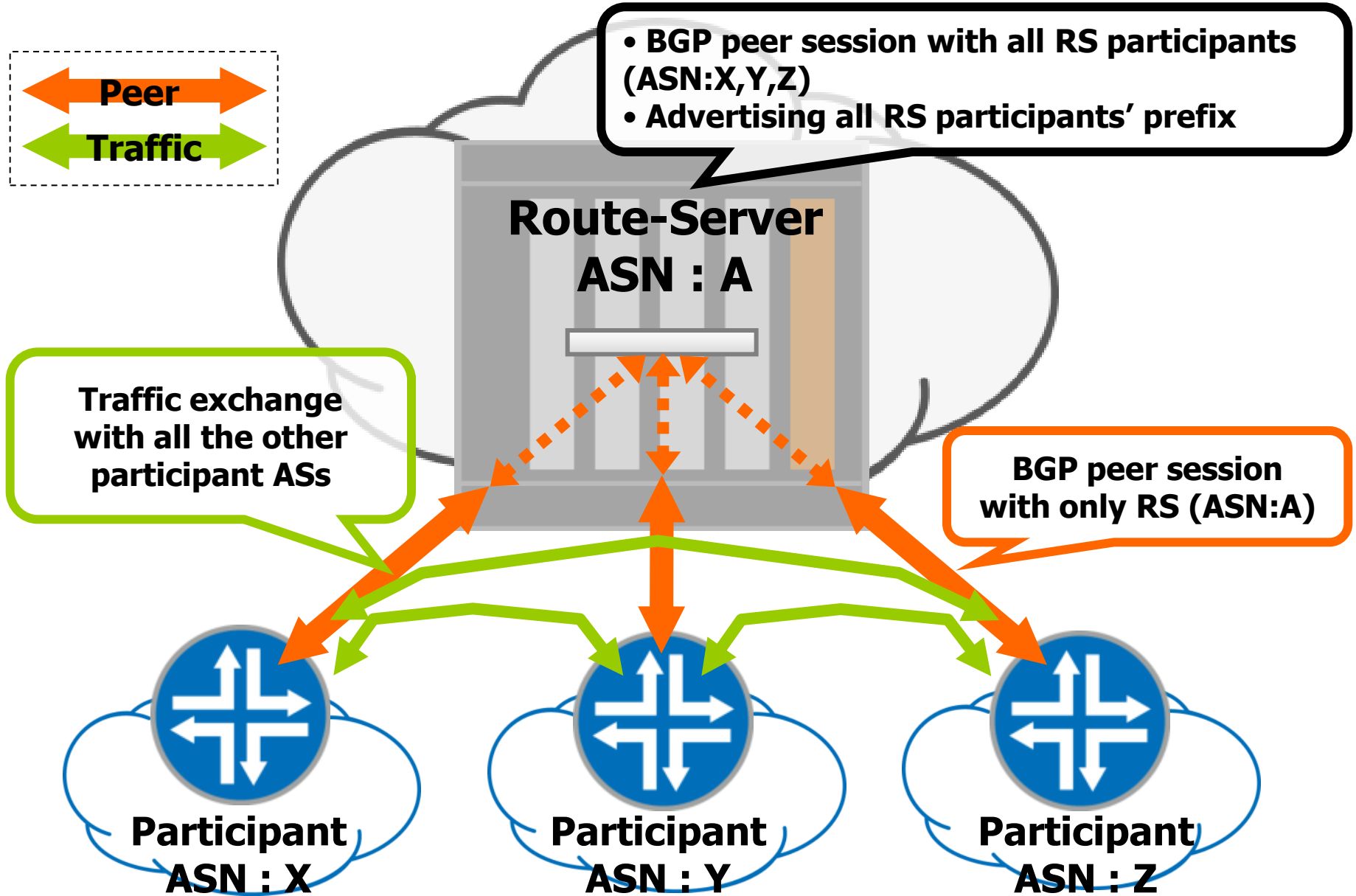
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What's Route Server at IXP?

- **"Route Server" from RFC1863**
  - A process that collects routing information from border routers and distributes this information to "client routers".

- **Service's purpose (it's simple)**
  - Route reflector from various global ASs
  - Multi-lateral Peering at IX segment
    - one bgp peer config for many ASs' prefixes

- **Service's optional functions**
  - Route filter
    - AS-Path filter, Prefix filter (ex. based IRRd)
  - Policy filter
    - Using bgp community attribute
  - Route confirm
    - Comparison with IRRd database
    - Looking glass

What's Route Server at IXP?

Peer

Traffic

• BGP peer session with all RS participants (ASN:X,Y,Z)
• Advertising all RS participants' prefix

Route-Server
ASN : A

Traffic exchange with all the other participant ASs

BGP peer session with only RS (ASN:A)

Participant
ASN : X

Participant
ASN : Y

Participant
ASN : Z

Route Server Implementation

- **OSS daemon**
  - **IXP is generally using now.**
    - **Quagga**
    - **OpenBGPd**
    - **BIRD**
  - **Topic issue**
    - **More stable. More reliable.**
    - **Quagga development team isn't doing very well in past days.**
    - **But, development activity is going well worldwide.**
    - **Euro-IX RS Working Group is working on improvement project.**
    - **Recently, NANOG 48 meeting had route servers session.**
- **Commercial implementation**
  - **Fewer IXP using than OSS now.**
    - **Vyatta**
    - **ZebOS**
    - **Network hardware vender's implementation**
    - **...etc**
  - **Topic issue**
    - **Actual case reports are very few.**
    - **But, hardware venders are interested in implementing.**

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Introduction: JPIX

- **Ethernet-based Layer 2 IX (Commercial)**
  - **Our main service**
  - **IX Switch installation site (2 segmentalized sites)**
    - **Tokyo Metropolitan Site**
      - **Otemachi, Bayarea, Otemachi 2nd, Toyosu, Nihonbashi,Nagoya, Tennozu.**
    - **Osaka Site**

- **Optional Service (Free of Charge)**
  - **Route Server < This presentation theme!!**
  - **NTP Server**
  - **NNTP Server**
  - **etc..**

- **Members**
  - **125AS over**

Introduction: JPIX
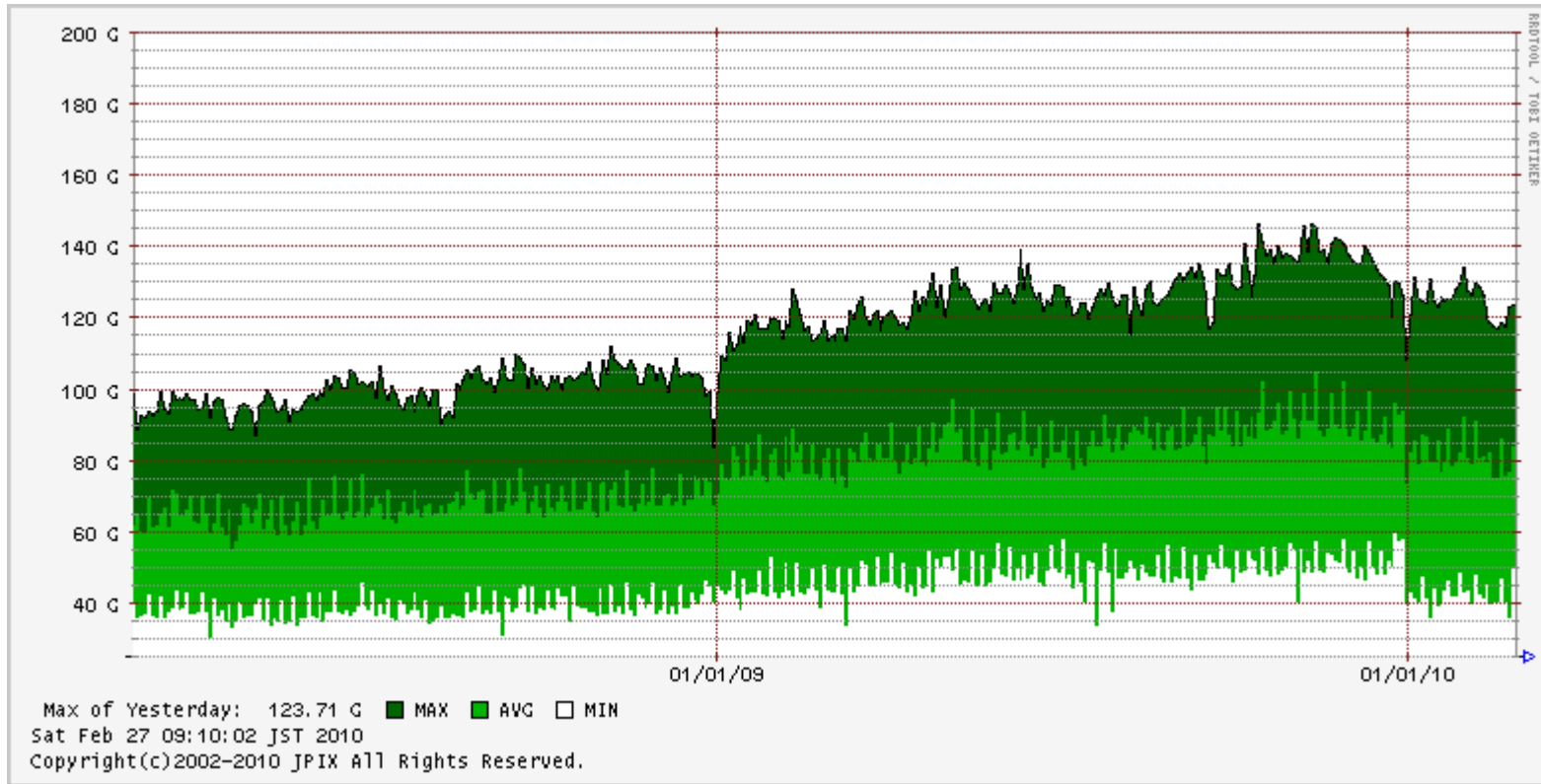
peak traffic : 120Gbps over

Introduction: JPIX (extras)

Traffic dimple on 13:00–15:00 26th Feb 2010
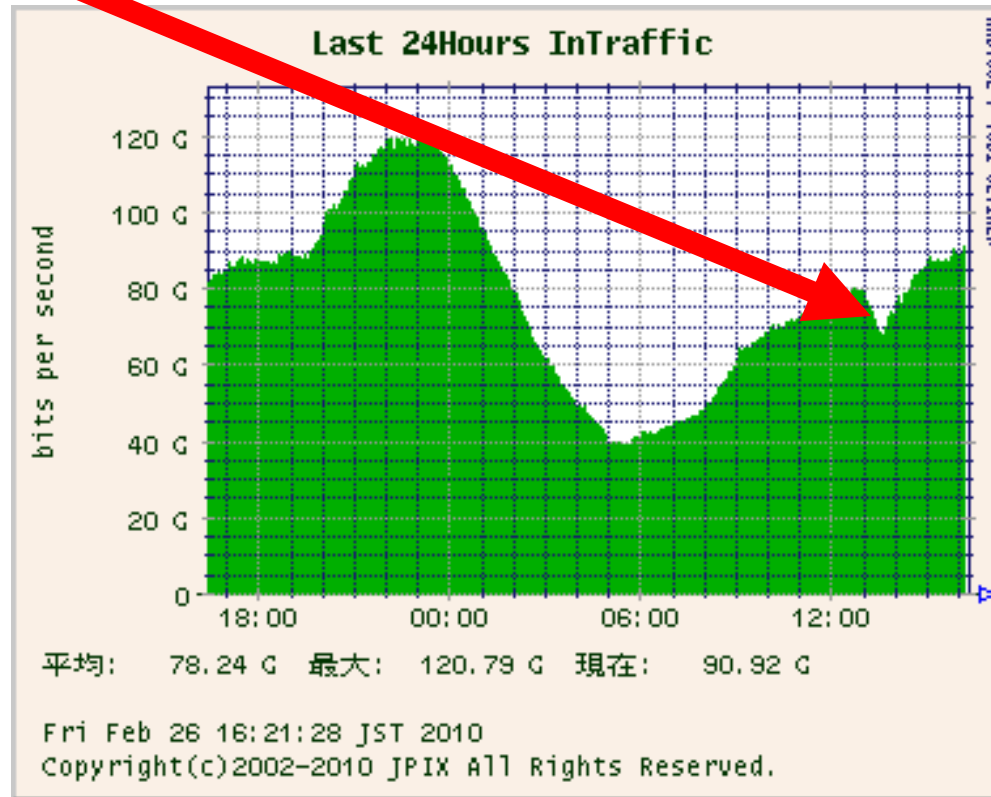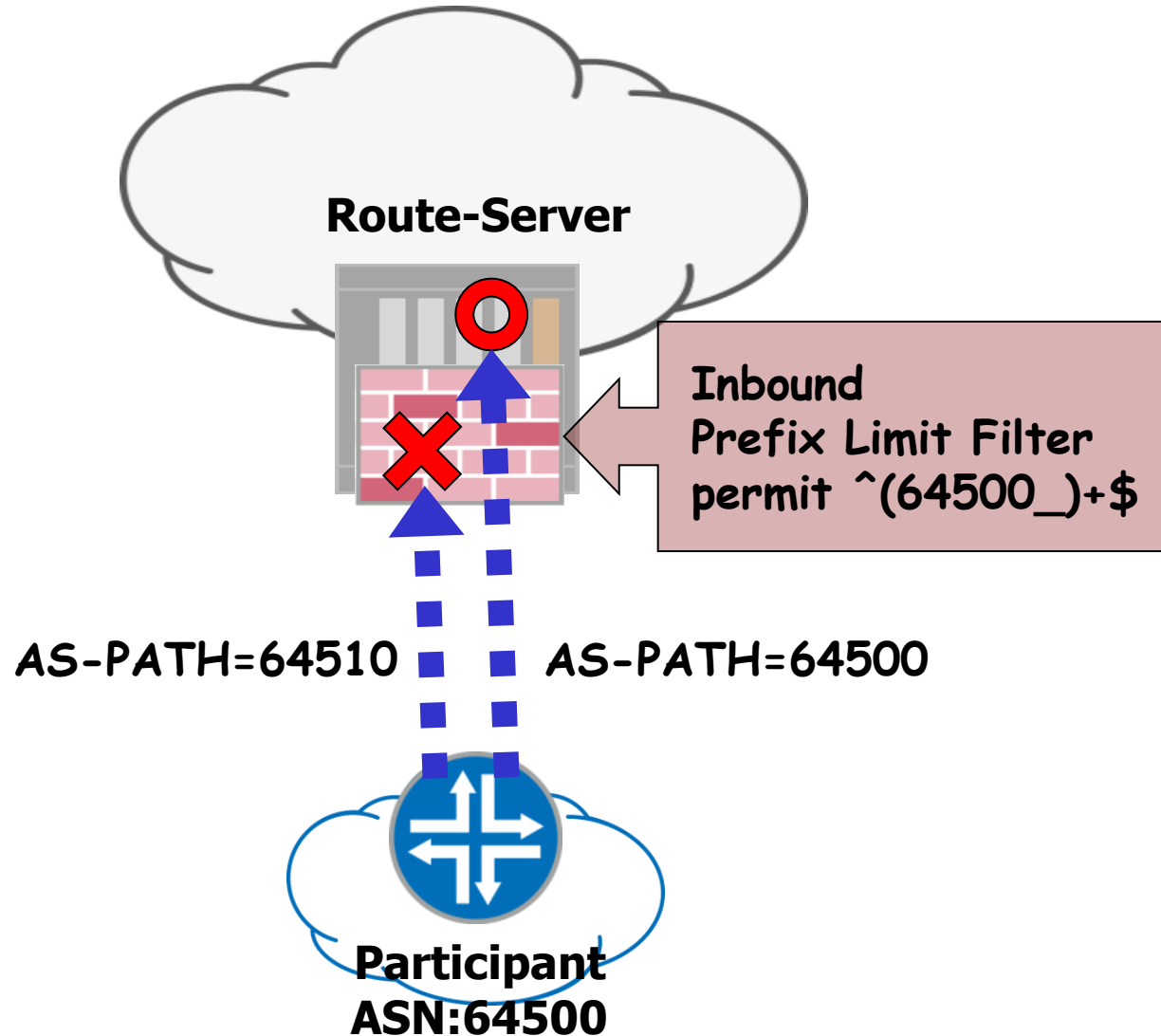

- **This traffic dimple is cased by figure skating final performance at Olympic Winter Games Vancouver**
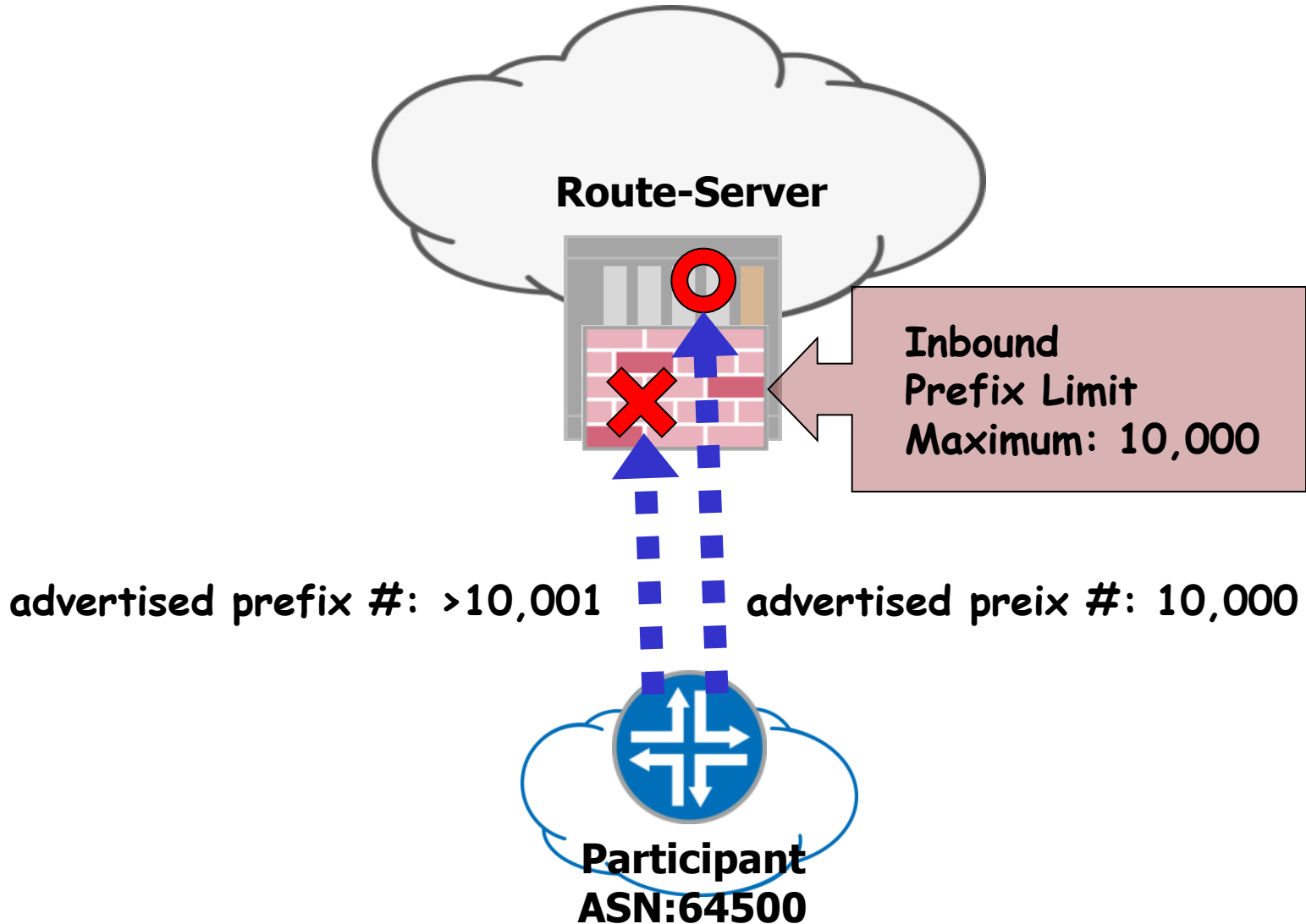- **Most Japanese Net-Surfers was watching TV in this time.**

Excuse me, Let's get back to the subject. ☺

JPIX Route Servers Implementation

- ## Based on Quagga
  - Protect BGP session with TCP/MD5 support
  - Dual Stack (IPv4/IPv6) bgp peering support
  - 4Byte ASN support

- ## Route Filtering
  - Inbound AS-PATH filter on Route-Server
  - Prefix Limit (10,000prefix/peer)

- ## Redundancy
  - Participants are peering with both active RS and backup RS

- ## Management from Participant operator
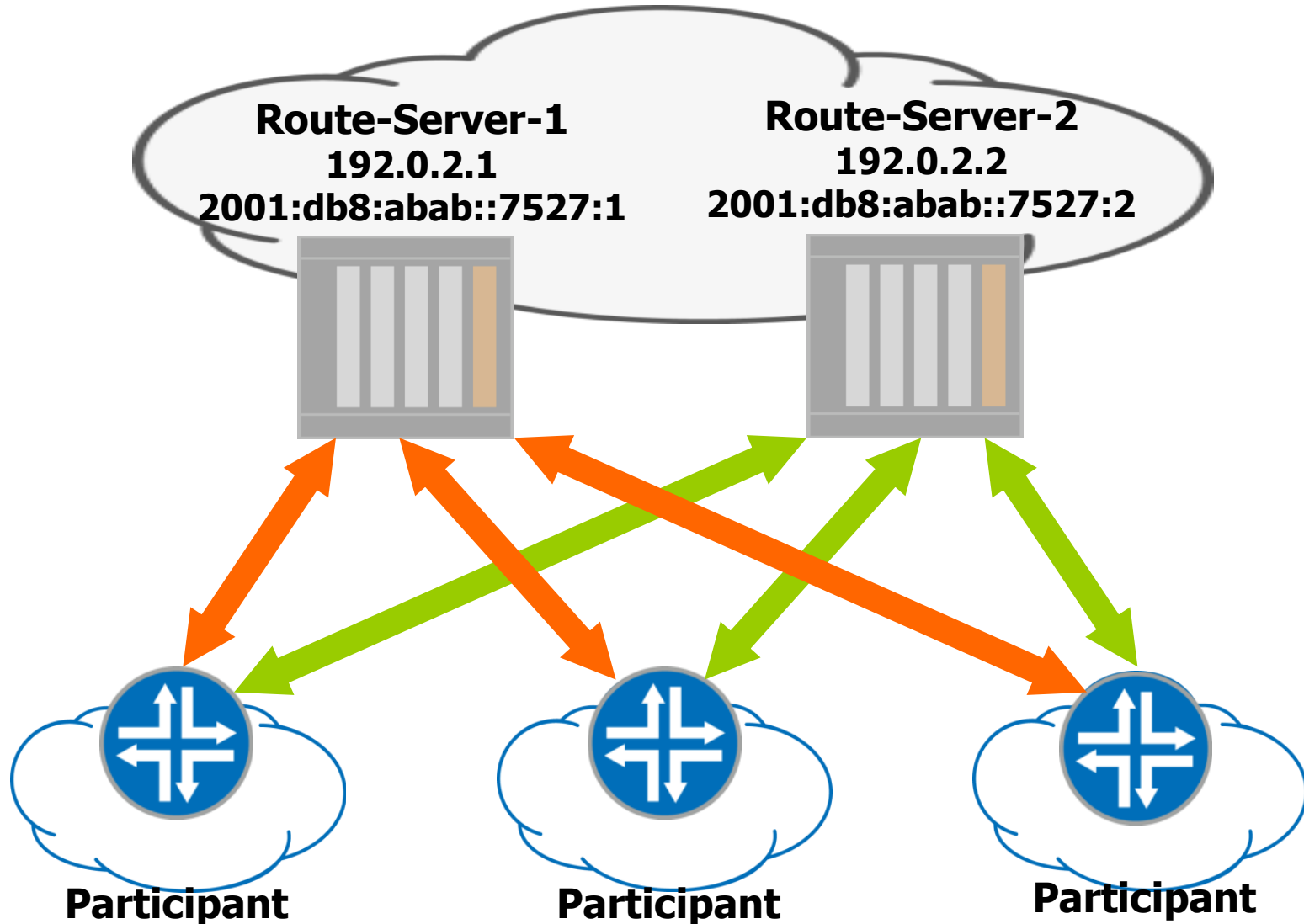 - Managed by Web-based GUI (Customer's Portal Web)

JPIX Route Servers Implementation

Route Filtering (AS-PATH Filter)

Route-Server

**Inbound
Prefix Limit Filter
permit ^(64500_)+$**

AS-PATH=64510   AS-PATH=64500

**Participant
ASN:64500**

JPIX Route Servers Implementation

Route Filtering (Prefix Limit)

Route-Server

**Inbound
Prefix Limit
Maximum: 10,000**

advertised prefix #: >10,001   advertised preix #: 10,000

**Participant
ASN:64500**

JPIX Route Servers Implementation
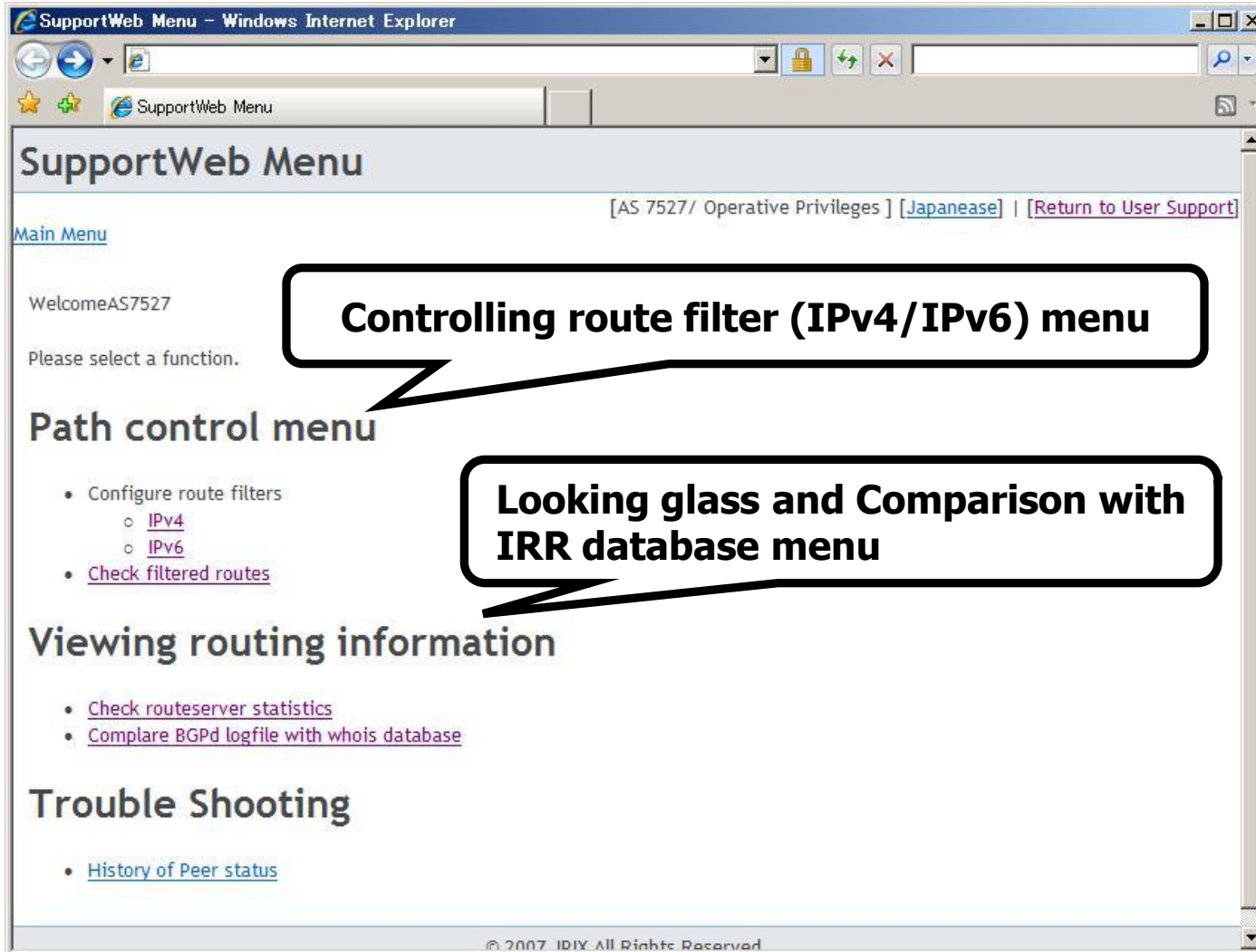
Route-Server Redundancy

Route-Server-1
192.0.2.1
2001:db8:abab::7527:1

Route-Server-2
192.0.2.2
2001:db8:abab::7527:2

Participant   Participant   Participant

JPIX Route Servers Implementation

JPIX Route-Server Customer's Portal Web

Controlling route filter (IPv4/IPv6) menu

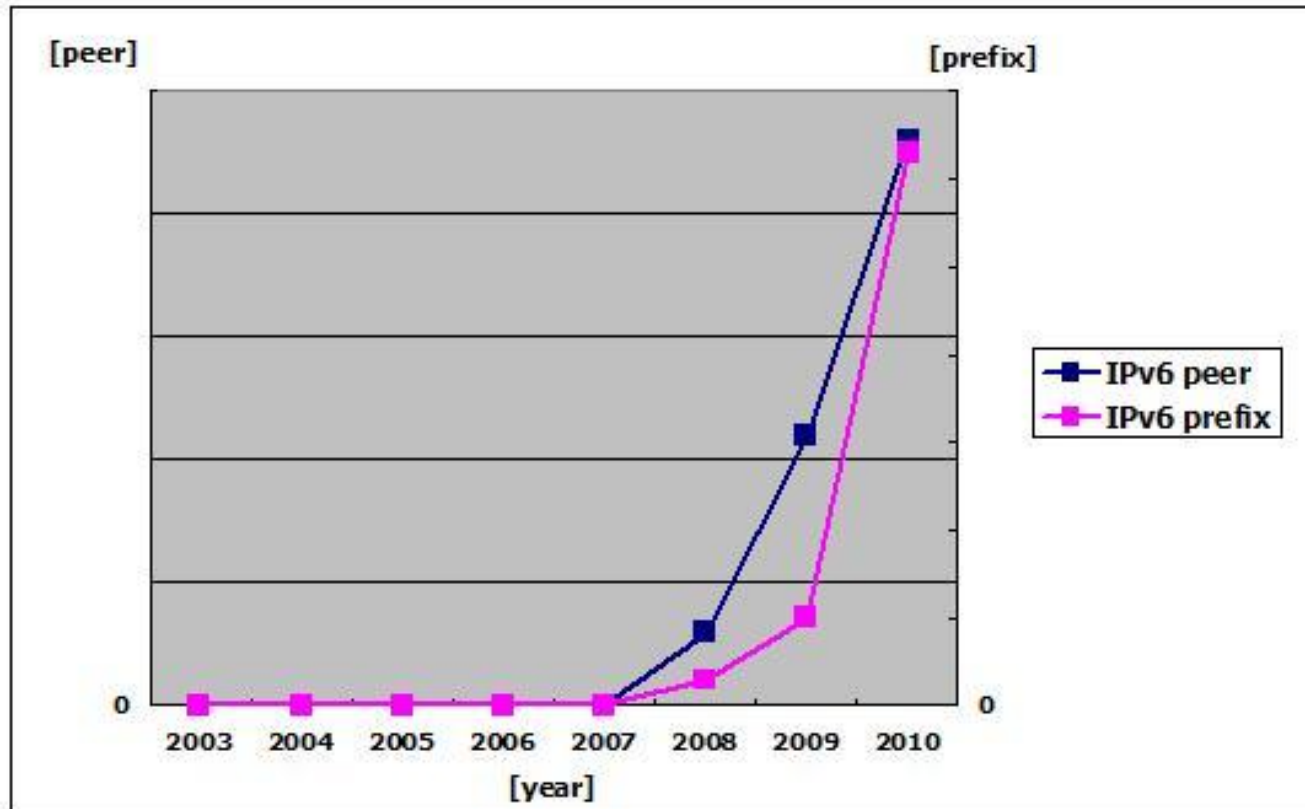**Looking glass and Comparison with IRR database menu**

JPIX Route-Server IPv4 statistics

Total peers and total prefixes on IPv4 RS
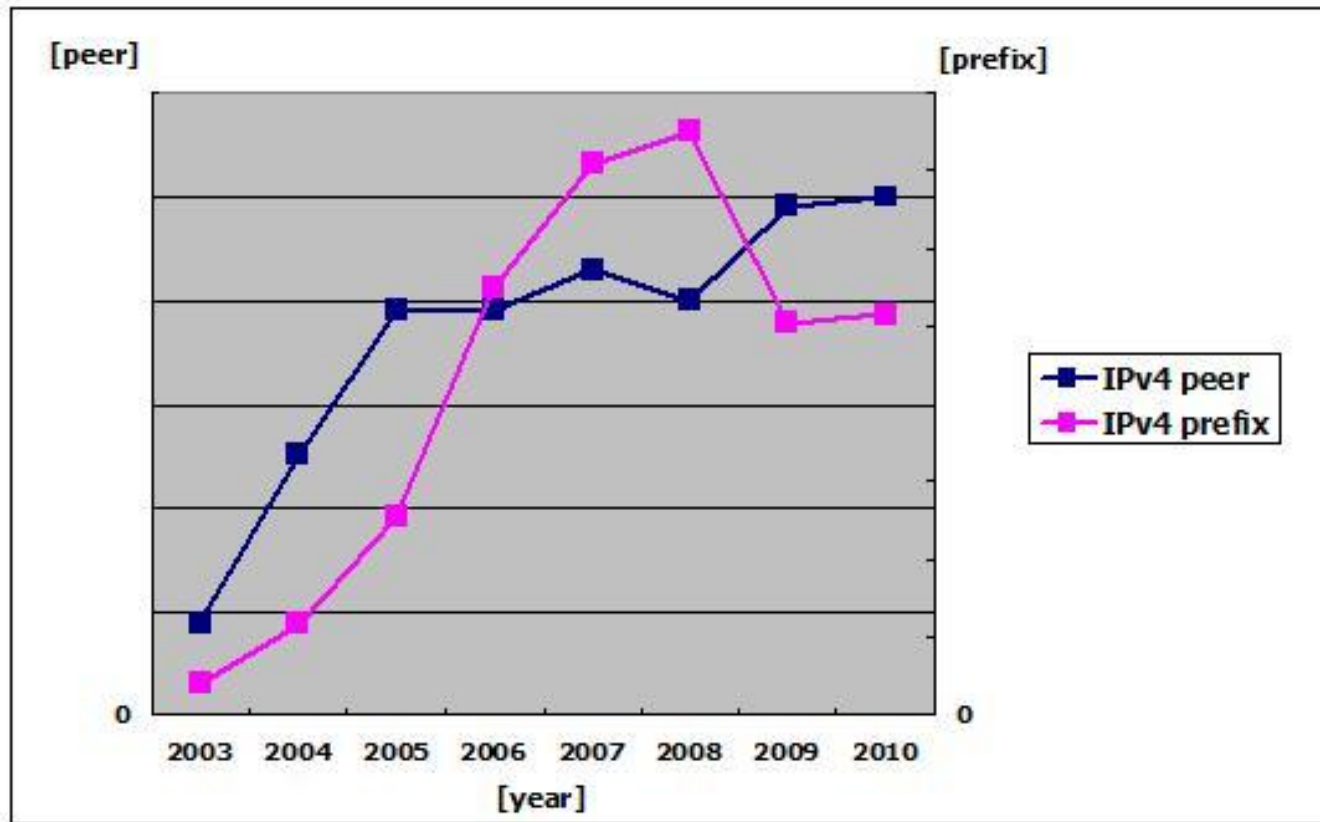
- **Number of Peers and Prefixes grow steadily**
- **Average number of prefixes per peer = 20.7 (just now)**
- **30% of the total IPv4 IX participants is using IPv4 RS**

JPIX Route-Server IPv6 statistics

Total peers and total prefixes on IPv6 RS

- **JPIX has launched IPv6 RS service in 2008.**
- **Number of IPv6 Peers != Number of IPv6 Prefixes**
- **60% of the total IPv6 IX participants is using IPv6 RS**

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Route Server issues facing JPIX

- **ISP inadvertently overwriting next-hop address of received prefix from Route Server.**
  - **ISP operator change next-hop address into BGP neighbor address (=Route Server's address).**
  - **As a result, Route Server will get into blackhole.**
  - **JPIX have a plan to implement blackhole detecting function.**

- **"bgp enforce-first-as" default enable/disable behavior depends on IOS version.**
  - **http://www.ciscosystems.com/en/US/docs/ios/iproute_bgp/command/reference/irg_bgp1.html#wp1061416**
  - **When participant router upgrading IOS version, router can not peer with Route Server**
  - **ISP operator need to explicitly configure "no bgp enforce-first-as".**

- ## More various route filtering
  - ### Route filtering is important service function for RS
  - ### Prefix filter, AS-PATH filter, other policy filter.

- ## Not want to disable "bgp enforce-first-as"
  - ### Route Server don't add ASN of RS's own to AS-PATH.
  - ### Security concern about received bgp routes.
    - #### ex) IOS: "no bgp enforce-first-as" is global configuration.

- ## Selective peering over the Route-Server Service
  - ### Ambivalent between Multi-lateral peering and Bi-lateral peering

Requirement for implementation from IXP

- **Improvement OSS bgp daemon**
  - **Every IXPs have already been spending money to use oss and local patch for Route-Server.**

- **More selectable platform.**
  - **In fact, We have only some software base implementation now.**
  - **Router Hardware vender should develop route server implementation.**
  - **There are features that BGP daemon can't do.**
    - **BFD (with BGP), Graceful switchover, ISSU, and more...**

- **At all, we are looking for good solution.**

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Request for Comments

- ## I want comments from ISP.
  - **What do you want features about Route Server service?**
  - **Are you using route reflector in your own AS?**

- ## I want comments from Router vender.
  - **Are you interested in implementing Route-Server?**

- ## I want comments about JPIX Route Server
  - **Route Server Implementation, Service, etc...**

- ## Any comments.

Thank you !