

Strategy for Deploying “RPKI Route Origin Validation(ROV)” to Route Server on IX

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APNIC48

180+ ASNs
2.0+ Tbps

- JPNAP Tokyo**
- NTT Otemachi
 - Equinix TY2
 - Equinix TY4
 - ComSpace I
 - AT TOKYO CC1
 - Colt TDC1
 - BBT Otemachi

- JPNAP Osaka**
- NTT Dojima1
 - NTT Dojima3
 - NTT Dojima4
 - Equinix OS1

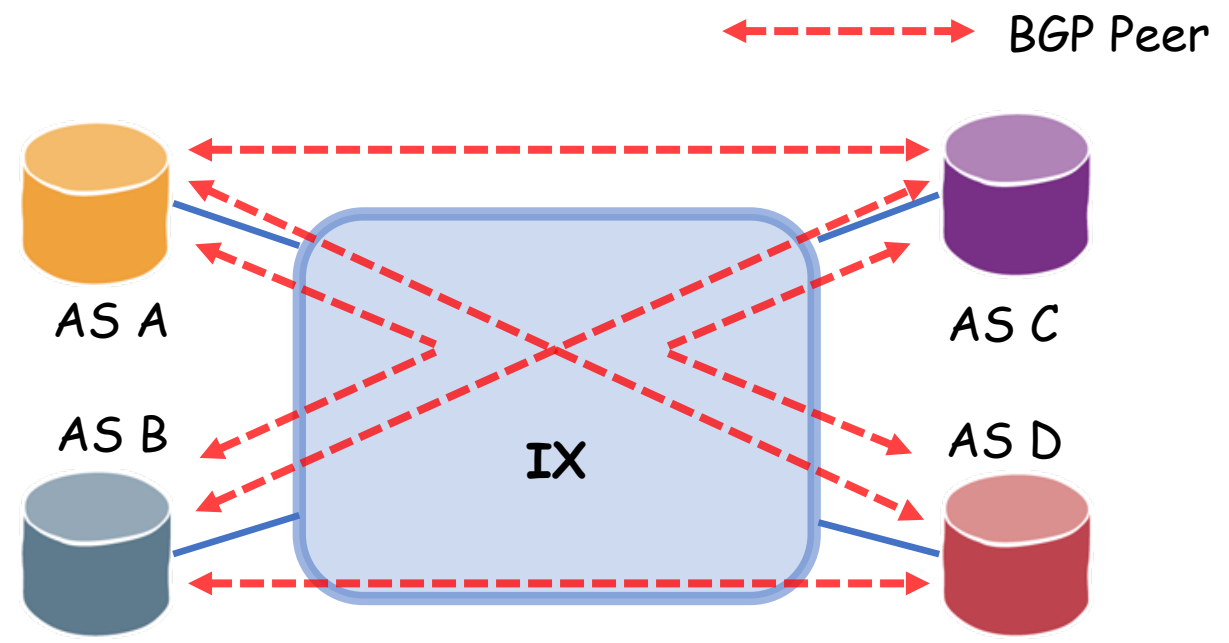
No.1 IX in Asia

- What is a route server
- Some considerable point of RPKI ROV and Our ideas
- How to provide/implement RPKI ROV Options for customers

What's Route Server (RS)?

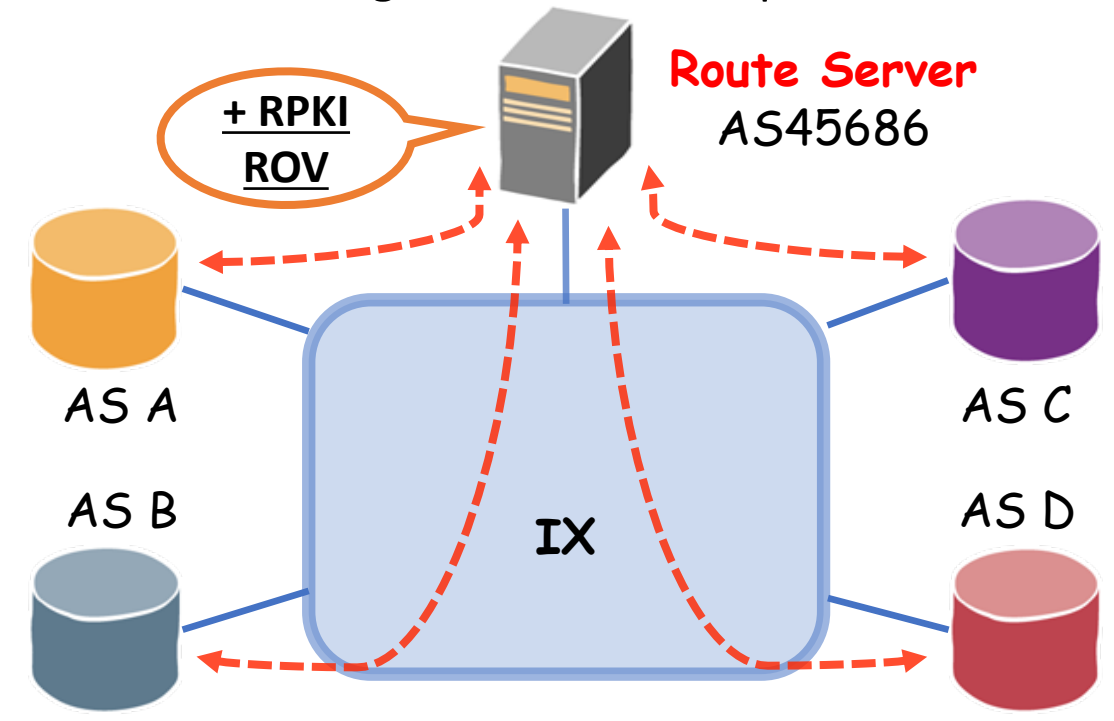
Without Route Server (Bi-lateral peering)

- Negotiate to establish peer with each AS



With Route Server (Multi-lateral peering)

- No need to negotiate with each peer



Ensuring routing securities is very important

- RPKI ROV
- IRRDB Validation



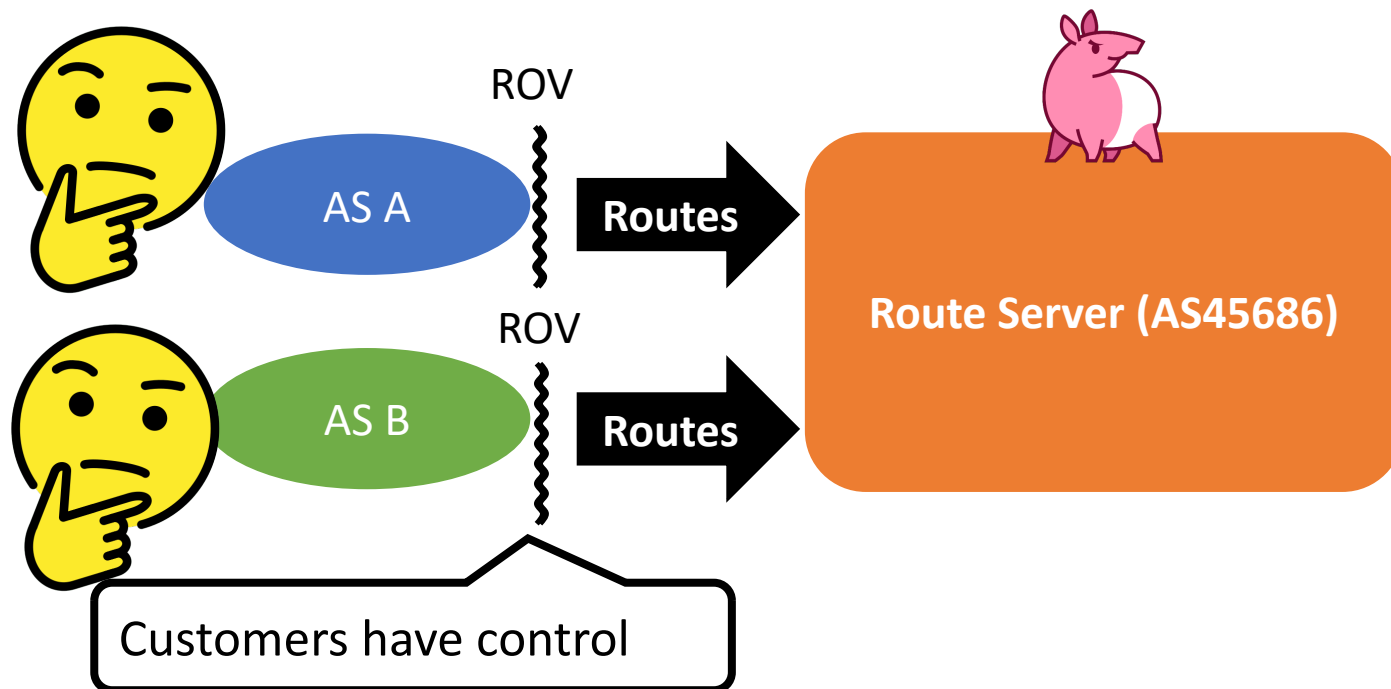
RPKI ROV on RS: What's important?

- As an IXP, we think providing “operational options” for our customers is quite important
 - = Adapting to customers’ preferences as much as possible
- In the context of RPKI ROV on RS
 - Providing customers a **uniform** flow of ROV control is not enough
- There are some points where the policies of customers should be considered and reflected
 - (1) Advertising routes (your prefixes advertised to other members)
 - (2) Receiving routes (the routes you get from other members)

-> *Let's take a look at some actual situations*

JP NAP (1) Advertising routes to RS

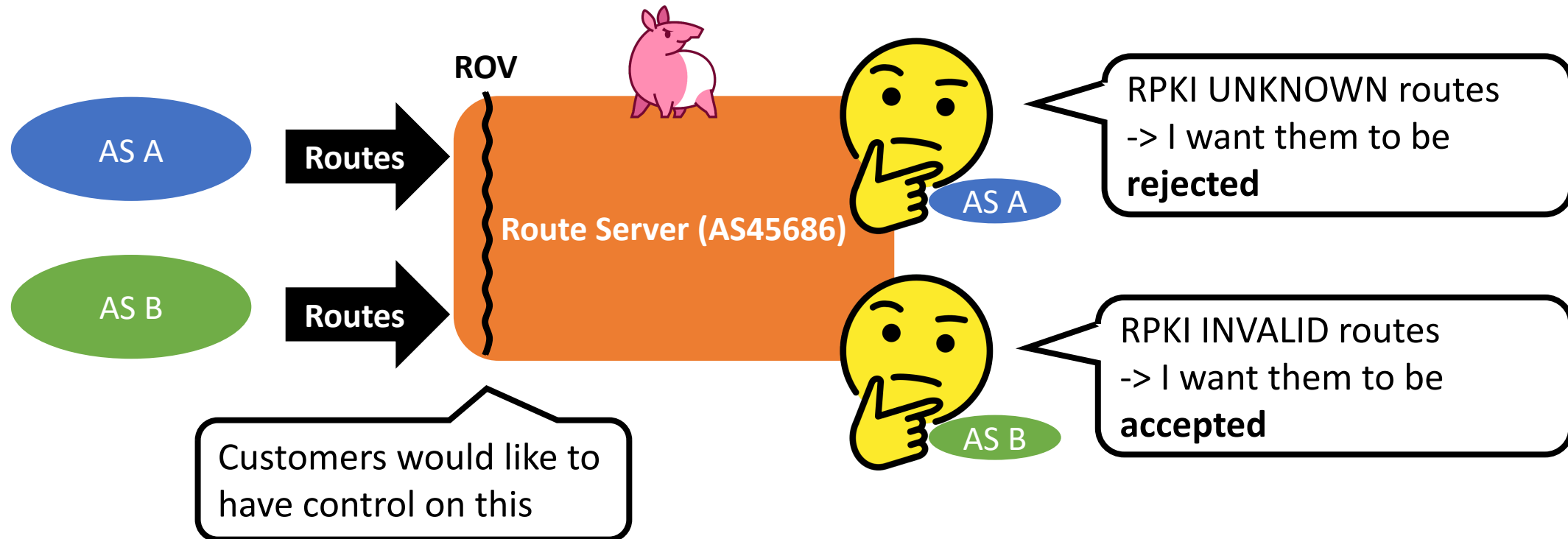
- Customers can reduce their operational costs of RPKI ROV by using RS
- If customers use RS, they will **delegate** RPKI ROV to RS
- However they would also like to control their routes by using the result of validation on RS





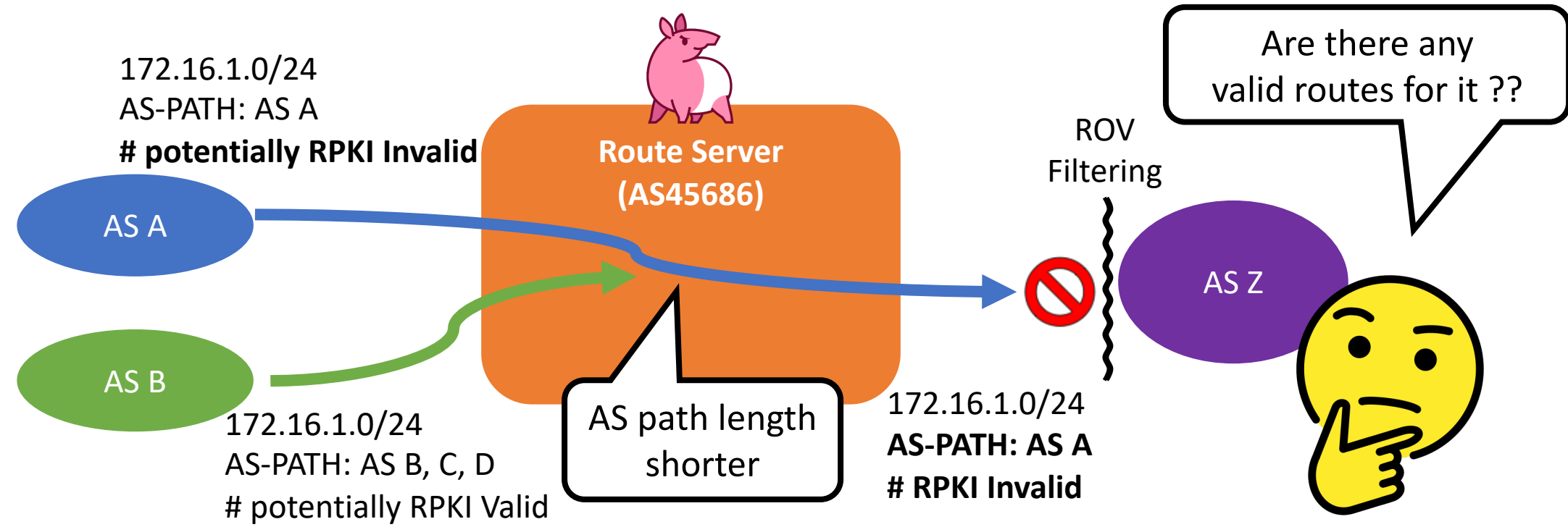
(1) Advertising routes to RS

- Customers can reduce their operational costs of RPKI ROV by using RS
 - If customers use RS, they will **delegate** RPKI ROV to RS
 - However they would also like to control their routes by using the result of validation on RS
- > *Providing options for advertised routes will be useful*



(2) Receiving routes from RS

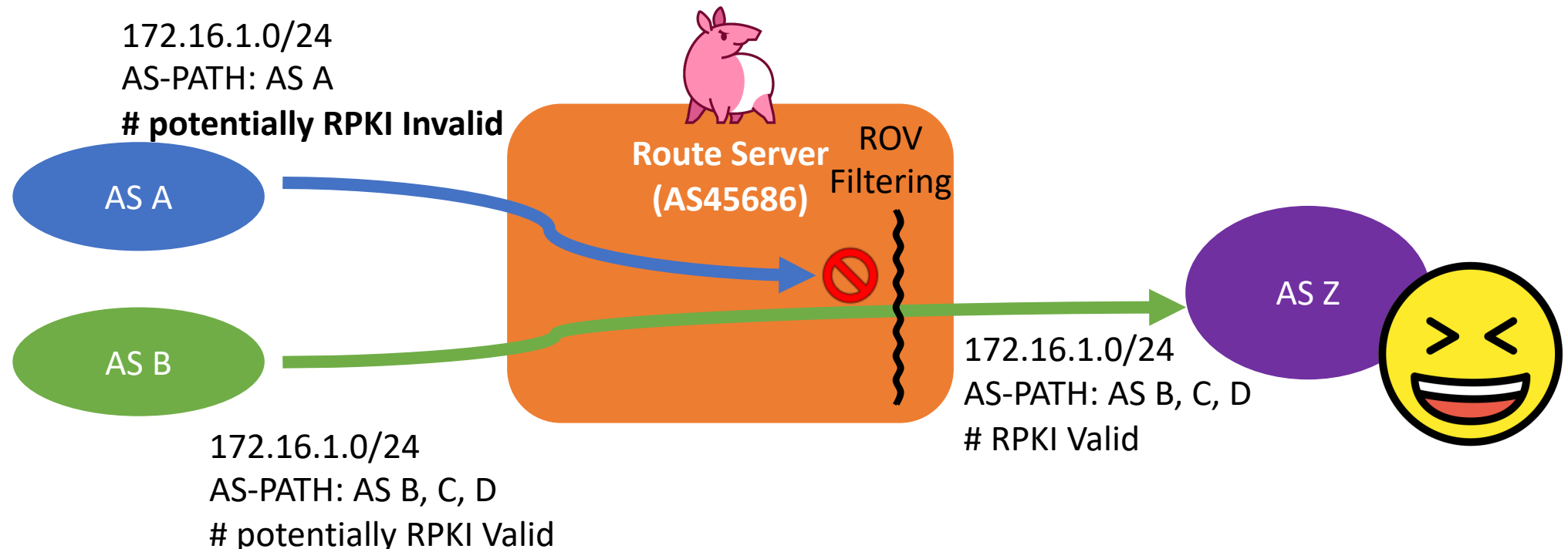
- What if a customer want to receive all routes, and filter them by “their own policy”:
- Example case:
 - When a RPKI Invalid route is selected as the best path on route server
 - ex.) due to AS path
- The customer will receive the RPKI Invalid route, although RS has the RPKI Valid route on its RIB
 - The valid route is hidden behind the invalid route: **“Valid Path Hiding”**





(2) Receiving routes from RS

- If we provide an option which enables customers to select the disposition of RPKI invalid route, and they choose “reject”
 - Then the second path which is RPKI valid and received from AS B will be advertised to AS Z
- (Additional) Using ADD-PATH may be also effective for this situation, but it is not common.



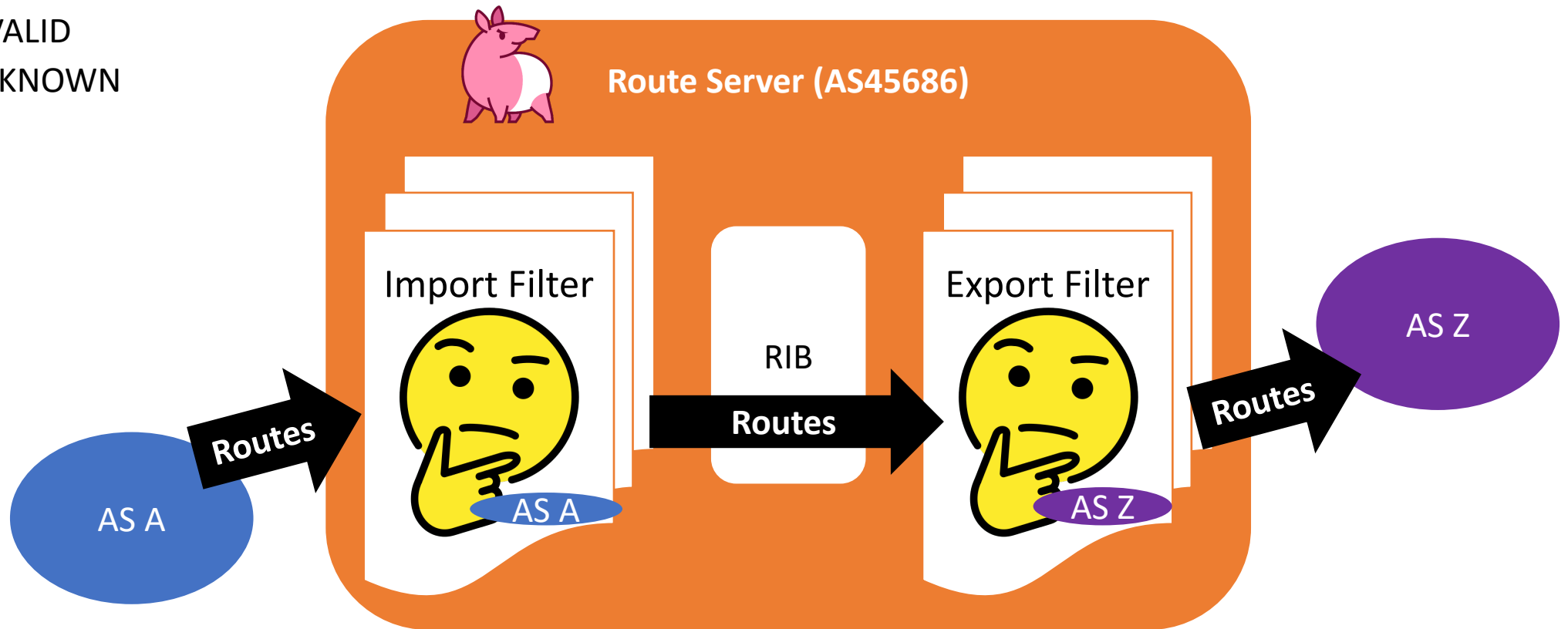
- If we provide “options” for our customers, we and customers will be able to operate routes exchanged on a route server flexibly
- What it should be;
 - RPKI Invalid routes are rejected
 - All of the AS register their ROA immediately
- However;
 - Registration rate of RPKI ROA is still low: less than 20% *1

-> In our solution, It will be effective that adjusting the default value of options according to the future routing security trends

*1 <https://rpki-monitor.antd.nist.gov/>

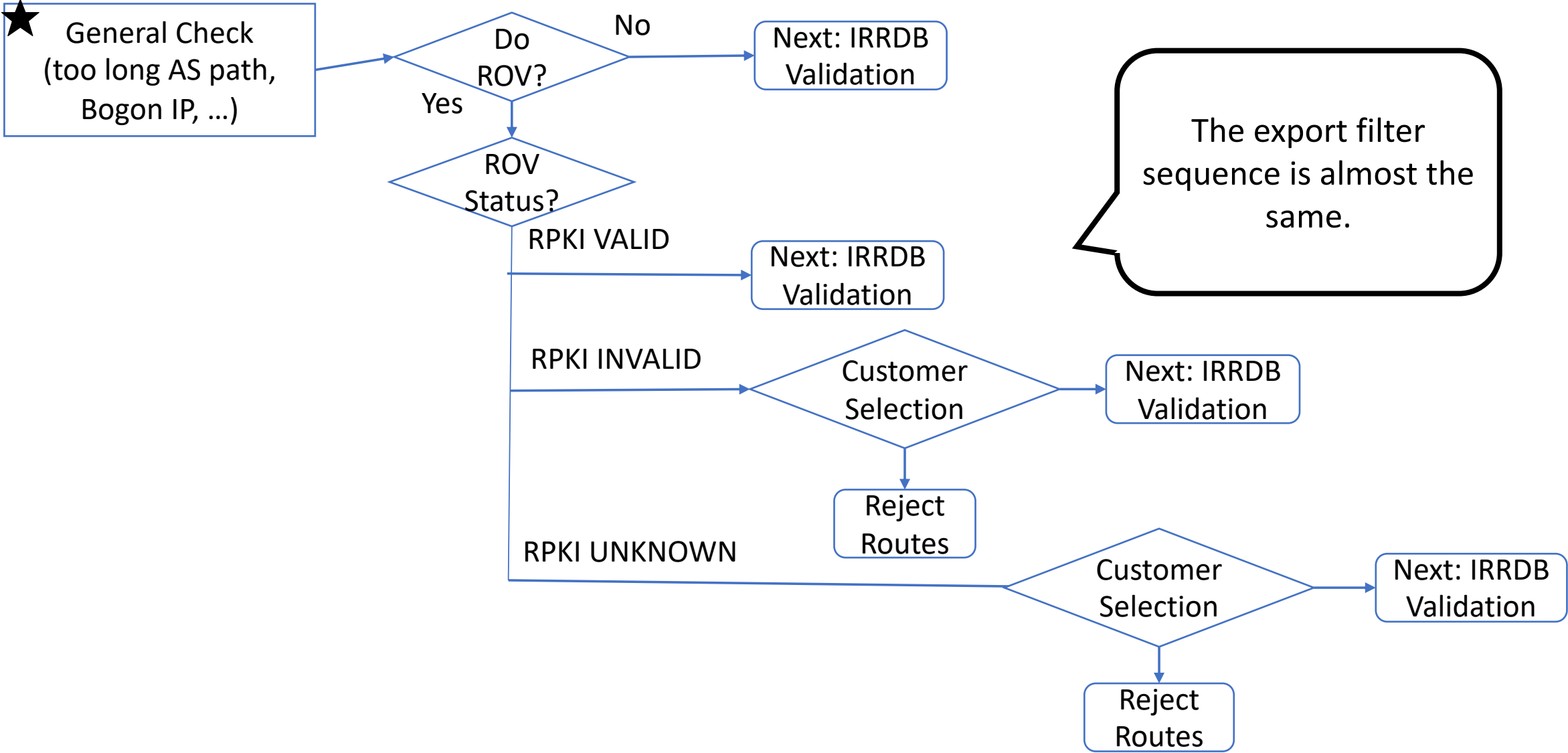
Deploying RPKI ROV “Options”

- Provide RPKI ROV “Options” for import/export filter with customers
 - Whether a route server will do RPKI ROV
 - Select treatments of each validation result
 - VALID
 - INVALID
 - UNKNOWN





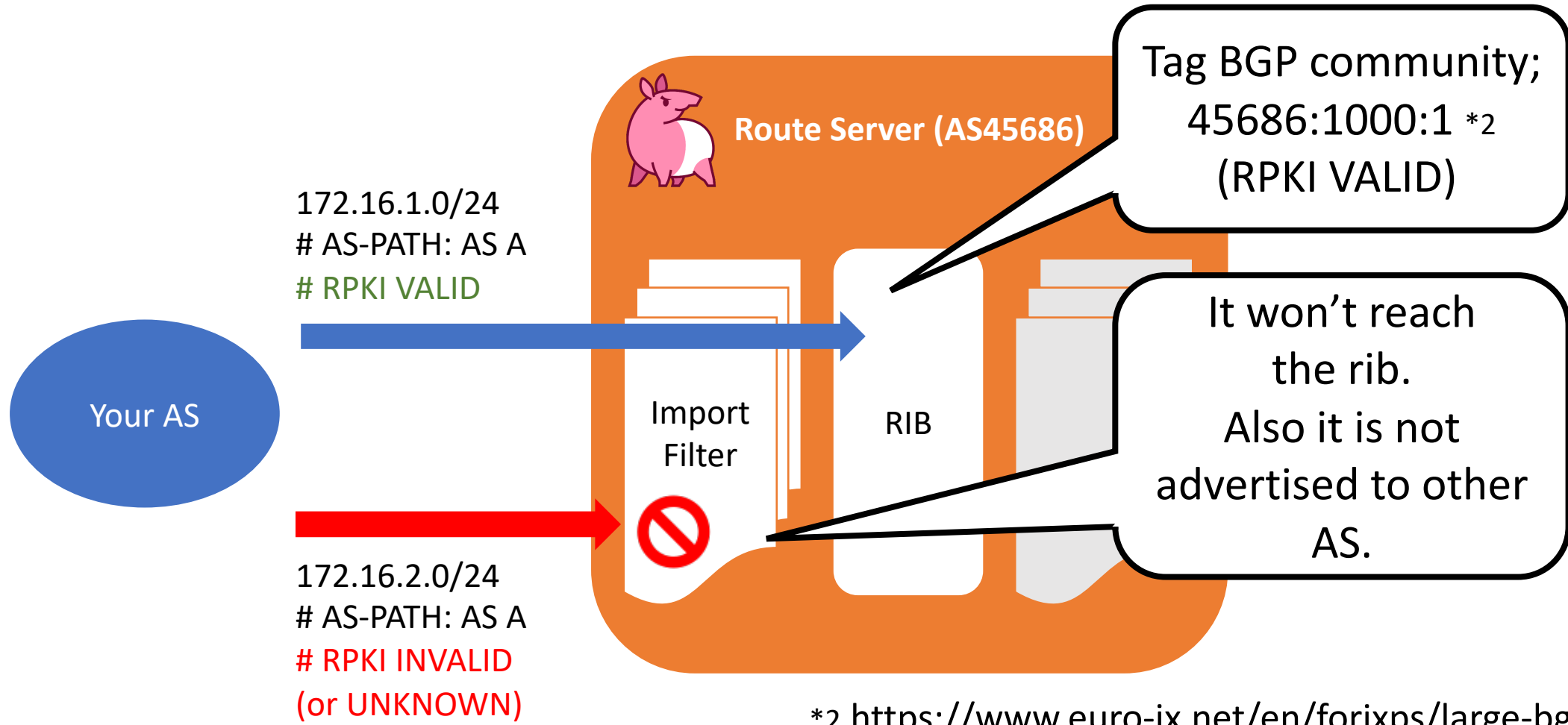
Validation Sequence of import filter



The export filter sequence is almost the same.

Advertising to a route server: Case1

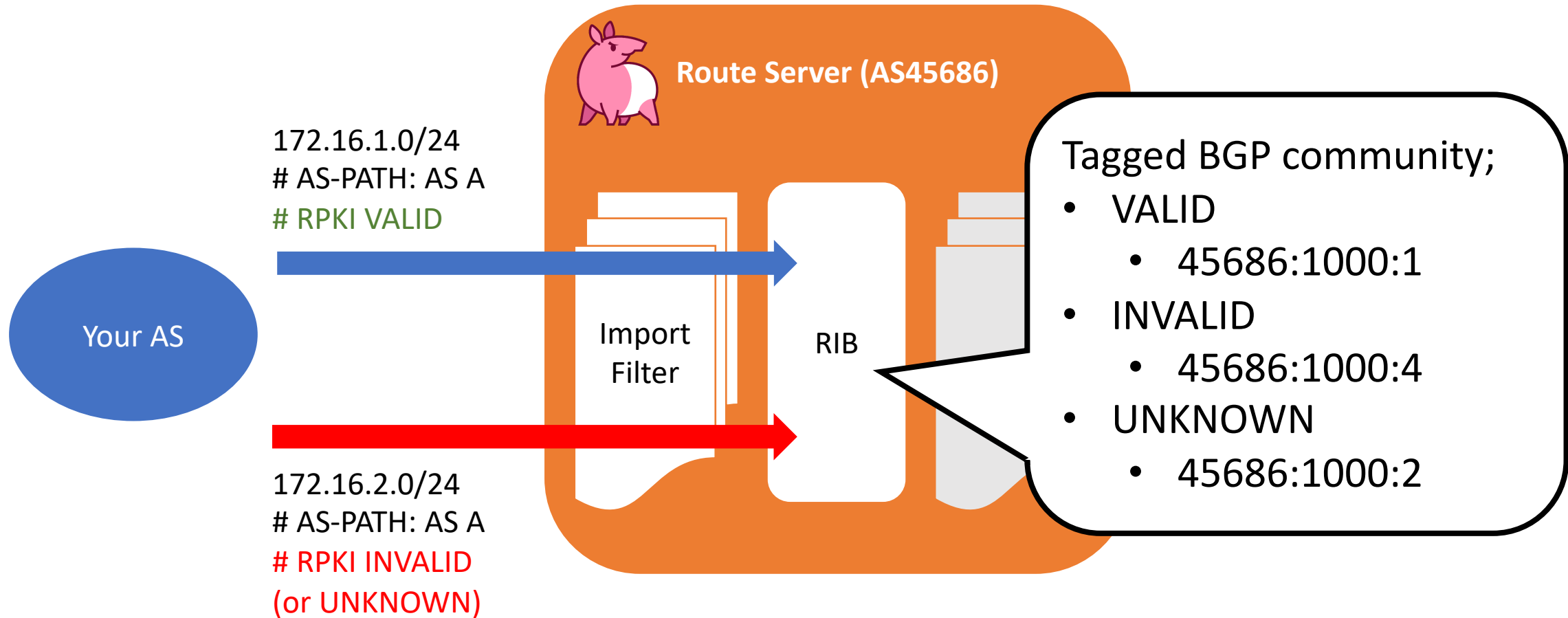
- Only accept valid routes on Import Filter



*2 <https://www.euro-ix.net/en/forixps/large-bgp-communities/>

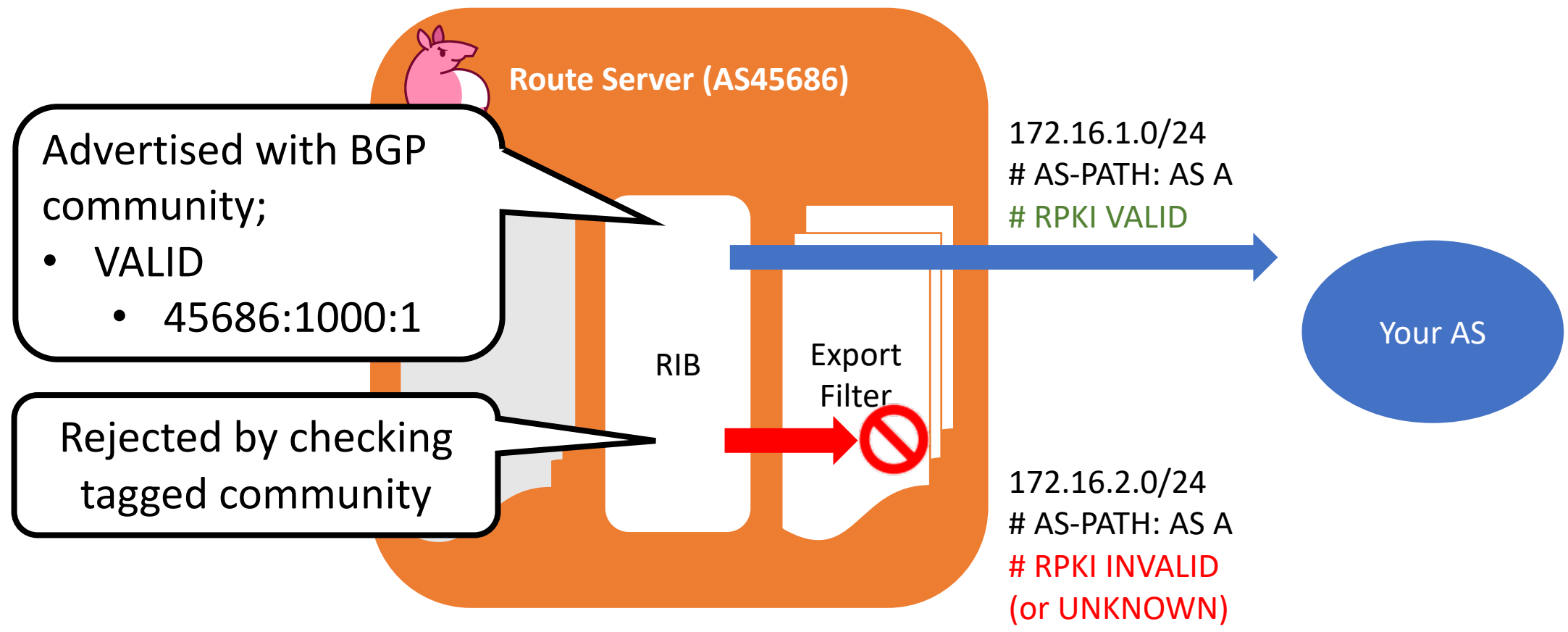
Advertising to a route server: Case2

- Import all routes with setting Large BGP community



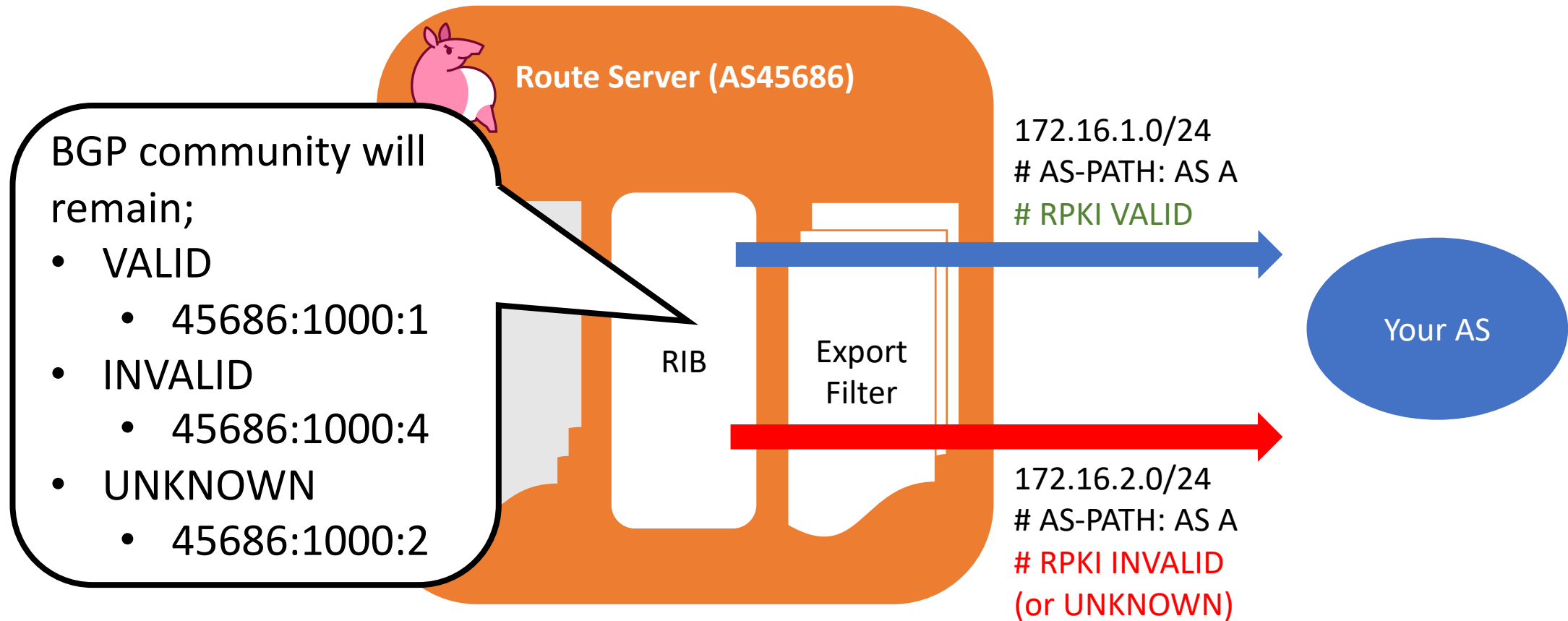
Receiving from a route server: Case1

- Only accept valid routes on Export Filter



Receiving from a route server: Case2

- Accept All routes with Large BGP community



- We're working on implementing these options...
- Investigating how to implement validation options with “BIRD” and “GoBGP” takes time
 - Due to BGPd redundancy

- As an IXP, we think that providing “operational options” for our customers is very important
 - Respecting customers’ policies as much as possible
- In our solution, adjusting the default value of RPKI ROV options will be effective according to the future routing security trends
- JPNAP is working on implementing with both “BIRD” and “GoBGP”

Thanks!
Any questions?

(Reference) Is RPKI Enough for filtering?

No!

- When AS A advertise the route from AS P to route servers accidentally
 - Don't want to do
 - Due to misconfiguration
- RPKI ROV on route server will not detect it
 - Its origin is AS: P
-> **VALID**
- IRRDB Validation can detect it
 - Check AS-SET: AS P will not match
-> **INVALID**
- We think that combining RPKI ROV and IRRDB validation is important

