

R&E Routing ComPATH Project

APAN-JP/TEIN2-JP/JGN2 NOCs

KDDI

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Agenda

- Background
- Outline
- Review
- Updating
- Future working

Background

Background

- **Current Status on R&E Networks**

- The connectivity of R&E networks are improving and progressing.
- Most user are expecting the high performance of the networks.
- Network operator have to support such user's research or demonstration.

And if there is any problem with networks, network operator have to resolve the problem as soon as possible.

Background

- **Problems on R&E Networks**

- Layer3 routings are becoming complex. As router configuration tend to be complex too, it increase the burden on network operators with routing control.
- Unexpected routings or asymmetric routings are generated.
- It is difficult to collect network's or organization's information.

For example they include routing policy, network topology, network status.

Background

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 - **BGP Path Matrix Tool**
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 - **APAN-JP Zebra Server**
 - ▶ Developing the tool of confirming the BGP routing status on each R&E networks in real time.

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- APAN-JP's approach by using tools
 - BGP Path Matrix Tool
 - ▶ Developing the web page for viewing each organization's routing policy. This routing policy is their choice paths data.
 - APAN-JP Zebra Server
 - ▶ Developing the tool of confirming the BGP routing status on each R&E networks in real time.
 - ComPATH Tool
 - ▶ Developing the tool which compare the choice path with the current path by each networks, and display the result after comparing.

Outline

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(BGP R&E Routing Project)

- Purpose

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- **Purpose**

- Understanding current BGP routing policy without asking other NOCs. **by using Path Matrix Tool.**
- Understanding the BGP path information of each organization's choice, not only primary but also backups. **by using Path Matrix Tool.**

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- Understanding the BGP path information of each organization's choice, not only primary but also backups. **by using Path Matrix Tool.**
- Viewing current "BGP best path" information of other network. **by using Zebra Server.**

Outline

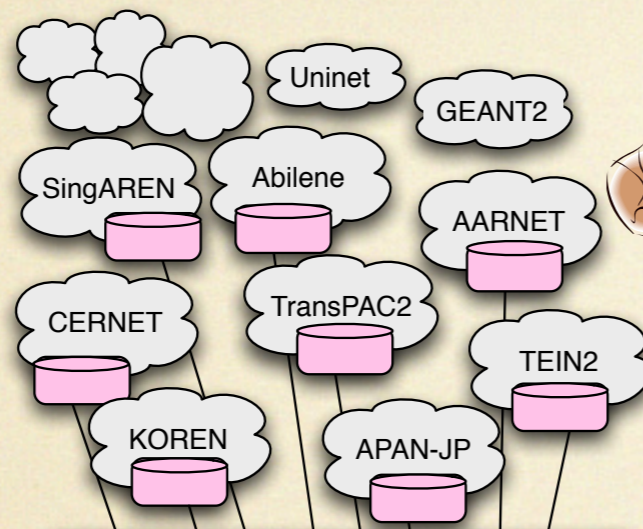
(BGP R&E Routing Project)

- **Purpose**

- Understanding current BGP routing policy without asking other NOCs. **by using Path Matrix Tool.**
- Understanding the BGP path information of each organization's choice, not only primary but also backups. **by using Path Matrix Tool.**
- Viewing current "BGP best path" information of other network. **by using Zebra Server.**
- Viewing the result of comparing current path with choice path and detecting the unexpected path. **by using ComPATH Tool.**

Illustration of the System

21 April 2007
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AARNET (GO) <-- Please select your organization when you input the path data.

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
AARNET (AAR) 7575	1 None 2 None 3 None	1 direct 2 3	1 TSG TJP 2 HAW 3	1 direct 2 7539 3 ABL	1 TSG THK 2 TP2 AJP 3 HAW AJP
Abilene (ABL) 11537	1 direct 2 TP2 AJP TJP TSG 3 GEA AAR	1 None 2 None 3 None	1 TP2 2 SIT 3 GEA SIT	1 TP2 AJP 2 STL 3 SIR	1 STL THK 2 TP2 AJP 3 AJP
APAN-JP (AJP) 7660	1 TJP TSG 2 TP2 3 HAW	1 TP2 2 direct 3 SIT	1 None 2 None 3 None	1 direct 2 CST 3 TP2 ABL	1 direct 2 TJP THK 3 KOR
APAN-TW (ATW) 9264	1 direct 2 AJP TJP TSG 3 SIR TSG	1 direct 2 AJP TP2 3	1 direct 2 CST 3 ABL TP2	1 None 2 None 3 None	1 direct 2 AJP 3
CERNET (CER) 4538	1 THK TSG 2 AJP TP2 ABL 3 AJP HAW	1 direct 2 AJP TP2 3 STL	1 direct 2 THK TJP 3 KOR	1 direct 2 AJP 3 STL	1 None 2 None 3 None

Path Matrix Tool

- Input the choice path information.
- Display the choice path information.

APAN-JP_tpr6

Prefix	AS PATH	Choice AS PATH
40.250.0/24	7660 23855 7610 4249 i	^(7660_)+(24287_)+(24490_)+(23855_)+
58.83.128.0/18	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.128.0/19	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.128.0/20	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.128.0/21	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.136.0/21	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.144.0/20	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.144.0/21	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.152.0/21	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.159.0/24	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.160.0/19	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.160.0/20	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.160.0/21	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.168.0/21	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.176.0/20	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+
58.83.176.0/21	7660 24287 24489 4538 9406 7497 9308 i	^(7660_)+(4538_)+

ComPATH Tool

- Compare the choice path data with current path data and display the result.

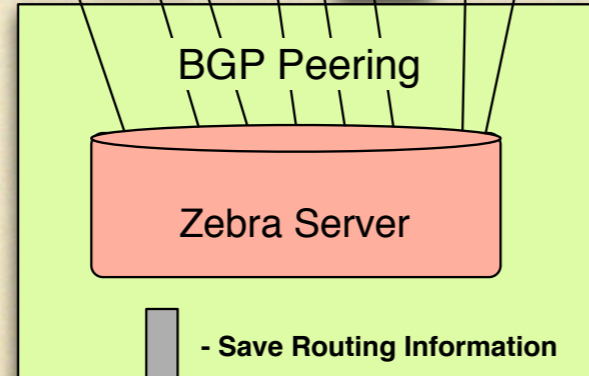
BGP Table of APAN-JP_tpr6

BGP table version is 0, local router ID is 203.181.248.35
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed
Origin codes: i - IGP, e - EGP, ? - incomplete

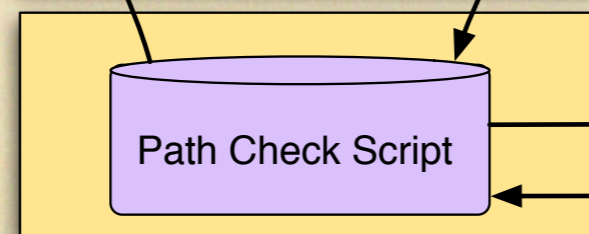
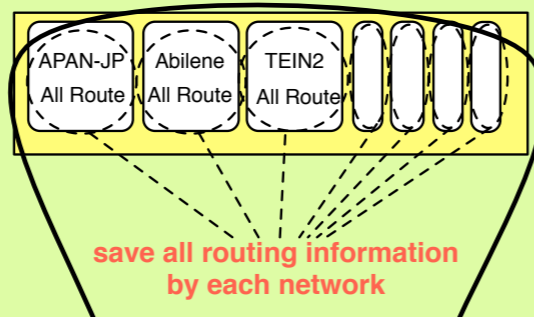
Network	Next Hop	Metric	LocPrf	Weight	Path
>> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
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>> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
>> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i
>> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i
>> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i
>> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i
>> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i

APAN-JP Zebra Server

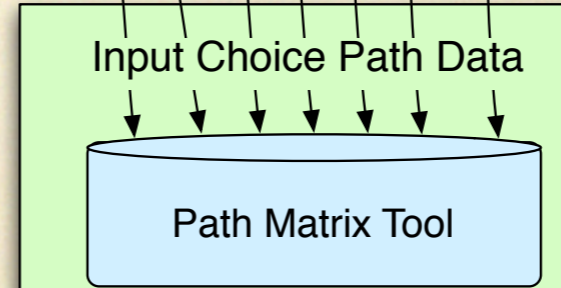
- Save the BGP routing information.
- Display the BGP routing information.



- Save Routing Information
- This Information Include Only Best Path Information

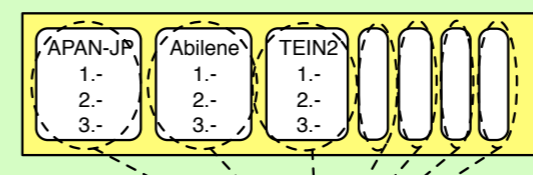


- Compare Real Path with choice Path
- Extract and Display Different Path

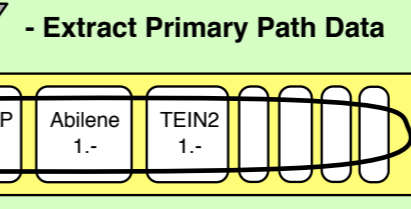


Matrix Web Page

- Save Path Data



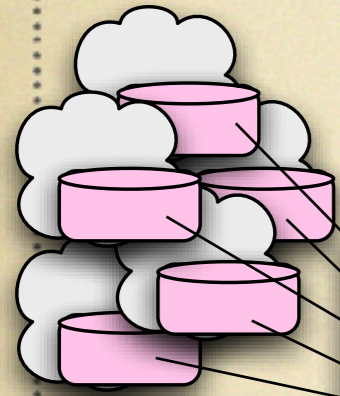
- save the each destination data by each network



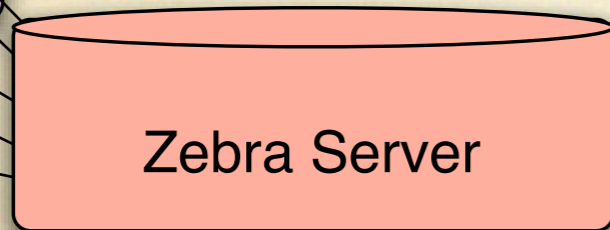
Checked Path Page

Outline

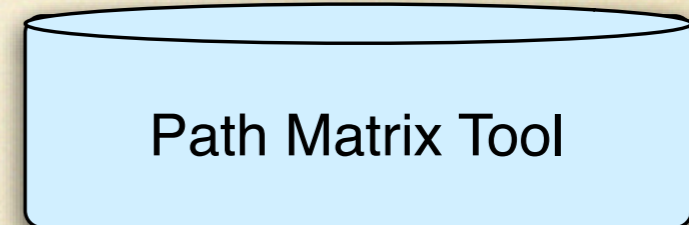
(System of **Comparing Paths**)



Peer with R&E Networks and Save BGP Routing Information

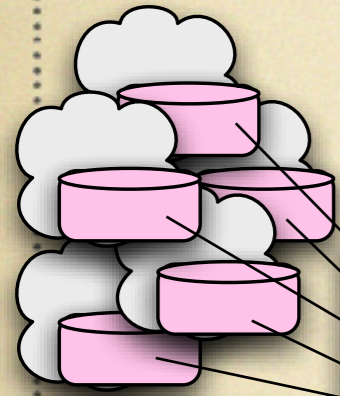


Input and Save Choice Path Information of R&E Networks.

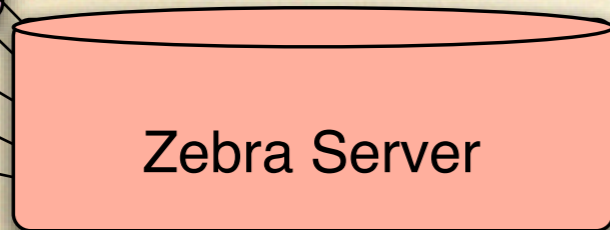


Outline

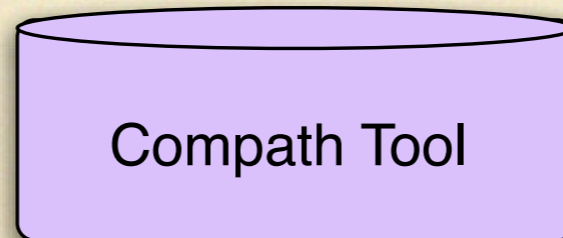
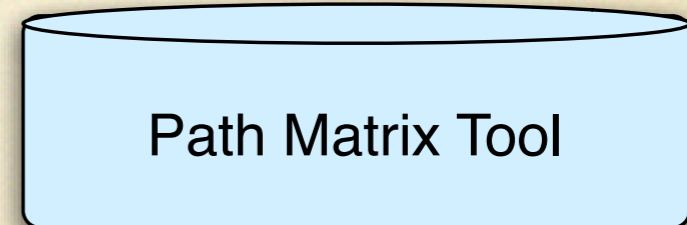
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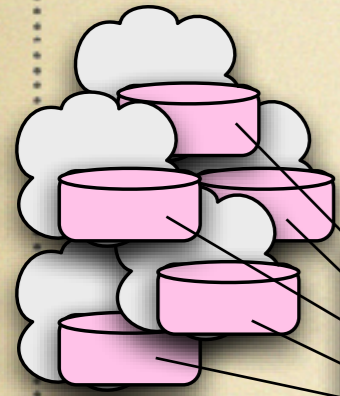


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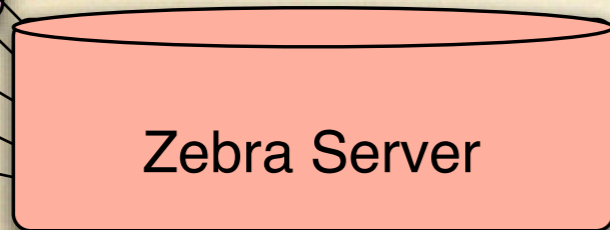


Outline

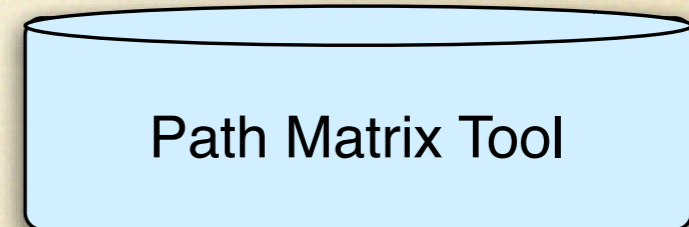
(System of **Comparing Paths**)



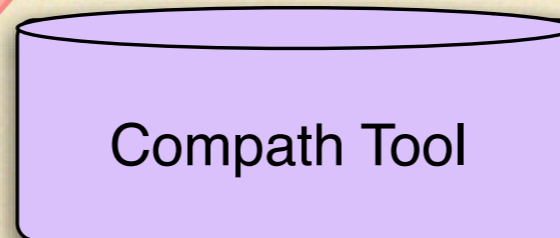
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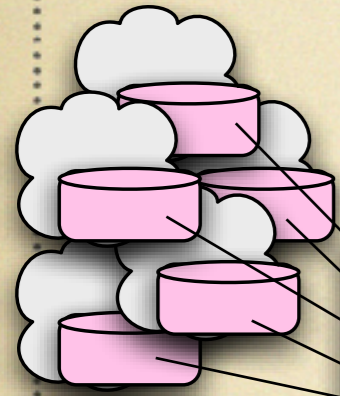


Get the data

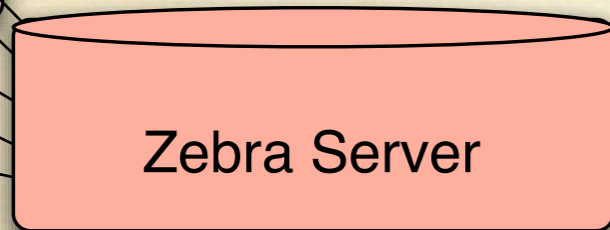


Outline

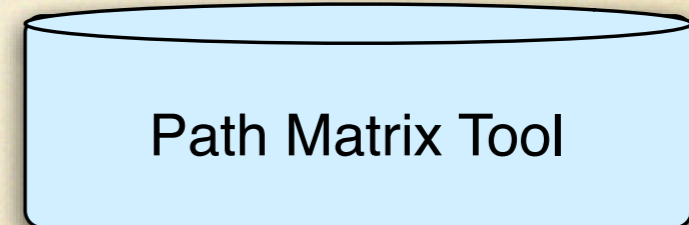
(System of Comparing Paths)



Peer with R&E Networks and Save BGP Routing Information



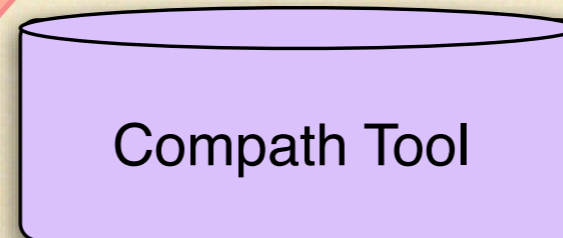
Input and Save Choice Path Information of R&E Networks.



Current Path Data

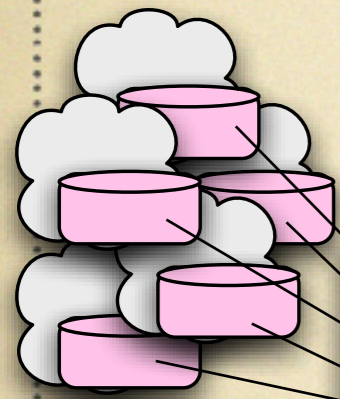


Get the data

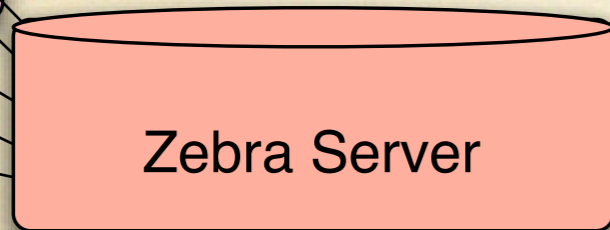


Outline

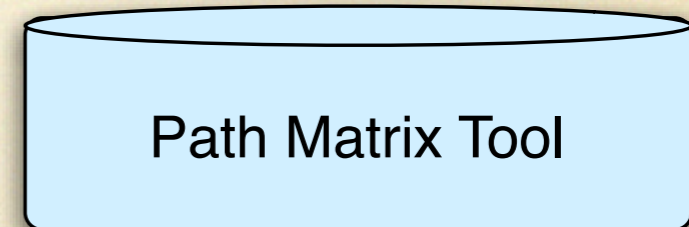
(System of **Comparing Paths**)



Peer with R&E Networks and Save BGP Routing Information



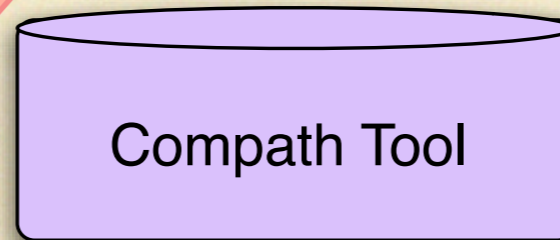
Input and Save Choice Path Information of R&E Networks.



Current Path Data

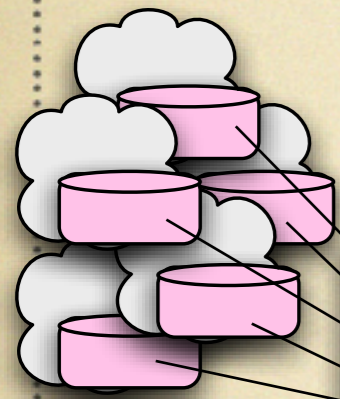


Get the data Get the data

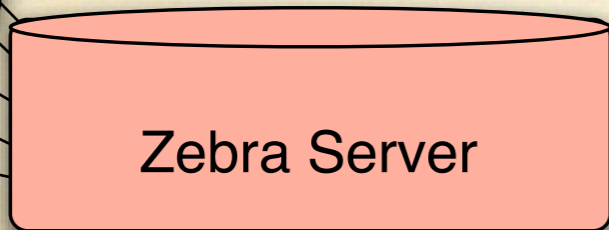


Outline

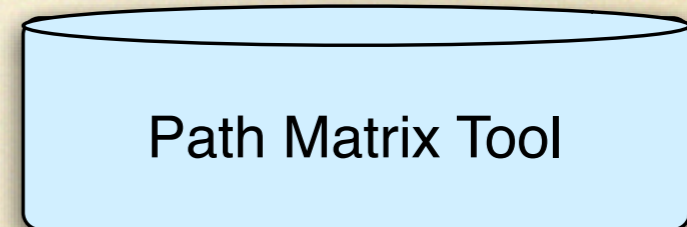
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Peer with R&E Networks and Save BGP Routing Information



Input and Save Choice Path Information of R&E Networks.

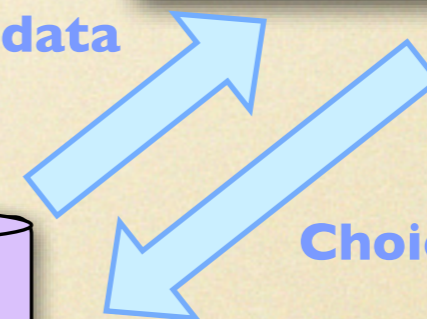
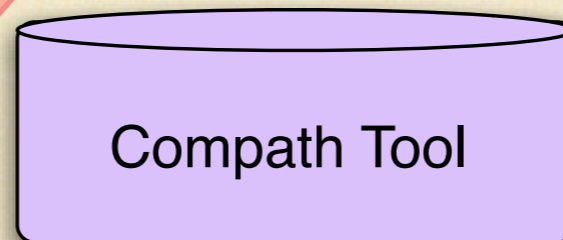


Current Path Data



Get the data

Get the data

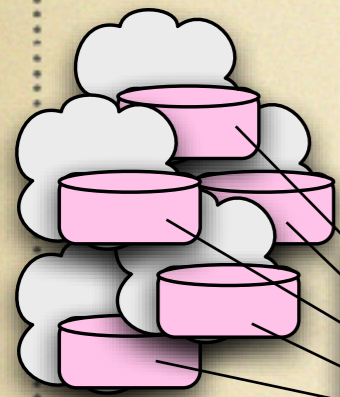


Choice Path Data

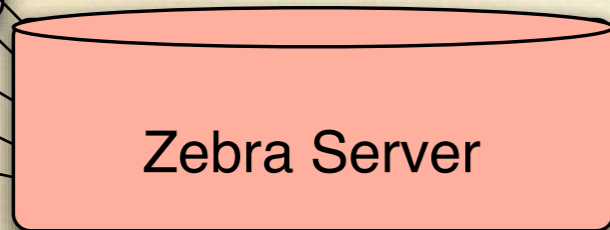


Outline

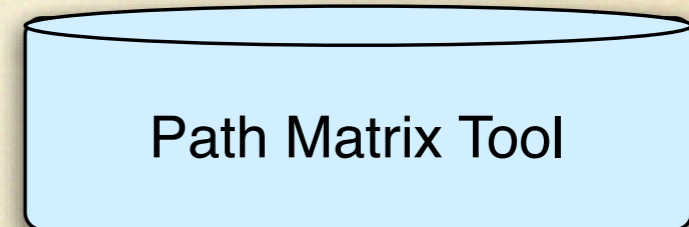
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Peer with R&E Networks and Save BGP Routing Information



Input and Save Choice Path Information of R&E Networks.

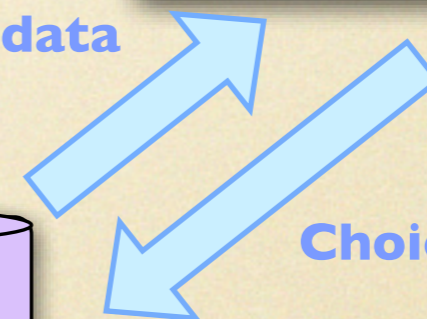
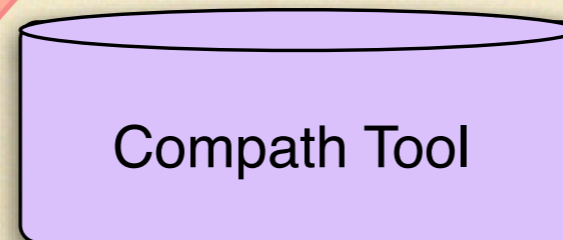


Current Path Data



Get the data

Get the data



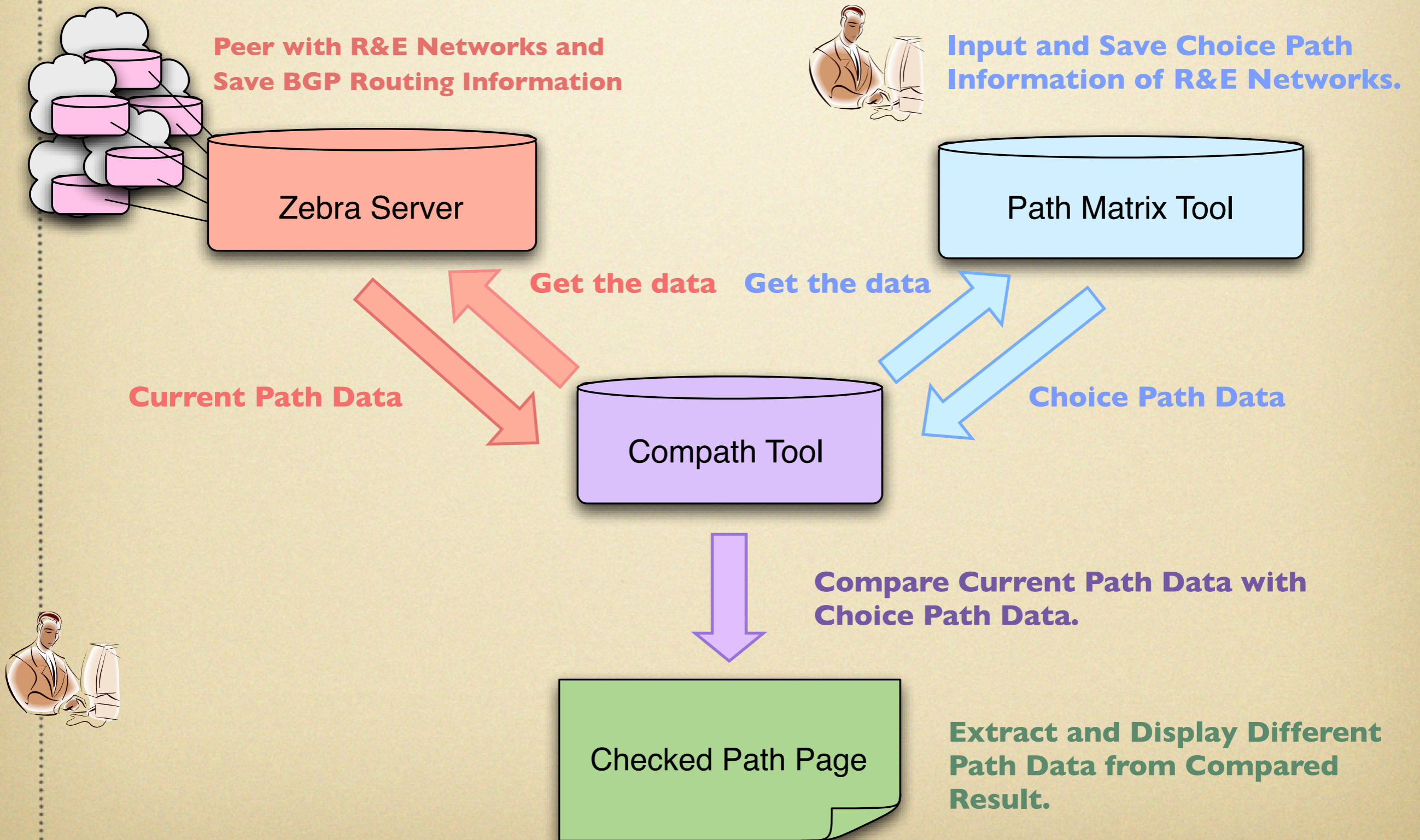
Choice Path Data

Compare Current Path Data with Choice Path Data.



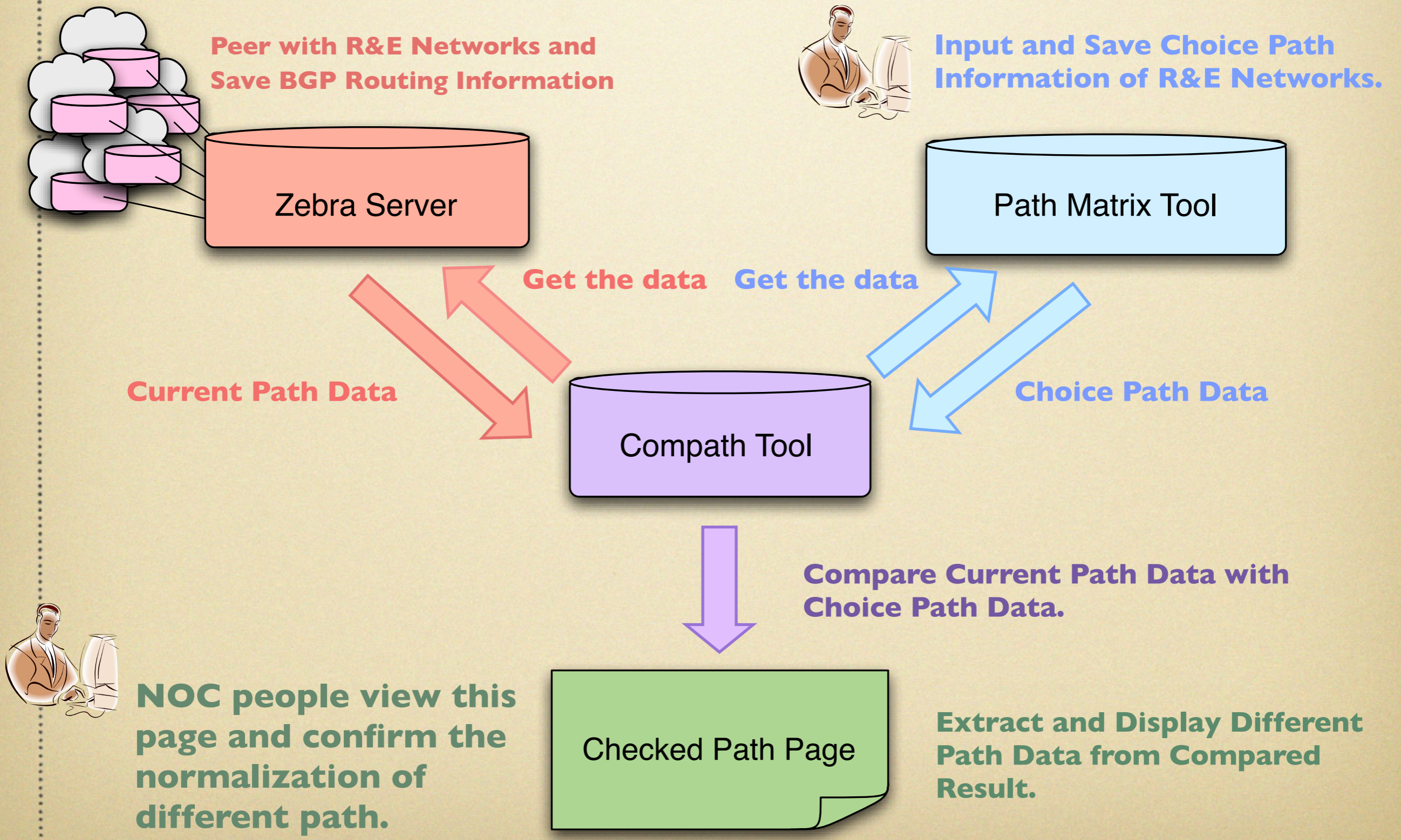
Outline

(System of **Comparing Paths**)



Outline

(System of **Comparing Paths**)



Updating

Updating

- Heretofore

- Compare “first choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
APAN-JP (AJP) 7660	1 TJP TSG	1 TP2	1 None	1 direct	1 direct
	2 TP2	2 direct	2 None	2 CST	2 TJP THK
	3 HAW	3 SIT	3 None	3 TP2 ABL	3 KOR

Zebra Server

BGP Table of APAN-JP_tpr6						
BGP table version is 0, local router ID is 203.181.248.35						
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed						
Origin codes: i - IGP, e - EGP, ? - incomplete						
Network	Next Hop	Metric	LocPrf	Weight	Path	
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
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*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	

ComPATH Tool

APAN-JP (7660) ---> CERNET (AS4538)		
Prefix	Current AS PATH	Choice AS PATH
116.213.64.0/19	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
116.213.96.0/19	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
195.66.155.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/20	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.180.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.184.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/23	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.38.108.0/22	7660 9270 4538 4538 i	^(7660_)+(4538_)+
202.38.112.0/21	7660 9270 4538 4538 i	^(7660_)+(4538_)+

Updating

- Heretofore

- Compare “first choice path” data with “best path” data.

Path Matrix Tool

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	3 HAW	3 SIT	3 None	3 TP2 ABL	3 KOR

ComPATH Tool

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202.152.176.0/20	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
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202.152.184.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/23	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.38.108.0/22	7660 9270 4538 4538 i	^(7660_)+(4538_)+
202.38.112.0/21	7660 9270 4538 4538 i	^(7660_)+(4538_)+

Zebra Server

BGP Table of APAN-JP_tpr6						
BGP table version is 0, local router ID is 203.181.248.35						
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed						
Origin codes: i - IGP, e - EGP, ? - incomplete						
Network	Next Hop	Metric	LocPrf	Weight	Path	
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i	
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i	
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i	
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	

Updating

- Heretofore

- Compare “first choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
Source					
APAN-JP (AJP) 7660	1 TJP TSG	1 TP2	1 None	1 direct	1 direct
	2 TP2	2 direct	2 None	2 CST	2 TJP THK
	3 HAW	3 SIT	3 None	3 TP2 ABL	3 KOR

ComPATH Tool

Prefix	Current AS PATH	Choice AS PATH
116.215.0.0/19	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
195.66.155.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/20	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.180.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.184.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/23	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.38.108.0/22	7660 9270 4538 4538 i	^(7660_)+(4538_)+
202.38.112.0/21	7660 9270 4538 4538 i	^(7660_)+(4538_)+

Zebra Server

BGP Table of APAN-JP_tpr6						
BGP table version is 0, local router ID is 203.181.248.35						
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed						
Origin codes: i - IGP, e - EGP, ? - incomplete						
Network	Next Hop	Metric	LocPrf	Weight	Path	
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i	
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i	
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i	
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	

Updating

- Heretofore

- Compare “first choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
Source					
APAN-JP (AJP) 7660	1 TJP TSG	1 TP2	1 None	1 direct	1 direct
	2 TP2	2 direct	2 None	2 CST	2 TJP THK
	3 HAW	3 SIT	3 None	3 TP2 ABL	3 KOR

Zebra Server

BGP Table of APAN-JP_tpr6					
BGP table version is 0, local router ID is 203.181.248.35					
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed					
Origin codes: i - IGP, e - EGP, ? - incomplete					
Network	Next Hop	Metric	LocPrf	Weight	Path
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i

ComPATH Tool

APAN-JP (7660) ---> CERNET (AS4538)		
Prefix	Current AS PATH	Choice AS PATH
116.215.0.0/19	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
195.66.155.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/20	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.180.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.184.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/23	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.38.108.0/22	7660 9270 4538 4538 i	^(7660_)+(4538_)+
202.38.112.0/21	7660 9270 4538 4538 i	^(7660_)+(4538_)+

Updating

- Heretofore

- Compare “first choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
Source					
APAN-JP (AJP) 7660	1 TJP TSG	1 TP2	1 None	1 direct	1 direct
	2 TP2	2 direct	2 None	2 CST	2 TJP THK
	3 HAW	3 SIT	3 None	3 TP2 ABL	3 KOR

ComPATH Tool

Prefix	Current AS PATH	Choice AS PATH
116.215.0.0/19	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
195.66.155.0/24	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/20	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.176.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.180.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.184.0/22	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.152.190.0/23	7660 24287 24489 4538 9406 7497 24134 i	^(7660_)+(4538_)+
202.38.108.0/22	7660 9270 4538 4538 i	^(7660_)+(4538_)+
202.38.112.0/21	7660 9270 4538 4538 i	^(7660_)+(4538_)+

Zebra Server

BGP Table of APAN-JP_tpr6					
BGP table version is 0, local router ID is 203.181.248.35					
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed					
Origin codes: i - IGP, e - EGP, ? - incomplete					
Network	Next Hop	Metric	LocPrf	Weight	Path
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i

Updating

- New

- Compare “first, second and third choice path” data with “best path” data.

Path Matrix Tool

Destination Source	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
APAN-JP (AJP) 7660	1 TJP TSG	1 TP2	1 None	1 direct	1 direct
	2 TP2	2 direct	2 None	2 CST	2 TJP THK
	3 HAW	3 SIT	3 None	3 TP2 ABL	3 KOR

Zebra Server

BGP Table of APAN-JP_tpr6						
BGP table version is 0, local router ID is 203.181.248.35						
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed						
Origin codes: i - IGP, e - EGP, ? - incomplete						
Network	Next Hop	Metric	LocPrf	Weight	Path	
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i	
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i	
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i	
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	

ComPATH Tool

APAN-JP (AS7660) ----> CERNET (AS4538)				
Prefix	Current AS PATH	First Choice AS PATH	Second Choice AS PATH	Third Choice AS PATH
202.38.108.0/22	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
202.38.112.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.0.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.105.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.112.0/22	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.112.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+

Updating

- New
 - Compare “first, second and third choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
Source					
APAN-JP (AJP) 7660	1 TJP TSG 2 TP2 3 HAW	1 TP2 2 direct 3 SIT	1 None 2 None 3 None	1 direct 2 CST 3 TP2 ABL	1 direct 2 TJP THK 3 KOR

Zebra Server

BGP Table of APAN-JP_tpr6						
BGP table version is 0, local router ID is 203.181.248.35						
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed						
Origin codes: i - IGP, e - EGP, ? - incomplete						
Network	Next Hop	Metric	LocPrf	Weight	Path	
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i	
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i	
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i	
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	

ComPATH Tool

APAN-JP (AS7660) ----> CERNET (AS4538)				
Prefix	Current AS PATH	First Choice AS PATH	Second Choice AS PATH	Third Choice AS PATH
202.38.108.0/22	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
202.38.112.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.0.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.105.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.112.0/22	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.112.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+

Updating

- New

- Compare “first, second and third choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
Source					
APAN-JP (AJP) 7660	1 TJP TSG 2 TP2 3 HAW	1 TP2 2 direct 3 SIT	1 None 2 None 3 None	1 direct 2 CST 3 TP2 ABL	1 direct 2 TJP TSG 3 KOR

Zebra Server

BGP Table of APAN-JP_tpr6						
BGP table version is 0, local router ID is 203.181.248.35						
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed						
Origin codes: i - IGP, e - EGP, ? - incomplete						
Network	Next Hop	Metric	LocPrf	Weight	Path	
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i	
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i	
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i	
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 559 i	
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i	

ComPATH Tool

APAN-JP (AS7660) ----> CERNET (AS4538)				
Prefix	Current AS PATH	First Choice AS PATH	Second Choice AS PATH	Third Choice AS PATH
202.38.108.0/22	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
202.38.112.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.0.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.105.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.112.0/22	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.112.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+

Updating

- New
 - Compare “first, second and third choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
Source					
APAN-JP (AJP) 7660	1 TJP TSG 2 TP2 3 HAW	1 TP2 2 direct 3 SIT	1 None 2 None 3 None	1 direct 2 CST 3 TP2 ABL	1 direct 2 TJP TSG 3 KOR

Zebra Server

BGP Table of APAN-JP_tpr6					
BGP table version is 0, local router ID is 203.181.248.35					
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed					
Origin codes: i - IGP, e - EGP, ? - incomplete					
Network	Next Hop	Metric	LocPrf	Weight	Path
*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.2.0.0/22	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.3.0.0/18	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.6.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.9.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 6356 i
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i
*> 9.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 20965 555 i
*> 12.0.48.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i
*> 12.6.208.0/20	203.181.248.144	0	0	0	7660 22388 11537 10578 1742 i

ComPATH Tool

APAN-JP (AS7660) ----> CERNET (AS4538)				
Prefix	Current AS PATH	First Choice AS PATH	Second Choice AS PATH	Third Choice AS PATH
202.38.108.0/22	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+
202.38.112.0/21	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+
211.64.0.0/21	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+
211.64.104.0/21	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+
211.64.104.0/24	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+
211.64.105.0/24	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+
211.64.112.0/22	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+
211.64.112.0/24	7660 22388 11537 20388 17579 4538	^(7660_)+(4538)_+	^(7660_)+(24287_)+(24489_)+(4538)_+	^(7660_)+(9270_)+(4538)_+

Updating

- New

- Compare “first, second and third choice path” data with “best path” data.

Path Matrix Tool

Destination	AARNET (AAR) 7575	Abilene (ABL) 11537	APAN-JP (AJP) 7660	APAN-TW (ATW) 9264	CERNET (CER) 4538
Source					
APAN-JP (AJP) 7660	1 TJP TSG 2 TP2 3 HAW	1 TP2 2 direct 3 SIT	1 None 2 None 3 None	1 direct 2 CST 3 TP2 ABL	1 direct 2 TJP TSG 3 KOR

Zebra Server

BGP Table of APAN-JP_tpr6					
BGP table version is 0, local router ID is 203.181.248.35					
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale, R Removed					
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*> 6.1.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
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*> 6.4.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.5.0.0/19	203.181.248.144	0	0	0	7660 22388 11537 668 i
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*> 6.7.0.0/16	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.8.0.0/20	203.181.248.144	0	0	0	7660 22388 11537 668 i
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*> 6.10.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 6.14.0.0/15	203.181.248.144	0	0	0	7660 22388 11537 668 i
*> 8.6.244.0/23	203.181.248.144	0	0	0	7660 22388 11537 11096 i
*> 8.6.245.0/24	203.181.248.144	0	0	0	7660 22388 19401 11096 i
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ComPATH Tool

APAN-JP (AS7660) ----> CERNET (AS4538)				
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202.38.108.0/22	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
202.38.112.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.0.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.104.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.105.0/24	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
211.64.112.0/21	7660 22388 11537 20388 17579 4538 i	^(7660_)+(4538_)+	^(7660_)+(24287_)+(24489_)+(4538_)+	^(7660_)+(9270_)+(4538_)+
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Review

Review

(Demonstration)

URL <http://compath.jp.apan.net/>

Test Target : APAN-JP(AS7660) ---> Any Network

APAN-JP's(AS7660) choice path data

Reference : http://compath.jp.apan.net/noc/all_path.cgi

APAN-JP's(AS7660) current path data

Reference : <http://compath.jp.apan.net/>

Review

On APAN-JP

Oct 5 10:36:10 2007 UTC

Organization	AS number	Total number of Received routes	Checked result	Checked result (include second)	Checked result (include second & third)
AARNET	7575	278	18	18	12
Internet2	11537	8065	3	3	2
APAN-TW	9264	344	0	0	0
CERNET	4538	422	299	245	245
GEANT2	20965	2401	8	8	5
Hawaii	6360	24	4	4	4
KOREN	9270	329	0	0	0
SingAREN	23855	29	29	0	0
SINET	2907	508	0	0	0
TEIN2-HK	24489	58	2	2	0
TEIN2-SG	24490	521	0	0	0
TransPAC2	22388	9016	0	0	0
Uninet	4621	228	0	0	0
ASGC	24167	4	4	4	4

Review

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SINET	2907	508	0	0	0
TEIN2-HK	24489	58	2	2	0
TEIN2-SG	24490	521	0	0	0
TransPAC2	22388	9016	0	0	0
Uninet	4621	228	0	0	0
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GEANT2	20965	2401	8	8	5
Hawaii	6360	24	4	4	4
KOREN	9270	329	Unintended Path		0
SingAREN	23855	29			0
SINET	2907	508	0	0	0
TEIN2-HK	24489	58	2	2	0
TEIN2-SG	24490	521	0	0	0
TransPAC2	22388	9016	0	0	0
Uninet	4621	228	0	0	0
ASGC	24167	4	4	4	4

Review

On APAN-JP

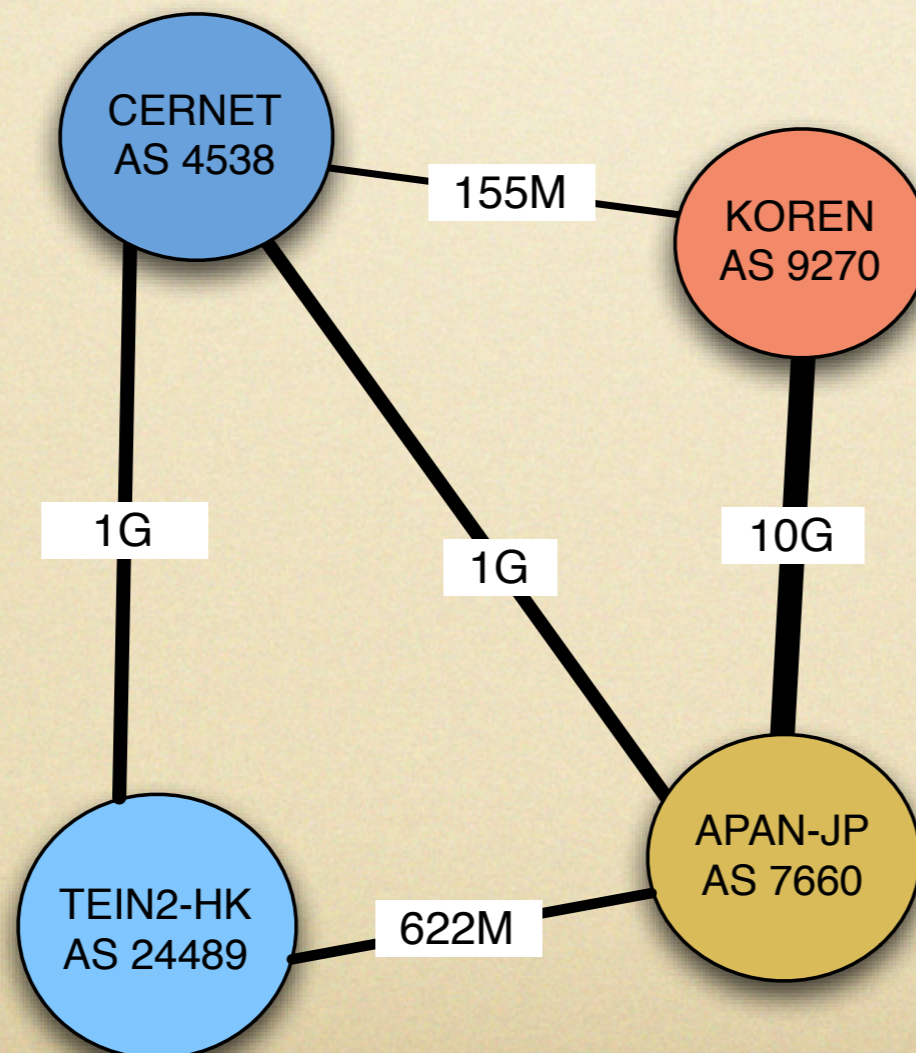
Oct 5 10:36:10 2007 UTC

Organization	AS number	Total number of Received routes	Checked result	Checked result (include second)	Checked result (include second & third)
AARNET	7575	278	18	18	12
Internet2	11537	8065	3	3	2
APAN-TW	9264	344	0	0	0
CERNET	4538	422	299	245	245
GEANT2	20965	2401	8	8	5
Hawaii	6360	24	4	4	4
KOREN	9270	329	Unintended		Unexpected
SingAREN	23855	29	29	0	Path
SINET	2907	508	0	0	0
TEIN2-HK	24489	58	2	2	0
TEIN2-SG	24490	521	0	0	0
TransPAC2	22388	9016	0	0	0
Uninet	4621	228	0	0	0
ASGC	24167	4	4	4	4

Review

- Unintended Path and Unexpected Path...

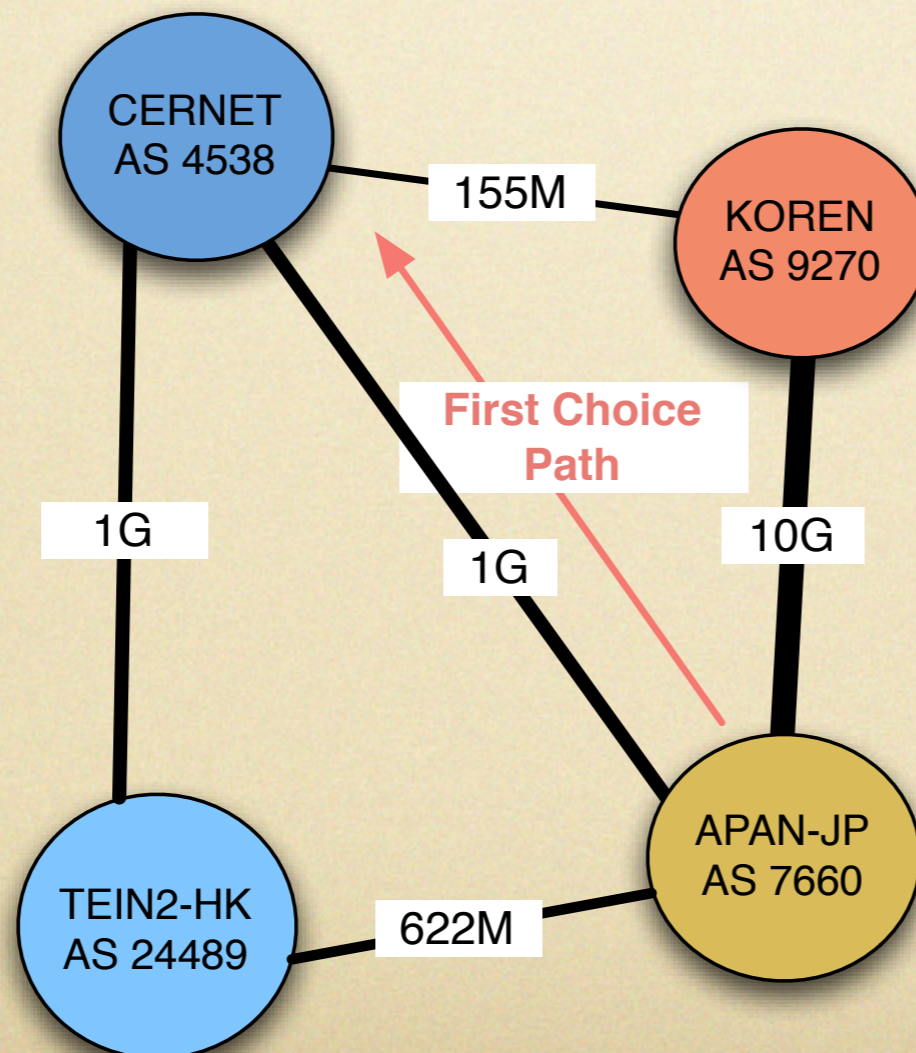
From APAN-JP To CERNET



Review

- Unintended Path and Unexpected Path...

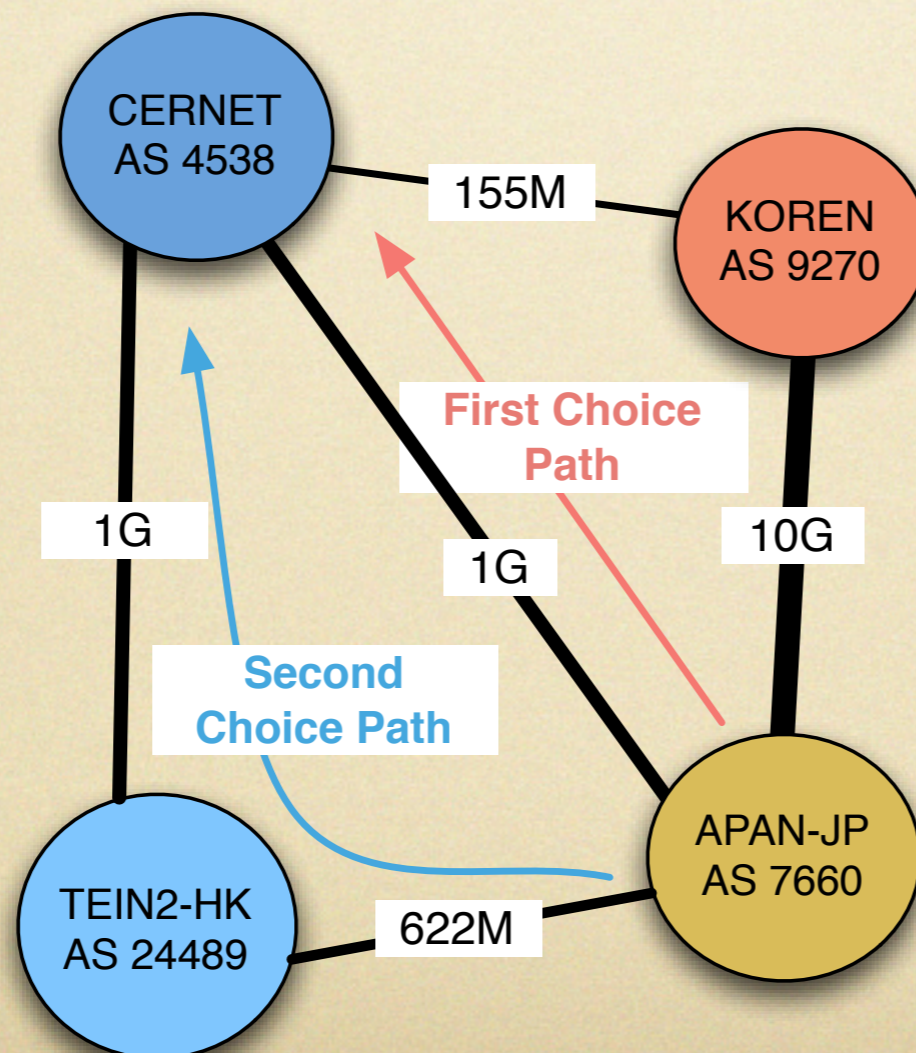
From APAN-JP To CERNET



Review

- Unintended Path and Unexpected Path...

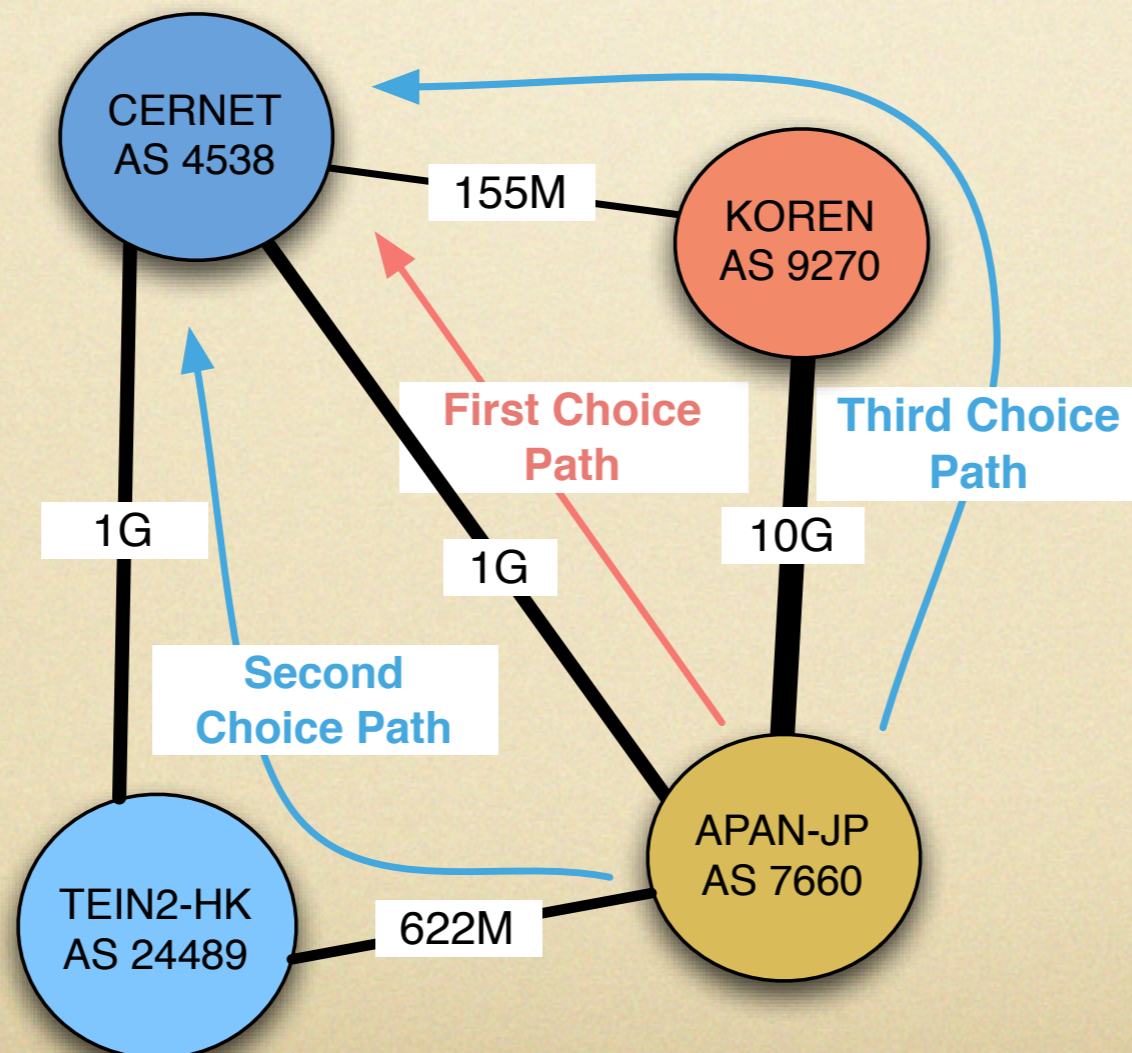
From APAN-JP To CERNET



Review

- Unintended Path and Unexpected Path...

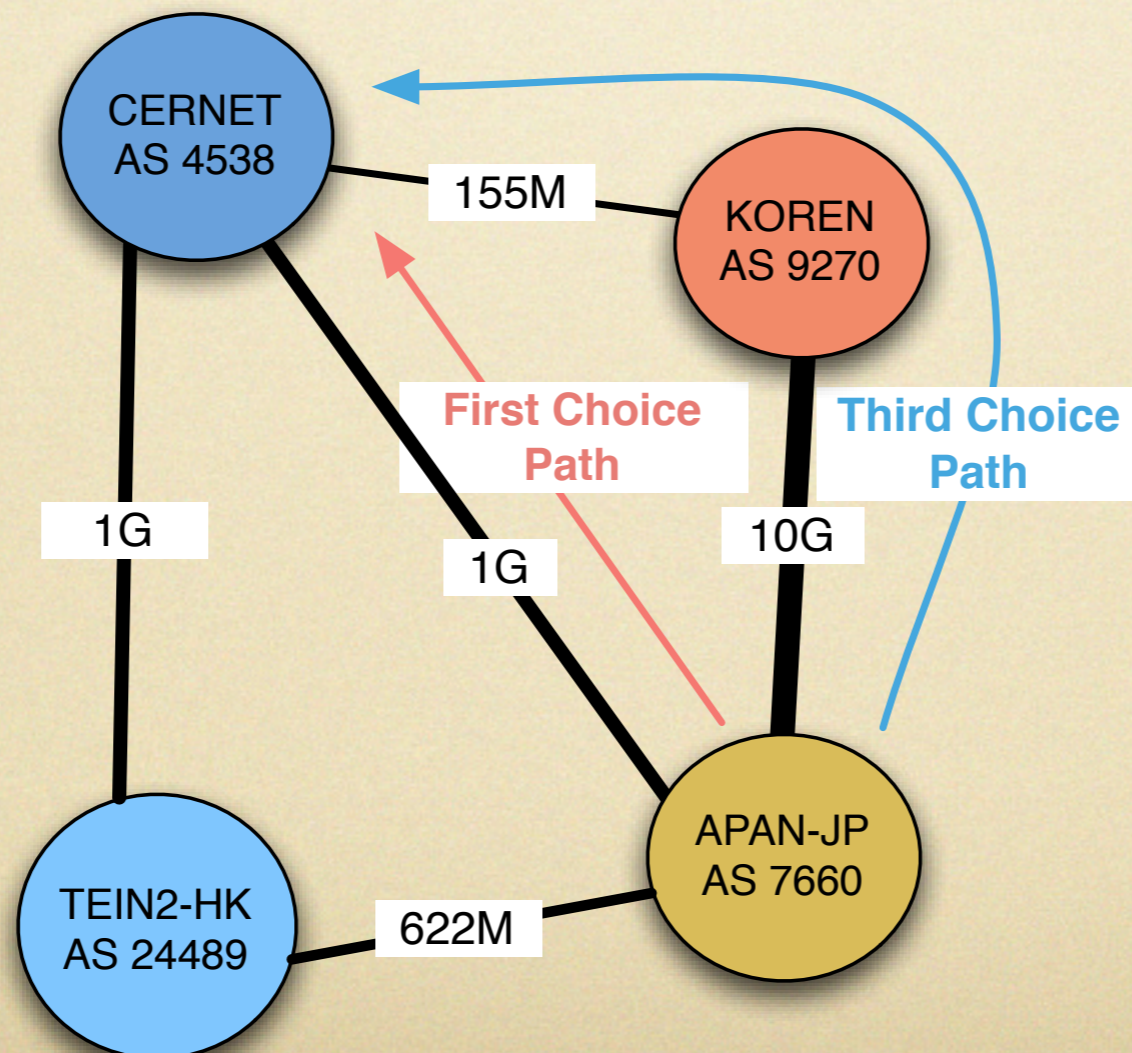
From APAN-JP To CERNET



Review

- Unintended Path and Unexpected Path...

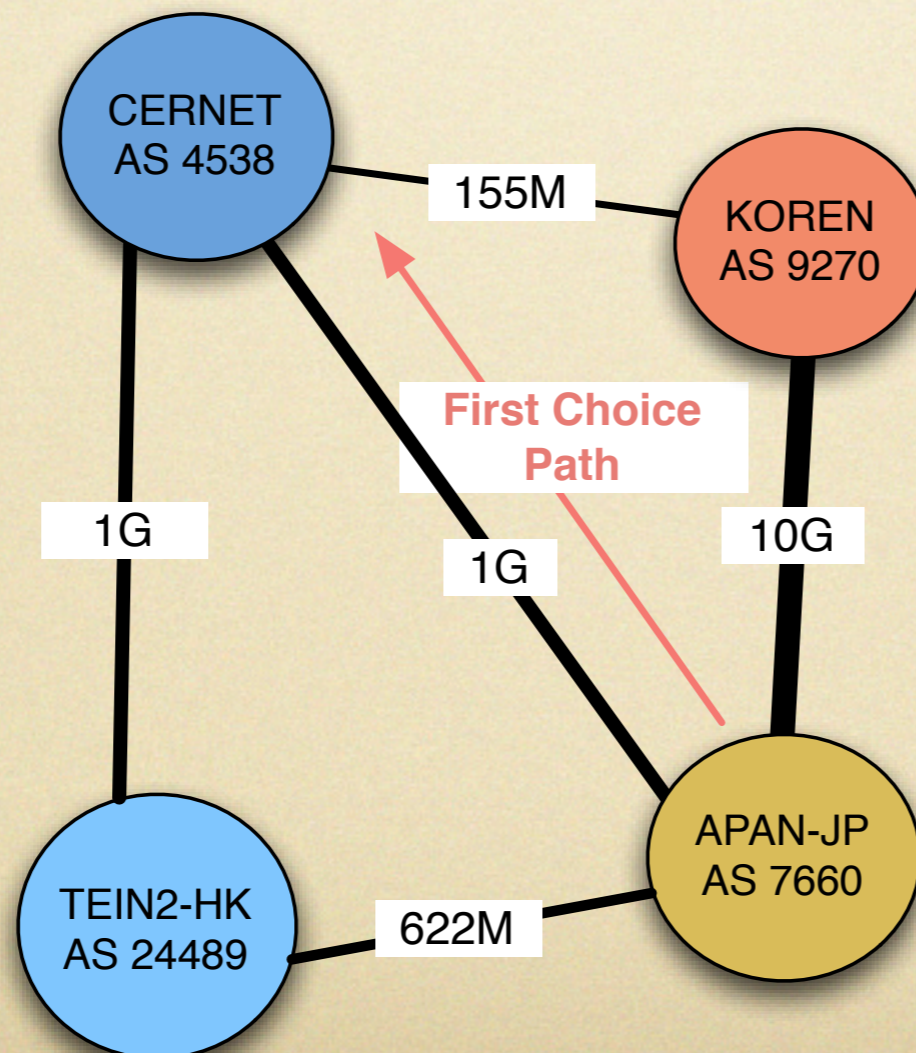
From APAN-JP To CERNET



Review

- Unintended Path and Unexpected Path...

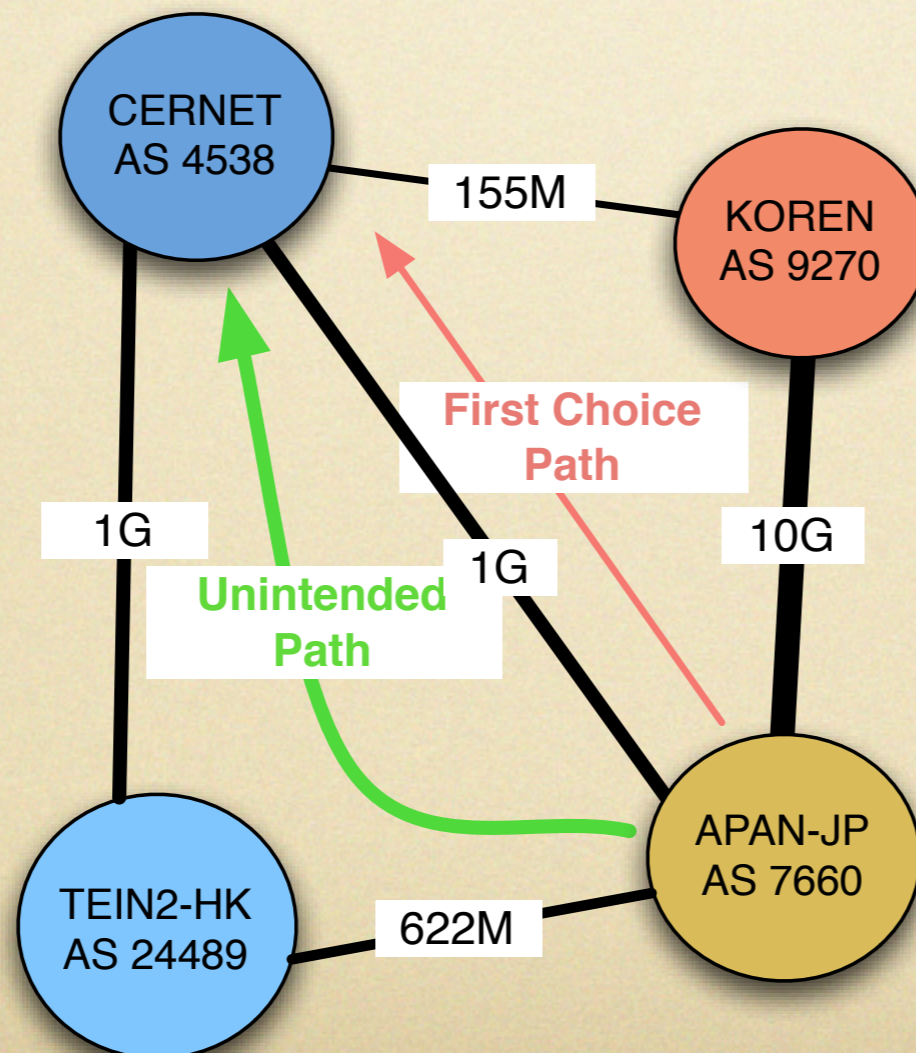
From APAN-JP To CERNET



Review

- Unintended Path and Unexpected Path...

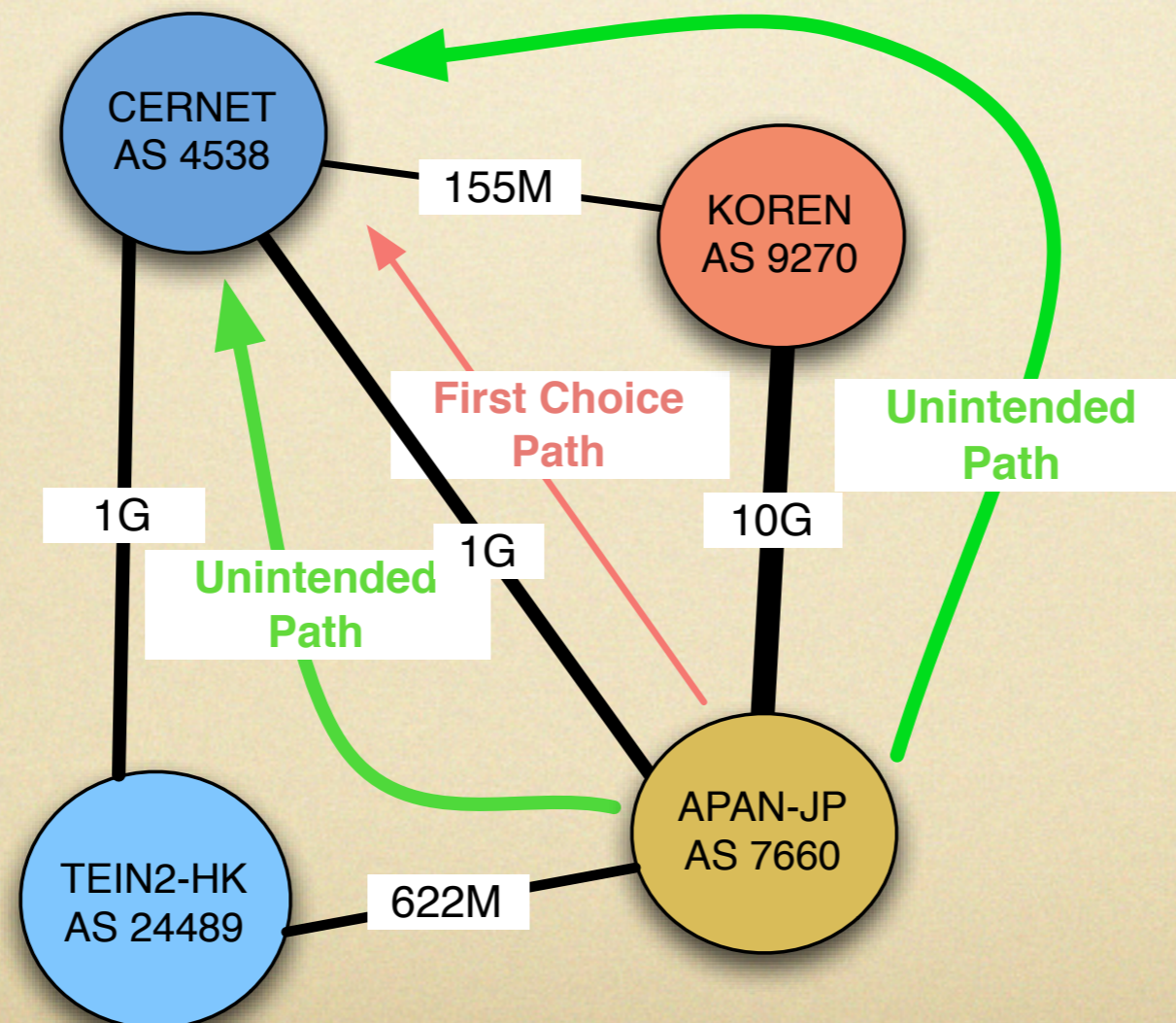
From APAN-JP To CERNET



Review

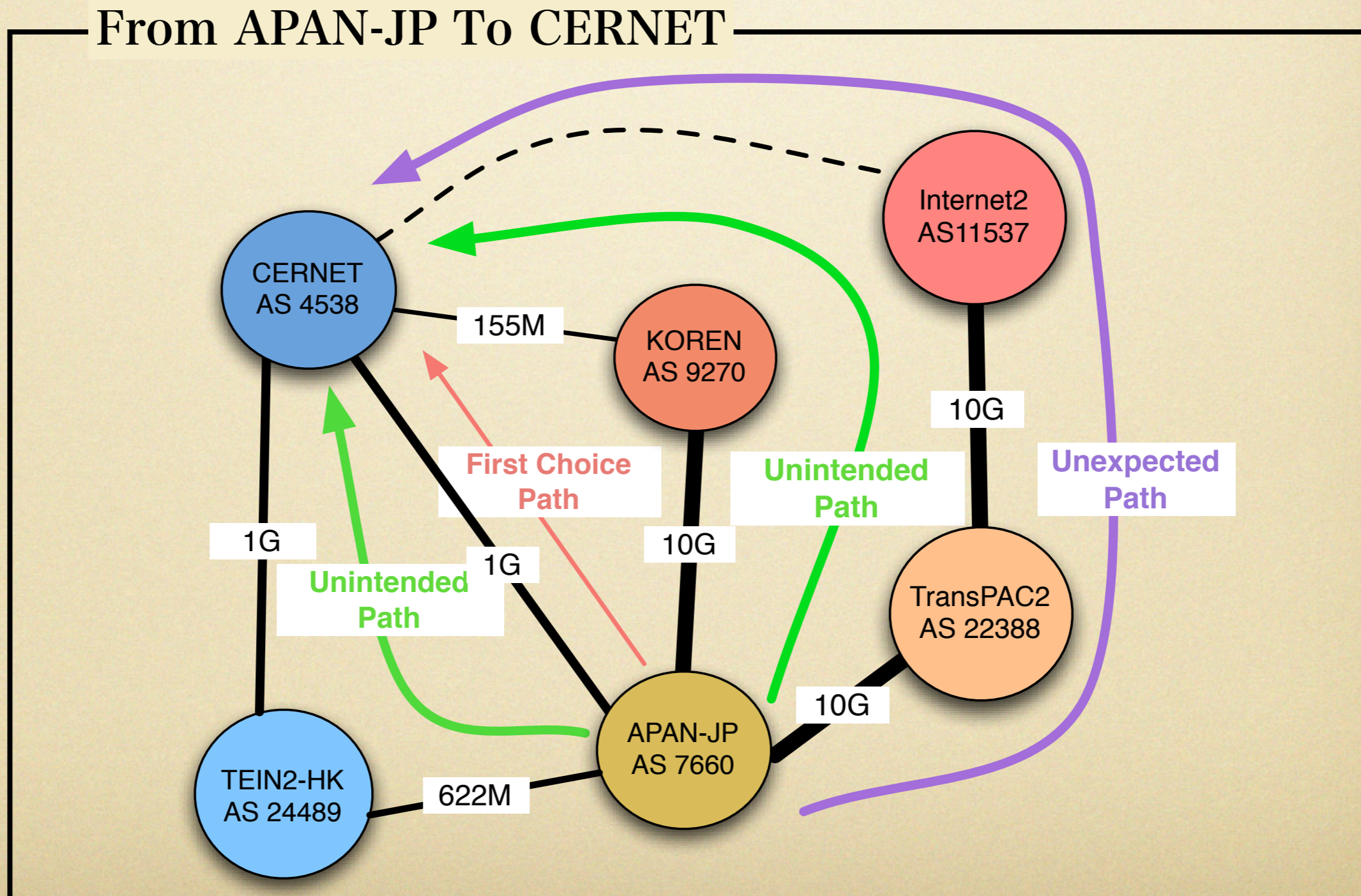
- Unintended Path and Unexpected Path...

From APAN-JP To CERNET



Review

- Unintended Path and Unexpected Path...



Future Working

Future working

Future working

- Developing the alarm function when the tool detect the “unexpected path”.

Future working

- Developing the alarm function when the tool detect the “unexpected path”.
- Detecting and filtering out “unexpected path”.

Future working

- Developing the alarm function when the tool detect the “unexpected path”.
- Detecting and filtering out “unexpected path”.
- Noticing “unintended path” and informing network operators for adjusting “unintended path”.

Thank you very much !

ops@jp.apan.net