

RPKI Workshop

Routing Lab

NANOG / Denver

2011.06.12

Randy Bush <randy@psg.com>

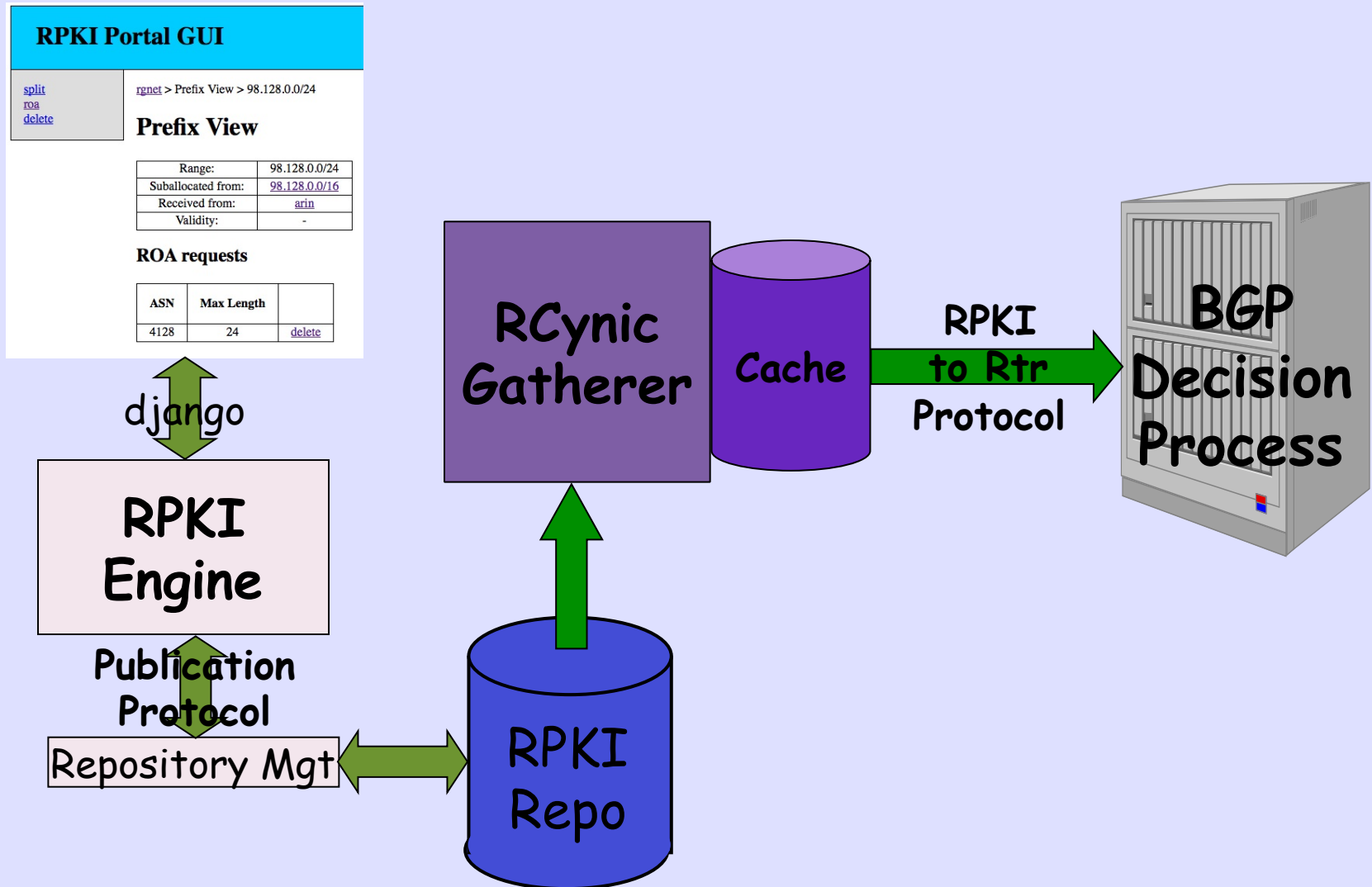
Michael Elkins <me@sigpipe.org>

Rob Austein <sra@isc.org>

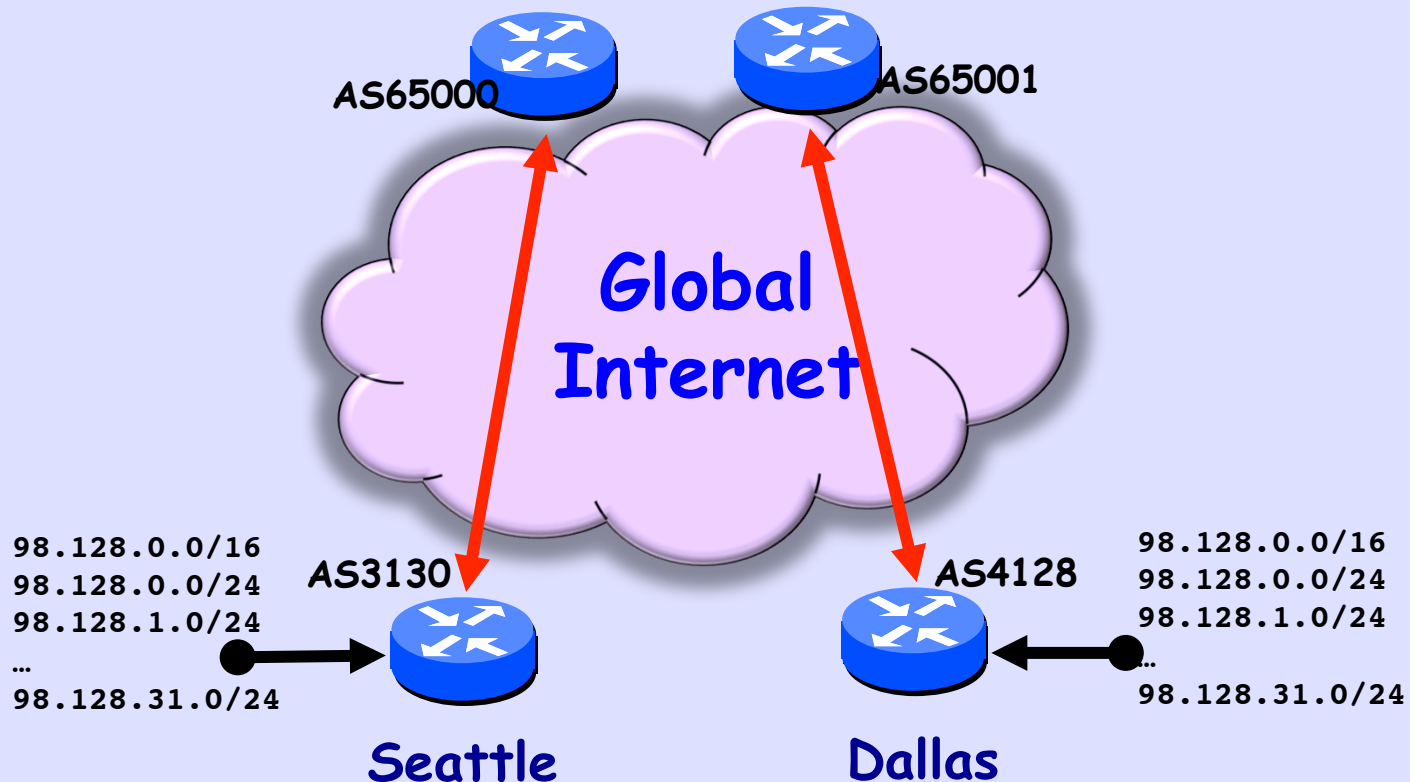
Philip Smith <pfs@cisco.com>

<http://archive.psg.com/110603.afnog-lab.pdf>

Lab Overview



BGP Feeds into Lab



DynaMIPS on MacBook Pro 17"

10.0.0.0/8

RPKI-Rtr
Protocol

AS65000

AS65001

196.200.222.128/192

Global
Internet

RPKI
Cache

98.128.0.0/16
98.128.0.0/24
98.128.1.0/24
...
98.128.31.0/24

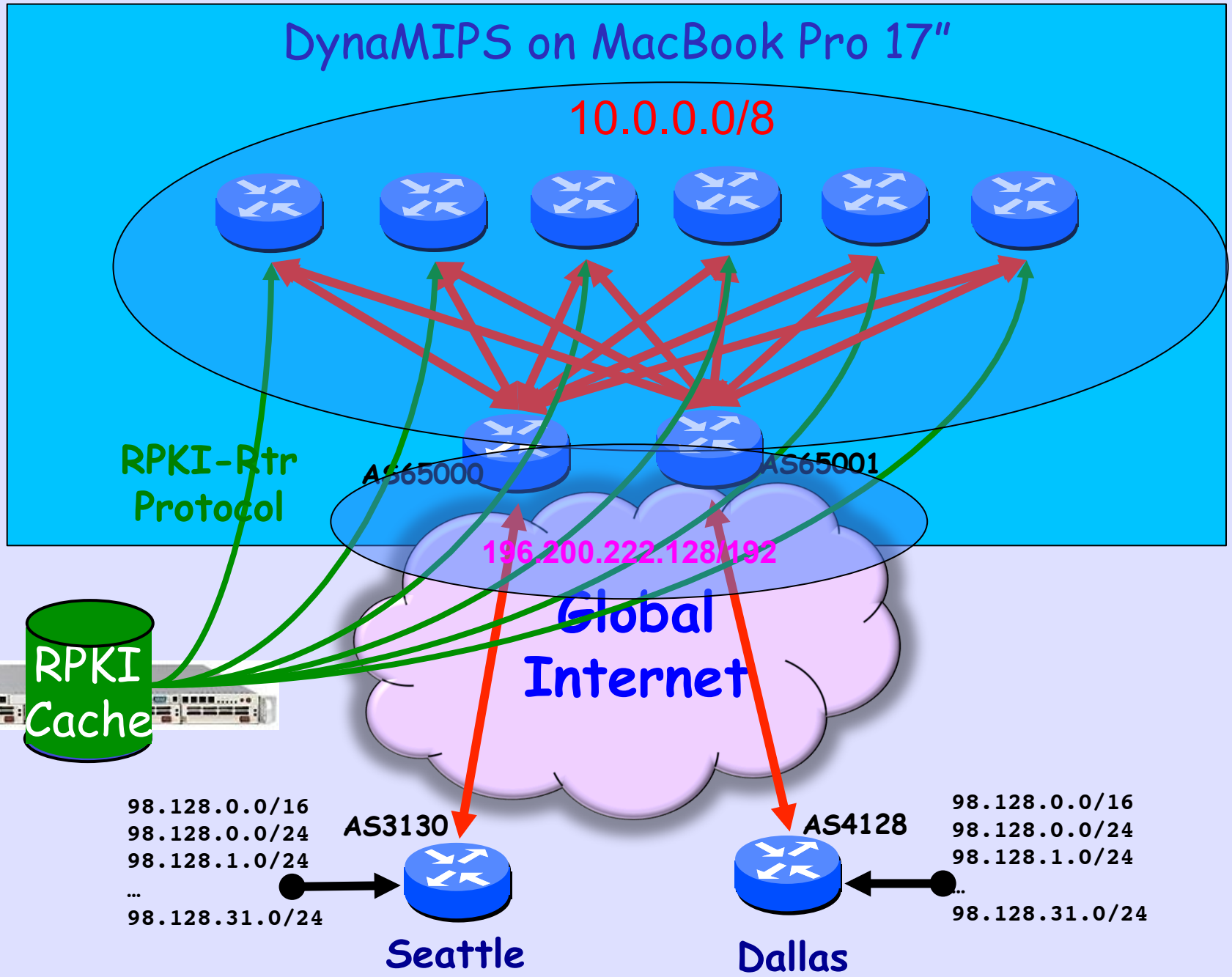
AS3130

Seattle

AS4128

Dallas

98.128.0.0/16
98.128.0.0/24
98.128.1.0/24
...
98.128.31.0/24



IP Address Allocation

98.128.0.0/16 ARIN Experimental Allocation

98.128.0.0/24 Instructors Play

98.128.1.0/24 labuser01

98.128.2.0/24 labuser02

...

98.128.16.0/24 labuser16

GUI Accounts

<https://demo.rpki.net/rpki>

| <u>UserID</u> | <u>Password</u> |
|---------------|-----------------|
| labuser01 | fnord |
| labuser02 | fnord |
| labuser03 | fnord |
| ... | |
| labuser16 | fnord |

RPKI Portal GUI

[parents](#)
[children](#)
[roas](#)
[ghostbusters](#)
[unallocated](#)

[export identity](#)
[select identity](#)

[refresh](#)

labuser01 > Dashboard

Dashboard

Parents

- [rgnet](#)

| Accepted Resource | Not Before | Not After |
|-------------------------------|------------------------|---------------------------|
| 98.128.1.0/24 | May 2, 2011, 8:44 a.m. | Feb. 18, 2012, 10:02 p.m. |



Children

none

Export (csv): [asns](#) | [prefixes](#)

ROA Requests

none

[export \(csv\)](#)

Ghostbuster Requests

none

[add](#)

Unallocated Resources

- [98.128.1.0/24](#) | [give](#) | [split](#) | [roa](#)

One Prefix

RPKI Portal GUI

[split](#)
[give to child](#)
[roa](#)



[labuser01](#) > Prefix View > 98.128.1.0/24

Prefix View

| | |
|----------------|--|
| Range: | 98.128.1.0/24 |
| Received from: | rgnet |
| Validity: | May 2, 2011, 8:44 a.m. - Feb. 18, 2012, 10:02 p.m. |

Unallocated

- 98.128.1.0/24

Issue a ROA

RPKI Portal GUI

[split](#)
[give to child](#)
[roa](#)

[labuser01](#) > Prefix View > 98.128.1.0/24


Prefix View

| | |
|----------------|--|
| Range: | 98.128.1.0/24 |
| Received from: | rgnet |
| Validity: | May 2, 2011, 8:44 a.m. - Feb. 18, 2012, 10:02 p.m. |


Unallocated

- 98.128.1.0/24

Issue ROA

Asns:  Comma-separated list of ASNs

Max length:



Looks Good

RPKI Portal GUI

[split](#)
[roa](#)

[labuser01](#) > Prefix View > 98.128.1.0/24

Prefix View

| | |
|----------------|--|
| Range: | 98.128.1.0/24 |
| Received from: | rgnet |
| Validity: | May 2, 2011, 8:44 a.m. - Feb. 18, 2012, 10:02 p.m. |

ROA requests

| ASN | Max Length | |
|------|------------|------------------------|
| 3130 | 24 | delete |

Router Accounts

```
telnet rmac.psg.com 20xx (your UserID)
```

```
% telnet rmac.psg.com 2001
```

```
user: cisco
```

```
password: cisco
```

```
enable: cisco
```

Configure RPKI Server

```
router bgp <AS>
```

```
bgp rpki server tcp <ip address> port <port>  
refresh <time in sec>
```

```
router bgp 651xx
```

```
bgp rpki server tcp 198.180.150.1 port \  
42420 refresh 120
```

Check Server

```
r0.sea#show ip bgp rpki servers
```

```
BGP SOVC neighbor is 198.180.150.1/42420 connected to port 42420
```

```
Flags 0, Refresh time is 600, Serial number is 1304239609
```

```
InQ has 0 messages, OutQ has 0 messages, formatted msg 345
```

```
Session IO flags 3, Session flags 4008
```

```
Neighbor Statistics:
```

```
Nets Processed 624
```

```
Connection state is ESTAB, I/O status: 1, unread input bytes: 0
```

```
Connection is ECN Disabled
```

```
Minimum incoming TTL 0, Outgoing TTL 255
```

```
Local host: 199.238.113.10, Local port: 57932
```

```
Foreign host: 198.180.150.1, Foreign port: 42420
```

```
Connection tableid (VRF): 0
```

Look at Table

```
router1#show ip bgp rpkf table
```

```
76 BGP sovc network entries using 6688 bytes of memory
```

```
78 BGP sovc record entries using 1560 bytes of memory
```

| Network | Maxlen | Origin-AS | Source | Neighbor |
|----------------|--------|-----------|--------|-------------------|
| 98.128.0.0/24 | 24 | 3130 | 0 | 198.180.150.1/424 |
| 98.128.0.0/16 | 16 | 3130 | 0 | 198.180.150.1/424 |
| 98.128.6.0/24 | 24 | 4128 | 0 | 198.180.150.1/424 |
| 98.128.9.0/24 | 24 | 3130 | 0 | 198.180.150.1/424 |
| 98.128.30.0/24 | 24 | 1234 | 0 | 198.180.150.1/424 |
| 128.224.1.0/24 | 24 | 3130 | 0 | 198.180.150.1/424 |
| 129.6.0.0/17 | 17 | 49 | 0 | 198.180.150.1/424 |
| 129.6.112.0/24 | 24 | 10866 | 0 | 198.180.150.1/424 |
| 129.6.128.0/17 | 17 | 49 | 0 | 198.180.150.1/424 |
| 147.28.0.0/16 | 16 | 3130 | 0 | 198.180.150.1/424 |

Look at BGP Table

```
* i I198.180.150.0      144.232.9.61      100  0 1239 3927 i
*> I                    199.238.113.9      0 2914 3927 i
* I                    129.250.11.41      0 2914 3927 i
*> V198.180.152.0      199.238.113.9      0 2914 4128 i
* V                    129.250.11.41      0 2914 4128 i
*> N198.180.155.0      199.238.113.9      0 2914 22773 i
* N                    129.250.11.41      0 2914 22773 i
*> N198.180.160.0      199.238.113.9      0 2914 23308 13408 5752 i
* N                    129.250.11.41      0 2914 23308 13408 5752 i
```

Look at a Prefix

```
R3#show ip bgp 98.128.0.0/24
```

```
BGP routing table entry for 98.128.0.0/24, version 360
```

```
Paths: (2 available, best #1, table default)
```

```
65000 3130
```

```
10.0.0.1 from 10.0.0.1 (193.0.24.64)
```

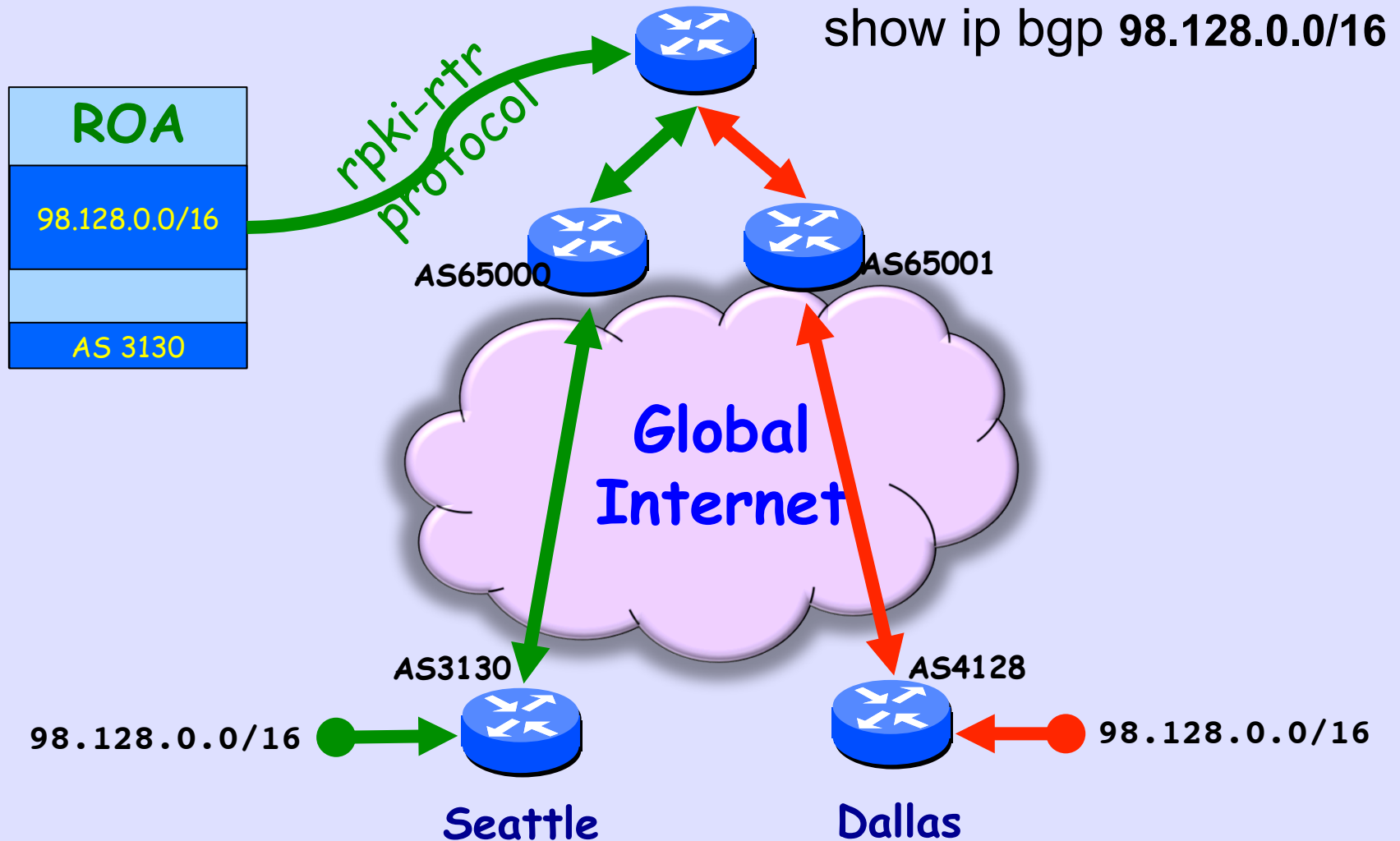
```
Origin IGP, localpref 100, valid, external, best  
path 680D859C RPKI State valid
```

```
65001 4128
```

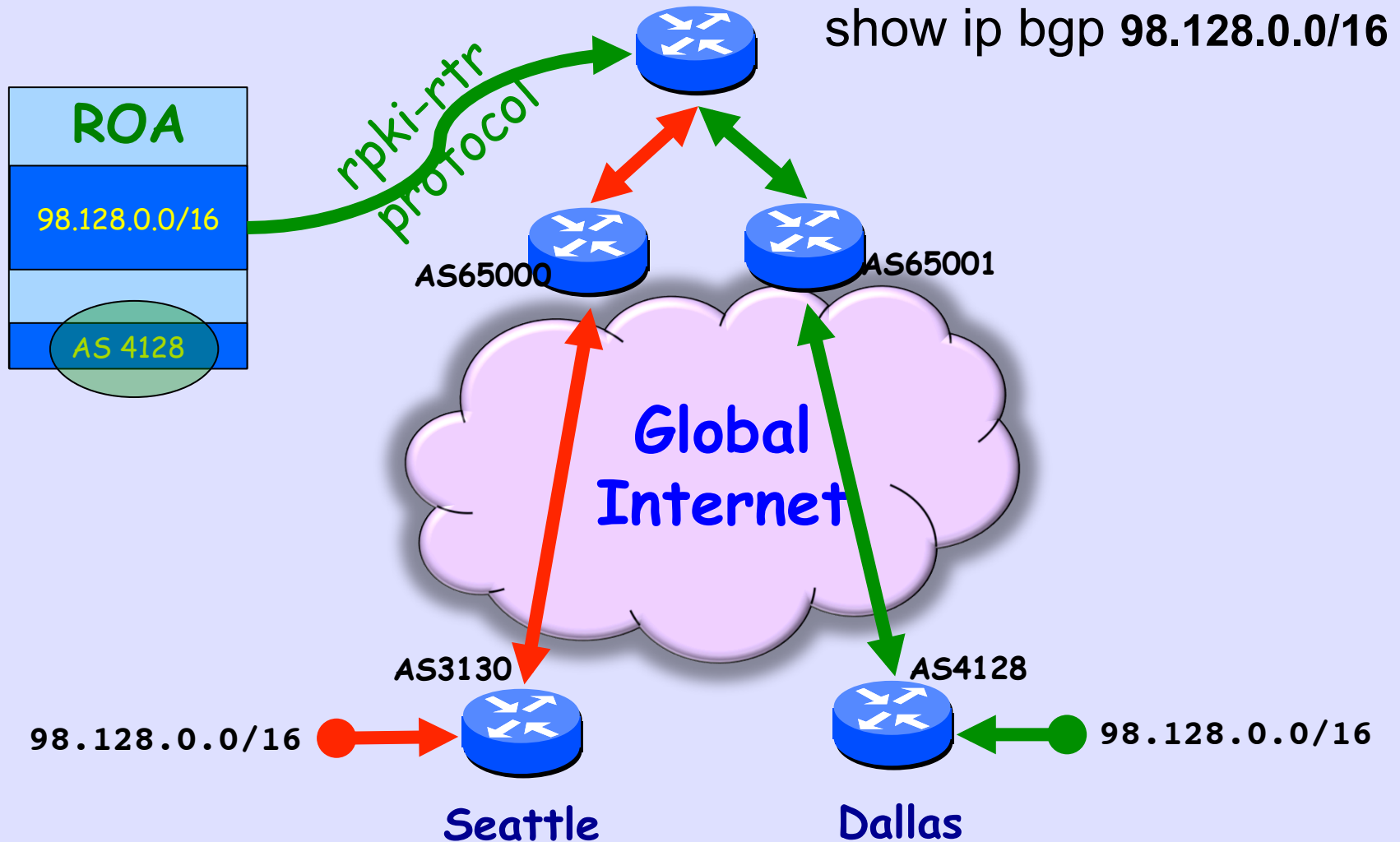
```
10.0.1.1 from 10.0.1.1 (193.0.24.65)
```

```
Origin IGP, localpref 100, valid, external  
path 680D914C RPKI State invalid
```

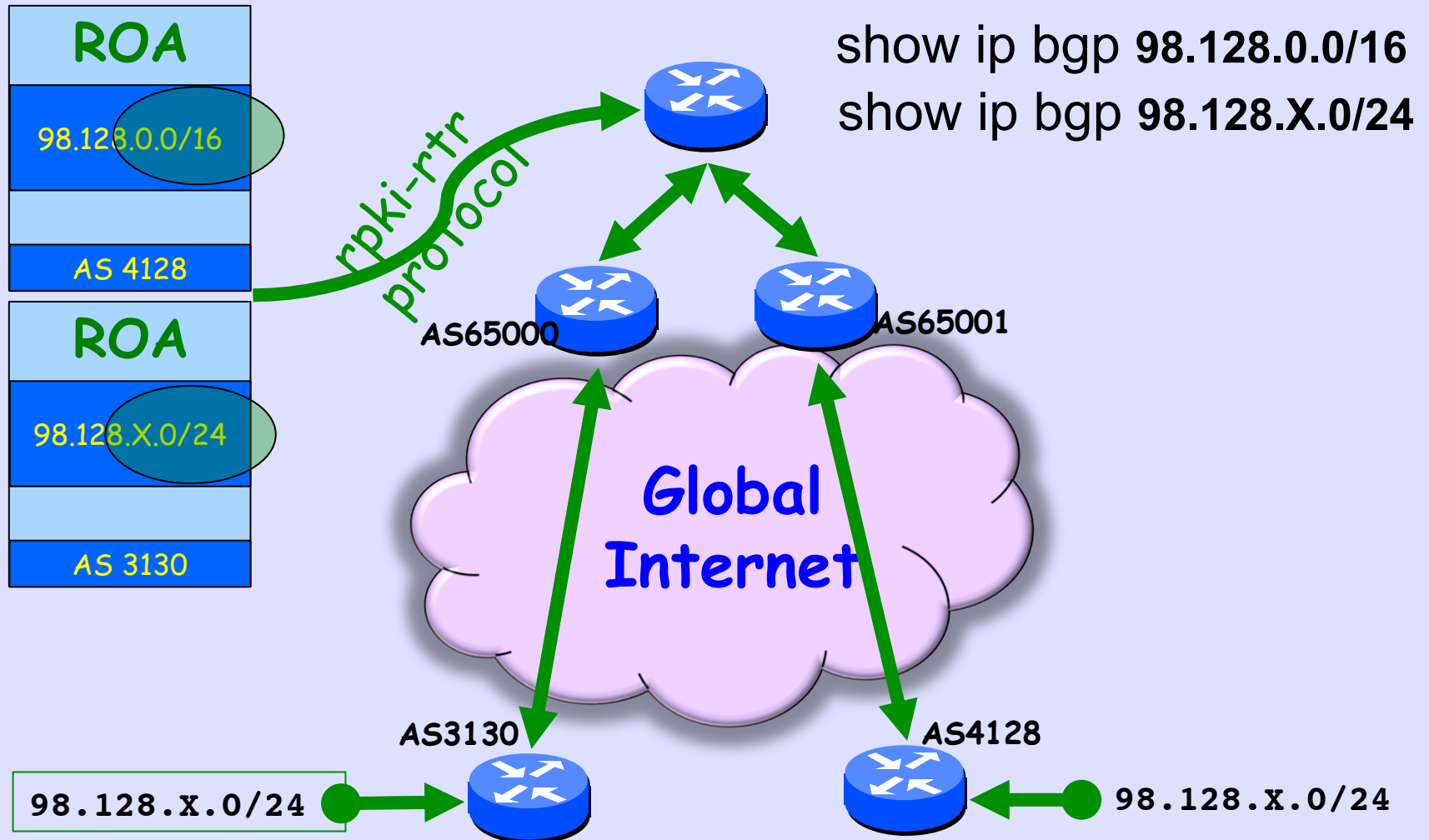

Fat-Finger Detected



ROA Controls Validity



Try Your Own /24



Mis-Origination Caught

```
R3#sh ip bg 98.128.0.0/24
```

```
BGP routing table entry for 98.128.0.0/24, version 94
```

```
Paths: (2 available, best #2, table default)
```

```
  Advertised to update-groups:
```

```
    1
```

```
  Refresh Epoch 1
```

```
 65000 3130
```

```
    10.0.0.1 from 10.0.0.1 (65.38.193.12)
```

```
      Origin IGP, localpref 100, valid, external
```

```
      path 6802D4DC RPKI State invalid
```

```
  Refresh Epoch 1
```

```
 65001 4128
```

```
    10.0.1.1 from 10.0.1.1 (65.38.193.13)
```

```
      Origin IGP, localpref 100, valid, external, best
```

```
      path 6802D7C8 RPKI State valid
```