

RPKI Workshop

Routing Lab

NANOG / Denver

2011.06.12

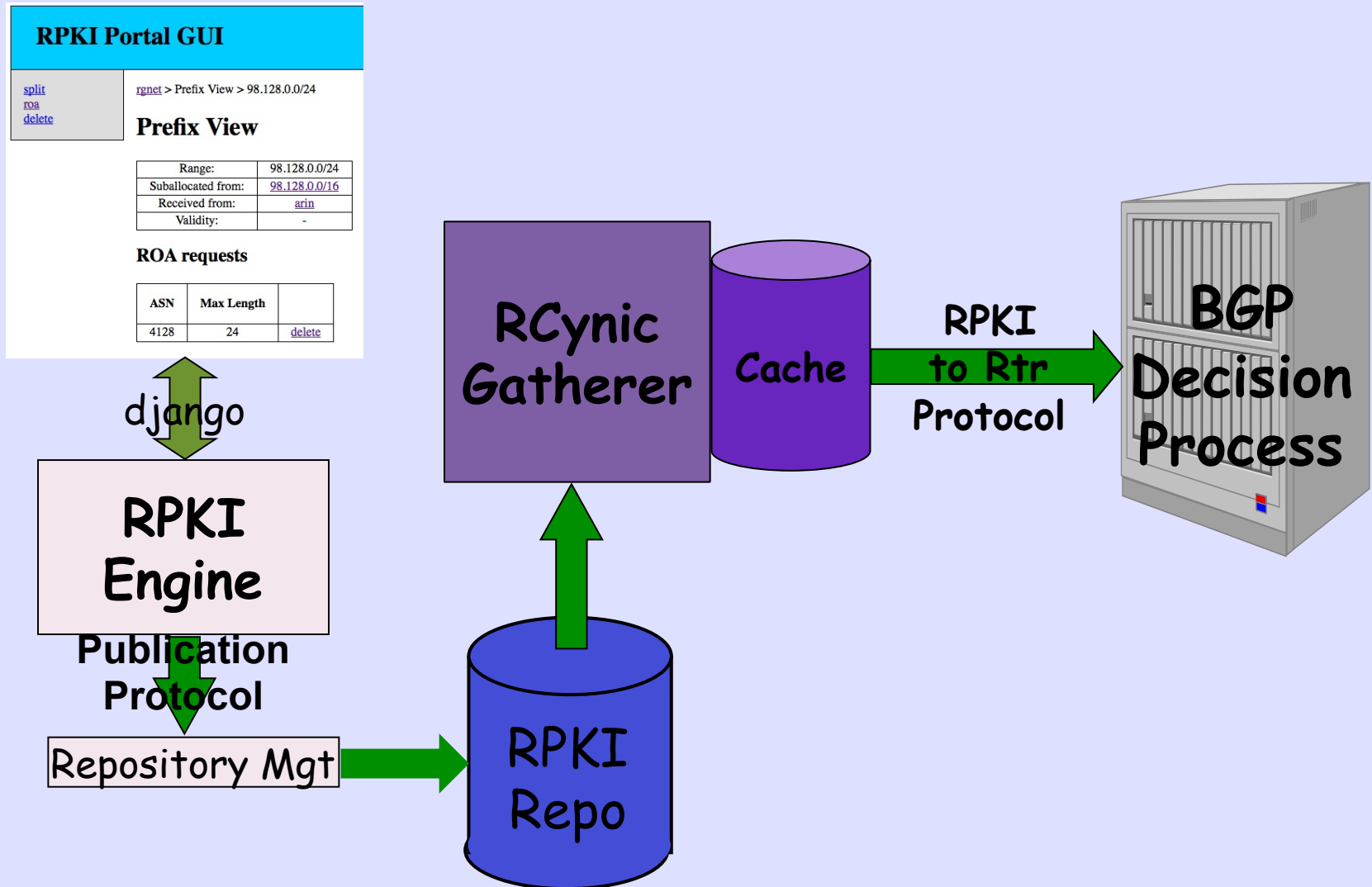
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Michael Elkins <me@sigpipe.org>

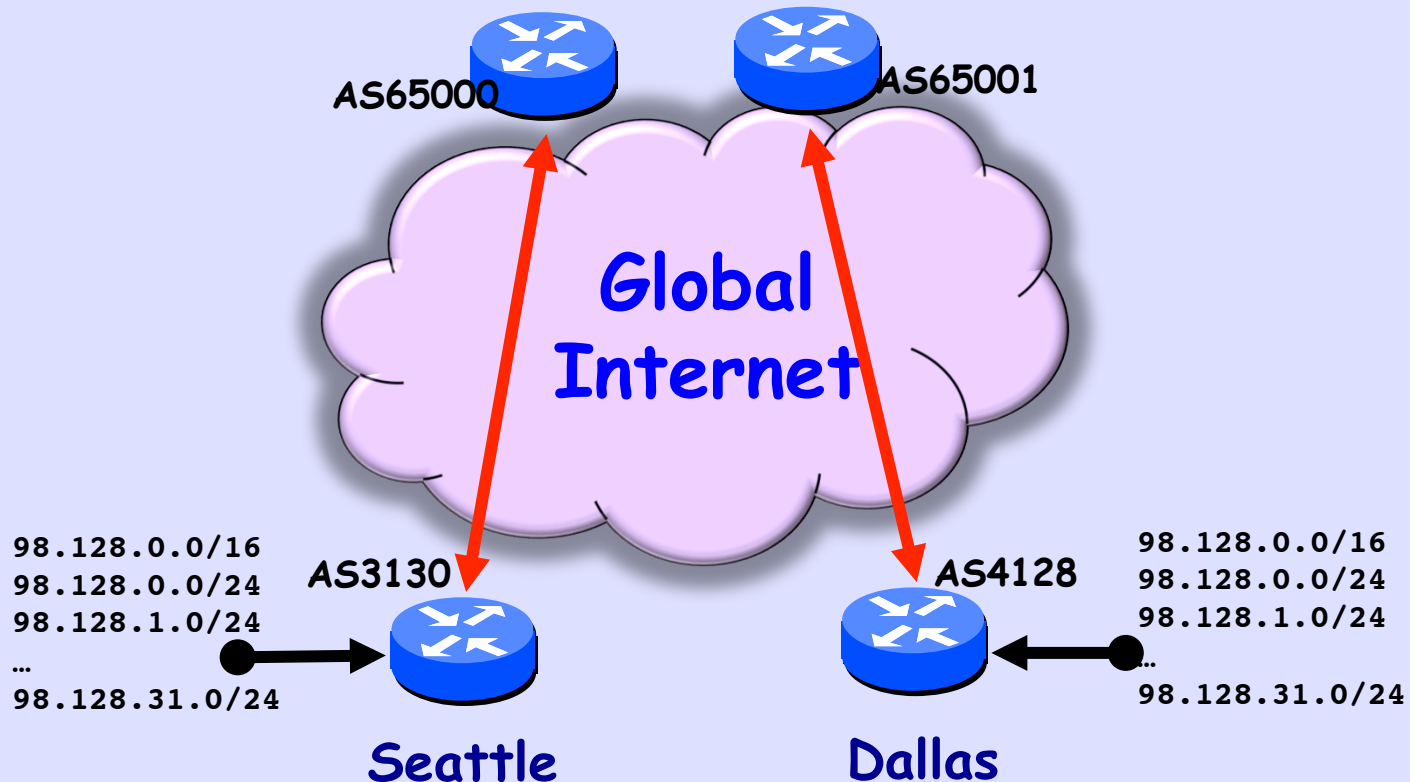
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Lab Overview



BGP Feeds into Lab



Junosphere Server

10.0.0.0/8

RPKI-Rtr Protocol

AS65000

AS65001

Global Internet

147.28.240.0/19

RPKI Cache

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

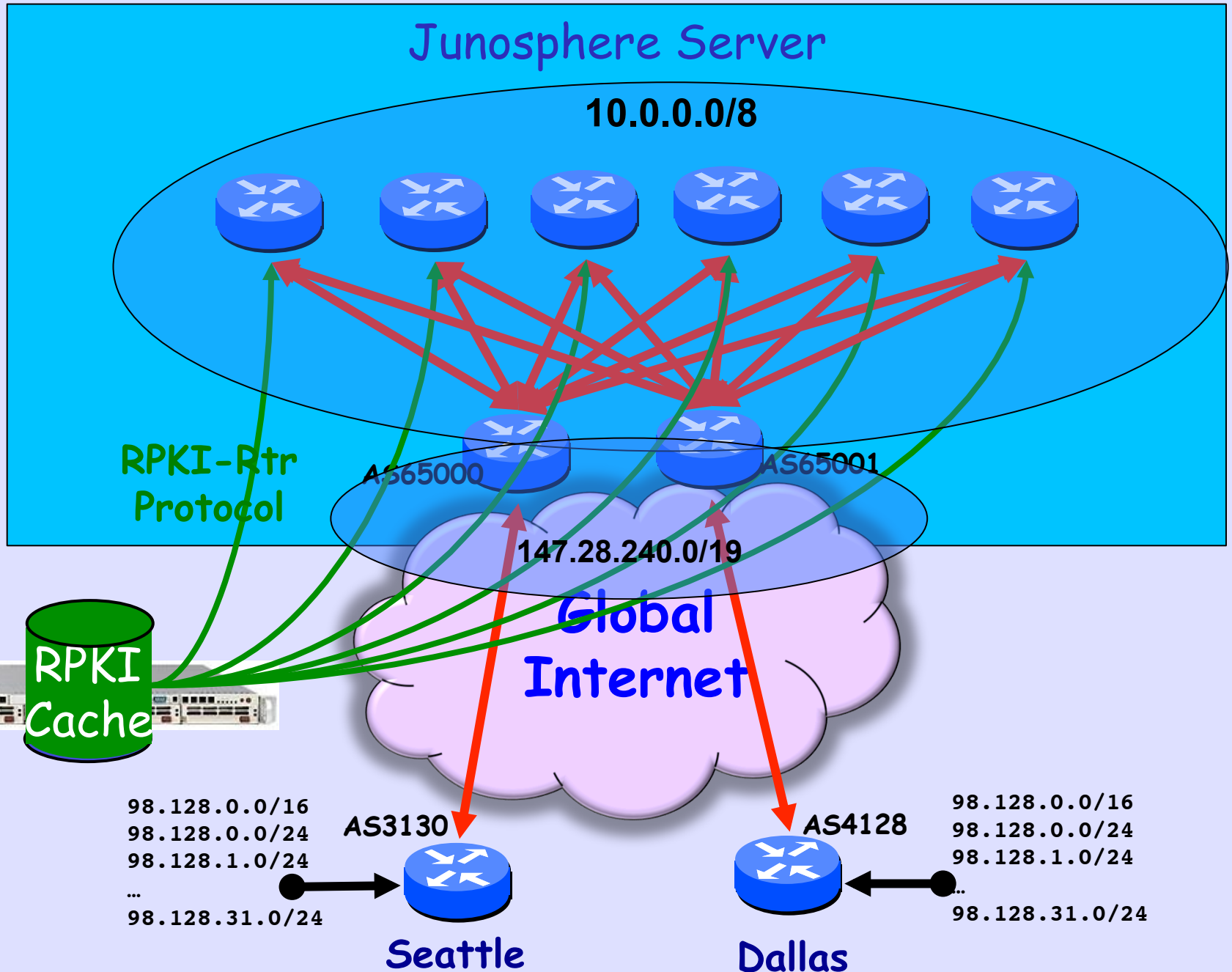
AS3130

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 Alloc

98.128.0.0/24 instructors play

98.128.1.0/24 labuser01

98.128.2.0/24 labuser02

...

98.128.32.0/24 labuser32

GUI Accounts

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

<u>UserID</u>	<u>Password</u>
labuser01	fnord
labuser02	fnord
labuser03	fnord
...	
labuser32	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

```
% ssh juniper@rxx.jlab.rpki.net
```

(where xx is your UserID)

```
juniper@r1.jlab.rpki.net's password: Juniper
```

```
--- JUNOS 10.3I built 2011-06-04 02:59:04 UTC
```

```
juniper@R1>
```

Router Configuration

- BGP peerings etc. should be up
 - AS 65000 - connected to b0 to Seattle
 - AS 65001 - connected to b1 to Dallas
- Please confirm

```
juniper@R1> show bgp summary | match ^10
10.0.0.253 65000 ... 1d 1:13:07 15/42/42/0 0/0/0/0
10.0.0.254 65001 ... 1d 1:12:38 27/41/41/0 0/0/0/0
```

<http://rpki.net/junos/jlab-routing.txt>

```
juniper@R1> show configuration routing-options | find validation
validation {
  traceoptions {
    file rpki.log;
    flag all detail;
    flag error detail;  }
  group test {
    session 198.180.150.1 {
      traceoptions {
        file r.log size 10m;
        flag error;
        flag state;
        flag packets; }
      refresh-time 120;
      hold-time 180;
      port 42420;
      local-address <ip-address of em0>;
      connect-retry 10; }  } }
```

Lab Cheat Sheets & JunOSphere Literature

<http://rpki.net/junos/>

<http://rpki.net/junos/jlab-policy.txt>

```
juniper@R1> show configuration policy-options | find validation
policy-statement route-validation {
  term valid {
    from {
      protocol bgp;
      validation-state valid; }
    then {
      local-preference 110;
      validation-state valid;
      accept;}}
  term invalid {
    from {
      protocol bgp;
      validation-state invalid; }
    then {
      local-preference 90;
      validation-state invalid;
      accept; } }
  term unknown {
    from {
      protocol bgp;
      validation-state unknown; }
    then {validation-state unknown;
      accept; } } }
```

Apply the Policy

```
juniper@r00> show configuration protocols
bgp {
  import route-validation;
  group as65000 {
    local-address 10.0.0.102;
    export none;
    peer-as 65000;
    neighbor 10.0.0.253;
  }
  group as65001 {
    local-address 10.0.0.102;
    export none;
    peer-as 65001;
    neighbor 10.0.0.254;
  }
}
```


Check Server

```
juniper@R1> show validation session brief
```

```
Session 198.180.150.1, State: up
```

```
Group: test, Preference: 100
```

```
Port: 42420
```

```
Refresh time: 120s
```

```
Hold time: 180s
```

```
Record Life time: 3600s
```

```
Serial (Full Update): 1307272205
```

```
Serial (Incremental Update): 1307272205
```

```
IPv4 prefix count: 81
```

```
IPv6 prefix count: 29
```

Look at Table

```
juniper@R1> show validation database brief
```

```
RV database for instance master
```

```
  Total IPv4 records: 81
```

```
  Total IPv6 records: 29
```

Prefix	Origin	Session	State
67.21.36.0/24-24	3970	198.180.150.1	valid
98.128.0.0/16-16	3130	198.180.150.1	valid
98.128.0.0/24-24	4128	198.180.150.1	valid
98.128.1.0/24-24	3130	198.180.150.1	valid
98.128.2.0/24-24	3130	198.180.150.1	valid
98.128.3.0/24-24	4128	198.180.150.1	valid
98.128.4.0/24-24	3130	198.180.150.1	valid
98.128.5.0/24-24	3130	198.180.150.1	valid
98.128.6.0/24-24	4128	198.180.150.1	valid
98.128.7.0/24-24	3130	198.180.150.1	valid
98.128.8.0/24-24	4128	198.180.150.1	valid

Look at a Prefix

```
juniper@R1> show route 98.128.1.0 detail
```

```
98.128.1.0/24 (2 entries, 1 announced)
```

```
    *BGP      Preference: 170/-111
```

```
      Source: 10.0.0.253
```

```
...      Validation State: valid
```

```
...      AS path: 65000 3130 I
```

```
...      BGP      Preference: 170/-101
```

```
...      Source: 10.0.0.254
```

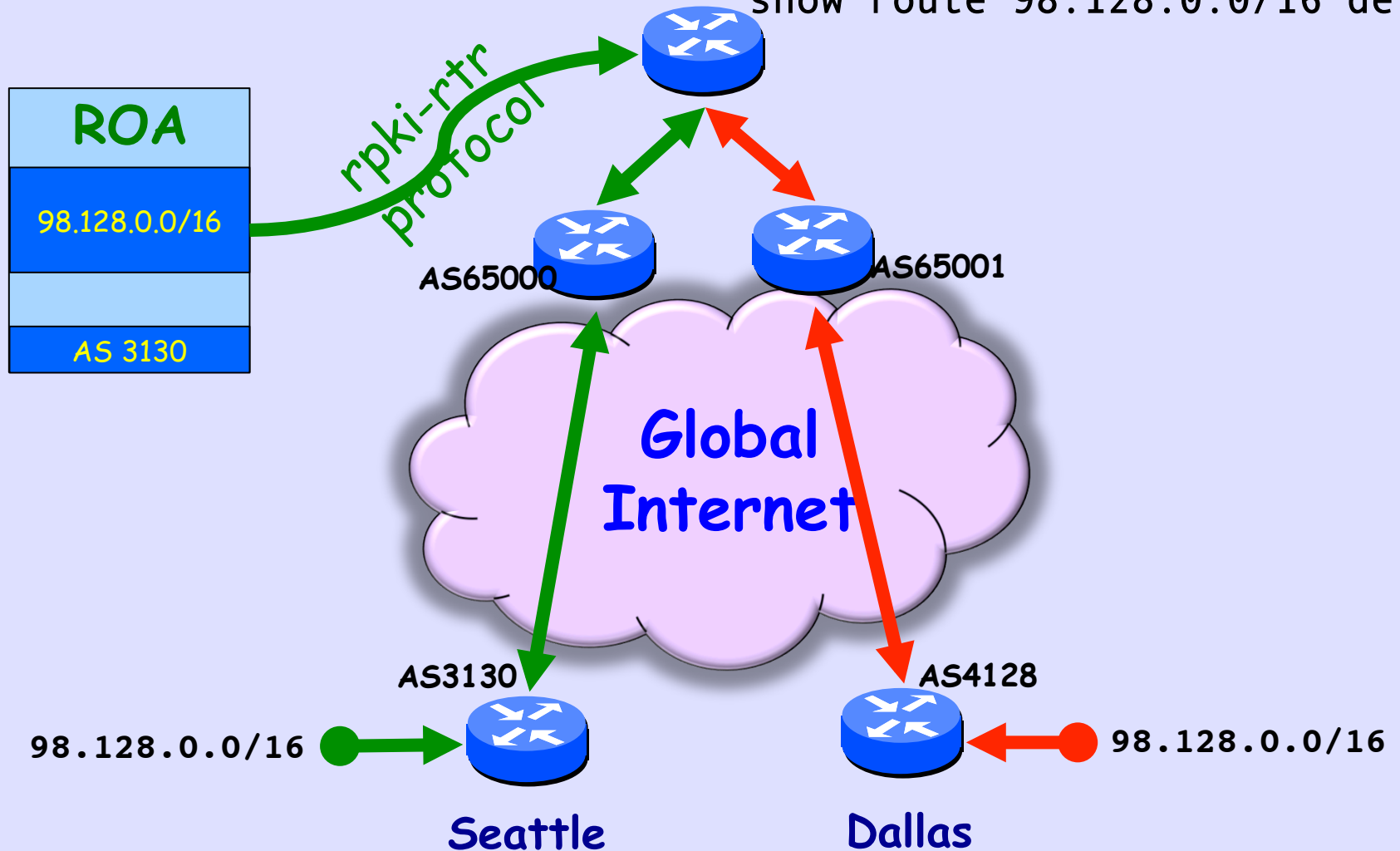
```
...      Validation State: invalid
```

```
...      AS path: 65001 4128 I
```

Go Play With Policy

Fat-Finger Detected

show route 98.128.0.0/16 detail



Find [In]Valid Routes

```
juniper@R1> show route validation-state invalid terse
```

A	V	Destination	...	AS path
I		98.128.0.0/16	...	65001 4128 I
I		98.128.0.0/24	...	65000 3130 I
I		98.128.1.0/24	...	65001 4128 I

```
juniper@R1> show route validation-state valid terse
```

A	V	Destination	...	AS path
*	V	98.128.0.0/16	...	65000 3130 I
*	V	98.128.0.0/24	...	65001 4128 I
*	V	98.128.1.0/24	...	65000 3130 I

Clearing Sessions

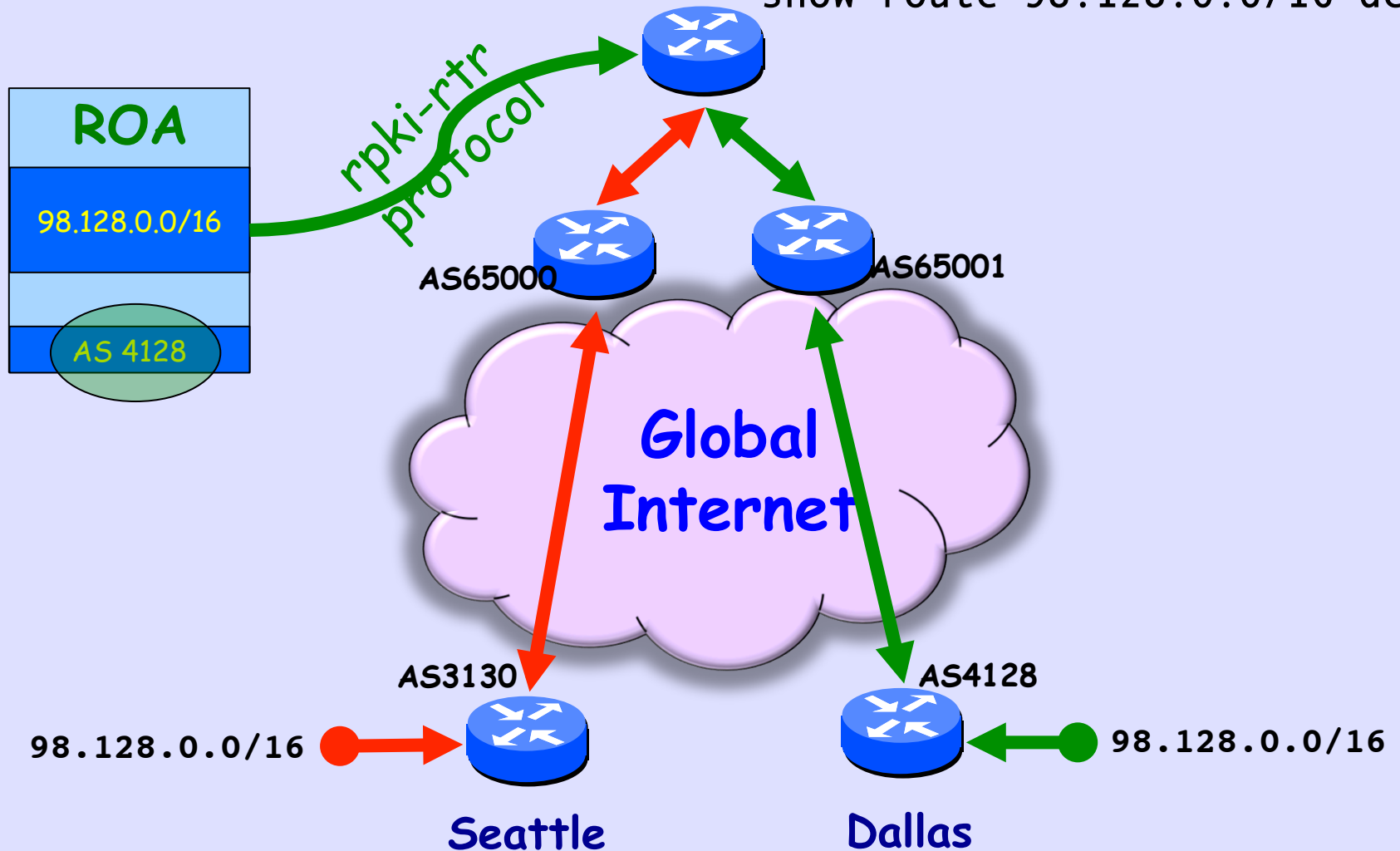
```
clear validation session <ip-address> \  
soft-inbound
```

```
clear validation session <ip-address>
```

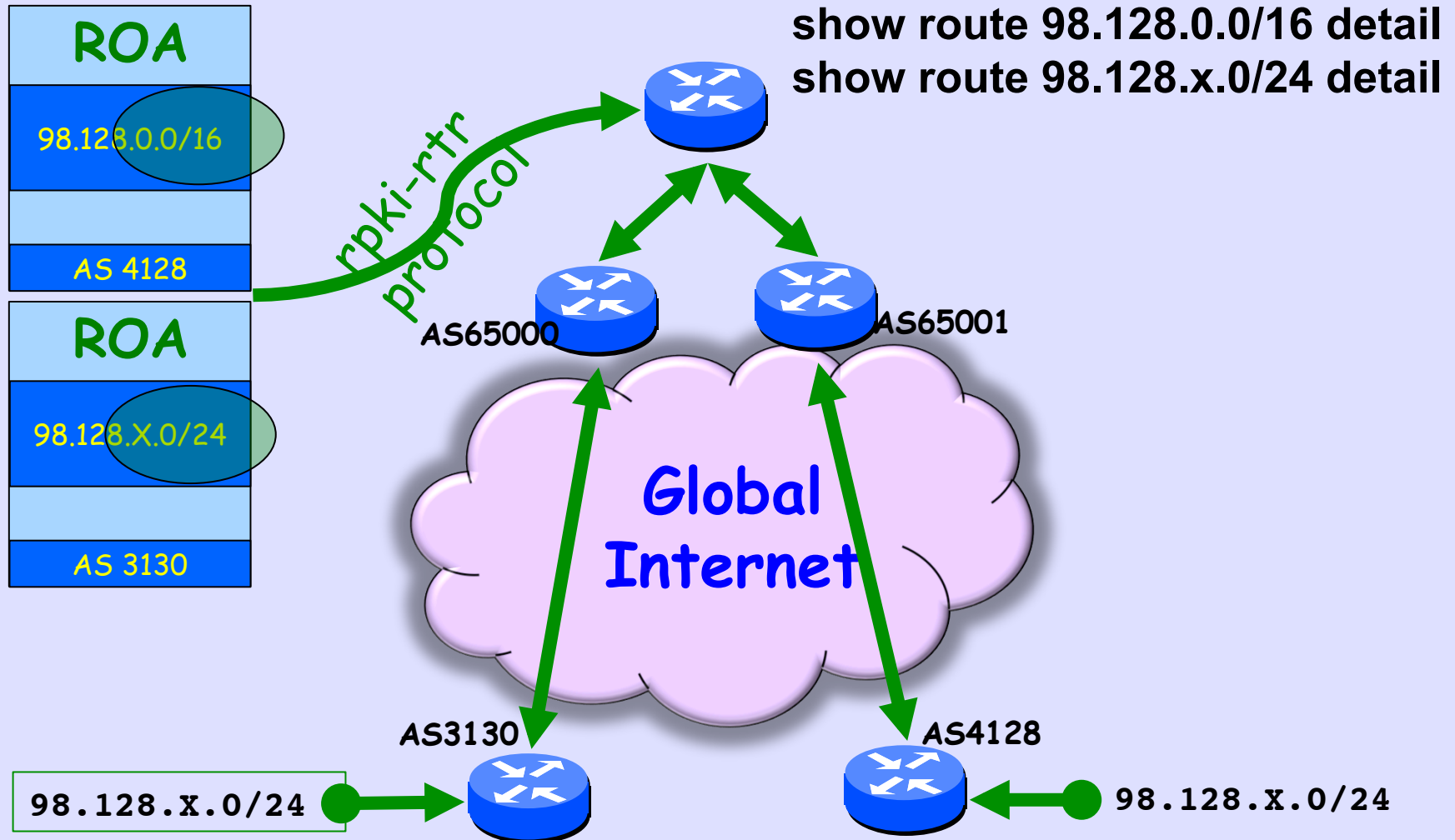
Due to a bug, we have to soft clear sessions to get database changes

ROA Controls Validity

show route 98.128.0.0/16 detail



Try Your Own /24



LocalPref is Set

```
juniper@R1> show route 98.128.0.0/24 detail
```

```
98.128.0.0/24 (2 entries, 1 announced)
```

```
    *BGP      Preference: 170/-111
```

```
    ...      Source: 10.0.0.254
```

```
    ...      Validation State: valid
```

```
    ...      AS path: 65001 4128 I
```

```
    ...      Localpref: 110
```

```
    ...      BGP      Preference: 170/-101
```

```
    ...      Source: 10.0.0.253
```

```
    ...      Validation State: invalid
```

```
    ...      AS path: 65000 3130 I
```

```
    ...      Localpref: 100
```