Selectively Synchronize the RPKI Data to Routers

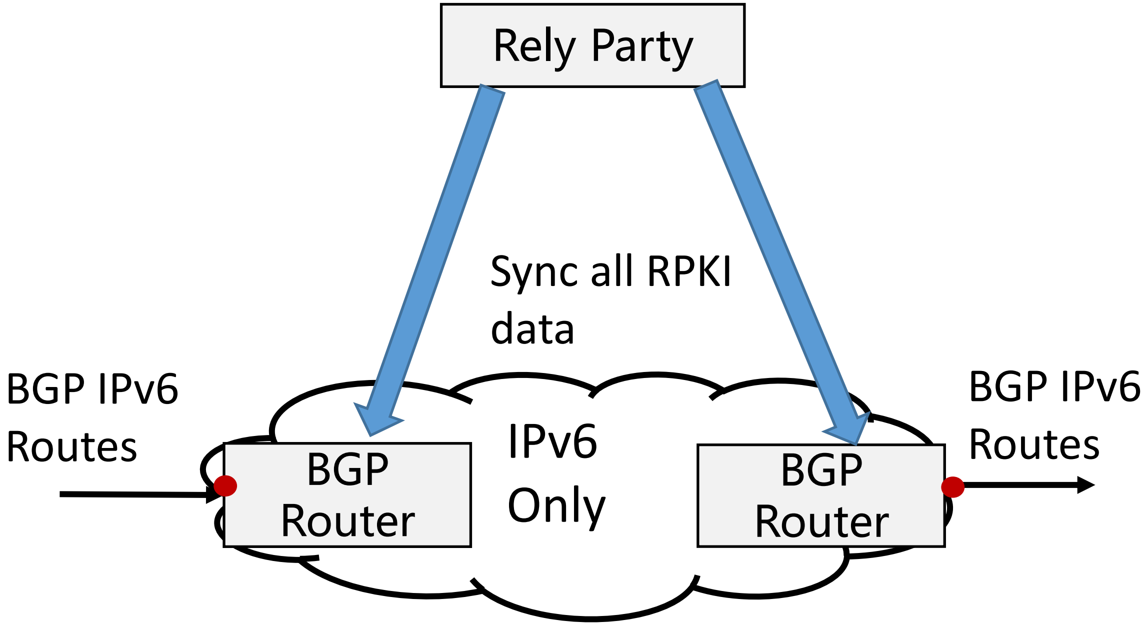
draft-fu-sidrops-enhanced-slurm-filter

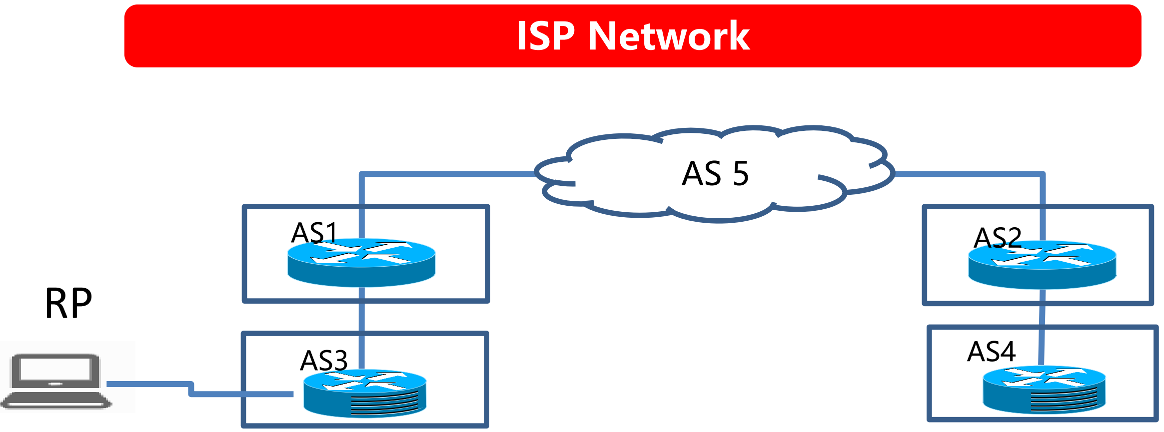
draft-geng-sidrops-rtr-selective-sync

Yu Fu

November 2025

Motivation





- ◻ IPv6-only network is only interested in IPv6-related BGP validation.
  - ◆ New China Education and Research Network (named FITI) under construction will be an IPv6-only network.
  - ◆ ISPs are deploying RPKI in their Network
- ◻ RPKI data types (RTR PDU): IPv4 prefix, IPv6 prefix, router key, ASPA.
- ◻ Likely more RPKI data types in the future.
- ◻ Network Operation requirements
  - ✓ We don't need all data, reduce the complexity of the operation, such as alarms from the unnecessary RPKI data transmission
  - ✓ Avoid unnecessary router resource consumption

Test for the draft

- We runned Cisco IOS and vJunos-Router, obtained some performance metrics:
    - ◆RP server supports IPv6-Only RPKI and all RPKI data.
    - ◆Cisco router and Juniper router synchronize same data in IPv6-Only RPKI and all RPKI.

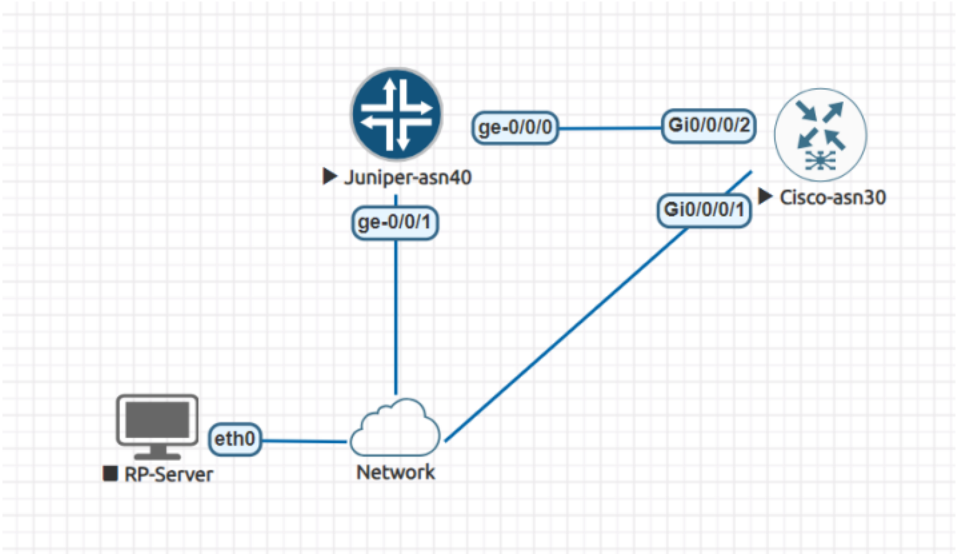


Figure1. Router Network Topology Diagram

One router performance metrics results

- One router performance metrics results

	Full-scale ROA Cache	Only IPv6 ROA Cache
The number of IP Address Prefix	452,650	81,333
Synchronization Duration	19.145 s	6.178 s
CPU Utilization	2%	1%
Memory	42 MB	11 MB
Interface Bandwidth Utilization	0.153 Mbps	0.179 Mbps
Interface Packet Loss Rate	0%	0%

1. **The total number** of the full-scale RPKI ROAs was 452,650, while the number of IPv6-only ROAs was 81,333.
2. **The synchronization time** was 19.145 seconds and 6.178 seconds respectively. IPv6-only ROAs achieved a 67.73% reduction compared to the full-scale.
3. **Router CPU utilization** was 2% and 1% respectively.
   - Baseline CPU usage before synchronization was 29%
   - Average CPU usage during full-scale ROA synchronization (5-second interval): 31%
   - Average CPU usage during IPv6-only ROA synchronization (5-second interval): 30%
4. **Memory** was 42 Megabytes (MB) and 11 MB respectively.
5. **Router interface bandwidth utilization** was 0.153 Mbps and 0.179 Mbps respectively. For Gigabit Ethernet interfaces, bandwidth utilization remains comparable between them.
6. Both scenarios showed 0% **packet loss**, indicating

Another router performance metrics results

- Another one router performance metrics results

	Full-scale ROA Cache	Only IPv6 ROA Cache
The number of IP Address Prefix	452,650	81,333
Synchronization Duration	22.959 s	4.222 s
CPU Utilization	0%	0%
Memory	42 MB	11 MB
Interface Bandwidth Utilization	1.145 Mbps	0.246 Mbps
Interface Packet Loss Rate	0%	0%

1. **The number** of the full-scale RPKI and IPv6-only ROAs was same with Juniper test scenario; it was 452,650 and 81,333 respectively.
2. **The synchronization time** was 22.959 seconds and 4.222 seconds respectively. IPv6-only ROAs achieved a 81.61% reduction compared to the full-scale.
3. **Router CPU utilization** was 0% and 0% respectively.
4. **Memory** was 42 Megabytes (MB) and 11 MB respectively.
5. **Router interface bandwidth utilization** was 1.145 Mbps and 0.246 Mbps respectively. For Gigabit Ethernet interfaces, the bandwidth utilization of full-scale ROA was **4 times** that of IPv6-only one.
6. Both scenarios showed 0% **packet loss**.

Conclusion

- ✓ From perspective of operation and router resource saving, better to selectively synchronize the RPKI Data to Routers.
- ✓ Better to consider the overload method to reduce the router side cost

- Optional solutions to help operators select RPKI data to be synchronized:
- ➢ a) Extend SLURM to support filtering data by RPKI data type
  - ◆ Looks simpler than the latter
- ➢ b) Extend RTR to support subscription
- ➢ c) Filter messages by Routers

Thanks!