Tracing RPKI Invalid Propagation using IYP & Scamper

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PROPAGATION OF RPKI INVALIDS

- 1.05% of routed IPv4 prefixes are RPKI Invalid [1]
- 22.3% of Autonomous Systems are fully protected from invalid announcements [2]

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Q1: Verify if RPKI Invalid prefixes have more hops, higher RTT

Q2: Do ASes in RoVista dataset drop all invalids?

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METHODOLOGY

1. Find RPKI Invalid prefixes on BGP **- Internet Yellow Pages**
2. Find active hosts in the prefix **- Internet Yellow Pages**
3. Perform traceroutes from multiple vantage points
    a. Intermediate IPs
    b. RTT **- Scamper**
    c. Hops

Control : Perform RTT measurement for RPKI valid prefixes originated from same AS

RESULTS

- Percentage of Traceroutes reaching the destination
    - RPKI Invalid - **25.7%**
    - RPKI Valid - **50.2%**
- **70.6%** RPKI invalids have higher number of intermediate hops
- **72.5%** RPKI invalids have higher RTT

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- Percentage of Traceroutes reaching the destination
  - RPKI Invalid - **25.7%**
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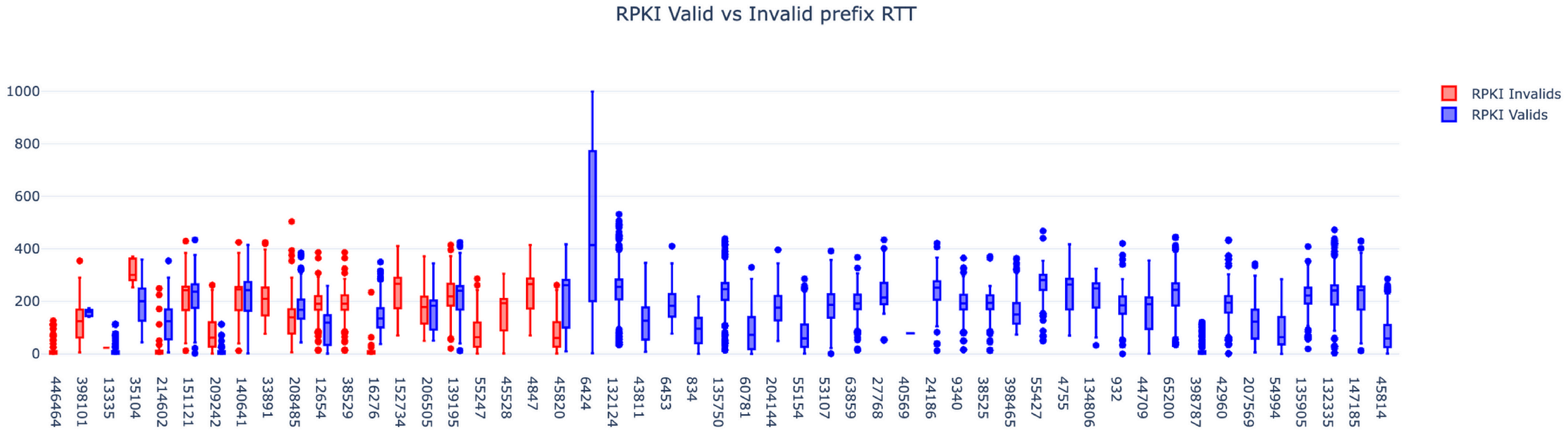
- **70.6%** RPKI invalids have higher number of intermediate hops
- **72.5%** RPKI invalids have higher RTT

Cloudflare

- RPKI Invalid
  - Completion Rate - **0.67%**
  - Mean RTT - **27.5 ms**
- RPKI Valid
  - Completion Rate - **99.26%**
  - Mean RTT - **8 ms**

RTT


RPKI Valid vs Invalid prefix RTT
RPKI Invalids
RPKI Valids
1000
800
600
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446464
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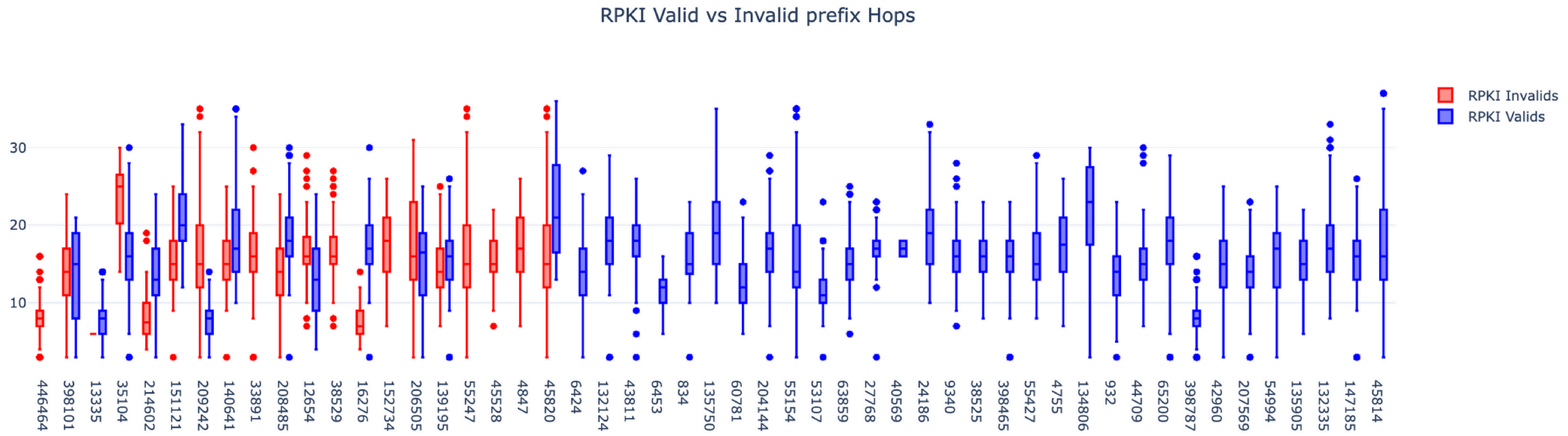
HOPS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TESTING ROVISTA

- We remove RPKI invalids with an RPKI Valid/NotFound covering prefix
- If we are able to traceroute RPKI Invalids, **no intermediate ASes are dropping invalids**
- Methodology
  - Map IP to prefix and prefix to ASN **- Internet Yellow Pages**
  - Check if intermediate ASes perform ROV **- Internet Yellow Pages**

OBSERVATION

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We can use Scamper to test ROV policies of ASes!

Questions?

Backup Slides

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- **Cloudflare**
  - RoVista ✅
  - They own the prefix
  - So, testing? isbgpsafeyet?
- **CENIC**
  - RoVista ✅
  - Not dropping invalids from Cloudflare

We can use Scamper to test ROV policies of ASes!

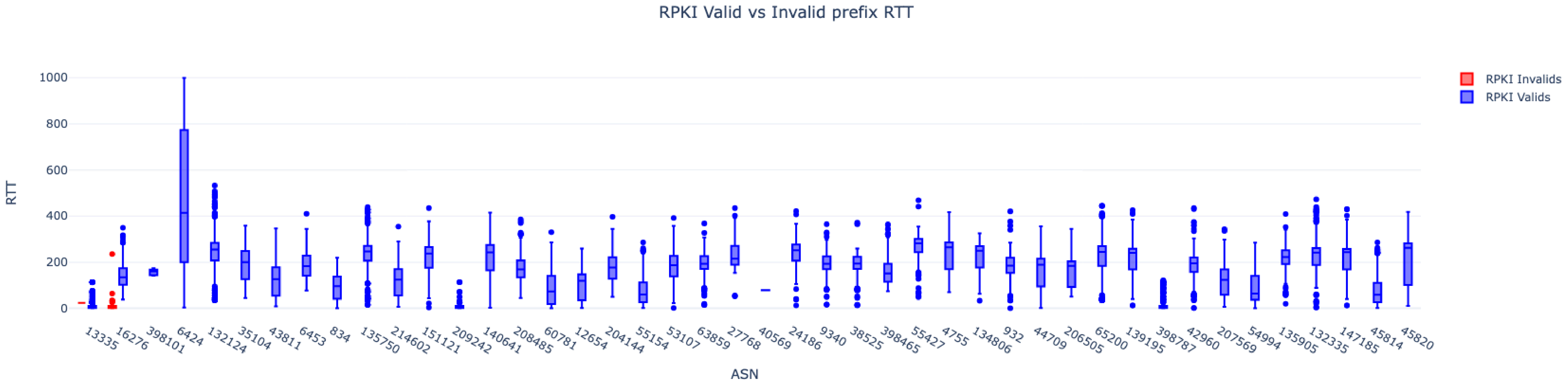
RESULTS

- Completion rate
  - RPKI Invalid - **0.9%**
  - RPKI Valid - **58.2%**
- **95.5%** RPKI invalids have higher number of intermediate hops
- **97.8%** RPKI invalids have higher RTT

Cloudflare

- RPKI Invalid
  - Completion Rate - **0.8%**
  - Mean RTT - **24 ms**
- RPKI Valid
  - Completion Rate - **98.1%**
  - Mean RTT - **8 ms**

RTT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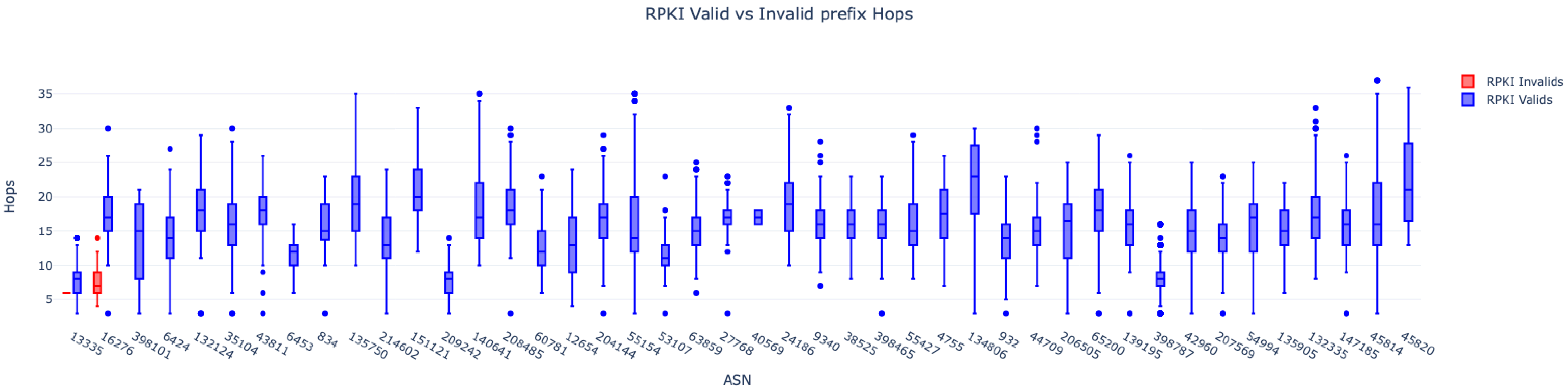
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