

RSS Metrics Work Party RSSAC Workshop Summary

October 3, 2019

RSS Thresholds

- Agreed that the work party should recommend thresholds for RSS metrics.
- Improve “Purpose” section to clarify purposes other than RSSAC037
- e.g. absent a governance system, RSSAC may want to know and take action if RSS thresholds are not being met.

Minimum vs Good

- Only recommend minimum performance thresholds at this time.
- Add text that other (likely higher) thresholds may apply on case-by-case basis to RSOs that enter into agreements and/or where there is financial consideration for services.

K=8

- When considering how many RSOs need to be “up” in order to provide acceptable root service, we agreed on:

$$K = \left\lceil \frac{2}{3}(N - 1) \right\rceil$$

- When one RSO is down, a second query will be successful with 2/3 probability.
- for N=13, K=8

Discarding measurements from offline VPs

- Probably underspecified in current document
- Need to define more specific method for determining when VPs are well connected or not

Daily vs Monthly

- Document currently says metrics are aggregated and published daily
- Agreement that monthly is more familiar and easier to consume
- Expect raw data to be published as soon as reasonably possible
 - acknowledge outside forces

Expectations on Data Sharing

- Add recommendation that “official” implementation of these metrics should provide the raw data (to anyone) in the interest of transparency.
- Any party can verify the metric calculation.
- Not concerned about gaming the system?

Pass/Fail vs Actual Numbers

- For RSOs, report pass/fail result
- For RSS, report actual numbers
- Provide rationale for this decision
 - RSS metrics are complex and don't convey the whole thing to the reader

Examples

- Keep examples in the document
- Be more explicit that an implementation of the metrics need not use the exact same format.
- Some readers might find the examples helpful to understand the metrics and their outputs.

RSO Availability

- Method/formula is good
- Threshold: 96%
- Threshold determined by k-of-n parallel availability formula with $k=8$ and $A=99.999\%$
- Add text reminding that this metric also measures availability of components between VP and RSO, not under RSO control
- “Usable Availability”?

RSO Latency

- Method good
- Threshold: 250 msec UDP, 500 msec TCP
- Rationale: 2x earth circumference at speed of light = 267 msec

$$2 \frac{40,075,000 \text{ m}}{299,792,458 \text{ m/s}} = 0.267 \text{ sec}$$

- TCP twice UDP because of connection setup round trip

RSO Correctness

- Combine DNSSEC & matching into single correctness metric
- Set DO bit on all correctness queries? or some probability?
- Update rules to expect signatures, NSEC
- Perform DNSSEC validation of signatures
- Three types of queries:
 1. <TLD> / NS
 2. nxdomain qnames from real traffic data (DITL)
 3. <RAND-NXD> for gap coverage
- Threshold: 100%
- Acknowledge that its not really possible to design a metric that identifies all cases of intentional incorrectness.

RSO Publication Latency

- Method good
- Threshold: 1 hour
- Rationale: 2x SOA retry

RSS Availability

1. K = number RSOs required for RSS availability, $N=13$ then $K=8$
2. In each measurement interval t , for each vantage point v , calculate the number $k_{t,v}$ of RSOs that responded to an availability query.
3. If $k_{t,v} > K$ then set $k_{t,v} = K$.
4. Calculate daily RSS availability as

$$A = \frac{\sum_{t,v=1,1}^{T,V} k_{t,v}}{\sum_{t,v=1,1}^{T,V} K}$$

RSS Availability Examples

- In one 5min interval, one VP can only reach 7 RSOs. In all other intervals, all VPs reach at least 8 RSOs. $A_{month} = 99.99992\%$ (six nines)
- A 24 hour attack takes all all RSOs entirely; $A_{month} = 96.66\%$
- A month-long attack takes out 6 RSOs entirely; $A_{month} = 87.50\%$
- A month-long attack takes out 5 RSOs entirely; $A_{month} = 100\%$

- Threshold: 99%
- Rationale: ?

RSS Response Latency

- In each measurement interval, for each vantage point, find the K=8 best response latencies
- For the aggregation interval, calculate the median of this subset.
- Threshold: 150 msec UDP, 300 msec TCP
- Rationale: lower than RSO response latency threshold

RSS Correctness

- Use new RSO correctness
- Simple fraction $\#correct / \#responses$
- Threshold: 100%
- Rationale: must be perfect

RSS Publication Latency

- Add this metric back
- Threshold: 30 minutes
- Rationale: same as RSO, one SOA refresh

Possible Future Work

Metrics document related future work:

- Add RSO self reporting to eliminate network components that RSO cannot control
- Investigate ways to improve VP distribution. [included in the recommendation already]
- Create a reference dataset and do the calculation to make sure we are doing it correctly

Other documents / efforts:

- Financial aspect of work and its relationship with the performance [Volunteer: Jeff]
- A document that advises the PMMF on how it should interpret and act on the data from the measurement system

Q & A