#### **ALTO Performance Metrics**

draft-ietf-alto-performance-metrics-07

Qin Wu
Y. Richard Yang
Young Lee
D. Dhody
Sabine Randriamasy

July 25, 2019 Montreal

#### Outline

- Updates from v06-v07
- Remaining issues requiring WG discussions
- Next step

# Updates Overview (v06-v07)

- Structure changes
- Many small text changes as well

```
2. Challenges on data sources and computation of ALTO
            2.2. ALTO performance metrics Computation Challenges . . . . .
             2.2.2. Availability of end to end path values Challenge . .
            2.3. Cost Metric: Packet Delay Variation (pdv) . . . . . . .
4. Traffic Engineering Performance Cost Metrics . . . . . . .
            4.1. Cost Metric: Link Maximum Reservable Bandwidth . . . . .
             4.2. Cost Metric: Link Residue Bandwidth . . . . . . . . . . . . . .
             2.5.3. Measurement Considerations . . . . . . . . . . . . . . . . . .
3. Traffic Engineering Performance Cost Metrics . . . . . . . . . .
            3.1. Cost Metric: Link Maximum Reservable Bandwidth . . . . .
             4.2.1. Configuration Parameters Considerations . . . . . .
```

### Main Update (v06-v07): Metric Definition

- Restructure the definition of each metric to be consistent with ALTO base protocol (RFC 7285)
  - v06, structure, for each metric,
    - Metric Name
    - Metric Description
    - Method of Measurement or Calculation
    - Units of Measurement
    - Measurement Point(s) with Potential Measurement Domain
    - Measurement Timing
    - Use and Applications

#### - RFC7285

#### 14.2. ALTO Cost Metric Registry

IANA has created and now maintains the "ALTO Cost Metric Registry", listed in Table 3.

	Intended Semantics
:	See <u>Section 6.1.1.1</u>   Private use

Table 3: ALTO Cost Metrics

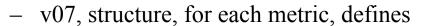
This registry serves two purposes. First, it ensures uniqueness of identifiers referring to ALTO cost metrics. Second, it provides references to particular semantics of allocated cost metrics to be applied by both ALTO servers and applications utilizing ALTO clients.

Requests to add a new value to the registry MUST include the following information:

- o Identifier: The name of the desired ALTO cost metric.
- o Intended Semantics: ALTO costs carry with them semantics to guide their usage by ALTO clients. For example, if a value refers to a measurement, the measurement units must be documented. For proper implementation of the ordinal cost mode (e.g., by a third-party service), it should be documented whether higher or lower values of the cost are more preferred.
- o Security Considerations: ALTO costs expose information to ALTO clients. As such, proper usage of a particular cost metric may require certain information to be exposed by an ALTO service provider. Since network information is frequently regarded as proprietary or confidential, ALTO service providers should be made aware of the security ramifications related to usage of a cost metric.

## Update (v06-v07): Metric Definition

- Restructure the definition of each metric to be consistent with ALTO base protocol (RFC 7285)
- v06, structure, for each metric, defines
  - Metric Name
  - Metric Description
  - Method of Measurement or Calculation
  - Units of Measurement
  - Measurement Point(s) with Potential Measurement Domain
  - Measurement Timing
  - Use and Applications



- Metric Name
- Metric identifier
- Intended semantics
  - Metric Description
  - Metric Representation
- Use and Example
- Measurement Considerations
  - Method of Measurement or Calculation
  - Measurement Point(s) with Potential Measurement Domain
  - Measurement Timing

### Metric Details

Metric	Representation
One-Way Delay, RTT, Packet Delay Variation	A single JSONNumber conforming to Sec. 6 [7159] (int [frac] [exp]); Must be non-negative; units is ms; NO infinity
Hop Count	The metric value type is a single 'JSONNumber' type value conforming to the number specification (Section 6, [RFC7159]). The number MUST be an integer and non-negative.
Packet Loss	The metric value type is a single 'JSONNumber' type value conforming to the number specification (Section 6, [RFC7159]). The number MUST be non-negative. The value represents the percentage of packet loss.
Throughput, Max Reservable BW, Residue BW	The metric value type is a single 'JSONNumber' type value conforming to the number specification (Section 6, [RFC7159]). The number MUST be non-negative. The unit is Mbps.

 Suggestions but not adopted: (1) add infinity; (2) allow units such as ms, Mbps/Kbps/Gbps, ...

## **Update: Operations Considerations**

- Substantially extended the section on operations considerations, to discuss,
  - Data Source Considerations
    - Active (specific measurement models such Poisson, ..., periodical)
    - Passive (derivation from existing data such as logs)
    - On-demand
  - Computation Considerations
    - Data cleaning, aggregation, inference, ...

# Remaining Issue (1): Metric Def Consistency and Reusability

A basic issue is consistency and reusability in IETF
 IPPM metrics [1][2]

ALTO performance metrics [this document]

+	+
Identifier	Intended Semantics
++	+
owdelay	See Section 2.1
rtt	See Section 2.2
pdv	See Section 2.3
hopcount	See Section 2.4
pktloss	See Section 2.5
throughput	See Section 2.6
maxresbw	See Section 3.1
residuebw	See Section 3.2
++	+

- UDP
  - RTDelay\_Active\_IP-UDP-Periodic RFCXXXXsecY Seconds 95Percentile
  - RTLoss\_Active\_IP-UDP-Periodic\_RFCXXXXsecY\_Percent\_LossRatio
  - OWPDV\_Active\_IP-UDP-Periodic\_RFCXXXXsecY\_Seconds\_95Percentile
  - OWDelay\_Active\_IP-UDP-Poisson-Payload250B\_RFCXXXXsecY\_Seconds\_<statistic>
  - OWDelay\_Active\_IP-UDP-Periodic20m-Payload142B RFCXXXXsecY Seconds <statistic>
- TCP
  - RTDelay\_Passive\_IP-TCP RFCXXXXsecY Seconds <statistic>
- DNS
  - RTDNS\_Active\_IP-UDP-Poisson\_RFCXXXXsecY\_Seconds\_Raw RLDNS\_Active\_IP-UDP-Poisson RFCXXXXsecY Logical Raw
- [1] https://datatracker.ietf.org/doc/draft-ietf-ippm-metric-registry/
- [2] https://datatracker.ietf.org/doc/draft-ietf-ippm-initial-registry/

# Discussion: Metric Def Consistency and Reusability

- Many levels of reusability and consistency
  - Reusability:
    - based ALTO metric registry on IPPM metric registry,
       or
    - not
      - -Consistency
        - » Same ID
        - » Same metric

# Remaining Issue (2): Operations and Security Considerations

- How much to update
  - Operations considerations
  - Security considerations

## **Next Step**

- Discussion with IPPM
- Finalize updates and submit an update

# **Backup Slides**