

Comparison of Reorder Metrics and Status of RD-RBD draft

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Comparison of Reorder Metrics

Essential and Desirable Attributes

Essential

- Capture reordering (fundamental requirement)
 - Both Earliness & Lateness with extents. Consider sequences $\{1, 19, 2, 3, \dots, 18\}$ and $\{1, 3, 4, \dots, 19, 2\}$. Only RD captures earliness and lateness with extent.
 - Consider $\{1, 4, 5, \dots, 19, 2, 3\}$.

N – reordering does not capture reordering.

Comparison of Reorder Metrics

Essential Attributes Contd.

- Low sensitivity to lost and duplicate packets
- On-the-fly computation
- Usefulness

“The metrics must be useful to users and providers in understanding the performance they experience or provide.”

- Paxson, V., et. al., RFC 2330

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Comparison of Reorder Metrics

Desirable Attributes

- Simple, yet informative
- Low spatial complexity - buffering
- Low computation complexity - comparisons
- Robustness – {1, 250, 2, 3, 4, ...}
- Operations on measures - Cascade of networks

Comparison of Reorder Metrics

X – attribute is absent ◐ - attribute is partially present √ - attribute is present

<i>Metric/ Attribute</i>	<i>RD</i>	<i>RBD</i>	<i>%</i>	<i>Reordering Extent</i>	<i>Byte- offset</i>	<i>n- reordering</i>
<i>Capture reordering</i>	√	◐	X	◐	◐	X
<i>Low sensitivity to loss and duplication</i>	√	◐	√	◐	◐	◐
<i>Usefulness</i>	√	◐	X	X	X	◐
<i>On-the-fly computation</i>	√	√	√	√	√	√

Comparison of Reorder Metrics

X – attribute is absent ◐ - attribute is partially present √ - attribute is present

<i>Metric/ Attribute</i>	<i>RD</i>	<i>RBD</i>	<i>%</i>	<i>Reordering Extent</i>	<i>Byte- offset</i>	<i>n- reordering</i>
<i>Spatial requirement</i>	Constant	Constant	Constant ?	O(N)	O(N)	O(N)
<i>Computation complexity</i>	O(N)	O(N)	O(N)	O(N ²)	O(N ²)	O(N ²)
<i>Operation for network cascade</i>	√	X	X	X	X	X

Status of RD and RBD draft

■ Paper on RD is accepted for publication:

Nischal M. Piratla, Anura Jayasumana and Abhijit Bare, “RD: A Formal, Comprehensive Metric for Packet Reordering,” IFIP Networking 2005, Ontario Canada, May 2005

■ Several papers in pipeline for publication

■ draft-jayasumana-reorder-density-04.txt is posted

Changes:

- Loss-orthogonal RBD removed
- Ready for next step - review

We make a motion that this draft be accepted as an “IPPM reorder metrics” draft