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, .., 18\} and \{1, 3, 4,..,19, 2\}. Only RD captures earliness and lateness with extent.
    - Consider \{1, 4, 5,….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

- ....
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   œ - attribute is partially present   √ - attribute is present

<table>
<thead>
<tr>
<th>Metric/Attribute</th>
<th>RD</th>
<th>RBD</th>
<th>%</th>
<th>Reordering Extent</th>
<th>Byte-offset</th>
<th>n-reordering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capture reordering</td>
<td>√</td>
<td>œ</td>
<td>X</td>
<td>œ</td>
<td>œ</td>
<td>X</td>
</tr>
<tr>
<td>Low sensitivity to loss and duplication</td>
<td>√</td>
<td>œ</td>
<td>✓</td>
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</tr>
<tr>
<td>Usefulness</td>
<td>√</td>
<td>œ</td>
<td>X</td>
<td>œ?</td>
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</tr>
<tr>
<td>On-the-fly computation</td>
<td>√</td>
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<tbody>
<tr>
<td><strong>Spatial requirement</strong></td>
<td>Constant</td>
<td>Constant</td>
<td>Constant ?</td>
<td>O(N)</td>
<td>O(N)</td>
<td>O(N)</td>
</tr>
<tr>
<td><strong>Computation complexity</strong></td>
<td>O(N)</td>
<td>O(N)</td>
<td>O(N)</td>
<td>O(N^2)</td>
<td>O(N^2)</td>
<td>O(N^2)</td>
</tr>
<tr>
<td><strong>Operation for network cascade</strong></td>
<td>√</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tbody>
</table>
## Status of RD and RBD draft

- **Paper on RD is accepted for publication:**

- **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**