Measurements concerning the DSCP for a LE PHB

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DSCP for Lower Effort (LE)

RFC4594 specified LE using CS1 : 001 000
Priority inversion with respect to BE (default)
Need a DSCP with 000 XXX
tsvwg-le-phb suggests DSCP 2 : 000 010

Will this actually work in today’s network?
PATHscope Measurements

- Tool created packets with increasing TTL
- Captured ICMP type 11 messages
- Measurements from 3 Digital Ocean vantage points to 300 targets randomly chosen from Alexa Top 1 Million list, using both TCP & UDP
DSCP 2 may not be a good choice

Bleaching of DiffServ upper 3 bits (ToS bleaching)

<table>
<thead>
<tr>
<th>Class</th>
<th>Old DSCP</th>
<th>New DSCP</th>
<th>DSCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF11, AF21, AF31, AF41</td>
<td>XXX 010</td>
<td>→</td>
<td>000 010</td>
</tr>
<tr>
<td>AF12, AF22, AF32, AF42, VA</td>
<td>XXX 100</td>
<td>→</td>
<td>000 100</td>
</tr>
<tr>
<td>AF13, AF23, AF33, AF43, EF</td>
<td>XXX 110</td>
<td>→</td>
<td>000 110</td>
</tr>
</tbody>
</table>

View from Digital Ocean data (900 unique source-destination pairs)
17% of paths modified the DSCP
10% reset upper 3 bits (ToS bleach)

Many common classes would be mapped to LE!
View from access networks

Edgetrace 177 paths from different access networks: 16% ToS Bleaching

PathsScope tests for 9202 unique source-destination pairs in European mobile networks (MONROE): Router pathologies of 705 routers: 4.7% ToS bleach

https://trace.erg.abdn.ac.uk/detailed_plots.html
Q & A

Acknowledgments

PATHscope
EU H2020 MONROE
(https://www.monroe-project.eu/)

Edgetrace
(https://github.com/uoaerg/edgetrace)
EU H2020 NEAT
(https://www.neat-project.org/)
Example
Suppose flow chooses AF2X PHB group and BE: AF21, AF22, AF23, BE

In a local DS network, AF2X are mapped to > default
After ToS bleaching:
   AF21 becomes mapped to LE (DSCP2)
   BE, AF23, AF24 is mapped to default PHB?

This is not good: “i.e., when resources become scarce, best-effort traffic has precedence over LE traffic and may preempt it” – priority inversion