

Benchmarking IPv6 Neighbor Cache Behavior

Draft-ietf-bmwg-ipv6-nd-00

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Disclaimer

- Draft needs work
- This deck describes what the draft SHOULD say
- It does not always describe what the draft actually says

Motivation: RFC 6583

- Imagine a port scan against an IPv4-only subnet
 - Probably a /24, maybe a /23
 - Creates 255 or maybe 512 ARP entries
 - No big deal
- Imagine a port scan against an IPv6 subnetwork
 - Probably a /64
 - Creates ~ 18,000,000,000,000,000,000 ND Cache entries
 - OMG!

What Are The Scaling Characteristics of the ND Implementation Under Test?

- Stale Entry Time
- Neighbor Cache Size
- Familiar Destination Recognition

Test Environment



- Interfaces are large enough that they won't congest during test
- DUT CPU is powerful enough that it won't saturate during test

Stale Entry Time Determination

- Target configuration
 - Do not send unsolicited ND messages
 - Respond to exactly one NS message
 - Subsequently, send no ND messages
- Send a stream from source to destination
 - 10 PPS
- Observe NS/NA exchange
- Observe first data packet arriving at destination
 - Record time (T1)
- Observe last packet arriving at destination
 - Record time (T2)
- Stale Entry Time = $T2 - T1$
 - +/- 100 ms

Neighbor Cache Exhaustion Determination

- Target configuration
 - Do not send unsolicited ND messages
 - Respond to all ND solicitations
- Initiate N streams
 - 1/5 Stale Entry Time PPS
 - This prevents ND cache entries from expiring
- When number of streams arriving at destination is $< N$, you have discovered ND Cache limit
- Observe degradation behavior
 - Crash (worst)
 - Streams go up and down (bad)
 - Some stream stay up, others stay down (good)

Familiar Destination Recognition

- Replicate previous experiment
- Observe number of streams arriving at destination (N)
- Pause a selected set of streams
 - For three times the Stale Entry Time
- Restart the paused streams plus an equal number of new streams
 - Interleaving, one old stream, one new stream
- Observe number of streams arriving at destination (M)
- Does $N = M$?
- Familiar Destination Recognition
 - All members of M are also members of N

Next Steps

- New Version of draft