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CCNinfo: Discovering Content and Network Information in Content-Centric Networks

draft-irtf-icnrg-ccninfo-06

Hitoshi Asaeda (NICT)
Atsushi Ooka (NICT)
Xun Shao (Kitami Institute of Technology)

Remarks

- CCNinfo is an active networking tool and fully compatible with CCNx TLV messages (RFC 8569 and 8609)
- CCNinfo is implemented on routers (to forward and respond request/reply messages) and consumers (i.e., end-user program)
- CCNinfo discovers the path and content caching information in CCN such as;
  - Reachability of caching routers and publishers
  - Hop count and RTT for content retrieval
  - On-path in-network cache conditions, e.g.,
    - Elapsed cache time
    - Remain cache lifetime
    - Num. of interests received per content, etc.
  - Multipath condition
- CCNinfo defines the access control and policy configuration for information disclosure

CCNinfo Request/Reply Messages

- CCNinfo uses two message types: ***Request*** and ***Reply***. Both messages are encoded in the CCNx TLV format.
- The Request message consists of a fixed header, Request block TLV, and Report block TLV(s).
- The Reply message consists of a fixed header, Request block TLV, Report block TLV(s), and Reply block/sub-block TLV(s).

- New CCNx type values are defined
  - Packet type; Request (PT_CCNINFO_REQUEST) and Reply (PT_CCNINFO_REPLY)
  - Top level type (T_DISCOVERY)
  - Hop-by-hop type (T_DISC_REQHDR and T_DISC_REPORT)
  - CCNx message type (T_DISC_REQ and T_DISC_REPLY)

Changes from -04

- Lots of improvements (thanks to DaveO and Paulo Mendes)
  - Describe differences from ICN ping and traceroute
  - Describe differences from application-level implementations (e.g., contrace [ComMag2015])
  - Support Optional CCNx ValidationAlgorithm and ValidationPayload TLVs defined in RFC8609 for both Request and Reply
  - Consideration of incapable routers and information provisioning (see next page)
  - And many editorial changes

Consideration of Incapable Routers and Information Provisioning

- Section 3.2.1.1. Reply Sub-Block TLV
  - … Note that some routers may not be capable of reporting the following values, such as Object Size, Object Count, # Received Interest, First Seqnum, Last Seqnum, Elapsed Cache Time, and Remain Cache Lifetime, shown in Figure 16, or do not report these values due to their policy. In that case, the routers set these fields to a value of one (i.e., %xFFFFFFFF).
  - The value of each field will be also all-one when the value is equal to or bigger than the maximum size expressed by the 32-bit field. The CCNinfo user program MUST inform that these values are invalid if the fields received are set to the value of one.

Summary

- CCNinfo, which is compatible with CCNx TLV format, is a powerful network tool providing topology and in-network cache information
- I-D was reviewed by ICNRG and other members
- Reference implementation included in Cefore (https://cefore.net)
  - Cefore is a software platform including forwarding daemon, CS daemon, sample applications, and networking tools
  - OSS (BSD 3-clause license) fully compatible with CCNx TLV messages (RFC 8569 and 8609)

- RG last call?

Thanks.