Content Store Management

For 5th NDN Hackathon

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Need

❖ This project is to design and implement a Content Store Management protocol for NFD

❖ To provide visibility to the content store
  - ➢ collect the counters CS hits and misses
  - ➢ list CS entries (at most 256) under a specified prefix

❖ To provide erase operation for experimental purpose
  - ➢ erase CS entries (at most 256) under a specified prefix

Approach

- To collect CS hits/misses
  - Now: collect the total hits/misses
  - Future: maybe collect hits/misses per entry/prefix
- List CS entries under a specified prefix
  - Now: list the first N entries (at most 256)
  - Future: maybe provide more flexible filters (like most N hitted)
- Erase CS entries under a specified prefix
  - Now: put erase function inside CS (small trick: detach before erase)
  - Future: move to CsManager
  - Now: encapsulated the return result (# of erased entries) into a Name
  - Future: define a new TLV type for this result

Benefit

- The protocol would allow experimenters and operators
  - to instrument the CS,
  - to understand the effectiveness of in-network caching.

Alternatives

- `logging`

Achieved

- ndn-cxx
  - A new ControlCommand: CsEraseCommand
  - Two new Status Dataset: CsInfoDataset, CsEnumerateDataset
- nfd
  - A new manager: CsManager
    - A command handler for: /localhost/nfd/cs/erase/PREFIX
    - A status daset handler for: /localhost/nfd/cs/info
    - A status daset handler for: /localhost/nfd/query/PREFIX
    - Unit tests
- nfdc
  - A new module: CsModule
    - nfdc cs info: display cs counters (hits/misses)
    - nfdc cs list [PREFIX]: enumerate entries under PREFIX
    - nfdc cs erae [PREFIX]: erase entries under PREFIX

Link

Ndn-cxx: https://gerrit.named-data.net/#/c/4385/

NFD: https://gerrit.named-data.net/#/c/4386/

Demo

- Two virtual machines: consumer & producer
- Before test:
  - nfd-start
  - configure routes
  - putchunks /A, /A/B, /C on producer
- Test steps (run on consumer):
  - Step1: nfdc cs info
  - Step2: catchunks /A, /A/B; nfdc cs info
  - Step3: catchunks /A, /C;   nfdc cs info
  - Step4: nfdc cs list /A
  - Step5: nfdc cs erase /A;   nfdc cs list /A
  - Step6: nfdc cs info; catchunks /A; producer: nfdc cs info