



NFD Measurements Management

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NEED

- Currently, NFD's Measurements Table is not exposed to management clients.
- Hard to retrieve stats for measurements-based strategies such as ASF.
 - Need to look at log files
- Help network operators and developers understand/debug the behavior of forwarding strategies.



Project objective



Support per-prefix read-only access to the measurements table via NFD management protocol.



APPROACH

- Task 1: Encode/decode measurement entries [Ashlesh]
 - Represent entry fields as TLV => client needs to understand it
- Task 2: Implement NFD manager which serializes the property tree produced by the strategy into JSON and returns it as a string [Davide]
- Task 3: Implement a new nfdc command: “nfdc measure query PREFIX” [Saurab]



BENEFIT

- If some user wants some measurement info from the strategy they no longer have to turn the logs on and look at the output
 - Useful to John to quickly look up measurements of faces on the testbed for diagnoses
 - Useful to ASF developers for debugging



ALTERNATIVES

- For encoding/decoding of the measurement entries, the easier options were:
 - To just use a plain string
 - To use a map {face-id => string}
 - We chose the most flexible option
- We used JSON as serialization format, many others can be used, e.g. protobuf, XML, ...
 - JSON is human readable



ACHIEVED

Everything...

...(except unit tests)

CODE

All code changes have been pushed to gerrit for review:

- ❑ ndn-cxx library: <https://gerrit.named-data.net/4381>
- ❑ NFD (manager): <https://gerrit.named-data.net/4382>
- ❑ NFD (ASF strategy): <https://gerrit.named-data.net/4387>
- ❑ nfdc tool: <https://gerrit.named-data.net/4384>

Subject	Status	Owner	Project	Branch	Updated	Size	CR	CS	V
tools: nfdc changes for measurement query		 Saurab Dulal	NFD	master	a minute ago	+129, -0		✓	
mgmt: MeasurementsManager		 Davide Pesavento	NFD	master	14 minutes ago	+154, -5		✓	✗
fw: implement queryMeasurements for AsfStrategy		 Ashlesh Gawande	NFD	master	15 minutes ago	+55, -12		✓	
Encoding for measurement entry		 Ashlesh Gawande	ndn-cxx	master	37 minutes ago	+319, -2		✓	✓



DEMO

```
/localhop/ndn/NLSR/LSA/ucla-site/%C1.Router/cs/ucla nex  
/ndn/ucla-site/ucla/ping nexthops={faceid=271 (cost=0)}  
/ndn/pku-site/%C1.Router/cs/pku nexthops={faceid=266 (c  
/localhop/ndn/NLSR/LSA/ucla-site/%C1.Router/cs/ucla/CO  
mini-ndn> ucla nfdc measure query /ndn/pku-site/pku  
Measurements for prefix: /  
{  
  "257": "242086 microseconds",  
  "266": "287920 microseconds"  
}  
mini-ndn> ucla nfdc measure query /ndn/caida-site/caida  
Measurements for prefix: /  
{  
  "266": "0 microseconds",  
  "257": "69779.7 microseconds"  
}
```



DEMO

<https://youtu.be/92KL5jCTvsl>