

Cefore ハンズオン: Cefore の基本操作

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Cefore デーモン (cefnetd/csmgrd) の起動・停止

- cefnetd の起動

```
% cefnetdstart
```

- cefnetd の停止

```
% cefnetdstop
```

- csmgrd の起動

```
% csmgrdstart
```

- csmgrd の停止

```
% csmgrdstop
```

NOTE: When you configure to use both cefnetd and csmgrd, first you need to start csmgrd, and then start cefnetd.

- Checking the status of cefnetd
 - cefstatus
 - CCNx ver.
 - Rx/Tx Interest #
 - Rx/Tx ContentObject #
 - Cache Mode
 - Face Table
 - FIB
 - PIT
 - cefstatus -v
 - 起動している cefore のバージョン確認

```

root@router:/cefore# cefstatus
Version      : 1
Port         : 9896
Rx Interest  : 0 (RGL[0], SYM[0], SEL[0])
Tx Interest  : 0 (RGL[0], SYM[0], SEL[0])
Rx ContentObject : 0
Tx ContentObject : 0
Cache Mode   : Excache
Faces : 6
  faceid = 4 : IPv4 Listen face (udp)
  faceid = 0 : Local face
  faceid = 5 : IPv6 Listen face (udp)
  faceid = 6 : IPv4 Listen face (tcp)
  faceid = 16 : Local face
  faceid = 7 : IPv6 Listen face (tcp)
FIB(App) :
  Entry is empty
FIB :
  Entry is empty
PIT(App) :
  Entry is empty
PIT :
  Entry is empty
  
```

```

root@consumer:/cefore# cefstatus -v
Cefore version 0.9.0b
  
```

NICT FIB 追加・削除 (static routing)

practice

- cefroute
 - Insertion
 - cefroute add ccnx:/aaa udp 10.0.0.1
 - Deletion
 - cefroute del ccnx:/aaa udp 10.0.0.1
- Alternative: preparing an FIB configuration file
 - /usr/local/cefore/cefnetd.fib
 - cefnetd automatically loads this file when starting its process

```
root@producer:/cefore# cat /usr/local/cefore/cefnetd.fib
ccnx:/ udp 10.0.0.1
```

- Routing Protocol
 - TBA

+ Setting FIB using cefnetd.fib

```
root@producer:/cefore# cefstatus
Version      : 1
Port         : 9896
Rx Interest  : 0 (RGL[0], SYM[0], SEL[0])
Tx Interest  : 0 (RGL[0], SYM[0], SEL[0])
Rx ContentObject : 0
Tx ContentObject : 0
Cache Mode   : Excache
Controller   : 192.168.0.99
Faces : 7
  faceid = 4 : IPv4 Listen face (udp)
  faceid = 0 : Local face
  faceid = 16 : address = 10.0.1.1:9896 (udp)
  faceid = 17 : Local face
  faceid = 5 : IPv6 Listen face (udp)
  faceid = 6 : IPv4 Listen face (tcp)
  faceid = 7 : IPv6 Listen face (tcp)
FIB(App) :
  Entry is empty
FIB : 1
  ccnx:/example
    Faces : 16 (-s-) RtCost=0
PIT(App) :
  Entry is empty
PIT :
  Entry is empty
```

NICT Csmgrd のステータス確認

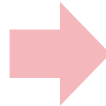
- Checking the status of csmgrd
 - csmgrstatus NAME_PREFIX

+ initial state

```
root@producer:/cefore# csmgrstatus ccnx:/

Connect to 127.0.0.1:9799
***** Connection Status Report *****
All Connection Num          : 1

***** Cache Status Report *****
Number of Cached Contents   : 0
```



+ after putting the 3 contents

```
root@producer:/cefore# csmgrstatus ccnx:/

Connect to 127.0.0.1:9799
***** Connection Status Report *****
All Connection Num          : 1

***** Cache Status Report *****
Number of Cached Contents   : 3

[0]
Content Name : ccnx:/ccc
Version      : None
Content Size : 4 Bytes
Cache Hit    : 0
Request Count : 0
Freshness    : 290 Sec
Elapsed Time : 8 Sec

[1]
Content Name : ccnx:/bbb
Version      : None
Content Size : 4 Bytes
Cache Hit    : 0
Request Count : 0
Freshness    : 283 Sec
Elapsed Time : 14 Sec

[2]
Content Name : ccnx:/aaa
Version      : None
Content Size : 4 Bytes
Cache Hit    : 0
Request Count : 0
Freshness    : 275 Sec
Elapsed Time : 22 Sec
```

+ specify name prefix

```
root@producer:/cefore# csmgrstatus ccnx:/aaa

Connect to 127.0.0.1:9799
***** Connection Status Report *****
All Connection Num          : 1

***** Cache Status Report *****
Number of Cached Contents   : 1

[0]
Content Name : ccnx:/aaa
Version      : None
Content Size : 4 Bytes
Cache Hit    : 0
Request Count : 0
Freshness    : 268 Sec
Elapsed Time : 29 Sec
```

Tuning up Cefore

- Primary parameters
 - cefnetd.conf
 - CS_MODE
 - 0: no content store [default]
 - 1: cefnetd's local cache
 - 2: external content store (csgmrd)
 - FORWARDING_STRATEGY
 - default: Forward the Interest to a face in the longest-prefix-matched(LPMed) FIB entry [default]
 - flooding: Forward the Interest to all the faces registered in the LPMed FIB entry
 - shortest_path: Forward the Interest to the face that has the minimum routing cost in the LPMed FIB entry
 - csmgrd.conf
 - CACHE_CAPACITY
 - The maximum number of cached ContentObjects in csmgrd
 - 819,200 [default]
 - CACHE_TYPE
 - filesystem: cache located on UNIX filesystem [default]
 - memory: cache located on memory (RAM)
 - CACHE_ALGORITHM
 - libcsmgrd_fifo
 - libcsmgrd_lru
 - libcsmgrd_lfu

Configuration parameters*

Parameter	Description	Default
CEF_LOG_LEVEL	Specifies the log output type for the cefnetd. Range: 0 ≤ n ≤ 3	0
PORT_NUM	Port number cefnetd uses. Range: 1024 < p < 65536 If the startup option "-p port_num" is used, the port number specified by the "-p port_num" option takes precedence over this parameter.	9896
PIT_SIZE	Max number of PIT entries. Range: 1 < n < 65536	2048
FIB_SIZE	Max number of FIB entries. Range: 1 < n < 65536	1024
CS_MODE	ContentStore mode Cefore uses.	0: No cache used 1: cefnetd's local cache 2: csmgrd
LOCAL_CACHE_CAPACITY	Max number of Cobs to use for the local cache in cefnetd. Range: 1 < n ≤ 8000000 Approximate memory usage: Cob size * 2 * num. of Cobs.	65535
CSMGR_NODE	csmgrd's IP address	localhost
CSMGR_PORT_NUM	TCP port number used by csmgrd to connect cefnetd. Range: 1024 < p < 65536	9799
FORWARDING_STRATEGY	Forwarding strategy when sending Interest messages. default : Forward the Interest to a face in the longest-prefix-matched (LPMed) FIB entry flooding : Forward the Interest to all the faces registered in the LPMed FIB entry shortest_path: Forward the Interest to the face that has the minimum routing cost in the LPMed FIB entry	0

*README is available at: <https://cefore.net/doc/Readme.html>

Cefputfile/cefgetfile によるファイル転送

- シナリオ
 - producer @ raspi がコンテンツ ccnx:/hello/YOUR_NAME.txt を csmgrd に upload
 - consumer @ ubuntu が アップロードされたコンテンツを要求
- 事前準備
 - /usr/local/ceofre/cefnetd.conf の CS_MODE=2 (csmgrd) に変更
- Producer

```
$ echo "Hello! I'm Yusaku Hayamizu from NICT" >hayamizu.txt
$ sudo csmgrdstart
$ sudo cefnetdstart
$ cefputfile ccnx:/hello/hayamizu.txt -f ./hayamizu.txt -t 3600 -e 3600
$ csmgrstatus ccnx:/hello
```

- Consumer
 - 経路設定

```
$ cefroute add ccnx:/hello udp 10.0.0.1
$ cefgetfile ccnx:/hello/hayamizu.txt -s 1 -f ./output.txt
```

- データ要求

```
$ cefgetfile ccnx:/hello/hayamizu.txt -s 1 -f ./output.txt
```


- Consumer (Ubuntu) の cefnetd を CS_MODE=1にして、local cache を有効化することで、キャッシュによる効果を体感
- 手順
 - Consumer において cefnetd を停止
 - /usr/local/cefore/cefnetd.conf を編集し、CS_MODE=1 に変更 (default=0, no-cache)
 - cefnetd を再起動
 - cefgetfile で再度コンテンツを取得

```
$ sudo cefnetdstop  
$ emacs -nw /usr/local/cefore/cefnetd.conf  
$ sudo cefnetdstart  
$ cefstatus  
$ cefgetfile ccnx:/hello/hayamizu.txt -s 1 -f ./output2.txt
```

