

# ICN DevOpS

ICN on Rails...

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# Motivation

- Several C/C++ implementations available
  - Great
  - Required for validating implementability in routers etc.
- Now: time to build systems (5G, IoT, enterprise, ...)
  - Would be great to have a agile programming environment
  - That can talk to talk to the CCNx infrastructure
  - That can be used for quick experiments

# ICN DevOps



- **Interactive ICN Forwarder Programming Environment**
- **Extensible at runtime**
  - New face types
  - Forwarding strategies
  - Caching algorithms
- **Access to existing code for security functions, web frameworks etc.**
- **Implemented in Clojure**
  - Robust, practical and fast programming language
  - Lisp dialect – runs on the JVM (+ JavaScript & CLR platforms)
  - Robust & efficient concurrency (Software Transactional Memory)
  - Immutable data, expression value caching

# Status

- Implements (subset of) ccnx-messages/semantics
- Talks to ccn-lite-peek, ccn-lite-relay
- Face implementations: UDP, HTTP, file directory
- Uses clojure/core.async
  - Think Hoare's CSP and Go's channel concept
  - Asynchronous communication in concurrent programs without callback hell
- Currently working on FLIC – it's fun
- Programming environment: clojure-1.7, emacs, CIDER

```
emacs@N-1124.office.hd
File Edit Options Buffers Tools Jabber Clojure Help

(defun prefix-match
  "return subset of fib that matches name based on name prefix keys.
  sorted by matched prefix length"
  [sorted-map name]
  (let [matches (filter #(.startsWith name (key %)) (rsubseq sorted-map <= name))]
    (reverse (sort-by #(count (% 0)) matches))))

(defun forwardInterest
  "try to find suitable interface based on LPM && forward msg to corresponding channel.
  Return new PIT entry or nil if no prefix matched"
  [msg itf]

  (do
    (log/debug "forwarding interest:" msg)
    (let [interfaces (prefix-match @fib (msg :name))
          nextItf (first interfaces)] ;pick one interface (most specific prefix) for now
      (if nextItf
        (do
          (log/debug "forwarding to " nextItf)
          (>!! (val nextItf) msg)
          {:itfContext {itf (get msg :itfContext)}, :incomingIfs #{itf}, :ttlms (newTtl)})
        )
        (do
          (log/debug "no prefix match -- ignoring interest...") ; should not include this in the PIT then
            nil))
      )
    ))

- (DOS) --- forwarder.clj 45% L119 (Clojure)
Undo!
```

# Plans

- Platform for CCNx protocol evolution
- ICN/web application development
- Video streaming servers and client
- Browser extensions (JavaScript platform)
- IoT-Gateway platform in RIOT scenarios
- NFV-ready package OsV
- Named Function Networking
- ICN Network Management

# Availability

- Soon – MIT license, on github
- Stay tuned...