Forces vs. ONF [July 2012]

Upcoming draft:
Draft-hares-forces-vs-openflow-00.txt
Question

- Requesting Input prior to draft
- How does ONF Relate to ForCES?

- How does this help us get to devices that operate in the Cloud or strong cloud services or Software (D*) Networks
  - D* = Defined, driven
Quotes:

“OpenFlow-0 is the Diff-Serv Tspec, OpenFlow-1.0 is Forces-, and OpenFlow 1.1 is Forces++”

“We realize with OF releases [0FS1.2, OFS-1.3, OFS-1.4], the implementation experience was lacking. Most implementations are on OFS 1.0. OFS releases are slowing down to let implementations out”

ONF has repackaged some of the ForCES existing technology in an industry
- Some of ForCES missing,
- Implementations experience is only on 1.0
- Is Google deployment in G-network – a pattern for all networks?”
Topics covered in the

- Goals - historically and now
- Architectural models
- Flow Logic
- Forwarding Models and Building Block Libraries
- Protocol
- Applications using (Firewalls, Load-balancer, High availability nodes).
Historical context

Forces History
- Designers of Network Processors (NP) wanting commodity chips for Advanced functions
- NP Forum Common API to control NP
- Movement to IETF for open standards

ONF history
- Researchers looking for large scale networks to test NG (GENI)
- ONF – Industry Forum with open work & Industry board voting on final Standards
OFS does not define initialization of system
Flow Logic

- Forces – Dynamic definition

- [McKeown2008][OFS1.0] – Static definition & protocol
Flow Logic

Å Forces

Å [OFS 1.1]/ [OFS 1.2)]

Is the Group Table == ForCES with LFB logic?
FP Modeling and Libraries

Å Forces FP Modeling
   ï Modeling language to allow flexible definitions and extensions of LFBs
   ï LFB library with models
   ï Sample libraries
      Å Ethernet LFBs
      Å IP Validator LFBs
      Å iP Forwarding (v4/v6 unicast/multicast)
      Å Redirect
      Å Schedule, Meta Dispatch

Å [McKeown-2008][OFS-1.0][OFS-1.1][OFS-1.2][OFS-1.3][OFS-1.4]
   ï Defined LFB

Å Hybrid –
   ï S.I.N (ships in night) or Integrated doesn’t change basics

Å [OFS-Futures]
   ï Realized that OFS-1.1 was too static
   ï LFB modeling on “todo list”, not planned
CE/FE Protocol

Å Forces
Å Runs over Secure Transport (TML with STCP)
  ï Security optional with IP-Sec
  ï Separated configuration, events, packet exceptions
Å Controls
  ï Configuration
  ï LFB control download
  ï Error control
  ï Events
Å Handles Error control
Å Pre-association concepts

OFS
Å Runs over Secure Transport (SSL)
Å Controls
  ï Configuration
  ï Flow Table download
  ï Error/ statistics
  ï no Synchronous events
Å Handles error control
Å No pre-association concepts in protocol
Draft Compares

Å Historical input
Å Goals
Å Architectural requirements
  ï Pre-association (controller meeting & connecting to forwarders)
  ï Impact on centralized

år Forwarding Models
  ï [OFS 1.1] [OFS-1.2]
år Protocol
  ï Secure transport
  ï Interface
år Use of Forces in S*D*N
  ï Netlink/ForCES
  ï Hybrid, distributed, control
  ï As good or better than OFS
My Conclusions

- Both ForCES and OFS follow the basic idea of separations of forwarding plane and control plane in network elements.
  - Both are capable of operating for centralized control, distributed control, and hybrid control.

- [OFS-1.1] Flow Table Logic with the instructions and Group Tables is the major difference between the ForCES RFCs.
  - Is this difference a benefit, problem or “it depends”
  - Implementation is needed for comparison (Academic and Commercial)
My Conclusion

Å [OFS-1.0][OFS-1.1][OFS-1.2][OFS-1.3]

- lacks a forwarding model, a standardized LFB library and the concepts of FE-CE associations (FE-Manger, CE-Manager, pre/post association phase).
- It appears the OpenFlow work is starting to invent the equivalent of existing ForCES work as OpenFlow work.
- The guide of this reinventing seems to be the Google code snippets passed to the OpenFlow Forum as examples of “running code” to provide rough consensus.
Next Steps in Net-Life

Â Let’s try out implementations
Â SDN over ______
  ï Will have multiple CE/Controller and Forwarding planes
  ï Do comparison between ONF & ForCES yourself in code
  ï Try it in multiple scenarios: Switch, MBH, firewall, AS
Â Share your experiences
WG Next Steps

- Ask adoption as WG draft
- Other drafts on Forces vs. ONF with experiences with SDN