proto-SDNRG Introduction

David Meyer

proto-SDNRG Meeting

IETF 84

Diverse views as to what “SDN” is

- Separation of control and data planes (or not)
- Control: Centralized, Distributed , Both
  - Proactive vs. Reactive control models
- {Over,Under}lay
- Interfaces to the forwarding plane
  - OpenFlow, Forces, MPLS, DiffServ, conex,…
- Interfaces to the control plane/routing system
  - ALTO, CDNi, XMPP, IRS, ONF Hybrid,…
- Data and Information Models
  - Yang, ….
- Config/Orchestration
  - Netconf, SNMP, OF-Config, OpenStack, Cloudstack, …
- …

And Lots of Open Questions (1)

- Architecture
  - Centralized vs. Distributed, Separation of Control and Data planes, …
  - Scalability
- APIs
  - *OSFN* (One Size Fits None)
  - Northbound/southbound
  - Data models, state persistence, state injection/extraction
  - Multi-layer feedback systems (control theoretic implications?)
  - Event based network control
  - "Abstractions"
- Protocols
  - OpenFlow, ForCES, PCE, …
- Network Programming Languages
  - Holy Grail (e.g., Frenetic, Nettle, Coolaid, …)
  - Reliable "Network Compilers"

Lots of Open Questions (2)

- Complexity
  - http://www.1-4-5.net/~dmm/an_and_antifragility.pdf
  - We observe that scalable and robust systems are both highly layered and distributed
    - But not everywhere….statefull PCE,
    - What does this tell us about SDN architectures, if anything?
  - Control theoretic considerations (optimal vs. robust control models?)
    - IRS → ? (e.g., new relationships between dynamic (routing) system and off-board agents)
  - Related: Theoretical Foundations
- Optimality vs. Fairness
  - And by which metrics (and who cares)?
  - Multicast Replication Engineering
- Instrumentation and measurement
- Security
  - Effects on provenance, new DoS vectors, privacy, …
- And what about operational considerations?
  - Simplicity (again), manageability, optimization,…
  - New operational models?
  - NPLs
- …

With that, let’s get going