SwitchOn Workshop

Breakout Future Networks Design and Applications
(E.g., Network protocols, routing, management, modeling, wireless networking)

Room 122

Edit this document: **http://tinyurl.com/switchonfuture**
Slides: **http://tinyurl.com/switchon-breakout**

Participants

Rodrigo Fonseca
Christian Rothenberg
Glenn Ricart
Jason Liu
Xin Sun
Allen B. MacKenzie
Dorgival Guedes
Flávio de Oliveira Silva, UFU
Christos Papadopoulos
Alessandro Anzaloni

Objectives:

Identify:

- Identify strategic research topics and themes in different areas
- Identify research opportunities in these areas for both countries
- Identify existing and future collaborations and collaborators
- Identify the needs for large-scale international collaborations

Challenges and Important Research Issues

- Troubleshooting
    - Visibility on different layer/domain state (hidden information)
    - OAM-related gap when moving towards operating SDN
    - Lost in relation to MPLS

  Trust applications

- Fault Management, HA , High-Reliability
    - Lack of models
    - Who to blame

- Complexity (lack of models) in the SDN architecture
    - Build abstractions to manage the complexity
    - Policy expression (end-to-end)
        - Security Expression (end-to-end) and enforcement
        - Cross-domain policy expression (SDX)

- Infrastructure to support new network architectures (NFV-like in spirit of Chip´s talk)
    - Slices (TCP/IP, XIA, MobilityFirst, NDN, ETArch...)
    - Dependence on the nature of traffic (e.g. smart-grid)
    - Low-latency / high-responsiveness

- Is SDN a new Network Architecture? How does it relate to architectural proposals such as NDN?

- Boundaries:
    - Inter-domain vs pervasive sliced architecture
    - Lack of Taxonomy for expressing boundaries
    - Allow communication between slices, sharing or not information, “boundary conditions” “slice permeability”
    - Applications: What belongs to the application / what belongs to the network
        - What is the application in an SDN
        - How can we provision applications on demand, with optimal network configuration

- Economics: how it will impact new network designs
    - (Like security) need to be thought / considered from design
    - “Contest” or “Market-like” dynamics

What are the assumptions? Programmability? Federated/Distributed control?
Distributed Control in Networks (in-between) is less understood than de-/centralized (towards an optimality in control design)

- Wireless
    - Middle-point between full mesh and full centralized
    - What if one could roam between any provider’s infrastructure in real-time?
    - LTE-advanced in white space (unreliable control channel)

NDN: Operations require a re-thinking (“ping content”, “traceroute content”)

Chameleon-like model for networks (“cooking slices with different properties”)

Dimensions: mobility, security, naming, routing

Existing Projects US and Brazil (not necessarily joint)

US
GENI
NSFCloud
FIA projects
NSF SmartGrid, Cyberphisical systems in CISE (IoT)

Brazil

fiBRe (www.fibre-ict.eu)
Entity Title Architecture (ETArch) http://http://mehar.facom.ufu.br/etarch/index.html)

No big projects on Future Networks beyond fiBRe, calls are usually not that large. Multiple punctual, smaller projects

RNP projects / CTIC
http://portal-web.rnp.br/en/research-and-development/ctic
http://portal-web.rnp.br/en/noticias/14-projects-are-presented

INCT (CNPq-funded larger longerish term multi-institution topic-based projects)
http://inct.cnpq.br/

FUNTEL (in the past, GIGA project)

Existing and Future Collaborations

We decided to have a meta discussion on how these collaborations form.
How did they start?
How do existing collaborations work, are run?
What scale?

Christian/Katia:
PhD student exchange for 2 years, periodic documents with open points
Katia: “Collaborations are successful if a student has vested interest”, weekly meetings

OpenSource is another type of collaboration: funding could/should require open-source, reproducible artifacts

Tools: github, writelatex, gerrit

Cultural issues in collaboration

People should be compatible, should understand collaboration, large teams are large to manage. Understand how people work.

A larger group needs a leader.

Jason/Cesar: Cesar spent some time at FIU, face time (not FaceTime)

Exchange of faculty/students/researchers. CNPq PVE initiative promising step.
CAPES/NSF on ICT initiative similar to the one existing are of Biodiversity (http://www.nsf.gov/bio/deb/suppopp.jsp#IREU)

Seed funding

Potentials for collaborations

not necessary to be large, start small (but think big)

Smart-city collaborations (portable, running in GENI)
Smart Grids
Sustainability / Energy

Join existing testbeds such as the NDN testbeds or even testbeds based on different network architectures