Trilogy
Architecting the Future Internet

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MANA Panel 2: FI - Networking Architectures - Horizontal Topics

Expected Outcome of the Panel 2: Proposals & priorities for interdisciplinary research directions as part of Future Internet research agenda
1. What are the main bottlenecks in the current Internet? What are the first 3-5 key challenges/problems to be fixed? What can we learn from the last 40 years of evolution Internet; what should be avoided

4. Better & different support of services/applications

5. Trust and privacy is crucial - how to provide trust models; how to design network elements/components which can be trusted?

6. How to test new functions? How to deploy novel features? Economic viable solution for changing networking systems?

7. How to interwork Future Internet with Current Internet? Parallel Internets

8. New Transport / New forwarding capability / programmability of the forwarding plane /programmability of the control plane

9. More or less intelligence in the networks

11. Information centric networks Vs connectivity networks

12. Virtualization of Networks

10. How to design energy efficient Networking Systems
No clean slate needed!
Internet is not (just) about distributed computing systems

- But economics
  - Mirror of society & commerce
  - On-going contention (tussle) amongst parties over economic & social reward, power etc

- Internet world – allow tussle at run time
  - Things change faster on Internet
  - Business models (value chain, actor-network) fluid

- So engineering design should reflect this: “design the playing field not the outcome”, “tussle at run time” (ie whilst the system is in use)
Resource pooling
– key reason for Internet’s success
How to share the resource pool?

- **1. TCP**
  - bit-rate
  - time

- **2. WFQ**
  - bit-rate
  - time

- **3. volume cap**
  - weighted sharing

- **4. DPI**
  - bit-rate
  - time

- **5. Virtualise**
  - (want) End-system flexibility
  - (needs) Accountability for network usage (scarcity)
    - If no-one else using link, then usage cost is zero
  - (technology to do it)
    - “Congestion transparency”
Priorities for FI Research

- Deployability
- Assume that parties are competitive (commercially, utility…)
  - Inter-domain vs intra-domain
  - Accountability for network usage
    - (for forwarding pkts)
- Resource pooling is beautiful,
  - how to stay beautiful?
    - Don’t cheese slice!
  - Congestion transparency to get accountability for network usage
    - Test, standards, innovations…
  - Resource pooling beyond usage for pkt forwarding?
Trilogy – An Architecture for Change

Scope
- Crudely: “Control” for “The Internet” : Internet hourglass at the control layer
- Reachability & resource control (& their integration)

Approach
- Economics & Design for Tussle are central
- Revolution then evolution

Objectives
- Develop a unified control architecture for the Future Internet that can adapt in a scalable, dynamic and robust manner to local operational and business requirements
- Develop and evaluate new technical solutions for: reachability & resource control
- Assess commercial & social control
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Ack

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