

Experimental Facilities

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Why rethink the Internet architecture?

□ Control plane issues :

- Security
- Naming / information access
- Support for new applications / services
 - Mobility
 - Quality of service
- Reliability and availability
 - Resilience
 - Problem analysis
- Scalability
- Economics

Rethinking the Internet architecture

❑ Solution unknown:

- Explore alternative architectures
- Enable a fresh start: question the fundamental design principles
- Architecture not intrinsic

❑ Approach:

- **Experimental facility**
- **Research into new architectures**

❑ Benefit:

- Intellectual challenge to uncover otherwise ignored system aspects
- Research in how to build and operate an experimental facility
- Experiments and failures are possible (desired!)

Experimental Facility

❑ Fundamental challenges

- How to build it so that it
 - Scales to a global scale
 - Allows for **experiments with unknown architectures**
 - Enables hands on experience to uncover systems aspects for researchers
 - Allows for repeated / reproducible measurements
 - Allows for concurrent measurement of multiple people
 - Allow long running and short experiments
 - Allow user opt-in

❑ Current solutions: Testbeds

- Limited scale and scope
- Interference of tests and measurements
- Lack of coordination

Experimental Facility

□ Clean Slate Design promises

- Design of an experimental facility
- Experiments with alternative network architectures
- Experiments with managing an experimental facility

□ Advantages

- First-hand experience with novel architectures
 - Not just paper work
- Transfer of results from experimental facility
 - How to build and operate it?
 - How to debug it?
 - How to federalize it?
 - How to take advantage of virtualization?
 - Where to place functionality within the network?

□ New Internet: net of networks?