

Distributed Systems and Applications Group Comments

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11 Participants

Questions

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- What are the Research Challenges?
- What are the Experiments you would run on the GENI?
- What is needed in GENI to run your experiments?

Research Challenges



- **Exploration of changes in different layers** to experiment with different protocols/algorithms under the DS&A
 - Need to run distributed systems on top of different mobility model ?
 - Need deployment of multiple layer
 - Need feedback from different layers
- **Management of applications**
 - How to do resource allocation?
 - Pricing – incentives – virtual currency

Research Challenges



- **Consideration of QoS** – bandwidth and delay guarantees
 - Need consideration of QoS and security and their tradeoffs
- **Consistency of slices** running in different layers in vertical fashion
 - Need isolation of traffic and services on each layer, but also consistency
 - Need vertical and horizontal slicing

Experiments



- **Application-driven experiments** –
 - Visualization, digital cinema, conferencing, tele-immersion, Voice-over-IP
 - Need reserve BW, configure network, get stats of end-to-end paths
- **Experimentation with different types of services and applications** of different duration and different QoS requirements
- **Pricing scheme for exchanging resources**
 - Pay for bandwidth to run different applications
 - Incentive schemes
- **New Protocols** for other sciences (physics and biology)

Experiments



- Experiment with pervasive services
- Measurement data experiments
 - Need many monitors
- Gathering tools
 - Need series of systems monitors, archiving and aggregating data

Experiments



- Security Experiments
 - Flash crowd experiments
- Application-level monitoring
- Application across different slices and networks - end-to-end experiments
- Data-side distributed system experiments taking into account storage
- Smart Networks experimentation
 - Figure out configurations and locations

Experiments



- **Validation of experiments** what has happened in the experiment, run experiments
 - need repeatability in experiments
- **Reusability of experiments** – repeatability
 - Controlled inputs (planetlab does not have controlled inputs)
 - Could we combine emulab with GENI to have repeatability

Needs for GENI (Requirements)

- Good guidelines and training
- Easy programming, design of experiment
- Repeatability
- End-to-end slide path management
- Interface to GENI from non-GENI devices
- Monitoring and data analysis
 - GENI should be very well software engineered system

Needs from GENI (Requirements)

- **Geographic distribution**
 - How to get through the campus, to different states, countries
- **Open Infrastructure** for public to be able to do security experiments (spam) – GENI should support security experiments
- **Complete Requirements**
 - We should have a document – by 2020 what are the services that will be needed
- **Standardization** of tools
- **Distribution mechanisms** for services
- **Modularization**