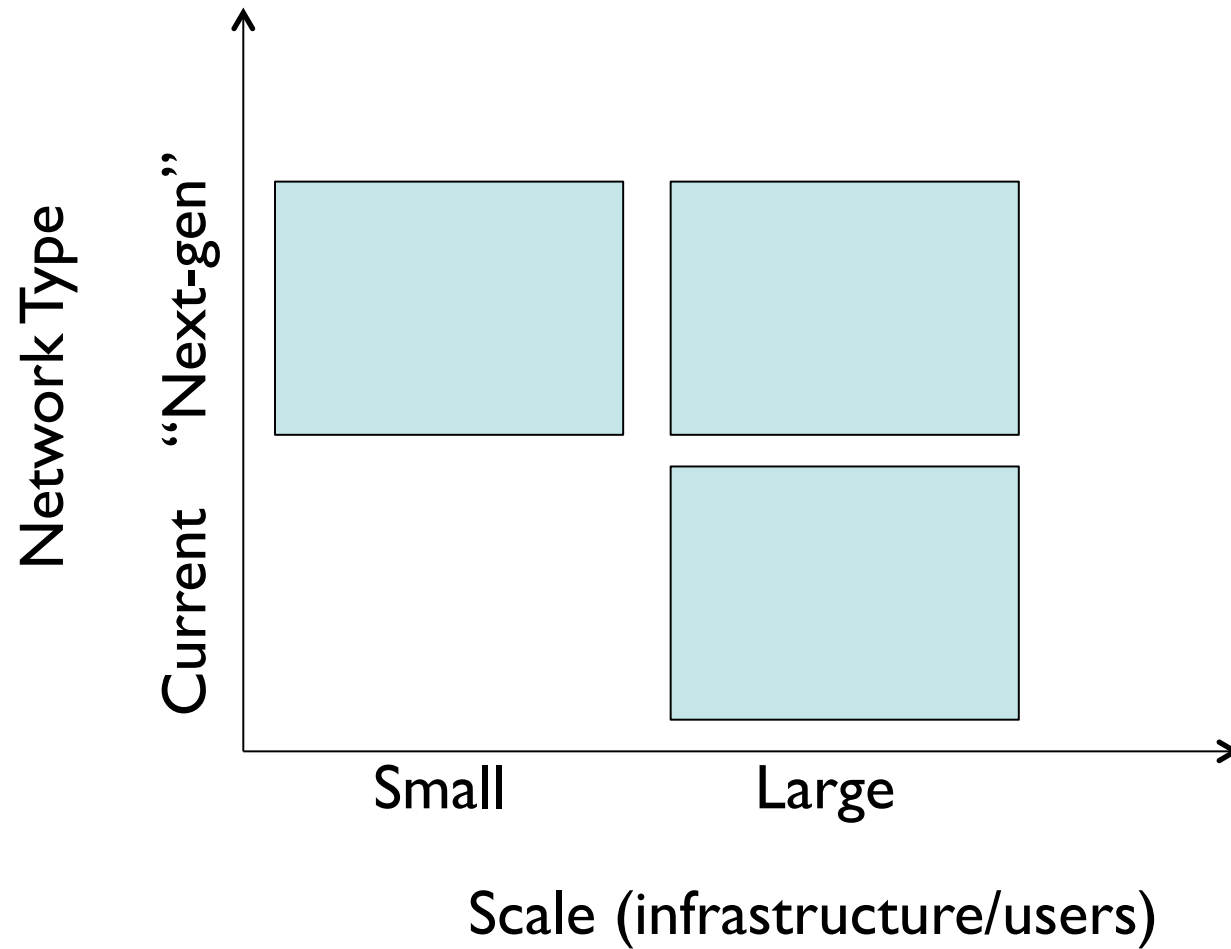

Research

Jack Brassil & Ashu Sabharwal

Domain of Our Discussion



(Current, Large)

- If we could “measure” (not build) current large-scale network
 - At radio layer
 - At network layer
 - At application usage
 - For example, PlanetLab is usage-data rich & infrastructure-light
- Then we could
 - Understand/quantify current bottlenecks
 - Develop models which are at large-scale ($\sim 10^4$)
 - Then conduct “what if” design and simulations
 - Develop “methods” for scaling to 10^9

(“Next-gen”, Small)

- If we could dedicated small-scale networks
 - With small time-scale delays
 - Framework for enabling control applications
 - Support fast local processing
 - Have many antennas (e.g. Massive MIMO), spectrum (e.g. 60GHz) & interfaces
- Then we could
 - Develop “methods” for large-scale vehicular networks
 - Develop smart-grid applications
 - Develop next-gen Layer 1-3 protocols
- Vehicular Networks
 - Small cell, programmable testbed will support low-latency, mission-critical vehicular applications (collision avoidance...)

(“Next-gen”, Large)

- If we could “build” a large-scale network with real users
 - Allow change of layers and their functions
 - Allow deep measurements
 - Allow fine grain control
- Then we could
 - Rethink network architectures from ground-up, and at the same time compare with current architectures
 - For example, develop, test and optimize MobilityFirst
 - Scale up some of the promising small-scale experiments

One More Thing...

- If we could build a “research phone” (e.g. Project Ara)
 - Hack-able at all layers
 - E.g. new interfaces via SIM/USB card-slot
 - Full control of all layers
 - Convince users to actually use it
- Then we could
 - Design new applications which leverage new functionality
 - Optimize both infrastructure and mobile