**Introduction**

- Existing infrastructure: no dedicated bandwidth or priority based communications
- Current Internet capacity can be overloaded: no method to dynamically limit bandwidth
- Current trend towards cloud: Remote resources / accessibility / security / cloud computing / cross platform
- Presented SDN based virtualized services/applications can alleviate these problems

**Why SDN?**

- Dynamic control of network:
  - Bandwidth allocation
  - Priorities
- Resilience/Fault tolerance:
  - Decoupled control plane
  - Easy reprogramming

**Architecture**

Each service has a virtual “channel”:
- Encapsulates service from end-to-end
- Completely virtualized
- Through-network isolation of service

Each user Application runs on a VM residing on the service provider server:
- Thin client implementation
- Virtualization through hardware

Dynamic control of the network:
- SDN enables dynamic control
- Dynamic priorities
- Dynamic bandwidth allocation

**Implementation**

- Server for each application
- VLAN for specific application

**User End:**
- VMs pushed to user end via LTSP
- Thin client (VM running on server)
- Each VM connected to unique VLAN

**Software:** (GNU Public Licensed)
- Floodlight Controller
- VirtualBox
- LTSP - Linux Terminal Server Project

**Hardware:**
- HP E3800 OpenFlow switch
- Runs in hybrid mode

**Examples**

- High priority to critical communication:
  - Critical infrastructure /Government communication
- Dynamic bandwidth control:
  - Time based (night time setbacks)
  - Usage based / Situation based (disaster situation)
- Easy network reprogramming: Reduced down times

**Future Work**

- Migration to GENI
- Dynamic control of packet forwarding via OpenFlow
- Larger scale implementation testing / performance analysis
- Application delivery via wireless communication
- Full thin client implementation on the home device
- Implementation for Mobile devices

**Highlights**

- Fully thin client on user end
- Isolation of services
- Dynamic bandwidth control
- Priority based packet forwarding
- Scalability
- Resilience/Fault tolerance

**Documentation**

Support and documentation via Sourceforge and dedicated website
nsec.if.uidaho.edu