

# LINK TECHNOLOGIES, Inc.

## **MikroTik**

*Routing the World*

### Homeland Security High Performance Case Study



# Your Instructor

- Dennis Burgess
  - Mikrotik Certified Consultant / Trainer
  - Certified Dude Consultant
  - In the WISP Industry since 2000
  - Consulting Since 1997
    - Cisco Certified
    - Microsoft Certified
  - WISP Experience
    - Owned and Operated a WISP Since 2000
    - Deployed Countless Mikrotik Based Networks
- ▶ WISPA Board Member

# WISPA!



**See WISPA in the Vendor Area!**  
**Great Member WIKI & List Servers!**

# What is this about?



# Project Requirements



# Project Requirements

**High Performance Data Network**  
**Support Security Cameras**  
**Support Multiple Government Agencies**  
**Support VoIP Deployment**  
**Support Multi-Meg Applications**  
**High Availability**  
**Fast Redundancy**

# Project Requirements

**32 Sites**

**High-Capacity Wireless Links**

**No Signal Point of Wireless Failures**

**Network Monitoring**

**Link Speeds and Usage of Network**

**Firewalling at all Locations as Necessary**

**QoS at all sites**

# Design Approach

**First Question?**

**What is High Performance?**





# Design Approach

**First Question?**

**GigE Wireless Links!**  
**150 – 300 Meg Links**

# Design Approach

## Second Question?



# Design Approach

## Second Question?



# Design Approach

**Second Question?**

**Currently Around 800  
Cameras on Network**

# Design Approach

## Redundancy?



# Design Approach

**Redundancy?**

**Every Site Has a Minimum of  
Two Wireless Connections**

# Design Approach

**Redundancy?**

**Every Site Has a Minimum of  
Two Wireless Connections**

**Some have upwards of Six**

# Design Approach

## Firewall?





# Design Approach

## Firewall?

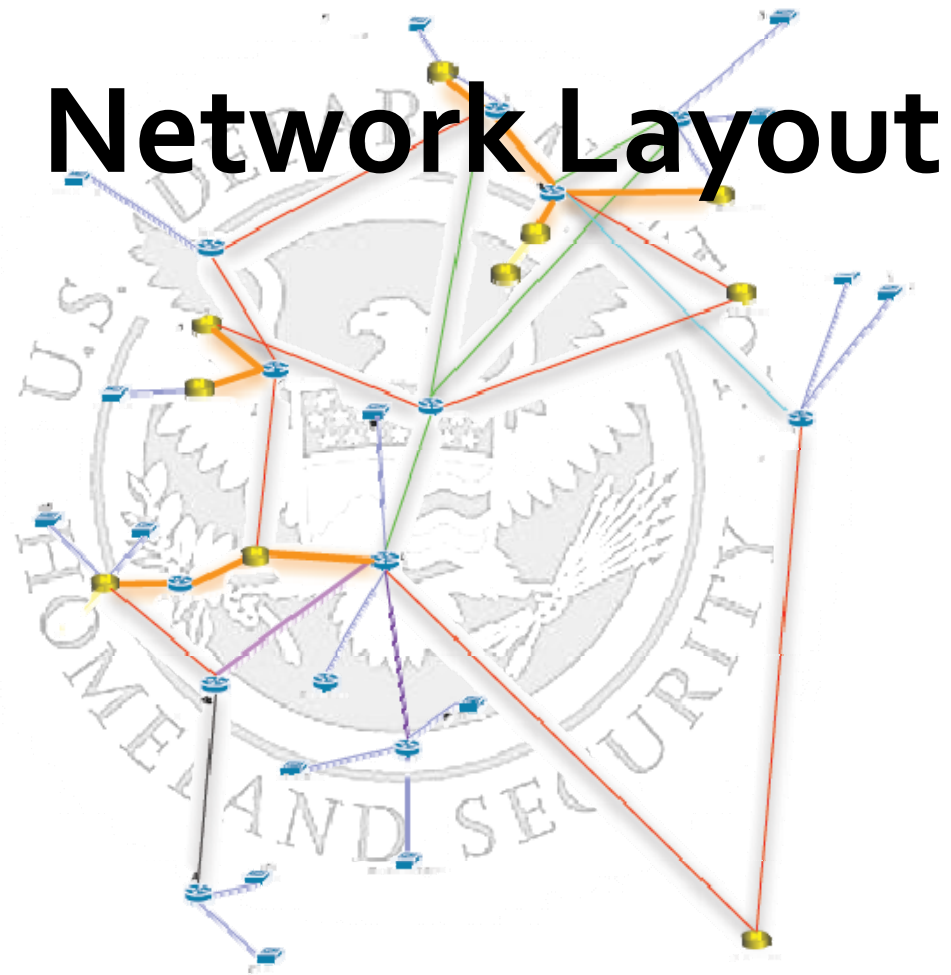
**Prevent Common items, such as NetBIOS, large amounts of connections.**

# Design Approach

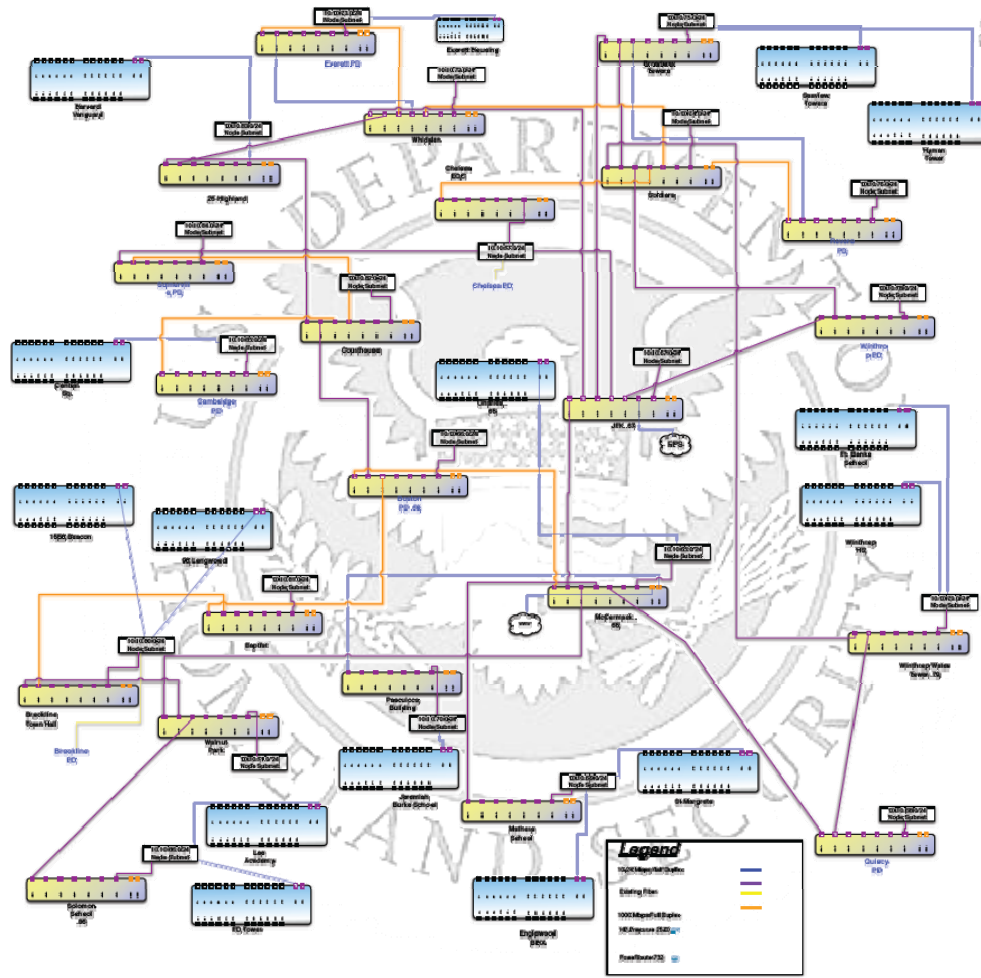
**QoS**

**Quality of Service  
For VoIP Connections  
And specific Applications**

# Design Approach



# Design Approach



# Failover

**Routing Protocol  
Choose OSPF**

**Why?**



# Failover

## Routing Protocol

Very Simple to Configure

# Failover

## Routing Protocol

**State Changes Create  
Network Topology Changes**

# Failover

**Routing Protocol**

**Link Goes Down**

**=**

**Instant Routing Change**



# Failover

**Routing Protocol**

**Most Links Have OBM  
Creates Super Fast  
State Changes**

# Failover

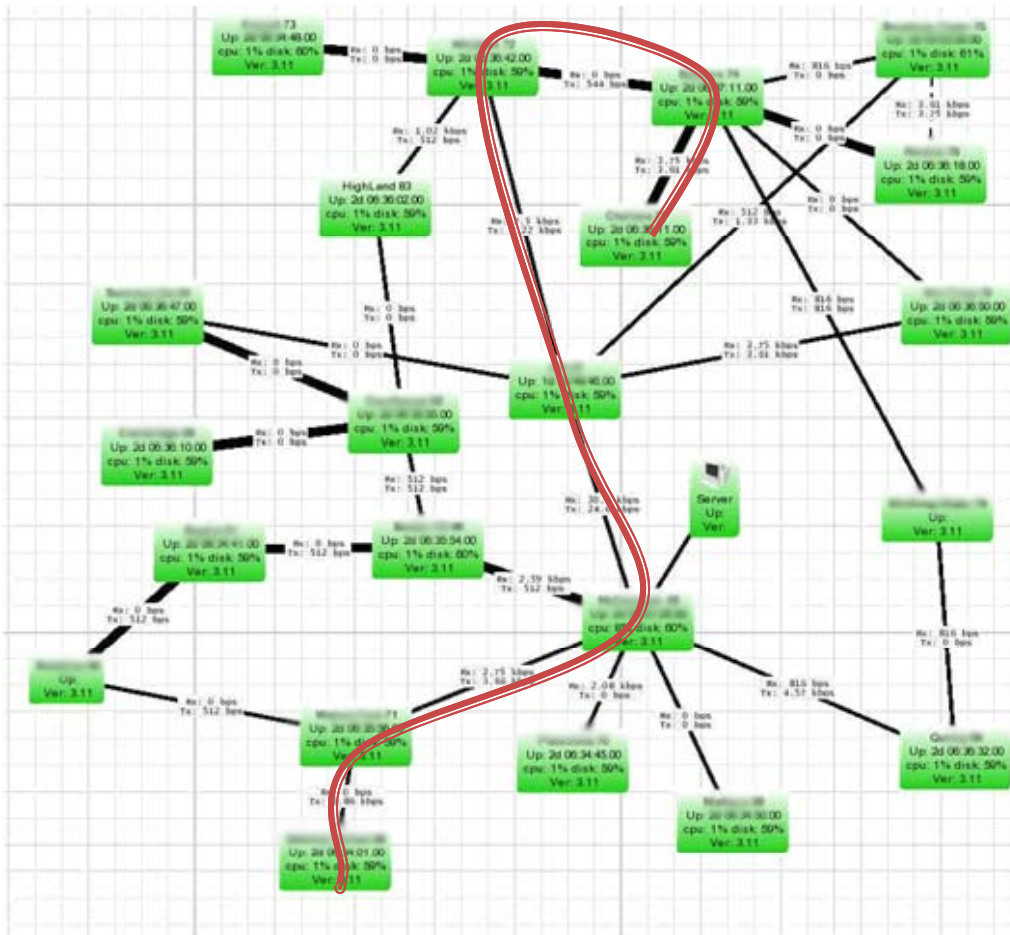
**Full Simulated Failure of Node**

**Performed by /sys shutdown!**

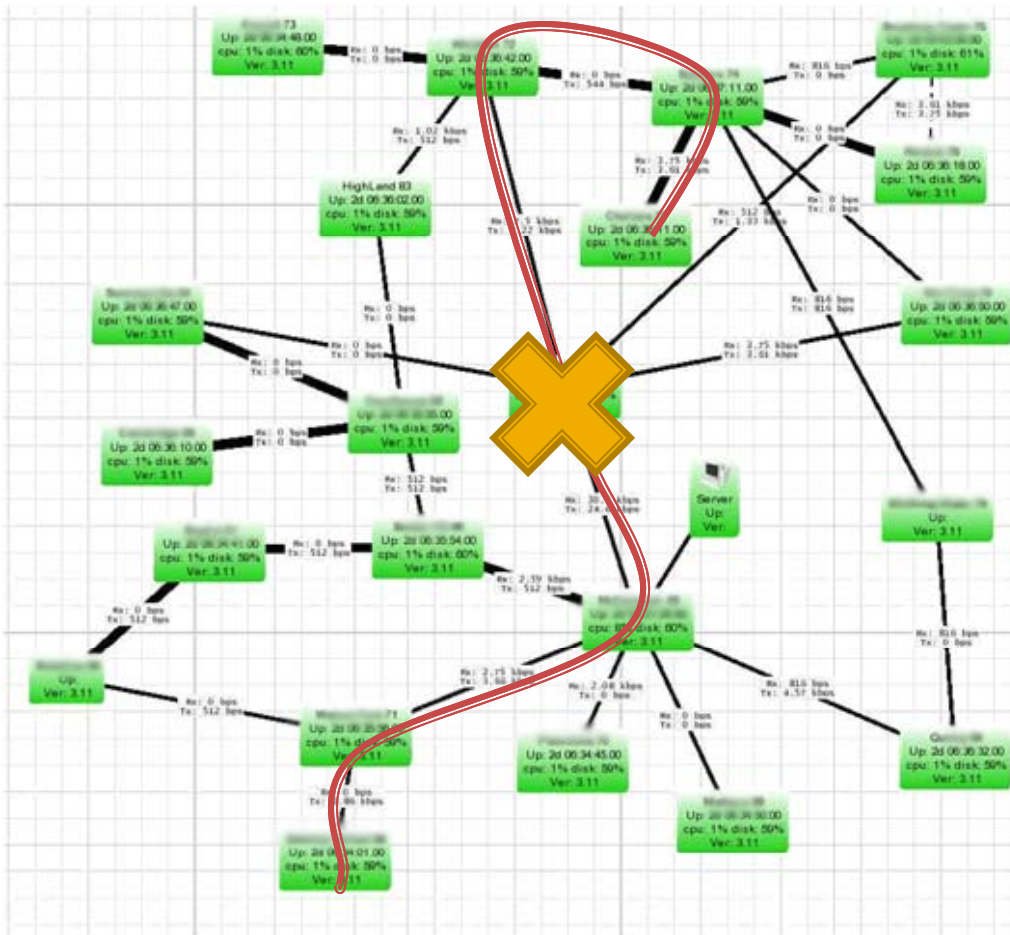


# Failover

## Normal Path



# Failover

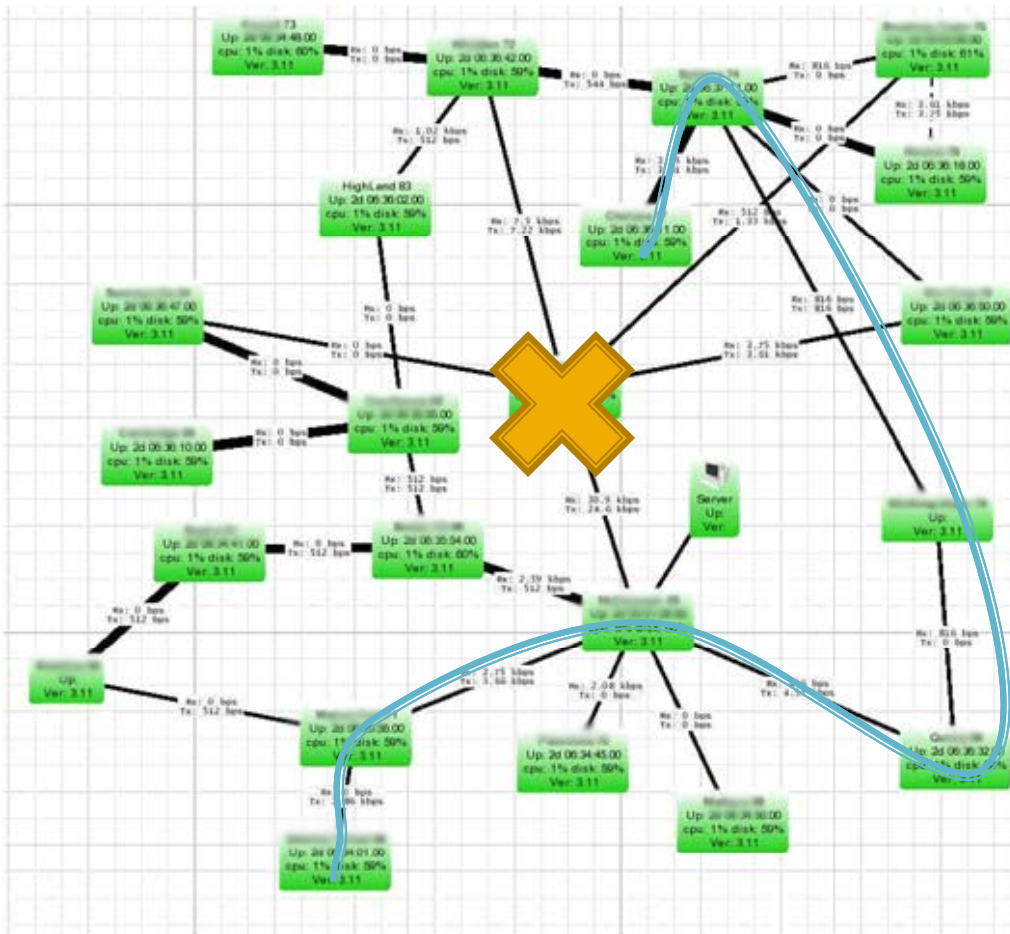


Normal  
Path

Shutdown  
Router

# Failover

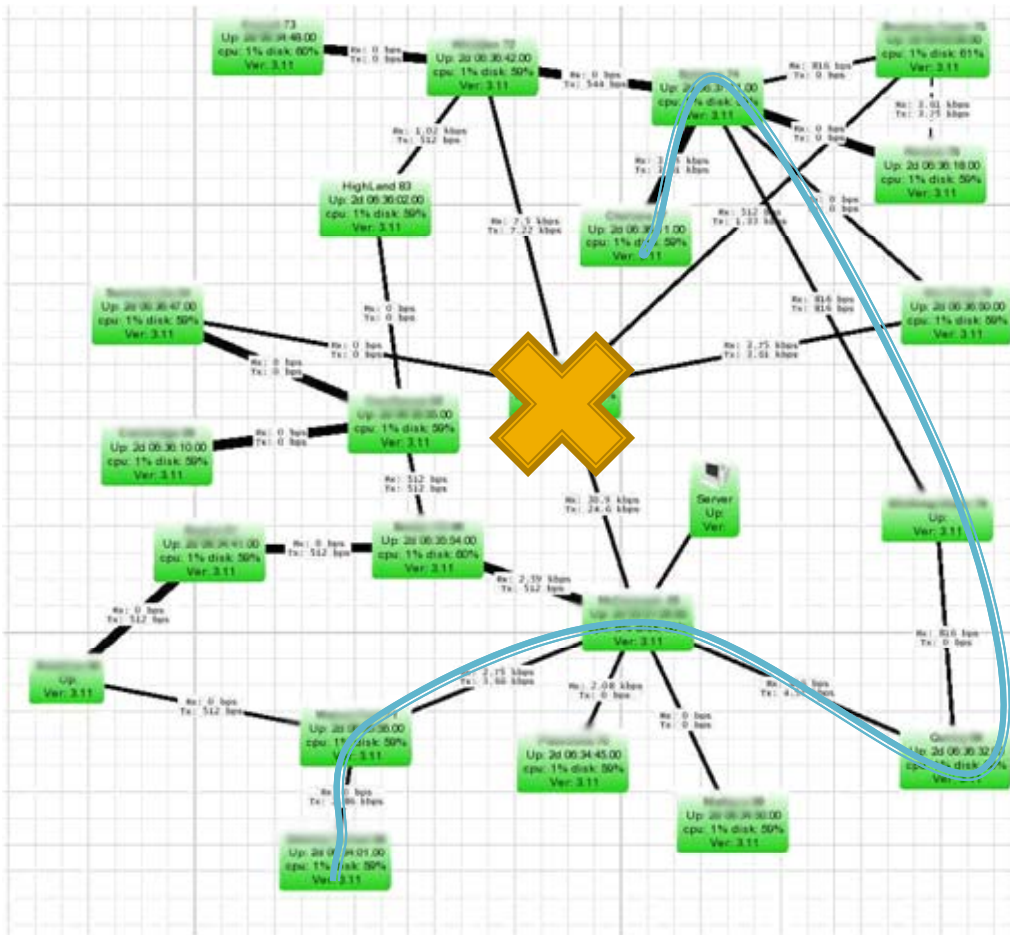
## New Path



# Failover

<3 Seconds  
Reroutes

Typically  
Never Lost  
a Ping!



# Hardware Used

## Hardware

### Supported & Tested Hardware



# Hardware Used

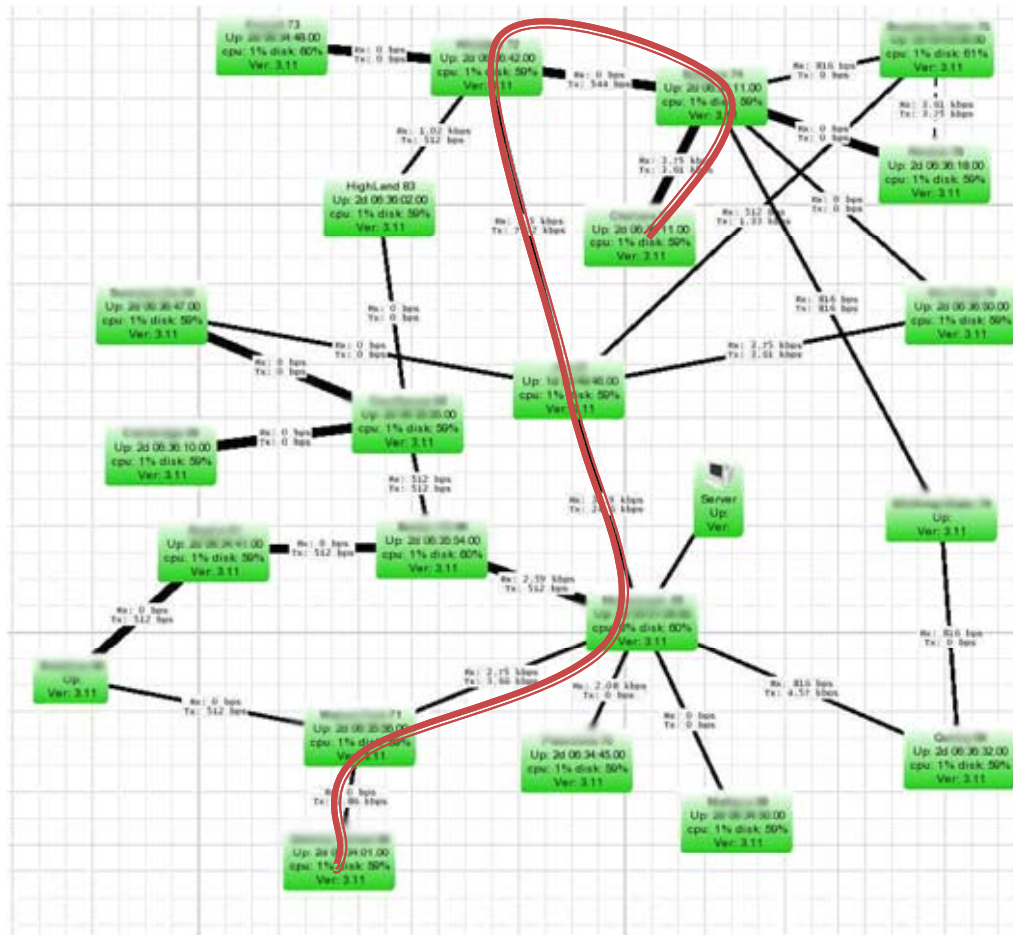
## Hardware Supported & Tested Hardware





# Performance

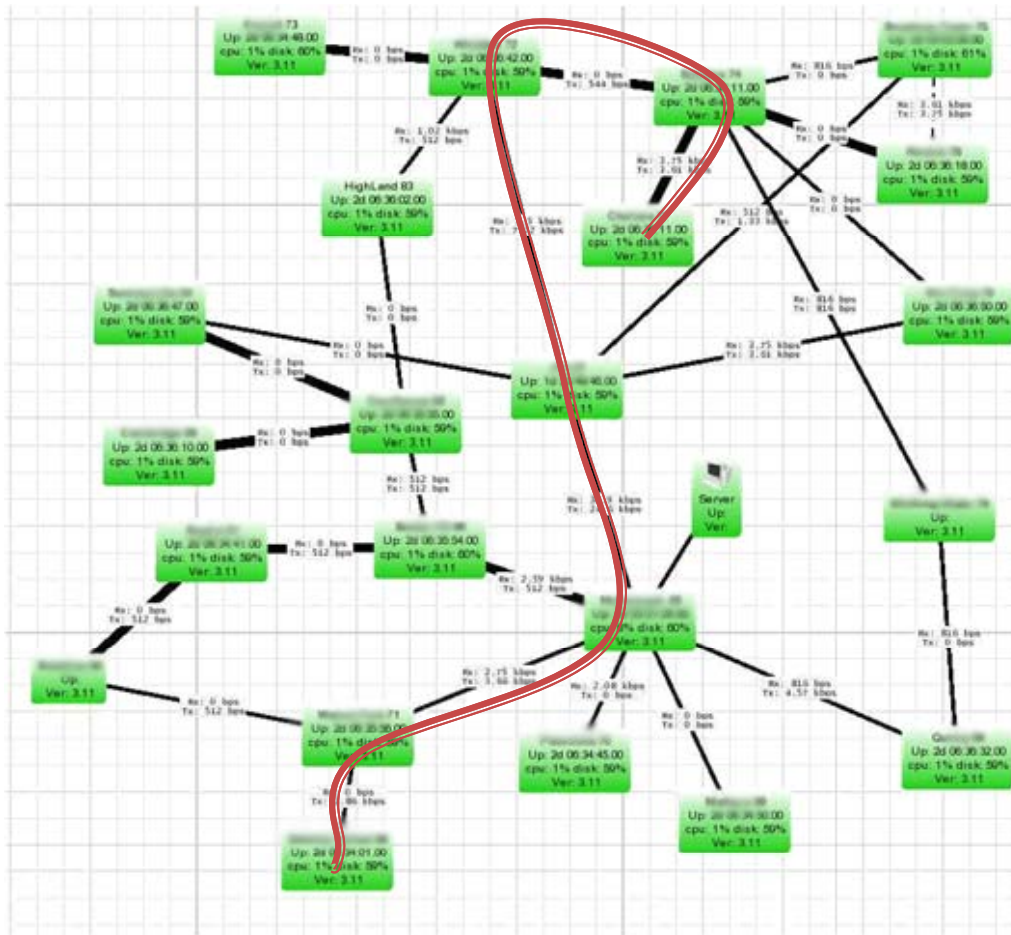
## IpPerf Testing



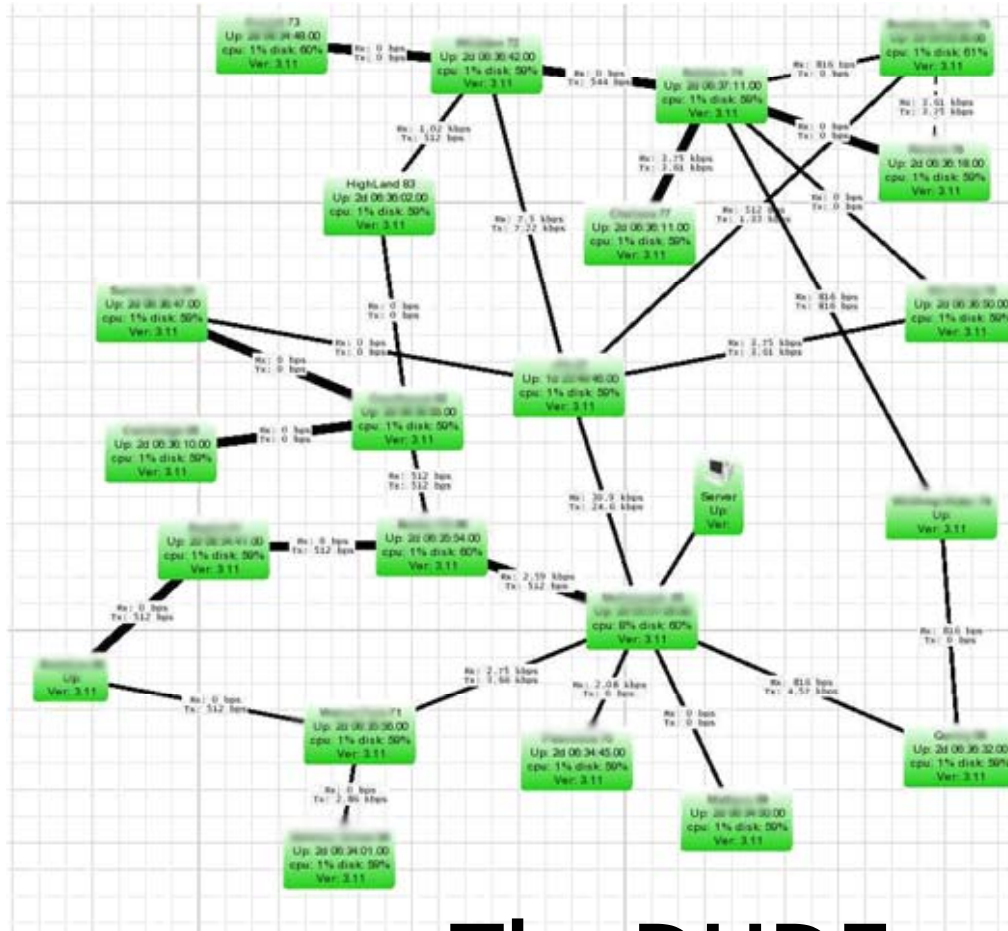
# Performance

## IpPerf Testing

993 Meg  
Though Up  
to 10 Hops!



# Monitoring

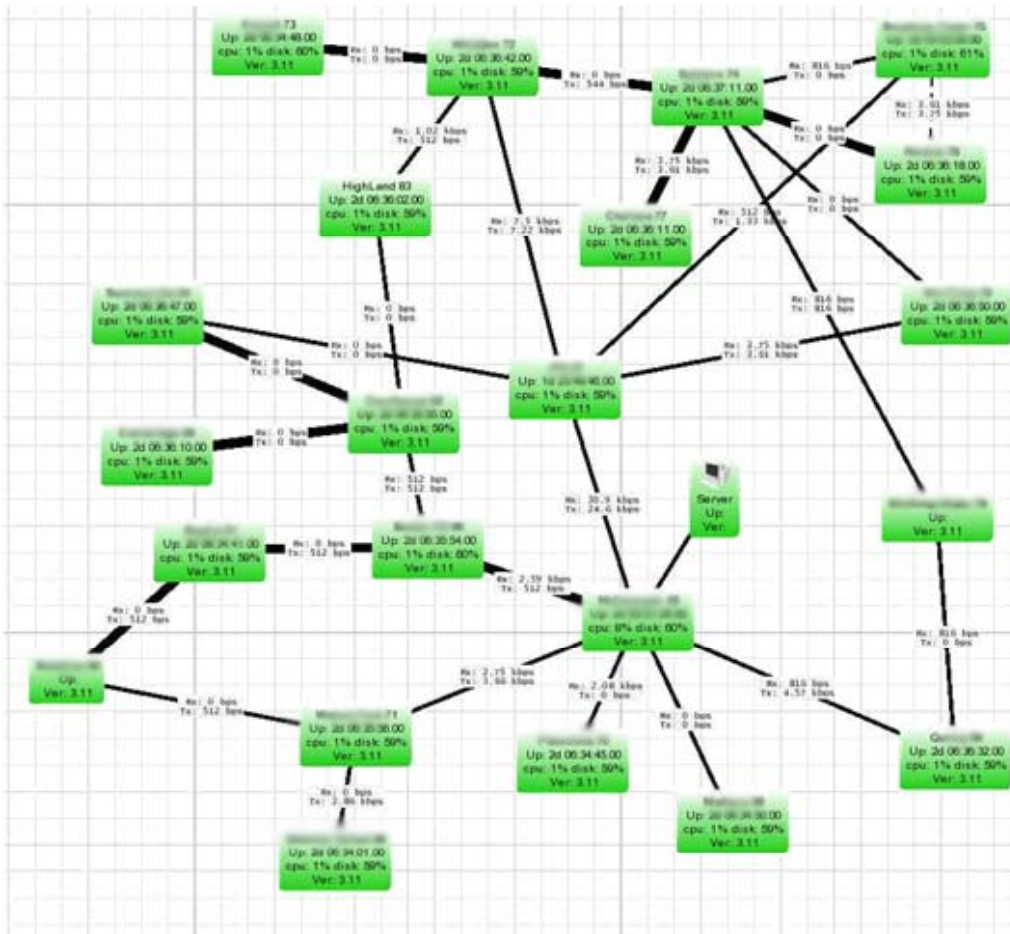


## The DUDE

# Monitoring

## The DUDE

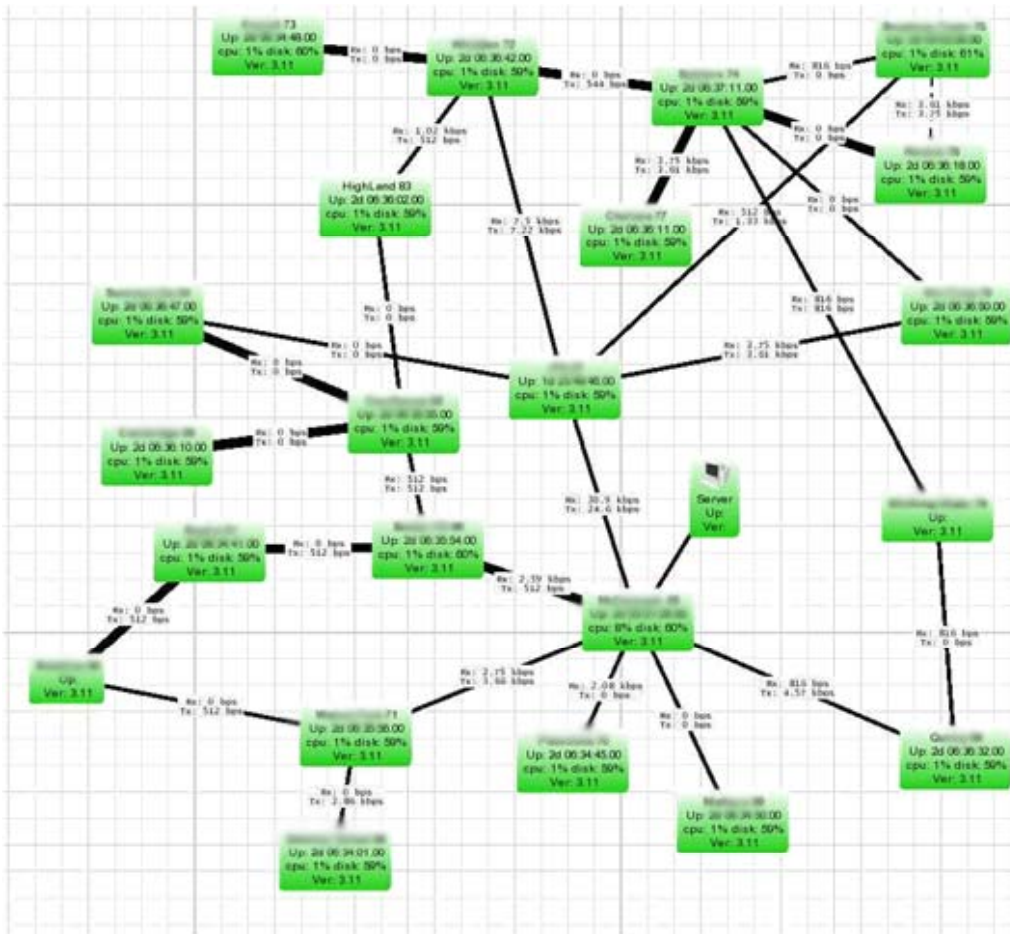
# Full Network Monitoring



# Monitoring

## The DUDE

# Link Monitoring and Graphing



# Deployment

## Phase 1

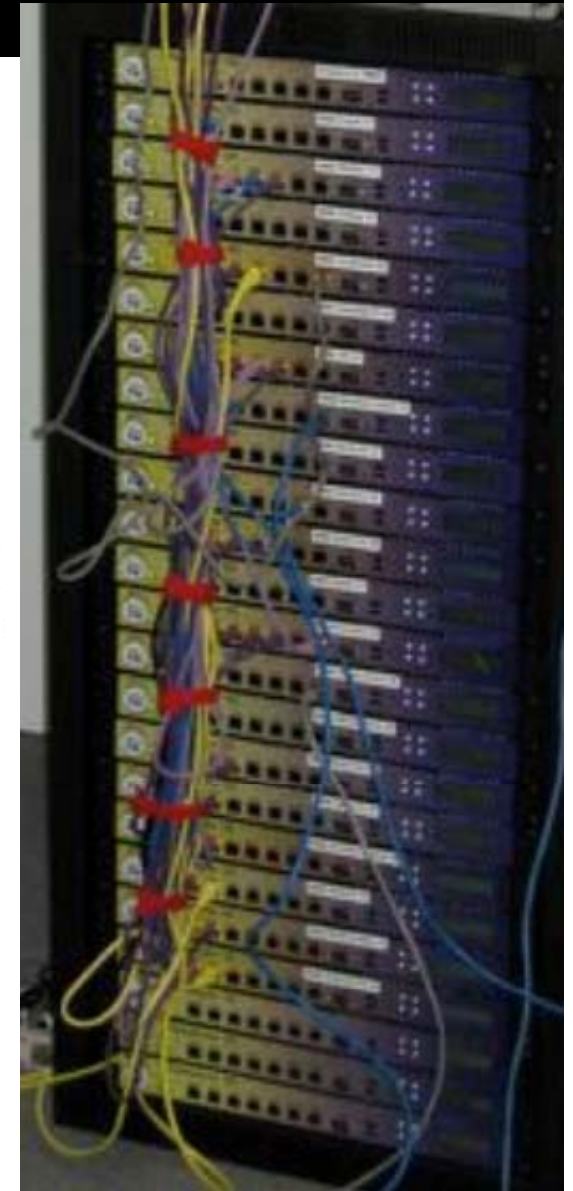
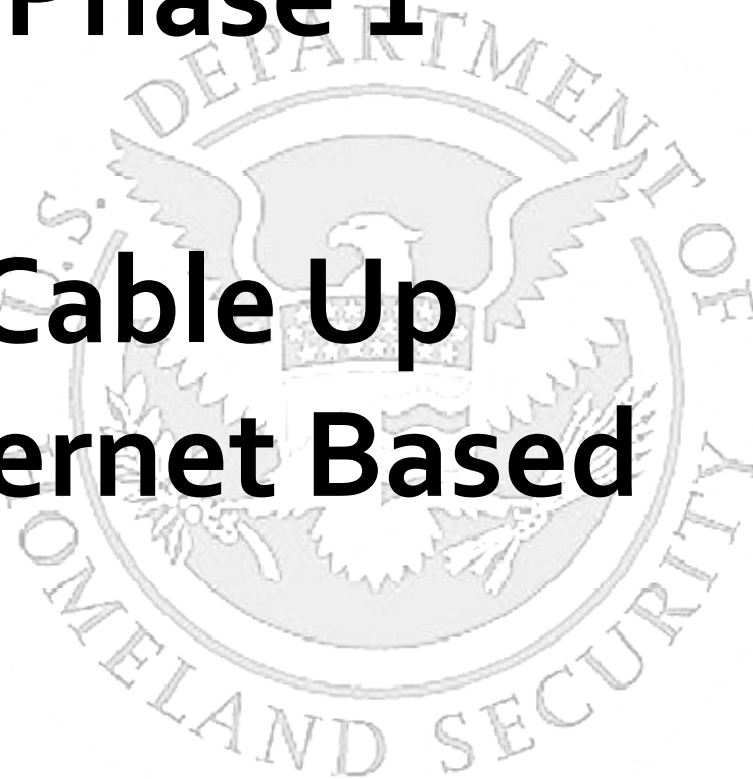
# Initial Configuration



# Deployment

## Phase 1

## Cable Up Ethernet Based



# Deployment

## Phase 1

**Configure Firewalls**  
**Configure IP Addresses**  
**Configure Routing**



# Deployment

## Phase 1

**Setup Network Monitoring**

**Verify DHCP Server**

**Verify Routing Failovers**

# Deployment

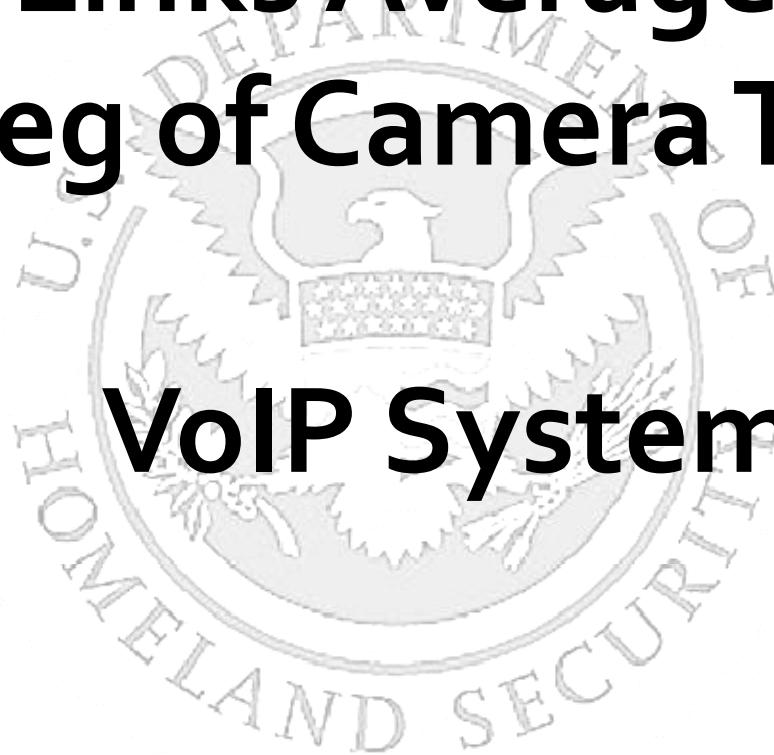
## Phase 2

**Actual Deployment  
Took about 2 months to  
Fully Deploy all wireless  
links, Routers, ETC.**

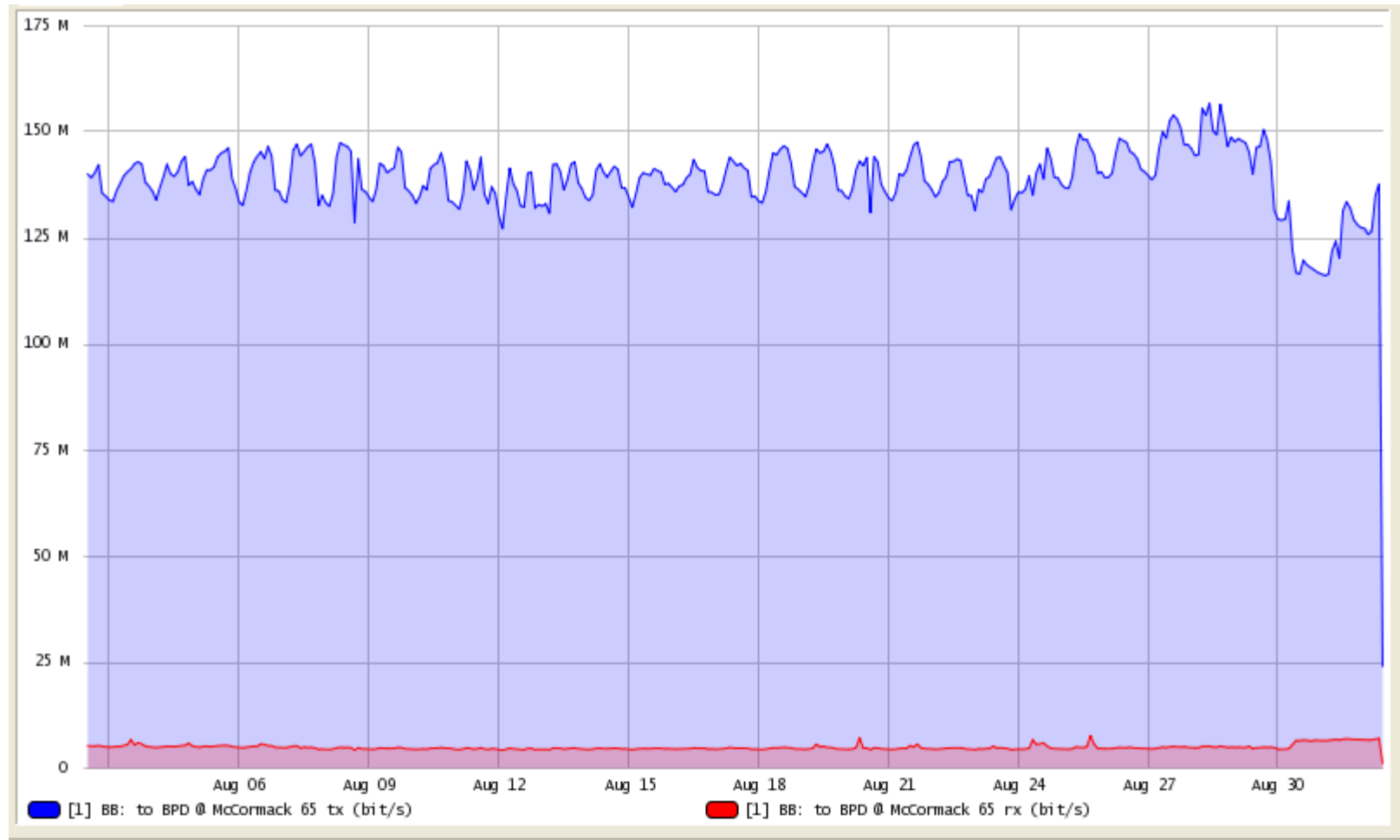
# System Running

**Some Links Average of + 300  
Meg of Camera Traffic**

**VoIP System**



# System Running



# Case Study

## Completed Network Rollout

Homeland Security  
Approved  
Hardware/Software



# Q&A Section

## ■ Thanks

- *Don't forget to stop by our Vendor Booth!*
- ***The FIRST "RouterOS" Book on the Market***
  - Office: 314-735-0270
  - Website: <http://www.linktechs.net>
  - E-Mail: [support@linktechs.net](mailto:support@linktechs.net)