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!

WISPA

Wireless Internet Service Providers Association

MikroTik

WISPA Vendor Member

See WISPA in the Vendor Area!

Great Member WIKI & List Servers!

What is this about?

Project Requirements

Case Study

Homeland Security Network

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?

Cameras?

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.

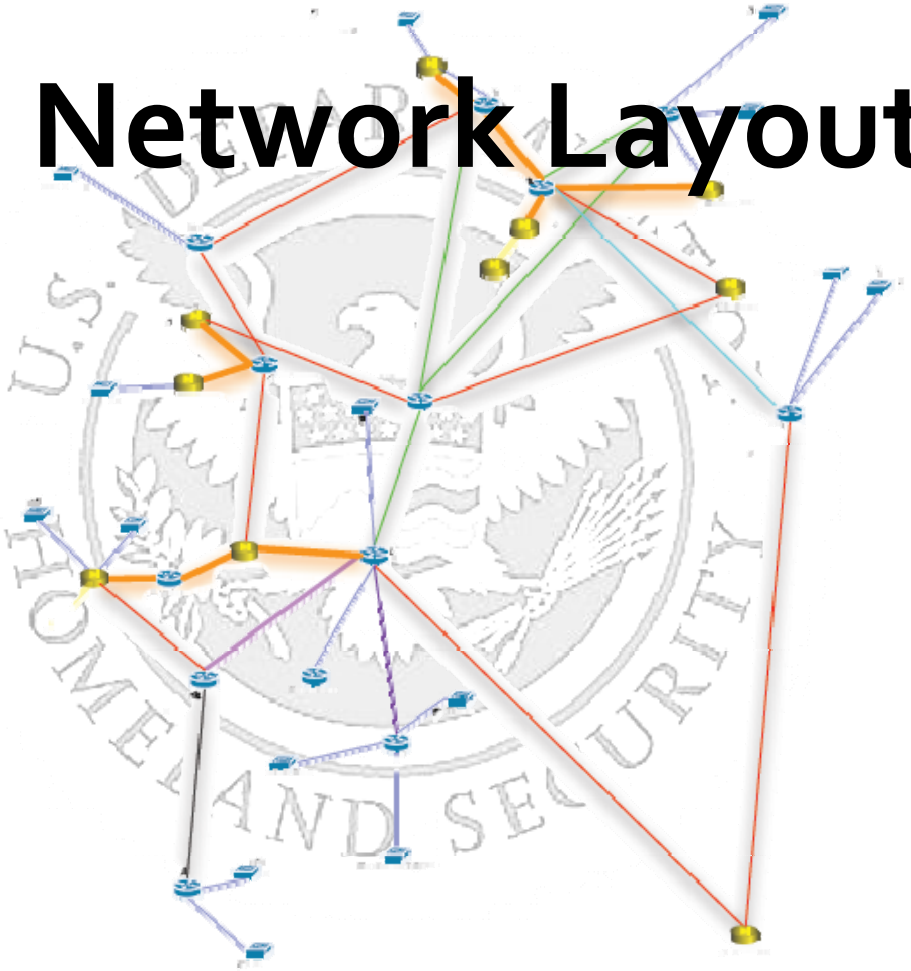
Design Approach

QoS

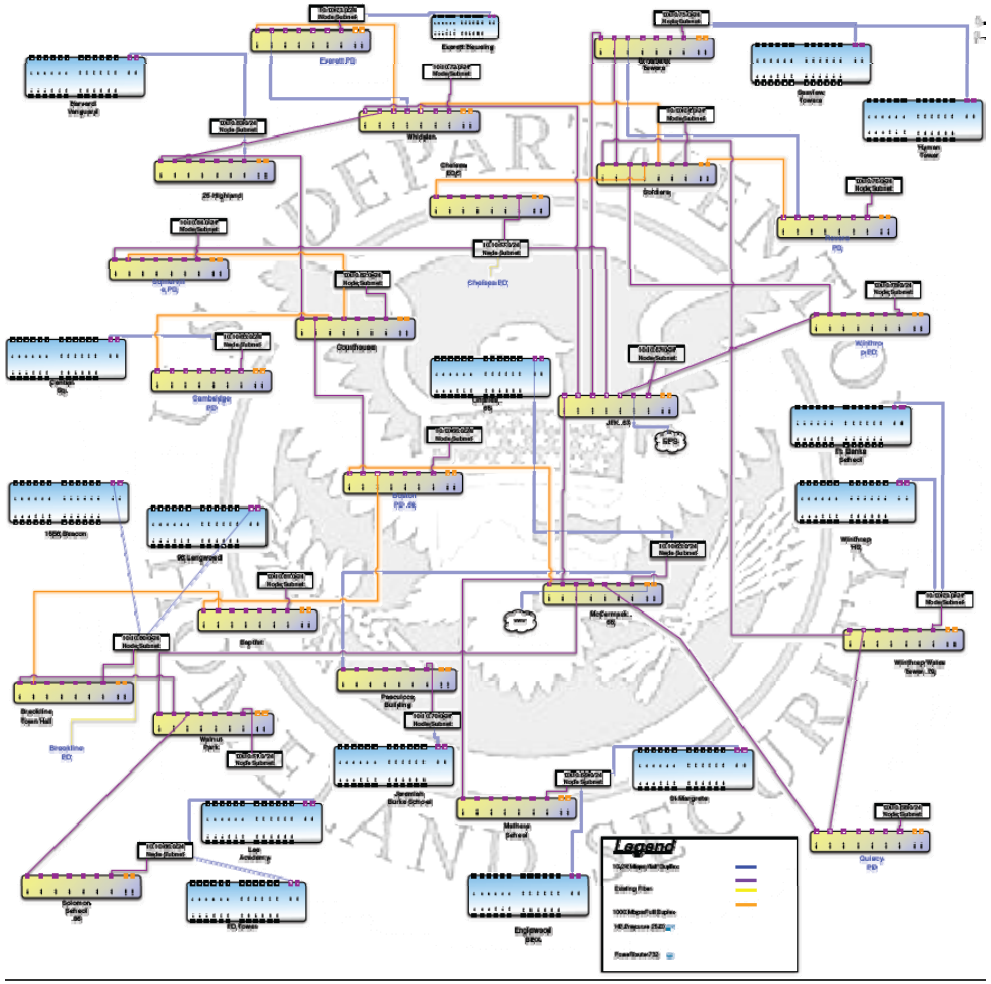
Quality of Service
For VoIP Connections
And specific Applications

Design Approach

Network Layout



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

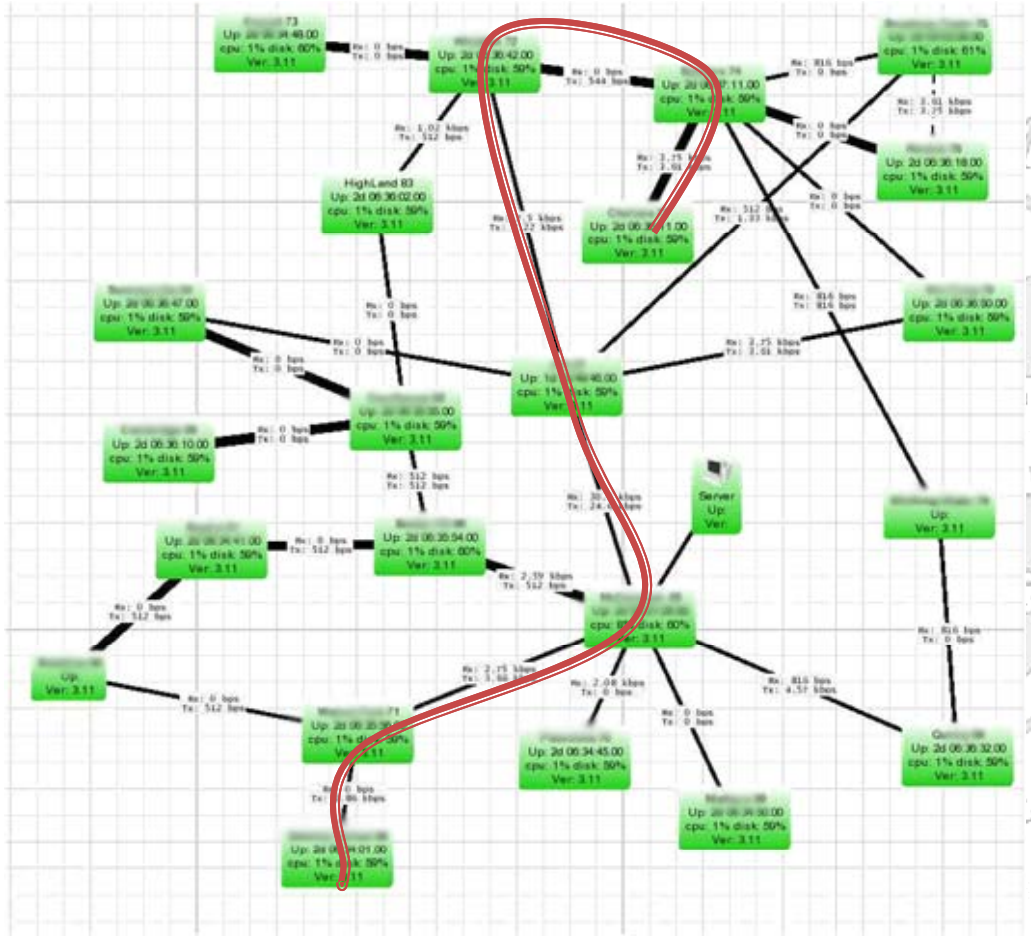
Most Links Have OBM Creates Super Fast State Changes

Failover

Full Simulated Failure of Node

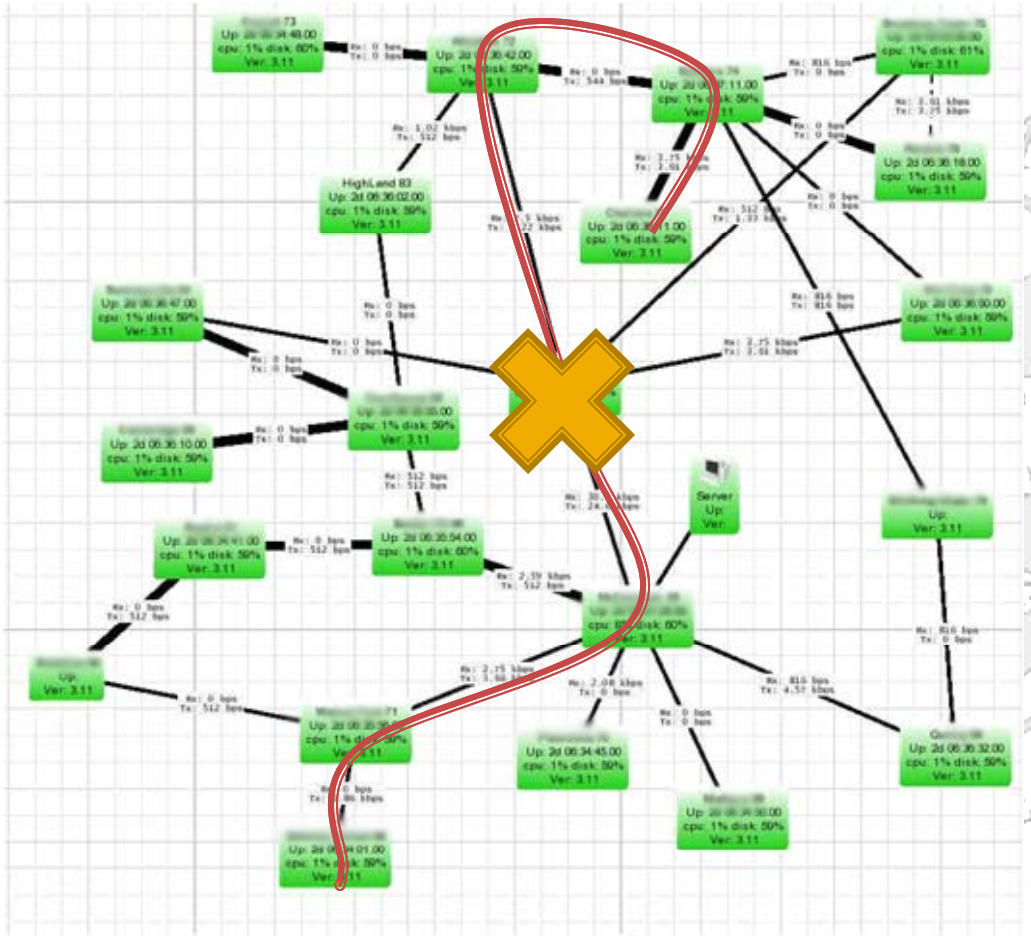
Preformed by /sys shutdown!

Failover



Normal Path

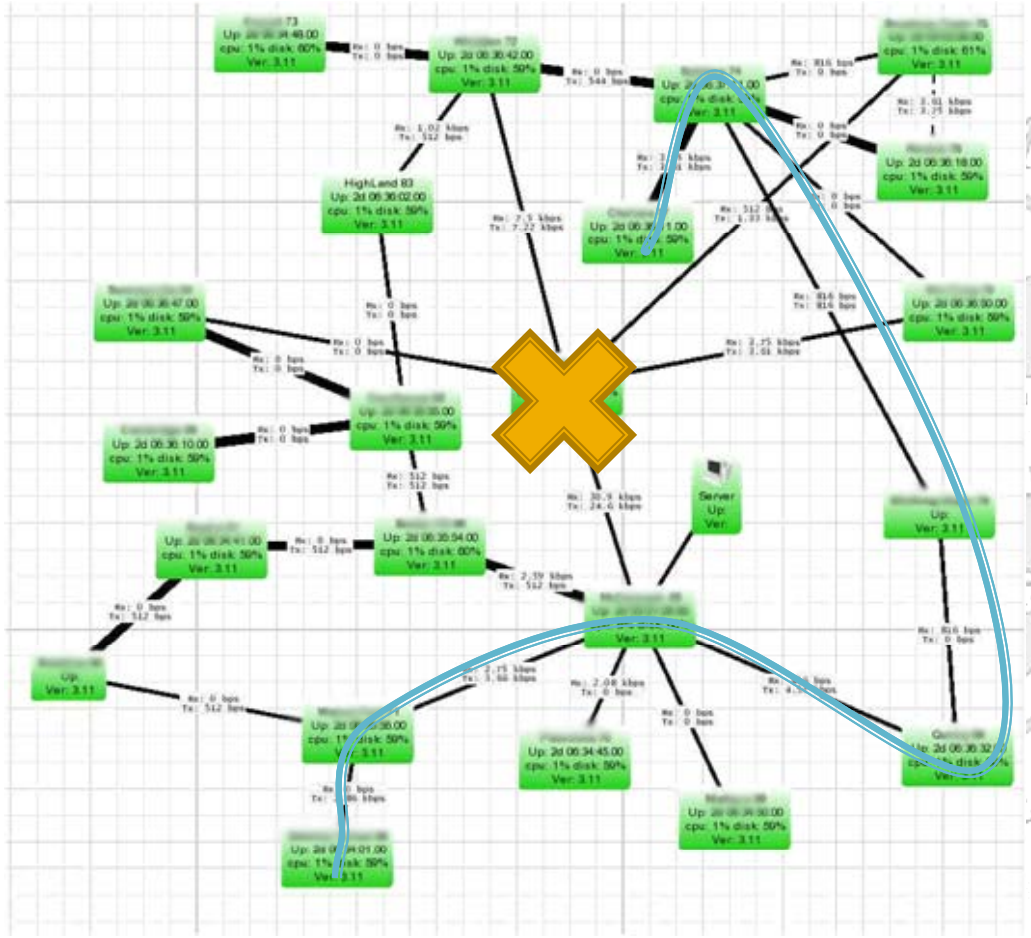
Failover



Normal Path

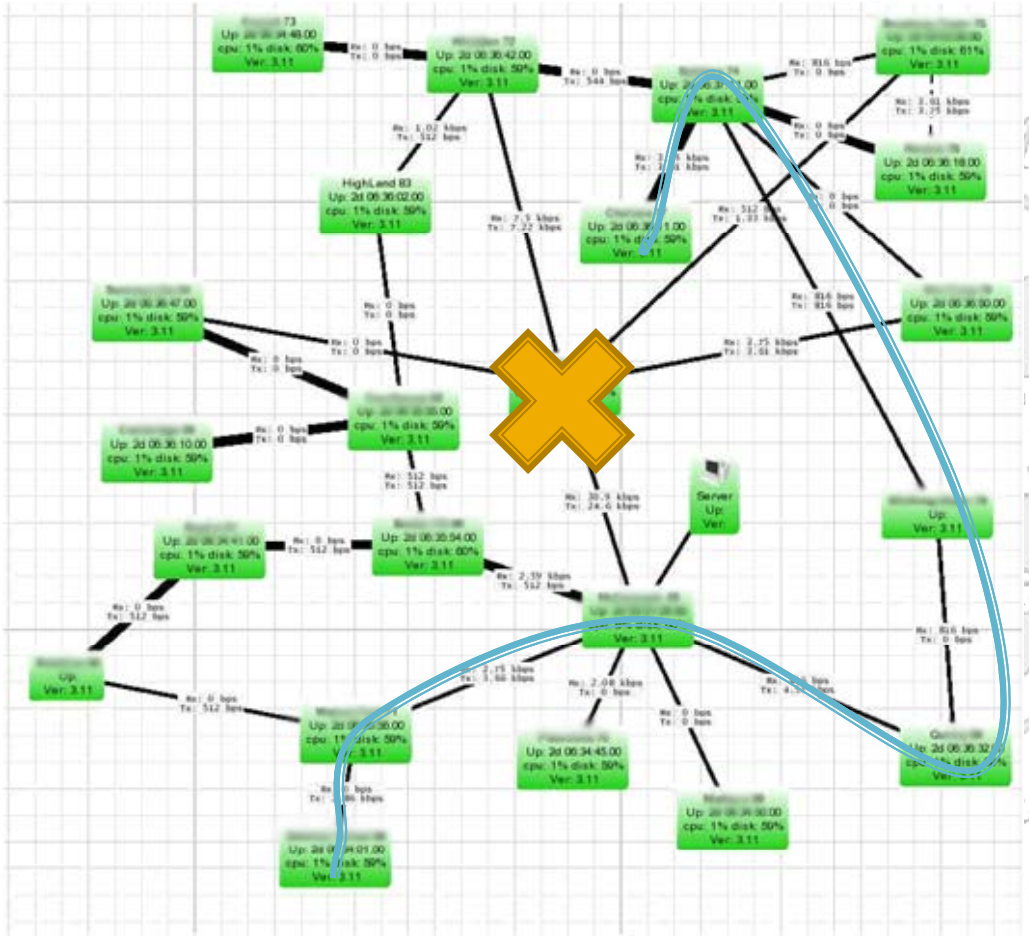
Shutdown Router

Failover



New Path

Failover



<3 Seconds Reroutes

Typically Never Lost a Ping!

Hardware Used

Hardware

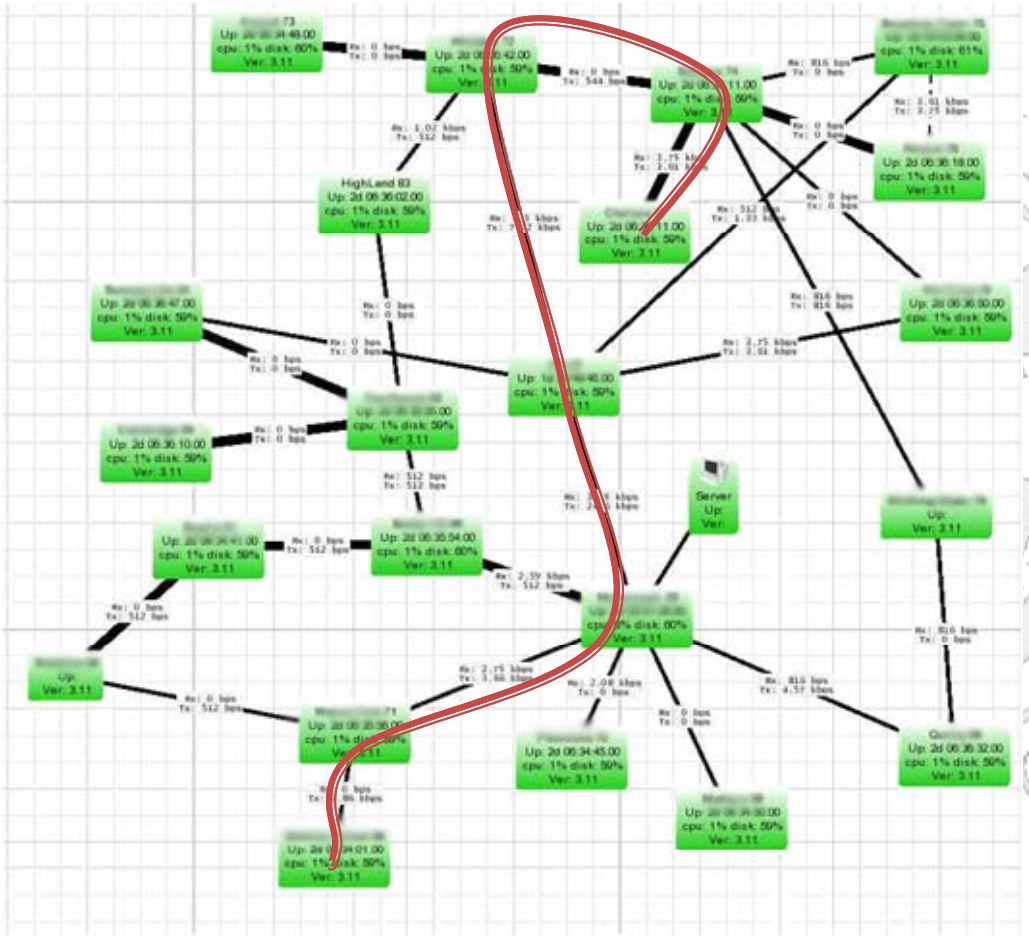
Supported & Tested Hardware

Hardware Used

Hardware

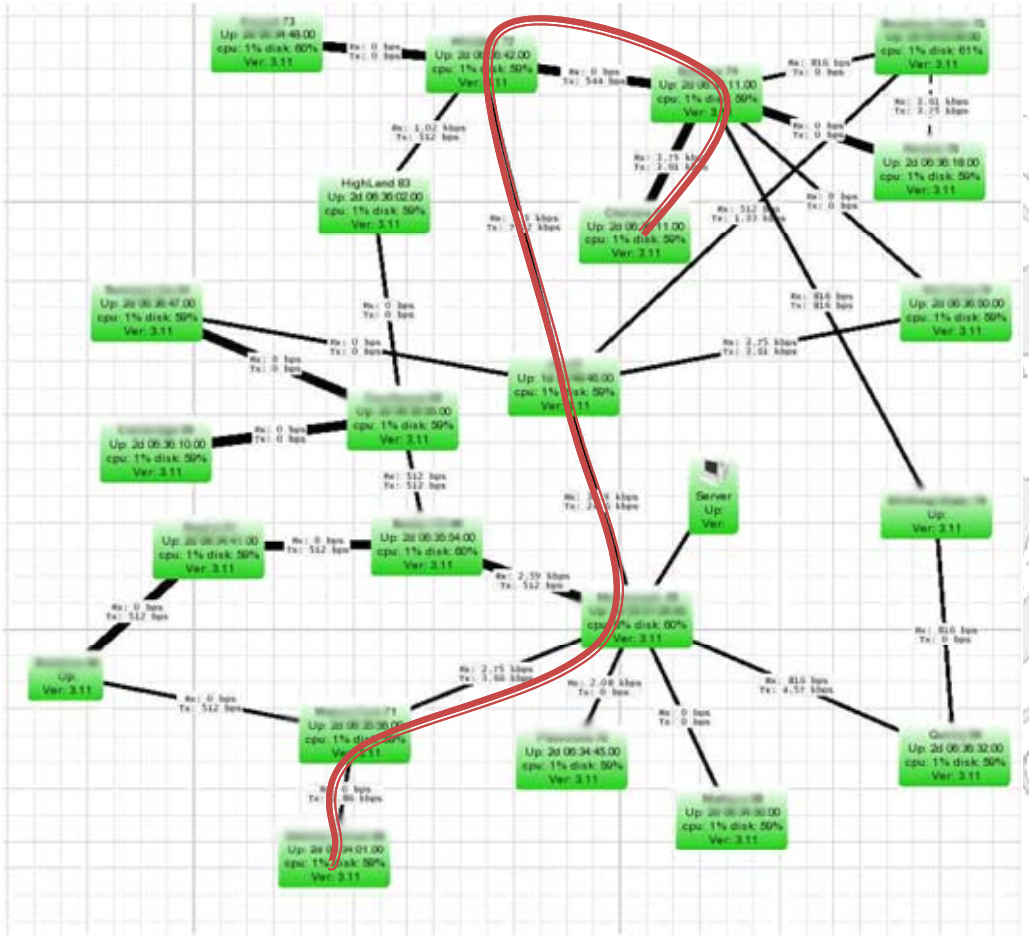
Supported & Tested Hardware

Preformance



IpPerf Testing

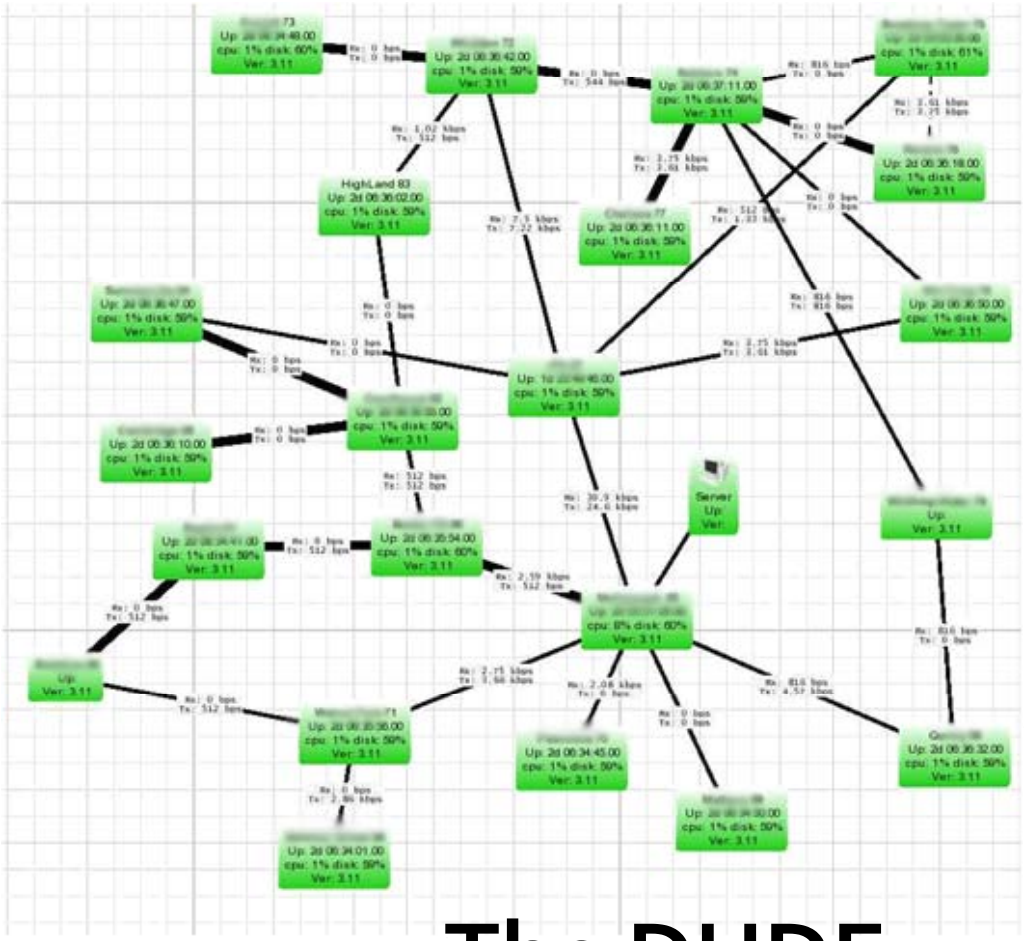
Preformance



IpPerf Testing

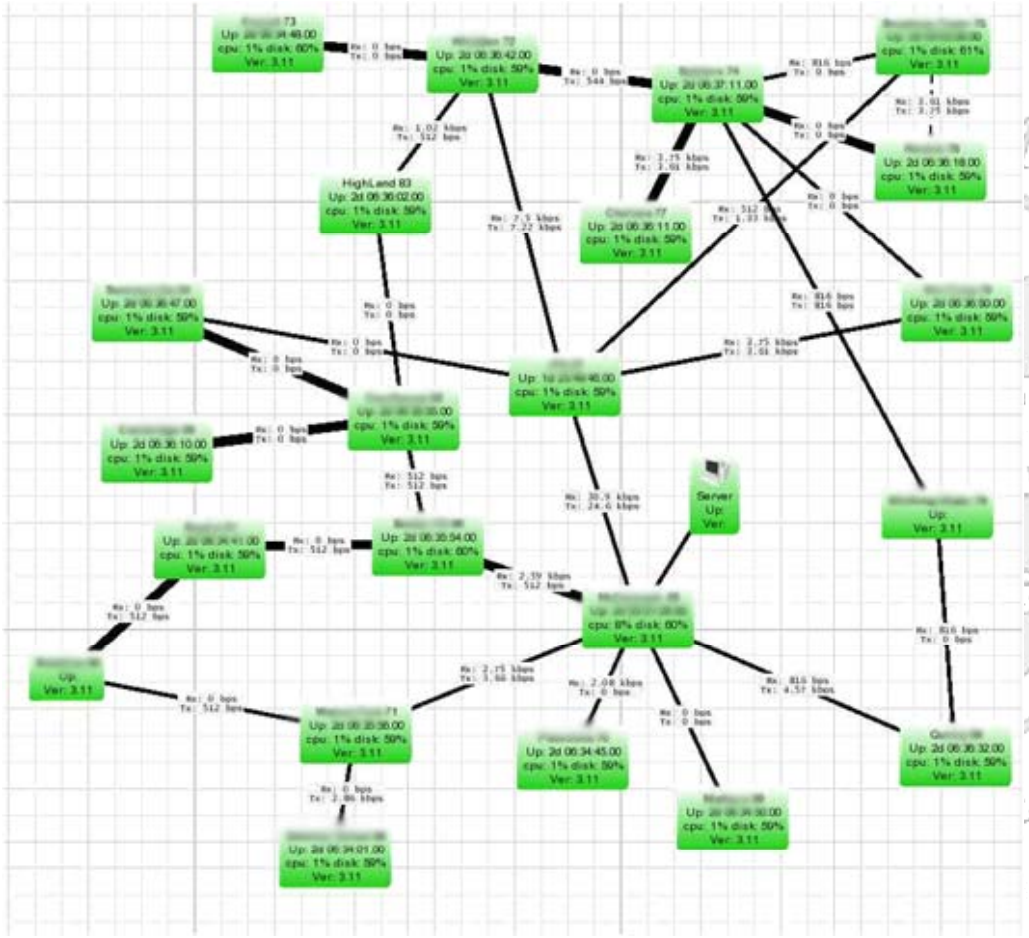
993 Meg Though Up to 10 Hops!

Monitoring



The DUDE

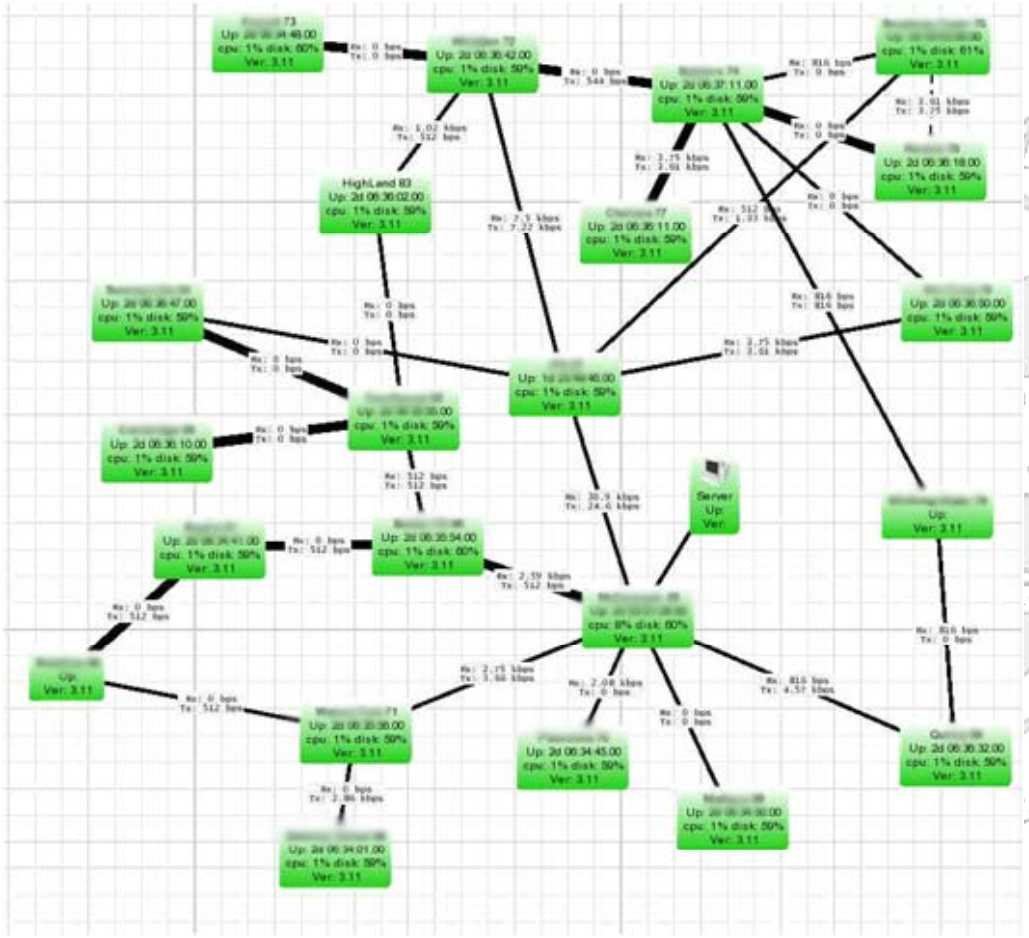
Monitoring



The DUDE

Full Network Monitoring

Monitoring



The DUDE

Link Monitoring and Graphing

Deployment

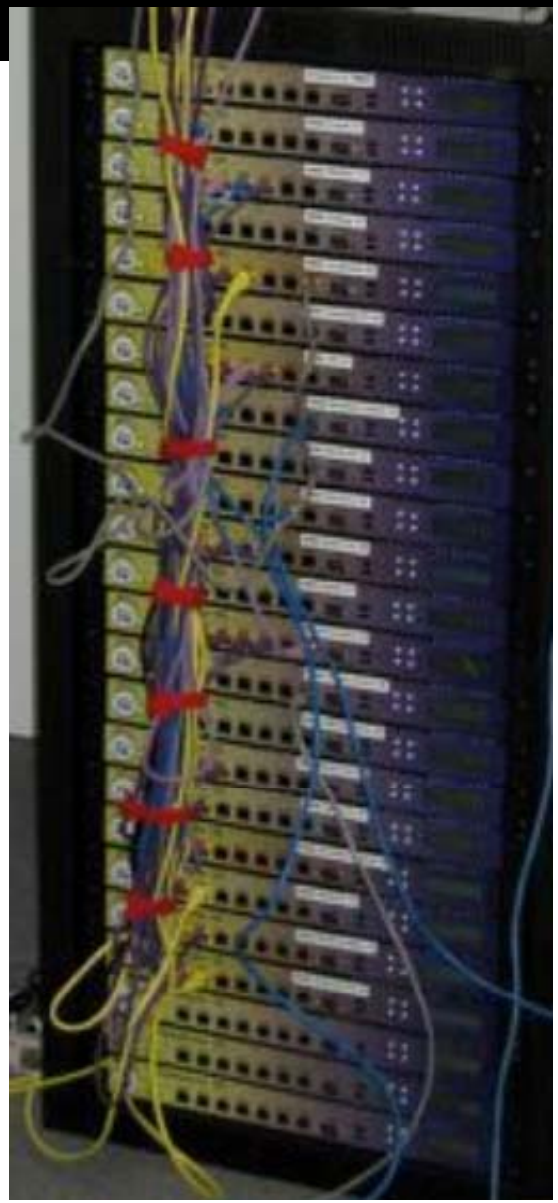
Phase 1

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

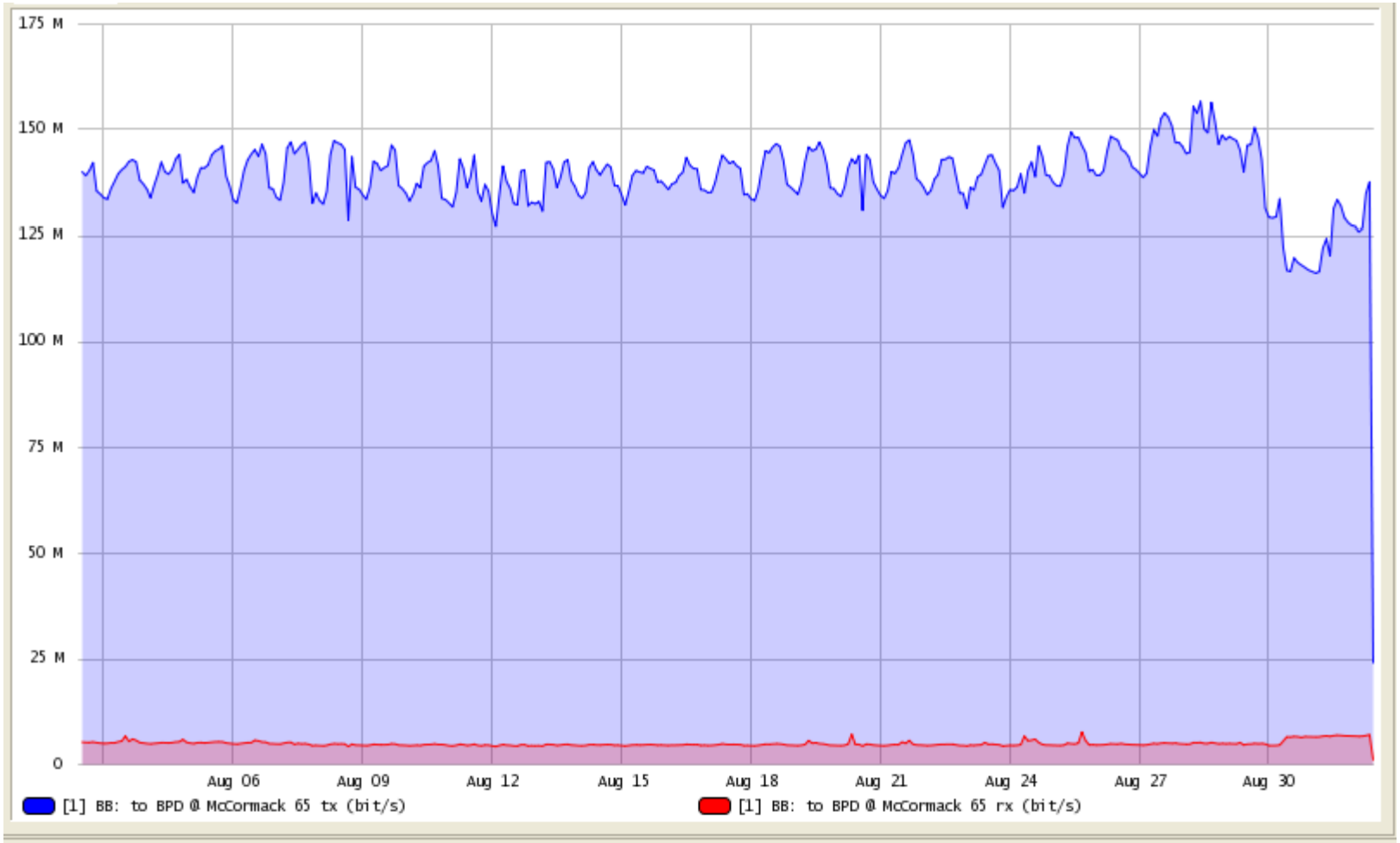
Actual Deployment Took about 2 months to Fully Deploy all wireless links, Routers, ETC.

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