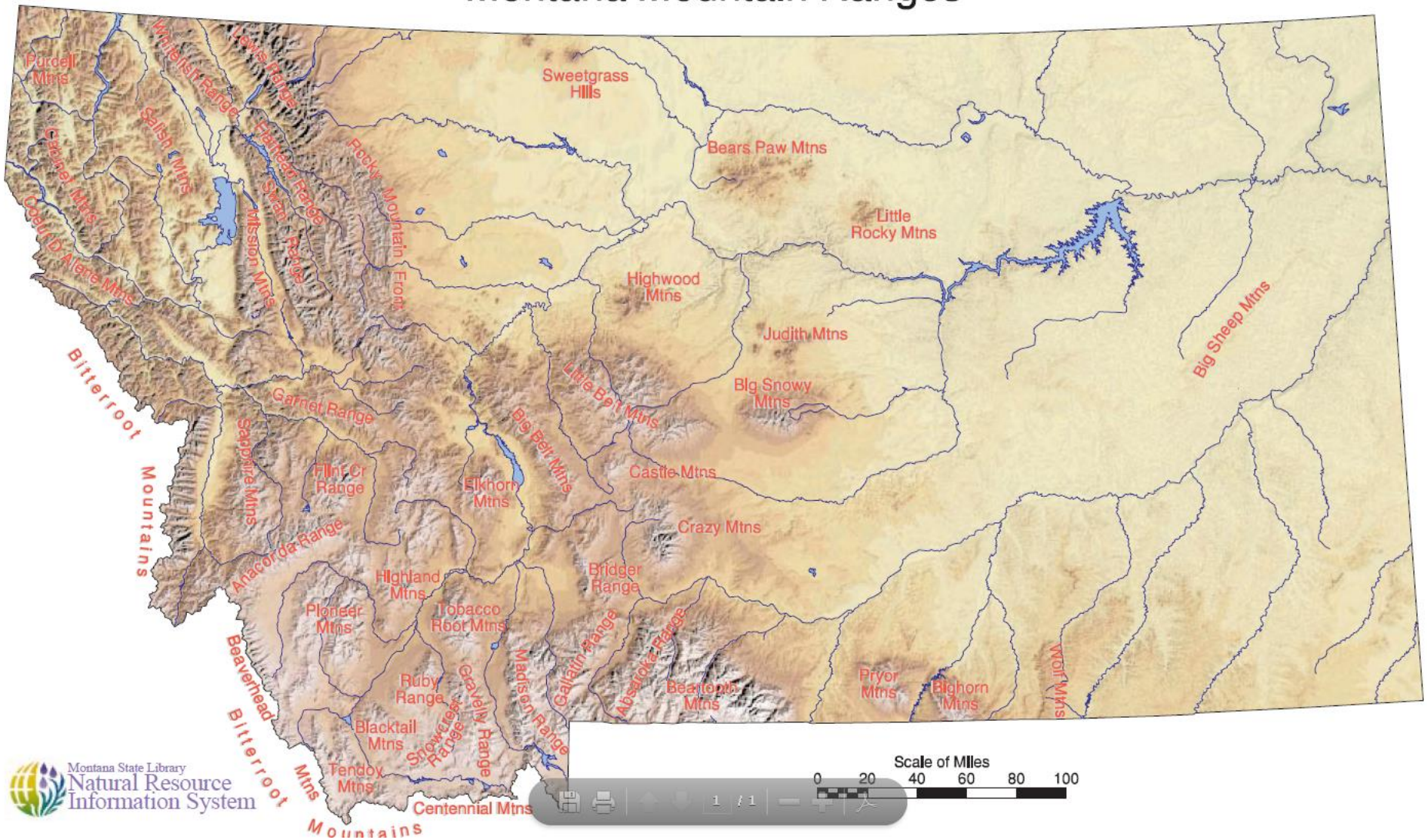
Network Services Overview

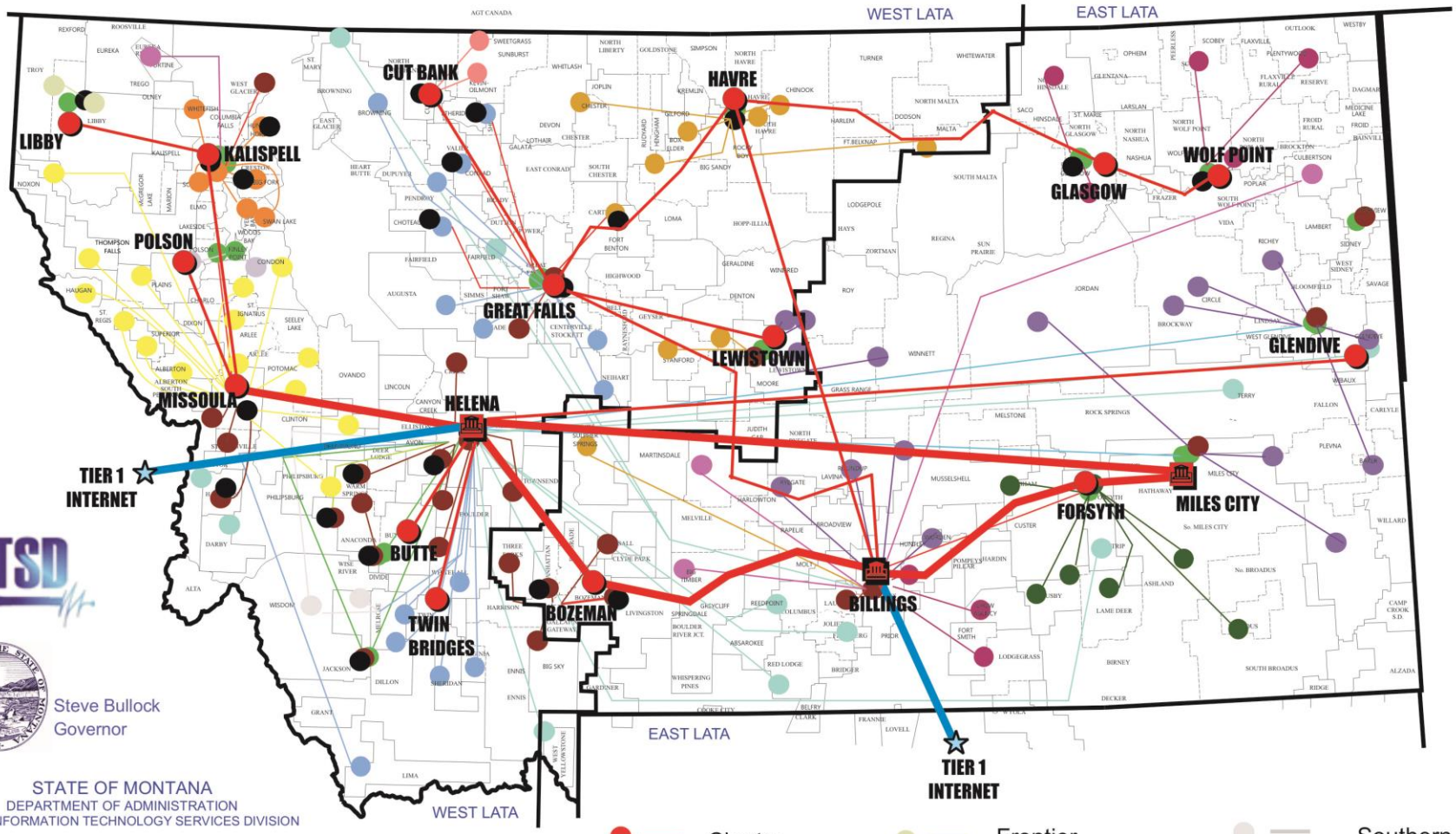
Kris Harrison – NTSB Bureau Chief

State ITSD

Montana Mountain Ranges



State of Montana
MPLS Core & Aggregation Network



Steve Bullock
Governor

STATE OF MONTANA
DEPARTMENT OF ADMINISTRATION
STATE INFORMATION TECHNOLOGY SERVICES DIVISION

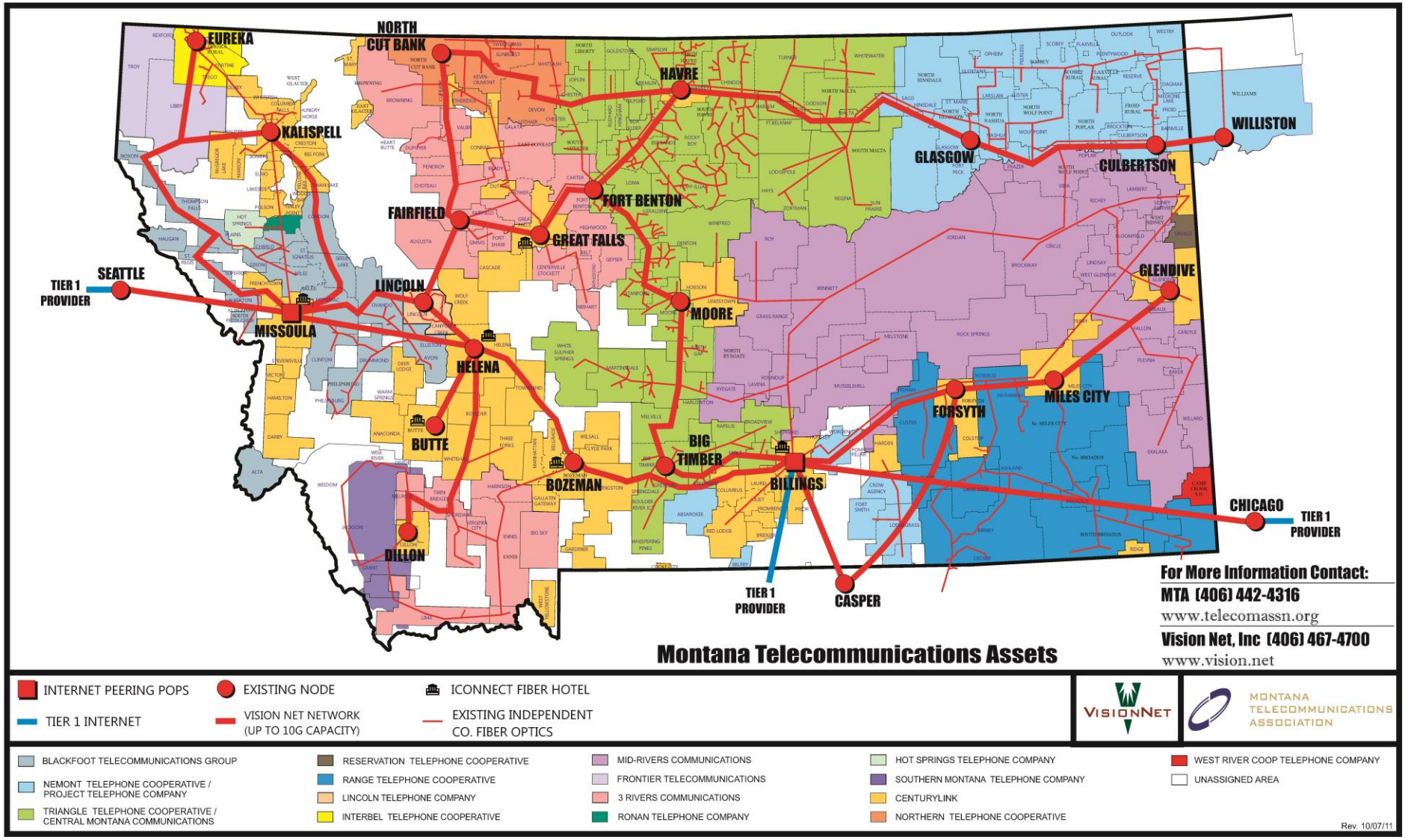
AGGREGATION CIRCUIT
CORE CIRCUIT
TIER 1 INTERNET

INTERNET PEERING POPS
EXISTING NODE OR MPLS HUB
STATE OF MT DATA CENTER
ICONNECT DATA CENTER

Charter
QCC
Nemont/Project
Qwest
Range
Mid-Rivers

Frontier
Century Tel
Ronan/ Hot Springs
Blackfoot
VisionNet
XC Networks

Southern Mt. Tel
Secondary Hub
Charter Builds
Triangle/CMC
3 Rivers
Northern


EUREKA
NORTH CUT BANK
HAVRE
KALISPELL
WILLISTON
GLASGOW
CULBERTSON
FORT BENTON
FAIRFIELD
GREAT FALLS
SEATTLE
TIER 1 PROVIDER
LINCOLN
MOORE
GLENDIVE
MISSOULA
HELENA
MILES CITY
FORSYTH
BUTTE
BIG TIMBER
BOZEMAN
BILLINGS
CHICAGO
TIER 1 PROVIDER
DILLON
TIER 1 PROVIDER
CASPER
For More Information Contact:
MTA (406) 442-4316
www.telecomassn.org
Vision Net, Inc (406) 467-4700
www.vision.net
Montana Telecommunications Assets
INTERNET PEERING POPS
EXISTING NODE
ICONNECT FIBER HOTEL
TIER 1 INTERNET
VISION NET NETWORK (UP TO 10G CAPACITY)
EXISTING INDEPENDENT CO. FIBER OPTICS
VISIONNET
MONTANA TELECOMMUNICATIONS ASSOCIATION
BLACKFOOT TELECOMMUNICATIONS GROUP
NEMONT TELEPHONE COOPERATIVE / PROJECT TELEPHONE COMPANY
TRIANGLE TELEPHONE COOPERATIVE / CENTRAL MONTANA COMMUNICATIONS
RESERVATION TELEPHONE COOPERATIVE
RANGE TELEPHONE COOPERATIVE
LINCOLN TELEPHONE COMPANY
INTERBEL TELEPHONE COOPERATIVE
MID-RIVERS COMMUNICATIONS
FRONTIER TELECOMMUNICATIONS
3 RIVERS COMMUNICATIONS
RONAN TELEPHONE COMPANY
HOT SPRINGS TELEPHONE COMPANY
SOUTHERN MONTANA TELEPHONE COMPANY
CENTURYLINK
NORTHERN TELEPHONE COOPERATIVE
WEST RIVER COOP TELEPHONE COMPANY
UNASSIGNED AREA
Rev. 10/07/11

Philosophy & Approach

- ✓ Efficient
- ✓ Secure
- ✓ Continuity
- ✓ Scalable
- ✓ Standards Based
- ✓ Customer Focus
- ✓ Industry Leader

Network Infrastructure Quick Facts

- SummitNet provides connectivity to approximately 22,000 devices at over 600 locations (228 Converged)

- Provides a private MultiProtocol Layer Switching (MPLS) network with Quality of Service (QOS)

- Provides a secure converged network that supports prioritized Voice, Video, & Data Services

Network Infrastructure Quick Facts

- Physically redundant 10Gb/s core network with 10Gb/s and 1Gb/s distribution links
- Core sites include Missoula, Helena, Bozeman, Billings, and Miles City
- Internet POP's in Helena and Billings using diverse carriers
- Standard remote site WAN access speeds are between 1.5Mb/s and 5Mb/s
  - Frame-relay & DSL sites offer cost effective speeds 56Kb/s to 1.5Mb/s
- 802.1x Authentication is implemented across the entire enterprise & authentication is required for network access

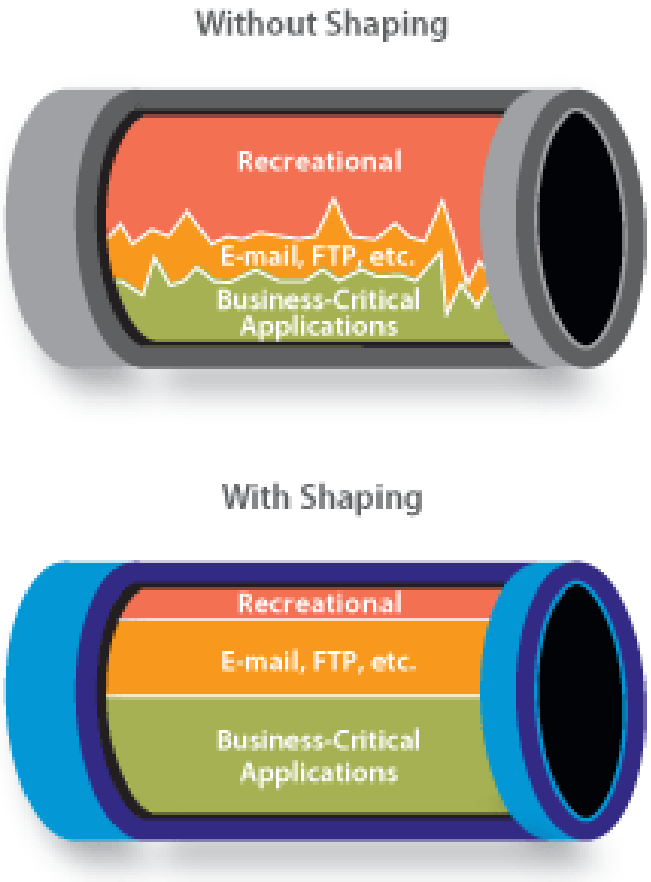
Traffic Shaping (QoS)

Traffic Shaping allows time sensitive traffic such as voice or video to have a higher priority through the network, thus ensuring functionality.

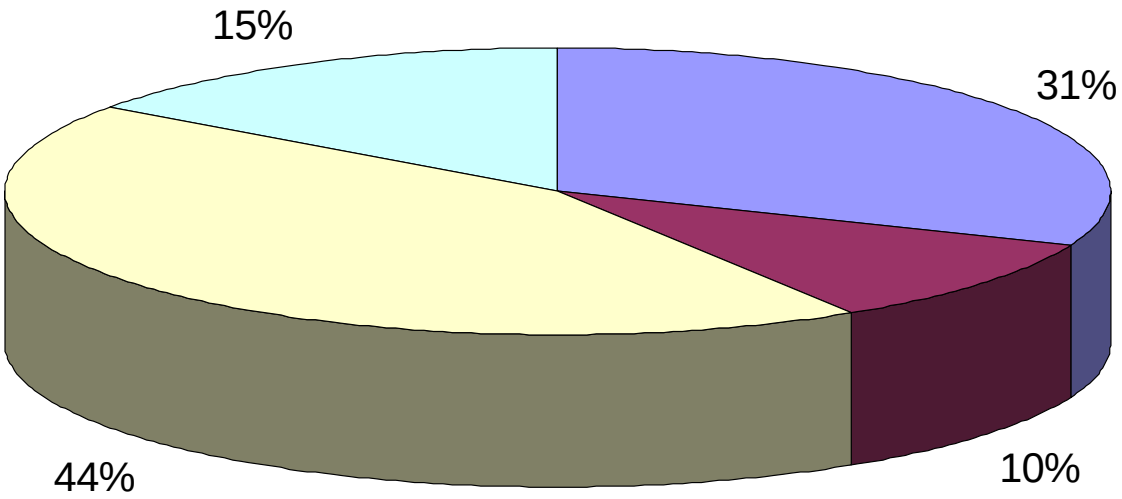
This is accomplished by:

- Limiting the amount of data any one application is allowed to consume on the WAN
- Lowering the priority of non-business data i.e. downloading of content from the Internet.

Traffic Shaping



Traffic Shaping for a 3Mb Site



Legend
31% 768K Video conference
10% Routing / Management
44% Internal State Traffic
15% Best-effort (Internet)

SUMMITNET Wireless Network

- ✓ Statewide Wireless Coverage
- ✓ Secure
  - ✓ Secure services utilizing 802.1X for Authentication, Authorization and Accounting
- ✓ Non-Secure (Sponsored Guest)
  - ✓ Recommended for guest access
  - ✓ Sponsored guest available to remote MPLS site
- ✓ Non-Secure (Open Guest)
  - ✓ Access is currently not restricted or inspected
  - ✓ Primarily on campus

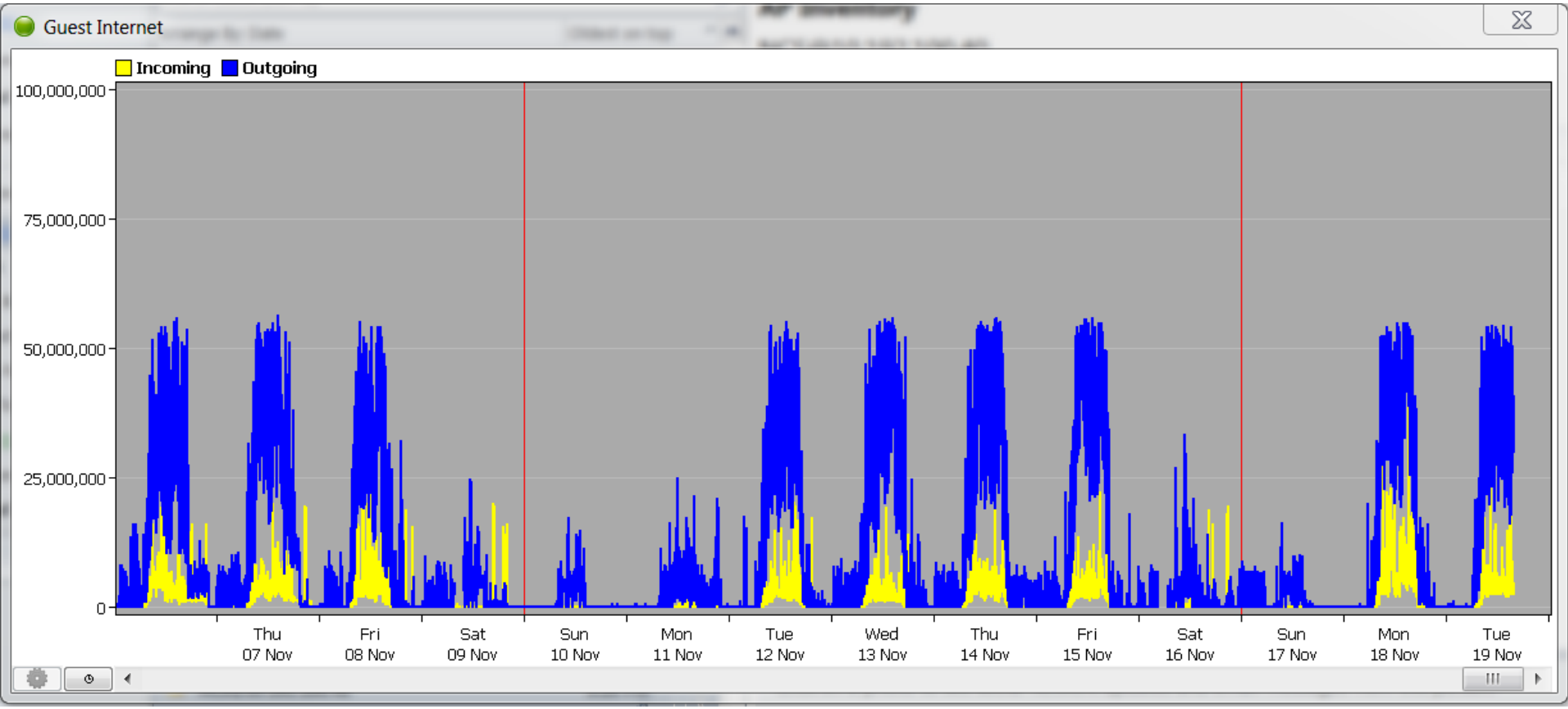
SUMMITNET Wireless Network

✓ Future Strategy

- Mobile Device Authentication
- Cisco Application Visibility Control (AVC) - Ability to QoS Netflix, Hulu, Pandora, etc.
- ISE – Identity Services Engine combines NAC & RADIUS into one box
- MDM – Mobile Device Management
- MDM & ISE for device profiling, posture assessment/enforcement, authentication
- Dynamic VLAN assignments where possible
- 802.11n & 802.11ac – All new AP deployments are at least 802.11n
- AP density, channel re-use; proliferation of mobile devices
- Disable legacy 802.11b rates

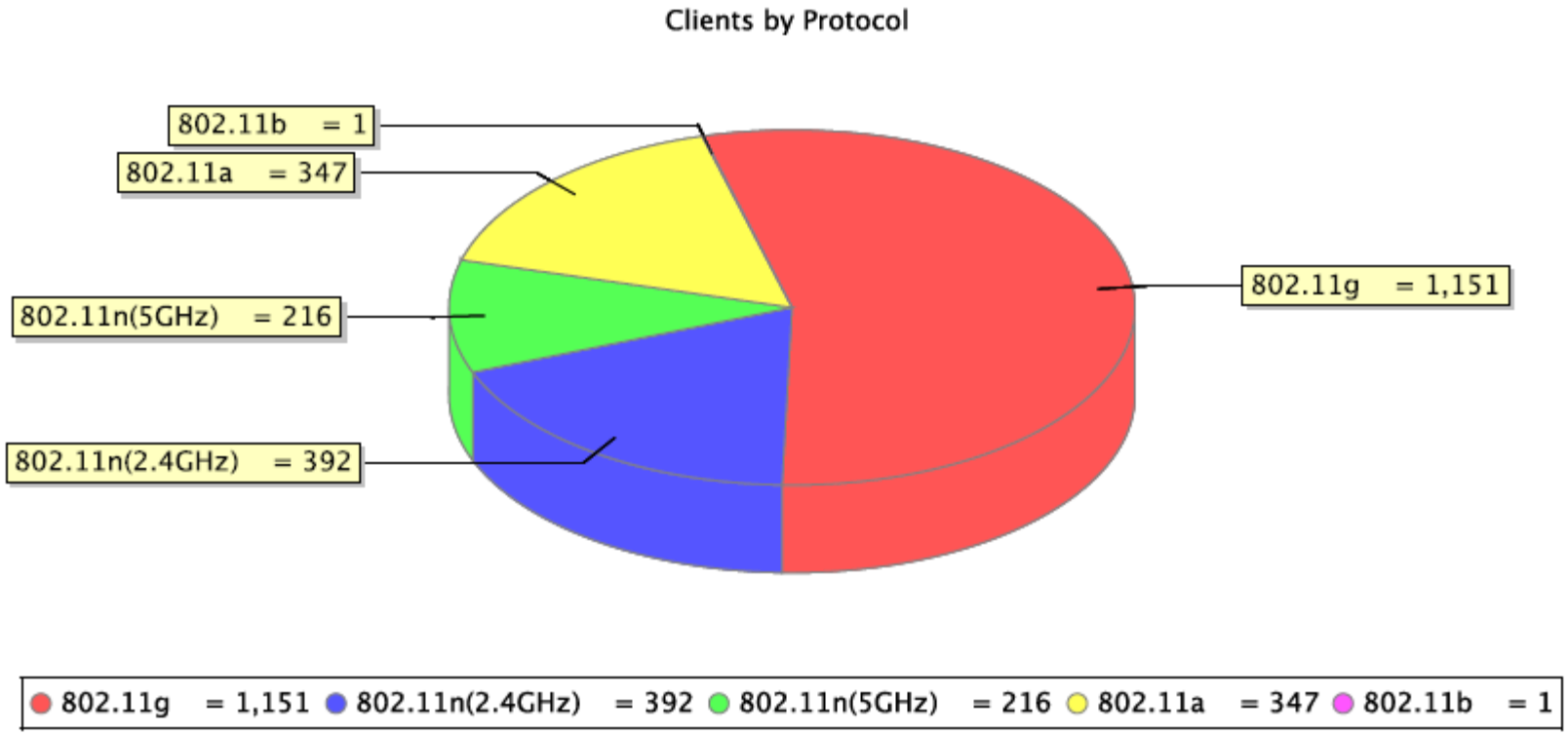
SUMMITNET Wireless Network

Snapshot of typical guest Internet bandwidth usage:

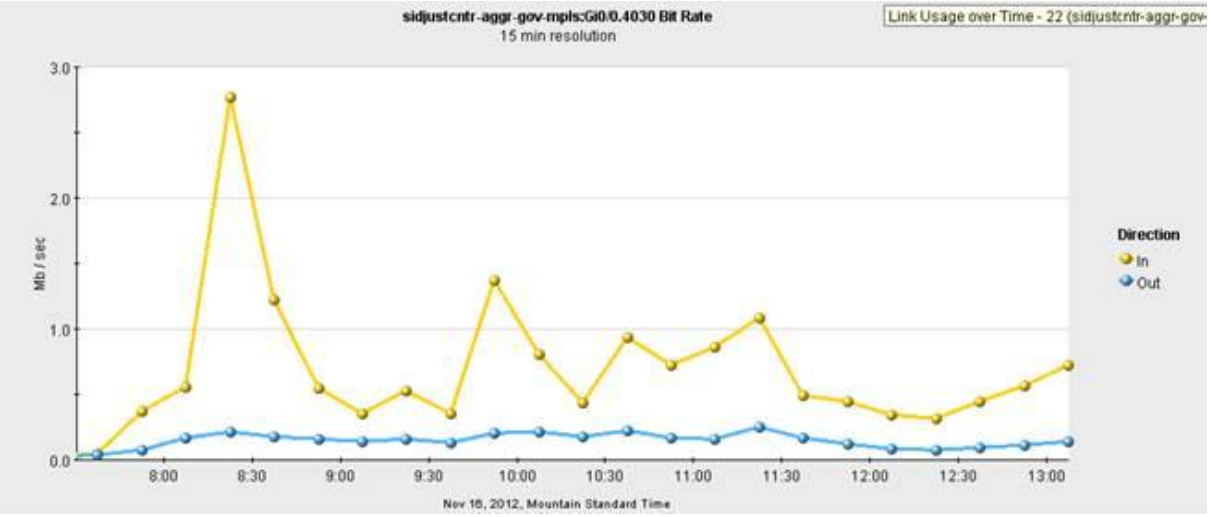


Wireless Metrics

- 509 AP's on the network
- 2200 Clients (average of 1700)



Monitoring tools



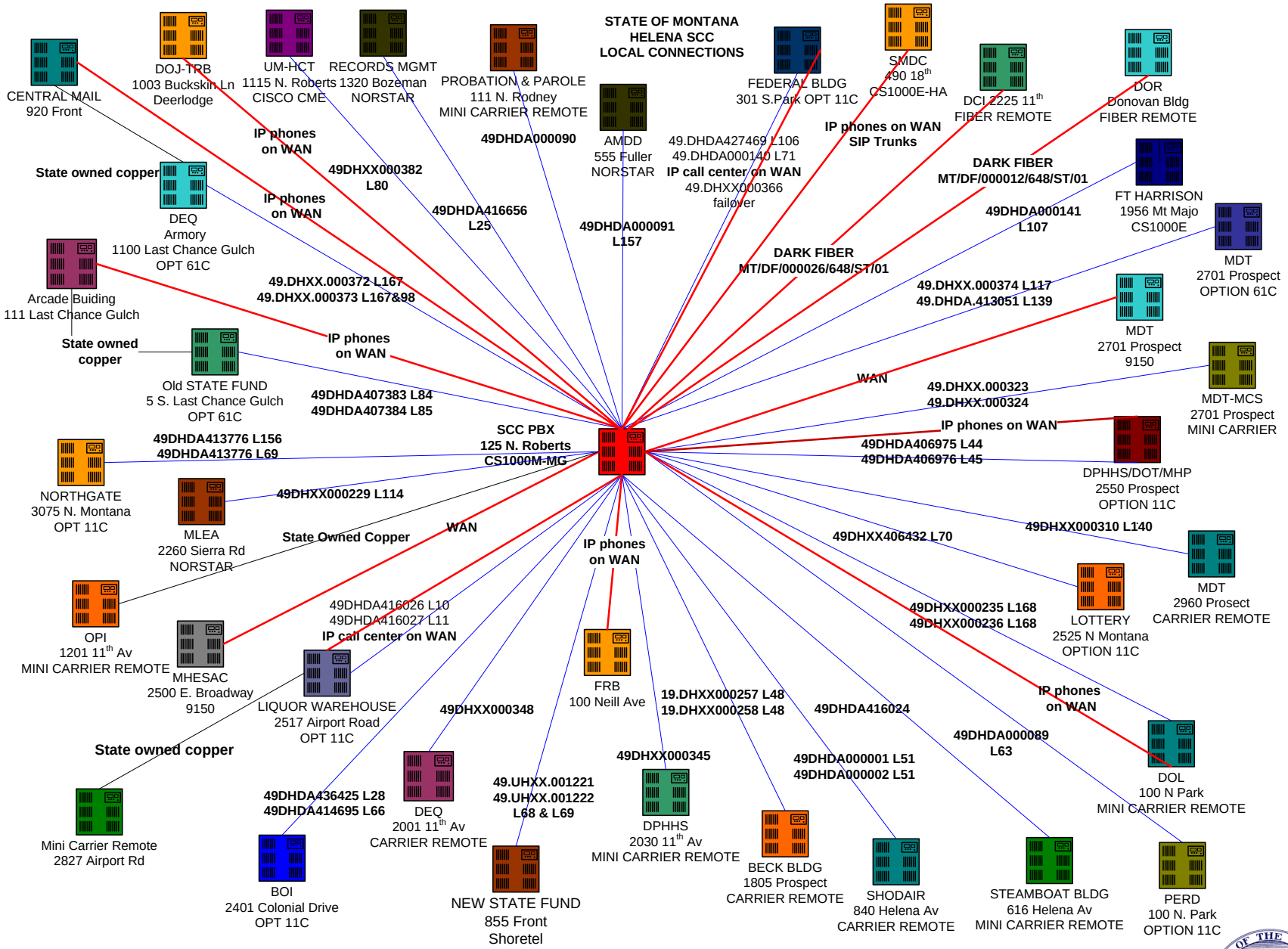
- Intermapper
- Cisco Prime Management Solution
- NetScout nGenius
- Wild Packets
- TAP Aggregation

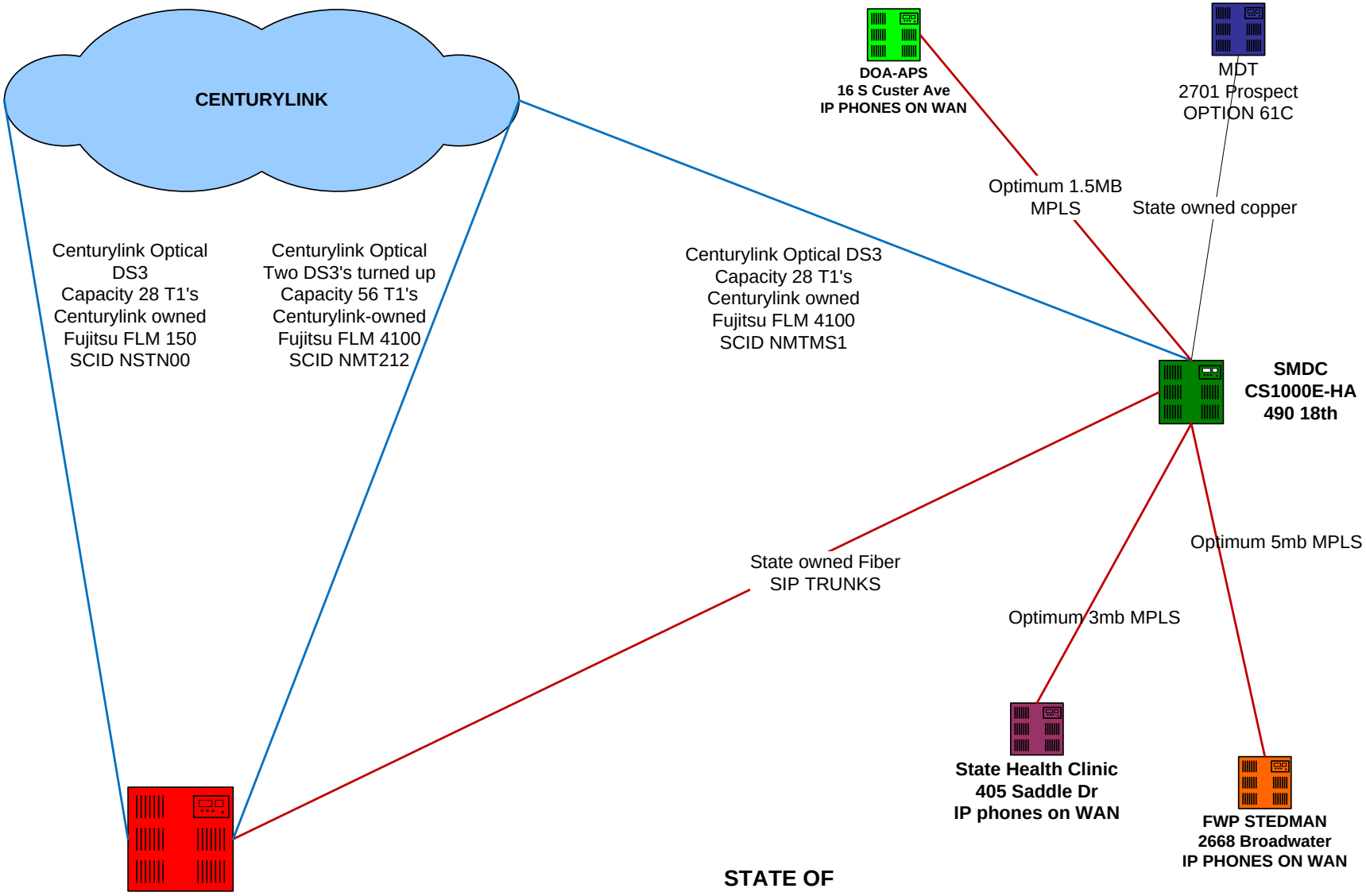
Security

- Rise in external threats
- Compliance
  - NIST
  - HIPAA
  - FISMA
    - Data Center Compliance
  - CJIS
- 802.1x

Enterprise Voice

- Provide service to 25,000 sets
- Helena & Billings switches
- Enterprise VoIP Strategy
  - Lync
  - Avaya
  - Cisco
- SIP Trunking
- DR Plan for VoIP


STATE OF MONTANA
HELENA SCC
LOCAL CONNECTIONS
CENTRAL MAIL
920 Front
DOJ-TRB
1003 Buckskin Ln
Deerlodge
UM-HCT
1115 N. Roberts
CISCO CME
RECORDS MGMT
1320 Bozeman
NORSTAR
PROBATION & PAROLE
111 N. Rodney
MINI CARRIER REMOTE
FEDERAL BLDG
301 S.Park OPT 11C
SMDC
490 18th
CS1000E-HA
DCI 2225 11th
FIBER REMOTE
DOR
Donovan Bldg
FIBER REMOTE
AMDD
555 Fuller
NORSTAR
IP phones
on WAN
49DHDA000090
49.DHDA427469 L106
49.DHDA000140 L71
IP call center on WAN
49.DHXX000366
failover
IP phones on WAN
SIP Trunks
State owned copper
49DHXX000382
L80
IP phones
on WAN
49DHDA416656
L25
49DHDA000091
L157
DARK FIBER
MT/DF/000012/648/ST/01
FT HARRISON
1956 Mt Majo
CS1000E
49DHDA000141
L107
DEQ
Armory
1100 Last Chance Gulch
OPT 61C
DARK FIBER
MT/DF/000026/648/ST/01
MDT
2701 Prospect
OPTION 61C
Arcade Buiding
111 Last Chance Gulch
49.DHXX.000372 L167
49.DHXX.000373 L167&98
49.DHXX.000374 L117
49.DHDA.413051 L139
MDT
2701 Prospect
9150
State owned
copper
IP phones
on WAN
Old STATE FUND
5 S. Last Chance Gulch
OPT 61C
49DHDA407383 L84
49DHDA407384 L85
WAN
49.DHXX.000323
49.DHXX.000324
MDT-MCS
2701 Prospect
MINI CARRIER
IP phones on WAN
49DHDA413776 L156
49DHDA413776 L69
SCC PBX
125 N. Roberts
CS1000M-MG
49DHDA406975 L44
49DHDA406976 L45
DPHHS/DOT/MHP
2550 Prospect
OPTION 11C
NORTHGATE
3075 N. Montana
OPT 11C
49DHXX000229 L114
MLEA
2260 Sierra Rd
NORSTAR
State Owned Copper
WAN
49DHXX406432 L70
49DHXX000310 L140
IP phones
on WAN
MDT
2960 Prosect
CARRIER REMOTE
OPI
1201 11th Av
MINI CARRIER REMOTE
49DHDA416026 L10
49DHDA416027 L11
IP call center on WAN
49DHXX000235 L168
49DHXX000236 L168
LOTTERY
2525 N Montana
OPTION 11C
MHESAC
2500 E. Broadway
9150
LIQUOR WAREHOUSE
2517 Airport Road
OPT 11C
FRB
100 Neill Ave
19.DHXX000257 L48
19.DHXX000258 L48
49DHXX000348
49DHDA416024
IP phones
on WAN
49DHDA000089
L63
State owned copper
DOL
100 N Park
MINI CARRIER REMOTE
49DHXX000345
49DHDA000001 L51
49DHDA000002 L51
49DHDA436425 L28
49DHDA414695 L66
DEQ
2001 11th Av
CARRIER REMOTE
49.UHXX.001221
49.UHXX.001222
L68 & L69
DPHHS
2030 11th Av
MINI CARRIER REMOTE
Mini Carrier Remote
2827 Airport Rd
BOI
2401 Colonial Drive
OPT 11C
NEW STATE FUND
855 Front
Shoretel
BECK BLDG
1805 Prospect
CARRIER REMOTE
SHODAIR
840 Helena Av
CARRIER REMOTE
STEAMBOAT BLDG
616 Helena Av
MINI CARRIER REMOTE
PERD
100 N. Park
OPTION 11C



STATE OF MONTANA DS3 and SMDC CONNECTIONS

Disaster Recovery

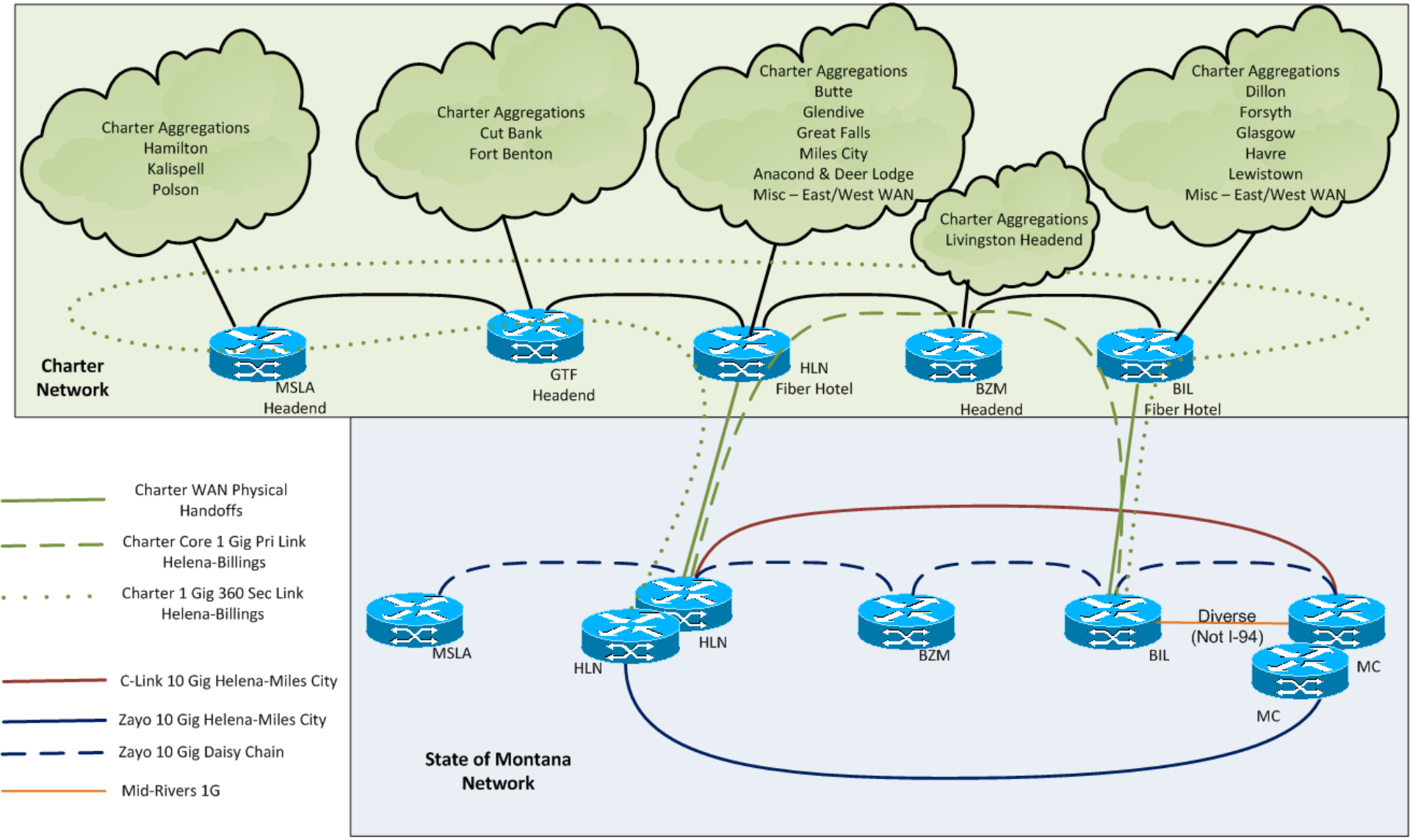
- State of Montana Data Centers

SMDC

MCDC

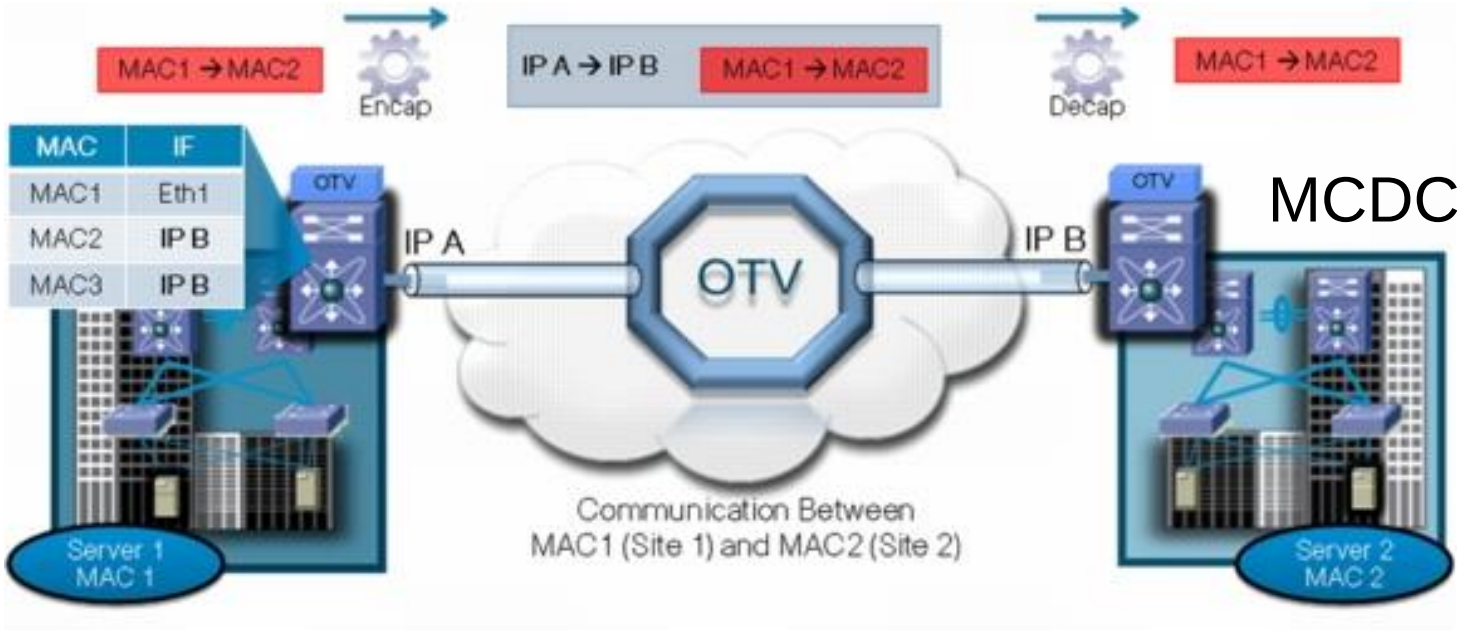
- Geographically Distributed
- Redundancy
- Continuity of Government

Charter MPLS Design and State of Montana Fail-Over



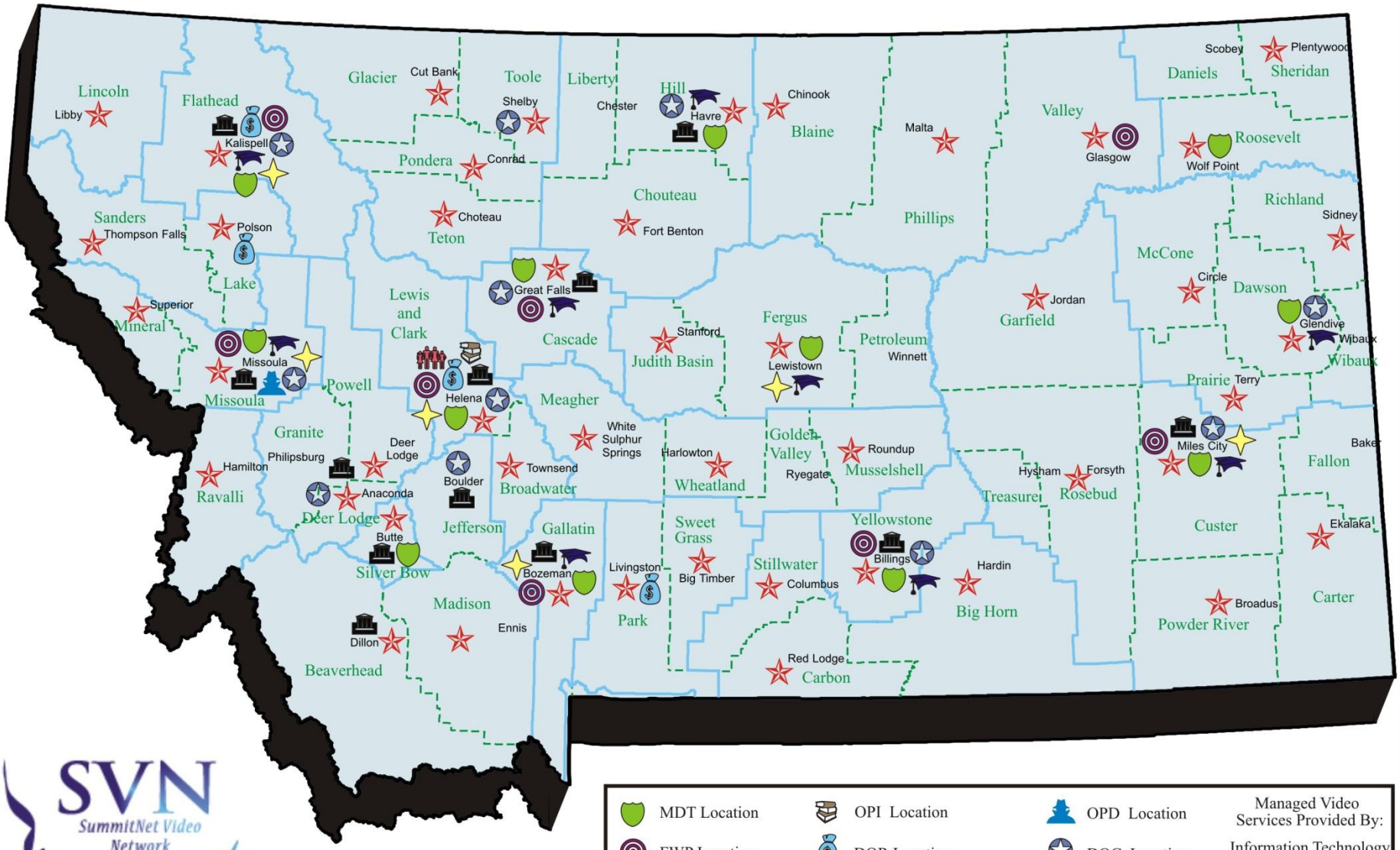
OTV

- Layer 2
- Transparent Workload Mobility
- Business Resiliency



SMDC

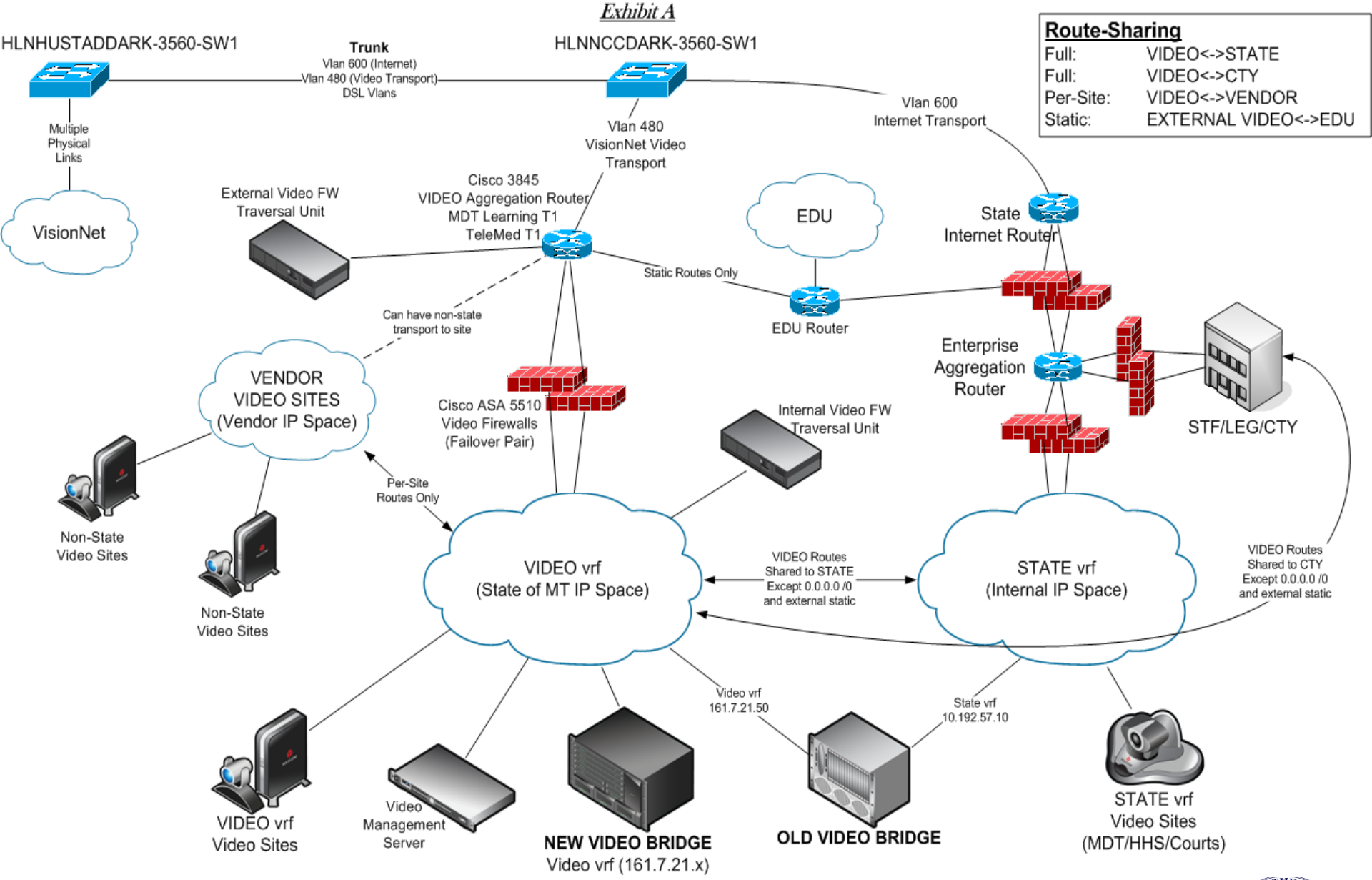
State of Montana
SummitNet Video Network



itsd.mt.gov

Judicial Video Network Users

Exhibit A


Route-Sharing
Full: VIDEO<->STATE
Full: VIDEO<->CTY
Per-Site: VIDEO<->VENDOR
Static: EXTERNAL VIDEO<->EDU
HLNHUSTADDARK-3560-SW1
Trunk
Vlan 600 (Internet)
Vlan 480 (Video Transport)
DSL Vlans
HLNNCCDARK-3560-SW1
Multiple Physical Links
VisionNet
Vlan 480 VisionNet Video Transport
Vlan 600 Internet Transport
External Video FW Traversal Unit
Cisco 3845 VIDEO Aggregation Router MDT Learning T1 TeleMed T1
EDU
State Internet Router
Static Routes Only
EDU Router
Can have non-state transport to site
VENDOR VIDEO SITES (Vendor IP Space)
Cisco ASA 5510 Video Firewalls (Failover Pair)
Internal Video FW Traversal Unit
Enterprise Aggregation Router
STF/LEG/CTY
Non-State Video Sites
Non-State Video Sites
Per-Site Routes Only
VIDEO vrf (State of MT IP Space)
VIDEO Routes Shared to STATE Except 0.0.0.0 /0 and external static
STATE vrf (Internal IP Space)
VIDEO Routes Shared to CTY Except 0.0.0.0 /0 and external static
Video vrf 161.7.21.50
State vrf 10.192.57.10
VIDEO vrf Video Sites
Video Management Server
NEW VIDEO BRIDGE Video vrf (161.7.21.x)
OLD VIDEO BRIDGE
STATE vrf Video Sites (MDT/HHS/Courts)

Microsoft Lync Integration

- Microsoft Lync is now fully integrated with Polycom video bridge
- Include both H.323 (Polycom) endpoints and SIP (Lync) clients in same bridge conference
- Both platforms conference on-demand utilizing Polycom bridge Virtual Meeting Rooms
- Benefit:
  - Convenience
  - Ease of use
  - Leverage both services to save travel costs

Recording and Streaming in HD with Polycom RSS 4000

- Any video conference can now be automatically recorded & streamed in HD upon request
  - Live streaming
  - Archive streams
  - Download archive files (DVD, .mp4, .asf, raw)
  - Network playback on endpoint
- Links can be distributed via email or published to website
- Convenience – Eliminates the need to make local recordings on DVD or VHS

Future Projects

- ID Management Expansion
  - Cisco ISE
- Network Compartmentalization
- Enterprise DR plan for VoIP
- Agency Connectivity
- FirstNet

Questions

Kris Harrison

Bureau Chief, NTSB

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