

 **MTIN Consulting**

**JUSTIN WILSON  
US MUM 2017**

J2SW.COM



# TOPICS COVERED

- MPLS - WHAT YOU NEED TO KNOW
- NETWORK DESIGN PHILOSOPHIES
- LESSONS LEARNED ON THE OL INTERWEBS
- WHAT YOU NEED TO KNOW IN THE NEXT 18 MONTHS
- EXTRAS IF TIME
- GIVEAWAY

# JUSTIN WILSON



- CCNA – CCNP – COMTRAIN - MTCNA
- ISP INDUSTRY SINCE 1993
- BLOGGER, THE BROTHERS WISP MEMBER, COMMUNITY REGULAR
- CEO MTIN.NET, COO MIDWEST-IX/FD-IX
- AVID GI JOE COLLECTOR

[j2sw.com](http://j2sw.com) • [mtin.net](http://mtin.net) • [connectivity.engineer](http://connectivity.engineer) • [midwest-ix.com](http://midwest-ix.com)

# MPLS / VPLS / ALPHABET SOUP

- MPLS
- VPLS
- WHY AND WHEN?



# WHY SHOULD I EVEN CARE ABOUT MPLS?

- SCALABILITY
- TRAFFIC ENGINEERING
- QOS
- REDUNDANCY
- INDEPENDENT OF LAYER 2 AND LAYER 3 PROTOCOLS
- BUT I CAN DO THIS WITH OSPF AND BGP ALREADY?



**WHAT IF I TOLD YOU**

**MPLS IS NOT ROUTING**

imgflip.com

# MPLS...

- **MPLS IS LAYER 2.5**

- YOU STILL NEED THINGS LIKE OSPF, BGP, EIGRP FOR IP
- IF YOU ARE RUNNING RIP COME SEE ME. YOU NEED HELP. I WILL HELP YOU FOR FREE YOU POOR B@\$%!RD.

- **ARE STATIC ROUTES BAD?**

- NO, JUST NOT SCALABLE
- IF YOU ARE RUNNING STATIC ROUTES COMFORTABLY YOU PROBABLY DON'T HAVE A NEED FOR MPLS

# DRAWBACKS TO MPLS

- MORE ADMINISTRATIVE OVERHEAD
- LARGER MTUS NEEDED
- INCREASED NETWORK COMPLEXITY
- CHANGE IS SCARY
- DO I REALLY NEED MPLS?



# MPLS SECURITY

- EASY TO SPOOF IP ADDRESSES, ALMOST IMPOSSIBLE TO SPOOF LABELS
  - EVERY PE ROUTER MAINTAINS A SEPARATE BR
- DOES NOT DO ENCRYPTION OR AUTHENTICATION
- MOST ATTACKS ARE AGAINST THE PE ROUTER OR THE ROUTING ON TOP OF MPLS

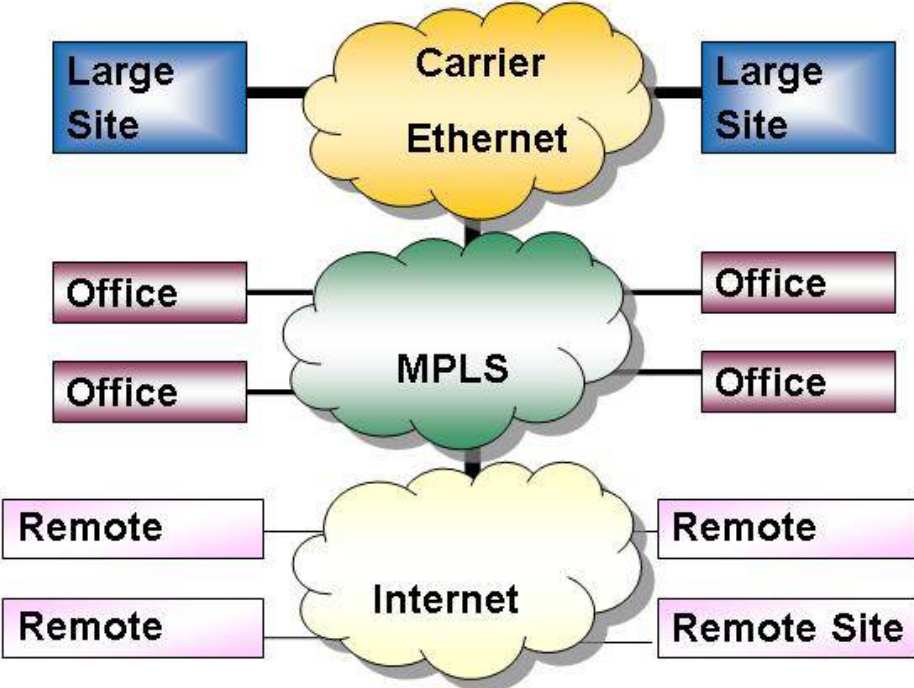
# VPLS

- VPLS CAN HELP YOU SAVE IP ADDRESSES
- TUNNEL BACK TO A CENTRAL CORE WHERE A SINGLE POOL CAN ASSIGN IPS
- WILL EOIP DO THE SAME FOR ME?

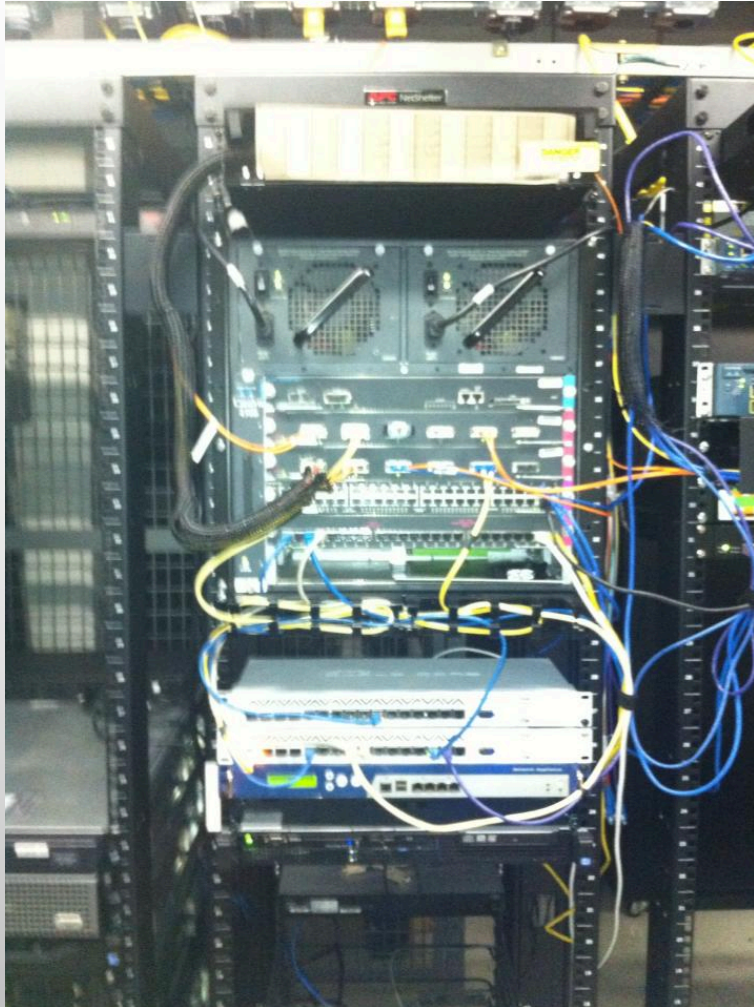
# NETWORK PHILOSOPHY



# WHERE TO USE?



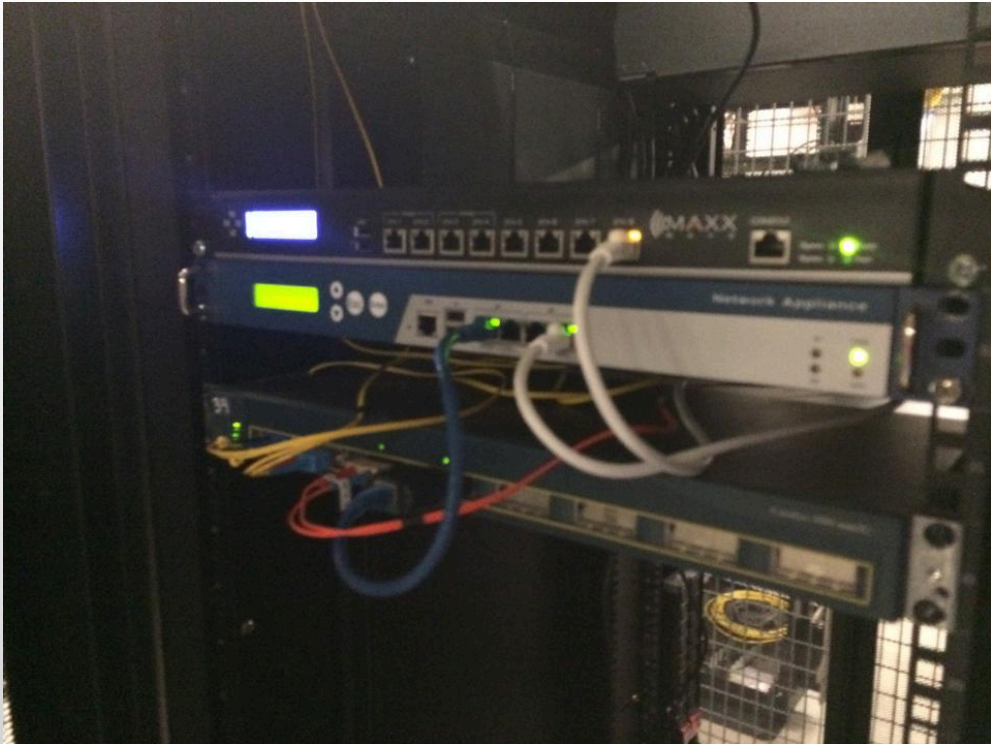
# SWITCH CENTRIC



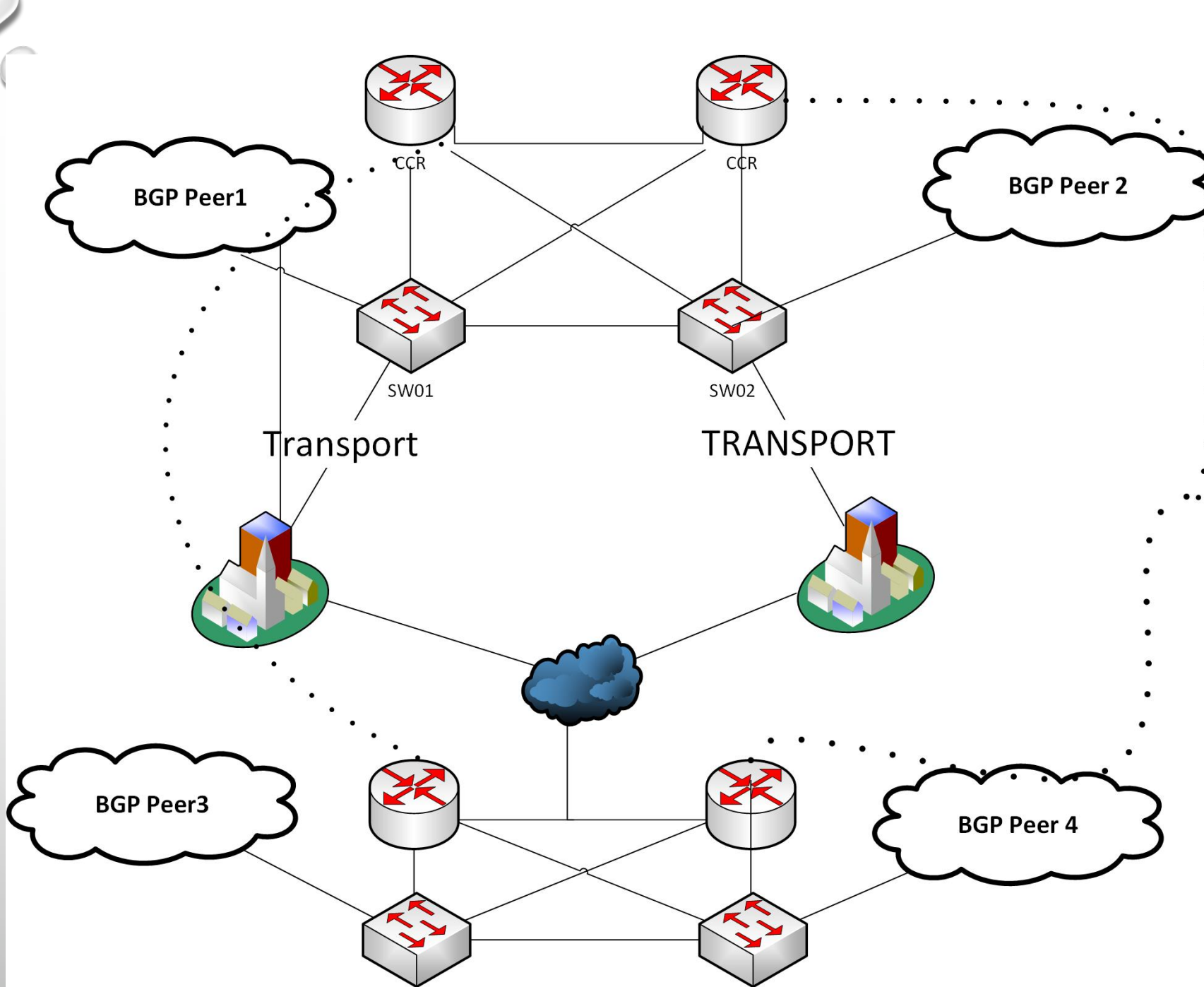
- Switch Fabric from 2013
- Transport and Transit circuits terminated on Cisco Chassis (pre mikrotik switching)
- Routers in VRRP
- BGP routers fed into VRRP Core
- Switches Switch Routers Route

```
uptime is 3 years, 7 weeks, 4 days,  
this control processor is 3 years, 7  
ned to ROM by power-on
```

# SMALL SWITCH CENTRIC



- Small DC Deployment
- Same concept
- Switches switch
- Provider circuits are your failure points most of the time



# WHAT DOES IT COST TO PLAN

- PLAN FOR 100 CUSTOMERS, PLAN FOR 10000
  - YOU CAN PLAN WHILE EATING GREEN EGGS AND HAM
  - SUCCESSFUL ISPS AND NETWORKS HAVE CONTINGENCY PLANS FOR EVERYTHING NOT JUST DISASTERS
  - KNOW YOUR PAIN POINTS
  - KNOW YOUR LIMITATIONS



WHAT SHOULD I KNOW IN THE NEXT 12 MONTHS?



# WHAT DO I NEED TO LEARN ABOUT?

- WIRELESS
  - LTE
  - SHRINKING CELL SIZES
  - MORE BANDWIDTH CLOSER TO THE CUSTOMER
  - INTERFERENCE MITIGATION

# IPV4 EXHAUSTION

- CGN
- IPV6
- OPEN MARKET PURCHASES
- NAT \*



\*WWJD (What would Janis do)

# MIKROTIK STUFF TO KNOW

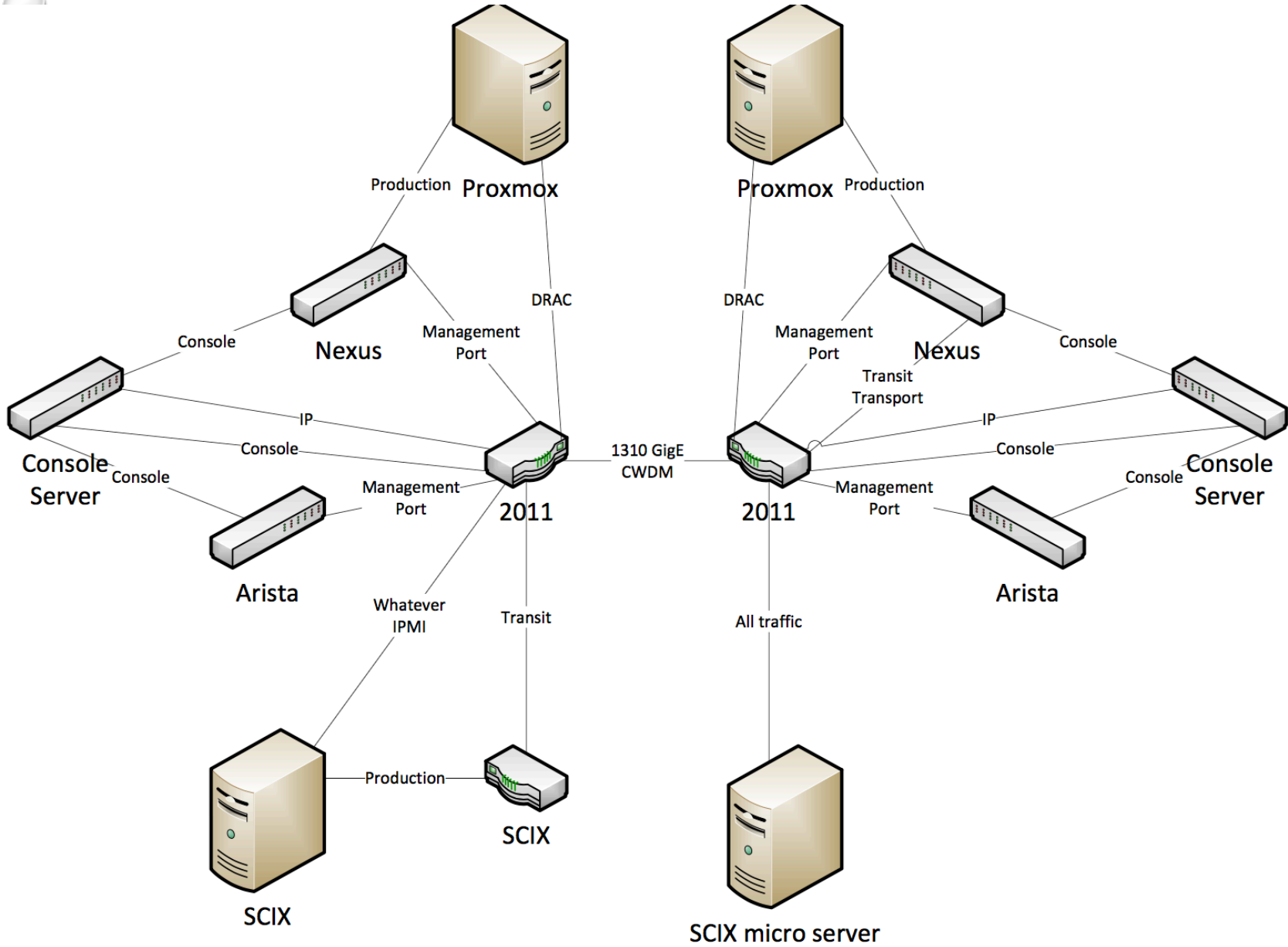
- FOR US PROVIDERS CALEA
- AUTOMATING YOUR NETWORKS
- EIRP LIMITS AND WIRELESS
- LEARN ABOUT 60 GHZ, EVEN IF YOU ARE RURAL

# LLFF (LESSONS LEARNED FROM FACEBOOK)

- PROTECT YOUR NETWORK DEVICES. EVEN IF THEY ARE PROTECTED BY FIREWALLS KEEP UP ON SOFTWARE UPDATES. \*
- GROUND YOUR STUFF....PROPERLY
- THERE ARE MANY WAYS TO DO SOMETHING. MANY ARE RIGHT. SOME ARE TOTALLY WRONG.
- MODULAR NETWORKS

# MIKROTIK CASE STUDY

- SWITCHES AND ROUTERS IN A DATA CENTER 4 HOURS AWAY FROM THE CLOSEST TECH
- NEEDED TO BE ABLE TO SEE WHAT IS GOING ON BEFORE DISPATCHING SOMEONE
- MULTIPLE METRO SITES
- 2011S AT THE HEART OF THE MANAGEMENT NETWORK



# RESOURCES

- FACEBOOK GROUPS (WISP TALK MOST ACTIVE)
- CONFERENCES
  - MUM
  - WISPA
- SERVICES AND PROGRAMS
  - UNIMUS
  - TOWERCOVERAGE
- PODCASTS
  - THE BROTHERS WISP
  - PACKET PUSHERS







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