

Gosh Wow, Volusia Networks!

or

An example of practical network
management in a complex environment.

Overall Network Architecture

- Connect to 80+ remote sites using:
 - Dark fiber between data centers
 - Private SONET ring to major campuses
 - Metro E to minor campus locations
 - Broadband VPN connections to smaller sites (fire stations, parks, treatment plants, etc)
 - Direct connect, MFN Metro E, T-1 to municipalities
 - Microwave T-1s to 800 Mhz Public Safety Radio Network sites

From an IT Director's Perspective:

- Are our customers needs being met?
 - Is the network robust?
 - Is the network reliable?
 - Is the network secure?
- Are we spending money wisely?

From a Network Manager's Perspective:

- Configurations
 - Do we have an easy to access configuration archive for:
 - Planned replacements?
 - Unplanned (emergency) replacements?
 - Do our deployments have errors? (duplex, addressing, etc)
- Performance
 - Are we running out of steam?
 - Are we refining/optimizing our architecture?
 - Traffic taking a smaller redundant path?
 - High bandwidth circuit bottlenecked by equipment?
 - Big circuit with a tiny usage?

How do we manage all that?

- Is anything broken?
 - Devices showing fault errors
 - Devices out of contact (device down or circuit outage)
- Can we do application analysis for:
 - Poor performance?
 - Application errors?
- Are we buying the right equipment?
 - CPU vs RAM mix for servers
 - Packet routing maximums (Mbps) for different routers
 - Buffer sizes and backplane capability for switches

Ciscoworks LAN Management Solution (LMS)

- Capture configuration changes automatically
- Check for updated versions of network device operating systems (IOS, IOSX, NX-OS)
- Deployment scripts for OS updates and mass configuration changes

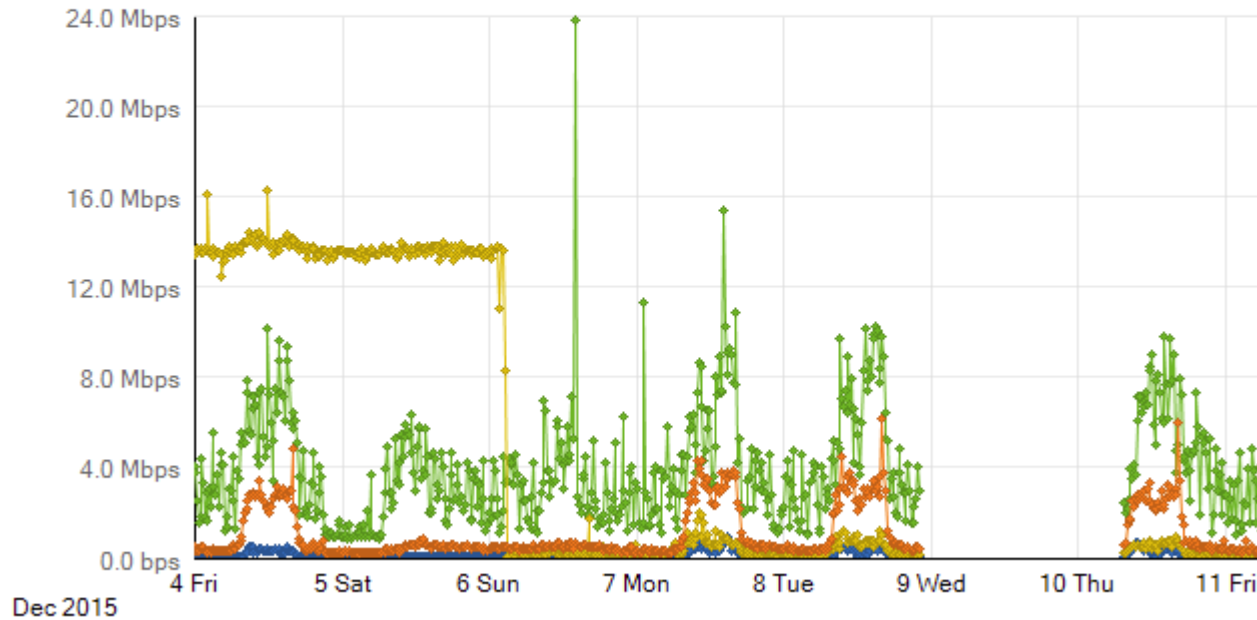
Solarwinds Orion Network Performance Monitor (NPM)

- Circuit usage in Mbps (top 25 list and graphs)
 - Typical use patterns
 - Variation to baseline
- Circuit usage vs capacity (% usage)
- Syslog error messages for immediate problems (duplex mismatches, route flaps, etc) and timeline information

Abnormal Circuit Usage

Interface Aggregate Chart - Average bps In
Last 7 Days

- VCG7.DeLDist-Cave - GigabitEthernet1/0/1 · VCG10 ILC SONET
- VCG7.DeLDist-Cave - GigabitEthernet1/0/2 · VCG12 CI SONET
- VCG7.DeLDist-Cave - GigabitEthernet1/0/3 · VCG13 NSB SONET
- VCG7.DeLDist-Cave - GigabitEthernet1/0/4 · VCG11 JC SONET



Jitter and Latency by Exception

Highest Latency



Collector Name	Operation Type	Latency
VCG1-VCG400_VCG400-FSRC_EVAC2_Default160ByteVoice	UDP Jitter	75(ms)
VCG1-236-D4_VCG236-D4_DefaultUDPEcho	UDPEcho	19(ms)
VCG1-MetroE_VCG203-H44_Default160ByteVoice	UDP Jitter	17(ms)
VCG1-MetroE_VCG15-HHRB_Default160ByteVoice	UDP Jitter	17(ms)
VCG1-MetroE_VCG17-SldWst_Default160ByteVoice	UDP Jitter	16(ms)
VCG1-MetroE_VCG19-Mosq_DefaultIpEcho	Echo	16(ms)
VCG1-MetroE_VCG30-Octr_Default160ByteVoice	UDP Jitter	16(ms)
VCG1-MetroE_VCG18-NSB-RB_Default160ByteVoice	UDP Jitter	15(ms)
VCG1-MetroE_vcg205-FS45_Default160ByteVoice	UDP Jitter	15(ms)
VCG1-MetroE_VCG213-TomLF1_Default160ByteVoice	UDP Jitter	15(ms)

Highest Jitter




























Highest Source to Destination (Average Jitter)

Collector Name	Operation Type	SD Jitter	DS Jitter
VCG1-VCG400_VCG400-FSRC_EVAC2_Default160ByteVoice	UDP Jitter	1.33(ms)	1.5(ms)
VCG1-VCG240_VCG240-Octy_Default160ByteVoice	UDP Jitter	1.0(ms)	1.0(ms)
VCG1-VCG139_VCG139-ILC2_Default160ByteVoice	UDP Jitter	2.0(ms)	1.0(ms)
VCG1-VCG139_VCG140-EOC_Default160ByteVoice	UDP Jitter	1.0(ms)	1.0(ms)
VCG1-VCG105_VCG105_VoIP1_Default160ByteVoice	UDP Jitter	1.5(ms)	1.0(ms)
VCG1-VCG109_VCG109-HC-B_Default160ByteVoice	UDP Jitter	1.0(ms)	1.0(ms)
VCG1-VCG101_VCG101-IT-AX_Default160ByteVoice	UDP Jitter	1.0(ms)	1.0(ms)
VCG1-VCG100_VCG100-IT-AX_Default160ByteVoice	UDP Jitter	1.0(ms)	1.0(ms)
VCG2-Hwy44VCG203_VCG203-H44_Default160ByteVoice	UDP Jitter	0.0(ms)	1.0(ms)
VCG1-VCG236_VCG236-D4_Default160ByteVoice	UDP Jitter	1.33(ms)	1.0(ms)

Top 25 Wireless APs by Clients Count

EDIT HELP

AP NAME	IP ADDRESS	CLIENTS COUNT
 ILC_FLEETMGT-ALPHA	10.81.160.101	13
 DAB-23	192.168.20.123	9
 MQ-1	10.202.2.140	9
 HH_RDBR	10.144.22.65	8
 TCK4E-2	10.1.40.127	8
 TCK4E-3	10.1.40.135	8
 EVAC-BRAVO	10.220.200.104	7
 BOA2-1	10.1.40.121	6
 BOA2-2	10.1.40.122	6
 EO137-7A	10.81.170.125	6
 EVAC_ECHO	10.220.200.108	6
 WFS35	192.168.113.173	6
 DAB-18	192.168.20.118	5
 DAB-3	192.168.20.103	5
 DAB-4	192.168.20.104	5
 DAB-6	192.168.20.106	5
 TCK1W-2	10.1.40.67	5
 TCK4E-1	10.1.40.139	5
 Tomoka_Fleet1	10.163.15.10	5
 BJ_IDF1-E	10.81.150.110	4
 BJ_IDF2-B	10.81.150.119	4
 DAB-12	192.168.20.112	4
 DAB-16	192.168.20.116	4
 DAB-5	192.168.20.105	4
 EO137-2A	10.81.170.127	4

Network vs Application

Quality of Experience Application Stats MANAGE EDIT HELP

LAST 24 HOURS, BY APPLICATION

QOE APPLICATION	AVG NETWORK RESPONSE TIME	AVG APPLICATION RESPONSE TIME	TOTAL DATA VOLUME	TOTAL # OF TRANSACTIONS
+ CIFS	7.28 ms	1.01 s	3.2 MB	13
+ DCE/RPC	0.51 ms	26.41 ms	222.1 KB	35
+ DNS	0.00 ms	0.00 ms	2.3 KB	11
+ Epmap	0.56 ms	35.90 ms	13.8 KB	11
+ Freenet	0.00 ms	0.00 ms	0 bytes	0
+ HTTP	3.42 ms	180.49 ms	52.0 KB	29
+ IEC 60870-5-104	0.00 ms	0.00 ms	0 bytes	0
+ MS OLAP	0.00 ms	0.00 ms	0 bytes	0
+ MS SQL	1.54 ms	63.28 ms	750.5 MB	81
+ NetBIOS Name Service	0.00 ms	0.00 ms	618 bytes	2
- NetBIOS Session service	7.28 ms	1.01 s	3.2 MB	13

Circuit Usage: Internet Inbound

Multiple Object Chart

LAST 7 DAYS



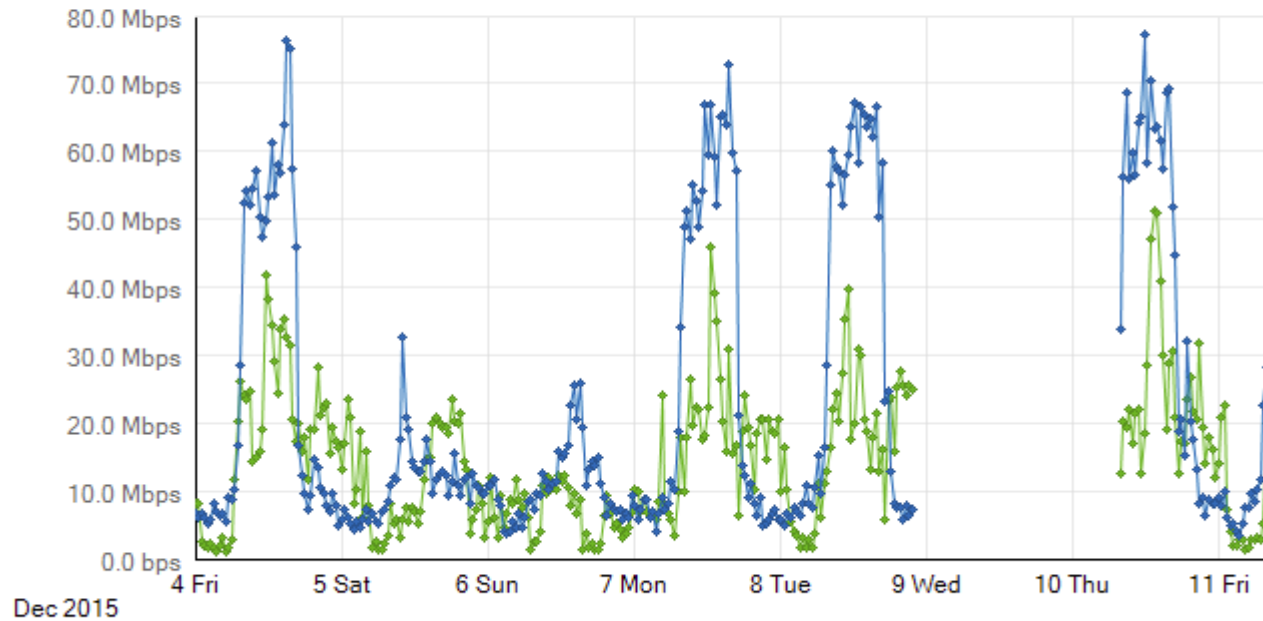
View Options

EDIT

HELP

Interface Aggregate Chart - Average bps In Last 7 Days

- VCG262-TCK-DMZ - GigabitEthernet1/0/11 · BHRR-1 Uplink to Modem
- VCG263-HCH-DMZ - FastEthernet1/0/47 · MFN Rtr Prim



Circuit Usage: Internet Outbound

Multiple Object Chart

LAST 7 DAYS

⋮

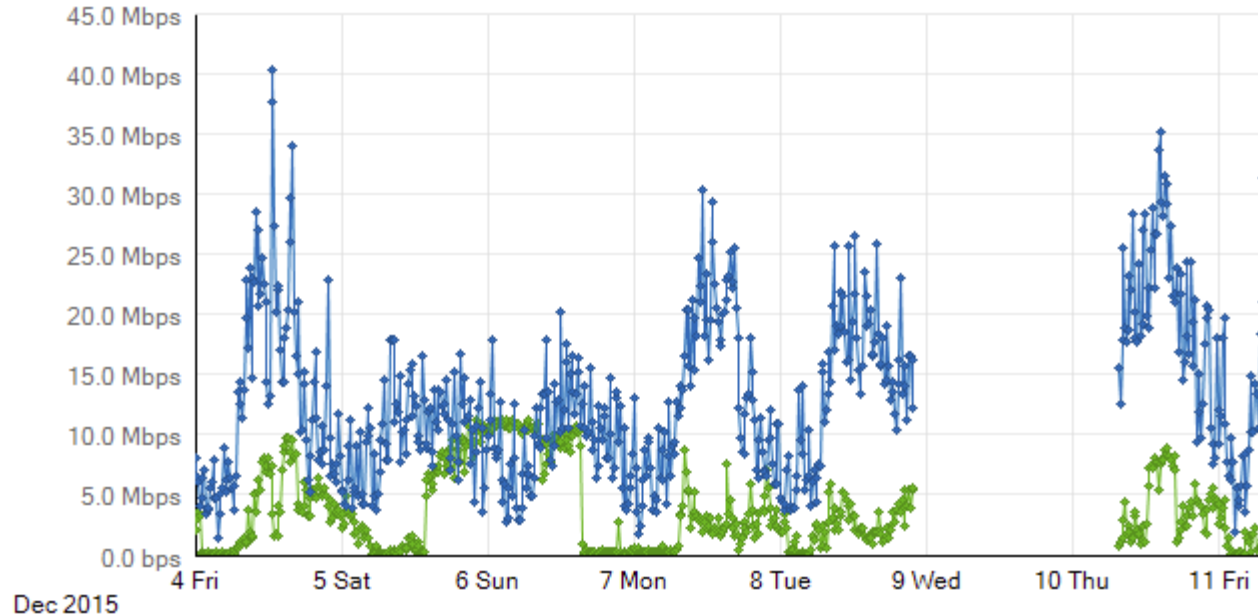
View Options

EDIT







HELP

Interface Aggregate Chart - Average bps Out Last 7 Days

- VCG262-TCK-DMZ - GigabitEthernet1/0/11 · BHRR-1 Uplink to Modem
- VCG263-HCH-DMZ - FastEthernet1/0/47 · MFN Rtr Prim
































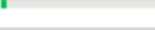




Syslog – Deployment Error

	12/10/2015 12:11:25 PM	172.30.1.130	VCG130_ME50_ILC_Router	VCG130	Warning	3680: Dec 10 12:11:25: Duplicate address 10.85.0.3 on GigabitEthernet0/1.210, sourced by 58f3.9c8d.b607
	12/10/2015 12:10:55 PM	172.30.1.130	VCG130_ME50_ILC_Router	VCG130	Warning	3679: Dec 10 12:10:55: Duplicate address 10.85.0.3 on GigabitEthernet0/1.210, sourced by 58f3.9c8d.b607
	12/10/2015 12:10:25 PM	172.30.1.130	VCG130_ME50_ILC_Router	VCG130	Warning	3678: Dec 10 12:10:25: Duplicate address 10.85.0.3 on GigabitEthernet0/1.210, sourced by 58f3.9c8d.b607
	12/10/2015 12:09:55 PM	172.30.1.130	VCG130_ME50_ILC_Router	VCG130	Warning	3677: Dec 10 12:09:55: Duplicate address 10.85.0.3 on GigabitEthernet0/1.210, sourced by 58f3.9c8d.b607
	12/10/2015 12:09:25 PM	172.30.1.130	VCG130_ME50_ILC_Router	VCG130	Warning	3676: Dec 10 12:09:25: Duplicate address 10.85.0.3 on GigabitEthernet0/1.210, sourced by 58f3.9c8d.b607
	12/10/2015 12:08:55 PM	172.30.1.130	VCG130_ME50_ILC_Router	VCG130	Warning	3675: Dec 10 12:08:55: Duplicate address 10.85.0.3 on GigabitEthernet0/1.210, sourced by 58f3.9c8d.b607



































Top 25 Hosts by Memory Utilization

[EDIT](#) [HELP](#)

HOST	MACHINE TYPE	MEMORY USED
 esxoracle2.covdnssrv.co.volusia.fl.us	VMware	143205 MB 55 % 
 ESX32.covdnssrv.co.volusia.fl.us	VMware	208734 MB 53 % 
 esx35.covdnssrv.co.volusia.fl.us	VMware	200708 MB 51 % 
 esx31.covdnssrv.co.volusia.fl.us	VMware	187557 MB 48 % 
 esx34.covdnssrv.co.volusia.fl.us	VMware	184607 MB 47 % 
 esx33.covdnssrv.co.volusia.fl.us	VMware	173382 MB 44 % 
 esxcj1.covdnssrv.co.volusia.fl.us	VMware	81794 MB 42 % 
 ESX61.covdnssrv.co.volusia.fl.us	VMware	144102 MB 37 % 
 esxcj2.covdnssrv.co.volusia.fl.us	VMware	70094 MB 36 % 
 esx06.covdnssrv.co.volusia.fl.us	VMware	127421 MB 32 % 
 esxoracle3.covdnssrv.co.volusia.fl.us	VMware	52757 MB 27 % 
 esx20.covdnssrv.co.volusia.fl.us	VMware	26689 MB 20 % 
 esxoracle1.covdnssrv.co.volusia.fl.us	VMware	52219 MB 20 % 
 esx21.covdnssrv.co.volusia.fl.us	VMware	23202 MB 18 % 
 esdcesx1.covdnssrv.co.volusia.fl.us	VMware	4376 MB 2 % 
 esdcesx2.covdnssrv.co.volusia.fl.us	VMware	4334 MB 2 % 
 esx01.covdnssrv.co.volusia.fl.us	VMware	3984 MB 2 % 

Top 25 Hosts by CPU Load

[EDIT](#) [HELP](#)

HOST	MACHINE TYPE	CPU LOAD
 esx31.covdnssrv.co.volusia.fl.us	VMware	32 % 
 ESX61.covdnssrv.co.volusia.fl.us	VMware	32 % 
 ESX32.covdnssrv.co.volusia.fl.us	VMware	27 % 
 esxoracle2.covdnssrv.co.volusia.fl.us	VMware	24 % 
 esx34.covdnssrv.co.volusia.fl.us	VMware	23 % 
 esx35.covdnssrv.co.volusia.fl.us	VMware	22 % 
 esx33.covdnssrv.co.volusia.fl.us	VMware	14 % 
 esxcj2.covdnssrv.co.volusia.fl.us	VMware	13 % 
 esx06.covdnssrv.co.volusia.fl.us	VMware	12 % 
 esxcj1.covdnssrv.co.volusia.fl.us	VMware	11 % 
 esx20.covdnssrv.co.volusia.fl.us	VMware	10 % 
 esxoracle1.covdnssrv.co.volusia.fl.us	VMware	9 % 
 esx21.covdnssrv.co.volusia.fl.us	VMware	8 % 
 esxoracle3.covdnssrv.co.volusia.fl.us	VMware	6 % 
 esdcesx1.covdnssrv.co.volusia.fl.us	VMware	1 % 
 esx01.covdnssrv.co.volusia.fl.us	VMware	1 % 
 esdcesx2.covdnssrv.co.volusia.fl.us	VMware	0 % 

vSphere Client

1 Month Summary for

