

{net.} NETwork DOcumentation Tool

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What does Netdot do?

- Discovers network devices and topology using SNMP
- IPv4 and IPv6 Address Management (IPAM)
- Documents cable plant details
- Organizes contact information
- Generates configurations for other tools
- Has role-based access control
- Useful reports

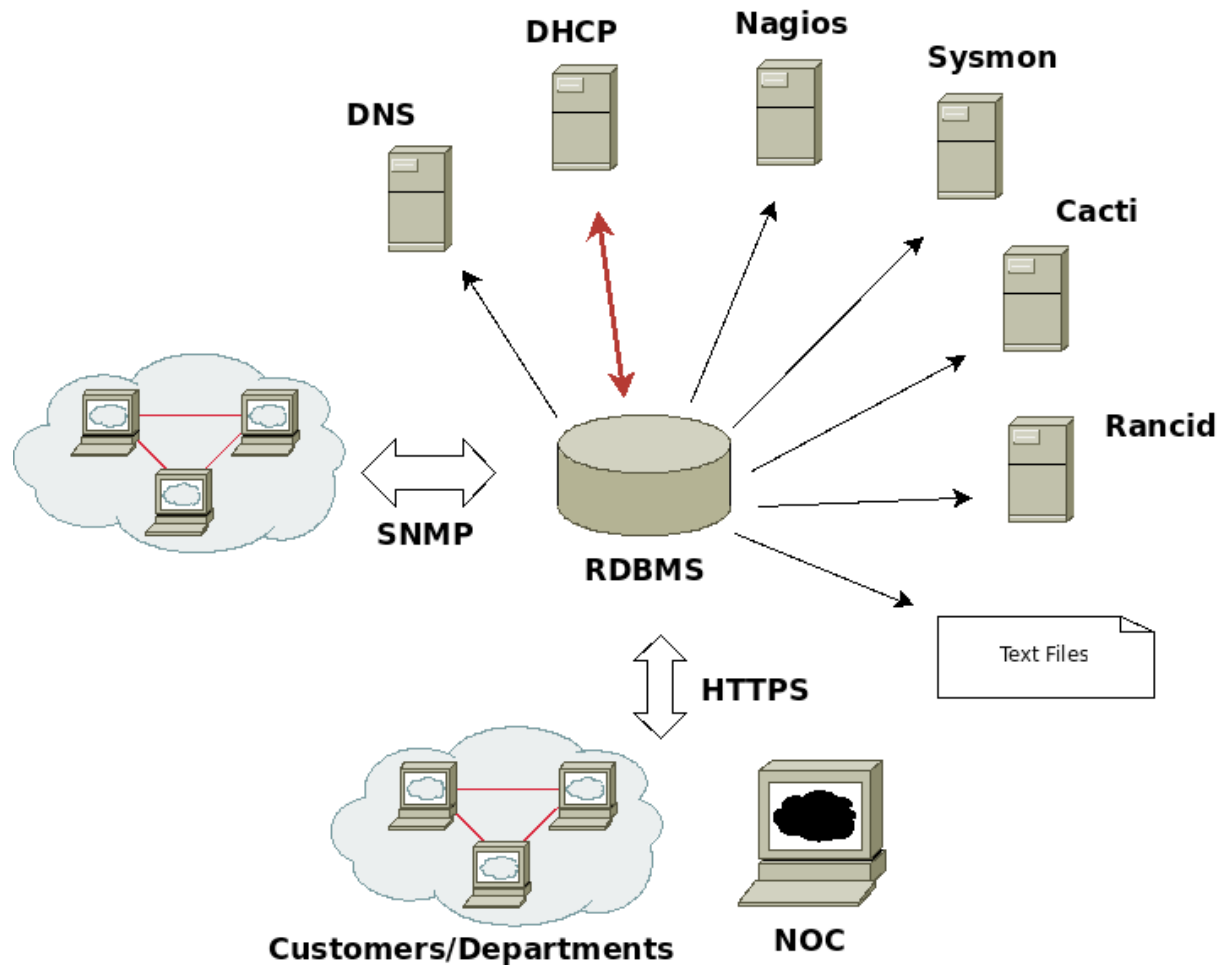


Why Netdot?

- Centralize and integrate network information
- Reduce manual processes
 - manual == outdated
- Accurate inventory
- Delegate tasks to departments/customers
- There were no similar open source projects
 - Most other tools do only one thing



Netdot – The source of “truth”



Device Documentation

- Device information:
 - Interfaces and IPs, subnets, VLANs, modules
 - BGP Peers
 - ARP tables, forwarding tables, Spanning Tree
 - Manufacturer, model, OS version, etc.
 - Uses SNMP::Info (from Netdisco project)
- We can add more information manually
 - Location, contacts, monitoring, port assignments,



Device Documentation

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search:

user: admin [logout]

Sun Nov 14 12:54:40 2010

Management Contacts Cable Plant Advanced Reports Export Help

Devices VLANs Address Space DNS Records DNS Zones DHCP Assets

Device Tasks

[search] [hide]

Discover Device

Name/IP:

SNMP

Version:

SNMP
Community:

discover

Add Device manually

Name:

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Device Information – BGP Peers

Device: [redacted] [HTTP] [HTTPS] [refresh] [snmp-update] [delete]

Basics [redacted] Rules IP info BGP Peers Circuits Topology ARP History All

Device BGP Info [redacted] [edit]

BGP ID: [redacted]

BGP Local AS: 3582

BGP Peers [edit]

Remote IP	ID	Entity	AS Name	AS Number	Monitored?
External (eBGP)					
128.223.[redacted]	0.0.0.0 [redacted]	MAOZ (3943)	MAOZ	3943	Yes
198.32.[redacted]	192.149.[redacted]	State of Oregon (1798)	ORNET	1798	Yes
198.32.[redacted]	170.96.[redacted]	Peacehealth (AS 18980)	AS 18980	18980	Yes
198.32.[redacted]	192.23.[redacted]	1 tfm associates, Eugene Oregon (10488)	TFM-NET	10488	Yes
198.32.[redacted]	158.16.[redacted]	4JNET (6377)	NET4J	6377	Yes
198.32.[redacted]	205.16.[redacted]	MAOZ (10876)	MAOZ	10876	Yes
198.32.[redacted]	198.32.[redacted]	OGIG Transit AS (4600)	OGIG	4600	Yes
198.32.[redacted]	198.32.[redacted]	OGIG Transit AS (4600)	OGIG	4600	Yes
207.98.[redacted]	207.98.[redacted]	Network for Education and Research in Oregon (3701)	NERO-NET	3701	Yes
Internal (iBGP)					
128.223.[redacted]	128.223.[redacted]	University of Oregon (3582)	UONET	3582	Yes
128.223.[redacted]	128.223.[redacted]	University of Oregon (3582)	UONET	3582	Yes
128.223.[redacted]	128.223.[redacted]	University of Oregon (3582)	UONET	3582	Yes
128.223.[redacted]	128.223.[redacted]	University of Oregon (3582)	UONET	3582	Yes
128.223.[redacted]	128.223.[redacted]	University of Oregon (3582)	UONET	3582	Yes
128.223.[redacted]	128.223.[redacted]	University of Oregon (3582)	UONET	3582	Yes
128.223.[redacted]	128.223.[redacted]	University of Oregon (3582)	UONET	3582	Yes

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Device Inventory

{net.} NETWORK DOCUMENTATION TOOL

search:
user: [\[logout\]](#)

Tue Jun 15 12:37:56 2010

Management	Contacts	Cable Plant	Advanced	Reports	Export	Help
Devices	IP	MAC Addresses	Topology Graph	Polling Stats	Database Reports	Custom Reports

Device Inventory

By

Manufacturer	Model	OS	Count
Cisco	AIR-CAP3502I-A-K9		2
		12.4(20100302:022631)	2
Linux System	Linux Firewall		2
			1
	Unix/Linux Server		1
Cisco Systems	Cisco 2800/3800 Series Wireless LAN Controller Module		1
		(recommended: 6.0.188.0)	1
	AIRAP1130	6.0.196.0	1
			1
	Catalyst C4900M	12.4(10b)JDA3	1
		(recommended: 12.2(53)SG)	3
	2811	12.2(53)SG	3
			1
	ASA5580sc	12.4(25b)	1
			8
	Catalyst C2960-48PST	8.2(2)	8
		(recommended: 12.2(50)SE1)	19
	Catalyst C37xx	12.2(50)SE1	9
		12.2(53)SE1	1
		12.2(46)SE	9
		(recommended: 12.2(50)SE)	7
		12.2(50)SE	1
	3800 series	12.2(40)SE	1
		12.2(46)SE	5
			1



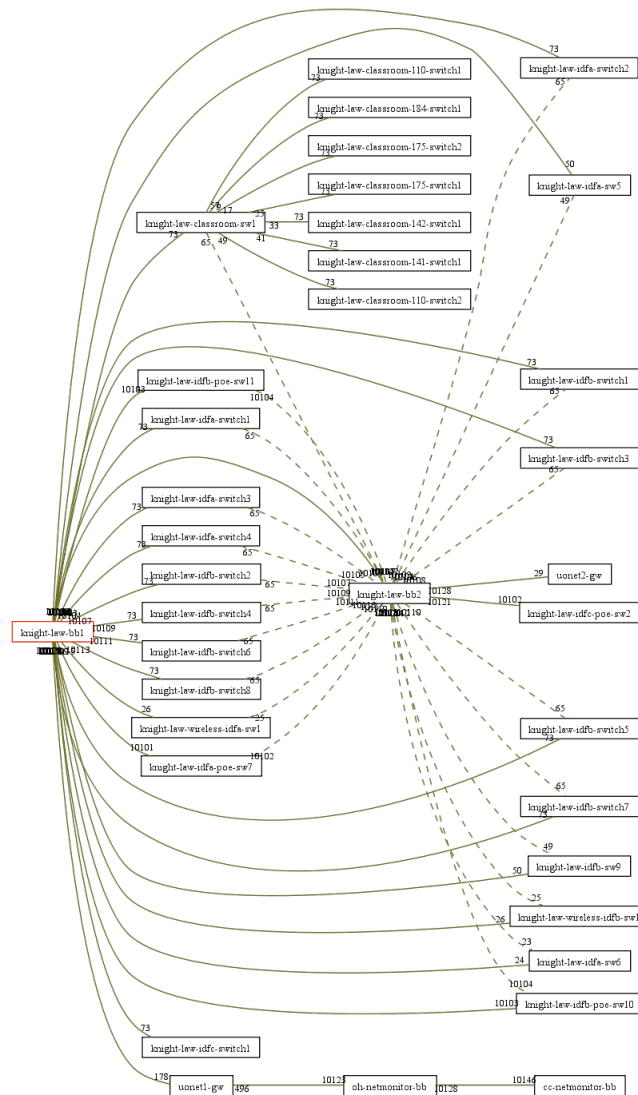
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Topology Discovery

- Discovers Layer 2 Topology
 - Collects and analyzes CDP/LLDP, Spanning Tree, switch forwarding tables and point-to-point subnets
 - Assigns each of these sources a weight and calculates an overall score for the likelihood of a link between two interfaces
 - Corroborating information increases the score, while contradicting information lowers the score
- Uses topology information to determine Nagios dependencies

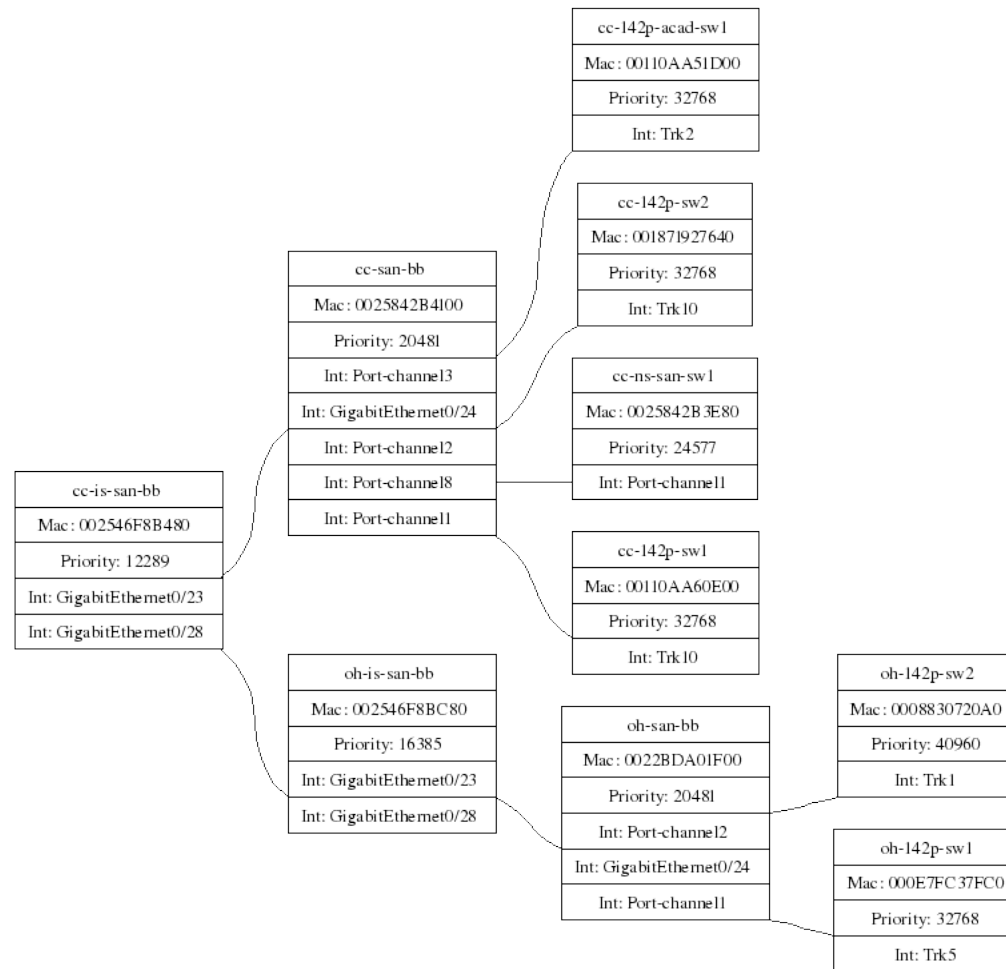


Topology Graphing



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Spanning Tree Visualization



IP Address Management

- Organizes v4 and v6 address space hierarchically
 - Learns subnets from L3 devices
- Shows graphical representation of IP blocks
- Generates DNS zone files and DHCP configurations
 - ISC BIND and DHCPD
- Tracks IP and MAC addresses over time
- Generates and updates DNS records for router interfaces automatically



Adding a subnet

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search:

user: admin [logout]

Sun Nov 14 13:03:17 2010

Management | Contacts | Cable Plant | Advanced | Reports | Export | Help

Devices | VLANs | Address Space | DNS Records | DNS Zones | DHCP | Assets

Address Space Tasks [search] [hide]

Add IP Block

IP/prefix:

Owner: [new]

Used By: [new]

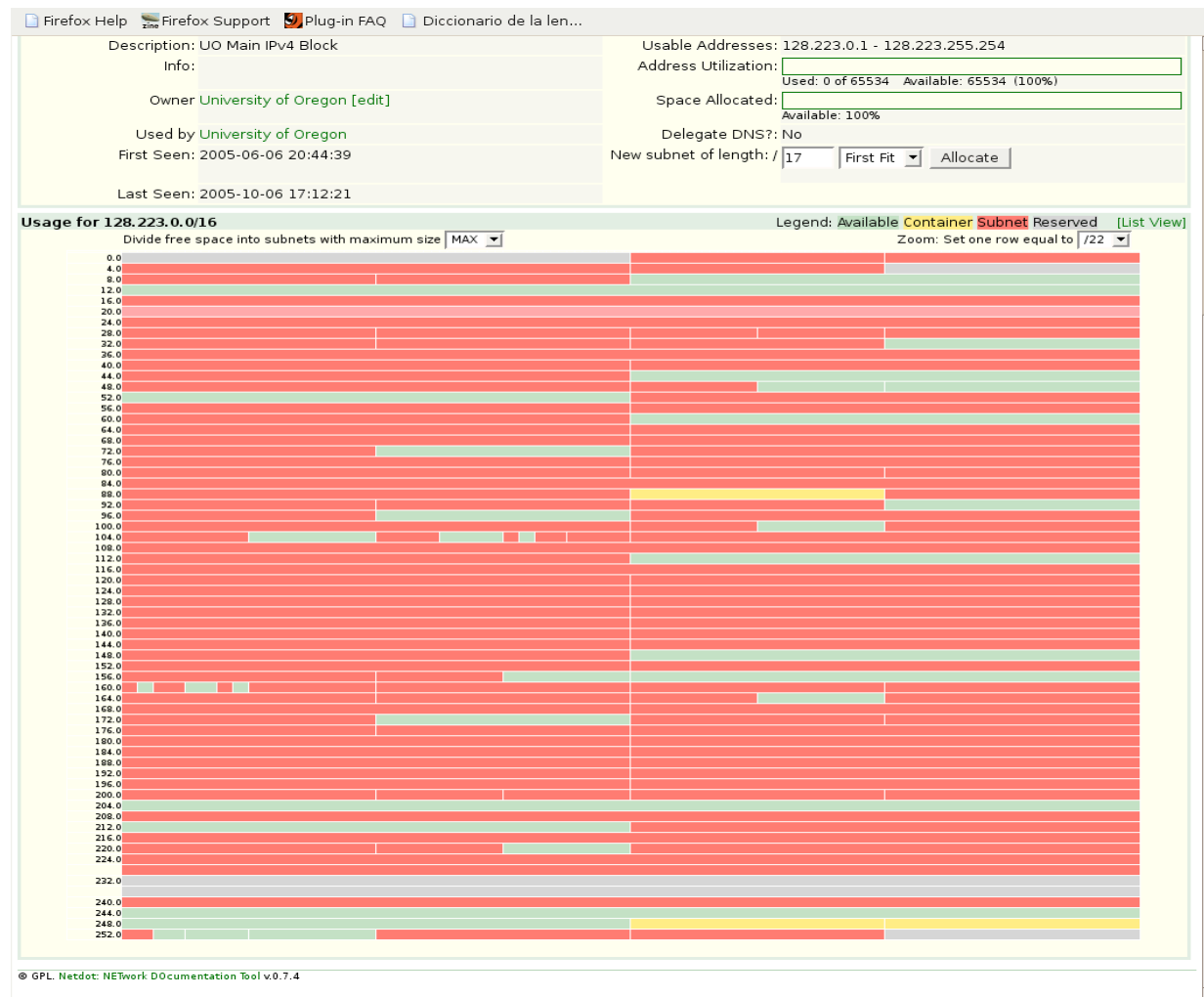
Status:

Description:

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Graphical IPv4 block view



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IPv4 Subnet View

[*]: 128.223.0.0/16 : 128.223.60.0/23

Address: 128.223.60.0/23

Status: Subnet

First Created 2005-06-06 19:38:11

Last Modified 2010-01-20 17:54:03

Vlan: 60

Description: ns-60

Info: Building: Computing Center (Network Services)

Owner: University of Oregon (3582) [edit]

Used by: Network Services

Netmask: 255.255.254.0

Broadcast: 128.223.61.255

Usable Addresses: 510 (128.223.60.1-128.223.61.254)

Utilization:

Used: 429 of 510 Available: 81 (15%)

DHCP Scope

Name

128.223.60.0 netmask 255.255.254.0

Type

subnet

Sites

Subnet

128.223.60.0/23

128.223.60.0/23

Site

Computing Center (39)

Oregon Hall (42)

DNS Zones

Choose an Address

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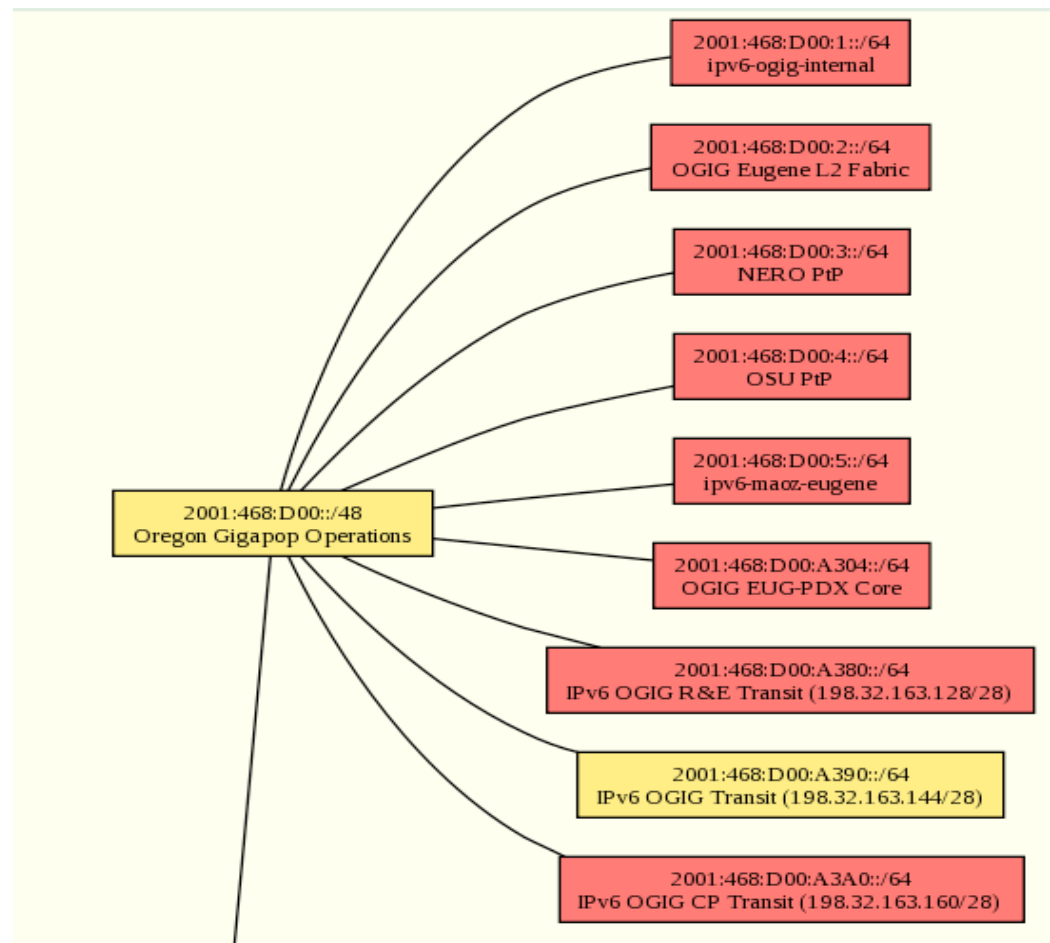
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IPv6 Block Tree View



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MAC and IP tracking

- Given an IP address...
 - Show last 10 ARP entries
 - Select last MAC address that used this IP
 - See edge port where this MAC address was last seen
 - Show network jack, room, etc.
- And of course, start at any of these elements and navigate to the rest



IP Address Management

- Using role-based access control, we can delegate the management of addresses and DNS records to customers
 - Users have a limited version of the web UI
 - Changes are committed every 5 minutes to a VCS and pushed to servers using CM tools
 - Full audit is kept in the database for change history

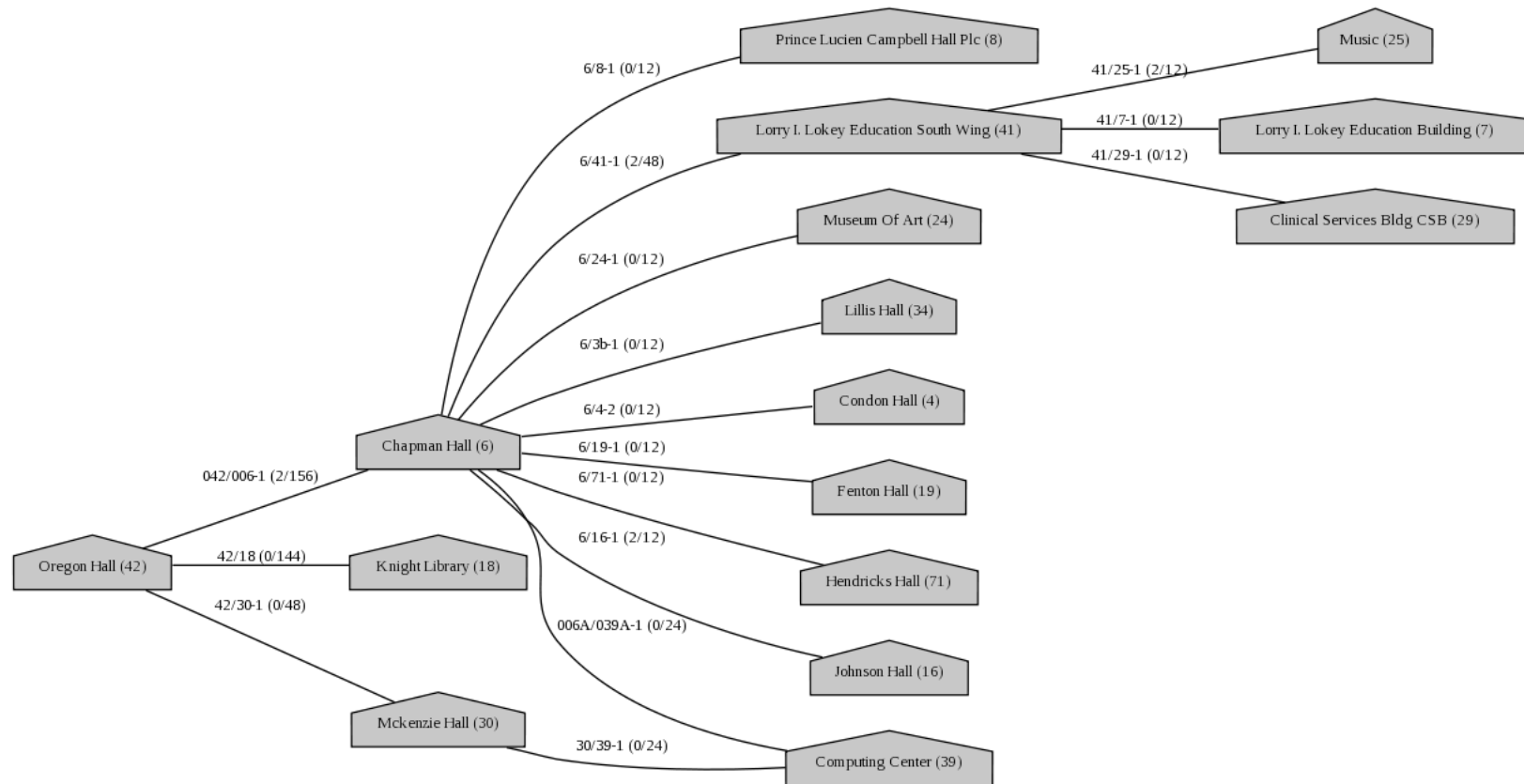


Cable Plant

- We can document inter-building fiber and copper bundles
 - Can represent series of splicing points
 - Can create circuits using pairs fiber strand sequences
- In-building fiber and copper distribution
 - Rooms, closets, Network jacks
 - Jacks can be associated with switch ports

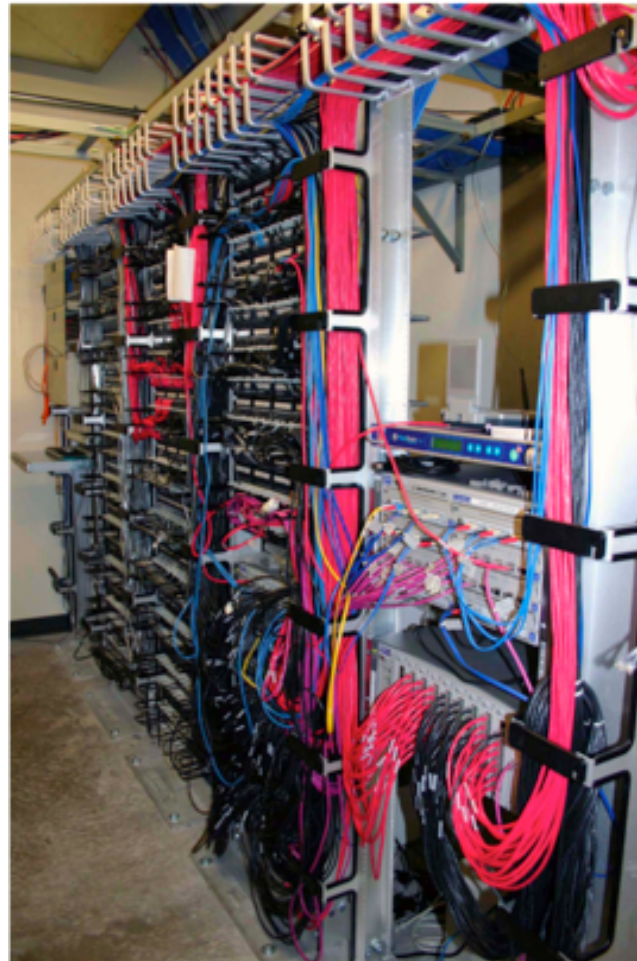


Backbone Cable Plant



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Closet Pictures



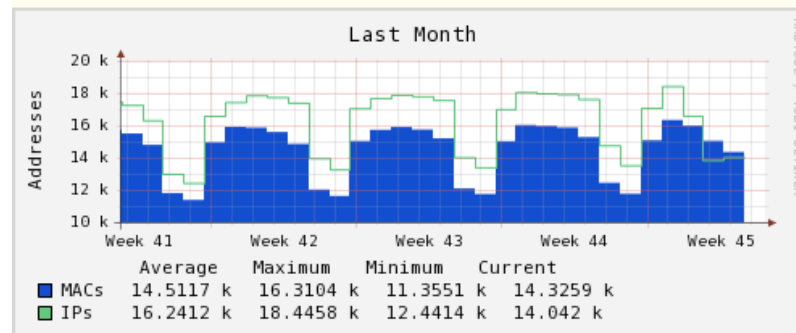
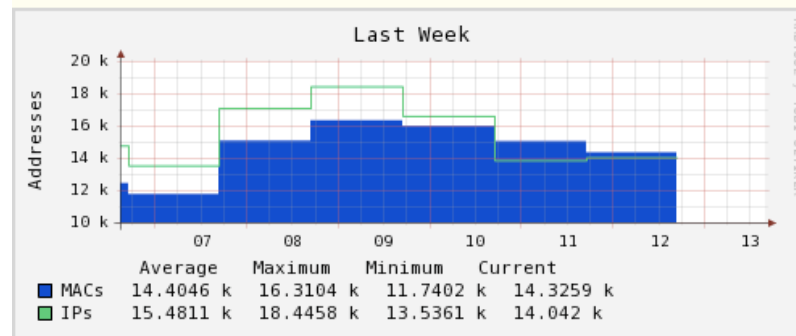
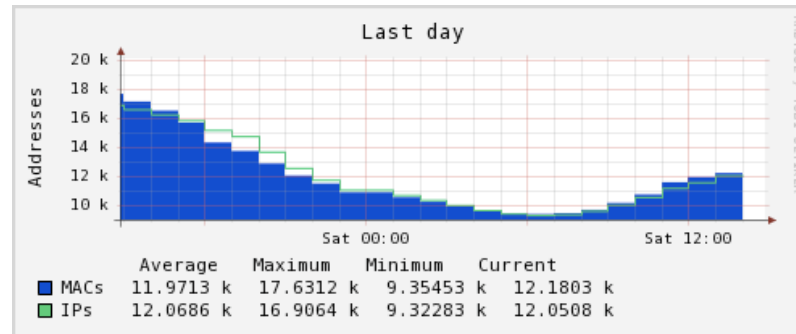
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More Reports

- Links with duplex mismatches
- Maxed-out subnets (over max threshold)
- Unused subnets (under min threshold)
- Top MAC address vendors
- Oldest unused static addresses



Number of machines in network



API

- The libraries can be installed on a remote server for programmatic access to the application via SQL, or
- Applications can interact via HTTP/HTTPS using the RESTful API
 - A convenient client Perl module available on CPAN
 - Netdot::Client::REST



Upcoming features

- IPv6 space visualization
 - Working on hierarchical quadtrees and multi-dimensional pie charts for navigating the huge address space
- IPv6 address collection via SNMP
 - Router addresses and neighbor caches
- DHCPv6 configuration support
- DNS updates with *nsupdate*



Upcoming features

- Improved cable plant section
 - Represent fiber modules, connector types, color codes, easier UI
- Inventory of equipment stock
 - Take advantage of bar-code scanners
- More access control granularity



Try it out!

- <http://netdot.uoregon.edu>



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