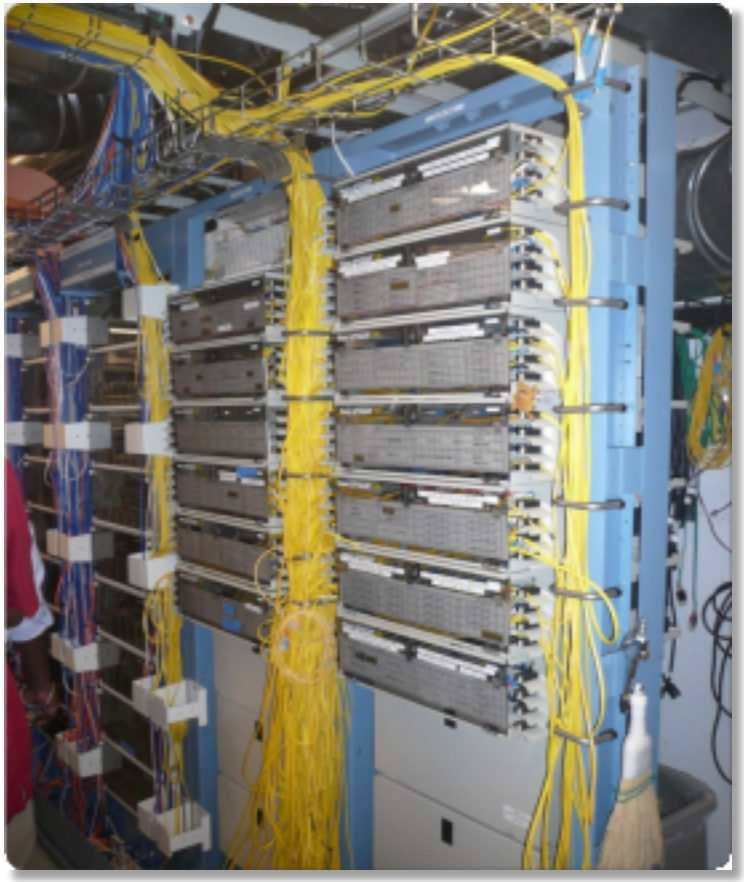
Network Monitoring and Management

Network Documentation

Documentation

Maybe you've asked, "*How do you keep track of it all*?"...



Document, document, document…

Updated Documentation is essential

- So that you can remember what you did 6 months ago
- So that others in your team can troubleshoot problems quickly
- Think about these questions:
  - What would happen to the network if the main engineer moves to another job?
  - How would your team deal with problems if you were sick? Or on vacation?

Documenting is hard

It's tedious

- "I'm so busy, I don't have time right now"

It's difficult to keep organized

- You need to have an established methodology that everyone can follow
- Otherwise it becomes crazy with time

It becomes outdated very quickly

- Old information is useless and can be even dangerous!

Guidelines

Create a documentation policy

- What's the responsibility of each person?
- What is the process? Order of tasks?
- How to verify completeness/quality?
- Methodologies
  - Consistent naming schemes
    - For devices, cabling, etc.

Guidelines

Label EVERYTHING

- Devices: routers, switches, servers, access points, etc.
- Cabling
- Network jacks
- Racks

Documentation

Basics, such as documenting your switches...

- What is each port connected to?
- Can be simple text file with one line for every port in a switch:
  - health-switch1, port 1, Room 29 – Director's office
  - health-switch1, port 2, Room 43 – Receptionist
  - health-switch1, port 3, Room 100 – Classroom
  - health-switch1, port 4, Room 105 – Professors Office
  - …..
  - health-switch1, port 25, uplink to health-backbone
- This information might be available to your network staff, help desk staff, via a wiki, software interface, etc.
- Remember to label your ports!

Documentation: Labeling

Nice…

Network Documentation

More automation might be needed. An automated network documentation system is something to consider.

- You can write local scripts to do this.
- You can consider some automated documentation systems.
- You'll probably end up doing both.

NOCs: Network Operation Centers

Where documentation, monitoring and management can all come together:

- Links to monitoring tools
- Ticketing systems
- Documentation systems
  - Diagrams
  - Databases
  - Wikis

The Network Operations Center

NOC = Network Operations Center

- Come in many forms and depend on the size of your organization and your goals.
- "One or more locations from which control is exercised over your network."
- NOCs can be:
  - Virtual
  - Located at the core of your network
  - With your help desk
  - Built in pieces
  - Etc.

A BIG NOC

There are even bigger NOCs out there…

A small NOC

In the same room there is a desk with a phone, another computer and a monitor. This acted as the group's Help Desk.

Many network problems could be detected and solved on the spot!

Automated Documentation Systems

There are quite a few automated network documentation systems. Each tends to do something different:

- **Netdot:**
  https://netdot.uoregon.edu/
- IPplan:
  http://iptrack.sourceforge.net/
- Netdisco:
  http://netdisco.org/
- Rack Tables:
  http://www.racktables.org/

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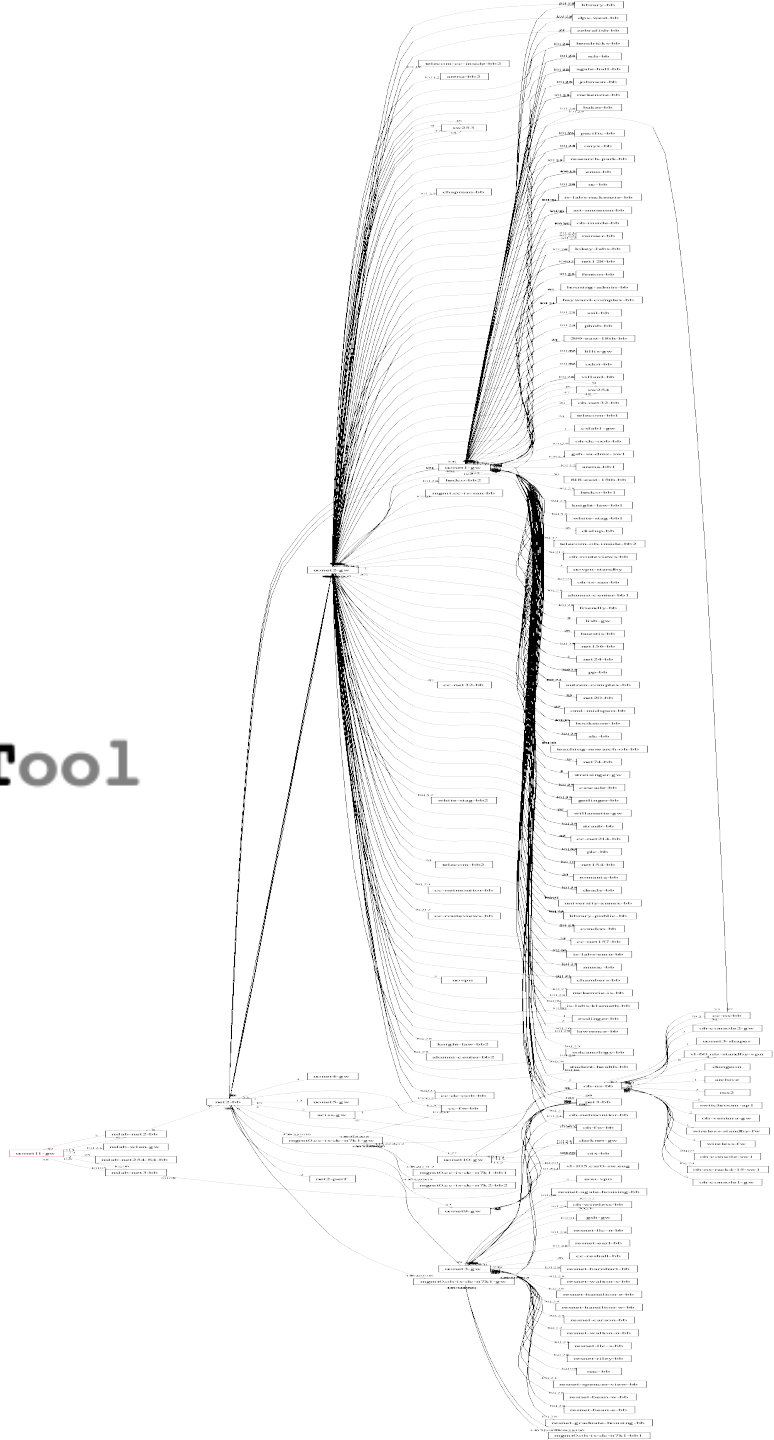
NETwork DOcumentation Tool



NSRC
Network Startup Resource Center

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NETwork DOcumentation Tool

It's a very comprehensive tool:

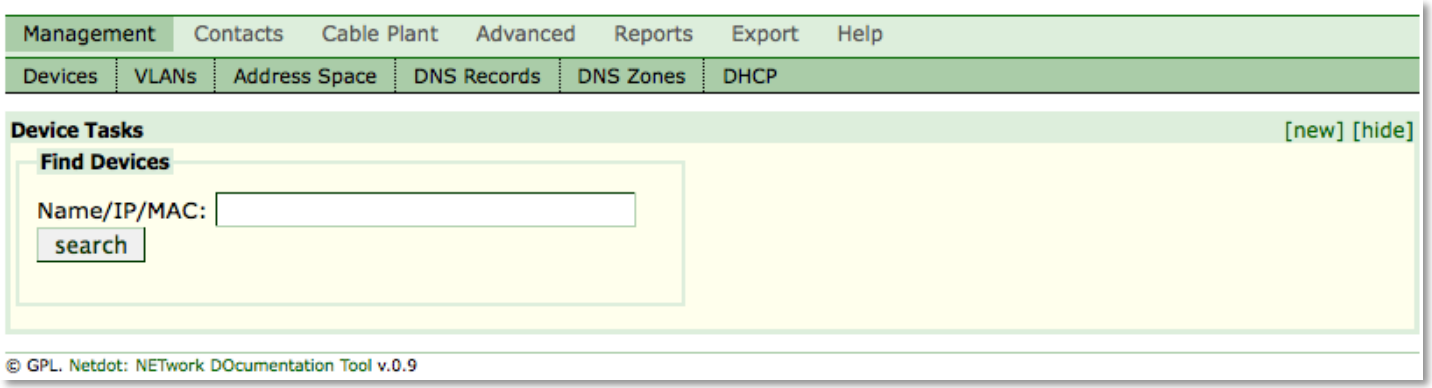
- Device discovery via SNMP
- Layer2 topology discovery and graphing, using:
  - CDP/LLDP
  - Spanning Tree Protocol
  - Switch forwarding tables
  - Router point-to-point subnets
- IPv4 and IPv6 address space management (IPAM)
  - Address space visualization
  - DNS/DHCP config management
  - IP and MAC address tracking

Continued ➔

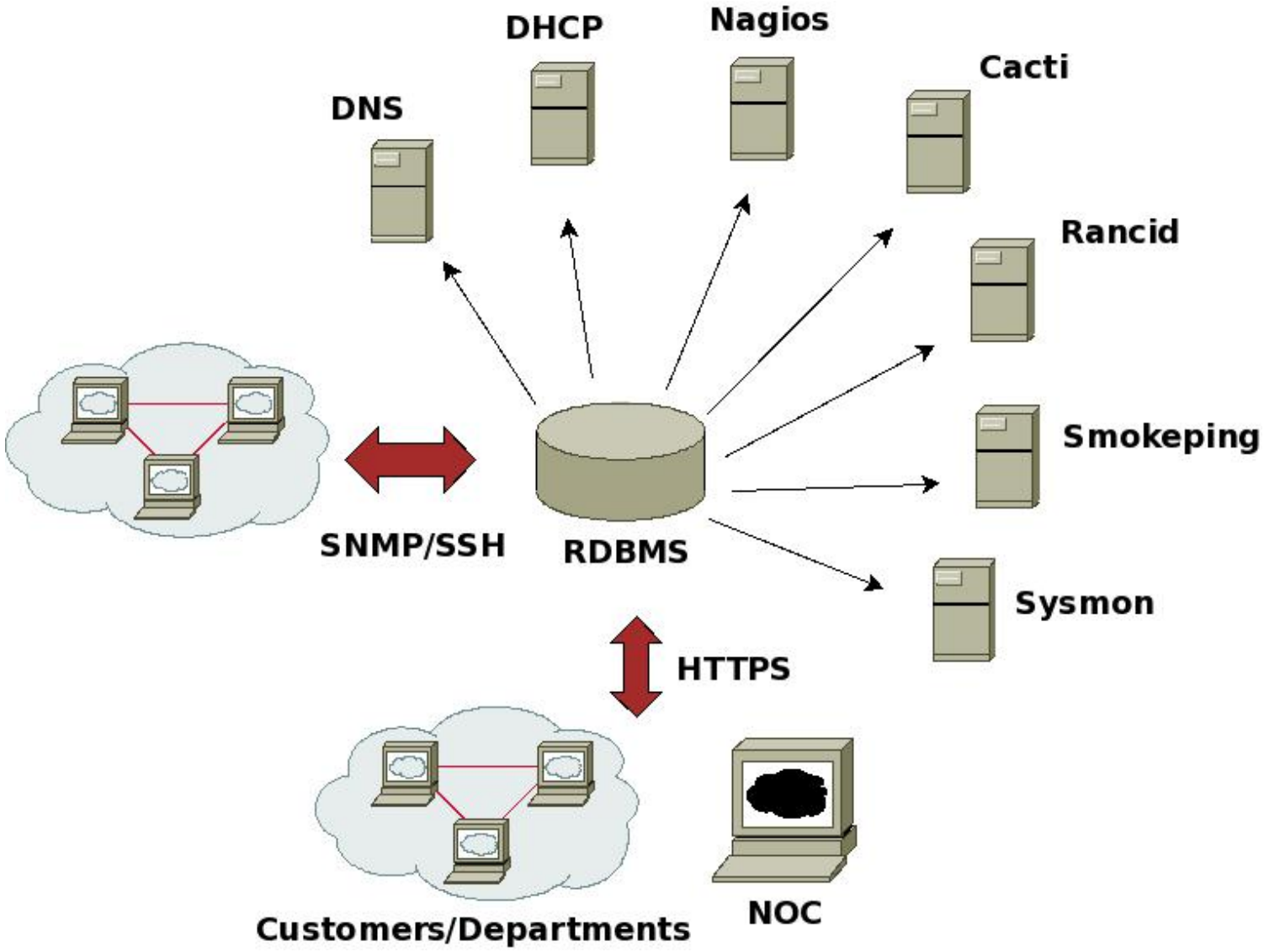
Netdot: {net.} NETwork DOcumentation Tool

Functionality continued:

- Cable plant (sites, fiber, copper, closets, circuits...)
- Contacts (departments, providers, vendors, etc.)
- Export scripts for various tools (Nagios, Sysmon, RANCID, Cacti, etc)
  - I.E., how we could automate node creation in Cacti!
- Multi-level user access: Admin, Operator, User
- It draws pretty pictures of your network



Netdot: NETwork DOcumentation Tool



Network devices

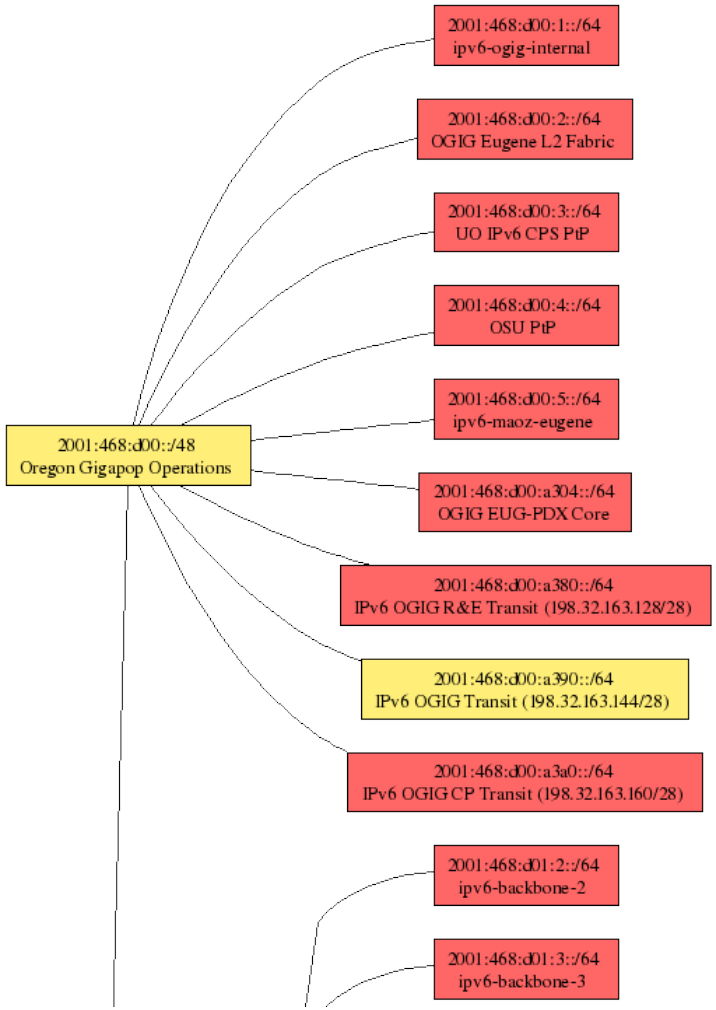
- Can be added via SNMP (preferred) or manually
- Automatic updates via SNMP
- Manufacturer, model, software version, name and domain, dates
- Maintenance contracts, out of band access, SNMP version and community
- Interfaces, VLANs, IP addresses, BGP peers
  - ARP tables (routers), redirection tables (switches)
- Topology
- Images, comments, change history

Topology

Netdot uses all possible sources of topological information:

- CDP and LLDP protocols
- Analyze redirection tables
- Spanning Tree protocol
- Point-to-point networks

Netdot Topology example

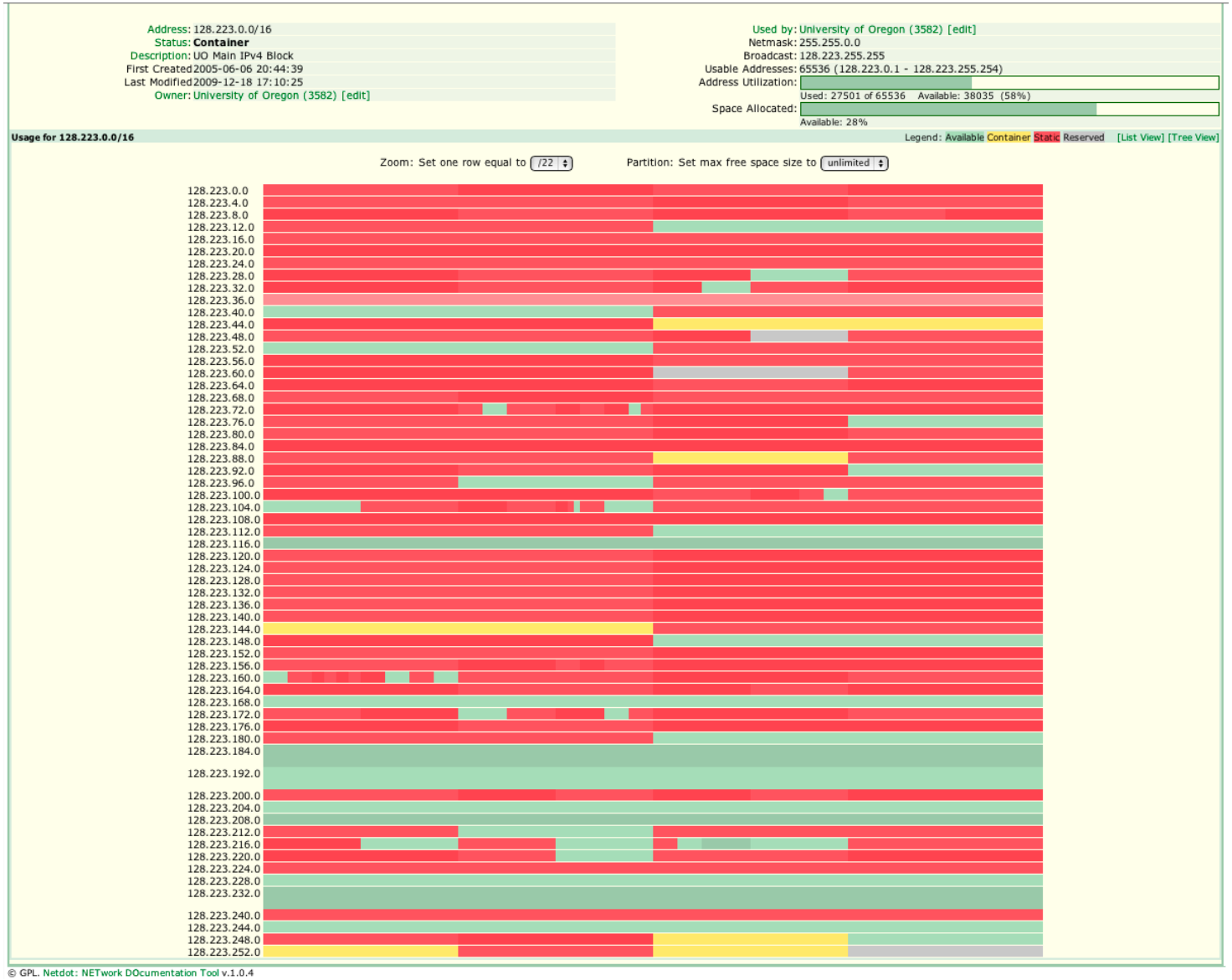


Netdot can draw the topology of a network or a segment of a network dynamically.

IP Space: Addresses and Blocks

- Hierarchical (*drill-down)* & graphical representation
- Support for IPv4 and IPv6
- Classification in:
  - Block
    - Container
    - Subnet
    - Reserved
  - Address
    - Static
    - Dynamic
    - Reserved

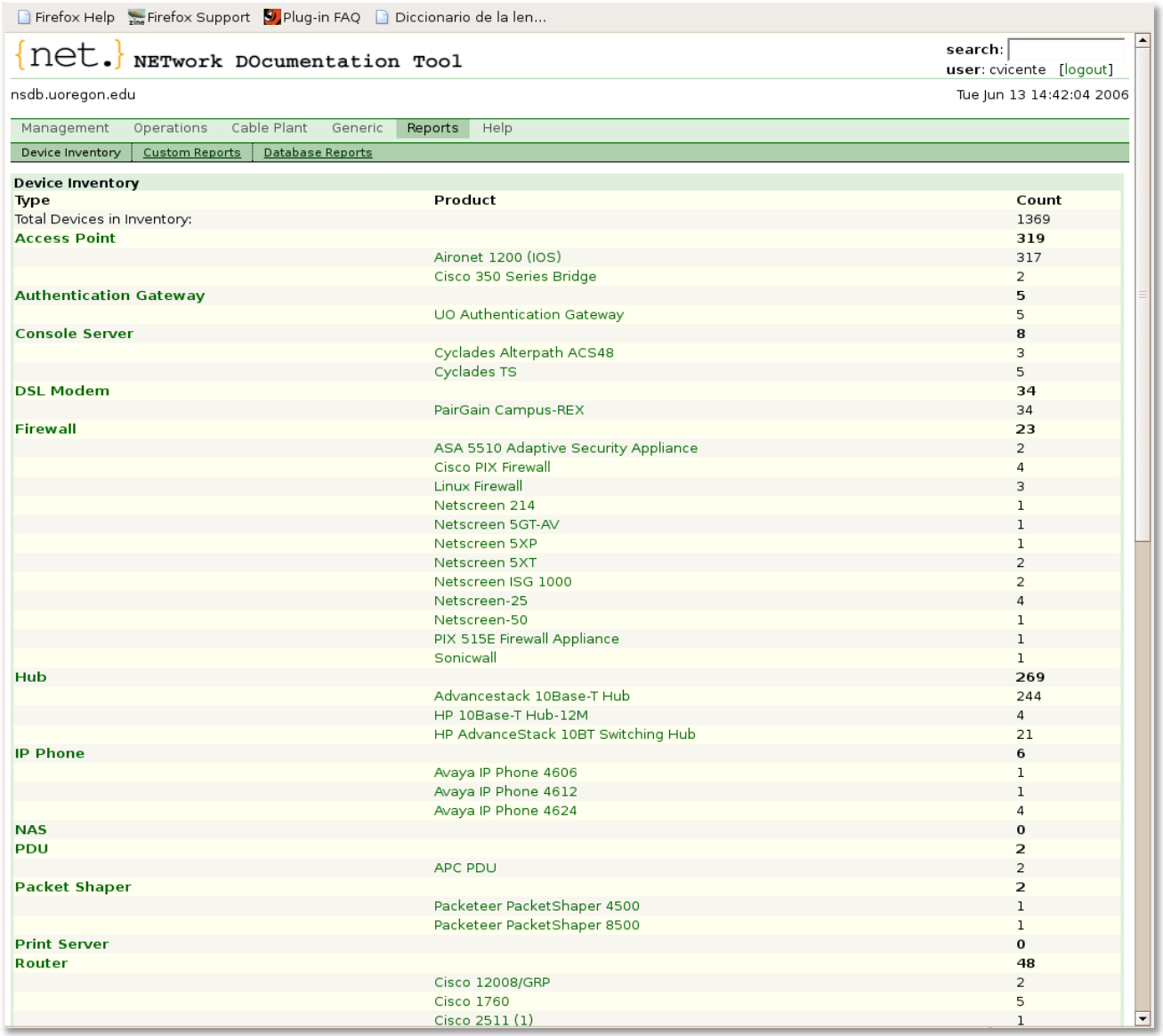
Visualization of IP space



Reports

- Devices
  - By category and by product
  - Out-of-date firmware
  - Duplex mismatches
- Most used MAC codes (Manufacturers)
- From the database
  - SQL table utilization reports

Inventory and Devices



Firefox Help | Firefox Support | Plug-in FAQ | Diccionario de la len...

{net.} NETwork DOcumentation Tool

search:
user: cvicente [logout]

nsdb.uoregon.edu

Tue Jun 13 14:42:04 2006

Management | Operations | Cable Plant | Generic | Reports | Help

Device Inventory | Custom Reports | Database Reports

Device Inventory

Type	Product	Count
Total Devices in Inventory:		1369
Access Point		**319**
	Aironet 1200 (IOS)	317
	Cisco 350 Series Bridge	2
Authentication Gateway		**5**
	UO Authentication Gateway	5
Console Server		**8**
	Cyclades Alterpath ACS48	3
	Cyclades TS	5
DSL Modem		**34**
	PairGain Campus-REX	34
Firewall		**23**
	ASA 5510 Adaptive Security Appliance	2
	Cisco PIX Firewall	4
	Linux Firewall	3
	Netscreen 214	1
	Netscreen 5GT-AV	1
	Netscreen 5XP	1
	Netscreen 5XT	2
	Netscreen ISG 1000	2
	Netscreen-25	4
	Netscreen-50	1
	PIX 515E Firewall Appliance	1
	Sonicwall	1
Hub		**269**
	Advancestack 10Base-T Hub	244
	HP 10Base-T Hub-12M	4
	HP AdvanceStack 10BT Switching Hub	21
IP Phone		**6**
	Avaya IP Phone 4606	1
	Avaya IP Phone 4612	1
	Avaya IP Phone 4624	4
NAS		**0**
PDU		**2**
	APC PDU	2
Packet Shaper		**2**
	Packeteer PacketShaper 4500	1
	Packeteer PacketShaper 8500	1
Print Server		**0**
Router		**48**
	Cisco 12008/GRP	2
	Cisco 1760	5
	Cisco 2511 (1)	1

Configuration exports

The information contained within Netdot enables the automatic generation of configurations for software packages.

- Monitoring devices and servces
  - Nagios, Sysmon
- Monitoring configurations
  - RANCID
- Traffic analysis
  - Cacti
- Services
  - DNS (Bind)
  - DHCP

But wait! There's more…

Cabling

- Inter-building cabling (backbone)
- Fibers
- Intra-building cabling (interior cabling)
- Cabling closets – physical data, photos.

Contacts

- Individuals
- By building
- Roles
- Contact lists

Other automated systems

Many. Each one does something different:

Open Source

- IPplan:
  http://iptrack.sourceforge.net/
- Netdisco
  http://netdisco.org/
- RackTables
  http://racktables.org/

Commercial

- HP OpenView
- IBM Tivoli and Netcool
- SolarWinds

[[IPplan]]

From the IPplan web page:

"IPplan is a free (GPL), web based, multilingual, TCP IP address management (IPAM) software and tracking tool written in php 4, simplifying the administration of your IP address space. IPplan goes beyond TCPIP address management including DNS administration, configuration file management, circuit management (customizable via templates) and storing of hardware information (customizable via templates)."

Lots of screenshots:

http://iptrack.sourceforge.net/doku.php?id=screenshots

Netdisco:

- Project launched 2003. Version 1.0 released October 2009.
- Some popular uses of Netdisco:
  - **Locate** a machine on the network by MAC or IP and show the switch port it lives at.
  - **Turn Off** a switch port while leaving an audit trail. Admins log why a port was shut down.
  - **Inventory** your network hardware by model, vendor, switch-card, firmware and operating system.
  - **Report** on IP address and switch port usage: historical and current.
  - **Pretty pictures** of your network.

RackTables

Web site:

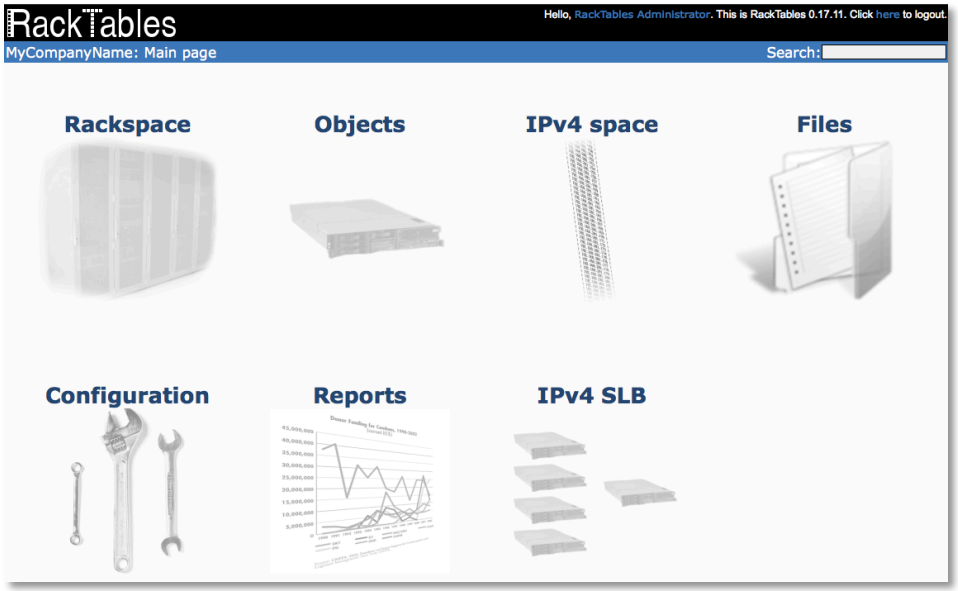
http://racktables.org/

From the RackTables web site

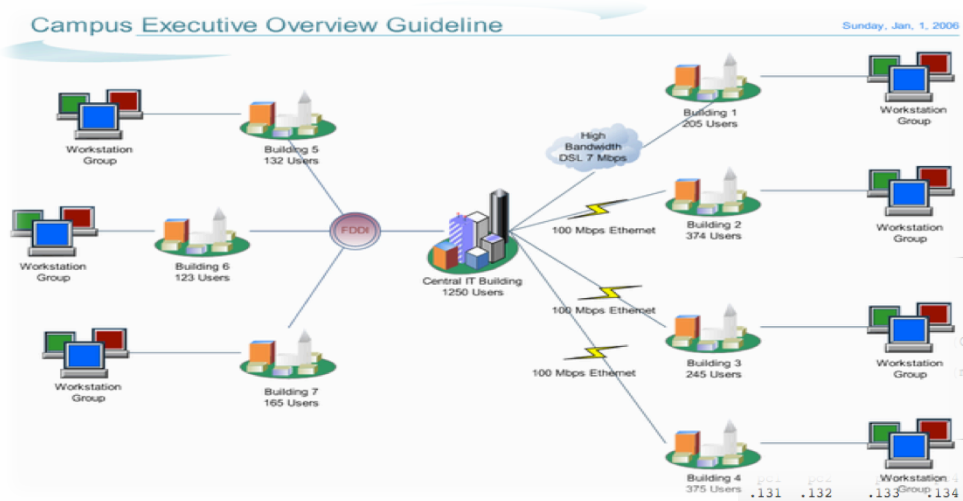
"Racktables is a nifty and robust solution for datacenter and server room asset management. It helps document hardware assets, network addresses, space in racks, networks configuration and much much more!"

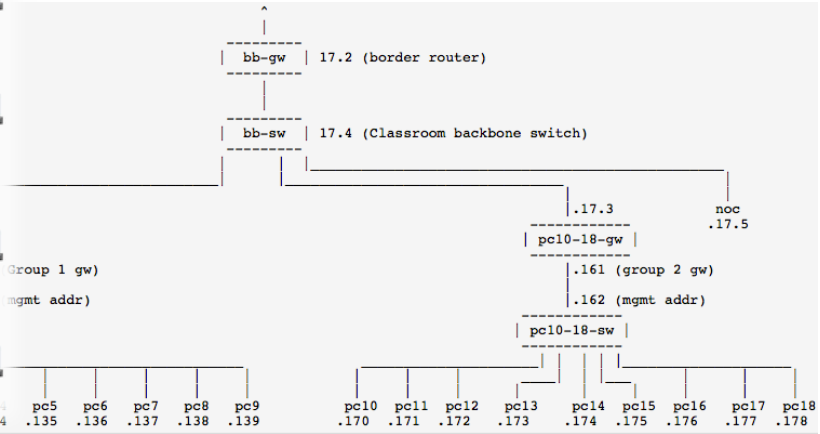
There is a demo system:

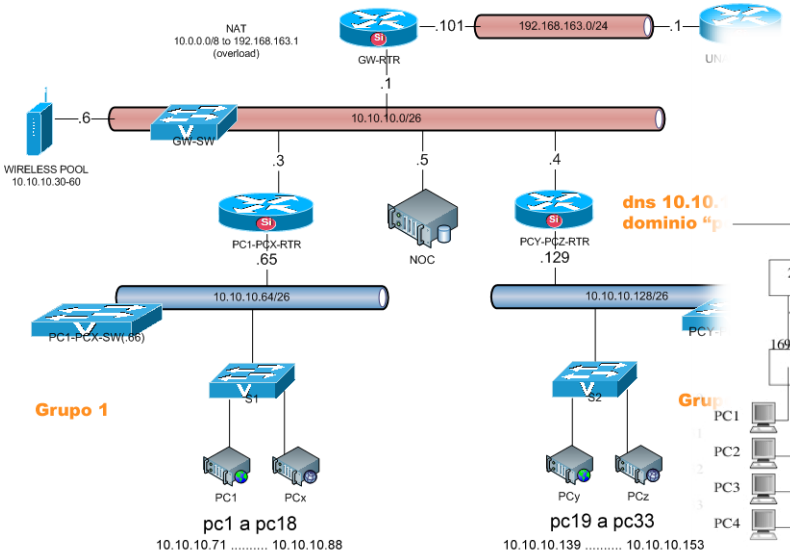
http://racktables.org/demo.php

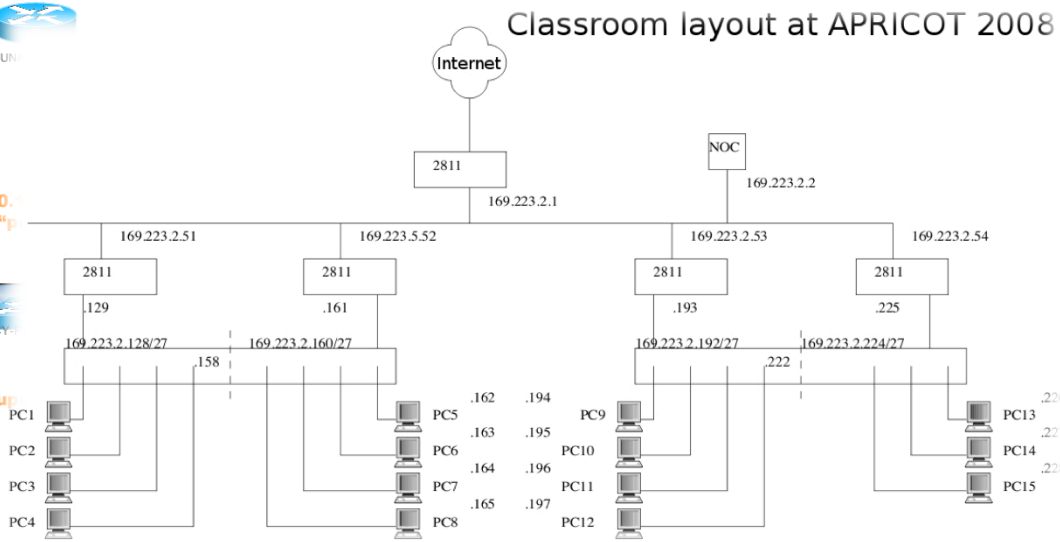


Documentation: Diagrams









Diagramming Software

Windows

- Visio:
  http://office.microsoft.com/en-us/visio/FX100487861033.aspx
- Ezdraw:
  http://www.edrawsoft.com/

Open Source

- ASCII:
  http://www.ascii-art.org/
- Dia:
  http://live.gnome.org/Dia
- Cisco reference icons:
  http://www.cisco.com/web/about/ac50/ac47/2.html
- Nagios Exchange:
  http://www.nagiosexchange.org/

Questions

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