Penguins all the way up

Scott Suehle - Community Manager

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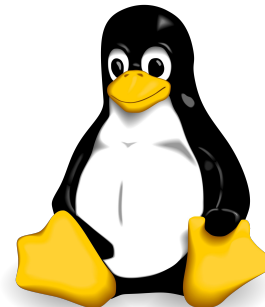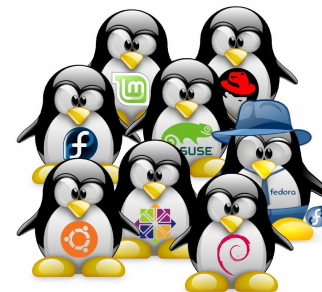- @8bitdad on the twitters

- kilted1 on #CumulusNetworks on Freenode

This talk is going to cover the networking world with a focus on open networking and Linux's role in shaping its future.

- Past, present, and future
- Who is driving the market?

In the beginning

Early attempts to communicate were primitive but effective. Drawings on cave walls told of the hunt and resources in specific areas for the nomadic people.
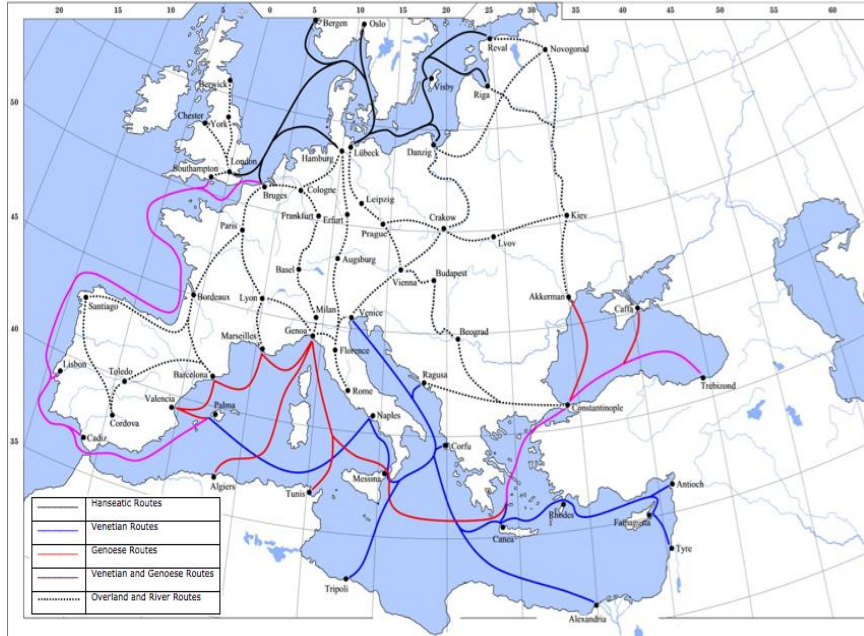
Network Admins: Cave drawing artists
Sysadmins: Hunters and Gatherers

Early advancements

The network of the ancient Greeks got a bit faster. Local groups communicated using intermediaries and sending runners to dispatch messages.

Network Admins: Intermediaries
Sysadmins: Runners

Medieval Expansion

Medieval times brought expanded trade routes and further explorations into new areas. Arguably the beginning of closed networks as certain routes began to fall under specific control.

Network Managers:
Captains/Explorers
Sysadmins: Merchants
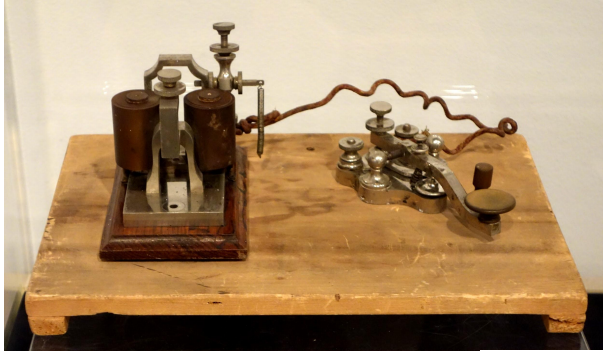
Technology got better and new methods were created. People could begin to share information in the matter of hours and minutes.

Network Admins: Telco companies
Sysadmins: Operators

Computers are invented and the Internet is born

early milestones	Key Layers of the Internet	milestones
email@-1971 Ray Tomlinson	CONTENT	1991-.html Berners-Lee & Cailliau
Archie-1990 Emtage & Deutsch	SEARCH ENGINE*	1998-Google Brin & Page
DOS Houdini-1986 Neil Larson	BROWSERS	1993-Mosaic Marc Andreessen
Vannevar Bush, Ted Nelson, Douglas Engelbart	WORLD WIDE WEB	1990-http:// Tim Berners-Lee
ARPANET-1969 J.C.R. Licklider	INTERNET	1975-TCP/IP Cerf & Kahn
SAGE-1956 George Valley	NETWORKS	1973-Ethernet Robert Metcalfe
Z3-1941 Konrad Zuse	COMPUTERS	1976-Apple Jobs & Wozniak

ARPANET and the early Internet brought about a method of networking that was unprecedented. Sharing data at speeds never seen before.

Network admins are born
Sysadmins are born

- Everyone knows the past is better. Why else would they be called the good old days?
- Reviewing and understanding the past helps us move forward and drive the next generation

THOSE WHO DO NOT REMEMBER THE PAST ARE CONDEMNED TO REPEAT IT.

QuoteHD.com

George Santayana
Spanish Philosopher
1863-1952

Let's take a look at where we are now.

- Doing work in the SDN and OpenFlow community
- Cisco ONE - Open Network Environment
- Cisco VIRL - Virtual Internet Routing Lab

- Largely Linux based firmware for commercial home routers
- Marketplace for preconfigured hardware
- Precursor to open enterprise networking we have today
- Communities mostly active, some have stagnated

Freedom of Choice in the Data Center Rack

Software-Locked Hardware

Choice of Hardware

Choice of OS
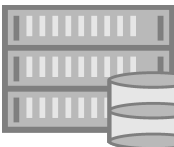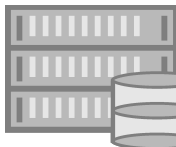
Open Networking Cheat Sheet

Project	Organization	Focus
OpenDaylight	Linux Foundation	SDN controller
OpenFlow	Open Network Foundation	Protocol
OpenStack	OpenStack Foundation	Cloud orchestration
Open Compute Project	Open Compute Project Foundation	Hardware specs
Open Contrail	Open Contrail Project/Juniper Networks	SDN/NFV network virtualization software
ONIE	Open Compute Project Foundation	Boot loader for network OSs
ONOS	Linux Foundation	SDN controller
OVS	Open vSwitch.org	Virtual switch

- via packetpushers.net

- There can be ONIE one
- Open Network Install Environment
- ONIE is to network hardware what PXE is to server hardware
- Enables bare metal switching where the user chooses the operating system to install

- Linux Foundation project to advance the adoption and advancements of SDN and NFV
- Working on trying to give a standard to the market
- Adoption rate is slow but it has a strong list of contributors

- Started at Facebook in 2011
- Quickly gained traction and support from some major companies (Apple, Goldman Sachs, BoA, Fidelity, Microsoft, and Rackspace)
- Started with the idea of making hardware designs open and sharable
- Open source the hardware your open source software runs on

Open Compute Project Members

Microsoft

cumulus®

rackspace.
the open cloud company

Goldman Sachs

(intel)

vmware

big switch networks

hyve solutions

HUAWEI

Hewlett Packard Enterprise

CISCO

zt Systems

Bank of America

Inventec
Innovation for Total Solution

Community

Capital One

SAMSUNG

wiwynn®

4 GreenCloud	Accelink Technologies Co.	Alliance Fiber Optic Products, Inc	Alpha Networks, Inc	AMAX	American MegaTrends, Inc	Amphenol	AndRobo Hitech Solutions	Apple, Inc
Asset Intertech, Inc	AT&T	Axiom Electronics	BetaLead Technologies	Broadcom	Cavium	Cloudbase	Cyan	DataCentred
Datacloud	Dell Inc	DriveScale Inc	Dynamic Group Circuit Design Inc	E4 Computer Engineering SDA	Edison DC Systems	eplexity	Ericsson	Green Platform Corp.
Hammer	Hexatom	IBM	IIIS Tsinghua University	Insyde Software Inc	INPHI Corporation	ITRenew Inc	Juniper Networks	Kuatro Technologies
Linbit USA	Liqid	MarkITx	Memoright International Inc	Mellanox	Midfin Systems Inc	Murata Manufacturing Co	NGCodec. Inc	Nutanix
One Stop SYstems	Orange Silicon Valley	Panasonic	Pattern Matched Technologies	Pluribus Networks	Qualcomm Inc	Schneider Electric	Sk Telecom	Splitted Desktop
Storage IO	Training City	UNH IO	Winstron NeWeb Corporation					

- Started HP Enterprise
- Community-based open network OS
- Partnership between HP, Accton, Broadcom, Intel and VMware. Arista is a supporting member.
- The OpenSwitch community is operating today. The first developer release of the new OpenSwitch NOS will be available before the first half of 2016, with deployments expected in the second half.

- Debian based, currently on Wheezy
- Mostly open with a few parts closed due to Broadcom SDK
- Contributes software back to the Debian main (ifupdown2, Quagga, and VRF)
- Makes Linux the common language from the top to the bottom of your data center rack

- SAI - Software abstraction infrastructure
- Premium Layer 2 and Layer 3 to be GA in Q3 2016

- NAAS - Network as a Service
- Intermediary for the vNICs and other OpenStack services

- Built from the ground up to accommodate Google's rising needs for bandwidth
- Google Andromeda custom SDN environment
- Combination of hardware, OS and SDN

- Network managers adoption of DevOps tools was a given
- Automation - how much more can be automated and how fast can it be done?
- Common language in all parts of the data center means network engineers and sysadmins can speak the same language

Software Defined Networking (SDN) and Network Function Virtualization (NFV) Market Worth 45.13 Billion USD by 2020

http://www.marketwatch.com/story/software-defined-networking-sdn-and-network-function-virtualization-nfv-market-worth-4513-billion-usd-by-2020-2015-07-31-1120317

- Traction helps drive innovation and tells companies what is wanted
- You never know what is possible until you ask

How can I get involved? What can I do to help?

- GNS3 is a virtual platform that allows you to test drive multiple network vendors without the cost of expensive hardware purchases

- The GNS3 community has grown to over 300,000 strong

- Virtualized platform that allows for testing through nested virtualization on GCE and AWS
- Overlay allows for simulation of Layer 2 networking between VMs

Packet Pushers
- http://packetpushers.net/
- Multiple podcasts
- Lots of networking information

Router Gods
- http://routergods.com/
- How-to videos
- Community for learning and certification

- https://community.cumulusnetworks.com/
- Hub for support and ideas surrounding but not limited to Cumulus Networks products

- http://www.opencompute.org/community/get-involved/
- Join in and find something you would like to do
- Have your company contribute

- https://github.com/opencomputeproject/onie

- Have a great cookbook, playbook or manifest
- Work on a great app that can benefit the community

Photo by Anonymous

- Meetup.com - Local groups of like minded individuals, often with pizza and beverages
- User Groups - More opportunities to get involved

Thank You!

START THE NETWORKING REVOLUTION