Penguins all the way up

Scott Suehle - Community Manager

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Who am I?

Scott Suehle

- Community Manager for Cumulus Networks
- Former customer support junkie
- scotts@cumulusnetworks.com
- @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 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
Early Technology

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

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

- 1971: email@- Ray Tomlinson
- 1973: Ethernet- Robert Metcalfe
- 1975: TCP/IP- Cerf & Kahn
- 1976: Apple- Jobs & Wozniak
- 1986: DOS Houdini- Neil Larson

Sysadmins are born

- 1990: Archie- Emtage & Deutsch
- 1990: http://- Tim Berners-Lee
- 1991: .html- Berners-Lee & Cailliau
- 1993: Mosaic- Marc Andreessen
- 1998: Google- Brin & Page

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- File:Internet Key Layers.png
- Uploaded by Concord hioz
- Created: 22 November 2014
So why the history lesson?

- 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.

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
OpenWRT/Tomato/DD-WRT

- 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**
  - Networking: Data center switches
  - Compute: Blade server chassis, blade servers
  - Storage: NAS/SAN appliances

- **Choice of Hardware**
- **Choice of OS**
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- via packetpushers.net
ONIE - Open Network Install Environment

- 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
OpenDaylight

- 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
Open Compute Project

- 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

Goldman Sachs

intel

big switch

Hewlett Packard Enterprise

Cisco

Systems

Bank of America

Huawei

Hyve solutions

Community

4 GreenCloud
Asset Intertech, Inc
Datadock
Hammer
Lite-On USA
One停止 Systems
Storage IO
Accellion Technologies Co
AT&T
Dell Inc
Hexagon
Lidg
Liqd
Orange Silicon Valley
Training City
Alliance Fiber Optic Products, Inc
Axiom Electronics
DriveScale Inc
IBM
MaltiTx
Panasonic
UNH IO
Alpha Networks, Inc
Amplify
American MegaTrends, Inc
BettaLead Technologies
Dynamic Group
Circuit Design Inc
IIS Shanghia
Memjiang
Memoright
International Inc
Pattern Matched Technologies
Winstrom NNetWeb Corporation
Broadcom
E4 Computer Engineering SDA
Imizes Software Inc
NetApp
Philips Networks
Qualcomm Inc
AMAX
Cavium
Edison DC Systems
INPHI Corporation
Cloudbase
CloudFusion
IT Ring Inc
Mura Devices
Manufacturing Co
Schneider Electric
Analog Devices
Solutions
Apple, Inc
Cyan
Ericsson
Juniper Networks
NGCodec, Inc
Nutanix
Splitter Desktop
Samsung

cumulusnetworks.com
OpenSwitch

- 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.
Cumulus Networks - Cumulus Linux

- 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
Dell Networking Operating System 10

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

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

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

- 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
Looking ahead

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

What’s next?

- Traction helps drive innovation and tells companies what is wanted
- You never know what is possible until you ask
I know what you are saying to yourself...

How can I get involved? What can I do to help?
GNS3

- 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.
Ravello Systems

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

Packet Pushers
- [http://packetpushers.net/](http://packetpushers.net/)
- Multiple podcasts
- Lots of networking information

Router Gods
- [http://routergods.com/](http://routergods.com/)
- How-to videos
- Community for learning and certification
Cumulus Networks - Open Networking community

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

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

- https://github.com/opencomputeproject/onie
Open source your own projects

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

- 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

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