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Human Infrastructure Magazine

A Newsletter on a Life in Networking

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Putting on rubber gloves to read this vendor proposal - Greg Ferro

News from OpenCompute Project

This week saw a lot of news about networking servers form the OpenCompute foundation. There are four key pieces of news that I think are worth looking at.

Reference: **Big News on Day One of OCP Summit » Open Compute Project**

Open Source BMC Controller

Facebook open sourced OpenBMC software that runs the Baseboard Management Controller. This is roughly as important as when x86 BIOSs become open source and widely available. Proprietary BMC don't add much value for customers so having a standard and open version should improve all network switches over time.

While BMC are well known technology in server hardware this component hasn't been widely discussed in networking.

The BMC is sub-system that provides software information about the physical hardware in the switch. This device runs internal software when the device is powered on, monitors the physical state of the device such power ready, operating temperature and then starts managing the initialisation of the operating system.

1. Has it own CPU/DRAM/Storage that runs software
2. monitors the power system for stability.
3. Provides physical sensor data such as temperature, fans,
4. Provides out-of-band access to load ONIE or other boot system.
5. IPMI interface for physical device management

Reference: **Intelligent Platform Management Interface - Wikipedia**

Note: In x86 server, the BMC is more commonly known by its brand names of Dell DRAC and HP iLO. They perform similar functions plus have more extensive operational capabilities than a typical networking device today.

Reference: **OpenBMC - Facebook Code**

Open Network Linux (ONL)

Every network device needs an operating system and OpenCompute Foundation has accepted ONL as default operating system going forward. Customers can now choose from commercial operating systems such PicOS from PICA8 or Cumulus Linux (an others) according to their requirements but ONL is set to become the "Linux operating system for networking devices".

BigSwitch Networks is responsible for contributing most of ONL codebase and have proven the operating system as part of their SwitchLite operating system for their products.

Reference: **"Open Network Linux" Helps OCP Move Towards a Fully Open Network Stack | Big Switch Networks, Inc.**

FBOSS

FBOSS is a modular set of applications that run **on** Open Network Linux to provide interfaces for operations and management. My guess is that "OSS" stands for "operational support services" as used in the telco concepts not "open source software" because these applications.

> Despite having "OS" in its name, FBOSS is not a full operating system. Rather, it is a set of applications that can be run on a standard Linux OS. Remember, we wanted to make switches feel like servers. For example, we deploy a set of applications supporting big-data-style computations onto specific tiers of servers, while we deploy packages like proxygen onto servers in our web tiers. We do the same thing for our network switches — each is just like another server that needs an FBOSS set of packages/applications.

Points to note:

1. FBOSS is not tied to a specific operating system and it is possible that Cumulus Linux, PICA8 and BigSwitch might include some of this code into their commercial operating systems.
2. FBOSS is used by Facebook in some of their data centres today.

3. FBOSS implements very few features today since Facebook has implemented what it needs. For example, all device configuration is done via an API (there is no CLI). The only routing protocol is BGP but it is limited to only certain features. This improves the reliability and speed of the device for Facebook.
4. Open Network Linux is the operating system that will "run" FBOSS.

   The initial FBOSS agent release is targeted for the Broadcom StrataXGS series of Ethernet switch ASICs (specifically the Trident and Trident II chips). Broadcom has now released its OpenNSL APIs, and the FBOSS agent can leverage those APIs to program the ASICs. Because OpenNSL has been released, we can open-source the FBOSS agent, allowing others to see how we program the Broadcom ASIC.

Reference: **FBOSS — a set of applications, Not an Operating System**

Broadcom Open Sourced Silicon API

For the last five or so years, Broadcom have used strong NDAs and threats to ensure that few people talk about their StrataXGS silicon (aka, Trident) and there is almost no information available on the Internet. The open sourcing of these APIs is a necessary step is developing software that can use the software provided. It is my view that Broadcom is being forced to open up by its customers such as Facebook who want to use open source and by competitors such as Cavium who realise that being open is a way to reach customers.

The Trident StrataXGS silicon is dominant today but Intel & Cavium are making strong efforts to gain entry in to market. Manufacturers like Accton and Quanta are using Broadcom silicon because there is software support in operating system like Cumulus Linux.

I’m hope that we will see more silicon diversity in the future, mostly because the Broadcom StrataXGS isn’t very good silicon compared to other products and hopeful that we will see OpenCompute with other with switch silicon soon.

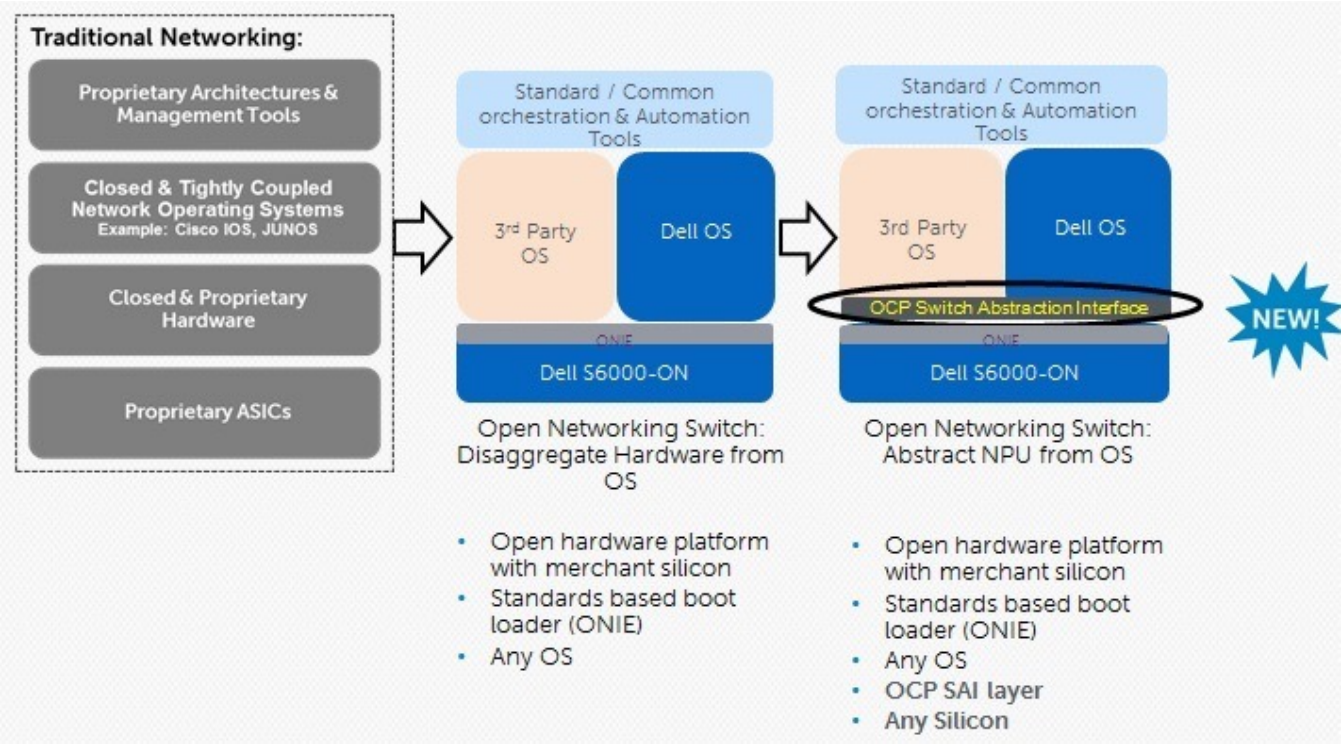
References:

Broadcom Open Switch APIs Drive Innovation in Network Infrastructure | Broadcom Cavium’s XPliant™ Ethernet Switch Supports the Emerging Open Ecosystems

Switch Abstraction Interface

This component at least as important as any of the others. The Switch Abstraction Interface (SAI) enables a common language between vendor network operating systems (NOS) and the particular silicon residing on the physical switch and is a co-operative effort between Microsoft, Dell, Facebook, Intel and Mellanox.

Today the whitebox market is dominated by merchant silicon from Broadcom using the Trident StrataXGS chipset as the first version of software used Broadcom APIs for their interface between the network operating system and silicon. The SAI provides an software abstraction so that other switching silicon can be used by standardising the interaction between the applications, operating system and silicon.



Reference: **How Open Can Networking Go? Dell's Driving the Industry to Find Out**

Lets All Get Together

OpenCompute has been progressing with its architecture for open hardware and software for networking. Compared to storage, servers and rack design the networking architecture has been lagging far behind.

I've made an attempt to bring all of this together in the following diagram. There are three effective layers, roughly equivalent to standard planes of management/control/data, that I've used to separate the functions.

Like to Know More

I am self-publishing a book on Whitebox Ethernet Switches. The book is currently in progress and I will be publishing regular updates as continue to add content (like this article) for the next year or so. You can buy the e-book

at **Leanpub - White Box Networking in 2015**. Its DRM-free and available in ePub, Kindle and PDF formats so you can read it electronically.

Answers to Questions ?

Do you think the behaviour of the ultra-large corp (Facebook, Amazon, Google et al) is damaging, in general, to the average enterprise? Specifically with their recreating protocols, platforms, OS's and features to be more inline with their requirements?

Not really. There is a huge transition in enterprise that is driven by the growth of the consumer market. For the last 30 years, Enterprise IT drove the market and so we got MS (bloody) Windows and cheap craptops. Enterprise IT wanted big powerful CPUs, monolithic applications and private WANs. But now companies like Apple and Samging don't even care about the Enterprise and this means that Internet replaces WAN, CPUs are small and efficient, and applications are hugely different.

That is, the money to made from smartphones and apps for the average person now dwarfs the total IT spend for Enterprise. This means that Enterprise is being forced to follow the consumer markets and make it fit their needs. The days of "enterprise ready" are over.

So I would say that the transition in technology is driven by a change in the market and not by companies. Sure, Facebook & Google are replacing Verizon, BT, Telstra in determining the future of the networking but because the consumer market now dominates IT Spending.

Reference: **AMA - Greg Ferro from Packet Pushers Podcast, 25 Year Enterprise IT Survivor. : networking**

There is no "power" in Positive Thinking

The power of positive thinking isn't really a "power", more like self-delusion that lets you think you are making progress even when you aren't.

> There's just one problem, however. Research my colleagues and I have performed over the past two decades suggests that positive thinking doesn't actually help us as much as we suppose. In fact, across dozens of peer-reviewed studies examining the effects of positive visions of the future on people pursuing various kinds of wishes — from health-related, such as losing weight, quitting smoking, or recovering quickly from surgery, to the improvement of professional or academic performance (for example, mid-level managers wishing to reduce job-related stress, graduate students looking for a job, or school children seeking to get good grades) — we've consistently found that people who positively fantasize make either the same or less progress in achieving attainable wishes than those who don't.

Nothing annoys me more than "life coaches". I would love to them all in the teeth.

Stop Being So Positive - HBR

Huge French TV Network Goes offline for hours

They lost control of their websites and TV broadcast platform. How bad will working there become once they beef up their security ? Imagine the restrictions on tools and technology that they are likely to implement now.

French TV network TV5Monde hijacked by pro-Isis hackers | World news | The Guardian

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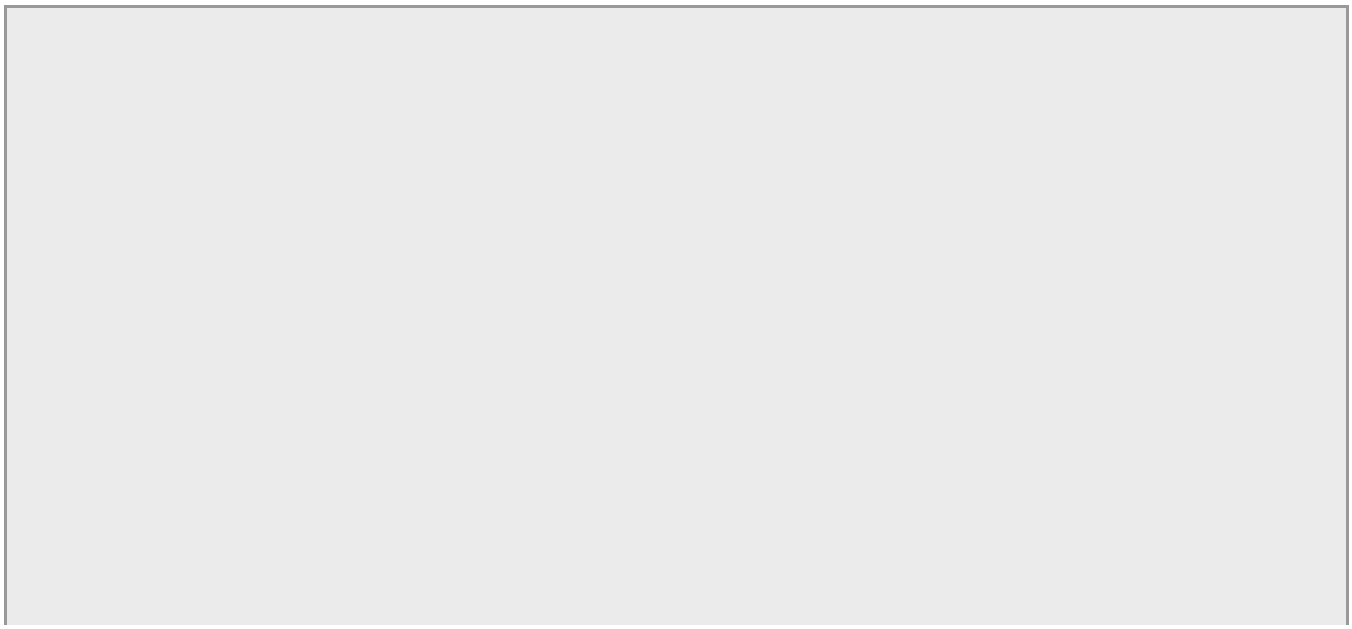
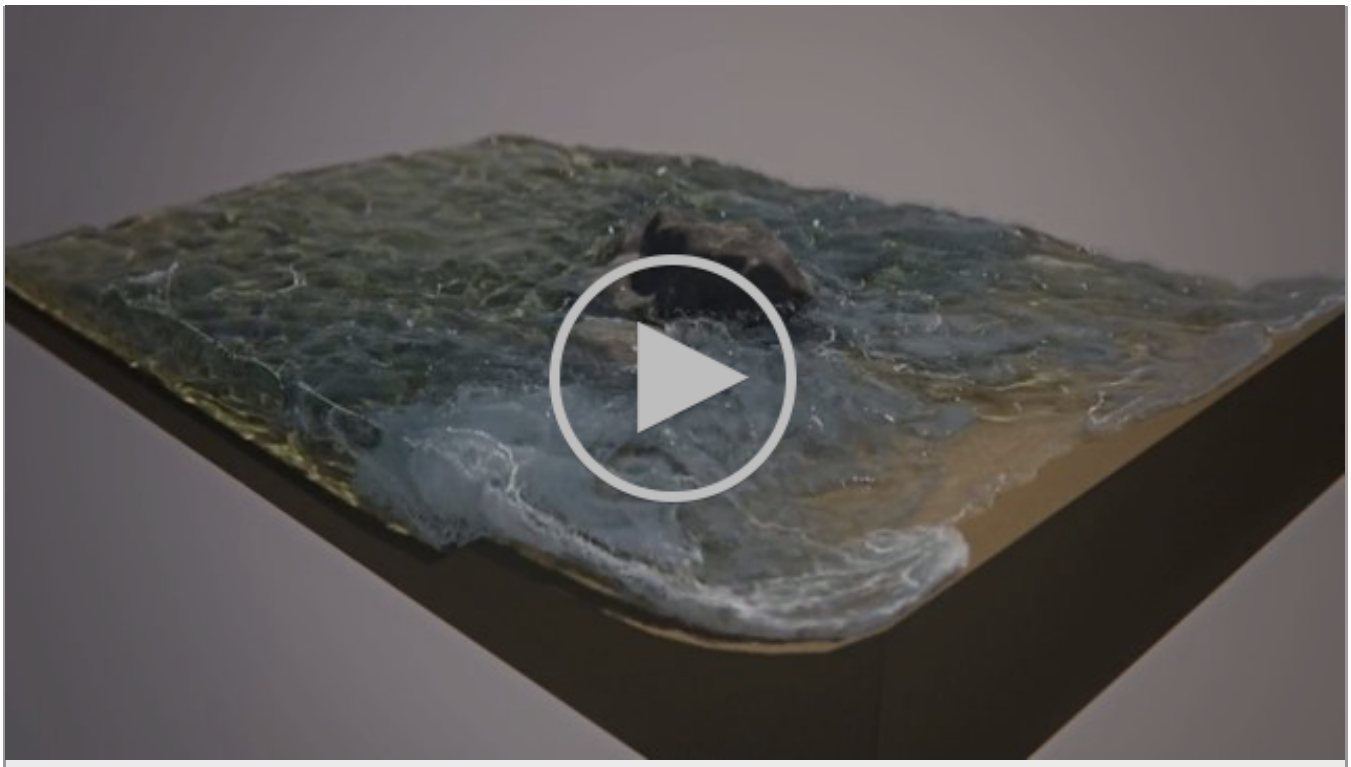
Why Knuckles Cracks

I crack my knuckles and seems to relieve tension in the my fingers but I've always wondered if I an causing some sort of long term damage.

> In every instance, the cracking and joint separation was associated with the rapid creation of a gas-filled cavity within the synovial fluid, a super-slippery substance that lubricates the joints.

'Pull my finger!' say scientists who solve knuckle-cracking riddle | (e) Science News





Check out this rendering of waves and spray. I couldn't stop watching this.

I welcome your feedback, questions and corrections. Send an email to **humaninfrastructure@packetpushers.net** and I will write a response.

About Piece of A Human Infrastructure

A strongly curated newsletter produced by Greg Ferro that contain observations and thoughts on IT Infrastructure with a networking focus that he has seen, done, discussed, reviewed or just simply found on the Internet.

The format is structured but flexible (like any magazine) and will change over time as I settle into a routine of capturing ideas, topics that seem relevant and ultimately finding patterns that seem to be interesting to you. Your feedback will drives changes so don't hesitate to email with feedback or ask followup questions for the next edition.

About Greg Ferro

Greg is a co-host of the Packet Pushers Podcast a weekly podcast on Data Networking which has over 8000 subscribers. He blogs regularly at EtherealMind.com for the last eight years and is pretty well known these days. He also write as an analyst for Network Computing and Gigaom Research. He speaks at major events on Data Centre Design, SDN and life in technology. He moderates panels, advises customers and technology companies.

He works as a part-time network engineer in the UK on a freelance basis. Because real work configuring routers and switches remain not only a passion but important to keeping touch with the industry.