Human Infrastructure is a bi-weekly magazine-style newsletter from EtherealMind.com with News, Views and Opinions on being a human in IT Infrastructure. Hit the signup page to subscribe and join 5,013 subscribers.

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# Human Infrastructure Magazine

A Newsletter on a Life in Networking

**Issue Number 11**
**06/15/2015**

Technology in Education

## Thought For The Week:

I' m not above bringing donuts to a meeting to get people to like me.

# **This Week:** Education In High Schools

I'm writing this as I'm traveling to London to be keynote speaker for a small conference of education IT professionals. I enjoy meeting people who work in real situations and in a market that's almost invisible to everyone else.

I learned that delivering IT to schools is a microcosm of the change happening broadly in enterprise IT. In the UK, the school IT budget is decreasing dramatically as education spending shrinks (*bites tongue very hard to avoid politics*). I've heard talk of 20-30% cuts across the board including staff, desktops, and servers. The focus is to do the same with less (no one sees how they can do more).

There is a real sense of urgency and desperation in education IT that I haven't seen anywhere else. The widespread lack of technology training in schools, especially high schools, make me incredibly sad. As a society, we should be pouring money into education, not cutting back.

/greg


# **Subception:** The Cloud In Education IT

The adoption of cloud services in education has been dramatic. I've noticed a polarizing debate between IT managers who prefer Google and those who perfer Microsoft for cloud services. Some are strongly in favour of Google Chromebooks using Gmail, Docs and Apps to allow for per-child computing at low unit cost and simple replacement.

Then there are schools (and the people who work in them) willing to pay more for the Microsoft platform because they don't want to switch away from Office & Exchange. Windows laptops have higher TCO (purchase cost, maintenance and licensing) than Chromebooks. And Microsoft Azure isn't free (Google has a paid plan for classroom software).

This debate is complicated by the budgeting process. Some schools have more capital than others. They have access to one-off funding every two to four years. Other schools have only a year-to-year operating budget.

School networks present interesting challenges. As you might expect, schools are going wireless, but this has serious implication for the shape of campus networking. The number of Ethernet ports is dramatically reduced but Power over Ethernet (POE) is a major issue to power those wireless APs.

Also highlighted was the end of the chassis switches in the campus. Once purchased for high density, high speed Ethernet, the speed/port combinations of the current generation of fixed-format switches mean that switch chassis are no longer needed. The next generation of switches, based on the Broadcom Tomahawk chipset, has 32 x 100GbE ports that can be modded using QSFP cables and configured to 10/25/40/50/100GbE.

Take a look at the Dell Z9100-ON:

- Multi-rate options including 10, 25, 40, 50, or 100Gb Ethernet ports with the Z9100-ON
- 750 Watts of power
- Exceptional low latency delivering as low as 400 ns
- User-configurable table adjustments for virtualized data-center deployments
- Hot-swappable redundant power
- Hot-swappable redundant fans

While I'm not sure that customers will "appreciate" pay-as-you-grow licensing, this product is a direct replacement for mid-range chassis switches

that are common for campus networks.

Combined with virtual switch stacking technologies like Brocade's HyperEdge, you really don't need to shell out the big dollars to build a campus Ethernet network--which is good for the customer.

Ethan Banks on Networking

Contributor

## Guest Writer: The Politics Of Networking

I used to believe that networking was a marketplace of ideas, and that the best technology would win the day. As I continue to build relationships with vendors and hear more back-channel chatter, I've found that the "best technology" often has little to do with anything. Blame my idealism, I suppose. I mean, most engineers want to assume some technology they are using that { dominates the market | was ratified by the IETF | won open source mindshare } is the best thing out there.

Reality is that some companies are founded due to jealousy. Some open source projects exist because someone else took their toys and went home. The goal isn't necessarily to do something better. It might just be to stick a finger in the eye of some peer. Rivalries are sometimes long-standing, and frequently not friendly. Press is manipulated by one company to write pieces that say something negative about another. White papers sometimes hurl personal barbs, if you read between the lines.

Lest you think such pettiness is exclusive to the realm of rich egomaniacs in Silicon Valley, it can hit you and me as well. I've heard from several customers of a very large networking company who tell of salespeople going over their heads because they didn't want to buy solution X. Some sales reps even recommend someone get fired because they weren't planning to use

solution X. This illustrates my point: The best tech doesn't always win.

Let's wrap this up with a brief thought. When reading about technology, it can be fascinating to watch the personalities involved. (LinkedIn is your friend, BTW.) You'll be surprised at the connections you can draw.

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## **Guest Writer:** Self-Driving Trucks, Self-Driving Networks

Automation is a key selling point of a host of emerging technologies, including SDN, NFV, and hyperconverged systems. Instead of wasting time racking of physical components and configuring devices, paths, and services, software takes care of it for you.

There are certainly benefits to more automation. It can cut costs. The IT department can serve the organization or customers more quickly. And technical staff can turn their minds and time to more useful things.

Automation is also poised to transform other industries. This May, automotive company Daimler introduced an **autonomous 18-wheeler truck**. Using cameras and radar, the truck can steer, regulate speed, and apply brakes without any input from a human driver.

Daimler isn't proposing to remove human drivers (at least not yet). A human driver would still be required when passing other vehicles, backing up, or operating the truck in a city.

One press release even trumpets a creepy-sounding **human/truck hybrid**: "Autonomous driving will fuse truck and driver into a team more than ever,

and into a meaningful, effective and highly economical combination of man and machine."

Daimler's list of benefits sounds very similar to those touted by tech vendors selling automation: relief from monotonous task, less room for human error, and the opportunity for operators to perform other tasks while the machine drives itself.

But if automation really takes hold, you could conceivably get rid of human operators entirely. According to a **Wired article**, when it comes to trucking, "The end game is eliminating the need for human drivers, at least for highway driving."

With autonomous trucks, you don't have to worry about an operator getting tired or making a mistake. You don't have to schedule mandated breaks, or deal with sick days, or pay salary and benefits.

Now substitute "trucks" for "networks" and read that paragraph again.

Automation is a double-edged sword: as you free up humans from tedious tasks, you inevitably also free up some number of humans from employment. How do you think automation will affect your job?

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*Got something to say? Send your contribution to* ***humaninfrastructure@packetpushers.net*** *and, if we publish it, we will pay you a pittance for it.*

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## You Need Business Continuity, Not Business Connectivity

Most software-defined wide area network (SD-WAN) vendors today provide an extended LAN solution to protect and connect enterprise locations. We call this business connectivity. What an enterprise really needs is an SD-WAN solution that optimizes and ensures WAN availability. We call this *business continuity*.

For organizations with customer-facing systems (Web site, customer care, sales, etc.), any application downtime has an immediate impact on revenue and customer satisfaction. From an internal IT perspective, when critical applications and data are not available, employee productivity suffers a significant reduction. Customer and employee expectations mean that critical systems now require 100 percent uptime. The key to limiting the impact of system failure is to fix the problem fast by providing rapid (sub-second) failover to alternative data center resources. How organizations achieve that is the challenge.

Access to the continuously available data center architecture relies on a high-performance, highly reliable WAN. Advances in software-defined networking (SDN) enable the network to support continuous availability via geographically distributed data centers. **This hands-on demonstration** illustrates how Sonus' business continuity solution is helping State Street Bank and other customers keep business up and running around the clock, even in the event of disaster. Ensure you know the differences between SD WAN business connectivity and SD WAN business continuity— and why

*business continuity* is a must for your network. Learn more at **www.sonus.net**.


# Q&A: The Future For Network Engineers

**Question:**

What do you think the future of networking and network engineers will be like?

**Answer:**

You will spend **less** time working physical things like cables, routers and racks as we move to software appliances, pre-built racks of servers, networking and storage. Networking will get more complex in a virtualization systems where overlay networks are the normal.

1. Fundamental technology like IPv4, IPv6, Ethernet will be unchanged.
2. Some technology will die. But it will die slowly - maybe so slowly that you don’t notice.
3. Software appliances, LAN, WAN, security and management will be added to existing networking skills.
4. You will do less boring work like finger banging the keyboard to configure VLANs.
5. Protocols will matter less in the future as software becomes equally important. This is a return to the old ways

Oh, and remember that the future will keep changing, so this advice is good for about 3 to 5 years. Maybe less.

> Got questions? Sure you do! Send them to **humaninfrastructure@packetpushers.net** and get answers (with no guarantee you'll like them).


# Internets of Interest : Pages To See

Webpages that have caught my attention in the last couple of weeks.

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## Wikipedia Moving To HTTPS

> Today, we're happy to announce that we are in the process of implementing HTTPS to encrypt all Wikimedia traffic. We will also use HTTP Strict Transport Security (HSTS) to protect against efforts to 'break' HTTPS and intercept traffic. With this change, the nearly half a billion people who rely on Wikipedia and its sister projects every month will be able to share in the world's knowledge more securely.

Link: **Securing access to Wikimedia sites with HTTPS « Wikimedia blog**

## 464XLAT: Breaking Free Of IPv4

This presentation (PDF) talks about native IPv6 networking in the T-Mobile network but providing IPv4 networking using 464-XLAT.

> T-Mobile is a large US carrier. It has decided to operate part of its mobile network, that supports some 45 million subscribers, in IPv6-only mode. The way they provide the IPv4 component of a Dual Stack environment is by a form of encapsulation that tunnels the IPv4 network stack on the mobile device across the IPv6 carrier network to the IPv4 gateway in the provider network. This encapsulation approach goes by the rather scary name of "464-XLAT".  So T-Mobile now operates a very large IPv6-only mobile data network that can be used by handsets that support 464-XLAT.

Link: **464XLAT: Breaking Free of IPv4**

## Campus LAN Design – A Different Approach

This post discusses the idea of using GPON in a campus network. I last looked into this about five years ago, and this post talks about how it could be done today.

> Recently I came across an alternative campus LAN design approach, something that was completely new to me. A high end hotel undertaking a project to refresh its network needed new endpoint connectivity to all the rooms and management areas, and in doing this they preferred to ditch the traditional network design instead opting to implement a GPON solution.

Link: **Campus LAN Design – A Different Approach**

## New Dune Chips Enable Heftier Switches

> The Trident-II ASIC delivers 1.28 Tb/sec of switching bandwidth. Its follow-on Tomahawk ASIC, which debuted last year, almost triples that up to 3.2 Tb/sec. As big as that jump is, these Trident and Tomahawk ASICs have fixed deep packet buffers and fixed table buffers on their ASICs, which can be limiting, and they cannot be ganged up to create modular and aggregation switches.

Link: **New Dune Chips Enable Heftier Switches**

## Mesosphere - Data Center Operating System

This is incredibly exciting to me. If you want to see the future of private cloud operations you need to watch the video in this blog post from Mesosphere.

> When Mesosphere started, its founders had a vision of making the datacenter as easy to use as a laptop. They asked themselves questions that seemed crazy at the time. Why should 40,000 cores in a datacenter or cloud be any different than the 4 cores in a laptop? Why can't we use a command line or even a graphical UI to navigate a datacenter like it was a desktop machine? Why can't we install datacenter-scale services with the same ease that we install apps on our iPhones?

Link: **The Mesosphere Datacenter Operating System Is Now Generally Available**

## How To Keep Your Knives Dangerously Sharp

Everyone should look after their tools. This includes kitchen implements.

> Of all the implements in your kitchen, your knives deserve the most respect. Think of them as mini swords, and imagine you live in a time of knights and kings. You wouldn't face a legion of belligerents with a dull sword, would you?

**How to keep your knives dangerously sharp - The Manual**

## Things On My Mind

# **On My Mind:** Virtual Doughnuts

By the hairy balls of **Crom**, I love doughnuts.


Here are the last five articles from the EtherealMind and Packet Pushers blog.

## EtherealMind.com Latest

Logical Razors Can Take on Corporate Babble - **Link**
Canned Response to BGP Networking Questions – Reddit - **Link**
IETF RFC 8374 BGPsec Design Choices and Summary of Supporting Discussions - **Link**
Net Neutrality Hasn't Ended, We Don't Know When - **Link**
Next Market Transition ? Cheaper Buying, Less Selling - **Link**

PacketPushers.net - The Last Five

Network Break 182: BGP Hijacked For Cryptocurrency Heist; Juniper, Big Switch Unveil New Products - **Link**
Show 387: AWS Networking – A View From The Inside - **Link**
PQ 147: Connecting Security And GDPR Compliance (Sponsored) - **Link**
Datanauts 131: Masters And Mentorship - **Link**
Network Break 181: Russia Accused Of Infrastructure Attacks; US Targets ZTE - **Link**

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I welcome your feedback, questions, and corrections. Send an email to **humaninfrastructure@packetpushers.net** and we'll get things sorted out.



**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.