

*IN THIS WEEK'S ISSUE: Networking isn't hard, Shortlisting, Simple vs Complex.
Enable the images, it looks better.*



PACKETPUSHERS

Human Infrastructure Magazine

A Newsletter About a Life in Networking

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The "Complexity is Simple" issue.

Thought For The Week:

What doesn't kill you means you can collect the pay check.

1. Is Networking Complex/Hard?

By Greg Ferro

It's not complicated (natch). It's distributed. And we don't have visibility to know.

Distributed Systems

What makes networking hard? A network is a distributed system where state must be shared between devices that are unreliably connected. It's a [fallacy](#) that a network will ever be reliable or predictable.

Skills

Network technologies and their fundamentals are simple. We know this because technical training for network operators, such as the Cisco CCNA/CCNP training programs, require so little time. So, for example, let's say that it takes about 120 hours to master the CCNA content and about 320 hours (8 person weeks) to master CCNP. There are no prerequisites - no math, programming or computing skills needed - just turn up and learn.

Creating a "well-trained and certified professional" in just 12 weeks of full time effort is not a lot of time. 8 weeks is about the length of vocational training for blue collar trades and marginally longer than it takes to train any basic skill.

Demonstrably, networking isn't **hard** to learn. It's just learning like any other skill.

Technology

Networking hasn't changed much in the last 30 years. Someone time traveling from 1996 would easily recognise a router or a switch. Network protocols like IP, Ethernet, BGP and OSPF are basically unchanged since the 1980's. Even IPv6 has been happening for more than 20 years.

It's getting simpler too. Only DNS, SSH and TLS are needed for day to day compared with dozens of protocols in the 1990s. Network devices are simpler to operate and network virtualisation of devices and paths is simplifying operations.

Faster and Smaller

I'll grant you that faster makes things harder but faster networks are also smaller networks. WAN Carriers that increase their speeds of backhaul to avoid more connections. Data Centre networks have fewer devices as servers use virtualisation to host up to 150 virtual machines or more per server. Containers increase this density further.

Network complexity is increased by the number of nodes in the network not the speed of the network. Faster speeds tend to result in fewer devices.

The Network Edge is Gone

The Corporate WAN is less important as tablets and smartphones use Internet. TLS encryption in the application has moved rapidly to replace the absolute need for VPN services. The edge of the network has been erased.

The network is now part of the application. The network edge is the device. Network complexity has been reduced. Application complexity has increased.

Be Realistic

In my view, the hardest part of networking is the lack of visibility. The tools don't exist that can inform me when an application is running slow because of the network. Or that a carrier isn't meeting their SLA.

That's why I'm very interested in Telemetry as the next generation of change in networking. The network isn't really a problem anymore, it's the lack of visibility that creates complexity.



Sponsor: Nuage Networks

Software-Defined Security: Pervasive. Vigilant. On-Demand

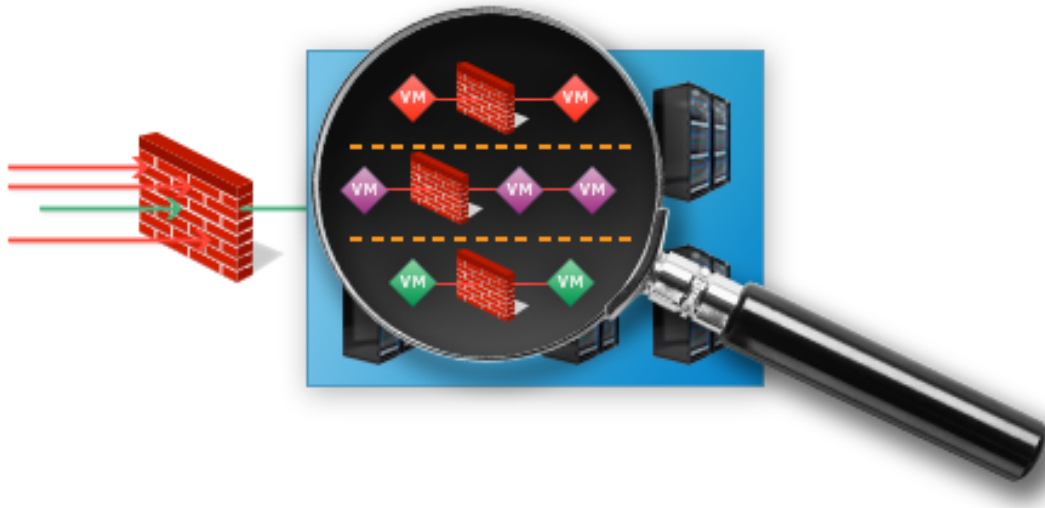
Today's networks are constantly changing to meet business demands and compliance requirements. More users. More applications. More end points. More complexity.

Enterprises can leverage the pervasiveness and agility of cloud connectivity by applying policy-based automation to their growing network topologies—but they must make fundamental changes in virtualization and networking, which necessitates new approaches to security. Cloud characteristics that affect security policies include:

- **Secure multi-tenancy** to ensure protection of individual tenants and applications sharing the same data center infrastructure and network.
- **On-demand service delivery** even in the face of unique security requirements requiring policies on a per-tenant basis.
- **Application-specific policies** that may require a single security appliance to support different policies on different traffic flows.
- **Location independence** that demands a virtualized—not fixed—approach to security topology.
- **Elastic scale-out** of additional security services to match the pace and scalability of new capacity development.
- **Untrusted cloud providers** that have inhibited enterprises from deploying solutions that could be more cost-effective.

The scale, complexity, and sophistication of security policies in large cloud networks requires policy-based automation delivered with an open, extensible Software-Defined Network (SDN) solution. Organizations need a solution that delivers and manages virtual networks over shared infrastructures, managing connectivity between physical and virtual workloads across the data center and the WAN.

SDN automates microsegmentation policies between tenants and workloads



Microsegmentation can be applied to enforce security policies at the most granular level, coupled with a zero-trust model that ensures the protection of individual workloads. Malicious endpoints must be detected and quarantined automatically by a platform that also provides contextual visibility and analytics.

Fortunately, solutions are available today that deliver policy-based automation for cloud networks. The result? Enterprises can accelerate cloud deployments and provide on-demand service delivery with peace of mind. For more information, visit nuagenetworks.net.

2. Three Vendors You Need On Any Shortlist

by Fred Chagnon

The vendor shortlist is a typical part of the procurement process, but it can be a puzzle to assemble in the technology market, where incumbents and startups kick up clouds of marketing dust to obscure your vision.

Here's a simple formula I use to decide which vendors will get an RFP. This

recipe not only helps me quickly narrow my search, but also includes due diligence steps to help me make the case for the final purchase.

The Incumbent: I reserve a spot for the vendor I'm with today; after all, it is their job to lose. There's a cost associated with switching vendors that goes beyond dollars; the impact that switching has on people and processes in my organization shouldn't be taken lightly.

And even if we're certain we're going to make the switch (for instance, because the vendor doesn't have a needed feature, or its costs are prohibitively high), I still request the bid because it brings the reason for switching to light.

The Champion: You know who this is. The one whose name is synonymous with the field itself; who owns more than half the total addressable market. If we take market dominance to mean this vendor is "the best", isn't it my job to bring the best to my organization?

I might be tempted to pass over the champion because I know they're likely to blow my budget, but this reason, or any other, is only explainable after considering their response to my proposal.

The Dark Horse: This last spot requires an open mind. Here I like to see a vendor who is doing things a little differently. Someone who offers a cloud-native or software-only solution where everyone else is still offering black boxes. Perhaps an OPEX-friendly monthly subscription price model in a market full of CAPEX schemes. I try to be open to different approaches to solving the problem and evaluate the vendor's unique solution on merit against its competitors.

There are times where these roles can't be filled, or where they overlap (such as when my incumbent is also the champion). In those cases, it's usually easy to find the next challenger in the market to fill a slot on the short list.

This is a simple formula, but it helps me get a clear picture of the landscape to be an informed buyer.





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3. Choosing Simple over Complex

by Ethan Banks

I have a problem. I need to pick up a box that's resting on a table in front of me. The box isn't heavy. The table isn't high. I could simply walk over to the table, grab the box with my two hands, and pick it up. That's what most of us would do. That's the obvious solution.

But that's not the only way I could have solved the problem of picking up the box.

- I could have smashed two table legs, causing the box to slide towards me, and then picked it up.

- I could have flown a drone with a grappling hook over the box, and used the hook to pick up the box.
- I could have estimated the weight of the box, calculated the number of helium balloons required to float the weight, and attached balloons to the box, lifting it up.
- I could have thrown a lariat around the box and pulled it toward me, picking it up when close enough.
- I could have applied vacuum suction to the side of the box, using that power to pick up the box.
- I could have turned a spatula into a tiny catapult under the box, launching it into the air towards me.
- I could have built a box picking-up robot.
- I could have hired Criss Angel to trick me into thinking the box was levitating.

The interesting thing about all of these alternate ways to pick up the box is that they are more complex than the obvious solution.

Smashing table legs is needlessly destructive. Drones need batteries and skilled operators. Helium balloons require precise measurements and calculations. Lariat-throwing is a skill best left to cowboys. Picking up boxes isn't a great use-case for vacuum cleaners. Catapults are entertaining, but decrease the probability of successfully picking up the box. Robots are complicated machines with long lead times before they are ready for production. Criss Angel would be expensive to hire, with questionable end results.

Therefore, I'm going to take the obvious, simple solution. The others are, by comparison, too complex.

Similarly, business problems should be resolved using the simplest possible solution. That doesn't mean the solution won't be complex. But as engineers, we should be engineering solutions that are as simple as we can make them.

Several times over my career, I've inherited "science experiment" networks, where every nerd knob was turned with no consistency across the system. CiscoPress gone wild! As soon as a network device went down, network behavior became unpredictable. I've executed many change controls to remove needless features or replace a complex design with a simpler one.

A documented feature does not imply it should be enabled. Neither does learning about a feature in a class, hearing about it on a podcast, or reading about it on a blog.

If you don't yet have a healthy skepticism of feature bloat, overly clever architectures, and interdependent moving parts, you will. Complexity is enough of a challenge when required. Adding complexity for the coolness factor is an act of self-sabotage.

1. Complexity introduces technical debt. If it's hard to build, it will be hard to maintain and upgrade. Technical debt can also introduce technical inertia, where it becomes too hard to move from one system to another.
2. Complexity pushes humans out. Simple systems are easier for humans to understand and troubleshoot. Complex systems are beyond the skill or ability of some to comprehend, leaving only a handful that can make sense of the system. Think about this the next time you're about to recommend a "rock star" design.
3. Complexity introduces fragility. For instance, a single router used as a default gateway for a VLAN is simple. For redundancy, perhaps we add a second router that can also act as a default gateway. Now we need a first hop redundancy protocol to float the IP address between the two routers. Yes, we made the system more robust, but we've also made the system potentially more fragile by adding other components to the system that can break.

I'm not arguing that we shouldn't have box picking-up robots or first hop redundancy protocols. I am arguing that networks should be built as simply as business requirements allow. Nerd knobs are there to solve specific problems, and not demonstrate your configuration prowess.

Don't solve non-existent problems. Solve only the existing ones, and do it as simply as you can. The engineer that comes after you will thank you.

Internets Of Interest

A collection of pre-loved links that might interest you. "Pre-loved" because we liked them enough to put into this newsletter. It's not *true* love.

The real reason this elephant chart is terrifying

[This article in Medium](#) caught my eye because it asks difficult questions about the economy and technological development, specifically in regard to the ability of machines and computers to replace humans--and not just factory workers, but white collar jobs as well.

"We need to be thinking hard, now, about technological unemployment. About the fact that while technology provides benefits to billions, the economic gains tend to be concentrated for a few."

Cisco ASA Firewall breach by NSA is getting worse

It seems that the NSA had completely owned the ASA firewall for nearly a decade.

Recently released code that exploits Cisco System firewalls and has been linked to the National Security Agency can work against a

much larger number of models than many security experts previously thought.

I've got the same questions that we had with Juniper firewall breach - did Cisco collaborate with NSA ? Was an employee subverted ? Is Cisco pissed at the US government ?

[LINK](#)

[Related link](#) of original breach notice.

VMware Hybrid Cloud Solution

VMware Cloud Foundation is multi-cloud networking strategy for for Hybrid Cloud if you want to stay committed to VMware as a vendor partner (like most of you will).

VMware Cloud Foundation™ is VMware's unified Software-Defined Data Center (SDDC) platform for the private and public cloud. It brings together VMware's vSphere®, Virtual SAN™ and NSX® into a natively integrated stack.

[LINK](#)

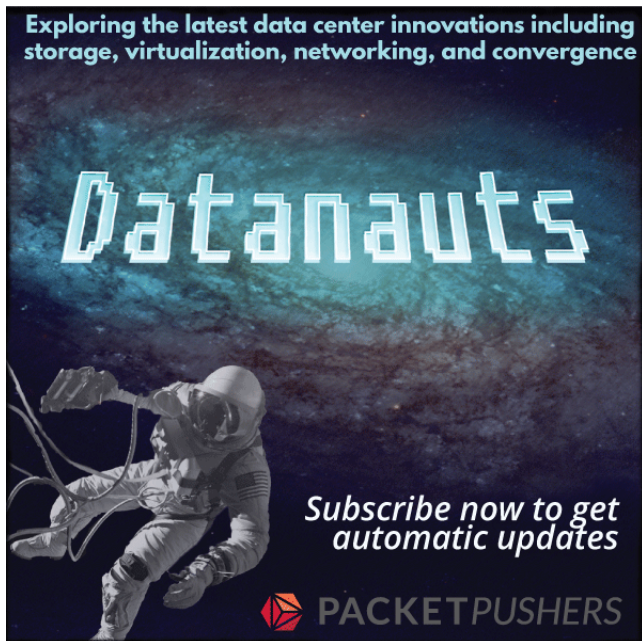
Worldwide IT Spending Forecast to Reach \$2.7 Trillion in 2020

IDC says we will spend how much ?

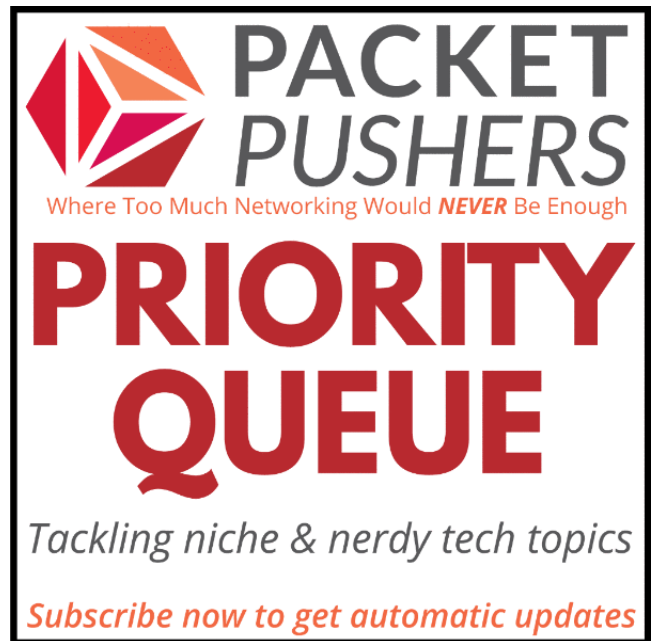
International Data Corporation (IDC) finds that worldwide revenues for information technology products and services will grow from nearly \$2.4 trillion in 2016 to more than \$2.7 trillion in 2020. This represents a compound annual growth rate (CAGR) of 3.3% for the 2015-2020 forecast period.

So the \$20B spend on the public cloud is a drop in the bucket.

[LINK](#)



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Recent Articles

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[EtherealMind.com Latest](#)

[Logical Razors Can Take on Corporate Babble](#)

[Canned Response to BGP Networking Questions – Reddit](#)

[IETF RFC 8374 BGPsec Design Choices and Summary of Supporting Discussions](#)

[Net Neutrality Hasn't Ended, We Don't Know When](#)

[Next Market Transition ? Cheaper Buying, Less Selling](#)

PacketPushers.net - The Last Five

[Network Break 182: BGP Hijacked For Cryptocurrency Heist; Juniper, Big Switch Unveil New Products](#)

[Show 387: AWS Networking – A View From The Inside](#)

[PQ 147: Connecting Security And GDPR Compliance \(Sponsored\)](#)


[Datanauts 131: Masters And Mentorship](#)

[Network Break 181: Russia Accused Of Infrastructure Attacks; US Targets ZTE](#)



Watch This!

Where we collect some videos that make us reflect, think about our inner lives, or just entertain us.





Apparently Overwatch is great game but now they are making movies with the game software. All the feels.



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The End Bit

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