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## Don't Be Afraid Of SD-WAN Lock-In

**Greg Ferro**

One objection I hear to SD-WAN is that if you buy it, you are locked in with a particular vendor.

Every purchase decision creates lock-in. There are always trade-offs. Interoperability is preferable, and sometimes it's necessary, but it's not *mandatory*.

Avoid the fallacy of thinking you have one network. You have a [network of networks](#). Each one is unique and interoperable. A WAN router cannot operate as a DC router. This is lock-in that exists in your network today.

Q. What is the key issue about technology lock-in?

A. The cost and time to switch to another solution.

## Return On Investment

In speaking with several companies about their SD-WAN deployments, ROI is typically less than one year. That is, the expense of replacing the existing routed WAN with an SD-WAN is recovered in cost reductions or savings in six to twelve months.

A few people I spoke with didn't get those results because they had unique requirements, or were stuck with legacy, high-cost, dedicated MPLS services from telcos, and they didn't realize cost reductions in the WAN.

Pro Tip: Do not overspend on fancy hardware, software, or multi-year licenses. Just get the bare minimum and plan to replace it every two years.

Don't have a heart attack! New networking technology doesn't have the baggage of existing network technology. (Yes, there are still problems. SD-WAN is not a fairy tale, but it's nowhere as bad as your existing OSPF or IPsec DMVPN network.)

I should just stop here. Really. Nothing else matters if the numbers work. But to humor those of you who just can't handle the fact that money always wins in technology, let's keep going. (*Looks forlornly at today's cheap-ass Ethernet networks and wishes that FDDI was still around.*)

## Overlay Networks

Overlay networking provides a workable abstraction from the physical network. Today's 'routing protocols' are brittle, unstable, and unpredictable compared to controller-driven SD-WAN.

Don't compare the problems of your existing networks with the realities of modern approaches to moving packets around.

Because overlay networking is easy to change, it's also easy to replace. However, it's also important to understand it.

## Run Two SD-WANs In Parallel

Your physical networks that use a routing protocol have substantial interoperability issues. Having two SD-WAN solutions running in two different functional areas at the same time limits the interoperability challenge to a small interface.

This situation is not ideal, but it's also not impossible.

## You Don't Need Special Hardware

Carrier bandwidth doesn't need special routers anymore. The days of ISDN, fractional T1, and frame relay are behind us. Some of you are blighted by telecommunications infrastructure that was obsolete by 2010, but don't make the mistake of building a five- or ten-year strategy for the lowest common denominator.

## Minimal Talent Required

No special talent is required to deploy and operate SD-WAN. Some vendors are selling complexity like a car salesman who wants to tell you all about the engine and gearbox that no one cares about.

I've met people with limited know-how and minimal experience that got the SD-WAN working with few hassles. It wasn't a magical, problem-free experience, but the problems were handled with a reasonable amount of training and time.

## Change Your Thinking

1. Be careful that you do not project the problems of your existing technology onto tomorrow's technology.
2. Take some time to research SD-WAN and understand how it fundamentally changes the WAN. You don't need precious bandwidth with guarantees: You want a LOT of bandwidth from many providers to get performance. It's a challenging idea.
3. Yes, you might have an accounting problem. Find a way to get around that.

## Tech Tip: FCC ID Search

Today's Tech Tip is the [FCC ID Search](#), a Web site that lets you look up technical specs on all kinds of devices that transmit radio waves. The tip comes from Ken, who used it to help solve a wireless mystery out in the field. Ken writes :

"My employer has a 15-acre photovoltaic solar array which produces power for several buildings. The solar panels automatically tilt and rotate in order to follow the sun throughout the day.

Recently, a number of those panels were not responding to commands from the controller. An electrical engineer contacted me because he believed there was a problem with the "WiFi network" that controlled the array.

I grabbed my laptop and drove out to the solar field. Once on-site, I fired up my favorite Wi-Fi analyzer. At first glance, it appeared the electrical engineer was correct: There was absolutely no Wi-Fi traffic visible on my analyzer.

That didn't seem right because I was standing just a few feet away from one of the wireless controllers. It appeared to be active – it had power, and the LEDs were green and blinking in a pattern that seemed to suggest traffic.

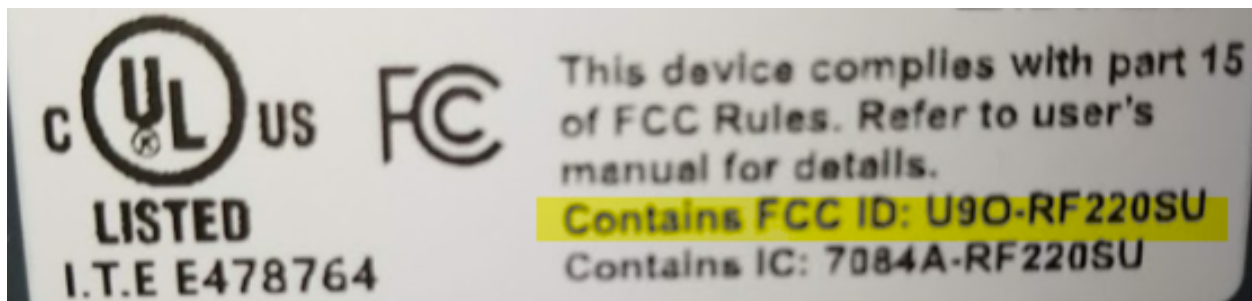
Then something occurred to me; the electrical engineer knows all about electrical concepts, but he's not a network pro. When he said it was a "WiFi" issue, I immediately

equated that to IEEE 802.11-based wireless network technology.

But maybe this wasn't 802.11 equipment. It could be some other RF technology that my analyzer couldn't detect. How could I figure that out?

The answer was easy! Thanks to my tax dollars, the FCC requires that "an intentional radiator (transmitter) is required to be approved using the certification procedure."

As part of the certification process, the manufacturer provides the FCC with detailed information on the device, including the radio technology and frequency used. Once approved, the FCC assigns an ID that uniquely identifies that device. The FCC requires that every transmitter displays its ID somewhere on the equipment. A quick check of the back of the hardware showed...



By submitting the FCC ID at the FCC ID Search web site at <https://www.fcc.gov/oet/ea/fccid> I was able to access the full suite of technical documentation that the manufacturer provided to the FCC.

The documentation package revealed that the device was actually using IEEE 802.15.4, a low-rate wireless PAN technology that my Wi-Fi analyzer couldn't detect.

**Pro tip:** If you don't get any results after entering the full FCC ID, try entering only the "grantor" ID – the characters to the left of the hyphen. Then browse the results to find a match of the full FCC ID. The FCC ID Search web site is an indispensable tool for understanding the radio characteristics and capabilities of access points, smart phones, or any commercial wireless device. Be sure to add it to your bookmarks today!"

*Ken, thanks for sharing. If you have a tech tip that will fit in a newsletter format (a link, a script, a pointer to a favorite tool, and so on), let me know at [drew@packetpushers.net](mailto:drew@packetpushers.net).*

## Tech Blogs: How To

### A Use Case for Network Automation - Linux Journal

<https://www.linuxjournal.com/content/use-case-network-automation>

Eric Pearce uses Python's Netmiko module to perform network discovery. Why not SNMP? "SNMP could provide a lot [of] the information I need, but it would have to be configured on each device manually first. In fact, the mass enablement of SNMP could be one of the first use cases for the network automation tools described in this article." A zero-to-hero style piece that assumes little about your knowledge level going in. - Ethan

## **TCP/IP over Amazon Cloudwatch Logs – clog – Clay Smith on Medium**

<https://medium.com/clog/tcp-ip-over-amazon-cloudwatch-logs-c1cf08f2296c>

File under weirdest thing you'll read this week. "This post is about implementing TCP/IP over Amazon Cloudwatch Logs using Go, which enables you to access network services running inside of AWS Lambda functions. It's slow and not very useful, but it was a fun way to learn more about Linux networking and using AWS services in a way that might horrify some AWS engineering teams." See also [RFC 1149](#) and updates. - Ethan

## **PyCon 2017 Regular Expressions Tutorial - Trey Hunner**

<http://pycon2017.regex.training/>

This appeared in my Twitter feeds this week. There's a 3 hour and 20 minute video paired with a lot of written material all about regex. FYI, the video embed stopped working, so you'll have to [watch the video portion on YouTube directly](#). I haven't gone through the tutorial/course myself, but at a glance, the coverage of regex looks thorough. I know a bit of regex, but this goes deeper--by far--than I've ever been. Bookmarking this one. - Ethan

## **Understanding the BGP prefix count - mellowd.dev**

<https://mellowd.dev/bgp/bgp-prefix-count/>

Darren O'Connor manages a highly connected Internet environment, and takes a look at his BGP peers. He explains why the prefix counts he's getting vary from peer to peer. - Ethan

## **BGP Zombies - RIPE Labs**

[https://labs.ripe.net/Members/romain\\_fontugne/bgp-zombies](https://labs.ripe.net/Members/romain_fontugne/bgp-zombies)

BGP zombies are routes that hang around in Internet routing tables even after the route has been withdrawn by the origin router. RIPE Labs investigates, offering statistics and speculation. "Given the erratic patterns observed in our study and the investigations

conducted with network operators, we believe zombies are mainly the results of software bugs in routers, BGP optimizers, and route reflectors.” - Ethan

## How to Plan for a Network Cutover - Network Phil

<https://networkphil.com/2019/04/28/how-to-plan-for-a-network-cutover/>

If you've never had to mastermind a network cutover before, this piece is a good place to start building your process. I especially value Phil's concluding advice. "I'd never start a cutover without a rollback plan." Rollback plans are often overlooked, because hey, you're not gonna rollback, right? And yet, that rollback plan is the thing that can save your butt at 2:30am when things aren't going well, and you know you'll have to try the cutover again another time. - Ethan

## My Activity - Google

<https://myactivity.google.com/>

Google has a new feature to automatically delete your browsing history. I found it more useful to tune up my entire Google Activity and block most stuff here <https://myactivity.google.com/myactivity>. Take a close look at the what Google thinks you want from ads too. Creepy and enlightening. I don't have pets or children anymore but Google thinks I do. - Greg

## Packet Pushers Live In NYC: Last Chance!

**gluware Intent '19 >** **PACKET PUSHERS**

Learn how to accelerate enterprise network automation

Tuesday, May 14 2019  
1-5pm  
Cocktail Reception  
5-7pm  
Limited seating,  
reserve your space now

Executive Conference Center  
1601 Broadway 7th Floor  
New York, NY 10019

[Register Now](#)

Time's running out to [sign up](#) for our live event in Times Square, taking place Tuesday, May 14th. Get nerdy about network automation with the Packet Pushers and event sponsor Gluware.

We're going to talk technology, hear from brand-name Gluware customers including pharma giant Merck about how they're automating brownfield networks, show live demos, and record a podcast on site.

When the tech talk is done, you can mingle with your networking peers at a free reception with food and drink, and say "Hi" to the Packet Pushers (assuming you can pry us away from the *hors d'oeuvres*).

[Click here to sign up](#). It's a free event, and we hope to see you there.

## Tech Blogs: Opinion

### Game Changer: VMware Cloud on Dell EMC - Not Your Dad's IT

<http://www.notyourdadsit.com/blog/2019/4/30/game-changer-vmware-cloud-on-dell-emc>

Nathaniel Avery opines on a new managed service offering announced at Dell EMC World: VMware Cloud on Dell EMC. It's a suite of VMware software running on Dell hardware that lives on your premises, but gets managed by VMware. In other words, it's the cloud consumption model brought down out of the sky to live in your data center. Dell and VMware aren't the first to try this model, but it's a logical combination. Nathaniel anticipates a few repercussions for on-site IT staff, but he also notes that shops staffed by generalists may appreciate this approach. He also says "It's only a matter of time before everyone is working with some version of cloud infrastructure." - Drew

### Why open source firmware is important for security - Ramblings from Jessie

<https://blog.jessfraz.com/post/why-open-source-firmware-is-important-for-security/>

Jessie Frazelle has a detailed blog, as well as a link to a presentation she gave, that makes the security case for open-source firmware. The crux of the argument is that the proprietary firmware that runs most machines these days is buggy, complex, obscure, and happens to operate with a high degree of privilege, making it an ideal target for exploits. Of course, open-source firmware can't guarantee zero bugs, but because it's open, the community can publicly track and fix problems. Check it out. - Drew

### Throwing the baby out with the bathwater (No, you're not Google, but why does this matter?) - Rule 11 Reader

<https://rule11.tech/throwing-the-baby-out-with-the-bathwater-no-youre-not-google-but-why-does-this-matter/>

I have said, “You’re not { Facebook | Amazon | Netflix | Google }.” The idea is to match technology with problems your company actually has--most companies don’t have the problems of FANG. Fair enough, but Russ White proposes a careful perspective balance. “Not everything is going to fit in your environment, of course. On the other hand, some things might fit. And regardless of whether any particular technology fits or not, you can still learn something about how systems work by considering how they are building things to scale to their needs.” - Ethan

## Take Social Media With A Grain Of Salt - kamshin.com

<https://www.kamshin.com/2019/05/take-social-media-with-a-grain-of-salt/>

Max Mortillaro shares a fresh reminder that social media is a filtered view of people’s lives. You’re seeing what they want you to see, in the way they want you to see it. If you can’t identify with the filtered lives you’re seeing online, remember you’re not alone. As Max says about himself, “You may look at someone successful, but that « successful » person you look at may feel itself insecure, prone to impostor syndrome, ever doubtful of its abilities. That’s who I am.” - Ethan

## Who Are the Winners and Losers? - Network Phil

<https://networkphil.com/2019/05/03/who-are-the-winners-and-losers/>

Phil takes a wrecking ball to the idea that success is defined by money, status, and employers. “It’s your CHARACTER that makes you a winner or a loser, not your salary, not whether you work for someone or own your own company, and certainly not whether you work in a cubicle or in a fancy office overlooking the park.” - Ethan

## The Lulz

Where can I get one?





# IT News

## 2019 Data Breach Investigations Report - Verizon Enterprise Solutions

<https://enterprise.verizon.com/resources/reports/d...>

Verizon releases a yearly breach report based using data-driven analysis. It's not an opinion or perspective, it's full of research based on raw data. We could wish for an independent source, but only an organization like Verizon has the money, resources, and data to produce this. Give it a read, but put your marketing goggles on first.

That said, it's useful for planning how to spend your security dollars by considering where the real risks are. - Greg

## Google CTF 2019 is here - Google Online Security Blog

<https://security.googleblog.com/2019/05/google-ctf-2019-is-here.html>

"Teams of security researchers will again come together from all over the globe for one weekend to eat, sleep and breathe security puzzles and challenges - some of them working together around the clock to solve some of the toughest security challenges on the planet. Up for grabs this year is \$31,337.00 in prize money and the title of Google CTF Champion." 31337. I see what they did there. - Ethan

## How the Skills Gap Strains - and Constrains - Security Pros - Dark Reading

<https://www.darkreading.com/cloud/how-the-skills-g...>

Kelly Jackson Higgins covers a new report by the Enterprise Strategy Group (ESG) and Information Systems Security Association (ISSA) International that finds "Most cybersecurity professionals are struggling with heavier workloads and insufficient time to properly master and deploy all of their security tools' features, as well as hone their own skills." - Drew

## Unless you want your payment card data skimmed, avoid these commerce sites

<https://arstechnica.com/information-technology/201...>

I swear we didn't intend to make this whole section about security, but sometimes that's just how things go. In any case, Dan Goodin at Ars Technica has a nicely reported piece about this troubling development: "More than 100 e-commerce sites around the world are infected with malicious code designed to surreptitiously skim

payment card data from visitors after they make purchases, researchers reported on Wednesday. Among those infected are US-based websites that sell dental equipment, baby merchandise, and mountain bikes. " Wheee! - Drew

## New Products & Industry Takes

### Migrate Your AWS Site-to-Site VPN Connections from a Virtual Private Gateway to an AWS Transit Gateway - AWS Blog

<https://aws.amazon.com/about-aws/whats-new/2019/04/migrate-your-aws-site-to-site-vpn-connections-from-a-virtual-private-gateway-to-an-aws-transit-gateway/>

"We are excited to announce AWS Site-to-Site Virtual Private Network (VPN) connections can now be moved from a virtual private gateway to an AWS Transit Gateway without having to make any changes on your customer gateway." The Packet Pushers talked about Transit Gateways with AWS networker Nick Matthews in [Heavy Networking episode 433](#) if you'd like more background information. - Ethan

### Announcing WSL 2 - Windows Command Line Tools For Developers - Microsoft

<https://devblogs.microsoft.com/commandline/announc...>

"Yes, you did just read that heading correctly! We will be shipping a real Linux kernel with Windows that will make full system call compatibility possible. This isn't the first time Microsoft has shipped a Linux kernel, as we have already shipped one in 2018 when we announced Azure Sphere. However, this will be the first time a Linux kernel is shipped with Windows, which is a true testament to how much Microsoft loves Linux! We'll be building the kernel in house from the latest stable branch, based on the source available at kernel.org. In initial builds we will ship version 4.19 of the kernel." I think hell just froze over. - Greg

### Cisco Security Advisories and Alerts

<https://tools.cisco.com/security/center/publicatio...>

It's a bad month for security in Cisco Security products, with over 20 High or Critical CVEs. It's a bumper crop of holes ranging from the incompetent to facepalm. In particular, the vulnerabilities in Cisco Firepower suggest that testing is optional? - Greg

## **Endace Launches Deep Storage 10GbE Network Recorder with Powerful Hosting Capabilities - Endace**

<https://www.endace.com/endace-launches-new-8200-series-endaceprobes>

Endace has released a new packet capture appliance, the EndaceProbe 8200. It's a 2U device with effective packet storage of 360Tbytes and a write-to-disk speed of 15Gbps. You can stack multiple probes to increase storage capacity, while managing and searching the appliances from a central console. You can also run third-party applications, including commercial and open-source applications, directly on the appliances. - Drew

## **Curvature Expands Global Footprint of Independent IT Services Delivery with Opening of Australian Office - PR Newswire**

<https://www.prnewswire.com/news-releases/curvature-expands-global-footprint-of-independent-it-services-delivery-with-opening-of-australian-office-300844884.html>

Curvature, which provides networking equipment and services on the secondary market, continues to grow. The company has announced a new office in Sydney, Australia and a satellite office in Melbourne. This puts the US-based company in twelve companies around the world. - Drew

## **Itential Enables DevOps & NetOps Teams to Accelerate the Move Toward Software-Driven, Programmable Networks with Launch of Developer Hub - Itential**

<https://www.itential.com/news/itential-enables-dev...>

Itential has launched DeveloperHub, which the company describes as "providing powerful tools and resources to enable DevOps and NetOps teams to simplify and accelerate the move toward software-driven, programmable networks through modern automation and agile network operations. " -Drew

## **New Whitepaper For Premium Ignition Members**

If you're a premium member of Ignition (i.e. you dropped \$99 on us), we've just released a new whitepaper available for download:

Intent-Based Networking Part 2: A Deep Dive Into Network Abstraction & Continuous Validation, by Phil Gervasi.

The new whitepaper:

- Explores in technical detail how Intent-Based Networking (IBN) systems work
- Explains how IBN systems abstract network devices & configurations to build working models
- Discusses the pros and cons of different approaches to abstraction
- Reviews the closed-loop model that drives the value of IBN systems
- Provides key takeaways

Thanks to everyone who's signed on as a premium member. We'll have more premium content coming soon, including a new paper on SD-WAN, and Ethan is hard at work on a video course on QoS. We appreciate your support and patience as we build out a library worth your time and money.

## The End Bit

Sponsorship and Advertising - Send an email to [humaninfrastructure@packetpushers.net](mailto:humaninfrastructure@packetpushers.net) for more information. You could reach more than 6,000 subscribers.

Human Infrastructure is bi-weekly newsletter with view, perspectives, and opinions. It is edited and published by Greg Ferro and Drew Conry-Murray from PacketPushers.net.

If you'd like to contribute, email Drew at [drew.conrymurray@packetpushers.net](mailto:drew.conrymurray@packetpushers.net).

We don't give away your email address or personal details because that would suck.

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