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Nuanced Problems Deserve Nuanced Solutions
By Ethan Banks

I recently exchanged emails with a Packet Pushers listener about QoS. Does QoS matter, or doesn't it? Is it worth investing in a QoS scheme?

These are the wrong questions to ask about QoS--or any technology. The correct questions are, "What business problem am I trying to solve? What technology tools can help me solve that problem?"

Let's illustrate with an imaginary business problem.

After a successful HQ VoIP deployment, Consolidated Financial Services has begun migrating remote offices to VoIP. The help desk reports an increasing number of tickets logged about phone call quality problems. The issue is confined to interoffice calls traversing WAN links. The executive suite is aware of this issue and is requesting a fix ASAP.

After analyzing bandwidth utilization, it's clear that WAN links are saturated from time to time. During the saturation windows, MOS drops. After cross referencing call logs with MOSs, the root of the call quality problem is definitely WAN link saturation.

Is implementing a QoS scheme the right answer? Maybe, but that's too simplistic. The issue here is **nuance**.

Technology solutions are rarely one-size-fits-all business problems. The best solution could be a mix of technologies. As an engineer, your job is to determine the appropriate nuanced solution, given your constraints.

Let's think through several ways to resolve this VoIP call quality problem.

1. **Less traffic.** A cursory analysis of the link showed saturation. But what was the link saturated with? Business-critical traffic? What it if was backup traffic that's not supposed to be going over the link because all backups have local targets, i.e. a misconfigured server? What if there is an ongoing malware issue spiking link utilization now and then? What if there's a missing default route at the remote office that's sending Internet traffic out via the WAN link when it's supposed to get dumped to the local Internet circuit?

2. **More bandwidth.** It could be that a higher bandwidth link creates enough headroom to remove the bottleneck. But what if there's no money for a bandwidth upgrade? What if the nature of the traffic means that a link doubled in capacity is still saturated frome time to time?

3. **QoS.** A quality of service scheme could be deployed to prioritize VoIP traffic. If properly implemented, the scheme could guarantee a certain amount of traffic for VoIP, while also eliminating jitter. Call quality should be improved, and a consistent MOS delivered, no matter if the link is congested. But what if the WAN provider doesn't offer traffic prioritization once your traffic hits their network?

You can only craft the best solution if you have a deep understanding of the problem.

- It could be that QoS, if implemented well, resolves the problem.
- It could be that analyzing the traffic mix reveals inappropriate traffic that, once eliminated, eases congestion.

- It could be that the remote office has simply outgrown its link, and that a bigger circuit is required.
- It could be that dedicating a separate circuit just for VoIP traffic makes sense.
- Maybe the right answer is mix of these. Perhaps eliminate inappropriate traffic from the link while also implementing a QoS scheme.
- Maybe the right answer isn't eliminating certain traffic classes from the WAN link. Perhaps all the traffic is legitimate. Using QoS to throttle certain traffic classes could leave more headroom for VoIP, though.
- Maybe the right answer is a complex traffic engineering scheme, but you know the NOS code in your infrastructure has TE bugs. And besides, no one on staff could support the solution effectively. You're just a consultant.

I hope you get the idea. Business problems are nuanced, with constraints unique to that business environment. Those constraints will force design compromises. Within compromises are tradeoffs.

Therefore, an answer to a nuanced problem can't be a simple, "Yep, let's slap some { QoS | SDN | bandwidth | cloud | leaf-spine | automation | EVPN } on it, and all the issues go away!"

Rather, your answer must be nuanced, and demonstrate a deep knowledge of the problem, constraints, and possible solutions--with their tradeoffs. Much of the time, there will be multiple possible technology solutions to any business problem, **where the ultimate solution is selected in consultation with the business stakeholders.**

Sponsor: Cisco FutureWAN'18
The SD-WAN Virtual Summit, Nov. 7 - 8

Got questions about SD-WAN? Sign up for a free online summit November 7th and 8th to learn about how to deploy branches more quickly, improve user experience, bolster security, and more.
This two-day event brings together IT practitioners, analysts, and vendors to share insights and technical presentations on SD-WAN.
The Summit includes a one-hour presentation by Ethan Banks and Drew Conry-Murray that will review key SD-WAN and security integrations including network virtualization, service chaining, branch-in-a-box, APIs, and the perimeter.

Plus you can see live demos, learn from expert panels, ask questions, and get everything you need to know about SD-WAN. Register here to browse the full agenda and then mark your calendar for this free online event.

Twelve Habits Of Real People: A Checklist
By Drew Conry-Murray

You know those lists that circulate on Twitter about common habits of successful founders and CEOs? Or health tips to boost your productivity?

This isn't one of those lists.

- Stay up late consuming tweets like Doritos

- Eat actual Doritos

- The whole bag

- Rub tongue against mouth abrasions as penance

- Sleep fitfully

- Drink too much coffee the next day

- How is it 1:15 pm already?

- Eat salad to restore self-worth

- Eat a Three Musketeers at 4:30 pm and burn self-worth to the ground

- Go home and watch Netflix

- 11:00 pm? Just five minutes on Twitter, I swear

- Do we have any Doritos?

Virtual Design Clinic 2: The VDC Strikes Back

Join the Packet Pushers and guest speakers for Virtual Design Clinic 2 on October 11, 2018. This live, free, online event is a half-day mini-conference you can attend without a plane ticket, hotel room, or bad coffee and stale pastries (unless you bring your own, in which case that's on you).

Virtual Design Clinic 2 features technical presentations including:
- Using Puppet For Network Automation
- Creating Virtual Networks With Terraform

- Understanding ASICs And Switch Internals

Plus, you can participate live in AMA sessions with the Packet Pushers and guest panelists.
- Virtual Design Clinic 2
- October 11, 2018
- 11:00 am to 3:00 pm Eastern US timezone

Register here and we'll see you in the cybers.
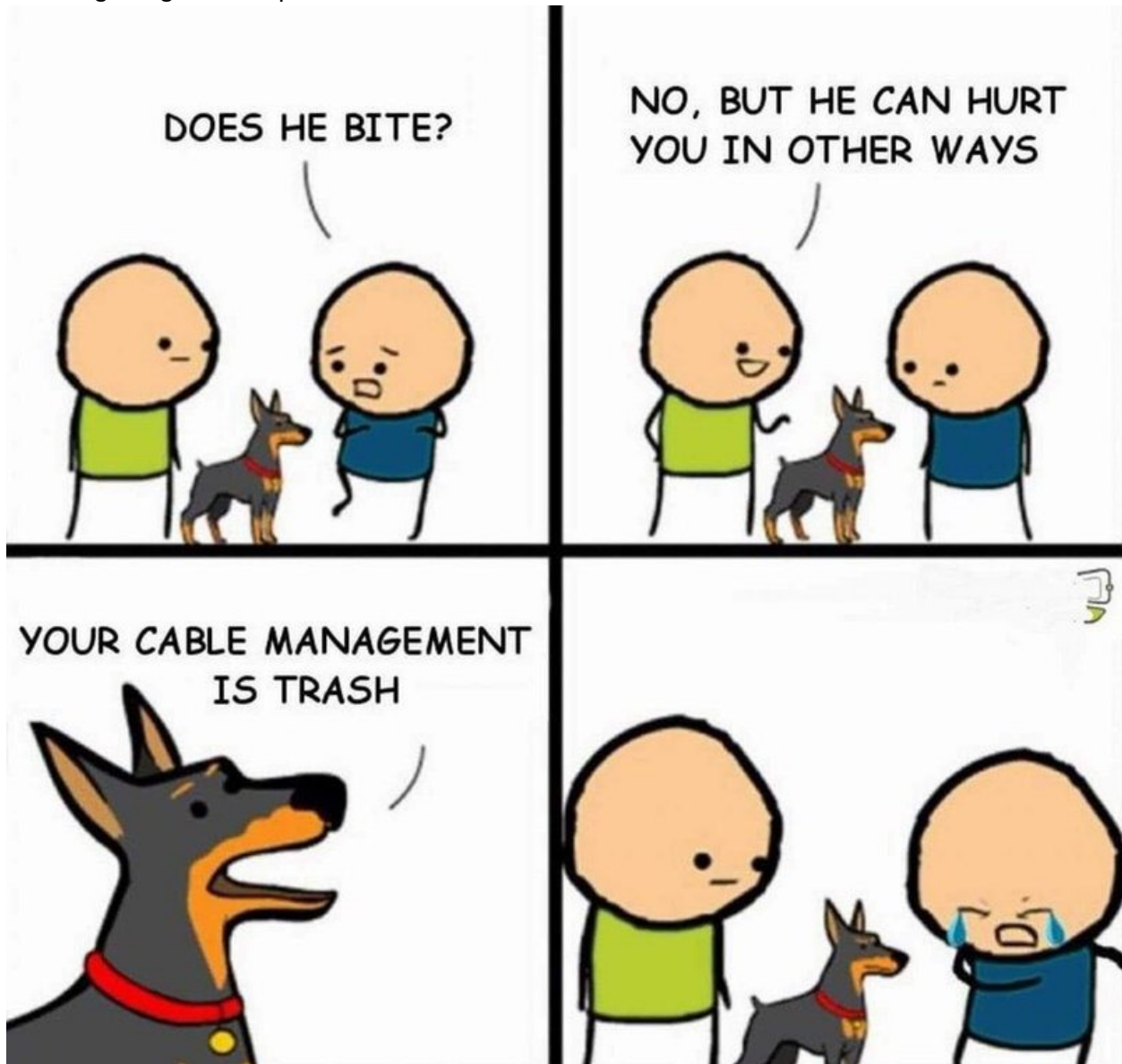
If you can't make all the presentations on October 11, we'll post them to our membership site, Ignition, which you can join for free.

And mark your calendar for a Holiday Change Freeze VDC coming December 19th!

Thanks, Internet!

Amusing things wash up in our social media feed. This is one we liked.

Packet Pushers News Bits

We generate a lot of content besides the long-form podcasts: short podcasts, blogs, news briefs, even video. These are a few recent posts.

Mode's Private Network Now An Option For Versa SD-WAN (Blog)

Mode, a startup that offers a private network that competes with MPLS services, has announced an integration deal with SD-WAN vendor Versa Networks.
Under the deal, Versa customers can use Mode's network alongside broadband links and private connections from traditional carriers and service providers. Customers can set up connections to Mode's network within Versa's portal, just as they would other links.

LINK

Barefoot Releases P4 Studio To Streamline Tofino ASIC Programming (Blog)

Barefoot Networks, which makes the Tofino programmable switch ASIC, has released P4 Studio, a software development environment (SDE) designed to make it easier for Barefoot customers to program Tofino and write custom functions and features.
P4 Studio is based on P4, an open-source language for programming network devices. P4 Studio encompasses a suite of eight tools.

LINK

Security Needs More People & Operations Not More Products (Video)

Simon Crumplin from Secrutiny talks about the need for more people in security to get value from your existing technology.

LINK

Internets Of Interest
Links, stories, and research from around the Web.

Keeping Up a Fast Pace on Spectrum - Medium

FCC Chairman Ajit Pai published a blog on Medium outlining a host initiatives the FCC is undertaking. One that caught our eye is a proposal to make the 6Ghz band available for unlicensed Wi-Fi use.

Pai writes "*...this massive amount of spectrum could enable faster Wi-Fi connections and substantially expand the reach of Internet access providers that use unlicensed spectrum, like small, competitive fixed wireless companies.*"

You can read the blog at the link below. The blog also includes a link to a PDF of the official proposal.

LINK

At age 69, former Cisco CEO John Chambers tells us 'I'm not retired' - Business Insider

Uncle John Chambers is back in the news. The ex-Cisco leader has a new book of business advice and personal stories, and is also investing in, and coaching, a number of startups. The interview with Business Insider also includes a brief excerpt of the book, called *Connecting The Dots*.

LINK

The End Bit