Open Network OS'

what's our deal here?

this presentation is...

- grenade rolling
- penance for sins
- rhetorical playground

- not a technical lightning talk
- a collection of "beer discussion" topics that keep coming up
  - i'm just writing the gist of some of them down (this might be a mistake)
  - mea culpa: i've argued the other side of this on behalf of ${EMPLOYERS}

hot take: we[1] aren't leaning the Open NOS problem hard enough

- there's been limited discussion in NANOG/non-OCP forums re: open NOS options
  - NANOG: 2x SONiC-specific presentations, 1-3x whitebox presentation
  - RIPE / APRICOT discussion seems similarly limited
- **our peers in the compute/systems space have been realizing significant innovations and gains leveraging open OS' - why aren't we?**
- hyperscalers are pushing Open NOS' with varying/reasonable degrees of success
  - see OCP last week - AI scale and economics are driving interesting developments
- vendors have made marketing noise around SONiC support
  - limited durable engagement
  - actual support options remain largely opaque - you need to have a heart-to-heart w/your AT

the yeah buts …
- networking's special …
  - asserted by: network equipment vendors, SDOs, operators, certification industry
- open network operating systems are only for hyperscalers
  - asserted by: network equipment vendors, enterprises, the podcasting class…

1. by "we", i mean the networking industry

yeah but … networking's special

networking silicon *can be* pretty special
- sorry, your features … probably aren't special

fixed pipeline ASICs readily support a wide range of features and deployment profiles
- currently very well suited to DC applications
- well suited to campus applications

Internet DFZ scale routing platforms have been holdouts on the Open NOS front
- until relatively recently …

optics start out special …
- become less special as PMDs and packaging becomes commodified

vendors can do "trick" features with available ASICs and provide open interfaces to these ASICs
- see also - the SAI (Switch Abstraction Interface) in SONiC
- novel behaviors - e.g., misc. interactions with encryption, funky tunnels, etc. are not always well suited to the current open abstraction layers. (avoid these if possible)

yeah but: … it's for hyperscalers

hot take: hyperscaler problems *are* your problems too … on different (time)scales

- multiple network operating systems [1] drive waste
  - vendors spend R&D 💸 on non-differentiating infrastructure
  - fragmentation of operator management systems [2,3]
- proprietary OS' are subject to vendor lifecycle whims
  - invariably leads to stranded hardware investment
  - operators requiring extended lifecycle support when there's still life in the hardware
- if you're not on the IO hamster wheel, you're likely looking at:
  - forced infrastructure swaps based on OS support capabilities
  - increased fragmentation of management planes
  - prolonged security compliance challenges
- late stage capitalism + supplier consolidation

I Am Altering the Deal, Pray I Don't Alter It Any Further.
– Darth Vader (aka vendor/acquirer X)

1. caveat: nature abhors a monoculture
2. mumble, mumble OpenConfig, IETF models, YANG, etc.
3. note #2 yields still more fragmentation

practicalities

- open NOS introduction on many/most legacy platforms is unrealistic
  - commercial pressures / leverage gone / etc. - you might be in luck for some DC platforms
- current incentives/leverage are concentrated in a handful of operators
  - these operators drive priorities
- "novel" hardware interfaces remain problematic
  - novelty exists at different levels in the OS stack
    - ASIC interfaces (SAI)
    - bootloaders (to say nothing of things like SecureBoot, etc.)
    - mundane stuff (LEDs, power supply info, etc.)

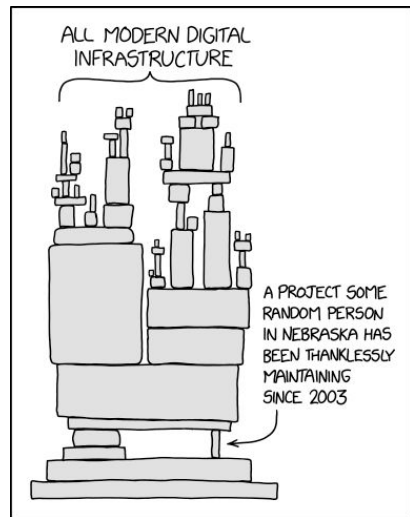this is a nudge to encourage folks to create this opportunity

capitalist realities

supported open (source) software can't really be free
  (and i would assert, shouldn't be)
- 💰💰💰 drives features and development priorities
- we need to give serious consideration to the underpinnings our networks are built on

have you asked/harangued your vendor-critter about …?
- their contributions / participation in various Open OS projects
- if your vendor is marketing SONiC/ONL … can they point at contributions in the code-base? (show me your PRs ….)
- is their bootloader actually available?
- do they have options for allowing to you to transition your current/legacy platforms to an Open NOS in the future (say, when they're done supporting that platform on xOS?)

  if you're not making this a thing … it won't be a thing.

ALL MODERN DIGITAL INFRASTRUCTURE

A PROJECT SOME RANDOM PERSON IN NEBRASKA HAS BEEN THANKLESSLY MAINTAINING SINCE 2003

xkcd: Dependency

conclusion

we seem to lack practical open discussions of what is required to facilitate a durable ecosystem of suppliers/vendors in an open NOS world

- there are technical components to this
- there are commercial components this
- there are (🤦) political components to this

it would be great to see submissions for future NANOGs that expand on deployment considerations associated with open NOS'

(i strongly suspect the PC would find this useful fodder for future NANOGs)

🍅🍅🍅