PAST, PRESENT, AND FUTURE OF NETWORK OPERATIONS

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A BIT OF HISTORY
WHERE DO WE COME FROM?
From an ops perspective nothing minimally interesting happened for almost 10 years.
MEANWHILE IN THE SYSTEMS WORLD

Focus was on breaking down the app as much as possible
WHY OH WHY?

- The network is a complex distributed system
  - Distributed database with eventual consistency? I call it {OSPF | IS-IS}
  - Gossip protocols? I call it BGP
- Dev guys kept asking us to enable st%#&d and unique knobs in the network to fix the app. Repeatable configurations down the toilet
- Focus was on complex protocols to move packets faster and build even more complex networks
- CCIE's can't learn anything but IOS and TCL and love typing command after command
They think all the problems can be solved with yet another AFI or encapsulation mechanism.
Major Tier 1 service providers still manage the network **manually** causing Internet **outages** and taking **3 months** for enabling a port.
/RANT

BECAUSE THERE IS HOPE
VENDOR ABSTRACTIONS

• **N.A.P.A.L.M.** - One API to rule them all
• **OpenConfig** - Vendor-neutral, model-driven network management designed by users
STREAMING TELEMETRY

Pub/Sub service to stream network telemetry using vendor-neutral models.
ROOT ACCESS TO UNDERLYING LINUX OS

FINALLY

SOMEONE GETS IT

Even to the ASIC via SDKs
USE CASES

- Network abstractions || Infra as code
- Running code on the network
- CI pipeline for TE changes
OPERATIONS ARE ABSTRACTED

(ansibly) ➜ ansibly git:(master) × inv --list
Available tasks:
  deploy.base           Deploy Base Role. Check Base role documentation for further details.
  deploy.faild          Deploy faild. Check faild role documentation for further details.
  dev.ipamd_start       Start docker container with ipamd.
  ops.peer_disable      Disable a peer on a device.
  ops.peer_enable       Enable a peer on a device.
  ops.pop_drain         Drain a POP for maintenance.
  ops.pop_undrain       Put POP in production.
  package.install       Deploy a package. Check metarole_service role documentation for further details.
  package.list          Get a list of overridden packages.
  preflight_checks.all  Run all the preflight checks.
  preflight_checks.ipv6 Run preflight checks for IPv6 role.
  show.bgp_neighbors    Get BGP neighbor state and statistics from the device.
  show.pop              Check POP health
OPERATIONS ARE **EXPOSED VIA API'S AND CHATOPS**
RUNNING CODE ON THE NETWORK
• Turns switches into hardware load balancers
• An agent running on the switch communicates with hosts
• The agent programs the ASIC
• The application is not really the point of this talk
WRITING NETWORK SOFTWARE

1. Merge triggers another Jenkins JOB
2. Jenkins executes invoke test.
3. Vagrant builds several VMs with different images, one for every image we are running in production and triggers the tests.
5. Jenkins executes invoke build
6. VMs package the app.
7. VMs upload the app to S3
CI PIPELINE FOR TE CHANGES
SUMMARY

• The network is late to the party but some folks are catching up
• Do not reinvent the wheel. Use the same tools & principles that sysadmin/developers have been using for years
• **Do not listen** to vendors that won't give you root access because they are lying
• The sole purpose of this is to make your job more interesting. A python script is not going to steal your job
QUESTIONS?