Open. Together.
Innovating the Cloud Network

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SONiC  Software for Open Networking in the Cloud

configuration and management tools

Jenkins
ANSIBLE
kubernetes
SWARM
puppet
CHEF
1st party

New
More apps
SNMP
BGP
DHCP
IPv6
New

Database
Platform
SWSS
Utility
TeamD
LLDP
RedisDB
SYNCD

Linux
Switch Abstraction Interface (SAI)
## SONiC Keeps Evolving

### Telemetry
- gRPC for streaming telemetry
- Dataplane Telemetry (Dtel) extension
- Virtual Path for streaming telemetry

### Platform Management
- Sensor/Transceiver monitoring
- Dynamic Parameter Tuning
- Platform Enhancement (PMON)

### Reliability
- Warm Reboot
- Routing stack graceful start

### System
- Kernel Upgrade
- Component docker upgrade
- Security patches

### RDMA
- PFC Watermark
- Asymmetric PFC

### Data Plane
- L3 VxLan Support
- Large Table/Deep Buffer Devices

### Configuration
- Incremental config
- ConfigDB

### Routing Stack
- Quagga → FRR
- cRPD from Juniper

### New Platforms
- Juniper PTX
- Broadcom TH3, JR2
- Mellanox Spectrum II
- Facebook Mini-pack
- Marvell 12.8T Falcon and ARM based switch
- Innovium Teralynx
- And more

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Warm Boot: A True Community Effort
Fast Boot

Control plane disruption < 90 seconds
Data plane disruption < 30 seconds

Control plane
Routing
Data Plane

OS Reboot (kexec)
OS Boots up
Data Plane Reset
Data Plane Restored
Warm Boot

- Control plane disruption < 90 seconds
- Data plane disruption < 1 second

- O.S Reboot
- Routing
- Data Plane
- SONiC Starts
- Warm Init
- Warm Reboot Finishes
- State Reconciliation, via SAI state-driven API
Warm Boot Architecture

1. Warm boot script stores App/ASIC DB on disc
2. Redis restores App/ASIC DB after reboot
3. OA reads AppDB and compiles a new ASIC DB
4. SyncD compares old/new ASIC DB, and apply diff to the ASIC
5. Applications waking up in parallel
   - May staged changes to App DB
   - OA comes in as usual, updates ASIC dB
   - SyncD keeps syncing ASIC DB to hardware
warm reboot demo 0312

2019-03-13 17:11 UTC

Recorded by: Maggie Sun

Organized by: Ying Xie
We are not done yet – Control Plane?

What about ARP, DHCP, etc.?

Control plane

Routing

Data Plane

O.S Reboot

SONiC Starts

ASIC Warm Init

State Reconciliation, via SAI state-driven API

Warm Reboot Finishes
Control Plane Assistant (Upcoming)

- **ASIC ➔ Assistant:**
  - ERSPAN mirror

- **Assistant ➔ ASIC:**
  - Assistant encap the payload meant for neighbors
  - ASIC decap and forward

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**Diagram:**

1. **Assistant** sends up to **CPU**
2. **CPU** sends packet to **ASIC**
3. **ASIC** sends packet to **Assistant**
4. **Assistant** encap payload meant for neighbors
5. **ASIC** decap and forward

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**Explanation:**

- **ERSPAN mirror**: This is a feature that allows for observing traffic without affecting it. It's used for monitoring purposes.
- **Assistant** interacts with the **CPU** to send up packets.
- The payload is encapsulated at the **Assistant** and decapsulated at the **ASIC**.
- The **ASIC** handles the packet forwarding to the destination.
SONiC Support for Disaggregated Chassis
SONiC Is Powering Microsoft At Cloud Scale

Tier 3 – Regional

Tier 2 – Data center

Tier 1 – Row Leaf

Tier 0 – Rack

Servers

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Enabling SONiC Beyond Tier 1?

Tier 3 – Regional

Tier 2 – Data center

Tier 1 – Row Leaf

Tier 0 – Rack

Servers
Chassis – the challenges

- Power efficiency
- Port density
- Low table scale on backend ASICs

- No standard topology/connectivity
- Proprietary ports/packet format
- Proprietary switching/load balancing
SONiC Support for Disaggregated Chassis

- **CLOS Topology with Ethernet ports**
- **VXLAN-based switching**
  - Each front end chip is a VXLAN Tunnel End Point (VTEP)
  - Packets inside the chassis are encapsulated with VXLAN headers
- **BGP-EVPN as the internal control plane**
  - One SONiC/BGP instance per ASIC
  - Frontend SONiC *directly* redistribute routes using EVPN

1000+ Ports
SONiC Disaggregated Chassis Demo at Booth
Commercial support

More industry adoption

More contributors and hardware support

Powering AI/gaming service

Powering bare metal service

Powering data center ToR/Leaf

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Open Invitation

Inviting contributions in all areas

- SONiC/SAI
- Hardware platform
- New features, applications and tools
- Download, test, deploy!

Website:  https://azure.github.io/SONiC/
Mailing list:  sonicproject@googlegroups.com
Source code:  https://github.com/Azure/SONiC/blob/gh-pages/sourcecode.md
Wiki:  https://github.com/Azure/SONiC/wiki/