SONiC Development and Deployment at Alibaba

Haiyong Wang
Senior Director
Alibaba Group
Alibaba Technology Stack

Business Platform

ML, Speech, NLP, Image & Video
Search Engine
AD Engine
Computing platform
Data platform
Algorithm platform

Software
Operation System
Database
Storage
Middleware

Infrastructure
Data Center
Server
Network
Operation

Anti-fraud
Privacy
Security
Productivity

TMall  Taobao  AliExpress  Data  Ads  Cloud Computing  Digital Media Entertainment  Cainiao  Ant Financial

Computing platform
Graph / Stream / Batch

Data platform
OneID / OneData / OneService / GProfile

Algorithm platform
Algorithm component / Deep learning framework / Visualization

Operation System
Container/Virtualization
Scheduling

Database
Cloud / Heterogeneous

Storage
High throughput
Low latency

Middleware
EDAS / MQ / ARMS

Data Center
Green

Server
Modular / Customization

Network
Available Scalable

Operation
Intelligent
Alibaba Network OS

Alibaba Network Management and Monitoring Services

- L2/L3
- Monitoring
- Management
- DB
- System Process
- Hardware Abstraction

Switch Hardware
SONiC

• Focus on hyper-scale datacenters
• Open source and vibrant community
• Wide support from ODMs and ASIC vendors
• Linux software and integration
Community Participation

• Announce joining SONiC@OCP community at ONS 2017
• Expand ODM and ASIC vendor SONiC@OCP support
• Lead SONiC adoption in China
• Major contributor to SONiC
## Feature Contribution

<table>
<thead>
<tr>
<th>Release</th>
<th>Release Date</th>
<th>SAI version</th>
<th>Features Included</th>
</tr>
</thead>
<tbody>
<tr>
<td>SONiC.201712</td>
<td>12/15/2017</td>
<td>1.0</td>
<td>SONiC Support SAI 1.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fast Reload</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ConfigDB framework</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TACACS+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LACP Fallback</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>MTU Setting</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vlan Trunk</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dynamic ACL Upgrade</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SWSS Unit Test Framework</td>
</tr>
</tbody>
</table>

- Special thanks to:
  - Alibaba team for contribution on: VLan Trunk, TACACS+, MTU Setting, LACP Fallback
  - Mellanox team for contribution on Dynamic ACL Upgrade
  - LinkedIn and community on meticulous design reviews
  - Microsoft team for contribution on: SONiC Support for SAI 1.0, Fast Reload, ConfigDB framework and SWSS Unit Test Framework
  - ASIC partners to provide SAI 1.0 support
  - Platform partners for platform driver support
Alibaba Network OS
Support dual uplinks
BGP Enhancements

• Announce low priority routes for graceful device restart
• RFC7911 enhancement to support multipath advertisement
• Enable ECMP member de-active on data plane before route removal
• Replace periodic timer with event trigger for faster response and lower CPU
Networking Telemetry

- UI
- Troubleshooting
- Monitoring/Alert

Networking data analytics

Networking data collectors

- CLI
- SNMP
- Syslog
- Mirror
- INT
- gRPC

Switch
Telemetry via gRPC

- Efficient collection stack
- Change only mode
- Push instead of poll
gRPC Architecture

- SONiC Redis DB
- Platform data
- Proc data
- ASIC data (non-SAI)

- DB Client
- Non-DB Client

- gRPC Dial-in Server (gNMI server)
- gRPC Publish (periodic and stream)

- gRPC Get and Subscribe (poll and stream)

- System Telemetry data Collectors

- SONiC System Telemetry gRPC service
gRPC Performance
Get Ready for Production

• Feature development and customization

• Testing
  • Automate regression with Robot framework
  • Add test topology to align with Alibaba network architecture

• Operation
  • Integrate with network management and monitoring systems
  • Customized zero touch provision
  • Unified CLI for network operation team
Alibaba Data Center Network Deployment
Challenges

• Multi-vendor hardware troubleshooting
• Interoperability of INT metadata across multi-vendor devices
Summary

- Alibaba has became a key contributor to SONiC community
- Tremendous progress of developing and deploying NOS at Alibaba
- Future work
  - 10X deployment scale
  - Expand to more device roles
  - Programmable network