“A New Network Revolution”
-Switch Abstraction Interface (SAI)-

A Reference Switch Abstraction Interface for OCP

Summary

Switch Abstraction Interface (SAI) defines an abstraction interface for switching ASICs. The interface is designed to provide a vendor-independent way of controlling both switching entities like hardware ASIC’s or NPU’s as well as software switches in a uniform manner. This specification also allows exposing vendor-specific functionality and extensions to existing features.

Something as basic as getting switches to forward packets requires implementing multiple management protocols and configuration generation which is undifferentiated work. Even basic routing protocols are now undifferentiated work. SAI allows the same network software stack to program and manage many different switch chips without undergoing any changes.

SAI helps to easily consume the latest and greatest hardware when we can run the same application stack on all our hardware, enabled by a simple, consistent programming interface.

SAI helps us to keep the base router platform simple, consistent, and stable. Thus shifting our focus to applications that require integrating our network with our cloud. We believe that fulfills a necessary part of the software ecosystem and is a big step towards open networking software.

Overview

Switch Abstraction Interface (SAI) is a standardized API that allows network hardware vendors to develop innovative hardware architectures to achieve great speeds while keeping the programming interface consistent. SAI helps easily consume the latest and greatest hardware by running the same application stack on all the hardware, enabled by a simple, consistent programming interface. New applications can run easier and faster on the latest hardware with lesser portability of bugs.

Figure 1: SAI in a plausible switch system architecture
Starting off with three main goals:

1. The ability to develop SAI on different vendor platforms.
2. Demonstrate the ease of implementation of a Layer 3 IP router.
3. To deploy a SAI implementation in an operator’s network.

OCP Networking SAI GitHub repository. Following a proposal submission, are discussions on the OCP mailing list that further define the proposal. Eventually the code is also submitted to a GitHub repository.

The SAI v0.92 introduces numerous proposals including:

- Access Control Lists (ACL)
- Equal Cost Multi Path (ECMP)
- Forwarding Data Base (FDB, MAC address table)
- Host Interface
- Neighbor database, Next hop and next hop groups
- Port management
- Quality of Service (QoS)
- Route, router, and router interfaces