Deep Dive on OCP Software Projects

Rajeev Sharma
Director, Software & Technologies
E-mail: rajeev@opencompute.org
OCP Projects and Sub-projects

**NETWORKING**
- ONL, ONIE, SAI, SONIC

**RACK & POWER**
- Adv cooling Solutions
- Power Shelf Interoperability
- OpenRack V3

**STORAGE**
- Archival
- Cloud Fast Fail API

**SERVER**
- PCI 3.0 MEZZ
- Open Domain Specific Architecture (ODSA)
- OCP Accelerator Infrastructure (OAI)

**DC Facility**
- Modular DC

**HPC**
- OpenEdge

**TELCO**
- OpenEdge

**HW MGMT**
- OpenRMC

**SECURITY**
- Open Sys
- EW

**CONSUME. COLLABORATE. CONTRIBUTE.**
Open System Firmware
Open System Firmware (OSF)

- Where does System Firmware reside in a typical Cloud/Rack?
Need for OSF to be Open!

- "Closed" System firmware
- Different Silicon vendors have their own version of boot flows.
- No one has single implementation
- Current firmware dev model not been able to keep pace with multiple cloud HW vendors.
Open System Firmware (OSF) Activities

- Major Companies contributing to the OSF development

  - Microsoft
  - Intel
  - Google
  - Facebook
  - Lenovo
  - IBM
  - Two Sigma
  - ITRene
  - 9 Elements
  - Cavium
  - AMD
  - ... and many more

GitHub Repositories Collateral link
https://github.com/opencomputeproject/OSF

- Bi-weekly OSF discussions
  - Architectural reviews
  - Workstream progress
  - Design reviews
  - Agenda setting
  - Miscellaneous collaborative discussions
Open RMC
Rack Manager Controller
OCP OpenRMC Project

• Motivation from System Firmware (BIOS) and BMC Firmware

• Needed to work on Rack Manager
  - OCP is designing Rack and Power
  - Not just the compute manager but a Rack level Manager

• The Rack Manager will run-
  - Firmware
  - Software
OpenRMC data traffic interfaces

A piece of hardware that provides Rack Management Functions

- Redfish
- Swordfish
- SSH
- Legacy REST
- Web GUI

OpenRMC Rack Manager

- Redfish
- Swordfish
- SSH
- IPMI
- I2C

Fabric bound

Orchestration Software

Data Center Information System

Device bound

- Compute node
- Storage Node
- GPU
OpenRMC proposed configurations

OpenRack

Power Shelf w/ RMC FW

Switch w/ RMC

EIA, OpenRack

Rack Manager

Olympus

OCP Networking Software

ONIE  SAI  SONiC
OCP Networking Projects

ONIE Open NW Install Env
- Provides an OS install environment
- Makes writing and running installers easier
- It is a small Linux based OS itself
- https://github.com/opencomputeproject/onie

SAI Switch Abstraction Interface
- Provides the standardized C APIs to program the ASIC
- ASIC is a microchip designed for a particular application
- https://github.com/opencomputeproject/SAI
OCP Networking Projects...Cont’d

- Linux distribution for bare metal switches
- NOS that ONIE would install
- Think of it as a collection of software packages, utilities & drivers that is run on OCP HW
- [https://github.com/opencomputeproject/OpenNetworkLinux](https://github.com/opencomputeproject/OpenNetworkLinux)

Software for Open Networking in Cloud
Built on SAI

- Breaks monolithic switching software into containerized components
- Enables failure recovery and upgrades with zero downtime.
- [https://github.com/Azure/SONiC](https://github.com/Azure/SONiC)
- Based on 4 Principals - Control, Extensibility, Agility and Collaboration
OCP Networking Projects...Cont’d

Configuration and management tools:
- Jenkins
- Ansible
- Kubernetes
- SONiC
- Puppet
- Chef

SONiC

Switch Abstraction Interface (SAI)
- Linux
- Edge-core NETWORKS
- Mellanox Technologies
- Delta
Project Zipline
OCP Project Zipline

Why Project Zipline

Continuous Data Drives the need

• Data Growth Projections

IDC predicts Global DataSphere will grow from **33 Zettabytes (ZB) in 2018 to 175 ZB by 2025**

**Figure 1: Annual size of the Global DataSphere**
OCP Project Zipline compression gains

Data Sets

Cloud Data Set #1

100%

Uncompressed Zipline

8%

Application Service Logs

Cloud Data Set #2

100%

Uncompressed Zipline

5%

IoT Text Files

Cloud Data Set #3

100%

Uncompressed Zipline

4%

System Logs
OCP Project Zipline... Cont’d

Use Cases
- Network Data Processing
- IoT Cloud Migration Appliances
- Storage Archival General purpose Microprocessors
- Productivity Applications
- Smart SSD’s
- Database accelerators

Partners
- CPU
  - Intel, AMD, ARM, MARVELL and SiFive
- Network
  - Broadcom, FUNGIBLE, Mellanox
- Storage
  - EIDETICOM, NGD Systems, PureStorage
- EDA
  - Cadence, Synopsys

THANK YOU

धन्यवाद
Backup Slides
Open System Firmware Concept

- Many silicon vendors supplying their own silicon interface
- We need one SIFM module which will help us go in different paths
  - E.g. one can go from Core Boot with Intel's help or AMDs help and go boot Linux
  - Even one can go through Linux Boot and boot Windows
OCP Project Zipline

Why Project Zipline

• By 2020

Continuous Data Drives the need for the Edge cloud

- 20 BILLION Connected Devices 3-4x from 2018
- 115 Yottabytes IoT Data Generated (1 YB = 10^{24} Bytes)
- 1,587 Exabytes IoT Data Captured (1 Exb = 10^{18} Bytes)
- 5.6 BILLION IoT Devices processing data at the Edge
OCP Project Zipline

• Targeted for legacy and modern data sets
  - Covering usage scenarios from Edge to Cloud

• Full solution stack Implementation
  - Algorithms + Software + Hardware

• Compression without compromise
  - Always-on data processing enabled by trifecta of high compression ratios + high throughout + low latency