Deep Dive on OCP Software Projects

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Open System Firmware
Open System Firmware

- 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 Activities

- Major Companies contributing to the OSF development
  - Microsoft
  - Intel
  - Google
  - Facebook
  - Lenovo
  - IBM
  - Two Sigma
  - ITRenew
  - 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 Rack Manager Controller (Open RMC)
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
OCP Data Traffic Interfaces

A piece of hardware that provides Rack Management Functions

Data Center Information System

Orchestration Software

Fabric bound

Open RMC Rack Manager

Redfish
Swordfish
SSH
Legacy REST
Web GUI

Device bound
- Compute Node
- Storage Node
- GPU
OpenRMC proposed configurations

OpenRack

EIA, OpenRack

Olympus

Microsoft RMC Build Process

- Kernel
- UBOOT
- BSP
- Applications + Services
- Recipes
- YOCTO
- Sources
- BITBAKE
- toolchain
- Repo
- QEMU
- BIN

Build Dependencies

Inspur Firmware Stack

Application
- Resource Aggregation
- RSD-RMM
- Multi-Node OS Deployment

IPC
- D-Bus

Runtime Library
- DB(Sensor/Log...)
- HW Mgmt(Power/Fan/Flash...)

BSP
- UART
- SPI
- I2C
- GPIO
- USB
- VGA
- ADC

Hardware
- Ast 2400/2500 (ARM Core,DDR,MAC,Flash,GPIO,I2C...)
- Board/(FAN,PSU,Temper Sensor...)

Community Component
- Inspur Plan for future

OCP Open Networking Software

ONIE  SAI  ONL  SONiC
OCP Networking Software Projects

ONIE
- Provides an OS install environment
- Makes writing and running installers easier
- It is a small Linux based OS itself
- [https://github.com/opencomputeproject/onie](https://github.com/opencomputeproject/onie)

SAI
- Provides the standardized C APIs to program the ASIC
- ASIC is a microchip designed for a particular application
- [https://github.com/opencomputeproject/SAI](https://github.com/opencomputeproject/SAI)
Software for Open Networking in Cloud

- Built on SAI
- Breaks monolithic switching software into containerized components
- Enables failure recovery and upgrades with zero downtime.
- Based on 4 Principals- Control, Extensibility, Agility and Collaboration
- https://github.com/Azure/SONiC

Open Network Linux

- 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
- https://github.com/opencomputeproject/OpenNetworkLinux
OCP 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...Cont’d

• 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
OCP Zipline Compression gains

Data Sets

- Cloud Data Set #1
  - Uncompressed: 100%
  - Zipline: 8%
  - Application Service Logs

- Cloud Data Set #2
  - Uncompressed: 100%
  - Zipline: 5%
  - IoT Text Files

- Cloud Data Set #3
  - Uncompressed: 100%
  - Zipline: 4%
  - System Logs

OCP Project Zipline...Cont’d

• Compression algorithm and specifications
  • Interoperability across endpoints (edge to cloud)

• Hardware architecture specifications
  • High bandwidth, Low latency implementation

• Verilog RTL source code and test suite
  • Open sourced IP – Industry first for OCP contributions
  • Enabling faster adoption in the silicon ecosystem
OCP Zipline...Cont’d

Use Cases

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

Partners

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