

OPEN POSSIBILITIES.

**Yosemite v1 Mono Lake Platform
Enablement - “Open All The Way Down”**



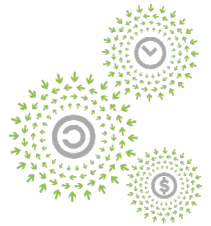
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Yosemite v1 Mono Lake Platform Enablement – “Open All The Way Down”

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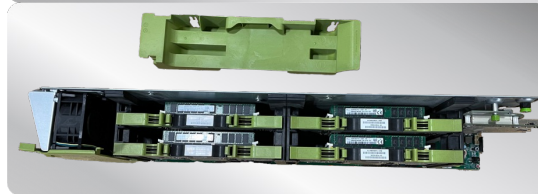
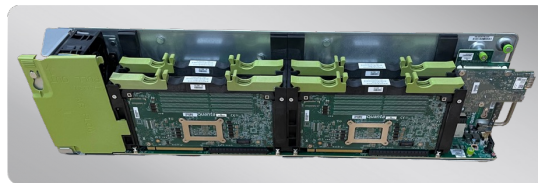
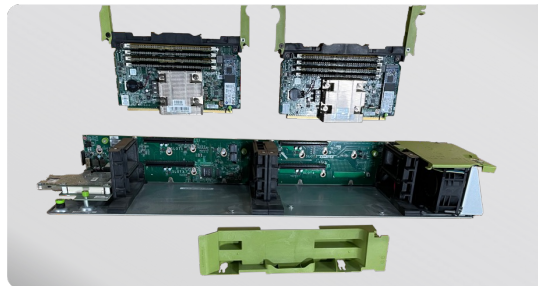
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PLATINUM™



Yosemite v1 Chassis

- ✓ Designed by Facebook
- ✓ Consists of 4 slots in a chassis called Yosemite allowing up to 4 servers per sled.
- ✓ Designed specifically for Facebook datacenters for hyperscale workload
- ✓ Contributed to the Open Compute Project in 2015 -

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OPEN SYSTEM
FIRMWARE



Yosemite v1 Chassis

✓ Facebook designs are now accessible for everyone – **Thank you Facebook!**

✓ <https://engineering.fb.com/2015/03/10/core-data/introducing-yosemite-the-first-open-source-modular-chassis-for-high-powered-microservers/>

✓ A rack of Yosemite v1 is 48 nodes providing 192 discrete CPUs + cores



**OPEN SYSTEM
FIRMWARE**



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Mono Lake Platform



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Mono Lake platform consists of Intel Xeon D-1500 Series "Broadwell" processors



Comes with FB OpenBMC



A released but immature Intel FSP and closed source UEFI BIOS Firmware

Legacy FSP Projects

FSP Project Name	Directory Name	FSP Specification Version
5th Generation Intel® Core™ processors and chipsets (formerly Broadwell)	BroadwellFspBinPkg	v1.0
Intel® Xeon® Processor D Product Family (formerly Broadwell-DE)	BroadwellDEFspBinPkg	v1.0

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Platform Challenges



Moving from a single purpose hyperscale platform to a general-purpose computing platform



Circularity gives us the motivation to do this work and ultimately the community benefits



An open platform that can meet computing needs for most business sectors [sans the Intel FSP]



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Endless Possibilities



Different Form Factors



High scalability



OCP everywhere



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SESAME
BY ITRENEW

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Host Firmware

Intel Xeon D-1500
Series “Broadwell-
DE” SoC, 16
cores/32 threads

coreboot
integrated with a
custom FSP and
LinuxBoot payload

Replaces the
original closed
source UEFI BIOS
firmware



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Note: The SPS/ME firmware is only available from Intel under NDA

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Coreboot

Initial implementation for Mono Lake was previously available on coreboot.org on the 4.11 branch



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- ✓ Was not in a production-worthy state

Fixes and Enhancements:

- ✓ Ported in SMM handler v2 code from master
- ✓ Ported in IMPI KCS driver bugfixes from master
- ✓ Numerous other IMPI fixes and enhancements
- ✓ Cleaned up ACPI tables
- ✓ Updated to use latest microcode
- ✓ Cleaned up devicetree and Kconfig

All code has been upstreamed to coreboot.org on the 4.11 branch

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Custom Broadwell-DE FSP



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Public FSP from
Intel only
supports up to 8
cores / 16
threads

SysPro is
licensed by Intel
to build and
distribute
custom FSPs

Our custom FSP
supports up to
16 cores / 32
threads

Also includes
fixes to a few
other issues
that we've
identified

Note: Our FSP is not available publicly per Intel license terms

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LinuxBoot (U-root) Payload



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Enhancements:

Included systemboot
to support VPD, IMPI,
BMC EOP, etc.

Added systemboot
support for generic
booters

- boot (in place of localboot)
- pxeboot (in place of fbnetboot)

Added support for
additional file systems:
btrfs, xfs, ext4

Note: Requires larger BIOS region to fit everything

Upstreaming still in progress

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BMC Firmware

ASPEED AST1250
BMC in Yosemite
v1 chassis

Yosemite v1
chassis can hold
up to 4 Mono
Lake server cards

Firmware based
on Facebook's
OpenBMC
implementation



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Firmware Summary



Open firmware solutions (or as open as they can be) for Mono Lake



See Mono Lake systems booting in the OCP Experience Center



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Call to Action

→ Will Submit to OCP for review next week!

→ Looking for feedback through code reviews and testing

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Open Discussion



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