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## Intro to Open System Firmware (OSF)



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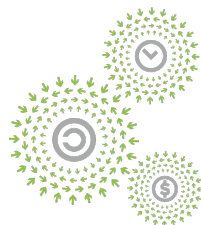
# Intro to Open System Firmware (OSF)

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# Agenda

1. What is Open System Firmware?
2. Review the Transition Schedule
3. Review the OSF Checklist
4. Examples of OSF Compliant Solutions
5. Discussion



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# What is Open System Firmware?



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- OCP Project since August 2019
- Incubation Committee Representative: Dong Wei
- Project Leads: Anjaneya “Reddy” Chagam, Ryan O'Leary
- Docs: [https://www.opencompute.org/wiki/Open\\_System\\_Firmware](https://www.opencompute.org/wiki/Open_System_Firmware)
  - Here you will find:
    - Charter
    - Transition Schedule
    - Checklist
- Github: <https://github.com/opencomputeproject/OpenSystemFirmware>
  - Here you will find existing OSF submissions.

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# OSF Checklist



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- See the OSF Sheet from the [OCP 2021 Suppliers Requirements](https://www.opencompute.org/wiki/Open_System_Firmware/Checklist)
  - [https://www.opencompute.org/wiki/Open\\_System\\_Firmware/Checklist](https://www.opencompute.org/wiki/Open_System_Firmware/Checklist)
- OSF is **required for OCP Acceptance**
- OSF is **optional for OCP Inspired**
- 9 Sections:
  - (1) Review Package, (2) **Licensing and Redistribution,**
  - **(3) Ownership and Reusability,** (4) **Build System,**
  - (5) Documentation, (6) **Test Regime,**
  - (7) Standard Compliance, (8) Firmware Configuration,
  - (9) Firmware Update

\* Sections in **bold** will be touched on in this session.

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# Don't worry!



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## Open *System* Firmware ≠ Open *Source* Firmware

- Binary Blobs *are* allowed.
- Redistribution restrictions *are not* allowed.

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# OSF checklist applies to ...

- It applies to all firmware design approaches, e.g.
  - OpenEDKII, coreboot, LinuxBoot, hostboot, petitboot, ...
- It applies to all architectures, e.g. x86, Arm, Power, ...
- It applies to compute/storage servers and networking servers.
- It applies to **host firmware**.



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# OSF checklist does not apply to ...



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- It does not prevent suppliers adding additional features (“value add”).
- It does not prescribe what may be used in a production environment.
- It does not apply to OCP platforms other than compute/storage/networking servers.
- **It does not apply to device firmware and BMC.**
  - BMC falls under the OCP Hardware Management project, so still pay attention to the BMC and Redfish sheets of the Suppliers Checklist!

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# Core Goals of the OSF Checklist

1. You can Construct\* It.
2. You can Install It.
3. You can Redistribute It.

\*Not necessarily from source code



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# You can Construct It.

- **The** top level build script shall be the only script needed to be run to fetch all blobs and source code.
  - **The** top level build script may invoke other scripts and utilities to carry out its main function.
  - note emphasis: there is **one script**
- Build and update utilities must be:
  - open-source, or
  - a redistributable binary which must run natively under at least Linux or Windows.



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# You can Construct It.

<https://github.com/opencomputeproject/OpenSystemFirmware>



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README.md

## Open System Firmware (OSF)

This repository holds software contributions for OSF.

To make it easy for customers to recreate firmware, ODMs SHALL document where the various components are and how to build a complete firmware image. These documents, instructions, and (e.g.) makefiles SHALL be placed in the repos shown below; however, we do not require that the entirety of (e.g.) the source code be copied into these repos. For example, if an ODM is using coreboot or Linux, source code SHALL be upstreamed to those projects. The OCP repos can then contain configuration files and, almost certainly, a git hash of the version of the software used. Binary artifacts SHOULD be placed in the OCP repos, as well as a link to the source of the binary(ies), and a license document.

Location	Description
[vendor_name]/[product_name]/	Directory of OSF product
[vendor_name]/[product_name]/LICENSE	License for this directory
[vendor_name]/[product_name]/Makefile	Script to build OSF product
[vendor_name]/[product_name]/src/	Directory for source files
[vendor_name]/[product_name]/bin/	Directory for binary files

Not necessarily open-source.

Optionally, [product\_name]/ can have a [product\_version]/ subdirectory in case there are multiple versions or revisions of the product's hardware with incompatible firmware.

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# You can Construct It. (example)



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<https://github.com/opencomputeproject/OpenSystemFirmware/tree/master/Wiwynn/deltalake>

..	
bin	Add Wiwynn OCP Delta Lake Open System Firmware
src	Add Wiwynn OCP Delta Lake Open System Firmware
LICENSE	Add Wiwynn OCP Delta Lake Open System Firmware
Open System Firmware Requirements Checklist (v1.2)...	Add Delta Lake OCP OSF checklist
README.md	Update README.md
Wiwynn_OSF_Cooperlake_QE_OCP_Checklist_V1.0_...	Add Wiwynn OCP Delta Lake Open System Firmware
download_and_build.sh	Add Wiwynn OCP Delta Lake Open System Firmware

☰ README.md

## OCP Delta Lake Open System Firmware

The open system firmware contribution to OCP Delta Lake is hosted in this directory. OCP Delta Lake is on the 3rd Gen Intel Xeon Scalable processors, which is referred to as [Delta Lake 1S Server](#). OCP Delta node server system [Yosemite-V3](#). The open system firmware solution developed for Delta Lake is based

Top-level build script  
Downloads source code from upstream projects

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# You can Install it.

- Open-source software must exist to update the firmware OR sufficient public documentation exists to write such software.
  - Ex: flashrom, fwupd, self updates, ...
- Watch out for:
  - One time fuses
  - Ownership models preventing end-users from flashing firmware.
- **Most current systems from most OCP vendors do not allow this today**
- **But some do!**



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# You can Redistribute it.

- Firmware is not tied to purchase of the hardware.
- Firmware can be freely redistributed.
  - by, e.g., placing it in a github repo open to all
- Firmware can be downloaded from the OCP Marketplace or Github
- Enabling Circular Economy



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# You can Redistribute it. (cont)

- OSF is open-source by default.
- Closed-source items are allowed given an approved and reasonable exception reason such as “containing silicon IP”.
- Each closed-source item must be redistributable, included in the submission, and reasonably granular.
- It is strongly encouraged, but not required, that every severable firmware component (e.g. a UEFI driver) be so documented.



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# How to Verify these Requirements?



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- Current model:
  - OSF submission contains collateral:
    - firmware image, source code, binary blobs, documentation, tooling, ...
  - Collateral is uploaded to github, reviewed by a PL and merged.
- How does the OSF review process verify the firmware image actually boots on the machine?
  - Can the OS boot?
  - Is multi-core supported?
  - Is all the memory initialized?
  - ...

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# Testing

- The OSF community defines the test plan, a list of tests.
- The testing is self-certified:
  - The submitter implements the tests, runs the tests and provides the results during the submission process.
- The current test regime:
  - Boot into a Linux OS (or any OSI-compliant OS)
  - 100 consecutive hard-reboots without issue
  - 100 consecutive warm-reboots without issue
- Note this test regime is extremely minimal and it is recommended for the end-user to perform additional testing.
- New OCP initiatives such as OSFCI, as well as Test and Validation Enablement will likely improve future iterations of the OSF process.

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# In Summary

- OSF Suppliers Checklist is required for OCP Acceptance
- Three core goals of the OSF Checklist:
  - You can Construct It.
  - You can Install It.
  - You can Redistribute It.
- Open System Firmware ≠ Open Source Firmware



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# Call to Action

- **Visit the OSF Experience Center today!**
  - Coreboot, LinuxBoot, MinPlatform demos and more!
  - Free stickers
- **OSF Wiki:**  
[https://www.opencompute.org/wiki/Open\\_System\\_Firmware](https://www.opencompute.org/wiki/Open_System_Firmware)
- **OSF Mailing list:**  
<https://ocp-all.groups.io/g/OCP-OSF>
- **Weekly calls:**  
<https://www.opencompute.org/projects/projects-calendar>  
10-11am PT, Thursday (biweekly)  
7:30-8pm PT, Wednesday (biweekly)
- **Github:**  
<https://github.com/opencomputeproject/OpenSystemFirmware>

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# Open Discussion



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