OCP OSF Checklist (v1.1)

Summary

This document is v1.1 status. Please continue to contribute and discuss.

For previous versions of the document, see
https://www.opencompute.org/wiki/Open_System_Firmware/Checklist.

This document captures requirements for the OCP OSF checklist for March, 2021 OCP platform submission related to OSF, according to
https://docs.google.com/document/d/1FAFE1apK4J2UVcOAoiJtU0-8MwUNoDnKAopBBF3JChw/edit#heading=h.y6zze7dc2yj9 .

This checklist is intended to enable OCP adopters to use OCP platform with a basically working Open System Firmware. This checklist is the initial one, more items/coverages will be added to future checklists, as the industry becomes more mature in terms of OSF.

What it covers

- It contains minimum items to meet the above stated goal.
- It applies to all firmware design approaches, such as open EDKII, or coreboot/LinuxBoot, hostboot/petitboot, to name a few.
- It applies to all architectures, including x86, Arm, Power, etc.
- It applies to compute/storage servers and networking servers.
- It applies to *host firmware*.

What it does not cover

- It does not prevent OCP platform submitter to submit OSF for the platform with higher standard, eg. more features, more stable.
- 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.

Definitions

Throughout this document, refer to these definitions for *italicized* terms:

- ***Host firmware***: Firmware for the main CPUs on the machine. This does not include device firmware, BMCs, voltage regulators and other embedded devices. This document only pertains to *host firmware*.
- ***Redistributable***: A software component (in source or binary form) with a license permitting redistribution from anyone to anyone by any means without an NDA, payment or royalties.
- ***Open-source***: Source code which is *redistributable* under an OSI-compatible license as defined by https://opensource.org/licenses and is publicly available for download.
- ***Build System***: Builds Open System Firmware from a combination of source code and binary blobs.
- ***Firmware image***: A binary file without any additional headers. If the firmware image is written directly to the firmware medium (typically a NOR FLASH, but other mediums are valid), this is sufficient to boot the machine.
- ***Firmware configuration***: Interfaces for configuring the firmware after it is deployed such as boot order and NVRAM variables.
- ***Owner***: The owner of the physical machine.

Review Process

1. A package containing relevant artifacts (source code, binary blobs, documentation, …) and supporting documentation is submitted to OSF leads or representatives for review. The package could reside in the OCP Github.
2. The package is reviewed using the below checklist in a fair and timely manner.
3. Upon a successful review, a pdf certificate is returned stating the firmware complies with requirements for Open System Firmware. The platform is now considered "OSF Ready". The artifacts will then be hosted by OCP marketplace online.
4. Upon a failed acceptance criteria review, an explanation is returned outlining which requirement(s) were not met.

Checklists

1. Review Package

1. Required supporting documentation:
   a. Name of the OCP platform which is under review
   b. Short description of the host firmware and its technical features. See Appendix B for suggestions for what constitutes a "technical feature".
   c. Emails to contact during the review process
   d. List of artifacts submitted for review and their respective licenses. Artifacts must be available at time of submission.

e. (optional) List of URLs for publicly downloading artifacts (for example pointing to GitHub).
2. Required artifacts:
   a. *Firmware image* as defined in the [Definitions](#) section.
   b. Description of the firmware ownership model as described in [section-3](#)
   c. Tool for user modification as described in [section-9](#)
   d. Documentation as defined in [section-5](#)
   e. Test results as defined in [section-6](#)

2. Licensing and Redistribution

1. The entirety of the review package must be:
   a. *redistributable*,
   b. publicly available for download, and
   c. submitted during the review process under a license that allows OCP to host on the marketplace.
2. All source code published as part of the review process must meet the above definition of *open-source*.
3. 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.

3. Ownership and Reusability

1. *Owners* must have the ability to:
   a. Update the firmware on the machine.
   b. If firmware needs to be signed*,
      i. Choose their own firmware signing key and change it as needed over time OR obtain the necessary signing key(s) through a transfer of ownership process.
         1. Note that, in particular, a requirement to choose immutable keys in advance and provide to, e.g., a chipset vendor or ODM makes a system noncompliant.
   c. Change owners at least 8 times. The number '8' is considered by end-users to be too low; it was chosen based on chipset vendor guidance concerning the limits of current chipsets. OCP reserves the right, in later versions of this spec, to increase the number. The most desirable value would be infinity, as in, e.g., Chromebooks
   d. Transfer ownership to a non-predetermined owner.

* Note the Security group plans to require firmware signing.
See Attestation DRAFT 0.9 document from OCP Security Group.

4. Build System

1. Build and update utilities must be:
    a. *open-source*, or
    b. a *redistributable* binary which must run natively under at least Linux or Windows.
2. The top level build script needs to be available either from the OCP website for the OCP platform, or its link needs to be available from the OCP website for the OCP platform.
3. The top level build script shall be the only script needed to be run to fetch all source code, binary blobs needed, and to build an entire host firmware image.
    a. The top level build script may invoke other scripts and utilities to carry out its main function.
    b. It must be possible to build without a network connection once a suitable set of packages and binaries have been gathered.
4. From initial release until End Of Support, it is the vendor's responsibility to:
    a. Demonstrate, on a continuing basis, that the build system functions correctly.
    b. Document when a platform will reach End Of Support.
5. If the platform requires signed firmware, it shall be possible for the owner to sign the image with a user-provided key. It must be possible to re-sign the firmware with a new key. Signing must continue to work after End Of Support.

5. Documentation

1. Documentation describes features of firmware, and build and install procedures.
    a. The documentation shall describe the validation scope (i.e. the test regime).
2. The documentation needs to be available either from OCP website for the OCP platform, or its link needs to be available from OCP website for the OCP platform.
    a. The documentation shall be *redistributable*.
3. The documentation shall describe the readiness of the OSF with one of the following levels:
    a. Pre-silicon. The OSF is good enough for pre-silicon entrance on the corresponding OCP platform as-is.
    b. Power-On. The OSF is good enough for power-on entrance on the corresponding OCP platform as-is. This is the level described in this checklist.
    c. Pre-production. The OSF is good enough for pre-production entrance on the corresponding OCP platform as-is.
    d. Production. The OSF is good enough for production entrance on the corresponding OCP platform as-is.

6. Test Regime

1. The platform with OSF must be capable of booting an operating system whose code is openly available under an OSI-approved license (such as Linux).
2. Bare minimum: The platform with OSF needs to be able to be cold re-booted into OS 100 times sequentially without issue.
3. If the system advertises support for a warm reboot, the platform flashed with OSF needs to be able to be warm re-booted into OS 100 times sequentially without issue.
4. Any support contract or warranty must confirm the system is conformant with such reboot tolerance.

7. Standard Compliance

1. For a given architecture family, the minimum standard interfaces required to boot and run a reasonable set of kernels must be provided. E.g., if required, ACPI should be available. On Power or RISC-V, flattened device tree should be available.
2. For every BMC or microcontroller on the platform, standard (or well-documented) inter-component interfaces are required such as IPMI, CoAP, etc.

8. Firmware Configuration

1. The OSF needs to provide a tool so that *firmware configuration* can be viewed and changed from, at minimum Linux, and optionally Windows.
2. This tool must be released in source form under an OSI-approved license. Existing examples in Linux include efibootmgr, sysfs variables, etc..

9. Firmware Upgrade

1. *Open-source* software must exist to update the firmware OR sufficient public documentation exists to write such software.
2. *Owners* must have the ability to update the firmware on the machine regardless of its state in its current life cycle.

Appendix A: License Requirements Summary

Artifact	Redistributable?	Open-Source?
Firmware	yes	partially
↳ Binary Blobs	yes	no

	yes	yes
↳ Buildable Source Code	yes	yes
Build System	yes	yes*
Flashing Utility	yes	yes**
Documentation	yes	--

* Build system can be closed-source if it runs natively under Linux or Windows.

** Flashing utility is either open-source or documented sufficiently for an open-source implementation to be written. This documentation must be freely available and no license or patent may forbid an open-source implementation.

Appendix B: Technical Features

The following supplies examples of features to be listed in the review submission for requirement 1.1.b. The list provides guidance to the reviewers to better understand the firmware. By no means are these features required to be implemented. The list may include, but is not limited to:

- Boot options. Ex: hard disk, USB, network boot, …
- Boot methods. Ex: UEFI, Legacy, SBBR, LinuxBoot, ...
- Interfaces. Ex: serial interface, VGA interface, GUI interface …
- Security features. Ex: TPM support, SecureBoot, ...
- SMP support
- Peripheral support
- Boot time
- …

Revision History

Version	Date	Changes
v1.0	April 30, 2020	Initial version
v1.1	October 1, 2020	- Removed "Appendix B: Required Open-Source Components" - Removed "Appendix D: Circular Economy Litmus Test" - Relaxed the requirement of ownership "applies to the system regardless of whether it is running proprietary firmware or OSF" - Other minor edits