

<b>Subject</b>	CRD Creation and Updates				
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## Summary

This document describes the procedure for the creation of, and updating of, the customer requirements document (CRD) as a part of overall platform deployment to Microsoft data centers. A CRD is an Excel spreadsheet file with the firmware, software, and limited hardware items (such as DIMMs) for the platform under development, defined at the rack level. The first release of the CRD is with P2. There can be CRD-DV updates until two weeks before building the golden rack (GR). This document is limited to the procedure for creating CRDs and for making NPI updates to the CRD. More information about the CRD creation and updating process can be found in the [More Information About CRDs section](#). Examples can be found in the [Examples](#) section.

## Prerequisites

- For a new CRD - A request for a new P2 SKU document from Mission Control PM. This happens after PPA approval. This is part of the PPA ADO checklist.
- For an update to an existing CRD - A request for a firmware update. Any changes must be approved at least two weeks before building the golden rack.

## Inputs

- The request for a new P2 SKU document.
  - A CRD first appears in a P2. The CRD may be revised throughout the process until two weeks before creating the Golden Rack (GR).
- PPA NUDD slide (new, unique, different, difficult), available from PPA deck
- Consultations with the following:
  - Program V-Team
  - Enablement PM, a part of the V-Team
  - SW/FW development teams
  - PDM team
  - Commodity team
- CRDs are not trivial to create as the inputs come from a diverse set of teams. Some SW/FW is quite static and changes roughly yearly, while others change monthly or weekly due to bug fixes, security fixes, and new features. The best sources for the correct/ideal SW/FW are listed below.

## Procedure Steps

### Creating a New CRD

#	Timing	Action	Responsible
1	Typically four (4) weeks prior to P2 release	<p><b>Find a Starter CRD</b></p> <p>Once the need for a new CRD as part of the development of a platform is established a starting point is required. The preferred starting point is a similar, existing, tested platform. 95% of the platforms are based on existing platforms, and even the few platforms that start from scratch can leverage existing SKUs. Determine the closest preceding platform to the desired hardware design with the V-Team.</p> <p>Find the CRD in OnePDM by searching OnePDM for keywords that zero into that platform.</p> <ol style="list-style-type: none"> <li>a) For example, a OnePDM “Search Parts” for “RASSY*A100*Gen7.1*” found the rack assembly for the second <a href="#">example CRD later in this document</a>. Always search for “RASSY”, which are rack assemblies, because CRDs are bound to racks, not server blades.</li> <li>b) Sort the resulting RASSYs by the Modified On column to ensure selection of the latest version (the Revision column can be a tip to most recent RASSY also). <ol style="list-style-type: none"> <li>a. Open this RASSY</li> <li>b. Click the BOM tab</li> <li>c. Scroll to the bottom looking for the CRD part</li> <li>d. Double click the CRD part to open it</li> <li>e. Click on the Documents tab</li> <li>f. Double click the entry that starts with “SPEC-CRD”. <ol style="list-style-type: none"> <li>i. This opens the CRD document (note there is no -001 part extension).</li> </ol> </li> <li>g. The CRD Excel file is on the File tab at the bottom</li> <li>h. Save a copy of this Excel file as the starter CRD.</li> </ol> </li> </ol>	Platform PM (AKA Enablement PM)
2		<p><b>Clean Up CRD for the New Platform</b></p> <p>The downloaded file is for a previous platform so update the CRD for the new SKU to avoid confusion.</p> <ol style="list-style-type: none"> <li>a) Cover Page: <ol style="list-style-type: none"> <li>a) Update the SKU name</li> <li>b) Clear the Document number (there will be a new one), Revision should be “A” and version is “0.01”.</li> </ol> </li> <li>b) Table of Contents: <ol style="list-style-type: none"> <li>a) Update the SKU name</li> <li>b) Update the SI (as appropriate)</li> <li>c) Update the Release FY and quarter.</li> </ol> </li> <li>c) Change History:</li> </ol>	Platform PM (AKA Enablement PM)

		<ul style="list-style-type: none"> <li>a) Update the Change Description for Rev A to use the new SKU name</li> <li>b) Delete any rows after Revision A as those apply to the previous SKU.</li> <li>d) FW-SW Configuration: The SKU name should update automatically as that references the Cover Page.</li> </ul>	
3		<p><b>Add Or Remove Changed Hardware</b></p> <p><i>NOTE: If the platform is identical to this starter CRD file, this step can be skipped.</i></p> <p>If various <u>hardware</u> has changed, add or remove Item/Model rows in the new FW table.</p> <ul style="list-style-type: none"> <li>a) For example, if the platform has HSM (Hardware Security Module) cards instead of FPGA (Field Programable Gate Array) cards, change the text. Or if the platform is adding a hard disk drive (HDD), then add a row for that.</li> </ul>	Platform PM (AKA Enablement PM)
4		<p><b>Update the FW Versions to the BEST versions</b></p> <p>Selection of the correct FW is best achieved by consulting with PM owners for each of the SW/FW payload areas, listed in the order of appropriateness for NEW platforms (not platforms in service in the fleet).</p> <ul style="list-style-type: none"> <li>a) Key FW That Often Changes – For FW such as BIOS, BMC, and FW unique to the platform (like GPU FW) that is in <u>active</u> development for the platform, consult the CHIE developers and FW PMs that are working on those versions. <ul style="list-style-type: none"> <li>a) The CHIE platform V-Team will typically have reps from BIOS, BMC, etc., and if not a V-Team member will know how to find them. The goal is to get the best FW versions from these sources for the time window the CRD will be used for manufacturing or testing. Leverage these sources of FW versions only for FW that is in active development for the platform. The developers will release these fresh builds to Azure Storage Explorer (ASE), <b>which is covered in a separate NICE training document</b>. Some FW only comes from the System Integrator, so they are also an important resource to check with.</li> </ul> </li> <li>b) Platforms That Are Not Similar But Use the Same Components – The new platform might be relatively standard, but uses one component that is new technology. The starter CRD might not include that component. <ul style="list-style-type: none"> <li>a) In this case, go hunting in OnePDM for other platforms that use that new component, and get that CRD info. For example, if the high memory platform is the first to adopt the Overlake network cards, copy the Overlake data from a Compute GP platform and inject it into the high memory platform CRD.</li> </ul> </li> </ul>	Platform PM (AKA Enablement PM)

		<p>c) FW That Changes Less – The broadest and easiest way to get Last Known Good versions of common FW is to check the <a href="#">FW LKG</a> spreadsheet.</p> <p>a) This is a reference file maintained by the CHIE FW PMs, on the CHEE team. They maintain what are called Last Known Good (LKG) versions of FW. LKG are versions of FW that have successfully been deployed to the fleet and met the criteria for number of clusters and/or duration. These versions should be ideal for new platforms, but sometimes these do not have the latest bug fixes that might be needed or desirable in a new platform. LKG versions certainly represent the most conservative/safe versions that could be entered in a new CRD.</p>	
5		<p><b>How to Handle Conflicts, Known Bugs, or FW Updates Coming “Next Week”</b> This is where the V-Team should weigh in, helping to arbitrate between “a solid but potentially older” version of a given piece of FW, and the “latest and greatest, just passed Dev smoke tests.”</p> <p>a) Also ask senior people on the team, discuss with the System Engineer or Qualification Lead, or even the System Integrator development team can have important insight into which version to use.</p> <p><b>Important:</b> the first version of a CRD released with a P2 likely is not the version that the SI will build with.</p> <p>a) There are usually a number of updates to the CRD before the BSL Golden Rack is built (or an earlier version called a Silver Rack).</p> <p>b) The goal is to have a stable version to build with and that version might be different from the version targeted for SKU Qual and that might be different from the eventual production version for the clusters when those go Live (have customer traffic).</p>	Platform PM (AKA Enablement PM)
6		<p><b>CRD is Added to the P2 SKU Document</b> The final step for a new CRD is to get it added to the P2 in OnePDM.</p> <p>a) The PDM team is responsible for creating the SKU BOM and documents. There will be an assigned PDM team member for the P2 and they likely have already reached out for the CRD.</p> <p>b) If not, work with the Mission Control PM to identify the current PDM scheduler and reach out to them to learn the assigned team member.</p> <p><i>NOTE: A new P2 also requires a FRU (Field Replaceable Unit) file and the BIOS Settings File.</i></p> <p>a) FRU: A FRU file has the programable content used to flash various server components. This enables utilities to interrogate the server components to identify which components or sub-assemblies (FRUs for spares) that the server was built with.</p>	Platform PM (AKA Enablement PM)

		<p>Currently <a href="#">Ric Walls</a> is the contact to generate a new FRU file.</p> <p>b) BIOS Settings File: The BIOS Settings file is an Excel spreadsheet provided by the BIOS team to document the settings used for the various BIOS Profiles. Profiles are two-letter identifiers that appear in the “BIOS BSL” row in the CRD. The version of the BIOS Settings file appears in the BIOS Release Notes file. If a new version of the file was used download a copy of the file from Azure Storage Explorer (ASE) and have the PDM team member include in the P2. The BIOS Settings files can be found on ASE using this path as an example: Partners/Common Area/Gen 8.x.</p>	
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## Updating a CRD

#	Timing	Action	Responsible
1		<p><b>When a CRD requires an update, follow this procedure.</b></p> <p>Download the current CRD from OnePDM to ensure the most recent version is in use.</p>	Platform PM (AKA Enablement PM)
2		<p>After consulting with appropriate PMs for the payload, update the rows and FW versions per the change(s) to be made.</p> <p>a) Review the changes with the V-Team to ensure awareness of the new FW target, the timing of the change, and whether there is any risk to the schedule or build.</p>	Platform PM (AKA Enablement PM)
3		<p>Follow the Engineering Change Approval (ECA) process (documented elsewhere in this library) to submit a <i>Change Request</i> work item in Azure Dev Ops.</p> <p>a) That ECA process document will specify different levels of lockdown and process for any updates.</p>	Platform PM (AKA Enablement PM)
4		<p>Follow that guidance to get the file approved and checked in.</p> <p><i>NOTE: The CHIE SW PM team will want to review any SW/FW changes and ensure that they were previously reviewed with the PM (or Dev) contact for payload.</i></p>	Platform PM (AKA Enablement PM)

## Outcomes

After completion of this procedure a CRD spreadsheet is attached to the P2 BOM for use with building the rack with current information.

The output of CRD creation is a CRD file. As of 2022, that file is an Excel file which is approved and checked into OnePDM. In late 2022, CHIE will start storing CRD files in OnePDM as Software BOMs, which puts the CRD data into database fields in OnePDM. In the case of a new SKU, the completed CRD is included in the P2 SKU documents by the

PDM Author and sent out for review/approval. In the case of an update to an existing CRD, the EPM/TPM creates an ECA to initiate an update to the CRD. Please see details in the next section.

## Next Procedure (Procedures) or Process (Processes)

- The CRD spreadsheet is used to build two golden racks. After that, it is used to build the remainder of the cluster.
- When necessary to update firmware or software, this process would be repeated.

## Useful Links and Resources

1. Current CRD template: [📄 CRD Template v5.xlsx](#)
2. Much can be learned about CRDs by looking at existing CRDs in OnePDM. Click “Search Documents”, in the Description enter “\*CRD\*”, click the Search icon.
3. CRD updates for the software or firmware for clusters after docking at the data center follow the process defined by the CHIE Deployment team at [E2E Process for Production FW Update](#).
4. [Cloud E2E Production Change Management \(PCM\)](#) [link opens PowerPoint deck] details the change management process racks in production.
5. [Examples included in this document](#).

## More Information About CRDs

In the development and deployment of cloud racks and infrastructure, a critical artifact is the recipe of software (SW) and firmware (FW) that is written or flashed to the various hardware components of the overall system (rack level, L11). In CHIE, the CRD is used to capture the SW/FW recipe that the System Integrator (SI)/Original Design Manufacturer (ODM) uses to build the racks for a cluster. CRDs include categories for various hardware components: motherboard, DIMMs, HDDs, SSDs, network card, security components (TPM, Cerberus), and FPGA accelerators. The CRD captures for each of these categories the SW/FW name, the version, and the location on a data share where to find it. ([See example later](#) in this document.) The CRD is also used by a DC technician to establish the SW/FW recipe that should be written/flushed for a SKU when components are replaced from spares inventory.

To build, test, config-verify, and maintain our cloud servers, a CRD is mandatory. Informal SW/FW recipes can start very early in the building block or platform development process, but they reach official status when they are included in the Rack Assembly (RASSY) as part of the Bill of Materials (BOM) in OnePDM, the configuration management tool.

Once an initial CRD is created, it will be updated from approximately three times to as many as 20 times over the course of the platform development from pilot SKU, to growth SKU, and eventually General Availability (GA). It is a common misconception that CRDs reach a “final” state. CRDs go through phases of rapid churn and a “freeze” or lock phase when late changes can cause impact to build schedules. Eventually the CRD unfreezes when change is again permitted. But because we always fix bugs over time, the CRD will always need updates to reflect the updated SW/FW that includes those fixes.

In addition to SW/FW components, the CRD also captures the memory (DIMMs) and storage (SSDs, HDDs) commodities used in the SKU. In the case of storage commodities, a FW version is also captured. Generally, there is a primary commodity followed by allowable substitutions (or subs). Allowable subs enable an SI to build a cluster using available, allowable commodities on hand which helps mitigate risk for continuity of supply.

**Caution:** CRD changes can require requalification, BSL package updates, updates to SI manufacturing scripts/testing, power testing to be redone, etc. Rework of completed racks at the SI may be required which could have schedule impact and dock date impact. Consult with the V-Team and the SI when calculating when to “cut-in” a CRD update.

## Examples

Simple Excel table with FW versions.

**Software Configuration**  
**Customer Requirements Document**  
**Compute Analytics AMD Gen 7.0 - ZT - FY20Q2**

Group	Item	Model	MPN	FW/OS Version	File or Notes
Main Blade	MB BIOS	C2160		C2160.BS.3A10.GN1	
	BSL BIOS	C2160		C2160.BS.3A10.AC1	BIOS Profile of .AC according to profile XLS
	BMC	C2160		3.10	
	TPM	C2160		7.85.4555.0	
	CPLD	C2160		11	
	Cerberus	C2160		1.3.0.3	
	ASIC Card	Corsica Card by MS	M1103804-001	EA21.40	
	SSD M.2	Samsung PM983	MZ1LB1T9HALS-00AMV	EDA78M5Q	
	HDD	Seagate 14TB	ST14000NM000G	MN02	
	FPGA	Longs Peak		200320_2_LP	MSFT_FPGA_A2010_FX_200320_2_LP.zip
	Mellanox NIC card - FW Rev	CX4 on LP		14.25.8100	
	Mellanox NIC card - uEFI Rev			14.18.0022	
	Mellanox NIC card - PXE Rev			3.5.0702	
	Boot			0004.0100	FPS-213-D0000293-101_MIS-S-1020ADE01_Bootloader_CS89A8_V0004.0100
	ImageA	P2010 - Flextronics	MIS-S-1020ADE00-301	010B.C64	FPS-213-D0000293-101_MIS-S-1020ADE01_RegionA_CSEA56_V010B.C643.hex
ImageB	010B.C64			FPS-213-D0000293-101_MIS-S-1020ADE01_RegionB_CS1054_V010B.C643.hex	
PSU	PS1000 - ARTESYN		4A5Q4H00	allowable sub	
Rack	TOR Switch OS	CELESTICA		Ship as is	
	Rack Manager	M2010		1.1.12.17	
Windows Drivers					
	Chipset OS Driver	C2060		v1.07.12.1102	



## Cloud Hardware Infrastructure & Engineering

	Mellanox NIC OS Driver	Longs Peak/CX4		2.22.21371.2	
	OFED Driver			4.6-1.0.1.1	Not sure if this is needed, checking (Dean comment 1/2/2019)
	Corsica Driver			1.1.1122.5	

Here is an example of a fairly complex CRD, with multiple blade types (GPU and Utility blades). This example also shows the History tab, which tracks updates to CRDs in Excel.



M1182218  
SPEC-CRD,FY20Q4,AZ

NOTE: Both of these examples include Windows Drivers at the bottom of the table. Technically, drivers are hosted in the Windows image applied by the Engineering Group at the data center. Hence, the system integrator is NOT required to install those on the racks. But it is very convenient for the SI and the CHIE qualification teams to know what drivers to use when testing, so those driver versions are increasingly listed in the CRD.