IBM Z and LinuxONE

Capacity on Demand User's Guide

SC28-7058-00

Note:

Before you use this information and the product it supports, read the information in "Safety" on page vii, Appendix E, "Notices," on page 133, and *IBM Systems Environmental Notices and User Guide*, Z125-5823.

This edition, SC28-7058-00, applies to IBM Z servers, beginning with the IBM z17, and IBM LinuxONE servers, beginning with the IBM LinuxONE Emperor 5.

There might be a newer version of this document in a **PDF** file available on **IBM Documentation**. Go to https://www.ibm.com/docs/en/systems-hardware, select **IBM Z** or **IBM LinuxONE**, then select your configuration, and click **Library Overview** on the navigation bar.

Contents

Safety

Safety notices

Safety notices may be printed throughout this guide. **DANGER** notices warn you of conditions or procedures that can result in death or severe personal injury. **CAUTION** notices warn you of conditions or procedures that can cause personal injury that is neither lethal nor extremely hazardous. **Attention** notices warn you of conditions or procedures that can cause damage to machines, equipment, or programs.

World trade safety information

Several countries require the safety information contained in product publications to be provided in their local language(s). If this requirement applies to your country, a safety information booklet is included in the publications package shipped with the product. The booklet contains the translated safety information with references to the US English source. Before using a US English publication to install, operate, or service this product, you must first become familiar with the related safety information in the *Systems Safety Notices*, G229-9054. You should also refer to the booklet any time you do not clearly understand any safety information in the US English publications.

Laser safety information

All IBM Z® models can use I/O cards such as FICON®, Open Systems Adapter (OSA), Network Express, Integrated Coupling Adapter2.0 SR (ICA SR2.0), zHyperLink Express, or other I/O features which are fiber optic based and utilize lasers (short wavelength or long wavelength lasers).

Laser compliance

All lasers are certified in the US to conform to the requirements of DHHS 21 CFR Subchapter J for Class 1 or Class 1M laser products. Outside the US, they are certified to be in compliance with IEC 60825 as a Class 1 or Class 1M laser product. Consult the label on each part for laser certification numbers and approval information.

Laser Notice: U.S. FDA CDRH NOTICE if low power lasers are utilized, integrated, or offered with end product systems as applicable. Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC 60825-1 Ed. 3., as described in Laser Notice No. 56, dated May 8, 2019.

CAUTION: Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

CAUTION: This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)

About this publication

This publication provides information that can be used to enable, order, and activate upgrades through Capacity on Demand offerings for IBM Z, beginning with the IBM® z17™.

Specialty engine upgrades are among the upgrades supported by Capacity on Demand offerings. For IBM Z, specialty engines include:

- Integrated Coupling Facility (ICF)
- Integrated Facility for Linux® (IFL)
- z Integrated Information Processor (zIIP)
- System Assist Processor (SAP)

For LinuxONE, specialty engines include:

- Integrated Facility for Linux (IFL)
- System Assist Processor (SAP)

Note: Screen captures that appear in this publication may not be at the latest level. They are provided to represent the task for reference and navigation purposes only.

Organization of this publication

This document contains the following information:

- Chapter 1, “Introduction,” on page 1 provides the information to help you select the solution that best fits the needs for your enterprise and information on managing system capacity.
- Chapter 3, “Planning,” on page 9 provides information on what to consider when you are planning for temporary and permanent upgrades.
- Chapter 4, “Enabling your machine to order upgrades,” on page 27 provides information on the agreements you need signed and the IDs you need to have in place before you order your temporary and permanent upgrades.
- Chapter 5, “Ordering,” on page 33 provides information and steps describing how to order your temporary and permanent records using Resource Link®.
- Chapter 6, “Retrieving and installing,” on page 49 provides information and steps describing how to retrieve and install your temporary and permanent records using the Support Element.
- Chapter 7, “Activating temporary upgrade records,” on page 57 provides information and steps describing how to activate your temporary records using the Support Element.
- Chapter 8, “Deactivating temporary capacity,” on page 65 provides information and steps describing how to deactivate processors or temporary model capacity using the Support Element.
- Chapter 9, “Deleting temporary Capacity on Demand records,” on page 67 provides information on how to delete temporary records using the Support Element.
- Chapter 10, “Billing,” on page 69 describes how you are charged based on the upgrade that you ordered.
- Chapter 11, “ Monitoring,” on page 71 provides information about the different functions available for you to use to monitor your Capacity on Demand activity.
- Chapter 12, “Discontinuing and removing Capacity on Demand features,” on page 75 describes the steps you must complete if you need to discontinue the use of and remove one or more of the Capacity on Demand (CoD) features on a machine.
- Appendix A, “Status and Messages ,” on page 107 provides order status and product messages pertaining to problems you may be experiencing.
- Appendix B, “Exporting your profile data,” on page 125 describes how to save your profile data.

- Appendix D, “Understanding the content of the Installed Records page in the Temporary Upgrades window,” on page 131 describes the fields displayed on the **Installed Records** page in the **Temporary Upgrades** window.
- Appendix E, “Notices,” on page 133 contains IBM trademarks and other special notices.

Related publications

Along with this publication, the following publications provide information about the functions and characteristics of the Capacity on Demand products and applications.

- *Processor Resource/System Manager (PR/SM) Planning Guide*, SB10-7184
- *SNMP Application Programming Interfaces*, SB10-7185
- *Hardware Management Console Web Services API*, SC27-2646

Related HMC and SE console information

Hardware Management Console (HMC) and Support Element (SE) information can be found on the console help system.

Who should read this publication

This document is intended for customers and enterprise decision makers to understand the On Demand concepts and process for implementing permanent and temporary upgrades using Capacity on Demand offerings. It can also be used by IBM or Business Partner service representatives who install and maintain system capacity.

Accessibility features

Accessibility features help users who have physical disabilities such as restricted mobility or limited vision use software products successfully. The accessibility features can help users do the following tasks:

- Run assistive technology such as screen readers and screen magnifier software.
- Operate specific or equivalent features by using the keyboard.
- Customize display attributes such as color, contrast, and font size.

Consult assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in this product. Consult the product information for the specific assistive technology product that is used to access our product information.

Keyboard navigation

This product uses standard Microsoft Windows navigation keys.

IBM and accessibility

See http://www.ibm.com/able for more information about the commitment that IBM has to accessibility.

How to provide feedback to IBM

We welcome any feedback that you have, including comments on the clarity, accuracy, or completeness of the information.

For additional information use the following link that corresponds to your configuration:

Configuration	Link
IBM z17® Model ME1	How to send feedback to IBM
IBM LinuxONE Emperor 5 Model ML1	How to send feedback to IBM

Chapter 1. Introduction

Businesses must handle unpredictable market opportunities, customer needs, and external pressure without missing a beat or interrupting existing processes. This means your IT infrastructure must support changing business objectives. You should have access to the resources you need, when you need them.

This is the basic principle underlying the Capacity on Demand offerings for IBM Z and LinuxONE. The Capacity on Demand offerings allow you to get the resources you need, when you need them.

Capacity on Demand offerings

The Capacity on Demand offerings provide permanent and temporary upgrades by activating one or more LICCC records. These upgrades occur without disruption to the operation of the server.

Depending on the type of upgrade, you can order upgrades yourself using the Customer Initiated Upgrade (CIU) application on Resource Link or you can call your IBM sales representative to order the upgrades.

Permanent upgrades

You can order permanent upgrades using the CIU application on Resource Link or through your IBM sales representative to:

- Add model capacity
- Add specialty engines
- Add memory
- Activate unassigned model capacity or supported specialty engines
- Deactivate activated model capacity or supported specialty engines.

You can order permanent upgrades through your IBM Sales representative also to:

- Activate channels
- Activate cryptos
- Change specialty engines (recharacterization).

Temporary upgrades

Temporary upgrades are provided through the following offerings:

- **On/Off Capacity on Demand (On/Off CoD)** - This offering allows you to temporarily add model capacity or specialty engines due to seasonal activities, period-end requirements, peaks in workload, or application testing.
- **Capacity Backup (CBU)** - This offering allows you to replace model capacity or specialty engines to a backup server in the event of an unforeseen loss of server capacity because of an emergency.
- **IBM Z Flexible Capacity for Cyber Resiliency** - This offering for IBM Z servers beginning with the IBM z16® allows you to shift production capacity between participating IBM servers at different sites.
- **Tailored Fit Pricing for IBM Z HW (TFP HW)** - A specialized offering that supports charges based on the actual capacity usage rather than the capacity active.

You can order CBU records, or related entitlements such as CBU tests, using the CIU application through Resource Link or calling your IBM sales representative.

You can order On/Off CoD records only by using the CIU application through Resource Link.

The process

Implementing the best Capacity on Demand solution to satisfy your requirements involves six steps:

1. Planning to determine your capacity needs
2. Enabling your machines to be ready for any upgrade
3. Ordering your upgrade records to have a solution readily available to use
4. Retrieving the required upgrade records
5. Installing the required upgrade records
6. Activating the specific upgrade processors.

Chapter 3, “Planning,” on page 9 through Chapter 7, “Activating temporary upgrade records,” on page 57 provide details on each of these steps.

In addition, Chapter 8, “Deactivating temporary capacity,” on page 65 and Chapter 9, “Deleting temporary Capacity on Demand records,” on page 67 provide information on deactivating capacity upgrades and deleting temporary records.

Note: This document will focus on using the CIU application through Resource Link to order permanent and temporary upgrades and the Support Element function through the HMC to retrieve, install, activate, and deactivate permanent and temporary upgrades.

Chapter 2. IBM Z Flexible Capacity for Cyber Resiliency

IBM Z Flexible Capacity for Cyber Resiliency is a *replacement capacity* offering introduced for the IBM z16. Flexible Capacity for Cyber Resiliency differs from other replacement capacity offerings by allowing you to remotely shift capacity and production workloads between participating IBM systems at different sites on demand. Once you shift to the alternate location, the capacity may stay active at the alternate site for up to one year. In addition to providing capacity when a disaster occurs, this capability can help demonstrate compliance with regulations that require organizations to be able to dynamically shift production to an alternate site and remain there for an extended period of time. This capability is also designed to help you proactively avoid disruptions from unplanned events. For example, it enables you to move production workload to avoid disruptions from an impending hurricane, flood, or wildfire, as well as from planned scenarios such as site facility maintenance.

Flexible Capacity for Cyber Resiliency is not an *additional capacity* offering. Flexible Capacity for Cyber Resiliency allows you to temporarily move active capacity you own from one location to another. At the end of a capacity shift, the total amount of capacity that you have active across your participating systems cannot exceed the amount of capacity that you own.

What to expect when ordering

Flexible Capacity for Cyber Resiliency is for shifting capacity between sites. For the purposes of this offering, a *site* is a different building, either in the same city or location, or in another city or region within the country. Shifting of capacity within a building or data center is supported by this offering. Capacity shifts may only occur within a given country; cross country shifts are not allowed.

When your sales representative discusses Flexible Capacity for Cyber Resiliency, you will need to be prepared to discuss the following:

- Which data centers and locations will be participating? There need to be at least two different locations for the offering, but there can be more.
- At each data center, which machines will be participating? Will capacity shifts occur between all machines in each location, or only select machines? For example, it may be decided to exclude dedicated internal coupling facilities from the shifts.
- What capacity is needed on each machine when their location is operating as the active data center? This discussion needs to include not only model capacity (CP engine capacity), but also if the movement of IFL, zIIP, or ICF engines are required.
- For each engine type, what capacity is needed on each machine, when that location is operating as the disaster recovery data center?
- Do you plan on automating the activation of Flexible Capacity for Cyber Resiliency, and if so with what technologies?

There are two general roles for machines participating in the Flexible Capacity for Cyber Resiliency offering:

Donating machines
: Machines where capacity is purchased on the machine, and that capacity will be moved to other machines as part of the capacity shift. When performing as a disaster recovery data center, these machines will have less capacity active than purchased.

Receiving machines
: Machines receiving capacity from another machine as part of the capacity shift. When performing as the active data center, these machines will have more capacity active than purchased.

A given machine may be both a donating machine and a receiving machine for different capacity types. For example, a machine may donate model capacity, but receive IFLs.

The donating machines will be configured with an active permanent capacity set to their level when performing as a disaster recovery (DR) system. Capacity and engines not needed when performing as a DR system will be unassigned. Each machine still has its owned capacity, but it is not active. They will then be equipped with a Flexible Capacity record that will raise them to the level needed when performing as the active data center.

The receiving machines will be given a Flexible Capacity record that activates capacity above what is purchased on the machine. The capacity levels on the record will allow these systems, when performing as the active production systems, to have equivalent capacity.

Let's look at an example. We have two data centers - Buffalo and Albany. The Buffalo data center is the disaster recovery data center, and has three machines configured with a 701 model capacity, for a total of 834 MSUs of capacity. The Albany data center is the original production data center. It has three machines purchased as a 710 model capacity, for a total of 6759 MSUs of capacity. The total owned model capacity, across the two data center is 7593 MSUs.

- The machines in Albany will be downgraded to a 701 active model capacity. The purchased capacity on each machine, also known as the high water mark (HWM) will remain as a 710. A Flexible Capacity record will be provided on this machine to restore the capacity back to a 710, by reactivating the unassigned model capacity.
- The machines in Buffalo will be configured as a 701 active model capacity and a 701 purchased capacity. A Flexible Capacity record will be provided on each of these machines to activate capacity above the HWM, up to a 710.

While our example has the same number of systems in each data center, and the same capacity on each system, this does not have to be the case. You most likely will have machines that have different capacities, and may have different numbers of participating machines in the different data centers. The important factor is that after the shift, the total amount of capacity active across the participating data centers must remain constant.

Installation

In most cases, your participating machines will ship with permanent active capacity levels set and Flexible Capacity records installed. After the machines are installed in your production data center, you would immediately activate your Flexible Capacity records, and bring up your production LPARs. In your disaster recovery location, the machines would be brought up with only the permanent active capacity. The Flexible Capacity records would remain inactive, until needed.

If Flexible Capacity for Cyber Resiliency is ordered for machines already installed, then careful installation planning is required, especially on the donating machines. For donating machines, as part of the setup process, the active permanent capacity will be lowered to the expected DR capacity level. This process makes these engines unavailable for use until reactivated via the Flexible Capacity record. Looking at our previous example, if the machines were installed in Albany with an active capacity of 710, then the machines would need to be downgraded to a 701, and then the Flexible Capacity record could be activated to take it back to the 710. During the period between the downgrade and the Flexible Capacity activation, the machine would be running as a 701.

IBM recommends that if you plan to add Flexible Capacity for Cyber Resiliency capabilities to machines already installed, add it first to your site performing as the DR site, then add it on your other site after the first capacity shift. Again, looking at our previous example, Flexible Capacity for Cyber Resiliency would first be added to the Buffalo site. Then after the capacity was activated at the Buffalo site and the workload moved there, the capacity downgrades and Flexible Capacity record installation would occur in Albany.

Activation and deactivation of Flexible Capacity for Cyber Resiliency

Manual activation and deactivation of the Flexible Capacity record is performed, like any other temporary capacity record, via the Perform Model Conversion task. For instructions on using the Perform Model

Conversion task to activate temporary capacity records, see Chapter 7, “Activating temporary upgrade records,” on page 57.

Activation of temporary capacity records may also be performed using supported Application Programming Interfaces (APIs):

- **Simple Network Management Protocol (SNMP)**

  See *SNMP Application Programming Interfaces*, SB10-7185-00

- **Web Services**

  See *Hardware Management Console Web Services API*, SC27-2646-00

- **z/OS® Base Control Program internal interface (BCPii)**

  See Base Control Program internal interface services in IBM Documentation.

Capacity shift limitations

Over the course of a 12 month period, up to 12 capacity adjustments are allowed on each machine participating in Flexible Capacity for Cyber Resiliency. A capacity adjustment is an increase or decrease in the capacity activated by the Flexible Capacity record on the machine. The 12 capacity adjustments are sufficient for 6 full capacity shifts per year, or a capacity shift every two months!

Once a capacity shift is started, the workload must be moved to the new system, and deactivated on the current system, within 24 hours. Using our prior example, a shift from Albany to Buffalo would be performed as follows:

1. The Flexible Capacity records on each machine in Buffalo would be activated.
2. On each Buffalo machine, the LPAR profiles would be activated, and Initial Program Load (IPL) of the operating systems and applications for the needed LPARs performed.
3. Workload is redirected from the Albany to Buffalo.
4. In Albany, LPARs no longer required are deactivated.
5. The Flexible Capacity records on each machine in Albany are deactivated.

If step 1 above occurred Friday at 10:00 PM in Buffalo, then step 5 must be completed prior to Saturday at 10:00 PM in Albany.

Once the shift occurs, there is no minimum time required for the capacity to remain active. You could move the capacity back the next day, or leave it for up to 12 months. The capacity is expected to be moved back within 12 months.

Performing a test with Flexible Capacity for Cyber Resiliency

A common requirement is to test the ability to bring up your capacity in your DR site, to ensure that all capacity can be activated, that the necessary "keys" are present, etc. This is frequently done after a major software upgrade to see that all necessary parts are upgraded.

To perform a test with Flexible Capacity for Cyber Resiliency, the capacity in the DR site would be activated using the Flexible Capacity record, the LPARs activated and Initial Program Load done. After verification that all systems loaded correctly, the LPARs would be deactivated in the DR site, and the Flexible Capacity record deactivated. This testing must be completed within 24 hours. If the test cannot be completed within 24 hours, then capacity should not be activated using Flexible Capacity records, and a different offering should be considered.

Using Flexible Capacity for Cyber Resiliency with other offerings

Capacity Back Up (CBU)

Capacity Back Up may still be required on machines running Flexible Capacity for Cyber Resiliency. There are two likely scenarios:

1. You require backup capabilities within the same data center or building.
2. You require more than 24 hours to perform your DR readiness testing of non-production workloads.

For case 1, the CBU activation is most likely to occur while a Flexible Capacity record is already active. The CBU record will add the DR capacity required above what is already active with the Flexible Capacity record. This capacity would be to replace capacity lost on another machine in the same building or data center. The normal CBU terms and conditions would apply to a CBU real activation. A CBU test activation should not be used to replace lost capacity.

For case 2, the CBU activation is most likely to occur on the site operating as the DR site, and the Flexible Capacity record is not active. The CBU test activation allows up to 10 days of capacity that can be used to test the ability to bring up the LPARs, and to run a test workload against those LPARs. In this case, production workload would not be run in the DR site. If you were going to execution production workload, a Flexible Capacity shift should be performed.

On/Off Capacity on Demand (On/Off CoD)

For machines using Flexible Capacity for Cyber Resiliency, the behavior of On/Off CoD is different than on other machines.

On/Off CoD is an offering that provides additional capacity for short term needs. On machines without Flexible Capacity, one of the ways that On/Off CoD is sometimes used is to reactivate unassigned capacity on the machines, to fulfill these short term spikes. When used to reactivate unassigned capacity, there is no additional hardware charges for the On/Off CoD.

For machines with Flexible Capacity records installed, a Flexible On/Off CoD record is provided. The behavior of this record differs from a standard On/Off CoD record in one important way: it cannot be used to reactivate unassigned capacity. For machines using Flexible Capacity for Cyber Resiliency, the unassigned capacity is considered part of the flexible capacity pool. The Flexible Capacity records must be used to reactivate this capacity, not the Flexible On/Off CoD records.

With the Flexible On/Off CoD record, all capacity activated by the record is considered additional capacity, above the purchased, and will result in a daily hardware charge.

Flexible On/Off CoD test records, and Flexible On/Off CoD Administrative records are available.

When adding Flexible Capacity for Cyber Resiliency to an existing system which uses On/Off CoD, it will be necessary to generate new Flexible On/Off CoD records for the machine to replace the legacy On/Off CoD records. After the installation of the Flexible Capacity for Cyber Resiliency record, you should log into your Resource Link CIU profile and create new Flexible Capacity On/Off CoD records for each On/Off CoD record you have on your system. These will then be staged for download and installation. After download of the Flexible On/Off CoD records, you should delete your legacy On/Off CoD records.

IBM Z Tailored Fit Pricing for HW

For machines participating in both Flexible Capacity for Cyber Resiliency and the Tailored Fit Pricing for HW (TFP HW) offering, the TFP HW corridor will be provided by a TFP HW record. This record is activated, to the contracted corridor level, when the machine is running production workloads, It is expected, that during a capacity shift, the TFP HW capacity will be moved with the Flexible Capacity and then deactivated after the capacity shift is completed. For example, our production workload is running in Albany, with a TFP HW corridor active there. As part of the capacity shift, both the Flexible Capacity record and the TFP HW record are activated in Buffalo. The workload is moved, and then both the TFP HW and Flexible Capacity record are deactivated in Albany.

Monitoring

The IBM Z Flexible Capacity for Cyber Resiliency offering provides unique capabilities to clients. However, these capabilities bring with them, complexity. To assist both IBM and you in keeping within the terms of the Flexible Capacity for Cyber Resiliency offering, IBM requires that all machines participating in the offering are monitored for compliance. This monitoring is performed in a fashion similar to what is done for clients using the On/Off CoD offering today.

Each time a machine's configuration is changed, the machine records the configuration change. This data is collected and attached to the machine's Vital Product Data (VPD). For each machine participating in the offering, the recommendation is that the machines have automated call home enabled. If automated call home is enabled, then every time the machine's configuration is changed, the VPD is transmitted back to IBM within 24 hours. This will allow IBM to track the changes you have made to the machine's configuration.

If the machine does not have call home enabled, then clients are required to export the VPD to media or an FTP site each month, and upload that data to IBM Resource Link website. VPD export should occur after the 2nd of the month, and must be uploaded to IBM Resource Link prior to the 15th of the month.

Chapter 3. Planning

Before it is time for you to actually order and activate permanent upgrades or temporary upgrades, you should do some planning. This section describes why you would use each of the Capacity on Demand offerings, the general structure of each offering, and items you should consider before enabling each offering.

Permanent upgrades

Consider the following before implementing any permanent capacity and memory upgrades:

- Ensure that you enable your system well in advance of needing to place an order. (The enablement process is described in Chapter 4, “Enabling your machine to order upgrades,” on page 27.)
- Determine what configurations you might need based on workload projections. For permanent upgrades, workloads are usually long term and handle day to day productions.
- When ordering a permanent upgrade, you can order unassigned model capacity and supported specialty engines without changing the active configuration.
- You can order a permanent upgrade and have it ready for download when the need arises. A permanent upgrade record can be staged on the Support Element.

  However, you cannot order another permanent upgrade until VPD is received that confirms the previous permanent upgrade is installed.
- Before installing consecutive permanent LICCC upgrades ordered from both the CIU application on Resource Link and your sales representative, carefully consider each upgrade's configuration and the effect they may have on each other upon installation. Refer to “Considerations for ordering and installing consecutive permanent LICCC upgrades” on page 10 for detailed information.
- Additional hardware cannot be installed using the CIU application through Resource Link, therefore, ensure that all additional capacity required is already installed.
- The sum of active and unassigned PUs is limited by the hardware or drawer capacity.
- You can perform a permanent capacity upgrade when temporary records are activated on a server.

  Refer to “Considerations while temporary upgrades are active” on page 11 for detailed information you need to consider before performing a permanent capacity upgrade while temporary upgrades are active.
- You can order permanent upgrades through your IBM Sales representative to change processor types. For example, you can convert an IFL to a zIIP or a zIIP to a CP. However, before you perform this conversion, look at your LPAR and processor pool definitions. If the engine being converted is the last engine of its type in the LPAR, you must configure the processor offline before applying the permanent upgrade.
- Additional logical processors can be concurrently configured online to logical partitions by the operating system when reserved processors are previously defined, resulting in image upgrades. The operating system must have the capability to concurrently configure more processors online.
- LinuxONE processing unit minimums and maximums apply to permanent upgrade orders and may be a factor in limiting the permanent upgrades you can order for a LinuxONE server:
  - A LinuxONE Emperor supports two model capacity configurations: 400 (no CPs) or 401 (one sub-capacity CP). Likewise, a LinuxONE Rockhopper supports two model capacity configurations: A00 (no CPs) or C01 (one sub-capacity CP). Active model capacity must always equal the purchased model capacity, so unassigning model capacity is not supported.
  - Unassigning IFLs is supported, but at least one IFL must be active.
  - ICF upgrades are not supported.
  - zIIP upgrades are not supported.

Considerations for ordering and installing consecutive permanent LICCC upgrades

An upgrade that requires only reconfiguring a machine's Licensed Internal Code Configuration Control (LICCC) to define its new, upgraded hardware configuration is referred to as a **LICCC upgrade**. All temporary upgrades are LICCC upgrades and some types of permanent upgrades are LICCC upgrades. Permanent upgrades that add model capacity, specialty engines, or memory are LICCC upgrades. Permanent upgrades that deactivate or reactivate model capacity or specialty engines also are LICCC upgrades.

The installation of a permanent LICCC upgrade is considered complete only after IBM has received and processed the machine's updated Vital Product Data (VPD). After an upgrade is installed, the machine's updated VPD is automatically scheduled to be sent to IBM within 24 hours. Upon receiving the updated VPD, its processing includes making it available to the CIU application on Resource Link and to the ordering system used by sales representatives to ensure that subsequent orders for upgrades are based on the machine's newly upgraded hardware configuration.

You can order permanent LICCC upgrades using the CIU application on Resource Link, through your IBM or Business Partner sales representative, or from both if necessary. However, to install consecutive permanent LICCC upgrades ordered from both sources, you must install the upgrades in the same sequence you ordered them (if you install an upgrade out of sequence, it will invalidate prior upgrades you ordered earlier but did not install yet). You also need to carefully consider each upgrade's configuration and the effect they may have on each other upon installation.

For example, if two permanent LICCC upgrades are based on the same hardware configuration when ordered, installing either upgrade will, of course, change that hardware configuration. Now, the other upgrade may or may not be compatible with the machine's new hardware configuration. When you attempt to install the other upgrade, the installation may fail. Or if you were able to install the upgrade, it may negate or undo all or part of the previously installed upgrade. To reduce the possibility of these outcomes, consider the source of a machine's most recently installed permanent LICCC upgrade, either Resource Link or your sales representative, before installing a subsequent permanent LICCC upgrade ordered from the other source.

After the installation of permanent LICCC upgrades ordered from your sales representative:

- Cancel (or have your service representative cancel) the machine's staged permanent LICCC upgrade ordered from Resource Link, if any (a staged upgrade has been downloaded but not installed).
- Consider using (or having your service representative use) the **Transmit Vital Product Data** task on the machine's Support Element to send its updated VPD manually and immediately after installing the upgrades in order to expedite its receipt and processing by IBM.
- Upon receipt of the updated VPD, if the machine has a permanent LICCC upgrade that was ordered from Resource Link but has not been downloaded yet, the order will be canceled automatically.
- Wait until IBM has received and processed the machine's updated VPD before ordering a new permanent LICCC upgrade from Resource Link. If the CIU machine profile on Resource Link still shows the machine's prior hardware configuration, then IBM has not processed the machine's updated VPD yet. Otherwise, if the machine's newly upgraded hardware configuration is shown, then its updated VPD has been processed.

Secondly, and perhaps more importantly, after the installation of a permanent LICCC upgrade ordered from Resource Link:

- Make your service representative aware of the installation of the upgrade from Resource Link before having them install permanent LICCC upgrades ordered from your sales representative.
- Have the service representative check when the upgrades were ordered. If they were ordered before the installation of the upgrade ordered from Resource Link was completed, then they are based on the machine's prior hardware configuration rather than its new configuration. In this case, your sales representative can advise you and your service representative whether the upgrades ordered from your sales representative must be canceled, can be adjusted, or can be installed as is.

Considerations while temporary upgrades are active

Capacity on Demand offerings support performing permanent upgrades while temporary upgrades are active. However, there are certain situations where it is necessary to deactivate or change the activation level of the temporary upgrades before activating the permanent upgrade to prevent any conflicts. Many of these situations apply only to systems that activate subcapacity CP engines. A precheck function is available on the Support Element to prevent a permanent upgrade if such conflicts exist. Refer to step "4" on page 51 for details.

On/Off CoD

With On/Off CoD upgrades, in most cases, there will not be problems because applying permanent upgrades will convert On/Off CoD engines of the same type to permanent engines.

For example, suppose you are running an IBM z17 at model capacity 739 with 4 temporary CP engines active. (See Figure 1 on page 11.) Then you apply a 2 CP permanent upgrade. The upgrade process will convert 2 of the temporary CP engines to permanent engines and leave 2 temporary CP engines active. (See Figure 2 on page 12.)

Note: In the tables that follow, each box represents a model capacity by its software model and approximate MSU value. The permanent model capacity is shown in bold text with a thick solid border. Temporary model capacity is shown with a thick dashed border. The permanent upgrade is represented by an arrow from original model capacity to the new model capacity. Invalid configuration changes are shown by an X.

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	**739** **7555**	740 7724	741 7893	742 8060	743 8226
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100

Figure 1. On/Off CoD configuration before permanent upgrade - successful upgrade

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100

Figure 2. On/Off CoD configuration after permanent upgrade - successful upgrade

Scenario 1: Are there sufficient number of engines on the system?

This scenario describes when there is an insufficient number of engines of the same type available on the system to apply a permanent upgrade with On/Off CoD active.

Suppose you are running an IBM z17 Max43 (ie. 43 available PUs) at model capacity 739 with 4 temporary CP engines active. (See Figure 1 on page 11.) Then you try to apply a 2 IFL upgrade. Because all engines on the system are active and the temporary engines are a different engine type, you will not be able to apply the upgrade without first deactivating 2 of the temporary CP engines.

Scenario 2: Will the permanent upgrade result in a higher subcapacity level than the On/Off CoD upgrade subcapacity level?

This scenario describes when On/Off CoD is active at a subcapacity level and you try to apply a permanent upgrade resulting in a higher subcapacity level. This scenario will not prevent you from completing your permanent upgrade, however, the resulting configuration may be different than expected.

On/Off CoD upgrades cannot activate capacity below the permanent subcapacity level. If the permanent capacity level is 6xx, then On/Off CoD upgrades can only be applied that add additional engines at the 6xx level, or that move to the 7xx level. On/Off CoD upgrades cannot change the subcapacity level to a 5xx or 4xx. When a permanent upgrade is applied when an On/Off CoD upgrade is active, if the subcapacity level of the permanent upgrade is greater than the capacity level of the current On/Off CoD upgrade, then the On/Off CoD upgrade's capacity level is increased to the permanent upgrade's subcapacity level.

Suppose you are running an IBM z17 at model capacity 635 with 4 temporary CP engines active. (See Figure 3 on page 13). Then you apply a permanent CP upgrade to a 736. Because the On/Off CoD record would now be at a lower capacity level than the permanent upgrade, the temporary subcapacity level is increased to a 739, a 47% increase in capacity, and 1 temporary CP engine is converted to a permanent engine. (See Figure 4 on page 13.)

If this increase in capacity and, therefore, the potential extra charges resulting from the higher capacity was not intended, you should either deactivate your On/Off CoD capacity or change to the desired subcapacity level before applying the permanent upgrade. In this instance, if the 736 level were still not enough capacity, then a change to the 737 level would be the next closest level.

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226
633 4433	634 4550	**635** **4667**	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100

Figure 3. On/Off CoD configuration before permanent upgrade - subcapacity level

733 6536	734 6707	735 6877	**736** **7047**	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100

Figure 4. On/Off CoD configuration after permanent upgrade - subcapacity level

Scenario 3: Are you trying to upgrade engines and downgrade engines when applying a permanent upgrade?

This scenario describes when On/Off CoD is active and the permanent record you try to apply is a mixture of upgrading engines and downgrading engines.

When a permanent upgrade increases the capacity level or number of engines of one type, and decreases the capacity level or number of engines of another type, On/Off CoD temporary engines are not converted from temporary to permanent. Instead the total number of temporary engines active will remain the same.

Suppose you are running at capacity level 708, (permanent capacity level of 705 plus 3 temporary CP engines) and 1 zIIP. Then you apply a permanent upgrade to add 3 CPs and 1 IFL, and remove 1 zIIP. The permanent upgrade results in running at capacity level 711 (permanent capacity level of 708 plus 3 temporary CP engines) and 1 IFL. The 3 temporary CP engines are not converted to permanent resources because the permanent upgrade contained a mixture of upgrading and downgrading resources.

Flexible Capacity

Considerations and scenarios for installing a permanent upgrade while a temporary Flexible Capacity upgrade is active are the same as On/Off CoD upgrades. The permanent upgrade converts temporary resources of the same type if possible.

Replacement capacity offerings

With the replacement capacity offerings, such as CBU, you need to be cautious when you try to apply a permanent upgrade primarily because with these offerings, active temporary capacity is not replaced by permanent capacity. Replacement capacity offerings add engines and capacity levels to the permanent engine and capacity levels. Therefore, when a permanent upgrade changes the engine counts or capacity levels, there is a corresponding change in the active temporary records. Replacement capacity that was activated before a permanent upgrade will be active on top of the new permanent configuration.

There are four basic scenarios to consider when planning for a permanent upgrade with a replacement capacity offering active. These scenarios include:

- Are there sufficient PUs on the system to allow for the permanent upgrade?
- Will the resultant configuration (permanent plus any active temporary records) after applying the permanent upgrade be a valid configuration?
- If you are on a subcapacity system and have replacement capacity records active, will the permanent upgrade result in an engine configuration that goes into the second drawer on a multi-drawer system?
- Do you have sufficient CBU features to continue activation at the new processor level?

Scenario 1: Are there sufficient PUs available on the system?

Because replacement capacity engines are not converted into permanent engines when a permanent upgrade is applied, you must ensure that there are sufficient engines available to activate the permanent upgrade.

Suppose you are running an IBM z17 Max43 (ie. 43 available PUs) at model capacity 739 with CBU engines active to a 743 level. (See Figure 5 on page 14.) With this scenario, you cannot perform any permanent engine upgrades, regardless of engine type, until the appropriate number of CBU engines have been deactivated.

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	**739** **7555**	740 7724	741 7893	742 8060	743 8226
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100

Figure 5. CBU configuration before permanent upgrade

Scenario 2: Will the resultant configuration be a valid configuration?

A subcapacity system has four subcapacity levels. When you activate a temporary upgrade, you activate one or more additional engines and one or more additional capacity levels. If you then apply a permanent upgrade, the resulting configuration must allow for the same number of temporary capacity levels and engines level to be active.

Suppose you are running an IBM z17 at model capacity 639 with CBU engines active to a 743 level (adding one capacity level and four engines). You then try to apply a permanent upgrade to a 739. The system would then attempt to add four engines and go up one capacity level from the new permanent configuration. Because there are no capacity levels beyond 7xx, the upgrade would fail. (See Figure 7 on page 15.)

In this case, for the upgrade to work, first lower the CBU activation to a 643, and then apply the upgrade.

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226	744 8392
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	**639** **5135**	640 5252	641 5368	642 5485	643 5601	
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587	
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100	

Figure 6. Configuration before permanent upgrade - subcapacity level is not valid

						X	X	X	X	X	
733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	**739** **7555**	740 7724	741 7893	742 8060	743 8226	744 8392
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601	
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587	
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100	

Figure 7. Configuration after permanent upgrade - subcapacity level is not valid

Scenario 3: Will resultant configuration go into the second drawer?

If you are on a subcapacity system, with a temporary record active, any permanent upgrade that moves the CP capacity marker to the second drawer will fail. This failure will occur even if the resulting capacity appears to be valid.

Suppose you are running an IBM z17 at model capacity 639 with CBU engines active to a 742 level. (See Figure 8 on page 16.) Then, if you try to apply a permanent upgrade to a 641, your upgrade will fail because you are moving the capacity marker beyond the 743 level into the second drawer. (See Figure 9 on page 16.)

For this upgrade to work, first decrease the CBU activation to a 641, and then apply the permanent upgrade. You could then activate additional CBU processors if necessary.

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226	744 8392
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	**639** **5135**	640 5252	641 5368	642 5485	643 5601	
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587	
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100	

Figure 8. Configuration before permanent upgrade - upgrade moves to next drawer

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226	X
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	**641** **5368**	642 5485	643 5601	
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587	
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100	

Figure 9. Configuration after permanent upgrade - upgrade moves to next drawer

Scenario 4: Using CBU is there sufficient CP features codes for increasing engine speed?

With CBU, CP capacity is managed by features codes. You select feature codes to either add engines or increase the engine speed.

Suppose you are running at capacity level 611 with increase capacity to a 711 using CBU. This requires 11 CP feature codes. Then, while CBU is active, you attempt to activate a permanent upgrade that adds an additional processor to go to a 612. The upgrade will fail because 12 CBU CP feature codes are now required.

To prevent this failure, either deactivate CBU prior to installing the permanent upgrade, or replenish the CBU record to add an additional CBU CP feature code prior to installing the permanent upgrade.

Software considerations

While capacity upgrades to the server itself are concurrent, your software may not be able to take advantage of the increased capacity without performing an Initial Program Load (IPL).

Software charges based on the total capacity of the server on which the software is installed are adjusted to the new capacity that is in place after the permanent upgrade.

Software products using Workload License Charge (WLC) may not be affected by the server upgrade, as their charges are based on partition utilization and not based on server total capacity.

Some third party software packages may require new license keys in order to take advantage of the additional capacity. Check with your software vendor for details.

See your IBM sales representative for further information.

Temporary upgrades

You can have eight temporary upgrade records (On/Off CoD, CBU) installed or active at any given time. However, you can only have one On/Off CoD record active at any given time.

On/Off CoD

Consider the following before implementing any temporary capacity upgrades using On/Off CoD:

- Plan in advance to determine what configurations you might need based on workload projections. This is important because, when properly planned, you only need to order one On/Off CoD record; and this record should be able to handle any possible configurations you want to activate.
- When you order an On/Off CoD record, you can prepay for the upgrade or post-pay for the upgrade.
  - As many additional specialty engines of each type up to the total purchased (permanently active plus unassigned) specialty engines of each type.
  - When ordering a post-paid On/Off CoD record, you select your upgrade configuration. There is no cost incurred when you order or install this type of record. You pay for what you activate during the activation time. You are charged on a 24-hour basis.
  - When ordering a prepaid On/Off CoD record, you can select one or more configurations and identify the duration of each configuration. Then Resource Link calculates the total number of tokens you will need. As resources are used, the tokens are decremented.

  For CP engines, a token represents an amount of processing capacity resulting in one MSU of software cost for one day (an MSU day). For specialty engines, a token represents the activation of one engine of that type for one day (a processor day).
- Ensure that you enable your system well in advance of needing to place an order. (The enablement process is described in Chapter 4, “Enabling your machine to order upgrades,” on page 27.)
- You can order an On/Off CoD record, retrieve the record to the Support Element, and install the record all in advance, to have it ready for activation.
- An On/Off CoD upgrade cannot change the server model, as additional processor drawer installation is not supported. However, On/Off CoD may change the server model capacity identifier if additional CP capacity is requested.
- Any currently unused capacity may be used for On/Off CoD, limited by the amount of currently physically installed capacity. Processing capacity that would previously have been referred to as CPs is measured in CP capacity units, not in PUs.
- On/Off CoD allows you to temporarily turn on unowned PUs, unassigned CPs (or unassigned CP capacity), and supported unowned and unassigned specialty engines available within the current model with the following limitations:
  - Temporary model capacity with CPs and capacity level equal to or greater than the active model capacity, up to 100% of the purchased capacity (active permanent capacity plus unassigned permanent capacity)
  - As many additional specialty engines of each type up to the total purchased (permanently active plus unassigned) specialty engines of each type
- An On/Off CoD record is initially available for up to 180 days, starting on the date you place your order.
- If you have an On/Off CoD record active and decide that you need to increase capacity, add processors, or extend the time to use the existing temporary capacity beyond the 180 days, you do not need to deactivate your current record to apply the new configuration record, temporarily leaving you with reduced capacity. You can reuse the existing On/Off CoD record by ordering a replenishment record.

When ordering a replenishment record, you cannot decrease any of the limits identified in the On/Off CoD record. They must stay the same or increase.

- An On/Off CoD record can be activated until midnight GMT on its expiration date. If the record is active when it expires, it will be deactivated automatically. You can extend the expiration date by ordering a replenishment record before or after the record expires. You can also enable the automatic renewal function to automatically extend the expiration date of installed records.
- LinuxONE processing unit minimums and maximums apply to On/Off CoD record orders and allow ordering records for activating IFL upgrades and SAP upgrades only.

Additional logical processors can be concurrently configured online to logical partitions by the operating system when reserved processors are previously defined, resulting in image upgrades. The operating system must have the capability to concurrently configure more processors online.

Note

On/Off CoD provides a "physical" concurrent upgrade, resulting in more enabled processors available to a server configuration. Thus, additional planning and tasks are required for nondisruptive "logical" upgrades.

Considerations for unassigned model capacity and unassigned specialty engines

Unassigned model capacity is the portion of a machine's purchased model capacity (if any) that is not active. A machine with unassigned model capacity typically is referred to as a downgraded machine because the active portion of its purchased model capacity is less than, or downgraded from, its total purchased model capacity (also referred to as the model capacity high water mark).

Supported On/Off CoD upgrades for a downgraded machine include unassigned model capacities (which may or may not include the purchased model capacity) that have equal or greater CPs and capacity level as the active model capacity. You can use any installed On/Off CoD record (excluding administrative On/Off CoD test records) to activate supported On/Off CoD upgrades that reactivate a downgraded machine's unassigned model capacity. So your planning for ordering and installing an On/Off CoD record typically requires deciding only how much more model capacity, above the purchased model capacity, you might want to activate with this On/Off CoD record.

Financial considerations may also apply to this decision. Currently there are no hardware charges for temporary reactivations of unassigned model capacity, but hardware charges for temporary activation of model capacity above your purchased model capacity are determined by your On/Off CoD upgrade pricing agreement with IBM or your Business Partner.

Begin by deciding whether you want the On/Off CoD record you order to support:

- Only reactivating unassigned model capacity, or
- Both reactivating unassigned model capacity and activating more model capacity (up to 100% more than your machine's purchased model capacity).

If you want an On/Off CoD record that supports only reactivating your machine's unassigned model capacity, then order a record that enables activating zero percent (0%) more model capacity.

When you order an On/Off CoD record, you will see that the 0% more model capacity option is paired with your machine's current purchased model capacity. This indicates the purchased model capacity is the **maximum** model capacity that can be activated with this On/Off CoD record if you choose 0% more model capacity. But it is important to understand that your selection is the **maximum** additional model capacity that can be activated with this On/Off CoD record; it is not necessarily the only model capacity that can be activated. If you choose 0% more model capacity, you will be able to use the record to activate any model capacity from the machine's downgraded model capacity up to and including its purchased model capacity.

For example, if you have an active model capacity of 715 (15 CPs) and a purchased model capacity of 718 (18 CPs), and you decide to order an On/Off CoD record that enables activating 0% more model capacity,

then you can use the record to activate temporary upgrades from 715 (15 CPs) to 716 (16 CPs), 717 (17 CPs), or 718 (18 CPs). The record supports reactivating part or all of the machine's unassigned model capacity.

Otherwise, if you want to order an On/Off CoD record that supports both reactivating your machine's unassigned model capacity and activating more model capacity, you will need to select the maximum additional model capacity you might want to activate with this On/Off CoD record.

Your options for selecting a maximum model capacity are shown as percent increases, from 0% to 100%, of your machine's current purchased model capacity. Some options show a percent increase paired with a specific model capacity to give you a reference for choosing a percent increase great enough to enable activating particular model capacities.

Regardless of the percent increase you choose, it is important to understand that your selection is the **maximum** additional model capacity that can be activated with this On/Off CoD record. The record you order can be used to activate any model capacity from the machine's downgraded model capacity up to the model capacity at or nearest to the percent increase you choose.

For example, if you have an active model capacity of 715 (15 CPs) and a purchased model capacity of 718 (18 CPs), and you decide to order an On/Off CoD record that enables activating 15% more model capacity, then you can use the record to activate temporary upgrades from 715 (15 CPs) to:

- 716 (16 CPs), 717 (17 CPs), or 718 (18 CPs) for reactivation of part or all of the unassigned model capacity, and
- 719 (19 CPs), 720 (20 CPs), or 721 (21 CPs) for reactivation of all unassigned model capacity plus activation of additional model capacity.

Your considerations and options for using On/Off CoD records for temporary reactivation of unassigned specialty engines are similar. Unassigned IFLs, for example, are the subset of a machine's purchased IFLs that are not active. You can use any installed On/Off CoD record to reactivate a machine's unassigned IFLs (excluding administrative On/Off CoD test records). When planning for ordering and installing an On/Off CoD record, you must decide whether you want the record to support only reactivating the unassigned IFLs or support both reactivating the unassigned IFLs and activating more IFLs (up to two times more than your machine's purchased IFLs).

If you want an On/Off CoD record that supports only reactivating your machine's unassigned IFLs, then order a record that enables activating zero (0) more IFLs. Otherwise, if you want to order an On/Off CoD record that supports both reactivating your machine's unassigned IFLs and activating more IFLs, you will need to select the **maximum** number of additional IFLs you might want to activate with this On/Off CoD record. In either case, it is important to understand that your selection is the **maximum** additional IFLs that can be activated with this On/Off CoD record. The record you order can be used to reactivate any number of unassigned IFLs and to activate additional IFLs up to the number you choose.

Software considerations

Software Parallel Sysplex® License Charge (PSLC) customers are billed at the million service unit (MSU) level represented by the combined permanent and temporary capacity. All PSLC products are billed at the peak MSUs enabled during the month, regardless of usage.

Customers with Workload License Charge (WLC) licenses are billed by product, at the highest four-hour rolling average for the month. In this instance, temporary capacity does not necessarily increase your software billing until that capacity is allocated to logical partitions and actually consumed.

For customers with IPLA, there is a daily charge for additional capacity above the current capacity purchased.

There may be additional fees for non-IBM software. In addition, some non-IBM software packages may require new license keys in order to take advantage of the additional capacity. Check with your software vendor for details.

See your IBM sales representative for further information.

On/Off CoD test

Consider the following before implementing any On/Off CoD test records:

- An On/Off CoD test record allows you to:

  Validate that the retrieve, install, activate, and deactivate On/Off CoD capacity upgrade process performs nondisruptively

  Train your authorized users to activate an On/Off CoD record

  Test an LPAR configuration

  Verify you can change between CP activation levels.
- An On/Off CoD test record cannot be active at the same time as an On/Off CoD record
- An On/Off CoD test record deactivates at the end of the test period (24 hours).

Administrative On/Off CoD test

Consider the following before implementing any administrative On/Off CoD test records:

- An administrative On/Off CoD test record allows you to test the Capacity on Demand process for training and API testing without incurring hardware or software charges.
- No capacity is activated with this test record.
- An administrative On/Off CoD test record cannot be active at the same time as another On/Off CoD record. You must deactivate the administrative On/Off CoD test record prior to activating any other On/Off CoD records.

CBU

Consider the following before implementing any temporary capacity upgrades using CBU:

- Existing CBU entitlement considerations:

  Note: These tasks must be done by an IBM or Business Partner sales representative.

  - Any CBU contract in place can be carried forward.
  - CBU entitlements can be carried forward as a single record or split into multiple records.
  - Splitting of records can only affect resources, not the term limit.
  - Each record created by this action includes test activations.
  - Any resources added to the carried forward entitlements will be priced accordingly.
  - CBU engine type conversions will be allowed during the upgrade.
- During the manufacturing process, up to four ordered CBU records will be installed rather than staged. If more than four records are ordered, the records are staged on the Support Element and you can manually select which records to install.
- A CBU agreement must be in place before the feature code for this offering can be enabled on your server. Enabling the CBU feature code is nondisruptive. (The enablement process is described in Chapter 4, “Enabling your machine to order upgrades,” on page 27.)
- CBU upgrades activate PUs through LICCC only. The hardware required for a CBU upgrade must already be installed. A CBU upgrade changes the model capacity identifier but cannot change the model.
- A CBU test upgrades the machine for the sole purpose of checking your system's ability to adequately perform in the event of an emergency. Each CBU record provides a specific number of free, 10-day test activations. The number of free test activations equates to the number of years that are purchased with the CBU record. (For example, a three year CBU record has three tests activations, a one year CBU record has one test activation.) Additional test activations beyond the free tests may be purchased in single increments up to a maximum of 15 CBU tests per record. This maximum of 15 tests per record cannot be exceeded and includes any free activations plus additional paid test activations.

- If CBU was not included in the order with your new machine, contact your sales representative to place an order for CBU.
- You can extend the expiration date of an existing non-expired CBU record up to a maximum of five years by ordering a replenishment record. The five years includes your current remaining years of the CBU record (rounded up) plus any newly purchased years. One test activation is provided for each additional year added to the CBU record. A CBU record cannot be activated after the expiration date has passed. If the record is active it will be automatically deactivated at midnight GMT two days after the expiration date and the CBU record will remain on the system.
- A CBU system typically operates with a "base" PU configuration having a preconfigured number of additional spare PUs reserved for activation, in case of an emergency, as CBU model capacity or specialty engines.
- The base CBU server configuration must have sufficient memory and channels to accommodate the potential needs of the largest CBU target configuration. When capacity is needed in an emergency, you can activate the emergency CBU configuration with the reserved spare PUs. It is very important to ensure that all required functions are available on the "backup" servers, including CFLEVELs for Coupling Facility partitions, as well as cryptographic and connectivity capabilities.
- You can run production workload on a CBU upgrade during a CBU test provided that at least an equivalent amount of production capacity is shut down for the duration of the CBU test. If you already have existing CBU contracts, you will also need to sign an Amendment (US form #Z125-8145) with IBM.
- You can order a CBU record that contains more PUs than they have available on your system. Then when you activate the CBU record, you would select the combination of PU types you want to activate.
- This upgraded configuration is activated temporarily and provides additional PUs above and beyond the server's original, permanent configuration. The number of additional PUs is limited by the configuration of the CBU record.
- When the emergency is over or the CBU test is complete, the server must be taken back to its original, permanent configuration. The CBU records can be deactivated at any time before the end of real or test activation. If it is not manually deactivated, it will be automatically deactivated and the CBU record will remain on the system.
- A real activation is available up to 90 days starting on the date you activate the CBU record. When a CBU real activation has been exhausted, the CBU record is automatically deactivated. Once the real activation has been consumed, the CBU record cannot be activated again, even if test activations are remaining on the record. However, you can order a replenishment record to restore the real activation for continued use of this CBU record. You may order and install this replenishment while the CBU real activation is still active to prevent a gap in your disaster recovery coverage.
- Once a CBU record enters the 2-day grace period, the only customer option is to deactivate all resources from this record. You cannot change the activation level by increasing or decreasing partial resources. If you attempt to partially increase or decrease resources, you will receive an error indicating the CBU record has expired.
- LinuxONE processing unit minimums and maximums apply to CBU record orders and allow ordering records for activating IFL upgrades and SAP upgrades only.

Note: CBU for processors provides a "physical" concurrent upgrade, resulting in more enabled processors available to a server configuration. Thus, additional planning and tasks are required for nondisruptive "logical" upgrades.

Software considerations

IBM software charges during a disaster or a test are not affected by CBU. Software charges for the designated CBU machine are based on its permanent configuration; software charges for any machine whose workload is transferred to the CBU machine during an emergency are based on that machine's permanent configuration. Please note that CBU does not add any IBM program authorizations beyond those that you have acquired.

There may be additional fees for non-IBM software. In addition, some non-IBM software packages may require new license keys in order to take advantage of the additional capacity. Check with your software vendor for details.

See your IBM sales representative for further information.

Tailored Fit Pricing for IBM Z HW (TFP HW)

Consider the following before implementing capacity upgrades with TFP HW:

- A TFP HW agreement must be in place before the feature code for this offering can be enabled on your server. Enabling the TFP HW feature code is nondisruptive. (The enablement process is described in Chapter 4, “Enabling your machine to order upgrades,” on page 27.
- TFP HW upgrades activate PUs through LICCC only. The hardware required for a TFP HW upgrade must already be installed. A TFP HW upgrade changes the model variable capacity identifier but cannot change the model.
- If TFP HW was not included in the order with your new machine, contact your sales representative to place an order for TFP HW.
- You can extend the expiration date of an existing non-expired TFP HW record up to a maximum of five years by ordering a replenishment record. The five years includes your current remaining years of the TFP HW record (rounded up) plus any newly purchased years. A TFP HW record cannot be activated after the expiration date has passed.
- TFP HW records are configured to run a constant corridor. Generally, the TFP HW corridor is always activate. The exception is when running TFP HW with Flexible Capacity. In that case, the TFP HW corridor is activated when the machine is running production workload, and then turned off when running as a backup server.
- When considering TFP HW in conjunction with Flexible Capacity be sure to take into consideration potential issues related to having multiple temporary capacity records active on subcapacity CP systems. These are described in “Subcapacity CP activation” on page 22.

Software considerations:

- TFP HW is only available to clients using Tailored Fit Pricing for z/OS software and select LinuxONE clients.
- There may be additional fees for non-IBM software. In addition, some non-IBM software packages may require new license keys in order to take advantage of the additional capacity. Check with your software vendor for details.
- See your IBM sales representative for further information.

Subcapacity CP activation

The restrictions described in this section apply only to IBM Z models that support CPs in multiple drawers. These restrictions do not apply to IBM Z models with CPs in a single drawer. Furthermore:

- These restrictions apply only to systems using subcapacity CPs (4xx, 5xx, or 6xx capacity levels); they do not apply to systems using full capacity CPs (7xx capacity levels).
- These restrictions apply only to temporary model capacity upgrades; they do not apply to specialty engine upgrades.
- These restrictions apply only when you use multiple temporary records at the same time. A typical scenario for using multiple temporary records at the same time is activating a CBU record while an On/Off CoD record is active.

Multi-drawer systems using subcapacity CPs allow using multiple temporary records at the same time, but some restrictions apply to the range of model capacity upgrades you can activate. The restrictions prevent activating and deactivating model capacity upgrades in combinations that would result in invalid configurations in the second drawer or beyond, where subcapacity CPs are not supported.

Figure 10 on page 23 shows an example of how unrestricted activation and deactivation of multiple records could lead to an invalid configuration in the second drawer of an IBM z17. The IBM z17 in this example is using subcapacity CPs (its permanent model capacity is 637) and it has two temporary records installed: an On/Off CoD record and a CBU record. Consider the result of using its temporary records as follows:

- The On/Off CoD record is used to activate a model capacity upgrade from 637 to 739.
- The CBU record is used to activate an additional 12 CPs, upgrading the model capacity from 739 to 751. The combined capacity level of the two upgrades is now in the second drawer.
- If the On/Off CoD record is deactivated while the CBU record remains active, it would result in a capacity setting of 649, which is not a valid configuration because subcapacity CPs are not supported beyond the first drawer.

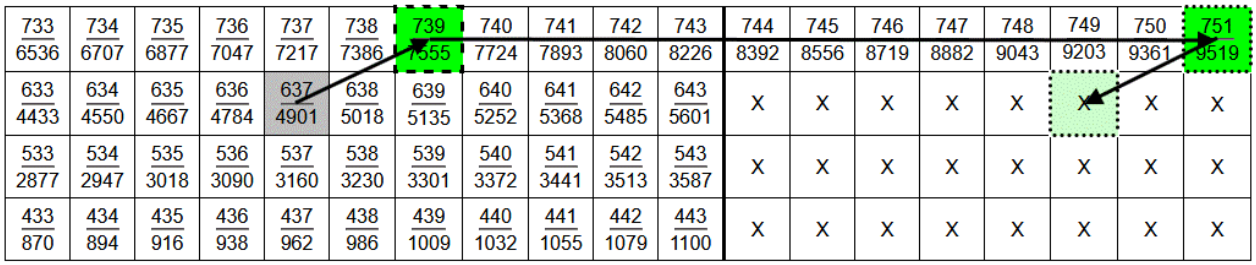


Figure 10. Example of invalid IBM z17 capacity setting from activation and deactivation of multiple records

Rules for subcapacity CP activations

To prevent invalid configurations when multiple records are active, three rules are enforced for activation of subcapacity CPs:

- When one record increases the capacity level, it is the only record allowed to subsequently activate capacity beyond the first drawer.
- When more than one record increases the capacity level, none of the records are allowed to activate capacity beyond the first drawer.
- When one record increases the capacity level and activates capacity beyond the first drawer, it is the only record allowed to subsequently activate additional CPs.

These rules, plus limits included in the temporary capacity records, guarantee the server returns to a valid configuration when any active record is deactivated.

Examples of the rules

The rules are illustrated in the following four examples.

Example one:

When a record activates an upgrade that increases the CP capacity level but does not enter the second drawer, another record can subsequently activate upgrades only within the first drawer.

For example, in Figure 11 on page 24, the first activated record changes the capacity setting of an IBM z17 from 637 to 739. The machine allows activation of additional CPs from any subsequent temporary record up to 743, the maximum capacity setting within the first drawer of an IBM z17, as shown.

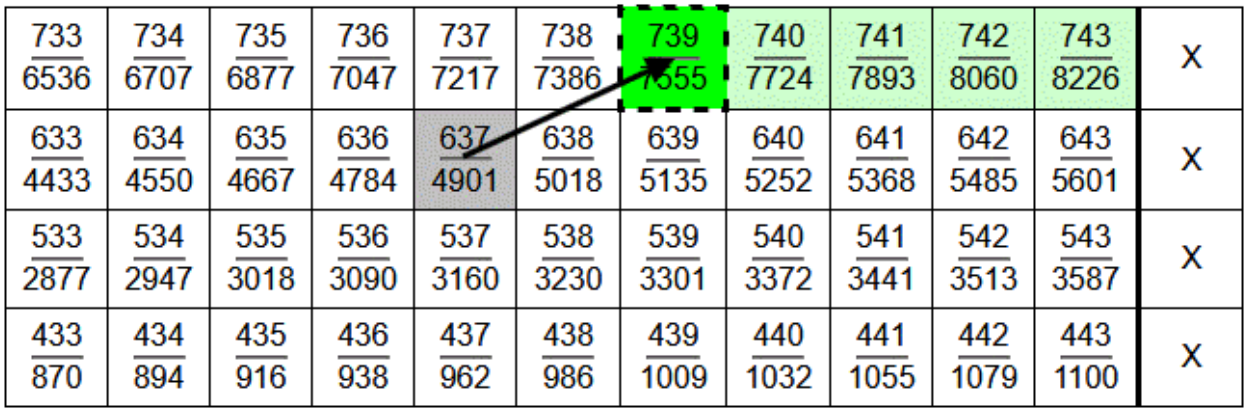


Figure 11. Example of IBM z17 upgrades allowed for other records after first record changes capacity level within the first drawer

Example two:

When multiple records activate upgrades that increase the capacity level but do not enter the second drawer, the machine does not allow any record to enter the second drawer.

For example, Figure 12 on page 24 shows two records that change the CP capacity level of an IBM z17. Entering the second drawer is not allowed. Only upgrades to capacity settings in the first drawer are allowed under the second rule.

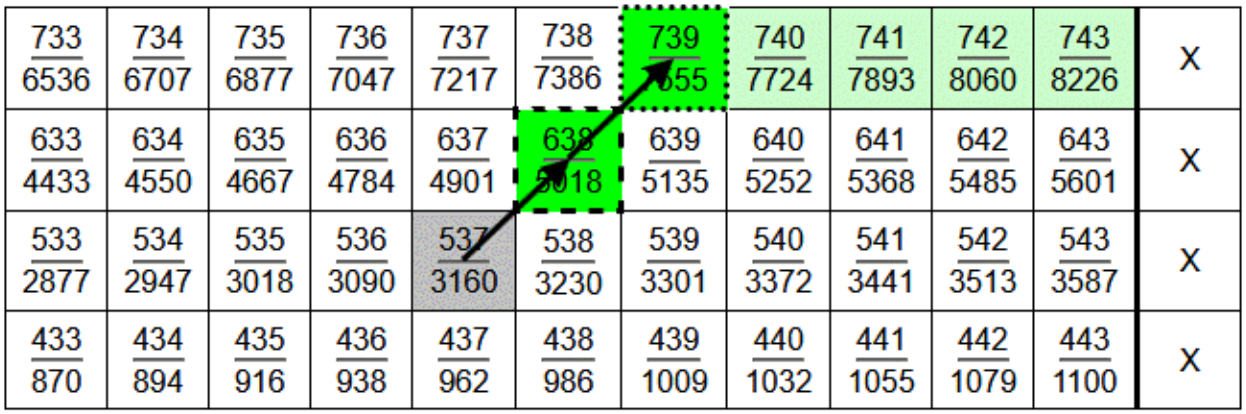


Figure 12. Example of IBM z17 upgrades allowed after two records change capacity levels

Example three:

When a record increases the CP capacity level and enters the second drawer, only this record can activate additional CPs. You can use other records only to add specialty engines.

For example, in Figure 13 on page 25, the first record activated an upgrade that changed the capacity setting of an IBM z17 from 537 to 747. While this record remains active, it is the only record allowed to add CPs (up to the limits defined by the capacity record) under the third rule. Other temporary records can be used only to add specialty engines.

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226	744 8392	745 8556	746 8719	747 8882	748 9043	749 9203	750 9361	751 9519
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601	X	X	X	X	X	X	X	X
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587	X	X	X	X	X	X	X	X
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100	X	X	X	X	X	X	X	X

Figure 13. Example of first record changing capacity level and entering the second drawer of an IBM z17

Example four:

When the first record does not increase the CP capacity level, the second record is allowed to increase the CP capacity level and to enter the second drawer.

Figure 14 on page 25 illustrates this example for an IBM z17:

- The first record upgrades the model capacity from 537 to 541, and another record upgrades it from 541 to 747. This is a valid configuration, because either record can be deactivated entirely without resulting in an invalid configuration.
- Adding more CPs with the first record is not possible because, under the third rule, only the record that activates capacity beyond the first drawer can add more CPs. So only the second record can add CPs (up to the limits defined by the capacity record).
- Both records can still deactivate CPs. That is, even the first record can decrease the number of activated CPs.

733 6536	734 6707	735 6877	736 7047	737 7217	738 7386	739 7555	740 7724	741 7893	742 8060	743 8226	744 8392	745 8556	746 8719	747 8882	748 9043	749 9203	750 9361	751 9519
633 4433	634 4550	635 4667	636 4784	637 4901	638 5018	639 5135	640 5252	641 5368	642 5485	643 5601	X	X	X	X	X	X	X	X
533 2877	534 2947	535 3018	536 3090	537 3160	538 3230	539 3301	540 3372	541 3441	542 3513	543 3587	X	X	X	X	X	X	X	X
433 870	434 894	435 916	436 938	437 962	438 986	439 1009	440 1032	441 1055	442 1079	443 1100	X	X	X	X	X	X	X	X

Figure 14. Example of second record changing capacity level and entering the second drawer of an IBM z17

Chapter 4. Enabling your machine to order upgrades

The enablement process for each Capacity on Demand offering begins when you order the associated enablement feature code and sign the associated IBM contract document(s), and for online buying capability, completes when you receive an email from Resource Link notifying you that your machine is enabled for ordering upgrade records.

This chapter lists the Capacity on Demand enablement features and their feature codes, lists the agreements that must be signed for the enablement process to begin, and guides you through the instructions you must follow to enable your machine to order upgrades.

Capacity on Demand enablement feature codes

The Capacity on Demand enablement features are:

- On-Line Capacity on Demand (CoD) Buying (FC 9900)
- Permanent Upgrade Authorization (FC 9898)
- On/Off CoD Authorization (FC 9896)
- CBU Authorization (FC 9910)
- Flexible Capacity for Cyber Resiliency (FC 9933)
- Tailored Fit Pricing for IBM Z HW (FC 9932)

You can order CoD enablement features through your sales representative when ordering a supported server or at any time afterward.

Agreements required for enablement

Most existing agreements for Customer Initiated Upgrade-On/Off Capacity on Demand (CIU-On/Off CoD) and Capacity Back Up (CBU) will carry forward to IBM Z and LinuxONE for those offerings. Refer to "Existing agreements that carry forward to IBM Z and IBM LinuxONE" on page 27 for a list of these agreements.

Capacity on Demand capabilities and features introduced for IBM Z and LinuxONE are supported by a new set of agreements. Refer to "Agreements and supplements for IBM Z and IBM LinuxONE Capacity on Demand functions and features" on page 28 for a list of these agreements.

Existing agreements that carry forward to IBM Z and IBM LinuxONE

CIU-On/Off CoD

If you have any of the following CIU-On/Off CoD agreements already existing, you can carry those forward for only the features associated with the previously signed agreements.

- *IBM Customer Agreement, Attachment for Customer Initiated Upgrade and IBM eServer On/Off Capacity on Demand* (US form #Z125-6611)
- *IBM Customer Agreement, Supplement for Customer Initiated Upgrade and IBM eServer On/Off Capacity on Demand II* (US form #Z125-6688)
- *IBM Customer Agreement, Supplement for Customer Initiated Upgrade and IBM eServer On/Off Capacity on Demand* (US form #Z125-6612)
- *IBM Customer Agreement, Addendum to Customer Initiated Upgrade and IBM eServer On/Off Capacity on Demand Tests* (US form #Z125-7139).

CBU

If you have any of the following CBU agreements already existing, you can carry those forward for only the offerings associated with the previously signed agreements.

- *IBM Customer Agreement, Attachment for Capacity Backup Upgrade* (US form #Z125-5598 Version -03, -04, or -05 only)
- *IBM Customer Agreement, Supplement for Capacity Backup Upgrade* (US form #Z125-6857)
- *IBM Customer Agreement, Supplement for Capacity Backup Upgrade II* (US form #Z125-7137).

Agreements and supplements for IBM Z and IBM LinuxONE Capacity on Demand functions and features

In addition to the customer agreements for each specific Capacity on Demand feature, there are additional customer agreements and supplements that must be signed before you can enable some of the features. These additional customer agreements are: the base Capacity on Demand agreement, the replacement capacity offering agreement, and the On-Line CoD Buying agreement.

Base Capacity on Demand agreement:
Contains the base terms for all IBM Z and LinuxONE Capacity on Demand features:

- *IBM Customer Agreement Attachment for IBM System z® Capacity on Demand Offerings* (US form #Z125-7879).

Replacement capacity offering agreement:
Contains the common terms common for each replacement capacity offering.

- *IBM Customer Agreement Attachment for IBM System z Replacement Capacity Offerings* (US form #Z125-7880).

On-Line CoD Buying agreement and supplement
Contains the supporting terms for the On-Line CoD Buying of Permanent Upgrades and On/Off CoD features and the optional On-Line CoD buying capability for the CBU features:

- *IBM Customer Agreement Attachment for IBM System z On-Line CoD Buying* (US form #Z125-7884)
- *Supplement for On-Line Ordering* (US form #Z125-7885) or *Supplement for On-Line Ordering II* (US form #Z125-7908).

  The On-Line Ordering attachment requires a supplement through which the customer's Resource Link IDs are specified as being valid for placing online orders for a given machine. The supplement must be prepared and signed with each transaction that includes an On-Line CoD Buying feature (FC 9900).

Note: The On-Line CoD Buying feature (FC 9900) is a prerequisite when ordering Permanent Upgrade Enablement (FC 9898) or On/Off CoD Enablement (FC 9896) for the first time. Without the On-Line CoD Buying feature, you cannot use Resource Link to acquire upgrades and other entitlements.

The On-Line CoD Buying feature (FC 9900) is optional for the CBU offering because CBU records can also be ordered or replenished through your sales representative. However, if the On-Line Buying feature (FC 9900) is subsequently ordered, you can use Resource Link to order CBU records and entitlement replenishment.

Agreements required for Capacity Back Up (CBU)

You are required to sign the following agreement one time within a given country before IBM will accept an order for your first instance of the enablement feature code for CBU Enablement (feature #9910):

- *IBM Customer Agreement Attachment for IBM System z Capacity Back Up* (US form #Z126-9408).

Note: For existing CBU clients, this agreement replaces all prior CBU agreements that may have been in place.

Agreements required for On/Off Capacity on Demand

You are required to sign the following agreements one time within a given country before IBM will accept an order for your first instance of the On/Off CoD Enablement feature (feature #9896):

- *IBM Customer Agreement Attachment for IBM System z Capacity on Demand Offerings* (US form #Z125-7879)
- *IBM Customer Agreement Attachment for IBM System z On-Line CoD Buying* (US form #Z125-7884), including either the *Supplement for On-Line Order* (US form #Z125-7885) or *Supplement for On-Line Ordering II* (US form #Z125-7908)
- *IBM Customer Agreement Attachment for IBM System z On/Off Capacity on Demand* (US form #Z125-7883).

Agreements required for On-Line CoD Buying of Permanent Upgrades

You are required to sign the following agreements one time within a given country before IBM will accept an order for your first instance of the Permanent Upgrade Enablement feature (feature #9898):

- *IBM Customer Agreement Attachment for IBM System z Capacity on Demand Offerings* (US form #Z125-7879)
- *IBM Customer Agreement Attachment for IBM System z On-Line CoD Buying* (US form #Z125-7884), including either the *Supplement for On-Line Ordering* (US form #Z125-7885) or *Supplement for On-Line Ordering II* (US form #Z125-7908).

Agreements required for Flexible Capacity for Cyber Resiliency

You are required to sign the following agreement one time within a given country before IBM will accept an order for your first instance of the enablement feature code for Flexible Capacity Enablement (feature #9933):

- *Attachment for IBM Z Flexible Capacity for Cyber Resiliency* (US form #Z126-9411).

Agreements required for Tailored Fit Pricing for IBM Z HW

You are required to sign the following agreement one time within a given country before IBM will accept an order for your first instance of the enablement feature code for TFP HW Enablement (feature #9932):

- *Attachment for Tailored Fit Pricing for IBM Z Hardware Consumption Solution* (US form #Z126-9250).

How to enable your machine for On-Line CoD ordering

To enable your machine for ordering CoD records:

1. Obtain an IBMid by creating an IBM account at http://www.ibm.com/account/profile.
2. Contact your IBM or Business Partner sales representative to order your Capacity on Demand offerings. After your sales representative submits your enablement order, they contact CSO/BPSO to generate the appropriate agreement(s) and supplement(s) that you must sign. These agreements explain the terms and conditions for your Capacity on Demand offerings. The supplement requires your registered IBMid, customer number, machine type and serial number.
3. The sales representative sends the signed supplement to the IBM Access Administrator who creates the machine profile based on the information you provide in the supplement.
4. Resource Link enables the IBM Service Support System to download the feature codes to the machine the next time the machine performs a Transmit Service Availability Data (TSAD) transmission. (This occurs during the next scheduled availability call home.)

   Note: You will want to verify that your machine is set for a schedule operation to transmit the machine TSAD. This is set up on the Support Element.
5. Once the above steps are completed, Resource Link sends an email to notify you that the machine is enabled for On-Line CoD ordering.

CIU machine profiles on Resource Link

A Customer Initiated Upgrade (CIU) machine profile is the IBM Resource Link web page that supports ordering Capacity on Demand (CoD) records online for a CoD-enabled machine. IBM creates a machine profile during the machine enablement process and notifies its authorized users by email when the machine profile is created.

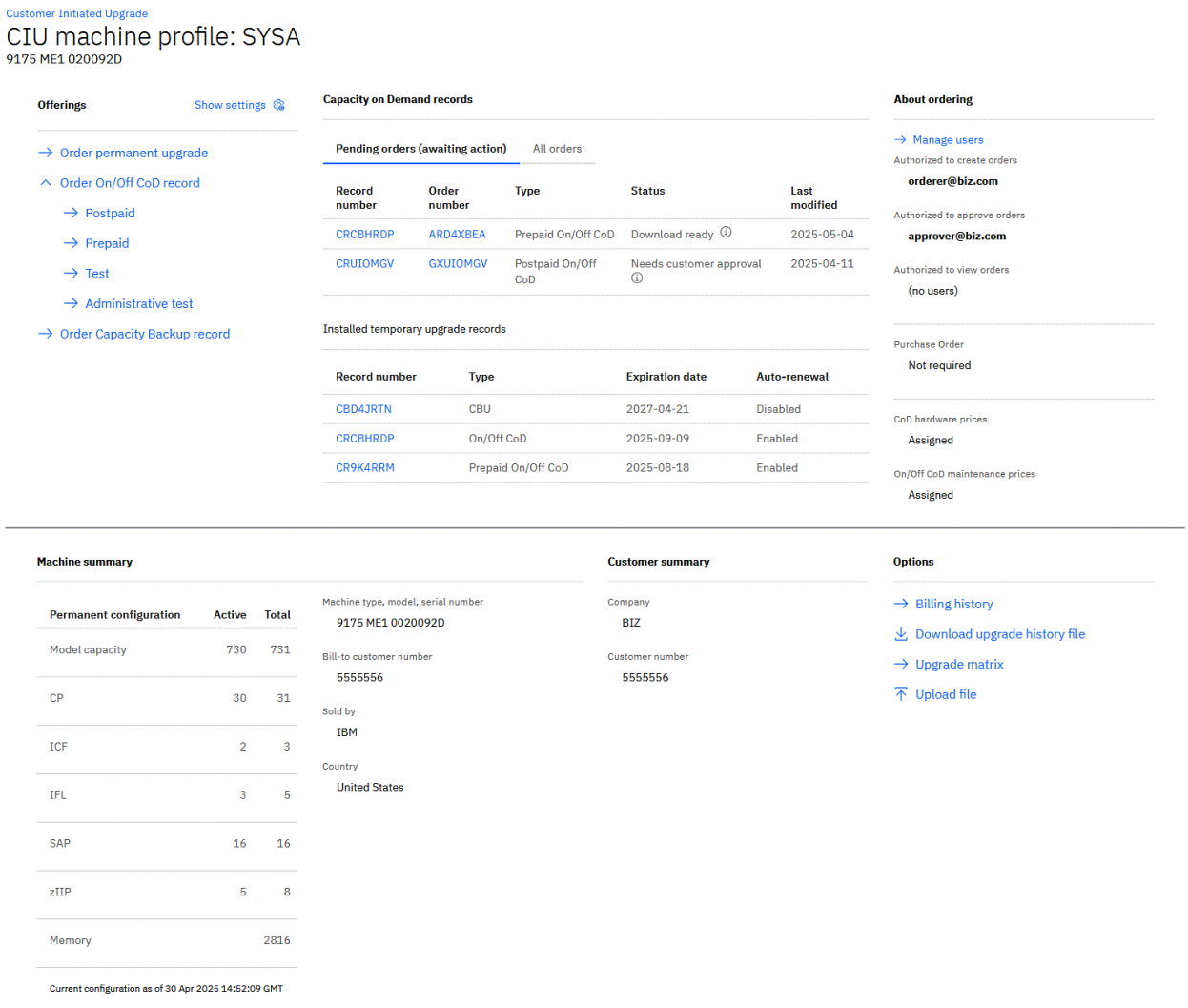
Opening machine profiles

Authorized users can open CIU machine profiles on Resource Link. To open a machine profile:

1. Click the **Customer Initiated Upgrade** link on the Resource Link homepage to open the **Active machine profiles** page.
2. Locate the machine in the list on the **Active machine profiles** page. Look for its identifiers in the **Machine** column (machine type, model, serial number) or its name in the **System name** column.
3. Click the machine's link in the **Machine** column to open its machine profile.

The machine profile page header identifies the machine by system name (if known), machine type, model, and serial number. The page content provides further details of its configuration and identification, along with links for enabled CoD ordering options, and for updating the machine profile.

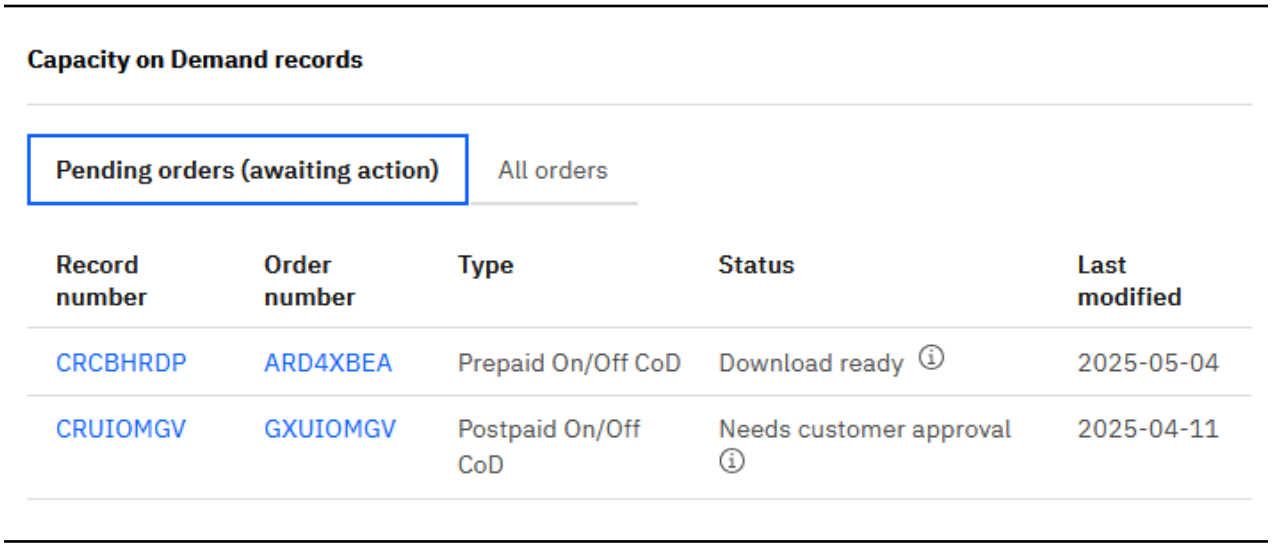
An upgrade matrix is also available. The matrix displays the potential upgrade capacities for the hardware model. To view this information, click **Upgrade matrix** in the **Options** link list.



The machine profile **About ordering** section includes the IDs authorized to order, approve, and view CoD records.

The machine profile **Capacity on Demand records** section provides a summary of CoD records that have been ordered for the server. Click the tabs to view the orders:

- **Pending orders (awaiting action)**: lists orders for records that require further action to install the records.
- **All orders**: lists pending, installed, and cancelled orders.



Managing user access to machine profiles

IBM enables initial access to a machine profile upon creating it during the machine enablement process. Initial access includes at least one orderer, and may include additional orderers, order approvers, and viewers.

Users authorized to create orders:
Users with this role are allowed to order the various Capacity on Demand records. Generally these users have knowledge about the type of records that are required and the desired activation configurations.

Users authorized to approve orders:
Users with this role must approve record orders before they are staged on the support system and made ready for download. Generally these users have the financial authority within a company to purchase upgrades. Depending on your company's policy, you may or may not have an order approver.

Users authorized to view orders:
Generally this role is assigned to members of the operations team who are not authorized to create or approve orders but may need to view orders.

Only authorized users can order upgrade records, view orders, or approve orders. The lists of authorized users can be managed by managing user IDs, which are shown in boldface in the **About ordering** section. Click the **Manage users** link to view or update the list of users authorized in each role.

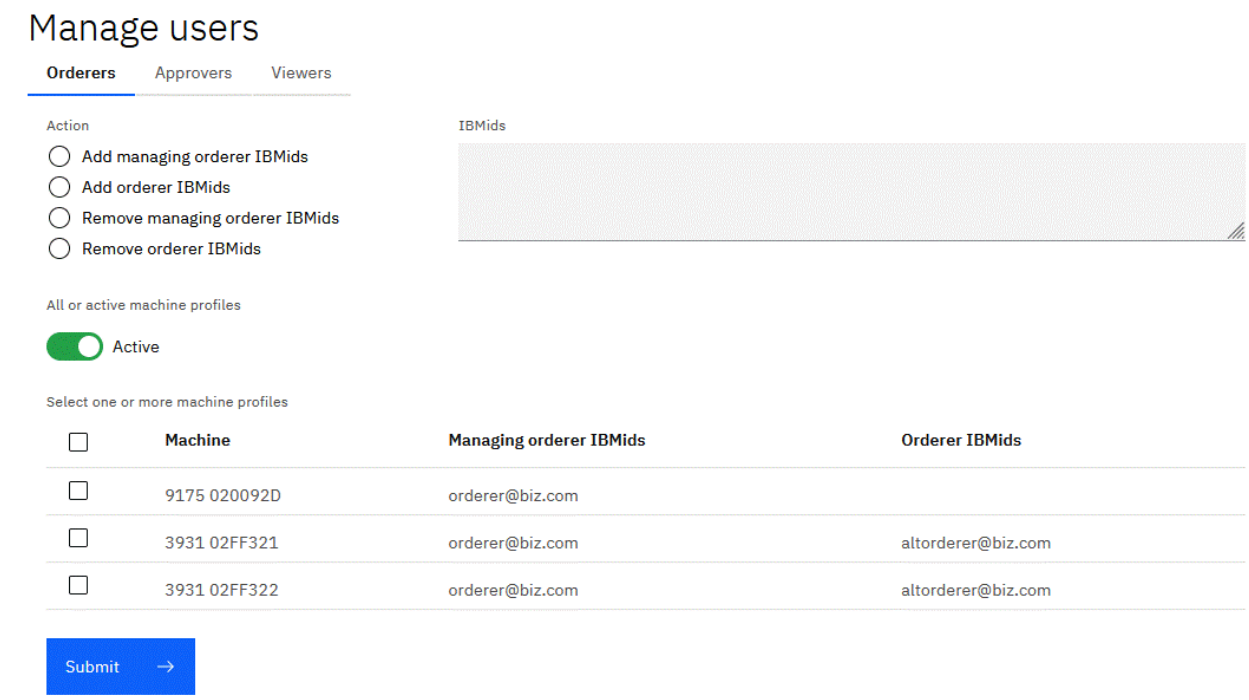


Figure 15. Manage users panel

Chapter 5. Ordering

This chapter explains what you should consider before ordering an upgrade and provides steps you need to follow when ordering an upgrade.

To order On/Off CoD records, you must use the CIU application through Resource Link. To order permanent upgrades or records for other temporary upgrade offerings, you can use the CIU application through Resource Link or you can call your IBM or Business Partner sales representative.

This chapter provides information about ordering an upgrade record using the CIU application through Resource Link.

Permanent upgrade considerations

Before you order a permanent upgrade using the CIU application through Resource Link, consider the following:

- You can only order one permanent upgrade record at a time. However, a single record can have multiple items (any number of engines of any type and memory) as long as they are within the limits of the machine. With this record, you can also order "unassigned" model capacity and IFLs.

  If a permanent upgrade is currently being processed, you cannot order another permanent upgrade until VPD is received that confirms the previous permanent upgrade is installed.
- When placing your order, consider how many engines will be left on your machine and how this will impact your enhanced drawer availability.
- Capacity limits or specialty engine limits. (See the following model-specific tables for details.)

Table 1. IBM z17 Model ME1 - Capacity limits and specialty engine limits for permanent upgrades

Model	Available PUs	Active PUs			zIIPs/ uzIIPs	Base SAPs	Opt SAPs
		CPs	ICFs / uICFs	IFLs / uIFLs			
ME1	43	0 - 43	0 - 43/42	0 - 43/42	0 - 42	5	0
ME1	90	0 - 90	0 - 90/89	0 - 90/89	0 - 89	10	0
ME1	136	0 - 136	0 - 136/135	0 - 136/135	0 - 135	16	0
ME1	183	0 - 183	0 - 183/182	0 - 183/182	0 - 182	21	0
ME1	208	0 - 208	0 - 208/207	0 - 208/207	0 - 207	24	0

Table 2. LinuxONE Emperor 5 Model ML1 - Capacity limits and specialty engine limits for permanent upgrades

Model	Available PUs	Active PUs			zIIPs/ uzIIPs	Base SAPs	Opt SAPs
		CPs	ICFs / uICFs	IFLs / uIFLs			
ML1	43	0 - 1		1 - 43/0 - 42		5	0
ML1	90	0 - 1		1 - 90/0 - 89		10	0
ML1	136	0 - 1		1 - 136/0 - 135		16	0
ML1	183	0 - 1		1 - 183/0 - 182		21	0
ML1	208	0 - 1		10 - 208/0 - 207		24	0

- If you increase permanent capacity, you may be taking away from the additional capacity available for CBU.
- If you increase permanent capacity while On/Off CoD resources are active, any active On/Off resources of the same type are used to satisfy the permanent upgrade.
- If you have a leased machine, determine whether you are going to lease the upgrade or purchase the upgrade.
- If your business process requires you to have a purchase order before placing an order, make sure you have the purchase order number ready before placing your order.
- CIU Express is the default method for ordering permanent upgrades. It allows you to place permanent upgrade orders for your machine and have the orders ready for download in a significantly shorter time frame - approximately three hours. The order will be staged until you download or cancel the upgrade record.

Continue to "How to order an upgrade record" on page 37 for instructions on how to order a permanent upgrade using the CIU application through Resource Link.

Temporary upgrade considerations

This section provides information you should consider before ordering temporary upgrade records.

On/Off CoD considerations

Before you order an On/Off CoD record, consider the following:

- For a single On/Off CoD record,
  - The maximum upgrade for CP capacity is 100% of the **current purchased capacity**. Current purchased capacity (also referred to as the "high water mark" or HWM) includes owned and active permanent capacity and owned and unassigned permanent capacity. (See Figure 16 on page 35.) Capacity is computed based on processing capacity gained by adding the engines. It is based off the published LSPR values for the configuration.

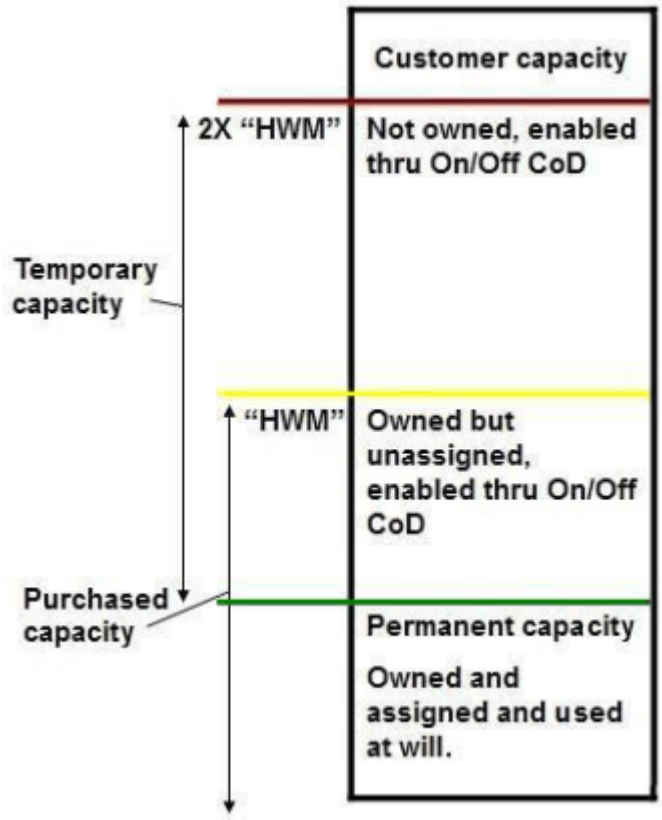


Figure 16. Maximum CP capacity

– The maximum upgrade allowed for specialty engines is doubling the number of engines.

For example, for an increase in model capacity, if you have a z17 at purchased model capacity 711, you can activate up to a 726. If you have a 711 with 2 unassigned engines (713 purchased), you would be able to activate up to a 730. For an increase in specialty engines, if you have 6 ICFs, you can add up to 6 more ICFs.

It is recommended that when you order a post-paid On/Off CoD record, you order the maximum capacity and maximum number of specialty engines.

Note: Resource Link will not allow you to order beyond the maximum.

Although it is recommended that you order the maximum capacity and number of specialty engines when you order a On/Off CoD record, there may be reasons when you do not want to maximize. For example, you may:

– Not want all engines available for use.
– Want to prevent certain types of upgrades.
– Want to reactivate just the unassigned capacity (order 0%).

  Note: Even though Resource Link displays the high water mark model when you specify 0% when ordering, a 0% On/Off CoD record on a downgraded machine allows you to activate any supported On/Off CoD upgrades to unassigned model capacities between the active permanent configuration and your high water mark.

- By default, an On/Off CoD record is initially available up to 180 days, starting on the date you place your order. After the 180 days, the record will expire unless you "replenish" the record. Replenish allows you to use an existing configuration to either increase your capacity, add specialty engines, or extend the expiration date rather than ordering a new On/Off CoD record.

You can order a replenishment record to manually extend the expiration date or you can enable the automatic renewal function to automatically extend the expiration date of installed records. With the automatic renewal function, a replenishment record is automatically generated 90 days before the record expires. The expiration date on the newly generated replenishment record is set to 180 days from the date the record was automatically generated, which extends the expiration date 90 days from the previous expiration date.

The automatic renewal function is available on both pre-paid and post-paid On/Off CoD records. Automatic renewal requires a Remote Support Facility (RSF) connection.

Refer to "How to order a replenishment record" on page 46 for instructions describing how to order a replenishment record.

- If you apply a permanent upgrade, by default, any active On/Off CoD resources of the same type are converted to permanent upgrades. If all On/Off CoD resources are consumed by the permanent upgrade, the On/Off CoD record remains active with zero resources allocated. Therefore, after the permanent upgrade is complete, you should deactivate (or Undo) the On/Off CoD record.
- If your business process requires you to have a purchase order before placing an order, make sure you have the purchase order number ready before placing your order.

Continue to "How to order an upgrade record" on page 37 for instructions how to order an On/Off CoD record using the CIU application through Resource Link.

On/Off CoD test considerations

Before you order an On/Off CoD test record, consider the following:

- There is one free On/Off CoD test allowed for each machine that is registered for On/Off CoD.
- An On/Off CoD test record has a maximum duration of 24 hours. It is automatically deactivated after 24 hours.
- An On/Off CoD test record is deactivated if the number of CPs and the number of specialty engines are set to zero.
- You can order any configuration within the limits of a normal On/Off CoD record.
- You can change activation levels with a On/Off CoD test record.

Administrative On/Off CoD test considerations

Before you order an administrative On/Off CoD test record, consider the following:

- The capacity level is fixed at 0%.
- You can order an administrative On/Off CoD test record that never expires, has an expiration date but is automatically renewed, or needs to be manually replenished within 180 days.

CBU considerations

Before you order a CBU record, consider the following:

- Determine what engines you need to backup.
- Determine whether you need to backup one machine at a time or multiple machines.
- Determine whether you need to backup multiple machines simultaneously.
- When ordering a CBU record, the specialty engines are ordered by quantity and the CP capacity is managed by feature codes.

  For CP capacity, you select feature codes to either add engines or increase the engine speed. (See Figure 17 on page 37.) In this example the CBU record will activate from the base 506 model, 6 CPs running at capacity level 5, to a 609 model. This requires 9 CBU CP features codes, 6 to increase the capacity level of the 6 permanent CPs (506 -> 606) plus 3 to add an additional 3 CPs (606 -> 609).

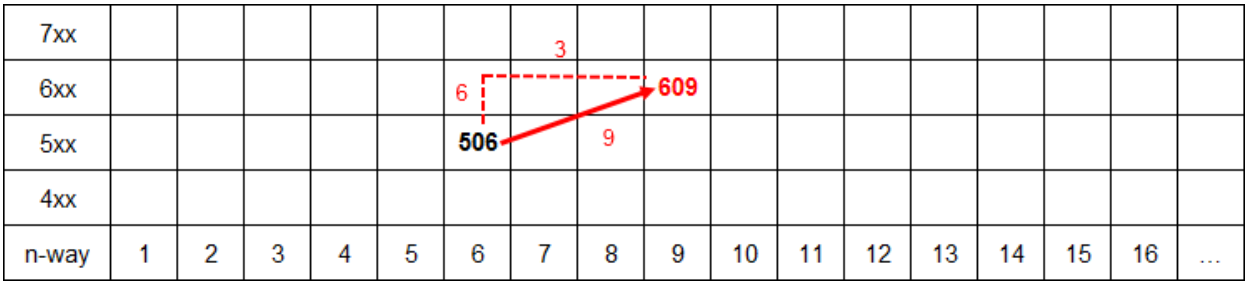


Figure 17. CBU CP feature codes

- A single real activation is available up to 90 consecutive days, starting on the date you activate the CBU record.
- If your business process requires you to have a purchase order before placing an order, make sure you have the purchase order number ready before placing your order.
- When ordering a CBU record, you must specify the length of the contract. The length of the contract can be 1-5 years.
- Each CBU record provides a specific number of free, 10-day test activations. The number of free test activations equates to the number of years that are purchased with the CBU record. (For example, a three year CBU record has three tests activations, a one year CBU record has one test activation.) Additional test activations beyond the free tests may be purchased in single increments up to a maximum of 15 CBU tests per record. This maximum of 15 tests per record cannot be exceeded and includes any free activations plus additional paid test activations.

  These test activations are only available for use if the real activation is available. Once the real activation has been used, **all** activations are disabled until the real activation is restored.
- If you want to order more tests or extend the expiration date to an existing record, you can "replenish" the order. Replenishment allows you to use an existing configuration rather than ordering a new CBU record. Refer to "How to order a replenishment record" on page 46 for detailed instructions.
- You cannot decrease the capacity level.
- You cannot remove permanent engines from the configuration.

Continue to "How to order an upgrade record" on page 37 for instructions how to order a CBU record using the CIU application through Resource Link.

How to order an upgrade record

To order an upgrade record using the CIU application through Resource Link, follow these steps:

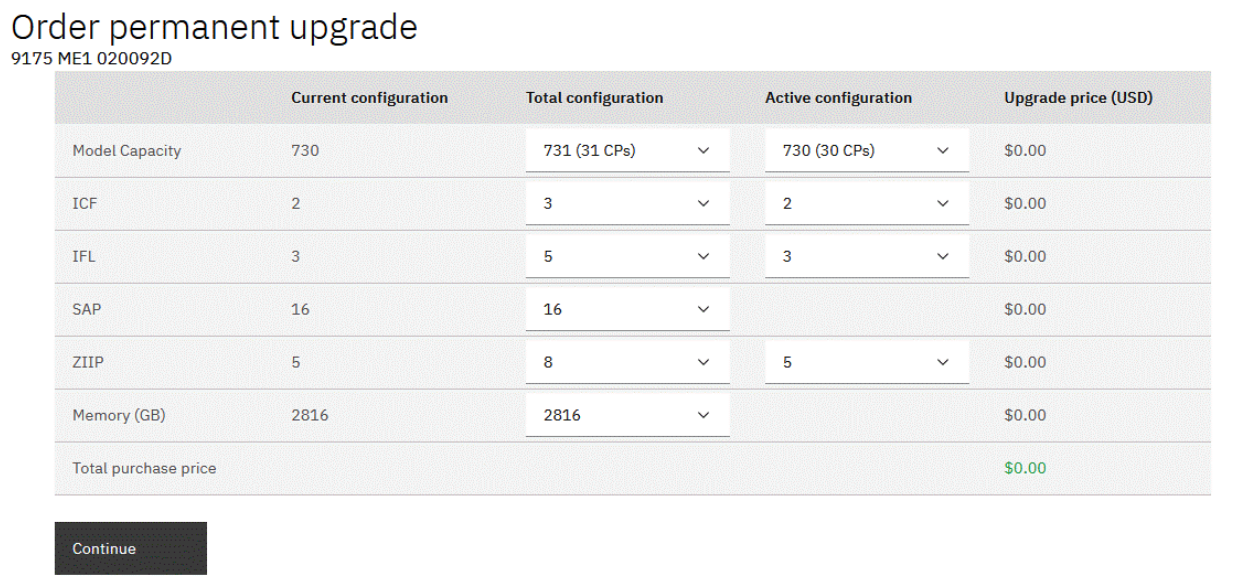
1. Sign onto Resource Link.
2. Click **Customer Initiated Upgrade** on the main Resource Link page. The **Active machine profiles** page opens. It lists all machines on which you are authorized to create or replenish orders, or on which you are listed as the order approver or viewer.
3. The first column displays the machine type, serial number, and customer number of each machine as a link. Click the link for the desired machine. The **Machine profile** page opens.
4. Depending on the type of upgrade, select from one of the following procedures and follow the steps describing how to order the record:
   - "Ordering a permanent upgrade" on page 38
   - "Ordering an On/Off CoD record" on page 39
   - "Ordering an On/Off CoD test record" on page 40
   - "Ordering an On/Off CoD record with prepaid upgrades" on page 41
   - "Ordering an administrative On/Off CoD test record" on page 43

- “Ordering a CBU record” on page 45

Ordering a permanent upgrade

An authorized orderer can order a permanent upgrade record for a machine from its CIU machine profile page:

1. Click **Order permanent upgrade**. The **Order permanent upgrade** page displays the current configuration and upgrade configuration information.



2. Two selection columns display upgrade configuration options.
   - The **Total configuration** selection list represents the amount of capacity you have purchased on the system. This is sometimes referred to as the "high water mark."
   - The **Active configuration** selection list represents the amount of capacity you want active on the system. These selections allow you to unassign model capacity or supported specialty engines by setting the active configuration lower than the total configuration.

   The capacity listed in the **Total configuration** field will always be greater than or equal to the capacity listed in the **Active configuration** field.

   a. Select the total upgrade configuration you want to order. For each entry, click the arrow to display the available upgrade values, and select your values.

      Note: Only the available upgrade values will display. For example, if you increase the number of CPs in your model capacity value, the number of specialty engines available for you to select will decrease.

   b. Select the model capacity and specialty engines you want in the *active* configuration. Remember, you do not have to specify all your total model capacity or total specialty engines in the active configuration. By setting the active configuration lower than the total configuration, model capacity and specialty engines not in the active configuration will be unassigned when you install the upgrade.

   c. If a price agreement was not negotiated for this machine, the **Total purchase price** displays the value **Not Negotiated**. While you can submit the order without a price, it will not be staged until a price is set. Contact your IBM sales representative to negotiate the price agreement. Once the price is set, you will be notified to return to Resource Link to accept the price.

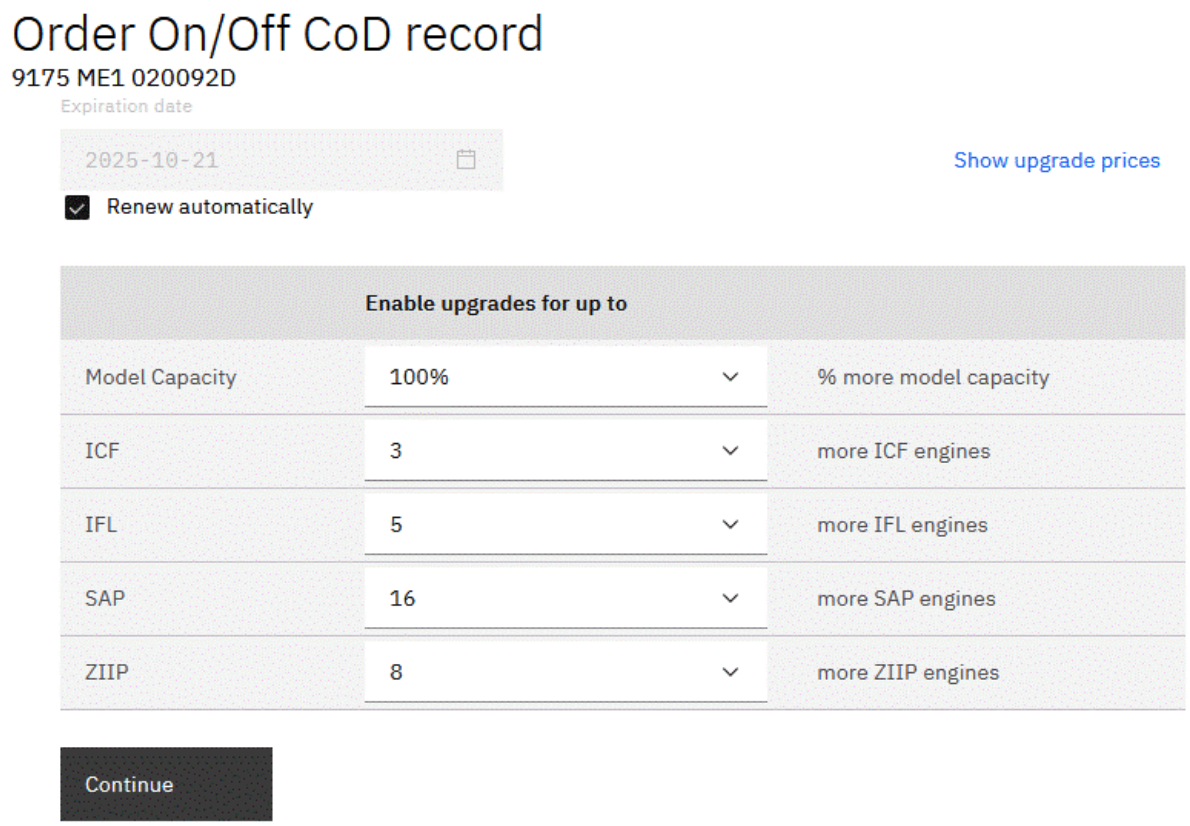
   Click Continue after selecting the upgrade configuration.

3. On the **Order permanent upgrade** page, verify the information is correct and read the terms of the order. If you accept the terms, click **I accept the Terms and Conditions of this order** and click **Submit** to order the record.
4. The order is created. If subsequent order processing actions are necessary, such as setting the order price or approving the order, Resource Link sets the order status accordingly and notifies the responsible party by email. The record will be staged on the support system for download after all subsequent order processing actions are completed by the responsible parties.

Ordering an On/Off CoD record

An authorized orderer can order a postpaid On/Off CoD record for a machine from its CIU machine profile page:

1. Click **Postpaid** in the **Order On/Off CoD record** link list. The **Order On/Off CoD record** page opens.



2. For upgrades that have prices set for this machine, the maximum selections are automatically initialized and displayed. Maximizing the selections creates an On/Off CoD capacity record that supports the widest possible range of On/Off CoD upgrades for the current machine configuration.

   If the prices are not negotiated yet, the upgrade value for the model capacity displays 0% and the upgrade value of each specialty engines displays 0. You can still select a value, however, before the order can be approved the price must be negotiated.

   Note: For model capacity, 100% means when you will be doubling your existing capacity (not doubling the number of engines).

   You can view the supported upgrades and their prices (if set) by clicking **Show upgrade prices**. These tables list the supported model capacities and their relative capacity as a percentage of the current capacity.

   The expiration date and automatic renewal option also display. (The automatic renewal option only displays on this initial **Order On/Off CoD record** page. It does not display when you order a replenishment record.) By default, an On/Off CoD record is initially available up to 180 days, starting

on the date you place your order. After the 180 days, the record will expire unless you replenish (renew) the record. You can automatically renew an installed record by enabling the automatic renewal function. (This is the default setting.) If you do not want the automatic renewal function enabled, deselect the **Renew automatically** checkbox. Then you must manually order replenishment records to extend the expiration date.

3. For each entry, click the arrow to select your upgrade values. Then click **Continue**. The **Order On/Off CoD record** page displays the values you entered along with the upgrade daily prices (if the prices were negotiated). The order description field will help identify this order in the staged orders listed on the Support Element.
4. On the **Order On/Off CoD record** page, read the terms and conditions.
5. If you are ready to accept, check **I accept the Terms and Conditions of this order** and click **Submit**.
6. The **On/Off Capacity on Demand order** page opens. Your record is now ordered and this page displays all the information about the record. This information includes the status of the order, the description, the expiration date, and the capacity upgrades you selected.

   If the order price is not negotiated, the status is **Needs price agreement**. This means an order was created without a prenegotiated agreement in place. Contact your sales representative to negotiate a price agreement. Once the price is set, you will be notified to return to Resource Link to accept the price.

   The order cannot be approved until the price has been negotiated and accepted.
7. When the order has been approved and is ready to be retrieved, the order status is **Download ready**. (You will also receive an email informing you that your upgrade record is "Download ready.")
8. Now your order can now be retrieved, installed, and activated through the Support Element.

   As the order is retrieved, installed, and activated, the status will be reflected on the machine profile page.

Ordering an On/Off CoD test record

Complete the steps under "How to order an upgrade record" on page 37 before you perform the following steps.

1. On the machine profile page, click **Show settings** in the **Offerings** section to make sure a test record is available to order.
2. Click **Test** in the **Order On/Off CoD record** link list. The **Order On/Off CoD record** page opens.
3. For upgrades that have prices set for this machine, the maximum selections are automatically initialized and displayed. Maximizing the selections creates an On/Off CoD capacity test record that supports the widest possible range of On/Off CoD upgrades for the current machine configuration.

   If the prices are not negotiated yet, the upgrade value for the model capacity displays 0% and the upgrade value of each specialty engines displays 0. You can still select a value, however, before the order can be approved the price must be negotiated.

   Note: For model capacity, 100% means when you will be doubling your existing capacity (not doubling the number of engines).

   You can view the supported upgrades and their prices (if set) by clicking **Show upgrade prices**. These tables list the supported model capacities and their relative capacity as a percentage of the current capacity.

   For a test record, you have a maximum duration of 24 hours.
4. For each entry, click the arrow to select your upgrade values. Then click **Continue**. The **Order On/Off CoD record** page now displays the values you entered along with the upgrade daily prices (if the prices were negotiated). The order description field will help identify this order in the staged orders listed on the Support Element.
5. On the **Order On/Off CoD record** page, read the terms and conditions.
6. If you are ready to accept, check **I accept the Terms and Conditions of this order** and click **Submit**.

7. The **On/Off Capacity on Demand order** page opens. Your record is now ordered and this page displays all the information about the record . This information includes the status of the order, the description, and the capacity upgrades you selected.

   Note: A test record is activated for a 24 hour period. It is deactivated automatically. Although you may see prices listed, you will incur no hardware or software costs during this 24 hours period. The main reason for ordering a test record is to validate that the complete order, retrieve, install, activate, and deactivate On/Off CoD capacity upgrade process performs nondisruptively. This includes viewing the prices.

   If the order price is not negotiated, the status is **Needs price agreement**. This means an order was created without a prenegotiated agreement in place. Contact your sales representative to negotiate a price agreement. Once the price is set, you will be notified to return to Resource Link to accept the price.

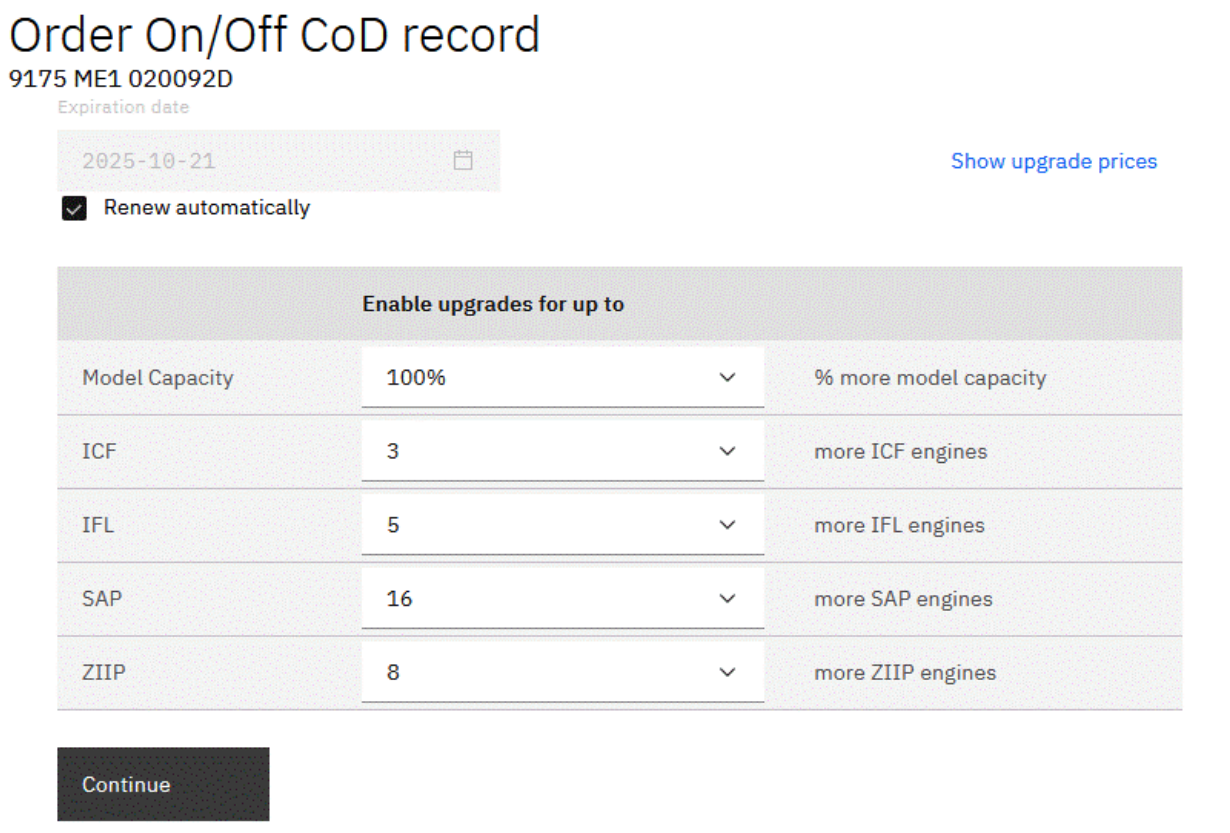
   The order cannot be approved until the price has been negotiated and accepted.
8. When the order has been approved and is ready to be retrieved, the order status is **Download ready**. (You will also receive an email informing you that your upgrade record is "Download ready.")
9. Now your order can now be retrieved, installed, and activated through the Support Element.

   As the order is retrieved, installed, and activated, the status will be reflected on the machine profile page.

Ordering an On/Off CoD record with prepaid upgrades

An authorized orderer can order an On/Off CoD record with prepaid upgrades for a machine from its CIU machine profile page:

1. Click **Prepaid** in the **Order On/Off CoD record** link list. The **Order On/Off CoD record** page opens.



2. For upgrades that have prices set for this machine, the maximum selections are automatically initialized and displayed. Maximizing the selections creates an On/Off CoD capacity record that supports the widest possible range of On/Off CoD upgrades for the current machine configuration.

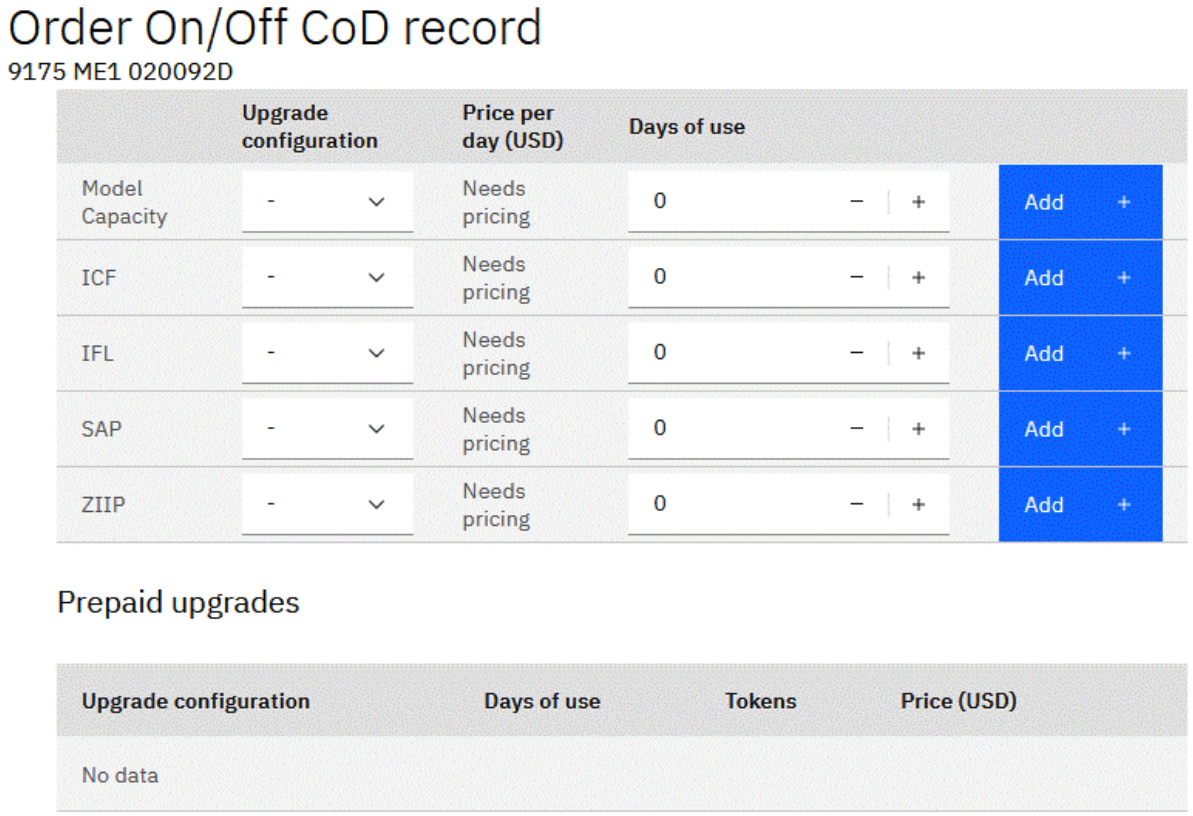
It is recommended to keep the maximum values on this page. Then you will have a wider selection of prepaid upgrades to add to your order. The values you choose on this page determines the values displayed in the pull-down menus on the next page.

If the prices are not negotiated yet, the upgrade value for the model capacity displays 0% and the upgrade value of each specialty engines displays 0. You can still select a value, however, before the order can be approved the price must be negotiated.

Note: For model capacity, 100% means when you will be doubling your existing capacity (not doubling the number of engines).

You can view the supported upgrades and their prices (if set) by clicking **Show upgrade prices**. These tables list the supported model capacities and their relative capacity as a percentage of the current capacity.

For each entry, select your upgrade values. Click **Continue**. The **Order On/Off CoD record** page displays tables for adding prepaid upgrades to the record.



3. For each entry (model capacity or engine type), following these steps:

   Note: You must add one upgrade at a time to your order.

   a. Click the arrow to display the pulldown menu, and select your upgrade value. The price (if negotiated) automatically displays in the **Price per day** field. If the price is not negotiated, you can still select a value; however, before the order can be approved, the price must be negotiated.

      Note: Remember, the values listed in the pulldown menus on this page are based on the values you selected on the previous page.

   b. Select the number of days you want to use this upgrade.

   c. Click **Add**. The information displays in the **Prepaid upgrades** table. This table displays information about each upgrade you selected. This information includes: the upgrade configuration you selected, the number of days for each upgrade, the number of tokens for each upgrade, and the price of each upgrade. It also displays the total price of all the upgrades you selected for this order.

Note: You are not limited to activating the exact upgrades you order. You can order what you estimate you will use, but you can activate whatever you need within the limits of the tokens.

For example, if you first select 732 (32 CPs) from the Model capacity pull-down menu for three days use, and then select 8 from the IFL pull-down menu for two days of use, a **Prepaid upgrades** table similar to the following displays:

d. If you want to remove any upgrade before continuing, next to the appropriate upgrade configuration in the **Prepaid upgrades** table, click **Remove**. The total price is automatically adjusted.

e. Once you are finished adding the prepaid upgrades to your order, click **Continue**. The **Order On/Off CoD record** page now displays the order details and terms and conditions.

4. Review the upgrades you selected.

   The **Description** field will help identify this order in the staged orders listed on the Support Element.

5. On the **Order On/Off CoD record** page, read the terms and conditions.
6. If you are ready to accept, check **I accept the Terms and Conditions of this order** and click **Submit**.
7. The **On/Off Capacity on Demand order** page opens. Your record is now ordered and this page displays all the information about the record. This information includes the status of the order, the description, and the capacity upgrades you selected.

   If the order price is not negotiated, the status is **Needs price agreement**. This means an order was created without a prenegotiated agreement in place. Contact your sales representative to negotiate a price agreement. Once the price is set, you will be notified to return to Resource Link to accept the price.

   The order cannot be approved until the price has been negotiated and accepted.

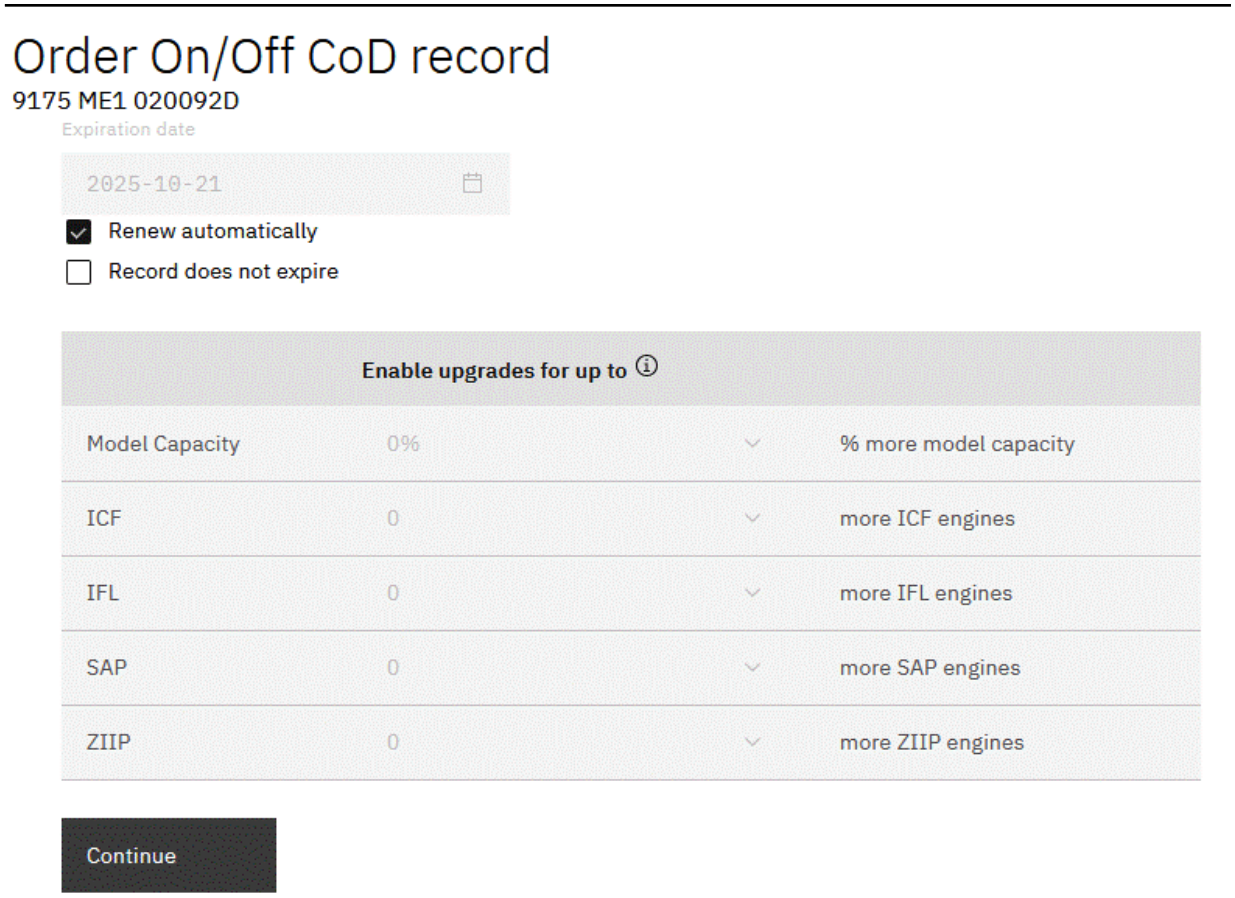
8. When the order has been approved and is ready to be retrieved, the order status is **Download ready**. (You will also receive an email informing you that your upgrade record is "Download ready.")
9. Now your order can now be retrieved, installed, and activated through the Support Element.

   As the order is retrieved, installed, and activated, the status will be reflected on the machine profile page.

Ordering an administrative On/Off CoD test record

Complete the steps under "How to order an upgrade record" on page 37 before you perform the following steps.

1. On the machine profile page, click **Administrative test** in the **Order On/Off CoD record** link list. The **Order On/Off CoD record** page opens.



2. Replenishment information also displays. This includes the expiration date field, the option to enable automatic renewal for the record, and the option to set no expiration date for the record.

   By default, the test record is initially available up to 180 days, starting on the date you place your order. After the 180 days, the record will expire unless you replenish (renew) the record or set no expiration date. You can automatically renew an installed record by enabling the automatic renewal function. (This is the default setting.) If you do not want the automatic renewal function enabled, deselect the **Renew automatically** checkbox. Then you must manually order replenishment records to extend the expiration date.

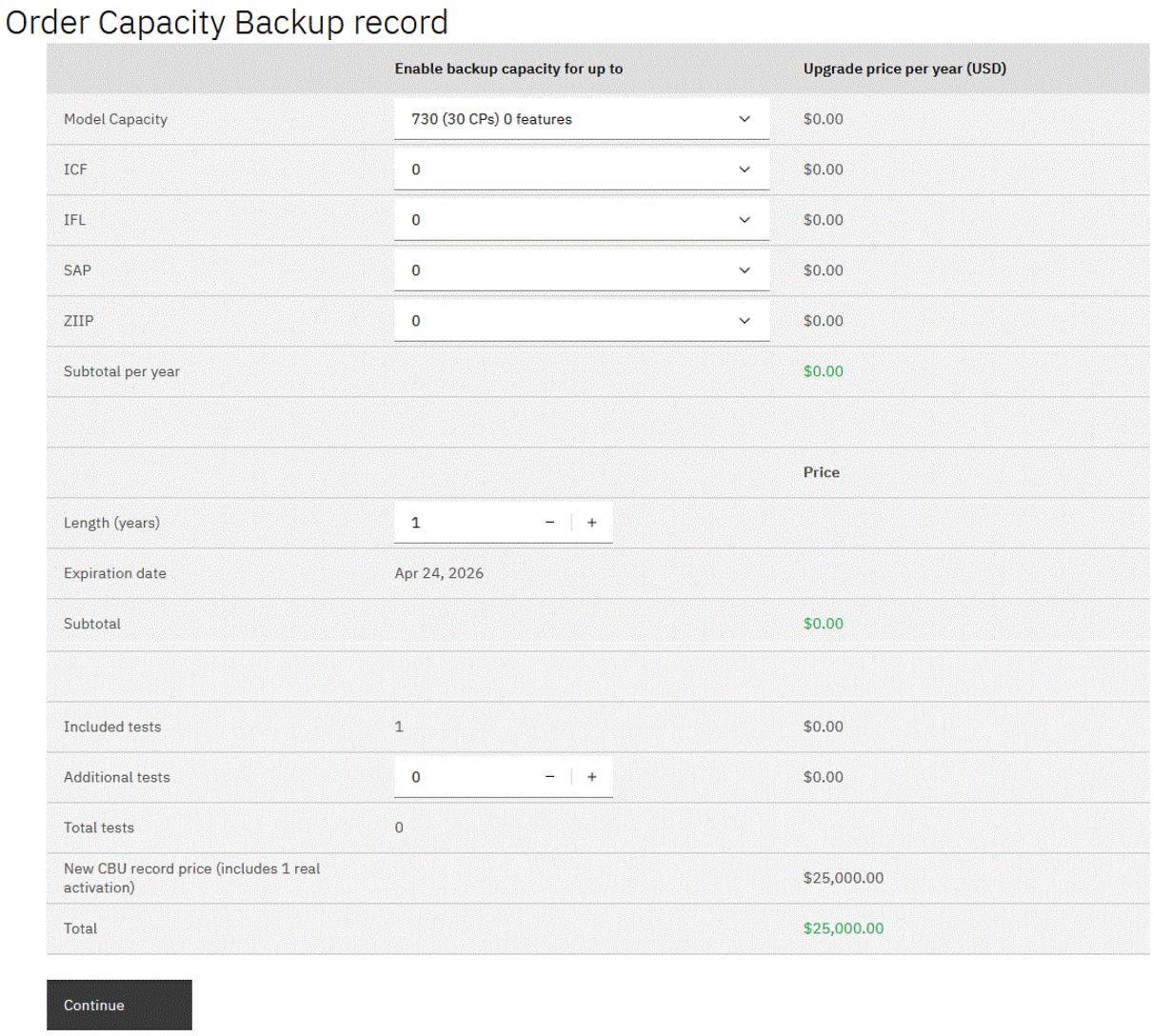
   The options to enable automatic renewal or to set no expiration date only display on this initial record order page. They do not display when you order a replenishment record. Also, if you select **Record does not expire**, you will not be able to order a replenishment record because there is nothing to replenish.
3. Click **Continue**. The **Order On/Off CoD record** page now displays the order details and terms and conditions. The order description field will help identify this order in the staged orders listed on the Support Element.
4. Read the terms and conditions.
5. If you are ready to accept, check **I accept the Terms and Conditions of this order** and click **Submit**.
6. The **On/Off Capacity on Demand order** page opens. Your record is now ordered and this page displays all the information about the record . This information includes the status of the order, the description, the expiration date, and the replenishment automatic renewal status.
7. When the order has been approved and is ready to be retrieved, the order status is **Download ready**. (You will also receive an email informing you that your upgrade record is "Download ready.")
8. Now your order can now be retrieved, installed, and activated through the Support Element.

   As the order is retrieved, installed, and activated, the status will be reflected on the machine profile page.

Ordering a CBU record

An authorized orderer can order a Capacity Backup (CBU) record for a machine from its CIU machine profile page:

1. Click **Order Capacity Backup record**. The **Order Capacity Backup record** page opens.



2. Select the model capacity and the number of specialty engines you need. Based on the model capacity you selected, the number of feature codes to be ordered will display in the entry field.

   Select the contract length - 1 to 5 years. Each CBU record provides one free, 10-day test for every year purchased with the CBU record.

   Optionally, select the number of additional test activations (for a fee). A maximum of 15 tests per record cannot be exceeded. This includes any free test activations plus additional paid test activations.
3. Click **Continue**. The **Order Capacity Backup record** page displays the values you entered along with the price per year (if the prices were negotiated). The order description field will help identify this order in the staged orders listed on the Support Element.
4. Read the terms and conditions.
5. If you are ready to accept, check **I accept the Terms and Conditions of this order** and click **Submit**.

6. The **Capacity Backup record order** page opens. Your record is now ordered and this page displays all the information about the record . This information includes the status of the order, the description, and the capacity upgrades you selected.

   If the order price is not negotiated, the status is **Needs price agreement**. This means an order was created without a prenegotiated agreement in place. Contact your sales representative to negotiate a price agreement. Once the price is set, you will be notified to return to Resource Link to accept the price.

   The order cannot be approved until the price has been negotiated and accepted.
7. When the order has been approved and is ready to be retrieved, the order status is **Download ready**. (You will also receive an email informing you that your upgrade record is "Download ready.")
8. Now your order can now be retrieved, installed, and activated through the Support Element.

   As the order is retrieved, installed, and activated, the status will be reflected on the machine profile page.

How to order a replenishment record

You can modify (replenish) On/Off CoD records for postpaid upgrades, On/Off CoD records for prepaid upgrades, administrative On/Off CoD test record, and CBU records. Ordering a replenishment record allows you to use an existing On/Off CoD or CBU record to increase the limits for currently active orders without having to replace the record.

When ordering an On/Off CoD replenishment record (other than an administrative On/Off CoD test replenishment record), you can add processing resources and extend expiration date.

When ordering an administrative On/Off CoD test replenishment record, you can only modify the replenishment expiration date. When initially ordering an administrative On/Off CoD test record, if you selected the **Record does not expire** option, you will not have the ability to replenish the record because the record will not expire.

When ordering a CBU replenishment record, you can add processing resources, extend expiration date, restore real activation and order more tests. If you add processing resources or extend the expiration date to an active CBU, these changes are made immediately available without having to deactivate and reactivate an active CBU. However, to extend a real activation, you need to deactivate the CBU real activation you are using, and then activate the CBU real again. This is also true for test CBU activations; you cannot extend a test with another test, you must deactivate in between.

For On/Off CoD records, in addition to manually ordering a replenishment record to extend the expiration date, you can also automatically renew an installed record by enabling the automatic renewal function. (This is the default setting.) You can enable or disable the automatic renewal function for an On/Off CoD record at any time from the **On/Off CoD record** page. Manually ordering a replenishment record will block the generation of automatic renewal records until the manually generated record has been cancelled or applied.

There are eight slots available for installed or active upgrade records. When you order a replenishment record, you are using the same slot for the order you are replenishing. If you ordered a completely new record, you would have to wait for an open slot if all were taken.

You can only increase a machines model capacity or processors when ordering a replenishment record. You cannot decrease the entitlement level for an existing offering.

An authorized orderer can order replenishment records from a machine's Capacity on Demand record pages.

To replenish an On/Off CoD record, follow these steps:

1. In the **Capacity on Demand records** section on the machine profile page, click the record number you want to replenish.

Installed temporary upgrade records

Record number	Type	Expiration date	Auto-renewal
CBD4JRTN	CBU	2027-04-21	Disabled
CRCBHRDP	On/Off CoD	2025-09-09	Enabled
CR9K4RRM	Prepaid On/Off CoD	2025-08-18	Enabled

The **On/Off Capacity on Demand record** page opens.

2. Click **Order replenishment record**. The **Order On/Off CoD record** page opens.
3. For the remaining steps, continue to one of the following:
   - For On/Off CoD record, go to "2" on page 39
   - For On/Off CoD record with prepaid upgrade, go to "2" on page 41
   - For administrative On/Off CoD test record, go to "2" on page 44.

To replenish a CBU record, follow these steps:

1. In the **Capacity on Demand records** section on the machine profile page, click the CBU record number you want to replenish.

Installed temporary upgrade records

Record number	Type	Expiration date	Auto-renewal
CBD4JRTN	CBU	2027-04-21	Disabled
CRCBHRDP	On/Off CoD	2025-09-09	Enabled
CR9K4RRM	Prepaid On/Off CoD	2025-08-18	Enabled

The **Capacity Backup record** page opens.

2. Click **Order replenishment record**. The **Order Capacity Backup record** page opens.
3. Fill in the appropriate information, then continue to step "3" on page 45.

How to cancel an upgrade record

You can cancel your Capacity on Demand record order any time before you retrieve the record using the Support Element. To cancel your order, following these steps:

1. In the **Capacity on Demand records** section on the **Machine profile** page, click the order number you want to cancel. The order page opens.
2. Click **Cancel order**.
3. The order page displays again. The status information at the top of the page shows that the order is canceled.

Chapter 6. Retrieving and installing

After ordering a permanent or temporary record, Resource Link notifies you by email when the upgrade is ready to download, and the status on the **Machine profile** page in Resource Link will be **Download ready**. You are now ready to retrieve and install the upgrade record.

The retrieve and install functions are performed on the Support Element using system programmer mode. To manage a staged, installed, activated/deactivated record, the system must be in IML complete state.

If you are retrieving an upgrade record from the support system, ensure you have a connection from the Support Element to the support system. If you do not have a connection, you will receive a message. The Remote Service Facility (RSF) must be enabled. To enable the Remote Service Facility, follow these steps:

1. On the Support Element, select the server.
2. In the tasks pad, expand the **Remote Customization** task list and select **Remote Service**.
3. Check **Enable remote service request**.
4. Select how the service call is reported.
5. Click **OK**.

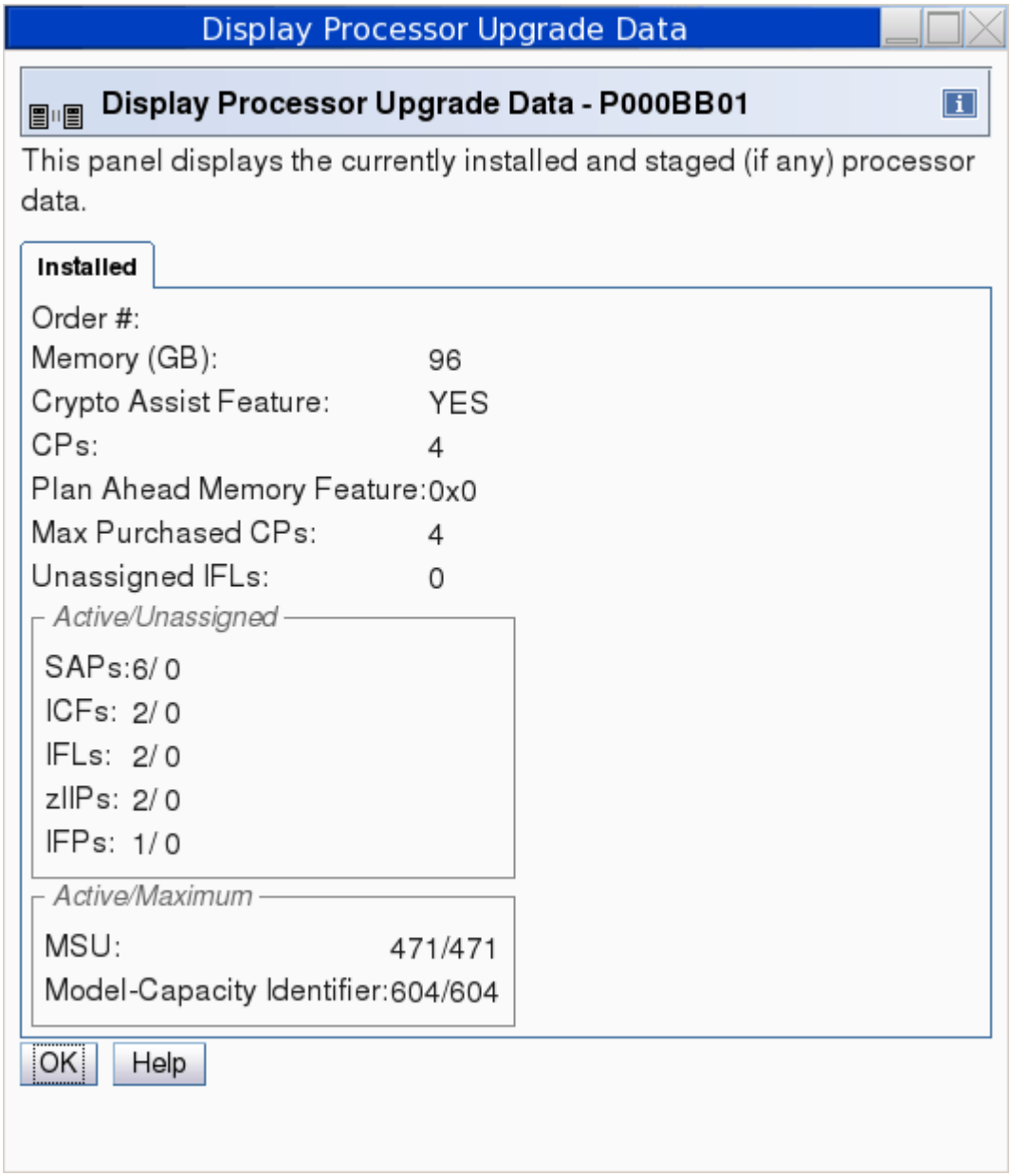
The information in this chapter assumes that you know how to navigate the HMC and the Support Element user interface. For information about the user interface, refer to the console help system.

If you are retrieving permanent upgrade records, refer to “Permanent upgrades” on page 49. If you are retrieving temporary upgrade records, refer to “Temporary upgrades” on page 53.

Permanent upgrades

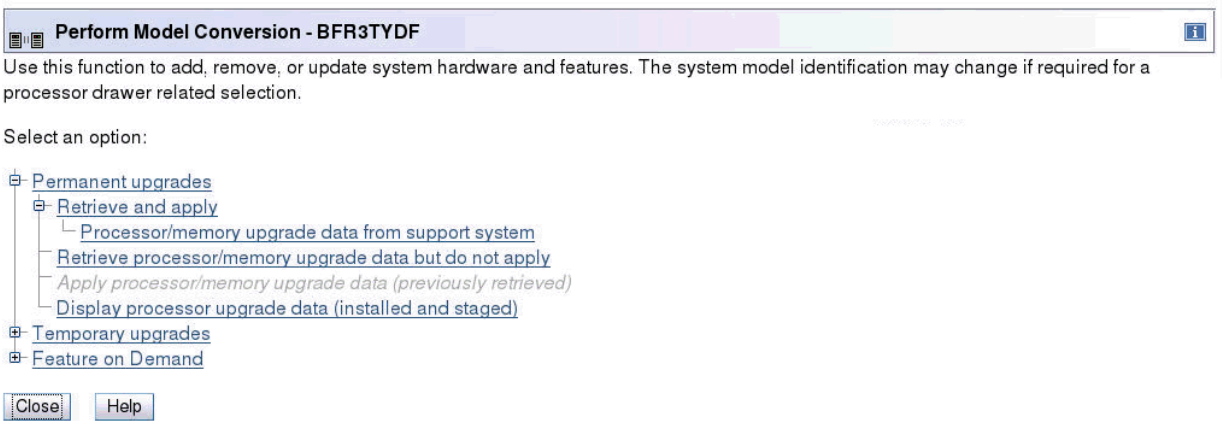
When retrieving and applying a permanent upgrade record, keep the following information in mind:

- If the installation of permanent LICCC upgrades ordered from your sales representative is in progress or was recently completed, before subsequently installing a permanent LICCC upgrade ordered from CIU on Resource Link, carefully consider each upgrade's configuration and the effect they may have on each other upon installation. Refer to “Considerations for ordering and installing consecutive permanent LICCC upgrades” on page 10 for detailed information.
- If your upgrade record is located on the support system, you can either retrieve and apply (activate) the upgrade record using one task or using two separate tasks. When using two tasks, the first task retrieves and stages the upgrade record on the Support Element. Then, whenever you are ready, the second task activates the upgrade record.
- You can view any installed or staged permanent upgrade record using the **Display processor upgrade data (installed and staged)** task on the **Perform Model Conversion** window. A **Display Processor Upgrade Data** window similar to the following opens:



To retrieve a permanent upgrade record, follow these steps:

1. Log onto the HMC in system programmer mode.
2. Using the expand icon (+) in the navigation toolbar, expand the **Systems Management** nodes in the navigation pane and select the server. For information on the HMC user interface, refer to the console help system.
3. From the tasks pad, click **Configuration** and **Perform Model Conversion**. The **Perform Model Conversion** window opens:



4. Use one of the following methods to retrieve and apply (install) a permanent upgrade record:
   - Retrieve and immediately apply the permanent upgrade record
   - Retrieve the permanent upgrade record and apply it at a later time.

   Note: In all methods, the upgrade is performed concurrently, if possible; otherwise it becomes activated after the next IML.

   If there are activated temporary upgrade records, you can either manually run the precheck function or let it run automatically. The precheck function runs automatically when you choose to retrieve and apply the permanent upgrade record at the same time.

   - **To retrieve your upgrade data from the support system and apply (install) it immediately:**
     a. From the **Perform Model Conversion** window, click **Permanent upgrades**, **Retrieve and apply**, and **Processor/memory upgrade data from support system**.
     b. On the **Customer Initiated Upgrade Order Activation Number** window, enter the order activation number and click **OK**.

        The permanent upgrade record is retrieved. If there are activated temporary upgrade records, the precheck function automatically runs to determine if there are any conflicts.

        If a conflict is detected, the permanent upgrade is not applied and a message window opens describing the conflict. After resolving the conflict, continue to step “4.e” on page 52 to apply the permanent upgrade.

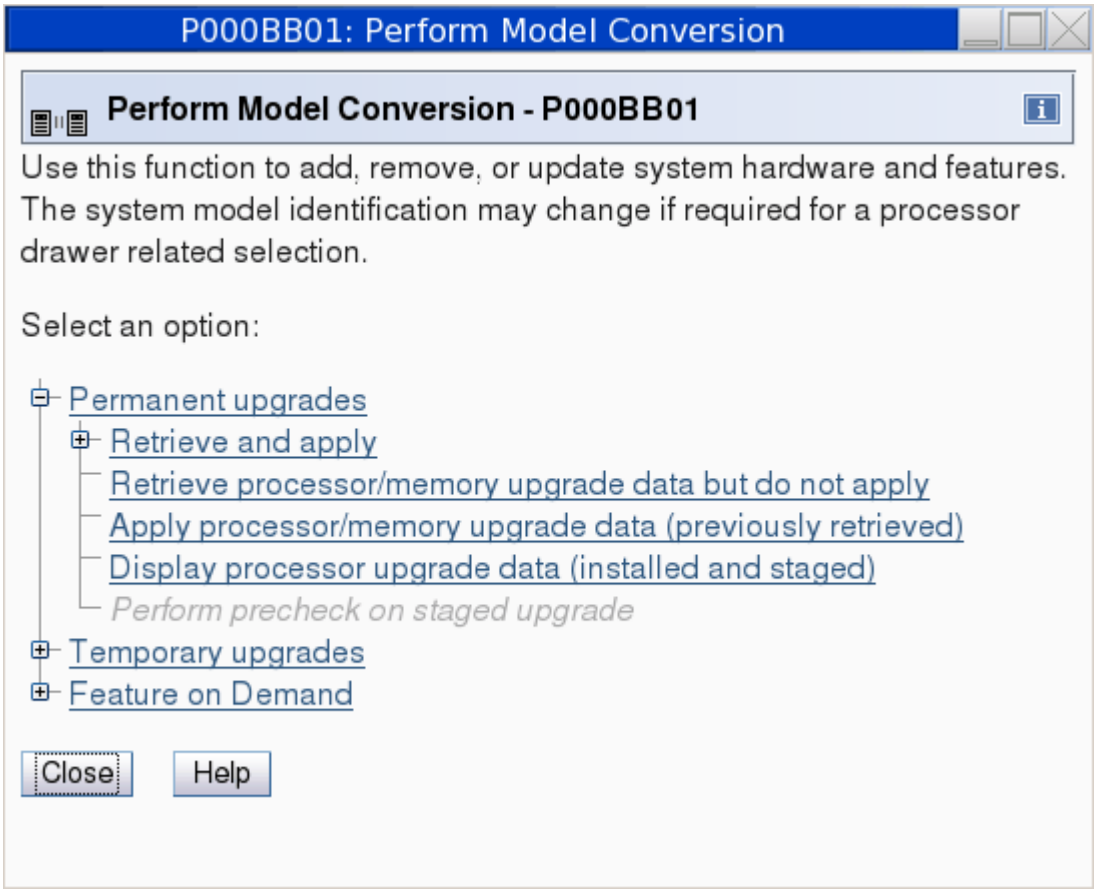
        If a conflict is not detected, the permanent upgrade is applied.

        If you increase permanent capacity while On/Off CoD resources are active, any active On/Off resources of the same type are used to satisfy the permanent upgrade.
   - **To retrieve your upgrade data from the support system and install it at a later time:**
     a. From the **Perform Model Conversion** window, click **Permanent upgrades** and **Retrieve processor/memory upgrade data but do not apply**.
     b. On the **Customer Initiated Upgrade Order Activation Number** window, enter the order activation number and click **OK**.

        The upgrade record is retrieved and stored on the Support Element hard drive to be installed at a later time.

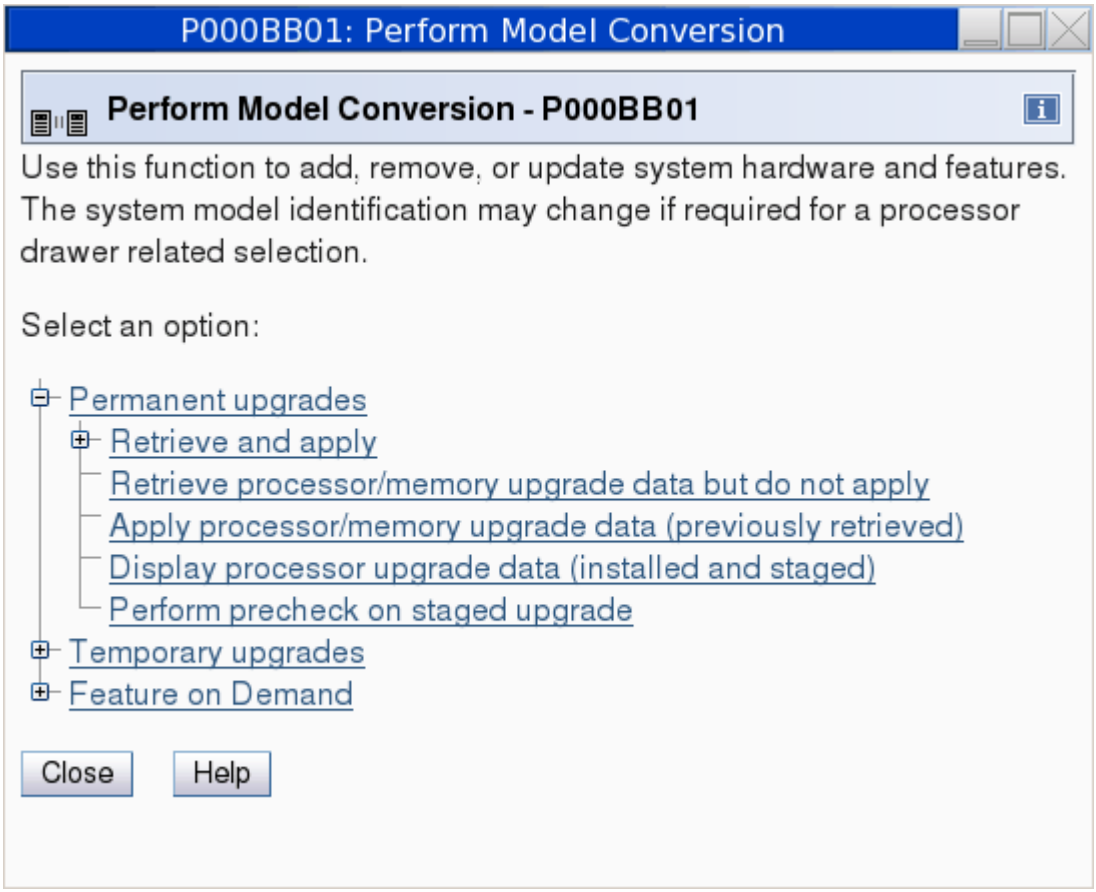
        If you decide you do not want to apply the upgrade record, contact IBM support who will dispatch someone to remove the record.
     c. When you are ready to apply the upgrade record you previously retrieved **AND** no temporary upgrade records are activated, the **Perform precheck on staged upgrade** tasks displays in the **Perform Model Conversion** window, but it is greyed out. This means that a permanent upgrade

record is staged, but no temporary upgrade records are activated. Therefore, the precheck function is not necessary.



d. Click **Permanent upgrades** and **Apply processor/memory upgrade data (previously retrieved)**. The permanent upgrade records are now installed.

e. When you are ready to apply the upgrade record you previously retrieved **AND** temporary upgrade records are activated or if you need to verify that a previous conflict is corrected, the **Perform precheck on staged upgrade** task displays in the **Perform Model Conversion** window. This allows you to check for any conflicts before applying the permanent upgrade record.



f. Click **Perform precheck on staged upgrade** to determine if there are any conflicts. If a conflict is detected, a message window opens describing the conflict. If a conflict is not detected, a message window opens saying the precheck was successful.

g. If the conflict is detected, resolve the conflict and repeat the previous step.

h. If a conflict is not detected, click **Apply processor/memory upgrade data (previously retrieved)**. The permanent upgrade is installed.

   If you increase permanent capacity while On/Off CoD resources are active, any active On/Off resources of the same type are used to satisfy the permanent upgrade.

5. Purchase billing is generated when the memory or processor upgrade is downloaded and the machine owner receives an email confirmation that it is downloaded. The **Machine profile** page in Resource Link will also reflect the changed status of this record.

   If the server is a leased machine, the lease payment is recalculated.

Temporary upgrades

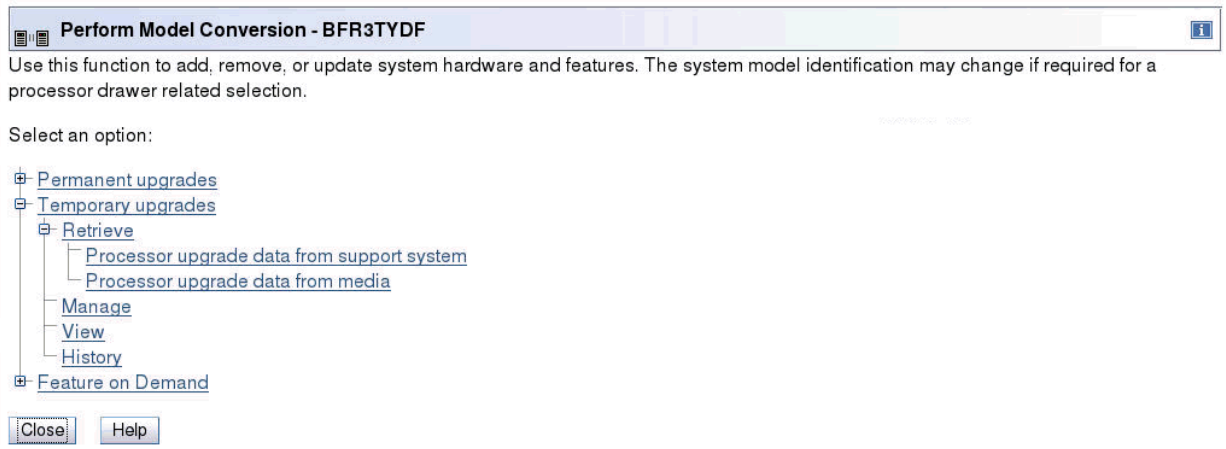
The retrieve, install, and activate tasks for temporary upgrade records are all separate.

Up to eight temporary upgrade records (such as On/Off CoD, CBU) can be installed and activated at any given time. However, you can only have one On/Off CoD record activated at any given time.

To retrieve and install a temporary upgrade record, follow these steps:

1. Log onto the HMC in system programmer mode.
2. Using the expand icon (+) in the navigation toolbar, expand the **Systems Management** nodes in the navigation pane and select the server. For information on the HMC user interface, refer to the console help system.

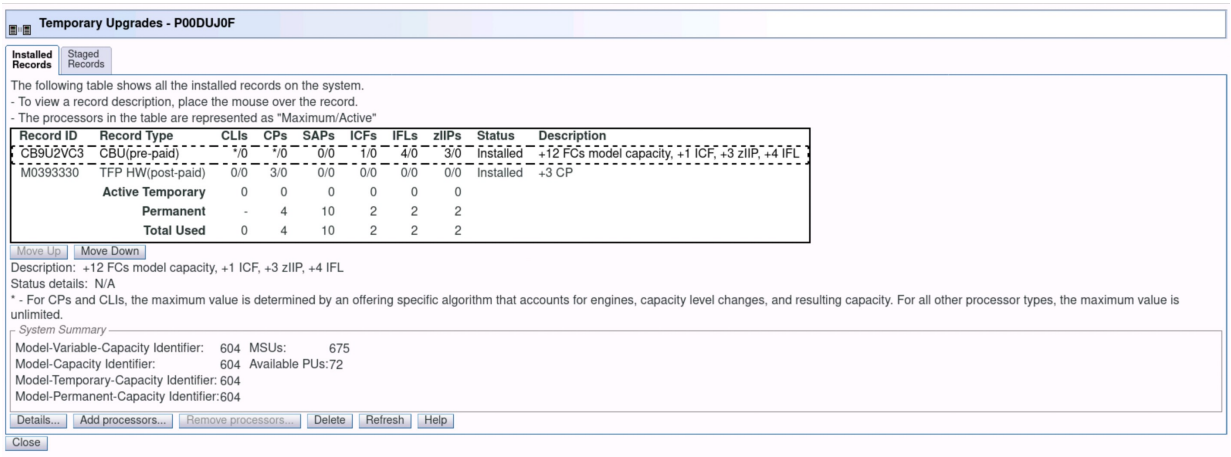
3. Expand the **Configuration** task list and click **Perform Model Conversion** (located in the Configuration list). The **Perform Model Conversion** window, similar to the following, opens:



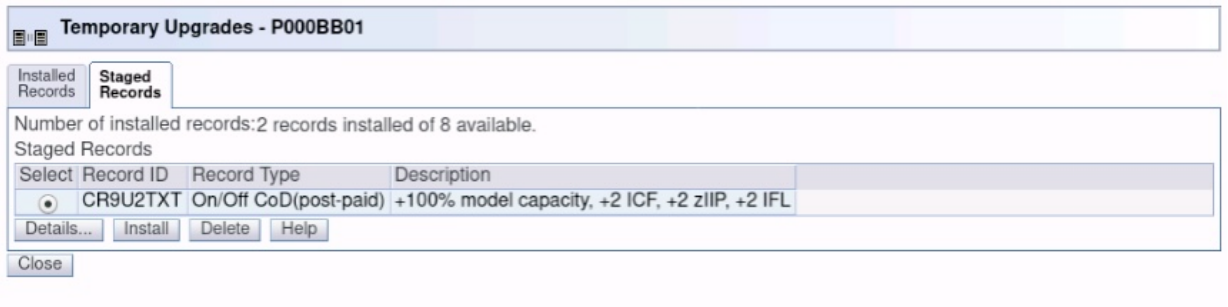
4. Retrieve your temporary upgrade record from with the support system or from a media device.
   - To retrieve your upgrade record from the support system, from the **Perform Model Conversion** window, click **Temporary upgrades**, **Retrieve**, and **Processor upgrade data from support system**.
   - To retrieve your upgrade data from a USB flash memory drive, from the **Perform Model Conversion** window, click **Temporary upgrades**, **Retrieve**, and **Processor upgrade data from media**.

   If you are retrieving a replenishment record and the original record is already installed, the replenishment record is read directly into the installed slot of the record matching the record ID and added to that record.

   If you are retrieving an original record, the record is placed in a staging area so it can be installed at a later time.
5. Once you are ready to install the upgrade record, from the **Perform Model Conversion** window, click **Temporary upgrades** and **Manage**. The **Temporary Upgrades** window opens. In this window, you can see how many records are installed on the server.



   See Appendix D, “Understanding the content of the Installed Records page in the Temporary Upgrades window,” on page 131 for details on the fields displayed on the **Installed Records** page in the **Temporary Upgrades** window.
6. To install a record you just retrieved, click the **Staged Records** tab. The **Staged Records** page opens:



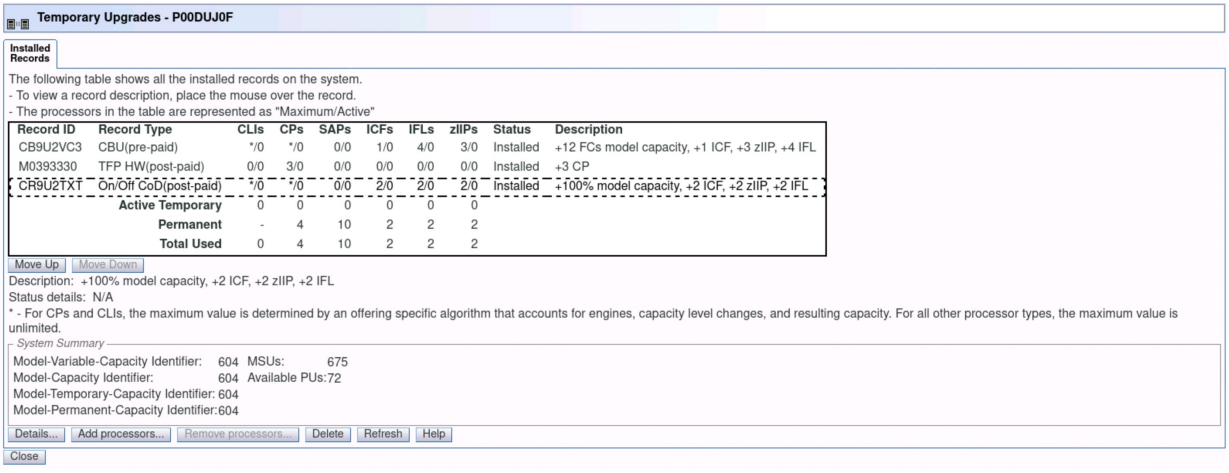
The table on the **Staged Records** page lists all the records that are ready to be moved to the installed area.

- When a record is in the staged area, any retrieved replenishment records (identified by the same Record ID) are also loaded into the staged area. When the record in the staged area is selected to be loaded into the installed area, all the associated replenishment records (records having the same Record ID) are processed from the staged area and added to the installed record ID. These replenishment records are processed in the order based on their timestamp. Only one install slot is used.

  Before the records are installed, you will be prompted with the following confirmation message: `Are you sure you want to install this record and all its replenishment records?`
- When a record is already in the installed area, any replenishment records (identified by the same record ID as the record in the installed area) retrieved are read directly into the installed slot of the record matching the record ID and added to that record.

Note: When you install a replenishment record, the record description on the Support Element is not updated. The record description on the Support Element shows the original record's description, including the original expiration date. The new expiration date **is** reflected in the **Record Details** window (in the Record Expiration Date field in the Time Limits area).

7. Select the record you want to install and click **Install**. The **Installed Records** page opens showing the newly installed record.



Chapter 7. Activating temporary upgrade records

This chapter discusses information you need to about activating a temporary upgrade record. It includes activation rules and describes the different methods for activating a temporary upgrade record.

Activation rules

- Entitlement is based on permanent capacity.
- Current model position can limit activation capability.
- You can change activation level for active offerings. You cannot activate a CBU record in test mode if it is already active in real mode or if the number of real activations available is zero. If a record is active in test mode, you cannot activate a CBU real activation either.
- You can have multiple temporary upgrade records (up to 8) activated at the same time. However, you can have only one On/Off CoD record activated at any given time.
- When you activate an On/Off CoD upgrade, an indicator is set in the Vital Product Data. This indicator is part of the Call Home transmission, which is sent on a scheduled basis. A time stamp is placed into Call Home data when the upgrade is deactivated.

Methods of activation

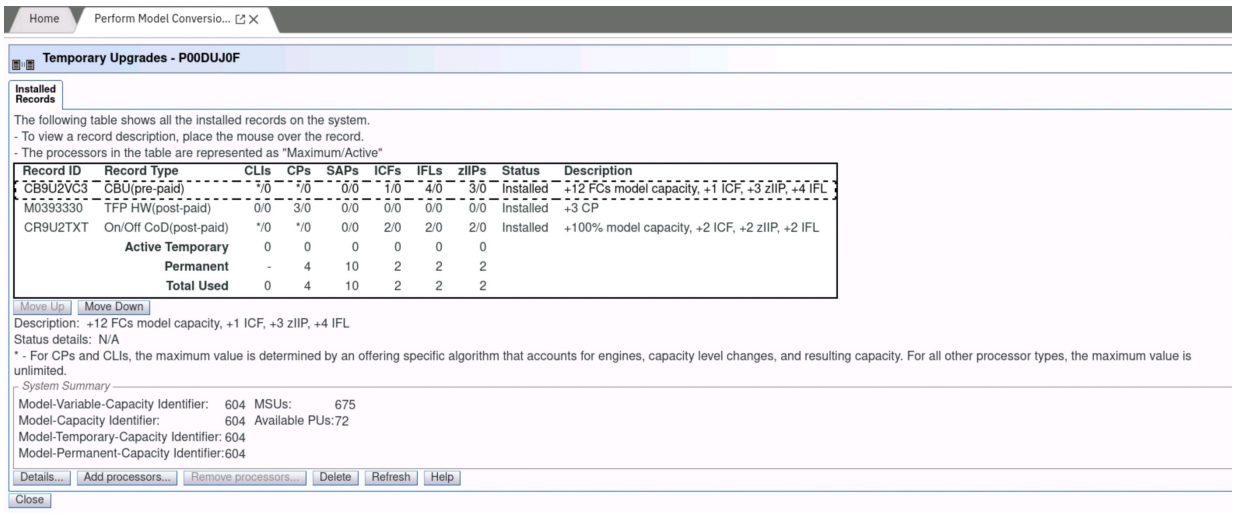
You can activate a temporary upgrade record using any of the following methods:

- Manually activating an upgrade record using the Support Element.
- Setting up scheduled operations to activate upgrade records
- Using APIs
- z/OS Capacity Provisioning.

Manually activating using the Support Element

To manually activate an installed upgrade record using the Support Element, follow these steps:

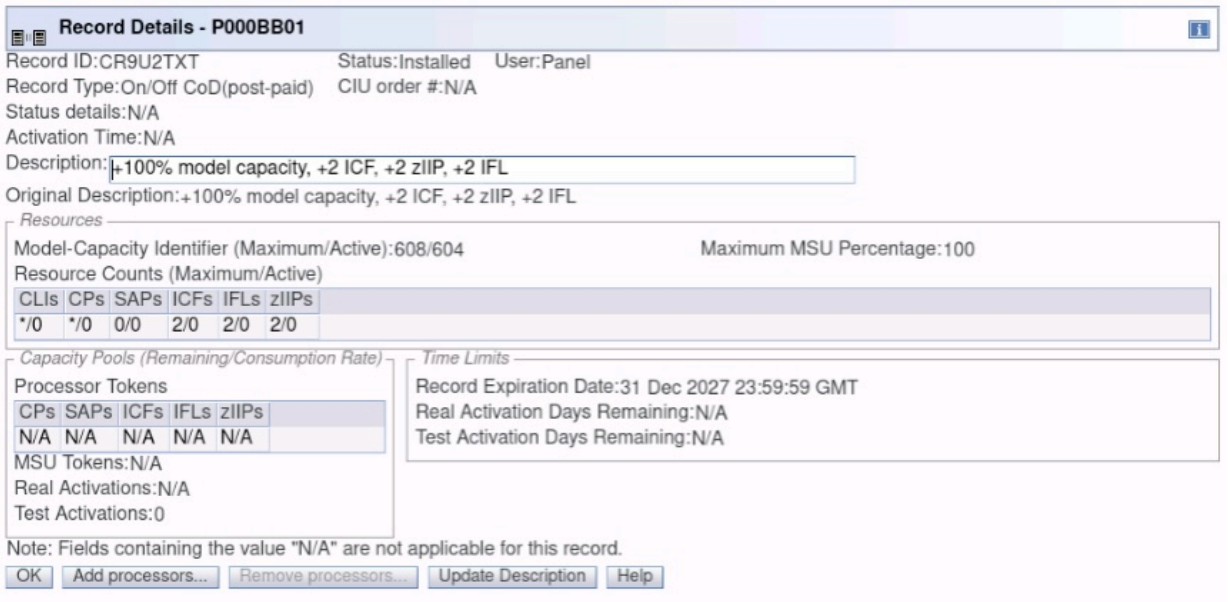
1. From the **Perform Model Conversion** window, click **Temporary upgrades** and **Manage**. The **Temporary Upgrades** window opens.



See Appendix D, “Understanding the content of the Installed Records page in the Temporary Upgrades window,” on page 131 for details on the fields displayed on the **Installed Records** page in the **Temporary Upgrades** window.

2. If you want to see more details about a record, such as the remaining test/real activations, the expiration dates, and whether the upgrade is controlled by tokens, select the record and click **Details...**. The **Record Details** window opens.

For On/Off CoD records:



The data in the **Capacity Pools (Remaining)** section is determined by the type of On/Off CoD upgrade record:

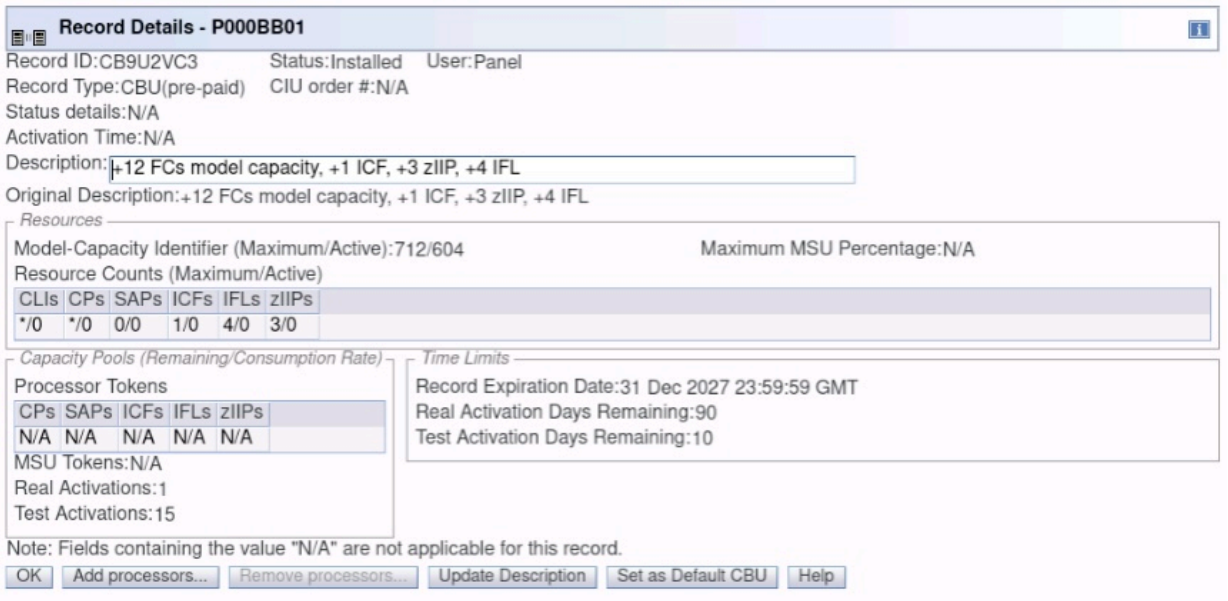
- If the On/Off CoD upgrade is not controlled by tokens, the values in the **Processor Tokens** table and the value of **MSU Tokens** is set to N/A.
- If the On/Off CoD upgrade is controlled by tokens, in the **Processor Token** table, the value of CPs is set to N/A, and the value of each specialty engine is set to the number of tokens purchased. (A token represents the activation of one engine of that type for one day.)

  MSU Tokens represents the number of tokens of processing capacity available based on the upgrade configurations and the number of days selected when you placed your order. **MSU Tokens** applies to CP engines. For CP engines, a token represents an amount of processing capacity resulting in one MSU of software cost for one day (an MSU day).

In the **Time Limits** section for post-paid On/Off CoD records, **Record Expiration Date** displays the date the record expires. For prepaid On/Off CoD upgrade records, **Record Expiration Date** is set to N/A. For all On/Off CoD upgrade records, **Real Activation Days Remaining** and **Test Activation Days Remaining** is set to N/A.

Note: To change the record description, edit or replace the existing description in the **Description** field, and then click **Update Description**. On the confirmation panel, click **OK**.

For CBU upgrades:



If the value of the **Status** field displays "(Default)" or "(Attention!, Default)," this record is set as the default CBU record. The default CBU record is used to support the legacy API interface by enabling the **Force activation** option on the **Change Activation Levels** window. (See Step 3 for information on setting the **Force activation** option.) Enabling and setting the **Force activation** option allow the APIs to activate or deactivate all the resources in the default CBU record. If there is no default CBU record specified, the oldest CBU record is used. To set a CBU record as the default CBU record, select the **Set as Default CBU** button located at the bottom of the **Record Details** window.

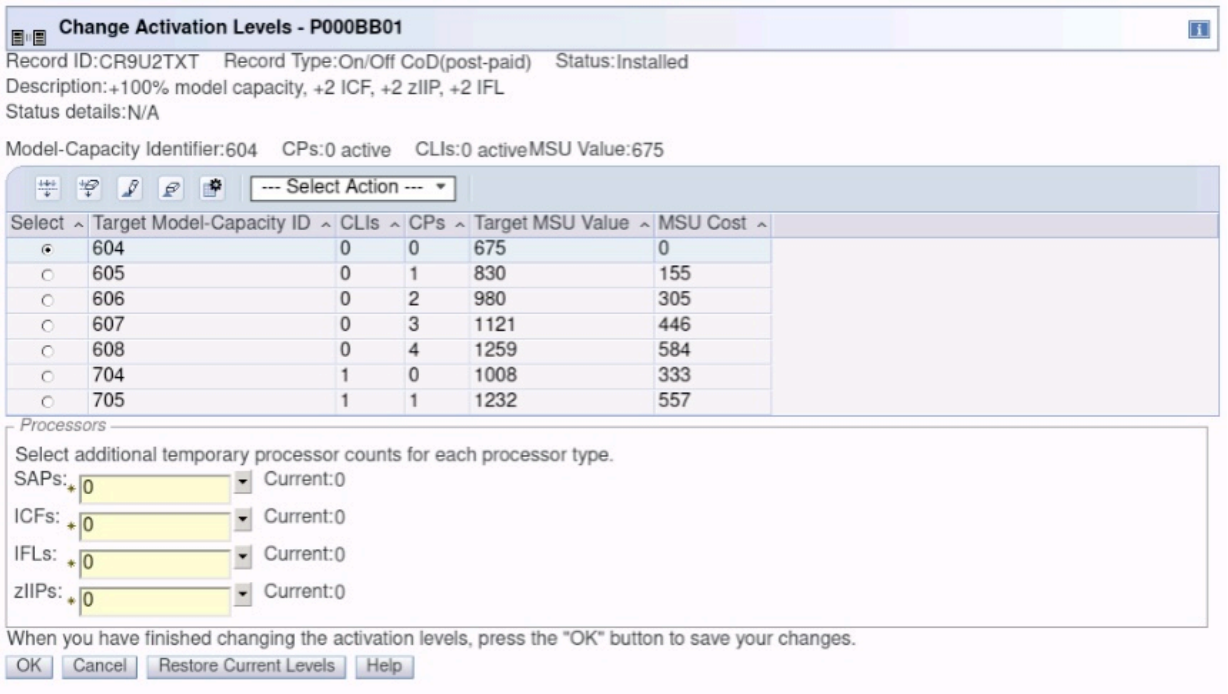
In the **Capacity Pools (Remaining)** section for a CBU record, **Processor Tokens** and **MSU Tokens** are set to N/A. **Real Activations** and **Test Activations** display the number of real or test activations remaining for this upgrade record.

In the **Time Limits** section for a CBU record, **Record Expiration Date** displays the date the record expires. **Real Activation Days Remaining** and **Test Activation Days Remaining** display the number of days allowed for a real or test activation, if the record is not active. Otherwise, **Real Activation Days Remaining** and **Test Activation Days Remaining** display the number of days remaining for the activation.

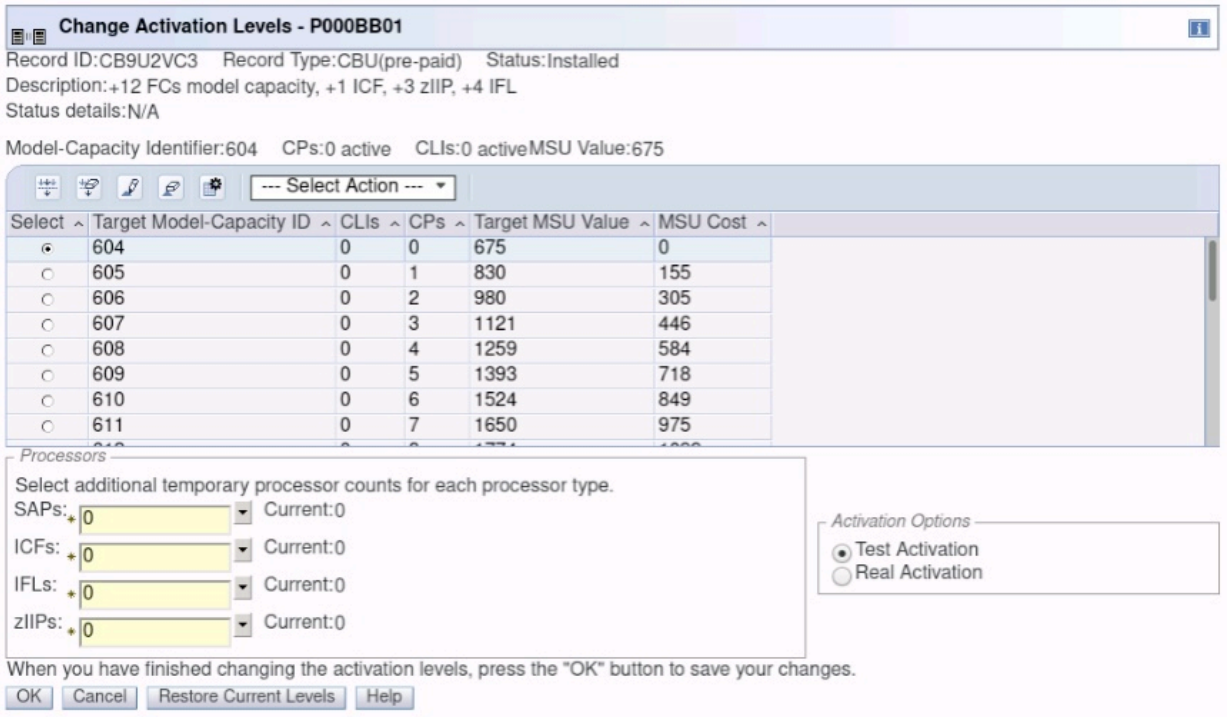
Note: To change the record description, edit or replace the existing description in the **Description** field, and then click **Update Description**. On the confirmation panel, click **OK**.

3. To activate processors in a record, select the record and click **Add processors...**. (You can perform this task from either the **Temporary Upgrades** window or the **Record Details** window.) Depending on the type of record you select, the **Change Activation Levels** window opens:

   For On/Off CoD records:



For CBU records:



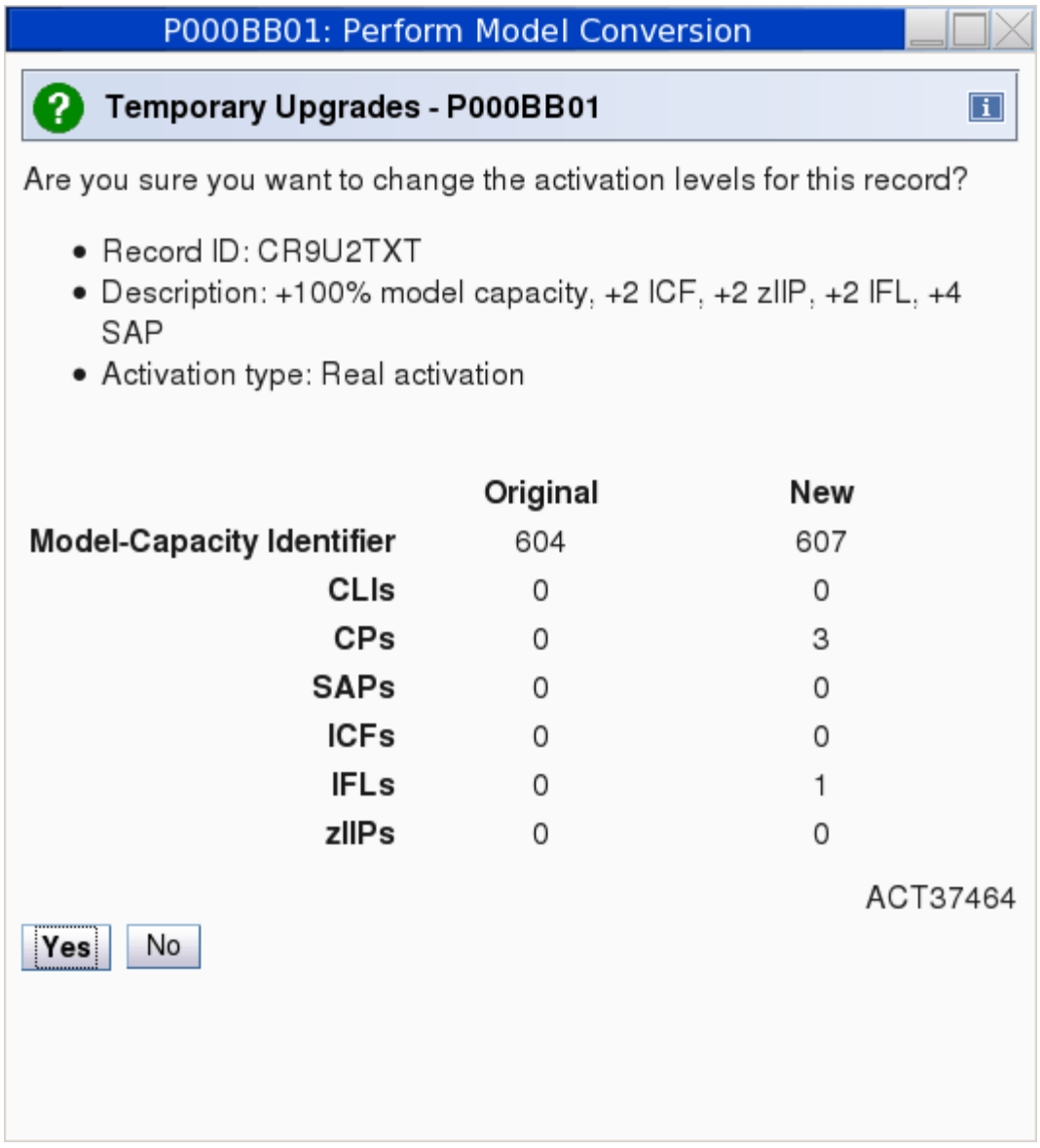
The table shows all the possible target model capacity identifiers that can be activated with this record. The values in this table are based on the configuration selections you set when you ordered the record on Resource Link, the current permanent configuration, and the available PUs in the system.

The Processors section identifies the count for each processor type that you can select.

The Activation Options section is visible for records that allow test activations. If a record is already activated for test, it must be deactivated prior to real activation.

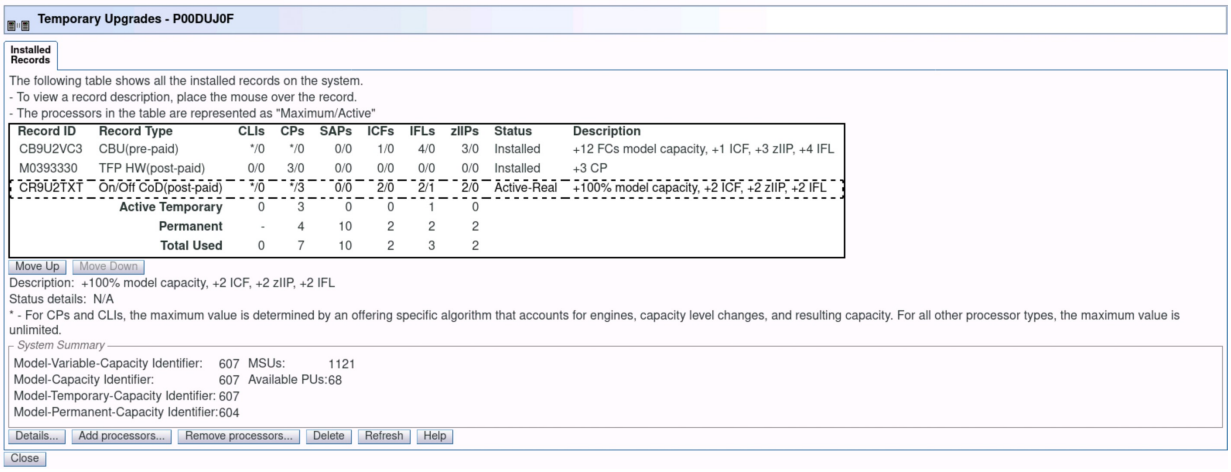
Force activation is only available for CBU records and can only be set on the default CBU record. (Refer back to Step 1 for information on setting the default CBU record.) It is supported for legacy CBU activations because legacy activations did not allow the user to specify levels. If the Force activation is checked, the record is activated to its maximum regardless of what resources are available. That is, the CP table refreshes with a single entry with the maximum values for the record and the other processor types are automatically restricted to their maximum LICCC values. The machine will activate as many resources as it can based on what is available and the remaining resources become pending PUs. Pending PUs become active as soon as resource become available. (This information can be seen on the **Records Details** window.)

4. Make your changes and click **OK**. A window opens showing the new activation levels you selected.



5. If you want to continue with the changes you made, click **Yes**.

   The changes you made are now active and are reflected in the **Temporary Upgrades** window.



Setting up scheduled operation to activate an upgrade record

Using the Customize Scheduled Operations task on the Support Element, you can set up a scheduled operation to activate and deactivate an On/Off CoD record. However, when you use this task, all resources in the On/Off record are activated or deactivated. You cannot partially activate or deactivate capacity or specialty engines.

To set up a scheduled operation, follow these steps:

1. On the Support Element, select the appropriate server.
2. From the Tasks pad, click **Operational Customization** and **Customize Schedule Operations**.
3. From the **Customize Scheduled Operations** window, click **Options** and **New**.
4. From the **Add a Scheduled Operation** window, select **Activate or deactivate processor resources in an OOCoD record** and click **OK**.
5. From the **Set up a Scheduled Operation** window, fill in the appropriate information on the **Date and Time** page, **Repeat** page, and **Options** page.
   - On the **Date and Time** page, enter the date and time you want to activate or deactivate the record.

     You can also select a time window value. If an existing conditions prevents the activate or deactivation of the record, an attempt to activate or deactivate will be made within this time window value.
   - On the **Repeat** page, you can set up criteria to have the activation or deactivation repeated.
   - On the **Options** page:
     a. Select the function you want performed – activate or deactivate.
     b. In the **Installed OOCoD Records** table, select the specific record you want to activate or deactivate.
     c. Click **Save**.

Using SNMP and HMC Web Services APIs to activate an upgrade record

Before using SNMP and HMC Web Services APIs to process temporary capacity records, you must first ensure that the HMC and Support Element are enabled to process SNMP and HMC Web Services APIs requests. Then you must enable the function that allows capacity changes through API requests.

For SNMP APIs:

- On the Support Element, open the **Customize API Settings** task, select the **Enable SNMP APIs** option, select the **Allow capacity change API requests** option, and click **OK**.

For HMC Web Services APIs:

- On the HMC, open the **Customize API Settings** task. Select the tab for the Web Services API, and enable the API. Authorize the appropriate HMC user to use it.
- On the Support Element, open the **Customize API Settings** task, select the **Allow capacity change API requests** option, and click **OK**.

The user performing the **Customize API Settings** task must be assigned the access administrator role. The user performing the **Customize Console Services** task must be assigned the access administrator or system programmer role. Hardware Management Console (HMC) and Support Element (SE) (version 2.12.1 or later) information can be found on the console help system.

Using SNMP APIs

You can use the HWMCA_ADD_CAPACITY_COMMAND and HWMCA_REMOVE_CAPACITY_COMMAND APIs to allow applications to add and remove temporary capacity for defined CPC objects. You can use the HWMCA_ACTIVATE_CBU_COMMAND and HWMCA_ACTIVATE_OOCOD_COMMAND APIs to allow applications to activate a CBU or On/Off CoD record for a defined CPC object.

When activating a CBU record, the API activates all the resource in the **default** CBU record. If there is no default CBU record specified, the oldest CBU record is used. To set a CBU record as the default CBU record, select the **Set as Default CBU** button located at the bottom of the **Record Details** window.

Refer to *SNMP Application Programming Interfaces* for details on these Command APIs.

Using HMC Web Services APIs

With the HMC Web Services APIs, you can use the **Add Temporary Capacity** and **Remove Temporary Capacity** requests to add and remove temporary capacity for a CPC. These operations are targeted at the CPC object to be affected. You can also use API operations such as **List CPCs** to locate the URIs of the CPC desired, and then invoke the **Add Temporary Capacity** or **Remove Temporary Capacity** operation using that CPC's URI.

Refer to *Hardware Management Console Web Services API* for details on the CPC object and the **Add Temporary Capacity** or **Remove Temporary Capacity** operations on it.

Using z/OS Capacity Provisioning

z/OS Capacity Provisioning gives the customer a flexible and automated process to control the configuration and activation of On/Off CoD records.

z/OS MVS Capacity provisioning allows you to set up rules defining the circumstances under which additional capacity should be provisioned in order to fulfill a specific business need. The rules are based on criteria, such as: a specific application, the maximum additional capacity that should be activated, time and workload conditions. This support provides a fast response to capacity changes and ensures sufficient processing power will be available with the least possible delay even if workloads fluctuate.

Refer to the *z/OS MVS Capacity Provisioning User's Guide* for more information.

Chapter 8. Deactivating temporary capacity

Deactivating is the process of removing temporary processors or decreasing temporary model capacity. Deactivation can be performed manually or automatically upon expiration.

When you are finished using all or part of a capacity upgrade, you can take action to remove processors or decrease model capacity using the Support Element. You can only remove activated resources for the specific offering. You cannot remove dedicated engines or the last of the engine type.

If you deactivate resources back to the base configuration, the activation is complete. (That is, if you deactivate the last temporary processor, your record is deactivated.) For a CBU and On/Off CoD record, to add resources again, you must start a new activation. For a On/Off CoD test record, once the record is deactivated, it is no longer available for use. You can delete the record.

If you do not manually deactivate the added capacity, the activated resources are automatically deactivated at expiration time (including any grace period). You will receive daily warning messages (hardware messages) starting five days in advance of the expiration. Once a temporary record enters the grace period, the only customer option is to deactivate all resources from this record. You cannot change the activation level by increasing or decreasing partial resources. If you attempt to partially increase or decrease resources, you will receive an error indicating the temporary record has expired.

After deactivation, a record remains as an installed record. If you want a record deleted, you must manually select the record on the **Installed Records** page and click **Delete**.

Considerations before deactivating

Before deactivating a record, consider the following:

- If the processors were made available into the shared pool without configuring any processor online to any logical partition, no preparatory actions are required. Deactivating the active record is sufficient, all the logical partitions defined with shared processors will fall back to exactly the same situation as before the record was activated.
- If the processors were made available into the shared pool and reserved processors were configured online in logical partitions (or a new logical partition with shared processors was activated), they should be configured offline (or logical partition deactivated) before record deactivation. Otherwise the logical-to-physical ratio would become different than before the activation of the record, which may lead to performance issues. Even if there are less physical processors available in the shared pool than logical shared processors assigned to any logical partition, the record can be deactivated.
- If processors were made available and new dedicated processors were brought online, they should be configured offline before record deactivation because record deactivation will remove processors only from the shared pool. If the processor(s) are not configured offline and there are active partitions using shared processors:
  - Deactivation will fail if it would bring the number of processors in the shared pool to zero
  - Deactivation will proceed if at least one processor remains in the shared pool. Note that in this case the ratio of shared logical processors to physical processor will be changed.

Processors are automatically deactivated if either of the following conditions occur:

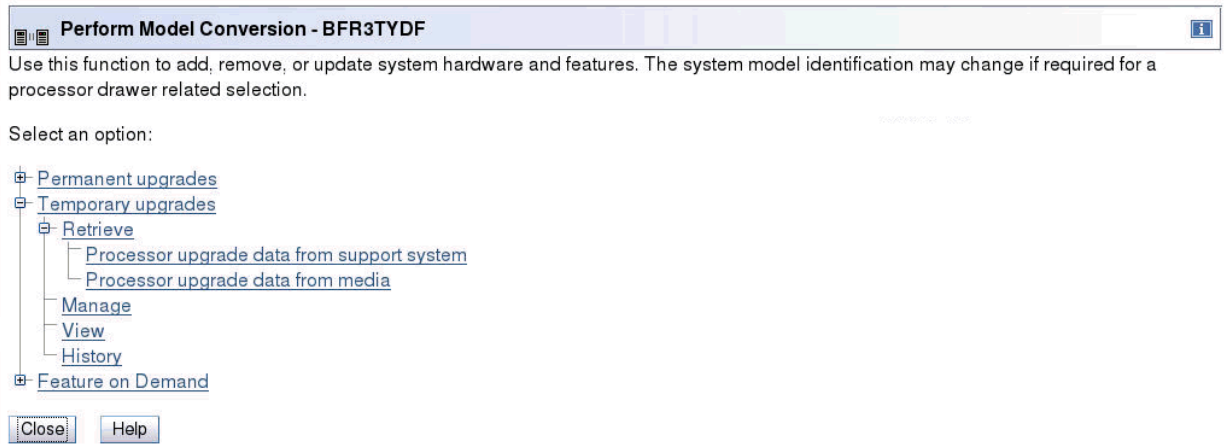
- A temporary record expires
- Activation days are exceeded.

Chapter 9. Deleting temporary Capacity on Demand records

You can delete staged and installed temporary Capacity on Demand records (such as On/Off CoD, CBU) when you no longer want or need them. For example, if you have On/Off CoD records that support activating more ICFs, but now you want to prevent activating additional ICFs, then you might want to delete any staged or installed records that support activating more ICFs. Or if you must discontinue the use of CoD features and remove them from your machine, you typically must delete all staged and installed temporary CoD records. (See Chapter 12, “Discontinuing and removing Capacity on Demand features,” on page 75 for details.)

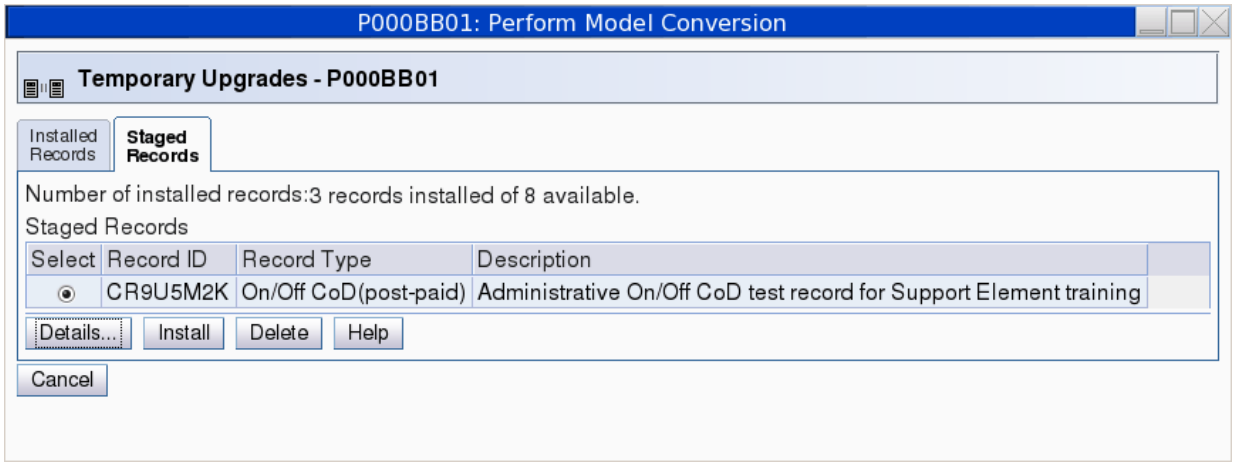
To delete staged and installed records, follow these steps:

1. Log onto the HMC in system programmer mode.
2. Using the expand icon (+) in the navigation toolbar, expand the **Systems Management** nodes in the navigation pane and select the server. For information on the HMC user interface, refer to the console help system.
3. From the tasks pad, click **Configuration** and **Perform Model Conversion**. The **Perform Model Conversion** window opens:



4. From the **Perform Model Conversion** window, click **Temporary upgrades** and **Manage**. The **Temporary Upgrades** window opens.
5. Click the **Staged Records** tab. The **Staged Records** page opens.

   The table on the **Staged Records** page lists all the records that are ready to be deleted or installed. If available, replenishment records (identified by the same Record ID as the original record) are also shown in this table.

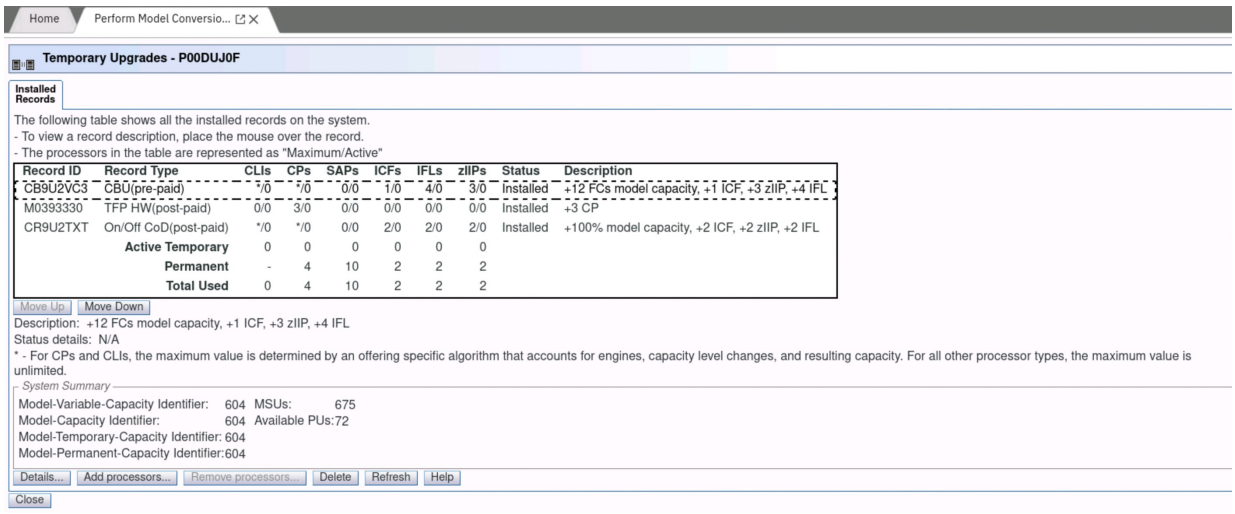


6. From the **Staged Records** page, select the records you need to delete and click **Delete**.

   Note: If you delete a record that has replenishment records, the replenishment records are also deleted.

7. Click the **Installed Records** tab. The **Installed Records** page opens.

   The table on the **Installed Records** page lists all the records that are currently installed or active.



8. From the **Installed Records** page, select the record you need to delete and click **Delete**.

   Note: If a record that you need to delete is currently active, you must deactivate the record before deleting it. (Refer to Chapter 8, “Deactivating temporary capacity,” on page 65 for details on deactivating a record.)

   All appropriate staged and installed records are now deleted.

9. Transmit the vital product data (VPD) to the support system using the following steps:

   a. Click **Cancel** on the **Temporary Upgrades** window and the **Perform Model Conversion** window to return to the tasks pad.

   b. From the tasks pad, click **Configuration** and **Transmit Vital Product Data**.

   c. From the **Transmit Vital Product Data to IBM** window, select **support system** and click **OK**.

Chapter 10. Billing

Permanent upgrades

For permanent upgrade records, you are charged one fee per record based on the price agreement negotiated for the machine or the record order. Billing begins when you download (retrieve) the permanent upgrade record to the Support Element.

Temporary upgrades

For temporary upgrades, the billing information is defined in the LICCC record. You are responsible for any software charges resulting from the activated capacity. The charges will depend on the license agreement for the particular software product.

For CBU records, you are charged one fee per record based on the price agreement negotiated for the machine or the record order. You are billed when you download (retrieve) the record to the Support Element. Records are priced for hardware. There are no additional software charges or maintenance charges.

For post-paid On/Off CoD records, when you activate the record, tracking for billing begins. You pay for what you activate during the activation time. You are charged on a 24-hour basis. For each month (starting with the month you activated the record), a report is generated; and in the following month, you are billed for hardware, software, and maintenance charges.

For prepaid On/Off CoD records, when you download the record, hardware billing is initiated. You will be billed for the total capacity enabled on the record based on the number of token days you requested. Every 24 hours tokens (corresponding to the upgrade configuration activated) are decremented from the token pool as they are used. You will be billed for any software and maintenance charges associated with the activated capacity in the month following the activation.

Billing is also based on activation level relative to permanent capacity. If you activate temporary capacity below the current purchased capacity (referred to as the "high water mark" (HWM)), there are no hardware charges. However, there may be software and maintenance charges.

Billing is managed via the support system and Resource Link.

Chapter 11. Monitoring

The chapter explains some of the functions available for you to use to monitor your Capacity on Demand activity.

STSI instruction

The model-capacity identifier, model-permanent capacity identifier, and model-temporary capacity identifier information provided by the STSI instruction allows programs to recognize On/Off CoD and CBU activity. The capacity identifiers correspond to software models.

Model Capacity Identifier equals the base machine capacity + billable capacity (On/Off CoD) + replacement capacity (CBU)

Model Permanent Capacity Identifier equals the base machine capacity

Model Temporary Capacity Identifier equals the base machine capacity + billable capacity (On/Off CoD)

Model Variable Capacity Identifier equals the Model Capacity Identifier

You can use the STSI instruction to obtain the model-capacity rating, model-permanent capacity rating, and model-temporary capacity rating. These capacity factors are the MSU ratings for the corresponding capacity identifiers. Using these values, you can determine how changing your capacity may impact your licensing agreements.

SNMP APIs

The following APIs allow registered application to be notified about temporary capacity changes:

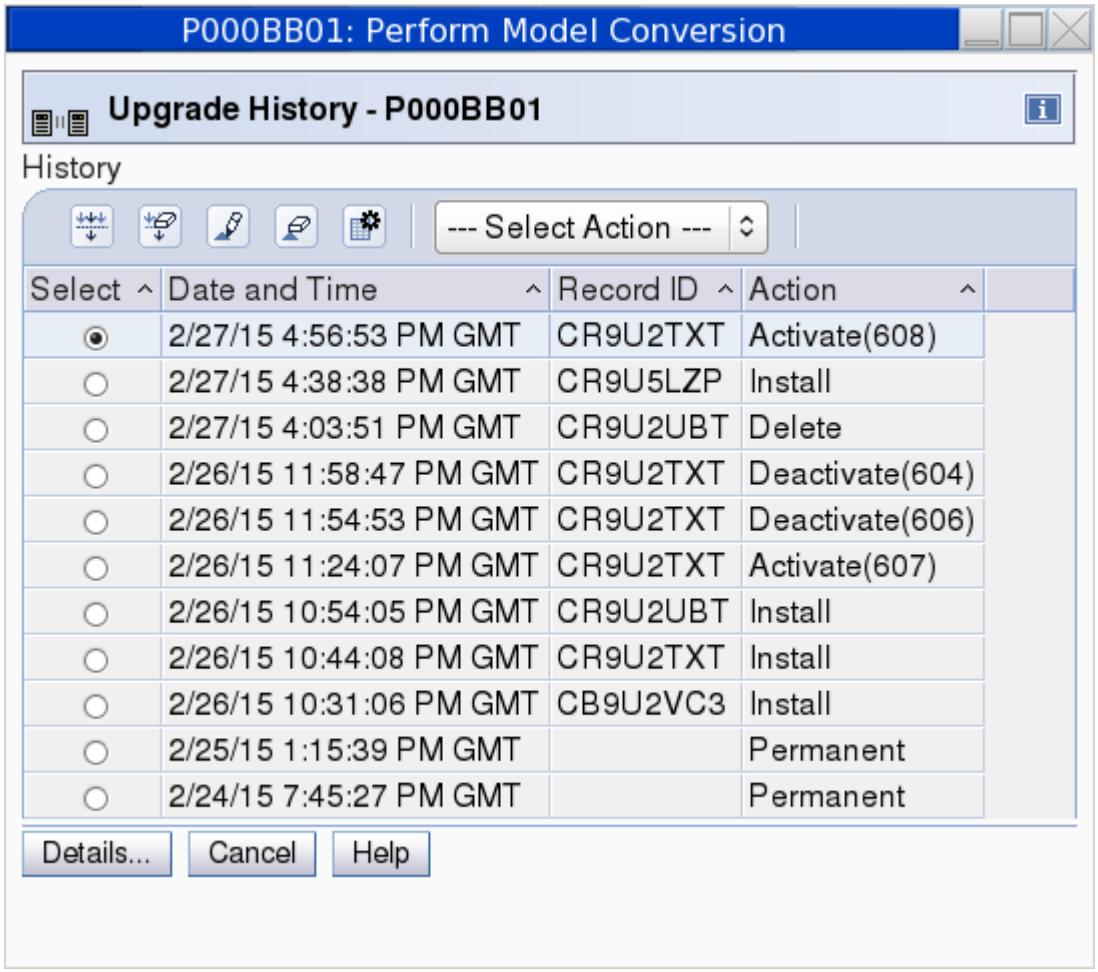
- HWMCA_EVENT_CAPACITY_CHANGE notifies the application that the processing capacity for a defined CPC object has changed.
- HWMCA_EVENT_CAPACITY_RECORD_CHANGE notifies the application that a change has occurred to a temporary capacity record.

Refer to *SNMP Application Programming Interfaces* for details.

History of activity on the system

Using the Support Element, you can view the history of actions taken on records for your system within the last 90 days. To view this history information, follow these steps:

1. From the Support Element, using the expand icon (+) in the navigation toolbar, expand the **Systems Management** nodes in the navigation pane and select the server. For information on the Support Element user interface, refer to the console help system.
2. From the tasks pad, click **Configuration** and **Perform Model Conversion**. The **Perform Model Conversion** window opens.
3. From the **Perform Model Conversion** window, click **Temporary upgrades** and **History**. The **Upgrade History** window opens.



The actions are identified as:

Activate/Deactivate
Displays when the activation levels were changed for the record.

Install
Displays when the record was moved from the staged area to the installed area.

Replenish
Displays when the record was replenished.

Delete
Displays when the selected record was permanently removed from the system.

Permanent
Displays when a change was made to the permanent LICCC on the system.

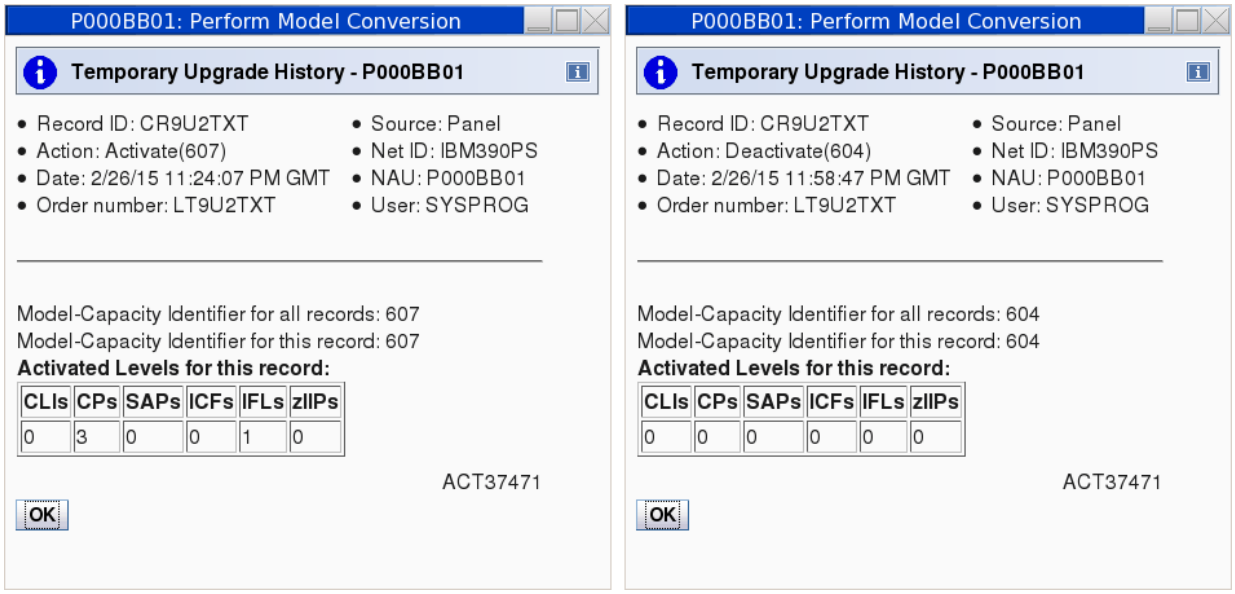
Expired
Displays when the record reached its expiration criteria. (Expiration criteria can be: a specific calendar date, a specific number of days, or a specific number of tokens.)

The entries in the table are initially sorted by the date and time of the changes made to the records. You can, however, sort the table by any column by clicking the arrow located to the right of the column header.

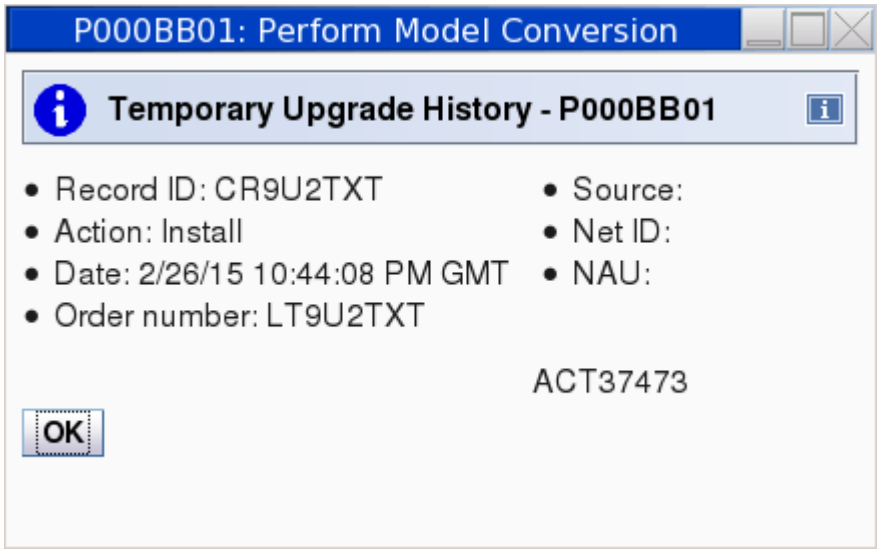
4. To view details about a specific action, select the record on the **Upgrade History** window and click **Details...**. The **Temporary Upgrade History** window opens. Depending on the action of the record selected, the contents of the **Temporary Upgrade History** window may include:

- The record ID of the selected record, the action performed on the selected record, the date the action was performed, the order number associated with the selected record, the ID of the last user who acted on this record, and the source, Net ID, and NAU
- The maximum/active model capacity identifier
- Unassigned IFLs
- A table containing the active CPs, and specialty engines installed **for the record**. For example, suppose you had a permanent configuration of 7 CPs and a CBU record had 2 active CPs previously. Then you add 3 more CBU CPs in a second activation. The table would show 5 active CPs (not 3 or not 12).

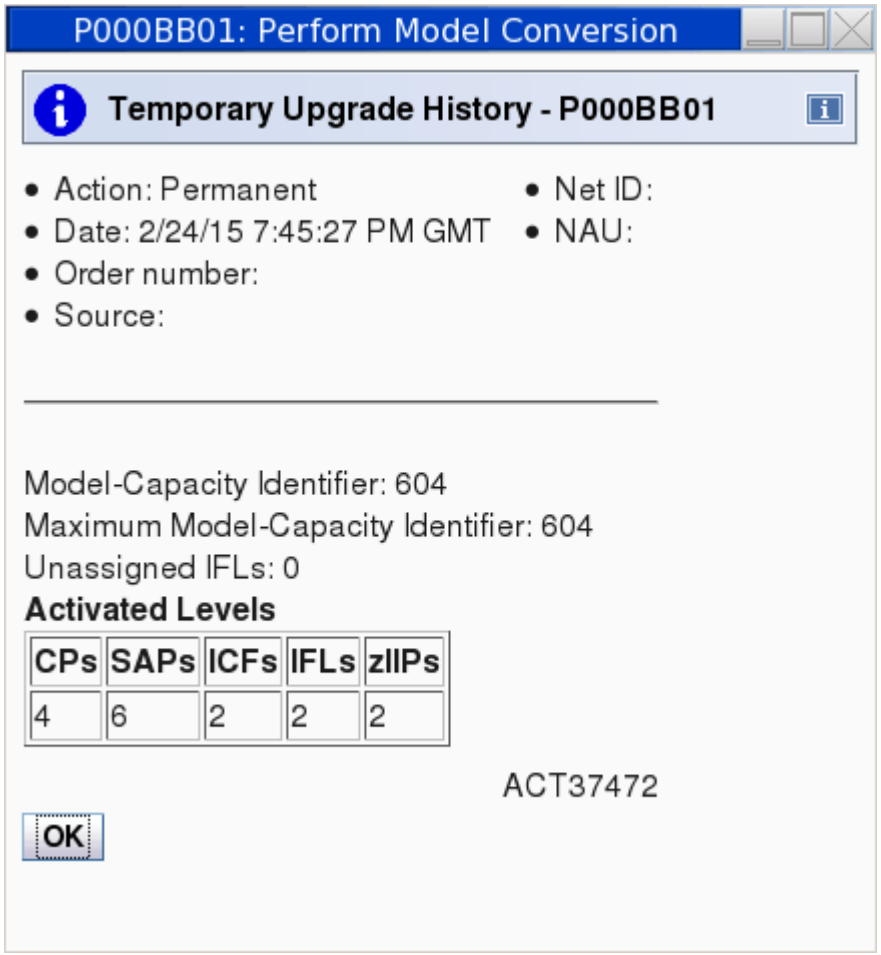
For example, when the action of the record is "Activate" or "Deactivate," a **Temporary Upgrade History** window similar to the following opens:



When the action of the record is "Delete,""Install," or "Replenish,", a **Temporary Upgrade History** window similar to the following opens:



When the action of the record is "Permanent," a **Temporary Upgrade History** window similar to the following opens:


P000BB01: Perform Model Conversion
Temporary Upgrade History - P000BB01
Action: Permanent
Date: 2/24/15 7:45:27 PM GMT
Order number:
Source:
Net ID:
NAU:
Model-Capacity Identifier: 604
Maximum Model-Capacity Identifier: 604
Unassigned IFLs: 0
Activated Levels
CPs SAPs ICFs IFLs zIIPs
4 6 2 2 2
ACT37472
OK

Chapter 12. Discontinuing and removing Capacity on Demand features

Certain events require that you discontinue your use of one or more of the Capacity on Demand (CoD) features on a machine and remove those features from the machine. These events include:

- You are upgrading your machine to a newer machine type
- You are selling your machine to another party
- You are returning your machine to IBM or another leasing company
- You no longer wish to participate in the CoD offering
- IBM has withdrawn the machine's CoD features from marketing (not applicable to CBU features).

These events may require you to deactivate CoD records or delete staged or installed CoD records. For details on deactivating CoD records, see Chapter 8, “Deactivating temporary capacity,” on page 65. For details on deleting staged or installed CoD records, see Chapter 9, “Deleting temporary Capacity on Demand records,” on page 67.

Upgrading your machine

If you are upgrading your machine to a newer machine type server, then the steps you need to perform prior to the upgrade will differ depending on how the upgrade is being done.

For upgrades where the machine's serial number remains the same, your IBM service representative will migrate your CoD records to the upgrade machine as part of the upgrade installation. However, prior to the upgrade, you must complete the following steps:

1. Deactivate any active CoD records
2. Remove the CoD features
3. Transmit or upload vital product data (VPD) to IBM.

   This step gives IBM an accurate representation of your machine's current CoD record state prior to the upgrade. It is especially important for On/Off CoD users to ensure that IBM Resource Link has an accurate record of all On/Off CoD activity that has occurred on the machine prior to the upgrade being performed. IBM computes charges for On/Off CoD usage based on information returned with the VPD, and incomplete VPD could result in incorrect charges.

If your IBM Z upgrade is a "hybrid" or another type of upgrade where your new or upgraded machine has a different serial number than the original machine, you must complete the following steps for all CoD records:

1. Deactivate any active CoD records
2. Delete any installed CoD records
3. Delete any staged CoD records
4. Remove the CoD features
5. Transmit or upload vital product data (VPD) to IBM.

New CBU records will be shipped with your upgraded machine. For prepaid On/Off CoD records, contact your IBM or Business Partner sales representative and notify them that you will need new records created and delivered for your upgraded machine. These records cannot be created prior to shipment of the upgraded machine because the records must be based on the final VPD transmitted to IBM after the upgrade is performed. You will need to create and install new post-paid On/Off CoD records for your machine after it is upgraded.

IBM will create a new CIU machine profile on Resource Link for the upgraded machine. You no longer need the CIU machine profile for the former machine. Disable the machine profile to remove it from your list of active machine profiles. See “Disabling a machine profile” on page 77.

Selling your machine to another company

If you are selling your machine to a third party, you must remove all CoD records on the machine prior to uninstalling the machine and transferring it to the new owner.

- Deactivate any active CoD records
- Delete any installed CoD records
- Delete any staged CoD records
- Remove the CoD features
- Transmit or upload vital product data (VPD) to IBM.

You no longer need the machine's CIU machine profile on Resource Link. Disable the machine profile to remove it from your list of active machine profiles. See “Disabling a machine profile” on page 77.

Returning your leased machine to IBM

If you are returning a leased machine to IBM or another lessor, the temporary CoD records on the machine must be removed prior to returning it. You must complete the following steps:

- Deactivate any active CoD records
- Delete any installed CoD records
- Delete any staged CoD records
- Remove the CoD features
- Transmit or upload vital product data (VPD) to IBM.

You no longer need the machine's CIU machine profile on Resource Link. Disable the machine profile to remove it from your list of active machine profiles. See “Disabling a machine profile” on page 77.

IBM withdrawing the machine from marketing

When IBM withdraws a machine from marketing, the right to use post-paid On/Off CoD records typically is withdrawn. Your right to use prepaid CoD records, such as CBU or prepaid On/Off CoD typically remains until terminated per the terms of the offering. You should check the announcement and offering terms for details. Unless instructed otherwise by IBM, upon the withdrawal from marketing of your machine, you must complete following steps:

- Deactivate any active post-paid On/Off CoD records
- Delete any installed post-paid On/Off CoD records
- Delete any staged post-paid On/Off CoD records
- Transmit or upload vital product data (VPD) to IBM.

IBM will disable CIU machine profiles on Resource Link for a withdrawn machine type, typically on the date when ordering new CoD records is no longer allowed.

Removing the Capacity on Demand features

To remove the Capacity on Demand features, follow these steps:

- Log onto the HMC in system programmer mode.
- Using the expand icon (+) in the navigation toolbar, expand the nodes in the navigation pane and select the server

- From the tasks pad, click **Recovery** and **Single Object Operations** to open a Support Element session for the selected server
- Make sure the correct server name is listed and selected, and click **Yes**
- From the Support Element, expand the nodes in the navigation pane and select the server name
- From the tasks pad, click **Configuration** and **Prepare System for Discontinuance**
- Click **Yes** to confirm the discontinuance on the **Prepare System for Discontinuance** window.

Disabling a machine profile

Disable a CIU machine profile when you no longer need it. You no longer need a CIU machine profile when, for example, you discontinue use of and remove the machine's CoD features for any of the events described in this chapter.

Disabling a machine profile will:

- remove it from the CIU **Active machine profiles** page on Resource Link
- Remove its ordering options
- Cancel any upgrades or CoD records on order.

Disabling a machine profile does not cancel, deactivate, or delete CoD records currently installed or staged on the machine. You still need to deactivate the machine's active CoD records and delete its installed and staged CoD records.

Disabling a machine profile does not delete it. A disabled machine profile remains listed on the CIU **All machine profiles** page on Resource Link so you can review its order history, billing history, or other information if necessary.

To disable a machine profile:

- Open the machine profile on Resource Link.
- Click the **Disable machine profile...** link in the **To update profile** link list. Clicking the link will display a confirmation page.
- Follow the instructions on the confirmation page to confirm disabling the machine profile.

Chapter 13. Dual Control

Dual Control is a feature of the IBM z17 platform which creates the ability for certain operations to have dual authentication before being executed. Within Capacity on Demand, the Perform Model Conversion task supports dual control when targeting z17 systems. The following operations are available to be under Dual Control authentication when Dual Control is enabled for a given user.

- Retrieving and applying Permanent Upgrades
- Retrieving, but not applying Permanent Upgrades
- Applying previously staged Permanent Upgrades
- Deleting previously staged Permanent Upgrades
- Retrieving and staging Temporary Upgrades
- Installing Temporary Upgrades
- Removing installed Temporary Upgrades
- Removing staged Temporary Upgrades
- Activating or deactivating Temporary Capacity
- Retrieving and applying Features on Demand
- Retrieving and staging Features on Demand
- Installing Features on Demand
- Removing Features on Demand

Configuring Dual Control for the Perform Model Conversion task

Dual Control is configured through the User Management task on the Hardware Management Console or Support Element. When configuring Dual Control, a user role must be created where a task and target mapping are present indicating which task is under Dual Control for which targets.

Before creating a Dual Control user role for Perform Model Conversion, please be aware of the following:

- When Dual Control is assigned to a given user on the Perform Model Conversion task, all operations previously listed will be under Dual Control.
- Dual Control will require two users to interact with Dual Control requests, the user who creates the request, and a separate user who approves or rejects the request.

To begin, open the User Management task and click on **Roles** and create a new role. The role may be configured however you would like, giving access to objects, tasks and groups is completely dependent on your needs and system configuration. The Dual Control section of the role is where a task and target mapping is created, indicating which tasks and which targets will be under Dual Control when the role is assigned to a user. When proceeding through the role creation, you will eventually find the Dual Control section in the role, which is shown below.

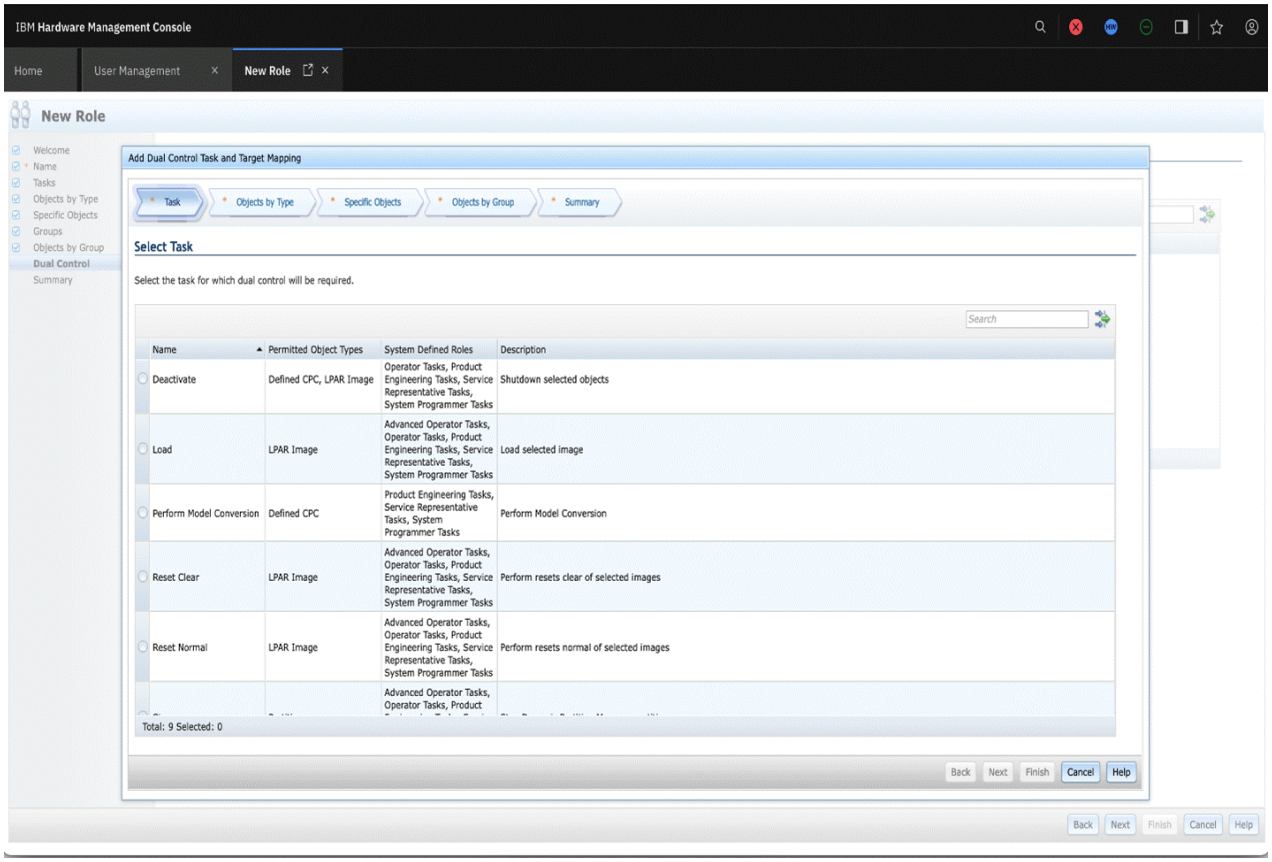


Figure 18. Add Dual Control Task and Target Mapping: Select Task

Selecting a task is the first step in creating a Dual Control task and target mapping. The task which is selected will have Dual Control enabled for all objects which are selected in the later steps when this role is present. To create a Dual Control role for the Perform Model Conversion task, select **Perform Model Conversion** and click **Next** on the inner window. You will then be prompted to select the type of target to add to the mapping. This can be a type of object, a specific object, or a group of objects. When combined with the task, the object or objects you select will form a task and target mapping for Dual Control. This allows you to have as much granularity as you would like when selecting which objects will be a part of the task and target mapping. An example of including and excluding objects could be adding a group of production CPCs into a Dual Control mapping, but excluding CPCs in a disaster recovery data center to not hinder recovery time in the event of a data center recovery action. The following images show the various options of object selection when creating a Dual Control task and target mapping.

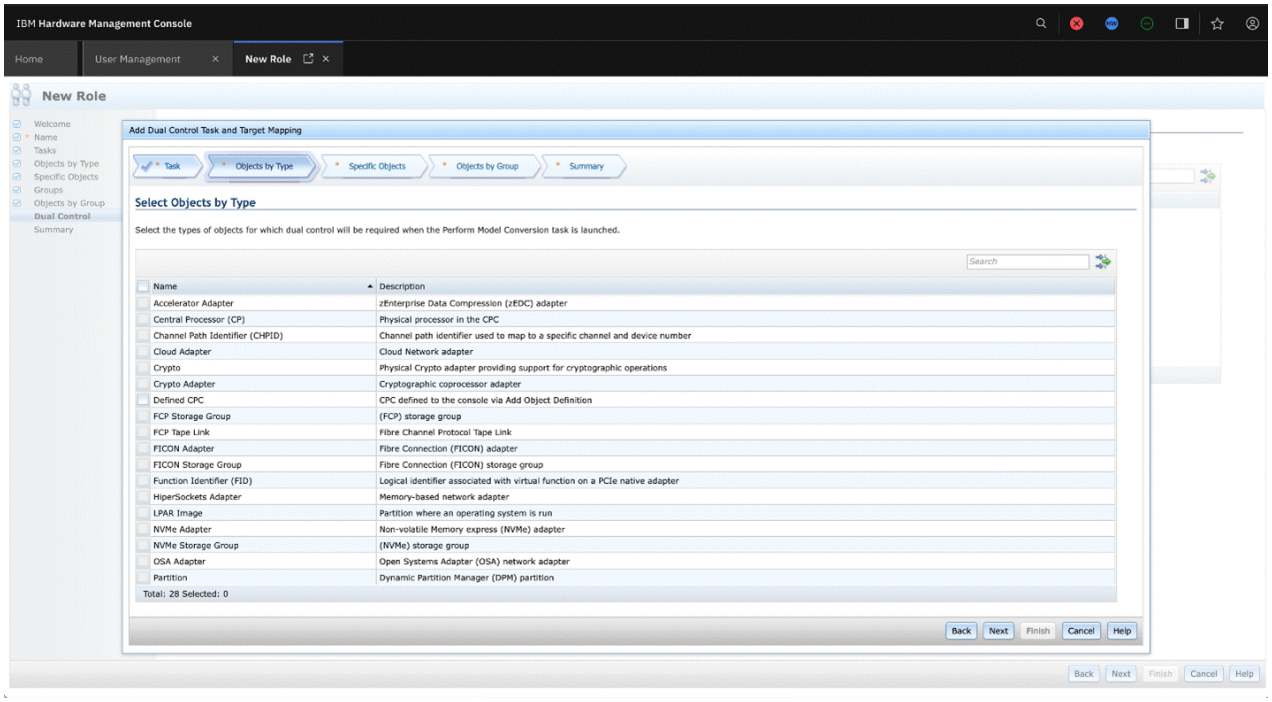


Figure 19. Add Dual Control Task and Target Mapping: Objects by type

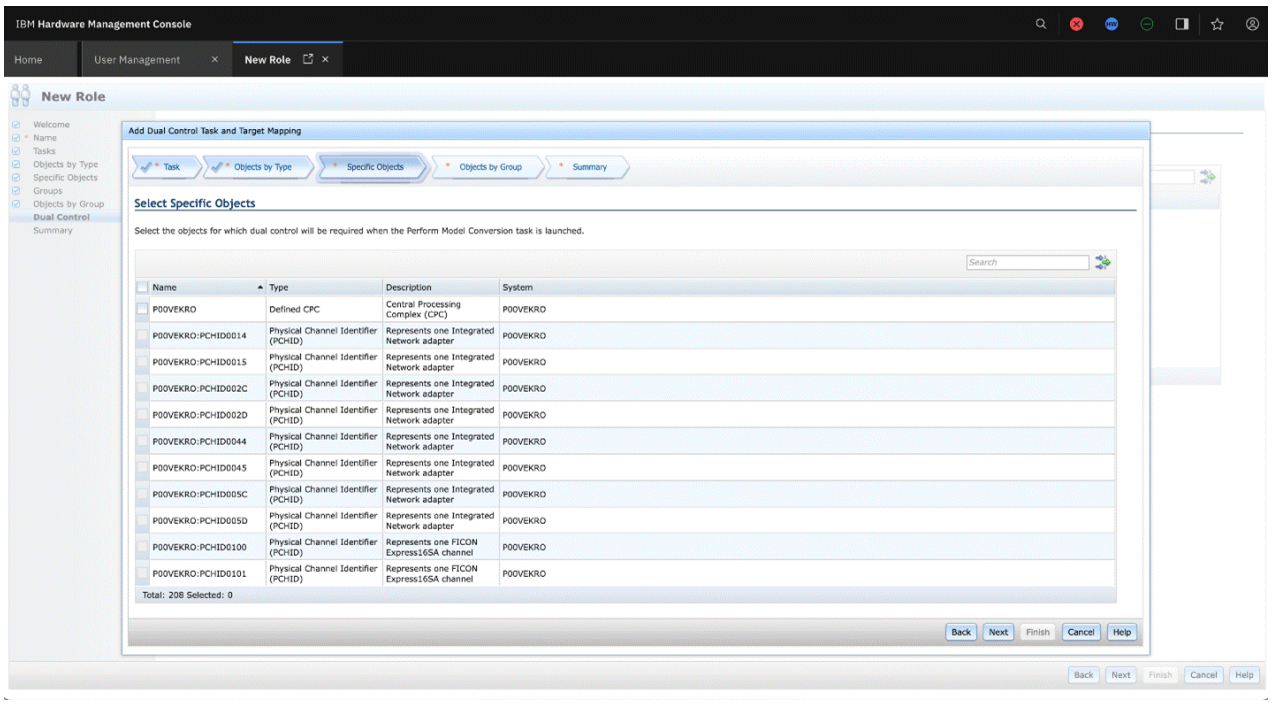


Figure 20. Add Dual Control Task and Target Mapping: Specific objects

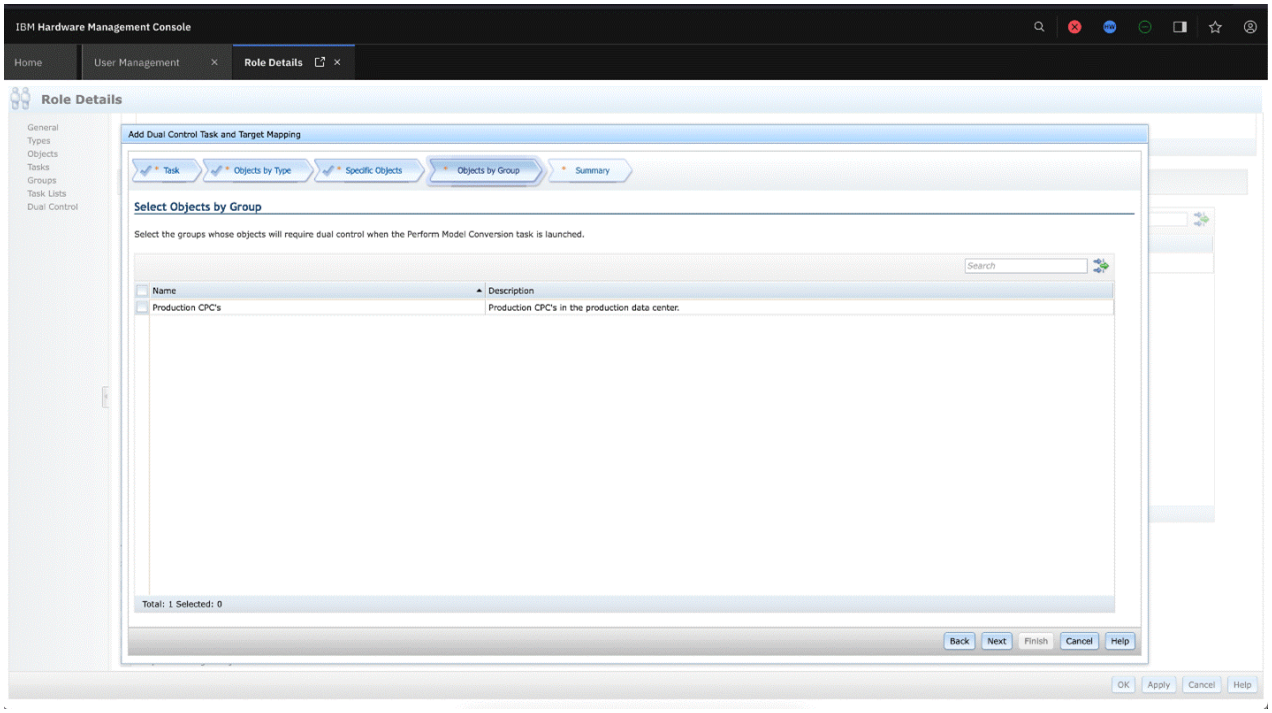


Figure 21. Add Dual Control Task and Target Mapping: Objects by group

Lastly, you will be prompted to select what roles or credentials will be used as an approver of the task and target mapping. Bear in mind, Dual Control requires two users to successfully interact with any Dual Control requests that are created. The role creation in this example would be assigned to someone who would create a Dual Control request and submit it for approval. The individual approving the request is determined in this step, and is completely dependent on your needs and system configuration.

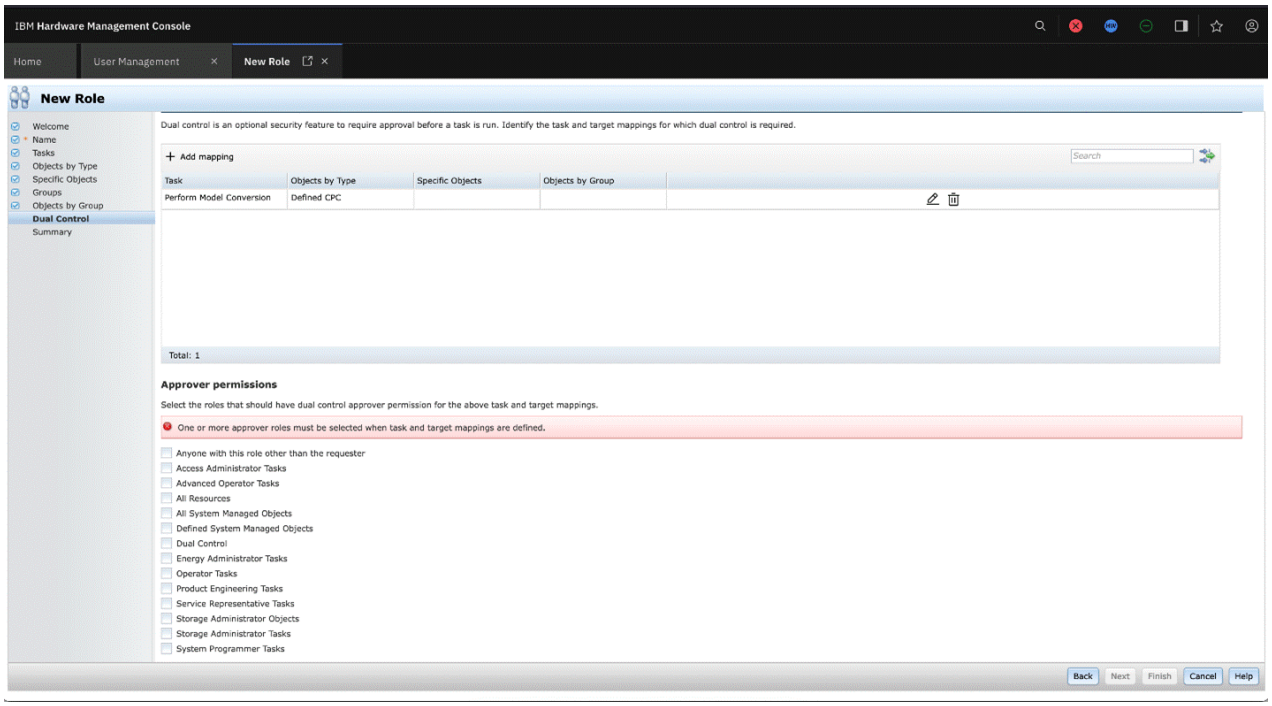


Figure 22. Add Dual Control Task and Target Mapping: Dual Control

Once, the role has been created, it may be assigned to a user. Though, in order to access the task and objects the mapping is created for, the user must have access to the task and objects specified in the mapping by a role that is assigned to the user. The task and target mapping does not automatically give the user permission to the task or target within the Dual Control mapping.

Using the Perform Model Conversion task to create Dual Control requests

When logged in as a user with Dual Control configured for the Perform Model Conversion task and a given target, the task will be launched the same way as a user without Dual Control configured. Open the Perform Model Conversion task by using the search bar or navigating to the target system, expand the **Configuration** tab, and click on the Perform Model Conversion task. From here, the task will open and a Dual Control banner will be displayed signifying the task is under Dual Control.

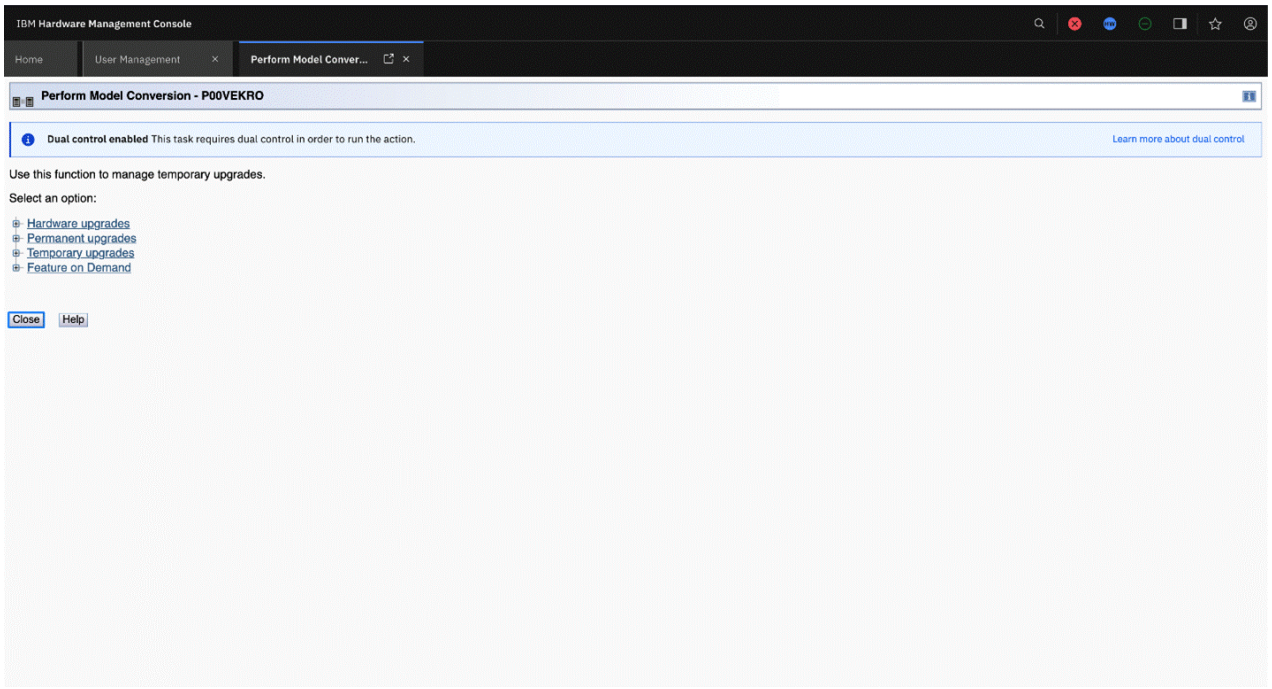


Figure 23. Perform Model Conversion

Once the task is opened, users with dual control will interact with the task the same way as users without dual control. The only thing that will change is when an operation that requires dual control is attempting to be submitted. In the following sections, we will go over the different types of dual control requests and how they can be created and interacted with.

Activating temporary capacity: end-to-end example

In this section, we will show an end-to-end example of how a Dual Control request can be created and successfully executed to activate temporary capacity. From the main Perform Model Conversion panel, expand Temporary Upgrades and click Manage.

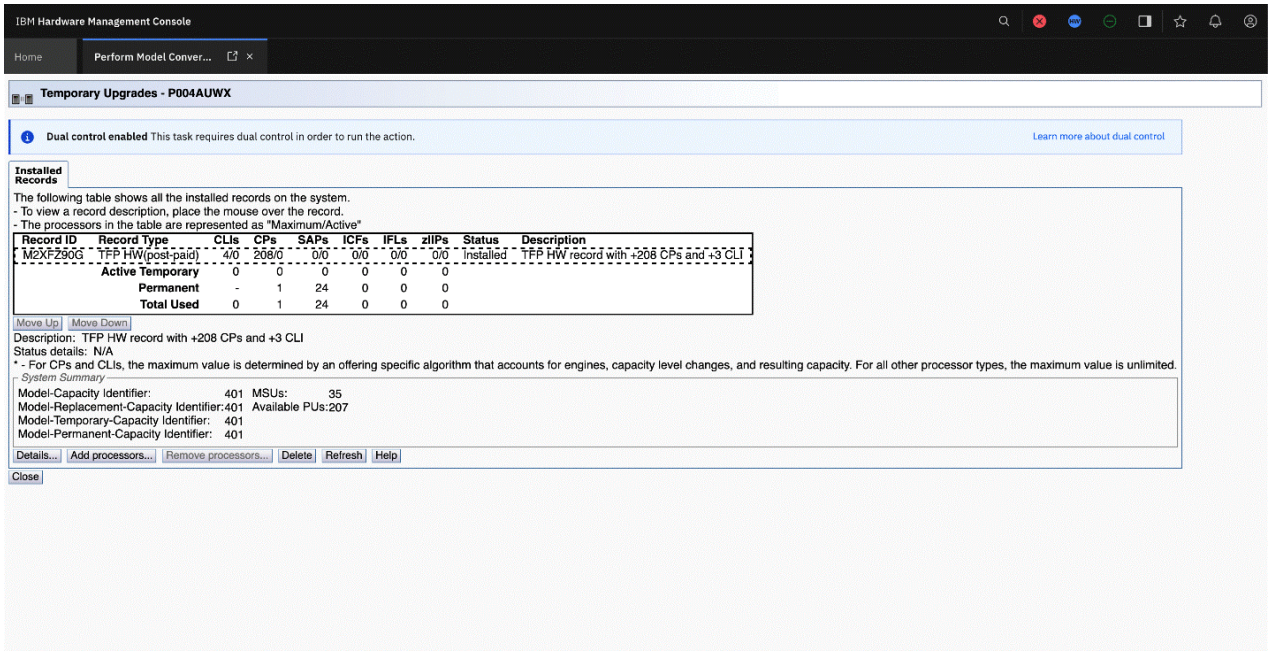


Figure 24. Temporary Upgrades: Manage

From here, click Add processors and select your desired capacity level. For the purposes of this example, we will add 14 general processors causing our Model-Capacity Identifier to go from a 401 to a 415.

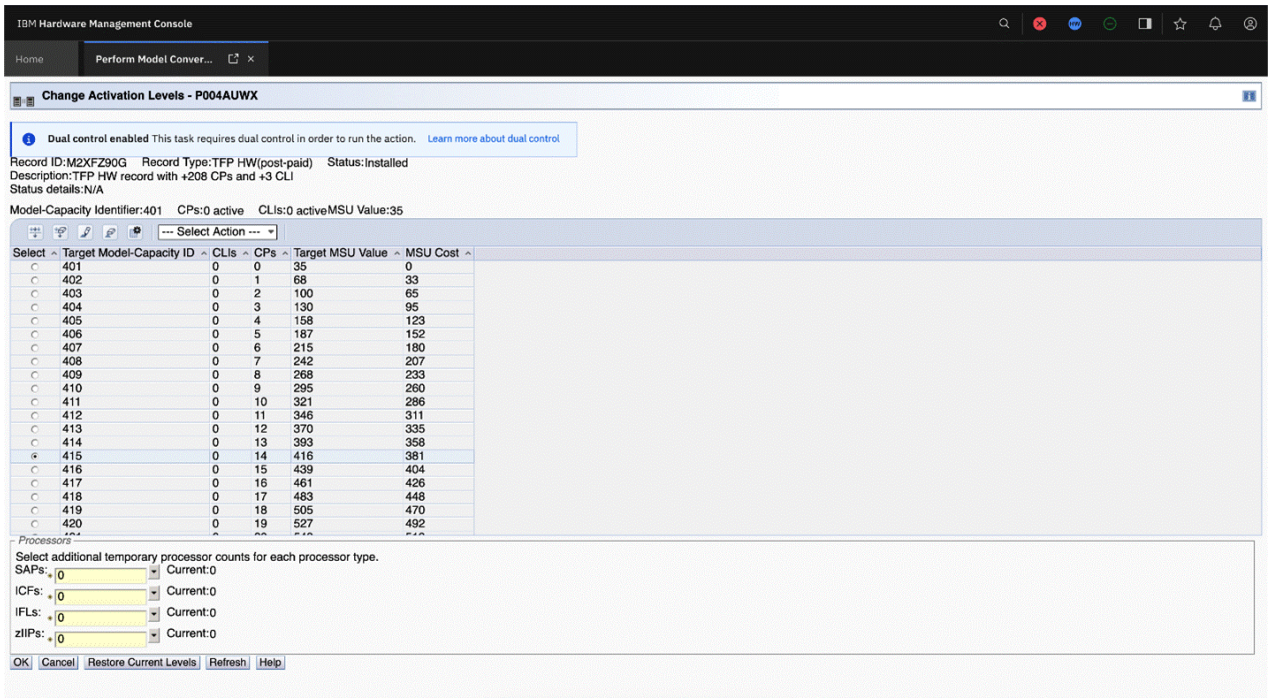


Figure 25. Temporary Upgrades: Change Activation Levels

Once the desired activation levels are selected, click OK. This will bring us to the confirmation panel.

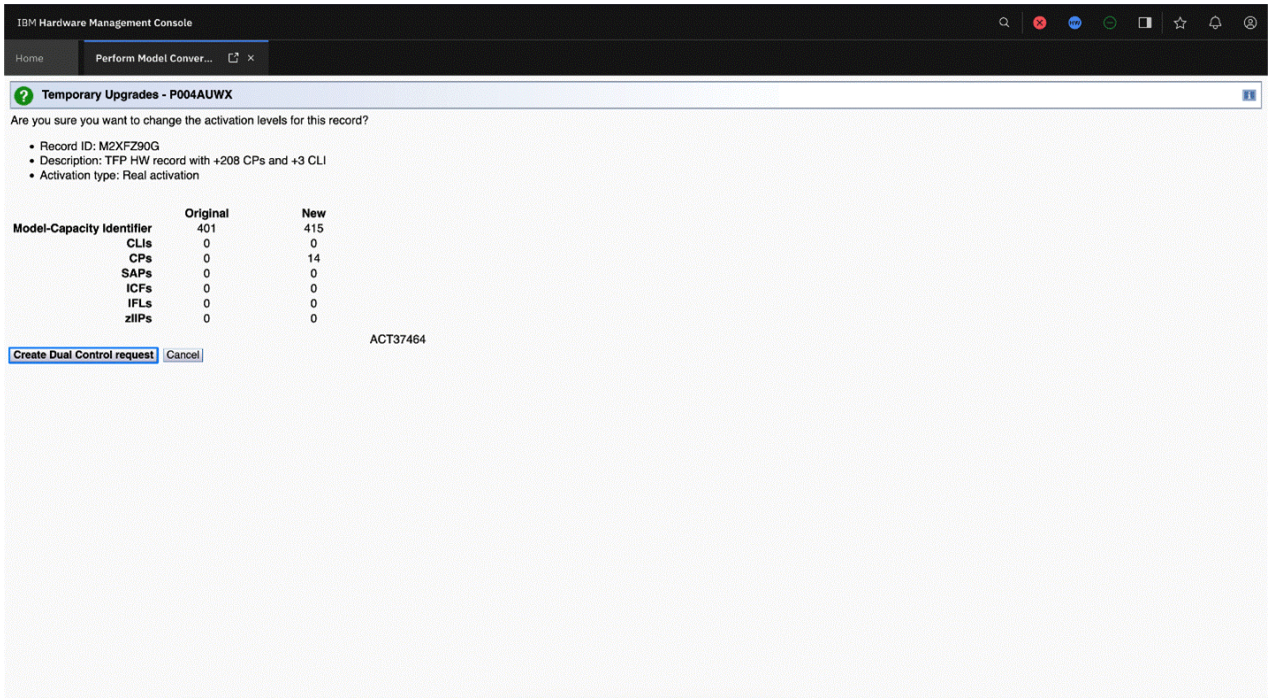


Figure 26. Temporary Upgrades: confirmation

Click the Create Dual Control request button to begin creating a Dual Control request. When the panel first opens, it will have several fields that are required to be filled out.

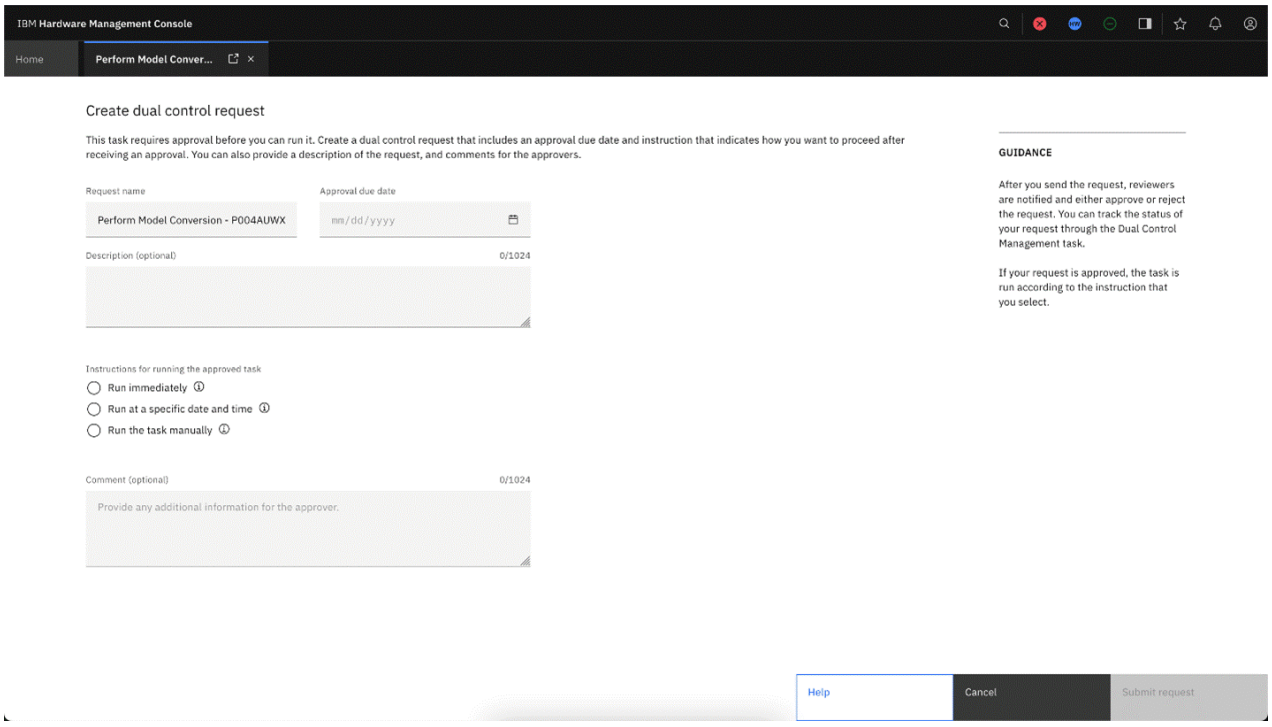


Figure 27. Temporary Upgrades: Create Dual Control Request

Notice the request name defaults to the task name and the target. This can be modified if you choose to give a more meaningful request name. The approval due date and instructions for running the approved

task are required fields in order to successfully create a request, the description and comment are optional. The following shows an example where all fields are filled in.

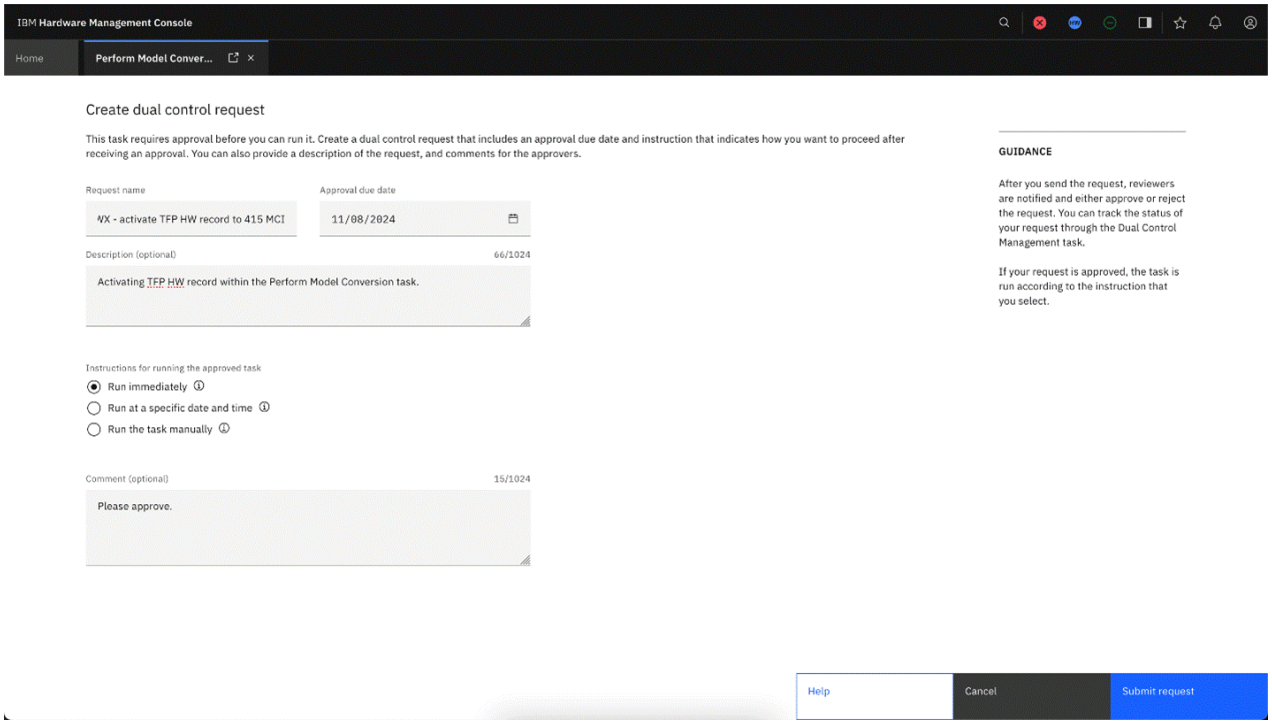


Figure 28. Temporary Upgrades: Create Dual Control Request - with fields completed

Notice the submit request button is now available. Click Submit request to create the dual control request. Once created, you may close the Perform Model Conversion task.

The path that was just shown is the path to create a dual control request, we will now go into the approval of a dual control request. Login as the user who has access to approve dual control requests for Perform Model Conversion, and open the Dual Control Management task. Below is a sample of what the task looks like after creating the previous request.

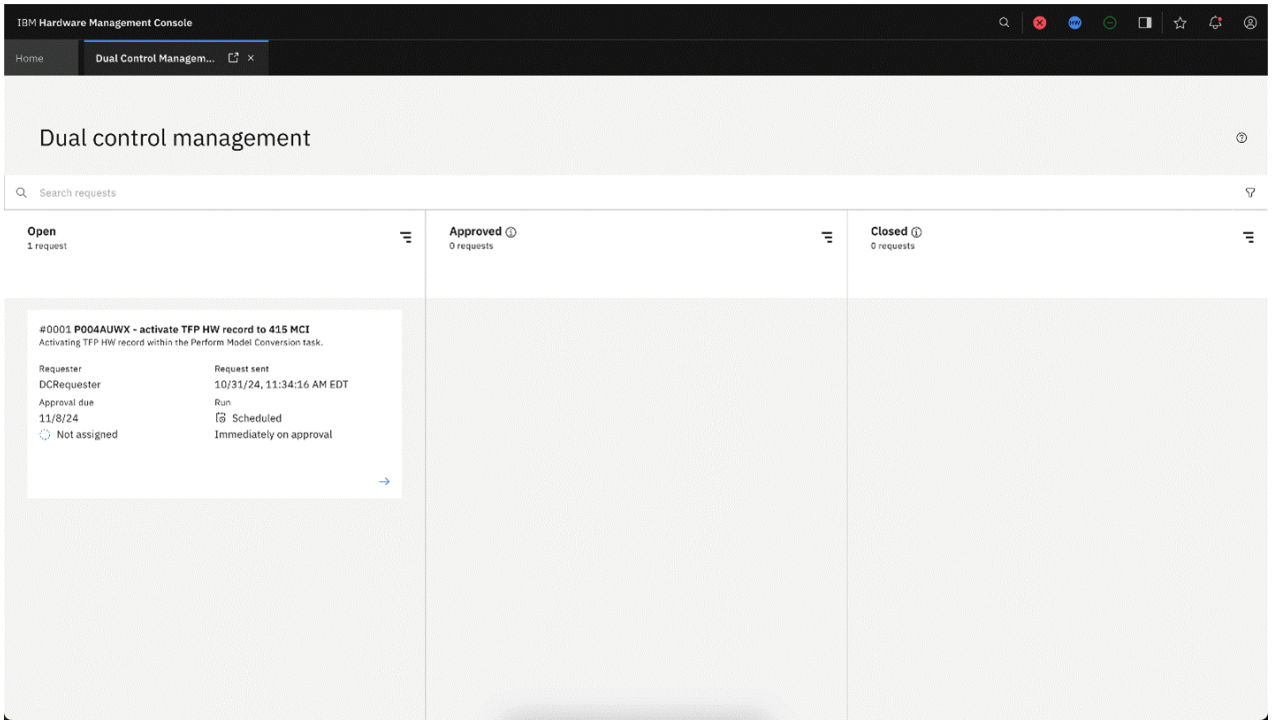


Figure 29. Temporary Upgrades: Dual Control management

The panel will show all requests in three different sections: open requests, which need to be approved or rejected; approved requests, which are either currently executing or will execute a future point; closed requests, which have either fully completed or were rejected. The request we created previously is currently open, to interact with the request, click on the launch details arrow on request card. This will open the details of the request which is shown below.

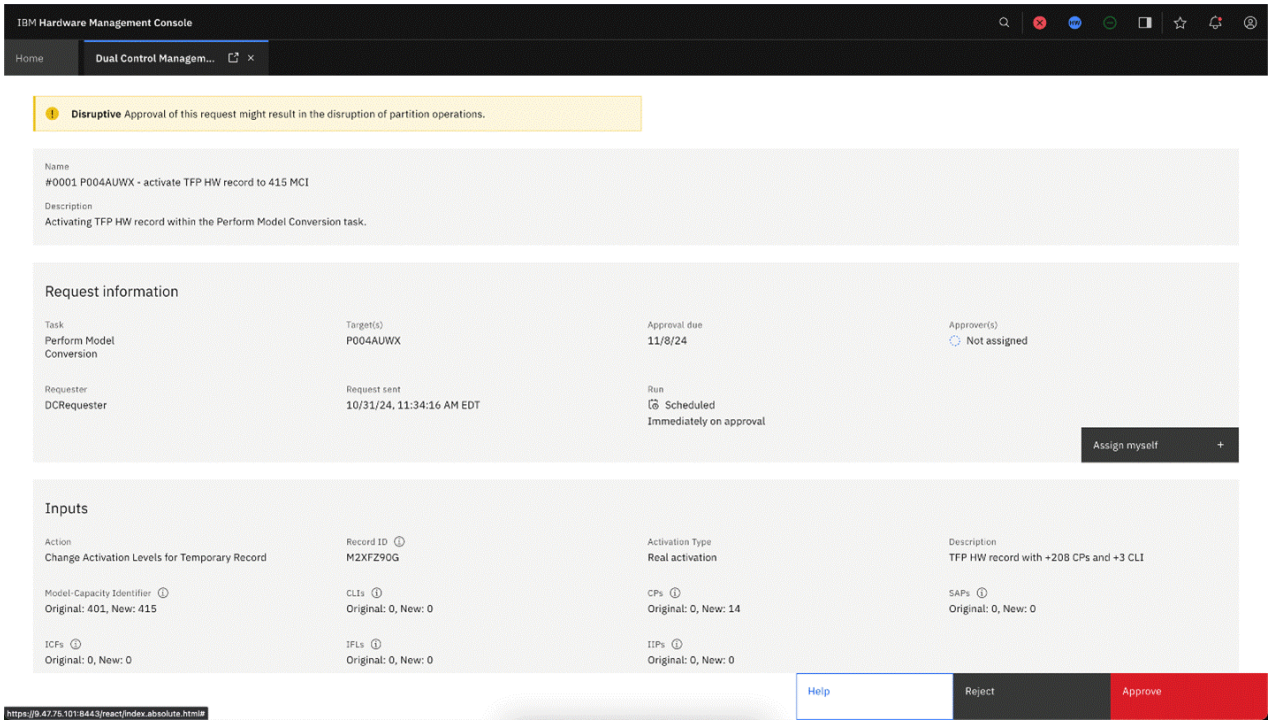


Figure 30. Temporary Upgrades: Dual Control request details

Within this window, all information relating to the request can be viewed, such as the task, target, and inputs. For this example, the inputs indicate which record is being activated, the type of activation, being a real activation, and the capacity level changes associated with this activation. Once the approve button is clicked, a confirmation panel will be shown confirming the approval of the request.

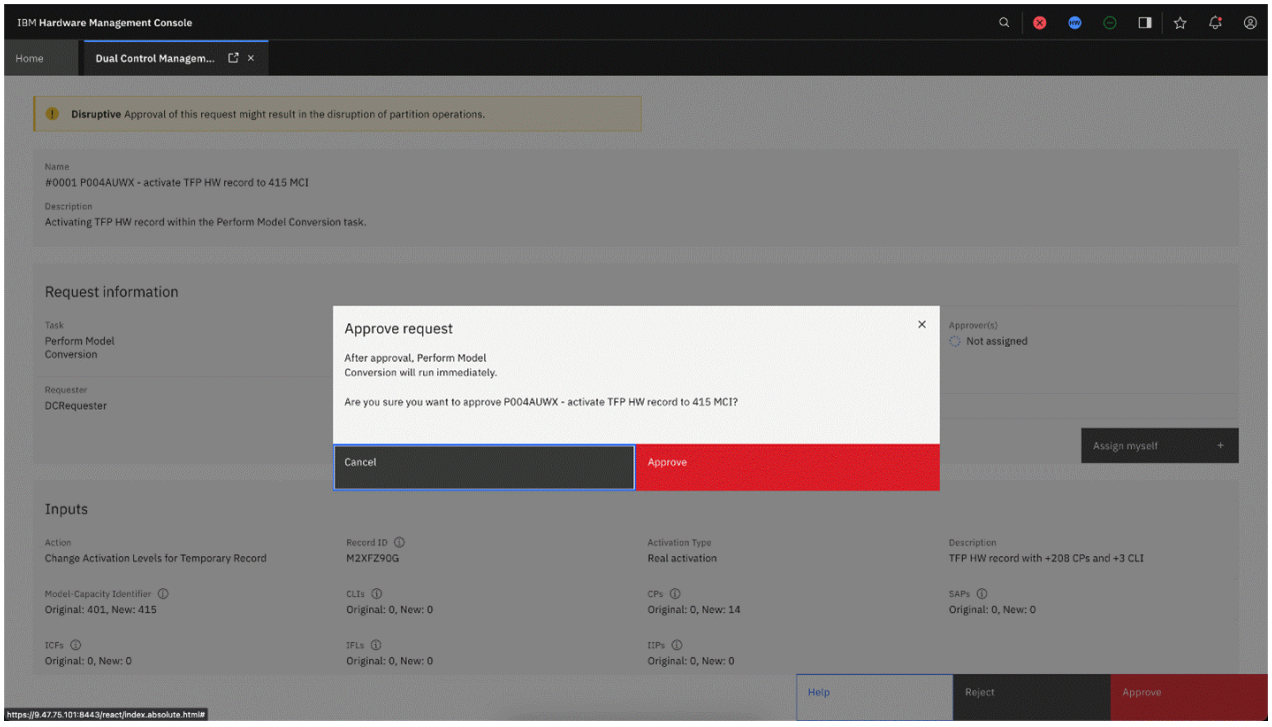


Figure 31. Temporary Upgrades: request approval confirmation

Notice the confirmation panel indicates the task will run immediately after it is approved. Once approved, the activation of the temporary capacity will begin as shown in the history section of the panel below.

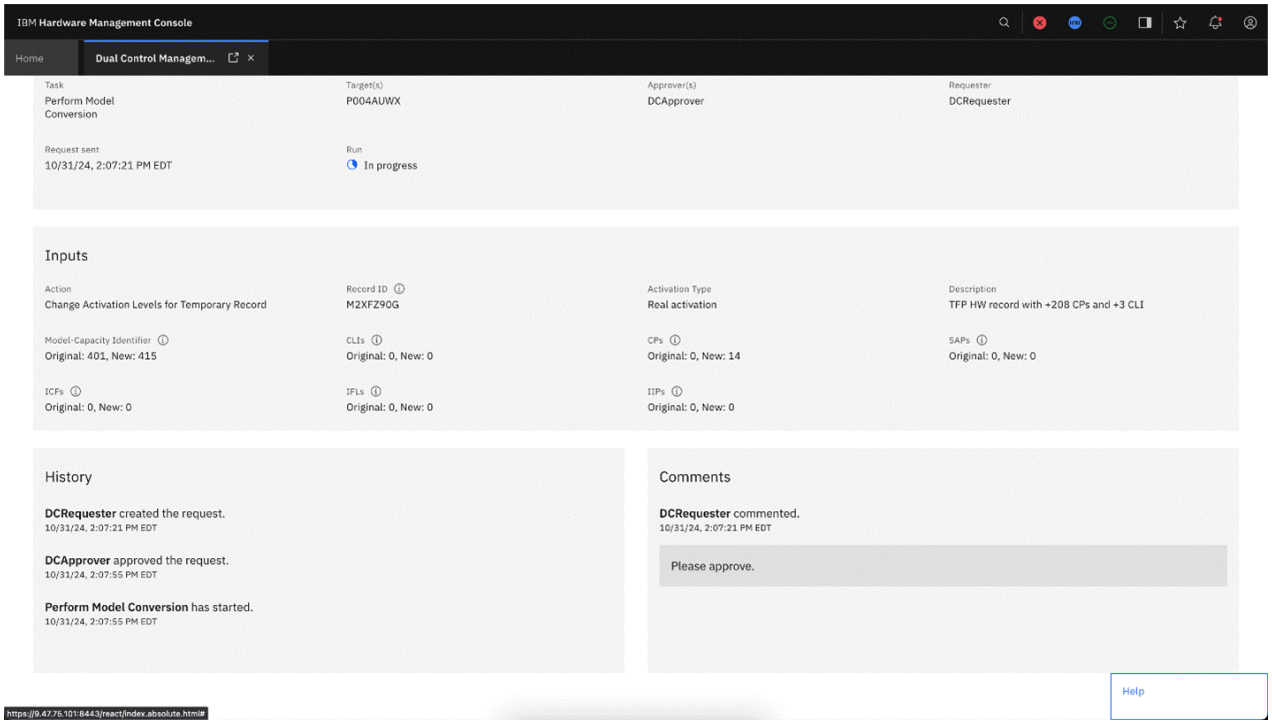


Figure 32. Temporary Upgrades: confirmation

The panel will automatically update based on the tasks current state. The above panel shows the task currently being in progress, the panel below shows the later successful completion of the task.

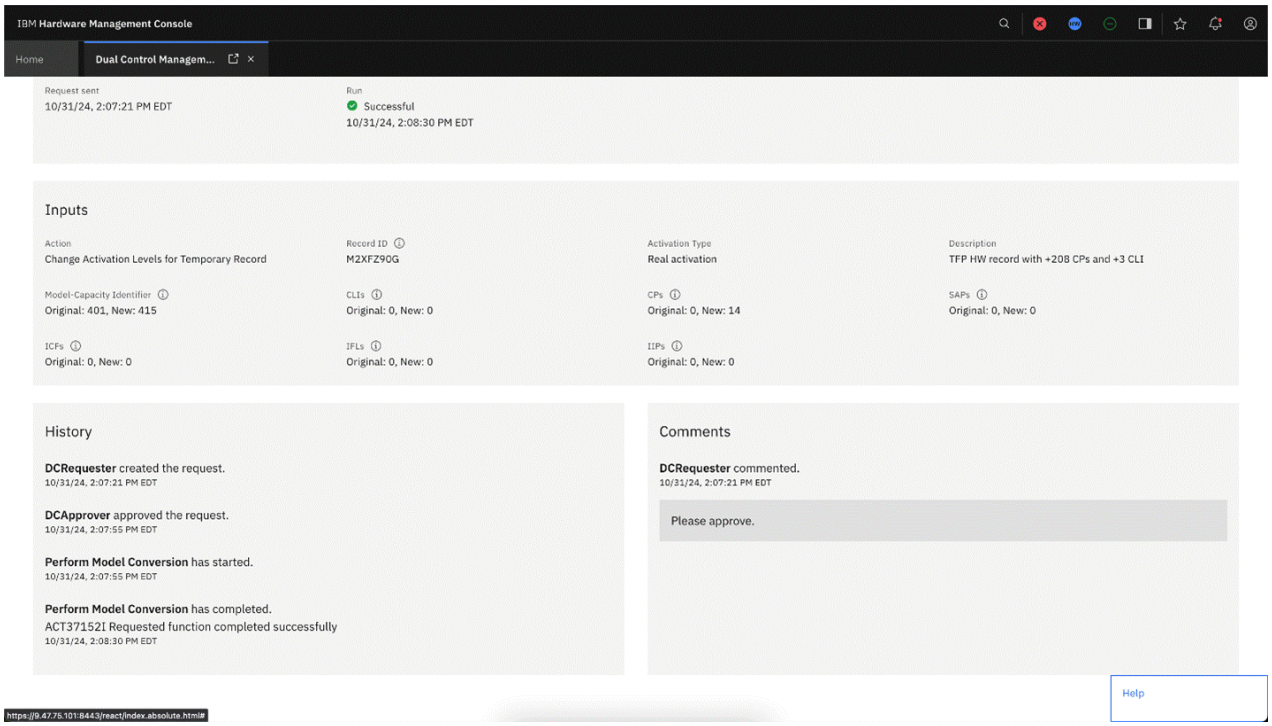


Figure 33. Temporary Upgrades: successful task completion

Once the request is completed, the targeted temporary record will have been successfully activated to the desired activation levels, in this case to a 415 Model-Capacity Identifier.

Operations supporting Dual Control

In the following sections, we will go over all possible Dual Control requests that can be created in the Perform Model Conversion task.

Permanent upgrades

In this section, we will go over the different Dual Control requests that can be created for permanent upgrades. For more information on permanent upgrades, please see “Permanent upgrades” on page 49.

Applying permanent upgrades

Applying permanent upgrades may be configured into a dual control request. This can be done either by applying a previously staged permanent upgrade or retrieving and applying a permanent upgrade from either the support system or media.

- To apply a previously staged permanent upgrade, within the Perform Model Conversion task, expand **Permanent Upgrades** and click **Apply processor/memory upgrade data (previously retrieved)**
- To retrieve and apply a permanent upgrade, within the Perform Model Conversion task, expand **Permanent Upgrades** and expand **Retrieve and Apply**. Select either **processor/memory upgrade data from support system** or **processor/memory upgrade data from media**. Please note, a valid media source is required if using the media option.

Once the desired operation is selected, the confirmation panel showing the permanent configuration changes will contain a **Create Dual Control request** button.

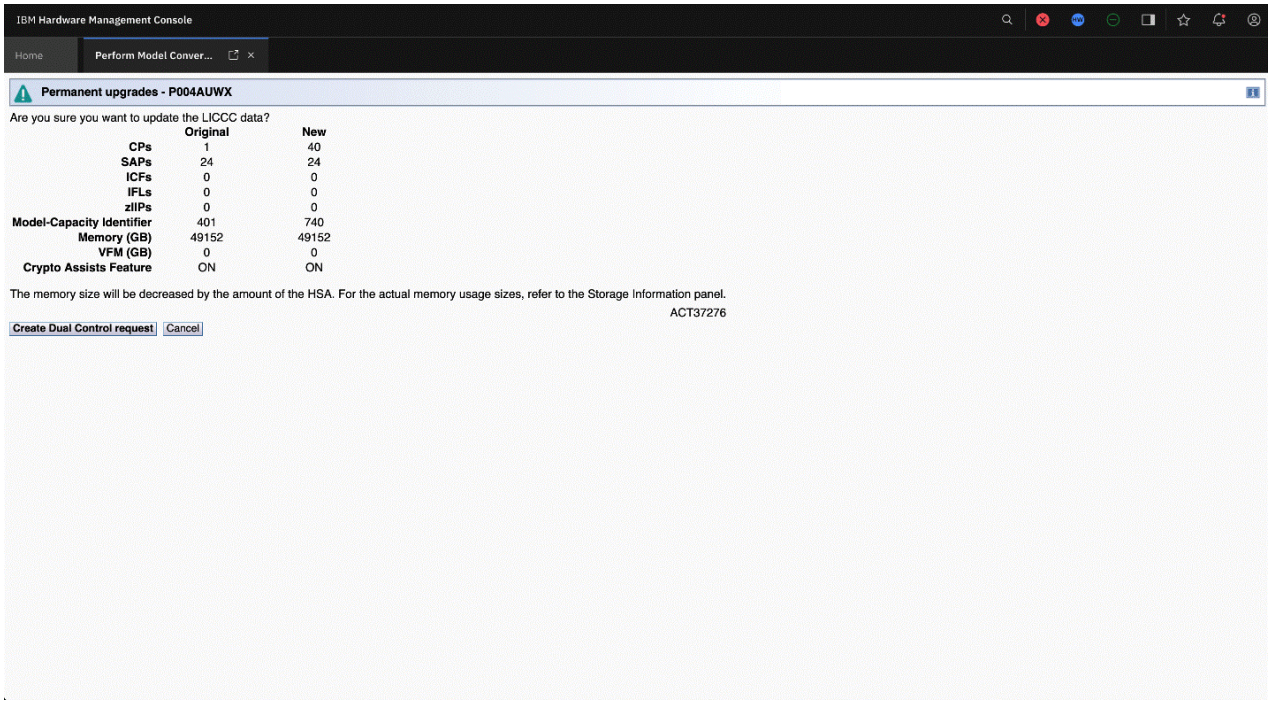


Figure 34. Permanent Upgrades: Create Dual Control request confirmation

If you choose to proceed with creating a Dual Control request for the installation of the permanent upgrade, you will be prompted to fill in the required information for the new Dual Control request.

The created Dual Control request can be viewed in the Dual Control Management task. The request will have inputs similar to the following example panel.

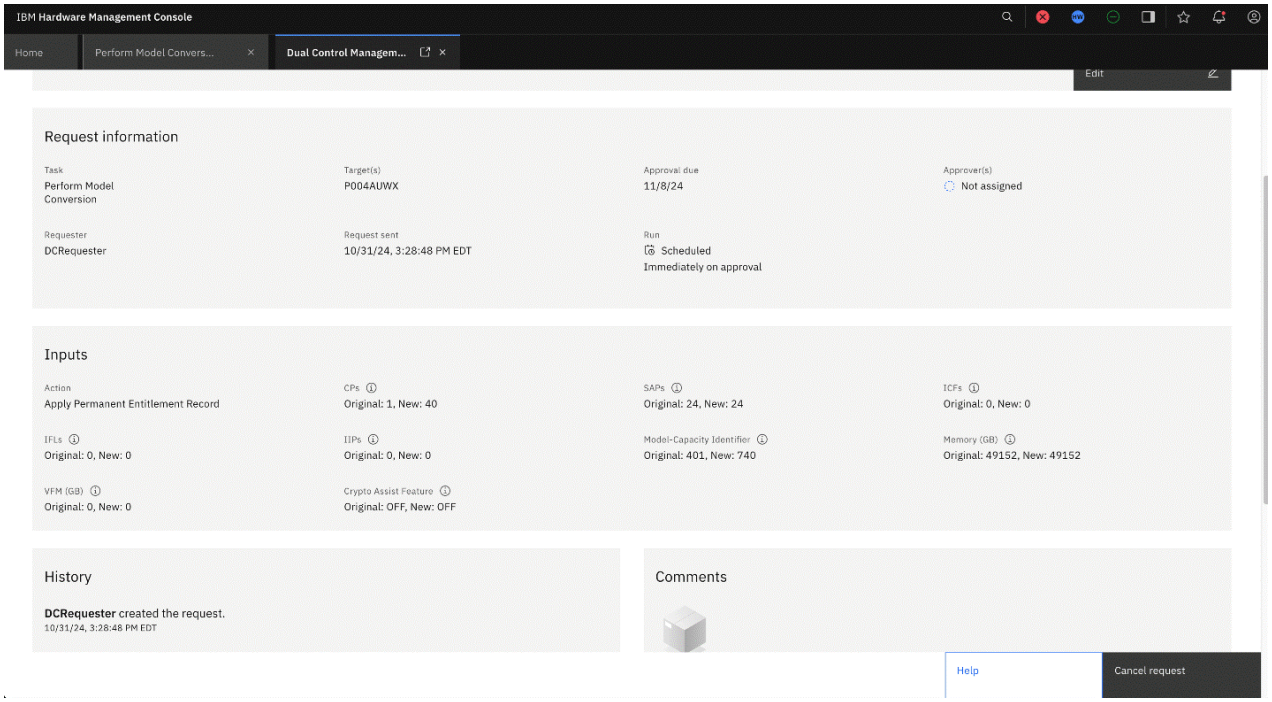


Figure 35. Permanent Upgrades: Create Dual Control request information

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P004AUWX, and the approval due date, which is 10/31/2024 in this example. The inputs indicate the specific details of the request, with the action being applying a permanent upgrade, and the different modifications of the permanent upgrade being shown. For this permanent upgrade, the CP count was increased from one to 39, while all other processor and memory levels remain unchanged. The Model-Capacity Identifier was altered from 401 to 740. The inputs information is the same information that can be found in the confirmation panel when applying a permanent upgrade to give the approver all the context required when determining whether to approve or reject the Dual Control request. Once approved, the permanent upgrade will be installed on the targeted system.

Retrieving Permanent Upgrades from the Support System

Retrieving permanent upgrades from the support system can be done through Dual Control requests. This requires a customer initiated upgrade order number to be entered in the Perform Model Conversion task. Within the Perform Model Conversion task, expand **Permanent upgrades** and select **Retrieve processor/ memory upgrade data but do not apply**. You will be prompted to enter a customer initiated upgrade order number.

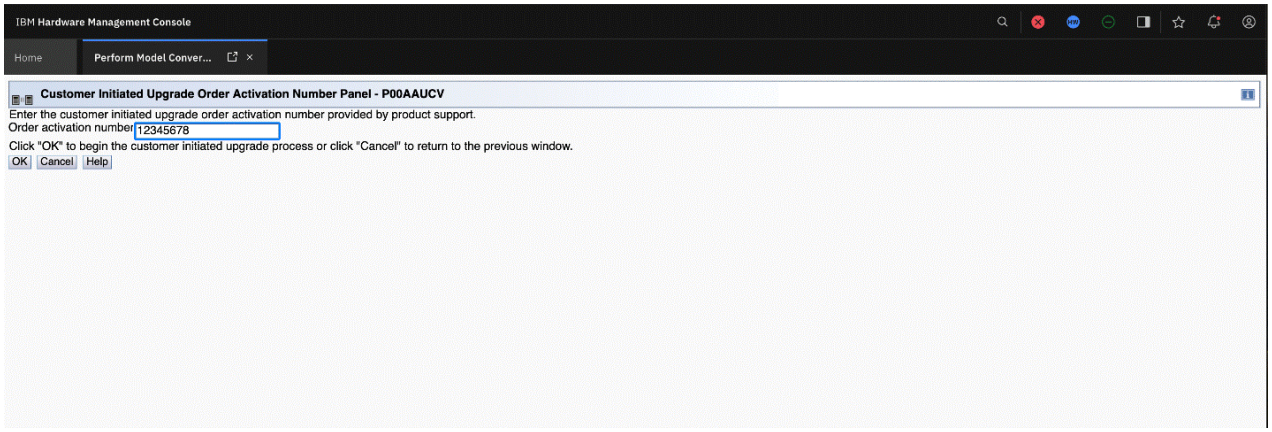


Figure 36. Permanent Upgrades: Retrieve processor/memory upgrade data but do not apply

Once the required information is entered in the Create Dual Control Request panel, the Dual Control request can be submitted and viewed in the Dual Control Management task.

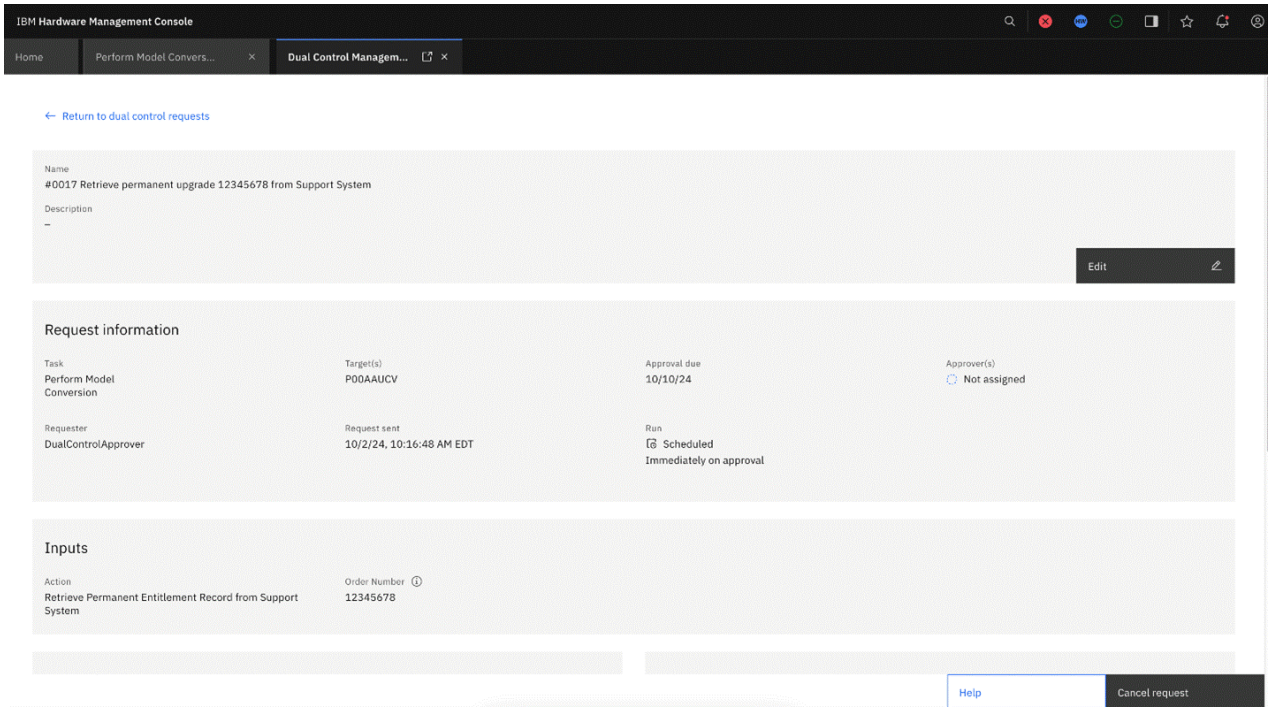


Figure 37. Permanent Upgrades: Dual Control Management

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/10/2024 in this example. The inputs indicate the request will attempt to retrieve a permanent upgrade from the support system with the order number 12345678. If approved, the permanent upgrade will be downloaded and staged on the targeted system.

Removing Staged Permanent Upgrades

Removing a staged permanent upgrade on the system is supported within the Dual Control framework. Within the Perform Model Conversion task, expand **Permanent upgrades** and select **Remove processor/memory upgrade data (previously retrieved)**. Once the required information is entered into the Create

Dual Control request panel, a Dual Control request will be available within the Dual Control Management task.

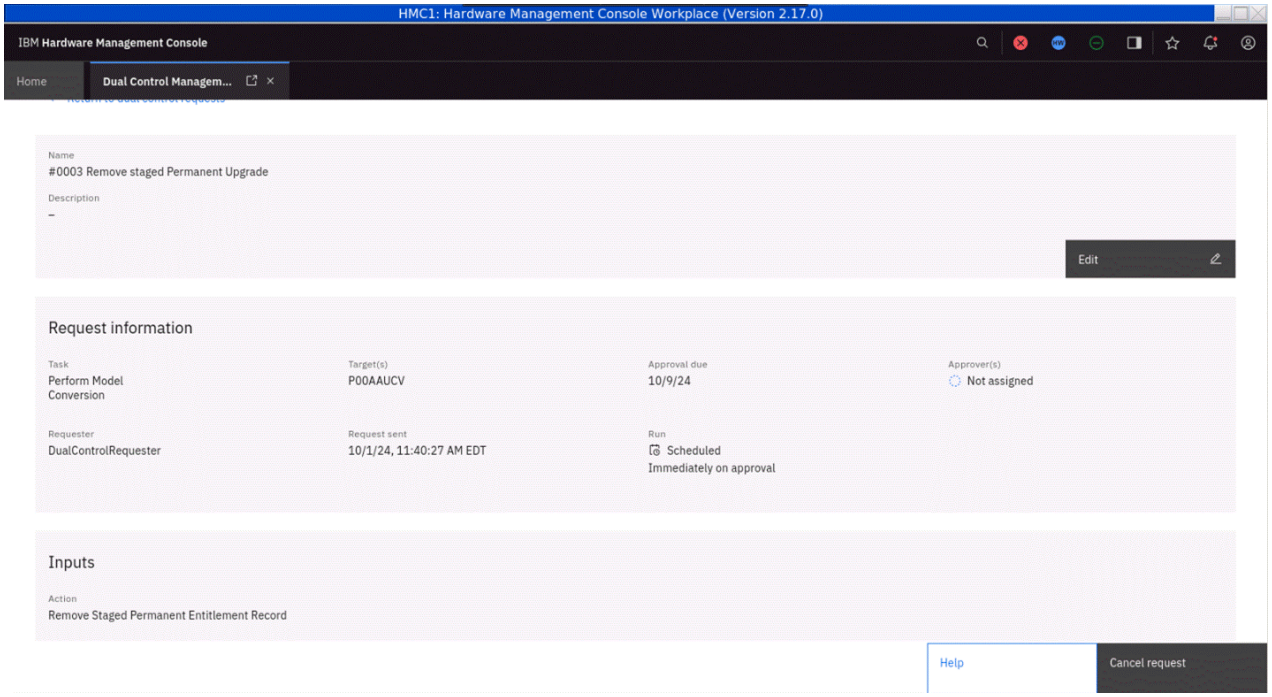


Figure 38. Permanent Upgrades: Remove processor/memory upgrade data (previously retrieved)

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/9/2024 in this example. The inputs indicate the Dual Control request will attempt to remove the staged permanent upgrade on the system. Once approved, the request will remove the staged permanent upgrade on the targeted system.

Temporary upgrades

In this section, we will go over the different Dual Control requests that can be created for temporary upgrades within the Perform Model Conversion task. For more information on temporary upgrades, please see “Temporary upgrades” on page 53.

Retrieving and Staging Temporary Upgrades

The retrieving and staging for temporary upgrades can be done through Dual Control requests through the Perform Model Conversion task. The retrieval can either be done through media or the support system.

- To retrieve a temporary upgrade from the support system, within the Perform Model Conversion task, expand **Temporary Upgrades**,expand **Retrieve**, and select **Processor upgrade data from support system**.
- To retrieve a temporary upgrade from media, within the Perform Model Conversion task, expand **Temporary Upgrades**,expand **Retrieve**, and select **Processor upgrade data from media**. Please note, a valid media source is required for the media option.

Once the desired retrieval source is selected, the Create Dual Control Request panel will be shown and the required fields must be set. Once submitted, a Dual Control request will be available within the Dual Control Management task.

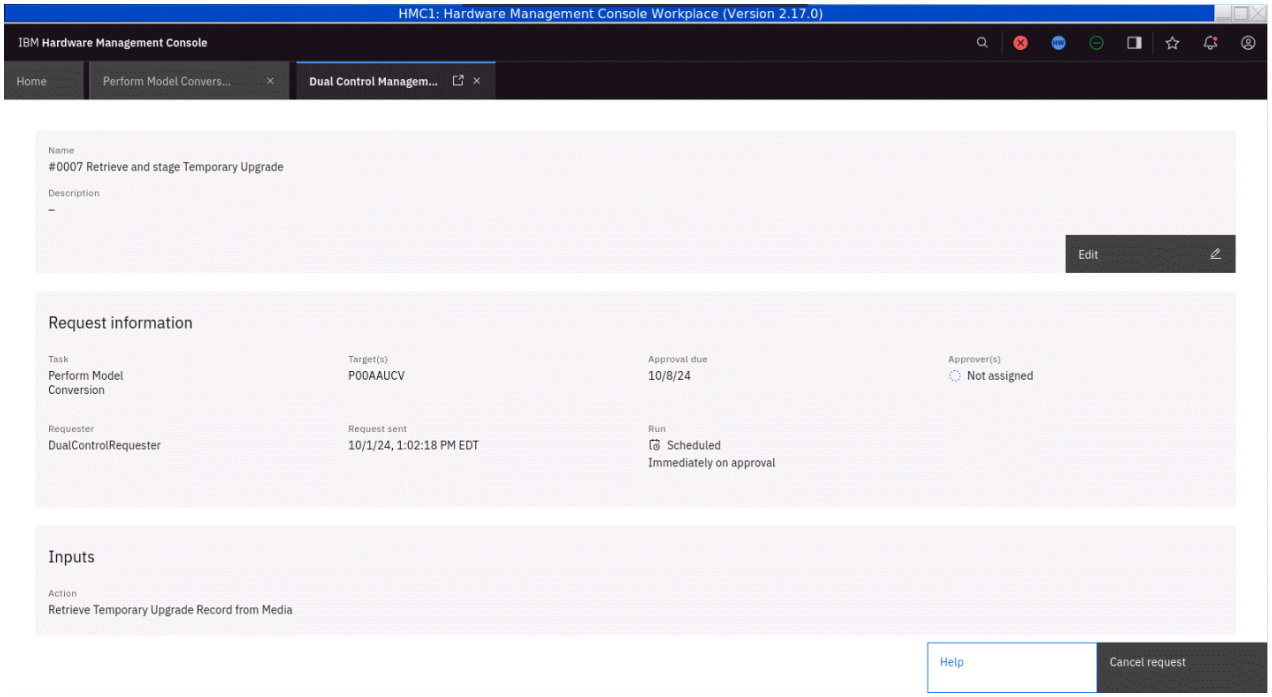


Figure 39. Temporary Upgrades: Retrieve -processor upgrade data from media

For retrieving a temporary upgrade from media, the request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/8/2024 in this example. The inputs indicate a retrieval of a temporary upgrade from media will occur if the request is approved. Please note, the media source is not required to be available when the request is executed.

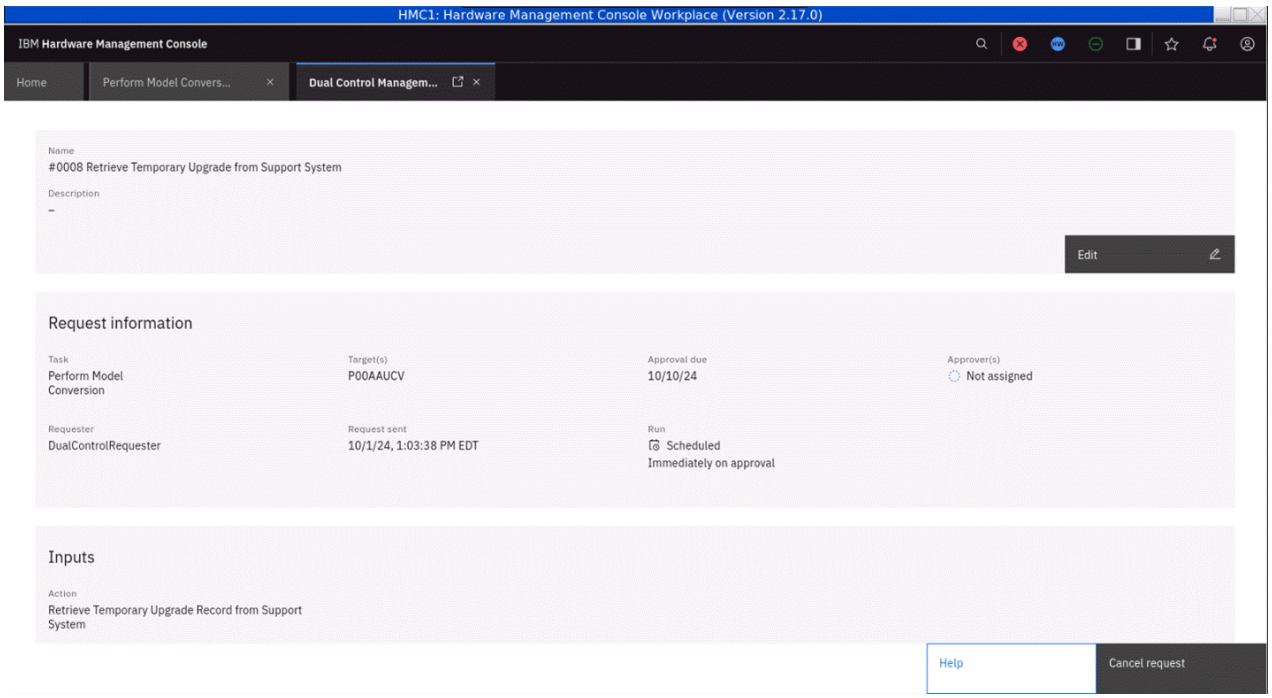


Figure 40. Temporary Upgrades: Retrieve -processor upgrade data from support

For retrieving a temporary upgrade from the support system, the request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/10/2024 in this example. The request indicates a retrieval of a temporary upgrade from the support system will occur if the request is approved. Please note, the system must have a valid connection to the support system at the time of the request execution in order to successful.

Installing Temporary Records

The installation of temporary records can be accomplished with a Dual Control request. Navigate to the Perform Model Conversion's **Temporary upgrade** section and click **Manage**. From here, you navigate to the **staged records** tab, select the record you wish to install, and click **install**. A confirmation panel will be shown to create a Dual Control request for the installation of the temporary record.

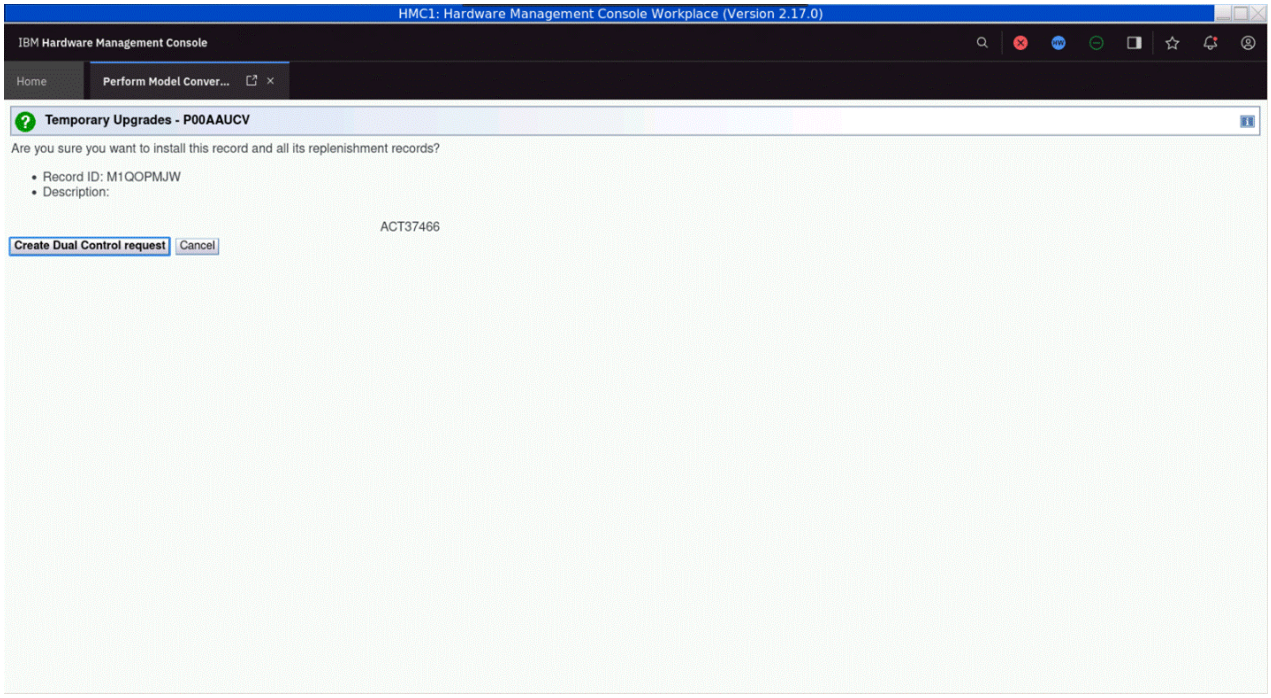


Figure 41. Temporary Upgrades: Retrieve - install and record confirmation

Once the required information is entered in the Create Dual Control Request panel, the Dual Control request can be submitted and viewed in the Dual Control Management task.

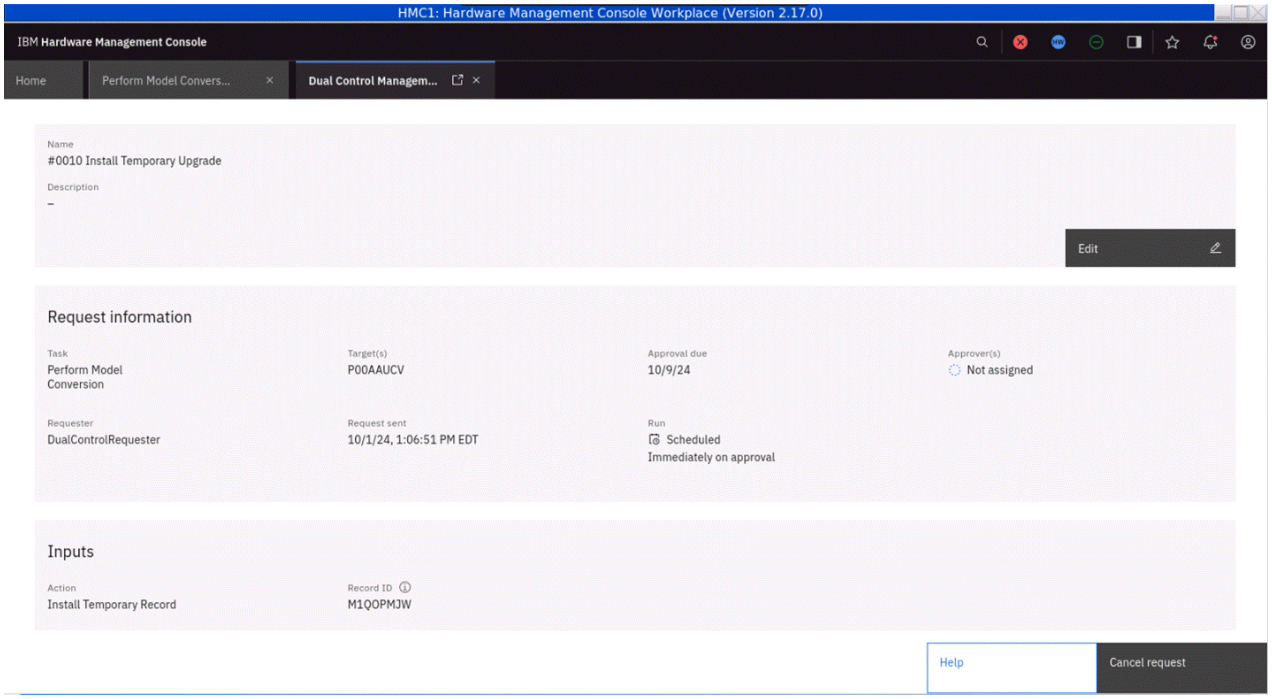


Figure 42. Temporary Upgrades: information

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/9/2024 in this example. The inputs indicate a temporary record with record identifier M1QOPMJW will be installed if the Dual Control request is executed. Once executed, the record will be installed on the targeted system.

Deleting or Removing Temporary Upgrades

The removal of a temporary record, whether staged or installed, can be done through a Dual Control request. Within the Perform Model Conversion task, expand **Temporary Upgrades** and click **Manage**. From here, you can select the desired record to be removed from the system under either the **installed records** tab or the **staged records** tab. Once the record is selected to be removed, you will be prompted with a confirmation panel to confirm if you would like to create a Dual Control request to remove this record from the system.

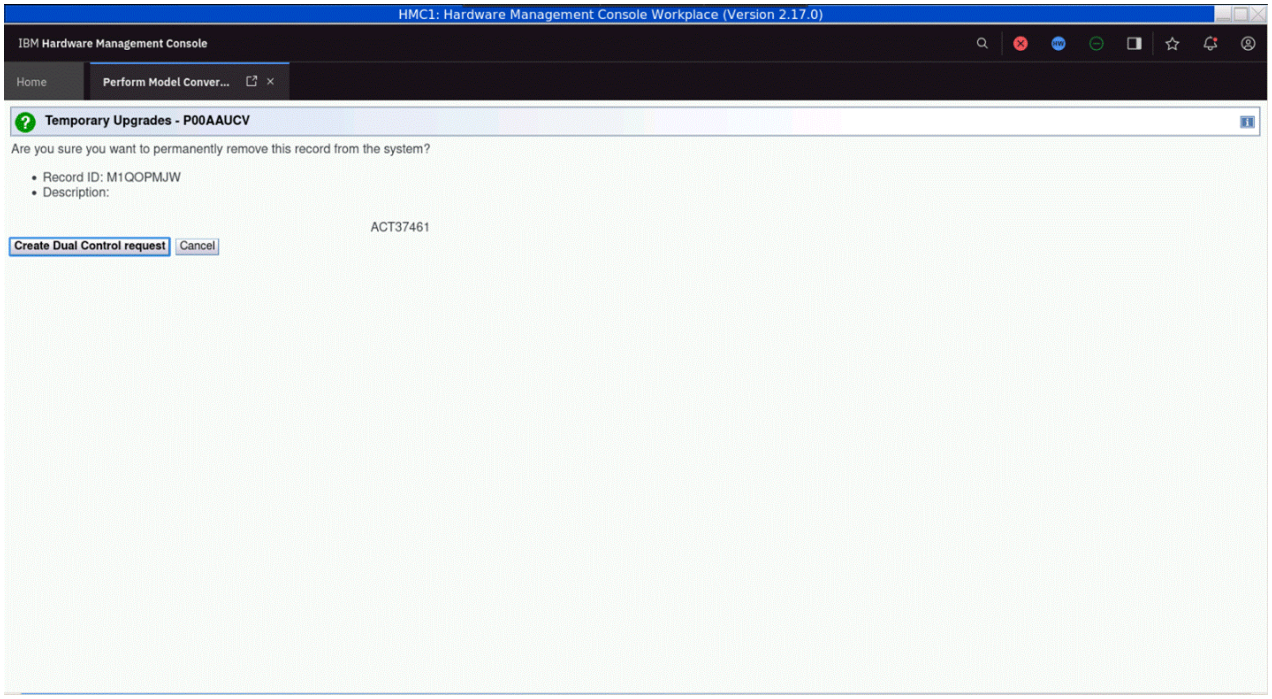


Figure 43. Temporary Upgrades: Retrieve - delete or remove confirmation

Once the required information is entered in the Create Dual Control Request panel, the Dual Control request can be submitted and viewed in the Dual Control Management task.

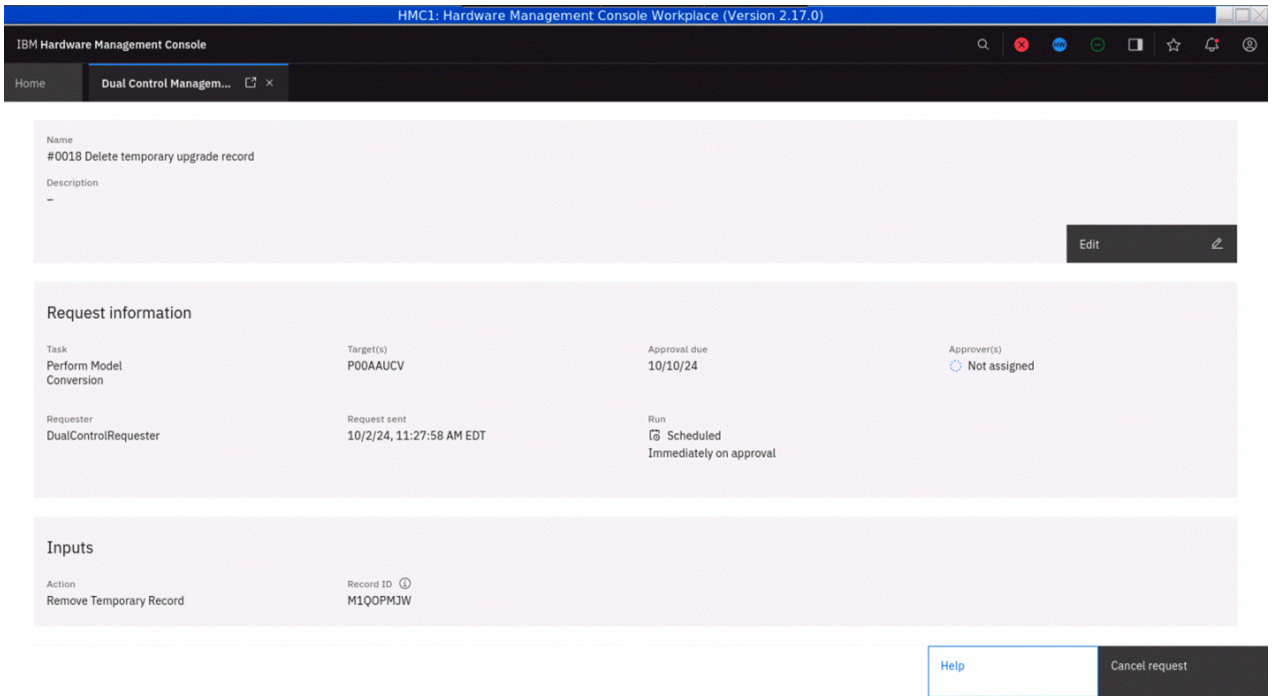


Figure 44. Temporary Upgrades: deletion or removal information

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/10/2024 in this example. The inputs indicate the temporary record with record identifier M1QOPMJW will be removed from the system

when this dual control request is executed. If approved, the targeted temporary record will be removed from the targeted system.

Activating or Deactivating Temporary Resources

The activation or deactivation of temporary resources can be done through a Dual Control request. From the Perform Model Conversion task, expand **Temporary Upgrades** and click **Manage.** Depending on your desired activation level, select **Add Processors** or **Remove Processors** and input your desired activation levels for the targeted record. Once complete, click **OK** and you will be prompted with a confirmation panel describing your changes and whether or not to proceed in creating a Dual Control request.

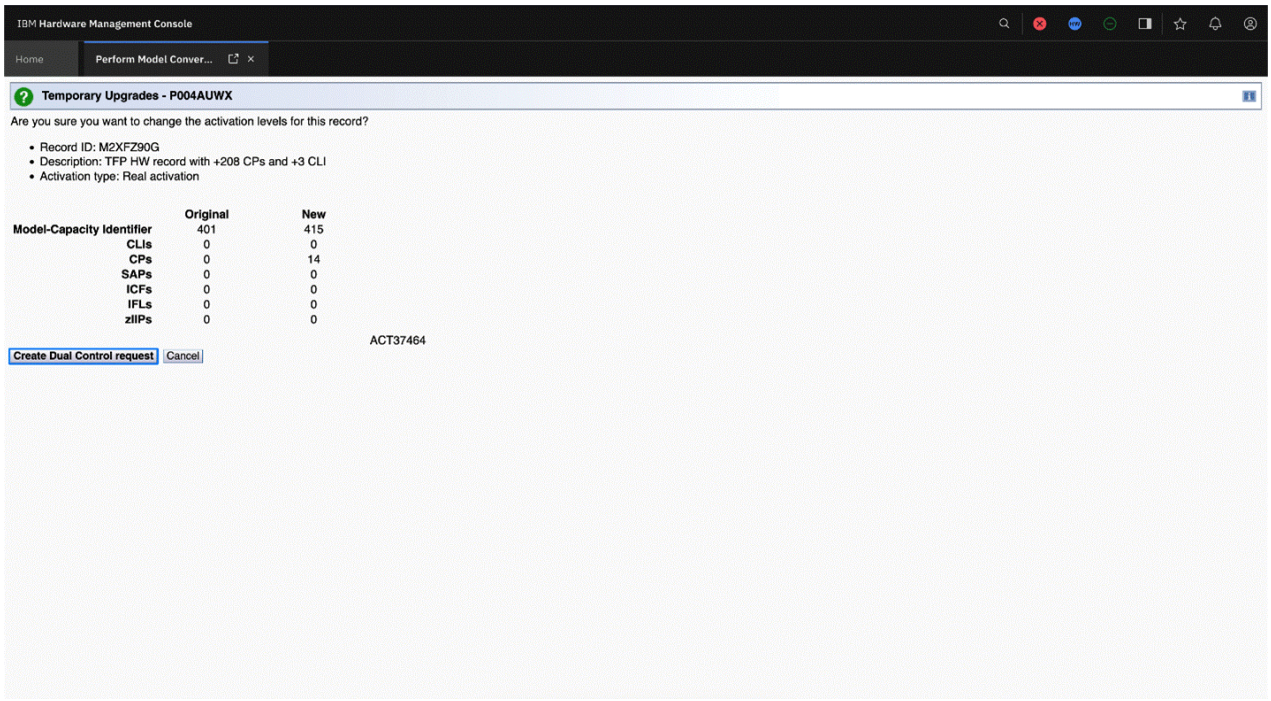


Figure 45. Temporary Upgrades: Retrieve - activate or deactivate confirmation

Once the required information is entered in the Create Dual Control Request panel, the Dual Control request can be submitted and viewed in the Dual Control Management task.

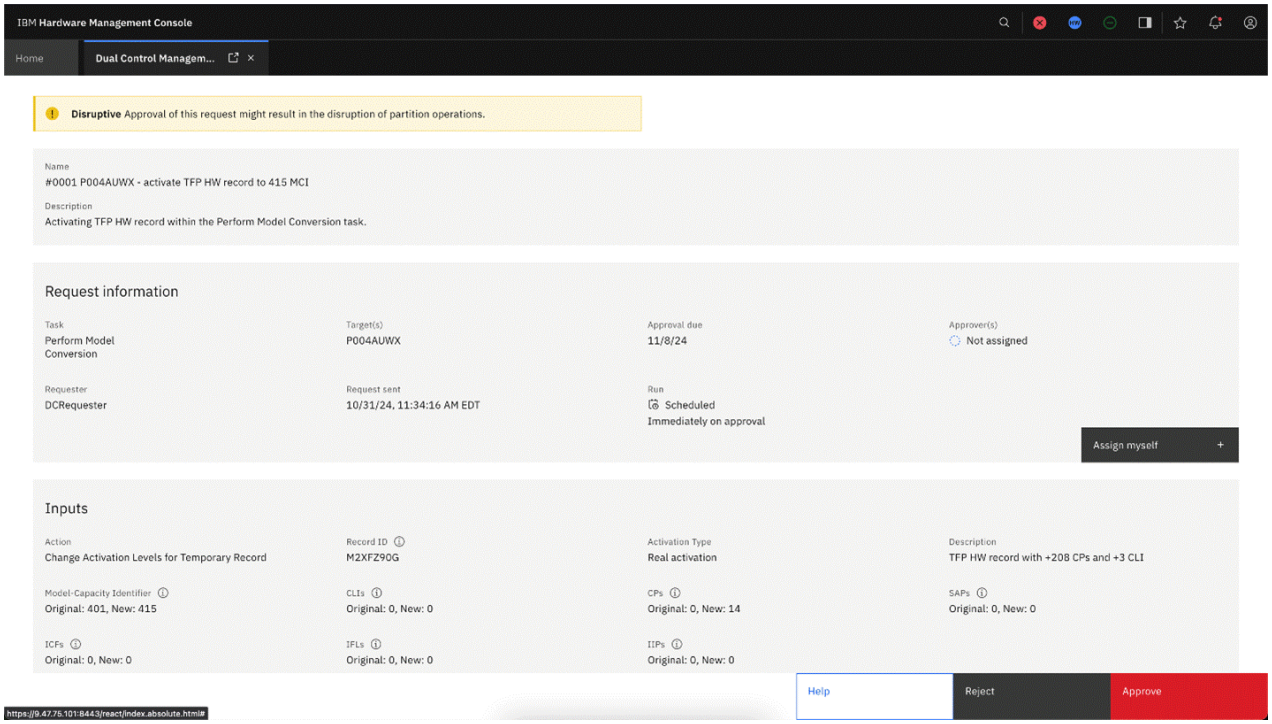


Figure 46. Temporary Upgrades: activation or deactivation information

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P004AUWX, and the approval due date, which is 10/31/2024 in this example. The inputs indicate there will be a change in activation levels for temporary record M2XFZ90G, which in this example has a record description being “TFP HW record with +208 CPs and +3 CLI”. The activation type will be a “Real Activation” where the CP count will be increased from zero to 15, and the Model-Capacity Identifier will be altered from 401 to 415. All other fields in this example will remain unchanged as indicated by the same “Original” and “New” value. If the Dual Control request is executed, the change to the temporary activation levels of record M1QOPMJW will be executed.

Feature on Demand

This section will go over different Dual Control requests that can be created for operations involving Features on Demand. For more information on Features on Demand, please view the Perform Model Conversion help page.

Retrieving Feature on Demand

The retrieval of Features on Demand can be done through a Dual Control request. Within the Perform Model Conversion panel, expand **Features on Demand** and click **Retrieve FoD data but do not apply**. You will be asked to select a desired media device and then will be prompted to fill in the required Dual Control request information. Once submitted, the newly created Dual Control request can be viewed in the Dual Control Management task.

Figure 47. Feature on Demand: Retrieve features

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/9/2024 in this example. The inputs indicate that when the request is executed, Features on Demand (FoD) will be retrieved and staged on the system. Please note, the media source does not need to be present when the Dual Control request is executed, only when the Dual Control request is being created does the media source need to be present and valid.

Retrieving and Applying Features on Demand

The application or installation of Features on Demand can be done through Dual Control requests.

- In order to retrieve and apply the Features on Demand, within the Perform Model Conversion task, expand **Feature on Demand** and click **Retrieve and Apply FoD data from media**. You will be prompted to select a desired media source.

You will be prompted with a confirmation panel to confirm the application of the desired features and to proceed to create a Dual Control request.

Figure 48. Feature on Demand: Apply features confirmation

Once the required information is entered in the Create Dual Control Request panel, the Dual Control request can be submitted and viewed in the Dual Control Management task.

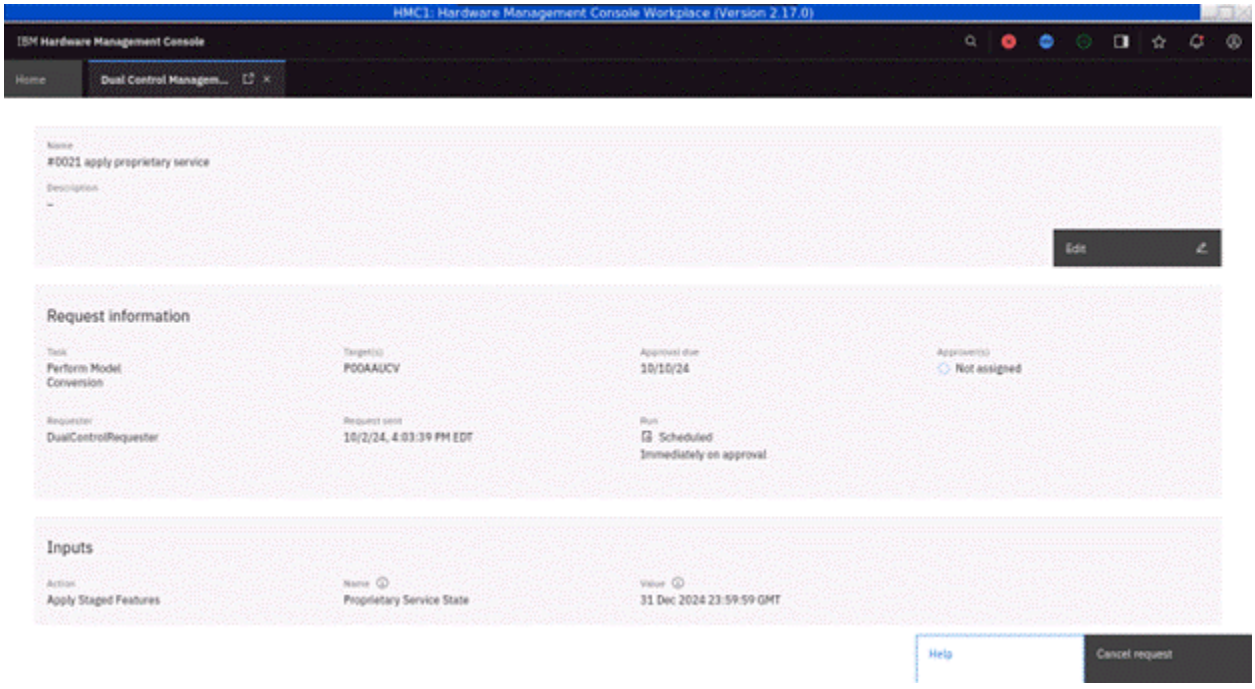


Figure 49. Feature on Demand: Apply features information

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/10/2024 in this example. The inputs indicate the Proprietary Service State Feature with an expiration date of December 31, 2024

23:59:59 GMT will be applied to the targeted system. Once the request is approved and executed, the feature will be applied to the system.

Removing an installed Feature on Demand Feature

The removal of an installed feature can be done through a Dual Control request. Within Perform Model Conversion, expand **Feature on Demand** and click **Manage**. From here, select the desired Feature to be removed and under the **Select Action** option menu, click **Remove Feature**. You will be prompted with a confirmation panel to decide whether to proceed in creating a Dual Control request to remove the targeted Feature.

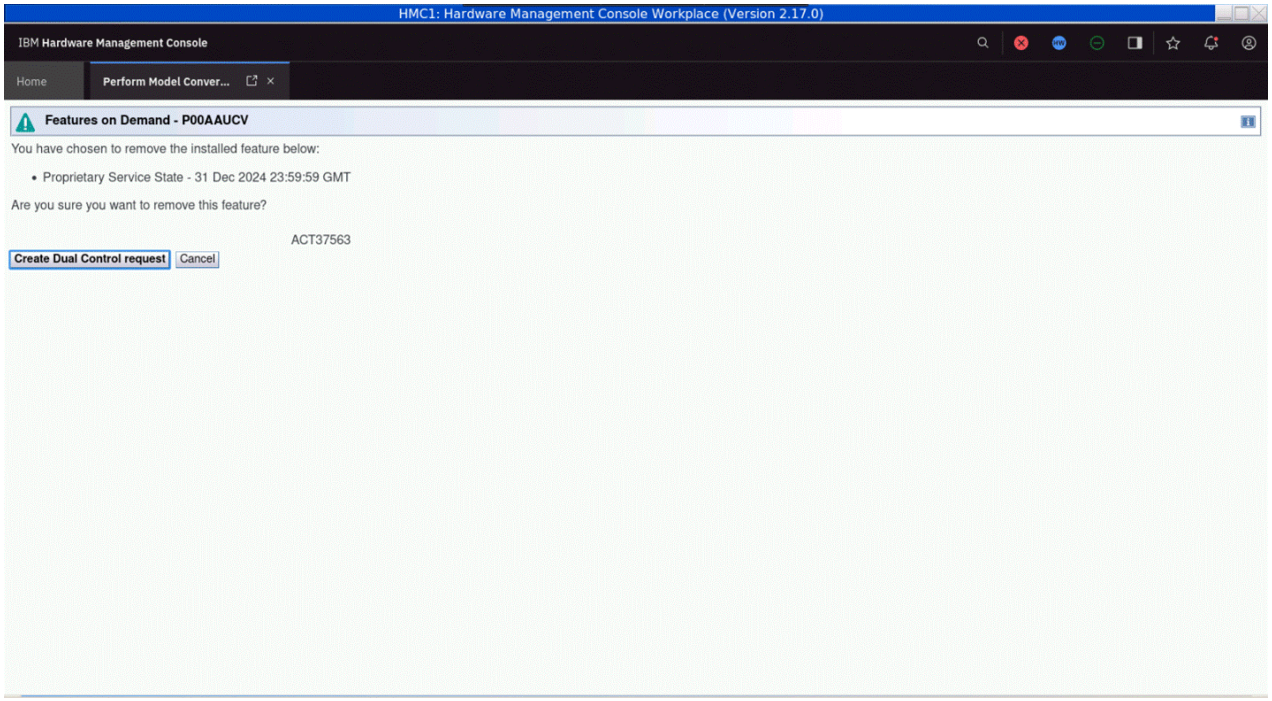


Figure 50. Feature on Demand: Remove features confirmation

Once the required information is entered in the Create Dual Control Request panel, the Dual Control request can be submitted and viewed in the Dual Control Management task.

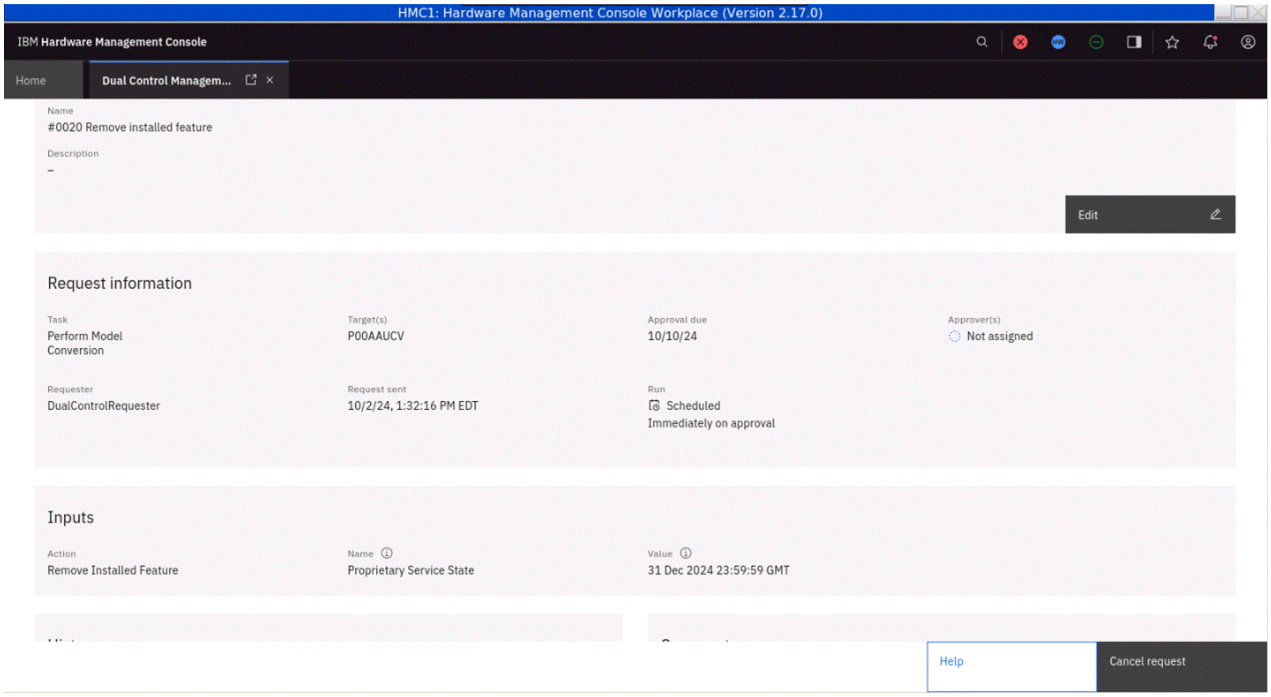


Figure 51. Feature on Demand: Remove features information

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P00AAUCV, and the approval due date, which is 10/10/2024 in this example. The inputs indicate the currently installed Proprietary Service State Feature, which expires on December 31, 2024 at 23:59:59 GMT, will be removed when this Dual Control request is approved and executed. Once executed, the Feature will be removed from the system.

Removing a Staged Features on Demand Record

The removal of a staged Features on Demand record can be done through a Dual Control request. Within the Perform Model Conversion task, expand **Feature on Demand** and click **Manage**. From here, click the **Staged** tab and click **Remove Record**. You will be prompted with a confirmation panel to decide whether to create a Dual Control request for the removal of the staged Features on Demand record.

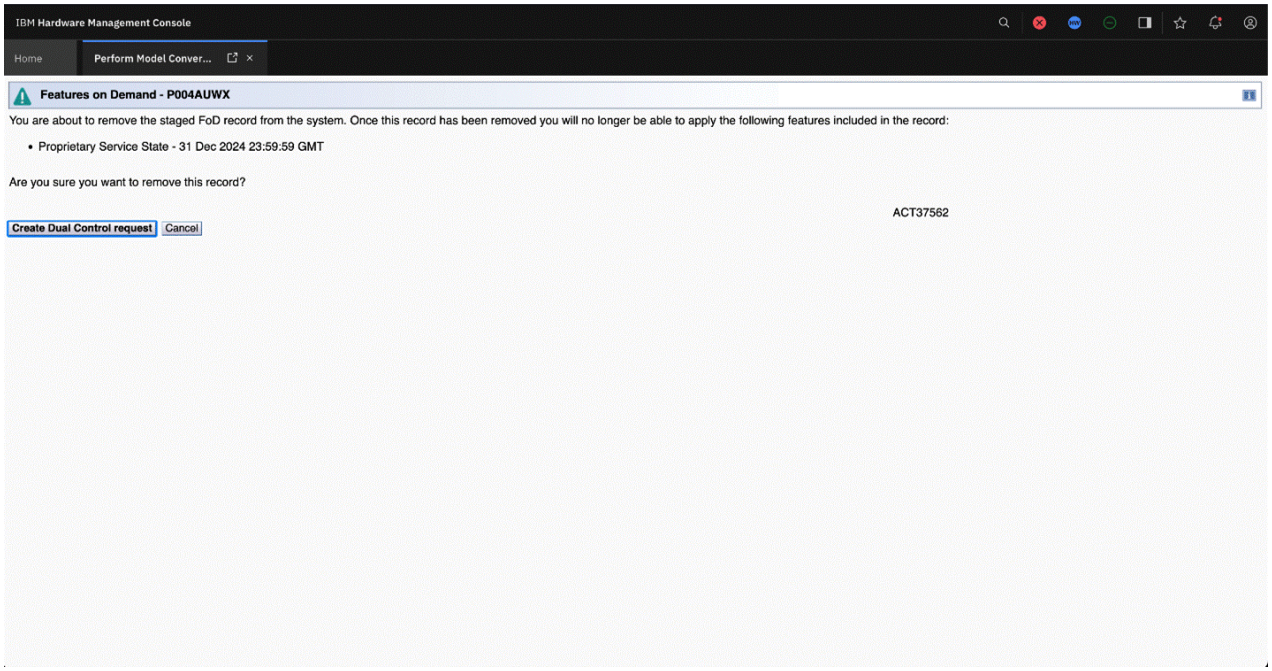


Figure 52. Feature on Demand: Remove staged record confirmation

Once the required information is entered in the Create Dual Control Request panel, the Dual Control request can be submitted and viewed in the Dual Control Management task.

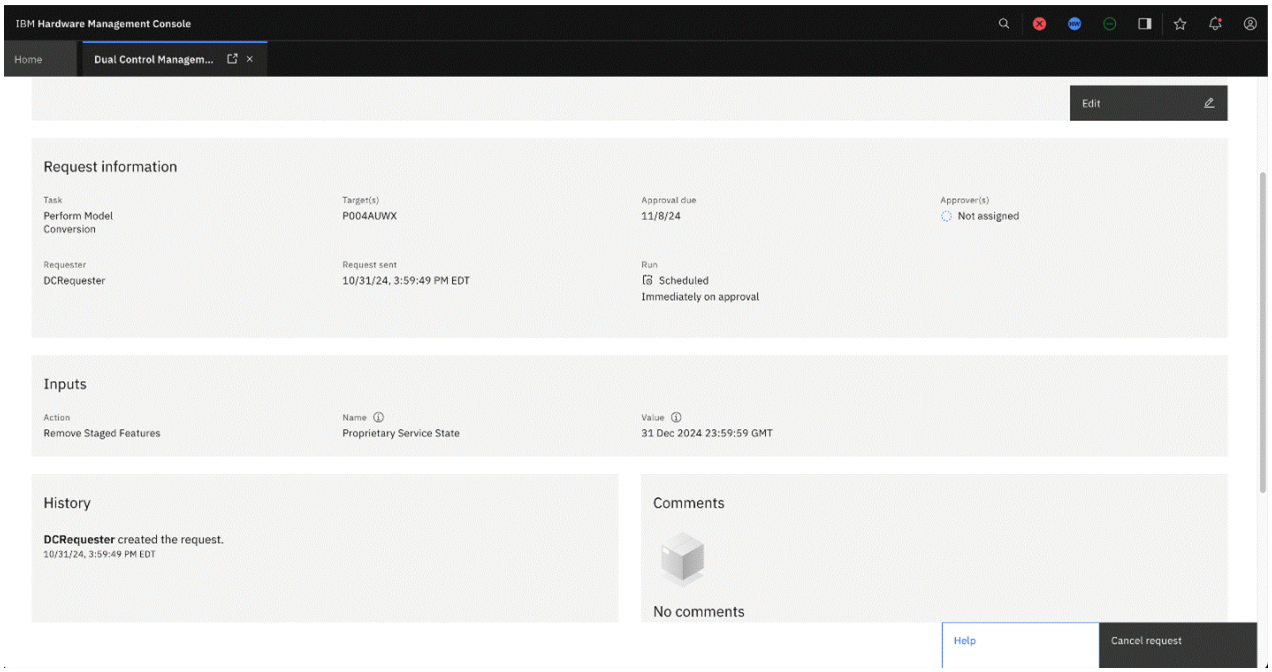


Figure 53. Feature on Demand: Remove staged record information

The request information will contain the task associated with the request, Perform Model Conversion, the target CPC, in this case P004AUWX and the approval due date, which is 11/8/2024 in this example. The inputs indicate the staged Proprietary Service State Feature with an expiration date of 12/31/2024 will be removed once the Dual Control request is approved and executed. Once executed, the targeted Feature will be permanently removed from the system.

Web Services API and Dual Control

The Hardware Management Console web services API supports Dual Control for specific operations. For Capacity on Demand, the operations **Add Temporary Capacity** and **Remove Temporary Capacity** can support the creation of Dual Control request with the appropriate information specified and the correct user configuration. For more information, please refer to the Hardware Management Console Web Services API documentation.

Dual Control Limitations

As Dual Control is new for the z17, the following limitations are in place and users should be aware of these limitations before configuring Dual Control for Capacity on Demand.

- Dual Control for Capacity on Demand is only supported for z17 systems, previous generations do not support Dual Control at this time.
- Dual Control requests are limited to one active request per target per console. For example, on an HMC, if a Dual Control request is open for Capacity on Demand (e.g., activate temporary capacity) targeting CPC X, users will be prohibited from creating another dual control request for Capacity on Demand targeting CPC X until the original request is either approved, rejected, or has expired. This is done to avoid conflicting requests which could result in undesired capacity changes.
- Dual Control requests may be unsuccessful if the underlying configuration has changed. Consequently, it is highly recommended requests be reviewed and approved or rejected as soon as possible.
- If Dual Control is configured for the Perform Model Conversion task and a specific CPC for a Web Services API user, the user will not be able to activate or deactivate temporary without creating a Dual Control request when targeting that specific CPC. The request must then be approved by an authorized approver. This will cause a delay from when the API request was initiated and when the capacity levels are actually altered. It is imperative users understand this concept before implementing Dual Control for the Perform Model Conversion task for Web Services API users.

Appendix A. Status and Messages

This chapter provides useful information for troubleshooting problems you may encounter when you order and activate a permanent upgrade or a temporary upgrade record.

“ Order status definitions” on page 107 provides explanations of the order status of the upgrade from ordering to activating to completing. This status is shown on the **Machine profile** page in Resource Link.

The “Messages ” on page 107 provides product messages with descriptions, in alphanumeric sequence, that are displayed on the Support Element.

Order status definitions

Canceled
The cancellation request is complete and the order was canceled.

Cancel requested
You requested to cancel the order. Notification is sent to you verifying the cancellation.

Complete
The order has been retrieved, installed and billing is complete.

Downloaded
The upgrade has been downloaded (retrieved) to the machine. For a permanent upgrade, billing is also notified.

Download ready
The order is ready for you to download (retrieve) and install using the Hardware Management console.

Installed
The order was detected as installed on the machine.

Needs Business Partner approval
An upgrade order placed for this machine requires approval from an authorized Business Partner administrator. Notification is sent to the Business Partner administrator when approval is required.

Needs customer approval
An upgrade order placed for this machine requires approval from an authorized approval user ID. Notification is sent to the authorized approver when approval is required.

Needs IBM Pricing
An order was created without a prenegotiated agreement in place. Your order cannot be retrieved or activated until there is a price agreement in place. Pricing will negotiate an agreement with you and the sales representative.

New
The order is being processed.

Price needs customer approval
Pricing set prices for an order that was created without a prenegotiated agreement. The authorized customer user ID is notified that the purchase price needs to be approved.

Staging
This order is now being processed in the IBM Service Support System. Authorized users will be notified by email when the order is ready to be retrieved.

Messages

This topic describes the messages displayed on the Support Element by the Capacity on Demand offerings during retrieve, installation, activation, and deactivation. The messages and descriptions are in alphanumeric sequence by message identifier.

Message format

The message format is:

```
ACTnnns text
```

nnn
Is the message serial number.

s
Is the type code:

E
Error. The user must perform a specific action.

I
Information. No operator action is required.

Q
Question. Requires a response or action.

W
Warning. A process is pending. Determine and perform an action.

text
Is the message text.

Message list

ACT37111E Warmstart error

Explanation

A problem was detected while updating the configuration.

User response

It is strongly recommended that you reboot the Support Element now to complete the configuration update. Failure to reboot the Support Element will preserve configuration data mismatches and unexpected system performance problems.

ACT37112E I390 sync error

Explanation

A problem was detected while trying to update the configuration concurrently.

User response

Please retry the operation. If a subsequent retry fails, then the operation must be completed disruptively. Contact your next level of support.

ACT37113I VPD information

Explanation

Update of the hardware configuration and VPD was successful.

User response

None.

ACT37114E VPD error

Explanation

A problem was detected while updating the configuration and VPD. The hardware configuration and VPD may not have been updated.

User response

Ensure that the configuration and VPD have been updated and try the operation again.

ACT37115E VPD error

Explanation

Update of the hardware configuration and VPD cannot be done on this machine type.

User response

Try the operation on a valid machine type.

ACT37116Q VPD

Explanation

Update the hardware configuration and vital product data to reflect the current LICCC data.

User response

Click **OK** to update the hardware configuration and VPD.

ACT37130Q Test initial

Explanation

A test will be performed to determine if various system FRUs meet minimum serviceability requirements.

User response

Click **OK** to start the test and display messages indicating the results.

ACT37131I Test OK

Explanation

The MSQ processor test indicates acceptable hardware.

User response

None.

ACT37132E Spare PUs

Explanation

There are insufficient spare PUs available. The MSQ test fails.

User response

None.

ACT37133E Test failure

Explanation

A problem was detected during the MSQ processor test. The test could not be completed.

User response

None.

ACT37142I Add successful

Explanation

The Flexible Memory Option feature was added successfully.

User response

None.

ACT37143E Add error

Explanation

An error occurred while installing the Flexible Memory Option feature.

User response

Try the operation again. If the error continues, contact your next level of support.

ACT37144I Remove successful

Explanation

Remove of the Flexible Memory Option feature was successful.

User response

None.

ACT37145E Remove error

Explanation

Remove of the Flexible Memory Option feature was unsuccessful.

User response

Try the operation again. If the error continues, contact your next level of support.

ACT37146W IML warning

Explanation

The selected operation cannot be processed at this time because a required IML was never completed after a previous configuration update.

User response

Please IML your system and retry the operation.

ACT37150W CBU busy

Explanation

The requested operation cannot be done at this time because a mirror operation is in progress.

User response

Please try again in approximately 10 minutes.

ACT37151E CBU error

Explanation

An error was encountered requiring the SE to be rebooted.

User response

Reboot the Support Element.

ACT37152I Completion successful

Explanation

Requested function completed successfully.

User response

None.

ACT37153W User cancelled

Explanation

Request was cancelled.

User response

None.

ACT37155W Undo CBU LPAR

Explanation

Undo temporary upgrade was selected from the **Perform Model Conversion** window. Ensure that at least *{0}* logically dedicated General Purpose (GP) CPs, *{1}* ICF CPs, *{2}* zAAPs, *{3}* IFLs and *{4}* zIIPs are configured offline.

You need at least one nondedicated GP CP, ICF CP, zAAP, IFL, or zIIP for any logical partitions using shared GP CPs, ICF CPs, zAAPs, IFLs or zIIPs.

User response

Click **OK** to continue. Click **Cancel** if you do not want to perform the Undo now.

ACT37160E Internal error

Explanation

Error detected performing the requested function.

User response

Try the operation again. If the problem continues, contact your next level of support.

ACT37161W Disable CP Assist for Cryptographic Functions

Explanation

The **IBM CP Assist for Cryptographic Functions** (CPACF) feature will be removed from the system. Operating systems and applications utilizing these functions may become unpredictable and fail.

Some functions of Integrated Cryptographic Service Facility (ICSF) may fail. See the *ICSF Application Programmer's Guide* for more information.

Some Linux kernel and application cryptographic functions may become unusable. Linux images should be shut down gracefully before removal of CPACF functions.

User response

Click **OK** to continue to process the new LICCC data. Click **Cancel** if you do not want to process the new LICCC at this time.

ACT37167W Memory successful

Explanation

The system was successfully updated with the new MCM and memory LICCC data. The system was able to complete the MCM upgrade concurrently. However, the upgrade will not take effect until the next IML is performed.

User response

Perform a system IML to initiate the MCM upgrade.

ACT37169W IOCDS active

Explanation

The request cannot be performed while the D0 IOCDS is active.

User response

Re-IML with another IOCDS and retry the operation.

ACT37170W Disruptive OK

Explanation

The system was successfully updated with the new LICCC data. However, validation of the new LICCC data will not occur until the next Power on Reset (POR). Incorrect LICCC data will severely affect system performance.

User response

It is strongly recommended that you perform a Power On Reset via a disruptive CPC deactivation and activation to verify the new LICCC data.

ACT37171E Function failed

Explanation

The operation cannot be performed in a timely manner.

User response

Try the operation again. If the problem continues, contact your next level of support.

ACT37172W IML required

Explanation

The system was successfully updated with the new LICCC data. However, validation of the new LICCC data will not occur until the next IML. Incorrect LICCC data will severely affect the system performance. Failure to do a POR after an Undo of a temporary upgrade will prevent successful upgrades in the future.

User response

It is strongly recommended that you perform a Power On Reset to verify the new LICCC data.

ACT37173E LICCC data corrupted

Explanation

The request was not performed because the LICCC data is corrupted.

User response

Contact IBM to have your system updated.

ACT37174E Machine state

Explanation

The request cannot be performed in the power-off state.

User response

Power on and retry the operation.

ACT37175E No spare

Explanation

The request cannot be performed at this time because there is no available hardware to support the LICCC upgrade.

User response

Try the operation again at a later time.

ACT37176E Not enabled

Explanation

The request cannot be performed until the feature is enabled.

User response

Contact IBM to have your system updated.

ACT37177W Upgrade warning

Explanation

Although the upgrade was successful, it will be lost after the next IML due to a Support Element problem. The next IML will restore the system back to its original configuration.

User response

Perform an IML to restore the system back to its original configuration.

ACT37178W Partial error

Explanation

Only a partial upgrade was performed. There is insufficient hardware available for the requested LICCC upgrade.

User response

None.

ACT37179E Partial success

Explanation

Request was partially successful. Detected errors were logged.

User response

Refer to the error log.

ACT37180E System resources are insufficient

Explanation

System resources are insufficient to perform this operation.

User response

Ensure that all the resources requested to be removed are not in use. See hardware messages for details. Contact your system programmer for assistance.

ACT37181E System resources are insufficient

Explanation

Ensure that no more than *{0}* logically dedicated General Purpose (GP) CPs, *{1}* ICF CPs, *{2}* zAAPs, *{3}* IFLs, and *{4}* zIIPs are configured online. You need at least one nondedicated GP CP, ICF CP, zAAP, IFL, or zIIP for any logical partitions using shared GP CPs, ICF CPs zAAPs, IFLs, or zIIPs respectively.

User response

Contact your system programmer.

ACT37182E Data corrupted

Explanation

The request was not performed because the retrieved data from the support system is corrupted.

User response

Contact IBM for assistance.

ACT37183E Retrieve error

Explanation

An error was detected trying to retrieve data from the support system.

User response

Contact IBM for assistance.

ACT37184E No data

Explanation

No data was retrieved from the support system.

User response

Contact IBM for assistance.

ACT37186W Retry

Explanation

Request to apply the CIU On/Off CoD was canceled by the user and, therefore, deleted from the system.

User response

Contact IBM for assistance.

ACT37188E System degraded

Explanation

The request cannot be done at this time because the system is currently degraded.

User response

Correct the problem and retry the operation.

ACT37190W TVM mode active

Explanation

The request cannot be performed while TVM mode is active.

User response

Try the request at a later time.

ACT37191E Request not authorized

Explanation

The request was not performed because the feature data would decrease system performance if activated.

User response

Contact IBM to have your system updated.

ACT37192E Request not authorized

Explanation

The request was not performed because the LICCC data is corrupted.

User response

Contact IBM to have your system updated.

ACT37193E Not authorized

Explanation

The request was not performed because the feature data would downgrade the MCM configuration if activated.

User response

Contact IBM to have your system updated.

ACT37194E Not authorized

Explanation

Request failed due to missing or invalid LICCC data.

User response

Contact IBM to have your system updated.

ACT37195E Not authorized

Explanation

The request was not performed because the LICCC data is not authorized for this system.

User response

Contact IBM to have your system updated.

ACT37197E Not authorized

Explanation

The request was not performed because the LICCC data was previously used.

User response

Contact IBM to have your system updated.

ACT37198E No telephone server

Explanation

The system was unable to connect to the support system because there was no available phone server.

User response

Retry the request when a phone server becomes available.

ACT37199E No RSF connection

Explanation

The system was unable to connect to the support system because there was no RSF connection.

User response

Restore your RSF connection, and retry the request.

ACT37200W Pending data

Explanation

New Customer Initiated Upgrade data cannot be retrieved because previously retrieved unapplied data has been detected.

User response

Apply or remove existing upgrade data before retrieving additional upgrade data.

ACT37201I No data available

Explanation

Customer Initiated Upgrade data is not present on the system.

User response

Contact your next level of support.

ACT37202W No telephone server

Explanation

Customer Initiated Upgrade data cannot be retrieved because your system is not registered as a phone server.

User response

Register your server as a phone server, and retry the request.

ACT37203W No data

Explanation

There is no retrieved Customer Initiated Upgrade data to be applied. Only unapplied upgrades can be removed.

User response

None.

ACT37204W Retrieve warning

Explanation

Defective PUs have been detected while retrieving Customer Initiated Upgrade data. It is strongly recommended that you replace the MCM prior to retrieving the CIU data.

User response

Click **OK** if you want to continue with CIU. Click **Cancel** if you do not want to retrieve the CIU data.

ACT37204I Order not valid

Explanation

An incorrect customer order number was entered.

User response

Enter the correct order number or contact IBM for assistance.

ACT37206W Activate CBU

Explanation

This CBU activation is not a test CBU.

User response

Click **OK** to continue with the request. Click **Cancel** if you do not want to continue.

ACT37207E Reboot

Explanation

A problem was detected while updating the configuration. It is strongly recommended that you perform a Power On Reset after rebooting the Support Element to complete the configuration update. Failure to perform both operations will preserve configuration data mismatches and unexpected system performance problems.

User response

Reboot the Support Element and perform a Power On Reset to complete the configuration update.

ACT37208W Add hardware

Explanation

Before beginning the Book operation, required hardware and software must be available.

User response

Verify that all the required hardware and software is available. The following FRUs are needed to complete this operation:

{0}

ACT37209W Service pending

Explanation

This system has outstanding service pending. You may wish to postpone this operation until the service has been completed.

User response

Click **OK** to continue or **Cancel** to exit this operation.

ACT37210W Fenced

Explanation

The system has fenced books.

User response

Please correct this before trying the requested function.

ACT37211E Feature data corrupted

Explanation

The request was not performed because the feature data is corrupted.

User response

Contact IBM to have your system updated.

ACT37212E Feature data not valid

Explanation

Request failed due to missing or invalid feature data.

User response

Contact IBM to have your system updated.

ACT37213E Flexible memory option error

Explanation

The Flexible Memory Option feature cannot be installed due to insufficient memory.

User response

Contact IBM to have your system updated.

ACT37214I Memory downgrade

Explanation

The requested operation cannot be completed at this time. The request to downgrade the system is a disruptive action.

User response

If you want to continue, deactivate the system, power on the CPC, and retry the operation.

ACT37215I Remove media

Explanation

The media must be removed from the device.

User response

Remove the media from the device.

ACT37222W Disruptive partial upgrade

Explanation

Only a partial upgrade was performed. There is insufficient hardware available for the requested LICCC upgrade. Validation of the new LICCC data will not occur until the next IML.

User response

None.

ACT37223E Time out

Explanation

Unable to establish connection to the support system.

User response

None.

ACT37224I Insert media

Explanation

Please ensure that the media has been inserted in the device.

User response

Click **OK** to continue or **Cancel** to exit.

ACT37225E Not prepared

Explanation

The request cannot be done at this time. The system is not ready for any Enhanced Book Availability operations at this time.

User response

Perform the *Prepare for Enhanced Book Availability* operation to determine the corrective actions.

ACT37226E Target error

Explanation

The request cannot be done at this time. The system is not ready for the Enhanced Book Availability operation on the targeted book.

User response

Perform the *Prepare for Enhanced Book Availability* operation to determine the corrective actions.

ACT37227E Next level retry

Explanation

Error detected performing the requested function.

User response

Contact IBM for assistance.

ACT37228E Next level no retry

Explanation

Error detected performing the requested function. This function should not be retried.

User response

Contact IBM for assistance.

ACT37229I Reseat book

Explanation

A problem was encountered while applying power to the target book. It is possible the book was not seated properly when installed. You can reseat the book at this time and retry the power sequence.

User response

Click **OK after** reseating the book. Click **Cancel** to exit without retrying.

ACT37230I CBU activation profiles

Explanation

Activation profiles may be changed due to the configuration update.

User response

None.

ACT37231W Memory degraded

Explanation

The system detected degraded memory.

It is strongly recommended that you cancel this request and service this system prior to upgrading system memory.

User response

Click **OK** to continue the memory upgrade request and process the new LICCC data. Validation of the new LICCC data will not occur until the next IML. Click **Cancel** if you do not want to upgrade memory at this time.

ACT37232W Incorrect memory

Explanation

The requested memory upgrade cannot be done concurrently because the system is not in the correct Power on Reset state.

User response

Click **OK** to continue the memory upgrade request and process the new LICCC data. Validation of the new LICCC data will not occur until the next IML. Click **Cancel** if you do not want to upgrade memory at this time.

ACT37233W Add Hardware MRU missing

Explanation

Add Book Hardware processing cannot continue until the second MRU is installed on the system.

User response

Install the required MRU and retry the action.

ACT37234W Add Hardware Power error

Explanation

System power is required for processing any book updates. If system power is on and the request was to Add Book Hardware, then the power system must be upgraded in order to support the additional book.

User response

Power on the system and retry this action.

ACT37235W Add Hardware DCA error

Explanation

A DCA plugging error was detected. Add Book Hardware processing cannot continue until the DCA cabling is corrected.

User response

Correct the DCA plugging and retry this action.

ACT37236I Fanout card rebalancing

Explanation

You have successfully completed an Add Book Hardware procedure. Determine whether you would like to continue with the fanout card rebalancing.

User response

Click **Yes** to continue with the fanout card rebalancing. Otherwise, click **No**.

ACT37237E Replug cables

Explanation

During the FRU activation, STI cables have been detected to be misplugged.

User response

Check the labels on your STI cables and replug them in the same positions they were prior to starting this Enhanced Book Availability (memory add) operation. Click **OK** to continue after replugging the STI cables in the correct locations as per the labels.

ACT37238E Unsupported hardware

Explanation

The system was successfully updated with the new LICCC data. However, the request to reset the capacity marker data was not performed because the data file does not match this system or because the capacity marker values in the data file are incorrect. Your system needs to be updated.

User response

Contact IBM to have your system updated.

ACT37242E On/Off CoD activated

Explanation

The On/Off CoD order cannot be removed because it has already been activated on the system.

User response

None.

ACT37243E Timeout

Explanation

The request could not be performed because the system was unable to connect to the support system in a timely manner.

User response

None.

ACT37245W Machine state

Explanation

The system is not in the required state to perform the requested operation. System is not powered on complete.

User response

Power on your system and retry the operation.

ACT37246W Service required warning

Explanation

The system is not in the required state to perform the requested operation. Service required is pending.

User response

Repair the service required action and retry the operation.

ACT37247W Memory degraded

Explanation

The system is not in the required state to perform the requested operation. Memory is degraded.

User response

Repair the memory and retry the operation.

ACT37248W Processors pending warning

Explanation

The system is not in the required state to perform the requested operation. The system has processors pending activation from a previous temporary processor activation request.

User response

Deactivate enough temporary processors to satisfy the pending state or wait until resources become available and retry the operation.

ACT37249W Missing file

Explanation

The system cannot perform the requested operation because the required input data was not found.

User response

None.

ACT37258W Invalid CP-KCID warning

Explanation

The system cannot perform the requested operation because the input data has an invalid CP-KCID combination.

User response

Contact IBM for new upgrade data.

ACT37259W Invalid maximum processors

Explanation

The system cannot perform the requested operation because the input data has a maximum processor value.

User response

Contact IBM for new upgrade data.

ACT37260W Invalid maximum processors

Explanation

The system cannot perform the requested operation because the input data has a maximum processor value that is not consistent with the current book configuration.

User response

Contact IBM for new upgrade data.

ACT37261W Invalid SAP processors

Explanation

The system cannot perform the requested operation because the input data has an invalid SAP processor value that is not consistent with the current book configuration.

User response

Contact IBM for new upgrade data.

ACT37262W Not Power On Reset

Explanation

The system is not in the required state to perform the requested operation. System is not in Power On Reset complete state.

User response

Power On Reset your system and retry the operation.

ACT37263W Invalid KCID

Explanation

The system cannot perform the requested operation because the input data has an invalid capacity marker value.

User response

Contact IBM for new upgrade data.

ACT37264W Invalid maximum purchased CPUs

Explanation

The system cannot perform the requested operation because the input data has an invalid maximum purchased CPUs value.

User response

Contact IBM for new upgrade data.

ACT37265W Invalid maximum purchased KCID

Explanation

The system cannot perform the requested operation because the input data has an invalid maximum purchased capacity marker value.

User response

Contact IBM for new upgrade data.

ACT37266W Invalid CP and SAP combinations

Explanation

The system cannot perform the requested operation because the input data has an invalid maximum processor and SAP processors combination.

User response

Contact IBM for new upgrade data.

ACT37267W No memory size

Explanation

The system cannot perform the requested operation because the input data has no memory size defined.

User response

Contact IBM for new upgrade data.

ACT37268E Exceeding physical memory

Explanation

The system cannot perform the requested operation because the processor LICCC upgrade data exceeds the physical capacity of processor hardware.

User response

Contact IBM for assistance.

ACT37269E No media selection

Explanation

A media type was not selected.

User response

Select a media type and click **OK**.

ACT37270W Successful upgrade

Explanation

The permanent upgrade activation was successful. However, some or all resources from an active temporary billable record (On/Off CoD) were converted to permanent to fulfill the request.

User response

To view the latest temporary processor configuration, from the **Perform Model Conversion** window, select the **Manage** option. If zero resources are active for

this temporary billable record, deactivate the record by using the Undo button.

ACT37271E Authorization error

Explanation

The requested activation could not be performed because the record is not authorized for the configuration changes requested or the specified target configuration does not exist.

User response

Retry again with less resources.

ACT37272E On/Off CoD error

Explanation

The requested activation could not be performed because only one billable capacity record can be active in the system at a time. The active billable record must be deactivated (Undo) before activating a new record.

User response

Use the **Manage** option on the **Perform Model Conversion** window to manage the records.

ACT37273E Invalid request

Explanation

The request to install a temporary process record could not be performed at this time because the maximum allowed records are already installed.

User response

Use the **Manage** option on the **Perform Model Conversion** window to manage the records.

ACT37274E Invalid state

Explanation

The request to remove a temporary processor record could not be performed at this time because it is currently active.

User response

Deactivate the record and try again.

ACT37275E Authorization error

Explanation

The temporary processor record cannot be activated with the parameters you selected due to one or more of the following expiration reasons:

- No real or test activations are left for this record
- Insufficient processor/MSU tokens are left in the token pools
- Record expiration date has been reached
- The number of activation days is exceeded.

User response

Use different activation parameters or contact IBM to discuss your options about this record.

ACT37276W Confirmation warning

Explanation

Are you sure you want to update the LICCC data?

	Original	New
CPs	*{0}*	*{1}*
SAPs	*{2}*	*{3}*
ICFs	*{4}*	*{5}*
IFLs	*{6}*	*{7}*
zAAPs	*{8}*	*{9}*
zIIPs	*{10}*	*{11}*
Model-Capacity Identifier	*{12}*	*{13}*
Memory (GB)	*{14}*	*{15}*
Crypto Assists Feature	*{16}*	*{17}*

The memory size will be decreased by the amount of the HSA. For the actual memory usage sizes, refer to the **Storage Information** window.

User response

View the information in the table and click **Yes** to make the changes you selected. Otherwise, click **No**.

ACT37277W Order not valid

Explanation

The requested upgrade cannot be performed because the order number is required to be eight characters.

User response

Click **OK** to enter the order number again, or click **Cancel** if you do not want to perform this request at this time.

ACT37280E Operation not performed

Explanation

The permanent LICCC operation could not be performed at this time because there is a conflict with the currently active temporary CP resources.

User response

Deactivate some temporary resources and retry this permanent LICCC operation.

ACT37292W Status ready

Explanation

Upon the selection of a book, the *Perform Enhanced Book Availability* request will evacuate resources and will power off the selected book.

User response

Click **OK** to continue. If you do not want to perform the request at this time, click **Cancel**.

ACT37293I Status ready

Explanation

The *Prepare for Enhanced Book Availability* has been performed on Book *{0}*. The book is ready for the *Prepare for Enhanced Book Availability* step.

User response

None.

ACT37294W Confirmation warning

Explanation

The following processor allocation will be made if **OK** is selected. Click **Cancel** if you wish to not make changes or abort the allocation.

Number of CPUs = *{0}*
Number of ICFs =*{1}*
Number of IFLs =*{2}*
Number of zAAPs = *{3}*
Number of zIIPs = *{4}*
PUs not assigned = *{5}*

User response

Click **OK** to continue or **Cancel** to exit.

ACT37295E Reassign not numeric data

Explanation

The data for *{0}* at *Non-Dedicated Count* is not of a numeric format.

User response

Enter the data again.

ACT37296E Reassign column error

Explanation

The total value of *{0}* for *Non-Dedicated Count* PUs will exceed the allowable value of *{1}*.

User response

Readjust the entered values in the *Non-Dedicated Count* column for the various PUs.

ACT37297E Reassign row error

Explanation

The *{0}* entry value of *{1}* would make the total for this entry greater than the allowed LICCC value of *{2}* for this type of PU.

User response

Correct the entered value in the nondedicated PUs row for *{0}*.

ACT37298E Book selection no changes

Explanation

You must select a target book for the chosen action.

User response

Select a target book.

ACT37299E Add Book Hardware error

Explanation

An error occurred that prevents the book from being added.

{0}

User response

Click **OK** to start removing the hardware. Use the windows to remove all the hardware in the reverse order of installation.

ACT37300E Perform Model Conversion error

Explanation

While doing a **Perform Model Conversion** Hardware Management Console (HMC) Single Object Operations on a media device, the following error occurred:

{0} (rc=*{1}*)

User response

Click **Yes** to retry the operation. Click **No** if you wish to exit.

ACT37460I No temporary records

Explanation

There are no temporary upgrade records on the system.

User response

None.

ACT37461Q Delete confirmation

Explanation

- Are you sure you want to permanently remove this record from the system?
  - Record ID: *{0}*
  - Description: *{1}*

User response

Click **Yes** to delete. Click **No** to exit.

ACT37462E Invalid state

Explanation

This record cannot be removed because it is currently active. If you want to remove this record, you must deactivate it first.

User response

To deactivate the record, you must remove all the temporary processors and decrease the capacity to the permanent capacity available on this record.

ACT37463Q Description confirmation

Explanation

Are you sure you want to change the record description from *{0}* to *{1}*?

User response

Click **Yes** to change the description. Click **No** if you want to leave the description as it is.

ACT37464Q Temporary change confirmation

Explanation

- Are you sure you want to change the activation levels for this record?
  - Record ID: *{0}*
  - Description: *{1}*
  - Activation type: *{2}*

	Original	New
Model-Capacity Identifier	*{3}*	*{10}*
CPs	*{4}*	*{11}*
SAPs	*{5}*	*{12}*
ICFs	*{6}*	*{13}*
IFLs	*{7}*	*{14}*
zAAPs	*{8}*	*{15}*
zIIPs	*{9}*	*{16}*

User response

View the information in the table and click **Yes** to make the changes you selected. Otherwise, click **No**.

ACT37465Q Install temporary records

Explanation

This is a replenishment record and cannot be installed by itself. When installing a replenishment record, the associated new record and all its replenishment records are installed and one install slot is used. The replenishment records are applied to the new record

in the order they were placed in the staged area according to their timestamps.

Would you like to install the associated new record and all its replenishment records?

User response

Click **Yes** if you want all replenishment records and the associated record installed. Otherwise, click **No**.

ACT37466Q Install temporary records

Explanation

- If a record in the staged area has any replenishment records (identified by the same record ID), then when this record is installed, all the replenishment records with the same record ID will also be installed and only one install slot will be used. The replenishment records are applied to the new record in the order they were placed in the staged area according to their timestamps.

  Are you sure you want to install this record and all its replenishment records?

  - Record ID: *{0}*
  - Description: *{1}*

User response

Click **Yes**, if you want all the records installed. Otherwise, click **No**.

ACT37467Q Removing staged temporary records

Explanation

- Are you sure you want to permanently remove this record and all its replenishments from the system?

  - Record ID: *{0}*
  - Description: *{1}*

User response

Click **Yes** to remove this record and all its replenishment records. Otherwise, click **No**.

ACT37468Q Confirmation

Explanation

Are you sure you want to cancel without saving your changes?

User response

Click **Yes** if you do not want to save your changes. Otherwise, click **No**.

ACT37469I Message wrapper

Explanation

{0}
{1}

User response

None.

ACT37470I History display

Explanation

There is no upgrade history on the system.

User response

None.

ACT37471I History display

Explanation

Record ID: *{0}*
Action: *{1}*
Date: *{2}*
Order number: *{3}*
Source: *{4}*
Net ID: *{5}*
NAU: *{6}*
{7}
Model-Capacity Identifier for this record: *{8}*

Activated Levels

CPs	SAPs	ICFs	IFLs	zAAPs	zIIPs
{9}	*{10}*	*{11}*	*{12}*	*{13}*	*{14}*

User response

None.

ACT37472I History display

Explanation

Action: *{0}*
Date: *{1}*
Order number: *{2}*

Source: *{3}*
Net ID: *{4}*
NAU: *{5}*
{6}
Model-Capacity Identifier: *{7}*
Maximum Model-Capacity Identifier: *{8}*
Unassigned IFLs: *{9}*

Activated Levels

CPs	SAPs	ICFs	IFLs	zAAPs	zIIPs
{10}	*{11}*	*{12}*	*{13}*	*{14}*	*{15}*

User response

None.

ACT37473I History display

Explanation

Record ID: *{0}*
Action: *{1}*
Date: *{2}*
Order number: *{3}*
Source: *{4}*
Net ID: *{5}*
NAU: *{6}*
{7}

User response

None.

ACT37474I History display

Explanation

- Record ID: *{0}*
- Action: *{1}*
- Date: *{2}*
- Order number: *{3}*

User response

None.

ACT37500W Timeout

Explanation

The requested operation cannot be done at this time because a CDU operation is in progress.

User response

Please try again in approximately 10 minutes.

ACT37501E SE error

Explanation

An error was encountered requiring the SE to be rebooted.

User response

Reboot the Support Element.

ACT37502W Change Management

Explanation

The requested operation cannot be done at this time because change management is permanently disabled.

User response

None.

ACT37503E Internal error

Explanation

An error was encountered acquiring change management status.

User response

Try the operation again. If the problem continues, contact your next level of support.

ACT37519W

Explanation

The requested permanent MES cannot be performed because one or more temporary records are currently active. One or more of the following conditions might display. Resolve all of the conditions and retry the operation.

- This system has *{nn}* pending PUs from a previous CBU activation with force activation option, and has no available PU. Uncheck the **Force activation** checkbox for record ID *{ID}* and modify this record's activation levels to remove the pending PUs condition. Alternatively, you can also remove the pending resources condition by deactivating resources from other temporary records.
- The target configuration with the new permanent MES configuration and the current active temporary upgrades is outside of valid configuration. Your

current model capacity identifier is *{nn}* and you tried to increase the model capacity levels by *{nn}* steps and/or *{nn}* CPs. Deactivate temporary capacity (by removing temporary CPs, decreasing temporary model capacity, or performing Undo to deactivate all the resources) from some or all temporary records in order to make the permanent upgrade target configuration valid.

- Not enough available PUs exist in the system. Deactivate at least *{nn}* PUs from temporary records.
- One or more active temporary upgrades increased the model capacity level and the target configuration results in the model capacity identifiers 713 through 764. Deactivate all temporary model capacity levels from the following temporary record IDs: *{ID1}, {ID2}, ...*
- One or more CBU records do not have enough CBU feature codes left to satisfy the new permanent configuration. Remove all temporary model capacity levels,

  or *{n1}* temporary processors from record ID *{ID1}*
  or *{n2}* temporary processors from record ID *{ID2}*
  or *{n3}* temporary processors from record ID *{ID3}*
  ⋮
  Otherwise, contact IBM to discuss your replenishment options for these records.

  Note: You can have up to eight records.
- The new permanent configuration plus the number of active temporary SAPs exceeds the allowed maximum. Deactivate at least *{nn}* SAPs from temporary records.

User response

Resolve each applicable condition and retry the operation.

ACT37520I

Explanation

The requested permanent MES can be performed.

User response

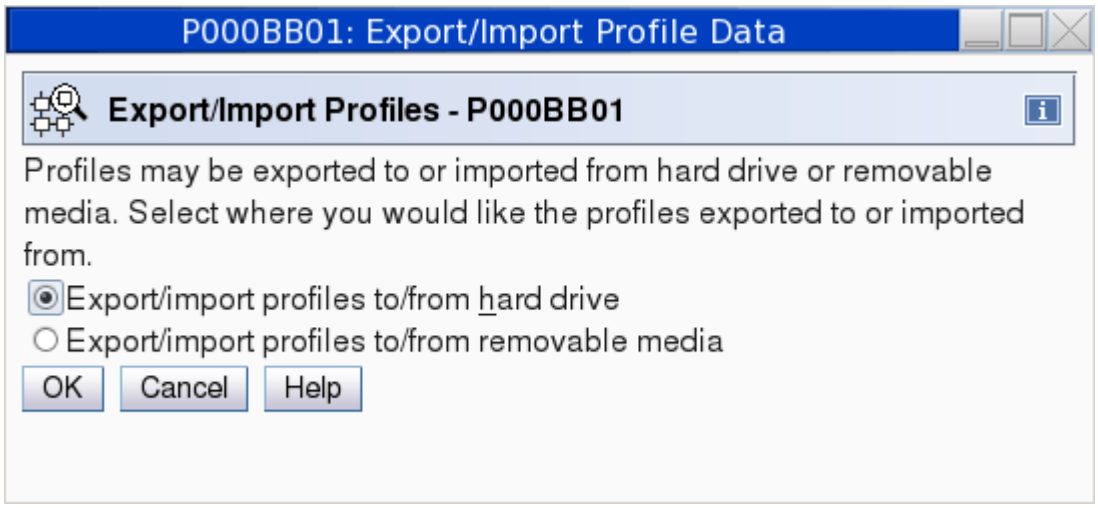
None.

Appendix B. Exporting your profile data

When a CBU is activated, more processors are activated in the system. When making any change to your activation profiles, it is recommended to export your profiles for safe keeping. You can save profile data to a USB flash memory drive or hard drive.

To export your profile data, follow these steps:

1. Log onto the HMC in system programmer mode.
2. Expand the nodes in the navigation pane and select the appropriate server.
3. Expand the task list and select **Single Object Operations** (located in the Recovery task list) to open a Support Element session for the selected server.
4. Make sure the correct server name is listed and selected, and click **Yes**.
5. From the Support Element, expand the nodes in the navigation pane and select the server name.
6. Expand the task list and select **Export/Import Profile Data** (located in the Operational Customization list). The **Export/Import Profiles** window opens:

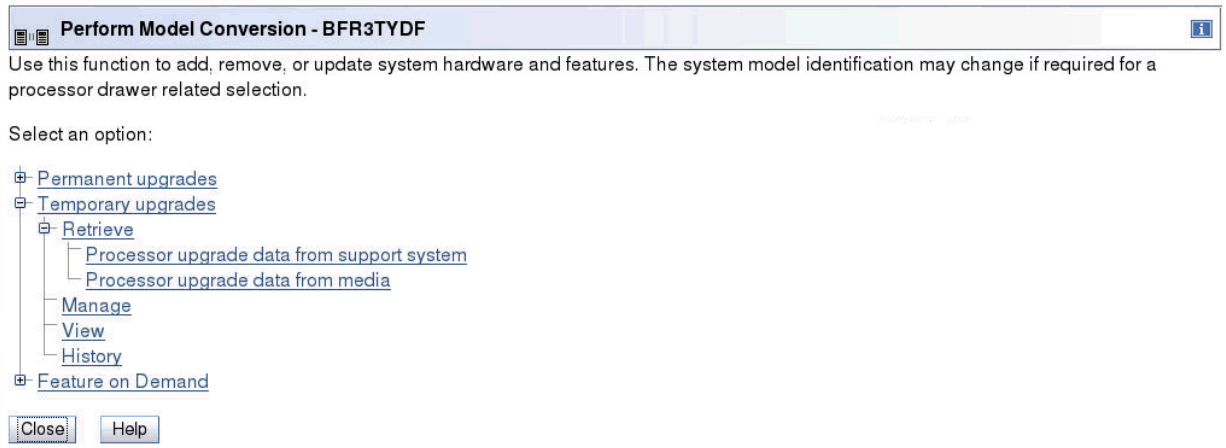


7. Select where you want your profiles exported:
   - To hard drive
   - To USB flash memory drive.
8. Click **OK**.

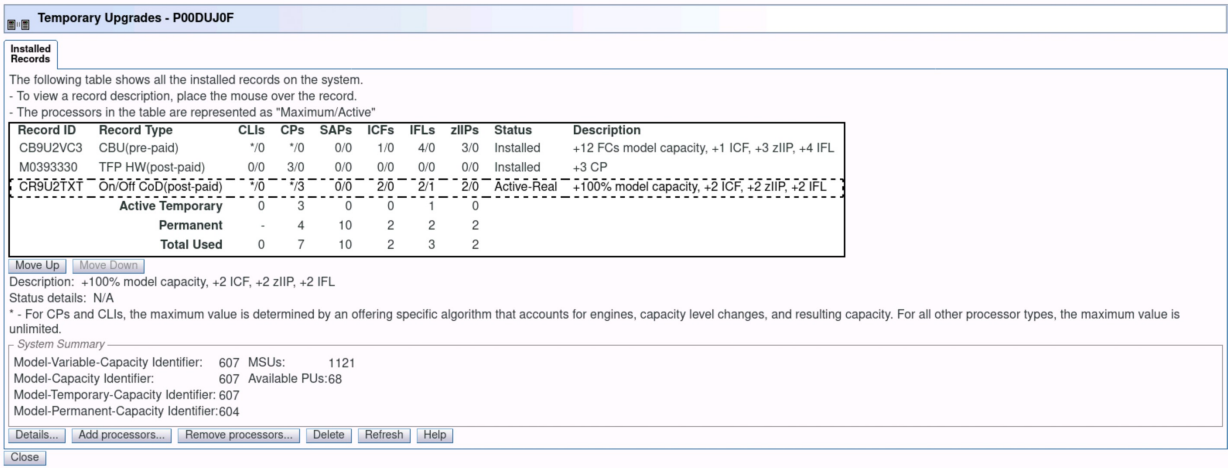
Appendix C. How to deactivate

To manually deactivate all or part of a temporary upgrade, follow these steps:

1. Log onto the HMC in system programmer mode.
2. Using the expand icon (+) in the navigation toolbar, expand the **Systems Management** nodes in the navigation pane and select the server. For information on the HMC user interface, refer to the console help system.
3. From the tasks pad, click **Configuration** and **Perform Model Conversion**. The **Perform Model Conversion** window opens:



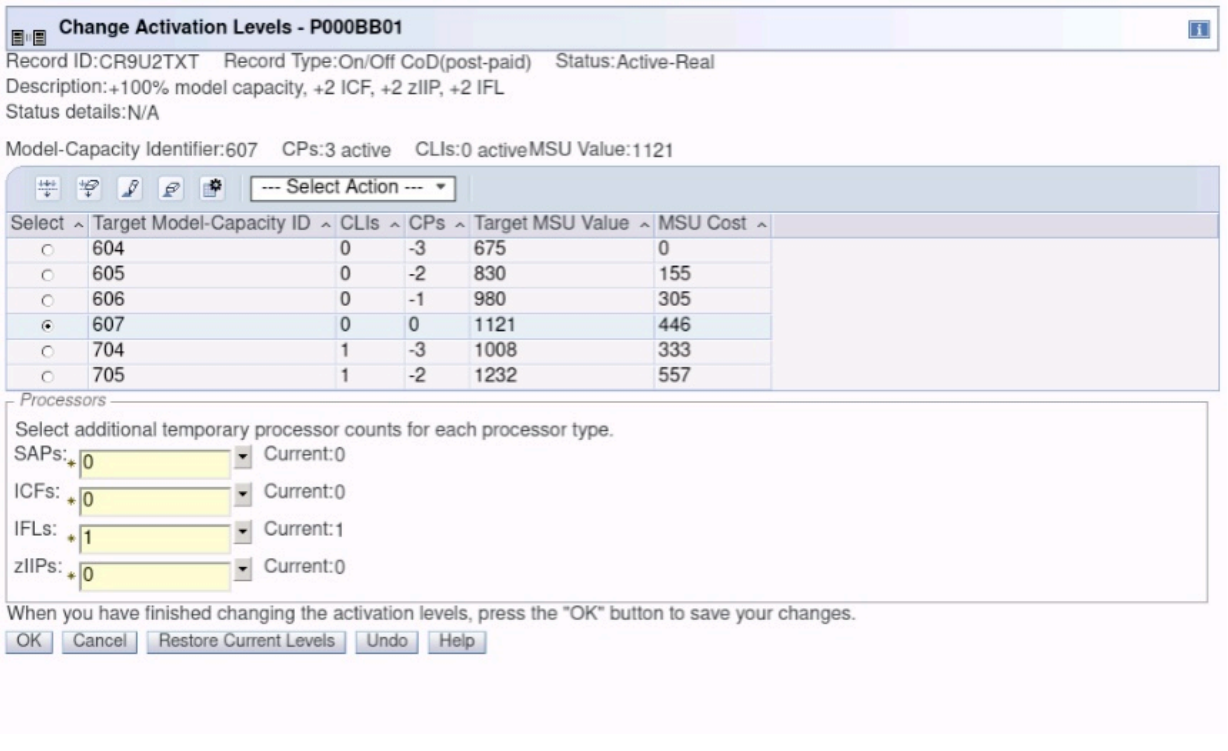
4. From the **Perform Model Conversion** window, click **Temporary Upgrades** and **Manage**. The **Temporary Upgrades** window opens.



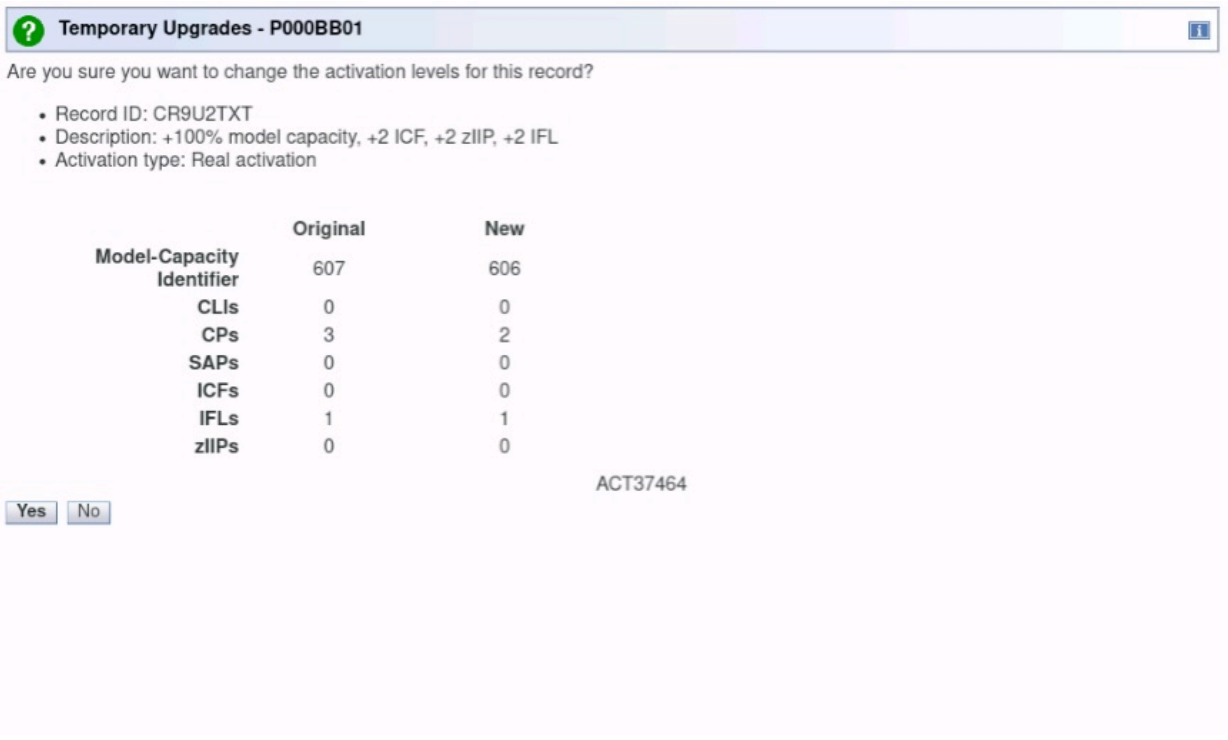
See Appendix D, “Understanding the content of the Installed Records page in the Temporary Upgrades window,” on page 131 for details on the fields displayed on the **Installed Records** page in the **Temporary Upgrades** window.

5. Select the active record you want to deactivate and click **Remove processors...**. The **Change Activation Levels** window opens.

   Note: When you are deactivating capacity, only the values to which you can "downgrade" are available.

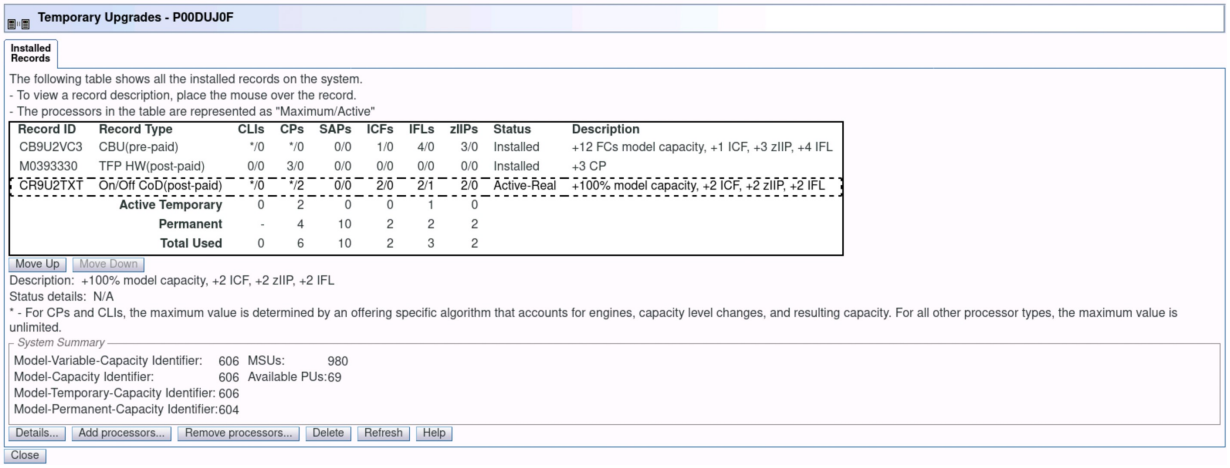


6. Either make your changes (the previous window shows a deactivation of one CP) or click **Undo**. The **Undo** function deactivates all the resources from the record back to the base configuration. Then click **OK**. The **Temporary Upgrades** window opens showing the changes.



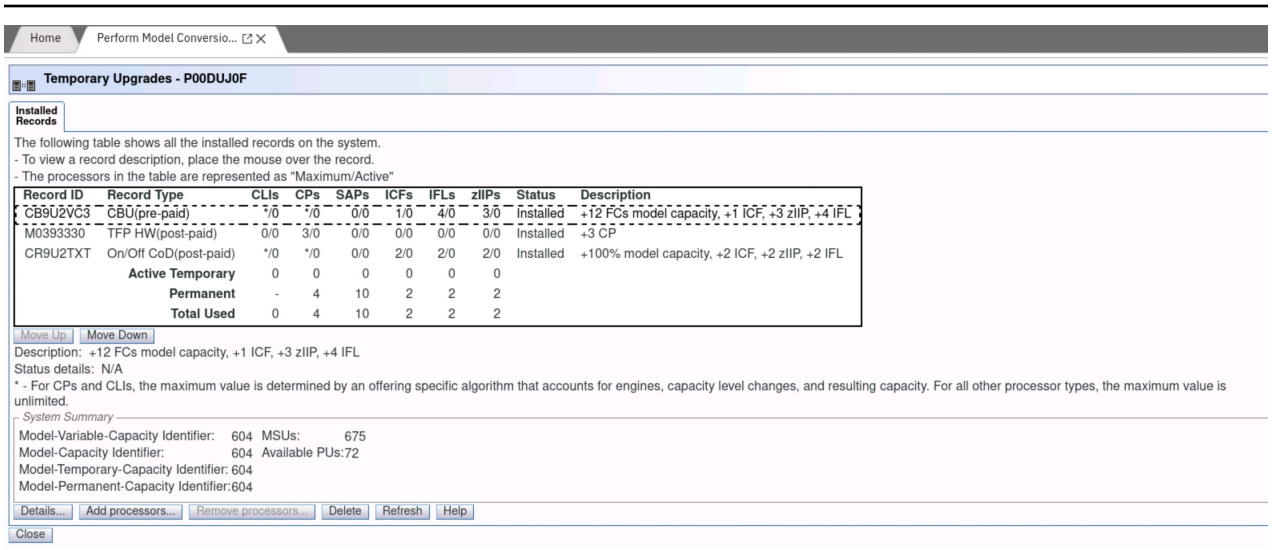
7. View the data and if you want to continue with the changes you made, click **Yes**.

   The changes you made are now active and are reflected in the **Temporary Upgrades** window.



Note: If you remove all the temporary processors and decrease the capacity to the permanent capacity available on this record, the record remains installed for you to modify at a later and the status changes to "Installed."

Appendix D. Understanding the content of the Installed Records page in the Temporary Upgrades window



For each record listed on the **Installed Records** page, these values (Maximum/Active) display for the model capacity information (CLIs and CPs) and the specialty engines (SAPs, ICFs, IFL, and zIIPs).

- Maximum = the maximum value of temp resources that can be activated for a given type
- Active = the current number of active resources of that type on this record.

For the specialty engines, the numbers always represent the number of engines of that type that fit into the category. For example, an IFL with the values 4/1 mean that the record can activate a maximum of 4 IFLs and has 1 IFL active.

Model capacity has two columns, CLIs and CPs, because of subcapacity engines. Model capacity is identified by a capacity level and a number of CP engines: 4*xx*, 5*xx*, 6*xx*, and 7*xx*.

For example, a 408 is a system running at capacity level 4, with 8 engines active. Because it is possible to set limits based on either the capacity level or the number of CP engines, two columns are displayed (CLIs and CPs). The CLI column shows how many capacity level increases the record allows, and the CP column shows the number of additional CP engines that may be activated by the record. Whether there is a value in the CLI and CP columns depends on whether the record limits activations by CLI or CP increments.

On/Off CoD records always show an * for the CLI and CP Maximum value because the record limits activations by percentage of capacity increased, not CLI or engine increments. CBU records also show as an * for the CLI and CP maximum value because the CBU record contains the number of CP features that can be applied, and a CP feature can be used to increase the number of engines or to increase an engine any number of capacity levels. It is not a specific limit of engines or capacity levels. The Pending and Active values for these two offerings are not * because, once activated, the activations can be represented in terms of a number of capacity levels or CP engines. For example, if the On/Off CoD record was activated to raise the current 408 capacity to a 609, the record would show a CLI value of */2 and a CP value of */1 because the capacity level was increased 2 levels (4 to 6) and 1 additional CP engine was added.

Appendix E. Notices

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European Community contact:
IBM Deutschland GmbH

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