

# IBM Z Flexible Capacity for Cyber Resiliency

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# IBM Z Flexible Capacity for Cyber Resiliency

This IBM Redpaper publication describes the IBM® Z® Flexible Capacity for Cyber Resiliency offering:

- ▶ “Introducing IBM Z Flexible Capacity for Cyber Resiliency” on page 2
- ▶ “Use cases of IBM Z Flexible Capacity for Cyber Resiliency” on page 3
- ▶ “DR and DR testing” on page 3
- ▶ “Compliance with regulations” on page 3
- ▶ “Facility maintenance” on page 4
- ▶ “Proactive avoidance” on page 5
- ▶ “Implementing IBM Z Flexible Capacity for Cyber Resiliency” on page 7
- ▶ “Setup process” on page 7
- ▶ “Transferring workloads between sites” on page 11
- ▶ “Multi-system environment” on page 13
- ▶ “Tailored Fit Pricing and IBM Z Flexible Capacity for Cyber Resiliency” on page 14
- ▶ “Flexible Capacity for Cyber Resiliency activation guide” on page 16
- ▶ “Terms and conditions of IBM Z Flexible Capacity for Cyber Resiliency” on page 39

# Introducing IBM Z Flexible Capacity for Cyber Resiliency

Resiliency remains an important topic for clients and a key value driver for IBM® Z®, especially for the largest IBM clients in regulated industries.

In response to concerns about cyber resiliency, IBM introduced the IBM Z Disaster Recovery (zDR) Cloud. This solution enabled active capacity flexibility between the production and disaster recovery (DR) sites. It also offered additional flexibility over the existing capacity backup (CBU) for the length, execution, and frequency of the tests.

The following list describes zDR Cloud disadvantages:

- ▶ zDR Cloud required an MES to run a site swap for test and CBU for unplanned site swaps.
- ▶ Onsite IBM intervention was required.
- ▶ A lead time of 2 weeks was required to implement, which induced delays.
- ▶ zDR applied only to planned site swap scenarios.
- ▶ DR testing and real DR scenarios not being the same caused compliance issues.
- ▶ A lack of standardization made automation difficult.

To overcome these issues and implement new functions and features, IBM developed the IBM Z Flexible Capacity for Cyber Resiliency offering.

The changing landscape in business continuity, regarding regulatory requirements was one of the key drivers for the introduction of this offer.

United States regulators require Tier1 institutions to demonstrate that they can run their production on a DR site. The same requirements also apply to Tier 2 financial institutions. These requirements can change frequently. Similar requirements also exist in the United Kingdom (UK), European Union (EU), and many other countries.

The existing capacity upgrades in IBM Z do not fully address these requirements. For instance, CBU activation is limited to 10 days, which prevents many clients from using their DR site for production data. This limit of 10 days is also one of the reasons why clients move only their test and development environments between sites.

Addressing the regulatory requirements is one of many reasons for introducing this offering. The possibility to be proactive and avoiding downtime is also important. Clients must be able to anticipate their actions when a disaster is predicted. A snowstorm and a hurricane are two examples of predicted disasters. It is beneficial to be able to move the production workload to the DR site before a disaster strikes.

To support these capabilities, IBM introduced a Flexible Capacity Record with the IBM z16™. This record can be used with other capacity records such as CBU, Capacity on Demand (CoD), and System Recovery Boost (SRB).

Flexible Capacity for Cyber Resiliency helps activate and deactivate capacity within the Flexible Capacity Record to improve Cyber Resiliency between participating IBM z16 systems in production and DR sites. Flexible Capacity for Cyber Resiliency provides increased flexibility regarding when and how to move workloads. Clients can decide to activate capacity on the DR site at any time. The activation can be done 12 times per year and for a maximum period of 12 months.

Flexible Capacity for Cyber Resiliency also helps organizations comply with evolving regulatory mandates by using IBM Geographically Dispersed Parallel Sysplex® (IBM GDPS®). GDPS profiles fully support Flexible Capacity for Cyber Resiliency and can be

defined per machine serial number and use case. GDPS profiles can be used during a DR event or as a maintenance script to activate the required capacity for a specified scenario. GDPS profiles use the **Capacity Activate** script command with various parameters to implement the scenarios.

## Use cases of IBM Z Flexible Capacity for Cyber Resiliency

Several scenarios demonstrate possible IBM Flexibly Capacity for Cyber Resiliency use cases.

### DR and DR testing

While you perform a DR test or an actual DR, you are facing the following challenges:

- ▶ Often, DR tests do not mirror real-life scenarios, which result in a lack of confidence and uncertainty in dealing with an actual outage. Situations can occur when you need to run your production workload from the secondary site. The go-to solution is to use backup capacity, for example, CBU. Under today's CBU offering, the CBU 90-day real activation can be used because of only an actual disaster. CBU tests can be used to run production workload but for a limited time of only 10 days.
- ▶ For some tests, you need more than the 10-day CBU. You might need a more extended period to verify that your production workload in your DR site works with all other aspects of the operations.
- ▶ Today's industry strives for automation and process simplification. To provide near-continuous availability and DR, you need to automate and test recovery procedures for planned and unplanned outages.

With IBM z16 production and DR systems that are operating at different data centers, you can install Flexible Capacity Records on each participating machine. If your production site is affected, you can activate the Flexible Capacity Record at the DR site and bring the capacity up to the production level of your primary site. You can then operate from the DR site for up to 1 year.

Flexible Capacity for Cyber Resiliency helps to increase business resiliency and brings additional flexibility. With Flexible Capacity for Cyber Resiliency, DR tests do not differ from an actual DR, and site swaps are done under full client control. Flexible Capacity for Cyber Resiliency supports all processors and workload types, and when the records are active on participating systems, you have up to 24 hours to transfer your workload between sites.

The Flexible Capacity for Cyber Resiliency offering can simplify efforts because of the minimal setup that is needed and the ability to automate the process with GDPS profiles or other automation tools. The site swap can be automated and tested, so in an actual unplanned outage, such as a cyberattack, this solution provides near-continuous availability.

### Compliance with regulations

Compliance with regulations can be a challenge. Changes in regulatory requirements require comprehensive and extended testing. In an increasing number of countries, regulators mandate switching from overfull production loads to operating from the secondary data center for 30 days and up to 6 months.

The windows for restoring critical business applications are smaller, and the cost of running production from a backup site is high, especially if the swap is not planned.

Flexible Capacity for Cyber Resiliency helps to meet the increasingly stringent requirements of global regulators, allowing a highly automated and fast process to demonstrate a production site swap. With this solution, you can install a Flexible Capacity Record on participating IBM z16 systems. Then at the DR site, you can activate the Flexible Capacity Record and bring the capacity up to the production level of the primary site.

You have a 24-hour window to migrate the workloads from one data center to another and prove compliance. After the data migration, you can move all workload types and run production from any site. As stated before, you can run production on the backup site for up to 1 year.

With Flexible Capacity for Cyber Resiliency, you can standardize your DR testing and gain confidence when you are swapping sites by using a streamlined and repeatable process. The offering is designed to help you meet the stringent requirements of global regulators, assist with automation and customization, and practice site swaps regularly.

## Facility maintenance

By using Flexible Capacity for Cyber Resiliency, you can run your production workload from your alternate site while you maintain your primary site with the capacity you need. This solution can be used in a facility maintenance scenario, in which maintenance for power, cooling, or buildings, is necessary. You can use the offering to move production workloads to an alternate site while the maintenance takes place.

When you perform facility maintenance, you are often confronted with the following problems:

- ▶ Maintenance that takes longer than planned can result in increased costs because of a need for increased capacity.
- ▶ Maintenance should be planned to prepare the migration of the production environment.
- ▶ Risk of downtime increases when the production workload is not secured during the maintenance period.
- ▶ Maintenance windows are getting smaller with little time to switch environments.

By using Flexible Capacity for Cyber Resiliency, you can continue running your production workloads without interruption. You can operate from your alternate site while maintenance is being performed at your primary site with the capacity you need.

When facility maintenance is required at one of your data centers to protect your production workloads, you can activate the Flexible Capacity Record on another site and transfer your workloads. IBM personnel are not needed on site during this process. Your production environment can be switched over remotely. Now, while you operate from another data center, the maintenance can be safely performed.

When the maintenance is completed, you can still stay on the alternate site for up to 1 year or move your workload back.

The Flexible Capacity for Cyber Resiliency offering helps to increase business resiliency. With Flexible Capacity for Cyber Resiliency, your production workload is protected and provided with an adequate capacity during maintenance. You have the flexibility to move your business-critical applications anytime, and by using GDPS profiles or other tools, you can automate numerous activation scenarios for different types of maintenance.

## Proactive avoidance

It is often necessary to act proactively to protect business-critical applications from the impacts of natural disasters and human-caused problems. You also need to remain operational when prolonged power outages take place.

Analysts say that 10% of IT Managers consider natural disasters a major risk for the continuity of their business-critical services. Scenarios can include natural disasters or, for example, a rolling power outage. By using the Flexible Capacity for Cyber Resiliency offering, you can decide to migrate your critical workloads to an alternate site *before* your business is impacted.

Unplanned downtime events can arise from various sources:

- ▶ A physical event, such as a hardware or software failure
- ▶ Natural hazards:
  - Floods
  - Hurricanes
  - Tornadoes
  - Earthquakes
  - Epidemics
- ▶ Technological hazards:
  - Accidents
  - Failures of systems and structures:
    - Pipeline explosions
    - Utility disruptions
    - Dam failures
- ▶ Human-caused threats:
  - Active assailant attacks
  - Chemical or biological attacks
  - Cyberattacks against data or infrastructure
- ▶ Sabotage:
  - Site-level failure
  - Partially failed data center

Usually, you do not have enough time to act proactively before unplanned downtimes, so there is a need to automate as many processes as possible. By using Flexible Capacity for Cyber Resiliency, you increase your business resiliency because the production workloads are migrated before your business is impacted.

As an example, the Flexible Capacity for Cyber Resiliency offering can help you because of a potential danger that is caused by a hurricane. Before one of the data centers is affected, the Flexible Capacity Record is activated on the IBM z16 system that is installed at a different data center. All workloads can then migrate by using the allowed 24-hour window. When the hurricane reaches your primary data center, workloads are running at the alternate site, and the business is not disrupted. You can continue to run your production at your alternate site until conditions at your primary site are restored, or you can move the workloads to the primary site when there is no longer a threat.

Now, you can react more quickly to disrupting events and protect your critical business services by migrating your workloads to an alternative site before your business is affected. The workloads can remain running at the alternate site for the maximum time of 1 year.



# Implementing IBM Z Flexible Capacity for Cyber Resiliency

This section describes the high-level process for implementing IBM Z Flexible Capacity for Cyber Resiliency.

## Setup process

The IBM Z Flexible Capacity for Cyber Resiliency offering allows clients to shift their capacity between participating IBM z16 systems at different sites.

With this offering, IBM introduces a temporary capacity record that is called Flexible Capacity Record. A Flexible Capacity Record is installed on each participating system and can include many types of engines:

- ▶ Central processor (CP)
- ▶ z Integrated Information processor (zIIP)
- ▶ Integrated Facility for Linux (IFL)
- ▶ Integrated Coupling Facility (ICF)

Initially, as shown in Figure 1, the systems on Site A and Site B are running at their purchased (active) capacity.

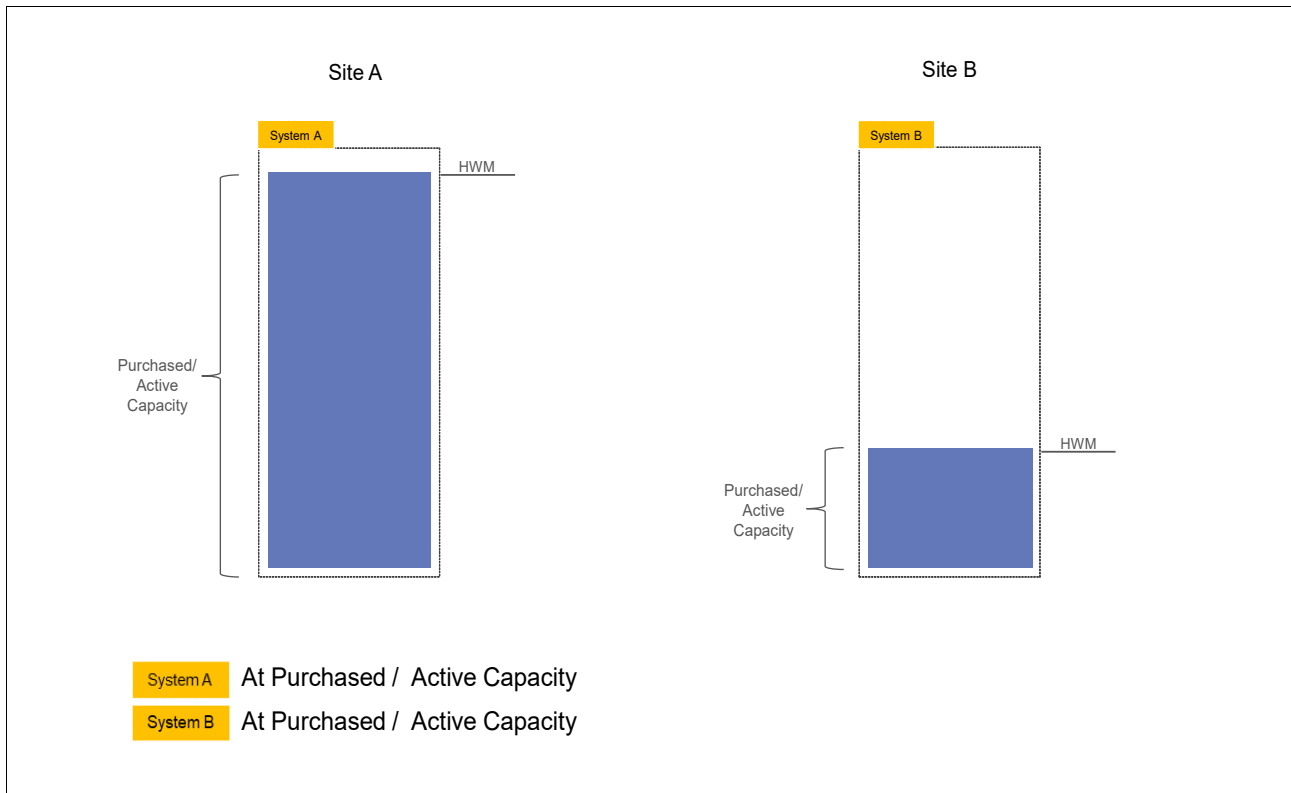


Figure 1 Starting configuration

Figure 2 illustrates the next step of the setup process; the active capacity of the participating IBM z16 systems is changed to their *base capacity*. The client defines the base capacity. The high-water mark (HWM) shows the purchased capacity level, which remains unchanged.

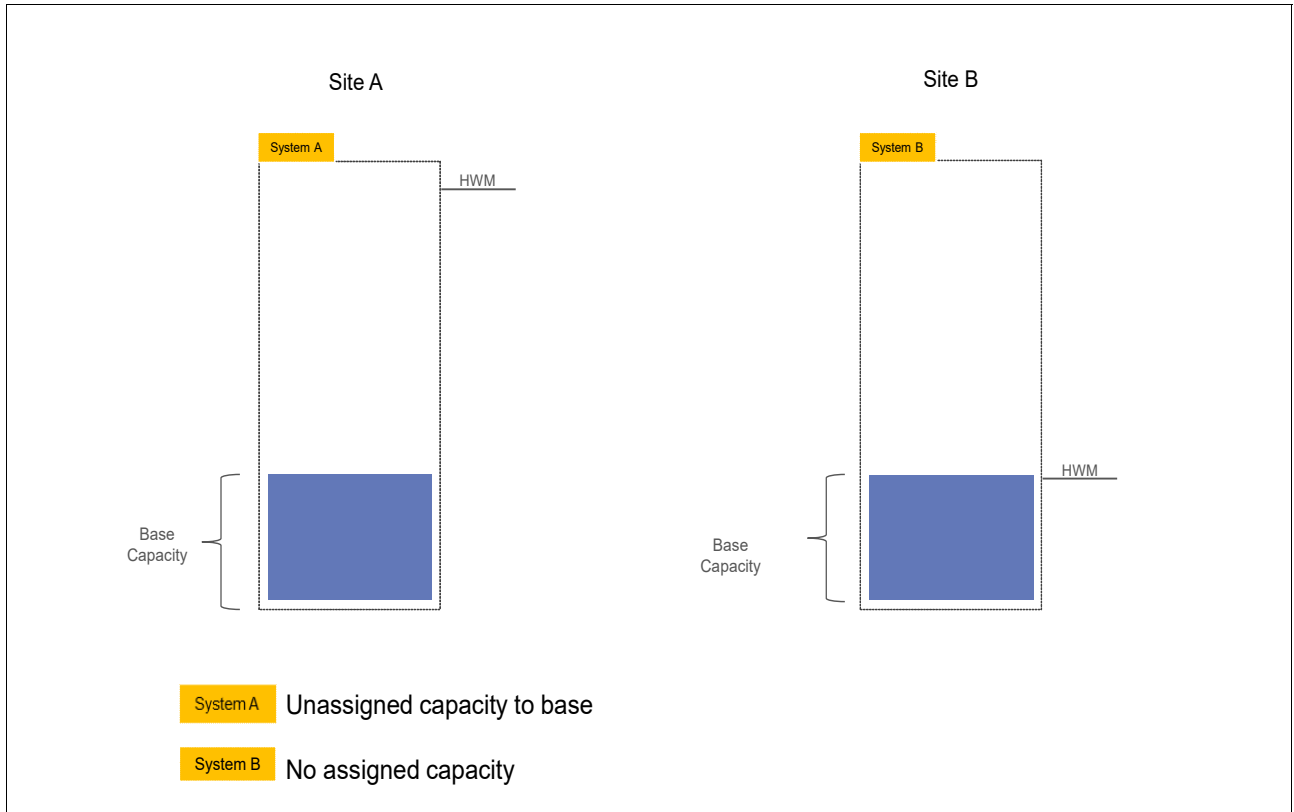


Figure 2 Setting the base capacity for Systems A and B

In the next step, the unassigned capacity in System A is restored with a Flexible Capacity Record. Another Flexible Capacity Record is installed on System B to increase the capacity to the amount that the client has licensed. See Figure 3.

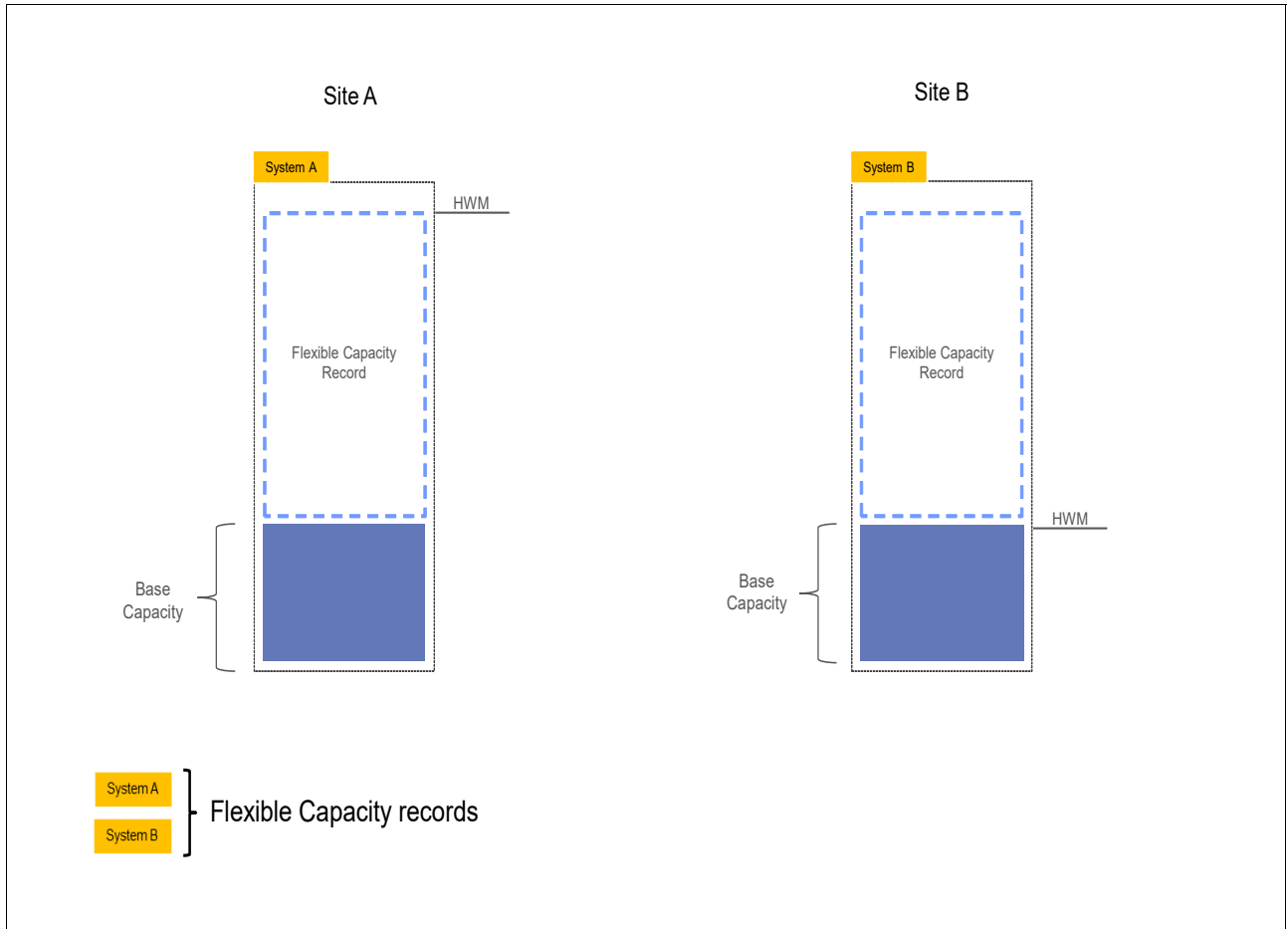


Figure 3 The Flexible Capacity Record installed on System A and System B

The Flexible Capacity Record on System A is activated up to the machine's HWM. On System B, the Flexible Capacity Record is installed, but not activated. With record activation on Site B, capacity is increased to the System A production level. The setup process is now complete. See Figure 4.

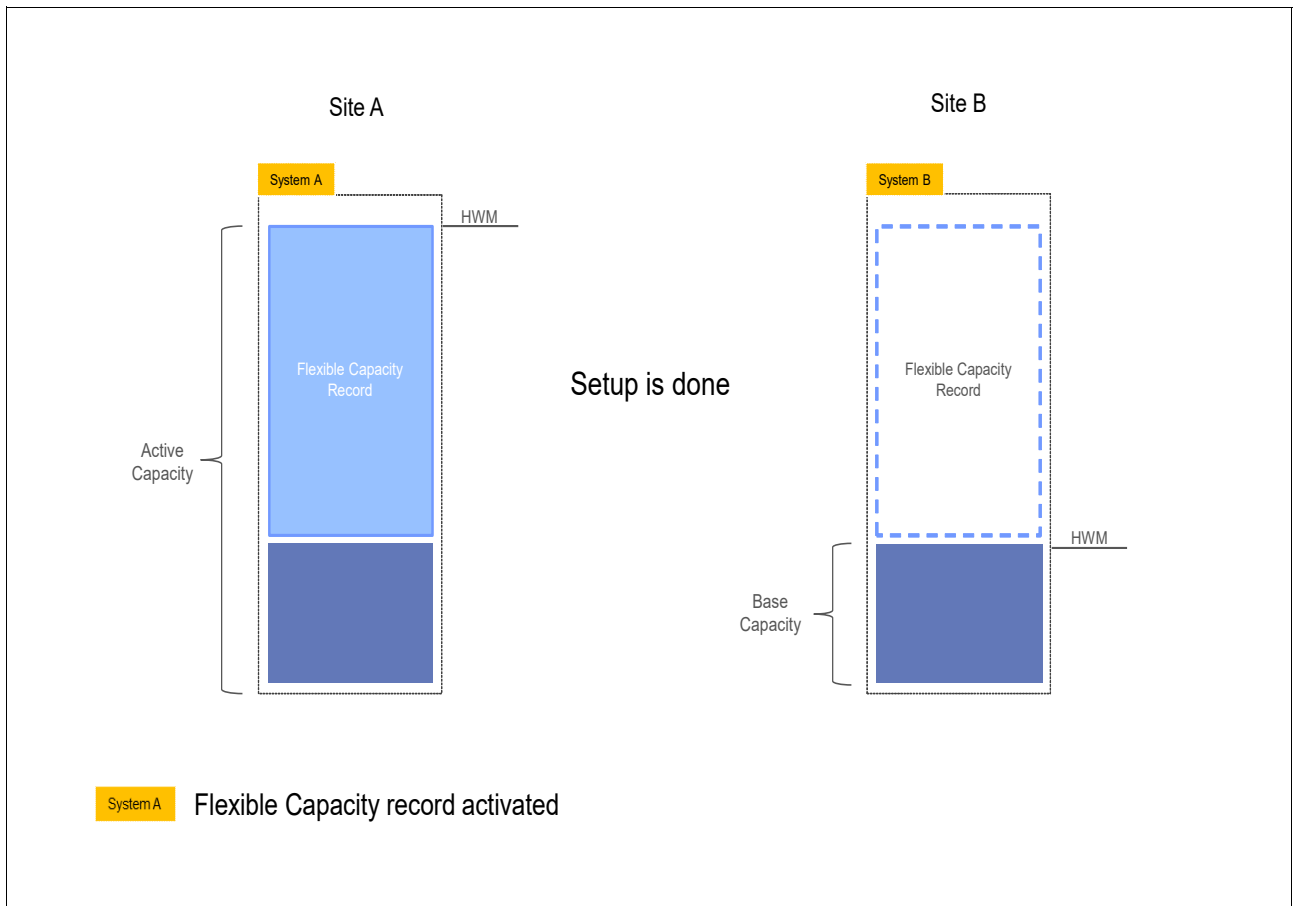


Figure 4 Flexible Capacity Record installed

## Transferring workloads between sites

After the setup is complete, as shown in Figure 5, it is possible to move the workloads from Site A to Site B. You have 24 hours to transfer your workload between sites, and, as mentioned before, this process can be fully automated by using GDPS procedures or other tools.

During this 24-hour window, Flexible Capacity for Cyber Resiliency can remain active on both sites. After 24 hours, Flexible Capacity for Cyber Resiliency will be deactivated on System A, which decreases the amount of capacity that is activated on System A.

You must stay within the limits of licensed processor capacity.

If you want to test DR scenarios, prove compliance, or perform maintenance on site A, you can activate the Flexible Capacity Records anytime without IBM involvement.

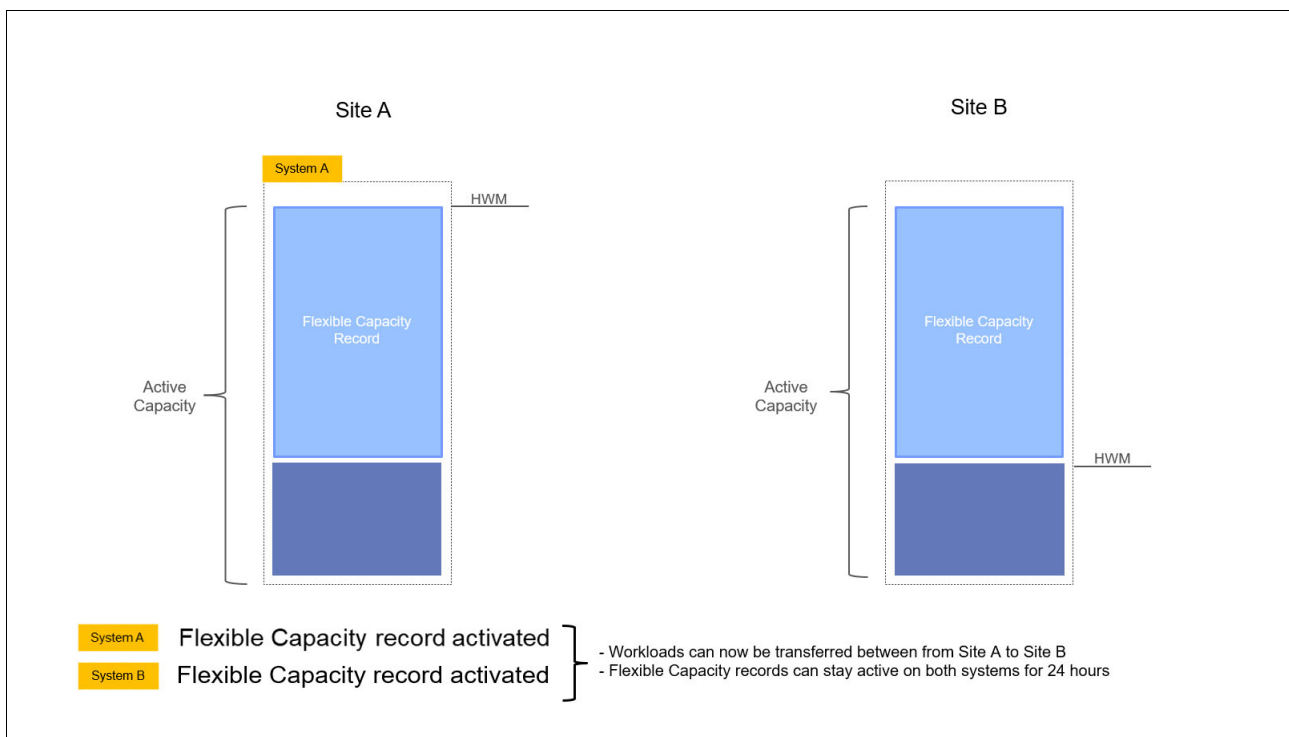


Figure 5 Flexible Capacity Record active on both sites, allowing workloads to be transferred

Figure 6 shows the Flexible Capacity Record deactivated on System A, returning to its *base capacity*. The Flexible Capacity for Cyber Resiliency on System B can remain active for up to 1 year.

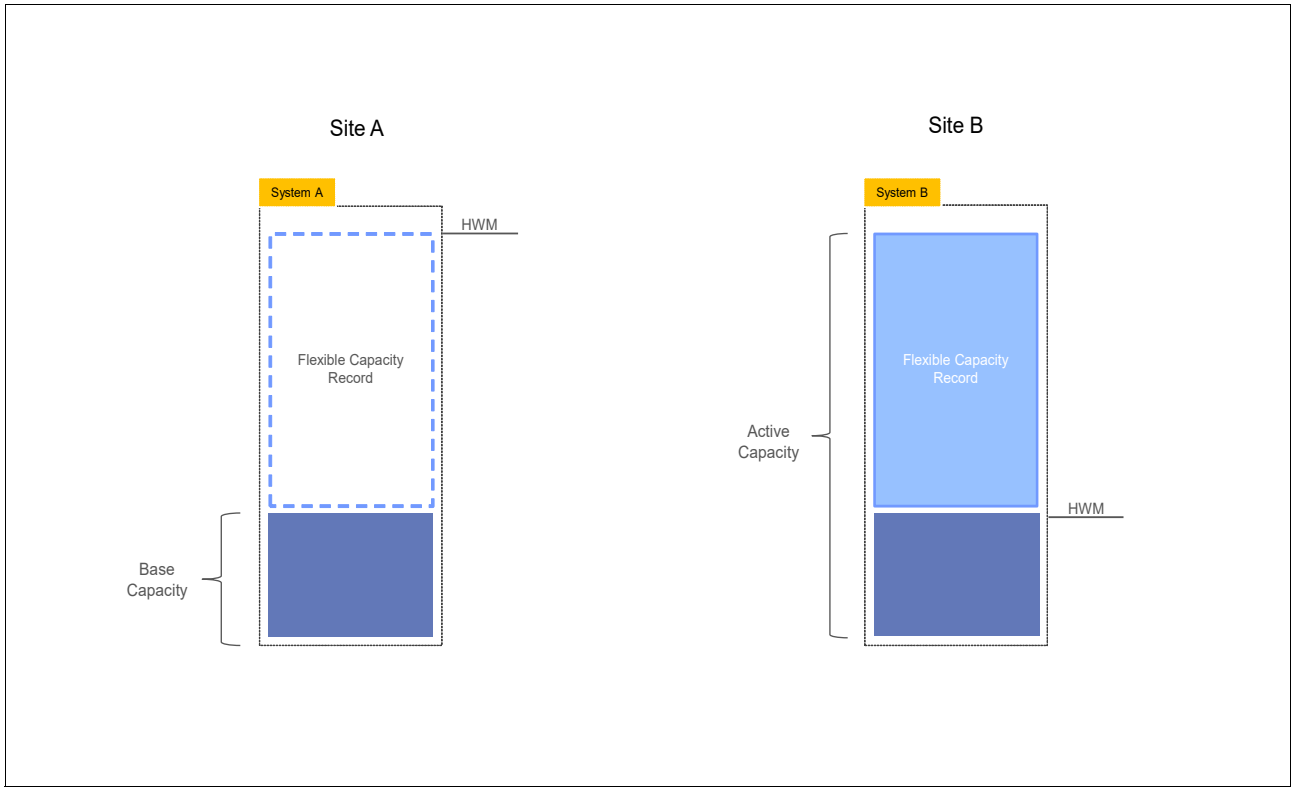


Figure 6 Flexible Capacity Record active on System B

## Multi-system environment

The minimal environment required to run Flexible Capacity for Cyber Resiliency is a two-site configuration with a system at each site.

Flexible Capacity for Cyber Resiliency is also suited for complex multi-system environments, and it does not require the number of systems on both sites to be the same. See Figure 7.

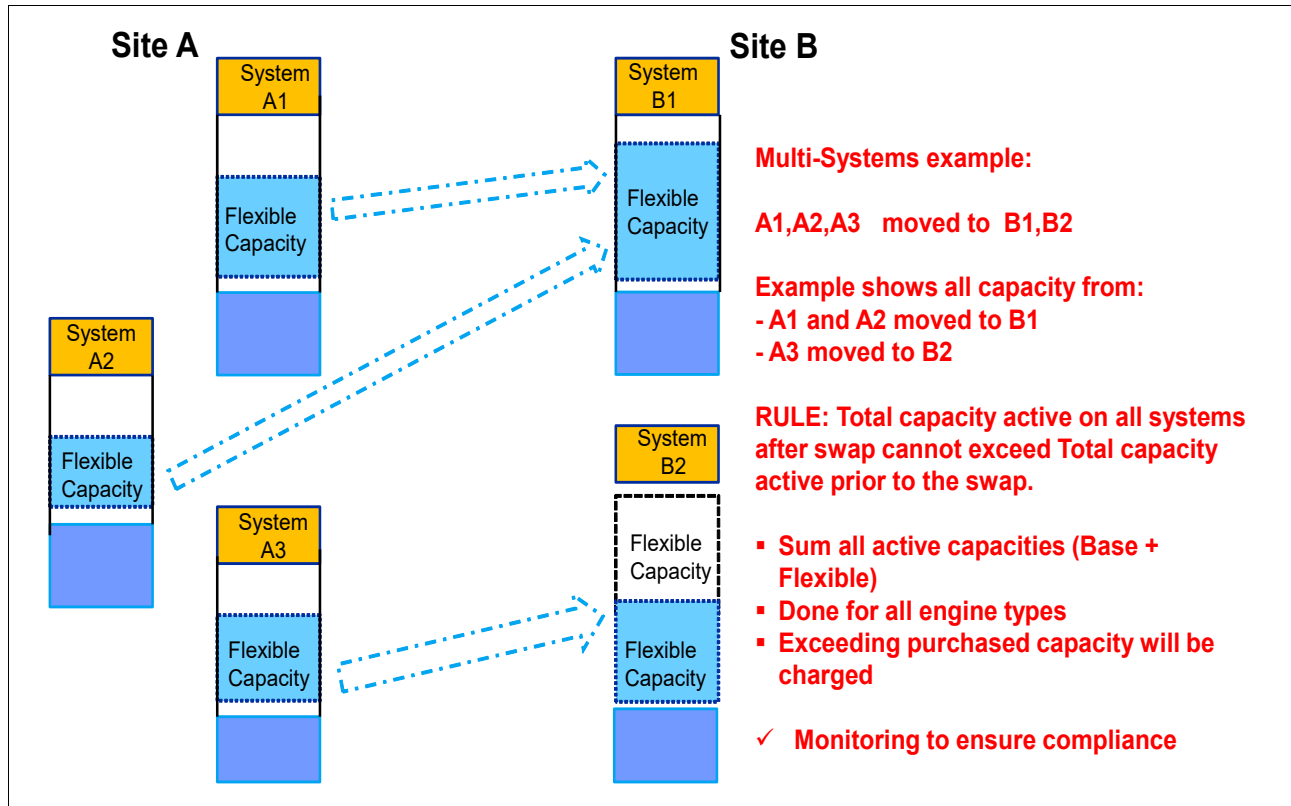


Figure 7 Multi-system Flexible Capacity for Cyber Resiliency example

Movement of capacity does not need to be one-to-one, and the capacity also can be split between multiple Systems on site B.

At the completion of the swap, the total capacity that is active on all systems after the swap cannot exceed the total capacity that was active before the swap.

## Tailored Fit Pricing and IBM Z Flexible Capacity for Cyber Resiliency

IBM Z Flexible Capacity for Cyber Resiliency can be used with Tailored Fit Pricing - Hardware Consumption Solution (TFP-HW). The Flexible Capacity for Cyber Resiliency limit is always based on the base capacity. The presence or activation of TFP-HW does not affect the amount of capacity that can be activated by a Flexible Capacity Record.

The Flexible Capacity Record is always designated as the first record that was activated, regardless of the order in which temporary records or TFP-HW was activated.

The example that is shown in Figure 8 shows an active Sysplex across Site A and Site B.

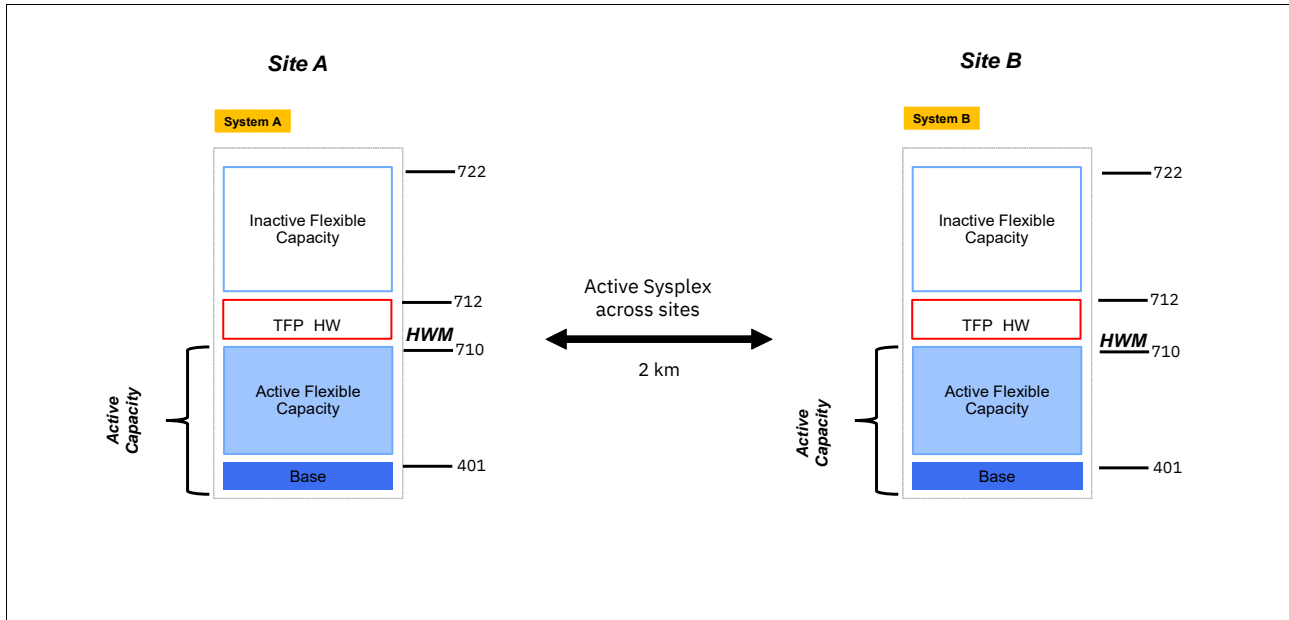


Figure 8 Flexible Capacity for Cyber Resiliency in a two-site sysplex

System A has a base capacity of a model 401 and the Flexible Capacity Record is partially activated up to a model 710. On top of the active Flexible Capacity for Cyber Resiliency sits a TFP-HW capacity of two extra CPs to a maximum of a model 712. The inactive part of the Flexible Capacity Record floats on top of the TFP-HW capacity.

System A is in a Sysplex with System B that has the same configuration.



The data-center operator plans to perform maintenance on System A and activates Flexible Capacity for Cyber Resiliency on System B. Figure 9 shows the configuration of both machines after the operator action.

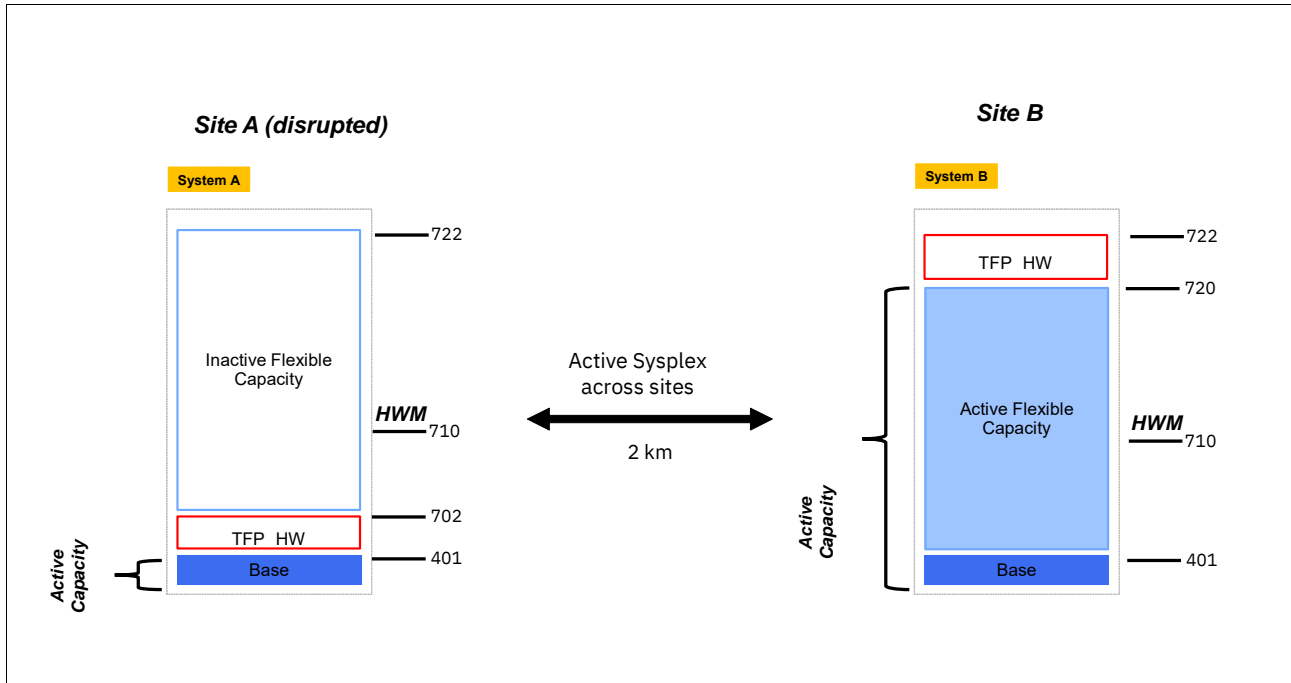


Figure 9 Flexible Capacity for Cyber Resiliency with two site sysplex

All of *System A* Flexible Capacity for Cyber Resiliency is activated on *System B*, and *System A* is left with only the base capacity of a model 401. On top of the base capacity sits the TFP-HW capacity.

System A can safely be deactivated, for instance, to undergo maintenance.

System B has now the entire Flexible Capacity Record activated and shows an active capacity of a model 720. The TFP-HW capacity sits again on top of the active capacity and adds now another 2 CPs to the model 720.

Figure 9 illustrates that the presence or activation of TFP-HW does not impact the amount of capacity that can be activated by a Flexible Capacity Record.

The charge for usage of the TFP-HW temporary capacity is based on its usage. Charges against usage of other temporary capacity are separate from the TFP-HW usage charges. Therefore, no double charging will occur.

# Ordering and installing IBM Z Flexible Capacity for Cyber Resiliency

To facilitate ordering IBM Z Flexible Capacity for Cyber Resiliency, you can use the following CoD feature codes (FC):

- ▶ Flexible Capacity Authorization (FC 9933)
- ▶ Flexible Capacity Record (FC 0376)
- ▶ Billing feature codes (Feature Codes 0317 - 0322, and 0378 - 0386)

FC 9933 and FC 0376 must be active on each machine that is participating in Flexible Capacity for Cyber Resiliency.

A new Capacity on Demand contract attachment also must be signed by the client.

## Flexible Capacity for Cyber Resiliency activation guide

The following activation example demonstrates the steps that are required to activate a Flexible Capacity Record and perform a capacity swap by using the HMC.

The following table shows the machines that we used in the activation example and shows their setup from IBM manufacturing:

<b>System A: 5C73B3WZ &gt;&gt; Site A 3931- A01 - Max82</b>	<b>System B: VNNMKEBX &gt;&gt; Site B 3931- A01 - Max82</b>
Purchased Model Capacity: 722 Active Model Capacity: 401	Purchased Model Capacity: 401 Active Model Capacity: 401
Purchased ICF engines: 10 Active ICF Engines: 0	Purchased ICF engines: 0 Active ICF Engines: 0
Purchased IFL engines: 10 Active ICF Engines: 0	Purchased IFL engines: 0 Active ICF Engines: 0
Purchased zIIPs engines: 10 Active ICF Engines: 0	Purchased zIIPs engines: 0 Active ICF Engines: 0
Flexible Capacity Record: Reactivation only	Flexible Capacity Record 11800%, 10 ICF, 10 IFL, 10 zIIP

## Post-install activation Reactivating unassigned capacity

Figure 10 shows the Flexible Capacity Record being activated on Site A.

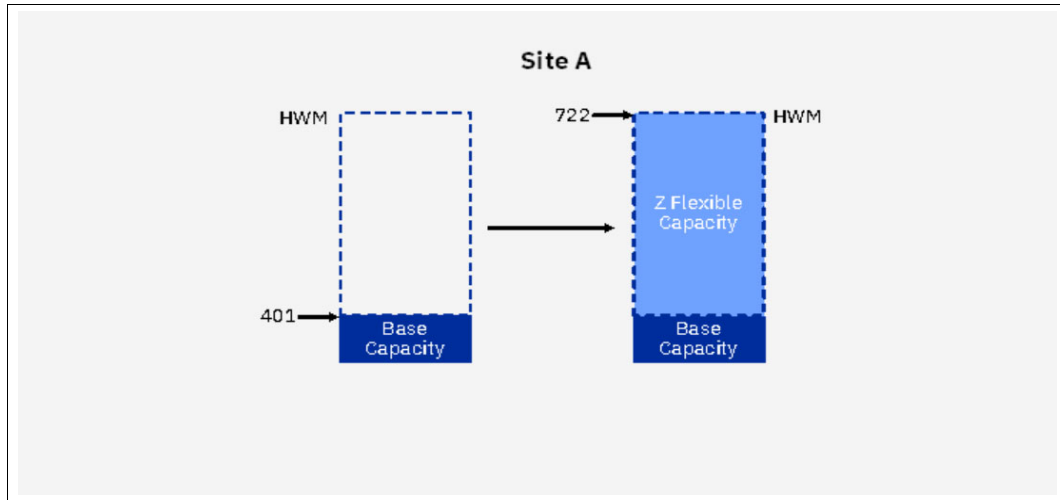


Figure 10 Activating the Flexible Capacity Record on Site A

The next step is to access the Hardware Management Console with proper credentials. After you log in, the Hardware Management Console Dashboard is displayed.

In the Dashboard, click the **(+) plus** sign at the left of **Systems Management** option. See Figure 11.

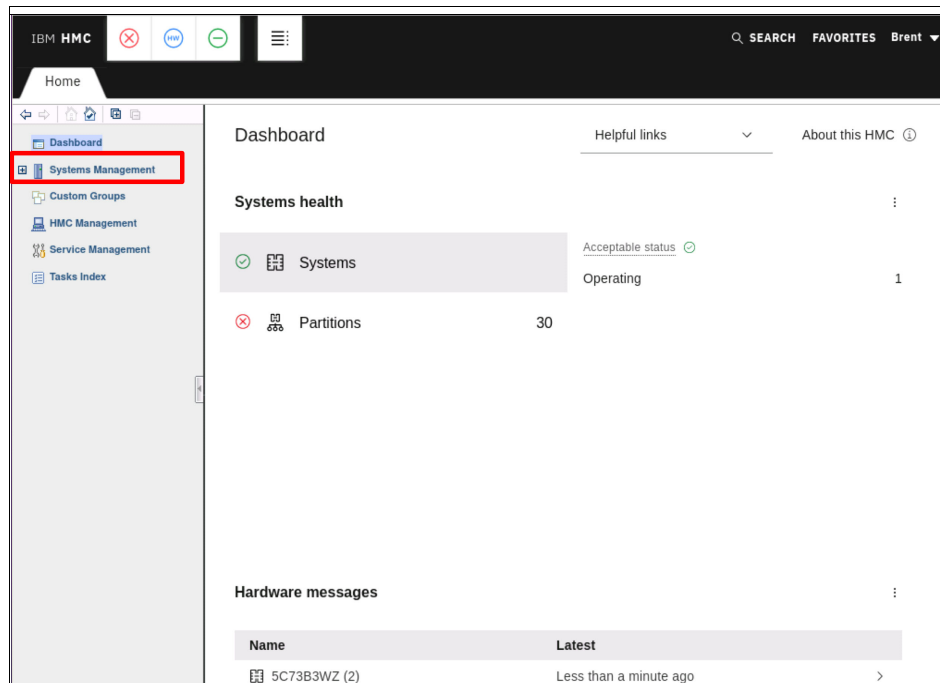


Figure 11 Use Systems Management to select the proper machine serial (5C73B3WX)

The list of partitions on the systems is displayed. In the **Partitions** tab, the command categories are listed in the Tasks pane. Click the **(+) plus** sign at the left of **Configuration** to view the list of options. See Figure 12.

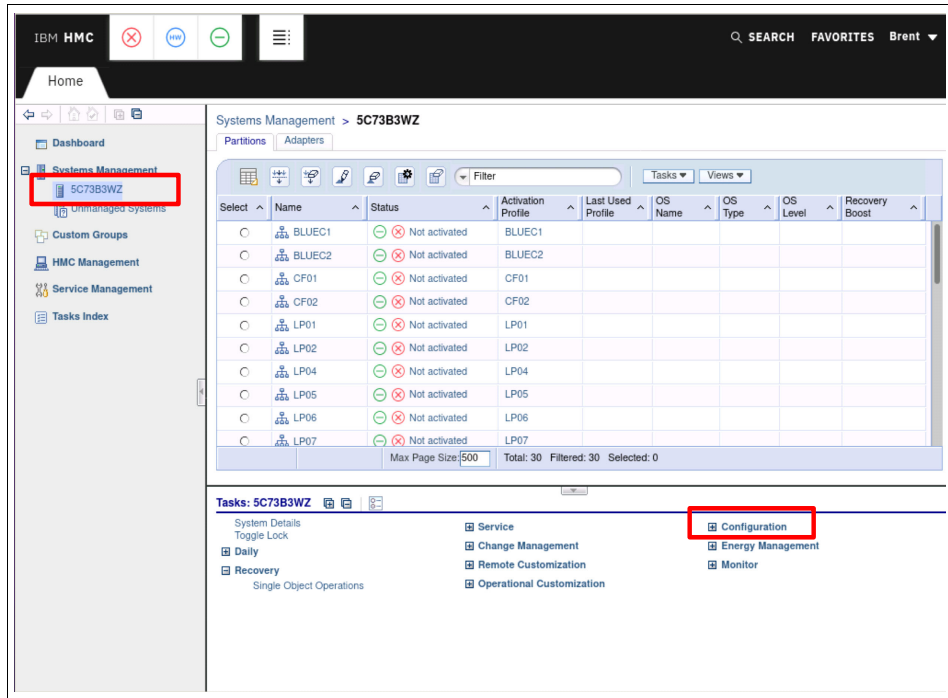


Figure 12 Selecting the Configuration Task

From the Configuration menu, select **Perform Model Conversion** to open the **Perform Model Conversion** tab, connect to the Support Element, and display the task. See Figure 13.

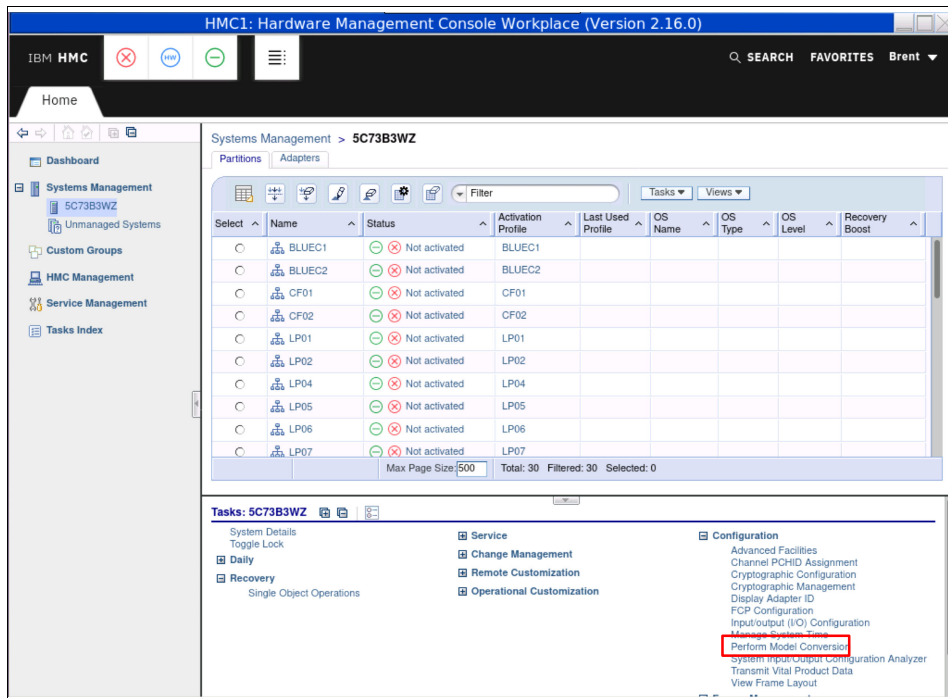


Figure 13 Selecting Perform a Model Conversion to initiate the related SE task

While the Perform Model Conversion (PMC) task is active, certain operations might be blocked, such as power-on reset of the system or installation of service updates. After you complete the Perform Model Conversion task, exit the task. Click **OK** to clear the warning. See Figure 14.

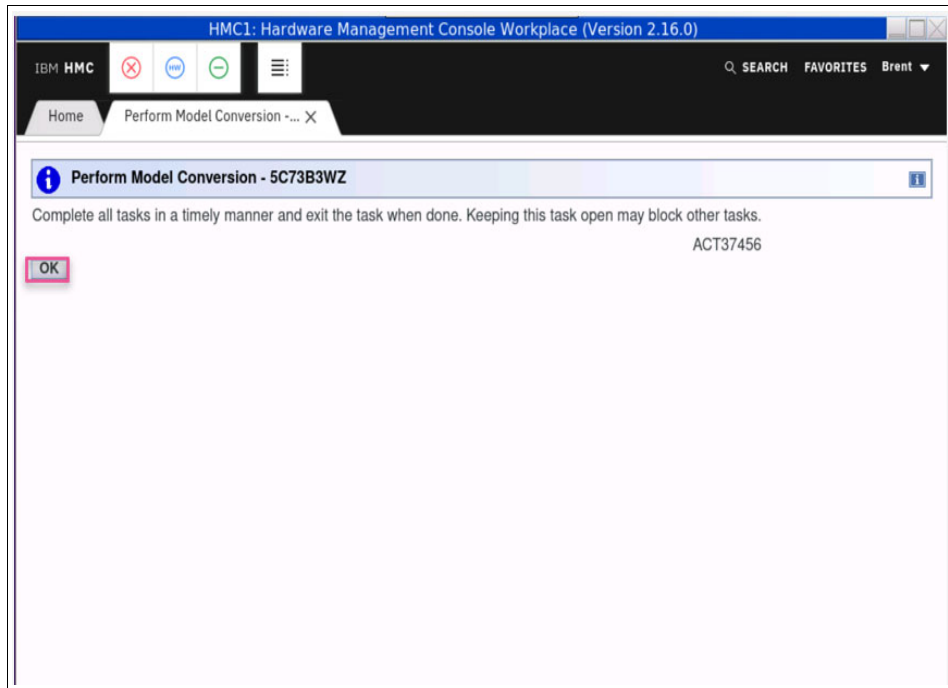


Figure 14 Warning message about tasks that are being blocked during Perform Model Conversion

In the **Perform Model Conversion** tab, expand the list for **Temporary Upgrades** to view the options. In this scenario, the Flexible Capacity Record is already installed but must be activated. Click **Manage** to open the Temporary Upgrades page where the record can be activated. See Figure 15.

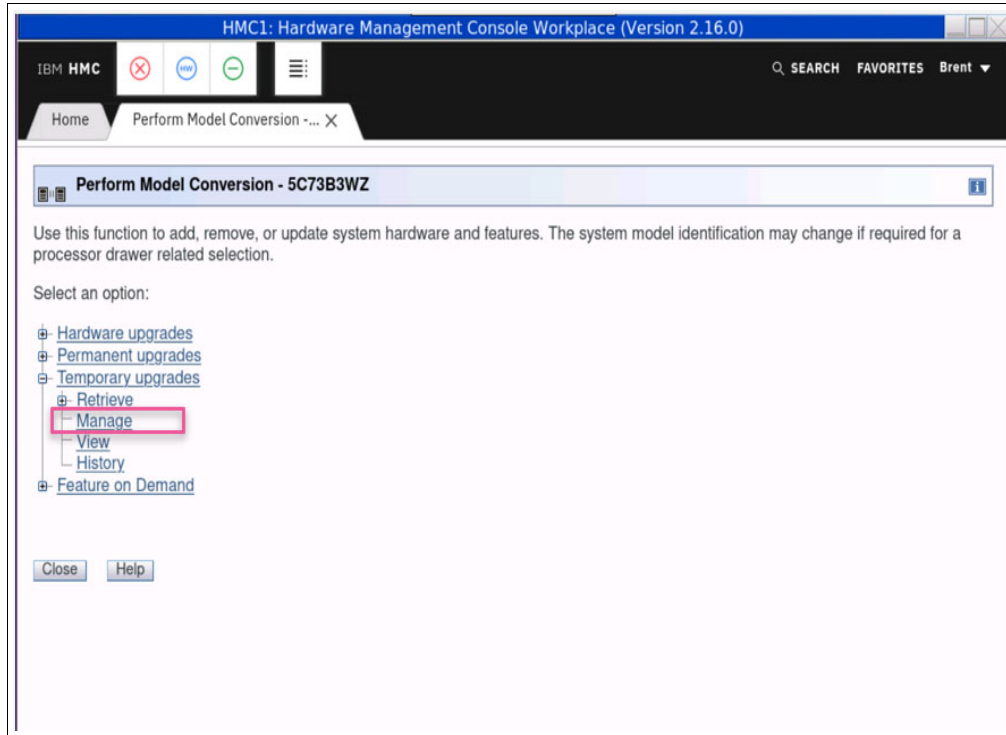


Figure 15 Selecting the Manage option

The list of installed records is displayed as shown in Figure 16.

You can have other records, such as a CBU or On/Off CoD record installed.

In this case, Flexible Capacity for Cyber Resiliency is the only record we installed on the system.

**Note:** The one or more records that appear on the Manage page were previously downloaded from the IBM Resource Link® and then installed on the system.

The list of actions that can be performed is shown at the bottom of the page.

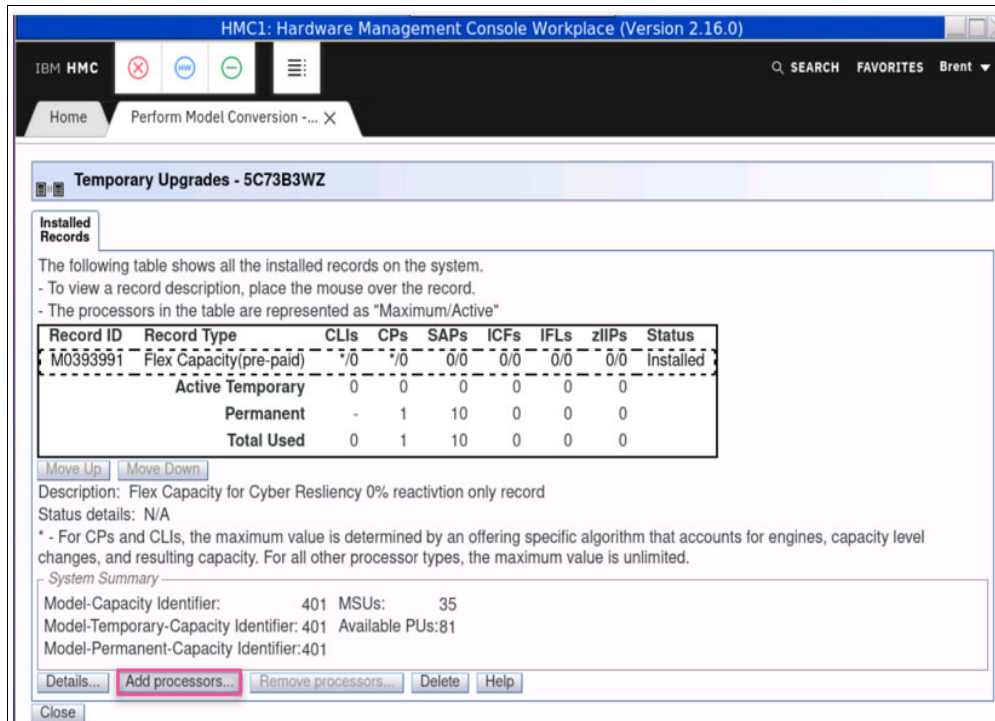


Figure 16 The record available to be used is shown under the Installed Records tab.

To activate the record, click **Add processor**, which opens the Change Activation Levels page with options to add additional processors. See Figure 17

In Figure 17, the current active configuration is displayed. The record shows that, currently, no temporary capacity is active. The model capacity options are shown as a list of software models. The list scrolls down to show all possible options.

For other engine types, pull-down menus show the number of additional processors you can add. Because this system in the example has unassigned capacity, the options are to reactivate any of the unassigned engines.

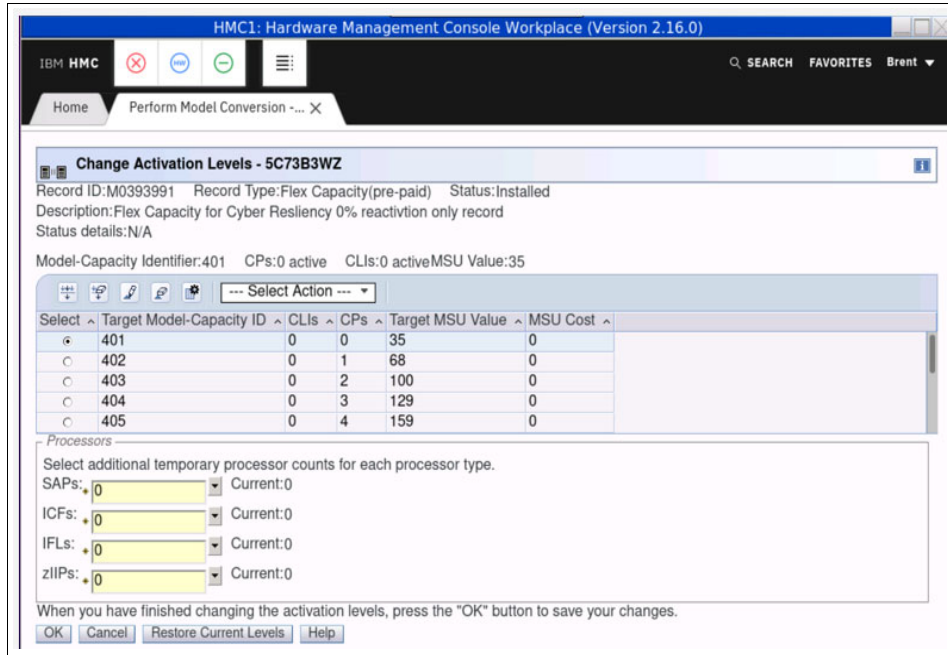


Figure 17 Change Activation Levels page showing current active configuration



As shown in Figure 18, you can scroll down the model capacity and select the maximum value, which is the purchased capacity of 722. You can also select to reactivate 10 ICFs and IFLs, and select the 10 zIIPs.

When all selections are done, click **OK** to accept the changes.

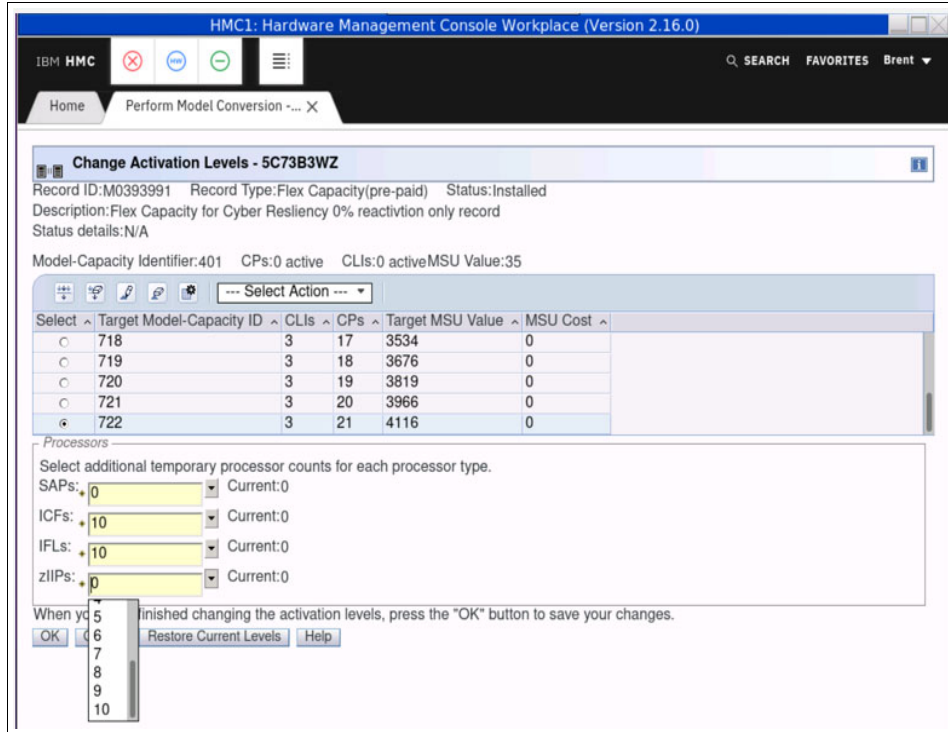


Figure 18 User Change Activation Levels selections

As shown in Figure 18, the model capacity is increased from 401 to a 722, which is an increase of 3 capacity levels and 21 engines.

Each of the specialty engines increase by 10 engines.

If you select **Restore Current Levels**, you return to the Change Activation Levels page to adjust your selections. See Figure 17 on page 22.

When you click **OK** in the Change Activation Levels page, a summary of changes that are selected is displayed as shown in Figure 19. Select **Yes** in the Temporary Upgrades page to proceed.

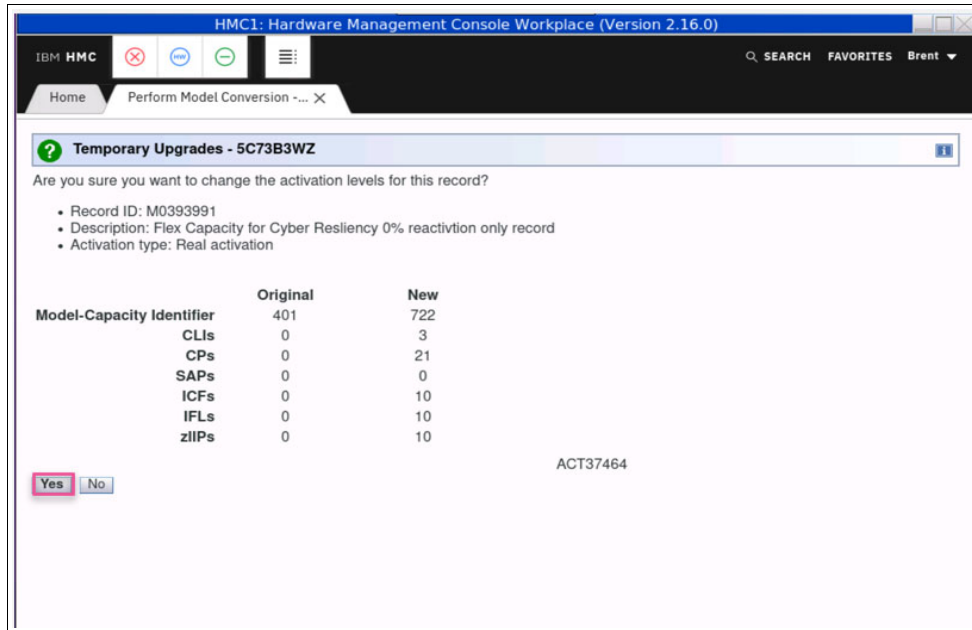


Figure 19 This page shows the changes made from the original configuration

Figure 20 shows the first message that is displayed while the machine is updating the processor activation levels. The second message is displayed when it is complete. Click **OK** on the second message to return to the initial Perform Model Conversion page.

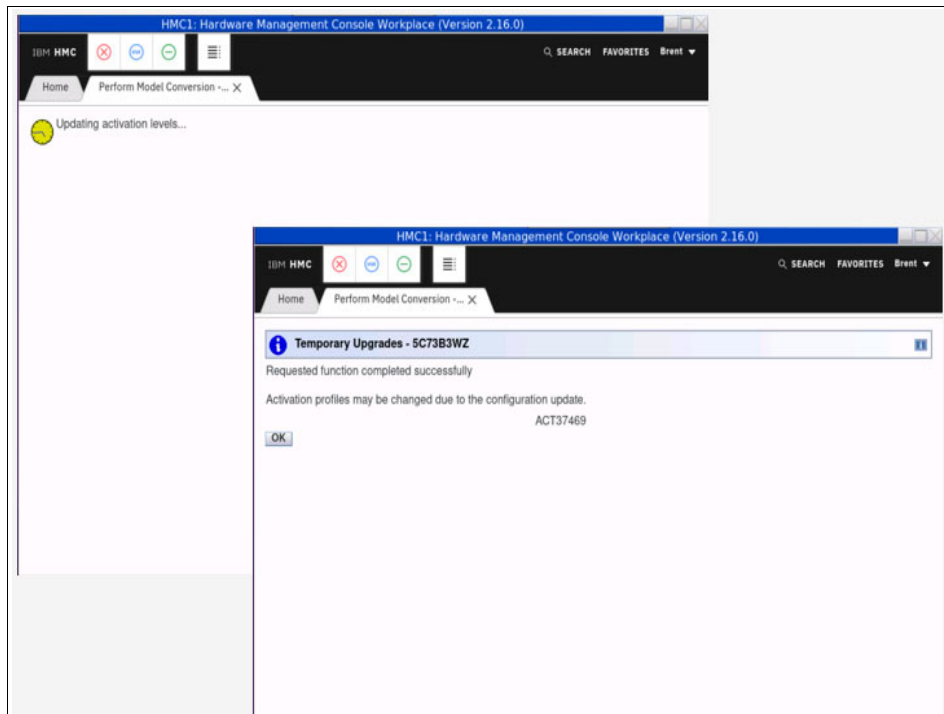


Figure 20 Temporary record activation completion messages sequence

The **Installed Records** tab is updated to reflect the changes you requested.

On the record itself, you can see that it activated 3 CLIs, 21 CPs, and 10 ICFs, IFLs, and zIIPs. The status is now **Active-Real**.

At the bottom of the page shown in Figure 21, you can see that the capacity is from a 401 to a 722. The updated capacity is reflected in both the Model-Capacity-identifier and the Model Temporary-Capacity identifier.

Click **Close** to close the **Perform Model Conversion** tab.

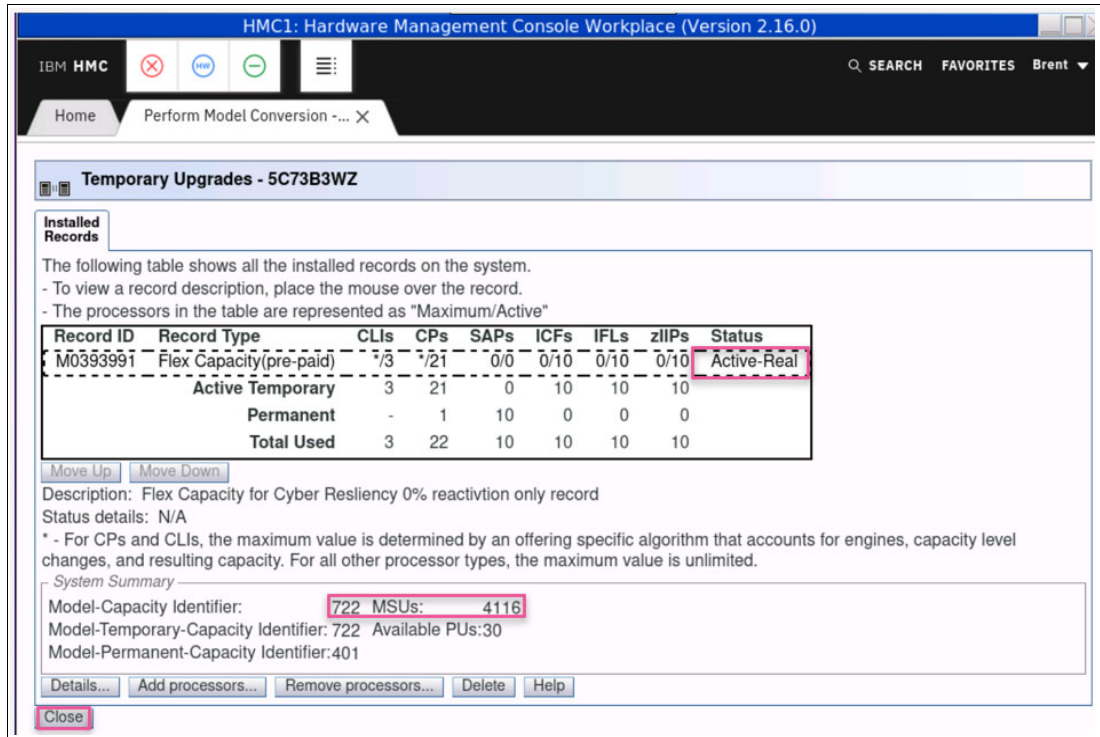


Figure 21 Temporary Upgrades after activating the Flexible Capacity Record

After the changes, the system is back to its purchased configuration. The LPARs can now be activated and the production workload can be started.

## Capacity Swap: Moving capacity from active system to target system

Figure 22 shows the Flexible Capacity Record being activated on Site B.

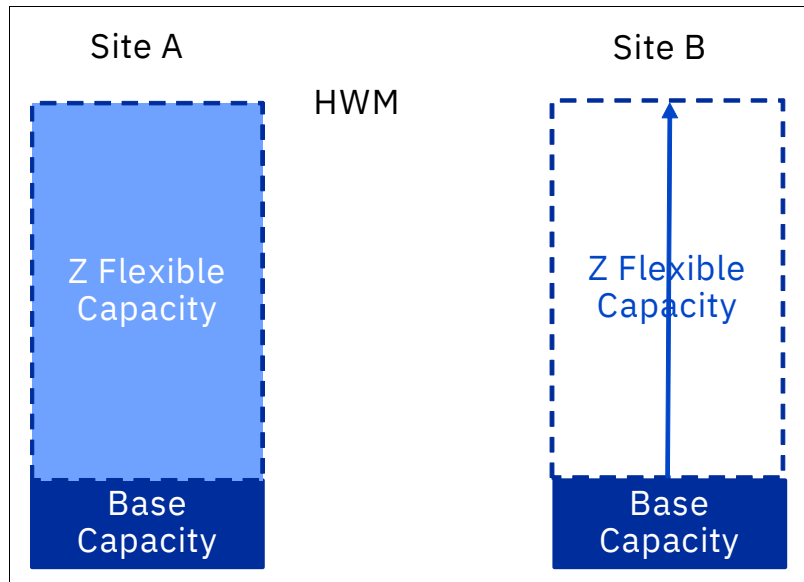


Figure 22 Activating the IBM Z Flexible Capacity Record on System B - Site B

Figure 23 shows the move of the capacity from current active to target system.

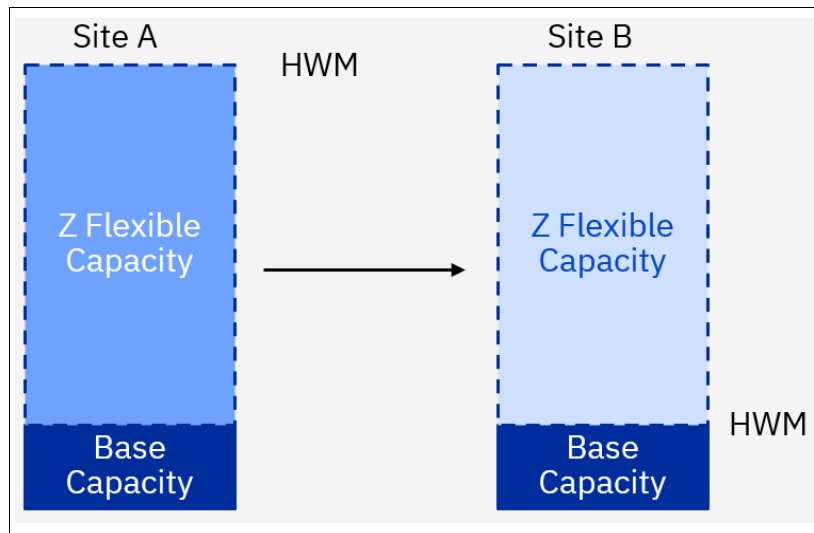


Figure 23 Moving capacity from Active to Alternate System

On the alternate system (Site B), using the same steps as before, open the Temporary Upgrades page.

On this system, the Flexible Capacity Record is inactive. The model capacity is a 401, and there are no active ICF, IFL, or zIIP engines.

Ensure that the record is selected (dashed box around the record) and click **Add Processors**, as shown in Figure 24.

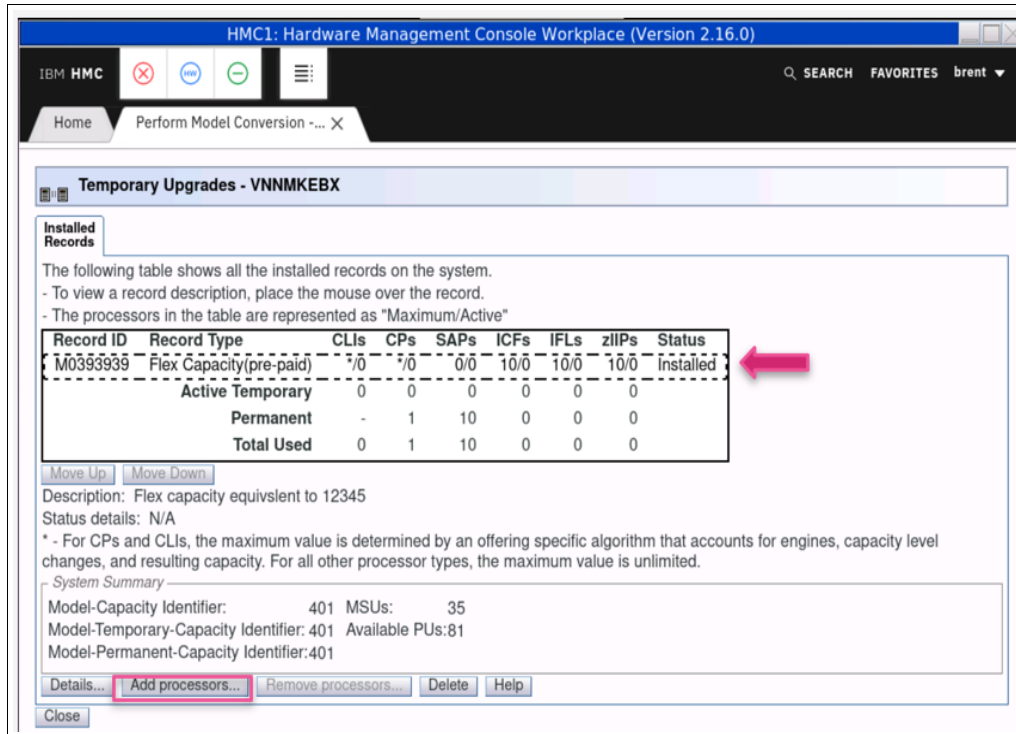


Figure 24 Site B (alternate) system Temporary Upgrades page

Activate the same capacity as the capacity that is active on Site A.

**Note:** On this system, MSU costs are associated with the model-capacity movements. That is because this machine is not a reactivation only record.

Scroll down in the Model Capacity pane and select 722. For each of the ICF, IFL, and zIIP pull-down menus select 10. See Figure 25

After all selections are made, click **OK**.

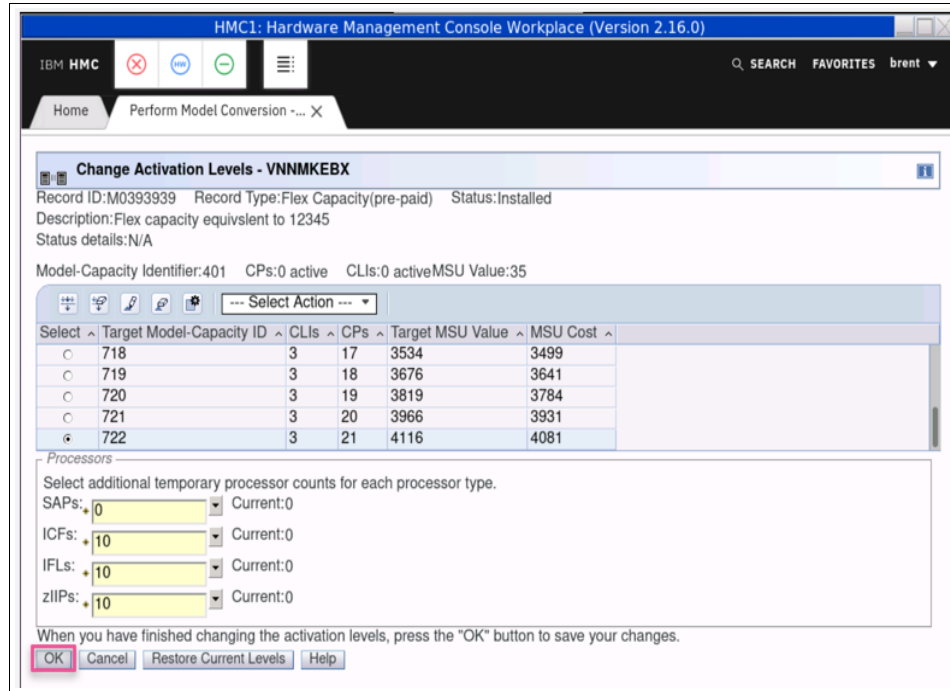


Figure 25 Change Activation Levels selected

The changes from the original configuration that are caused by this temporary record are now shown in Figure 25.

Here you can change the model capacity from a 401 to a 722. That is an increase of 3 capacity levels, and 21 engines. Each of the specialty engines is increased by 10 engines.

If everything is correct, click **OK** to continue. If you click **Cancel**, you are returned to the Change Activation Levels page to adjust your selections.

When you click **OK**, the page at Figure 26 opens. Confirm the changes by clicking **Yes**.

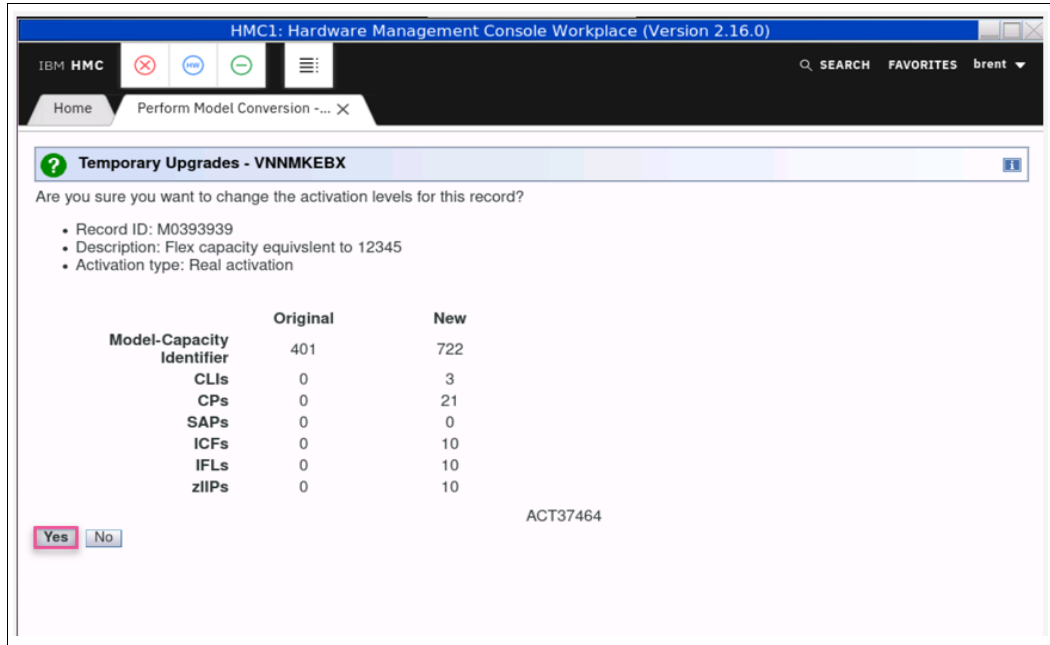


Figure 26 Temporary upgrades for System B (Site B) are shown

The first message is displayed while the machine is updating the processor activation levels. See Figure 27. When update is complete, the window is updated with a second message to verify successful completion. Click **OK** to return to the initial Temporary Upgrades page of the **Perform Model Conversion** tab.

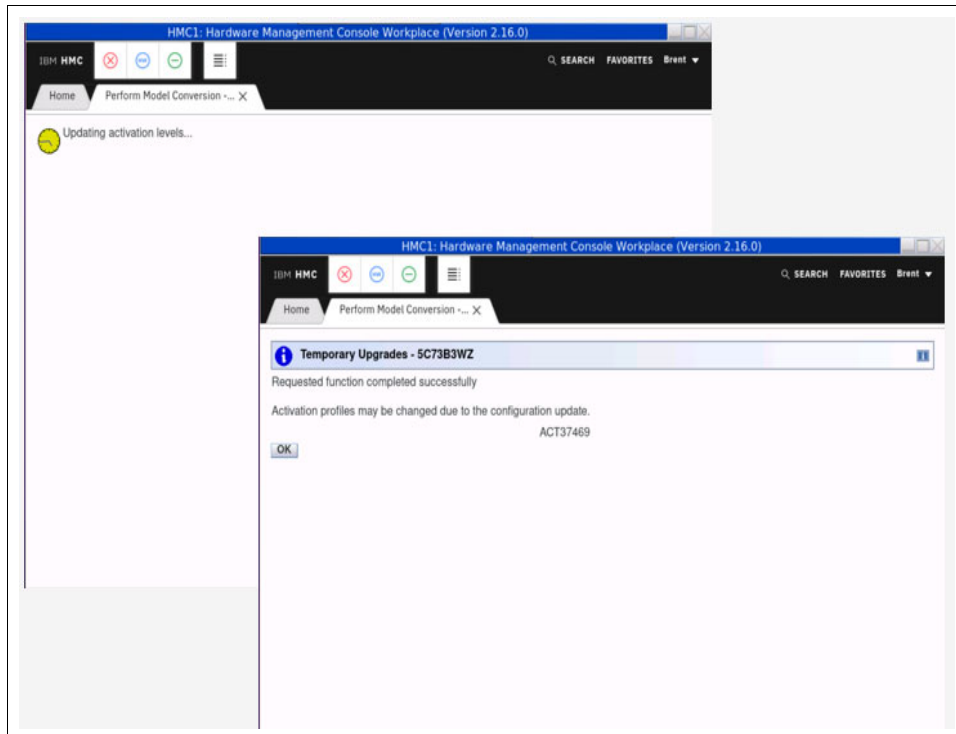


Figure 27 Temporary record activation completion messages sequence

Figure 28 on page 30 shows that the **Installed Records** tab is updated to reflect the requested changes.

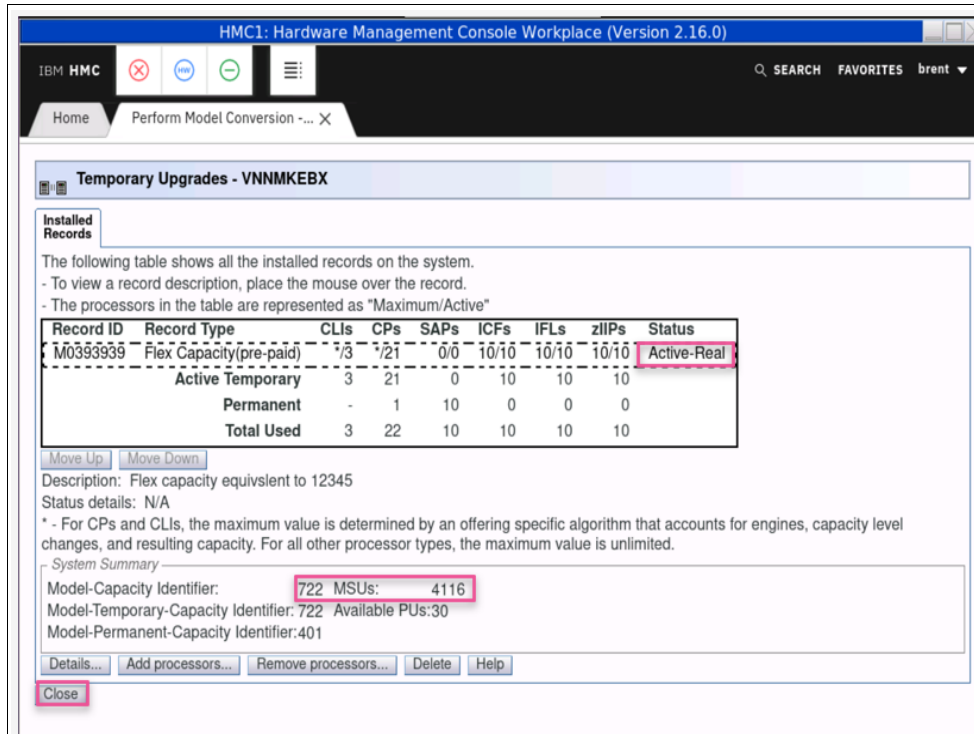


Figure 28 Installed Records tab after the requested changes

The record with 3 CLIs, 21 CPs, and 10 ICFs, IFLs, and zIIPs is activated. The status is Active-Real. In the System Summary section, the capacity is changed to 722. The updated capacity is reflected in both the Model Capacity-identifier and the Model Temporary-Capacity identifier.

Click **Close** and close the **Perform Model Conversion** tab.

At this point, your processor configuration on this system matches your current production system. Activate your LPARs on this system, and then redirect your workload to site B to use this system at site B as your production system.

The next step is to reconfigure site A, which is now your backup system.



**Second step: Removing capacity from the former production system**

Figure 29 shows the removal of Flexible Capacity Record installed on the system at site A.

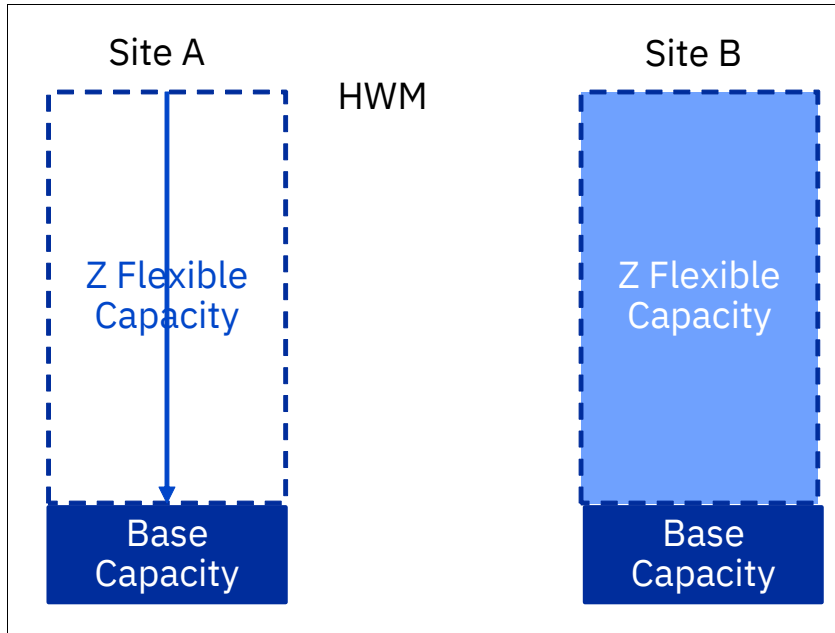


Figure 29 Removing the Flexible Capacity Record from the system at site A

Deactivate all LPARs that are no longer needed at site A, so the LPARs do not reserve resources. When done, expand the Configuration menu and select **Perform Model Conversion** to open the Temporary Upgrades page.

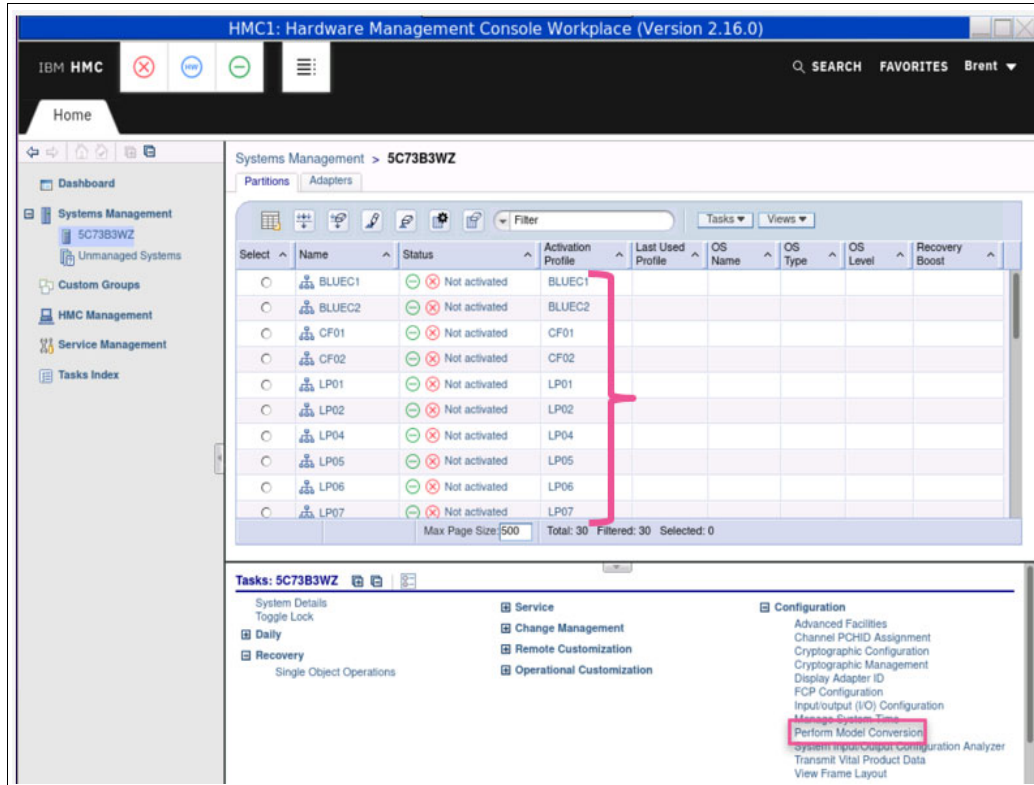


Figure 30 Deactivating LPARs and selecting Perform Model Conversion task

In the **Installed Records** tab, the status of the Flexible Capacity Record is **Active-Real**. Remove the extra processors from the record to deactivate it. Select **Remove processors** to remove capacity from the record. See Figure 31.

The screenshot shows the IBM HMC Hardware Management Console Workplace interface. The main content area is titled "Temporary Upgrades - 5C73B3WZ" and contains an "Installed Records" section. A table lists installed records with columns for Record ID, Record Type, CLIs, CPs, SAPs, ICFs, IFLs, zIIPs, and Status. The first record, M0393991, is a "Flex Capacity (pre-paid)" record with a status of "Active-Real", highlighted by a red arrow. Below the table, there are buttons for "Move Up", "Move Down", "Details...", "Add processors...", "Remove processors..." (highlighted in red), "Delete", and "Help". A "Close" button is at the bottom left.

Record ID	Record Type	CLIs	CPs	SAPs	ICFs	IFLs	zIIPs	Status
M0393991	Flex Capacity (pre-paid)	3	21	0	0	0	0	Active-Real
	Active Temporary	3	21	0	10	10	10	
	Permanent	-	1	10	0	0	0	
	Total Used	3	22	10	10	10	10	

Figure 31 Removing the Flexible Capacity Record on Site A

When you click **Remove processors** the Change Activation Levels page is displayed, showing only options to remove capacity. See Figure 32.

When you scroll down the Model Capacity table, you can see that the 722 capacity is selected. The ICF, IFLs, and zIIPs are all at 10.

To turn off all active engines, select the **Undo** button, which sets all values back to their initial value.

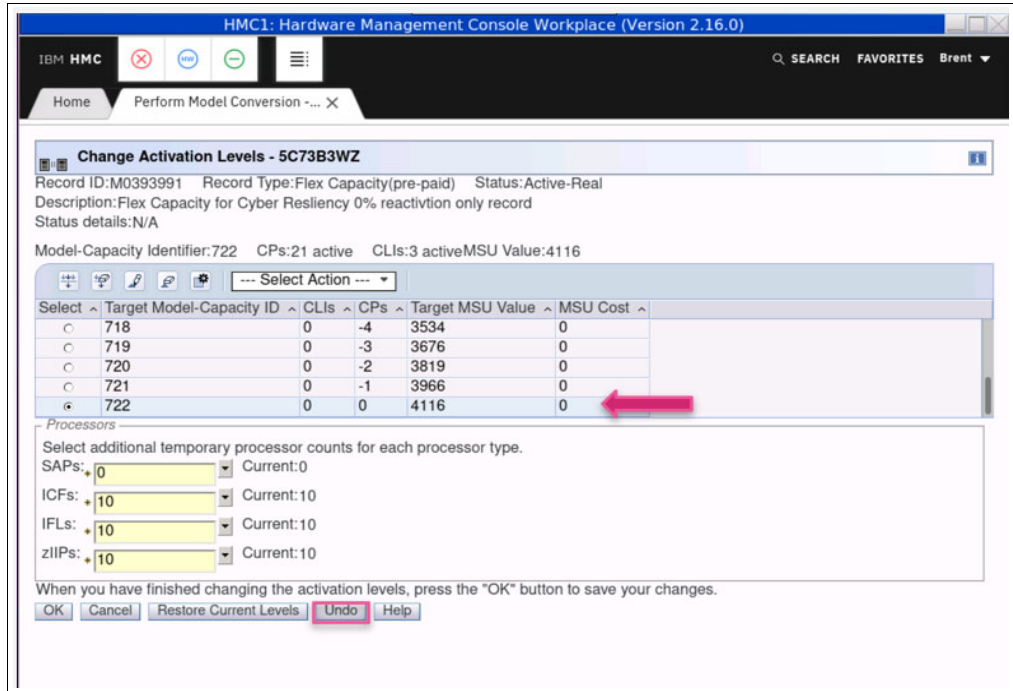


Figure 32 Removing the Flexible Capacity Record

After selecting **Undo**, the capacity level selected is back to the base capacity level of 401, which is a decrease of 3 Capacity levels and 21 CPs. The selected ICF, IFL, and zIIP engine counts are decreased by 10 and are now zero. See Figure 33. Click **OK**.

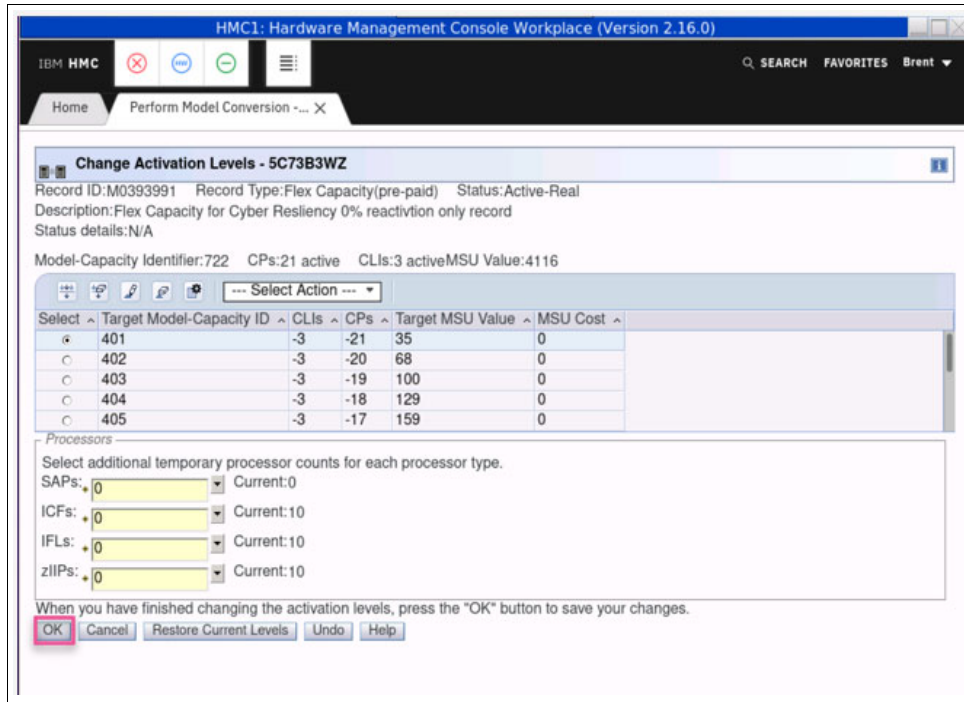


Figure 33 Restoring the system at site A to its base capacity level

## Confirming the changes in the Temporary Upgrades page

In the Temporary Upgrades page, you can confirm the requested changes. See Figure 34. The Model capacity is decreased to 401 by removing 3 capacity levels and 21 CP engines. The ICFs, IFLs, and zIIPs values are zero active.

Click **Yes** to accept the changes.

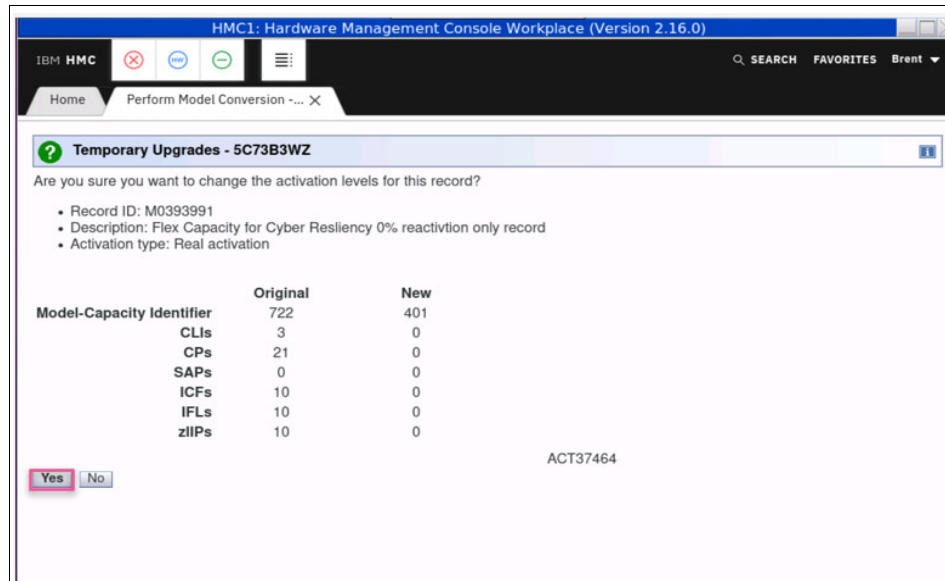


Figure 34 Temporary Upgrades confirmation window

## Processor removal warning

The warning about removing processors is displayed when you decrease the number of active temporary processors. See Figure 35.

The warning is displayed to remind you to verify that there are no active LPAR configurations that have a dependency on the engines from this record. If dependencies exist, the deactivation fails.

Select **OK** to remove the processors and deactivate the record.

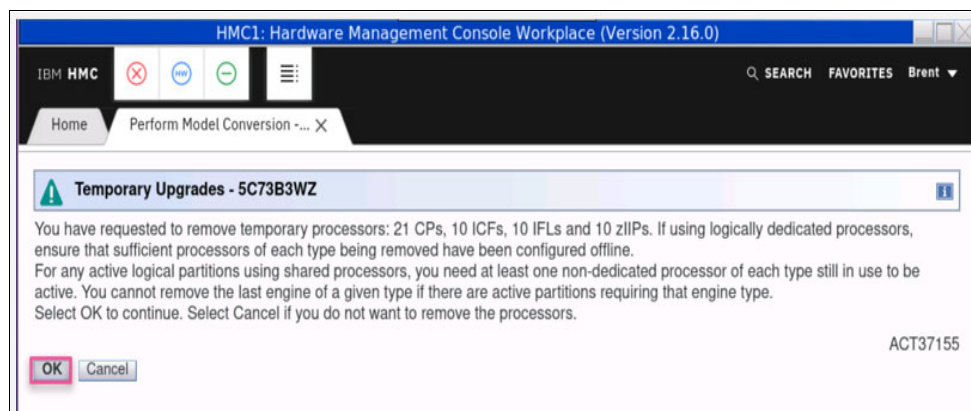


Figure 35 Temporary Upgrades - Processor removal warning message

Click **OK** in the Temporary Upgrades page. See Figure 35.

When you click **OK**, the first message is displayed while the machine is updating the processor activation levels. When the update is complete, the window is updated with a second message to verify successful completion. Click **OK** to return to the initial Temporary Upgrades window in the **Perform Model Conversion** tab. See Figure 36.

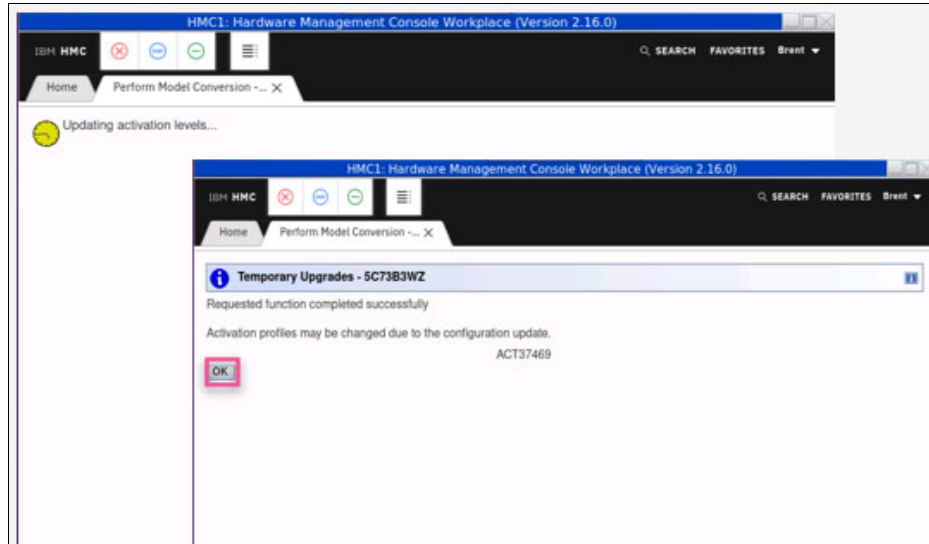


Figure 36 Messages displayed while the Flexible Capacity Record is being deactivated

The **Installed records** tab now shows the Flexible Capacity Record as **Installed**. See Figure 37. It is no longer active. No processors are shown on the record as active. The model identifiers are the same and match the base permanent capacity.

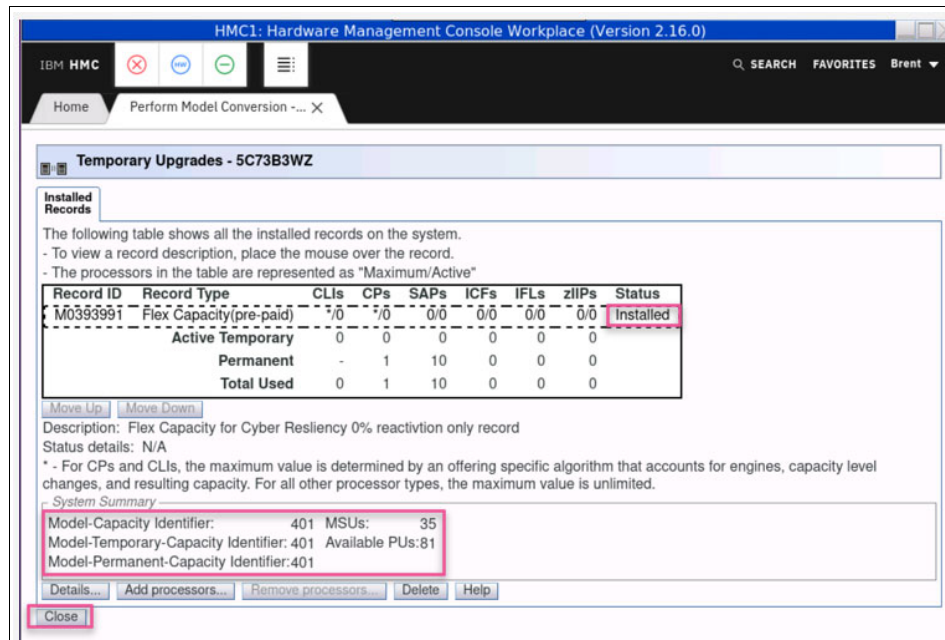


Figure 37 Flexible Capacity Record shown as installed and not active

## Changeover is complete

Production is now running at site B using Flexible Capacity for Cyber Resiliency. See Figure 38.

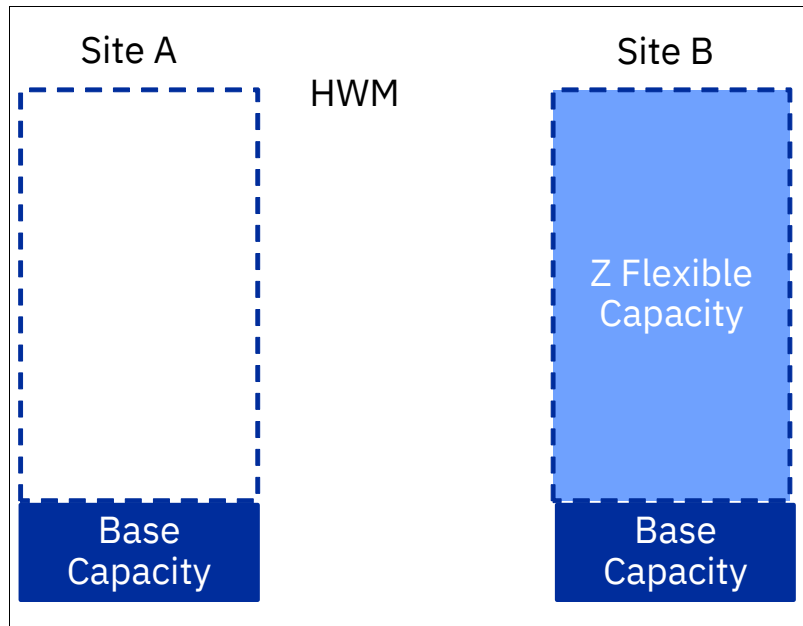


Figure 38 Production workload now running on System B - Site B

## Reversing the changeover

Reversal of the changeover follows the same process:

- ▶ The Flexible Capacity Record is activated in the alternate site.
- ▶ The LPARs are activated, and the workload is started.
- ▶ LPARs on current site are deactivated.
- ▶ The Flexible Capacity Record is deactivated.



# Terms and conditions of IBM Z Flexible Capacity for Cyber Resiliency

The terms and conditions of IBM Z Flexible Capacity for Cyber Resiliency are listed in Table 1.

Table 1 Terms and conditions of Flexible Capacity for Cyber Resiliency

Term or condition	Description
<b>Cross site movement</b>	Inter-site moves can be done, regardless of distance, mirroring, or coupling technology. Intra-site moves are <i>not</i> allowed (two machines in the same data center cannot move workloads back and forth).
<b>Entitlement</b>	The owner of the machine holds a title to the physical hardware. The capacity of that machine is enabled and controlled by the Licensed Internal Code (LIC) of the machine, which is licensed, not sold.
<b>Overlap period</b>	A 24-hour period in which the temporary record can be active on both systems.
<b>Activation limit</b>	12 activations or deactivations per record in a year (12 activations equals 6 round trips).
<b>Activation period</b>	Keep the Flexible Capacity Record active on your alternative site for up to 1 year.
<b>License transfer</b>	LIC is licensed to one specific serial numbered machine only. It cannot be transferred to another machine.
<b>License expiration</b>	The LIC license is expired 5 years past Withdrawn from Marketing (WFM). An invalid LIC license resumes if the IBM Z machine is upgraded or replaced with an IBM Z machine that is not older than N-2.
<b>TFP for software</b>	Offering requires TFP for software; Country Multiplex Pricing (CMP) is grandfathered in.
<b>Maintenance</b>	Continue with same pricing scheme as for zDR Cloud 1.0 (price active capacity). Overlap time is determined by the client.
<b>Microcode only</b>	IBM Z Flexible Capacity for Cyber Resiliency is microcode only. More memory, I/O cards, drawers, and other infrastructure-related components must be prepared by the client.
<b>Call home<sup>a</sup></b>	IBM uses Call Home data to monitor capacity usage.

a. IBM Call Home is not a requirement and might not be available on specific clients. IBM provides an option for clients that do not have Call Home enabled.

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