



Using Intel® on Demand



Note: Before using this information, read the general information in [“Notices”](#) on page xlii.

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Chapter 1. Introduction

Almost any IT infrastructure investment that you make includes capabilities that are well beyond those capabilities that you initially need. In some cases, your environment might grow to need those other capabilities in subsequent months or years while in other cases, you might never need them.

Intel® On Demand

Starting from the 4th Gen Intel Xeon Scalable processors introduce new embedded accelerators to add even more processing capability: Basic capabilities are available at the initial processor installation, while others remain inactivated. As development environment and tasks evolve, computing demands may accelerate and require leverage of the previously inactivated processor capabilities. In such cases, user can select desired processor capabilities and activate them through Intel On Demand feature—a feature that allows user to customize processor capabilities according to environment and tasks at hand. Currently the following features are available on different CPUs:

- **Intel Quick Assist Technology (Intel QAT)¹**

Intel® QAT which helps free up processor cores by offloading encryption, decryption, and compression so systems can serve a larger number of clients or use less power. With Intel QAT, 4th gen Intel Xeon Scalable processors are the highest performance CPUs that can compress and encrypt in a single data flow.

- **Intel Dynamic Load Balancer (Intel DLB)²**

Intel DLB is a hardware managed system of queues and arbiters connecting producers and consumers. It is a PCI device envisaged to live in the server CPU uncore and can interact with software running on cores, and potentially with other devices.

- **Intel Data Streaming Accelerator (Intel DSA)¹**

Intel DSA drives high performance for storage, networking, and data-intensive workloads by improving streaming data movement and transformation operations. Designed to offload the most common data movement tasks that cause overhead in data center-scale deployments, Intel DSA helps speed up data movement across the CPU, memory, caches, all attached memory, storage, and network devices.

- **Intel In Memory Accelerator (Intel IAA)¹**

Intel IAA helps run database and analytics workloads faster, with potentially greater power efficiency. This built-in accelerator increases query throughput and decreases the memory footprint for in-memory database and big data analytics workloads. Intel IAA is ideal for in-memory databases, and source databases.

- **Intel Software Guard Extensions (Intel SGX) 512 GB³**

Intel® SGX offers hardware-based memory encryption that isolates specific application code and data in memory. Intel SGX allows user-level code to allocate private regions of memory, called enclaves, which are designed to be protected from processes running at higher privilege levels.

References

- ¹*Achieve Performance Advantage with Intel oneAPI, AI Tools, and 4th Gen Intel® Xeon® Scalable Processors Featuring Built-in Accelerator Engines*, (n.d.). Intel. <https://www.intel.com/content/www/us/en/developer/articles/technical/performance-advantage-with-xeon-and-oneapi-tools.html>
- ²*Intel® Dynamic Load Balancer*, (2023, May 23) Intel. <https://www.intel.com/content/www/us/en/download/686372/intel-dynamic-load-balancer.html>
- ³*Intel® Software Guard Extensions (Intel® SGX)*, (n.d.) Intel. <https://www.intel.com/content/www/us/en/architecture-and-technology/software-guard-extensions.html>

Table 1. Intel On Demand Features

<ul style="list-style-type: none"> • Communications & Storage Suite 4 <ul style="list-style-type: none"> – Intel Quick Assist Technology (Intel QAT) – Intel Dynamic Load Balancer (Intel DLB) – Intel Data Streaming Accelerator (Intel DSA) 	<ul style="list-style-type: none"> • Analytics Suite 4 <ul style="list-style-type: none"> – Intel In Memory Accelerator (Intel IAA) – Intel Data Streaming Accelerator (Intel DSA)
<ul style="list-style-type: none"> • Communications & Storage Suite 2 <ul style="list-style-type: none"> – Intel Quick Assist Technology (Intel QAT) – Intel Dynamic Load Balancer (Intel DLB) 	<ul style="list-style-type: none"> • Analytics Suite 1 <ul style="list-style-type: none"> – Intel In Memory Accelerator (Intel IAA)
<ul style="list-style-type: none"> • SGX 512 <ul style="list-style-type: none"> – Intel Software Guard Extensions (Intel SGX) 512 GB 	

Note: Intel On Demand is only supported by Intel On Demand capable processors. For more information please identify your server model and refer to your Product Guide's Processor Option section on [Lenovo Press](#).

Note: All processors in a system must be installed with identical Intel On Demand feature.

Chapter 2. Installing Intel® On Demand

Various tools that are available to install and Intel On Demand activation keys

Overview of Intel® On Demand activation processes

Intel On Demand upgrades are orderable part numbers that are similar to any other option. To use the upgrades, they must be activated first for the specific processor on which they are used. The Intel On Demand upgrade is activated in one of the following ways:

- Automatically during manufacturing, if the Intel On Demand are ordered as part of a configure-to-order (CTO) or Special Bid configuration.

Note: If you configure an Intel On Demand as part of a factory order (eg configure-to-order), Lenovo manufacturing or the Lenovo Business Partner enables the feature as part of the configuration and testing of the Lenovo systems. You can begin using the feature as soon as you receive the order.

- Where the Intel On Demand are ordered separately, a manual process involving email delivery of authorization codes and the use of the FoD web site to create and download activation keys (if the FoD part numbers are ordered separately).

Here's an overview of the steps

1. Go to Features on Demand web site, also known as the Lenovo Key Management System or LKMS: <https://fod.lenovo.com/lkms> to input the Authorization Code in order to acquire the Activation Key
2. Follow the Request activation key process to obtain Activation Key, user will need to input Machine Type, Machine serial number and Intel PPIN. See "Intel PPIN" on page 5.
3. Install Intel On Demand suite with the Activation Key via XCC or LXCE OneCLI.
4. Power cycle the server.
5. Acquire and upload Intel On Demand status report.

Note: As of January 2017, Lenovo no longer delivers authorization codes via postal mail. Orders for Intel On Demand should include an email address so that the authorization codes can be delivered via email.

Installation Tool

Installation tool

Intel On Demand can be installed via Lenovo XClarity Controller (XCC) and Lenovo XClarity Essentials OneCLI (LXCE OneCLI). After confirming that your processor supports Intel On Demand, you also need to make sure the XCC and LXCE OneCLI installed in your system supports installing Intel On Demand.

1. Check if Lenovo XClarity Controller (XCC) supports installing Intel On Demand (two methods provided):

- **Via XCC WebGUI**

Go to **BMC Configuration** → **License**, if there is a section named **On Demand Capabilities for Intel CPU** in the page, it indicates that current XCC supports installing Intel On Demand, otherwise you need to update XCC firmware to the latest version to ensure it supports installing Intel On Demand.

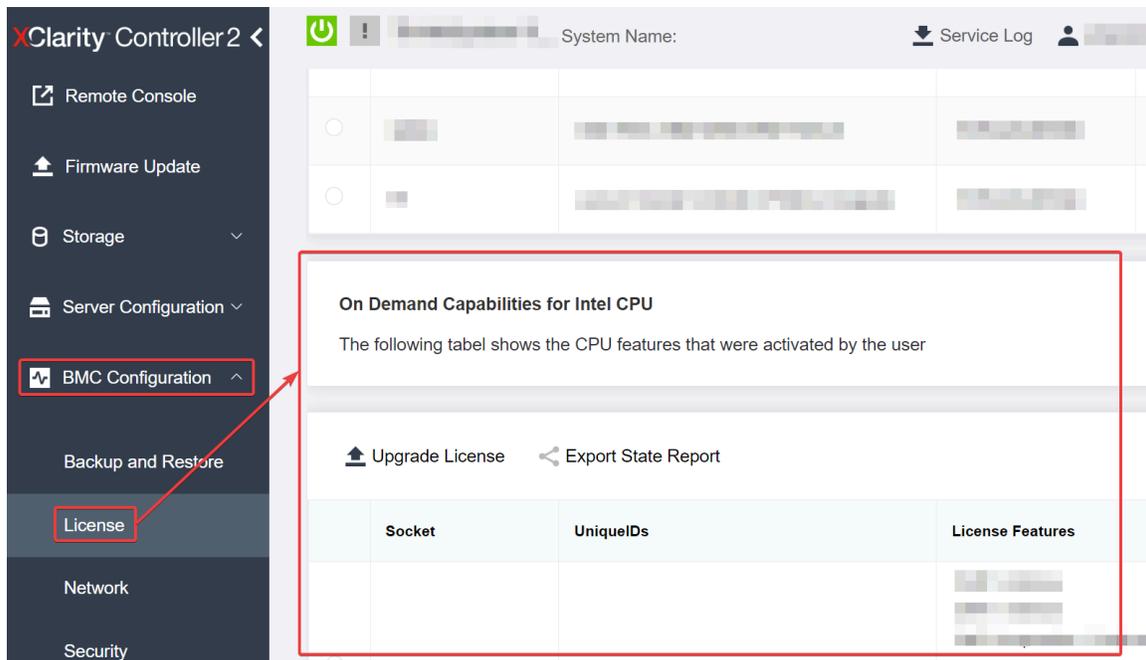


Figure 1. On Demand Capabilities for Intel CPU in XCC Web GUI

- **Via XCC REST API**

- Use the **GET** method with the following Request URL:
GET `https://bmc_ip/redfish/v1/LicenseService/Licenses/`
- In the response JSON object, the Members field includes the API such as `/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability`, where X is the CPU numbering, it indicates that current XCC supports installing Intel On Demand, otherwise you need to update XCC firmware to the latest version to ensure it supports installing Intel On Demand.

For example:

```
"Members": [
  {
    "@odata.id": "/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability"
  },
  {
    "@odata.id": "/redfish/v1/LicenseService/Licenses/CPU2_OnDemandCapability"
  }
]
```

- Check if LXCE OneCLI supports installing Intel On Demand

- LXCE OneCLI version must be at 4.2.0 or above.

Enabling Intel On Demand Features

- Select the Intel On Demand features that meets your workload needs, see [“Intel® On Demand” on page 1](#).
- After completing ordering the features, you will receive Authorization Code via e-mail.
- PPIN is a mandatory information for enabling the features. Read the PPIN of the processor that is to be installed with the features. See [“Intel® PPIN” on page 5](#).
- Go to <https://fod.lenovo.com/lkms> and input the Authorization Code to acquire the Activation Key.
- In the website, input Machine Type, Machine serial number, and PPIN.

6. The website will generate the Activation Key. Download the Activation Key.
7. Install the features to the processor with the Activation Key via XCC or LXCE OneCLI. See [“Activating Intel® On Demand” on page 7](#).

Note: If more than one Activation Keys are acquired, it is mandatory to install them in the sequential order they were acquired. For example, start with installing the first acquired key, and proceed with the second acquired key, and so on.

8. AC cycle the server.
9. (Optional) Upload Intel On Demand State Report. See [“Intel® On Demand Feedback” on page 8](#).

The State Report represents the current configuration state of the Intel On Demand capable processors. Lenovo accepts State Reports from customers to calibrate the current state of the Intel On Demand capable processors.

10. To see the features installed in a processor, see [“Checking the Intel On Demand features installed in a processor” on page 10](#).

Retrieving and activating Intel® On Demand

After replacing a processor, you may need to transfer the features from the defective processor to the new processor. Complete the following steps to transfer features to new processor.

1. Before removing the defective processor from the system, read the PPIN of the defective processor. See [“Intel® PPIN” on page 5](#).
2. After installing the new processor, read the PPIN of the new processor. See [“Intel® PPIN” on page 5](#).
3. Go to <https://fod.lenovo.com/lkms> and input the PPIN of the defective processor. (Input PPIN in the UID section.)
4. Select the features to be transferred.
5. Input the PPIN of the new processor.
6. The website will generate the new Activation Key. Download the new Activation Key. See [“Activating Intel® On Demand” on page 7](#).
7. Install the features to the new processor with the new Activation Key via XCC or LXCE OneCLI.
8. AC cycle the server.
9. (Optional) Upload Intel On Demand State Report. See [“Intel® On Demand Feedback” on page 8](#).

The State Report represents the current configuration state of the Intel On Demand capable processors. Lenovo accepts State Reports from customers to calibrate the current state of the Intel On Demand capable processors.

10. To see the features installed in a processor, see [“Checking the Intel On Demand features installed in a processor” on page 10](#).

Intel® PPIN

Reading PPIN

Protected Processor Inventory Number, or PPIN, is a mandatory information for enabling Intel On Demand. PPIN can be read via XCC Web GUI, XCC REST API, and LXCE OneCLI. See the following for more information.

Reading PPIN via XCC Web GUI

Open XCC Web GUI, go to **Inventory page → CPU tab → Expand → PPIN**

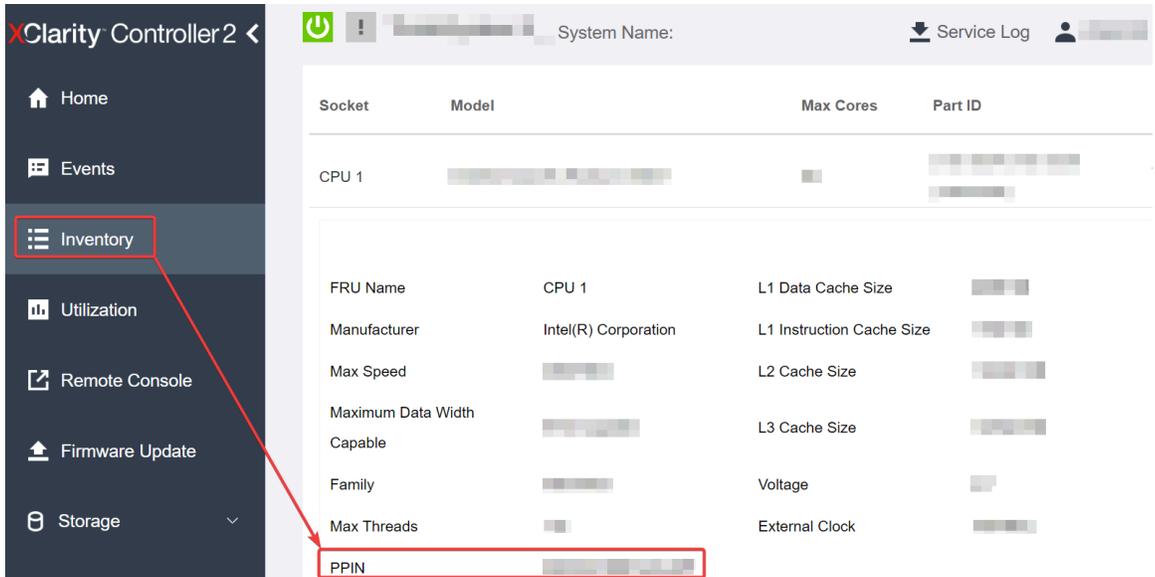


Figure 2. Reading PPIN via XCC Web GUI

Reading PPIN via XCC REST API

1. Use the **GET** method with the following Request URL:
 GET https://bmc_ip/redfish/v1/Systems/1/Processors
 For example:
 GET https://bmc_ip/redfish/v1/Systems/1/Processors
2. In the response JSON object, the Members field shows reference link to an element of processor resource.

For example:

```
"Members":[
{
@odata.id: "/redfish/v1/Systems/1/Processors/1"
},
{
@odata.id: "/redfish/v1/Systems/1/Processors/2"
}
],
```

3. Select the processor you need to read the PPIN from. Use the **GET** method with the following Request URL, where x is the CPU numbering:
 GET https://bmc_ip/redfish/v1/Systems/1/Processors/x
 For example, to read Processor 1 PPIN, see the following:
 GET https://bmc_ip/redfish/v1/Systems/1/Processors/1
4. In the response JSON object, the ProcessorId field shows the ProtectedIdentificationNumber field, which is the PPIN info of the requested CPU.

For example:

```
"ProcessorId":{
  "ProtectedIdentificationNumber":"1234567890xxxyyy"
},
```

Reading PPIN via LXCE OneCLI

Input the following command:
 OneCli.exe fod showppin -b XCC_USER:XCC_PASSWORD@XCC_HOST

The output shows PPIN information. For example:

Machine Type: 7D75

Serial Number: 7D75012345

FoD PPIN result:

```
=====
| Socket ID |          PPIN          |
| Processor 1 | 1234567890xxxyyy |
| Processor 2 | 9876543210zzzyyy |
=====
```

Activating Intel® On Demand

Installing Intel On Demand to processor

Install Intel On Demand features to the processor with the Activation Key downloaded from the <https://fod.lenovo.com/lkms> via XCC Web GUI, XCC REST API or LXCE OneCLI.

Use XCC Web GUI to install Intel On Demand

1. Open XCC Web GUI, go to **BMC Configuration → License → On Demand Capabilities for Intel CPU → Upgrade License → Browse → Import** to upload the Activation Key

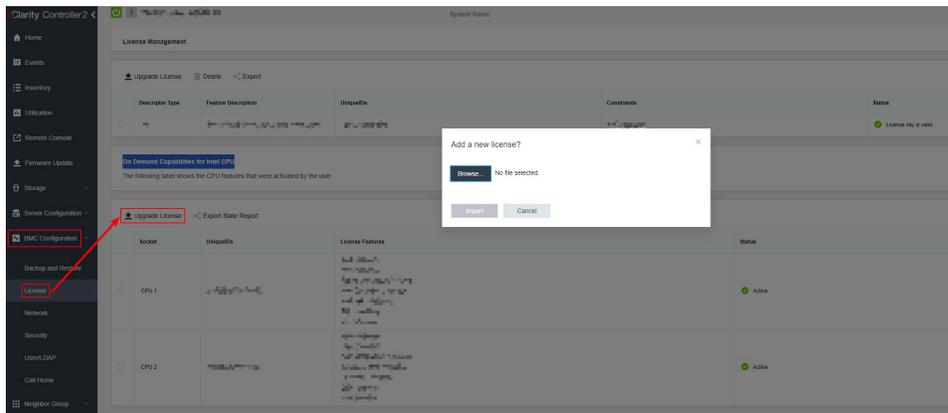


Figure 3. Uploading Activation Key via XCC Web GUI

2. If the installation is successful, the Web GUI will show a pop-up window with the message “License key upgraded successfully. The features will be activated on the processor after system power cycle”.

Otherwise, see “[Troubleshooting & FAQs](#)” on page 11.

Use XCC REST API to install Intel On Demand

1. Use the **POST** method with the following Request URL:
POST https://bmc_ip/redfish/v1/LicenseService/Licenses
2. Transfer Activation Key to base64 string at first and fill it into the LicenseString field as POST data.
{
 "LicenseString": ""
}
3. If the installation is successful, XCC REST API show the message “License key upgraded successfully. The features will be activated on the processor after system power cycle”.

Otherwise, see “[Troubleshooting & FAQs](#)” on page 11.

Use LXCE OneCLI to install Intel On Demand

Input the following command, where <key_file> specifies the Activation Key:
OneCli.exe fod install --keyfile <key_file>

If successfully installed, the response will show:
Successfully install key

Call Lenovo support if the response shows the following:
Failed to install key

Intel® On Demand Feedback

Acquiring and uploading Intel On Demand State Report

After completing enabling or transferring Intel On Demand, acquire and upload the State Report via XCC Web GUI, XCC REST API, and LXCE OneCLI. See the following for more information.

Use XCC Web GUI to upload State Report

1. Open XCC Web GUI, go to **BMC Configuration** → **License** → **On Demand Capabilities for Intel CPU** → **Choose CPU** → **Export State Report**

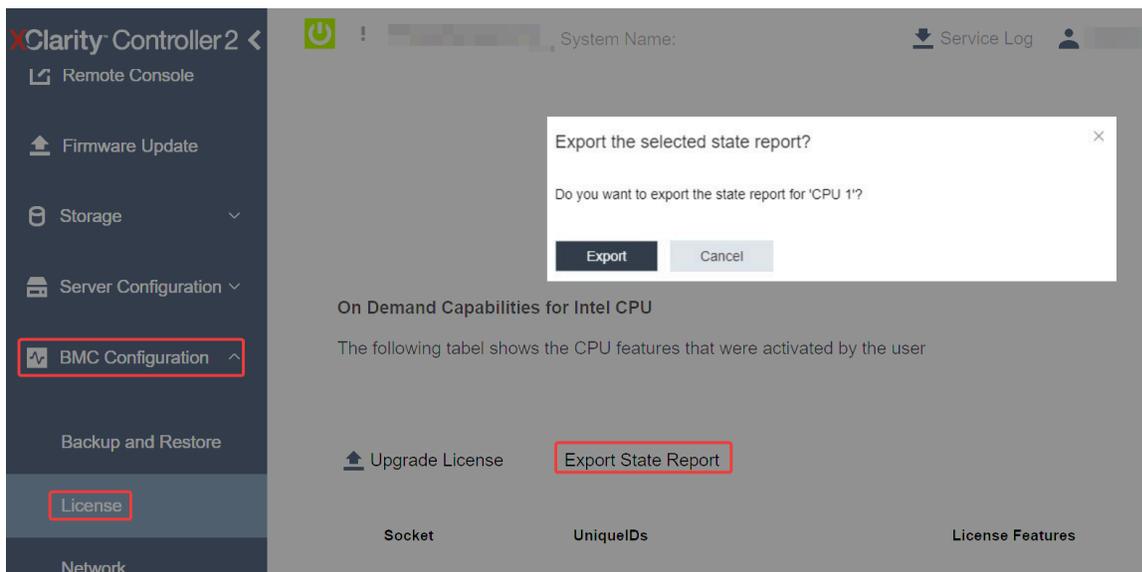


Figure 4. Export State Report via XCC Web GUI

2. Upload State Report via “On Demand Feedback” section in <https://fod.lenovo.com/lkms>.

Use XCC REST API to upload State Report

1. Use the **GET** method with the following Request URL to retrieve CPU State Report API, where X is the CPU numbering:
GET `https://bmc_ip/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability`
For example, to retrieve CPU 1 State Report API, see the following:
GET `https://bmc_ip/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability`
2. In the response JSON object, the response of the target field of the `LenovoLicense.ExportStateReport` field is the CPU State Report API, where X is the CPU numbering:

```
"Actions": {  
  "Oem": {  
    "#LenovoLicense.ExportStateReport": {
```

```

        "title": "ExportStateReport",
        "target": "/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport"
    }
}
},

```

In the following example, the response of the target field is the CPU 1 State Report API. Copy the CPU 1 State Report API.

```

"Actions": {
  "Oem": {
    "#LenovoLicense.ExportStateReport": {
      "title": "ExportStateReport",
      "target": "/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport"
    }
  }
},

```

3. Retrieve the State Report.

- a. Use the **POST** method with the following Request URL with CPU State Report API to retrieve the State Report, where X is the CPU numbering:

POST https://bmc_ip/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport

For example, to retrieve CPU 1 State Report, see the following:

POST https://bmc_ip/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability/Actions/Oem/LenovoLicense.ExportStateReport

- b. Use an empty JSON object as POST data. When using API tool such as Postman, fill an empty JSON object in **Body** → **Raw** → **JSON**, fill a NULL object '{}' in a JSON file.

4. In the response, retrieve the State Report in the stateReports field.

```

{
  "stateReports": [
    {
      "syntaxVersion": "1.0",
      "timestamp": "",
      "objectId": "",
      "hardwareComponentData": [
        {
          "hardwareId": {
            "type": "PPIN",
            "value": ""
          },
          "stateCertificate": {
            "pendingCapabilityActivationPayloadCount": ,
            "value": ""
          },
          "hardwareType": "CPU"
        }
      ]
    }
  ]
}

```

5. Upload State Report via “On Demand Feedback” section in <https://fod.lenovo.com/lkms>.

Use LXCE OneCLI to upload State Report

1. Acquire State Report with the following command:
OneCli.exe fod exportreport -b XCC_USER:XCC_PASSWORD@XCC_HOST
 2. Upload State Report with the following command:
OneCli.exe fod uploadreport --file CPU1_xxxxxx_StateReport.json --kmsid KMS_USER:KMS_PASSWORD
- Where:

CPU1_xxxxxx_StateReport.json is the file name downloaded from the **fod exportreport** command in Step 1.

KMS_USER and KMS_PASSWORD are your ID and password on the <https://fod.lenovo.com/lkms>.

Checking the Intel On Demand features installed in a processor

You can check the Intel On Demand features installed in a processor via XCC Web GUI, XCC REST API, and LXCE OneCLI. See the following for more information.

Note: If the processor has not been installed with any license, it would not appear in the **On Demand Capabilities for Intel CPU** section in XCC Web GUI.

Use XCC Web GUI to check the Intel On Demand features installed in a processor

Go to **BMC Configuration** → **License** → **On Demand Capabilities for Intel CPU** → **Choose CPU** → **License Features**, where the installed features are listed.

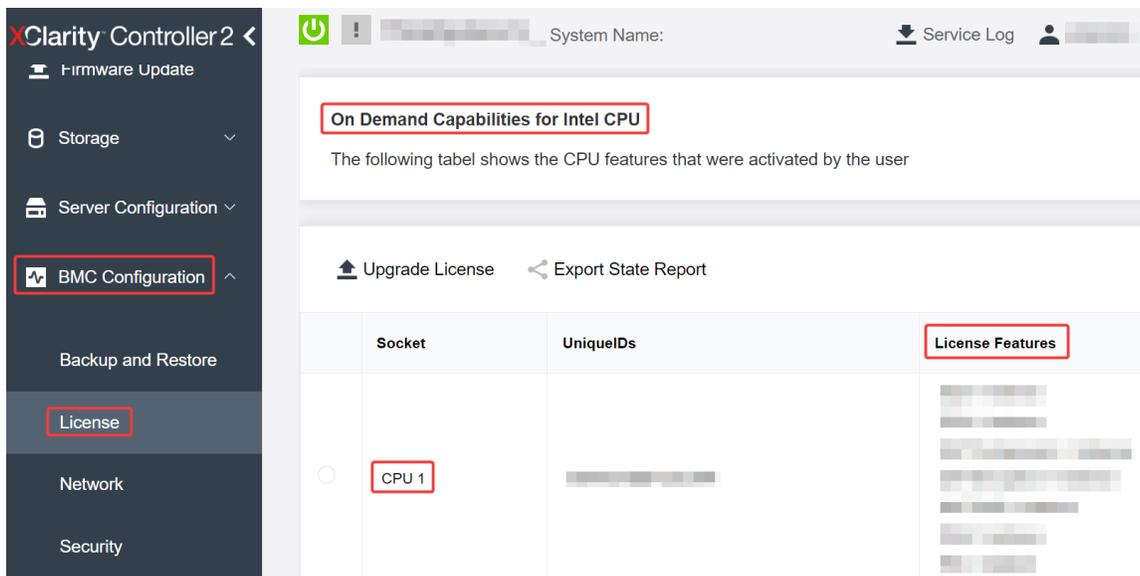


Figure 5. Checking the Intel On Demand features installed in a processor in XCC Web GUI

Use XCC REST API to check the Intel On Demand features installed in a processor

1. Use the **GET** method with the following Request URL to retrieve Intel On Demand features installed on CPU X, where X is the CPU numbering:
GET https://bmc_ip/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability
For example, to retrieve Intel On Demand features installed on CPU 1, see the following:
GET https://bmc_ip/redfish/v1/LicenseService/Licenses/CPU1_OnDemandCapability
2. In the response JSON object, the FeatureList field contains the Intel On Demand features installed in this processor.

```
"Dem": {  
  "Lenovo": {  
    "FeatureList": []  
    "@odata.type": ""  
  }  
},
```

Use LXCE OneCLI to check the Intel On Demand features installed in a processor

1. Check installed features with the following command:
OneCli.exe fod report -b XCC_USER:XCC_PASSWORD@XCC_HOST
2. The output shows all license, including Intel On Demand features. For example:

```

FoD Reports result:
=====
| Feature | Key | Status | Description | User | Expired |
| Type | ID | | Feature List | Reminding | Date |
=====
| N/A | CPU1_OnDemandCapability | StandbyOffline | DSA 4 instances, | N/A | N/A |
| | | | IAA 4 instances | | |
=====
| N/A | CPU2_OnDemandCapability | Enabled | DSA 4 instances, | N/A | N/A |
| | | | IAA 4 instances | | |
=====
| 004a | XCC2_Platinum | Enabled | Lenovo XClarity Controller 2 | N/A | N/A |
| | | | Platinum Upgrade | | |
=====
Succeed.

```

Troubleshooting & FAQs

Refers to the table below for Intel On Demand installation error messages and user actions.

Table 2. Intel On Demand installation messages and user actions

Message	User Action
License key upgraded successfully. The features will be activated on the processor after system power cycle.	You can activate Intel On Demand after performing one system power cycle.
The activation key format is invalid	Check if you have uploaded the correct Activation Key file. If the error persists, contact Lenovo support.
Invalid processor PPIN in Activation key	Check if you have uploaded the correct Activation Key file. If the error persists, contact Lenovo support.
The license was installed in the processor already	You have already installed this activation key. Check if the activation key you uploaded is correct.
Not enough NMRAM space in the processor	Contact Lenovo support.
Internal error	Contact Lenovo support.
Cold reset needed before next provisioning	If you want to continue installing an activation key, perform a system power cycle at first.
Unable to provision LAC due to FEH error	Contact Lenovo support.
Unable to import license in shutdown state, please try again after power on.	Power on the system before installing Intel On Demand.
Unable to import license due to On Demand Capabilities information is in progress. Please try again later.	If you want to continue installing an activation key, try again later.

Chapter 3. Using the FoD web site

This chapter describes all the functions of the Features on Demand web site, also known as the Lenovo Key Management System or LKMS: <https://fod.lenovo.com/lkms>.

Note: If you cannot access <https://fod.lenovo.com/lkms>, try to access <https://fod2.lenovo.com/lkms>, which is also an available address of LKMS.

The FoD website is the primary tool that is used to manage FoDs authorization codes and activation keys.

FoD support contacts

Please use the relevant email address listed below for any FoD or Electronic Software Distribution (ESD) questions you might have:

- USA and Canada: ESDNA@lenovo.com
- Asian Pacific countries: ESDAP@lenovo.com
- Europe, Middle East and Africa (EMEA): ESDEMEA@lenovo.com
- Latin American countries: ESDLA@lenovo.com
- China: ESDChina@lenovo.com

Note: The above email addresses replace fod@lenovo.com

Creating an FoD account

It is necessary to have or create a Lenovo FoD account before an authorization code can be used to obtain single or multiple activation keys.

Complete the following steps to set up eFoD on the FoD website:

1. Go to the FoD website, <https://fod.lenovo.com/lkms>.

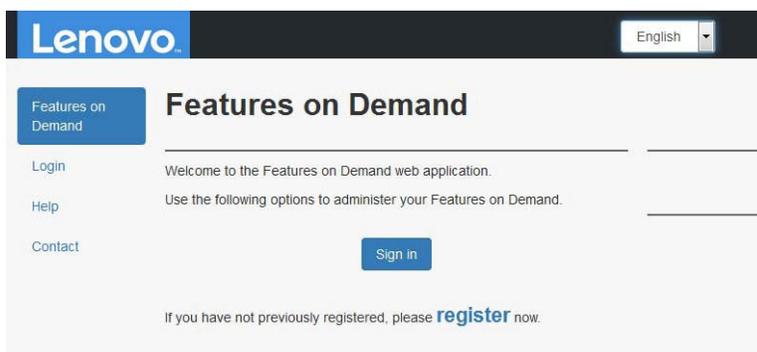


Figure 6. Lenovo FoD website login panel

2. Register for an account if you do not already have one by clicking the **register** link.
3. Log into the FoD web site as shown in [Figure 7 “Login panel” on page 14](#).

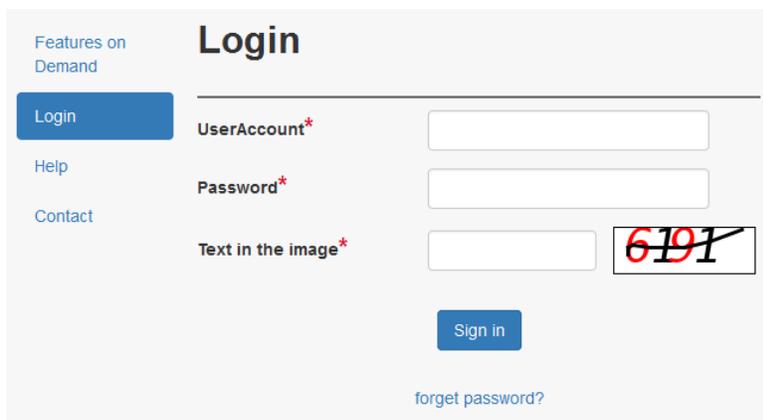


Figure 7. Login panel

- You will then be presented with the Welcome page as shown in Figure 8 “Welcome page (standard user)” on page 14.

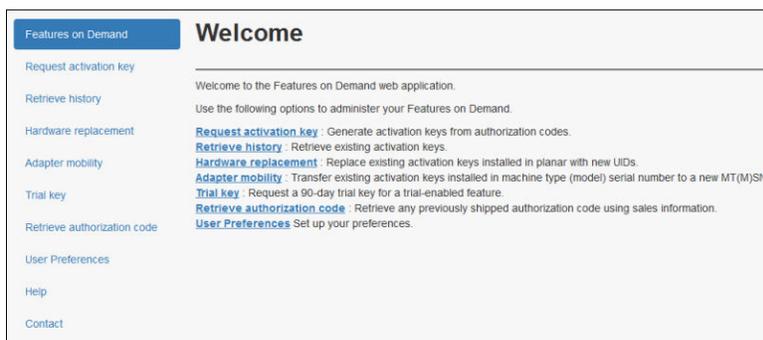


Figure 8. Welcome page (standard user)

An FoD user account can be an administrator of one or more customer numbers. To find out who the administrators are for your customer number, contact the FoD support (see “[FoD support contacts](#)” on page 13 and “[Help](#)” on page 38.) Methods on how you can become an administrator are described in “[Find the administrator/Becoming an administrator](#)” on page 14.

Find the administrator/Becoming an administrator

An FoD user account can be an administrator of one or more customer numbers. To find out who the administrators are for your customer number, contact the FoD support (see “[FoD support contacts](#)” on page 13 and “[Help](#)” on page 38.)

By default, FoD accounts are regular accounts (in the FoD web site, you will see “EXTERNAL USER” on the right-hand side of the web page).

For customer numbers who want to use the Inventory Management (eFOD) features of the FoD web site, there is an administrator class of users that have access to additional functions.

To become an administrator of your own customer number, there are two ways:

- Ask an existing administrator to make you an administrator as well. To find out who the administrators are for your customer number, contact the FoD support (see “[FoD support contacts](#)” on page 13 and “[Help](#)” on page 38.)

- Email Lenovo FoD support and request the access:
 1. Send an email to the FoD support team (see [“FoD support contacts” on page 13](#)) with the following information:
 - Request, for example “Please make me an administrator for my company’s FoD purchases”
 - Your email address
 - Your company name
 - Your customer number(s)
 - Your first name
 - Your last name
 2. Once the request has been processed you will be sent an email from lkms@lenovo.com. You must click the link in the email to confirm the activation before you will see the menu for the administrator.

Note: Only the first administrator will get the email which they will have to respond to. For all additional administrators, no confirmation email will be sent.
 3. Once you have admin access, your account type will change to “EXTERNAL ADMIN”.

Requesting an activation key

Use the **Request activation key** section of the FoD web site to create an activation key from the authorization code that you received in the mail from Lenovo. The activation key is what you use to enable the feature upgrade on the system or option.

Before you begin, make sure that the following items are available:

- **Authorization code** for the FoD component you wish to install: The authorization code is at the top of the Features on Demand Activation Instructions document you received as a PDF attachment in an email when you placed the order. An example of such a document is shown in [Figure 9 “Activation Instructions document” on page 16](#).

IMPORTANT - Keep this document for future reference



Features on Demand Activation Instructions

FoD Option: ServeRAID M5100 Series RAID 6 Upgrade for System x
Option P/N or Product ID: 00D7083
Feature code: A357
Quantity ordered: 1
Plant order:
Sales order:

Authorization Code:

To activate your FoD option, complete the following steps:

1. Locate the authorization code at the top of this document
2. Make sure that you have access to the hardware that you want to activate.
3. Login at <https://fod.lenovo.com/lkms>
4. Select **Request activation key** from the left navigation pane.
5. Enter the authorization code and click **Continue**
6. Follow the instructions on the web page to activate the Features on Demand option, and verify that the request is successful.

The activation key file is sent to the email address that you provide during the activation process.

For more detailed information, including instructions for automating the activation and installation of the activation key by using Lenovo Tools Center or similar tools, see the Features on Demand User's Guide at <https://fod.lenovo.com/lkms> under the Help section.

If you require additional assistance, contact your Lenovo sales representative, reseller, or FoD@lenovo.com

For Manufacturing Use Only

Plant Order:  Sales order:  Qty: 1 
(S) Part Number: 00D7083 + (Q) Qty: 1 +  (LP) Part Number: 00D7083
Printed in CHINA

Figure 9. Activation Instructions document

- **UID** of the component to be upgraded: Access to the hardware or software that you want to activate so that you can determine the UID that is required to identify the component that you want to upgrade.

Complete the following steps to activate a Features on Demand feature by using an authorization code:

1. In the Welcome page, select **Request activation key** from the left navigation pane. [Figure 11 “Request activation key function” on page 17](#) appears.

Figure 10. Request activation key function

Select one of the options to enter the Authorization Code.

2. Proceed to the corresponding section:
 - [“Input a single authorization code” on page 17](#)
 - [“Selected from the list associated with your email address” on page 19](#)
 - [“Upload multiple authorization codes” on page 20](#)

Input a single authorization code

1. Enter the authorization code that was provided to you in the Activation Instructions document and click **Continue**.

Figure 11. Request activation key function

2. You will see the details of the FoD component associated with the Authorization Code you entered, as shown in [Figure 12 “Enter the machine type and serial number of the server you are upgrading” on page 18](#).

Select the machine type and type in the serial number of the server you want to apply the FoD upgrade to. You will only need to enter the model for certain machine types; for all others, the model field will be greyed out. Click **Generate key**.

Request activation key

Step 2: Machine details

Your authorization code is displayed below.

Select your machine type and model if available and enter your 7 character machine serial number. (Your machine serial number can be found on the back panel or in one of the system administration tools).

Feature code

Feature description

Part number / PID

Remaining keys

Machine Type* ⓘ

Model ⓘ

Machine serial number* ⓘ

UID*

Figure 12. Enter the machine type and serial number of the server you are upgrading

- You may receive a warning message that either the server serial number or the UID are not in the Lenovo KMS system, as shown in [Figure 13 “Warning message” on page 18](#). Verify the details you entered are correct and click **Generate key** to continue.

ⓘ The entered machine does NOT exist in lenovo records. If the information you entered is wrong the key **WILL NOT WORK**

Figure 13. Warning message

- You are then prompted to confirm all details before continuing, similar to [Figure 14 “Confirm the details” on page 19](#). Ensure that the information is correct and then, click **Confirm**.

Request activation key

Step 3: Machine details confirm

Before request key generation , please confirm the below detail information for key generation.

Authorization code	<input type="text"/>
Feature code	<input type="text"/>
Feature description	<input type="text"/>
Part number / PID	<input type="text"/>
UID type	<input type="text"/>
Machine Type	<input type="text"/>
Model	<input type="text"/>
Machine serial number	<input type="text"/>

Figure 14. Confirm the details

- Download and save the activation key by clicking the **Download** link as shown below. In addition, you may choose to also enter one or more email addresses and click **Submit**. Separate the email addresses with a semicolon. Recipients will receive the key file as an attachment.

Request activation key

Step 4: Download

Activation key was generated successfully

Please [Download](#) here!

Other recipients(cc):

Figure 15. Key delivery options

Selected from the list associated with your email address

- If your email address is associated with devices, the list appears. Select the items that you need, and click **Continue**.
 - You can select more than one options in the upper list.
 - You can select only one option in the lower list.

Request activation key

Please select below type *

Input a Single Authorization Code
 Selected from the list associated with your email address
 Upload Multiple Authorization Codes

Software Total Items: (15)

<input checked="" type="checkbox"/>					
<input checked="" type="checkbox"/>					
<input checked="" type="checkbox"/>					
<input checked="" type="checkbox"/>					
<input type="checkbox"/>					
<input type="checkbox"/>					
<input type="checkbox"/>					
<input type="checkbox"/>					
<input type="checkbox"/>					
<input type="checkbox"/>					

[Continue](#)

Must be individually redeemed, additional information is required, Total Items: (15)

	Auth Code	Sales Order	Purchase Order	Part Number	Quantity	S/W Desc
<input checked="" type="radio"/>						
<input type="radio"/>						
<input type="radio"/>						
<input type="radio"/>						
<input type="radio"/>						

Figure 16. Request activation key function

2. Download and save the activation key by clicking the **Download** link as shown below. In addition, you may choose to also enter one or more email addresses and click **Submit**. Separate the email addresses with a semicolon. Recipients will receive the key file as an attachment.

Request activation key

Step 4: Download

Activation key was generated successfully

Please [Download](#) here!

Other recipients(cc):

[Submit](#)

Figure 17. Key delivery options

Upload multiple authorization codes

1. Upload authorization codes to request activation key.
 - a. If necessary, click **Download Template** to download the template file for uploading authorization codes.
 - b. Click **Choose File** and select the authorization code file. Then, click **Upload** to upload the file.
- 2.

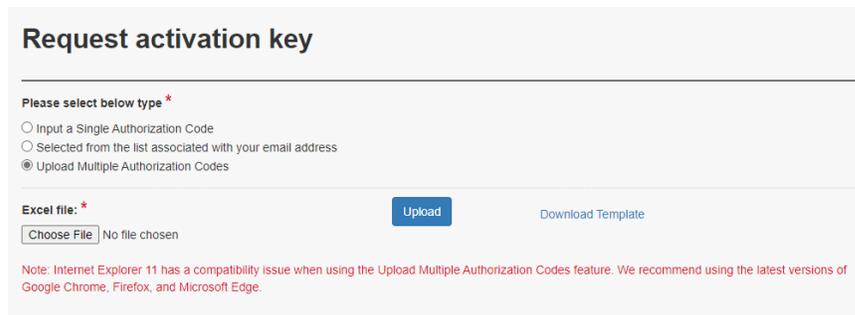


Figure 18. Request activation key function

3. Download and save the activation key by clicking the **Download** link as shown below. In addition, you may choose to also enter one or more email addresses and click **Submit**. Separate the email addresses with a semicolon. Recipients will receive the key file as an attachment.

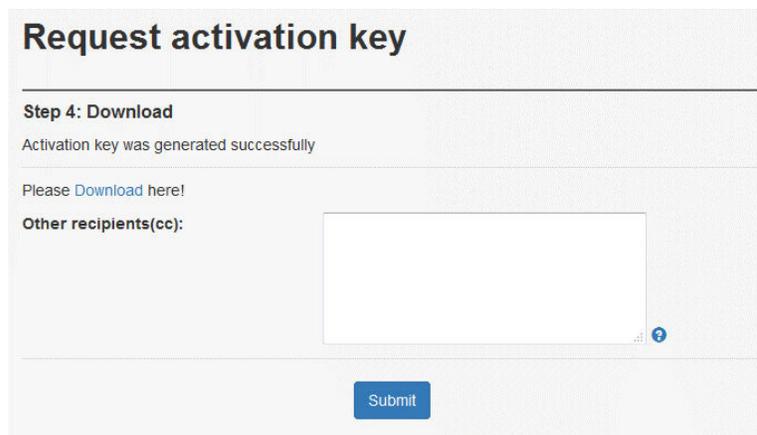


Figure 19. Key delivery options

Retrieve history

In the Retrieve history page, you can use the authorization code or the UID to search for the activation key history. By using the retrieve history page, you can also retrieve again an activation key that might be lost because of a hardware replacement.

The results from a search by using the authorization code list all activation keys that are generated for the authorization code. The results from a search by using the UID list all activation keys that are generated for the UID.

To retrieve the history, complete the following steps:

1. In the Welcome page, select Retrieve history from the left navigation pane. [Figure 20 “Retrieving activation key history” on page 22](#) appears.

Retrieve history

Step 1: Search

Use authorization code or unique identifier(UID) or machine type serial number(MT\SN) to search for activation key history.

Please select a search type and enter a search value

Search type* ?

Search value* ?

Figure 20. Retrieving activation key history

2. Select a search type. The choices are:
 - Search history via authorization code
 - Search history via UID
 - Search history via machine type serial number
 - Search history via Lenovo Customer Number
3. Enter a value to search on and click **Continue**.

The results that are displayed provide the following information, depending on what search type is performed:

- A search of an authorization code shows the total number of keys this authorization code is valid for, and the number that are unused (ie the number as yet unconverted to activation keys). The keys already created are listed with the ability to download those keys. See [Figure 21 “Retrieve history using an authorization code” on page 22](#) for an example.

Retrieve history

Step 2: Result

This lists the activation keys generated for the authorization code entered.

Select the keys you want to retrieve and download the keys directly or have them send to your registered email address:

Note:To ensure that you continue to receive future correspondence without issues, please add FOD@lenovo.com as an expectation to your spam filter

Select All

Generated keys for feature code:

Total keys: 4, Unused keys: 3, Part number:

Machine Type	Model	Serial number
<input type="checkbox"/>		

Figure 21. Retrieve history using an authorization code

- A search of a UID shows the keys that were generated for the system or the keys that were installed in the factory for that system. An example is shown in [Figure 22 “Retrieve history using a UID” on page 23](#).

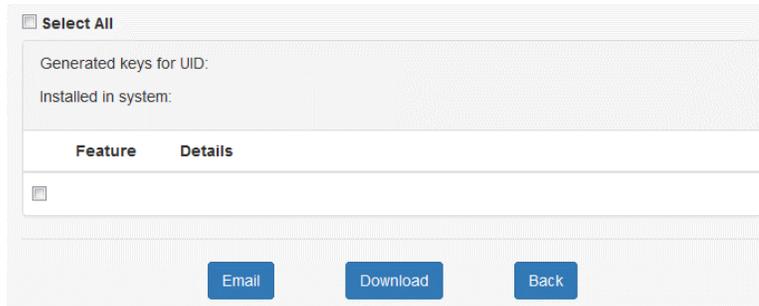


Figure 22. Retrieve history using a UID

- A search of a machine type serial number shows the keys that were generated for the system or the keys that were installed in the factory for that system. The generated keys are listed with the ability to download those keys, as shown in [Figure 23 “Retrieve history using a machine type & serial number” on page 23](#).

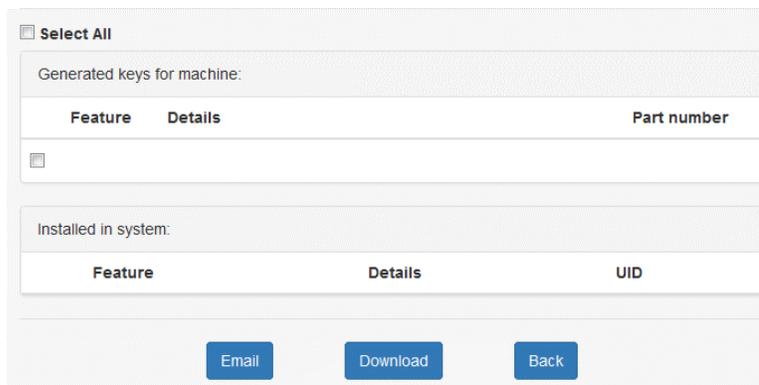


Figure 23. Retrieve history using a machine type & serial number

- A search of a Lenovo Customer Numbers shows the keys that were generated for the system or the keys that were installed in the factory for that system. The generated keys are listed with the ability to download those keys, as shown in [Figure 24 “Retrieve history using a Lenovo Customer Number” on page 24](#).

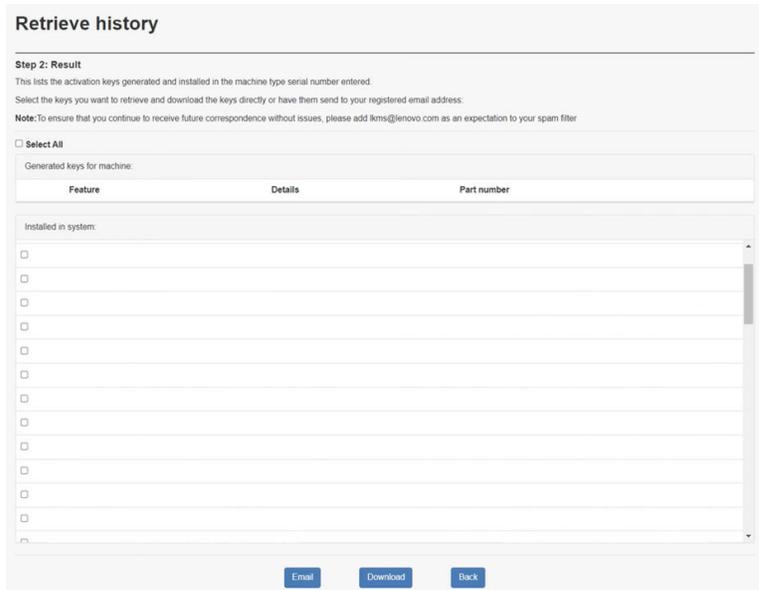


Figure 24. Retrieve history using a Lenovo Customer Number

4. To download a key, select it and click **Download**. You will be prompted to save the key file to your local file system. Alternatively, click **Email** and you will be sent an email with the key file as an attachment.

License Replacement/Swap for Hardware and Software

See the section corresponding to your system:

- “License Replacement” on page 24
- “Convert/Swap license for controller of DM/DG series” on page 27

License Replacement

If there is a hardware failure on a server, such as a processor, network adapter or network switch in a Flex chassis, we must update the unique identifier for the replacement part on the FoD website.

The unique identifier is normally referred to as the FoD ID and PPIN. The Hardware replacement menu is not needed for keys that are tied to the machine type and serial number (MTSN), such as the IMM Advanced Upgrade or ServeRAID adapters.

Complete the following steps:

1. Log into the FoD web site, <https://fod.lenovo.com/lkms>.
2. To access the hardware replacement menu, select **License replacement** from the left navigation pane.

License Replacement/Swap for Hardware and Software

Step 1: Machine details

Select your machine type and model if available and enter your 7 character machine serial number. (Your machine serial number can be found on the back panel or in one of the system administration tools).

Machine type*

Model

Machine serial number*

OR

If you do not know the MTSN of your server or chassis or your activations are not tracked using those values (some OEM do not). Enter the UID of the device below.

NOTE: If you enter the UID value, your MTSN selection will be ignored and only the below UID used to find your FOD upgrades to replace.

UID*

Figure 25. License Replacement/Swap for Hardware and Software

- In the drop-down menu, select your machine type from the list, and then enter the machine type serial number. If you do not know the MTSN of your server or chassis, or your activations are not tracked using those values, enter the UID to continue.

Note: If the UID is entered, the value of machine type and serial number will be ignored.

- Click **Continue**. The available keys for that system are shown in the next window, as shown in [Figure 26 “Installed keys” on page 25](#).

License Replacement/Swap for Hardware and Software

Step 2: Activation keys selection

This lists the activation keys generated for the UID entered.

Select the keys you want to replace its UID.

Select all

Installed in system:

UID	Feature	Detail
<input type="checkbox"/>		

Figure 26. Installed keys

- Select all components and click **Continue**.
- Enter new UID in the appropriate field(s), one for each component, as shown in [Figure 27 “Enter new UIDs” on page 26](#) and then click **Continue**.

License Replacement/Swap for Hardware and Software

Step3: Enter new UIDs

Here is the list of the activation keys you want to replace.
Please enter new UIDs for each keys.

Installed in system:		
UID type	Feature	Detail
Emulex ASIC S/N		
Old UID		<input type="text"/>
New UID		<input type="text"/>

Figure 27. Enter new UIDs

- Review your selections in the next window, as shown in [Figure 28 “Confirm selections”](#) on page 26, then click **Confirm**.

License Replacement/Swap for Hardware and Software

Step4: Replacement confirm

Once confirmed, this action cannot be reversed. Please ensure the data displayed corresponds to the key you wish to replace.

Installed in system:		
UID type	Feature	Detail
Emulex ASIC S/N		
Old UID		<input type="text"/>
New UID		<input type="text"/>

Figure 28. Confirm selections

- A successful key transfer is shown in [Figure 29 “Successful hardware replacement”](#) on page 26.

License Replacement/Swap for Hardware and Software

Step5: Download

New activation keys were generated successfully, please click on the uid for download the key.

Figure 29. Successful hardware replacement

- You can now download the new activation key by clicking the link provided in [Figure 29 “Successful hardware replacement”](#) on page 26.
- You can also use the Retrieve history function of the FoD web site to get the activation key emailed to you. Specify the new UID as shown in [Figure 30 “Downloading the key via Retrieve History”](#) on page 27. For more information on the Retrieve history function, see [“Retrieve history”](#) on page 21.

Figure 30. Downloading the key via Retrieve History

Note: Responsibility: It is ultimately the client’s responsibility to reinstall their FoD keys. However, be advised that in most service scenarios in which a client needs a part replaced, the client often is not aware that they have FoD keys that are applied or might not know how to reapply the keys. In these cases, Remote Support works with the client and Field Technician to reapply the keys.

Convert/Swap license for controller of DM/DG series

Headswap: When a controller is replaced, you can migrate your entitled controller license to the new controller. This migration process is called as Headswap.

Note: Before performing a Headswap process, make sure that the new controller (to which the license will be migrated) is NOT associated with any license.

License Conversion: The license can be changed from NLF to legacy format, or from legacy to NLF format. This change process is called as License Conversion.

Complete the following steps to perform Headswap and/or License Conversion for the controller license of your DM/DG series system:

1. Log into the FoD web site, <https://fod.lenovo.com/lkms>.
2. To access the hardware replacement menu, select **License replacement** from the left navigation pane.

Figure 31. License Replacement/Swap for Hardware and Software

3. Enter the UID, and then click **Continue**. Figure 32 “Activation key selection” on page 28 appears.



Figure 32. Activation key selection

4. Select the keys to be migrated/changed. Then click **Continue**. Depends on your system, different options appear.

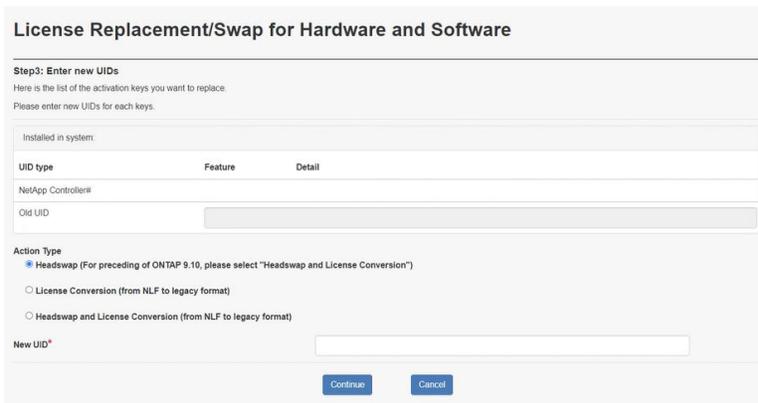


Figure 33. Enter new UIDs

5. Select the required action:



Figure 34. Actions for legacy license

Actions for legacy license

- Headswap (For ONTAP 9.13 and above, please select "Headswap and License Conversion")
- License conversion (from legacy to NLF format)
- Headswap and License Conversion (from legacy to NLF format)

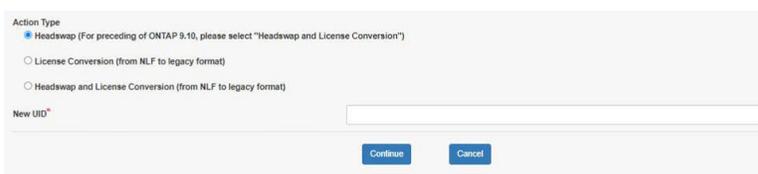


Figure 35. Actions for NLF license

Actions for NLF license

- Headswap (For preceding of 9.10, please select “Headswap and License Conversion”)
 - License conversion (from NLF to legacy format)
 - Headswap and License Conversion (from NLF to legacy format)
6. Click **Continue**.
 7. If License Conversion is going to be performed, [Figure 36 “Replacement confirm” on page 29](#) appears. Review the list, and then click **Confirm**.

Important: Once the action is confirmed, it CANNOT be reversed.

License Replacement/Swap for Hardware and Software

Step 4: Replacement confirm

Once confirmed, this action cannot be reversed. Please ensure the data displayed corresponds to the key you wish to replace.

Installed in system:

UID type	Feature	Detail

Old UID

Figure 36. Replacement confirm

8. The license will be sent to your login email.

Adapter mobility

Transfer installed activation keys to a new machine.

Complete the following steps:

1. Log into the FoD web site, <https://fod.lenovo.com/lkms>.
2. To access the Adapter mobility menu, select **Adapter mobility** from the left navigation pane. [Figure 37 “Adapter mobility” on page 29](#) appears.

Adapter mobility

Step 1: Machine details

Select your machine type and model if available and enter your 7 character machine serial number. (Your machine serial number can be found on the back panel or in one of the system administration tools).

Machine type*

Model

Machine serial number*

Figure 37. Adapter mobility

3. Enter the information of the machine in which the activation key is installed.
 - a. In the drop-down menu, select the machine type from the list.

- b. If necessary, select the model.
- c. Then, enter the machine type serial number, and click **Continue**. The available keys for that system are shown in the next window, as shown in [Figure 38 “Installed keys” on page 30](#).

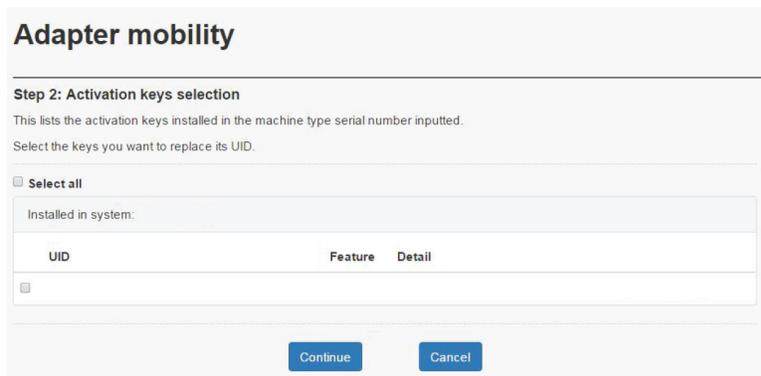


Figure 38. Installed keys

- 4. Select the items to be transferred to a new machine, and click **Continue**. The next window shows, as shown in [Figure 39 “New machine details” on page 30](#).
- 5. Enter the information of the new machine to which the activation key is going to be transferred.
 - a. In the drop-down menu, select the machine type from the list.
 - b. If necessary, select the model.
 - c. Then, enter the machine type serial number, and click **Continue**.

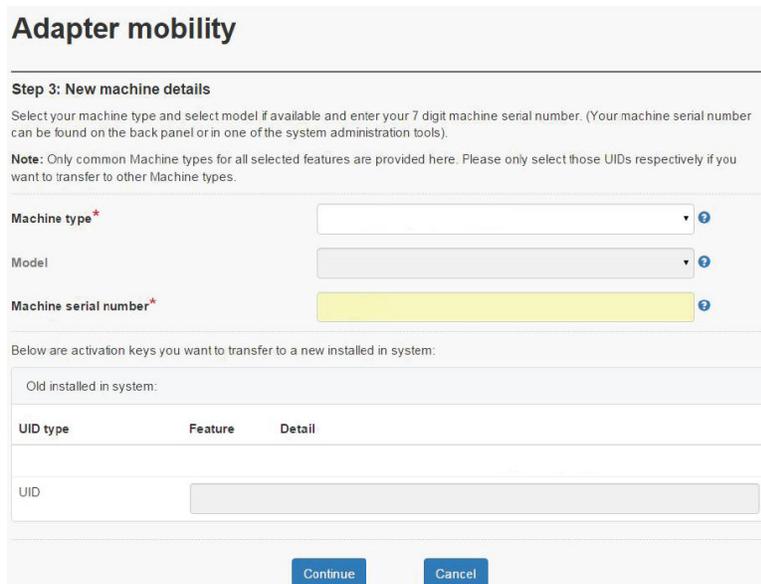


Figure 39. New machine details

- 6. Review your selections in the next window, as shown in [Figure 40 “Transfer confirm” on page 31](#), then click **Confirm**.

Important: Once the action is confirmed, it CANNOT be reversed.

Adapter mobility

Step4: Transfer confirm
Once confirmed, this action cannot be reversed. Please ensure the data displayed corresponds to the key you wish to transfer.

New installed in system:

Machine type

Model

Machine serial number

Below are activation keys you want to transfer to a new installed in system:

Old installed in system:

UID type	Feature	Detail
UID		<input type="text"/>

Figure 40. Transfer confirm

7. A successful key transfer is shown in [Figure 41 “Successful key transfer”](#) on page 31.

Adapter mobility

Selected license keys have been transferred successfully!

Step4: Transfer confirm
Once confirmed, this action cannot be reversed. Please ensure the data displayed corresponds to the key you wish to transfer.

New installed in system:

Machine type

Model

Machine serial number

Below are activation keys you want to transfer to a new installed in system:

Old installed in system:

UID type	Feature	Detail
UID		<input type="text"/>

Figure 41. Successful key transfer

Trial/Storage key

It is available to request a 90-day trial key for a trial-enabled feature, or a perpetual Storage key for DM/DG series from the FoD web site.

1. Log into the FoD web site, <https://fod.lenovo.com/lkms>.
2. To access the Trial/Storage key menu, select **Trial/Storage key** from the left navigation pane, [Figure 42 “Trial/Storage key”](#) on page 32 appears.

Trial key

Step 1: Feature selection
Select a feature and enter your company name, contact name, email, phone number. (Phone number is optional)

Feature*

Company name*

Contact name*

Email*

Phone number

[Continue](#) [Cancel](#)

Figure 42. Trial/Storage key

3. Proceed to the corresponding section for requesting a trial key or a storage key:
 - [“Request a trial key” on page 32](#)
 - [“Request a storage key” on page 33](#)

Request a trial key

1. In the drop-down menu, select the feature of the key. Then, enter the information into the fields, and click **Continue**.
2. When the next window shows, as shown in [Figure 43 “Machine detail” on page 32](#), enter the information into the fields.
 - a. Select the machine type and the model.
 - b. Enter the machine serial number (7 characters) into the field.
 - c. If necessary, enter the switch S/N.

Trial key

Step 2: Machine detail
Select your machine type and model if available. Enter your 7 character machine serial number and enter UID if FoD is not MT-SN or MTM-SN type. (Your machine serial number can be found on the back panel or in one of the system administration tools).

Machine type*

Model

Machine serial*

[Continue](#) [Cancel](#)

Figure 43. Machine detail

3. Click **Continue**.
4. When the next window shows, as shown in [Figure 44 “Confirm” on page 33](#), make sure that the displayed information is correct. Then, click **Confirm**.

Important: Once the action is confirmed, it CANNOT be reversed.

Figure 44. Confirm

- Download and save the activation key by clicking the **Download** link as shown in [Figure 45 “Download” on page 33](#). In addition, you may choose to also enter one or more email addresses and click **Submit**. Separate the email addresses with a semicolon. Recipients will receive the key file as an attachment.

Figure 45. Download

Request a storage key

- In the drop-down menu, select the feature of the key. Once the storage key feature is selected, **Controller Serial Number** appears.

Figure 46. Enter Controller Serial Number

2. Enter **Controller Serial Number**, and then click **Continue**. Figure 47 “Request activation key” on page 34 appears.

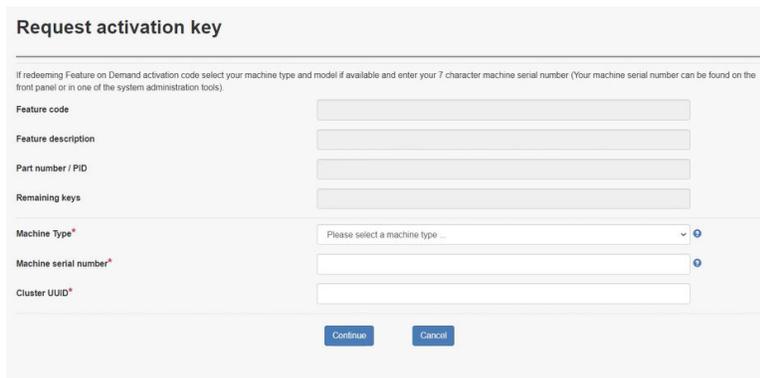


Figure 47. Request activation key

3. Enter the required information, including **Machine Type**, **Machine serial number**, and **Cluster UUID**. Then click **Continue**. Figure 48 “Machine details confirm” on page 34 appears.

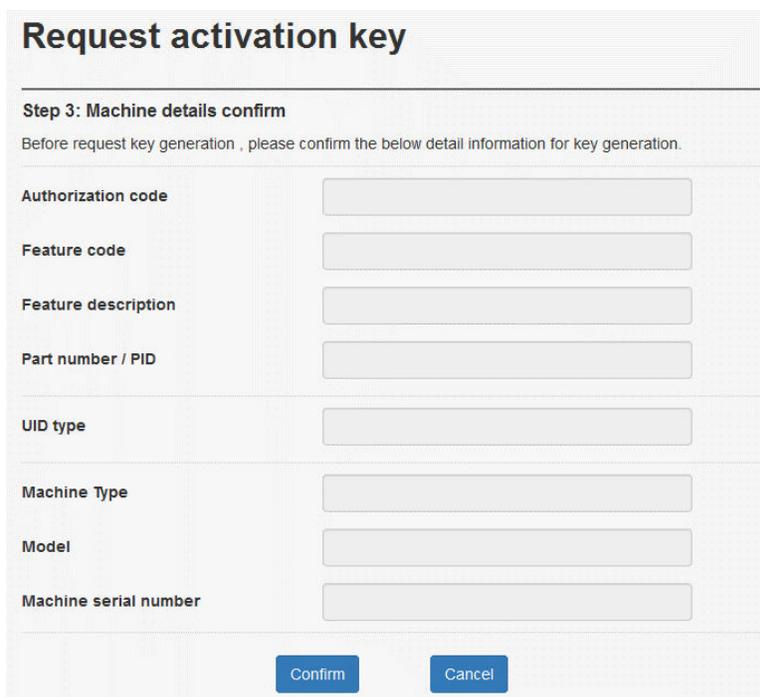


Figure 48. Machine details confirm

4. Review the details, and then click **Confirm**.
5. Download and save the activation key by clicking the **Download** link as shown below. In addition, you may choose to also enter one or more email addresses and click **Submit**. Separate the email addresses with a semicolon. Recipients will receive the key file as an attachment.

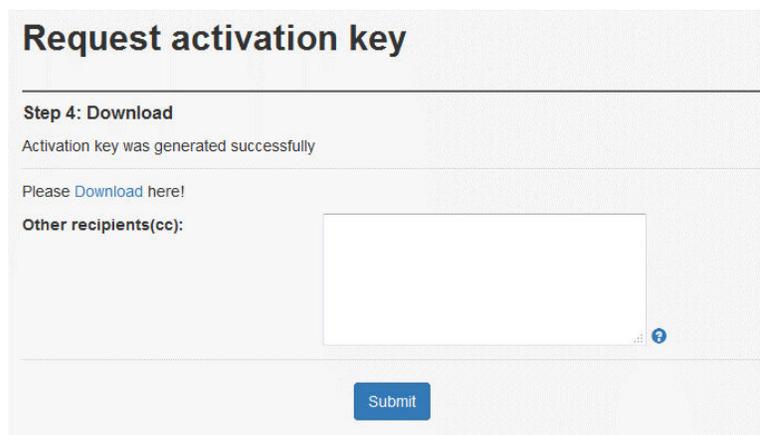


Figure 49. Key delivery options

Storage Host Protocol Change

1. From the Welcome page, select **Storage Host Protocol Change** from the left navigation pane. [Figure 50 “Storage host protocol change” on page 35](#) appears.

Figure 50. Storage host protocol change

2. In the drop-down menu, select your machine type from the list, and then select CTO and feature.
3. Enter the required information:
 - Machine serial
 - Safe ID or Feature Enable Identifier
4. Click **Continue**. [Figure 51 “Confirm” on page 36](#) appears.

Storage Host Protocol Change

Step 2: Confirm
Once confirmed, this action will not be reversible. Make sure the displayed information corresponds to the key you wish to create!

Machine type

Feature code

Feature description

Machine serial

UID

Email

Figure 51. Confirm

5. Review the information, and then click **Confirm**.

Important: Once the action is confirmed, it CANNOT be reversed.

6. Once the change is done, [Figure 52 “Mail sending” on page 36](#) appears. To send email to more recipients, you may choose to enter one or more email addresses and click **Submit**. Separate the email addresses with a semicolon.

Storage Host Protocol Change

Step 3: Mail sending
Activation key was generated successfully

Other recipients(cc):

Figure 52. Mail sending

Retrieve an authorization code

In the Retrieve Authorization Code page, you can request to have the authorization codes of a particular order number and part number emailed to you.

To retrieve an authorization code, complete the following steps:

1. In the Welcome page, select **Retrieve authorization code** from the left navigation pane. [Figure 53 “Retrieving an authorization code” on page 37](#) appears.

Retrieve authorization code

Retrieve authorization code
 For authorization code retrieval complete the below mandatory fields (*) and submit the request.
 The application will provide the authorization code by emailing a PDF file if a matching record is found.

The fields indicated with an asterisk (*) are required to complete this transaction. If you do not want to provide the information use the Cancel button on your browser to return to the previous page, or close the window or browser session that is displaying this page.

Note: To ensure that you continue to receive future correspondence without issues, please add lkms@lenovo.com as an exception to your spam filter.

Identification

Sold-to Customer #* ⓘ

Order number* ⓘ

Option P/N or Product ID* ⓘ

Your email address

Other recipients(cc:) ⓘ

Note: By clicking **Submit** you agree that Lenovo may process and retain your data for the purposes listed above in accordance with Lenovo's data privacy policy.

Figure 53. Retrieving an authorization code

2. Enter the sold-to customer number, order number and either the option part number or Product ID. These numbers are on the packing list that is included with your order. Hover over the Help icon ⓘ next to each field to see what format each number can be.
3. Click **Submit**. An email is sent to you within a minute or two. The Activation Instructions documents will be attached as PDFs. The authorization codes will be sent to your email address. You can optionally enter additional email addresses to also receive the information. Separate them with a semicolon.

User preferences

The user preferences page of the FoD web site is where you can control whether you get emails from the FoD system.

From the Welcome page, select **User preferences** from the left navigation pane. [Figure 54 “User preferences” on page 37](#) appears.

User Preferences

This option allows you to set up how and if the website communicates with you via email. Lenovo Business Partners with access to Inventory management can also set up how their delivery emails are created, when they are being sent to their customers.

My preferences:

I consent to Lenovo sending me reminders about pending entitlement expirations and renewal quotes [click here to check detail](#)

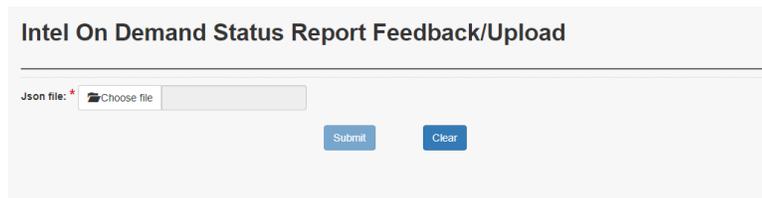
Figure 54. User preferences

Check or uncheck the box to change the setting of receiving emails from the FoD system. Then, click **Update** to update the setting.

Intel On Demand Status Report Feedback/Upload

After completing enabling or transferring Intel On Demand, acquire the report and upload it via the FoD website.

From the Welcome page, select **On Demand Feedback** from the left navigation pane. [Figure 55 “Intel On Demand Status Report Feedback/Upload” on page 38](#) appears.



Intel On Demand Status Report Feedback/Upload

Json file: *

Figure 55. Intel On Demand Status Report Feedback/Upload

To acquire the report, see [“Intel® On Demand Feedback” on page 8](#) for more information.

Help

From the navigation menu, select **Help**.

Help page provides the information of ESD/FOD support mail addresses and useful links.

Chapter 4. Using the FoD keys

The FoD keys can be used with various tools. See the following links for more information.

- To use the FoD keys in Lenovo XClarity Controller, see “License Management” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.
- To use the FoD keys with Lenovo XClarity Controller REST API, see “Resource License” section in the XCC REST API reference compatible with your server at <https://pubs.lenovo.com/lxcc-overview/>.
- To use the FoD keys in Lenovo XClarity Essentials OneCLI, see “The FoD key” section in <https://pubs.lenovo.com/lxce-onecli/>.

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