Intel On Demand

Overview, enablement, and troubleshooting

Lenovo

Overview of Intel On Demand

Intel On Demand implements software-defined silicon (SDSi) features on certain 4th Generation Intel Xeon Scalable processors and is available via Lenovo license. The licenses enable customers to activate embedded accelerators and increase the SGX Enclave size in supported processor models as their workload and business needs change.
Available upgrades are as follows:

- Up to four QuickAssist Technology (Intel QAT) accelerators
- Up to four Intel Dynamic Load Balancer (Intel DLB) accelerators
- Up to four Intel Data Streaming Accelerator (Intel DSA) accelerators
- Up to four Intel In-Memory Analytics Accelerator (Intel IAA) accelerators
- 512 GB SGX Enclave, an encrypted memory space for use by Intel Software Guard Extensions (SGX)

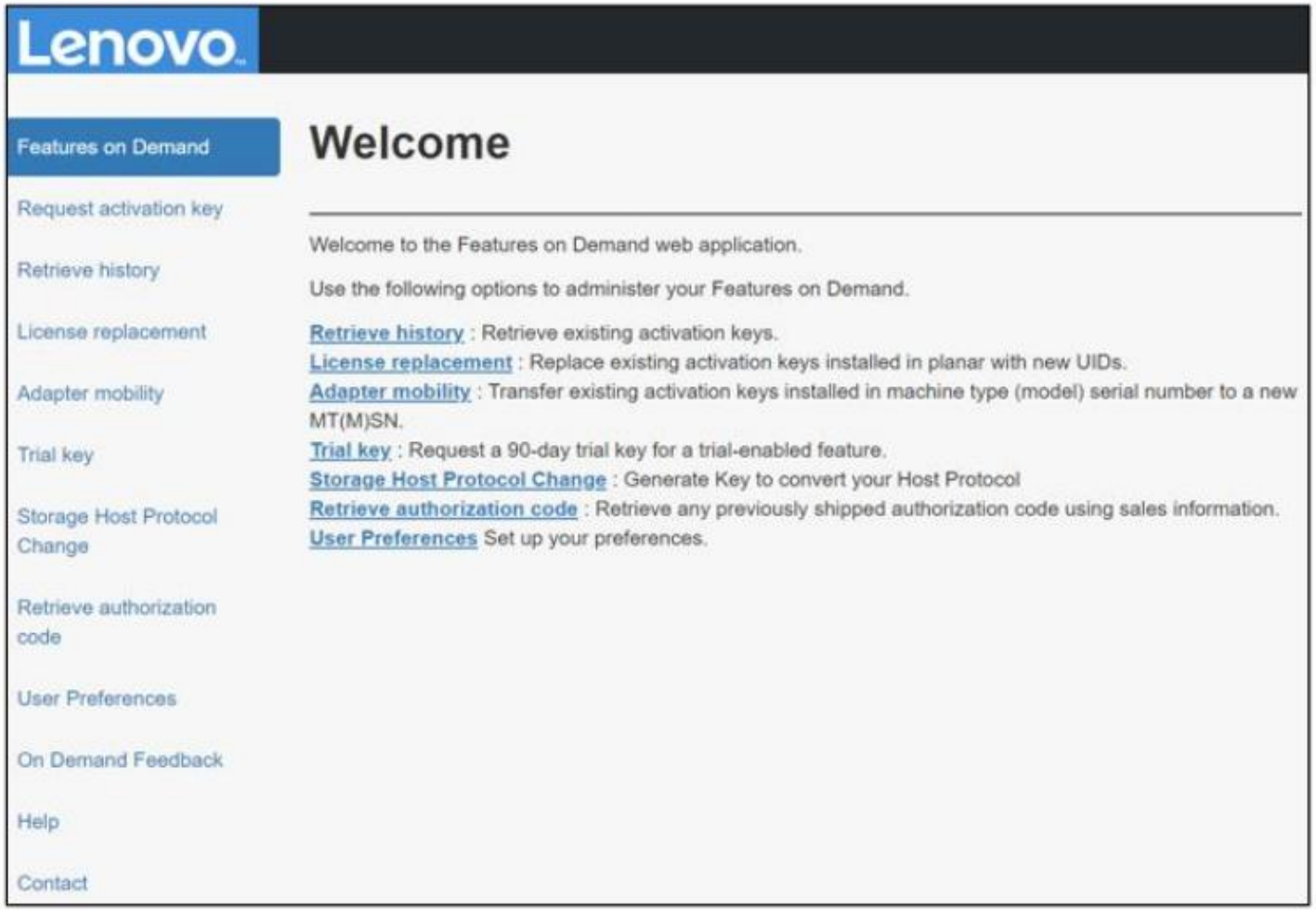
Note: Intel On Demand is not supported by all processors. For information about supported Intel CPUs and details of each feature, refer to Lenovo Press.

Configuration rules

- Licenses can be activated in the factory using feature codes or as field upgrades using the option part numbers. Field upgrades allow customers to only activate the accelerators or increase the SGX Enclave size when their applications can best take advantage of them.
- Intel On Demand is licensed on individual processors.
- For servers with two processors, customers will need identical licenses for each processor.
- If customers add a second processor as a field upgrade, that processor must have an identical license with the first processor.
- Upgrades cannot be removed once activated.

Lenovo Features on Demand web page

The Lenovo Features on Demand web page is used to request, retrieve, and administer a user's features and licenses.



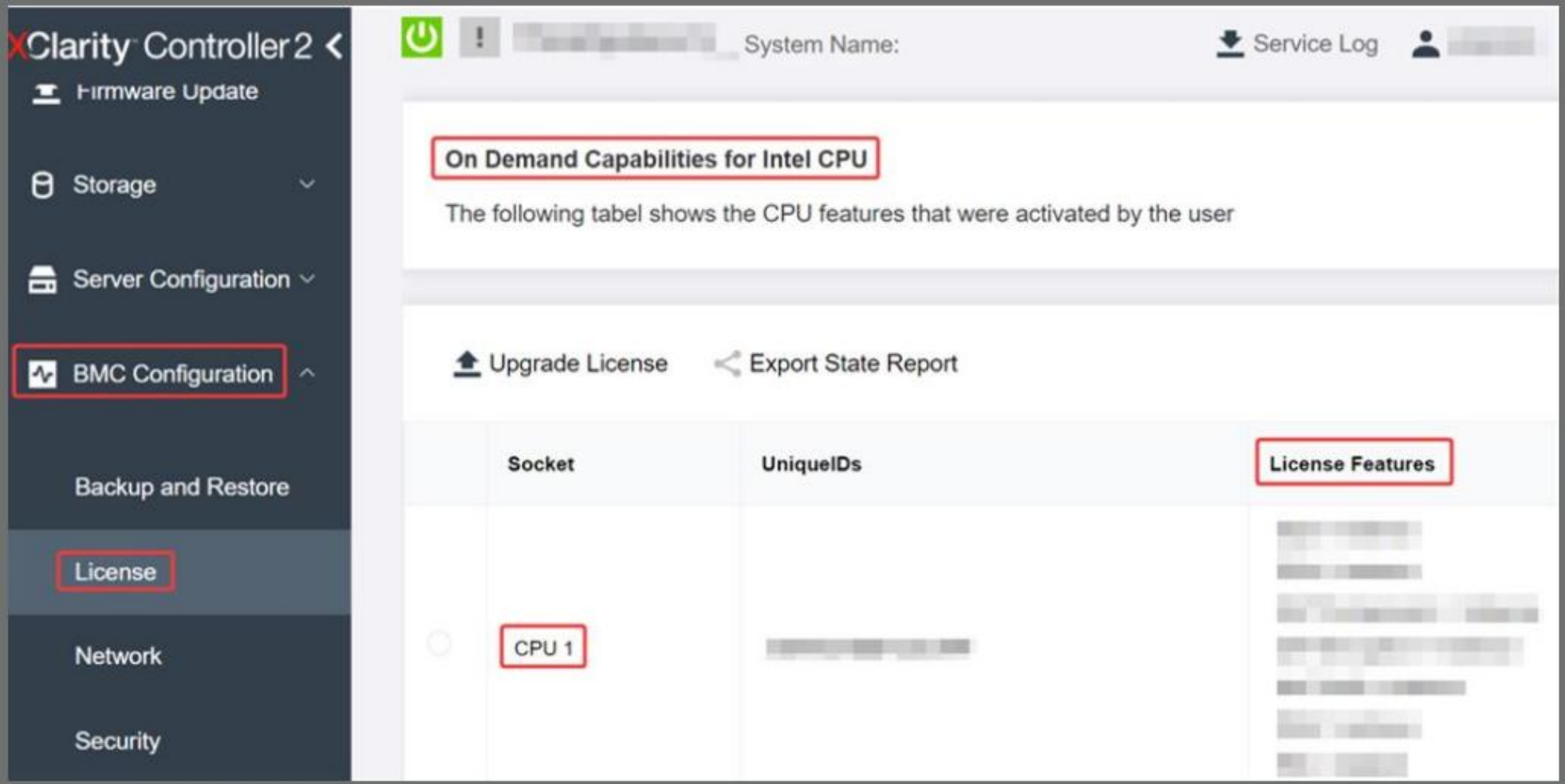
Installation tools

Intel On Demand can be installed through Lenovo XClarity Controller (XCC) or Lenovo XClarity Essentials OneCLI (OneCLI). XCC or OneCLI must be updated to the latest version before Intel On Demand features are applied.
Users can check the licenses installed on their system with the XCC web GUI, XCC REST API and OneCLI.

Note: LXCE OneCLI must be version 4.2.0 or above.

Installation tools

XCC web GUI



Installation tools

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 API information in the following format (**x** is the CPU number):

  `/redfish/v1/LicenseService/Licenses/CPUX_OnDemandCapability`

  In this example, you can see that the current XCC version supports Intel On Demand. If Intel On Demand is not supported, the XCC firmware needs to be updated to the latest version.

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

Installation tools

OneCLI

Use the `OneCLI` command to check installed features:

```
OneCli.exe fod report -b XCC_USER:XCC_PASSWORD@XCC_HOST
```

- The output will show all licenses, including Intel On Demand features.

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

Enabling Intel On Demand

Work through the following steps to use Intel On Demand features:

- Purchase an Intel On Demand license to receive an email with an authorization code.
- Check the Protected Processor Inventory Number (PPIN) of the processor to be installed with the Intel On Demand feature.
- Go to the Lenovo Features on Demand web page (LMKS) and enter the authorization code to acquire the Activation Key for the feature.
- Enter the Machine Type, Machine serial number, and PPIN.
- The website will generate the activation key, which can be downloaded or emailed to the user.
- Use XCC or OneCLI to apply the license to the processor with the activation key.
- Reboot the server.
- (Optional) Upload the Intel On Demand State Report.

Note: Individual steps will be explained in more detail on the following pages.

Note: The State Report shows the current configuration status of the Intel On Demand-capable processors in a server. After receiving a State Report from a customers, Lenovo can calibrate the current status of Intel On Demand-capable processors.

Transferring licenses

Before replacing a processor installed with Intel On Demand features, the license must be transferred to the new processor. Work through the following steps to transfer a license:

1. Use XCC or OneCLI to record the PPIN of the defective processor.
2. Replace the defective processor.
3. Turn on the server and read the new processor's PPIN.
4. Use the LKMS web page to obtain a new activation key.
5. Before applying the license to the new processor, make sure the XCC firmware has been updated to the latest version.
6. In the XCC web GUI, go to **BMC Configuration** –> **License**. The On Demand capabilities will be shown in the **Intel CPU** section of the **License** tab.
7. Use **Upgrade License** –> **Browse** –> **Import** to upload the activation key.
8. Restart the server.
9. (Optional) Export and upload the State Report.

Note: Individual steps will be explained in more detail on the following pages.

Checking a PPIN

To enable Intel On Demand, users must have the processor's PPIN. The PPIN can be checked using the XCC web GUI, the XCC REST API, or OneCLI.

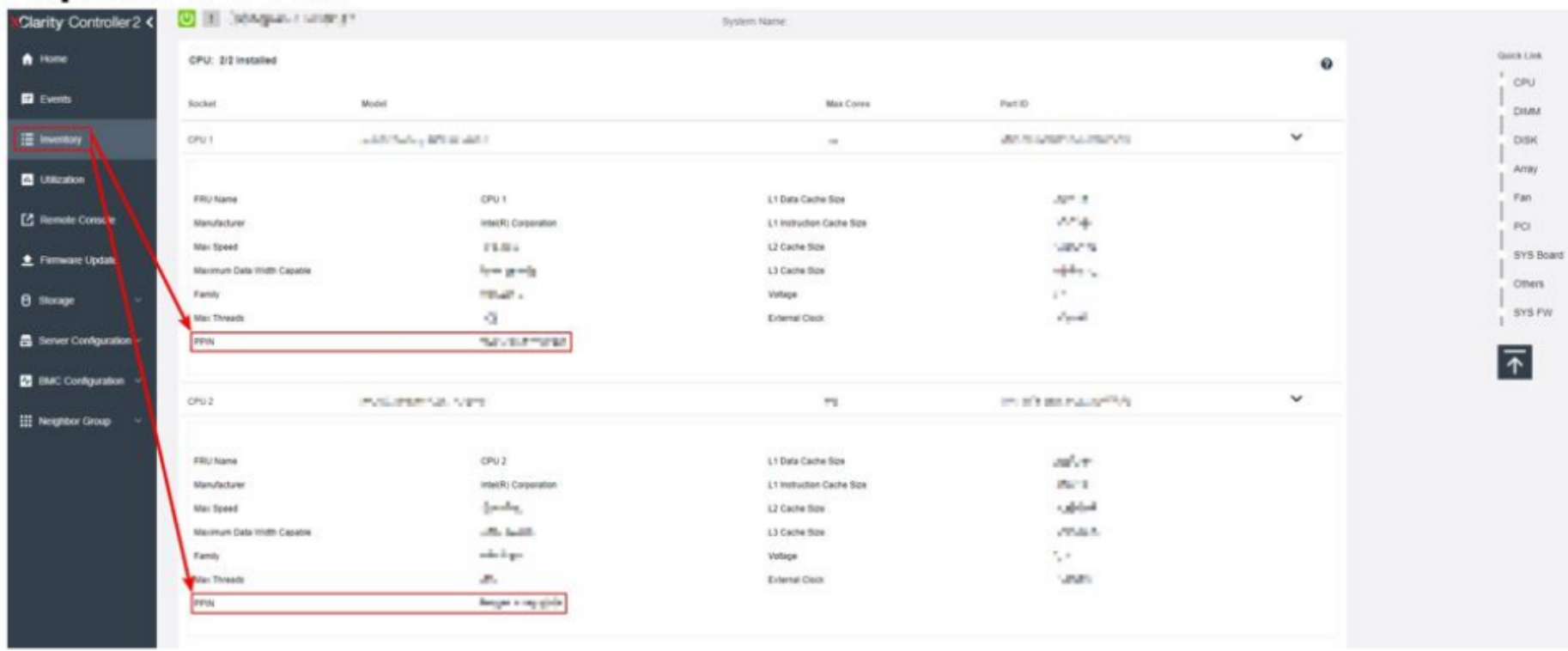
XCC web GUI

XCC REST API

OneCLI

Click the icons for more information.

Log in to the XCC web GUI and select the **Inventory** page → **CPU** tab → **Expand** → **PPIN**



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Checking a PPIN

To enable Intel On Demand, users must have the processor's PPIN. The PPIN can be checked using the XCC web GUI, the XCC REST API, or OneCLI.

XCC web GUI

XCC REST API

OneCLI

To read the processor 1 PPIN, use the GET method with the following Request URL:

```
GET https://bmc_ip/redfish/v1/Systems/1/Processors
```

In the response JSON object, the `ProcessorId` field shows the `ProtectedIdentificationNumber`, which is the PPIN info of the requested CPU.

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

Click the icons for more information.

Checking a PPIN

To enable Intel On Demand, users must have the processor's PPIN. The PPIN can be checked using the XCC web GUI, the XCC REST API, or OneCLI.

XCC web GUI

XCC REST API

OneCLI

Enter the following command:

```
OneCli.exe fod showppin -b XCC_USER:XCC_PASSW0RD@XCC_HOST
```

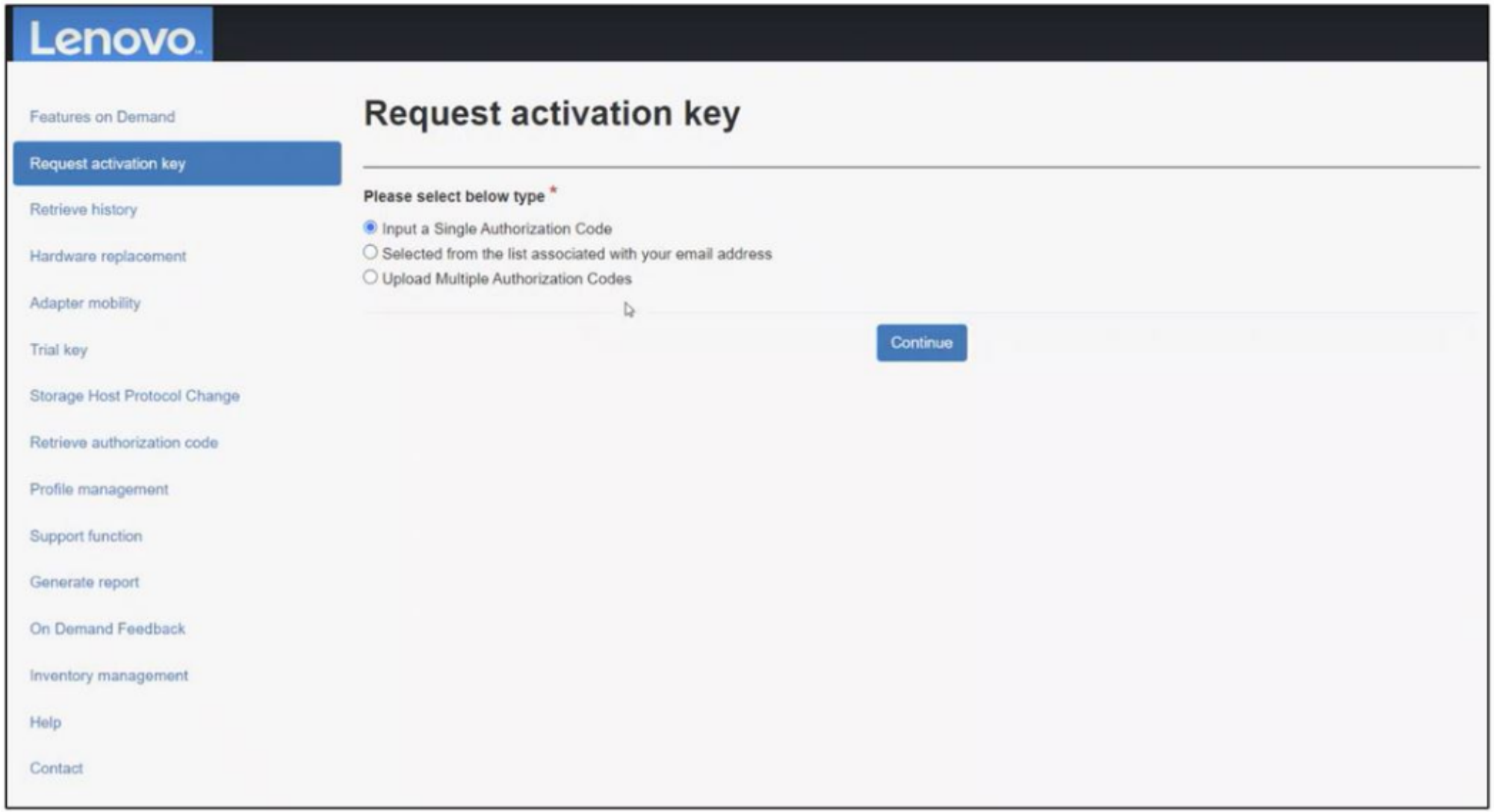
The output will display the PPIN information.

```
Machine Type: 7D75
Serail Number: 7D75012345
FoD PPIN result:
=======================================
|   Socket ID   |        PPIN         |
|  Processor 1  |  49F2B81FGEF89BD3   |
|  Processor 2  |  558DCC1FF51421F3   |
=======================================
```

Click the icons for more information.

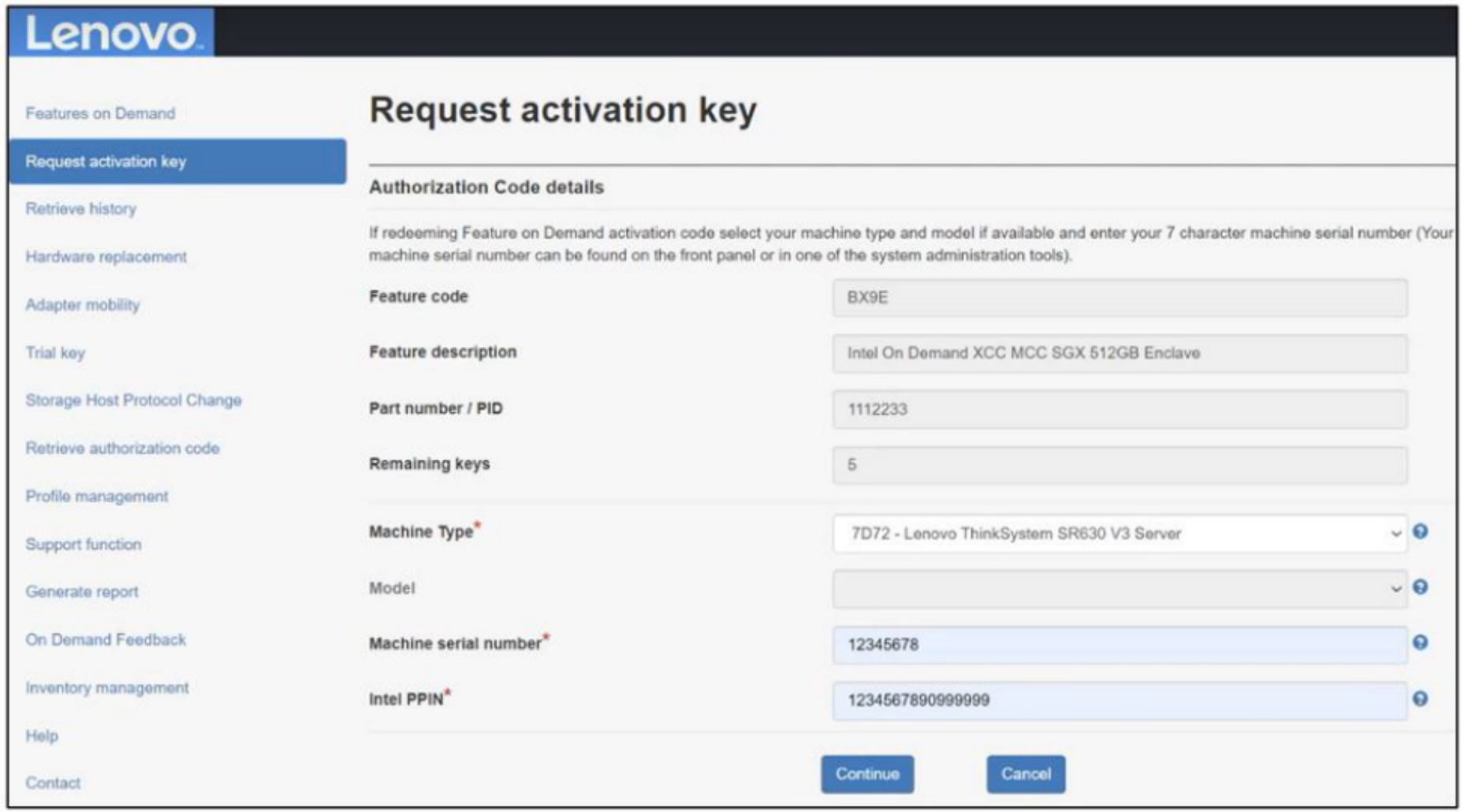
Requesting an activation key -1

To request an activation key, users can input a single authorization code:



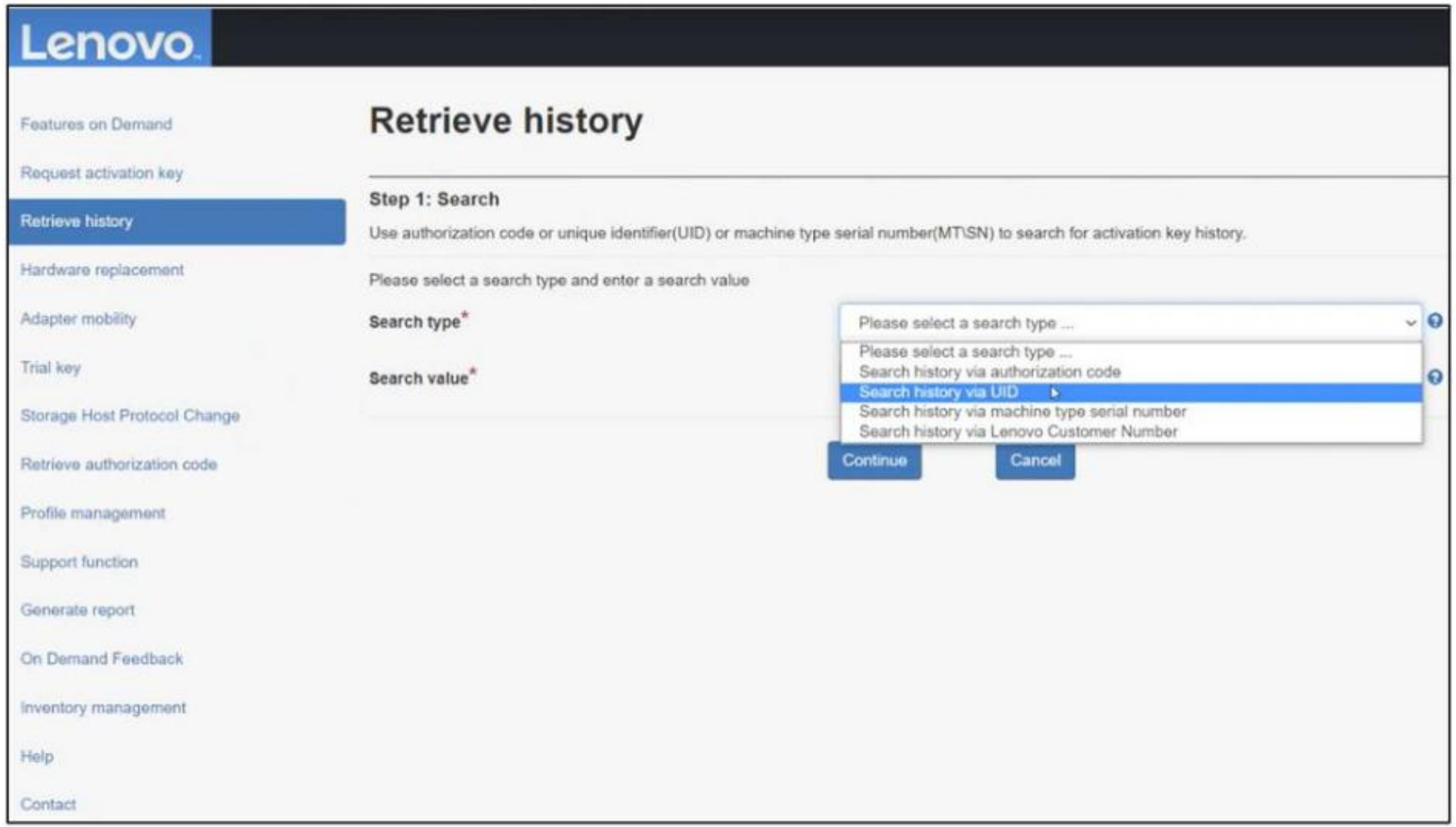
Requesting an activation key -2

Log in to the website, select **Request activation key**, and then enter the necessary information in the **Machine Type**, **Machine serial number**, and **Intel PPIN** fields to get the activation key.



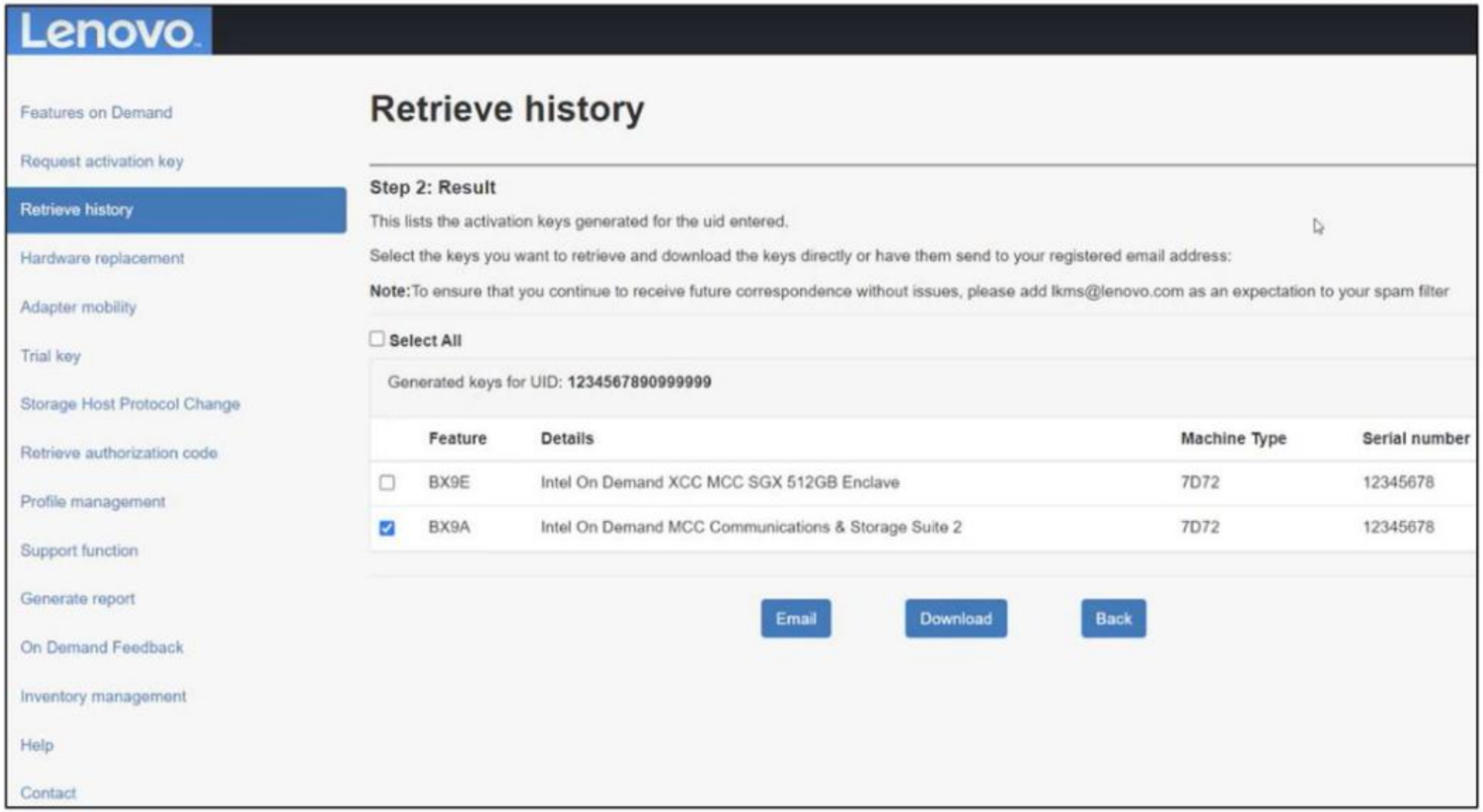
Retrieving history -1

Users can also retrieve their license purchase history from the LKMS website. Information can be searched for by authorization code, unique identifier (UID), machine type serial number, or Lenovo Customer Number.



Retrieving history -2

Search results will be displayed, and they can also be downloaded or emailed to the user.



Installing Intel On Demand on a processor

After retrieving the activation key from the website, users can apply the license through the XCC web GUI, the XCC REST API, or OneCLI.

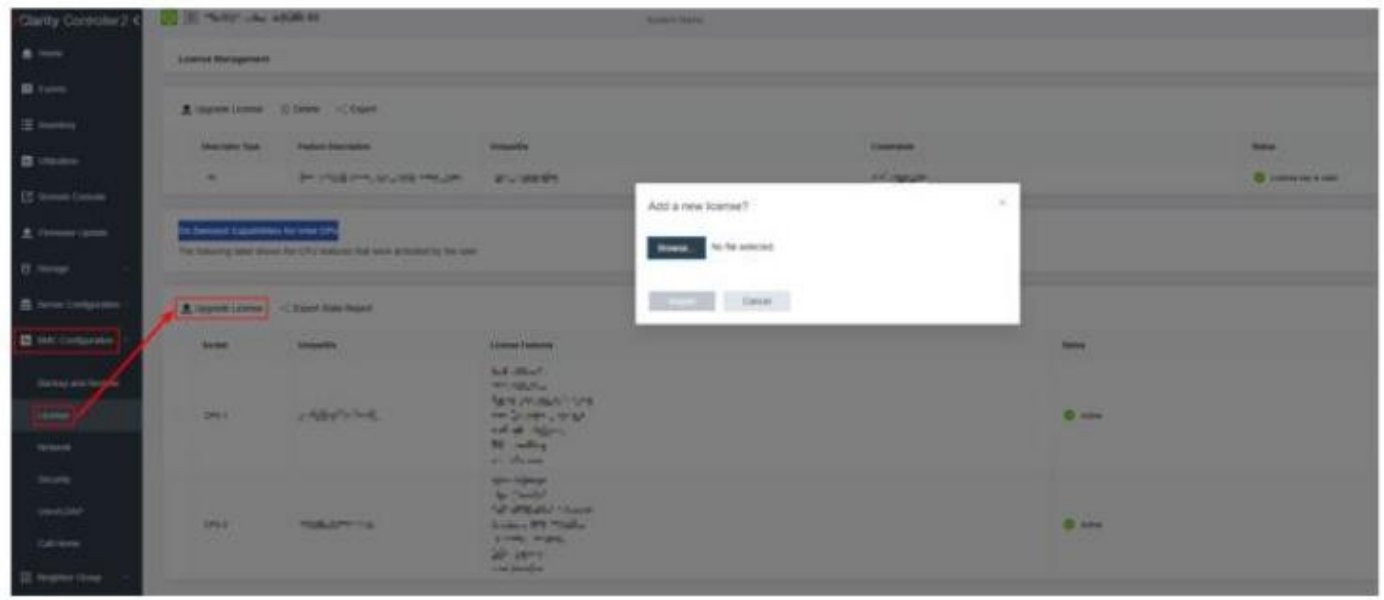
XCC web GUI

XCC REST API

OneCLI

Click the icons for more information.

Log in to the XCC web GUI and select **BMC Configuration → License → On Demand Capabilities for Intel CPU → Upgrade License → Browse → Import** to upload the activation key.



If the installation is successful, the following message will be displayed in a pop-up window: **License key upgraded successfully. The features will be activated on the processor after system power cycle**.

Installing Intel On Demand on a processor

After retrieving the activation key from the website, users can apply the license through the XCC web GUI, the XCC REST API, or OneCLI.

XCC web GUI

XCC REST API

OneCLI

Use the POST method with the following Request URL:

```
POST https://bmc_ip/redfish/v1/LicenseService/Licenses
```

Transfer the activation key to base64 string* and enter it into the `LicenseString` field as POST data.

```
{
    "LicenseString": ""
}
```

If the installation is successful, the following message will be displayed:

```
License key upgraded successfully. The features will be
activated on the processor after system power cycle.
```

Click the icons for more information.

Note: *To make the conversion, Linux users can run the `base64` command, and Windows users can use the base64encode website.

Installing Intel On Demand on a processor

After retrieving the activation key from the website, users can apply the license through the XCC web GUI, the XCC REST API, or OneCLI.

XCC web GUI

XCC REST API

OneCLI

Enter the following command with the activation key in place of <key_file>:

```
OneCli.exe fod install --keyfile <key_file>
```

If successful, the response will be:

```
Successfully install key
```

Call Lenovo Support if the following response is shown:

```
Failed to install key
```

Click the icons for more information.

Acquiring the Intel On Demand State Report

After completing the enablement or transfer of Intel On Demand features, acquire the State Report through the XCC web GUI, the XCC REST API, or OneCLI. Then, upload it to the Lenovo Features on Demand website.

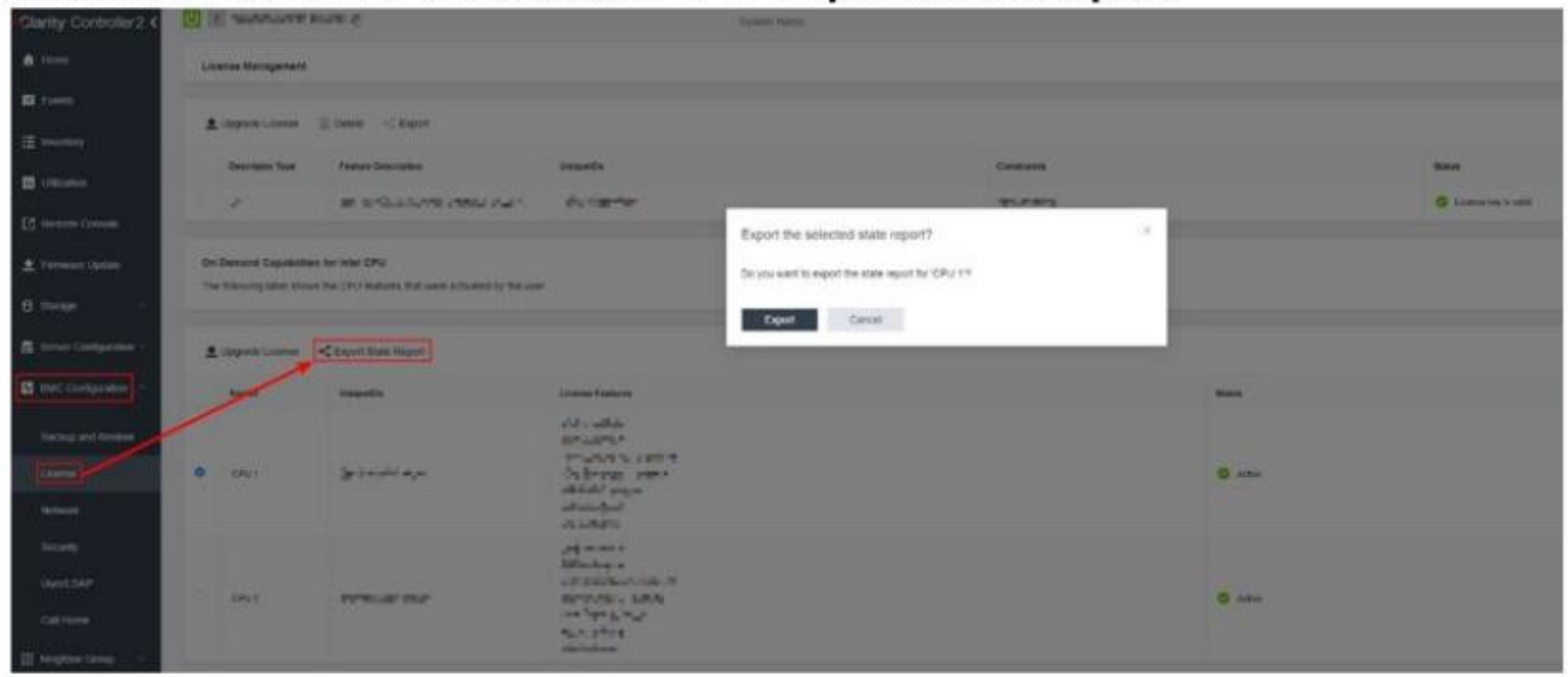
XCC web GUI

XCC REST API

OneCLI

Click the icons for more information.

Open the XCC web GUI, and go to **BMC Configuration** → **License** → **On Demand Capabilities for Intel CPU** → select a CPU → **Export State Report**.



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XCC web GUI

XCC REST API

Step1: Use the GET method with the following Request URL to retrieve the CPU State Report API (**x** is the processor number):

```
 GET
https://bmc_ip/redfish/v1/LicenseService/Licenses/CPUx_OnDemandCapa
bility
```

OneCLI

Click the icons for more information.

Step 1 2 3 4

Click each number in turn to see the procedure.

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Acquiring the Intel On Demand State Report

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XCC web GUI

XCC REST API

OneCLI

Step 2: In the JSON response, the `target` field under `LenovoLicense.ExportStateReport` shows the CPU State Report API – (**x** is the processor number):

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

Click the icons for more information.

Step 1 2 3 4

Click each number in turn to see the procedure.

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Acquiring the Intel On Demand State Report

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XCC web GUI

XCC REST API

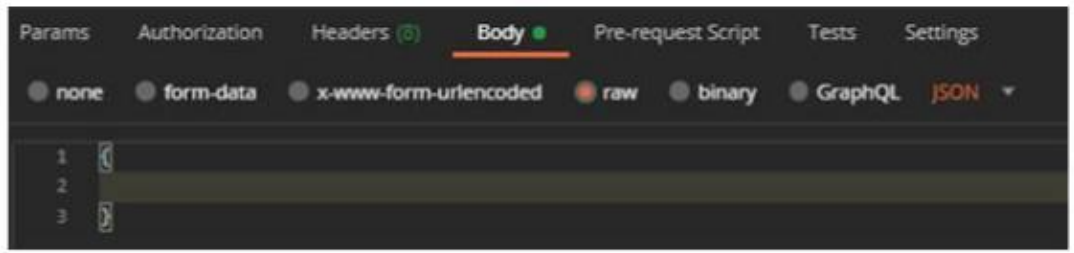
OneCLI

Step 3: You can retrieve the State Report with the following methods:

A. Use the POST method with the following Request URL to retrieve the CPU State Report API – (**x** is the processor number):

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

B. Use an empty JSON object as POST data. When using an API tool such as Postman, enter an empty JSON object in **Body → Raw → JSON**, and enter **{}** (a NULL object) in the JSON file.



Click the icons for more information.

Step 1 2 3 4

Click each number in turn to see the procedure.

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XCC web GUI

XCC REST API

OneCLI

Click the icons for more information.

Step 4: Retrieve the State Report from the `stateReports` field.

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

Step 1 2 3 4

Click each number in turn to see the procedure.

Lenovo

Acquiring the Intel On Demand State Report

After completing the enablement or transfer of Intel On Demand features, acquire the State Report through the XCC web GUI, the XCC REST API, or OneCLI. Then, upload it to the Lenovo Features on Demand website.

XCC web GUI

XCC REST API

OneCLI


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


Click the icons for more information.

Step 1 2 3 4

Click each number in turn to see the procedure.

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Acquiring the Intel On Demand State Report

After completing the enablement or transfer of Intel On Demand features, acquire the State Report through the XCC web GUI, the XCC REST API, or OneCLI. Then, upload it to the Lenovo Features on Demand website.

XCC web GUI

Enter the following command to retrieve the State Report :

```
OneCli.exe fod exportreport -b
XCC_USER:XCC_PASSWORD@XCC_HOST
```

XCC REST API

Upload State Report with the following command:

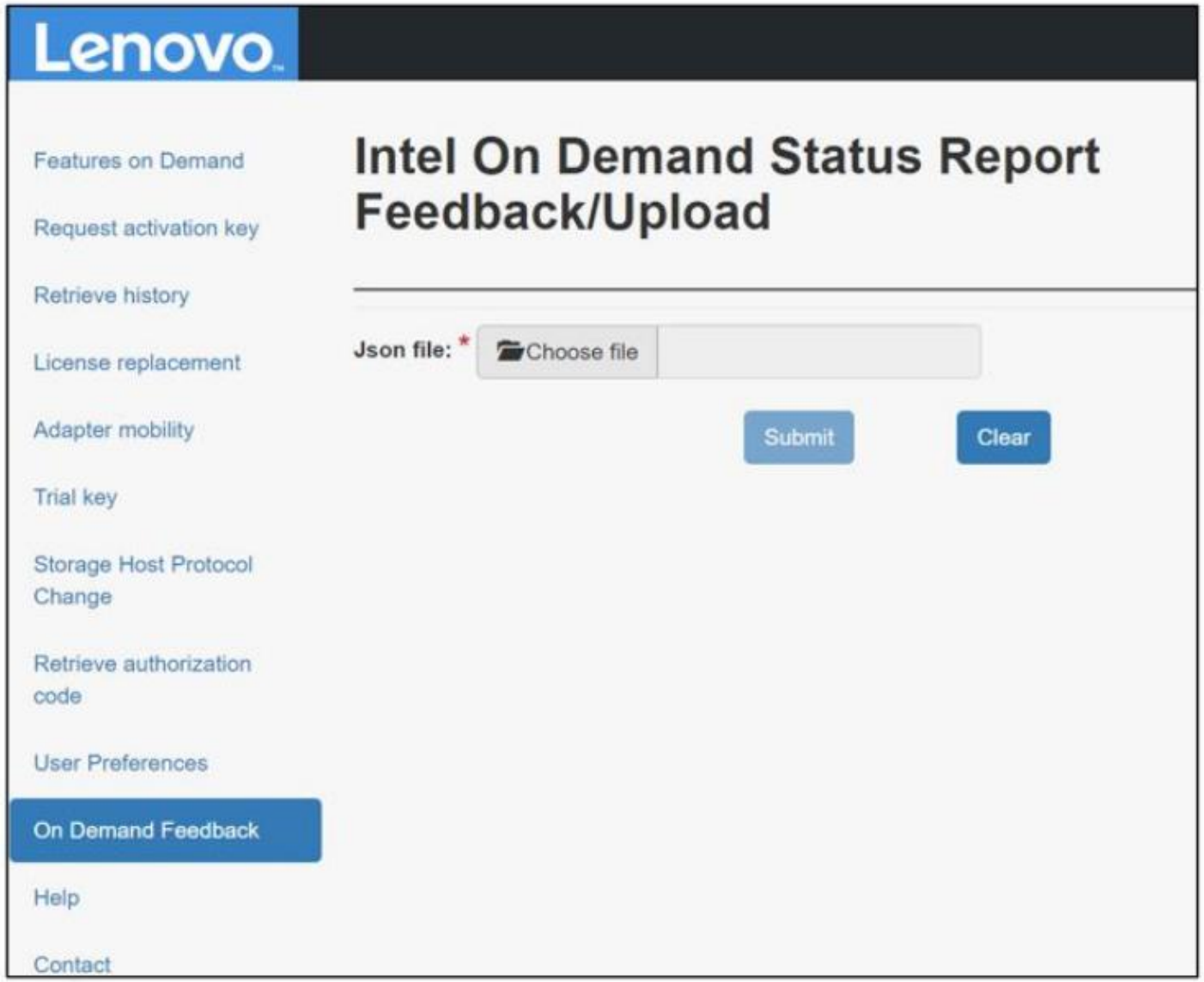
```
OneCli.exe fod uploadreport --file
CPU1_xxxxxx_StateReport.json --kmsid KMS_USER:KMS_PASSWORD
```

OneCLI

Click the icons for more information.

Uploading the Intel On Demand State Report

Log in to the Lenovo Features on Demand website, select **On Demand Feedback**, and then upload the State Report by selecting the desired JSON file.



Enabling Intel On Demand – troubleshooting

The following table shows messages that might be displayed after users import a license to enable Intel On Demand features. The corresponding user actions are also provided.

Message	User Action
License key upgraded successfully. The features will be activated on the processor after system power cycle.	Reboot the system to activate the Intel On Demand features.
The activation key format is invalid	Check the activation key file. If the error persists, contact Lenovo Support.
Invalid processor PPIN in Activation key	Check if the PPIN in the activation key file and processor are identical.
The license was installed in the processor already	The activation key has been used on the other processor. Check the activation key.
Not enough NMRAM space in the processor	Contact Lenovo Support.
Internal error	Contact Lenovo Support.

Note: For more error messages and user actions, refer to Lenovo Docs.

Enabling Intel On Demand – troubleshooting

The following table shows messages that might be displayed after users import a license to enable Intel On Demand features. The corresponding user actions are also provided.

Message	User Action
The license was installed in the processor already	The activation key has been used on the other processor. Check the activation key.
Not enough NMRAM space in the processor	Contact Lenovo Support.
Internal error	Contact Lenovo Support.
Cold reset needed before next provisioning	Restart the system, and then import the activation key.
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.

Note: For more error messages and user actions, refer to Lenovo Docs.