Lenovo
Device Intelligence

2.2 - Device Setup Guide

Overview

This product requires a software client to be installed on each device that is included by the solution. The software is called **Lenovo Universal Device Client** (UDC) and is a Windows service and driver that is capable of pairing the device with Lenovo cloud services. UDC will periodically send device usage and health telemetry to the Lenovo cloud services for analysis, aggregation, and, reporting. These insights can be viewed centrally in the solution portal to identify trends across the organization or with in individual device.

Requirements

Software Details

|	
Recommended Version	2.11
Install Types	- INF driver - Setup exe
Size	~65 MB
Service	- Display name: `Universal Device Client Service` - Service name: `UDCService` - Location: `%windir%\System32\drivers\Lenovo\udc\Service\UDClientService.exe`
Process Name	`UDClientService.exe` `UDCUserAgent.exe`
Install Location	`%windir%\System32\drivers\Lenovo\udc`
Device Driver	- Name: `Universal Device Client Device` - Path: `Root\UdsUdcDriver`

Software Requirements

Client software for this solution has a few requirements that the device must meet.

Category	Requirement
Manufacturer	Any device manufacturer is supported, though some features may only be available or verified on Lenovo devices.
Operating System	- Windows 10 version 1809 ("October 2018 Update") or newer. 64 bit OS - Special editions such as "10 S" or "10x" are not currently supported
Hardware	Trusted Platform Module (TPM) 2.0 enabled.
Environment	- Access to the Internet - specifically `*.uds.lenovo.com` on ports `80, 443 & 8883` **Proxy is supported in some scenario**s. Devices may require additional configuration to support. Refer to **Using the Troubleshooter Section** for details.

Registering Device in the Portal

Prior to inclusion into the solution for your organization, each device must be paired with your organization in the portal. This process may be referred to as registering, adding, or claiming and consists of 4 steps:
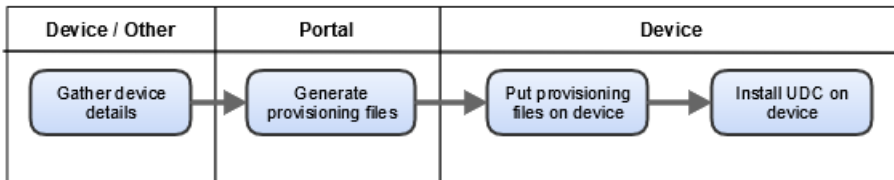
Gathering Device Details

Getting Device Details Manually

Data	Required	Command	Requirements	Example value
Name	Required	`wmic computersystem get Name`	alphanumeric + '-' < 128 chars	Grimme-x270
Manufacturer	Required	`wmic bios get manufacturer`	< 255 chars	- Lenovo - Microsoft
Model	Required	`wmic csproduct get name`	**If Lenovo**: first 4 characters **If Non-Lenovo**: < 255 characters	(If Lenovo) 20KG (Non Lenovo) 027772391468
Category	Required		PC	PC
Activation Code	Optional	Provided by Lenovo Support.	Required for some new (manufactured after 2019) Lenovo devices.	ABCD1234
Serial Number	Required	`wmic bios get serialnumber`	alphanumeric, < 20 chars	PZ10BAJMG
Family	Optional	Marketing name for the device.	< 255 chars	- Thinkpad x270 - Thinkpad X1 Carbon (5th) - Microsoft Surface book 2
Enclosure Type	Optional	The device form factor.	- notebook - desktop - tablet	

Get Devices Programmatically

Example Powershell to get device details

```
[pscustomobject][ordered] @{
    "device_name" = Get-CimInstance -ClassName Win32_ComputerSystem | Select-Object -ExpandProperty Name
    "device_manufacturer" = Get-WmiObject -Class Win32_BIOS | Select-Object -ExpandProperty Manufacturer
    "device_modeltype" = Invoke-Command { $model = (Get-WmiObject -Class Win32_ComputerSystem).Model; $mfctr =
(Get-WmiObject -Class Win32_BIOS).Manufacturer; if($mfctr -imatch "lenovo") { return $model.Substring(0,4) }
else { return $model }}
    "device_category" = "PC"
    "device_activation_code" = ""
    "device_serialnumber" = Get-WmiObject -Class Win32_BIOS | Select-Object -ExpandProperty SerialNumber
    "device_family" = Get-CimInstance -ClassName Win32_ComputerSystem | Select-Object -ExpandProperty
SystemFamily
    "device_enclosuretype" = Invoke-Command { $map=@{"notebook"=@(10,9,14,31,32);"desktop"=@(3,6,7,13);"tablet"
=@(30,11)}; $chasi=(Get-WmiObject -Class Win32_SystemEnclosure).ChassisTypes;return ($map.GetEnumerator().where
{ $_.Value -icontains  [string]$chasi}).Name}
}
```

Get Device Details for Multiple Devices

To avoid entering device information one at a time, you can prepare a CSV file that contains the necessary information. You can refer to the table above for details for each device field.

Example CSV for multiple devices

```
device_name,device_manufacturer,device_modeltype,device_category,device_activation_code,device_serialnumber,
device_family,device_enclosuretype
Grimme-x270,Lenovo,20KG,PC,,PZ10BAJMG,Thinkpad x270,notebook
Rabbit-x290,Lenovo,18UM,PC,,AZ91LAKVB,Thinkpad x290,notebook
Fox-SurfaceBook,Microsoft,Surface Pro 6027772391468,PC,,MHL28276WG9,Microsoft Surface book 2,notebook
```

To avoid manually retrieving values for a device, you can use PowerShell to create a CSV in the correct format with the required values. Using existing remote management tools such as PowerShell remoting, SCCM, , etc., you can run this command on many devices and collect the necessary data for each.

Example Powershell to create CSV file for device

```
[pscustomobject][ordered] @{
    "device_name" = Get-CimInstance -ClassName Win32_ComputerSystem | Select-Object -ExpandProperty Name
    "device_manufacturer" = Get-WmiObject -Class Win32_BIOS | Select-Object -ExpandProperty Manufacturer
    "device_modeltype" = Invoke-Command { $model = (Get-WmiObject -Class Win32_ComputerSystem).Model; $mfctr =
(Get-WmiObject -Class Win32_BIOS).Manufacturer; if($mfctr -imatch "lenovo") { return $model.Substring(0,4) }
else { return $model }}
    "device_category" = "PC"
    "device_activation_code" = ""
    "device_serialnumber" = Get-WmiObject -Class Win32_BIOS | Select-Object -ExpandProperty SerialNumber
    "device_family" = Get-CimInstance -ClassName Win32_ComputerSystem | Select-Object -ExpandProperty
SystemFamily
    "device_enclosuretype" = Invoke-Command { $map=@{"notebook"=@(10,9,14,31,32);"desktop"=@(3,6,7,13);"tablet"
=@(30,11)}; $chasi=(Get-WmiObject -Class Win32_SystemEnclosure).ChassisTypes;return ($map.GetEnumerator().where
{ $_.Value -icontains  [string]$chasi}).Name}
} | Export-Csv -Path "C:\ProgramData\device-upload.csv" -NoTypeInformation -Encoding UTF8
```

If you have many CSV files (one per device) that you would like to combine into a single CSV file for uploading to the portal, you can use the following:

Example Powershell to create CSV file for device

```
$inputDir = "C:\path\to\csv-files"
$outputDir = "C:\path\to\output"
(Get-childItem -Path $inputDir  -Filter "*.csv" | ForEach-Object { Import-Csv -Path $_.FullName } ) | Export-
Csv -Path (Join-Path $outputDir "combined.csv") -NoTypeInformation -Encoding UTF8
```

Registering Lenovo Devices that Require an Activation Code

In some scenarios, you will be asked to provide an activation code when registering a new or previously added device. Some example scenarios are:

- Beginning in 2019, some Lenovo PCs are manufactured with a TPM platform key which acts as a protected birth certificate for the device and is the base for establishing a secure and trusted identity within Lenovo cloud services. The platform key cannot be viewed, replaced, removed, nor duplicated.
  If a device in your organization has the platform key and UDC has auto-registered, the portal will prompt you for an activation code when appropriate.
- If a device was was previously used by the Lenovo Cloud but was "unclaimed" from within the portal, an activation code will be required when being re-added.

Methods of Getting Activation Code

Retrieve activation code from device

If the device has UDC 2.11 or higher, an activation code will be sent to the device for your retrieval. The activation code is stored in a CSV file that requires elevation to access.

1. Remotely (Powershell, SCCM, remote desktop, etc) or locally access the device
2. To ensure the activation code will not expire soon, we suggest restarting the UDC service and waiting for UDC to generate and store an updated activation code
   `Restart-Service UDCService`
3. Retrieve `%programdata%\lenovo\Udc\privileged\claimcode.csv`
4. Examine CSV file and look at `device_activation_code` column

Requesting activation code from Lenovo Support

1. Follow steps to create CSV file containing your device(s).
2. Contact the Lenovo Platform Support Team (cspsupport@lenovo.com)
   a. Attach your CSV file
   b. Provide the URL to your portal which contains your organization account ID
3. Lenovo Platform Support Team will respond with a resulting CSV file that contains activation codes for each device
4. Upload the new CSV into your portal.

NOTE: The activation codes expire within **24 hours** from when they were generated. After receiving your CSV file, please upload to the portal before the expiration is reached.

Adding Device to Portal

1. Visit the portal for your organization using the URL that was supplied. The URL is unique to your organization.
2. Access Device Manager Devices
3. Use the button to begin add process
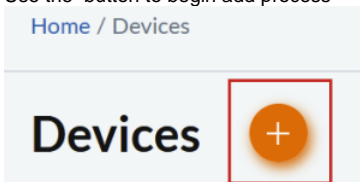
4. On the Add Device page, you can choose between adding a single device, or adding multiple devices through bulk CSV upload.
   The maximum number of devices that can be added at one time is 750. If you have more than 750 devices, please split the request into multiple CSV files.

Using "Add Individually" method for single device	Using "Add from file" method for bulk adding

Use the form to manually enter device details	Upload a CSV file containing one or many devices

Add Device
All fields required except where noted otherwise.

ADD INDIVIDUALLY   ADD FROM FILE

INFORMATION

Name
Grimme-x270

Serial Number
PZ10BAJMG

Manufacturer
Lenovo

Family (optional)
Lenovo Thinkpad x270

Model Type
20KGZ3TBUS

Enclosure type (optional)
Notebook

After clicking Submit, you will be instructed on how to download
and install the file needed to provision your device

Cancel   Submit

Add Device
All fields required except where noted otherwise.

ADD INDIVIDUALLY

Create a CSV (.csv) file with the following required information in this order:

device_name, device_manufacturer, device_modeltype, device_serialnumber,
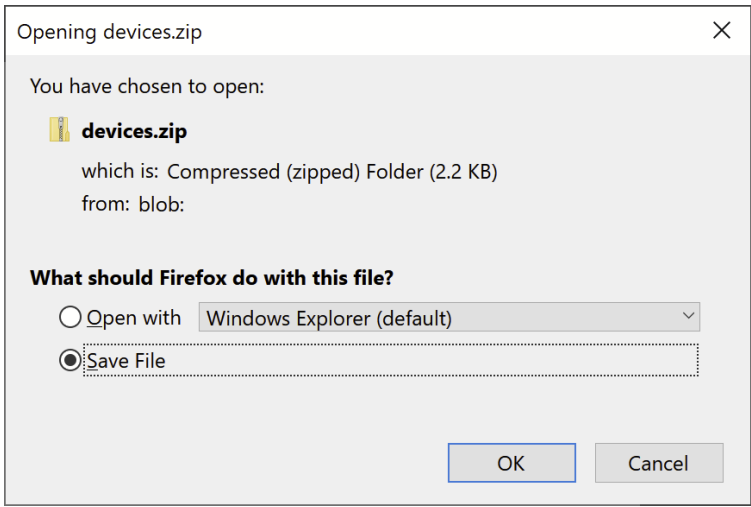device_family (optional), device_enclosuretype (optional)

Example (all the commas are required):Device1, Lenovo, ThinkPad X1 Yoga, SN001PM001,,

Drop CSV file here or
🔗 Click to select file to upload

📄 my-devices.csv

Cancel

5. Follow the instructions on the page and use submit button to complete.
6. The Portal generates a **provisioning package** and prompts you to download the ZIP file containing the provisioning files for your device. **Save this zip file in a memorable location - you may need to refer to it again, particularly if Support is needed.**

Opening devices.zip   ✕

You have chosen to open:

🗜️ **devices.zip**

which is: Compressed (zipped) Folder (2.2 KB)
from: blob:

What should Firefox do with this file?

◯ <u>O</u>pen with   Windows Explorer (default)   ▾

◉ <u>S</u>ave File

OK   Cancel

7. Inside the ZIP file there are three files that will be referred to as **Provisioning files**:

Name

📄 configuration.json
📊 devices.csv

File	Description
`configuration.json.signed`	Contains the default signed device configuration for your organization.
`configuration.json`	Contains the default device configuration for your organization. **This file can be ignored**.
`devices.csv`	Contains token information for the device(s) that the Lenovo device software will use to pair with the portal. If you registered many devices, the tokens for all devices will be in this file. This one file can be used for all the devices that were entered.

ℹ️ **Merging provisioning files**

If you added devices at different times, you will have multiple provisioning files. If you desire a single set of provisioning files to deploy to many devices, you can:

1. Copy the contents of all CSV files into a single CSV file (Retain only a single header / 1st line)
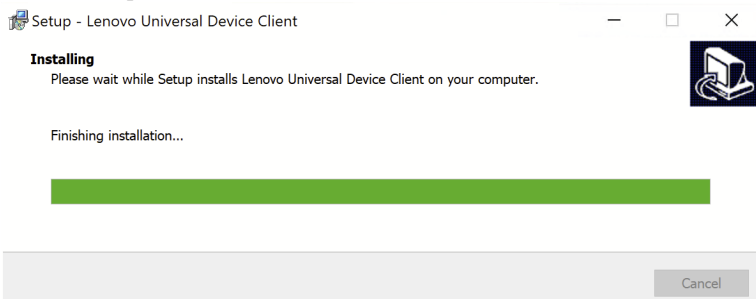2. Use the latest `configuration.json.signed`

Provision Device with UDC

> ℹ **How to get UDC**
>
> UDC and other supporting materials can be downloaded from support.Lenovo.com.

Manual Install Using Setup

> ℹ
> - The installer does not create an entry in "Add / Remove Programs". It must be uninstalled through command line arguments or Device Manager.
>   The provisioning files `devices.csv` and `configuration.json.signed` should be copied to a root drive before starting install. For example, `C:\devices.csv,`

The installer can be run by double clicking and using UI, or can be run through command line.

1. Copy the provisioning files `devices.csv` and `configuration.json.signed` onto the primary system drive. For example, `C:\devices.csv`
   Please note that that you should **deploy the signed configuration file** (`configuration.json.signed`), not the unsigned file (`configuration.json`)
2. Run `UDCSetup.exe`

3. Follow instructions

Manually Install Using Driver Package

1. Copy the provisioning files `devices.csv` and `configuration.json.signed` on to the primary system drive. For example, `C:\devices.csv`
2. Copy the UDC setup files onto the PC and extract. For instance, `C:\temp\udc`
3. Start Command Prompt or PowerShell with Administrative elevation using key combination (`Windows Key + X + A`)
   a. Change directory to the extracted UDC install folder (`cd C:\temp\udc`)
   b. Run `InfInstall.cmd`
      If the setup quickly exits without installing, ensure you followed instructions to `CD` to the same folder as the `InfInstall.cmd` file.   Simply right click and running the `InfInstall.cmd` file will not result in successful install.
4. Verify install success by checking if the UDC service is installed and running
   (PowerShell) `Get-Service UDCService | Select-Object Name, Status, StartType`

Automated Install Using Setup

The setup supports the following command line arguments:

Option	Description
`/SILENT`	No UI unless interaction is necessary (errors)
`/VERYSILENT`	No UI. Not interactive, no progress window
`/NORESTART`	Prevent restart from occurring

Automated install using UDC setup

```
:: This will install UDC
:: Ensure provisioning files (CSV, JSON) are in a root drive (example: C:\devices.csv)
:: Ensure running with elevated privileges
UDCSetup.exe /VERYSILENT
```

Automated Install Using Driver Package

Automated install using driver package

```
:: This will install UDC
:: Ensure provisioning files (CSV, JSON) are in a root drive (example: C:\devices.csv)
:: Ensure running with elevated privileges
PUSHD C:\Path\To\INFdir
.\x64\Service\UdcInfInstaller.exe -install .\UdcDriver.inf
POPD
```

Automated Install Using SCCM

For deployment using SCCM, please refer to the dedicated **SCCM Guide**.

Verify Successful Provisioning

If device has been provisioned with correct files, the device status in the portal will be:

Verify successful registration in Portal Devices

	DEVICE NAME	MANUFACTURER	SERIAL NUMBER	STATUS	UPLOAD DATE
☐	Rabbit-x290	lenovo	AZ91LAKVB	Active	00-26-2020 05:20 AM
☐	Grimme-x270	Lenovo	PZ10BAJMG	Pending	08-26-2020 02:31 PM

A device with the status **ACTIVE** indicates that the device has completed registration.

A device with the status **PENDING** indicates that the device was not successful registering with the portal. If you have installed UDC and provisioning files on the device and it continues to be in the Pending status, please refer to the **Using the Troubleshooter Section** of this document. If you continue to have issues with a particular device, you can delete the device and add it again using the (add) button.

Device Client Update

The process of updating UDC from one version to the next is the same process as install. You may use the UI installer or INF setup command. It is **not necessary** to "provision" the device again with the CSV & Configuration files on system root drive (C:\) as the device is already registered and associated with your organization.

Device Client Removal

Automated Uninstall

**Automated uninstall using Powershell**

```
# This will uninstall UDC device, service, driver, & data
# Ensure running with elevated privileges
$udcInstall = Get-Item (Join-Path ([System.Environment]::SystemDirectory)
"drivers\Lenovo\udc\Data\InfBackup\UDCInfInstaller.exe")
if($null -eq $udcInstall) { throw "Unable to locate UDC install files" }
Push-Location $udcInstall.Directory.FullName
& $udcInstall.Fullname -uninstall
Pop-Location
```

Automated uninstall using Cmd

```
:: This will uninstall UDC device, service, driver, & data
:: Ensure running with elevated privileges
PUSHD %windir%\System32\drivers\Lenovo\udc\Data\InfBackup\
.\UDCInfInstaller.exe -uninstall
POPD
```

Manual Uninstall

1. Start **Device Manager** by using running `devmgmt.msc` or key combination `(Windows Key + X + M)`
2. Navigate to **System Devices** "**Universal Device Client Device**"
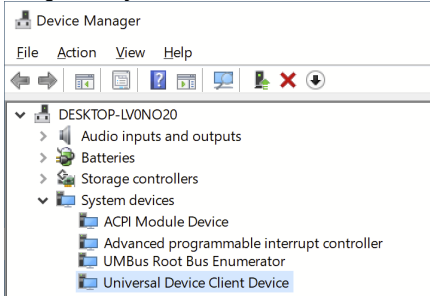
3. Right click on "**Universal Device Client Device**" "**Uninstall Device**"
4. When prompted, **check the checkbox** for "Delete the driver software for this device"
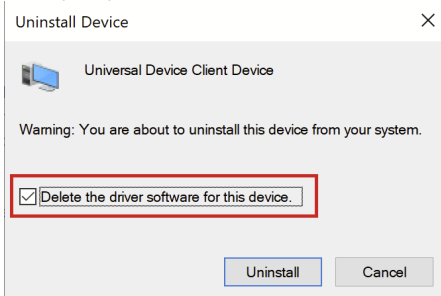
5. The device should be restarted to complete uninstall

Support and Assistance

For any issue related to Lenovo Device Intelligence, please use the Support Ticketing feature as the primary method of requesting support. If you are unable to access this feature, please send a support request to cspsupport@lenovo.com. The more details that you can provide in the initial email will help to decrease the amount of time necessary to resolve the issue.

Using the Troubleshooter

ⓘ   **How to get troubleshooting tool**

The troubleshooting tool is currently privately distributed and provided by Lenovo Support.

The solution provides a troubleshooting tool that can check for the presence of some common problems. It also collects some information about the device and environment that a support engineer can use to diagnose the problem without needing access to the device. When the tool completes running, it creates a zip file on the Desktop that can be included in a support request.
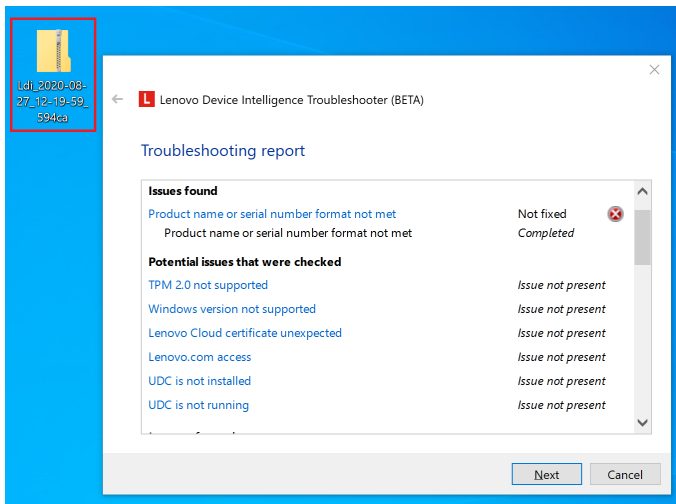
1. Double click on the `diagcab` file that was provided.
2. Proceed through the wizard.
3. When asked, please enable diagnostic logging so that necessary logs can be included in the result.
   After the problem is resolved, you can run the tool again to disable logging.
4. When the tool is completed, look at the report findings to see if any issues are applicable.
5. If the problem is not solved, find the Zip file on the Desktop (Format: "`LDI_*.zip`") and provide to Lenovo Support.

Common Issues

	Symptom	Cause	Details
1	Device stuck in 'pending' state	Full model number was not provided for a Lenovo device	If device is Lenovo, provided model type must be first 4 characters of the model in BIOS or sticker on device. Details are provided in the **"Gathering Device Details" Section** of this guide
2	Device stuck in 'pending' state	Provisioning files (csv & json) not in correct location	The provisioning files (`devices.csv, configuration.json.signed`) must be placed in the root of a physical drive on the device. For example, `C:\devices.csv`,
3	Device stuck in 'pending' state	System service unable to contact Lenovo.com	Refer to instructions on environment requirements to check network, proxy & firewall requirements.

4	Device stuck in 'pending' state	Proxy not configured for System services	Some corporate environments may require a proxy for device to reach the Internet. On Windows there are two areas of network and proxy configuration (WinINet & WinHTTP) and it is important to configure both. Comparisons of both can be read about on Microsoft.com - WinINet vs. WinHTTP. Whereas traditional applications use WinINet, UDC as a system service that utilizes WinHTTP, and therefore may encounter issues that other applications on the device do not - especially proxy configuration.
			
			Below are some useful commands for working with WinINet and WInHTTP. `Netsh` commands should be run with elevation.
			
			• Import proxy configuration from WinINet into WinHTTP. This is helpful if you configured credentials for proxy
			`netsh winhttp import proxy source=ie`
			• Configure WinHTTP proxy
			`netsh winhttp set proxy <proxy>:<port>`
			• Show current WinHTTP proxy configuration
			`netsh winhttp show proxy`
			• Reset WinHTTP proxy configuration to default
			`netsh winhttp reset proxy`
			
			UDC uses Background Intelligent Transfer Service (BITS) for downloading supporting files. Bits should configured to be aware of the proxy. Details from Microsoft.com article. This command must be run with elevation.
			
			`bitsadmin.exe /util /setieproxy localsystem MANUAL_PROXY <proxy>:<port> NULL`
			Example: `bitsadmin.exe /util /setieproxy localsystem MANUAL_PROXY 10.10.2.20:443 NULL`

5	Device stuck in 'pending' state	Network proxy is intercepting traffic to Lenovo.com	Lenovo device software utilizes a security measure known as certificate pinning to ensure direct communication with Lenovo cloud services. In some corporate environments, a proxy is utilized that intercepts and inspects TLS (https) traffic between device and the Internet. Lenovo device software is unable to differentiate between good or bad intentions and cannot support this scenario. If the software is unable to communicate with Lenovo.com, please update proxy configuration (on device or proxy) to exclude the interception and inspection for the following endpoint: • `*.uds.lenovo.com` To exclude traffic using Group Policy, please refer to the instructions detailed on Microsoft.com: Use Group Policy to apply WinHTTP proxy settings to Windows clients The endpoint can be excluded from proxy in Windows 10 via Settings Network & Internet Proxy Manual Proxy Setup **Manual proxy setup** Use a proxy server for Ethernet or Wi-Fi connections. These settings don't apply to VPN connections. Use a proxy server On Address: 10.8.32.9 Port: 1234 Use the proxy server except for addresses that start with the following entries. Use semicolons (;) to separate entries. *.uds.lenovo.com
6	Device stuck in 'pending' state	TPM 2.0 is not supported	`Get-WMIObject -class Win32_Tpm -Namespace root\cimv2\Security\MicrosoftTpm	Select-Object SpecVersion`
7	Device stuck in 'pending' state	Mismatch device details	Use `WMIC` commands documented in earlier steps to get device details and ensure that the device is represented in `devices.csv`
8	Device stuck in 'pending' state	Provisioning files expired	The provisioning files have an expiration that is indicated by portal when creating. If they are expired, you can follow steps to remove and re-add.
9	Device stuck in 'pending' state	UDC is not running	Ensure that the Windows service "`UDCService`" is running and set to automatic start. `Get-Service UDCService	Select-Object Name, Status, StartType`
10	Provisioning files (CSV & JSON) are not downloaded	Restriction on number of devices that can be added at a time	**The maximum number of devices that can be added at one time is 750**. If you have more than 750 devices, please split the request into multiple CSV files. After adding, you can combine the contents of the resulting CSV files into a single CSV file.