Thermal Settings on Dell Latitude Devices managed by VMware Workspace One Intelligence

A common complaint from PC laptop users is that the fan is loud and seems to run most of the time. We know, however, that fans don't run without a reason. Modern mobile CPUs are designed to provide full power at peak usage, but not as a default. Upon investigation, we might find a bad driver, high numbers of agents running on the client and software with problems. In my experience, I've seen Skype consuming more than 20% of CPU, and the highest real-life draw from a single source was a DropBox agent which was taking 60% of CPU.

A CPU running near max capacity requires more cooling than one which is intermittently peaking. A couple of years ago, Dell released the Dell Power Manager to improve battery charging and provide different thermal profiles for users who prefer silent devices and have no problems with small impacts on performance. You can find information on Dell Power Manager here:

https://www.dell.com/support/home/en-us/drivers/driversdetails?driverid=kdhhr&oscode=wt64a&productcode=latitude-5420-laptop

For one of my customers, I designed a test to show the differences between the baseline device performance and two Dell Power Manager profiles: Optimized and Quiet.

		Score*	max. GHz	max. Temp	
Base line	N/A	551	3.6		98
Dell Power Manager	Power Manager Profile Quiet	539	3.33		89
Dell Power Manager	Power Manager Profile Optimized	551	3.6		99

*generated with Intel Extreme Tuning Utility

The Quiet profile measured lower in the overall CPU score, but there was a noticeable difference in the maximum CPU temperature and maximum clock frequency.

Dell Power Manager has four options, each of which impacts performance and fan speed. The Optimized Profile option is the default on all Dell clients, but if you have software running in the background which needs a higher level of performance, it could trigger the fan to run because of the heat being generated. Users are sensitive today to this noise and fan-less devices like smart phones have re-set expectations. To address this, you would normally start with BIOS and driver updates, but the simplest fix may be to change the Profile to improve the user experience.

Managing Dell Power Management settings

The Dell Power Manager has several options for changing settings.

1. User Interface

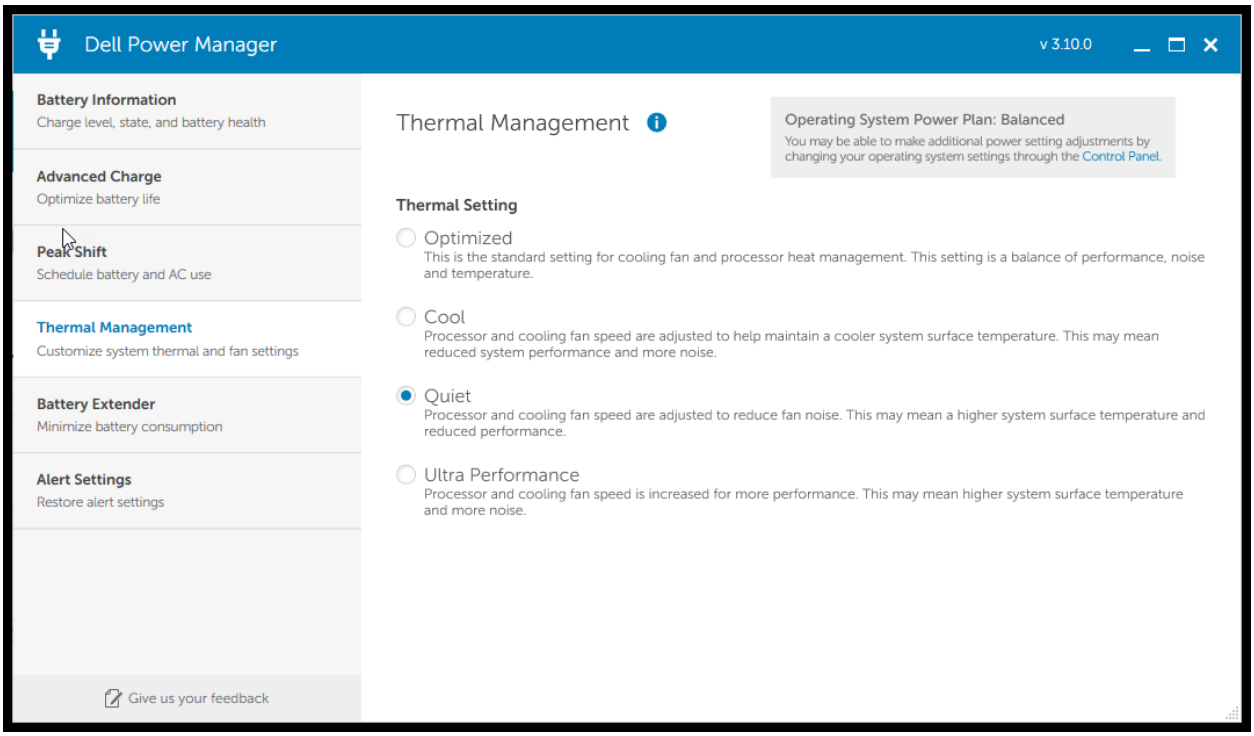


Figure 1: Dell Power Manager Thermal Management (Version 3.10.0)

2. Register Key

[HKEY_LOCAL_MACHINE\SOFTWARE\Policies\Dell\CommandPowerManager]
"DoNotRemove"="Null"
"TMSettingsGroup"="True"
"TMPolicyVersion"="1.0.0"
"TMMode"=dword:00000000
"TMModeBalanced"=dword:00000000
"TMModeCool"=dword:00000000
"TMModeQuiet"=dword:00000000
"TMModeUltra"=dword:00000000

3. ADMX-Templates for Active Directory Group Policies

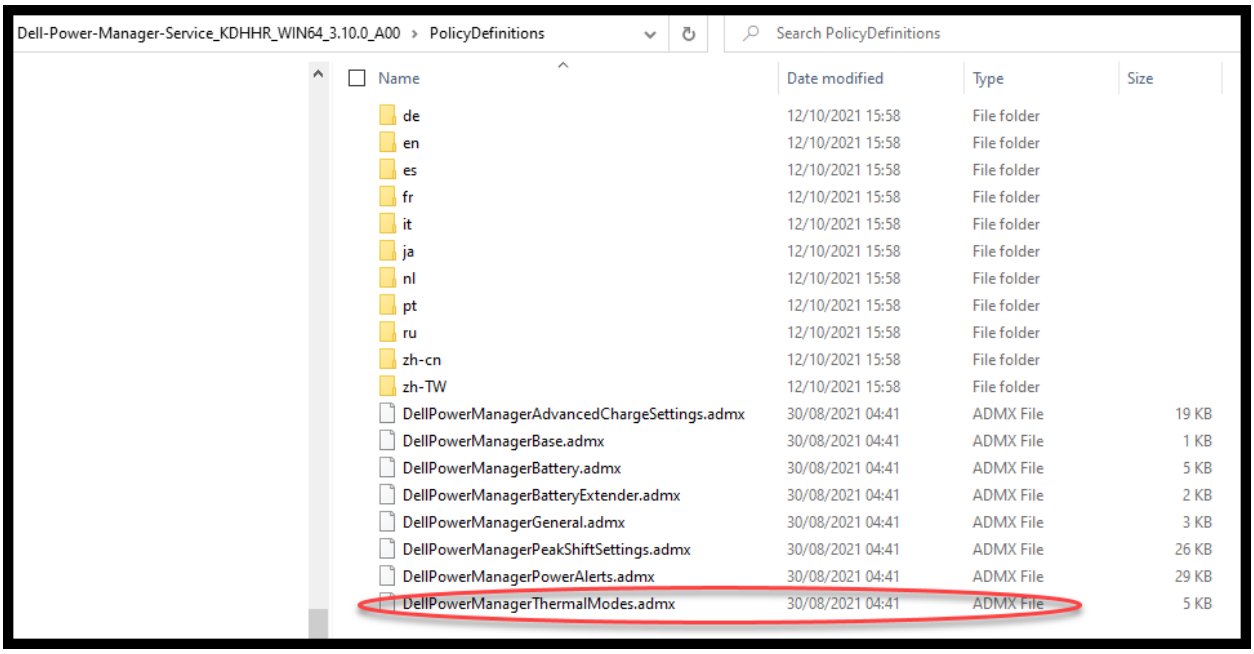


Figure 2: Unpacked Dell install file

This is provided for those who need the ability to change settings like these without Dell Power Manager installed on a device.

Thermal Management in BIOS

Dell has added Thermal Management in the BIOS for newer Latitude and Precision mobile devices. Devices like the Latitude 7400 2-in-1 support these settings. If yours does not, it could mean that you need to update BIOS to gain this capability. To check if your device supports this feature, open your BIOS menu directly or through a PowerShell script.

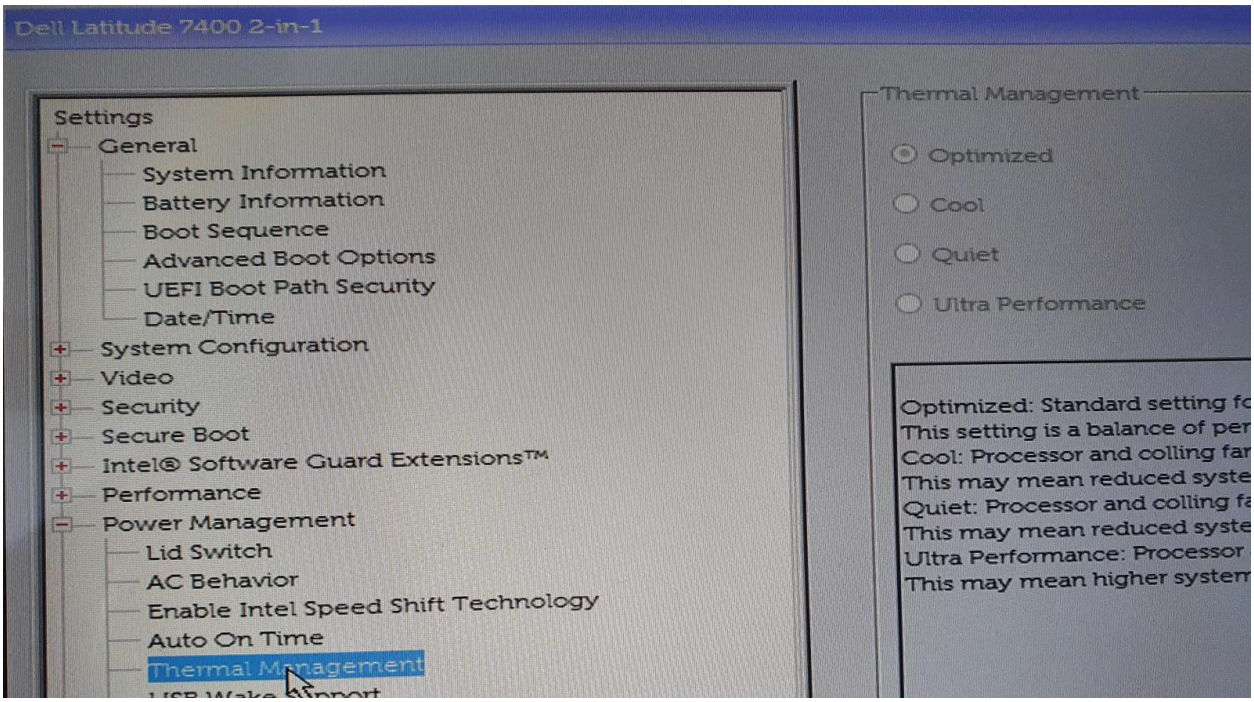


Figure 3: Dell BIOS 7400 2-in-1

If you do not want to check all devices directly in BIOS, you can use Dell Command Configure and Dell Command Monitor to query each device for the availability of these settings.

You can also accomplish this through a Workspace One sensor to generate a dashboard showing which devices support thermal settings in BIOS. I've published a script for this in my Github Repository which you can download and use:

https://github.com/SvenRiebe/DellCommandMonitorSensorsWS1

Sensor for checking thermal settings available in BIOS

```
#################################################################################
#
# Name: Sensor Dell BIOS Thermal Management Setting available (need Dell Command Monitor on the device)
#
# Author: Sven Riebe
#
# Status: test
#
# Version 1.0.0
#
# Date: 07-21-2021
```

```
$thermal_setting = Get-CimInstance -Namespace root\dcim\sysman -ClassName dcim_biosenumeration
-Filter "AttributeName='Thermal Management'" | select -ExpandProperty Currentvalue

If ($thermal_setting -ge 1)
{$thermal = "supported"
}
else
{$thermal = "unsupported"
}
Write-Output $thermal
```

Sensor for checking thermal profile value for the device

```
########################################################################
#
# Name: Sensor Dell BIOS Thermal Management Profile is set to device (need Dell Command Monitor on
the device)
#
# Author: Sven Riebe
#
# Status: validate
#
# Version 1.0.0
#
# Date: 07-21-2021

$thermal_mode = switch(Get-CimInstance -Namespace root\dcim\sysman -ClassName
DCIM_ThermalInformation -Filter "AttributeName='Thermal Mode'" | Select -ExpandProperty
CurrentValue)
{
 0 {"Optimized"}
 1 {"Cool"}
 2 {"Quiet"}
 3 {"Performance"}
 }
write-output $thermal_mode
```

Automated thermal settings through VMware Workspace One Intelligence

In a highly mobile environment, you can manage the thermal settings using Workspace One Intelligence. The idea is that if devices should have the Optimized profile, Workspace One Intelligence will use a workflow to identify which devices have the wrong setting and change it to the correct value in their BIOS. This will work when the client has an internet or VPN connection, and it does require a device re-boot.

Two sensors are helpful for this workflow. First, check to ensure that each device has the option to set this value through BIOS. If it's not possible for a device, filter it out. For each device which supports these settings, check the value of the profile and if it is **NOT** set to 'Quiet', then deploy a BIOS setting by app to this device (you need to ignore all devices with the 'Quiet' profile as a change will affect the user experience).

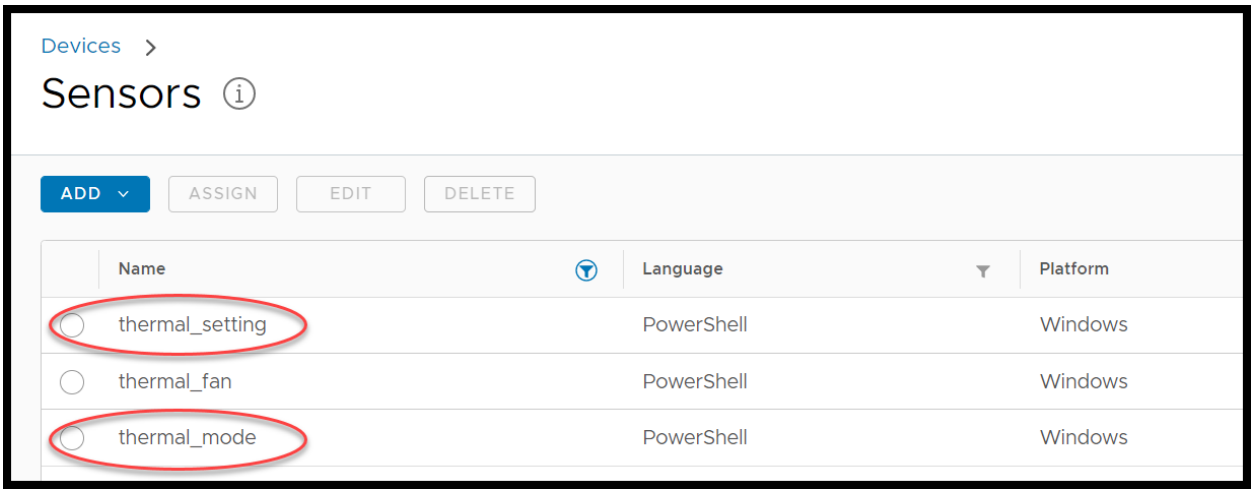


Figure 4: Sensors for the workflow

Once you deploy the sensors, it could take some time before you see the results. You can steer this by the assignment, i.e., if the sensor runs to establish the baseline or if is it triggered by events like a login. In my case, I run the sensor first to establish the baseline, then run it again at each start-up, since the user may have changed this in BIOS through Dell Power Manager.

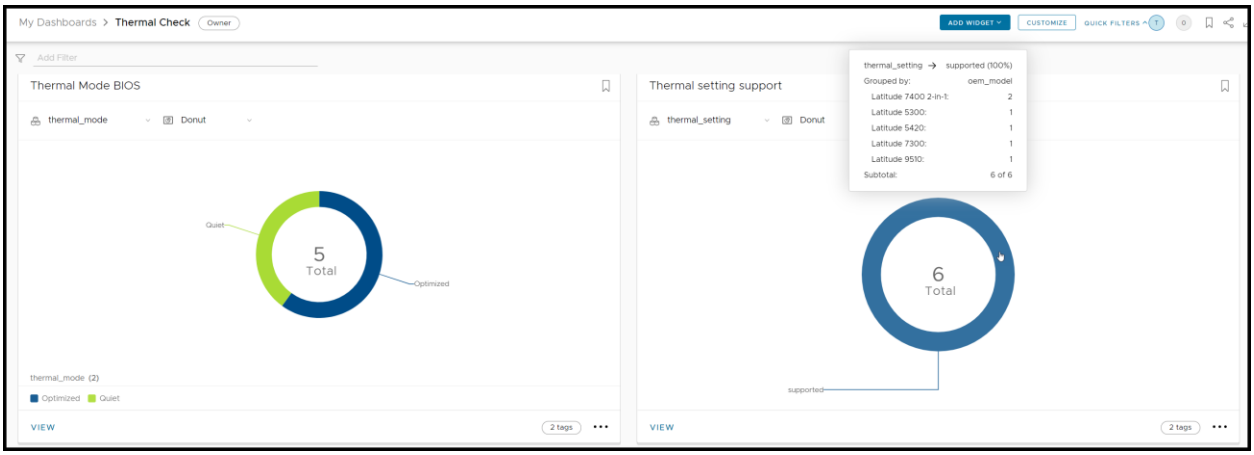


Figure 5: Dashboard for sensors

We can now see the devices which support thermal setting in BIOS, as well as their current settings. Now, let's return to the planned workflow to automate the process to check these two sensors and set all non-Quiet profiles to Quiet.

Start first with a PowerShell script to change the thermal setting. The values which can be set are:

0 {"Optimized"}
1 {"Cool"}
2 {"Quiet"}
3 {"Performance"}

You can use a script to change the thermal setting to value 2 = Quiet. I have generated a script for this task which you can use, or you can build this yourself if you choose.

BIOS setting with PowerShell

Please note: You will need Dell Command | Monitor on your client to use this script.

```
# WS1 BIOS Thermal Profile as Dell Command Monitor script for PowerShell execution
# Author: Sven Riebe Twitter: @SvenRiebe
# Version: 1.0
# Status: Test

# If you have BIOS PW on this device put in here the pw for authorization
$adminpw = "Password1234!"

#Start logging
Start-Transcript -Path "C:\temp\thermalsetting.txt" -Append

#checking exiting value
Get-CimInstance -Namespace root\dcim\sysman -ClassName dcim_biosenumeration -Filter
"AttributeName='Thermal Management'" | select Currentvalue


#Power Profile Manger in BIOS 1 = Optimized, 2 = Cool, 3 = Quiet, 4 = UltraPerformance
set to Quite slient Fan for Latitude
```

```
Get-CimInstance -Namespace root\dcim\sysman -ClassName DCIM_BIOSService | Invoke-
CimMethod -MethodName SetBIOSAttributes -Arguments @{AttributeName=@("Thermal
Management");AttributeValue=@("3");AuthorizationToken=$adminpw}

#checking value again
Get-CimInstance -Namespace root\dcim\sysman -ClassName dcim_biosenumeration -Filter
"AttributeName='Thermal Management'" | select Currentvalue


#Stop logging
Stop-Transcript
```

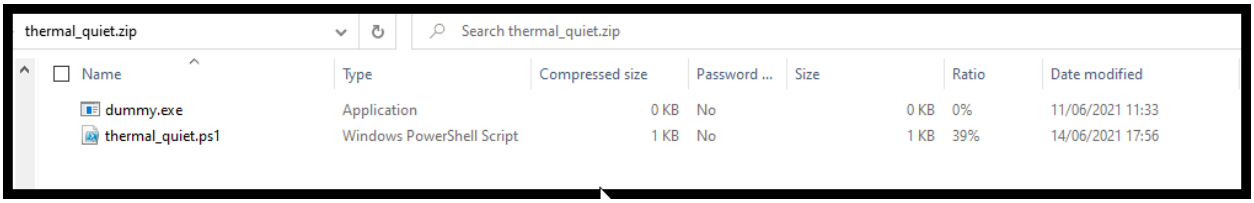
https://github.com/SvenRiebe/ws1appscripts/blob/main/ws1_script_thermal_bios_settings_V1_0_0.ps1

The script includes a log which Is addressed later in this article.

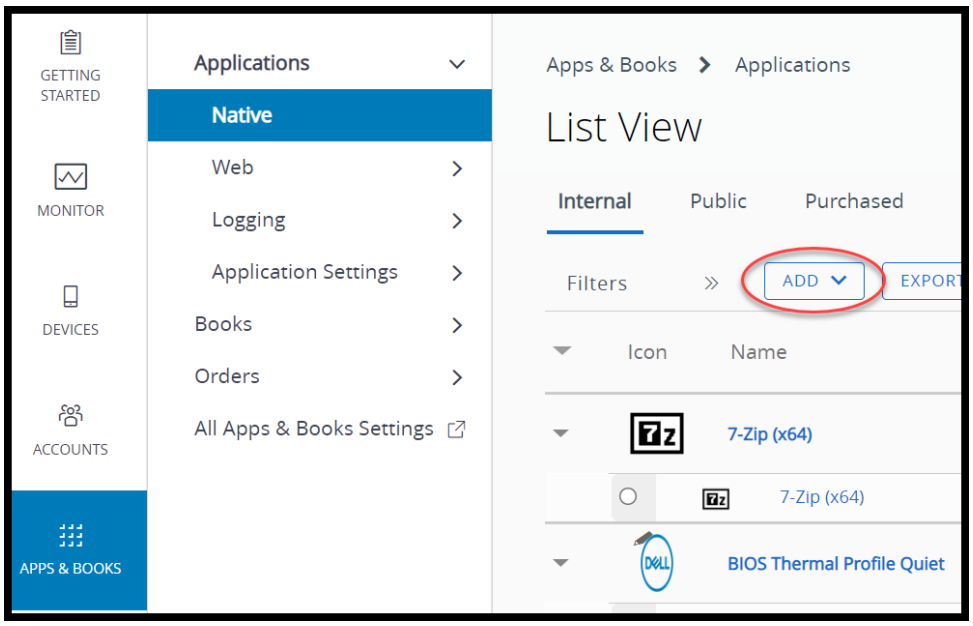
In the future, Workspace One UEM will support PowerShell to run directly like an app. However in my sandbox, the update is not finished so I will deploy this script as an internal application since this is the option I can use later in my workflow.

Preparing the App for deployment by Workspace One UEM

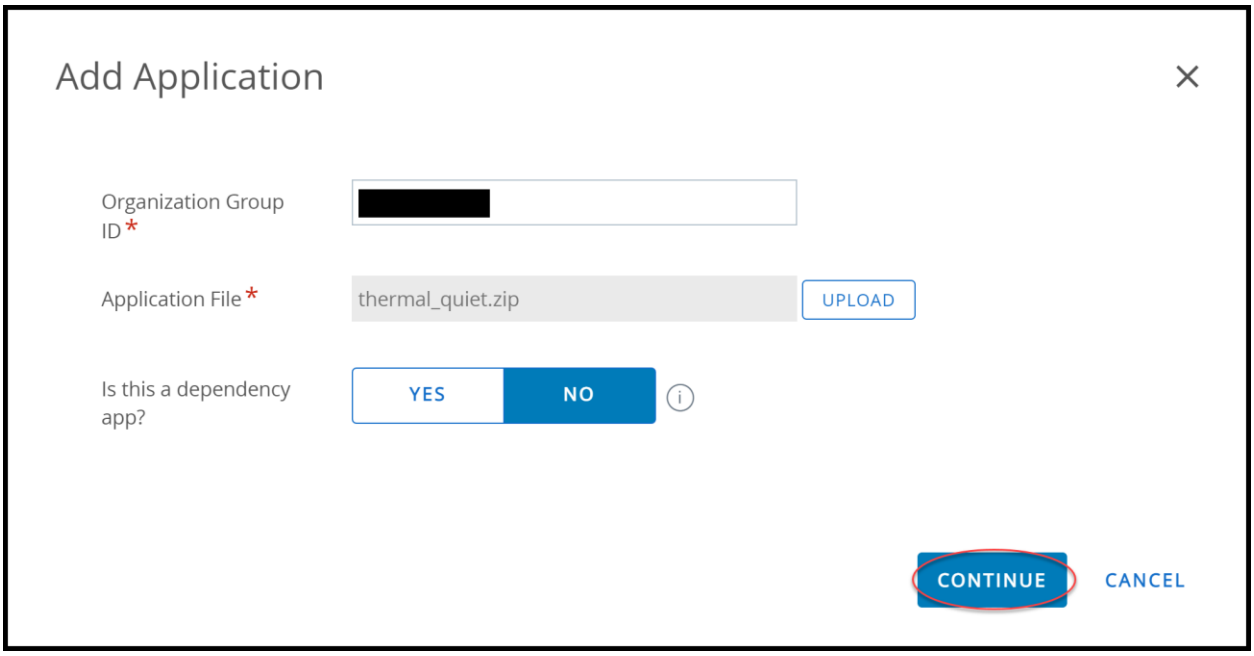
Zip the PowerShell with a dummy.exe file first.



The package is now ready for the deployment. Upload the Zip-File to the Workspace One UEM, and deploy it as a Native app to the devices. Click on Applications -> Native and Add.



Upload the file and click continue.

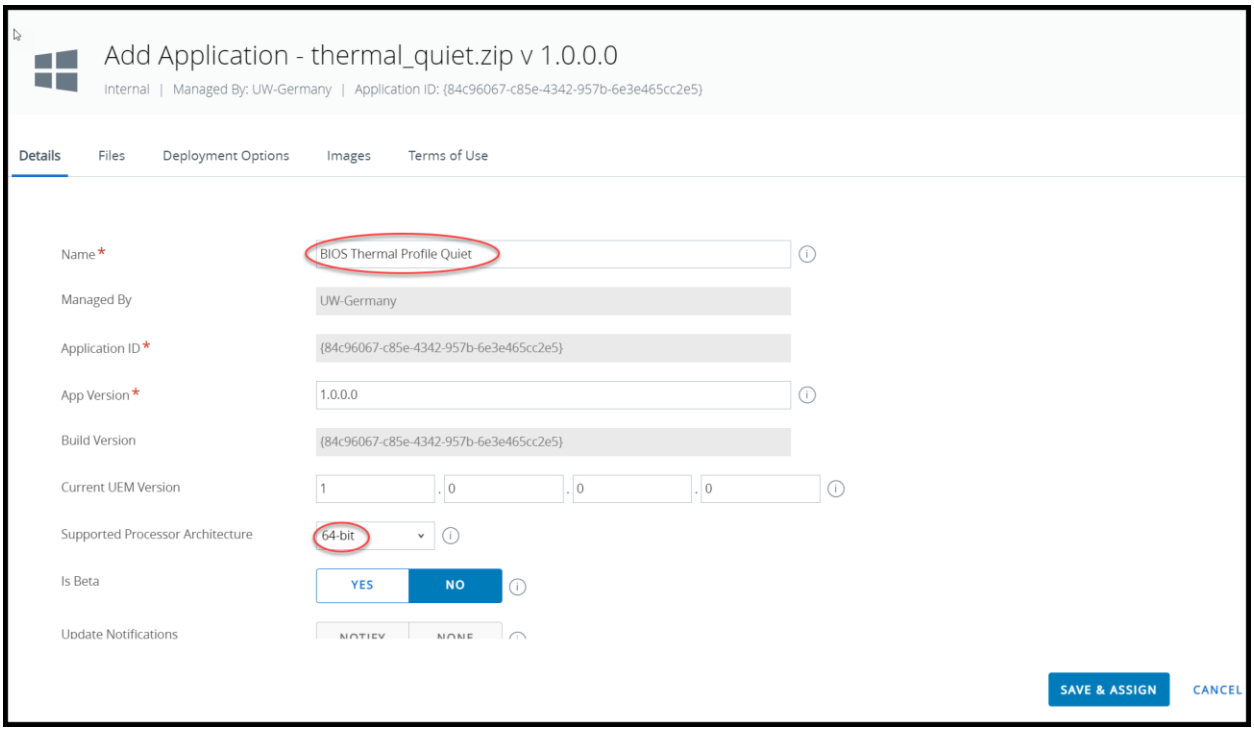


Input is needed from you for the App deployment.

Details:

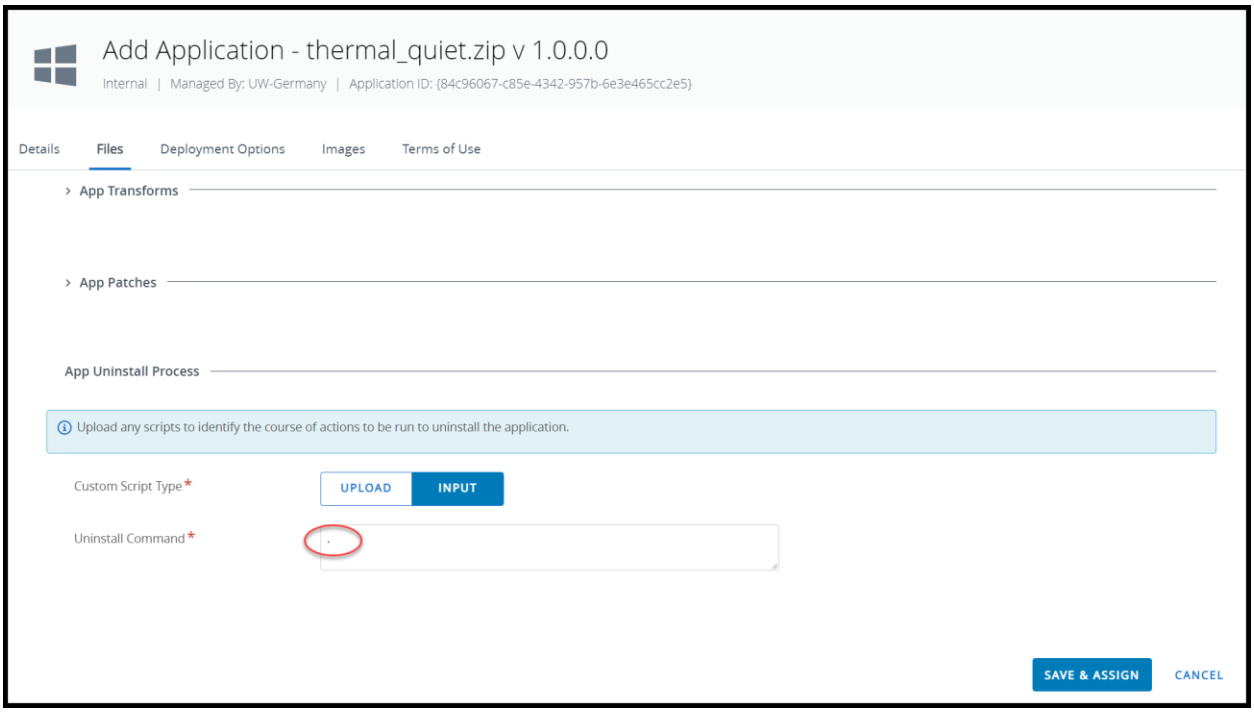
Name: BIOS Thermal Profile Quiet

Supported Processor Architecture: 64-Bit



Files:

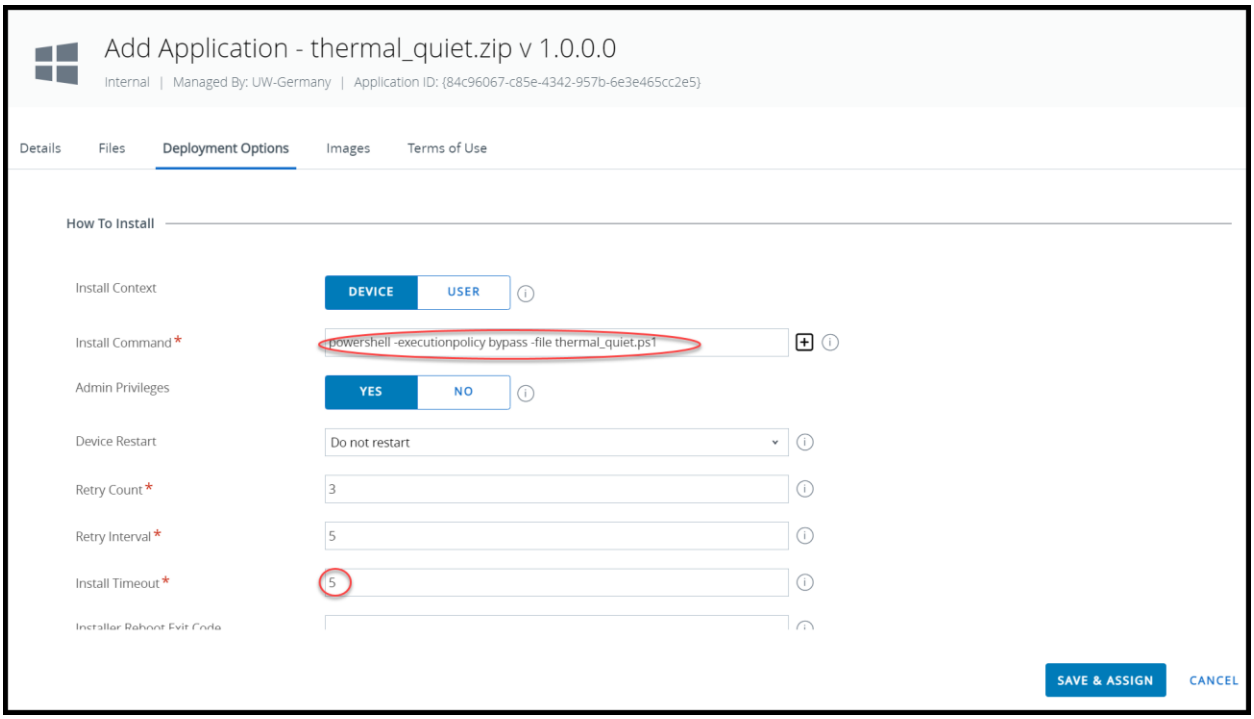
There are no mst-files or others which require a uninstall. You could make a script for moving back to Optimized, but uninstall is mandatory for non-msi. Type anything you want in the **uninstall command** field.


Add Application - thermal_quiet.zip v 1.0.0.0
Internal | Managed By: UW-Germany | Application ID: {84c96067-c85e-4342-957b-6e3e465cc2e5}
Details
Files
Deployment Options
Images
Terms of Use
App Transforms
App Patches
App Uninstall Process
Upload any scripts to identify the course of actions to be run to uninstall the application.
Custom Script Type *
UPLOAD
INPUT
Uninstall Command *
SAVE & ASSIGN
CANCEL

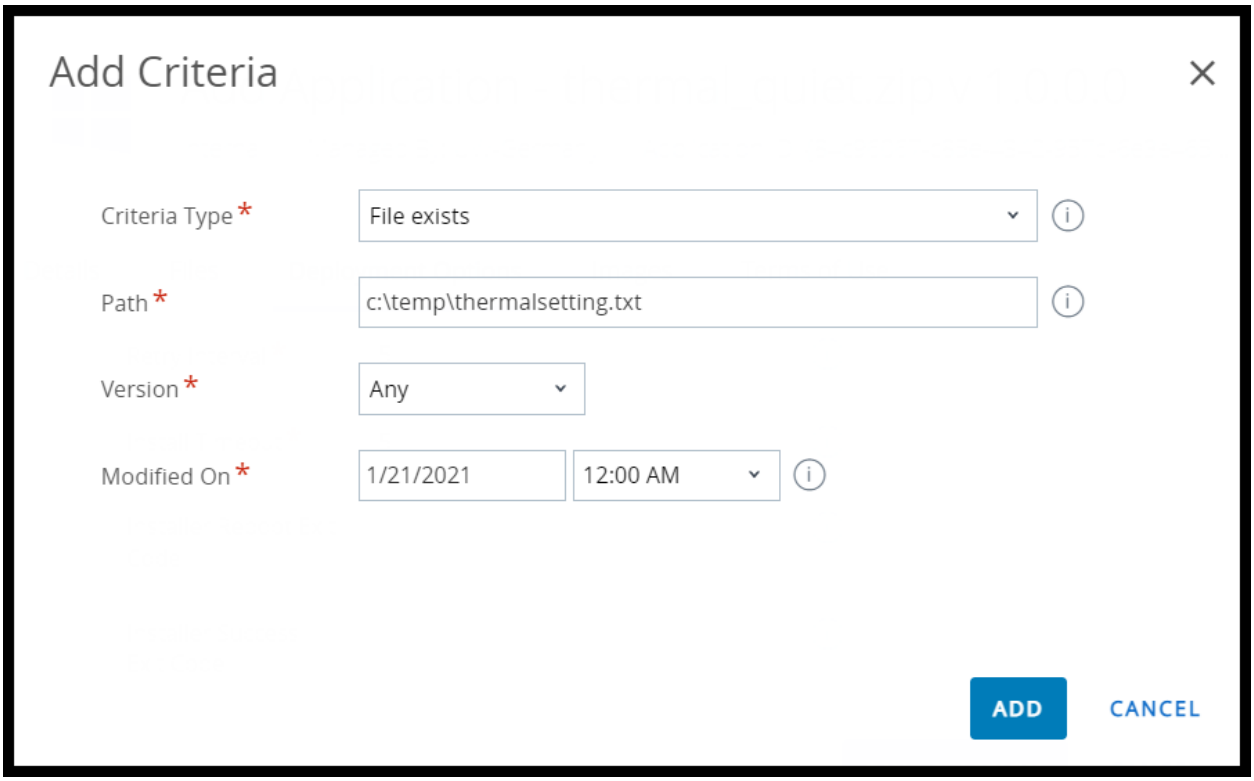
Deployment Options

Install Command: powershell -executionpolicy bypass -file ws1_script_thermal_bios_settings_V1_0_0.ps1

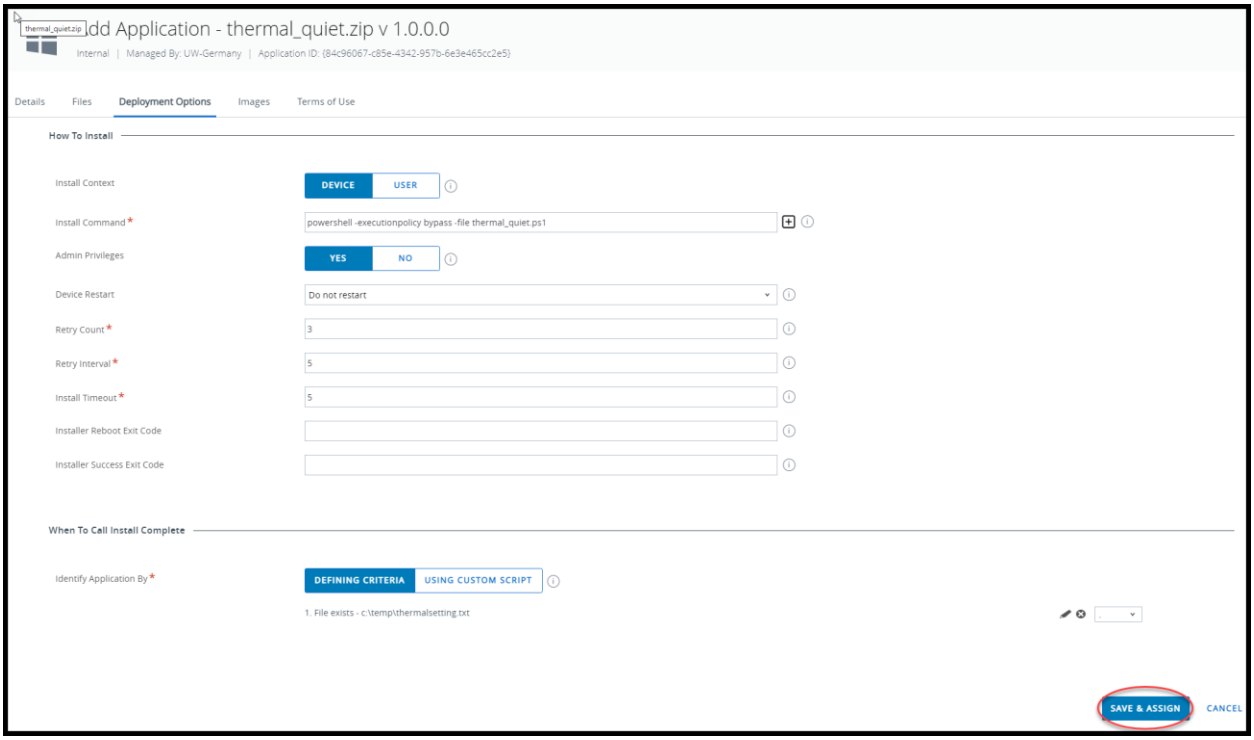
Install Timeout: 5 (Specify the amount of time, in minutes, that the installation process can run before the installer considers the installation may have failed and no longer monitors the installation operation. The limit on the install timeout is 150 minutes. **Recommendation:** reduce time from 60 min to 5 min to save time in case of troubleshooting)



Since this is a non-msi, it means Workspace One UEM will need a need a key for success. I will use the logging file – though there are other options, this is the easiest way to check an existing file.

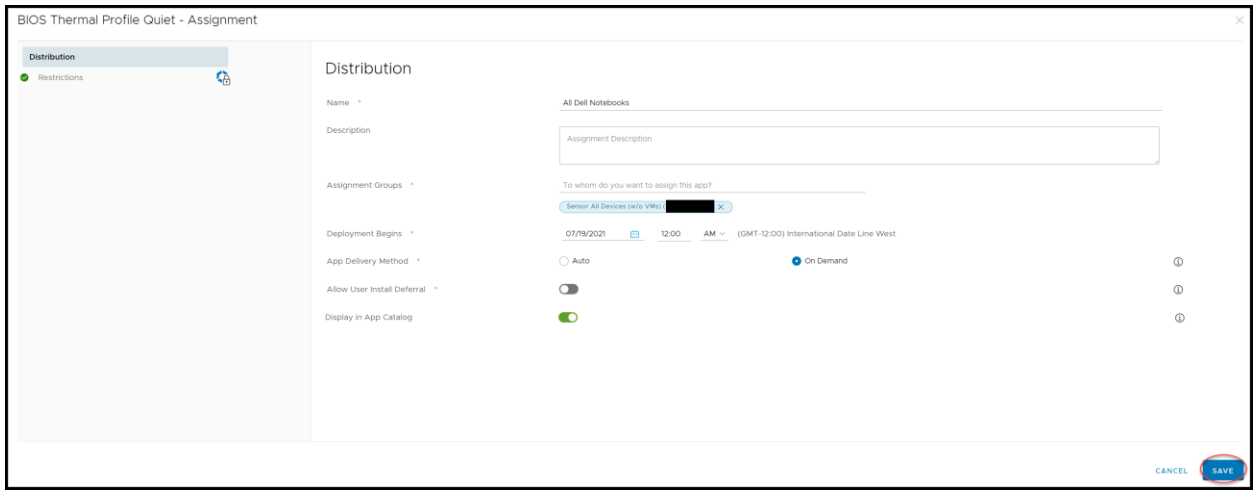


The app deployment is now ready for assignment. Click Save & Assign.

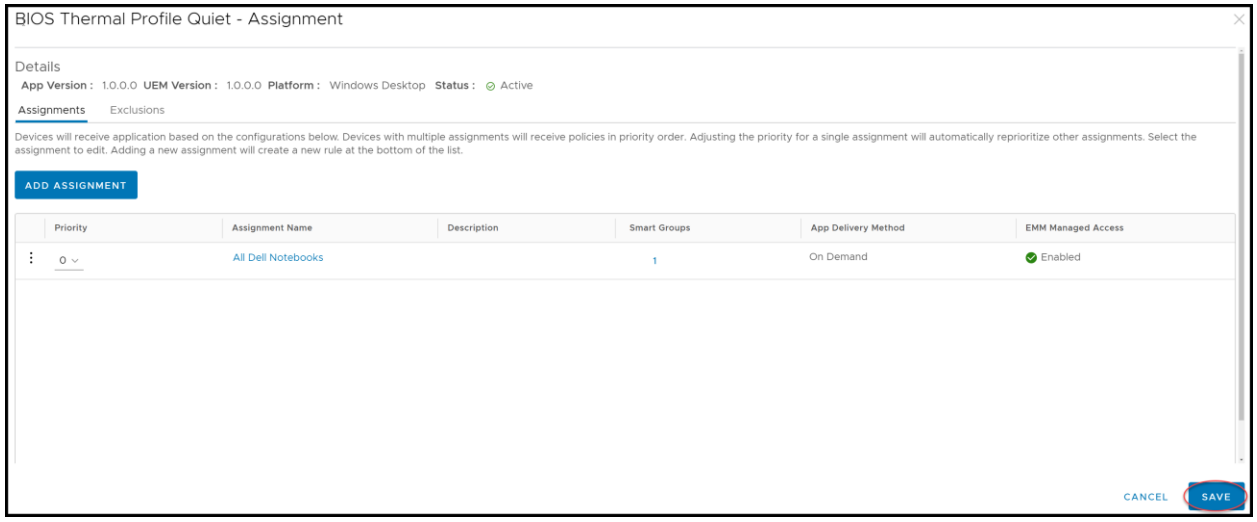


You can now assign all Dell laptops for this app. I made a sensors group which excludes all devices which are not laptops. You will need this if you do not have a new smart group which includes all the relevant devices where the app should be deployed.

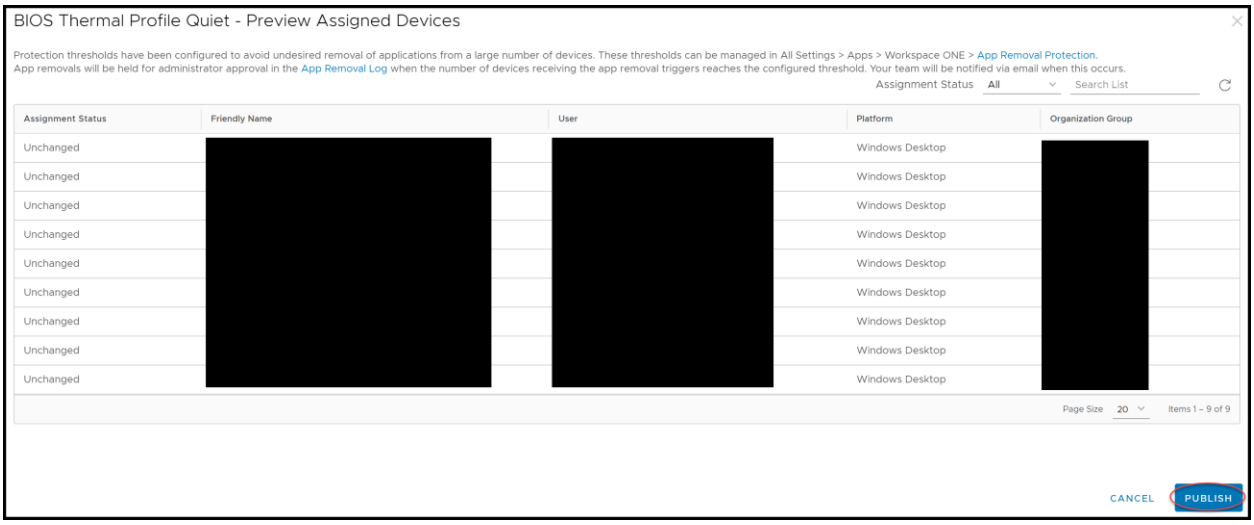
I am working with the app as 'IT only' which restricts users from accessing the app via the Software Center. If you want to allow your users to run the BIOS settings themselves, you can activate the **Display in App Catalog**. The deployment is on demand, and in this instance, I chose not to deploy it to all of my devices – only later, to specific devices.



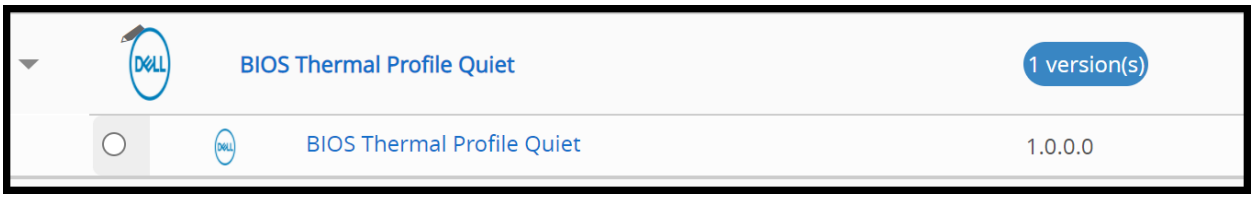
Click now save.



Make a short check to ensure that everything is working correctly with the assignment and click Publish.


BIOS Thermal Profile Quiet - Preview Assigned Devices
Protection thresholds have been configured to avoid undesired removal of applications from a large number of devices. These thresholds can be managed in All Settings > Apps > Workspace ONE > App Removal Protection.
App removals will be held for administrator approval in the App Removal Log when the number of devices receiving the app removal triggers reaches the configured threshold. Your team will be notified via email when this occurs.
Assignment Status All
Search List
Assignment Status
Friendly Name
User
Platform
Organization Group
Unchanged
Windows Desktop
Page Size 20
Items 1 – 9 of 9
CANCEL
PUBLISH

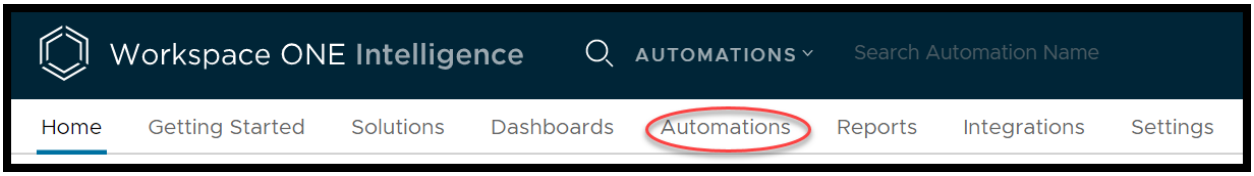
The app is now visible.



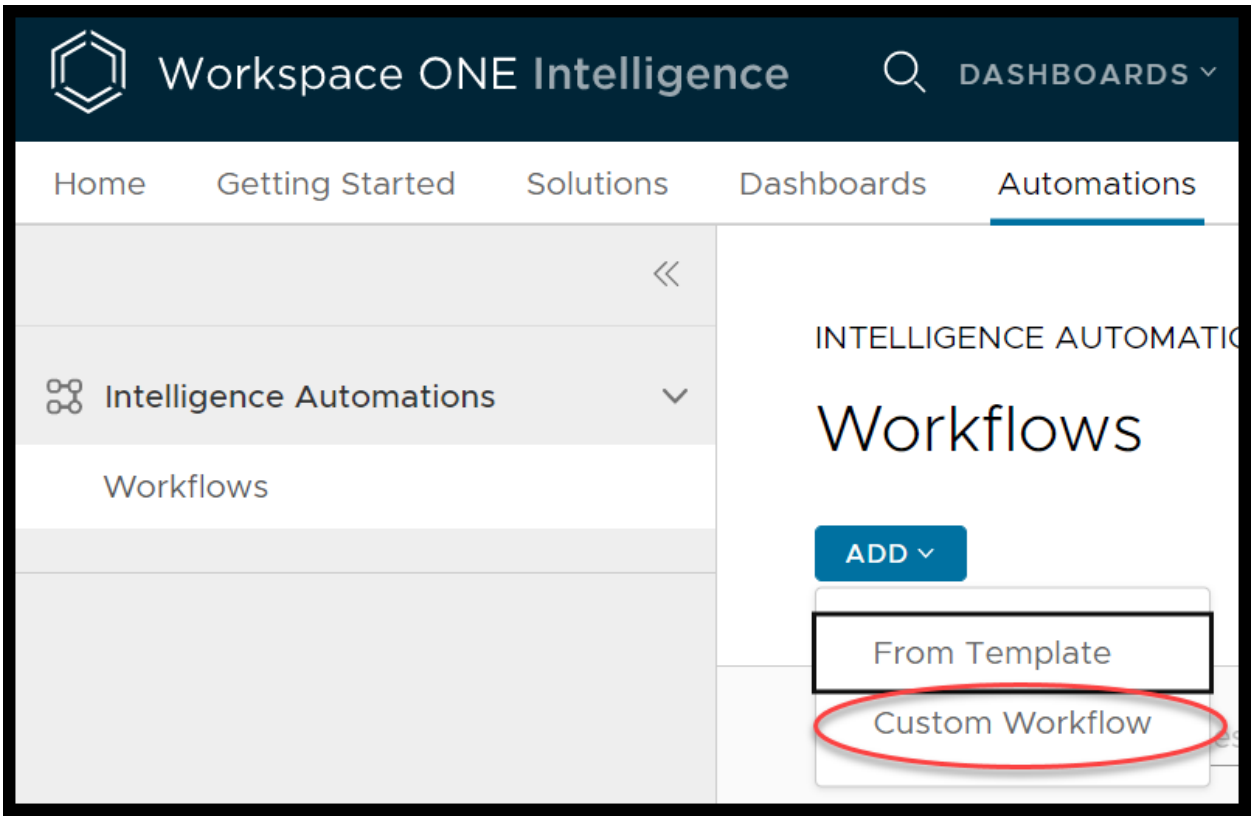
Automation by Dell Command | Monitor and Workspace One Intelligence.

The sensors are now in place to identify the right devices and the approach to change the BIOS settings has been determined. Let's look at the workflow.

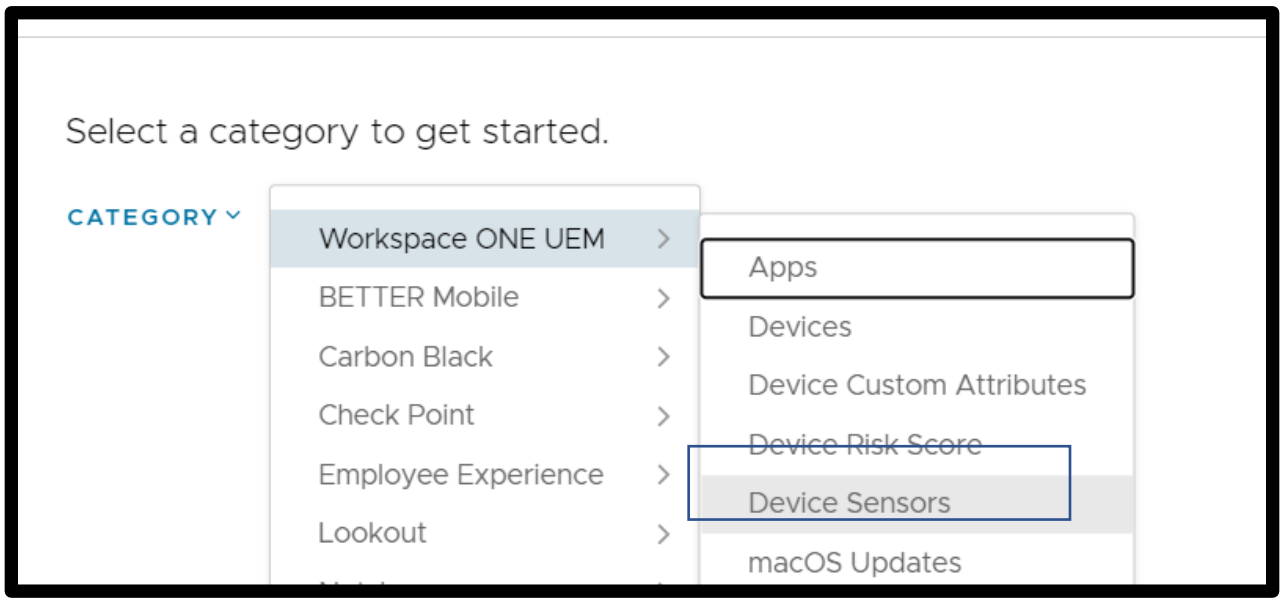
Open Workspace One Intelligence and click on Automations.



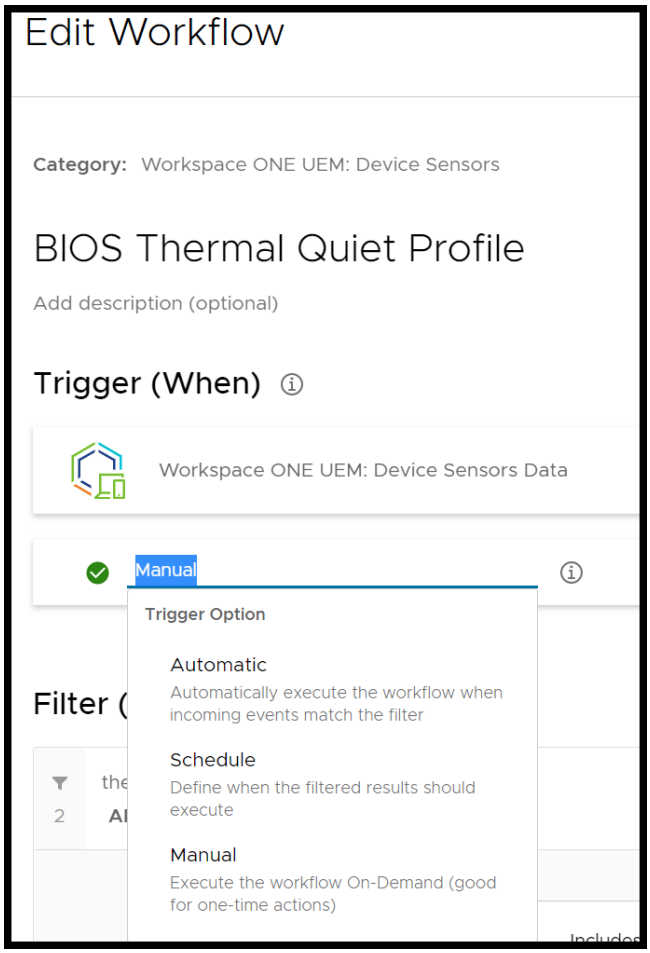
Add a Custom Workflow now.



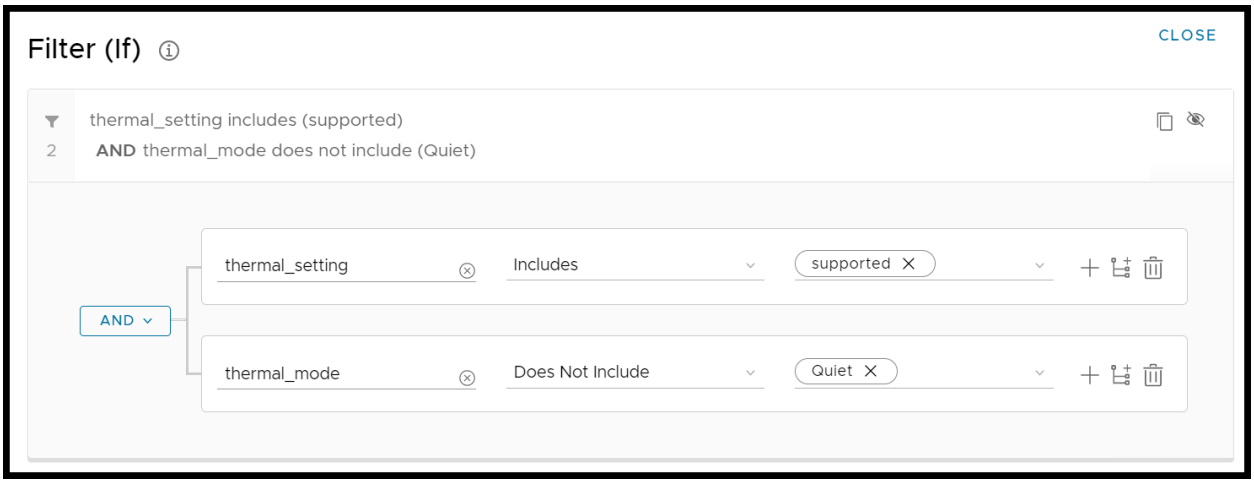
The Category is Workspace One UEM -> Device Sensors. This will enable us to use the sensors we have in place.



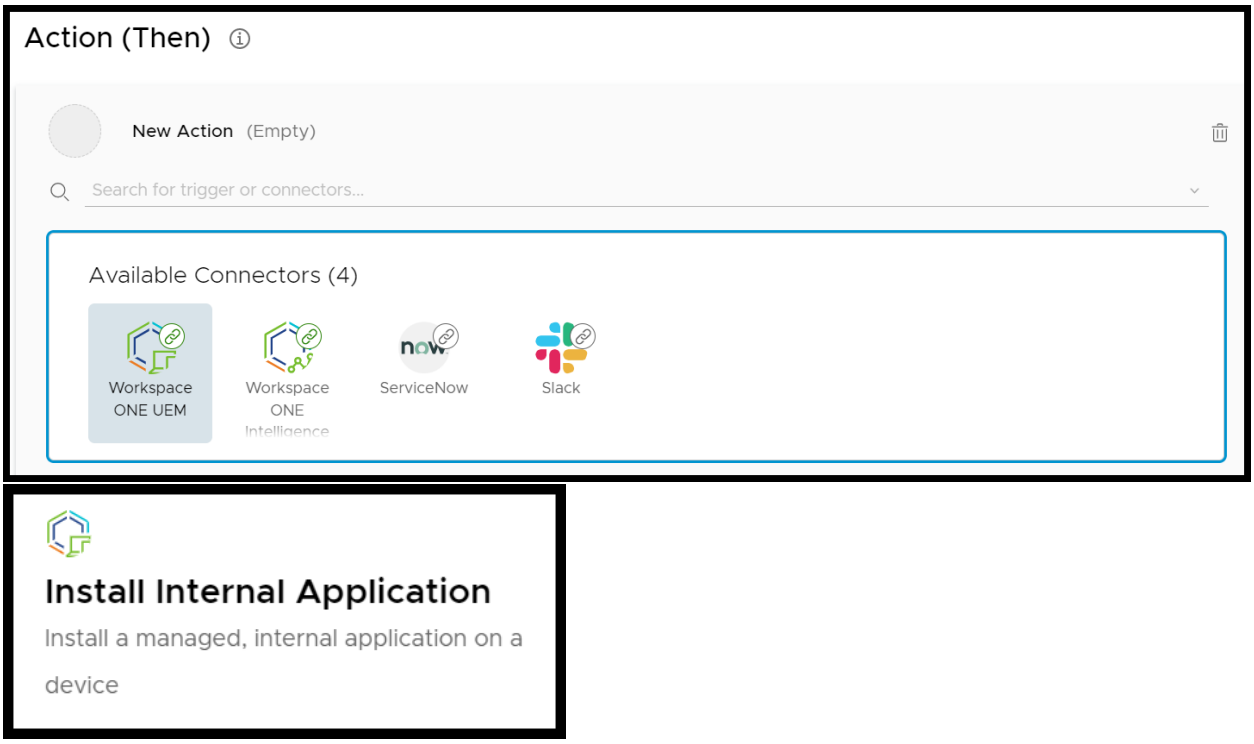
Give this workflow a name like ‘BIOS Thermal Quiet Profile’ and chose an option on how this workflow will run. You can schedule it to run once a week and choose this as Automatic or Manual.



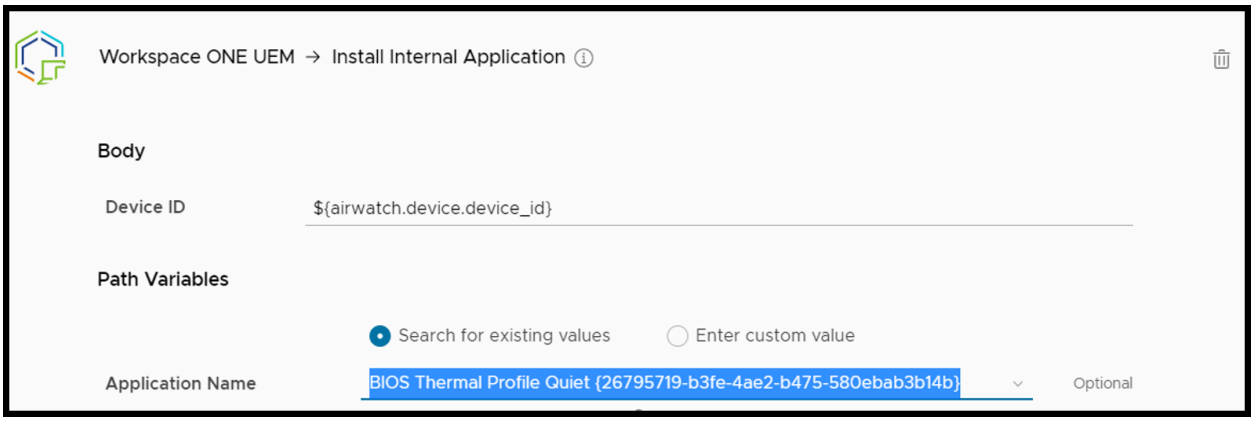
Now let’s use the sensors to filter for devices with non-Quiet profile and which support BIOS thermal settings.



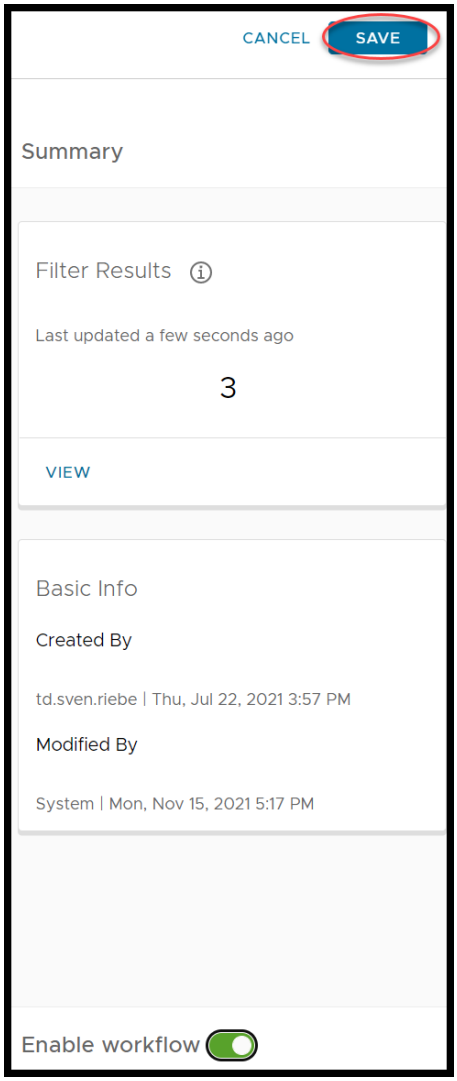
Next, plan the actions you will take – in this case, we are using Workspace One UEM to take the action ‘Install Internal Application’.



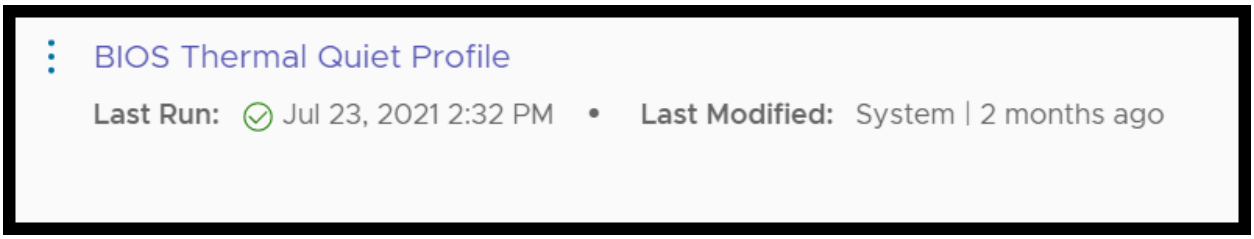
Select the new app which was previously generated for the needed BIOS settings.



In this case, one device is matched. Enable the workflow and click ‘Save’.



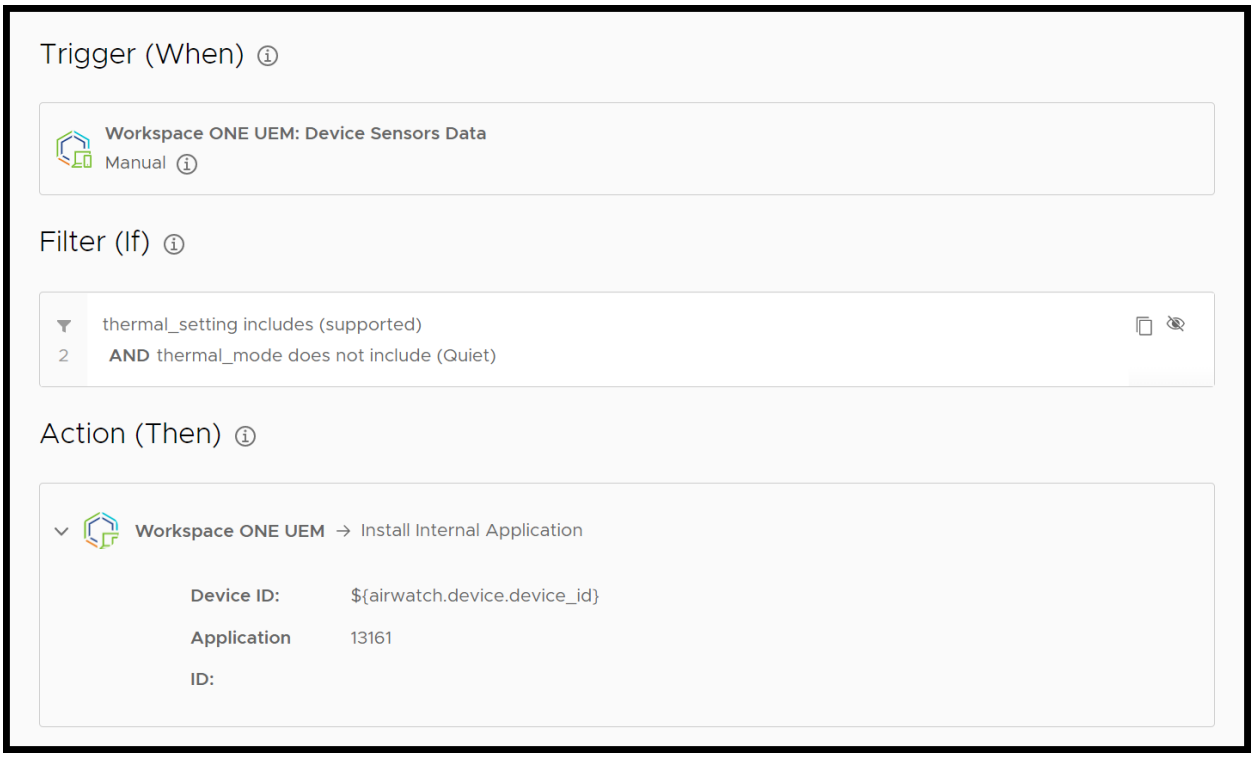
We have now generated a full managed workflow.



Please note that you can easily automate another device setting in the same way, such as setting Thunderbolt security.

Some may say that it's not secure to use a BIOS password in clear text in PowerShell. This is indeed true, but the purpose of this article is to provide an understanding of how orchestration could work. There are options if you want to protect the BIOS password:

1. Build one script for Settings and one for File Clearing and deploy both as zip files to the device (this is a workaround). This prevents someone from capturing the BIOS password.
2. Dell offers Dell Command | Configure (DCC), where DCC has the option to build a .exe which includes password and settings. That way, the password would not be discoverable in clear text. You can take this .exe and make a deployment like what was done with the zip file in the previous option.
3. If you are using the BIOS Profile from Workspace One, it handles the BIOS password through a secure communication. This adds steps to the workflow, where the first step deletes the BIOS profile (removing the old password), the second step deploys the script without password and the last step redeploys the BIOS profile again. This allows the thermal setting to be changed without the password appearing in clear text.



Let me know if you have other ideas to share. Thank you for reading this blog. 😊