Overview CMM

The PowerShell module Configuration and Credential Management for PowerShell Modules (CMM), is intended to be used to

- create
- manage
- retrieve

configuration and credential data from the Microsoft PowerShell module Microsoft.PowerShell.SecretManagement. This module is a prerequisite for CMM. Developer of PowerShell module and scripts can access credential and configuration data via CMM. CMM does not provide commands to read the data from the local store of Microsoft.PowerShell.SecretManagement. CMM provides a method to access the credential and configuration data.

The concept of the module is to use templates and configurations. From a template, one or more configurations can be created.

The module requires the PowerShell *ConsoleHost*.

Templates

For every PowerShell module or script, which uses CMM to retrieve credential and configuration data, a template is needed. For a PowerShell module, which is available in more then one version, multiple templates could be necessary.

A template provides the attributes of a configuration.

Configuration

A configuration is based on a template. A configuration holds the data (variables). PowerShell modules and scripts can access and use the configuration data.

Example

In the following example templates and configurations will be created. The data will be used in a PowerShell module.

The module, which uses the data, is called OLX. There are two versions of the module available. Version 1.0.0.0 and version 2.0.0.0.

Creating and Configuring the Templates

To create a template, the CMM command

- Register-CMMModuleTemplate

is used. The following data will be provided to create the template:

- ModuleName
- MinModuleVersion (the minimum module version for which the template is valid, default is 0.0.0.0)

- TemplateDescription
- PSCredentialVarName (name for the variable which stores the credential)
- PSCredentialVarHelpMessage (an optional help message for the parameter/variable created with *PSCredentialVarName*)
- HostVarName (the name for the connection)
- HostVarDefaultValue (an optional default value for the host name)
- HostVarHelpMessage (an optional help message)

```powershell
$ParamHash=@{
    ModuleName='OLX';
    MinModuleVersion='0.0.0.0';
    TemplateDescription='For demo purpose';
    PSCredentialVarName='OLXCred';
    PSCredentialVarHelpMessage='Enter your OLX credential';
    HostVarName='OLXHost';
    HostVarDefaultValue='portal.application.com';
    HostVarHelpMessage='Enter the host url (portal.application.com)'
}; # end ParamHash
Register-CMMModuleTemplate @ParamHash;
```


Figure 1 Register module

The template OLX_0.0.0.0 is now available. The template provides two parameters/variables.

Figure 2 Default value and mandatory

Even if there is configured a default value for the host name the parameter is marked as mandatory (Figure 2 Default value and mandatory). Mandatory is only enforced when no default value is configured.

With this basic configuration, dater for connecting to a host and provide a credential is now configured. This minimum setting is a requirement for every template.

In the next steps we will add additional parameters/variables.

Name	Data type	IsMandatory	Help message	Default value
OLXSendReportsTo	String	True	Enter the email address of the reporting mailbox	

OLXPort	Int32		Enter the port	9466

```
$addTemplateVar=@{
Template='OLX_Ver:0.0.0.0';
VariableName='OLXSendReportsTo';
DataTyp='String';
IsMandatory=$true;
HelpMessage='Enter the email address of the reporting mailbox';
};
Add-CMMModuleTemplateVariable @addTemplateVar

$addTemplateVar=@{
Template='OLX_Ver:0.0.0.0';
VariableName='OLXPort';
DataTyp='Int32';
HelpMessage='Enter the port';
DefaultValue=9466;
};
Add-CMMModuleTemplateVariable @addTemplateVar
```


Figure 3 Additional Parameters/Variables added

Create a Configuration and Test

The purpose of the configuration is to configure the values, which are used in other PowerShell modules and scripts.

The command

- New-CMMConfiguration

retrieves some of the parameters from the template. in the following command, the names and types for the parameters

- OLXCred
- OLXSendReportsTo
- OLXHost
- OLXPort

are configured in the template OLX_Ver:0.0.0.0.

New-CMMConfiguration -Template OLX_Ver:0.0.0.0 -Name Cust1 -Description 'OLX cfg for Cust1' - OLXCred tom@cust1.com -OLXSendReportsTo fred@cust1.com

Figure 4 Create Configuration

Because the parameters

- OLXHost
- OLXPort

are omitted, the names and the values are red from the template. To read the names and the values from the template, default values must be configured.

For the lab setup the following configurations will be applied.

```
$newCfg=@{
    Template='OLX_Ver:0.0.0.0';
    Name='Cust1Lab';
    Description='OLX for Cust1 lab';
    AllowPushNotification=$true;
    'OLXCred'='tom@cust1.lab';
    'OLXHost'='portal.application.lab';
    'OLXPort'=5998
    'OLXSendReportsTo'='tom@cust1.lab';
};

New-CMMConfiguration @newCfg;

$newCfg=@{
    Template='OLX_Ver:0.0.0.0';
    Name='Cust2';
    Description='OLX for Cust2';
    'OLXCred'='tom@cust2.com';
    'OLXSendReportsTo'='ina@cust2.com';
};

New-CMMConfiguration @newCfg;


$newCfg=@{
    Template='OLX_Ver:0.0.0.0';
    Name='Cust3';
    Description='OLX for Cust3';
    'OLXCred'='rico@cust3.com';
    'OLXSendReportsTo'='mary@cust3.com';
};

New-CMMConfiguration @newCfg;
```

Figure 5 Configuration List

Loading the test module, will result in a warning message because no default config is configured.

Figure 6 Load Module OLX

During the load process, the module looks up if a default configuration is configured.

With the command

- Set-CMMConfiguration

the default configuration can be configured.

If the module will be reloaded the default configuration will be loaded.

Figure 7 Load Module OLX with Default Config

With the command

- Get-OLXActiveConfiguration

the active configuration can be verified.

Figure 8 Verify Active Config

With

- Get-OLXConfig

a different config can be selected.

Figure 9 Show Config (Ctrl-Space)

```
PS C:\> Get-OLXConfig -Configuration Cust1

Name                            Value
----                            -----
ConfigVersion                   0.0.0.0
InconsistentAttributes          {}
ConfigName                      Cust1
Data                            {OLXHost, OLXSendReportsTo, OLXCred, OLXPort}
Variables:
OLXHost:  portal.application.com
OLXSendReportsTo:  fred@cust1.com
OLXCred:  tom@cust1.com
OLXPort:  9466

PS C:\>
```

Figure 10 Display Config

Loading the module OLX 2.0.0.0 will result in loading the same configuration as version 1.0.0.0, because no template for a higher version is available.

```
PowerShell 7 (x64)

PS C:\> Import-Module OLX -RequiredVersion 2.0.0.0 -Force
Configuration Cust1Lab as default config loaded
PS C:\> Get-OLXActiveConfig

Name                            Value
----                            -----
Name                            Cust1Lab
Version                         0.0.0.0
OLXHost:  portal.application.lab
OLXSendReportsTo:  tom@cust1.lab
OLXCred:  tom@cust1.lab
OLXPort:  5998

PS C:\>
```

Figure 11 Load Module OLX 2.0.0.0

Tests with V2.0.0.0 Template

With the following commands the test setup for the template version 2.0.0.0 will be prepared.

```powershell
$ParamHash=@{
    ModuleName='OLX';
    MinModuleVersion='2.0.0.0';
    TemplateDescription='For demo purpose v2';
    PSCredentialVarName='OLXCred';
    PSCredentialVarHelpMessage='Enter your OLX credential';
    HostVarName='OLXHost';
    HostVarDefaultValue='portal.application.com';
    HostVarHelpMessage='Enter the host url (portal.application.com)'
}; # end ParamHash

Register-CMMModuleTemplate @ParamHash;

$addTemplateVar=@{
```

```
Template='OLX_Ver:2.0.0.0';
VariableName='OLXSendReportsTo';
DataTyp='String';
IsMandatory=$true;
HelpMessage='Enter the email address of the reporting mailbox';
};
Add-CMMModuleTemplateVariable @addTemplateVar

$addTemplateVar=@{
Template='OLX_Ver:2.0.0.0';
VariableName='OLXPort';
DataTyp='Int32';
HelpMessage='Enter the port';
DefaultValue=9466;
};
Add-CMMModuleTemplateVariable @addTemplateVar


$addTemplateVar=@{
Template='OLX_Ver:2.0.0.0';
VariableName='OLXSkipCertCheck';
DataTyp='Boolean';
HelpMessage='If the cert check should be skipped, enter True (security risk)';
DefaultValue=$false;
};
Add-CMMModuleTemplateVariable @addTemplateVar
```


Figure 12 Setup for Template V2.0.0.0

Reloading the module OLX 2.0.0.0 results in a warning, because no default configuration is configured.

Figure 13 Loading OLX V2.0.0.0

A default config can only be loaded from a template, with the best matching version. Configuring a new template, my prevent your module/script to load the default configuration.

If the test PowerShell module OLX starts, a global variable with the name

- SkipTemplateVersionFiltering

is initialized. The initial value is FALSE. The global variable is used with the following methods:

- GetConfigerationList
- GetConfig

The behavior of *SkipTemplateVersionFiltering* is described in the file about_CMM.

If no configuration for the most resent template exists, and *SkipTemplateVersionFiltering* is set to FASE, no configuration will be accessible. If *SkipTemplateVersionFiltering* is set to TRUE configurations from "older" templates will be accessible.

Figure 14 List older Configurations

Figure 15 Set older Config as Active

Now we add a new configuration to the recently added template with the version 2.0.0.0.

```
$newCfg=@{
    Template='OLX_Ver:2.0.0.0';
    Name='Cust1';
    Description='OLX for Cust1';
    AllowPushNotification=$true;
    'OLXCred'='tom@cust1.com';
    'OLXHost'='portal.application.com';
    'OLXPort'=5998
    'OLXSendReportsTo'='tom@cust1.com';
};

New-CMMConfiguration @newCfg;

$newCfg=@{
    Template='OLX_Ver:2.0.0.0';
    Name='Cust1Lab';
    Description='OLX for Cust1 lab';
    AllowPushNotification=$true;
    'OLXCred'='tom@cust1.lab';
    'OLXHost'='portal.application.lab';
    'OLXPort'=5998
    'OLXSendReportsTo'='tom@cust1.lab';
};
```
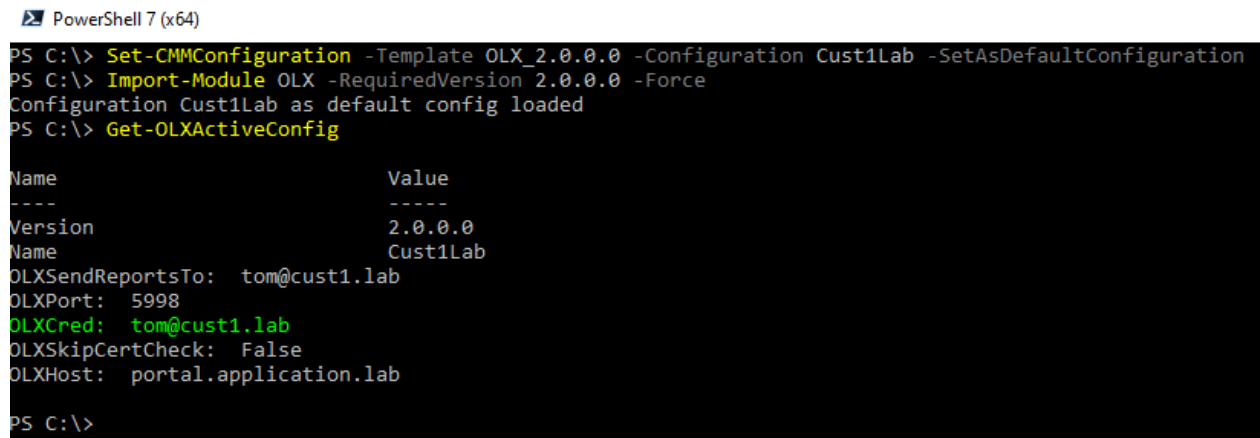
```
New-CMMConfiguration @newCfg;

$newCfg=@{
    Template='OLX_Ver:2.0.0.0';
    Name='Cust2';
    Description='OLX for Cust2';
    'OLXCred'='tom@cust2.com';
    'OLXSendReportsTo'='ina@cust2.com';
};

New-CMMConfiguration @newCfg;
```

If a configuration is configured as default configuration and the module is reloaded, the default configuration will be loaded.
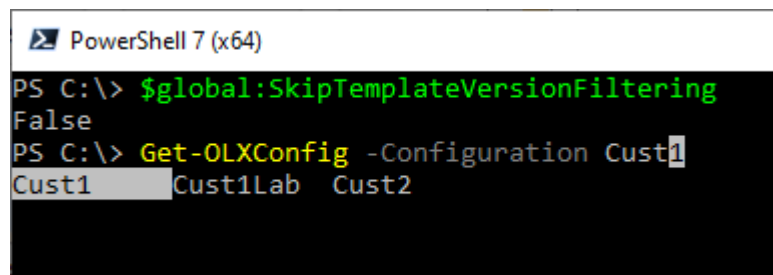

Figure 16 Reload Module with Default Configuration

If *SkipTemplateVersionFiltering* is set to FALSE, only the configurations configured for the template with the version 2.0.0.0 are available.

Figure 17 Available Configurations

If the *SkipTemplateVersionFiltering* is set to TRUE, the configuration for Cust3 (only for template 0.0.0.0 configured) is now available.

```
PowerShell 7 (x64)

PS C:\> $global:SkipTemplateVersionFiltering=$true
PS C:\> $global:SkipTemplateVersionFiltering
True
PS C:\> Get-OLXConfig -Configuration Cust1
Cust1      Cust1Lab  Cust2      Cust3
```

If, for Cust1, the configuration is queried, the most resent configuration (2.0.0.0) is returned.

```
PowerShell 7 (x64)

PS C:\> Get-OLXConfig -Configuration Cust1

Name                       Value
----                       -----
Data                       {OLXSendReportsTo, OLXPort, OLXCred, OLXSkipCertCheck…}
ConfigName                 Cust1
ConfigVersion              2.0.0.0
InconsistentAttributes     {}
Variables:
OLXSendReportsTo:  tom@cust1.com
OLXPort:  5998
OLXCred:  tom@cust1.com
OLXSkipCertCheck:  False
OLXHost:  portal.application.com

PS C:\>
```

Push Notification

Push notification is an experimental feature. It only works if CMM and the PowerShell module using CMM is running in the same PowerShell session.

To verify if a configuration is configured for push notification list the appropriate configuration.

```
PowerShell 7 (x64)

PS C:\> Get-CMMConfiguration -Configuration OLX_Cust1Lab_Ver:2.0.0.0

Name      Min. Ver. Description        PushNotify Parameter        Value
----      --------- -----------        ---------- ---------        -----
Cust1Lab 2.0.0.0   OLX for Cust1 lab  False      OLXCred          tom@cust1.lab
                                                  OLXHost          portal.application.lab
                                                  OLXPort          443
                                                  OLXSendReportsTo tom@cust1.lab
                                                  OLXSkipCertCheck False

PS C:\>
```
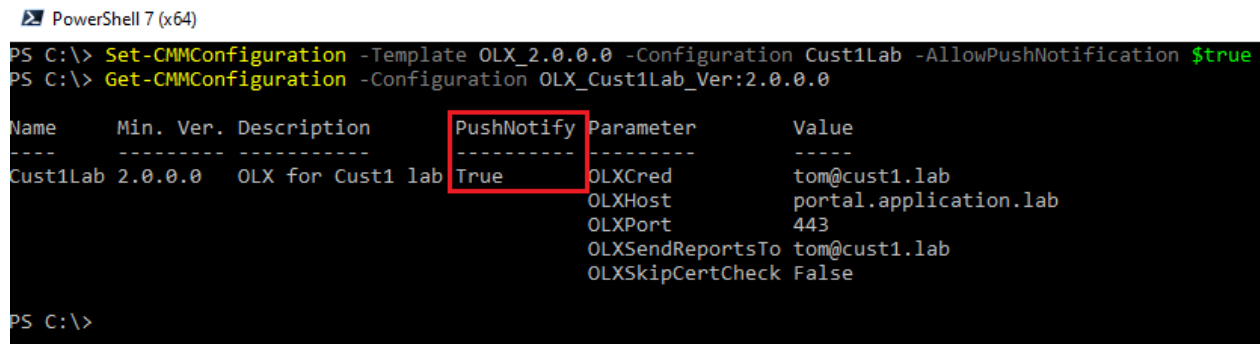
Figure 18 Verify PushNotify

To configure a configuration for push notification run the following command:

Set-CMMConfiguration -Template OLX_2.0.0.0 -Configuration Cust1Lab -AllowPushNotification $true

Figure 19 Configure PushNotify

Push notification is now configured.

To make PushNotify work, the PowerShell module, which is using CMM must export an object with a method named

- UpdateConfig

In the example module, which can be found in the folder

- EXAMPLES

a simple PowerShell class is included. The code can be found in the file

- LibsHelperFunctions.ps1 (in both versions of the module OLX)

CMM sends the name of the configuration and the version of the template, from which the configuration was created, to the method. The sample code checks if the updated configuration is active. If so, it reloads the configuration from CMM.

If the sample class is used, the object can be exported with the following code (can be found in OLX.psm1)

```
$vStr=(($Script:ModuleVersion).ToString()).Replace('.','_');
$vName='__' + $Script:ModuleName + '_' + $vStr;
New-Variable -Name $vName -Value ([GetModuleData]::new());
Export-ModuleMember -Variable $vName;
```

The variable *ModuleVersion* was in OLX.psm1.

The configuration

- Cust1Lab

is the active configuration. OLXPort is set to 443.

Figure 20 Configuration Check

With the following command OLXPort will be set to 9999.

Set-CMMConfiguration -Template OLX_2.0.0.0 -Configuration Cust1Lab -OLXPort 9999

Both the configuration and the active configuration in the sample PowerShell module are updated.

Figure 21 Updte with PushNotify