Troubleshooting DSC

Jeff Hicks

Author/Teacher

@jeffhicks | https://jdhitsolutions.com/blog

Troubleshooting

Did the configuration fail to run?

- Can you create the MOF?

Did the configuration fail to deploy?

- Can you push the MOF?

https://docs.microsoft.com/powershell/scripting/windows-powershell/wmf/known-issues/known-issues-dsc?view=powershell-5.1

- Link is in the demo files

DSC-related files

Use cmdlets to manage these files

Logs of configuration operations in ConfigurationStatus

```
Directory: C:\windows\system32\configuration

Mode                LastWriteTime         Length Name
----                -------------         ------ ----
d---s-        12/7/2019     2:49 AM              BaseRegistration
d---s-       10/19/2021     8:20 AM              ConfigurationStatus
d---s-        12/7/2019     2:14 AM              JobLogs
d---s-        12/7/2019     2:14 AM              PartialConfigurations
d---s-        12/7/2019     2:31 AM              Registration
d---s-        12/7/2019     2:31 AM              Schema
-a----       10/17/2021     5:55 PM        6678  Current.mof
-a----       10/19/2021     8:36 AM         482  DSCEngineCache.mof
-a----       10/19/2021     8:36 AM        2264  DSCResourceStateCache.mof
-a----       10/19/2021     8:35 AM      690526  DSCStatusHistory.mof
-a----        9/14/2021     2:40 PM        1952  MetaConfig.backup.mof
-a----        9/14/2021     2:40 PM        1952  MetaConfig.mof
-a----       10/17/2021     5:54 PM        6678  Previous.mof
```

```
PS C:\> Get-DscConfigurationStatus -CimSession SRV1
```

Get-DSCConfigurationStatus

Gets detailed information about completed configuration runs

```
PS C:\> Get-DscConfigurationStatus –CimSession SRV1

Status     StartDate                Type         Mode   RebootRequested       NumberOfResources
------     ---------                ----         ----   ---------------       -----------------
Success    10/19/2021 1:18:35 PM    Consistency  Push   False                 1
```

Get-DSCConfigurationStatus

Gets detailed information about completed configuration runs

```
PS C:\> Get-DscConfigurationStatus –CimSession SRV1 | Select *
```

Get-DSCConfigurationStatus

This is a rich object

```
PS C:\> Get-DscConfigurationStatus -CimSession SRV1 | Select *


DurationInSeconds        : 0
Error                    :
HostName                 : SRV1
IPV4Addresses            : {192.168.3.50, 127.0.0.1}
IPV6Addresses            : {fe80::8020:5529:26c4:c682%2, ::2000:0:0:0, ::1, ::2000:0:0:0}
JobID                    : {96A41A2A-3100-11EC-A28D-00155D0A7A7D}
LCMVersion               : 2.0
Locale                   : en-US
MACAddresses             : {00-15-5D-0A-7A-7D, 00-00-00-00-00-00-00-E0}
MetaConfiguration        : MSFT_DSCMetaConfiguration
MetaData                 : Author: ArtD; Name: Sample; Version: 2.0.0; GenerationDate: 09/27/2021 16:25:35; GenerationHost: WIN10;
Mode                     : Push
NumberOfResources        : 1
RebootRequested          : False
ResourcesInDesiredState  : {[File]Demo}
ResourcesNotInDesiredState :
StartDate                : 10/19/2021 10:18:35 AM
Status                   : Success
Type                     : Consistency
PSComputerName           : SRV1
CimClass                 : root/Microsoft/Windows/DesiredStateConfiguration:MSFT_DSCConfigurationStatus
CimInstanceProperties    : {DurationInSeconds, Error, HostName, IPV4Addresses...}
CimSystemProperties      : Microsoft.Management.Infrastructure.CimSystemProperties
```

```
PS C:\> Get-DscConfigurationStatus -CimSession SRV1 -all | Group-Object -Property Type
```

Get-DSCConfigurationStatus

Get all operations
Status history in C:\windows\system32\Configuration\DSCStatusHistory.mof

```
PS C:\> Get-DscConfigurationStatus -CimSession SRV1 -all | Group-Object -Property Type

Count Name                        Group
----- ----                        -----
  439 Consistency                 {[MSFT_DSCConfigurationStatus] Success 10/19/2021 10:18:35 AM, [MSFT_
   16 Initial                     {[MSFT_DSCConfigurationStatus] Success 10/19/2021 6:51:40 AM, [MSFT_[
    3 LocalConfigurationManager   {[MSFT_DSCConfigurationStatus] Success 10/17/2021 7:15:02 AM, [MSFT_[
    5 DirectResourceAccess        {[MSFT_DSCConfigurationStatus] Success 10/16/2021 7:26:41 AM, [MSFT_[
```

```
PS C:\> Test-DscConfiguration -ComputerName SRV1
True
```

Testing DSC Status

Test if the current configuration is in the desired state

```
PS C:\> Test-DscConfiguration -ComputerName SRV1 -Detailed -ov t

PSComputerName  ResourcesInDesiredState        ResourcesNotInDesiredState  InDesiredState
--------------  -----------------------        --------------------------  --------------
srv1            {[Service]Winrm, [Service]L... {[File]Work}                False
```

Testing DSC Status

Discover what is in or not in compliance

```
PS C:\> $t.resourcesNotInDesiredState

ConfigurationName    : Sample
DependsOn            :
ModuleName          : PSDesiredStateConfi…
ModuleVersion       : 1.1
PsDscRunAsCredential :
ResourceId          : [File]Work
SourceInfo          : ::6::5::File
DurationInSeconds   : 0
Error               :
FinalState          :
InDesiredState      : False
InitialState        :
InstanceName        : Demo
RebootRequested     : False
ResourceName        : File
StartDate           : 10/19/2021 10:33:47…
PSComputerName      : SRV1
```

◄ Name your configurations so you can track back to the source

◄ Might help identify what resource is failing
◄ You can locate the source (line::column)

◄ There might be error information
◄ You might want to build tooling around this

```
PS C:\> Help Invoke-DSCResource
```

Using Invoke-DSCResource

Implement a DSC Resource without a configuration
Run ON the node you want to test
Beware of potential 2nd hop issues

```powershell
$Settings = @{
    DestinationPath = "C:\Work"
    Ensure          = "Present"
    Type            = "Directory"
}

$splat = @{
    Name       = "File"
    ModuleName = "PSDesiredStateConfiguration"
    Method     = "Test"
    Property   = $settings
    Verbose    = $True
}

Invoke-DSCResource @splat
```

◄ Create a hashtable of settings you would set in a configuration

◄ Invoke-DSCResource parameters

◄ Get/Set/Test

```
[SRV1]: PS C:\> $Settings = @{
    DestinationPath = "C:\Work"
    Ensure          = "Present"
    Type            = "Directory"
}


[SRV1]: PS C:\> $splat = @{
    Name        = "File"
    ModuleName  = "PSDesiredStateConfiguration"
    Method      = "Test"
    Property    = $settings
    Verbose     = $True
}

[SRV1]: PS C:\> Invoke-DscResource @splat
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, ''methodName' = ResourceTest,'className' = MSFT_DSCLocalConfigurationManager,'nam
espaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-3584449507-2337337966-1611825372-1104.
VERBOSE: [SRV1]: LCM:  [ Start  Test     ]  [[File]DirectResourceAccess]
VERBOSE: [SRV1]:                             [[File]DirectResourceAccess] The destination object was found and no action is required.
VERBOSE: [SRV1]: LCM:  [ End    Test     ]  [[File]DirectResourceAccess] True in 0.0160 seconds.
VERBOSE: [SRV1]: LCM:  [ End    Set      ]    in  0.0320 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.

InDesiredState
--------------
True
VERBOSE: Time taken for configuration job to complete is 0.335 seconds
```

```
[SRV1]: PS C:\> $set2 = @{
    DestinationPath = "C:\Work2"
    Ensure          = "Present"
    Type            = "Directory"
}

[SRV1]: PS C:\> $splat.Property = $set2

[SRV1]: PS C:\> $splat.Method = "Set"

[SRV1]: PS C:\> Invoke-DscResource @splat
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, ''methodName' = ResourceSet,'className' = MSFT_DSCLocalConfigurationManager,'name
spaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-3584449507-2337337966-1611825372-1104.
VERBOSE: [SRV1]: LCM:  [ Start  Set      ]  [[File]DirectResourceAccess]
VERBOSE: [SRV1]:                             [[File]DirectResourceAccess] The system cannot find the file specified.
VERBOSE: [SRV1]:                             [[File]DirectResourceAccess] The related file/directory is: C:\Work2.
VERBOSE: [SRV1]: LCM:  [ End    Set      ]  [[File]DirectResourceAccess]  in 0.0320 seconds.
VERBOSE: [SRV1]: LCM:  [ End    Set      ]    in  0.0470 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.

RebootRequired
--------------
False
VERBOSE: Time taken for configuration job to complete is 0.35 seconds
```

Managing Configuration Documents

Current.mof
The most recently and successfully applied configuration

Previous.mof
The last recently and successfully applied configuration

Pending.mof
The configuration in process of being applied

MetaConfig.mof
LCM configuration

Managing Configuration Documents

Stored in %WINDIR%\System32\Configuration

Encrypted in place
- Except Metaconfig.mof

Some files will get automatic backups

Use cmdlets to manage
- They will rotate and rename as needed

```
PS C:\> Start-DscConfiguration -Wait -force -ComputerName SRV1 -UseExisting -verbose
```

Managing Configuration Documents

Manually re-apply the current configuration

```
PS C:\> Remove-DscConfigurationDocument -Stage pending -Force -CimSession srv1
```

Managing Configuration Documents

Remove an existing document
Sometimes a configuration will fail or hang in a pending state

```
PS C:\> Remove-DscConfigurationDocument -Stage previous -Force -CimSession srv1
```

Managing Configuration Documents

Remove the previous configuration document

```
PS C:\> Remove-DscConfigurationDocument -Stage current -Force -CimSession srv1
```

Managing Configuration Documents

Remove the current configuration document
Does not undo the configuration
But can keep it from being re-applied

```
PS C:\> Restore-DscConfiguration -CimSession SRV1 -Verbose
```

Managing Configuration Documents

Rollback using previous.mof if it exists
Current.mof becomes the new previous.mof

DSC EventLogs

Some resources may have logging

Create a transcript using –Verbose –Wait

Applications and Services Logs
- Microsoft
  - Windows
    - Desired State Configuration
      - Operational
      - Admin
      - Analytic (disabled)
      - Debug (disabled)

```
PS C:\> Get-WinEvent -ListLog *DSC* -ComputerName SRV2

LogMode    MaximumSizeInBytes RecordCount LogName
-------    ------------------ ----------- -------
Circular             1052672           0 Microsoft-Windows-DSC/Admin
Circular             1052672        1913 Microsoft-Windows-DSC/Operational
```

DSC Event Logs

Admin is usually empty
Use –Force to see disabled logs

```
PS C:\> Get-WinEvent -LogName Microsoft-Windows-DSC/Operational -ComputerName SRV2
-MaxEvents 10
```

DSC Event Logs

```
PS C:\> Get-WinEvent -ProviderName microsoft-windows-dsc -ComputerName SRV2
-MaxEvents 10
```

DSC Event Logs

Or use the provider

```
PS C:\> Get-WinEvent -FilterHashtable @{Logname = 'Microsoft-Windows-
DSC/Operational';Level='2'} -ComputerName srv1 -MaxEvents 20
```

DSC Event Logs

**Use filtering
Information = 4
Warnings = 3
Errors = 2**

```
PS C:\> wevtutil.exe set-log Microsoft-Windows-Dsc/Analytic /q:true /e:true
```

DSC Event Logs

**Enable the analytic log
Captures DSC activity**

```
PS C:\> Get-WinEvent -LogName Microsoft-Windows-DSC/Analytic -Oldest
```

DSC Event Logs

Need to use –Oldest parameter

```
PS C:\> Get-WinEvent -LogName Microsoft-Windows-DSC/Analytic -Oldest |
Format-Table TimeCreated,LevelDisplayName,Message -wrap

TimeCreated               LevelDisplayName Message
-----------               ---------------- -------
10/21/2021 5:53:24 AM Information
10/21/2021 5:55:38 AM Information          Job {3016417F-326E-11EC-AE1A-00155D0A7A7B} :
                                           Deleting file from C:\Windows\system32\configuration\DSCEngineCache.mof
10/21/2021 5:55:38 AM Information          Job {3016417F-326E-11EC-AE1A-00155D0A7A7B} :
                                           Deleting file from C:\Windows\system32\configuration\DSCEngineCache.mof
10/21/2021 5:55:52 AM Information          Job {3818A560-326E-11EC-AE1A-00155D0A7A7B} :
                                           Deleting file from C:\Windows\system32\configuration\DSCEngineCache.mof
10/21/2021 5:55:52 AM Information          Job {3818A560-326E-11EC-AE1A-00155D0A7A7B} :
                                           Deleting file from C:\Windows\system32\configuration\DSCEngineCache.mof
10/21/2021 5:56:26 AM Information          Job {4CC32F50-326E-11EC-AE1A-00155D0A7A7B} :
                                           Deleting file from C:\Windows\system32\configuration\DSCEngineCache.mof
10/21/2021 5:56:26 AM Information          Job {4CC32F50-326E-11EC-AE1A-00155D0A7A7B} :
                                           Deleting file from C:\Windows\system32\configuration\DSCEngineCache.mof
10/21/2021 5:56:36 AM Information          Job {4CC32F51-326E-11EC-AE1A-00155D0A7A7B} :
                                           Deleting file from C:\Windows\system32\configuration\DSCEngineCache.mof
10/21/2021 5:56:36 AM Information          Job {4CC32F51-326E-11EC-AE1A-00155D0A7A7B} :
                                           Executing GET for WMIv2 DSC resource MSFT_FileDirectoryConfiguration with resource
10/21/2021 5:56:36 AM Information          Job {4CC32F51-326E-11EC-AE1A-00155D0A7A7B} :
                                           Displaying messages from the engine:
                                             WMI channel 1
                                             ResourceID: [File]DirectResourceAccess
                                             Message : [WIN10]: LCM:  [ Start  Get      ]  [[File]DirectResourceAccess]
10/21/2021 5:56:36 AM Information          Job {4CC32F51-326E-11EC-AE1A-00155D0A7A7B} :
                                           Invoking session and getting result for namespace NULL, classname MSFT_FileDirector
                                           GetTargetResource
10/21/2021 5:56:36 AM Information          Job {4CC32F51-326E-11EC-AE1A-00155D0A7A7B} :
                                           Displaying messages from the engine:
                                             WMI channel 1
                                             ResourceID: [File]DirectResourceAccess
                                             Message : [WIN10]: LCM:  [ End    Get      ]  [[File]DirectResourceAccess]  in 0.
10/21/2021 5:56:36 AM Information          Job {4CC32F51-326E-11EC-AE1A-00155D0A7A7B} :
                                           Displaying messages from the engine:
```

```
PS C:\> wevtutil.exe set-log Microsoft-Windows-Dsc/Analytic /q:true /e:false
```
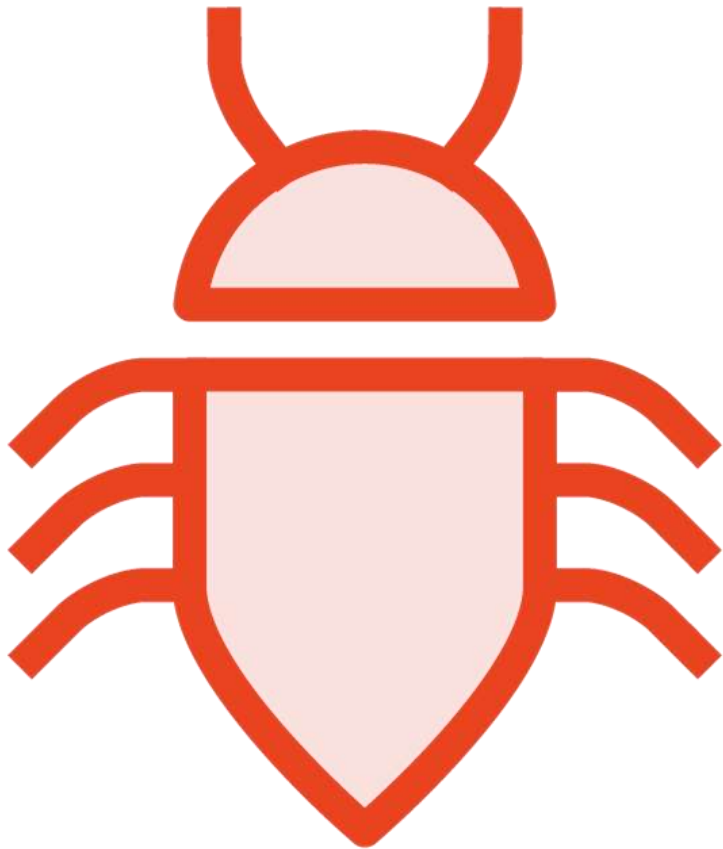
DSC Event Logs

Disable the log when finished
You can also enable and use Microsoft-Windows-Dsc/Debug
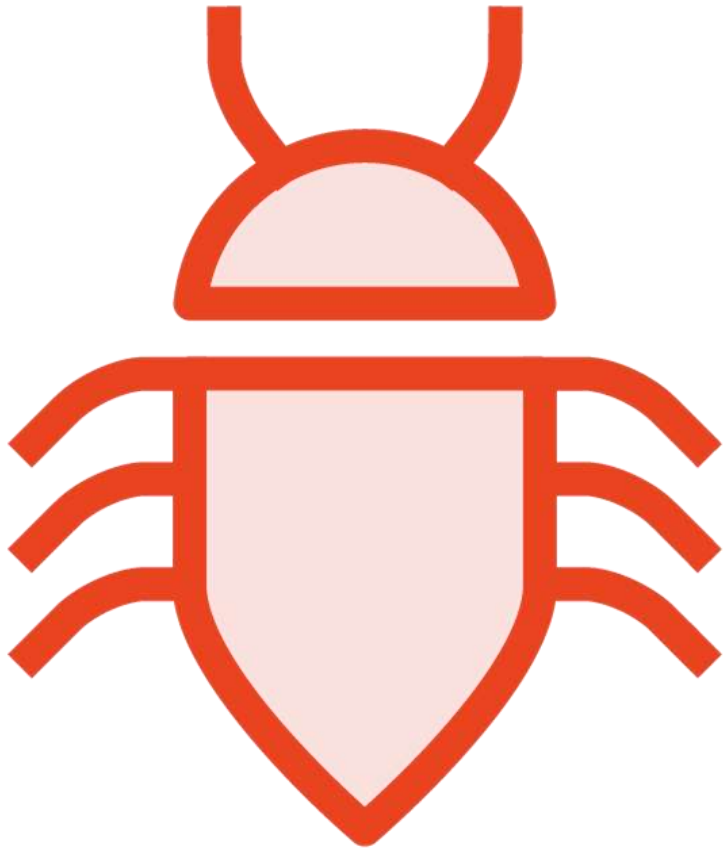
DSC Debug Mode

Enable-DSCDebug

- Reconfigures the LCM

Starts the configuration process in debug mode

Every command becomes a break point

DSC Debug Mode

Interactive remote debugging

- Let the configuration complete

Consider a backup or virtual machine snapshot before debugging

Disable-DSCDebug

```
PS P:\m8\demos> Start-DscConfiguration -Path C:\dsc\DebugDemo -wait -verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, ''methodName' = SendConfigurationApply,'className' = MSFT_DSCLocalConfigurationMa
nager,'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer WIN10 with user sid S-1-5-21-3584449507-2337337966-1611825372-1104.
VERBOSE: [SRV1]: LCM:  [ Start  Set        ]
WARNING: [SRV1]:                        [DSCEngine] Warning LCM is in Debug 'ResourceScriptBreakAll' mode.  Resource script processing will be stopped
 to wait for PowerShell script debugger to attach.
VERBOSE: [SRV1]:                        [DSCEngine] Importing the module C:\Windows\system32\WindowsPowerShell\v1.0\Modules\PSDesiredStateConfiguratio
n\DscResources\MSFT_ServiceResource\MSFT_ServiceResource.psm1 in force mode.
VERBOSE: [SRV1]: LCM:  [ Start  Resource ]    [[Service]Bits]
VERBOSE: [SRV1]: LCM:  [ Start  Test      ]    [[Service]Bits]
VERBOSE: [SRV1]:                        [[Service]Bits] Importing the module MSFT_ServiceResource in force mode.
WARNING: [SRV1]:                        [[Service]Bits] Resource is waiting for PowerShell script debugger to attach.  Use the following commands to b
egin debugging this resource script:
Enter-PSSession -ComputerName SRV1 -Credential <credentials>
Enter-PSHostProcess -Id 2720 -AppDomainName DscPsPluginWkr_AppDomain
Debug-Runspace -Id 3
```

Demo
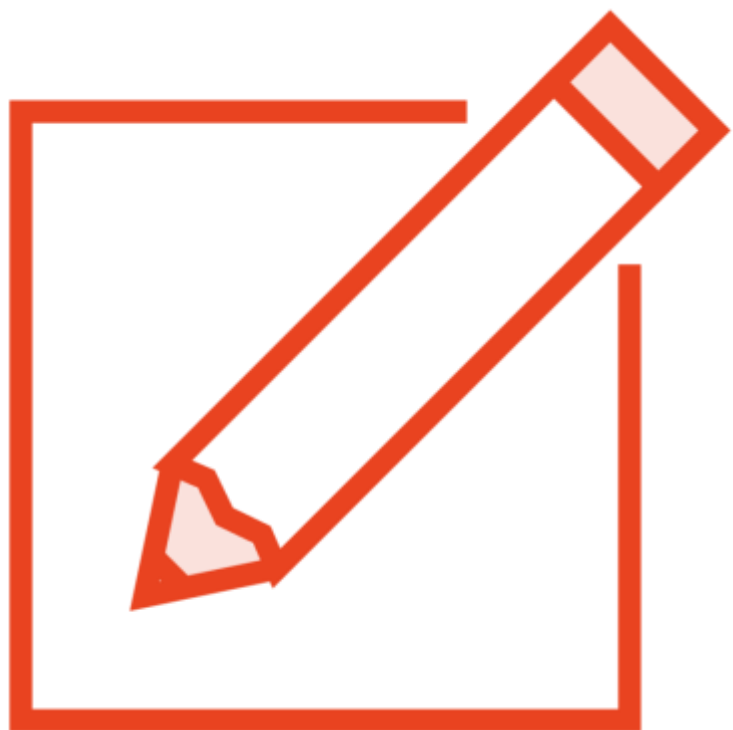
Using DSC Debug Mode

Common DSC Mistakes

PowerShell remoting fails

PowerShell version mismatch

Wrong DSC resource module version

DSC Best Practices

Use module version numbers

Protect configuration scripts and artifacts

- NTFS permissions

- Use source control

- Encrypt credentials

Document configurations

DSC Best Practices

Pester test
- Configurations
- Infrastructure

Push with –Verbose and -Wait

Build a DSC toolkit