

Chapter 1: What's New in PowerShell and Windows Server

```
PS C:\Windows\system32> $CommandsBeforeRSAT | Get-Member | Select-Object -ExpandProperty TypeName -Unique
System.Management.Automation.AliasInfo
System.Management.Automation.FunctionInfo
System.Management.Automation.FilterInfo
System.Management.Automation.CmdletInfo
```

PowerShell ISE: \$commands | Select-Object Name,Source,CommandType | Sort-Object Source,Name | Out-GridView

Filter

and Name starts with ✖

+ Add criteria ✖ Clear All

Name	Source	CommandType
Get-Verb		Function
Get-ADAccountAuthorizationGroup	ActiveDirectory	Cmdlet
Get-ADAccountResultantPasswor...	ActiveDirectory	Cmdlet
Get-ADAuthenticationPolicy	ActiveDirectory	Cmdlet
Get-ADAuthenticationPolicySilo	ActiveDirectory	Cmdlet
Get-ADCentralAccessPolicy	ActiveDirectory	Cmdlet
Get-ADCentralAccessRule	ActiveDirectory	Cmdlet
Get-ADClaimTransformPolicy	ActiveDirectory	Cmdlet
Get-ADClaimType	ActiveDirectory	Cmdlet
Get-ADComputer	ActiveDirectory	Cmdlet
Get-ADComputerServiceAccount	ActiveDirectory	Cmdlet
Get-ADDCCloningExcludedApplic...	ActiveDirectory	Cmdlet
Get-ADDefaultDomainPasswordP...	ActiveDirectory	Cmdlet
Get-ADDomain	ActiveDirectory	Cmdlet
Get-ADDomainController	ActiveDirectory	Cmdlet
Get-ADDomainControllerPasswor...	ActiveDirectory	Cmdlet
Get-ADDomainControllerPasswor...	ActiveDirectory	Cmdlet
Get-ADFineGrainedPasswordPolicy	ActiveDirectory	Cmdlet
Get-ADFineGrainedPasswordPolic...	ActiveDirectory	Cmdlet
Get-ADForest	ActiveDirectory	Cmdlet
Get-ADGroup	ActiveDirectory	Cmdlet
Get-ADGroupMember	ActiveDirectory	Cmdlet
Get-ADObject	ActiveDirectory	Cmdlet
Get-ADOptionalFeature	ActiveDirectory	Cmdlet
Get-ADOrganizationalUnit	ActiveDirectory	Cmdlet
Get-ADPrincipalGroupMembership	ActiveDirectory	Cmdlet
Get-ADReplicationAttributeMetad...	ActiveDirectory	Cmdlet

Use the filter to search and narrow your results.

Smodules | Out-GridView

Filter

and Name contains server ✖

+ Add criteria ▼ ✖ Clear All

ModuleType	Version	Name ▲	ExportedCommands
Manifest	2.0.0.0	DhcpServer	Add-DhcpServerInDC Add-DhcpServerv4Class Add-
Manifest	2.0.0.0	DnsServer	Add-DnsServerConditionalForwarderZone Add-Dns
Manifest	2.0.0.0	IpamServer	Get-IpamDhcpConfigurationEvent Remove-IpamDh
Script	1.0.0.0	ServerCore	Get-DisplayResolution Set-DisplayResolution
Script	2.0.0.0	ServerManager	Get-WindowsFeature Install-WindowsFeature Unins
Cim	1.0.0.0	ServerManagerTasks	Get-SMCounterSample Get-SMPerformanceCollect

Sorted by Name, filtered for modules that contain 'server'

```
PS C:\Windows\system32> Get-WindowsFeature -Name RSAT*
```

Display Name	Name	Install State
[X] Remote Server Administration Tools	RSAT	Installed
[X] Feature Administration Tools	RSAT-Feature-Tools	Installed
[X] SMTP Server Tools	RSAT-SMTP	Installed
[X] BitLocker Drive Encryption Administratio...	RSAT-Feature-Tools-B...	Installed
[X] BitLocker Drive Encryption Tools	RSAT-Feature-Tools-B...	Installed
[X] BitLocker Recovery Password Viewer	RSAT-Feature-Tools-B...	Installed
[X] BITS Server Extensions Tools	RSAT-Bits-Server	Installed
[X] DataCenterBridging LLDP Tools	RSAT-DataCenterBridg...	Installed
[X] Failover Clustering Tools	RSAT-Clustering	Installed
[X] Failover Cluster Management Tools	RSAT-Clustering-Mgmt	Installed
[X] Failover Cluster Module for Windows ...	RSAT-Clustering-Powe...	Installed
[X] Failover Cluster Automation Server	RSAT-Clustering-Auto...	Installed
[X] Failover Cluster Command Interface	RSAT-Clustering-CmdI...	Installed
[X] Network Load Balancing Tools	RSAT-NLB	Installed
[X] Shielded VM Tools	RSAT-Shielded-VM-Tools	Installed
[X] SNMP Tools	RSAT-SNMP	Installed
[X] Storage Replica Module for Windows Power...	RSAT-Storage-Replica	Installed
[X] WINS Server Tools	RSAT-WINS	Installed
[X] Role Administration Tools	RSAT-Role-Tools	Installed
[X] AD DS and AD LDS Tools	RSAT-AD-Tools	Installed
[X] Active Directory module for Windows ...	RSAT-AD-PowerShell	Installed
[X] AD DS Tools	RSAT-ADDS	Installed
[X] Active Directory Administrative ...	RSAT-AD-AdminCenter	Installed
[X] AD DS Snap-Ins and Command-Line ...	RSAT-ADDS-Tools	Installed
[X] AD LDS Snap-Ins and Command-Line Tools ...	RSAT-ADLDS	Installed
[X] Hyper-V Management Tools	RSAT-Hyper-V-Tools	Installed
[X] Remote Desktop Services Tools	RSAT-RDS-Tools	Installed
[X] Remote Desktop Gateway Tools	RSAT-RDS-Gateway	Installed
[X] Remote Desktop Licensing Diagonoser T...	RSAT-RDS-Licensing-D...	Installed
[X] Active Directory Certificate Services Tools	RSAT-ADC5	Installed
[X] Certification Authority Management T...	RSAT-ADC5-Mgmt	Installed
[X] Online Responder Tools	RSAT-Online-Responder	Installed
[X] Active Directory Rights Management Servi...	RSAT-ADRMS	Installed
[X] DHCP Server Tools	RSAT-DHCP	Installed
[X] DNS Server Tools	RSAT-DNS-Server	Installed
[X] Fax Server Tools	RSAT-Fax	Installed
[X] File Services Tools	RSAT-File-Services	Installed
[X] DFS Management Tools	RSAT-DFS-Mgmt-Con	Installed
[X] File Server Resource Manager Tools	RSAT-FSRM-Mgmt	Installed
[X] Services for Network File System Man...	RSAT-NFS-Admin	Installed
[X] Network Controller Management Tools	RSAT-NetworkController	Installed
[X] Network Policy and Access Services Tools	RSAT-NPAS	Installed
[X] Print and Document Services Tools	RSAT-Print-Services	Installed
[X] Remote Access Management Tools	RSAT-RemoteAccess	Installed
[X] Remote Access GUI and Command-Line T...	RSAT-RemoteAccess-Mgmt	Installed
[X] Remote Access module for Windows Pow...	RSAT-RemoteAccess-Po...	Installed
[X] Volume Activation Tools	RSAT-VA-Tools	Installed


```

1 #New Cmdlets in PowerShell 4
2
3 Show-Command Get-FileHash
4 Get-FileHash -Path $env:windir\notepad.exe -Algorithm SHA256
5
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```

PS C:\Windows\system32> Show-Command Get-FileHash

PS C:\Windows\system32> Get-FileHash -Path \$env:windir\notepad.exe -Algorithm SHA512

Algorithm	Hash	Path
SHA512	5F5A3B5E64B4A149865F65D678028CEF3BC0DE16EF265C130B985494AB6690193F8...	C:\Windows\notepad.exe

PS C:\Windows\system32> Show-Command Get-FileHash

Get-FileHash

Parameters for "Get-FileHash":

Path: LiteralPath Stream

Path: * \$env:windir\notepad.exe

Algorithm: SHA512

Common Parameters

Run Copy Cancel

```

7
8 Show-Command Test-NetConnection
9 Test-NetConnection -CommonTCPPort HTTP -InformationLevel Detailed
10 Test-NetConnection -ComputerName windows.com
11 Test-NetConnection -DiagnoseRouting
12
13
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```

PS C:\Windows\system32> Test-NetConnection -Port 443 -ComputerName google.com -InformationLevel Detailed

```

ComputerName      : google.com
RemoteAddress     : 216.58.192.110
RemotePort        : 443
NameResolutionResults : 216.58.192.110
MatchingIPsecRules :
NetworkIsolationContext : Internet
InterfaceAlias    : Ethernet
SourceAddress     : 192.168.2.230
NetRoute (NextHop) : 192.168.2.1
TcpTestSucceeded  : True

```

PS C:\Windows\system32> Show-Command Test-NetConnection

Test-NetConnection

Parameters for "Test-NetConnection":

CommonTCPPort ICMP NetRouteDiagnostics RemotePort

Port: * 443

ComputerName:

InformationLevel:

Common Parameters

Run Copy Cancel

```
PS C:\Windows\system32> Get-Command -Verb Write -Module *Utility
```

CommandType	Name	Version	Source
Cmdlet	Write-Debug	3.1.0.0	Microsoft.PowerShell.Utility
Cmdlet	Write-Error	3.1.0.0	Microsoft.PowerShell.Utility
Cmdlet	Write-Host	3.1.0.0	Microsoft.PowerShell.Utility
Cmdlet	Write-Information	3.1.0.0	Microsoft.PowerShell.Utility
Cmdlet	Write-Output	3.1.0.0	Microsoft.PowerShell.Utility
Cmdlet	Write-Progress	3.1.0.0	Microsoft.PowerShell.Utility
Cmdlet	Write-Verbose	3.1.0.0	Microsoft.PowerShell.Utility
Cmdlet	Write-Warning	3.1.0.0	Microsoft.PowerShell.Utility

Get-Item

Common Parameters

- Debug
- ErrorAction:
- ErrorVariable:
- InformationAction:
- InformationVariable:
Type: System.Management.Automation.ActionPreference
Optional
- OutBuffer:
- OutVariable:
- PipelineVariable:
- Verbose
- WarningAction:
- WarningVariable:

Run Copy Cancel

```
PS C:\Windows\system32> "Here is a sentence!" | ConvertFrom-String | Get-Member
```

```
TypeName: System.Management.Automation.PSCustomObject
```

Name	MemberType	Definition
Equals	Method	bool Equals(System.Object obj)
GetHashCode	Method	int GetHashCode()
GetType	Method	type GetType()
ToString	Method	string ToString()
P1	NoteProperty	string P1=Here
P2	NoteProperty	string P2=is
P3	NoteProperty	char P3=a
P4	NoteProperty	string P4=sentence!

```
PS C:\Windows\system32> "Here,is,a,list!" | ConvertFrom-String -PropertyNames First,Second,Third,Fourth -Delimiter ',' | Get-Member
```

```
TypeName: System.Management.Automation.PSCustomObject
```

Name	MemberType	Definition
Equals	Method	bool Equals(System.Object obj)
GetHashCode	Method	int GetHashCode()
GetType	Method	type GetType()
ToString	Method	string ToString()
First	NoteProperty	string First=Here
Fourth	NoteProperty	string Fourth=list!
Second	NoteProperty	string Second=is
Third	NoteProperty	char Third=a

```
PS C:\Windows\system32> $TextToParse = '@'
```

```
Animal, Bird
```

```
Shape like Square
```

```
Number is 42
```

```
Person named Bob
```

```
'@
```

```
$Template1 = '@'
```

```
{[string]Category*:Animal}, {[string]Example:Bird}
```

```
'@
```

```
ConvertFrom-String -TemplateContent $Template1 -InputObject $TextToParse
```

```
Category
```

```
-----
```

```
Animal
```

```

PS C:\Windows\system32> $TextToParse = @"
Animal, Bird
Shape like Square
Number is 42
Person named Bob
"@

PS C:\Windows\system32> $Template3 = @"
{{[string]Category#:Animal}}, {[string]Example:Bird}
{{[string]Category#:Country} like {[string]Example:Italy}
{{[string]Category#:Number} like {[int]Example:99}
"@

PS C:\Windows\system32> ConvertFrom-String -TemplateContent $Template3 -InputObject $TextToParse

```

Category	Example
Animal	Bird
Shape	Square
Number	42
Person	Bob

```

PS C:\Windows\system32> $TestValue =
@"
This is line 1
and line 2
"@

PS C:\Windows\system32> $TestValue
This is line 1
and line 2

PS C:\Windows\system32> $TestValue | Format-Hex

```

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	
00000000	54	68	69	73	20	69	73	20	6C	69	6E	65	20	31	0D	0A	This is line 1..
00000010	61	6E	64	20	6C	69	6E	65	20	32							and line 2

```
PS C:\Windows\system32> Get-Command -Module PowerShellGet
```

CommandType	Name	Version	Source
Function	Find-Command	1.1.2.0	PowerShellGet
Function	Find-DscResource	1.1.2.0	PowerShellGet
Function	Find-Module	1.1.2.0	PowerShellGet
Function	Find-RoleCapability	1.1.2.0	PowerShellGet
Function	Find-Script	1.1.2.0	PowerShellGet
Function	Get-InstalledModule	1.1.2.0	PowerShellGet
Function	Get-InstalledScript	1.1.2.0	PowerShellGet
Function	Get-PSRepository	1.1.2.0	PowerShellGet
Function	Install-Module	1.1.2.0	PowerShellGet
Function	Install-Script	1.1.2.0	PowerShellGet
Function	New-ScriptFileInfo	1.1.2.0	PowerShellGet
Function	Publish-Module	1.1.2.0	PowerShellGet
Function	Publish-Script	1.1.2.0	PowerShellGet
Function	Register-PSRepository	1.1.2.0	PowerShellGet
Function	Save-Module	1.1.2.0	PowerShellGet
Function	Save-Script	1.1.2.0	PowerShellGet
Function	Set-PSRepository	1.1.2.0	PowerShellGet
Function	Test-ScriptFileInfo	1.1.2.0	PowerShellGet
Function	Uninstall-Module	1.1.2.0	PowerShellGet
Function	Uninstall-Script	1.1.2.0	PowerShellGet
Function	Unregister-PSRepository	1.1.2.0	PowerShellGet
Function	Update-Module	1.1.2.0	PowerShellGet
Function	Update-ModuleManifest	1.1.2.0	PowerShellGet
Function	Update-Script	1.1.2.0	PowerShellGet
Function	Update-ScriptFileInfo	1.1.2.0	PowerShellGet

```
PS C:\Windows\system32> Install-PackageProvider NuGet -Force -Verbose
VERBOSE: Using the provider 'Bootstrap' for searching packages.
VERBOSE: Finding the package 'Bootstrap:FindPackage' 'NuGet',',',',','.
VERBOSE: Performing the operation 'Install Package' on target 'Package nuget' version '2.8.5.208' from 'https://oneget.org/nuget-2.8.5.208.package.swidtag.'.
VERBOSE: Installing the package 'https://oneget.org/nuget-2.8.5.208.package.swidtag'.
VERBOSE: Installed the package 'nuget' to 'C:\Program Files\PackageManagement\ProviderAssemblies\nuget\2.8.5.208\Microsoft.PackageManagement.NuGetProvider.d11'.
VERBOSE: Skipping previously processed assembly: C:\Program Files\PackageManagement\ProviderAssemblies\nuget\2.8.5.208\Microsoft.PackageManagement.NuGetProvider
.d11.
Name                Version           Source            Summary
----                -
nuget                2.8.5.208        https://onege... NuGet provider for the OneGet meta-package manager
VERBOSE: Importing the package provider NuGet
VERBOSE: The provider 'NuGet' has already been imported. Trying to import it again.
VERBOSE: Loading an assembly 'C:\Program Files\PackageManagement\ProviderAssemblies\nuget\2.8.5.208\Microsoft.PackageManagement.NuGetProvider.d11'.
VERBOSE: Acquiring providers for assembly: C:\Program Files\PackageManagement\ProviderAssemblies\nuget\2.8.5.208\Microsoft.PackageManagement.NuGetProvider.d11
VERBOSE: Imported provider 'C:\Program Files\PackageManagement\ProviderAssemblies\nuget\2.8.5.208\Microsoft.PackageManagement.NuGetProvider.d11'.
```

```
PS C:\Windows\system32> Get-PackageProvider -Name NuGet | Select-Object Version
```

```
Version
-----
2.8.5.208
```

```
PS C:\Windows\system32> Install-Module -Name PowerShellGet -Force
WARNING: The version '1.1.1.0' of module 'PackageManagement' is currently in use. Retry the operation after closing the applications.
PS C:\Windows\system32>
```

```
PS C:\Windows\system32> Get-Module -Name PowerShellGet | Select-Object Version
```

```
Version  
-----  
1.1.2.0
```

```
PS C:\Windows\system32>
```

```
PS C:\Windows\system32> Get-PSRepository
```

Name	InstallationPolicy	SourceLocation
PSGallery	Trusted	https://www.powershellgallery.com/api/v2/

```
Find-PackageProvider | Select Name, Source, Summary | Format-Table -Wrap -AutoSize
```

Name	InstallationPolicy	SourceLocation
PSGallery	Trusted	https://www.powershellgallery.com/api/v2/

Name	Source	Summary
nuget	https://oneget.org/nuget-2.8.5.208.package.swidtag	NuGet provider for the OneGet meta-package manager
ps1	https://oneget.org/ps1-1.0.0.210.package.swidtag	ps1 provider for the OneGet meta-package manager
chocolatey	https://oneget.org/ChocolateyPrototype-2.8.5.130.package.swidtag	ChocolateyPrototype provider for the OneGet meta-package manager
PowerShellGet	PSGallery	PowerShell module with commands for discovering, installing, updating and publishing the PowerShell artifacts like Modules, DSC Resources, Role Capabilities and Scripts.
GistProvider	PSGallery	Gist-as-a-Package - PackageManagement PowerShell Provider to interop with Github Gists
GitHubProvider	PSGallery	GitHub-as-a-Package - PackageManagement PowerShell Provider to interop with Github
TSDProvider	PSGallery	PowerShell PackageManagement provider to search & install TypeScript definition files from the community DefinitelyTyped repo
ChocolateyGet	PSGallery	An PowerShell OneGet provider that discovers packages from https://www.chocolatey.org .
MyAlbum	PSGallery	MyAlbum provider discovers the photos in your remote file repository and installs them to your local folder.
ContainerImage	PSGallery	This is a PackageManagement provider module which helps in discovering, downloading and installing windows Container OS images.
DockerMsftProvider	PSGallery	For more details and examples refer to our project site at https://github.com/PowerShell/ContainerProvider .
NanoServerPackage	PSGallery	PowerShell module with commands for discovering, installing, and updating Docker images.
OfficeProvider	PSGallery	A PackageManagement provider to Discover, Save and Install Nano Server Packages on-demand
GitLabProvider	PSGallery	OfficeProvider allows users to install Microsoft Office365 ProPlus from Powershell.
WSAProvider	PSGallery	GitLab PackageManagement provider
0install	PSGallery	Provider to Discover, Install and inventory windows server apps
		Zero Install is a decentralized cross-platform software-installation system.

```
PS C:\Windows\system32> Find-PackageProvider -Source PSGallery | Select-Object -Property Name, Summary | Format-Table -Wrap -AutoSize
```

Name	Summary
GitHubProvider	GitHub-as-a-Package - PackageManagement PowerShell Provider to interop with Github
TSDProvider	PowerShell PackageManager provider to search & install TypeScript definition files from the community DefinitelyTyped repo
PowerShellGet	PowerShell module with commands for discovering, installing, updating and publishing the PowerShell artifacts like Modules, DSC Resources, Role Capabilities and Scripts.
GistProvider	Gist-as-a-Package - PackageManagement PowerShell Provider to interop with Github Gists
ChocolateyGet	An PowerShell OneGet provider that discovers packages from https://www.chocolatey.org .
MyAlbum	MyAlbum provider discovers the photos in your remote file repository and installs them to your local folder.
ContainerImage	This is a PackageManagement provider module which helps in discovering, downloading and installing Windows Container OS images. For more details and examples refer to our project site at https://github.com/PowerShell/ContainerProvider .
DockerMsftProvider	PowerShell module with commands for discovering, installing, and updating Docker images.
NanoServerPackage	A PackageManagement provider to Discover, Save and Install Nano Server Packages on-demand
OfficeProvider	OfficeProvider allows users to install Microsoft Office365 ProPlus from Powershell.
GitLabProvider	GitLab PackageManagement provider
WSAProvider	Provider to Discover, Install and inventory windows server apps
0install	Zero Install is a decentralized cross-platform software-installation system.

```
PS C:\Windows\system32> Get-Command -Module PowerShellGet -Verb Find
```

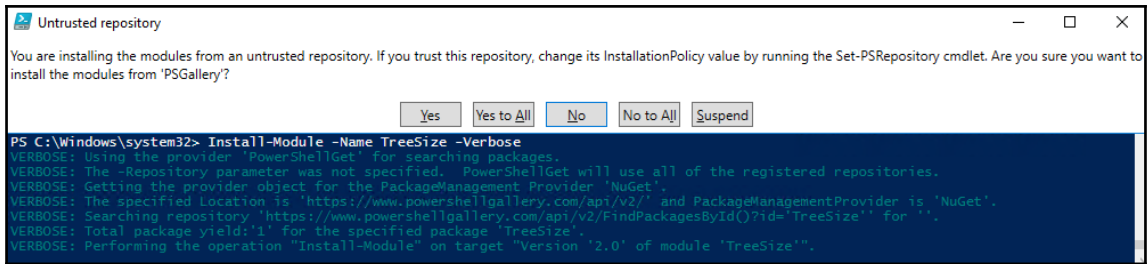
CommandType	Name	Version	Source
Function	Find-Command	1.1.2.0	PowerShellGet
Function	Find-DscResource	1.1.2.0	PowerShellGet
Function	Find-Module	1.1.2.0	PowerShellGet
Function	Find-RoleCapability	1.1.2.0	PowerShellGet
Function	Find-Script	1.1.2.0	PowerShellGet

The screenshot shows a window titled '\$Modules | Out-GridView' with a search bar containing 'tree'. Below the search bar is a table with columns: Version, Name, Repository, and Description.

Version	Name	Repository	Description
2.0	TreeSize	PSGallery	Provides a Get-TreeSize command
1.3.2	PsIseProjectEx...	PSGallery	Provides a tree view that enables to index and explore whole directory structure containing Pow...
1.0	ModuleScaffo...	PSGallery	Create Directory Tree and basic files for a new module

```
PS C:\Windows\system32> Get-Command -Module PowerShellGet -Verb Install
```

CommandType	Name	Version	Source
Function	Install-Module	1.1.2.0	PowerShellGet
Function	Install-Script	1.1.2.0	PowerShellGet



```
PS C:\Windows\system32> Get-Help Get-TreeSize -Examples

NAME
    Get-TreeSize

SYNOPSIS
    Recursively lists provider items and sums their lengths

----- EXAMPLE 1 -----

PS C:\>Get-Treesize

Localization\ 12021
|-- En-US\    2025
|-- En\       1339

----- EXAMPLE 2 -----

PS C:\>Get-Treesize -ShowFiles

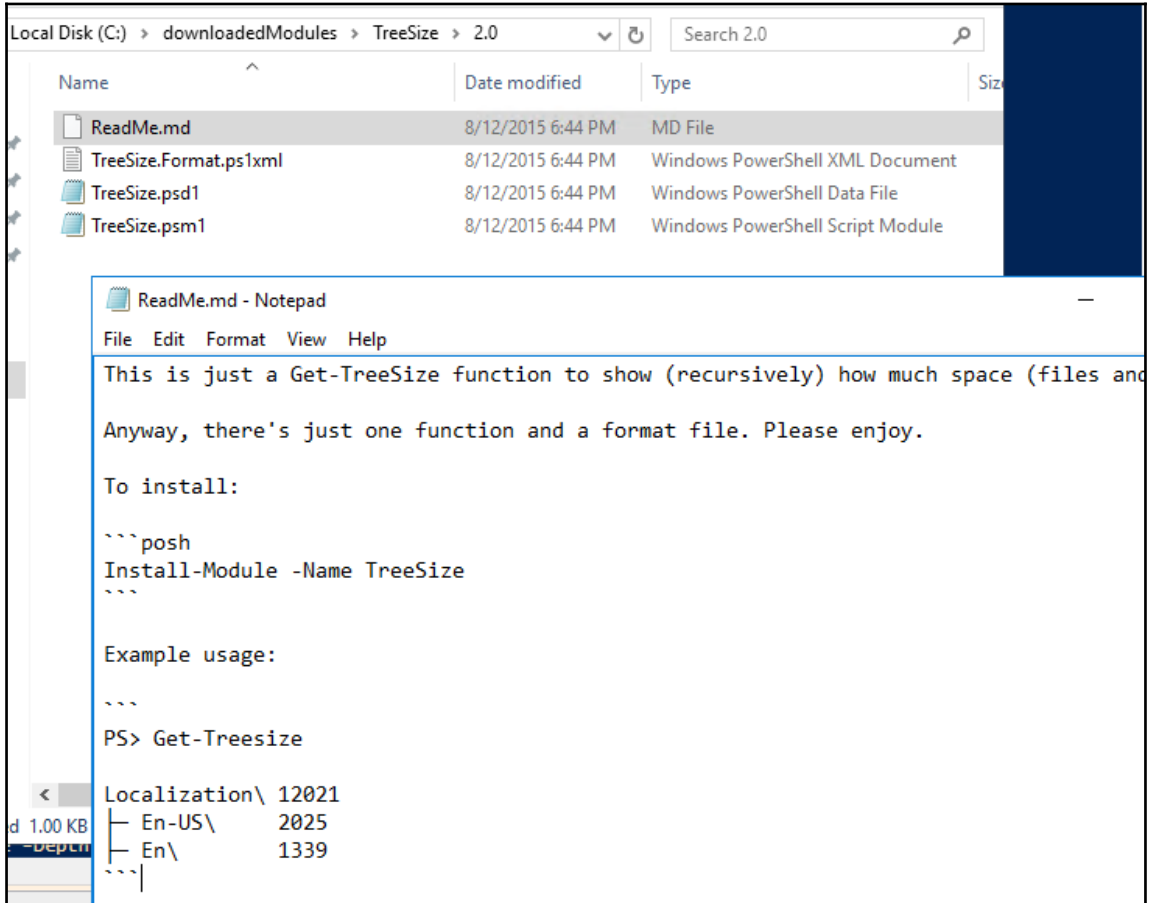
Localization\      12021
|-- Localization.psd1 6698
|-- En-US\          2025
    |-- UserSettings.psd1 1000
    |-- Localization.psd1 958
    |-- numbers.psd1 67
|-- UserSettings.psd1 1959
|-- En\             1339
    |-- UserSettings.psd1 1253
    |-- numbers.psd1 86

----- EXAMPLE 3 -----

PS C:\>Get-Treesize | Format-Custom
```



```
PS C:\Windows\system32> Uninstall-Module dbatools -Verbose
VERBOSE: Performing the operation "Uninstall-Module" on target "Version '0.8.692' of module 'dbatools'".
VERBOSE: Successfully uninstalled the module 'dbatools' from module base 'C:\Program Files\WindowsPowerShell\Modules\dbatools\0.8.692'.
PS C:\Windows\system32>
```



Local Disk (C:) > downloadedModules > TreeSize > 2.0

Name	Date modified	Type	Size
ReadMe.md	8/12/2015 6:44 PM	MD File	
TreeSize.Format.ps1xml	8/12/2015 6:44 PM	Windows PowerShell XML Document	
TreeSize.psd1	8/12/2015 6:44 PM	Windows PowerShell Data File	
TreeSize.psm1	8/12/2015 6:44 PM	Windows PowerShell Script Module	

ReadMe.md - Notepad

File Edit Format View Help

This is just a Get-TreeSize function to show (recursively) how much space (files and folders) are taking up on the drive. It's a simple function, but it's useful. Anyway, there's just one function and a format file. Please enjoy.

To install:

```
```posh
Install-Module -Name TreeSize
```
```

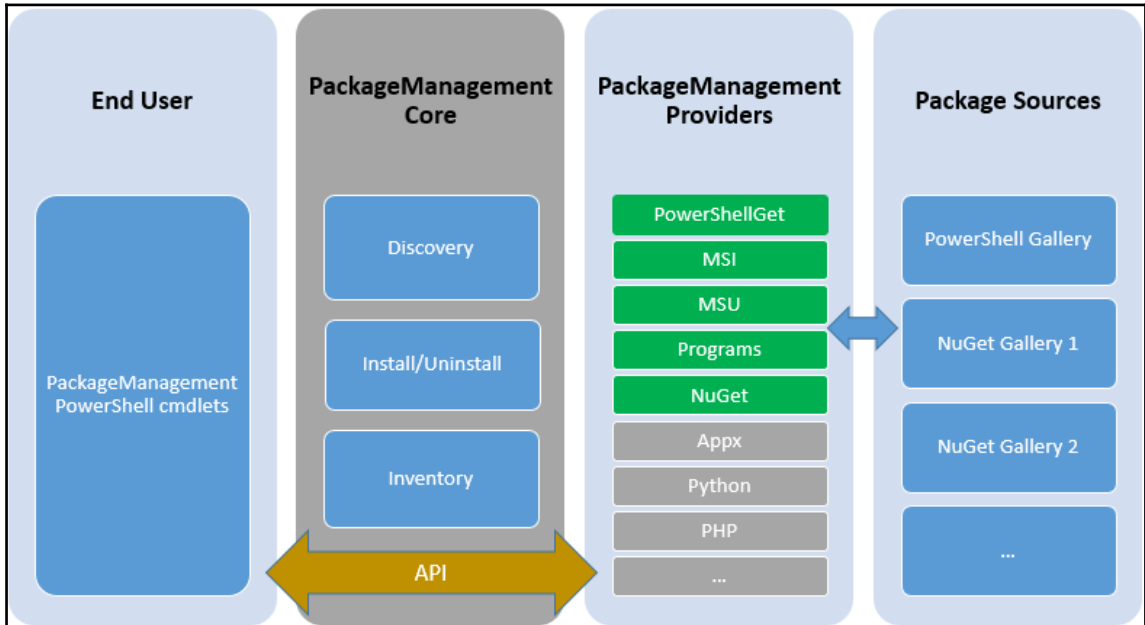
Example usage:

```
```
PS> Get-Treesize
Localization\ 12021
| En-US\ 2025
| En\ 1339
|```
```

```
PS C:\Windows\system32> $ModuleFolder = "$env:HOMEDRIVE\downloadedModules\TreeSize"
Get-ChildItem -Path $ModuleFolder -Filter *.psm1 -Recurse |
Select -ExpandProperty FullName -First 1 |
Import-Module -Verbose
VERBOSE: Loading module from path 'C:\downloadedModules\TreeSize\2.0\TreeSize.psm1'.
VERBOSE: Exporting function 'Get-TreeSize'.
VERBOSE: Exporting alias 'TreeSize'.
VERBOSE: Importing function 'Get-TreeSize'.
VERBOSE: Importing alias 'TreeSize'.
```

```
PS C:\Windows\system32> Get-Command -Module PowerShellGet -Verb Find
```

CommandType	Name	Version	Source
Function	Find-Command	1.1.2.0	PowerShellGet
Function	Find-DscResource	1.1.2.0	PowerShellGet
Function	Find-Module	1.1.2.0	PowerShellGet
Function	Find-RoleCapability	1.1.2.0	PowerShellGet
Function	Find-Script	1.1.2.0	PowerShellGet



```
PS C:\foo> Get-Command -Module PackageManagement
```

CommandType	Name	Version	Source
Cmdlet	Find-Package	1.1.1.0	PackageManagement
Cmdlet	Find-PackageProvider	1.1.1.0	PackageManagement
Cmdlet	Get-Package	1.1.1.0	PackageManagement
Cmdlet	Get-PackageProvider	1.1.1.0	PackageManagement
Cmdlet	Get-PackageSource	1.1.1.0	PackageManagement
Cmdlet	Import-PackageProvider	1.1.1.0	PackageManagement
Cmdlet	Install-Package	1.1.1.0	PackageManagement
Cmdlet	Install-PackageProvider	1.1.1.0	PackageManagement
Cmdlet	Register-PackageSource	1.1.1.0	PackageManagement
Cmdlet	Save-Package	1.1.1.0	PackageManagement
Cmdlet	Set-PackageSource	1.1.1.0	PackageManagement
Cmdlet	Uninstall-Package	1.1.1.0	PackageManagement
Cmdlet	Unregister-PackageSource	1.1.1.0	PackageManagement

```
PS C:\foo> Get-PackageProvider | Select-Object -Property Name, Version
```

Name	Version
Chocolatey	2.8.5.130
msi	3.0.0.0
msu	3.0.0.0
NuGet	2.8.5.208
PowerShellGet	1.1.2.0
Programs	3.0.0.0

```
PS C:\foo> Get-Package -ProviderName msu | Select Name
```

Name
Definition Update for Windows Defender - KB2267602 (Definition 1.233.3763.0)
Definition Update for Windows Defender - KB2267602 (Definition 1.233.3794.0)
Definition Update for Windows Defender - KB2267602 (Definition 1.233.3735.0)
Definition Update for Windows Defender - KB2267602 (Definition 1.233.3771.0)
Definition Update for Windows Defender - KB2267602 (Definition 1.233.3794.0)
Definition Update for Windows Defender - KB2267602 (Definition 1.233.1099.0)
Definition Update for Windows Defender - KB2267602 (Definition 1.233.897.0)

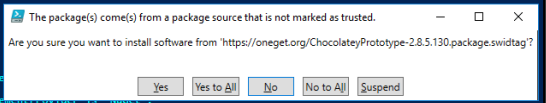
```
PS C:\foo> Get-PackageProvider -Name NuGet | Select-Object -Property Name, Version
```

Name	Version
NuGet	2.8.5.208

```
PS C:\foo> Find-PackageProvider | Select-Object -Property Name, Summary | Format-Table -Wrap -AutoSize
```

Name	Summary
nuget	NuGet provider for the OneGet meta-package manager
ps1	ps1 provider for the OneGet meta-package manager
chocolatey	ChocolateyPrototype provider for the OneGet meta-package manager
ContainerImage	This is a PackageManagement provider module which helps in discovering, downloading and installing Windows Container OS images. For more details and examples refer to our project site at <a href="https://github.com/PowerShell/ContainerProvider">https://github.com/PowerShell/ContainerProvider</a> .
DockerMsftProvider	PowerShell module with commands for discovering, installing, and updating Docker images.
NanoServerPackage	A PackageManagement provider to Discover, Save and Install Nano Server Packages on-demand
GitHubProvider	GitHub-as-a-Package - PackageManagement PowerShell Provider to interop with Github
ChocolateyGet	An PowerShell OneGet provider that discovers packages from <a href="https://www.chocolatey.org">https://www.chocolatey.org</a> .
TSDPProvider	PowerShell PackageManager provider to search & install TypeScript definition files from the community DefinitelyTyped repo
PowerShellGet	PowerShell module with commands for discovering, installing, updating and publishing the PowerShell artifacts like Modules, DSC Resources, Role Capabilities and Scripts.
GistProvider	Gist-as-a-Package - PackageManagement PowerShell Provider to interop with Github Gists
MyAlbum	MyAlbum provider discovers the photos in your remote file repository and installs them to your local folder.
OfficeProvider	OfficeProvider allows users to install Microsoft Office365 ProPlus from Powershell.
GitLabProvider	GitLab PackageManagement provider
WSAPProvider	Provider to Discover, Install and inventory windows server apps
0install	Zero Install is a decentralized cross-platform software-installation system.

```
PS C:\foo> Install-PackageProvider -Name Chocolatey -Verbose
VERBOSE: Using the provider 'Bootstrap' for searching packages.
VERBOSE: Finding the package 'Bootstrap::FindPackage' 'Chocolatey'.
VERBOSE: Using the provider 'PowerShellGet' for searching packages.
VERBOSE: The -Repository parameter was not specified. PowerShellGet will use all of the registered providers.
VERBOSE: Getting the provider object for the PackageManagement Provider 'NuGet'.
VERBOSE: The specified Location is 'https://www.powershellgallery.com/api/v2/' and PackageManagement provider is 'NuGet'.
VERBOSE: Searching repository 'https://www.powershellgallery.com/api/v2/FindPackagesById()?id='Chocolatey'' for 'Chocolatey'.
VERBOSE: Total package yield: '0' for the specified package 'Chocolatey'.
VERBOSE: Performing the operation 'Install Package' on target 'Package 'chocolatey' version '2.8.5.130' from 'https://oneget.org/ChocolateyPrototype-2.8.5.130.package.swidtag'.
```



```
PS C:\foo> Get-PackageProvider | Select-Object -Property Name,Version

Name Version
---- -
Chocolatey 2.8.5.130
msi 3.0.0.0
msu 3.0.0.0
NuGet 2.8.5.208
PowerShellGet 1.1.2.0
Programs 3.0.0.0
```

```
PS C:\foo> $AvailableChocolateyPackages = Find-Package -ProviderName Chocolatey
#How many software packages are available?
$AvailableChocolateyPackages | Measure-Object

Count : 4504
Average :
Sum :
Maximum :
Minimum :
Property :
```

```
PS C:\foo> $AvailableChocolateyPackages | Sort-Object Name,Version | Select-Object Name, Version, Summary | Out-GridView
```

Name	Version	Summary
sysinternals	2016.11.18	Sysinternals - utilities to help you manage, troubleshoot and diagnose your Windows systems and applications.

```
30 Install-Package -ProviderName Chocolatey -Name sysinternals

Downloading 'https://live.sysinternals.com/files/SysinternalsSuite.zip'.
Completed..

Unpacking Archive 'sysinternalsinstall.zip'.
Unpacked PORTMON.CNT.
```

```
PS C:\foo> Get-ChildItem -Path $env:ChocolateyPath\lib\sysinternals.2016.11.18\tools -Filter *.exe | Select-Object -Property Name
Name

accesschk.exe
accesschk64.exe
A...
```

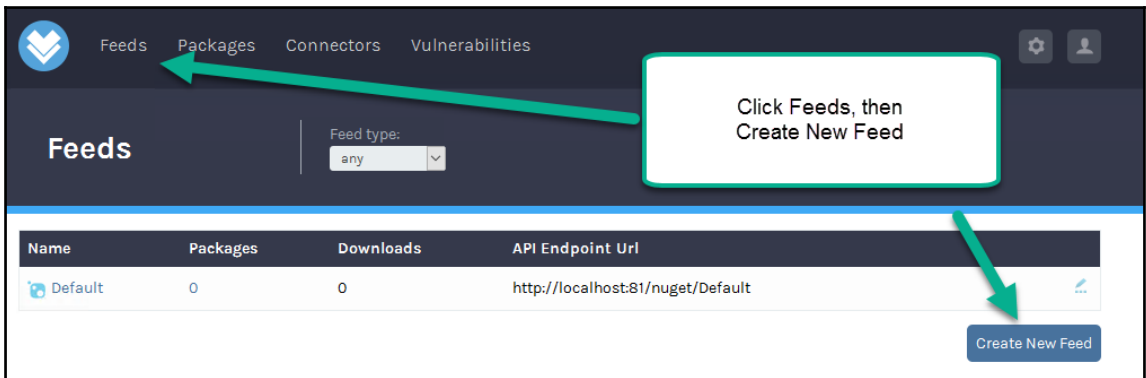
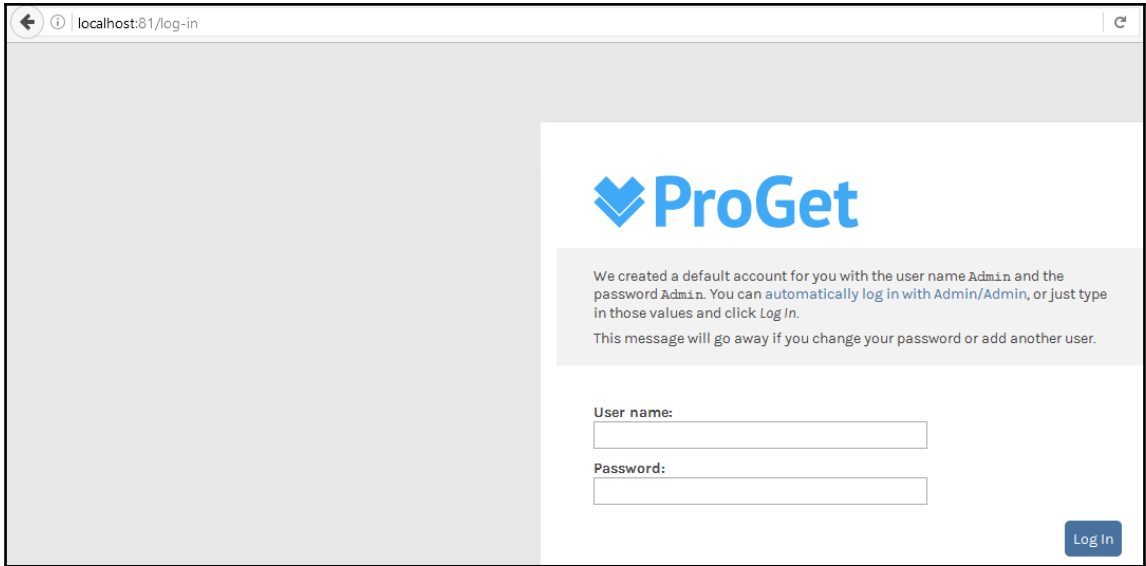
```
PS C:\foo> $PSInfoCommand = "C:\Chocolatey\lib\sysinternals.2016.11.18\tools\PsiInfo.exe"
Invoke-Expression -Command $PSInfoCommand

PsiInfo v1.78 - Local and remote system information viewer
Copyright (C) 2001-2016 Mark Russinovich
Sysinternals - www.sysinternals.com

Querying information for SVR2016...

System information for \\SVR2016:
Uptime: 0 days 6 hours 20 minutes 12 seconds
Kernel version: Windows Server 2016 Datacenter, Multiprocessor Free
Product type: Standard Edition
Product version: 6.3
Service pack: 0
Kernel build number: 14393
Registered organization:
Registered owner: Windows User
IE version: 9.0000
System root: C:\Windows
Processors: 1
Processor speed: 2.4 GHz
Processor type: Intel(R) Core(TM) i7-4710HQ CPU @
Physical memory: 4 MB
Video driver: Microsoft Hyper-V Video
```

```
PS C:\foo> Get-Package -ProviderName Chocolatey | Install-Package -Verbose
VERBOSE: Skipping installed package sysinternals 2016.11.18.
```



## Create Feed



### Universal

Package repository for packages containing arbitrary files.

### NuGet

Package repository for .NET, C++/CoApp, etc.

### PowerShell

PowerShell commands or Desired State Configuration (DSC) resources.

### Chocolatey

Machine-level software packages and installers for Windows.

### Maven

An m2-formatted repository for Java artifacts and .jar files.

### npm

A private registry for NodeJS/JavaScript packages.

### Bower

A private registry for Bower/JavaScript packages.

### Docker


A private registry for Docker repositories.

### Ruby Gems

A private Gem server.

Close

**Create PowerShell Feed** ✕

 Please keep it **URL friendly** - the feed's name is used in the API endpoint URL, and no one likes having to escape whitespace and other characters.

Feed name:

[Create New PowerShell Feed](#) [Close](#)



Feeds Packages Connectors Vulnerabilities

Administration > Feeds >

## Manage MyPowerShellPackages Feed

**Properties**

Name	MyPowerShellPackages	rename
Description	no description	change
Type	PowerShell	change
Caching	Enabled (connector packages will be cached when they are first requested)	clear   configure
Replication	Disabled	configure   history
Disk Path	C:\ProgramData\ProGet\Packages\nugetv2\F2	change
Package Store	default	change
Drop Path	not set	change
NuGet API Key	not set	change

**Feed Connectors** [add connector](#)

Connector URL	Filter
This feed has no connectors.	

**Vulnerability Sources** [add source](#)

Source	Known Vulnerabilities
This feed has no vulnerability sources configured.	

**License Filters** [edit](#)

Allow any license

**Retention Rules** [create](#)

This feed has no retention rules defined.

[Deactivate Feed](#) [Delete Feed](#)

```
PS C:\foo> Find-Package -Source MyPowerShellPackages
Name Version Source
----- -
Carbon 2.4.0 MyPowerShellPackages
Pester 3.4.0 MyPowerShellPackages
Summary

Carbon is a PowerShell module for automating the configur...
Pester provides a framework for running BDD style Tests t...
```

## Chapter 2: Implementing Nano Server

```
PS C:\foo> $Server2016ISOPath = 'D:\iso\winServer2016.iso'
$MountResult = Mount-DiskImage -ImagePath $Server2016ISOPath -PassThru
$MountResult | Select-Object -Property *
```

Attached	: False
BlockSize	: 0
DevicePath	:
FileSize	: 5653628928
ImagePath	: D:\iso\winServer2016.iso
LogicalSectorSize	: 2048
Number	:
Size	: 5653628928
StorageType	: 1
PSComputerName	:
CimClass	: ROOT/Microsoft/windows/Storage:MSFT_DiskImage
CimInstanceProperties	: {Attached, BlockSize, DevicePath, FileSize...}
CimSystemProperties	: Microsoft.Management.Infrastructure.CimSystemProperties

```
PS C:\foo> $Server2016InstallationRoot = ($MountResult |
 Get-Volume |
 Select-object -ExpandProperty Driveletter) + ':'
$Server2016InstallationRoot
E:
```

```
PS C:\foo> $NanoServerFolder = Join-Path -Path $Server2016InstallationRoot -ChildPath 'NanoServer'
$NsigFolder = Join-Path -Path $NanoServerFolder -ChildPath 'NanoServerImageGenerator'
$NsigFolder
E:\NanoServer\NanoServerImageGenerator

PS C:\foo> Get-ChildItem -Path $NsigFolder -Recurse

Directory: E:\NanoServer\NanoServerImageGenerator

Mode LastWriteTime Length Name
---- -
d-r--- 2016-09-12 8:19 AM en-US
--r--- 2016-09-12 8:19 AM 163433 Convert-WindowsImage.ps1
--r--- 2016-09-12 8:19 AM 478 NanoServerImageGenerator.psd1
--r--- 2016-09-12 8:19 AM 101216 NanoServerImageGenerator.psm1

Directory: E:\NanoServer\NanoServerImageGenerator\en-US

Mode LastWriteTime Length Name
---- -
--r--- 2016-09-12 8:19 AM 13302 nanoserverimagegenerator.strings.psd1
```

```
PS C:\foo> Import-Module -Name $NsigFolder
Get-Command -Module NanoServerImageGenerator
```

CommandType	Name	Version	Source
Function	Edit-NanoServerImage	1.0.0.0	NanoServerImageGenerator
Function	Get-NanoServerPackage	1.0.0.0	NanoServerImageGenerator
Function	New-NanoServerImage	1.0.0.0	NanoServerImageGenerator

```
PS C:\> $NanoBaseFolder = 'C:\NanoBase'
PS C:\> $VMFolder = 'D:\VMs'
PS C:\> $NanoComputerName = 'NANO1'
PS C:\> $NanoVMFolder = Join-Path -Path $VMFolder -ChildPath $NanoComputerName
PS C:\> $NanoVMPATH = Join-Path -Path $NanoVMFolder -ChildPath "${0}.vhd" -f $NanoComputerName
```

```
PS C:\> New-NanoServerImage -DeploymentType Guest -Edition Datacenter
-MediaPath $Server2016InstallationRoot -BasePath $NanoBaseFolder
-TargetPath $NanoVMPATH -ComputerName $NanoComputerName
```

Converting image....

Processing.

Operation.

Running.

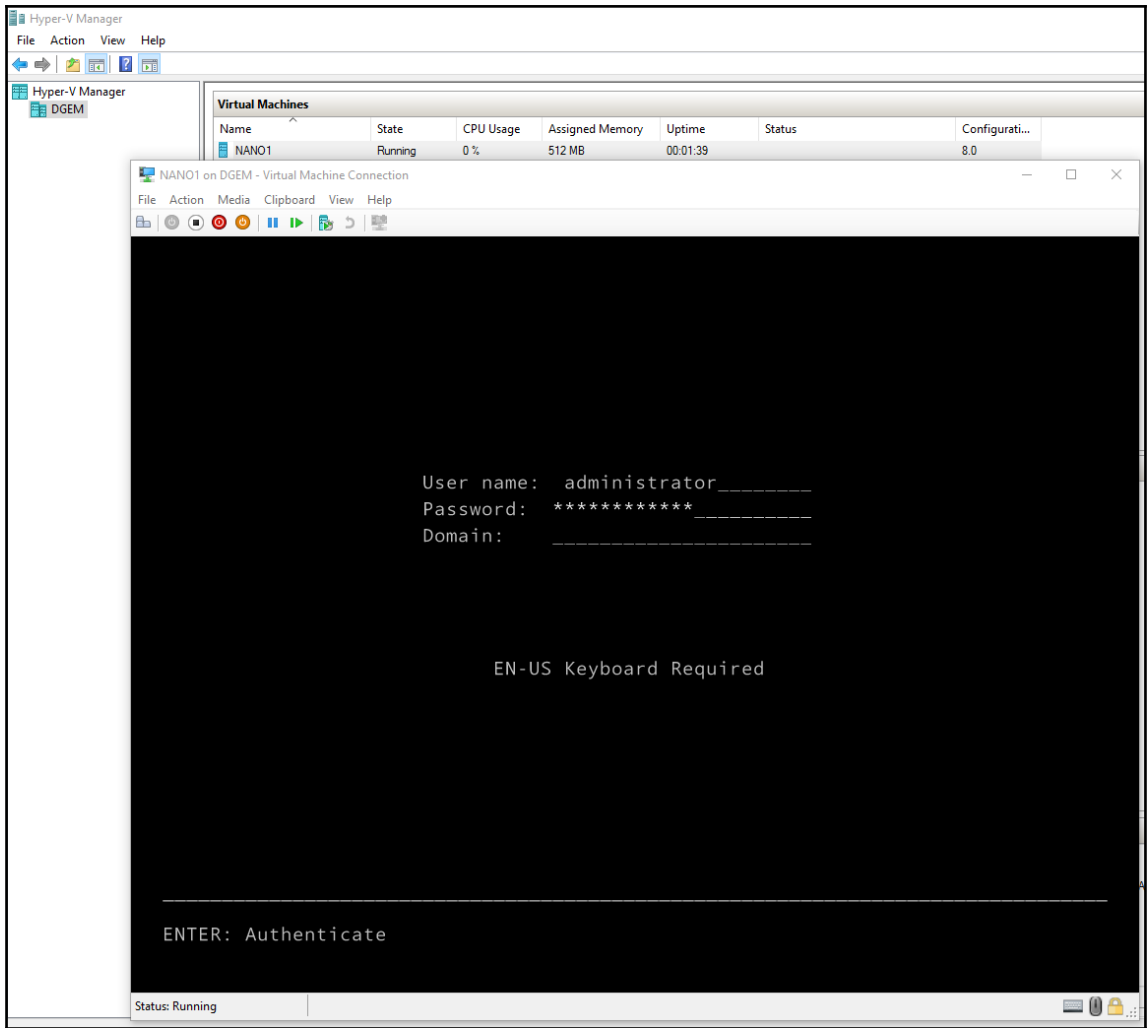
```
PS C:\foo> $SwitchName = Get-VMSwitch | Select-Object -ExpandProperty Name -First 1
```

```
PS C:\foo> New-VM -VHDPATH $NanoVMPATH -Name $NanoComputerName -Path $NanoVMFolder
-SwitchName $SwitchName -Generation 2 -Verbose
VERBOSE: New-VM will create a new virtual machine "NANO1".
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
NANO1	off	0	0	00:00:00	operating normally	8.0

```
PS C:\foo> Start-VM -Name $NanoComputerName -Verbose
VERBOSE: start-VM will start the virtual machine "NANO1".
```

```
PS C:\foo>
```



Nano Server Recovery Console

```
=====
Computer Name: NAN01
User Name: .\administrator
Workgroup: WORKGROUP
OS: Microsoft Windows Server 2016 Datacenter
Local date: Monday, January 16, 2017
Local time: 12:34 PM
=====
```

```
> Networking
 Inbound Firewall Rules
 Outbound Firewall Rules
 WinRM
```

---

```
Up/Dn: Scroll | ESC: Log out | F5: Refresh | Ctl+F6: Restart
Ctl+F12: Shutdown | ENTER: Select
```

Network Settings

=====  
Select an adapter to configure.  
-----

> Ethernet (00-15-5D-02-6C-05)

---

Up/Dn: Highlight | ENTER: Select | ESC: Back

IP Configuration

```
=====
Ethernet
Microsoft Hyper-V Network Adapter
00-15-5D-02-6C-05

```

```
DHCP [Disabled]
IP Address _____
Subnet Mask _____
Default Gateway _____
```

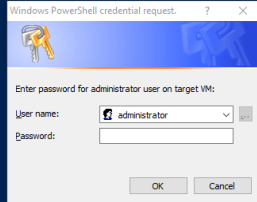
ESC: Cancel | ENTER: Save | F4: Toggle

```
PS C:\foo> Get-VM -Name N*
```

<u>Name</u>	<u>State</u>	<u>CPUUsage(%)</u>	<u>MemoryAssigned(M)</u>	<u>Uptime</u>	<u>Status</u>	<u>Version</u>
NAN01	Running	0	512	1.06:49:21.5540000	Operating normally	8.0

```
PS C:\foo>
```

```
PS C:\foo> $Credential = Get-Credential -Message "Enter password for administrator user on target VM:" -UserName administrator
```



A Windows PowerShell credential request dialog box. The title bar reads "Windows PowerShell credential request." The main text says "Enter password for administrator user on target VM:". There is a "User name:" label with a dropdown menu showing "administrator" and a "Password:" label with an empty text box. At the bottom are "OK" and "Cancel" buttons.

```
PS C:\foo> Invoke-Command -VMName $NanoComputerName -Credential $Credential -ScriptBlock { Get-Process }
```

Handles	NPM(K)	PM(K)	WS(K)	CPU(s)	Id	SI	ProcessName	PSComputerName
0	6	748	1828	0.03	292	0	csrss	NANO1
0	5	892	3512	0.02	284	0	EMT	NANO1
0	0	0	4		0	0	Idle	NANO1
0	19	3792	10460	0.16	348	0	lsass	NANO1
0	42	27980	52264	2.47	2016	0	powershell	NANO1
0	8	1640	4704	0.08	332	0	services	NANO1
0	2	316	1036	0.02	208	0	smss	NANO1
0	8	1628	5040	0.09	440	0	svchost	NANO1
0	14	1720	5620	0.05	472	0	svchost	NANO1
0	14	9212	12944	0.38	556	0	svchost	NANO1
0	7	1404	5448	0.02	584	0	svchost	NANO1
0	9	1572	5456	0.03	600	0	svchost	NANO1
0	19	12508	22068	4.70	648	0	svchost	NANO1
0	14	2212	7060	0.08	712	0	svchost	NANO1
0	28	5708	12496	0.19	748	0	svchost	NANO1
0	28	4012	8968	0.02	836	0	svchost	NANO1
0	16	5060	12844	0.13	992	0	svchost	NANO1
0	0	80	68	0.92	4	0	System	NANO1
0	7	724	3264	0.02	316	0	wininit	NANO1
0	6	1296	5984	0.03	1600	0	WMIADAP	NANO1
0	8	5764	11376	1.50	1640	0	WmiPrvSE	NANO1

```
PS C:\foo> Enter-PSSession -VMName $NanoComputerName -Credential $Credential
[NANO1]: PS C:\Users\administrator\Documents>
```

```
[NANO1]: PS C:\Users\administrator\Documents> New-Item -ItemType Directory -Path c:\foo
-ErrorAction SilentlyContinue
Set-Location c:\foo
```

```
[NANO1]: PS C:\foo>
```



```
[NANO1]: PS C:\> Get-ComputerInfo -Property CsName, WindowsEditionId, OSVersionLevel, OSType, OSVersion, WindowsBuildLabEx, BiosBIOSVersion
```

```
CsName : NANO1
WindowsEditionId : ServerDatacenterNano
OSVersionLevel : NanoServer
OSType : WINNT
OSVersion : 10.0.14393
WindowsBuildLabEx : 14393.693.amd64fre.rs1_release.161220-1747
BiosBIOSVersion : {VIRTUAL - 1, Hyper-V UEFI Release v1.0, EDK II - 10000}
```

```
[NANO1]: PS C:\Users\administrator\Documents> $PSVersionTable
```

Name	Value
WSManStackVersion	3.0
PSRemotingProtocolVersion	2.3
SerializationVersion	1.1.0.1
PSEdition	Core
PSVersion	5.1.14368.1000
BuildVersion	10.0.14368.1000
PSCompatibleVersions	{1.0, 2.0, 3.0, 4.0...}
CLRVersion	

```
[NANO1]: PS C:\Users\administrator\Documents> Get-NetIPAddress -AddressFamily IPV4 -InterfaceAlias Ethernet |
Select-Object -ExpandProperty IPAddress
169.254.232.208
```

```
[NANO1]: PS C:\foo> New-NetIPAddress -InterfaceAlias 'Ethernet' -IPAddress 10.10.10.151 -
-PrefixLength 24 -DefaultGateway 10.10.10.254
```

```
IPAddress : 10.10.10.151
InterfaceIndex : 3
InterfaceAlias : Ethernet
AddressFamily : IPV4
Type : Unicast
PrefixLength : 24
PrefixOrigin : Manual
SuffixOrigin : Manual
AddressState : Tentative
ValidLifetime : Infinite ([TimeSpan]::MaxValue)
PreferredLifetime : Infinite ([TimeSpan]::MaxValue)
SkipAsSource : False
PolicyStore : ActiveStore
```

```
[NANO1]: PS C:\foo> Set-DnsClientServerAddress -InterfaceAlias 'Ethernet' -ServerAddresses 10.10.10.10, 10.10.10.11
Get-DnsClientServerAddress
```

InterfaceAlias	Interface Index	Address Family	ServerAddresses
Ethernet	3	IPv4	{10.10.10.10, 10.10.10.11}
Ethernet	3	IPv6	{}
Loopback Pseudo-Interface 1	1	IPv4	{}
Loopback Pseudo-Interface 1	1	IPv6	{}

```
[NANO1]: PS C:\foo> Exit-PSSession
```

```
PS C:\foo>
```

```
[NANO1]: PS C:\foo> $NanoServerIP = '10.10.10.151'
Set-Item WSMAN:\localhost\Client\TrustedHosts $NanoServerIP -Force
Get-Item WSMAN:\localhost\Client\TrustedHosts
```

```
WSManConfig: Microsoft.WSMan.Management\WSMan::localhost\Client
```

Type	Name	SourceOfValue	Value
System.String	TrustedHosts		10.10.10.151

```
PS C:\foo> Test-WSMan $NanoServerIP
```

```
wsmid : http://schemas.dmtf.org/wbem/wsman/identity/1/wsmanidentity.xsd
ProtocolVersion : http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd
ProductVendor : Microsoft Corporation
ProductVersion : OS: 0.0.0 SP: 0.0 Stack: 3.0
```

```
PS C:\foo> Enter-PSSession -ComputerName $NanoServerIP -Credential $Credential
```

```
[10.10.10.151]: PS C:\Users\administrator\Documents>
```

```
[10.10.10.151]: PS C:\> Get-ComputerInfo -Property CsName, WindowsEditionId, OSServerLevel,
OSType, OSVersion, WindowsBuildLabEx, BiosBIOSVersion
```

```
CsName : NANO1
WindowsEditionId : ServerDatacenterNano
OsServerLevel : NanoServer
OsType : WINNT
OsVersion : 10.0.14393
WindowsBuildLabEx : 14393.693.amd64fre.rs1_release.161220-1747
BiosBIOSVersion : {VRTUAL - 1, Hyper-V UEFI Release v1.0, EDK II - 10000}
```

```
[10.10.10.151]: PS C:\foo> Exit-PSSession
```

```
PS C:\foo>
```

```
PS C:\foo> $CimSession = New-CimSession -Credential $Credential -ComputerName $NanoServerIP
$CimSession
```

```
Id : 1
Name : CimSession1
InstanceId : c8a93c75-c063-4d49-ba07-7b682b7b11a4
ComputerName : 10.10.10.151
Protocol : WSMAN
```

```
PS C:\foo>
```

```
PS C:\foo> Get-CimInstance -CimSession $CimSession -ClassName Win32_ComputerSystem | Format-List *
```

```
PSShowComputerName : True
AdminPasswordStatus : 3
BootupState :
ChassisBootupState : 3
KeyboardPasswordStatus : 3
```

```
PSComputerName : 192.168.2.151
CimClass : root/cimv2:Win32_ComputerSystem
CimInstanceProperties : {Caption, Description, InstallDate, Name...}
CimSystemProperties : Microsoft.Management.Infrastructure.CimSystemProperties
```

```
PS C:\foo> Get-CimClass -CimSession $CimSession | Measure-Object
```

```
Count : 838
Average :
Sum :
Maximum :
Minimum :
Property :
```

```
PS C:\foo> Get-CimInstance -CimSession $CimSession -Query "SELECT * from CIM_Process"
```

ProcessId	Name	HandleCount	WorkingSetSize	VirtualSize	PSComputerName
0	System Idle Process	0	4096	65536	10.10.10.151
4	System	323	57344	1974272	10.10.10.151
212	smss.exe	46	688128	2199029833728	10.10.10.151
296	csrss.exe	110	1970176	2199035736064	10.10.10.151
320	wininit.exe	76	3928064	2199042248704	10.10.10.151
336	services.exe	179	5058560	2199041740800	10.10.10.151
352	lsass.exe	728	10661888	2199064793088	10.10.10.151
436	svchost.exe	192	6164480	2199056437248	10.10.10.151
468	svchost.exe	269	6688768	2199057764352	10.10.10.151
572	svchost.exe	127	5861376	2199052247040	10.10.10.151
588	svchost.exe	319	8515584	2199073071104	10.10.10.151
604	svchost.exe	135	3604480	2199054733312	10.10.10.151
648	svchost.exe	482	21643264	2199139741696	10.10.10.151
684	svchost.exe	287	6873088	2199066492928	10.10.10.151
720	svchost.exe	710	22839296	2199128432640	10.10.10.151
796	svchost.exe	291	8560640	2199066771456	10.10.10.151
960	svchost.exe	311	12668928	2199105224704	10.10.10.151
268	EMT.exe	66	3862528	2199043854336	10.10.10.151
1208	WmiPrvSE.exe	159	8671232	2199059148800	10.10.10.151
1256	WmiPrvSE.exe	202	11505664	2199062700032	10.10.10.151
1664	WmiApSrv.exe	134	6787072	2199051653120	10.10.10.151

```
PS C:\foo> Get-CimSession | Remove-CimSession
```

```
PS C:\foo> Get-PackageProvider
```

Name	Version	DynamicOptions
msi	3.0.0.0	AdditionalArguments
msu	3.0.0.0	
NuGet	2.8.5.208	Destination, ExcludeVersion, Scope, SkipDependencies, Headers, Filter...
PowershellGet	1.0.0.1	PackageManagementProvider, Type, Scope, AllowClobber, SkipPublisherCh...
Programs	3.0.0.0	IncludewindowsInstaller, IncludeSystemComponent

```

PS C:\foo> Find-PackageProvider | Select-Object Name, Summary | Format-Table -AutoSize -wrap
Name Summary

nuget NuGet provider for the OneGet meta-package manager
ps1 ps1 provider for the OneGet meta-package manager
chocolatey ChocolateyPrototype provider for the OneGet meta-package manager
PowerShellGet PowerShell module with commands for discovering, installing, updating and publishing the
 PowerShell artifacts like Modules, DSC Resources, Role Capabilities and Scripts.
ContainerImage This is a PackageManagement provider module which helps in discovering, downloading and
 installing Windows Container OS images.

 For more details and examples refer to our project site at
 https://github.com/PowerShell/ContainerProvider.
DockerMsftProvider PowerShell module with commands for discovering, installing, and updating Docker images.
NanoServerPackage A PackageManagement provider to Discover, Save and Install Nano Server Packages on-demand
GitHubProvider GitHub-as-a-Package - PackageManagement PowerShell Provider to interop with Github
GistProvider Gist-as-a-Package - PackageManagement PowerShell Provider to interop with Github Gists
ChocolateyGet An PowerShell oneGet provider that discovers packages from https://www.chocolatey.org.
TSDPProvider PowerShell PackageManager provider to search & install TypeScript definition files from the
 community DefinitelyTyped repo
MyAlbum MyAlbum provider discovers the photos in your remote file repository and installs them to your
 local folder.
OfficeProvider OfficeProvider allows users to install Microsoft Office365 ProPlus from Powershell.
WSAProvider Provider to Discover, Install and inventory windows server apps
GitLabProvider GitLab PackageManagement provider
0install Zero Install is a decentralized cross-platform software-installation system.

PS C:\foo> Install-PackageProvider -Name NanoServerPackage -Verbose
VERBOSE: Using the provider 'Bootstrap' for searching packages.
VERBOSE: Finding the package 'Bootstrap::FindPackage' 'NanoServerPackage','',''.
VERBOSE: Using the provider 'PowerShellGet' for searching packages.
VERBOSE: The -Repository parameter was not specified. PowerShellGet will use all of the registered repositories.
VERBOSE: Getting the provider object for the PackageManagement Provider 'NuGet'.
VERBOSE: The specified Location is 'https://www.powershellgallery.com/api/v2/' and PackageManagementProvider is 'NuGet'.
VERBOSE: Searching repository 'https://www.powershellgallery.com/api/v2/FindPackagesById()?id='NanoServerPackage'' for ''.
VERBOSE: Total package yield:'1' for the specified package 'NanoServerPackage'.
VERBOSE: Skipping installed package NanoServerPackage 1.0.1.0.

```

```

PS C:\foo> Get-Command -Module NanoServerPackage

CommandType Name Version Source

Function Find-NanoServerPackage 1.0.1.0 NanoServerPackage
Function Install-NanoServerPackage 1.0.1.0 NanoServerPackage
Function Save-NanoServerPackage 1.0.1.0 NanoServerPackage

```

```

PS C:\foo> $NanoPackages = Find-NanoServerPackage | Select-Object -Property Name, Description
$NanoPackages | Format-Table -AutoSize -wrap

```

Name	Description
Microsoft-NanoServer-IPHelper-Service-Package	Provides tunnel connectivity using IPv6 transition technologies (6to4, ISATAP, Port Proxy, and Teredo), and IP-HTTPS.
Microsoft-NanoServer-SCVMM-Compute-Package	Includes services for monitoring a Hyper-V host using System Center Virtual Machine Manager (SCVMM).
Microsoft-NanoServer-ShieldedVM-Package	Includes Host Guardian Service and other features necessary to provision shielded VMs on a Hyper-V server.
Microsoft-NanoServer-Compute-Package	Includes Hyper-V and NetQoS which provide a virtualization host platform and network services for creating and managing virtual machines and their resources.
Microsoft-NanoServer-SecureStartup-Package	Includes support for BitLocker, Trusted Platform Module, Secure Boot, and other services for supporting hardware-based security features.
Microsoft-NanoServer-OEM-Drivers-Package	Includes basic drivers for a variety of network adapters and storage controllers. This is the same set of drivers included in a server Core installation of Windows Server.
Microsoft-NanoServer-Storage-Package	Includes services and tools for creating and managing file system and storage resources.
Microsoft-NanoServer-Defender-Package	Includes Windows Defender which provides real-time protection against viruses, spyware, and other malicious software. Also includes a default signature file containing virus and spyware definitions.
Microsoft-NanoServer-DSC-Package	Includes PowerShell Desired State Configuration which provides a set of PowerShell language extensions, cmdlets, and resources for declaratively configuring software services and applications.
Microsoft-NanoServer-DNS-Package	Includes Domain Name System (DNS) Server which provides name resolution for TCP/IP networks.
Microsoft-NanoServer-IIS-Package	Includes Internet Information Services (IIS) which provides a reliable, manageable, and scalable web application infrastructure.
Microsoft-NanoServer-DCB-Package	Includes Data Center Bridging (DCB) which is a suite of IEEE standards that are used to enhance Ethernet local area networks by providing hardware-based bandwidth guarantees and transport reliability.
Microsoft-NanoServer-FailoverCluster-Package	Includes Failover Clustering which allows multiple servers to work together to provide high availability of server roles.
Microsoft-NanoServer-SoftwareInventoryLogging-Package	Includes services and tools for logging Microsoft asset management data and forwarding this data periodically to a collection server for aggregation.
Microsoft-NanoServer-Host-Package	Includes drivers and services for running on a physical machine.
Microsoft-NanoServer-SNMP-Agent-Package	Simple Network Management Protocol (SNMP) is a popular protocol for network management. It is used for collecting information from, and configuring, network devices, such as servers, printers, hubs, switches, and routers on an Internet Protocol (IP) network.
Microsoft-NanoServer-SCVMM-Package	Includes services for monitoring a physical or virtual machine using System Center Virtual Machine Manager (SCVMM).
Microsoft-NanoServer-Guest-Package	Includes drivers and integration services for running as a guest virtual machine in Hyper-V.
Microsoft-NanoServer-Containers-Package	Includes services and tools to create and manage Windows Server Containers and their resources.

```

PS C:\> $InstallPackages = @('Microsoft-NanoServer-Storage-Package',
 'Microsoft-NanoServer-IIS-Package',
 'Microsoft-NanoServer-DSC-Package')

$InstallPackages
Microsoft-NanoServer-Storage-Package
Microsoft-NanoServer-IIS-Package
Microsoft-NanoServer-DSC-Package

```

```
PS C:\foo> $Server2016InstallationRoot = 'E:\'
```

```
PS C:\foo> $NanoServerFolder = Join-Path -Path $Server2016InstallationRoot -ChildPath 'NanoServer'
$NsigFolder = Join-Path -Path $NanoServerFolder -ChildPath 'NanoServerImageGenerator'
$NsigFolder
E:\NanoServer\NanoServerImageGenerator
```

```
PS C:\foo> Import-Module -Name $NsigFolder
Get-Command -Module NanoServerImageGenerator
```

CommandType	Name	Version	Source
Function	Edit-NanoServerImage	1.0.0.0	NanoServerImageGenerator
Function	Get-NanoServerPackage	1.0.0.0	NanoServerImageGenerator
Function	New-NanoServerImage	1.0.0.0	NanoServerImageGenerator

```
PS C:\foo> $DomainJoinBlobPath = 'C:\foo\NANO2.djoin'
```

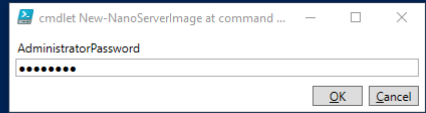
```
PS C:\foo> $IPV4Address = '10.10.10.152'
$IPV4DNS = '10.10.10.10','10.10.10.11'
$IPV4Gateway = '10.10.10.254'
$IPV4SubnetMask = '255.255.255.0'
```

```
PS C:\foo> $NanoServerImageParameters = @{
 DeploymentType = 'Guest'
 Edition = 'DataCenter'
 TargetPath = $NanoVMPath
 BasePath = $NanoBaseFolder
 DomainBlobPath = $DomainJoinBlobPath
 Ipv4Address = $IPV4Address
 Ipv4Dns = $IPV4DNS
 Ipv4Gateway = $IPV4Gateway
 IPV4SubnetMask = $IPV4SubnetMask
 InterfaceNameOrIndex = 'Ethernet'
 Package = $InstallPackages
}
$NanoServerImageParameters

Name Value

TargetPath D:\VMS\NANO2\NANO2.vhdx
DeploymentType Guest
Ipv4Dns {10.10.10.10, 10.10.10.11}
IPV4SubnetMask 255.255.255.0
InterfaceNameOrIndex Ethernet
Edition DataCenter
BasePath C:\NanoBase
Ipv4Address 10.10.10.152
Ipv4Gateway 10.10.10.254
DomainBlobPath C:\foo\NANO2.djoin
Package {Microsoft-NanoServer-Storage-Package, Microsoft-NanoServer-IIS-Package, Microso...
```

```
PS C:\foo> New-NanoServerImage @NanoServerImageParameters
cmdlet New-NanoServerImage at command pipeline position 1
Supply values for the following parameters:
```

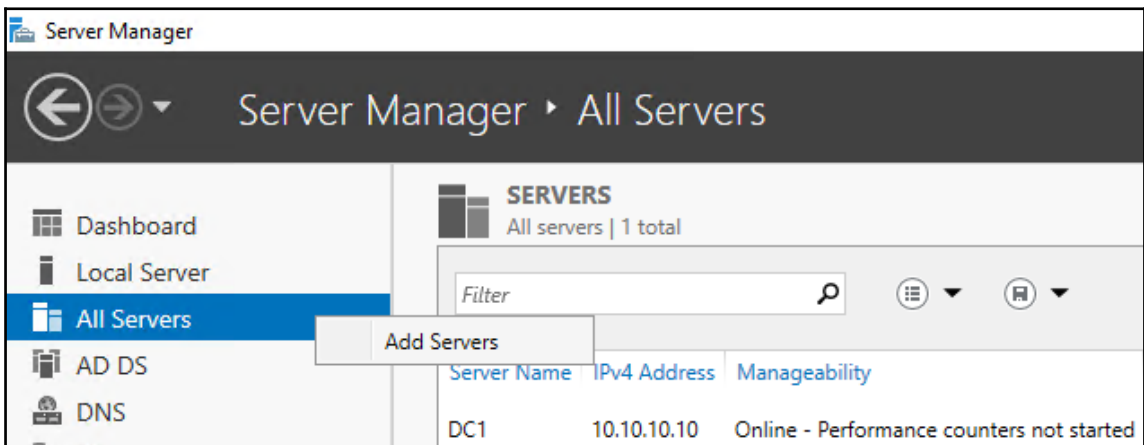


A small dialog box titled "cmdlet New-NanoServerImage at command ..." with a close button. It contains a label "AdministratorPassword" and a text input field with masked characters "\*\*\*\*\*". There are "OK" and "Cancel" buttons at the bottom right.

```
PS C:\foo> Get-VMSwitch | select-Object -ExpandProperty Name
Public-wifi
Internal
```

```
PS C:\foo> $SwitchName = 'Internal'
```

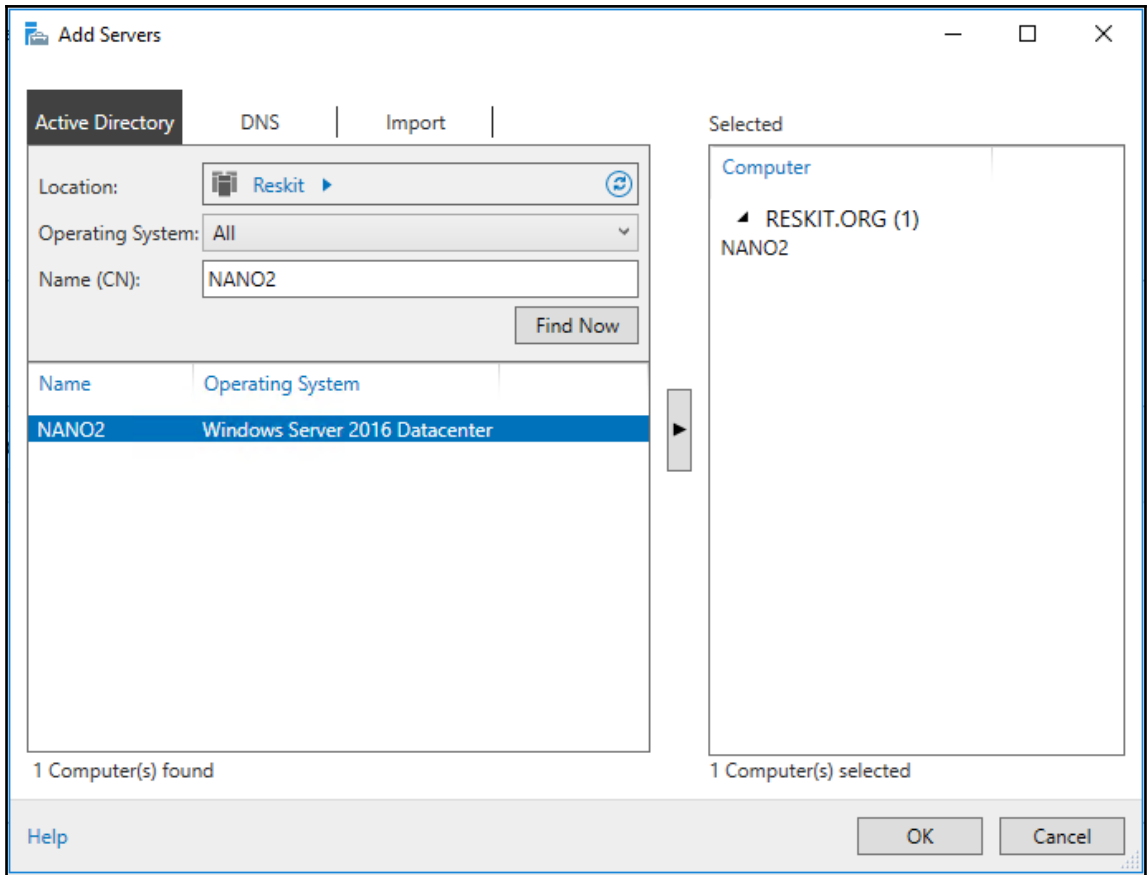
```
PS C:\foo> New-VM -VHDPATH $NanoVMPATH -Name $NanoComputerName -Path $NanoVMFolder
-SwitchName $SwitchName -Generation 2 -Verbose |
Start-VM
VERBOSE: New-VM will create a new virtual machine "NANO2".
```



The screenshot shows the Server Manager console. The left-hand navigation pane has "All Servers" selected. The main area displays a table of servers. An "Add Servers" button is overlaid on the table. The table has columns for "Server Name", "IPv4 Address", and "Manageability".

Server Name	IPv4 Address	Manageability
DC1	10.10.10.10	Online - Performance counters not started





Server Manager

Server Manager ▶ File and Storage Services ▶ Servers

**Servers**

- Servers
- Volumes
- Disks
- Storage Pools
- Shares
- iSCSI
- Work Folders

**SERVERS**  
All servers | 2 total

Filter

Server Name	IPv4 Address	Manageability	Last Update
DC1	10.10.10.10	Online - Performance counters not started	12/02/2017 00:00:07
NANO2	10.10.10.152	Online	12/02/2017 00:02:45

# Chapter 3: Managing Windows Updates

```
PS C:\> Install-WindowsFeature -Name 'UpdateServices' -IncludeManagementTools -Verbose
VERBOSE: Installation started...
VERBOSE: Continue with installation?
VERBOSE: Prerequisite processing started...
VERBOSE: Prerequisite processing succeeded.

Success Restart Needed Exit Code Feature Result

True No Success {ASP.NET 4.6, HTTP Activation, Remote Serv...
WARNING: Additional configuration may be required. Review the article Managing WSUS Using PowerShell at TechNet Library (http://go.microsoft.com/fwlink/?LinkId=235499) for more information on the recommended steps to perform WSUS installation using PowerShell.
VERBOSE: Installation succeeded.
```

```
PS C:\> Get-WindowsFeature | Where-Object -FilterScript {$PSItem.Installed}

Display Name Name Install State

[X] File and Storage Services FileAndStorage-Services Installed
[X] File and iSCSI Services File-Services Installed
[X] File Server FS-FileServer Installed
[X] Storage Services Storage-Services Installed
[X] Web Server (IIS) Web-Server Installed
[X] Web Server Web-WebServer Installed
[X] Common HTTP Features Web-Common-Http Installed
[X] Default Document Web-Default-Doc Installed
[X] Static Content Web-Static-Content Installed
[X] Performance Web-Performance Installed
[X] Dynamic Content Compression Web-Dyn-Compression Installed
[X] Security Web-Security Installed
[X] Request Filtering Web-Filtering Installed
[X] Windows Authentication Web-Windows-Auth Installed
[X] Application Development Web-App-Dev Installed
[X] .NET Extensibility 4.6 Web-Net-Ext45 Installed
[X] ASP.NET 4.6 Web-Asp-Net45 Installed
[X] ISAPI Extensions Web-ISAPI-Ext Installed
[X] ISAPI Filters Web-ISAPI-Filter Installed
[X] Management Tools Web-Mgmt-Tools Installed
[X] IIS Management Console Web-Mgmt-Console Installed
[X] IIS 6 Management Compatibility Web-Mgmt-Compat Installed
[X] IIS 6 Metabase Compatibility Web-Metabase Installed
[X] IIS 6 Management Console Web-Lgcy-Mgmt-Console Installed
```

```
PS C:\> $WSUSContentDir = 'C:\WSUS'
PS C:\> New-Item -Path 'C:\WSUS' -ItemType Directory

Directory: C:\

Mode LastWriteTime Length Name
---- -
d----- 28/02/2017 17:31 WSUS

PS C:\> & "$env:ProgramFiles\Update Services\Tools\WsusUtil.exe" WsusUtil.exe postinstall CONTENT_DIR=$WSUSContentDir
Log File is located at C:\Users\Administrator\AppData\Local\Temp\2\tmp1AF6.tmp
Post install is starting
Post install has successfully completed
```

```

Get-Content C:\Users\Administrator\AppData\Local\Temp\2\tmp1AFB.tmp
2017-02-28 17:33:56 Postinstall started
2017-02-28 17:33:56 Detected role services: Api, UI, WidDatabase, Services
2017-02-28 17:33:56 Start: LoadSettingsFromParameters
2017-02-28 17:33:56 Content local is: True
2017-02-28 17:33:56 Content directory is: C:\WSUS
2017-02-28 17:33:56 SQL instname is:
2017-02-28 17:33:56 End: LoadSettingsFromParameters
2017-02-28 17:33:56 Start: Run
2017-02-28 17:33:56 Fetching WsusAdministratorsSid from registry store
2017-02-28 17:33:56 Value is S-1-5-21-564364657-173954772-155622663-1000
2017-02-28 17:33:56 Fetching WsusReportersSid from registry store
2017-02-28 17:33:56 Value is S-1-5-21-564364657-173954772-155622663-1001
2017-02-28 17:33:56 Configuring content directory...
2017-02-28 17:33:56 Configuring groups...
2017-02-28 17:33:56 Starting group configuration for WSUS Administrators...
2017-02-28 17:33:56 Found group in registry, attempting to use it...
2017-02-28 17:33:56 Writing group to registry...
2017-02-28 17:33:56 Finished group creation
2017-02-28 17:33:56 Starting group configuration for WSUS Reporters...
2017-02-28 17:33:56 Found group in registry, attempting to use it...
2017-02-28 17:33:56 Writing group to registry...
2017-02-28 17:33:56 Finished group creation
2017-02-28 17:33:56 Configuring permissions...
2017-02-28 17:33:56 Fetching content directory...
2017-02-28 17:33:56 Fetching ContentDir from registry store
2017-02-28 17:33:56 Value is C:\WSUS
2017-02-28 17:33:56 Fetching group SIDs...

```

```
PS C:\> Get-Website
```

Name	ID	State	Physical Path	Bindings
----	--	----	-----	-----
Default Web Site	1	Started	%SystemDrive%\inetpub\wwwroot	http *:80:
WSUS	6668	Started	C:\Program Files\Update	http :8530:
Administration	363		Services\WebServices\Root\	https :8531: sslFlags=0

```
PS C:\> Get-Command -Module UpdateServices
```

CommandType	Name	Version	Source
Cmdlet	Add-WsusComputer	2.0.0.0	UpdateServices
Cmdlet	Add-WsusDynamicCategory	2.0.0.0	UpdateServices
Cmdlet	Approve-WsusUpdate	2.0.0.0	UpdateServices
Cmdlet	Deny-WsusUpdate	2.0.0.0	UpdateServices
Cmdlet	Get-WsusClassification	2.0.0.0	UpdateServices
Cmdlet	Get-WsusComputer	2.0.0.0	UpdateServices
Cmdlet	Get-WsusDynamicCategory	2.0.0.0	UpdateServices
Cmdlet	Get-WsusProduct	2.0.0.0	UpdateServices
Cmdlet	Get-WsusServer	2.0.0.0	UpdateServices
Cmdlet	Get-WsusUpdate	2.0.0.0	UpdateServices
Cmdlet	Invoke-WsusServerCleanup	2.0.0.0	UpdateServices
Cmdlet	Remove-WsusDynamicCategory	2.0.0.0	UpdateServices
Cmdlet	Set-WsusClassification	2.0.0.0	UpdateServices
Cmdlet	Set-WsusDynamicCategory	2.0.0.0	UpdateServices
Cmdlet	Set-WsusProduct	2.0.0.0	UpdateServices
Cmdlet	Set-WsusServerSynchronization	2.0.0.0	UpdateServices

```
PS C:\> $WSUSServer = Get-WsusServer
$WSUSServer | Select *
```

```
WebServiceUrl : http://WSUS1:8530/ApiRemoting30/WebService.asmx
BypassApiRemoting : False
IsServerLocal : True
Name : WSUS1
Version : 10.0.14393.0
IsConnectionSecureForApiRemoting : True
PortNumber : 8530
PreferredCulture : en
ServerName : WSUS1
UseSecureConnection : False
ServerProtocolVersion : 1.20
```

```
PS C:\> $WSUSServer | Get-Member -MemberType Method
```

TypeName: Microsoft.UpdateServices.Internal.BaseApi.UpdateServer

Name	MemberType	Definition
AddDynamicCategories	Method	void AddDynamicCategories(System.Collections.Generic.IEnumer...
AddDynamicCategory	Method	void AddDynamicCategory(Microsoft.UpdateServices.Administrati...
CancelAllDownloads	Method	void CancelAllDownloads(), void IUpdateServer.CancelAllDownlo...
CreateComputerTargetGroup	Method	Microsoft.UpdateServices.Administration.IComputerTargetGroup ...
CreateDynamicCategory	Method	Microsoft.UpdateServices.Administration.IDynamicCategory Crea...
CreateInstallApprovalRule	Method	Microsoft.UpdateServices.Administration.IAutomaticUpdateAppro...
CreateObjRef	Method	System.Runtime.Remoting.ObjRef CreateObjRef(type requestedType)
DeleteDynamicCategory	Method	void DeleteDynamicCategory(string name, Microsoft.UpdateServi...
DeleteInstallApprovalRule	Method	void DeleteInstallApprovalRule(int ruleId), void IUpdateServe...
DeleteUpdate	Method	void DeleteUpdate(guid updateId), void IUpdateServer.DeleteUp...
Equals	Method	bool Equals(System.Object obj)
ExpirePackage	Method	void ExpirePackage(Microsoft.UpdateServices.Administration.Up...
ExportPackageMetadata	Method	void ExportPackageMetadata(Microsoft.UpdateServices.Administr...
ExportUpdates	Method	void ExportUpdates(string packagePath, string logPath)

```

PS C:\> $WSUSProducts = Get-WsusProduct
$WSUSProducts

Title ID

Exchange 2000 Server 83a83e29-7d55-44a0-afed-aea164bc35e6
Exchange Server 2003 3cf32f7c-d8ee-43f8-a0da-8b88a6f8af1a
Exchange 352f9494-d516-4b40-a21a-cd2416098982
Local Publisher 7c40e8c2-01ae-47f5-9af2-6e75a0582518
Locally published packages 5cc25303-143f-40f3-a2ff-803a1db69955
Microsoft Corporation 56309036-4c77-4dd9-951a-99ee9c246a94
Office 2003 1403f223-a63f-f572-82ba-c92391218055
Office XP 6248b8b1-ffeb-dbd9-887a-2acf53b09dfe
Office 477b856e-65c4-4473-b621-a8b230bb70d9
SQL Server 7145181b-9556-4b11-b659-0162fa9df11f
SQL 0a4c6c73-8887-4d7f-9cbe-d08fa8fa9d1e
Windows 2000 family 3b4b8621-726e-43a6-b43b-37d07ec7019f
Windows Server 2003 family dbf57a08-0d5a-46ff-b30c-7715eb9498e9
Windows Server 2003, Datacenter Edition 7f44c2a7-bc36-470b-be3b-c01b6dc5dd4e
Windows XP 64-Bit Edition Version 2003 a4bedb1d-a809-4f63-9b49-3fe31967b6d0
Windows XP family 558f4bc3-4827-49e1-accf-ea79fd72d4c9
Windows 6964aab4-c5b5-43bd-a17d-ffb4346a8e1d

```

```

PS C:\> $WSUSSubscription.StartSynchronizationForCategoryOnly()

Do {
 Write-Output $WSUSSubscription.GetSynchronizationProgress()
 Start-Sleep -Seconds 5
}
While ($WSUSSubscription.GetSynchronizationStatus() -ne 'NotProcessing')
$WSUSSubscription.GetLastSynchronizationInfo() | Select-Object -Property
TotalItems ProcessedItems Phase

3139 0 Categories
3139 5 Categories
3139 3139 NotProcessing

```

```
PS C:\> $WSUSSubscription.GetLastSynchronizationInfo()

Id : 9d673e1d-1a48-4d99-9033-6df613089a87
StartTime : 28/02/2017 19:58:25
EndTime : 28/02/2017 20:08:15
StartedManually : True
Result : Succeeded
Error : NotApplicable
ErrorText :
UpdateErrors : {}
```

```
PS C:\> Get-WsusProduct -TitleIncludes 'Server 2016'
Get-WsusProduct -TitleIncludes 'Windows 10'

Title ID

Exchange Server 2016 49c3ddde-4df2-4534-980c-83f4e27b23b5
Microsoft SQL Server 2016 93f0b0bc-9c20-4ca5-b630-06eb4706a447
Windows Server 2016 569e8e8f-c6cd-42c8-92a3-efbb20a0f6f5
Windows 10 and later drivers 05eebf61-148b-43cf-80da-1c99ab0b8699
Windows 10 and later upgrade & servicing 34f268b4-7e2d-40e1-8966-8bb6ea3dad27
Windows 10 Anniversary Update and Later bab879a4-c1af-4b52-9617-0f9ae1286fb6
Windows 10 Anniversary Update and Later 0ba562e6-a6ba-490d-bdce-93a770ba8d21
Windows 10 Anniversary Update Server and 3c54bb6c-66d1-4a79-884c-8a0c96fa20d1
Windows 10 Dynamic Update e4b04398-adbd-4b69-93b9-477322331cd3
Windows 10 Feature On Demand e104dd76-2895-41c4-9eb5-c483a61e9427
Windows 10 GDR-DU LP 6111a83d-7a6b-4a2c-a7c2-f222eebcabf4
Windows 10 GDR-DU abc45868-0c9c-4bc0-a36d-03d54113baf4
Windows 10 Language Interface Packs 7d247b99-caa2-45e4-9c8f-6d60d0aae35c
Windows 10 Language Packs fc7c9913-7a1e-4b30-b602-3c62ffff9b1a
Windows 10 LTSB d2085b71-5f1f-43a9-880d-ed159016d5c6
Windows 10 a3c2375d-0c8a-42f9-bce0-28333e198407
```

```
PS C:\>$ChosenProducts = @('Windows Server 2016'
, 'Microsoft SQL server 2016'
, 'windows 10')
```

```
PS C:\> Get-WsusProduct |
Where-Object {$PSItem.Product.Title -in $ChosenProducts} |
Set-WsusProduct
```

```
PS C:\> Get-WsusClassification
```

Title	ID
-----	--
Applications	5c9376ab-8ce6-464a-b136-22113dd69801
Critical Updates	e6cf1350-c01b-414d-a61f-263d14d133b4
Definition Updates	e0789628-ce08-4437-be74-2495b842f43b
Driver Sets	77835c8d-62a7-41f5-82ad-f28d1af1e3b1
Drivers	ebfc1fc5-71a4-4f7b-9aca-3b9a503104a0
Feature Packs	b54e7d24-7add-428f-8b75-90a396fa584f
Security Updates	0fa1201d-4330-4fa8-8ae9-b877473b6441
Service Packs	68c5b0a3-d1a6-4553-ae49-01d3a7827828
Tools	b4832bd8-e735-4761-8daf-37f882276dab
Update Rollups	28bc880e-0592-4cbf-8f95-c79b17911d5f
Updates	cd5ffd1e-e932-4e3a-bf74-18bf0b1bbd83
Upgrades	3689bdc8-b205-4af4-8d4a-a63924c5e9d5

```
PS C:\> $ChosenClassifications = @('Critical Updates'
 , 'Definition Updates'
 , 'Security Updates'
 , 'Service Packs'
 , 'Update Rollups'
 , 'Updates')
$ChosenClassifications
Critical Updates
Definition Updates
Security Updates
Service Packs
Update Rollups
Updates
```

```
PS C:\> Get-WsusClassification |
 where-object {$PSItem.Classification.Title -in $ChosenClassifications} |
 Set-WsusClassification
```



```
PS C:\>
$WSUSServer = Get-WsusServer
$WSUSSubscription = $WSUSServer.GetSubscription()
$WSUSSubscription.StartSynchronization()
```

```
PS C:\> $WSUSServer = Get-WsusServer
$WSUSSubscription = $WSUSServer.GetSubscription()
$WSUSSubscription.StartSynchronization()
$IntervalSeconds = 1
#wait for synchronizing to start
Do {
 Write-Output $WSUSSubscription.GetSynchronizationProgress()
 Start-Sleep -Seconds $IntervalSeconds
}
while ($WSUSSubscription.GetSynchronizationStatus() -eq 'NotProcessing')
#wait for all phases of process to end
Do {
 Write-Output $WSUSSubscription.GetSynchronizationProgress()
 Start-Sleep -Seconds $IntervalSeconds
}
Until ($WSUSSubscription.GetSynchronizationStatus() -eq 'NotProcessing')
#when complete, check result of synchronization
Start-Sleep $IntervalSeconds
$WSUSSubscription.GetLastSynchronizationInfo()
```

TotalItems	ProcessedItems	Phase
-----	-----	-----
0	0	NotProcessing
0	0	Categories
0	0	Categories
16	0	Updates
16	2	Updates
16	2	Updates

```
PS C:\> $WSUSSubscription.SynchronizeAutomatically = $true
$WSUSSubscription.NumberOfSynchronizationsPerDay = 1
$WSUSSubscription.Save()
```

```
PS C:\> $WSUSServer = Get-WsusServer
$WSUSServerURL = "http{2}://{0}:{1}" -f `
 $WSUSServer.Name,
 $WSUSServer.PortNumber,
 ('','s')[$WSUSServer.UseSecureConnection]
$WSUSServerURL
http://wsus1:8530
```

```
PS C:\> $PolicyName = "WSUS Client"
New-GPO -Name $PolicyName
New-GPLink -Name $PolicyName -Target "DC=RESKIT,DC=Org"
```

```
PS C:\>
$key = 'HKLM\Software\Policies\Microsoft\Windows\WindowsUpdate\AU'
Set-GPRegistryValue -Name $PolicyName `
 -Key $key `
 -ValueName 'UseWUServer' `
 -Type DWORD -Value 1
$key = 'HKLM\Software\Policies\Microsoft\Windows\WindowsUpdate\AU'
Set-GPRegistryValue -Name $PolicyName `
 -Key $key `
 -ValueName 'AUOptions' `
 -Type DWORD `
 -Value 2
$key = 'HKLM\Software\Policies\Microsoft\Windows\WindowsUpdate'
Set-GPRegistryValue -Name $PolicyName `
 -Key $key `
 -ValueName 'WUServer' `
 -Type String `
 -Value $WSUSServerURL
$key = 'HKLM\Software\Policies\Microsoft\Windows\WindowsUpdate'
Set-GPRegistryValue -Name $PolicyName `
 -Key $key `
 -ValueName 'WUStatusServer' `
 -Type String -Value $WSUSServerURL
```

```
PS C:\Users\Administrator> Gpupdate /force
wuauclt /detectnow
Updating policy...
```

```
PS C:\> $WSUSServer = Get-WsusServer
$WSUSServer.CreateComputerTargetGroup("Domain Controllers")

UpdateServer Id Name

Microsoft.UpdateServices.Internal.BaseApi.UpdateServer b76f8295-29c3-468c-9eac-311cfb0d2d67 Domain Controllers
PS D:\Google Drive\Book Authoring\Content First Drafts\ch3\result logs>
```

```
PS C:\> Get-WsusComputer -NameIncludes DC1 |
Add-WsusComputer -TargetGroupName "Domain Controllers"
```

```
PS C:\> $DCGroup = $WSUSServer.GetComputerTargetGroups() |
Where-Object Name -eq "Domain Controllers"
```

```
PS C:\> Get-WsusComputer |
Where-Object ComputerTargetGroupIDs -Contains $DCGroup.Id

Computer IP Address Operating System Last Status Report

dc1.reskit.org 10.10.10.10 windows Server 2016 Datacenter 03/03/2017 22:38:47
```

```
PS C:\> $WSUSServer = Get-WsusServer
$ApprovalRule = $WSUSServer.CreateInstallApprovalRule("Critical Updates")
```

```
PS C:\> # Define a deadline:
$RuleDeadline = New-Object
Microsoft.UpdateServices.Administration.AutomaticUpdateApprovalDeadline
$RuleDeadline.DayOffset = 3
$RuleDeadline.MinutesAfterMidnight = 180
$ApprovalRule.Deadline = $RuleDeadline
```

```
PS C:\> $UpdateClassification = $ApprovalRule.GetUpdateClassifications()
$UpdateClassification.Add(($WSUSServer.GetUpdateClassifications() |
Where-Object -Property Title -eq 'Critical Updates'))
$UpdateClassification.Add(($WSUSServer.GetUpdateClassifications() |
Where-Object -Property Title -eq 'Definition Updates'))
$ApprovalRule.SetUpdateClassifications($UpdateClassification)
0
1
```

```
PS C:\> $TargetGroups = New-Object
Microsoft.UpdateServices.Administration.ComputerTargetGroupCollection
$TargetGroups.Add(($WSUSServer.GetComputerTargetGroups() |
Where-Object -Property Name -eq "Domain Controllers"))
$ApprovalRule.SetComputerTargetGroups($TargetGroups)
0
```

```
PS C:\> $ApprovalRule.Enabled = $true
$ApprovalRule.Save()
```

```
PS C:\> $WSUSServer = Get-WsusServer
```

```
#See overall update status
$WSUSServer.GetStatus()
```

UpdateCount	DeclinedUpdateCount	ApprovedUpdateCount	NotApprovedUpdateCount	ComputerTargetCount
10448	82	24	10342	6

```
PS C:\> $WSUSServer.GetComputerTargets()
```

FullDomainName	IPAddress	ClientVersion	LastSyncTime	OSDescription
dc1.reskit.org	10.10.10.10	10.0.14393.594	12/05/2017 01:31:17	Windows Server 2016 Datacenter
dg	10.10.10.254	10.0.14393.594	12/05/2017 04:34:07	Windows Server 2016 Datacenter
sg-cl11.reskit.org	10.10.10.141	10.0.10240.1...	02/04/2017 19:49:01	Windows 10 Pro
wsus1.reskit.org	:::1	10.0.14393.594	12/05/2017 03:52:08	Windows Server 2016 Datacenter
srv1.reskit.org	10.10.10.50	10.0.14393.594	12/05/2017 01:29:02	Windows Server 2016 Datacenter
srv2.reskit.org	10.10.10.51	10.0.14393.0	13/03/2017 01:51:16	Windows Server 2016 Datacenter

```
PS C:\> Get-HotFix -ComputerName DC1
```

```
$CimSession = New-CimSession DC1
Get-SilWindowsUpdate -CimSession ($CimSession) | Format-Table -AutoSize
$CimSession | Remove-CimSession
```

Source	Description	HotFixID	InstalledBy	InstalledOn
DC1	Update	KB3192137	NT AUTHORITY\SYSTEM	12/09/2016
DC1	Update	KB3211320	NT AUTHORITY\SYSTEM	07/03/2017
DC1	Update	KB4013418	NT AUTHORITY\SYSTEM	19/03/2017
DC1	Security Update	KB3213986	NT AUTHORITY\SYSTEM	07/03/2017

ID	InstallDate	PSComputerName
KB3192137	12/09/2016	DC1
KB3211320	07/03/2017	DC1
KB4013418	19/03/2017	DC1
KB3213986	07/03/2017	DC1

```

PS C:\> $SecurityUpdates = $WSUSServer.SearchUpdates("Windows Server 2016") |
Where-Object -Property UpdateClassificationTitle -EQ "Security Updates" |
Sort-Object -Property CreationDate -Descending

$SecurityUpdates | Get-Member

TypeName: Microsoft.UpdateServices.Internal.BaseApi.Update

Name MemberType Definition

AcceptLicenseAgreement Method void AcceptLicenseAgreement(), void IUpdate.AcceptLicenseAgreement()
Approve Method Microsoft.UpdateServices.Administration.IUpdateApproval Approve(Microsoft.UpdateServices.Administr...
ApproveForOptionalInstall Method Microsoft.UpdateServices.Administration.IUpdateApproval ApproveForOptionalInstall(Microsoft.Update...
CancelDownload Method void CancelDownload(), void IUpdate.CancelDownload()
CreateObjRef Method System.Runtime.Remoting.ObjRef CreateObjRef(type requestedType)
Decline Method void Decline(), void Decline(bool failIfReplica), void IUpdate.Decline()
Equals Method bool Equals(System.Object obj)
ExpirePackage Method void ExpirePackage(), void IUpdate.ExpirePackage()
ExportPackageMetadata Method void ExportPackageMetadata(string fileName), void IUpdate.ExportPackageMetadata(string fileName)
GetChangesFromPreviousRevision Method Microsoft.UpdateServices.Administration.RevisionChanges GetChangesFromPreviousRevision(), Microsof...
GetFlashCode() Method string GetFlashCode()

Property

MsrcSeverity Property Microsoft.UpdateServices.Administration.MsrcSeverity {get;set;}
ProductFamilyTitles Property System.Collections.Specialized.StringCollection ProductFamilyTitles {get;}
ProductTitles Property System.Collections.Specialized.StringCollection ProductTitles {get;}
PublicationState Property Microsoft.UpdateServices.Administration.PublicationState PublicationState {get;set;}
ReleaseNotes Property string ReleaseNotes {get;set;}
RequiresLicenseAgreementAcceptance Property bool RequiresLicenseAgreementAcceptance {get;set;}
SecurityBulletins Property System.Collections.Specialized.StringCollection SecurityBulletins {get;}

```

```

PS C:\> $SecurityUpdates | Select CreationDate, Title

CreationDate Title

09/05/2017 18:45:42 Cumulative Update For Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3207296)
09/05/2017 18:45:10 Cumulative Update For Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3195038)
09/05/2017 18:43:48 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 5 (for x64-based Systems) (KB3209498)
09/05/2017 18:43:38 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 5 (for x64-based Systems) (KB3202790)
09/05/2017 18:43:27 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 5 (for x64-based Systems) (KB3194343)
09/05/2017 18:43:25 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 5 (for x64-based Systems) (KB3201860)
09/05/2017 17:00:05 2017-05 Security Update for Adobe Flash Player for Windows Server 2016 for x64-based Systems (KB4020821)
09/05/2017 17:00:03 2017-05 Cumulative Update for Windows Server 2016 for x64-based Systems (KB4019472)
09/05/2017 06:54:45 Cumulative Update For Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3199442)
17/04/2017 18:25:47 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 5 (KB3188128)
17/04/2017 18:25:17 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 4 for x64-based Systems (KB3188128)
17/04/2017 18:24:57 Security Update for Windows Server 2016 Technical Preview 5 (KB3172729)
17/04/2017 18:23:09 Cumulative Update for Windows Server 2016 Technical Preview 3 (KB3097877)
17/04/2017 17:07:23 Cumulative Update for Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3172989)
17/04/2017 17:03:59 Cumulative Update for Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3188966)
17/04/2017 16:57:40 Cumulative Update for Windows Server 2016 for x64-based Systems (KB3193494)
11/04/2017 17:00:05 Security Update for Adobe Flash Player for Windows Server 2016 (for x64-based Systems) (KB4018483)
11/04/2017 17:00:03 Cumulative Update for Windows Server 2016 for x64-based Systems (KB4015217)
03/04/2017 18:27:04 Cumulative Update for Windows Server 2016 for x64-based Systems (KB3176495)
03/04/2017 18:26:21 Cumulative Update for Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3176494)
03/04/2017 17:46:22 Cumulative Update for Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3163016)
14/03/2017 17:00:05 Security Update for Adobe Flash Player for Windows Server 2016 (for x64-based Systems) (KB4014329)
13/12/2016 18:00:01 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 5 (for x64-based Systems) (KB3209498)
13/12/2016 18:00:01 Cumulative Update for Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3207296)
08/11/2016 18:00:00 Security Update for Windows Server 2016 Technical Preview 5 (KB3198389)
13/09/2016 17:00:00 Security Update for Adobe Flash Player for Windows Server 2016 Technical Preview 4 for x64-based Systems (KB3188128)
24/08/2016 17:00:00 Security Update for Windows Server 2016 Technical Preview 5 (KB3172729)
13/07/2016 21:00:00 Cumulative Update for Windows Server 2016 Technical Preview 5 for x64-based Systems (KB3172989)
10/11/2015 18:00:00 Cumulative Update for Windows Server 2016 Technical Preview 3 (KB3097877)

```

```

$SelectedUpdate = $SecurityUpdates |
Where-Object -Property KnowledgebaseArticles -EQ 4019472

```

```

$DCTargetGroup = $WSUSServer.GetComputerTargetGroups() |
Where-Object -Property Name -eq 'Domain Controllers'

```

```

PS C:\> $SelectedUpdate.Approve("Install", $DCTargetGroup)

UpdateTitle GoLiveTime Deadline AdministratorName TargetGroup

2017-05 Cumulativ... 12/05/2017 18:48:34 31/12/9999 23:59:59 RESKIT\Administrator Domain Controllers

```

```
PS C:\> $DeclinedUpdate = $SecurityUpdates |
 Where-Object -Property KnowledgebaseArticles -EQ 4020821
```

```
PS C:\> $DeclinedUpdate.Decline($DCTargetGroup)
```

## Chapter 4: Managing Printers

```
PS C:\Users\administrator> Get-PrinterPort -Name Sales_Colour |
Format-Table -Property Name, Description, PrinterHostAddress, Portnumber
```

```

Name Description PrinterHostAddress Portnumber

Sales_Colour Standard TCP/IP Port 10.10.10.61 9100
```

```
PS C:\Users\administrator> Get-PrinterDriver -Name NEC* |
Format-Table -Property Name, Manufacturer, DriverVersion, PrinterEnvironment
```

```

Name Manufacturer DriverVersion PrinterEnvironment

NEC Color MultiWriter Class Driver NEC 2814750710366208 Windows x64
```

```
PS C:\Users\administrator> Get-Printer -ComputerName Psrv -Name SGCP1 |
Format-Table -Property Name, ComputerName, Type, PortName, Location, Published, Shared
```

```

Name ComputerName Type PortName Location Published Shared

SGCP1 Psrv Local Sales_Colour True True
```

```
PS C:\Users\administrator> $Printer = Get-Printer -Name 'SGCP1'
PS C:\Users\administrator> $Printer | Format-Table Name, Published
```

```

Name Published

SGCP1 False
```

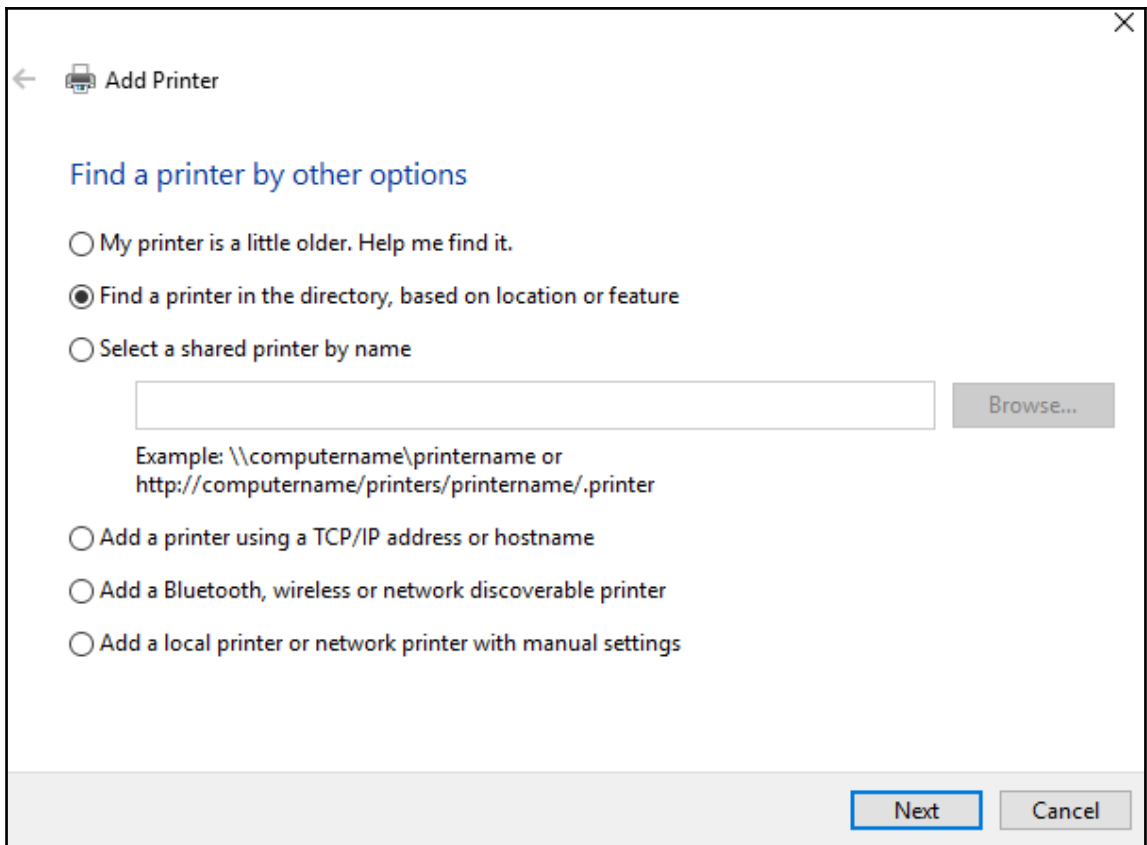
```
PS C:\Users\administrator> $Printer | Set-Printer -Published $true `
-Location '10th floor 10E4'
```

```
PS C:\Users\administrator> Get-Printer -Name 'SGCP1' |
Format-Table Name, Published, Location
```

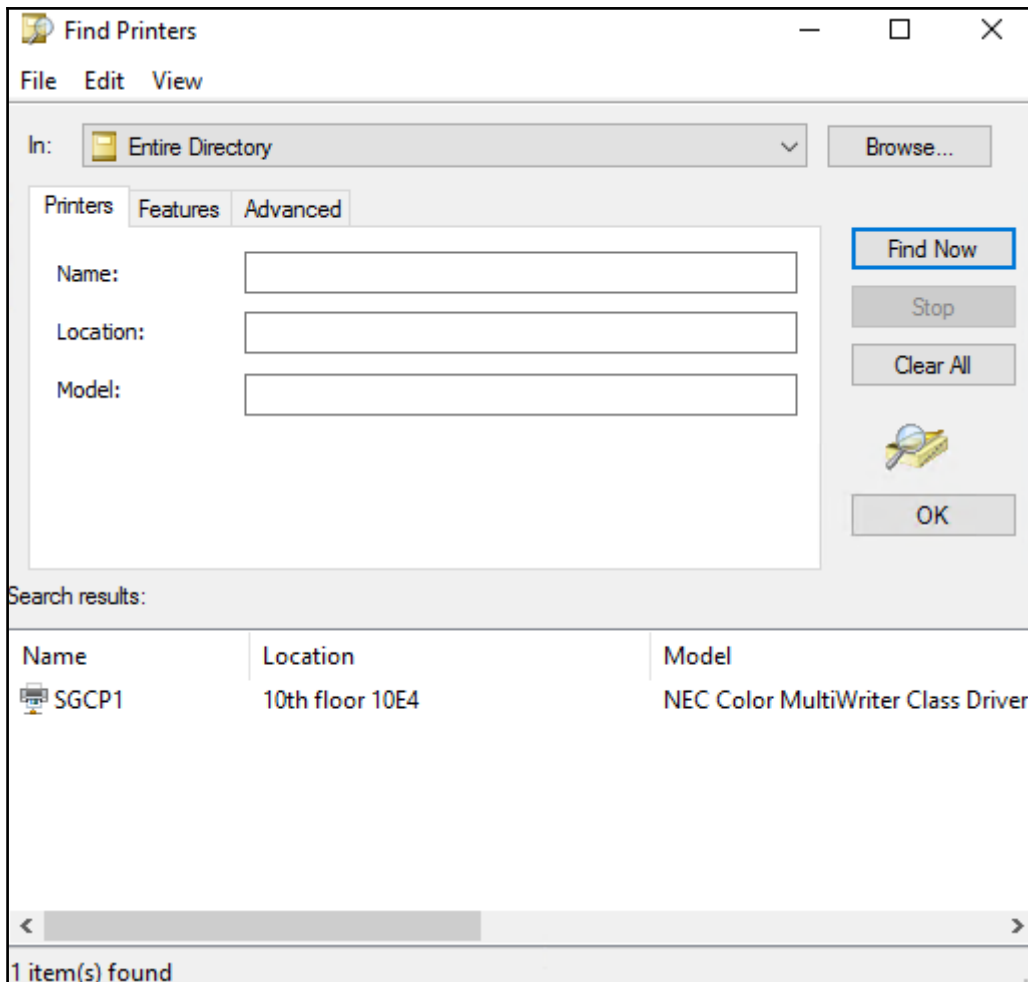
```

Name Published Location

SGCP1 True 10th floor 10E4
```







```
PS C:\Users\administrator> Get-Printer SGCP1
```

```

Name ComputerName Type DriverName PortName Shared Published
---- -
SGCP1 Local Local HP LaserJet 9000 PS C... Sales_Colour True True

```

```
PS C:\Users\administrator> $Printers = Get-CimInstance -ClassName Win32_Printer
```

```
PS C:\Users\administrator> "{0} Printers defined on this system" -f $printers.count
6 Printers defined on this system
```

```
PS C:\Users\administrator> $Printer | Format-Table -AutoSize
Name ShareName SystemName PrinterState PrinterStatus Location

SGCP1 SGCP1 PSRV 0 3 10th floor 10E4
```

The screenshot shows the Windows Print Management console. The left pane shows a tree view with 'Print Servers' expanded to 'PSRV (local)' and 'Printers' selected. The main pane displays details for printer 'SGCP1'.

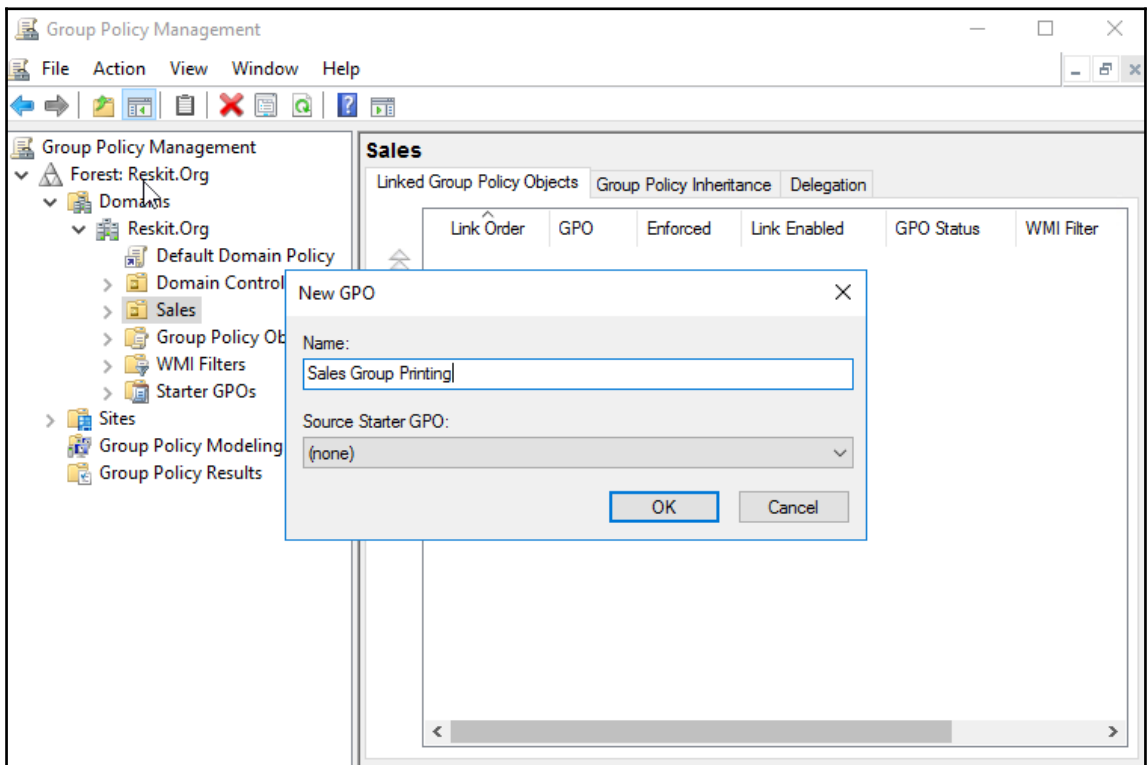
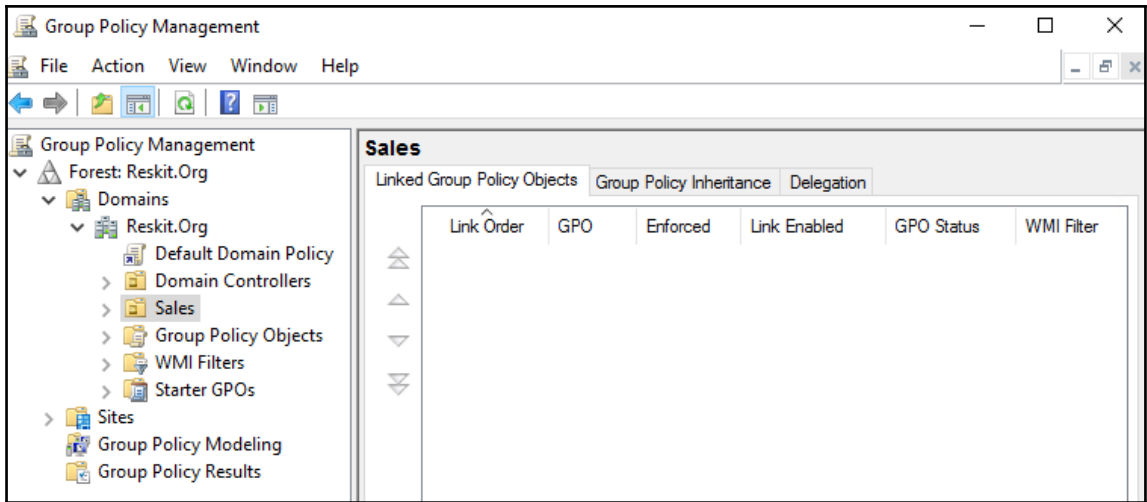
Printer Name	Queue Status	Jobs In ...	Server Name	Driver Name	Actions
SGCP1	Ready	1	PSRV (local)	NEC Color MultiWriter Class Driver	Printers Wi... More ...

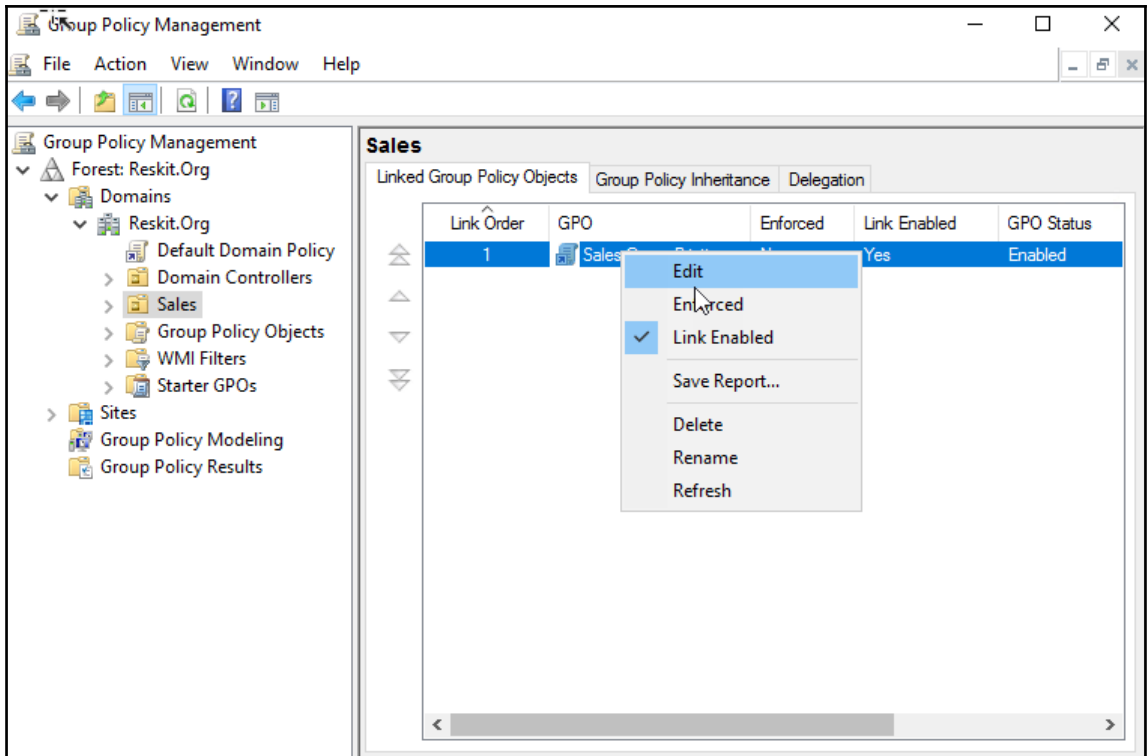
Below the printer details, there is a 'Jobs' section with a 'Printer Web Page' link. A table shows a job in progress:

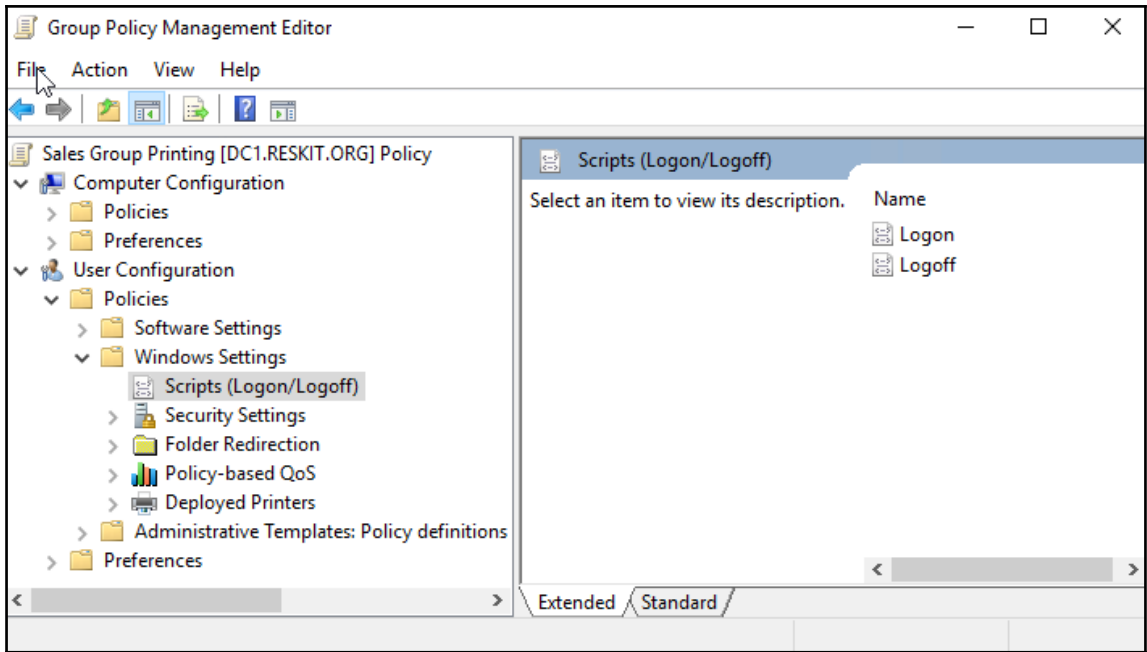
Document Name	Job Status	Owner	Pages	Size	Submitted
Test Page	Printing	Administrator	1	226 KB	21:09:01 10/12/2016

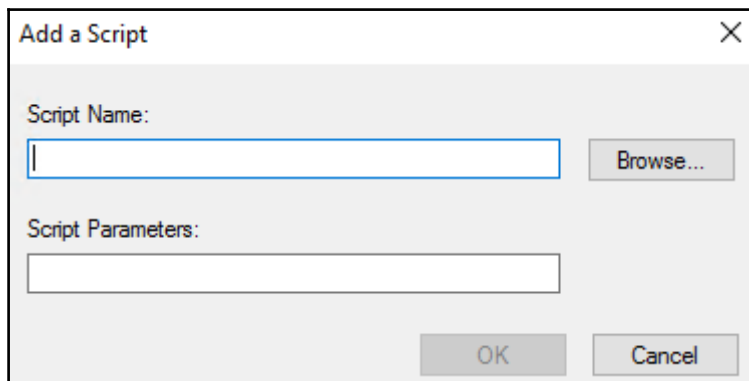
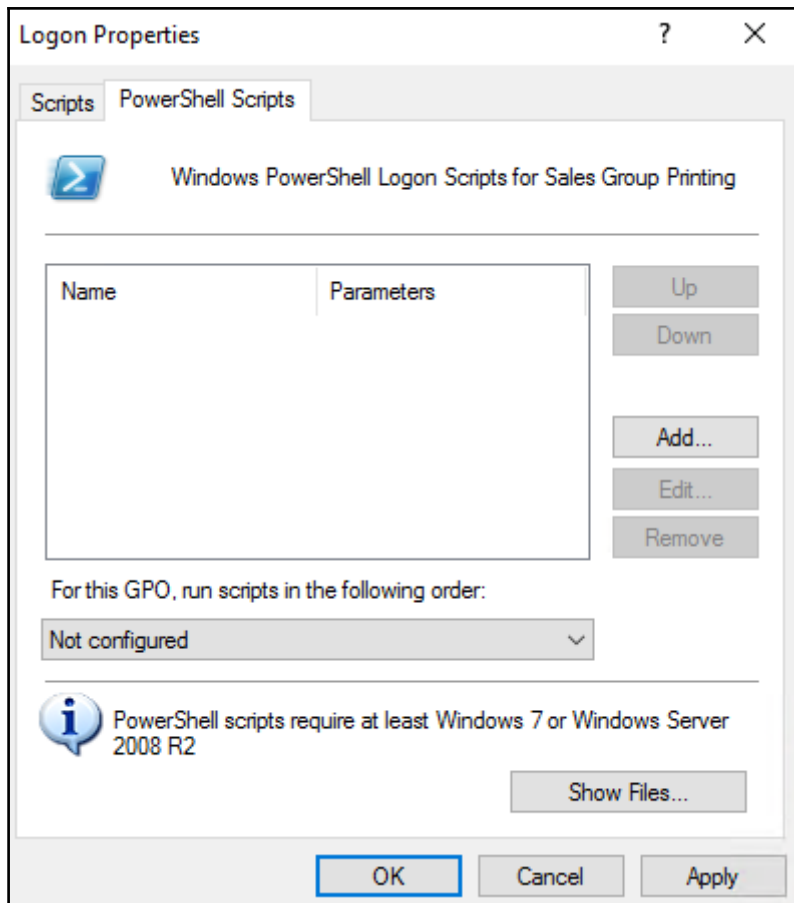
```
ACE Trustee: Administrator
Account: RESKIT\Administrator - Manage Printer: Allowed
ACE Trustee: Administrator
Account: RESKIT\Administrator - Manage Documents: Allowed
ACE Trustee: CREATOR OWNER
Account: \CREATOR OWNER - Manage Child: Allowed
ACE Trustee: ALL APPLICATION PACKAGES
Account: APPLICATION PACKAGE AUTHORITY\ALL APPLICATION PACKAGES - Manage Child: Allowed
ACE Trustee: Everyone
Account: \Everyone - Print: Allowed
ACE Trustee: Everyone
Account: \Everyone - Generic Execute: Allowed
ACE Trustee: ALL APPLICATION PACKAGES
Account: APPLICATION PACKAGE AUTHORITY\ALL APPLICATION PACKAGES - Print: Allowed
ACE Trustee: ALL APPLICATION PACKAGES
Account: APPLICATION PACKAGE AUTHORITY\ALL APPLICATION PACKAGES - Generic Execute: Allowed
ACE Trustee: Administrators
Account: BUILTIN\Administrators - Manage This Printer: Allowed
ACE Trustee: Administrators
Account: BUILTIN\Administrators - Manage Child: Allowed
```

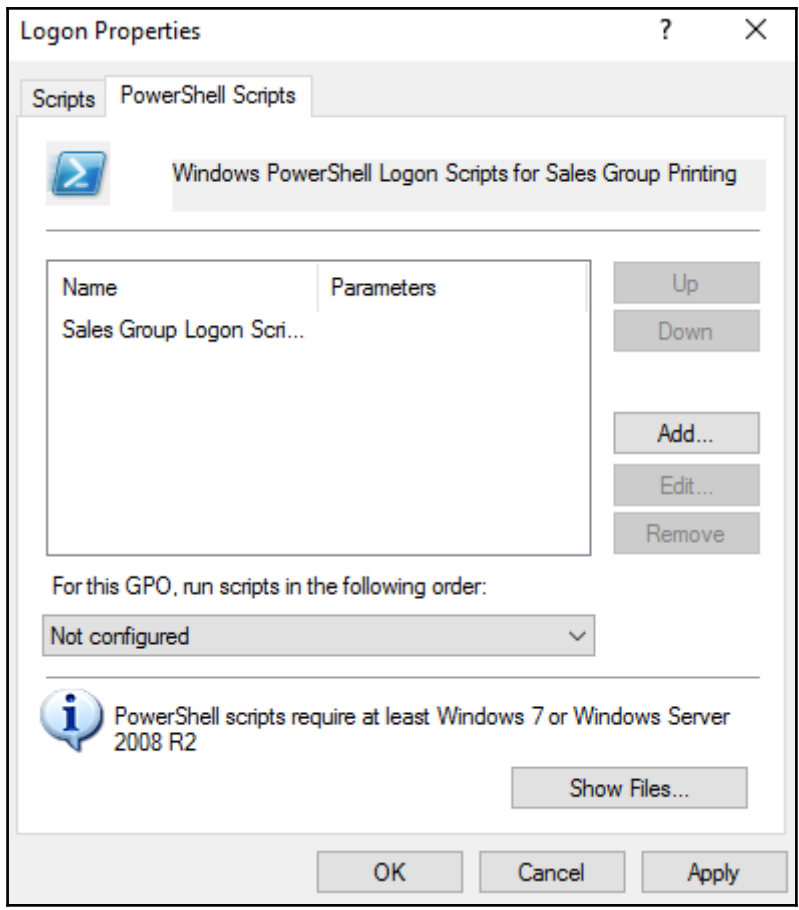
```
Group Name : Accounting Group
Group SID : S-1-5-21-715049209-2702507345-667613206-1118
SDDL : O:BAG:DUD:PAI(A;OICI;FA;;;DA)(A;OICI;0x3D8F8;;;S-1-5-21-715049209-2702507345-667613206-1118)
```











```

PS C:\Users\tf1.RESKIT> cd \transcript
PS C:\transcript> cat .\transcript.txt

Windows PowerShell transcript start
Start time: 20161214141914
Username: RESKIT\tf1
RunAs User: RESKIT\tf1
Machine: SG-CL1 (Microsoft Windows NT 10.0.14393.0)
Host Application: -ExecutionPolicy Bypass -File Sales Group Logon Script.ps1
Process ID: 3688
PSVersion: 5.1.14393.0
PSEdition: Desktop
PSCompatibleVersions: 1.0, 2.0, 3.0, 4.0, 5.0, 5.1.14393.0
BuildVersion: 10.0.14393.0
CLRVersion: 4.0.30319.42000
WSManStackVersion: 3.0
PSRemotingProtocolVersion: 2.3
SerializationVersion: 1.1.0.1

Transcript started, output file is C:\transcript\transcript.txt
*** Logon script - Sales GVroup Logon Script.ps1
*** Date/time: [14/12/2016 14:19:14]
*** SG Printer does not exist
*** Date/time: [14/12/2016 14:19:16]
*** Adding SG Printer

Name ComputerName Type DriverName PortName
---- -
\\psrv\SGCP1 PSRV Connection NEC Color MultiWriter ... Sales_Col...

```

```

PS C:\Users\tf1.RESKIT> cd C:\transcript\
PS C:\transcript> cat .\transcript.txt

Windows PowerShell transcript start
Start time: 20161214142529
Username: RESKIT\tf1
RunAs User: RESKIT\tf1
Machine: SG-CL1 (Microsoft Windows NT 10.0.14393.0)
Host Application: -ExecutionPolicy Bypass -File Sales Group Logon Script.ps1
Process ID: 3604
PSVersion: 5.1.14393.0
PSEdition: Desktop
PSCompatibleVersions: 1.0, 2.0, 3.0, 4.0, 5.0, 5.1.14393.0
BuildVersion: 10.0.14393.0
CLRVersion: 4.0.30319.42000
WSManStackVersion: 3.0
PSRemotingProtocolVersion: 2.3
SerializationVersion: 1.1.0.1

Transcript started, output file is C:\transcript\transcript.txt
*** Logon script - Sales GVroup Logon Script.ps1
*** Date/time: [14/12/2016 14:25:30]
*** Sales group printer found

Name ComputerName Type DriverName PortName
---- -
\\psrv\SGCP1 psrv Connection NEC Color MultiWriter ... Sales_Col...

Windows PowerShell transcript end
End time: 20161214142533

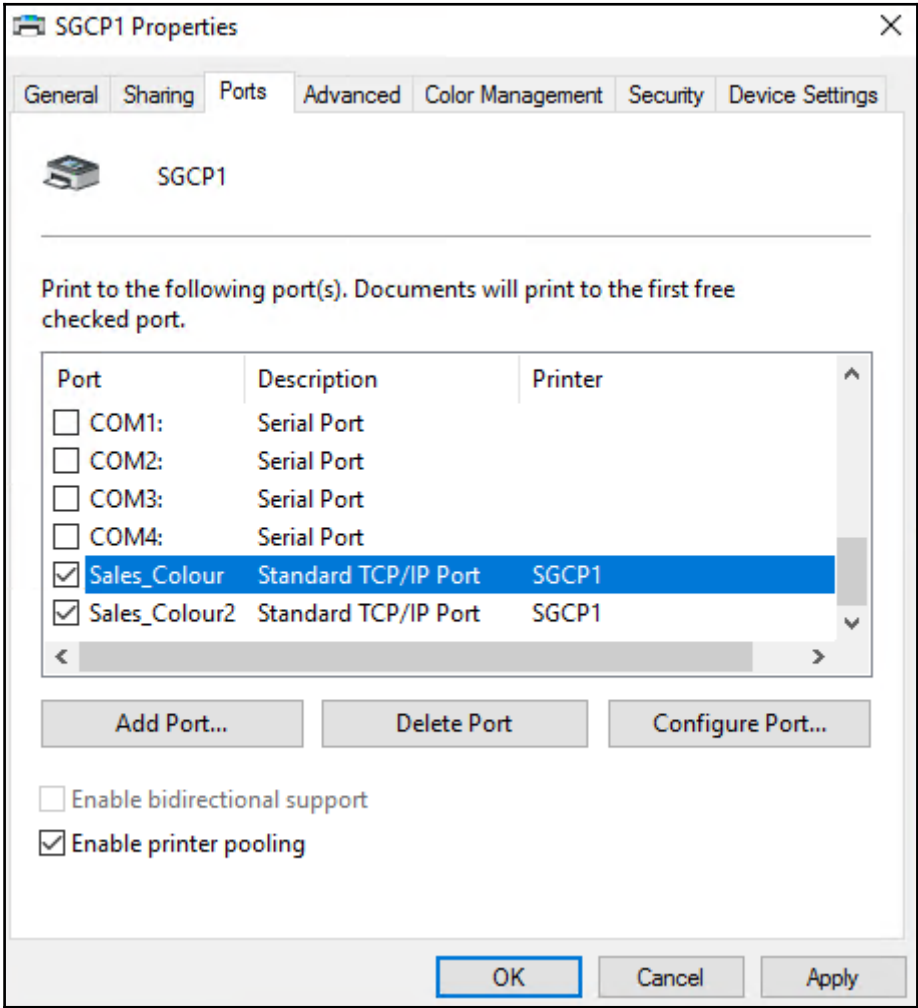
```

Branch Office Printing Enabled

Branch Office Printing Disabled



Name	Type	DriverName	PortName
SGCP1	Local	NEC Color Multiwriter class Driver	Sales_Colour2,Sales_Colour



Id	Type	User	Computer	Printer	Port	Bytes	Pages
5	Print Document	Administrator	\\PSRV	Microsoft Print to PDF	C:\Users\administrator\Documents\xx.pdf	39407	1
4	Print Document	Administrator	\\PSRV	Microsoft Print to PDF	C:\Users\administrator\Documents\x.pdf	39406	1
3	Print Document	Administrator	\\PSRV	Microsoft Print to PDF	C:\Users\administrator\Documents\test1.pdf	39405	1

## Chapter 5: Managing Server Backup

```
PS C:> $Pol
Schedule :
BackupTargets :
VolumesToBackup :
FilesSpecsToBackup :
FilesSpecsToExclude :
ComponentsToBackup :
BMR : False
SystemState : False
OverwriteOldFormatVhd : False
VssBackupOptions : VssCopyBackup
```

```
PS C:\> $Schedule = '06:00'
PS C:\> Set-WBSchedule -Policy $POL -Schedule $Schedule
20 March 2017 06:00:00
```

```
PS C:\> Get-WBDisk |
Format-Table -Property DiskName, DiskNumber,
FreeSpace, Properties
```

DiskName	DiskNumber	FreeSpace	Properties
Virtual HD ATA Device	0	121787637760	ContainsCriticalVolume
Microsoft Virtual Disk	1	95086919168	ValidTarget

```

PS C:\> $TargetDisk = Get-WBDisk |
 Where-Object Properties -match 'ValidTarget' |
 Select-Object -First 1
PS C:\> $Target = New-WBBackupTarget -Disk $TargetDisk `
 -Label 'Recipe 6-1' `
 -PreserveExistingBackups $true
PS C:\> Add-WBBackupTarget -Policy $Pol -Target $Target -Force

Label : Recipe 6-1
WBDisk : Microsoft Virtual Disk
WBVolume :
Path :
TargetType : Disk
InheritAcl : False
PreserveExistingBackup : True

```

```

PS C:\> $DisktoBackup = Get-WBDisk | Select-Object -First 1
PS C:\> $Volume = Get-WBVolume -Disk $DisktoBackup |
 Where-Object FileSystem -eq 'NTFS'
PS C:\> Add-WBVolume -Policy $Pol -Volume $Volume

VolumeLabel : System Volume
MountPath : C:
MountPoint : \\?\Volume{0da61551-0000-0000-0000-100000000000}
FileSystem : NTFS
Property : Critical, ValidSource
FreeSpace : 121785053184
TotalSpace : 137436856320

```

```

PS C:\> $POL

Schedule : {20/03/2017 06:00:00}
BackupTargets : {Recipe 6-1}
VolumesToBackup : {System Volume (C:)}
FilesSpecsToBackup :
FilesSpecsToExclude :
ComponentsToBackup :
BMR : False
SystemState : False
OverwriteOldFormatVhd : False
VssBackupOptions : VssCopyBackup

```

```

PS C:\> $Drive = Get-CimInstance -Class Win32_volume |
 Where-Object Label -EQ 'Recipe 6-1'
PS C:\> Set-CimInstance -InputObject $Drive -Property @{DriveLetter='Q:'}
PS C:\> Get-CimInstance -Class Win32_Volume |
 Where-Object Label -EQ 'Recipe 6-1' |
 Format-Table -Property DriveLetter, Label

DriveLetter Label

Q: Recipe 6-1

```

```

PS C:\> Get-WBPolicy

Schedule : {20/03/2017 06:00:00}
BackupTargets : {Recipe 6-1}
VolumesToBackup : {System Volume (C:)}
FilesSpecsToBackup : {}
FilesSpecsToExclude : {}
ComponentsToBackup : {}
BMR : False
SystemState : False
OverwriteOldFormatVhd : False
VssBackupOptions : VssCopyBackup

PS C:\> Get-WBSummary

NextBackupTime : 21/03/2017 06:00:00
NumberOfVersions : 36
LastSuccessfulBackupTime : 20/03/2017 13:18:54
LastSuccessfulBackupTargetPath : \\?\Volume{303f5cce-4450-45e0-b268-8f2de40de561}
LastSuccessfulBackupTargetLabel : Recipe 6-1
LastBackupTime : 20/03/2017 13:18:54
LastBackupTarget : Q:
DetailedMessage :
LastBackupResultHR : 0
LastBackupResultDetailedHR : 0
CurrentOperationStatus : NoOperationInProgress

```

```
Do the backup
PS C:\> $MBPol = Get-WBPolicy -Editable

PS C:\Windows\system32> Start-WBBackup -Policy $MBPol
Creating a shadow copy of the volumes in the backup...
Creating a shadow copy of the volumes in the backup...
Creating a shadow copy of the volumes in the backup...
Updating the backup for deleted items...
Volume 1 (0%) of 1 volume(s).
.... multiple lines deleted for brevity
Volume 1 (100%) of 1 volume(s).
Creating a shadow copy of the backup storage location(s)...
The backup operation completed.
```

```
PS C:\> Get-WBPolicy

Schedule : {20/03/2017 06:00:00}
BackupTargets : {Recipe 6-1}
VolumesToBackup : {System Volume (C:)}
FilesSpecsToBackup : {}
FilesSpecsToExclude : {}
ComponentsToBackup : {}
BMR : False
SystemState : False
OverwriteOldFormatVhd : False
VssBackupOptions : VssCopyBackup
```

```

PS Q:\> Get-ChildItem -Path Q: -Recurse -Depth 3 -Directory

Directory: Q:\

Mode LastWriteTime Length Name
---- -
d----- 22/12/2016 06:00 WindowsImageBackup

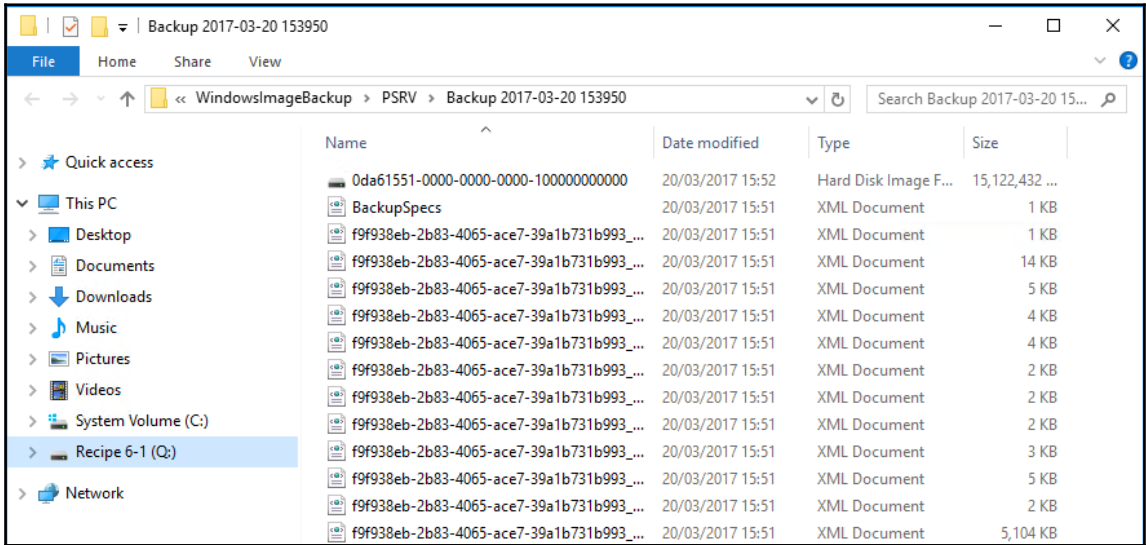
Directory: Q:\WindowsImageBackup

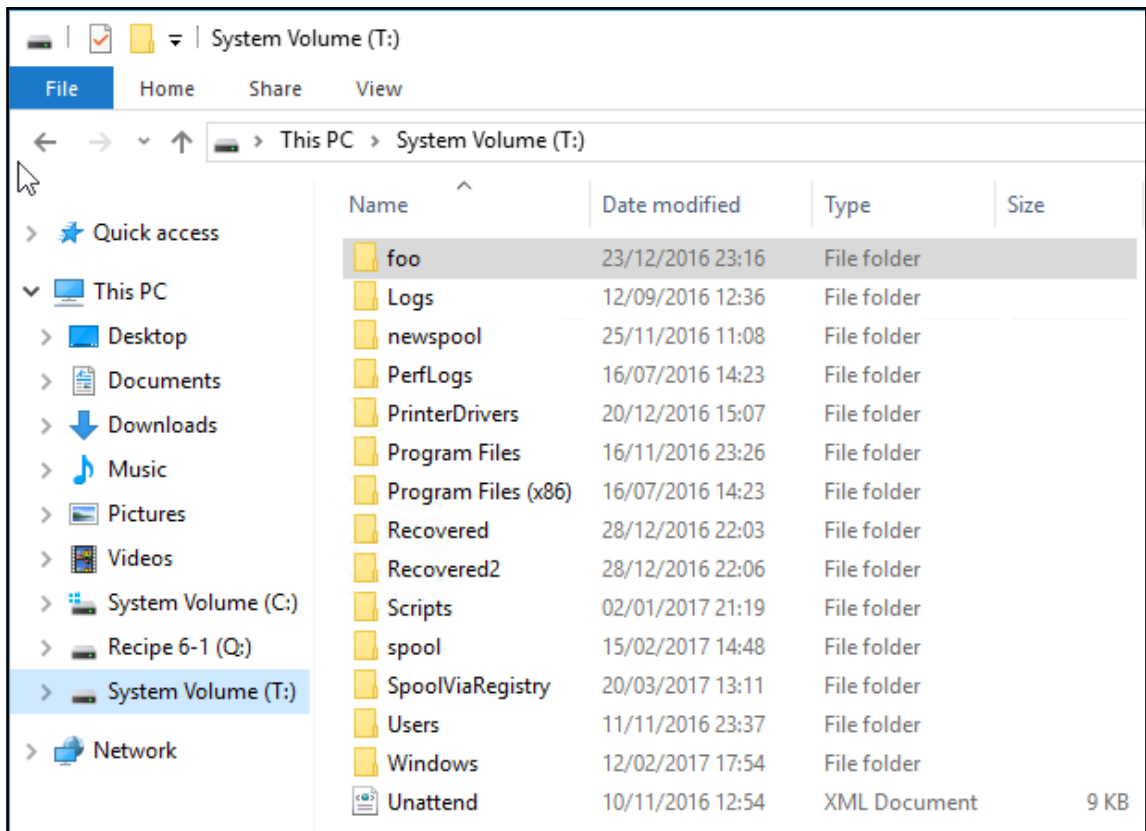
Mode LastWriteTime Length Name
---- -
d----- 22/12/2016 06:08 PSRV

Directory: Q:\WindowsImageBackup\PSRV

Mode LastWriteTime Length Name
---- -
d----- 22/12/2016 06:08 Backup 2016-12-22 060006
d----- 22/12/2016 06:08 Catalog
d----- 22/12/2016 06:08 Logs
d----- 22/12/2016 06:08 SPPMetadataCache

```





```
STEP 1

PS C:\> $00Pol = New-WBPolicy
PS C:\> $FSpec1 = New-WBFileSpec -FileSpec 'C:\Foo'
PS C:\> $FSpec2 = New-WBFileSpec -FileSpec 'C:\Users\administrator\Documents'
PS C:\> Add-WBFileSpec -Policy $00Pol -FileSpec $FSpec1,$FSpec2
PS C:\> $Volume = Get-WBVolume -VolumePath Q:
PS C:\> $Target = New-WBBackupTarget -Volume $Volume
PS C:\> Add-WBBackupTarget -Policy $00Pol -Target $Target

Label : Recipe 6-1
WBDisk :
WBVolume : Recipe 6-1 (Q:)
Path : \\?\Volume{303f5cce-4450-45e0-b268-8f2de40de561}
TargetType : Volume
InheritAcl : False
PreserveExistingBackup : False
```

```

PS C:\> Start-WBBackup -Policy $00Pol
Initializing the list of items to be backed up...
Creating a shadow copy of the volumes in the backup...
Updating the backup for deleted items...
Scanning the file system...
Volume 1 (79%) of 1 volume(s).
Compacting the virtual hard disk for volume C:, 33% completed.
Creating a shadow copy of the backup storage location(s)...
The backup operation completed.

```

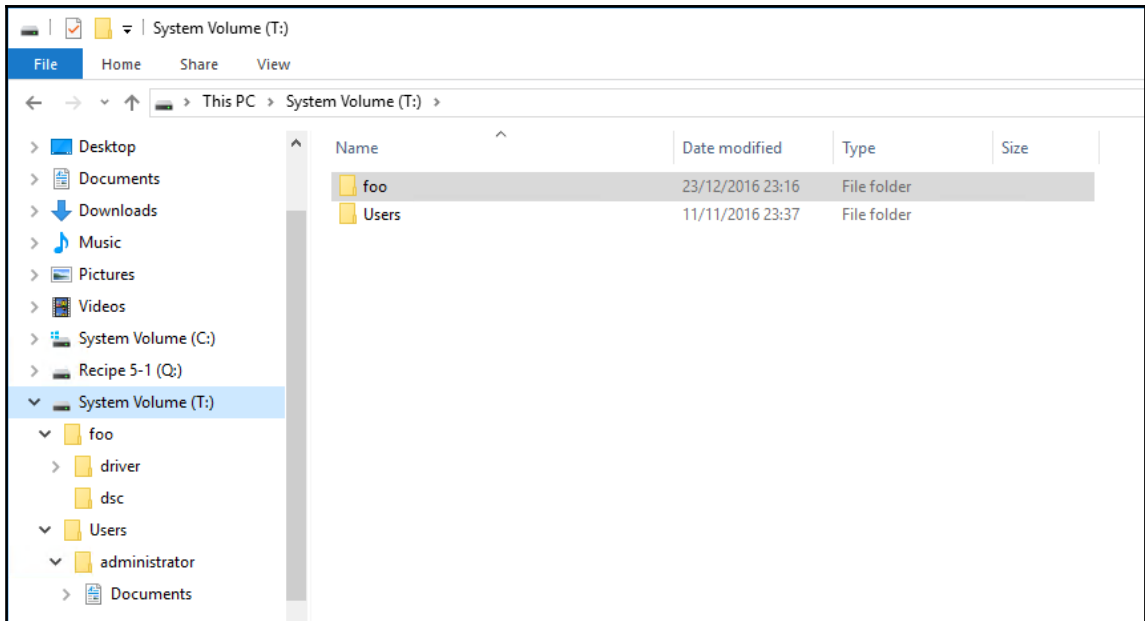
The screenshot shows the Windows Computer Management console. The left-hand navigation pane is expanded to 'Storage' > 'Disk Management'. The main area displays a table of volumes and a detailed view of the selected disk.

Volume	Layout	Type	File System	Status
Recipe 5-1 (Q:)	Simple	Basic	NTFS	Healthy (Primary Partition)
System Volume (C:)	Simple	Basic	NTFS	Healthy (System, Boot, Page File, Active, Crash Dump, P
System Volume (T:)	Simple	Basic	NTFS	Healthy (Primary Partition)

Disk	Volume	Size	File System	Status	Free Space
Disk 0 Basic 128.00 GB Online	System Volume (C:)	128.00 GB	NTFS	Healthy (System, Boot, Page File, Active, Crash Dump, Primary Partition)	
Disk 1 Basic 126.88 GB Online	Recipe 5-1 (Q:)	126.86 GB	NTFS	Healthy (Primary Partition)	20 MB Unallocated
Disk 2 Basic 128.02 GB Online	System Volume (T:)	128.00 GB	NTFS	Healthy (Primary Partition)	20 MB Unallocated





```
PS C:\> $Job = Get-WBJob -Previous 1
PS C:\> $Job

JobType : Backup
StartTime : 21/03/2017 16:10
EndTime : 21/03/2017 16:29
JobState : Completed
CurrentOperation :
HResult : 0
DetailedHResult : 0
ErrorDescription :
JobItems : {VolumeList}
VersionId : 03/21/2017-16:10
SuccessLogPath : C:\Windows\Logs\WindowsServerBackup\Backup-21-03-2017_16-10-04.log
FailureLogPath : C:\Windows\Logs\WindowsServerBackup\Backup_Error-21-03-2017_16-10-04.log

PS C:\> $Job | Select-Object -ExpandProperty JobItems

Name : VolumeList
Type : VolumeList
State : Completed
HResult : 0
DetailedHResult : 0
ErrorDescription :
BytesProcessed : 13802864640
TotalBytes : 13802864640
CurrentItem :
SubItemProcessed : 1
SubItemFailed : 0
TotalSubItem : 1
SubItemList : {C:}
```

```

PS C:\> $BUSet = Get-WBBackupSet | Where-Object Versionid -eq $Job.VersionId
PS C:\> $BUSet

VersionId : 03/21/2017-16:10
BackupTime : 21/03/2017 16:10:04
BackupTarget : \\?\Volume{303f5cce-4450-45e0-b268-8f2de40de561}
RecoverableItems : Volumes, SystemState, Applications, Files, BareMetalRecovery
Volume : {System Volume (C:)}
Application : {Registry}
VssBackupOption : VssCopyBackup
SnapshotId : 1bad2a5f-64cb-4b55-b3a0-10669839c80c
BackupSetId : bc6a2dfc-610d-4ba6-81e9-f7e671b6eaab

```

```

PS C:\> If (-Not (Test-Path C:\Recovered))
 {New-Item -Path C:\Recovered -ItemType Directory}
PS C:\> $File = 'C:\Foo\D1.txt'
PS C:\> $TargetPath = 'C:\Recovered\'
PS C:\> Start-WBFileRecovery -BackupSet $BUSet -SourcePath $File `
 -TargetPath $TargetPath -Option CreateCopyIfExists `
 -Force
Recovering files from C:\Foo\D1.txt :
Completed.

PS C:\> Get-ChildItem -Path $TargetPath

 Directory: C:\Recovered

Mode LastWriteTime Length Name
---- -
-a---- 20/03/2017 19:00 62 d1.txt

```

```

PS C:\> If (-Not (Test-Path C:\Recovered2))
 {New-Item -Path C:\Recovered2 -ItemType Directory}

PS C:\> $SourcePath = 'C:\Foo\'
PS C:\> $TargetPath = 'C:\Recovered2\'
PS C:\> Start-WBFileRecovery -BackupSet $BUSet -SourcePath $SourcePath `
 -TargetPath $TargetPath -Recursive -Force
Recovering files from C:\Foo\ :
Recovering files from C:\Foo\ : 88% of files recovered.
Completed.

```

```

PS C:\> Get-ChildItem -Path C:\Recovered2\foo

```

Directory: C:\recovered2\foo

Mode	LastWriteTime		Length	Name
----	-----		-----	----
d-----	13/11/2016	00:02		driver
d-----	09/12/2016	10:17		dsc
-a-----	20/03/2017	19:00	62	d1.txt
-a-----	20/03/2017	19:00	62	d2.txt

```

PS C:\> Get-VM -Path DC1

```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
----	----	-----	-----	-----	-----	-----
DC1	Running	0	4000	00:29:30.8490000	Operating normally	8.0

```
PS C:\> Wbadmin Start Backup -BackupTarget:C: -HyperV:'DC1'
wbadmin 1.0 - Backup command-line tool
(C) Copyright 2013 Microsoft Corporation. All rights reserved.

Retrieving volume information...
Any virtual machines included in the backup might be temporarily placed into a
saved state when the backup runs.
This will back up HyperV\DC1 to C:.
Do you want to start the backup operation?
[Y] Yes [N] No Y

The backup operation to C: is starting.
Creating a shadow copy of the volumes specified for backup...

Starting application backup...
Copying files for DC1(Online)... 4% done.
Backup of DC1(Online) succeeded.
Application backup succeeded.
Backup of DC1(Online) succeeded.

Summary of the backup operation:

The backup operation successfully completed.
Backup of DC1(Online) succeeded.

Application backup succeeded.

Log of files successfully backed up:
C:\WINDOWS\LogS\WindowsServerBackup\Backup-22-03-2017_22-07-49.log
```

```
PS C:\> Get-Content C:\WINDOWS\LogS\WindowsServerBackup\Backup-29-12-2016_23-56-53.log
Backed up D:\
Backed up D:\DC1\
Backed up D:\DC1\DC1-AutoRecovery.avhdx
Backed up D:\DC1\DC1.vhdx
Backed up D:\DC1\Ref2016.vhdx
Backed up D:\hyper-v\
Backed up D:\hyper-v\DC1\
Backed up D:\hyper-v\DC1\New Virtual Machine\
Backed up D:\hyper-v\DC1\New Virtual Machine\Snapshots\
Backed up D:\hyper-v\DC1\New Virtual Machine\Snapshots\FC35EC6C-021C-4A9C-BB86-010A59E22DF7.vmcx
Backed up D:\hyper-v\DC1\New Virtual Machine\Snapshots\FC35EC6C-021C-4A9C-BB86-010A59E22DF7.VMRS
Backed up D:\hyper-v\DC1\New Virtual Machine\Virtual Machines\
Backed up D:\hyper-v\DC1\New Virtual Machine\Virtual Machines\6501E155-A138-48E0-8392-683FF6F26759.VMRS
Backed up D:\hyper-v\DC1\New Virtual Machine\Virtual Machines\6501E155-A138-48E0-8392-683FF6F26759.vmcx
Application backup
Writer Id: {66841CD4-6DED-4F4B-8F17-FD23F8DDC3DE}
Component: 6501E155-A138-48E0-8392-683FF6F26759
Caption : Online\DC1
Logical Path:
```

```
PS C:\> Get-ChildItem -Path C:\WindowsImageBackup\
Directory: C:\WindowsImageBackup
```

Mode	LastWriteTime	Length	Name
d-----	3/22/2017 10:09 PM		HV1

```
PS C:\> Get-ChildItem -Path C:\WindowsImageBackup\HV1
Directory: C:\WindowsImageBackup\HV1
```

Mode	LastWriteTime	Length	Name
d-----	3/22/2017 10:20 PM		Backup 2017-03-22 220749
d-----	3/22/2017 10:20 PM		Catalog
d-----	3/22/2017 10:20 PM		Logs
d-----	12/29/2016 3:03 PM		SPPMetadataCache
-a-----	12/29/2016 3:00 PM	16	MediaId

```
Location of Config Information: D:\DC1
Exists: True
Location of DC1 Hard Drive : D:\DC1\Virtual Hard Disks\DC1.vhdx
Exists: True
```

```
PS C:\> Stop-VM -Name DC1 -TurnOff -Force
PS C:\> Remove-VM -Name DC1 -Force
PS C:\> Get-VM -Name DC1
Get-VM : Hyper-V was unable to find a virtual machine with name "DC1".
At line:1 char:1
+ Get-VM -Name DC1
+ ~~~~~
+ CategoryInfo : InvalidArgument: (DC1:String) [Get-VM], VirtualizationException
+ FullyQualifiedErrorId : InvalidParameter,Microsoft.HyperV.PowerShell.Commands.GetVM
```

```

PS C:\> $Backupversions = Wbadmin.Exe Get Versions -Backuptarget:C:
PS C:\> $Version = $Backupversions | Select-String 'Version identifier' |
 Select-Object -Last 1
PS C:\> $VID = $Version.Line.Split(' ')[2]
PS C:\> $Cmd = "& Wbadmin.exe Start Recovery -Itemtype:Hyperv -Items:DC1 "
PS C:\> $Cmd += "-Version:$vid -AlternateLocation -RecoveryTarget:C:\Recovery"
PS C:\> Invoke-Expression -Command $Cmd

```

wbadmin 1.0 - Backup command-line tool  
(C) Copyright 2013 Microsoft Corporation. All rights reserved.

Warning: If a Virtual Machine you are trying to recover to alternate location was backed up from this host, this will delete and overwrite the original virtual machine if it still exists.

You have chosen to recover the application HyperV. The files for the following components will be recovered to C:\Recovery.

Warning: If a Virtual Machine you are trying to recover to alternate location was backed up from this host, this will delete and overwrite the original virtual machine if it still exists.

Warning: The virtual machines might not start if their network settings are different after recovery. After recovery is complete use Hyper-V Manager to verify the network settings of the virtual machines before they are started.

```

VM name: DC1
VM caption: Online\DC1
VM identifier: DD8F6DE3-5F65-4990-B0DD-BF3288FB47BE

```

Do you want to recover the application HyperV?  
[Y] Yes [N] No Y

```

Preparing the component DC1(Online) for recovery...
Recovering the files for the component DC1(Online), copied (1%).
Recovering the files for the component DC1(Online), copied (100%).
Recovering the component DC1(Online).
The component DC1(Online) was successfully recovered.
The recovery operation completed.
Log of files successfully recovered:
C:\WINDOWS\Logs\WindowsServerBackup\ApplicationRestore-22-03-2017_22-35-29.log

```

Summary of the recovery operation:

-----  
The component DC1(Online) was successfully recovered.

```

PS C:\> Start-VM -Name DC1
PS C:\> Wait-Vm -Name DC1 -For IPAddress
PS C:\> Get-VM -Name DC1

```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
DC1	Running	0	4000	00:01:28.9540000	Operating normally	8.0

```
Location of Config Information: C:\Recovery\DC1\D_\Book - DC1
Exists: True
Location of DC1 Hard Drive : C:\Recovery\DC1\D_\Book - DC1\Virtual Hard Disks\DC1.vhdx
Exists: True
```

```
PS C:\> Install-WindowsFeature -Name Windows-Server-Backup

Success Restart Needed Exit Code Feature Result

True No Success {Windows Server Backup}
```

```
PS C:\> Install-WindowsFeature -Name Windows-Server-Backup

Success Restart Needed Exit Code Feature Result

True No NoChangeNeeded {}
```



```

PS C:\> If (Get-WBPolicy) {Remove-WBPolicy -All -Force}
Create new policy
$FullBUPol = New-WBPolicy
$Schedule = '06:00'
Set schedule
Set-WBSchedule -Policy $FullBUPol -Schedule $Schedule | Out-Null
Create a credential
$U = 'administrator@reskit.org'
$P = ConvertTo-SecureString -String 'Pa$$w0rd' -AsPlainText -Force
$Cred = New-Object -TypeName System.Management.Automation.PSCredential `
 -ArgumentList $U,$P
Create target and add to backup policy
Invoke-Command -ComputerName SRV1 -Credential $cred `
 -ScriptBlock {
 New-Item -Path 'C:\Backup' `
 -ItemType Directory
 New-SmbShare -Name Backup -Path 'C:\Backup' `
 -FullAccess "$Env:USERDOMAIN\domain admins" |
 Out-Null
 }
$Target = New-WBBackupTarget -NetworkPath '\\SRV1\Backup' -Credential $Cred
Add-WBBackupTarget -Policy $FullBUPol -Target $Target -Force | Out-Null
Get and set volume to backup
$DisktoBackup = Get-WBDisk | Select-Object -First 1
$Volume = Get-WBVolume -Disk $DisktoBackup
Add-WBVolume -Policy $FullBUPol -Volume $Volume | Out-Null
Add BMR to policy
Add-WBBareMetalRecovery -Policy $FullBUPol
Set policy
Set-WBPolicy -Policy $FullBUPol -Force
PS C:\> Start-WBBackup -Policy $FullBUPol -Force
Creating a shadow copy of the volumes in the backup...
Volume 1 (0%) of 1 volume(s).
Volume 1 (100%) of 1 volume(s).
The backup operation completed.

```

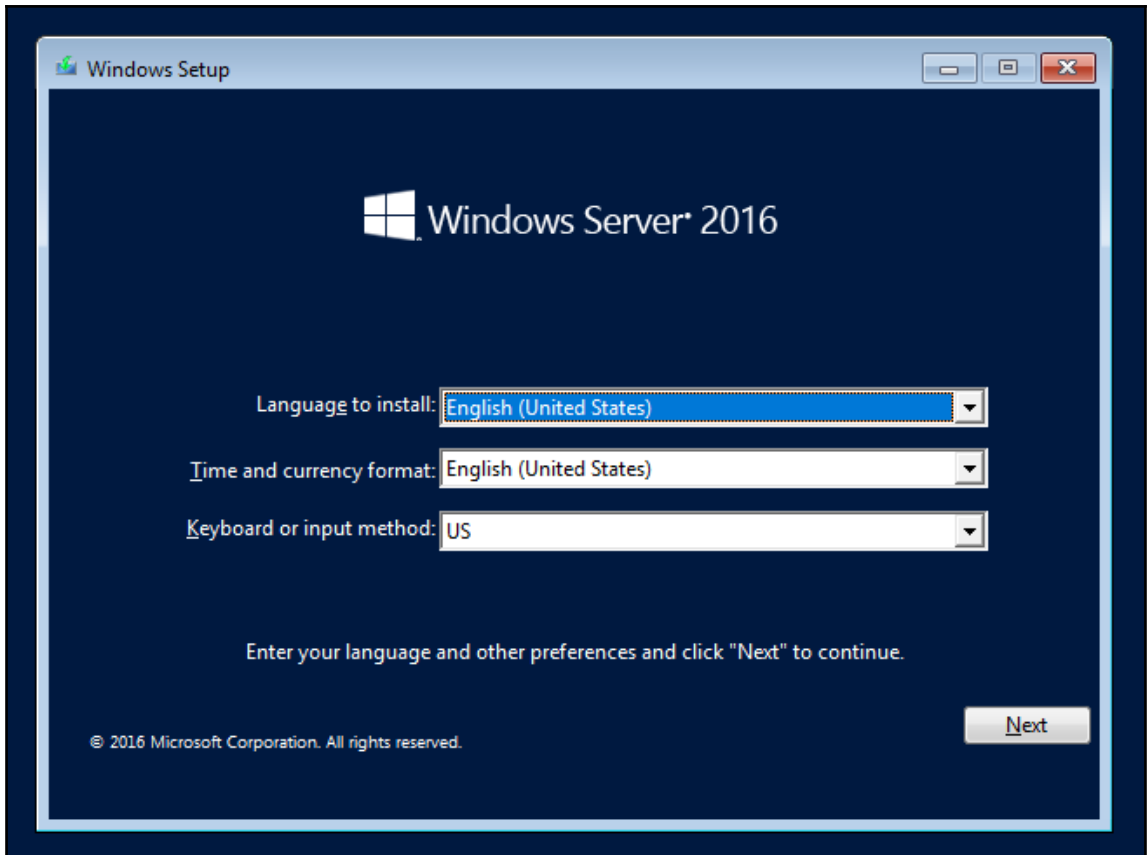
```

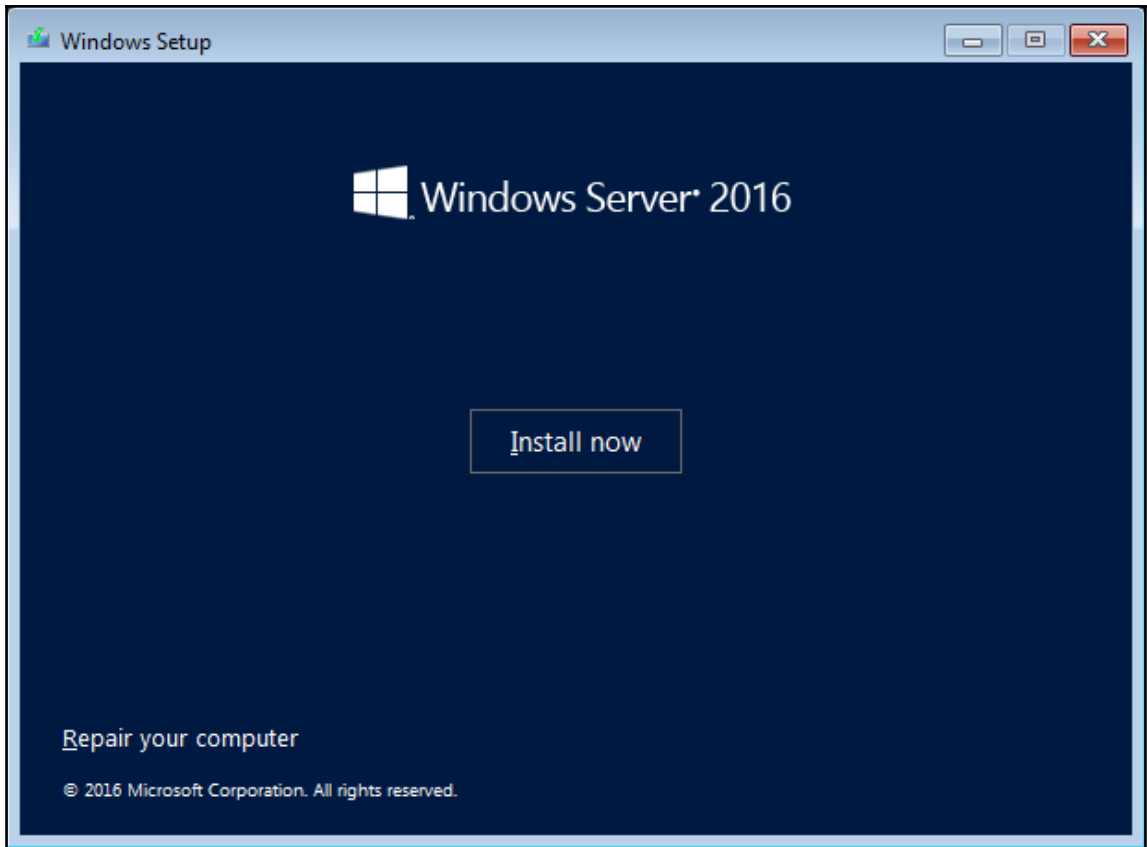
An item with the specified name C:\Backup already exists.
+ CategoryInfo : ResourceExists: (C:\Backup:String) [New-Item], IOException
+ FullyQualifiedErrorId : DirectoryExist,Microsoft.PowerShell.Commands.NewItemCommand
+ PSComputerName : SRV1

The name has already been shared.
+ CategoryInfo : NotSpecified: (MSFT_SMBShare:ROOT/Microsoft/Windows/SMB/MSFT_SMBShare) [New-SmbShare], CimException
+ FullyQualifiedErrorId : Windows System Error 2118,New-SmbShare
+ PSComputerName : SRV1

```







# Choose an option



Troubleshoot

Reset your PC or see advanced options



Turn off your PC



# Advanced options



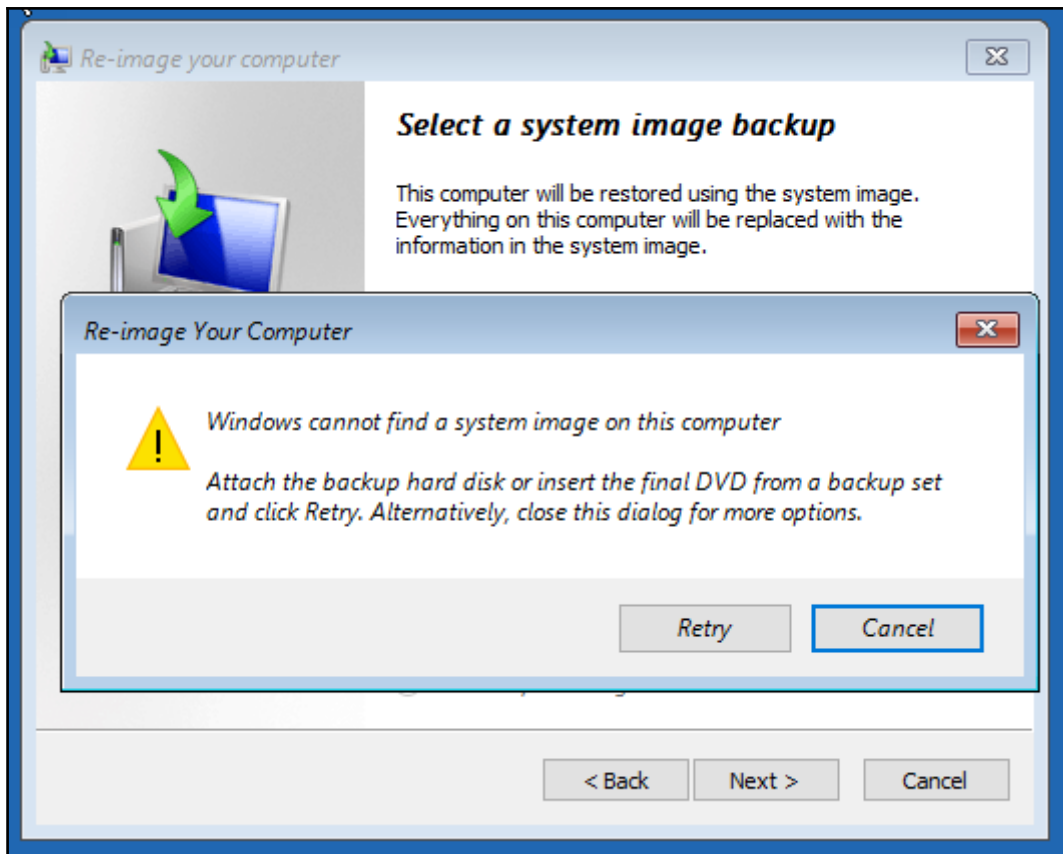
## System Image Recovery

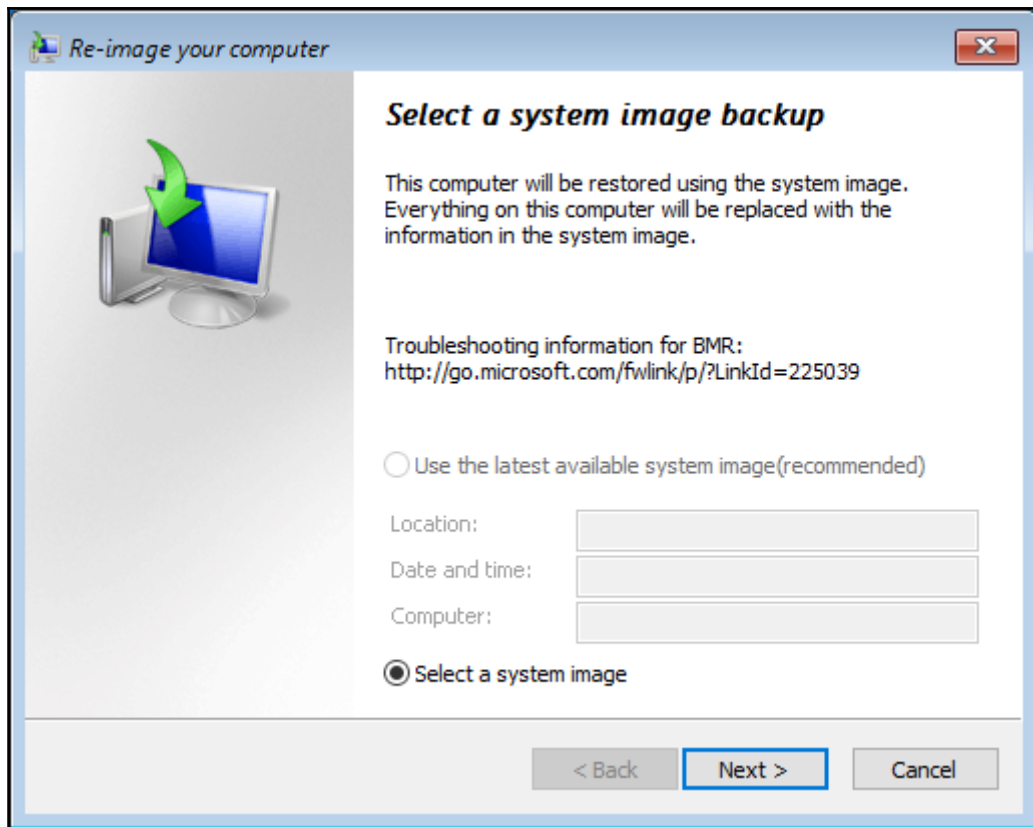
Recover Windows using a specific system image file

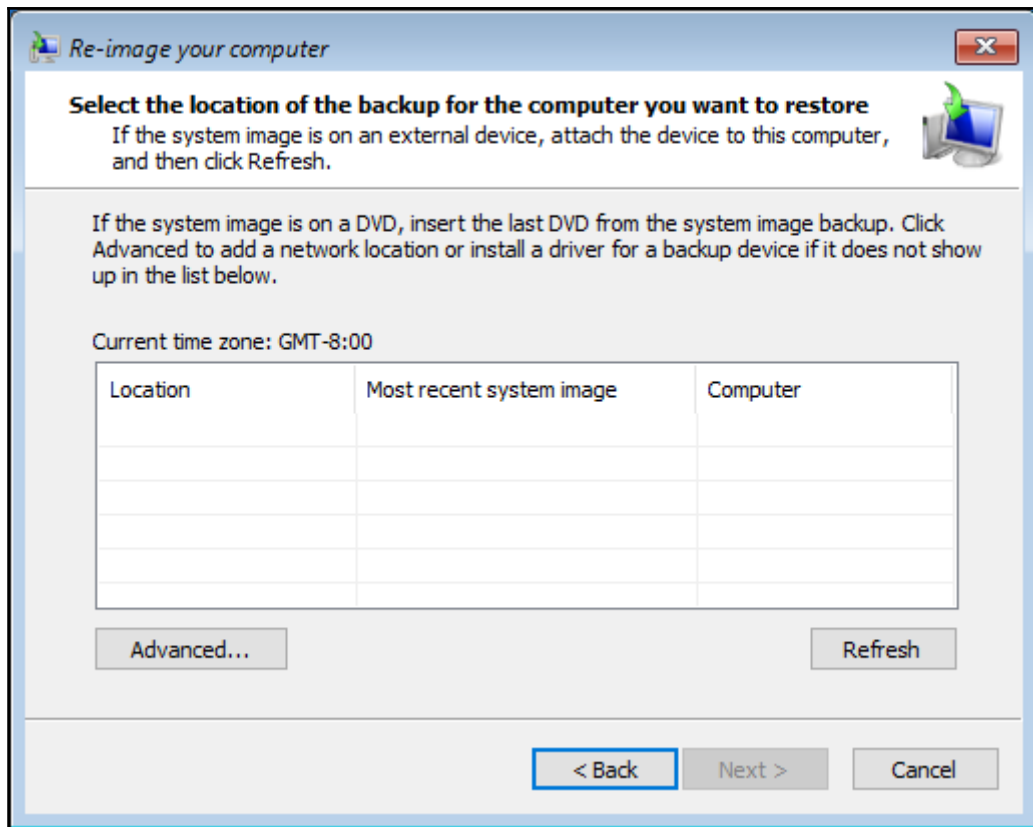


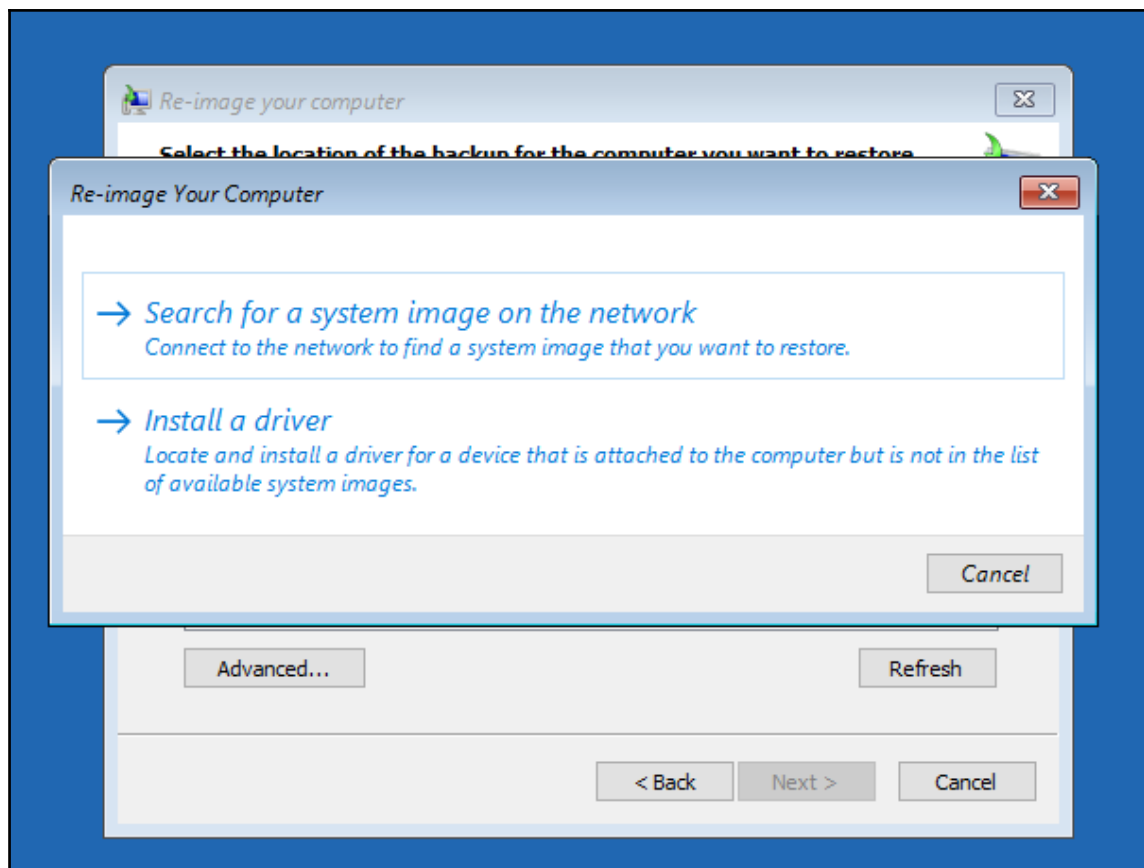
## Command Prompt

Use the Command Prompt for advanced troubleshooting

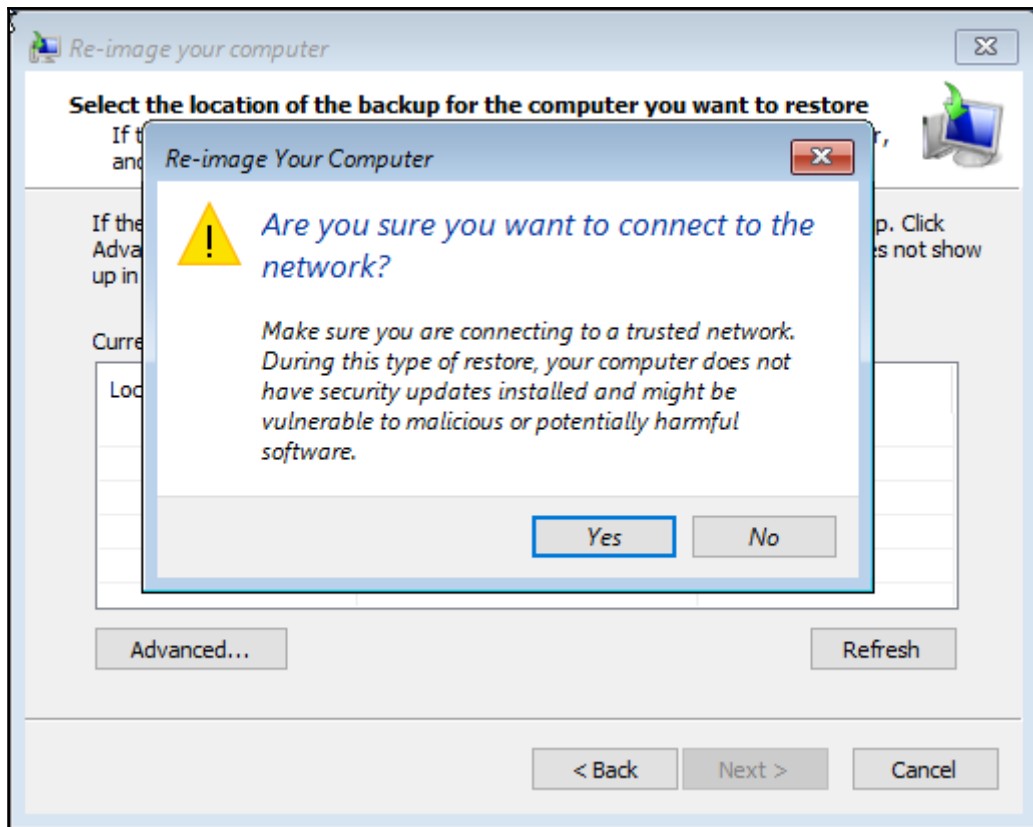


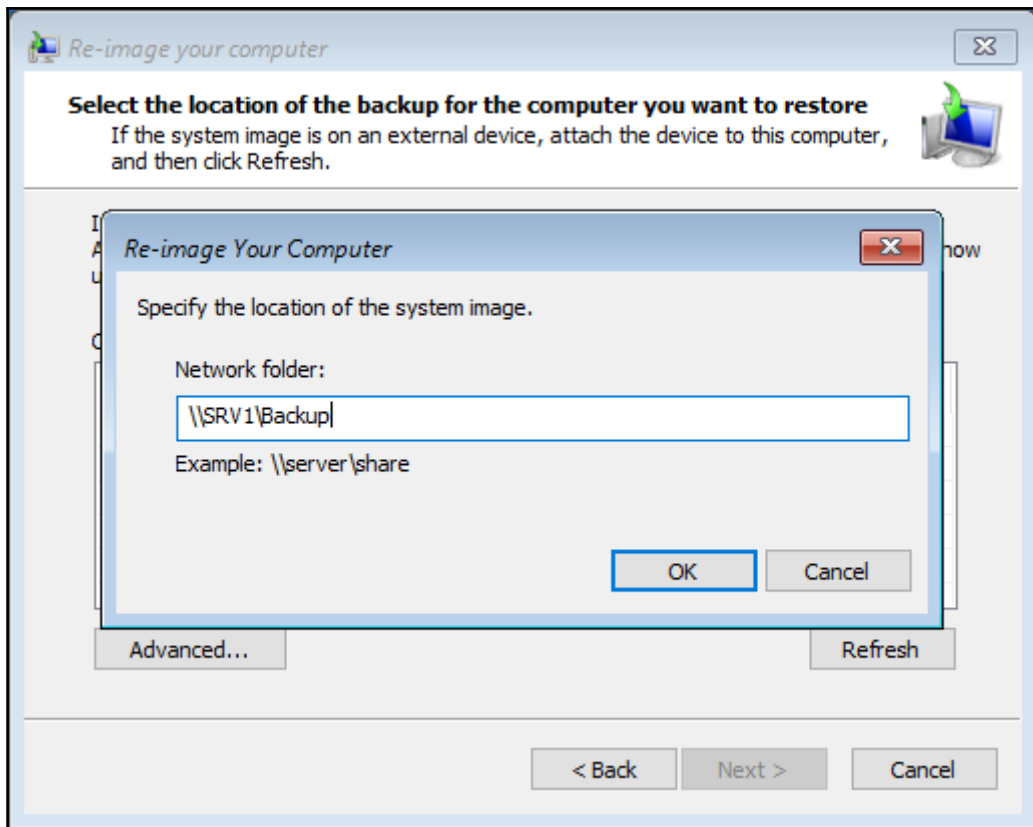


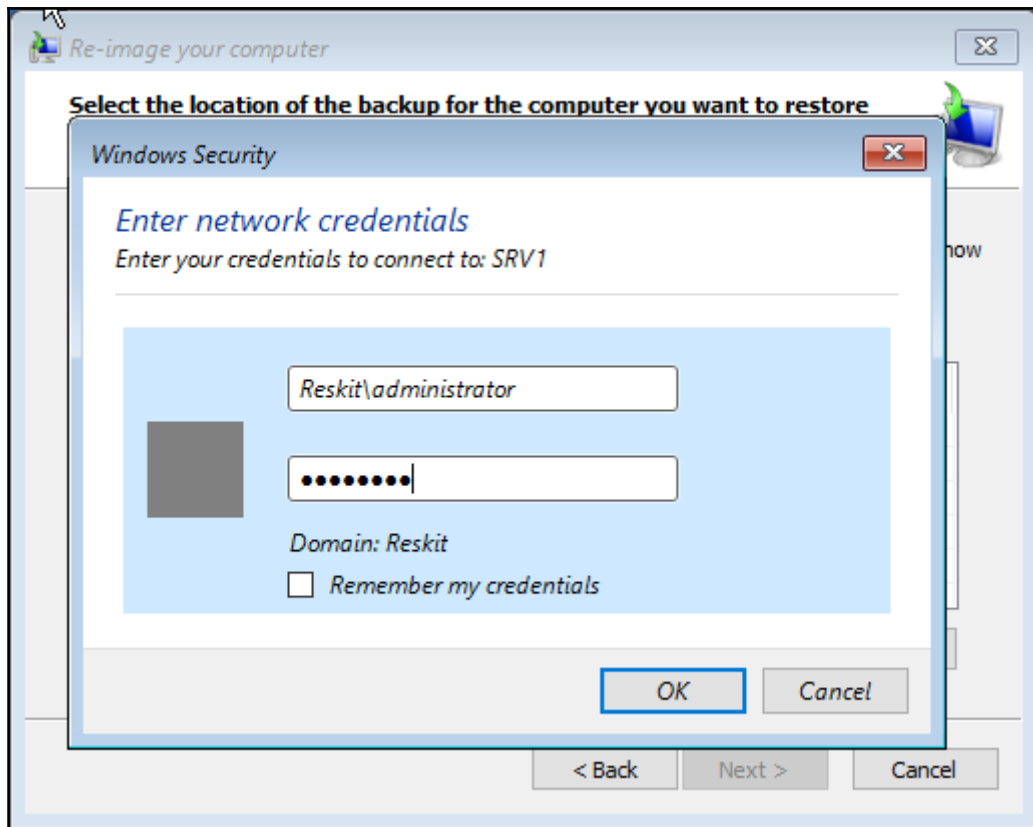


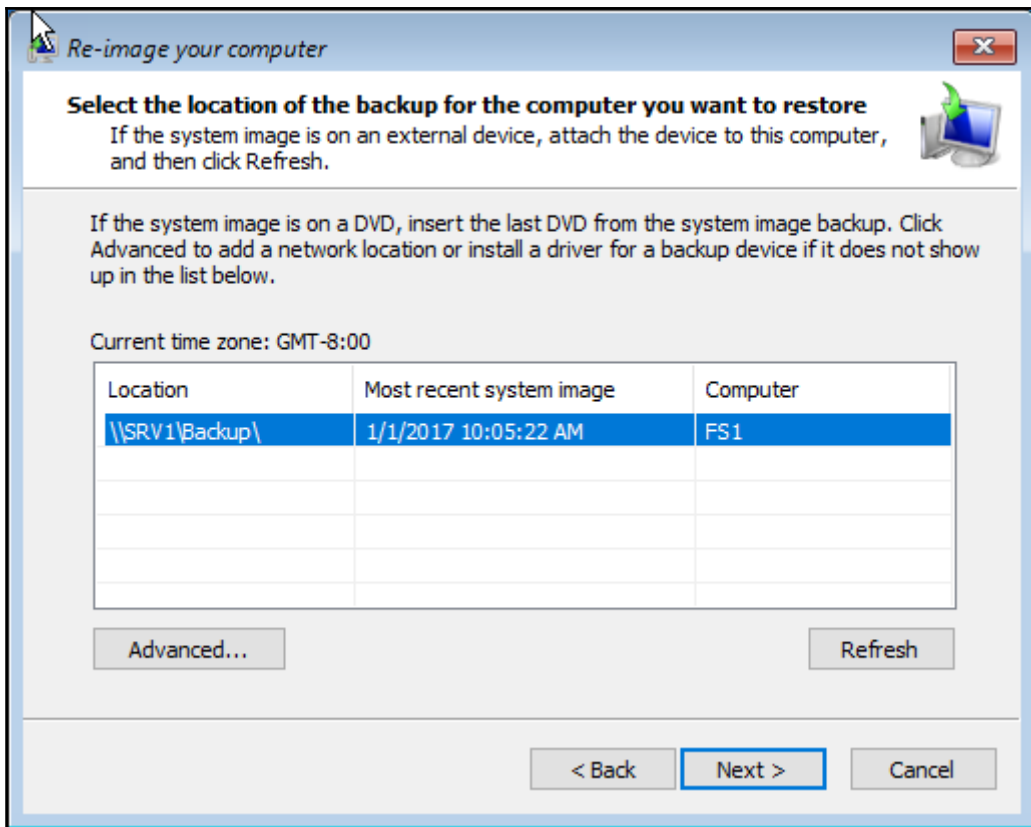


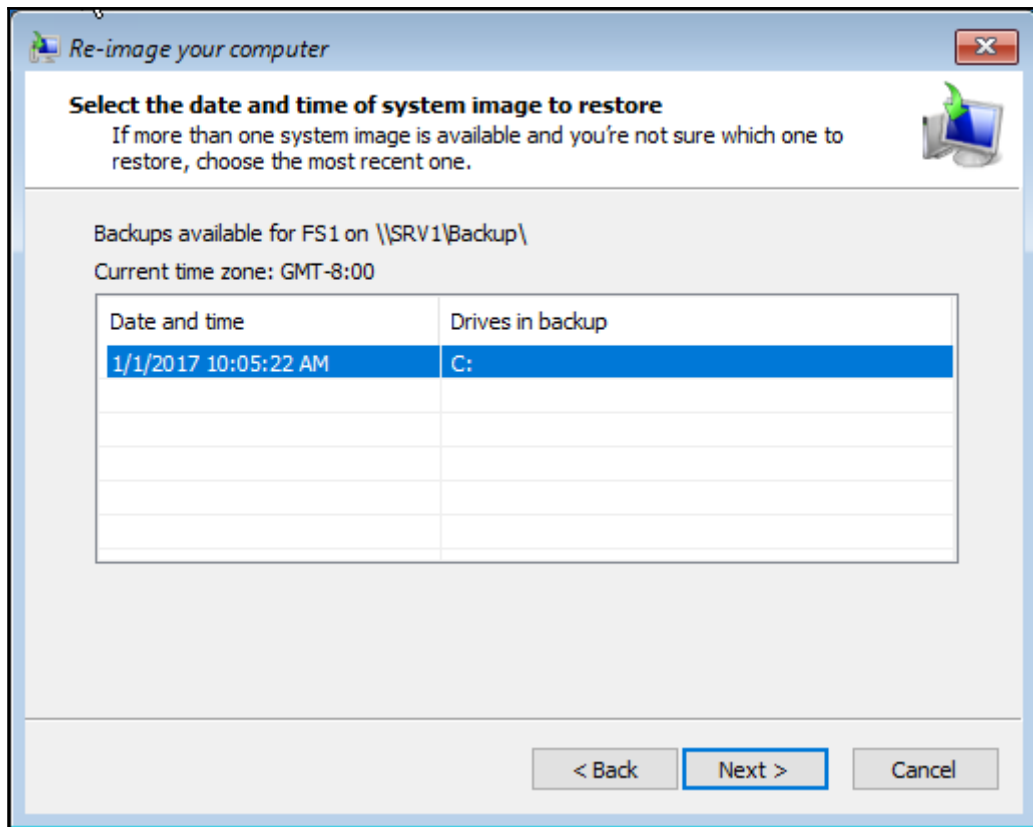


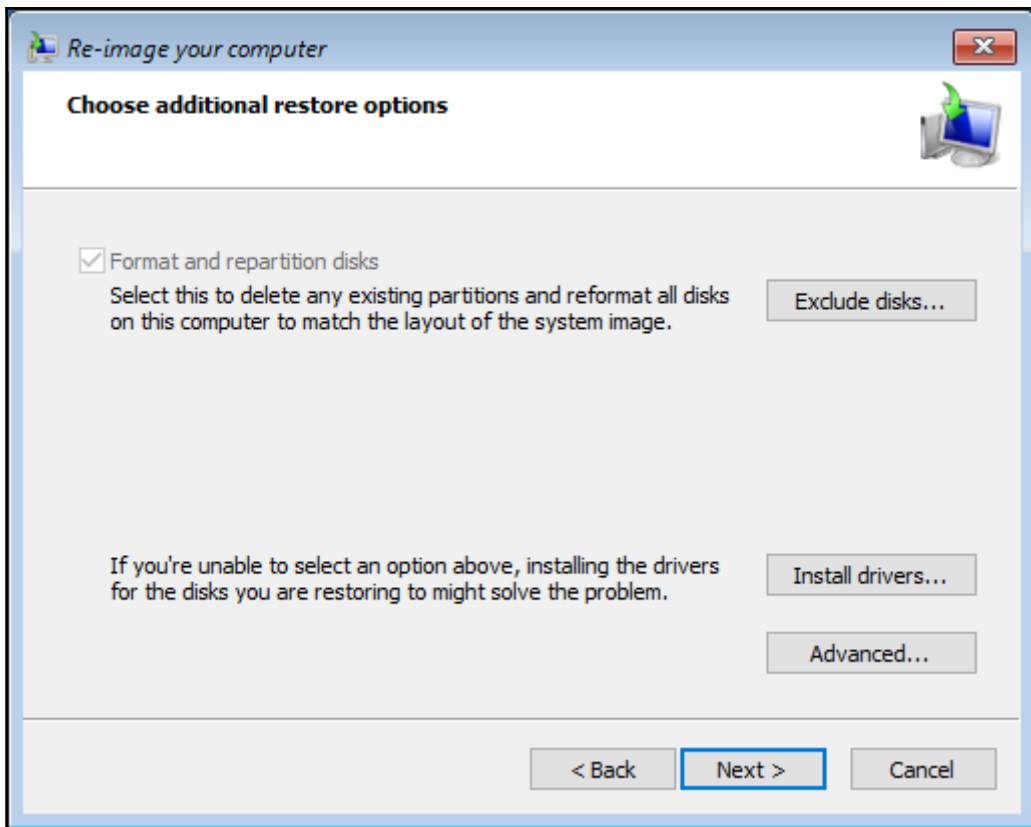


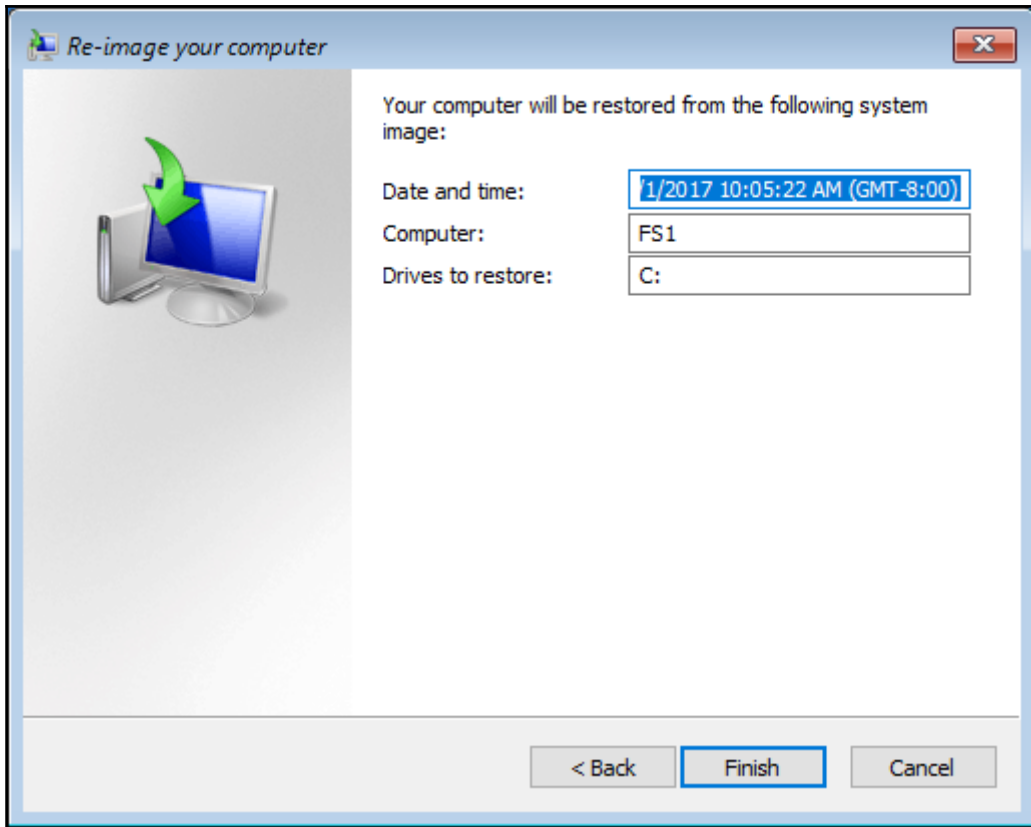


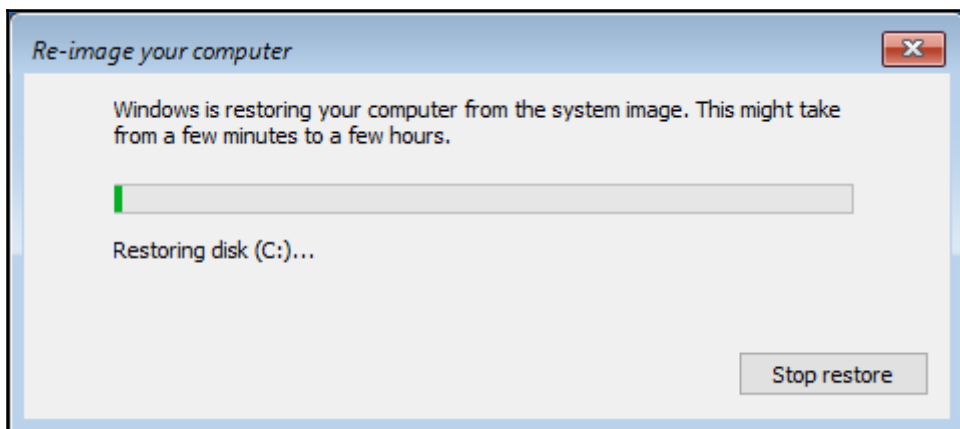
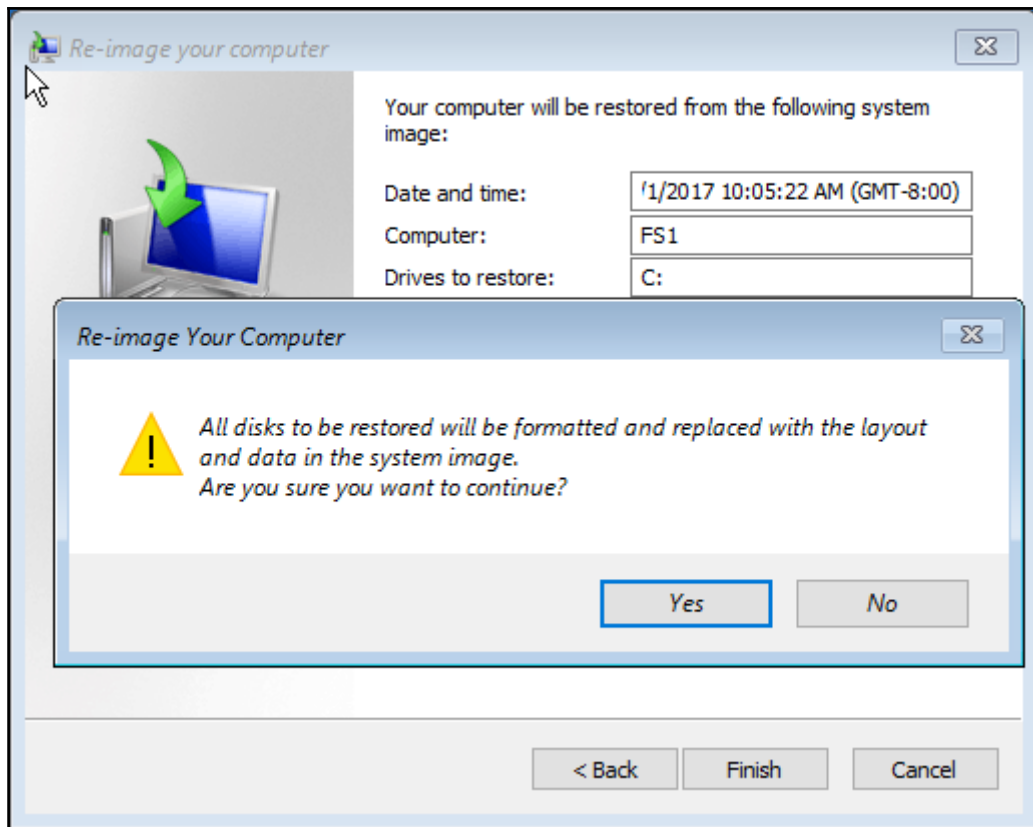




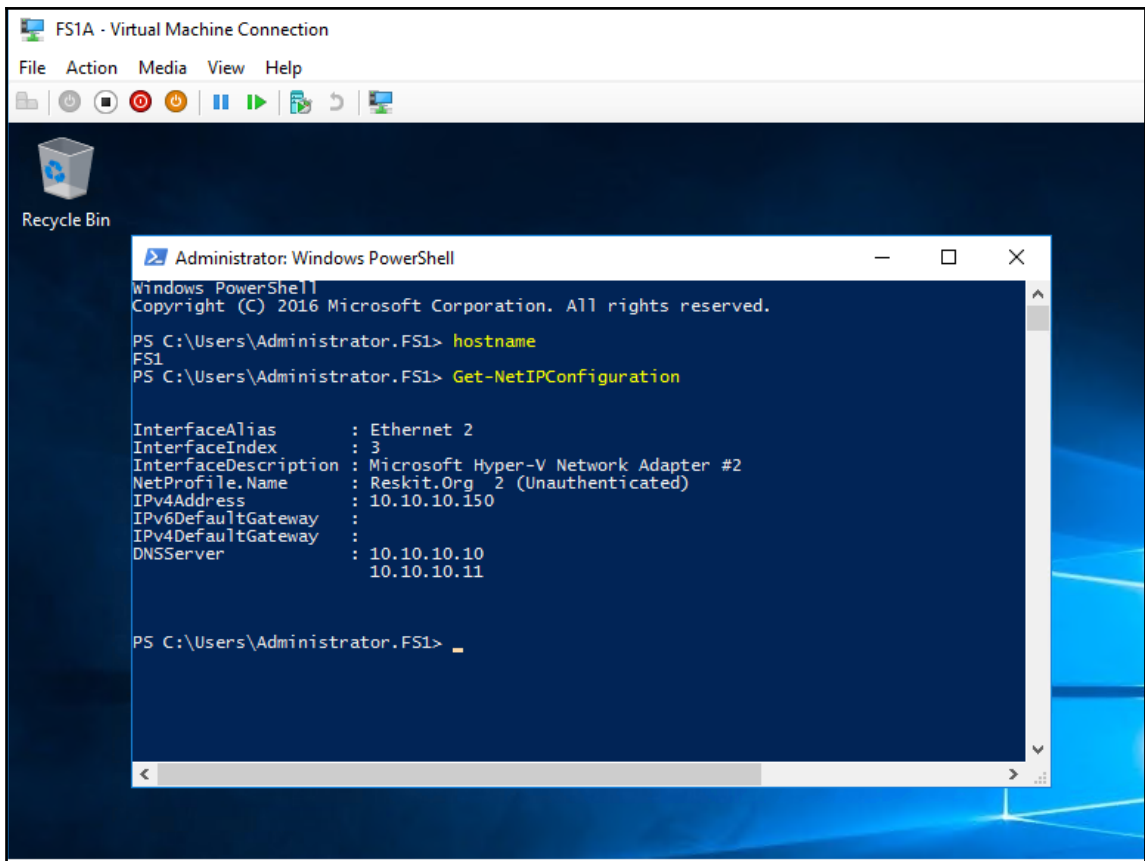


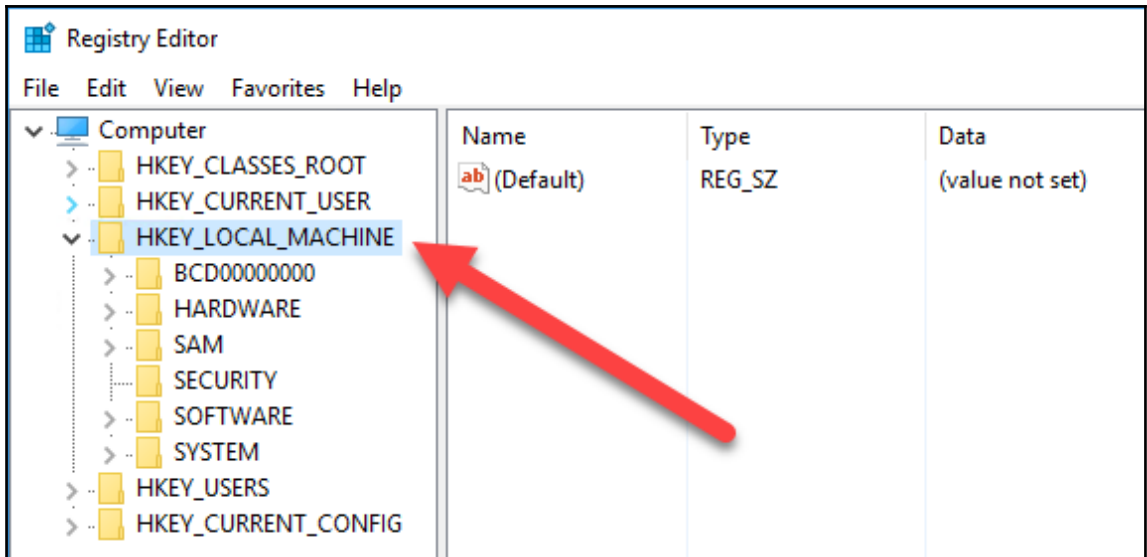


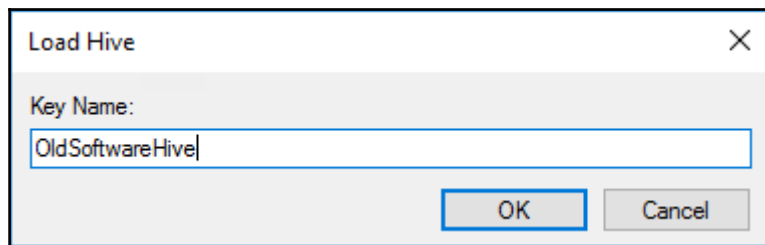
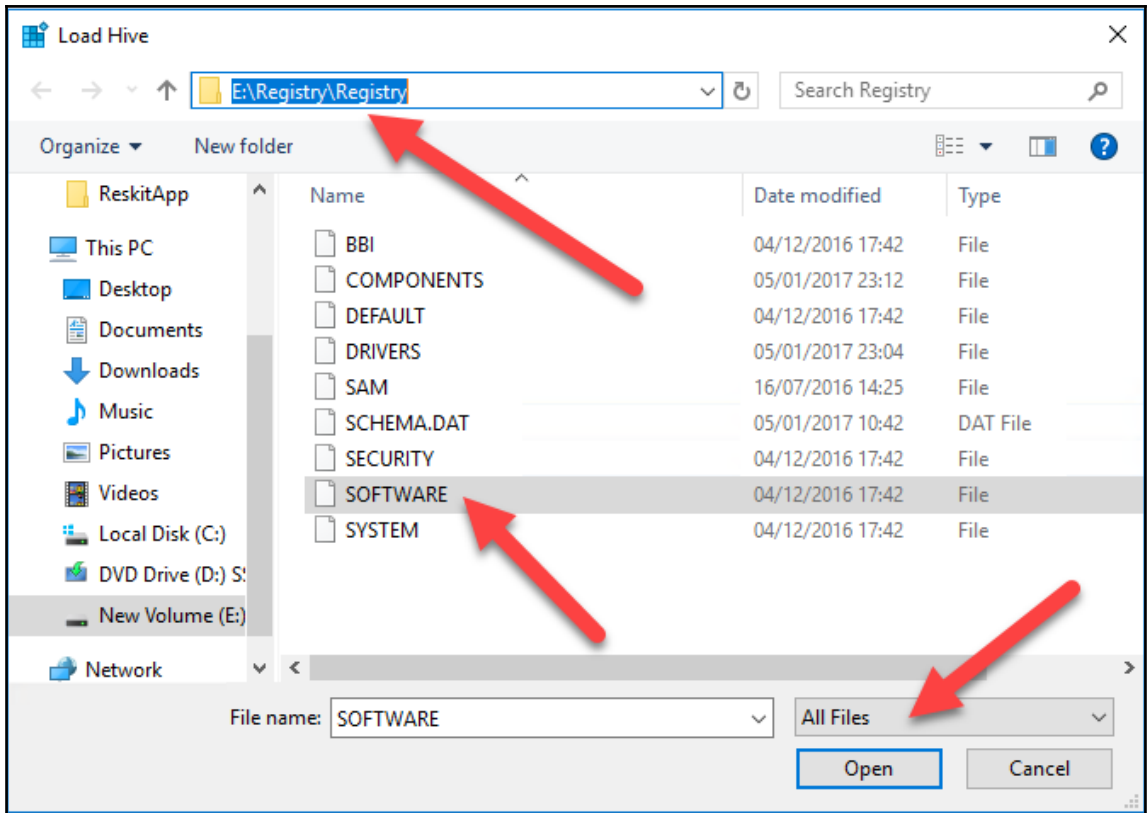


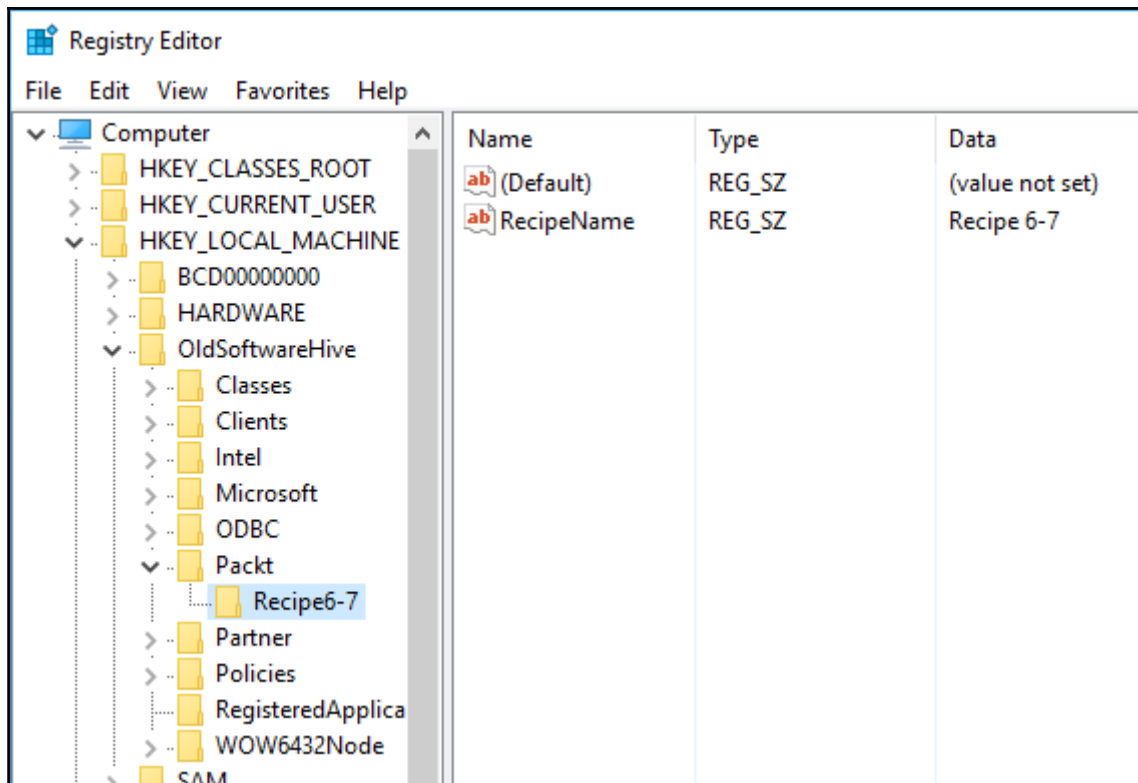












```

PS C:\> $TopKey = 'HKLM:\Software\Packt'
PS C:\> $SubKey = 'Recipe6-7'
PS C:\> $RegPath = Join-Path $TopKey -ChildPath $SubKey
PS C:\> New-Item -Path $TopKey

 Hive: HKEY_LOCAL_MACHINE\Software

Name Property
---- -
Packt

PS C:\> New-Item -Path $Regpath

 Hive: HKEY_LOCAL_MACHINE\Software\Packt

Name Property
---- -
Recipe6-7

PS C:\> Set-ItemProperty -Type String -Name RecipeName -Path $regpath -Value "Recipe 6-7"
PS C:\> Get-Item -Path $Regpath

 Hive: HKEY_LOCAL_MACHINE\Software\Packt

Name Property
---- -
Recipe6-7 RecipeName : Recipe 6-7

```

```

PS C:\> If (Get-WBPolicy) {Remove-WBPolicy -All -Force}
PS C:\> $FullBUPol = New-WBPolicy
PS C:\> $Schedule = '06:00'
PS C:\> Set-WBSchedule -Policy $FullBUPol -Schedule $Schedule | Out-Null
PS C:\> $BuDisk = Get-WBDisk | Where-Object Properties -Match 'ValidTarget'
PS C:\> $BuVol = $BuDisk | Get-WBVolume | Where-Object MountPath -eq 'E:'
PS C:\> $Target = New-WBBackupTarget -Volume $BuVol
PS C:\> Add-WBBackupTarget -Policy $FullBUPol -Target $Target -Force | Out-Null
PS C:\> $DisktoBackup = Get-WBDisk | Where-Object Disknumber -eq 0
PS C:\> $Volume = Get-WBVolume -Disk $DisktoBackup
PS C:\> Add-WBVolume -Policy $FullBUPol -Volume $Volume | Out-Null
PS C:\> Add-WBBareMetalRecovery -Policy $FullBUPol
PS C:\> Add-WBSystemState -Policy $FullBUPol
PS C:\> Start-WBBackup -Policy $FullBUPol -Force
Creating a shadow copy of the volumes in the backup...
Creating a shadow copy of the volumes in the backup...
Volume 1 (0%) of 1 volume(s).
Volume 1 (100%) of 1 volume(s).
Compacting the virtual hard disk for volume C:, 98% completed.
Creating a shadow copy of the backup storage location(s)...
The backup operation completed.

```

```
PS C:\> $Backup = Get-WBBackupSet | Where-Object BackupTarget -Match 'E:' |
Select -Last 1
PS C:\> $Backup.Application
```

```
Identifier WriterId Component

Registry afbab4a2-367d-4d15-a586-71dbb18f8485 {Registry\}
```

```
PS C:\> wbadmin Start Recovery -Version:$Version -ItemType:App -Items:Registry -Recoverytarget:E:\
wbadmin 1.0 - Backup command-line tool
(C) Copyright 2013 Microsoft Corporation. All rights reserved.
```

You have chosen to recover the application Registry. The files for the following components will be recovered to E:\.  
 Note: Recovering the files to an alternate location without involving writer will not recover the application.

Component = Registry (\Registry)

Do you want to recover the application Registry?  
 [Y] Yes [N] No Y

```
Preparing the component Registry for recovery...
Recovering the files for the component Registry, copied (20%).
Recovering the files for the component Registry, copied (100%).
Recovering the component Registry.
The component Registry was successfully recovered.
The recovery operation completed.
Log of files successfully recovered:
C:\Windows\Logs\WindowsServerBackup\ApplicationRestore-26-03-2017_20-26-36.log
```

Summary of the recovery operation:

-----  
 The component Registry was successfully recovered.

```
PS C:\> Get-ChildItem -Path E:\Registry\Registry\
```

Directory: E:\Registry\Registry

Mode	LastWriteTime	Length	Name
-a----	04/12/2016 17:42	65536	BBI
-a----	05/01/2017 23:12	41943040	COMPONENTS
-a----	04/12/2016 17:42	524288	DEFAULT
-a----	05/01/2017 23:04	5242880	DRIVERS
-a----	16/07/2016 14:25	65536	SAM
-a----	05/01/2017 10:42	11796480	SCHEMA.DAT
-a----	04/12/2016 17:42	32768	SECURITY
-a----	04/12/2016 17:42	66846720	SOFTWARE
-a----	04/12/2016 17:42	13893632	SYSTEM

```
PS C:\> Get-ChildItem -Path HKLM:\OldSoftwareHive\Packt
```

```
Hive: HKEY_LOCAL_MACHINE\OldSoftwareHive\Packt
```

Name	Property
Recipe6-7	RecipeName : Recipe 6-7

The screenshot shows a Gmail interface with an email titled "Backup Report for FS1 at: [01/10/2017 15:01:50]". The email is from BackupReport@reskit.org and contains an attachment named "Report.txt". A Notepad window is open, displaying the content of the report. The report content is as follows:

```
Backup Report for FS1 at [01/10/2017 15:01:50]

*** Backup Sets ***
VersionId BackupTime Application BackupTarget

01/08/2017-06:00 08/01/2017 06:00:09 (Registry) \\SRV1\Backup

*** Event Log Messages ***

*** Backup Error logs ***

Directory: C:\Windows\Logs\WindowsServerBackup

Mode LastWriteTime Length Name

-a----- 04/01/2017 06:12 2 Backup_Error-04-01-2017_06-00-11.log
-a----- 05/01/2017 06:12 2 Backup_Error-05-01-2017_06-00-11.log
-a----- 06/01/2017 06:48 2 Backup_Error-06-01-2017_06-00-21.log
-a----- 07/01/2017 06:42 2 Backup_Error-07-01-2017_06-00-10.log
-a----- 08/01/2017 06:46 2 Backup_Error-08-01-2017_06-00-09.log
```

Task Name	State	Action	Start	Frequency
Daily Backup Report	Ready	C:\scripts\BackupReport.ps1	2017-01-10T06:00:00+00:00	1

Sign in to your account



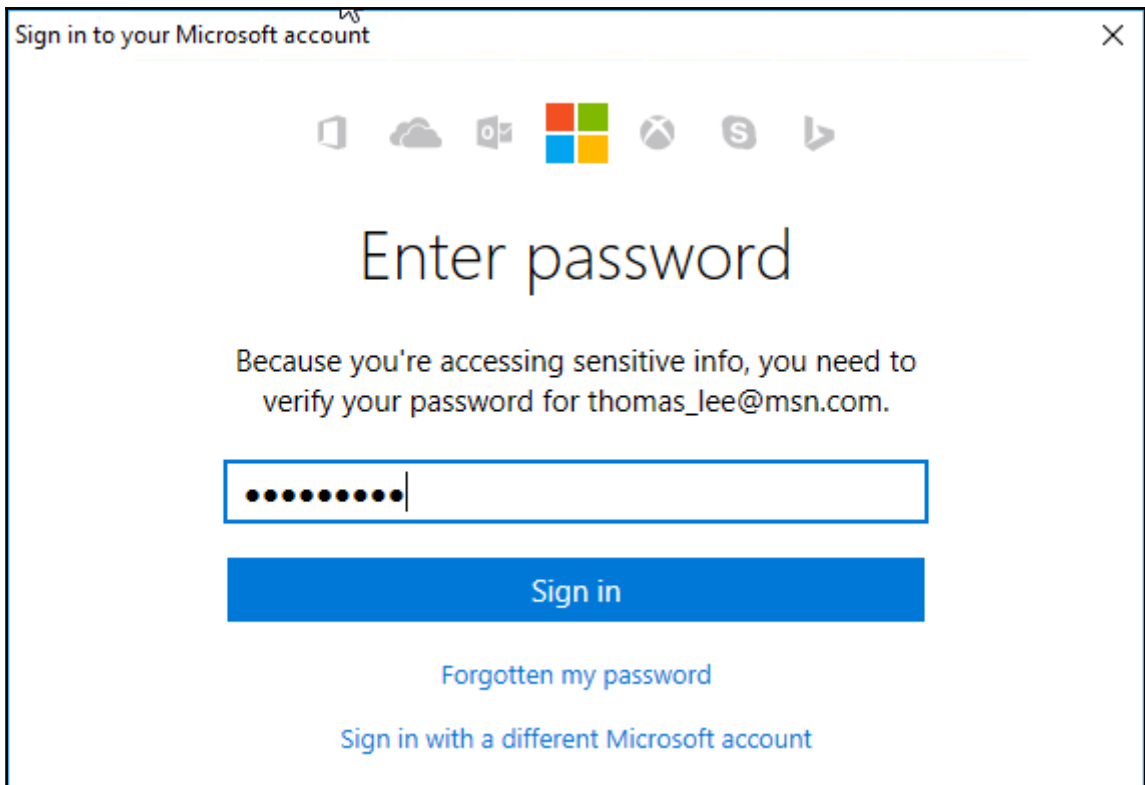
# Microsoft Azure

Work or school, or personal Microsoft account

Sign in

[Can't access your account?](#)





```
PS C:\> Login-AzureRmAccount

Environment : AzureCloud
Account : AzureAdmin@Reskit.Org
TenantId : 53746561-6c20-596f-7572-204661636521
SubscriptionId : 4a6572727-9207-26f6-36b7-32069742121
SubscriptionName : Reskit.Org
CurrentStorageAccount :
```

```
PS C:\> $Sub = Get-AzureRmSubscription
PS C:\> Select-AzureRmSubscription -SubscriptionId $Sub[0].SubscriptionId

Environment : AzureCloud
Account : AzureAdmin@Reskit.Org
TenantId : 53746561-6c20-596f-7572-204661636521
SubscriptionId : 4a6572727-9207-26f6-36b7-32069742121
SubscriptionName : Reskit.Org
CurrentStorageAccount :
```

```
PS C:\> Register-AzureRmResourceProvider -ProviderNamespace 'Microsoft.RecoveryServices'

ProviderNamespace : Microsoft.RecoveryServices
RegistrationState : Registered
ResourceTypes : {vaults, operations, locations, Locations/backupStatus...}
Locations : {West US, East US, North Europe, West Europe...}
```

```
PS C:\> $RGName = 'Recipe'
PS C:\> $Location = 'WestEurope'
PS C:\> New-AzureRmResourceGroup -Name $RGName -Location $Location

ResourceGroupName : Recipe
Location : westeurope
ProvisioningState : Succeeded
Tags :
ResourceId : /subscriptions/4a6572727-9207-26f6-36b7-32069742121/resourceGroups/Recipe
```

```
PS C:\> $VaultName = 'RecipeVault'
PS C:\> New-AzureRmRecoveryServicesVault -Name $VaultName -ResourceGroupName $RGName `
 -Location $Location

Name : RecipeVault
ID : /subscriptions/4a6572727-9207-26f6-36b7-32069742121/resourceGroups/Recipe/providers/Microsoft.RecoveryServices/vaults/RecipeVault
Type : Microsoft.RecoveryServices/vaults
Location : westeurope
ResourceGroupName : Recipe
SubscriptionId : 4a6572727-9207-26f6-36b7-32069742121
Properties : Microsoft.Azure.Commands.RecoveryServices.ARSVaultProperties
```

```
PS C:\> Get-AzureRmRecoveryServicesVault

Name : RecipeVault
ID : /subscriptions/4a6572727-9207-26f6-36b7-32069742121/resourceGroups/Recipe/providers/Microsoft.RecoveryServices/vaults/RecipeVault
Type : Microsoft.RecoveryServices/vaults
Location : westeurope
ResourceGroupName : Recipe
SubscriptionId : 4a6572727-9207-26f6-36b7-32069742121
Properties : Microsoft.Azure.Commands.RecoveryServices.ARSVaultProperties
```

```
PS C:\> $CredPath = 'C:\Foo'
PS C:\> $CredsFile = Get-AzureRmRecoveryServicesVaultSettingsFile -Backup -Vault $Vault -Path $CredPath
PS C:\> "Credential File Path: [{0}]" -f $CredsFile.FilePath

Credential File Path: [C:\Foo\RecipeVault_Mon Mar 27 2017.VaultCredentials]
```

```
PS C:\> Start-OBRegistration -VaultCredentials $Credsfile.FilePath -Confirm:$false
Vault credentials validation succeeded. Below are the backup vault details.
```

```
CertThumbprint : a94630f92e3320846484b64c61b4f421f7579131
SubscriptionID : 4a6572727-9207-26f6-36b7-32069742121
ServiceResourceName : RecipeVault
Region : westeurope
```

```
Machine registration succeeded.
```

```
PS C:\> $PassPhrase = ConvertTo-SecureString -String 'Cookham!JerryGarciaf123_Rebecca' -AsPlainText -Force
PS C:\> $PassCode = 'BWROCKS!0'
PS C:\> Set-OBMachineSetting -EncryptionPassphrase $PassPhrase -SecurityPIN $Passcode
Server properties updated successfully.
```

```
PS C:\> $APolicy = New-OBPolicy
PS C:\> $APolicy

BackupSchedule :
DsList :
PolicyName :
RetentionPolicy :
State : New
PolicyState : Valid
```

```
PS C:\> $Sched = New-OBSchedule -DaysofWeek Tuesday, Saturday -TimesofDay 04:00
PS C:\> Set-OBSchedule -Policy $APolicy -Schedule $Sched
```

```
BackupSchedule : 14:00
 Wednesday, Saturday,
 Every 1 week(s)
DsList :
PolicyName :
RetentionPolicy :
State : New
PolicyState : Valid
```

```
PS C:\> $RetentionPolicy = New-OBRetentionPolicy -RetentionDays 7
PS C:\> Set-OBRetentionPolicy -Policy $APolicy -RetentionPolicy $RetentionPolicy
```

```
BackupSchedule : 04:00
 Tuesday, Saturday,
 Every 1 week(s)
DsList :
PolicyName :
RetentionPolicy : Retention Days : 7
 WeeklyLTRSchedule :
 Weekly schedule is not set
 MonthlyLTRSchedule :
 Monthly schedule is not set
 YearlyLTRSchedule :
 Yearly schedule is not set
State : New
PolicyState : Valid
```

```
PS C:\> If (Get-OBPolicy) {Remove-OBPolicy -Confirm:$false}
PS C:\> Set-OBPolicy -Policy $APolicy -Confirm:$false
```

```
BackupSchedule : 04:00
 Tuesday, Saturday,
 Every 1 week(s)
DsList : {DataSource
 DatasourceId:140738999491858
 Name:C:\
 FileSpec:FileSpec
 FileSpec:C:\
 IsExclude:False
 IsRecursive:True
 ,FileSpec
 FileSpec:C:\Windows
 IsExclude:True
 IsRecursive:True
 }
PolicyName : 419dbee5-603c-4bad-9f56-e95e2db06099
RetentionPolicy : Retention Days : 7
 WeeklyLTRSchedule :
 Weekly schedule is not set
 MonthlyLTRSchedule :
 Monthly schedule is not set
 YearlyLTRSchedule :
 Yearly schedule is not set
State : Existing
PolicyState : Valid
```

```
PS C:\> Get-OBPolicy | Get-OBSchedule
```

```
SchedulePolicyName : 3b1abde1-f223-42e1-bc04-32e3691547ca
ScheduleRunDays : {Tuesday, Saturday}
ScheduleRunTimes : {04:00:00}
ScheduleWeeklyFrequency : 1
State : Existing
OfflineSeedingParams :
```

```
PS C:\> Get-OBPolicy | Start-OBBackup
```

```
Taking snapshot of volumes...
Preparing storage...
Generating backup metadata information and preparing the metadata VHD...
Data transfer is in progress. It might take longer since it is the first backup and all data needs to be transferred...
Data transfer completed and all backed up data is in the cloud. Verifying data integrity...
Data transfer completed
Job completed.
The backup operation completed successfully.
```

```
PS C:\> $RecoveryOption = New-OBRecoveryOption -DestinationPath 'C:\AzRecover' `
 -OverwriteType Skip
PS C:\> Start-OBRecovery -RecoverableItem $Item -RecoveryOption $RecoveryOption

Job is in pre restore step...
Estimating size of backup items...
Estimating size of backup items...
Job completed.
The recovery operation completed successfully.
```

```
PS C:\AzRecover\C_vol> Get-ChildItem C:\AzRecover\C_vol

Directory: C:\AzRecover\C_vol

Mode LastWriteTime Length Name
---- -
d----- 28/03/2017 01:50 Foo

PS C:\AzRecover\C_vol> Get-ChildItem C:\AzRecover\C_vol\Foo

Directory: C:\AzRecover\C_vol\Foo

Mode LastWriteTime Length Name
---- -
-a----- 28/03/2017 00:21 39912192 MarsInstaller.EXE
```

# Chapter 6: Managing Performance

```
PS C:> $CounterSets = Get-Counter -ListSet *
PS C:> "There are {0} counter sets on [{1}]" -f $CounterSets.count, (hostname)
There are 167 counter sets on [SRV1]
```

```
There are 165 counters on [dc1]
There are 147 counters on [ca]
There are 193 counters on [dg]
There are 167 counters on [srv1]
There are 175 counters on [fs1]
There are 174 counters on [fs2]
There are 147 counters on [psrv]
```

CounterSetName	Description
Processor	The Processor performance object consists of counters that measure aspects of processor activity. The processor is the part of the computer that performs arithmetic and logical computations, initiates operations on peripherals, and runs the threads of processes. A computer can have multiple processors. The processor object represents each processor as an instance of the object.
Memory	The Memory performance object consists of counters that describe the behavior of physical and virtual memory on the computer. Physical memory is the amount of random access memory on the computer. Virtual memory consists of the space in physical memory and on disk. Many of the memory counters monitor paging, which is the movement of pages of code and data between disk and physical memory. Excessive paging, a symptom of a memory shortage, can cause delays which interfere with all system processes.
Network QoS Policy	This counter set consists of flow statistics specific to a network QoS policy.
Network Interface	The Network Interface performance object consists of counters that measure the rates at which bytes and packets are sent and received over a network connection. It includes counters that monitor connection errors.
Network Adapter	The Network Adapter performance object consists of counters that measure the rates at which bytes and packets are sent and received over a physical or virtual network connection. It includes counters that monitor connection errors.
FileSystem Disk Activity	The FileSystem Disk Activity performance counter set consists of counters that measure the aspect of filesystem's IO Activity. This counter set measures the number of bytes filesystem read from and wrote to the disk drive.
LogicalDisk	The Logical Disk performance object consists of counters that monitor logical partitions of a hard or fixed disk drives. Performance Monitor identifies logical disks by their a drive letter, such as C.
PhysicalDisk	The Physical Disk performance object consists of counters that monitor hard or fixed disk drive on a computer. Disks are used to store file, program, and paging data and are read to retrieve these items, and written to record changes to them. The values of physical disk counters are sums of the values of the logical disks (or partitions) into which they are divided.

```
Memory counter set has [36] counters
Processor counter set has [15] counters
```

At	Counter	Value
14/01/2017 00:30:00	\\srv1\memory\page faults/sec	12.0078471280982
14/01/2017 00:30:01	\\srv1\memory\available bytes	1257881600
14/01/2017 00:30:02	\\srv1\memory\committed bytes	4254994432
14/01/2017 00:30:03	\\srv1\memory\commit limit	5827514368
14/01/2017 00:30:04	\\srv1\memory\write copies/sec	0
14/01/2017 00:30:05	\\srv1\memory\transition faults/sec	1.99866808758643
14/01/2017 00:30:06	\\srv1\memory\cache faults/sec	0
14/01/2017 00:30:07	\\srv1\memory\demand zero faults/sec	0
14/01/2017 00:30:08	\\srv1\memory\pages/sec	0
14/01/2017 00:30:09	\\srv1\memory\pages input/sec	0
14/01/2017 00:30:10	\\srv1\memory\page reads/sec	0
14/01/2017 00:30:11	\\srv1\memory\pages output/sec	0
14/01/2017 00:30:12	\\srv1\memory\pool paged bytes	137068544
14/01/2017 00:30:13	\\srv1\memory\pool nonpaged bytes	42594304
14/01/2017 00:30:14	\\srv1\memory\page writes/sec	0
14/01/2017 00:30:15	\\srv1\memory\pool paged allocs	108561
14/01/2017 00:30:16	\\srv1\memory\pool nonpaged allocs	76393
14/01/2017 00:30:17	\\srv1\memory\free system page table entries	12311148
14/01/2017 00:30:18	\\srv1\memory\cache bytes	31903744
14/01/2017 00:30:19	\\srv1\memory\cache bytes peak	97136640
14/01/2017 00:30:20	\\srv1\memory\pool paged resident bytes	101056512
14/01/2017 00:30:21	\\srv1\memory\system code total bytes	3825664
14/01/2017 00:30:22	\\srv1\memory\system code resident bytes	3547136
14/01/2017 00:30:23	\\srv1\memory\system driver total bytes	13737984
14/01/2017 00:30:24	\\srv1\memory\system driver resident bytes	12300288
14/01/2017 00:30:25	\\srv1\memory\system cache resident bytes	0
14/01/2017 00:30:26	\\srv1\memory%\% committed bytes in use	73.0534822617316
14/01/2017 00:30:27	\\srv1\memory\available kbytes	1224696
14/01/2017 00:30:28	\\srv1\memory\available mbytes	1197
14/01/2017 00:30:29	\\srv1\memory\transition pages repurposed/sec	0
14/01/2017 00:30:30	\\srv1\memory\free & zero page list bytes	879222784
14/01/2017 00:30:31	\\srv1\memory\modified page list bytes	42606592
14/01/2017 00:30:32	\\srv1\memory\standby cache reserve bytes	182726656
14/01/2017 00:30:33	\\srv1\memory\standby cache normal priority bytes	193556480
14/01/2017 00:30:34	\\srv1\memory\standby cache core bytes	0
14/01/2017 00:30:35	\\srv1\memory\long-term average standby cache lifetime (s)	14400

CounterSetName	CounterSetType
Processor	MultiInstance
Memory	SingleInstance
Network QoS Policy	SingleInstance
Network Interface	MultiInstance
Network Adapter	MultiInstance
FileSystem Disk Activity	SingleInstance
LogicalDisk	MultiInstance
PhysicalDisk	MultiInstance



```

Timestamp CounterSamples
----- -
14/01/2017 00:42:44 \\srv1\memory\page faults/sec :
 0.999193451046316

14/01/2017 00:42:45 \\srv1\processor(0)\% processor time :
 1.62150741984958

 \\srv1\processor(_total)\% processor time :
 1.62150741984958

```

```

TypeName: Microsoft.PowerShell.Commands.GetCounter.PerformanceCounterSampleSet
Name MemberType Definition

CounterSamples Property Microsoft.PowerShell.Commands.GetCounter.PerformanceCounterSample[] CounterSamples
{get;set;}
Timestamp Property datetime Timestamp {get;set;}
Readings ScriptProperty System.Object Readings {get=$strPaths = ""
 foreach ($ctr in $this.CounterSamples)
 {
 $strPaths += ($ctr.Path + " : " + "`n")
 $strPaths += ($ctr.CookedValue.ToString() + "`n`n")
 }
 return $strPaths;}

```



TypeName: Microsoft.PowerShell.Commands.GetCounter.PerformanceCounterSample

Name	MemberType	Definition
CookedValue	Property	double CookedValue {get;set;}
CounterType	Property	System.Diagnostics.PerformanceCounterType CounterType {get;set;}
DefaultScale	Property	uint32 DefaultScale {get;set;}
InstanceName	Property	string InstanceName {get;set;}
MultipleCount	Property	uint32 MultipleCount {get;set;}
Path	Property	string Path {get;set;}
RawValue	Property	uint64 RawValue {get;set;}
SecondValue	Property	uint64 SecondValue {get;set;}
Status	Property	uint32 Status {get;set;}
TimeBase	Property	uint64 TimeBase {get;set;}
Timestamp	Property	datetime Timestamp {get;set;}
Timestamp100NSec	Property	uint64 Timestamp100NSec {get;set;}

Path : \\srv1\processor(0)\% processor time  
InstanceName : 0  
CookedValue : 0  
RawValue : 3159552968750  
SecondValue : 131289666340986025  
MultipleCount : 1  
CounterType : Timer100NsInverse  
Timestamp : 15/01/2017 15:10:34  
Timestamp100NSec : 131289666340980000  
Status : 0  
DefaultScale : 0  
TimeBase : 10000000

Path : \\srv1\processor(\_total)\% processor time  
InstanceName : \_total  
CookedValue : 0  
RawValue : 3159552968750  
SecondValue : 131289666340986025  
MultipleCount : 1  
CounterType : Timer100NsInverse  
Timestamp : 15/01/2017 15:10:34  
Timestamp100NSec : 131289666340980000  
Status : 0  
DefaultScale : 0  
TimeBase : 10000000

```
PS C:\> Get-Cimclass -ClassName Win32*perf* | Measure-Object
```

```
Count : 343
Average :
Sum :
Maximum :
Minimum :
Property :
```

```
PS C:\> Get-Cimclass -ClassName Win32*perfFormatted* | Measure-Object
```

```
Count : 171
Average :
Sum :
Maximum :
Minimum :
Property :
```

```
PS C:\> Get-Cimclass -ClassName Win32*perfraw* | Measure-Object
```

```
Count : 171
Average :
Sum :
Maximum :
Minimum :
Property :
```

```
PS C:\> Get-cimclass "win32_PerfFormatted*perfos*" | Select-Object -Property CimClassName
```

```
CimClassName
```

```

Win32_PerfFormattedData_PerfOS_Cache
Win32_PerfFormattedData_PerfOS_Memory
Win32_PerfFormattedData_PerfOS_NUMANodeMemory
Win32_PerfFormattedData_PerfOS_Objects
Win32_PerfFormattedData_PerfOS_PagingFile
Win32_PerfFormattedData_PerfOS_Processor
Win32_PerfFormattedData_PerfOS_System
```

```
PS C:\> Get-cimclass "win32_PerfFormatted*disk*" | Select-Object -Property CimClassName
```

```
CimClassName
```

```

Win32_PerfFormattedData_Counters_FileSystemDiskActivity
Win32_PerfFormattedData_PerfDisk_LogicalDisk
Win32_PerfFormattedData_PerfDisk_PhysicalDisk
```

```
PS C:\> Get-CimInstance -ClassName Win32_PerfFormattedData_PerfOS_Memory
```

```
Caption :
Description :
Name :
Frequency_Object :
Frequency_PerfTime :
Frequency_Sys100NS :
Timestamp_Object :
Timestamp_PerfTime :
Timestamp_Sys100NS :
AvailableBytes : 688861184
AvailableKBytes : 672716
AvailableMBytes : 656
CacheBytes : 55291904
CacheBytesPeak : 124846080
CacheFaultsPersec : 0
CommitLimit : 2652426240
CommittedBytes : 1655054336
DemandZeroFaultsPersec : 19
FreeAndZeroPageListBytes : 50941952
FreeSystemPageTableEntries : 12310378
LongTermAverageStandbyCacheLifetimes : 14400
ModifiedPageListBytes : 4993024
PageFaultsPersec : 27
PageReadsPersec : 0
PagesInputPersec : 0
PagesOutputPersec : 0
```

```
PS C:\> Get-CimInstance -ClassName Win32_PerfFormattedData_PerfOS_Processor |
Where Name -eq '_Total'
```

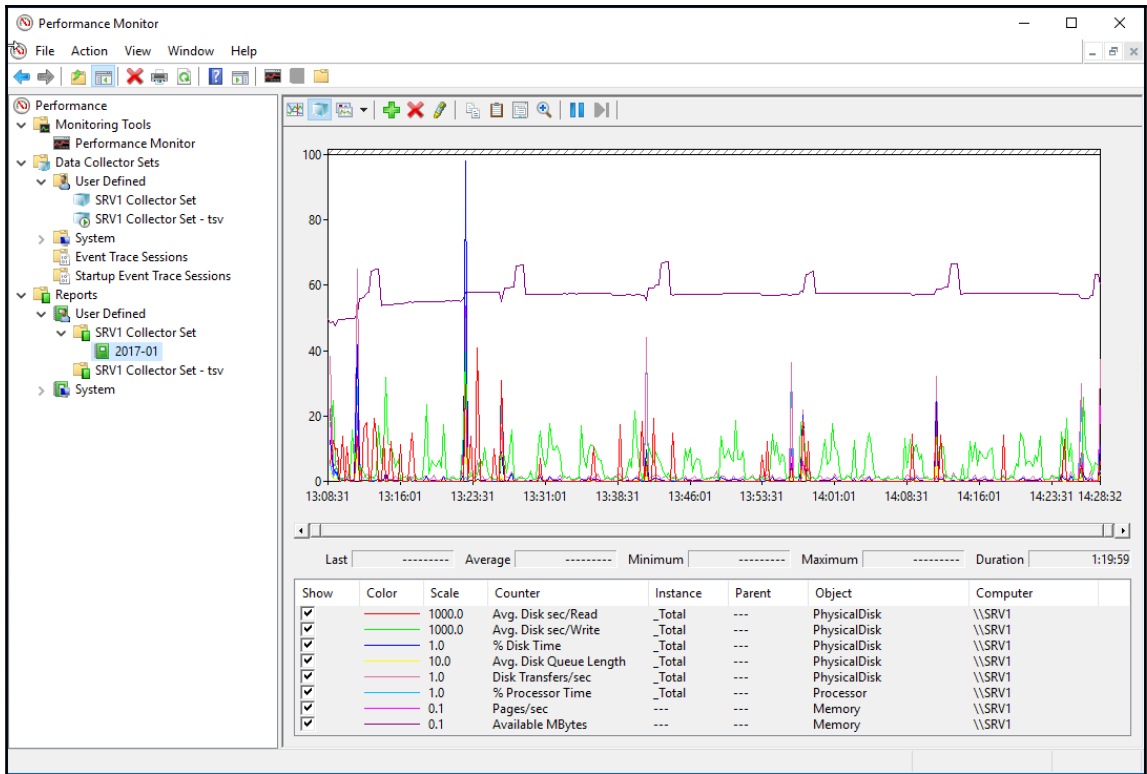
```
Caption :
Description :
Name : _Total
Frequency_Object :
Frequency_PerfTime :
Frequency_Sys100NS :
Timestamp_Object :
Timestamp_PerfTime :
Timestamp_Sys100NS :
C1TransitionsPersec : 15
C2TransitionsPersec : 73
C3TransitionsPersec : 0
DPCRate : 1
DPCsQueuedPersec : 81
InterruptsPersec : 163
PercentC1Time : 22
PercentC2Time : 73
PercentC3Time : 0
PercentDPCTime : 0
PercentIdleTime : 96
PercentInterruptTime : 0
PercentPrivilegedTime : 0
PercentProcessortime : 2
PercentUserTime : 0
PSComputerName :
```

```
PS C:\> Get-CimInstance -ClassName Win32_PerfFormattedData_PerfOS_Processor |
Select -Property Name, PercentProcessortime
```

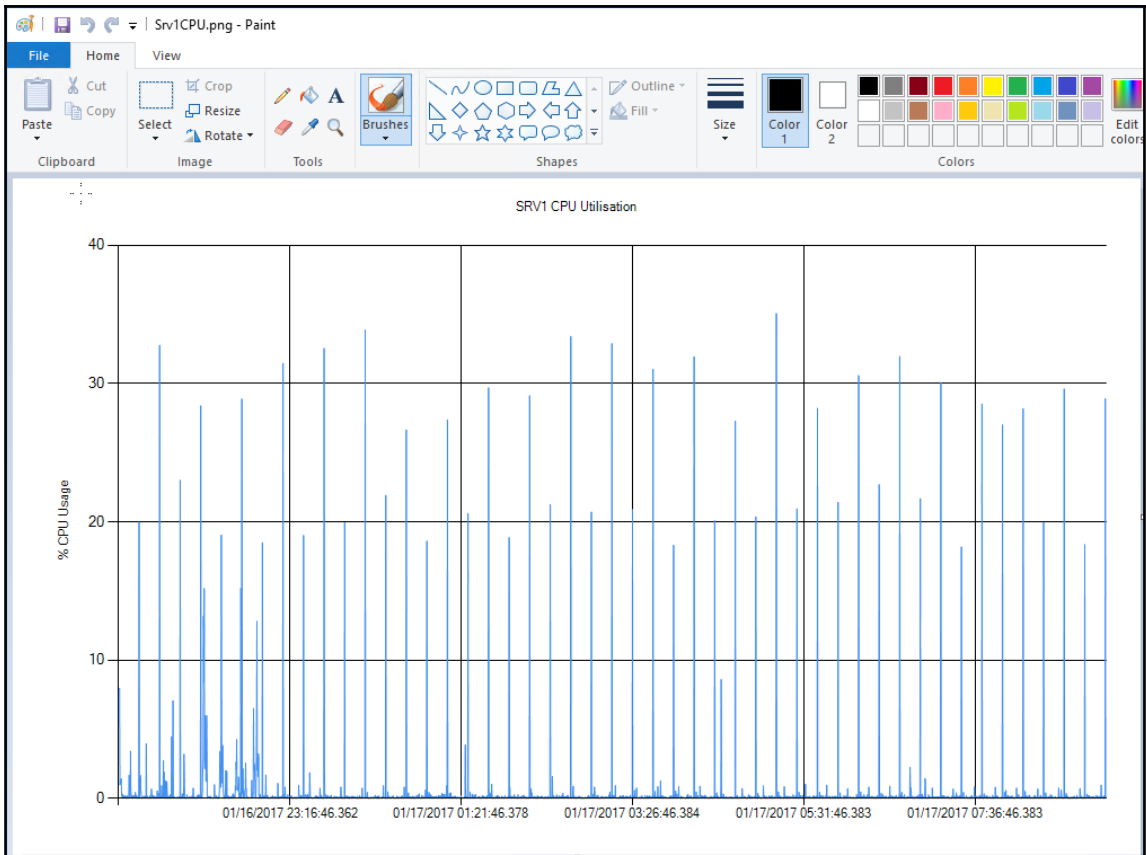
Name	PercentProcessortime
-----	-----
_Total	0
0	0

```
PS C:\> Get-CimInstance -ClassName Win32_PerfFormattedData_PerfOS_Memory -ComputerName DC1
```

```
Caption :
Description :
Name :
Frequency_Object :
Frequency_PerfTime :
Frequency_Sys100NS :
Timestamp_Object :
Timestamp_PerfTime :
Timestamp_Sys100NS :
AvailableBytes : 562872320
AvailableKBytes : 549680
AvailableMBytes : 536
CacheBytes : 66990080
CacheBytesPeak : 130334720
CacheFaultsPersec : 0
CommitLimit : 2549665792
CommittedBytes : 1793781760
DemandZeroFaultsPersec : 7
FreeAndZeroPageListBytes : 34189312
FreeSystemPageTableEntries : 12309607
LongTermAverageStandbyCacheLifetimes : 14400
ModifiedPageListBytes : 1671168
PageFaultsPersec : 19
PageReadsPersec : 0
PagesInputPersec : 0
PagesOutputPersec : 0
PagesPersec : 0
PageWritesPersec : 0
PercentCommittedBytesInUse : 70
-----+-----
-----+-----
```



Property	Count	Maximum	CPU95	Minimum
\\SRV1\Processor(_Total)\% Processor Time	2881	35.06	0.86	35.06



C:\PerfLogs\System\Diagnostics\SRV1\_20170910-00005\report.htm C:\PerfLogs\System\Diagn...


### System Diagnostics Report

Computer: SRV1  
Collected: 10 September 2017 14:22:05  
Duration: 60 Seconds

### Diagnostic Results

#### Warnings

#### Error


**Symptom:**  A service is reported as having an unexpected error code

**Cause:** One or more services has failed. The service did not stop gracefully, suggesting the service may have crashed or one of its components stopped in an unsupported way.

**Details:** Service exited with code not equal to 0 or 1077

**Resolution:** Restart the service

**Related:** [Performance Diagnosis](#)

**Symptom:**  Device is disabled.


**Cause:** A device is disabled preventing it from working properly.

**Details:** The device, Microsoft Hyper-V Network Adapter, is disabled. If this device is no longer used it may be intentionally disabled. The Plug and Play ID for this device is 3.

**Resolution:**

1. Determine if you need the device.
2. If you need the device, enable it in Device Manager.
3. If you do not use the device it can be left disabled.

**Related:** [Explanation of Error Codes Generated by Device Manager](#)  
[Manage Devices in Windows](#)

**Symptom:**  Device is disabled.

**Cause:** A device is disabled preventing it from working properly.

**Details:** The device, Microsoft Hyper-V Network Adapter, is disabled. If this device is no longer used it may be intentionally disabled. The Plug and Play ID for this device is VMBUS{F8615163-DF3E-46C5-913F-F2D2F965ED0E}\{57588175-FFAF-46AB-86A7-E0F7D883A842}.

**Resolution:**

1. Determine if you need the device.
2. If you need the device, enable it in Device Manager.
3. If you do not use the device it can be left disabled.

**Related:** [Explanation of Error Codes Generated by Device Manager](#)  
[Manage Devices in Windows](#)

#### Informational



# Chapter 7: Troubleshooting Windows Server 2016

```
PS C:\> Ping DC1
```

```
Pinging DC1.Reskit.Org [10.10.10.10] with 32 bytes of data:
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
```

```
Ping statistics for 10.10.10.10:
```

```
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
PS C:\> Test-Connection -ComputerName DC1
```

Source	Destination	IPV4Address	IPV6Address	Bytes	Time(ms)
SRV1	DC1	10.10.10.10		32	0
SRV1	DC1	10.10.10.10		32	0
SRV1	DC1	10.10.10.10		32	0
SRV1	DC1	10.10.10.10		32	0

```
PS C:\> Test-Connection -ComputerName DC1 -Quiet
True
```

```
C:\> Test-Connection -computer 'DC1','DC2','SRV1' -Count 1
```

Source	Destination	IPV4Address	IPV6Address	Bytes	Time(ms)
SRV1	DC1	10.10.10.10		32	0
SRV1	DC2	10.10.10.11		32	0
SRV1	SRV1	10.10.10.50	fe80::b8df:5252:3cf6:b0b7%2	32	0

```
PS C:\> Test-NetConnection -ComputerName DC1 -CommonTCPPort SMB
```

```
ComputerName : DC1
RemoteAddress : 10.10.10.10
RemotePort : 445
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
TcpTestSucceeded : True
```

```
PS C:\> Test-NetConnection -ComputerName DC1 -CommonTCPPort HTTP
 -InformationLevel Detailed
```

```
ComputerName : DC1
RemoteAddress : 10.10.10.10
RemotePort : 80
NameResolutionResults : 10.10.10.10
MatchingIPsecRules :
NetworkIsolationContext : Private Network
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
NetRoute (NextHop) : 0.0.0.0
TcpTestSucceeded : True
```

```
PS C:\> Test-NetConnection -ComputerName DC1 -Port 445
```

```
ComputerName : DC1
RemoteAddress : 10.10.10.10
RemotePort : 445
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
TcpTestSucceeded : True
```

```
WARNING: Ping to 10.10.10.123 failed -- Status: DestinationHostUnreachable
```

```
ComputerName : 10.10.10.123
RemoteAddress : 10.10.10.123
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
PingSucceeded : False
PingReplyDetails (RTT) : 0 ms
```

```
C:\> Test-NetConnection -ComputerName DC1 -PORT 9999
WARNING: TCP connect to DC1:9999 failed
```

```
ComputerName : DC1
RemoteAddress : 10.10.10.10
RemotePort : 9999
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
PingSucceeded : True
PingReplyDetails (RTT) : 0 ms
TcpTestSucceeded : False
```

```
PS C:\Windows\system32> $TSPacks | Format-Table -Property Name, Version,
MinimumVersion,
Description
-Wrap -AutoSize
```

Name	Version	MinimumVersion	Description
Aero	1.0	6.1	Find and fix problems with the Aero desktop experience.
Windows Store Apps	4.0	6.1	Troubleshoot problems that may prevent Windows Store Apps from working properly.
Sound	4.1	6.1	Troubleshoot problems that prevent your computer from playing or recording sound.
Background Intelligent Transfer Service	3.5	6.0	Find and fix problems that may prevent background downloads from working.
Blue Screen	1.0	6.1	Troubleshoot errors that cause Windows to stop or restart unexpectedly.
Hardware and Devices	4.0	6.1	Find and fix problems with devices and hardware.
Devices and Printers	3.0	6.1	Troubleshoot problems with devices and printers.
HomeGroup	1.2	6.1	Find and fix problems with viewing computers or shared files in a homegroup.
Internet Explorer Performance	1.2	6.1	Find and fix problems with Internet Explorer performance.
Internet Explorer Safety	1.1	6.1	Find and fix problems with security and privacy features in Internet Explorer.
Keyboard	1.0	6.1	Find and fix problems with your computer's keyboard settings.
Windows Network Diagnostics	4.0	6.1	Detects problems with network connectivity.
Program Compatibility Troubleshooter	2.0	6.1	Find and fix problems with running older programs on this version of Windows.
Performance	1.0	6.1	Find and fix problems to help optimize Windows speed and performance.
Power	1.0	6.1	Find and fix problems with your computer's power settings to conserve power and extend battery life.
Printer	4.0	6.1	Find and fix problems with printing.
Search and Indexing	1.0	6.1	Find and fix problems with Windows Search.
Speech	1.0	6.1	Get your microphone ready and fix problems that may prevent Windows from hearing you.
USB	1.0	6.2	Troubleshoot problems with a USB device.
Video Playback	3.0	6.1	Find and fix problems playing movies, television, and video.
Windows Media Player Settings	1.1	6.1	Find and fix problems with Windows Media Player settings.
Windows Media Player Library	1.1	6.1	Find and fix problems with the Windows Media Player Library.
Windows Media Player DVD	1.1	6.1	Find and fix problems with playing DVDs in Windows Media Player.
Windows Update	9.1	6.1	Resolve problems that prevent you from updating Windows.

```
PS C:\Windows\system32> $TSPack.RootCauses
```

```
Name
```

```

```

```
Default Windows Update data locations have changed
Potential Windows Update Database error detected
Windows Update components must be repaired
System date and time aren't correct
```

```
PS C:\> $TSPack.RootCauses.Resolutions
```

Name	Manual	Elevation	Interactive
----	-----	-----	-----
Repair default Windows Update locations	False	True	False
Repair Windows Update Database Corruption	False	True	True
Repair Windows Update components	False	True	True
Set the correct date and time	False	True	False

```
PS C:\> $TsPack = $TSPacks | where id -eq 'WindowsUpdateDiagnostic'
```

```
PS C:\> $TsPack | Invoke-TroubleshootingPack
```

```
Please select the resolutions to apply
The following resolutions are available to address problems that were found
```

```
Potential Windows Update Database error detected
```

```
[1] Repair Windows Update Database Corruption
```

```
Windows Update components must be repaired
```

```
[2] Repair Windows Update components
```

```
[?] Help
```

```
[x] Exit
```

```
:
```

```
Running resolution 'Repair Windows Update components'...
Stopping Bits service
Stopping CryptSvc service
Clearing Bits queue
Starting CryptSvc service
Starting Bits service
```

The selected resolutions have been run.  
Please select whether you wish to run additional resolutions or exit.

[1] Run additional resolutions

[?] Help  
[x] Exit  
:

```
PS C:\> Get-Content -Path C:\Answers.xml
```

```
<?xml version="1.0" encoding="UTF-8"?>
<Answers Version="1.0">
 <Interaction ID="INT_AggressiveMode">
 <Value>1</Value>
 </Interaction>
</Answers>
```

```
PS C:\> Get-BpaModel | Format-Table -Property Name, Id
```

Name	Id
-----	--
RightsManagementServices	Microsoft/Windows/AD RMS
CertificateServices	Microsoft/Windows/CertificateServices
Cluster-Aware Updating	Microsoft/Windows/ClusterAwareUpdating
Microsoft DHCP Server Configuration Analysis Model	Microsoft/Windows/DHCPServer
DirectoryServices	Microsoft/Windows/DirectoryServices
Microsoft DNS Server Configuration Analysis Model	Microsoft/Windows/DNSServer
File Services	Microsoft/Windows/FileServices
Hyper-V	Microsoft/Windows/Hyper-V
LightweightDirectoryServices	Microsoft/Windows/LightweightDirect...
Network Policy and Access Services (NPAS)	Microsoft/Windows/NPAS
Microsoft Remote Access Server Configuration An...	Microsoft/Windows/RemoteAccessServer
TerminalServices	Microsoft/Windows/TerminalServices
Windows Server Update Services	Microsoft/Windows/UpdateServices
Microsoft Volume Activation Configuration Analy...	Microsoft/Windows/VolumeActivation
WebServer	Microsoft/Windows/WebServer

```
PS C:\> Invoke-BpaModel -ModelId Microsoft/Windows/FileServices
```

```
ModelId : Microsoft/Windows/FileServices
SubModelId :
Success : True
ScanTime : 21/07/2017 11:21:59
ScanTimeUtcOffset :
Detail : {SRV1, SRV1}
```

```
PS C:\> $Results.count
116
```

```
PS C:\> ($Results | Where-Object Severity -eq 'Error').count
0
```

```
PS C:\> $Warnings | Select -First 3 |
Format-List Category, Problem, Impact, Resolution
```

```
Category : Configuration
Problem : In addition to the normal file names, the server is creating short, eight-character
 file names with a three-character file extension (8.3 file names) for all files.
Impact : Creating short file names in addition to the normal, long file names can
 significantly decrease file server performance.
Resolution : Disable short file name creation unless short file names are required by legacy
 applications.
```

```
Category : Configuration
Problem : Srv.sys is not set to start on demand.
Impact : Client computers will not be able to access file shares and other Server Message
 Block (SMB)-based network services on this computer.
Resolution : Set Srv.sys to start on demand.
```

```
Category : Configuration
Problem : AsynchronousCredits doesn't have the recommended value on this server.
Impact : SMB not in a default configuration, which could lead to less than optimal behavior.
Resolution : Set AsynchronousCredits to the recommended value, 64.
```

```
PS C:\> Invoke-Command -ComputerName DC1 -ScriptBlock {Get-BpaModel} |
Format-Table -Property Name, Id
```

Name	Id
-----	--
RightsManagementServices	Microsoft/Windows/ADRMS
CertificateServices	Microsoft/Windows/CertificateServices
Microsoft DHCP Server Configuration Analysis Model	Microsoft/Windows/DHCPServer
DirectoryServices	Microsoft/Windows/DirectoryServices
Microsoft DNS Server Configuration Analysis Model	Microsoft/Windows/DNSServer
File Services	Microsoft/Windows/FileServices
Hyper-V	Microsoft/Windows/Hyper-V
LightweightDirectoryServices	Microsoft/Windows/LightweightDirect...
Network Policy and Access Services (NPAS)	Microsoft/Windows/NPAS
Microsoft Remote Access Server Configuration Analysis Model	Microsoft/Windows/RemoteAccessServer
TerminalServices	Microsoft/Windows/TerminalServices
Windows Server Update Services	Microsoft/Windows/UpdateServices
Microsoft Volume Activation Configuration Analysis Model	Microsoft/Windows/VolumeActivation
WebServer	Microsoft/Windows/WebServer

```
PS C:\> $SB = {Invoke-BpaModel -ModelId `
 Microsoft/Windows/DirectoryServices}
PS C:\> Invoke-Command -ComputerName DC1 -ScriptBlock $sb
```

```
ModelId : Microsoft/Windows/DirectoryServices
SubModelId :
Success : True
ScanTime : 21/07/2017 11:24:58
ScanTimeUtcOffset :
Detail : {DC1, DC1}
```

```
PS C:\> $RResults.count
43
```

```
PS C:\> $RResults | Group-Object SEVERITY |
Format-Table -Property Name, Count
```

Name	Count
----	-----
Information	35
Error	1
Warning	7

```
PS C:\> $RRResults | Where-Object Severity -EQ 'Error' |
Format-List -Property Category,Problem,Impact,Resolution
```

```
Category : Configuration
Problem : The primary domain controller (PDC) emulator operations master in this forest is not
configured to correctly synchronize time from a valid time source.
Impact : If the PDC emulator master in this forest is not configured to correctly synchronize
time from a valid time source, it might use its internal clock for time
synchronization. If the PDC emulator master in this forest fails or otherwise
becomes unavailable (and if you have not configured a reliable time server
(GTIMESERV) in the forest root domain), other member computers and domain
controllers in the forest will not be able to synchronize their time.
Resolution : Set the PDC emulator master in this forest to synchronize time with a reliable
external time source. If you have not configured a reliable time server (GTIMESERV)
in the forest root domain, set the PDC emulator master in this forest to synchronize
time with a hardware clock that is installed on the network (the recommended
approach). You can also set the PDC emulator master in this forest to synchronize
time with an external time server by running the w32tm /config
/computer:DC1.Reskit.Org /manualpeerlist:time.windows.com /syncfromflags:manual
/update command. If you have configured a reliable time server (GTIMESERV) in the
forest root domain, set the PDC emulator master in this forest to synchronize time
from the forest root domain hierarchy by running w32tm /config
/computer:DC1.Reskit.Org /syncfromflags:domhier /update.
```

```
PS C:\> Get-EventLog -LogName *
```

Max(K)	Retain	OverflowAction	Entries	Log
20,480	0	OverwriteAsNeeded	19,919	Application
15,168	0	OverwriteAsNeeded	138	DFS Replication
20,480	0	OverwriteAsNeeded	0	HardwareEvents
512	7	OverwriteOlder	0	Internet Explorer
20,480	0	OverwriteAsNeeded	0	Key Management Service
20,480	0	OverwriteAsNeeded	29,373	Security
20,480	0	OverwriteAsNeeded	61,889	System
15,360	0	OverwriteAsNeeded	15,454	Windows PowerShell



```
PS C:\> Get-EventLog -LogName * -ComputerName DC1
```

Max(K)	Retain	OverflowAction	Entries	Log
512	7	OverwriteOlder	320	Active Directory Web Services
20,480	0	OverwriteAsNeeded	21,312	Application
15,168	0	OverwriteAsNeeded	1,324	DFS Replication
512	0	OverwriteAsNeeded	3,186	Directory Service
02,400	0	OverwriteAsNeeded	336	DNS Server
20,480	0	OverwriteAsNeeded	0	HardwareEvents
512	7	OverwriteOlder	0	Internet Explorer
20,480	0	OverwriteAsNeeded	0	Key Management Service
31,072	0	OverwriteAsNeeded	188,206	Security
20,480	0	OverwriteAsNeeded	17,112	System
15,360	0	OverwriteAsNeeded	15,825	Windows PowerShell

```
PS C:\> Get-EventLog -LogName application |
 Group-Object -property EntryType |
 Format-Table -Property Name, Count
```

Name	Count
Information	19549
0	246
Error	103
Warning	21

```

PS C:\> Get-EventLog -LogName System |
 Group-Object -Property Source |
 Sort-Object -Property Count -Descending |
 Select -First 10 |
 Format-Table -Property name, count

```

Name	Count
Service Control Manager	57343
WAS	653
Microsoft-Windows-Kernel-General	508
Microsoft-Windows-Hyper-V-Netvsc	469
Microsoft-Windows-Time-Service	418
Microsoft-Windows-FilterManager	317
EventLog	278
Microsoft-Windows-Kernel-Boot	192
HTTP	179
Microsoft-Windows-DNS-Client	171

```

PS C:\> $LocEventLogs = Get-WinEvent -ListLog *
PS C:\> $LocEventLogs.count
385

```

```

PS C:\> $LocEventLogs |
 Sort-Object -Property RecordCount -Descending |
 Select-Object -First 10

```

LogMode	MaximumSizeInBytes	RecordCount	LogName
Circular	20971520	61837	System
Circular	20971520	27148	Security
Circular	20971520	19979	Application
Circular	20000000	19253	Microsoft-Windows-Store/Operational
Circular	10485760	17476	Microsoft-Windows-TaskScheduler/Operational
Circular	15728640	15487	windows PowerShell
Circular	4194304	8245	Microsoft-Windows-GroupPolicy/Operational
Circular	8388608	4898	Microsoft-Windows-SmbClient/Security
Circular	1052672	2566	Microsoft-Client-Licensing-Platform/Admin
Circular	1052672	2524	Microsoft-Windows-Kernel-IO/Operational

```
PS C:\> $RemEventLogs = Get-WinEvent -ListLog * -ComputerName DC1
PS C:\> $RemEventLogs.count
407
```

```
PS C:\> $RemEventLogs |
Sort-Object -Property RecordCount -Descending |
Select-Object -First 10
```

LogMode	MaximumSizeInBytes	RecordCount	LogName
Circular	134217728	187690	Security
Circular	20000000	29766	Microsoft-Windows-Store/Operational
Circular	10485760	17463	Microsoft-Windows-TaskScheduler/Operational
Circular	20971520	16648	System
Circular	15728640	15819	Windows PowerShell
Circular	4194304	7485	Microsoft-Windows-GroupPolicy/Operational
Circular	15728640	3146	Microsoft-Windows-PowerShell/Operational
Circular	1052672	3012	Directory Service
Circular	1052672	2483	Microsoft-Windows-Kernel-IO/Operational
Circular	1052672	2424	Microsoft-Client-Licensing-Platform/Admin

```
PS C:\> $Updates = Get-WinEvent -LogName 'Microsoft-Windows-WindowsUpdateClient/Operational' |
Where-Object ID -EQ 41
```

```
PS C:\> $out = Foreach ($Update in $Updates) {
 $ht = @{}
 $ht.Time = $Update.TimeCreated
 $ht.update = ($Update.Properties | Select -First 1).Value
 New-Object -TypeName PSObject -Property $HT }
PS C:\> $out |
```

```
Sort-Object -Property TimeCreated |
Format-Table -Wrap
```

Time	update
24/07/2017 19:40:22	Definition Update for Windows Defender - KB2267602 (Definition 1.249.158.0)
24/07/2017 17:56:28	Definition Update for Windows Defender - KB2267602 (Definition 1.249.155.0)
23/07/2017 17:42:55	Definition Update for Windows Defender - KB2267602 (Definition 1.249.118.0)
23/07/2017 16:28:32	Definition Update for Windows Defender - KB2267602 (Definition 1.249.116.0)
23/07/2017 15:53:03	2017-07 Cumulative Update for Windows Server 2016 for x64-based Systems (KB4025339)
23/07/2017 15:53:03	Microsoft .NET Framework 4.7 for Windows 10 Version 1607 and Windows Server 2016 for x64 (KB3186568)
23/07/2017 15:53:03	2017-06 Update for Windows Server 2016 for x64-based Systems (KB3150513)
23/07/2017 14:57:00	2017-06 Update for Windows Server 2016 for x64-based Systems (KB4023834)
23/07/2017 13:43:12	Definition Update for Windows Defender - KB2267602 (Definition 1.249.113.0)
23/07/2017 13:42:56	Windows Malicious Software Removal Tool for Windows 8, 8.1, 10 and Windows Server 2012, 2012 R2, 2016 x64 Edition - July 2017 (KB890830)

```
PS C:> Get-ADGroupMember -Identity $ECGName
```

```
distinguishedName : CN=DC1,OU=Domain Controllers,DC=Reskit,DC=Org
name : DC1
objectClass : computer
objectGUID : cf557bc7-45e3-407a-8fb2-4a14d0d6537a
SamAccountName : DC1$
SID : S-1-5-21-715049209-2702507345-667613206-1000
```

```
PS C:\> Set-GPPermission -Name $GPOName `
 -TargetName 'Authenticated Users' `
 -TargetType Group `
 -PermissionLevel None
```

```
DisplayName : Event Collection
DomainName : Reskit.Org
Owner : RESKIT\Domain Admins
Id : 0023d350-09ee-428d-8013-b5c617f97bd9
GpoStatus : AllSettingsEnabled
Description :
CreationTime : 03/09/2017 23:57:47
ModificationTime : 03/09/2017 23:58:00
UserVersion : AD Version: 0, SysVol Version: 0
ComputerVersion : AD Version: 0, SysVol Version: 0
WmiFilter :
```

```
PS C:\> $EventKey='HKLM\Software\Policies\Microsoft\Windows\EventLog\EventForwarding\SubscriptionManager'
PS C:\> $TargetAddress="Server=http://DC1.reskit.org:5985/wsman/SubscriptionManager/WEC"
```

```
PS C:\> Set-GPRegistryValue -Name "Event Source" -Key $EventKey `
 -ValueName '1' `
 -Type STRING `
 -Value $TargetAddress
 DisplayName : Event Source
```

```
DomainName : Reskit.Org
Owner : RESKIT\Domain Admins
Id : 83da9e1d-ea48-4a78-a2b1-27095aee808e
GpoStatus : AllSettingsEnabled
Description :
CreationTime : 04/09/2017 14:34:23
ModificationTime : 05/09/2017 15:45:38
UserVersion : AD Version: 0, SysVol Version: 0
ComputerVersion : AD Version: 5, SysVol Version: 5
WmiFilter :
```

```
PS C:\> $badlogins = Get-WinEvent -LogName ForwardedEvents
PS C:\> Foreach ($badlogin in $badlogins) {
 $obj = [Ordered] @{}
 $obj.Time = $badlogin.TimeCreated
 $obj.Logon = ($badlogin |
 Select-Object -ExpandProperty properties).value | select -skip 5 -first 1
 New-Object -TypeName PSObject -Property $obj
}
```

Time	Logon
----	-----
06/09/2017 09:30:12	EvilHacker
05/09/2017 19:01:11	hacker420X@mahkooc.com
04/09/2017 19:00:39	NiceHacker@ReallyBadplace.com
04/09/2017 19:00:14	administrator

# Chapter 8: Managing Windows Networking Services

```

PS C:\> ipconfig.exe
Windows IP Configuration

Ethernet adapter Ethernet:
 Connection-specific DNS Suffix :
 Link-local IPv6 Address : fe80::7c02:98f1:76b5:d1f%3
 IPv4 Address. : 10.10.10.10
 Subnet Mask : 255.255.255.0
 Default Gateway : 10.10.10.254
Tunnel adapter isatap.{C056D004-9A93-4155-8654-1EDC8DE8509E}:
 Media State : Media disconnected
 Connection-specific DNS Suffix :

PS C:\> ipconfig.exe /all
Windows IP Configuration

 Host Name : DC1
 Primary Dns Suffix : Reskit.Org
 Node Type : Hybrid
 IP Routing Enabled. : No
 WINS Proxy Enabled. : No
 DNS Suffix Search List. : Reskit.Org

Ethernet adapter Ethernet:

 Connection-specific DNS Suffix :
 Description : Microsoft Hyper-V Network Adapter
 Physical Address. : 00-15-5D-01-71-39
 DHCP Enabled. : No
 Autoconfiguration Enabled : Yes
 Link-local IPv6 Address : fe80::7c02:98f1:76b5:d1f%3(Preferred)
 IPv4 Address. : 10.10.10.10(Preferred)
 Subnet Mask : 255.255.255.0
 Default Gateway : 10.10.10.254
 DHCPv6 IAID : 50337117
 DHCPv6 Client DUID. : 00-01-00-01-20-10-56-CC-00-15-5D-01-71-39
 DNS Servers : ::1
 127.0.0.1
 NetBIOS over Tcpip. : Enabled

Tunnel adapter isatap.{C056D004-9A93-4155-8654-1EDC8DE8509E}:

 Media State : Media disconnected
 Connection-specific DNS Suffix :
 Description : Microsoft ISATAP Adapter
 Physical Address. : 00-00-00-00-00-00-E0
 DHCP Enabled. : No
 Autoconfiguration Enabled : Yes

PS C:\> Get-NetIPConfiguration

InterfaceAlias : Ethernet
InterfaceIndex : 3
InterfaceDescription : Microsoft Hyper-V Network Adapter
NetProfile.Name : Reskit.Org
IPv4Address : 10.10.10.10
IPv6DefaultGateway :
IPv4DefaultGateway : 10.10.10.254
DNSServer : ::1
 127.0.0.1

```

```
PS C:\> Ping DC1.Reskit.Org -4
Pinging DC1.Reskit.Org [10.10.10.10] with 32 bytes of data:
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128
Reply from 10.10.10.10: bytes=32 time<1ms TTL=128

Ping statistics for 10.10.10.10:
 Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
 Approximate round trip times in milli-seconds:
 Minimum = 0ms, Maximum = 0ms, Average = 0ms

PS C:\> Test-NetConnection DC1.Reskit.Org
ComputerName : DC1.Reskit.Org
RemoteAddress : 10.10.10.10
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
PingSucceeded : True
PingReplyDetails (RTT) : 0 ms

PS C:\> Test-NetConnection DC1.Reskit.Org -Port 389 -InformationLevel Detailed
ComputerName : DC1.Reskit.Org
RemoteAddress : 10.10.10.10
RemotePort : 389
NameResolutionResults : 10.10.10.10
MatchingIPsecRules :
NetworkIsolationContext : Private Network
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
NetRoute (NextHop) : 0.0.0.0
TcpTestSucceeded : True

[SRV1]: PS C:\> Test-NetConnection DC1.Reskit.Org -CommonTCPPort SMB
ComputerName : DC1.Reskit.Org
RemoteAddress : 10.10.10.10
RemotePort : 445
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.50
TcpTestSucceeded : True
```



```
STEP 3. SMB Folder sharing/using
```

```
PS C:\> net use X: \\SRV1\c$
The command completed successfully.
```

```
PS C:\> New-SMBMapping -LocalPath 'Y:' -RemotePath \\SRV1\c$
Status Local Path Remote Path

OK Y: \\SRV1\c$
```

```
PS C:\> net use
New connections will be remembered.
Status Local Remote
```

```

OK X: \\SRV1\c$ Microsoft Windows Network
OK Y: \\SRV1\c$ Microsoft Windows Network
The command completed successfully.
```

```
PS C:\> Get-SMBMapping
Status Local Path Remote Path

OK X: \\SRV1\c$
OK Y: \\SRV1\c$
```

```
PS C:\> net share Foo=c:\
Foo was shared successfully.
```

```
PS C:\> New-SmbShare -Path C:\ -Name Foo2
Name ScopeName Path Description

```

```
Foo2 * C:\
```

```
PS C:\> net share
```

Share name	Resource	Remark
ADMIN\$	C:\Windows	Remote Admin
I\$	I:\	Default share
C\$	C:\	Default share
E\$	E:\	Default share
IPC\$		Remote IPC
H\$	H:\	Default share
Foo	c:\	
Foo2	C:\	

```
The command completed successfully.
```

```
[SRV1]: PS C:\> Get-SmbShare
```

Name	ScopeName	Path	Description
ADMIN\$	*	C:\Windows	Remote Admin
C\$	*	C:\	Default share
E\$	*	E:\	Default share
Foo	*	c:\	
Foo2	*	C:\	
H\$	*	H:\	Default share
I\$	*	I:\	Default share
IPC\$	*		Remote IPC

```
PS C:\> nslookup -querytype=all DC1.Reskit.Org
Server: DC1.Reskit.Org
Address: 10.10.10.10
DC1.Reskit.Org internet address = 10.10.10.10
```

```
PS C:\> Resolve-DnsName -Name DC1.Reskit.Org -Type ALL
```

Name	Type	TTL	Section	IPAddress
DC1.Reskit.Org	A	3600	Answer	10.10.10.10

```
PS C:\> ipconfig /displaydns
Windows IP Configuration
```

```
dc2.reskit.org
```

```

Record Name : DC2.Reskit.Org
Record Type : 1
Time To Live : 3120
Data Length : 4
Section : Answer
A (Host) Record : 10.10.10.11
```

```
dc1.reskit.org
```

```

Record Name : DC1.Reskit.Org
Record Type : 1
Time To Live : 3026
Data Length : 4
Section : Answer
A (Host) Record : 10.10.10.10
```

```
PS C:\> Get-DnsClientCache
Entry
```

RecordName	Record Type	Status	Section	TimeTo Live	Data Length	Data
dc2.reskit.org	DC2.Reskit.Org	A Success	Answer	3114	4	10.10.10.11
dc1.reskit.org	DC1.Reskit.Org	A Success	Answer	3020	4	10.10.10.10

```
PS C:\> Get-NetIPAddress -InterfaceIndex $Ifindex -AddressFamily $IType
```

```
IPAddress : 10.10.10.150
InterfaceIndex : 3
InterfaceAlias : Ethernet
AddressFamily : IPv4
Type : Unicast
PrefixLength : 24
PrefixOrigin : Dhcp
SuffixOrigin : Dhcp
AddressState : Preferred
ValidLifetime : 7.23:53:49
PreferredLifetime : 7.23:53:49
SkipAsSource : False
PolicyStore : ActiveStore
```

```

PS C:\> New-NetIPAddress -InterfaceAlias $IFAlias `
 -PrefixLength 24 `
 -DefaultGateway '10.10.10.254' `
 -IPAddress '10.10.10.11' `
 -DefaultGateway '10.10.10.254' `
 -AddressFamily $IPType

IPAddress : 10.10.10.11
InterfaceIndex : 3
InterfaceAlias : Ethernet
AddressFamily : IPv4
Type : Unicast
PrefixLength : 24
PrefixOrigin : Manual
SuffixOrigin : Manual
AddressState : Tentative
ValidLifetime : Infinite ([TimeSpan]::MaxValue)
PreferredLifetime : Infinite ([TimeSpan]::MaxValue)
SkipAsSource : False
PolicyStore : ActiveStore

```

```
PS C:\> Get-NetIPConfiguration
```

```

InterfaceAlias : Ethernet
InterfaceIndex : 3
InterfaceDescription : Microsoft Hyper-V Network Adapter
NetProfile.Name : Reskit.Org
IPv4Address : 10.10.10.11
IPv6DefaultGateway :
IPv4DefaultGateway : 10.10.10.254
DNSServer : 10.10.10.10

```

```
PS C:\> Test-NetConnection -ComputerName DC1 -port 389
```

```

ComputerName : DC1
RemoteAddress : 10.10.10.10
RemotePort : 389
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.11
TcpTestSucceeded : True

```

```
PS C:\> Resolve-DnsName -Name dc2.reskit.org -Server DC1
```

Name	Type	TTL	Section	IPAddress
DC2.Reskit.Org	AAAA	1200	Question	fe80::6455:fbff:194b:fe9b
DC2.Reskit.Org	A	1200	Question	10.10.10.11

```
Get-NetIPAddress -InterfaceIndex $Ifindex -AddressFamily $IPType
```

```
IPAddress : 10.10.10.11
InterfaceIndex : 3
InterfaceAlias : Ethernet
AddressFamily : IPv4
Type : Unicast
PrefixLength : 24
PrefixOrigin : Manual
SuffixOrigin : Manual
AddressState : Preferred
ValidLifetime : Infinite ([TimeSpan]::MaxValue)
PreferredLifetime : Infinite ([TimeSpan]::MaxValue)
SkipAsSource : False
PolicyStore : ActiveStore
```

```
PS C:\> Get-NetIPAddress -InterfaceIndex $Ifindex -AddressFamily $IPType
```

```
IPAddress : 10.10.10.150
InterfaceIndex : 3
InterfaceAlias : Ethernet
AddressFamily : IPv4
Type : Unicast
PrefixLength : 24
PrefixOrigin : Dhcp
SuffixOrigin : Dhcp
AddressState : Preferred
ValidLifetime : 7.23:59:54
PreferredLifetime : 7.23:59:54
SkipAsSource : False
PolicyStore : ActiveStore
```

```
PS C:\> Install-WindowsFeature AD-Domain-Services -IncludeManagementTools
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{Active Directory Domain Services, Group P...

```

PS C:\> $PasswordSS = ConvertTo-SecureString -string 'Pa$$w0rd' -AsPlainText -Force
PS C:\> Install-ADDSForest -DomainName 'Reskit.Org' `
 -SafeModeAdministratorPassword $PasswordSS -Force `
 -InstallDNS -NoReboot
WARNING: Windows Server 2016 domain controllers have a default for the security setting named "Allow cryptography algorithms compatible with Windows NT 4.0" that prevents weaker cryptography algorithms when establishing security channel sessions.

For more information about this setting, see Knowledge Base article 942564 (http://go.microsoft.com/fwlink/?LinkId=104751).

```

```

WARNING: A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "Reskit.Org". Otherwise, no action is required.

```

```

WARNING: Windows Server 2016 domain controllers have a default for the security setting named "Allow cryptography algorithms compatible with Windows NT 4.0" that prevents weaker cryptography algorithms when establishing security channel sessions.

For more information about this setting, see Knowledge Base article 942564 (http://go.microsoft.com/fwlink/?LinkId=104751).

```

```

WARNING: A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "Reskit.Org". Otherwise, no action is required.

```

Message	Context	RebootRequired	Status
You must restart this computer to complete the operation...	DCPromo.General.4	True	Success

```

PS C:\> Resolve-DnsName -Name dc1.reskit.org -Server DC1.Reskit.Org -Type A

```

Name	Type	TTL	Section	IPAddress
dc1.reskit.org	A	3600	Answer	10.10.10.10

```

PS C:\> Test-NetConnection -ComputerName DC1.Reskit.Org -port 445

```

```

ComputerName : DC1.Reskit.Org
RemoteAddress : 10.10.10.10
RemotePort : 445
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.11
TcpTestSucceeded : True

```

```

PS C:\> Test-NetConnection -ComputerName DC1.Reskit.Org -port 389

```

```

ComputerName : DC1.Reskit.Org
RemoteAddress : 10.10.10.10
RemotePort : 389
InterfaceAlias : Ethernet
SourceAddress : 10.10.10.11
TcpTestSucceeded : True

```

```
PS C:\> Install-WindowsFeature AD-Domain-Services, DNS, RSAT-DHCP, Web-Mgmt-Tools
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{Active Directory Domain Services, DNS Ser...

```
PS C:\> $PasswordSS = ConvertTo-SecureString -string 'Pa$$w0rd' -AsPlainText -Force
PS C:\> Install-ADDSDomainController -DomainName 'Reskit.org' `
 -SafeModeAdministratorPassword $PasswordSS `
 -SiteName 'Default-First-Site-Name' `
 -NoRebootOnCompletion -Force
```

WARNING: Windows Server 2016 domain controllers have a default for the security setting named "Allow cryptography algorithms compatible with Windows NT 4.0" that prevents weaker cryptography algorithms when establishing security channel sessions.

For more information about this setting, see Knowledge Base article 942564 (<http://go.microsoft.com/fwlink/?LinkId=104751>).

WARNING: A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "Reskit.Org". Otherwise, no action is required.

WARNING: Windows Server 2016 domain controllers have a default for the security setting named "Allow cryptography algorithms compatible with Windows NT 4.0" that prevents weaker cryptography algorithms when establishing security channel sessions.

For more information about this setting, see Knowledge Base article 942564 (<http://go.microsoft.com/fwlink/?LinkId=104751>).

WARNING: A delegation for this DNS server cannot be created because the authoritative parent zone cannot be found or it does not run Windows DNS server. If you are integrating with an existing DNS infrastructure, you should manually create a delegation to this DNS server in the parent zone to ensure reliable name resolution from outside the domain "Reskit.Org". Otherwise, no action is required.

Message	Context	RebootRequired	Status
You must restart this computer to complete the operation...	DCPromo.General.4	True	Success

```
PS C:\> Get-DNSServerZone -name 'foo.bar', '10.10.10.in-addr.arpa'
```

ZoneName	ZoneType	IsAutoCreated	IsDsIntegrated	IsReverseLookupZone	IsSigned
foo.bar	Primary	False	True	False	False
10.10.10.in-addr.arpa	Primary	False	True	True	False

```
PS C:\> Get-DnsServerResourceRecord -ZoneName foo.bar -name 'home'
```

HostName	RecordType	Type	Timestamp	TimeToLive	RecordData
home	A	1	0	30.00:00:00	10.42.42.42



```
PS C:\> Get-DnsServerResourceRecord -zonename 'reskit.org' -name '@' -RRType Mx
HostName RecordType Type Timestamp TimeToLive RecordData

@ MX 15 0 00:00:00 [10][mail.reskit.org.]
```

```
Get-DnsServerEDns
CacheTimeout EnableProbes EnableReception

00:30:00 True True
```

```
PS C:\> Test-DnsServer -IPAddress 10.10.10.10 -Context DnsServer
IPAddress Result RoundTripTime TcpTried UdpTried

10.10.10.10 Success 00:00:11 True True
```

```
PS C:\> Install-WindowsFeature -Name DHCP `
 -IncludeManagementTools

Success Restart Needed Exit Code Feature Result

True No Success {DHCP Server, DHCP Server Tools}
```

```
PS C:\> Add-DHCPserverSecurityGroup -Verbose
VERBOSE: Adds DHCP users and DHCP administrators security groups on the DHCP server DC1
```

```
PS C:\> Add-DhcpServerInDC -DnsName DC1.Reskit.Org

WARNING: The DHCP server dc1.reskit.org with IP address 10.10.10.10 is
already authorized in Active Directory. The authorization check on the
DHCP server has been initiated.
```

```
PS C:\> Get-DhcpServerv4Scope -ComputerName DC1.Reskit.Org
ScopeId SubnetMask Name State StartRange EndRange LeaseDuration

10.10.10.0 255.255.255.0 Reskit Active 10.10.10.150 10.10.10.199 8.00:00:00
```



```
PS C:\> Get-DhcpServerV4OptionValue -ComputerName DC1.Reskit.Org
```

OptionId	Name	Type	Value	VendorClass
15	DNS Domain Name	String	{Reskit.Org}	
6	DNS Servers	IPv4Add...	{10.10.10.10}	

```
Set-DhcpServerV4OptionValue -DnsDomain Reskit.Org `
0/1 completed.
```

```
Validating the DNS servers...
Validating the DNS server 10.10.10.110..
```

```
PS C:\Windows\system32> Install-WindowsFeature -Name DHCP,RSAT-DHCP `
-ComputerName DC2.Reskit.Org
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{DHCP Server}

```
PS C:\Windows\system32> Get-DhcpServerInDC
```

IPAddress	DnsName
10.10.10.10	dc1.reskit.org
10.10.10.11	dc2.reskit.org

```
PS C:\> Install-WindowsFeature -Name ADCS-Cert-Authority -IncludeManagementTools
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{Active Directory Certificate Services, Ce...}

```
PS C:\> Install-AdcsCertificationAuthority -CAType StandaloneRootCA `
 -KeyLength 4096 -HashAlgorithmName SHA256 `
 -ValidityPeriod Years -ValidityPeriodUnits 20 `
 -CACommonName "Reskit Root CA" `
 -CryptoProviderName "RSA#Microsoft Software Key Storage Provider" `
 -Confirm:$false
```

```
ErrorId ErrorString

0
```

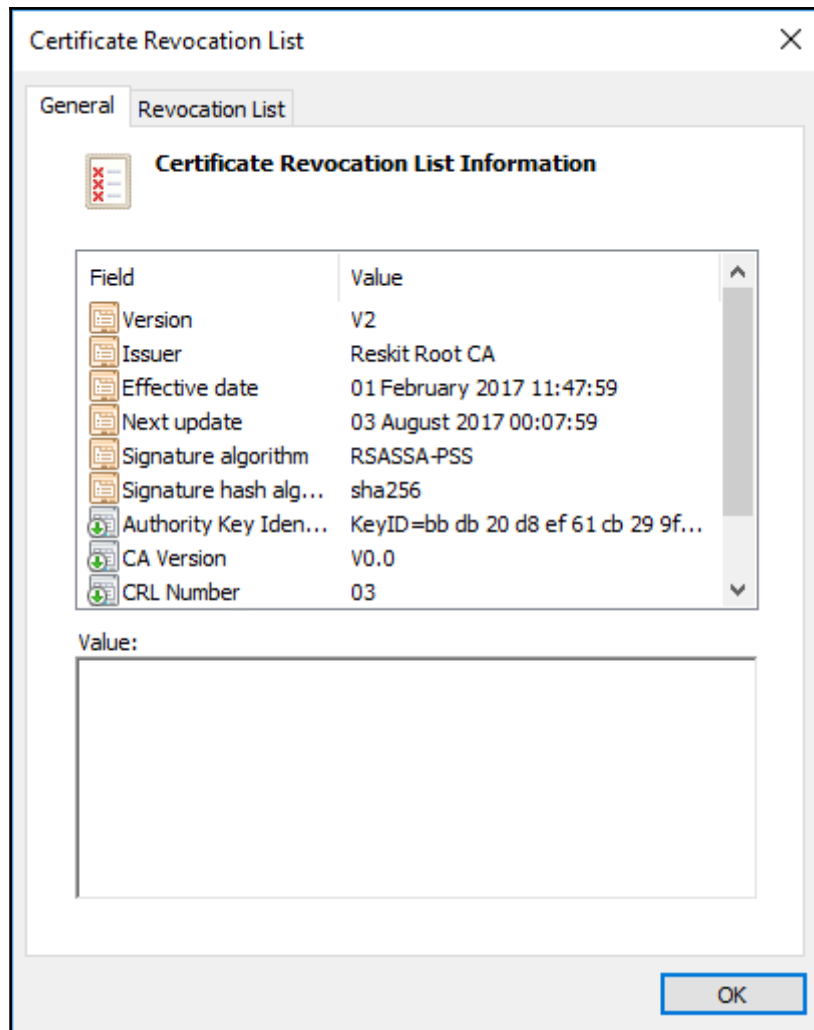
```
PS C:\> certutil.exe -setreg CA\DSConfigDN 'CN=Configuration,DC=reskit,DC=org'
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CertSvc\Configuration\Reskit Root CA\DSConfigDN:
Old Value:
 DSConfigDN REG_SZ = cn=foo
New Value:
 DSConfigDN REG_SZ = CN=Configuration,DC=reskit,DC=org
CertUtil: -setreg command completed successfully.
The CertSvc service may need to be restarted for changes to take effect.
```

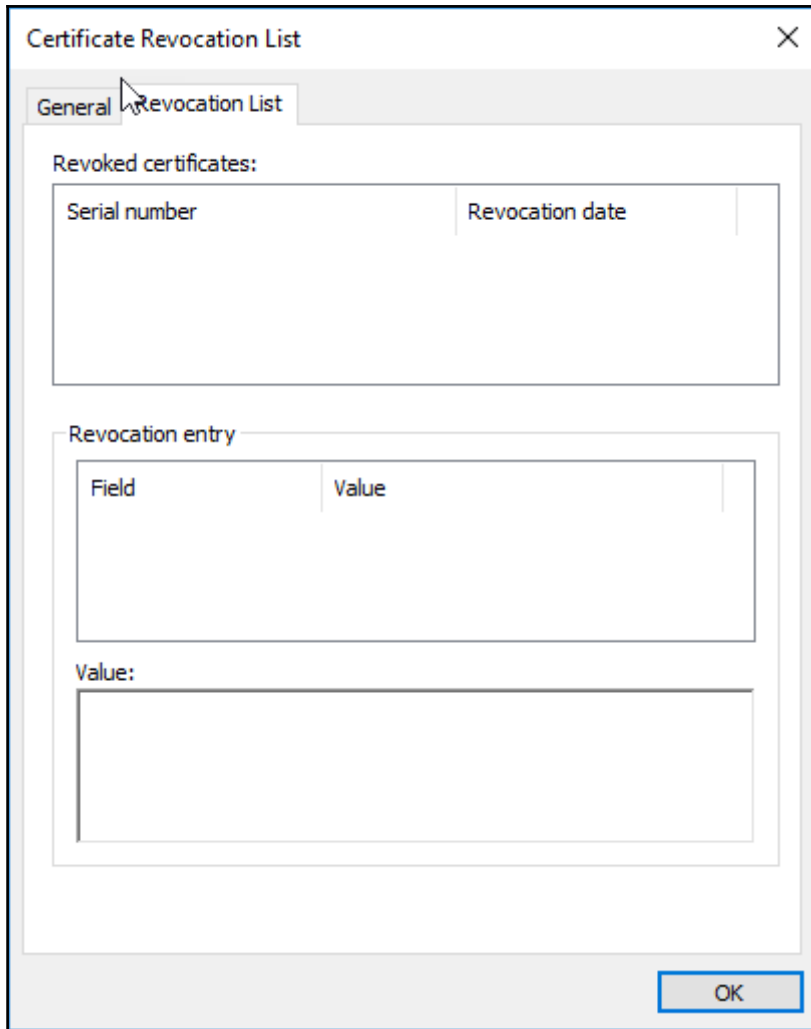
```
PS C:\> certutil.exe -crl
CertUtil: -CRL command completed successfully.
```

```
PS C:\> Get-ChildItem -Path C:\Windows\System32\CertSrv\CertEnroll
```

```
Directory: C:\Windows\System32\CertSrv\CertEnroll
```

Mode	LastWriteTime		Length	Name
----	-----	-----	-----	----
-a----	01/02/2017	11:57	815	Reskit Root CA.crl
-a----	31/01/2017	21:22	1401	ROOT_Reskit Root CA.crt





```
PS C:\pki> certutil.exe -dspublish -f 'ROOT_Reskit Root CA.crt' RootCA
ldap:///CN=Reskit Root CA,CN=Certification Authorities,CN=Public Key Services,CN=Services,CN=Configuration,DC=Reskit,DC=Org?cACertificate
Certificate added to DS store.
ldap:///CN=Reskit Root CA,CN=AIA,CN=Public Key Services,CN=Services,CN=Configuration,DC=Reskit,DC=Org?cACertificate
Certificate added to DS store.
CertUtil: -dsPublish command completed successfully.

PS C:\pki> certutil.exe -addstore -f root 'ROOT_Reskit Root CA.crt'
root "Trusted Root Certification Authorities"
Signature matches Public Key
Certificate "Reskit Root CA" added to store.
CertUtil: -addstore command completed successfully.

PS C:\pki> certutil.exe -addstore -f root 'Reskit Root CA.crl'
root "Trusted Root Certification Authorities"
CRL "CN=Reskit Root CA" added to store.
CertUtil: -addstore command completed successfully.
```

```
PS C:\> New-Item C:\PKI -ItemType Directory -ErrorAction Ignore
```

```
Directory: C:\
```

Mode	LastWriteTime	Length	Name
d-----	01/02/2017 16:10		PKI

```
PS C:\> Add-WindowsFeature ADCS-Cert-Authority,
ADCS-Web-Enrollment,
ADCS-Enroll-Web-Pol,
ADCS-Enroll-Web-Svc,
ADCS-Online-Cert,
Web-Mgmt-Console `
-IncludeManagementTools
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{Active Directory Certificate Services, Ce...

```
PS C:\PKI> New-WebVirtualDirectory -Site 'Default Web Site' `
-Name 'PKI' `
-PhysicalPath 'C:\PKI'
```

Name	PhysicalPath
PKI	C:\PKI

```
PS C:\> C:\Windows\System32\inetsrv\appcmd.exe `
set config /section:requestfiltering `
/allowdoubleescaping:true
Applied configuration changes to section
"system.webServer/security/requestFiltering" for
"MACHINE/WEBROOT/APPHOST" at configuration commit
path "MACHINE/WEBROOT/APPHOST"
```

```

PS C:\> Install-AdcsCertificationAuthority -CAType EnterpriseSubordinateCA `
-CACommonName 'ReskitIssuing CA' `
-CryptoProviderName 'RSA#Microsoft Software Key Storage Provider' `
-KeyLength 4096 `
-HashAlgorithmName SHA256 `
-Confirm:$false
WARNING: The Active Directory Certificate Services installation is incomplete. To]
complete the installation, use the request file "C:\CA.Reskit.Org_ReskitIssuing CA.req"
to obtain a certificate from the parent CA. Then, use the Certification Authority snap-in
to install the certificate. To complete this procedure, right-click the node with the name
of the CA, and then click Install CA Certificate. The operation completed successfully. 0x0 (WIN32: 0)

ErrorId ErrorString

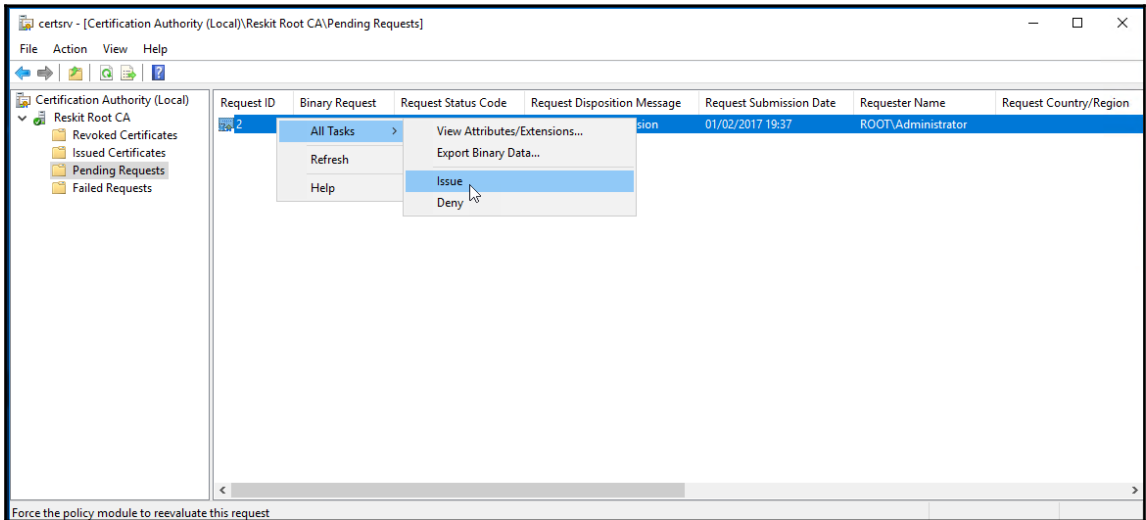
398 The Active Directory Certificate Services installation is
incomplete. To complete the installation, use the request
file "C:\CA.Reskit.Org_ReskitIssuing CA.req" to obtain...

```

```

PS C:\> certreq.exe -submit 'C:\CA.Reskit.Org_ReskitIssuing CA.req'
RequestId: 2
RequestId: "2"
Certificate request is pending: Taken Under Submission (0)

```



```
PS C:\> certutil.exe -installcert C:\ca.reskit.org.crt
CertUtil: -installCert command completed successfully.
The CertSvc service may need to be restarted for changes to take effect.
```

```
PS C:\> Start-Service -Name CertSvc
PS C:\> Get-Service -Name CertSvc
```

Status	Name	DisplayName
-----	----	-----
Running	CertSvc	Active Directory Certificate Services

```
PS C:\> certutil.exe -setreg CA\CRLPeriod "Weeks"
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\CertSvc\Configuration\ReskitIssuing CA\CRLPeriod:
Old Value:
 CRLPeriod REG_SZ = Weeks
New Value:
 CRLPeriod REG_SZ = Weeks
CertUtil: -setreg command completed successfully.
The CertSvc service may need to be restarted for changes to take effect.
```

```
PS C:\pki> Restart-Service -Name CertSvc

PS C:\pki> Start-Sleep -Seconds 15

PS C:\pki> Certutil.exe -crl
CertUtil: -CRL command completed successfully.
```

```

PS C:\> certutil -dump $to
X509 Certificate Revocation List:
Version: 2
Signature Algorithm:
 Algorithm ObjectID: 1.2.840.113549.1.1.10 RSASSA-PSS
 Algorithm Parameters:
0000 30 34 a0 0f 30 0d 06 09 60 86 48 01 65 03 04 02
0010 01 05 00 a1 1c 30 1a 06 09 2a 86 48 86 f7 0d 01
0020 01 08 30 0d 06 09 60 86 48 01 65 03 04 02 01 05
0030 00 a2 03 02 01 20
 2.16.840.1.101.3.4.2.1 sha256 (sha256NoSign)
 05 00
 1.2.840.113549.1.1.8 mgf1
 2.16.840.1.101.3.4.2.1 sha256 (sha256NoSign)
 05 00
 0x20 (32)
Issuer:
 CN=ReskitIssuing CA
 DC=Reskit
 DC=Org
 Name Hash(sha1): e232d9004c223e170f064c82b0a490bee2f20aaa
 Name Hash(md5): 97795df84f336ae126e69bacf9bf7e35

ThisUpdate: 02/02/2017 00:16
NextUpdate: 16/02/2017 12:36
CRL Entries: 0
CRL Extensions: 4
 2.5.29.35: Flags = 0, Length = 18
 Authority Key Identifier
 KeyID=60 84 26 cf 53 1b ee 96 e9 61 02 f7 d9 31 e1 ee f1 1e 93 11

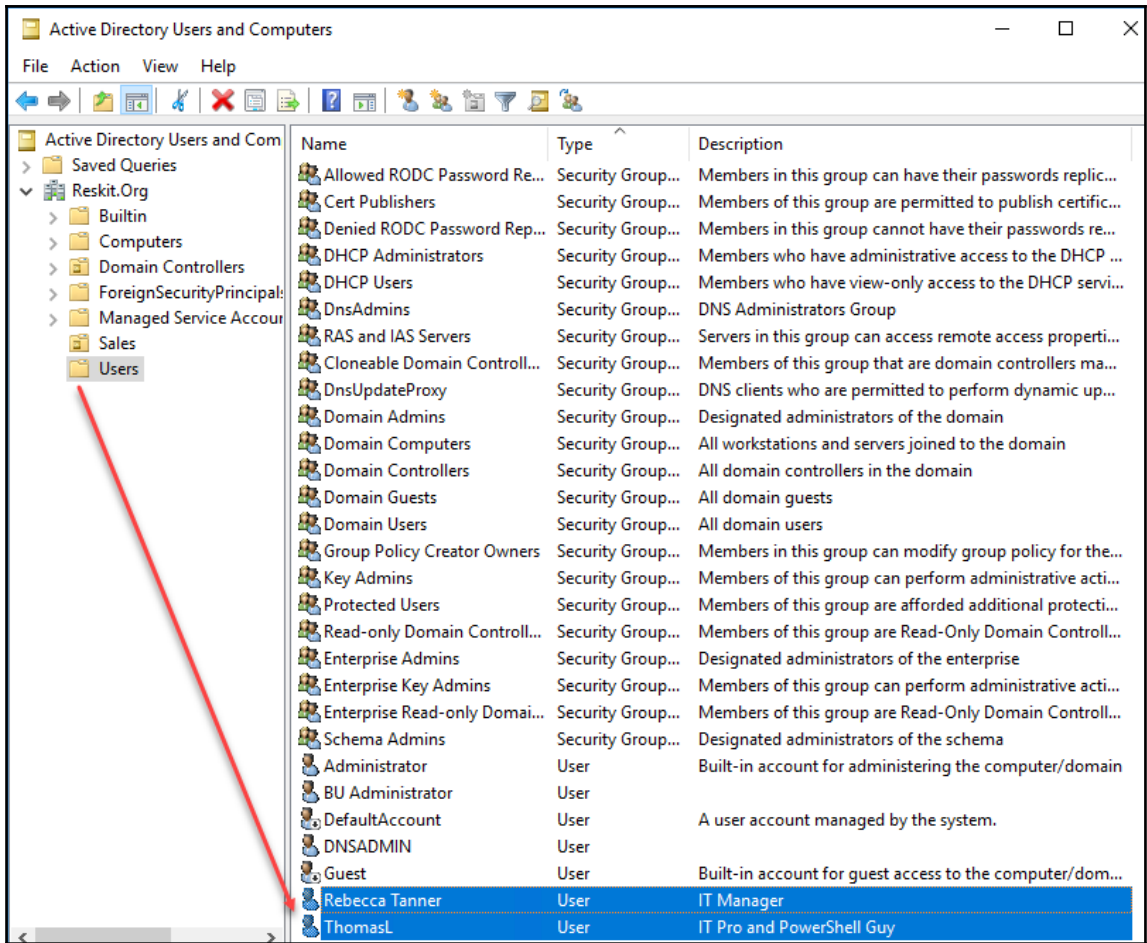
```

```
PS C:\> Get-ChildItem -Path $CEPath
```

```
Directory: C:\Windows\System32\CertSrv\CertEnroll
```

Mode	LastWriteTime	Length	Name
-a----	01/02/2017 11:57	815	Reskit Root CA.crl
-a----	31/01/2017 21:22	1401	ROOT_Reskit Root CA.crt





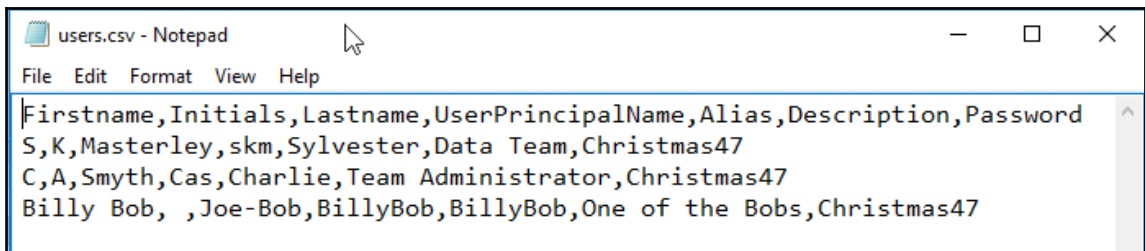
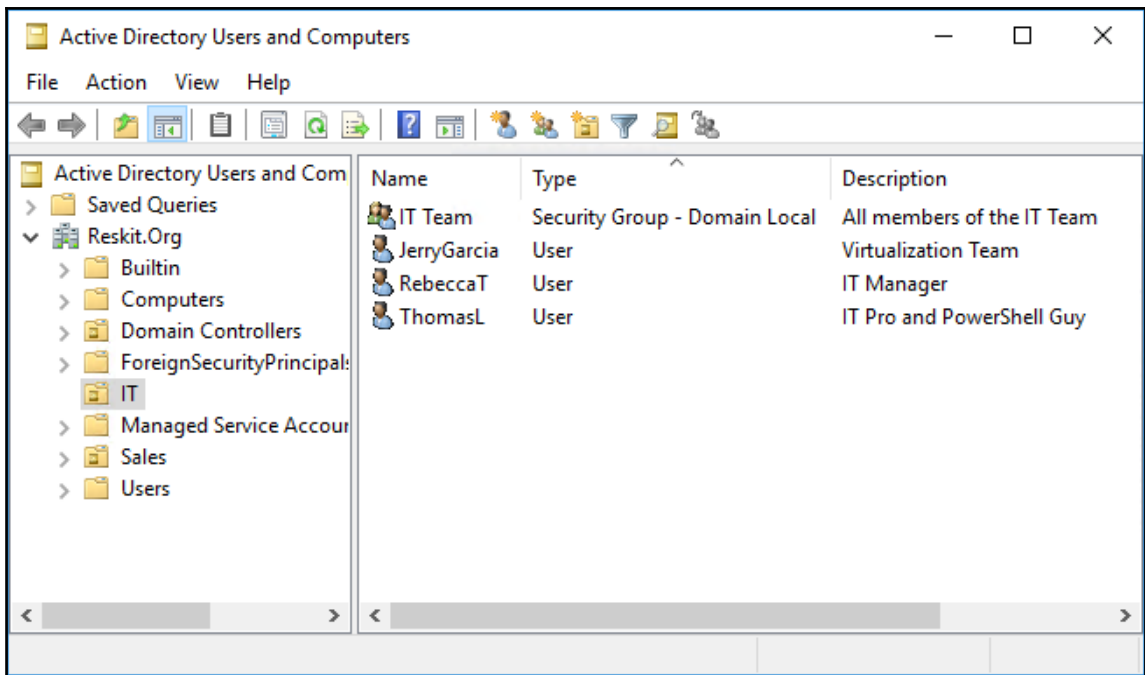
```
PS C:\> New-ADUser @NewUserHT `
 -SamAccountName 'JerryG' `
 -UserPrincipalName 'jerryg@reskit.org' `
 -Description 'Virtualization Team' `
 -Name 'JerryGarcia' `
 -DisplayName 'Jerry Garcia (IT)' `
 -Path 'OU=IT,DC=Reskit,DC=Org' `
 -PassThru

I
DistinguishedName : CN=JerryGarcia,OU=IT,DC=Reskit,DC=Org
Enabled : True
GivenName :
Name : JerryGarcia
ObjectClass : user
ObjectGUID : 42d4820d-9281-45b3-bb02-2a98b165a5d5
SamAccountName : JerryG
SID : S-1-5-21-715049209-2702507345-667613206-1134
Surname :
UserPrincipalName : jerryg@reskit.org
```

```
PS C:\> Set-ADUser -Identity ThomasL `
 -OfficePhone '44168555420' `
 -Office 'Cookham HQ' `
 -EmailAddress 'ThomasL@Reskit.Org' `
 -GivenName 'Thomas' `
 -Surname 'Lee' `
 -HomePage 'https://tf109.blogspot.com'

PS C:\> Get-ADUser -Identity ThomasL `
 -Properties Office,OfficePhone,EmailAddress

DistinguishedName : CN=ThomasL,OU=IT,DC=Reskit,DC=Org
EmailAddress : ThomasL@Reskit.Org
Enabled : True
GivenName : Thomas
Name : ThomasL
ObjectClass : user
ObjectGUID : d8d326cb-0852-4099-a54b-47e78436c842
Office : Cookham HQ
OfficePhone : 44168555420
SamAccountName : ThomasL
SID : S-1-5-21-715049209-2702507345-667613206-1131
Surname : Lee
UserPrincipalName : ThomasL@Reskit.Org
```



```
PS c:\> Recipe10-11.ps1
Created S Masterley
Created C Smyth
Created Billy Bob Joe-Bob
```

```
*** Reskit.Org AD Report
*** Generated [02/03/2017 00:05:55]

```

```
*** Disabled Users
```

SamAccountname	DisplayName
Guest	Guest Account
DefaultAccount	Default Account
krbtgt	krbtgt

```
*** Enabled users Not logged in the past 7 days
```

DisplayName	LastLogonDate
DNS Admin	
BU Administrator	10/01/2017 15:38:21

```
*** High Number of Bad Password Attempts
```

SamAccountname	BadPWDCount
ThomasL	8

```
*** Reskit.Org AD Privileged User Report
*** Generated [02/04/2017 12:13:55]

```

Group: Enterprise Admins

Name	WhenCreated	LastlogonDate
Administrator	09/11/2016 22:36:19	31/01/2017 16:59:37
BU Administrator	10/01/2017 15:37:58	10/01/2017 15:38:21
DNSADMIN	19/01/2017 16:23:57	
Sylvester	02/02/2017 19:52:37	02/02/2017 21:25:33

Group: Domain Admins

Name	WhenCreated	LastlogonDate
Administrator	09/11/2016 22:36:19	31/01/2017 16:59:37
BU Administrator	10/01/2017 15:37:58	10/01/2017 15:38:21
DNSADMIN	19/01/2017 16:23:57	

Group: Schema Admins

Name	WhenCreated	LastlogonDate
Administrator	09/11/2016 22:36:19	31/01/2017 16:59:37
BU Administrator	10/01/2017 15:37:58	10/01/2017 15:38:21

\*\*\* Changes to Privileges User Membership

Name	Group	Side
BU Administrator	Schema Admins	ADDED

# Chapter 9: Managing Network Shares

```
PS C:\> Get-SmbShare -Name * |
Get-SmbShareAccess |
Format-Table -GroupBy Name
```

Name: Backup

Name	ScopeName	AccountName	AccessControlType	AccessRight
Backup *		Everyone	Allow	Full

Name: IPC\$

Name	ScopeName	AccountName	AccessControlType	AccessRight
IPC\$ *		BUILTIN\Administrators	Allow	Full
IPC\$ *		BUILTIN\Backup Operators	Allow	Full
IPC\$ *		NT AUTHORITY\INTERACTIVE	Allow	Full

```
PS C:\> New-SmbShare -Name foo -Path C:\foo
```

Name	ScopeName	Path	Description
foo *		C:\foo	

```
PS C:\> Get-SmbShareAccess -Name foo
```

Name	ScopeName	AccountName	AccessControlType	AccessRight
foo *		RESKIT\Administrator	Allow	Read
foo *		NT AUTHORITY\SYSTEM	Allow	Full
foo *		CREATOR OWNER	Allow	Full
foo *		RESKIT\IT Team	Allow	Read
foo *		RESKIT\IT Management	Allow	Full

```

C:\> Get-SmbClientConfiguration

ConnectionCountPerRssNetworkInterface : 4
DirectoryCacheEntriesMax : 16
DirectoryCacheEntrySizeMax : 65536
DirectoryCacheLifetime : 10
DormantFileLimit : 1023
EnableBandwidthThrottling : True
EnableByteRangeLockingOnReadOnlyFiles : True
EnableInsecureGuestLogons : True
EnableLargeMtu : True
EnableLoadBalanceScaleOut : True
EnableMultiChannel : True
EnableSecuritySignature : True
ExtendedSessionTimeout : 1000
FileInfoCacheEntriesMax : 64
FileInfoCacheLifetime : 10
FileNotFoundCacheEntriesMax : 128
FileNotFoundCacheLifetime : 5
KeepConn : 600
MaxCmds : 50
MaximumConnectionCountPerServer : 32
OplocksDisabled : False
RequireSecuritySignature : False
SessionTimeout : 60
UseOpportunisticLocking : True
WindowSizeThreshold : 8

```

```

PS R:\> Get-SmbClientNetworkInterface |
Format-Table -auto -wrap

```

If	Idx	RSS ?	RDMA ?	Speed	IpAddresses	Friendly Name
2		True	False	10 Gbps	{fe80::458e:834a:e0a:479e, 10.10.10.150}	Ethernet
3		False	False	100 Kbps	{fe80::5efe:10.10.10.150}	isatap.{495B370B-020D-43D2-BEAF-A11390D3C902}

```

PS C:\> net view \\fs1

```

```

Shared resources at \\fs1

```

```

Share name Type Used as Comment

```

```

Backup Disk Used in Recipe 5-7 to hold backup of SRV1
foo Disk Foo share for IT

```

```

The command completed successfully.

```



```
PS C:> New-SmbMapping -LocalPath r: -RemotePath \\fs1.reskit.org\foo

Status Local Path Remote Path

OK r: \\fs1.reskit.org\foo
```

```
PS C:\> Get-SmbMapping

Status Local Path Remote Path

OK R: \\fs1.reskit.org\foo
```

```
PS C:\> Get-ChildItem -Path r:

Directory: R:\

Mode LastWriteTime Length Name
---- -
-a---- 09/01/2017 20:48 39075088 MarsInstaller.exe
-a---- 09/01/2017 21:15 4458 VaultCredentials1
-a---- 08/01/2017 22:56 4458 VaultCredentials2
-a---- 09/01/2017 11:38 26 recovery.txt
-a---- 05/02/2017 17:19 12 sss.txt
```

```
PS C:\> Get-SmbConnection

ServerName ShareName UserName Credential Dialect NumOpens

fs1.reskit.org foo RESKIT\JerryG RESKIT.ORG\JerryG 3.1.1 0
fs1.reskit.org foo RESKIT\tf1 RESKIT.ORG\tf1 3.1.1 1
```

```
PS C:\Users\Administrator> Get-SmbOpenFile

FileId SessionId Path ShareRelativePath ClientComputerName ClientUserName

223338299757 223338299481 C:\foo\ [fe80::458e:834a:e0a:479e] RESKIT\tf1
223338299765 223338299473 C:\foo\ 10.10.10.150 RESKIT\JerryG
```

```

PS C:\> Install-WindowsFeature FS-iSCSITarget-Server

Success Restart Needed Exit Code Feature Result

True No Success {iSCSI Target Server}

```

```

PS C:\Windows\system32> Get-IscsiTargetServerSetting

ComputerName : SRV1.Reskit.Org
IsClustered : False
Version : 10.0
DisableRemoteManagement : False

```

```

PS C:\> New-IscsiVirtualDisk -Path I:\Sales\SalesData.vhdx `
 -Description 'LUN For Sales' `
 -SizeBytes 1GB

ClusterGroupName :
ComputerName : SRV1.Reskit.Org
Description : LUN For Sales
DiskType : Dynamic
HostVolumeId : {16A46190-ECA9-11E6-8368-00155D017120}
LocalMountDeviceId :
OriginalPath :
ParentPath :
Path : I:\Sales\SalesData.vhdx
SerialNumber : 0F1AD0DD-B095-4616-83E2-3F65A220497F
Size : 1073741824
SnapshotIds :
Status : NotConnected
VirtualDiskIndex : 54770768

```

```
PS C:\> New-IscsiServerTarget -TargetName $LunName `
 -InitiatorIds DNSNAME:fs1.reskit.org

ChapUserName :
ClusterGroupName :
ComputerName : SRV1.Reskit.Org
Description :
EnableChap : False
EnableReverseChap : False
EnforceIdleTimeoutDetection : True
FirstBurstLength : 65536
IdleDuration : 00:00:00
InitiatorIds : {DnsName:fs1.reskit.org}
LastLogin :
LunMappings : {}
MaxBurstLength : 262144
MaxReceiveDataSegmentLength : 65536
ReceiveBufferCount : 10
ReverseChapUserName :
Sessions : {}
Status : NotConnected
TargetIqn : iqn.1991-05.com.microsoft:srv1-salestarget-target
TargetName : SalesTarget
```

```
PS C:\> Set-Service msiscsi -StartupType 'Automatic'
```

```
PS C:\> Start-Service msiscsi
```

```
WARNING: Waiting for service 'Microsoft iSCSI Initiator Service (msiscsi)' to start...
```

```
PS C:\> New-IscsiTargetPortal -TargetPortalAddress Srv1.reskit.org `
 -TargetPortalPortNumber 3260
```

```
InitiatorInstanceName :
InitiatorPortalAddress :
IsDataDigest : False
IsHeaderDigest : False
TargetPortalAddress : Srv1.reskit.org
TargetPortalPortNumber : 3260
PSComputerName :
```

```

PS C:\> $Target = Get-IscsiTarget |
 Where-Object NodeAddress -Match 'SalesTarget'
PS C:\> $Target

IsConnected NodeAddress PSComputerName

False iqn.1991-05.com.microsoft:srv1-sales-target-target

```

```

PS C:\> Connect-IscsiTarget -TargetPortalAddress Srv1 `
 -NodeAddress $Target.NodeAddress

AuthenticationType : NONE
InitiatorInstanceName : ROOT\ISCSIPRT\0000_0
InitiatorNodeAddress : iqn.1991-05.com.microsoft:fs1.reskit.org
InitiatorPortalAddress : 0.0.0.0
InitiatorSideIdentifier : 400001370000
IsConnected : True
IsDataDigest : False
IsDiscovered : False
IsHeaderDigest : False
IsPersistent : True
NumberOfConnections : 1
SessionIdentifier : fffffda83afc10010-40000137000000028
TargetNodeAddress : iqn.1991-05.com.microsoft:srv1-sales-target
TargetSideIdentifier : 0100
PSComputerName :

```

```

PS C:\> $ISD = Get-Disk | Where-Object BusType -eq 'iscsi'
PS C:\> Set-Disk -InputObject $isd -IsOffline $False
PS C:\> Set-Disk -InputObject $isd -IsReadOnly $False
PS C:\> $ISD | New-Volume -FriendlyName SalesData -FileSystem ReFS -DriveLetter s

```

DriveLetter	FileSystemLabel	FileSystem	DriveType	HealthStatus	OperationalStatus	SizeRemaining	Size
S	SalesData	ReFS	Fixed	Healthy	OK	396.13 MB	1.06 GB

```

PS C:\> Set-Location -Path S:
PS S:\> New-Item -Path S:\ -Name SalesData -ItemType Directory

Directory: s:\

Mode LastWriteTime Length Name
---- -
d----- 07/02/2017 22:32 SalesData

PS s:\> 'Testing 1-2-3' | Out-File -FilePath s:\SalesData\Test.txt
PS s:\> Get-ChildItem s:\SalesData

Directory: s:\SalesData

Mode LastWriteTime Length Name
---- -
-a----- 07/02/2017 22:33 32 Test.txt

```

```

PS C:\> Install-WindowsFeature -Name Failover-Clustering `
 -ComputerName FS1 `
 -IncludeManagementTools

Success Restart Needed Exit Code Feature Result

True No Success {Failover Clustering}

PS C:\> Install-WindowsFeature -Name Failover-Clustering `
 -ComputerName FS2 `
 -IncludeManagementTools

Success Restart Needed Exit Code Feature Result

True No Success {Failover Clustering}

```

```

PS C:\> $CheckOutput = 'c:\foo\clustercheck'
PS C:\> Test-Cluster -Node FS1, FS2 -ReportName $CheckOutput

Mode LastWriteTime Length Name
---- -
-a----- 08/02/2017 20:00 657770 clustercheck.htm

```

**Microsoft**

## Failover Cluster Validation Report

**Node:** FS1.Reskit.Org Validated  
**Node:** FS2.Reskit.Org Validated  
**Started:** 08/02/2017 19:49:59  
**Completed:** 08/02/2017 19:51:37

The Validate a Configuration Wizard must be run after any change is made to the configuration of the cluster or hardware. For more information, see <http://go.microsoft.com/fwlink/?LinkId=280145>.

### Results by Category

Name	Result Summary	Description
<a href="#">Inventory</a>		Success
<a href="#">Network</a>		Success
<a href="#">Storage</a>		Not Applicable
<a href="#">System Configuration</a>		Success

```
PS C:\> New-Cluster -Name FS `
 -Node 'fs1.reskit.org', 'fs2.reskit.org' `
 -StaticAddress 10.10.10.100
```

```
Name

FS
```

```
PS C:\> Add-ClusterScaleOutFileServerRole -Name SalesFS
```

```
Name OwnerNode State
---- -
SalesFS FS1 Online
```

```
PS C:\> Get-ClusterResource |
 Where-Object OwnerGroup -Match 'Available'
 Add-ClusterSharedVolume -Name VM
```

Name	State	Node
Cluster Disk 1	Online	FS1

```
PS C:\> $SdFolder = 'S:\SalesData'
PS C:\> New-SMBShare -Name SalesData `
 -Path $SdFolder `
 -Description 'SalesData'
```

Name	ScopeName	Path	Description
SalesData	FS	S:\SalesData	SalesData

```
PS C:\> $HvFolder = 'C:\ClusterStorage\Volume1\HVDATA'
PS C:\> New-Item -Path $HvFolder -ItemType Directory |
 OUT-NULL
PS C:\> New-SMBShare -Name SalesHV -Path $HvFolder `
 -Description 'Sales HV (CA)' `
 -FullAccess 'Reskit\IT Team' `
 -ContinuouslyAvailable:$true
```

Name	ScopeName	Path	Description
SalesHV	SALESFS	C:\ClusterStorage\Volume1\HVDATA	Sales HV (CA)

```
PS C:\> Get-SmbShare
```

Name	ScopeName	Path	Description
Backup	*	C:\Recipe 5-7	Restore applications
foo	*	C:\foo	Used in Recipe 5-7 to hold backup of SRV1
IPC\$	*		Foo share for IT
SalesData	FS	S:\SalesData	Remote IPC
SalesHV	SALESFS	C:\ClusterStorage\Volume1\HVDATA	SalesData
			Sales HV (CA)

```
Add-WindowsFeature -Name FS-DFS-Namespaces `
 -IncludeManagementTools `
 -ComputerName 'Srv1'
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{{DFS Namespaces}}

```
Add-WindowsFeature -NameFS-DFS-Namespaces `
 -IncludeManagementTools `
 -ComputerName 'Srv1'
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{{DFS Namespaces}}

```
PS C:\> Get-Module DFSN -ListAvailable
```

Directory: C:\Windows\system32\WindowsPowerShell\v1.0\Modules

ModuleType	Version	Name	ExportedCommands
Manifest	1.0	DFSN	{Get-DfsnRoot, Remove-DfsnRoot, Set-DfsnRoot, New-DfsnRoot...}

```
PS C:\> Get-Command -Module DFSN | Measure-Object
```

```
Count : 23
Average :
Sum :
Maximum :
Minimum :
Property :
```

```
PS C:\> $Sb = {
 New-Item -Path E:\ShareData -ItemType Directory -Force | Out-Null
 New-SmbShare -Name ShareData -Path E:\ShareData -FullAccess Everyone
}
Invoke-Command -ComputerName Srv1, Srv2 -ScriptBlock $Sb
```

Name	ScopeName	Path	Description
ShareData	*	E:\ShareData	
ShareData	*	E:\ShareData	



```
PS C:\foo> New-DfsnRoot -Path \\Reskit.Org\ShareData `
 -TargetPath \\Srv1\ShareData `
 -Type DomainV2 `
 -Description 'Reskit Shared Data DFS Root'
```

Path	Type	Properties	TimeToLiveSec	State	Description
\\Reskit.Org\ShareData	Domain V2		300	Online	Reskit Shared Data DFS Root

```
STEP 5
PS C:\foo> New-DfsnRootTarget -Path \\Reskit.Org\ShareData `
 -TargetPath \\Srv2\ShareData `
New-DfsnRootTarget : The requested object could not be found.
At line:1 char:1
+ New-DfsnRootTarget -Path \\Reskit.Org\ShareData `
+ ~~~~~
+ CategoryInfo : ObjectNotFound: (MSFT_DfsNamespaceRootTarget:ROOT\Microsoft\...\spaceRootTarget) [New-DfsnRootTarget], CimException
+ FullyQualifiedErrorId : MI_RESULT_6,New-DfsnRootTarget
```

```
PS C:\foo> Get-DfsnRootTarget -Path \\Reskit.Org\ShareData
```

Path	TargetPath	State	ReferralPriorityClass	ReferralPriorityRank
\\Reskit.Org\ShareData	\\Srv1.Reskit.Org\ShareData	Online	sitecost-normal	0
\\Reskit.Org\ShareData	\\Srv2.Reskit.Org\ShareData	Online	sitecost-normal	0

```

PS C:\foo> $Sb = {
 New-Item -Path C:\IT2 -ItemType Directory | Out-Null
 New-SmbShare -Name 'ITData' -Path C:\IT2 -FullAccess Everyone
 New-Item -Path C:\Sales -ItemType Directory | Out-Null
 New-SmbShare -Name 'Sales' -Path C:\Sales -FullAccess Everyone
 New-Item -Path C:\OldSales -ItemType Directory | Out-Null
 New-SmbShare -Name 'SalesHistorical' -Path 'C:\OldSales'
 'Root' | out-file c:\it2\root.txt
 'Root' | out-file c:\Sales\root.txt
 'Root' | out-file c:\oldsales\root.txt
}
Invoke-Command -ScriptBlock $Sb -Computer FS1

```

Name	ScopeName	Path	Description	PSComputerName
ITData	*	C:\IT2		FS1
Sales	*	C:\Sales		FS1
SalesHistorical	*	C:\OldSales		FS1

```

PS C:\foo> $Sb = {
 New-Item -Path C:\IT2 -ItemType Directory | Out-Null
 New-SmbShare -Name 'ITData' -Path C:\IT2 -FullAccess Everyone
 New-Item -Path C:\Sales -ItemType Directory | Out-Null
 New-SmbShare -Name 'Sales' -Path C:\Sales -FullAccess Everyone
 New-Item -Path C:\OldSales -ItemType Directory | Out-Null
 New-SmbShare -Name 'SalesHistorical' -Path C:\IT2
 'Root' | out-file c:\it2\root.txt
 'Root' | out-file c:\Sales\root.txt
 'Root' | out-file c:\oldsales\root.txt
}
Invoke-Command -ScriptBlock $sb -Computer FS2

```

Name	ScopeName	Path	Description	PSComputerName
ITData	*	C:\IT2		FS2
Sales	*	C:\Sales		FS2
SalesHistorical	*	C:\IT2		FS2

```

PS C:\foo> $sb = {
 New-Item C:\ITM -ItemType Directory | Out-Null
 New-SmbShare -Name 'ITM' -Path C:\ITM -FullAccess Everyone
 'Root' | out-file c:\itm\root.txt
}
Invoke-Command -ScriptBlock $sb -Computer DC1

```

Name	ScopeName	Path	Description	PSComputerName
ITM	*	C:\ITM		DC1

```

PS C:\foo> # DC2 folders/shares
$Sb = {
 New-Item C:\ITM -ItemType Directory | Out-Null
 New-SmbShare -Name 'ITM' -Path C:\ITM -FullAccess Everyone
 'Root' | out-file c:\itm\root.txt
}
Invoke-Command -ScriptBlock $Sb -Computer DC2

```

Name	ScopeName	Path	Description	PSComputerName
ITM	*	C:\ITM		DC2

```

PS C:\foo> New-DfsnFolder -Path '\\Reskit\ShareData\IT\ITData' `
 -TargetPath '\\fs1\ITData\`
 -EnableTargetFailback $true `
 -Description 'IT Data'

Path State TimeToLiveSec Properties Description
---- -
\\Reskit\ShareData\IT\ITData Online 300 Target Failback IT Data

PS C:\foo> New-DfsnFolderTarget -Path '\\Reskit\ShareData\IT\ITData' `
 -TargetPath '\\fs2\ITData\`

Path TargetPath State ReferralPriorityClass ReferralPriorityRank
---- -
\\Reskit\ShareData\IT\ITData \\fs2\ITData\ Online sitecost-normal 0

PS C:\foo> New-DfsnFolder -Path '\\Reskit\ShareData\IT\ITManagement' `
 -TargetPath '\\DC1\itm\`
 -EnableTargetFailback $true `
 -Description 'IT Management Data'

Path State TimeToLiveSec Properties Description
---- -
\\Reskit\ShareData\IT\ITManagement Online 300 Target Failback IT Management Data

PS C:\foo> New-DfsnFolderTarget -Path '\\Reskit\ShareData\IT\ITManagement' `
 -TargetPath '\\DC2\itm\`

Path TargetPath State ReferralPriorityClass ReferralPriorityRank
---- -
\\Reskit\ShareData\IT\ITManagement \\DC2\itm\ Online sitecost-normal 0

PS C:\foo> New-DfsnFolder -Path '\\Reskit\ShareData\Sales\SalesData' `
 -TargetPath '\\fs1\sales\`
 -EnableTargetFailback $true `
 -Description 'SalesData'

Path State TimeToLiveSec Properties Description
---- -
\\Reskit\ShareData\Sales\SalesData Online 300 Target Failback SalesData

PS C:\foo> New-DfsnFolderTarget -Path '\\Reskit\ShareData\Sales\SalesData' `
 -TargetPath '\\fs2\sales\`

Path TargetPath State ReferralPriorityClass ReferralPriorityRank
---- -
\\Reskit\ShareData\Sales\SalesData \\fs2\sales\ Online sitecost-normal 0

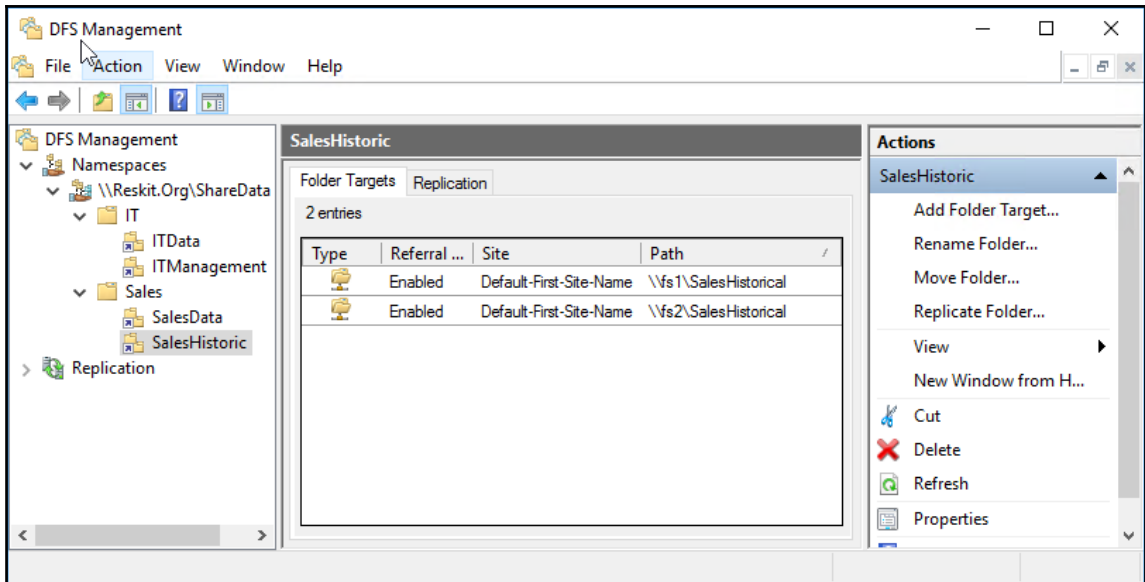
PS C:\foo> New-DfsnFolder -Path '\\Reskit\ShareData\Sales\SalesHistoric' `
 -TargetPath '\\fs1\SalesHistorical\`
 -EnableTargetFailback $true `
 -Description 'Sales Group Historical Data'

Path State TimeToLiveSec Properties Description
---- -
\\Reskit\ShareData\Sales\SalesHistoric Online 300 Target Failback Sales Group Historical Data

PS C:\foo> New-DfsnFolderTarget -Path '\\Reskit\ShareData\Sales\SalesHistoric' `
 -TargetPath '\\fs2\SalesHistorical\`

Path TargetPath State ReferralPriorityClass ReferralPriorityRank
---- -
\\Reskit\ShareData\Sales\SalesHistoric \\fs2\SalesHistorical\ Online sitecost-normal 0

```



```

PS C:\> $Sb = {
 Add-WindowsFeature -Name FS-DFS-Replication `
 -IncludeManagementTools
}
PS C:\> Invoke-Command -ScriptBlock $sb `
 -ComputerName DC1, DC2, FS2, FS2, SRV1, SRV2 |
 Format-Table -Property PSComputername, FeatureResult, Success

```

PSComputerName	FeatureResult	Success
DC2	{DFS Replication}	True
DC1	{DFS Replication}	True
SRV2	{DFS Replication}	True
SRV1	{DFS Replication}	True
FS1	{DFS Replication}	True
FS2	{DFS Replication}	True

```

PS C:\> Get-Module DFSR -ListAvailable
 Directory: C:\Windows\system32\WindowsPowerShell\v1.0\Modules

ModuleType Version Name ExportedCommands

Binary 2.0.0.0 DFSR {New-DfsReplicationGroup, Get-DfsReplicationGroup, Set-DfsReplicationGroup, Remove-DfsReplicationGroup...}

PS C:\> Get-Command -Module DFSR | Measure-Object
Count : 45
Average :
Sum :
Maximum :
Minimum :
Property :

```

```

PS C:\> New-DfsReplicationGroup -GroupName FSShareRG `
 -DomainName Reskit.Org `
 -Description 'Replication Group for FS1, FS2 shares' |
 Out-Null
PS C:\> New-DfsReplicationGroup -GroupName DCShareRG `
 -DomainName Reskit.Org `
 -Description 'Replication Group for DC1, DC2 shares' |
 Out-Null
PS C:\> Get-DfsReplicationGroup | Format-Table -Property GroupName, DomainName, Description, State

```

GroupName	DomainName	Description	State
FSShareRG	Reskit.Org	Replication Group for FS1, FS2 shares	Normal
DCShareRG	Reskit.Org	Replication Group for DC1, DC2 shares	Normal

```

PS C:\> Get-DfsReplicatedFolder |
 Format-Table GroupName, FolderName, DomainName, DfsnPath

```

GroupName	FolderName	DomainName	DfsnPath
FSShareRG	ITData	Reskit.Org	\\Reskit.Prg\ShareData\IT\ITData
FSShareRG	Sales	Reskit.Org	\\Reskit.Org\ShareData\Sales\SalesData
FSShareRG	SalesHistorical	Reskit.Org	\\Reskit.Org\ShareData\Sales\SalesHistoric
DCShareRG	ITManagement	Reskit.Org	\\reskit.org\sharedata\IT\ITManagement

```

PS C:\> Get-DfsReplicatedFolder |
 Format-Table GroupName, FolderName, DomainName, DfsnPath

```

GroupName	FolderName	DomainName	DfsnPath
FSShareRG	ITData	Reskit.Org	\\Reskit.Prg\ShareData\IT\ITData
FSShareRG	Sales	Reskit.Org	\\Reskit.Org\ShareData\Sales\SalesData
FSShareRG	SalesHistorical	Reskit.Org	\\Reskit.Org\ShareData\Sales\SalesHistoric
DCShareRG	ITManagement	Reskit.Org	\\reskit.org\sharedata\IT\ITManagement

```
PS C:\> Get-DfsrMembership -GroupName FSShareRG -ComputerName FS1, FS2 |
Format-Table GroupName, ComputerName, ComputerDomainName, ContentPath, Enabled
```

GroupName	ComputerName	ComputerDomainName	ContentPath	Enabled
FSShareRG	FS1	Reskit.Org	C:\It2	True
FSShareRG	FS2	Reskit.Org	c:\It2	True
FSShareRG	FS1	Reskit.Org	C:\Sales	True
FSShareRG	FS2	Reskit.Org	c:\Sales	True
FSShareRG	FS1	Reskit.Org	C:\OldSales	True
FSShareRG	FS2	Reskit.Org	c:\OldSales	True

```
PS C:\> Get-DfsrMembership -GroupName DCShareRG -ComputerName DC1, DC2 |
Format-Table GroupName, ComputerName, ComputerDomainName, ContentPath, Enabled
```

GroupName	ComputerName	ComputerDomainName	ContentPath	Enabled
DCShareRG	DC1	Reskit.Org	C:\ITM	True
DCShareRG	DC2	Reskit.Org	C:\ITM	True

```
PS C:\> Get-DfsrMember |
Format-Table -Property Groupname, DomainName, DNSName, Description
```

GroupName	DomainName	DnsName	Description
FSShareRG	Reskit.Org	FS1.Reskit.Org	File Server members
FSShareRG	Reskit.Org	FS2.Reskit.Org	File Server members
DCShareRG	Reskit.Org	DC1.Reskit.Org	DC Server members
DCShareRG	Reskit.Org	DC2.Reskit.Org	DC Server members

C:\foo\Propagation-FSShareRG-ITData-28Feb20 DFS Replication - Health Report DFS Replication - Propagation ... DFS Replication - Propagati...

# DFS Replication Propagation Report (Show All)

Report generated on: 28 February 2017 at 01:07:50 (GMT0:00)

Replication group: FSShareRG

Replicated folder: ITData

Number of tests reported: 5

Average replication time to all members:

Maximum replication time to all members:

Propagation test status:
 

- Propagation tests complete (5)
- Propagation tests with errors (0)
- Propagation tests incomplete (0)

**TESTS COMPLETED (5 test(s) completed)**

- Test launched from FSI.Reskit.Org on 28 February 2017 at 01:02:17 (GMT0:00)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:53:40 (GMT0:00)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:38:56 (GMT0:00)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:38:26 (GMT0:00)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:38:17 (GMT0:00)

**TESTS INCOMPLETE (0 test(s) incomplete)**

**TESTS WITH ERROR (0 test(s) in error)**

**DETAILS (5 tests) (Show All)**

- Test launched from FSI.Reskit.Org on 28 February 2017 at 01:02:17 (GMT0:00) (Show All)
  - Reference server: FSI.Reskit.Org
  - Reference site: Default-First-Site-Name
  - Status: Done (1 of 1 completed)
  - Date launched: 28 February 2017 at 01:02:17 (GMT0:00)
  - Replication time: <1 sec.
  - Test file: FSI@3614E4CB-D418-421D-B4F3-FA60A160CC39@FSShareRG-ITData.xml
  - Graph of replication time
  - Replication time
  - Members (1 member)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:53:40 (GMT0:00) (Show All)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:38:56 (GMT0:00) (Show All)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:38:26 (GMT0:00) (Show All)
- Test launched from FSI.Reskit.Org on 27 February 2017 at 18:38:17 (GMT0:00) (Show All)

C:\foo\Health-FSShareRG-2 | DFS Replication - Health Re...

# DFS Replication Health Report

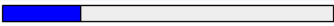
(Show All)

**Data collected on:** 28 February 2017 at 01:11:44 (GMT0:00)

**Replication Group:** FSShareRG (Reskit.Org)

**Reference member:** fs1

**Server scope:** Selected 1 of 2 servers

**DFS Replication bandwidth savings:**  23.56% reduction (31.46 KB replicated instead of 41.2 KB)

**Server health:**

- ✔ Servers with no errors or warnings (1)
- ✘ Servers with DFS Replication errors (0)
- 🚫 Servers unavailable for reporting (0)
- ⚠ Servers with DFS Replication warnings (0)

**✘ ERRORS (0 servers with errors)**

**⚠ WARNINGS (0 servers with warnings)**

**🚫 SERVERS UNAVAILABLE FOR REPORTING (All servers reporting)**

**SERVER DETAILS (1 server)** (Show All)

**FS1** (Show All)

DNS name: fs1.reskit.org  
 Domain name: Reskit.Org  
 Reference domain controller: DC1.Reskit.Org  
 IP address: fe80::ecda:bfd4:5ffd:e5a2%11, fe80::b865:dc55:7640:c413%17, fe80::d9fb:c299:d9d8:de30%6, 10.10.10.102, 10.10.10.101, 169.254.1.89  
 Site: Default-First-Site-Name  
 Time zone: (GMT0:00)

**✘ ERRORS (There are no errors to report)**

**⚠ WARNINGS (There are no warnings to report)**

**📘 INFORMATIONAL**

- 📘 Service state: Running
- 📘 DFS Replication service uptime: 1 day 2 hr.
- 📘 DFS Replication service version: 10.0.14393.206
- 📘 Summary of replicated folder status

The following table provides a high-level overview of replicated folder status on this server.

Replicated Folder	Status	# of Files Received	DFS Replication Bandwidth Savings
ITData	Normal	3	1.37%
Sales	Normal	3	23.87%
SalesHistorical	Normal	3	1.37%

📘 Data shown about the number of received files and the DFS Replication Bandwidth Savings accumulate from the time the DFS Replication service is started.



# Chapter 10: Managing Internet Information Server

```
PS C:\> Install-WindowsFeature -Name Web-Server `
 -IncludeAllSubFeature `
 -IncludeManagementTools
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{Application Development, Application Init...

```
PS C:\> Get-WindowsFeature -Name Web* | Where-Object installed
```

Display Name	Name	Install State
[X] Web Server (IIS)	Web-Server	Installed
[X] Web Server	Web-WebServer	Installed
[X] Common HTTP Features	Web-Common-Http	Installed
[X] Default Document	Web-Default-Doc	Installed
[X] Directory Browsing	Web-Dir-Browsing	Installed
[X] HTTP Errors	Web-Http-Errors	Installed
[X] Static Content	Web-Static-Content	Installed
[X] HTTP Redirection	Web-Http-Redirect	Installed
[X] WebDAV Publishing	Web-DAV-Publishing	Installed
[X] Health and Diagnostics	Web-Health	Installed
[X] HTTP Logging	Web-Http-Logging	Installed
[X] Custom Logging	Web-Custom-Logging	Installed
[X] Logging Tools	Web-Log-Libraries	Installed
[X] ODBC Logging	Web-ODBC-Logging	Installed
[X] Request Monitor	Web-Request-Monitor	Installed
[X] Tracing	Web-Http-Tracing	Installed
[X] Performance	Web-Performance	Installed
[X] Static Content Compression	Web-Stat-Compression	Installed
[X] Dynamic Content Compression	Web-Dyn-Compression	Installed
[X] Security	Web-Security	Installed
[X] Request Filtering	Web-Filtering	Installed
[X] Basic Authentication	Web-Basic-Auth	Installed
[X] Centralized SSL Certificate Support	Web-CertProvider	Installed
[X] Client Certificate Mapping Authentic...	Web-Client-Auth	Installed
[X] Digest Authentication	Web-Digest-Auth	Installed
[X] IIS Client Certificate Mapping Authe...	Web-Cert-Auth	Installed
[X] IP and Domain Restrictions	Web-IP-Security	Installed
[X] URL Authorization	Web-Url-Auth	Installed
[X] Windows Authentication	Web-Windows-Auth	Installed
[X] Application Development	Web-App-Dev	Installed
[X] .NET Extensibility 3.5	Web-Net-Ext	Installed
[X] .NET Extensibility 4.6	Web-Net-Ext45	Installed
[X] Application Initialization	Web-AppInit	Installed
[X] ASP	Web-ASP	Installed
[X] ASP.NET 3.5	Web-Asp-Net	Installed
[X] ASP.NET 4.6	Web-Asp-Net45	Installed
[X] CGI	Web-CGI	Installed
[X] ISAPI Extensions	Web-ISAPI-Ext	Installed
[X] ISAPI Filters	Web-ISAPI-Filter	Installed
[X] Server Side Includes	Web-Includes	Installed
[X] WebSocket Protocol	Web-WebSockets	Installed
[X] FTP Server	Web-Ftp-Server	Installed
[X] FTP Service	Web-Ftp-Service	Installed
[X] FTP Extensibility	Web-Ftp-Ext	Installed
[X] Management Tools	Web-Mgmt-Tools	Installed
[X] IIS Management Console	Web-Mgmt-Console	Installed
[X] IIS 6 Management Compatibility	Web-Mgmt-Compat	Installed
[X] IIS 6 Metabase Compatibility	Web-Metabase	Installed
[X] IIS 6 Management Console	Web-Lgcy-Mgmt-Console	Installed
[X] IIS 6 Scripting Tools	Web-Lgcy-Scripting	Installed
[X] IIS 6 WMI Compatibility	Web-WMI	Installed
[X] IIS Management Scripts and Tools	Web-Scripting-Tools	Installed
[X] Management Service	Web-Mgmt-Service	Installed

```

PS C:\> Import-Module WebAdministration
PS C:\> Get-Module -Name WebAdministration -ListAvailable

 Directory: C:\Windows\system32\WindowsPowerShell\v1.0\Modules

ModuleType Version Name ExportedCommands

Manifest 1.0.0.0 WebAdministration {Start-WebCommitDelay, Stop-WebCommitDelay, Get-WebConfigurationLock...}

PS C:\> Get-Command -Module webadministration |
Measure-Object |
Select-Object -Property Count

Count

79

```

```

PS C:\> Get-Module -Name IISAdministration
PS C:\> Get-Command -Module IISAdministration |
Measure-Object |
Select-Object -Property Count

ModuleType Version Name ExportedCommands

Script 1.0.0.0 iisadministration {Clear-IISCentralCertProvider, Clear-IISConfigCollection...}

Count : 31

```

```

PS C:\> Get-PSProvider -PSProvider WebAdministration

Name Capabilities Drives
---- -
WebAdministration ShouldProcess {IIS}

```

```

PS C:\> Get-ChildItem -Path IIS:\

Name

AppPools
Sites
SslBindings

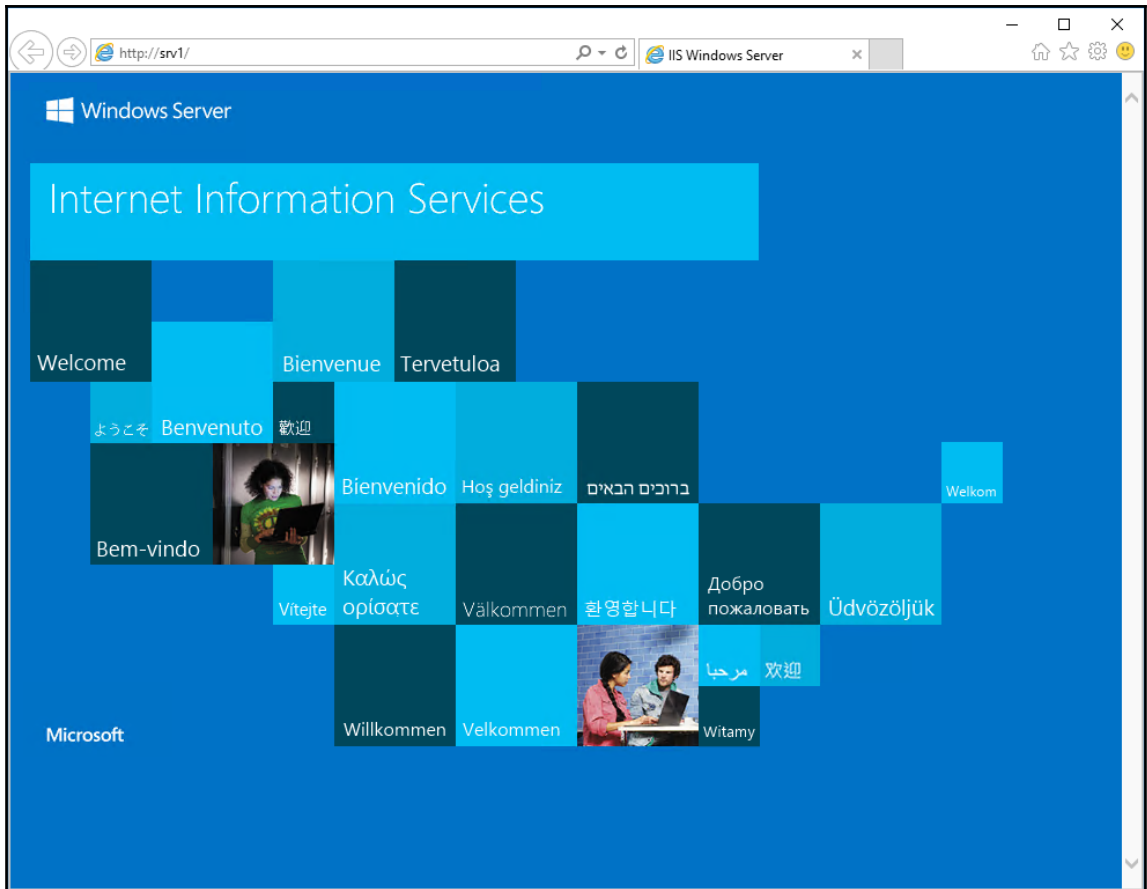
```

```

PS C:\> Get-Childitem -Path IIS:\Sites

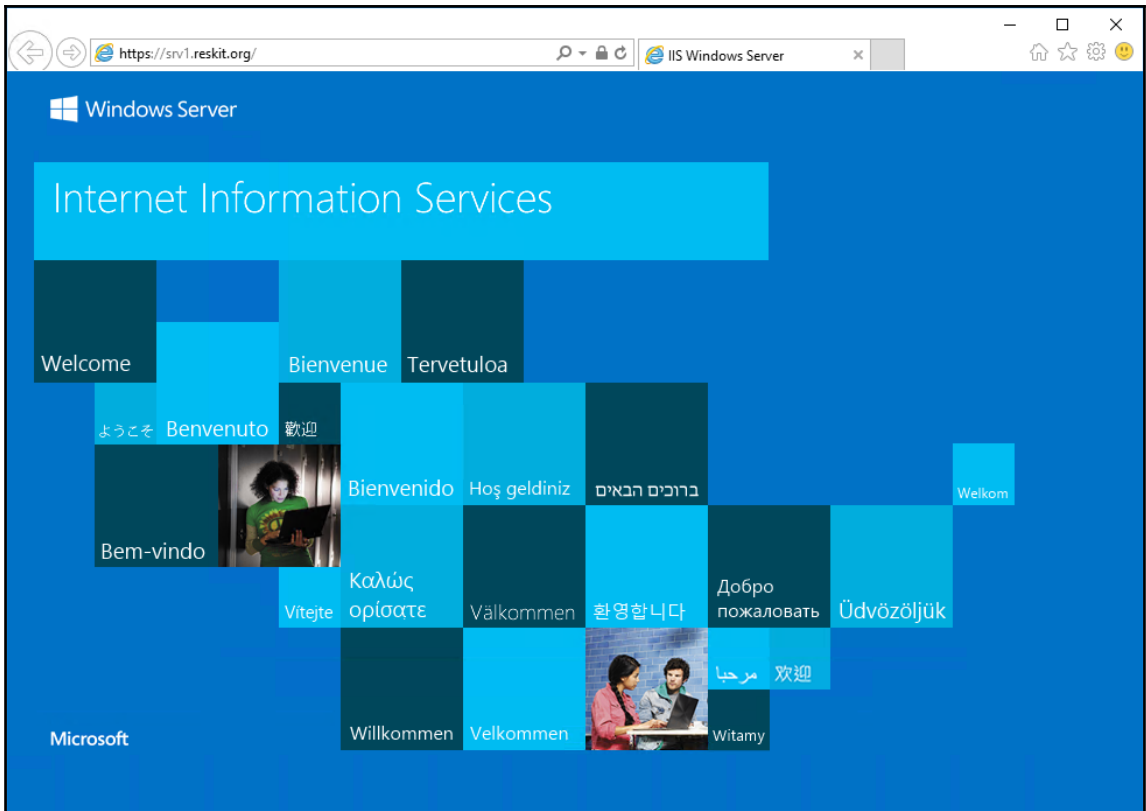
Name ID State Physical Path Bindings
---- -- -
Default Web Site 1 Started %SystemDrive%\inetpub\wwwroot http *:80:

```



```
PS C:\> $SSLCert | New-Item -Path IIS:\SslBindings\0.0.0.0!443
```

IP Address	Port	Host Name	Store	Sites
0.0.0.0	443		MY	Default Web Site



```
PS C:\> Get-TlsCipherSuite |
```

```
Format-Table Name, Exchange, Cipher, Hash, Certificate
```

Name	Exchange	Cipher	Hash	Certificate
TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	ECDH	AES		ECDSA
TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	ECDH	AES		ECDSA
TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384	ECDH	AES		RSA
TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256	ECDH	AES		RSA
TLS_DHE_RSA_WITH_AES_256_GCM_SHA384	DH	AES		RSA
TLS_DHE_RSA_WITH_AES_128_GCM_SHA256	DH	AES		RSA
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384				
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	ECDH	AES	SHA256	ECDSA
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384	ECDH	AES	SHA384	RSA
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256	ECDH	AES	SHA256	RSA
TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA	ECDH	AES	SHA1	ECDSA
TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA	ECDH	AES	SHA1	ECDSA
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA	ECDH	AES	SHA1	RSA
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	ECDH	AES	SHA1	RSA
TLS_DHE_RSA_WITH_AES_256_CBC_SHA	DH	AES	SHA1	RSA
TLS_DHE_RSA_WITH_AES_128_CBC_SHA	DH	AES	SHA1	RSA
TLS_RSA_WITH_AES_256_GCM_SHA384	RSA	AES		RSA
TLS_RSA_WITH_AES_128_GCM_SHA256	RSA	AES		RSA
TLS_RSA_WITH_AES_256_CBC_SHA256	RSA	AES	SHA256	RSA
TLS_RSA_WITH_AES_128_CBC_SHA256	RSA	AES	SHA256	RSA
TLS_RSA_WITH_AES_256_CBC_SHA	RSA	AES	SHA1	RSA
TLS_RSA_WITH_AES_128_CBC_SHA	RSA	AES	SHA1	RSA
TLS_RSA_WITH_3DES_EDE_CBC_SHA	RSA	3DES	SHA1	RSA
TLS_DHE_DSS_WITH_AES_256_CBC_SHA256				
TLS_DHE_DSS_WITH_AES_128_CBC_SHA256	DH	AES	SHA256	DSA
TLS_DHE_DSS_WITH_AES_256_CBC_SHA	DH	AES	SHA1	DSA
TLS_DHE_DSS_WITH_AES_128_CBC_SHA	DH	AES	SHA1	DSA
TLS_DHE_DSS_WITH_3DES_EDE_CBC_SHA	DH	3DES	SHA1	DSA
TLS_RSA_WITH_NULL_SHA256	RSA		SHA256	RSA
TLS_RSA_WITH_NULL_SHA	RSA		SHA1	RSA
TLS_PSK_WITH_AES_256_GCM_SHA384				
TLS_PSK_WITH_AES_128_GCM_SHA256	PSK	AES		
TLS_PSK_WITH_AES_256_CBC_SHA384	PSK	AES	SHA384	
TLS_PSK_WITH_AES_128_CBC_SHA256	PSK	AES	SHA256	
TLS_PSK_WITH_NULL_SHA384	PSK		SHA384	
TLS_PSK_WITH_NULL_SHA256	PSK		SHA256	
TLS_RSA_WITH_RC4_128_SHA	RSA	RC4	SHA1	RSA
TLS_RSA_WITH_RC4_128_MD5	RSA	RC4	MD5	RSA

```
PS C:\> Get-TlsCipherSuite -Name RC4 |
Format-Table Name, Exchange, Cipher, Hash, Certificate
```

Name	Exchange	Cipher	Hash	Certificate
-----	-----	-----	-----	-----
TLS_RSA_WITH_RC4_128_SHA	RSA	RC4	SHA1	RSA
TLS_RSA_WITH_RC4_128_MD5	RSA	RC4	MD5	RSA

```
PS C:\> Get-TlsCipherSuite -Name RC4 |
Format-Table Name, Exchange, Cipher, Hash, Certificate
```

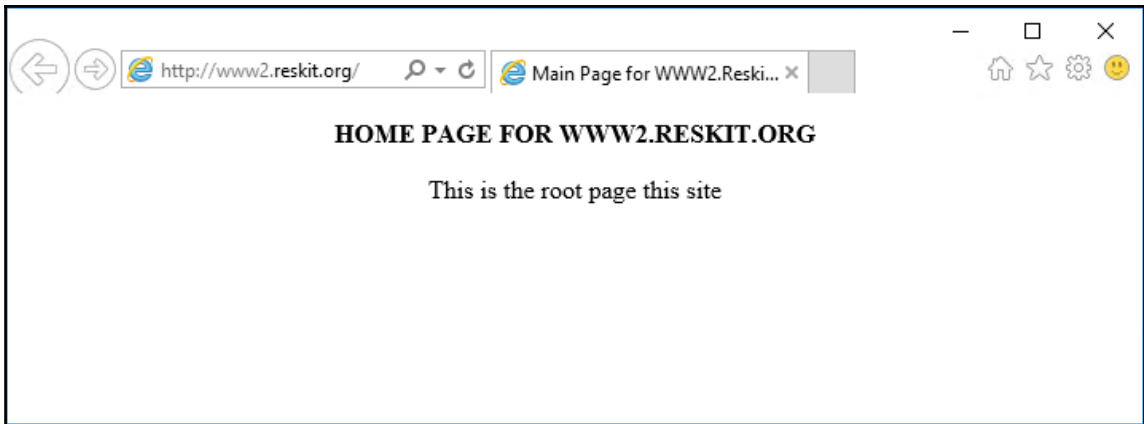
Name	Exchange	Cipher	Hash	Certificate
-----	-----	-----	-----	-----
TLS_RSA_WITH_RC4_128_SHA	RSA	RC4	SHA1	RSA
TLS_RSA_WITH_RC4_128_MD5	RSA	RC4	MD5	RSA

```
PS C:\> $sb = {
If (-NOT (Test-Path c:\SSLCerts)) {
 New-Item -Path c:\SSLCerts -ItemType Directory `
 -Name 'SSL Certificate Share'
New-SmbShare -Name 'SSLCertShare' -Path c:\SSLCerts
}
PS C:\> Invoke-Command -ScriptBlock $sb -ComputerName DC1
```

Name	ScopeName	Path	Description	PSComputerName
-----	-----	-----	-----	-----
SSLCertShare	*	c:\SSLCerts		DC1

```
PS C:\> New-Website -PhysicalPath $sitepath -name www2 `
-HostHeader 'www2.reskit.org'
```

Name	ID	State	Physical Path	Bindings
-----	---	-----	-----	-----
www2	2	Started	C:\inetpub\www2	http *:80:www2.reskit.org



```
PS C:\> $LogFileLocation = (Get-ItemProperty 'IIS:\Sites\Default Web Site' -Name logfile).directory
PS C:\> $LogFileFolder = [System.Environment]::ExpandEnvironmentVariables("$LogFileLocation")
PS C:\> Get-ChildItem -Path $LogFileFolder -Recurse

Directory: C:\inetpub\logs\LogFiles

Mode LastWriteTime Length Name
---- -
d----- 20/06/2017 16:54 w3svc1

Directory: C:\inetpub\logs\LogFiles\w3svc1

Mode LastWriteTime Length Name
---- -
-a---- 11/06/2017 16:39 1848 u_ex170611.log
-a---- 15/06/2017 18:02 838 u_ex170615.log
-a---- 20/06/2017 17:01 2217 u_ex170620.log
```

```
PS C:\> New-WebAppPool -Name WWW2Pool

Name State Applications
---- -
WWW2Pool Started
```

```
PS C:\> New-WebApplication -Name WWW2 -Site www2 `
 -ApplicationPool WWW2Pool `
 -PhysicalPath C:\inetpub\www2

Name Application pool Protocols Physical Path
---- -
WWW2 WWW2Pool http C:\inetpub\www2
```



```
PS C:\> Get-IISAppPool
```

Name	Status	CLR Ver	Pipeline Mode	Start Mode
DefaultAppPool	Started	v4.0	Integrated	OnDemand
Classic .NET AppPool	Started	v2.0	Classic	OnDemand
.NET v2.0 Classic	Started	v2.0	Classic	OnDemand
.NET v2.0	Started	v2.0	Integrated	OnDemand
.NET v4.5 Classic	Started	v4.0	Classic	OnDemand
.NET v4.5	Started	v4.0	Integrated	OnDemand
RKAppPool	Started	v4.0	Integrated	OnDemand
PSWS	Started	v4.0	Integrated	OnDemand
WWW2Pool	Started	v4.0	Integrated	OnDemand

The screenshot displays the Internet Information Services (IIS) Manager interface. The main window shows a list of application pools for the server SRV1. The 'Advanced Settings' dialog box is open, showing configuration options for the selected pool. The 'Recycling' section is expanded, showing settings for memory limits and request limits.

**Application Pools List:**

Name	Status	.NET CLR V...	Managed Pipe...	Identity
.NET v2.0	Started	v2.0	Integrated	ApplicationPoolIdentity
.NET v2.0 Classic	Started	v2.0	Classic	ApplicationPoolIdentity
.NET v4.5	Started	v4.0	Integrated	ApplicationPoolIdentity
.NET v4.5 Classic	Started	v4.0	Classic	ApplicationPoolIdentity
Classic .NET Ap...	Started	v2.0	Classic	ApplicationPoolIdentity
DefaultAppPool	Started	v4.0	Integrated	ApplicationPoolIdentity
PSWS	Started	v4.0	Integrated	LocalSystem
RKAppPool	Started	v4.0	Integrated	ApplicationPoolIdentity
WWW2Pool	Started	v4.0	Integrated	ApplicationPoolIdentity

**Advanced Settings Dialog:**

- Startup Time Limit (seconds): 90
- Process Orphaning: Enabled (False), Executable (False)
- Rapid-Fail Protection: 'Service Unavailable' Response: HttpLevel, Enabled (True), Failure Interval (minutes): 5, Maximum Failures: 5
- Recycling: Disable Overlapped Recycle (False), Disable Recycling for Configurat (False), Generate Recycle Event Log Entr (True), Private Memory Limit (KB): 1073741824, Regular Time interval (minutes): 1740, Request Limit: 100000, Specific Times: [0] 07:55:00, [1] 19:55:00, Virtual Memory Limit (KB): 0

```
PS C:\> Install-WindowsFeature -Name NLB `
 -IncludeManagementTools
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{Network Load Balancing, Remote Server Adm..

```
PS C:\> Install-WindowsFeature -Name NLB `
 -IncludeManagementTools `
 -ComputerName NLB2
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{Network Load Balancing, Remote Server Adm..

```
PS C:\> Invoke-Command -ScriptBlock {Get-WindowsFeature web-Server, NLB} `
 -ComputerName NLB1, NLB2 |
 Format-Table -Property DisplayName,PSComputerName,InstallState
```

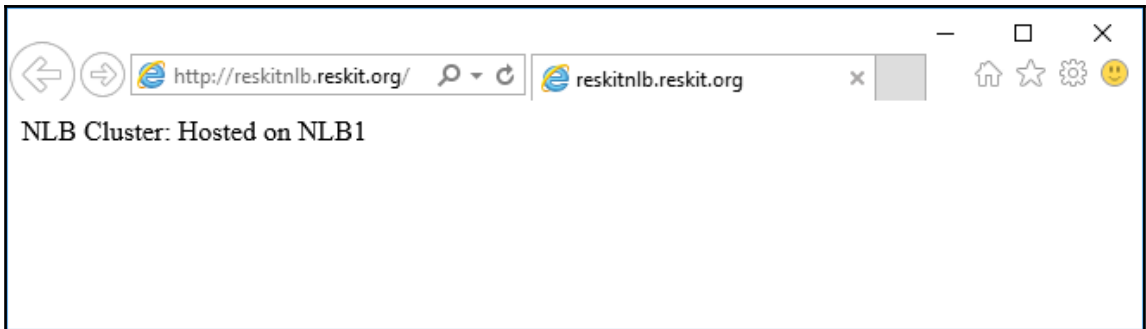
DisplayName	PSComputerName	InstallState
Web Server (IIS)	NLB2	Installed
Network Load Balancing	NLB2	Installed
Web Server (IIS)	NLB1	Installed
Network Load Balancing	NLB1	Installed

```
PS C:\> New-NlbCluster -InterfaceName ethernet `
 -ClusterName 'ReskitNLB' `
 -ClusterPrimaryIP 10.10.10.55 -SubnetMask 255.255.255.0 `
 -OperationMode Unicast
```

Name	IPAddress	SubnetMask	Mode
ReskitNLB	10.10.10.55	255.255.255.0	MULTICAST

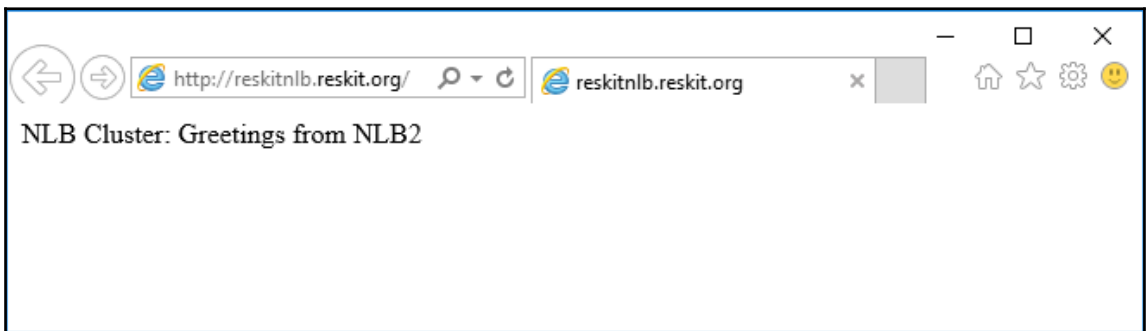
```
PS C:\> Add-NlbClusterNode -NewNodeName NLB2 `
 -NewNodeInterface 'Ethernet' `
 -InterfaceName 'Ethernet'
```

Name	State	Interface	HostID
NLB2	Converged(default)	Ethernet	2



```
PS C:\> Stop-NlbClusterNode -HostName NLB1
```

Name	State	Interface	HostID
NLB1	Stopped	Ethernet	1



# Chapter 11: Managing Hyper-V

```
PS C:> $Sb = {
 Install-WindowsFeature -Name Hyper-V `
 -IncludeManagementTools}
PS C:> Invoke-Command -ComputerName HV1, HV2 `
 -ScriptBlock $Sb

PSComputerName : HV2
RunspaceId : ae4a4853-631e-4d5c-a33d-e10886175ea3
Success : True
RestartNeeded : Yes
FeatureResult : {Hyper-V, Hyper-V Module for windows PowerShell, Hyper-V GUI Management Tools,
 Remote Server Administration Tools...}
ExitCode : SuccessRestartRequired
WARNING: You must restart this server to finish the installation process.

PSComputerName : HV1
RunspaceId : 86417f8f-27c0-4755-bcfa-cc0113854628
Success : True
RestartNeeded : Yes
FeatureResult : {Hyper-V, Hyper-V Module for windows PowerShell, Hyper-V GUI Management Tools,
 Remote Server Administration Tools...}
ExitCode : SuccessRestartRequired
WARNING: You must restart this server to finish the installation process.
```

```
PS C:> $Sb = {
 New-Item -Path H:\Vm -ItemType Directory -Force | Out-Null
 New-Item -Path H:\Vm\vhds -ItemType Directory -Force | Out-Null
 New-Item -Path H:\Vm\VMs -ItemType Directory -force | Out-Null
 Get-ChildItem -Path H:\Vm
}
```

```
Invoke-Command -ComputerName HV1, HV2 -ScriptBlock $Sb
```

Directory: H:\Vm

Mode	LastWriteTime	Length	Name	PSComputerName
----	-----	-----	----	-----
d-----	01/03/2017 12:15		vhds	HV1
d-----	01/03/2017 12:15		VMs	HV1
d-----	01/03/2017 12:16		vhds	HV2
d-----	01/03/2017 12:16		VMs	HV2

```
PS C:\> Get-VMHost -ComputerName HV1, HV2 |
 Format-List -Property Name, MemoryCapacity,
 Virtual*Path, NumaSpanningEnabled,
 EnableEnhancedSessionMode,
 ResourceMeteringSaveInterval

Name : HV1
MemoryCapacity : 16776744960
VirtualHardDiskPath : H:\vm\vhds
VirtualMachinePath : H:\VM\VMs
NumaSpanningEnabled : True
EnableEnhancedSessionMode : True
ResourceMeteringSaveInterval : 01:30:00

Name : HV2
MemoryCapacity : 16776744960
VirtualHardDiskPath : H:\vm\vhds
VirtualMachinePath : H:\VM\VMs
NumaSpanningEnabled : True
EnableEnhancedSessionMode : True
ResourceMeteringSaveInterval : 01:30:00
```

```
A prerequisite check for the Hyper-V feature failed.
1. Hyper-V cannot be installed: The processor does not have required virtualization capabilities.
+ CategoryInfo : InvalidOperation: (Hyper-V:ServerComponentWrapper) [Install-WindowsFeature], Exception
+ FullyQualifiedErrorId : Alteration_PrerequisiteCheck_Failed,Microsoft.Windows.ServerManager.Commands.AddWindow
sFeatureCommand
+ PSComputerName : hvl
```

```
PS C:\> Get-VM -Name psdirect

Name State CPUUsage(%) MemoryAssigned(M) Uptime Status Version
---- -
psdirect Running 0 1024 00:09:48.2910000 Operating normally 8.0
```

```
PS C:\> Invoke-Command -VMName psdirect `
 -Credential $RKcred `
 -ScriptBlock {hostname}

Tiger
```

```
PS C:\> $VMID = (Get-VM -VMName psdirect).VMId.Guid
PS C:\> Invoke-Command -Vmid $VMID `
 -Credential $RKCCred `
 -ScriptBlock {hostname}
```

Tiger

```
PS C:\> Enter-PSSession -VMName psdirect -Credential $RKCCred
[psdirect]: PS C:\Users\administrator\Documents> Get-CimInstance -Class Win32_ComputerSystem

Name PrimaryOwnerName Domain TotalPhysicalMemory Model Manufacturer

TIGER Packt Recipe Book Reader Reskit.Org 1073270784 Virtual Machine Microsoft Corporation

[psdirect]: Exit-PSSession
PS C:\>
```

```
PS C:\> Get-VMGroup |
 Format-Table -Property Name, GroupType, VMMembers

Name GroupType VMMembers

HVServers VMCollectionType {HV2, HV1}
```

```
PS C:\> $Members = (Get-VmGroup -Name HVServers).VMMembers
PS C:\> $Members
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
HV2	Running	0	16000	21.04:47:26.3860000	Operating normally	8.0
HV1	Running	0	16000	21.02:39:38.7180000	Operating normally	8.0

```
PS C:\> Set-VMhost -ComputerName HV1 -MacAddressMinimum 00155D017000 `
 -MacAddressMaximum 00155D017099
PS C:\> Set-VMhost -ComputerName HV2 -MacAddressMinimum 00155D017100 `
 -MacAddressMaximum 00155D017199
PS C:\> Get-VMhost -ComputerName HV1, HV2 |
 Format-Table -Property Name, MacAddressMinimum,
 MacAddressMaximum
```

Name	MacAddressMinimum	MacAddressMaximum
HV1	00155D017000	00155D017099
HV2	00155D017100	00155D017199

```
PS C:\> Get-VMProcessor -VM (Get-VMGroup HvServers).VMMembers |
Format-Table -Property VMName, OperationalStatus
```

```
VMName OperationalStatus

HV2 {Ok, HostResourceProtectionEnabled}
HV1 {Ok, HostResourceProtectionEnabled}
```

```
PS C:\> New-VM -Name VM1 -Path $VMLocation -MemoryStartupBytes 1GB
```

```
Name State CPUUsage(%) MemoryAssigned(M) Uptime Status Version

VM1 Off 0 0 00:00:00 Operating normally 8.0
```

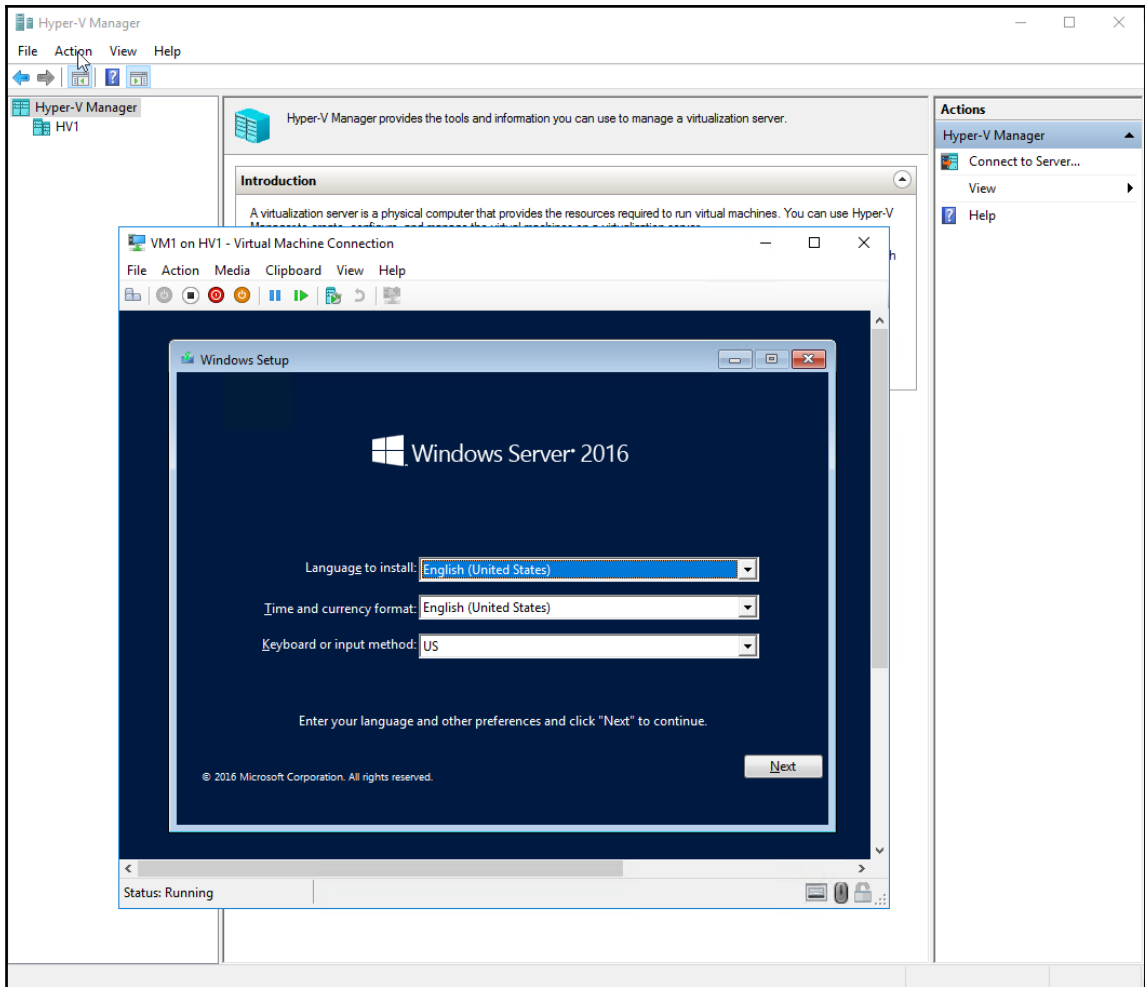
```
PS C:\> New-VHD -Path $VhdPath -SizeBytes 128GB -Dynamic
```

```
ComputerName : HV1
Path : H:\Vm\Vhds\VM1.Vhdx
VhdFormat : VHDX
VhdType : Dynamic
FileSize : 4194304
Size : 137438953472
MinimumSize :
LogicalSectorSize : 512
PhysicalSectorSize : 4096
BlockSize : 33554432
ParentPath :
DiskIdentifier : E98F967A-0D2A-482B-99AF-7C05DFFA5912
FragmentationPercentage : 0
Alignment : 1
Attached : False
DiskNumber :
Number :
```

```
PS C:\> Get-VM -Name $VMName
```

```
Name State CPUUsage(%) MemoryAssigned(M) Uptime Status Version

VM1 Running 0 1024 00:00:53.2290000 Operating normally 8.0
```



```
PS C:\> Get-VM -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	0	1024	00:52:46.5730000	Operating normally	8.0

```
PS C:\> Set-VMbios VM1 -StartupOrder ('IDE', 'CD', 'LegacyNetworkAdapter', 'Floppy')
PS C:\> Get-VMbios VM1
```

VMName	StartupOrder	NumLockEnabled
VM1	{IDE, CD, LegacyNetworkAdapter, Floppy}	False



```
PS C:\> Set-VMProcessor -VMName VM1 -Count 2
PS C:\> Get-VMProcessor -VmName VM1
```

VMName	Count	CompatibilityForMigrationEnabled	CompatibilityForOlderOperatingSystemsEnabled
VM1	2	False	False

```
PS C:\> Set-VMemory -VMName VM1 `
 -DynamicMemoryEnabled $true `
 -MinimumBytes 512MB `
 -StartupBytes 1GB `
 -MaximumBytes 2GB
```

```
PS C:\> Get-VMemory -VMName VM1
```

VMName	DynamicMemoryEnabled	Minimum(M)	Startup(M)	Maximum(M)
VM1	True	512	1024	2048

```
PS C:\> Get-VMScsiController -VMName VM1
```

VMName	ControllerNumber	Drives
VM1	0	{}
VM1	1	{}

```
PS C:\> Add-VMScsiController -VMName VM1
PS C:\> Get-VMScsiController -VMName VM1
```

VMName	ControllerNumber	Drives
VM1	0	{}
VM1	1	{}
VM1	2	{}

```

PS C:\> $VHDPATH = 'H:\Vm\Vhds\VM1-D.VHDX'
PS C:\> New-VHD -Path $VHDPATH -SizeBytes 8GB -Dynamic

ComputerName : HV1
Path : H:\Vm\Vhds\VM1-D.VHDX
VhdFormat : VHDX
VhdType : Dynamic
FileSize : 4194304
Size : 8589934592
MinimumSize :
LogicalSectorSize : 512
PhysicalSectorSize : 4096
BlockSize : 33554432
ParentPath :
DiskIdentifier : E0555AA8-07C1-4615-A86B-434FCB396948
FragmentationPercentage : 0
Alignment : 1
Attached : False
DiskNumber :
Number :

```

```
PS C:\> Get-VMHardDiskDrive -VMName VM1
```

VMName	ControllerType	ControllerNumber	ControllerLocation	DiskNumber	Path
VM1	IDE	0	0		H:\Vm\Vhds\VM1.Vhdx
VM1	SCSI	0	0		H:\Vm\Vhds\VM1-D.VHDX

```
PS C:\> Get-VMNetworkAdapter -VMName VM1
```

Name	IsManagementOs	VMName	SwitchName	MacAddress	Status	IPAddresses
Network Adapter	False	VM1		00155D017001	{Ok}	{169.254.152.196, fe80::c413:c78b:ea9e:98c4}

```

PS C:\> $user = 'VM1\Administrator'
PS C:\> $pass = ConvertTo-SecureString -String 'Pa$$w0rd' -AsPlainText -Force
PS C:\> $cred = New-Object -TypeName System.Management.Automation.PSCredential `
 -ArgumentList $user,$pass
PS C:\> Invoke-Command -VMName VM1 `
 -ScriptBlock {Get-NetIPConfiguration | Format-List} `
 -Credential $cred

```

```

InterfaceAlias : Ethernet
InterfaceIndex : 2
InterfaceDescription : Microsoft Hyper-V Network Adapter
NetAdapter.Status : Disconnected

```

```
PS C:\> New-VMSwitch -Name External -NetAdapterName 'Ethernet' `
 -Notes 'Created on HV1'
```

Name	SwitchType	NetAdapterInterfaceDescription
External	External	Microsoft Hyper-V Network Adapte

```
PS C:\> Get-VMNetworkAdapter -VMName VM1
```

Name	IsManagementOs	VMName	SwitchName	MacAddress	Status	IPAddresses
Network Adapter	False	VM1	External	00155D017001	{0k}	{10.10.10.157, fe80::c413:c78b:ea9e:98c4}

```
PS C:\> Invoke-Command -VMName VM1 `
 -ScriptBlock {Get-NetIPConfiguration} `
 -Credential $cred
```

```
InterfaceAlias : Ethernet
InterfaceIndex : 2
InterfaceDescription : Microsoft Hyper-V Network Adapter
NetProfile.Name : Reskit.Org
IPv4Address : 10.10.10.157
IPv6DefaultGateway :
IPv4DefaultGateway :
DNSServer : 10.10.10.10
 : 10.10.10.11
PSComputerName : VM1
```

```
PS C:\> Invoke-Command -VMName VM1 `
 -ScriptBlock {Hostname} `
 -Credential $cred
```

```
WIN-05LPHTHBB5U
```

```
PS C:\> Invoke-Command -VMName VM1 `
 -ScriptBlock {Get-NetIPConfiguration} `
 -Credential $cred

InterfaceAlias : Ethernet
InterfaceIndex : 2
InterfaceDescription : Microsoft Hyper-V Network Adapter
NetProfile.Name : Reskit.Org
IPv4Address : 10.10.10.157
IPv6DefaultGateway :
IPv4DefaultGateway :
DNSServer : 10.10.10.10
 : 10.10.10.11
PSComputerName : VM1
```

```
PS C:\> Invoke-Command -VMName VM1 `
 -ScriptBlock {Hostname} `
 -Credential $cred

VM1
```

```
PS C:\> Stop-VM -VMName VM1
PS C:\> Get-VM -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Off	0	0	00:00:00	Operating normally	8.0

```
PS C:\> Set-VMProcessor -VMName VM1 `
 -ExposeVirtualizationExtensions $true
PS C:\> Get-VMProcessor -VMName VM1 |
 Format-Table -Property Name, Count,
 ExposeVirtualizationExtensions
```

Name	Count	ExposeVirtualizationExtensions
Processor	1	True

```
PS C:\> Start-VM -VMName VM1
PS C:\> Wait-VM -VMName VM1 -For Heartbeat
PS C:\> Get-VM -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	2	1024	00:00:49.8890000	Operating normally	8.0

```

PS C:\> $user = 'VM1\Administrator'
PS C:\> $pass = ConvertTo-SecureString -String 'Pa$$w0rd' `
 -AsPlainText -Force
PS C:\> $cred = New-Object -TypeName System.Management.Automation.PSCredential `
 -ArgumentList $user,$pass
PS C:\> Invoke-Command -VMName VM1 `
 -ScriptBlock {Install-WindowsFeature -Name Hyper-V `
 -IncludeManagementTools} `
 -Credential $cred

```

Success	Restart Needed	Exit Code	Feature	Result	PSCoMputerName
True	Yes	SuccessRest...	{Hyper-V}		VM1

WARNING: You must restart this server to finish the installation process.

```

PS C:\> Stop-VM -VMName VM1
PS C:\> Start-VM -VMName VM1
PS C:\> Wait-VM -VMName VM1 -For IPAddress
PS C:\> Get-Vm -VMName VM1

```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	5	1024	00:01:43.6280000	Operating normally	8.0

```

$sb = {
 $VMname = 'Nested11'
 New-VM -Name VM1 -MemoryStartupBytes 1GB}
Invoke-Command -VMName $VMName `
 -ScriptBlock $sb `
 -Credential $cred

```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version	PSCoMputerName
Nested1	Off	0	0	00:00:00	Operating normally	8.0	VM1

```

PS C:\> Get-VM -Name VM1

```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Off	0	0	00:00:00	Operating normally	8.0

```
PS C:\> Start-VM -Name VM1
PS C:\> Get-VM -Name VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	0	1024	00:00:00.0740000	Operating normally	8.0

```
PS C:\> Wait-VM -VMName VM1 -For IPAddress
PS C:\> Get-VM -Name VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	1	1024	00:01:08.0590000	Operating normally	8.0

```
PS C:\> Suspend-VM -VMName VM1
PS C:\> Get-VM -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Paused	0	572	15:04:52.9640000	Operating normally	8.0

```
PS C:\> Resume-VM -VMName VM1
PS C:\> Get-VM -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	0	572	15:04:56.1310000	Operating normally	8.0

```
PS C:\> Save-VM -VMName VM1
PS C:\> Get-Vm -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Saved	0	0	00:00:00	Operating normally	8.0

```
PS C:\> Start-VM -VMName VM1
PS C:\> Get-Vm -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	3	572	00:00:04.2040000	Operating normally	8.0

```
PS C:\> Get-VM -VMname VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	0	598	08:02:17.5450000	Operating normally	8.0

```
PS C:\> Restart-VM -VMName VM1 -Force
```

```
PS C:\> Get-VM -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	8	1024	00:00:00.7290000	Operating normally	8.0

```
PS C:\> Wait-Vm -VMName VM1 -For IPAddress
```

```
PS C:\> Get-VM -VMName VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	4	1024	00:02:03.4850000	Operating normally	8.0

```
PS C:\> Stop-VM -VMName VM1 -TurnOff
```

```
PS C:\> Get-VM -VMname VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Off	0	0	00:00:00	Operating normally	8.0

```
PS C:\> Get-VM -Name VM1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	1	4096	00:01:18.2620000	Operating normally	8.0

```
PS C:\> (Get-Vm -VMName VM1).ConfigurationLocation
```

```
H:\Vm\VMs\VM1
```

```
PS C:\> Get-VMHardDiskDrive -VMName vm1
```

VMName	ControllerType	ControllerNumber	ControllerLocation	DiskNumber	Path
VM1	IDE	0	0		H:\Vm\Vhds\VM1.Vhdx



```
PS C:\> (Get-VM -Name VM1).ConfigurationLocation
C:\VM1
PS C:\> Get-VMHardDiskDrive -VMName VM1
```

VMName	ControllerType	ControllerNumber	ControllerLocation	DiskNumber	Path
VM1	IDE	0	0		c:\VM1\Virtual Hard Disks\VM1.Vhdx

```
PS C:\> Get-VM -ComputerName HV1
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	0	4096	01:24:37.6100000	Operating normally	8.0

```
PS C:\> Get-VM -ComputerName HV2
```

```
PS C:\> "Migration took: [{0:n2}] seconds"
-f ($($finish-$start).totalminutes)

Migration took: [7.49] minutes
```

```
PS C:\> Get-VM -ComputerName HV1
PS C:\> Get-VM -ComputerName HV2
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Running	0	4096	00:18:09.1260000	Operating normally	8.0

```
PS C:\> Get-VMReplicationServer -ComputerName HV2
```

RepEnabled	AuthType	KerbAuthPort	CertAuthPort	AllowAnyServer
True	Kerb	42000	443	True

```
PS C:\> Get-VM -ComputerName HV2
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Off	0	0	00:00:00	Operating normally	8.0



```
STEP 6 - Get VM1 Status on HV2:
```

```
PS C:\> Get-VM -ComputerName HV2
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Off	0	0	00:00:00	Operating normally	8.0

```
STEP 6 - Get VM1 Status on HV2:
```

```
PS C:\> Get-VM -ComputerName HV2
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Off	0	0	00:00:00	Operating normally	8.0

```
PS C:\> Measure-VMReplication -ComputerName HV1
```

VMName	State	Health	LReplTime	PReplSize(M)	AvgLatency	AvgReplSize(M)	Relationship
VM1	Replicating	Normal	12/07/2017 22:36:39	0.0039	00:00:31	628.29	Simple

```
PS C:\> $sb = {
 $VM1Test = Start-VMFailover -AsTest -VMName VM1 ` -
 -Confirm:$false
 Start-VM $VM1Test}
```

```
PS C:\> Invoke-Command -ComputerName HV2 -ScriptBlock $sb
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version	PSComputerName
VM1 - Test	Off	0	0	00:00:00	Operating normally	8.0	HV2

```
PS C:\> Get-VM -ComputerName HV2
```

Name	State	CPUUsage(%)	MemoryAssigned(M)	Uptime	Status	Version
VM1	Off	0	0	00:00:00	Operating normally	8.0
VM1 - Test	Running	1	4096	00:00:22.4220000	Operating normally	8.0

```

PS C:\> Get-VM -ComputerName HV1

Name State CPUUsage(%) MemoryAssigned(M) Uptime Status Version

VM1 Running 2 4096 00:29:04.9700000 Operating normally 8.0

PS C:\> Get-VM -ComputerName HV2

Name State CPUUsage(%) MemoryAssigned(M) Uptime Status Version

VM1 Off 0 0 00:00:00 Operating normally 8.0

```

```

PS C:\> Get-VM -ComputerName HV1

Name State CPUUsage(%) MemoryAssigned(M) Uptime Status Version

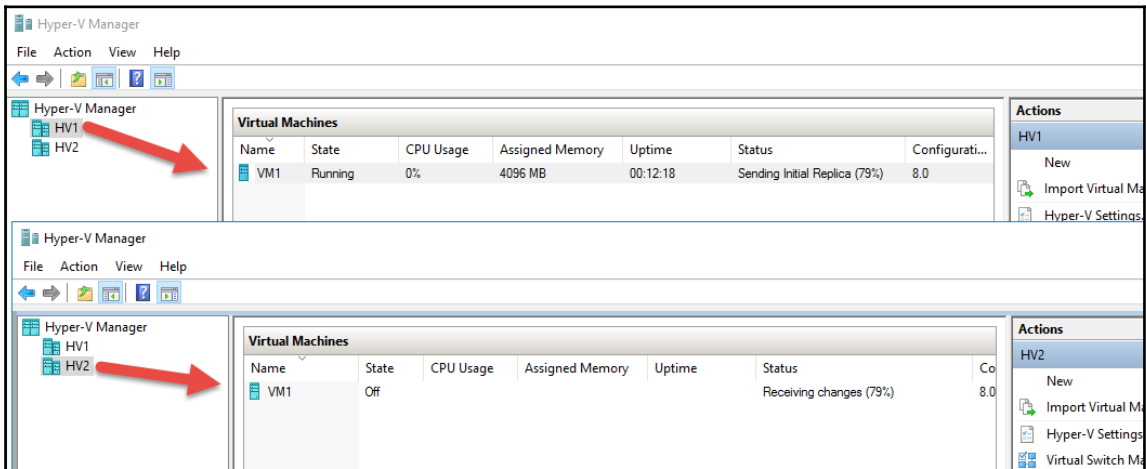
VM1 Off 0 0 00:00:00 Operating normally 8.0

PS C:\> Get-VM -ComputerName HV2

Name State CPUUsage(%) MemoryAssigned(M) Uptime Status Version

VM1 Running 0 4096 00:01:13.3530000 Operating normally 8.0

```



```
PS C:\> $sb = { Get-ChildItem -Path C:\ }
Invoke-Command -VMName VM1 -ScriptBlock $sb `
-Credential $cred
```

Directory: C:\

Mode	LastWriteTime	Length	Name	PSComputerName
d-----	12/09/2016 12:36		Logs	VM1
d-----	16/07/2016 14:23		PerfLogs	VM1
d-r----	12/09/2016 12:35		Program Files	VM1
d-----	16/07/2016 14:23		Program Files (x86)	VM1
d-r----	13/07/2017 17:36		Users	VM1
d-----	12/07/2017 10:49		Windows	VM1

```
PS C:\> $Parent = Split-Path -Parent (Get-VM -Name VM1 |
SELECT -ExpandProperty HARDDRIVES).PATH
PS C:\> Get-ChildItem -Path $Parent
```

Directory: C:\vm1\Virtual Hard Disks

Mode	LastWriteTime	Length	Name
-a----	15/07/2017 12:11	9969860608	VM1.Vhdx
-a----	15/07/2017 12:13	138412032	VM1_856D7A40-284A-4CFC-BF25-4D8B57254404.avhdx

```
PS C:\> $sb = {
$FileName1 = 'C:\File_After_Checkpoint_1'
Get-Date | Out-File -FilePath $FileName1
Get-Content -Path $FileName1}
PS C:\> Invoke-Command -VMName VM1 -ScriptBlock $sb `
-Credential $cred
```

15 July 2017 12:16:12

```
Get-VMSnapshot -VMName VM1
```

VMName	Name	SnapshotType	CreationTime	ParentSnapshotName
VM1	Snapshot1	Standard	15/07/2017 12:12:01	
VM1	Snapshot2	Standard	15/07/2017 12:17:39	Snapshot1

```
PS C:\> Get-ChildItem -Path $Parent
```

```
Directory: C:\vm1\Virtual Hard Disks
```

Mode		tWriteTime	Length	Name
-a----	15/07/2017	12:11	9969860608	VM1.Vhdx
-a----	15/07/2017	12:17	196083712	VM1_856D7A40-284A-4CFC-BF25-4D8B57254404.avhdx
-a----	15/07/2017	13:57	272629760	VM1_E122EE41-1FD5-4EBD-BC0A-A84A290936C6.avhdx

```
PS C:\> $sb = {
 $FileName2 = 'C:\File_After_Checkpoint_2'
 Get-Date | Out-File -FilePath $FileName2
 Get-ChildItem -Path C:\ -File
}
Invoke-Command -VMName VM1 -ScriptBlock $sb `
```

```
-Credential $cred
```

```
Directory: C:\
```

Mode		LastWriteTime	Length	Name	PSComputerName
-a----	15/07/2017	12:16	60	File_After_Checkpoint_1	VM1
-a----	15/07/2017	12:21	60	File_After_Checkpoint_2	VM1

```
PS C:\> $sb = {Get-ChildItem -Path C:\}
PS C:\> Invoke-Command -VMName VM1 -ScriptBlock $sb `
```

```
-Credential $cred
```

```
Directory: C:\
```

Mode		LastWriteTime	Length	Name	PSComputerName
d-----	12/09/2016	12:36		Logs	VM1
d-----	16/07/2016	14:23		PerfLogs	VM1
d-r----	12/09/2016	12:35		Program Files	VM1
d-----	16/07/2016	14:23		Program Files (x86)	VM1
d-r----	13/07/2017	17:36		Users	VM1
d-----	12/07/2017	10:49		Windows	VM1

```
PS C:\> $sb = { Get-ChildItem -Path C:\}
PS C:\> Invoke-Command -VMName VM1 -ScriptBlock $sb `
-Credential $cred
```

Directory: C:\

Mode	LastWriteTime	Length	Name	PSComputerName
d-----	12/09/2016 12:36		Logs	VM1
d-----	16/07/2016 14:23		PerfLogs	VM1
d-r----	12/09/2016 12:35		Program Files	VM1
d-----	16/07/2016 14:23		Program Files (x86)	VM1
d-r----	13/07/2017 17:36		Users	VM1
d-----	12/07/2017 10:49		Windows	VM1
-a----	15/07/2017 12:16	60	File_After_Checkpoint_1	VM1

```
PS C:\> Get-VMSnapshot -VMName VM1
```

VMName	Name	SnapshotType	CreationTime	ParentSnapshotName
VM1	Snapshot1	Standard	15/07/2017 12:12:01	
VM1	Snapshot2	Standard	15/07/2017 12:17:39	Snapshot1

```
PS C:\> Get-ChildItem -Path $Parent
```

Directory: C:\vm1\Virtual Hard Disks

Mode	tWriteTime	Length	Name
-a----	15/07/2017 12:11	9969860608	VM1.Vhdx
-a----	15/07/2017 12:17	196083712	VM1_856D7A40-284A-4CFC-BF25-4D8B57254404.avhdx
-a----	15/07/2017 13:57	272629760	VM1_E122EE41-1FD5-4EBD-BC0A-A84A290936C6.avhdx

```
PS C:\> Get-ChildItem -Path $Parent
```

Directory: C:\vm1\Virtual Hard Disks

Mode	LastWriteTime	Length	Name
-a----	15/07/2017 13:58	9969860608	VM1.Vhdx

Total Counter sets : [173]

Hyper-V Related Counter Sets : [31]

CounterSetName	Description
Hyper-V Configuration	This counter set represents the statistics for HyperVStorage f...
Hyper-V Dynamic Memory Balancer	This counter set represents the statistics for the Microsoft D...
Hyper-V Dynamic Memory Integration Service	This counter set represents the statistics for Dynamic Memory ...
Hyper-V Dynamic Memory VM	This counter set represents the memory statistics for a Virtua...
Hyper-V Hypervisor	Information on the hypervisor.
Hyper-V Hypervisor Logical Processor	Information on logical processors.
Hyper-V Hypervisor Partition	Information on virtual machines
Hyper-V Hypervisor Root Partition	Information on virtual machines
Hyper-V Hypervisor Root Virtual Processor	Information on virtual processors
Hyper-V Hypervisor Virtual Processor	Information on virtual processors
Hyper-V Legacy Network Adapter	Performance counters for a virtual machine's Ethernet controller.
Hyper-V Replica VM	This counter set represents the Hyper-V Replica statistics for...
Hyper-V Virtual IDE Controller (Emulated)	Performance counters for a virtual machine's IDE Controller.
Hyper-V Virtual Machine Bus	This counter set represents the statistics for the virtual mac...
Hyper-V Virtual Machine Bus Pipes	Per-Pipe statistics, for performance debugging.
Hyper-V Virtual Machine Bus Provider Pipes	Per-Pipe statistics, for performance debugging.
Hyper-V Virtual Machine Health Summary	This counter set represents the health summary statistics for ...
Hyper-V Virtual Network Adapter	This counter set represents the statistics for the Microsoft H...
Hyper-V Virtual Network Adapter Drop Reasons	This counter set represents the drop reasons statistics for th...
Hyper-V Virtual Network Adapter VRSS	This counter set represents the statistics for the Microsoft H...
Hyper-V Virtual Storage Device	This counter set represents the statistics for a virtual stora...
Hyper-V Virtual Switch	This counter set represents the statistics for the Microsoft H...
Hyper-V Virtual Switch Port	This counter set represents the statistics for the Microsoft H...
Hyper-V Virtual Switch Processor	This counter set represents the statistics for the Microsoft H...
Hyper-V VM Live Migration	Performance counters for a virtual machine's live migration.
Hyper-V VM Remoting	Performance counters for a virtual machine's remoting system.
Hyper-V VM Save, Snapshot, and Restore	Performance counters for a virtual machine's save, snapshot, a...
Hyper-V VM Vid Numa Node	The perf counters for a numa node.
Hyper-V VM Vid Partition	These are the perf counters for a VID partition object.
Hyper-V VM Virtual Device Pipe IO	Worker process per-pipe statistics, for performance debugging.
Hyper-V Worker Virtual Processor	Performance counters for the virtual processor of a virtual ma...

**Hyper-V RVP Counters : [146]**

Counter	Value
% guest run time	1.223
% hypervisor run time	0.057
% remote run time	0.000
% total run time	1.280

```
PS C:\> $Reportobj = New-Object -TypeName PSObject -Property $report
PS C:\> $Reportobj
```

```
HostName : HV1
Maker : Microsoft Corporation
Model : Virtual Machine
PSVersion : 5.1.14393.0
OSEdition : Microsoft Windows Server 2016 Datacenter
OSArch : 64-bit
OSLang : 1033
LastBootTime : 15/07/2017 09:39:35
UpTimeDays : 2.174
CPUCount : 8
HostCPUUsage : 31.61328927579385
HostMemoryGB : 15.62
AllocatedMemoryGB : 4
```

```
PS C:\> $vmht |
 sort-object -Property uptime -descending |
 Format-Table
```

VMName	Status	Uptime	VMCPU	ReplMode	ReplState
VM1	Operating normally	2.01:50:10.1610000	12	None	Disabled
VM3	Operating normally	00:00:00	0	None	Disabled
VM2	Operating normally	00:00:00	0	None	Disabled

# Chapter 12: Managing Azure

```
PS C:\> Find-Module -Name Azure, AzureRM
```

Version	Name	Repository	Description
3.8.0	Azure	PSGallery	Microsoft Azure PowerShell - Service Management
3.8.0	AzureRM	PSGallery	Azure Resource Manager Module



```

PS C:\> $HT = @{{ Label = 'Cmdlets' }}
PS C:\> $HT.Expression = {(Get-Command -Module $_.name).count}
PS C:\> Get-Module -Name Azure* -ListAvailable |
 Sort-Object -Property `
 {(Get-Command -Module $_.name).count} -Descending |
 Format-Table Name,Version,Author,$HT -AutoSize

```

Name	Version	Author	Cmdlets
AzureRM	3.8.0	Microsoft Corporation	1564
AzureRM.Network	3.7.0	Microsoft Corporation	242
AzureRM.Compute	2.9.0	Microsoft Corporation	155
AzureAD	2.0.0.109	Microsoft Corporation	134
AzureRM.Sql	2.8.0	Microsoft Corporation	113
AzureRM.ApiManagement	3.6.0	Microsoft Corporation	88
AzureRM.Automation	2.8.0	Microsoft Corporation	70
AzureRM.Batch	2.8.0	Microsoft Corporation	69
AzureRM.DataLakeStore	3.6.0	Microsoft Corporation	68
AzureRM.Resources	3.8.0	Microsoft Corporation	67
AzureRM.SiteRecovery	3.7.0	Microsoft Corporation	62
Azure.Storage	2.8.0	Microsoft Corporation	61
AzureRM.DataLakeAnalytics	2.8.0	Microsoft Corporation	50
AzureRM.LogicApp	2.8.0	Microsoft Corporation	43
AzureRM.Websites	2.8.0	Microsoft Corporation	41
AzureRM.OperationInsights	2.8.0	Microsoft Corporation	40
AzureRM.HDIInsight	2.8.0	Microsoft Corporation	35
AzureRM.KeyVault	2.8.0	Microsoft Corporation	35
AzureRM.ServiceBus	0.2.0	Microsoft Corporation	34
AzureRM.DataFactories	2.8.0	Microsoft Corporation	29
AzureRM.Insights	2.8.0	Microsoft Corporation	25
AzureRM.EventHub	0.2.0	Microsoft Corporation	24
AzureRM.Cdn	2.8.0	Microsoft Corporation	24
AzureRM.Backup	2.8.0	Microsoft Corporation	24
AzureRM.StreamAnalytics	2.8.0	Microsoft Corporation	21
AzureRM.NotificationHubs	2.8.0	Microsoft Corporation	21
AzureRM.IotHub	1.4.0	Microsoft Corporation	20
AzureRM.RecoveryServices.Backup	2.8.0	Microsoft Corporation	20
AzureRM.Scheduler	0.13.0	Microsoft Corporation	17
AzureRM.RedisCache	2.8.0	Microsoft Corporation	15
AzureRM.MachineLearning	0.13.0	Microsoft Corporation	14
AzureRM.AnalysisServices	0.2.0	Microsoft Corporation	14
AzureRM.TrafficManager	2.8.0	Microsoft Corporation	14
AzureRM.profile	2.8.0	Microsoft Corporation	13
AzureRM.ServerManagement	2.8.0	Microsoft Corporation	13
AzureRM.Storage	2.8.0	Microsoft Corporation	12
AzureRM.Dns	2.8.0	Microsoft Corporation	11
AzureRM.DevTestLabs	2.8.0	Microsoft Corporation	10
AzureRM.Media	0.5.0	Microsoft Corporation	9
AzureRM.RecoveryServices	2.8.0	Microsoft Corporation	7
AzureRM.CognitiveServices	0.6.0	Microsoft Corporation	7
AzureRM.PowerBIEmbedded	2.8.0	Microsoft Corporation	6
Azure.AnalysisServices	0.2.0	Microsoft Corporation	4
AzureRM.Tags	2.8.0	Microsoft Corporation	3
AzureRM.UsageAggregates	2.8.0	Microsoft Corporation	3
AzureRM.Billing	0.11.0	Microsoft Corporation	1

```
PS C:\> Find-Module -Name AzureAD |
 Format-Table -Property Name,Version,Author `
 -AutoSize -Wrap
```

Name	Version	Author
-----	-----	-----
AzureAD	2.0.0.115	Microsoft Corporation

```
PS C:\> Get-Module -Name AzureAD -ListAvailable |
 Format-Table -Property Name,Version,Author, Description `
 -AutoSize -Wrap
```

Name	Version	Author	Description
-----	-----	-----	-----
AzureAD	2.0.0.115	Microsoft Corporation	Azure Active Directory V2 General Availability Module. This is the General Availability release of Azure Active Directory V2 PowerShell Module. For detailed information on how to install and run this module from the PowerShell Gallery including prerequisites, please refer to <a href="https://msdn.microsoft.com/powershell/gallery/readme">https://msdn.microsoft.com/powershell/gallery/readme</a>

Sign in to your account

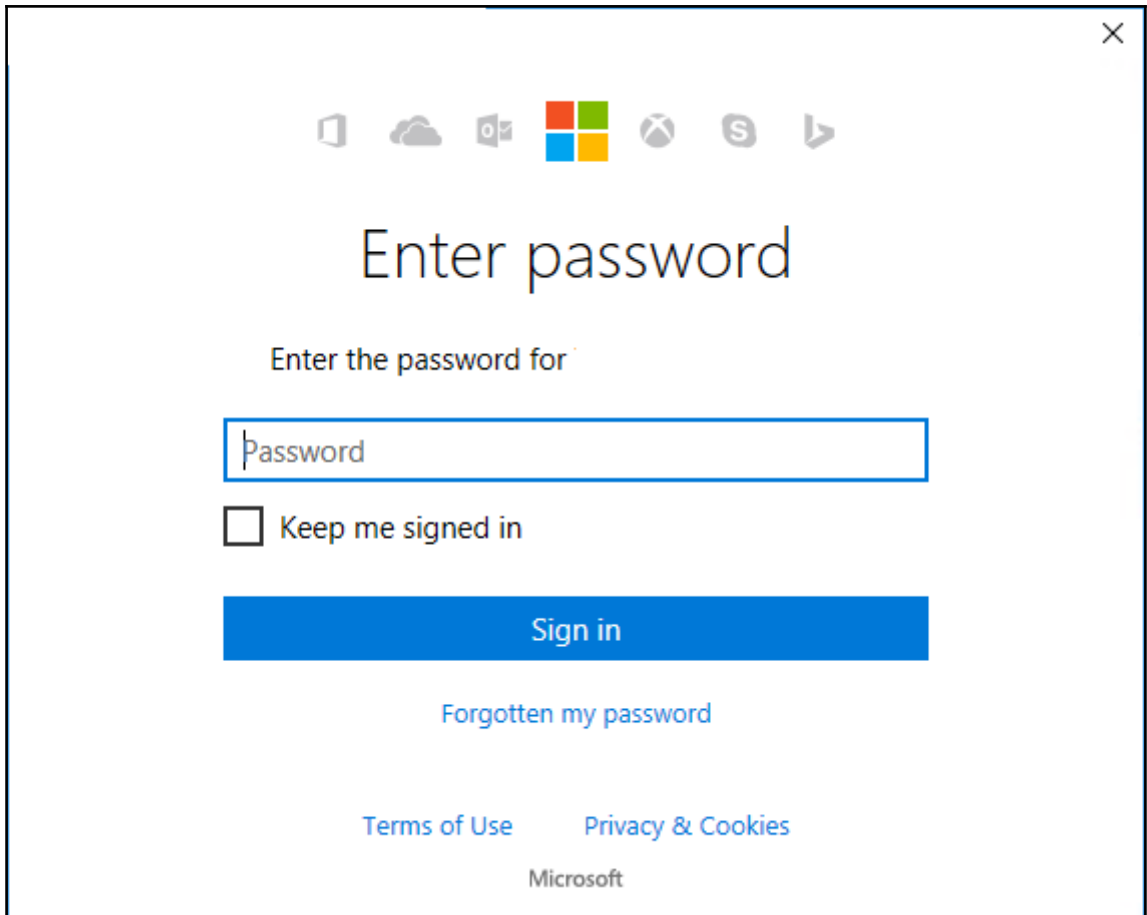


# Microsoft Azure

Work or school, or personal Microsoft account

Sign in

[Can't access your account?](#)



```
PS C:\> $SubID = $Subscription.Context.Subscription.SubscriptionId
PS C:\> Get-AzureRmSubscription -SubscriptionId $SubID |
 Format-List -Property *
```

SubscriptionId	: 0bc29420-0222-4599-b91e-e8699f760742
SubscriptionName	: MSDN Platforms
State	: Enabled
TenantId	: c1a6d420-6960-42e1-9104-65669aabc420
CurrentStorageAccountName	:

```
PS C:\> Get-AzureRmLocation | Sort-Object Location |
Format-Table Location, DisplayName
```

Location	DisplayName
australiaeast	Australia East
australiasoutheast	Australia Southeast
brazilsouth	Brazil South
canadacentral	Canada Central
canadaeast	Canada East
centralindia	Central India
centralus	Central US
eastasia	East Asia
eastus	East US
eastus2	East US 2
japaneast	Japan East
japanwest	Japan West
koreacentral	Korea Central
koreasouth	Korea South
northcentralus	North Central US
northeurope	North Europe
southcentralus	South Central US
southeastasia	Southeast Asia
southindia	South India
uksouth	UK South
ukwest	UK West
westcentralus	West Central US
westeurope	West Europe
westus	West US
westus2	West US 2

```
PS C:\> Get-AzureRmEnvironment |
Format-Table -Property name, ManagementPortalURL
```

Name	ManagementPortalUrl
AzureCloud	<a href="http://go.microsoft.com/fwlink/?LinkId=254433">http://go.microsoft.com/fwlink/?LinkId=254433</a>
AzureChinaCloud	<a href="http://go.microsoft.com/fwlink/?LinkId=301902">http://go.microsoft.com/fwlink/?LinkId=301902</a>
AzureUSGovernment	<a href="https://manage.windowsazure.us">https://manage.windowsazure.us</a>
AzureGermanCloud	<a href="http://portal.microsoftazure.de/">http://portal.microsoftazure.de/</a>

```

PS C:\> Get-AzureRmResourceGroup -Name $RGName |
 Format-List -Property *

ResourceGroupName : packet_rg
Location : uksouth
ProvisioningState : Succeeded
Tags : {Publisher, Author}
TagsTable :
 Name Value
 =====
 Publisher Packt
 Author Thomas Lee

ResourceId : /subscriptions/0bc29420-0222-4599-b91e-e8699f760742/resourceGroups/packet_rg

```

```

PS C:\> $Sak = Get-AzureRmStorageAccountKey -Name $SName `
 -ResourceGroupName $RgName
PS C:\> $Sak

KeyName Value Permissions

key1 DhJnWv1T4F1CN1hDskTJ22pRptfCSC0BVWB5LzIcJrtFb6vvfiAX52pCd3apziIPs420pS1osvJHP5Vevt/j7Q== Full
key2 gKxqYQc+W4a3wf3jghI1RxNS4PVs/J8qOX59QmzS5Unt1BYZJYT6PrAvAM066iiGndc1jtWpg/51KnN0roUeA== Full

```

```

PS C:\> $SACon = New-AzureStorageContext -StorageAccountName $SName `
 -StorageAccountKey $Key
PS C:\> $SACon

StorageAccountName : packet100sa
BlobEndPoint : https://packet100sa.blob.core.windows.net/
TableEndPoint : https://packet100sa.table.core.windows.net/
QueueEndPoint : https://packet100sa.queue.core.windows.net/
FileEndPoint : https://packet100sa.file.core.windows.net/
Context : Microsoft.WindowsAzure.Commands.Common.Storage.AzureStorageContext
Name :
StorageAccount : BlobEndpoint=https://packet100sa.blob.core.windows.net/;QueueEndpoint=https://packet100sa.queue.core.windows.net/;
 TableEndpoint=https://packet100sa.table.core.windows.net/;FileEndpoint=https://packet100sa.file.core.windows.net/;
 AccountName=packet100sa;AccountKey=[key hidden]
EndPointSuffix : core.windows.net/

```

```

PS C:\> New-AzureStorageContainer -Name $CName -Context $SACon -Permission Blob

CloudBlobContainer : Microsoft.WindowsAzure.Storage.Blob.CloudBlobContainer
Permission : Microsoft.WindowsAzure.Storage.Blob.BlobContainerPermissions
PublicAccess : Blob
LastModified : 29/05/2017 15:10:31 +00:00
ContinuationToken :
Context : Microsoft.WindowsAzure.Commands.Common.Storage.AzureStorageContext
Name : packetcontainer

PS C:\> New-AzureStorageContainer -Name $CName2 -Context $SACon -Permission Blob

CloudBlobContainer : Microsoft.WindowsAzure.Storage.Blob.CloudBlobContainer
Permission : Microsoft.WindowsAzure.Storage.Blob.BlobContainerPermissions
PublicAccess : Blob
LastModified : 29/05/2017 15:13:03 +00:00
ContinuationToken :
Context : Microsoft.WindowsAzure.Commands.Common.Storage.AzureStorageContext
Name : packetcontainer2

```

```
PS C:\> Get-AzureStorageContainer -Context $SACon |
Select-Object -ExpandProperty CloudBlobContainer
```

Blob End Point: <https://packt100sa.blob.core.windows.net/>

Name	Uri	LastModified
packtcontainer	<a href="https://packt100sa.blob.core.windows.net/packtcontainer">https://packt100sa.blob.core.windows.net/packtcontainer</a>	30/05/2017 13:18:11 +00:00
packtcontainer2	<a href="https://packt100sa.blob.core.windows.net/packtcontainer2">https://packt100sa.blob.core.windows.net/packtcontainer2</a>	30/05/2017 13:18:11 +00:00

```
PS C:\> 'This is a small blob!!' | Out-File .\Azurefile.txt
```

```
PS C:\> $Blob = Set-AzureStorageBlobContent -Context $SACon `
-File .\Azurefile.txt `
-Container $CName
```

```
PS C:\> $Blob
```

```
ICloudBlob : Microsoft.WindowsAzure.Storage.Blob.CloudBlockBlob
BlobType : BlockBlob
Length : 50
ContentType : application/octet-stream
LastModified : 29/05/2017 15:14:10 +00:00
SnapshotTime :
ContinuationToken :
Context : Microsoft.WindowsAzure.Commands.Common.Storage.AzureStorageContext
Name : azurefile.txt
```

```
PS C:\> $BlobUrl = "$($Blob.Context.BlobEndPoint)$CName/$($Blob.name) "
```

```
PS C:\> $BlobUrl
```

```
https://packt100sa.blob.core.windows.net/packtcontainer/azurefile.txt
```



```
PS C:\> New-AzureStorageShare -Name $ShareName -Context $SACon
```

File End Point: <https://packt100sa.file.core.windows.net/>

Name	LastModified
packtshare	29/05/2017 17:30:13 +00:00

```
PS C:\> $Mount = 'Z:'
PS C:\> Get-SmbMapping -LocalPath $Mount -ErrorAction SilentlyContinue |
 Remove-SmbMapping -Force -ErrorAction SilentlyContinue
PS C:\> $Rshare = "\\$SaName.file.core.windows.net\$ShareName"
PS C:\> New-SmbMapping -LocalPath $Mount -RemotePath $Rshare `
 -UserName $SaName -Password $Key
```

Status	Local Path	Remote Path
OK	Z:	\\packt100sa.file.core.windows.net\packtshare

```
PS C:\> Get-AzureStorageShare -Context $SACon |
 Format-List -Property *
```

ServiceClient : Microsoft.WindowsAzure.Storage.File.CloudFileClient  
Uri : https://packt100sa.file.core.windows.net/packtshare  
StorageUri : Primary = 'https://packt100sa.file.core.windows.net/packtshare';  
Secondary = ''  
Name : packtshare  
Metadata : {}  
Properties : Microsoft.WindowsAzure.Storage.File.FileShareProperties

```
PS C:\> Get-SmbMapping
```

Status	Local Path	Remote Path
OK	Z:	\\packt100sa.file.core.windows.net\packtshare

```
PS C:\> Get-ChildItem -Path z:\ -Recurse |
 Format-Table -Property FullName, Mode, Length
```

FullName	Mode	Length
z:\foo	d-----	
z:\foo\recipe.txt	-a----	28

```
PS C:\> Get-Content -Path z:\foo\recipe.txt
Recipe 15-4
```



```
PS C:\> Get-AzureRmAppServicePlan -ResourceGroupName $RgName -Name $AppSrvName
```

```
Sku : Microsoft.Azure.Management.WebSites.Models.SkuDescription
ServerFarmWithRichSkuName : packt100
WorkerTierName :
Status : Ready
Subscription : 0bc29420-0222-4599-b91e-e8699f760742
AdminSiteName :
HostingEnvironmentProfile :
MaximumNumberOfWorkers : 1
GeoRegion : UK South
PerSiteScaling : False
NumberOfSites : 1
ResourceGroup : packet_rg
Id : /subscriptions/0bc29420-0222-4599-b91e-e8699f760742/resourceGroups/packet_rg/
providers/Microsoft.Web/serverfarms/packt100
Name : packt100
Location : UK South
Type : Microsoft.Web/serverfarms
```

```
PS C:\> $WebApp = Get-AzureRmWebApp -ResourceGroupName $RgName -Name $AppSrvName
$WebApp
```

```
SiteName : packt100
State : Running
HostNames : {packt100.azurewebsites.net}
RepositorySiteName : packt100
UsageState : Normal
Enabled : True
EnabledHostNames : {packt100.azurewebsites.net, packt100.scm.azurewebsites.net}
AvailabilityState : Normal
HostNamesSslStates : {packt100.azurewebsites.net, packt100.scm.azurewebsites.net}
ServerFarmId : /subscriptions/0bc29250-0222-4599-b91e-e8aa9f760794/resourceGroups/
packet_rg/providers/Microsoft.Web/serverfarms/pack
t100
LastModifiedTimeUtc : 30/05/2017 13:39:41
SiteConfig : Microsoft.Azure.Management.WebSites.Models.SiteConfig
TrafficManagerHostNames :
PremiumAppDeployed :
ScmSiteAlsoStopped : False
TargetSwapSlot :
HostingEnvironmentProfile :
MicroService : WebSites
GatewaySiteName :
ClientAffinityEnabled : True
ClientCertEnabled : False
HostNamesDisabled : False
OutboundIpAddresses : 51.140.37.134,51.140.39.0,51.140.36.48,51.140.39.192
ContainerSize : 0
MaximumNumberOfWorkers :
CloningInfo :
ResourceGroup : packet_rg
IsDefaultContainer :
DefaultHostName : packt100.azurewebsites.net
Id : /subscriptions/0bc29250-0222-4599-b91e-e8aa9f760794/resourceGroups/
packet_rg/providers/Microsoft.Web/sites/packt100
Name : packt100
Location : UK South
Type : Microsoft.Web/sites
Tags :
```

https://packt100.azure... Microsoft Azure App Servic... x

# Your App Service app has been created

Go to your app's **Quick Start** guide in the Azure portal to get started or read our [deployment documentation](#).

Microsoft Virtual Academy

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## Deep Dive into Azure App Service: A Platform to Build Modern Applications

By Cory Fowler, Sunitha Muthukrishna, Yochay Kiriaty, Apurva Joshi, Byron Tardif...

Want to get hands-on with the Azure App Service team? Check out this video for detailed demos on the service's tools and features, along with helpful tips from experts who walk you through how to build and deploy your apps on Azure App Service. See easy deployment options that streamline your DevOps cycles, and learn to manage and configure your services. Dive into monitoring and troubleshooting tools that are at your fingertips. Need to scale your apps to meet traffic demand? Learn that, too. Plus, discover Azure ...

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Start lesson

Microsoft

Copyright © Microsoft Azure 2017

https://packt100.azurewebsites.net/ New Azure Web Site x

**This is the start page for the really cool NEW Azure Web App**

A page created by PowerShell in Microsoft Azure

```

PS C:\> $Pip = New-AzureRmPublicIpAddress -Name $IPName `
 -ResourceGroupName $RgName `
 -Location $Locname -AllocationMethod Dynamic `
 -Tag @{Owner='PACKT';Type='IP'}
WARNING: The output object type of this cmdlet will be modified in a future release.

PS C:\> $Pip | FT Name, IPAddress,ResourceGroup*, Location, *State

Name IPAddress ResourceGroupName Location ProvisioningState

Packt_IP1 Not Assigned packt_rg uksouth Succeeded

```

```

PS C:\> $VM = New-AzureRmVMConfig -VMName $VMName -VMSize "Standard_A1"
PS C:\> $VM

```

```

Name : Packt100
HardwareProfile : {VmSize}

```

```

PS C:\> $VM = Set-AzureRmVMOperatingSystem -VM $VM `
 -Windows -ComputerName $CompName `
 -Credential $VMCred `
 -ProvisionVMAgent -EnableAutoUpdate

PS C:\> $VM

```

```

Name : Packt100
HardwareProfile : {VmSize}
OSProfile : {ComputerName, AdminUsername, AdminPassword, WindowsConfiguration}

```

```

PS C:\> $SkuName = '2016-Datacenter'
PS C:\> $SKU = Get-AzureRMVMImageSkus -Location $Locname `
 -Publisher $Publisher `
 -Offer $Offer.Offer |
 Where-Object Skus -eq $SkuName
PS C:\> $VM = Set-AzureRmVMSourceImage -VM $VM -PublisherName $publisher `
 -Offer $Offer.offer `
 -Skus $sku.Skus `
 -Version "latest"

```

```

$VM

Name : Packt100
HardwareProfile : {VmSize}
OSProfile : {ComputerName, AdminUsername, AdminPassword, WindowsConfiguration}
StorageProfile : {ImageReference}

```


```
PS C:\> $StorageAcc = Get-AzureRmStorageAccount -ResourceGroupName $RgName -Name $SName
PS C:\> $BlobPath = "vhds/Packt100.vhd"
PS C:\> $OsDiskUri = $StorageAcc.PrimaryEndpoints.Blob.ToString() + $BlobPath
PS C:\> $DiskName = 'PacktOsDisk'
PS C:\> $VM = Set-AzureRmVMOSDisk -VM $VM -Name $DiskName -VhdUri $OsDiskUri -CreateOption FromImage
PS C:\> $VM
```

```
Name : Packt100
HardwareProfile : {VmSize}
NetworkProfile : {NetworkInterfaces}
OSProfile : {ComputerName, AdminUsername, AdminPassword, WindowsConfiguration}
StorageProfile : {ImageReference, OsDisk}
NetworkInterfaceIDs : {/subscriptions/0bc29420-0222-4599-b91e-e8699f760742/resourceGroups/
packt_rg/providers/Microsoft.Network/networkInterfaces/VMnic1}
```

Windows Security ×

## Enter your credentials

These credentials will be used to connect to 51.140.65.246.




pact100\tfl

Password


Domain: pact100

Remember me

[More choices](#)



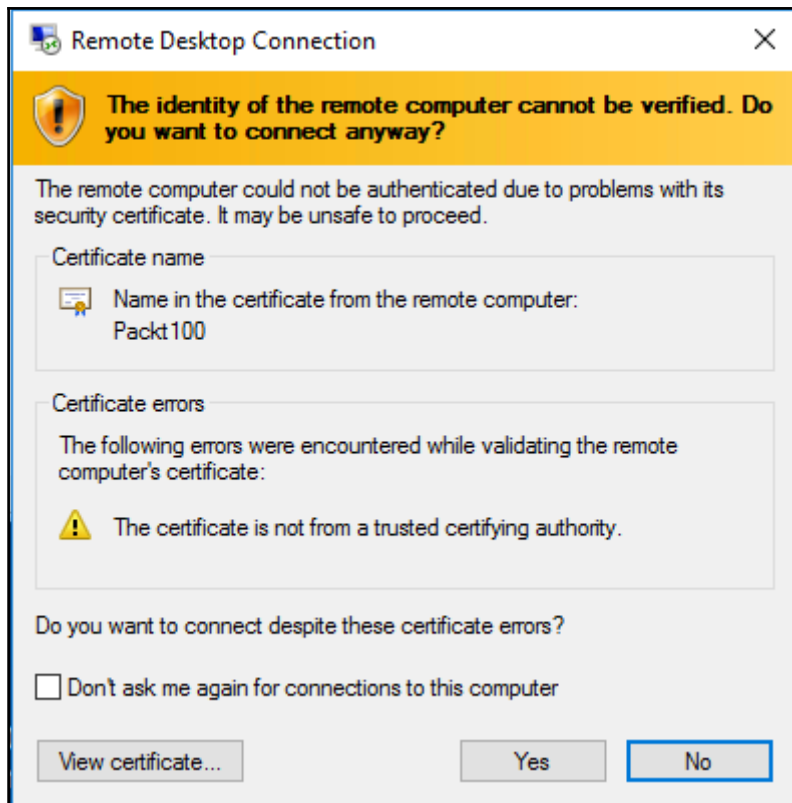
Reskit Administrator  
RESKIT\Administrator



Use a different account

OK

Cancel



51.140.65.246 - Remote Desktop Connection

Recycle Bin

Deployment Id:	53e16de5-bffd-49b1-8196-766bfa0a2515
Internal IP:	10.10.2.4
Public IP:	
Boot Time:	6/2/2017 3:22 AM
Free Space:	C:\ 114.49 GB NTFS
	D:\ 68.77 GB NTFS
Host Name:	PACKT100
Memory:	1792 MB
OS Version:	Windows Server 2016 Datacenter
User Name:	tfl

10:35 AM  
6/2/2017

# Chapter 13: Using Desired State Configuration

```
PS C:\> Get-DscResource
```

ImplementedAs	Name	ModuleName	Version	Properties
Binary	File			{DestinationPath, Attributes, Checksum, Content...
Binary	SignatureValidation			{SignedItemType, TrustedStorePath}
PowerShell	Archive	PSDesiredStateConfiguration	1.1	{Destination, Path, Checksum, Credential...}
PowerShell	Environment	PSDesiredStateConfiguration	1.1	{Name, DependsOn, Ensure, Path...}
PowerShell	Group	PSDesiredStateConfiguration	1.1	{GroupName, Credential, DependsOn, Description...}
Composite	GroupSet	PSDesiredStateConfiguration	1.1	{DependsOn, PsDscRunAsCredential, GroupName, En...}
Binary	Log	PSDesiredStateConfiguration	1.1	{Message, DependsOn, PsDscRunAsCredential}
PowerShell	Package	PSDesiredStateConfiguration	1.1	{Name, Path, ProductId, Arguments...}
Composite	ProcessSet	PSDesiredStateConfiguration	1.1	{DependsOn, PsDscRunAsCredential, Path, Credent...}
PowerShell	Registry	PSDesiredStateConfiguration	1.1	{Key, ValueName, DependsOn, Ensure...}
PowerShell	Script	PSDesiredStateConfiguration	1.1	{GetScript, SetScript, TestScript, Credential...}
PowerShell	Service	PSDesiredStateConfiguration	1.1	{Name, BuiltInAccount, Credential, Dependencies...}
Composite	ServiceSet	PSDesiredStateConfiguration	1.1	{DependsOn, PsDscRunAsCredential, Name, Startup...}
PowerShell	User	PSDesiredStateConfiguration	1.1	{UserName, DependsOn, Description, Disabled...}
PowerShell	WaitForAll	PSDesiredStateConfiguration	1.1	{NodeName, ResourceName, DependsOn, PsDscRunAsC...}
PowerShell	WaitForAny	PSDesiredStateConfiguration	1.1	{NodeName, ResourceName, DependsOn, PsDscRunAsC...}
PowerShell	WaitForSome	PSDesiredStateConfiguration	1.1	{NodeCount, NodeName, ResourceName, DependsOn...}
PowerShell	WindowsFeature	PSDesiredStateConfiguration	1.1	{Name, Credential, DependsOn, Ensure...}
Composite	WindowsFeatureSet	PSDesiredStateConfiguration	1.1	{DependsOn, PsDscRunAsCredential, Name, Ensure...}
PowerShell	WindowsOptionalFeature	PSDesiredStateConfiguration	1.1	{Name, DependsOn, Ensure, LogLevel...}
Composite	WindowsOptionalFeatureSet	PSDesiredStateConfiguration	1.1	{DependsOn, PsDscRunAsCredential, Name, Ensure...}
PowerShell	WindowsPackageCab	PSDesiredStateConfiguration	1.1	{Ensure, Name, SourcePath, DependsOn...}
PowerShell	WindowsProcess	PSDesiredStateConfiguration	1.1	{Arguments, Path, Credential, DependsOn...}

```
PS C:\> Get-DscResource -Name File | Format-List -Property *
```

```
ResourceType : MSFT_FileDirectoryConfiguration
Name : File
FriendlyName : File
Module :
ModuleName :
Version :
Path :
ParentPath : C:\Windows\system32\Configuration\Schema\MSFT_FileDirectoryConfiguration
ImplementedAs : Binary
CompanyName :
Properties : {DestinationPath, Attributes, Checksum, Contents...}
```

```

PS C:\> Get-DscResource -Name File -Syntax
File [String] #ResourceName
{
 DestinationPath = [string]
 [Attributes = [string[]]{ Archive | Hidden | ReadOnly | System }]
 [Checksum = [string]{ CreatedDate | ModifiedDate | SHA-1 | SHA-256 | SHA-512 }]
 [Contents = [string]]
 [Credential = [PSCredential]]
 [DependsOn = [string[]]]
 [Ensure = [string]{ Absent | Present }]
 [Force = [bool]]
 [MatchSource = [bool]]
 [PsDscRunAsCredential = [PSCredential]]
 [Recurse = [bool]]
 [SourcePath = [string]]
 [Type = [string]{ Directory | File }]
}

```

```

PS C:\> Get-Item -Path Function:\PrepareSRV2

```

CommandType	Name	Version	Source
Configuration	PrepareSRV2		

```

PS C:\> PrepareSRV2 -OutputPath c:\dsc

```

```

Directory: C:\dsc

```

Mode	LastWriteTime	Length	Name
-a----	06/04/2017 14:20	2016	SRV2.mof



```

PS C:\> Get-Content -Path C:\DSC\SRV2.mof
/*
@TargetNode='SRV2'
@GeneratedBy=administrator
@GenerationDate=04/06/2017 14:20:02
@GenerationHost=SRV1
*/
instance of MSFT_FileDirectoryConfiguration as $MSFT_FileDirectoryConfiguration1ref
{
ResourceID = "[File]basefiles";
Ensure = "Present";
DestinationPath = "c:\\reskitapp\\";
ModuleName = "PSDesiredStateConfiguration";
SourceInfo = "::6:5::File";
Recurse = True;
SourcePath = "\\dc1\\ReskitApp\\";
ModuleVersion = "1.0";
ConfigurationName = "PrepareSRV2";
};
instance of OMI_ConfigurationDocument
{
Version="2.0.0";
MinimumCompatibleVersion = "1.0.0";
CompatibleVersionAdditionalProperties= {"Omi_BaseResource:ConfigurationName"};
Author="administrator";
GenerationDate="04/06/2017 14:20:02";
GenerationHost="SRV1";
Name="PrepareSRV2";
};

```

```

PS C:\> Start-DscConfiguration -Path C:\dsc\ -Wait -Verbose

VERBOSE: Perform operation 'Invoke CimMethod' with following parameters,
 'methodName' = SendConfigurationApply,
 'className' = MSFT_DSCLocalConfigurationManager, 'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]basefiles]
VERBOSE: [SRV2]: [[File]basefiles] The system cannot find the file specified.
VERBOSE: [SRV2]: [[File]basefiles] The related file/directory is: c:\reskitapp.
VERBOSE: [SRV2]: [[File]basefiles] The network name cannot be found.
VERBOSE: [SRV2]: [[File]basefiles] The related file/directory is: \\dc1\ReskitApp.
VERBOSE: [SRV2]: [[File]basefiles] Building file list from cache.
VERBOSE: [SRV2]: LCM: [End Test] [[File]basefiles] in 2.3430 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[File]basefiles]
VERBOSE: [SRV2]: [[File]basefiles] The system cannot find the file specified.
VERBOSE: [SRV2]: [[File]basefiles] The related file/directory is: c:\reskitapp.
VERBOSE: [SRV2]: [[File]basefiles] The network name cannot be found.
VERBOSE: [SRV2]: [[File]basefiles] The related file/directory is: \\dc1\ReskitApp.
VERBOSE: [SRV2]: [[File]basefiles] Building file list from cache.
VERBOSE: [SRV2]: [[File]basefiles] Copying file \\dc1\ReskitApp\Index.htm to c:\reskitapp\Index.htm.
VERBOSE: [SRV2]: [[File]basefiles] Copying file \\dc1\ReskitApp\Page2.htm to c:\reskitapp\Page2.htm.
VERBOSE: [SRV2]: LCM: [End Set] [[File]basefiles] in 0.4690 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [End Set]
VERBOSE: [SRV2]: LCM: [End Set]
VERBOSE: [SRV2]: LCM: [End Set] in 43.0380 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 45.014 seconds

```

```
Invoke-Command -Computer SRV2 `
-ScriptBlock {Get-Childitem C:\reskitapp}
```

Directory: C:\reskitapp

Mode	LastWriteTime	Length	Name	PSComputerName
-a----	05/01/2017 11:50	472	Index.htm	SRV2
-a----	05/01/2017 11:52	383	Page2.htm	SRV2

```
PS C:\> Invoke-Command -Computer SRV2 `
-ScriptBlock { Remove-Item -Path C:\ReskitApp\Index.htm
Get-Childitem -Path C:\ReskitApp }
```

Directory: C:\ReskitApp

Mode	LastWriteTime	Length	Name	PSComputerName
-a----	05/01/2017 11:52	383	Page2.htm	SRV2

```
PS C:\> Start-DscConfiguration -Path C:\dsc\ `
-Wait -Verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, ''methodName' = SendConfigurationApply,
'className' = MSFT_DSCLocalConfigurationManager,'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set]
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]basefiles]
VERBOSE: [SRV2]: [[File]basefiles] The network name cannot be found.
VERBOSE: [SRV2]: [[File]basefiles] The related file/directory is: \\dc1\ReskitApp.
VERBOSE: [SRV2]: [[File]basefiles] Building file list from cache.
VERBOSE: [SRV2]: LCM: [End Test] [[File]basefiles] in 0.0310 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[File]basefiles]
VERBOSE: [SRV2]: [[File]basefiles] The network name cannot be found.
VERBOSE: [SRV2]: [[File]basefiles] The related file/directory is: \\dc1\ReskitApp.
VERBOSE: [SRV2]: [[File]basefiles] Building file list from cache.
VERBOSE: [SRV2]: [[File]basefiles] Copying file \\dc1\ReskitApp\Index.htm to c:\reskitapp\Index.htm.
VERBOSE: [SRV2]: [[File]basefiles] The destination object was found and no action is required.
VERBOSE: [SRV2]: LCM: [End Set] [[File]basefiles] in 0.0310 seconds.
VERBOSE: [SRV2]: LCM: [End Resource]
VERBOSE: [SRV2]: LCM: [End Set] in 0.7350 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 2.112 seconds
```

```

PS C:\> Start-DscConfiguration -Path C:\dsc\ `
 -Wait -Verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, ''methodName' = SendConfigurationApply,
'className' = MSFT_DSCLocalConfigurationManager,'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid 5-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]basefiles]
VERBOSE: [SRV2]: [[File]basefiles] The network name cannot be found.
VERBOSE: [SRV2]: [[File]basefiles] The related file/directory is: \\dc1\ReskitApp.
VERBOSE: [SRV2]: [[File]basefiles] Building file list from cache.
VERBOSE: [SRV2]: [[File]basefiles] The destination object was found and no action is required.
VERBOSE: [SRV2]: LCM: [End Test] [[File]basefiles] in 0.0080 seconds.
VERBOSE: [SRV2]: LCM: [Skip Set] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [End Resource] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [End Set] [[File]basefiles]
VERBOSE: [SRV2]: LCM: [End Set] in 0.1840 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 0.269 seconds

```

```

PS C:\> Get-WindowsFeature -Name DNS -ComputerName SRV2

```

Display Name	Name	Install State
[ ] DNS Server	DNS	Available

```

PS C:\> ProvisionServices -OutputPath C:\DSC `
 -NodeName SRV2 `
 -FeatureName DNS

```

Directory: C:\DSC

Mode	LastWriteTime	Length	Name
-a----	12/04/2017 13:04	1914	SRV2.mof

```

PS C:\> Get-Content -Path C:\DSC\SRV2.mof
/*
@TargetNode='SRV2'
@GeneratedBy=administrator
@GenerationDate=04/12/2017 13:07:03
@GenerationHost=SRV1
*/
instance of MSFT_RoleResource as $MSFT_RoleResource1ref
{
ResourceID = "[WindowsFeature]DNS";
IncludeAllSubFeature = True;
Ensure = "Present";
SourceInfo = "::9::3::WindowsFeature";
Name = "DNS";
ModuleName = "PSDesiredStateConfiguration";
ModuleVersion = "1.0";
ConfigurationName = "ProvisionServices";
};

instance of OMI_ConfigurationDocument
{
Version="2.0.0";
MinimumCompatibleVersion = "1.0.0";
CompatibleVersionAdditionalProperties= {"Omi_BaseResource:ConfigurationName"};
Author="administrator";
GenerationDate="04/12/2017 13:07:03";
GenerationHost="SRV1";
Name="ProvisionServices";
};

```

```

PS C:\> Start-DscConfiguration -Path C:\DSC -Wait -Verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters,
'methodName' = SendConfigurationApply, 'className' = MSFT_DSCLocalConfigurationManager,
'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]DNS]
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]DNS]
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]DNS]
VERBOSE: [SRV2]: [[WindowsFeature]DNS] The operation 'Get-WindowsFeature' started: DNS
VERBOSE: [SRV2]: [[WindowsFeature]DNS] The operation 'Get-WindowsFeature' succeeded: DNS
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]DNS] in 12.4460 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]DNS]
VERBOSE: [SRV2]: [[WindowsFeature]DNS] Installation started...
VERBOSE: [SRV2]: [[WindowsFeature]DNS] Continue with installation?
VERBOSE: [SRV2]: [[WindowsFeature]DNS] Prerequisite processing started...
VERBOSE: [SRV2]: [[WindowsFeature]DNS] Prerequisite processing succeeded.
VERBOSE: [SRV2]: [[WindowsFeature]DNS] Installation succeeded.
VERBOSE: [SRV2]: [[WindowsFeature]DNS] Successfully installed the feature DNS.
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]DNS] in 80.3970 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[WindowsFeature]DNS]
VERBOSE: [SRV2]: LCM: [End Set]
VERBOSE: [SRV2]: LCM: [End Set] in 94.2100 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 94.554 seconds

```

Status	Name	DisplayName
Running	DNS	DNS Server

```
PS C:\foo> Get-PSRepository
```

Name	InstallationPolicy	SourceLocation
PSGallery	Untrusted	https://www.powershellgallery.com/api/v2/

```
PS C:\> Find-DscResource -Repository 'PSGallery'
```

Name	Version	ModuleName	Repository
Archive	2.5.0.0	PSDscResources	PSGallery
Environment	2.5.0.0	PSDscResources	PSGallery
Group	2.5.0.0	PSDscResources	PSGallery
GroupSet	2.5.0.0	PSDscResources	PSGallery
Registry	2.5.0.0	PSDscResources	PSGallery
Script	2.5.0.0	PSDscResources	PSGallery
Service	2.5.0.0	PSDscResources	PSGallery
ServiceSet	2.5.0.0	PSDscResources	PSGallery
User	2.5.0.0	PSDscResources	PSGallery
WindowsFeature	2.5.0.0	PSDscResources	PSGallery
WindowsFeatureSet	2.5.0.0	PSDscResources	PSGallery
WindowsOptionalFeature	2.5.0.0	PSDscResources	PSGallery
WindowsOptionalFeatureSet	2.5.0.0	PSDscResources	PSGallery
WindowsPackageCab	2.5.0.0	PSDscResources	PSGallery
WindowsProcess	2.5.0.0	PSDscResources	PSGallery
ProcessSet	2.5.0.0	PSDscResources	PSGallery
Carbon_EnvironmentVariable	2.4.1	Carbon	PSGallery
Carbon_FirewallRule	2.4.1	Carbon	PSGallery
Carbon_Group	2.4.1	Carbon	PSGallery
Carbon_IniFile	2.4.1	Carbon	PSGallery
...			

```
PS C:\> Find-DscResource | Where-Object Name -match 'IIS'
```

Name	Version	ModuleName	Repository
xIisFeatureDelegation	1.17.0.0	xWebAdministration	PSGallery
xIisHandler	1.17.0.0	xWebAdministration	PSGallery
xIisLogging	1.17.0.0	xWebAdministration	PSGallery
xIisMimeTypeMapping	1.17.0.0	xWebAdministration	PSGallery
xIisModule	1.17.0.0	xWebAdministration	PSGallery
IisLogging	0.1.0.0	WebAdministrationDsc	PSGallery
xIISWebBinding	1.0.0.1	xIISWebBinding	PSGallery
xIISCertSBinding	1.0.0.1	xIISCertSBinding	PSGallery
xIISApplicationPoolIdentityType	1.0.0.2	xIISApplicationPoolIdentityType	PSGallery
xIISMachineKey	1.0.0.1	xIISMachineKey	PSGallery
xIISMail	1.0.0.1	xIISMail	PSGallery
cIISSharedConfig	1.0.37	cCogito	PSGallery
cAspNetIisRegistration	1.0.0	cAspNetIisRegistration	PSGallery
xIISSession	1.0.0.0	xIISSession	PSGallery

```
PS C:\> Find-DscResource | Where-Object ModuleName -eq 'xWebAdministration'
```

Name	Version	ModuleName	Repository
xIisFeatureDelegation	1.17.0.0	xWebAdministration	PSGallery
xIisHandler	1.17.0.0	xWebAdministration	PSGallery
xIisLogging	1.17.0.0	xWebAdministration	PSGallery
xIisMimeTypeMapping	1.17.0.0	xWebAdministration	PSGallery
xIisModule	1.17.0.0	xWebAdministration	PSGallery
xSSLSettings	1.17.0.0	xWebAdministration	PSGallery
xWebApplication	1.17.0.0	xWebAdministration	PSGallery
xWebAppPool	1.17.0.0	xWebAdministration	PSGallery
xWebAppPoolDefaults	1.17.0.0	xWebAdministration	PSGallery
xWebConfigKeyValue	1.17.0.0	xWebAdministration	PSGallery
xWebsite	1.17.0.0	xWebAdministration	PSGallery
xWebsiteDefaults	1.17.0.0	xWebAdministration	PSGallery
xWebVirtualDirectory	1.17.0.0	xWebAdministration	PSGallery

```
PS C:\> Get-Module -Name xWebAdministration -ListAvailable
```

```
Directory: C:\Program Files\WindowsPowerShell\Modules
```

ModuleType	Version	Name	ExportedCommands
Manifest	1.17.0.0	xWebAdministration	

```
PS C:\> Get-DscResource -Module xWebAdministration
```

ImplementedAs	Name	ModuleName	Version	Properties
PowerShell	xIisFeatureDelegation	xWebAdministration	1.17.0.0	{OverrideMode, SectionName, DependsOn, PsDscRun...}
PowerShell	xIisHandler	xWebAdministration	1.17.0.0	{Ensure, Name, DependsOn, PsDscRunAsCredential}
PowerShell	xIisLogging	xWebAdministration	1.17.0.0	{LogPath, DependsOn, LogFlags, LogFormat...}
PowerShell	xIisMimeTypeMapping	xWebAdministration	1.17.0.0	{Ensure, Extension, MimeType, DependsOn...}
PowerShell	xIisModule	xWebAdministration	1.17.0.0	{Name, Path, RequestPath, Verb...}
PowerShell	xSSLSettings	xWebAdministration	1.17.0.0	{Bindings, Name, DependsOn, Ensure...}
PowerShell	xWebApplication	xWebAdministration	1.17.0.0	{Name, PhysicalPath, WebAppPool, Website...}
PowerShell	xWebAppPool	xWebAdministration	1.17.0.0	{Name, autoShutdownExe, autoShutdownParams, aut...}
PowerShell	xWebAppPoolDefaults	xWebAdministration	1.17.0.0	{ApplyTo, DependsOn, IdentityType, ManagedRunti...}
PowerShell	xWebConfigKeyValue	xWebAdministration	1.17.0.0	{ConfigSection, Key, WebsitePath, DependsOn...}
PowerShell	xWebsite	xWebAdministration	1.17.0.0	{Name, ApplicationPool, ApplicationType, Authen...}
PowerShell	xWebsiteDefaults	xWebAdministration	1.17.0.0	{ApplyTo, AllowSubDirConfig, DefaultApplication...}
PowerShell	xWebVirtualDirectory	xWebAdministration	1.17.0.0	{Name, PhysicalPath, WebApplication, Website...}



```

PS C:\Windows\system32> Start-DscConfiguration -Path C:\DSC -Verbose -Wait
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, 'methodName' = SendConfigurationApply,
'className' = MSFT_DSCLocalConfigurationManager, 'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set]
VERBOSE: [SRV2]: LCM: [End Set]
The PowerShell DSC resource MSFT_xWebAppPool from module <xWebAdministration,1.17.0.0> does not exist at the PowerShell
module path nor is it registered as a WMI DSC resource.
+ CategoryInfo : InvalidOperation: (root/Microsoft/...gurationManager:String) [], CimException
+ FullyQualifiedErrorId : DscResourceNotFound
+ PSComputerName : SRV2

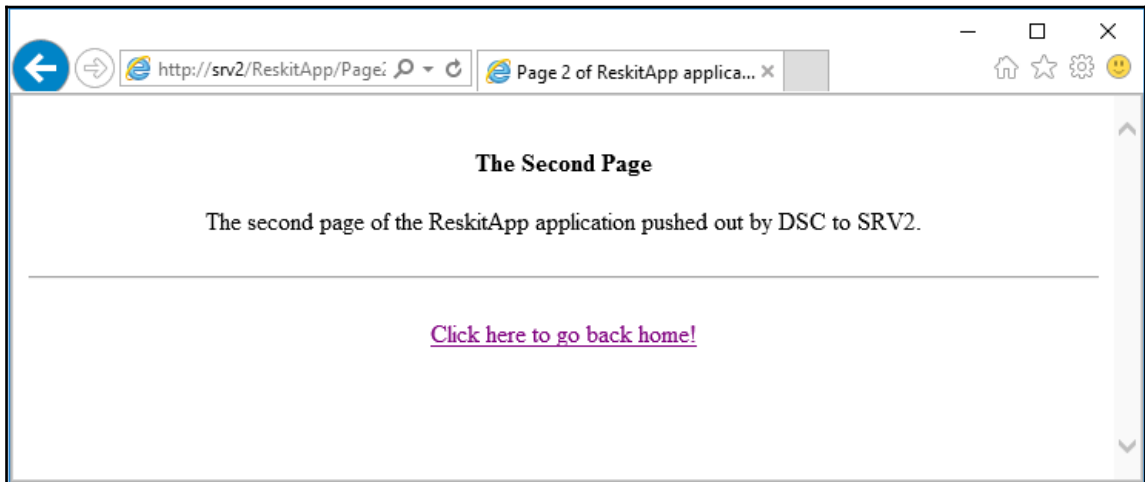
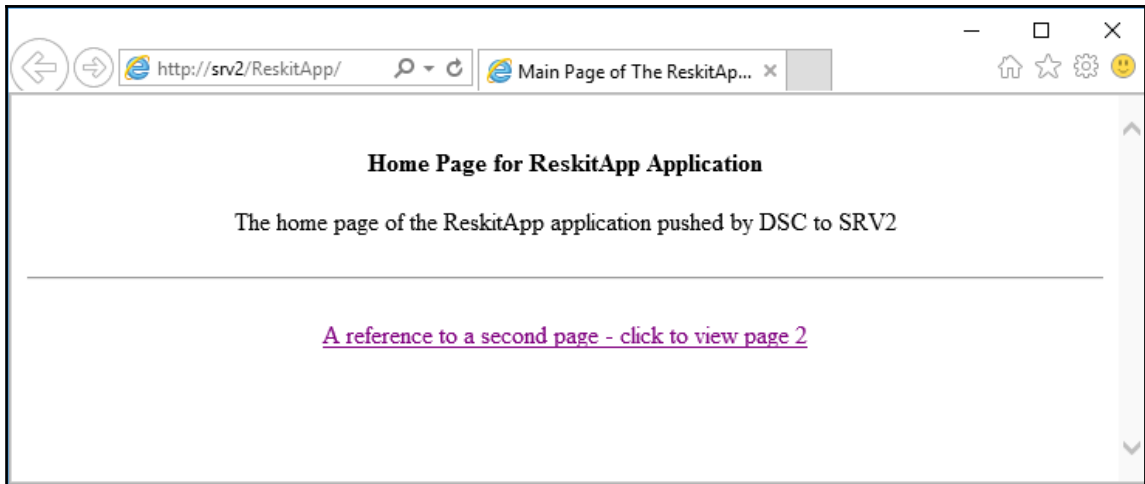
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 1.841 seconds

```

```

PS C:\> Start-DscConfiguration -Path C:\DSC -Verbose -Wait
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, 'methodName' = SendConfigurationApply,
'className' = MSFT_DSCLocalConfigurationManager, 'namespaceName' = root
/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set]
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]IISsrv2]
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]IISsrv2]
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]IISsrv2] The operation 'Get-WindowsFeature' started: Web-Server
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]IISsrv2] The operation 'Get-WindowsFeature' succeeded: Web-Server
in 2.1870 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]IISsrv2]
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]IISsrv2] Installation started...
VERBOSE: [SRV2]: LCM: [End Resource] [[WindowsFeature]IISsrv2] Continue with installation?
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]IISsrv2] Prerequisite processing started...
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]IISsrvTools] Prerequisite processing succeeded...
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]IISsrvTools] Prerequisite processing succeeded.
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]IISsrvTools] Installation succeeded.
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]IISsrvTools] Successfully installed the feature Web-Server.
in 97.0810 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[WindowsFeature]IISsrvTools]
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]IISsrvTools]
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]IISsrvTools] The operation 'Get-WindowsFeature' started: Web-Mgmt-Tools
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]IISsrvTools] The operation 'Get-WindowsFeature' succeeded: Web-Mgmt-Tools
in 3.7500 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]IISsrvTools]
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]IISsrvTools] Installation started...
VERBOSE: [SRV2]: LCM: [End Resource] [[WindowsFeature]IISsrvTools] Continue with installation?
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]IISsrvTools] Prerequisite processing started...
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]IISsrvTools] Prerequisite processing succeeded.
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]IISsrvTools] Prerequisite processing succeeded.
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]IISsrvTools] Installation succeeded.
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]IISsrvTools] Successfully installed the feature Web-Mgmt-Tools.
in 33.2590 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [End Test] [[File]RKAppFiles] The system cannot find the file specified.
VERBOSE: [SRV2]: LCM: [End Set] [[File]RKAppFiles] The related file/directory is: C:\ReskitApp.
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]RKAppFiles] The related file/directory is: \\DC1\ReskitApp.
VERBOSE: [SRV2]: LCM: [End Test] [[File]RKAppFiles] Building file list without using cache.
VERBOSE: [SRV2]: LCM: [End Set] [[File]RKAppFiles] in 0.2650 seconds.
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]RKAppFiles] The system cannot find the file specified.
VERBOSE: [SRV2]: LCM: [End Test] [[File]RKAppFiles] The related file/directory is: C:\ReskitApp.
VERBOSE: [SRV2]: LCM: [End Set] [[File]RKAppFiles] The network name cannot be found.
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]RKAppFiles] The related file/directory is: \\DC1\ReskitApp.
VERBOSE: [SRV2]: LCM: [End Test] [[File]RKAppFiles] Building file list without using cache.
VERBOSE: [SRV2]: LCM: [End Set] [[File]RKAppFiles] Copying file \\DC1\ReskitApp\Index.htm to C:\ReskitApp\Index.htm.
VERBOSE: [SRV2]: LCM: [Start Resource] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [Start Test] [[File]RKAppFiles] Copying file \\DC1\ReskitApp\page2.htm to C:\ReskitApp\page2.htm.
VERBOSE: [SRV2]: LCM: [End Test] [[File]RKAppFiles] in 0.0650 seconds.
VERBOSE: [SRV2]: LCM: [End Set] [[File]RKAppFiles]
VERBOSE: [SRV2]: LCM: [Start Resource] [[xWebAppPool]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [Start Test] [[xWebAppPool]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [End Test] [[xWebAppPool]ReskitAppPool] Application pool "RKAppPool" was not found.
VERBOSE: [SRV2]: LCM: [End Set] [[xWebAppPool]ReskitAppPool] The "Ensure" state of application pool "RKAppPool" does not match the desired state.
The target resource is not in the desired state.
VERBOSE: [SRV2]: LCM: [Start Resource] [[xWebAppPool]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [Start Test] [[xWebAppPool]ReskitAppPool] in 2.4550 seconds.
VERBOSE: [SRV2]: LCM: [End Test] [[xWebAppPool]ReskitAppPool] Performing the operation "Set-TargetResource" on target "RKAppPool".
VERBOSE: [SRV2]: LCM: [End Set] [[xWebAppPool]ReskitAppPool] Application pool "RKAppPool" was not found.
Application pool "RKAppPool" was found.
VERBOSE: [SRV2]: LCM: [Start Resource] [[xWebAppPool]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [Start Test] [[xWebAppPool]ReskitAppPool] Creating application pool "RKAppPool".
Application pool "RKAppPool" was found.
VERBOSE: [SRV2]: LCM: [End Test] [[xWebAppPool]ReskitAppPool] in 1.2330 seconds.
VERBOSE: [SRV2]: LCM: [End Set] [[xWebAppPool]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [Start Resource] [[xWebApplication]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [Start Test] [[xWebApplication]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [End Test] [[xWebApplication]ReskitAppPool] Web application "ReskitApp" is absent and should not absent.
VERBOSE: [SRV2]: LCM: [End Set] [[xWebApplication]ReskitAppPool] in 0.2030 seconds.
VERBOSE: [SRV2]: LCM: [Start Resource] [[xWebApplication]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [Start Test] [[xWebApplication]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [End Test] [[xWebApplication]ReskitAppPool] Creating new Web application "ReskitApp".
VERBOSE: [SRV2]: LCM: [End Set] [[xWebApplication]ReskitAppPool] in 0.5890 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[xWebApplication]ReskitAppPool]
VERBOSE: [SRV2]: LCM: [Start Resource] [[Log]Completed]
VERBOSE: [SRV2]: LCM: [Start Test] [[Log]Completed]
VERBOSE: [SRV2]: LCM: [End Test] [[Log]Completed] in 0.0000 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[Log]Completed]
VERBOSE: [SRV2]: LCM: [End Set] [[Log]Completed] Finished running the RKAPP DSC against SRV2
VERBOSE: [SRV2]: LCM: [End Resource] [[Log]Completed] in 0.0000 seconds.
VERBOSE: [SRV2]: LCM: [End Set] [[Log]Completed]
VERBOSE: [SRV2]: LCM: [End Set] in 147.5190 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 148.871 seconds

```



```
PS C:\> LCMConfig -OutputPath C:\DSC
Directory: C:\DSC

Mode LastWriteTime Length Name
---- -
-a---- 19/04/2017 13:15 2712 SRV2.meta.mof
```



```

PS C:\Windows\system32> Get-DscLocalConfigurationManager

ActionAfterReboot : ContinueConfiguration
AgentId : 9CE04E83-1AE3-11E7-836B-B187B8E24E90
AllowModuleOverWrite : True
CertificateID :
ConfigurationDownloadManagers : {[ConfigurationRepositoryShare]PullServer}
ConfigurationID : 5d79ee6e-0420-4c98-9cc3-9f696901a816
ConfigurationMode : ApplyAndAutoCorrect
ConfigurationModeFrequencyMins : 30
Credential :
DebugMode : {NONE}
DownloadManagerCustomData :
DownloadManagerName :
LCMCompatibleVersions : {1.0, 2.0}
LCMState : Idle
LCMStateDetail :
LCMVersion : 2.0
StatusRetentionTimeInDays : 10
SignatureValidationPolicy : NONE
SignatureValidations : {}
MaximumDownloadSizeMB : 500
PartialConfigurations :
RebootNodeIfNeeded : True
RefreshFrequencyMins : 45
RefreshMode : Pull
ReportManagers : {}
ResourceModuleManagers : {[ResourceRepositoryShare]ResourceServer}

```

```

PS C:\> Get-DscLocalConfigurationManager |
Select-Object -ExpandProperty ConfigurationDownloadManagers

```

```

ResourceId : [ConfigurationRepositoryShare]PullServer
SourceInfo : ::22::6::ConfigurationRepositoryShare
Credential :
SourcePath : \\SRV1\DSCConfiguration

```

```

PS C:\> Get-DscLocalConfigurationManager |
Select-Object -ExpandProperty ResourceModuleManagers

```

```

ResourceId : [ResourceRepositoryShare]ResourceServer
SourceInfo : ::27::6::ResourceRepositoryShare
Credential :
SourcePath : \\SRV1\DSCResource

```

```
PS C:\> PullSrv1 -OutputPath C:\DSC
```

```
Directory: C:\DSC
```

Mode	LastWriteTime	Length	Name
----	-----	-----	----
-a----	19/04/2017 21:25	4256	localhost.mof

```
PS C:\> Start-DscConfiguration -Path C:\DSC -Wait -Verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, 'methodName' = SendConfigurationApply,
'className' = MSFT_DSCLocalConfigurationManager, 'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV1]: LCM: [Start Set]
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]ConfigFolder]
VERBOSE: [SRV1]: LCM: [Start Test] [[File]ConfigFolder]
VERBOSE: [SRV1]: The system cannot find the file specified.
VERBOSE: [SRV1]: The related file/directory is: C:\DSCConfiguration.
VERBOSE: [SRV1]: LCM: [End Test] [[File]ConfigFolder] in 0.0000 seconds.
VERBOSE: [SRV1]: LCM: [Start Set] [[File]ConfigFolder]
VERBOSE: [SRV1]: The system cannot find the file specified.
VERBOSE: [SRV1]: The related file/directory is: C:\DSCConfiguration.
VERBOSE: [SRV1]: LCM: [End Set] [[File]ConfigFolder] in 0.0310 seconds.
VERBOSE: [SRV1]: LCM: [End Resource] [[File]ConfigFolder]
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]ResourceFolder]
VERBOSE: [SRV1]: LCM: [Start Test] [[File]ResourceFolder]
VERBOSE: [SRV1]: The system cannot find the file specified.
VERBOSE: [SRV1]: The related file/directory is: C:\DscResource.
VERBOSE: [SRV1]: LCM: [End Test] [[File]ResourceFolder] in 0.0000 seconds.
VERBOSE: [SRV1]: LCM: [Start Set] [[File]ResourceFolder]
VERBOSE: [SRV1]: The system cannot find the file specified.
VERBOSE: [SRV1]: The related file/directory is: C:\DscResource.
VERBOSE: [SRV1]: LCM: [End Set] [[File]ResourceFolder] in 0.0160 seconds.
VERBOSE: [SRV1]: LCM: [End Resource] [[File]ResourceFolder]
VERBOSE: [SRV1]: LCM: [Start Resource] [[xSmbShare]DscConfiguration]
VERBOSE: [SRV1]: LCM: [Start Test] [[xSmbShare]DscConfiguration]
VERBOSE: [SRV1]: Share with name DSCConfiguration does not exist
VERBOSE: [SRV1]: LCM: [End Test] [[xSmbShare]DscConfiguration] in 0.5620 seconds.
VERBOSE: [SRV1]: LCM: [Start Set] [[xSmbShare]DscConfiguration]
VERBOSE: [SRV1]: Creating share DSCConfiguration to ensure it is Present
VERBOSE: [SRV1]: LCM: [End Set] [[xSmbShare]DscConfiguration] in 0.1260 seconds.
VERBOSE: [SRV1]: LCM: [End Resource] [[xSmbShare]DscConfiguration]
VERBOSE: [SRV1]: LCM: [Start Resource] [[xSmbShare]DscResource]
VERBOSE: [SRV1]: LCM: [Start Test] [[xSmbShare]DscResource]
VERBOSE: [SRV1]: Share with name DSCResource does not exist
VERBOSE: [SRV1]: LCM: [End Test] [[xSmbShare]DscResource] in 0.0150 seconds.
VERBOSE: [SRV1]: LCM: [Start Set] [[xSmbShare]DscResource]
VERBOSE: [SRV1]: Creating share DSCResource to ensure it is Present
VERBOSE: [SRV1]: LCM: [End Set] [[xSmbShare]DscResource] in 0.0620 seconds.
VERBOSE: [SRV1]: LCM: [End Resource] [[xSmbShare]DscResource]
VERBOSE: [SRV1]: LCM: [End Set] in 2.1920 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 2.652 seconds
```

```
PS C:\> Get-SMBShare -Name DSC*
```

Name	ScopeName	Path	Description
----	-----	-----	-----
DSCConfiguration	*	C:\DscConfiguration	DSC Configuration Share
DSCResource	*	C:\DscResource	DSC Resource Share

```
PS C:\> TelnetSRV2 -OutputPath C:\DSCConfiguration

Directory: C:\DSCConfiguration

Mode LastWriteTime Length Name
---- -
-a---- 19/04/2017 21:32 1858 SRV2.mof
```

```
PS C:\> Get-ChildItem C:\DSCConfiguration

Directory: C:\DSCConfiguration

Mode LastWriteTime Length Name
---- -
-a---- 19/04/2017 20:56 1858 5d79ee6e-0420-4c98-9cc3-9f696901a816.MOF
-a---- 19/04/2017 21:23 64 5d79ee6e-0420-4c98-9cc3-9f696901a816.MOF.checksum
```

```
PS C:\> Invoke-Command -ScriptBlock {Get-ChildItem -Path Cert:\LocalMachine\root |
 Where Subject -Match 'SRV1'} -ComputerName SRV2

PSParentPath: Microsoft.PowerShell.Security\Certificate::LocalMachine\root

Thumbprint Subject PSComputerName

57BEA3F06B515B15C8CB97F4DD2861F80840CA39 CN=SRV1 SRV2
```

```
PS C:\> New-Item -Path C:\DSC -ItemType Directory `
 -ErrorAction SilentlyContinue | Out-Null
PS C:\> Get-ChildItem -Path C:\DSC | Remove-Item -Force | Out-Null
PS C:\> Remove-Item -Path 'C:\Windows\System32\configuration*.mof' `
 -ErrorAction SilentlyContinue
PS C:\> WebPullSrv1 -OutputPath C:\DSC

Directory: C:\DSC

Mode LastWriteTime Length Name
---- -
-a---- 20/04/2017 4:20 4104 SRV1.mof
```

```

PS Cert:\LocalMachine\my> Start-DscConfiguration -Path C:\DSC -WAIT -Verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters, 'methodName' = SendConfigurationApply,
'className' = MSFT_DSCLocalConfigurationManager, 'name
spaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV1]: LCM: [Start Set] [[WindowsFeature]DSCService]
VERBOSE: [SRV1]: LCM: [Start Resource] [[WindowsFeature]DSCService]
VERBOSE: [SRV1]: LCM: [Start Test] [[WindowsFeature]DSCService] The operation 'Get-WindowsFeature' started: DSC-Service
VERBOSE: [SRV1]: [[WindowsFeature]DSCService] The operation 'Get-WindowsFeature' succeeded: DSC-Service
VERBOSE: [SRV1]: LCM: [End Test] [[WindowsFeature]DSCService] in 3.3520 seconds.
VERBOSE: [SRV1]: LCM: [End Set] [[WindowsFeature]DSCService]
VERBOSE: [SRV1]: LCM: [End Resource] [[WindowsFeature]DSCService]
VERBOSE: [SRV1]: LCM: [Start Resource] [[XDCWebService]WebPullSRV1]
VERBOSE: [SRV1]: LCM: [Start Test] [[XDCWebService]WebPullSRV1]
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Check Ensure
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] The website PSDSCPullServer is not present
VERBOSE: [SRV1]: LCM: [End Test] [[XDCWebService]WebPullSRV1] in 0.8750 seconds.
VERBOSE: [SRV1]: LCM: [Start Set] [[XDCWebService]WebPullSRV1]
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Create the IIS endpoint
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Setting up endpoint at - https://SRV1:8080/PSDSCPullServer.svc
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Verify that the certificate with the provided thumbprint exists in CE
RT:\LocalMachine\MY\
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Checking IIS requirements
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Delete the App Pool if it exists
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Remove the site if it already exists
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Create the bin folder for deploying custom dependent binaries require
d by the endpoint
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Adding App Pool
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Set App Pool Properties
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Add and Set Site Properties
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] p11
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Enabling firewall exception for port 8080
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Disable Inbound Firewall Notification
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Add Firewall Rule for port 8080
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Set values into the web.config that define the repository later than
BLUE OS
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Only ESENT is supported on Windows Server 2016
VERBOSE: [SRV1]: [[XDCWebService]WebPullSRV1] Pull Server: Set values into the web.config that indicate the locatio
n of repository, confi
guration, modules
VERBOSE: [SRV1]: LCM: [End Set] [[XDCWebService]WebPullSRV1] in 9.7930 seconds.
VERBOSE: [SRV1]: LCM: [End Resource] [[XDCWebService]WebPullSRV1]
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [Start Test] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: [[File]RegistrationKeyFile] The system cannot find the path specified.
VERBOSE: [SRV1]: [[File]RegistrationKeyFile] The related file/directory is: C:\ProgramFiles\WindowsPowerShell\DscSer
vice\RegistrationKeys.
txt.
VERBOSE: [SRV1]: LCM: [End Test] [[File]RegistrationKeyFile] in 0.0160 seconds.
VERBOSE: [SRV1]: LCM: [Start Set] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: [[File]RegistrationKeyFile] The system cannot find the path specified.
VERBOSE: [SRV1]: [[File]RegistrationKeyFile] The related file/directory is: C:\ProgramFiles\WindowsPowerShell\DscSer
vice\RegistrationKeys.
txt.
VERBOSE: [SRV1]: LCM: [End Set] [[File]RegistrationKeyFile] in 0.0470 seconds.
VERBOSE: [SRV1]: LCM: [End Resource] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [End Set] in 16.1180 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 16.256 seconds

```



The image shows a web browser window with the address bar containing the URL `https://srv1:8080/P/`. The browser has several tabs open, with the active one showing the XML content. The XML code is as follows:

```
<?xml version="1.0" encoding="utf-8" ?>
- <service xml:base="https://srv1:8080/PSDSCPullServer.svc/"
 xmlns="http://www.w3.org/2007/app"
 xmlns:atom="http://www.w3.org/2005/Atom">
- <workspace>
 <atom:title>Default</atom:title>
 - <collection href="Configurations">
 <atom:title>Configurations</atom:title>
 </collection>
 - <collection href="Modules">
 <atom:title>Modules</atom:title>
 </collection>
 - <collection href="Action">
 <atom:title>Action</atom:title>
 </collection>
 - <collection href="Module">
 <atom:title>Module</atom:title>
 </collection>
 - <collection href="StatusReport">
 <atom:title>StatusReport</atom:title>
 </collection>
 - <collection href="Node">
 <atom:title>Node</atom:title>
 </collection>
 - <collection href="Reports">
 <atom:title>Reports</atom:title>
 </collection>
 - <collection href="Nodes">
 <atom:title>Nodes</atom:title>
 </collection>
 </workspace>
</service>
```

```
PS C:\> Remove-Item -Path C:\DSC* -Recurse -Force
PS C:\> $Guid = '5d79ee6e-0420-4c98-9cc3-9f696901a816'
PS C:\> SRV2WebPull -Guid $Guid -OutputPath C:\DSC
```

Directory: C:\DSC

Mode	LastWriteTime	Length	Name
-a----	22/04/2017 20:28	1988	SRV2.meta.mof

```
PS C:\Users\administrator.RESKIT\Documents> Set-DscLocalConfigurationManager -ComputerName SRV2 -Path C:\DSC -Verbose
VERBOSE: Performing the operation "Start-DscConfiguration: SendMetaConfigurationApply" on target "MSFT_DSCLocalConfigurationManager".
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters,
'methodName' = SendMetaConfigurationApply,'className' = MSFT_T_DSCLocalConfigurationManager,'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set]
VERBOSE: [SRV2]: LCM: [Start Resource] [MSFT_DSCMetaConfiguration]
VERBOSE: [SRV2]: LCM: [Start Set] [MSFT_DSCMetaConfiguration]
VERBOSE: [SRV2]: LCM: [End Set] [MSFT_DSCMetaConfiguration] in 0.0310 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [MSFT_DSCMetaConfiguration]
VERBOSE: [SRV2]: LCM: [End Set]
VERBOSE: [SRV2]: LCM: [End Set] in 0.0940 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Set-DscLocalConfigurationManager finished in 1.291 seconds.
```

```
PS C:\> Remove-Item -Path C:\DSC* -Rec -Force
PS C:\> TelnetSRV2 -OutputPath C:\DSCConfiguration
```

Directory: C:\DSCConfiguration

Mode	LastWriteTime	Length	Name
-a----	22/04/2017 20:51	1850	SRV2.mof



```

PS C:\> Rename-Item -Path C:\DSC\SRV2.mof `
 -NewName C:\DSC\$Guid.MOF
PS C:\> New-DscChecksum -Path c:\DSC
PS C:\> Get-ChildItem -Path C:\DSC

Directory: C:\DSC

Mode LastWriteTime Length Name
---- -
-a----- 22/04/2017 20:51 1850 5d79ee6e-0420-4c98-9cc3-9f696901a816.MOF
-a----- 22/04/2017 20:52 64 5d79ee6e-0420-4c98-9cc3-9f696901a816.MOF.checksum

```

```

PS C:\> Update-DscConfiguration -ComputerName SRV2 -wait -verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters,
'methodName' = PerformRequiredConfigurationChecks,'className' = MSFT_DSCLocalConfigurationManager,
'namespaceName' = root\Microsoft\Windows\DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: [] Executing Get-Action with configuration 5d79ee6e-0420-4c98-9cc3-9f696901a816's
checksum: E342D86BD10FB02C027AF5D5A667136485AFBA3F560CC4D7AFF638699D05845.
VERBOSE: [SRV2]: [] Executing Get-Action with configuration 's checksum returned result status: GetConfiguration.
VERBOSE: [SRV2]: [] Checksum is different. LCM will execute GetConfiguration to pull configuration.
VERBOSE: [SRV2]: [] Executing GetConfiguration succeeded. Configuration was pulled from server.
VERBOSE: [SRV2]: [] Applying the new configuration(s) pulled.
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]TelnetClient]
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]TelnetClient]
VERBOSE: [SRV2]: [] The operation 'Get-WindowsFeature' started: Telnet-Client
VERBOSE: [SRV2]: [] The operation 'Get-WindowsFeature' succeeded: Telnet-Client
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]TelnetClient] in 1.0930 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]TelnetClient]
VERBOSE: [SRV2]: [] Installation started...
VERBOSE: [SRV2]: [] Continue with installation?
VERBOSE: [SRV2]: [] Prerequisite processing started...
VERBOSE: [SRV2]: [] Prerequisite processing succeeded.
VERBOSE: [SRV2]: [] Installation succeeded.
VERBOSE: [SRV2]: [] Successfully installed the feature Telnet-Client.
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]TelnetClient] in 23.2420 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[WindowsFeature]TelnetClient]
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 25.194 seconds

```

```

PS C:\> $Session = New-CimSession -ComputerName SRV2
PS C:\> Get-DscConfiguration -CimSession $Session

ConfigurationName : TelnetSRV2
DependsOn :
ModuleName : PSDesiredStateConfiguration
ModuleVersion : 1.1
PSDscRunAsCredential :
ResourceId : [WindowsFeature]TelnetClient
SourceInfo :
Credential :
DisplayName : Telnet Client
Ensure : Present
IncludeAllSubFeature : False
LogPath :
Name : Telnet-Client
Source :
PSComputerName : SRV2
CimClassName : MSFT_RoleResource

```

```
PS C:\> $DscCert
```

```
 PSParentPath: Microsoft.PowerShell.Security\Certificate::LocalMachine\MY
```

Thumbprint	Subject
FCE666DED34214D913141246506E5AA3B34F0FA9	CN=SRV1

```
PS C:\> Invoke-Command -ScriptBlock {Get-ChildItem -Path Cert:\LocalMachine\root |
 where-Object Subject -Match 'SRV1'} -ComputerName SRV2
```

```
 PSParentPath: Microsoft.PowerShell.Security\Certificate::LocalMachine\root
```

Thumbprint	Subject	PSCOMPUTERNAME
FCE666DED34214D913141246506E5AA3B34F0FA9	CN=SRV1	SRV2

```
PS C:\> Get-Module xPSDesiredStateConfiguration -ListAvailable
```

```
 Directory: C:\Program Files\WindowsPowerShell\Modules
```

ModuleType	Version	Name	ExportedCommands
Script	6.2.0.0	xPSDesiredStateConfiguration	{Publish-MOFToPullServer, Publish-DSCModuleAndMof, Publish-ModuleToPullServer}

```
PS C:\> Invoke-Command -ComputerName SRV2 `
 -ScriptBlock {Get-Module xPSDesiredStateConfiguration -ListAvailable}
```

```
 Directory: C:\Program Files\WindowsPowerShell\Modules
```

ModuleType	Version	Name	ExportedCommands	PSCOMPUTERNAME
Script	6.2.0.0	xPSDesiredStateConfiguration	{Publish-ModuleToPullServer, Publish-MOFToPullServer, Pu...}	SRV2

```
PS C:\> Get-ChildItem -Path C:\DSC -ErrorAction SilentlyContinue |
 Remove-Item -Force | Out-Null
```

```
PS C:\> Remove-Item -Path 'C:\Windows\System32\configuration*.mof' `
 -ErrorAction SilentlyContinue
```

```
PS C:\> WebPullSrv1 -OutputPath C:\DSC -CertThumbPrint $DscCert.Thumbprint
```

```
 Directory: C:\DSC
```

Mode	LastWriteTime	Length	Name
-a----	03/05/2017 19:35	5536	SRV1.mof



```

P5 C:\> Start-DscConfiguration -Path C:\DSC -Wait -Verbose

VERBOSE: Perform operation 'Invoke CimMethod' with following parameters:
VERBOSE: MethodName = Set-DscConfigurationApply, ClassName = MSTP_DSCLocalConfigurationManager,
VERBOSE: NamespaceName = root\Microsoft\Windows\DesiredStateConfiguration\
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV1]: LCM: [Start Set] [[File]DSCConfig-Folder]
VERBOSE: [SRV1]: LCM: [Start Test] [[File]DSCConfig-Folder]
VERBOSE: [SRV1]: LCM: [End Resource] [[File]DSCConfig-Folder] The system cannot find the file specified.
VERBOSE: [SRV1]: LCM: [End Test] [[File]DSCConfig-Folder] The related File/directory is: C:\DSCConfiguration.
VERBOSE: [SRV1]: LCM: [Start Set] [[File]DSCConfig-Folder] in 0.0160 seconds.
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]DSCConfig-Folder]
VERBOSE: [SRV1]: LCM: [End Test] [[File]DSCConfig-Folder] The system cannot find the file specified.
VERBOSE: [SRV1]: LCM: [End Set] [[File]DSCConfig-Folder] The related File/directory is: C:\DSCConfiguration.
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]DSCResource-Folder] in 0.0000 seconds.
VERBOSE: [SRV1]: LCM: [Start Test] [[File]DSCResource-Folder]
VERBOSE: [SRV1]: LCM: [End Resource] [[File]DSCResource-Folder] The system cannot find the file specified.
VERBOSE: [SRV1]: LCM: [End Test] [[File]DSCResource-Folder] The related File/directory is: C:\DSCResource.
VERBOSE: [SRV1]: LCM: [Start Set] [[File]DSCResource-Folder] in 0.0160 seconds.
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]DSCResource-Folder]
VERBOSE: [SRV1]: LCM: [End Test] [[File]DSCResource-Folder] The system cannot find the file specified.
VERBOSE: [SRV1]: LCM: [End Set] [[File]DSCResource-Folder] The related File/directory is: C:\DSCResource.
VERBOSE: [SRV1]: LCM: [Start Resource] [[WindowsFeature]DSCService] in 0.0310 seconds.
VERBOSE: [SRV1]: LCM: [Start Test] [[WindowsFeature]DSCService]
VERBOSE: [SRV1]: LCM: [End Test] [[WindowsFeature]DSCService] The operation 'Get-WindowsFeature' started: DSC-Service
VERBOSE: [SRV1]: LCM: [Start Resource] [[WindowsFeature]DSCService] The operation 'Get-WindowsFeature' succeeded: DSC-Service
VERBOSE: [SRV1]: LCM: [End Test] [[WindowsFeature]DSCService] in 0.9530 seconds.
VERBOSE: [SRV1]: LCM: [Start Set] [[WindowsFeature]DSCService]
VERBOSE: [SRV1]: LCM: [End Set] [[WindowsFeature]DSCService] Installation started...
VERBOSE: [SRV1]: LCM: [Start Resource] [[WindowsFeature]DSCService] Continue with installation?
VERBOSE: [SRV1]: LCM: [End Resource] [[WindowsFeature]DSCService] Prerequisite processing started...
VERBOSE: [SRV1]: LCM: [Start Test] [[WindowsFeature]DSCService] Prerequisite processing succeeded.
VERBOSE: [SRV1]: LCM: [End Test] [[WindowsFeature]DSCService] Installation succeeded.
VERBOSE: [SRV1]: LCM: [Start Set] [[WindowsFeature]DSCService] Successfully installed the feature DSC-Service.
VERBOSE: [SRV1]: LCM: [End Set] [[WindowsFeature]DSCService] in 106.2660 seconds.
VERBOSE: [SRV1]: LCM: [End Resource] [[DSCWebService]WebPu1|SRV1]
VERBOSE: [SRV1]: LCM: [Start Resource] [[DSCWebService]WebPu1|SRV1]
VERBOSE: [SRV1]: LCM: [Start Test] [[DSCWebService]WebPu1|SRV1]
VERBOSE: [SRV1]: LCM: [End Test] [[DSCWebService]WebPu1|SRV1] Check Ensure
VERBOSE: [SRV1]: LCM: [Start Set] [[DSCWebService]WebPu1|SRV1] Check Port
VERBOSE: [SRV1]: LCM: [End Set] [[DSCWebService]WebPu1|SRV1] Check Physical Path property
VERBOSE: [SRV1]: LCM: [Start Resource] [[DSCWebService]WebPu1|SRV1] Physical Path of Website PSDSCPullServer does not match the desired state.
VERBOSE: [SRV1]: LCM: [End Resource] [[DSCWebService]WebPu1|SRV1] in 1.8000 seconds.
VERBOSE: [SRV1]: LCM: [Start Test] [[DSCWebService]WebPu1|SRV1]
VERBOSE: [SRV1]: LCM: [End Test] [[DSCWebService]WebPu1|SRV1] Create the IIS endpoint
VERBOSE: [SRV1]: LCM: [Start Set] [[DSCWebService]WebPu1|SRV1] Setting up endpoint at - https://SRV1:8080/PSDSCPullServer.vsc
VERBOSE: [SRV1]: LCM: [End Set] [[DSCWebService]WebPu1|SRV1] Verify that the certificate with the provided thumbprint exists in CERT:\LocalMachine\MY\
VERBOSE: [SRV1]: LCM: [Start Resource] [[DSCWebService]WebPu1|SRV1] Checking IIS requirements
VERBOSE: [SRV1]: LCM: [End Resource] [[DSCWebService]WebPu1|SRV1] Delete the App Pool if it exists
VERBOSE: [SRV1]: LCM: [Start Test] [[DSCWebService]WebPu1|SRV1] Remove the site if it already exists
VERBOSE: [SRV1]: LCM: [End Test] [[DSCWebService]WebPu1|SRV1] p11
VERBOSE: [SRV1]: LCM: [Start Set] [[DSCWebService]WebPu1|SRV1] Create the bin folder for deploying custom dependent binaries required by the endpoint
VERBOSE: [SRV1]: LCM: [End Set] [[DSCWebService]WebPu1|SRV1] Adding App Pool
VERBOSE: [SRV1]: LCM: [Start Resource] [[DSCWebService]WebPu1|SRV1] Set App Pool Properties
VERBOSE: [SRV1]: LCM: [End Resource] [[DSCWebService]WebPu1|SRV1] Add and Set Site Properties
VERBOSE: [SRV1]: LCM: [Start Test] [[DSCWebService]WebPu1|SRV1] p11
VERBOSE: [SRV1]: LCM: [End Test] [[DSCWebService]WebPu1|SRV1] Enabling firewall exception for port 8080
VERBOSE: [SRV1]: LCM: [Start Set] [[DSCWebService]WebPu1|SRV1] Disable Inbound Firewall Notification
VERBOSE: [SRV1]: LCM: [End Set] [[DSCWebService]WebPu1|SRV1] Add Firewall Rule for port 8080
VERBOSE: [SRV1]: LCM: [Start Resource] [[DSCWebService]WebPu1|SRV1] Set values into the web.config that define the repository later than BLUE 05
VERBOSE: [SRV1]: LCM: [End Resource] [[DSCWebService]WebPu1|SRV1] Only EBSENT is supported on Windows Server 2016
VERBOSE: [SRV1]: LCM: [Start Test] [[DSCWebService]WebPu1|SRV1] Pull Server: Set values into the web.config that indicate the location of repository, configuration, mo
dules
VERBOSE: [SRV1]: LCM: [End Test] [[DSCWebService]WebPu1|SRV1] in 12.7870 seconds.
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [Start Test] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [End Test] [[File]RegistrationKeyFile] The destination object was found and no action is required.
VERBOSE: [SRV1]: LCM: [Start Set] [[File]RegistrationKeyFile] in 0.0320 seconds.
VERBOSE: [SRV1]: LCM: [End Set] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [Start Resource] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [End Resource] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [Start Test] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [End Test] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [Start Set] [[File]RegistrationKeyFile]
VERBOSE: [SRV1]: LCM: [End Set] [[File]RegistrationKeyFile] in 124.8960 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 127.37 seconds

```

```
https://srv1:8080/PSDSCPullServer.svc/
<?xml version="1.0" encoding="utf-8" ?>
- <service xml:base="https://srv1:8080/PSDSCPullServer.svc/"
 xmlns="http://www.w3.org/2007/app"
 xmlns:atom="http://www.w3.org/2005/Atom">
- <workspace>
 <atom:title>Default</atom:title>
 + <collection href="Configurations">
 + <collection href="Modules">
 + <collection href="Action">
 + <collection href="Module">
 + <collection href="StatusReport">
 + <collection href="Node">
 + <collection href="Reports">
 + <collection href="Nodes">
 </workspace>
</service>
```

```
PS C:\> $CSSrv2 = New-CimSession -ComputerName SRV2
PS C:\> Set-DscLocalConfigurationManager -CimSession $CSSrv2 `
 -Path C:\DSC `
 -Verbose
VERBOSE: Performing the operation "Start-DscConfiguration:
SendMetaConfigurationApply" on target "MSFT_DSCLocalConfigurationManager".
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters,
'methodName' = SendMetaConfigurationApply,'className' = MSFT_DSCLocalConfigurationManager,
'namespaceName' = root/Microsoft/Windows/DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV2 with user
sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: LCM: [Start Set]
VERBOSE: [SRV2]: LCM: [Start Resource] [MSFT_DSCMetaConfiguration]
VERBOSE: [SRV2]: LCM: [Start Set] [MSFT_DSCMetaConfiguration]
VERBOSE: [SRV2]: LCM: [End Set] [MSFT_DSCMetaConfiguration] in 0.0150 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [MSFT_DSCMetaConfiguration]
VERBOSE: [SRV2]: [] Registration of the Dsc Agent with the
server https://SRV1:8080/PSDSCPullServer.svc was successful.
VERBOSE: [SRV2]: LCM: [End Set]
VERBOSE: [SRV2]: LCM: [End Set] in 25.0200 seconds.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Set-DscLocalConfigurationManager finished in 25.203 seconds.
```

```
PS C:\> Get-ChildItem -Path C:\DSCConfiguration
```

```
Directory: C:\DSCConfiguration
Mode LastWriteTime Length Name
---- -
-a----- 03/05/2017 20:29 1936 TelnetConfig.Mof
-a----- 03/05/2017 20:29 64 TelnetConfig.Mof.checksum
-a----- 03/05/2017 20:29 1920 TFTPConfig.Mof
-a----- 03/05/2017 20:29 64 TFTPConfig.Mof.checksum
```

```
PS C:\> Update-DscConfiguration -ComputerName SRV2 -wait -verbose
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters,
'methodName' = PerformRequiredConfigurationChecks, 'className' = MSFT_DSCLocalConfigurationManager, 'name
spaceName' = root/microsoft/windows/desiredstateconfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: [] Executing Get-Action with configuration 's checksum returned result status: GetConfiguration.
VERBOSE: [SRV2]: [] Checksum is different. LCM will execute GetConfiguration to pull configuration.
VERBOSE: [SRV2]: [] Executing GetConfiguration succeeded. configuration TelnetConfig was pulled from server.
VERBOSE: [SRV2]: [] Executing GetConfiguration succeeded. configuration TFTPConfig was pulled from server.
VERBOSE: [SRV2]: [] Applying the new configuration(s) pulled.
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]TelnetClient]
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]TelnetClient]
VERBOSE: [SRV2]: [] The operation 'Get-windowsFeature' started: Telnet-Client
VERBOSE: [SRV2]: [] The operation 'Get-windowsFeature' succeeded: Telnet-Client
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]TelnetClient] in 0.9530 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]TelnetClient]
VERBOSE: [SRV2]: [] Installation started...
VERBOSE: [SRV2]: [] Continue with installation?
VERBOSE: [SRV2]: [] Prerequisite processing started...
VERBOSE: [SRV2]: [] Prerequisite processing succeeded.
VERBOSE: [SRV2]: [] Installation succeeded.
VERBOSE: [SRV2]: [] Successfully installed the feature Telnet-Client.
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]TelnetClient] in 32.4180 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[WindowsFeature]TelnetClient]
VERBOSE: [SRV2]: LCM: [Start Resource] [[WindowsFeature]TFTPClient]
VERBOSE: [SRV2]: LCM: [Start Test] [[WindowsFeature]TFTPClient]
VERBOSE: [SRV2]: [] The operation 'Get-windowsFeature' started: TFTP-Client
VERBOSE: [SRV2]: [] The operation 'Get-windowsFeature' succeeded: TFTP-Client
VERBOSE: [SRV2]: LCM: [End Test] [[WindowsFeature]TFTPClient] in 2.1090 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[WindowsFeature]TFTPClient]
VERBOSE: [SRV2]: [] Installation started...
VERBOSE: [SRV2]: [] Continue with installation?
VERBOSE: [SRV2]: [] Prerequisite processing started...
VERBOSE: [SRV2]: [] Prerequisite processing succeeded.
VERBOSE: [SRV2]: [] Installation succeeded.
VERBOSE: [SRV2]: [] Successfully installed the feature TFTP-Client.
VERBOSE: [SRV2]: LCM: [End Set] [[WindowsFeature]TFTPClient] in 21.9150 seconds.
VERBOSE: [SRV2]: LCM: [End Resource] [[WindowsFeature]TFTPClient]
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 71.607 seconds
PS C:\> Test-DscConfiguration -ComputerName SRV2
True
```

```
PS C:\> Test-DscConfiguration -ComputerName SRV2
False
```

```

PS C:\> Start-DscConfiguration -UseExisting -Verbose -wait -ComputerName srv2
VERBOSE: Perform operation 'Invoke CimMethod' with following parameters,
 'methodName' = ApplyConfiguration, 'className' = MSFT_DSCLocalConfigurationManager, 'namespaceName' = root\microsoft\windows\DesiredStateConfiguration'.
VERBOSE: An LCM method call arrived from computer SRV1 with user sid S-1-5-21-715049209-2702507345-667613206-500.
VERBOSE: [SRV2]: [] Starting consistency engine.
VERBOSE: [SRV2]: [] Checking consistency for current configuration.
VERBOSE: [SRV2]: LCM: [Start Resource] [[windowsFeature]TelnetClient]
VERBOSE: [SRV2]: LCM: [Start Test] [[windowsFeature]TelnetClient]
VERBOSE: [SRV2]: LCM: [End Test] [[windowsFeature]TelnetClient] The operation 'Get-windowsFeature' started: Telnet-Client
VERBOSE: [SRV2]: LCM: [Start Set] [[windowsFeature]TelnetClient] The operation 'Get-windowsFeature' succeeded: Telnet-Client
 in 0.4840 seconds.
VERBOSE: [SRV2]: [] Installation started...
VERBOSE: [SRV2]: [] Continue with installation?
VERBOSE: [SRV2]: [] Prerequisite processing started...
VERBOSE: [SRV2]: [] Prerequisite processing succeeded.
VERBOSE: [SRV2]: [] Installation succeeded.
VERBOSE: [SRV2]: [] Successfully installed the feature Telnet-Client.
 in 24.0370 seconds.
VERBOSE: [SRV2]: LCM: [End Set] [[windowsFeature]TelnetClient]
VERBOSE: [SRV2]: LCM: [End Resource] [[windowsFeature]TFTPClient]
VERBOSE: [SRV2]: LCM: [Start Resource] [[windowsFeature]TFTPClient]
VERBOSE: [SRV2]: LCM: [Start Test] [[windowsFeature]TFTPClient]
VERBOSE: [SRV2]: [] The operation 'Get-windowsFeature' started: TFTP-Client
VERBOSE: [SRV2]: LCM: [End Test] [[windowsFeature]TFTPClient] The operation 'Get-windowsFeature' succeeded: TFTP-Client
 in 1.7030 seconds.
VERBOSE: [SRV2]: LCM: [Start Set] [[windowsFeature]TFTPClient]
VERBOSE: [SRV2]: [] Installation started...
VERBOSE: [SRV2]: [] Continue with installation?
VERBOSE: [SRV2]: [] Prerequisite processing started...
VERBOSE: [SRV2]: [] Prerequisite processing succeeded.
VERBOSE: [SRV2]: [] Installation succeeded.
VERBOSE: [SRV2]: [] Successfully installed the feature TFTP-Client.
 in 16.4280 seconds.
VERBOSE: [SRV2]: LCM: [End Set] [[windowsFeature]TFTPClient]
VERBOSE: [SRV2]: LCM: [End Resource] [[windowsFeature]TFTPClient]
VERBOSE: [SRV2]: [] consistency check completed.
VERBOSE: Operation 'Invoke CimMethod' complete.
VERBOSE: Time taken for configuration job to complete is 42.861 seconds

```

```

PS C:\> Get-WindowsFeature -Name Telnet-Client, TFTP-Client -ComputerName SRV2

```

Display Name	Name	Install State
[X] Telnet Client	Telnet-Client	Installed
[X] TFTP Client	TFTP-Client	Installed