



PowerShell

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What is PowerShell?

- PowerShell is a task automation and configuration management framework from Microsoft, consisting of a command-line shell and associated scripting language.
- Windows Command Shell
- Accepts Command from command line - **cmdlets**
- You can navigate the file system and the registry
- You can run scripts
- You can run script directly from the command line



CMD vs PS

```
C:\WINDOWS\system32\cmd.exe  
Microsoft Windows [Version 10.0.16299.309]  
(c) 2017 Microsoft Corporation. All rights reserved.
```

```
C:\Users\Admin>
```

```
Administrator: Windows PowerShell  
Windows PowerShell  
Copyright (C) Microsoft Corporation.  
PS C:\WINDOWS\system32>
```

PowerShell Version

- **PowerShell v1** (PS 1.0)

- In Nov, 2006 for XP, WinServer 2003 SP1, Windows Vista.
- Optional in Win Server 2008.

- **PowerShell v2** (PS 2.0)

- Integrated with Win7 & Win SVR 2008R2.
- Included 240 cmdlets.
- Includes below features:
 - PS remoting
 - Jobs, Advance functions
 - Debugging, ISE.
 - New APIs.

PowerShell Version

- **PowerShell v3** (PS 3.0)
 - Integrated with Win 8 & Win SVR 2012.
 - Supports WinRM service. (5985/5986)
 - Job scheduling, session connectivity, help update, auto module detection.
- **PowerShell v4** (PS 4.0)
 - Integrated with Win 8.1 & Win SVR 2012R2.
 - Includes DSC, execution policy, save-help, 'where' & 'foreach'.
- **PowerShell v5** (PS 5.0 or PS 5.1)
 - Integrated with Win10 & Win SVR 2016.
 - Includes Chocolatey's repository-based package management.

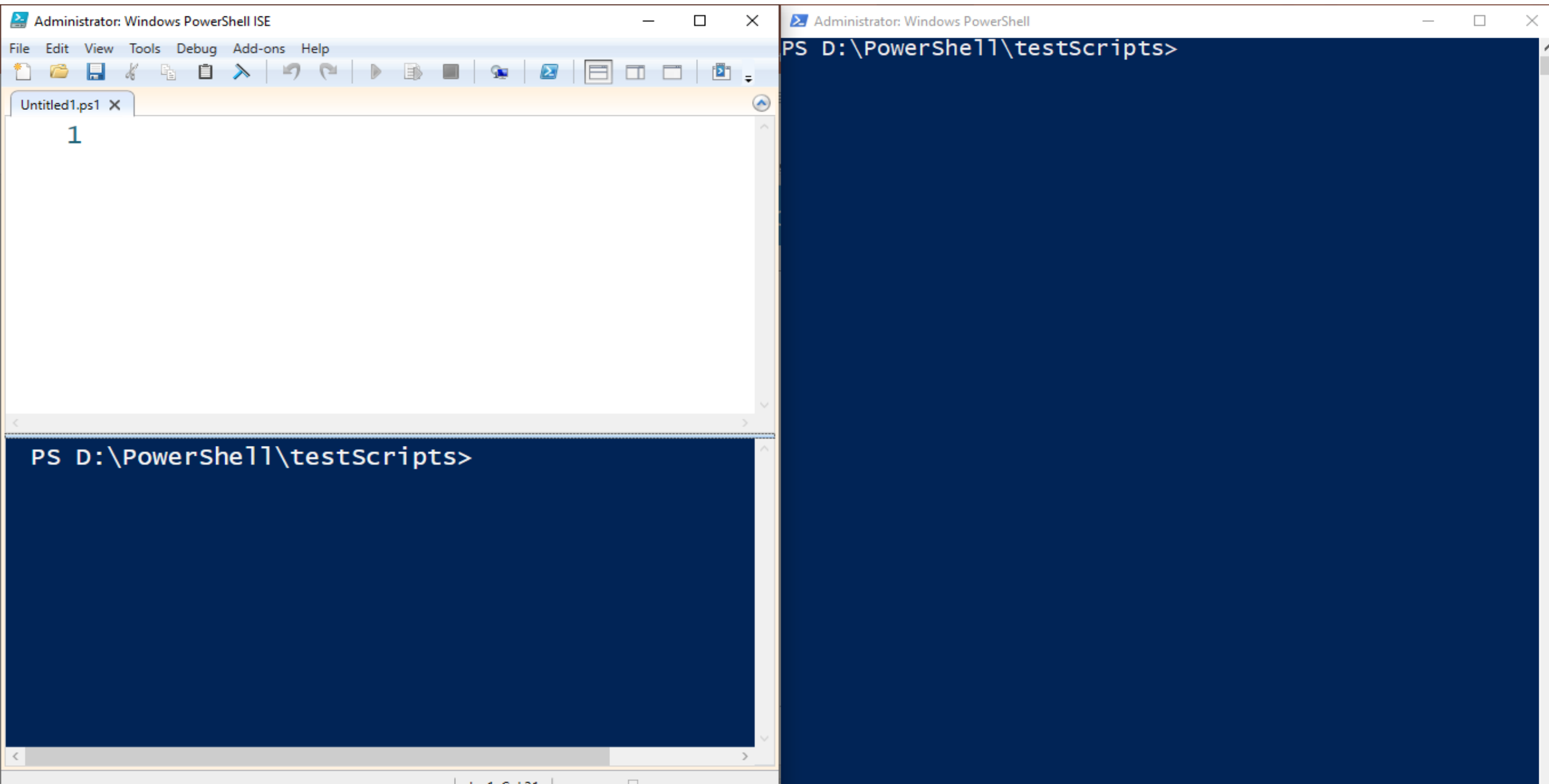
- **PowerShell 5.1**

- It was released along with the Windows 10 Anniversary Update.
- PowerShell 5.1 is the first version to come in two editions of "Desktop" and "Core".
 - "*Desktop*" edition is the continuation of the traditional Windows PowerShell
 - "*Core*" edition runs on .NET Core and is bundled with Windows Server 2016 Nano Server

- **PowerShell Core 6.0**

- Cross-platform, independent of Windows, free and open source.
- It's a new edition of PS that is cross-platform (Windows, macOS, and Linux), open-source, and built for heterogeneous environments and the hybrid cloud.
- Supports MacOS & Linux.
- Setup renamed from "powershell.exe" to "pwsh.exe"

PowerShell vs Integrated Scripting Environment (ISE)



File extensions

1. **PS1** – Windows PowerShell script
2. **PSD1** – Windows PowerShell data file (for Version 2)
3. **PSM1** – Windows PowerShell module file (for Version 2)
4. **PS1XML** – Windows PowerShell format and type definitions
5. **CLIXML** – Windows PowerShell serialized data
6. **PSC1** – Windows PowerShell console file
7. **PSSC** – Windows PowerShell Session Configuration file

Updating PowerShell

```
PS D:\PowerShell\testScripts> update-help
```

```
Updating Help for module Microsoft.PowerShell.Operation.Validation  
Locating Help Content...  
[
```

Help command

```
PS D:\PowerShell\testScripts> help update-help
```

NAME

Update-Help

SYNOPSIS

Downloads and installs the newest help files on your computer.

SYNTAX

```
Update-Help [[-Module] <String[]>] [[-UICulture] <CultureInfo[]>] [-Con  
[-Force] [-FullyQualifiedModule <ModuleSpecification[]>] [-LiteralPath  
[-UseDefaultCredentials] [-WhatIf] [<CommonParameters>]
```

```
Update-Help [[-Module] <String[]>] [[-SourcePath] <String[]>] [[-UICult  
[-Credential <PSCredential>] [-Force] [-FullyQualifiedModule <ModuleSpe  
[-UseDefaultCredentials] [-WhatIf] [<CommonParameters>]
```

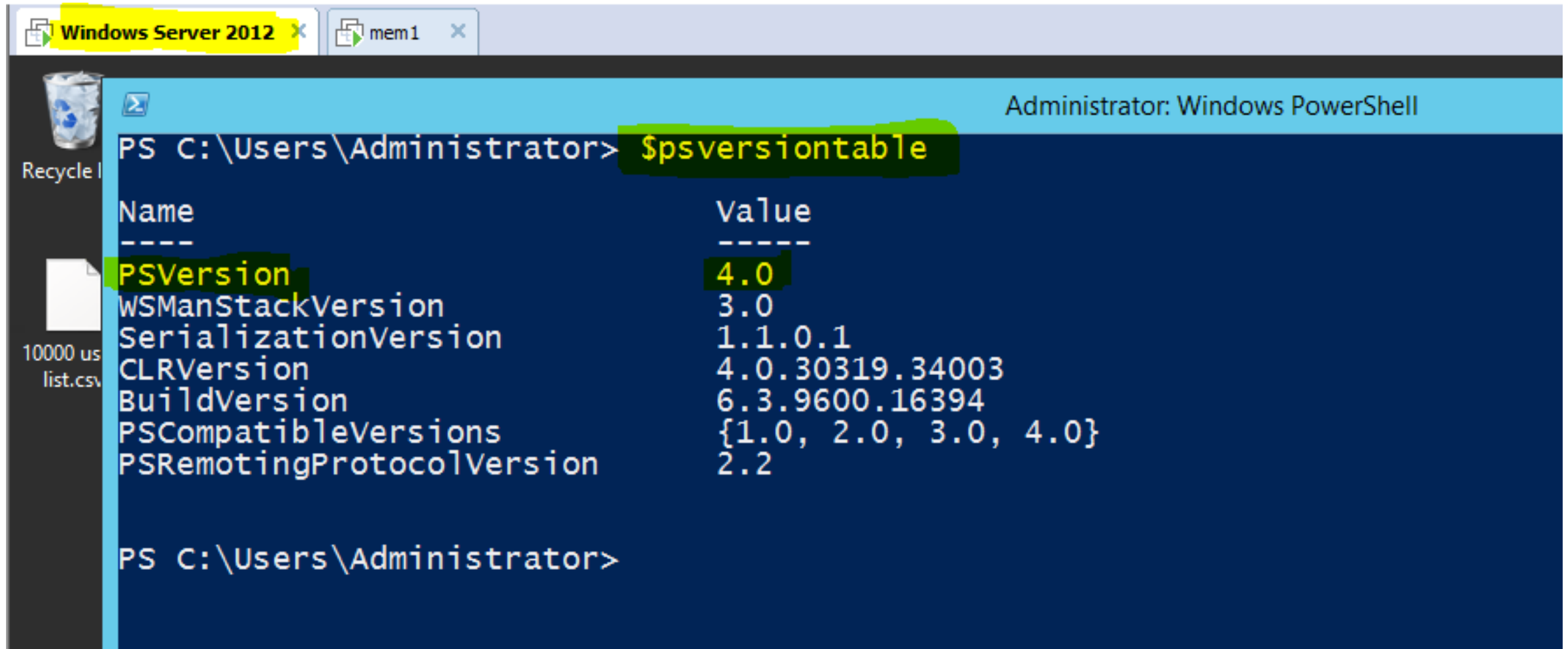
DESCRIPTION

The Update-Help cmdlet downloads the newest help files for Windows PowerShell on your computer. You can use the Get-Help cmdlet to view the new help files.

Upgrade PowerShell

- V2 -> V4 (DotNet FW 4.0 required)
- V3 -> V4/V5 (DotNet FW 4.0 required, 4.5.0 required)
- V4 -> V5 (DotNet FW 4.5 required)

Upgrade PowerShell (before upgrade)



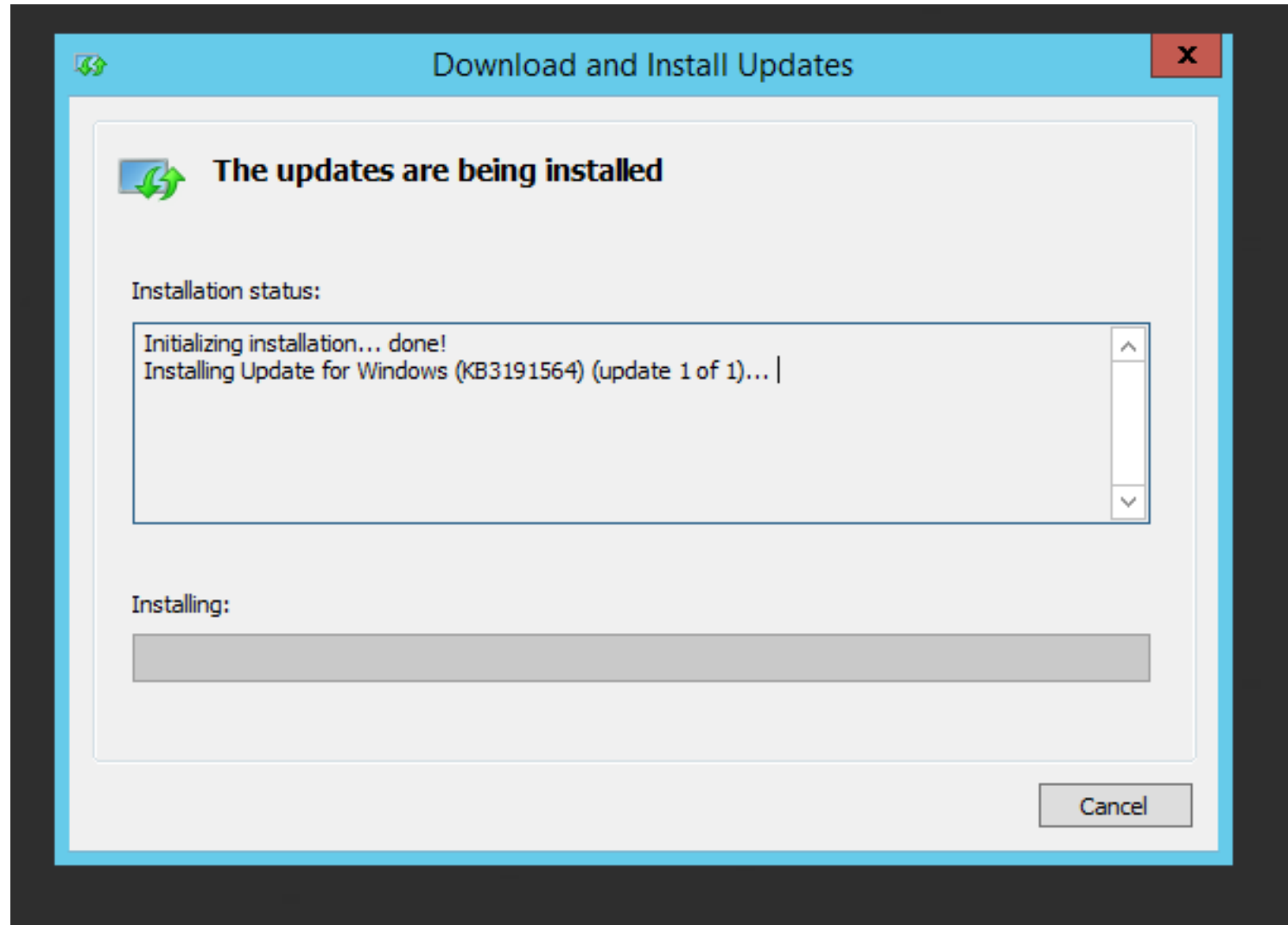
The screenshot shows a Windows PowerShell console window titled "Administrator: Windows PowerShell". The command prompt is at "PS C:\Users\Administrator>". The command "\$psversiontable" has been entered and executed. The output is a table with two columns: "Name" and "Value". The "PSVersion" row is highlighted in yellow, showing a value of "4.0". Other rows include "WSManStackVersion" (3.0), "SerializationVersion" (1.1.0.1), "CLRVersion" (4.0.30319.34003), "BuildVersion" (6.3.9600.16394), "PSCompatibleVersions" ({1.0, 2.0, 3.0, 4.0}), and "PSRemotingProtocolVersion" (2.2).

```
PS C:\Users\Administrator> $psversiontable
```

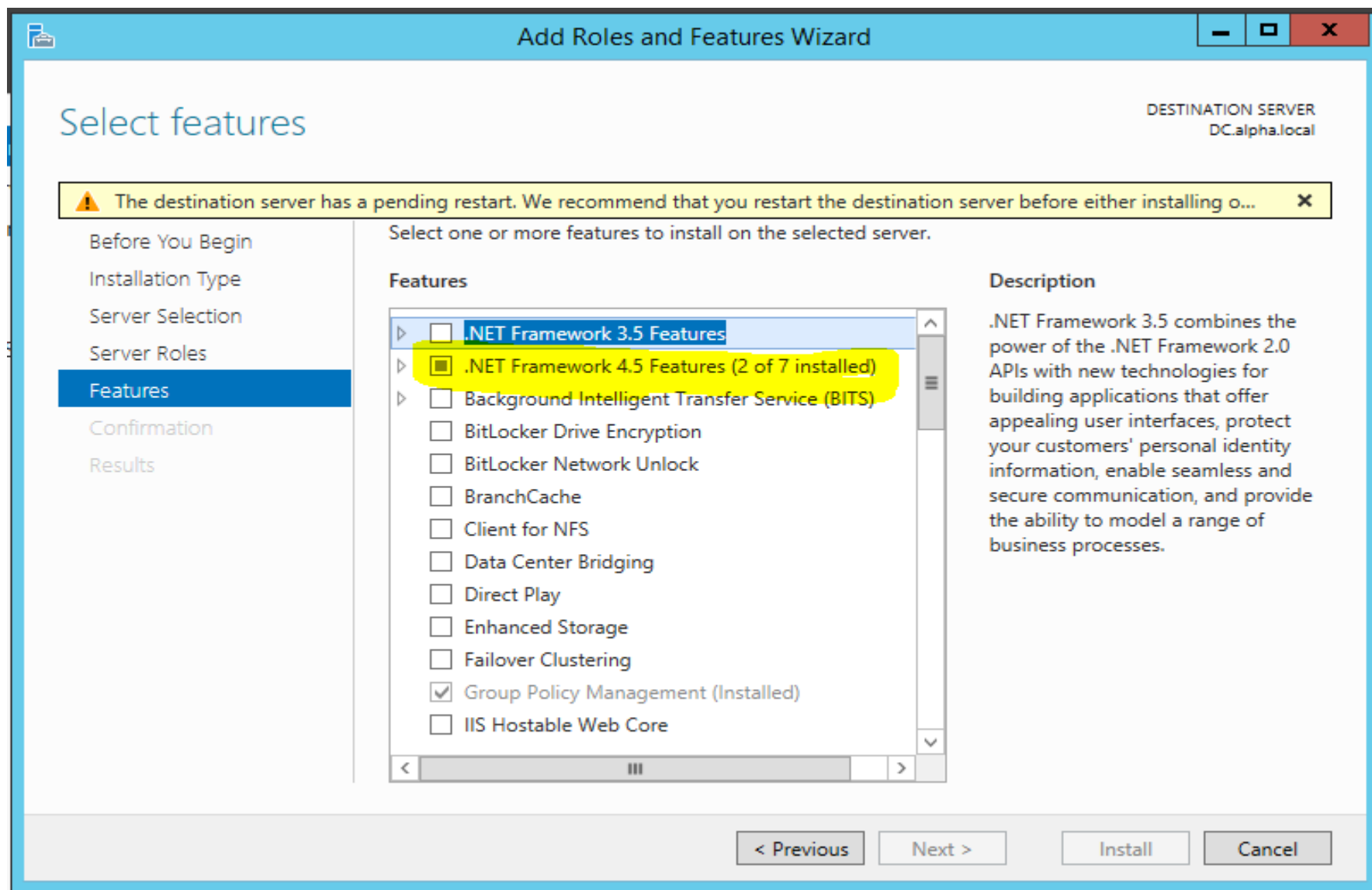
Name	Value
PSVersion	4.0
WSManStackVersion	3.0
SerializationVersion	1.1.0.1
CLRVersion	4.0.30319.34003
BuildVersion	6.3.9600.16394
PSCompatibleVersions	{1.0, 2.0, 3.0, 4.0}
PSRemotingProtocolVersion	2.2

```
PS C:\Users\Administrator>
```

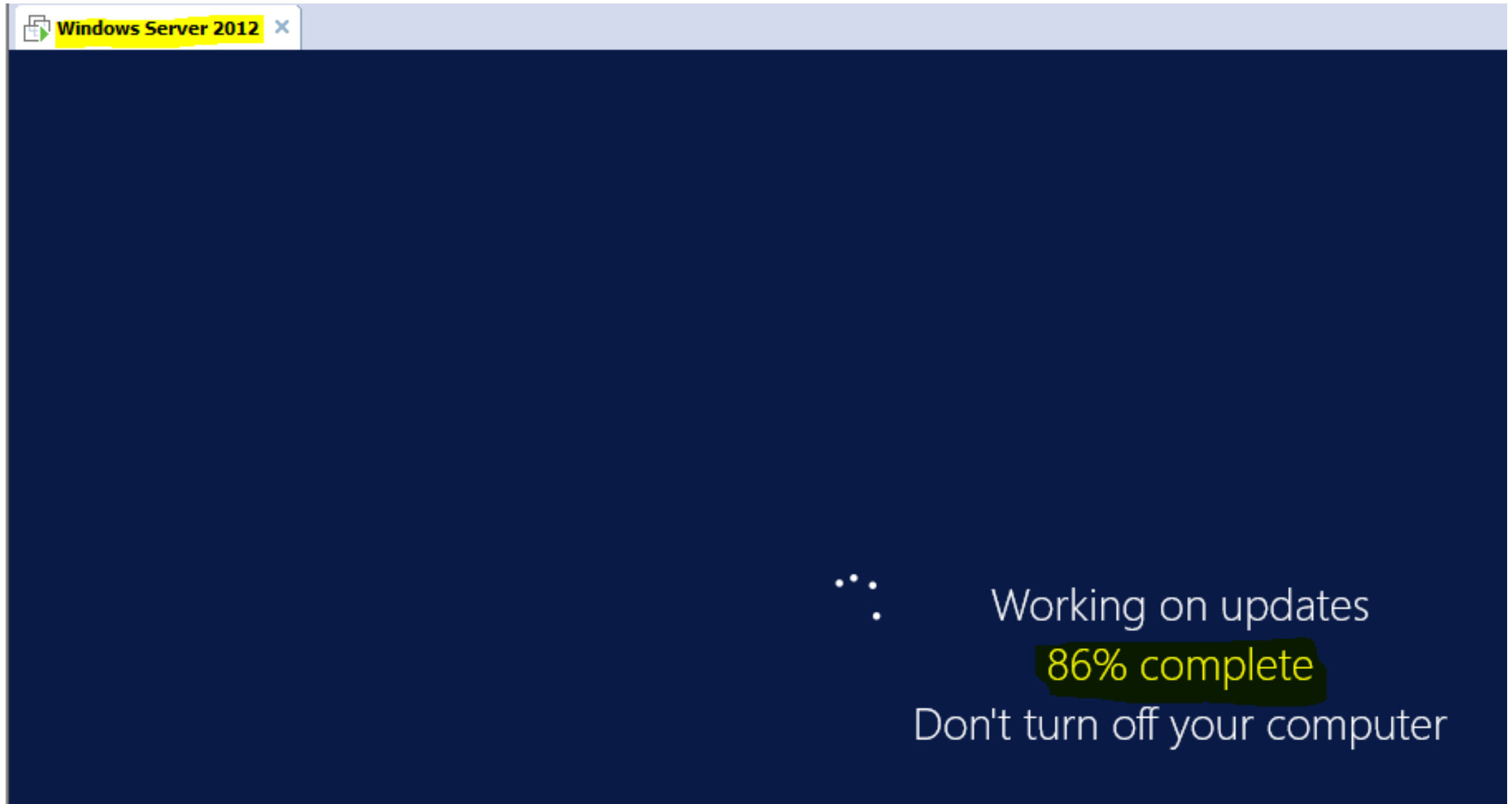
Upgrade PowerShell (While upgrade)



Upgrade PowerShell (While upgrade)



Upgrade PowerShell (While upgrade)



Upgrade PowerShell (after upgrade)

Windows Server 2012 x



Administrator: Windows PowerShell

```
PS C:\Users\Administrator> $psversiontable
```

Name	Value
PSVersion	5.1.14409.1005
PSEdition	Desktop
PSCompatibleVersions	{1.0, 2.0, 3.0, 4.0...}
BuildVersion	10.0.14409.1005
CLRVersion	4.0.30319.34003
WSManStackVersion	3.0
PSRemotingProtocolVersion	2.3
SerializationVersion	1.1.0.1

```
PS C:\Users\Administrator> _
```


Working locally with PS

```
PS D:\PowerShell\testScripts> Get-ChildItem
```

```
Directory: D:\PowerShell\testScripts
```

Mode	LastWriteTime	Length	Name
d-----	2/21/2019 7:33 AM		d4
d-----	1/21/2019 1:50 PM		mod-1
d-----	2/20/2019 9:17 AM		testPack

```
-a---- PS D:\PowerShell\testScripts> New-Item -Name testFile.txt -ItemType File
```

```
Directory: D:\PowerShell\testScripts
```

Mode	LastWriteTime	Length	Name
------	---------------	--------	------

```
-a---- PS D:\PowerShell\testScripts> New-Item -Name testDir -ItemType Directory
```

```
Directory: D:\PowerShell\testScripts
```

Mode	LastWriteTime	Length	Name
d-----	2/25/2019 9:46 PM		testDir

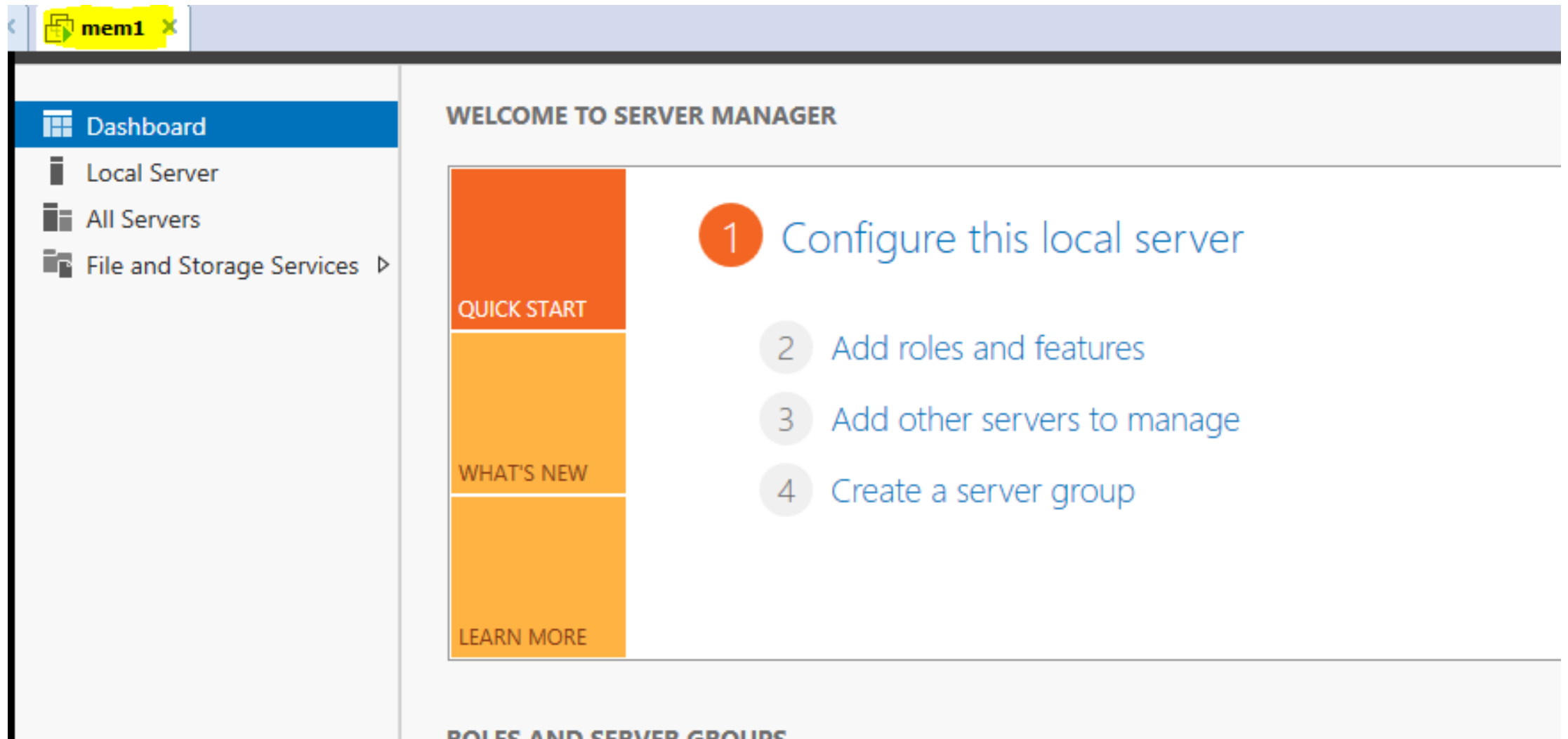
Working remotely with PS

```
Administrator: Windows PowerShell
PS C:\Users\Administrator> hostname
DC
PS C:\Users\Administrator> New-PSSession -ComputerName mem1

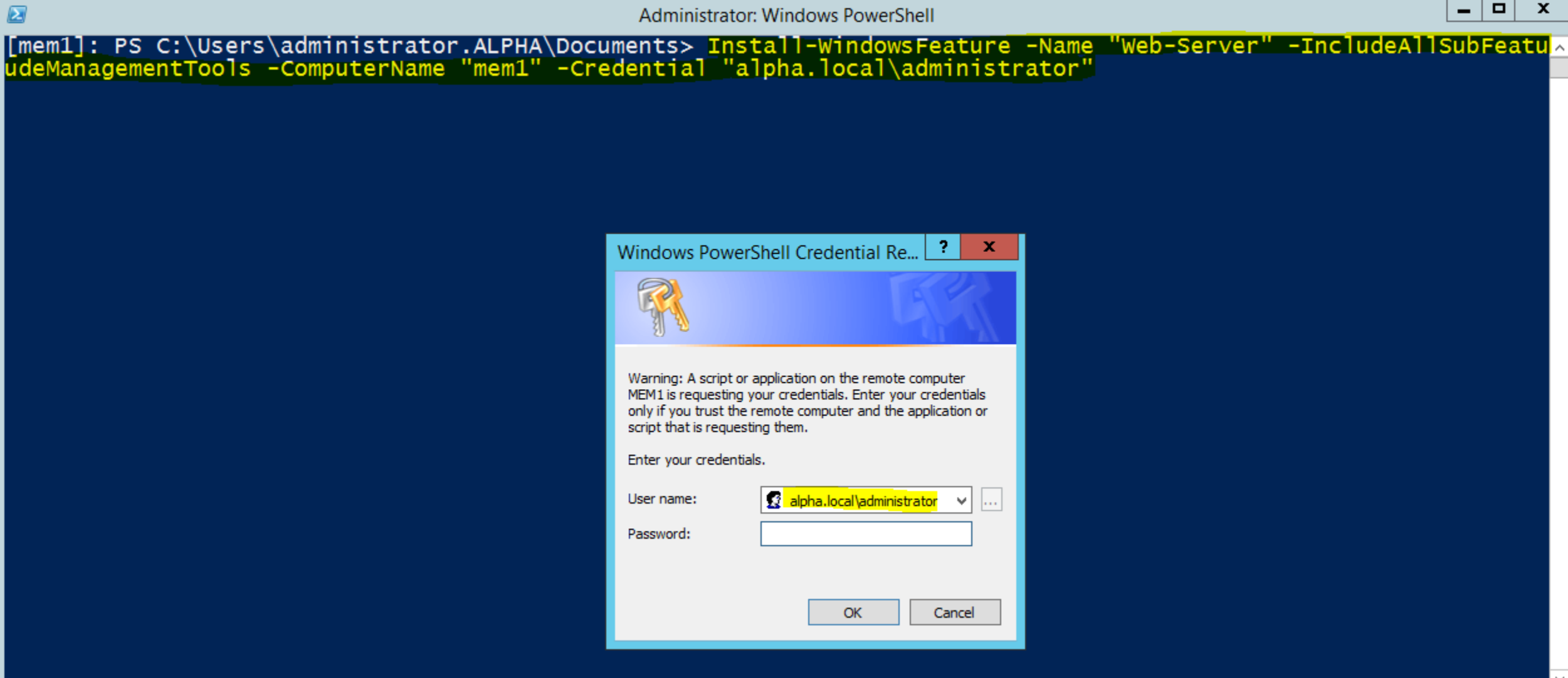
Id Name                ComputerName      State      ConfigurationName Availability
-- --                -
1 Session1          mem1             Opened     Microsoft.PowerShell Available

PS C:\Users\Administrator> Get-PSSession | Enter-PSSession
[mem1]: PS C:\Users\administrator.ALPHA\Documents> hostname
mem1
[mem1]: PS C:\Users\administrator.ALPHA\Documents> _
```

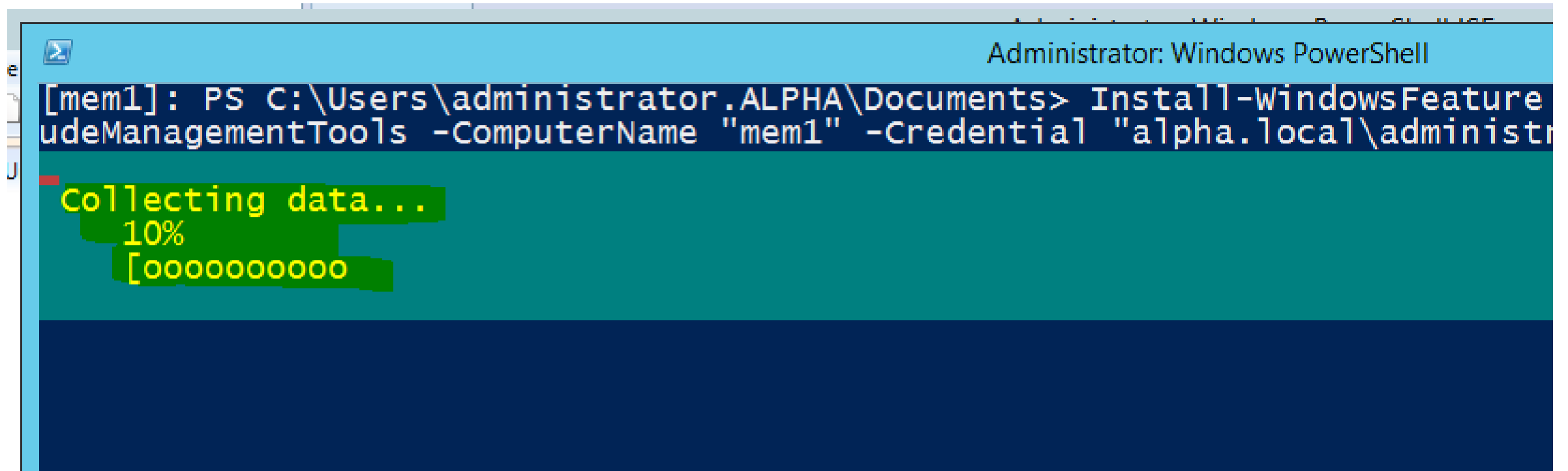
Working remotely with PS – Before installing IIS webserver



Working remotely with PS – After installing IIS webserver



Working remotely with PS – After installing IIS webserver



The screenshot shows a Windows PowerShell terminal window with a light blue title bar that reads "Administrator: Windows PowerShell". The command prompt shows the user is logged in as "mem1" and is in the directory "C:\Users\administrator.ALPHA\Documents". The command entered is "Install-WindowsFeature ManagementTools -ComputerName 'mem1' -Credential 'alpha.local\administrator'". The output shows "Collecting data..." followed by "10%" and a progress bar consisting of 10 'o' characters. The terminal has a dark blue background with yellow text for the command and green text for the progress bar.

```
Administrator: Windows PowerShell  
[mem1]: PS C:\Users\administrator.ALPHA\Documents> Install-WindowsFeature  
ManagementTools -ComputerName "mem1" -Credential "alpha.local\administr  
Collecting data...  
10%  
[oooooooooooo
```

Working remotely with PS – After installing IIS webserver

A screenshot of a Windows PowerShell terminal window titled "Administrator: Windows PowerShell". The prompt shows the user is in the directory C:\Users\administrator.ALPHA\Documents. A command has been entered: Get-WindowsFeature -Name "Web-*" | Install-windowsFeature. Below the command, the output indicates "Start Installation..." followed by "68%" completion. A progress bar consisting of approximately 68 white circles is displayed below the percentage. The terminal background is dark blue, and the command and progress information are highlighted in yellow.

Working remotely with PS – After installing IIS webserver

The screenshot displays the Windows Server Manager interface. The top navigation bar includes 'Server Manager' and 'Dashboard'. The left-hand navigation pane lists 'Dashboard', 'Local Server', 'All Servers', 'File and Storage Services', 'IIS' (highlighted in yellow), and 'Remote Access'. The main content area is titled 'WELCOME TO SERVER MANAGER' and contains sections for 'QUICK START', 'WHAT'S NEW', and 'LEARN MORE'. A task pane on the right is open, showing a 'Post-deployment Configuration' task for 'Web Application Proxy at MEM1'. The task description states 'Configuration required for Web Application Proxy at MEM1' and includes a yellow-highlighted link: 'Open the Web Application Proxy Wizard'. Below this, a 'Feature removal' section shows a progress bar and the message 'Removal succeeded on mem1.alpha.local', with a link to 'Remove Roles and Features'. At the bottom of the task pane is a 'Task Details' link. A 'Hide' button is located in the bottom right corner of the task pane.

Server Manager ▸ Dashboard

Dashboard

- Local Server
- All Servers
- File and Storage Services ▸
- IIS**
- Remote Access

WELCOME TO SERVER MANAGER

1 QUICK START

2

3

4

WHAT'S NEW

LEARN MORE

Post-deployment Configura... TASKS | X

Configuration required for Web Application Proxy at MEM1

Open the Web Application Proxy Wizard

Feature removal

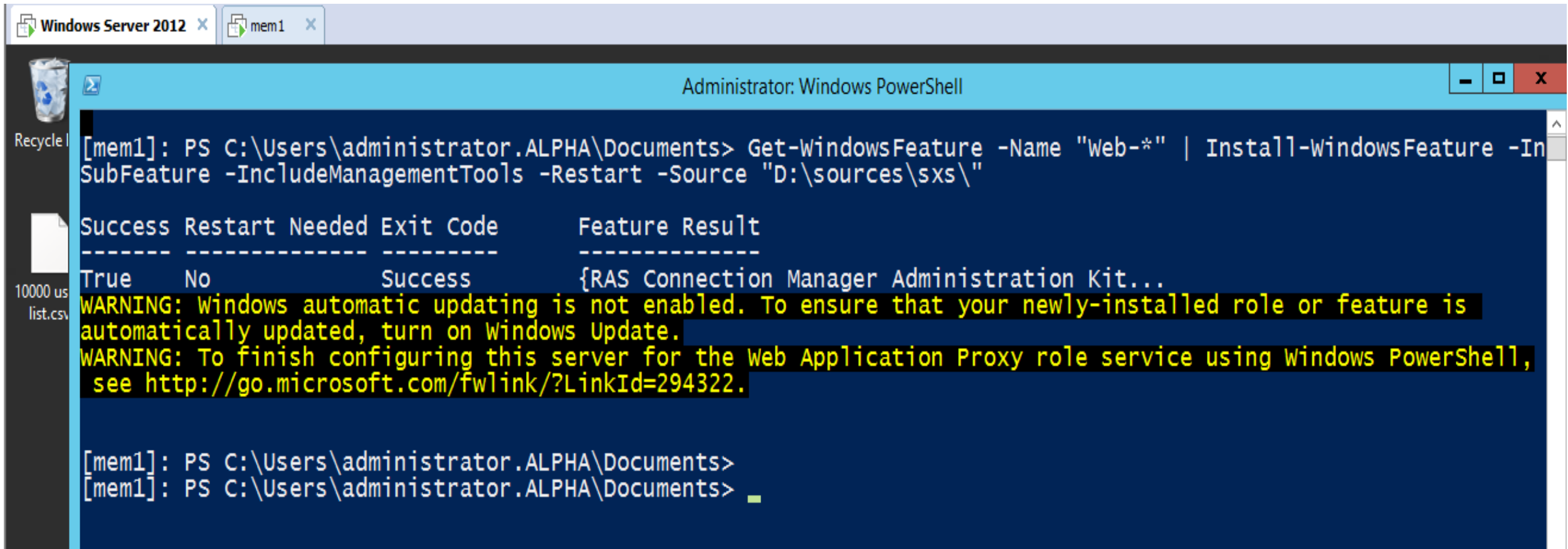
Removal succeeded on mem1.alpha.local

[Remove Roles and Features](#)

Task Details

Hide

Working remotely with PS – After installing IIS webserver



The screenshot shows a remote session window titled "Windows Server 2012" with a tab for "mem1". Inside, an "Administrator: Windows PowerShell" window is open. The command prompt shows the execution of a PowerShell command to install web-related Windows features. The output includes a table with columns for Success, Restart Needed, Exit Code, and Feature Result. The feature installed is the "RAS Connection Manager Administration Kit...". Two yellow warning messages are displayed, advising on Windows updates and configuration links.

```
[mem1]: PS C:\Users\administrator.ALPHA\Documents> Get-WindowsFeature -Name "Web-*" | Install-WindowsFeature -IncludeManagementTools -Restart -Source "D:\sources\sxs\"
```

Success	Restart Needed	Exit Code	Feature Result
True	No	Success	{RAS Connection Manager Administration Kit...

WARNING: Windows automatic updating is not enabled. To ensure that your newly-installed role or feature is automatically updated, turn on Windows Update.

WARNING: To finish configuring this server for the Web Application Proxy role service using Windows PowerShell, see <http://go.microsoft.com/fwlink/?LinkId=294322>.

```
[mem1]: PS C:\Users\administrator.ALPHA\Documents>  
[mem1]: PS C:\Users\administrator.ALPHA\Documents>
```


Creating scripts with ISE.

```
1 $os = Get-CimInstance -ClassName Win32_OperatingSystem -ComputerName localhost
2 $cs = Get-CimInstance -ClassName Win32_ComputerSystem -ComputerName localhost
3 $bios = Get-CimInstance -ClassName Win32_BIOS -ComputerName localhost
4
5 $properties = @{
6     'OSVersion' = $os.version;
7     'OSBuild' = $os.buildnumber;
8     'Mgfr' = $cs.manufacturer;
9     'Model' = $cs.model;
10    'BIOSerial' = $bios.serialnumber
11 }
12
13 $obj = New-Object -TypeName PSObject -Property $properties
14 Write-Output $obj
```

```
PS D:\PowerShell\testScripts> D:\PowerShell\testScripts\convert-to-html.ps1
```

```
BIOSerial : HRBLYX1
OSVersion : 10.0.17763
Model     : Latitude E6430
OSBuild   : 17763
Mgfr      : Dell Inc.
```

```
PS D:\PowerShell\testScripts>
```

Error handling with PS

```
7  Get-WmiObject -ComputerName localhost -Class win32 _bios -ErrorAction SilentlyContinue
8
9
10
11
12
13
14
15
16 |
```

```
PS D:\PowerShell\testScripts> D:\PowerShell\testScripts\error.ps1
```

```
PS D:\PowerShell\testScripts>
```

PS integration with other products

- Integration with several Microsoft products:
 - Microsoft Azure
 - Microsoft SQL server
 - Visual Studio
 - Office 365
 - Power BI
 - Windows Servers
 - AWS
 - Exchange server
 - Skype
 - SharePoint
 - DSC - Linux



That's all Folks!



**Any
Questions?**