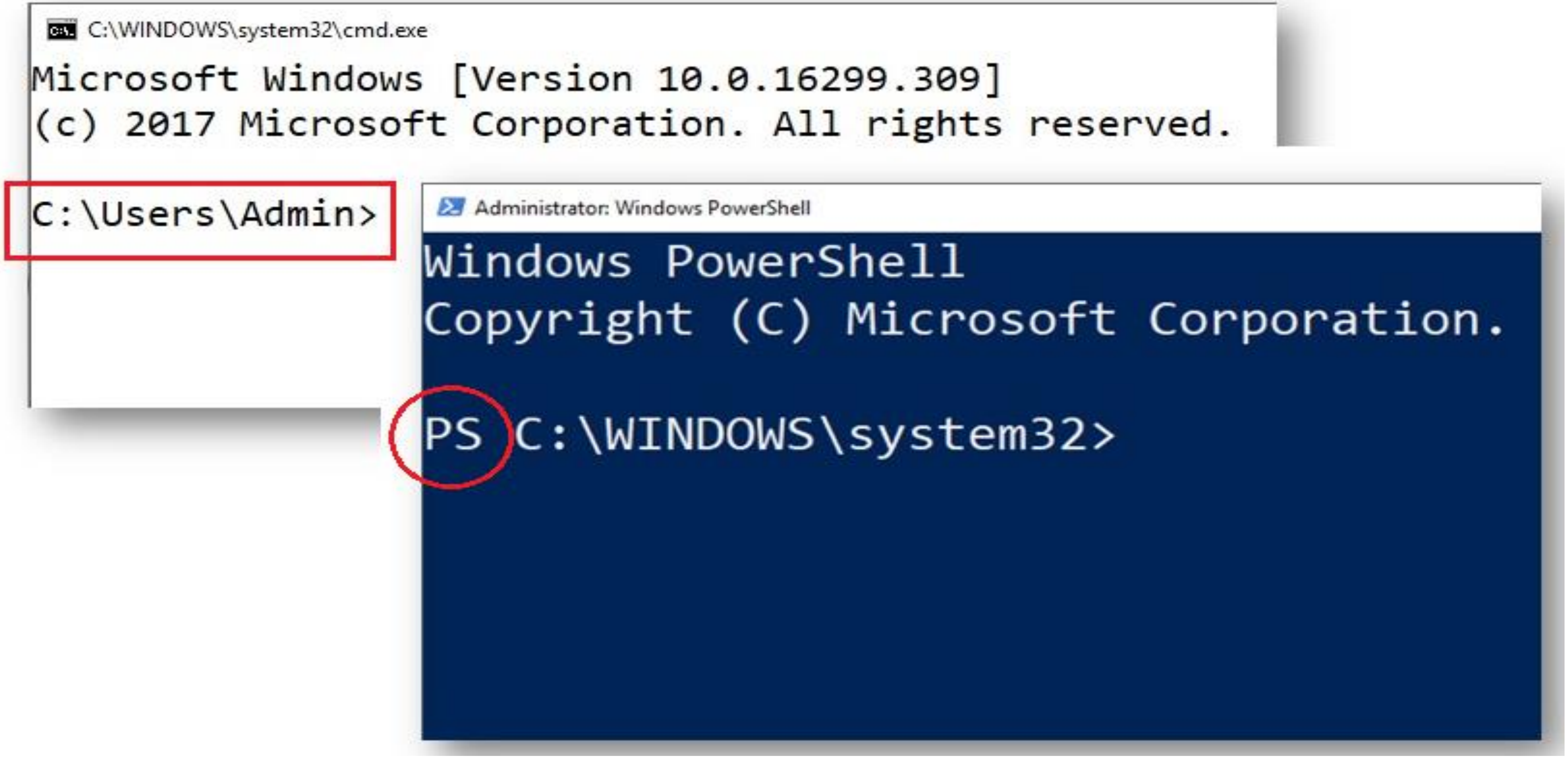
PowerShell

Trainer – Jitendra Singh Tomar

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.

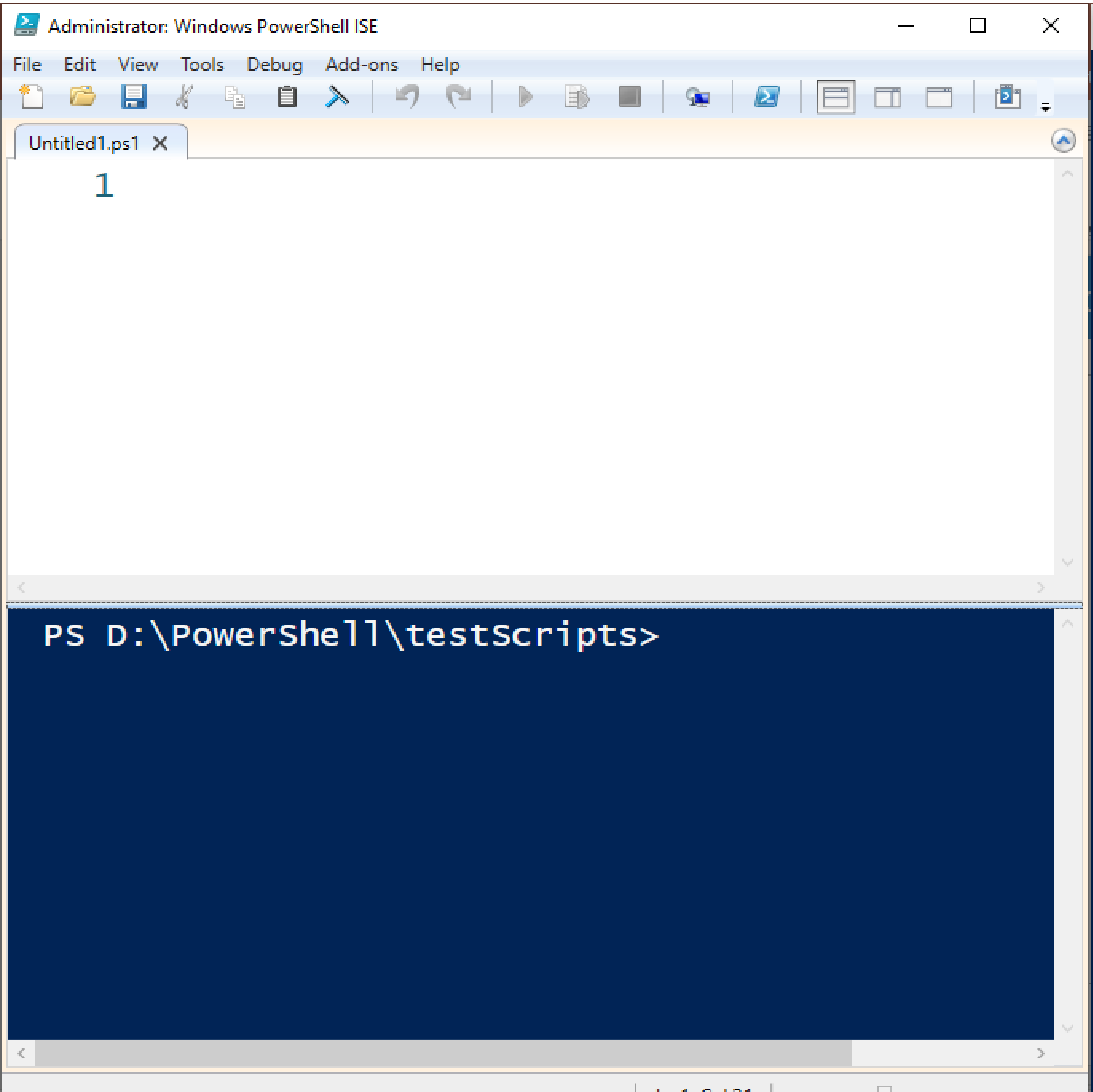
PowerShell Version

- **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.

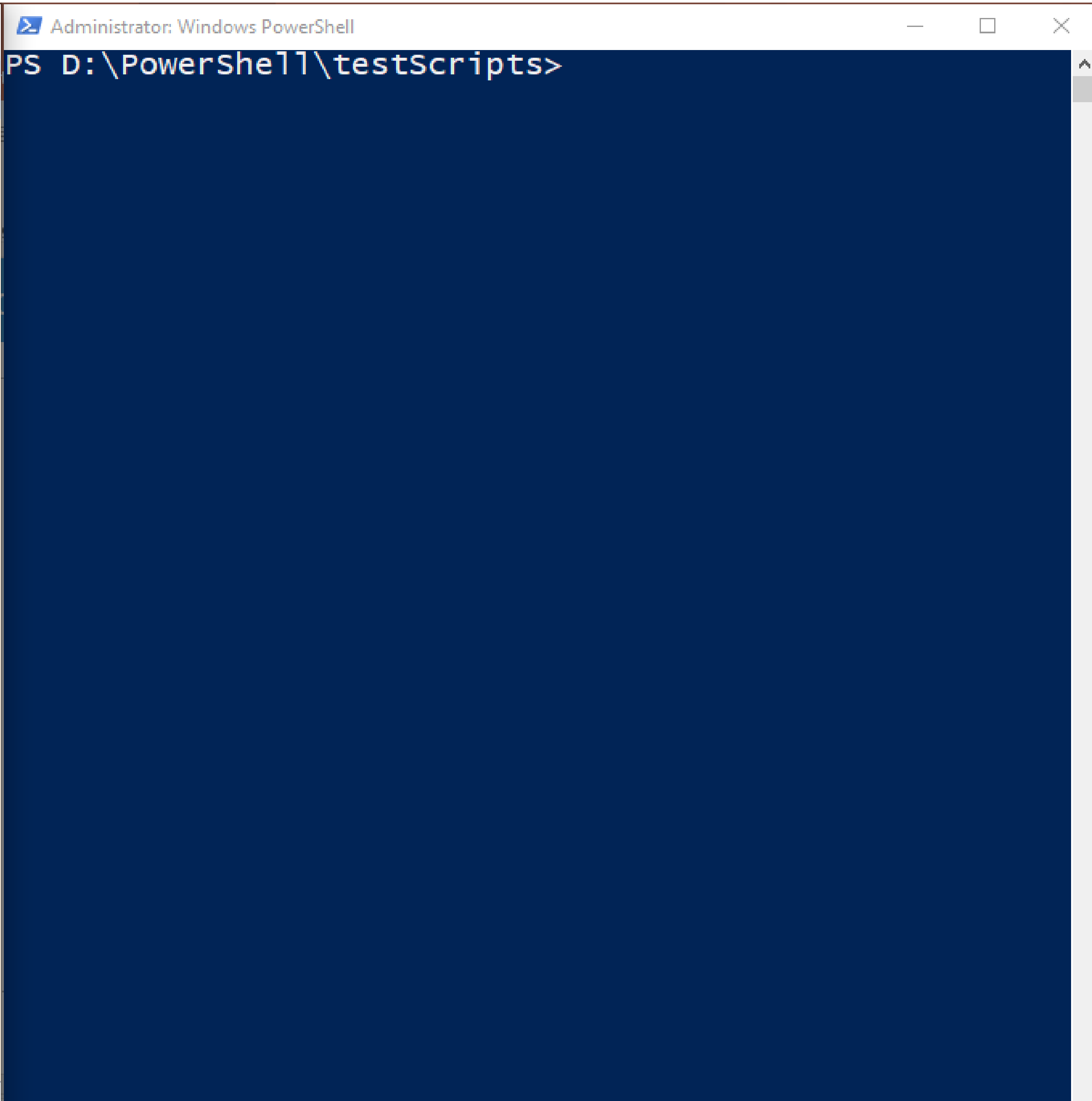
PowerShell Version

- **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)



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

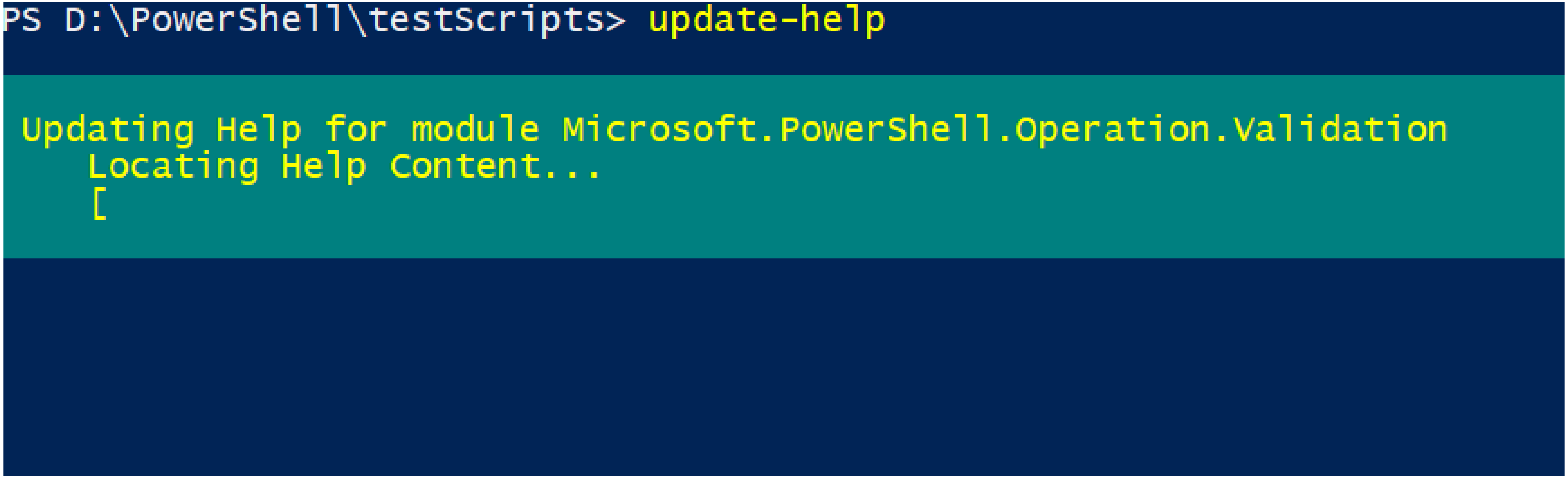


```
PS D:\PowerShell\testScripts>
```

File extensions

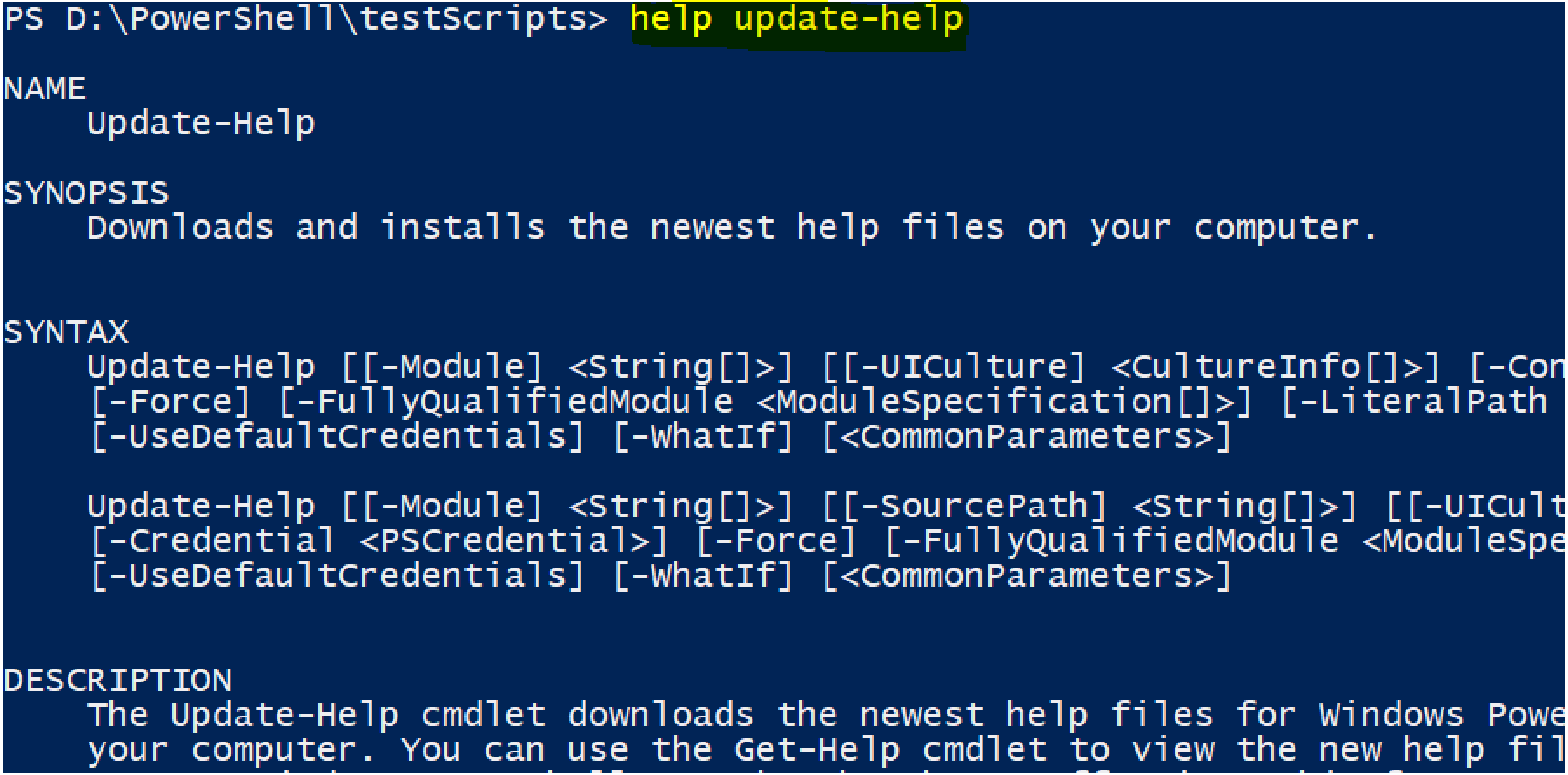
1. **PS1** – Windows PowerShell script
2. **PSD1** – Windows PowerShell data file (for Version 2)
3. **PSM1** – Windows PowerShell module file (for Version 2)
4. **PS1XML** – Windows PowerShell format and type definitions
5. **CLIXML** – Windows PowerShell serialized data
6. **PSC1** – Windows PowerShell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

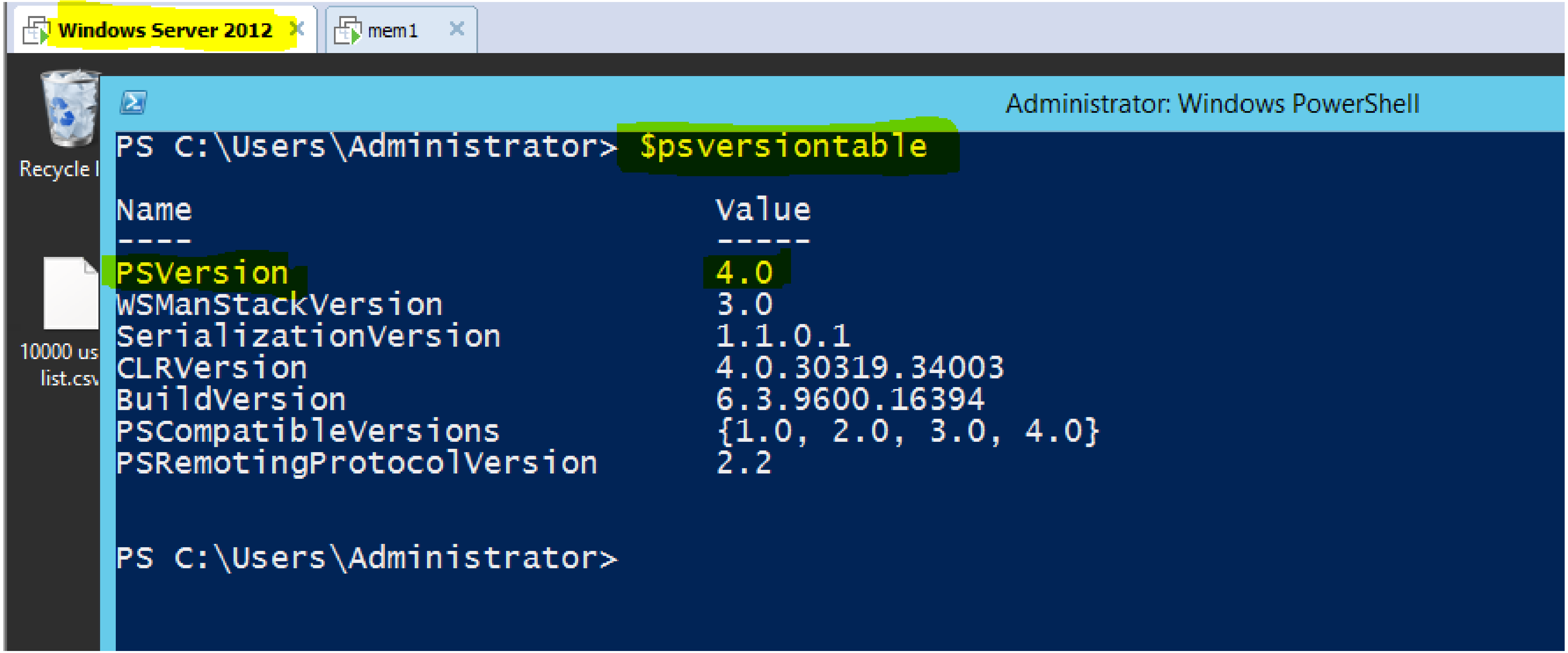


```
PS D:\PowerShell\testScripts> help update-help

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 Powe
    your computer. You can use the Get-Help cmdlet to view the new help fil
```

Upgrade PowerShell

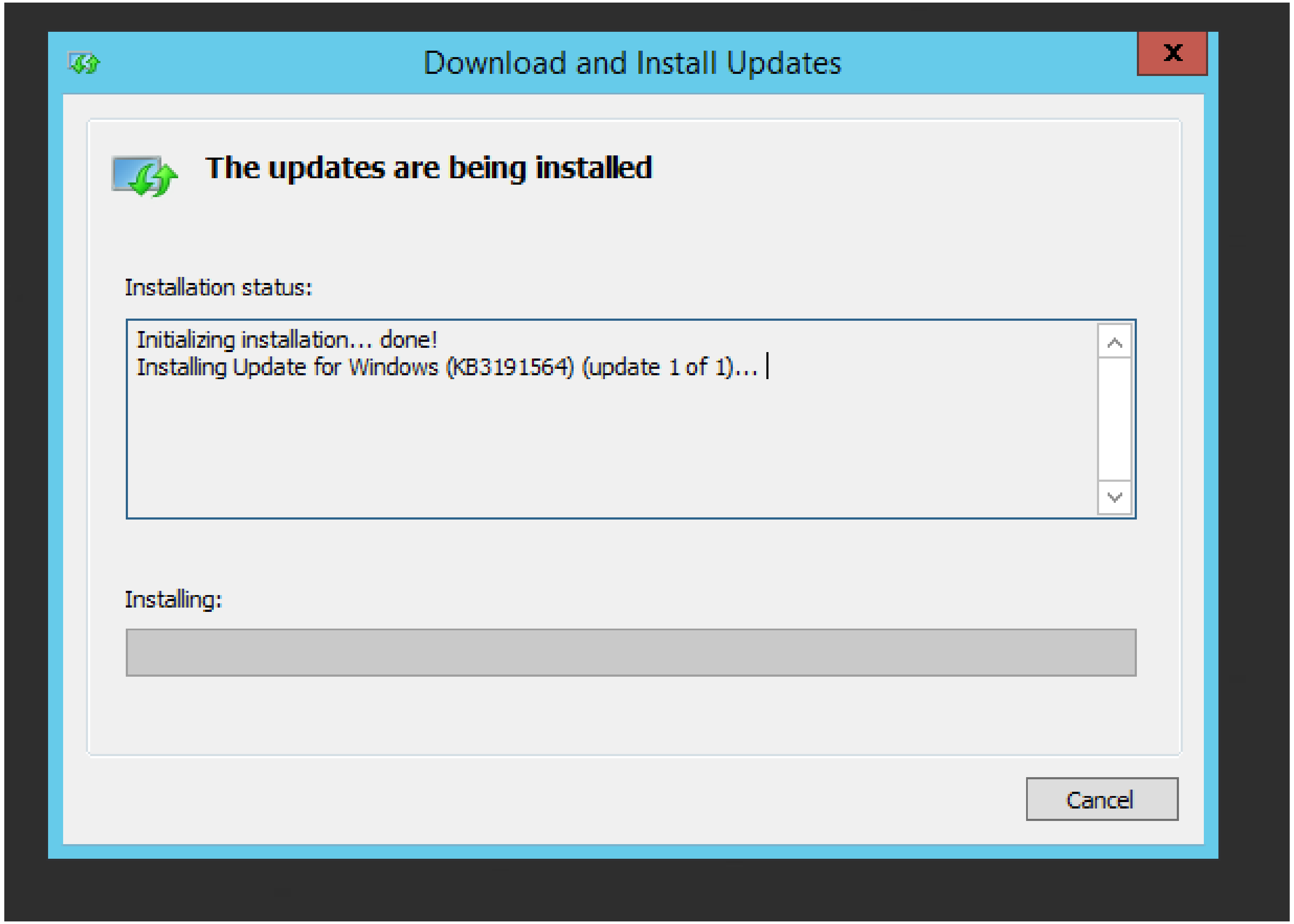
- V2 -> V4 (DotNet FW 4.0 required)
- V3 -> V4/V5 (DotNet FW 4.0 required, 4.5.0 required)
- V4 -> V5 (DotNet FW 4.5 required)

Upgrade PowerShell (before upgrade)



```
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)



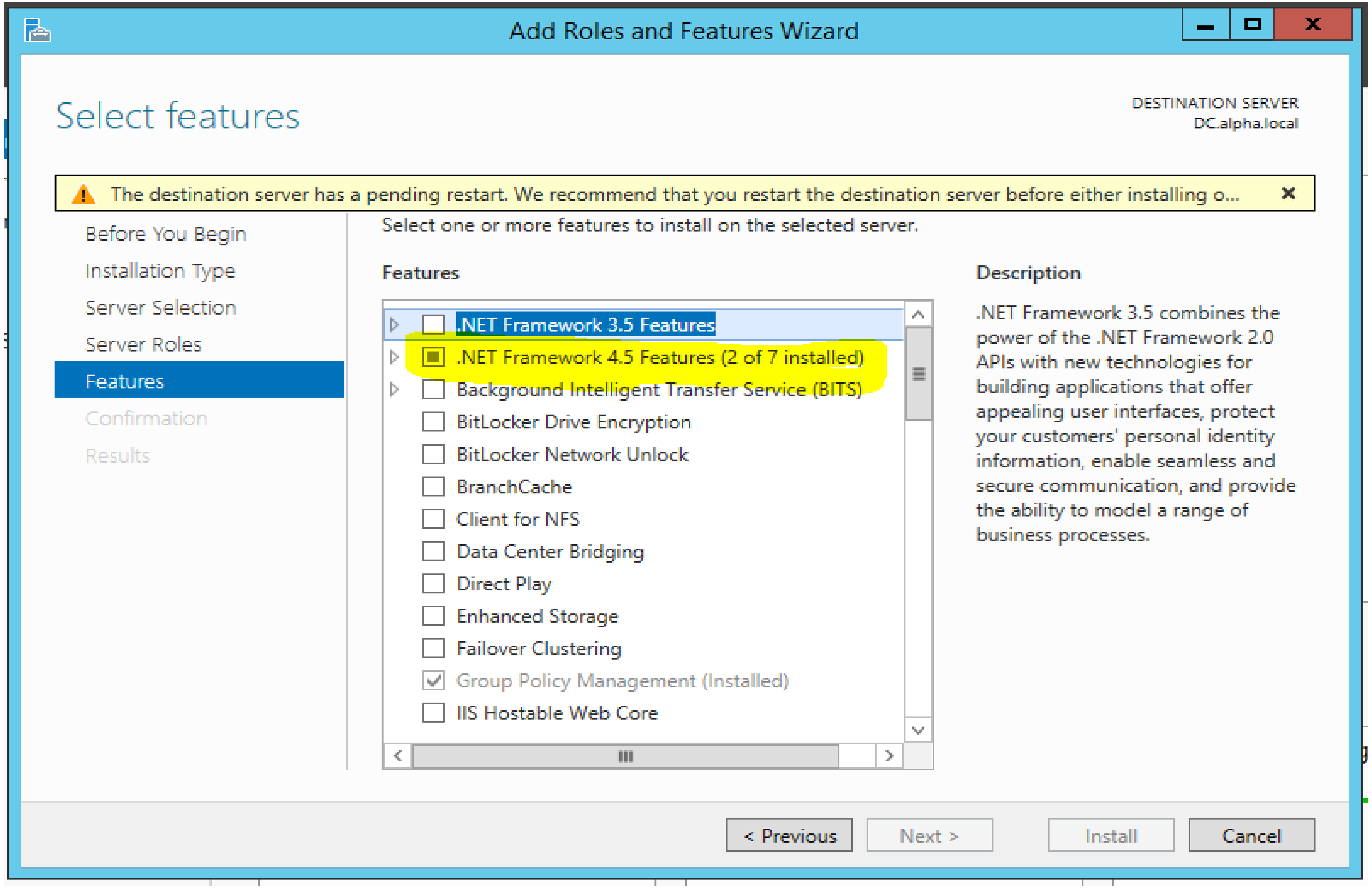
The updates are being installed

Installation status:

```
Initializing installation... done!
Installing Update for Windows (KB3191564) (update 1 of 1)...
```

Installing:

Upgrade PowerShell (While upgrade)



Select features

DESTINATION SERVER
DC.alpha.local

The destination server has a pending restart. We recommend that you restart the destination server before either installing o...

Select one or more features to install on the selected server.

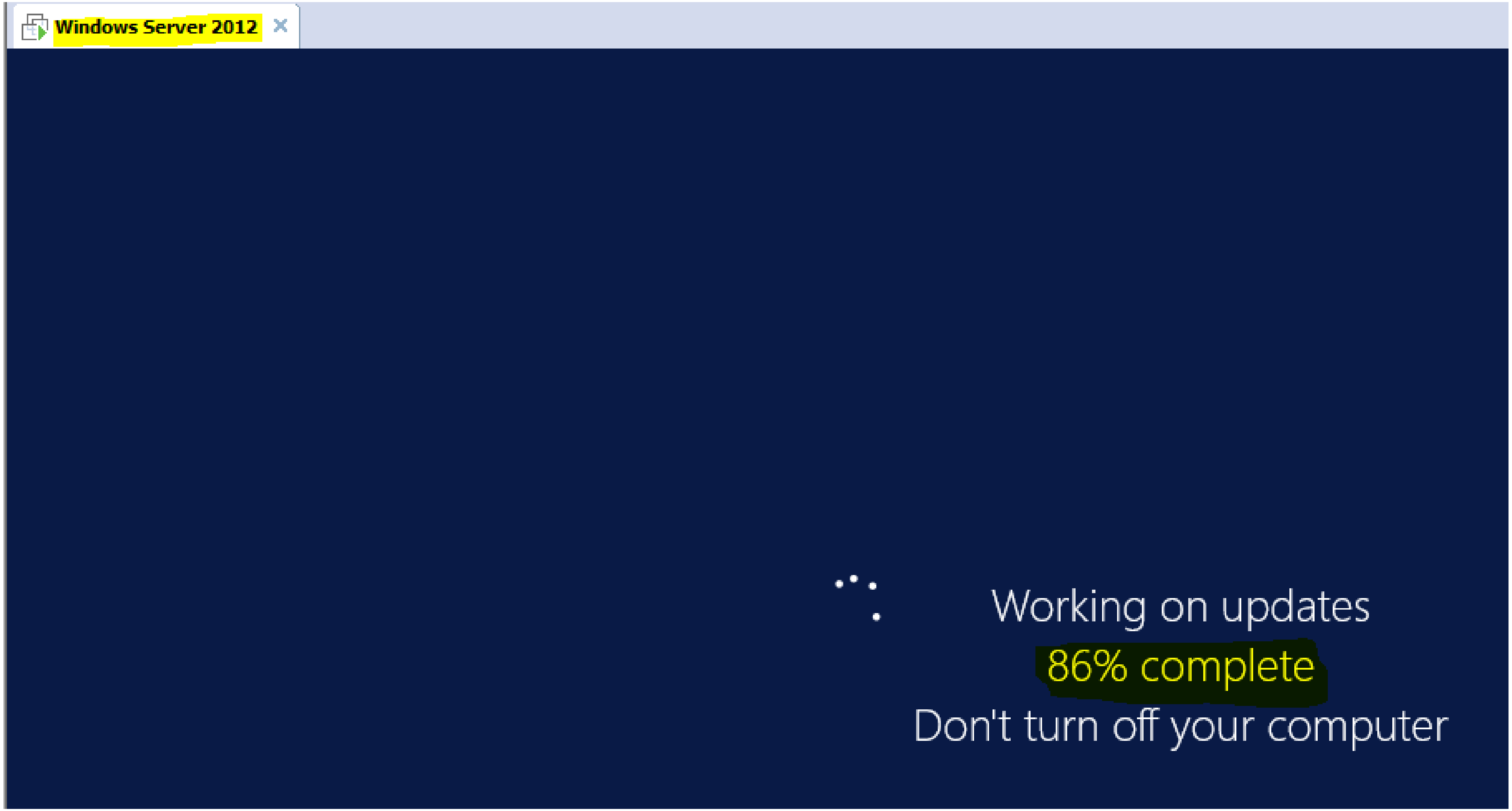
Features

- □ .NET Framework 3.5 Features
- ■ .NET Framework 4.5 Features (2 of 7 installed)
- □ Background Intelligent Transfer Service (BITS)
- □ BitLocker Drive Encryption
- □ BitLocker Network Unlock
- □ BranchCache
- □ Client for NFS
- □ Data Center Bridging
- □ Direct Play
- □ Enhanced Storage
- □ Failover Clustering
- ☑ Group Policy Management (Installed)
- □ IIS Hostable Web Core

Description

.NET Framework 3.5 combines the power of the .NET Framework 2.0 APIs with new technologies for building applications that offer appealing user interfaces, protect your customers' personal identity information, enable seamless and secure communication, and provide the ability to model a range of business processes.

Upgrade PowerShell (While upgrade)

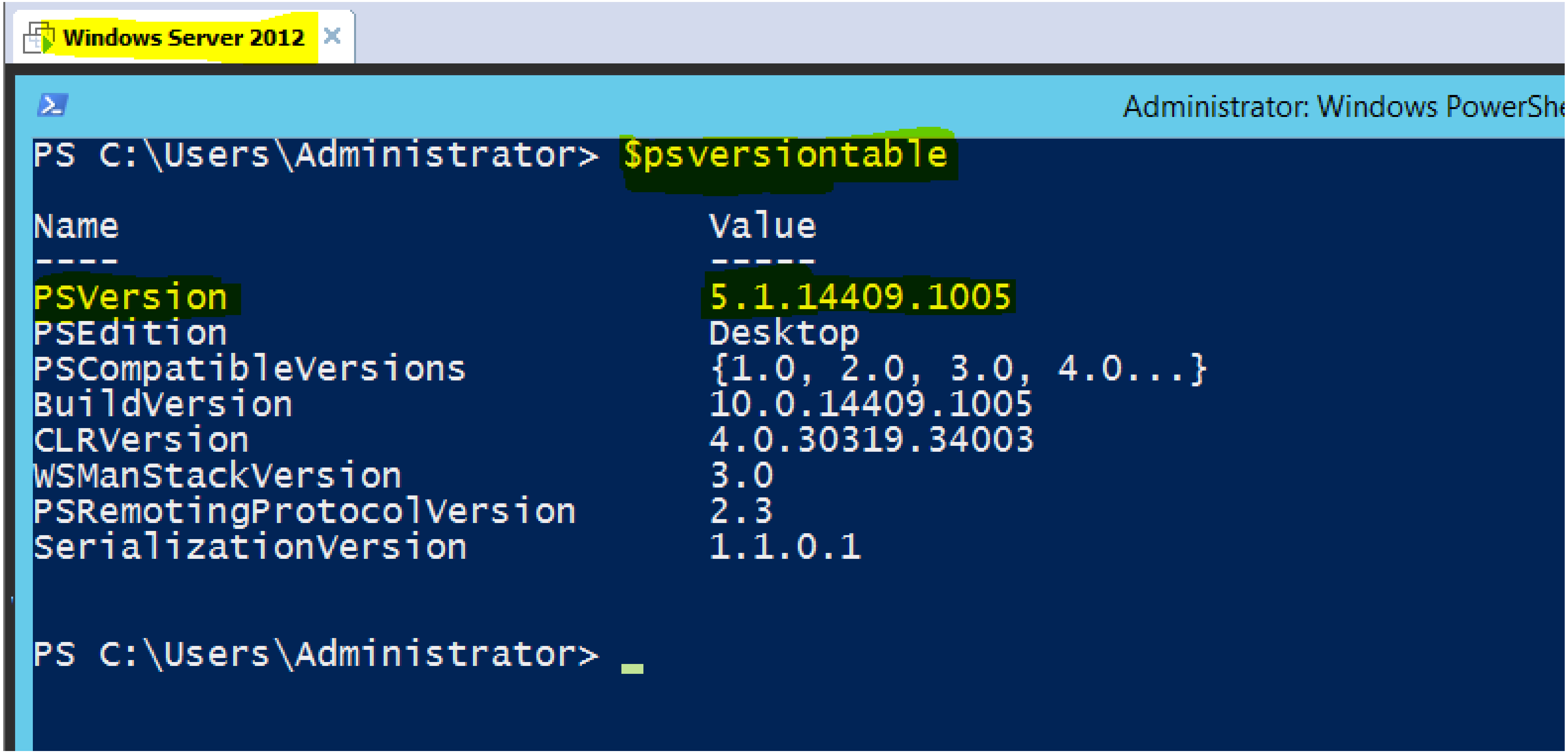


Working on updates

86% complete

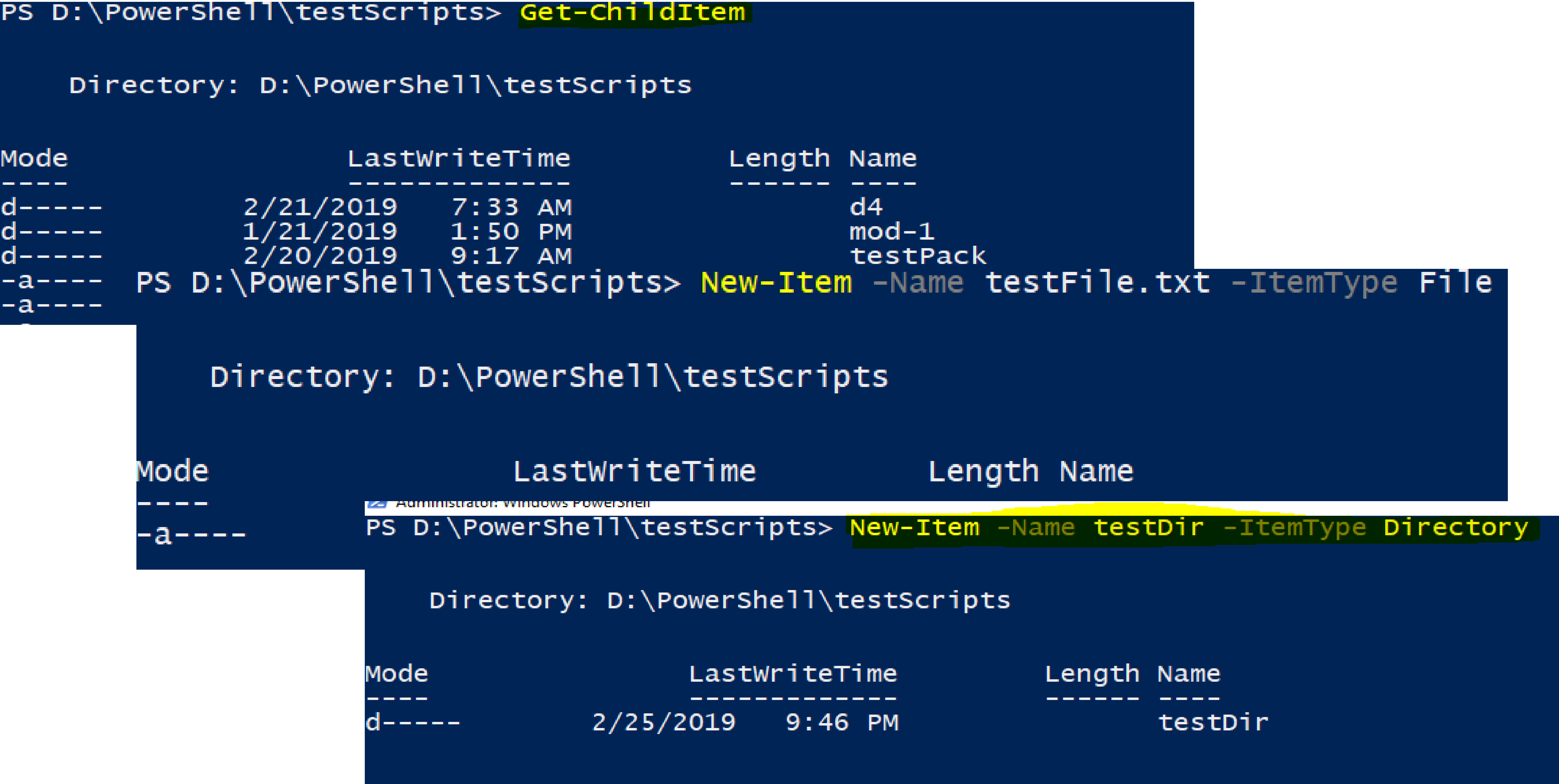
Don't turn off your computer

Upgrade PowerShell (after upgrade)



```
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

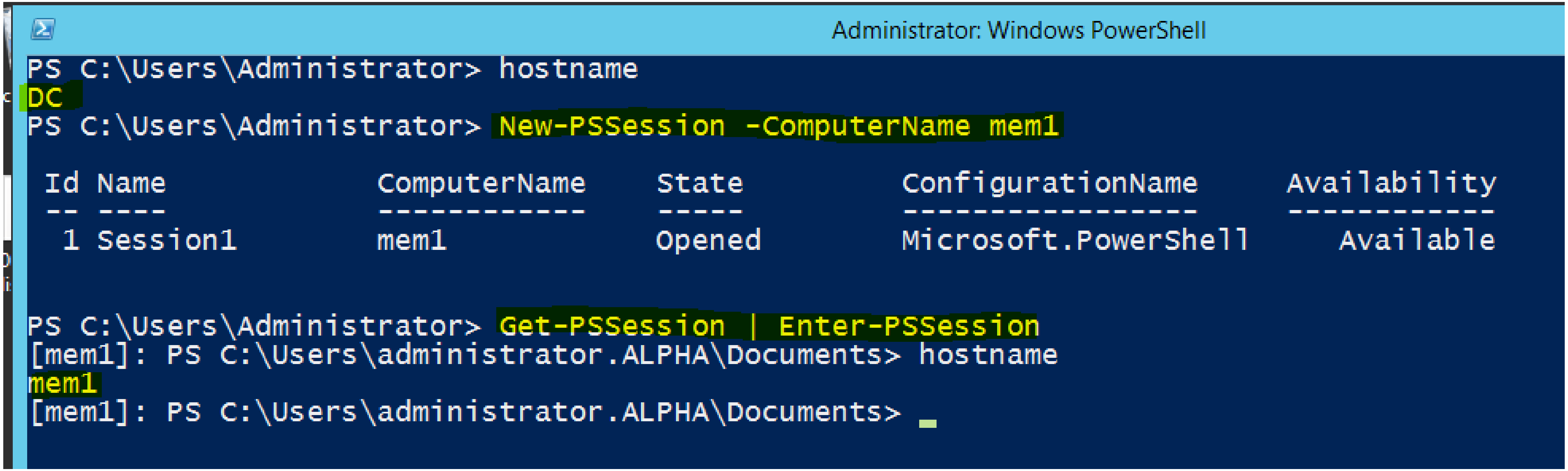


```
PS D:\PowerShell\testScripts> Get-ChildItem


    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----
-a----
```

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


    Directory: D:\PowerShell\testScripts


Mode                LastWriteTime         Length Name
----
-a----
```

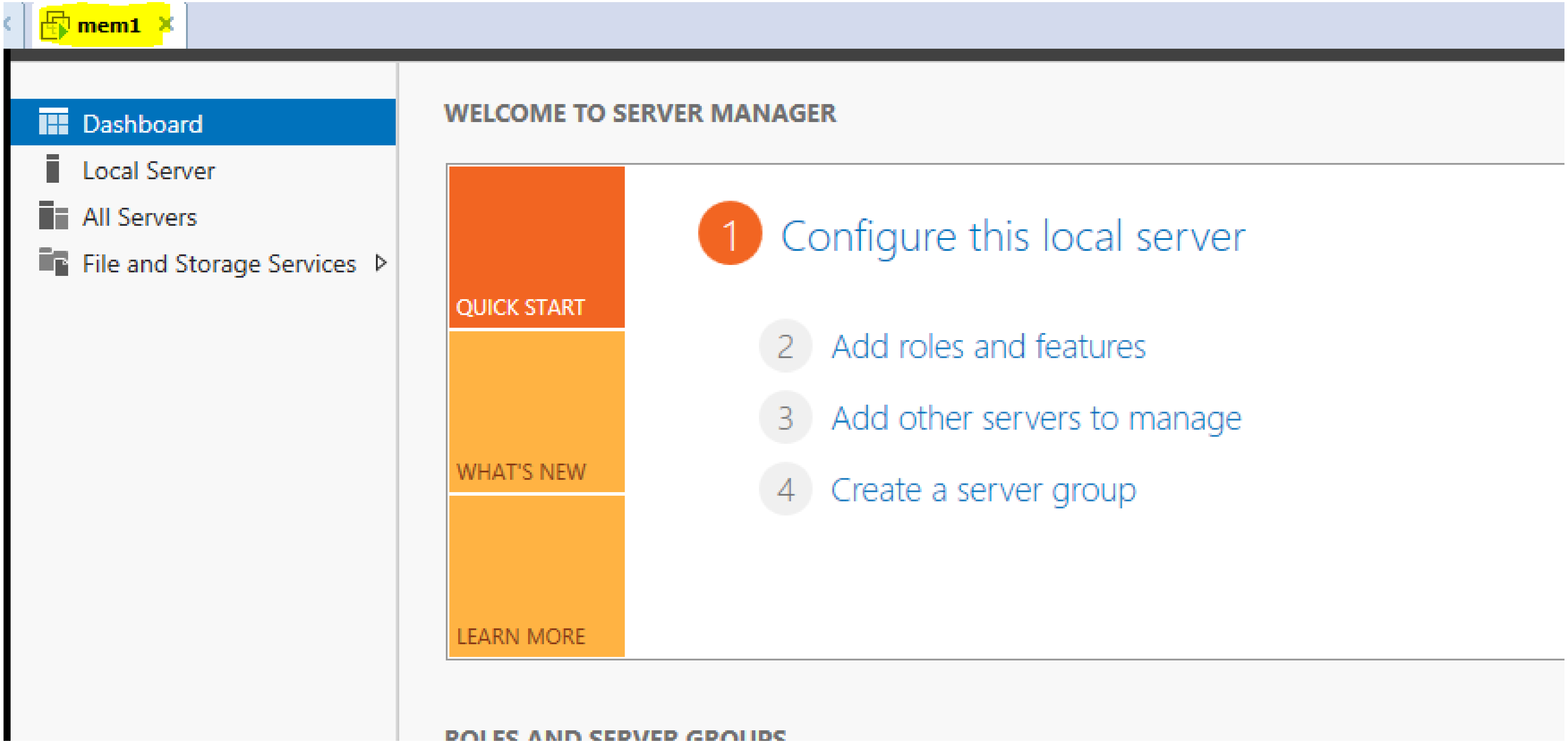
```
Administrator: Windows PowerShell
PS D:\PowerShell\testScripts> New-Item -Name testDir -ItemType Directory


    Directory: D:\PowerShell\testScripts


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

Working remotely with PS



```
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



mem1

- Dashboard
- Local Server
- All Servers
- File and Storage Services

WELCOME TO SERVER MANAGER

QUICK START

WHAT'S NEW

LEARN MORE

1 Configure this local server

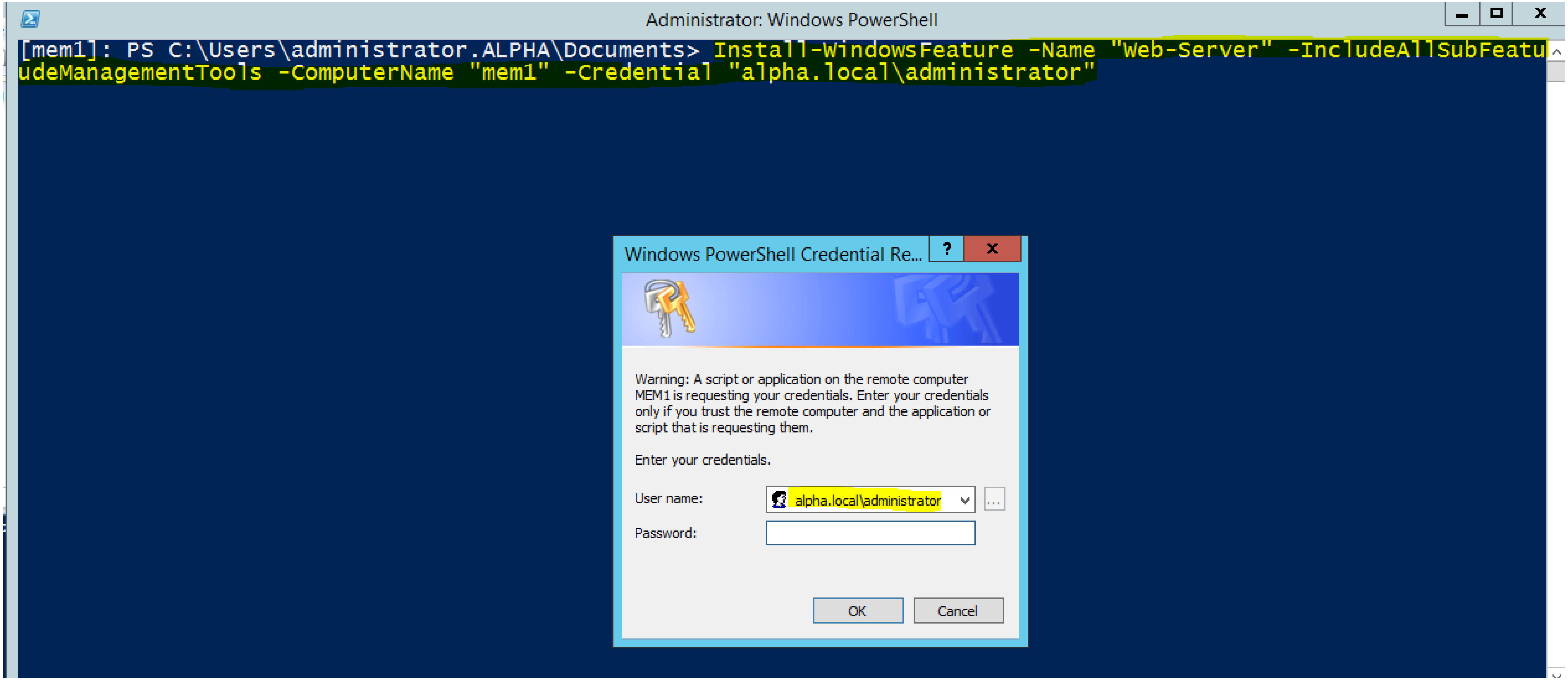
2 Add roles and features

3 Add other servers to manage

4 Create a server group

ROLES AND SERVER GROUPS

Working remotely with PS – After installing IIS webserver



Administrator: Windows PowerShell

```
[mem1]: PS C:\Users\administrator.ALPHA\Documents> Install-WindowsFeature -Name "Web-Server" -IncludeAllSubFeatu
udeManagementTools -ComputerName "mem1" -Credential "alpha.local\administrator"
```

Windows PowerShell Credential Re...

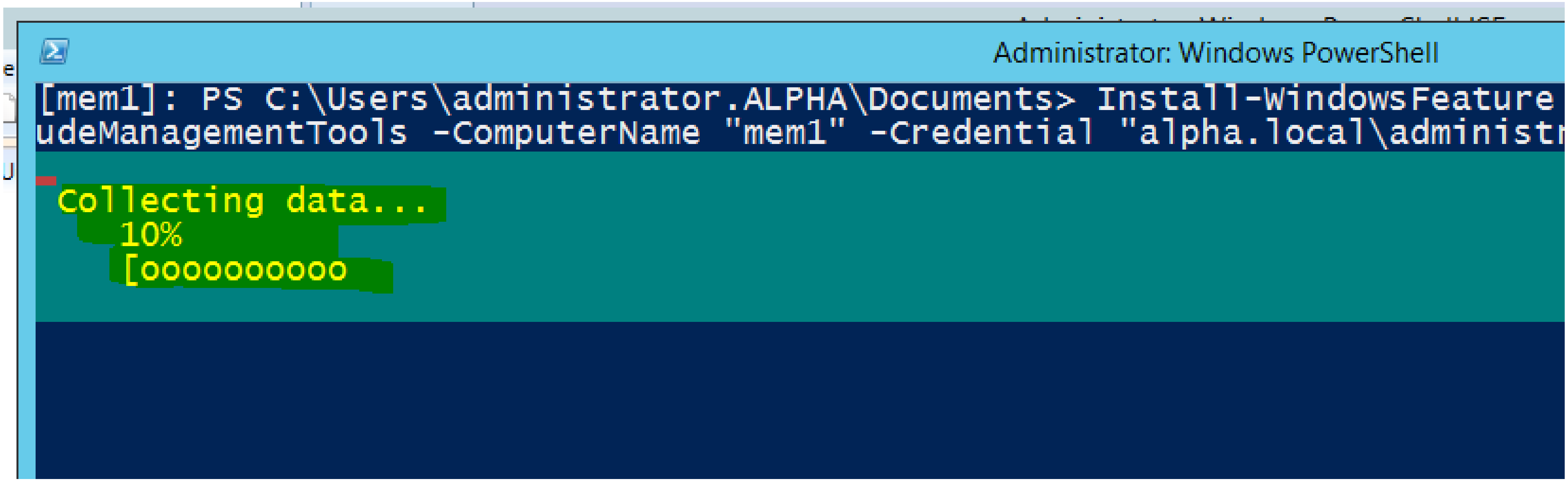
Warning: A script or application on the remote computer MEM1 is requesting your credentials. Enter your credentials only if you trust the remote computer and the application or script that is requesting them.

Enter your credentials.

User name: alpha.local\administrator

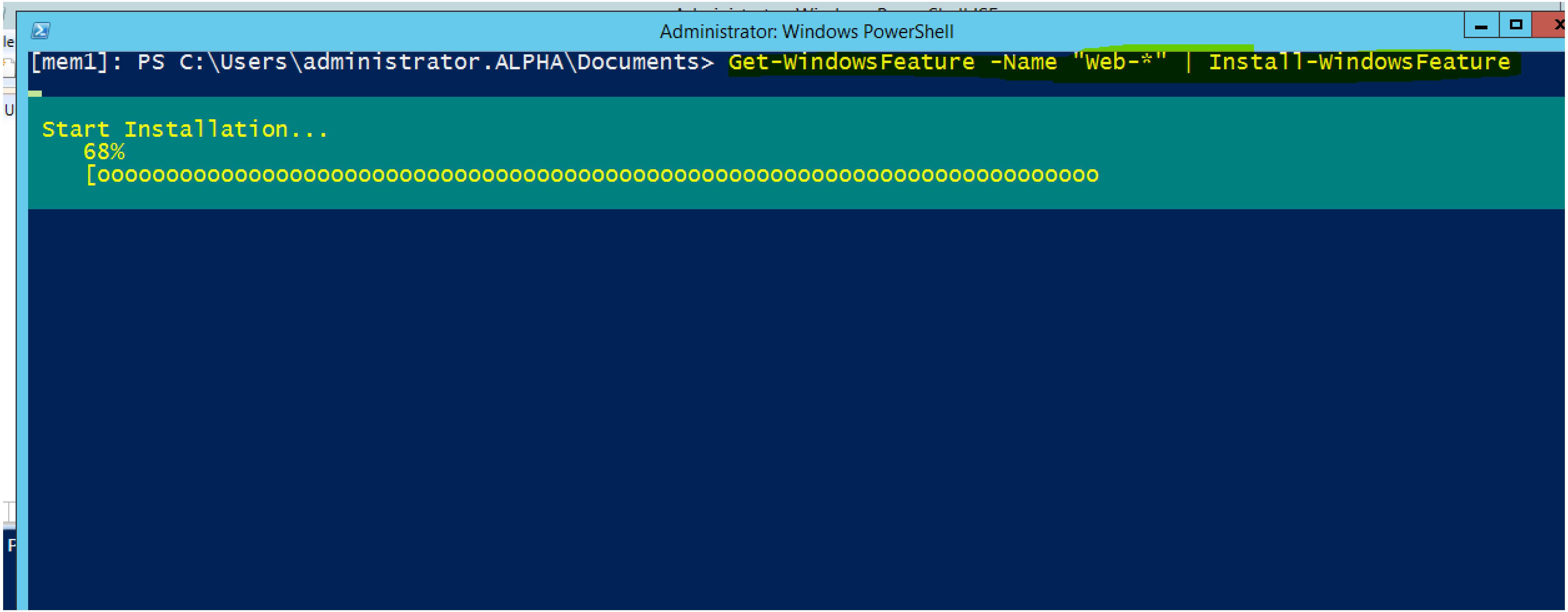
Password:

Working remotely with PS – After installing IIS webserver



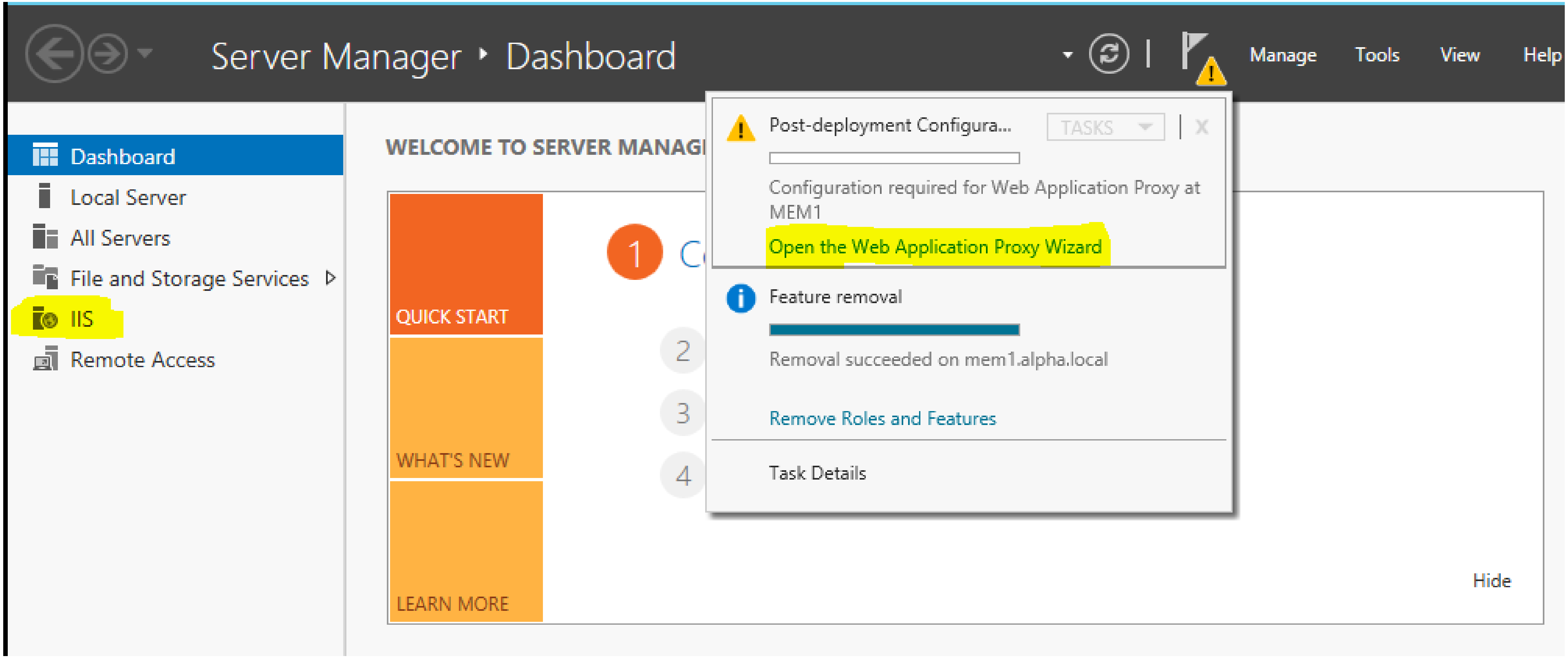
```
[mem1]: PS C:\Users\administrator.ALPHA\Documents> Install-WindowsFeature
udeManagementTools -ComputerName "mem1" -Credential "alpha.local\administr

 Collecting data...
    10%
    [oooooooooo
```

Working remotely with PS – After installing IIS webserver



```
[mem1]: PS C:\Users\administrator.ALPHA\Documents> Get-WindowsFeature -Name "Web-*" | Install-WindowsFeature

Start Installation...
   68%
   [ooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooooo
```

Working remotely with PS – After installing IIS webserver



Post-deployment Configura...

Configuration required for Web Application Proxy at MEM1

Open the Web Application Proxy Wizard

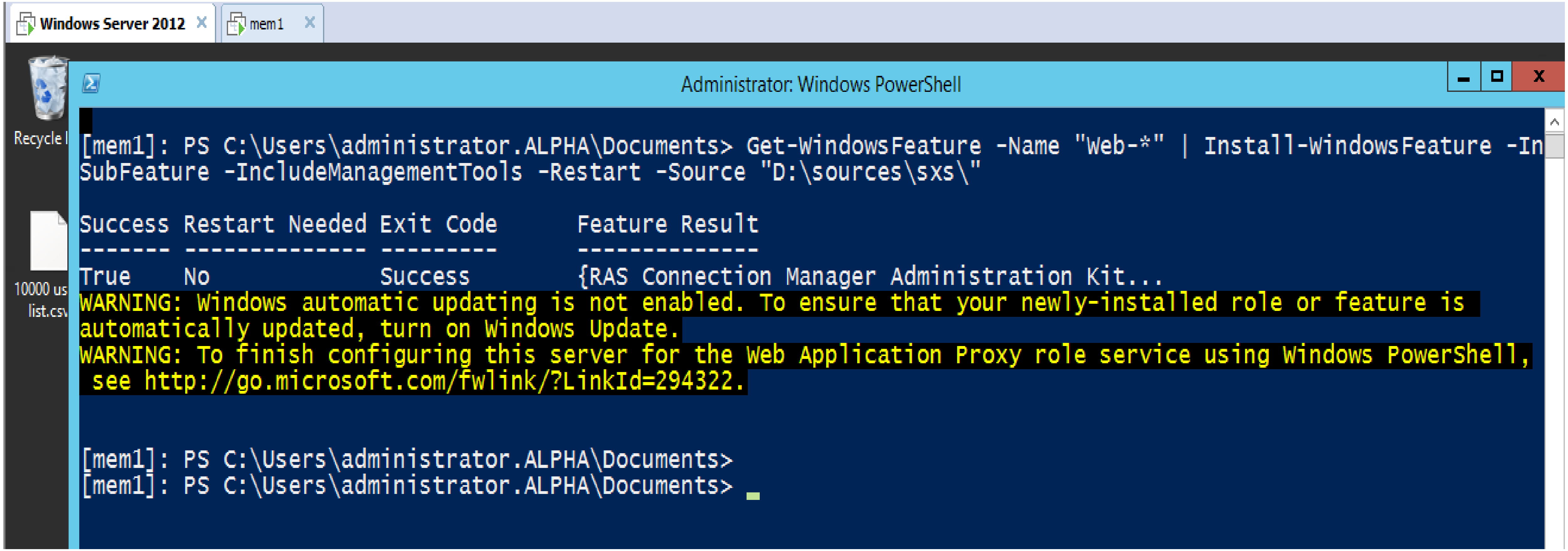
Feature removal

Removal succeeded on mem1.alpha.local

Remove Roles and Features

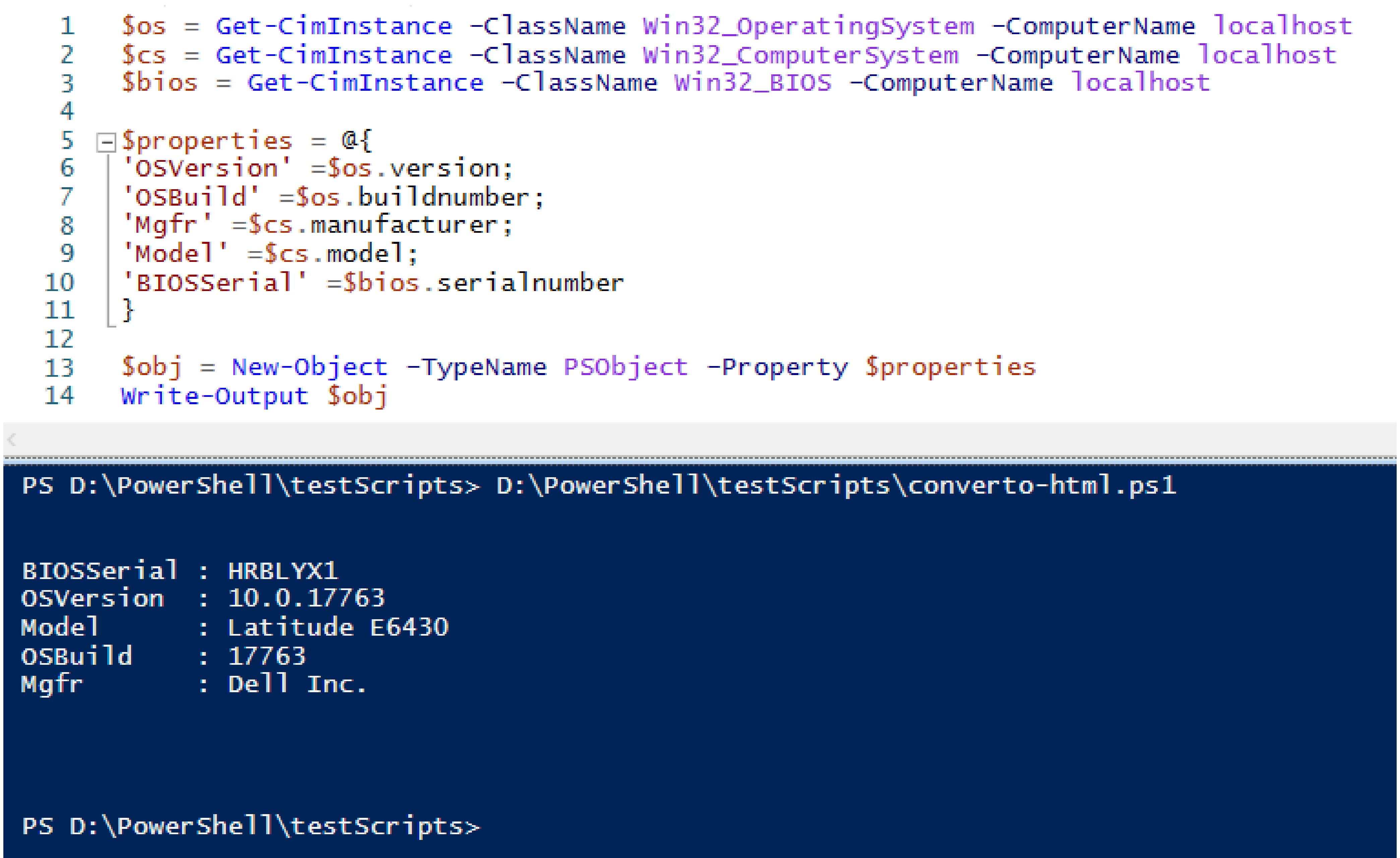
Task Details

Working remotely with PS – After installing IIS webserver



```
[mem1]: PS C:\Users\administrator.ALPHA\Documents> Get-WindowsFeature -Name "Web-*" | Install-WindowsFeature -In
SubFeature -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> _
```

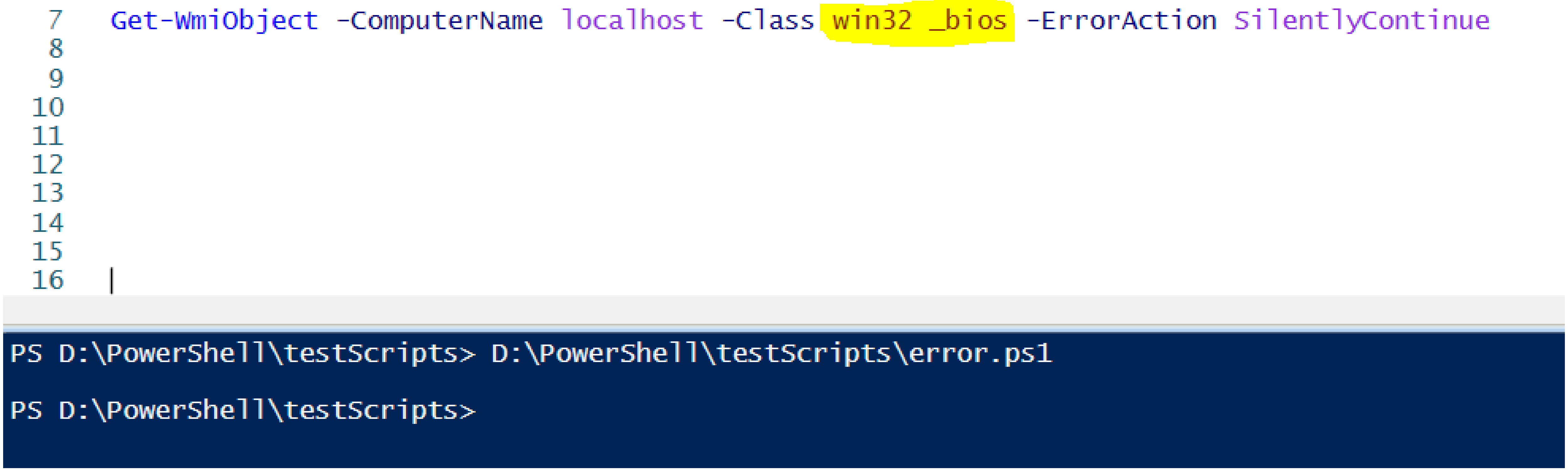
Creating scripts with ISE.



```
$os = Get-CimInstance -ClassName Win32_OperatingSystem -ComputerName localhost
$cs = Get-CimInstance -ClassName Win32_ComputerSystem -ComputerName localhost
$bios = Get-CimInstance -ClassName Win32_BIOS -ComputerName localhost

$properties = @{
'OSVersion' =$os.version;
'OSBuild' =$os.buildnumber;
'Mgfr' =$cs.manufacturer;
'Model' =$cs.model;
'BIOSSerial' =$bios.serialnumber
}

$obj = New-Object -TypeName PSObject -Property $properties
Write-Output $obj
```

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


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



PS D:\PowerShell\testScripts>
```

Error handling with PS



```
Get-WmiObject -ComputerName localhost -Class win32 _bios -ErrorAction SilentlyContinue
```

```
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 Question?