

PowerShell – A DBA's Best Friend



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Who am I?

- Senior Oracle & SQL Server Database Administrator
- Past Senior Performance Test Engineer
- Past Oracle Instructor
- Past Lead Database Administrator
- Oracle Certified Professional (OCP) – 8, 8i, 9i,10g
- Hewlett Packard AIS – LoadRunner v11Certified
- ITIL Foundation Certificate in IT Service

ORACLE[®]
Certified Professional



Who Pays My Bills?

- University of California Office of the President
- The Office of the President is the system wide headquarters of the University of California, managing its fiscal and business operations, and supporting the academic and research missions across its campuses, labs and medical centers.
- Together with the university's executive leadership, the Office of the President helps give shape to a vision for the university, managing the activities that are central to UC's Public Mission and essential to the idea of one university.
- Teach
- Research
- Public Service



Agenda

- What is PowerShell?
- PowerShell Environments
- History and Background
- What you Need to Know about PowerShell
- Why Use PowerShell for Database Management?
- Setting up PowerShell
- SQL Modules
- Important Cmdlets
- Using the ISE
- Setting up Environment for Oracle/PowerShell
- Configuring Connections
- Retrieving Data
- Working with Data
- Much more....



Quick Poll Questions

- How many of you have used PowerShell?
- How many of you work in a Windows environment?
- What types of RDBMS do you support?
 - Oracle?
 - SQL Server?
 - MySQL?
 - Others?
- What would you like to learn from this session?





KEEP
CALM
AND
LEARN
POWERSHELL

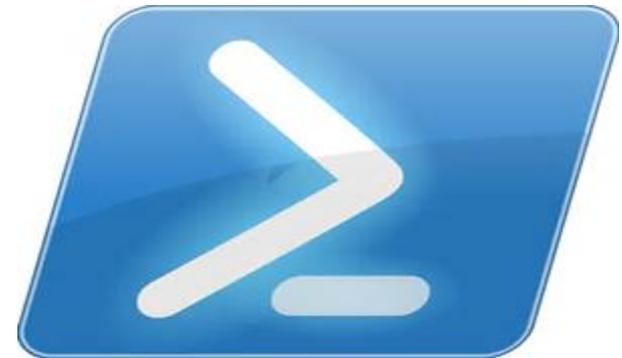
What is PowerShell?

- Replacement for VB Scripting and Command Prompt
- A task automation and configuration management tool for IT professionals
- An interactive object-oriented command environment with scripting language features utilizing small programs called cmdlets.
- Simplifies configuration, administration and management of heterogeneous environments
- Standard-based remoting protocols
- Object based extensible scripting solution integrated into Windows OS
- Great for IT professionals who do not have time and need to simplify



History & Background

- Born: 1999
- 2005: Code name – Monad
- 2006: Version 1.0
 - 130 cmdlets
- 2008: Version 2.0
 - 230 cmdlets
 - Backward compatible
 - Integrated shell environment(ISE)
 - Remoting
- 2012: Version 3.0
 - >2300 cmdlets
 - WinPE
 - Web Access
 - Enhanced ISE
 - Workflow
- 2013: Version 4.0
 - >2300 cmdlets
 - Desired State Configuration (DSC)
- 2015: Version 5.0
 - >2300 cmdlets
 - Zip Package Manager
 - Copy files between sessions



Important Tidbits of PowerShell

- Complete Scripting Solution
- Object Based
- Based on .NET Framework
- Uses Object Models (COM, ADSI, ADO, WMI...)
- Integrates with Most Software
- Multiple RDBMS Support
 - SQL Server
 - Oracle
 - MySQL



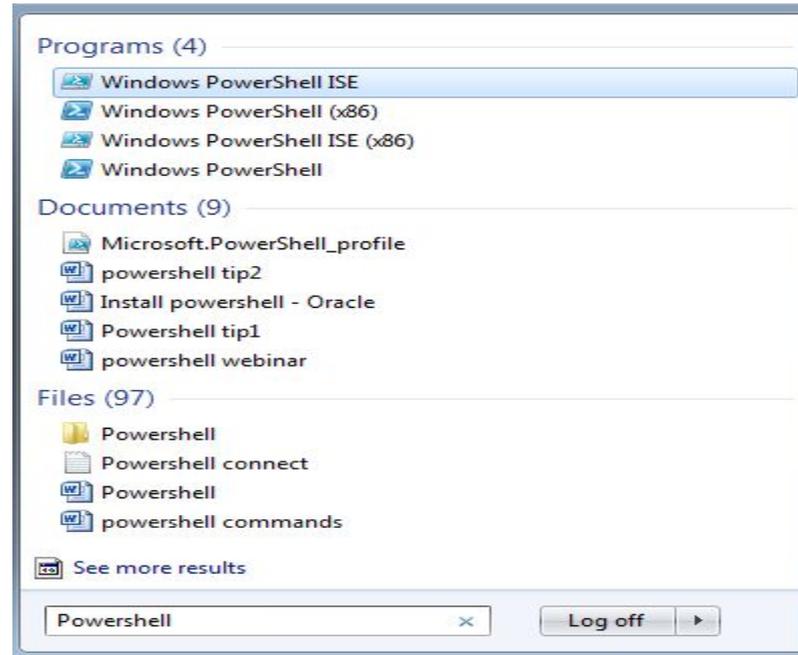
Why Use PowerShell for DB Management?

- Lightweight tool to manage simple database operations
- Utilize the power of .NET
- Not GUI
- Lack of command line scripting for Oracle database management in Microsoft
- Database task automation without having to use a batch file, job, etc.
- DBAs typically manage multiple databases (Oracle, SQL Server, MySQL)



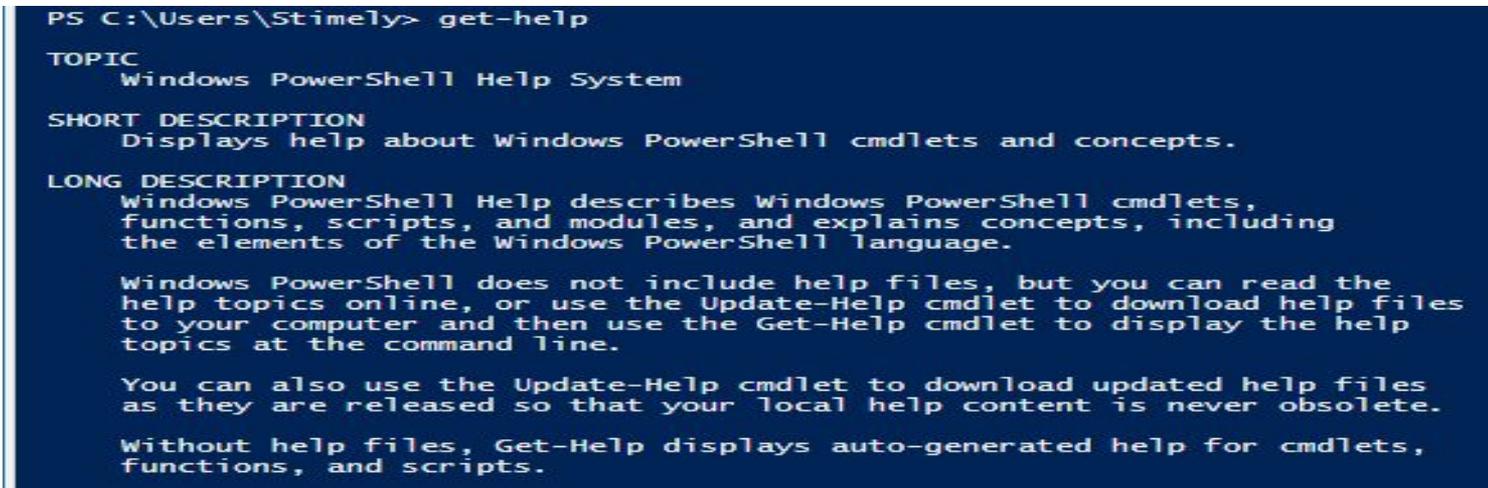
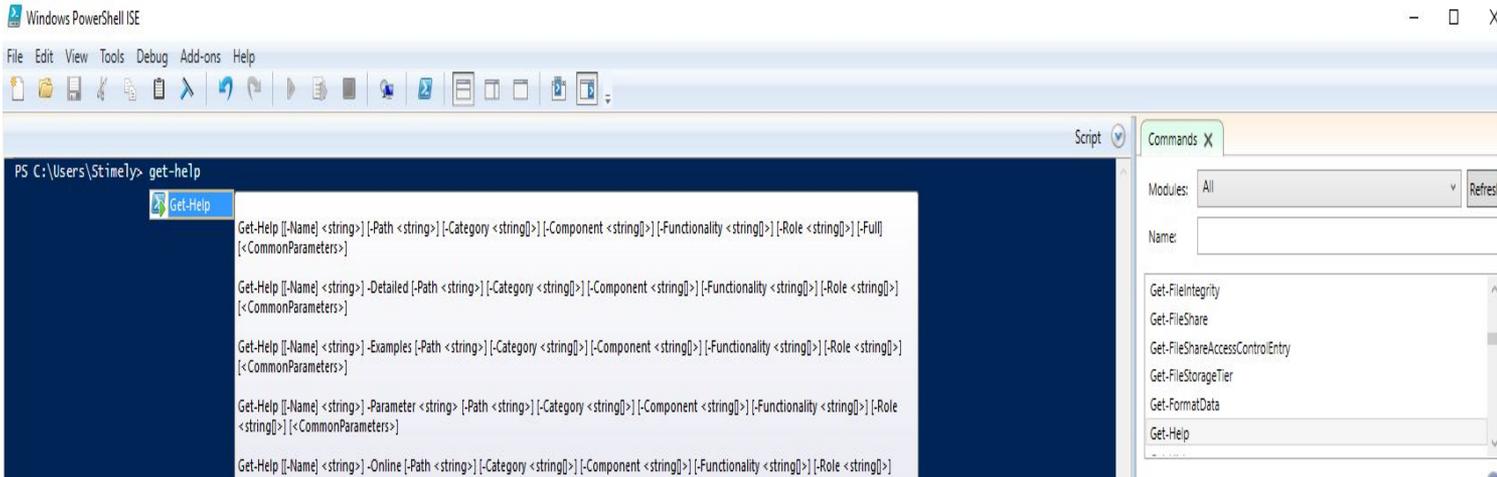
Setting up PowerShell

- Already Installed
- Find it:



- Download it (Windows Management Framework):
 - <https://www.microsoft.com/en-us/download/details.aspx?id=40855>

Introduction to PowerShell



Object Oriented Terminology

- Class = Blueprint
- Properties = Description
- Methods (functions) = Actions
- Object = House
- Instantiating a new object = Building a New House
- Each object is an instance of the class = House a copy of the blueprint



What are Cmdlets?

- Cmdlets are commands in PowerShell
 - Every cmdlet is an action which returns Microsoft .NET Framework object
- All cmdlets are designed with a similar syntax and structure
- Structure of a cmdlet:
 - Verb – noun –parameter
 - E.g.: Get-process
 - Get-process –name oracle
- Command Verbs
 - Get
 - Set
 - Enable
 - Disable
 - New
 - Remove

Important cmdlets to use

- Get-Help or ? Or Help
- Get-Command or gc
- Get-Item
- Get-Content
- Get-Service
- Get-Process
- Get-PSDrive of gdr
- Get-Alias or ga
- Get-Member or gm

```
Administrator: Windows PowerShell
PS C:\Windows\system32> Get-Command | findstr Cluster
Cmdlet Add-ClusterDisk
Cmdlet Add-ClusterFileServerRole
Cmdlet Add-ClusterGenericApplicationRole
Cmdlet Add-ClusterGenericScriptRole
Cmdlet Add-ClusterGenericServiceRole
Cmdlet Add-ClusterGroup
Cmdlet Add-ClusterNode
Cmdlet Add-ClusterPrintServerRole
Cmdlet Add-ClusterResource
Cmdlet Add-ClusterResourceDependency
Cmdlet Add-ClusterResourceType
Cmdlet Add-ClusterServerRole
Cmdlet Add-ClusterSharedVolume
Cmdlet Add-ClusterVirtualMachineRole
Cmdlet Block-ClusterAccess
Cmdlet Clear-ClusterDiskReservation
Cmdlet Clear-ClusterNode
Cmdlet Get-Cluster
Cmdlet Get-ClusterAccess
Cmdlet Get-ClusterAvailableDisk
Cmdlet Get-ClusterGroup
Cmdlet Get-ClusterLog
Cmdlet Get-ClusterNetwork
Cmdlet Get-ClusterNetworkInterface
Cmdlet Get-ClusterNode
Cmdlet Get-ClusterOwnerNode
Cmdlet Get-ClusterParameter
Cmdlet Get-ClusterQuorum
Cmdlet Get-ClusterResource
Cmdlet Get-ClusterResourceDependency
Cmdlet Get-ClusterResourceDependencyReport
Cmdlet Get-ClusterResourceType
Cmdlet Get-ClusterSharedVolume
Cmdlet Grant-ClusterAccess
Cmdlet Move-ClusterGroup
Cmdlet Move-ClusterResource
Cmdlet Move-ClusterSharedVolume
Cmdlet Move-ClusterVirtualMachineRole
Cmdlet New-Cluster
Cmdlet Remove-Cluster
Cmdlet Remove-ClusterAccess
Cmdlet Remove-ClusterGroup
Cmdlet Remove-ClusterNode
Cmdlet Remove-ClusterResource
Cmdlet Remove-ClusterResourceDependency
Cmdlet Remove-ClusterResourceType
Cmdlet Remove-ClusterSharedVolume
Cmdlet Repair-ClusterSharedVolume
Cmdlet Resume-ClusterNode
Cmdlet Resume-ClusterResource
Cmdlet Set-ClusterLog
Cmdlet Set-ClusterOwnerNode
Cmdlet Set-ClusterParameter
Cmdlet Set-ClusterQuorum
Cmdlet Set-ClusterResourceDependency
Cmdlet Start-Cluster
Cmdlet Start-ClusterGroup
Cmdlet Start-ClusterNode
Cmdlet Start-ClusterResource
Cmdlet Stop-Cluster
Cmdlet Stop-ClusterGroup
Cmdlet Stop-ClusterNode
Cmdlet Stop-ClusterResource
Cmdlet Suspend-ClusterNode
Cmdlet Suspend-ClusterResource
Cmdlet Test-Cluster
Cmdlet Test-ClusterResourceFailure
Cmdlet Update-ClusterIPResource
Cmdlet Update-ClusterVirtualMachineConfiguration
Add-ClusterDisk [-InputObject] <ClusterDiskInfof...
Add-ClusterFileServerRole [-Name] <String> [-S...
Add-ClusterGenericApplicationRole [-Name] <Stri...
Add-ClusterGenericScriptRole [-Name] <String> [...
Add-ClusterGenericServiceRole [-Name] <String> [...
Add-ClusterGroup [-Name] <StringCollection> [-In...
Add-ClusterNode [-Name] <StringCollection> [-In...
Add-ClusterPrintServerRole [-Name] <String> [-...
Add-ClusterResource [-Name] <String> [-Group] (...
Add-ClusterResourceDependency [-Resource] <Stri...
Add-ClusterResourceType [-Name] <String> [-Dill...
Add-ClusterServerRole [-Name] <String> [-Stora...
Add-ClusterSharedVolume [-Name] <StringCollecti...
Add-ClusterVirtualMachineRole [-Name] <String> [...
Block-ClusterAccess [-User] <StringCollection> [...
Clear-ClusterDiskReservation [-Node] <StringCol...
Clear-ClusterNode [-Name] <StringCollection> [...
Clear-ClusterNode [-Resource] <String> [-Grou...
Get-Cluster [-Name] <String> [-Verbose] [-Debu...
Get-ClusterAccess [-User] <StringCollection> [...
Get-ClusterAvailableDisk [-InputObject] <PSObje...
Get-ClusterGroup [-Name] <StringCollection> [-...
Get-ClusterLog [-Name] <StringCollection> [-De...
Get-ClusterNetwork [-Name] <StringCollection> [...
Get-ClusterNetworkInterface [-Name] <StringColl...
Get-ClusterNode [-Name] <StringCollection> [-In...
Get-ClusterOwnerNode [-Resource] <String> [-Grou...
Get-ClusterParameter [-Name] <StringCollection>...
Get-ClusterQuorum [-InputObject] <PSObject> [-Cl...
Get-ClusterResource [-Name] <StringCollection> [...
Get-ClusterResourceDependency [-Resource] <Stri...
Get-ClusterResourceDependencyReport [-Resource] (...
Get-ClusterResourceType [-Name] <StringCollecti...
Get-ClusterSharedVolume [-Name] <StringCollecti...
Grant-ClusterAccess [-User] <StringCollection> [...
Move-ClusterGroup [-Name] <String> [-Node] <S...
Move-ClusterResource [-Name] <String> [-Group...
Move-ClusterSharedVolume [-Name] <String> [-N...
Move-ClusterVirtualMachineRole [-Name] <String>...
New-Cluster [-Name] <String> [-Node] <StringColl...
Remove-Cluster [-CleanupDD] [-Force] [-InputObj...
Remove-ClusterAccess [-User] <StringCollection>...
Remove-ClusterGroup [-Name] <StringCollection> [...
Remove-ClusterNode [-Name] <StringCollection> [...
Remove-ClusterResource [-Name] <StringCollection...
Remove-ClusterResourceDependency [-Resource] <S...
Remove-ClusterResourceType [-Name] <StringColl...
Remove-ClusterSharedVolume [-Name] <StringColl...
Repair-ClusterSharedVolume [-VolumeName] <String...
Resume-ClusterNode [-Name] <StringCollection> [...
Resume-ClusterResource [-Name] <String> [-Volu...
Set-ClusterLog [-Size] <Int32> [-Level] <Int32> ...
Set-ClusterOwnerNode [-Resource] <String> [-Grou...
Set-ClusterParameter [-Name] <String> [-Value]...
Set-ClusterQuorum [-NodeMajority] [-NodeAndDiskM...
Set-ClusterResourceDependency [-Resource] <Stri...
Start-Cluster [-Name] <String> [-Wait] <Int32> [...
Start-ClusterGroup [-Name] <String> [-Wait] <In...
Start-ClusterNode [-Name] <StringCollection> [...
Start-ClusterResource [-Name] <String> [-Wait] (...
Stop-Cluster [-Force] [-InputObject] <PSObject> ...
Stop-ClusterGroup [-Name] <String> [-Wait] <Int...
Stop-ClusterNode [-Name] <StringCollection> [-...
Stop-ClusterResource [-Name] <String> [-Wait] (...
Suspend-ClusterNode [-Name] <StringCollection> [...
Suspend-ClusterResource [-Name] <String> [-Volu...
Test-Cluster [-Name] <StringCollection> [-Repo...
Test-ClusterResourceFailure [-Name] <String> [...
Update-ClusterIPResource [-Name] <String> [-Re...
Update-ClusterVirtualMachineConfiguration [-Nan...
```

Find CMDLETS

- Get-Command – Lists all cmdlets in version
 - Check version – \$psversiontable
 - Get-command | more (No ISE – only console)
 - Lists cmdlets, aliases, functions, scripts, filters, workflows and applications

```
Get-Command [[-ArgumentList] <Object[]>] [-All] [-ListImported] [-Module <String[]>]
[-Noun <String[]>] [-ParameterName <String[]>] [-ParameterType <PSTypeName[]>] [-
Syntax]
[-TotalCount <Int32>] [-Verb <String[]>] [<CommonParameters>]
```

```
Get-Command [[-Name] <String[]>] [[-ArgumentList] <Object[]>] [-All] [-CommandType
<CommandTypes>] [-ListImported] [-Module <String[]>] [-ParameterName <String[]>]
[-ParameterType <PSTypeName[]>] [-Syntax] [-TotalCount <Int32>] [<CommonParameters>]
```

Learn PowerShell – Get-Help

- Displays information about Windows PowerShell commands and concepts (Man pages)
- Best way to learn PowerShell
 - E.g.: `Get-Help Get-Alias`
- Many ways to display help
 - `Get-help (cmdlet)`
 - `(cmdlet) -?`
 - `Get-Help (cmdlet) -examples`
 - `Get-Help (cmdlet) -detailed`
 - `Get-Help (cmdlet) -full`
 - `Get-Help (cmdlet) -ShowWindow (PowerShell 3.0/4.0)`



PowerShell Cmdlet of the Day

Demo – Get-Help/cmdlet use



Database Modules to Add

- What is a Module?
 - A *module* is a set of related Windows PowerShell functionalities, grouped together as a convenient unit
- Oracle
 - ODP.net
- MySQL
 - MySQL.NET connector
- SQL Server
 - SQLPS Module



Using the ISE

The screenshot shows the Windows PowerShell ISE interface. The main window is titled "Windows PowerShell ISE" and contains a menu bar (File, Edit, View, Tools, Debug, Add-ons, Help) and a toolbar with various icons. The main editing area shows a PowerShell script in a tab titled "Untitled1.ps1* X". The script is as follows:

```
1  ## try to load assembly, fail otherwise ##  
2  $Assembly = [System.Reflection.Assembly]::LoadWithPartialName("System.Data.OracleClient")  
3  
4  if ( $Assembly ) {  
5      Write-Host "System.Data.OracleClient Loaded!"  
6  }  
7  else {  
8      Write-Host "System.Data.OracleClient could not be loaded! Exiting..."  
9      Exit 1  
10 }
```

Below the script is a console window showing the execution of the script:

```
PS C:\Users\Stimely> ## try to load assembly, fail otherwise ##  
$Assembly = [System.Reflection.Assembly]::LoadWithPartialName("System.Data.OracleClient")  
  
if ( $Assembly ) {  
    Write-Host "System.Data.OracleClient Loaded!"  
}  
else {  
    Write-Host "System.Data.OracleClient could not be loaded! Exiting..."  
    Exit 1  
}  
System.Data.OracleClient Loaded!  
  
PS C:\Users\Stimely>
```

On the right side, there is a "Commands" pane with a dropdown menu set to "SQLASCMDLETS" and a "Refresh" button. Below this is a list of commands:

- Add-RoleMember
- Backup-ASDatabase
- Invoke-ASCmd
- Invoke-ProcessCube
- Invoke-ProcessDimension
- Invoke-ProcessPartition
- Merge-Partition
- New-RestoreFolder
- New-RestoreLocation
- Remove-RoleMember
- Restore-ASDatabase

Five callout boxes with arrows point to specific features:

- Shortcuts Toolbar**: Points to the toolbar at the top.
- PowerShell tab**: Points to the "Untitled1.ps1* X" tab.
- Script**: Points to the PowerShell code in the main editor.
- Console**: Points to the output window at the bottom.
- Command Pane**: Points to the list of commands on the right.

Integrated Scripting Environment (ISE) DEMO



Connecting Oracle to PowerShell

- Install Oracle 11g Express Edition
- PowerShell 2.0 or later (preferably 3.0 or later)

```
PS C:\WINDOWS\system32> $PSVersionTable
```

Name	Value
PSVersion	4.0
WSManStackVersion	3.0
SerializationVersion	1.1.0.1
CLRVersion	4.0.30319.42000
BuildVersion	6.3.9600.16406
PSCompatibleVersions	{1.0, 2.0, 3.0, 4.0}
PSRemotingProtocolVersion	2.2

- Oracle Data Access Components (ODAC) – Oracle Developer Tools for Visual Studio
- Toad for Oracle
- Set-ExecutionPolicy -Scope Process -ExecutionPolicy Bypass
- Function – Get-OLEDBData code found at link below:
- <http://sev17.com/2010/03/01/querying-oracle-from-powershell-part-2/>

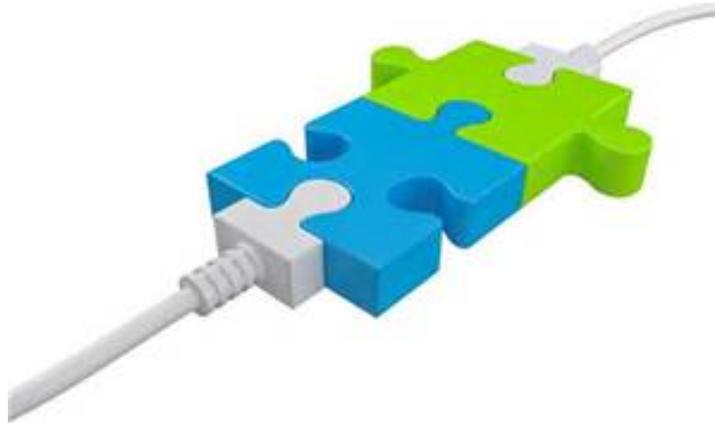
Oracle Connection Configuration

- Load ODAC
 - Oracle Data Provider for .NET (ODP.NET)
 - DataAccess.dll
- OLE DB
- Microsoft's Data Provider for Oracle
- ODBC



Other Connection Options

- TNSNames
- Configuration Files
- Using Credentials



Retrieving Data

- Loading and establishing a connection using ODP.net
- Using functions to pull data
 - Reading large amounts of data
 - Data readers
- Role of parameters in retrieving data
- Data types



"He's a whizz at data retrieval."

Working with Data

- Sorting and exporting data
 - Export to text files
 - Export to html
- Inserting data
 - Add functions
 - Making it work with bulk inserts
- Updating and Deleting Data
 - Functions to use
 - Multi-statement blocks
 - Error Checking
 - Running the script
- Creating and using Oracle Data Adapter



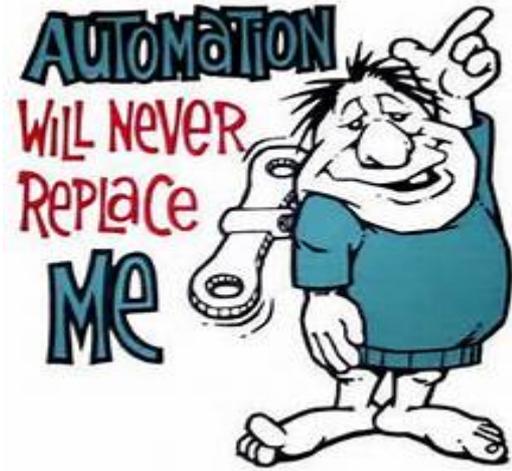
Scripting with PowerShell

- Common Code Bodies
- Creating reusable functions for scripts with library of Oracle functions
- PowerShell profile
- Common libraries



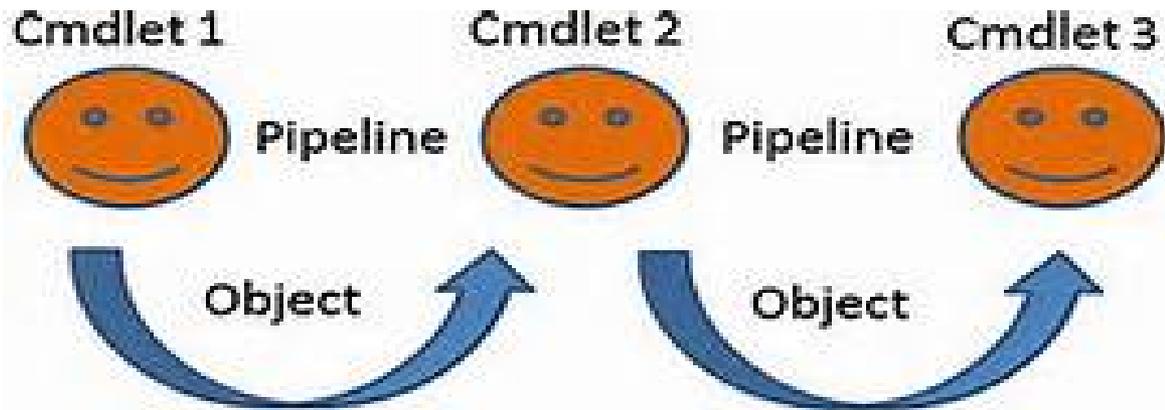
Automating tasks with PowerShell

- Inputs and Outputs
- Parameters to use
- Functions for automation
- How to automate the code created



Creating a script library

- Setting the path and profile
- Creating PowerShell modules for reuse
- Function support



DEMO



Putting
it all
Together



References & Links

- **Instant Oracle Database and PowerShell How-to** — Geoffrey Hudik
 - <http://www.amazon.com/Instant-Oracle-Database-PowerShell-How/dp/1849688583>
- <http://powershell.org/wp/>
- https://www.youtube.com/channel/UCFX97evt_7Akx_R9ovfiSwQ
- <https://www.idera.com/productssolutions/freetools/powershellplus>
- <http://software.dell.com/products/powergui-freeware/>
- https://technet.microsoft.com/en-us/library/hh857339.aspx#BKMK_new50
- <https://technet.microsoft.com/en-us/library/dd819514.aspx>
- <https://blogs.technet.microsoft.com/heyscriptingguy/2012/12/04/use-oracle-odp-net-and-powershell-to-simplify-data-access/>
- <http://codingbee.net/tutorials/powershell/powershell-run-sql-queries-using-sqlplus/>



- Summer Conference 2016
 - Starring – Craig Shallahamer orapub.com
 - 18 August 2016
 - 8:00 AM – 5:00 PM
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