EXPLORING SQLPS

The SQL Server Powershell Module In Depth

UpSearch

Protect, unlock and optimize your data's value

Thank you, sponsors!

UpSearch

Microsoft® SQL Server®

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IDERA ACE

Microsoft CERTIFIED Solutions Expert

Data Platform

Mike Fal

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What is SQLPS?

The Provider

Cmdlets/Functions

Practical Use

Don't Panic!

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```
    $trns = Get-ChildItem $dir -recurse | Where-Object {$_.name -like "*.trn"} | sort-object LastWriteTime
}
else{
    $full = Get-ChildItem $dir | Where-Object {$_.name -like "*.bak"} | Sort-Object LastWriteTime -desc | Select-Object -first 1
    $diff = Get-ChildItem $dir | Where-Object {$_.name -like "*.dff"} | sort-object LastWriteTime -desc | select-object -first 1
    $trns = Get-ChildItem $dir | Where-Object {$_.name -like "*.trn"} | sort-object LastWriteTime
}

#initialize and process full backup
$outputfile = Join-Path -Path $outputdir -ChildPath "restore_$database.sql"
$restore = Get-RestoreObject $database $full
$hfull = Get-Header $restore $smosrv
if($database.Length -eq 0)
{
    $database = $hfull.DatabaseName
    $restore.Database=$database
}

$LSNCheck = $hfull.CheckpointLSN
$files = $restore.ReadFileList($smosrv)
foreach($file in $files){
    $pfile = $file.PhysicalName
    if($newdata.Length -gt 0 -and $file.Type -eq "D"){
        $pfile=$newdata + $pfile.Substring($pfile.LastIndexOf("\"))
    }

    if($newdata.Length -gt 0 -and $file.Type -eq "L"){
        $pfile=$newlog + $pfile.Substring($pfile.LastIndexOf("\"))
    }

    $newfile = New-Object("Microsoft.SqlServer.Management.Smo.RelocateFile") ($file.LogicalName,$pfile)
    $restore.RelocateFiles.Add($newfile) | out-null
}

$sqlout += "/*****************************************************"
$sqlout += "Restore Database Script Generated $(Get-Date)"
$sqlout += "Database: "+$database
$sqlout += "*****************************************************/"
$sqlout += "--FULL RESTORE"
If($Owner){$sqlout += "EXECUTE AS LOGIN = '$Owner';"}
$sqlout += $restore.Script($smosrv)

#process differential backups
if($diff -ne $null){
    $restore = Get-RestoreObject $database $diff
    $hdiff = Get-Header $restore $smosrv

    if($hdiff.DatabaseBackupLSN -eq $LSNCheck){
        $sqlout += "--DIFF RESTORE"
        $sqlout += $restore.Script($smosrv)
        $LSNCheck = $hdiff.LastLSN
    }
    else{
```

Don't focus on the code, focus on the concepts.

Ask questions!

In the beginning...

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SQLPS

- Powershell module for SQL Server
- Includes cmdlets and the provider
- SQL Server 2012 or greater
- Powershell 2.0 or greater

```
Import-Module SQLPS
```

SqlServer

- Introduced with SSMS July 2016 update!
- Includes everything from SQLPS along with fixes
- Not compatible with SQLPS!

```
Import-Module SqlServer
```

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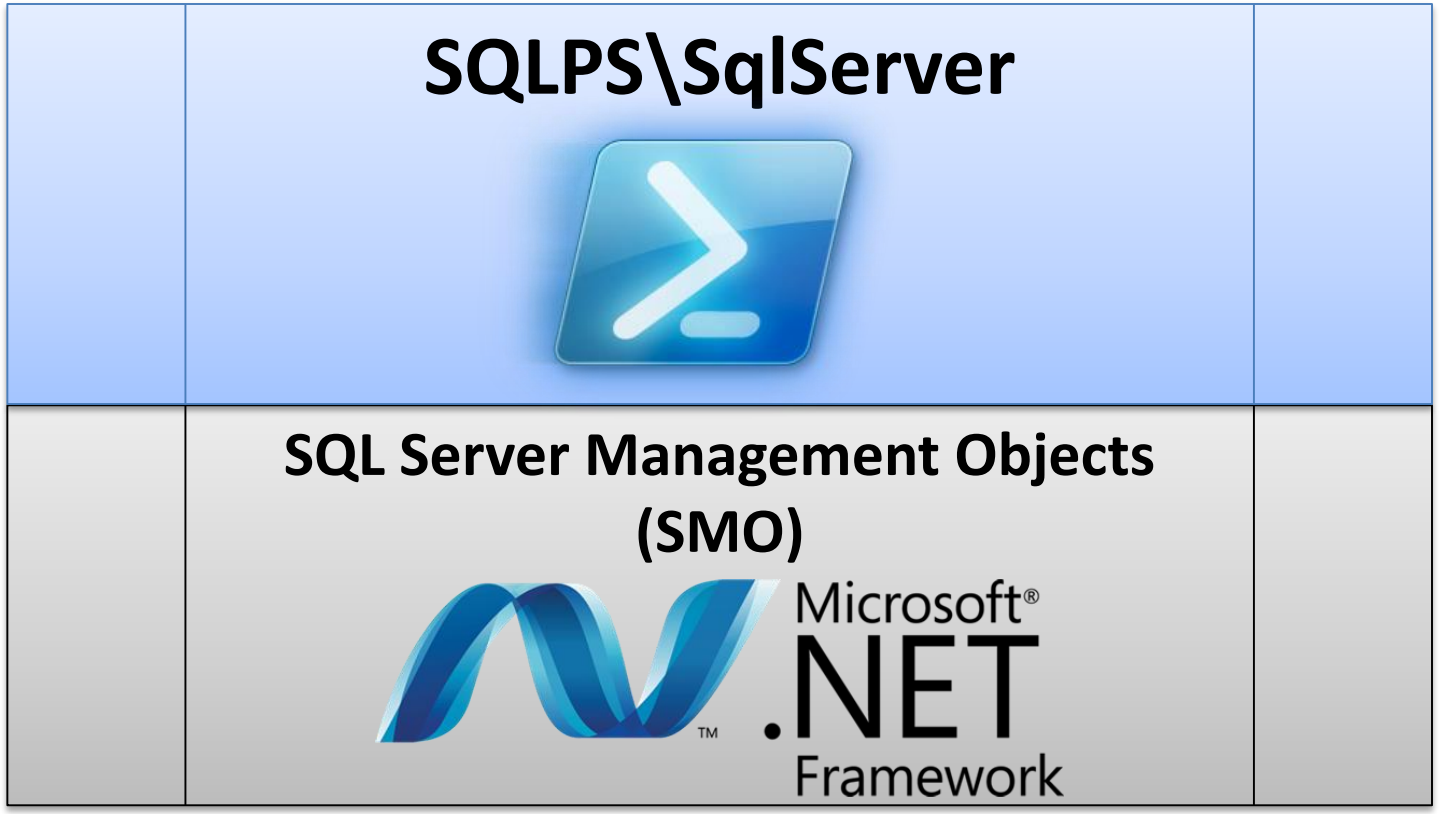
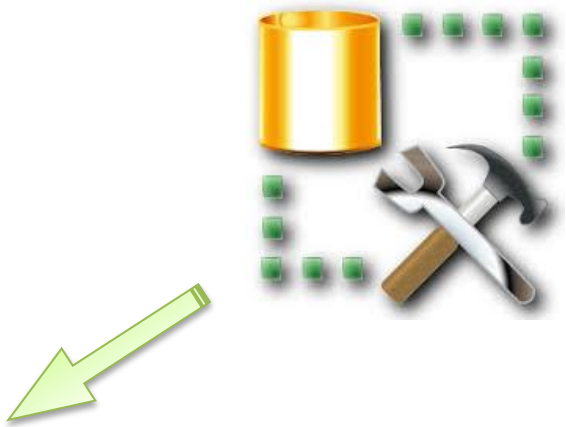
- Not installed specifically
- Included anytime you install ANY SQL Server component
- SQLPS Installation Path:

```
C:\Program Files (x86)
   \Microsoft SQL Server
   \130\Tools\PowerShell\Modules
```

- SqlServer Installation Path

```
C:\Program Files\WindowsPowerShell\Modules
```





.Net Library

requires .Net 2.0

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SMO ASSEMBLIES	
Microsoft.SqlServer.Management.Common	Microsoft.SqlServer.SqlEnum
Microsoft.SqlServer.Smo	Microsoft.SqlServer.RegSvrEnum
Microsoft.SqlServer.Dmf	Microsoft.SqlServer.WmiEnum
Microsoft.SqlServer.Instapi	Microsoft.SqlServer.ServiceBrokerEnum
Microsoft.SqlServer.SqlWmiManagement	Microsoft.SqlServer.ConnectionInfoExtended
Microsoft.SqlServer.ConnectionInfo	Microsoft.SqlServer.Management.Collector
Microsoft.SqlServer.SmoExtended	Microsoft.SqlServer.Management.CollectorEnum
Microsoft.SqlServer.SqlTDiagM	Microsoft.SqlServer.Management.Dac
Microsoft.SqlServer.SString	Microsoft.SqlServer.Management.DacEnum
Microsoft.SqlServer.Management.RegisteredServers	Microsoft.SqlServer.Management.Utility
Microsoft.SqlServer.Management.Sdk.Sfc	

DEMO!


Breeding
ken Problems
Get a new Puppy
Chores
2014

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```
Name     Provider                                    Root                CurrentLocation
----     --------                                    ----                ---------------
A        Microsoft.PowerShell.Core\FileSystem        A:\
Alias    Microsoft.PowerShell.Core\Alias
C        Microsoft.PowerShell.Core\FileSystem        C:\                 Users\Administrator
Cert     Microsoft.PowerShell.Security\Certificate   \
D        Microsoft.PowerShell.Core\FileSystem        D:\
Env      Microsoft.PowerShell.Core\Environment
Function Microsoft.PowerShell.Core\Function
HKCU     Microsoft.PowerShell.Core\Registry          HKEY_CURRENT_USER
HKLM     Microsoft.PowerShell.Core\Registry          HKEY_LOCAL_MACHINE
Variable Microsoft.PowerShell.Core\Variable
WSMan    Microsoft.WSMan.Management\WSMan
```

Windows Components as Drives

Get-PSDrive

Explore/Use like a FileSystem

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Windows PowerShell

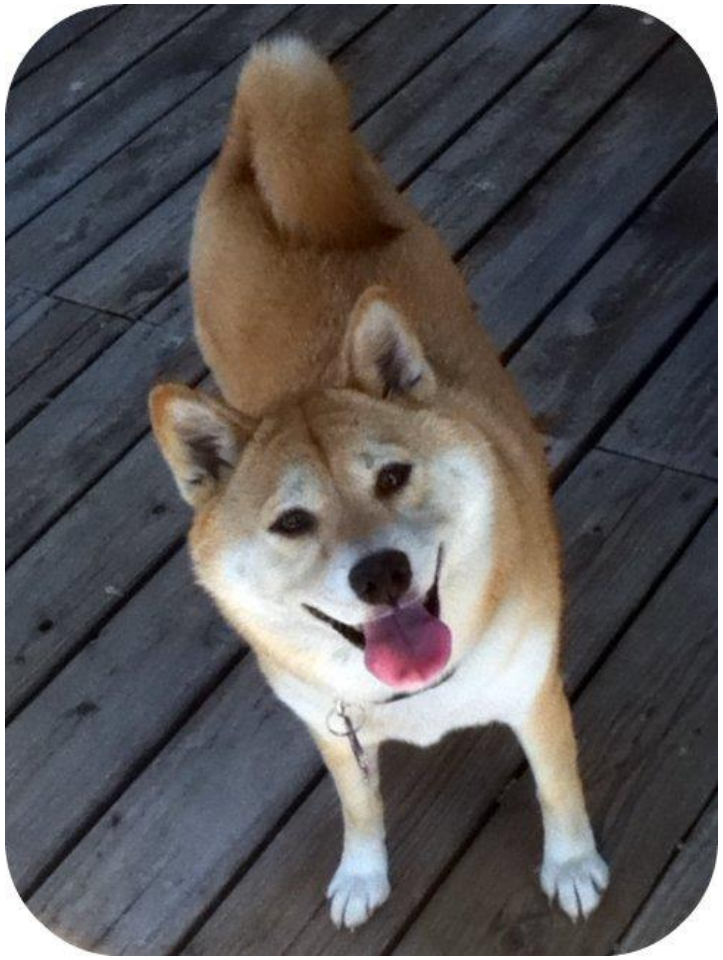
```
PS SQLSERVER:\> dir

Name             Root                      Description
----             ----                      -----------
DAC              SQLSERVER:\DAC            SQL Server Data-Tier Application
                                           Component
DataCollection   SQLSERVER:\DataCollection SQL Server Data Collection
SQLPolicy        SQLSERVER:\SQLPolicy      SQL Server Policy Management
Utility          SQLSERVER:\Utility        SQL Server Utility
SQLRegistration  SQLSERVER:\SQLRegistration SQL Server Registrations
SQL              SQLSERVER:\SQL            SQL Server Database Engine
SSIS             SQLSERVER:\SSIS           SQL Server Integration Services
XEvent           SQLSERVER:\XEvent         SQL Server Extended Events
DatabaseXEvent   SQLSERVER:\DatabaseXEvent SQL Server Extended Events
SQLAS            SQLSERVER:\SQLAS          SQL Server Analysis Services
```

DEMO!

Timeouts!

Tab completion and Intellisense

Contextual behavior



Verb-Noun

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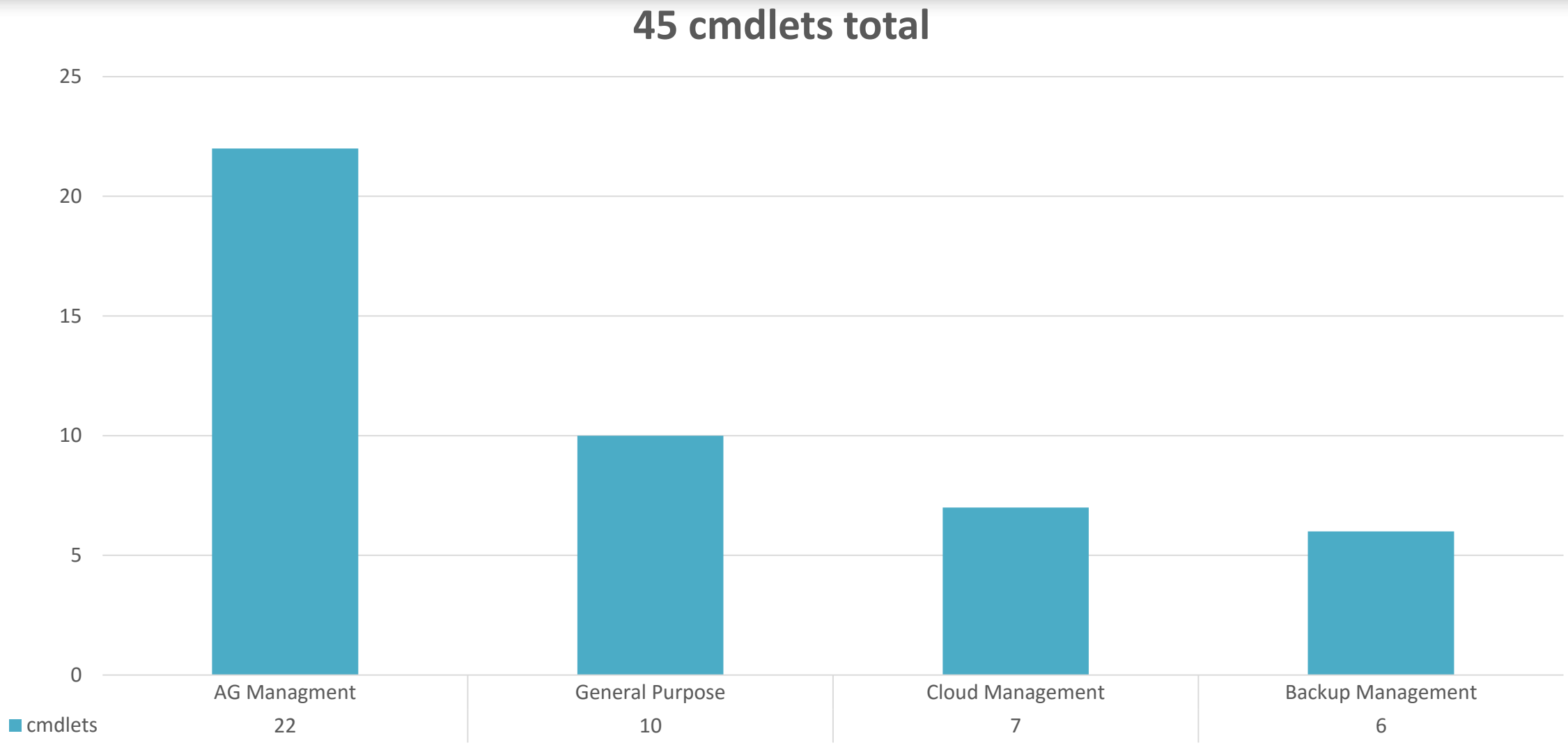
45 cmdlets total
25
20
15
10
5
0
AG Managment
General Purpose
Cloud Management
Backup Management
cmdlets
22
10
7
6

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Convert-UrnToPath
Decode-SqlName
Encode-SqlName
Get-SqlCredential
Get-SqlDatabase
Invoke-PolicyEvaluation
Invoke-Sqlcmd
New-SqlCredential
Remove-SqlCredential
Set-SqlCredential

Do not match Powershell naming standards

Useful for checking Policy Based Management

“Replacement” for sqlcmd, heavily used

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Backup-SqlDatabase
Restore-SqlDatabase
New-SqlBackupEncryptionOption
Get-SqlSmartAdmin
Set-SqlSmartAdmin
Test-SqlSmartAdmin

Standard
Backup and Restore
operations

SqlSmartAdmin cmdlets
for Azure Managed Backups

Add-SqlFirewallRule
Remove-SqlFirewallRule
Get-SqlInstance
Set-SqlAuthenticationMode
Set-SqlNetworkConfiguration
Start-SqlInstance
Stop-SqlInstance

These cmdlets all require the Cloud Adapter Service

Careful, this doesn't return what you think it does…

These do the same as Start-Service and Stop-Service

Add-SqlAvailabilityDatabase	Remove-SqlAvailabilityReplica
Add-SqlAvailabilityGroupListenerStaticIp	Resume-SqlAvailabilityDatabase
Disable-SqlAlwaysOn	Set-SqlAvailabilityGroup
Enable-SqlAlwaysOn	Set-SqlAvailabilityGroupListener
Join-SqlAvailabilityGroup	Set-SqlAvailabilityReplica
New-SqlAvailabilityGroup	Set-SqlHADREndpoint
New-SqlAvailabilityGroupListener	Suspend-SqlAvailabilityDatabase
New-SqlAvailabilityReplica	Switch-SqlAvailabilityGroup
New-SqlHADREndpoint	Test-SqlAvailabilityGroup
Remove-SqlAvailabilityDatabase	Test-SqlAvailabilityReplica
Remove-SqlAvailabilityGroup	Test-SqlDatabaseReplicaState

Advanced Topic

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Always Encrypted
18 cmdlets

Add-SqlAzureAuthenticationContext	New-SqlColumnEncryptionKey
Add-SqlColumnEncryptionKeyValue	New-SqlColumnEncryptionKeyEncryptedValue
Complete-SqlColumnMasterKeyRotation	New-SqlColumnEncryptionSettings
Get-SqlColumnEncryptionKey	New-SqlColumnMasterKey
Get-SqlColumnMasterKey	New-SqlCspColumnMasterKeySettings
Invoke-SqlColumnMasterKeyRotation	Remove-SqlColumnEncryptionKey
New-SqlAzureKeyVaultColumnMasterKeySettings	Remove-SqlColumnEncryptionKeyValue
New-SqlCertificateStoreColumnMasterKeySettings	Remove-SqlColumnMasterKey
New-SqlCngColumnMasterKeySettings	Set-SqlColumnEncryption

SQL Agent
6 cmdlets

Get-SqlAgent
Get-SqlAgentJob
Get-SqlAgentJobHistory
Get-SqlAgentJobSchedule
Get-SqlAgentJobStep
Get-SqlAgentSchedule

SQL Error Log
2 cmdlets

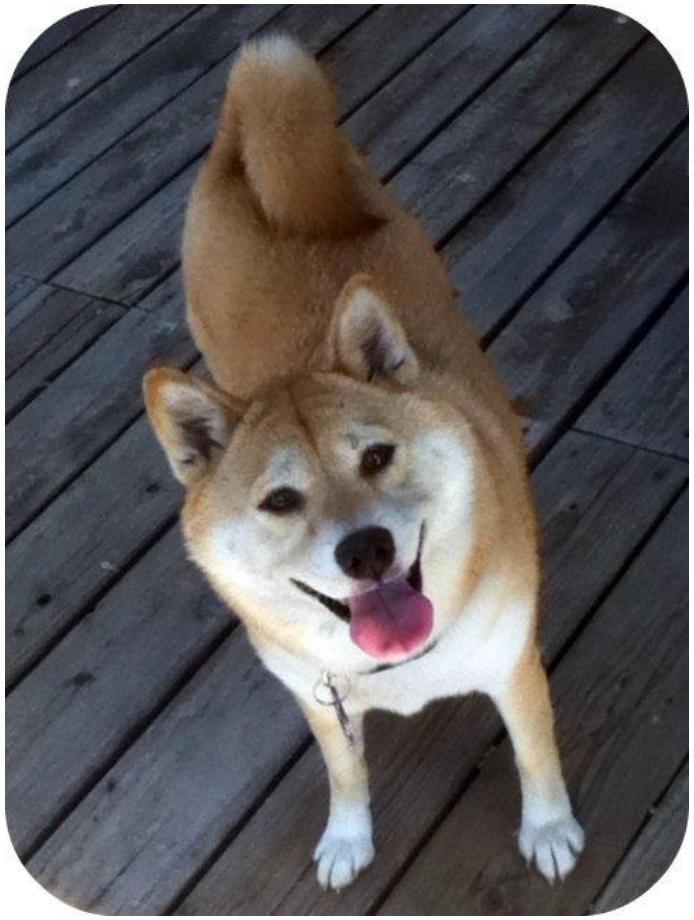
Get-SqlErrorLog
Set-SqlErrorLog

DEMO!

Poorly Documented *(Changing!)*

Unexpected behavior

Lack of support *(Changing!)*




WHAT'S
NEXT?

DEMO!

- ✓What is the SQLPS Module?
- ✓How do we use it?
- ✓The Provider, what is that all about?
- ✓What kind of cmdlets (functions) are there?
- ✓How do I use this darn thing, anyway?

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https://upsearch.com/connect-with-us/

https://github.com/MikeFal