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Event Logs

DCSync Related

Logs related to DCSync Credential attacks. This is a start but needs more filtering as there are tons of 4662 events.

```
<QueryList>
  <Query Id="0" Path="Security">
    <Select Path="Security">*[System[(EventID=4662)]]</Select>
  </Query>
</QueryList>
```

GPO Drive Map Troubleshooting

[Source](#)

```
<QueryList>
  <Query Id="0" Path="Microsoft-Windows-GroupPolicy/Operational">
    <Select Path="Microsoft-Windows-GroupPolicy/Operational">*[System[(EventID='4001')]]</Select>
    <Select Path="Microsoft-Windows-GroupPolicy/Operational">*[System[(EventID='5017')]]</Select>
    <Select Path="Microsoft-Windows-GroupPolicy/Operational">*[System[(EventID='5312')]]</Select>
    <Select Path="Microsoft-Windows-GroupPolicy/Operational">*[System[(EventID='4016')]]</Select>
  </Query>
```

```
</QueryList>
```

Recently installed software

This will only show software related installation events that are still stored in the system event log, so be mindful of the date of the last event log entry to know how far back logs are available.

```
Get-WinEvent -ProviderName MsiInstaller | where id -eq 1033 | select TimeCreated,Message |  
Format-List
```

Windows IP address conflict

```
<QueryList>  
  <Query Id="0" Path="System">  
    <Select Path="System">*[System[(EventID='4199')]]</Select>  
  </Query>  
</QueryList>
```

Log example:

The system detected an address conflict for IP address 10.X.Y.Z with the system having network hardware address 00-1F-FE-D8-31-00. Network operations on this system may be disrupted as a result.

Via PowerShell:

```
$query = @"  
<QueryList>  
  <Query Id="0" Path="System">  
    <Select Path="System">*[System[(EventID='4199')]]</Select>  
  </Query>  
</QueryList>  
"@  
  
$ipConflictEvents = Get-WinEvent -FilterXml $query -Oldest  
$ipConflictEvents | Format-Table
```

Windows RDP-Related Event Logs

[Source](#)

Below is a consolidated XML query of all of the event ids related in the above document. I have yet to have this actually solve a problem for me as of 5/30/2024. I still need to dive into the details of the individual log entries with different types and data.

```
<QueryList>
  <Query Id="0" Path="System">
    <Select Path="Microsoft-Windows-TerminalServices-
RemoteConnectionManager/Operational">*</Select>
    <Select Path="Security">*[System[(EventID=4624)]]</Select>
    <Select Path="Security">*[System[(EventID=4625)]]</Select>
    <Select Path="Security">*[System[(EventID=4634)]]</Select>
    <Select Path="Security">*[System[(EventID=4647)]]</Select>
    <Select Path="Security">*[System[(EventID=4778)]]</Select>
    <Select Path="Security">*[System[(EventID=4779)]]</Select>
    <Select Path="System">*[System[(EventID=9009)]]</Select>
  </Query>
</QueryList>
```

#end

Excel

Conditional highlighting with functions

This is a collection of frequently used functions for conditional highlighting in Excel.

Highlight cells that are formatted dates and the dates are older than X days. Applies to =\$A:\$A if all dates you want highlighted are in the A column.

```
=IF(LEFT(CELL("format",A1),1)="D",IF(A1<TODAY()-37,TRUE,FALSE),FALSE)
```

:end

Installing Certificates on Windows

Using PowerShell to install into the Local Computer store

This can only be done with elevated privileges.

```
Import-Certificate -CertStoreLocation Cert:\LocalMachine\Root -FilePath cert.crt
```

Junctions

Finding junctions / reparse points

```
# return all reparse points on the C: volume  
DIR C:\ /S /AL
```

Checking reparse points

```
fsutil reparsepoint query [dir/file]
```

#end

Microsoft Remote Desktop Certificates

Manually replacing RDP certificate

Install the new certificate in the Local Computer Personal store:

If no password is needed:

```
Import-PfxCertificate -CertStoreLocation Cert:\LocalMachine\My -FilePath cert.pfx
```

Or if a password is needed:

```
$mypwd = Get-Credential -UserName 'Enter password below' -Message 'Enter password below'  
Import-PfxCertificate -CertStoreLocation Cert:\LocalMachine\My -Password $mypwd.Password -  
FilePath cert.pfx
```

After installing the new certificate in the Local Computer Personal store, run the following commands:

```
Set-Location Cert:\LocalMachine\my  
Get-ChildItem
```

Pick the Thumbprint of the certificate you wish to use then run the following command using the proper thumbprint:

```
#Replace Certificate for RDS  
wmic /namespace:\\root\cimv2\TerminalServices PATH Win32_TSGeneralSetting Set  
SSLCertificateSHA1Hash="[new_cert_thumbprint]"
```

This effectively updates the registry key:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Terminal Server\WinStations\RDP-  
Tcp\SSLCertificateSHA1Hash
```

Use the following command to verify that the proper certificate is being used:

```
Get-WmiObject "Win32_TSGeneralSetting" -Namespace root\cimv2\terminalservices -Filter  
"TerminalName='RDP-tcp' "
```

[Source](#)

Windows Server 2022 method

Couldn't the WMI method to work on Windows Server 2022. This did.

```
$serverName = "MYTS01"
$certHash = "xxxxx"
$path = (Get-WmiObject "Win32_TSGeneralSetting" -ComputerName $serverName -Namespace
root\cimv2\terminalservices -Filter "TerminalName='RDP-tcp'")
Set-WmiInstance -Path $path -Arguments @{SSLCertificateSHA1Hash=$certHash}
```

Signing RDP files

Use the rdpsign app to

```
rdpsign /sha256 xxxxxxxx "Remote Desktop File.rdp"
```

Windows Server 2022 Remote Desktop Services Deployment Management

Work in progress

```
$computerName = 'Somecomputer'
$remotePath = '\\10.10.10.10'
$certFilePath = '\\10.10.10.10\tmp\certs\mycert.pfx'

Enter-PSSession $computerName

# for non-domain RemotePath prefix the username with localhost: localhost\admin
$nasCredential = Get-Credential
New-SmbMapping -RemotePath $remotePath -UserName $nasCredential.UserName -Password
$nasCredential.GetNetworkCredential().Password

# import the cert
Import-PfxCertificate -FilePath $certFilePath -CertStoreLocation Cert:\LocalMachine\My
```

```
cd Cert:\LocalMachine\My
dir
$certThumbprint = ''

# Check the Remote Desktop Services Deployment
Get-RDCertificate

# Update the RDS roles to use the provided certificate
Set-RDCertificate -Role RDRedirector -Thumbprint $certThumbprint
Set-RDCertificate -Role RDPublishing -Thumbprint $certThumbprint
Set-RDCertificate -Role RDWebAccess -Thumbprint $certThumbprint
Set-RDCertificate -Role RDGateway -Thumbprint $certThumbprint

# Check the Remote Desktop Services Deployment
Get-RDCertificate
```

#end

Network Policy Server / NPS

Enable NTLMv2 support for MSCHAPv2 RADIUS requests

Enables proxied radius requests when using things like radsecproxy, duoauthproxy, etc. Avoids the MS-CHAP-Error responses.

```
$registryPath = "HKLM:\System\CurrentControlSet\Services\RemoteAccess\Policy"
$propertyName = "Enable NTLMv2 Compatibility"
$propertyValue = "1"

New-ItemProperty -Path $registryPath -Name $propertyName -Value $propertyValue -PropertyType
DWORD -Force

Stop-Service IAS
Sleep 2
Start-Service IAS
```

[Source 1](#) / [Source 2](#)

On-Prem to Azure DNS Migration

The Azure CLI can easily be used to do this migration. Here's the steps to use the Azure CLI:

1. Create the new zone in Azure via the portal or the `azure-cli create` command.
2. Export the newly created zone from Azure to get the new SOA and NS records.
3. Open the original zone file to import into Azure.
4. Delete the existing SOA and NS records.
5. Copy the exported SOA and NS records and paste them into the original zone file.
6. Update the SOA serial number. The recommended format is **YYYYMMDD1**
7. Save the changes to the original zone file.
8. Use the `azure-cli` command to import the zone file.
9. Go to the Azure Portal and validate that the zone file was imported correctly. A visual inspection of records is highly recommended for thoroughness.
10. Once validated, go to the registrar and update the name servers.

The above process can be accomplished through the portal by creating the zone and manually adding each record. Don't forget to update the serial number in the SOA record of the newly created zone.

Azure CLI command to import zone file

Note the zone file must be properly formatted. The first record must be the SOA resource, and the NS records have to match the Azure DNS NS records.

```
az network dns zone import -g [Azure-Resource-Group] -n [zone_name] -f [imported_zone_file]
```

Azure CLI command to export zone file from Azure

```
az network dns zone export -g [Azure-Resource-Group] -n [zone_name] -f [exported_zone_file]
```

OpenSSH on Windows

https://learn.microsoft.com/en-us/windows-server/administration/openssh/openssh_install_firstuse?tabs=gui

Check if OpenSSH is available

```
Get-WindowsCapability -Online | Where-Object Name -like 'OpenSSH*'
```

Install OpenSSH Client and Server

```
# Install the OpenSSH Client
Add-WindowsCapability -Online -Name OpenSSH.Client~~~~0.0.1.0

# Install the OpenSSH Server
Add-WindowsCapability -Online -Name OpenSSH.Server~~~~0.0.1.0
```

Start OpenSSH Server

```
# Start the sshd service
Start-Service sshd
```

Set OpenSSH Server to start automatically on boot

```
# OPTIONAL but recommended:
Set-Service -Name sshd -StartupType 'Automatic'
```

Make sure the firewall doesn't block the OpenSSH Server

```
# Confirm the Firewall rule is configured. It should be created automatically by setup. Run
the following to verify
if (!(Get-NetFirewallRule -Name "OpenSSH-Server-In-TCP" -ErrorAction SilentlyContinue |
Select-Object Name, Enabled)) {
    Write-Output "Firewall Rule 'OpenSSH-Server-In-TCP' does not exist, creating it..."
    New-NetFirewallRule -Name 'OpenSSH-Server-In-TCP' -DisplayName 'OpenSSH Server (sshd)' -
Enabled True -Direction Inbound -Protocol TCP -Action Allow -LocalPort 22
} else {
    Write-Output "Firewall rule 'OpenSSH-Server-In-TCP' has been created and exists."
}
```

Run sshd on an alternate port

Edit the Port line in `C:\ProgramData\ssh\sshd_config`:

```
Port 12322
```

Use the following command to update the Windows Firewall rule to match the port you specified above:

```
Set-NetFirewallRule -Name 'OpenSSH-Server-In-TCP' -LocalPort 12322
```

Require publickey and password authentication

Add the following line to `C:\ProgramData\ssh\sshd_config`

```
AuthenticationMethods "publickey,password"
```

publickey authentication for administrators

Public keys for administrators must be put in the file

`%PROGRAMDATA%\ssh\administrators_authorized_keys`. Use the script below to make sure the file has proper permissions.

```
$acl = Get-Acl C:\ProgramData\ssh\administrators_authorized_keys
$acl.SetAccessRuleProtection($true, $false)
$administratorsRule = New-Object
system.security.accesscontrol.filesystemaccessrule("Administrators","FullControl","Allow")
$systemRule = New-Object
system.security.accesscontrol.filesystemaccessrule("SYSTEM","FullControl","Allow")
$acl.SetAccessRule($administratorsRule)
$acl.SetAccessRule($systemRule)
$acl | Set-Acl
```

Stop and Start the sshd service

```
Stop-Service sshd
```

```
Start-Service sshd
```

```
netstat -an -p TCP | find '"22"'
```

Example configuration

Port 12322

#PubkeyAuthentication yes

AuthenticationMethods "publickey,password"

AuthorizedKeysFile .ssh/authorized_keys

#PasswordAuthentication yes

#PermitEmptyPasswords no

override default of no subsystems

Subsystem sftp sftp-server.exe

Match Group administrators

AuthorizedKeysFile __PROGRAMDATA__/ssh/administrators_authorized_keys

Use PowerShell as default interpreter

Check current value of registry key

Get-ItemProperty -Path "HKLM:\SOFTWARE\OpenSSH" -Name DefaultShell

Legacy PowerShell

New-ItemProperty -Path "HKLM:\SOFTWARE\OpenSSH" -Name DefaultShell -Value

"C:\Windows\System32\WindowsPowerShell\v1.0\powershell.exe" -PropertyType String -Force

PowerShell v7

New-ItemProperty -Path "HKLM:\SOFTWARE\OpenSSH" -Name DefaultShell -Value "C:\Program
Files\PowerShell\7\pwsh.exe" -PropertyType String -Force

Delete registry key to revert to traditional command line

Remove-ItemProperty -Path "HKLM:\SOFTWARE\OpenSSH" -Name DefaultShell

#end

PowerShell

PowerShell

Active Directory

Get-SMBOpenFile

Basics

Expanding objects

Much of the data we receive from cmdlets are objects that require further manipulation to get to the data we're looking for.

```
# Connect to Microsoft Graph
Connect-MgGraph -Scopes "Mail.Read"

# Define the user and folder details
$userId = "user@domain.com"
$mailFolderId = "folder-id-here"

# Get the messages in the specified folder
$messages = Get-MgUserMailFolderMessage -UserId $userId -MailFolderId $mailFolderId

# Format the output to expand sender, from, and include subject
$messages | Select-Object -Property Id,ReceivedDateTime,From,Sender,Subject | Format-List
```

Below is example output of the above script:

```
# example output without object expansion
# note the un-expanded values for From and Sender
Id                : [REDACTED_GUID]
ReceivedDateTime  : MM/DD/YYYY 2:52:35 AM
Subject           : [REDACTED_SUBJECT]
From              : Microsoft.Graph.PowerShell.Models.MicrosoftGraphRecipient
Sender            : Microsoft.Graph.PowerShell.Models.MicrosoftGraphRecipient
```

The actual data we're looking for related to From and Sender is in the following expansions:

```
From.EmailAddress.Name
From.EmailAddress.Address
Sender.EmailAddress.Name
Sender.EmailAddress.Address
```

Below is an example of how to accomplish that in the Select-Object statement:

```
# Connect to Microsoft Graph
Connect-MgGraph -Scopes "Mail.Read"

# Define the user and folder details
$userId = "user@domain.com"
$mailFolderId = "folder-id-here"

# Get the messages in the specified folder
$messages = Get-MgUserMailFolderMessage -UserId $userId -MailFolderId $mailFolderId

# Format the output to expand sender, from, and include subject
$messages | Select-Object -Property Subject,
    @{Name="SenderName";Expression={$_.Sender.EmailAddress.Name}},
    @{Name="SenderEmail";Expression={$_.Sender.EmailAddress.Address}},
    @{Name="FromName";Expression={$_.From.EmailAddress.Name}},
    @{Name="FromEmail";Expression={$_.From.EmailAddress.Address}} |
    Format-List
```

The output is not actual useful data, rather than the name of the object type that was returned:

```
Id                : [REDACTED_GUID]
ReceivedDateTime  : MM/DD/YYYY 2:52:35 AM
Subject           : Weekly Duo Report
SenderName        : Security Team
SenderEmail       : security@domain.com
FromName          : Security Team
FromEmail         : security@domain.com
```

Using variables in -Filter statements

Example of using a variable in a -Filter statement with the Get-ADGroup cmdlet. Note this cmdlet doesn't properly throw exceptions that can be handled by a try / catch block, so we have to use a Filter statement and check to see if anything was returned.

```
# Assign group name we're looking for to a variable
$GroupName = "Administrators"

# Get-ADGroup doesn't throw exceptions properly, so we have to work around this since we can't
use try / catch
$Group = Get-ADGroup -Filter "Name -eq '$GroupName'" -Properties members

If ($Group -eq $null) {
    "# $($GroupName) - group not found!!!"
} else {
    "# $($GroupName)"
}
```

Errors and Solutions

This page contains a list of common PowerShell errors and their solutions.

Invoke-WebRequest : The request was aborted: Could not create SSL/TLS secure channel.

The cause of the error is that PowerShell, by default, uses TLS 1.0 to make https requests. TLS 1.0 has been broken for a long time now and is no longer supported by most websites. You can change this behavior with running any of the below command to use all protocols. You can also specify single protocol.

```
[Net.ServicePointManager]::SecurityProtocol = "Tls12"
```

```
[Net.ServicePointManager]::SecurityProtocol = [Net.SecurityProtocolType]::Tls,  
[Net.SecurityProtocolType]::Tls11, [Net.SecurityProtocolType]::Tls12,  
[Net.SecurityProtocolType]::Ssl3
```

```
[Net.ServicePointManager]::SecurityProtocol = "Tls, Tls11, Tls12, Ssl3"
```

Restart-Computer : Failed to restart the computer COMPUTERNAME with the following error message: A system shutdown is in progress.

12/23/2024

A server this morning wouldn't respond to CTRL-ALT-DEL requests, remote Event Viewer requests, but we were able to access it via remote a PowerShell session. When we issued the Restart-Computer cmdlet, the error response was that a system shutdown is in progress. Suggestions on the web were to kill any lsass and winlogon processes.

Killing the lsass process did the trick this morning and the server rebooted as expected afterwards.

```
# list all lsass processes
```

```
Get-Process -IncludeUserName | Where-Object {$_.ProcessName -Like 'lsass'}
```

```
# to actually stop all lsass processes
```

```
Get-Process -IncludeUserName | Where-Object {$_.ProcessName -Like 'lsass'} | Stop-Process
```

```
#end
```

Firewall management

List firewall rules with ICMP in the DisplayName

```
Get-NetFirewallRule | Where-Object DisplayName -Like "*ICMP*" | Sort-Object Enabled,Name |  
Format-Table
```

Enable ICMP Echo Request

```
Set-NetFirewallRule -DisplayName "File and Printer Sharing (Echo Request - ICMPv4-In)" -  
enabled True  
Set-NetFirewallRule -DisplayName "File and Printer Sharing (Echo Request - ICMPv6-In)" -  
enabled True
```


Group Policy and PowerShell

You can manage Group Policy via PowerShell... who knew!? ☐☐

Listing GPOs

```
Get-GPO -All | Sort-Object -Property DisplayName | FT -Property  
DisplayName,Owner,GpoStatus,Description
```

```
Get-GPO -All -Domain domain.loc -Server dc1.domain.loc | Sort-Object -Property DisplayName |  
FT -Property DisplayName,Owner,GpoStatus,Description
```

Generating GPO reports

```
# Generate a GPO Report for a single named GPO  
$gpoName = "PowerShell Logging"  
Get-GPO -All | Where-Object { $_.DisplayName -eq $gpoName } | ForEach-Object {  
    $reportPath = "C:\GPOReports\" + $_.DisplayName + ".html"  
    Get-GPOReport -GUID $_.ID -ReportType HTML -Path "$($reportPath)"  
}
```

```
# Generate GPO reports for all GPOs in the current domain  
$queryDomain = $env:USERDNSDOMAIN  
$queryServer = ($env:LOGONSERVER).replace("\\", ".") + "." + $env:USERDNSDOMAIN  
Get-GPO -All -Domain $queryDomain -Server $queryServer | Sort-Object -Property DisplayName |  
ForEach-Object {  
    $reportPath = "C:\GPOReports\" + $_.DomainName + " - " + $_.DisplayName.replace("/", "_") +  
    ".html"  
    "Generating report for $($_.DisplayName) in $($reportPath)..."  
    Get-GPOReport -Domain $queryDomain -Server $queryServer -GUID $_.ID -ReportType HTML -Path  
    "$($reportPath)"  
}
```

#end

Querying Event Logs

I noticed that there is a huge speed difference between using an XML Query and PowerShell Get-EventLog piped through Where-Object to filter event logs. Thanks to [this article](#), I learned how to use the XML Query via PowerShell, so you get the best of both worlds.

Know your version

Here's different commands that will show you which version PowerShell you're running.

```
$PSVersionTable.PSVersion
```

```
Get-Host
```

```
$host
```

```
$host.version
```

General concepts

There are two different cmdlets for accessing Windows Event Logs. Get-WinEvent is a newer version of Get-EventLog.

Get-WinEvent

- You have access to more information
- Because you have more information, it might take more effort to filter the data

Get-EventLog

- One clear advantage: you can use the **-After** and **-Before** attributes to easily filter results by date

Filtering results

If you want to know how to filter the results, simply pipe the cmdlet to Get-Member:

The output of the command clearly shows you the methods and properties returned:

```
PS C:\> Get-EventLog system -newest 1 | Get-Member
```

```
TypeName: System.Diagnostics.EventLogEntry#system/nhi/1074012975
```

Name	MemberType	Definition
----	-----	-----
Disposed	Event	System.EventHandler Disposed(System.Object, System.EventArgs)
CreateObjRef	Method	System.Runtime.Remoting.ObjRef CreateObjRef(type requestedType)
Dispose	Method	void Dispose(), void IDisposable.Dispose()
Equals	Method	bool Equals(System.Diagnostics.EventLogEntry otherEntry), bool Equals(System.Object obj)
GetHashCode	Method	int GetHashCode()
GetLifetimeService	Method	System.Object GetLifetimeService()
GetObjectData	Method	void ISerializable.GetObjectData(System.Runtime.Serialization.SerializationInfo info, System.Runtime.Serialization.StreamingContext context)
GetType	Method	type GetType()
InitializeLifetimeService	Method	System.Object InitializeLifetimeService()
ToString	Method	string ToString()
Category	Property	string Category {get;}
CategoryNumber	Property	int16 CategoryNumber {get;}
Container	Property	System.ComponentModel.IContainer Container {get;}
Data	Property	byte[] Data {get;}
EntryType	Property	System.Diagnostics.EventLogEntryType EntryType {get;}
Index	Property	int Index {get;}
InstanceId	Property	long InstanceId {get;}
MachineName	Property	string MachineName {get;}
Message	Property	string Message {get;}
ReplacementStrings	Property	string[] ReplacementStrings {get;}
Site	Property	System.ComponentModel.ISite Site {get;set;}
Source	Property	string Source {get;}
TimeGenerated	Property	datetime TimeGenerated {get;}
TimeWritten	Property	datetime TimeWritten {get;}

```
UserName                Property      string UserName {get;}
EventID                  ScriptProperty System.Object EventID {get=$this.get_EventID() -band
0xFFFF;}
```

Get-EventLog Examples

```
# Show available event logs and stats
Get-EventLog -List
```

```
# get the most recent 10 system log entries
# just change the LogName from System to Application, Security, etc. to access other logs
Get-EventLog -LogName System -Newest 10
```

```
# get all system logs from the last 4 hours
Get-EventLog -LogName System -After (Get-Date).AddHours(-4)
```

```
# get all system logs from the last 24 hours
Get-EventLog -LogName System -After (Get-Date).AddDays(-1)
```

```
# View specific event using the event Index
Get-EventLog -LogName System -Index [Event_Index_Number] | Format-List
```

```
# get the most recent 10 entries from a specific source
Get-EventLog -LogName System -Source Kerberos -Newest 10
Get-EventLog -LogName System -Source Microsoft-Windows-WLAN-AutoConfig -Newest 10
```

```
# Get system logs from the last 24 hours from Source WLAN-AutoConfig
Get-EventLog -LogName system -After (Get-Date).AddDays(-1) -Source Microsoft-Windows-WLAN-
AutoConfig
```

```
# get the most recent 10 Error entries
Get-EventLog -LogName Application -EventType Error -Newest 10
Get-EventLog -LogName Security -EventType Error -Newest 10
Get-EventLog -LogName System -EventType Error -Newest 10
```

```
# Get list of Event Log Sources from the System log from the last 8 hours sorted by log count
Get-EventLog -LogName System -after (Get-Date).AddHours(-8) | Group-Object -Property Source -
NoElement | Select-Object -Property Count, Name | Sort-Object -Descending Count
```

```
# Find logins in the last 24 hours
Get-EventLog system -after (get-date).AddDays(-1) | where {$_.InstanceId -eq 7001}
```

```
# Find last computer start
$today = get-date -Hour 0 -Minute 0;
Get-EventLog system -after $today | sort -Descending | select -First 1
```

```
# Find logins and logoffs in the last 7 days
$logs = get-eventlog system -source Microsoft-Windows-Winlogon -After (Get-Date).AddDays(-7);
$res = @(); ForEach ($log in $logs) {if($log.instanceid -eq 7001) {$type = "Logon"} Elseif
($log.instanceid -eq 7002){$type="Logoff"} Else {Continue} $res += New-Object PSObject -
Property @{Time = $log.TimeWritten; "Event" = $type; User = (New-Object
System.Security.Principal.SecurityIdentifier
$Log.ReplacementStrings[1]).Translate([System.Security.Principal.NTAccount])}};
$res
```

Get-WinEvent Examples

```
# Get user Logon / Logoff events
Get-WinEvent -FilterHashtable @{
    LogName='System'
    ProviderName='Microsoft-Windows-Winlogon'
    ID=7001,7002
}
```

```
Get-WinEvent -FilterHashtable @{
    LogName='Application'
    ProviderName='.NET Runtime'
    Keywords=36028797018963968
    ID=1023
    Level=2
}
```

```
}
```

Formatting output

[Source](#)

You can see what formatters are available on any system using the following command

```
Get-Command -Verb Format -Module Microsoft.PowerShell.Utility
```

Below is the output on Windows 11 as of 10/31/2023

```
PS C:\> Get-Command -Verb Format -Module Microsoft.PowerShell.Utility
```

CommandType	Name	Version	Source
-----	----	-----	-----
Function	Format-Hex	3.1.0.0	
	Microsoft.PowerShell.Utility		
Cmdlet	Format-Custom	3.1.0.0	
	Microsoft.PowerShell.Utility		
Cmdlet	Format-List	3.1.0.0	
	Microsoft.PowerShell.Utility		
Cmdlet	Format-Table	3.1.0.0	
	Microsoft.PowerShell.Utility		
Cmdlet	Format-Wide	3.1.0.0	
	Microsoft.PowerShell.Utility		

You also have access to the following cmdlets for other output formats

[Export-CliXml](#)

```
# Export-Clixml exports an XML representation of an object or objects and stores it in a file
Get-Acl C:\Windows | Export-CliXml -Path .\c-windows-acl.xml
```

```
# You can use Import-CliXml to save the stored object or objects back to a variable
$WindowsFolderACL = Import-CliXml -Path .\c-windows-acl.xml
```

[Export-Csv](#)

```
# Export-Csv - Add an example later
```

Redirecting data with Out-* cmdlets

[Source](#)

```
Out-Host -Paging
```

```
Get-Process | Out-Host -Paging | Format-List
```

```
Get-Process | Format-List | Out-Host -Paging
```

```
Get-Command | Out-Null
```

```
Get-Command Get-Command | Out-Printer -Name 'Microsoft Office Document Image Writer'
```

```
Get-Process | Out-File -FilePath C:\temp\processlist.txt
```

```
Get-Command | Out-File -FilePath c:\temp\output.txt -Width 2147483647
```

```
Get-EventLog -LogName System -After (Get-Date).AddDays(-1) -EntryType Error | Out-GridView
```

Grouping output

Remember to use the Get-Member cmdlet to see what properties you can use with Sort-Object and -GroupBy

```
Get-Service -Name win* | Sort-Object StartType | Format-Table -GroupBy StartType -AutoSize
```

```
PS C:\> Get-Service -Name win* | Sort-Object StartType | Format-Table -GroupBy StartType -
AutoSize
```


StartType: Automatic

Status	Name	DisplayName
Running	Winmgmt	Windows Management Instrumentation
Running	WinDefend	Microsoft Defender Antivirus Service

StartType: Manual

Status	Name	DisplayName
Stopped	WinRM	Windows Remote Management (WS-Management)
Running	WinHttpAutoProxySvc	WinHTTP Web Proxy Auto-Discovery Service

Querying for specific logs

System uptime related logs

For the actual current system uptime via PowerShell, [look here](#). The code below will show actual related event log entries.

Use this XML Filter in the Windows Event Viewer to create a custom filtered view of Kernel-General "The operating system started at system time..." events.

Event ID	Description
12	
13	
41	The system has rebooted without cleanly shutting down first. This error could be caused if the system stopped responding, crashed, or lost power unexpectedly.
1074	Logged when an app (ex: Windows Update) causes the system to restart, or when a user initiates a restart or shutdown.
6006	Logged as a clean shutdown. It gives the message "The Event log service was stopped".

6008

Logged as a dirty shutdown. It gives the message "The previous system shutdown at time on date was unexpected".

```
$query = @"
<QueryList>
  <Query Id="0" Path="System">
    <Select Path="System">*[System[(EventID='12')]]</Select>
    <Select Path="System">*[System[(EventID='13')]]</Select>
    <Select Path="System">*[System[(EventID='41')]]</Select>
    <Select Path="System">*[System[(EventID='1074')]]</Select>
    <Select Path="System">*[System[(EventID='6006')]]</Select>
    <Select Path="System">*[System[(EventID='6008')]]</Select>
  </Query>
</QueryList>
"@
```

```
Get-WinEvent -FilterXml $query | Format-List
```

Finding account lockouts.

XML Query

Use this XML Filter in the Windows Event Viewer to create a custom filtered view displaying account lockouts.

```
<QueryList>
  <Query Id="0" Path="Security">
    <Select Path="Security">
      *[
        System[(EventID='4740')]
      ]
    </Select>
  </Query>
</QueryList>
```

PowerShell Script - Slow method

```
Get-EventLog -LogName Security | Where-Object {$_.EventID -eq 4740} |
  Select-Object -Property TimeGenerated, Source, EventID, InstanceId, Message
```

PowerShell Script - Fast method

```
$query = @"
<QueryList>
  <Query Id="0" Path="Security">
    <Select Path="Security">
      *
      [
        System[ (EventID= '4740' ) ]
      ]
    </Select>
  </Query>
</QueryList>
"@

Get-WinEvent -FilterXml $query | Format-List
```

Finding account lockouts for a particular user.

XML Query

Use this XML Filter in the Windows Event Viewer to create a custom filtered view displaying account lockouts for the administrator user.

```
<QueryList>
  <Query Id="0" Path="Security">
    <Select Path="Security">
      *
      [
        EventData[Data[@Name='TargetUserName']='administrator']
        and
        System[ (EventID= '4740' ) ]
      ]
    </Select>
  </Query>
</QueryList>
```

PowerShell Script - Fast method

```
$query = @"
<QueryList>
  <Query Id="0" Path="Security">
```

```

<Select Path="Security">
  *
  EventData[Data[@Name='TargetUserName']='administrator']
  and
  System[(EventID='4740')]
]
</Select>
</Query>
</QueryList>
"@

```

```
Get-WinEvent -FilterXml $query | Format-List
```

NPS + Azure MFA Logs - XML Query

XML Filter for custom filtered view that suppresses accounting event logs.

```

<QueryXML>
<QueryList>
  <Query Id="0" Path="System">
    <Select Path="System">*[System[Provider[@Name='NPS']]]</Select>
    <Select Path="Security">*[System[Provider[@Name='Microsoft-Windows-Security-Auditing'] and
Task = 12552]]</Select>
    <Suppress Path="Security">*[System[Provider[@Name='Microsoft-Windows-Security-Auditing'] and
Task = 12552 and (Data='Network Policy Server discarded the accounting request for a
user.')]</Suppress>
    <Select Path="Security">*[System[Provider[@Name='Microsoft-Windows-Security-Auditing']] and
*[EventData[Data[@Name='LogonProcessName'] and (Data='IAS')]]</Select>
    <Select Path="AuthN0ptCh">*</Select>
    <Select Path="AuthZAdminCh">*</Select>
    <Select Path="AuthZ0ptCh">*</Select>
  </Query>
</QueryList>
</QueryXML>

```

NPS Logs - XML Query

XML Filter for custom filtered view that suppresses accounting event logs.

```

<QueryXML>
<QueryList>
  <Query Id="0" Path="System">
    <Select Path="System">*[System[Provider[@Name='NPS']]]</Select>
    <Select Path="Security">*[System[Provider[@Name='Microsoft-Windows-Security-Auditing'] and
Task = 12552]]</Select>
    <Suppress Path="Security">*[System[Provider[@Name='Microsoft-Windows-Security-Auditing'] and
Task = 12552 and (Data='Network Policy Server discarded the accounting request for a
user.')]</Suppress>
    <Select Path="Security">*[System[Provider[@Name='Microsoft-Windows-Security-Auditing']]] and
*[EventData[Data[@Name='LogonProcessName'] and (Data='IAS')]]</Select>
  </Query>
</QueryList>
</QueryXML>

```

Disk logs

XML Query

XML Filter for custom filtered view for disk events.

```

<QueryList>
  <Query Id="0" Path="System">
    <Select Path="System">*[System[Provider[@Name='disk']]]</Select>
  </Query>
</QueryList>

```

VPN Client Logs

PowerShell Query

```

$query = @"
<QueryList>
  <Query Id="0" Path="Application">
    <Select Path="Application">*[System[Provider[@Name='RasAuto' or @Name='RasCfg' or
@Name='RasClient' or @Name='Rasman' or @Name='Microsoft-Windows-RasServer' or
@Name='Microsoft-Windows-RasSstp' or @Name='Microsoft-Windows-EapMethods-RasChap' or
@Name='Microsoft-Windows-NcdAutoSetup' or @Name='Microsoft-Windows-NCSI' or @Name='Microsoft-
Windows-NetworkProfile']]]</Select>
  </Query>
</QueryList>

```

```

    <Select Path="System">*[System[Provider[@Name='RasAuto' or @Name='RasCfg' or
@Name='RasClient' or @Name='Rasman' or @Name='Microsoft-Windows-RasServer' or
@Name='Microsoft-Windows-RasSstp' or @Name='Microsoft-Windows-EapMethods-RasChap' or
@Name='Microsoft-Windows-NcdAutoSetup' or @Name='Microsoft-Windows-NCSI' or @Name='Microsoft-
Windows-NetworkProfile']]]</Select>
  </Query>
</QueryList>
"@

$vpnEvents = Get-WinEvent -FilterXml $query -Oldest

# Displays events from the last 24 hours grouped by ProviderName
# This is the best view for easily browsing
$vpnEvents | ?{$_.TimeCreated -ge (Get-Date).Addhours(-24)}

```

```

# Displays events from the last 24 hours as a time sorted list
$vpnEvents | ?{$_.TimeCreated -ge (Get-Date).Addhours(-24)} | Format-List

```

XML Query

```

<QueryList>
  <Query Id="0" Path="Application">
    <Select Path="Application">*[System[Provider[@Name='RasAuto' or @Name='RasCfg' or
@Name='RasClient' or @Name='Rasman' or @Name='Microsoft-Windows-RasServer' or
@Name='Microsoft-Windows-RasSstp' or @Name='Microsoft-Windows-EapMethods-RasChap' or
@Name='Microsoft-Windows-NcdAutoSetup' or @Name='Microsoft-Windows-NCSI' or @Name='Microsoft-
Windows-NetworkProfile']]]</Select>
    <Select Path="System">*[System[Provider[@Name='RasAuto' or @Name='RasCfg' or
@Name='RasClient' or @Name='Rasman' or @Name='Microsoft-Windows-RasServer' or
@Name='Microsoft-Windows-RasSstp' or @Name='Microsoft-Windows-EapMethods-RasChap' or
@Name='Microsoft-Windows-NcdAutoSetup' or @Name='Microsoft-Windows-NCSI' or @Name='Microsoft-
Windows-NetworkProfile']]]</Select>
  </Query>
</QueryList>

```

Searching for Wired/WLAN-AutoConfig related errors

Wired-AutoConfig

```
#Powershell

$addhours = 12;

# Setup filter for error only logs
$filter = @{ LogName = "Microsoft-Windows-Wired-AutoConfig/Operational"
StartTime = [DateTime]::Now.AddHours($addhours*-1)
EndTime = [DateTime]::Now
Level = 2
}

Write-Host ([DateTime]::Now.AddHours($addhours*-1))

Write-Host ([DateTime]::Now)

$Events = Get-Winevent -FilterHashtable $filter


# Parse out the event message data
ForEach ($Event in $Events) {
    # Convert the event to XML
    $eventXML = [xml]$Event.ToXml()
    # Iterate through each one of the XML message properties
    For ($i=0; $i -lt $eventXML.Event.EventData.Data.Count; $i++) {
        # Append these as object properties
        Add-Member -InputObject $Event -MemberType NoteProperty -Force -Name
        $eventXML.Event.EventData.Data[$i].name -Value
        $eventXML.Event.EventData.Data[$i].'#text'
    }
}
```

```
# Show results stored in variable
$Events | Format-List
```

WLAN-AutoConfig

```
#Powershell

$addhours = 12;

# Setup filter for error only logs
$filter = @{ LogName = "Microsoft-Windows-WLAN-AutoConfig/Operational"
StartTime = [DateTime]::Now.AddHours($addhours*-1)
EndTime = [DateTime]::Now
Level = 2
}

Write-Host ([DateTime]::Now.AddHours($addhours*-1))

Write-Host ([DateTime]::Now)

$Events = Get-Winevent -FilterHashtable $filter


# Parse out the event message data
ForEach ($Event in $Events) {
    # Convert the event to XML
    $eventXML = [xml]$Event.ToXml()
    # Iterate through each one of the XML message properties
    For ($i=0; $i -lt $eventXML.Event.EventData.Data.Count; $i++) {
        # Append these as object properties
        Add-Member -InputObject $Event -MemberType NoteProperty -Force -Name
        $eventXML.Event.EventData.Data[$i].name -Value
        $eventXML.Event.EventData.Data[$i].'#text'
    }
}

$Events | Select-Object id, MachineName, ProcessId,TimeCreated, Adapter, LocalMac, SSID,
Cipher, Auth, PeerMac | Format-List
```



```
# Show results stored in variable
$Events | Select-Object id, MachineName, ProcessId,TimeCreated, Adapter, LocalMac, SSID,
Cipher, Auth, PeerMac | Format-List
```

Show available wireless profiles and available wireless networks

```
# show profiles
netsh wlan show profiles

# show available networks
netsh wlan show networks
```

Duo Security Events

```
# Get Duo Security related events
Get-WinEvent -FilterHashtable @{
    LogName='Application'
    ProviderName='Duo Security'
}
```

Internet availability via Universal Telemetry Client

```
$query = @"
<QueryList>
  <Query Id="0" Path="Microsoft-Windows-UniversalTelemetryClient/Operational">
    <Select Path="Microsoft-Windows-UniversalTelemetryClient/Operational">
      *[System[(EventID=55)]] and *[EventData[Data[@Name='State'] and (Data='false')]]
    </Select>
    <Select Path="Microsoft-Windows-UniversalTelemetryClient/Operational">
      *[System[(EventID=55)]] and *[EventData[Data[@Name='State'] and (Data='true')]]
    </Select>
  </Query>
</QueryList>
"@

$Events = Get-WinEvent -FilterXml $query -Oldest
```

```
$Events
```

Show network disconnects

```
$query = @"
<QueryList>
  <Query Id="0" Path="Microsoft-Windows-NetworkProfile/Operational">
    <Select Path="Microsoft-Windows-NetworkProfile/Operational">
      *[System[(EventID=10001)]]
    </Select>
  </Query>
</QueryList>
"@

$Events = Get-WinEvent -FilterXml $query -Oldest

$Events
```

netsh wlanreport

netsh will generate an HTML report containing logs of the last 3 days regarding the wireless network interfaces of a device.

```
# The results will be stored here: C:\ProgramData\Microsoft\Windows\WlanReport\wlan-report-latest.html
netsh wlan show wlanreport
```

Sources: [1](#)

Snippets

While a file exists or not

```
# while a file exists
While (Test-Path C:\Temp\File_I_Want_Gone.txt -ErrorAction SilentlyContinue) {
    # Do something here while the file exists
}
```

```
# while a file doesn't exists
While (!(Test-Path C:\Temp\File_I_Want_Gone.txt -ErrorAction SilentlyContinue)) {
    # Do something here while the file doesn't exists
}
```

```
# while a file exists
While (Test-Path C:\Temp\File_I_Want_Gone.txt -ErrorAction SilentlyContinue) {
    # try to delete the file, continue silently if we can't
    Remove-Item "C:\Temp\File_I_Want_Gone.txt" -ErrorAction SilentlyContinue
    # print date each time just to give some sort of feedback on the console
    Get-Date
}
```

Testing Microsoft SQL database connectivity

```
function Test-SQLConnection
{
    [OutputType([bool])]
    Param
    (
        [Parameter(Mandatory=$true,
                    ValueFromPipelineByPropertyName=$true,
                    Position=0)]
```

```
        $ConnectionString
    )
    try
    {
        $sqlConnection = New-Object System.Data.SqlClient.SqlConnection $ConnectionString;
        $sqlConnection.Open();
        $sqlConnection.Close();

        return $true;
    }
    catch
    {
        return $false;
    }
}
```

```
Test-SQLConnection "Data Source=localhost;database=someDatabase;User
ID=bogusTestUser;Password=bogusTestPassword;"
```

[[Source](#)]

Useful PowerShell Commands

Placeholder

Select-String is the Grep equivalent

Examples:

```
# Searching for multiple patterns at the same time
Select-String -Path "*.txt" -Pattern "Pattern1","Pattern2","Pattern3"

# Only return the first 10 results
Select-String -Path "*.txt" -Pattern "Pattern1","Pattern2","Pattern3" | Select-Object -First 10

# Searching for IP addresses
Select-String -Path "*.log" -Pattern '\b\d{1,3}\.\d{1,3}\.\d{1,3}\.\d{1,3}\b' | Select-Object -First 10
```

Uptime

The script below will give you the uptime in any version of PowerShell.

```
Get-CimInstance -ClassName Win32_OperatingSystem | Select LastBootUpTime
```

The [Get-Uptime](#) cmdlet was introduced in PowerShell 6.0.

```
Get-Uptime
```

Format processes by start date

This command will show a lot of errors if you're not running PowerShell as Administrator.

```
Get-Process | Sort-Object StartTime | Format-Table -View StartTime
```

Active Directory Account Information

This command will show you the date of the last password set for a user.

```
Get-ADUser -Identity [USERNAME] -properties * | select accountexpirationdate, accountexpires,
accountlockouttime, badlogoncount, padpwdcount, lastbadpasswordattempt, lastlogondate,
lockedout, passwordexpired, passwordlastset, pwdlastset | format-list
```

Sources:

[PowerShell Format-Table](#)

Active Directory Account Password Expiration

The old way:

```
net use userName /domain
```

The PowerShell way:

```
Get-ADUser -identity userName -Properties "DisplayName", "msDS-UserPasswordExpiryTimeComputed"
|
Select-Object -Property
"Displayname",@{Name="ExpiryDate";Expression={[datetime]::FromFileTime($_."msDS-
UserPasswordExpiryTimeComputed")}}
```

Active Directory OU Account Password Expiration

```
Get-ADUser -filter * -SearchBase "OU=Management,OU=ADPRO
Users,DC=ad,DC=activedirectorypro,DC=com" -Properties "DisplayName", "msDS-
UserPasswordExpiryTimeComputed" | Select-Object -Property
"Displayname",@{Name="ExpiryDate";Expression={[datetime]::FromFileTime($_."msDS-
UserPasswordExpiryTimeComputed")}}
```

View physical network interfaces

```
# Show all physical devices
Get-NetAdapter -Physical | Sort-Object -Property MediaType,Name | Format-Table
ifIndex,MediaType,InterfaceMetric,Name,InterfaceDescription,Status,MacAddress,LinkSpeed
```

Get interface metrics

```
# IPv4 - Display interfaces sorted by metric and alias
Get-NetIPInterface -AddressFamily IPv4 | Sort InterfaceMetric,InterfaceAlias

# IPv6 - Display interfaces sorted by metric and alias
Get-NetIPInterface -AddressFamily IPv6 | Sort InterfaceMetric,InterfaceAlias

# All - Display interfaces sorted by metric and alias
Get-NetIPInterface | Sort InterfaceMetric,InterfaceAlias
```

Set interface metrics

The following commands will set Ethernet interfaces to be preferred over wireless interfaces by manipulating the InterfaceMetric of each device. If there are more than one Ethernet and/or Wireless interface on the machine, you may want to adjust these metrics further to provide a more detailed use order.

Ethernet first, then wireless:

```
# Set Ethernet devices interface metric to 11
Get-NetAdapter -Physical | Where {$_.MediaType -eq "802.3"} | Set-NetIPInterface -
InterfaceMetric 11

# Set Wireless devices interface metric to 12
Get-NetAdapter -Physical | Where {$_.MediaType -eq "Native 802.11"} | Set-NetIPInterface -
InterfaceMetric 12
```

Wireless first, then Ethernet:

```
# Set Wireless devices interface metric to 12
Get-NetAdapter -Physical | Where {$_.MediaType -eq "Native 802.11"} | Set-NetIPInterface -
InterfaceMetric 12

# Set Ethernet devices interface metric to 13
Get-NetAdapter -Physical | Where {$_.MediaType -eq "802.3"} | Set-NetIPInterface -
InterfaceMetric 13
```

Is your Office installation 32 or 64 bit?

```
# .platform value will be either x86 for 32-bit or x64 for 64-bit
$officeCheck = (Get-ItemProperty -Path
"HKLM:\SOFTWARE\Microsoft\Office\ClickToRun\Configuration").platform

if ($officeCheck -eq 'x64'){
    Write-Output "Office is 64 bit."
}
else {
    Write-Output "Office is 32 bit."
}
```

Exporting Event Logs using Out-HTMLView

You can use the Out-HTMLView module to view or save and view later.

```
$executionPolicy = Get-ExecutionPolicy
#Set-ExecutionPolicy -Scope Process -ExecutionPolicy Bypass -Force
Set-ExecutionPolicy -Scope Process -ExecutionPolicy Unrestricted -Force

try { Import-Module -Name PSWriteHTML }
catch {
    Install-Module -Name PSWriteHTML
    Import-Module -Name PSWriteHTML
}
```



```

$lastHours = -4
$timestamp = (Get-Date).ToString('yyyyMMdd_HH:mm:ss')
$systemEventLogFile = ("$(env:TEMP)\$(timestamp)_eventlogs_system_Out-HTMLView.html")
$applicationEventLogFile = ("$(env:TEMP)\$(timestamp)_eventlogs_system_Out-HTMLView.html")

Get-EventLog -LogName System -After (Get-Date).AddHours($lastHours) | Out-HTMLView -FilePath
$systemEventLogFile
Get-EventLog -LogName Application -After (Get-Date).AddHours($lastHours) | Out-HTMLView -
FilePath $applicationEventLogFile

Write-Host ("Event Logs for the last $($lastHours) hours saved to the following files:")
Write-Host ("$(systemEventLogFile)")
Write-Host ("$(applicationEventLogFile)")

#end

```

List installed Windows Features

```
Get-WindowsFeature | Where-Object {$_. installstate -eq "installed"}
```

CPU utilization

[Source](#)

```

Get-Counter -ComputerName localhost '\Process(*)\% Processor Time' `
| Select-Object -ExpandProperty countersamples `
| Select-Object -Property instancename, cookedvalue `
| Sort-Object -Property cookedvalue -Descending | Select-Object -First 20 `
| ft InstanceName,@{L='CPU';E={(($_.Cookedvalue/100).toString('P'))}} -AutoSize

```

Get external IP address

The OpenDNS way via PowerShell

```
$(Resolve-DnsName -Name myip.opendns.com -Server 208.67.222.220).IPAddress
```

The OpenDNS way via cmd

```
nslookup myip.opendns.com 208.67.222.220
```

The OpenDNS way using dig (Linux)

```
dig a myip.opendns.com @208.67.222.220
```

-end

Windows Network Management from the command line

Get interface metrics

```
# IPv4 - Display interfaces sorted by metric and alias
Get-NetIPInterface -AddressFamily IPv4 | Sort InterfaceMetric,InterfaceAlias

# IPv6 - Display interfaces sorted by metric and alias
Get-NetIPInterface -AddressFamily IPv6 | Sort InterfaceMetric,InterfaceAlias

# All - Display interfaces sorted by metric and alias
Get-NetIPInterface | Sort InterfaceMetric,InterfaceAlias
```

Set interface metrics

The following commands will set Ethernet interfaces to be preferred over wireless interfaces by manipulating the InterfaceMetric of each device. If there are more than one Ethernet and/or Wireless interface on the machine, you may want to adjust these metrics further to provide a more detailed use order.

```
# Set Ethernet devices interface metric to 11
Get-NetAdapter -Physical | Where {$_.MediaType -eq "802.3"} | Set-NetIPInterface -
InterfaceMetric 11

# Set Wireless devices interface metric to 12
```

```
Get-NetAdapter -Physical | Where {$_.MediaType -eq "Native 802.11"} | Set-NetIPInterface -  
InterfaceMetric 12
```

netsh and firewall

```
# turn off Windows firewall for all profiles  
netsh advfirewall set allprofiles state off
```

netsh wireless

```
# show wireless LAN interfaces on the system  
netsh wlan show interfaces  
  
# show properties of the wireless LAN drivers on the system  
netsh wlan show drivers  
  
# show list of networks visible on the system  
netsh wlan show networks  
  
# show more detailed information on visible networks  
netsh wlan show networks mode=bssid  
  
# show a list of profiles configured on the system  
netsh wlan show profiles
```

```
# connect to an SSID using a Profile  
netsh wlan connect ssid=[ssid] name=[profile]
```

```
# disconnect all wireless interfaces  
netsh wlan disconnect
```

```
# PowerShell script to run all of the commands and save the output to a txt file

$outputFile = "$($env:TEMP)\$(Get-Date).ToString('yyyyMMdd_HH:mm:ss'))_netsh_wlan_info_$(($env:COMPUTERNAME).output.txt"

$scriptBlock1 = {
    # basic information
    dir env: | Where-Object {$_.Name -Like 'USER*' -Or $_.Name -Like 'COMPUTERNAME' -Or $_.Name -Like 'LOGONSERVER'}
    ipconfig /all
    nslookup google.com

    # show wireless LAN interfaces on the system
    netsh wlan show interfaces

    # show properties of the wireless LAN drivers on the system
    netsh wlan show drivers

    # show list of networks visible on the system
    netsh wlan show networks

    # show more detailed information on visible networks
    netsh wlan show networks mode=bssid

    # show a list of profiles configured on the system
    netsh wlan show profiles

    # show the rest of the env:
    dir env:
}

Invoke-Command -ScriptBlock $scriptBlock1 | Out-File -FilePath $outputFile
Write-Output "netsh wlan output saved the following file: $($outputFile)"
```

Setting IPv4 address using netsh

```
netsh interface ipv4 show config
```

```
# set IPv4 address and dns on an interface using dhcp
```

```
netsh interface ipv4 set address name="Ethernet" source=dhcp
```

```
netsh interface ipv4 set dns name="Ethernet" source=dhcp
```

```
# set IPv4 address on an interface
```

```
netsh interface ipv4 set address name="Ethernet" static 10.1.1.84 255.255.255.0 10.1.1.1
```

```
# set DNS servers on an interface
```

```
netsh interface ipv4 set dns name="Ethernet" static 8.8.8.8 1.1.1.1
```

```
#end
```

Resource Usage

SYSTEMINFO

You can cheat and use good old SYSTEMINFO from any command line. This will give you fairly comprehensive system information.

```
systeminfo
```

Memory Usage

Again you can cheat, use SYSTEMINFO and filter the output:

```
systeminfo | Select-String 'Memory:'
```

The code snippet below will work with PowerShell 3.0 and newer

```
if ([Environment]::Is64BitOperatingSystem) {  
    #64 bit logic here  
    get-process | Group-Object -Property ProcessName |  
    % {  
        [PSCustomObject]@{  
            ProcessName = $_.Name  
            Mem_MB = [math]::Round((($_.Group|Measure-Object WorkingSet64 -Sum).Sum / 1MB, 0)  
            ProcessCount = $_.Count  
        }  
    } | sort -desc Mem_MB | Select-Object -First 25  
} else {  
    #32 bit logic here
```

```

get-process | Group-Object -Property ProcessName |
% {
    [PSCustomObject]@{
        ProcessName = $_.Name
        Mem_MB = [math]::Round(($_.Group|Measure-Object WorkingSet -Sum).Sum / 1MB, 0)
        ProcessCount = $_.Count
    }
} | sort -desc Mem_MB | Select-Object -First 25
}

```

The code below will execute on Windows 7 and newer.

```

if ((Get-WmiObject win32_operatingsystem | select osarchitecture).osarchitecture -eq "64-bit")
{
    #64 bit logic here
    get-process | Group-Object -Property ProcessName |
    % {
        [PSCustomObject]@{
            ProcessName = $_.Name
            Mem_MB = [math]::Round(($_.Group|Measure-Object WorkingSet64 -Sum).Sum / 1MB, 0)
            ProcessCount = $_.Count
        }
    } | sort -desc Mem_MB | Select-Object -First 25
} else {
    #32 bit logic here
    get-process | Group-Object -Property ProcessName |
    % {
        [PSCustomObject]@{
            ProcessName = $_.Name
            Mem_MB = [math]::Round(($_.Group|Measure-Object WorkingSet -Sum).Sum / 1MB, 0)
            ProcessCount = $_.Count
        }
    } | sort -desc Mem_MB | Select-Object -First 25
}

```


64-bit or 32-bit machine / ps host / process

Various ways of determining if the system is 64-bit or 32-bit

[\[Source\]](#)

```
# Get the path where powershell resides.  If the caller passes -use32 then
# make sure we are returning back a 32 bit version of powershell regardless
# of the current machine architecture
function Get-PowerShellPath() {
    param ( [switch]$use32=$false,
            [string]$version="1.0" )

    if ( $use32 -and (test-win64machine) ) {
        return (join-path $env:windir "syswow64\WindowsPowerShell\v$version\powershell.exe")
    }

    return (join-path $env:windir "System32\WindowsPowerShell\v$version\powershell.exe")
}

# Is this a Win64 machine regardless of whether or not we are currently
# running in a 64 bit mode
function Test-Win64Machine() {
    return test-path (join-path $env:WinDir "SysWow64")
}

# Is this a Wow64 powershell host
function Test-Wow64() {
    return (Test-Win32) -and (test-path env:\PROCESSOR_ARCHITECTURE6432)
}
```

```

# Is this a 64 bit process
function Test-Win64() {
    return [IntPtr]::size -eq 8
}

# Is this a 32 bit process
function Test-Win32() {
    return [IntPtr]::size -eq 4
}

function Get-ProgramFiles32() {
    if (Test-Win64 ) {
        return ${env:ProgramFiles(x86)}
    }

    return $env:ProgramFiles
}

function Invoke-Admin() {
    param ( [string]$program = $(throw "Please specify a program" ),
            [string]$argumentString = "",
            [switch]$waitForExit )

    $psi = new-object "Diagnostics.ProcessStartInfo"
    $psi.FileName = $program
    $psi.Arguments = $argumentString
    $psi.Verb = "runas"
    $proc = [Diagnostics.Process]::Start($psi)
    if ( $waitForExit ) {
        $proc.WaitForExit();
    }
}

# Run the specified script as an administrator
function Invoke-ScriptAdmin() {
    param ( [string]$scriptPath = $(throw "Please specify a script"),
            [switch]$waitForExit,
            [switch]$use32=$false )

    $argString = ""

```

```
for ( $i = 0; $i -lt $args.Length; $i++ ) {  
    $argString += $args[$i]  
    if ( ($i + 1) -lt $args.Length ) {  
        $argString += " "  
    }  
}  
  
$p = "-Command & "  
$p += resolve-path($scriptPath)  
$p += " $argString"  
  
$psPath = Get-PowershellPath -use32:$use32  
write-debug ("Running: $psPath $p")  
Invoke-Admin $psPath $p -waitForExit:$waitForExit  
}
```

Installed software via PowerShell

Query registry for installed software

There's more data in each registry than is being displayed in the PowerShell Custom Objects output be the script below. You can inspect `$InstalledSoftware` for further details.

```
# HKEY_Local_Machine
$HKLM_InstalledSoftware = Get-ChildItem
"HKLM:\Software\Microsoft\Windows\CurrentVersion\Uninstall"
$HKLM_PrettyList = foreach ($obj in $HKLM_InstalledSoftware) {
    [PSCustomObject]@{
        Name = ($obj.Name).Split('\')[-1]
        DisplayName = $obj.GetValue('DisplayName')
        DisplayVersion = $obj.GetValue('DisplayVersion')
        Publisher = $obj.GetValue('Publisher')
        InstallLocation = $obj.GetValue('InstallLocation')
    }
}
$HKLM_PrettyList | Sort-Object -Property Publisher,Name | Select-Object -Property
DisplayName,Publisher,InstallLocation,Name
```

The above information does not include software installed to the current logged in user. Just change the hive that's being queried as shown below:

```
# HKEY_Current_User
$HKCU_InstalledSoftware = Get-ChildItem
"HKCU:\Software\Microsoft\Windows\CurrentVersion\Uninstall"
$HKCU_PrettyList = foreach ($obj in $HKCU_InstalledSoftware) {
    [PSCustomObject]@{
        Name = ($obj.Name).Split('\')[-1]

```

```
    DisplayName = $obj.GetValue('DisplayName')
    DisplayVersion = $obj.GetValue('DisplayVersion')
    Publisher = $obj.GetValue('Publisher')
    InstallLocation = $obj.GetValue('InstallLocation')
}
}
$HKCU_PrettyList | Sort-Object -Property Publisher,Name | Select-Object -Property
DisplayName,Publisher,InstallLocation,Name
```

TCP/IP Reset

WiFi adapter sees available network, however will not accept tcp/ip address. Attempting to reset winsock and ip stack may resolve the problem. Note, this information is one of many possible solutions that should only be attempted if you have a good working knowledge of the Windows OS network settings and services.

1. Open a command prompt using the Run As Administrator option.
2. Run the following commands individually in the listed order.

```
netsh winsock reset  
netsh int ip reset  
ipconfig /release  
ipconfig /renew  
ipconfig /flushdns
```

Teams

Busy on busy during calls

- InboundPstnCallRoutingTreatment must be set to something other than "Use default settings" in order for BusyOnBusyEnabledType to be honored at all.
- The GUI "Let users decide" is the equivalent of the PowerShell "UserOverride"


```
PS C:\> Get-CSTeamsCallingPolicy -Identity Global
```

[Output edited to show pertinent information]

Identity	: Global
BusyOnBusyEnabledType	: UserOverride
InboundPstnCallRoutingTreatment	: UserOverride

Global (Org-wide default)

Default policy for users who aren't assigned to a policy.

 To manage calling settings for guest users, go to [Users > Guest access](#)

General

Make private calls

Find related settings at [Meetings > Meeting policies](#)

☒ On

Cloud recording for calling

Find related settings at [Meetings > Meeting policies](#) and [Meetings > Live events policies](#)

☐ Off

Transcription

Find related settings at [Meetings > Meeting policies](#), [Meetings > Live events policies](#), and [Voice > Voicemail policies](#)

☐ Off

Routing for PSTN calls

Let users decide

Routing for federated calls

Use default settings

Call forwarding and simultaneous ringing to people in your organization

☒ On

Call forwarding and simultaneous ringing to external phone numbers

☒ On

Voicemail for inbound calls

Let users decide

Inbound calls can be routed to call groups

☒ On

Delegation for inbound and outbound calls

☒ On

Prevent toll bypass and send calls through the PSTN

☐ Off

Music on hold for calls

☒ On

Busy on busy during calls

Let users decide

Web PSTN calling

☒ On

Real-time captions in Teams calls

Find related settings at [Meetings > Meeting policies](#)

☒ On

Real-time-text (RTT)

☒ On

Automatically answer incoming meeting invites

☐ Off

Spam filtering

On

SIP devices can be used for calls

☐ Off

Open apps in browser for incoming PSTN calls

☐ Off

How to stop Aftershokz / Shokz headphones from beeping while muted

[Source](#)

While Teams is muted, hold both VOLUME buttons (volume "+" and "-" at the same time) for about 3 seconds. You will hear MUTE OFF.

Transitioning from old to new

IPv4 ARP -> IPv6 Neighbors

```
netsh interface ipv6 show neighbors
```

```
# OUTPUT:
```

```
Interface 16: Wi-Fi
```

Internet Address	Physical Address	Type
- - - - -	- - - - -	- - - -
fe80::2a80:88ff:efcd:8a41	28-80-88-dc-6a-41	Reachable(Router)

ipconfig -> PowerShell

```
Get-NetIPAddress
```

```
Get-NetIPAddress | Select-Object -Property InterfaceAlias,IPAddress
```

```
Get-NetIPConfiguration | Select-Object -Property InterfaceAlias,IPv4Address
```

Local admin rights

```
# This is the actual PowerShell command, however I have yet to see it run successfully:
```

```
Get-LocalGroupMember -Group Administrators
```

```
# This is the legacy command that works just fine:
```

```
net localgroup administrators
```

```
# To add an AzureAD user to the local administrators group:
```

```
net localgroup administrators AzureAD\[USERNAME] /add
```

```
#end
```

Useful MSSQL Queries

Show running queries

```
SELECT req.session_id,  
       req.status,  
       req.command,  
       req.cpu_time,  
       req.total_elapsed_time,  
       sqltext.TEXT  
FROM sys.dm_exec_requests req  
CROSS APPLY sys.dm_exec_sql_text(sql_handle) AS sqltext
```

Kill running query

Get the session_id from the previous query, then use the KILL command:

```
KILL [session_id]
```

#end

Sysinternals

“ The [Sysinternals](#) web site was created in 1996 by [Mark Russinovich](#) to host his advanced system utilities and technical information. Whether you're an IT Pro or a developer, you'll find [Sysinternals](#) utilities to help you manage, troubleshoot and diagnose your Windows and Linux systems and applications.

Sysinternals Suite

The whole suite in [one download](#), or via PowerShell below.

```
$URL = "https://download.sysinternals.com/files/SysinternalsSuite.zip"
$OutFile = "C:\Scripts\Sysinternals\SysinternalsSuite.zip"
$OutPath = Split-Path -Path $OutFile

if (-not (Test-Path -Path $OutPath)) {
    New-Item -Path $OutPath -ItemType Directory
    Write-Output "Target folder $($OutPath) has been created."
}

Invoke-WebRequest -URI $URL -OutFile $OutFile
Expand-Archive -Path $OutFile -DestinationPath $OutPath
```

PsTools Suite

The whole PSTools suite in [one download](#), or via PowerShell below.

```
$URL = "https://download.sysinternals.com/files/PSTools.zip"
$OutFile = "C:\Scripts\Sysinternals\PSTools.zip"
$OutPath = Split-Path -Path $OutFile

if (-not (Test-Path -Path $OutPath)) {
    New-Item -Path $OutPath -ItemType Directory
```

```
        Write-Output "Target folder $($OutPath) has been created."
    }
}
```

```
Invoke-WebRequest -URI $URL -OutFile $OutFile
Expand-Archive -Path $OutFile -DestinationPath $OutPath
```

Curated list

These are the ones that I use the most.

```
$DownloadPath = "C:\Scripts"
$SysinternalsFiles = @(
    "procexp.chm",
    "procexp.exe",
    "procexp64.exe",
    "procmon.exe",
    "psexec.exe",
    "pslist.exe",
    "psservice.exe",
    "tcpview.chm",
    "tcpview.exe",
    "tcpview64.exe"
)

if (-not (Test-Path -Path $DownloadPath)) {
    New-Item -Path $DownloadPath -ItemType Directory
    Write-Output "Target folder $($DownloadPath) has been created."
}

foreach ($AppFile in $SysinternalsFiles) {
    Write-Output "$($AppFile)"
    $outputFile = "$($DownloadPath)\$($AppFile)"
    $URL = "https://live.sysinternals.com/$AppFile"
    if (Test-Path -Path $outputFile) {
        Remove-Item $outputFile
        Write-Output "    - deleted existing"
    }
    Write-Output "    - downloading"
    Invoke-WebRequest -URI $URL -OutFile $outputFile
}
```

```
Write-Output "    - done"
```

```
}
```

```
-end
```

Power Automate

Teams webhook requests for Mezmo Alerts

Mezmo Webhook configuration

Content-Type: application/json

```
{
  "title": "Mezmo - User account alert",
  "summary": "{{ matches }} line(s) matched in {{ name }}",
  "view": "{{ name }}",
  "matches": "{{ matches }}",
  "line": "{{ line }}",
  "lines": "{{ lines }}",
  "level": "{{ level }}",
  "url": "{{ url }}",
  "query": "{{ query }}",
  "app": "{{ app }}",
  "host": "{{ host }}",
  "tag": "{{ tag }}"
}
```

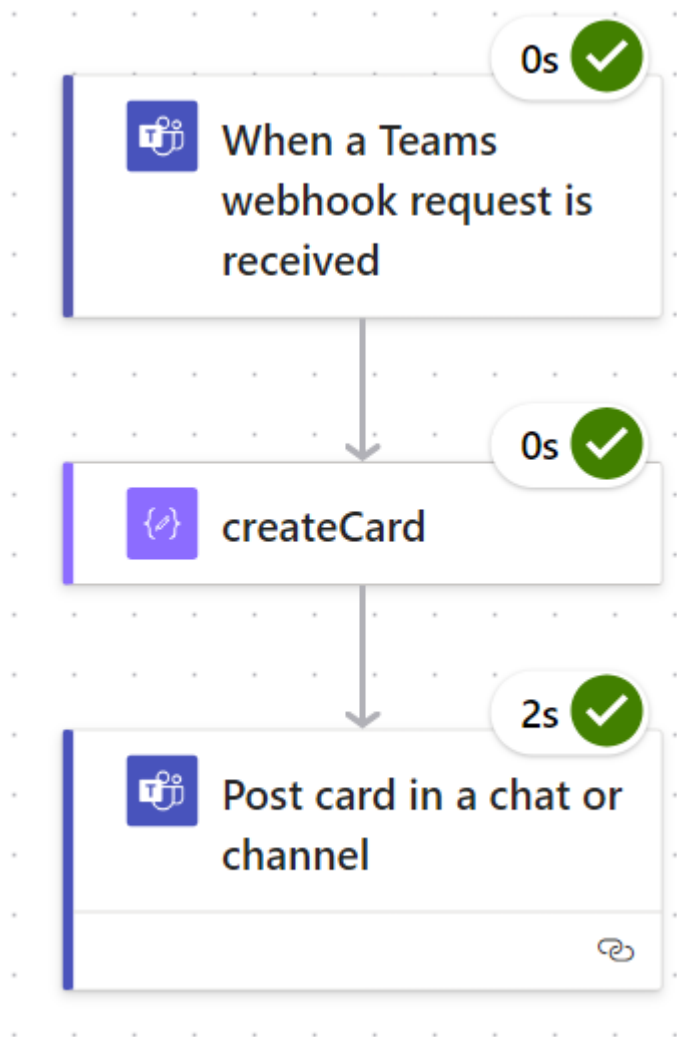
Teams Workflow

Using the default Teams Workflow that was created failed because evidently the suggested content from Mezmo wasn't correct. I'm sure there's a way to craft the message properly straight from the Mezmo configuration so you can use the default Teams Workflow, but I haven't figured it out yet.

Instead, I went down the path of customizing the workflow in Power Automate and leveraging Compose to create the card I wanted (or at least as close as I've been able to get so far) with the data I'm sending from Mezmo via the Webhook.

Power Automate Workflow Edit

The screenshot below is the basic workflow.



Compose: createCard

JSON Parameters

```
{
  "$schema": "http://adaptivecards.io/schemas/adaptive-card.json",
  "version": "1.4",
  "type": "AdaptiveCard",
  "body": [
    {
      "type": "TextBlock",
      "size": "Medium",
      "weight": "Bolder",
      "id": "Title",
      "text": "@{triggerBody()?['title']}"
    },
    {
```

```
"type": "FactSet",
"facts": [
  {
    "title": "Summary",
    "value": "@{triggerBody()?['summary']}"
  },
  {
    "title": "View",
    "value": "@{triggerBody()?['view']}"
  },
  {
    "title": "Host",
    "value": "@{triggerBody()?['host']}"
  },
  {
    "title": "Query",
    "value": "@{triggerBody()?['query']}"
  },
  {
    "title": "Severity",
    "value": "@{triggerBody()?['level']}"
  }
],
},
{
  "type": "TextBlock",
  "id": "Line",
  "text": "Line: @{triggerBody()?['line']}",
  "wrap": true
},
{
  "type": "Container",
  "items": [
    {
      "type": "TextBlock",
      "text": "Click to see all lines",
      "weight": "Bolder",
      "size": "Medium",
      "color": "Accent"
    },
  ],
}
```

```

{
  "type": "ActionSet",
  "actions": [
    {
      "type": "Action.ToggleVisibility",
      "title": "Show Details",
      "targetElements": [
        "AllLinesExpanded"
      ]
    }
  ],
},
{
  "type": "Container",
  "id": "AllLinesExpanded",
  "isVisible": false,
  "items": [
    {
      "type": "TextBlock",
      "text": "@{triggerBody()?['lines']}",
      "wrap": true
    }
  ]
}
],
},
{
  "type": "TextBlock",
  "id": "URL",
  "text": "[Link to logs](@{triggerBody()?['url']})",
  "wrap": true
}
]
}

```

Resulting Teams Card



via Workflows 3:55 PM

Mezmo - User account alert

Summary: 1 line(s) matched in Test View. Security level: info

View Test View

Host Test View

Query Test View

Line: After matching at least 1 line in a 30 second period, we'll send an alert to this email with all the matched lines

[Click to see all lines](#)

Show Details

[Link to logs](#)

-end

Microsoft Remote Desktop

Select RDP transport protocols (client side)

[Source](#)

Check

```
Get-ItemProperty -Path "HKLM:\SOFTWARE\Policies\Microsoft\Windows NT\Terminal Services" -Name "SelectTransport"
```

"Use only TCP"

```
Set-ItemProperty -Path "HKLM:\SOFTWARE\Policies\Microsoft\Windows NT\Terminal Services" -Name "SelectTransport" -Value 1 -Type DWord
```

"Use both UDP and TCP"

```
Set-ItemProperty -Path "HKLM:\SOFTWARE\Policies\Microsoft\Windows NT\Terminal Services" -Name "SelectTransport" -Value 0 -Type DWord
```

"Use either UDP or TCP"

```
Set-ItemProperty -Path "HKLM:\SOFTWARE\Policies\Microsoft\Windows NT\Terminal Services" -Name "SelectTransport" -Value 2 -Type DWord
```

PowerShell Modules

PowerShell Modules

PowerAruba

[PowerAruba](#)

[PowerArubaSW](#) - PowerShell module to manage ArubaOS switches

Microsoft 365 Licensing

[Source](#)