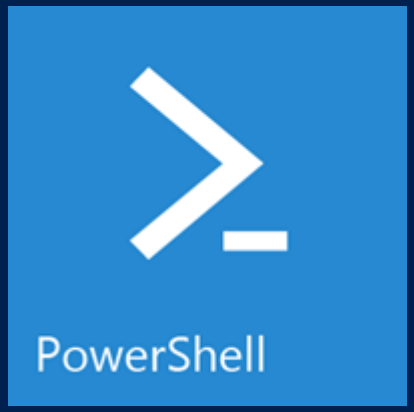

PowerShell Remoting

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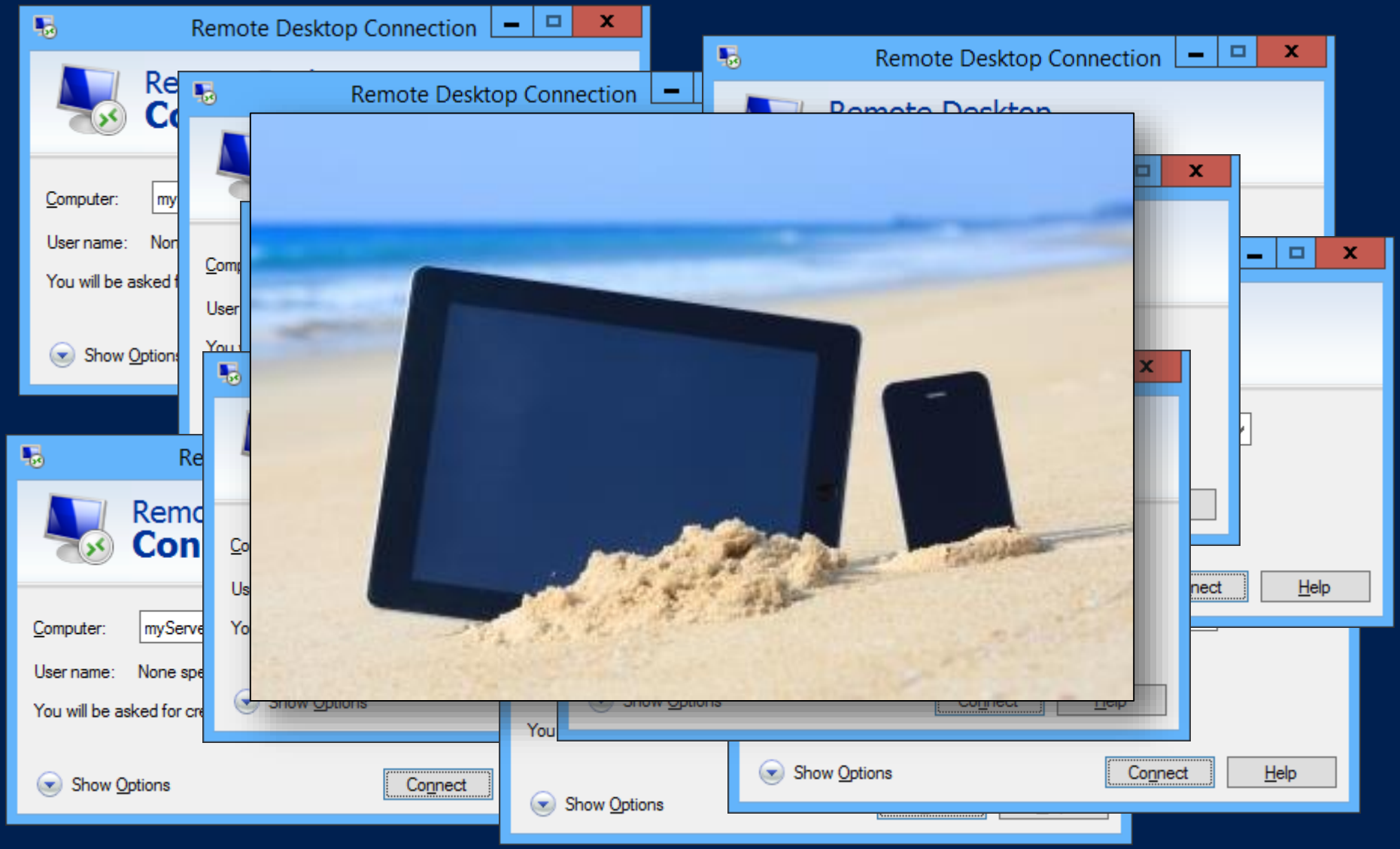
Why remote commands?



In the old days…

- PsExec and WMI were almost the only tools allowing remote execution
  - With the downside: The new process on the remote machine cannot be controlled from the machine where the process was spawned

What **isn't** PowerShell Remoting?

- The -ComputerName parameter does not rely on PowerShell Remoting.
- They use distributed COM (DCOM) or remote procedure call (RPC) to connect to the remote systems
- For example:
  - `Get-WmiObject`
  - `Get-HotFix`
  - `Get-Process`
  - `Get-EventLog`

What **is** PowerShell Remoting?

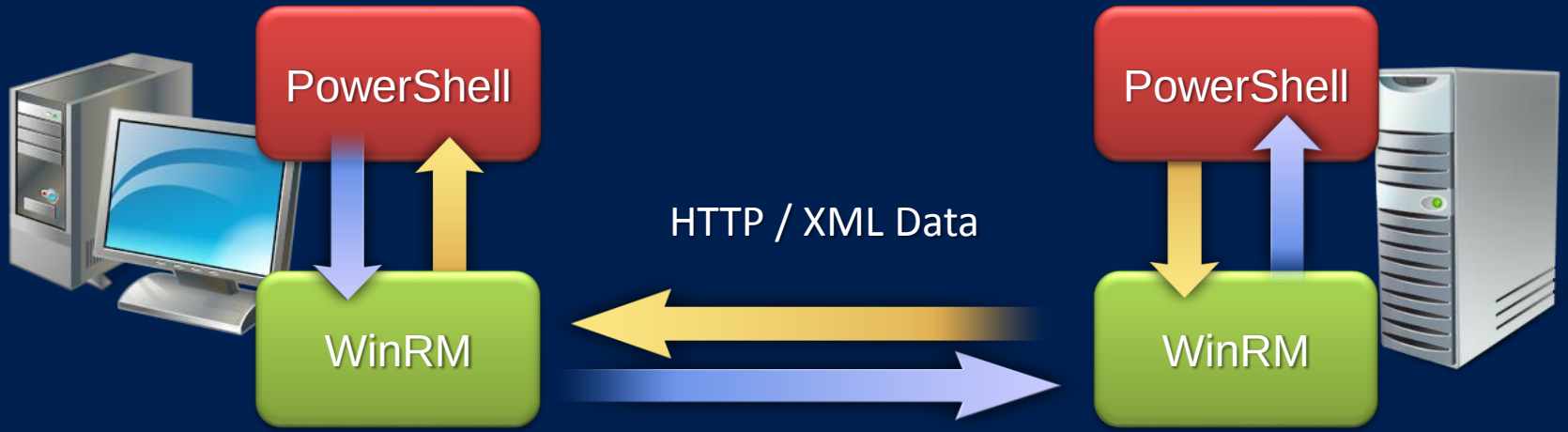
- A PowerShell feature that allows remote management from a central location
- Based on WinRM 2 (an implementation of WS-Man)
- Adapts the Universal Code Execution Model (whatever runs locally should run anywhere)
- There are many different styles of remoting (interactive, fan-out, fan-in, implicit)

What do I need?

- PowerShell v2.0 (v3.0 or above for some features)
- The user needs to be in the local administrators group (for the default session configurations)
- The network location must be private or domain
- Remoting needs to be enabled (It is disabled by default)
- As of Windows Server 2012, PowerShell Remoting is enabled by default and is mandatory for server management

Under the hood

- WinRM / WS-Man is based on HTTP and a single port (5985)
  - 5986 for HTTPS
- Objects are serialized into XML streams



CIM vs. WMI

- WMI requires DCOM connectivity
  - TCP 135 & TCP 1024+
- CIM requires less complex network connectivity
  - TCP 5985
- Open platform WSMan standard (OS Agnostic)

- `Get-WmiObject Win32_BIOS –ComputerName DC01`
- `Get-CimInstance Win32_BIOS –ComputerName DC01`

Getting started

- Enable-PSRemoting
- winrm quickconfig
- Computer Configuration -> Policies -> Administrative Templates -> Windows Components
  - Windows Remote Management
  - Windows Remote Shell

I don’t want to be me

- Cmdlets in PowerShell do not accept credentials as strings (username and password). They expect a PSCredential object
- This object can either be obtained using the cmdlet **`Get-Credential`**, or using **`New-Object System.Management.Automation.PSCredential`**
- Credentials can also be saved to disk or a database using the data protection API
- **`Export-CliXml / Import-CliXml`**

When do I use it?

- 1:Many (fan-out): Large Scale Automation
  - Send the script to remote machines
  - Throttling – limits the number of concurrent operations
- 1:1 (interactive): Secure Telnet Replacement
  - Cmdline equivalent of Remote Desktop
  - Interact with a remote machine as if it were local
- Many:1 (fan-in): Delegated Administration & Hosting
  - No tools installation required on client
  - Constrained session environment (cmdlets, parameters, language)

One at a time

- **`Invoke-Command`**
- Can be used against one or many remote computers
- Script blocks can be executed remotely as well as scripts. The result can be treated as coming from the local machine
- Scripts do not need to be on the remote machine or on a share. WinRM copies the script in the background

Keep it running

- **`New-PSSession`**
- Create a persistent session object
- Persistent sessions can be used to prevent the creation of a new runspace every time
- Pass the session object using the **`-Session`** parameter

I want to be there

- **`Enter-PSSession`**
- Enter the previously created session, or create one on the fly
- For some operations determine the lifetime of a session is desired
  - v2.0: If the job controller looses the connection the session is destroyed and running scripts are stopped
  - v3.0 and above: Sessions can be disconnected and reconnected even from another computer

Be there, here

- **`Import-PSSession`**
- Brings the remote commands to the local session
- Can import cmdlets that do not exist on the local computer
- Managing different technologies (SharePoint, Exchange, Active Directory) from a single computer without the need of installing the management tools on various machines

Where are the tweaks?

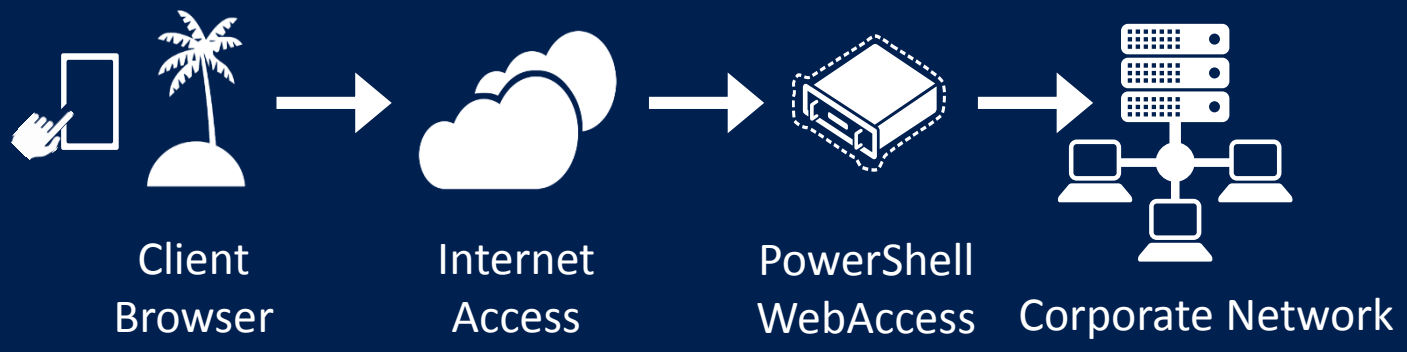
- Use the WSMan: PSDrive to navigate through the configuration settings
  - dir WSMan:\localhost\Service -Recurse
  - Set-Item WSMan:\localhost\Shell\MaxShellsPerUser 25
  - Set-Item WSMan:\localhost\listener*\Port 8888

What about non-admins?

- By default, only local administrators can use remote PowerShell
- Set-PSSessionConfiguration can be used to change the permission using the UI or SDDL
- The information can be also changed directly in the registry (XML)
- To transfrom SDDL into something readable and vice versa, the CommonSecurityDescriptor class can be used

PowerShell Web Access

- Acts as a Windows PowerShell gateway, providing a web-based PowerShell console
- Increases the value of your investment in PowerShell
- Built for phones, tablets
- Cross-platform support



Q & A

Resources

- Layman's Guide to PowerShell 2.0 remoting:

http://www.ravichaganti.com/blog/?page_id=1301

- Administrator's Guide to Windows PowerShell Remoting:

http://powershell.com/cs/media/p/4908.aspx

- Secrets of PowerShell Remoting:

http://powershell.org/wp/wp-content/uploads/2012/08/SecretsOfPowerShellRemoting.zip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