MVA
Microsoft Virtual Academy

Free, online, technical courses

Take a free online course.

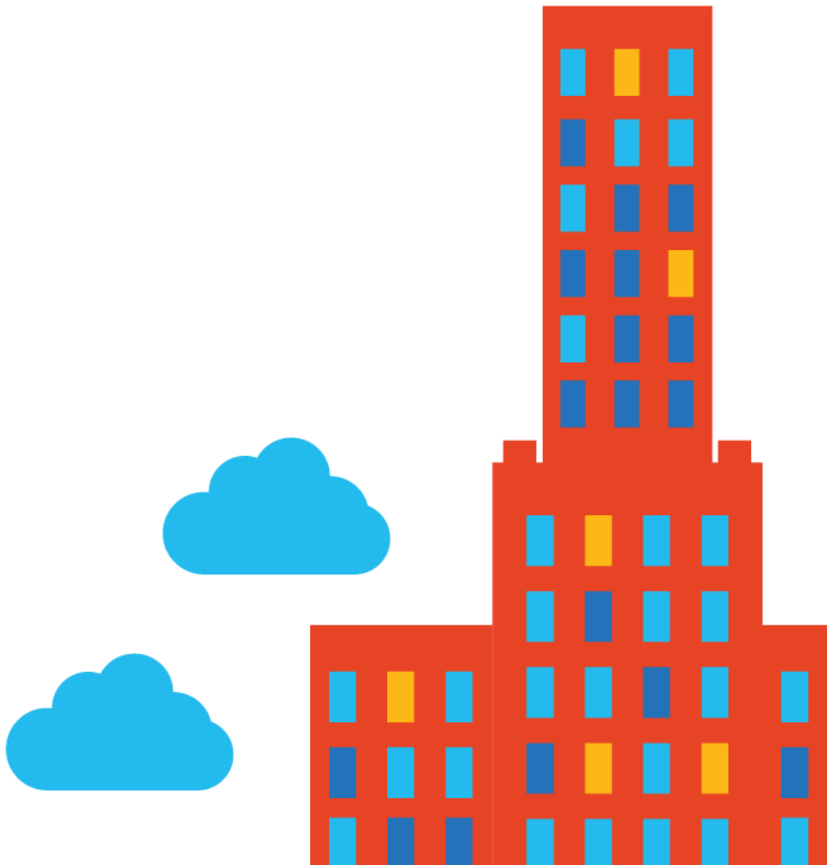
http://www.microsoftvirtualacademy.com

Microsoft

Module 3
Introducing Nano Server.

Module Agenda

- The journey.
- Getting started with Nano Server.
- Nano Server Management.
- Preliminary Results.
- Developers & apps.
- Resources.



The journey.

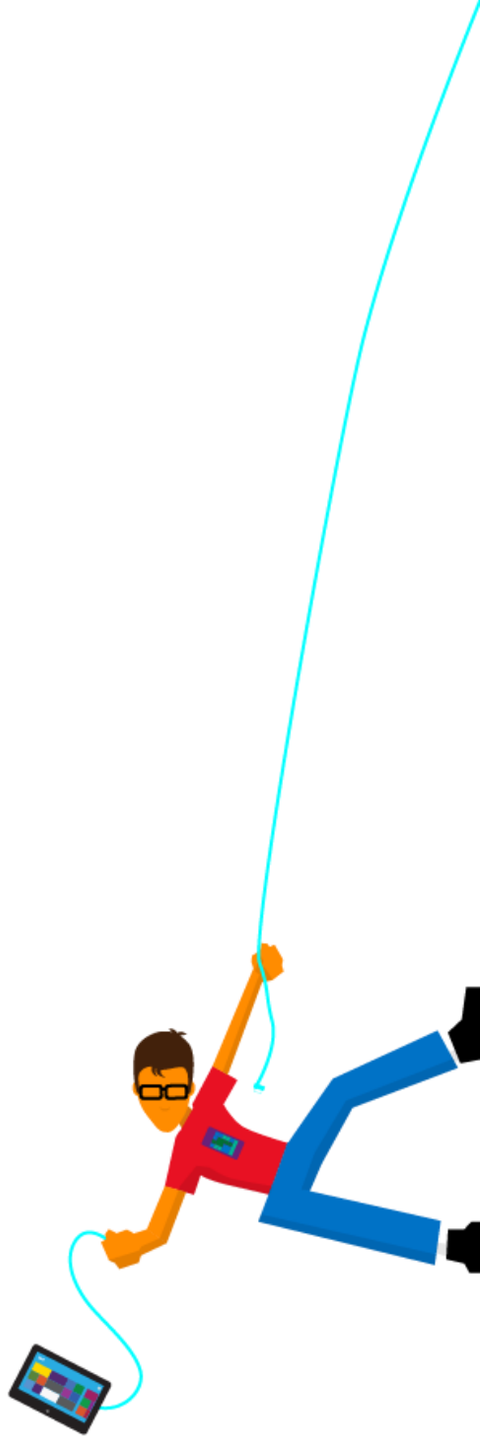
Customer Voice

- Reboots impact my business
  - Why do I have to reboot because of a patch to a component I never use?
  - When a reboot is required, the systems need to be back in service ASAP

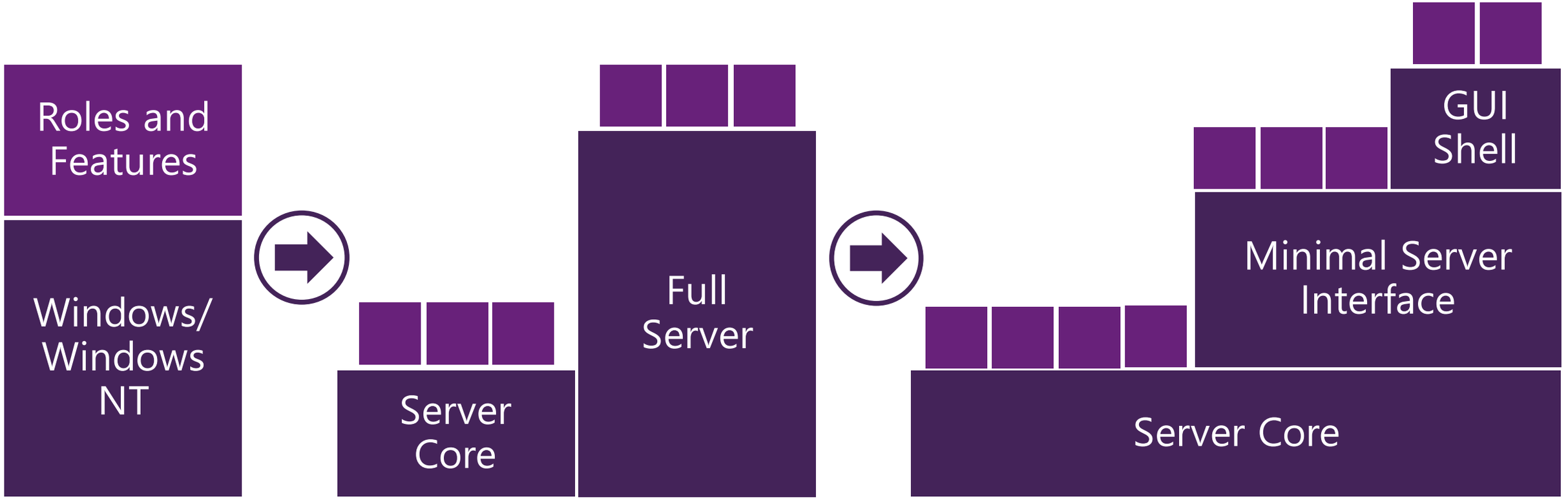
- Server images are too big
  - Large images take a long time to install and configure
  - Transferring images consumes too much network bandwidth
  - Storing images requires too much disk space

- Infrastructure requires too many resources
  - If the OS consumes fewer resources, I can increase my VM density
  - Higher VM density lowers my costs and increases my efficiency & margins

I want just the components
I **need**, and nothing more.



The story so far…



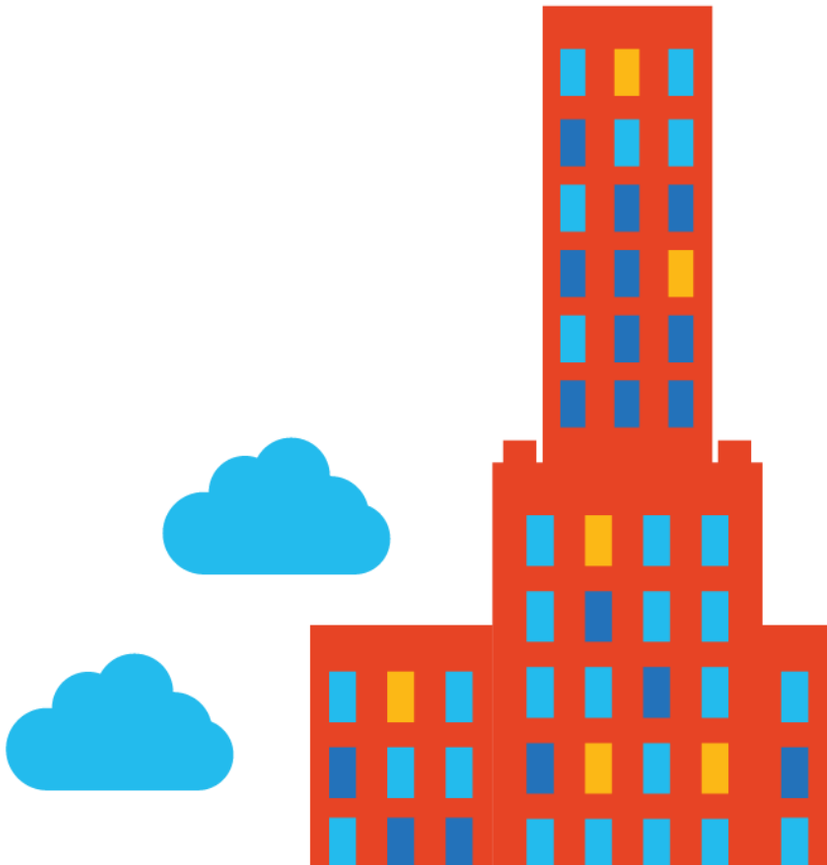
Windows NT to Windows Server 2003

Windows Server 2008 and Windows Server 2008 R2

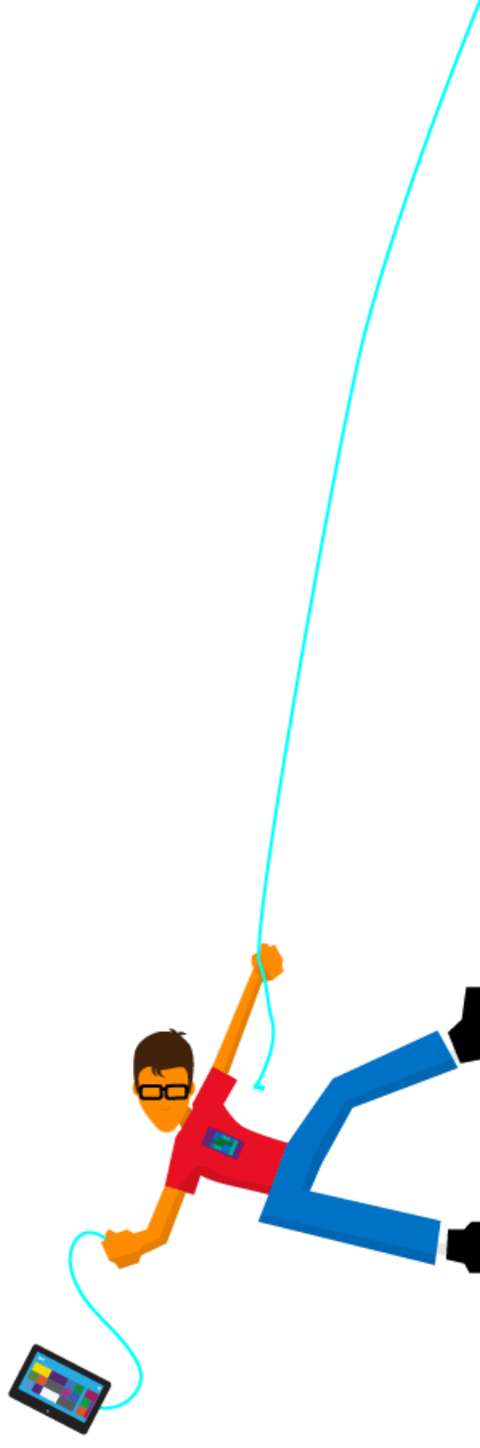
Windows Server 2012 and Windows Server 2012 R2

Our Cloud Journey

- Azure
  - Patches and reboots interrupt service delivery
  - (**VERY** large # of servers) * (large OS resource consumption) => COGS
  - Provisioning large host images competes for network resources
- Cloud Platform System (CPS)
  - Cloud-in-box running Windows Server & System Center
  - Excessive time required to fully deploy
  - Patching impacts network allocation
    - Fully loaded CPS would live migrate > 16TB for every host OS patch
    - Network capacity could have otherwise gone to business uses
  - Costly reboots result in service disruption:
    - Compute host ~2 minutes
    - Storage host ~5 minutes

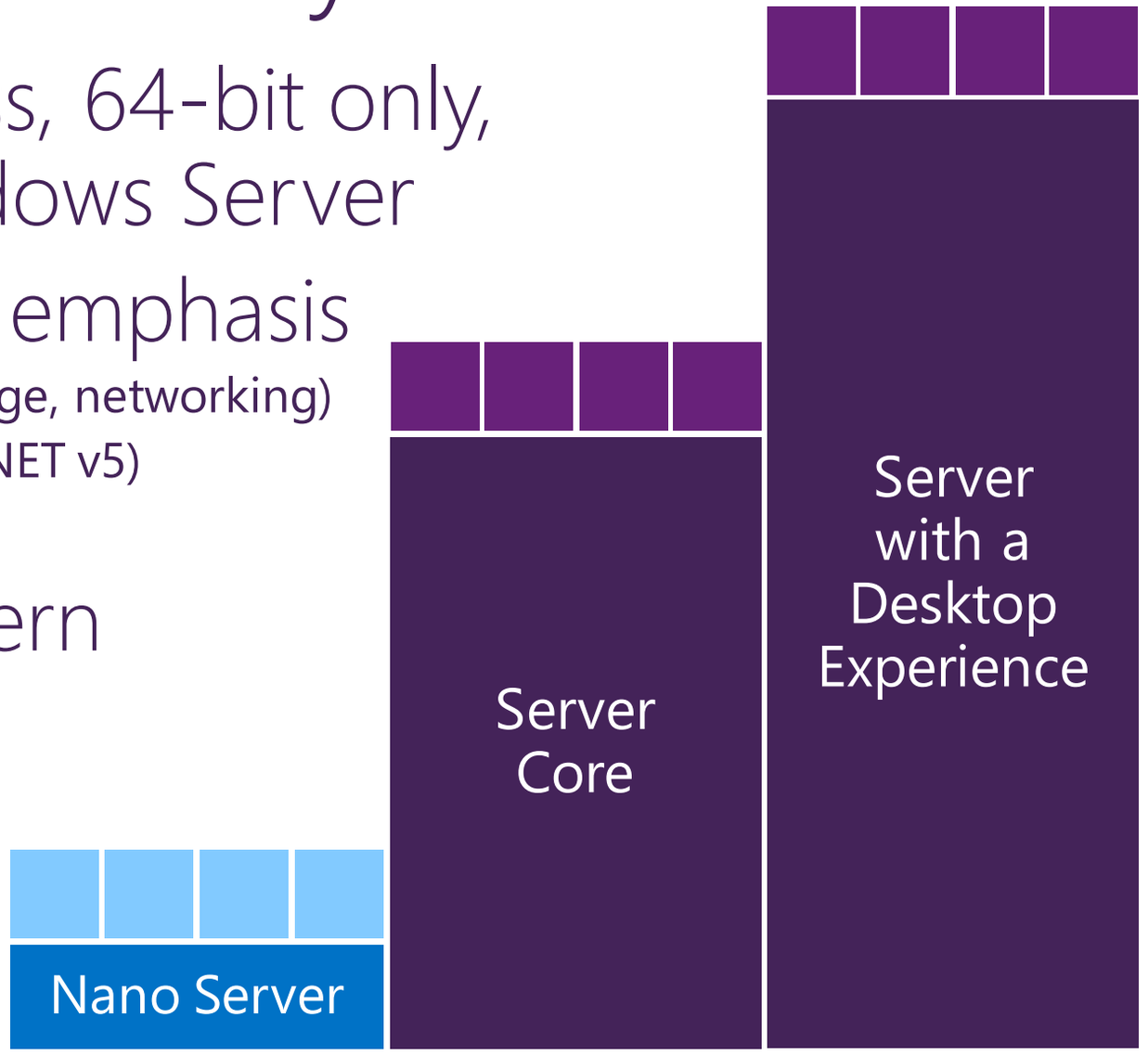


We need server configuration **optimized for the cloud**



The next step in the journey…

- **Nano Server**: A new headless, 64-bit only, deployment option for Windows Server
- Deep refactoring with cloud emphasis
  - Cloud fabric & infrastructure (clustering, storage, networking)
  - Born-in-the-cloud applications (PaaS v2, ASP.NET v5)
  - VMs & Containers (Hyper-V & Docker)
- Extend the Server Core pattern
  - Roles & features live outside of Nano Server
  - No Binaries or metadata in OS image
  - Standalone packages install like apps
  - Full driver support
  - Antimalware



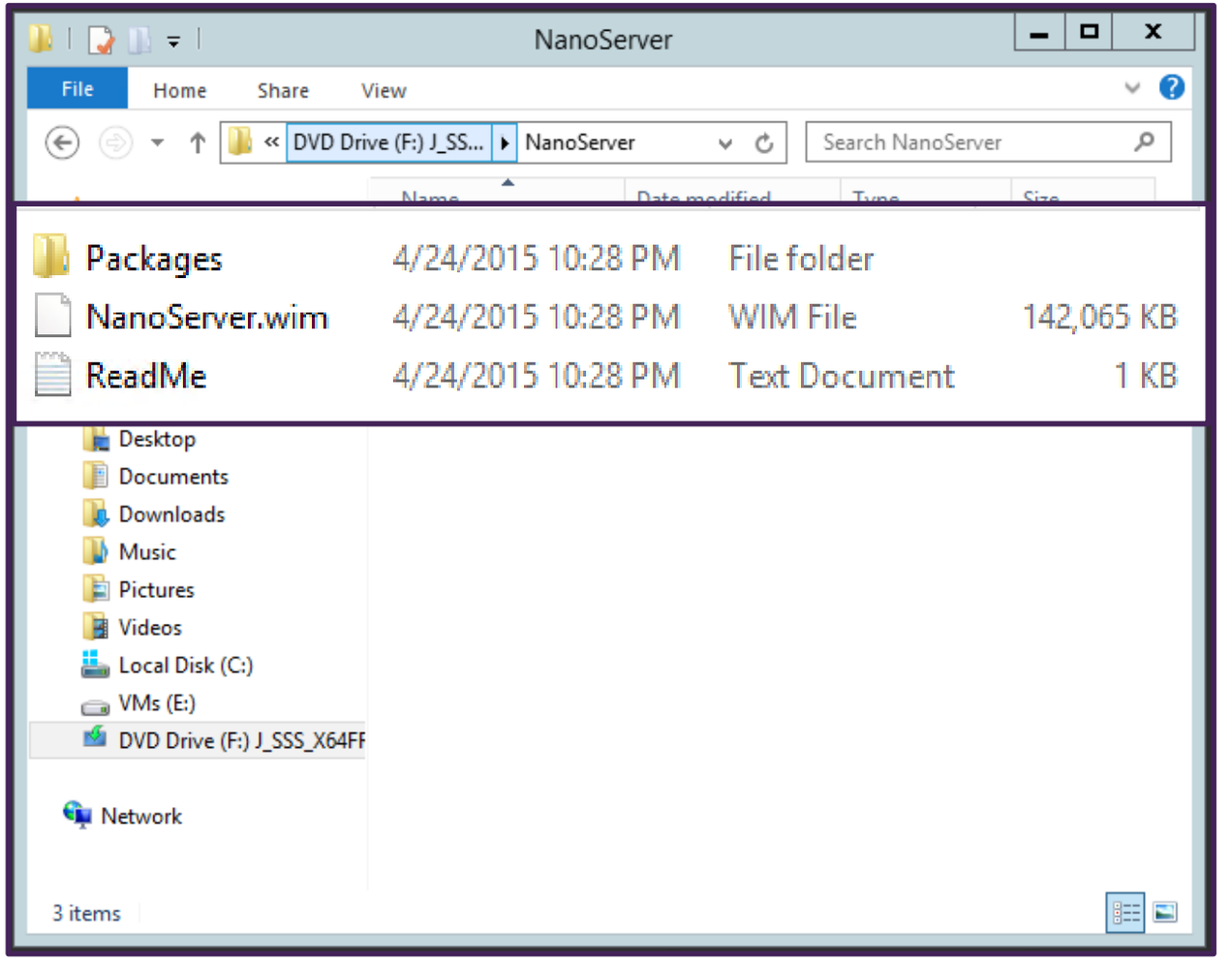
Nano Server - Roles & Features

- Zero-footprint model
  - Server Roles and Optional Features live outside of Nano Server
  - Standalone packages that install like applications
- Key Roles & Features
  - Hyper-V, Storage (SoFS), and Clustering
  - Core CLR, ASP.NET 5 & PaaS
- Full Windows Server driver support
- Antimalware Built-in
- System Center and App Insights agents to follow

Getting started with Nano Server.

Getting started

- Nano Server is an installation option
  - Like Server Core, but cannot be selected during Setup
  - Must be customized with drivers
  - Located on the Windows Server media
- Available within the Windows Server Technical Preview



Getting Started | Nano in a VM

1. Mount the Technical Preview ISO, and, assuming the drive letter for the mounted image is D:\, run the following:

```
Copy "D:\NanoServer" "C:\NanoServer" -Recurse
```

2. Make a new folder called DISM. From the Sources folder on the distribution media, copy these files to the DISM folder: api*downlevel*.dll, *dism*, *provider*

3. Generate a VHD from NanoServer.wim by using Convert-WindowsImage.ps1 from TechNet Script Center.

```
Convert-WindowsImage.ps1 –WIM ‘C:\NanoServer\NanoServer.wim’ –VHD
‘C:\NanoServer\NanoServer.vhd’ –VHDformat VHD -Edition 1
```

4. Mount the image, to add drivers/packages:

```
Mount-DiskImage –ImagePath C:\NanoServer\NanoServer.vhd’
```

5. Mount the image, to add drivers/packages: (it will choose the next drive letter, in our case E:\)

```
Mount-DiskImage –ImagePath C:\NanoServer\NanoServer.vhd’
```

6. Add the driver packages relevant to your deployment:

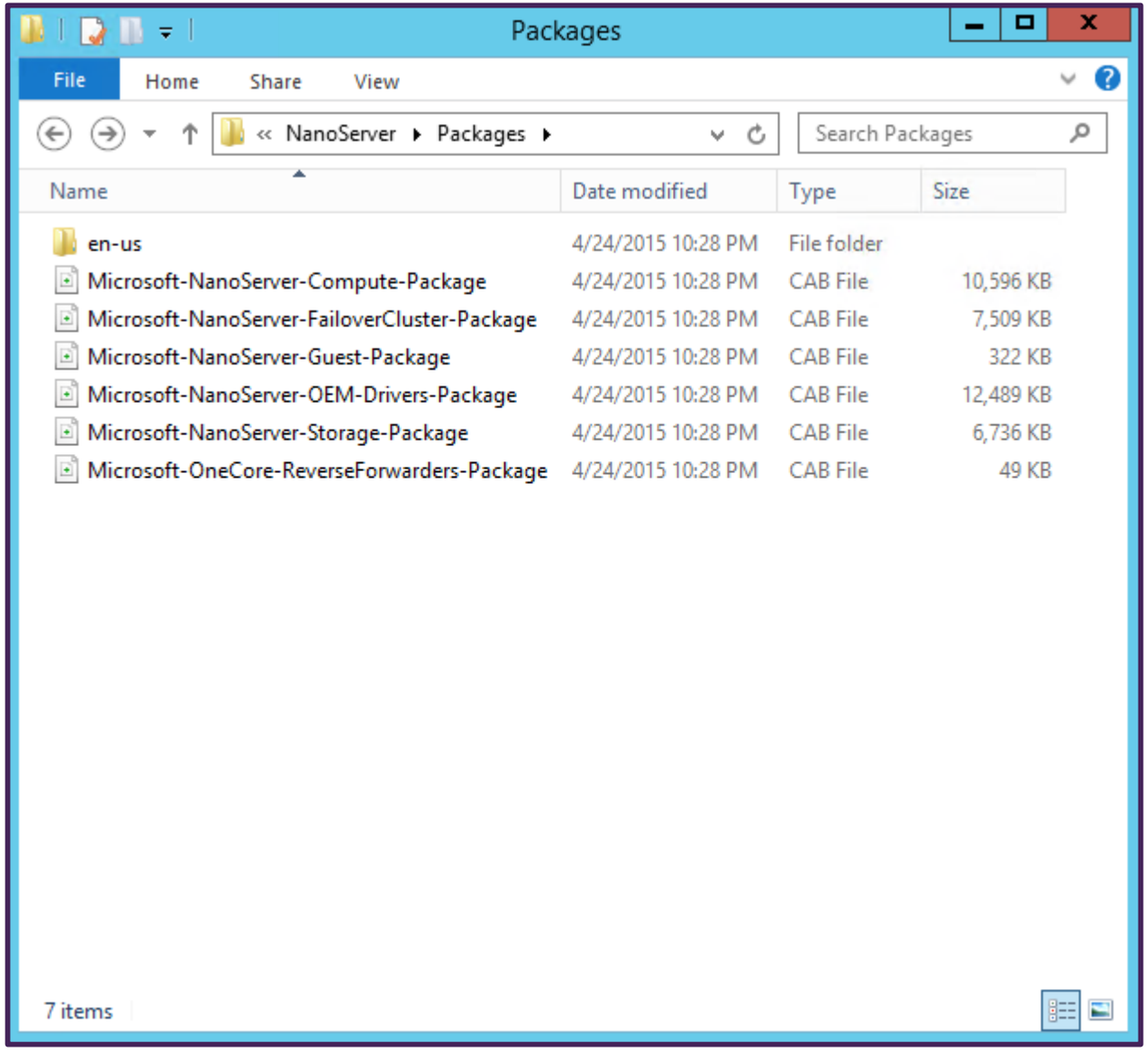
```
Add-WindowsPackage –Path E:\ –PackagePath C:\NanoServer\Packages\Microsoft-
NanoServer-Guest-Package.cab
```

7. Dismount the image, ready to add as a VHD to a new VM:

```
Dismount-DiskImage –ImagePath ‘C:\VHD\NanoServer.vhd’
```

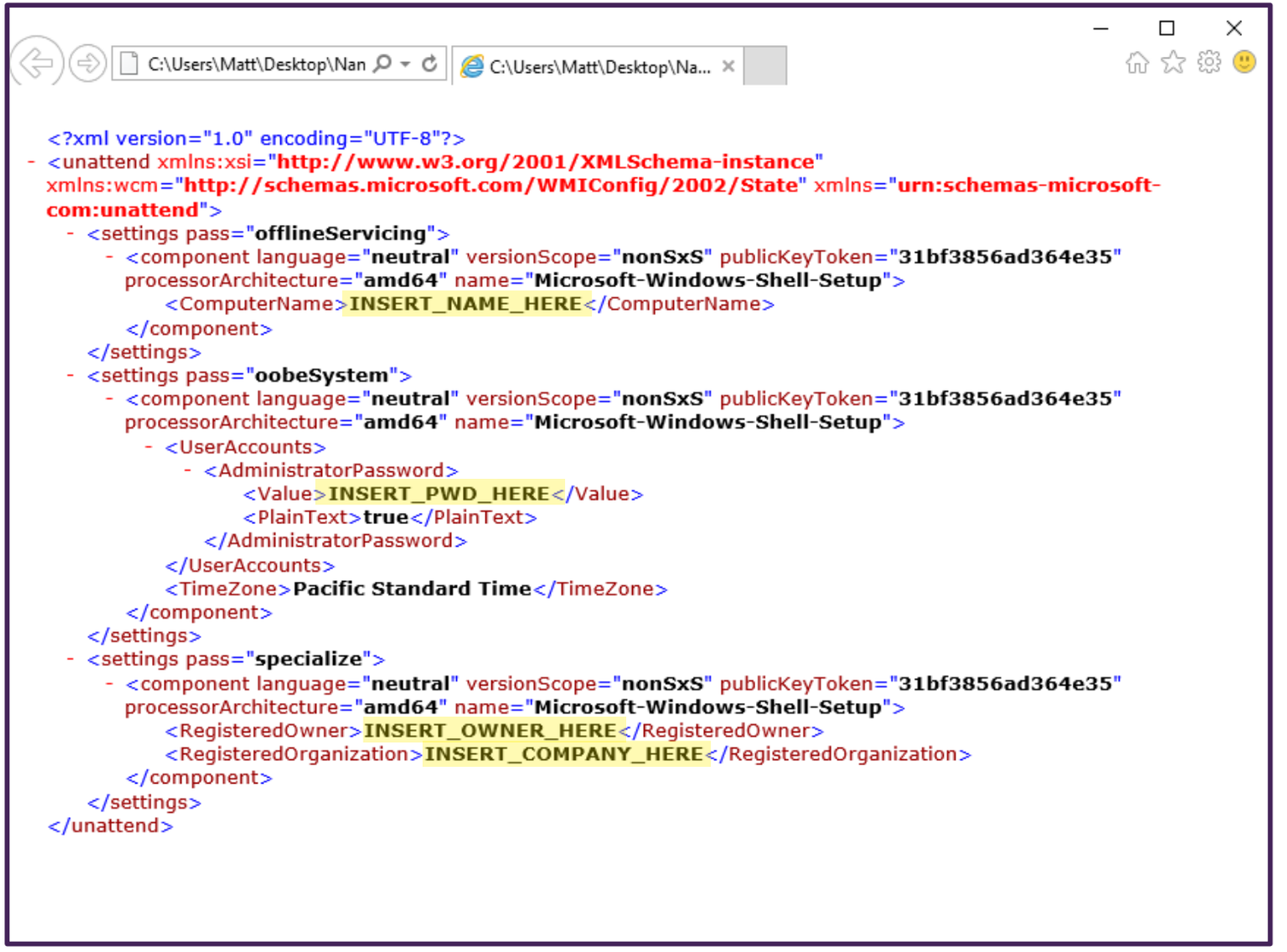
Drivers, Roles and Features

- For the leanest image, install just the drivers your hardware requires.
  - Dism /Add-Driver /driver:<path>
- Nano Server includes a package of all drivers in Server Core
  - Dism /Add-Package /PackagePath:.\packages\Microsoft-NanoServer-OEM-Drivers-Package.cab
- Packages are provided for:
  - Hyper-V Host
  - File Server Host
  - Failover Clustering
  - Nano as a VM
  - All OEM Drivers (in Server Core)
  - Reverse Forwarders



Customizing Nano Server

- To complete the configuration, you need: **computer name** and **administrator password**.
- Simplest way is with an Unattend.xml file.
  - Place Unattend.xml inside C:\NanoServer folder
- Can include Domain-Join information.



Customizing Nano Server

1. From an elevated command prompt, run:

```
dism\dism /Mount-Image /ImageFile:.\NanoServer.vhd /Index:1 /MountDir:.\mountdir
```

2. Then apply the unattend.xml file:

```
dism\dism /image:.\mountdir /Apply-Unattend:.\unattend.xml
```

3. Create a "Panther" folder (used by Windows systems for storing files during setup. Copy the Unattend.xml file to it, and then unmount the VHD with these commands:

```
md .\mountdir\windows\panther
copy .\unattend.xml .\mountdir\windows\panther
dism\dism /Unmount-Image /MountDir:.\mountdir /Commit
```

4. To have IP information displayed on first boot, use a SetupComplete.cmd file (created with Notepad, containing the string "ipconfig":

```
dism\dism /Mount-Image /ImageFile:.\NanoServer.vhd /Index:1 /MountDir:.\mountdir
md .\mountdir\Windows\Setup
md .\mountdir\Windows\Setup\Scripts
copy .\SetupComplete.cmd .\mountdir\Windows\Setup\Scripts
dism\dism /Unmount-Image /MountDir:.\mountdir /Commit
```

Also see: http://blogs.technet.com/b/nanoserver/archive/2015/05/19/how-to-display-ipconfig-on-nano-server-every-time-it-boots.aspx

Demo.

Getting started | Nano in a VM

Joining a domain

- Harvest a data blob from a domain machine that is already running Windows Server Technical Preview

```
djoin.exe /provision /domain <domain-name> /machine <machine-name> /savefile .\odjblob
```

- Copy the "odjblob" file to the Nano Server then configure with PowerShell (may require firewall adjustment on Nano Server first)

```
#Edit Firewall Settings
$ip = "<ip address of Nano Server>"
Enter-PSSession -ComputerName $ip -Credential $ip\Administrator
netsh advfirewall firewall set rule group="File and Printer Sharing" new enable=yes

#Copy Data Blob to Nano Server
net use z: \\<ip address of Nano Server>\c$
md z:\Temp
copy odjblob z:\Temp

#Apply the data blob file and reboot
djoin /requestodj /loadfile c:\Temp\odjblob /windowspath c:\windows /localos
shutdown /r /t 5
Exit-PSSession
```

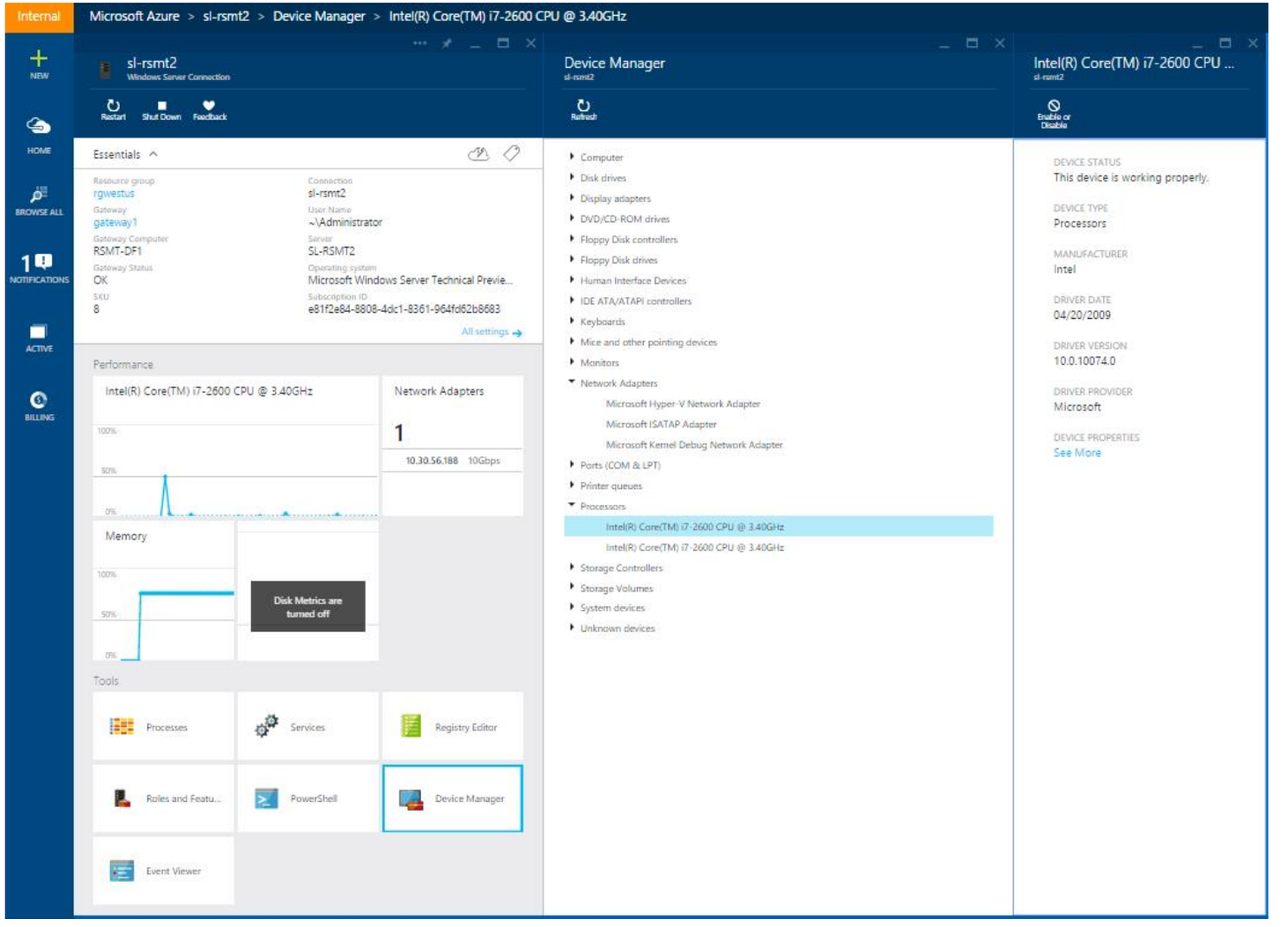
Nano Server management.

Remotely Managing Nano Server

Remote Graphical & Web Tools	PowerShell Remoting	VM and Container Management	Deployment & Monitoring	Partners & Frameworks
• Server Manager • Azure Portal tools • Task manager • Registry editor • File explorer • Server configuration • Event viewer • Disk manager • Device & driver management • Performance • Users & groups	• Core PowerShell engine, language, and cmdlets • Windows Server cmdlets (network, storage, etc.) • PowerShell DSC • Remote file transfer • Remote script authoring & debugging • PowerShell Web Access	• Hyper-V Manager • Hyper-V cmdlets • PowerShell Direct over PSRP • CimSession support • Docker • SCVMM agent & console • 3rd party agents & consoles	• DISM online & VHD support • Unattended setup • Visual Studio integration • DSC Local Config Manager • Setup & boot eventing • SCOM agent • VSO App Insights • Azure Op Insights	• Chef integration • .NET Core and CoreCLR • ASP.NET 5 • Python, PHP, Ruby, Node.js • PowerShell Classes • PS Script Analyzer • PowerShell Gallery • PowerShellGet

Remotely Managing Nano Server

- Remote Server Management Tools
- Core PowerShell & WMI
- PowerShell DSC
- Hyper-V Manager
- Failover Cluster Manager
- Server Manager
- Perfmon, Event Viewer, Disk Manager, Device Manager etc….



Demo.

Server Manager & MMCs for managing Nano Server

Core PowerShell on Nano Server

- Built on .NET Core Runtime
  - Lean, composable, open source, cross platform
  - CoreCLR + ASP.NET 5 + C# "Roslyn" compiler
- Reduced disk footprint: 55MB total
  - CoreCLR (45MB) + PowerShell (8MB) + Modules (2MB)
- Full language, subset of features, subset of cmdlets
- PowerShell remoting (server-side only)
  - Backwards compatible with existing PowerShell remoting clients to PS 2.0
  - File transfer over PowerShell remoting
  - Remote script authoring & debugging in ISE
- Cmdlets for managing Nano Server components

Using PowerShell remoting

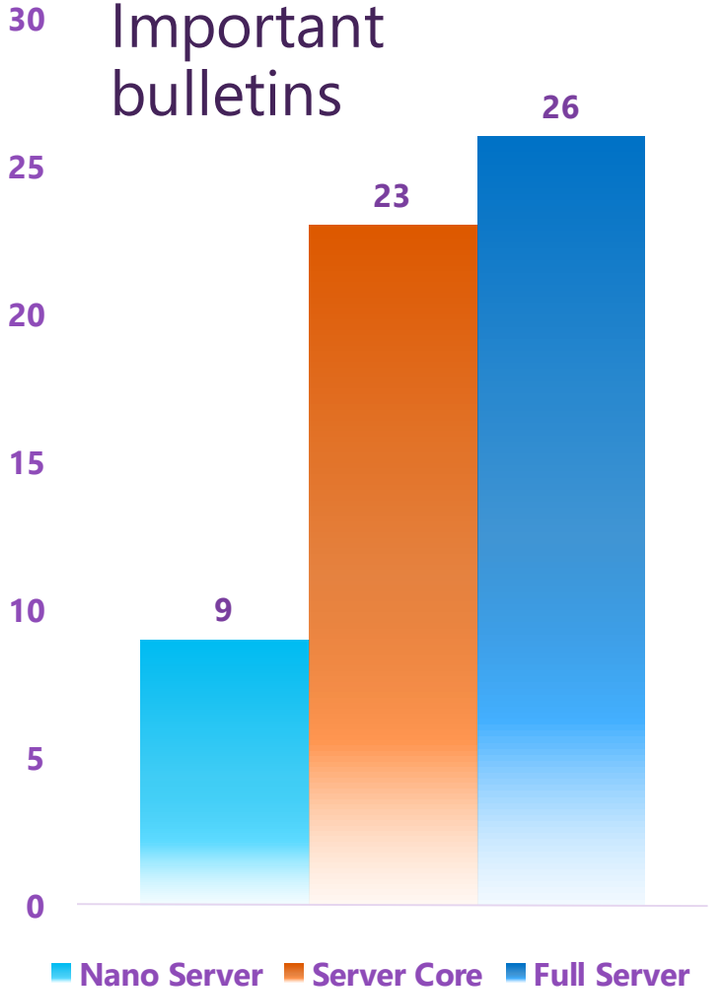
- 2 Key Steps:
  - Add IP of the Nano Server to your management computer's list of trusted hosts
  - Add account you are using to the Nano Server's administrators, and enable CredSSP if you plan to use that feature

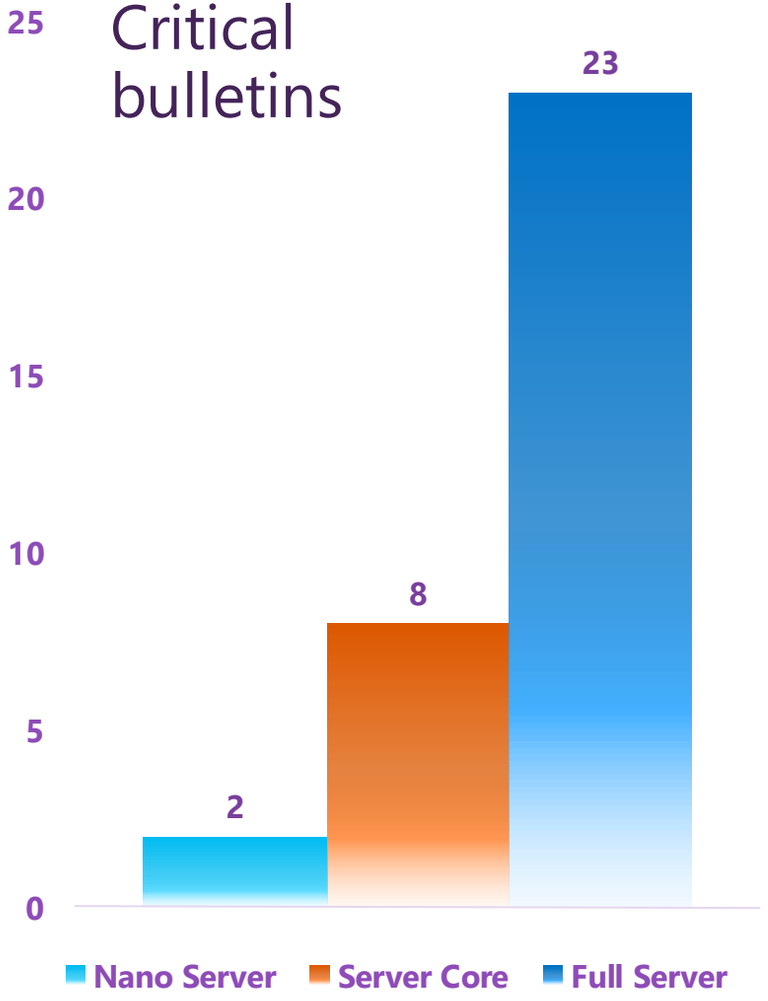
-
```
Set-Item WSMan:\localhost\Client\TrustedHosts "<IP address of Nano Server>“

$ip = “<IP address of Nano Server>”
$user = “$ip\Administrator”
Enter-PSSession -ComputerName $ip -Credential $user
Exit-PSSession
```

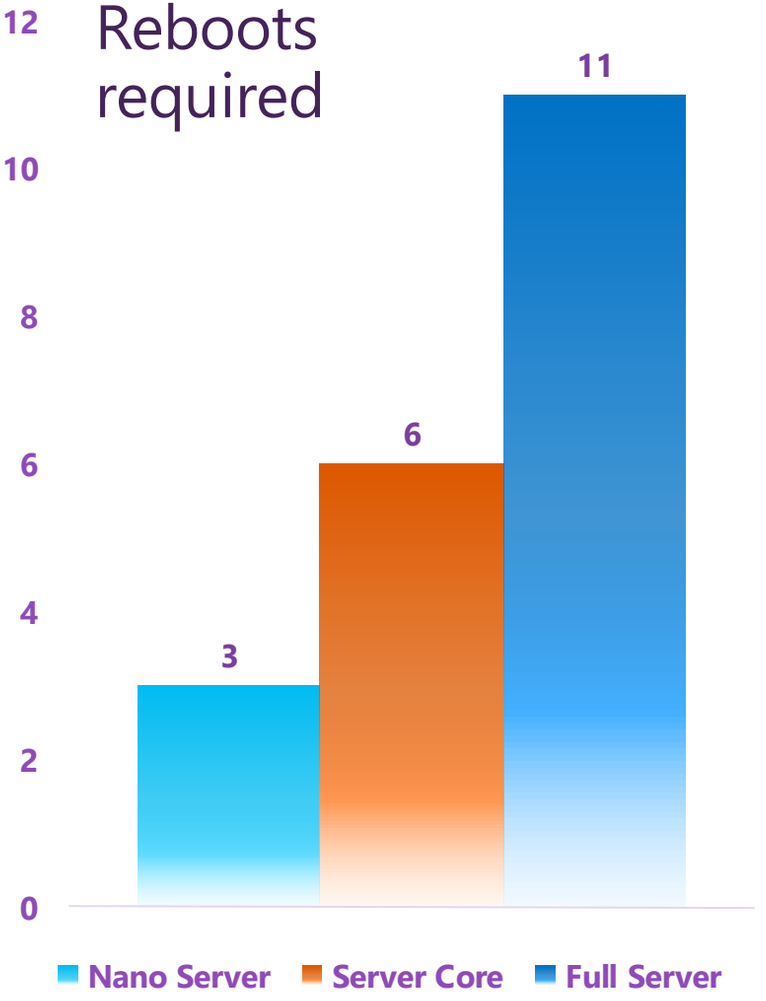
Demo.
Core PowerShell on Nano Server

Preliminary Results.

Servicing improvements*

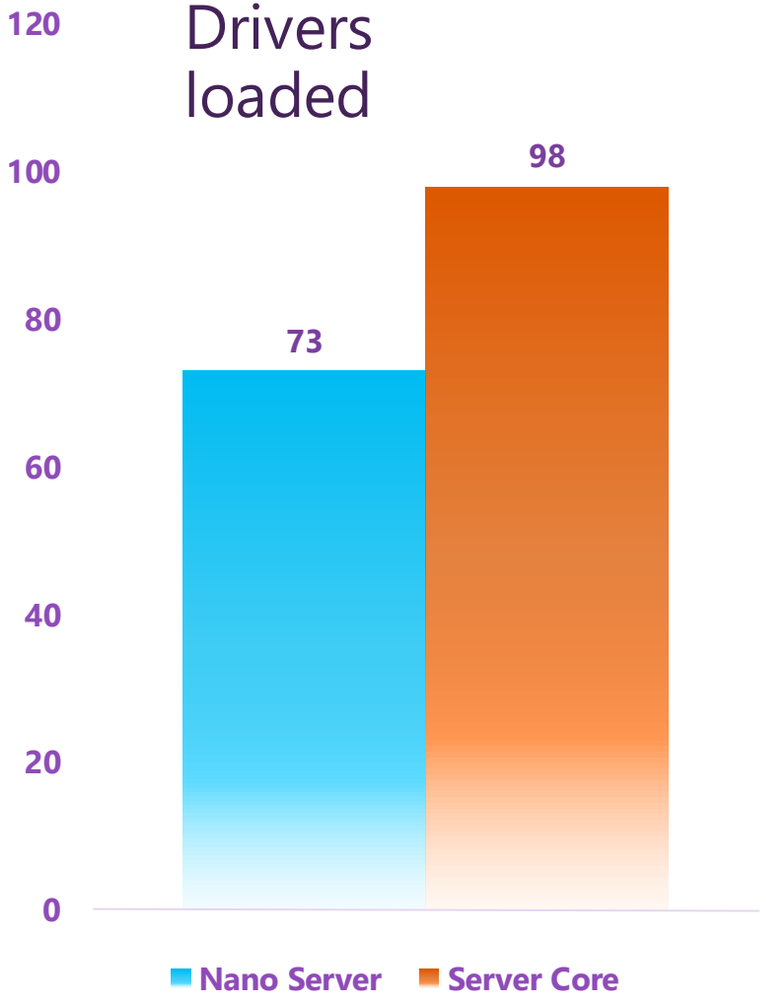


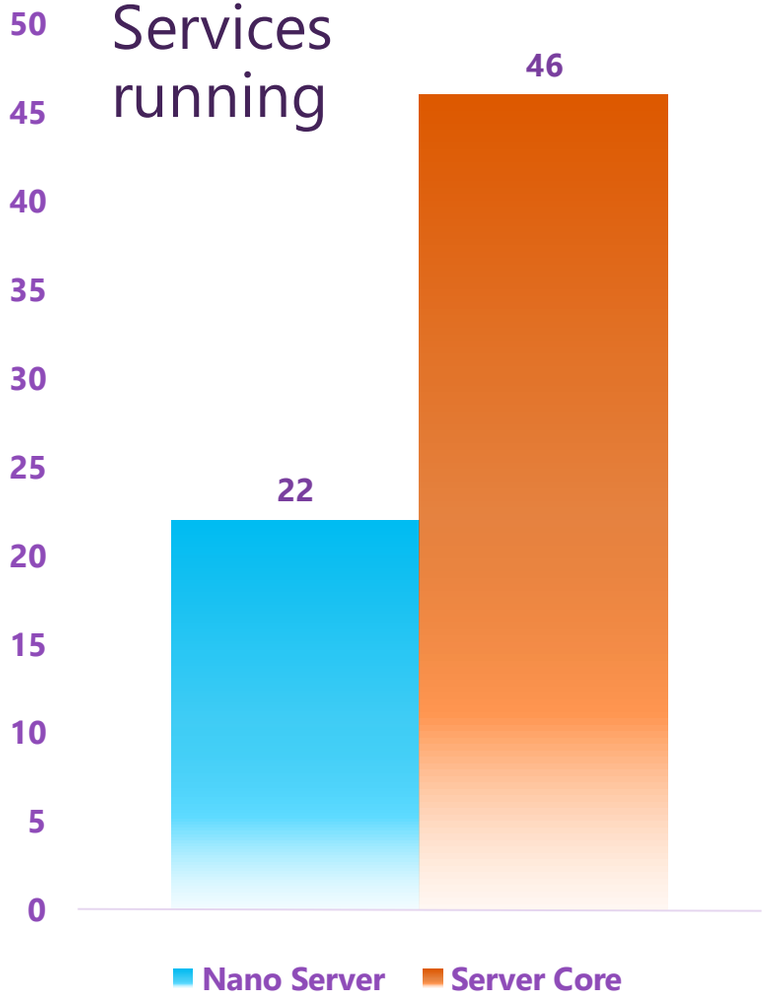


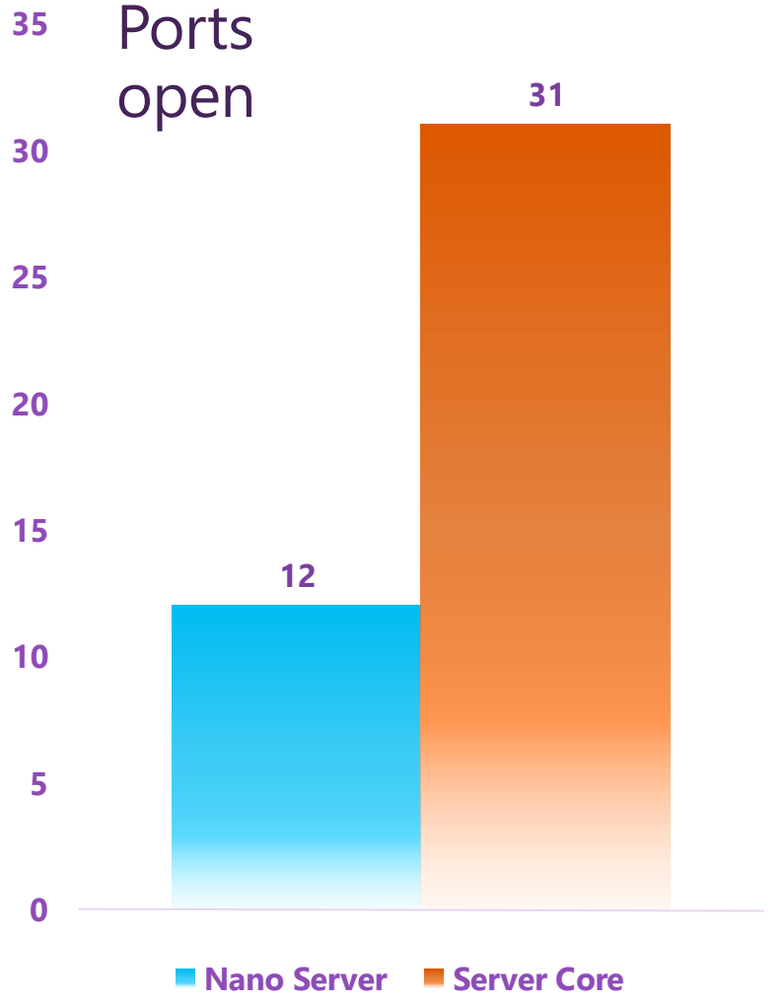


* Analysis based on all patches released in 2014

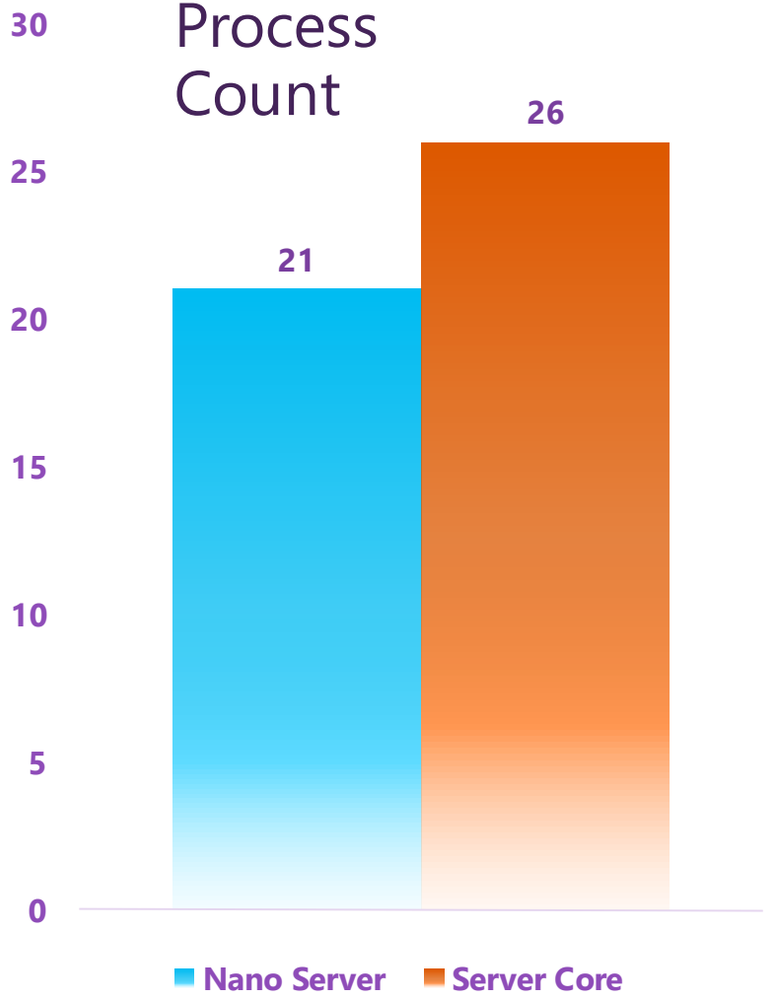
Security improvements

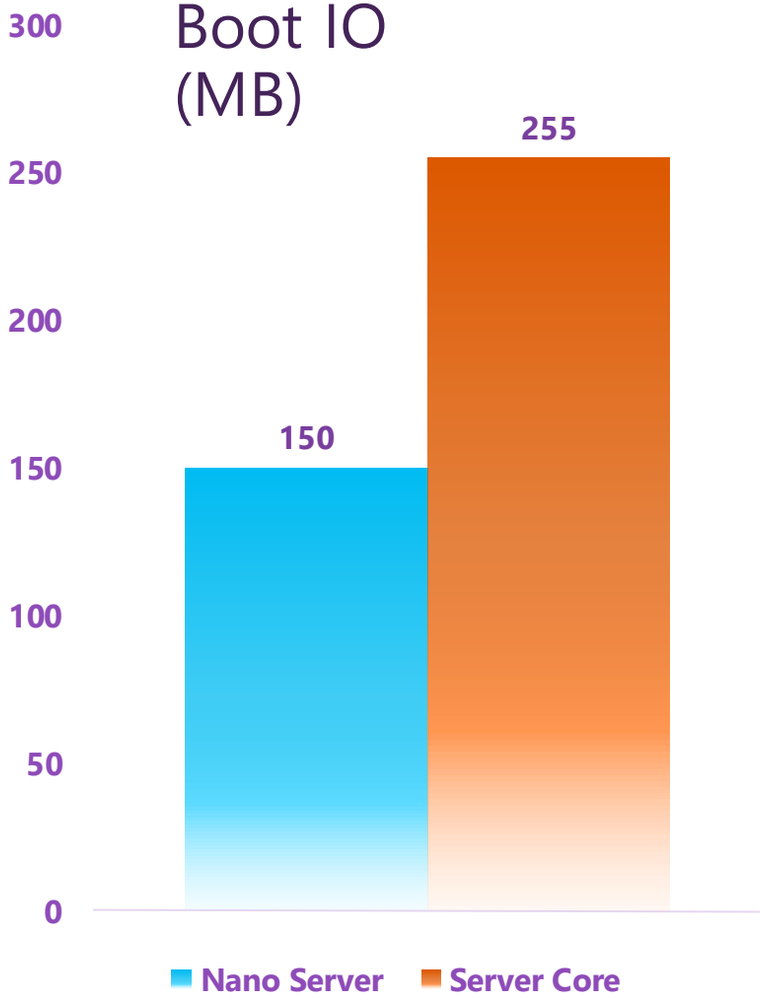


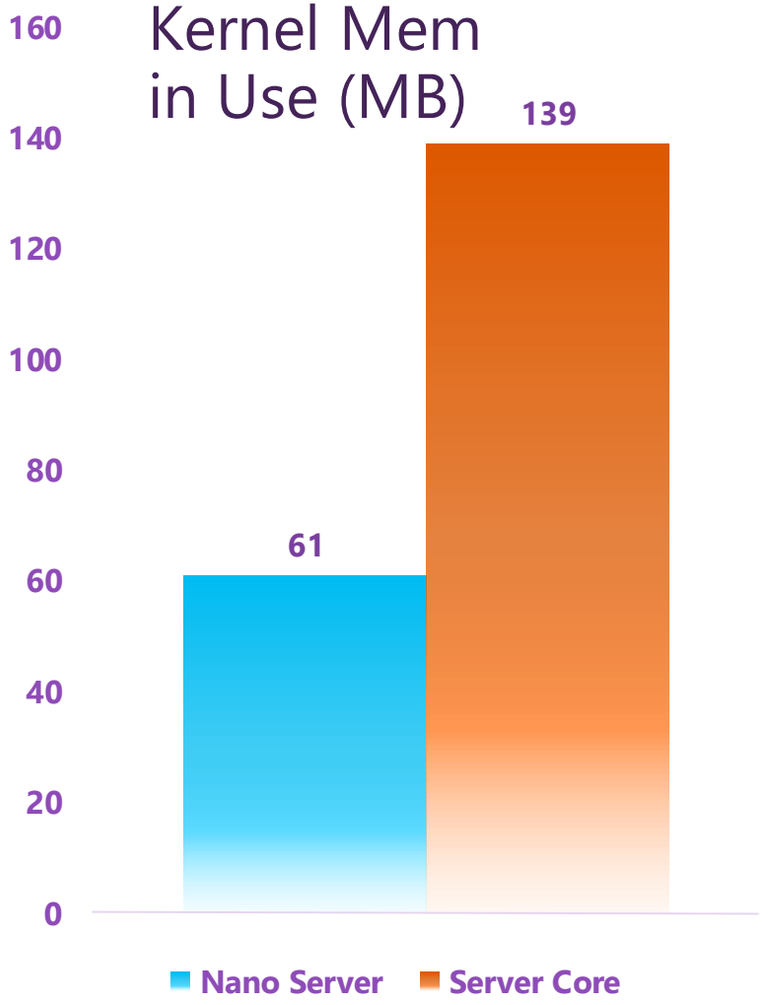




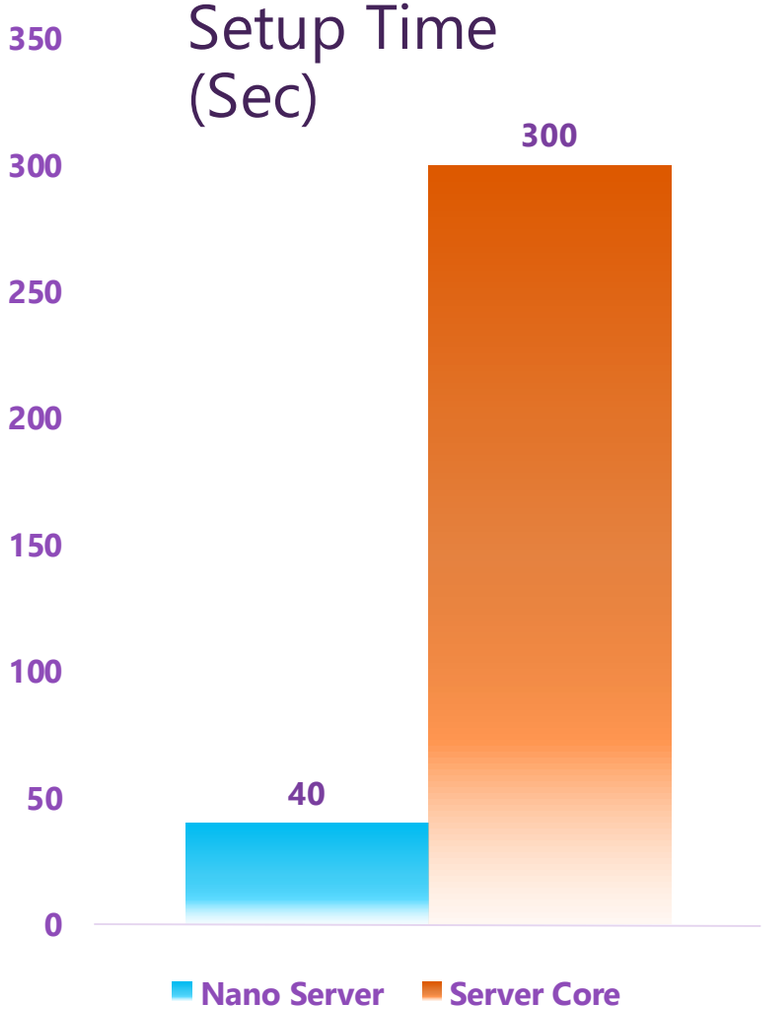
Resource utilization improvements

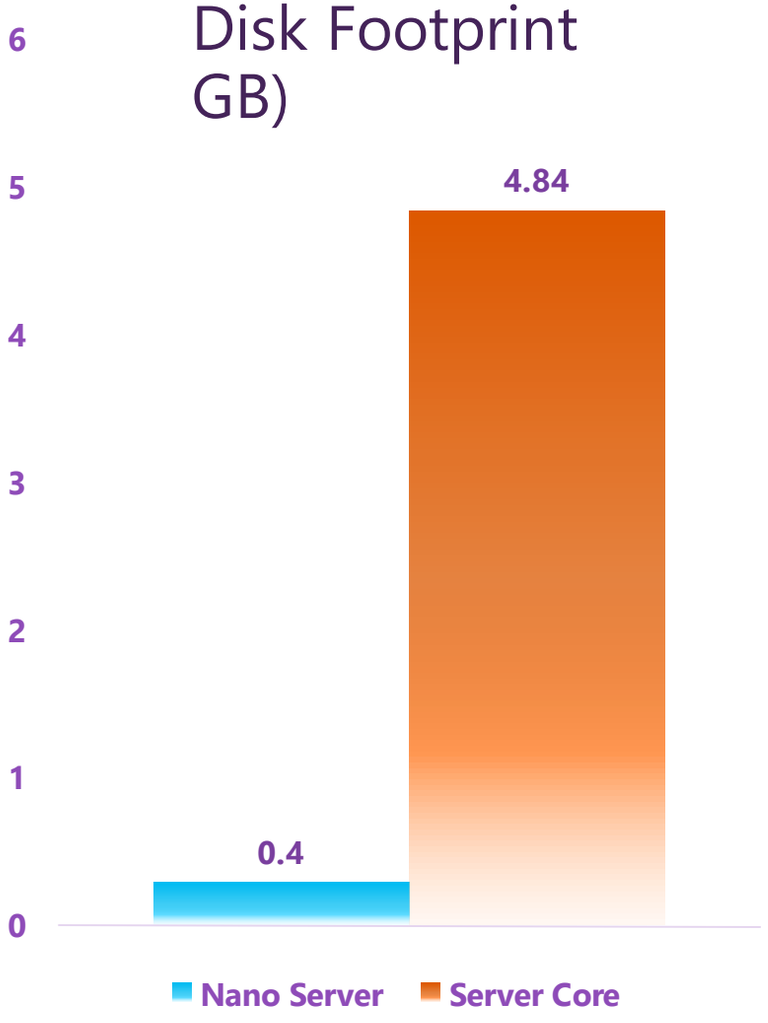


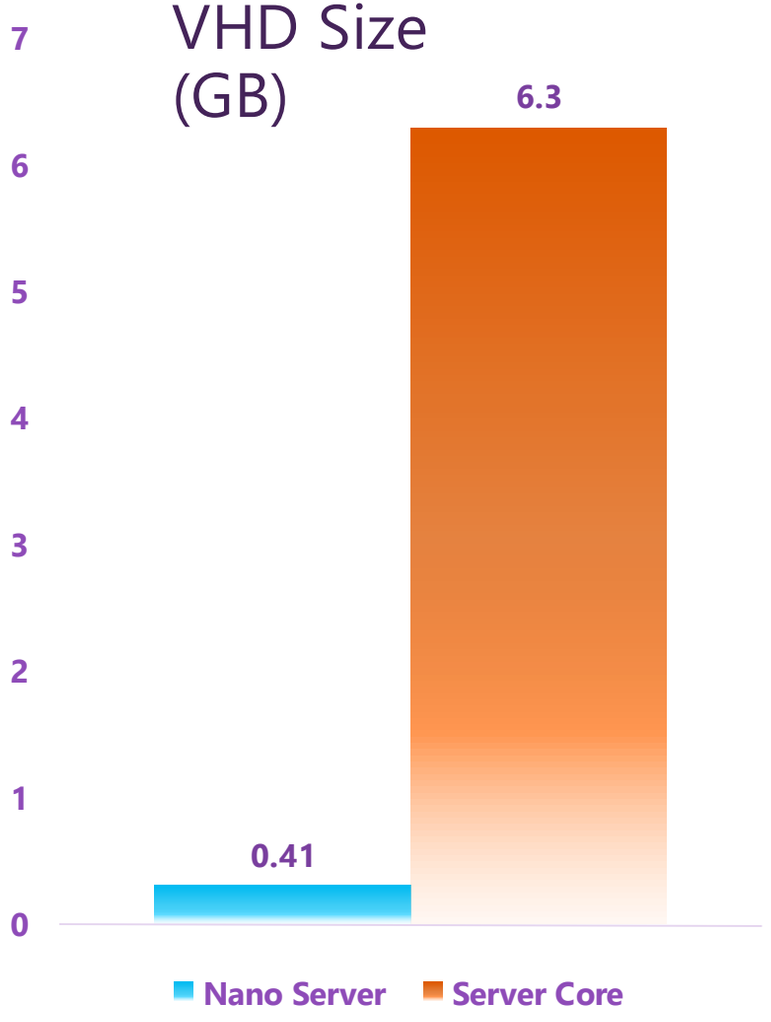




Deployment improvements







Developers & apps.

Nano Server - Developer Experience

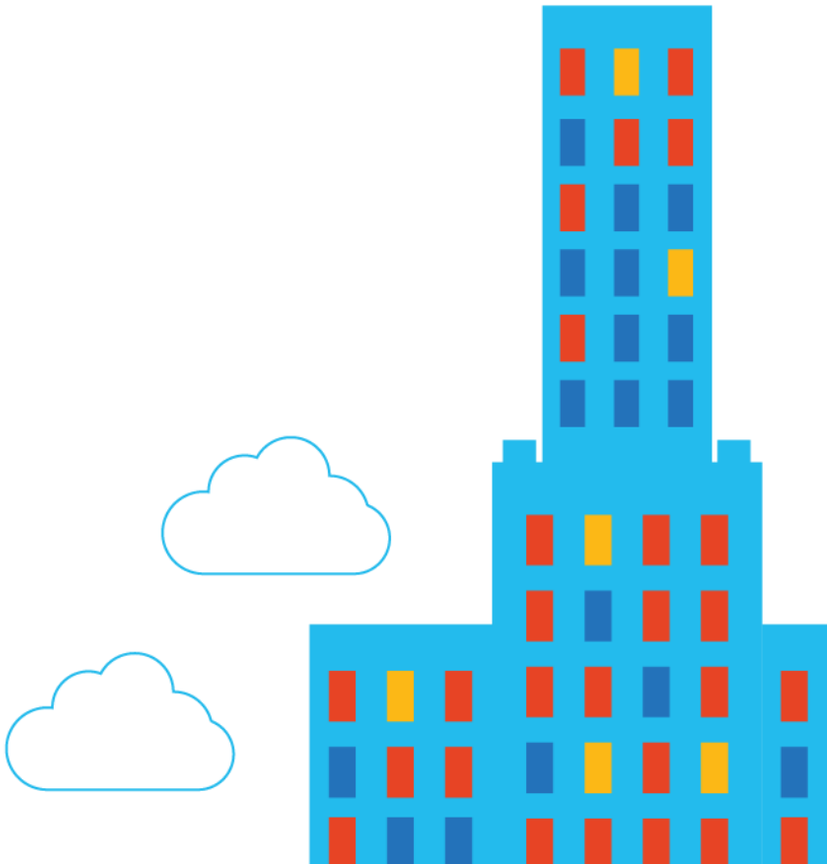
Windows SDK & Visual Studio 2015 targeting Nano Server

Download tooling from the VS gallery

Rich design-time experience

Project template, full IntelliSense, error squiggles, etc.

Full remote debugging experience



Reverse Forwarders

A missing DLL will result in an app failing to run

Provide a way to run existing apps without recompiling for Nano Server

With Reverse Forwarders your apps will load and API calls in those DLLs will either result in

- API call will succeeding if the API is in the Nano Server boundary
- Return of Not Implemented if it is not within the Nano Server boundary

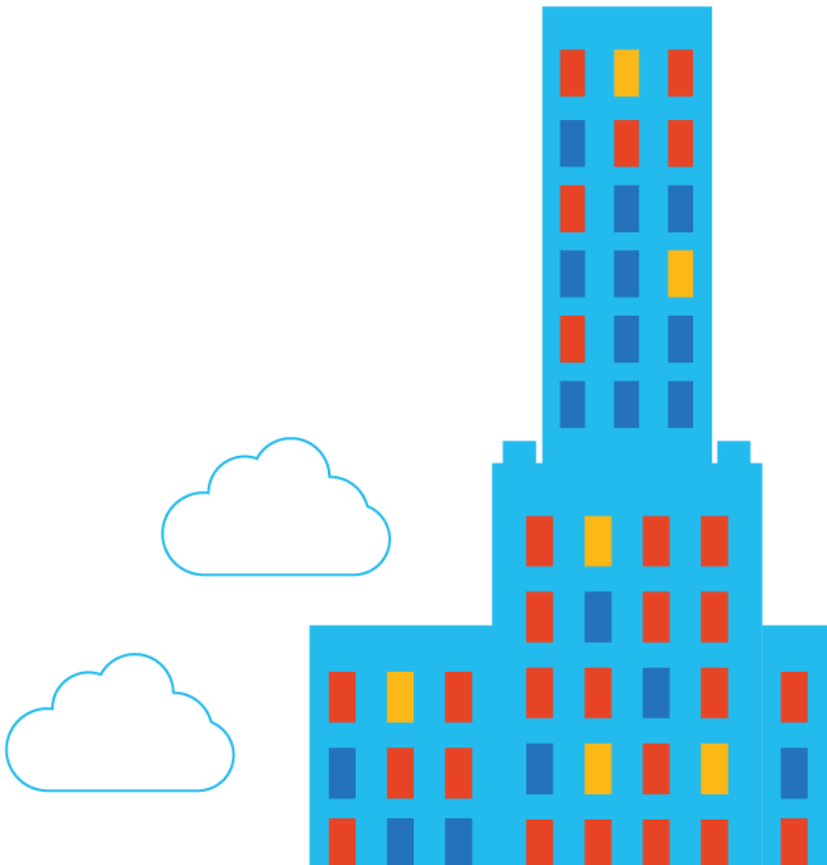
Does not eliminate the need to refactor code to what is available in Nano Server

Reverse Forwarders

Optional package that can be included in a Nano Server image when needed

Available reverse forwarders include:

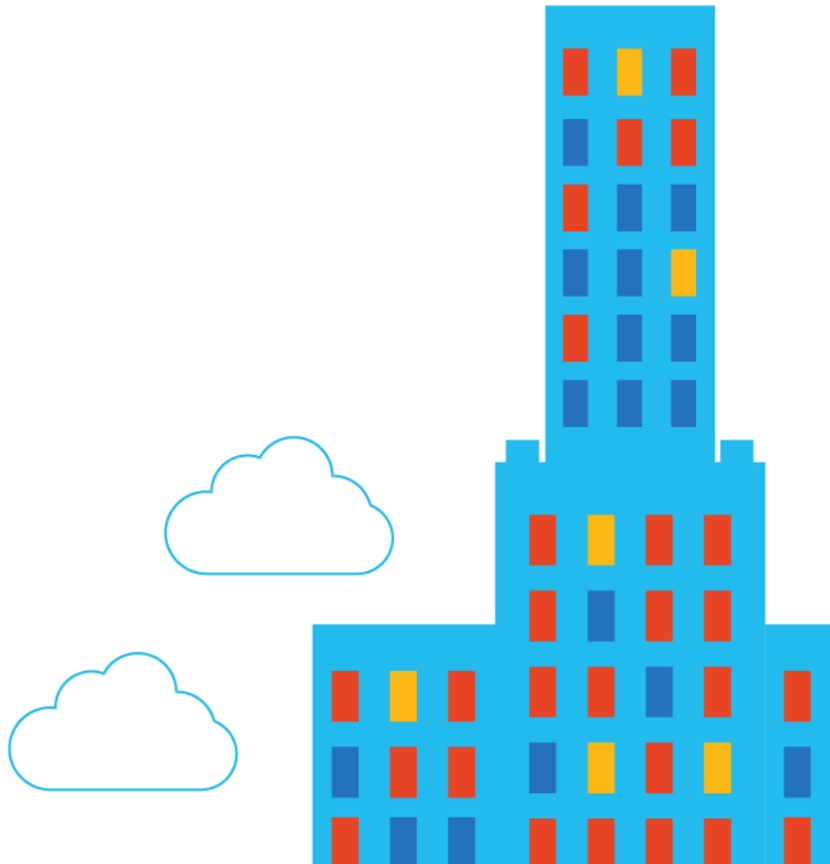
- advapi32.dll
- comctl32.dll
- comdlg32.dll
- gdi32.dll
- kernel32.dll
- ole32.dll



Reverse Forwarders

What runs today?

Chef
PHP
Nginx
Python 3.5
Node.js
GO
Redis
MySQL
OpenSSL
Java (OpenJDK)
Ruby (2.1.5)
SQLite



Resources.

Nano Resources and Feedback

Shift your org and tools to full remote management of Server Core

Inventory tools and agents that only run locally
Check with your ISV for a remotable version
Send list of those with no remote equivalent and ISV to nanoserver@microsoft.com

Deploy Nano Server, your apps, and your tools

Deployment guide at: https://msdn.microsoft.com/en-us/library/mt126167.aspx
Give use feedback and let us know where you encounter difficulties:
http://windowsserver.uservoice.com/forums/295068-nano-server

Remote Management feedback

http://windowsserver.uservoice.com/forums/295071-remote-management-tools

Microsoft

TechNet Evaluation Center

Deep technical content and free product evaluations

At the TechNet Evaluation Center you can download free, trial versions of Microsoft software, with no feature limits. Dozens of trials are available – all at no cost.

Try Windows Server 2012 R2 for up to 180 days. Download the Windows 8.1 Enterprise 90-day evaluation. Or try Microsoft Azure at no-cost for up to 90 days.

Download Microsoft software trials today.

Technet.microsoft.com/evalcenter

TechNet Virtual Labs

Hands-on deep technical labs

Microsoft Hands On Labs offer virtual environments that will take you through guided, technically deep product learning experience.

Learn at your own pace in labs that you can complete in 90 minutes or less. There is no complex setup or installation is required to use TechNet Virtual Labs.

Find Hand On Labs.

Technet.microsoft.com/virtuallabs

MVA

Free, online, technical courses

Microsoft Virtual Academy provides free online training on the IT scenarios that are important to your company and your career.

Learn at your own pace and boost your IT skills with over 100 courses across more than 15 Microsoft technologies including Windows Server, Windows 8, Microsoft Azure, Office 365, virtualization, Windows Phone, and more.

Take a free online course.

microsoftvirtualacademy.com