What's Coming in Windows Server 2016

– Nano Server and Containers

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Microsoft

Voice of the Customer

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

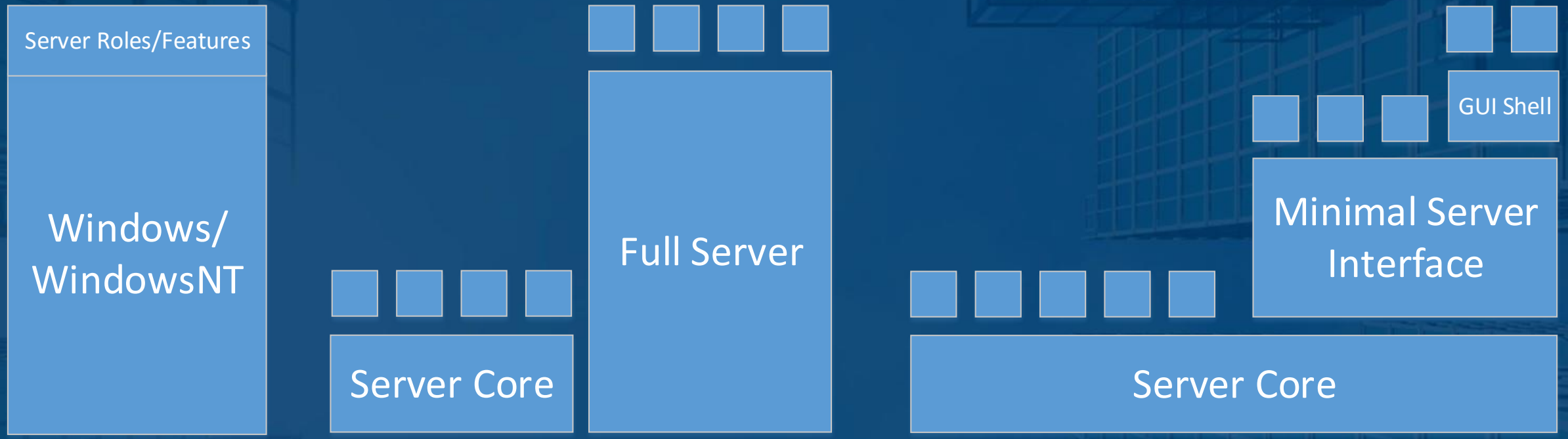
Server images are too big

- 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

The Server Journey*



Windows NT to Windows Server 2003

Windows Server 2008 and Windows Server 2008 R2

Windows Server 2012 and Windows Server 2012 R2

* Admin GUIs on servers are poison

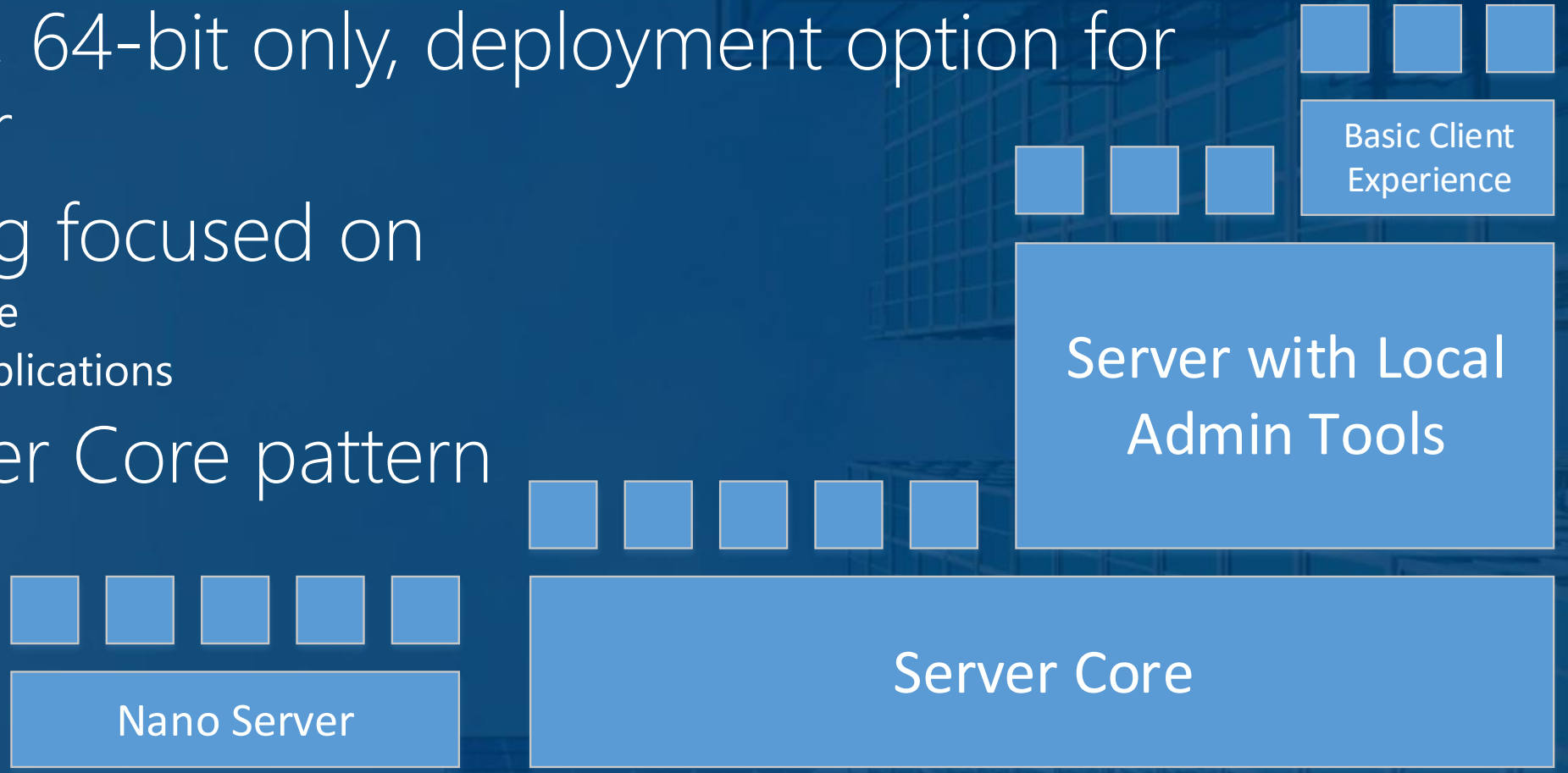
Next Step in Our Cloud Journey

A new headless, 64-bit only, deployment option for Windows Server

Deep refactoring focused on

- CloudOS infrastructure
- Born-in-the-cloud applications

Follow the Server Core pattern



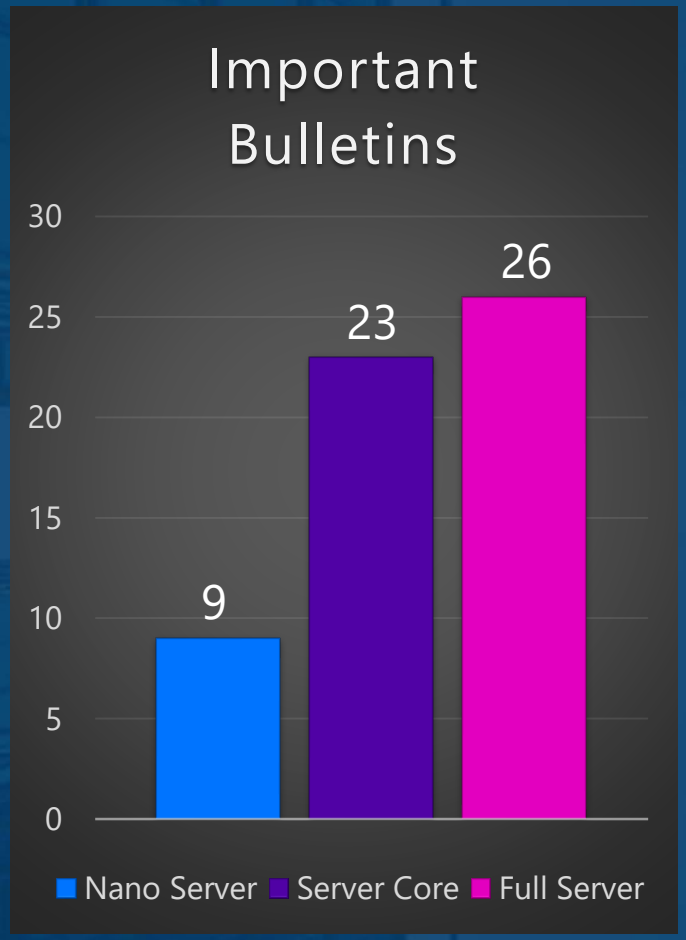
Core PowerShell

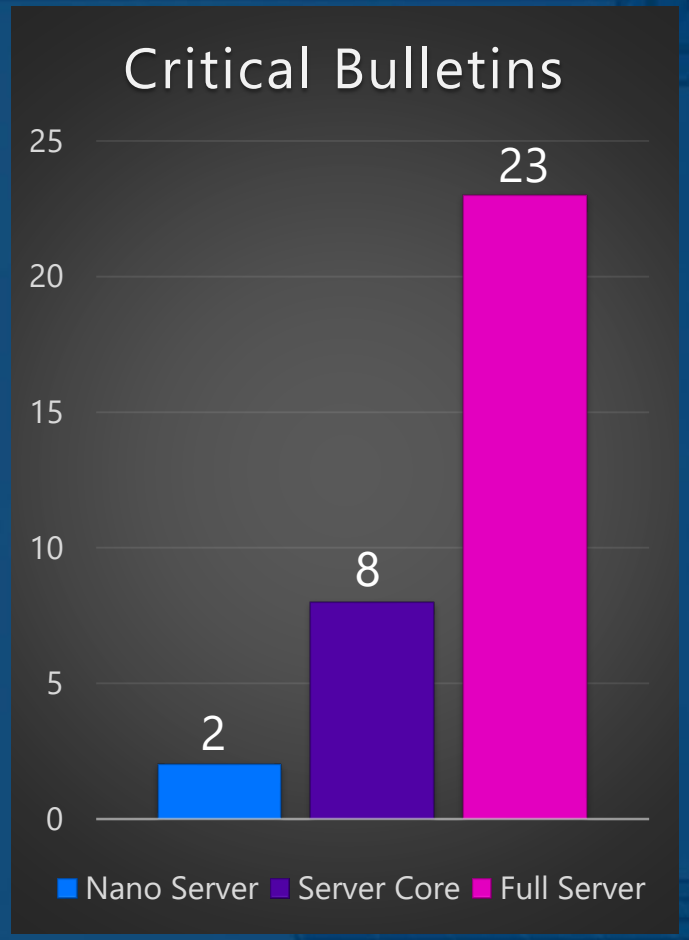
- Refactored to run on CoreCLR
- Full PowerShell language compatibility & remoting
  - Invoke-Command, New-PSSession, Enter-PSSession, etc.
- Most core engine components
- Support for all cmdlet types: C#, Script, and CIM
- Limited set of cmdlets initially

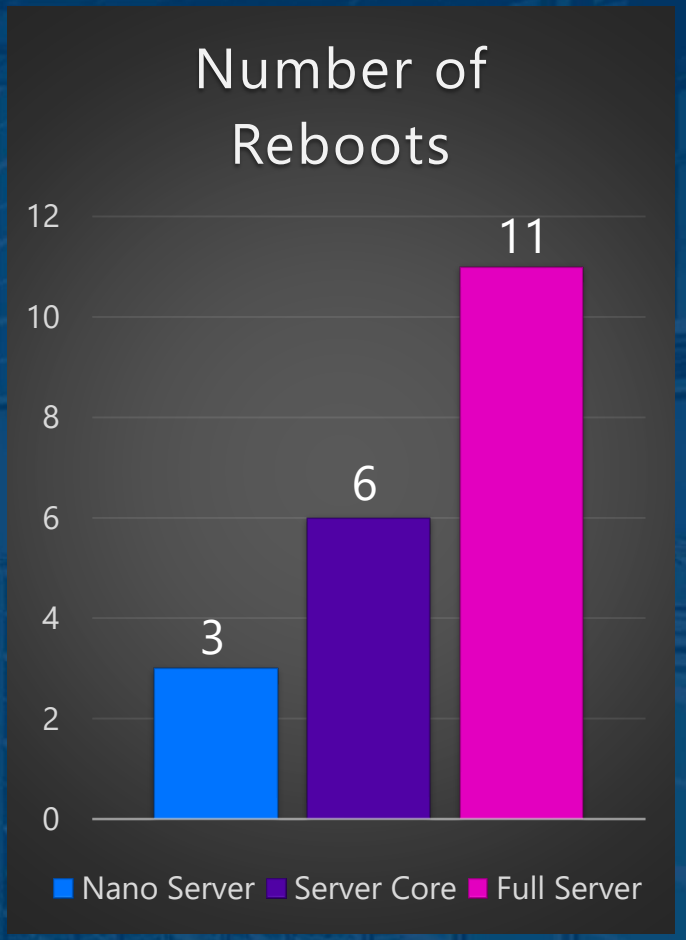
Nano Server - Management

- Eliminating the need to ever sit in front of a server
- Configuration via PowerShell Desired State Configuration (DSC)
- Remote management/automation via Core PowerShell and WMI
- Integrate into DevOps toolchains

Servicing Improvements*

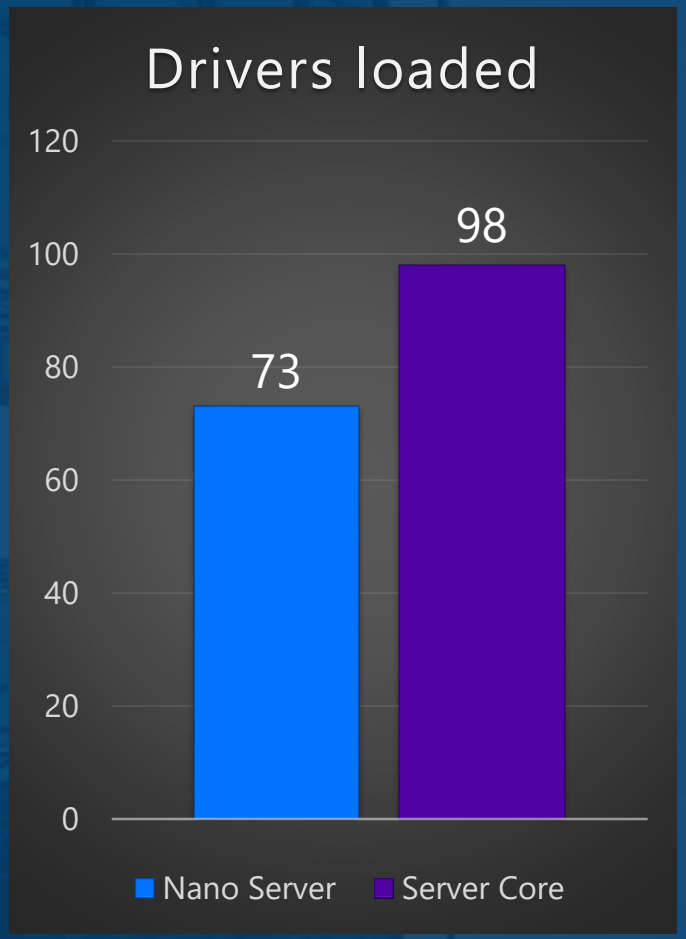


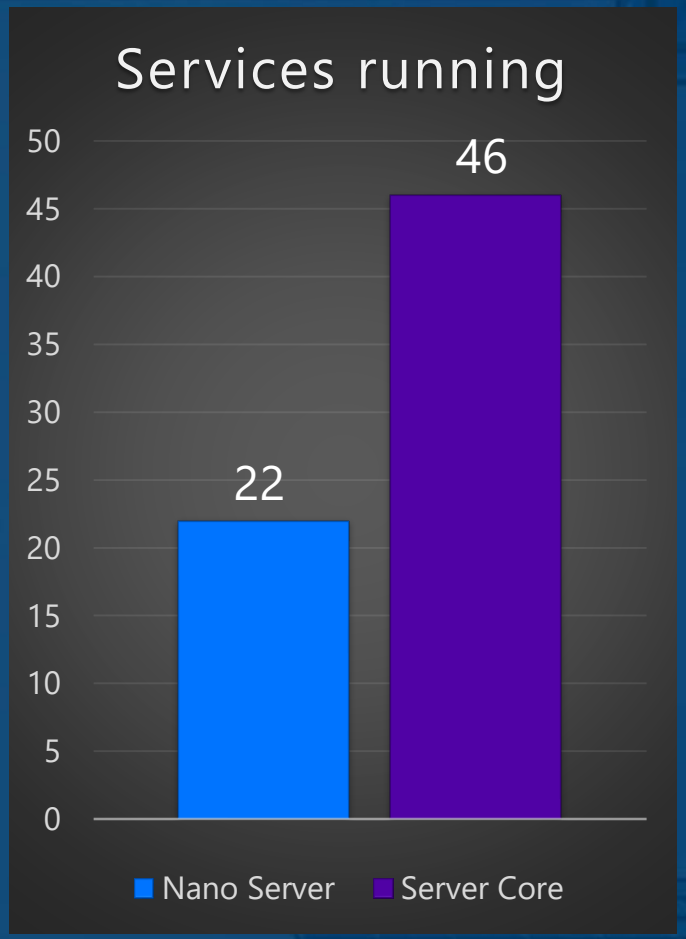


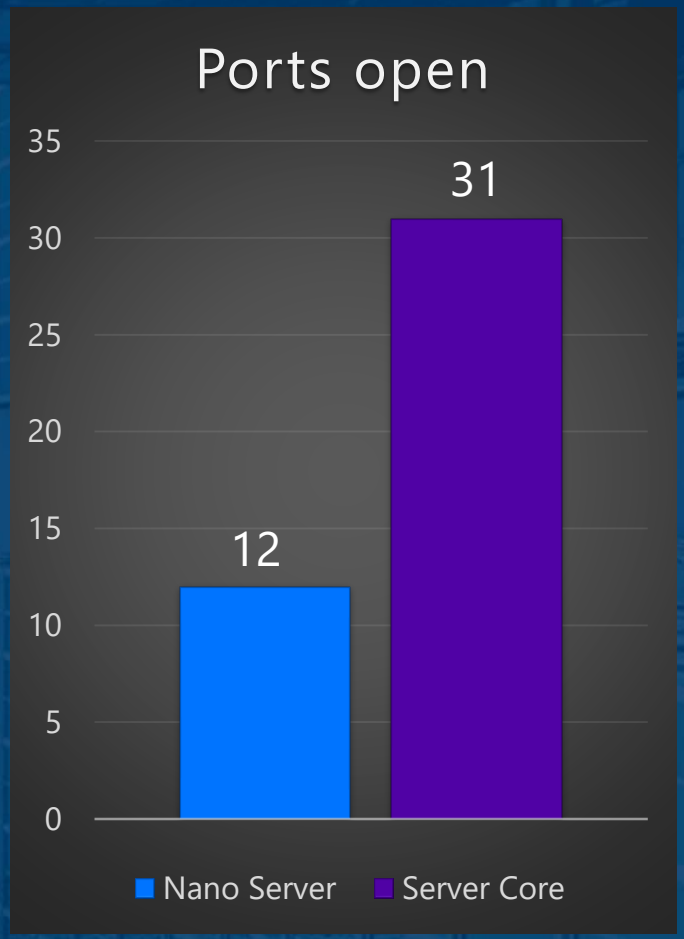


* Analysis based on all patches released in 2014

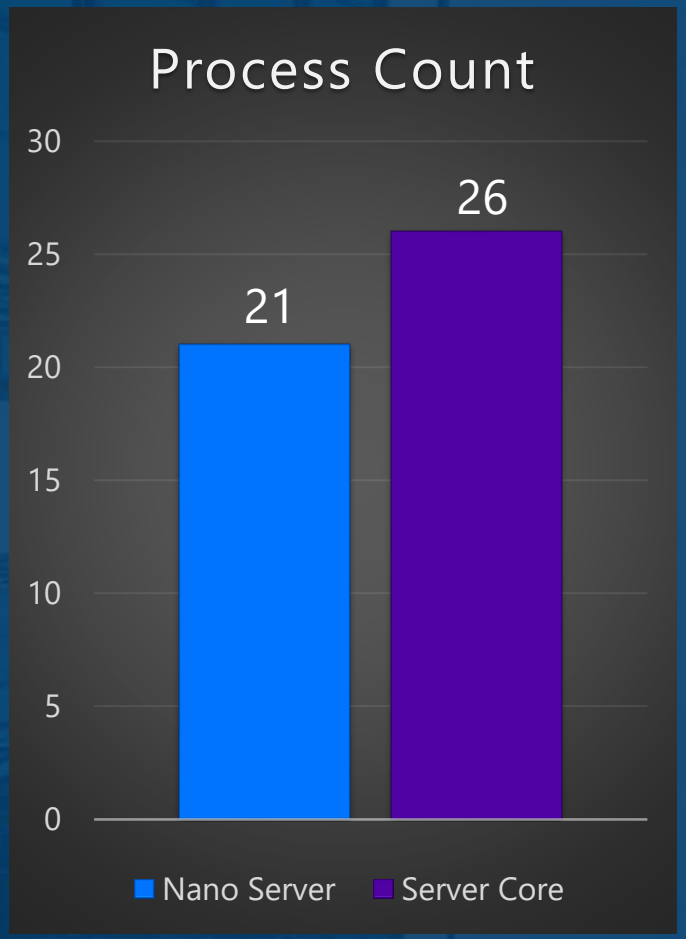
Security Improvements

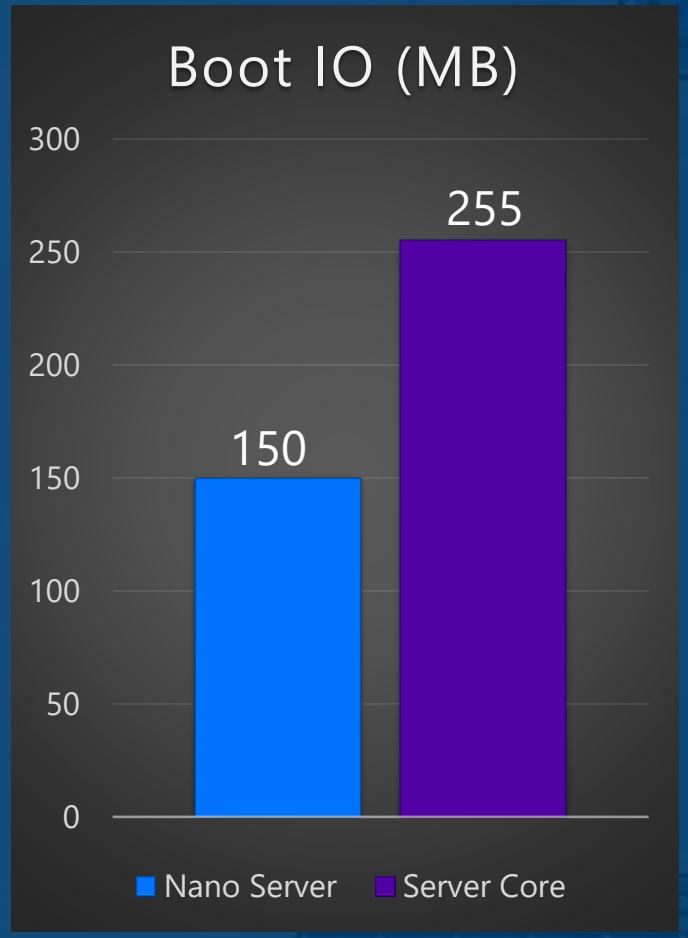


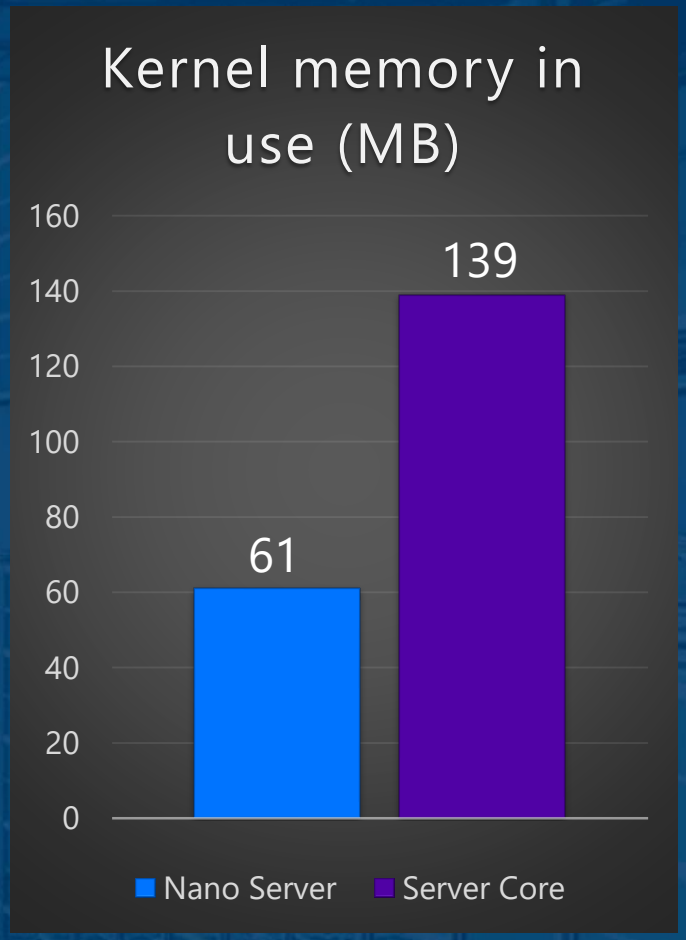




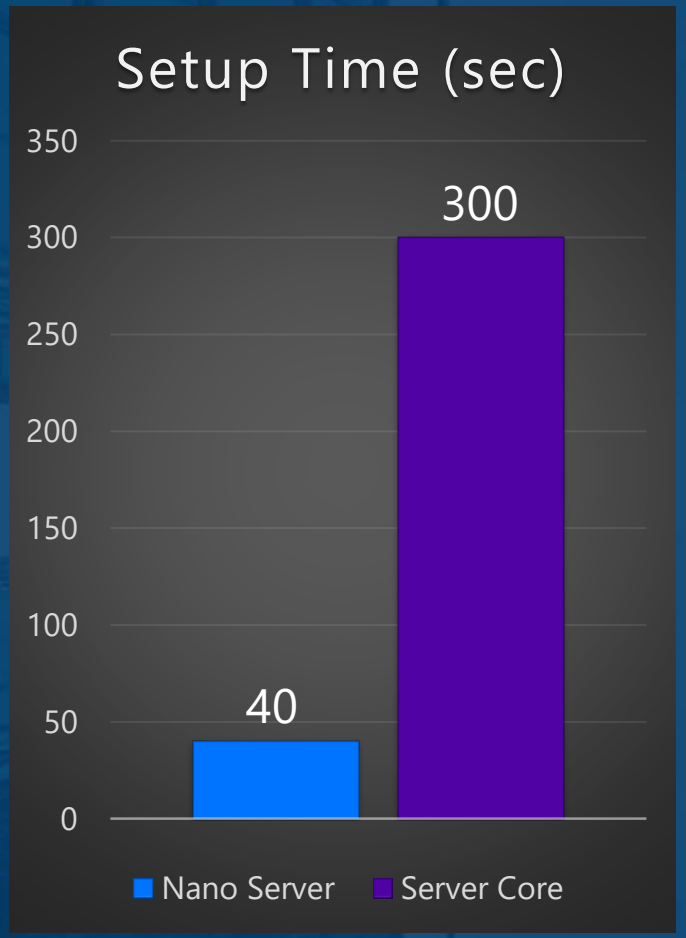
Resource Utilization Improvements

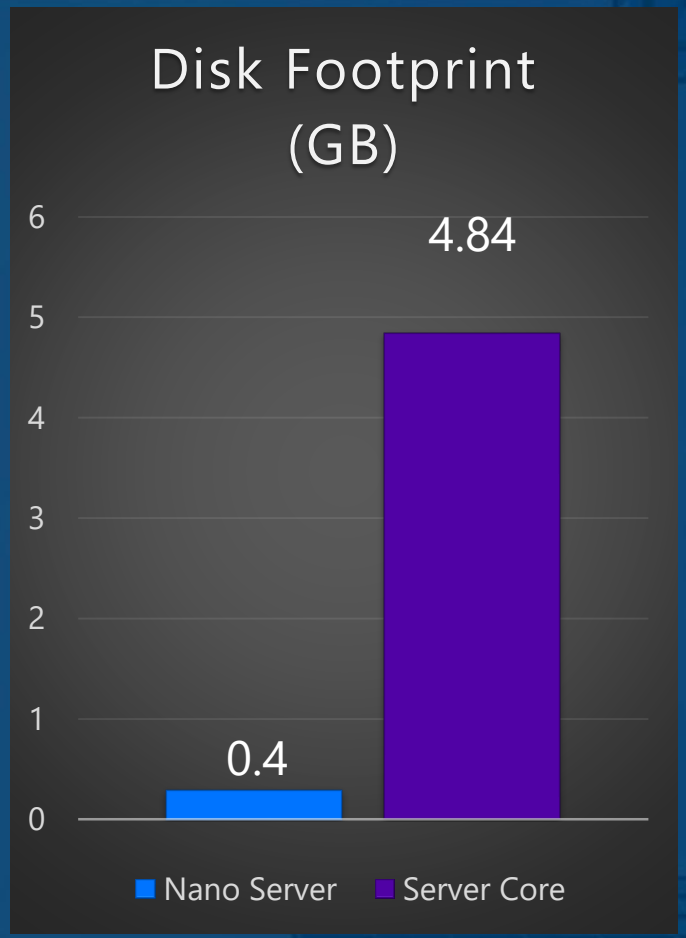


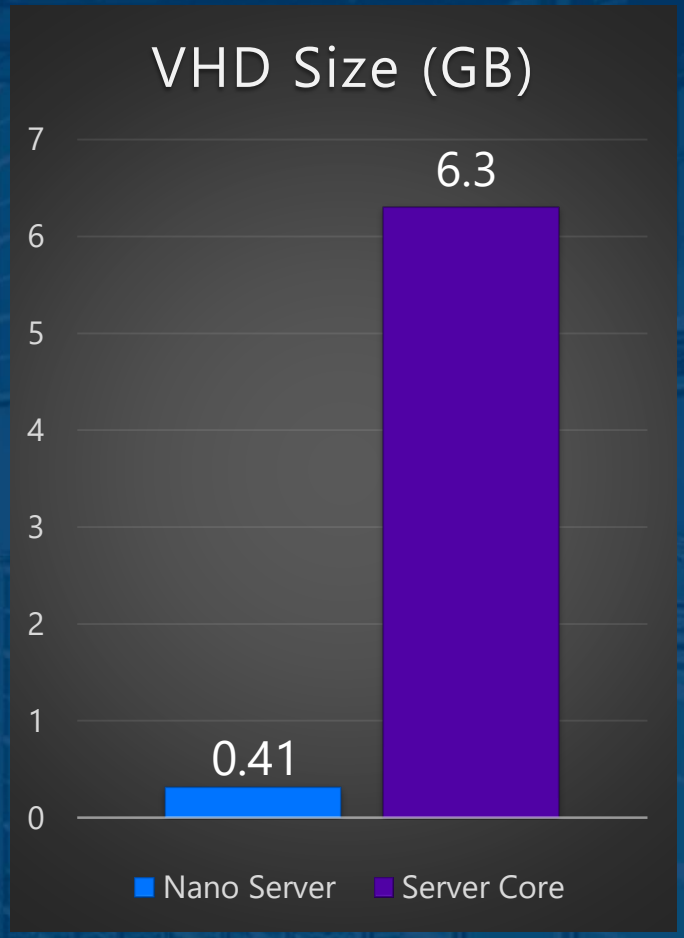




Deployment Improvements

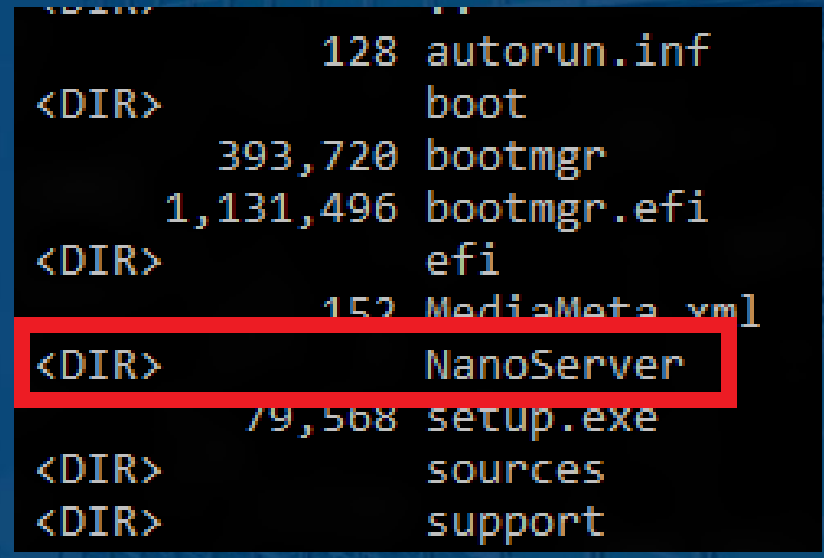






Nano Server in Windows Server vNext

- An installation option, like Server Core
- Not listed in Setup because image must be customized with drivers
  - Separate folder on the Windows Server media
- Available in the Windows Server Technical Preview 2



Installing Drivers

- 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
- To run Nano Server as a VM install
  - Dism /Add-Package /PackagePath:.\packagesMicrosoft-NanoServer-Guest-Package.cab

Installing Roles and Features

- Nano Server folder has a Packages sub-folder
- Dism /Add-Package /PackagePath:.\packages\<package>
- Dism /Add-Package /PackagePath:.\packages\en-us\<package>

```
<DIR>          en-us
    10,849,531 Microsoft-NanoServer-Compute-Package.cab
     7,688,488 Microsoft-NanoServer-FailoverCluster-Package.cab
       329,611 Microsoft-NanoServer-Guest-Package.cab
    12,788,634 Microsoft-NanoServer-OEM-Drivers-Package.cab
     6,897,101 Microsoft-NanoServer-Storage-Package.cab
        49,548 Microsoft-OneCore-ReverseForwarders-Package.cab
```

Installing Agents and Tools on Nano Server

- No MSI support in Nano Server
  - Current builds of Nano Server require xcopy or custom PowerShell script
- Nano Server Installer in the works, which will provide
  - Install
  - Uninstall
  - Inventory
  - Online and offline installation support

Nano Server – Just enough OS

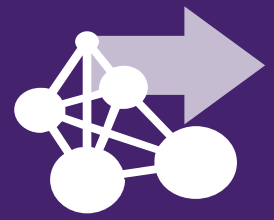
Nucleus of next-gen cloud infrastructure and applications

Powers modern cloud infrastructure

- Faster time to value
- Much lower servicing footprint
- Significantly lower attack surface
- Breakthrough efficiency

Optimized for next-gen distributed applications

- Higher density and performance
- Next-gen distributed app frameworks
- Interoperate with existing server applications



Nano Server - Roles & Features

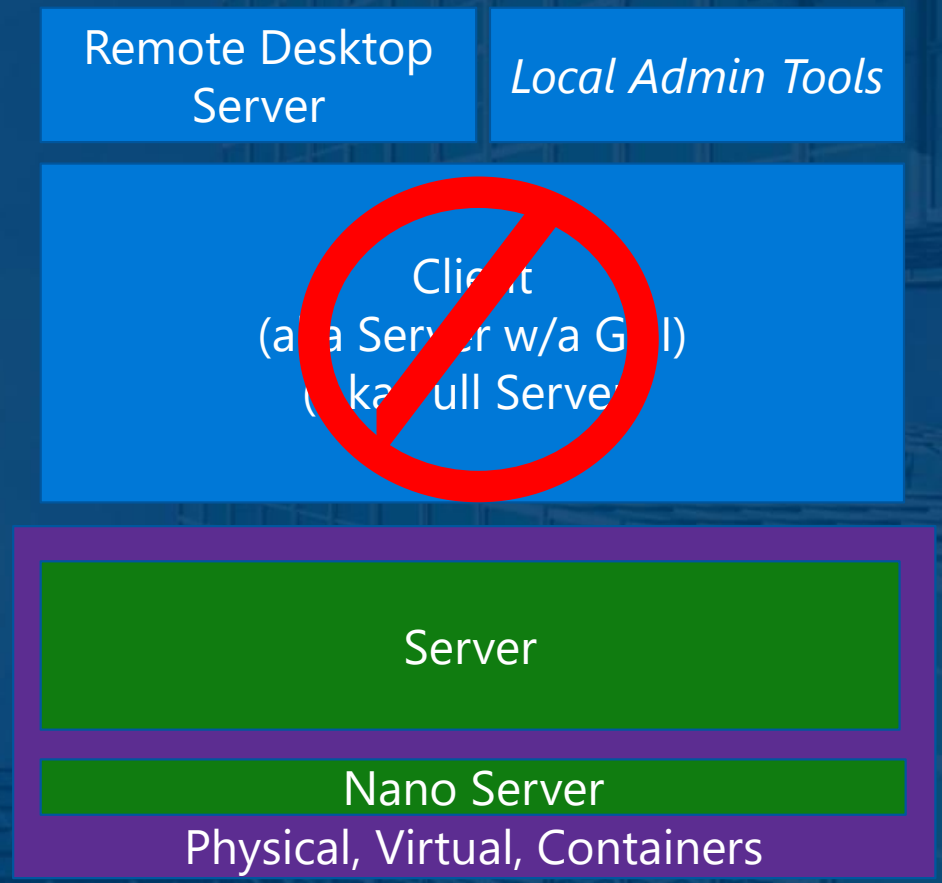
- Zero-footprint model
  - Server Roles and Optional Features live outside of Nano Server
  - Standalone packages that install like applications
- Key Roles & Features
  - Hyper-V, Storage (SoFS), and Clustering
  - Core CLR, ASP.NET 5 & PaaS
- Full Windows Server driver support
- Antimalware Built-in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

Nano Server - Cloud Application platform

- Born-in-the-cloud application support
  - Subset of Win32
  - CoreCLR, PaaS, and ASP.NET 5
- Available everywhere
  - Host OS for physical hardware
  - Guest OS in a VM
  - Windows Server containers
  - Hyper-V containers
- Future additions
  - PowerShell Desired State Configuration (DSC) & PackageManagement
  - Additional Roles and Application Frameworks

Server Application Development

- Deep refactoring
- Client stack for RDS
- Developers target Server or Nano Server
- Deploy to Physical, Virtual or Containers

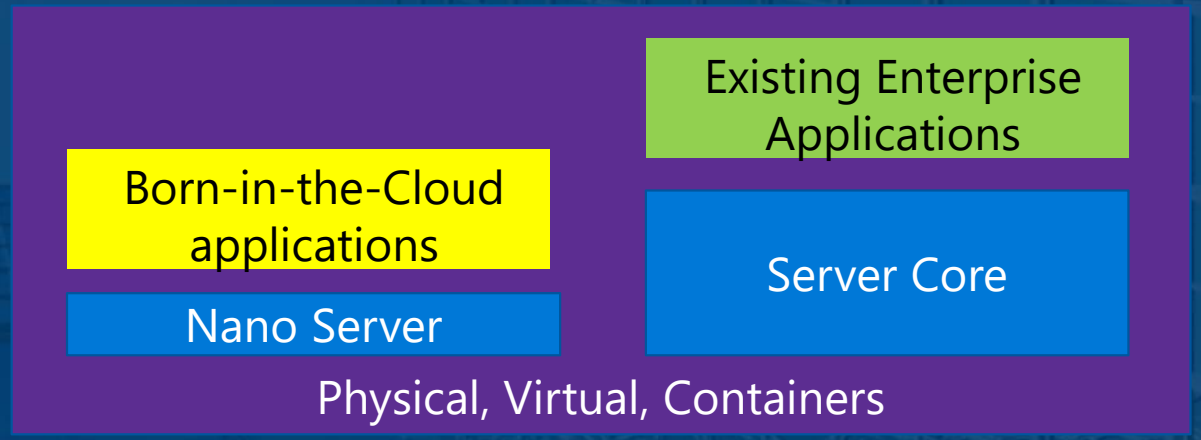


Nano Server - Developer Experience

- Windows SDK & Visual Studio 2015 target Nano Server
  - Download tooling from the VS gallery
- Rich design-time experience
  - Project template, full IntelliSense, error squiggles, etc.
- Full remote debugging experience

Roadmap

- Nano Server is the future nucleus of Windows Server
  - Target for cloud components and Born-in-the-Cloud applications
  - New foundation for all components
    - Provides a Just Enough OS model for all applications
- Not everything will run on Nano Server
  - Server Core provides compatibility for existing Enterprise applications



Demonstration

Creating a Nano server VM

Resources

- Channel 9 – Search for *Nano Server*
  http://channel9.msdn.com
- Windows Server Technical Preview
  http://www.microsoft.com/en-us/evalcenter/evaluate-windows-server-technical-preview
- "Windows Server 2016: Virtualization Deep Dive"
  https://mva.microsoft.com/en-us/training-courses/windows-server-2016-virtualization-deep-dive-14094
- All things nanoServer
  http://aka.ms/nanoserver

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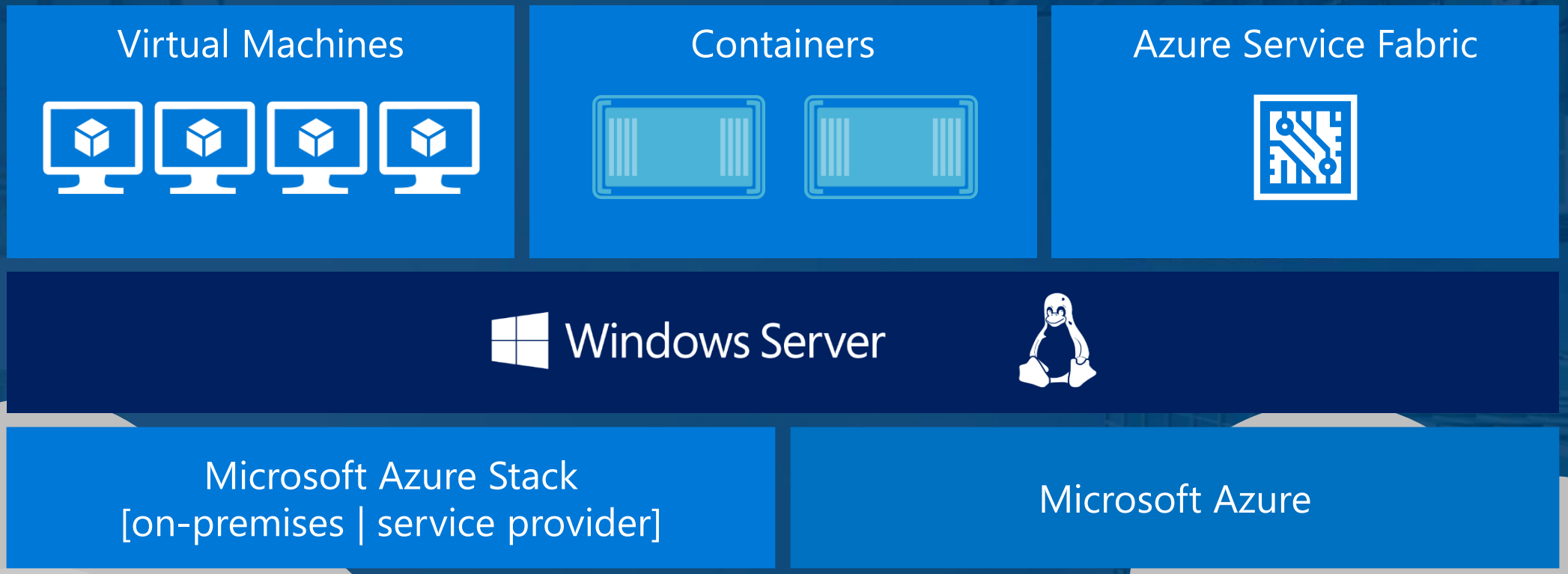
Containers

Compute infrastructure spectrum: Flexibility with control across on-premises and Azure



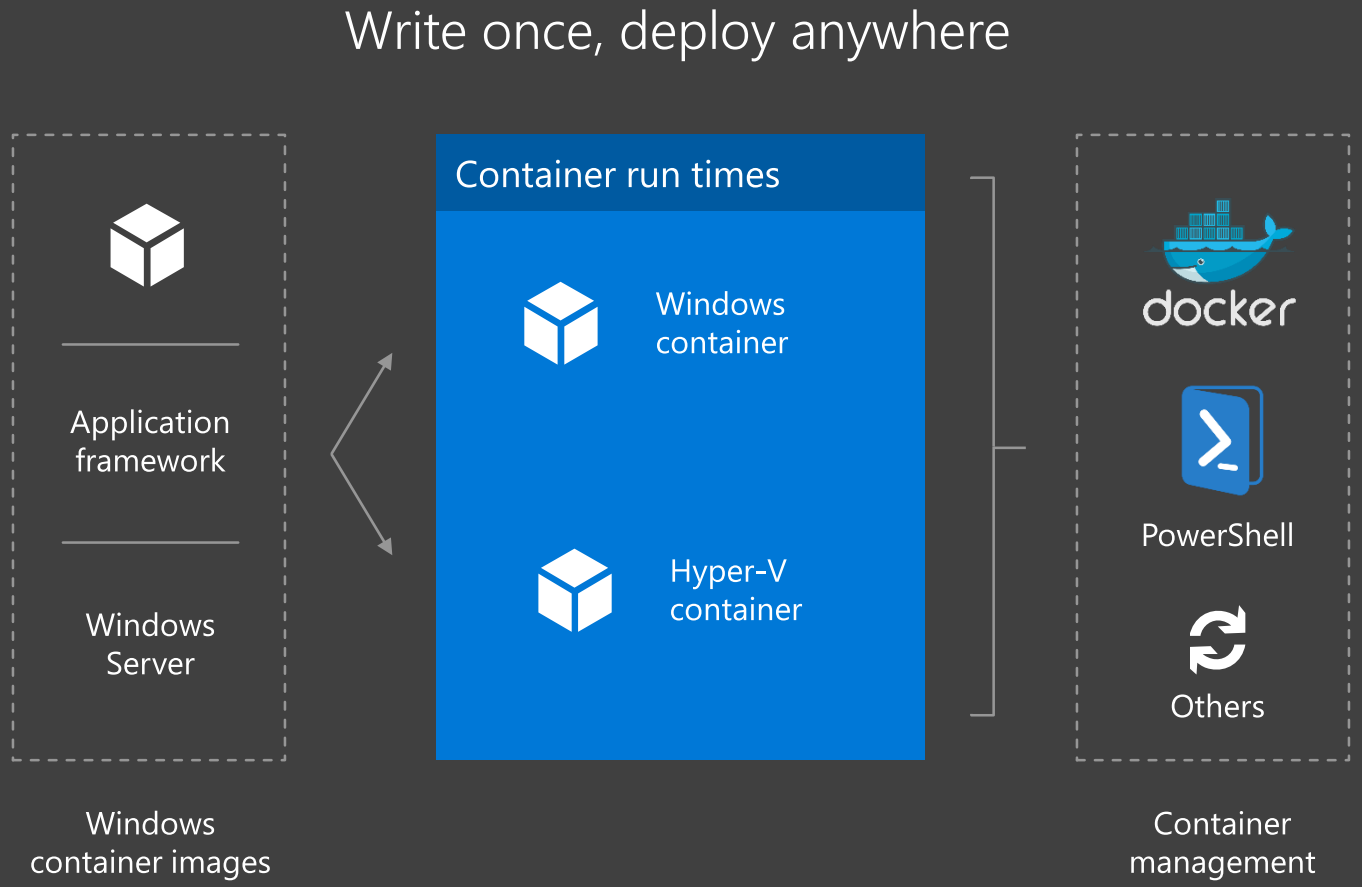
Containers

A new approach to build, ship, deploy, and instantiate modern applications

Self-contained abstraction mechanism

Enabling lightweight, composable, and portable applications

Flexible levels of isolation

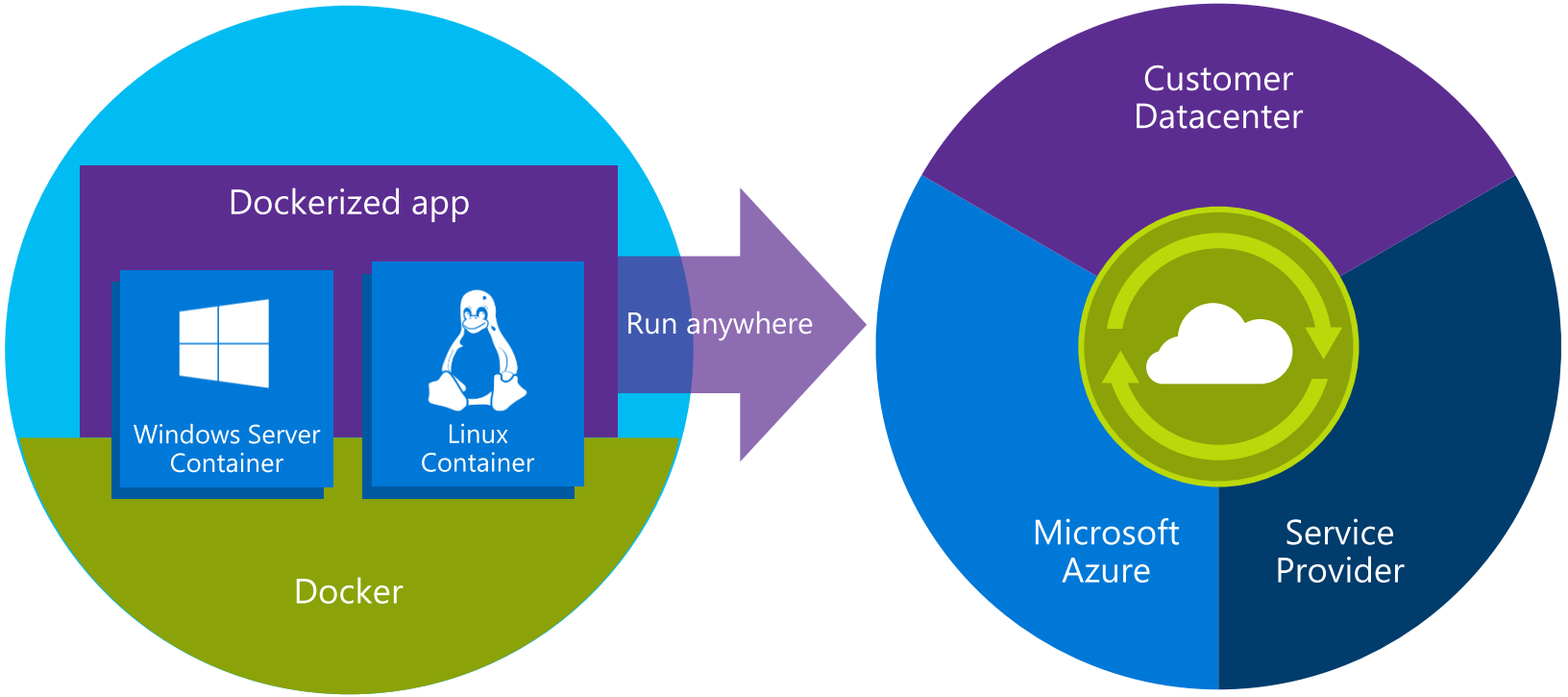


Docker integration

Joint strategic investments to drive containers forward

Docker: An open source engine that automates the deployment of any application as a portable, self-sufficient container that can run almost anywhere.

Partnership: Enable the Docker client to manage multi-container applications using both Linux and Windows Server containers, regardless of the hosting environment or cloud provider.

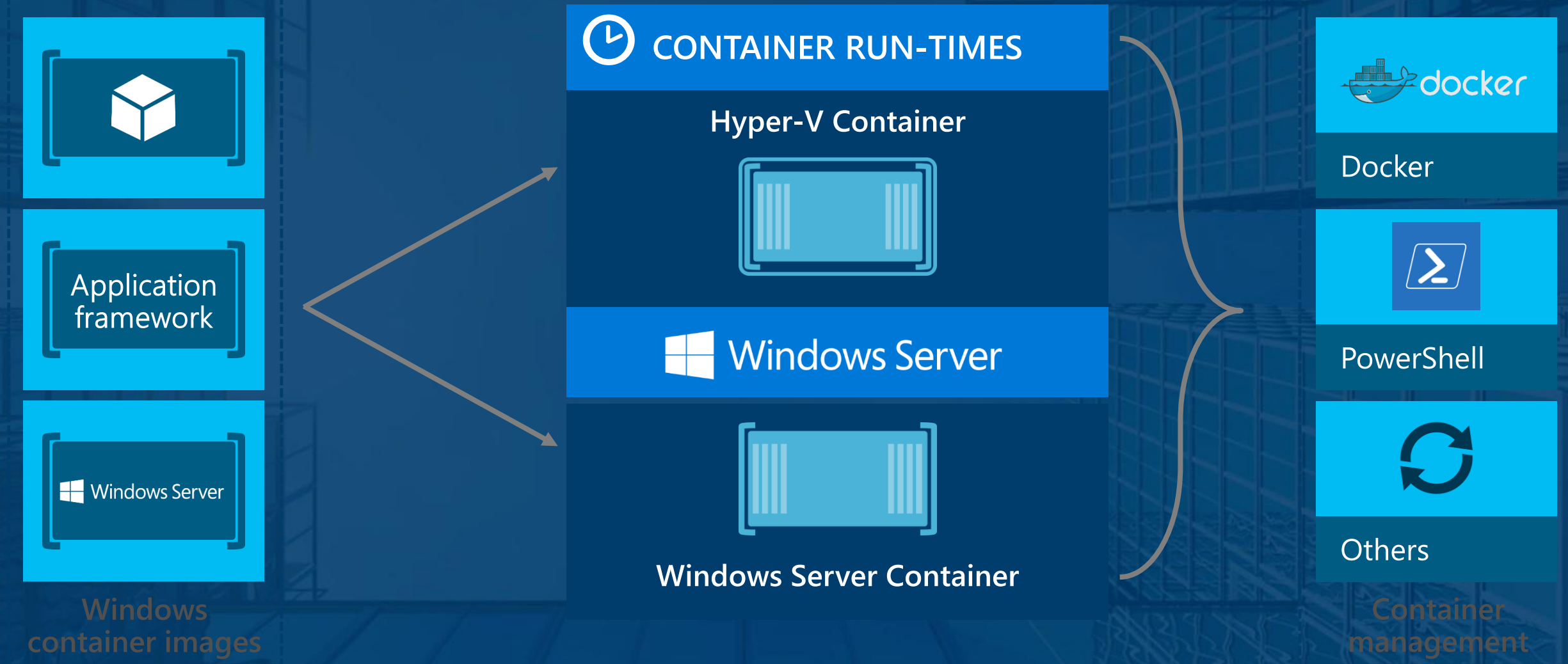


Strategic investments

- Investments in upcoming Windows Server release
- Open source development of the Docker Engine for Windows Server
- Azure support for the Docker Swarm APIs
- Federation of Docker Hub images into the Azure Gallery and Portal

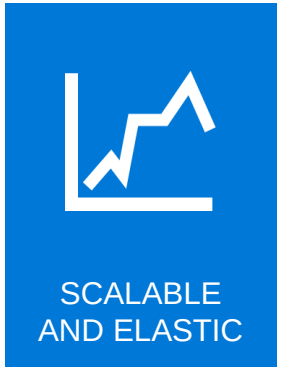
Write once deploy anywhere

Modern app development with flexible isolation



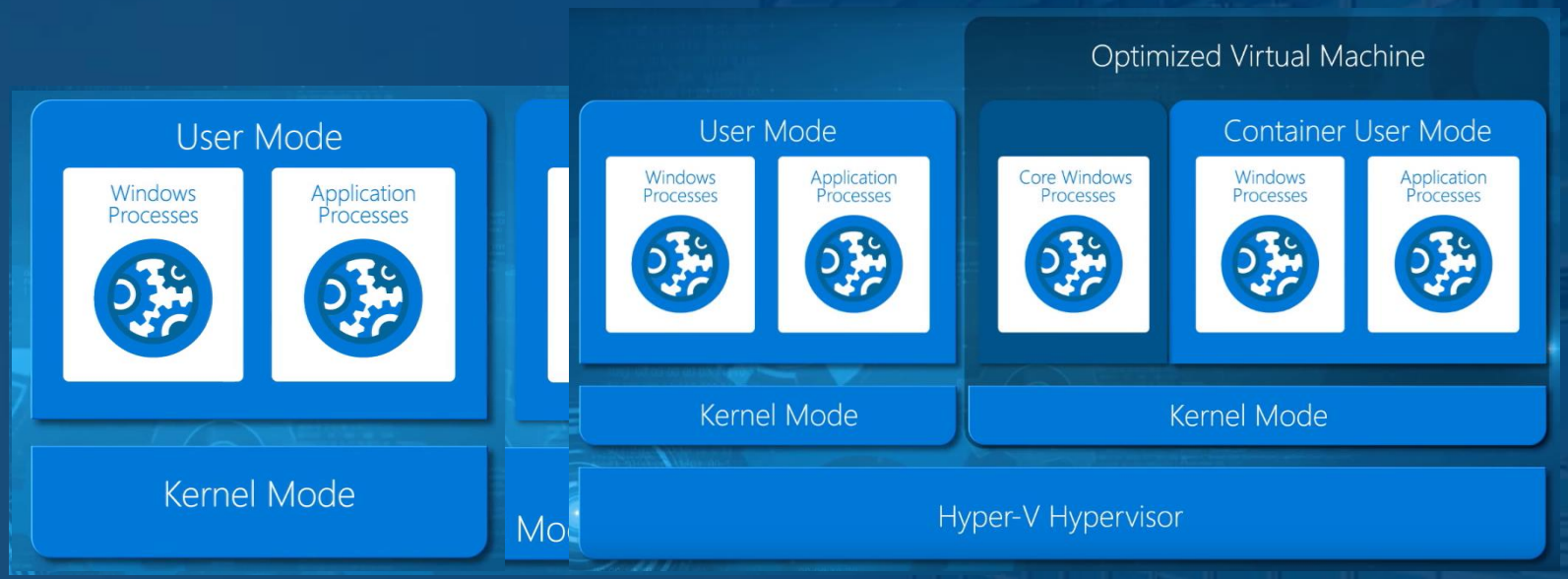
Microsoft's Container Runtimes

Windows Server Container



Hyper-V Container

Isolation Versus Secure Isolation



Windows Server Containers

Hyper-V Containers

Demonstration

Windows Server Containers

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  https://mva.microsoft.com/en-us/training-courses/windows-server-2016-virtualization-deep-dive-14094
- All things Windows Containers
- http://aka.ms/windowscontainers

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Want to learn more?

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  http://aka.ms/HybridSeminarUK

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