

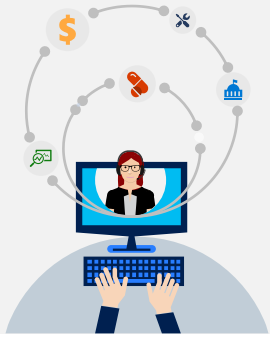


# Windows Virtual Desktop

Customer Presentation

Fall 2019

# Virtualization can address a broad range of business needs



## Security and regulation

Financial Services

Healthcare

Government



## Flexible workforce

Mergers and acquisition

Short term employees

Contractor and partner  
access

BYOD and mobile

Call centers

Branch workers



## Specialized workloads

Design and engineering

Legacy apps

Software dev test

# WVD is Microsoft's virtualization service and delivers compelling value

## Windows Virtual Desktop

Best User Experience



Enhanced Security



Simplified Management

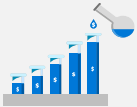


Azure



Standardized, Global, & Secure

Superior Economics



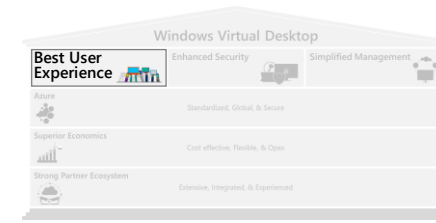
Cost effective, Flexible, & Opex

Strong Partner Ecosystem

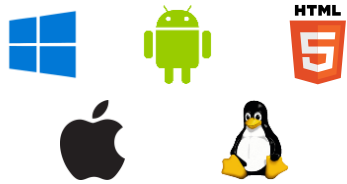


Extensive, Integrated, & Experienced

# Best Virtualized End-user Experience



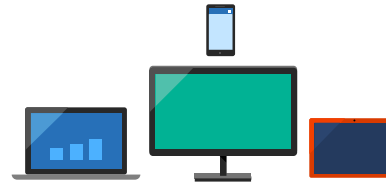
## Platform of your choice



- Connect from any device of your choice (Windows, MacOS / iOS, HTML5, Android, Linux\*)

\* Coming soon

## Windows differentiation



- Like-local Windows experience
- Extensive support for devices

## Enhanced protocol



- Support for Windows Hello for Business
- Dynamically adapting bandwidth utilization

## Containerized User Profiles



- Containerized User Profiles (FSLogix) with fast VHD load times

## Native O365 performance



- Uncompromised O365 email and calendar performance, Real-time Outlook search
- Persistent and non persistent environments

## Teams Enhancements



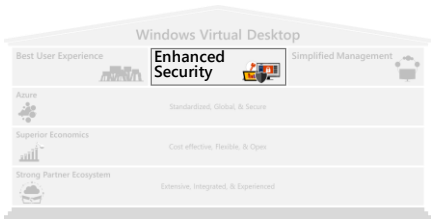
- Best conferencing and media experience
- Multimedia redirection capability, high-performance, low latency audio & video calling



Office 365 ProPlus also supported on Windows Server 2019 (with OneDrive Files-on-Demand capabilities)



# Enhanced Security with Simplified Configuration



## Azure AD Security Services



Sophisticated security services easily configured through Azure AD (e.g. MFA, CA, etc.)

## Reduced Attack Surface



Reverse connect technology eliminates the need to open inbound ports to the VMs

## Granular Access Control



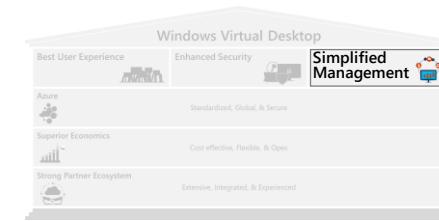
Multiple admins can be assigned role-based access control

## Isolated User Sessions



Isolated user sessions in both single and multi-session environments

# Efficient and Simplified Management

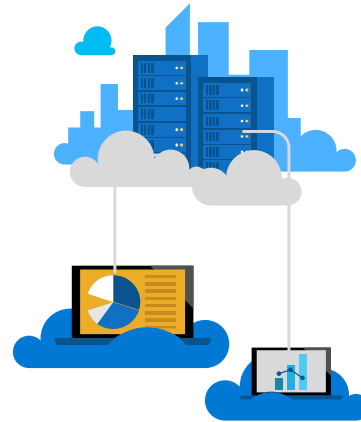


## User Experience Management



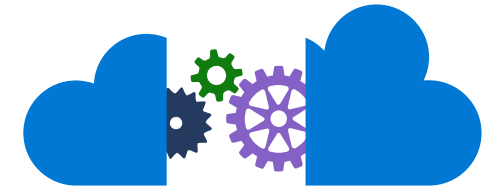
- One service supports both Desktop & RemoteApp experience
- Flexible user experience through a single host pool, with multiple app groups
- Familiar Azure AD credentials, to access WVD resources

## VM Management



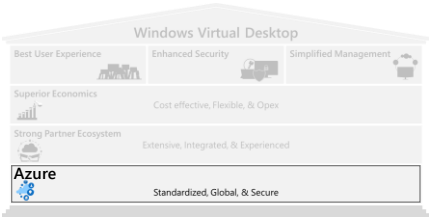
- Multiple tools for automated VM deployment
- Enhanced OS/App update tools
- Disaster Recovery with integrated Azure Site Recovery

## WVD Service Management



- Simplified and effective troubleshooting using advanced diagnostic service
- 3rd party value-added services enabled by APIs

# Built on Azure: Standardized, Global, and Secure Cloud



## Standardized

*Consistent infrastructure across regions*

### IaaS

Compute

Storage

Networking

### PaaS

*Uniform deployment via serverless architecture*

### Serverless Platform

Containers

Microservices

Integration services

Purpose-built, **standardized infrastructure** across geos  
Modernized workloads for **simplified deployment**

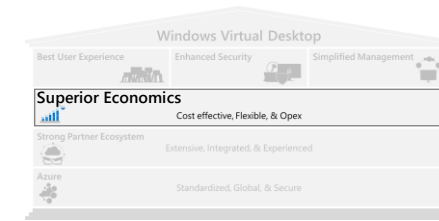
## Global

Largest geographical footprint of any cloud provider with more than **54 Azure regions**

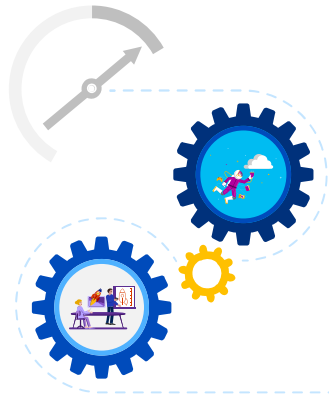
## Secure

Microsoft Cyber Defense Operations Center  
**>3,500** full-time security professionals  
**6.5 trillion** global signals daily  
**\$1 billion** annual cybersecurity investment

# Superior Economics from Significant Cost Savings



## Infrastructure



**~70%\*  
Savings**

- Windows 10 experience at multi-session cost
- Cost effective compute and storage
- Flexible network provisioning
- Best value compute rate
- Opex spend aligned to business usage

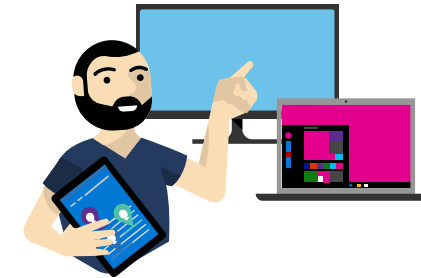
## Licensing



**~60%\*  
Savings**

- WVD management service included with the licenses you already own
- Savings on RDS CAL with multi-session deployment
- 3-year Windows 7 ESU included

## Labor



**~60%\*\*  
Savings**

- Lower labor cost because compute and storage move to cloud
- Lower labor cost when you use PaaS services

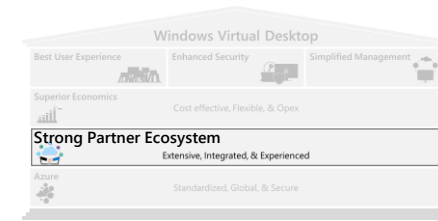
Note: Infrastructure includes compute, storage (IaaS/PaaS), and networking

\*See [Example Scenario: WVD Economic Benefits](#)

\*\* industry analysis



# Extensive Partner Ecosystem with Strong Virtual Desktop Expertise



## WVD Approved Providers



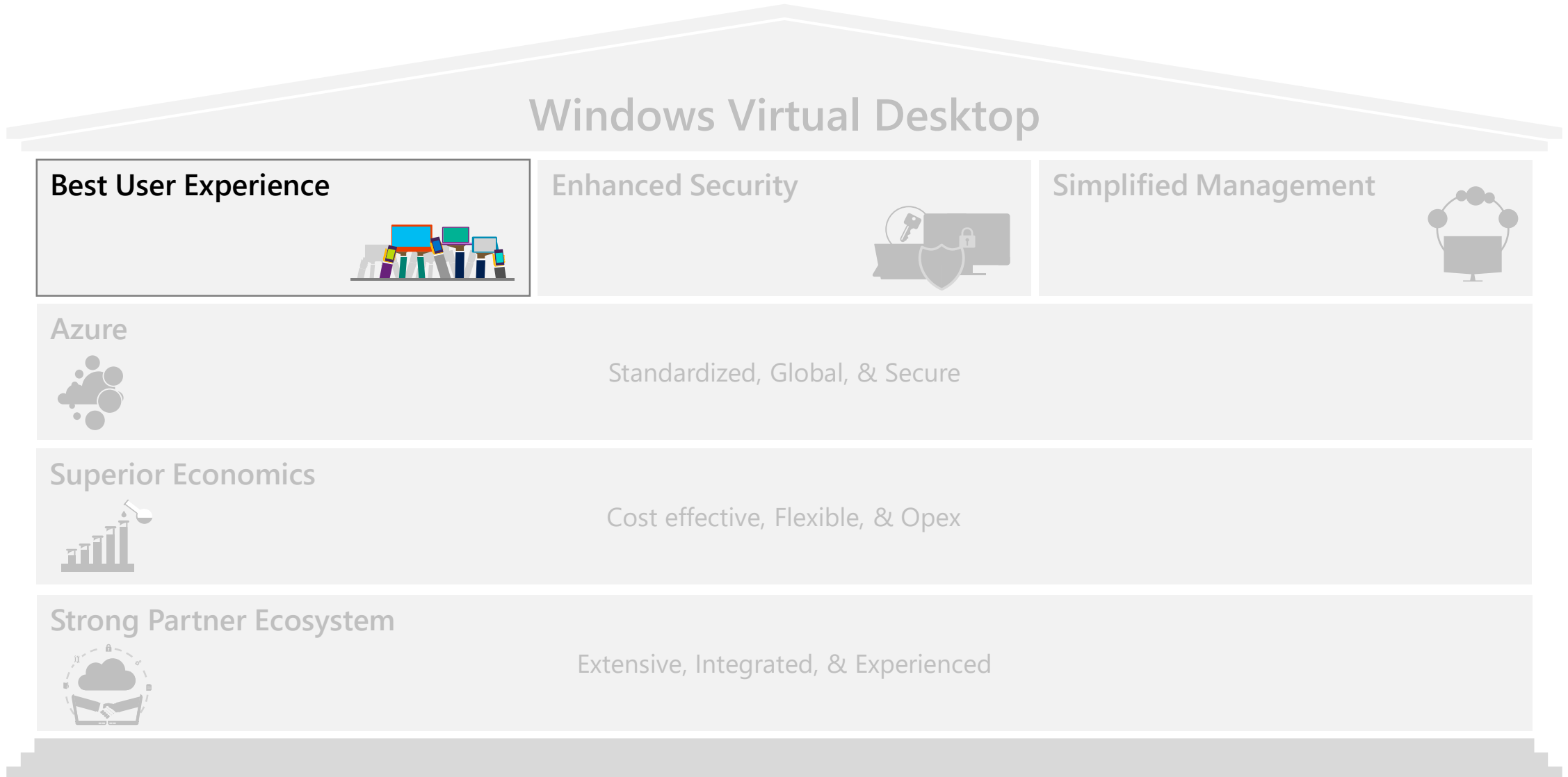
- Citrix and VMware provide value add to WVD (e.g. hybrid deployment management)
- Windows 10 Enterprise multi-session is also available with Citrix & VMware management planes
- Customer ultimately decides the management plane(s) of choice

## WVD Value-Added Partners

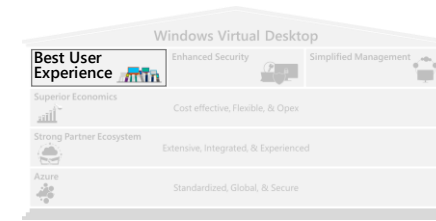


- WVD customers have access to a broad SW/Services partner network with expertise in
  - Customer Environment Assessment
  - Diagnostics & End User Experience Monitoring
  - Application Layering
  - Management
  - Printing
  - App Compatibility Assessment / Remediation

# Detail on WVD value drivers follows (“double-click”)



# ***Best Virtualized End-user Experience*** **Platform of choice**



**WVD allows users to connect from any device of their choice**



## **User Experience Benefits**

***Local and remote UI is optimized for the various form factors across all supported platforms: Windows, macOS, iOS, HTML5, and Android***

***Linux SDK\* will enable partners to build their own high performance WVD clients for their Linux endpoints***

*Performance of clients built on Linux SDK is at parity with other non-Windows clients*

***Windows experience is indistinguishable from native***

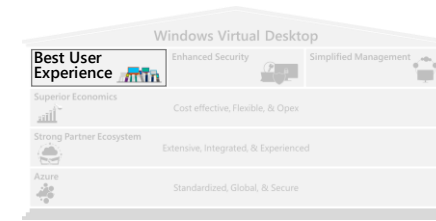
*MacOS client provides integrated RemoteApp experience*

*iOS, Android, and HTML5 clients provide immersive RemoteApp experience*

\* Coming soon

***Best Virtualized End-user Experience***

# Differentiated Windows Experience



**Windows devices deliver the best WVD experience for end users**



## User Experience Benefits

*Like-local Windows experience (integrated Start Menu, task bar, action center, App Switcher)*

*Extensive support for devices*

*Multiple monitor support (max 16 monitors with up to 8k x 8k resolution each)*

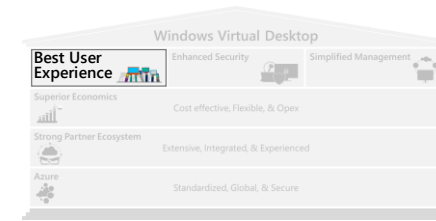
*RemoteApp indistinguishable from local apps*

*Integration with accessibility tools (e.g. Jaws)*

*Support for 3<sup>rd</sup> party extensions*

***Best Virtualized End-user Experience***

# Enhanced WVD / remote desktop protocol



**RDP enhancements deliver the optimized WVD experience for end users**



## User Experience Benefits

*Support for Windows Hello for Business and smartcard authentication*

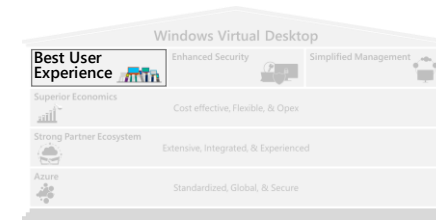
*Dynamically adapting bandwidth utilization*

*Devices and resources redirection (camera, printers, multi-touch, pen, time zone, clipboard)*

*Dynamic resolution and scaling*

*Better user experience with graphics optimized with mixed-mode encoding (clear text code for text and H.264 for video)*

# Containerized user profiles enable fast VHD load times



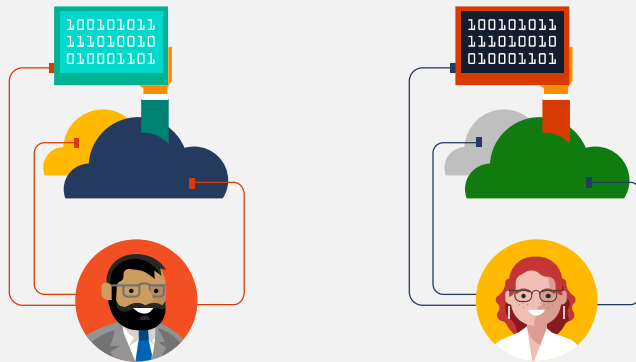
**End users receive seamless O365 experience**



## WVD

Containerized profiles

User profiles



Placed into a VHD container that is stored on Azure

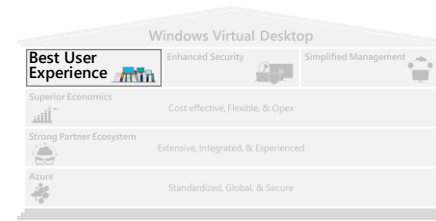
- Dynamically attached at user logon
- Content appears to be in its native location

## User Experience Benefits

***Achieves extremely fast logon times***

***Uses native Windows VHD capabilities – no hypervisor***

# Outlook Enhancements, OneDrive & Desktop Search Improvements



**End users get native O365 performance and behavior in both non-persistent and persistent virtual environments**



## WVD

- Deploy Cached Exchange Mode in virtual environments
- Cached Mode improvements
  - ✓ Syncing of Inbox prior to Calendar for faster startup experience
  - ✓ Admin option to reduce calendar sync window
  - ✓ Reduce the number of folders that are synced by default\*
- Windows Desktop Search index is now per-user and can be persisted with the user profile
- Reliable OneDrive syncing in non-persistent environments
- OneDrive Files-on-Demand capabilities

\* Coming soon

## User Experience Benefits

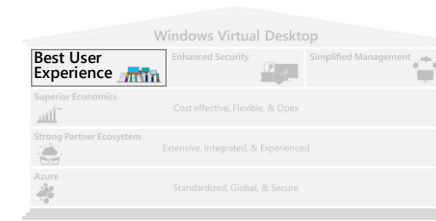
***Uncompromised O365 email and calendar performance***

***Real-time Outlook search***

***Speedy, persistent, per-user Windows Desktop search***

***Seamless O365 co-authoring and collaboration in non-persistent environments***

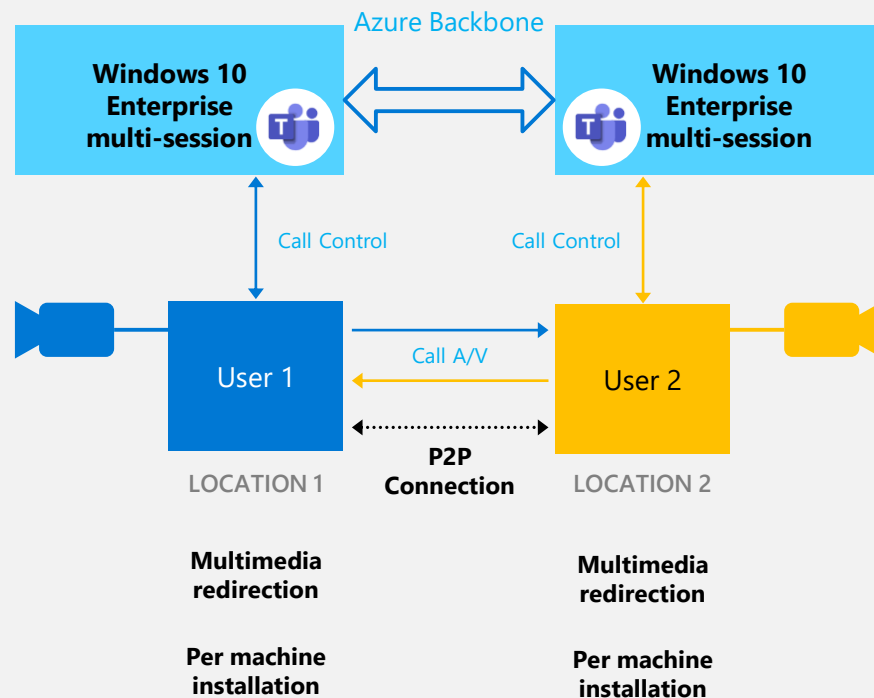
# Teams Enhancements (Coming soon)



**Teams provides end users with better conferencing and media experience**



## Teams on WVD – With Enhancement



## User Experience Benefits

***Less network bandwidth compared to USB camera redirection***

***Increased video framerates, up to 30 fps***

***Enhanced UI for ease of use in virtualized environments***

***Ability to redirect multiple cameras***

***High-performance, low latency audio & video calling***



# Windows Virtual Desktop

Best User Experience



**Enhanced Security**



Simplified Management

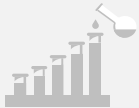


Azure



Standardized, Global, & Secure

Superior Economics



Cost effective, Flexible, & Opex

Strong Partner Ecosystem



Extensive, Integrated, & Experienced

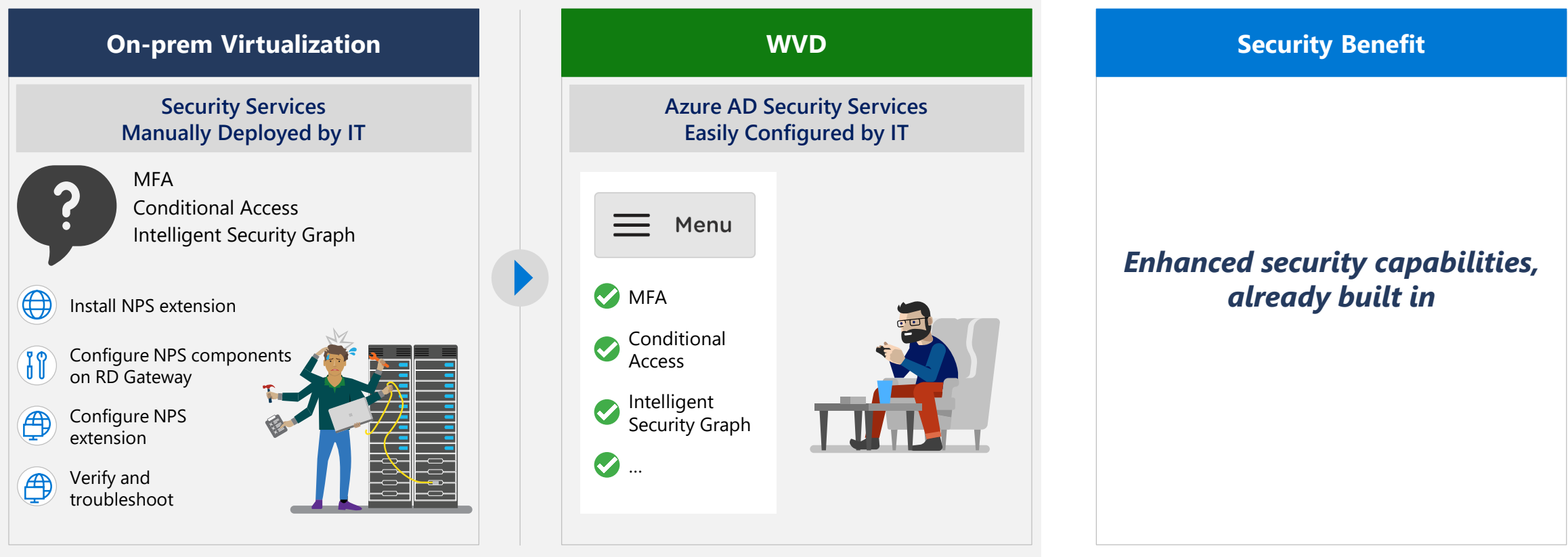
# Enhanced Security with Simplified Configuration

## Azure AD security services are readily available



### Customer Scenario – Moving from on-prem virtualization to WVD

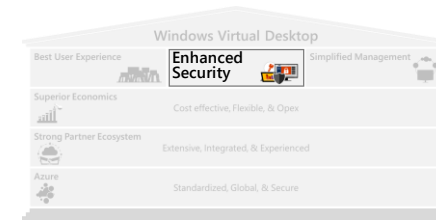
- WVD customers can readily utilize sophisticated Azure AD security services via built-in integration



Note: with WVD on Azure AD, admin can set up Conditional Access (CA) controls once and then easily expand that CA to other applications

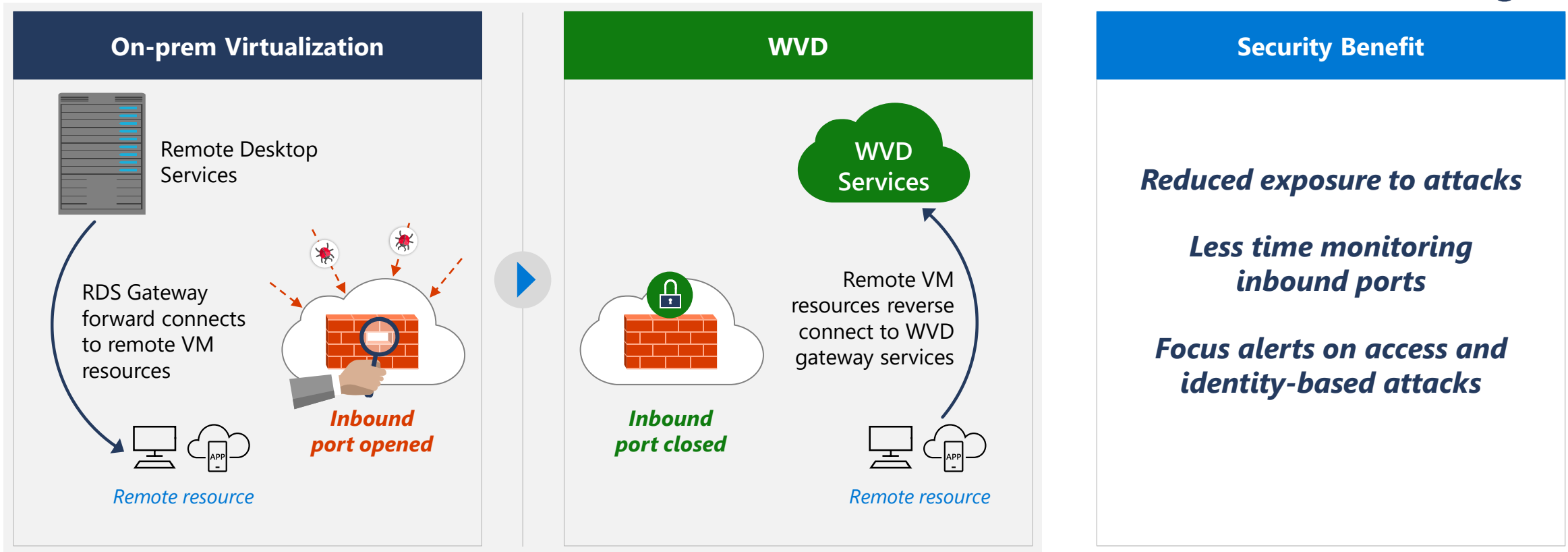
## Enhanced Security with Simplified Configuration

# The attack surface is reduced, compared to on-prem



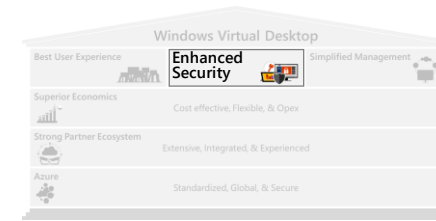
### Customer Scenario – Moving from on-prem virtualization to WVD

- Reverse connect eliminates the need to open inbound ports, reducing the attack surface



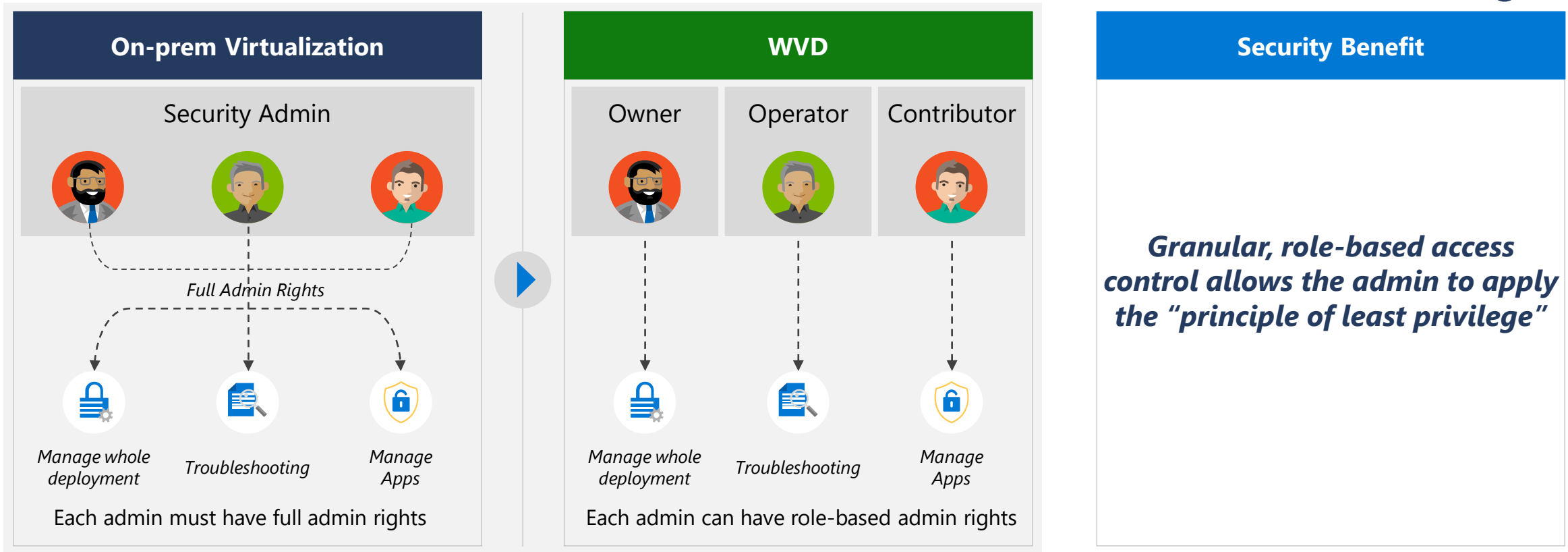
## Enhanced Security with Simplified Configuration

# Granular access control enables role-based administration



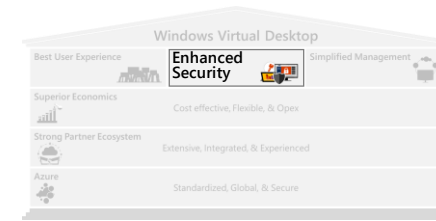
### Customer Scenario – Moving from on-prem virtualization to WVD

- WVD role-based access control enables delegation of admin rights at granular level



## Enhanced Security with Simplified Configuration

# User sessions are isolated

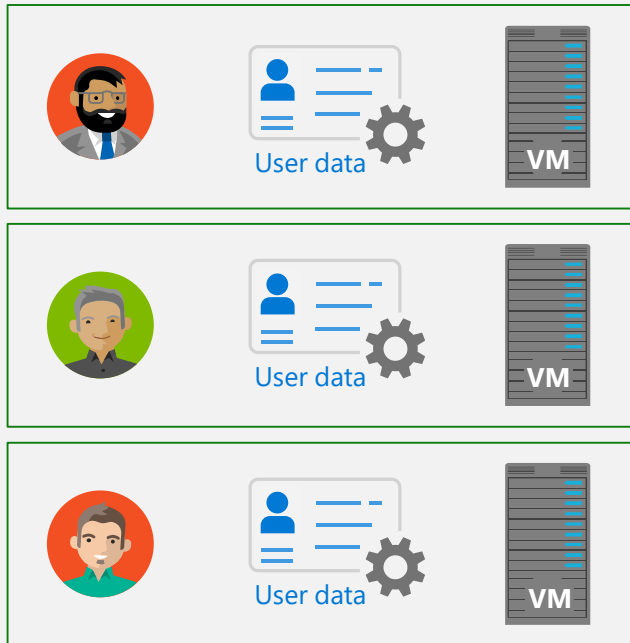


### Customer Scenario – Deploys both Windows 10 Enterprise single-session and multi-session in WVD

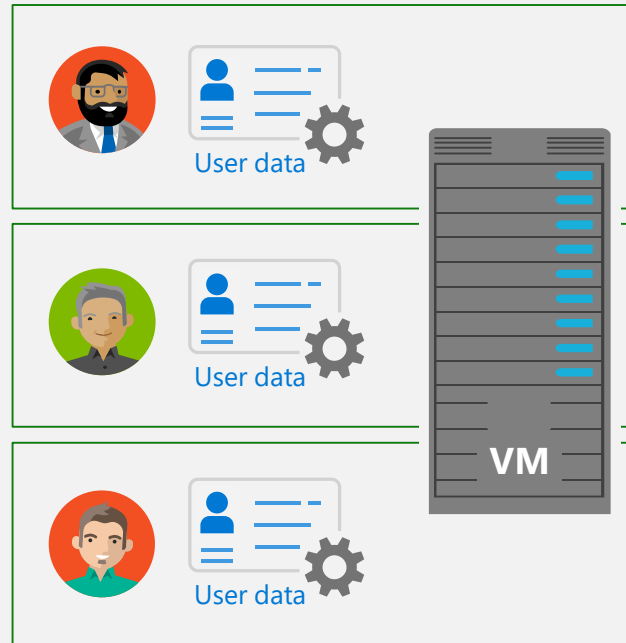
- WVD ensures user isolation in both single and multi-session environment



#### Windows 10 Enterprise Single-session in WVD



#### Windows 10 Enterprise Multi-session in WVD



#### Security Benefit

***Users are always isolated,  
whether using single or  
multi-session***

# Windows Virtual Desktop

Best User Experience



Enhanced Security



Simplified Management

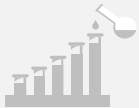


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Cost effective, Flexible, & Opex

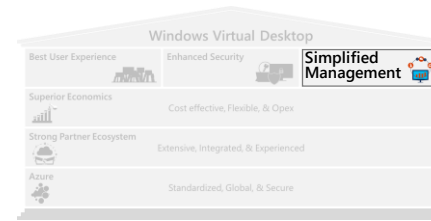
Strong Partner Ecosystem



Extensive, Integrated, & Experienced

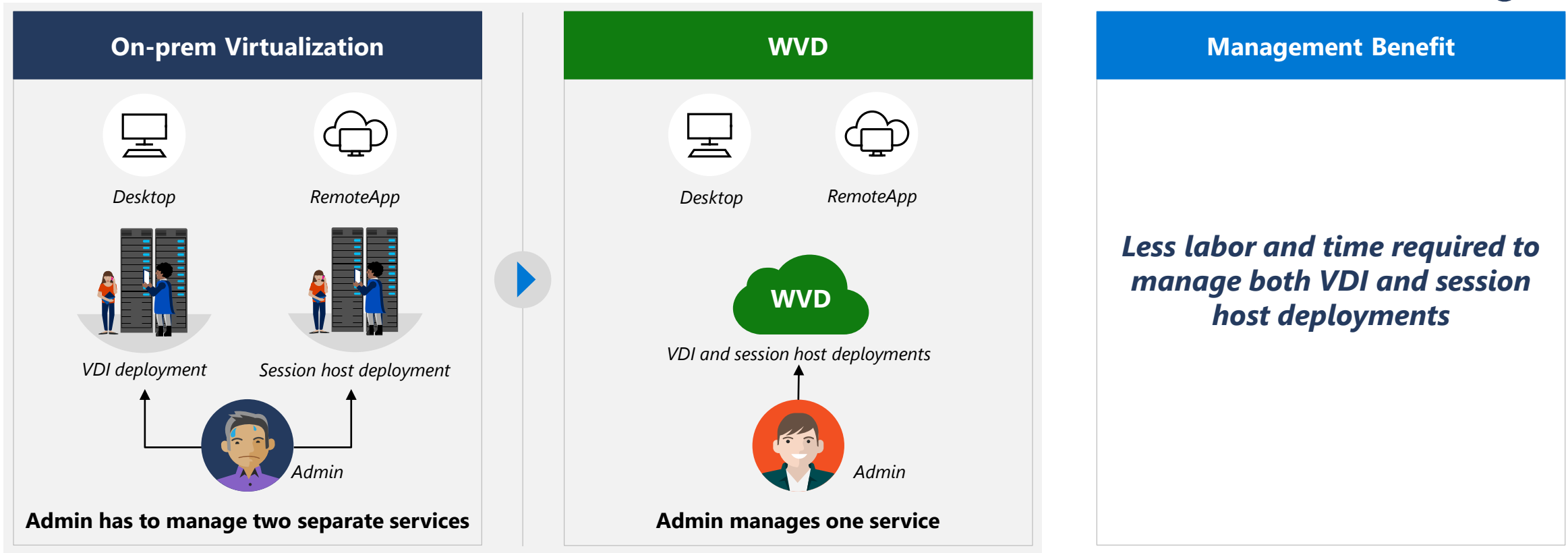
## Efficient and Simplified Management

# One service supports both desktop & RemoteApp experience

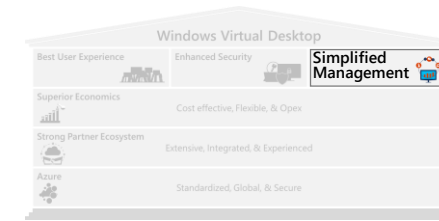


### Customer Scenario – From on-prem virtualization to WVD

- Both desktop and RemoteApp are managed through one WVD service



# Readily-available VM management tools



## Customer Scenario – From on-prem virtualization to WVD

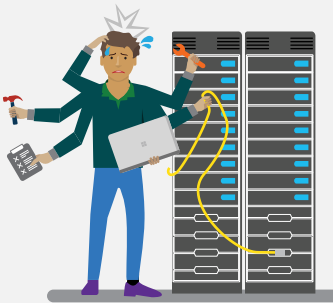
- WVD customers can leverage a broad set of VM management tools via WVD and Azure



### On-prem Virtualization

Complicated VM Management  
Manually Conducted by IT

- ? VM Deployment
- ? OS and App Management
- ? DR Setup and Configuration

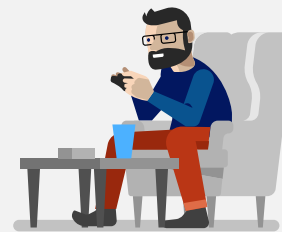


### WVD

Readily-available, Built-in Tools  
Easily Utilized by IT

Menu

- ✓ VM Deployment (e.g. Azure Update Management)
- ✓ Multiple OS and App Management tools at choice
- ✓ DR with Azure Site Recovery
- ✓ ...

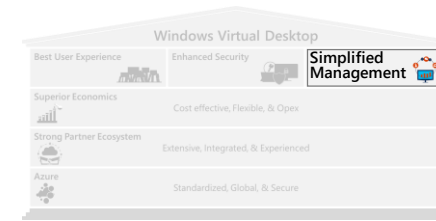


### Management Benefit

***Simplified management via  
versatile tools and automation***



# Simplified and Efficient Troubleshooting with Diagnostic Service

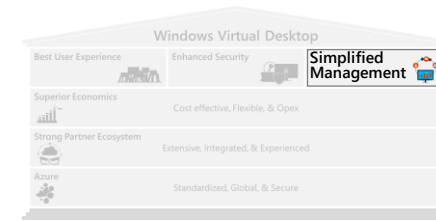


## Customer Scenario – From on-prem virtualization to WVD

- Advanced Diagnostic Service enables WVD customers to identify root cause and fix issues more efficiently

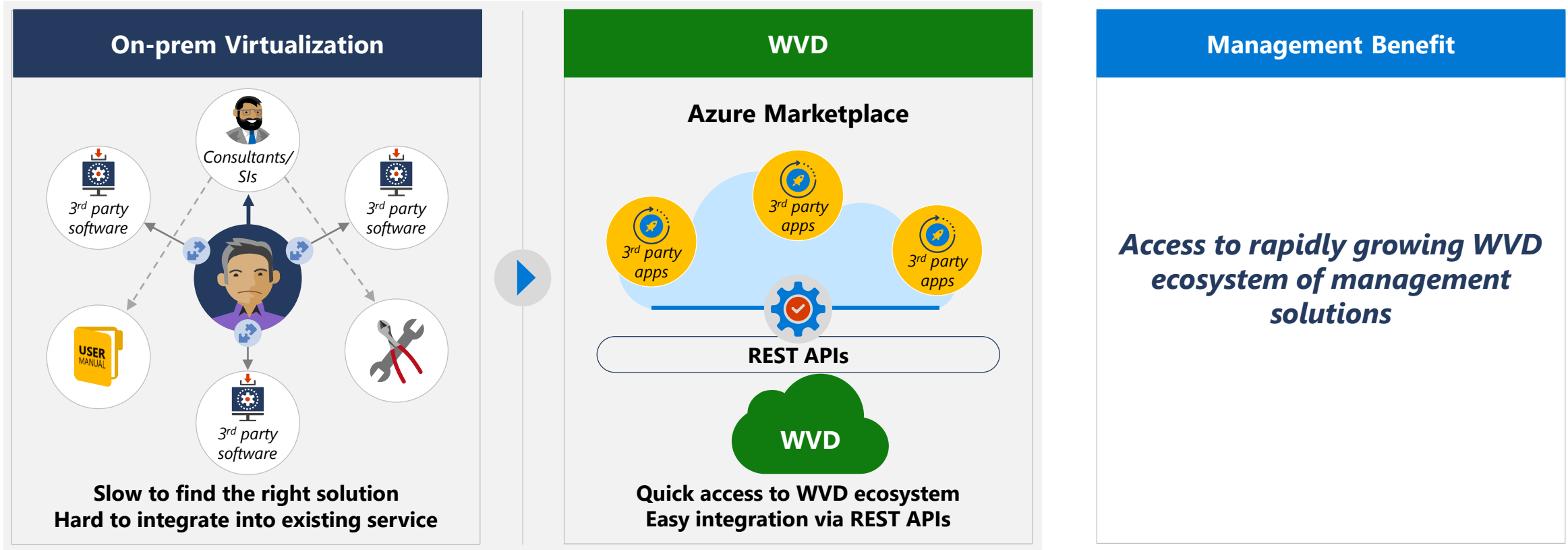


# Extensive 3rd Party Value-added Services Enabled by APIs



## Customer Scenario – From on-prem virtualization to WVD

- WVD customers have access to best-of-breed management solutions, including 3<sup>rd</sup> party apps



# Windows Virtual Desktop

Best User Experience



Enhanced Security



Simplified Management

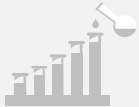


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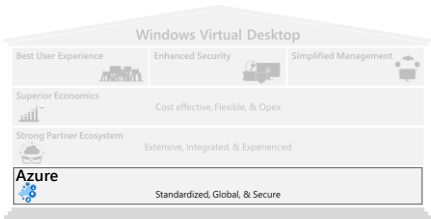
Cost effective, Flexible, & Opex

Strong Partner Ecosystem



Extensive, Integrated, & Experienced


# Built on Azure: Standardized, Global, and Secure Cloud





Standardized

Consistent infrastructure across regions


IaaS

  
Compute

  
Storage


  
Networking


PaaS





Partner ecosystem across multiple sites


SI


  
Infosys

  
HCL


  
DXC technology


  
wipro


  
IBM


  
Cognizant


ISV/IHV


  
vmware


  
SAMSUNG


  
IGEL

  
Lakeside

  
liquidware


  
SAP

  
CITRIX

  
NetApp


Purpose-built, standardized infrastructure across geos  
**300,000+** global partner ecosystem, leveraging consistent standards and IT architectures

Global



Largest geographical footprint of any cloud provider with more than **54 Azure regions**

Secure



Microsoft Cyber Defense Operations Center  
**>3,500** full-time security professionals  
**6.5 trillion** global signals daily  
**\$1 billion** annual cybersecurity investment

# Windows Virtual Desktop

Best User Experience



Enhanced Security



Simplified Management

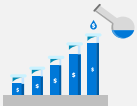


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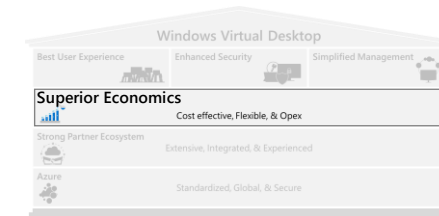
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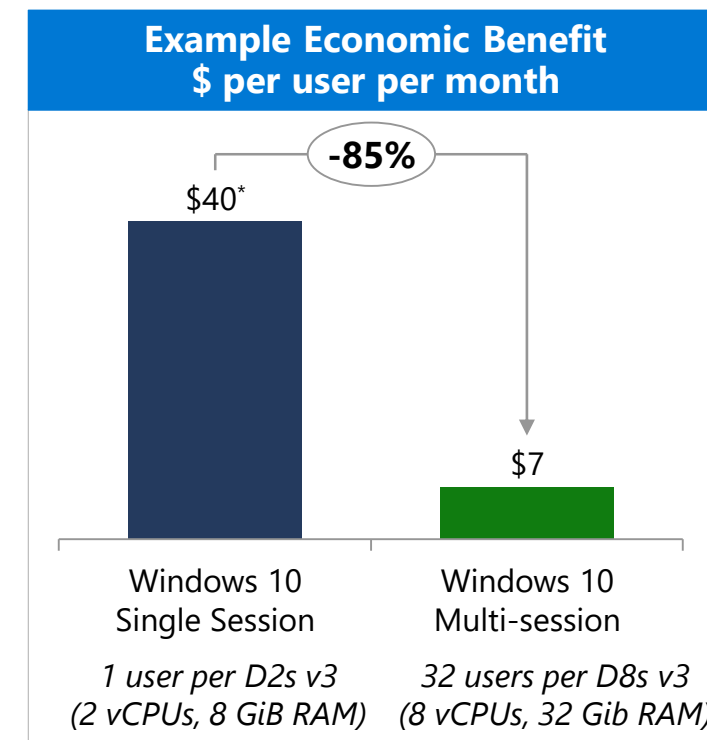
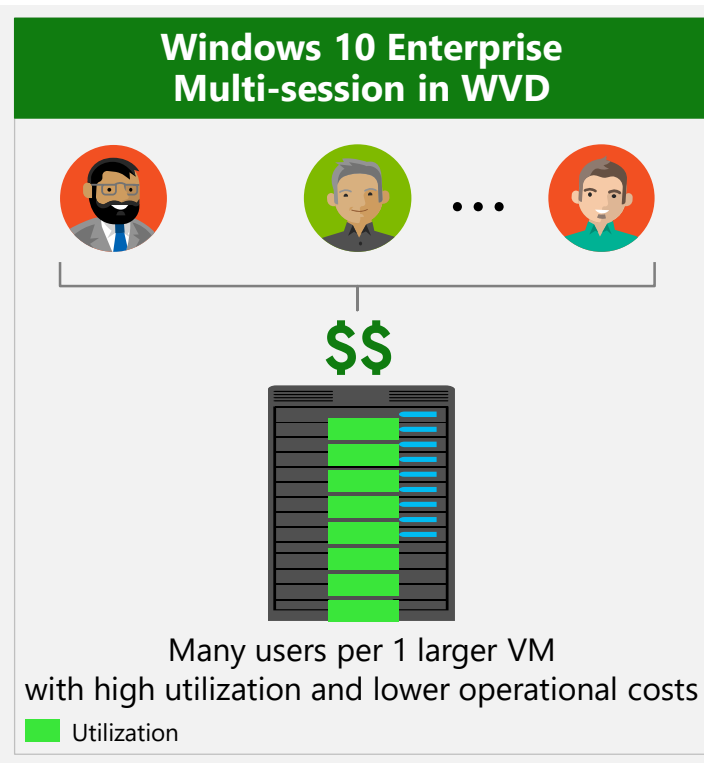
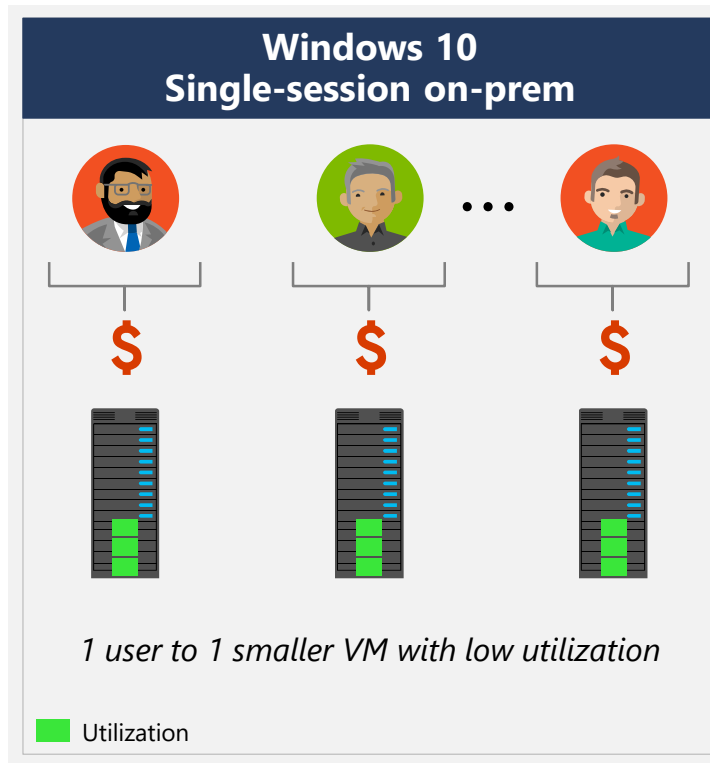
Extensive, Integrated, & Experienced

# Windows 10 Experience at Multi-session Cost



## Customer Scenario – From Windows 10 single-session on-prem to Windows 10 multi-session in WVD

- Trade many small dedicated VMs for few large shared VMs (with higher utilization and lower operational costs)



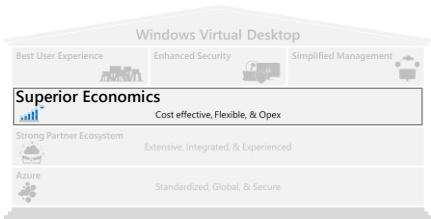
Note: WVD is the only way to run Windows 10 Multi-Session

Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and infrastructure configuration

\*The \$40 PUPM for single session cost is modeled for a common configuration: Windows 10 single-session in WVD starts at ~\$15 per user per month for 1 vCPU, 2 GiB RAM configuration

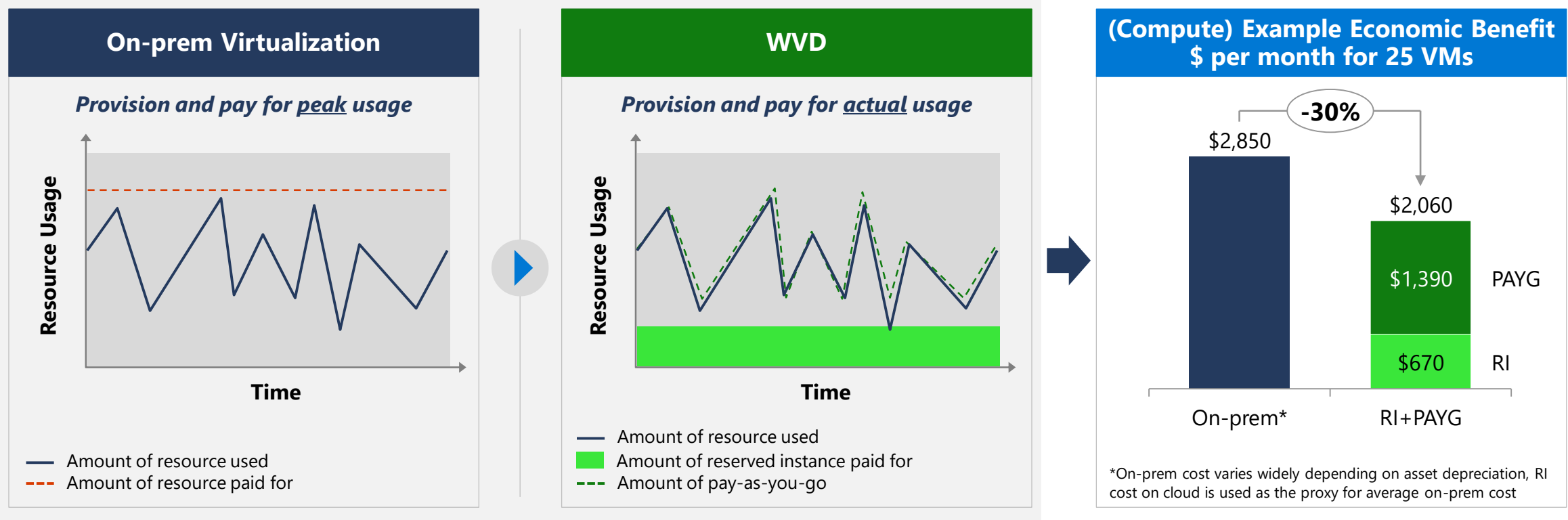
# Cost-optimized infrastructure

## Cost Effective Compute and Storage\*



### Customer Scenario – From on-prem virtualization to WVD

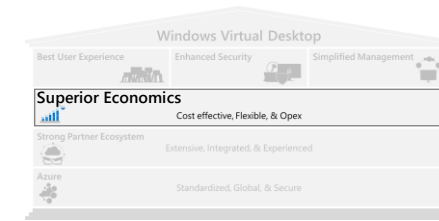
- Pay for actual usage instead of peak usage; optimize compute by using both Pay-as-you-go and Reserved Instance



\*When using Azure NetApp Files or Azure Files for storage, customers pay for actual consumed storage (vs. pay for fixed-sized disks)  
Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and infrastructure configuration

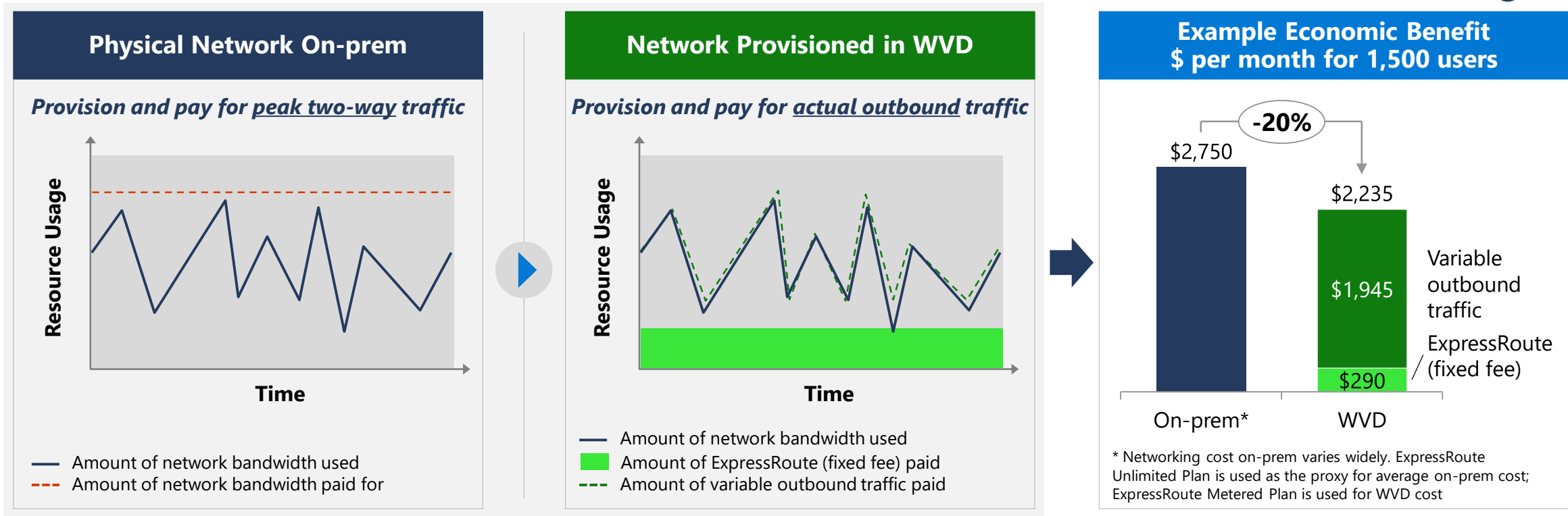
# Cost-optimized infrastructure

## Flexible Network Provisioning



### Customer Scenario – From Physical Network on-prem to Network Provisioned in WVD

- Pay for actual outbound data transfer instead of peak two-way data transfer;
- Optimize networking cost by using both fixed fee and variable outbound traffic



Note: Customers can connect from on-prem physical networks to Azure virtual networks via two ways: Virtual Private Network (VPN) or ExpressRoute

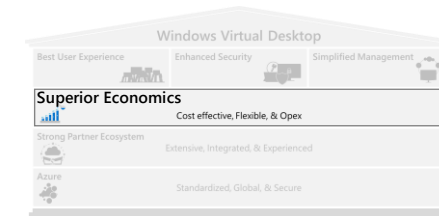
Note: Variable outbound traffic can be implemented via Virtual Network or ExpressRoute

Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and network configuration



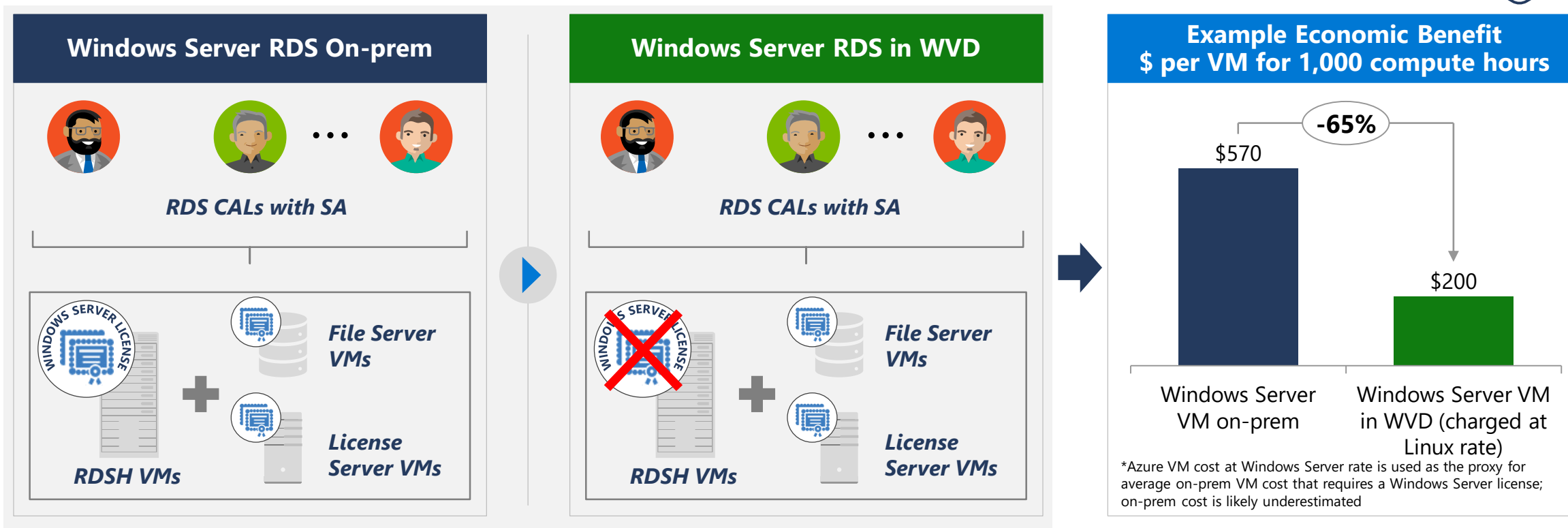
# Cost-optimized infrastructure

## Best Value Compute Rate



### Customer Scenario – From Windows Server on-prem to Windows Server in WVD

- WVD doesn't require Windows Server license for session host VMs (i.e. session host VMs charged at Linux compute rate)

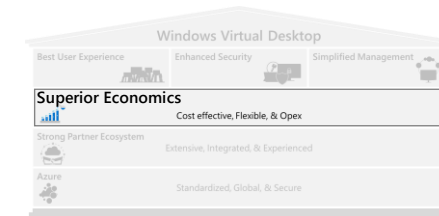


Note: Non-session host VMs still require Windows Server license (only if Azure Hybrid Benefits are not available)

Note: With Azure NetApp Files or Azure Files, customers also save the cost of Windows Server license and its hosting VM that would otherwise be required by File Server

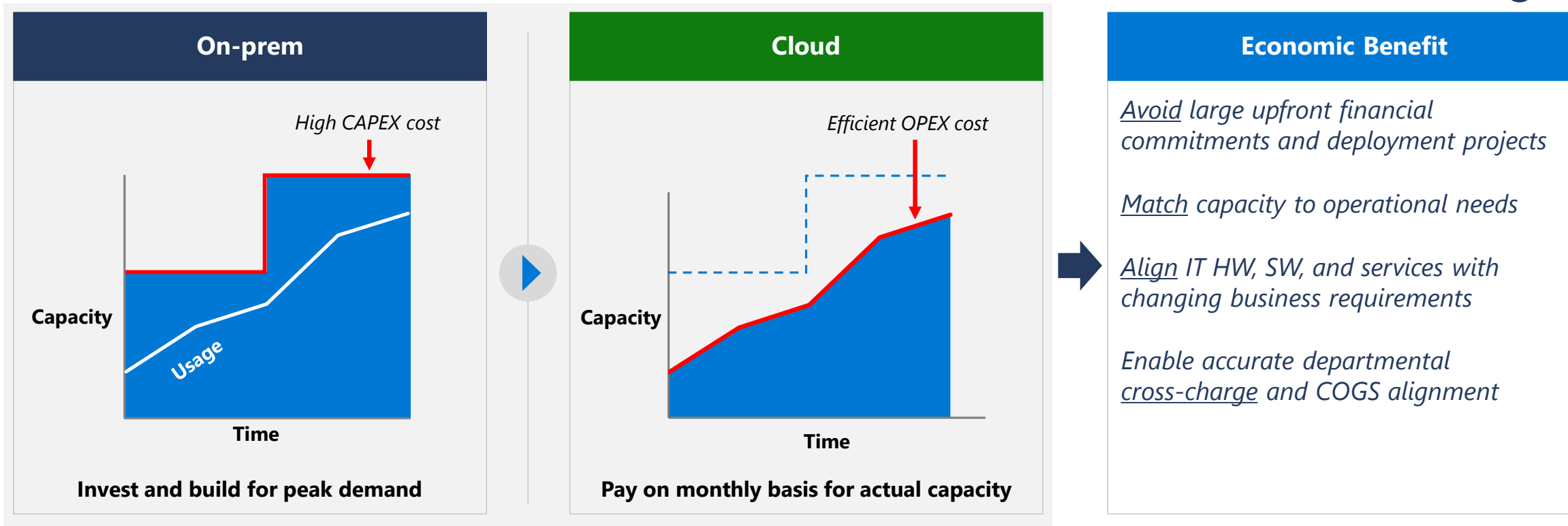
Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and infrastructure configuration

# Opex Spend Aligned to Business Usage



## Customer Scenario – On-prem to Cloud

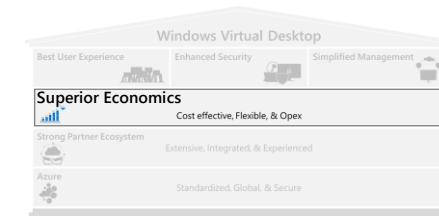
- From up-front Capex commitment to flexible Opex investment



Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and infrastructure configuration

## Cost-advantaged licensing

# Management Service Included With the Licenses you Already Own



### Customer Scenario – From on-prem virtualization to WVD

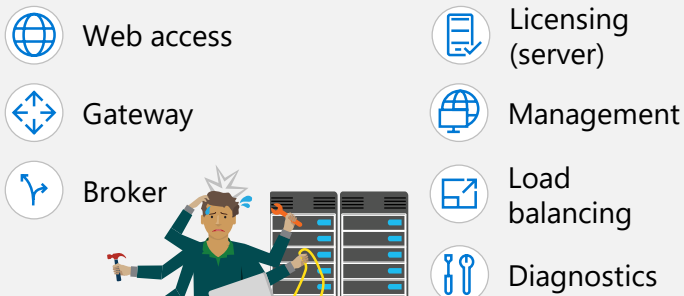
- WVD management service included with the licenses\* most Microsoft customers own
- Eliminate the infrastructure cost associated with on-prem management services



#### On-prem Virtualization

Management Services  
deployed by IT

##### Management service deployment



#### WVD

Management Services  
provided by WVD



#### Economic Benefit

**No management infrastructure needed**  
**No additional licenses required**  
**Reduced labor cost**

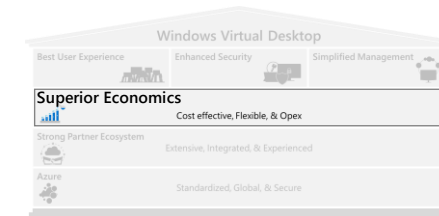
\*See Appendix for WVD Client licensing requirements, including specific SKUs

Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and current licensing position

Note: Customers who require Citrix or VMware management services to meet their needs will incur additional cost

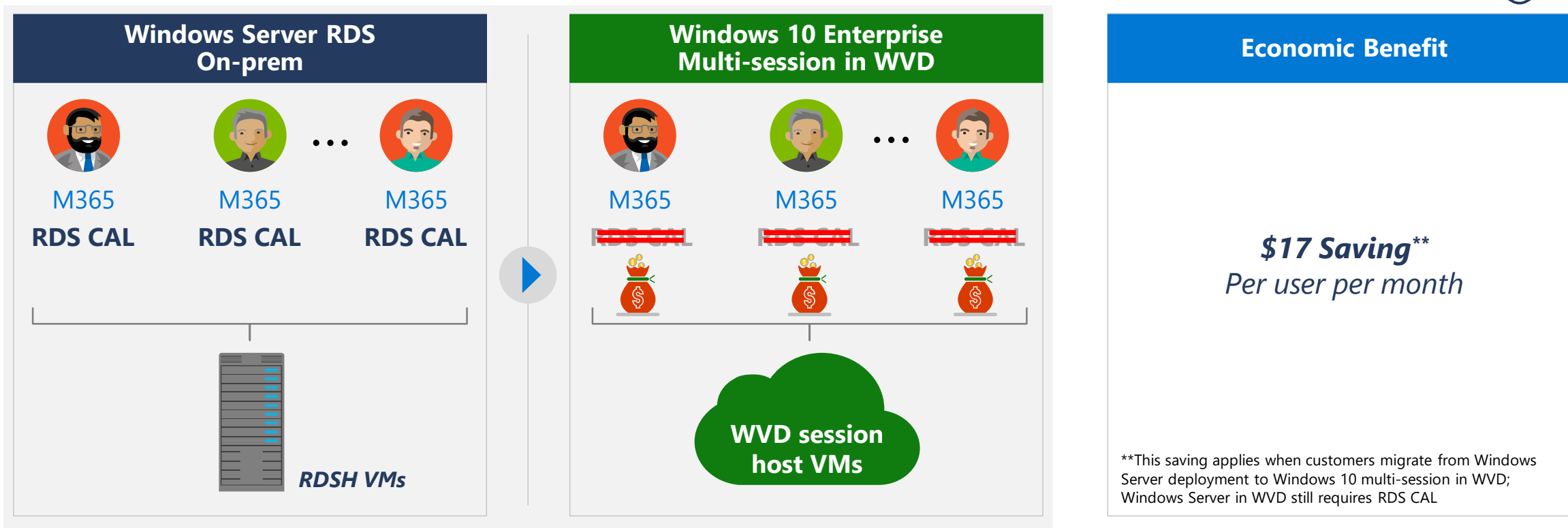
## Cost-advantaged licensing

# Savings on RDS CAL with Multi-session Deployment



### Customer Scenario – From Windows Server RDS on-prem to Windows 10 Enterprise Multi-session in WVD

- Save on RDS CAL when migrating from Windows Server RDS on-prem to Windows 10 Enterprise multi-Session\* in WVD



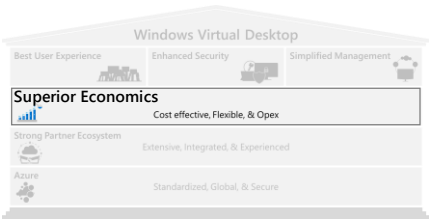
\*Customers can leverage the license (e.g. M365 E3/E5, Win 10 E3/E5) they already own. See Appendix for a complete list of WVD licensing requirements

Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and current licensing position

Note: Customers need to fully refactor desktops and apps when migrating from Windows Server deployment to Windows 10 multi-session in WVD

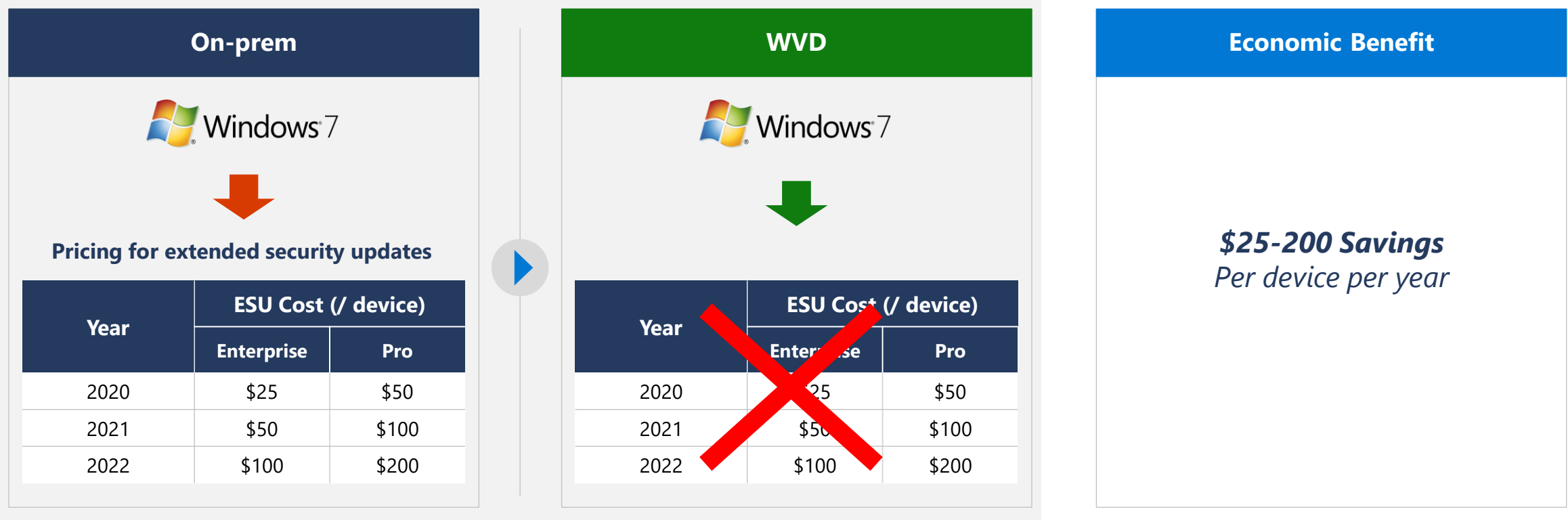
# Cost-advantaged licensing

## 3-year Win7 ESU Included



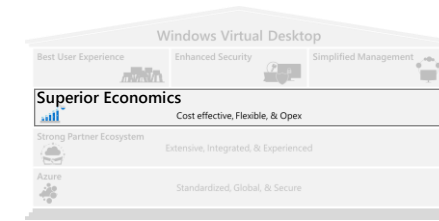
### Customer Scenario – From Windows 7 on-prem to Windows 7 in WVD

- With WVD, 3-year Extended Security Update is included for Windows 7 VMs running on Azure\*



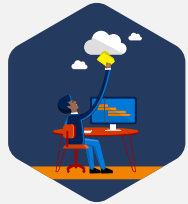
\*Benefit not applicable to Windows 7 running on local devices  
Note: Figures are illustrative and based on pre-configured assumptions; actual savings vary by user requirements and current licensing position

# Reduced Labor Requirements



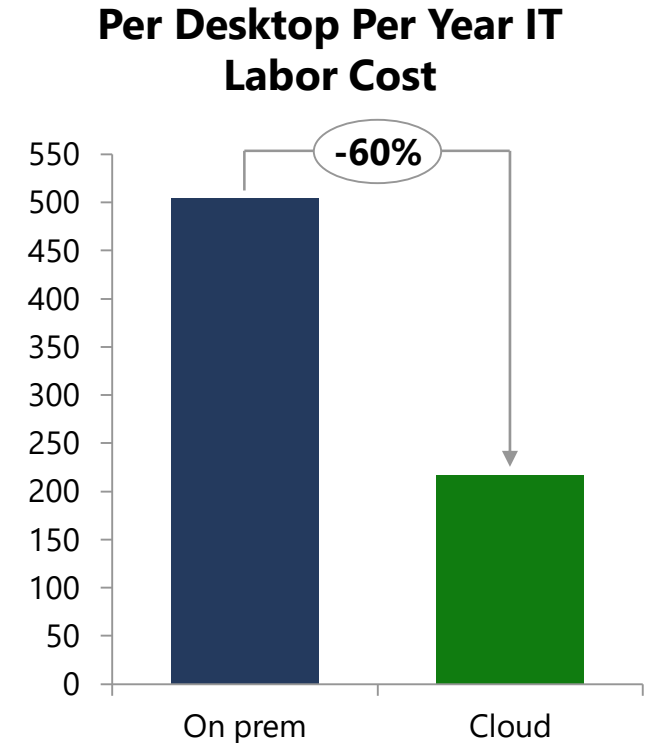
## Lower labor cost because compute and storage move to cloud

- Eliminate high overhead associated with managing on-premise infrastructure
- Reduced labor cost due to increased automation in the cloud



## Lower labor cost when you use PaaS services

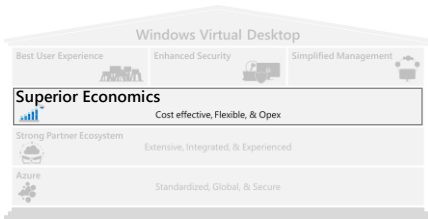
- WVD delivered as an evergreen PaaS service, reducing your labor cost for managing and upgrading management plane
- Simplified file storage management, leveraging fully managed NetApp Files service



Source: industry analysis

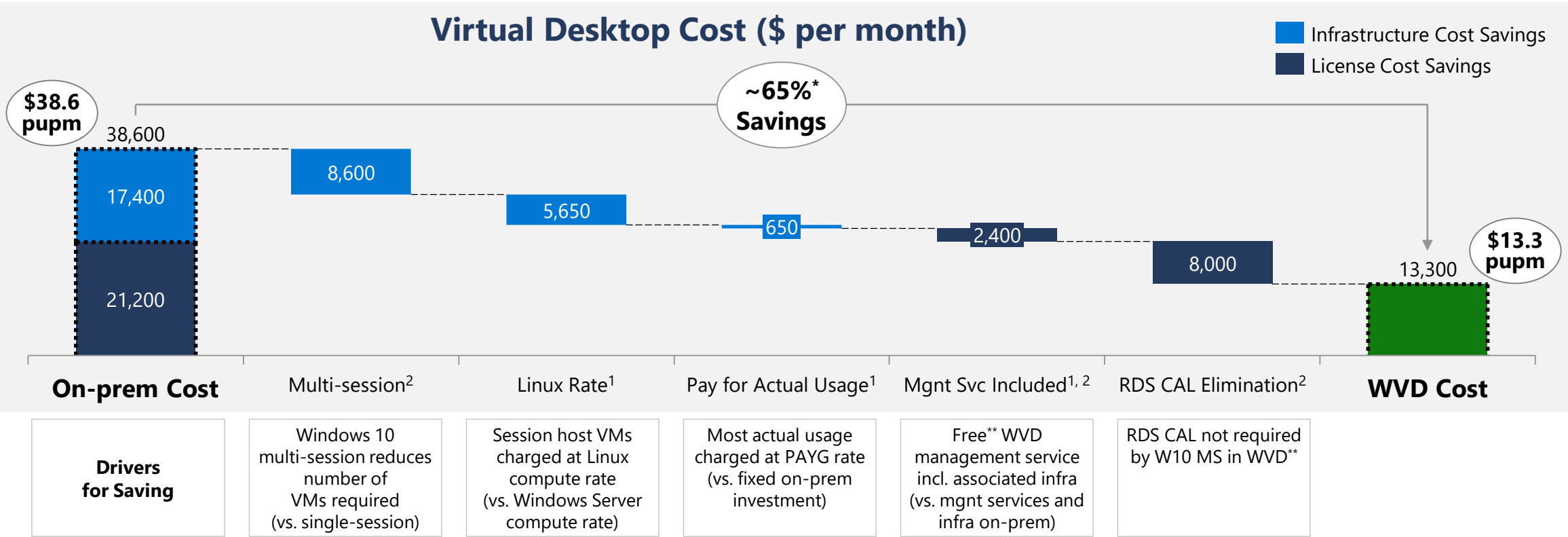
Note: Figures are illustrative; actual savings vary by user requirements and current virtual desktop operating model

# Example Scenario: WVD Economic Benefits



## Example Migration Scenario

- User Group 1: 800 medium workload users (session running 170 hrs/month): From Windows Server on-prem to Windows 10 multi-session in WVD
- User Group 2: 200 medium workload users (session running 400 hrs/month): From Windows 10 single-session on-prem to Windows 10 multi-session in WVD



Note: Chart shows the overall on-prem and WVD cost and associated cost savings for User Group 1 and 2 combined

Note: Given on-prem costs are highly variable, Azure reserved instance cost is used as the proxy for average on-prem cost; on-prem cost is likely underestimated

Note: Results generated by WVD Solution Configurator, an excel-based tool for sizing WVD opportunities; figures are rounded for simplicity

1 – Savings for User Group 1; 2 – Savings for User Group 2

\*~70% Savings on infrastructure cost and ~60% on license cost, respectively; labor cost excluded

\*\*Many customers already own licenses that qualify them for WVD (e.g. Win10 E3/E5, M365 E3/E5, VDA) and incur no additional cost for WVD

# Windows Virtual Desktop

Best User Experience



Enhanced Security



Simplified Management

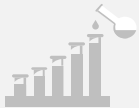


Azure



Standardized, Global, & Secure

Superior Economics



Cost effective, Flexible, & Opex

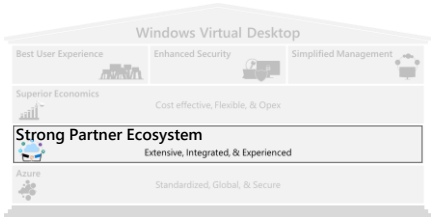
Strong Partner Ecosystem



Extensive, Integrated, & Experienced

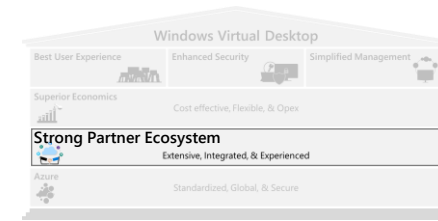


# Extensive Partner Ecosystem



WVD Approved Providers	 			
WVD Value- Added Partners		 		
				
WVD Hardware Partners	 	 	 	

# Strong Expertise in Virtual Desktop Deployment and Management



Category	Description	Partner Solution Examples		Delivery Mechanism
<b>Customer Environment Assessment</b>	Assess resource utilization of apps/users/OS, baseline user experiences and recommend sizing for WVD	<ul style="list-style-type: none"> <li>• Lakeside</li> <li>• Liquidware</li> <li>• ControlUp</li> </ul>		<ul style="list-style-type: none"> <li>• Azure Migrate</li> <li>• OCP</li> </ul>
<b>Diagnostics &amp; End User Experience Monitoring</b>	Assess, monitor, and manage end user experiences with GUI enabling reactive troubleshooting as well as predictive troubleshooting leveraging AI/ML	<ul style="list-style-type: none"> <li>• Lakeside</li> <li>• Liquidware</li> <li>• ControlUp</li> </ul>	<ul style="list-style-type: none"> <li>• RDPSoft</li> <li>• Sepago</li> </ul>	<ul style="list-style-type: none"> <li>• Azure Marketplace</li> </ul>
<b>Application Layering</b>	Enable dynamic provisioning of apps during boot/log on time based on user profile	<ul style="list-style-type: none"> <li>• Liquidware</li> <li>• Citrix's Unidesk</li> </ul>		<ul style="list-style-type: none"> <li>• Azure Marketplace</li> </ul>
<b>Management</b>	Deployment and configuration	<ul style="list-style-type: none"> <li>• Active Cypher</li> <li>• CloudVae</li> <li>• CloudJumper</li> </ul>	<ul style="list-style-type: none"> <li>• Nerdio</li> <li>• PTG Ubikite</li> </ul>	<ul style="list-style-type: none"> <li>• Azure Marketplace</li> </ul>
<b>Printing</b>	Remove the need for print server infrastructure	<ul style="list-style-type: none"> <li>• Uprint</li> <li>• ThinPrint</li> </ul>		<ul style="list-style-type: none"> <li>• Azure Marketplace</li> </ul>
<b>App Compat Assessment / Remediation</b>	Assess app compatibility for layering new packaging	<ul style="list-style-type: none"> <li>• Cloudhouse</li> <li>• Citrix's Unidesk</li> <li>• Numecent</li> </ul>	<ul style="list-style-type: none"> <li>• Liquidware</li> </ul>	<ul style="list-style-type: none"> <li>• Azure Marketplace</li> </ul>

Thank You

# Appendix

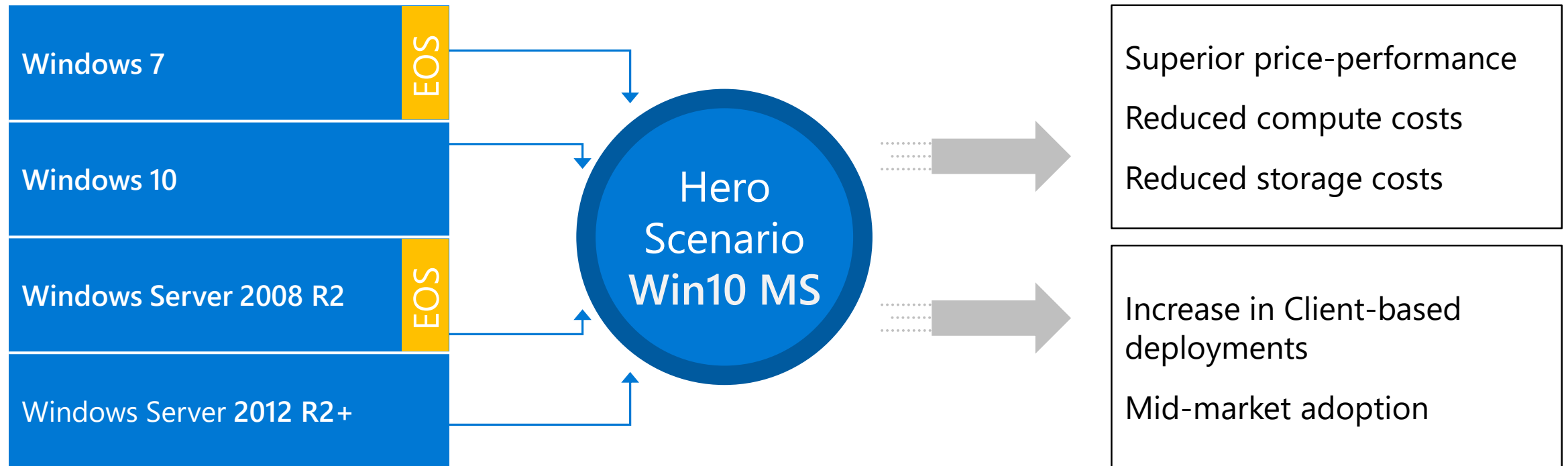
# Windows Virtual Desktop

The best virtual desktop and app experience, delivered on Azure



# The ONLY multi-session Windows 10 experience

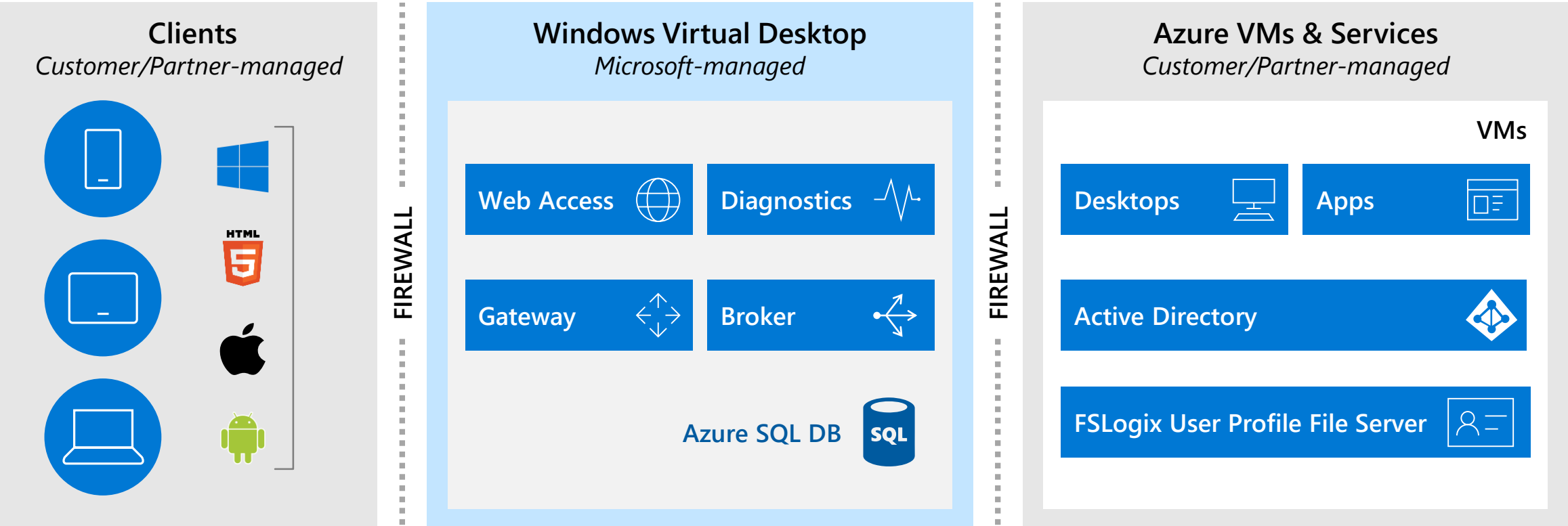
Multiple users active simultaneously on the same VM  
Each user's data is isolated from every other user



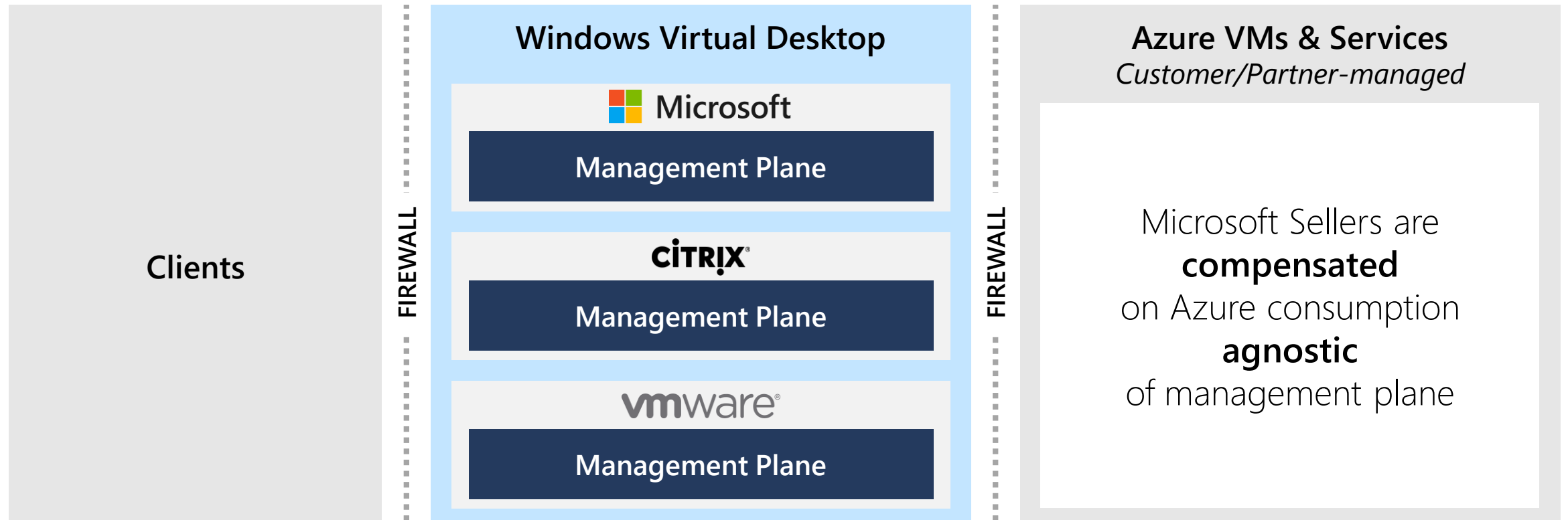
Application compatibility and user experiences **vary** between **Server** and **Client** OS

# WVD Architectural Overview

## 3 BIG PIECES



# Citrix & VMware integration



- Citrix and VMware provide value add to WVD (e.g. hybrid deployment management)
- Windows 10 multi-session is also available with Citrix & VMware management planes
- Customer ultimately decides the management plane(s) of choice



# Many customers are already eligible for WVD

## WVD Licensing Requirements

### CLIENT

Customers are eligible to access Windows 10 and Windows 7 with Windows Virtual Desktop (WVD) if they have one of the following licenses\*:

- Microsoft 365 E3/A3
- Microsoft 365 E5/A5
- Microsoft 365 F1
- Microsoft 365 Business
- Windows 10 Enterprise E3/E5
- Windows 10 Education A3/A5
- Windows 10 VDA per user

*\*Customers can access Windows Virtual Desktop from their non-Windows Pro endpoints if they have a Microsoft 365 E3/E5, Microsoft 365 A3/A5 or Windows 10 VDA per user license.*

### SERVER

Customers are eligible to access Windows Server 2012 R2 and newer desktops and apps if they have an RDS CAL license with active Software Assurance (SA)

# All discounts and benefits of Azure apply to WVD

▶ Virtualization endpoints only  
Burst-to-Azure (cloud)

▶ Brand new virtualization env  
Lift and shift

▶ Windows Virtual Desktop  
Lift and shift and **Modernize**

Azure Hybrid User Benefit

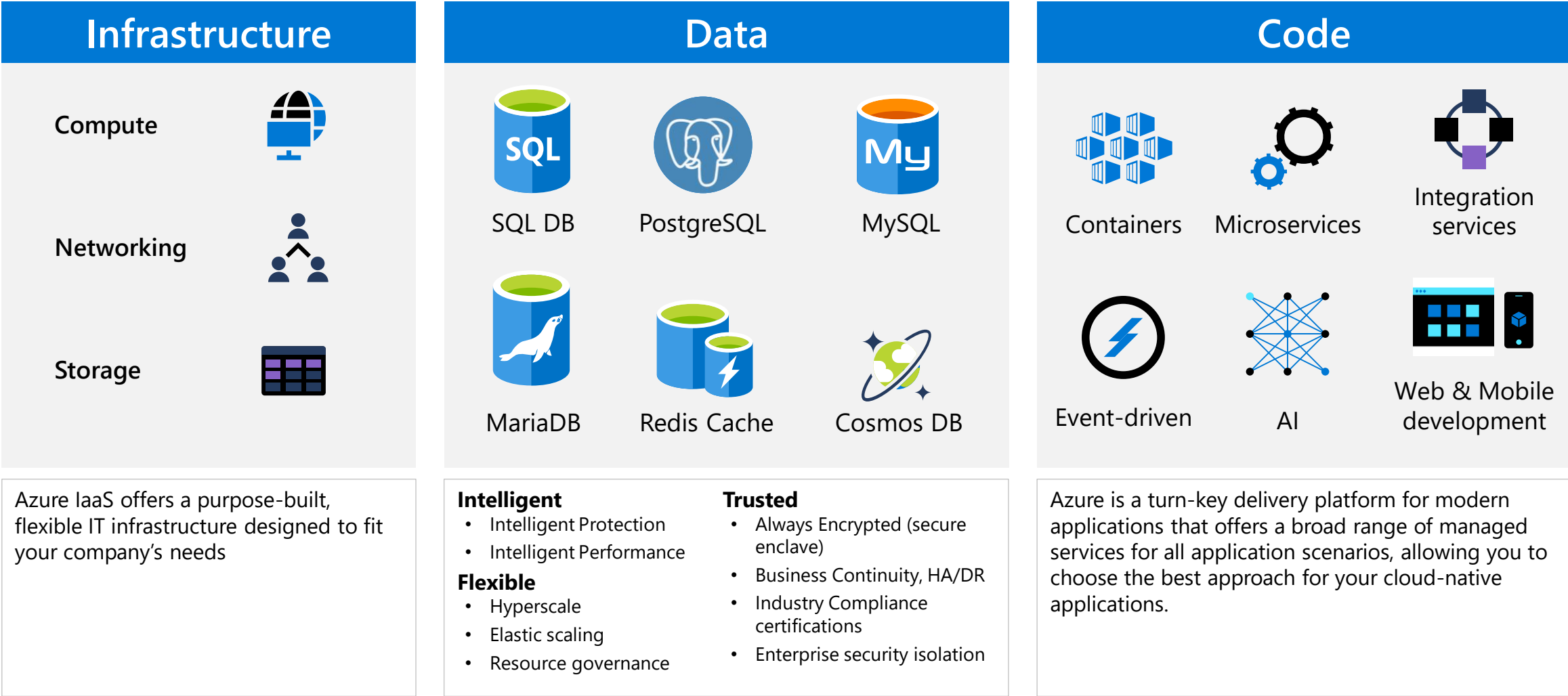
Azure Consumption based Incentive Programs

CSP Margins & Rebates

Reserved Instances

DPOR

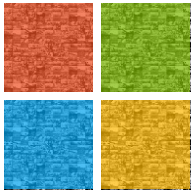
# Azure Enhances Productivity



# Microsoft is Your Trusted Technology Partner

## Trusted business partner

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### Microsoft mission

*"Empower every person and every organization on the planet to achieve more"*



**Satya Nadella**, Microsoft CEO

*October 2018*

"No customer wants to be dependent on a provider that sells them technology on one end and competes with them on the other. Getting this equation right is key to their success going forward. **Microsoft is uniquely positioned to help.**"

## Trusted innovation partner

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### Shared IP Innovation Principles:

Microsoft's policies give customers peace of mind and clarity when innovating with us

### Azure IP Advantage:

Microsoft offers best-in-industry protection against IP risks



Patent Pick



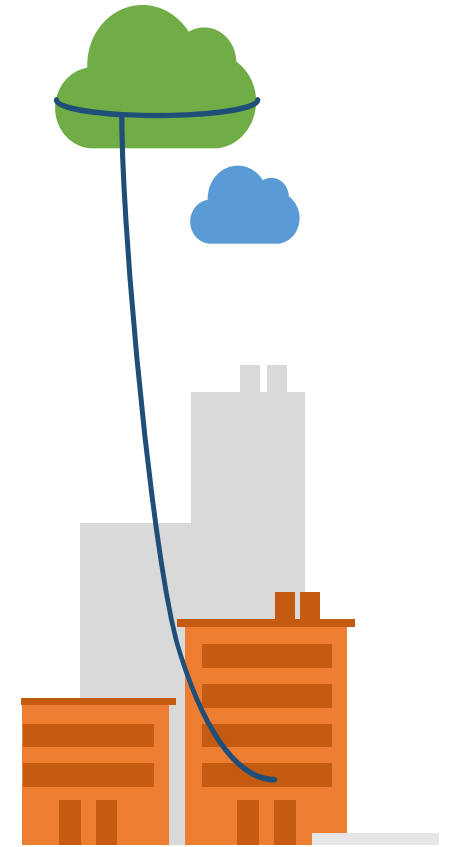
Uncapped  
Indemnification



Springing  
License

# Microsoft is committed to WVD as the future of the Windows platform

- 1 Broad availability and rapid global rollout of the WVD Service
- 2 Compelling infrastructure and licensing pricing to end customers
- 3 Plan to support wide range of devices, including mobile and thin client running other operating systems
- 4 Rapid innovation/integration with Microsoft and Azure products e.g., Teams, Microsoft Defender ATP
- 5 Wide partner ecosystem to build on/integrate with WVD



# Calculation Backups

# WVD Infrastructure Cost\* at a Glance

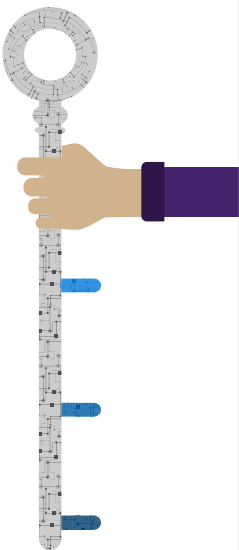


## Customer Requirements

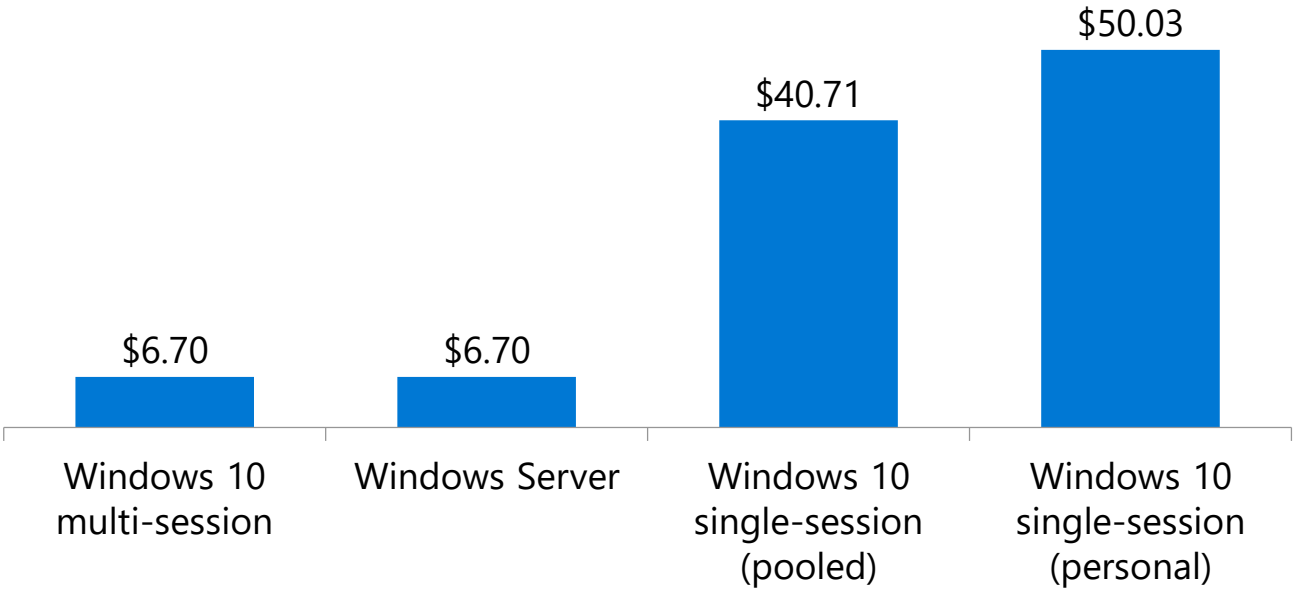
- User Type: Medium (Microsoft Office apps users)
- # of Users: 1,000
- Peak Concurrency: 80%
- Profile Storage Requirement: 20GB / user
- Network egress: 100 kpbs / user

## Key Infrastructure Assumptions

- **Compute:**
  - East US
  - 3-year Reserved Instance
  - D8s v3 (for multi-session)
  - 4 users/vCPU (for multi-session)
  - D2s v3 (for single-session)
- **Storage:**
  - Azure NetApp Files
- **Networking:**
  - Virtual Network (East US Same Region)



## WVD Cost\* Per User Per Month



Note: Results generated by WVD Solution Configurator, an excel-based tool for sizing WVD opportunities; figures are rounded for simplicity  
\*License cost not included; Many customers already own licenses that qualify them for WVD (e.g. Win10 E3/E5, M365 E3/E5, VDA) and incur no additional license cost for WVD

# WVD Cost Estimation for Win10 multi-session vs. Win10 single-session(1/3)

## Opportunity Profile

WVD Opportunity	User Group 1	User Group 2
WVD (W7, W10, W10 MS, WS)	Windows 10 multi-session	Windows 10
Customer Environment / User Requirements		
User Type	Medium	Medium
Named (total) users	1,000	1,000
Peak Concurrency	80%	80%
Pooled / Personal	Pooled	Pooled
Azure Region (for infrastructure)	US-East	US-East



# WVD Cost Estimation for Win10 multi-session vs. Win10 single-session(2/3)

## Compute Cost

Session Host VM	User Group 1	User Group 2
OS Type	Windows 10 multi-session	Windows 10
Pooled / Personal	Pooled	Pooled
Deployment Type	Multi-session	Single-session
# users/vCPU (only valid for multi-session) (Default)	4	N/A
VM Instance (Default)	D8s v3	D2s v3
Reserved Instance (Default)	3-year reserved	3 -year reserved
Price / hour per VM	\$0.147	\$0.0368
Users per VM	32	1
Peak hours / month per VM	730	730
VMS during peak hours	26	801
<b>Total VM cost / month</b>	<b>\$2,797</b>	<b>\$21,536</b>
OS Disk (for Session Host VM)	User Group 1	User Group 2
OS Disk size (GB) required (Default)	127	127
# OS Disk per VM (Default)	1	1
OS Disk Tier (Default)	Premium	Premium
OS Disk	premiumssd-p10	premiumssd-p10
OS Disk cost per VM	\$19.71	\$19.71
# VMS during peak hours	26	801
Total OS Disk cost / month during peak hours	\$512.46	\$15,787.71
<b>Total OS Disk cost / month</b>	<b>\$512.16</b>	<b>\$15,787.71</b>

## Storage Cost

Storage Requirements	User Group 1	User Group 2
Storage GB/user (Default)	20	20
Total profile storage required (GB)	20,000	20,000
<b>Azure NetApp Files</b>		
Azure Region	US-East	US-East
Pricing Option	Month	Month
Storage Hours	N/A	N/A
Storage Tier (Default)	Standard	Standard
Cost / GB / (Month or Hour)	\$0.15	\$0.15
<b>Total Azure NetApp Files Storage cost / month</b>	<b>\$2,949.20</b>	<b>\$2,949.20</b>

# WVD Cost Estimation for Win10 multi-session vs. Win10 single-session(3/3)

## Networking Cost

Virtual Network	User Group 1	User Group 2
Source vNet Region	US-East	US-East
Destination vNet Region	US-East	US-East
Type	Same Region	Same Region
Network egress (Default kbps per user)	150	150
Average work hours (per user per month)	160	160
Network egress (GB per user per month)	66	66
Network egress (total GB)	65,918	65,918
Cost per GB	\$0.01	\$0.01
<b>Total Virtual Network Cost / month</b>	<b>\$659.18</b>	<b>\$659.18</b>

## Total Cost

WVD Total Infrastructure Cost (Total cost / month)	User Group 1	User Group 2
<b>Compute</b>	<b>\$3,309.54</b>	<b>\$37,323.32</b>
<b>Storage</b>	<b>\$2,949.20</b>	<b>\$2,949.20</b>
<b>Networking</b>	<b>\$659.18</b>	<b>\$659.18</b>
<b>EA or Other Customer Discount</b>	<b>0%</b>	<b>0%</b>
<b>Total Azure Infrastructure cost / month</b>	<b>\$6,917.92</b>	<b>\$40,931.70</b>
<b>Named (total) users</b>	<b>1,000</b>	<b>1,000</b>
<b>Azure Infrastructure cost / user / month</b>	<b>\$6.92</b>	<b>\$40.93</b>

# Default Values (Microsoft Guidance) for WVD Cost Estimation

User Type Profiles	Light	Medium	Heavy	Heavy Graphics
Description	Ideal for lightweight use cases with such as data entry and call center apps.	Ideal for basic Microsoft Office apps such as Word and Excel, as well as database apps.	Ideal for more intensive workloads such as development or engineering.	Ideal for graphics intensive apps such as 3D CAD and Adobe Photoshop.
VM Instance (Default) Multi-session	D8s v3	D8s v3	D8s v3	NV6
VM Instance (Default) Single-session	D2s v3	D2s v3	D2s v3	NV6
# users/vCPU (only valid for multi-session) (Default)	6	4	3	1
OS Disk size (GB) required (Default)	127	127	127	127
# OS Disk per VM (Default)	1	1	1	1
OS Disk Tier (Default)	Premium	Premium	Premium	Premium
Profile Data Disk size (GB) required (Default)	2,000	2,000	2,000	2,000
Storage GB/user (Default)	20	20	20	20
Storage Option (Default)	Azure NetApp Files	Azure NetApp Files	Azure NetApp Files	Azure NetApp Files
Storage Tier (Default)	Standard	Standard	Standard	Standard
Profile Data Disk Tier (Default)	Premium	Premium	Premium	Premium
Network egress (Default kbps per user)	75	150	500	1,000