Microsoft

Azure Virtual Desktop

Enable a secure, remote desktop, experience from anywhere

Joke Feije-Edelman - Cloud Solution Architect
Maran Verweij - Cloud Solution Architect

4 April 2024

Workshops Agenda

Times are approximate and will be fluid with the class.

Duration	Content
60-90 minutes	Presentation on Azure Virtual Desktop
Till lunch	Hands-on Lab: Deploying Azure Virtual Desktop
	Break: for lunch
Afternoon	Remainder of the presentation on Azure Virtual Desktop Hands-on Lab: Deploying Azure Virtual Desktop


Search
Recording has started. This meeting is being recorded. By joining, you are giving consent for this meeting to be reco...
Dismiss
Connecting remotely to Microsoft resources
Meeting chat
Slide 14 of 35
Take control
Brendan Lacey (Unisys Europe Limited)
Alexander Smutny
Type here to search
esc
backspace
tab
enter
caps lock
shift
ctrl
fn
insert
home
page up
delete
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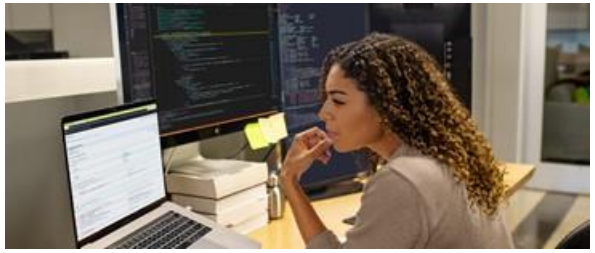
page down

Cloud VDI can provide a flexible, cost-effective way to address current IT challenges and unlock new use cases

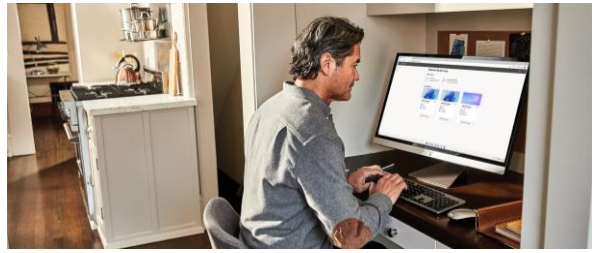
Data security

Improve regulatory compliance and IP protection via data centralization and a reduced threat surface.



High-capacity computing

Cloud-scale compute and storage to support specialized workloads like design and development.



BYOPC programs

Enable secure Cloud PCs, even on personal devices.

Disaster recovery

Help ensure continuity and access for your workforce and company data even in the most challenging circumstances.

Temporary workforces

Simplify and accelerate the onboarding and offboarding process for elastic workforces.

Mergers & Acquisitions

Provide seamless transitions and access for growing businesses.

The right technology for all your needs

Cloud PC – Windows 365 **Optimized for simplicity**	**Cloud VDI – Azure Virtual Desktop** **Optimized for flexibility**
Windows 10 or Windows 11 personalized desktop	Windows 10, Windows 11, or Windows Server multi-session desktops
Complete end-to-end Microsoft service	Remote app streaming
One-stop administration in Microsoft Endpoint Manager (Enterprise edition)	Full control over configuration and management
Direct self-service model (Business edition)	Citrix and VMware support
Predictable per user pricing	Flexible consumption-based pricing

See appendix for a more comprehensive overview

Customer case

Tailspin toys

- Design manufacture and sell toys for dogs
- Currently responsible for a toy, a combination between a boomerang and a frisbee which hypes among dog owner, business is growing
- Currently 35 employees
- Need to work from anywhere
- Already have Office 365
- Looking for a Workplace solution

1 Introduction to Azure Virtual Desktop

Azure Virtual Desktop is a cloud VDI solution designed to meet the challenges of hybrid work

Enable a secure, remote desktop experience from virtually anywhere

Access Windows 11 and Windows 10 from virtually anywhere

Maintain full control over configuration and management

Get the security and reliability of Azure

Optimize cost with multi-session and pay for only what you use

Access Windows 11 and 10 from virtually anywhere

Boost productivity inside and outside of the office

Provide access to Windows 11 and Windows 10 on a variety of devices

Deliver a seamless experience on Microsoft Office and Teams

Allow users to personalize their Windows 11 and Windows 10 virtual experiences with roaming user profiles

Maintain full control over configuration and management

Customize and optimize your virtualization infrastructure in the cloud

Enable GPU accelerated app rendering and encoding on Azure Virtual Desktop session hosts

Empower IT to specify how desktops are distributed across VM's

Simplify the delivery of company specific apps to employees with capabilities for external users

Get the security and reliability of Azure

Unlock the powerful security, scalability, and flexibility of Microsoft Azure

Deploy your virtual infrastructure in Azure Datacenters around the world

Use Microsoft Entra ID and Multi-Factor Authentication to secure your virtual desktops

Provide management and customization options for IT by leveraging Azure services like Azure Monitor

Optimize cost with multi-session and pay for only what you use

Make your virtualization infrastructure cost-efficient

Deliver multiple desktop sessions on a single VM with Windows 11 and Windows 10 multi-session

Optimize deployment costs and scale session host VMs with Autoscale

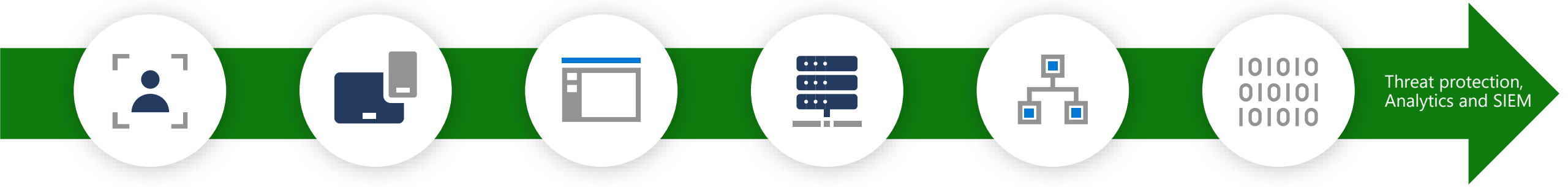
Use existing Windows and Microsoft 365 licenses to access Windows 11 and Microsoft Office

Shared responsibility

CUSTOMER MICROSOFT

Responsibility	Traditional on-prem VDI	Azure Virtual Desktop
Identity	■	■
End user devices (mobile and PCs)	■	■
Application security	■	■
Operating systems	■	■
Deployment configuration	■	■
Network controls	■	■
Virtualization control plane	■	
Physical hosts	■	
Physical network	■	
Physical datacenter	■	

End to end security for your virtual desktops



Identity

Conditional Access
MEM support
MFA

Session Host

Defender ATP
Policies

Apps

Application Control
AppLocker

Infrastructure

Azure Security Center
Secure Score
Best Practices

Networking

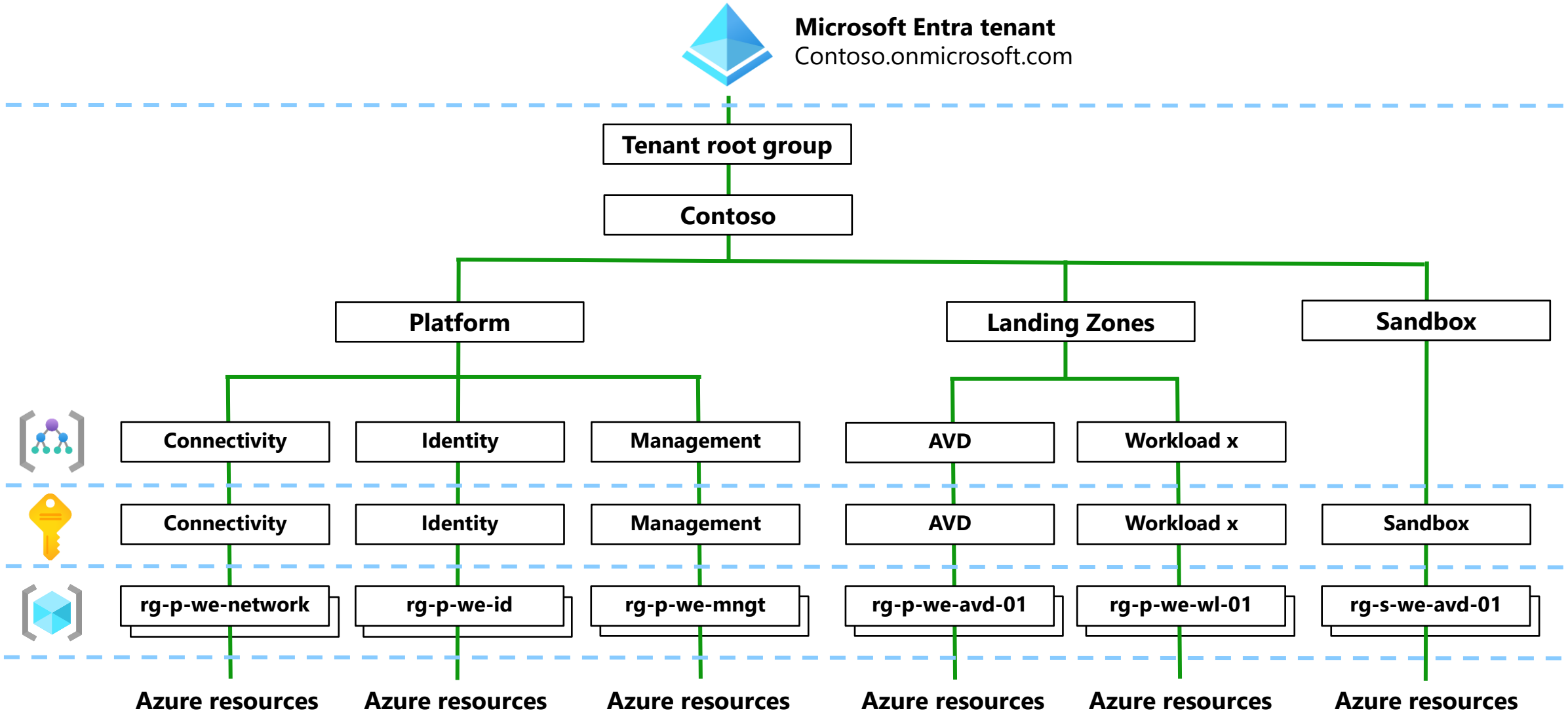
Reverse Connect
Service tags
Firewall

Data

Information Protection
Azure Disk Encryption

[Azure Virtual Desktop security best practices - Azure | Microsoft Learn]

Azure resources organization

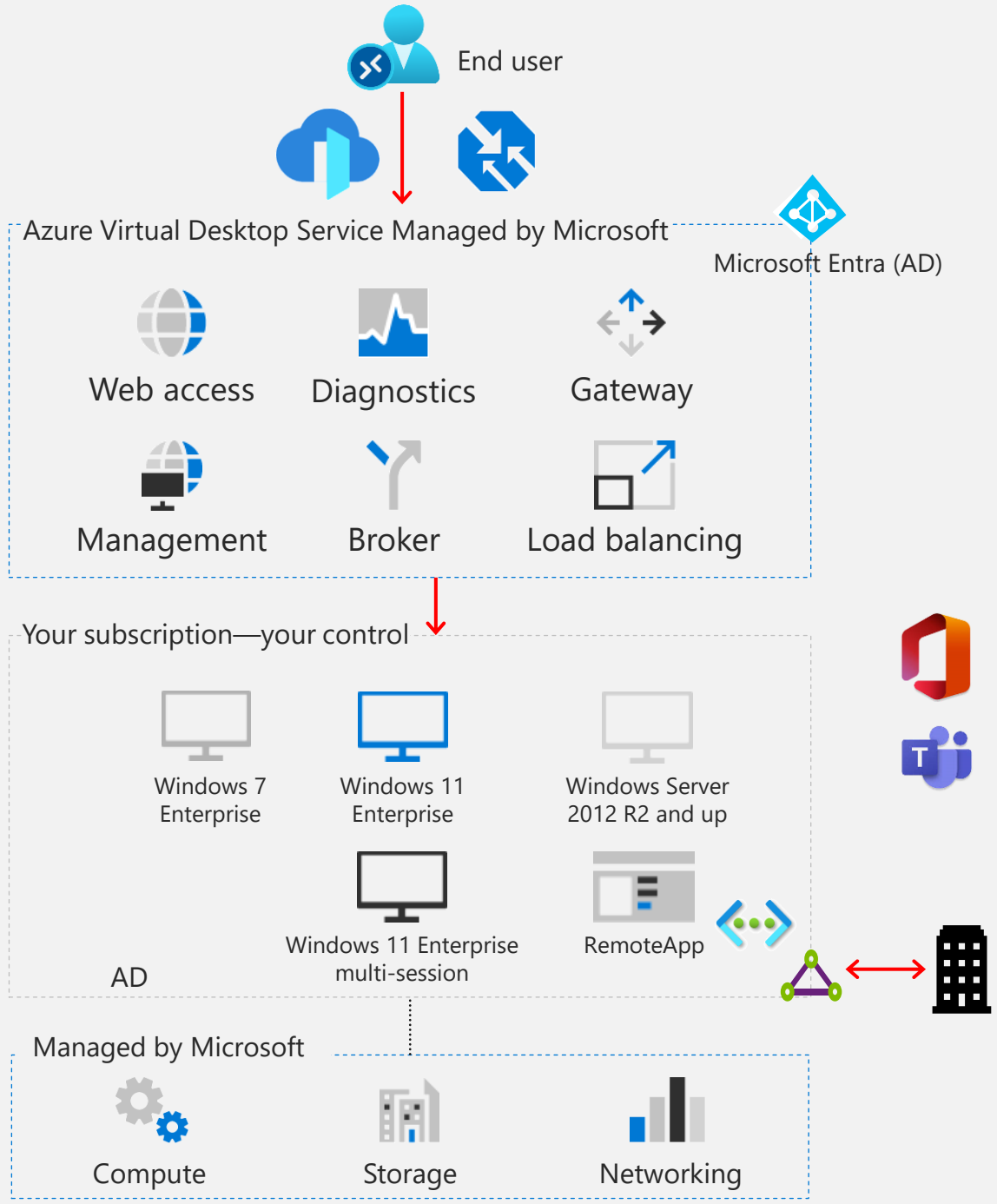


Azure Virtual Desktop architecture

Provide your employees full desktop and access to remote apps

Connect from virtually any device of your choice

Focus on right policies and controls rather than managing infrastructure



Cloud VDI on Azure

Azure provides 3 different solutions depending on your preference

Azure Virtual Desktop

Azure Virtual Desktop provides a secure Cloud VDI platform to help companies solve business problems and address new working models and effectively do more with less.

Citrix with Azure Virtual Desktop

Citrix DaaS customers can benefit from the reliability, resilience and security of Azure Virtual Desktop while still benefitting from Citrix's image management, provisioning, session recording and HDX multimedia technology.

VMware Horizon Cloud on Microsoft Azure

With this combination of platforms, customers can begin using their AVD benefit more quickly by taking advantage of hybrid support and a common management interface across all platforms

Gartner Magic Quadrant for Desktop as a Service

Figure 1: Magic Quadrant for Desktop as a Service

Source: [Gartner report]

2 Deployment options for Azure Virtual Desktop

Deployment options for Azure Virtual Desktop – IdP configuration

Choose the appropriate IdP configuration based on your user requirements

Active Directory Domain Services

- Run AD DS on any Virtual Machine in Azure in your region
- You are in control, but also responsible for management, availability, security etcetera.

Microsoft Entra Domain Services

- Fast deployment compared to the AD DS solution
- Less infrastructure and management burden
- Pay as you go

Microsoft Entra Joined

- No additional infrastructure components necessary
- Works with Virtual Machine extensions
- Single-Sign-On possible

Deployment options for Azure Virtual Desktop – Key components

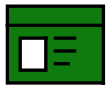
Choose the appropriate compute, user profile, and apps solutions based on your user requirements

Compute

- You can choose any VM in Azure in your region
- Lift and shift or establish new VDI infrastructure with any compute option
- Support for personal and pooled virtual machines

User profile

- Faster login and application launch times with FSLogix
- Support for Azure Files, NetApp Files and File server cluster

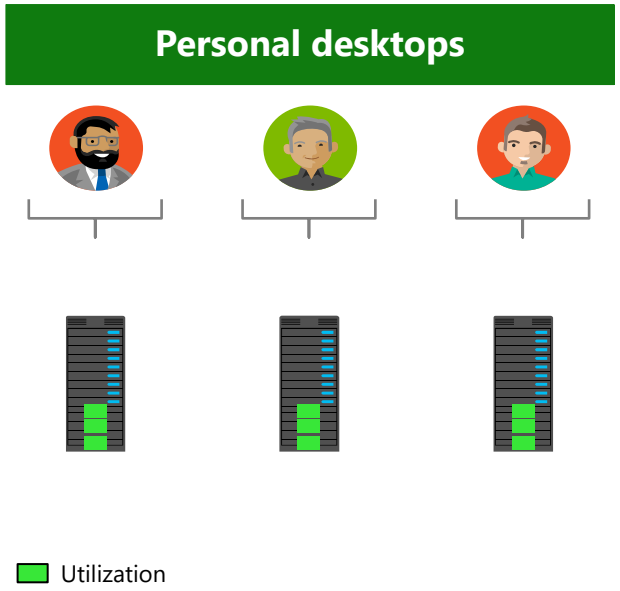


Apps

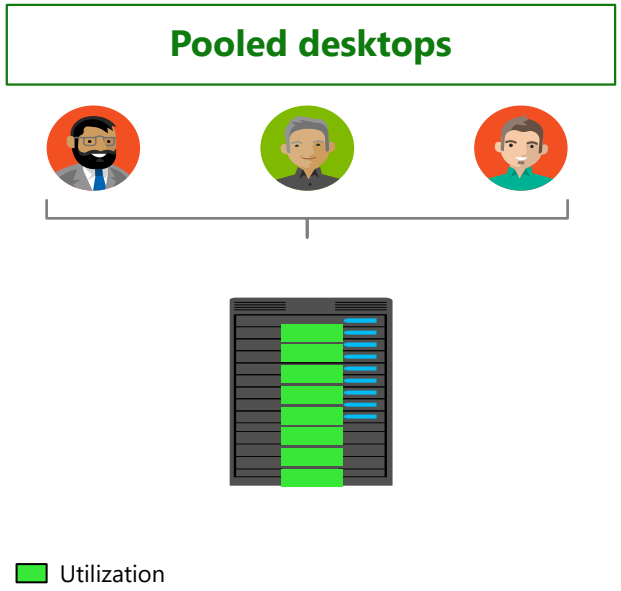
- Create a single image with all applications for all users
- Use App Masking to ensure the right applications are visible to the right users

Compute

Choose the right configuration to meet your user requirements



- Ideal for **single-session** users with **heavy performance** requirements
- Choose the right VM to run robust biz. apps like CAD, SAP and others
- Always-on experience and single state retention



- Ideal for **multi-session** users and certain **single-session** with **light – medium** workloads with basic business requirements
- Choose the right VM to run most business apps

Azure automation - automate your Azure management tasks and orchestrate actions across external systems from right within Azure

Pay only for the virtual machines (VMs), storage, and networking consumed when the service is in use.

User profile management with FSLogix

Optimize profile containers

Faster login and application launch times than roaming profiles and folder redirection.

Pick from multiple storage options

Store profile containers in Azure files/NetApp Files/File server clusters

Migrate existing user profiles

Perform mass conversions of user profiles from various types to FSLogix based profile containers at scale

Apps with FSLogix and MSIX

Minimize number of master images by creating a single image with all applications

Why App Masking with FSLogix?

- Excellent app compatibility with no packaging, sequencing, backend infrastructure, or virtualization.
- Control app licensing costs by limiting access to specific users
- Reduce the amount of host pools

Why MSIX?

- Single format for physical and virtual environments
- Doesn't require packaging to be delivered
- Clean install/ uninstall
- Secured by default
- Optimized storage and network bandwidth

Why MSIX app attach?

- Dynamic application delivery
- Only authorized users can see or access apps running on multiple user instances
- MSIX apps behave like natively installed apps

3rd Party Tools

Azure Virtual Desktop partner ecosystem

Rich ISV partner ecosystem allows you to further enhance your Azure Virtual Desktop experience

Category	Description
Customer Environment Assessment	Assess resource utilization of apps/users/OS, baseline user experiences and recommend sizing for Azure Virtual Desktop. *Example - Lakeside*
Diagnostics & End User Experience Monitoring	Assess, monitor, and manage end user experiences with GUI enabling reactive troubleshooting as well as predictive troubleshooting leveraging AI/ML *Example – Sepago*
Application Layering	Enable dynamic provisioning of apps during boot/log on time based on user profile *Example – Liquidware*
Management	Deployment and configuration *Example– Nerdio, NetApp (CloudJumper)*
Printing	Remove the need for print server infrastructure *Example – PrinterLogic*
App Compatibility Assessment / Remediation	Assess app compatibility for layering new packaging *Example – PolicyPak*

Please explore our rich partner environment - https://docs.microsoft.com/en-us/azure/virtual-desktop/partners

Licensing and Pricing

Many customers are already eligible for Azure Virtual Desktop

Azure Virtual Desktop Licensing Requirements

Client

Customers are eligible to access Windows 11 and Windows 10 single and multi session and Windows 7 with Azure Virtual Desktop if they have one of the following licenses*:

- ***Microsoft 365 Business Premium***
- **Microsoft 365 E3/E5**
- **Microsoft 365 A3/A5/Student Use Benefits**
- **Microsoft 365 F3**
- **Windows 11 and Windows 10 Enterprise E3/E5**
- **Windows 11 and Windows 10 Education A3/A5**
- **Windows 11 and Windows 10 VDA E3/E5**

Server

Customers are eligible to access Server workloads with Azure Virtual Desktop if they have one of the following licenses:

- **RDS CAL license with active Software Assurance (SA) or RDS User Subscription Licenses**

Customers pay for the virtual machines (VMs), storage, and networking consumed when the users are using the service

**Customers can access Azure Virtual Desktop from their non-Windows Pro endpoints if they have a Microsoft 365 E3/E5/F3, Microsoft 365 A3/A5 or Windows 11 and Windows 10 VDA per user license. Source: Azure Virtual Desktop Prerequisites*

Pricing for Azure Virtual Desktop

Calculate your user cost

- No charge for users with eligible Microsoft/Windows licenses
- Monthly per user price to access Azure Virtual Desktop for external users*

*Windows Server not supported

Calculating your infrastructure costs

An Azure user account and subscription are required to deploy and manage a virtual machine. Pricing factors include:

- Virtual machines and operating system (OS) storage
- Data disk (personal desktop only)
- User profile storage
- Networking

Per user cost –

- **License –** purchased by the organization
- **Monthly price –** purchased by the organization/ISV offering the desktop/app to their customers

Pay only for the virtual machines (VMs), storage, and networking consumed when the service is in use.

Azure Virtual Desktop Pricing page on Azure.com

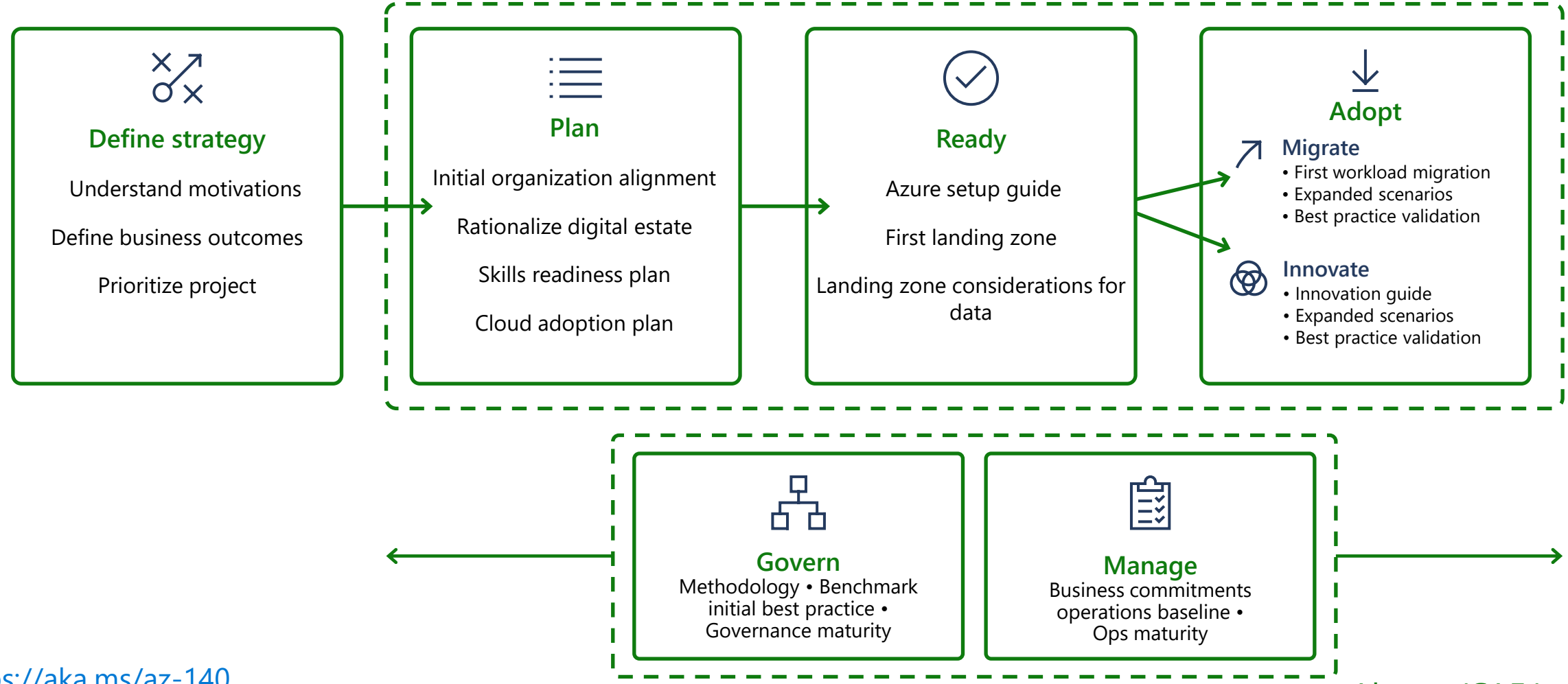
Cost savings

- Autoscaling
- Usage of Azure reserved instances around 70% discount for a 3 years commit.

3 | Pre-requisites, Design and Architecture, Best Practices

Pre-requisites

Microsoft Cloud Adoption Framework for Azure



https://aka.ms/az-140

Aka.ms/CAF/migrate

Plan your virtual desktop migration - Cloud Adoption Framework | Microsoft Learn

More information on how CAF can work for Azure Virtual Desktop: Microsoft Azure Virtual Desktop specialization

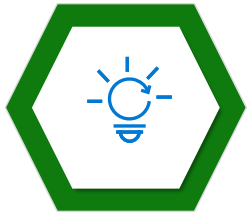
Azure Infrastructure Prerequisites to Deploy Azure Virtual Desktop

Azure subscription

- Create your Azure free account today if you don't have one
- For information on Azure administrative roles, see Azure roles, Microsoft Entra roles, and classic subscription administrator roles.

Microsoft Entra ID (f.k.a. Azure AD)

- Learn how to create a new tenant in Microsoft Entra ID.
- See how to use Microsoft Entra Connect to synchronize your cloud and on-premises identities.



Determine your identity strategy

- AD DS
- Microsoft Entra DS (f.k.a. AAD DS)
- Microsoft Entra joined (f.k.a. AAD Domain Joined)

Required credentials

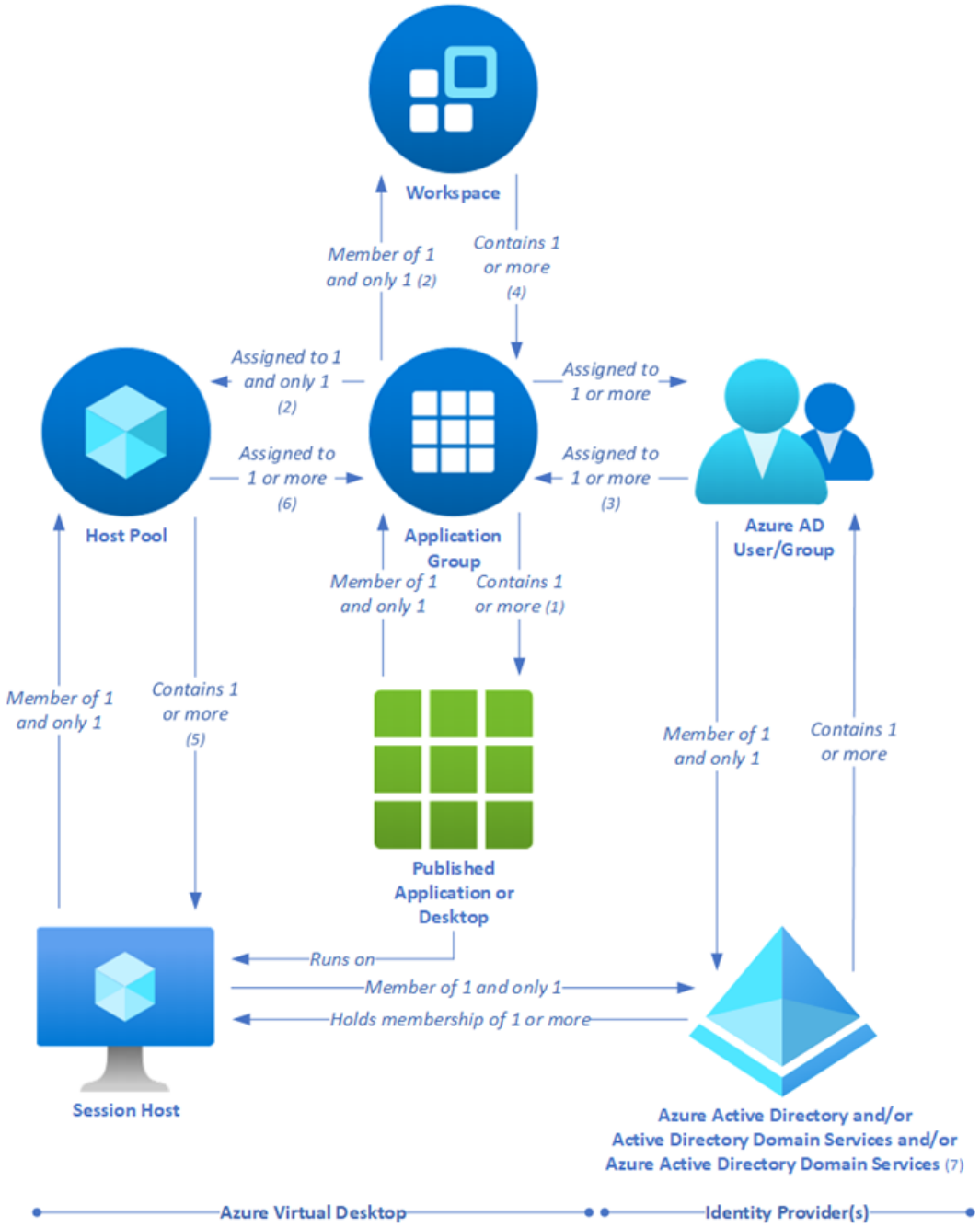
- Microsoft Entra ID
- AD Domain join account
- Subscription Contributor

All associated Azure resources in one region

- Image
- Virtual Network
- Storage

More resources available for you:
Get started at aka.ms/startAVD
AVD documentation on Azure.com
Microsoft Cloud Adoption Framework for Azure

Design and Architecture



Resource	Purpose
Published desktop	A Windows desktop environment that runs on Azure Virtual Desktop session hosts and is delivered to users over the network
Published application	A Windows application that runs on Azure Virtual Desktop session hosts and is delivered to users over the network
Application group	A logical grouping of published applications or a published desktop
Microsoft Entra user account/group	Identifies the users who are permitted to launch published desktops or applications
Microsoft Entra ID (7)	Identity provider
AD DS (7)	Identity and directory services provider
Microsoft Entra Domain Services (7)	Platform as a service (PaaS)-based identity and directory services provider
Workspace	A logical grouping of application groups
Host pool	A group of identical session hosts that serve a common purpose
Session host	A virtual machine that hosts published desktops or applications

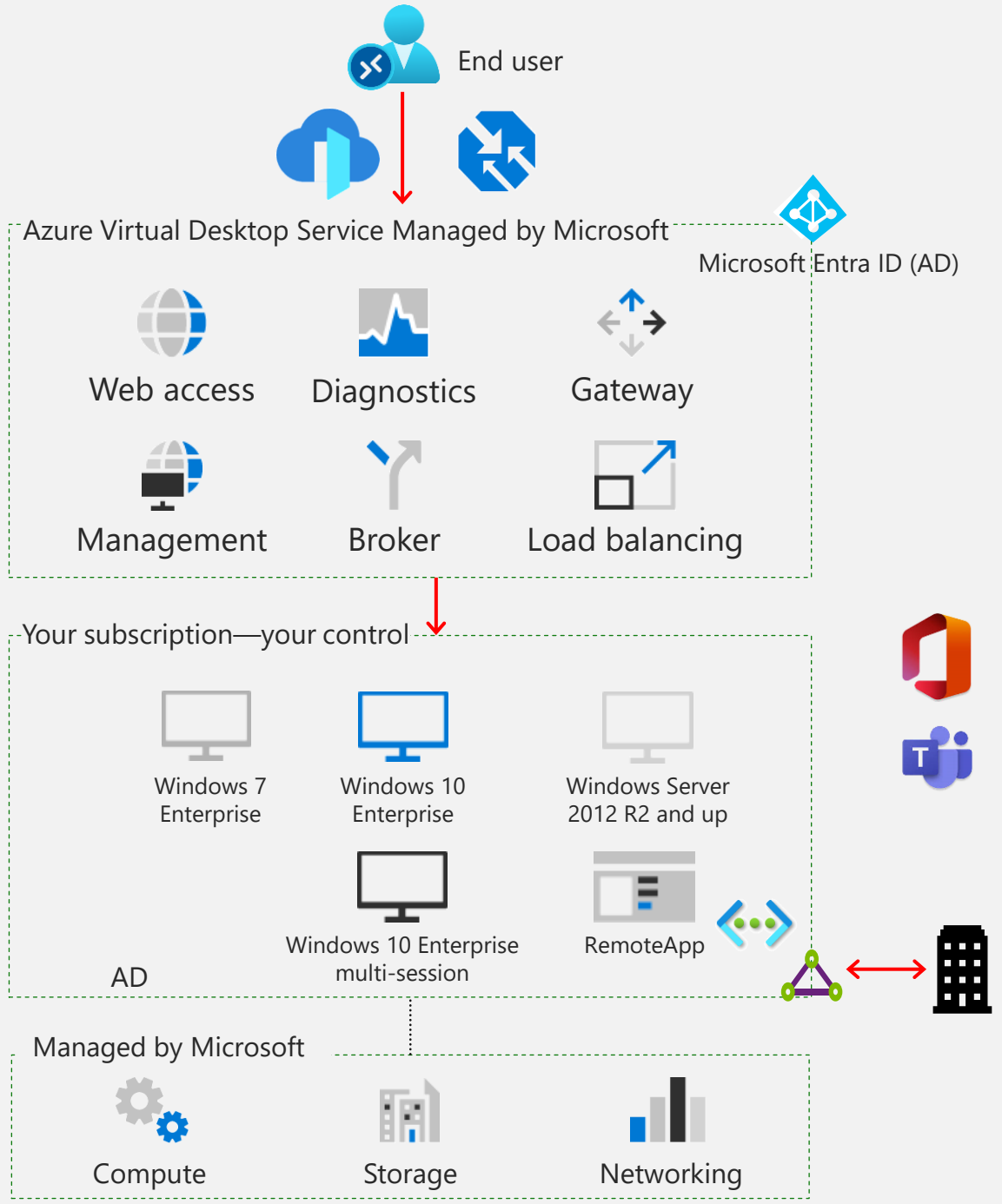
[Azure Virtual Desktop for the enterprise - Azure Architecture Center | Microsoft Learn]

Azure Virtual Desktop architecture – Part 2

Provide your employees full desktop and access to remote apps

Connect from virtually any device of your choice

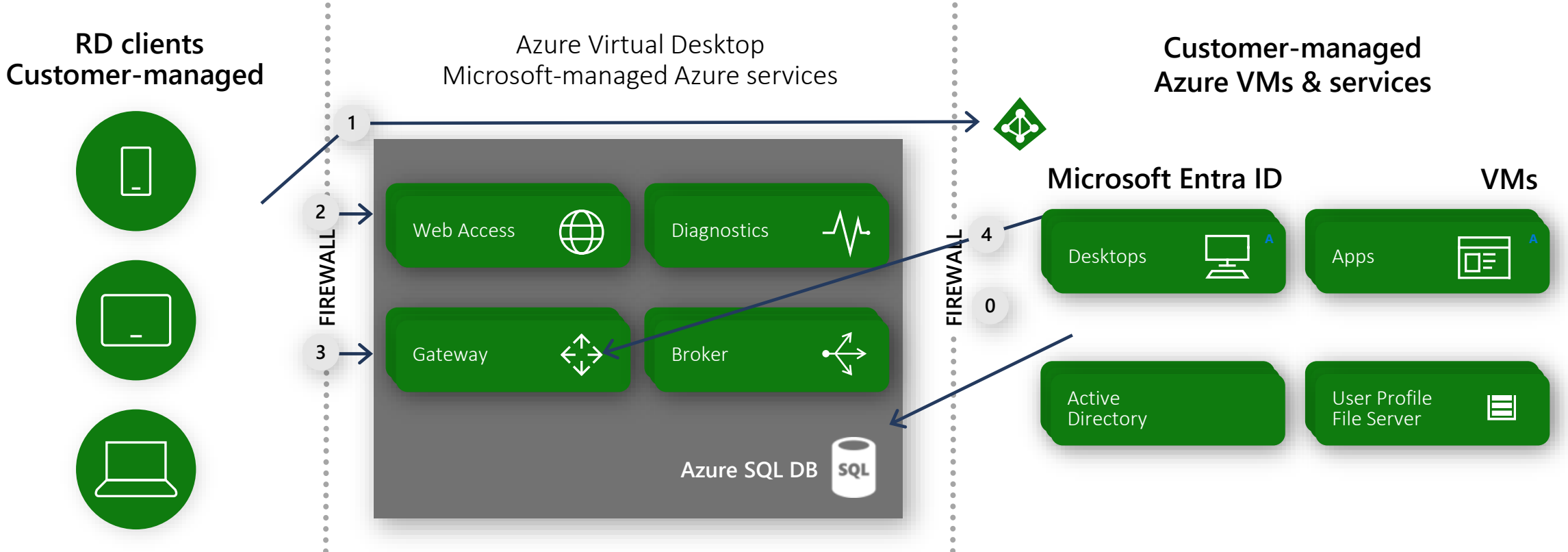
Focus on right policies and controls rather than managing infrastructure



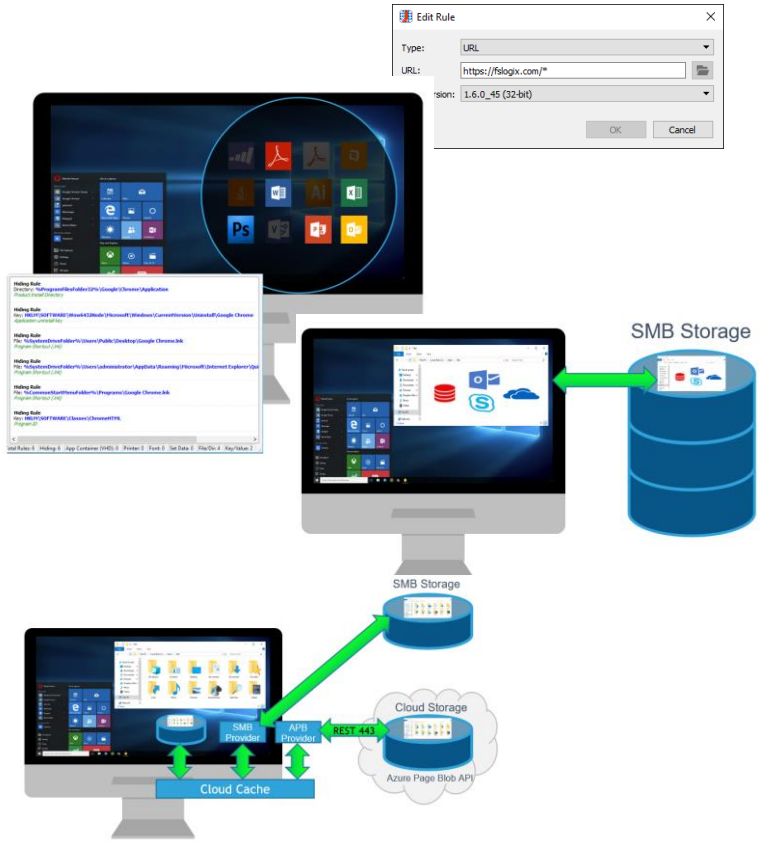
User Connection Flow

0. Agents within the VM interact the Azure Virtual Desktop managed service that it's active
1. User launches RD client which connects to Microsoft Entra ID, user signs in, and Microsoft Entra ID returns token
2. RD client presents token to Web Access, Broker queries DB to determine resources authorized for user
3. User selects resource, RD client connects to Gateway
4. Broker orchestrates connection from host agent to Gateway

RDP traffic now flows between RD client and session host VM over connections 3 and 4



FSLogix profiles

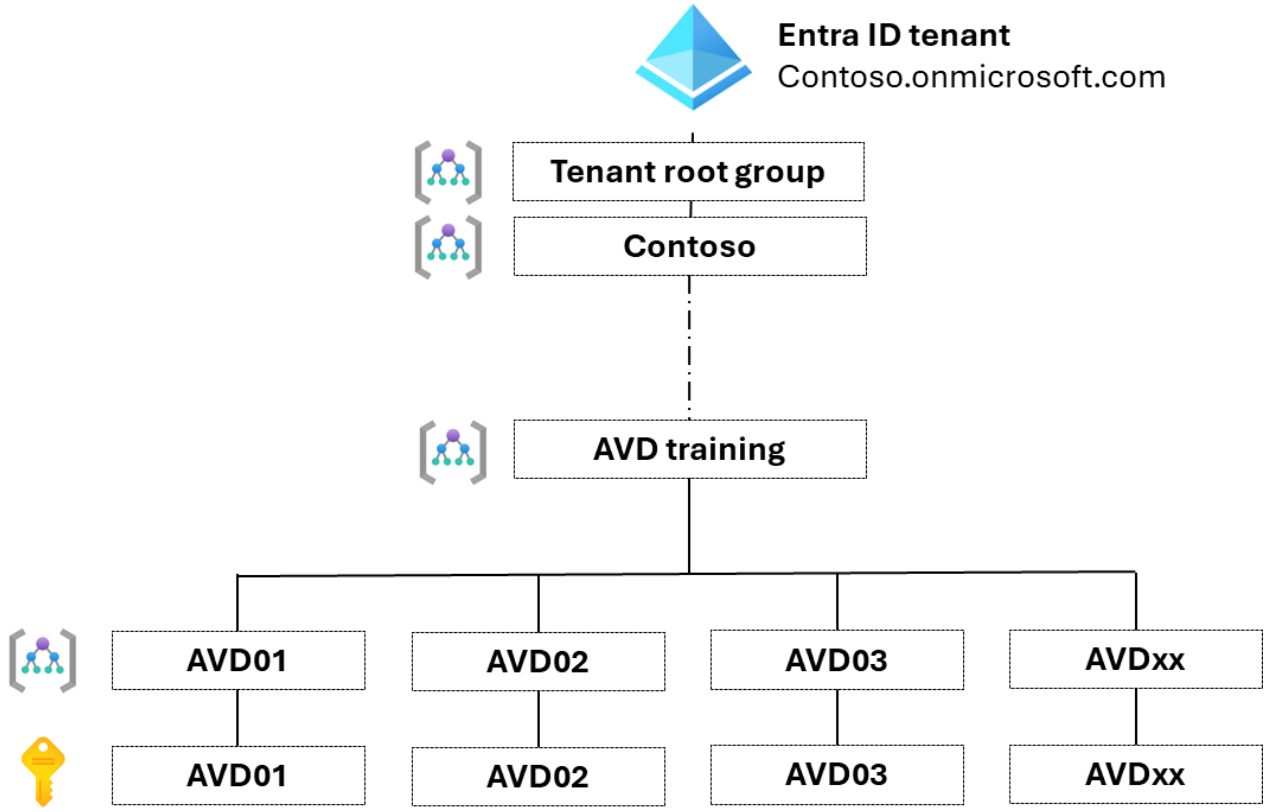


- Profile is stored in VHD/VHD(X)
- Same approach used by User Profile Disk (UPD)
- Mounted at Login – faster login and no target storage requirement
- Size of Profile doesn't impact logon time
- VHD(X) = Block Transfer decreases network utilization
- Caching from Windows Cache Manager
- Profile Container redirects everything from the user profile.
- Filter driver causes profile to appear local – broader application support

[Azure Virtual Desktop FSLogix profile containers files - Azure | Microsoft Learn]

4 | Set-up for Hands-On Lab

Logical architecture - Training tenant



Roles available

During this training you have 3 roles to your availability:

1. Global reader role
2. User administrator role
3. Owner role on your Management group/subscription

What do I have to do?

1. Logon to the Azure portal using your own Entra ID account which is a guest user in the tenant.
2. Make sure to use a personal unique identifier to your resources.
3. Use region **UK South**.
4. Follow the instructions available at:

aka.ms/avdlab

→ NL-AVD for SMB**.docx*** ←

Best Practices

Azure Virtual Desktop Host Location Considerations

Choose the right Azure region/geography for you

Compliance & data residency

Service availability

Pricing

User location

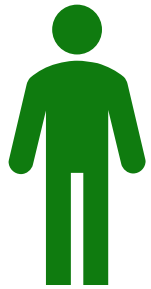
Tip: Use the following PS to get insights in Virtual Machines and zone availability
Get-AzComputeResourceSku | Where-Object { $_.Locations -contains "westeurope" -and $_.ResourceType -eq "virtualMachines" }

[Azure global infrastructure (microsoft.com)]

Cheat sheet ;-)

Difference between scale up and out

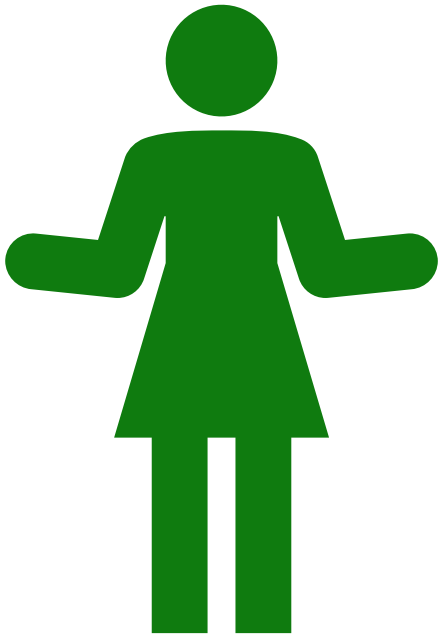
Scale up



Scale out

Cheat sheet ;-)

Difference between scale up and out



Scale up

Scale out

Azure Virtual Desktop Host Sizing Recommendations

Multi-Session Recommendations

The following table lists the maximum suggested number of users per virtual central processing unit (vCPU) and the minimum VM configuration for each workload. These recommendations are based on Remote Desktop workloads

Workload type	Maximum users per vCPU	vCPU/RAM/OS storage minimum	Example Azure instances	Profile container storage minimum
Light	6	8 vCPUs, 16-GB RAM, 32-GB storage	D8s_v5, D8s_v4, F8s_v2, D8as_v4, D16s_v5, D16s_v4, F16s_v2, D16as_v4	30 GB
Medium	4	8 vCPUs, 16-GB RAM, 32-GB storage	D8s_v5, D8s_v4, F8s_v2, D8as_v4, D16s_v5, D16s_v4, F16s_v2, D16as_v4	30 GB
Heavy	2	8 vCPUs, 16-GB RAM, 32-GB storage	D8s_v5, D8s_v4, F8s_v2, D8as_v4, D16s_v5, D16s_v4, F16s_v2, D16as_v4	30 GB
Power	1	6 vCPUs, 56 GB RAM, 340 GB storage	D16ds_v5, D16s_v4, D16as_v4, NV6, NV16as_v4	30 GB

Single Session / Personal Desktop Recommendations

- Sizing largely dependent on the workload, apps deployed, and user type.
- We recommend at least two physical CPU cores per VM (typically four vCPUs with hyperthreading).
- If you need more specific VM sizing recommendations for single-session scenarios, check with your software vendors specific to your workload.
- VM sizing for single-session VMs will likely align with physical device guidelines.
- Use other tools to get granular level sizing and scaling recommendations.

Rely on multi-layered security controls across hybrid environments

Identity & access

Unify identity management and secure identities to implement zero trust

App and data security

Encrypt data, and protect keys and secrets used by apps

Network security

Enhance the protection of your virtual networks

Threat protection

Access cloud-native SIEM and AI-driven security analytics

Security management

Manage security state of hybrid workloads with a single view

Azure Sentinel | **Azure Security Center** | **Microsoft Entra ID** | **Azure Key Vault** | **Azure Firewall & DDoS**

Azure Virtual Desktop Insights

What is it?

Azure Virtual Desktop Insights is a dashboard built on Azure Monitor Workbooks that helps IT professionals understand their Azure Virtual Desktop environments.

Use cases for Azure Virtual Desktop Insights:

- Connectivity - High latency
- Session host performance
- Client version usage
- Cost saving opportunities - Session host utilization

Use cases for Azure Virtual Desktop Insights - Azure Virtual Desktop | Microsoft Learn

Azure Virtual Desktop Insights - video

Use Azure Virtual Desktop Insights to monitor your AVD deployment | Azure Friday

Patch management

Use one host pool as a pilot group before updating all host pools

Update VMs with existing Azure management solutions and all VMs in a host pool

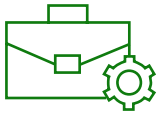
Updates can be staged in a maintenance window to keep systems available after logon

All VMs must be at the same update level after maintenance window is completed

Use SCCM to manage your images

Learn about using Windows Update for Business in Microsoft Intune | Microsoft Learn

Master image management



The master image can be managed by already existing processes and technologies, including:

- Azure Update Management
- System Center Configuration Manager
- Third-party

Write your own “best practices” automations to configure a golden image for Azure Virtual Desktop

Application-masking technology helps to minimize the number of golden images and simplify app image management

Preparing a Master Image

Create and manage session host image for Azure Virtual Desktop - Training | Microsoft Learn

5 | Next Steps

Review Azure Infrastructure Prerequisites to Deploy Azure Virtual Desktop

Azure subscription

- Create your Azure free account today if you don't have one
- For information on Azure administrative roles, see Azure roles, Microsoft Entra roles, and classic subscription administrator roles.

Microsoft Entra ID (f.k.a. Azure AD)

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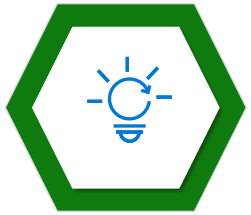

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- Microsoft Entra joined (f.k.a. AAD Domain Joined)

Required credentials

- Microsoft Entra ID
- AD Domain join account
- Subscription Contributor

All associated Azure resources in one region

- Image
- Virtual Network
- Storage

More resources available for you:
Get started at aka.ms/startAVD
AVD documentation on Azure.com
Microsoft Cloud Adoption Framework for Azure

Security session

Engage with your partner to start your journey to Azure Virtual Desktop

Begin your journey to Azure Virtual Desktop

- **Step 1:** Participate in a demo to understand the performance and cost benefits of Azure Virtual Desktop
- **Step 2:** Assess dependencies, readiness, costs, and sizing for your Azure Virtual Desktop solution
- **Step 3:** Test and migrate workloads to Azure Virtual Desktop

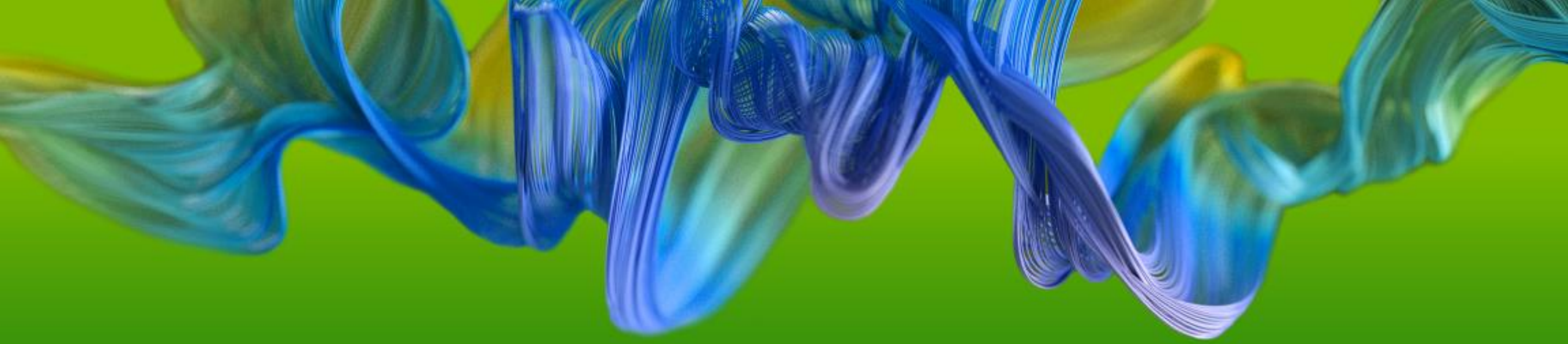
Resources

- Learn more about Azure Virtual Desktop and remote app streaming
- Assess Azure Virtual Desktop end user experience quality
- Get started with Azure Virtual Desktop
- Azure Virtual Desktop learning path
- Cloud Adoption Framework
- Azure Virtual Desktop Partner Community
- Azure Migration and Modernization Program
- BIO Compliance
- Azure Virtual Desktop specialization audit checklist

Azure Bootcamp Evaluation

Microsoft

Thank You



Appendix

The right technology for all your needs

Cloud PC – Windows 365 **Optimized for simplicity**	**Cloud VDI – Azure Virtual Desktop** **Optimized for flexibility**
Windows 10 or Windows 11 personalized desktop	Windows 10, Windows 11, or Windows Server multi-session desktops
Complete end-to-end Microsoft service	Remote app streaming
One-stop administration in Microsoft Endpoint Manager (Enterprise edition)	Full control over configuration and management
Direct self-service model (Business edition)	Citrix and VMware support
Predictable per user pricing	Flexible consumption-based pricing

Main advantages of Azure Virtual Desktop

Windows 11 Enterprise multi-session:

AVD enables multiple concurrent users to use the same session host, saving cost.

Pooled host pools:

AVD pooled host pools can accept connections from any user authorized to an app group within the host pool increasing overall utilization and cost savings.

Choice of VMs:

AVD lets you choose any Azure Windows VM as session hosts with all OS disk sizes available.

Built-in AAD integration*:

AVD built-in integration makes it easy to domain-join VMs and onboard existing AD-enabled users without creating new accounts.

SCCM support:

SCCM can manage AVD VMs (including Windows 11* multi-session) to automate patching and app updates.

Intune support:

Intune supports AVD VMs. Intune treats AVD personal VMs the same as Windows 11 Enterprise physical desktops.

Single service:

AVD is a single service for both virtual desktops and apps.

Reverse connect:

AVD securely establish users through reverse connections to the service, so you never have to leave any inbound ports open.

Multi-monitors:

AVD supports up to 16 monitors with up to 8k.

Windows Server 2019 support:

AVD supports WS 2019

Local drive redirection:

AVD supports local drive redirection

Choice of storage solutions:

AVD offers a choice of storage solutions File Server, Azure NetApp Files and Azure Files.

VMware and Citrix:

AVD gives the choice of using AVD or Citrix or VMware management planes.

Microsoft Teams Optimizations, Zoom, WebEx:

Microsoft Teams on AVD supports chat and collaboration. With media optimizations, it also supports calling and meeting functionality; the Windows Desktop client handles audio and video locally for Teams calls and meetings. Supported by Zoom and WebEx desktop applications.

Main advantages of Windows 365 Cloud PC

Get started fast

Quickly and effortlessly set up Cloud PCs for your employees or customers

Quickly onboard temporary employees

Get limited-term team members up and running quickly with secure access to company resources, apps, and computing power

Work from anywhere

Pick up where you left off with your secure, personalized Windows experience on any device.

Simplify management

Conveniently access and manage Cloud PCs anytime through windows365.microsoft.com

Access all your resources

Use popular business apps, custom and line-of-business apps, and all your data and content.

Streamline IT

Enjoy all the benefits of desktop virtualization without the typical costs or required IT expertise.

Scale for your needs

Choose from a variety of performance options to suit businesses of any size.

Support remote and distributed workforces

Work from anywhere with secure access to apps, tools, and company resources

Bring your own PC

Easily enable employee-owned computers without the risk of unmanaged devices

Increase productivity

Allow employees to work when and where they choose with Windows in the cloud streamed to any device

Minimize risk

Reduce security risks by storing and securing information in the cloud, not on devices.

Manage costs

Stay within budget without compromising your business with fixed per-user pricing.