



# AZ-900: Microsoft Azure Fundamentals



Adjust the cover title for either AZ-900T01 or AZ-900T00.

# Hello! Instructor Introduction

- Instructor: Tim Warner
- Cornell alum ('95 & '97)
- Microsoft Certified Trainer, Microsoft MVP
- Author, Pluralsight
- Twitter: [@TechTrainerTim](https://twitter.com/TechTrainerTim)



# Microsoft's move from product-based to role-based certification



# Azure Applications and Infrastructure certifications

## Fundamentals

Microsoft Certified:  
Azure Fundamentals  
(Optional)

## Associate

Microsoft Certified:  
Azure Administrator Associate

— OR —

Microsoft Certified:  
Azure Developer Associate

Microsoft Certified:  
Azure Security Engineer Associate

## Role-based

### Expert

Microsoft Certified:  
Azure DevOps Engineer Expert

Microsoft Certified:  
Azure for SAP Workloads  
Specialty\*

Microsoft Certified:  
Azure Solutions Architect Expert

Key  
Optional Path  
Required Path  
\* Exam in beta

# Azure Fundamentals audience profile



This exam is designed for candidates looking to demonstrate foundational level knowledge of cloud services and how those services are provided with Microsoft Azure. **The exam is intended for candidates with non-technical backgrounds**, such as those involved in selling or purchasing cloud-based solutions and services or who have some involvement with cloud-based solutions and services, **as well as those with a technical background who have a need to validate their foundational level knowledge around cloud services**. Technical IT experience is not required however some general IT knowledge or experience would be beneficial. This exam can be taken as an optional first step in learning about cloud services and how those concepts are exemplified by Microsoft Azure. **It can be taken as a precursor to Microsoft Azure or Microsoft cloud services exams.**

# Course Agenda

- Module 1 – Cloud concepts
- Module 2 – Core Azure services
- Module 3 - Security, privacy, compliance, and trust
- Module 4 – Pricing and support
- Module 5 – Exam prep



## Class Schedule

- 9:00am EST – Begin training
- 10:30am-10:45am – AM break
- 12:00pm-1:00pm – Lunch
  - Course survey before lunch
- 2:30-2:45pm – PM break
- 5:00pm – End training



## Course Material Additions

[timw.info/bigred1](http://timw.info/bigred1)



## Survey

[timw.info/bigred2](http://timw.info/bigred2)



**Let's Go!**





# AZ-900

## Module 1:

### Cloud concepts



Adjust the title page for AZ-900T00 or AZ-900T01.

## Module 1 – Learning objectives

- Describe and understand cloud services and their benefits.
- Understand key terms you will encounter when working with cloud services.
- Understand public, private, and hybrid cloud models.
- Understand infrastructure as a service (IaaS).
- Understand platform as a service (PaaS).
- Understand software as a service (SaaS).



# Cloud computing

- Compute power - such as Linux servers or web applications.
- Storage - such as files and databases.
- Networking - such as secure connections between the cloud provider and your company.
- Analytics - such as visualizing telemetry and performance data.



Cloud providers include Microsoft, Amazon, and Google



Cloud computing - <https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/>

## Key concepts

High availability

Fault tolerance

Scalability

Elasticity

Global reach

Customer latency capabilities

Agility

Predictive cost considerations

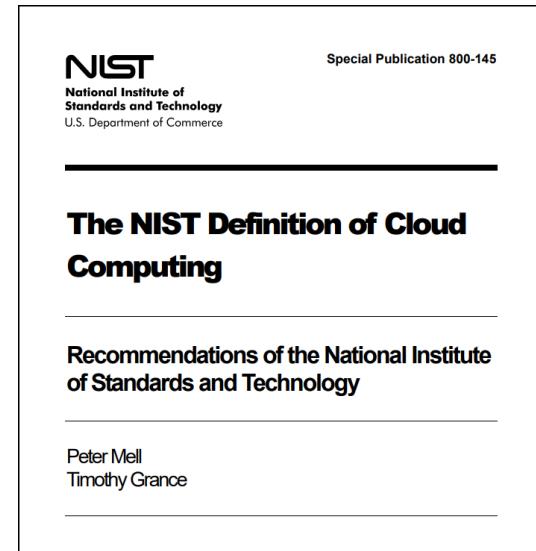
Disaster recovery

Security

There is a term reference guide available at <https://azure.microsoft.com/en-us/overview/cloud-computing-dictionary/>

# NIST Cloud Computing White Paper

- <https://timw.info/nist>



## Economies of scale

- The concept of *economies of scale* is the ability to reduce costs and gain efficiency when operating at a larger scale in comparison to operating at a smaller scale.



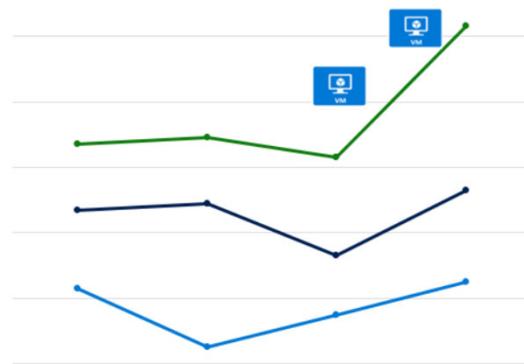
- Cloud providers are very large businesses, and thus can leverage the benefits of economies of scale and then pass those benefits on to their customers.

## CapEx vs. OpEx

- Capital Expenditure (CapEx)
  - Spend on physical infrastructure upfront.
  - Deduct the expense from your tax bill.
  - High upfront cost, value of investment reduces over time.
- Operational Expenditure (OpEx)
  - Spend on services or products as needed.
  - Get billed immediately.
  - Deduct the expense from your tax bill in the same year.
  - No upfront cost, pay-as-you use.

## Consumption-based model

- No upfront costs.
- No need to purchase and manage costly infrastructure.
- Ability to pay for additional resources as they are needed.
- Ability to stop paying for resources that are no longer needed.



## Demo

Azure Pricing Calculator

Azure Total Cost of Ownership (TCO)  
Calculator

Cost Management + Billing



## Cloud model comparison

### Public cloud:

- No capital expenditures to scale up.
- Applications can be quickly provisioned and deprovisioned.
- Organizations pay only for what they use.

### Private cloud:

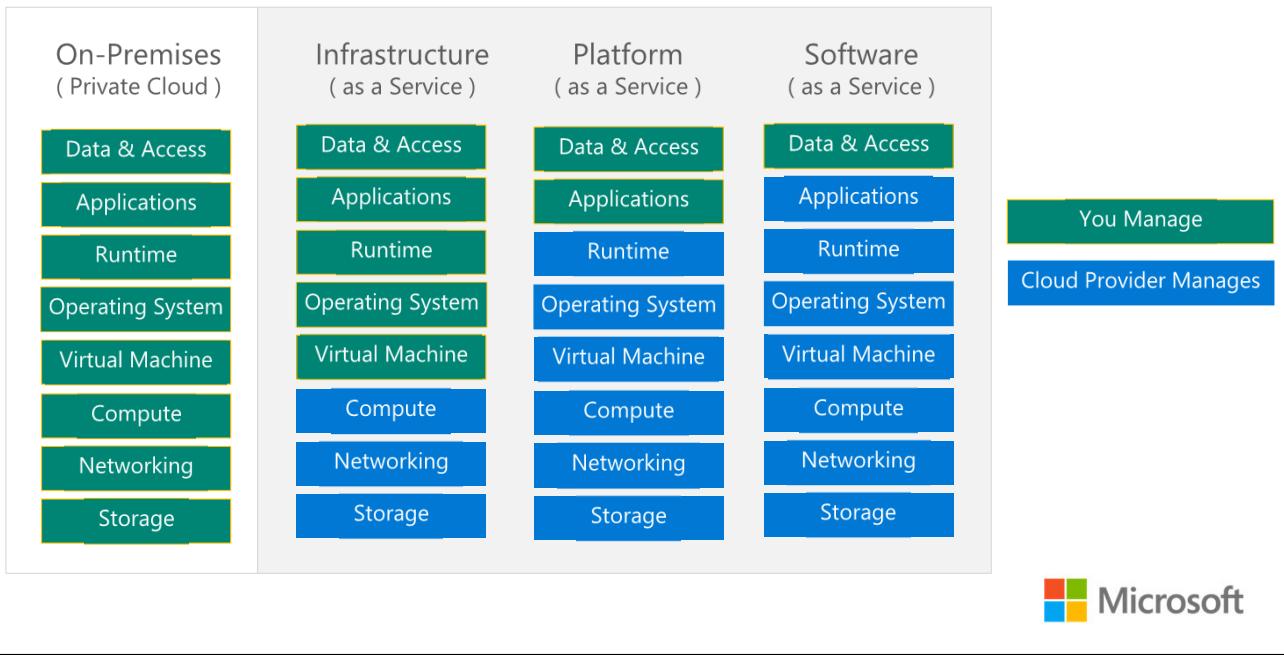
- Organizations have complete control over resources.
- Organizations have complete control over security.

### Hybrid cloud:

- Most flexibility.
- Organizations determine where to run their applications.
- Organizations control security, compliance, or legal requirements.



# Shared responsibility model



IaaS, PaaS, and SaaS have dedicated topics, coming up.

# Cloud service comparison

## IaaS

- The most flexible cloud service.
- You configure and manage the hardware for your application.

## PaaS

- Focus on application development.
- Platform management is handled by the cloud provider.

## SaaS

- Pay-as-you-go pricing model.
- Users pay for the software they use on a subscription model.



The slide contains only some of the cloud service comparison discussion points.

## Demo

SaaS: Office 365

PaaS: Azure App Service + Azure SQL

IaaS: Azure Virtual Machines





## AZ-900 Module 2: Core Azure services



Adjust the cover for either AZ-900T00 or AZ-900T01.

## Module 2 – Learning objectives

- Understand and describe core Azure architectural components.
- Understand and describe core Azure services and products.
- Understand and describe Azure solutions.
- Understand and describe Azure management tools.



# Regions

- A region represents a collection of datacenters.
- Provides flexibility and scale.
- Preserves data residency.
- Select regions close to your users.
- Be aware of region deployment availability.
- There are global services that are region independent.



Worldwide there are 54 regions representing 140 countries



A list of regions and their locations is available at <https://azure.microsoft.com/en-us/global-infrastructure/locations/>

## Region Pairs

- Each Azure region is paired with another region.
- Azure prefers at least 300 miles of separation between datacenters in a regional pair.
- Some services provide automatic replication to the paired region.
- In an outage, recovery of one region is prioritized out of every pair.
- Azure system updates are rolled out to paired regions sequentially (not at the same time).
- Paired regions are members of the same geography – except Brazil.



A full list of region pairs is available at <https://docs.microsoft.com/en-us/azure/best-practices-availability-paired-regions#what-are-paired-regions>

# Availability Options

## VM SLA

99.9% with Premium Storage

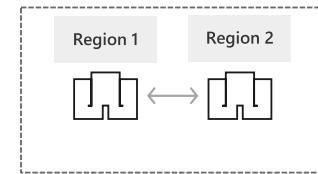
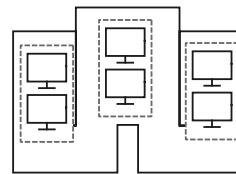
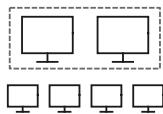
## VM SLA

99.95%

## VM SLA

99.99%

## MULTI-REGION DISASTER RECOVERY



### SINGLE VM

Easier lift and shift

### AVAILABILITY SETS

Protecting against failures within datacenters

### AVAILABILITY ZONES

Protection from entire datacenter failures

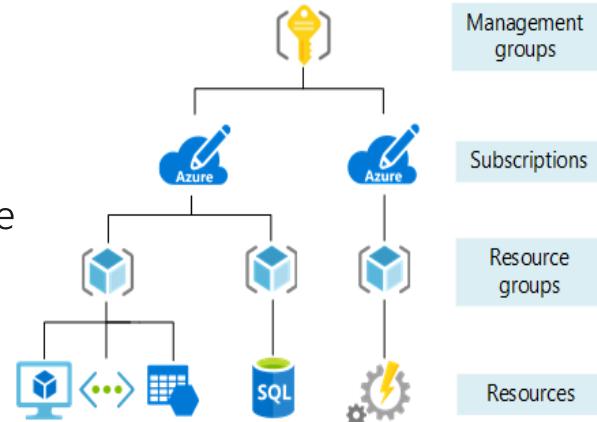
### REGION PAIRS

Regional protection within Data Residency Boundaries

This slide is to introduce the upcoming topics. You could also use the slide at the end of the lesson to review.

## Azure Resource Manager

- Provide a management layer that enables you to create, update, and delete resources in your Azure subscription.
- Create, configure, manage and delete resources and resource groups.
- Organize resources.
- Control access and resources.
- Automate using different tools and SDKs.



You can view more details about Azure Resource Manager at <https://docs.microsoft.com/en-us/azure/azure-resource-manager>

## Demo

Deploy a virtual machine

Configure high availability

Azure management tools



## Azure compute services



- Azure VMs use Infrastructure as a Service (IaaS) to provide computing power in the cloud.



- VM scale sets are designed for automatic scaling of identical VMs.



- App services is a Platform as a Service (PaaS) offering to build, deploy, and scale enterprise-grade web, mobile, and API apps.



- Functions perform compute actions based on an event.



Azure virtual machines - <https://azure.microsoft.com/en-us/services/virtual-machines/>

Virtual machine scale sets - <https://azure.microsoft.com/en-us/services/virtual-machine-scale-sets/>

App services - <https://azure.microsoft.com/en-us/services/app-service/>

Azure Functions - <https://azure.microsoft.com/en-us/services/functions/>

## Container services

*Containers* are a virtualization environment. However, unlike virtual machines, you do not manage an operating system. Containers are meant to be lightweight, and are designed to be created, scaled out, and stopped dynamically.



- Azure Container Instances: A PaaS offering that allows you to upload your containers, which it then will run for you.
  
- Azure Kubernetes Service: A container orchestrator service for managing large numbers of containers.



Azure Container Instances - <https://azure.microsoft.com/en-us/services/container-instances/>

Azure Kubernetes Service - <https://azure.microsoft.com/en-us/services/kubernetes-service/>

## Azure network services

-  • Azure Virtual Network provides secure communication between Azure resources.
-  • Azure Load Balancer automatically scales to create highly-available access to applications or resources.
-  • VPN Gateway is a platform managed scalable and highly-available application delivery controller.
-  • Azure Application Gateway provides for the management of traffic to web applications.
-  • Content Delivery Network provides a distributed network of servers that efficiently deliver web content in their local region.



Virtual Networks - <https://azure.microsoft.com/en-us/services/virtual-network/>

Azure Load Balancer - <https://azure.microsoft.com/en-us/services/load-balancer/>

VPN gateway - <https://azure.microsoft.com/en-us/services/vpn-gateway/>

Azure Application Gateway - <https://azure.microsoft.com/en-us/services/application-gateway/>

Content Delivery Network - <https://azure.microsoft.com/en-us/services/cdn/>

Networking - <https://azure.microsoft.com/en-us/product-categories/networking/>

## Demo

Configure networking

ACR & ACI



# Azure storage services

IaaS	PaaS
<b>Disks</b> <ul style="list-style-type: none"> <li>Persistent disks for Azure IaaS VMs.</li> <li>Premium Storage.</li> <li>Disks option: SSD based, high IOPS, low latency.</li> <li>Lift and shift operations.</li> </ul>	<b>Files</b> <ul style="list-style-type: none"> <li>SMB and REST access.</li> <li>Access from anywhere.</li> <li>Secure access.</li> </ul>
<b>Containers</b> <ul style="list-style-type: none"> <li>Unstructured data – text or binary.</li> <li>Block Blobs.</li> <li>Page Blobs.</li> <li>Append Blobs.</li> </ul>	<b>Tables</b> <ul style="list-style-type: none"> <li>NoSQL data store - structured data.</li> <li>Dynamic scaling based on load.</li> <li>Scales to petabytes of data.</li> <li>Fast key/value lookups.</li> </ul>
<b>Queues</b> <ul style="list-style-type: none"> <li>Store and retrieve messages.</li> <li>Highly scalable.</li> <li>Messages can be processed asynchronously.</li> </ul>	

Built on an unified distributed storage system

Durability, Encryption at rest, Strongly consistent replication, fault tolerance, auto load-balancing

Storage services - <https://azure.microsoft.com/en-us/product-categories/storage/>

## Azure database services



- Azure Cosmos DB is a globally-distributed database service that enables you to elastically and independently scale throughput and storage.
- Azure SQL Database is a relational database as a service (DaaS) based on the latest stable version of the Microsoft SQL Server database engine.
- Azure Database Migration is a fully-managed service designed to enable seamless migrations from multiple database sources to Azure data platforms with minimal downtime.

These are just a few of our database offerings.

✓ These are just a few of our database service offerings. Take a minute to review other database services and [find the product you need](<https://azure.microsoft.com/en-us/product-categories/databases/>).

Azure Cosmos DB - <https://azure.microsoft.com/en-us/services/cosmos-db/>

Azure SQL Database - <https://azure.microsoft.com/en-us/services/sql-database/>

Azure Database Migration Service - <https://azure.microsoft.com/en-us/services/database-migration/>

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Azure Database Migration Service - <https://azure.microsoft.com/en-us/services/database-migration/>

## Demo

Storage accounts

Databases

Azure SQL

Cosmos DB



## Big data and analytics



- Azure SQL Data Warehouse is a cloud-based Enterprise Data Warehouse that leverages massively parallel processing to run complex queries quickly across petabytes of data.
- Azure HDInsight is a fully-managed, open-source analytics service for enterprises. It is a cloud service that makes it easier, faster, and more cost-effective to process massive amounts of data.
- Azure Data Lake Analytics is an on-demand analytics job service that simplifies big data. Instead of deploying and tuning hardware, you write queries to transform your data and extract valuable insights.

Azure SQL Data Warehouse - <https://azure.microsoft.com/en-us/services/sql-data-warehouse/>

Azure HDInsight - <https://azure.microsoft.com/en-us/services/hdinsight/>

Azure Data Lake Analytics - <https://azure.microsoft.com/en-us/services/data-lake-analytics/>

Data and Analytics services - <https://azure.microsoft.com/en-us/product-categories/analytics/>

# Artificial Intelligence



- Azure Machine Learning service provides a cloud-based environment used to develop, train, test, deploy, manage, and track machine learning models.
- Azure Machine Learning Studio is a collaborative, drag-and-drop visual workspace where you can build, test, and deploy machine learning solutions without needing to write code.

Azure Machine Learning Service - <https://azure.microsoft.com/en-us/services/machine-learning-service/>

Azure Machine Learning Studio - <https://azure.microsoft.com/en-us/services/machine-learning-studio/>

**Note:** For a full list of Artificial Intelligence and Machine Learning services available with Azure, see the AI + Machine Learning section on the <https://azure.microsoft.com/en-us/overview/ai-platform/> page.

## Serverless computing



- Azure Functions is code running your service and not the underlying platform or infrastructure. Creates infrastructure based on an event.



- Azure Logic Apps is a cloud service that helps you automate and orchestrate tasks, business processes, and workflows when you need to integrate apps, data, systems, and services.



- Azure Event Grid is a fully-managed, intelligent event routing service that uses a publish-subscribe model for uniform event consumption.

Azure Functions - <https://docs.microsoft.com/en-us/azure/azure-functions/>

Azure Logic Apps - <https://docs.microsoft.com/en-us/azure/logic-apps/>

Azure Event Grid - <https://docs.microsoft.com/en-us/azure/event-grid/>

**Note:** For more details about serverless services available with Azure, see <https://azure.microsoft.com/en-us/solutions/serverless/>

## DevOps



- Azure DevOps services provides development collaboration tools including pipelines, Git repositories, Kanban boards, and extensive automated and cloud-based load testing.
- Azure DevTest Labs allows you to quickly create environments in Azure while minimizing waste and controlling cost.

Azure DevOps Services - <https://docs.microsoft.com/en-us/azure/devops/>

Azure DevTest Labs - <https://azure.microsoft.com/en-us/services/devtest-lab/>

**Note:** For more general details on DevOps services available with Azure, see <https://docs.microsoft.com/en-us/azure/#pivot=products&panel=devops>

## Azure App Service

Quickly and easily build web and mobile apps for any platform or device.

- Multiple languages and frameworks.
- DevOps optimization.
- Global scale with high availability.
- Connections to SaaS platforms and on-premises data.
- Security and compliance.
- Application templates.
- Visual Studio integration.
- API and mobile features.
- Serverless code.



This slide provides a chance to talk about the App Service before the Web App walkthrough.



# AZ-900

## Module 03:

### Security, privacy, compliance, and trust



Adjust the cover for either AZ-900T00 or AZ-900T01.

## Module 3 – Learning objectives

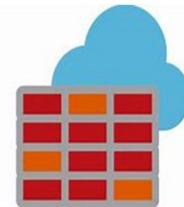
- Understand and describe how to secure network connectivity in Microsoft Azure.
- Understand and describe core Azure identity services.
- Understand and describe security tools and features.
- Understand and describe Azure governance methodologies.
- Understand and describe monitoring and reporting in Azure.
- Understand and describe privacy, compliance, and data protection standards in Azure.



## Azure Firewall

Stateful, managed, Firewall as a Service (FaaS) that grants/ denies server access based on originating IP address, to protect network resources.

- Applies inbound and outbound traffic filtering rules.
- Built-in high availability.
- Unrestricted cloud scalability.
- Uses Azure Monitor logging.



- ✓ Azure Application Gateway also provides a firewall, Web Application Firewall (WAF). WAF provides centralized, inbound protection for your web applications.

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Azure Firewall - <https://azure.microsoft.com/en-us/services/azure-firewall/>

## Azure Distributed Denial of Service (DDoS) protection

DDoS attacks overwhelm and exhaust network resources, making apps slow or unresponsive.

- Sanitizes unwanted network traffic, before it impacts service availability.
- Basic service tier is automatically enabled in Azure.
- Standard service tier adds mitigation capabilities, tuned to protect Azure Virtual Network resources.



Azure DDoS Protection - <https://azure.microsoft.com/en-us/services/ddos-protection/>

## Network Security Groups (NSGs)

Filters network traffic to, and from, Azure resources on Azure Virtual Networks.

- Set inbound and outbound rules to filter by source and destination IP address, port, and protocol.
- Add multiple rules, as needed, within subscription limits.
- Azure applies default, baseline, security rules to new NSGs.
- Override default rules with new, higher priority, rules.



NSG -<https://docs.microsoft.com/en-us/azure/virtual-network/security-overview#network-security-groups>

## Demo

NSG rules

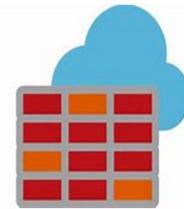
Network Watcher tests



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## Azure Multi-Factor Authentication

Provides additional security for your identities by requiring two or more elements for full authentication.

- Something you know.
- Something you possess.
- Something you are.



*Discuss what could qualify for each of the items listed*

- **Something you know:** This could be a password or the answer to a security question.
- **Something you possess:** This might be a mobile app that receives a notification, or a token-generating device.
- **Something you are:** This is typically some sort of biometric property, such as a fingerprint or face scan used on many mobile devices.

MFA - <https://docs.microsoft.com/en-us/azure/active-directory/authentication/concept-mfa-howitworks>

## Azure Security Center

A monitoring service that provides threat protection across all your Azure, and on-premises, services.

- Provides security recommendations based on your configurations, resources, and networks.
- Monitors security settings across your on-premises and cloud workloads.
- Automatically applies your security policies to any new services you provision.



Azure Security - <https://azure.microsoft.com/en-us/services/security-center/>

## Azure Key Vault

- Stores application secrets in a centralized cloud location, to securely control access permissions, and access logging.
  - Secrets management.
  - Key management.
  - Certificate management.
  - Storing secrets backed by hardware security modules (HSMs).

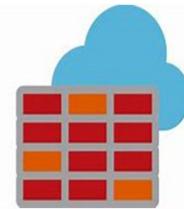


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## Azure Policy

Stay compliant with your corporate standards and service level agreements (SLAs) by using policy definitions to enforce rules and effects for your Azure resources.

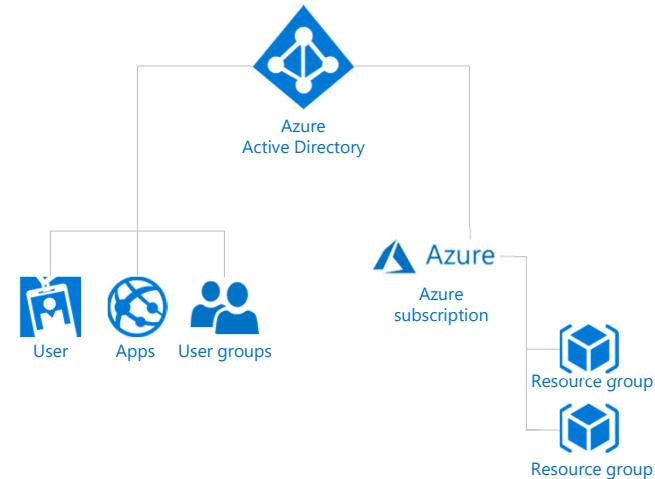
- Evaluates and identifies Azure resources that do not comply with your policies.
- Provides built-in policy and initiative definitions, under categories such as Storage, Networking, Compute, Security Center, and Monitoring.



Azure Policy - <https://azure.microsoft.com/en-us/services/azure-policy>

## Role-based access control (RBAC)

- Fine-grained access management
- Segregate duties within your team and grant only the amount of access to users that they need to perform their jobs.
- Enables allowing or disallowing access to the Azure portal, and controlling access to resources.



Azure RBAC - <https://docs.microsoft.com/en-us/azure/role-based-access-control/overview>

## Resource locks

Lock Types	Read	Update	Delete
CanNotDelete	Yes	Yes	No
ReadOnly	Yes	No	No

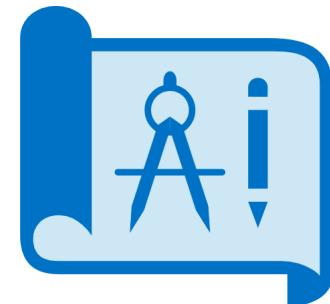
- Protect your Azure resources from accidental deletion or modification.
- Manage locks at subscription, resource group, or individual resource levels within Azure Portal.

**Resource Locks** - <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-lock-resources>

## Azure Blueprints

Create reusable environment definitions that can recreate your Azure resources and apply your policies instantly.

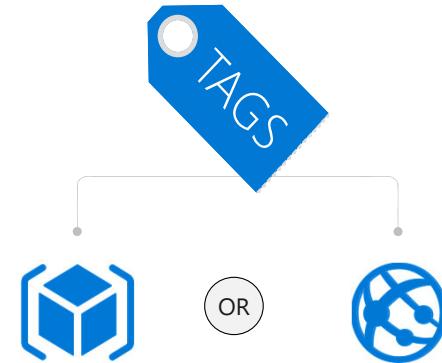
- Help audit and trace your deployments, and maintain compliance using built-in tools and artifacts.
- Associate blueprints with specific Azure DevOps build artifacts, and release pipelines, for rigorous tracking.



Azure Blueprints - <https://azure.microsoft.com/en-us/services/blueprints/>

## Tags

- Provides metadata for your Azure resources.
- Logically organizes resources into a taxonomy.
- Consists of a name-value pair.
- Very useful for rolling up billing information.



owner: joe  
department: marketing  
environment: production

cost-center: marketing

[Tags](https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-using-tags) - <https://docs.microsoft.com/en-us/azure/azure-resource-manager/resource-group-using-tags>

## Microsoft privacy statement

Provides openness and honesty about how Microsoft handles the user data collected from its products and services.

The Microsoft privacy statement explains:

- What data Microsoft processes.
- How Microsoft processes it.
- What purposes the data is used for.

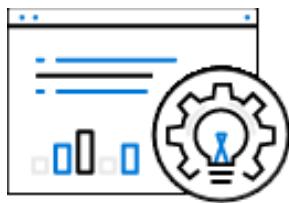


Microsoft's Privacy Statement at - [microsoft.com/privacystatement](https://microsoft.com/privacystatement)

## Trust Center

Learn about security, privacy, compliance, policies, features, and practices across Microsoft's cloud products.

The Trust Center website provides :



- In-depth, expert information.
- Curated lists of recommended resources, arranged by topic.
- Role-specific information for business managers, administrators, engineers, risk assessors, privacy officers, and legal teams.

Trust Center - <https://www.microsoft.com/trustcenter>

## Service Trust Portal (STP)

A Trust Center companion website for compliance-related publications about Microsoft cloud services. Hosts the Compliance Manager service.

Use STP to access :

- Audit reports across Microsoft cloud services.
- Guides to using Microsoft cloud services for regulatory compliance.
- Publications about trust, and how Microsoft cloud services protect your data.



STP - <https://servicetrust.microsoft.com/>

## Compliance Manager

Workflow-based, risk assessment tool in Trust Portal that supports your organization's regulatory compliance activities.

Compliance Manager features :

- Assign, track, and verify your compliance and assessment-related activities.
- Provides a score by evaluating your compliance status.
- Stores and manages your compliance-related artifacts in a secure digital repository.



✓ Compliance Manager is a dashboard that provides a summary of your data protection and compliance status, as well as recommendations to improve your data protection and compliance status. The Customer Actions provided in Compliance Manager are recommendations only. Each organization must evaluate the effectiveness of these recommendations, in their respective regulatory environment, prior to implementation. Compliance Manager recommendations should not be interpreted as a guarantee of compliance.

## Demo

Trust Center

Service Trust Portal

Compliance Manager





# AZ-900

## Module 4:

### Azure pricing and support



Adjust the cover for either AZ-900T00 or AZ-900T01.

## Module 4 – Learning objectives

- Understand and describe Microsoft Azure subscriptions and management groups.
- Recognize ways to plan and manage Azure costs.
- Understand Azure support options.
- Understand and describe features of Azure Service Level Agreements (SLAs).
- Understand and describe the service lifecycle in Azure.



# Subscription offers

- Free (next slide)
- Pay-as-you-go
- Enterprise Agreement
- Student
- An account can have one subscription or multiple subscriptions.

**SELECT AN OFFER**

 Pay-As-You-Go Dev/Test  
This offer is for teams of active Visual Studio subscribers to run dev/test workloads on Microsoft Azure, providing discounted rates on Windows virtual machines and access to exclusive images in the Azure Gallery.  
[Learn more](#)

 Visual Studio Enterprise: BizSpark  
Enjoy monthly credits and lower rates.  
Use MSDN software at no additional charge.  
[Learn more](#)

 Visual Studio Professional  
Enjoy monthly credits and lower rates.  
Use MSDN software for development and test at no additional charge.  
[Learn more](#)

Azure subscription offers - <https://azure.microsoft.com/en-us/support/legal/offer-details/>

# Azure free account

## What do I get?

With your Azure free account, you get all of this—and you won't be charged until you choose to upgrade.

**12 months + \$200 credit + Always free**

of popular free services

to explore any Azure service for 30 days

25+ services

- Provides 12 months of our most popular services, a \$200 credit to explore any Azure service for 30 days, and over 25 services are free.
- At the end of the trial you can upgrade to pay-as-you-go pricing.

Azure free accounts - <https://azure.microsoft.com/en-us/free/>

## Purchasing Azure products and services

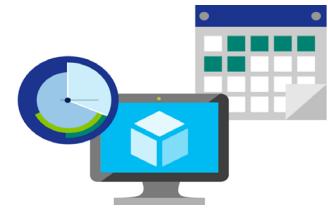
- Three main customer types on which the available purchasing options for Azure products and services are contingent are:
  - **Enterprise:** Enterprise customers sign an Enterprise Agreement with Azure that commits them to spending a negotiated amount on Azure services, which they typically pay annually.
  - **Web direct:** Web direct customers sign up for Azure through the Azure website.
  - **Cloud solution providers (CSPs):** Typically are Microsoft partner companies that a customer hires to build solutions on top of Azure. Payment and billing for Azure usage occurs through the customer's CSP.

Azure products and services purchasing options - <https://azure.microsoft.com/en-us/pricing/purchase-options/>

## Factors affecting costs

There are three primary factors affecting costs:

- **Resource Type:** Costs are resource-specific, so the usage that a meter tracks and the number of meters associated with a resource depend on the resource type.
- **Services:** Azure usage rates and billing periods can differ between Enterprise, Web Direct, and CSP customers.
- **Location:** The Azure infrastructure is globally distributed, and usage costs might vary between locations that offer Azure products, services, and resources.



Azure usage charges - <https://docs.microsoft.com/en-us/azure/billing/billing-understand-your-invoice>

# Subscription offers

- Free (next slide)
- Pay-as-you-go
- Enterprise Agreement
- Student
- An account can have one subscription or multiple subscriptions.

**SELECT AN OFFER**

 Pay-As-You-Go Dev/Test  
This offer is for teams of active Visual Studio subscribers to run dev/test workloads on Microsoft Azure, providing discounted rates on Windows virtual machines and access to exclusive images in the Azure Gallery.  
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 Visual Studio Enterprise: BizSpark  
Enjoy monthly credits and lower rates.  
Use MSDN software at no additional charge.  
[Learn more](#)

 Visual Studio Professional  
Enjoy monthly credits and lower rates.  
Use MSDN software for development and test at no additional charge.  
[Learn more](#)

Azure subscription offers - <https://azure.microsoft.com/en-us/support/legal/offer-details/>

# Azure free account

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**12 months + \$200 credit + Always free**

of popular free services

to explore any Azure service for 30 days

25+ services

- Provides 12 months of our most popular services, a \$200 credit to explore any Azure service for 30 days, and over 25 services are free.
- At the end of the trial you can upgrade to pay-as-you-go pricing.

Azure free accounts - <https://azure.microsoft.com/en-us/free/>

## Purchasing Azure products and services

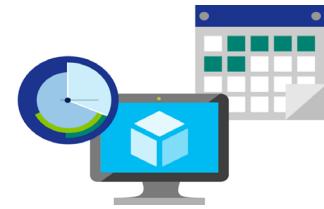
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  - **Cloud solution providers (CSPs):** Typically are Microsoft partner companies that a customer hires to build solutions on top of Azure. Payment and billing for Azure usage occurs through the customer's CSP.

Azure products and services purchasing options - <https://azure.microsoft.com/en-us/pricing/purchase-options/>

## Factors affecting costs

There are three primary factors affecting costs:

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- **Location:** The Azure infrastructure is globally distributed, and usage costs might vary between locations that offer Azure products, services, and resources.



Azure usage charges - <https://docs.microsoft.com/en-us/azure/billing/billing-understand-your-invoice>

## Support plan options

Every Azure subscription includes free access to billing and subscription support, Azure products and services documentation, online self-help documentation, white papers, and community support forums.

	Basic	Developer	Standard	Professional Direct
Scope	Available to all Microsoft Azure accounts	Trial and non-production environments	Production workload environments	Business-critical dependence
Technical Support		Business hours access to Support Engineers via email	24x7 access to Support Engineers via email and phone	24x7 access to Support Engineers via email and phone

For more information about Azure support options, refer to  
<https://azure.microsoft.com/en-us/support/plans/>

## Service Level Agreements (SLAs)

- SLAs document the specific terms that define Azure performance standards.
- SLAs define Microsoft's commitment to an Azure service or product.
- Individual SLAs are available for each Azure product and service.
- SLAs also define what happens if a service or product fails to meet the designated availability commitments.



## SLAs for Azure products and services

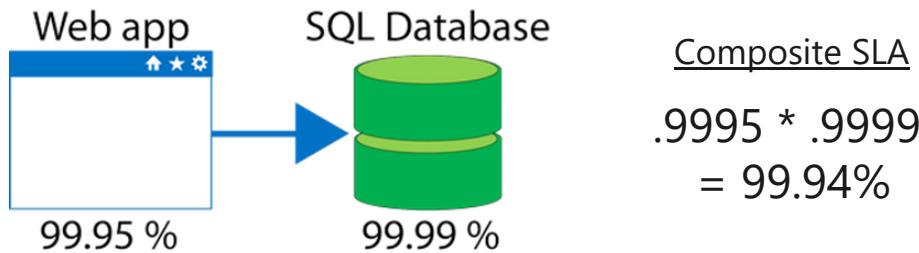
- Performance targets are expressed as uptime and connectivity guarantees.
- Performance-targets range from 99.9% (three nines) to 99.99% (four nines).
- If a service fails to meet the guarantees, a percentage of the monthly service fees can be credited to you.

SLA	Downtime per month	Downtime per year
99.9%	43.2 minutes	8.76 hours
99.95	21.6 minutes	4.38 hours
99.99	4.32 minutes	52.56 minutes

You might want to browse to some SLA's directly <https://azure.microsoft.com/en-us/support/legal/sla/summary/> and explore one or two as examples.

## Composite SLAs

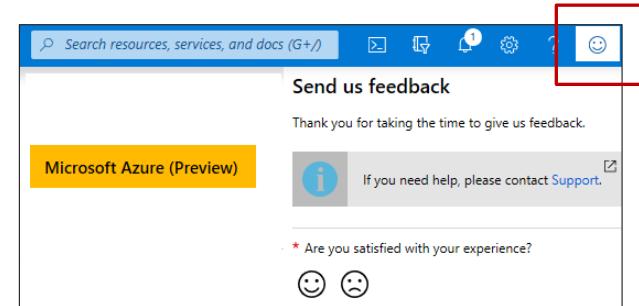
- If the App Service has a 99.95% SLA, and the Azure SQL Database has a 99.99% SLA, what is the composite SLA for your application?



- Notice the composite SLA is lower than the individual SLAs.
- Improve the SLA by creating independent fallback paths.

## Accessing Azure Portal preview

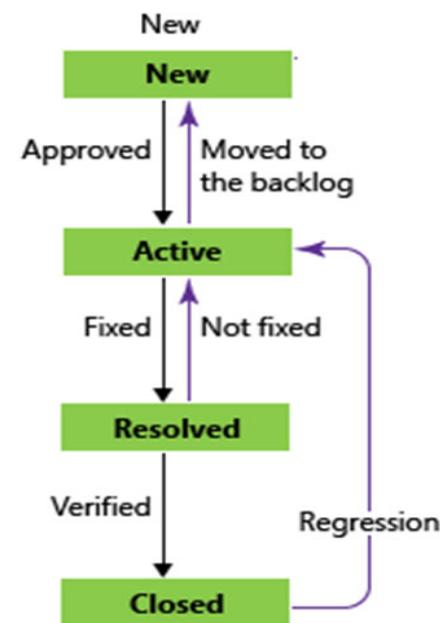
- Access the Azure Portal (Preview) - <https://preview.portal.azure.com>.
- Provide feedback on new features such as full-screen blades, performance, navigation, notifications, and accessibility improvements.
- Check out the Azure Portal feedback forum.



✓ Azure Portal feedback forum - <https://feedback.azure.com/forums/223579-azure-portal>

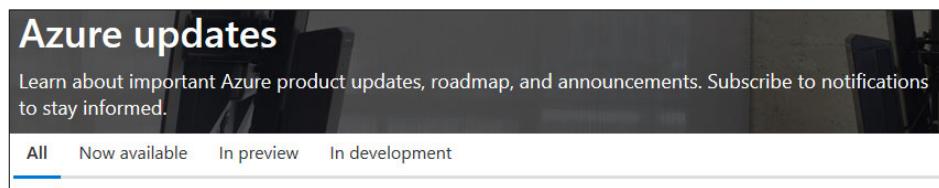
## General Availability

- New features are evaluated and tested.
- Feature bugs go through a lifecycle of new, active, resolved, and fixed.
- General availability provides successfully tested features to all Azure customers.
- Azure blog announcements is a good source of information.



✓ Learn about updates and new product features on the Azure announcements blog - <https://azure.microsoft.com/en-us/blog/topics/announcements/>.

## Monitoring service and feature updates



- Azure updates provides information about the Azure products, services, and features, and product roadmaps, and availability.
- View details about all Azure updates and their status.
- Browse and search for updates.
- Subscribe to Azure update notifications by RSS.

For more information about Azure updates, refer to <https://azure.microsoft.com/en-us/updates/>

## Demo

Azure SLAs

Azure Updates

Azure Service Status

Azure Feedback



# Single Answer Multiple Choice

 Question 4 (of 5)

Review later  
 Comment later

Time remaining 01:58:22

Your network contains an Active Directory domain named contoso.com. The domain contains two servers named Server1 and Server2 that run Windows Server 2012 R2. Server1 has the Group Policy Management feature installed. Server2 has the Print and Document Services server role installed.

On Server2, you open **Print Management** and you deploy a printer named Printer1 by using a Group Policy object (GPO) named GPO1.

When you open GPO1 on Server1, you discover that the Deployed Printers node does not appear.

You need to view the Deployed Printers node in GPO1.

What should you do?

A. On Server1, add and share a printer.  
 B. On Server1, install the Print and Document Services Tools.  
 C. On a domain controller, create a Group Policy central store.  
 D. On Server1, modify the Group Policy filtering options of GPO1.

 Help    Calculator    Color scheme    Reset

 Previous    Next

# Multiple Answer Multiple Choice

## Question 3 of 7

You have a computer that runs Windows 7.

You start the computer and receive the following error message:

BOOTMGR is missing  
Press Ctrl+Alt+Del to restart

You then start the computer from the Windows 7 installation media.

You need to ensure that the computer successfully starts Windows 7.

What are two possible ways to achieve this goal? ( Each correct answer presents a complete solution. Choose two.)

- A. Run Startup Repair.
- B. Run System Restore.
- C. Run **Bootrec /RebuildBcd**.
- D. Run **Bcdedit /createstore**.

Reset(T)

Instructions(I)

## Repeated Scenario

You need to move an Azure VM to another hardware host.

Solution: You redeploy the VM.

Does this solution meet the goal?

Yes

No

## Repeated Scenario

You need to move an Azure VM to another hardware host.

Solution: You enable boot diagnostics on the VM.

Does this solution meet the goal?

Yes

No

## Select and Place

Question 5 (of 9)

Review later  
 Comment later

Time remaining 01:38:28

You have a Microsoft SharePoint 2013 Service Pack 1 (SP1) server farm.

You need to recommend which tools should be used to recover deleted SharePoint site groups, deleted document libraries, and deleted SharePoint Designer 2010 workflows. The solution must use the minimum amount of administrative effort.

Which tool should you recommend for each type of content? To answer, drag the appropriate tool to the correct recovery task. Each tool may be used once, more than once, or not at all. You may need to drag the split bar between panes or scroll to view content.

**Tool**

- Microsoft SQL Server backups
- Recycle Bin
- Windows Server Backups

**Recovery Task**

- Document libraries
- SharePoint Site groups
- SharePoint Designer workflows
- Resources

... . . . .

## Build List and Reorder

**Question 4 (of 5)**

Review later  
 Comment later

Time remaining 01:56:12

You have a Hyper-V host named Server1.

A technician creates a virtual machine named VM1 on Server1 by using the New Virtual Machine Wizard.

You start VM1 and you discover that there is no option to start by using PXE.

You need to ensure that you can start VM1 by using PXE.

Which three actions should you perform in sequence? (To answer, move the appropriate three actions from the list of actions to the answer area and arrange them in the correct order.)

**Actions**

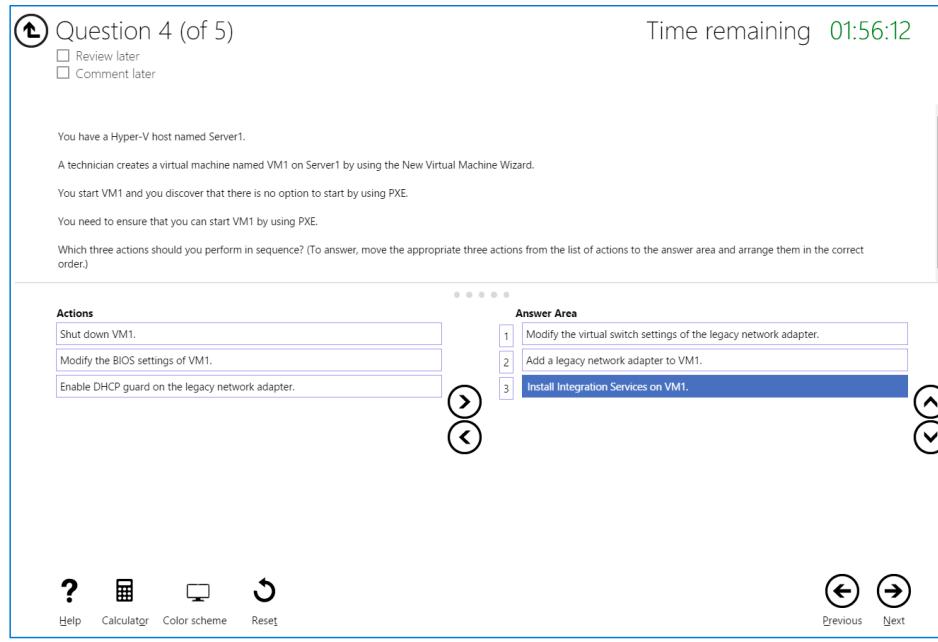
- Shut down VM1.
- Modify the BIOS settings of VM1.
- Enable DHCP guard on the legacy network adapter.

**Answer Area**

- 1 Modify the virtual switch settings of the legacy network adapter.
- 2 Add a legacy network adapter to VM1.
- 3 Install Integration Services on VM1.

Previous Next

Help Calculator Color scheme Reset



# Active Screen

**Question 18 of 32**

You configure a SharePoint Server 2010 Service Pack 1 (SP1) server farm.

You need to enable the cache profile for anonymous users on internal collaboration sites for the site collection. You also need to allow administrators to choose a different page output cache profile for page layouts.

What should you do? (To answer, configure the appropriate option or options in the dialog box in the answer area.)

**Answer Area**

**Libraries**  
Site Pages  
Shared Documents

**Lists**  
Calendar  
Tasks

**Discussions**  
Team Discussion

**Recycle Bin**

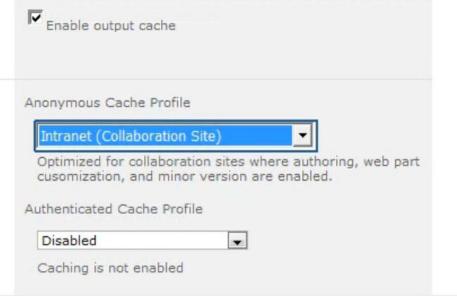
**Output Cache**  
Select the **Enable output cache** check box to enable output caching in this site collection.

**Default Page Output Cache Profile**  
A cache profile specifies how long items should be held in the cache. It also describes to the caching system how to determine whether a cached page element is in fact valid for other requests for the same element from different users.  
You can specify different cache profiles to use for anonymous and authenticated users. This optimizes the use of the cache based on the authentication methods allowed on the site.  
[Learn more about the default page output cache profile.](#)

**Anonymous Cache Profile**  
**Intranet (Collaboration Site)**  
Optimized for collaboration sites where authoring, web part customization, and minor version are enabled.

**Authenticated Cache Profile**  
**Disabled**  
Caching is not enabled

**Reset(T)** **Instructions(I)**



## Statement/Code Analysis

```
private void btnEquals_Click(object sender, EventArgs e)
{
    if (plusButtonClicked == true)
    {
        total2 = total1 + double.Parse(txtDisplay.Text);
    }
    else if (minusButtonClicked == true)
    {
        total2 = total1 - double.Parse(txtDisplay.Text);
    }

    txtDisplay.Text = total2.ToString();
    total1 = 0;
}
```

Blah blah blah.

Yes

No

Another statement.

Yes

No

# Case Study

## Case Study

Time remaining 01:56:02

### Question

#### Background

Existing Environment

Business Requirements

Technical Requirements

Problem Statements

Exhibits

This exam includes at least one case study. **Case studies are not timed separately. You can use as much exam time as you would like to complete each case.** However, there may be additional case studies and sections on this exam. You must manage your time to ensure that you are able to complete all questions included on this exam in the time provided.

To answer the questions included in a case study, you will need to reference information that is provided in the case study. Case studies might contain exhibits and other resources that provide more information about the scenario that is described in the case study. Each question is independent of the other questions in this case study.

At the end of this case study, a review screen will appear. This screen allows you to review your answers and to make changes before you move to the next section of the exam. After you begin a new section, you cannot return to this section.

#### To start the case study

To display the first question in this case study, click the **Next** button. Use the buttons in the left pane to explore the content of the case study before you answer the questions. Clicking these buttons displays information such as business requirements, existing environment, and problem statements. If the case study has an **All Information** tab, note that the information displayed is identical to the information displayed on the subsequent tabs. When you are ready to answer a question, click the **Question** button to return to the question.



Help



Calculator



Color scheme



Reset



Next

# Performance-Based Lab

The screenshot shows the Microsoft Azure portal interface. On the left, the navigation menu includes 'Create a resource', 'All services', 'Resource groups', 'All resources', 'Recent', 'App Services', 'Virtual machines (classic)', 'Virtual machines', 'SQL databases', 'Cloud service checklist', 'Automation', 'Azure Active Directory', 'Monitor', 'Security Center', 'Cost Management + bills', 'Help + support', and 'Advisor'. The main area displays the 'All resources' page with a table of resources. The table columns are 'Name', 'Type', 'Region', 'Status', and 'Actions'. Several resources are listed, including multiple 'Virtual machine' entries and one 'Virtual machine interface'. To the right of the table, a large white box represents the 'Performance-Based Lab' interface. It features a timer at the top right showing '1 Hr 59 Min Remaining' and 'Time remaining 01:54:00'. Below the timer is a section titled 'Tasks' with the sub-instruction 'Click to expand each objective.' followed by a list of seven tasks labeled Task 1 through Task 7, each preceded by a plus sign. At the bottom of this box are three icons: a question mark, a user profile, and a right-pointing arrow, along with the text 'Sign In' and 'Username/Password'.

**Exam DP-201: Designing an Azure Data Solution****Languages:** English, Japanese, Chinese (Simplified), Korean**Retirement date:** none

This exam measures your ability to accomplish the following technical tasks: design Azure data storage solutions; design data processing solutions; and design for data security and compliance.

United States

**\$165 USD\***

Price based on the country in which the exam is proctored.

[Schedule exam >](#)

Official practice test for Designing an Azure Data Solution

All objectives of the exam are covered in depth so you'll be ready for any question on the exam.



 Microsoft  
Learning

Your Dashboard

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## Verify exam discount eligibility

### For Microsoft employees

Microsoft employees are eligible for discounted exams. The discount will be reflected at the end of the checkout process. For MOS exams at Certipoint, please request a voucher through the Microsoft Employee Voucher Portal.

To verify you are a Microsoft employee, link your Microsoft work account (alias@microsoft.com).

[Link account](#)

### For Microsoft event attendees

If you recently attended a Microsoft event, you may be eligible for a discounted Microsoft Certification exam. To check eligibility, select an event you attended and verify the account used to register for the event.  
[Terms and Conditions](#) apply.

Microsoft Ignite 2019, Orlando

[Verify account](#)

### Continue scheduling exam

Proceed to the Pearson VUE website to complete the exam scheduling process.

[Go to Pearson VUE](#)



Microsoft

Select exam options

DP-201: Designing an Azure Data Solution

All fields are required.

How do you want to take your exam? [Exam delivery option descriptions](#)

At a local test center

At my home or office

I have a Private Access Code

Are you going to be testing on this device and network?

If so, perform a quick pre-check to verify compatibility of your device and network before planning to take this exam in your home or office.  
If you skip, be sure to do a full system test before test day to avoid lost exam fees and launch delays.

Run pre-check

Next

The screenshot shows a Microsoft Exam interface. On the left is a vertical sidebar with icons for 'My Exams' (double arrows), 'My Profile' (person icon), 'My Certifications' (certification icon), and 'Logout' (arrow icon). The main content area has a title 'Select exam options' and the exam code 'DP-201: Designing an Azure Data Solution'. A message says 'All fields are required.' Below it, a question asks 'How do you want to take your exam?' with three options: 'At a local test center' (radio button), 'At my home or office' (radio button, selected), and 'I have a Private Access Code' (radio button). Another message asks if the user is testing on their device, with a note about performing a quick pre-check. A 'Run pre-check' button is present. At the bottom right is a yellow 'Next' button. A circular icon with a right-pointing arrow is in the bottom right corner of the main content area.

**Agree to online exam policies**

DP-201: Designing an Azure Data Solution

To take this exam in an online environment, please agree to the following terms and conditions.

By accessing this website and ticking the box you indicate your acceptance of Pearson VUE's, a business of NCS Pearson, Inc., Privacy and Cookies Policy ("Privacy Policy"), Terms and Conditions and use of cookies to support your experience. You also understand, acknowledge and agree that the testing programme sponsor has its own, possibly different, privacy policy.

By providing your personal information, as stated in this [Privacy Policy](#), for the purpose of registering for a licensure, certification or academic admission test, including the administration of such test, you acknowledge, agree and consent to the video and audio recording of your face image, voice, desk and workspace for the purposes of test quality, security and the integrity of the testing process, and you consent to the processing of such personal information and test data by Pearson VUE and to the transfer of such data to Pearson VUE's hub server, located in the USA, as the data processor, its authorized third parties, if any, both in the capacity as data processors for the processing of your personal information and test data on behalf of the testing program sponsor, as the data controller, located in the USA or elsewhere. Pearson VUE and other data processing entities, if any, are the recipients of your personal information and test data are located outside of the European Union and the European Economic Area; however, Pearson VUE will enter into reasonable data transfer agreements with such entities for the purpose of communicating and following the instructions of your testing program sponsor and for establishing reasonable security measures to protect the confidentiality and integrity of your personal information and test data.

If you choose to take the test through our online proctoring function, which is not mandatory in the event that there are other ways of taking the test as determined by the testing programme sponsor, you will be monitored during the testing session in real time so that your face, voice, desk and workspace will be captured and possibly recorded during the testing session. You understand, acknowledge and agree that you have no right to privacy at your current location during the exam testing session and you explicitly waive any and all claims asserting a right to individual privacy or other similar claims. By accessing this website and ticking this box you signify your acknowledgement and agreement that any inappropriate or wrongful conduct, as determined in Pearson VUE's or the test proctor's sole discretion, witnessed while monitoring your testing session at your current location will be reported by Pearson VUE to the testing programme sponsor and may also be reported to the appropriate governmental authorities, including, but not limited to, any law enforcement officials.

By accessing this website and ticking this box you signify that you understand, acknowledge and agree that if any third party is: 1) **detected as being present in your physical location, whether visible or not; or 2) overheard in any manner, whether physically detected through movement and making of noise or through sounds irrespective of whether they are in your current location or not during your testing session, the test will be terminated and you will not receive any score or in the event you've completed the test and received a score your score may be invalidated or revoked.** Further, you understand, acknowledge and agree that if your testing session is terminated for this or any other reason you will not receive a test fee refund, credit or voucher.

P
Previous
Next
W

Microsoft

» ← Select exam language

DP-201: Designing an Azure Data Solution

What is your preferred language for the exam?

Chinese Simplified

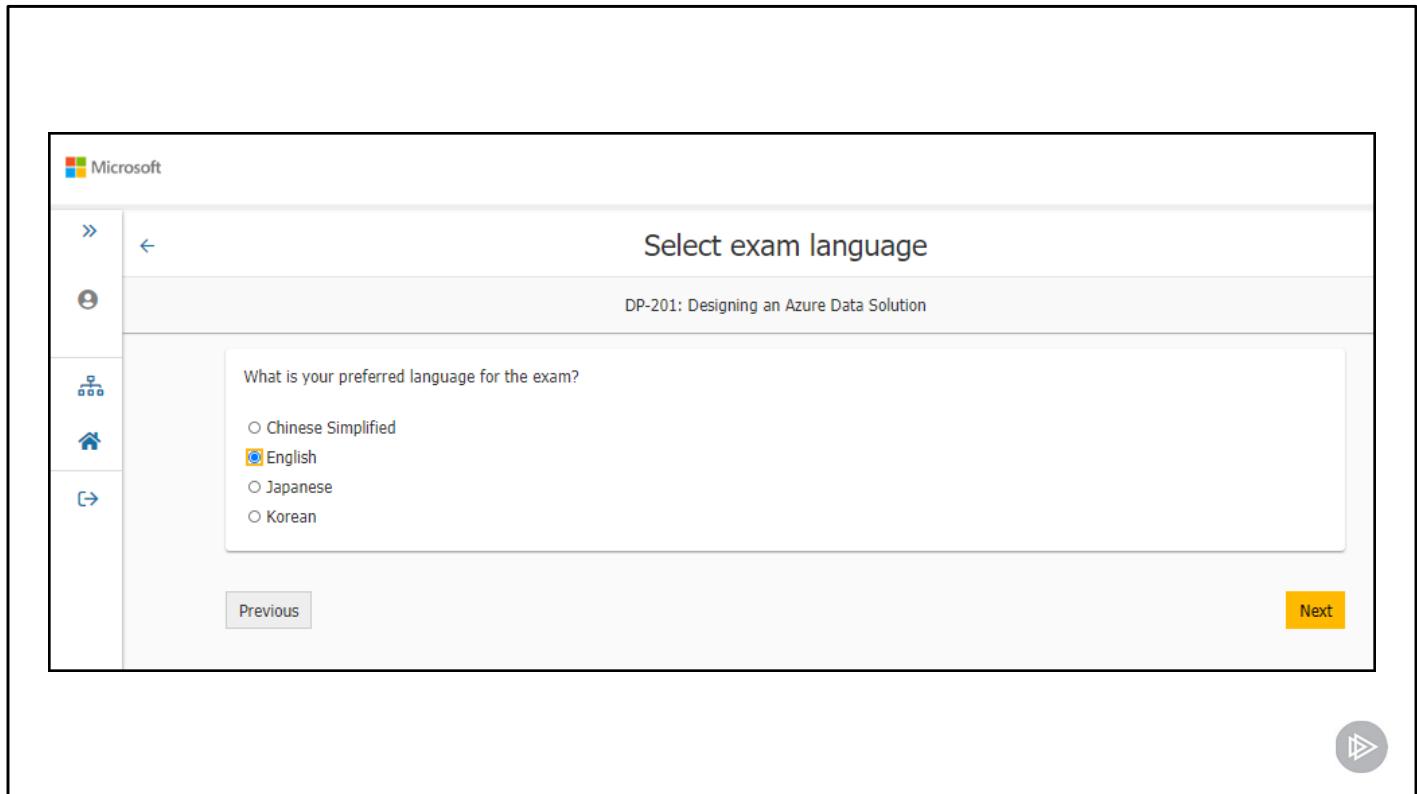
English

Japanese

Korean

Previous

Next



A screenshot of a Microsoft exam selection interface. At the top, it says "Select exam language" and "DP-201: Designing an Azure Data Solution". Below that, it asks "What is your preferred language for the exam?". There are four options: "Chinese Simplified", "English" (which is checked), "Japanese", and "Korean". At the bottom left is a "Previous" button, and at the bottom right is a yellow "Next" button.



The screenshot shows a Microsoft web interface for exam registration. On the left is a vertical toolbar with icons for back, forward, search, refresh, and other navigation functions. The main area has a header "Exam details" and a sub-header "DP-201: Designing an Azure Data Solution". Below this, there's a section for "Exam:" listing "DP-201: Designing an Azure Data Solution" and a link to "View Testing Policies". A "Price\*:" field shows "USD 165.00". The "Language:" is listed as "English". Under "System Requirements:", there's a note: "ALERT: Before you register for an online proctored exam, review the system requirements, check the list of participating countries, read about the testing protocols, and complete the required system test: [Online Proctoring Required Information](#)". At the bottom, a note states: "\*Prices listed are based on today's date and do not include local taxes which may be applicable." Navigation buttons "Previous" and "Next" are at the bottom, along with a circular "Print" icon.

The screenshot shows a Microsoft quiz interface. On the left is a vertical toolbar with icons for back, forward, search, home, and refresh. The main area has a header "Select proctor language" and a sub-header "DP-201: Designing an Azure Data Solution". A question asks "What is the language you prefer the proctor to speak?" with two options: "Japanese" (radio button) and "English" (radio button, selected). Navigation buttons "Previous" and "Next" are at the bottom, with "Next" highlighted in yellow.



Microsoft

Find an appointment

DP-201: Designing an Azure Data Solution

Select Date  
[Why can't I find an available appointment?](#)

June 2020						
Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Select a date from the calendar. Only available dates can be selected.

Available start times: Thursday, June 18, 2020  
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Morning	Afternoon
04:30 AM	12:00 PM
07:45 AM	12:15 PM
08:00 AM	12:30 PM
08:15 AM	12:45 PM
08:30 AM	01:00 PM

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Review and confirm contact information to avoid issues on test day.

Description	Details	Price	Actions
Exam DP-201: Designing an Azure Data Solution  Language: English Exam Length: 180 minutes	Appointment Thursday, June 18, 2020 Start Time: 12:15 PM CDT <a href="#">Change Appointment</a>	165.00	<a href="#">Remove</a>

**Available Products**

In addition to scheduling your exam, you might be interested in the following products.

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System Requirements

**ALERT:** Before you register for an online proctored exam, review the system requirements, check the list of participating countries, read about the testing protocols, and complete the required system test: [Online Proctoring Required Information](#)

Admission Policy

PLEASE NOTE THIS EXAM IS PROCTORED IN ENGLISH ONLY. THERE IS NOT AN OPTION FOR LOCAL LANGUAGE PROCTORING AT THIS TIME.

**PERFORM A SYSTEM TEST (Prior to Exam Day):**  
Please follow this link to perform a SYSTEM TEST from the same computer and location you will be testing from on exam day: <http://www.pearsonvue.com/microsoft/op>. Ensure you have administrative rights on your computer to be able to download the software.  
If your system does not meet the requirements please register to take the exam at a testing center. If your computer is found not to meet requirements on the exam day you are unlikely to receive a refund.

**REVIEW EXAM INFORMATION (Prior to Exam Day):**  
Please follow this link <http://www.pearsonvue.com/microsoft/op> to find information on:

- Exam policies
- System requirements
- Admission steps.

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Exam  
DIP-201: Designing an Azure Data Solution  
Language: English  
Exam Length: 180 minutes

Appointment  
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Description Details Price

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- DP-900: Microsoft Azure Data Fundamentals (beta)
- AI-900: Microsoft Azure AI Fundamentals (beta)
- AI-100: Designing and Implementing an Azure AI Solution
- DA-100: Analyzing Data with Microsoft Power BI (beta)
- DP-300: Administering Relational Databases on Microsoft Azure (beta)
- AZ-104: Microsoft Azure Administrator (beta)
- AZ-400: Designing and Implementing Microsoft DevOps Solutions
- 743: Upgrading Your Skills to MCSA: Windows Server 2016

The "My Account" section on the right includes links for Preferences, Exam History, View Score Reports, and My Receipts. At the bottom right of the dashboard area is a circular icon with a downward-pointing arrow.

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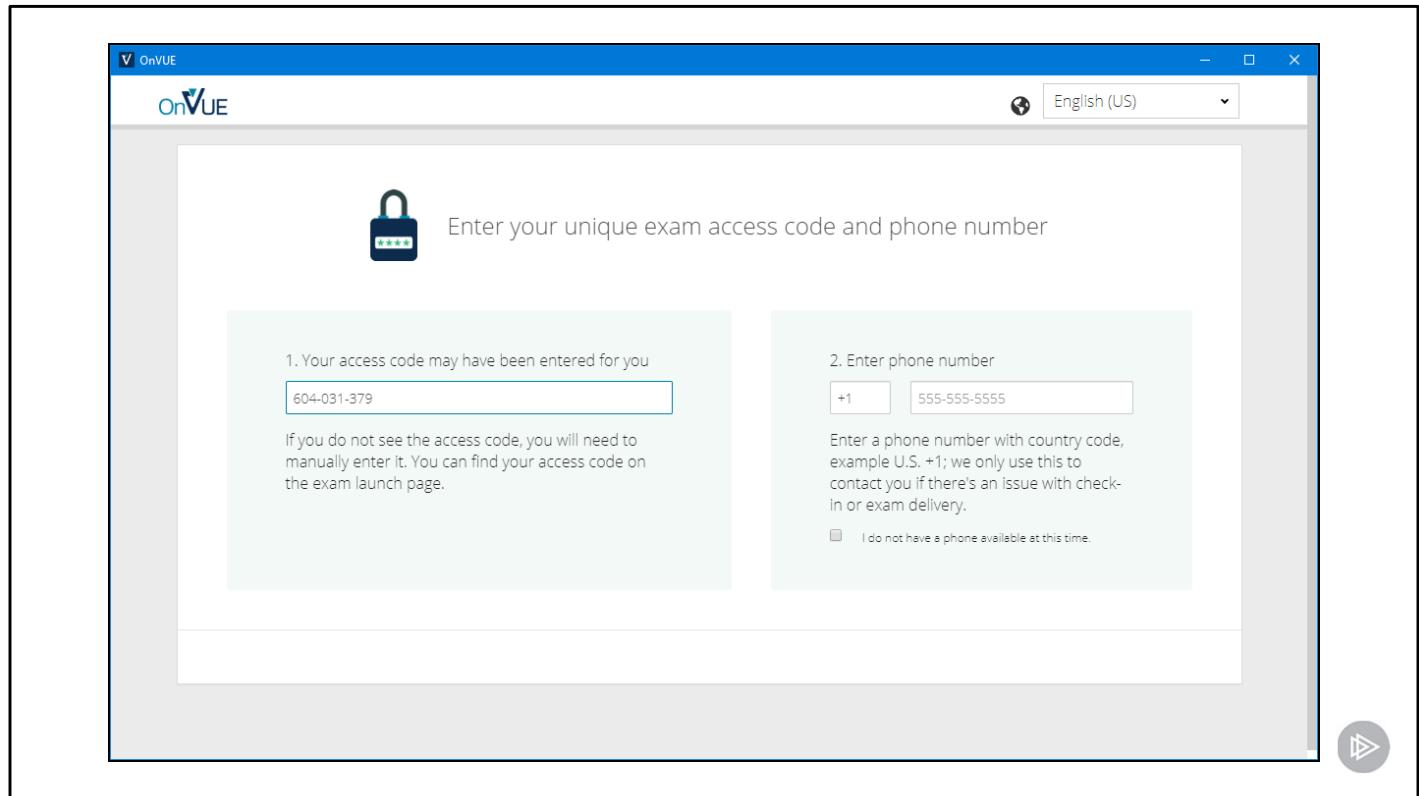
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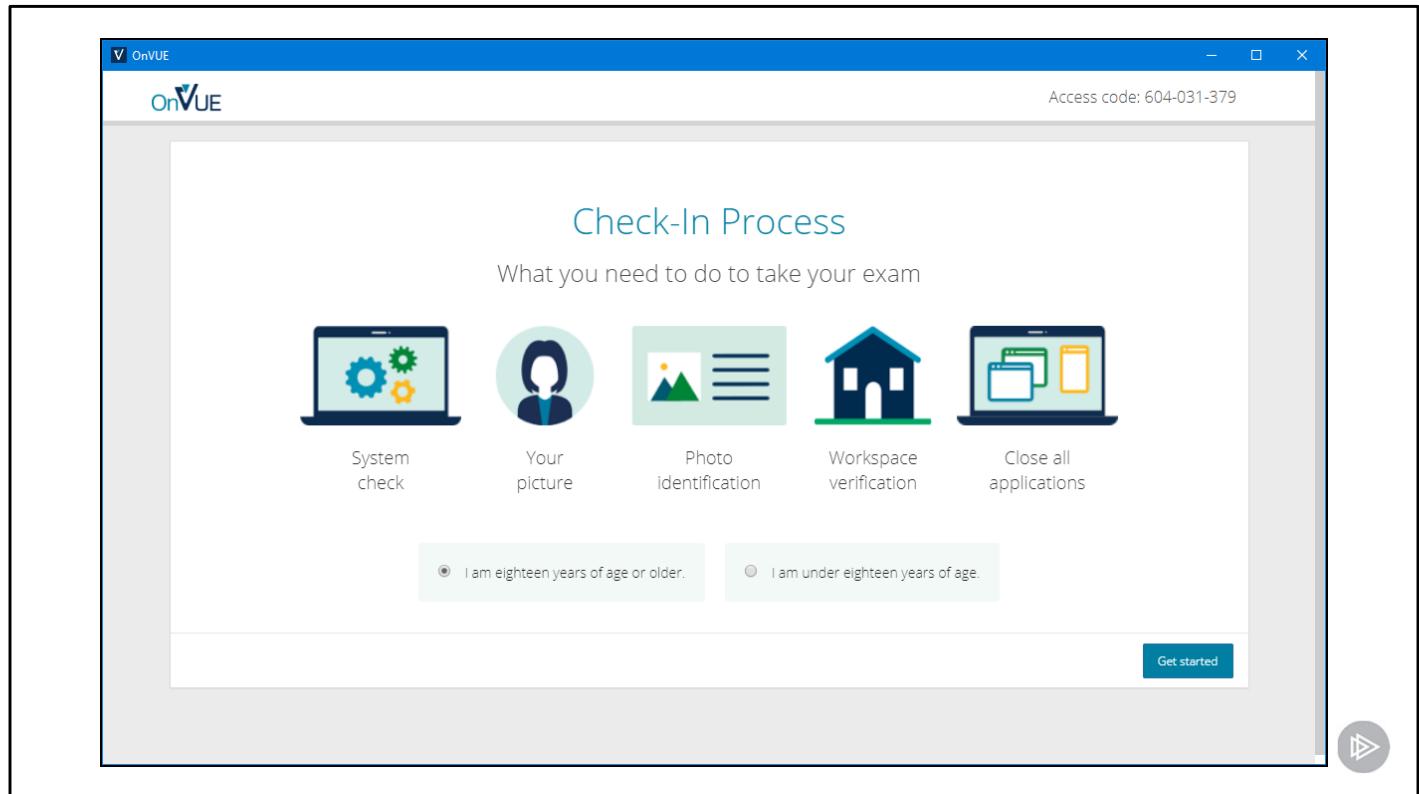
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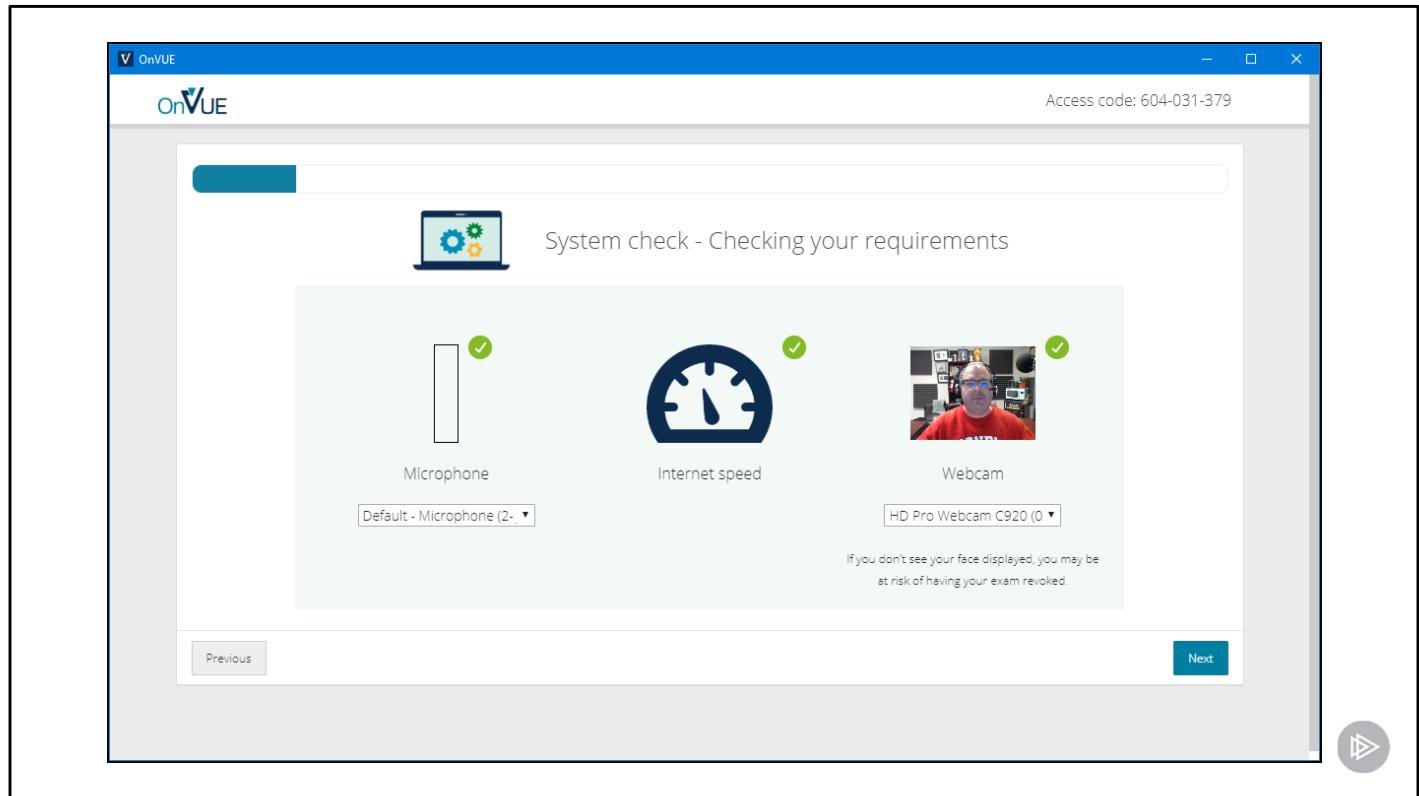
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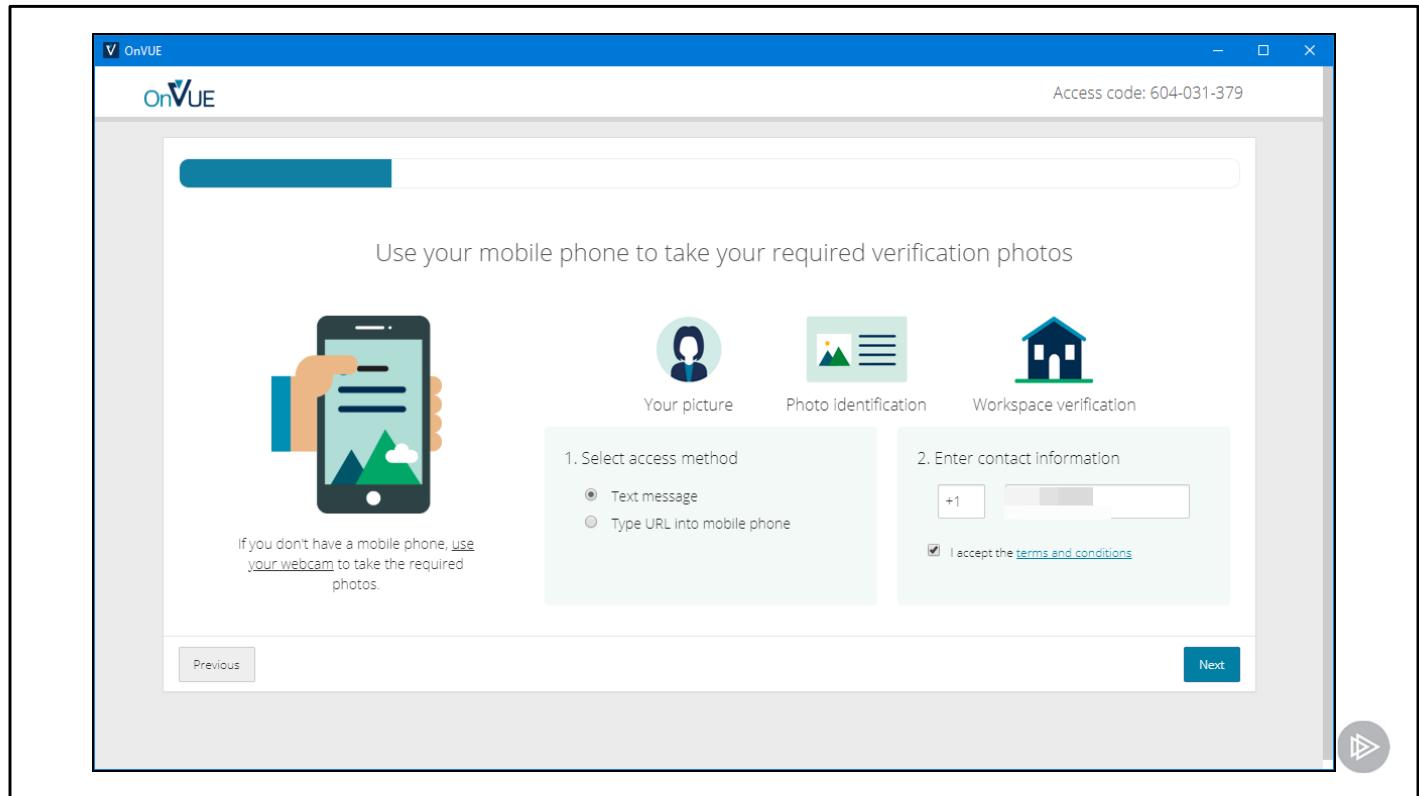
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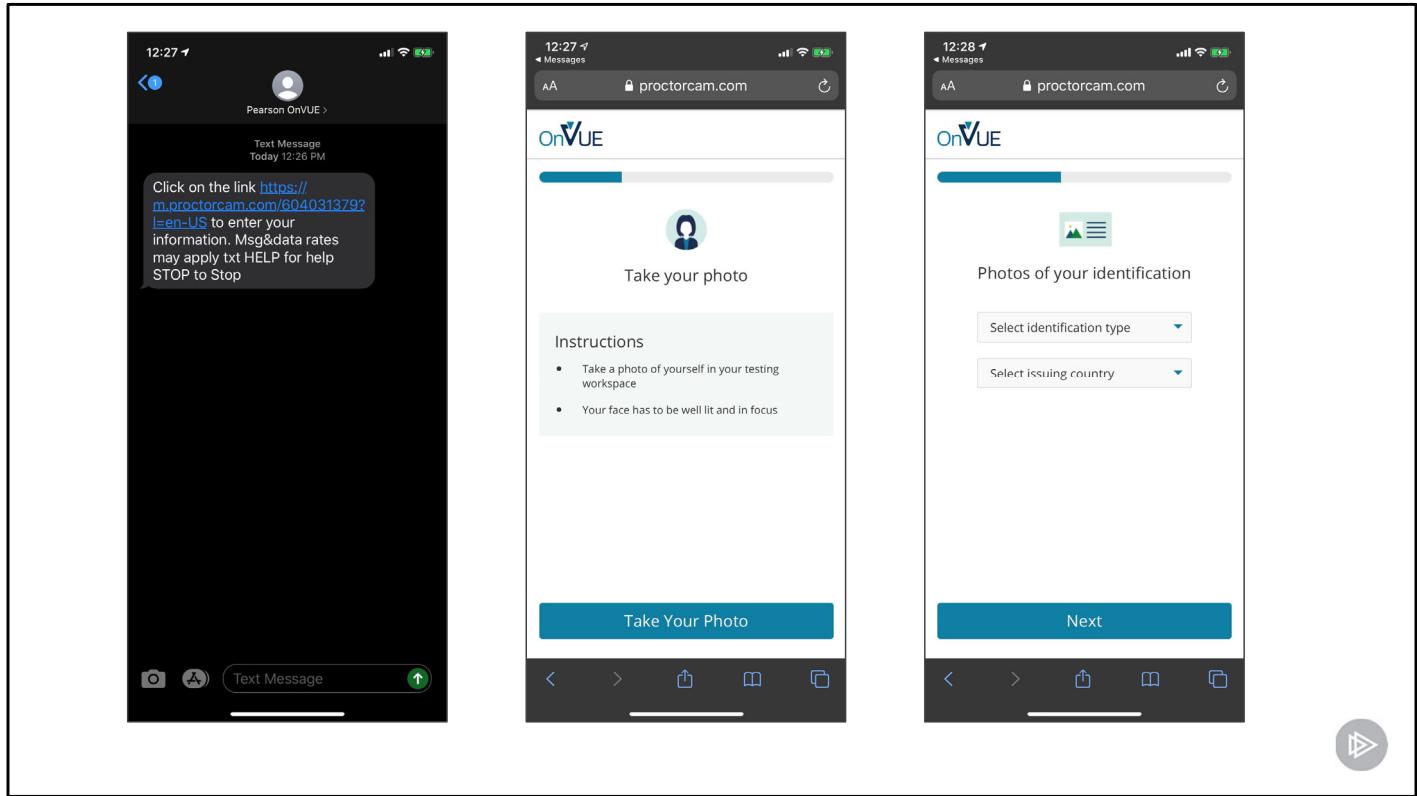


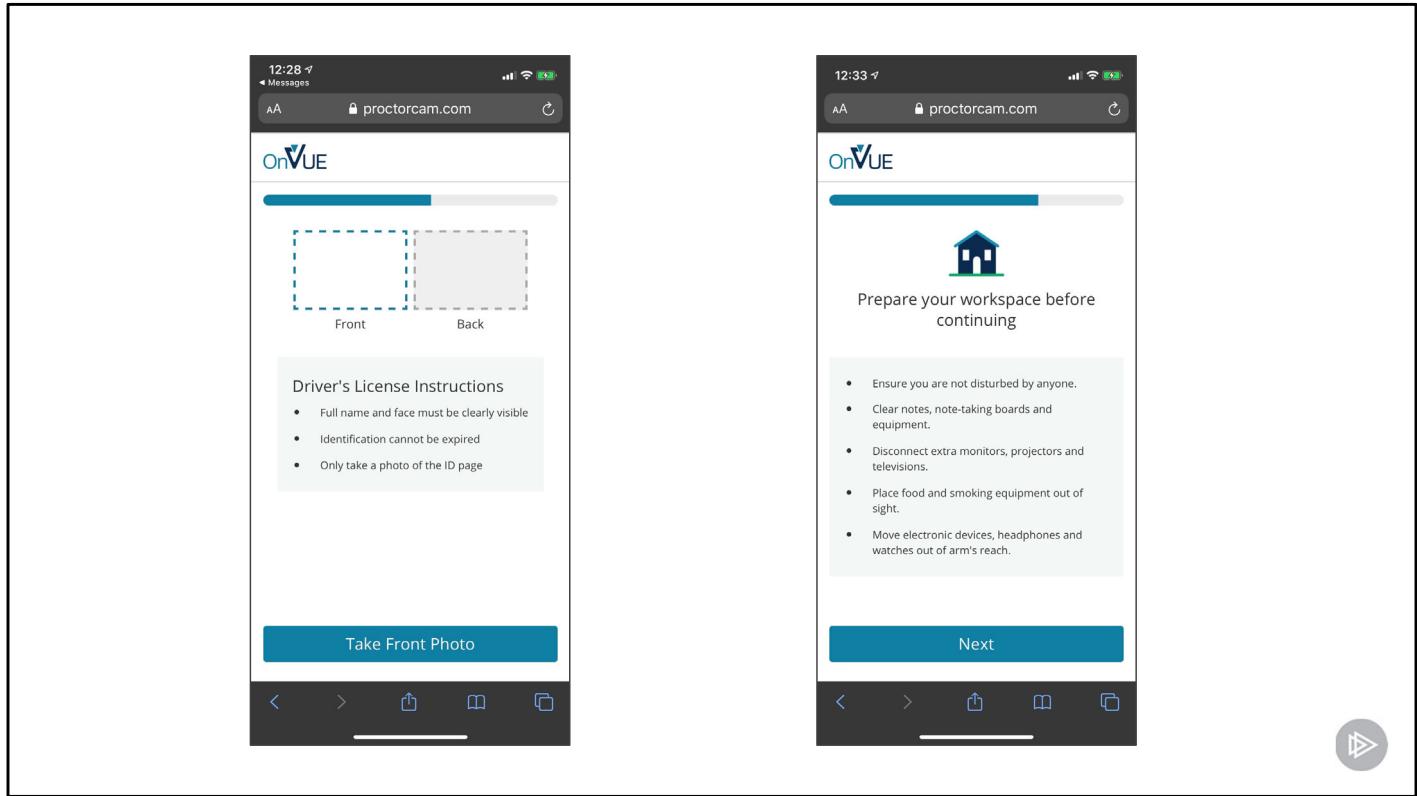


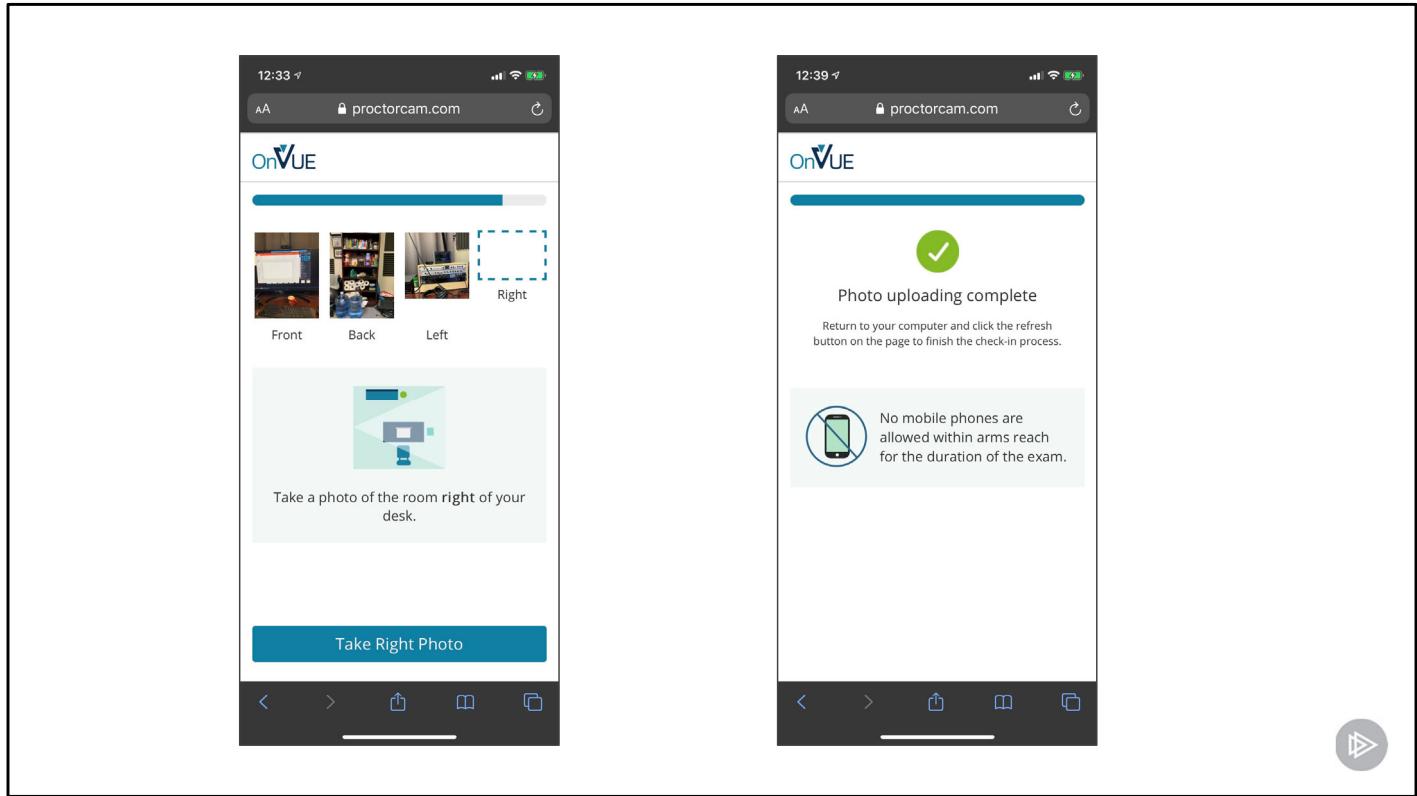


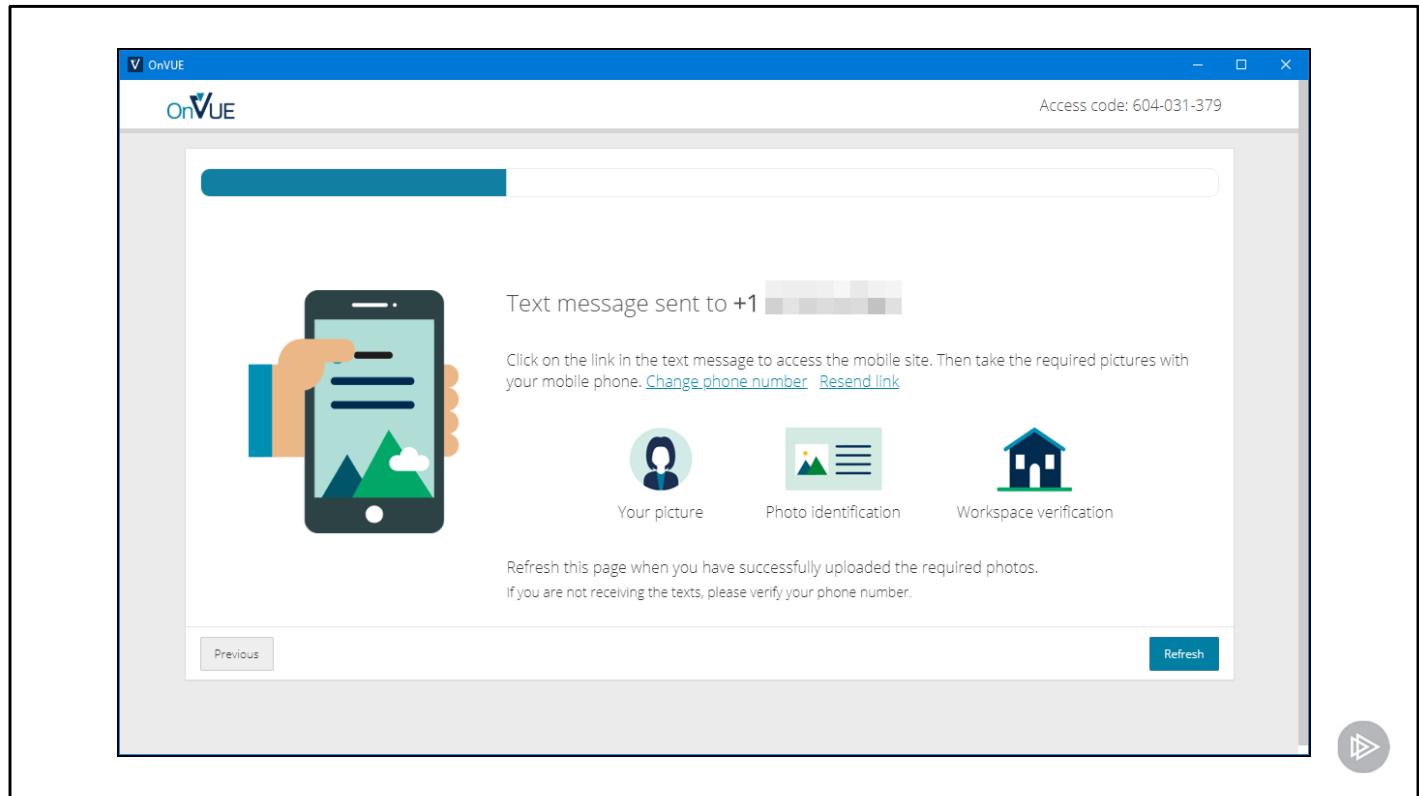












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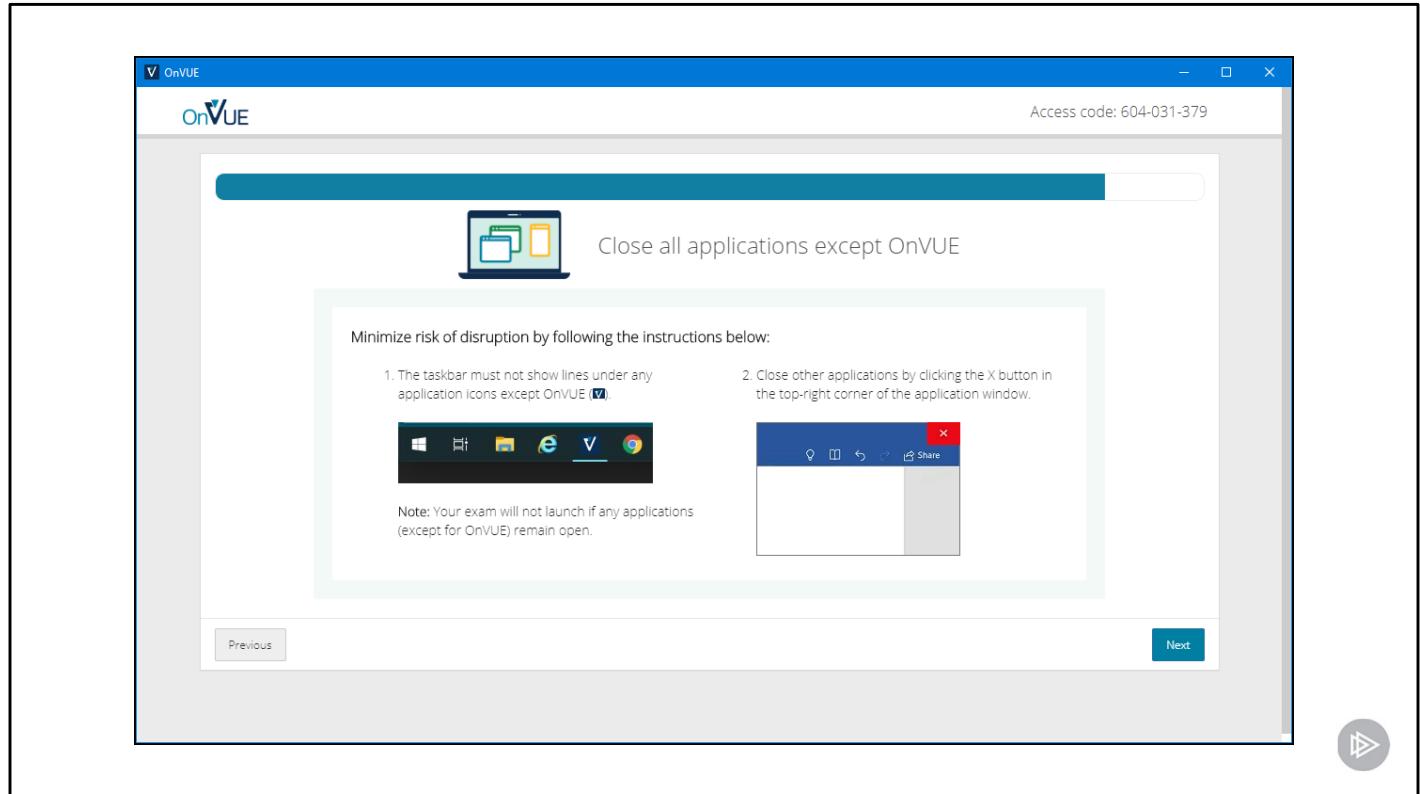
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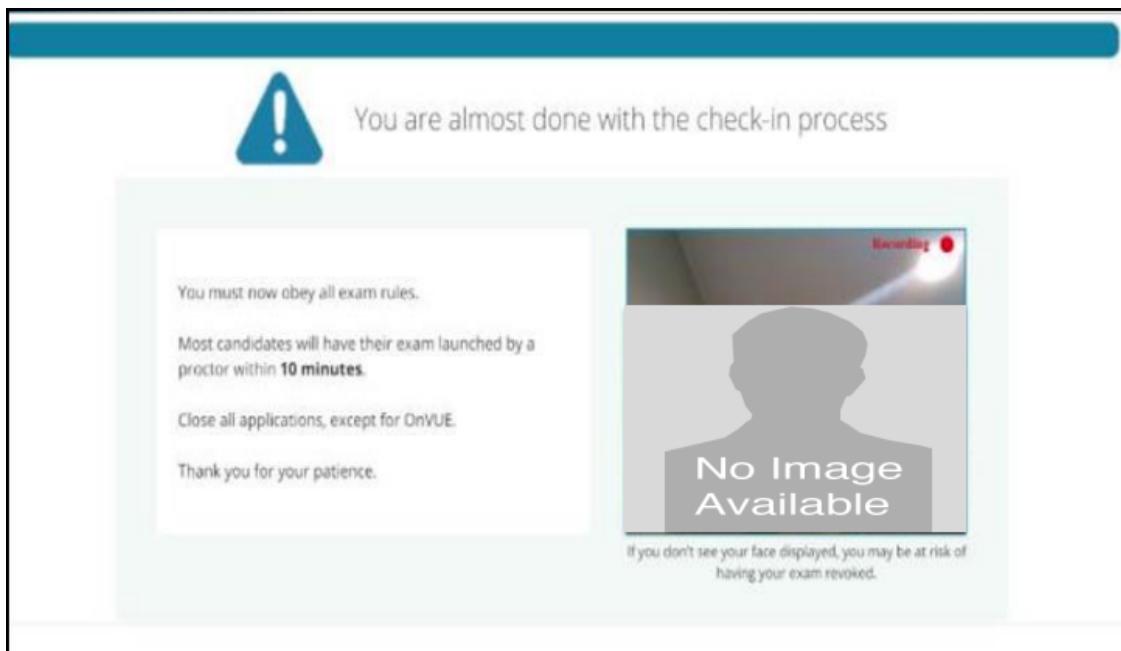
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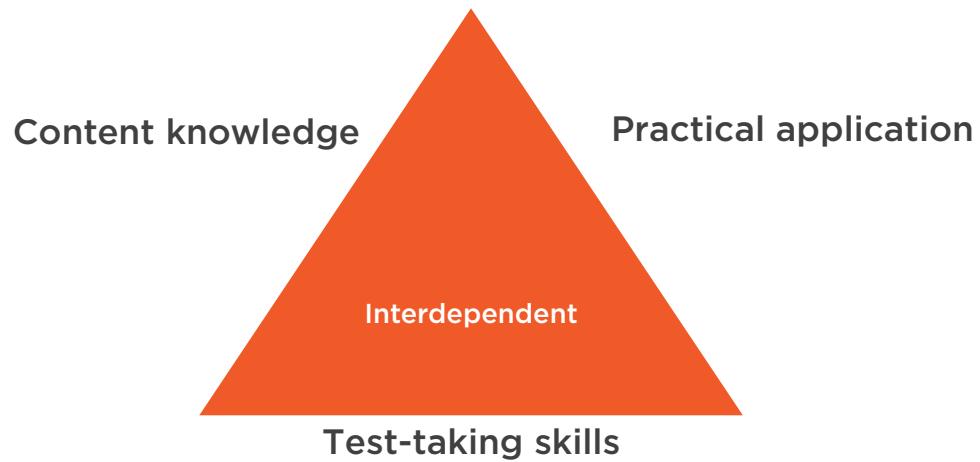
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**Skills**

Azure, Cloud Architecture, Cloud Computing, Cloud Data, Cloud Developer, Cloud Infrastructure, Cloud Networking, Cloud Platform, Cloud Security, Cloud Services, Cloud Storage, Cloud Technologies, Powershell, Virtualization

## Tim's Cert Study Pyramid



## Your marching orders

### Perform a self-appraisal

- What's your Azure specialty
- What's your theory/practice balance
- What's your best learning style

### Develop a study plan

- Make an OD outline
- Use MS Learn for hands-on practice
- Don't forget about practice exams

### Pass the exam

- Find a delivery method that works for you
- Be proactive and prepared (ID, etc)
- Breathe!



# Thanks so much!

- Instructor: Tim Warner
- Twitter: @TechTrainerTim
- Email: tim@techtrainertim.com

