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**70-534**

**Architecting Microsoft Azure Solutions**

**Version 6.0**

**Testlet 1**

**Overview**
VanArsdel, Ltd. builds skyscrapers, subways, and bridges. VanArsdel is a leader in using technology to do construction better.

**Overview**
VanArsdel employees are able to use their own mobile devices for work activities because the company recognizes that this usage enables employee productivity. Employees also access Software as a Service (SaaS) applications, including DocuSign, Dropbox, and Citrix. The company continues to evaluate and adopt more SaaS applications for its business. VanArsdel uses Azure Active Directory (AD) to authenticate its employees, as well as Multi-Factor Authentication (MFA). Management enjoys the ease with which MFA can be enabled and disabled for employees who use cloud-based services. VanArsdel's on-premises directory contains a single forest.

**Helpdesk:**
VanArsdel creates a helpdesk group to assist its employees. The company sends email messages to all its employees about the helpdesk group and how to contact it. Configuring employee access for SaaS applications is often a time-consuming task. It is not always obvious to the helpdesk group which users should be given access to which SaaS applications. The helpdesk group must respond to many phone calls and email messages to solve this problem, which takes up valuable time. The helpdesk group is unable to meet the needs of VanArsdel's employees.
However, many employees do not work with the helpdesk group to solve their access problems. Instead, these employees contact their co-workers or managers to find someone who can help them. Also, new employees are not always told to contact the helpdesk group for access problems. Some employees report that they cannot see all the applications in the Access Panel that they have access to. Some employees report that they must re-enter their passwords when they access cloud applications, even though they have already authenticated.

**Bring your own device (BYOD):**
VanArsdel wants to continue to support users and their mobile and personal devices, but the company is concerned about how to protect corporate assets that are stored on these devices. The company does not have a strategy to ensure that its data is removed from the devices when employees leave the company.

**Customer Support**
VanArsdel wants a mobile app for customer profile registration and feedback. The company would like to keep track of all its previous, current, and future customers worldwide. A profile system using third-party authentication is required as well as feedback and support sections for the mobile app.

**Migration:**
VanArsdel plans to migrate several virtual machine (VM) workloads into Azure. They also plan to extend their on-premises Active Directory into Azure for mobile app authentication.

**Business Requirements**

**Hybrid Solution:**
- A single account and credentials for both on-premises and cloud applications
- Certain applications that are hosted both in Azure and on-site must be accessible to both VanArsdel employees and partners
- The service level agreement (SLA) for the solution requires an uptime of 99.9%
- The partners all use Hotmail.com email addresses

**Mobile App:**
VanArsdel requires a mobile app for project managers on construction job sites. The mobile app has the following requirements:
- The app must display partner information.
- The app must alert project managers when changes to the partner information occur.
- The app must display project information including an image gallery to view pictures of construction projects.
- Project managers must be able to access the information remotely and securely.

**Security:**
- VanArsdel must control access to its resources to ensure sensitive services and information are accessible only by authorized users and/or managed devices.
- Employees must be able to securely share data, based on corporate policies, with other VanArsdel employees and with partners who are located on construction job sites.
- VanArsdel management does NOT want to create and manage user accounts for partners.

**Technical Requirements**

**Architecture:**
- VanArsdel requires a non-centralized stateless architecture fonts data and services where application, data, and computing power are at the logical extremes of the network.
- VanArsdel requires separation of CPU storage and SQL services

**Data Storage:**
VanArsdel needs a solution to reduce the number of operations on the contractor information table. Currently, data transfer rates are excessive, and queue length for read/write operations affects performance.
- A mobile service that is used to access contractor information must have automatically scalable, structured storage
- Images must be stored in an automatically scalable, unstructured form.

**Mobile Apps:**
- VanArsdel mobile app must authenticate employees to the company's Active Directory.
- Event-triggered alerts must be pushed to mobile apps by using a custom Node.js script.
- The customer support app should use an identity provider that is configured by using the Access Control Service for current profile registration and authentication.
- The customer support team will adopt future identity providers that are configured through Access Control Service.

**Security:**
- Active Directory Federated Server (AD FS) will be used to extend AD into Azure.
- Helpdesk administrators must have access to only the groups of Azure resources they are responsible for. Azure administration will be performed by a separate group.
- IT administrative overhead must be minimized.
- Permissions must be assigned by using Role Based Access Control (RBAC).
- Line of business applications must be accessed securely.

**QUESTION 1**
You need to assign permissions for the Virtual Machine workloads that you migrate to Azure.

The solution must use the principal of least privileges.

What should you do?

A. Create all VMs in the cloud service named Groupl and then connect to the Azure subscription. Run the following Windows PowerShell command:
New-AzureRoleAssignment -Mail user1@vanarsdelltd.com -RoleDefinitionName Contributor -ResourceGroupName group1
B. In the Azure portal, select an individual virtual machine and add an owner.
C. In the Azure portal, assign read permission to the user at the subscription level.
D. Create each VM in a separate cloud service and then connect to the Azure subscription. Run the following Windows PowerShell command:
Get-AzureVM | New-AzureRoleAssignment -Mail userl@vanarsdelltd.com -RoleDefinitionName Contributor

**Correct Answer:** A
**Section: [none]**
**Explanation**

**Explanation/Reference:**

* Scenario: Permissions must be assigned by using Role Based Access Control (RBAC).

* Role-Based access control (RBAC) in the Azure Portal and Azure Resource Management API allows you to manage access to your subscription at a fine-grained level. With this feature, you can grant access for Active Directory users, groups, or service principals by assigning some roles to them at a particular scope.

Create a role assignment
Use New-AzureRoleAssignment to create a role assignment.

Example: This will create a role assignment for a group at a resource group level.

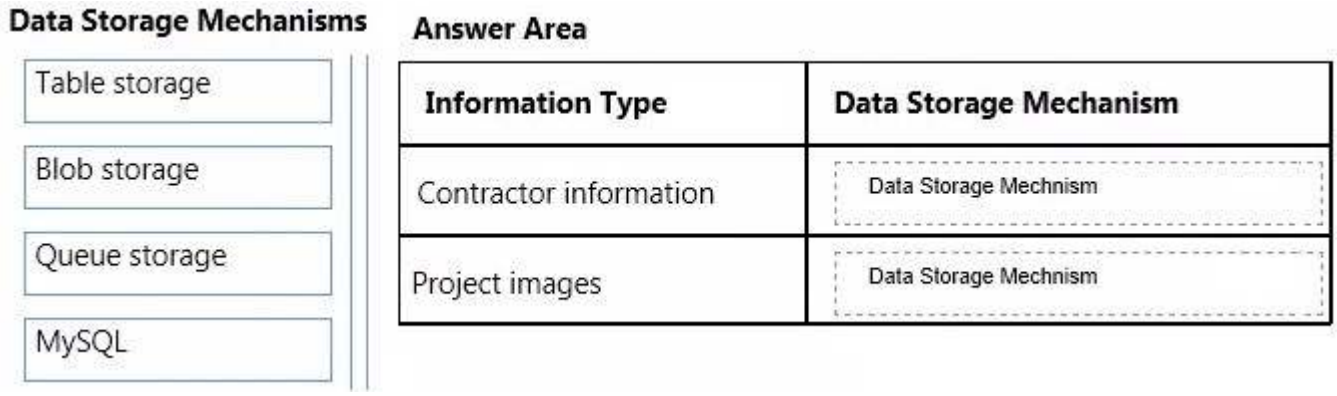
PS C:\> New-AzureRoleAssignment -ObjectID <group object ID> -RoleDefinitionName Reader -ResourceGroupName group1

Reference: Managing Role-Based Access Control with Windows PowerShell
https://azure.microsoft.com/en-gb/documentation/articles/role-based-access-control-powershell/

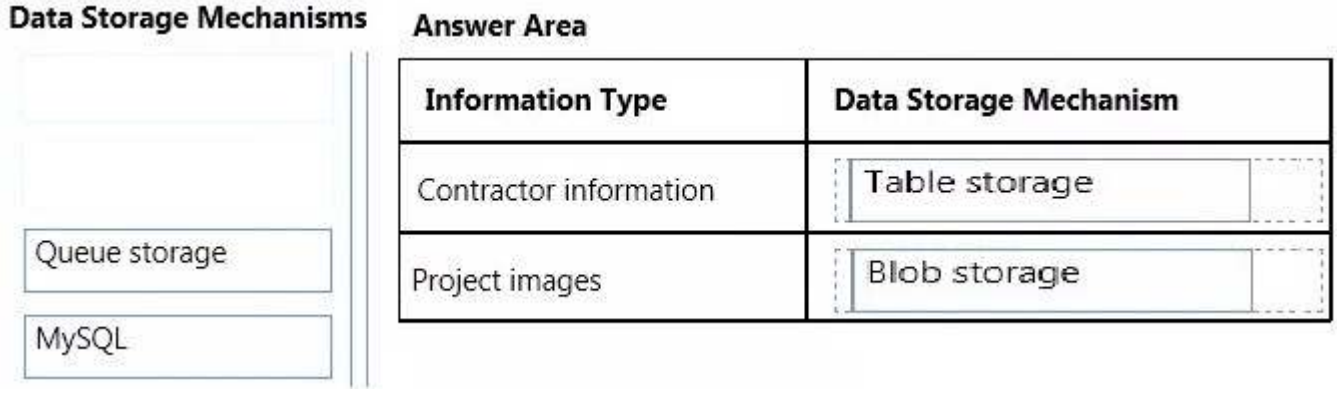
**QUESTION 2**
DRAG DROP
You need to recommend data storage mechanisms for the solution.

What should you recommend? To answer, drag the appropriate data storage mechanism to the correct information type. Each data storage mechanism 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.

**Select and Place:**




**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
* use Table storage for Contractor information
* Use Blob for Project Images
* Scenario: VanArsdel needs a solution to reduce the number of operations on the contractor information table. Currently, data transfer rates are excessive, and queue length for read/write operations affects performance.
/ A mobile service that is used to access contractor information must have automatically scalable, structured storage
/ Images must be stored in an automatically scalable, unstructured form.

Note: Blob is an acronym for Binary Large object. Basically Blob is a sequence of bytes – just what an application needs. Blob can hold audio, video, email messages, archived files, zip files or a word processing document in a very general way.

Reference: Understanding Blob,Queue,Table storage in Windows Azure
http://www.thewindowsclub.com/understanding-blobqueuetable-storage-windows-azure

**QUESTION 3**
You need to design the system that alerts project managers to data changes in the contractor information app.

Which service should you use?

A. Azure Mobile Service
B. Azure Service Bus Message Queueing
C. Azure Queue Messaging
D. Azure Notification Hub

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario:
/ Mobile Apps: Event-triggered alerts must be pushed to mobile apps by using a custom Node.js script.
/ The service level agreement (SLA) for the solution requires an uptime of 99.9%

* If you are already using Azure Storage Blobs or Tables and you start using queues, you are guaranteed 99.9% availability. If you use Blobs or Tables with Service Bus queues, you will have lower availability.

Note: Microsoft Azure supports two types of queue mechanisms: Azure Queues and Service Bus Queues.
/ Azure Queues, which are part of the Azure storage infrastructure, feature a simple REST-based Get/Put/Peek interface, providing reliable, persistent messaging within and between services.
/ Service Bus queues are part of a broader Azure messaging infrastructure that supports queuing as well as publish/subscribe, Web service remoting, and integration patterns.

Reference: Azure Queues and Service Bus Queues - Compared and Contrasted
https://msdn.microsoft.com/en-us/library/azure/hh767287.aspx

**QUESTION 4**
You need to recommend a solution that allows partners to authenticate.

Which solution should you recommend?

A. Configure the federation provider to trust social identity providers.
B. Configure the federation provider to use the Azure Access Control service.
C. Create a new directory in Azure Active Directory and create a user account for the partner.
D. Create an account on the VanArsdel domain for the partner and send an email message that contains the

password to the partner.

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario: The partners all use Hotmail.com email addresses.

* In Microsoft Azure Active Directory Access Control (also known as Access Control Service or ACS), an identity provider is a service that authenticates user or client identities and issues security tokens that ACS consumes.
The ACS Management Portal provides built-in support for configuring Windows Live ID as an ACS Identity Provider.

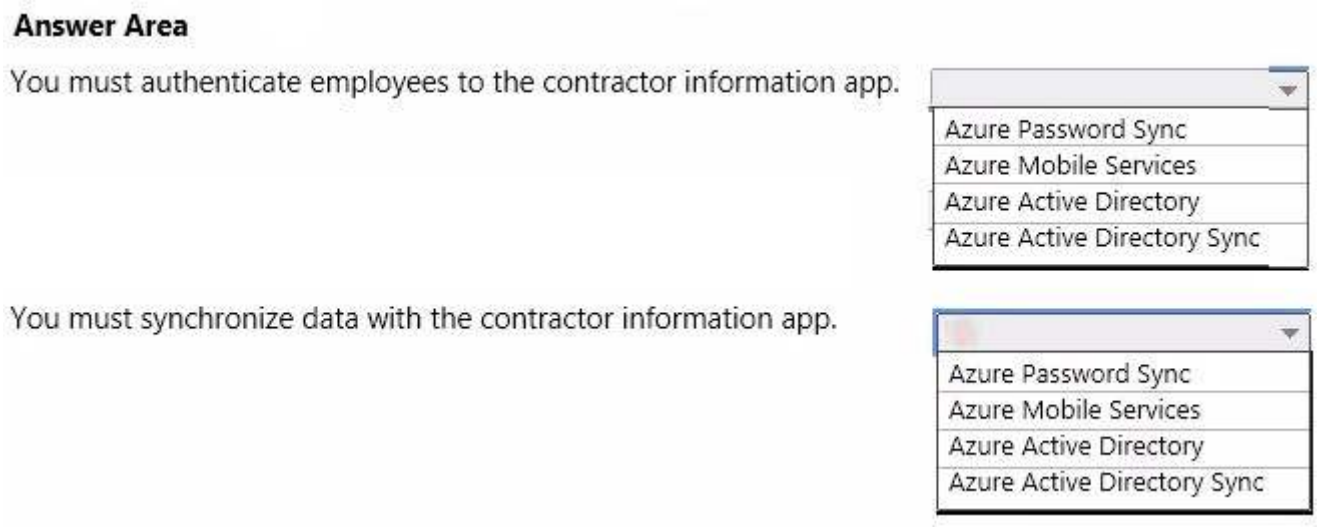
Incorrect:
Not C, not D: Scenario: VanArsdel management does NOT want to create and manage user accounts for partners.

Reference: Identity Providers
https://msdn.microsoft.com/en-us/library/azure/gg185971.aspx

**QUESTION 5**
HOTSPOT
You need to design the contractor information app.

What should you recommend? To answer, select the appropriate options in the answer area.

**Hot Area:**




**Correct Answer:**

**Answer Area**

You must authenticate employees to the contractor information app.


You must synchronize data with the contractor information app.


**Section: [none]**
**Explanation**

**Explanation/Reference:**
/ They also plan to extend their on-premises Active Directory into Azure for mobile app authentication
/ VanArsdel mobile app must authenticate employees to the company's Active Directory.

Reference: Get Started with Offline Data Sync in Mobile Services
http://azure.microsoft.com/en-gb/documentation/articles/mobile-services-ios-get-started-offline-data/

**QUESTION 6**
You are designing a plan to deploy a new application to Azure. The solution must provide a single sign-on experience for users.

You need to recommend an authentication type.

Which authentication type should you recommend?

A. SAML credential tokens
B. Azure managed access keys
C. Windows Authentication
D. MS-CHAP

**Correct Answer:** A
**Section: [none]**
**Explanation**

**Explanation/Reference:**
A Microsoft cloud service administrator who wants to provide their Azure Active Directory (AD) users with sign-on validation can use a SAML 2.0 compliant SP-Lite profile based Identity Provider as their preferred Security Token Service (STS) / identity provider. This is useful where the solution implementer already has a user directory and password store on-premises that can be accessed using SAML 2.0. This existing user directory can be used for sign-on to Office 365 and other Azure AD-secured resources.

Reference: Use a SAML 2.0 identity provider to implement single sign-on
https://msdn.microsoft.com/en-us/library/azure/dn641269.aspx?f=255&MSPPError=-2147217396

**QUESTION 7**
You need to prepare the implementation of data storage for the contractor information app.

What should you?

A. Create a storage account and implement multiple data partitions.
B. Create a Cloud Service and a Mobile Service. Implement Entity Group transactions.
C. Create a Cloud Service and a Deployment group. Implement Entity Group transactions.
D. Create a Deployment group and a Mobile Service. Implement multiple data partitions.

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Explanation:
* Scenario:
/ VanArsdel needs a solution to reduce the number of operations on the contractor information table. Currently, data transfer rates are excessive, and queue length for read/write operations affects performance.
/ A mobile service that is used to access contractor information must have automatically scalable, structured storage

* The basic unit of deployment and scale in Azure is the Cloud Service.

Reference: Performing Entity Group Transactions
https://msdn.microsoft.com/en-us/library/azure/dd894038.aspx

**QUESTION 8**
You need to ensure that users do not need to re-enter their passwords after they authenticate to cloud applications for the first time.

What should you do?

A. Enable Microsoft Account authentication.
B. Set up a virtual private network (VPN) connection between the VanArsdel premises and Azure datacenter. Set up a Windows Active Directory domain controller in Azure VM. Implement Integrated Windows authentication.
C. Deploy ExpressRoute.
D. Configure Azure Active Directory Sync to use single sign-on (SSO).

**Correct Answer:** D
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Single sign-on (SSO) is a property of access control of multiple related, but independent software systems. With this property a user logs in once and gains access to all systems without being prompted to log in again at each of them.

Reference: http://en.wikipedia.org/wiki/Single_sign-on

**Testlet 1**

**Background**
**Overview**
Trey Research conducts agricultural research and sells the results to the agriculture and food industries. The company uses a combination of on-premises and third-party server clusters to meet its storage needs. Trey Research has seasonal demands on its services, with up to 50 percent drops in data capacity and bandwidth demand during low-demand periods. They plan to host their websites in an agile, cloud environment where the company can deploy and remove its websites based on its business requirements rather than the requirements of the hosting company.
A recent fire near the datacenter that Trey Research uses raises the management team's awareness of the vulnerability of hosting all of the company's websites and data at any single location. The management team is concerned about protecting its data from loss as a result of a disaster.

**Websites**
Trey Research has a portfolio of 300 websites and associated background processes that are currently hosted in a third-party datacenter. All of the websites are written in ASP.NET, and the background processes use Windows Services. The hosting environment costs Trey Research approximately S25 million in hosting and maintenance fees.

**Infrastructure**
Trey Research also has on-premises servers that run VMs to support line-of-business applications. The company wants to migrate the line-of-business applications to the cloud, one application at a time. The company is migrating most of its production VMs from an aging VMWare ESXi farm to a Hyper-V cluster that runs on Windows Server 2012.

**Applications**

**DistributionTracking**
Trey Research has a web application named Distributiontracking. This application constantly collects realtime data that tracks worldwide distribution points to customer retail sites. This data is available to customers at all times.
The company wants to ensure that the distribution tracking data is stored at a location that is geographically close to the customers who will be using the information. The system must continue running in the event of VM failures without corrupting data. The system is processor intensive and should be run in a multithreading environment.

**HRApp**
The company has a human resources (HR) application named HRApp that stores data in an on-premises SQL Server database. The database must have at least two copies, but data to support backups and business continuity must stay in Trey Research locations only. The data must remain on-premises and cannot be stored in the cloud.

HRApp was written by a third party, and the code cannot be modified. The human resources data is used by all business offices, and each office requires access to the entire database. Users report that HRApp takes all night to generate the required payroll reports, and they would like to reduce this time.

**MetricsTracking**
Trey Research has an application named MetricsTracking that is used to track analytics for the DistributionTracking web application. The data MetricsTracking collects is not customer-facing. Data is stored on an on-premises SQL Server database, but this data should be moved to the cloud. Employees at other locations access this data by using a remote desktop connection to connect to the application, but latency issues degrade the functionality.

Trey Research wants a solution that allows remote employees to access metrics data without using a remote desktop connection. MetricsTracking was written in-house, and the development team is available to make modifications to the application if necessary. However, the company wants to continue to use SQL Server for MetricsTracking.

**Business Requirements**

**Business Continuity**
You have the following requirements:
- Move all customer-facing data to the cloud.
- Web servers should be backed up to geographically separate locations,
- If one website becomes unavailable, customers should automatically be routed to websites that are still operational.
- Data must be available regardless of the operational status of any particular website.
- The HRApp system must remain on-premises and must be backed up.
- The MetricsTracking data must be replicated so that it is locally available to all Trey Research offices.

**Auditing and Security**
You have the following requirements:
- Both internal and external consumers should be able to access research results.
- Internal users should be able to access data by using their existing company credentials without requiring multiple logins.
- Consumers should be able to access the service by using their Microsoft credentials.
- Applications written to access the data must be authenticated.
- Access and activity must be monitored and audited.
- Ensure the security and integrity of the data collected from the worldwide distribution points for the distribution tracking application.

**Storage and Processing**
You have the following requirements:
- Provide real-time analysis of distribution tracking data by geographic location.
- Collect and store large datasets in real-time data for customer use.
- Locate the distribution tracking data as close to the central office as possible to improve bandwidth.
- Co-locate the distribution tracking data as close to the customer as possible based on the customer's location.
- Distribution tracking data must be stored in the JSON format and indexed by metadata that is stored in a SQL Server database.
- Data in the cloud must be stored in geographically separate locations, but kept with the same political boundaries.

**Technical Requirements**

**Migration**
You have the following requirements:
- Deploy all websites to Azure.
- Replace on-premises and third-party physical server clusters with cloud-based solutions.
- Optimize the speed for retrieving exiting JSON objects that contain the distribution tracking data.
- Recommend strategies for partitioning data for load balancing.

**Auditing and Security**
You have the following requirements:
- Use Active Directory for internal and external authentication.
- Use OAuth for application authentication.

**Business Continuity**
You have the following requirements:
- Data must be backed up to separate geographic locations.
- Web servers must run concurrent versions of all websites in distinct geographic locations.
- Use Azure to back up the on-premises MetricsTracking data.
- Use Azure virtual machines as a recovery platform for MetricsTracking and HRApp.
- Ensure that there is at least one additional on-premises recovery environment for the HRApp.

**QUESTION 1**
DRAG DROP
You need to ensure that customer data is secured both in transit and at rest.

Which technologies should you recommend? To answer, drag the appropriate technology to the correct security requirement. Each technology 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.

**Select and Place:**

**Technologies**

- Transparent Data Encryption
- TLS/SSL
- PGP key
- Service Bus
- Azure Rights Management service
- Azure Import/Export service

**Answer Area**

| Security requirement | Tec |
|---|---|
| Customer connections to the website or from the mobile app | |
| SQL Server data migration for large datasets | |
| Encryption management for data based on key exchanges between servers | |

**Correct Answer:**

**Technologies**

- PGP key
- Service Bus
- Azure Import/Export service

**Answer Area**

| Security requirement | Tec |
|---|---|
| Customer connections to the website or from the mobile app | Azure Rig |
| SQL Server data migration for large datasets | Transpare |
| Encryption management for data based on key exchanges between servers | TLS/SSL |

**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Azure Rights Management service
Azure Rights Management service uses encryption, identity, and authorization policies to help secure your files and email, and it works across multiple devices—phones, tablets, and PCs. Information can be protected both within your organization and outside your organization because that protection remains with the data, even when it leaves your organization's boundaries.
* Transparent Data Encryption
Transparent Data Encryption (often abbreviated to TDE) is a technology employed by both Microsoft and Oracle to encrypt database files. TDE offers encryption at file level. TDE solves the problem of protecting data

at rest, encrypting databases both on the hard drive and consequently on backup media.

* TLS/SSL
Transport Layer Security (TLS) and its predecessor, Secure Sockets Layer (SSL), are cryptographic protocols designed to provide communications security over a computer network. They use X.509 certificates and hence asymmetric cryptography to authenticate the counterparty with whom they are communicating, and to negotiate a symmetric key.

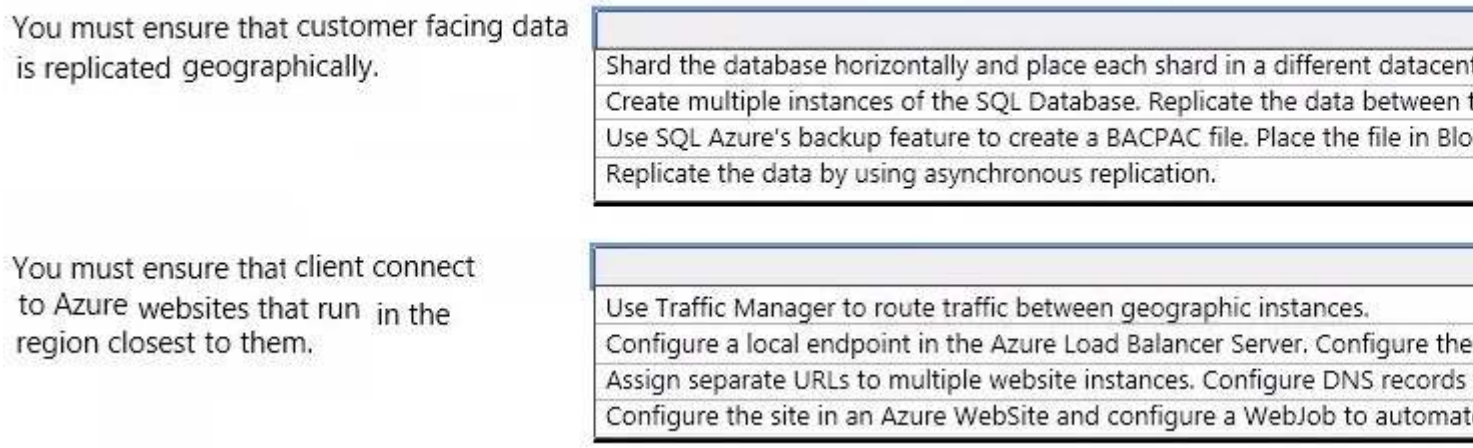
Reference: How Applications Support Azure Rights Management
https://technet.microsoft.com/en-us/library/jj585004.aspx
Reference: http://en.wikipedia.org/wiki/Transparent_Data_Encryption
Reference: http://en.wikipedia.org/wiki/Transport_Layer_Security

**QUESTION 2**
HOTSPOT
You need to plan the business continuity strategy.

For each requirement, what should you recommend? To answer, select the appropriate option from each list in the answer area.

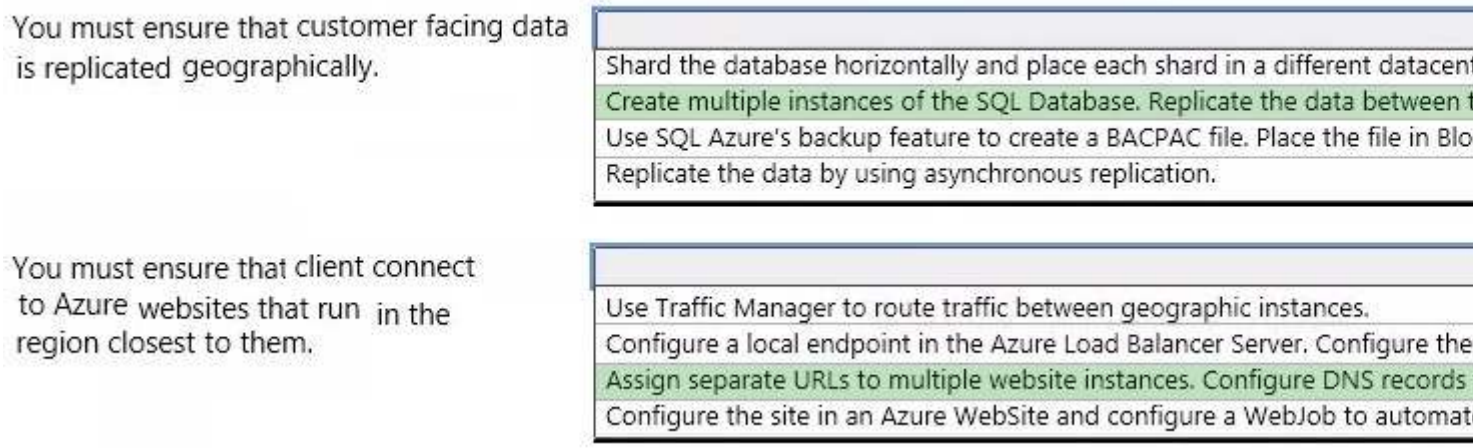
**Hot Area:**

**Answer Area**




**Correct Answer:**

**Answer Area**




**Section: [none]**

**Explanation**

**Explanation/Reference:**

**QUESTION 3**
HOTSPOT
You need to design a data storage strategy for each application.

In the table below, identify the strategy that you should use for each application. Make only one selection in each column.

**Hot Area:**

| Strategy | Human Resources Application | Metrics Application |
|---|---|---|
| Create separate SQL databases on individual virtual machines and partition appropriately. | ○ | ○ |
| Migrate the existing SQL database to a larger virtual machine. | ○ | ○ |
| Migrate the existing data to Azure table storage in the cloud. | ○ | ○ |

**Correct Answer:**

| Strategy | Human Resources Application | Metrics Application |
|---|---|---|
| Create separate SQL databases on individual virtual machines and partition appropriately. | ● | ○ |
| Migrate the existing SQL database to a larger virtual machine. | ○ | ○ |
| Migrate the existing data to Azure table storage in the cloud. | ○ | ● |

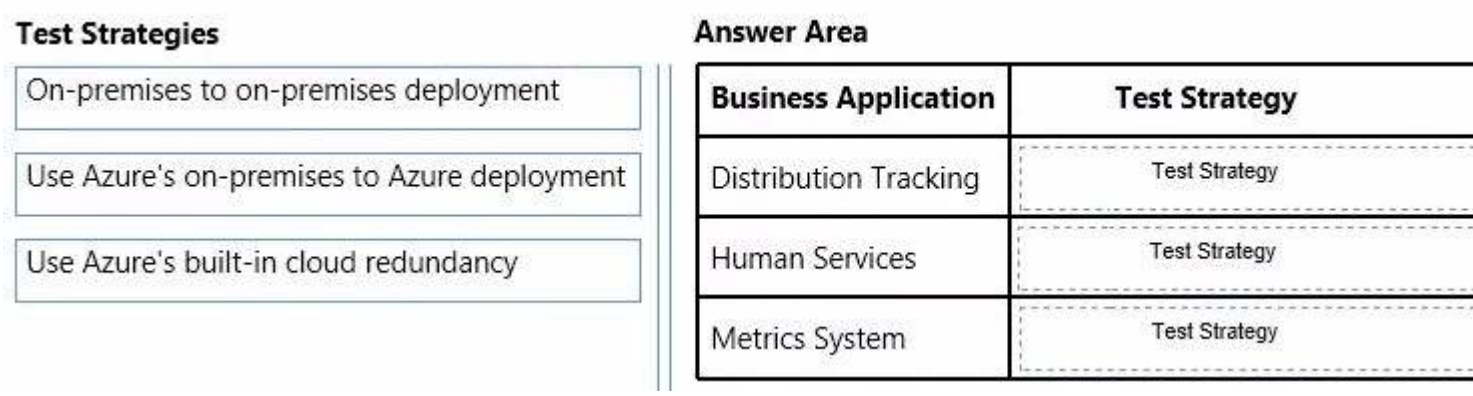
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario:
/ HRApp
The company has a human resources (HR) application named HRApp that stores data in an on-premises SQL Server database.
The data must remain on-premises and cannot be stored in the cloud.
The human resources data is used by all business offices, and each office requires access to the entire database.
/ Metrics application
Data is stored on an on-premises SQL Server database, but this data should be moved to the cloud.

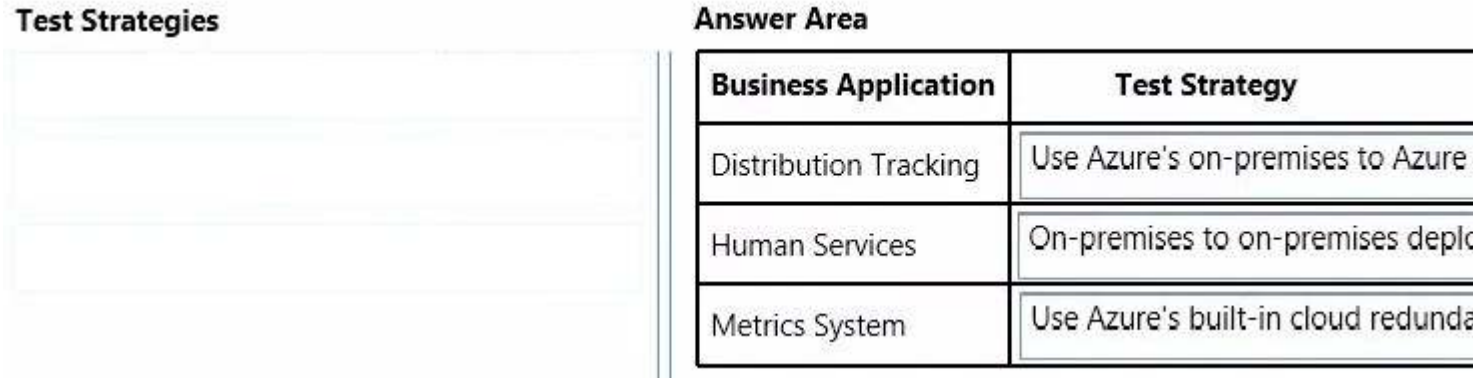
**QUESTION 4**
DRAG DROP
You need to recommend a test strategy for the disaster recovery system.

What should you do? To answer, drag the appropriate test strategy to the correct business application. Each test strategy 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.

**Select and Place:**




**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Distribution tracking
The company wants to ensure that the distribution tracking data is stored at a location that is geographically close to the customers who will be using the information.
* / HRApp
The data must remain on-premises and cannot be stored in the cloud.

* / Metrics application
Data is stored on an on-premises SQL Server database, but this data should be moved to the cloud.

**QUESTION 5**
You need to configure the distribution tracking application.

What should you do?

A. Map each role to a single upgrade domain to optimize resource utilization.
B. Design all services as stateless services.
C. Configure operations to queue when a role reaches its capacity.
D. Configure multiple worker roles to run on each virtual machine.

**Correct Answer:** D
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario: distribution tracking application
The system is processor intensive and should be run in a multithreading environment.

Reference: Running multiple workers inside one Windows Azure Worker Role
http://mark.mymonster.nl/2013/01/29/running-multiple-workers-inside-one-windows-azure-worker-role

**Testlet 1**

**Background**

**Overview**
Contoso, Ltd., manufactures and sells golf clubs and golf balls. Contoso also sells golf accessories under the Contoso Golf and Odyssey brands worldwide.

Most of the company's IT infrastructure is located in the company's Carlsbad, California, headquarters. Contoso also has a sizable third-party colocation datacenter that costs the company USD $30,000 to $40,000 a month. Contoso has other servers scattered around the United States.

Contoso, Ltd., has the following goals:
- Move many consumer-facing websites, enterprise databases, and enterprise web services to Azure.
- Improve the performance for customers and resellers who are access company websites from around the world.
- Provide support for provisioning resources to meet bursts of demand.
- Consolidate and improve the utilization of website- and database-hosting resources.
- Avoid downtime, particularly that caused by web and database server updating.
- Leverage familiarity with Microsoft server management tools.

**Infrastructure**
Contoso's datacenters are filled with dozens of smaller web servers and databases that run on under-utilized hardware. This creates issues for data backup. Contoso currently backs up data to tape by using System Center Data Protection Manager. System Center Operations Manager is not deployed in the enterprise.

All of the servers are expensive to acquire and maintain, and scaling the infrastructure takes significant time. Contoso conducts weekly server maintenance, which causes downtime for some of its global offices. Special events, such as high-profile golf tournaments, create a large increase in site traffic. Contoso has difficulty scaling the web-hosting environment fast enough to meet these surges in site traffic.

Contoso has resellers and consumers in Japan and China. These resellers must use applications that run in a datacenter that is located in the state of Texas, in the United States. Because of the physical distance, the resellers experience slow response times and downtime.

**Business Requirements**

**Management and Performance**

**Management**
- Web servers and databases must automatically apply updates to the operating system and products.
- Automatically monitor the health of worldwide sites, databases, and virtual machines.
- Automatically back up the website and databases.
- Manage hosted resources by using on-premises tools.

**Performance**
- The management team would like to centralize data backups and eliminate the use of tapes.
- The website must automatically scale without code changes or redeployment.
- Support changes in service tier without reconfiguration or redeployment.
- Site-hosting must automatically scale to accommodate data bandwidth and number of connections.
- Scale databases without requiring migration to a larger server.
- Migrate business critical applications to Azure.
- Migrate databases to the cloud and centralize databases where possible.

**Business Continuity and Support**

**Business Continuity**
- Minimize downtime in the event of regional disasters.
- Recover data if unintentional modifications or deletions are discovered.
- Run the website on multiple web server instances to minimize downtime and support a high service level

agreement (SLA).

**Connectivity**
- Allow enterprise web services to access data and other services located on-premises.
- Provide and monitor lowest latency possible to website visitors.
- Automatically balance traffic among all web servers.
- Provide secure transactions for users of both legacy and modern browsers.
- Provide automated auditing and reporting of web servers and databases.
- Support single sign-on from multiple domains.

**Development Environment**
You identify the following requirements for the development environment:
- Support the current development team's knowledge of Microsoft web development and SQL Service tools.
- Support building experimental applications by using data from the Azure deployment and on-premises data sources.
- Mitigate the need to purchase additional tools for monitoring and debugging.
- System designers and architects must be able to create custom Web APIs without requiring any coding.
- Support automatic website deployment from source control.
- Support automated build verification and testing to mitigate bugs introduced during builds.
- Manage website versions across all deployments.
- Ensure that website versions are consistent across all deployments.

**Technical Requirement**

**Management and Performance**

**Management**
- Use build automation to deploy directly from Visual Studio.
- Use build-time versioning of assets and builds/releases.
- Automate common IT tasks such as VM creation by using Windows PowerShell workflows.
- Use advanced monitoring features and reports of workloads in Azure by using existing Microsoft tools.

**Performance**
- Websites must automatically load balance across multiple servers to adapt to varying traffic.
- In production, websites must run on multiple instances.
- First-time published websites must be published by using Visual Studio and scaled to a single instance to test publishing.
- Data storage must support automatic load balancing across multiple servers.
- Websites must adapt to wide increases in traffic during special events.
- Azure virtual machines (VMs) must be created in the same datacenter when applicable.

**Business Continuity and Support**

**Business Continuity**
- Automatically co-locate data and applications in different geographic locations.
- Provide real-time reporting of changes to critical data and binaries.
- Provide real-time alerts of security exceptions.
- Unwanted deletions or modifications of data must be reversible for up to one month, especially in business critical applications and databases.
- Any cloud-hosted servers must be highly available.

**Enterprise Support**
- The solution must use stored procedures to access on-premises SQL Server data from Azure.
- A debugger must automatically attach to websites on a weekly basis. The scripts that handle the configuration and setup of debugging cannot work if there is a delay in attaching the debugger.

**QUESTION 1**
DRAG DROP
You need to deploy the virtual machines to Azure.

Which four Azure PowerShell scripts should you run in sequence? To answer, move the appropriate scripts from the list of scripts to the answer area and arrange them in the correct order.

**Select and Place:**

| Scripts | Answer Area |
| --- | --- |
| New-AzureStorageContainer $ContainerName -Permission Container | |
| New-AzureStorageAccount -StorageAccountName $StorageAccountName -AffinityGroup $AffinityGroup | |
| New-AzureResourceGroup –Name $Name –Location $Location –TemplateFile $TemplateJSONFile –TemplateParameterFile $ParmsJSONFile | |
| Add-AzureWorkerRole MyWorkerRole -I 2 | |
| $AffinityGroup = New-AzureAffinityGroup -Name $Name -Location $Location -Description<br>New-AzureResourceGroup –Name $Name –Location $Location –TemplateFile $TemplateJSONFile –TemplateParameterFile $ParmsJSONFile | |
| $newVM = New-AzureVMConfig -name $vmname -InstanceSize $instancesize -ImageName $winimage \| Add-AzureProvisioningConfig -Windows -AdminUsername $adminname -Password $adminpassword<br><br>New-AzureVM -ServiceName $Name -Location $Location -VMs $newVM -VNetName $vnet -WaitForBoot | |

**Correct Answer:**

**Scripts**

New-AzureResourceGroup –Name $Name –Location $Location –TemplateFile $TemplateJSONFile –TemplateParameterFile $ParmsJSONFile

Add-AzureWorkerRole MyWorkerRole -I 2

**Answer Area**

$AffinityGroup = New-AzureAffinityGroup -Name $Name -Location $Location -Description

New-AzureResourceGroup –Name $Name –Location $Location –TemplateFile $TemplateJSONFile –TemplateParameterFile $ParmsJSONFile

New-AzureStorageAccount -StorageAccountName $StorageAccountName -AffinityGroup $AffinityGroup

New-AzureStorageContainer $ContainerName -Permission Container

$newVM = New-AzureVMConfig -name $vmname -InstanceSize $instancesize -ImageName $winimage | Add-AzureProvisioningConfig -Windows -AdminUsername $adminname -Password $adminpassword

New-AzureVM -ServiceName $Name -Location $Location -VMs $newVM -VNetName $vnet -WaitForBoot

**Section: [none]**
**Explanation**

**Explanation/Reference:**
Note:
* In order to upload a VHD file to Azure, we need :
1. Azure PowerShell SDK
2. A publish setting file
3. An affinity group
4. A Storage account
5. A container

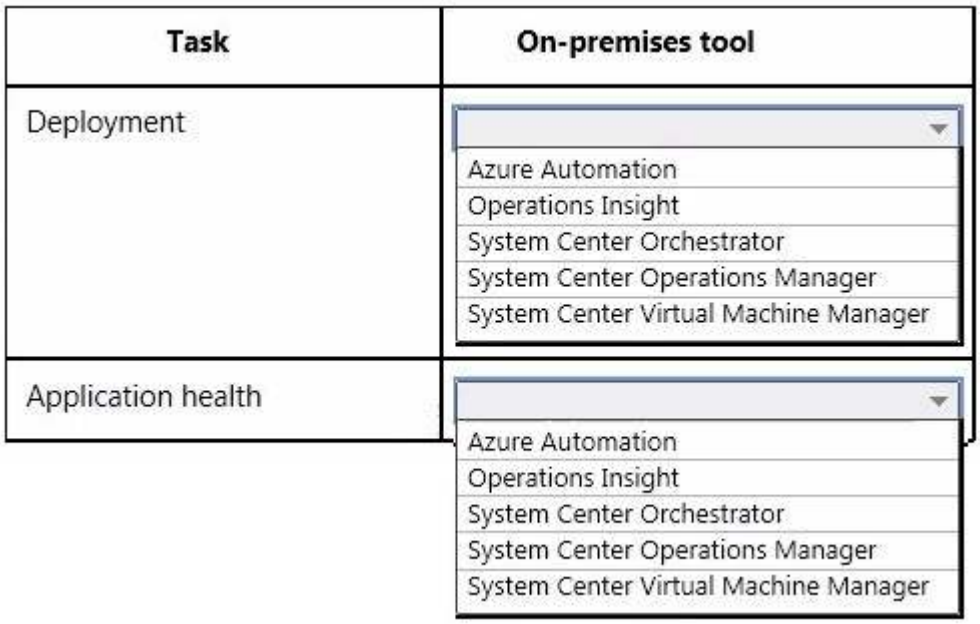
Incorrect answers:
* Add-AzureWorkerRole creates required files and configuration (sometimes referred to as scaffolding) for a custom worker role.

Reference: Deploy a custom Windows VHD in Azure with PowerShell and validate with Pester
http://pwrshell.net/deploy-a-custom-windows-vhd-in-azure-with-powershell-and-validate-with-pester/

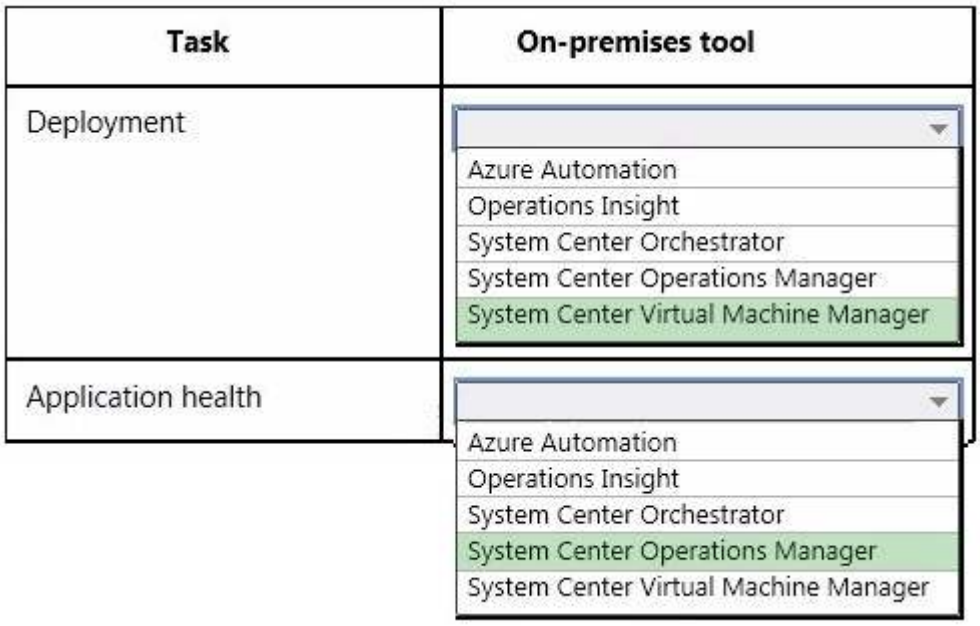
**QUESTION 2**
HOTSPOT
You need implement tools at the client's location for monitoring and deploying Azure resources.

Which tools should you use? To answer, select the appropriate on-premises tool for each task in the answer area.

**Hot Area:**




**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
* System Center Virtual Machine Manager (SCVMM) enables rapid provisioning of new virtual machines by the administrator and end users using a self-service provisioning tool.

* System Center Operations Manager (SCOM) is a cross-platform data center management system for operating systems and hypervisors. It uses a single interface that shows state, health and performance information of computer systems. It also provides alerts generated according to some availability, performance, configuration or security situation being identified.
The basic idea is to place a piece of software, an agent, on the computer to be monitored. The agent watches several sources on that computer, including the Windows Event Log, for specific events or alerts generated by the applications executing on the monitored computer.

* Scenario:
Leverage familiarity with Microsoft server management tools.
Manage hosted resources by using on-premises tools.
Mitigate the need to purchase additional tools for monitoring and debugging.
Use advanced monitoring features and reports of workloads in Azure by using existing Microsoft tools.

Reference: http://en.wikipedia.org/wiki/System_Center_Operations_Manager

**QUESTION 3**
You need to configure availability for the virtual machines that the company is migrating to Azure.

What should you implement?

A. Traffic Manager
B. Express Route
C. Update Domains
D. Cloud Services

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
ExpressRoute gives you a fast and reliable connection to Azure making it suitable for scenarios like periodic data migration, replication for business continuity, disaster recovery and other high availability strategies. It can also be a cost-effective option for transferring large amounts of data such as datasets for high performance computing applications or moving large VMs between your dev/test environment in Azure and on-premises production environment.

Reference: ExpressRoute, Experience a faster, private connection to Azure
http://azure.microsoft.com/en-us/services/expressroute/

**QUESTION 4**
DRAG DROP
You need to recommend network connectivity solutions for the experimental applications.

What should you recommend? To answer, drag the appropriate solution to the correct network connection requirements. Each solution 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.

**Select and Place:**

**Solutions**

- ExpressRoute
- point-to-site VPN
- site-to-site VPN

**Answer Area**

| Network connection requirements | Solution |
|---|---|
| A dedicated connection between one on-premises location and its development environment within Azure | Solution |
| Encrypted Internet connection between one developer's server and the development environment within Azure | Solution |
| Encrypted Internet connection between one on-premises location and its development environment within Azure | Solution |
| Most secure, highest bandwidth, lowest latency option for connecting an on-premises network to Azure | Solution |

**Correct Answer:**

**Solutions**

ExpressRoute

point-to-site VPN

site-to-site VPN

**Answer Area**

| Network connection requirements | Solution |
|---|---|
| A dedicated connection between one on-premises location and its development environment within Azure | ExpressRoute |
| Encrypted Internet connection between one developer's server and the development environment within Azure | point-to-site VPN |
| Encrypted Internet connection between one on-premises location and its development environment within Azure | point-to-site VPN |
| Most secure, highest bandwidth, lowest latency option for connecting an on-premises network to Azure | site-to-site VPN |

**Section: [none]**
**Explanation**

**Explanation/Reference:**
Box 1: ExpressRoute
ExpressRoute gives you a fast and reliable connection to Azure making it suitable for scenarios like periodic data migration, replication for business continuity, disaster recovery and other high availability strategies. It can also be a cost-effective option for transferring large amounts of data such as datasets for high performance computing applications or moving large VMs between your dev/test environment in Azure and on-premises production environment.

Box 2: point-to-site VPN
Box 3: point-to-site VPN
A point-to-site VPN also allows you to create a secure connection to your virtual network. In a point-to-site configuration, the connection is configured individually on each client computer that you want to connect to the virtual network
Box 4: site-to-site VPN
A site-to-site VPN allows you to create a secure connection between your on-premises site and your virtual network. To create a site-to-site connection, a VPN device that is located on your on-premises network is configured to create a secure connection with the Azure Virtual Network Gateway. Once the connection is created, resources on your local network and resources located in your virtual network can communicate directly and securely. Site-to-site connections do not require you to establish a separate connection for each client computer on your local network to access resources in the virtual network.

* Scenario: Support building experimental applications by using data from the Azure deployment and on-premises data sources.

Reference: ExpressRoute, Experience a faster, private connection to Azure
http://azure.microsoft.com/en-us/services/expressroute/

**QUESTION 5**
You need to recommend a solution for publishing one of the company websites to Azure and configuring it for remote debugging.

Which two actions should you perform? Each correct answer presents part of the solution.

A. From Visual Studio, attach the debugger to the solution.
B. Set the application logging level to Verbose and enable logging.
C. Set the Web Server logging level to Information and enable logging.
D. Set the Web Server logging level to Verbose and enable logging.
E. From Visual Studio, configure the site to enable Debugger Attaching and then publish the site.

**Correct Answer:** AD
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario:
/ Mitigate the need to purchase additional tools for monitoring and debugging.
/A debugger must automatically attach to websites on a weekly basis. The scripts that handle the configuration and setup of debugging cannot work if there is a delay in attaching the debugger.
* A: After publishing your application you can use the Server Explorer in Visual Studio to access your web sites. After signing in you will see your Web Sites under the Windows Azure node in Server Explorer. Right click on the site that you would like to debug and select Attach Debugger.

D: We need to debug the web site, not an application. We should use the more informative Verbose logging level.

Reference: Remote Debugging a Window Azure Web Site with Visual Studio 2013
http://blogs.msdn.com/b/webdev/archive/2013/11/05/remote-debugging-a-window-azure-web-site-with-visual-studio-2013.aspx

**Testlet 1**

**Background**

**Overview**
Lucerne Publishing creates, stores, and delivers online media for advertising companies. This media is streamed to computers by using the web, and to mobile devices around the world by using native applications. The company currently supports the iOS, Android, and Windows Phone 8.1 platform.

Lucerne Publishing uses proprietary software to manage its media workflow. This software has reached the end of its lifecycle. The company plans to move its media workflows to the cloud. Lucerne Publishing provides access to its customers, who are third-party companies, so that they can download, upload, search, and index media that is stored on Lucerne Publishing servers.

**Apps and Applications**
Lucerne Publishing develops the applications that customers use to deliver media. The company currently provides the following media delivery applications:
- Lucerne Media W - a web application that delivers media by using any browser
- Lucerne Media M - a mobile app that delivers media by using Windows Phone 8.1
- Lucerne Media A - a mobile app that delivers media by using an iOS device
- Lucerne Media N - a mobile app that delivers media by using an Android device
- Lucerne Media D - a desktop client application that customer's install on their local computer

**Business Requirements**
Lucerne Publishing's customers and their consumers have the following requirements:
- Access to media must be time-constricted once media is delivered to a consumer.
- The time required to download media to mobile devices must be minimized.
- Customers must have 24-hour access to media downloads regardless of their location or time zone.
- Lucerne Publishing must be able to monitor the performance and usage of its customer-facing app.

Lucerne Publishing wants to make its asset catalog searchable without requiring a database redesign.
- Customers must be able to access all data by using a web application. They must also be able to access data by using a mobile app that is provided by Lucerne Publishing.
- Customers must be able to search for media assets by key words and media type.
- Lucerne Publishing wants to move the asset catalog database to the cloud without formatting the source data.

**Other Requirements**

**Development**
Code and current development documents must be backed up at all times. All solutions must be automatically built and deployed to Azure when code is checked in to source control.

**Network Optimization**
Lucerne Publishing has a .NET web application that runs on Azure. The web application analyzes storage and the distribution of its media assets. It needs to monitor the utilization of the web application. Ultimately, Lucerne Publishing hopes to cut its costs by reducing data replication without sacrificing its quality of service to its customers. The solution has the following requirements:
- Optimize the storage location and amount of duplication of media.
- Vary several parameters including the number of data nodes and the distance from node to customers.
- Minimize network bandwidth.
- Lucerne Publishing wants be notified of exceptions in the web application.

**Technical Requirements**

**Data Mining**
Lucerne Publishing constantly mines its data to identify customer patterns. The company plans to replace the existing on-premises cluster with a cloud-based solution. Lucerne Publishing has the following requirements:

**Virtual machines:**

- The data mining solution must support the use of hundreds to thousands of processing cores.
- Minimize the number of virtual machines by using more powerful virtual machines. Each virtual machine must always have eight or more processor cores available.
- Allow the number of processor cores dedicated to an analysis to grow and shrink automatically based on the demand of the analysis.
- Virtual machines must use remote memory direct access to improve performance.

**Task scheduling:**
The solution must automatically schedule jobs. The scheduler must distribute the jobs based on the demand and available resources.

**Data analysis results:**
The solution must provide a web service that allows applications to access the results of analyses.

**Other Requirements**

**Feature Support**
- Ad copy data must be searchable in full text.
- Ad copy data must indexed to optimize search speed.
- Media metadata must be stored in Azure Table storage.
- Media files must be stored in Azure BLOB storage.
- The customer-facing website must have access to all ad copy and media.
- The customer-facing website must automatically scale and replicate to locations around the world.
- Media and data must be replicated around the world to decrease the latency of data transfers.
- Media uploads must have fast data transfer rates (low latency) without the need to upload the data offline.

**Security**
- Customer access must be managed by using Active Directory.
- Media files must be encrypted by using the PlayReady encryption method.
- Customers must be able to upload media quickly and securely over a private connection with no opportunity for internet snooping.

**QUESTION 1**
You need to analyze Lucerne's performance monitoring solution.

Which three applications should you monitor? Each correct answer presents a complete solution.

A. The Lucerne Media-D application
B. The data mining application
C. The Lucerne Media-W application
D. The Lucerne Media-M app
E. The Lucerne Media-N app

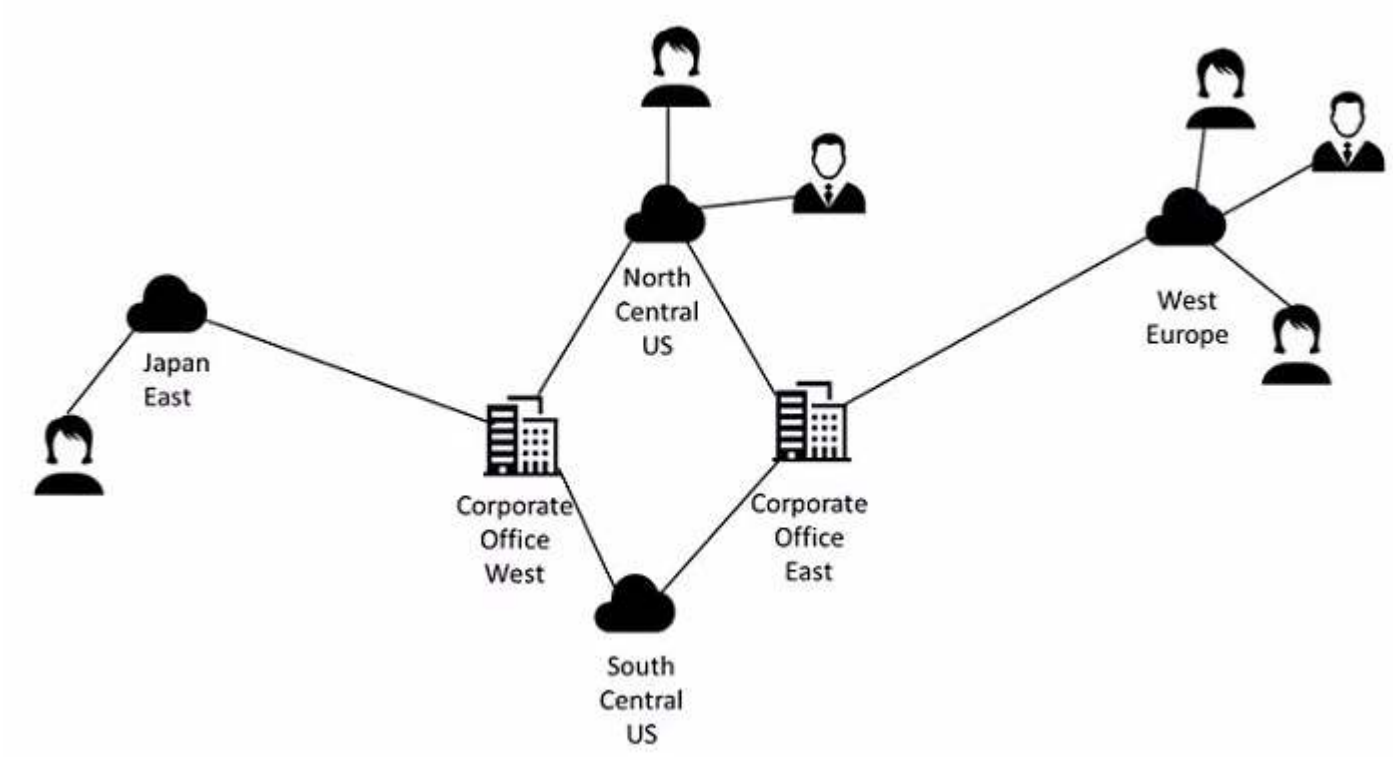
**Correct Answer:** CDE
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Monitor the web application and the mobile apps.

C: Lucerne Media W - a web application that delivers media by using any browser
D: Lucerne Media M - a mobile app that delivers media by using Windows Phone 8.1
E: Lucerne Media N - a mobile app that delivers media by using an Android device

* Scenario:
/ Lucerne Publishing must be able to monitor the performance and usage of its customer-facing app.
/ Customers must be able to access all data by using a web application. They must also be able to access data by using a mobile app that is provided by Lucerne Publishing.

**QUESTION 2**
HOTSPOT
The company has two corporate offices. Customers will access the websites from datacenters around the world.




You need to architect the global website strategy to meet the business requirements. Use the drop-down menus to select the answer choice that answers each question.

**Hot Area:**

**Answer Area**

'here should you deploy the websites?

- South Central US
- Corporate Office West and Corporate Office East
- East Asia, North Central US, and West Europe

'here should you store the media?

- South Central US
- Corporate Office West and Corporate Office East
- East Asia, North Central US, and West Europe

'here should you deploy the data warehouse?

- South Central US
- East Asia, North Central US, and West Europe
- Corporate Office West and Corporate Office East

**Correct Answer:**


**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario: The customer-facing website must have access to all ad copy and media.

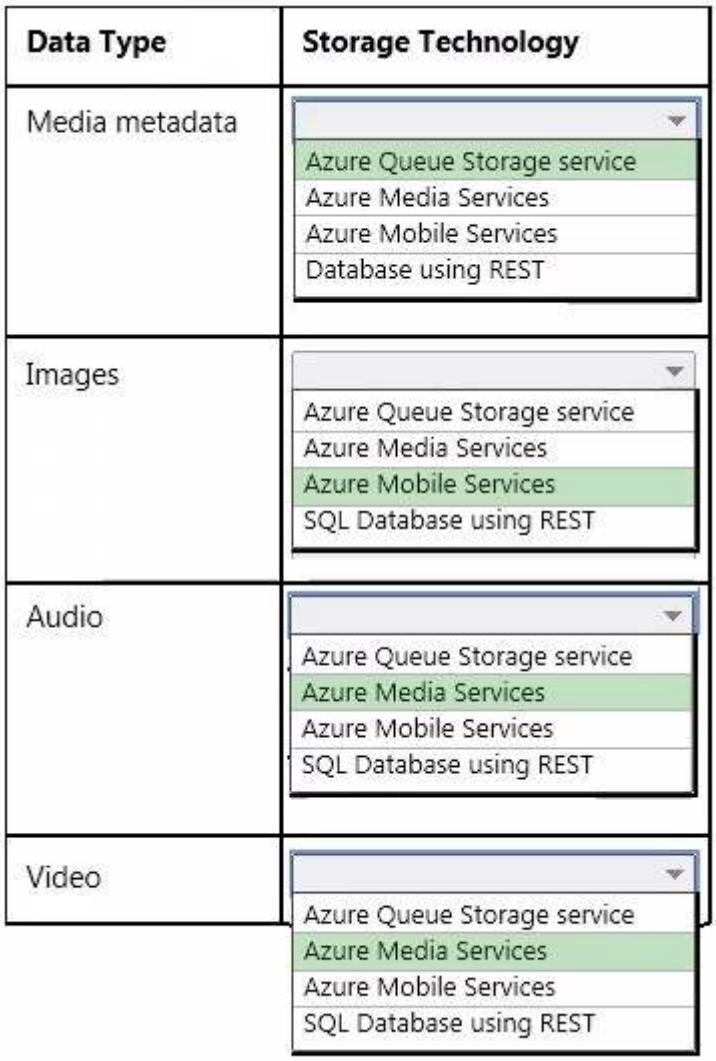
**QUESTION 3**
HOTSPOT
You need to recommend strategies for storing data.

Which services should you recommend? To answer, select the appropriate storage technology for each data type in the answer area.

**Hot Area:**

| Data Type | Storage Technology |
| --- | --- |
| Media metadata | Azure Queue Storage service<br>Azure Media Services<br>Azure Mobile Services<br>Database using REST |
| Images | Azure Queue Storage service<br>Azure Media Services<br>Azure Mobile Services<br>SQL Database using REST |
| Audio | Azure Queue Storage service<br>Azure Media Services<br>Azure Mobile Services<br>SQL Database using REST |
| Video | Azure Queue Storage service<br>Azure Media Services<br>Azure Mobile Services<br>SQL Database using REST |

**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Media metadata: Azure Queue Storage Service
Scenario: Media metadata must be stored in Azure Table storage.
Azure Queues provide a uniform and consistent programming model across queues, tables, and BLOBs – both for developers and for operations teams.

* Images: Azure Mobile Services
Scenario: Media files must be stored in Azure BLOB storage.
You can use Azure Mobile Services to access images from mobile devices.

* Audio: Azure Media Services
* Video: Azure Media Services
Microsoft Azure Media Services is an extensible cloud-based platform that enables developers to build scalable media management and delivery applications. Media Services is based on REST APIs that enable you to securely upload, store, encode and package video or audio content for both on-demand and live streaming delivery to various clients (for example, TV, PC, and mobile devices).

Reference: Azure Media Services Overview
https://azure.microsoft.com/en-us/documentation/articles/media-services-overview/

**QUESTION 4**
You need to configure the deployment of the storage analysis application.

What should you do?

A. Create a new Mobile Service.
B. Configure the deployment from source control.
C. Add a new deployment slot.
D. Turn on continuous integration.

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Scenario: Data analysis results:
The solution must provide a web service that allows applications to access the results of analyses.

**QUESTION 5**
You need to recommend an appropriate solution for the data mining requirements.

Which solution should you recommend?

A. Design a schedule process that allocates tasks to multiple virtual machines, and use the Azure Portal to create new VMs as needed.
B. Use Azure HPC Scheduler Tools to schedule jobs and automate scaling of virtual machines.
C. Use Traffic Manager to allocate tasks to multiple virtual machines, and use the Azure Portal to spin up new virtual machines as needed.
D. Use Windows Server HPC Pack on-premises to schedule jobs and automate scaling of virtual machines in Azure.

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Microsoft Azure Traffic Manager allows you to control the distribution of user traffic to your specified endpoints, which can include Azure cloud services, websites, and other endpoints. Traffic Manager works by applying an intelligent policy engine to Domain Name System (DNS) queries for the domain names of your Internet resources. Your Azure cloud services or websites can be running in different datacenters across the world.

* Scenario:
**Virtual machines:**
- The data mining solution must support the use of hundreds to thousands of processing cores.
- Minimize the number of virtual machines by using more powerful virtual machines. Each virtual machine must always have eight or more processor cores available.
- Allow the number of processor cores dedicated to an analysis to grow and shrink automatically based on the demand of the analysis.
- Virtual machines must use remote memory direct access to improve performance.

**Task scheduling:**
The solution must automatically schedule jobs. The scheduler must distribute the jobs based on the demand and available resources.

Reference: https://azure.microsoft.com/sv-se/documentation/articles/traffic-manager-overview/

**QUESTION 6**
You need to ensure that the website scales.

What should you do?

A. Deploy Traffic Manager and configure it to route user traffic to specified endpoints to other Azure datacenters.
B. Enter multiple DNS entries in each virtual network to route requests to other Azure datacenters.
C. Set up a new Azure datacenter to Azure datacenter VPN to enable the solution to communicate across regions.
D. Use a virtual network to route network traffic in a single Azure datacenter.

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Scenario: The customer-facing website must automatically scale and replicate to locations around the world.
Azure ExpressRoute enables you to create private connections between Azure datacenters and infrastructure that's on your premises or in a colocation environment. ExpressRoute connections do not go over the public Internet, and offer more reliability, faster speeds, lower latencies and higher security than typical connections over the Internet. In some cases, using ExpressRoute connections to transfer data between on-premises and Azure can also yield significant cost benefits.

Reference: ExpressRoute, Experience a faster, private connection to Azure
http://azure.microsoft.com/en-us/services/expressroute/

**Testlet 1**

## Background

### Overview
Northwind Electric Cars is the premier provider of private, low-cost transportation in Denver. Northwind drivers are company employees who work together as a team. The founding partners believe that by hiring their drivers as employees, their drivers focus on providing a great customer experience. Northwind Electric Cars has a reputation for offering fast, reliable, and friendly service, due largely to their extensive network of drivers and their proprietary dispatching software named NorthRide.

Northwind Electric Cars drivers depend on frequent, automatic updates for the NorthRide mobile app. The Northwind management team is concerned about unplanned system downtime and slow connection speeds caused by high usage. Additionally, Northwind's in-house data storage solution is unsustainable because of the new influx of customer data that is retained. Data backups are made periodically on DVDs and stored on-premises at corporate headquarters.

### Apps

#### NorthRide App
Northwind drivers use the NorthRide app to meet customer pickup requests. The app uses a GPS transponder in each Northwind vehicle and Bing Maps APIs to monitor the location of each vehicle in the fleet in real time. NorthRide allows Northwind dispatchers to optimize their driver coverage throughout the city.

When new customers call, the dispatcher enters their pickup locations into NorthRide. NorthRide identifies the closest available driver. The dispatcher then contacts the driver with the pick-up details. This process usually results in a pick-up time that is far faster than the industry average.
Drivers use NorthRide to track the number of miles they drive and the number of customers they transport. Drivers also track their progress towards their established goals, which are measured by using key performance indicators (KPIs).

#### NorthRide App 2.0
Northwind Electric Cars is growing quickly. New callers often wait for their calls to be answered because the dispatchers are contacting their drivers to arrange pickups for other customers.

To support the growth of the business, Northwind's development team completes an overhaul of the NorthRide system that it has named NorthRide 2.0. When a dispatcher enters a customer's pickup location, the address and driving directions are automatically sent to the driver who is closest to the customer's pickup location.

Drivers indicate their availability on the NorthRide mobile app and can view progress towards their KPI's in real time. Drivers can also record customer ratings and feedback for each pickup.

## Business Requirements

### Apps

#### NorthRideFinder App
Northwind Electric Cars needs a customer-facing website and mobile app that allows customers to schedule pickups. Customers should also be able to create profiles that will help ensure the customer gets a ride faster by storing customer information.

#### Predictor App
Northwind Electric Cars needs a new solution named Predictor. Predictor is an employee-facing mobile app. The app predicts periods of high usage and popular pickup locations and provides various ways to view this predictive data. Northwind uses this information to better distribute its drivers. Northwind wants to use the latest Azure technology to create this solution.

### Other Requirements
- On-premises data must be constantly backed up.
- Mobile data must be protected from loss, even if connectivity with the backend is lost.

- Dispatch offices need to have seamless access to both their primary data center and the applications and services that are hosted in the Azure cloud.
- Connectivity needs to be redundant to on-premises and cloud services, while providing a way for each dispatch office to continue to operate even if one or all of the connection options fail.
- The management team requires that operational data is accessible 24/7 from any office location.

**Technical Requirements**

**Apps and Website**

NorthRide / NorthRideFinder Apps:
- The solution must support on-premises and Azure data storage.
- The solution must scale as necessary based on the current number of concurrent users.
- Customer pickup requests from NorthRideFinder must be asynchronous.
- The customer pickup request system will be high in volume, and each request will have a short life span.
- Data for NorthRideFinder must be protected during a loss of connectivity.
- NorthRide users must authenticate to the company's Azure Active Directory.

Northwind Public Website
- The customer website must use a WebJob to process profile images into thumbnails
- The customer website must be developed with lowest cost and difficulty in mind.
- The customer website must automatically scale to minimize response times for customers.

**Other Requirements**

**Data Storage:**
- The data storage must interface with an on-premises Microsoft SQL backend database.
- A disaster recovery system needs to be in place for large amounts of data that will backup to Azure.
- Backups must be fully automated and managed the Azure Management Portal.
- The recovery system for company data must use a hybrid solution to back up both the on-premises Microsoft SQL backend and any Azure storage.

**Predictive Routing:**
- An Azure solution must be used for prediction systems.
- Predictive analytics must be published as a web service and accessible by using the REST API.

**Security:**
- The NorthRide app must use an additional level of authentication other than the employee's password.
- Access must be secured in NorthRide without opening a firewall port.
- Company policy prohibits inbound connections from internet callers to the on-premises network.
- Customer usernames in NorthRideFinder cannot exceed 10 characters.
- Customer data in NorthRideFinder can be received only by the user ID that is associated with the data.

**QUESTION 1**
You need to design the authentication solution for the NorthRide app. Which solution should you use?

A. Azure Active Directory Basic with multi-factor authentication for the cloud and on-premises users.
B. Active Directory Domain Services with mutual authentication
C. Azure Active Directory Premium and add multi-factor authentication the for cloud users
D. Active Directory Domain Services with multi-factor authentication

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario: The NorthRide app must use an additional level of authentication other than the employee's password.

* Azure Multi-Factor Authentication is the multi-factor authentication service that requires users to also verify sign-ins using a mobile app, phone call or text message. It is available to use with Azure Active Directory, to secure on-premise resources with the Azure Multi-Factor Authentication Server, and with custom applications and directories using the SDK.

Incorrect answers:
Not A: Azure Active Directory Basic does not support multi-factor authentication. Azure Active Directory Premium is required.

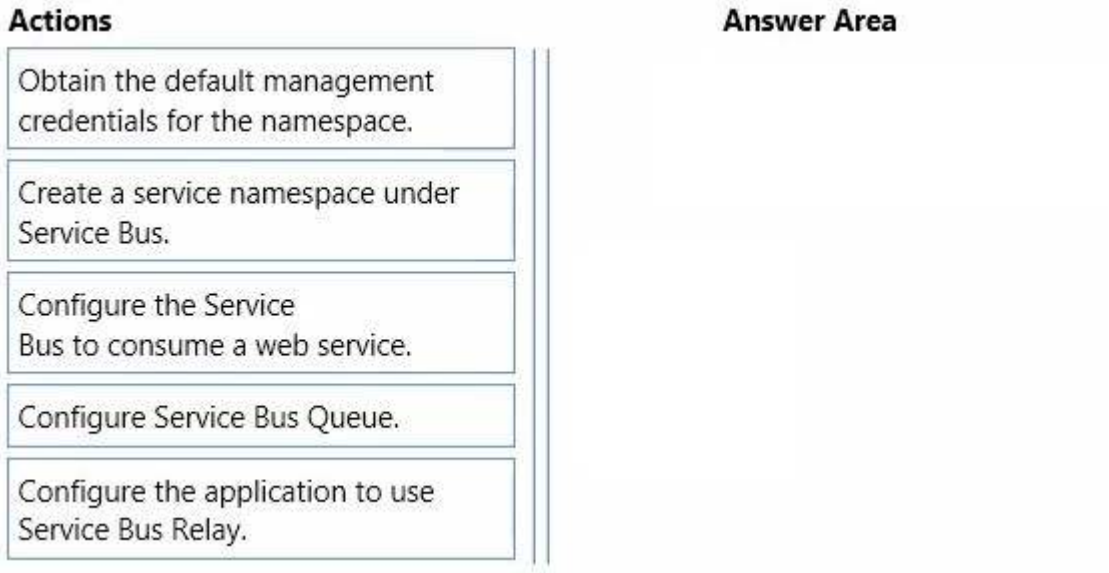
Reference: What is Azure Multi-Factor Authentication?
https://azure.microsoft.com/en-us/documentation/articles/multi-factor-authentication/

Reference: Azure Active Directory Pricing
http://azure.microsoft.com/en-gb/pricing/details/active-directory/

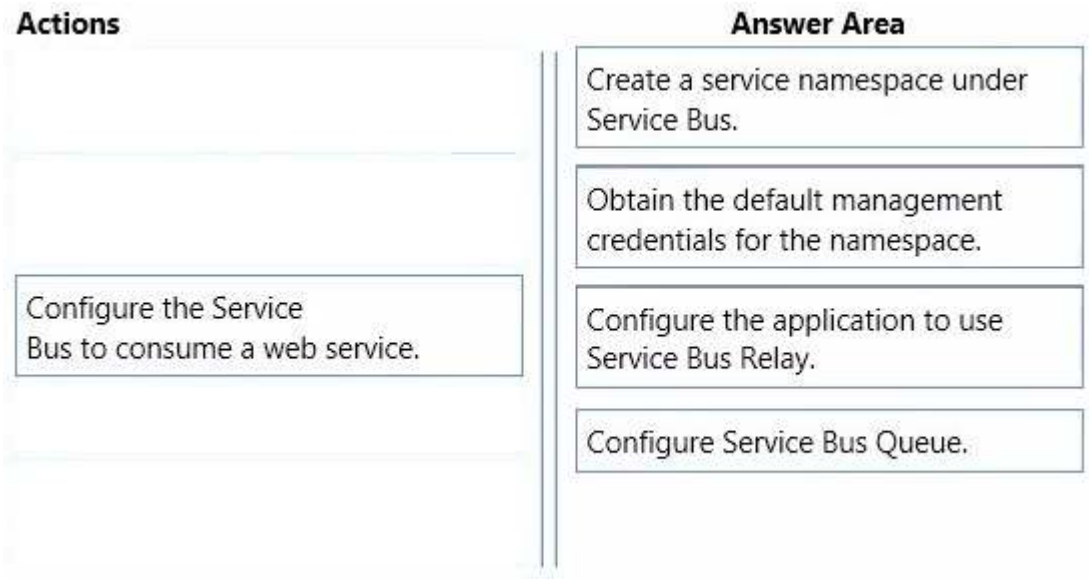
**QUESTION 2**
DRAG DROP
You need to provide a data access solution for the NorthRide app.

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

**Select and Place:**




**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
Note:
Box 1: Create a service namespace under Service Bus
To begin using Service Bus queues in Azure, you must first create a service namespace. A namespace provides a scoping container for addressing Service Bus resources within your application.
Box 2: Obtain the default management credentials for the namespace.
In order to perform management operations, such as creating a queue on the new namespace, you must obtain the management credentials for the namespace.
Box 3: Configure the application to use Service Bus Relay
When you create an application that uses Service Bus, you must add a reference to the Service Bus assembly and include the corresponding namespaces.
The Service Bus NuGet package is the easiest way to get the Service Bus API and to configure your application with all of the Service Bus dependencies.
After installing this package you are now ready to write code for Service Bus.
Box 4: Configure Service Bus Queue
This would include:
* set up a Service Bus connection string
* create a queue
* provide code to send/receive messages from the queue
Reference: How to Use Service Bus Queues
https://azure.microsoft.com/en-gb/documentation/articles/service-bus-dotnet-how-to-use-queues/

**QUESTION 3**
You need to recommend the appropriate technology to provide the predictive analytics for passenger pickup.

What should you do?

A. Use Power BI to analyze the traffic data and PowerPivot to categorize the results.
B. Use HDInsight to analyze the traffic data and write a .NET program to categorize the results.
C. Use Machine Learning Studio to create a predictive model and publish the results as a web service.
D. Use Hadoop on-premises to analyze the traffic and produce a report that shows high traffic zones.

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Scenario: Predictive Routing:
/ An Azure solution must be used for prediction systems.
/ Predictive analytics must be published as a web service and accessible by using the REST API.

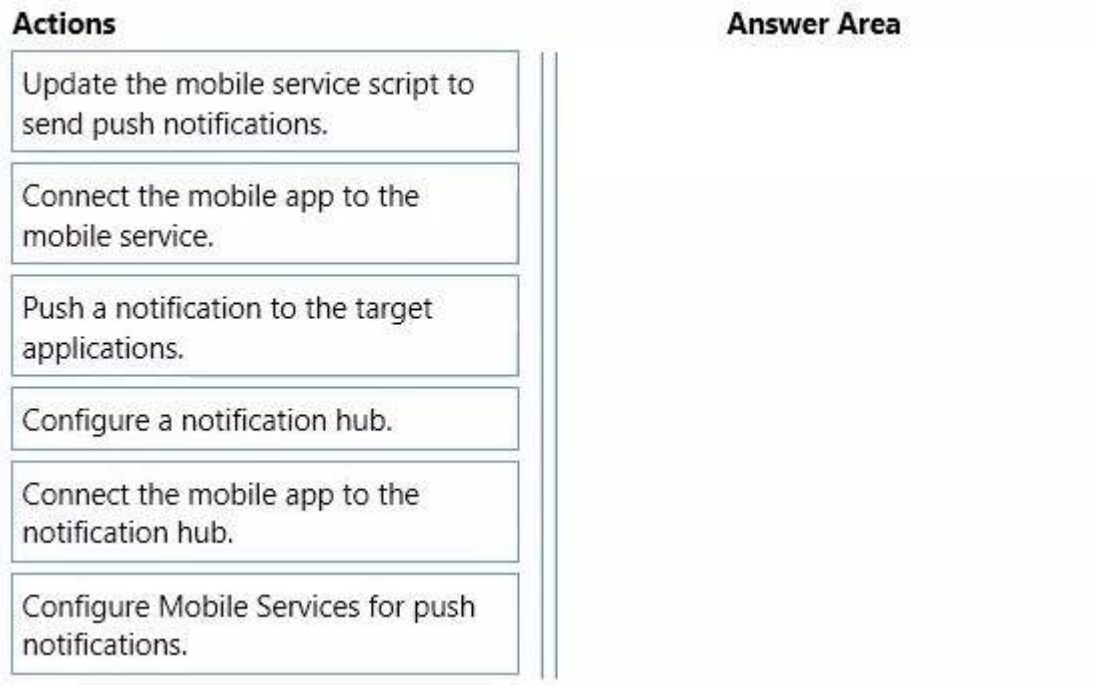
* Microsoft Azure Machine Learning Studio is a collaborative visual development environment that enables you to build, test, and deploy predictive analytics solutions that operate on your data. The Machine Learning service and development environment is cloud-based, provides compute resource and memory flexibility, and eliminates setup and installation concerns because you work through your web browser.

Reference: What is Azure Machine Learning Studio?
https://azure.microsoft.com/en-us/documentation/articles/machine-learning-what-is-ml-studio/

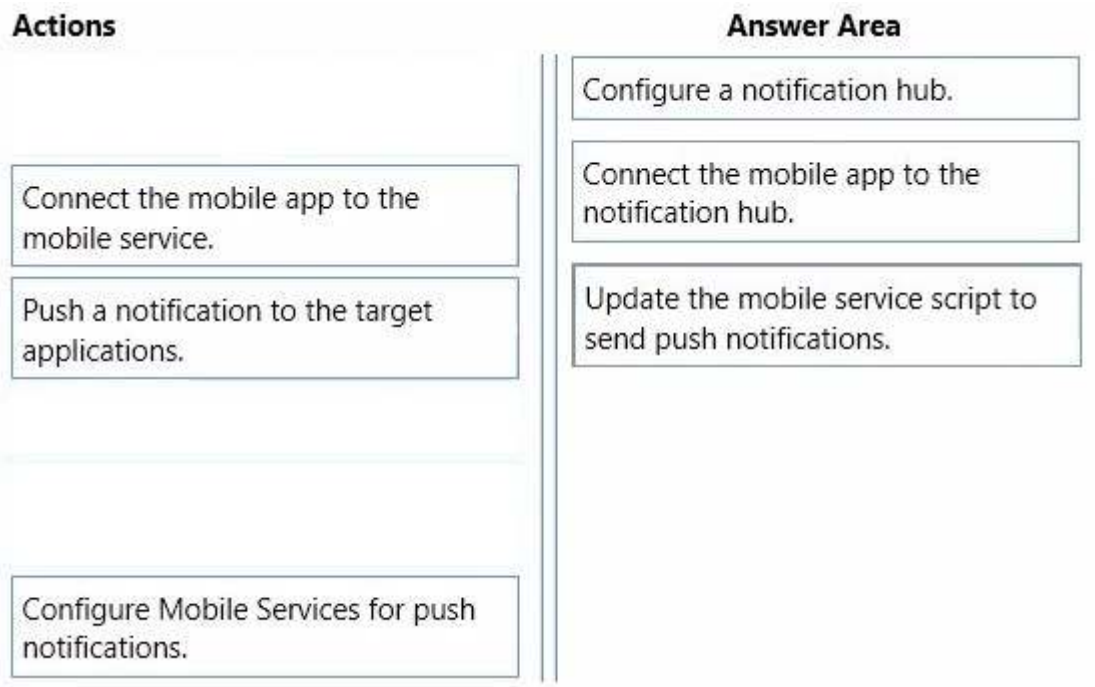
**QUESTION 4**
DRAG DROP
You need to design the notification service for the customer-facing mobile app.

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

**Select and Place:**




**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
Explanation: Azure Notification Hubs provide an easy-to-use infrastructure that enables you to send mobile push notifications from any backend (in the cloud or on-premises) to any mobile platform.

Configuration steps include:
1. Configure your Notification Hub
2. Connecting your app to the Notification Hub
3. Send notification from your back-end
You can send notifications using Notification Hubs from any back-end using the REST interface. You do this through a script, not a configuration of Mobile Services. Use Java or PHP for the script.

Reference: Getting Started with Notification Hubs
https://azure.microsoft.com/en-us/documentation/articles/notification-hubs-windows-store-dotnet-get-started/#send-notification-from-your-back-end

**QUESTION 5**
You need to recommend a technology for processing customer pickup requests.

Which technology should you recommend?

A. Notification hub
B. Queue messaging
C. Mobile Service with push notifications
D. Service Bus messaging

**Correct Answer:** D
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Service Bus queues are part of a broader Azure messaging infrastructure that supports queuing as well as

publish/subscribe, Web service remoting, and integration patterns.
Service Bus Queue support Push-style API (while Azure Queue messaging does not).

Incorrect:
Not A: Notification Hub is only used to push notification, not for processing requests.
Not B As a solution architect/developer, you should consider using Azure Queues when:
* Your application must store over 80 GB of messages in a queue, where the messages have a lifetime shorter than 7 days.
* Your application wants to track progress for processing a message inside of the queue. This is useful if the worker processing a message crashes. A subsequent worker can then use that information to continue from where the prior worker left off.

You require server side logs of all of the transactions executed against your queues.

Not C: To process the messages we do not need push notification.

Reference: Azure Queues and Service Bus Queues - Compared and Contrasted
https://msdn.microsoft.com/en-us/library/azure/hh767287.aspx

**QUESTION 6**
You need to recommend a solution that meets the requirements for data storage for the NorthRide app.

What should you include in the recommendation?

A. Azure Remote App
B. Azure Service Bus
C. Azure Connect
D. Azure SQL Database

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Service Bus queues are part of a broader Azure messaging infrastructure that supports queuing as well as publish/subscribe, Web service remoting, and integration patterns.
Service Bus Queue support Push-style API (while Azure Queue messaging does not).

Reference: Azure Queues and Service Bus Queues - Compared and Contrasted
https://msdn.microsoft.com/en-us/library/azure/hh767287.aspx

**Question Set 1**

**QUESTION 1**
You are designing an Azure web application. The solution will be used by multiple customers. Each customer has different business logic and user interface requirements. Not all customers use the same version of the .NET runtime.

You need to recommend a deployment strategy.

What should you recommend?

A. Deploy with multiple web role instances.
B. Deploy each application in a separate tenant.
C. Deploy all applications in one tenant.
D. Deploy with multiple worker role instances.

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
There are two types of tenant environments. The simplest type is a single-tenant application where one customer has 100% dedicated access to an application's process space. A single Tenant Applications has a separate, logical instance of the application for each customer or client. A single tenant application is much more predictable and stable by its nature since there will never be more than one dedicated customer at any point in time in that VM. That customer has all of its users accessing that dedicated instance of the application.

Reference: Multi Tenancy and Windows Azure. Overview of Multi tenant Application and Single tenant Application Architectural considerations.
http://sanganakauthority.blogspot.in/2011/12/multi-tenancy-and-windows-azure.html

**QUESTION 2**
You design an Azure application that processes images. The maximum size of an image is 10 MB. The application includes a web role that allows users to upload images and a worker role with multiple instances that processes the images. The web role communicates with the worker role by using an Azure Queue service.

You need to recommend an approach for storing images that minimizes storage transactions.

What should you recommend?

A. Store images in Azure Blob service. Store references to the images in the queue.
B. Store images in the queue.
C. Store images in OneDrive attached to the worker role instances. Store references to the images in the queue.
D. Store images in local storage on the web role instance. Store references to the images in the queue.

**Correct Answer:** A
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Azure Queues provide a uniform and consistent programming model across queues, tables, and BLOBs – both for developers and for operations teams.
Microsoft Azure blob storage can be used to store the image data, the application can use a worker role in Azure to perform background processing tasks on the images, how the application may use shared access signatures to control access to the images by users.

Azure blobs provide a series of containers aimed at storing text or binary data. Block blob containers are ideal for streaming data, while page blob containers can be used for random read/write operations.
Reference: 5 – Executing Background Tasks
https://msdn.microsoft.com/en-gb/library/ff803365.aspx
Reference: Azure Queues and Service Bus Queues - Compared and Contrasted
https://msdn.microsoft.com/en-us/library/azure/hh767287.aspx

**QUESTION 3**
You are designing an Azure application. The application includes two web roles and three instances of a worker role. The web roles send requests to the worker role by using one or more Azure Queues.

You need to recommend a queue design for sending requests to the worker role.

What should you recommend?

A. Create a queue for each combination of web roles and worker role instances. Send requests to all worker role instances based on the sending web role.
B. Create a single queue. Send all requests on the single queue.
C. Create a queue for each worker role instance. Send requests on each worker queue by using a round robin rotation.
D. Create a queue for each web role. Send requests on all queues at the same time.

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
To communicate with the worker role, a web role instance places messages on to a queue. A worker role instance polls the queue for new messages, retrieves them, and processes them. There are a couple of important things to know about the way the queue service works in Azure. First, you reference a queue by name, and multiple role instances can share a single queue. Second, there is no concept of a typed message; you construct a message from either a string or a byte array. An individual message can be no more than 64 kilobytes (KB) in size.

Reference: 5 – Executing Background Tasks
https://msdn.microsoft.com/en-gb/library/ff803365.aspx
Reference: .NET Multi-Tier Application Using Service Bus Queues
http://azure.microsoft.com/en-gb/documentation/articles/cloud-services-dotnet-multi-tier-app-using-service-bus-queues/

**QUESTION 4**
You are designing an Azure application that will use a worker role. The worker role will create temporary files.

You need to minimize storage transaction charges.

Where should you create the files?

A. In Azure local storage
B. In Azure Storage page blobs
C. On an Azure Drive
D. In Azure Storage block blobs

**Correct Answer:** A
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Local storage is temporary in Azure. So, if the virtual machine supporting your role dies and cannot recover,

your local storage is lost! Therefore, Azure developers will tell you, only volatile data should ever be stored in local storage of Azure.

Reference: Windows Azure Local File Storage How To Guide And Warnings
http://www.intertech.com/Blog/windows-azure-local-file-storage-how-to-guide-and-warnings/
Reference: http://blog.codingoutloud.com/2011/06/12/azure-faq-can-i-write-to-the-file-system-on-windows-azure/

**QUESTION 5**
You are designing an Azure web application. The application uses one worker role. It does not use SQL Database. You have the following requirements:
- Maximize throughput and system resource availability
- Minimize downtime during scaling

You need to recommend an approach for scaling the application.

Which approach should you recommend?

A. Increase the role instance size.
B. Set up horizontal partitioning.
C. Increase the number of role instances.
D. Set up vertical partitioning.

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
On the Scale page of the Azure Management Portal, you can manually scale your application or you can set parameters to automatically scale it. You can scale applications that are running Web Roles, Worker Roles, or Virtual Machines. To scale an application that is running instances of Web Roles or Worker Roles, you add or remove role instances to accommodate the work load.

Reference: How to Scale an Application
http://azure.microsoft.com/en-gb/documentation/articles/cloud-services-how-to-scale/

**QUESTION 6**
You are evaluating an Azure application. The application includes the following elements:
- A web role that provides the ASP.NET user interface and business logic
- A single SQL database that contains all application data

Each webpage must receive data from the business logic layer before returning results to the client. Traffic has increased significantly. The business logic is causing high CPU usage.

You need to recommend an approach for scaling the application.

What should you recommend?

A. Store the business logic results in Azure Table storage.
B. Vertically partition the SQL database.
C. Move the business logic to a worker role.
D. Store the business logic results in Azure local storage.

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**

For Cloud Services in Azure applications need both web and worker roles to scale well.

Reference: Application Patterns and Development Strategies for SQL Server in Azure Virtual Machines
https://msdn.microsoft.com/en-us/library/azure/dn574746.aspx

**QUESTION 7**
You are planning an upgrade strategy for an existing Azure application. Multiple instances of the application run in Azure. The management team is concerned about application downtime, due to a business service level agreement (SLA).

You are evaluating which change in your environment will require downtime.

You need to identify the changes to the environment that will force downtime.

Which change always requires downtime?

A. Adding an HTTPS endpoint to a web role
B. Upgrading the hosted service by deploying a new package
C. Changing the value of a configuration setting
D. Changing the virtual machine size

**Correct Answer:** A
**Section: [none]**
**Explanation**

**Explanation/Reference:**
If you change the number of endpoints for your service, for example by adding a HTTPS endpoint for your existing Web Role, it will require downtime.

Reference: Re-Deploying your Windows Azure Service without Incurring Downtime
http://blog.toddysm.com/2010/06/re-deploying-your-windows-azure-service-without-incurring-downtime.html

**QUESTION 8**
You are designing an Azure application that processes graphical image files. The graphical Images are processed in batches by remote applications that run on multiple servers.

You have the following requirements:
- The application must remain operational during batch-processing operations.
- Users must be able to roll back each image to a previous version.

You need to ensure that each remote application has exclusive access to an image while the application processes the image. Which type of storage should you use to store the images?

A. Table service
B. Queue service
C. Blob service
D. A single Azure VHD that is attached to the web role

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Blob Leases allow you to claim ownership to a Blob. Once you have the lease you can then update the Blob or delete the Blob without worrying about another process changing it underneath you. When a Blob is leased, other processes can still read it, but any attempt to update it will fail. You can update Blobs without taking a lease first, but you do run the chance of another process also attempting to modify it at the same time.

* You can opt to use either optimistic or pessimistic concurrency models to manage access to blobs and containers in the blob service.

Reference: Azure Blob Storage Part 8: Blob Leases
http://justazure.com/azure-blob-storage-part-8-blob-leases/
Reference: Using Blob Leases to Manage Concurrency with Table Storage
http://www.azurefromthetrenches.com/?p=1371

**QUESTION 9**
You are designing an Azure application that stores data.

You have the following requirements:
- The data storage system must support storing more than 500 GB of data.
- Data retrieval must be possible from a large number of parallel threads.
- Threads must not block each other.

You need to recommend an approach for storing data.

What should you recommend?

A. Azure Notification Hubs
B. A single SQL database in Azure
C. Azure Queue storage
D. Azure Table storage

**Correct Answer:** D
**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Azure Table Storage can be useful for applications that must store large amounts of nonrelational data, and need additional structure for that data. Tables offer key-based access to unschematized data at a low cost for applications with simplified data-access patterns. While Azure Table Storage stores structured data without schemas, it does not provide any way to represent relationships between the data.

* As a solution architect/developer, consider using Azure Table Storage when:
/ Your application stores and retrieves large data sets and does not have complex relationships that require server-side joins, secondary indexes, or complex server-side logic.
/ You need to achieve a high level of scaling without having to manually shard your dataset.

Reference: Azure Table Storage and Windows Azure SQL Database - Compared and Contrasted
https://msdn.microsoft.com/en-us/library/azure/jj553018.aspx

**QUESTION 10**
HOTSPOT
You have an Azure website that runs on several instances. You have a WebJob that provides additional functionality to the website.

The WebJob must run on all instances of the website.

You need to ensure that the WebJob runs even when the website is idle for long periods of time.

How should you create and configure the WebJob object? To answer, select the appropriate options in the answer area.

**Hot Area:**

**Answer Area**

| Requirement | Action |
|---|---|
| Create the WebJob object | Create the WebJob as a scheduled task.<br>Create the WebJob as an on-demand task.<br>Create the WebJob as a continuously running task. |
| Configure the WebJob object | Enable AlwaysOn for the website.<br>Enable AlwaysOn for the database.<br>Configure the WebJob to run continuously. |

**Correct Answer:**

**Answer Area**

| Requirement | Action |
|---|---|
| Create the WebJob object | Create the WebJob as a scheduled task.<br>Create the WebJob as an on-demand task.<br>Create the WebJob as a continuously running task. |
| Configure the WebJob object | Enable AlwaysOn for the website.<br>Enable AlwaysOn for the database.<br>Configure the WebJob to run continuously. |

**Section: [none]**
**Explanation**

**Explanation/Reference:**
* You can run programs or scripts in WebJobs in your App Service web app in three ways: on demand, continuously, or on a schedule.

* For continuous WebJobs there is an important feature called "always on" which is only available for a Standard Website, this will make sure your Website and WebJob are always up.

Reference: Run Background tasks with WebJobs
http://azure.microsoft.com/en-us/documentation/articles/web-sites-create-web-jobs/

**QUESTION 11**
An application currently resides on an on-premises virtual machine that has 2 CPU cores, 4 GB of RAM, 20 GB of hard disk space, and a 10 megabit/second network connection.

You plan to migrate the application to Azure. You have the following requirements:
- You must not make changes to the application.
- You must minimize the costs for hosting the application.

You need to recommend the appropriate virtual machine instance type.

Which virtual machine tier should you recommend?

A. Network Optimized (A Series)
B. General Purpose Compute, Basic Tier (A Series)
C. General Purpose Compute, Standard Tier (A Series)
D. Optimized Compute (D Series)

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
General purpose compute: Basic tier
An economical option for development workloads, test servers, and other applications that don't require load balancing, auto-scaling, or memory-intensive virtual machines.

CPU core range: 1-8
RAM range: 0.75 – 14 GB
Disk size: 20-240 GB

Incorrect answers:
Not A: Network optimized: fast networking with InfiniBand support
Available in select data centers. A8 and A9 virtual machines feature Intel® Xeon® E5 processors. Adds a 40Gbit/s InfiniBand network with remote direct memory access (RDMA) technology. Ideal for Message Passing Interface (MPI) applications, high-performance clusters, modeling and simulations, video encoding, and other compute or network intensive scenarios.
Not C: CPU core range: 1-8
RAM range: 0.75 – 56 GB
Disk size: 20-605 GB

Not D: D-series virtual machines feature solid state drives (SSDs) and 60% faster processors than the A-series and are also available for web or worker roles in Azure Cloud Services. This series is ideal for applications that demand faster CPUs, better local disk performance, or higher memories.

Reference: Virtual Machines Pricing. Launch Windows Server and Linux in minutes
http://azure.microsoft.com/en-us/pricing/details/virtual-machines/

**QUESTION 12**
You are designing an Azure web application that includes many static content files.
The application is accessed from locations all over the world by using a custom domain name.

You need to recommend an approach for providing access to the static content with the least amount of latency.

Which two actions should you recommend? Each correct answer presents part of the solution.

A. Place the static content in Azure Table storage.
B. Configure a CNAME DNS record for the Azure Content Delivery Network (CDN) domain.
C. Place the static content in Azure Blob storage.
D. Configure a custom domain name that is an alias for the Azure Storage domain.

**Correct Answer:** BC
**Section: [none]**
**Explanation**

**Explanation/Reference:**
B: There are two ways to map your custom domain to a CDN endpoint.
1. Create a CNAME record with your domain registrar and map your custom domain and subdomain to the CDN endpoint
2. Add an intermediate registration step with Azure cdnverify

C: The Azure Content Delivery Network (CDN) offers developers a global solution for delivering high-bandwidth content by caching blobs and static content of compute instances at physical nodes in the United States, Europe, Asia, Australia and South America.
The benefits of using CDN to cache Azure data include:
/ Better performance and user experience for end users who are far from a content source, and are using applications where many 'internet trips' are required to load content
/ Large distributed scale to better handle instantaneous high load, say, at the start of an event such as a product launch

Reference: Using CDN for Azure
https://azure.microsoft.com/en-gb/documentation/articles/cdn-how-to-use/

Reference: How to map Custom Domain to Content Delivery Network (CDN) endpoint
https://github.com/Azure/azure-content/blob/master/articles/cdn-map-content-to-custom-domain.md
https://github.com/Azure/azure-content/blob/master/articles/cdn-map-content-to-custom-domain.md

**QUESTION 13**
You are designing an Azure development environment. Team members learn Azure development techniques by training in the development environment.

The development environment must auto scale and load balance additional virtual machine (VM) instances.

You need to recommend the most cost-effective compute-instance size that allows team members to work with Azure in the development environment.

What should you recommend?

A. Azure A1 standard VM Instance
B. Azure A2 basic VM Instance
C. Azure A3 basic VM Instance
D. Azure A9 standard VM Instance

**Correct Answer:** A
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Azure A1 standard VM Instance would be cheapest with 1 CPU core, 0.75 GB RAM, and 40 GB HD. It would be good enough for training purposes.

Reference: Virtual Machines Pricing, Launch Windows Server and Linux in minutes
http://azure.microsoft.com/en-us/pricing/details/virtual-machines/

**QUESTION 14**
You have business services that run on an on-premises mainframe server.

You must provide an intermediary configuration to support existing business services and Azure. The business services cannot be rewritten. The business services are not exposed externally.

You need to recommend an approach for accessing the business services.

What should you recommend?

A. Connect to the on-premises server by using a custom service in Azure.
B. Expose the business services to the Azure Service Bus by using a custom service that uses relay binding.
C. Expose the business services externally.
D. Move all business service functionality to Azure.

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
The Service Bus relay service enables you to build hybrid applications that run in both an Azure datacenter and your own on-premises enterprise environment. The Service Bus relay facilitates this by enabling you to securely expose Windows Communication Foundation (WCF) services that reside within a corporate enterprise network to the public cloud, without having to open a firewall connection, or require intrusive changes to a corporate network infrastructure.

Reference: How to Use the Service Bus Relay Service
http://azure.microsoft.com/en-gb/documentation/articles/service-bus-dotnet-how-to-use-relay/

**QUESTION 15**
You design an Azure web application. The web application is accessible by default as a standard cloudapp.net URL.

You need to recommend a DNS resource record type that will allow you to configure access to the web application by using a custom domain name.

Which DNS record type should you recommend?

A. SRV
B. MX
C. CNAME
D. A

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
A CNAME record maps a specific domain, such as contoso.com or www.contoso.com, to a canonical domain name. In this case, the canonical domain name is the <myapp>.cloudapp.net domain name of your Azure hosted application. Once created, the CNAME creates an alias for the <myapp>.cloudapp.net. The CNAME entry will resolve to the IP address of your <myapp>.cloudapp.net service automatically, so if the IP address of the cloud service changes, you do not have to take any action.

Incorrect:
Not D:
* Since an A record is mapped to a static IP address, it cannot automatically resolve changes to the IP address of your Cloud Service.
* An A record maps a domain, such as contoso.com or www.contoso.com, or a wildcard domain such as *.contoso.com, to an IP address. In the case of an Azure Cloud Service, the virtual IP of the service. So the main benefit of an A record over a CNAME record is that you can have one entry that uses a wildcard, such as *.contoso.com, which would handle requests for multiple sub-domains such as mail.contoso.com, login.contoso.com, or www.contso.com.

Reference: Configuring a custom domain name for an Azure cloud service
http://azure.microsoft.com/en-gb/documentation/articles/cloud-services-custom-domain-name/

**QUESTION 16**
A company hosts a website and exposes web services on the company intranet.

The intranet is secured by using a firewall. Company policies prohibit changes to firewall rules.

Devices outside the firewall must be able to access the web services.

You need to recommend an approach to enable inbound communication.

What should you recommend?

A. The Azure Access Control Service
B. Windows Azure Pack
C. The Azure Service Bus
D. A web service in an Azure role that relays data to the internal web services

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
The Service Bus Relay is designed for the use-case of taking existing Windows Communication Foundation (WCF) web services and making those services securely accessible to solutions that reside outside the corporate perimeter without requiring intrusive changes to the corporate network infrastructure. Such Service Bus relay services are still hosted inside their existing environment, but they delegate listening for incoming sessions and requests to the cloud-hosted Service Bus.

Reference: .NET On-Premises/Cloud Hybrid Application Using Service Bus Relay
http://azure.microsoft.com/en-gb/documentation/articles/cloud-services-dotnet-hybrid-app-using-service-bus-relay/

**QUESTION 17**
DRAG DROP
You have a website that displays text, pictures, video files, and audio files. The website processes requests from countries and regions all over the world. You plan to migrate the website to the Azure platform.

The website has the following requirements:
- Encode, store, and stream audio and video at scale.
- Load-balance communications with the website instance that is closest to the user's location.
- Deliver content with high-bandwidth and low latency.

You need to recommend the technologies to implement the solution.

Which technologies should you recommend? To answer, drag the appropriate technology to the correct requirement. Each technology 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.

**Select and Place:**

**Technologies**

- TrafficManager
- MediaServices
- Multifactor Authentication
- Service Bus
- Azure Active Directory
- Azure Content Delivery Network
- Windows Network Load Balancing
- Azure Blob Service

**Answer Area**

| Requirement | Technology |
|---|---|
| Encode media | Technology |
| Load-balanced communication | Technology |
| Deliver content | Technology |

**Correct Answer:**

**Technologies**

- Multifactor Authentication
- Service Bus
- Azure Active Directory
- Windows Network Load Balancing
- Azure Blob Service

**Answer Area**

| Requirement | Technology |
|---|---|
| Encode media | MediaServices |
| Load-balanced communication | TrafficManager |
| Deliver content | Azure Content Delivery Network |

**Section: [none]**
**Explanation**

**Explanation/Reference:**
* MediaServices
Azure Media Services is being used to power consumer and enterprise streaming solutions worldwide.

Combining powerful and highly scalable cloud-based encoding, encryption and steaming components, Azure Media Services is helping customers with valuable and premium video content to easily reach larger audiences on today's most popular digital devices, such as tablets and mobile phones.

Reference: Media Services, Cloud for Premium Video Workflows
http://azure.microsoft.com/en-gb/services/media-services/

* TrafficManager

Reference: Traffic Manager, Geo-route incoming traffic to your app for better performance and availability
http://azure.microsoft.com/en-us/services/traffic-manager/

* Azure Content Delivery Network
The Azure Content Delivery Network (CDN) is designed to send audio, video, applications, images, and other files faster and more reliably to customers using servers that are closest to each user. This dramatically increases speed and availability, resulting in significant user experience improvements.

Reference: Azure CDN, A fast and modern global delivery network for high-bandwidth content
http://azure.microsoft.com/en-us/services/cdn/

**QUESTION 18**
You are designing an Azure application. The application includes services hosted in different geographic locations. The service locations may change.

You must minimize the cost of communication between services.

You need to recommend an approach for data transmission between your application and Azure services. The solution must minimize administrative effort.

What should you recommend?

A. Azure Table storage
B. Service Bus
C. Service Management API
D. Azure Queue storage

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
The cost of ACS transactions is insignificant when performing messaging operations against Service Bus queues. Service Bus acquires one ACS token per a single instance of the messaging factory object. The token is then reused until it expires, after about 20 minutes. Therefore, the volume of messaging operations in Service Bus is not directly proportional to the amount of ACS transactions required to support these operations.

Reference: Azure Queues and Service Bus Queues - Compared and Contrasted
https://msdn.microsoft.com/library/azure/hh767287.aspx

**QUESTION 19**
You are designing a distributed application for Azure.

The application must securely integrate with on-premises servers.

You need to recommend a method of enabling Internet Protocol security (IPsec)-protected connections between on-premises servers and the distributed application.

What should you recommend?

A. Azure Access Control
B. Azure Content Delivery Network (CDN)
C. Azure Service Bus
D. Azure Site-to-Site VPN

**Correct Answer:** D
**Section: [none]**
**Explanation**

**Explanation/Reference:**
IPsec can be used on Azure Site-to-Site VPN connections. Distributed applications can used the IPSec VPN connections to communicate.

Reference: About Virtual Network Secure Cross-Premises Connectivity
https://msdn.microsoft.com/en-us/library/azure/dn133798.aspx

**QUESTION 20**
A company has 10 on-premises SQL databases. The company plans to move the databases to SQL Server 2012 that runs in Azure Infrastructure-as-a-Service (IaaS). After migration, the databases will support a limited number of Azure websites in the same Azure Virtual Network.

You have the following requirements:
- You must restore copies of existing on-premises SQL databases to the SQL servers that run in Azure IaaS.
- You must be able to manage the SQL databases remotely.
- You must not open a direct connection from all of the machines on the on-premises network to Azure.
- Connections to the databases must originate from only five Windows computers.

You need to configure remote connectivity to the databases.

Which technology solution should you implement?

A. Azure Virtual Network site-to-site VPN
B. Azure Virtual Network multi-point VPN
C. Azure Virtual Network point-to-site VPN
D. Azure ExpressRoute

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
A point-to-site VPN would meet the requirements.

Reference: Configure a Point-to-Site VPN connection to an Azure Virtual Network
https://azure.microsoft.com/en-us/documentation/articles/vpn-gateway-point-to-site-create/

**QUESTION 21**
You have several virtual machines (VMs) that run in Azure. You also have a single System Center 2012 R2 Configuration Manager (SCCM) primary site on-premises.

You have the following requirements:
- All VMs must run on the same virtual network.
- Network traffic must be minimized between the on-premises datacenter and Azure.
- The solution minimize complexity.

You need to use SCCM to collect inventory and deploy software to Azure VMs.

What should you do first?

A. Configure client push for the Azure virtual network.
B. Enable and configure Operations Insights in Azure.
C. Install a cloud distribution point on an Azure VM.
D. Install a secondary site underneath the primary site onto an Azure VM.

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Cloud-based distribution Point, a Configuration Manager Site System Role in the Cloud

Much of the Configuration Manager topology is made up of distribution points, they are very helpful in many situations where bandwidth and geographical separation are the facts of life, but also hard to manage if you have hundreds or even thousands of them.

This feature started with the vision that it makes perfect sense to have big distribution points in the Windows Azure cloud where one should not worry about things like (but not limited to) size, performance, reliability, security, access from all around the world, hardware/software update issues etc.

Note: Content management in System Center 2012 Configuration Manager provides the tools for you to manage content files for applications, packages, software updates, and operating system deployment. Configuration Manager uses distribution points to store files that are required for software to run on client computers. These distribution points function as distribution centers for the content files and let users download and run the software. Clients must have access to at least one distribution point from which they can download the files.

Reference: New Distribution Points in Configuration Manager SP1
http://blogs.technet.com/b/configmgrteam/archive/2013/01/31/new-distribution-points-in-configuration-manager-sp1.aspx

**QUESTION 22**
You are running a Linux guest in Azure Infrastructure-as-a-Service (IaaS).

You must run a daily maintenance task. The maintenance task requires native BASH commands.

You need to configure Azure Automation to perform this task.

Which three actions should you perform? Each correct answer presents part of the solution.

A. Create an automation account.
B. Create an Orchestrator runbook.
C. Create an asset credential.
D. Run the Invoke-Workflow Azure PowerShell cmdlet.
E. Import the SSH PowerShell Module.

**Correct Answer:** ACE
**Section: [none]**
**Explanation**

**Explanation/Reference:**
A: An Automation Account is a container for your Azure Automation resources: it provides a way to separate your environments or further organize your workflows.
To create An Automation Account

1. Log in to the Azure Management Portal.
2. In the Management Portal, click Create an Automation Account.
3. On the Add a New Automation Account page, enter a name and pick a region for the account.

Reference: Get started with Azure Automation
http://azure.microsoft.com/en-gb/documentation/articles/automation-create-runbook-from-samples/

C:
* Asset credentials are either a username and password combination that can be used with Windows PowerShell commands or a certificate that is uploaded to Azure Automation.
* The Assets page in Automation displays the various resources (also called “settings”) that are globally available to be used in or associated with a runbook, plus commands to import an integration module, add a new asset, or delete an asset. Assets include variables, schedules, credentials, and connections.

Reference: Getting Started with Azure Automation: Automation Assets
http://azure.microsoft.com/blog/2014/07/29/getting-started-with-azure-automation-automation-assets-2/

E:

Reference: Managing SSH enabled Linux hosts using Service Management Automation
http://blogs.technet.com/b/orchestrator/archive/2014/05/01/managing-ssh-enabled-linux-hosts-using-service-management-automation.aspx

**QUESTION 23**
A company has multiple Azure subscriptions. It plans to deploy a large number of virtual machines (VMs) into Azure.

You install the Azure PowerShell module, but you are unable connect to all of the company's Azure subscriptions.

You need to automate the management of the Azure subscriptions.

Which two Azure PowerShell cmdlets should you run?

A. Get-AzurePublishSettingsFile
B. Import-AzurePublishSettingsFile
C. Add-AzureSubscription
D. Import-AzureCertificate
E. Get-AzureCertificate

**Correct Answer:** AB
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Before you start using the Windows Azure cmdlets to automate deployments, you must configure connectivity between the provisioning computer and Windows Azure. You can do this automatically by downloading the PublishSettings file from Windows Azure and importing it.

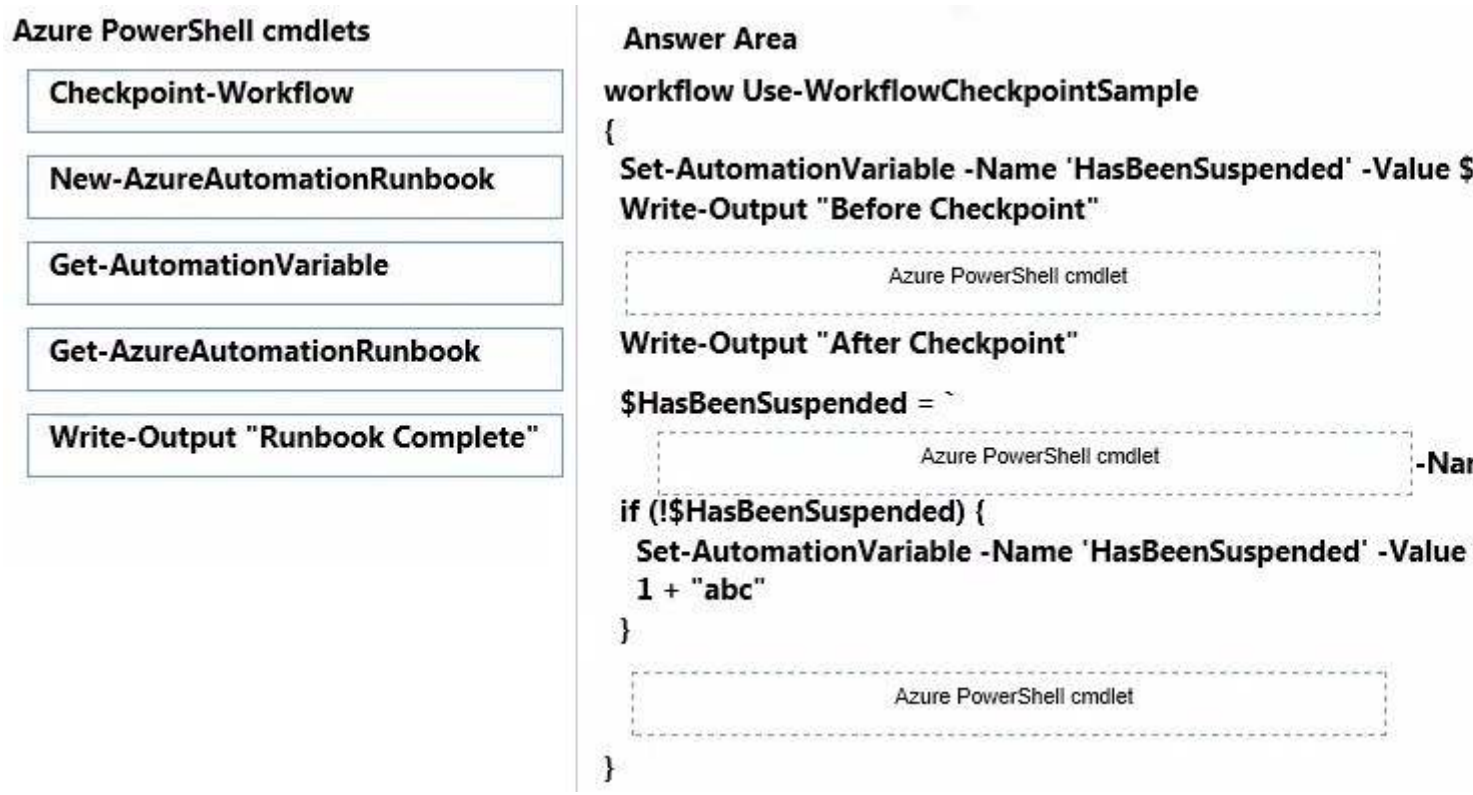
To download and import publish settings and subscription information
1. At the Windows PowerShell command prompt, type the following command, and then press Enter.
```
Get-AzurePublishSettingsFile
```
2. Sign in to the Windows Azure Management Portal, and then follow the instructions to download your Windows Azure publishing settings. Save the file as a .publishsettings type file to your computer.
3. In the Windows Azure PowerShell window, at the command prompt, type the following command, and then press Enter.
```
Import-AzurePublishSettingsFile <mysettings>.publishsettings
```

Reference: How to: Download and Import Publish Settings and Subscription Information
https://msdn.microsoft.com/en-us/library/dn385850%28v=nav.70%29.aspx

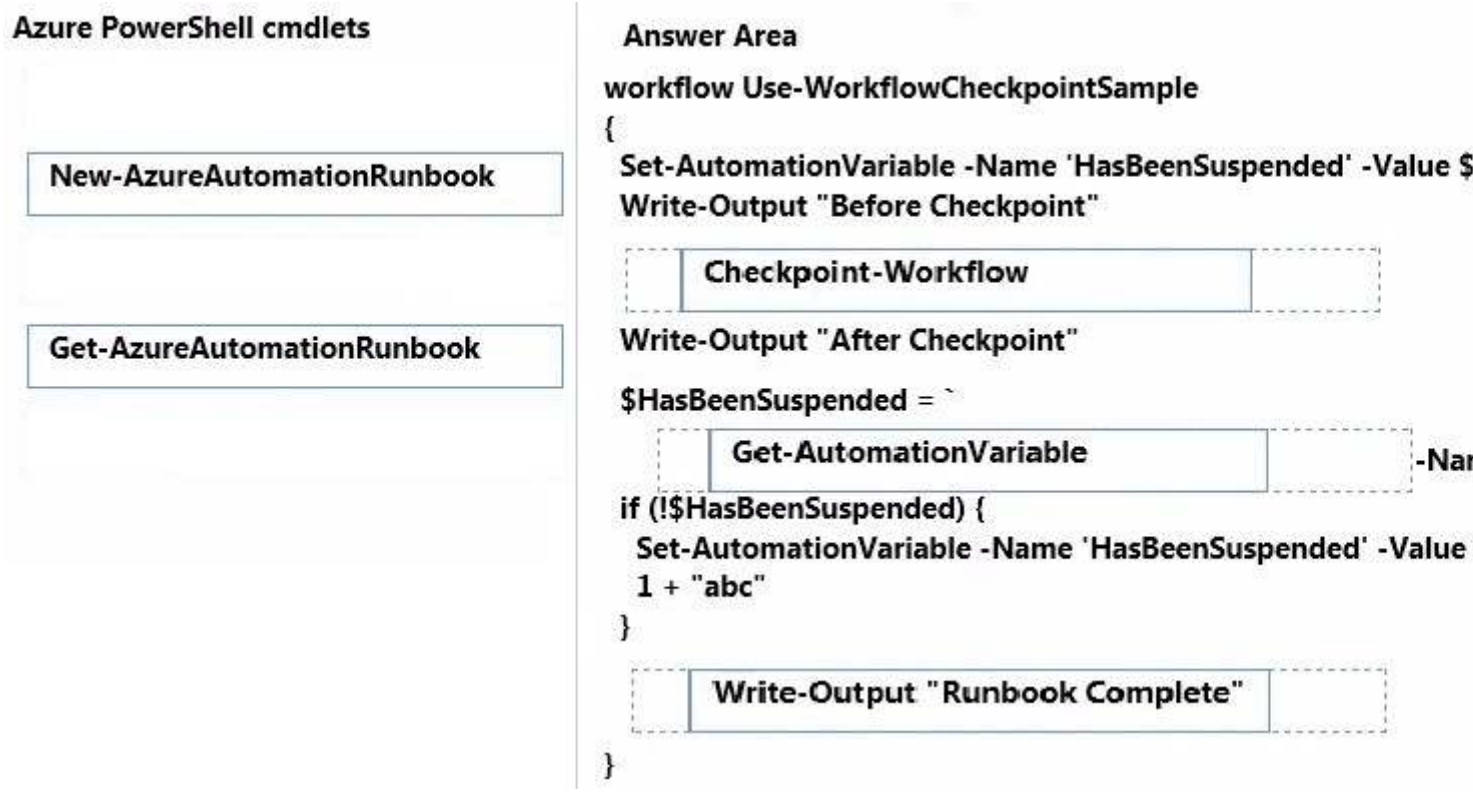
**QUESTION 24**
DRAG DROP
You need to automate tasks with Azure by using Azure PowerShell workflows.

How should you complete the Azure PowerShell script? To answer, drag the appropriate cmdlet to the correct location. Each cmdlet 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.

**Select and Place:**




**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**

```
workflow Use-WorkflowCheckpointSample
{
    # An exception occurs if 'HasBeenSuspended' does not already exist.
    # Exceptions that are not caught with a try/catch will cause the runbook to suspend.
    Set-AutomationVariable -Name 'HasBeenSuspended' -Value $False

    # This line occurs before the checkpoint. When the runbook is resumed after
    # suspension, 'Before Checkpoint' will not be output a second time.
    Write-Output "Before Checkpoint"

    # A checkpoint is created.
    Checkpoint-Workflow

    # This line occurs after the checkpoint. The runbook will start here on resume.
    Write-Output "After Checkpoint"

    $HasBeenSuspended = Get-AutomationVariable -Name 'HasBeenSuspended'

    # If branch only executes if the runbook has not previously suspended.
    if (!$HasBeenSuspended) {
        Set-AutomationVariable -Name 'HasBeenSuspended' -Value $True

        # This will cause a runtime exception. Any runtime exception in a runbook
        # will cause the runbook to suspend.
        1 + "abc"
    }

    Write-Output "Runbook Complete"
```

}
Reference: How to use workflow checkpoints in Azure Automation Runbooks
https://gallery.technet.microsoft.com/scriptcenter/How-to-use-workflow-cd57324f

**QUESTION 25**
HOTSPOT
A company uses Azure for several virtual machine (VM) and website workloads. The company plans to assign administrative roles to a specific group of users. You have a resource group named GROUP1 and a virtual machine named VM2.

The users have the following responsibilities:

| User | Responsibility |
|---|---|
| Admin1 | Control access to VM2. |
| Admin2 | Prepare reports with billing and usage information. |
| Admin3 | Maintain all resources in the GROUP1 resource group. |

You need to assign the appropriate level of privileges to each of the administrators by using the principle of least privilege.

What should you do? To answer, select the appropriate target objects and permission levels in the answer area.

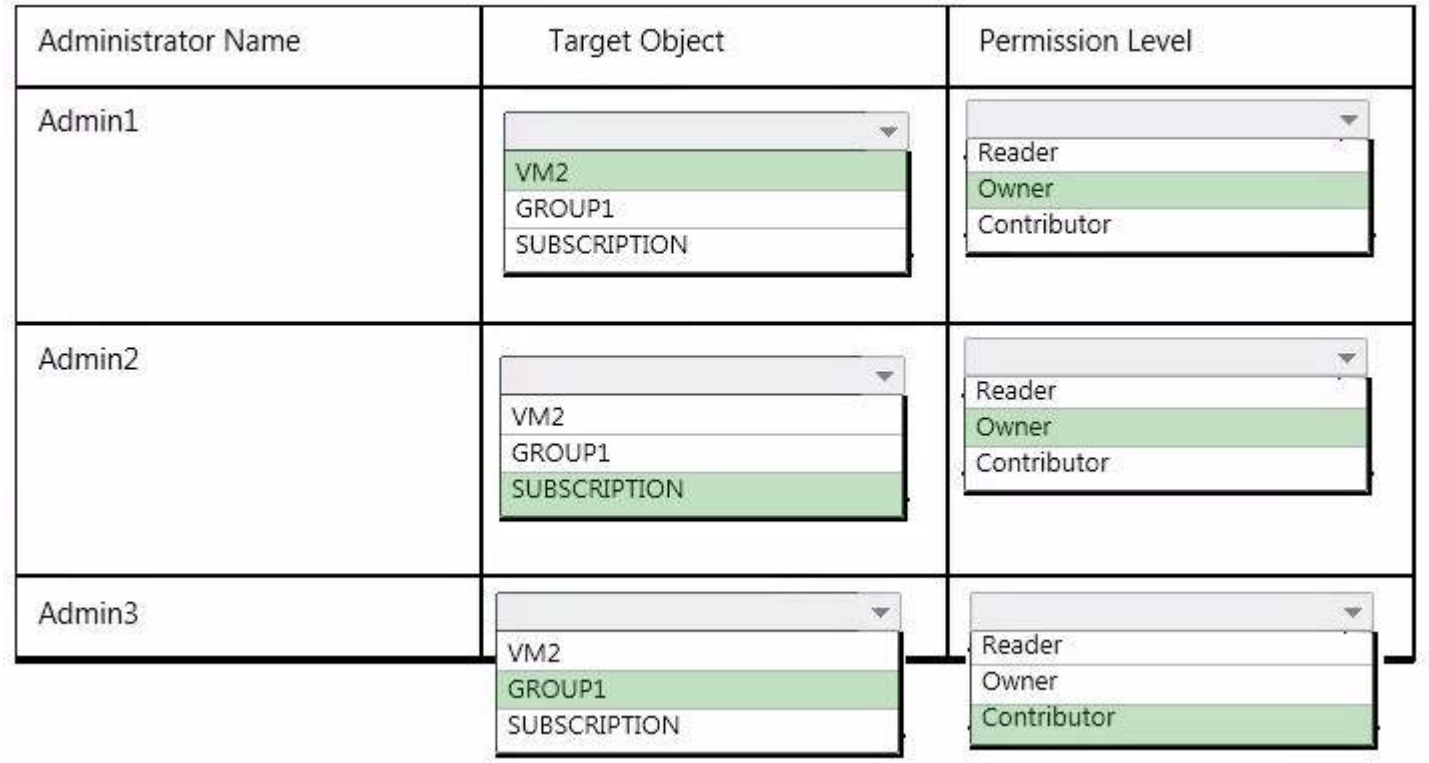
**Hot Area:**

**Answer Area**

| Administrator Name | Target Object | Permission Level |
|---|---|---|
| Admin1 | VM2 / GROUP1 / SUBSCRIPTION | Reader / Owner / Contributor |
| Admin2 | VM2 / GROUP1 / SUBSCRIPTION | Reader / Owner / Contributor |
| Admin3 | VM2 / GROUP1 / SUBSCRIPTION | Reader / Owner / Contributor |

**Correct Answer:**

**Answer Area**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
* Owner can manage everything, including access.

* Contributors can manage everything except access.

Note: Azure role-based access control allows you to grant appropriate access to Azure AD users, groups, and services, by assigning roles to them on a subscription or resource group or individual resource level.

Reference: Role-based access control in the Microsoft Azure portal
http://azure.microsoft.com/en-us/documentation/articles/role-based-access-control-configure/

**QUESTION 26**
HOTSPOT
Resources must authenticate to an identity provider.

You need to configure the Azure Access Control service.

What should you recommend? To answer, select the appropriate responses for each requirement in the answer area.

**Hot Area:**

**Answer Area**

| Action | Requirement |
|---|---|
| You must distribute an authorization token to a client when it authenticates against Windows Live ID. | Distribute an Identity Provider (IDP) token.<br>Distribute an Access Control Service token.<br>Distribute an Application Programming Interface |
| You must integrate an application with the Azure Access Control service. | Use WS-Trust.<br>Use Kerberos. |

**Correct Answer:**

**Answer Area**

| Action | Requirement |
|---|---|
| You must distribute an authorization token to a client when it authenticates against Windows Live ID. | Distribute an Identity Provider (IDP) token.<br>Distribute an Access Control Service token.<br>Distribute an Application Programming Interface |
| You must integrate an application with the Azure Access Control service. | Use WS-Trust.<br>Use Kerberos. |

**Section: [none]**
**Explanation**

**Explanation/Reference:**
Box 1:
* Token - A user gains access to an RP application by presenting a valid token that was issued by an authority that the RP application trusts.
* Identity Provider (IP) - An authority that authenticates user identities and issues security tokens, such as Microsoft account (Windows Live ID), Facebook, Google, Twitter, and Active Directory. When Azure Access Control (ACS) is configured to trust an IP, it accepts and validates the tokens that the IP issues. Because ACS can trust multiple IPs at the same time, when your application trusts ACS, you can your application can offer users the option to be authenticated by any of the IPs that ACS trusts on your behalf.

Reference: How to Authenticate Web Users with Azure Active Directory Access Control
http://azure.microsoft.com/en-gb/documentation/articles/active-directory-dotnet-how-to-use-access-control/

Box 2: WS-Trust is a web service (WS-*) specification and Organization for the Advancement of Structured

Information Standards (OASIS) standard that deals with the issuing, renewing, and validating of security tokens, as well as with providing ways to establish, assess the presence of, and broker trust relationships between participants in a secure message exchange. Azure Access Control (ACS) supports WS-Trust 1.3.

Incorrect:
ACS does not support Kerberos.

Reference: Protocols Supported in ACS
https://msdn.microsoft.com/en-us/library/azure/gg185948.aspx

**QUESTION 27**
Contoso, Ltd., uses Azure websites for public-facing customer websites. The company has a mobile app that requires customers sign in by using a Contoso customer account.

Customers must be able to sign on to the websites and mobile app by using a Microsoft, Facebook, or Google account. All transactions must be secured in-transit regardless of device.

You need to configure the websites and mobile app to work with external identity providers.

Which three actions should you perform? Each correct answer presents part of the solution.

A. Request a certificate from a domain registrar for the website URL, and enable TLS/SSL.
B. Configure IPsec for the websites and the mobile app.
C. Configure the KerberosTokenProfile 1.1 protocol.
D. Configure OAuth2 to connect to an external authentication provider.
E. Build an app by using MVC 5 that is hosted in Azure to provide a framework for the underlying authentication.

**Correct Answer:** ADE
**Section: [none]**
**Explanation**

**Explanation/Reference:**
DE: This tutorial shows you how to build an ASP.NET MVC 5 web application that enables users to log in using OAuth 2.0 with credentials from an external authentication provider, such as Facebook, Twitter, LinkedIn, Microsoft, or Google.

A:
* You will now be redirected back to the Register page of the MvcAuth application where you can register your Google account. You have the option of changing the local email registration name used for your Gmail account, but you generally want to keep the default email alias (that is, the one you used for authentication). Click Register.

* To connect to authentication providers like Google and Facebook, you will need to set up IIS-Express to use SSL.

Reference: Code! MVC 5 App with Facebook, Twitter, LinkedIn and Google OAuth2 Sign-on (C#)
http://www.asp.net/mvc/overview/security/create-an-aspnet-mvc-5-app-with-facebook-and-google-oauth2-and-openid-sign-on

**QUESTION 28**
You are designing a solution that will interact with non-Windows applications over unreliable network connections. You have a security token for each non-Windows application.

You need to ensure that non-Windows applications retrieve messages from the solution.

Where should you retrieve messages?

A. An Azure Queue
B. The Azure Service Bus Queue
C. An Azure blob storage container that has a private access policy
D. Azure Table storage

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Any Microsoft or non-Microsoft applications can use a Service Bus REST API to manage and access messaging entities over HTTPS.
By using REST applications based on non-Microsoft technologies (e.g. Java, Ruby, etc.) are allowed not only to send and receive messages from the Service Bus, but also to create or delete queues, topics and subscription in a given namespace.

Reference: Service Bus Explorer
https://code.msdn.microsoft.com/windowsazure/service-bus-explorer-f2abca5a

**QUESTION 29**
You are the administrator for a company named Contoso, Ltd.

Contoso also has an Azure subscription and uses many on-premises Active Directory products as roles in Windows Server including the following:
- Active Directory Domain Services (AD DS)
- Active Directory Certificate Services (AD CS)
- Active Directory Rights Management Services (AD RMS)
- Active Directory Lightweight Directory Services (AD LDS)
- Active Directory Federation Services (AD FS).

Contoso must use the directory management services available in Azure Active Directory.

You need to provide information to Contoso on the similarities and differences between Azure Active Directory and the Windows Server Active Directory family of services.

Which feature does Azure Active Directory and on-premises Active Directory both support?

A. Using the GraphAPI to query the directory
B. Issuing user certificates
C. Supporting single sign-on (SSO)
D. Querying the directory with LDAP

**Correct Answer:** C
**Section: [none]**
**Explanation**

**Explanation/Reference:**
AD FS supports Web single-sign-on (SSO) technologies, and so does Azure Active Directory.
If you want single sign on we usually suggest using ADFS if you're a Windows shop. Going forward though, Azure Active Directory is another alternative you can use.

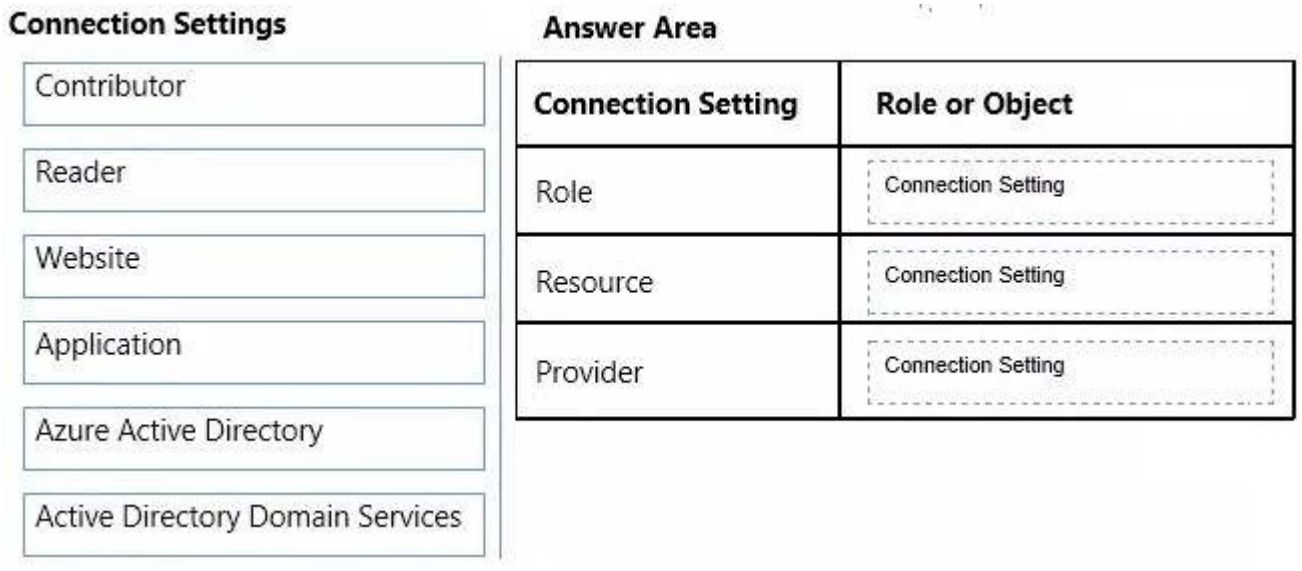
Reference: Using Azure Active Directory for Single Sign On with Yammer
https://samlman.wordpress.com/2015/03/02/using-azure-active-directory-for-single-sign-on-with-yammer/

**QUESTION 30**
DRAG DROP
Contoso, Ltd., uses Azure websites for their company portal sites.

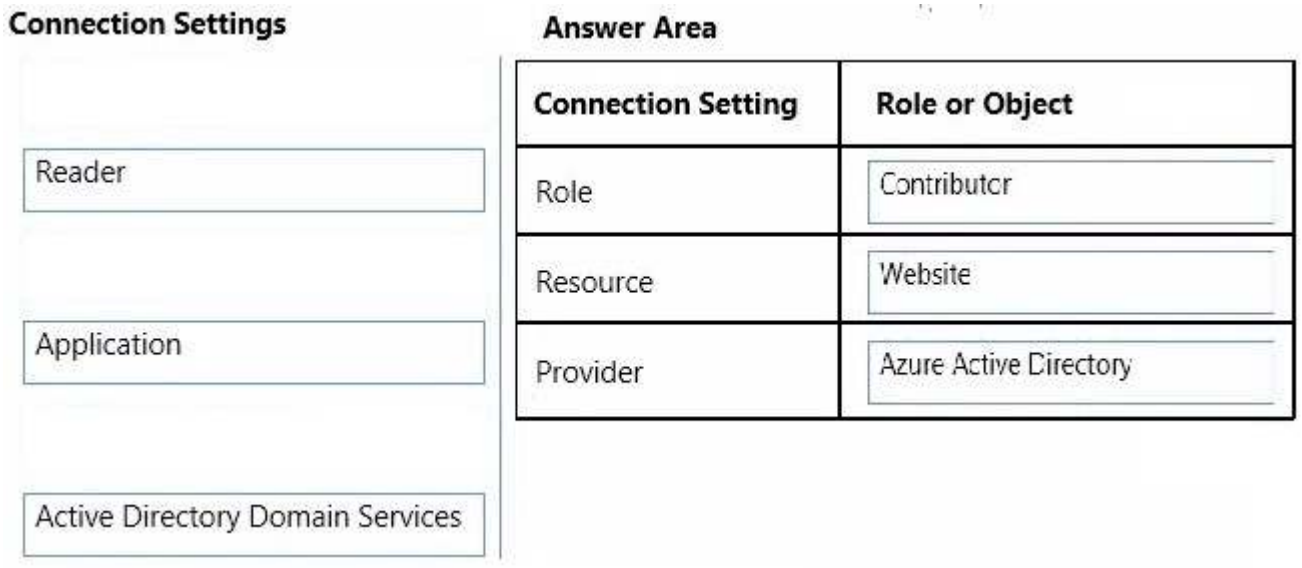
Admin users need enough access to effectively perform site monitoring or management tasks.
You need to grant admin access to a group of 10 users.

How should you configure the connection? To answer, drag the role or object to the correct connection setting. Each item 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.

**Select and Place:**




**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
Reference: RBAC and Azure Websites Publishing
http://azure.microsoft.com/blog/2015/01/05/rbac-and-azure-websites-publishing/

**QUESTION 31**
A company has a very large dataset that includes sensitive information. The dataset is over 30 TB in size.

You have a standard business-class ISP internet connection that is rated at 100 megabits/second.

You have 10 4-TB hard drives that are approved to work with the Azure Import/Export Service.

You need to migrate the dataset to Azure. The solution must meet the following requirements:
- The dataset must be transmitted securely to Azure.
- Network bandwidth must not increase.
- Hardware costs must be minimized.

What should you do?

A. Prepare the drives with the Azure Import/Export tool and then create the import job. Ship the drives to Microsoft via a supported carrier service.
B. Create an export job and then encrypt the data on the drives by using the Advanced Encryption Standard (AES). Create a destination Blob to store the export data.
C. Create an import job and then encrypt the data on the drives by using the Advanced Encryption Standard (AES). Create a destination Blob to store the import data.
D. Prepare the drives by using Sysprep.exe and then create the import job. Ship the drives to Microsoft via a supported carrier service.

**Correct Answer:** A
**Section: [none]**
**Explanation**

**Explanation/Reference:**
You can use the Microsoft Azure Import/Export service to transfer large amounts of file data to Azure Blob storage in situations where uploading over the network is prohibitively expensive or not feasible.

Reference: Use the Microsoft Azure Import/Export Service to Transfer Data to Blob Storage
http://azure.microsoft.com/en-gb/documentation/articles/storage-import-export-service/

**QUESTION 32**
DRAG DROP
You are migrating Active Directory Domain Services (AD DS) domains to Azure.

You need to recommend the least complex directory synchronization solution.

What should you recommend? To answer, drag the appropriate solution to the correct client requirement. Each solution 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.

**Select and Place:**

| Solutions |
| --- |
| Directory Sync (DirSync) with Password Sync |
| Directory Sync (DirSync) with single sign-on (SSO) |
| Azure Access Control Service |

| Answer Area |
| --- |
| **Client requirements** |
| Customize the user sign-in page. |
| Enable users to sign in and access cloud services using their on-premises password. |
| Ensure user authentications occur in the on-premises Active Directory. |
| Control password policies from the on-premises Active Directory. |

**Correct Answer:**

| Solutions |
| --- |
| Directory Sync (DirSync) with Password Sync |
| Directory Sync (DirSync) with single sign-on (SSO) |
| Azure Access Control Service |

| Answer Area |
| --- |
| **Client requirements** |
| Customize the user sign-in page. |
| Enable users to sign in and access cloud services using their on-premises password. |
| Ensure user authentications occur in the on-premises Active Directory. |
| Control password policies from the on-premises Active Directory. |

**Section: [none]**
**Explanation**

**Explanation/Reference:**

**QUESTION 33**
DRAG DROP
You have a web application on Azure.

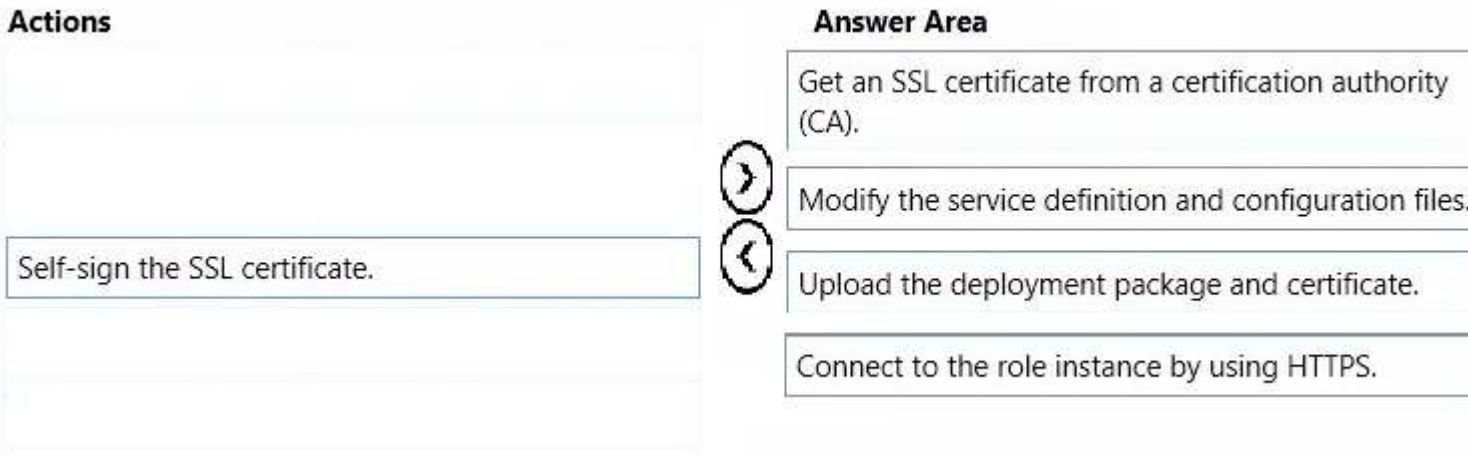
The web application does not employ Secure Sockets Layer (SSL).

You need to enable SSL for your production deployment web application on Azure.

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

**Select and Place:**


**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
Reference: Configuring SSL for an application in Azure
http://azure.microsoft.com/en-gb/documentation/articles/cloud-services-configure-ssl-certificate/

**QUESTION 34**
You are designing an Azure web application.

All users must authenticate by using Active Directory Domain Services (AD DS) credentials.

You need to recommend an approach to enable single sign-on to the application for domain-authenticated users.

Which two actions should you recommend? Each correct answer presents part of the solution.

A. Use Forms authentication to generate claims.
B. Use the SQL membership provider in the web application.
C. Use Windows Identity Foundation in the web application.
D. Use Active Directory Federation Services (AD FS) to generate claims.

**Correct Answer:** CD
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Reference: What is Windows Identity Foundation?
https://msdn.microsoft.com/en-us/library/ee748475.aspx

Reference: DirSync with Single Sign-On
https://msdn.microsoft.com/en-us/library/azure/dn441213.aspx

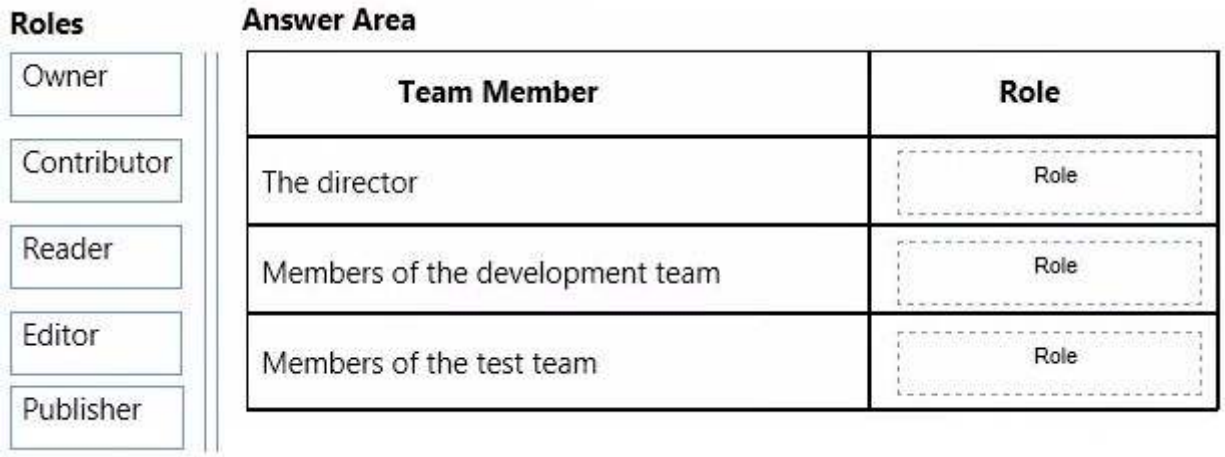
**QUESTION 35**
DRAG DROP
You are the Azure architect for an organization. You are working with C-level management to assign Azure role-based access control roles to a team within the organization. A single director oversees two teams, a development team and a test team. The director is wholly responsible for the organization's Azure account, including billing, infrastructure, and access control. The director is the only member of the team with the ability to alter access controls.

You have the following requirements:
- Members of the development team must be able to view or alter Azure infrastructure to support application development.
- Members of the test team must be able to view Azure infrastructure to support test cases.

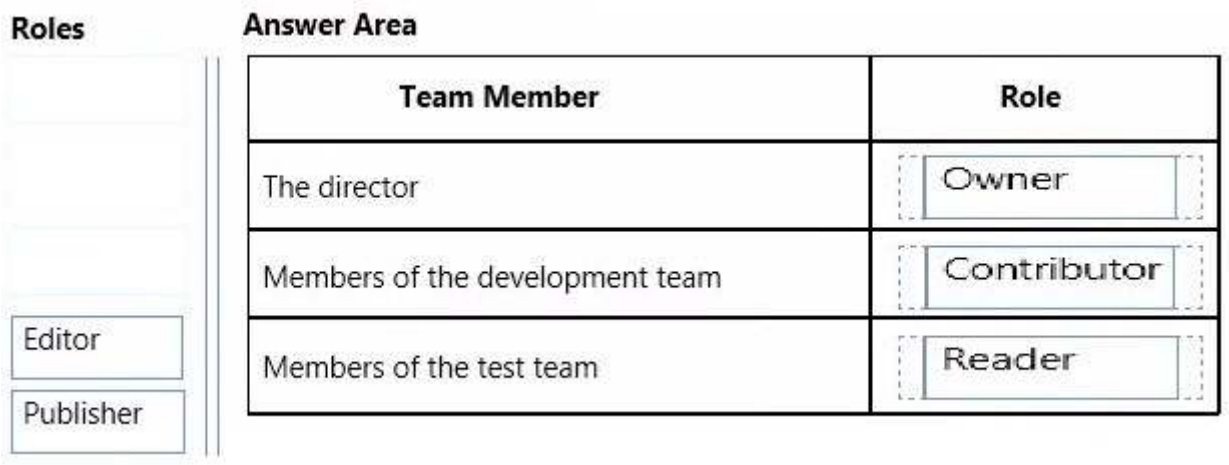
You need to assign built-in Azure role-based access control roles to team members within the organization.

Which role should you assign to each team member? To answer, drag the appropriate role to the correct team member. Each role 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.

**Select and Place:**



**Correct Answer:**




**Section: [none]**
**Explanation**

**Explanation/Reference:**
Reference: Role-based access control in the Microsoft Azure portal
http://azure.microsoft.com/en-us/documentation/articles/role-based-access-control-configure/

**QUESTION 36**
You are designing an Azure application that provides online backup storage for hundreds of media files. Each file is larger than 1GB.

The data storage solution has the following requirements:
It must be capable of storing an average of 1TB of data for each user.
It must support sharing of data between all Windows Azure instances.
It must provide random read/write access.

You need to recommend a durable data storage solution.

What should you recommend?

A. Azure Drive
B. Azure Page Blob service
C. Azure Block Blob service
D. Local storage on an Azure instance

**Correct Answer:** B
**Section: [none]**
**Explanation**

**Explanation/Reference:**
Reference: Understanding Block Blobs and Page Blobs
https://msdn.microsoft.com/en-us/library/azure/ee691964.aspx