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Exam Name: Developing Solutions for
Microsoft Azure

Version: Demo

Testlet 1

Case Study

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Background

You are a developer for Proseware, Inc. You are developing an application that applies a set of governance policies for Proseware's internal services, external services, and applications. The application will also provide a shared library for common functionality.

Requirements

Policy service

You develop and deploy a stateful ASP.NET Core 2.1 web application named Policy service to an Azure App Service Web App. The application reacts to events from Azure Event Grid and performs policy actions based on those events.

The application must include the Event Grid Event ID field in all Application Insights telemetry.

Policy service must use Application Insights to automatically scale with the number of policy actions that it is performing.

Policies

Log Policy

All Azure App Service Web Apps must write logs to Azure Blob storage. All log files should be saved to a container named logdrop. Logs must remain in the container for 15 days.

Authentication events

Authentication events are used to monitor users signing in and signing out. All authentication events must be processed by Policy service. Sign outs must be processed as quickly as possible.

PolicyLib

You have a shared library named PolicyLib that contains functionality common to all ASP.NET Core web services and applications. The PolicyLib library must:

Exclude non-user actions from Application Insights telemetry.

Provide methods that allow a web service to scale itself

Ensure that scaling actions do not disrupt application usage

Other

Anomaly detection service

You have an anomaly detection service that analyzes log information for anomalies. It is implemented as an Azure Machine Learning model. The model is deployed as a web service. If an anomaly is detected, an Azure Function that emails administrators is called by using an HTTP WebHook.

Health monitoring

All web applications and services have health monitoring at the /health service endpoint.

Issues

Policy loss

When you deploy Policy service, policies may not be applied if they were in the process of being applied during the deployment.

Performance issue

When under heavy load, the anomaly detection service undergoes slowdowns and rejects connections.

Notification latency

Users report that anomaly detection emails can sometimes arrive several minutes after an anomaly is detected.

App code

Relevant portions of the app files are shown below. Line numbers are included for reference only and include a two-character prefix that denotes the specific file to which they belong.

```
EventGridController.cs
EG01 public class EventGridController : Controller
EG02 {
EG03     public static AsyncLocal<string> EventId = new AsyncLocal<string>();
EG04     public IActionResult Process([FromBody] string eventsJson)
EG05     {
EG06         var events = JObject.Parse(eventsJson);
EG07
EG08         foreach (var @event in events)
EG09         {
EG10             EventId.Value = @event["id"].ToString();
EG11             if (@event["topic"].ToString().Contains("providers/Microsoft.Storage"))
EG12             {
EG13                 SendToAnomalyDetectionService(@event["data"]["url"].ToString());
EG14             }
EG15
EG16             {
EG17                 EnsureLogging(@event["subject"].ToString());
EG18             }
EG19         }
EG20         return null;
EG21     }
EG22     private void EnsureLogging(string resource)
EG23     {
EG24         . . .
EG25     }
EG26     private async Task SendToAnomalyDetectionService(string uri)
EG27     {
EG28         var content = GetLogData(uri);
EG29         var scoreRequest = new
EG30         {
EG31             Inputs = new Dictionary<string, List<Dictionary<string, string>>>()
EG32             {
EG33                 {
EG34                     "input1",
```

```

EG35         new List<Dictionary<string, string>>()
EG36         {
EG37             new Dictionary<string, string>()
EG38             {
EG39                 {
EG40                     "logcontent", content
EG41                 }
EG42             }
EG43         }
EG44     },
EG45 },
EG46     GlobalParameters = new Dictionary<string, string>() { }
EG47 };
EG48 var result = await (new HttpClient()).PostAsJsonAsync(".", scoreRequest);
EG49 var rawModelResult = await result.Content.ReadAsStringAsync();
EG50 var modelResult = JObject.Parse(rawModelResult);
EG51 if (modelResult["notify"].HasValues)
EG52 {
EG53     . . .
EG54 }
EG55 }
EG56 private (string name, string resourceGroup) ParseResourceId(string
resourceId)
EG57 {
EG58     . . .
EG59 }
EG60 private string GetLogData(string uri)
EG61 {
EG62     . . .
EG63 }
EG64 static string BlobStoreAccountSAS(string containerName)
EG65 {
EG66     . . .
EG67 }
EG68 }

```

Relevant portions of the app files are shown below. Line numbers are included for reference only and include a two-character prefix that denotes the specific file to which they belong.

LoginEvent.cs

```

LE01 public class LoginEvent
LE02 {
LE03
LE04 public string subject { get; set; }
LE05 public DateTime eventTime { get; set; }
LE06 public Dictionary<string, string> data { get; set; }
LE07 public string Serialize()
LE08 {
LE09     return JsonConvert.SerializeObject(this);
LE10 }
LE11 }

```

Q1

You need to resolve a notification latency issue.

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

NOTE: Each correct selection is worth one point.

- A. Set Always On to false.
- B. Set Always On to true.
- C. Ensure that the Azure Function is set to use a consumption plan.
- D. Ensure that the Azure Function is using an App Service plan.

Answer: BD

Explanation:

Azure Functions can run on either a Consumption Plan or a dedicated App Service Plan. If you run in a dedicated mode, you need to turn on the Always On setting for your Function App to run properly. The Function runtime will go idle after a few minutes of inactivity, so only HTTP triggers will actually "wake up" your functions. This is similar to how WebJobs must have Always On enabled.

Scenario: Notification latency: Users report that anomaly detection emails can sometimes arrive several minutes after an anomaly is detected.

Anomaly detection service: You have an anomaly detection service that analyzes log information for anomalies. It is implemented as an Azure Machine Learning model. The model is deployed as a web service.

If an anomaly is detected, an Azure Function that emails administrators is called by using an HTTP WebHook.

References:

<https://github.com/Azure/Azure-Functions/wiki/Enable-Always-On-when-running-on-dedicated-App-Service-Plan>

Develop Azure Infrastructure as a Service Compute Solutions

Testlet 2

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LabelMaker app

Coho Winery produces bottles, and distributes a variety of wines globally. You are a developer implementing highly scalable and resilient applications to support online order processing by using Azure solutions.

Coho Winery has a LabelMaker application that prints labels for wine bottles. The application sends data to several printers. The application consists of five modules that run independently on virtual machines (VMs).

Coho Winery plans to move the application to Azure and continue to support label creation.

External partners send data to the LabelMaker application to include artwork and text for custom label designs.

Requirements

Data

You identify the following requirements for data management and manipulation:

Order data is stored as nonrelational JSON and must be queried using Structured Query Language (SQL).

Changes to the Order data must reflect immediately across all partitions. All reads to the Order data must fetch the most recent writes.

Security

You have the following security requirements:

Users of Coho Winery applications must be able to provide access to documents, resources, and applications to external partners.

External partners must use their own credentials and authenticate with their organization's identity management solution.

External partner logins must be audited monthly for application use by a user account administrator to maintain company compliance.

Storage of e-commerce application settings must be maintained in Azure Key Vault.

E-commerce application sign-ins must be secured by using Azure App Service authentication and Azure Active Directory (AAD).

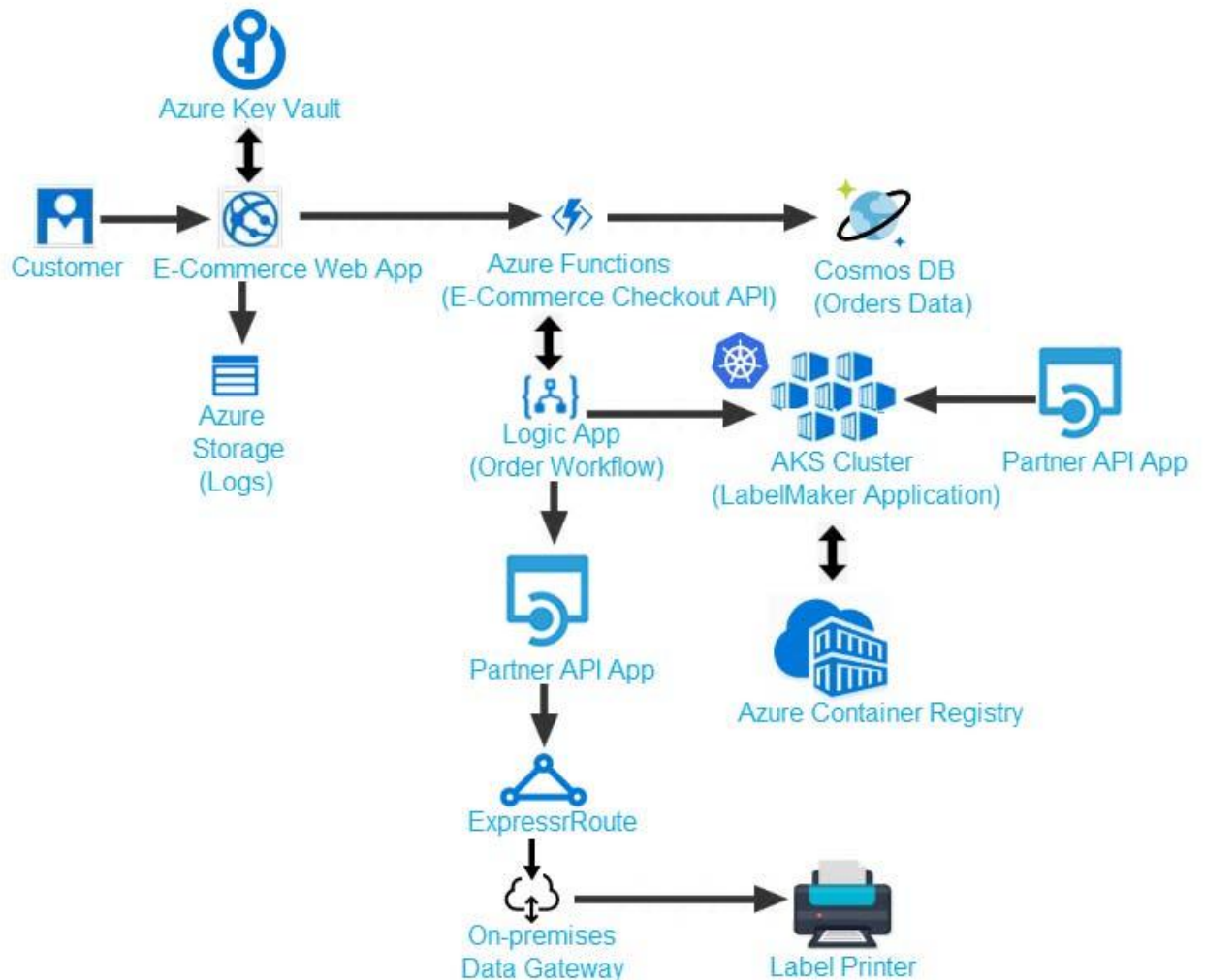
Conditional access policies must be applied at the application level to protect company content

The LabelMaker applications must be secured by using an AAD account that has full access to all namespaces of the Azure Kubernetes Service (AKS) cluster.

LabelMaker app Azure Monitor Container Health must be used to monitor the performance of workloads that are deployed to Kubernetes environments and hosted on Azure Kubernetes Service (AKS).

You must use Azure Container Registry to publish images that support the AKS deployment.

Architecture



Issues

Calls to the Printer API App fail periodically due to printer communication timeouts. Printer communications timeouts occur after 10 seconds. The label printer must only receive up to 5 attempts within one minute.

The order workflow fails to run upon initial deployment to Azure.

Order .json

Relevant portions of the app files are shown below. Line numbers are included for reference only.

This JSON file contains a representation of the data for an order that includes a single item.

```
01 {
02   "id" : 1,
03   "customers" : [
04     {
05       "familyName" : "Doe",
06       "givenName" : "John",
07       "customerid" : 5
08     }
09   ],
10   "line_items" : [
11     {
12       "fulfillable_quantity" : 1,
13       "id" : 6,
14       "price" : "199.99",
15       "product_id" : 7513594,
16       "quantity": 1,
17       "requires_shipping" : true,
18       "sku" : "SFC-342-N" ,
19       "title" : "Surface Go",
20       "vendor" : "Microsoft" ,
21       "name" : "Surface Go - 8GB",
22       "taxable" : true,
23       "tax_lines" : [
24         {
25           "title" : "State Tax",
26           "price" : "3.99",
27           "rate" : 0.06
28         }
29       ],
30       "total_discount" : "5.00"
```

Q2

HOTSPOT

You need to ensure that you can deploy the LabelMaker application.

How should you complete the CLI commands? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:

Answer Area

az create --name --location eastus

az create --resource-group CohoWineryLabelMaker --name
 --node-count 5 --enable-addons

Answer:

Answer Area

az create --name --location eastus

az create --resource-group CohoWineryLabelMaker --name
 --node-count 5 --enable-addons

Explanation:

Box 1: group

Create a resource group with the az group create command. An Azure resource group is a logical group in which Azure resources are deployed and managed.

The following example creates a resource group named myResourceGroup in the westeurope location.

```
az group create --name myResourceGroup --location westeurope
```

Box 2: CohoWinterLabelMaker

Use the resource group named, which is used in the second command.

Box 3: aks

The command az aks create, is used to create a new managed Kubernetes cluster.

Box 4: monitoring

Scenario: LabelMaker app

Azure Monitor Container Health must be used to monitor the performance of workloads that are deployed to Kubernetes environments and hosted on Azure Kubernetes Service (AKS).

You must use Azure Container Registry to publish images that support the AKS deployment.

Develop Azure Infrastructure as a Service Compute Solutions

Testlet 3

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Background

Wide World Importers is moving all their datacenters to Azure. The company has developed several applications and services to support supply chain operations and would like to leverage serverless computing where possible.

Current environment

Windows Server 2016 virtual machine

This virtual machine (VM) runs Biz Talk Server 2016. The VM runs the following workflows:

Ocean Transport ?This workflow gathers and validates container information including container contents and arrival notices at various shipping ports.

Inland Transport ?This workflow gathers and validates trucking information including fuel usage, number of stops, and routes.

The VM supports the following REST API calls:

Container API ?This API provides container information including weight, contents, and other attributes.

Location API ?This API provides location information regarding shipping ports of call and truck stops.

Shipping REST API ?This API provides shipping information for use and display on the shipping website.

Shipping Data

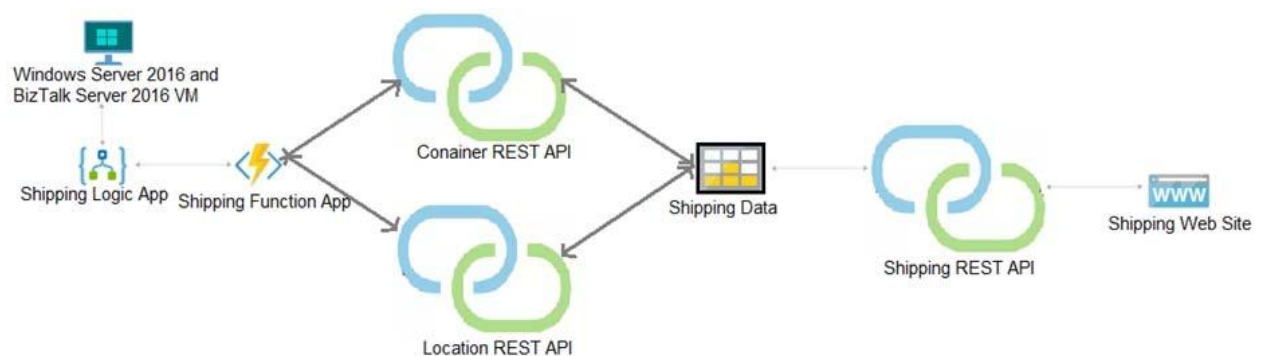
The application uses MongoDB JSON document storage database for all container and transport information.

Shipping Web Site

The site displays shipping container tracking information and container contents. The site is located at [http:// shipping.wideworldimporters.com](http://shipping.wideworldimporters.com)

Proposed solution

The on-premises shipping application must be moved to Azure. The VM has been migrated to a new Standard_D16s_v3 Azure VM by using Azure Site Recovery and must remain running in Azure to complete the BizTalk component migrations. You create a Standard_D16s_v3 Azure VM to host BizTalk Server. The Azure architecture diagram for the proposed solution is shown below:



Shipping Logic App

The Shipping Logic app must meet the following requirements:

Support the ocean transport and inland transport workflows by using a Logic App.

Support industry-standard protocol X12 message format for various messages including vessel content details and arrival notices.

Secure resources to the corporate VNet and use dedicated storage resources with a fixed costing model.

Maintain on-premises connectivity to support legacy applications and final BizTalk migrations.

Shipping Function app

Implement secure function endpoints by using app-level security and include Azure Active Directory (Azure AD).

REST APIs

The REST API's that support the solution must meet the following requirements:

Secure resources to the corporate VNet.

Allow deployment to a testing location within Azure while not incurring additional costs.

Automatically scale to double capacity during peak shipping times while not causing application downtime.

Minimize costs when selecting an Azure payment model.

Shipping data

Data migration from on-premises to Azure must minimize costs and downtime.

Shipping website

Use Azure Content Delivery Network (CDN) and ensure maximum performance for dynamic content while minimizing latency and costs.

Issues

Windows Server 2016 VM

The VM shows high network latency, jitter, and high CPU utilization. The VM is critical and has not been backed up in the past. The VM must enable a quick restore from a 7-day snapshot to include in-place restore

of disks in case of failure.

Shipping website and REST APIs

The following error message displays while you are testing the website:

```
Failed to load http://test-shippingapi.wideworldimporters.com/: No 'Access-Control-Allow-Origin' header is present on the requested resource. Origin 'http://testwideworldimporters.com/' is therefore not allowed access.
```

Q3

You need to support the requirements for the Shipping Logic App.

What should you use?

- A. Azure Active Directory Application Proxy
- B. Point-to-Site (P2S) VPN connection
- C. Site-to-Site (S2S) VPN connection
- D. On-premises Data Gateway

Answer: D

Explanation:

Before you can connect to on-premises data sources from Azure Logic Apps, download and install the on-premises data gateway on a local computer. The gateway works as a bridge that provides quick data transfer and encryption between data sources on premises (not in the cloud) and your logic apps.

The gateway supports BizTalk Server 2016.

Note: Microsoft have now fully incorporated the Azure BizTalk Services capabilities into Logic Apps and Azure App Service Hybrid Connections.

Logic Apps Enterprise Integration pack bring some of the enterprise B2B capabilities like AS2 and X12, EDI standards support

Scenario: The Shipping Logic app must meet the following requirements:

Support the ocean transport and inland transport workflows by using a Logic App.

Support industry standard protocol X12 message format for various messages including vessel content details and arrival notices.

Secure resources to the corporate VNet and use dedicated storage resources with a fixed costing model.

Maintain on-premises connectivity to support legacy applications and final BizTalk migrations.

References:

<https://docs.microsoft.com/en-us/azure/logic-apps/logic-apps-gateway-install>

Q4

HOTSPOT

You need to configure Azure App Service to support the REST API requirements.

Which values should you use? To answer, select the appropriate options in the answer area.

NOTE: Each correct selection is worth one point.

Hot Area:

Answer Area

Setting	Value
Plan	<input type="text" value=""/> Basic Standard Premium Isolated
Instance Count	<input type="text" value=""/> 1 10 20 100

Answer:

Answer Area

Setting	Value
Plan	<input type="text" value="Plan"/> ▼
	Basic
	Standard
	Premium
	Isolated
Instance Count	<input type="text" value="Instance Count"/> ▼
	1
	10
	20
	100

Explanation:

Plan: Standard

Standard support auto-scaling

Instance Count: 10

Max instances for standard is 10.

Scenario:

The REST API's that support the solution must meet the following requirements:

Allow deployment to a testing location within Azure while not incurring additional costs.

Automatically scale to double capacity during peak shipping times while not causing application downtime.

Minimize costs when selecting an Azure payment model.

References:

<https://azure.microsoft.com/en-us/pricing/details/app-service/plans/>

Develop Azure Infrastructure as a Service Compute Solutions

Question Set 4

Q5

You are writing code to create and run an Azure Batch job.

You have created a pool of compute nodes.

You need to choose the right class and its method to submit a batch job to the Batch service.

Which method should you use?

- A. `JobOperations.EnableJobAsync(String, IEnumerable<BatchClientBehavior>, CancellationTokens)`
- B. `JobOperations.CreateJob()`
- C. `CloudJob.Enable(IEnumerable<BatchClientBehavior>)`
- D. `JobOperations.EnableJob(String, IEnumerable<BatchClientBehavior>)`
- E. `CloudJob.CommitAsync(IEnumerable<BatchClientBehavior>, CancellationTokens)`

Answer: E

Explanation:

A Batch job is a logical grouping of one or more tasks. A job includes settings common to the tasks, such as priority and the pool to run tasks on. The app uses the

`BatchClient.JobOperations.CreateJob` method to create a job on your pool.

The `Commit` method submits the job to the Batch service. Initially the job has no tasks.

```
{  
CloudJob job = batchClient.JobOperations.CreateJob();  
job.Id = jobId;  
job.PoolInformation = new PoolInformation { PoolId = PoolId }; job.Commit();  
}
```

...

References:

<https://docs.microsoft.com/en-us/azure/batch/quick-run-dotnet>

Q6

DRAG DROP

You are developing Azure WebJobs.

You need to recommend a WebJob type for each scenario.

Which WebJob type should you recommend? To answer, drag the appropriate WebJob types to the correct scenarios. Each WebJob type 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.

NOTE: Each correct selection is worth one point.

Select and Place:

Answer Area

WebJob types	Scenario	WebJob type
<input type="text" value="Triggered"/>	Run on all instances that the web app runs on. Optionally restrict the WebJob to a single instance.	<input type="text"/>
<input type="text" value="Continuous"/>	Run on a single instance that Azure select for load balancing.	<input type="text"/>
	Supports remote debugging	<input type="text"/>

Answer:

Answer Area

WebJob types	Scenario	WebJob type
Triggered	Run on all instances that the web app runs on. Optionally restrict the WebJob to a single instance.	Continuous
Continuous	Run on a single instance that Azure select for load balancing.	Triggered
	Supports remote debugging	Continuous

Explanation:

Box 1: Continuous

Continuous runs on all instances that the web app runs on. You can optionally restrict the WebJob to a single instance.

Box 2: Triggered

Triggered runs on a single instance that Azure selects for load balancing.

Box 3: Continuous

Continuous supports remote debugging.

Note:

The following table describes the differences between continuous and triggered WebJobs.

Continuous	Triggered
Starts immediately when the WebJob is created. To keep the job from ending, the program or script typically does its work inside an endless loop. If the job does end, you can restart it.	Starts only when triggered manually or on a schedule.
Runs on all instances that the web app runs on. You can optionally restrict the WebJob to a single instance.	Runs on a single instance that Azure selects for load balancing.
Supports remote debugging.	Doesn't support remote debugging.

References:

<https://docs.microsoft.com/en-us/azure/app-service/web-sites-create-web-jobs>

Q7

DRAG DROP

You are developing a software solution for an autonomous transportation system. The solution uses large data sets and Azure Batch processing to simulate navigation sets for entire fleets of vehicles.

You need to create compute nodes for the solution on Azure Batch.

What should you do?

Put the actions in the correct order.

Select and Place:

Select these

In the Azure CLI, run the command: az batch account create

In Azure CLI, run the command: az batch task create

In Azure CLI, run the command: az batch pool create

In Azure CLI, run the command: az batch job create

Place here

Four empty rectangular boxes for placing the actions in the correct order.

Answer:

Select these

Four empty rectangular boxes for selecting the actions.

Place here

Four rectangular boxes containing the actions in the correct order:
1. In the Azure CLI, run the command: az batch account create
2. In Azure CLI, run the command: az batch pool create
3. In Azure CLI, run the command: az batch job create
4. In Azure CLI, run the command: az batch task create

Explanation:

With the Azure CLI:

Step 1: In the Azure CLI, run the command: `az batch account create` First we create a batch account.

Step 2: In Azure CLI, run the command: `az batch pool create`

Now that you have a Batch account, create a sample pool of Linux compute nodes using the `az batch pool create` command.

Step 3: In Azure CLI, run the command: `az batch job create`

Now that you have a pool, create a job to run on it. A Batch job is a logical group for one or more tasks. A job includes settings common to the tasks, such as priority and the pool to run tasks on. Create a Batch job by using the `az batch job create` command.

Step 4: In Azure CLI, run the command: `az batch task create`

Now use the `az batch task create` command to create some tasks to run in the job.

References:

<https://docs.microsoft.com/en-us/azure/batch/quick-create-cli>