Microsoft

AZ-300T02 Module 02: Implementing and Managing Storage

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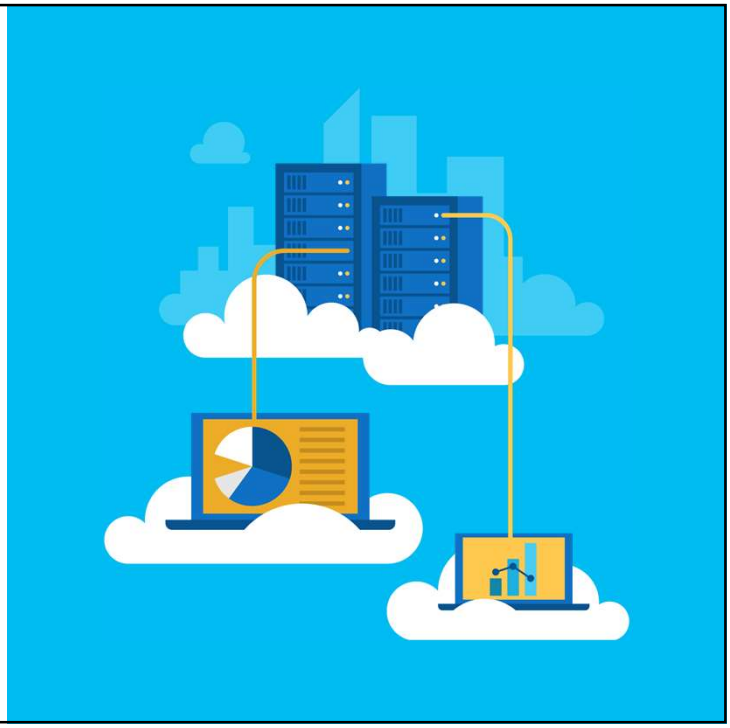

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Module 02: Implementing and Managing Storage

Lesson 01: Azure Storage Accounts

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Azure Storage

Azure Storage serves as:

- **Storage for Azure VMs:**
  - **operating system and data disks**
  - **file storage**
- **Store for unstructured data:**
  - **Blobs**
  - **Queues**
  - **Data Lake Store**
- **Store for structured data:**
  - **Tables**
  - **Cosmos DB**
  - **Azure SQL Database**

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Storage Account Endpoints

- Blob service: http://*mystorageaccount*.blob.core.windows.net
- Table service: http://*mystorageaccount*.table.core.windows.net
- Queue service: http://*mystorageaccount*.queue.core.windows.net
- File service: http://*mystorageaccount*.file.core.windows.net

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Configuring Custom Domain Names

Direct CNAME mapping:

- **Create a CNAME record that points to the Azure storage account [storage account].blob.core.windows.net.**
- **This method can result in a brief downtime during registration of the custom domain with Azure.**

Intermediary mapping with asverify:

- **Step 1. Prepend asverify to your own CNAME record. This allows Azure to recognize your custom domain.**
- **Step 2. Modify the DNS record for the domain.**
- **This methods eliminates downtime.**

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Pricing and Billing

Storage costs depend on:

- **The amount of data**
- **Performance level**
- **Access tier (per-gigabyte cost decreases as the tier gets cooler)**

Storage costs include:

- **Data access costs: increase as the tier gets cooler.**
- **Transaction costs: increases as the tier gets cooler. Delete is free.**
- **Geo-Replication data transfer costs (per GB): for GRS and RA-GRS storage accounts and charges for bandwidth used to replicate data to the second Azure region**
- **Outbound data transfer costs (per GB): transferred out of an Azure region**
- **Changing the storage tier:**
  - **Changing the account storage tier from cool to hot (warmer tier) incurs a charge equal to reading all the data existing in the storage account.**
  - **changing the account storage tier from hot to cool (cooler tier) incurs a charge equal to writing all the data into the cool tier (GPv2 accounts only).**
  - **Cool (30 days) and Archive (180 days) also attracts early deletion charges**

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Storage Account Management

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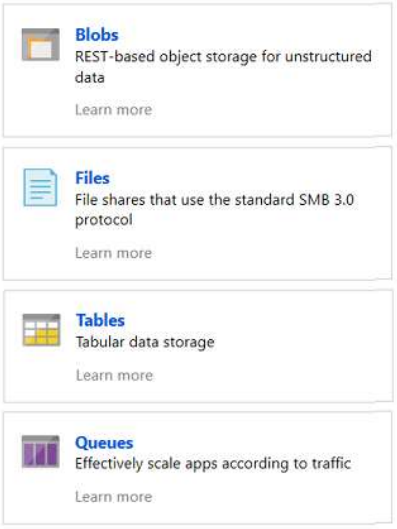
Azure Storage Services

- Azure Blobs: A massively scalable object store for text and binary data
- Azure Files: Managed file shares for cloud or on-premises deployments
- Azure Tables: A NoSQL store for schema less storage of structured data
- Azure Queues: A messaging store for reliable messaging between application components



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Standard and Premium Storage Accounts

- Standard:
  - Backed by magnetic drives (HDD)
  - Lowest cost per GB
- Premium:
  - Backed by solid state drives (SSD)
  - Can only be used with Azure VM disks

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Storage Types

- **Storage V2** – latest version, lowest price, supports all services, recommended
- **Storage V1** – legacy account
- **Blob Storage** - specialized for storing unstructured object data

✔ You can easily upgrade a general-purpose v1 or Blob storage account to a general-purpose v2 account with no downtime and without the need to copy data

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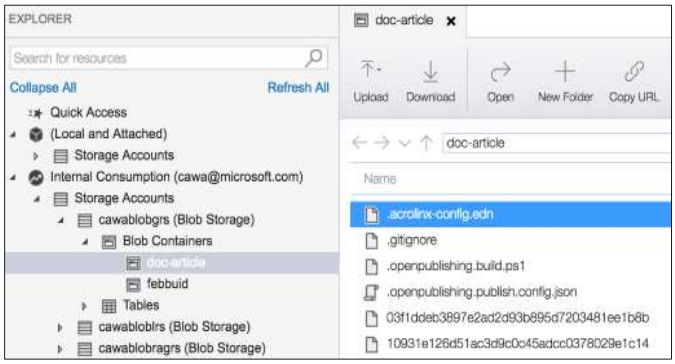
Azure Storage Explorer

- Access multiple accounts and subscriptions
- Create, delete, view, edit storage resources
- View and edit Blob, Queue, Table, File, Cosmos DB storage and Data Lake Storage
- Obtain shared access signature (SAS) keys
- Available for Windows, Mac, and Linux



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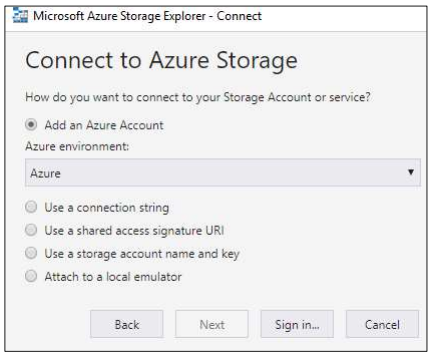
Storage Explorer Connection Options

- Connect to an Azure subscription
- Work with local development storage (emulator)
- Attach to external storage
- Attach a storage account or storage service by using a shared access signature
- Connect to an Azure Cosmos DB account by using a connection string



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Module 02: Implementing and Managing Storage

Lesson 02: Data Replication

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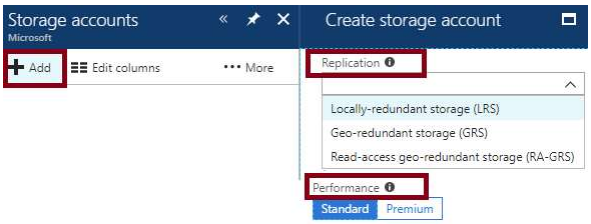
Replication Options

- Locally-redundant storage (LRS):
  - **The only replication option when using Premium performance tier**
- Zone-redundant storage (ZRS):
- Geo-redundant storage (GRS)
- Read-access geo-redundant storage (RA-GRS)



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Locally Redundant Storage

Copies:

- **3 in the same Azure facility**

Strategy:

- **Data replicated synchronously across 3 replicas in the same Azure facility**

Protection:

- **Localized hardware failures**

Additional considerations:

- **LRS is an economical option if your data can be easily reconstructed**
- **LRS is the only available option if you use the Premium performance tier**
- **When using LRS, you should plan for an alternative recovery strategy**

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Geo-Redundant Storage

Copies:

- **Total of 6, with 3 per Azure region.**

Strategy:

- **Data replicated synchronously across 3 replicas in the same Azure facility**
- **Data replicated synchronously within each region and asynchronously across regions.**

Protection:

- **Localized hardware failures and region-wide disasters**

Additional considerations:

- **With GRS, data in the secondary region becomes available for reads and writes (via the primary endpoint) only after Microsoft initiates a failover from the primary region.**
- **With RA-GRS, data in the secondary region is always available for reads (via the secondary endpoint). It becomes available for writes (via the primary endpoint) only after Microsoft initiates a failover from the primary region.**

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Zone Redundant Storage

Copies:

- **3 across different Azure facilities in separate zones in the same region.**

Strategy:

- **Data replicated synchronously across 3 replicas in separate zones in the same region.**

Protection:

- **Localized hardware failures and failures of individual facilities**

Additional considerations:

- **ZRS is not yet available in all regions.**
- **ZRS may not protect your data against a regional disaster where multiple zones are permanently affected.**
- **ZRS does not support Azure VM disk files**

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Comparing Replication Strategies

Replication Option	LRS	ZRS	GRS	RA-GRS
Node unavailability within a data center	Yes	Yes	Yes	Yes
An entire data center (zonal or non-zonal) becomes unavailable	No	Yes	Yes	Yes
A region-wide outage	No	No	Yes	Yes
Read access to your data (in a remote, geo-replicated region) for region-wide unavailability	No	No	No	Yes
Available in storage account types	GPv1, GPv2, Blob	Standard, GPv2	GPv1, GPv2, Blob	GPv1, GPv2, Blob

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Storage Account PowerShell Tasks

Task	Example
Check to see if a storage account name is available.	**Get-AzureRmStorageAccountNameAvailability** -Name 'mystorageaccount'
Create a storage account.	**New-AzureRmStorageAccount** -ResourceGroupName MyResourceGroup -AccountName mystorageaccount -Location westus -SkuName Standard_GRS
Retrieve a specific storage account or all the storage accounts in a resource group or subscription.	**Get-AzureRmStorageAccount** -ResourceGroupName "RG01" -AccountName "mystorageaccount"
Modify storage account properties, such as type.	**Set-AzureRmStorageAccount** -ResourceGroupName "MyResourceGroup" -AccountName "mystorageaccount" -Type "Standard_RAGRS"

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Module 02: Implementing and Managing Storage

Lesson 03: Storing and Accessing Data

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Import and Export Service

Transfers very large amounts of data between on-premises and Azure:

- **Import. Securely transfers data to Azure Blob storage (block and page blobs) and Azure Files. You ship hard drives containing your data to an Azure data center.**
- **Export. Securely transfers data from Azure Blob storage (block, page, and append blobs) to your location. You ship empty hard drives to an Azure data center.**

Scenarios:

- **Migrating data to the cloud**
- **Content distribution**
- **Backup and data recovery**

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Import Jobs

Identify:

- **data to be imported**
- **the number of drives**
- **destination blob or file**

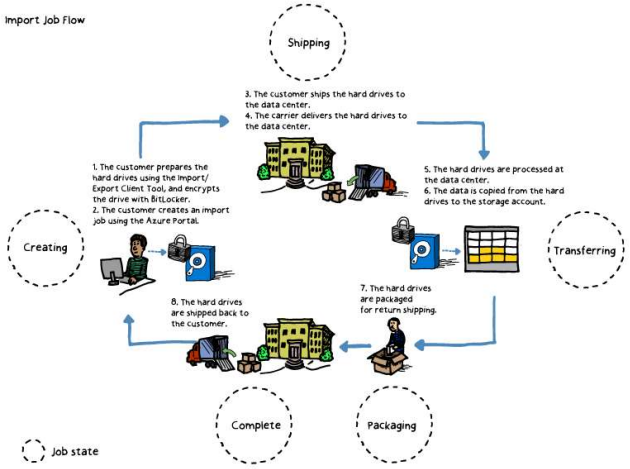
Run WAImportExport Tool:

- **To copy data to hard disk drives**
- **To encrypt data with BitLocker**

Create an import job:

- **Via Azure portal (upload drive journal)**
- **Via Import/Export REST API**

- **Provide shipping info**
- **Ship the hard disk drives**
- **Update tracking number**
- **Microsoft handles:**
  - **Job processing**
  - **Shipment of drives back to you**



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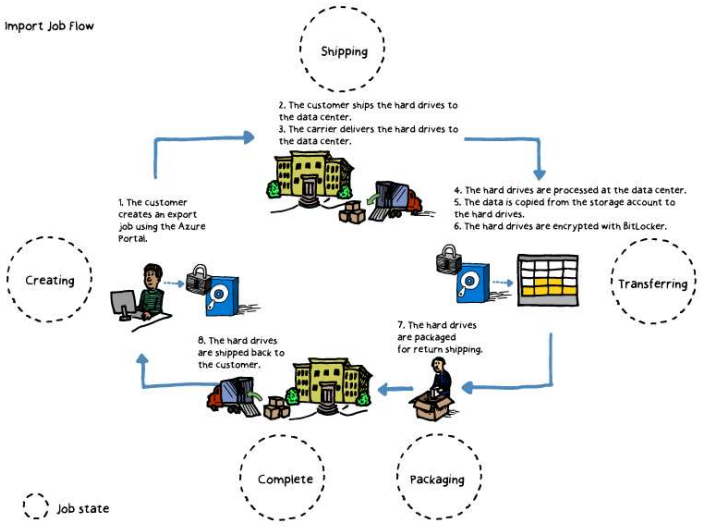
Export Jobs

- **Identify:**
  - **data to be exported**
  - **the number of drives**
  - **the source blobs**
- **Create an export job:**
  - **via the Azure portal**
  - **via Import/Export REST API**
- **Provide shipping info**
- **Ship empty hard drives**
- **Update delivery tracking info**
- **Microsoft handles:**
  - **job processing**
  - **shipment of drives back to you**



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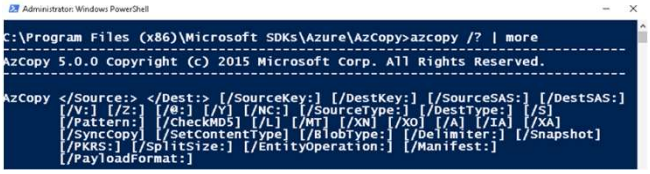
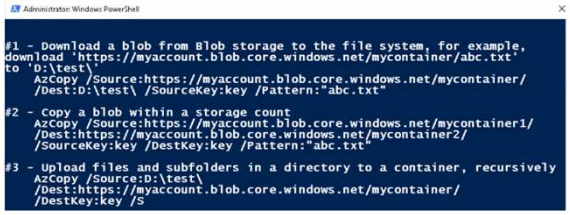
AzCopy

a command-line utility for automating Azure Storage tasks:

- **Copy to/from Microsoft Azure Blob, File, and Table storage**
- **Copy between a file system and a storage account, or between storage accounts**





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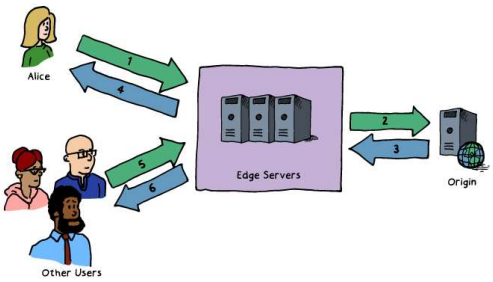
How CDN Works

Azure content caching service:

- **Designed to expedite delivery of audio, video, images, etc. hosted by Azure services**
- **Utilizes the following data flow:**
  - **1. Alice requests a file using a URL pointing to a CDN location. DNS routes the request to the optimal POP**
  - **2. If edge servers do not have the file cached,**

  they requests it from the origin.
  - **3. The origin returns the file, including its TTL.**
  - **4. The server caches the file and returns it to Alice.**

  The file remains cached until the TTL expires.
  - **5. Subsequent requests are served from the cache.**



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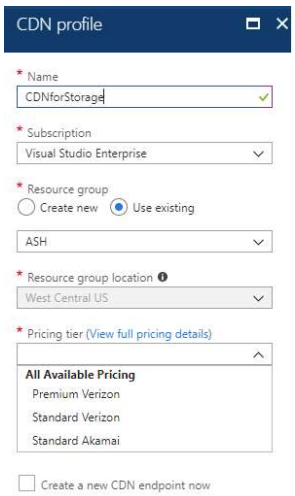
CDN Profile

A collection of CDN endpoints with the same:

- **Pricing tier and provider:**
  - **Premium Verizon**
  - **Standard Verizon**
  - **Standard Akamai**

Pricing based on:

- **GBs of outbound data transfers**
- **Zone:**
  - **Zone 1—North America, Europe, Middle East and Africa**
  - **Zone 2—Asia Pacific (including Japan)**
  - **Zone 3—South America**
  - **Zone 4—Australia**
  - **Zone 5—India**



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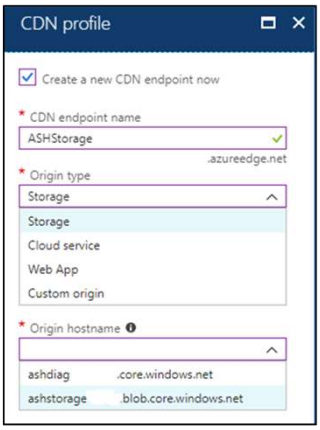
CDN Endpoints

Represent configuration of content origin:

- **CDN endpoint name**
- **Origin type:**
  - **Storage**
  - **Cloud Service**
  - **Web App**
  - **Custom origin**
- **Origin hostname**
- **CDN features that affect content delivery, such as:**
  - **Compression**
  - **Query string**
  - **Geo filtering**
  - **Custom domains**



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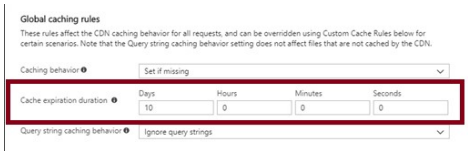
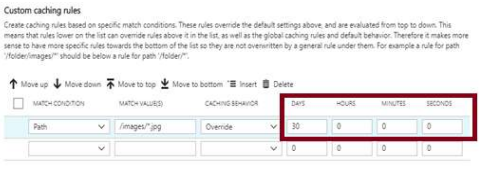
CDN Time-to-Live

CDN TTL can be:

- **Included in cache-directive headers in the HTTP response from the content origin**
- **Determined by Cache Expiration Duration, configurable by using:**
  - **Global caching rules: affect all requests to the endpoint**
  - **Custom caching rules: match paths and file extensions**
- **Custom caching rules override global ones**





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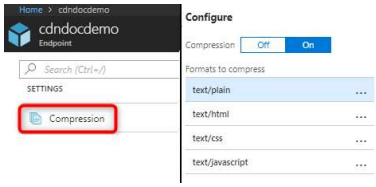
CDN Compression

Improves file transfer speed and increases page-load performance:

Supports:

- **Enabling compression on the origin. In this case, the CDN passes along the compressed files and delivers them to clients that request them.**
- **Enabling compression directly on the CDN edge servers. In this case, the CDN compresses the files and serves them to end users.**
- **Enabling compression based on the MIME types list, allowing selection of the content formats to compress.**



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Module 02: Implementing and Managing Storage

Lesson 04: Monitoring Storage

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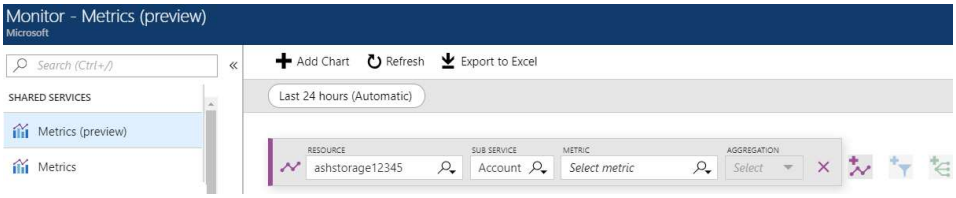
Monitor Metrics

Azure Monitor provides unified interface for monitoring Azure services

- **Includes Azure Storage monitoring**
- **Offers access via the Azure portal and Monitor API (REST and .NET)**
- **Integrates with Log Analytics and Event Hubs**
- **Stores metrics for 30 days and allows long term retention in Azure Storage**
- **Supports consistent metrics filtering (resource, subservice) and aggregation criteria.**



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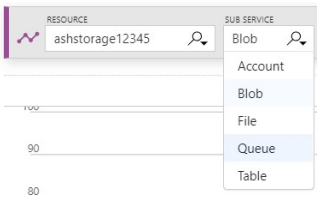
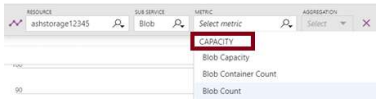
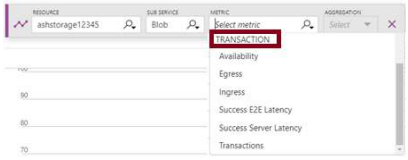
Capacity and Transaction Metrics

Available from the Azure portal:

- **Select a Storage Account resource**
- **Select a sub-service: Account, Blob, File, Queue, or Table**
- **The sub-service selection determines Capacity metrics:**
  - **For example, for Blob sub-service, Capacity metrics include:**
    - **Blob Capacity**
    - **Blob Container Count**
    - **Blob Count**
- **Transaction metrics are available at:**
  - **account level**
  - **service level:**
    - **Blob storage**
    - **Table storage**
    - **Queue storage**
    - **Azure Files**







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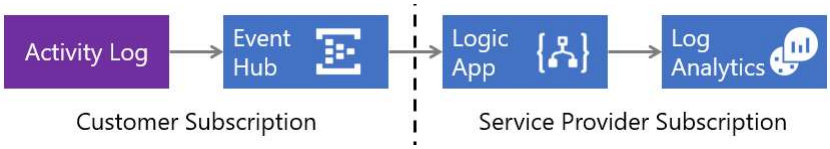
Collect Across Subscriptions

You can collect Azure Activity Logs into a Log Analytics workspace using the Azure Log Analytics Data Collector connector for Logic Apps

- **This facilitates using a workspace in a subscription that has a different Azure AD tenant**
- **It offers a number of advantages, including:**
  - **Low latency, since the Azure Activity Log is streamed into the Event Hub**
  - **Serverless services, with no infrastructure components to deploy**
  - **Minimal custom code**



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LAB [300TO01-M02-01]

1. Publish Static Website in Azure with Web Caching in High Availability.

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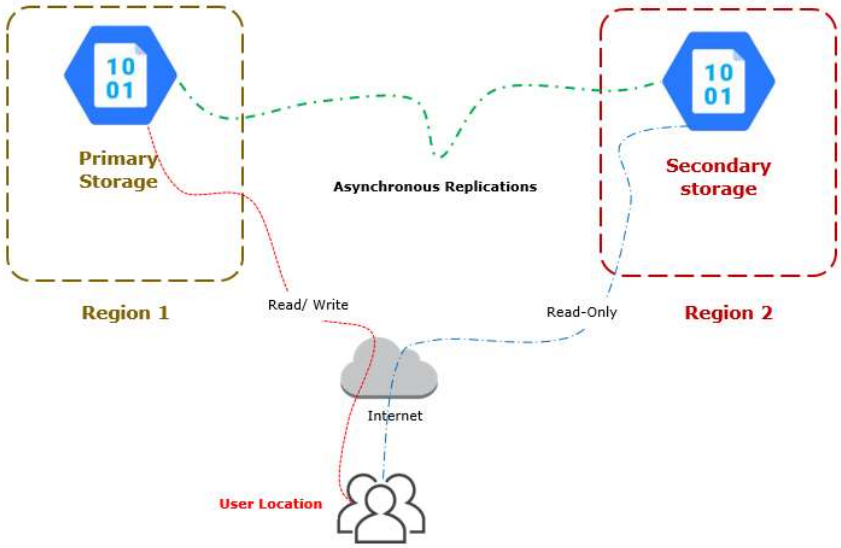
Part A



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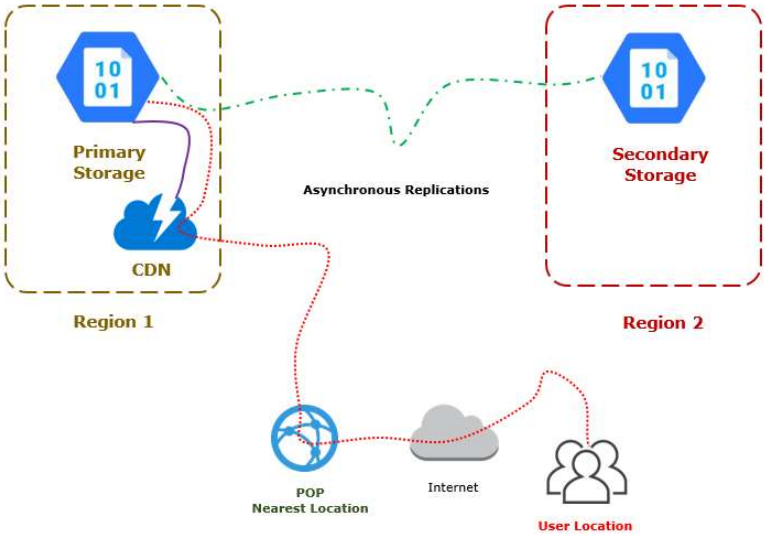
Part B



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LAB [300TO01-M02-01]

1. Publish Static Website in Azure with Web Caching in High Availability.
   a. **Services, Tools & Code used**
      i. Azure Storage
      ii. Azure Blob
      iii. Azure Storage Explorer
      iv. HTML Code
      v. Azure CDN
      vi. AzCopy

Duration: 45 mnts.

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Microsoft

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