Azure Storage and Cognitive Services

Azure Storage

Blobs

Storage for any type of data, analogous to files in a file system, with individual blobs storing up to 1 TB of data

Queues

Reliable messaging for workflow processing and for communication between applications or application components

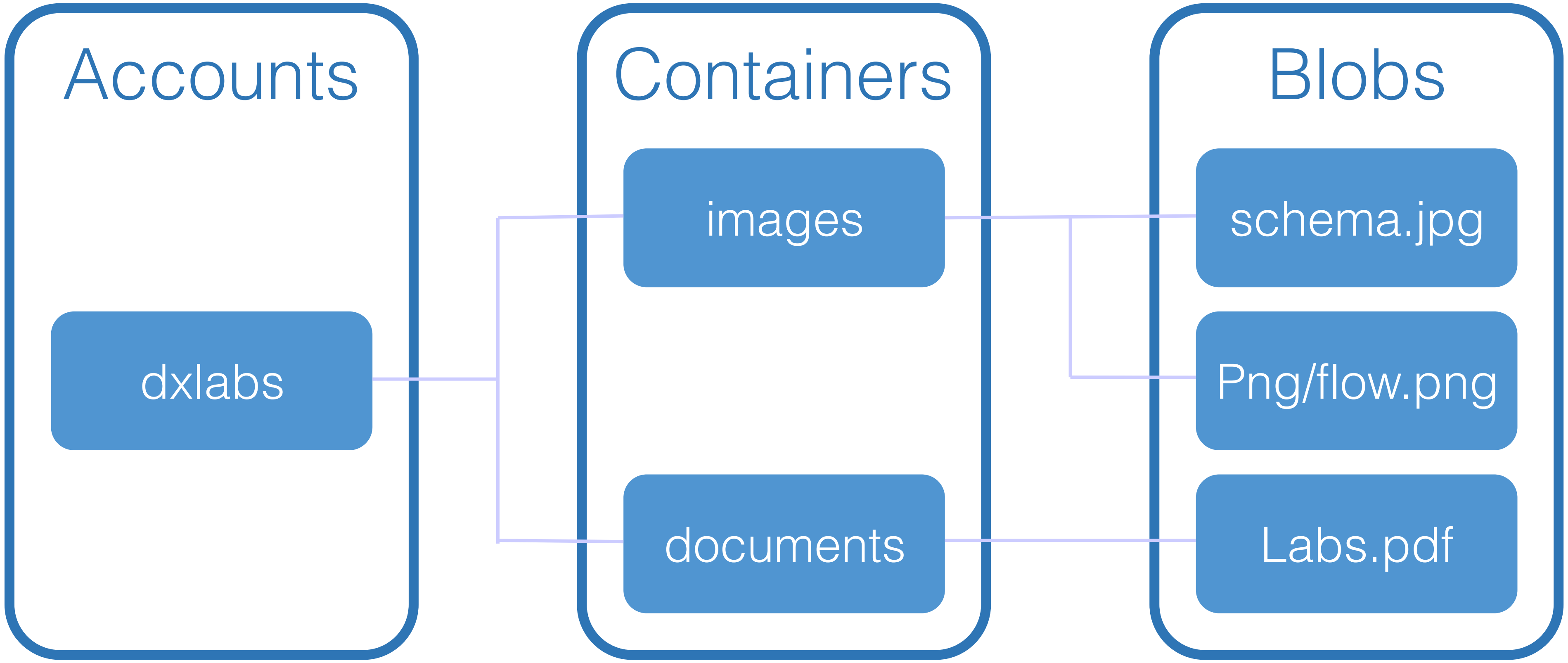
Tables

NoSQL data storage rapid development and fast access to large quantities of data

Files

File sharing using Server Message Block (SMB) protocol

Blob Storage

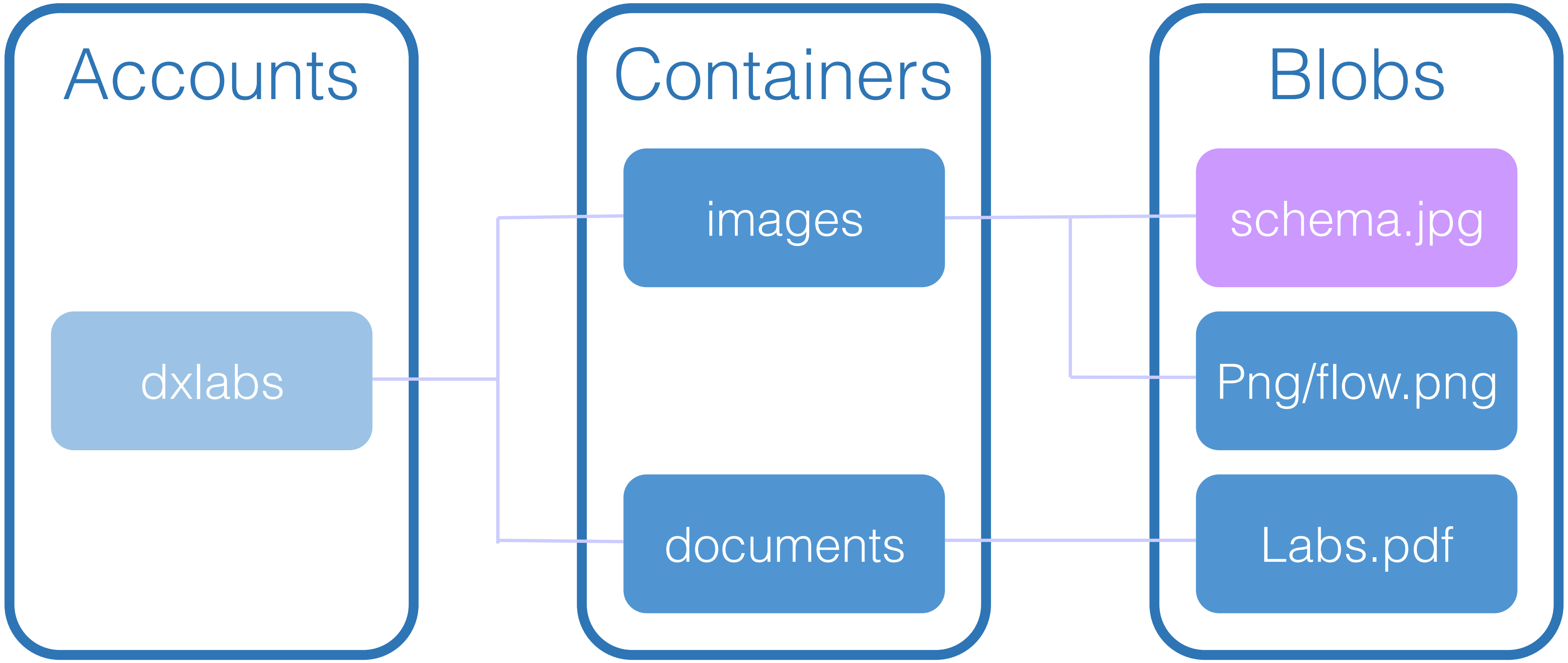


3 to 24 characters
0-9 and a-z
Unique within Azure

3 to 63 characters
0-9, a-z, and dashes

1 to 1,024 characters
<u>Any</u> characters (including slashes)
URL characters must be escaped
Max. 254 path segments

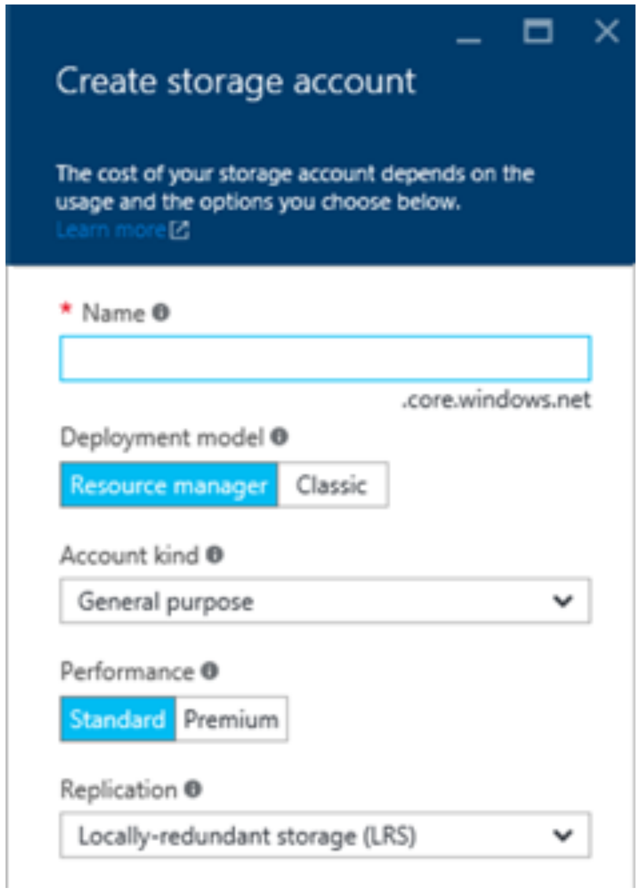
Blob URLs



https://dxlabs.blob.core.windows.net/images/schema.jpg

Storage Accounts

- Up to 500 TB of data per account
- Maximum of 100 storage accounts per subscription
- Two types of accounts
  - "General purpose" and "Blob storage"
- Four types of replication
  - LRS, ZRS, GRS, and RA-GRS
- Support optional 256-bit AES encryption (currently in preview)


Create storage account

The cost of your storage account depends on the usage and the options you choose below.
Learn more

* Name

.core.windows.net

Deployment model: [✓ Resource manager] Classic

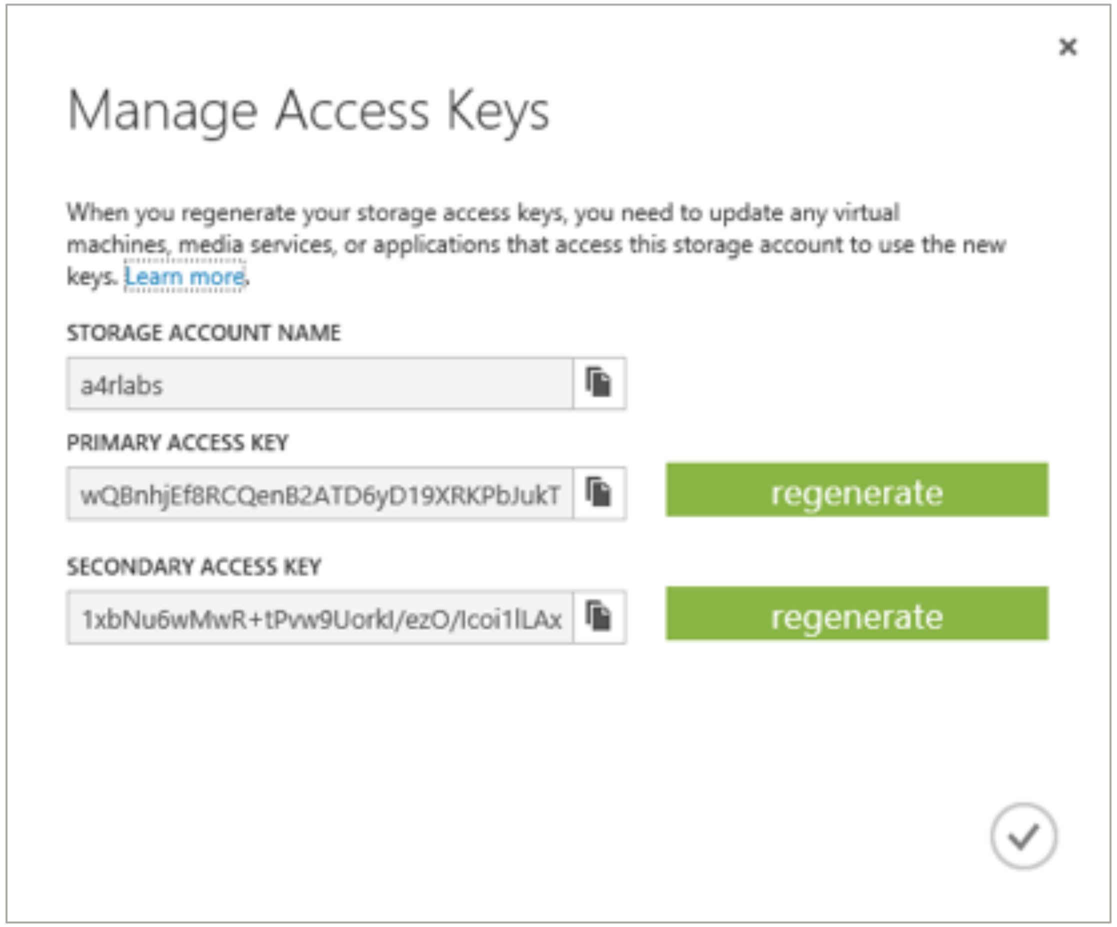
Account kind: General purpose

Performance: [✓ Standard] Premium

Replication: Locally-redundant storage (LRS)

Storage Keys

- Access to storage by non-account-owners relies on keys for authentication
  - Two 512-bit keys per account
- Keys should be "rolled" periodically for security
- Keys can be used to generate shared-access signatures (SAS) for secure and restricted access



Manage Access Keys

When you regenerate your storage access keys, you need to update any virtual machines, media services, or applications that access this storage account to use the new keys. Learn more.

STORAGE ACCOUNT NAME

a4rlabs

PRIMARY ACCESS KEY

wQBnhjEf8RCQenB2ATD6yD19XRKPbJukT

SECONDARY ACCESS KEY

1xbNu6wMwR+tPvw9Uorkl/ezO/Icoi1lLAx

Shared-Access Signatures

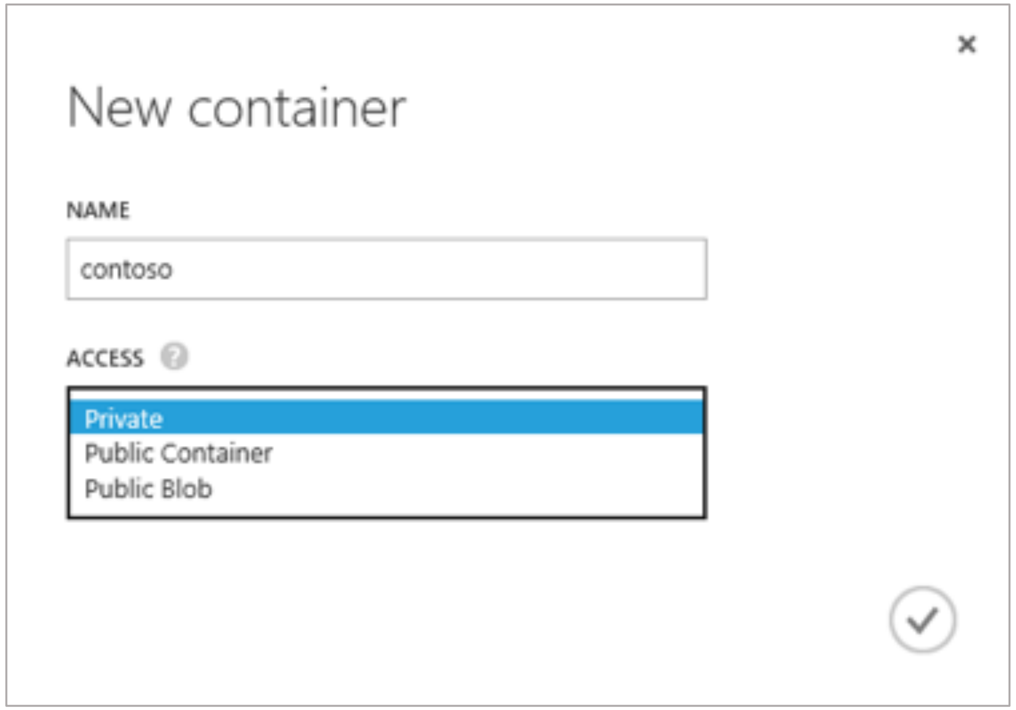
Blob URL

https://a4rlabs.blob.core.windows.net/images/schema.jpg?st=2016-02-07T19%3A58%3A00Z&se=2016-02-08T19%3A58%3A00Z&sp=r&sv=2015-02-21&sr=b&sig=BGebg1eduvPTwQnZWZlBphM8YGP9sRYt2WiPIL70vcw%3D

Query string containing shared-access signature

Storage Containers

- Unlimited number of blob containers per storage account
- Three access policies
  - Private – Blobs can't be read or enumerated anonymously
  - Public Container – Blobs can be read and enumerated anonymously
  - Public Blob – Blobs can be read anonymously, but cannot be enumerated



New container

NAME

contoso

ACCESS

Private
Public Container
Public Blob

Storage Blobs

- Unlimited number of blobs per container
- Three types of blobs

Block
Up to 195 GB
General-purpose streaming and storage

Append
Up to 195 GB
Optimized for append operations

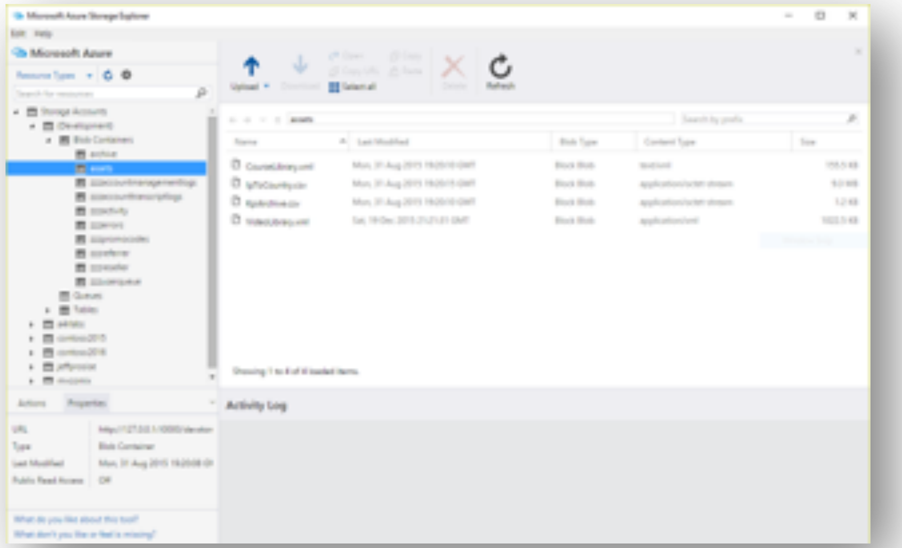
Page
Up to 1 TB
VHDs only; optimized for random access

- Blobs also support user-defined metadata (key-value pairs)

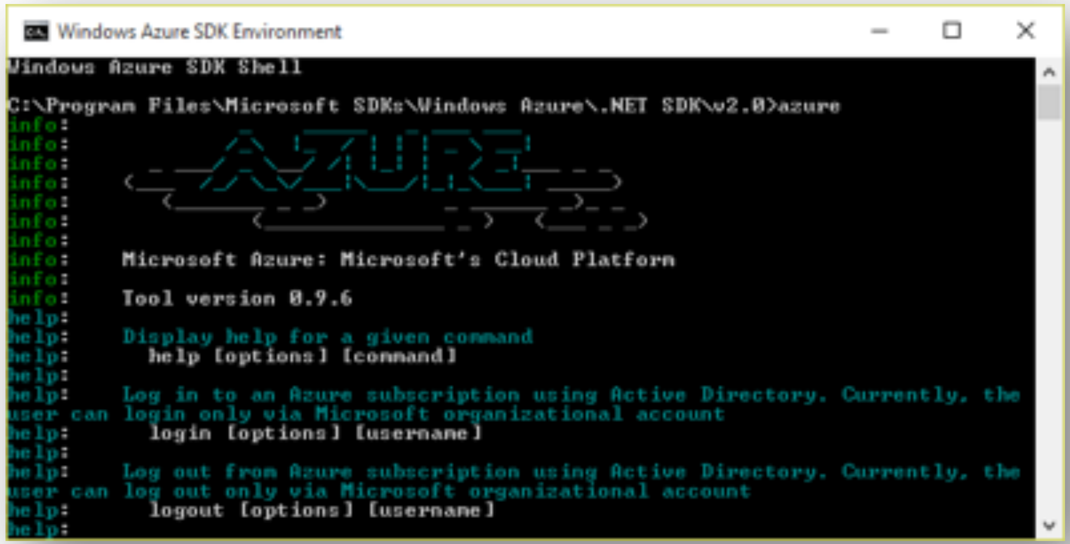
Azure Storage Tools

- Portal doesn't provide functionality for uploading blobs
- Use free, third-party, cross-platform tools instead

Microsoft Azure Storage Explorer



Azure Command-Line Interface (CLI)



```
Windows Azure SDK Shell

C:\Program Files\Microsoft SDKs\Windows Azure\.NET SDK\v2.0>azure
info:
info:
info:
info:
info:
info:
info:
info:    Microsoft Azure: Microsoft's Cloud Platform
info:
info:    Tool version 0.9.6
help:
help:    Display help for a given command
help:      help [options] [command]
help:
help:    Log in to an Azure subscription using Active Directory. Currently, the
user can login only via Microsoft organizational account
help:      login [options] [username]
help:
help:    Log out from Azure subscription using Active Directory. Currently, the
user can log out only via Microsoft organizational account
help:      logout [options] [username]
help:
```

Accessing Blob Storage Programmatically

- Blob service can be accessed using REST APIs
  - Accessible to any programming language that supports HTTP(S)
- Blob service can also be accessed using Azure Storage SDKs available for popular languages and platforms

.NET	Node.js	Java	C++	PHP	Ruby	Python	iOS	Xamari n

- Also available from NuGet, NPM, and other package managers

Uploading a Blob (C#)

- Create a blob in the specified storage account and specified container using the Azure Storage SDK for .NET
- Upload the contents of a local file to the blob
- Get the connection string for the storage account from the Azure portal

```
CloudStorageAccount account =
    CloudStorageAccount.Parse("connection_string);
CloudBlobClient client = account.CreateCloudBlobClient();
CloudBlobContainer container =
    client.GetContainerReference("container_name");
CloudBlockBlob blob =
    container.GetBlockBlobReference("blob_name"));
await blob.UploadFromFileAsync("file_name");

// Or use UploadFromStreamAsync or
// UploadFromByteArrayAsync
```

Downloading a Blob (Node.js)

- Get a reference to a specified blob in a specified container in a specified storage account
- Download the blob and store its contents in a local file

```
var storage = require("azure-storage");
var service =
    storage.createBlobService("connection_string");
service.getBlobToLocalFile(
    "container_name", "blob_name", "file_name",
 function(error, result, response) {
    if (!error) {
        // File downloaded
    }
});

// Or use getBlobToStream, getBlobToTest, or
// createReadStream
```

Enumerating Blobs in a Container (C#)

- Enumerate all the block blobs in a specified container in a specified storage account
- Retrieve the name of each blob
- IListBlobItem could CloudBlockBlob, Cloud-PageBlob, or Cloud-AppendBlob

```
CloudStorageAccount account =
    CloudStorageAccount.Parse("connection_string);
CloudBlobClient client = account.CreateCloudBlobClient();
CloudBlobContainer container =
    client.GetContainerReference("container_name");

foreach (IListBlobItem item in container.ListBlobs())
{
    var blob = item as CloudBlockBlob;
    if (blob != null)
    {
        string name = blob.Name;
    }
}
```

Writing Blob Metadata (Node.js)

- Add metadata properties named "Property1," "Property2," and "Property3" to a blob

```
var storage = require("azure-storage");
var service =
    storage.createBlobService("connection_string");

var metadata = {
    "Property1", "Value1",
    "Property1", "Value2",
    "Property1", "Value3"
};

service.setBlobMetaData("container_name", "blob_name",
    metadata, function(error, result, response) {
    if (!error) {
        // Succeeded
    }
});
```

Reading Blob Metadata (C#)

- Read metadata properties named "Property1," "Property2," and "Property3" from a blob

```
blob.FetchAttributes();
string p1 = blob.Metadata.ContainsKey("Property1") ?
    blob.Metadata["Property1"] : null;
string p2 = blob.Metadata.ContainsKey("Property2") ?
    blob.Metadata["Property2"] : null;
string p3 = blob.Metadata.ContainsKey("Property3") ?
    blob.Metadata["Property3"] : null;
```

Deleting a Blob (Node.js)

- Get a reference to a specified blob in a specified container in a specified storage account
- Delete the blob

```
var storage = require("azure-storage");
var service =
    storage.createBlobService("connection_string");
service.deleteBlob("container_name", "blob_name",
    function(error, response) {
    if (!error) {
        // Blob deleted
    }
});
```

Microsoft Cognitive Services

- Intelligence APIs for building intelligent apps

Give your apps a human side

Knock down barriers between you and your ideas. Enable natural and contextual interaction with tools that augment users' experiences via the power of machine-based AI. Plug them in and bring your ideas to life.

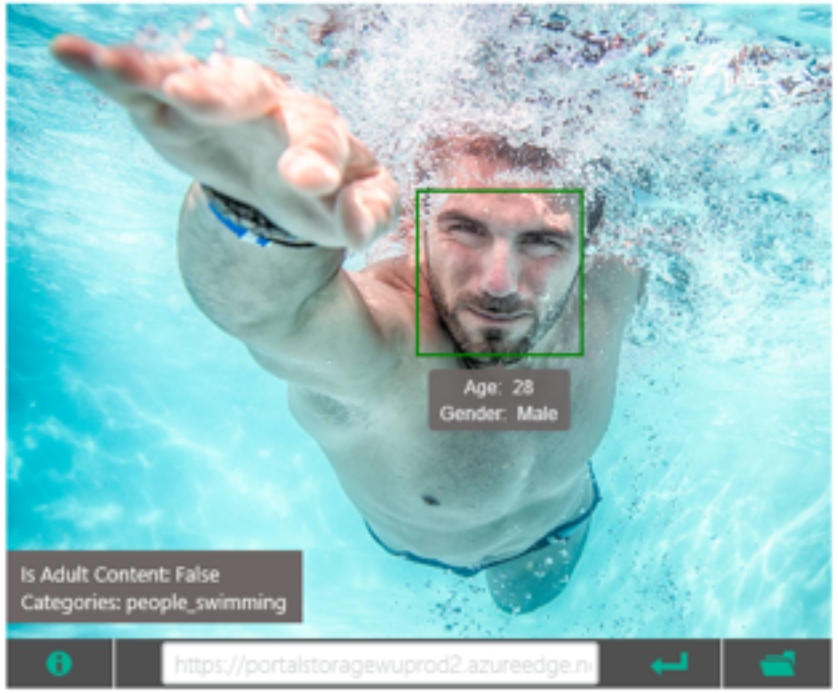
Cognitive Services APIs

Vision	Computer Vision	Emotion	Face	Video	
Speech	Bing Speech	Custom Recognitio n	Speaker Recognitio n		
Language	Bing Spell Check	Language Understanding	Linguistic Analysis	Text Analytics	Web Language Model
Knowledge	Academic Knowledge	Entity Linking	Knowledge Exploration	Recom-mendation s	
Search	Bing Auto-suggest	Bing Image Search	Bing News Search	Bing Video Search	Bing Web Search

Computer Vision API

Analyze an image

This feature returns information about visual content found in an image. Use tagging, descriptions and domain-specific models to identify content and label it with confidence. Apply the adult/racy settings to enable automated restriction of adult content. Identify image types and color schemes in pictures.


Age: 28
Gender: Male
Is Adult Content: False
Categories: people_swimming
https://portalstoragewuprod2.azureedge.n

Features:

Feature Name	Value
Description	{ "type": 0, "captions": [{ "text": "a man swimming in a pool of water", "confidence": 0.7850108693093019 }] }
Tags	[{ "name": "water", "confidence": 0.9996442794799805 }, { "name": "sport", "confidence": 0.9504992365837097 }, { "name": "swimming", "confidence": 0.9062818288803101, "hint": "sport" }, { "name": "pool", "confidence": 0.8787588477134705 }, { "name": "water sport", "confidence": 0.631849467754364, "hint": "sport" }]
Image Format	jpeg
Image Dimensions	1500 x 1155
Clip Art Type	0 Non-clipart
Line Drawing Type	0 Non-LineDrawing
Black & White Image	False

Using the Computer Vision API (C#)

- Submit an image via URI to the Computer Vision API and ask for captions and descriptive tags
  - Optionally pass a stream instead of a URI
- Uses Microsoft.Project-Oxford.Vision NuGet package
- Other VisualFeatures include Adult, Category, Color, Faces, ImageType, and Tags

```
VisionServiceClient vision =
    new VisionServiceClient("subscription_key");
VisualFeature[] features =
    new VisualFeature[] { VisualFeature.Description };
AnalysisResult result =
    await vision.AnalyzeImageAsync(uri, features);

string caption = result.Description.Captions[0].Text);

foreach (string tag in result.Description.Tags)
{
    // tag holds descriptive tag for image (e.g., "river")
}
```

Using the Computer Vision API (Node.js)

- Submit an image via URI to the Computer Vision API and ask for captions and descriptive tags
  - Optionally pass a stream instead of a URI
- Other VisualFeatures include Adult, Category, Color, Faces, ImageType, and Tags

```
var options = {
    url: "https://api.projectoxford.ai/vision/v1.0/analyze",
    qs: { visualFeatures: "Description" },
    method: 'POST',
    headers: {
        'Content-Type': 'application/json',
        'Ocp-Apim-Subscription-Key': 'subscription_key'
    },
  ...
};
request(options, function(err, response, result) {
    if(!err) {
        var caption = result.description.captions[0].text;
    }
});
```