Windows Azure

Windows Azure Storage

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Windows Azure Storage

Storage in the Cloud

Scalable, durable, and available
Anywhere at anytime access
Only pay for what the service uses

Exposed via RESTful Web Services

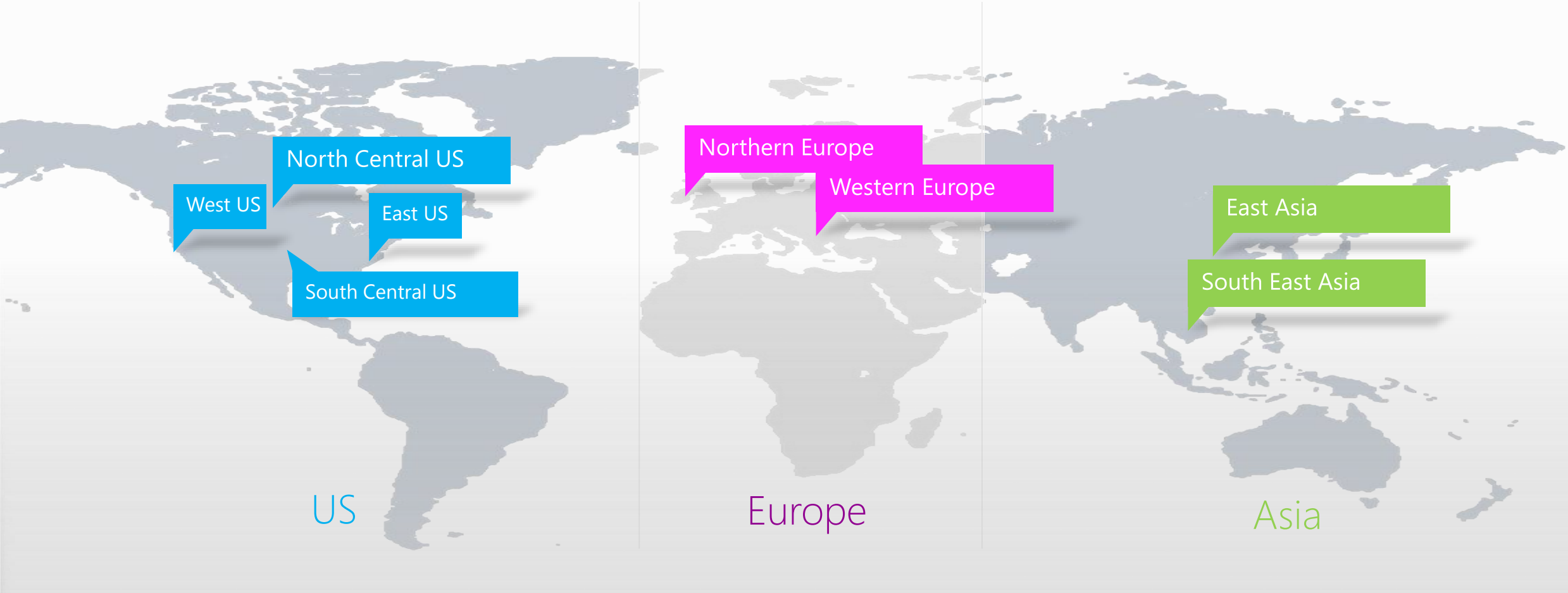
Use from Windows Azure Compute
Use from anywhere on the internet

REST = Representational State Transfer – a client-server model for web applications

Windows Azure Storage Account

User specified globally unique account name

Can choose geo-location to host storage account:



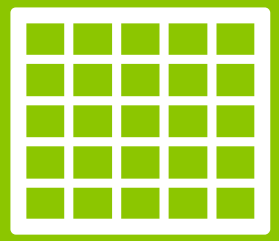
Windows Azure Storage Abstractions

Blobs

Simple named files along with metadata for the file.

Drives

Durable NTFS volumes for Windows Azure applications to use. Based on Blobs.



Tables

Structured storage. A table is a set of entities; an entity is a set of properties.

Queues

Reliable storage and delivery of messages for an application.

Features

Geo-Replication

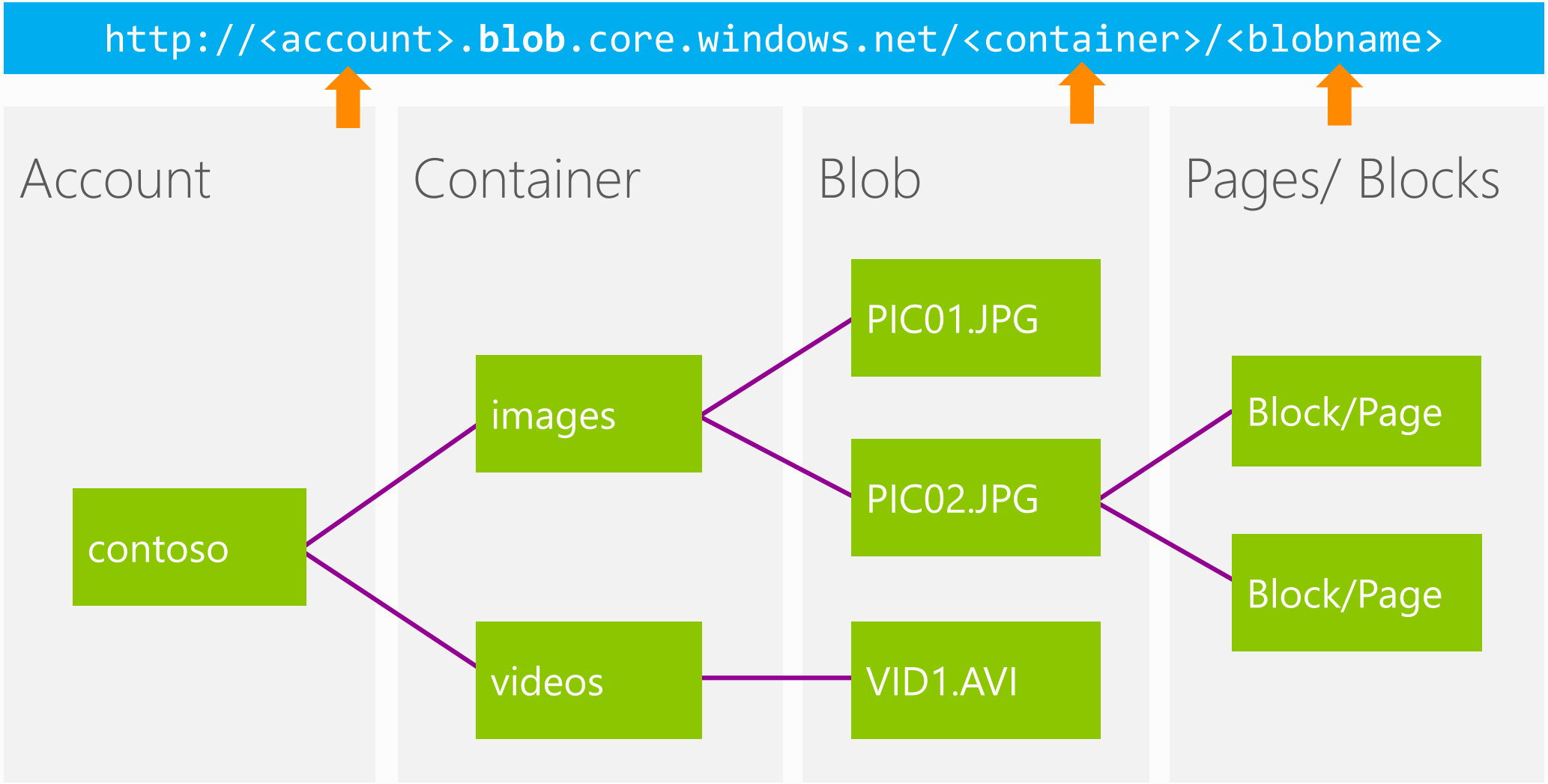
Storage Analytics

Background Async Copy

Blob Storage

Windows Azure™

Blob Storage Concepts



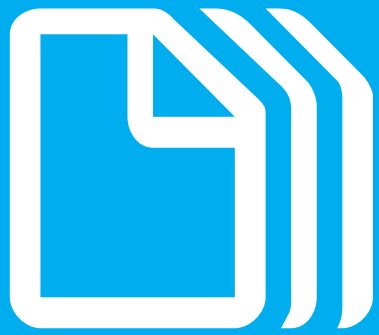
Blob Details

Associate Metadata with Blob

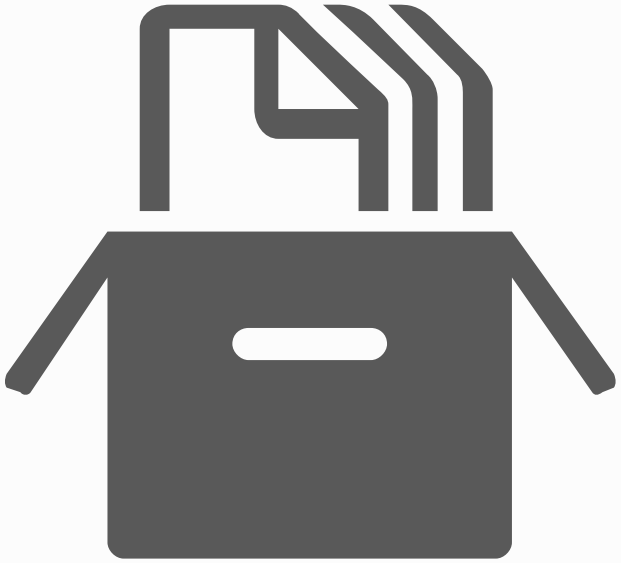
Standard HTTP metadata/headers (Cache-Control, Content-Encoding, Content-Type, etc)

Metadata is <name, value> pairs, up to 8KB per blob

Either as part of PutBlob or independently



Blob Containers



Multiple Containers per Account

Special $root container

Blob Container

A container holds a set of blobs
Set access policies at the container level
Associate Metadata with Container
List the blobs in a container
Including Blob Metadata and MD5
NO search/query. i.e. no WHERE MetadataValue = ?

Blobs Throughput

Effectively in Partition of 1
Target of 60MB/s per Blob

Two Types of Blobs Under the Hood

Block Blob

Targeted at streaming workloads

Each blob consists of a sequence of blocks

Each block is identified by a Block ID

Size limit 200GB per blob

Optimistic Concurrency via Etags

Page Blob (VHD)

Targeted at random read/write workloads

Each blob consists of an array of pages

Each page is identified by its offset from the start of the blob

Size limit 1TB per blob

Optimistic or Pessimistic (locking) concurrency via leases

Uploading a Block Blob

Uploading a large blob

THE BLOB

```
blobName = "TheBlob.wmv";
PutBlock(blobName, blockId1, block1Bits);
PutBlock(blobName, blockId2, block2Bits);
.....
PutBlock(blobName, blockIdN, blockNBits);
PutBlockList(blobName,
                blockId1,...,blockIdN);
```

Benefit

Efficient continuation and retry

Parallel and out of order upload of blocks

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Tables

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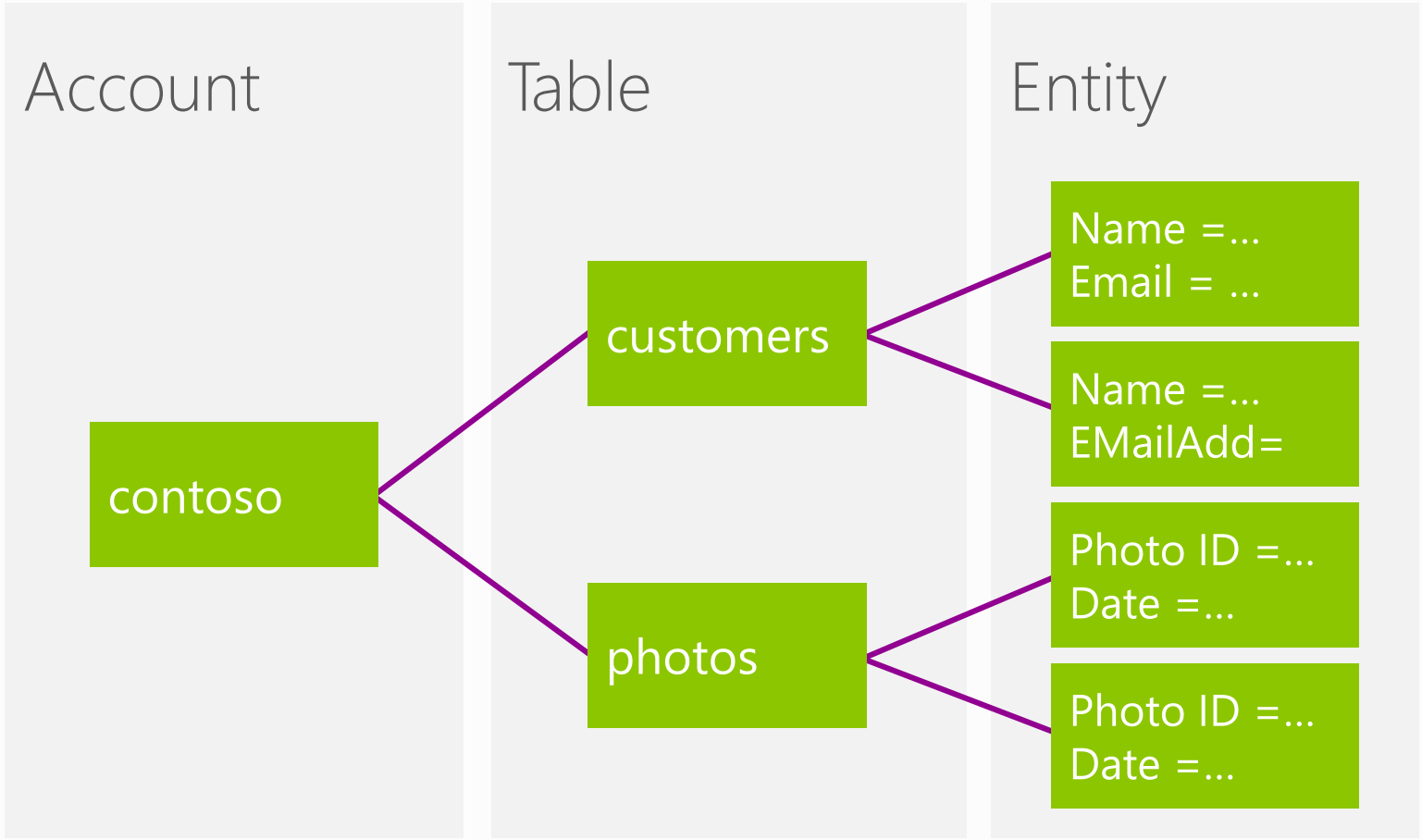
Table Storage Concepts



Entity Properties

Entity can have up to 255 properties

Up to 1MB per entity

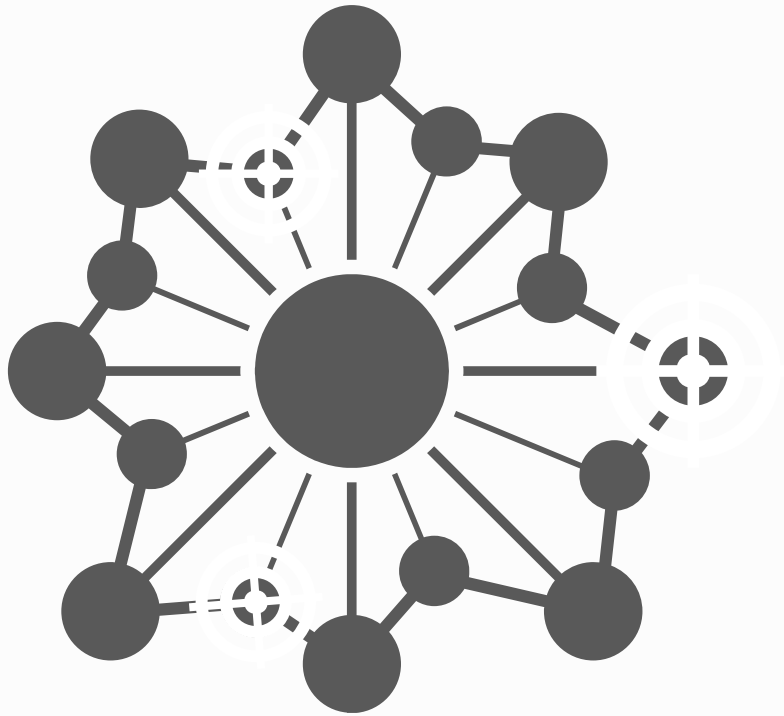
Mandatory Properties for every entity

PartitionKey & RowKey (only indexed properties)
Uniquely identifies an entity
Defines the sort order

Timestamp
Optimistic Concurrency
Exposed as an HTTP Etag

No fixed schema for other properties

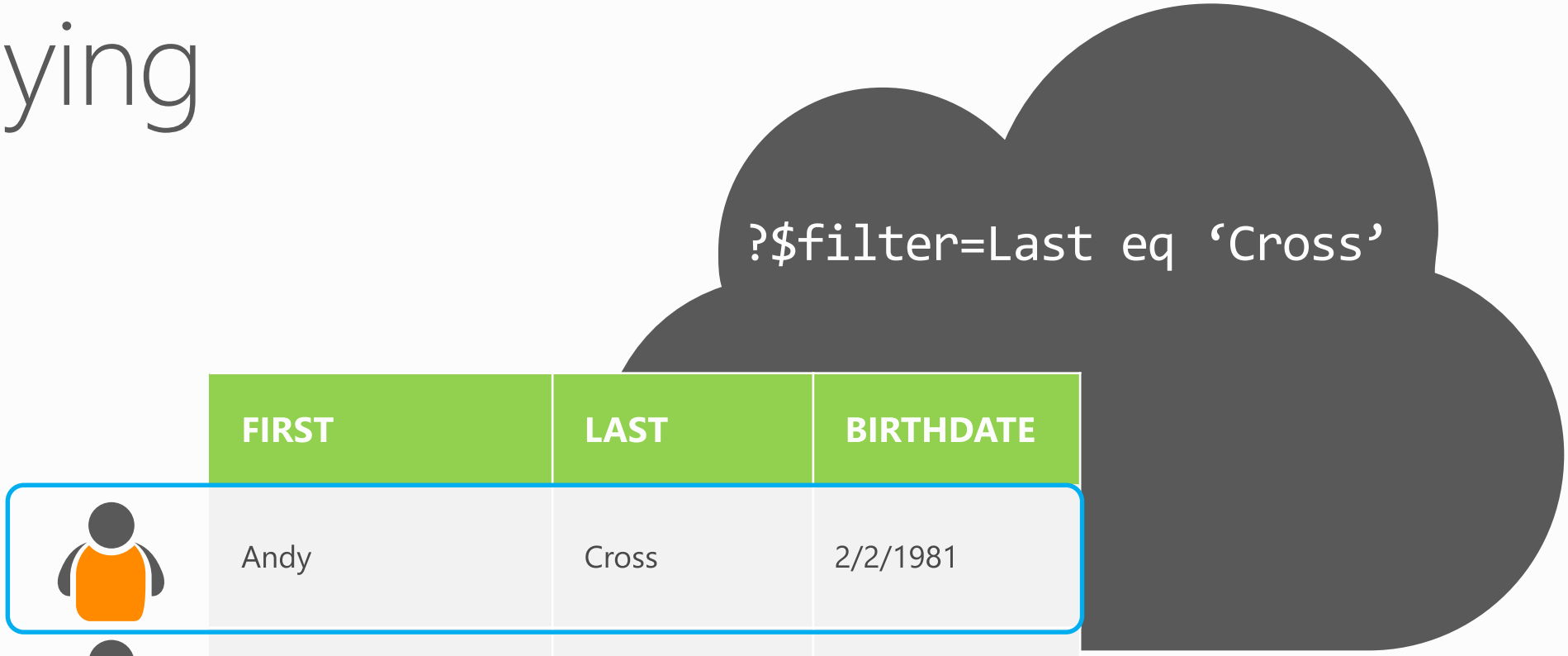
Each property is stored as a <name, typed value> pair
No schema stored for a table
Properties can be the standard .NET types
String, binary, bool, DateTime, GUID, int, int64, and double



No Fixed Schema

FIRST	LAST	BIRTHDATE	FAV SPORT
Andy	Cross	2/2/1981	
Richard	Conway	8/11/1974	Kickboxing
Isaac	Abraham	5/8/1977	

Querying



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