

Implementing NoSQL Databases in Microsoft Azure

AN INTRODUCTION TO NOSQL DATABASES



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Overview



An introduction to NoSQL databases

- Relational vs. NoSQL data model
- When to use NoSQL

Managed NoSQL offerings by Azure

- Azure Storage (table, blob, queue, file)
- Azure Data Lake
- Cosmos DB (Document DB)

Cosmos DB APIs

- SQL, Table, MongoDB, Cassandra & Graph

Summary



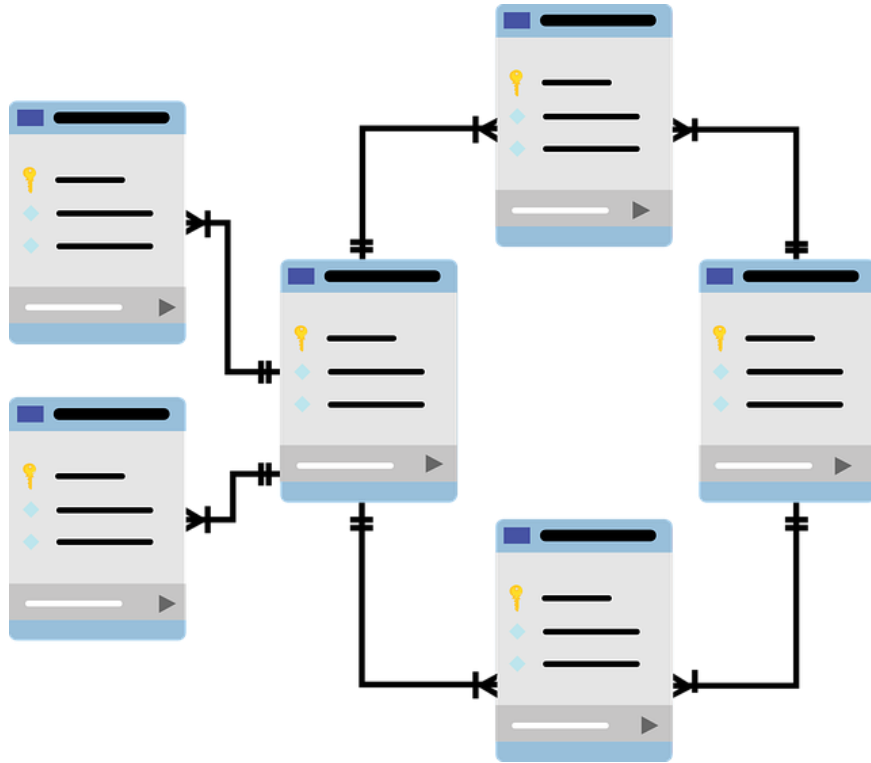
NoSQL



“A NoSQL database provides a mechanism for storage and retrieval of data that is modeled in means other than the tabular relations...”

Wikipedia





```
{
  "person": {
    "name": "John Smith",
    "address": {
      "streetAddress": "#1, 1 sample street",
      "city": "Boston",
      "country": "USA"
    }
  }
}
```



NoSQL



Such databases have existed since the late 1960s, but did not have the "NoSQL" name



NoSQL databases are increasingly used in big data and real-time web applications



The data structures used by NoSQL databases include key-value, wide column, graph, or document such as JSON



Simplicity of design, simpler horizontal scaling and finer control over availability

NoSQL vs. Relational

Data model

No need to define the schema first, easier to update as data and requirements change

Data structure

Designed to handle unstructured data, which makes up much of today's data

Scaling

Much cheaper to scale a NoSQL database than relational, scaling out over cheap servers



NoSQL and non-relational
are not the same thing.



NoSQL and Non-relational

NoSQL should not be only recommended to store non-relational data

NoSQL databases can be used to store relational data

NoSQL is mainly about horizontal scalability, availability and price

Use it when the workload calls for cheaper storage, massive scale, low latency, and global distribution



Some NoSQL databases
support SQL-Like queries.



Managed NoSQL Offerings by Azure



NoSQL Offerings by Azure

IaaS

Provision VMs and install
database engines

PaaS

Azure manages the underlying
infrastructure



Managed NoSQL Offerings by Azure

Azure Storage

Unstructured data
in cheap storage

Cosmos DB

Microsoft's own NoSQL
database (Document DB)



The storage account is accessible
from anywhere in the world
over HTTP or HTTPS.



Azure storage account is durable,
highly available, secure, and
massively scalable.



Azure Storage Account

Azure Blob Storage

Azure Table Storage

Azure Storage Queues

Azure File Storage



Azure Cosmos DB is
Microsoft's globally
distributed, multi-model
database service.



Cosmos DB Offers Multiple APIs

SQL API

Table API

MongoDB API

Cassandra API

Graph API



Cosmos DB Is Multi-model

Data stored as JSON documents

Use the SQL and MongoDB API

Data stored as key-value pairs

Use the Azure Table API

Data is stored as wide-columns

Use the Cassandra API

Data is stored as graphs

Use the Gremlin API



Demo



A tour of Azure Storage Account

A tour of Azure Cosmos DB



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- NoSQL benefits

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