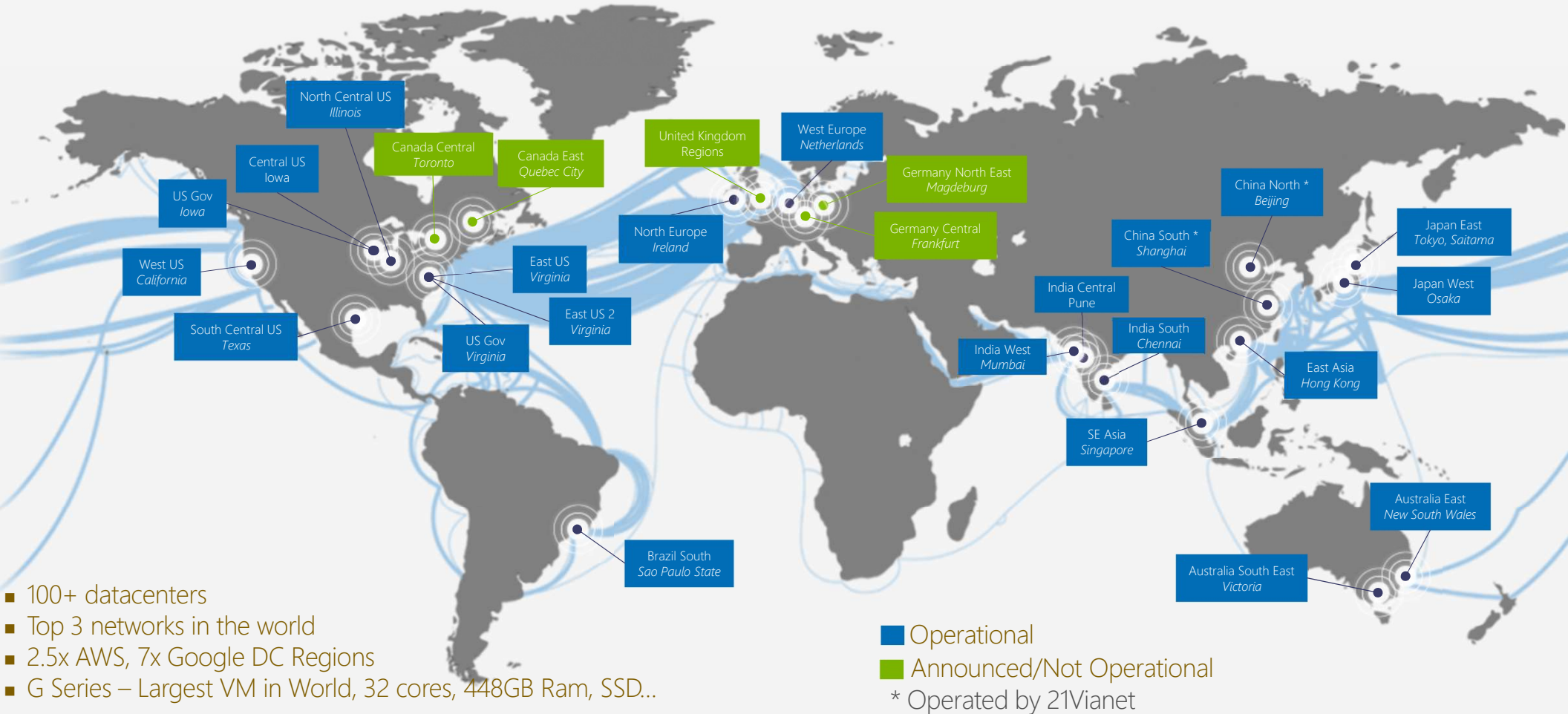


## What is Azure?

- Azure is a continually expanding set of cloud services that help your organization meet your current and future business challenges.
- Azure gives you the freedom to build, manage, and deploy applications on a massive global network using your favorite tools and frameworks.
- Azure provides more than 100 services that enable you to do everything from running your existing applications on virtual machines to exploring new software paradigms, such as intelligent bots and mixed reality.
- Link : <https://docs.microsoft.com/en-us/azure/cloud-adoption-framework/ready/azure-setup-guide/organize-resources>
- <https://cloudinfrastructureservices.co.uk/designing-azure-subscription-vs-resource-groups-best-practices/>
- <https://docs.microsoft.com/en-us/azure/azure-resource-manager/management/manage-resource-groups-portal>

# Hyper scale Infrastructure is the enabler

27 Regions Worldwide, 22 ONLINE...huge capacity around the world...growing every year



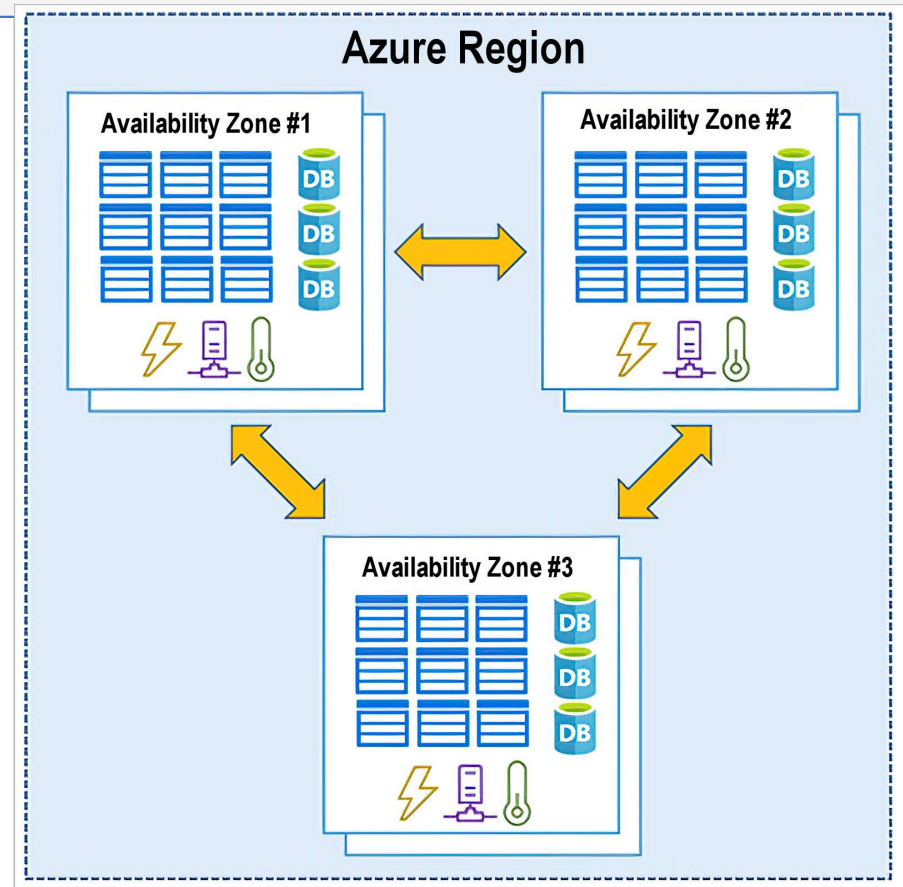
- 100+ datacenters
- Top 3 networks in the world
- 2.5x AWS, 7x Google DC Regions
- G Series – Largest VM in World, 32 cores, 448GB Ram, SSD...

## Azure regions

- A *region* is a geographical area on the planet that contains at least one but potentially multiple datacenters that are nearby and networked together with a low-latency network.
- Azure intelligently assigns and controls the resources within each region to ensure workloads are appropriately balanced.
- **Why are regions important?**
  - ✓ Azure has more global regions than any other cloud provider.
  - ✓ These regions give you the flexibility to bring applications closer to your users no matter where they are.
  - ✓ Global regions provide better scalability and redundancy. They also preserve data residency for your services.
- **Special Azure regions**
- Azure has specialized regions that you might want to use when you build out your applications for compliance or legal purposes. A few examples include:
  - ✓ US DoD Central, US Gov Virginia, US Gov Iowa and more: These regions are physical and logical network-isolated instances of Azure for U.S. government agencies and partners. These datacenters are operated by screened U.S. personnel and include additional compliance certifications.
  - ✓ China East, China North, and more: These regions are available through a unique partnership between Microsoft and 21Vianet, whereby Microsoft doesn't directly maintain the datacenters.
- Link : <https://docs.microsoft.com/en-us/azure/availability-zones/az-overview>

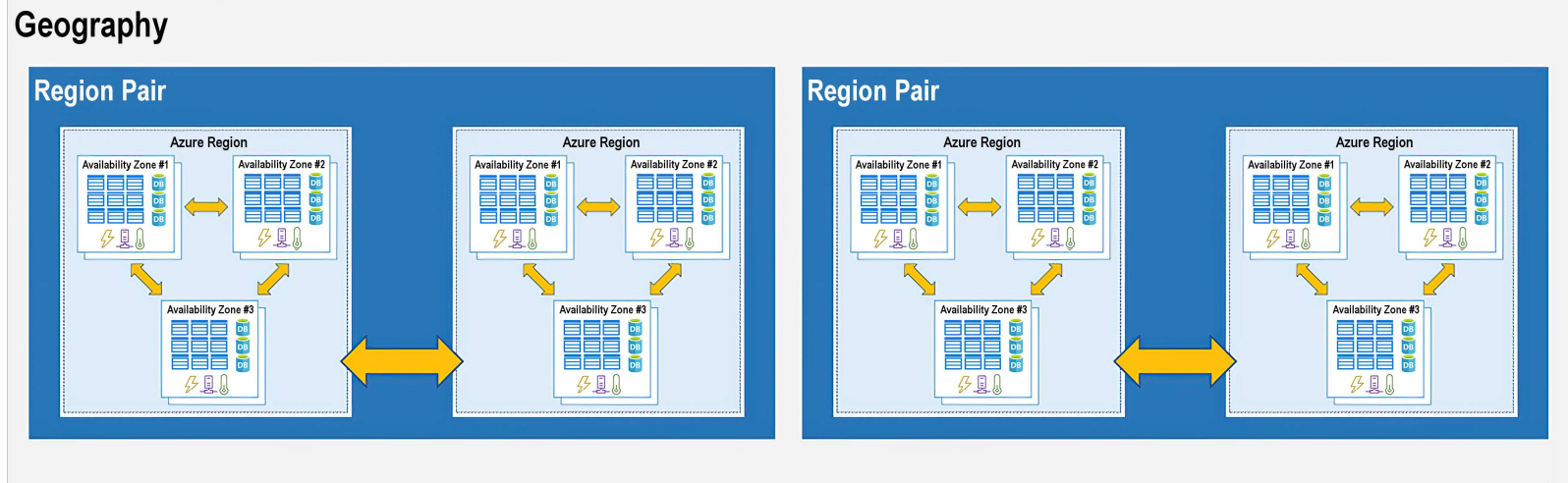
## Azure availability zones

- Availability zones are physically separate datacenters within an Azure region.
- Each availability zone is made up of one or more datacenters equipped with independent power, cooling, and networking.
- An availability zone is set up to be an *isolation boundary*. If one zone goes down, the other continues working.
- Availability zones are connected through high-speed, private fiber-optic networks.



## What is a region pair?

- Each Azure region is always paired with another region within the same geography (such as US, Europe, or Asia) at least 300 miles away.
- This approach allows for the replication of resources (such as VM storage) across a geography that helps reduce the likelihood of interruptions because of events such as natural disasters, civil unrest, power outages, or physical network outages that affect both regions at once.
- If a region in a pair was affected by a natural disaster, for instance, services would automatically failover to the other region in its region pair.
- Examples of region pairs in Azure are West US paired with East US and SouthEast Asia paired with East Asia.



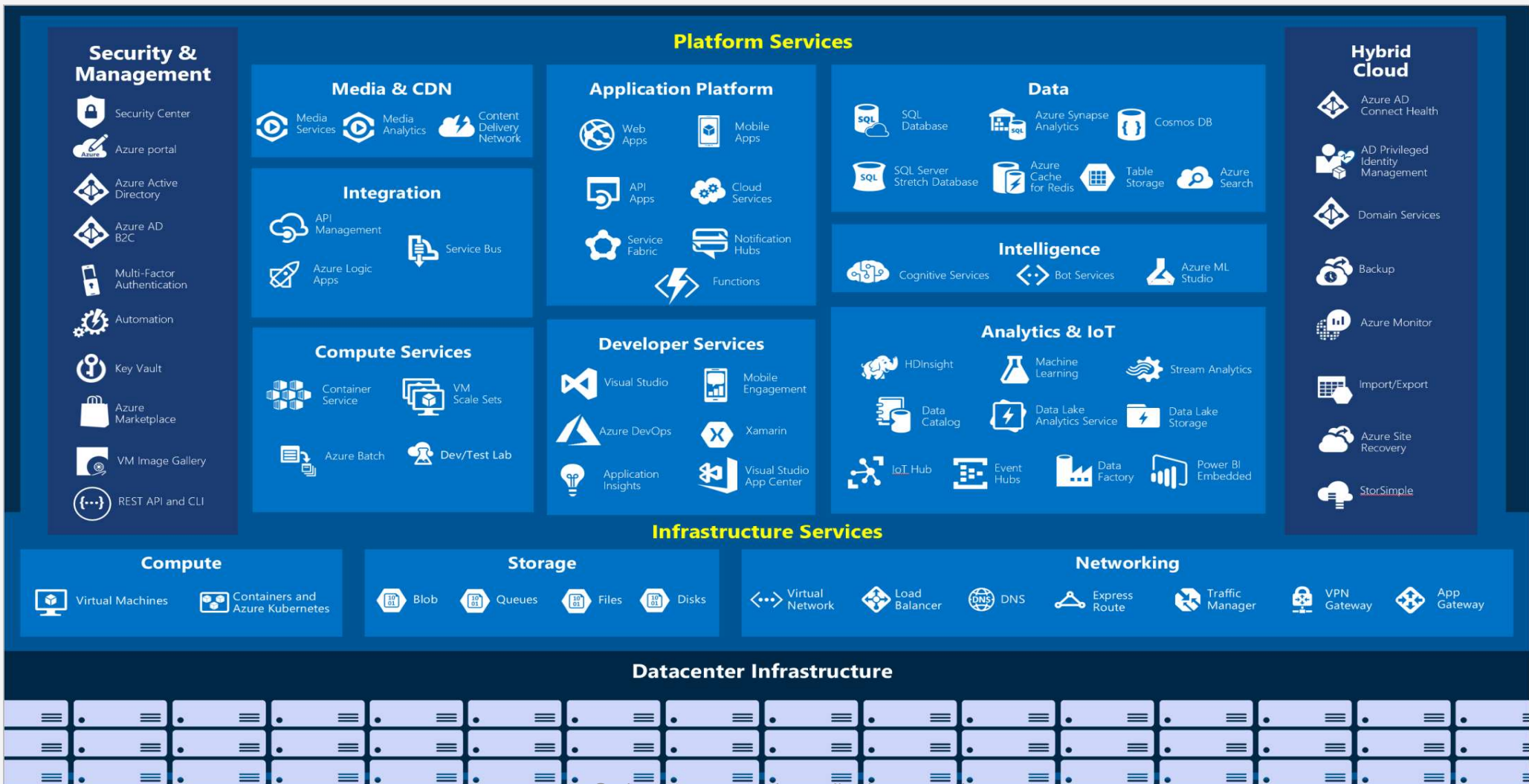
## Additional advantages of region pairs:

- Additional advantages of region pairs:
  - If an extensive Azure outage occurs, one region out of every pair is prioritized to make sure at least one is restored as quickly as possible for applications hosted in that region pair.
  - Planned Azure updates are rolled out to paired regions one region at a time to minimize downtime and risk of application outage.
  - Data continues to reside within the same geography as its pair (except for Brazil South) for tax- and law-enforcement jurisdiction purposes.

## Azure portal?

- The Azure portal is a web-based, unified console that provides an alternative to command-line tools. With the Azure portal, you can manage your Azure subscription by using a graphical user interface. You can:
  - ✓ Build, manage, and monitor everything from simple web apps to complex cloud deployments.
  - ✓ Create custom dashboards for an organized view of resources.
  - ✓ Configure accessibility options for an optimal experience.
  
- <https://azure.microsoft.com/en-us/>

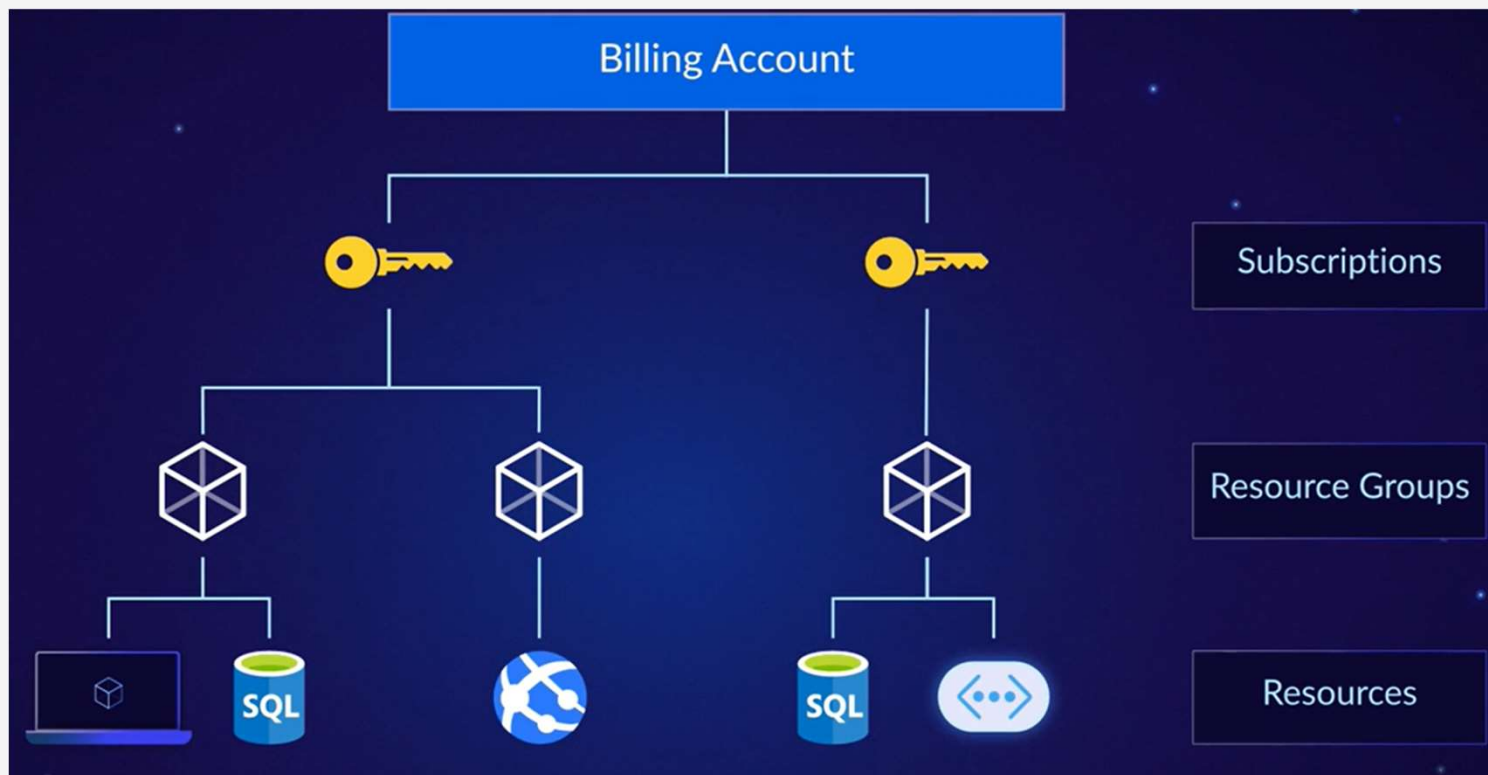
# Azure Services



## Describe core Azure architectural components

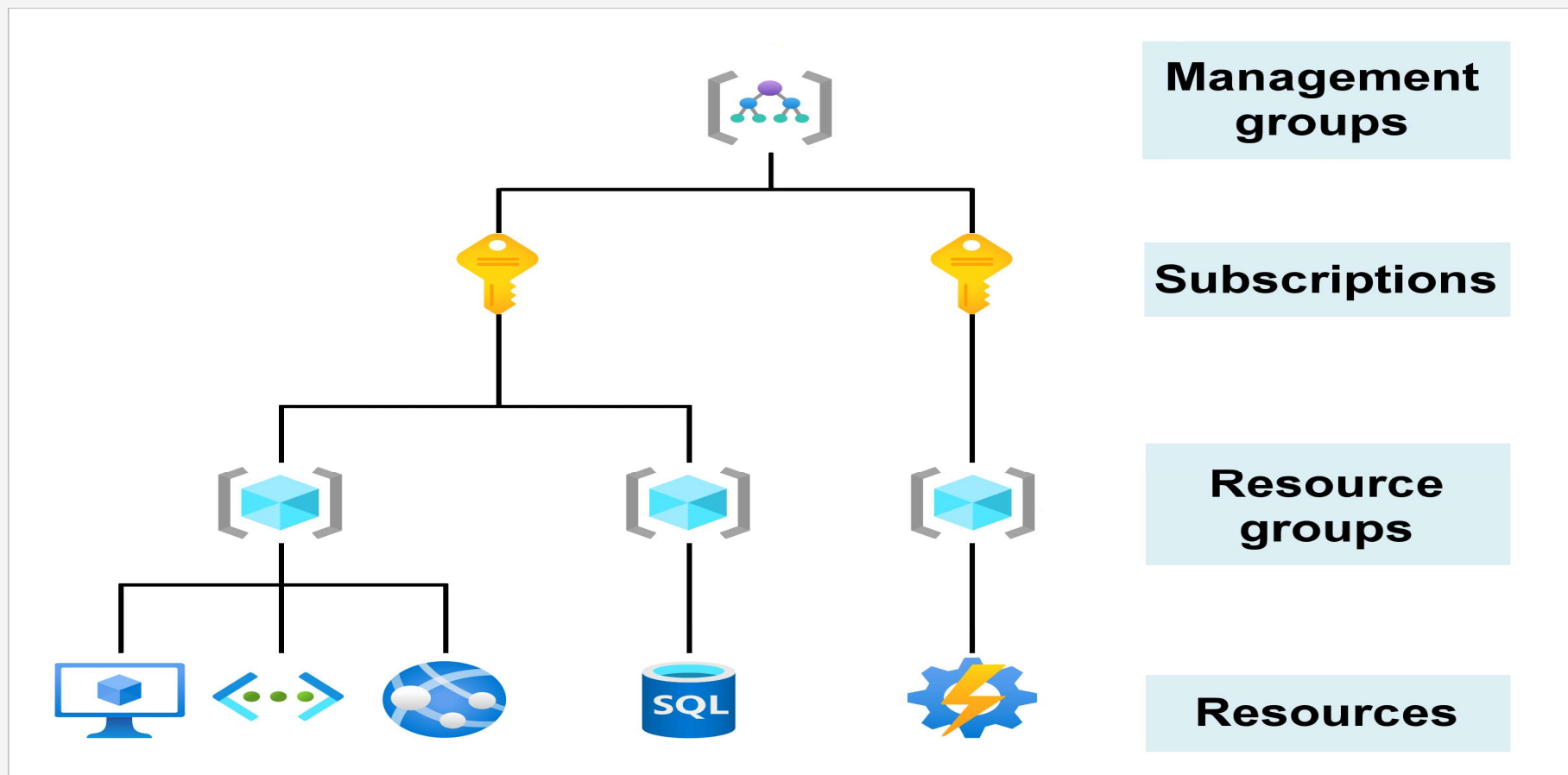
- When you sign up for an Azure account, Microsoft creates both a **billing account** and a **subscription**.
- A **billing account** can contain **multiple subscriptions**, each of which contains its own isolated set of resources. Within a **subscription**, each resource is part of a **resource group**.
- **Resources**: Resources are instances of services that you create, like virtual machines, storage, or SQL databases.
- **Resource groups**: Resources are combined into resource groups, which act as a logical container into which Azure resources like web apps, databases, and storage accounts are deployed and managed.
- **Subscriptions**: A subscription groups together user accounts and the resources that have been created by those user accounts. For each subscription, there are limits or quotas on the amount of resources that you can create and use. Organizations can use subscriptions to manage costs and the resources that are created by users, teams, or projects.
- **Management groups/Accounts**: These groups help you manage access, policy, and compliance for multiple subscriptions. All subscriptions in a management group automatically inherit the conditions applied to the management group.

## Describe core Azure architectural components



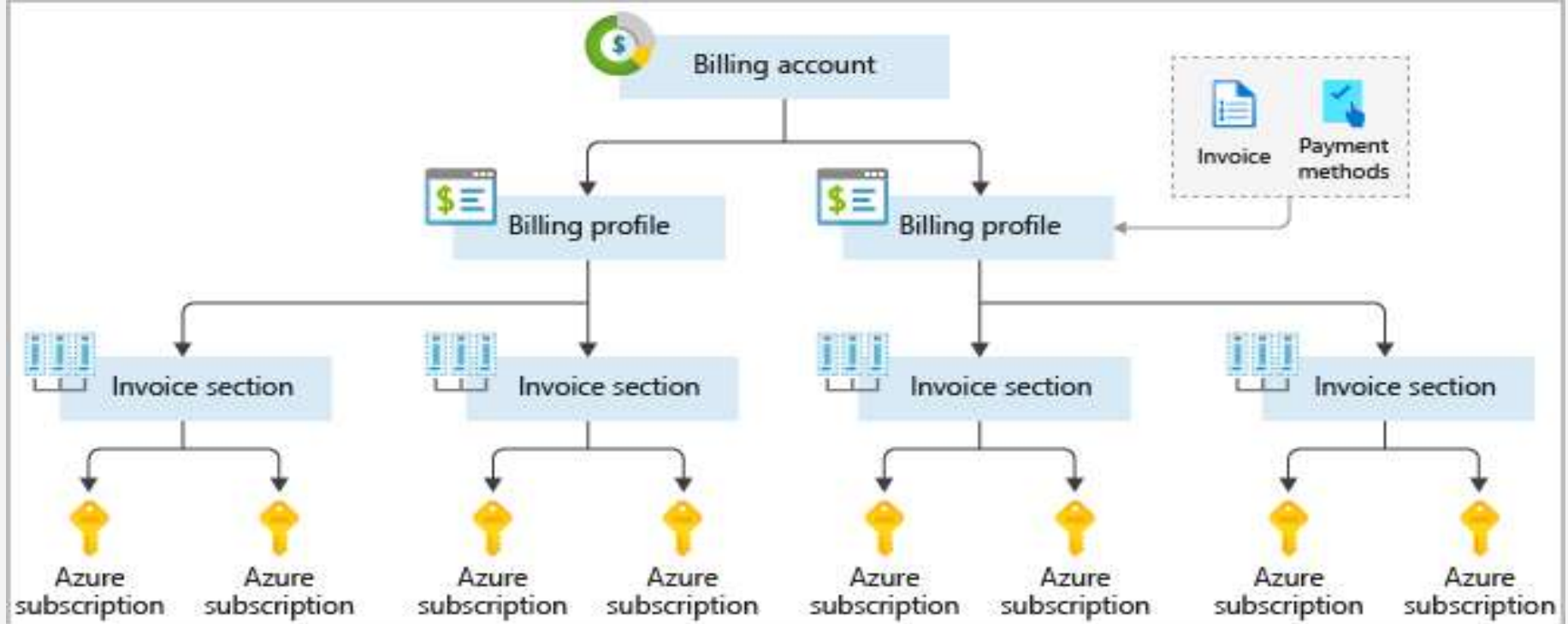
- When you sign up for an Azure account, Microsoft creates both a **billing account** and a **subscription**. It's easy to get the two mixed up because they're both involved in billing.
- A **billing account** is an agreement you or your organization sign to use Microsoft services.
- A **subscription** is actually just a collection of Azure resources. But all of the resources in a subscription are on the same monthly bill, so it's also a unit of billing.
- **So why do you need to have both a billing account and a subscription?**
- Well, you might want to have multiple subscriptions in your billing account.
- Since each subscription generates a separate invoice, it can be useful to have a separate subscription for each department in your organization.
- Also, since the resources in different subscriptions are isolated from each other, you might want to have multiple subscriptions for security or compliance reasons.

## Describe core Azure architectural components

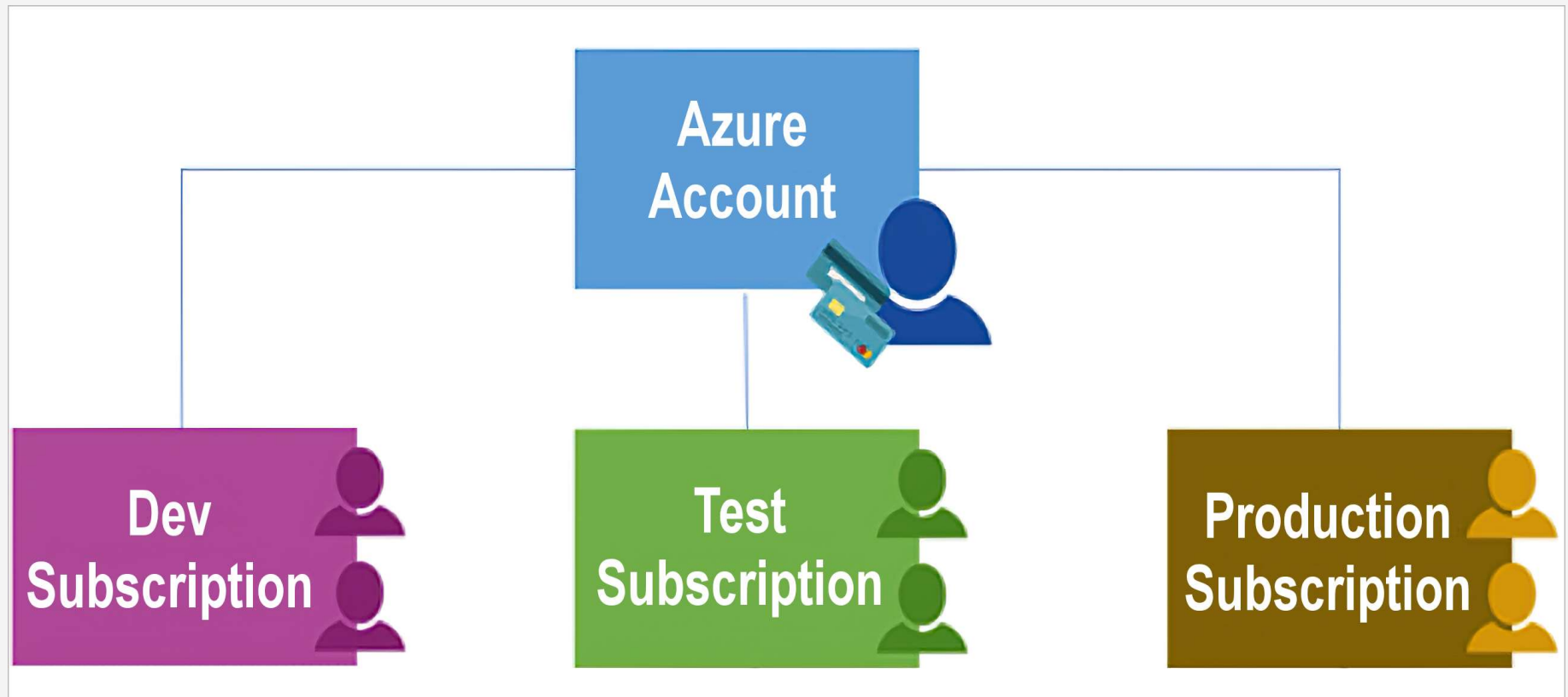


## Customize billing to meet your needs

Each invoice section is a line item on the invoice that shows the charges incurred that month. For example, you might need a single invoice for your organization but want to organize charges by department, team, or project.



## Azure subscriptions

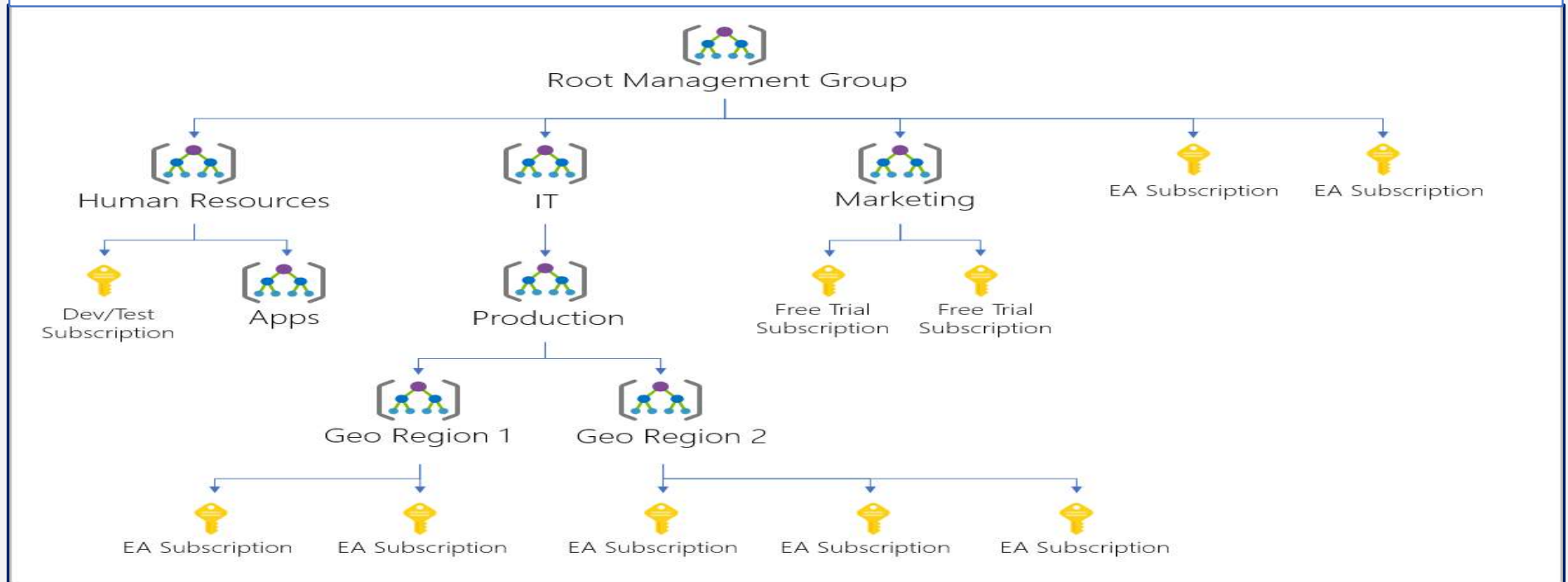


## Azure management groups

- If your organization has many subscriptions, you might need a way to efficiently manage access, policies, and compliance for those subscriptions.
- Azure management groups provide a level of scope above subscriptions.
- You organize subscriptions into containers called management groups and apply your governance conditions to the management groups.

## Hierarchy of management groups and subscriptions

- You can build a flexible structure of management groups and subscriptions to organize your resources into a hierarchy for unified policy and access management.
- Diagram shows an example of creating a hierarchy for governance by using management groups.



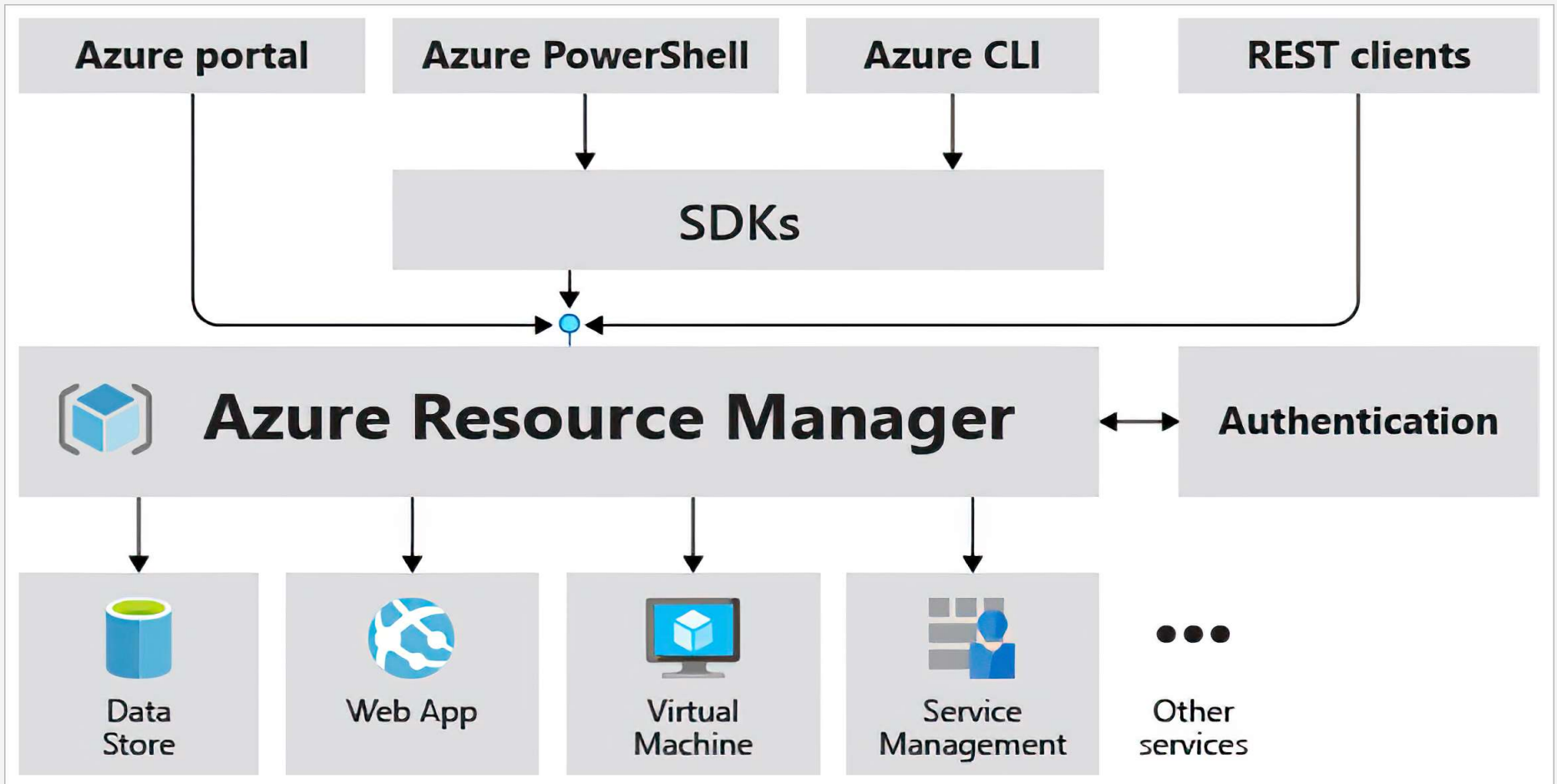
## Important facts about management groups

- 10,000 management groups can be supported in a single directory.
- A management group tree can support up to six levels of depth. This limit doesn't include the root level or the subscription level.
- Each management group and subscription can support only one parent.
- Each management group can have many children.
- All subscriptions and management groups are within a single hierarchy in each directory.

## Azure Resource Manager

- Azure Resource Manager is the deployment and management service for Azure.
- It provides a management layer that enables you to create, update, and delete resources in your Azure account. You use management features like access control, locks, and tags to secure and organize your resources after deployment.
- When a user sends a request from any of the Azure tools, APIs, or SDKs, Resource Manager receives the request. It authenticates and authorizes the request.
- Resource Manager sends the request to the Azure service, which takes the requested action. Because all requests are handled through the same API, you see consistent results and capabilities in all the different tools.

## Azure Resource Manager



## The benefits of using Resource Manager

- Manage your infrastructure through declarative templates rather than scripts. A Resource Manager template is a JSON file that defines what you want to deploy to Azure.
- Deploy, manage, and monitor all the resources for your solution as a group, rather than handling these resources individually.
- Redeploy your solution throughout the development life cycle and have confidence your resources are deployed in a consistent state.
- Define the dependencies between resources so they're deployed in the correct order.
- Apply access control to all services because RBAC is natively integrated into the management platform.
- Apply tags to resources to logically organize all the resources in your subscription.
- Clarify your organization's billing by viewing costs for a group of resources that share the same tag.

## Azure services

- **Compute services** This includes the Azure Virtual Machines—both Linux and Windows, Cloud Services, App Services (Web Apps, Mobile Apps, Logic Apps, API Apps, and Function Apps), Batch (for large-scale parallel and batch compute jobs), RemoteApp, Service Fabric, and the Azure Container Service.
- **Data services** This includes Microsoft Azure Storage (comprised of the Blob, Queue, Table, and Azure Files services), Azure SQL Database, DocumentDB, StorSimple, and the Redis Cache.
- **Application services** This includes services that you can use to help build and operate your applications, such as Azure Active Directory (Azure AD), Service Bus for connecting distributed systems, HDInsight for processing big data, Azure Scheduler, and Azure Media Services.
- **Network services** This includes Azure features such as Virtual Networks, ExpressRoute, Azure DNS, Azure Traffic Manager, and the Azure Content Delivery Network.

## Commonly used categories:

- Let's take a closer look at the most commonly used categories:
  - Compute
  - Networking
  - Storage
  - Mobile
  - Databases
  - Web
  - Internet of Things (IoT)
  - Big data
  - AI
  - DevOps

## Compute

- Compute services are often one of the primary reasons why companies move to the Azure platform. Azure provides a range of options for hosting applications and services.

Here are some examples of compute services in Azure.

Service name	Service function
Azure Virtual Machines	Windows or Linux virtual machines (VMs) hosted in Azure
Azure Virtual Machine Scale Sets	Scaling for Windows or Linux VMs hosted in Azure
Azure Kubernetes Service	Cluster management for VMs that run containerized services
Azure Service Fabric	Distributed systems platform that runs in Azure or on-premises
Azure Batch	Managed service for parallel and high-performance computing applications
Azure Container Instances	Containerized apps run on Azure without provisioning servers or VMs
Azure Functions	An event-driven, serverless compute service

## Networking

- Linking compute resources and providing access to applications is the key function of Azure networking.
- Networking functionality in Azure includes a range of options to connect the outside world to services and features in the global Azure datacenters.

## Networking

Service name	Service function
<b>Azure Virtual Network</b>	Connects VMs to incoming virtual private network (VPN) connections
<b>Azure Load Balancer</b>	Balances inbound and outbound connections to applications or service endpoints
<b>Azure Application Gateway</b>	Optimizes app server farm delivery while increasing application security
<b>Azure VPN Gateway</b>	Accesses Azure Virtual Networks through high-performance VPN gateways
<b>Azure DNS</b>	Provides ultra-fast DNS responses and ultra-high domain availability
<b>Azure Content Delivery Network</b>	Delivers high-bandwidth content to customers globally
<b>Azure DDoS Protection</b>	Protects Azure-hosted applications from distributed denial of service (DDoS) attacks
<b>Azure Traffic Manager</b>	Distributes network traffic across Azure regions worldwide
<b>Azure ExpressRoute</b>	Connects to Azure over high-bandwidth dedicated secure connections
<b>Azure Network Watcher</b>	Monitors and diagnoses network issues by using scenario-based analysis
<b>Azure Firewall</b>	Implements high-security, high-availability firewall with unlimited scalability
<b>Azure Virtual WAN</b>	Creates a unified wide area network (WAN) that connects local and remote sites

## Storage

- These services all share several common characteristics:
  - ✓ **Durable** and highly available with redundancy and replication.
  - ✓ **Secure** through automatic encryption and role-based access control.
  - ✓ **Scalable** with virtually unlimited storage.
  - ✓ **Managed**, handling maintenance and any critical problems for you.
  - ✓ **Accessible** from anywhere in the world over HTTP or HTTPS.

## Storage

Service Name	Service Function
<b>Azure Blob storage</b>	Storage service for very large objects, such as video files or bitmaps.
<b>Azure File storage</b>	File shares that can be accessed and managed like a file server.
<b>Azure Queue storage</b>	A data store for queuing and reliably delivering messages between applications.
<b>Azure Table storage</b>	A NoSQL store that hosts unstructured data independent of any schema.

## Databases

Service name	Service function
<b>Azure Cosmos DB</b>	Globally distributed database that supports NoSQL options.
<b>Azure SQL Database</b>	Fully managed relational database with auto-scale, integral intelligence, and robust security.
<b>Azure Database for MySQL</b>	Fully managed and scalable MySQL relational database with high availability and security.
<b>Azure Database for PostgreSQL</b>	Fully managed and scalable PostgreSQL relational database with high availability and security.
<b>SQL Server on Azure Virtual Machines</b>	Service that hosts enterprise SQL Server apps in the cloud.
<b>Azure Synapse Analytics</b>	Fully managed data warehouse with integral security at every level of scale at no extra cost.
<b>Azure Database Migration Service</b>	Service that migrates databases to the cloud with no application code changes.
<b>Azure Cache for Redis</b>	Fully managed service caches frequently used and static data to reduce data and application latency.
<b>Azure Database for MariaDB</b>	Fully managed and scalable MariaDB relational database with high availability and security.

### ➤ **What is App Service?**

- ✓ App Service is an HTTP-based service that enables you to build and host many types of web-based solutions without managing infrastructure.
- ✓ For example, you can host web apps, mobile back ends, and RESTful APIs in several supported programming languages. Applications developed in .NET, .NET Core, Java, Ruby, Node.js, PHP, or Python can run in and scale with ease on both Windows- and Linux-based environments.

### ➤ **What is Azure Marketplace?**

- ✓ Azure Marketplace is an online store that hosts applications that are certified and optimized to run in Azure.
- ✓ Many types of applications are available, ranging from AI and machine learning to web applications. As you'll see in a couple of minutes, deployments from the store are done via the Azure portal by using a wizard-style user interface.
- ✓ This user interface makes evaluating different solutions easy.

## Azure Marketplace?

- Azure Marketplace helps connect users with Microsoft partners, independent software vendors, and startups that are offering their solutions and services, which are optimized to run on Azure.
- Azure Marketplace customers can find, try, purchase, and provision applications and services from hundreds of leading service providers.
- All solutions and services are certified to run on Azure.

