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# NERD'S GUIDE TO

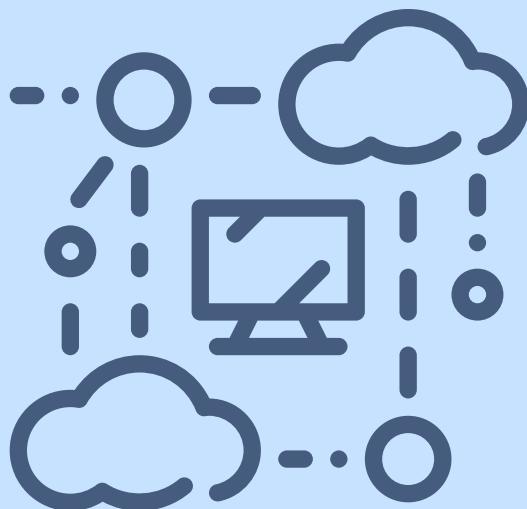
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# Azure



PRAGMATIC  
WORKS





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# AZURE FUNDAMENTALS

## MICROSOFT AZURE IS AN EVER-EXPANDING

set of cloud services that help build, run, and manage applications with expansive computing resources. It helps organizations in all industries solve business challenges through hundreds of services, including application development, testing, and hosting, to create virtual machines, to integrate and sync systems, to collect and store metrics, and to utilize virtual hard drives.

Azure is an ecosystem made up of various parts, including, but not limited to:

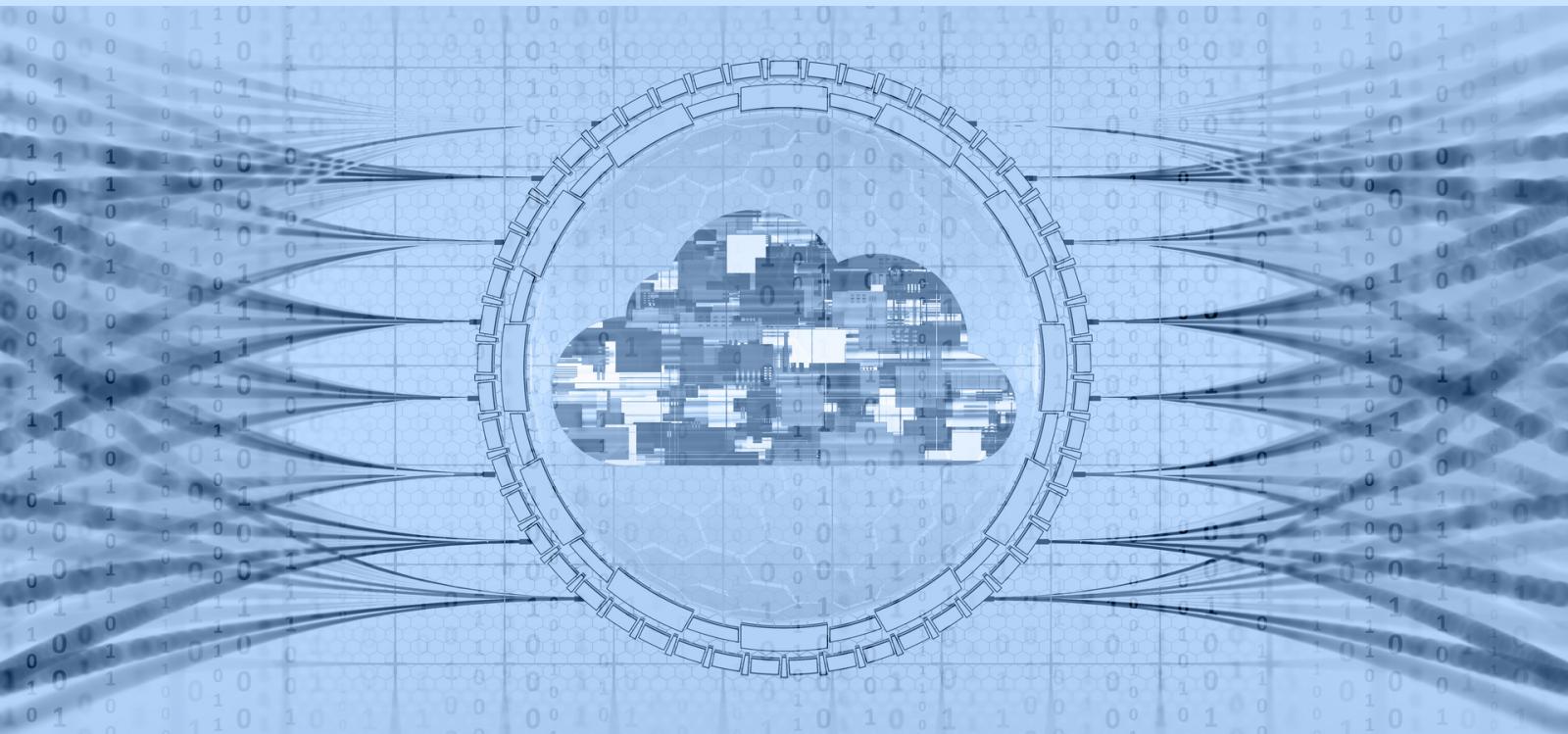
- Azure Accounts & Subscriptions
- Azure Portal
- Azure Marketplace
- Azure APIs and CLIs
- Azure Resource Manager
- Azure Monitor
- Azure Regions & Datacenters
- Azure SLA, Compliance & Trust

## WHY USE AZURE?

To create and manage your own applications you need servers, storage, developers, a dedicated network, security, and more. Investing in all of these things can be expensive, difficult to manage, and could hurt whether you fail - because you lose your investment - or are successful - because you'll end up needing to invest in and manage more servers and storage systems to keep up with demand.

Azure solves all these issues by putting the resources you need in one place. It's free to start and has a pay per use model, so you only have to pay for the services you use. Azure is also accessible to just about anyone. All you need is internet and access to the Azure portal, which connects you to hundreds of services.

The cloud hosts, stores, manages, and processes data online, or remotely, using servers around the globe, as opposed to locally on one device, and can be accessed through any internet browser.



## HOW AZURE WORKS

Azure works with a technology called virtualization, which separates the coupling between a computer's CPU and its operating system using an abstraction layer known as a hypervisor. Hypervisors imitate the functions of a computer and its CPUs in a virtual machine and run multiple virtual machines at a time.

Azure uses virtualization on a massive scale in Microsoft data centers across the world. Each data center has many racks of servers, and each server has a hypervisor. Every rack has one server that runs a software called a fabric controller, which connects them to another piece of software called an orchestrator. Orchestrators manage everything in Azure, including user requests.

When a user requests to make a virtual machine, the orchestrator packages everything that's needed, locates a server rack, and sends the package to the fabric controller, which creates a virtual machine that users can connect to.

## AZURE DATA SERVICES

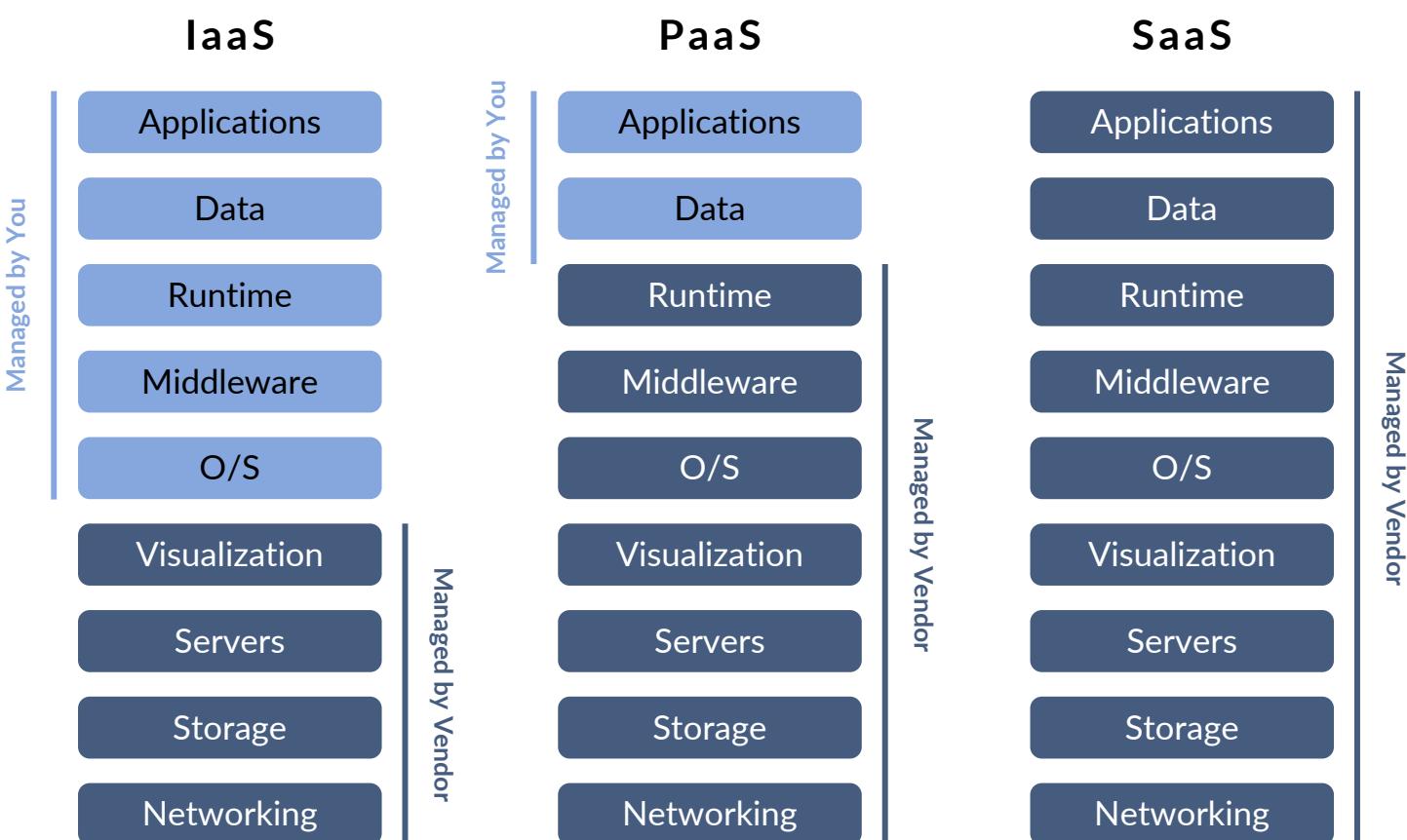
Azure can be very intimidating and overwhelming at first, there are more than 200 Azure services, which are currently divided into 18 different categories.

- Compute
- Networking
- Storage
- IoT
- Migration
- Mobile
- Analytics
- Containers
- AI and Machine Learning
- Integration
- Management Tools
- Developer Tools
- Security
- Databases
- DevOps
- Media
- Identity
- Web

**SaaS, or Software as a Service**, is a service that offers on-demand pay-per-use application software to users. With SaaS, software installation isn't required because it's run in the cloud and is accessible from any platform by multiple users. SaaS's resources are managed by vendors. SaaS is typically used by end users.

**PaaS, or Platform as a Service**, is a development environment. It's made up of a programming language execution environment, an operating system, web server, and database. Users can build and manage programs without worrying about the underlying infrastructure. They manage data and application resources, while all other resources are managed by a vendor. PaaS is most often used by developers.

**IaaS, or Infrastructure as a Service**, offers all computing resources in a virtual environment. Resources include, data storage and visualization, virtualization, and servers and networking, all of which vendors are typically responsible for managing. Users are responsible for resources such as applications, data, runtime, and middleware. IaaS has enhanced scalability so dynamic workloads are supported. IaaS is typically used by developers and SysAdmins.



# AZURE STORAGE

## Blob Storage

Blob storage stores massive amounts of unstructured data such as text, binary or application data, videos, and audio files. It contains data management that allows you to optimize your storage using different data tiers – premium, hot, cold, and archived.

## Data Lake Store Gen 2

Data Lake Storage Gen2 is a multimodal cloud storage service. Before it, cloud users had to choose between object store – such as blob storage, which stores massive amounts of objects in a flat hierarchy – or file system, which is a hierarchy that organizes data into structured directories. Azure Data Lake Storage Gen2 combines the qualities of both object store and file system, so you have file store capability and organization and object store scale.

# AZURE & SQL

**WHEN CHOOSING A SQL SERVER SOLUTION IN AZURE, AN IMPORTANT CONSIDERATION** is how close the features of that service match an on-prem installation. With Azure SQL Database and SQL Managed Instance, most of the database management features, SQL language, and query processing are the same. They share a common code base with latest version of SQL Server. Other common factors include security features, database features, language features, and multi-model capabilities.

## Azure SQL Database

Azure SQL Database is a platform as a service used for building new apps in the cloud. It has pre-provisioned or serverless compute and hyperscale storage to meet demanding workload environments. Users manage the database while Azure handles the infrastructure, OS, and SQL server.

## SQL Server on Virtual Machines

SQL Server on Virtual Machines is an Infrastructure as a Service used for re-hosting apps requiring OS-level access and control with automated manageability features. Azure manages the infrastructure and host while users manage the OS and SQL server.

## Azure Managed Instance

Azure Managed Instance is a Platform as a Service used for modernizing existing apps. It offers high capability with SQL Server and native VNET support. Azure manages the infrastructure and OS while users are responsible for the server.

## SQL Server on Virtual Machines

SQL Pools are a massively parallel processing (MPP) architecture designed for big data applications and large aggregated queries. SQL Pools can support up to 128 concurrent queries and 1,200 active concurrent slots. Because it's a MPP solution, queries can be 20 to 100 times faster than other solutions. SQL Pools can also be paused to save costs.

# AZURE DEVOPS



## Azure DevOps

Azure DevOps is a Software as a Service platform and orchestrator that provides a toolchain for developing and deploying software. By operating in the SaaS model, patches or upgrades to the toolchain aren't required. DevOps' popularity comes from its use in any language, on any platform, and in any cloud. With it, users can plan, code, build, test, deploy, and operate software. DevOps is supported by Azure Marketplace, which allows third parties to extend its functionality.

## GitHub

Git is a version control system for tracking changes to computer files. It is distributed, or decentralized, version control, which means many developers can work on a single project without having to be on the same network. It tracks who made what changes to the work and when, making for easy collaboration. Files can be reverted to old versions at any time.

GitHub is a Git repository hosting service that provides a web-based graphical interface. Some of its features include identifying and analyzing vulnerabilities to code, the ability to publish privately or publicly, and easy code hosting with all of the codes and documentations hosted in one place.

# AZURE DATA FACTORY

## What is Azure Data Factory?

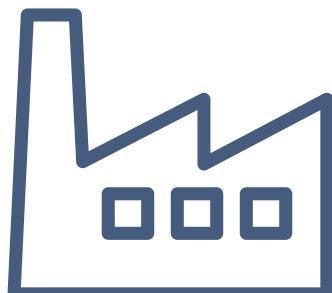
Azure Data Factory (ADF) is a cloud-based service for data integration. It is used to integrate disparate data sources from across your organization including data in the cloud and data stored on-premises.

## Azure Data Factory replaces SQL Server Integration Services (SSIS)

Azure Data Factory is Microsoft's cloud replacement for SSIS and is better designed and suited for connecting to and working with Cloud and Hybrid environments.

### Lift & Shift

Azure Data Factory is a solution for running SSIS packages in ADF. It leverages Azure Infrastructure, but you can still use or run your existing SSIS Packages either in the cloud or on a self-hosted network.

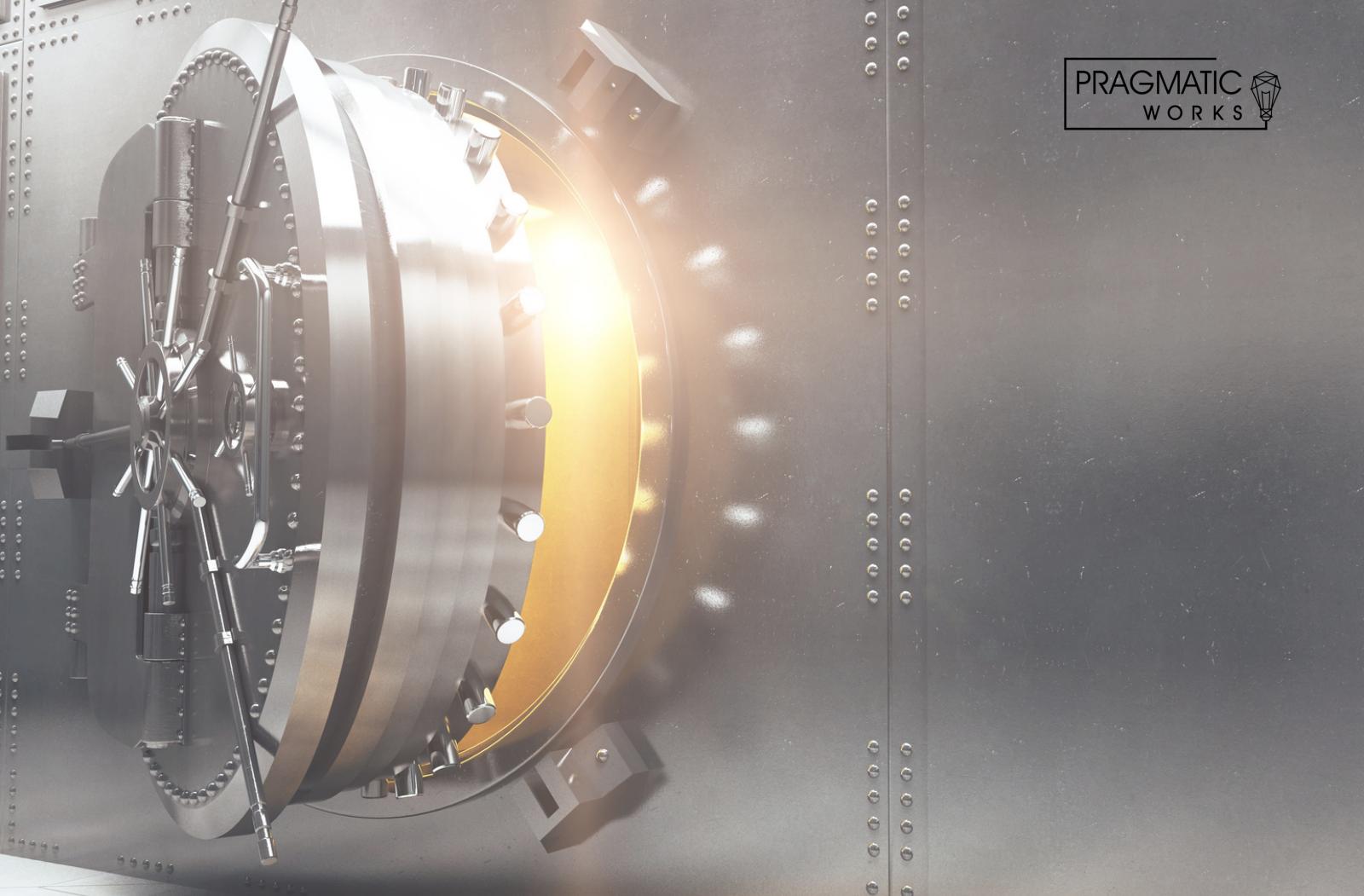


### Scheduling with Triggers

A pipeline is a logical grouping of activities that together perform a task. A pipeline run defines an instance of a pipeline execution. To execute a pipeline run you use a trigger, which is a unit of processing that determine when a pipeline execution needs to be kicked off. You can schedule a pipeline to run on a schedule or based on a trigger.

### Monitoring

Monitoring in ADF is built in and is easy to use. It's accessed through the manage and monitor tab, which features a list of triggered pipeline runs in the selected time period. You can change the time range and filter by status, pipeline name, or annotation. With monitoring, you can make run-specific actions such as rerun and view consumption reports.



# AZURE KEY VAULTS

## HOW AZURE KEY VAULT CAN SECURE SENSITIVE INFORMATION AND PASSWORDS

Azure Key Vault is a cloud hosted service offering secure storage and access for certificates, connection strings and other secrets. It streamlines the key management process and provides full control of keys for accessing and encrypting your data. Administrators can grant or revoke access to keys as needed. Key Vaults also control access to anything stored within them. Applications in Azure resources authenticate to Key Vault to retrieve secrets. The best authentication method for Azure services is to use a managed identity, as it allows Azure services to authenticate to the Key Vault or to any service that supports Active Directory authentication, without having to include credentials in your code. With Azure Key Vault, applications never have direct access to keys; administrators can monitor and audit key uses with Azure logging. Key Vault also allows the separation of security maintenance from application development. For example, Key Vault secrets can be used to store connection strings for various resources accessed by Azure Data Factory. Those connection strings can be updated by administrators without affecting the Azure Data Factory pipelines or having to send new passwords to developers.

# PRAGMATIC WORKS



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