

Cloud Services Models "PaaS"

By

Asst.L. Mohamed A. Abdul Hamed

University of Basra

College of Computer Science and Information Technology

Computer Science Department

Overview

- **Cloud Platform as a Service (PaaS) .**
- **PaaS architecture and how it works .**
- **What is included in PaaS?**
- **The main offerings of PaaS.**
- **PaaS Characteristics .**
- **Microsoft Azure as example.**

Platform as a Service (PaaS)

- **Platform as a service** (PaaS) is a cloud computing model in which a third-party provider delivers hardware and software tools -- usually those needed for application development -- to users over the internet.
- A PaaS provider hosts the hardware and software on its own infrastructure.
- **As a result**, PaaS frees users from having to install in-house hardware and software to develop or run a new application.

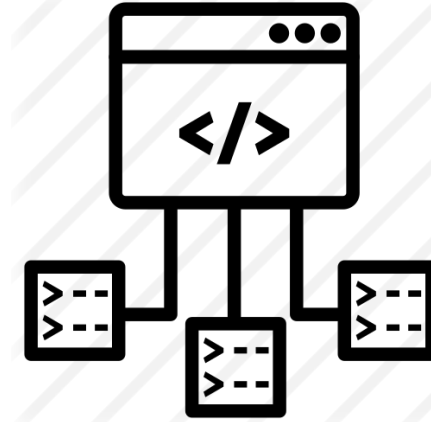
PaaS architecture and how it works

- PaaS can be accessed over any internet connection, making it possible to build an entire application in a web browser.
- Users can focus on creating and running applications rather than constructing and maintaining the underlying infrastructure and services.
- Because the development environment is not hosted locally, developers can work on the application from anywhere in the world. This enables teams that are spread out across geographic locations to **collaborate**.
- Many PaaS products are geared toward **software development**. These platforms offer compute and storage infrastructure, as well as text editing, version management, compiling and testing services that help developers create new software more quickly and efficiently.

What is included in PaaS?

- The main offerings included by PaaS vendors are:
 1. Development tools
 2. Middleware
 3. Operating systems
 4. Database management
 5. Infrastructure
- Different vendors may include other services as well, but these are the core PaaS services.

The main offerings



1. Development tools

- PaaS vendors offer a variety of tools that are necessary for software development, including a source code editor, a debugger, a compiler, and other essential tools.
- These tools may be offered together as a **framework**.
- The specific tools offered will depend on the vendor, but PaaS offerings should include everything a developer needs to build their application.

Note: a framework is often a layered structure indicating what kind of programs can or should be built and how they would interrelate.

- Platforms offered as a service usually include middleware, so that developers don't have to build it themselves.
- Middleware is software that sits in between user-facing applications and the machine's operating system;
- for example, middleware is what allows software to access input from the keyboard and mouse.
- Middleware is necessary for running an application, but end users don't interact with it.

The main offerings



3- Operating systems

- A PaaS vendor will provide and maintain the operating system that developers work on and the application runs on.

4- Databases

- PaaS providers administer and maintain databases. They will usually provide developers with a database management system as well.

5- Infrastructure

- PaaS is the next layer up from IaaS in the cloud computing service model, and everything included in IaaS is also included in PaaS.
- A PaaS provider either manages servers, storage, and physical data centers, or purchases them from an IaaS provider

PaaS Characteristics

- **Faster time to market**
- PaaS is used to build applications more quickly than would be possible if developers had to worry about building, configuring, and provisioning their own platforms and backend infrastructure.
- With PaaS, all they need to do is write the code and test the application, and the vendor handles the rest.
- **One environment from start to finish**
- PaaS permits developers to build, test, debug, deploy, host, and update their applications all in the same environment.
- This enables developers to be sure a web application will function properly as hosted before they release, and it simplifies the application development lifecycle.

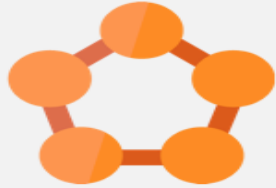
PaaS Characteristics

- **Price**
- PaaS is more cost-effective than leveraging IaaS in many cases. Overhead is reduced because PaaS customers don't need to manage and provision virtual machines.
- In addition, some providers have a **pay-as-you-go** pricing structure, in which the vendor only charges for the computing resources used by the application, usually saving customers money.
- However, each vendor has a slightly different pricing structure, and some platform providers charge a flat fee per month.
- **Ease of licensing**
- PaaS providers handle all licensing for operating systems, development tools, and everything else included in their platform.

PaaS



CLOUDFOUNDRY



Azure Fabric



Google App Engine



AWS Lambda



kubernetes

Infrastructure



Microsoft
Azure



IBM **Bluemix**™



HEROKU



amazon
web services

ORACLE
CLOUD



Pivotal
Web Services

Microsoft Azure (Windows Azure)



- The Microsoft Azure website provides a directory of hundreds of different services you can use, including full virtual machines, databases, file storage, backups, and services for mobile and web apps.
- Azure is an ever-expanding set of cloud computing services to help your organization meet its business challenges.
- Azure gives you have the freedom to build, manage, and deploy applications on a massive, global network using your preferred tools and frameworks.

Some of solution provided by Azure



Internet of Things

Power your digital transformation, collect untapped data, and find new insights by connecting your devices, assets, and sensors



AI Platform

Artificial intelligence productivity for every developer and every scenario



SAP on Azure

Bring cloud scale and agility to your mission-critical SAP workloads



Blockchain

Quickly develop and deploy distributed apps on the blockchain of your choice

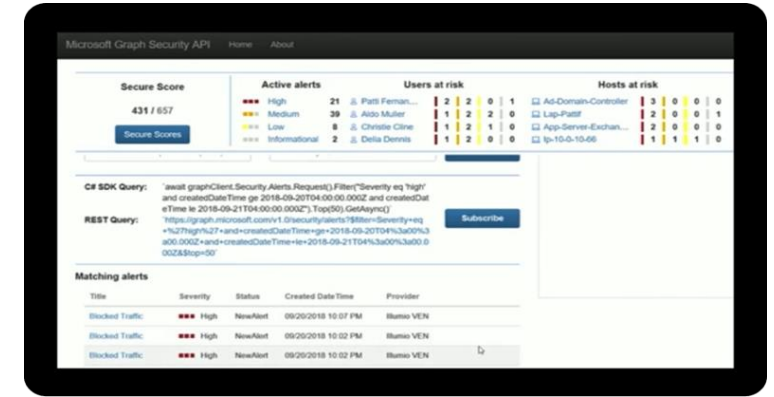


Azure Active Directory and Windows 10

- Microsoft is also using Azure to extend Windows in some important ways. Traditionally, organizations that wanted to have a central user directory and management of their PCs needed to run their own Microsoft Active Directory server.
- Now, in addition to the traditional Active Directory software that can be installed on a Windows server, an organization can use Azure Active Directory.
- Azure AD is the same sort of thing—but hosted on Microsoft Azure.
- It allows organizations to have all those centralized administration features without requiring them to host their own Active Directory server (and set up the often complicated infrastructure and access permissions needed to make it work remotely).

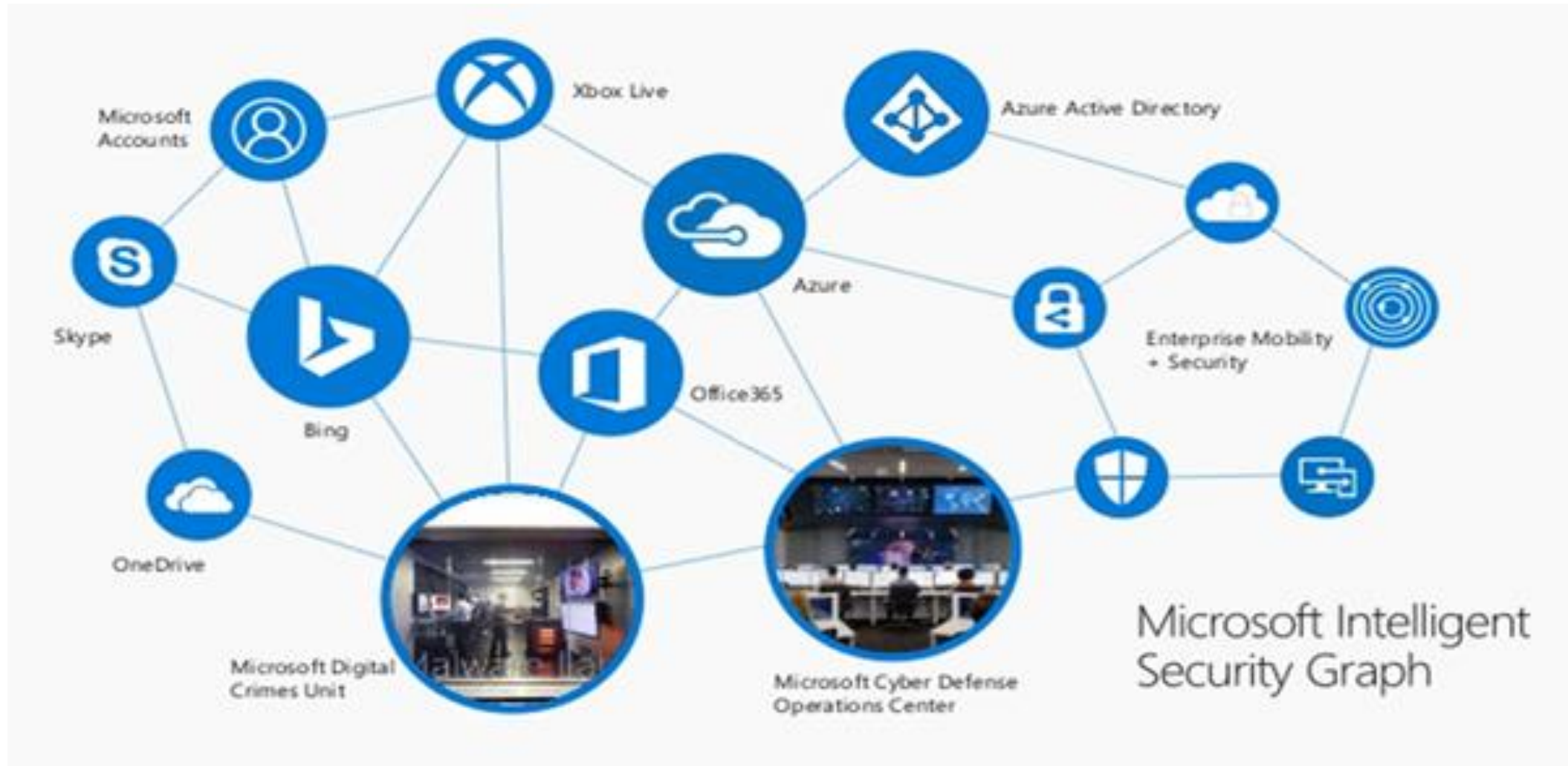
Note: **Active Directory (AD)** is a Microsoft product that consists of several services that run on Windows Server to manage permissions and access to networked resources.

Advanced security with Intelligent Security Graph



- Detect threats early with unique intelligence
- Identify new threats and respond quickly with services that are informed by real-time global cybersecurity intelligence delivered at cloud scale.
- Using machine learning, behavioral analytics, and application-based intelligence, Microsoft data scientists analyze the flood of data in the **Microsoft Intelligent Security Graph**.
- The resulting insights inform services in Azure and help you detect threats faster.

Microsoft Intelligent Security Graph



References

- **Book by Realtime publisher, 'Dan Sullivan', 'The Definitive Guide to Cloud Computing'.**
- **Website, <https://azure.microsoft.com/en-us/overview/>**
- **Website, [HTTPs://searchcloudcomputing.techtarget.com/definition/Windows-Azure](https://searchcloudcomputing.techtarget.com/definition/Windows-Azure).**