



Cloud Computing

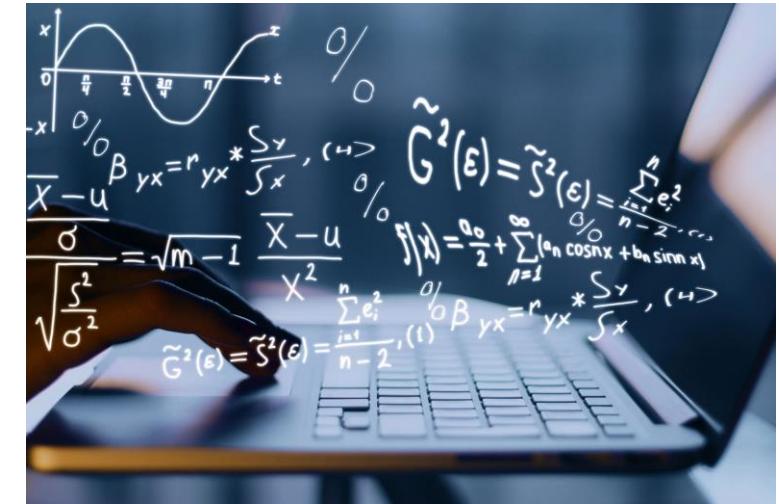
Infrastructure and Web Development

Engineering School

Daniel Franco



UAB
Universitat Autònoma de Barcelona
Escola d'Enginyeria



What are we going to do?

- Manage your cloud subscription
- Create cloud services

The screenshot shows the Microsoft Azure portal interface. At the top, there's a navigation bar with links like 'Aplicaciones', 'Bionic Engineering', 'Flightradar24.com', 'CEN - European C...', 'Caja de Ingenieros', 'Save to Mendeley', 'Dictionary, translat...', and 'Download Star War...'. Below the bar, the main header says 'Microsoft Azure' and has a search bar 'Buscar recursos, servicios y documentos (G+)'. The main content area is titled 'Servicios de Azure' and features a grid of service icons: 'Crear un recurso' (plus sign), 'Azure Blockchain...', 'Lab Services', 'App Services', 'Máquinas virtuales', 'Cuentas de almacenamiento', 'SQL Database', 'Servidores de Azure Data...', 'Azure Cosmos DB', and 'Más servicios' (arrow). Below this, there's a section for 'Recursos recientes' showing a single entry: 'Azure para estudiantes: Starter' (Tipo: Suscripción, Última consulta: hace 6 horas). At the bottom, there are sections for 'Navegar' (Suscripciones, Grupos de recursos, Todos los recursos, Panel) and 'Herramientas' (Microsoft Learn, Azure Monitor, Security Center, Administración de costos).

The screenshot shows the AWS Elastic Beanstalk creation wizard. The top navigation bar includes links for 'Aplicaciones', 'Bionic Engineering', 'Flightradar24.com', 'CEN - European C...', 'Caja de Ingenieros', 'Save to Mendeley', 'Dictionary, translat...', and 'Download Star War...'. The main title is 'Elastic Beanstalk' with a close button. Below it, there are two tabs: 'Entornos' and 'Aplicaciones', with 'Aplicaciones' selected. The main content area is titled 'Crear una aplicación web' and contains instructions: 'Cree una nueva aplicación y un nuevo entorno con una aplicación de ejemplo o su propio código. Al crear un entorno, permite que AWS Elastic Beanstalk administre los recursos de AWS y los permisos en su nombre.' A 'Más información' link is provided. There are two sections: 'Información de la aplicación' (with a 'Nombre de la aplicación' input field) and 'Etiquetas de la aplicación' (with fields for 'Clave' and 'Valor' and a 'Eliminar etiqueta' button). At the bottom, there are buttons for 'Comentarios' and 'Español', and a footer note: '© 2008 - 2020, Amazon Web Services, Inc. o sus empresas afiliadas. Todos los derechos reservados. Política de privacidad'.

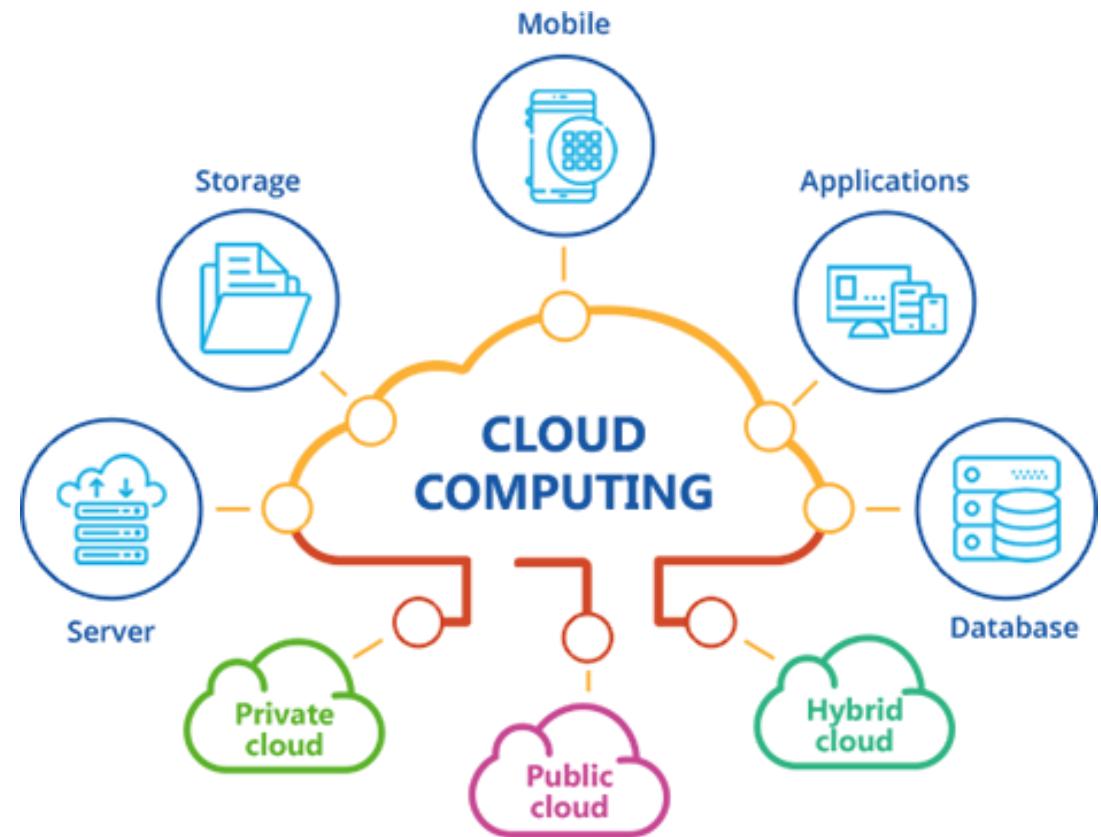
The background features a stylized, low-poly illustration of clouds in various shades of blue and white, set against a solid blue sky.

Introducing Cloud Computing

Cloud Services

Cloud computing

- Cloud computing is the on-demand availability of computer system resources, especially data storage and computing power, without direct active management by the user.
 - Data centres available to many users over the Internet.
 - Allows dynamically allocate and deploy the needed services at every moment
 - Large clouds have functions distributed over multiple locations from central servers.



[Reset Thread](#)[Dark Mode](#)[OpenAI Discord](#)[FAQ](#)[Log out](#)

DF

Can you tell me what it the importance of cloud computing?



Cloud computing is a way of storing, accessing, and managing data over the internet instead of on a local computer or server. This technology offers many benefits, such as increased access to data and resources, improved collaboration and communication, and reduced costs for hardware and software. Cloud computing has become an important tool for businesses, organizations, and individuals to store and access data in a flexible and scalable way. It allows users to access data and applications from any device with an internet connection, making it a convenient and effective way to work and share information.

[Try again](#)

DF

هل يمكن أن تخبرني ما هي أهمية الحوسبة السحابية؟



الحوسبة السحابية هي طريقة لتخزين والوصول إلى وإدارة البيانات عبر الإنترنت بدلاً من الوصول إليها على جهاز كمبيوتر محلي أو خادم. يقدم هذا التقنية العديد من الفوائد، مثل زيادة الوصول إلى البيانات والموارد، وحسن التعاون والتواصل، وتقليل التكاليف للأجهزة الثابتة والبرامج. أصبحت الحوسبة السحابية أداة مهمة للشركات والمنظمات والأفراد لتخزين والوصول إلى البيانات بطريقة نشطة ومتعددة الخيارات. تتيح للمستخدمين الوصول إلى البيانات والتطبيقات من أي جهاز متصل بالإنترنت، مما يجعلها طريقة مريحة وفعالة للعمل ومشاركة المعلومات.



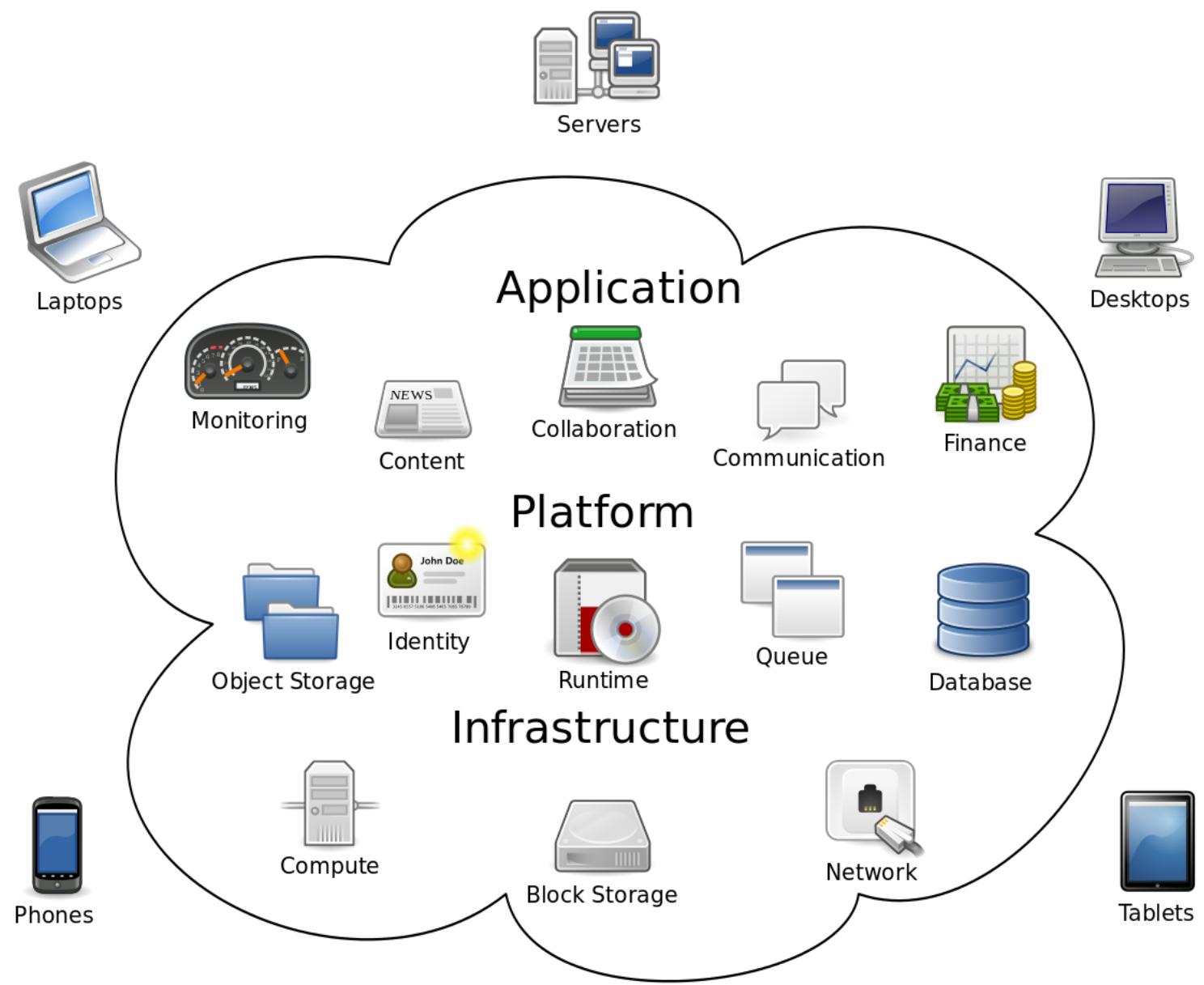
DF

Em pots dir quina és la importància del cloud computing?



El cloud computing és una manera de desar, accedir i gestionar dades a través d'internet en lloc de fer-ho en un ordinador o servidor local. Aquesta tecnologia ofereix molts avantatges, com ara un major accés a les dades i recursos, millora de la col·laboració i la comunicació, i reducció dels costos per a maquinari i programari. El cloud computing s'ha convertit en una eina important per a les empreses, organitzacions i individus per desar i accedir a les dades de manera flexible i escalable. Permet als usuaris accedir a les dades i aplicacions des de qualsevol dispositiu amb connexió a internet, cosa que el fa una manera convenient i efectiva de treballar i compartir informació.





Cloud computing

Cloud computing services

Cloud service models

IaaS
(infrastructure as a service)

PaaS
(platform as a service)

SaaS
(software as a service)



More control
over IT resources

Less control
over IT resources

{* CLOUD *}

BBC makes switch to AWS, serverless for new website architecture, observers grumble about the HTML

News aggregator says it's 'way more complicated and much harder to parse'

Tim Anderson Wed 4 Nov 2020 // 14:01 UTC

SHARE

UPDATED The BBC website, the [sixth most popular in the UK](#), has mostly migrated from the broadcaster's bit barns to Amazon Web Services (AWS) with around half the site now rendered using AWS Lambda, a serverless platform.

"Until recently much of the BBC website was written in PHP and hosted on two data centres near London," Matthew Clark, head of architecture, said [lately](#). "Almost every part has been rebuilt on the cloud."

PHP runs fine in the cloud, but this is not a matter of lift and shift. Instead, the BBC team devised a new architecture based on serverless computing. It also endeavoured to combine what used to be several sites – such as News, Sport, and so on – into one, though Clark said the World Service, iPlayer video, and the radio site BBC Sounds remain separate.



Products

Solutions

Pricing

Documentation

Learn

Partner Network

AWS Marketplace

Customer Enablement

Events

Explore More

[Sign In to the Console](#)

Slack Case Study

2015

Slack provides a messaging platform that integrates with and unifies a wide range of communications services such as Twitter, Dropbox, Google Docs, Jira, GitHub, MailChimp, Trello, and Stripe. The San Francisco-based company, which launched its eponymous app in February 2014, was started by a small group of Silicon Valley entrepreneurs that include Flickr founder Stewart Butterfield. Privately-held Slack is on Fortune Magazine's "Unicorn List" of startup firms worth \$1 billion or more, with a \$2.8 billion valuation supported by a five percent weekly user growth rate and major brand-name customers including Adobe, Samsung, Intuit, NASA, Dow Jones, eBay, and Expedia.



“

With traditional IT, it would take weeks or months to contend with hardware lead times to add more capacity. Using AWS, we can look at user metrics weekly or daily and react with new capacity in 30 seconds."

Richard Crowley

Director of Operations, Slack

The Challenge

In the age of the unicorn startups, Slack has drawn attention for its meteoric rise and potential for disrupting traditional business communications tools, particularly email. By June 2015—less than 18 months after its launch—the company already had more than 1.1 million daily users, 300,000 paid seats, and more than 30 million messages flowing through Slack each week via integrations with other services.

Slack's founders had already learned hard lessons from previous failed ventures. One of those was the importance of picking the right IT infrastructure to run the business. If Slack was to succeed in a fiercely competitive business-software marketplace, its founders knew they would need a lean staff, low costs, and above all an IT environment capable of supporting speed, agility, and innovation. Going to the cloud was the logical choice.

"The realities of physical space, hardware acquisition, replacement parts, running a server facility with all its costs—all the physical manifestations that can lead to breakages—made a traditional IT environment impractical for an Internet startup," says Richard Crowley, Slack's director of operations. "Plus we would have needed an extra layer of expertise just to run the infrastructure. We could have operated with that kind of IT infrastructure, but the cost and complexity would have made it much harder to launch the business."

Why Amazon Web Services

Crowley says Slack turned to Amazon Web Services out of experience and because it was the best choice for the company going forward. Tiny Speck—the original company name for what became Slack Technologies—used AWS in 2009 when it was the only viable offering for public cloud services.

[Get access](#)
protocol


That massive Slack outage this month? It started with an AWS networking error.

And problems with Slack's infrastructure meant things got far, far worse from there.



This sign was about as interactive as Slack's software on Jan. 4. | Photo: Justin Sullivan/Getty Images

By Tom Krazit | January 20, 2021



The [hours-long outage](#) that kicked off the 2021 working year for Slack customers was the result of a cascading series of problems initially caused by network scaling issues at AWS, Protocol has learned.

According to a root-cause analysis that Slack distributed to customers last week,

Most Popular

1. ['It's not OK': Elastic takes aim at AWS, at the risk of major collateral damage](#)
2. [Whitehouse.gov HTML includes Easter egg for coders](#)
3. [Everything you need to know about the Roblox direct listing](#)

{* SECURITY *}

Singapore changes the rules and will now use COVID-19 contact-tracing app data in criminal cases

Privacy policy re-written, which is somewhat scary given Singapore has made trackers just-about-mandatory

Simon Sharwood, APAC Editor

Tue 5 Jan 2021 // 03:58 UTC

SHARE

The Singapore government has decided to use data gathered by its TraceTogether COVID-19-coronavirus contact-tracing app in criminal investigations.

The reuse of the info was revealed yesterday in Singapore's parliament, after Deputy Speaker Christopher De Souza was asked if the data will be used in crime probes and, if so, what legal provisions and safeguards are in place.

Minister of State for Home Affairs Desmond Tan [replied](#) by saying that Singapore's Criminal Procedure Code means its Police can obtain any data for criminal investigations, including data gathered by TraceTogether.

Amazon Will Suspend Hosting For Pro-Trump Social Network Parler

Amazon's suspension of Parler's account means that unless it can find another host, once the ban takes effect on Sunday Parler will go offline.

**John Paczkowski**

Technology and Business Editor

**Ryan Mac**

BuzzFeed News Reporter

Last updated on January 9, 2021, at 10:08 p.m. ET

Posted on January 9, 2021, at 9:07 p.m. ET

TIME

INSIDE THE NEXT HOUSING CRISIS

VIDEO



NEWSLETTER

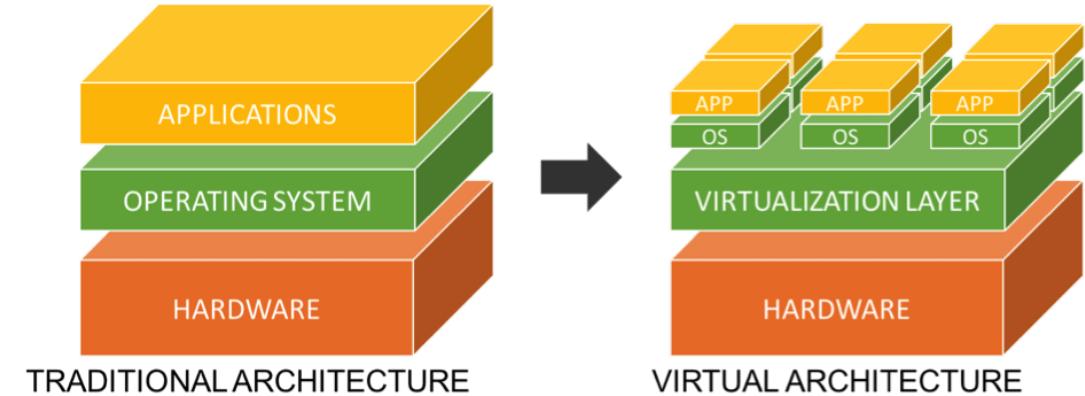
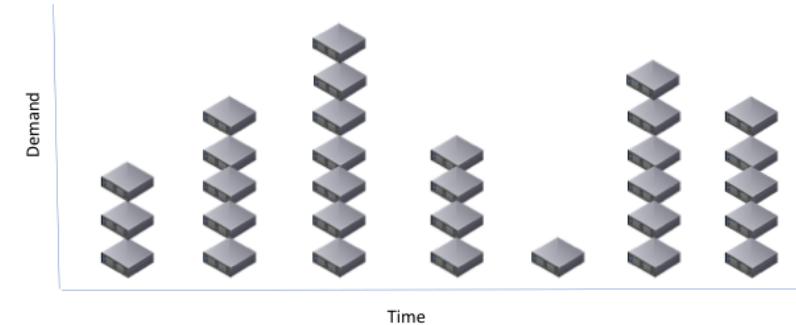
TECH • INTERNET

Why Amazon's Move to Drop Parler Is a Big Deal for the Future of the Internet

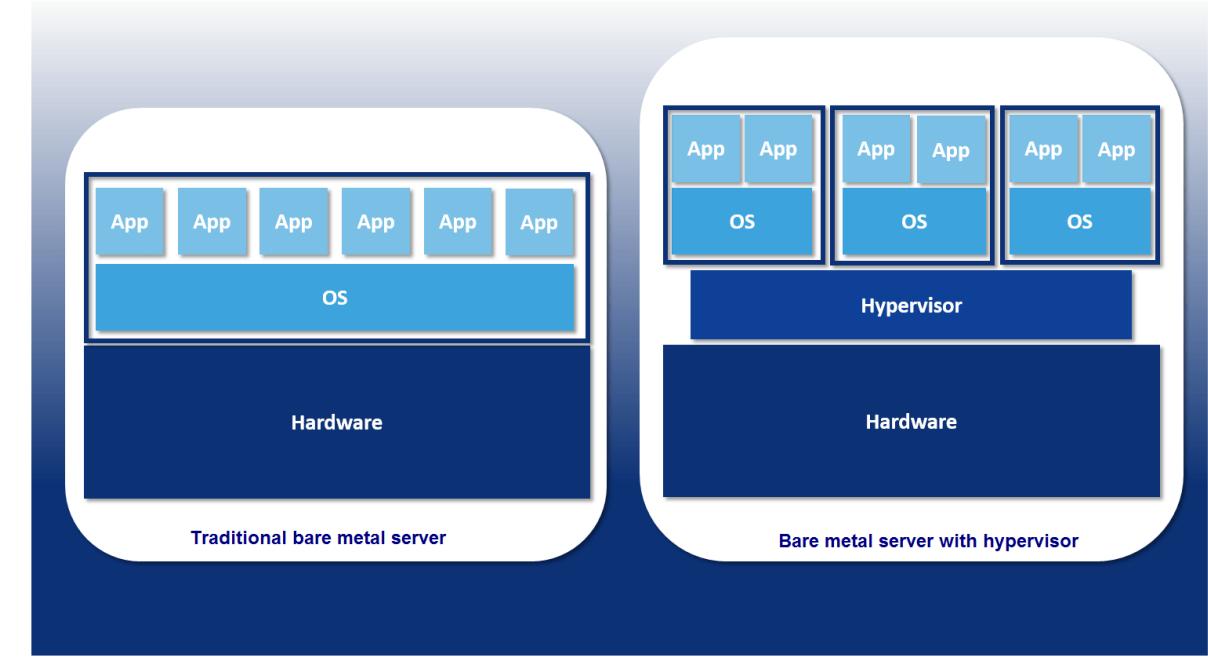
Public Cloud/Private Cloud

- Cloud
 - Virtualization
 - Virtual Machines
 - Elasticity
 - Dynamic dimensioning
 - Dynamic provisioning

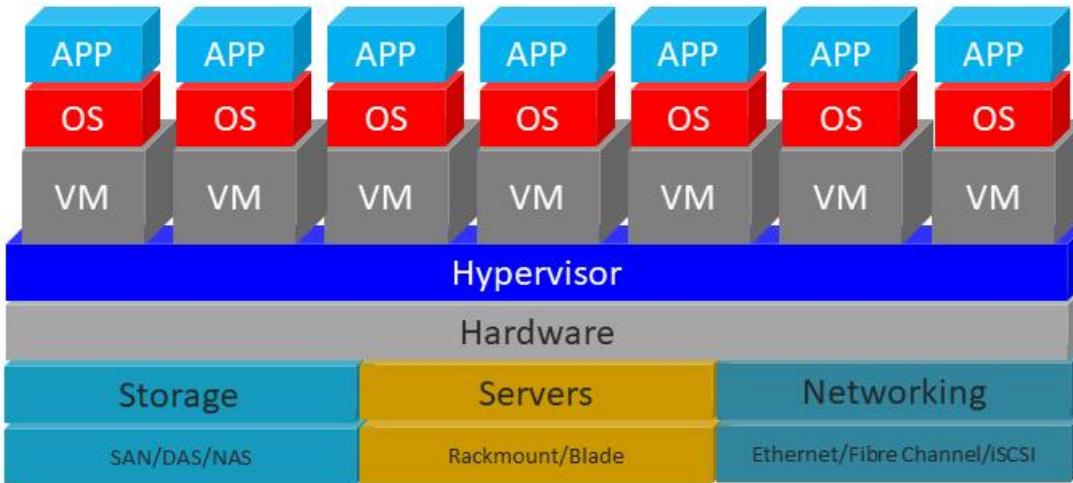
Elasticity in Cloud Computing



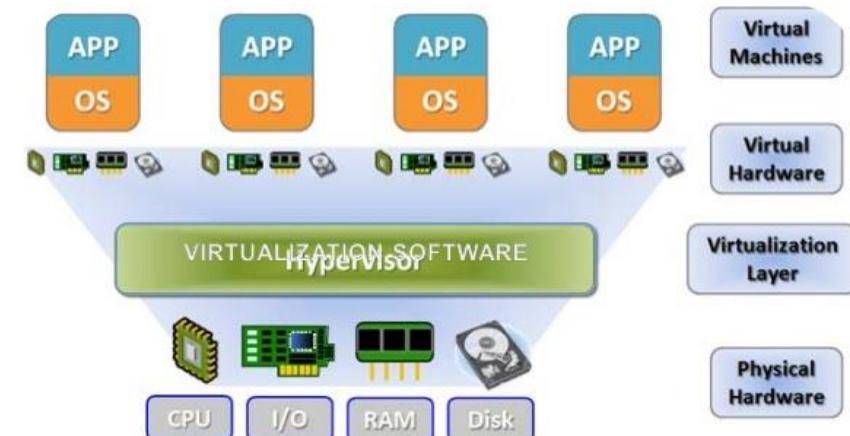
Hypervisor technology

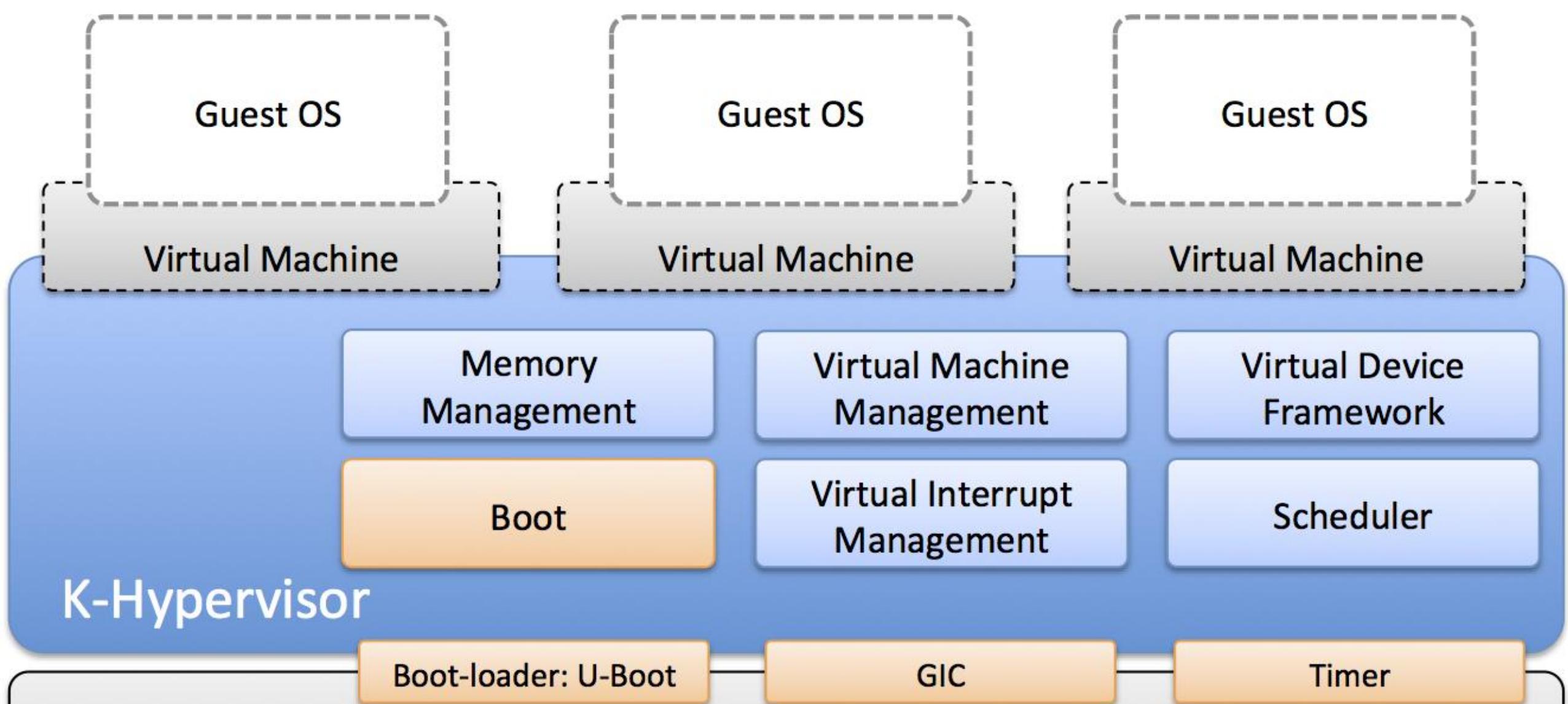


How does a hypervisor work?



What is Virtualization?

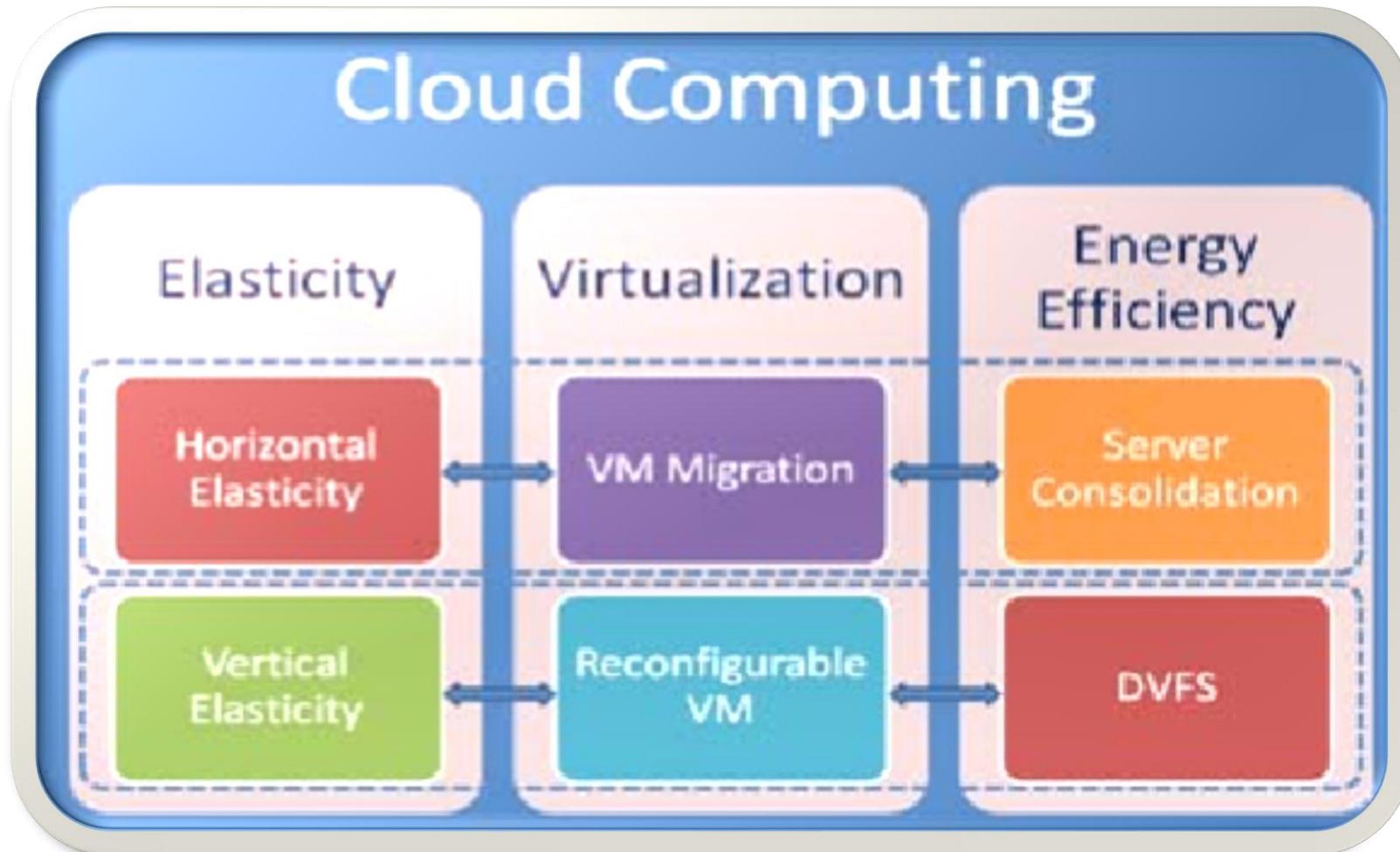




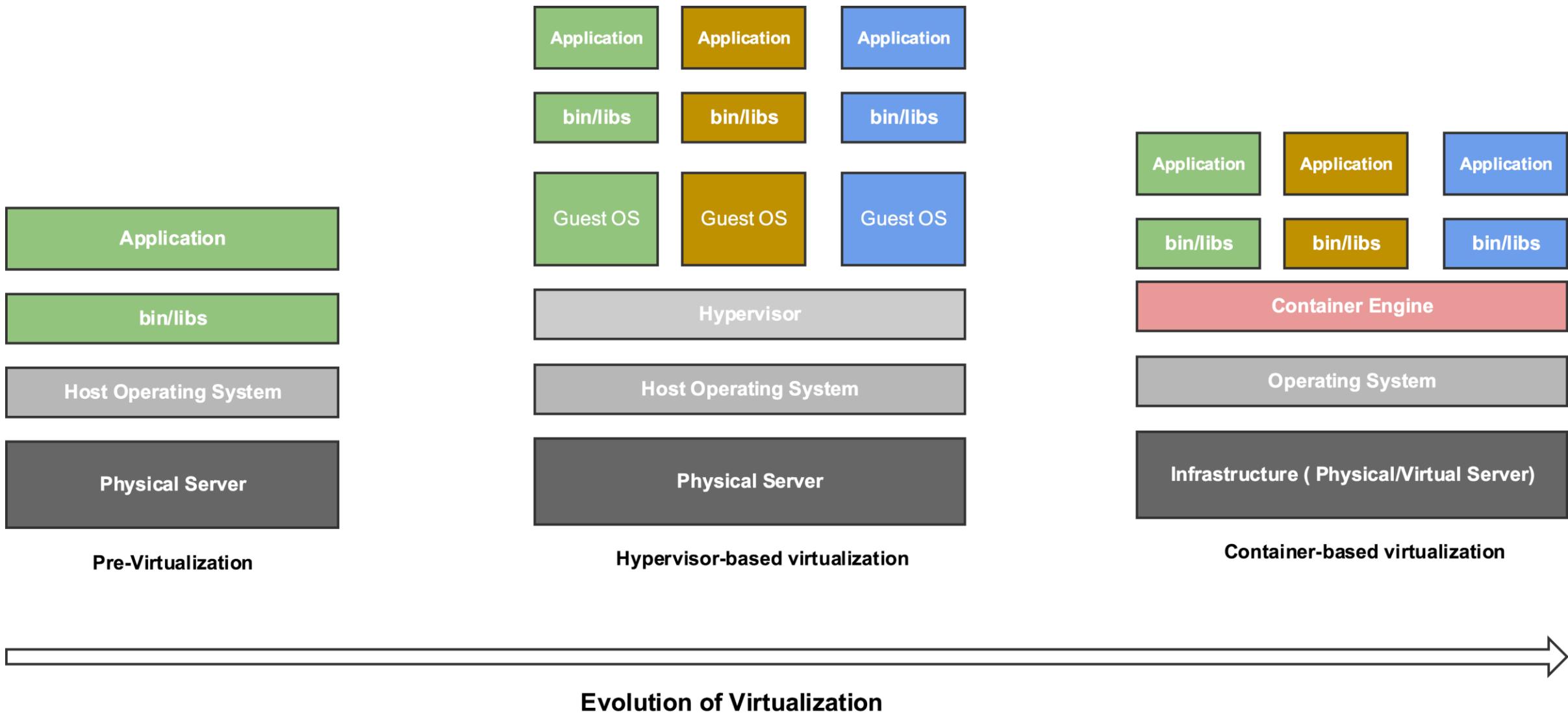
Hardware:

ARMv7 Virtualization Extensions: Cortex-A15 SMP

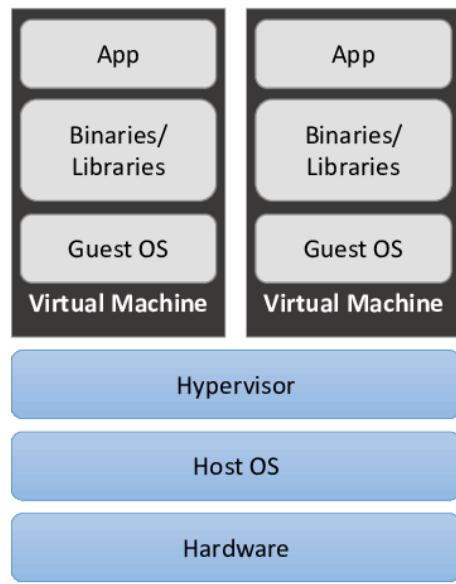
Virtualization enables Elasticity and Efficiency



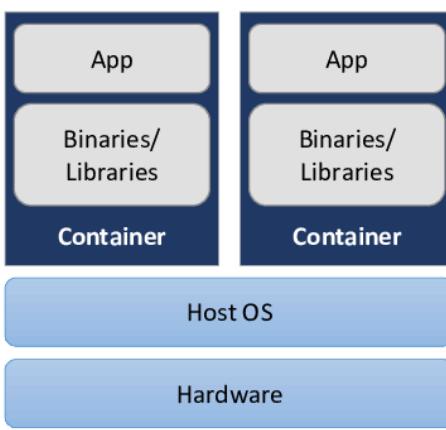
Hypervisor technology



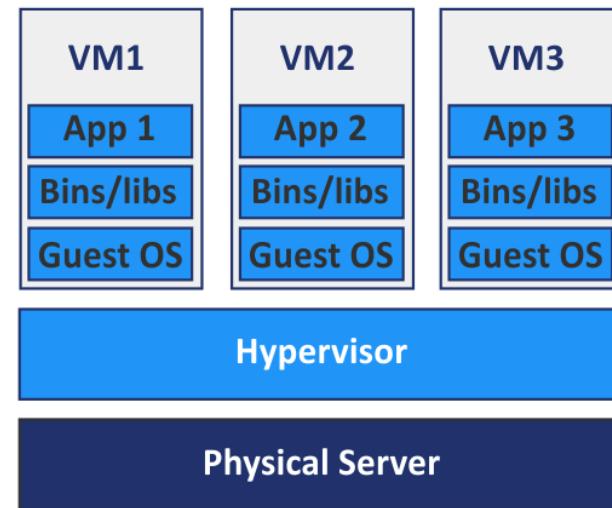
Hypervisor technology



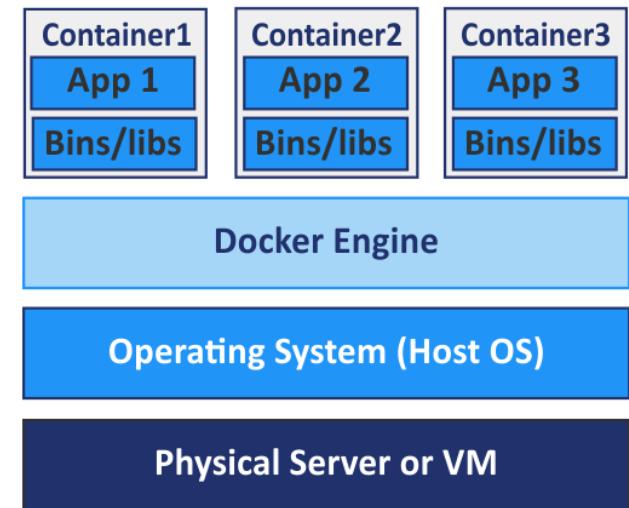
Container-based



Virtual Machines



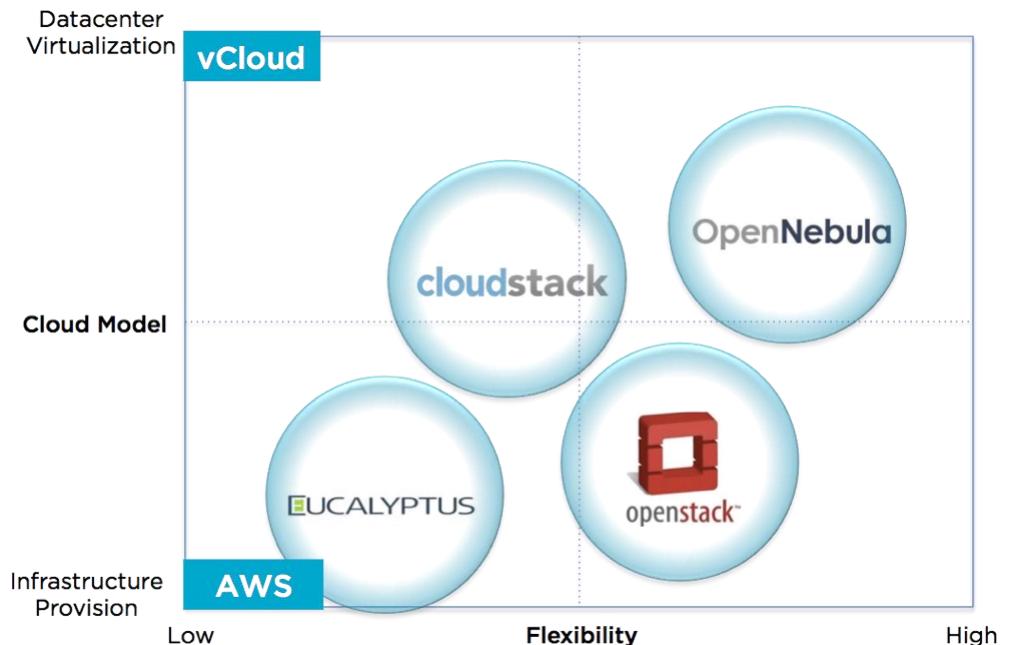
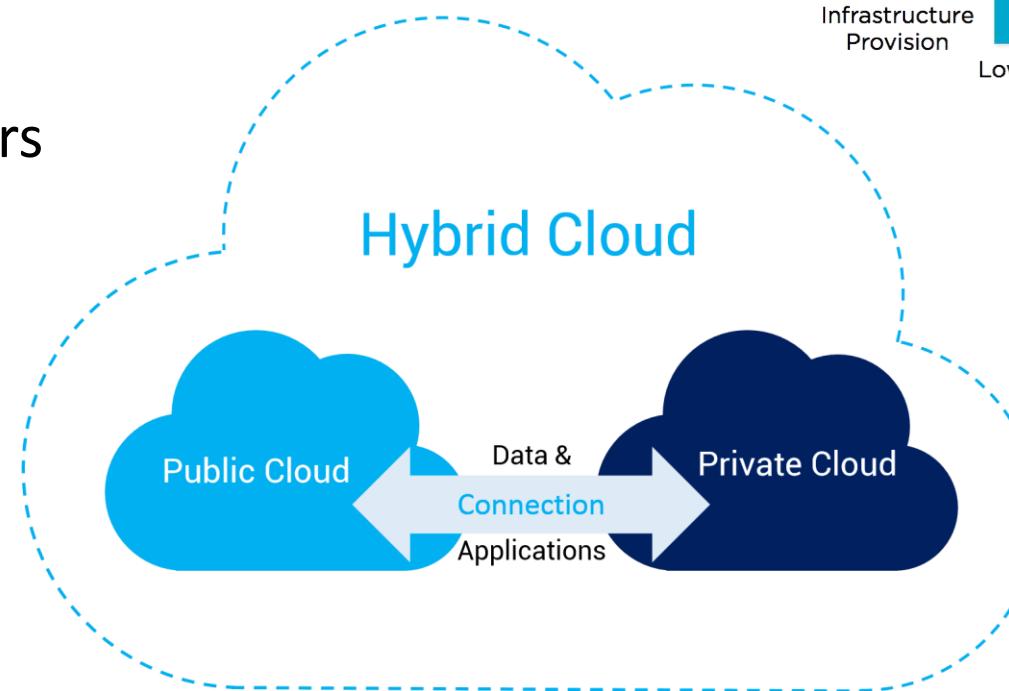
Containers



Hypervisor-based

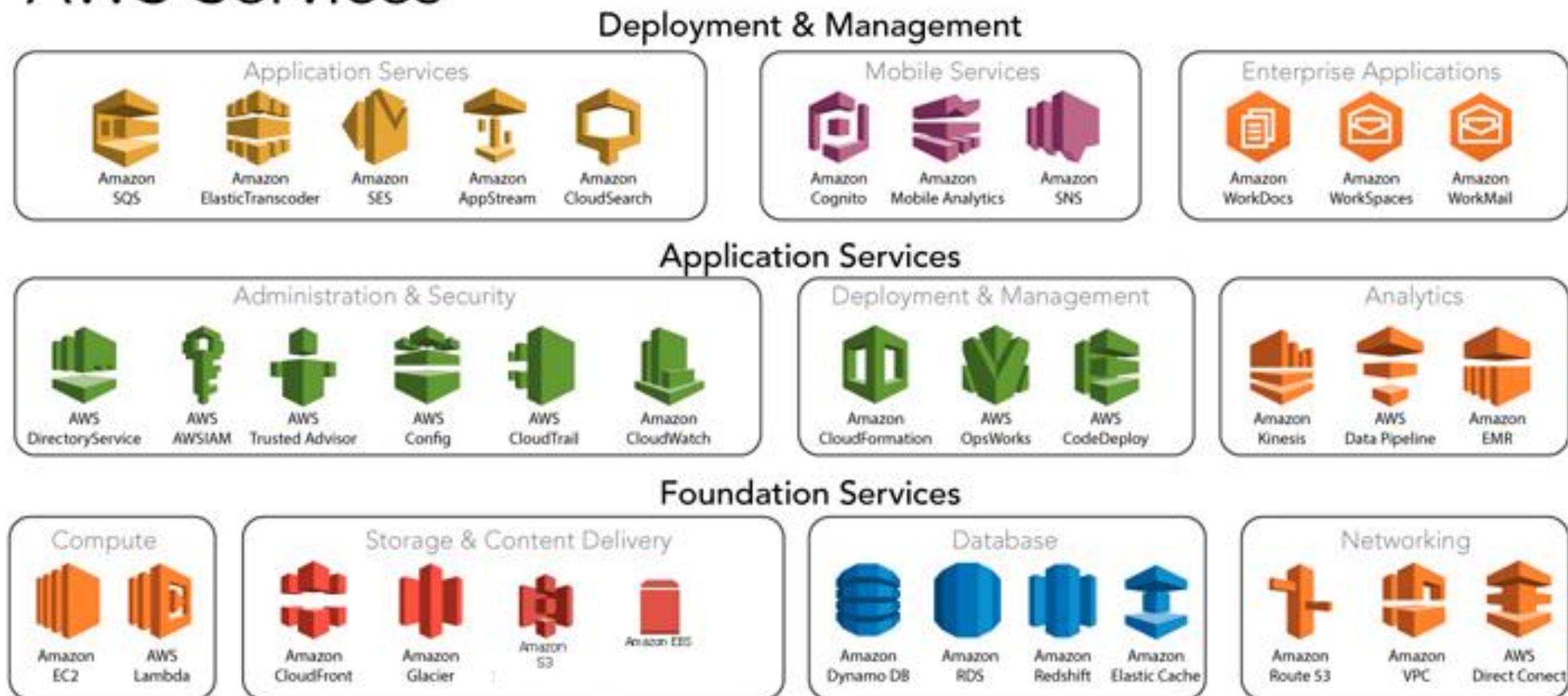
Public Cloud/Private Cloud

- Private Cloud
 - Open Stack
 - Open Nebula
 - Cloud Stack
- Public Cloud
 - Many providers
- Hybrid cloud
- Multi Cloud



Amazon web services

AWS Services



AWS foundational services

Applications



Virtual desktops



Collaboration and sharing

Platform Services

Databases

Relational

NoSQL

Caching

Analytics

Cluster computing
Real-time Data warehouse
Data workflows

Application services

Queuing
Orchestration
App Streaming
Transcoding
Email
Search

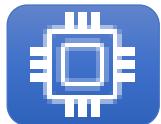
Deployment and management

Containers
DevOps tools
Resource templates
Usage tracking
Monitoring and logs

Mobile Services

Identity
Sync
Mobile Analytics
Notifications

Foundation Services



Compute (virtual, automatic scaling, and load balancing)



Networking



Storage (object, block, and archive)

Infrastructure



Regions



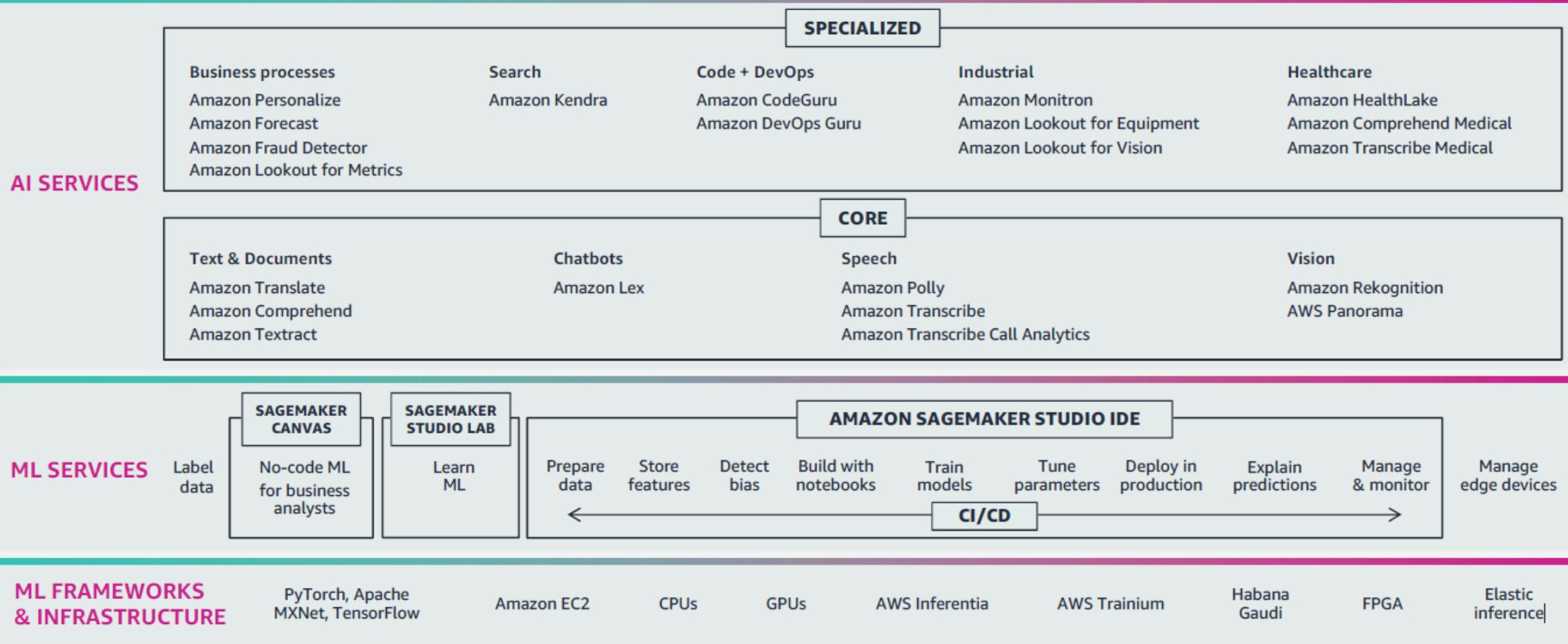
Availability Zones



Edge locations

The AWS ML stack

Broadest and most complete set of machine learning capabilities



AWS Solutions Library

- Content Localization on AWS
- AWS QnABot
- Media2Cloud
- Maintaining Personalized Experiences with ML
- Discovering Hot Topics Using Machine Learning
- AWS Media Insights Engine
- AI Powered Speech Analytics for Amazon Connect
- Serverless Bot Framework
- Document Understanding Solution
- AWS Content Analysis
- Text Analysis with Amazon OpenSearch Service and Amazon Comprehend
- MLOps Workload Orchestrator
- Photo Search on AWS
- Liveness Detection Framework
- Improving Forecast Accuracy with ML
- AWS Streaming Data Solution for Amazon Kinesis
- AWS Streaming Data Solution for MSK
- Predictive Segmentation using Amazon Pinpoint and Amazon SageMaker
- Predictive Maintenance using ML
- Fraud Detection using ML
- Real-time IoT Device Monitoring with Kinesis Data Analytics
- Predictive User Engagement

Building your team's skills



Hands-on learning



Training and certification



AWS DeepRacer
reinforcement learning

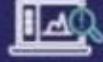
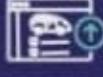
AWS DeepComposer
Generative AI

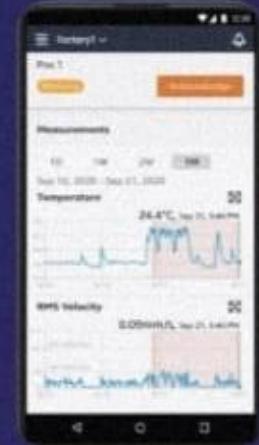
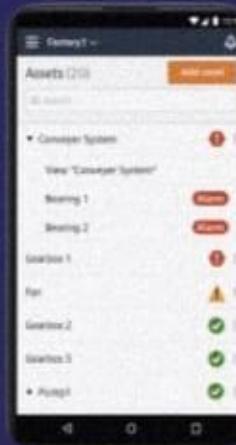
AWS DeepLens
deep learning

AWS ML training
and certification

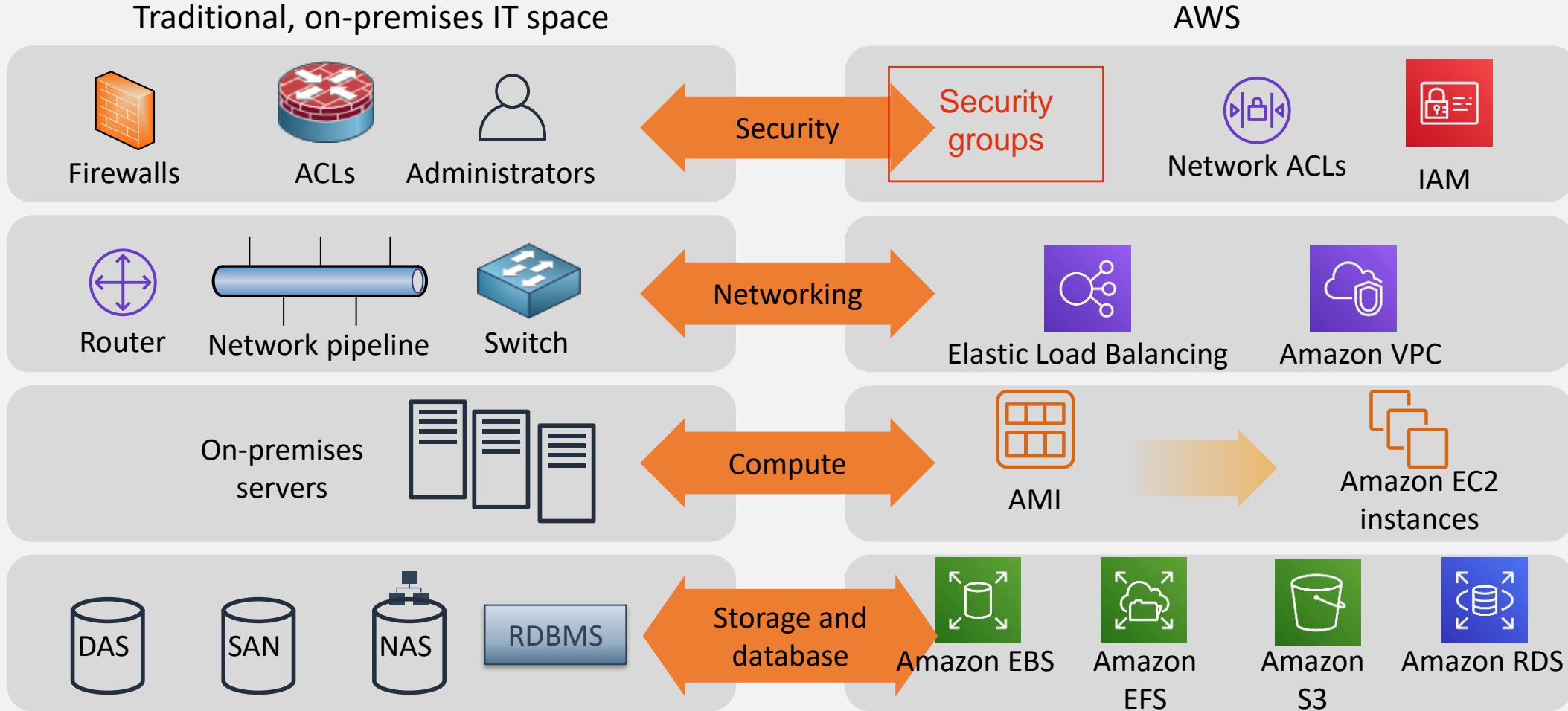
Partnerships
with MOOCs

Reduce downtime with end-to-end machine monitoring with Amazon Monitron

-  End-to-end system—sensors, gateway device, and mobile and desktop app
-  Easily tracks and reviews developing faults
-  Enables predictive maintenance for machinery, including motors, pumps, bearings, and gearboxes
-  No development work or ML expertise required



Similarities between AWS and traditional IT

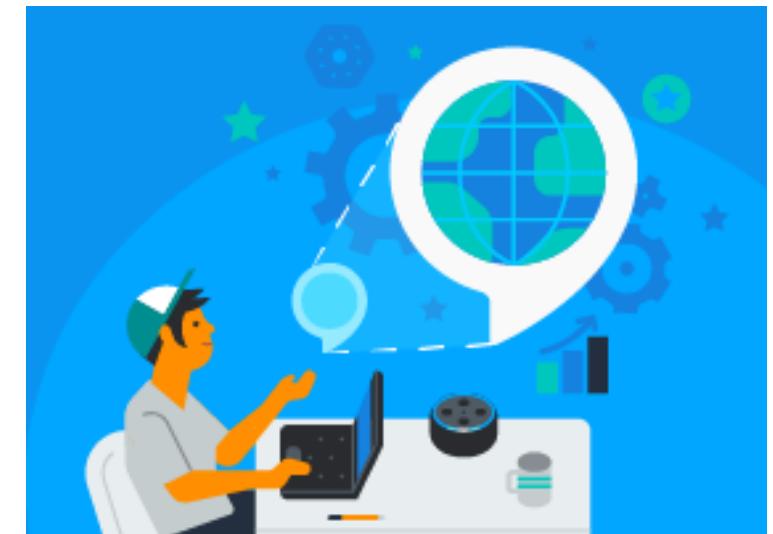




amazon alexa



Alexa Helps Builders,
Developers, and
Entrepreneurs to Innovate
and Create a Voice-first
Business

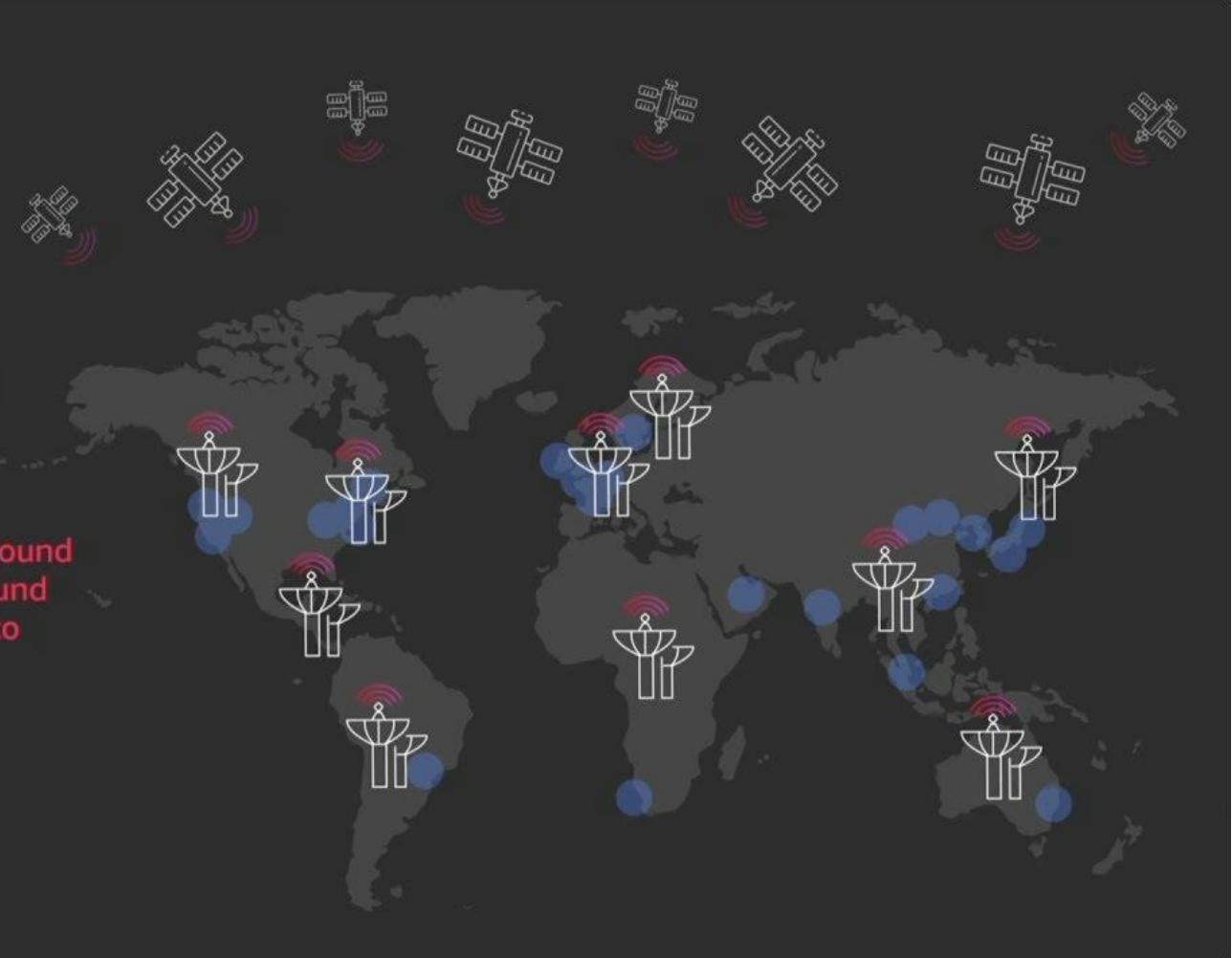


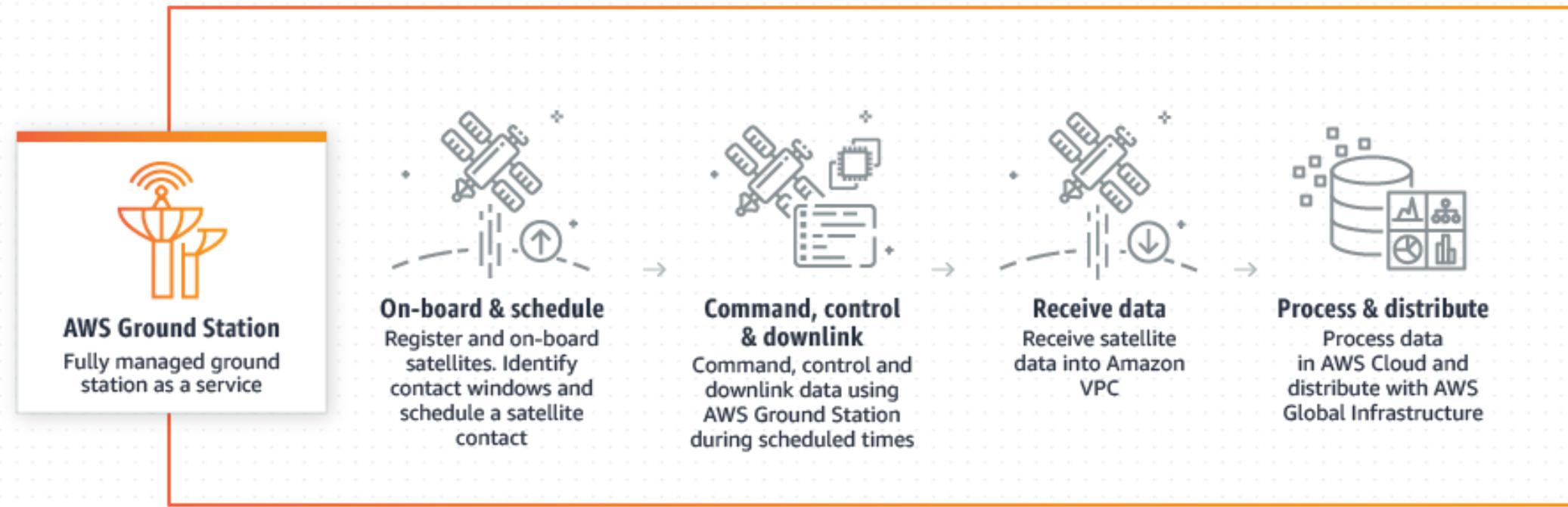
ANATOMY OF AN AI SYSTEM



AWS Ground Station

Fully managed network of ground station antennas located around the world in close proximity to AWS infrastructure regions





Nano and Picosatellites



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aclegg@nsf.gov

US National Science Foundation

Dos nanosatèl·lits de la UPC, en òrbita per estudiar les regions polars i proporcionar imatges d'observació de la Terra fent ús de la intel·ligència artificial



[↓ Descarregar](#)

Recreació dels dos CubeSats, batejats com a ³Cat-5/A i ³Cat-5/B, orbitant al voltant de la Terra per dur a terme la missió FSSCat.

Dos petits satèl·lits del Nanosat Lab de la UPC han viatjat a l'espai, el 2 de setembre des de Kourou, a la Guaiana Francesa (a les 03.51 hores del 3 de setembre, hora espanyola) per dur a terme la missió FSSCat, guanyadora al 2017 del 'Sentinel Small Satellite (S³) Challenge Award' de l'ESA. La missió té com a objectiu principal monitoritzar el gel polar i la humitat del sòl, alhora que s'assajaran sistemes de comunicació entre nanosatèl·lits, de cara a crear una futura xarxa de satèl·lits federats. A bord també viatja el demostrador tecnològic de l'ESA ϕ -sat-1, el primer que posa en òrbita la intel·ligència artificial a l'espai i que servirà per detectar la presència de núvols a les imatges òptiques i destriar-ne les que no tenen prou qualitat.

03/09/2020

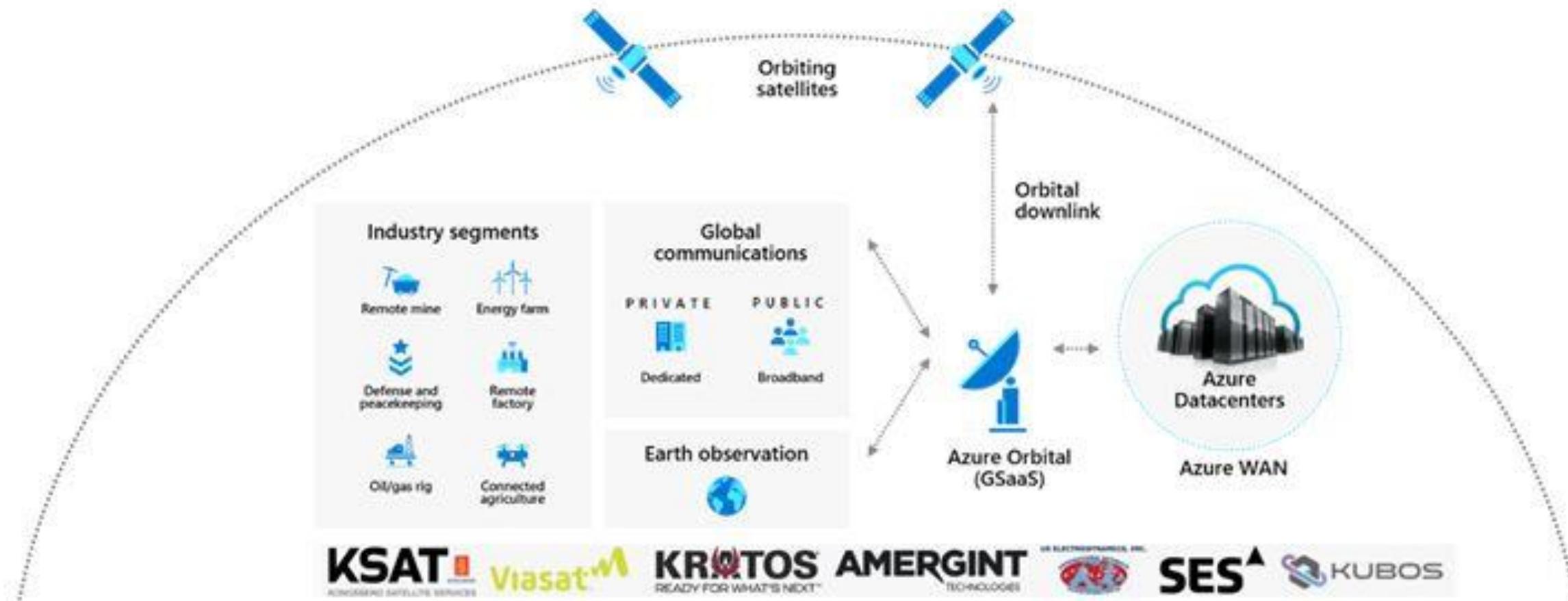
Catalunya fa el salt a l'espai: es crea l'Agència Espacial catalana que llençarà aviat dos nanosatèl·lits

Així ho ha anunciat el Govern, que preveu la creació de prop de 1.200 llocs de treball amb aquesta nova estratègia

El **Govern** de la **Generalitat** ha anunciat aquest **dimarts, 27 d'octubre**, la creació de **l'Agència Espacial de Catalunya** i la intenció de llençar a **l'espai** els seus dos primers **nanosatèl·lits** de cara al primer semestre de l'any 2021. D'aquesta manera, estem davant del primer salt a l'espai de la història de **Catalunya**. Una estratègia «de país» que implicarà una inversió inicial de 2,5 milions d'euros i que pretén guanyar presència en la **cursa espacial** generant uns 1.200 nous llocs de treball en el futur. «**Catalunya** no vol perdre el tren en aquesta **indústria** d'alt valor afegit», ha explicat el conseller de Polítiques Digitals, Jordi Puigneró. «Calculem que cada euro invertit en aquest sector es multiplicarà per 15 en els propers anys», ha afegit Puigneró.



Azure Orbital round Station as a Service



KSAT
KONUSPACE SATELLITE SERVICES

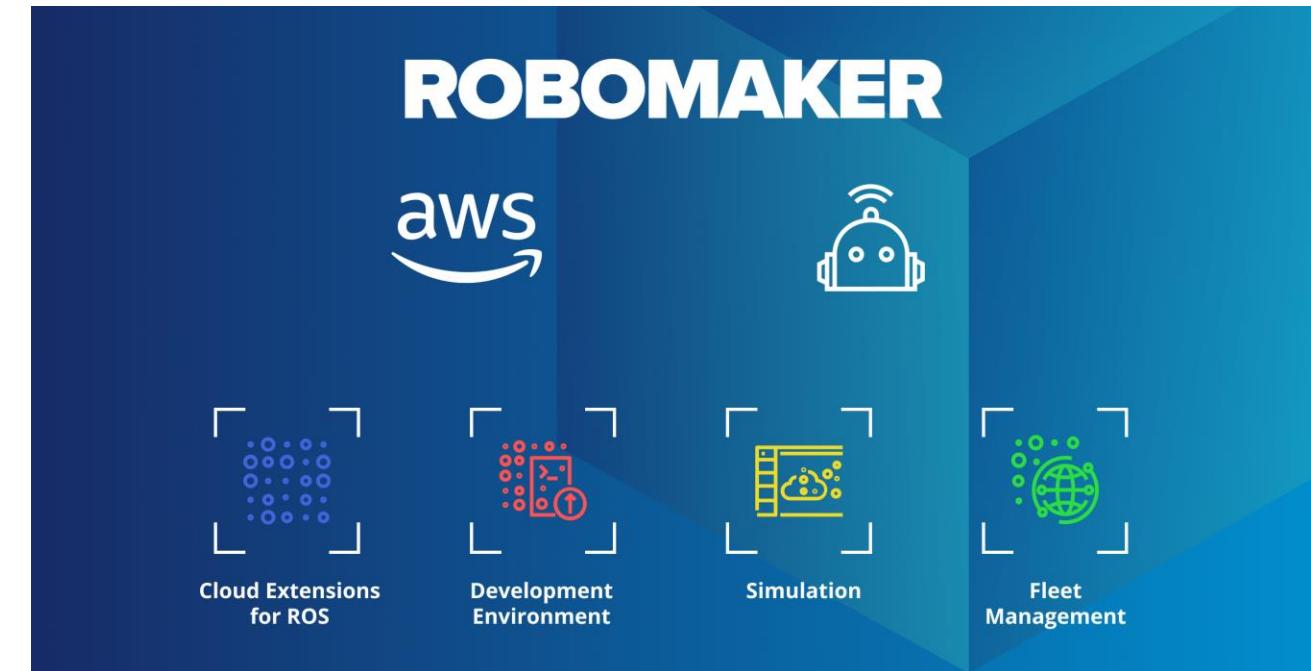
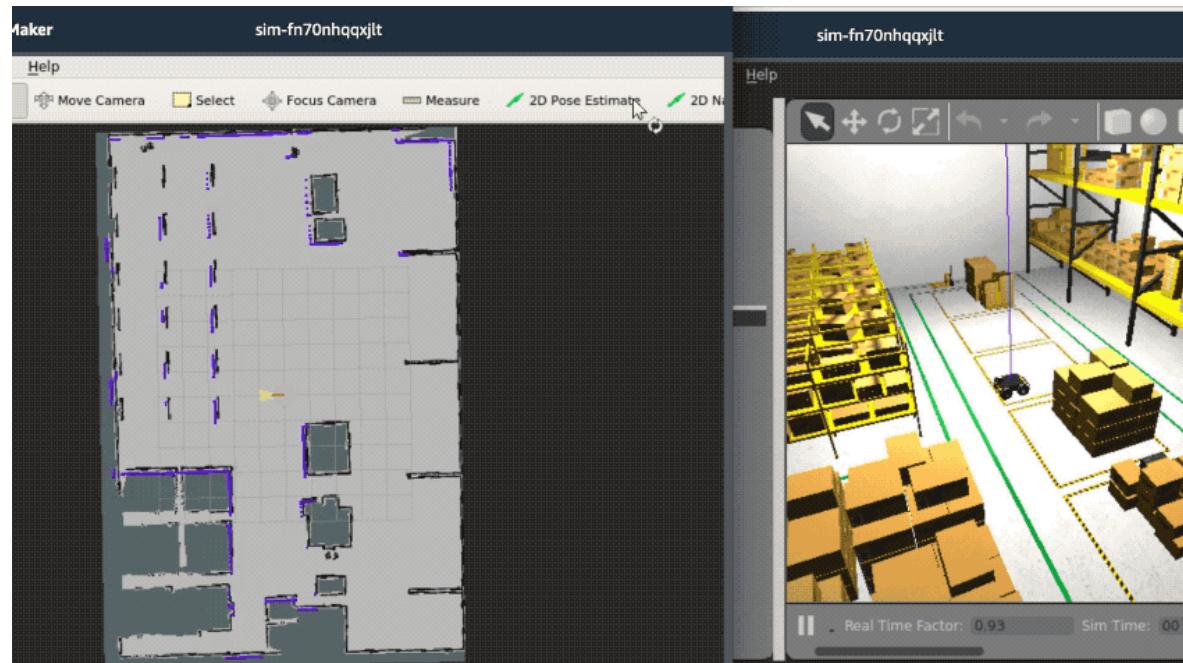
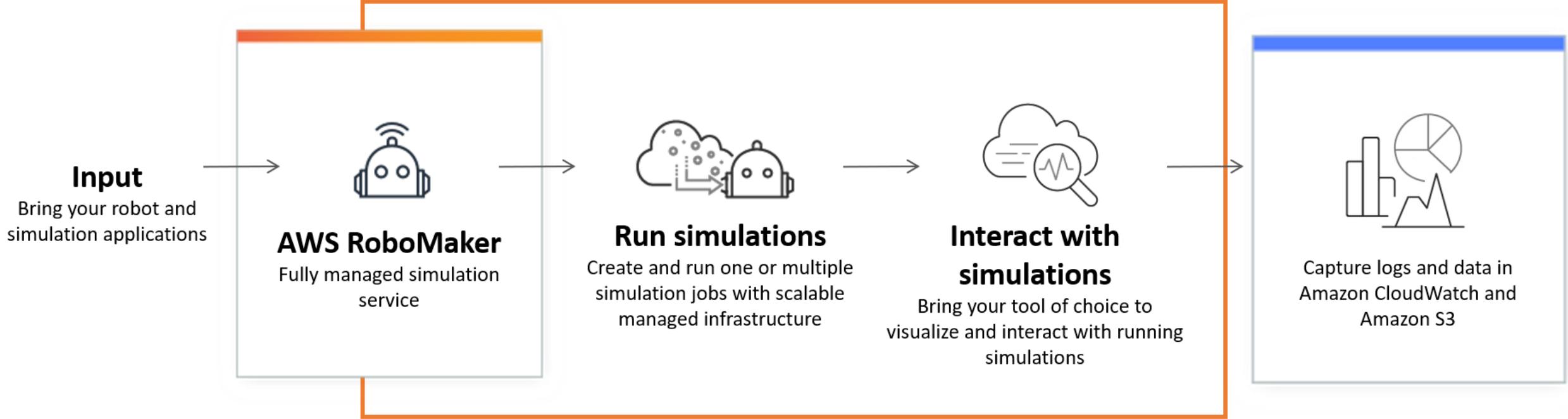
Viasat M

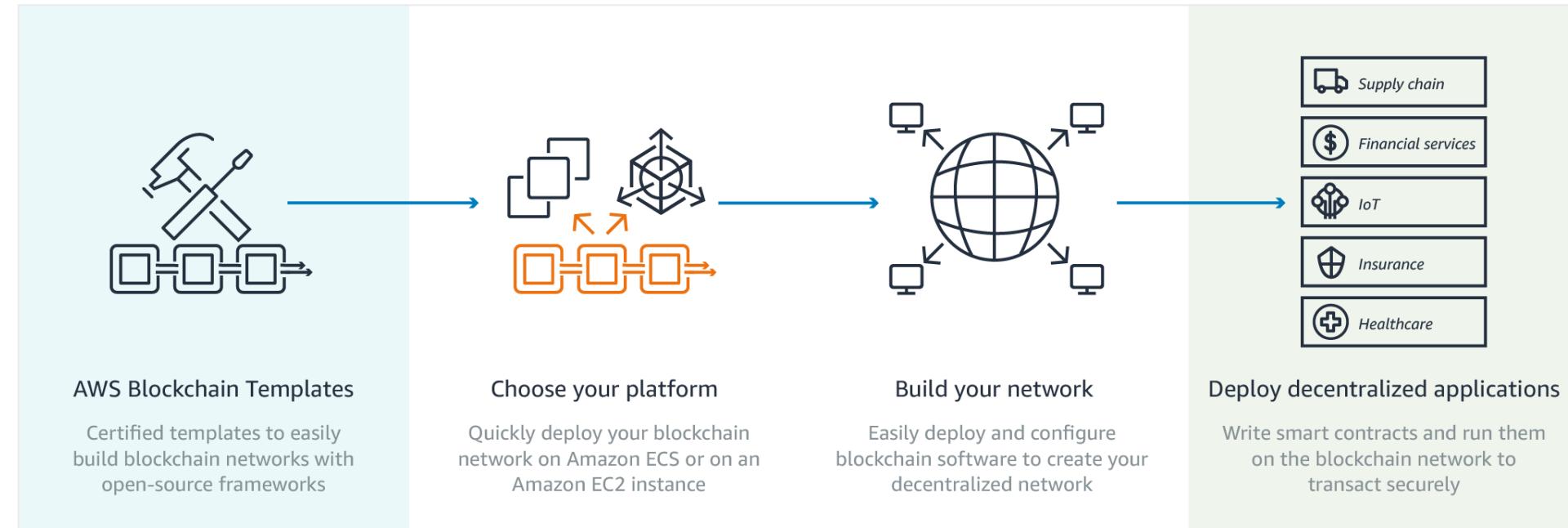
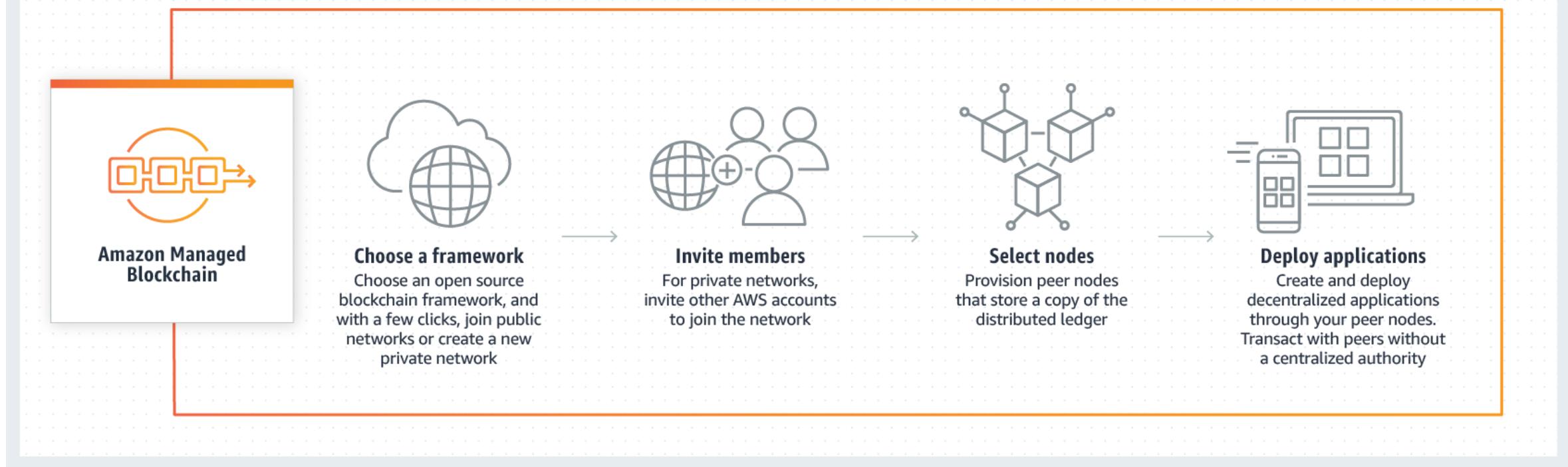
KRATOS AMERGINT
READY FOR WHAT'S NEXTTM
TECHNOLOGIES

UR ELECTROSPACES, INC.

SES▲

KUBOS







Challenges



Supplier
Ethical sourcing uncertain



Manufacturer
Environmental impacts unknown. Fragmented data systems and data loss



Regulator
Infrequent third party quality control



Logistics
Manual transport updates not in real-time



Wholesaler
Overstock and stockouts due to inaccurate supply and demand data



Retailer
Product provenance and authenticity uncertain



Consumer
Minimal supply chain insight



Benefits



Supplier
Ethical sourcing ensured



Manufacturer
Measure and reduce environmental impacts. Complete data visibility on single shared ledger



Regulator
Reduced need for regulators. Smart contracts ensure quality control throughout the supply chain



Logistics
Automated real-time transport updates



Wholesaler
Manage stock with real-time data



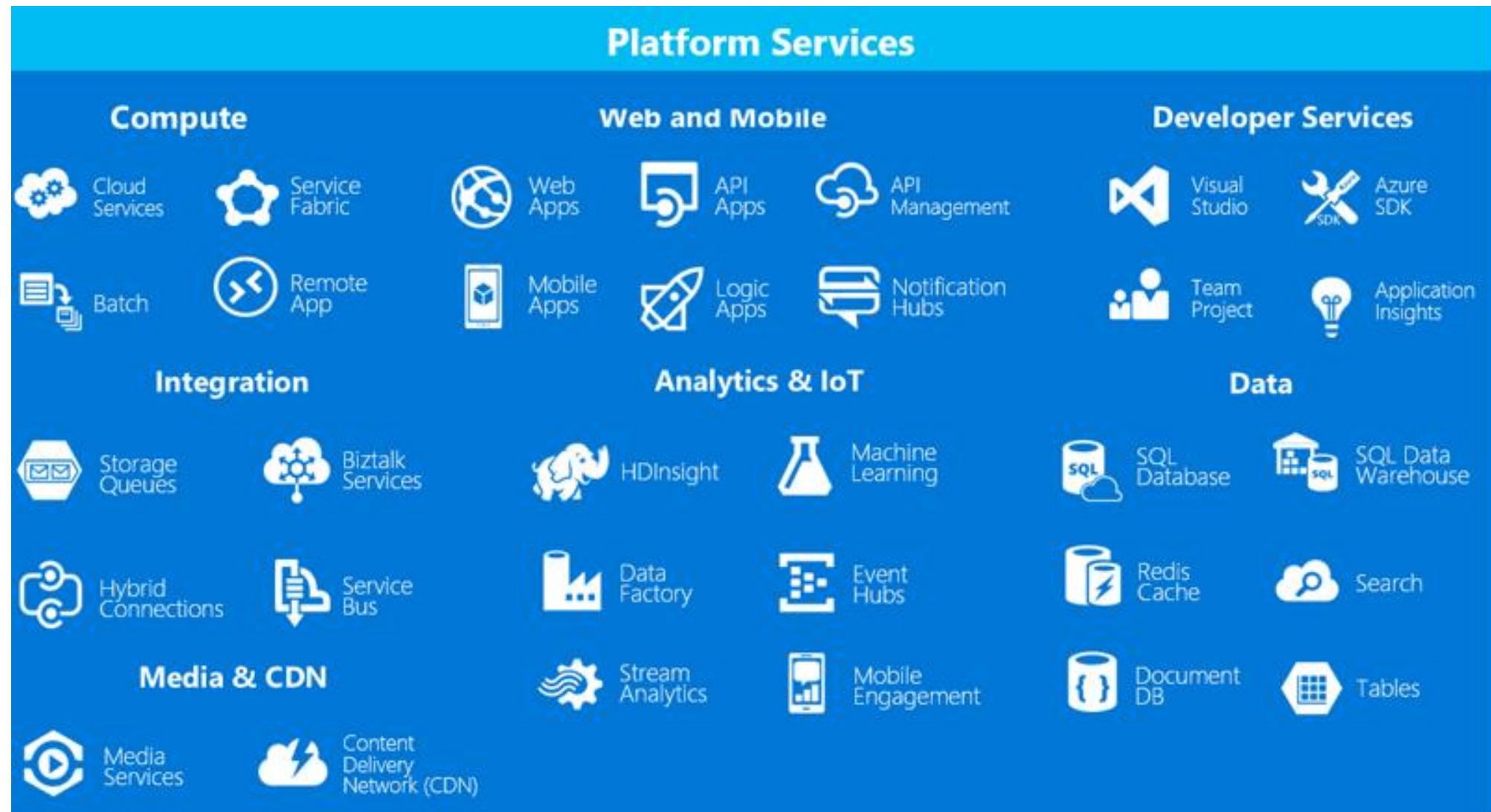
Retailer
Certainty of product provenance and authenticity



Consumer
Supply chain insight empowers informed decision making



Microsoft Azure web services



Security & Management

- Security Center
- Azure portal
- Azure Active Directory
- Azure AD B2C
- Multi-Factor Authentication
- Automation
- Key Vault
- Azure Marketplace
- VM Image Gallery
- REST API and CLI

Media & CDN



Integration



Compute Services



Application Platform



Developer Services



Infrastructure Services

Compute



Storage



Datacenter Infrastructure



Hybrid Cloud



Cloud Providers

- Amazon Web Services (AWS)
- Microsoft Azure Cloud
- Google Cloud
- IBM Cloud



IBM Cloud



Google Cloud

General Purpose

- AliBaba: <https://www.alibabacloud.com/>
- Huawei: <https://www.huaweicloud.com/en-us/product/>

Industrial Applications

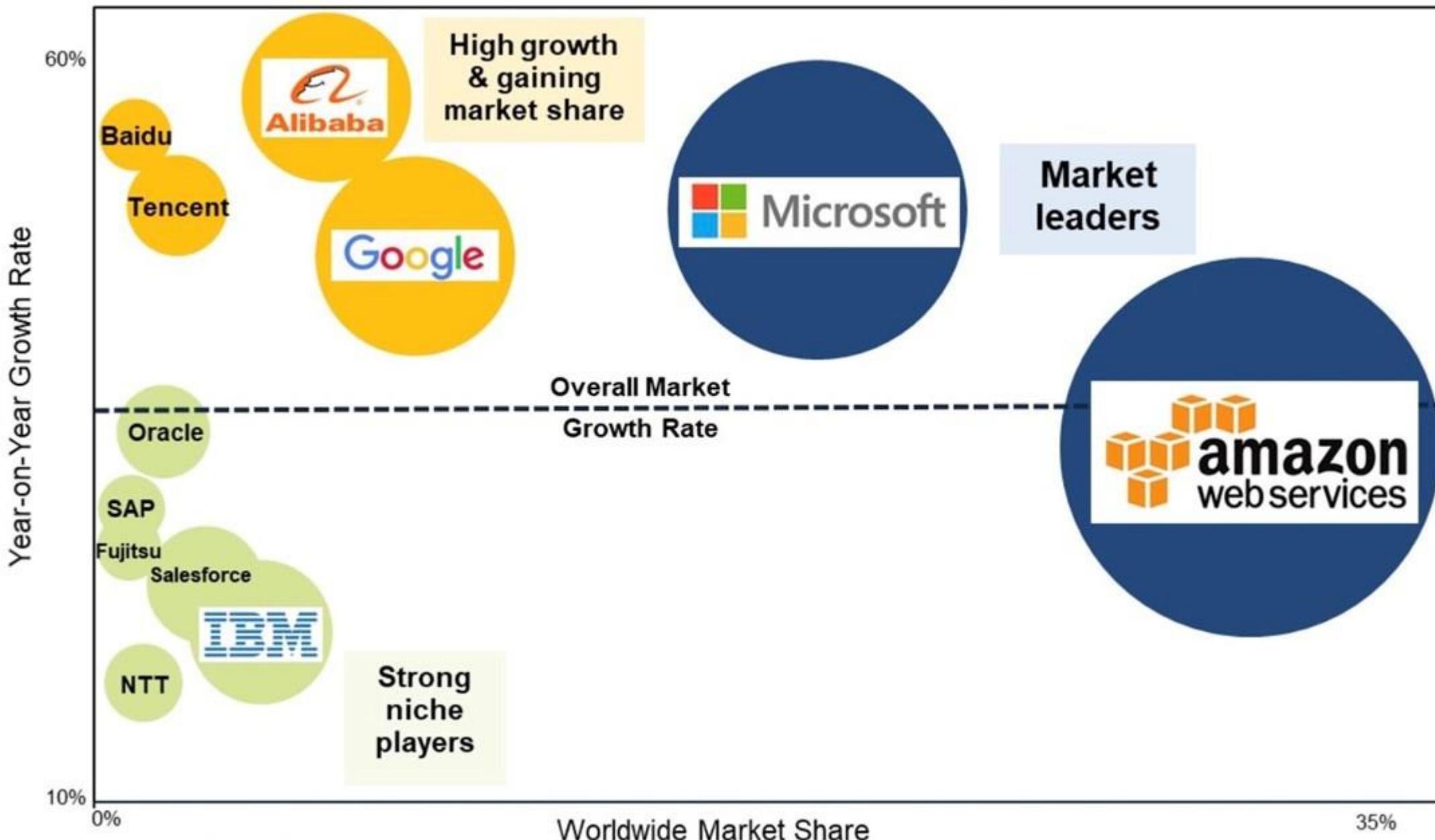
- Siemens: <https://www.sw.siemens.com/portfolio/cloud/>
- General Electric: <https://www.ge.com/digital/iiot-platform/predix-cloud-and-predix-private-cloud>
- Industrial IoT (IIoT)
 - Edge Computing: <https://openautomationsoftware.com/blog/iiot-edge-computing-vs-cloud-computing/>

Business Oriented

- SAP
 - <https://www.sap.com/products/cloud-platform.html>
 - <https://aws.amazon.com/sap/>
 - <https://www.linkeit.com/>
- Oracle: <https://www.oracle.com/index.html>

Cloud Provider Competitive Positioning

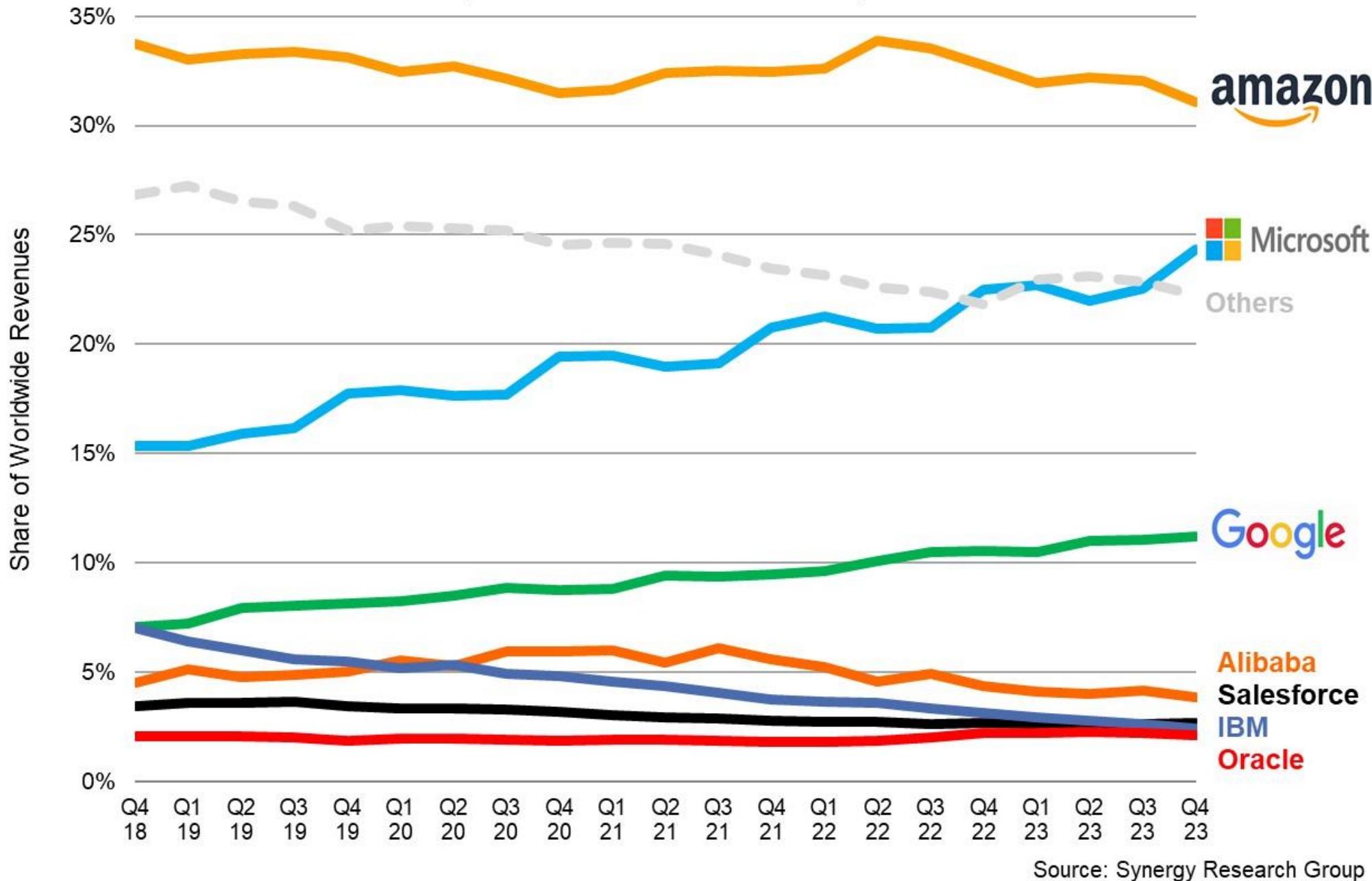
(IaaS, PaaS, Hosted Private Cloud - Q1 2021)



Source: Synergy Research Group

Cloud Provider Market Share Trend

(IaaS, PaaS, Hosted Private Cloud)



Source: Synergy Research Group



Alibaba passes IBM in cloud infrastructure market with over \$2B in revenue

When **Alibaba** entered the cloud infrastructure market in earnest in 2015 it had ambitious goals, and...

By Ron Miller | November 5, 2020



IBM Signs Strategic Collaboration Agreement with Amazon Web Services to Deliver IBM Software as-a-Service on AWS

- Building on IBM Software being available as-a-Service on IBM Cloud, this first-of-its-kind agreement between IBM and AWS will provide clients with access to IBM Software that runs cloud-native on AWS

May 11, 2022



Cloud Adoption Statistics for 2021

The public cloud computing market will be worth \$800 billion by 2025.

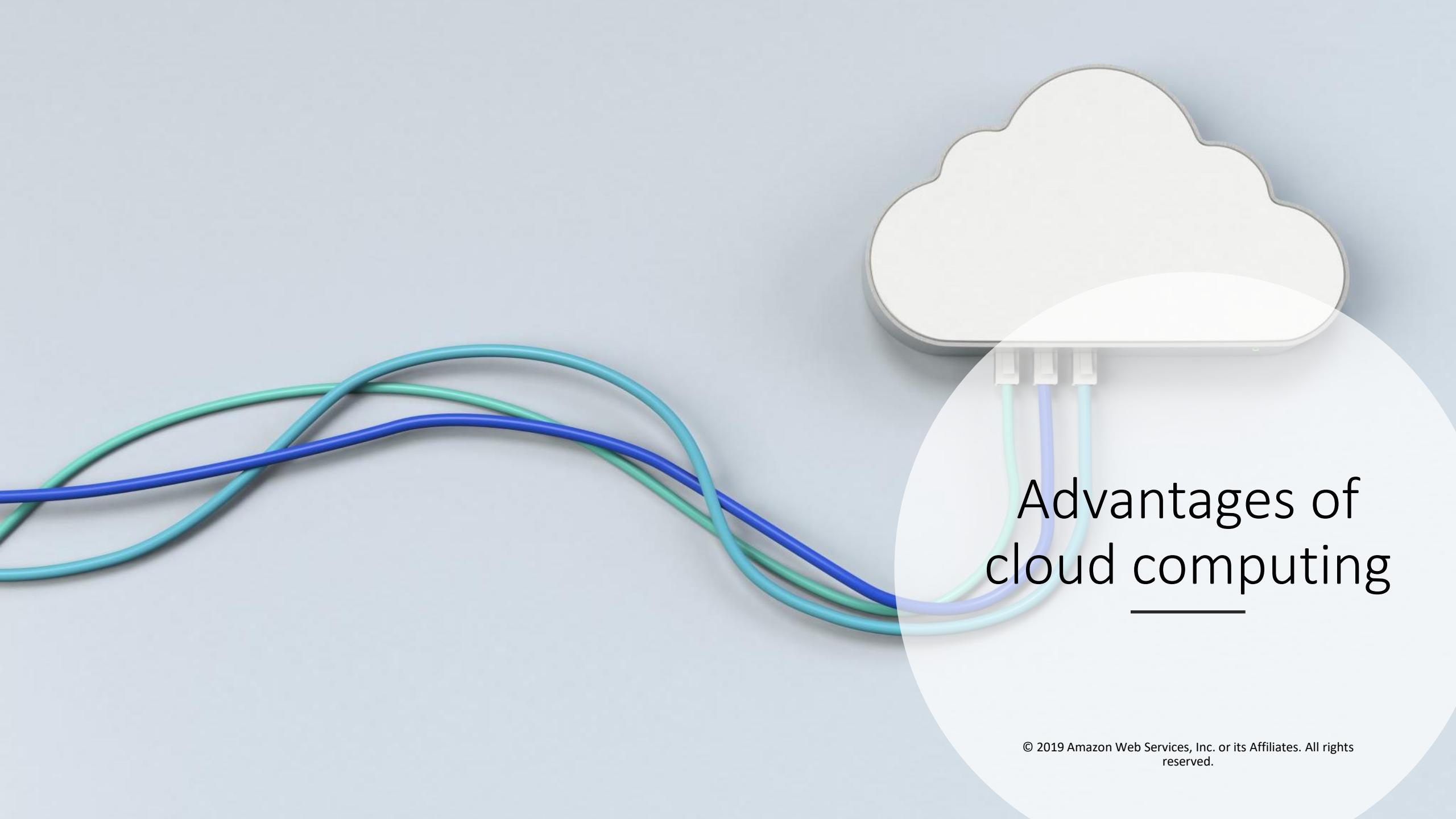
By 2024, enterprise cloud spending will make up 14% of IT revenue globally.

Platform as a Service (PaaS) will grow by 26.6% in 2021.

70% of companies using the cloud plan to increase their budgets in the future.

61% of businesses migrated their workloads to the cloud in 2020.

Amazon Web Services (AWS) had a 76% share of the enterprise cloud adoption in 2020.

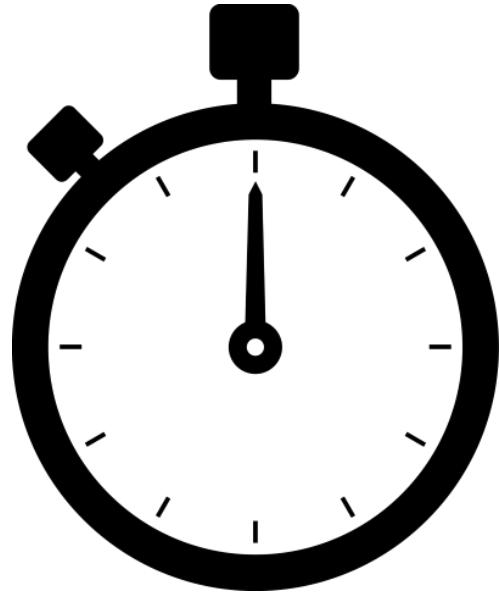


Advantages of cloud computing

Trade capital expense for variable expense



Data center investment
based on forecast



Pay only for the amount
you consume

Massive economies of scale

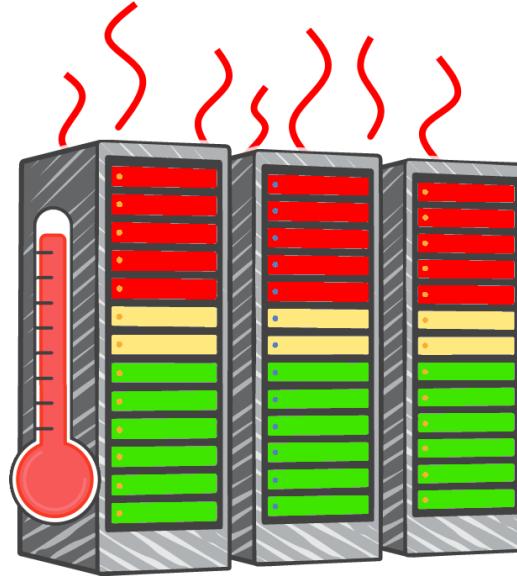
Because of aggregate usage from all customers, AWS can achieve higher economies of scale and pass savings on to customers.



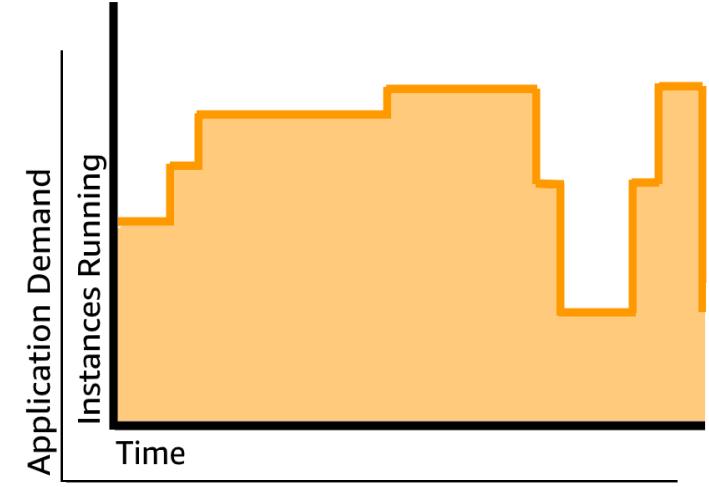
Stop guessing capacity



Overestimated
server capacity



Underestimated
server capacity

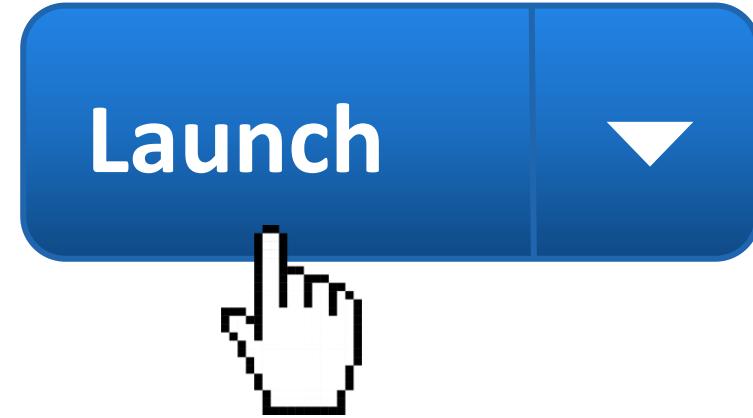


Scaling on demand

Increase speed and agility

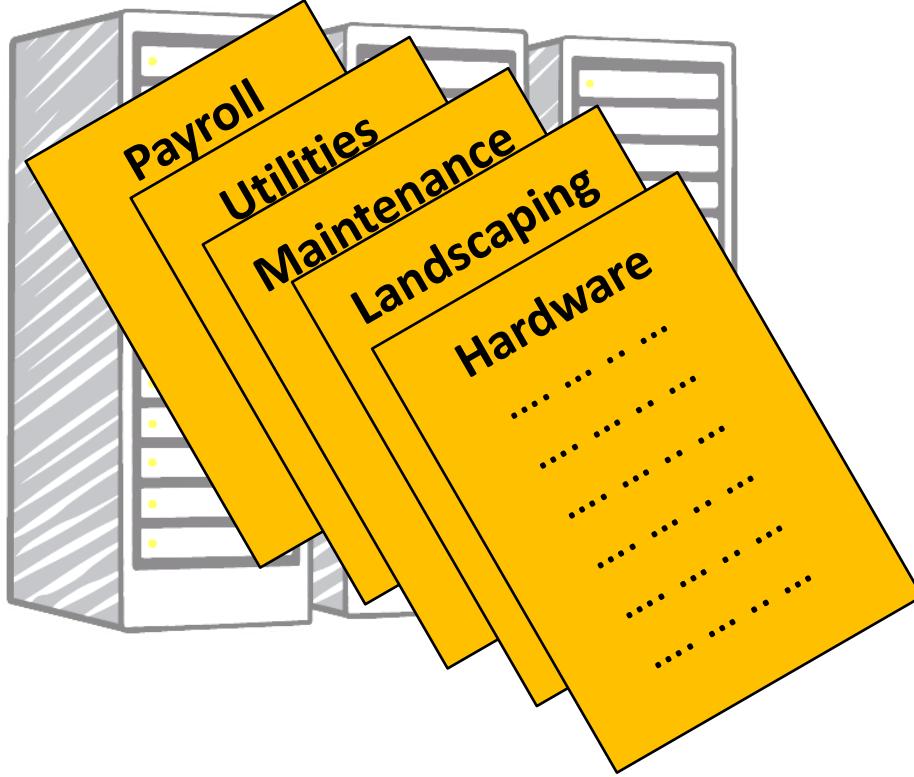


Weeks between wanting
resources and having resources

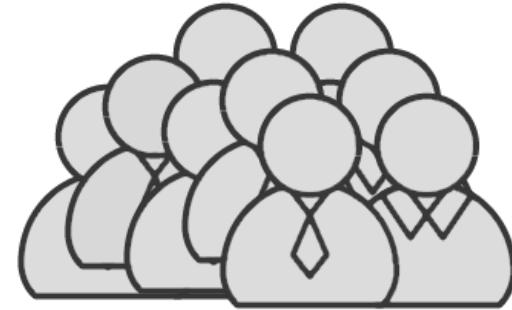
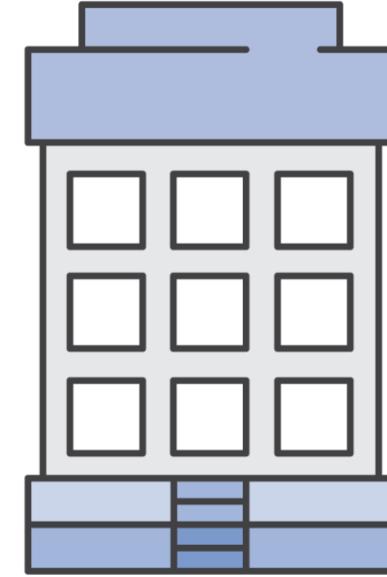
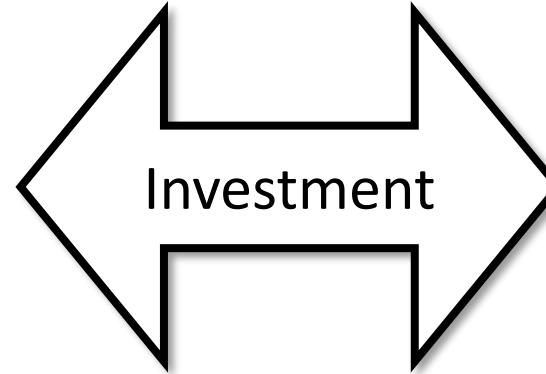


Minutes between wanting
resources and having resources

Stop spending money on running and maintaining data centers

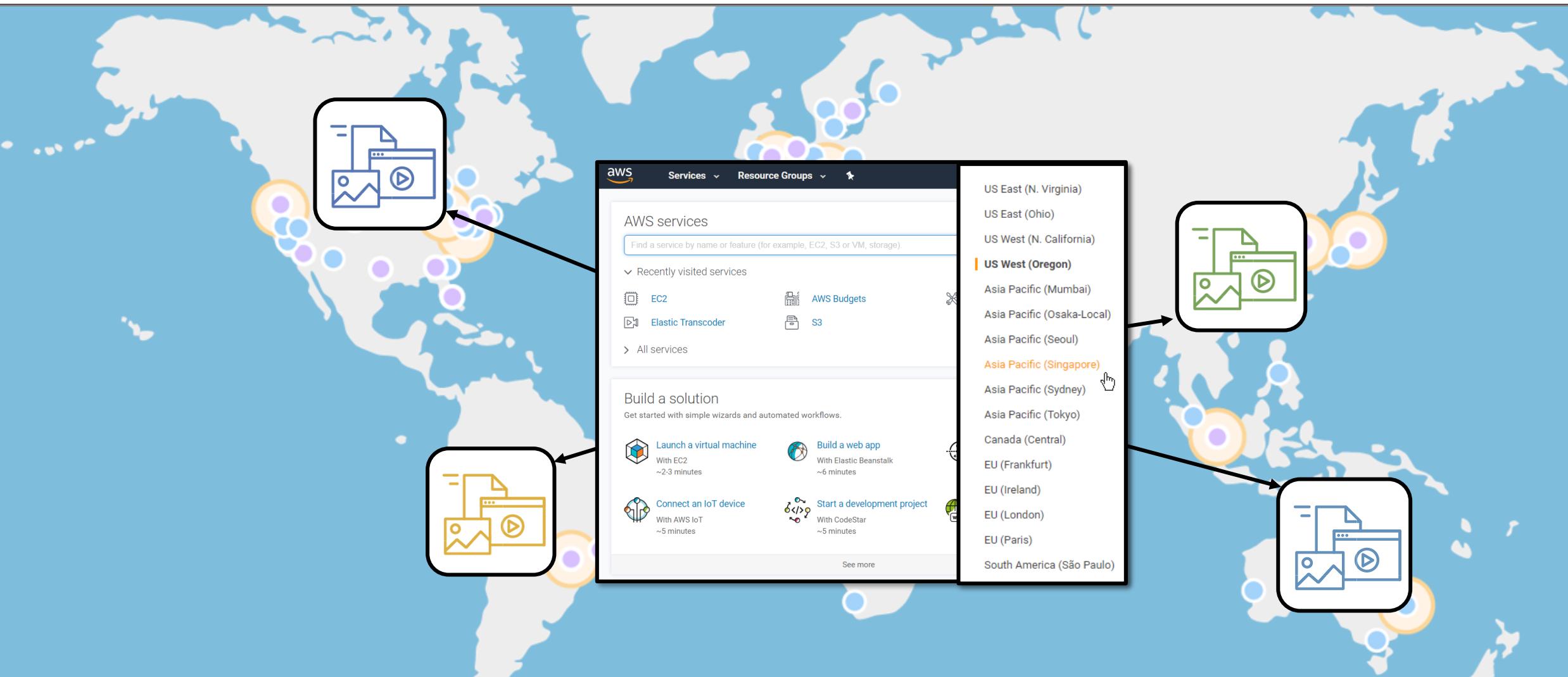


Running data centers

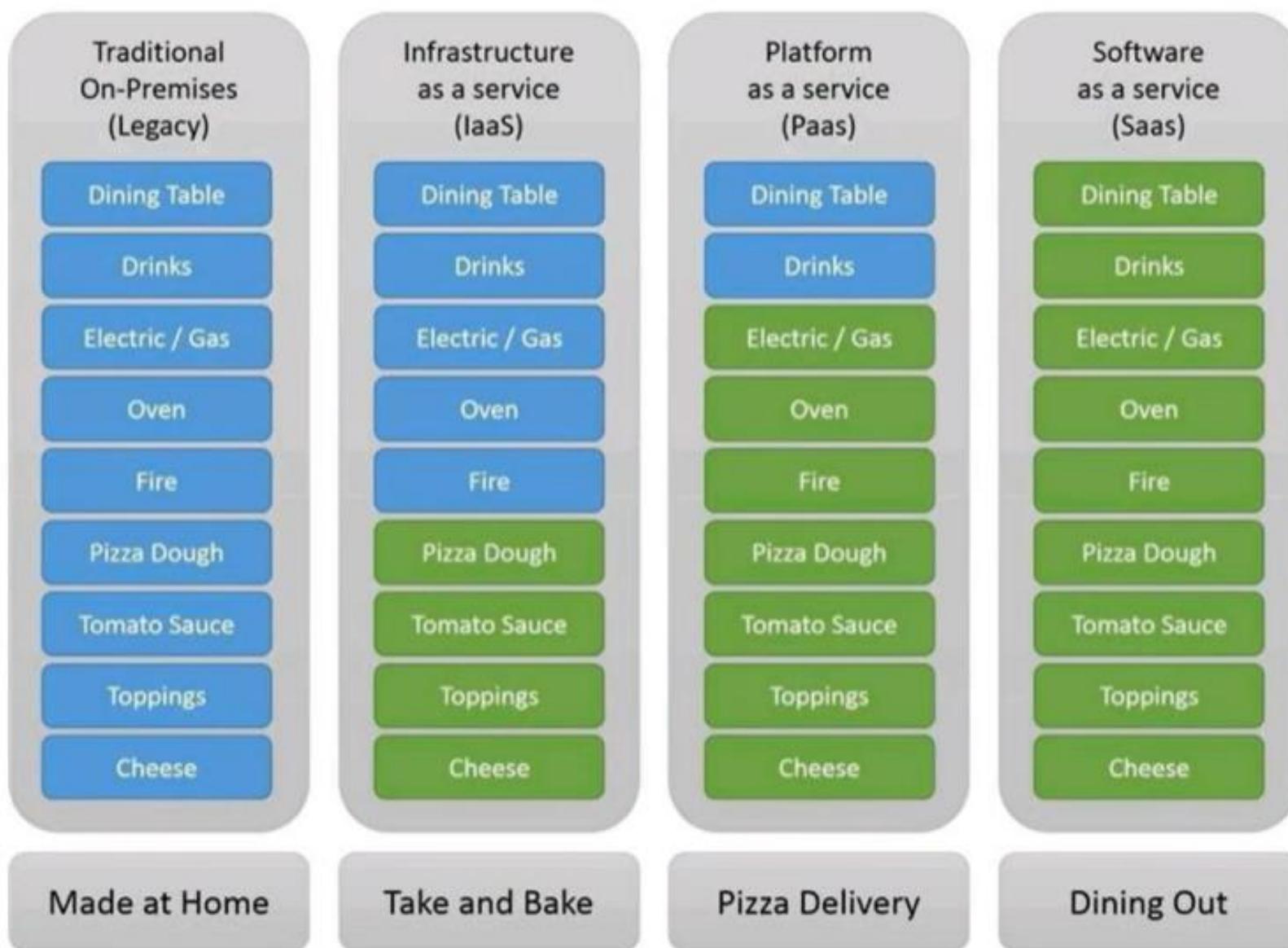


Business and customers

Go global in minutes

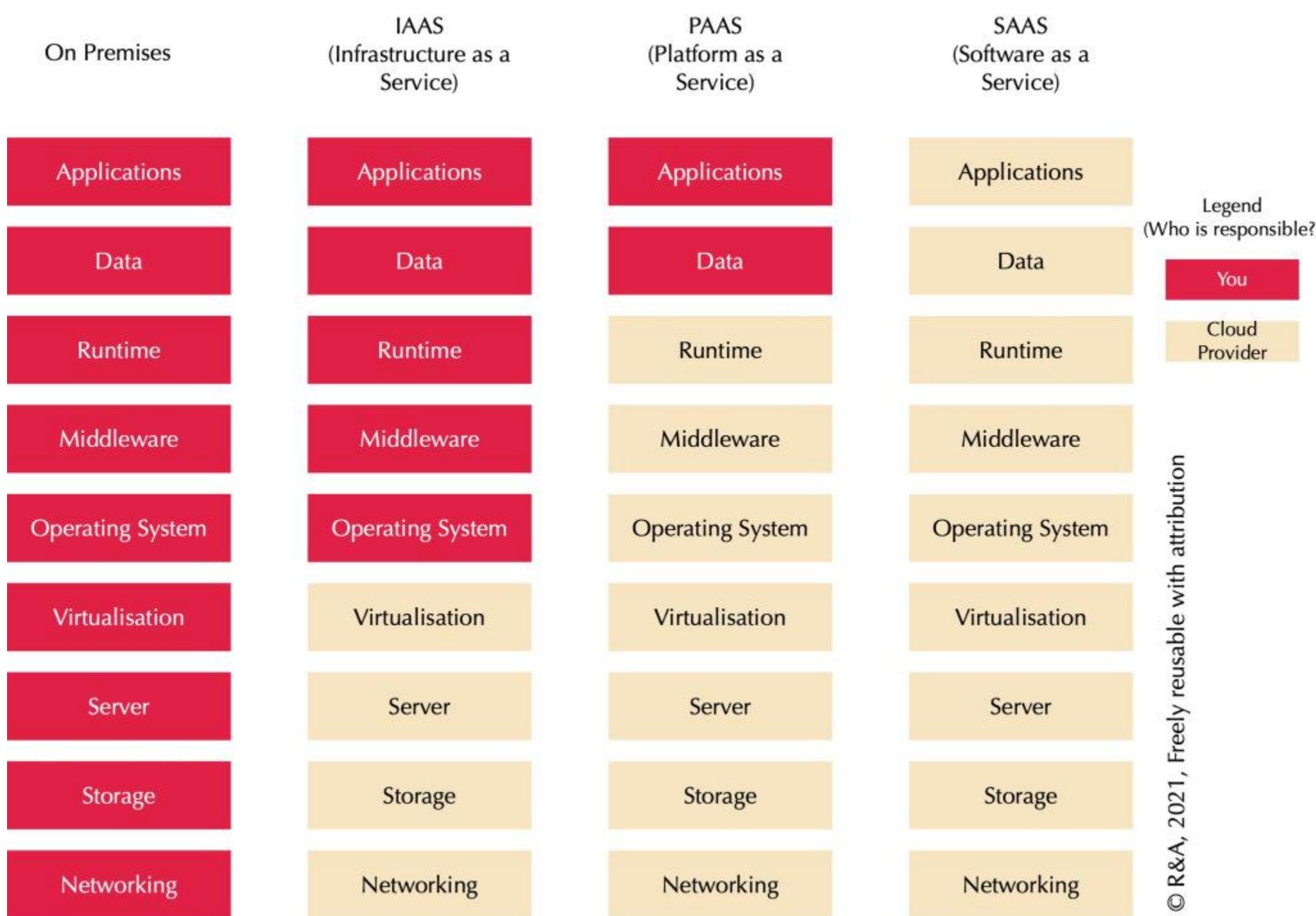


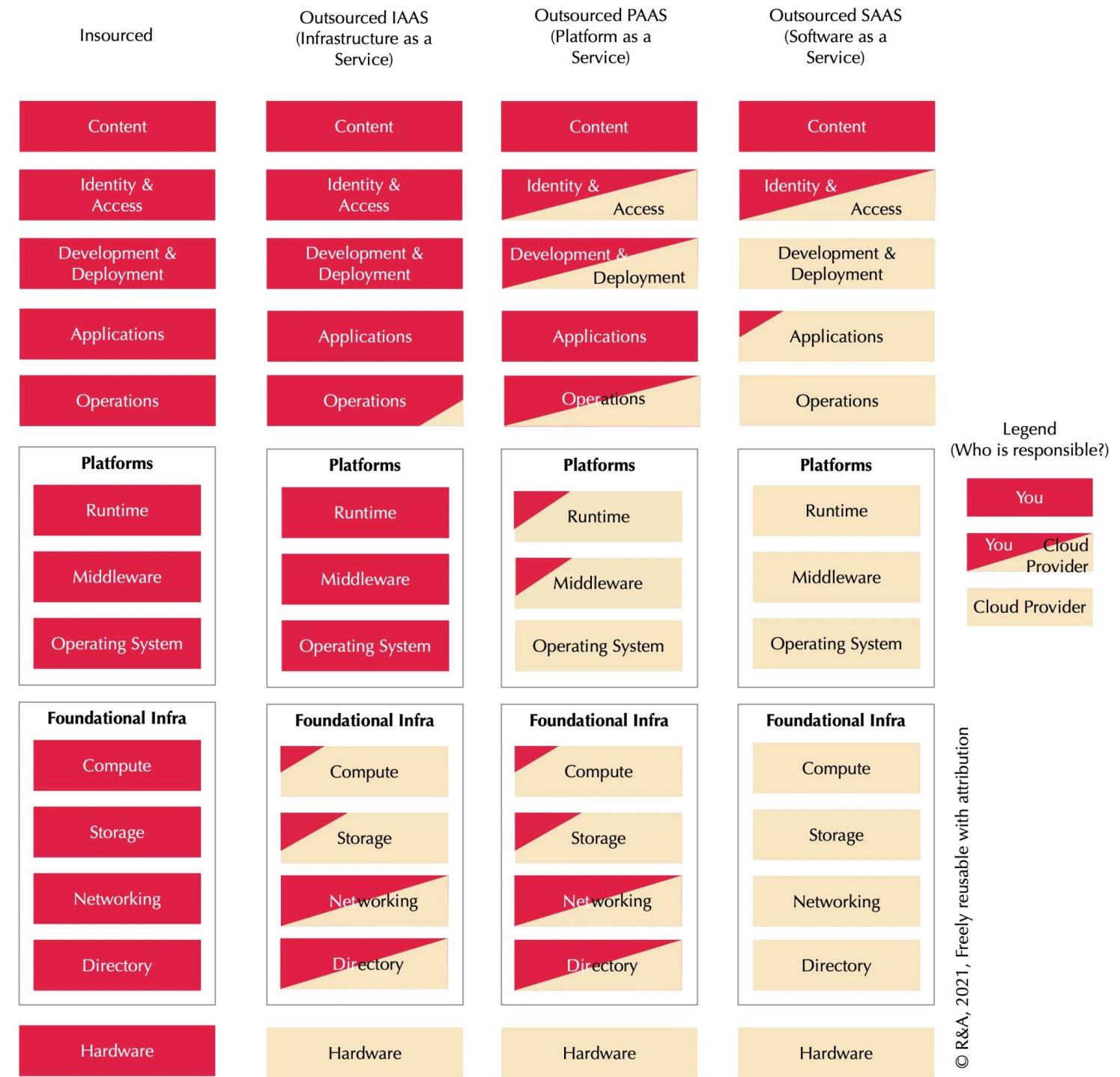
Pizza as a Service



■ You Manage

■ Vendor Manages





IoT Platforms on Cloud

Amazon

- <https://aws.amazon.com/es/iot/>

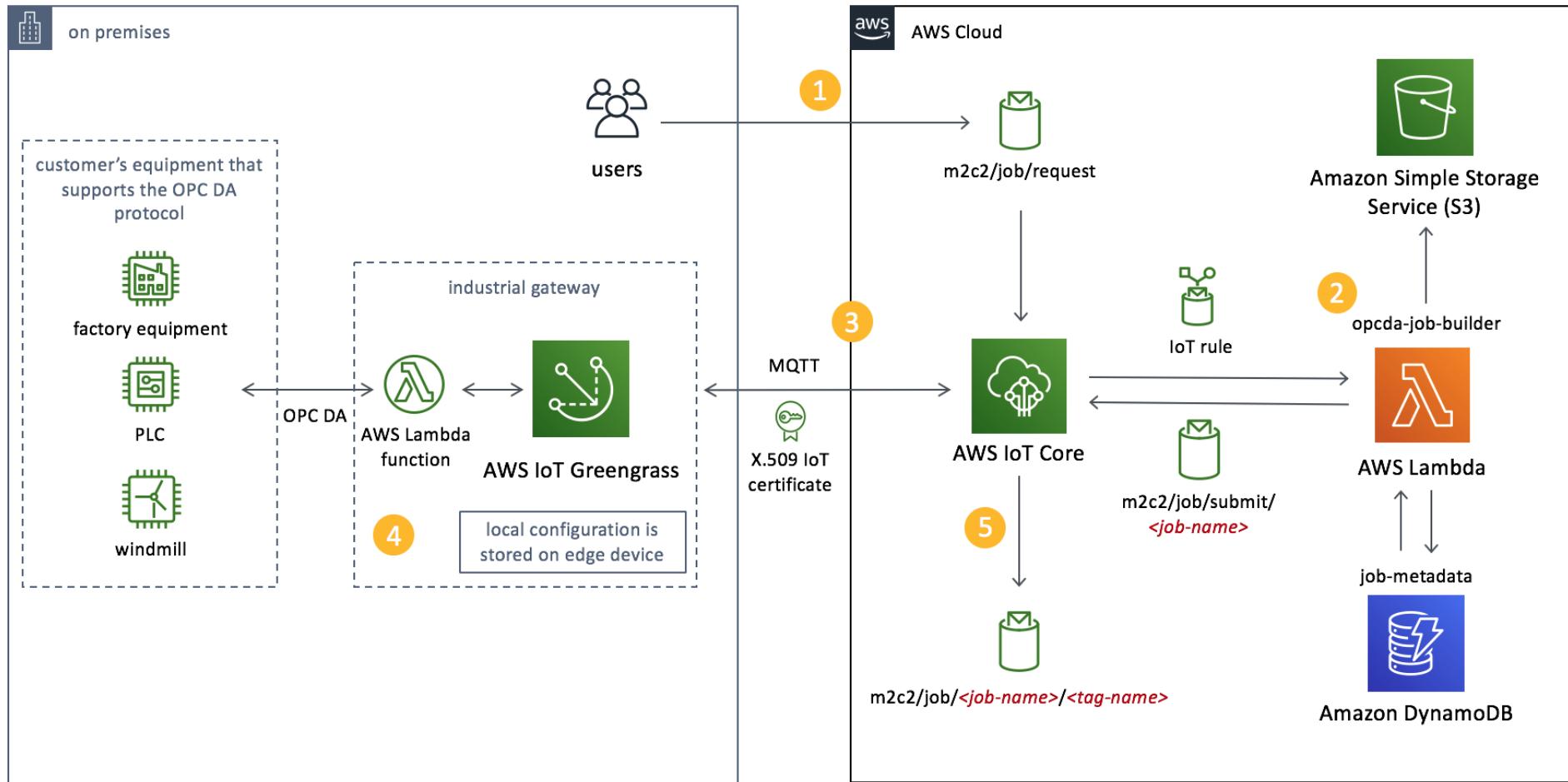
Azure

- <https://azure.microsoft.com/es-es/overview/iot/>

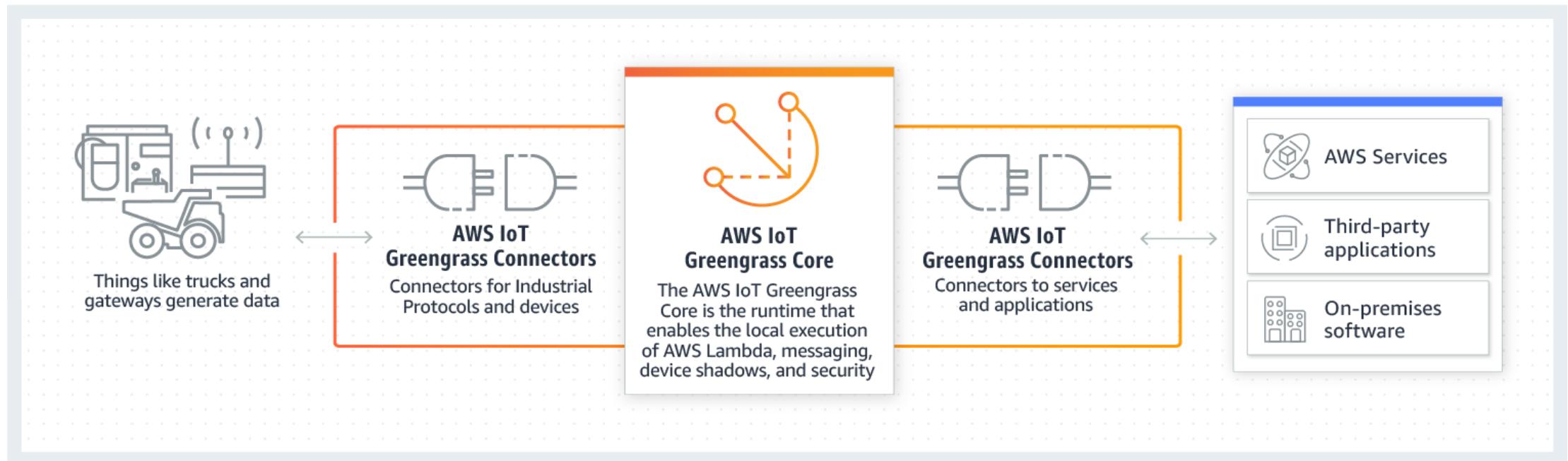
IBM

- <https://www.ibm.com/cloud/internet-of-things>
- NodeRed
 - NodeJs
 - <https://nodejs.org/en/>
 - <https://en.wikipedia.org/wiki/Node-RED>
 - <https://nodered.org/>
 - <https://blog.techdesign.com/get-started-with-iot-visual-wiring-tool-node-red/>
 - JSON
 - <https://www.json.org/json-en.html>
 - <https://en.wikipedia.org/wiki/JSON>

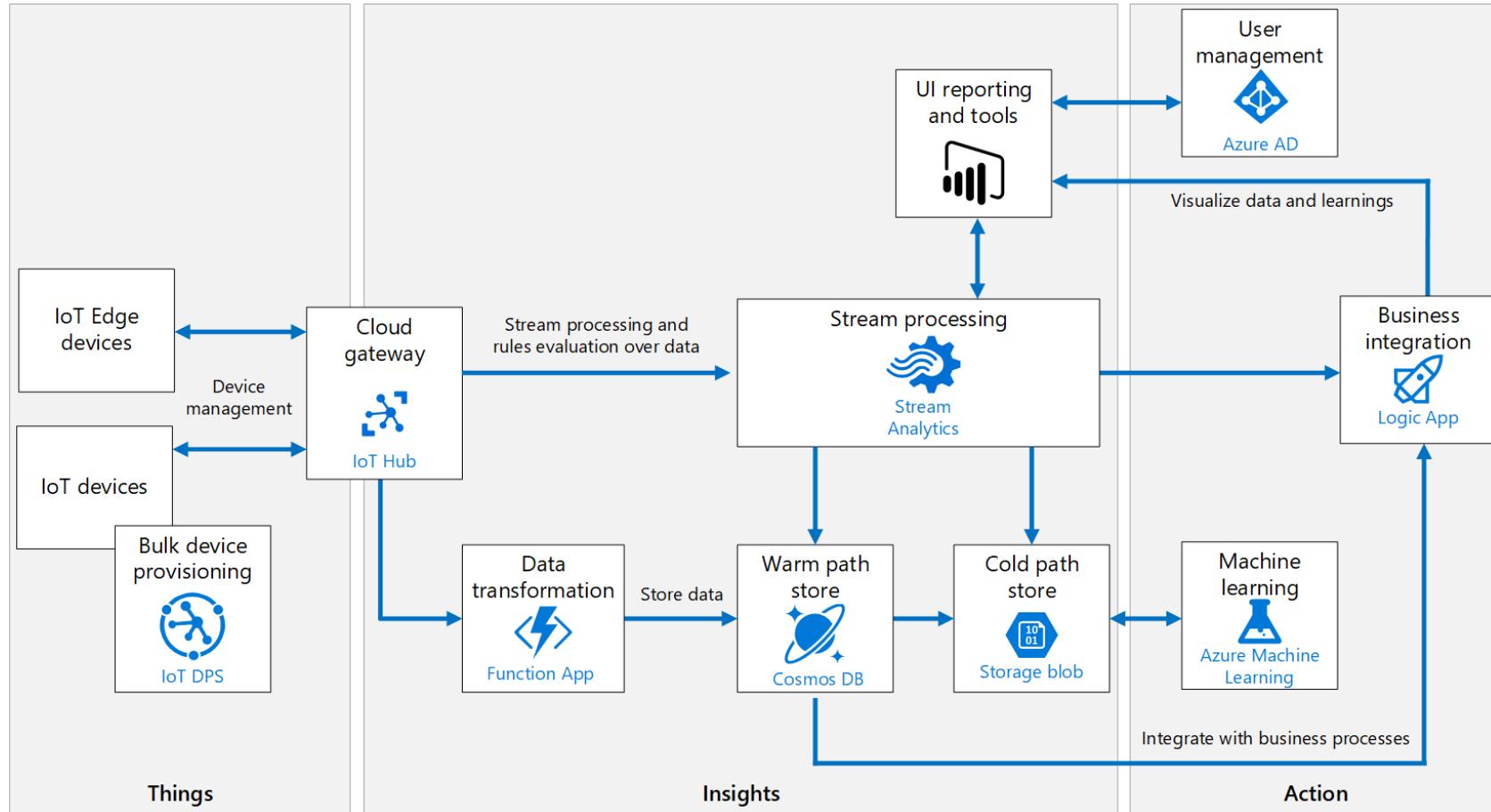
AWS IoT Computing

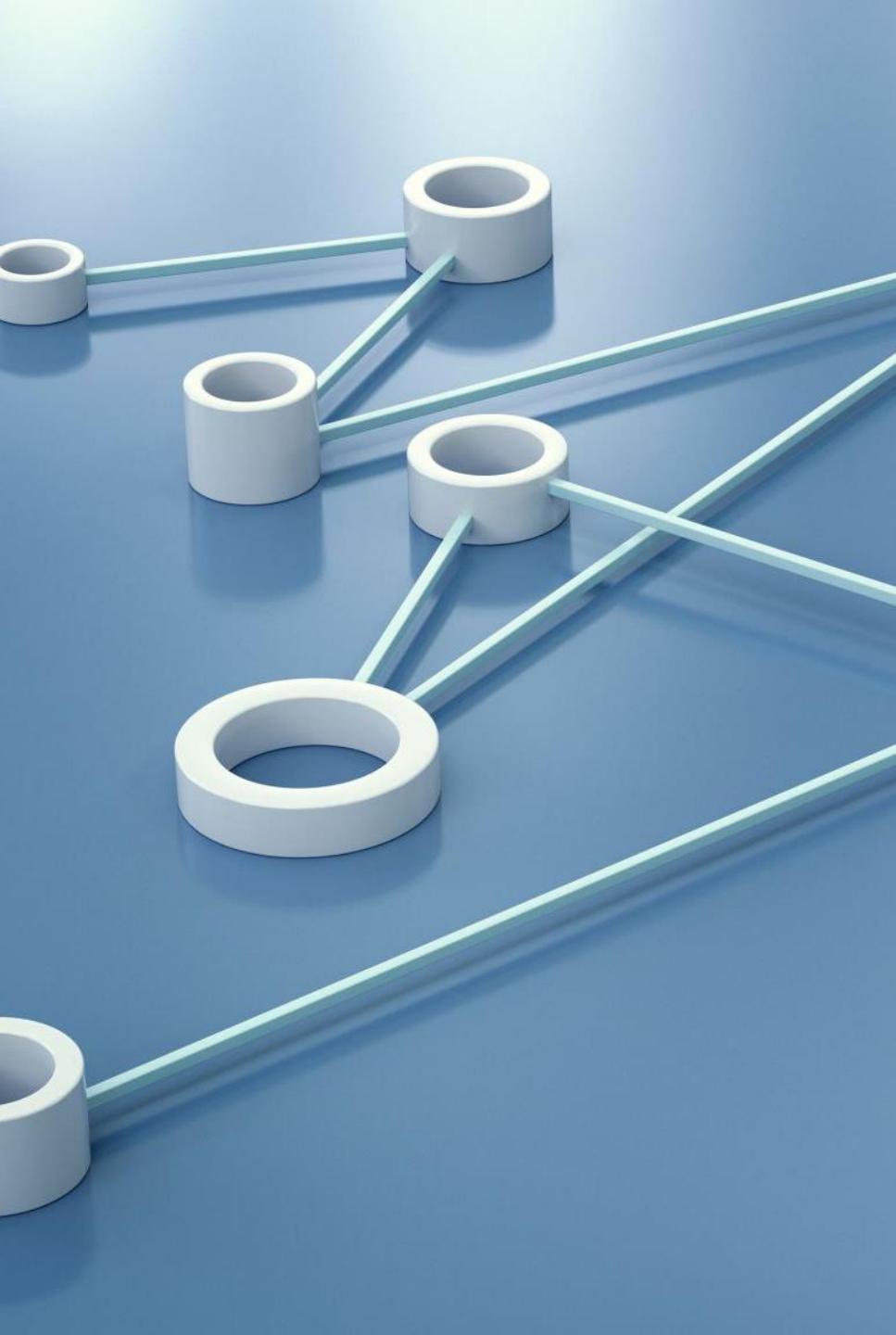


AWS Edge Computing



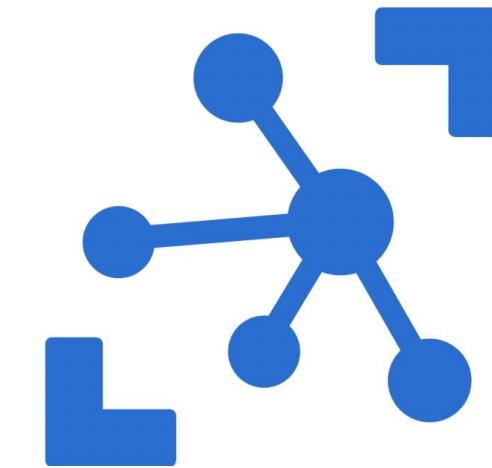
Azure IoT Computing





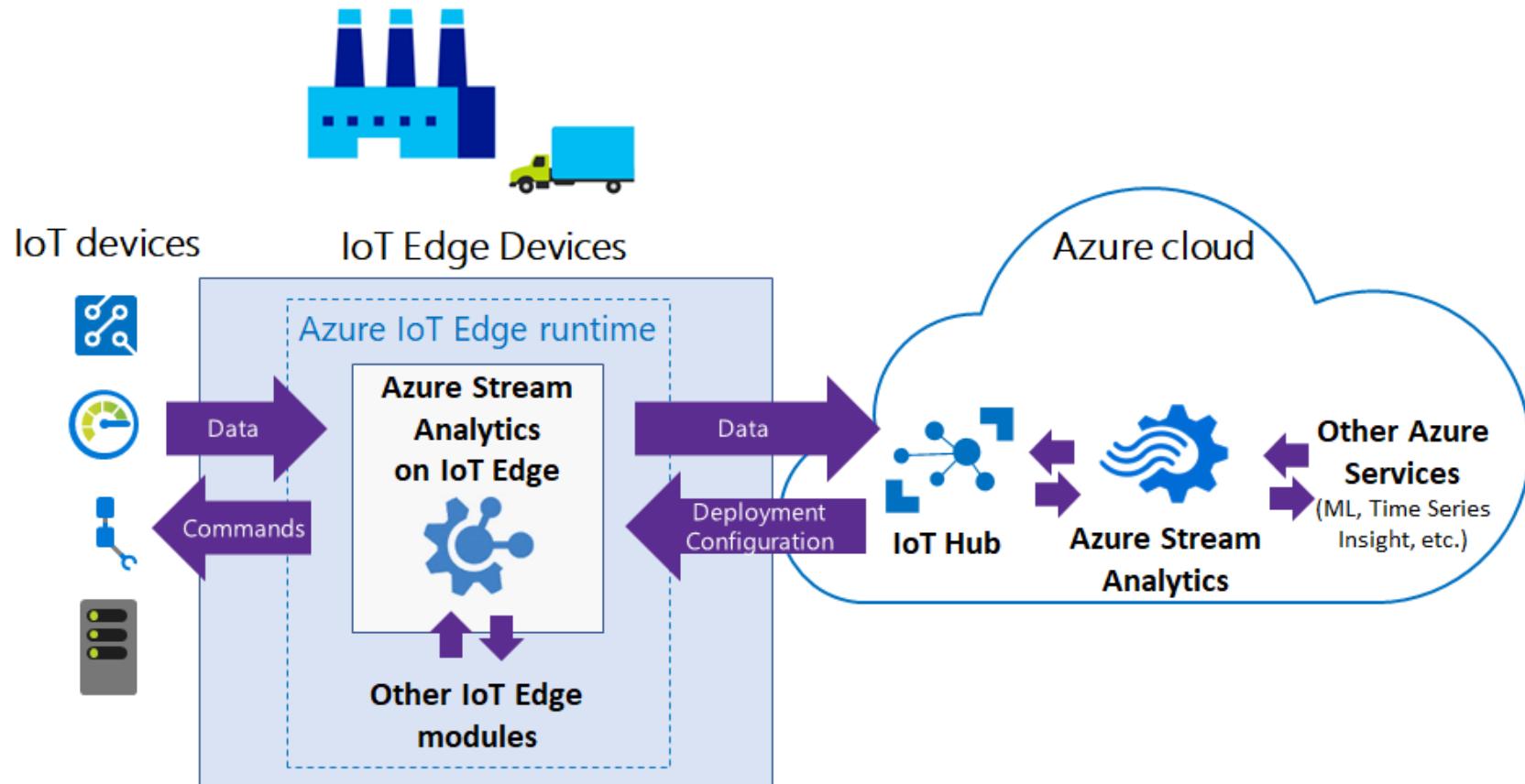
Azure IoT Computing

- [Create an IoT hub using the Azure CLI](#)

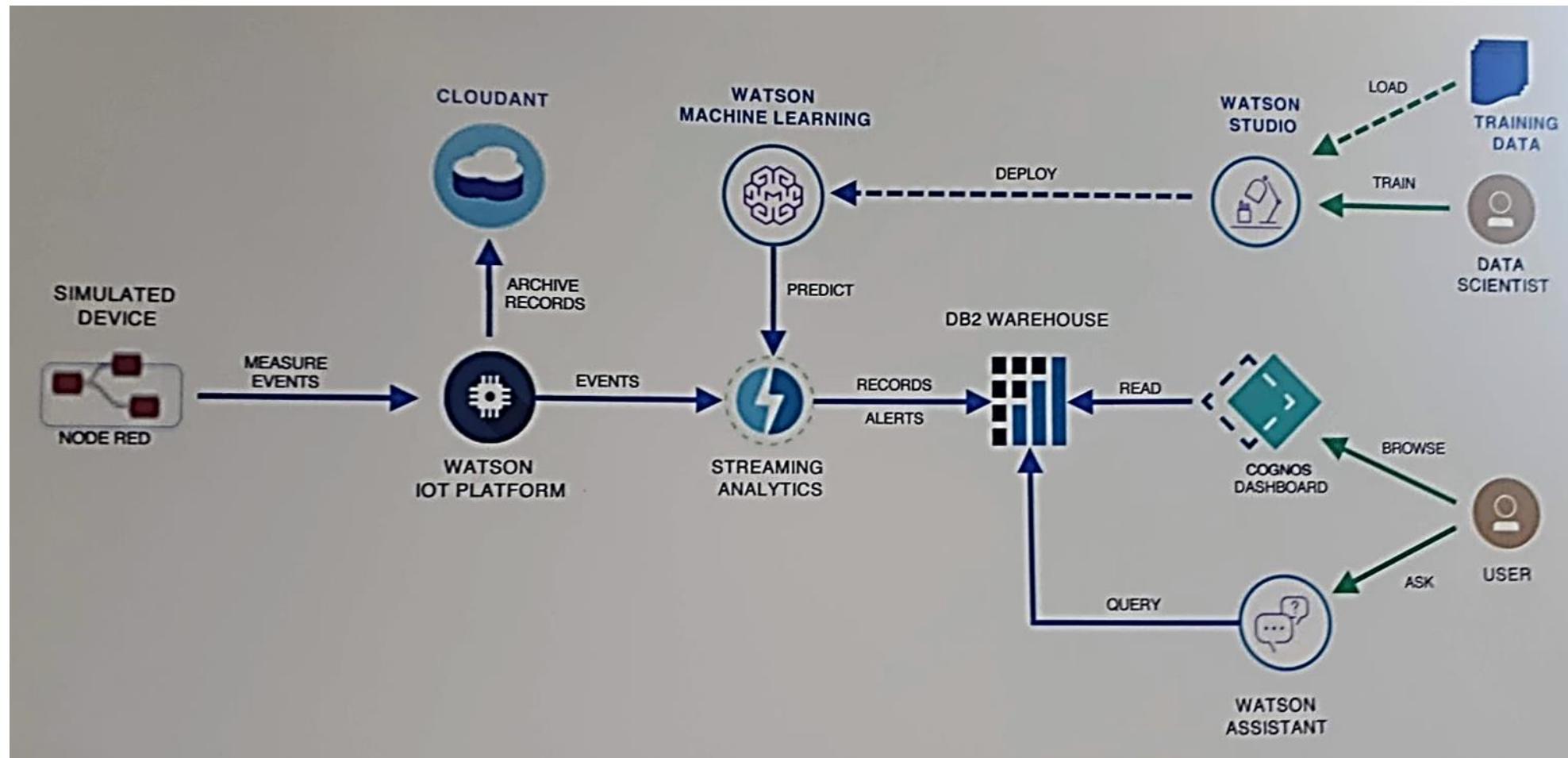


Azure IoT Hub

Azure Edge Computing



IoT Platforms on Cloud



<https://developer.ibm.com/recipes/tutorials/getting-started-with-watson-iot-platform-using-node-red/>

<https://developer.ibm.com/videos/an-introduction-to-node-red/>

<https://nodered.org/docs/getting-started/ibmcloud>



Real Time Operating System

<https://www.intervalzero.com/industries/industrial-automation/>



IntervalZero
RTX

Hardware

FogROS brings robotic cloud computing to the Robot Operating System

Brian Heater @bheater / 5:01 PM GMT+2 • May 23, 2022

 Comment



We demonstrate in example applications that the performance gained by using cloud computers can overcome the network latency to significantly speed up robot performance. In examples, FogROS 2 reduces SLAM latency by 50%, reduces grasp planning time from 14s to 1.2s, and speeds up motion planning 28x. When compared to alternatives, FogROS 2 reduces network utilization by up to 3.8x.

Dell Technologies, IBM and Microsoft are developing cloud, edge, 5G strategies

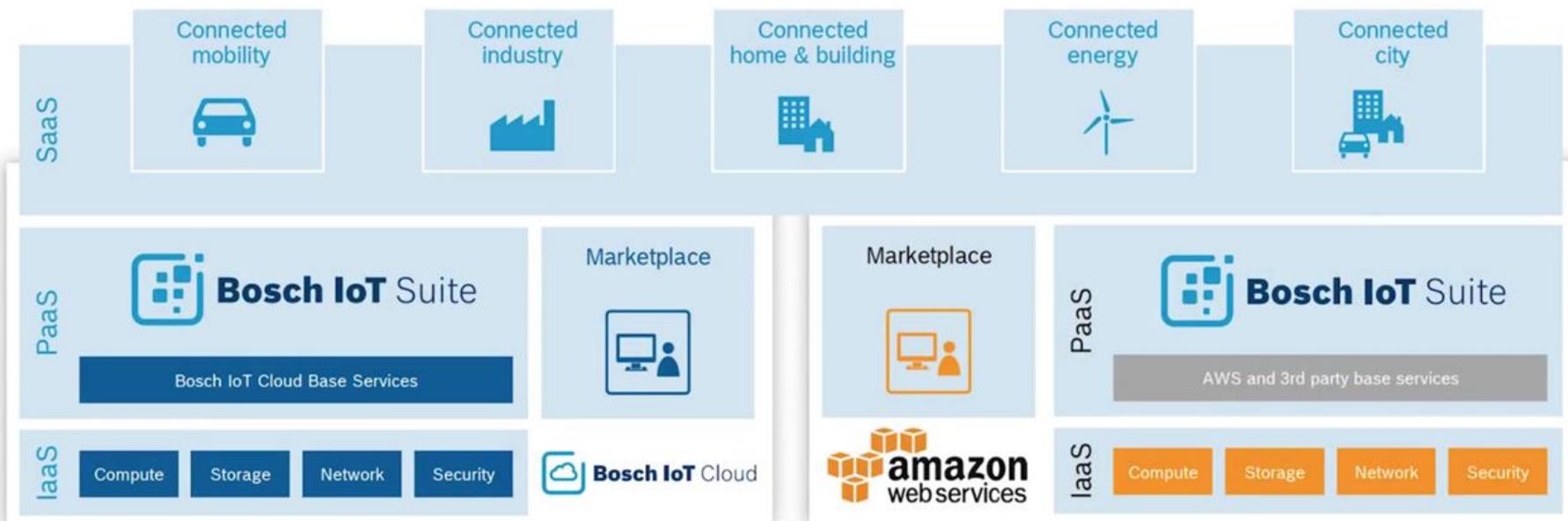
- Operators have, across the board, acknowledged the importance of **edge computing** in delivering a differentiated, revenue-generating **5G service**. There have also been a number of trials in key mobile markets. But, given the trajectory of network investment and product development, we're not quite there yet—more in an ideation, strategy stage. **Cloud and IT providers**, already deeply involved in the enterprise (including telco) market and sensing a chance to bolster sales across the board with the move to the edge, have developed fairly complete edge narratives that incorporate **5G and hybrid cloud computing**.
- [How three tech giants are approaching edge computing \(rcrwireless.com\)](http://rcrwireless.com)

Bosch IoT Suite now publicly available on AWS Marketplace

- We published three of our Bosch IoT Suite services on the AWS Marketplace today. In addition to its availability in the Bosch IoT Cloud, the Bosch IoT Suite has been running on Amazon Web Services since March 2017.
- With the marketplace listing, Bosch.IO (formerly Bosch Software Innovations) now allows developers to subscribe to our services directly using their AWS account and, in turn, to build their IoT solutions.

Bosch IoT Suite on AWS Marketplace

The Bosch IoT Suite on Bosch IoT Cloud & Amazon Web Services (AWS)

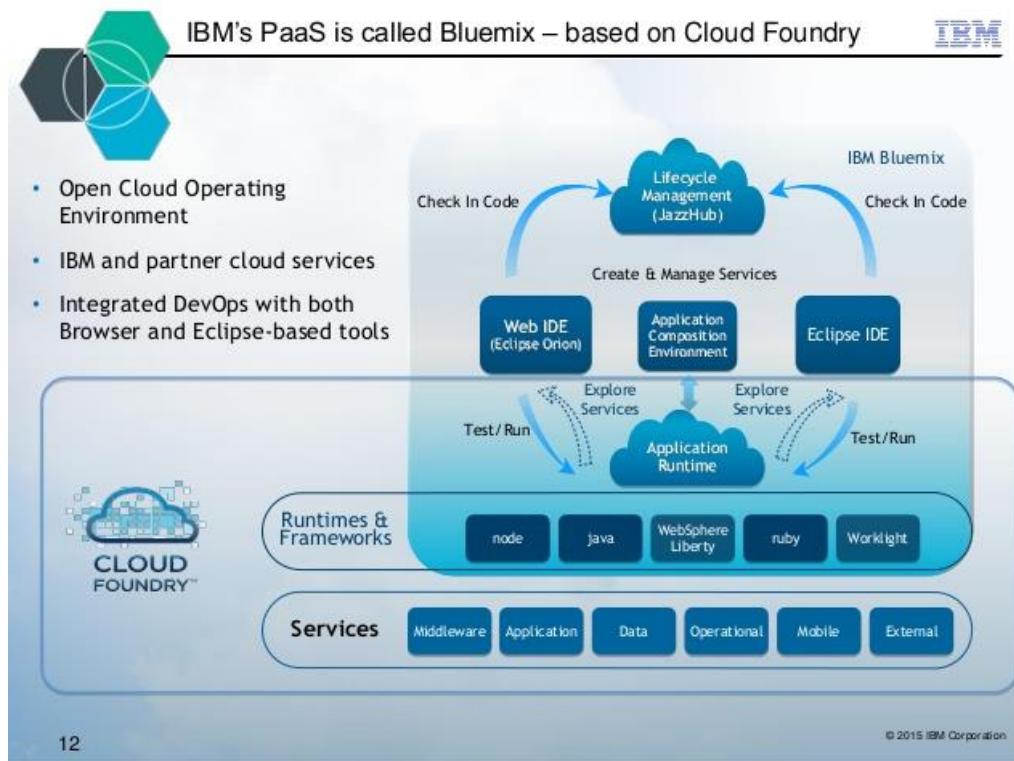


- **Industrial-grade IoT services** for developers and enterprise customers who build on AWS
- **Global availability** of the IoT platform services and vertical solutions from Bosch

Bosch and IBM Clouds

- [Bosch Connects 6 Million Devices with Cloud Foundry](#)
 - Bosch delivers an open IoT cloud to efficiently develop and manage industrial apps for automotive, manufacturing, supply chain, smart homes, etc.
- IBM Cloud Foundry
 - The IBM Cloud Foundry platform is not just about creating new apps or migrating existing ones, on-prem or off-prem implementations, or offering IaaS and PaaS cloud services. It's designed to bring all of these aspects together to help you solve your real, complex business problems in the cloud.

IBM and Bosch IoT



Screenshot of the IBM Cloud Catalog interface. The search bar at the top contains the text "Internet of Things". The results are displayed under the "Servicios (8)" tab. The results include:

- AT&T Flow Designer**: Otro proveedor • Internet de las cosas. Description: Design, Build and Deploy IoT Solutions in Minutes. Status: Gratuito.
- AT&T IoT Data Plans**: Otro proveedor • Internet de las cosas. Description: Launch your IoT product fast with IoT data plans. Status: Gratuito.
- Bosch IoT Rollouts**: Otro proveedor • Internet de las cosas. Description: Rollout software and firmware updates to devices. Status: Gratuito.
- Car Diagnostic API**: Otro proveedor • Internet de las cosas. Description: IBM • Internet de las cosas. Status: Gratuito.
- Internet of Things Platform**: IBM • Internet de las cosas. Description: IBM • Internet de las cosas. Status: Gratuito.
- Portworx Enterprise**: Otro proveedor • Almacenamiento • Bases de datos • Herramientas de desarrollador • Internet de las cosas. Description: Portworx Enterprise. Status: Gratuito.

Microchip launches range of IoT solutions for rapid prototyping



<https://www.smart2zero.com/news/microchip-launches-range-iot-solutions-rapid-prototyping>

<https://www.microchip.com/iot>

ARM Resources

- <https://www.arm.com/resources/education/online-courses>
- <https://www.arm.com/resources/education/books>
- <https://www.arm.com/resources/education/education-kits/efficient-embedded-systems>
- <https://www.arm.com/resources/education/online-courses/rapid-embedded-systems>
- <https://www.arm.com/resources/education/online-courses/internet-of-things>
- <https://www.arm.com/resources/education/online-courses/mechatronics-and-robotics>

Comparison of Wireless Technologies

- Peer-to-Peer Technologies
 - Bluetooth, WiFi Direct, NFC
- Low-power / Short-range / Low-data Mesh Technologies
 - Bluetooth Low-Energy, Zigbee, Z-Wave, and 6LoWPAN
- Local Area Network (LAN) Technologies
 - WiFi
- Long-distance Cellular Technologies
 - GSM / GPRS, LTE
- Low-power Long-distance Technologies
 - LoRa/ LoRaWan, NB-IoT, LTE-M

COMPARISON – main LPWAN technologies



Feature	LORAWAN	SIGFOX	LTE Cat 1	LTE M	NB - LTE
Modulation	SS chip	UNB / GFSK / BPSK	OFDMA	OFDMA	OFDMA
Rx Bandwidth	500 – 125 KHz	100 Hz	20 MHz	20 – 1.4 MHz	200 KHz
Data Rate	290bps – 50Kbps	100 bit / sec 12 / 8 bytes Max	10 Mbit /sec	200 kbps – 1 Mbps	Average 20K bit / sec
Max. # Msgs/day	Unlimited	UL: 140 msgs / day	Unlimited	Unlimited	Unlimited
Max Output Power	20 dBm	20 dBm	23 – 46 dBm	23/30 dBm	20 dBm
Link Budget	154 dB	151 dB	130 dB+	146 dB	150 dB
Battery lifetime – 2000 mAh	105 months	90 months		18 months	
Power Efficiency	Very High	Very High	Low	Medium	Med high
Interference immunity	Very High	Low	Medium	Medium	Low
Coexistence	Yes	No	Yes	Yes	No
Security	Yes	No	Yes Oui	Yes	Yes

Comparison
of Wireless
Technologies

thethingsnetwork.org



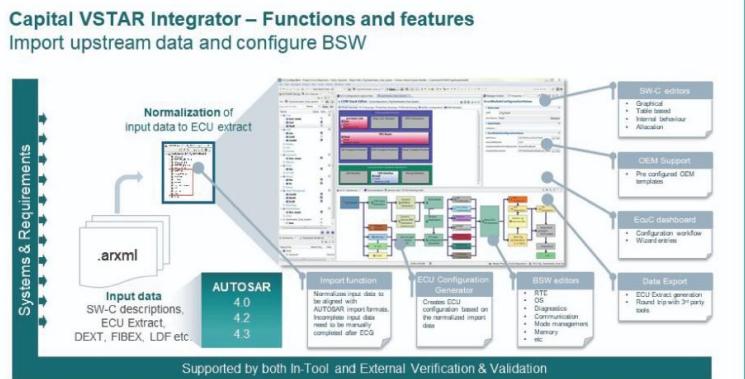
- Building a global open LoRaWAN™ network
- The Things Network is about enabling low power Devices to use long range Gateways to connect to an open-source, decentralized Network to exchange data with Applications.



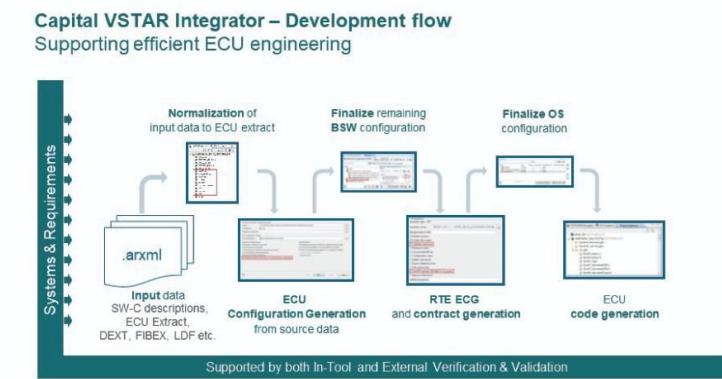
Software-defined Vehicles

- Software-defined automobiles: An efficient platform for essential parallelization

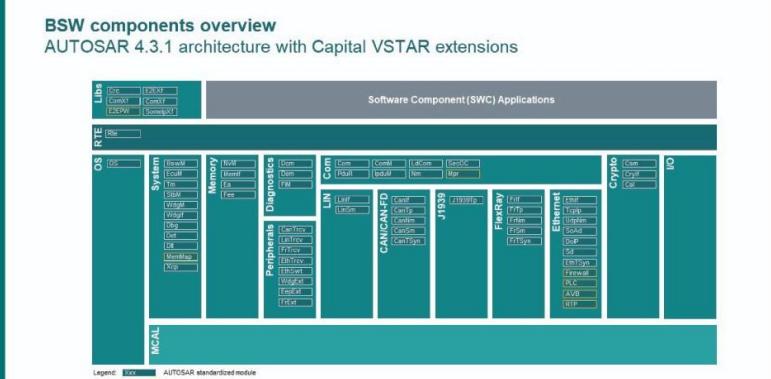
Connection to system design tools



Generation of customized configuration



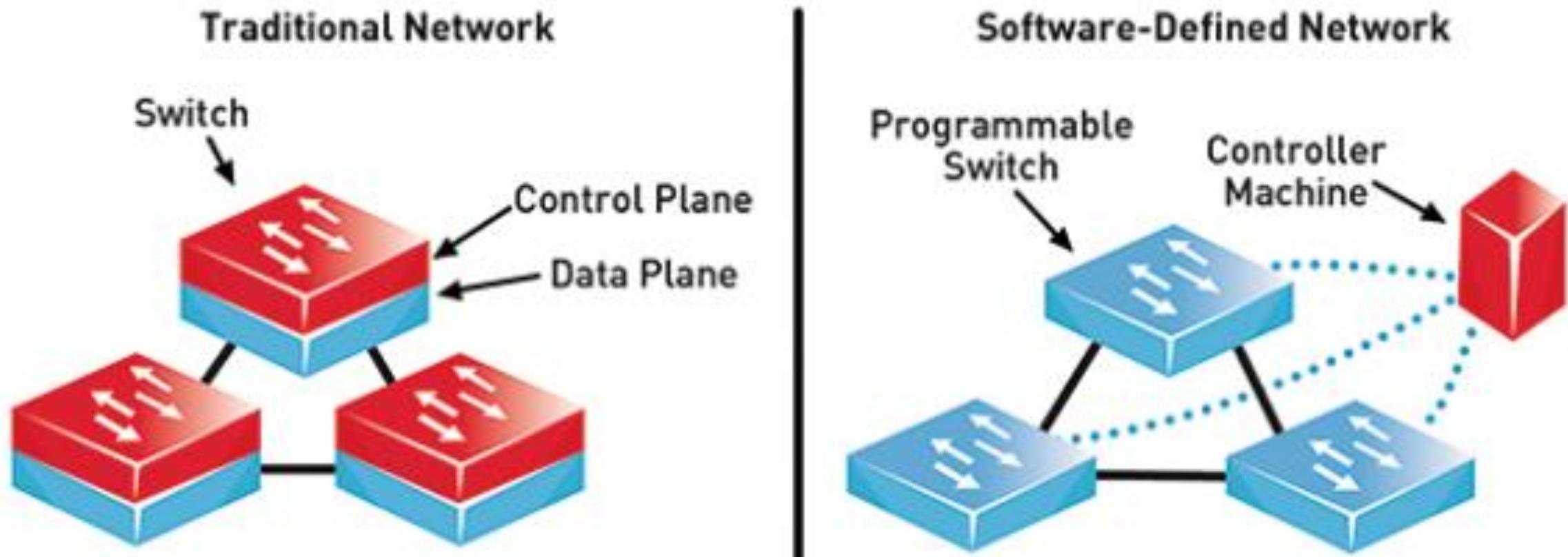
Embedded software



Software-Defined-Thing

- Software Defined Networks

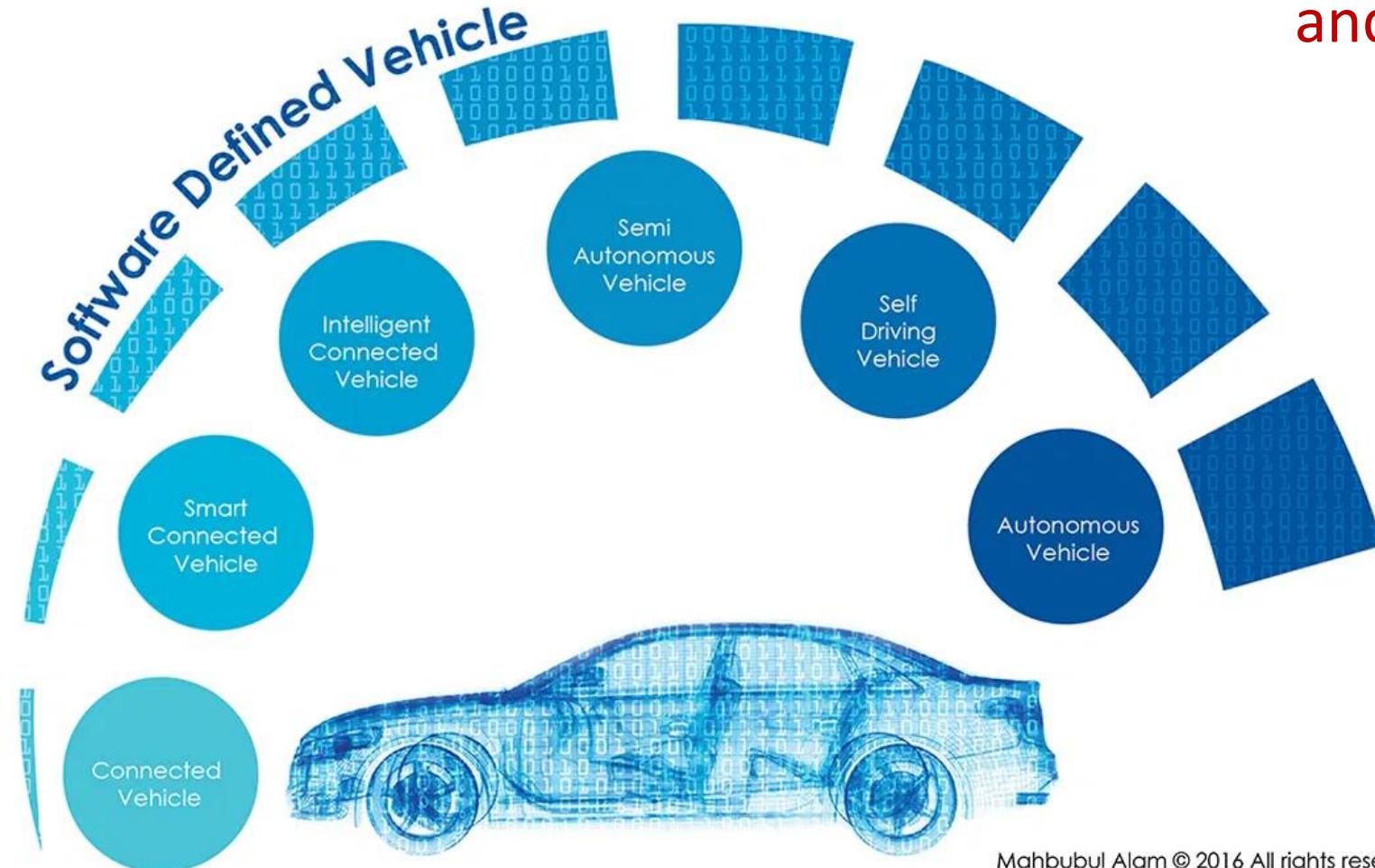
Added value
in software
and data!



Software-Defined-Thing

- Software Defined Networks
- Software Defined Vehicle

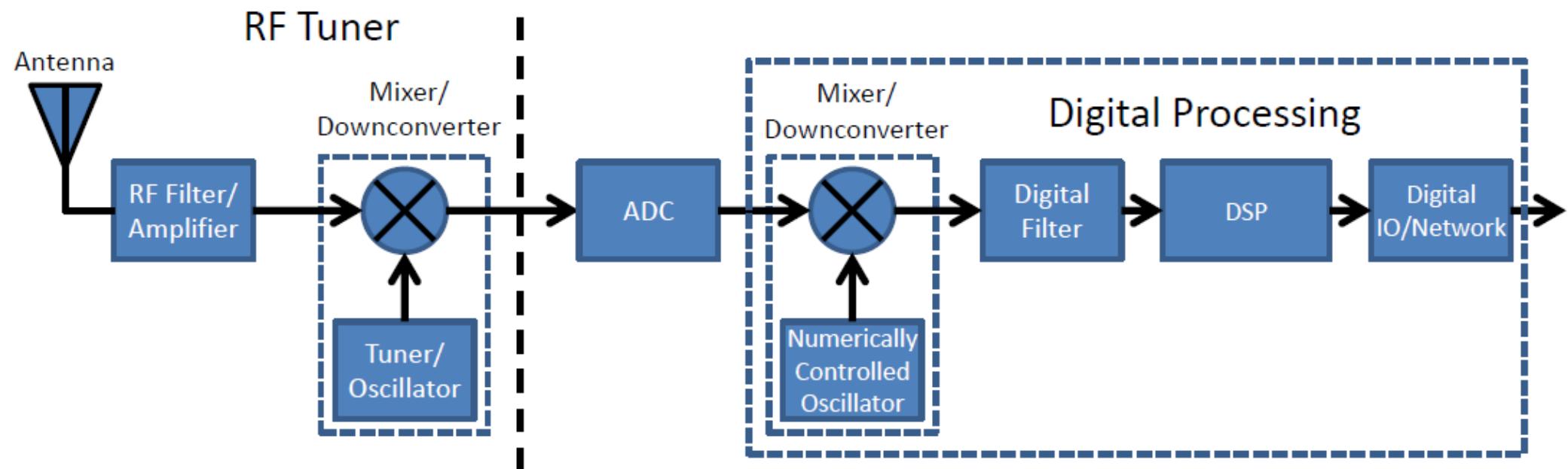
Added value
in software
and data!



Software-Defined-Thing

- Software Defined Networks
- Software Defined Vehicle
- Software Defined Radio
- Infrastructure as a Code

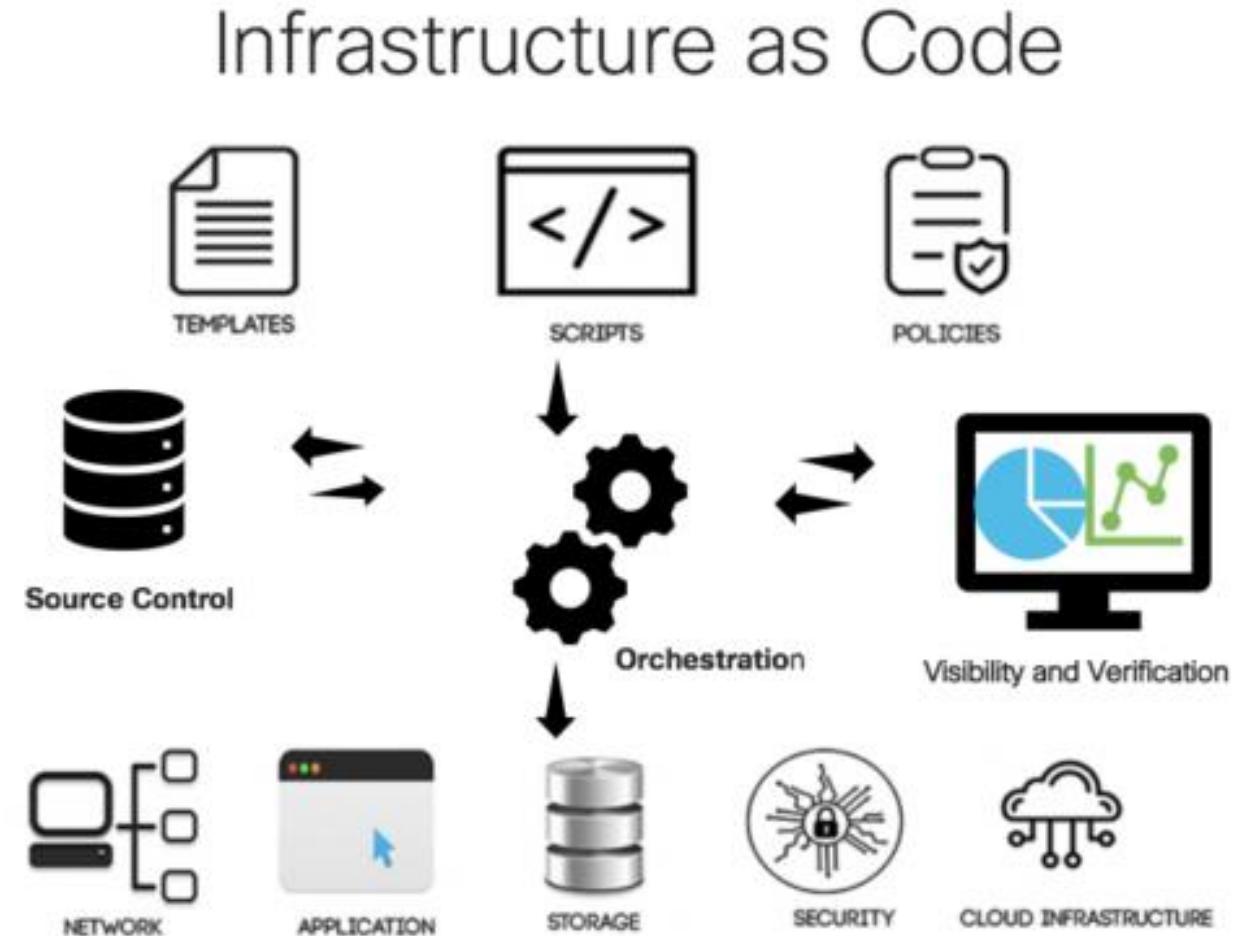
Added value
in software
and data!



Software-Defined-Thing

- Software Defined Networks
- Software Defined Vehicle
- Software Defined Radio
- Infrastructure as a Code

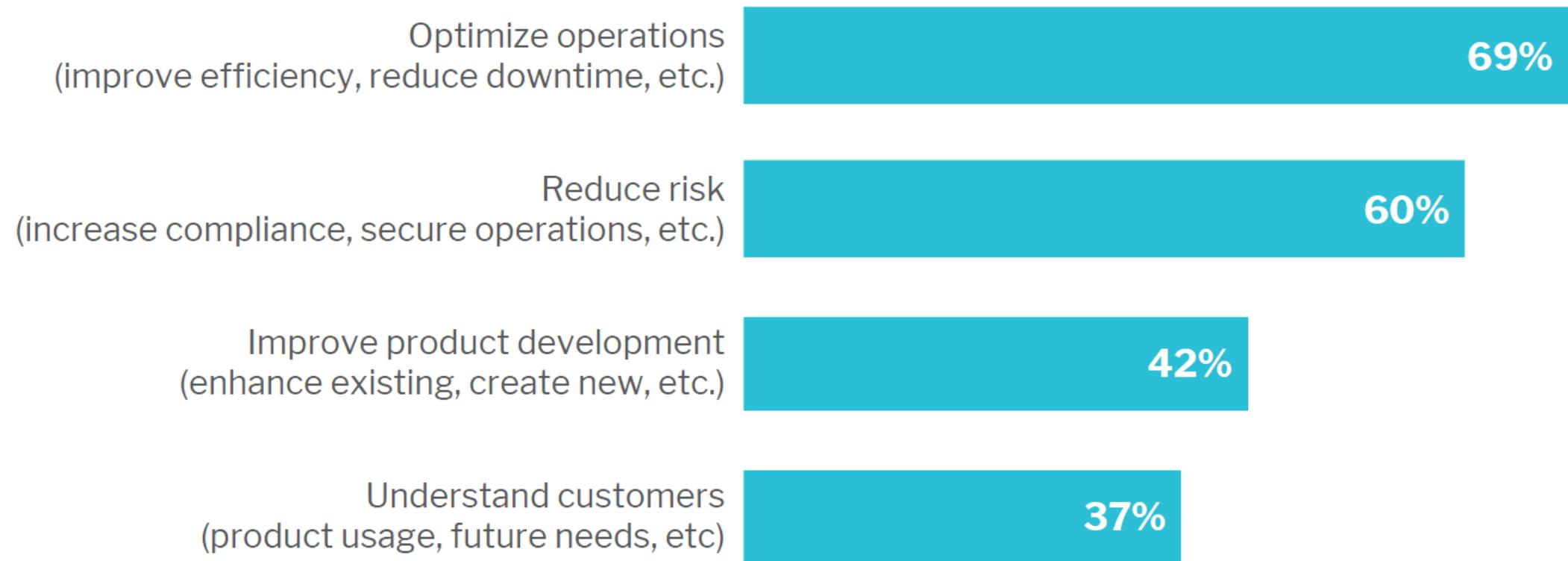
Added value
in software
and data!



Transforming manufacturing with IoT

Business Outcomes Drive Industrial IoT Deployments

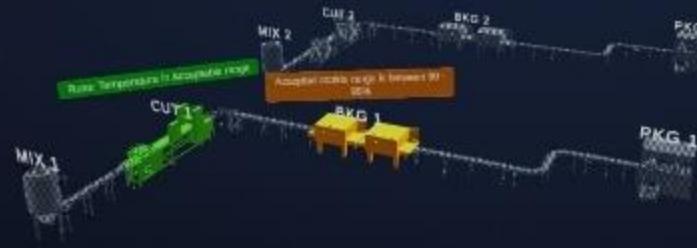
Source: 451 Research's Voice of the Enterprise: IoT Budget Survey, Q1 2019



The Path to Lights-Out Manufacturing Starts with Software

- Lights out manufacturing
 - Factories that employ "lights-out manufacturing" are fully automated and require no human presence on-site. These factories are considered to be able to run "with the lights off"
 - [FANUC](#), a Japanese [robotics](#) company, has been operating as a lights-out factory since 2001.^[6] [Robots](#) are building other robots at a rate of about 50 per 24-hour shift and can run unsupervised for as long as 30 days at a time
 - [https://en.wikipedia.org/wiki/Lights_out_\(manufacturing\)](https://en.wikipedia.org/wiki/Lights_out_(manufacturing))





1 Month 

1 Week 

1 Day 

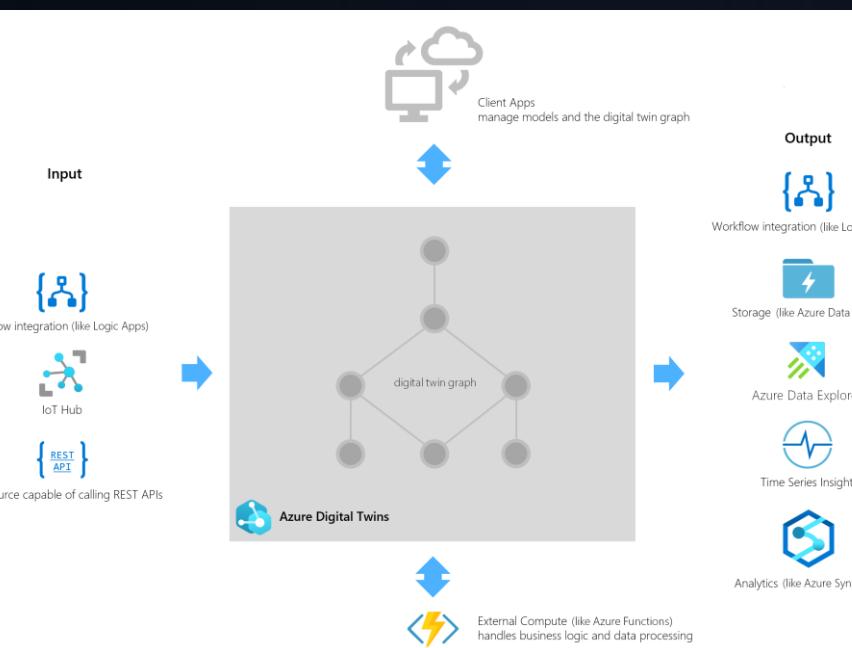
1 Hour 

Live 

Azure Digital Twins

Use IoT spatial intelligence to create models of physical environments.

< BKG1



SUGAR RUSH

Unit 1 Machine State Unit 2 Machine State

BKG 1

Batch Id	Weight Per Cookie	Accepted Cookie	Over Cooked	Under Cooked	Broken Cookies
200620220738	6.73 g	2466	10 	0 	126 
Total Cookies	180 °C	230 °C	7.11 %	3200.11 g	4.81 mm

CUT 1 BKG 1 MIX 2 CUT 2 BKG 2 Moisture Hardness Thickness

1 Month 

1 Week 

1 Day 

1 Hour 

Live 

A Connected Future

The Internet of Things



The Internet of Things (IoT) is transforming the way we interact with our devices at home, at work, and throughout our cities.

This network of connected devices gathers vast amounts of data about our online activities.

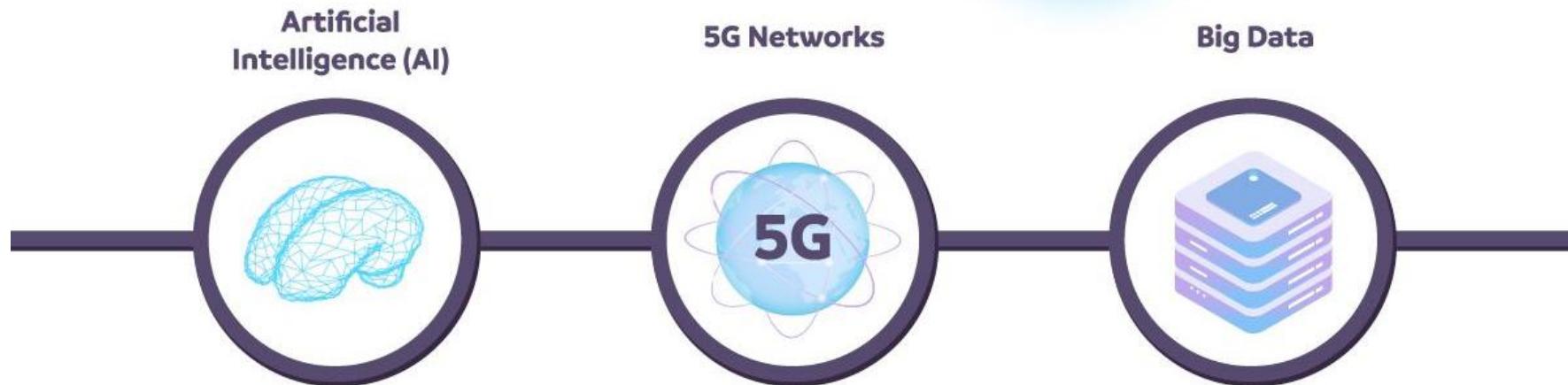
Daily Data Generated from IoT Devices

5 quintillion bytes

(1 BILLION GIGABYTES, 0.1 EXABYTES)

REUTERS/THOMAS PETER

IoT is empowered by
three key technologies:



Programmable intelligence enabling devices to learn, reason, and process information like humans

5th generation mobile networks with extremely fast, near-zero latency for real-time data processing

Volumes of data from numerous Internet-connected sources, that are too large for normal processing methods

Together, AI and IoT merge to create AIoT — a smart, connected network of devices that seamlessly communicate over powerful 5G networks — unleashing the power of data better and faster than ever.

The 4 Major AIoT Segments

1

Wearables

Wearable devices continuously monitor and track user preferences and habits. Applications include fitness and health trackers, heart rate monitoring, wireless headphones, and AR/VR devices.



Smart
watches



AR/VR
goggles



Wireless
earbuds



The 4 Major AIoT Segments

2

Smart Home

Smart home devices such as thermostats, coffee makers, lights, and smart TVs learn a user's habits to develop automated home "support" for everyday tasks. Applications include energy efficiency, safety, entertainment, access control, and personal comfort.



Smart speakers



IoT appliances



Smart thermostats



The 4 Major AIoT Segments

3

Smart City

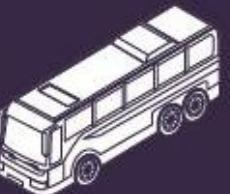
Smart cities that integrate all levels of municipal services are becoming safer, more convenient places to live. Applications include open data for better urban planning, optimized energy consumption, and increased public safety through smart traffic surveillance.



Smart
energy grids



Smart
streetlights



Smart public
transportation



The 4 Major AIoT Segments

4

Smart Industry

Smart industry devices—the Industrial Internet of Things (IIoT)—use real-time data analytics and machine-to-machine sensors to optimize operations, logistics, and supply chain. Data generated from these devices helps industries foresee challenges—preventing costly errors and workplace injuries.



Autonomous
manufacturing
robots



Automated
supply chain
management



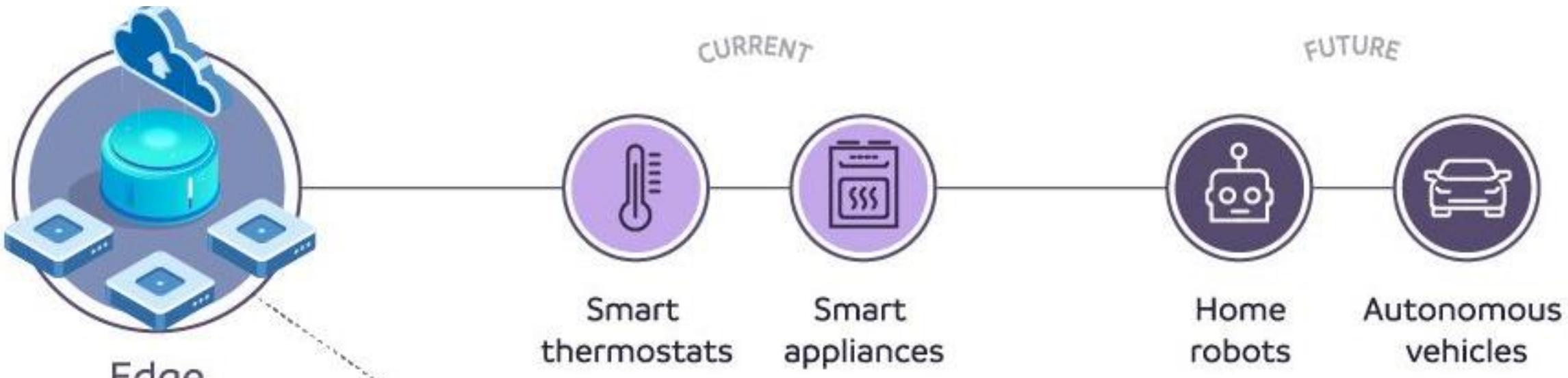
Predictive
maintenance
sensors



Future AIoT Technologies

AIoT innovation ***shows no signs of slowing down.***

AIoT will test how much data our devices can process, future advancements will push the boundaries of processing and learning.



Edge
Computing

CURRENT

Smart
thermostats Smart
appliances

FUTURE

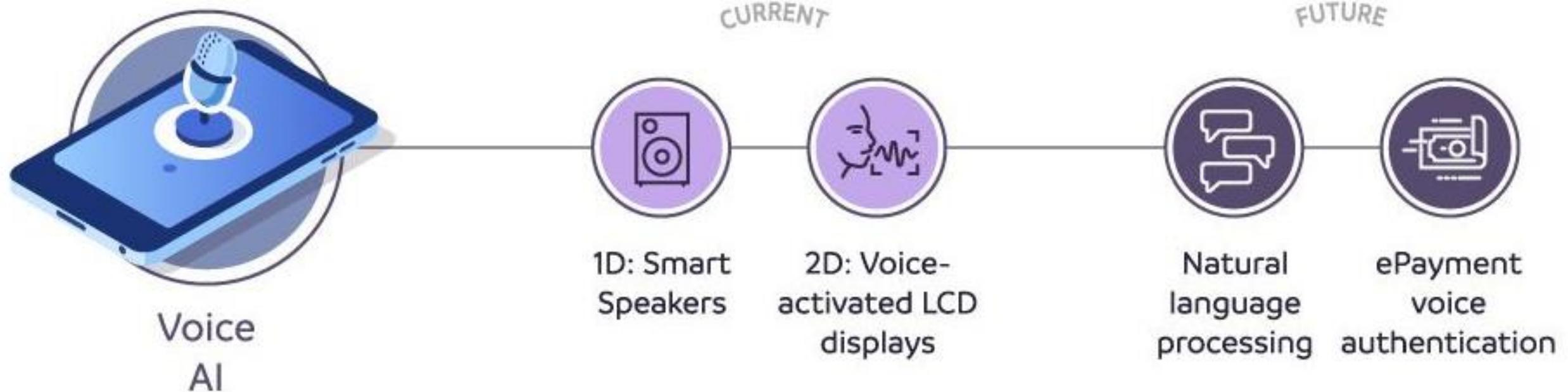
Home
robots Autonomous
vehicles

Data processed by the device itself, a local computer or server, rather than remote data centers

Future AIoT Technologies

AIoT innovation ***shows no signs
of slowing down.***

AIoT will test how much data our devices can process, future advancements will push the boundaries of processing and learning.



Future AIoT Technologies

AIoT innovation ***shows no signs of slowing down.***

AIoT will test how much data our devices can process, future advancements will push the boundaries of processing and learning.



Future AIoT Technologies

AIoT innovation ***shows no signs
of slowing down.***

AIoT will test how much data our devices can process, future advancements will push the boundaries of processing and learning.

AIoT promises to radically transform how we interact with our homes, offices, and cities every day.

IBM AI Cognitive Service



Image Classifier - Test

IBM Watson Studio - Google Chrome
dataplatform.cloud.ibm.com/studio/watson-vision-combined/food/view?service_guid=crn:v1:bluemix:public:watson-vision-combi...
Aplicaciones Bionic Engineering Flightradar24.com ... :: CEN - European C... Caja de Ingenieros Save to Mendeley Dictionary, translati... Download Star War... » Otros marcadores
IBM Watson Studio daniel franco puntes's Acc... DF

Food

Overview Test Implementation

Filter

Threshold 0.12

0 1

Classes

- bread
- bun
- hamburger
- hamburger bun
- sandwich
- snack food



sandwich	0.87
snack food	0.87
hamburger	0.87
hamburger bun	0.50
bun	0.50

Mostrar todo X

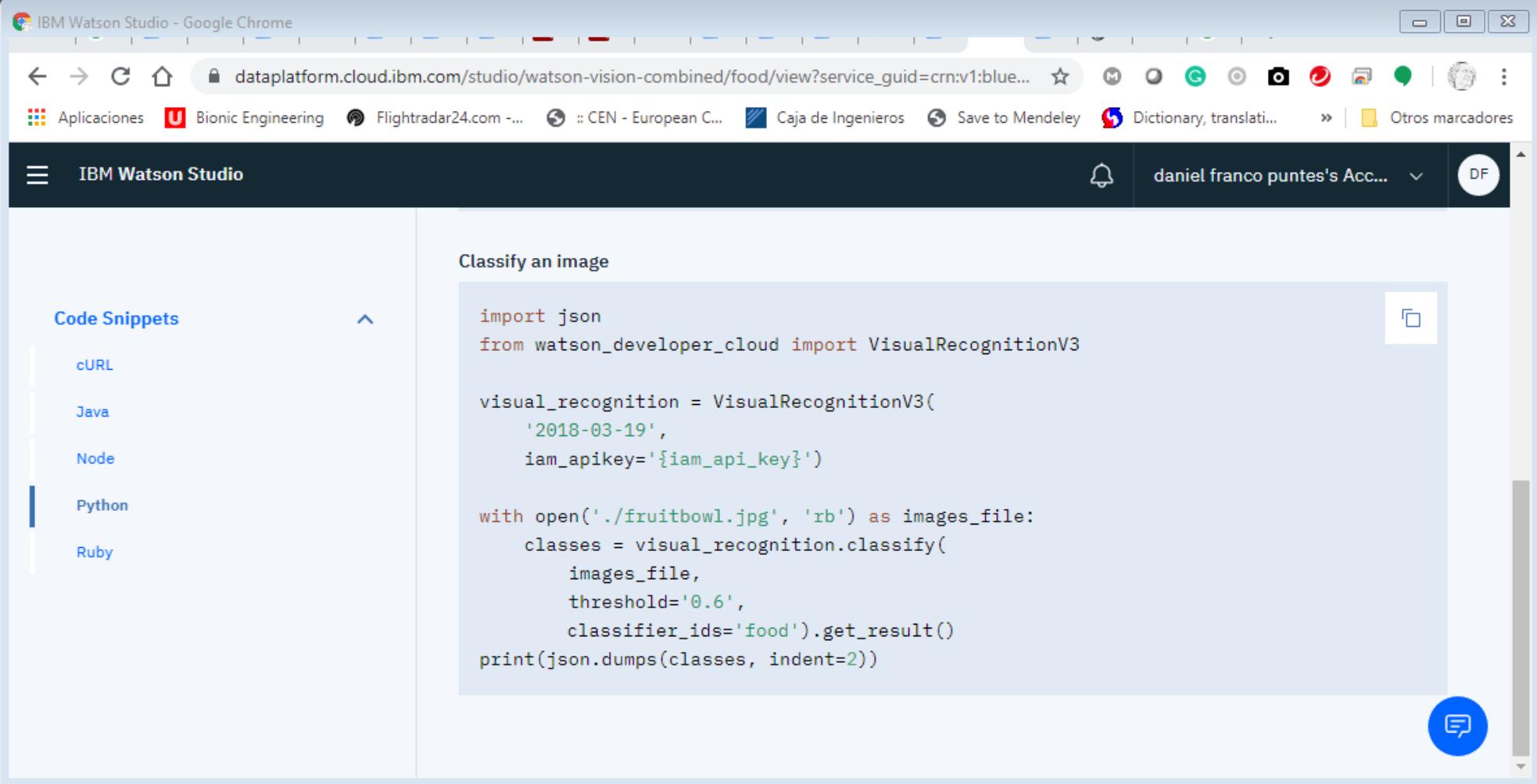
Image Classifier – Python Code Snippets

The screenshot shows a browser window for IBM Watson Studio, specifically the 'Food' service. The URL is dataplatform.cloud.ibm.com/studio/watson-vision-combined/food/view?service_guid=crn:v1:bluemix:public:watson-vision-combi.... The page is titled 'Food' and has tabs for 'Overview', 'Test', and 'Implementation'. The 'Implementation' tab is active. On the left, there's a sidebar titled 'Code Snippets' with options for 'curl', 'Java', 'Node', 'Python', and 'Ruby'. Under 'Python', there are two snippets: one for 'pip' and one for 'Authentication'. The 'pip' snippet contains the command `pip install --upgrade "watson-developer-cloud>=2.4.1"`. The 'Authentication' snippet contains the Python code:

```
from watson_developer_cloud import VisualRecognitionV3

visual_recognition = VisualRecognitionV3(
    version='{version}',
    iam_apikey='{apikey}'
)
```

Image Classifier – Python Code Snippets



The screenshot shows a browser window for IBM Watson Studio in Google Chrome. The URL is dataplatform.cloud.ibm.com/studio/watson-vision-combined/food/view?service_guid=crn:v1:blue.... The page title is "IBM Watson Studio". On the left, there's a sidebar titled "Code Snippets" with options for cURL, Java, Node, Python (which is selected), and Ruby. The main content area displays a Python script for classifying an image:

```
import json
from watson_developer_cloud import VisualRecognitionV3

visual_recognition = VisualRecognitionV3(
    '2018-03-19',
    iam_apikey='{iam_api_key}')

with open('./fruitbowl.jpg', 'rb') as images_file:
    classes = visual_recognition.classify(
        images_file,
        threshold='0.6',
        classifier_ids='food').get_result()
print(json.dumps(classes, indent=2))
```



Live Agenda

 Find Session

Content Levels ▾ Topic ▾ Session Track ▾

March 9, 2023 10:00 AM - 10:30 AM CET

Data: The genesis for invention

Swami Sivasubramanian Vice President for Databases, Analytics, and AI & Machine Learning Services, AWS

Join Swami Sivasubramanian, Vice President, Data and Machine Learning, AWS, as he showcases the latest AWS innovations that can help transform your company's data into meaningful insights and actions for your business. In this keynote, he'll discuss... [More Info](#)

[Add To Calendar](#)[Add to My Agenda](#)

100 - Foundational

Keynote



March 9, 2023 10:35 AM - 11:05 AM CET

Democratizing your organization's data analytics experience

Pragnesh Shah Solutions Architect, AWS | Victory Uchenna Solutions Architect, AWS

AWS analytics services empower data users, such as data scientists, analysts, and business users with diverse technical expertise, across an organization to quickly access, analyze, and gain insights from their data. In this session, learn how AWS can do... [More Info](#)

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200 - Intermediate

Analytics Track



March 9, 2023 10:35 AM - 11:05 AM CET

Self-service analytics with Amazon Redshift Serverless

Ceren Tahtasiz Startup Solutions Architect, AWS

As a startup, get your analytics faster without worrying about data warehouse management and maximizing your utilization. Amazon Redshift Serverless lets you get started in seconds and run data warehousing and analytics workloads at scale... [More Info](#)

[Add To Calendar](#)[Add to My Agenda](#)

300 - Advanced

Start Up Track



March 9, 2023 10:35 AM - 11:05 AM CET

Industrialiser les processus ML en utilisant Amazon SageMaker MLOps

Mariem Kithiri Consultante en IA/ML, Professional Services, AWS

Les outils de MLOps (opérations de ML) permettent d'automatiser et standardiser les processus du cycle de vie ML afin d'industrialiser les modèles ML plus rapidement et maintenir la qualité des modèles en production. Amazon SageMaker ... [More Info](#)

[Add To Calendar](#)[Add to My Agenda](#)

300 - Advanced

Français



March 9, 2023 10:35 AM - 11:05 AM CET

Acelere sus proyectos de ML con herramientas low-code y no-code de Sagemaker

João Moura Arquitecto de Soluciones Especializado IA/ML, AWS

Los proyectos de ML requieren experimentación continua y prototipado rápido para llegar al éxito. Tipicamente estos procesos son largos y costosos. Amazon SageMaker dispone de herramientas no-code y low-code para cada paso de ciclo de vida de... [More Info](#)

[Add To Calendar](#)[Add to My Agenda](#)

200 - Intermediate

Español



March 9, 2023 10:35 AM - 11:05 AM CET

Moderne und effektive Datenmodelle mit Amazon DynamoDB

Ben Freiberg Senior Solutions Architect, AWS

Die Modellierung Ihrer Daten in Amazon DynamoDB erfordert einen anderen Ansatz als die Modellierung in relationalen Datenbanken. Wir stellen Ihnen die wichtigsten Schritte und Grundsätze vor um moderne und effektive Datenmodelle i... [More Info](#)

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200 - Intermediate

Deutsch



March 9, 2023 10:35 AM - 11:05 AM CET

Use cases for maximizing business value from data

Ismail Makhlouf Senior Specialist Solutions Architect - Data Analytics, AWS

LEVEL 200





AWS re:Invent

AWS re:Invent

NOV. 27 – DEC. 1, 2023 | LAS VEGAS, NV

[Watch on demand](#)

HIGHLIGHTS

Catch up with re:Invent



LATEST



Welcome to re:Invent 2020!

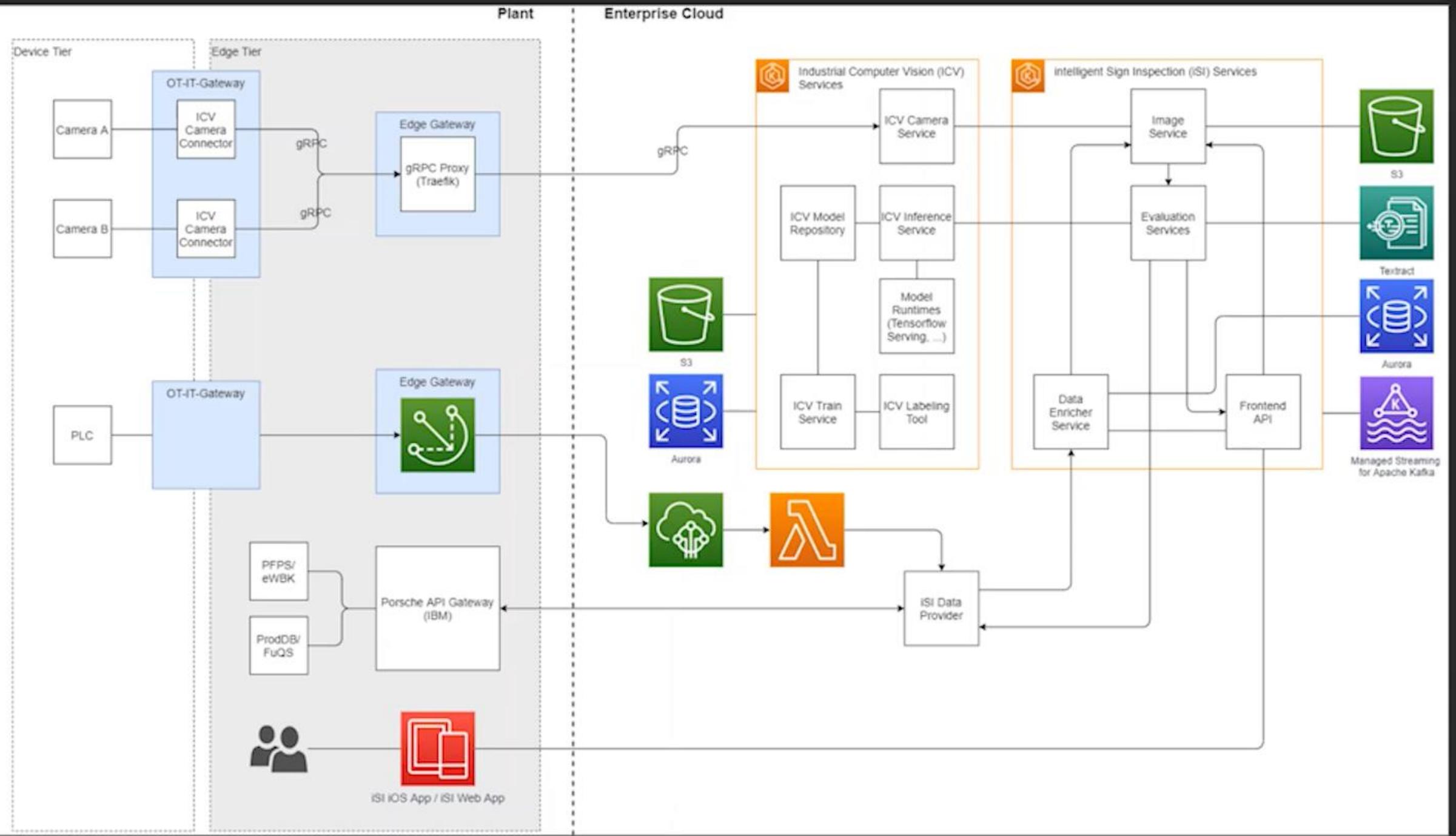
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Join us **virtually?**

If you can't make it to Las Vegas this year, you can register to virtually attend our live keynotes and leadership sessions. In addition, breakout sessions will be offered on demand. Virtual registration is included for all in person attendees.

[Register now](#)



Building a connected factory with Volkswagen

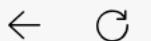
John Vukore
Practice Manager
AMTS

Thomas Heidrich
Product Owner, AI-Based
Computer Vision
Porsche plant Ulmberg

Wim Van Overhaege
Product Owner, AI-Based
Computer Vision
Porsche plant Stutzen



www.ams.com/connected-factory



https://globalazure.net



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Global Azure 2024

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April
18th-
20th
when

6
continents

where

+500
speakers
who

+600
sessions
online + in
person



INICIO

AGENDA

SPONSORS

CONDUCTA

18 - 20 Abril de 2024

#GlobalAzure



GLOBAL AZURE 2024

LIVE FROM SPAIN!

Ya estamos de nuevo con una nueva edición de nuestro evento favorito sobre la plataforma de nube pública Microsoft Azure. Ha pasado un año desde nuestra última edición que como recordarás además de los eventos por streaming, hicimos un evento híbrido con eventos físicos en Madrid, Barcelona y Zaragoza. En esta edición seguimos apostando por los eventos físicos por lo que estaremos presentes de nuevo en estas tres ciudades, y quien sabe si anunciamos alguna proximamente.)

Así que es para nosotros un placer anunciar que...

¡Volvemos a Madrid, Barcelona y también Zaragoza!

La idea es que podamos disfrutar de las charlas de los ponentes y de las sesiones de networking en directo en las tres ciudades, además de hacer algunas sesiones en directo los días previos al evento.

El evento se realizará entre el 18 y 20 de Abril de 2024 y, como siempre, será totalmente gratuito. Iremos contando los detalles de la agenda más adelante, y qué día serán los eventos en cada ciudad. ¡Pero ya puedes reservar la fecha en tu agenda!

En esta edición la organización global también está trabajando de nuevo en la creación de una agenda global única, donde podrás seleccionar entre literalmente cientos de sesiones en directo y en diferido, con un catálogo de sesiones unificado con todas las sesiones que estamos preparando desde cientos de localizaciones alrededor del globo. Puedes consultar el catálogo global de sesiones en la web del [Global Azure](#), incluida la agenda de las sesiones que estamos organizando desde España.

Sesiones en directo en español

Desde el 15 de enero y hasta el 15 de marzo tendremos abierto el Call for Speakers, así que si tienes alguna sesión interesante que proponer, no dejes de enviarla a través del Call for Papers que ahora mismo sigue habilitado para ello.

Con estas sesiones creamos una agenda con todos los tracks en español que iremos actualizando a medida que nos vayan llegando vuestras propuestas. Estate atent@ porque habrán sesiones que te dejarán con la boca abierta.

AGENDA

GLOBAL AZURE 2024 - LIVE FROM SPAIN
(horarios de las sesiones en zona horaria UTC+2)

Los directos del jueves serán retransmitidos por YouTube y Twitch. Las sesiones del Track 1 de Madrid serán retransmítidas en YouTube. No habrá retransmisión de Barcelona y Zaragoza, así que aún estás a tiempo de registrarte y verlo en personal. Puedes pasarte también por el servidor de Discord que hemos habilitado y pasar un buen rato, charlar con los speakers y resolver alguna duda que puedas tener con Azure. Y como no, no te olvides de seguirnos en [Twitter](#) y [LinkedIn](#)!

En estos momentos estamos conformando la agenda, por lo que si tienes alguna propuesta de sesión no dudes en enviárnosla. La idea es una charla que idealmente tenga entre nivel 200 a 400 (200=intermedio; 300=avanzado; 400=experto/hardcore), sobre alguna temática o servicio de Azure dentro de alguno de los tres tracks: DEV, IT y DEVOPS.

[ENVIAR PROPUESTA DE SESIÓN](#)

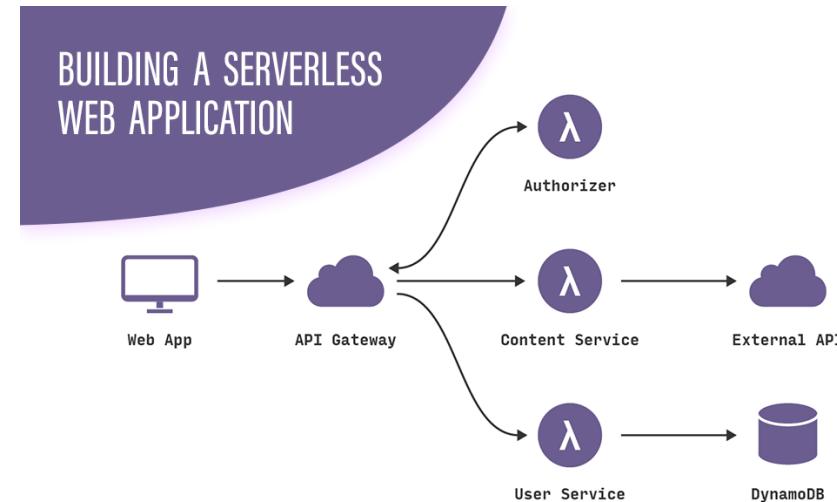
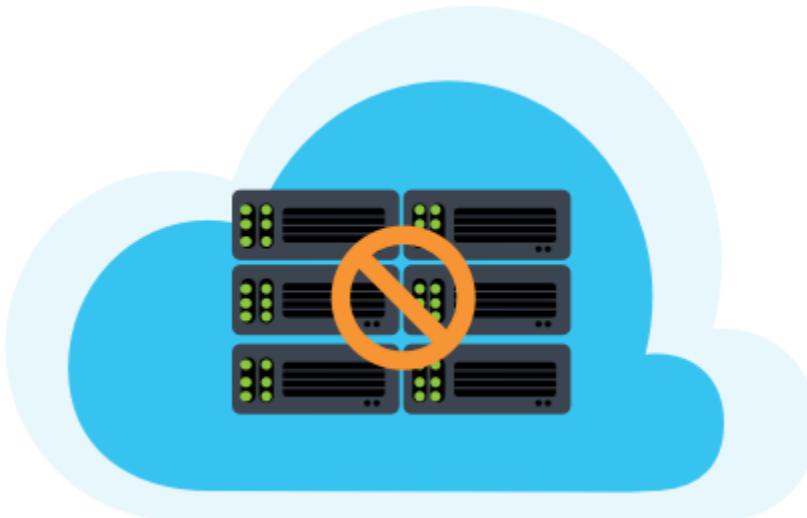


Microsoft Ignite

Seattle, WA | November 15–16, 2023

How Cloud Computing is changing IT world

- Classical System administrator to **Cloud Infrastructure Manager**
 - IaaS
- Classical SW Development to **serverless and microservices**



Traditional deployment and operations

- Configure an instance
- Update OS
- Install application platform
- Build and deploy applications
- Configure automatic scaling and load balancing
- Continuously patch, secure, and monitor servers
- Monitor and maintain applications

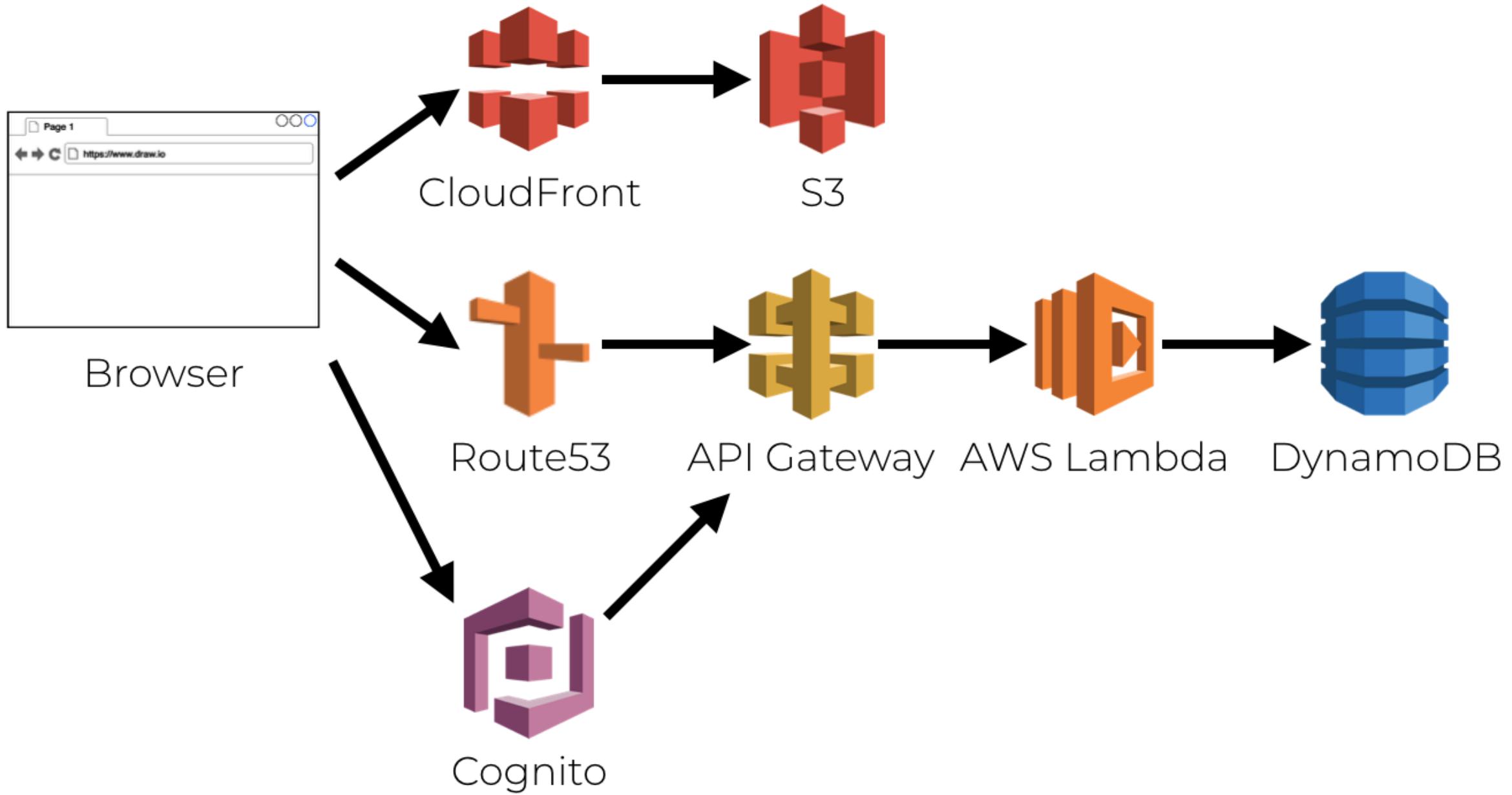
Serverless deployment and operations

- Configure an instance
- Update OS
- Install application platform
- Build and deploy applications
- Configure automatic scaling and load balancing
- Continuously patch, secure, and monitor servers
- Monitor and maintain applications

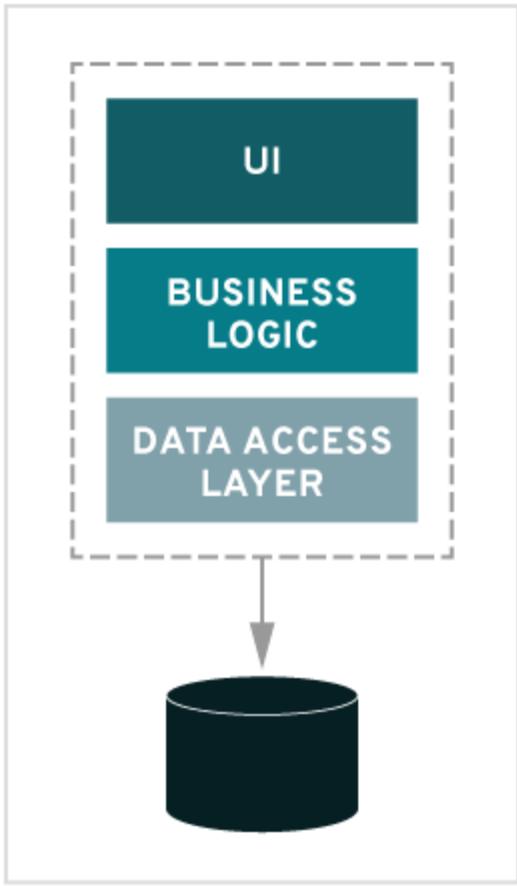


AWS Lambda

- Lets you run code without provisioning or managing servers
- Triggers your code in response to events
- Scales automatically
- Provides built-in code monitoring and logging with Amazon CloudWatch

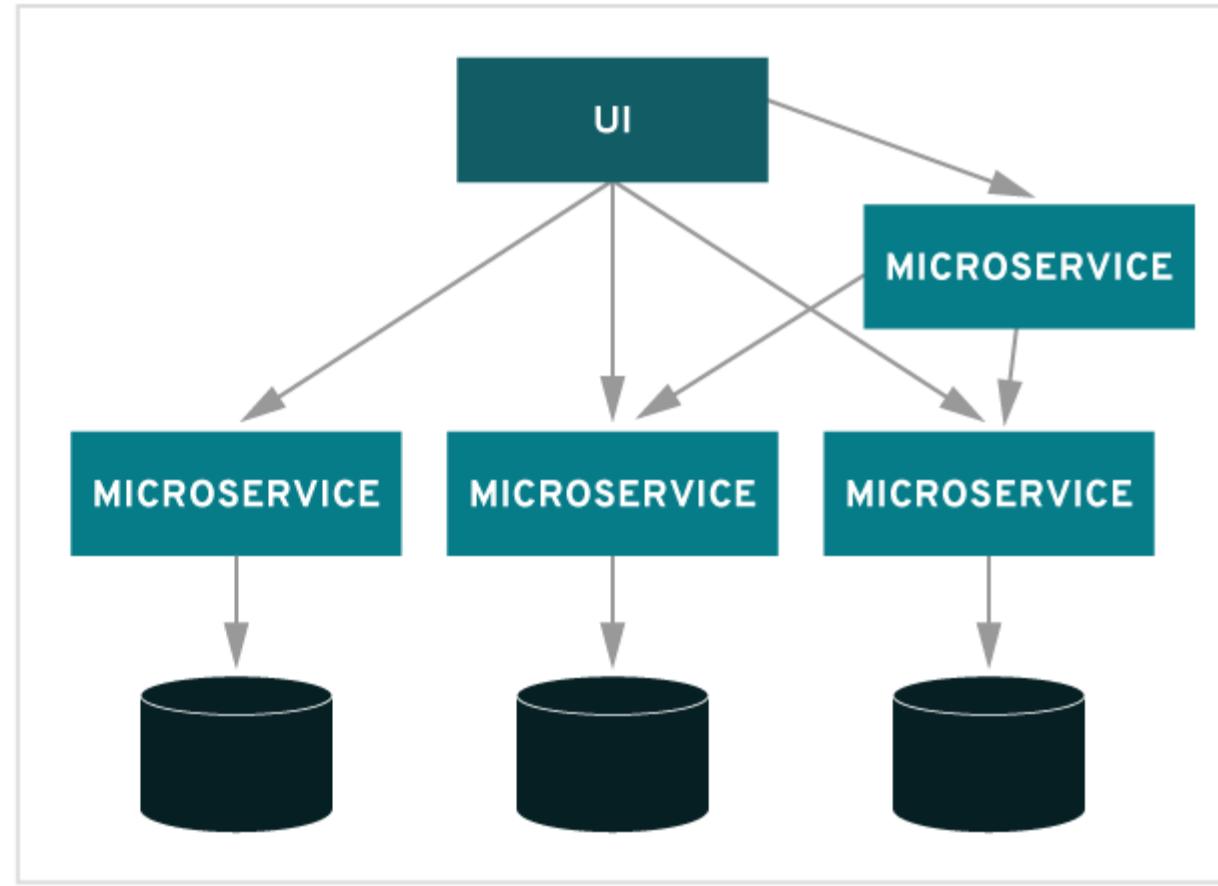


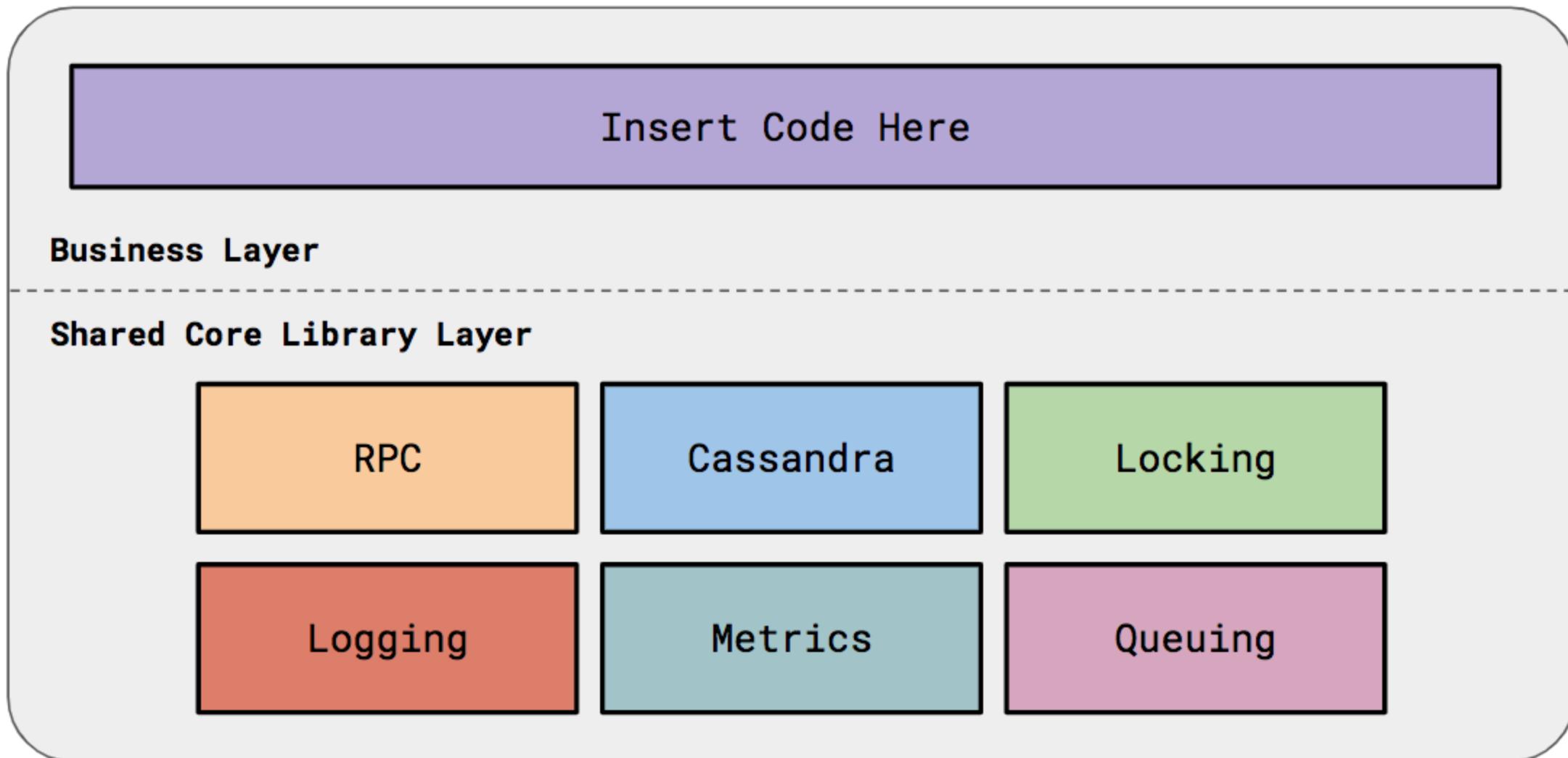
MONOLITHIC



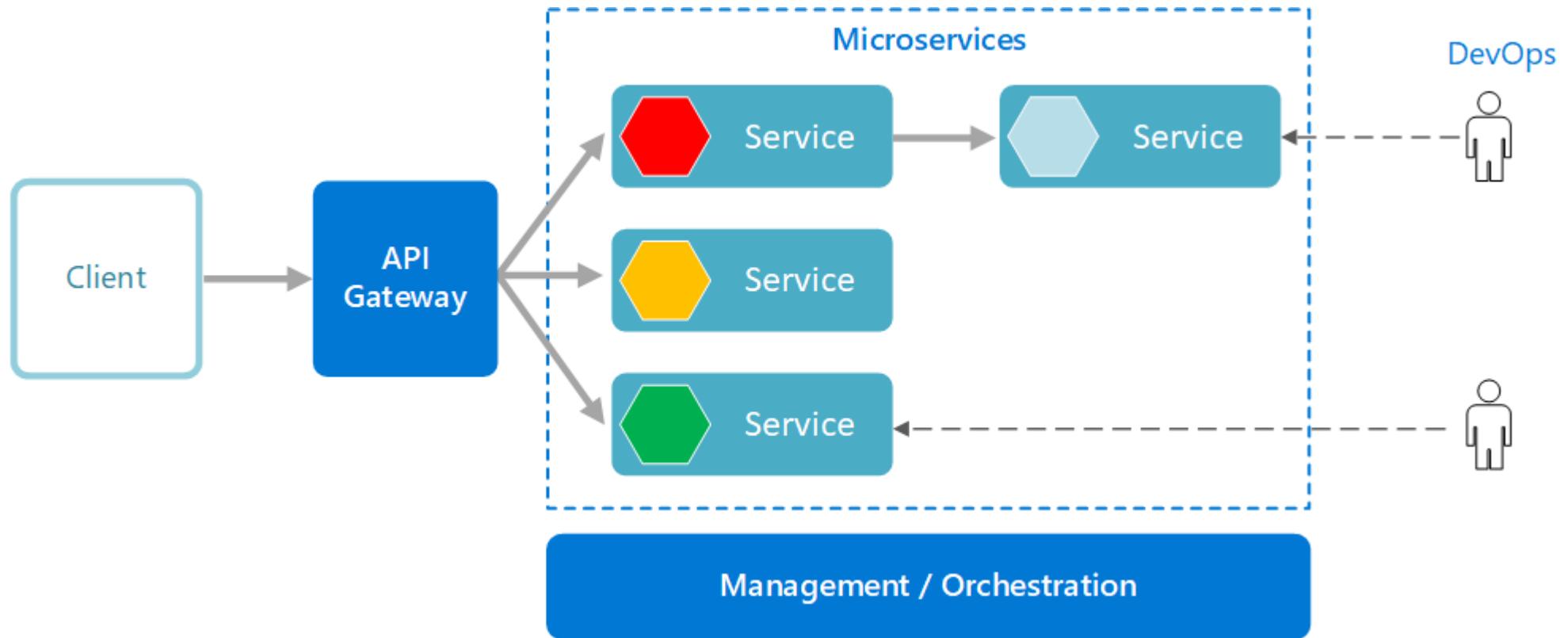
VS.

MICROSERVICES





A microservice





Monzo: Building a Mobile-First U.K. Digital Bank Using Cloud and Microservices Architectures



Monzo
Bank
Banco



Monzo Bank es un banco británico digital con sede en Londres, Reino Unido. Antes de recibir una licencia bancaria, operó a través de una aplicación móvil y una tarjeta prepago de débito, convirtiéndose así en uno de los primeros challenger banks centrados en aplicaciones móviles en Reino Unido. [Wikipedia](#)

Atención al cliente: 00 44 20 3872 0620

Fundación: 2015

Ingresos: 67,2 millones GBP (2020)

Sede central: Londres, Reino Unido

Cantidad de empleados: 1.551 (2019)

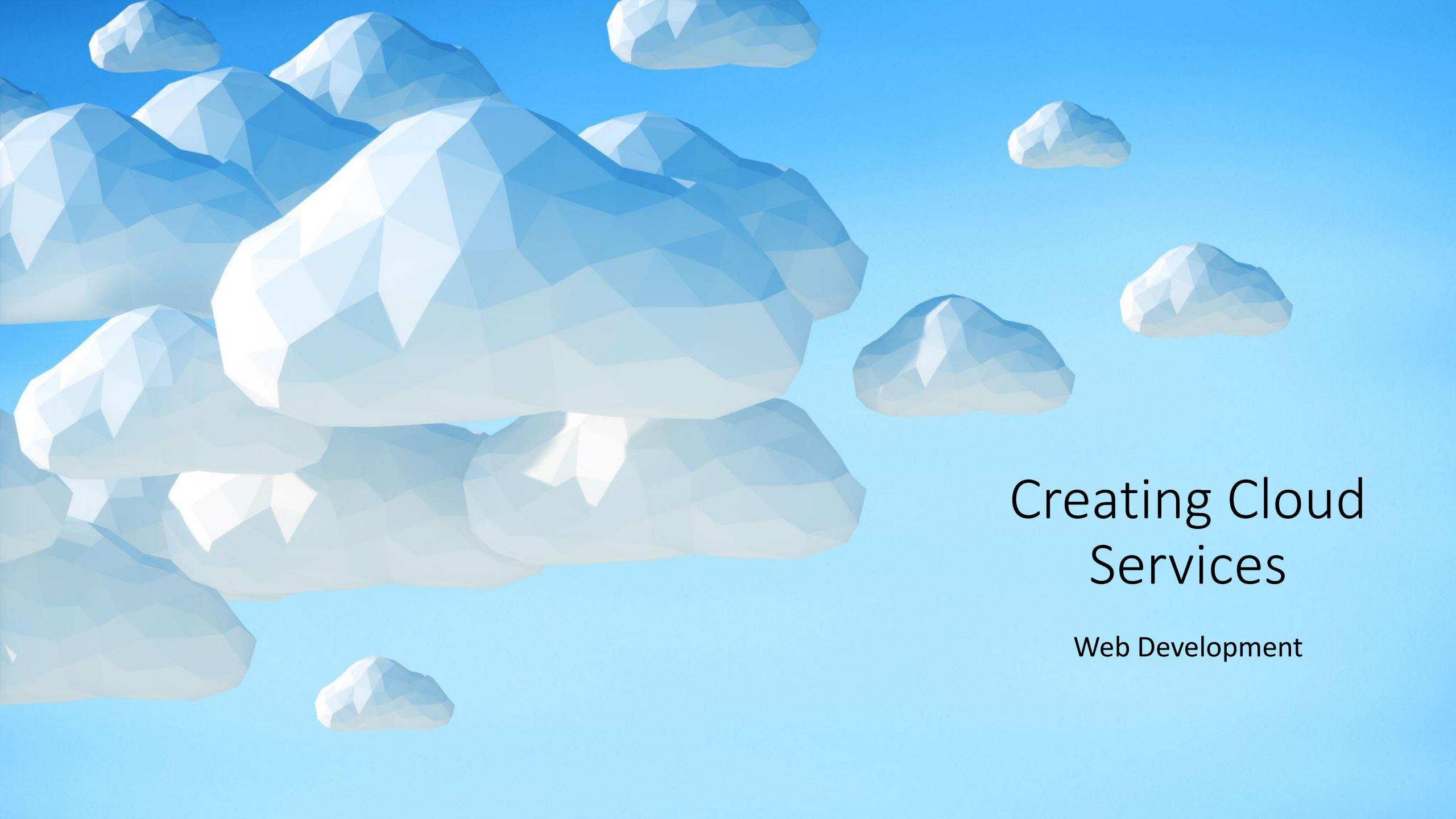
Fundadores: Tom Blomfield, Paul Rippon, Jason Bates, Jonas Huckestein, Gary Dolman



Monzo: Building a Mobile-First U.K. Digital Bank Using Cloud and Microservices Architectures



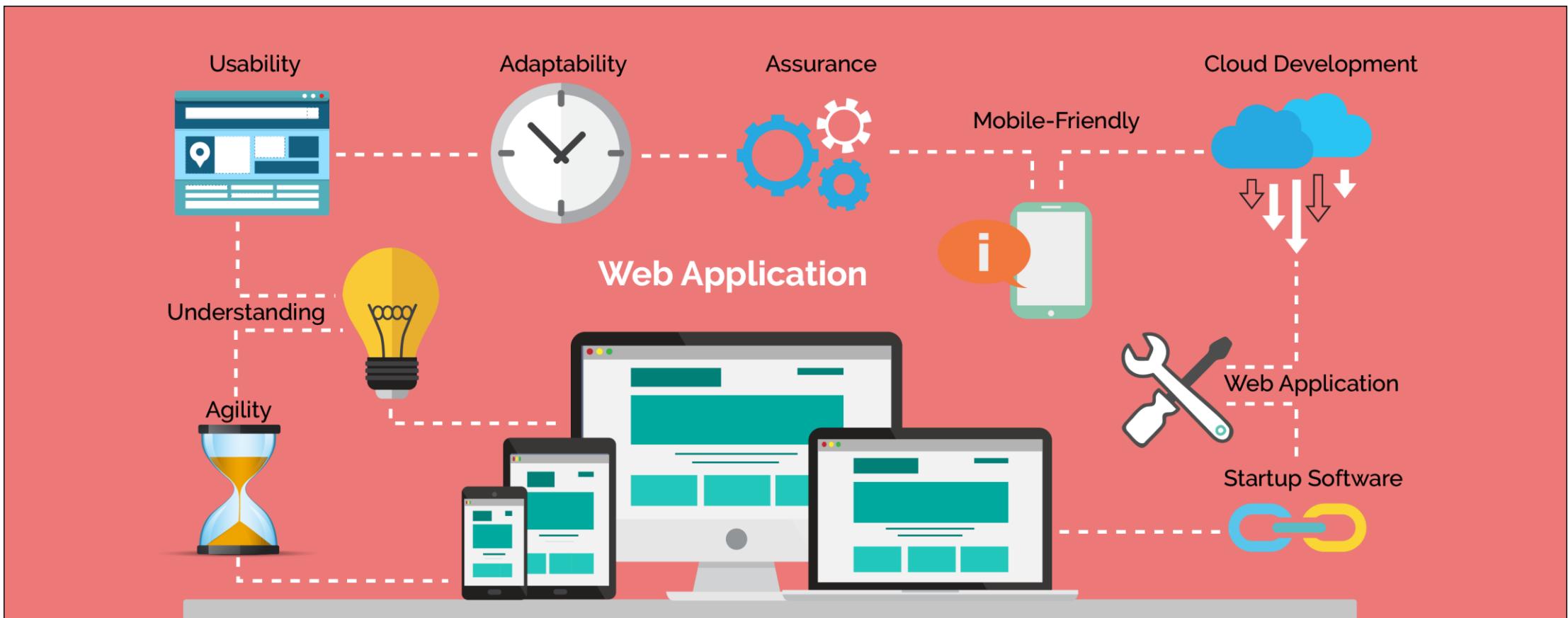
- Monzo runs over 1,500 microservices in production and that number continues to grow.
 - Monzo uses AWS cloud to host its core banking application to leverage scale and flexibility of cloud computing as well as eliminate the guessing game around capacity, provisioning, and infrastructure management.
 - It developed its core banking systems from scratch backed by microservices architecture, running across multiple virtualized servers using container tools including Docker and Kubernetes.
 - Monzo does not have mainframe technology or monolithic applications.
 - The microservices architecture makes its core banking application a collection of small components that can scale independently, communicate synchronously or asynchronously, are event-driven, and have application programming interfaces (APIs). The application is also platform-agnostic for easy interoperability.

The background features a collection of stylized, low-poly clouds composed of triangles in shades of blue and white, set against a solid blue gradient.

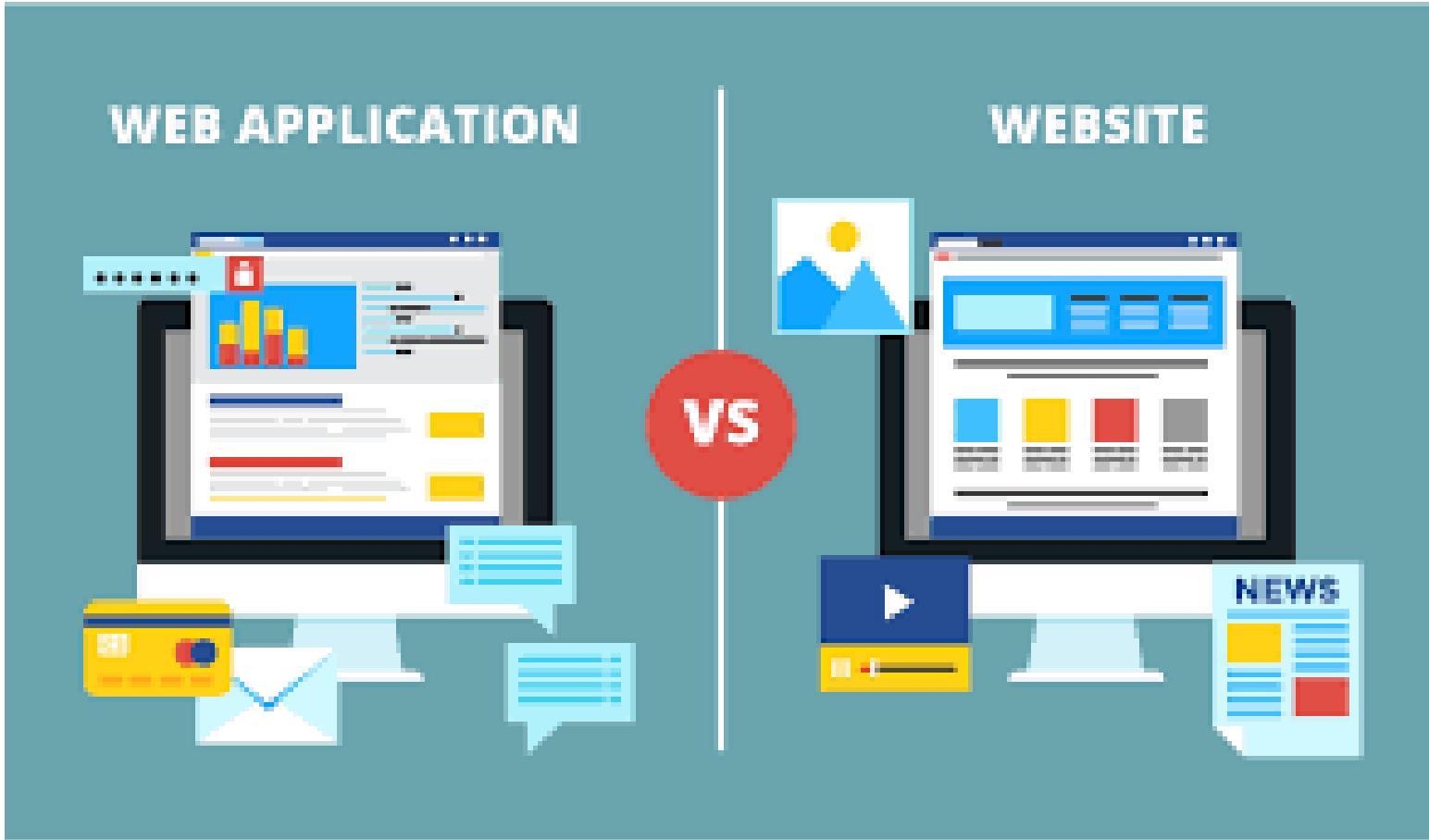
Creating Cloud Services

Web Development

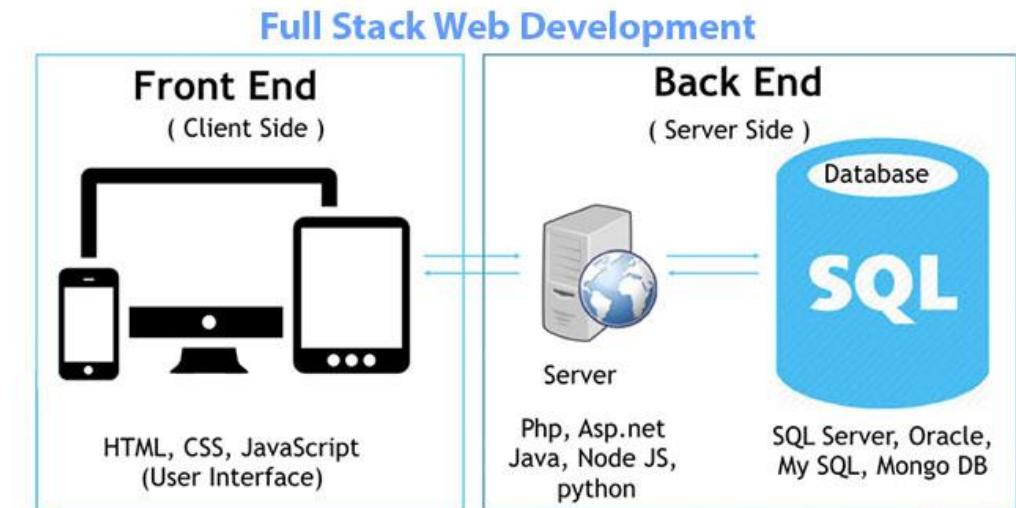
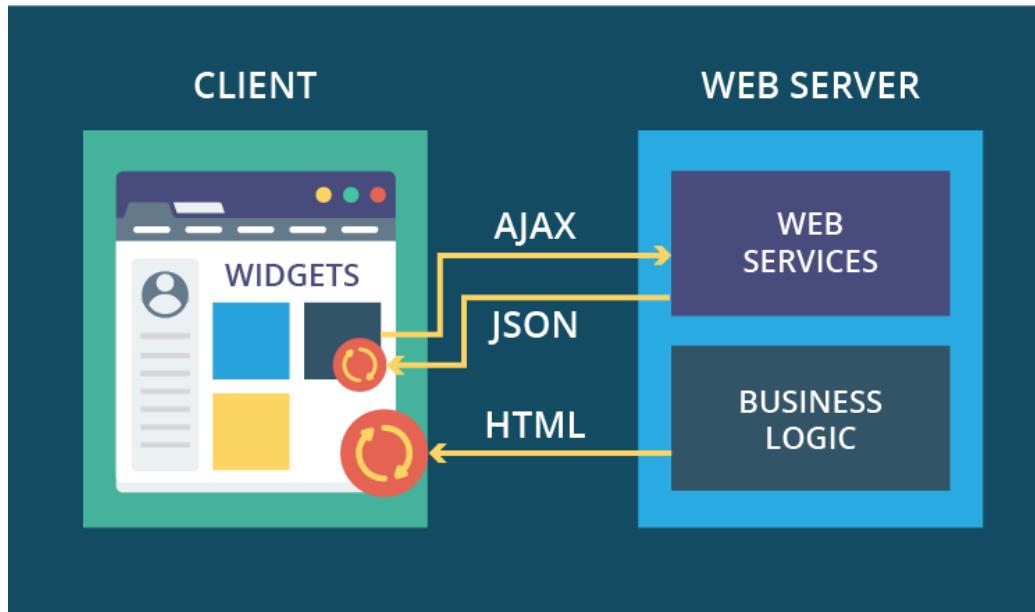
Web applications



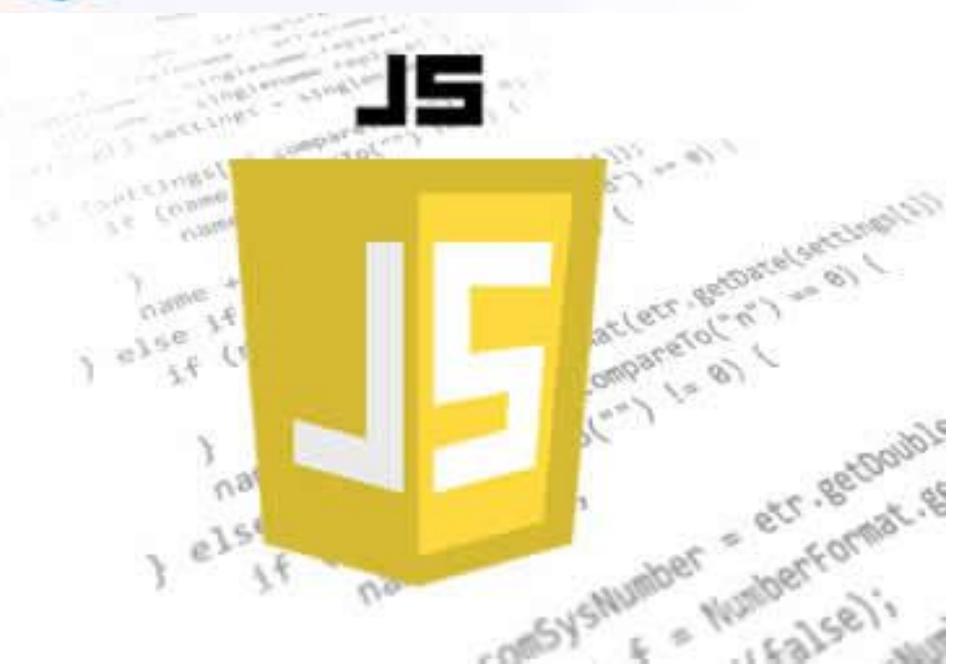
Web App vs. Web Page



Web development



Web development: Front-end

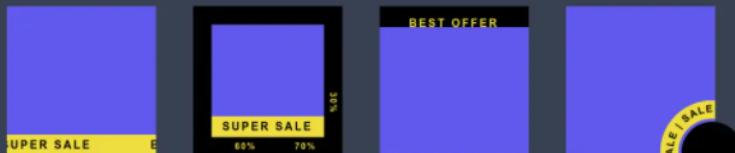


CODEPEN

CREATE

[Pen](#) ▾[Project](#)[Collection](#)[Your Work](#)[Activity](#)[Assets](#)[Pinned Items](#)[Following](#)[Trending](#)[Challenges](#)[Spark](#)[CodePen PRO](#) Search CodePen...[Following](#)[Trending](#)[Your Work](#)

Picked by CodePen

**Sale label**

@BrawadaCom

...

TRAVEL

NEVER STOP TO EXPLORING THE WORLD

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

[EXPLORE](#)**Travel Video Landing Page**

Brad Traversy

...

**Subtle cross**

Giorgos



Picked by CodePen



JavaScript playground

- [CodePen](#)
- [CodeSandbox](#)
- [StackBlitz](#)

The screenshot shows the CodePen website's homepage. The left sidebar has sections like 'CREATE' (Pen, Project, Collection), 'Your Work', 'Activity', 'Assets', 'Pinned Items', and navigation links for 'Following', 'Trending', 'Challenges', and 'Spark'. The main area displays a 'Trending' feed with various projects. One project by 'Sale label' (@BrawadaCom) is highlighted, showing a 'UPPER SALE' banner. Another project by 'Giorgos' shows a 'Subtle cross when hovering on a grid'.

The screenshot shows the CodeSandbox website. On the left, there's a sidebar with 'Template Info' (Vanilla, JavaScript example starter project), 'Environment' (parcel), and 'Files' (src folder containing index.js and styles.css). The main area shows the code for index.js and its output in a browser window. The browser shows a simple 'Hello Vanilla!' page with some explanatory text about Parcel configuration.

```
index.js
import './styles.css';

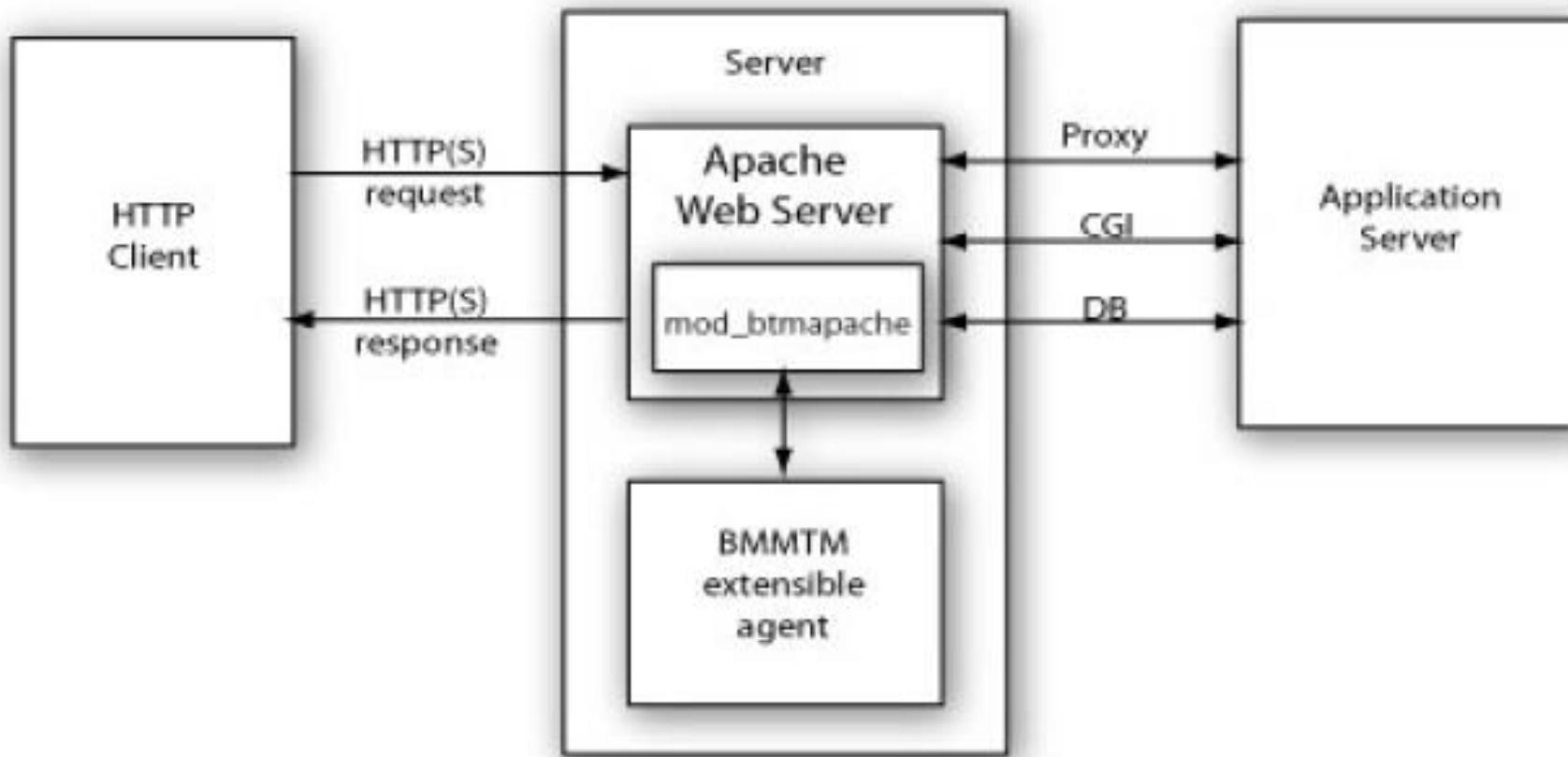
document.getElementById("app").innerHTML =
<h1>Hello Vanilla!</h1>
<div>
  We use the same configuration as Parcel
  info about Parcel
  <a href="https://parceljs.org" target="_blank">here</a>
</div>
;
```

The screenshot shows the StackBlitz website. It features a 'CREATE A NEW PROJECT' section with icons for various frameworks: Angular, React, Vue, TypeScript, Ionic, RxJS, JavaScript, Static, Svelte, FAST, Angular JS, Ignite UI, KendoReact, and Wijmo. Below this is a 'Projects' section listing two items: 'angular-ivy-a4wzbu' (Angular) and 'js-ptd1yk' (JavaScript). The bottom of the page includes links for 'Terms of Use', 'Privacy Policy', and copyright information.

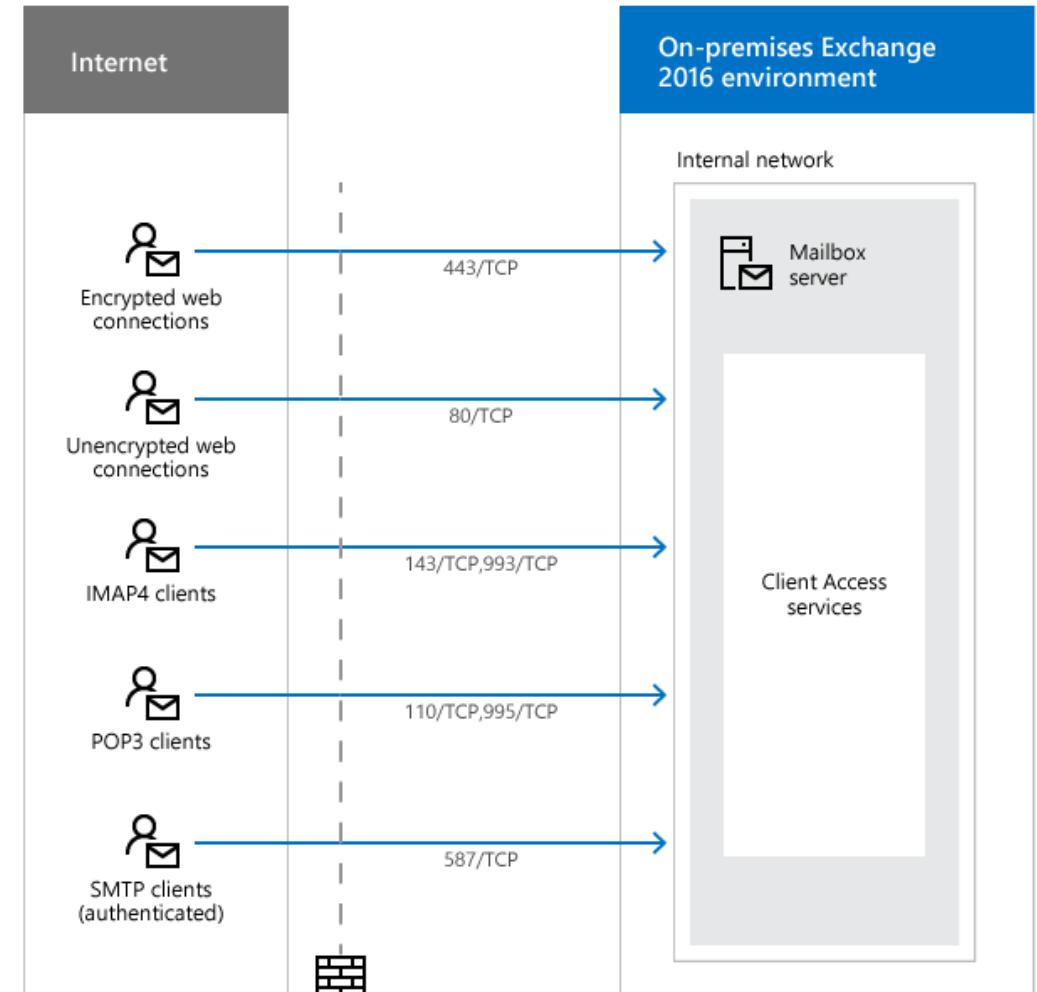
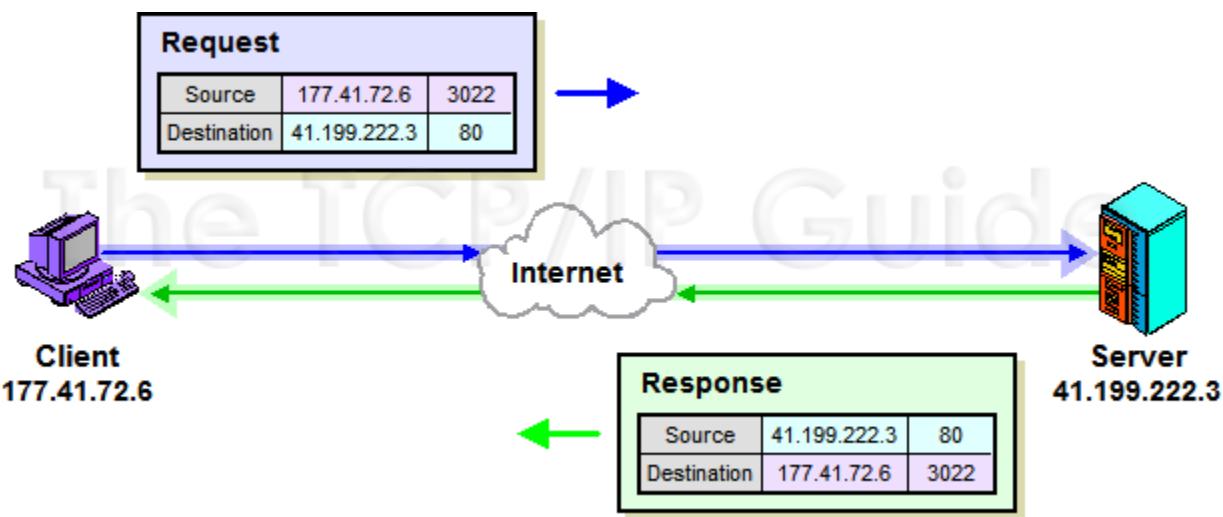
Web development: Back-end



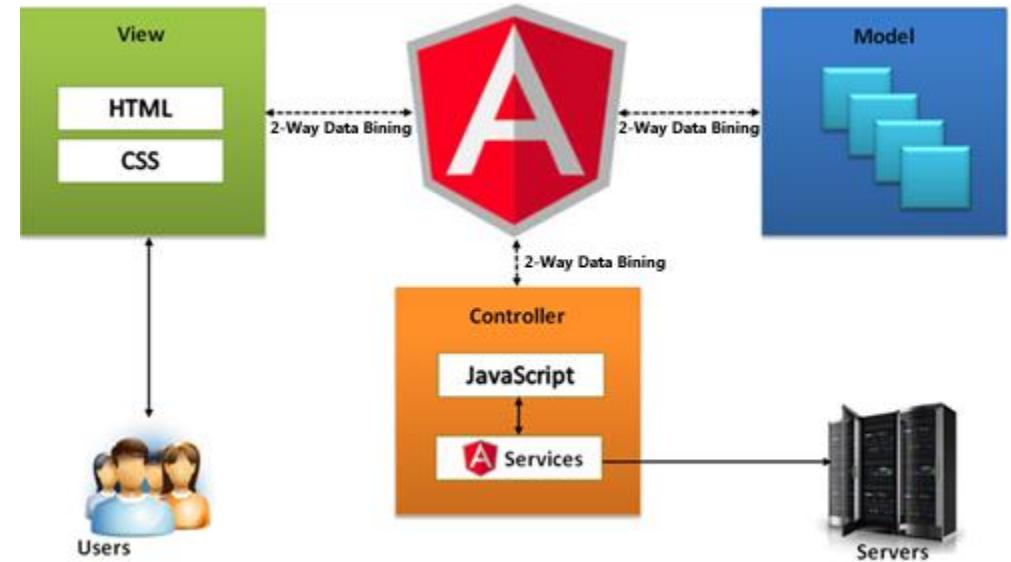
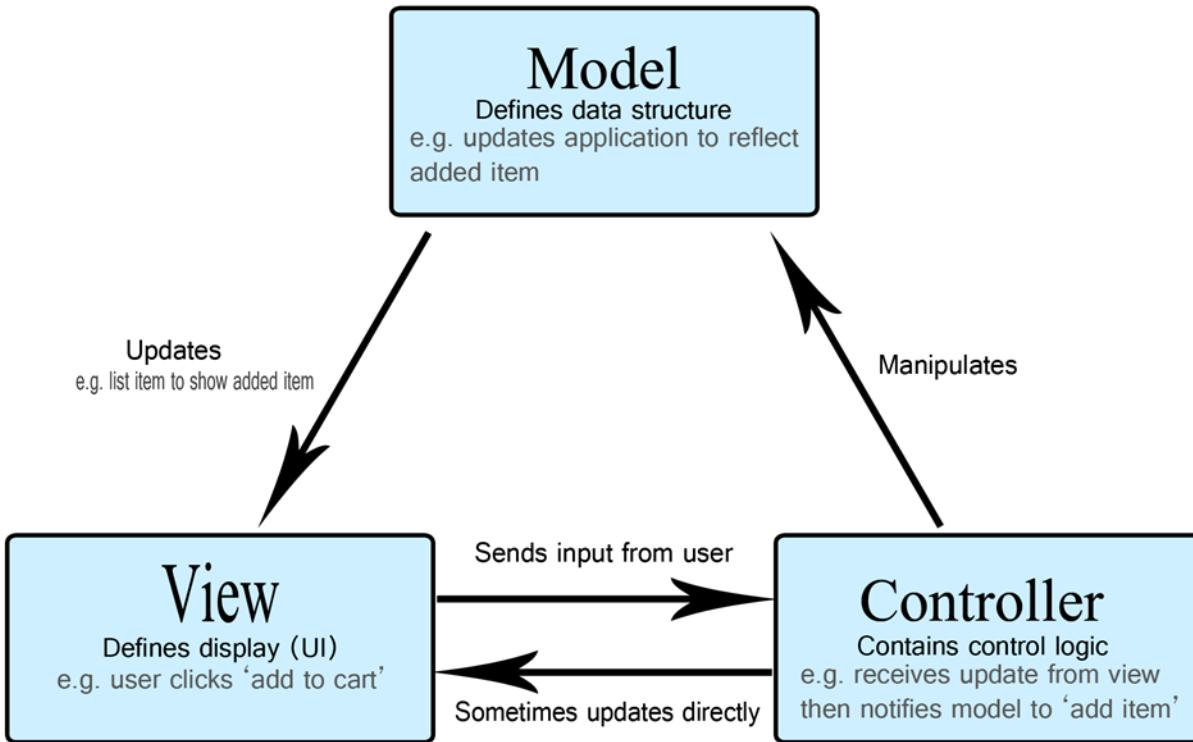
Apache Web Server



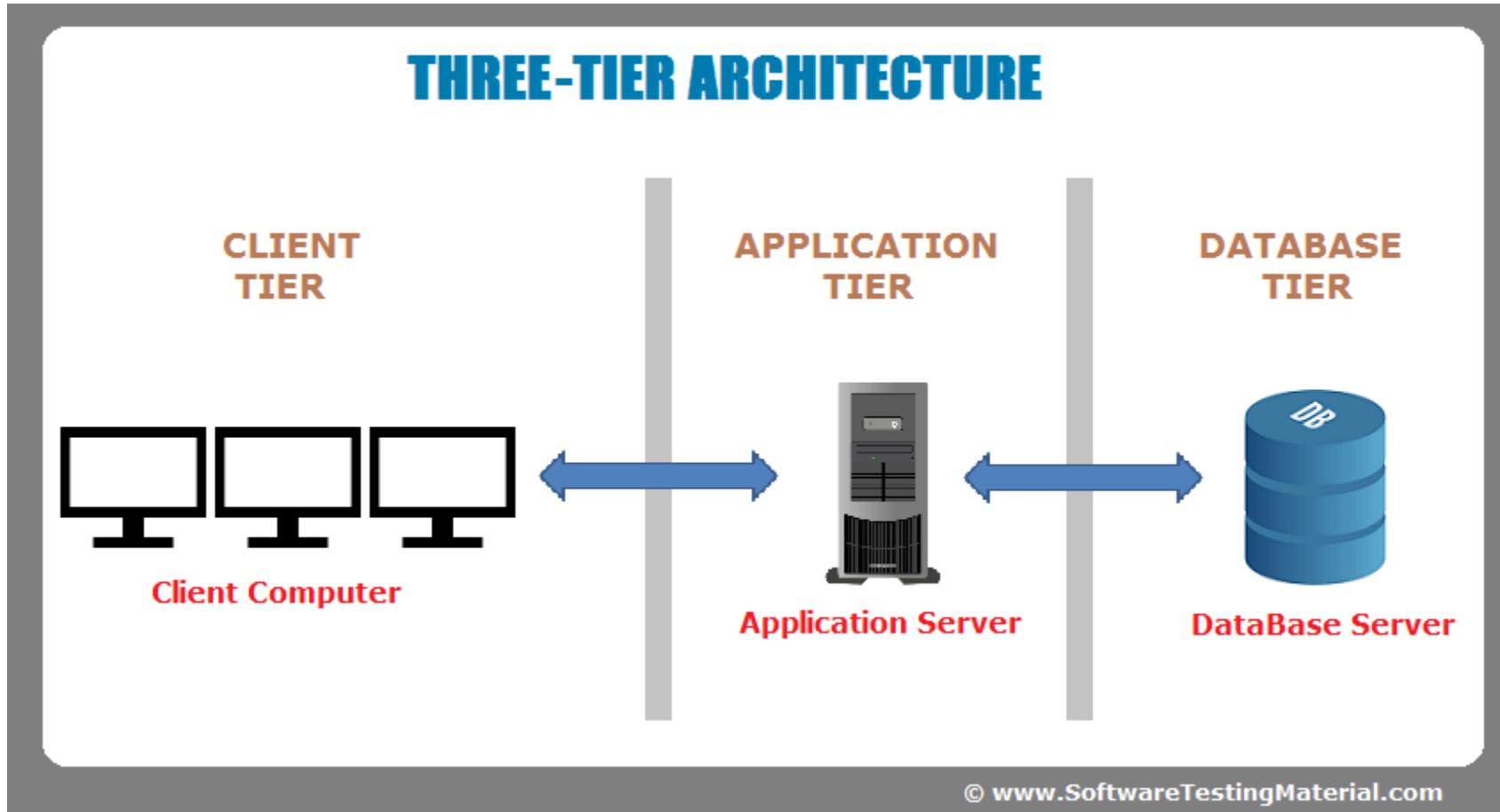
Communication Ports



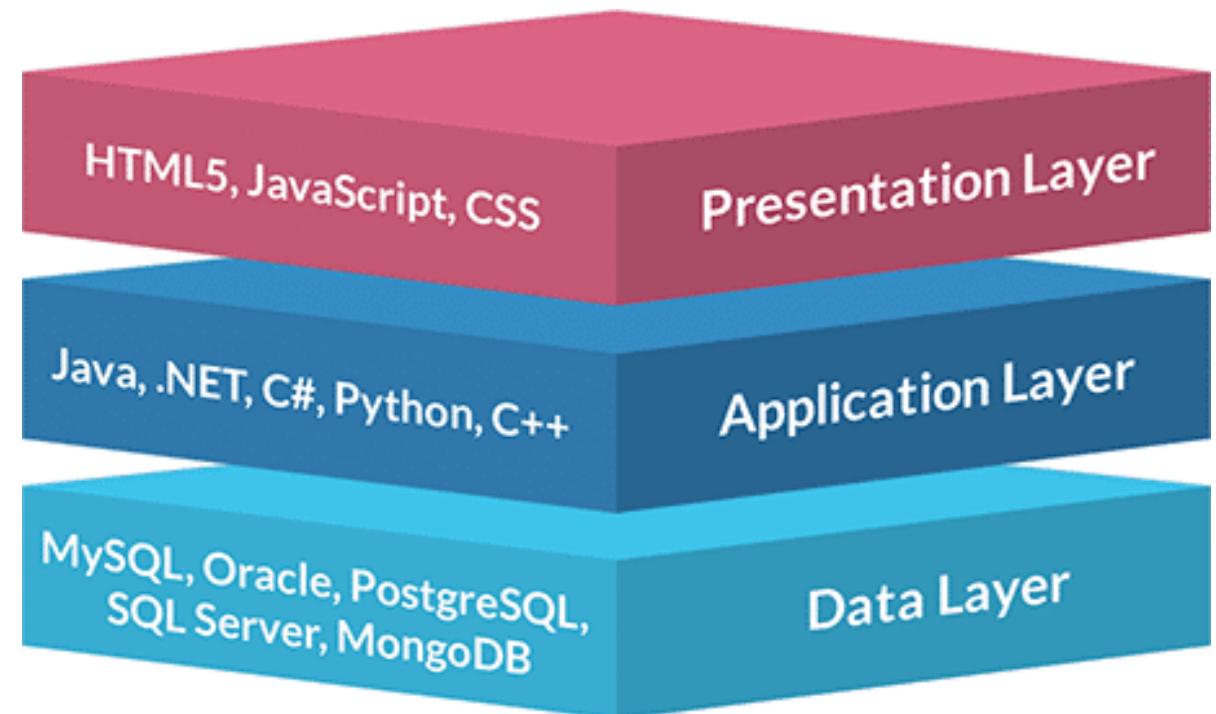
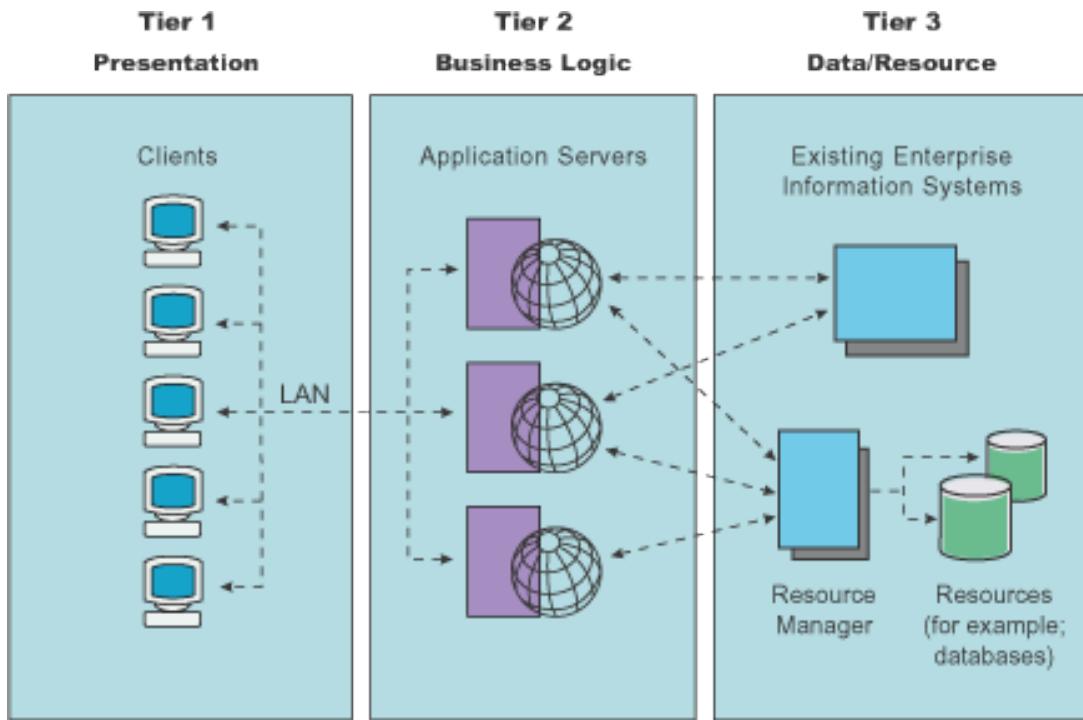
Model View Controller (MVC)



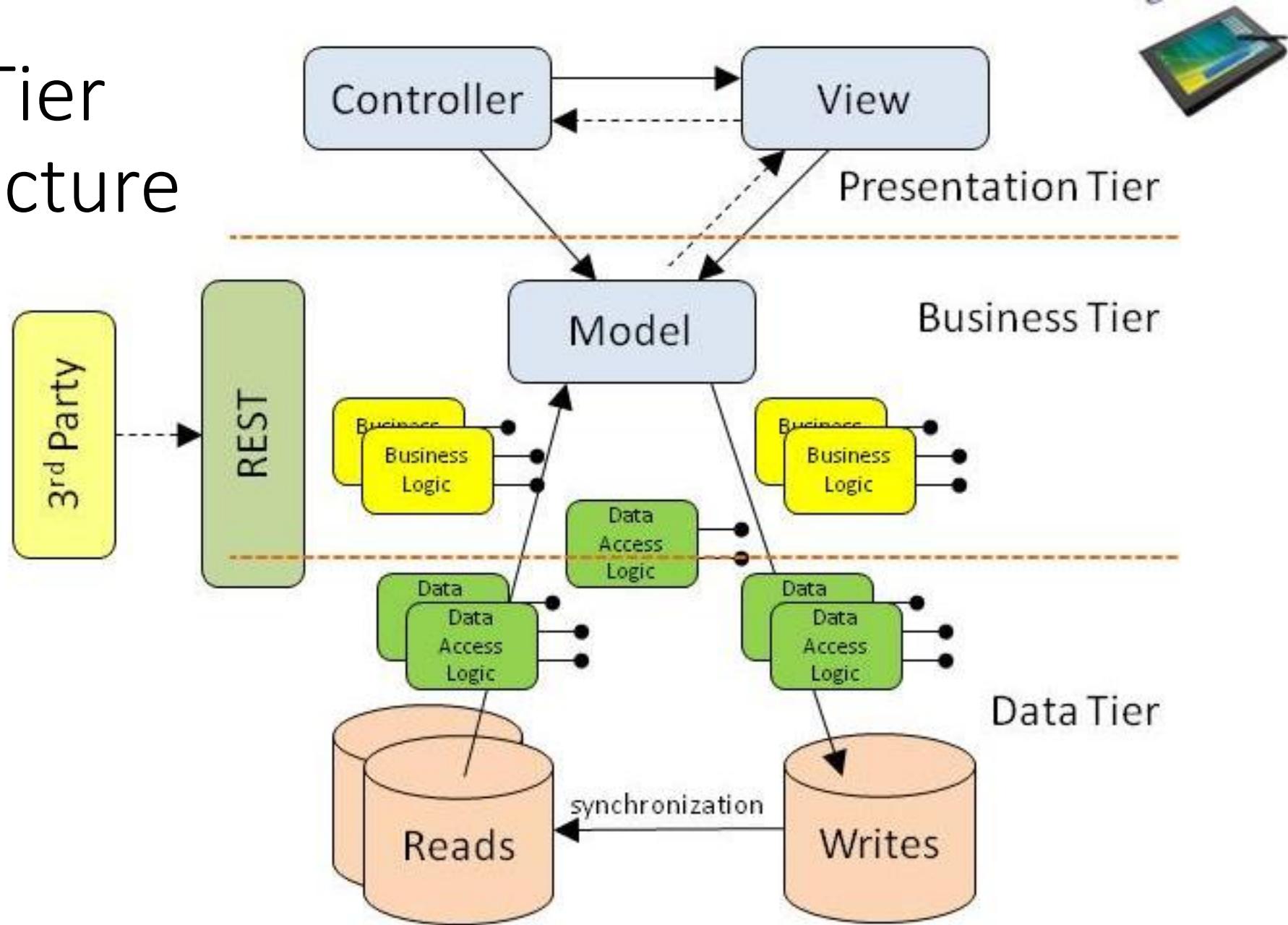
Three Tier Architecture



Three Tier Architecture



Three Tier Architecture



Web Development Frameworks



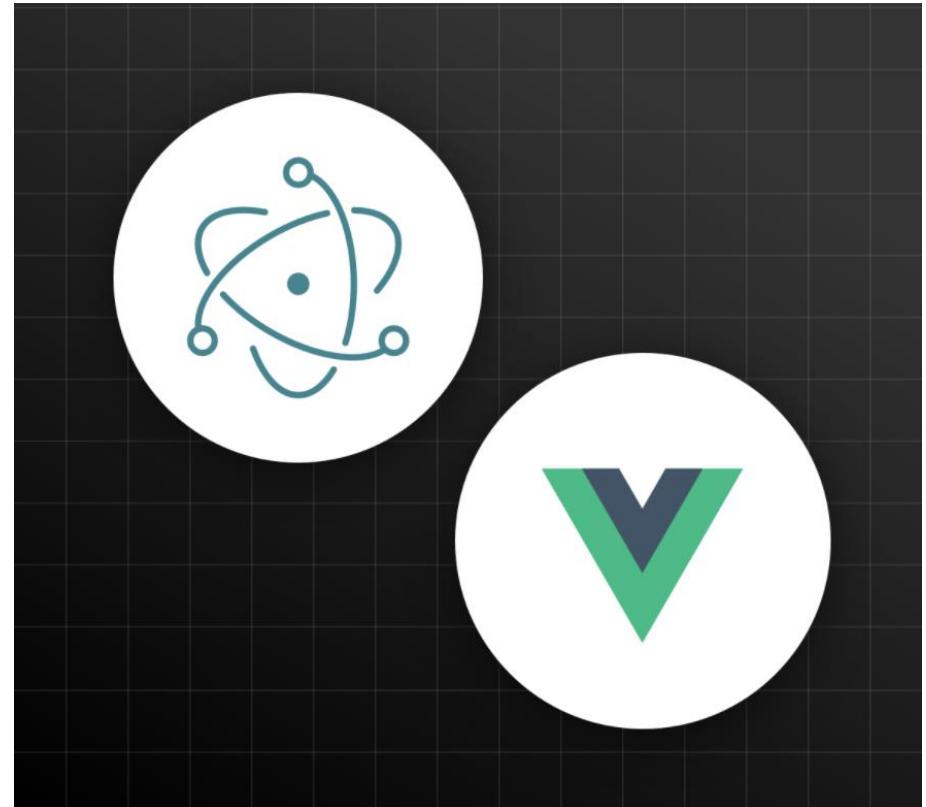
Using appropriate framework is essential for a developer because it saves an important time and efforts for building an app.

Modern Django

- Modern Django — Part 0: Introduction and Initial Setup
 - <https://medium.com/@djstein/modern-django-part-0-introduction-and-initial-setup-657df48f08f8>
- Modern Django — Part 1: Project Refactor and Meeting the Django Settings API
 - <https://medium.com/@djstein/modern-django-part-1-project-refactor-and-meeting-the-django-settings-api-d2784efb606f>
- Modern Django — Part 2: REST APIs, Apps, and Django REST Framework
 - <https://medium.com/@djstein/modern-django-part-2-rest-apis-apps-and-django-rest-framework-ea0cac5ab104>

Electron and Vue.js

- [Electron Tutorial: Building Modern Desktop Apps with Vue.js \(auth0.com\)](#)
 - how to leverage Vue.js and Electron to build and secure modern desktop applications
- [Microsoft Teams se pasa a WebView2 para ser más rápida \(microsofters.com\)](#)
- [Microsoft Teams 2.0 will use half the memory, dropping Electron for Edge Webview2 – Tom Talks](#)



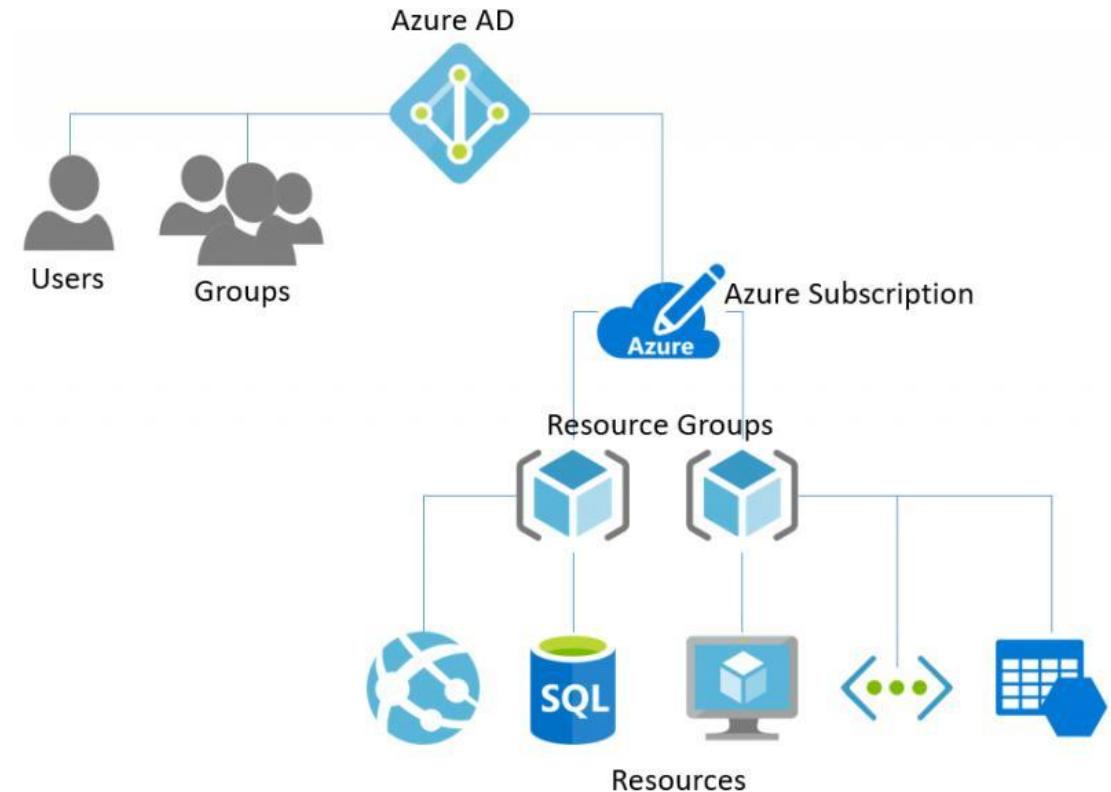
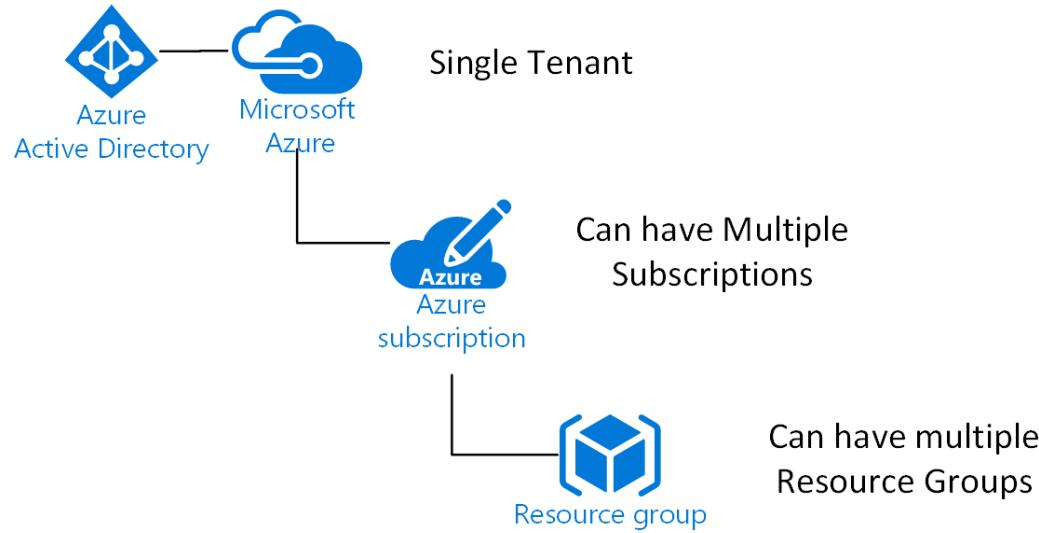
Flask micro web framework



- **Flask** is a micro web framework written in Python.
 - It is classified as a microframework because it does not require particular tools or libraries.
 - Flask supports extensions that can add application features as if they were implemented in Flask itself.
 - Extensions exist for
 - object-relational mappers,
 - form validation,
 - upload handling,
 - various open authentication technologies and
 - several common framework related tools.

Azure Cloud

- Tenant-Account, Suscription, Resource Group, Resource
- Azure Active Directory



What is Azure CLI?

- CLI: Command Line Interface
 - The Azure command-line interface (Azure CLI) is a set of commands used to create and manage Azure resources.
 - Use CLI:
 - On Cloud
 - Locally
- Azure use
 - Web Access
 - Cloud CLI
 - Local CLI
 - Visual Studio Code



Tutorial 1-Command Line: Deploy Python web app to Azure App Service

- **Create an Azure subscription:**
 - [sign up now](#) for a free account
- **Install the following SW:**
 - A Python environment
 - [Python](#)
- **Install the [Azure CLI](#)**
 - allows to run commands in any shell to provision and configure Azure resources.
- **Open a terminal window (PowerShell) and check your Python version is 3.6 or higher**
 - `py -3 --version`

Tutorial 1-Command Line: Deploy Python web app to Azure App Service

- Check that your Azure CLI version is 2.0.80 or higher
 - az –version
- Sign in to Azure through the CLI
 - az login
- Clone the sample
 - git clone <https://github.com/Azure-Samples/python-docs-hello-world>
- Navigate into in the python-docs-hello-world folder
 - cd python-docs-hello-world

- **Create a virtual environment and install dependencies**
 - `py -m venv .venv`
 - `.venv\scripts\activate`
 - `pip install -r requirements.txt`
- Type in the terminal:
 - `flask run`
- Open a new window in your web browser and access your app at:
 - `http://127.0.0.1:5000/`

Tutorial 1-Command Line: Deploy Python web app to Azure App Service

- Open a web browser and go to the sample app at
 - `http://localhost:5000/`
- In your terminal window, press **Ctrl+C** to exit the development server
- **Deploy the sample**
 - `az webapp up --sku F1 --name <app-name>`
- Browse to the deployed application in your web browser at the URL
 - `http://<app-name>.azurewebsites.net`

Tutorial 1-Command Line: Deploy Python web app to Azure App Service

- Modify app.py
- Watch logs in PowerShell
 - az webapp log tail
- Watch logs in Azure portal
 - Manage your app in the options
 -  Log Stream

Tutorial 1b-Command Line: Deploy Python web app to Azure App Service

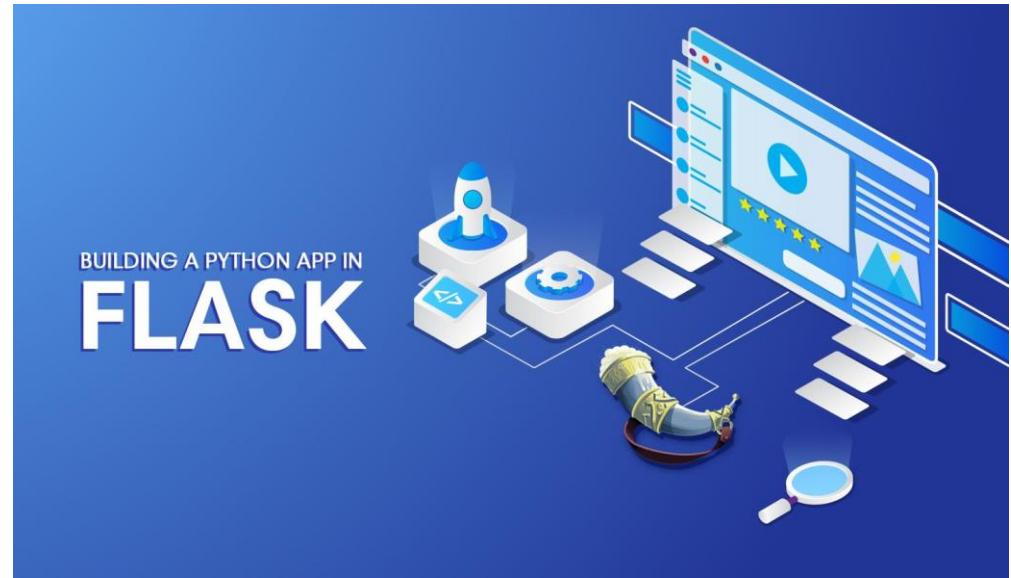
- git clone <https://github.com/Azure-Samples/msdocs-python-flask-webapp-quickstart>
- cd msdocs-python-flask-webapp-quickstart
- py -m venv .venv
- .venv\scripts\activate
- pip install -r requirements.txt
- flask run
- Browse to the sample application at <http://localhost:5000> in a web browser.

Tutorial 1-VSC: Deploy Python web app to Azure App Service

- **Create an Azure subscription:**
 - [sign up now](#) for a free account
- **Install the following SW:**
 - A Python environment
 - [Python](#)
 - Install Git
 - <https://git-scm.com/downloads>
 - Visual Studio Code with the Azure App Service extension.
 - [Visual Studio Code](#).
 - install the [Azure App Service](#) extension,
 - install the [Azure Storage extension](#)
 - Visual Studio Code [Python](#) extension.
- **Sign in to Azure**
 - sign into your Azure account by navigating to the **Azure** explorer

Deploy Minimal Flask app

- In file explorer
 - Create a new folder,
- IN Visual Studio Code:
 - open the folder,
 - add a file named *hello.py*
 - *Type this code in the hello.py file:*
 - `from flask import Flask`
 - `myapp = Flask(__name__)`
 - `@myapp.route("/")`
 - `def hello():`
 - `return "This is my first web app, running locally"`

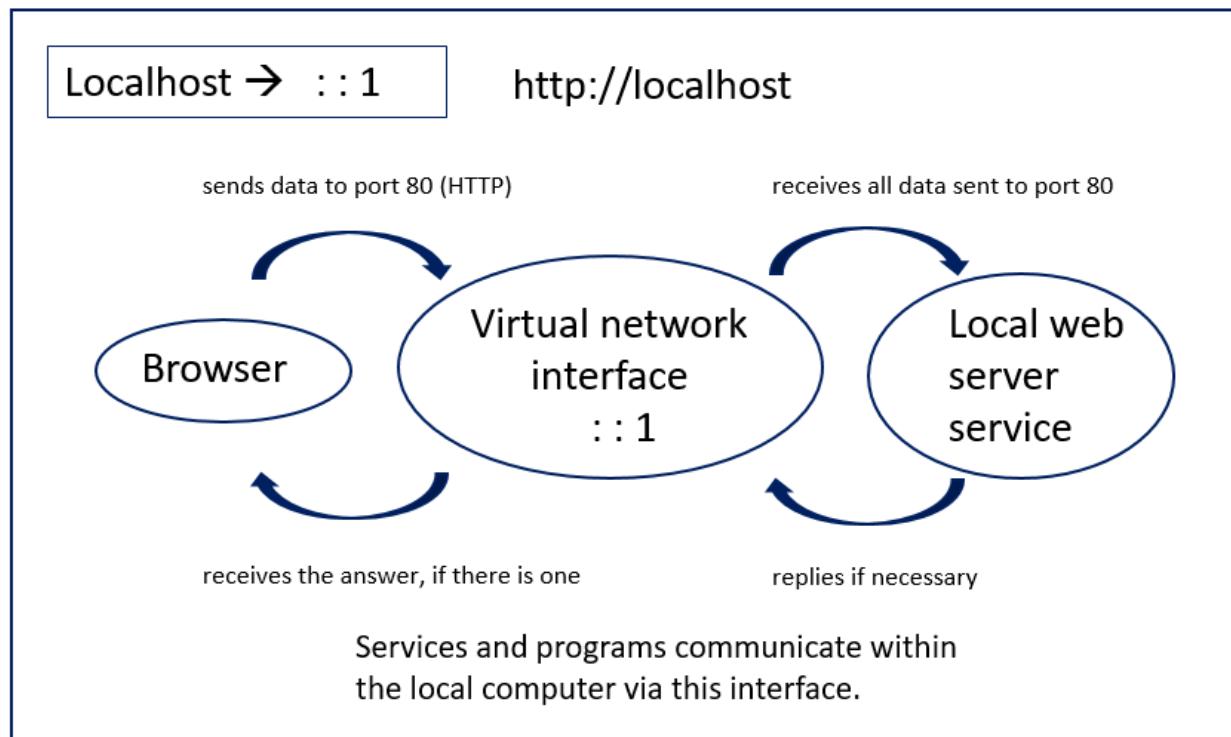
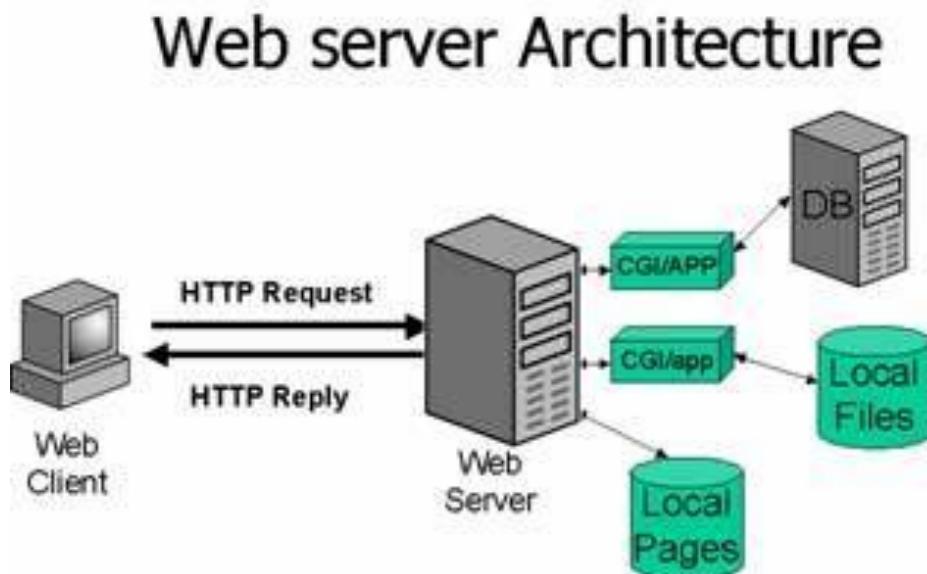


Deploy Minimal Flask app

- Create a file named *requirements.txt* with the following contents:
 - Flask==1.1.1
- Open a New Terminal
- Change to Git Bash
- Type in the terminal:
 - `export FLASK_APP=hello:myapp`
 - `flask run`
- Open a new window in your web browser and access your app at:
 - `http://127.0.0.1:5000/`

Deploy Minimal Flask app

- What happened?
- Can you Access your web app from your mobile phone typing <http://127.0.0.1:5000/>
 - Why?



Deploy Minimal Flask app

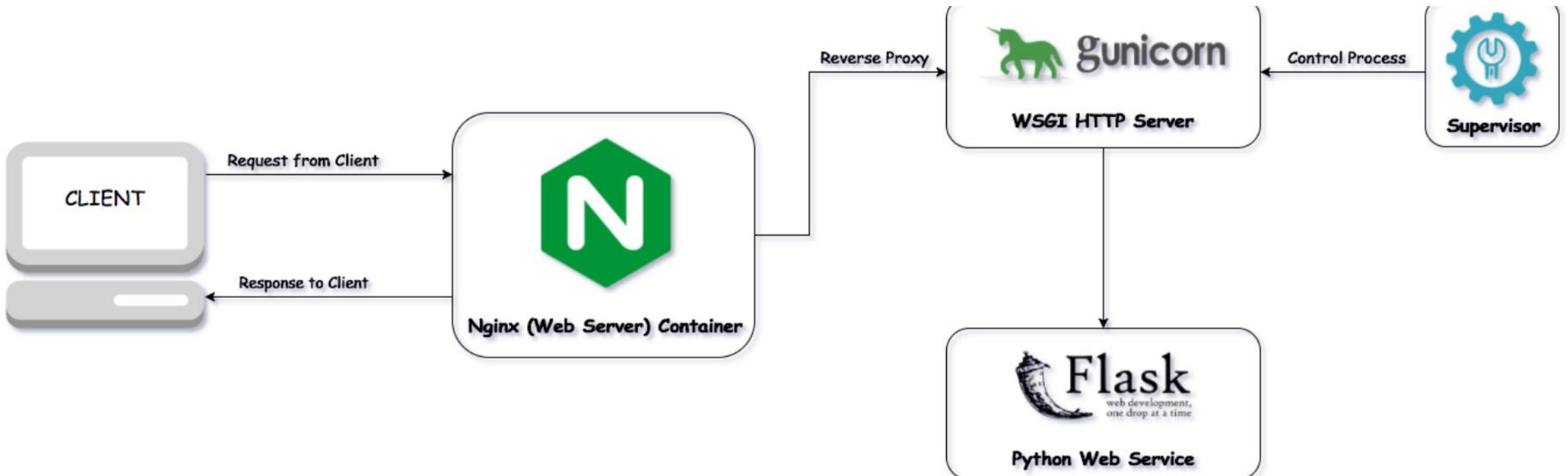
- In computer networking, **localhost** is a **hostname** that means *this computer*. It is used to access the network services that are running on the host via the **loopback** network interface. Using the loopback interface bypasses any local **network interface** hardware.
- A locally installed **website** may be accessed from a Web browser by the **URL** `http://localhost` to display its home page.
- The name **localhost** normally resolves to the **IPv4** loopback address `127.0.0.1`

Deploy your app to Azure Cloud

- In Visual Studio Code:
 - **Azure: App Service** explorer,
 - select the + command to create a new App Service
 - Enter a name for your app
 - Select **Python 3.8** as the runtime.
 - App Service,
 - expand the App Service
 - right-click **Application Settings**,
 - select **Open in Portal**
 - Azure portal,
 - sign in if necessary
- **Configuration** page,
 - select **General settings**,
 - **Stack settings > Startup Command**,
 - Type “gunicorn --bind=0.0.0.0 --timeout 600 hello:myapp”
 - select **Save**.



NginX –Gunicorn Web Server



- <https://stackshare.io/stackups/apache-httpd-vs-gunicorn-vs-nginx>

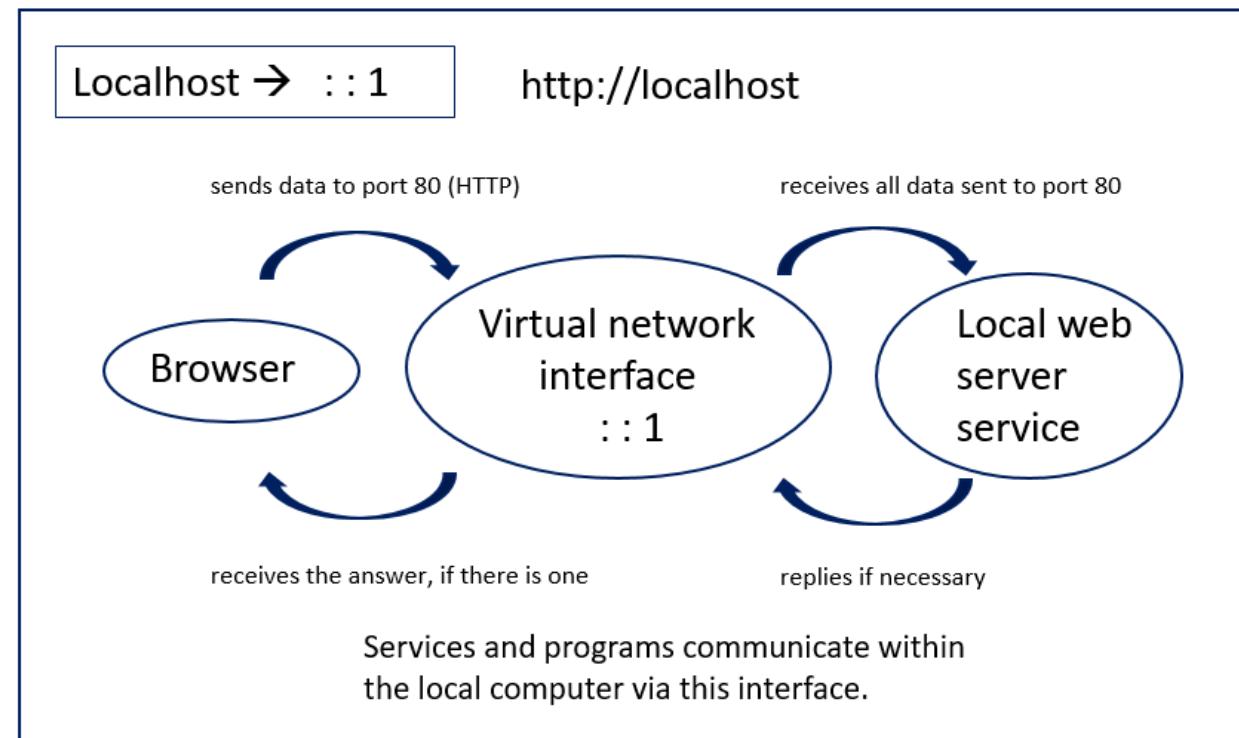
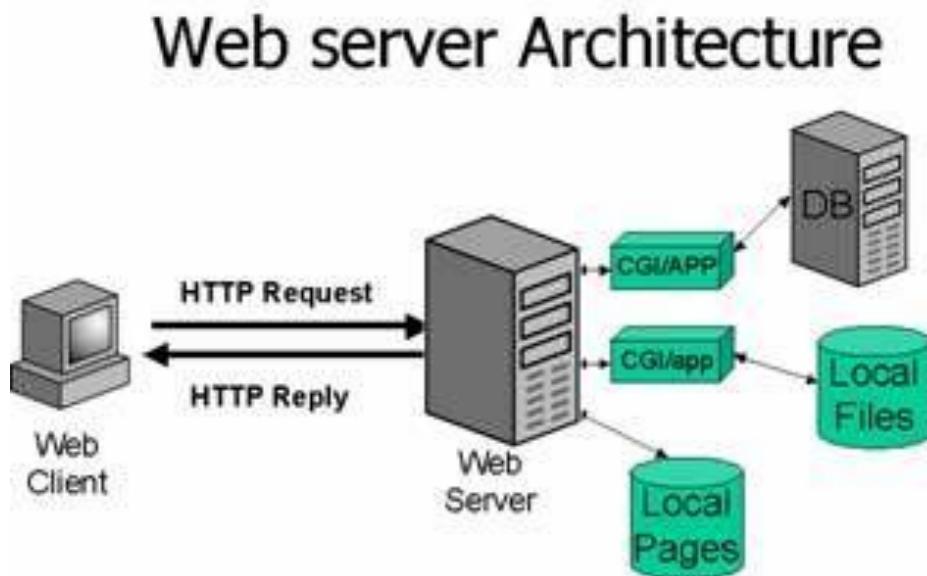
Deploy your app to Azure Cloud

- In Visual Studio Code:
 - **Azure: App Service** explorer,
 - select the blue up arrow:
 - For "Select the folder to deploy," select your current app folder.
 - For "Select Web App," choose the App Service you created in the previous step.
 - (after a few minutes) Select the **Browse Website** button to view the running site.



Deploy your app to Azure Cloud

- What happened now?
- Can you Access your web app from you mobile phone typing
<https://<your webapp name>.azurewebsites.net/>
 - Why?





AZURE

APP SERVICE

Azure para estudiantes

test4

Open in Portal
Browse Website

Start

Stop

Restart

Delete...

Deploy to Web App...

Configure Deployment Source...

Start Streaming Logs

Stop Streaming Logs

Generate Azure CLI Script

Start Remote Debugging

SSH into Web App

Refresh

hello.py

azureCLI.sh X

requirements.txt

azureCLI.sh

```
1 SUBSCRIPTION="Azure para estudiantes"
2 RESOURCEGROUP="appsvc_linux_centralus"
3 LOCATION="centralus"
4 PLANNAME="appsvc_linux_centralus"
5 PLANSKU="F1"
6 SITENAME="test4dani"
7 RUNTIME="PYTHON|3.8"

8
9 # login supports device login, username/password, and service principals
10 # see https://docs.microsoft.com/en-us/cli/azure/?view=azure-cli-latest#az\_login
11 az login
12 # list all of the available subscriptions
13 az account list -o table
14 # set the default subscription for subsequent operations
15 az account set --subscription $SUBSCRIPTION
16 # create a resource group for your application
17 az group create --name $RESOURCEGROUP --location $LOCATION
18 # create an appservice plan (a machine) where your site will run
19 az appservice plan create --name $PLANNAME --location $LOCATION --is-linux --sku $PLANSK
20 # create the web application on the plan
21 # specify the node version your app requires
22 az webapp create --name $SITENAME --plan $PLANNAME --runtime $RUNTIME --resource-group $R
23
24 # To set up deployment from a local git repository, uncomment the following commands.
25 # first, set the username and password (use environment variables!)
26 # USERNAME=""
27 # PASSWORD=""
28 # az webapp deployment user set --user-name $USERNAME --password $PASSWORD
29
30 # now, configure the site for deployment. in this case, we will deploy from the local gi
31 # you can also configure your site to be deployed from a remote git repository or set up
```

DEBUG CONSOLE

PROBLEMS

OUTPUT

TERMINAL

Tasks

▼



> COSMOS DB

azureCLI.sh from Flask App in Visual Studio Code 1/4

```
SUBSCRIPTION="Azure para estudiantes"  
RESOURCEGROUP="appsvc_linux_centralus"  
LOCATION="centralus"  
PLANNAME="appsvc_linux_centralus"  
PLANSKU="F1"  
SITENAME="test4dani"  
RUNTIME="PYTHON|3.8"
```

azureCLI.sh 2/4

```
# login supports device login, username/password, and service principals
# see https://docs.microsoft.com/en-us/cli/azure/?view=azure-cli-latest#az_login
az login

# list all of the available subscriptions
az account list -o table

# set the default subscription for subsequent operations
az account set --subscription $SUBSCRIPTION

# create a resource group for your application
az group create --name $RESOURCEGROUP --location $LOCATION

# create an appservice plan (a machine) where your site will run
az appservice plan create --name $PLANNNAME --location $LOCATION --is-linux --sku $PLANSKU --resource-group $RESOURCEGROUP
```

azureCLI.sh 3/4

```
# create the web application on the plan  
# specify the node version your app requires  
az webapp create --name $SITENAME --plan $PLANNNAME --runtime $RUNTIME --resource-group $RESOURCEGROUP  
  
# To set up deployment from a local git repository, uncomment the following commands.  
# first, set the username and password (use environment variables!)  
# USERNAME=""  
# PASSWORD=""  
# az webapp deployment user set --user-name $USERNAME --password $PASSWORD
```

azureCLI.sh 4/4

```
# now, configure the site for deployment. in this case, we will deploy from the local git repository
# you can also configure your site to be deployed from a remote git repository or set up a CI/CD workflow
# az webapp deployment source config-local-git --name $SITENAME --resource-group $RESOURCEGROUP

# the previous command returned the git remote to deploy to
# use this to set up a new remote named "azure"
# git remote add azure "https://$USERNAME@$SITENAME.scm.azurewebsites.net/$SITENAME.git"
# push master to deploy the site
# git push azure master

# browse to the site
# az webapp browse --name $SITENAME --resource-group $RESOURCEGROUP
```



Cloud Computing

Infrastructure and Web Development

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