

A photograph of four business professionals (two men and two women) sitting around a wooden conference table in a modern office. They are engaged in a discussion, with laptops and papers on the table. A large window in the background shows a cityscape. A semi-transparent red banner is overlaid across the middle of the image, containing the title text.

# Introduction to Cloud Services

August 16, 2017

Iliya Gatsev



## About the author

- Name : Iliya Gatsev
- Working as Network Engineer for Cisco @ IBM
- Professional teacher of IT (bachelor's degree)
- Master in Software Technologies ( master's degree)
- Passed VMware Certified Associate- “Cloud” exam in 2013
- Passed Citrix Sales Professional certification exam in 2016
- Passed many additional trainings and exams about Cloud technologies
- Love to learn about new cloud technologies



# Some of my certificates about Cloud technologies:



VMware is proud to award the title of  
**VMware Certified Associate**  
Cloud  
to  
**Iliya Gatsev**  
in recognition of successful completion  
of all certification requirements

CERTIFICATION DATE: November 20, 2013  
CANDIDATE ID: VMW-01271072U-00412835  
VERIFICATION CODE: 12276284-97ED-842471319A3F  
Validate certificate authenticity: [vmware.com/go/verifycert](http://vmware.com/go/verifycert)



  
PAT GELSINGER, CHIEF EXECUTIVE OFFICER



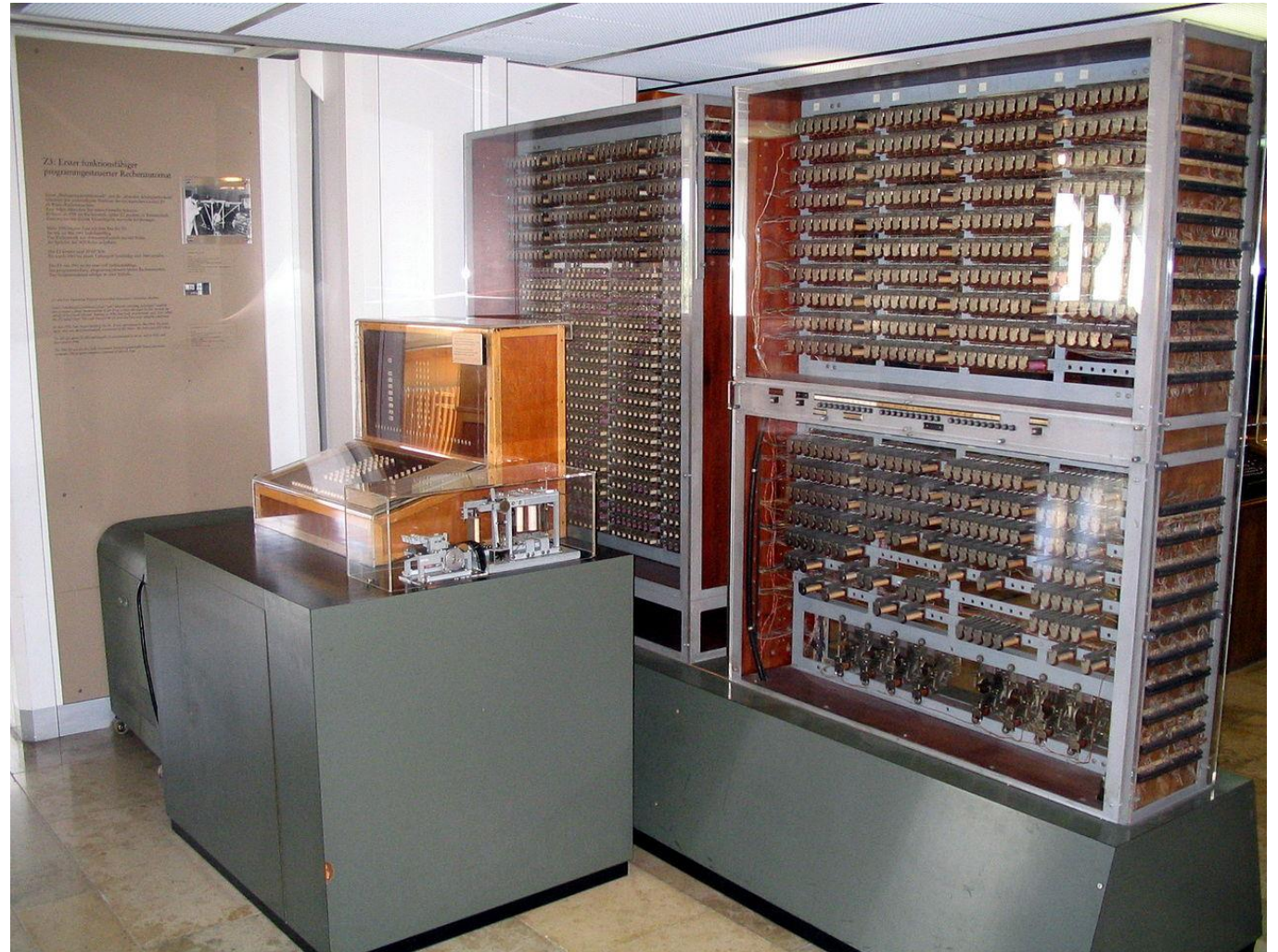
# Course Content

1. History of cloud computing and Cloud computing vs. Virtualization
2. Cloud Computing Models and Deployment
3. Global Infrastructure of the Clouds and Cloud computing providers.
4. Different responsibilities for IaaS, PaaS, and SaaS
5. Advantages and Disadvantages
6. Facts about Cloud Computing and Cloud computing predictions
7. Knowledge check

# History of cloud computing

- The Zuse Z3 is the first programmable computer.
- The electromechanical Zuse Z3, completed in 1941, was the world's first programmable computer, and by modern standards one of the first machines that could be considered a complete computing machine.

Zuse Z3 replica on display at Deutsches Museum in Munich.



Source: [https://en.wikipedia.org/wiki/Cloud\\_computing](https://en.wikipedia.org/wiki/Cloud_computing)  
[https://en.wikipedia.org/wiki/Information\\_technology](https://en.wikipedia.org/wiki/Information_technology)  
<https://www.ibm.com/blogs/cloud-computing/2014/03/a-brief-history-of-cloud-computing-3/>

Source: Wikipedia.org



## History of cloud computing

- IBM mainframes are large computer systems produced by IBM since 1952.
- IBM cloud computing emerged from the union of its mainframe computing and virtualization technologies.
- IBM's first experiments in virtualization occurred in the 1960s with the development of the virtual machine (VM) on CP-40 and CP-67 operating systems

IBM 704 mainframe at NACA in 1957



Source: Wikipedia.org

Source: [https://en.wikipedia.org/wiki/Cloud\\_computing](https://en.wikipedia.org/wiki/Cloud_computing)

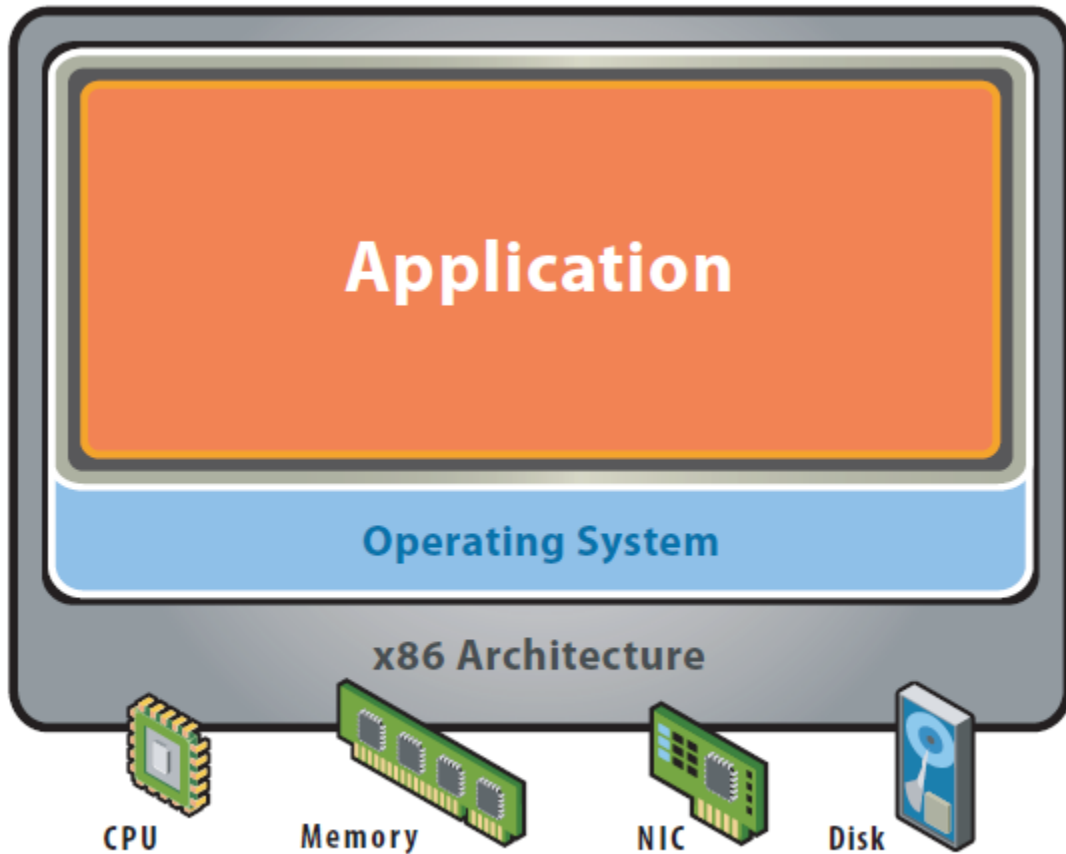
[https://en.wikipedia.org/wiki/Information\\_technology](https://en.wikipedia.org/wiki/Information_technology)

<https://www.ibm.com/blogs/cloud-computing/2014/03/a-brief-history-of-cloud-computing-3/>

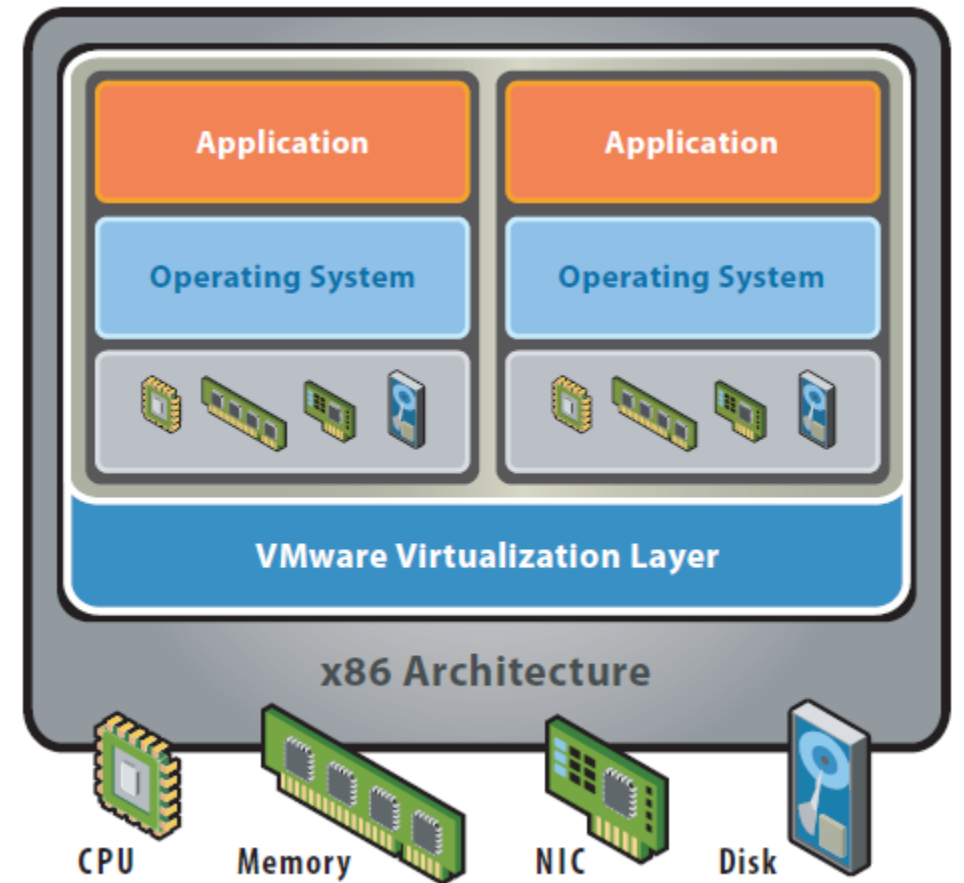


# Virtualization Overview

## Before Virtualization:



## After Virtualization:



Source: Virtualization Overview - VMWARE WHITE PAPER



# Virtualization Overview

## Before Virtualization:

Single OS image per machine

Software and hardware tightly coupled

Running multiple applications on same machine often creates conflict

Underutilized resources

Inflexible and costly infrastructure

## After Virtualization:

Hardware-independence of operating system and applications

Virtual machines can be provisioned to any system

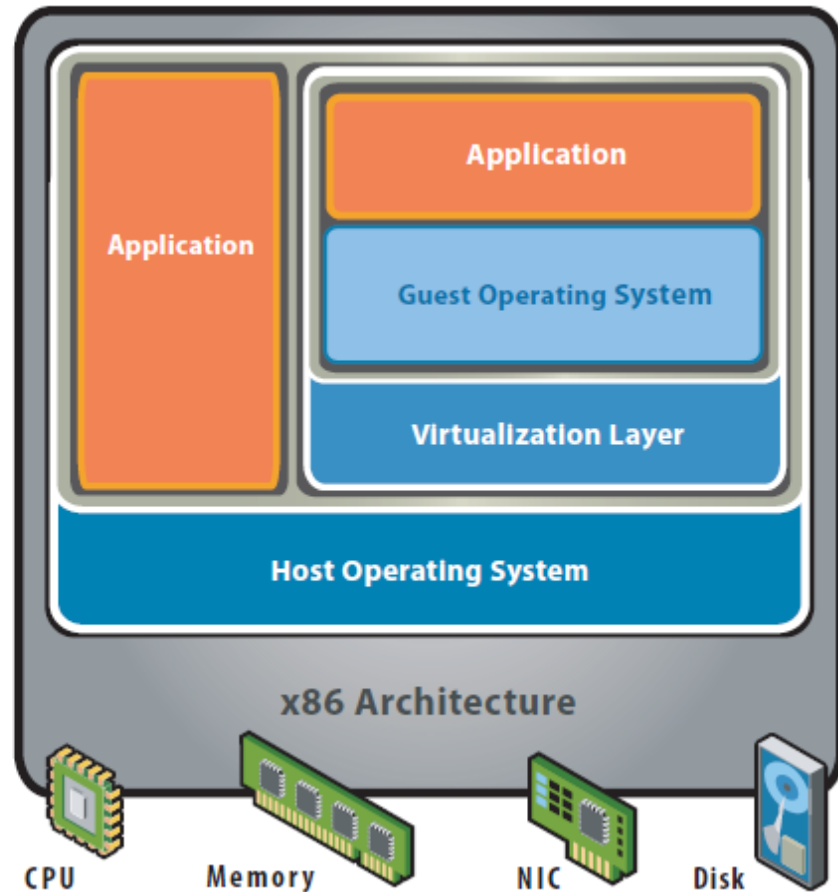
Can manage OS and application as a single unit by encapsulating them into virtual machines



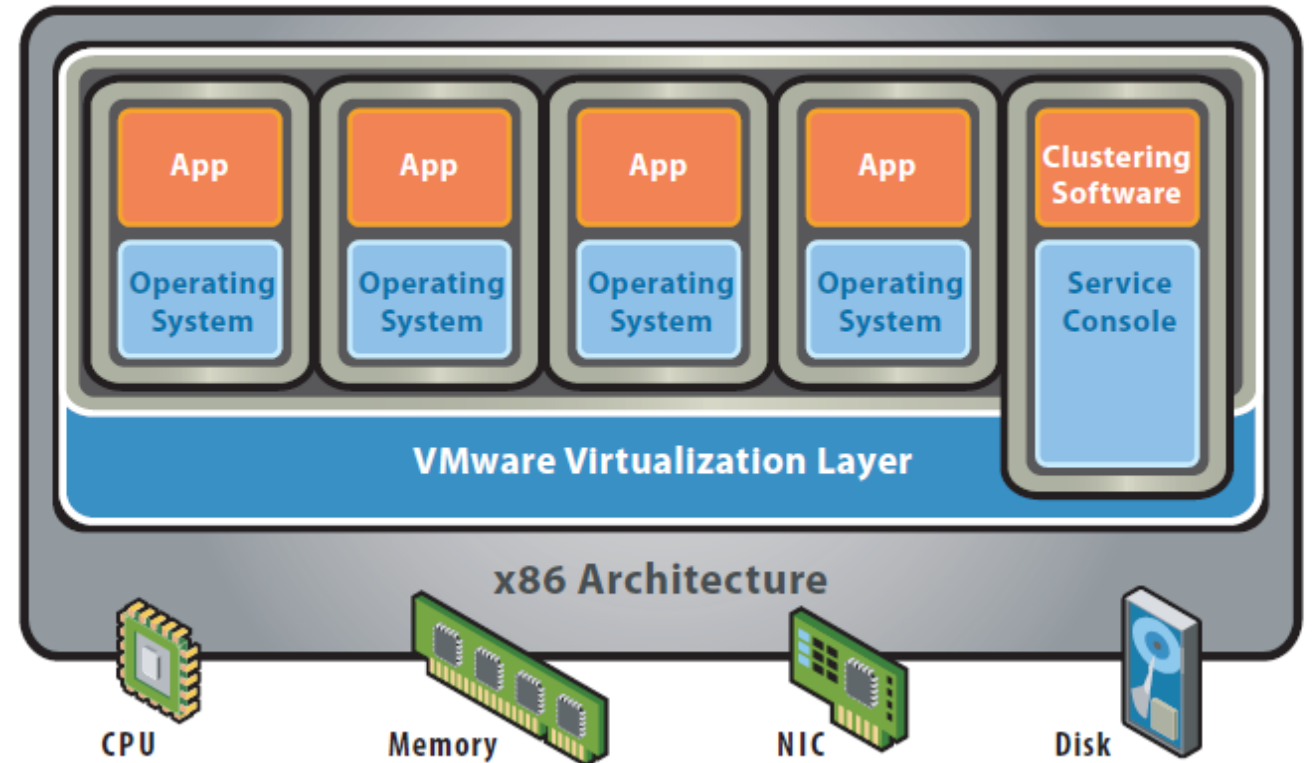


# Virtualization Overview

## Hosted Architecture:



## Bare-Metal (Hypervisor) Architecture:



Source: Virtualization Overview - VMWARE WHITE PAPER



# Virtualization Overview

- **Hosted Architecture**

Installs and runs as an application

Relies on host OS for device support and physical resource management

- **Bare-Metal (Hypervisor) Architecture**

Lean virtualization-centric kernel

Service Console for agents and helper applications



# Virtualization vs. Cloud Computing

- How is virtualization different from cloud computing?

Essentially, virtualization differs from cloud computing because virtualization is software that manipulates hardware, while cloud computing refers to a service that results from that manipulation.



Source: <http://www.businessnewsdaily.com/5791-virtualization-vs-cloud-computing.htm>



## IBM Cloud and VMware streamline hybrid cloud adoption (video)

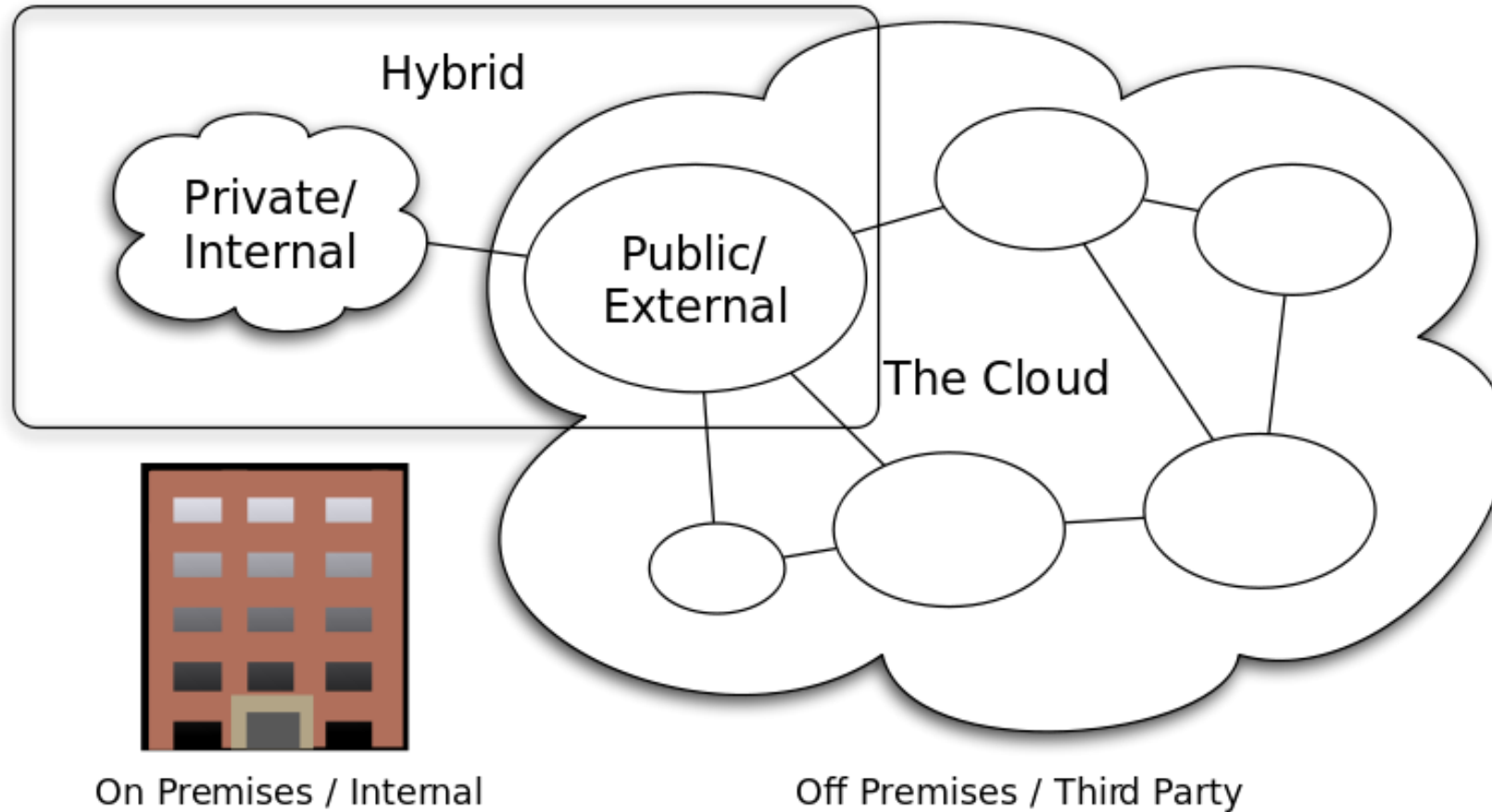


Source: [https://www.youtube.com/watch?v=51bq\\_Yhuof4](https://www.youtube.com/watch?v=51bq_Yhuof4)

# What Is Cloud Computing?



# Cloud Computing types



## Cloud Computing Types

CC-BY-SA 3.0 by Sam Johnston

Source: Wikipedia.org

Source: [https://en.wikipedia.org/wiki/Cloud\\_computing](https://en.wikipedia.org/wiki/Cloud_computing)



# Cloud Computing Deployment Models

Private cloud

Community cloud

Public cloud

Hybrid cloud



# Cloud Computing types



Infrastructure as a Service  
(IaaS)

Platform as a Service (PaaS)

Software as a Service (SaaS)





# Cloud Providers



# Magic Quadrant for Cloud Infrastructure as a Service, Japan

In March 2017, Gartner released its “Magic Quadrant for Cloud Infrastructure as a Service, Japan.” In this report, Gartner positions IBM at the top of the Visionary Quadrant.



# Cloud Computing Characteristics

Rapid elasticity

Resource pooling

Network access

On demand self-service

Measured service



# Global Cloud Infrastructure



## Cloud services

Machines in the cloud

Storage in the cloud

Databases in the cloud

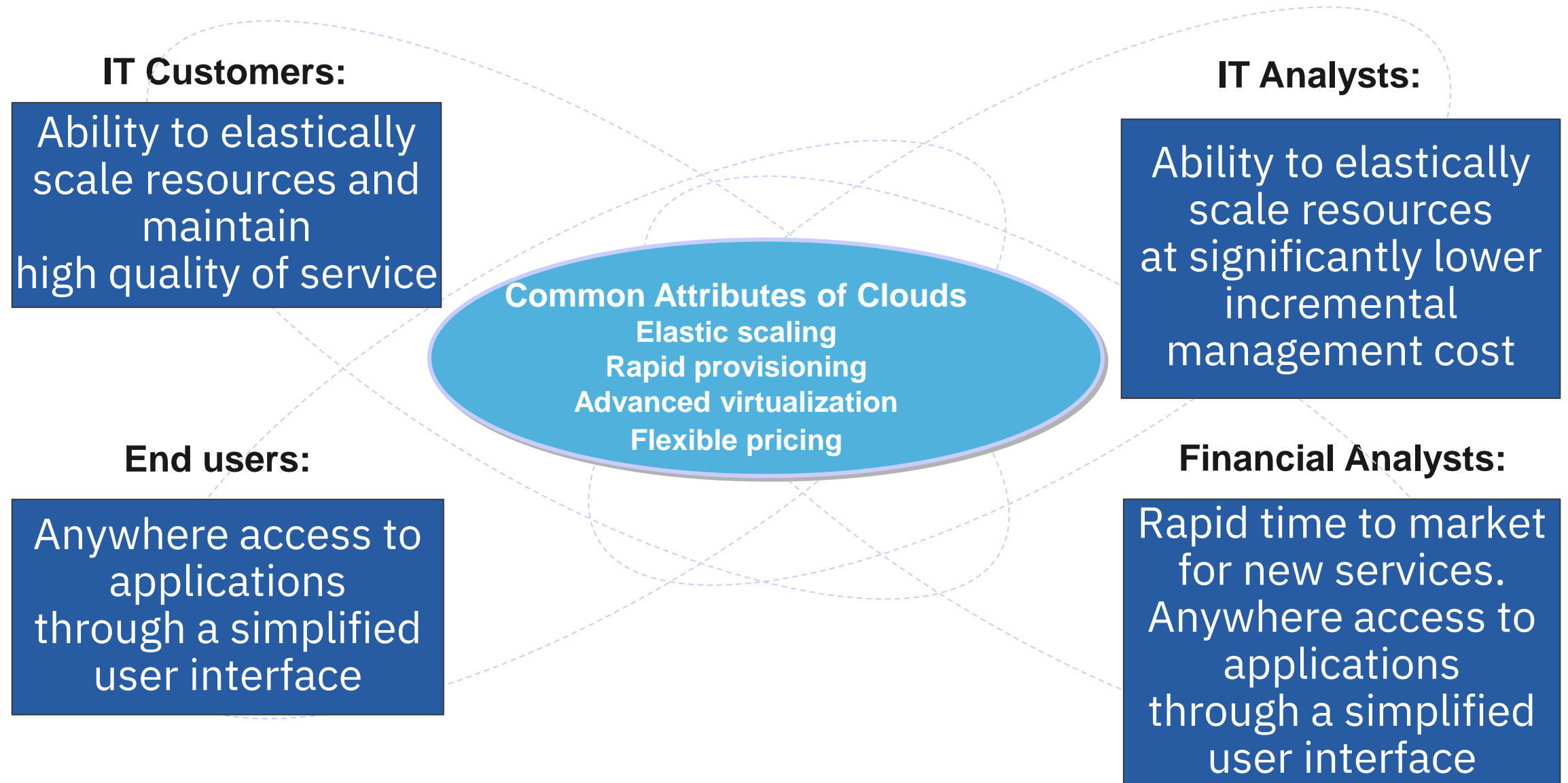
Applications in the cloud

message queues

data mining



# Cloud computing –points of view



Source: IBM Corporate Strategy analysis of MI, PR, AR and VCG compilations



# What is Bluemix? (now IBM Cloud)

Bluemix (Bluemix is now IBM Cloud) is an **open-standard**, cloud-based **platform** for **building, managing**, and **running applications of all types** (web, mobile, big data, new smart devices, and so on).



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## Go Live in Minutes

The developer can choose any language runtime or bring their own. Zero to production in one command.

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## APIs and Services

A catalog of IBM, third party, and open source API services allow the developer to stitch an application together in minutes.

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## On-Prem Integration

Build hybrid environments. Connect to on-premise assets plus other public and private clouds.

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## DevOps

Development, monitoring, deployment, and logging tools allow the developer to run the entire application.

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## Layered Security

IBM secures the platform and infrastructure and provides you with the tools to secure your apps.

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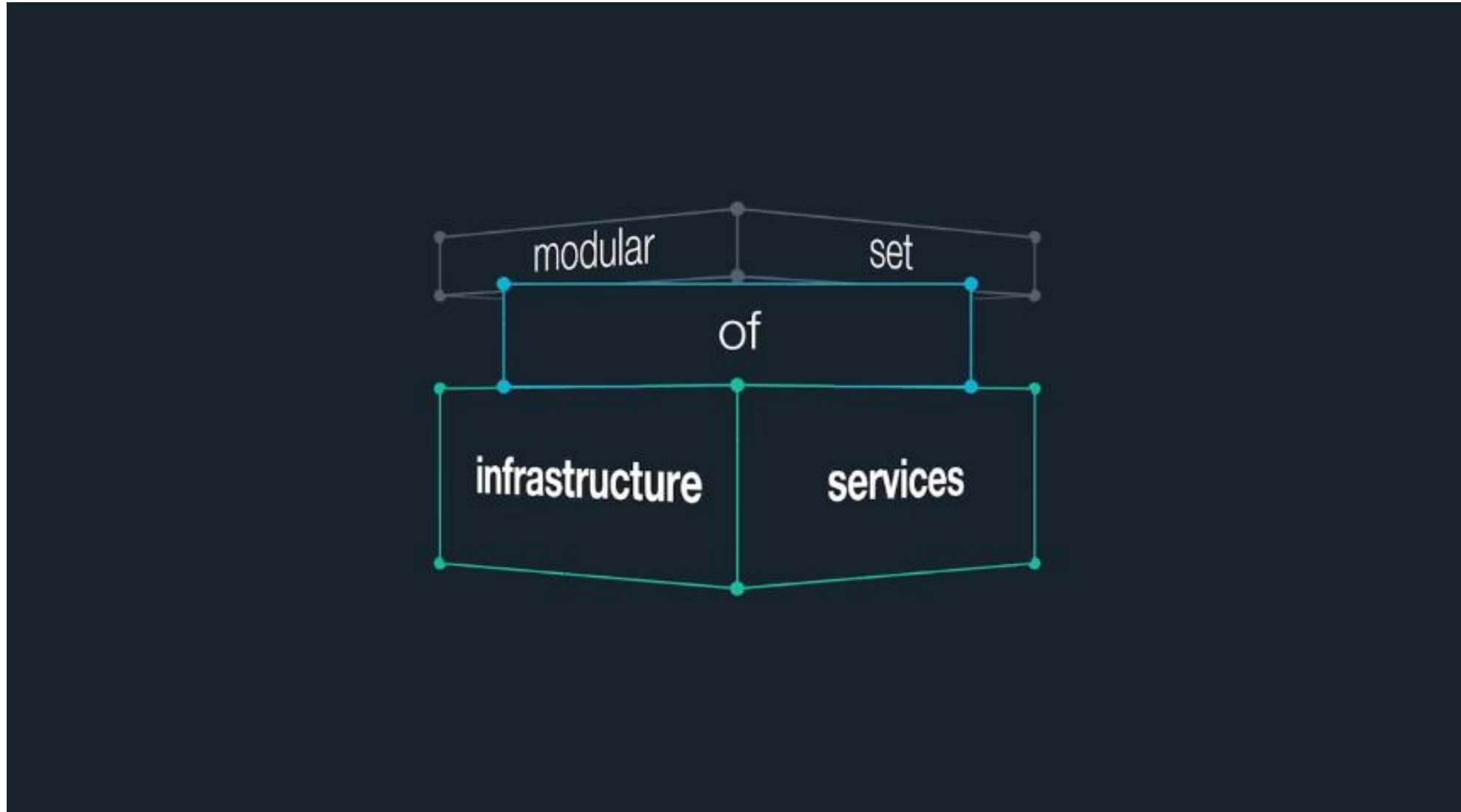
## Flexible Pricing

Sign up in minutes. Pay as you go and subscription models offer choice and flexibility.

Source: <https://www.ibm.com/blogs/bluemix/2017/10/bluemix-is-now-ibm-cloud/>



# General Information: IBM Bluemix - Get Your Cloud Together (video)



Source: <https://www.youtube.com/watch?v=p9dZiMpbVH0>

Note: Bluemix is now IBM Cloud

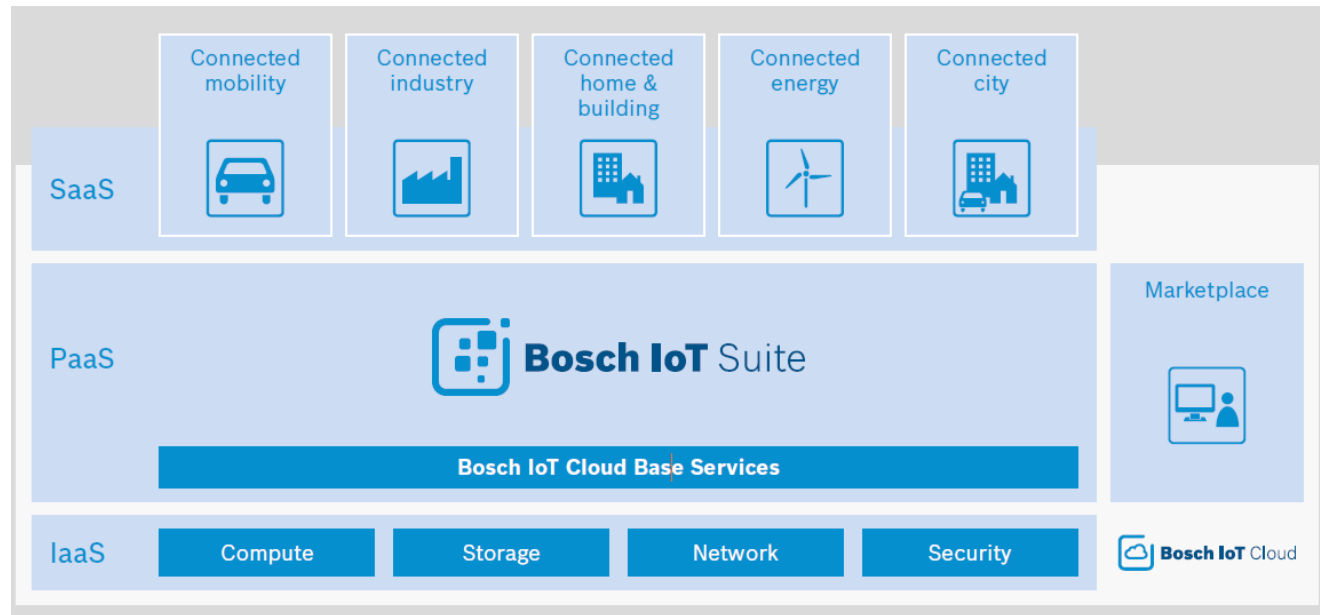
<https://www.ibm.com/blogs/bluemix/2017/10/bluemix-is-now-ibm-cloud/>





# IoT and the cloud working well together

The Internet of Things (IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data.



Source: The Bosch IoT Suite



Source: Wikipedia

Source: <https://www.ibm.com/blogs/internet-of-things/bosch-ibm-industrial-iot/>  
[https://en.wikipedia.org/wiki/Internet\\_of\\_things](https://en.wikipedia.org/wiki/Internet_of_things)



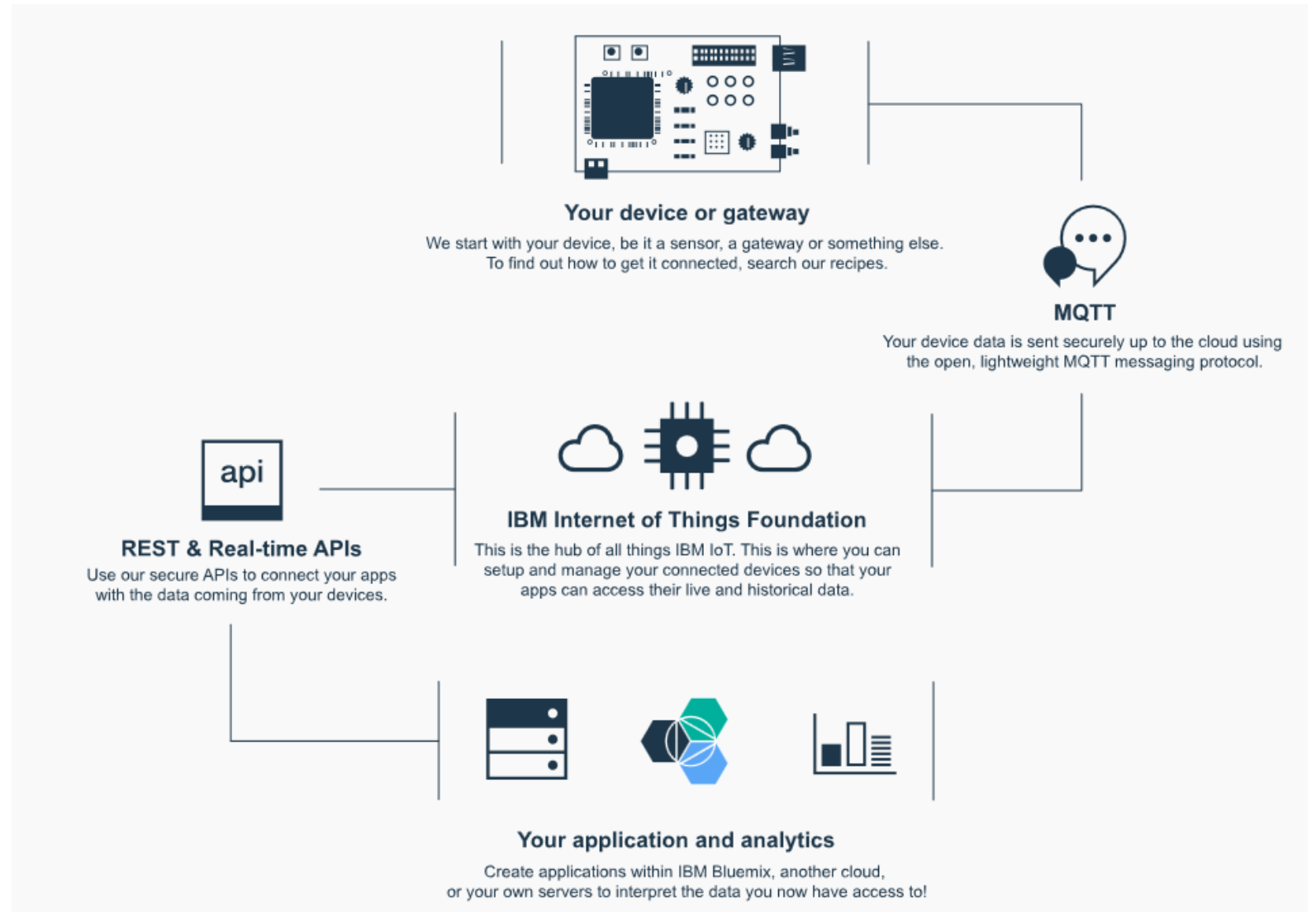
# IoT and the cloud working well together

Start by setting your smart alarm clock for 7 AM. Since your clock connects to your coffee machine, it has a cup of your favorite brew ready for you when you wake up.

Your central heating system is also connected, so it's warm and there's plenty of hot water.

Your car is connected to your calendar, so the satellite navigation has determined your route before you even get into your car.

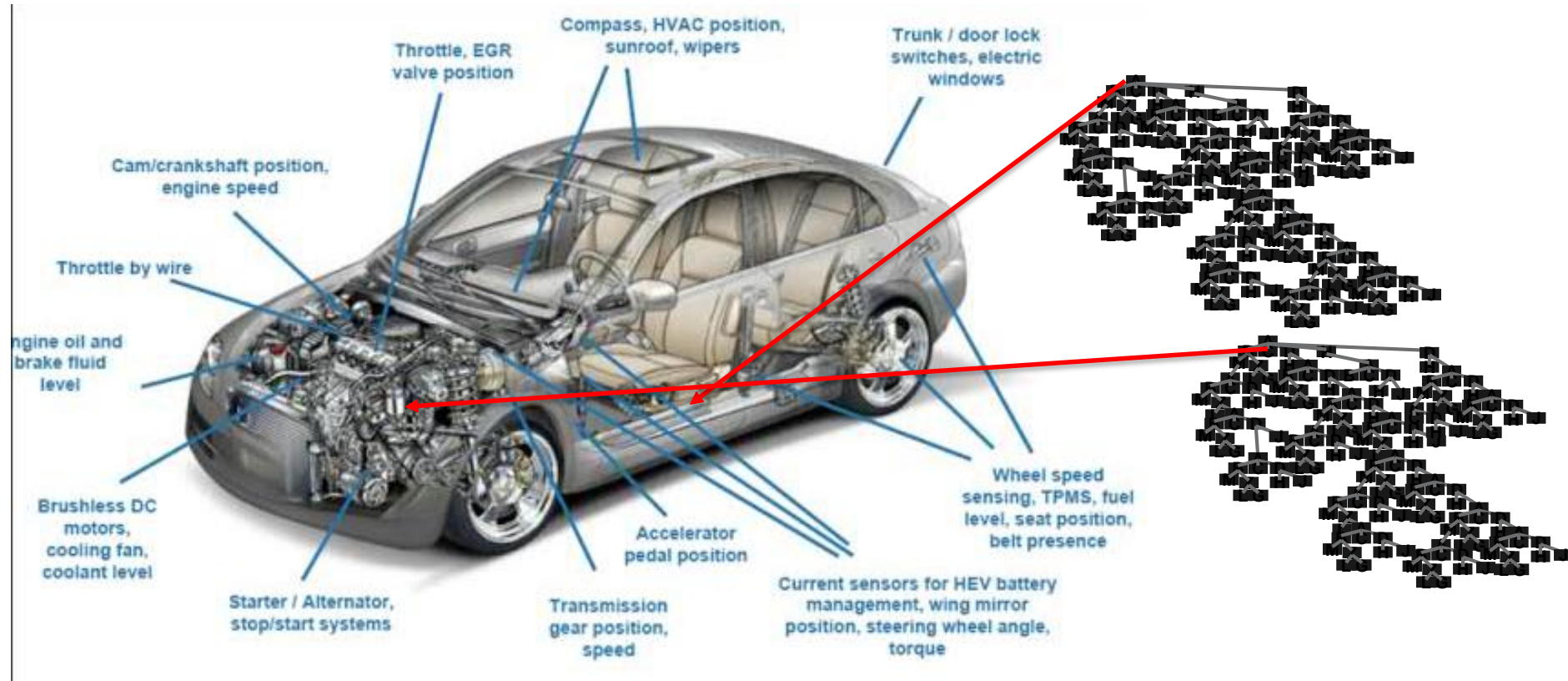
And when you hit traffic your car can text or email your team to let them know you'll be a bit late, or better still, it will wake you up earlier to avoid the traffic altogether.



Source: <https://www.ibm.com/internet-of-things/resources/library/what-is-iot/>



# IoT and the cloud working well together



# IoT and the cloud working well together

With IoT, you can...

Rapidly and securely connect devices

Optimize operations

Enable new business models

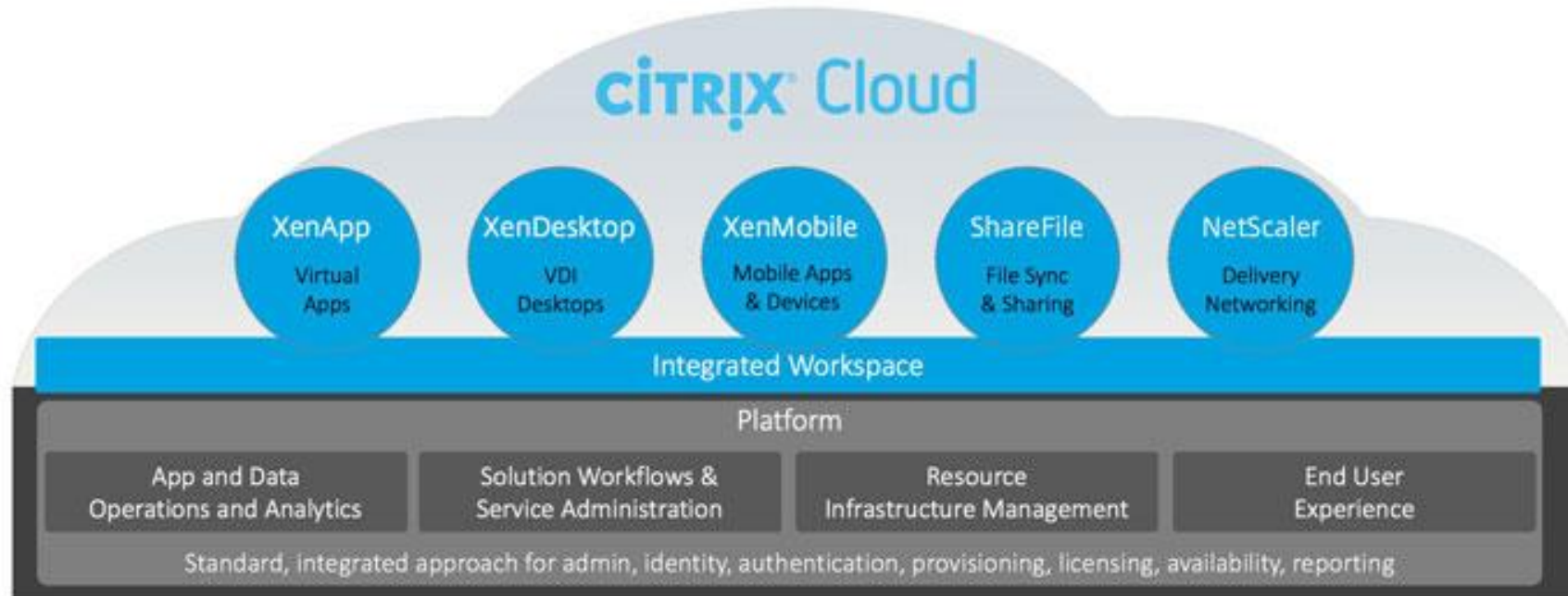
Engage with clients and markets in new ways



# Citrix Cloud

Citrix and IBM have shared more than 20 years of close partnership.

Citrix Cloud services represent the fastest, simplest, and most flexible approach to delivering integrated digital workspaces available today. Services are provided either as full Software-as-a-Service (SaaS), or other cases, as hybrid cloud services where Citrix provides cloud-based management, while customers determine where workloads are located.



Source: Citrix

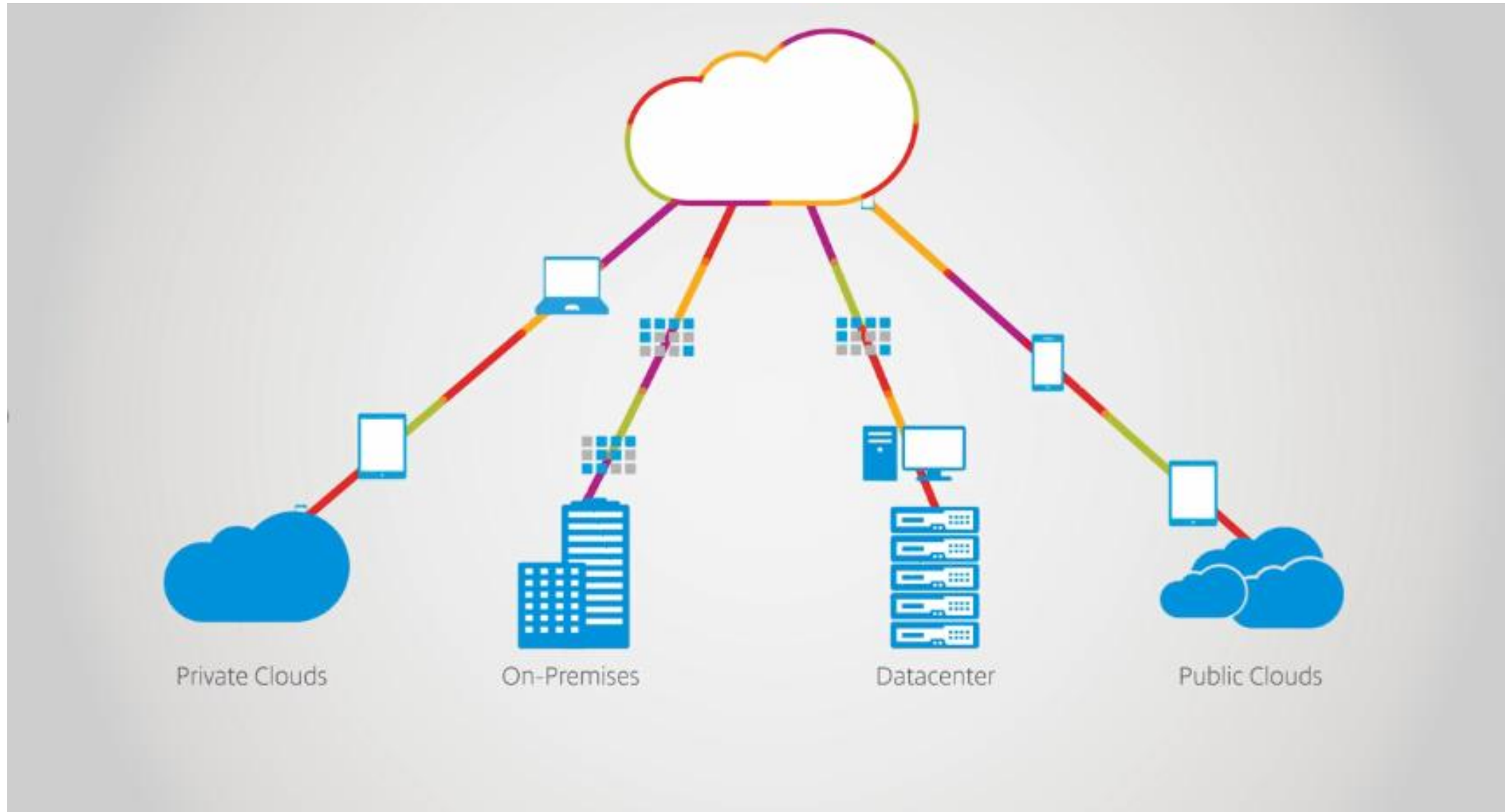
Source: <https://www.citrix.com/products/citrix-cloud/resources/>



# Citrix Cloud -Desktops-as-a-Service (DaaS)



# Citrix Cloud: How It Works (video)



Source: <https://www.youtube.com/watch?v=QywoWo9fDgY>



# Different responsibilities for IaaS, PaaS, and SaaS.

On Premises	IaaS	PaaS	SaaS
Applications	Applications	Applications	Applications
Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
O/S	O/S	O/S	O/S
Virtualization	Virtualization	Virtualization	Virtualization
Servers	Servers	Servers	Servers
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking





# Security responsibility in the cloud

Responsibility	SaaS	PaaS	IaaS	On-premise
Data governance & rights management	Green	Green	Green	Green
Client endpoints	Green	Green	Green	Green
Account & access management	Green	Green	Green	Green
Identify & directory infrastructure	Yellow	Yellow	Green	Green
Application	Blue	Yellow	Green	Green
Network controls	Blue	Yellow	Green	Green
Operating system	Blue	Blue	Green	Green
Physical hosts	Blue	Blue	Blue	Green
Physical network	Blue	Blue	Blue	Green
Physical datacenter	Blue	Blue	Blue	Green



# Advantages and Disadvantages of Cloud Computing

## Advantages

Trade capital expense for variable expense

Benefit from massive economies of scale

Stop guessing about capacity

Increase speed and agility

Stop spending money running and maintaining data centers

Go global in minutes

## Disadvantages

Possible Downtime

Not the Solution for Everything

Security and privacy

Vendor lock-in

Costs

Customer support



# Cloud Transformation

**Gartner Says By 2020, a Corporate "No-Cloud" Policy Will Be as Rare as a "No-Internet" Policy Is Today**



Source: <http://www.gartner.com/newsroom/id/3354117>  
<https://www.pexels.com/photo/blue-skies-clouds-cut-fingers-335907/>

## Knowledge check

IaaS stands for Infrastructure as a Service ?

a) True

b) False

Answer a

## Knowledge check

"Customer Relations Management (CRM) would be an example of Software as a Service (SaaS) ?

a) True

b) False

Answer a

## Knowledge check

Which of these is not a major type of cloud computing usage?

- a) Infrastructure as a Service
- b) Hardware as a Service
- c) Platform as a Service
- d) Software as a Service

Answer b

## Knowledge check

What does CDN stand for?

- a) Compute Data Node
- b) Citrix Delivery Network
- c) Content Delivery Network
- d) Cloud Delivery Network

Answer c

## Knowledge check

Web hosting is a service that enables customers to deploy a website quickly. This is an example of

- a) IaaS
- b) SaaS
- c) None of the above.
- d) PaaS

Answer d



## Knowledge check

Which of the following is Cloud Platform by IBM ?

a) IBM Cloud +

b) Bluemix

c) Cloud +

d) All of the mentioned

Answer b

Note: Bluemix is now IBM Cloud

<https://www.ibm.com/blogs/bluemix/2017/10/bluemix-is-now-ibm-cloud/>



## Knowledge check

Organizations with a workforce that is distributed geographically would not benefit from public cloud services ?

a) True

b) False

Answer b



## Knowledge check

Adding additional memory to a server is an example of what type of scalability?

a) Horizontal

b) Vertical

c) Diagonal

d) Load balancing

Answer b

## Knowledge check

True or false? Cloud computing is the same as virtualized computing

a) True

b) False

Answer b

**IBM**®

