EDEM

Máster en Data Analytics

Introduction: SDLC and Virtualization

Alberto Hernández Cantos

Hello!

I am ***Alberto Hernandez Cantos***

DevOps Engineer and Cloud Architect

You can find me at

https://www.linkedin.com/in/alberto-hernandez-cantos-9502a8a3/

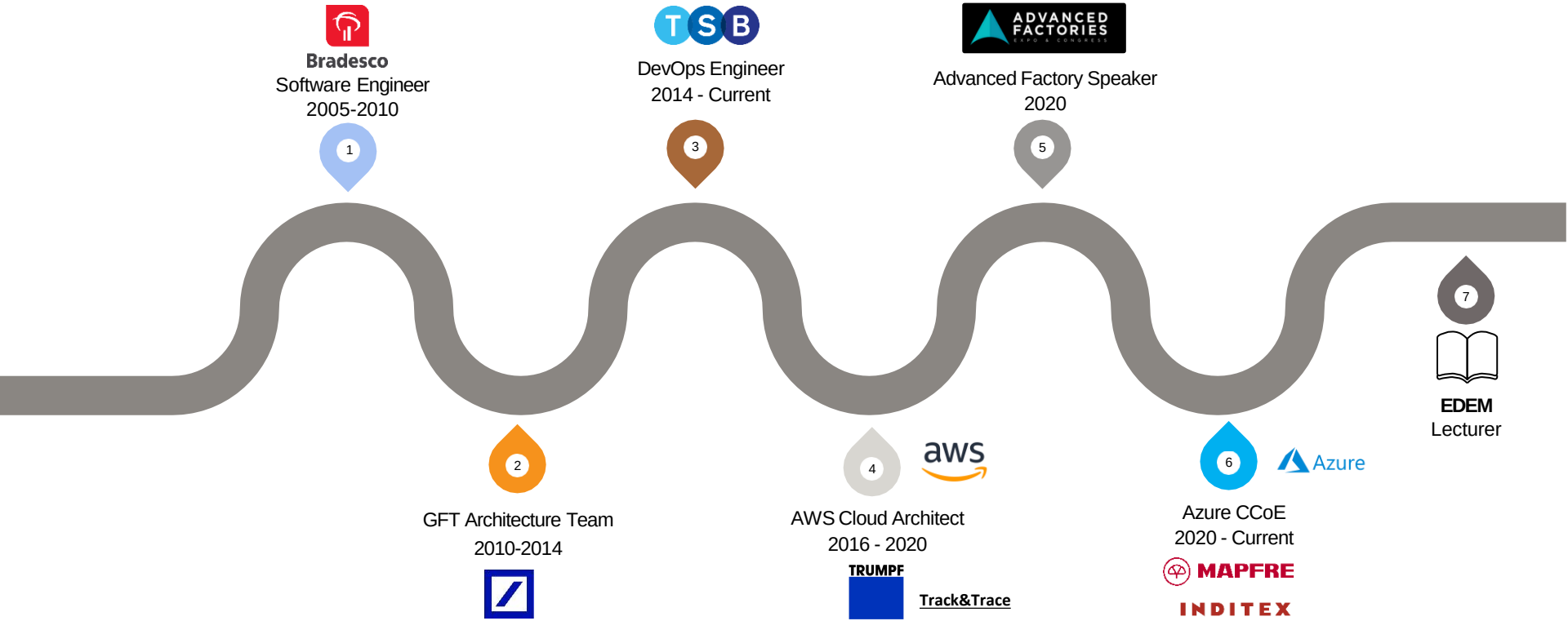
alhercan@gmail.com

EDEM

Career

GFT

DevOps Offering Manager




NOW IT'S
YOUR TURN.

Agenda

1. SLDC - Software Development Lifecycle
2. DevOps
3. Modern Applications
4. Virtual Machines
5. Hypervisor
6. Virtualization in Cloud

1

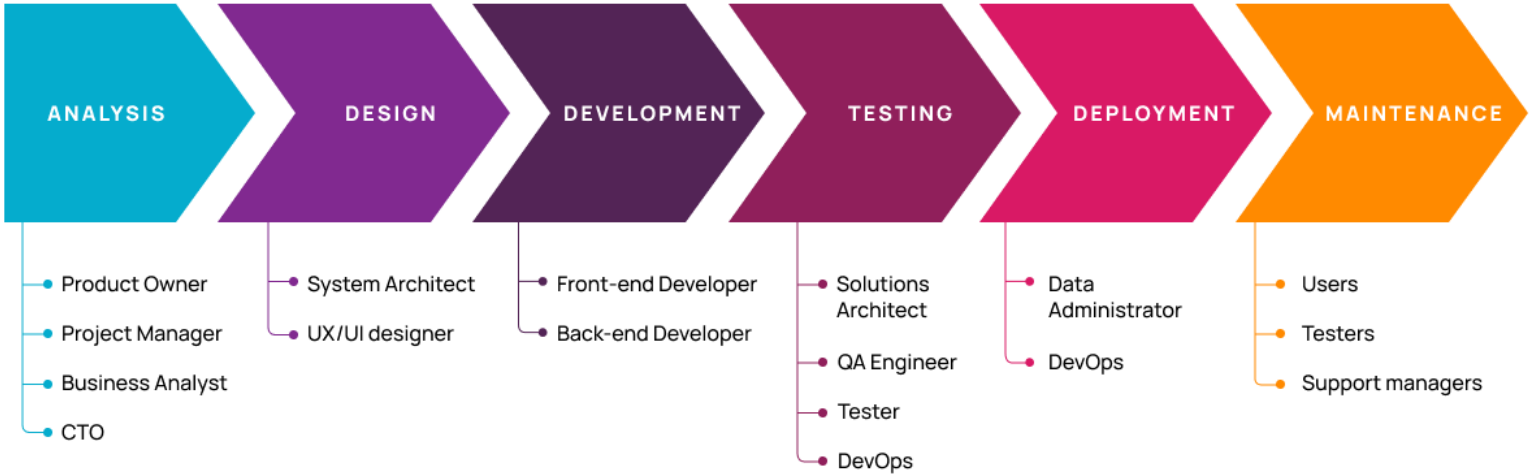
SDLC – Software Development Lifecycle

EDEM

SDLC

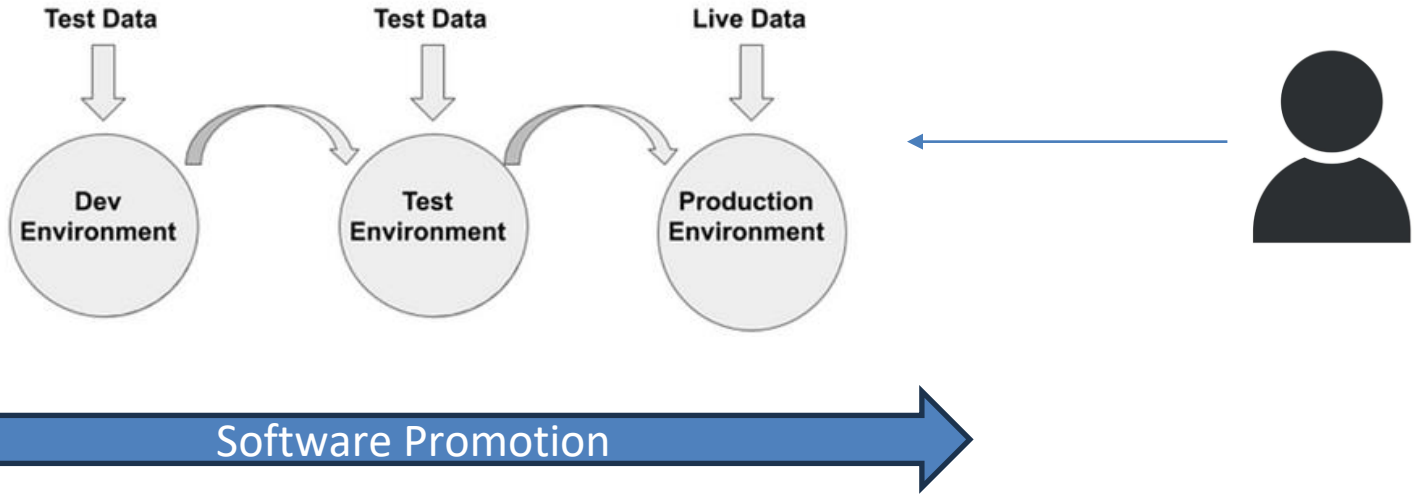
- The SDLC describes all the tasks that are necessary to **create and deploy a software application**, reducing resource waste and increasing efficiency.

- SDLC Phases:



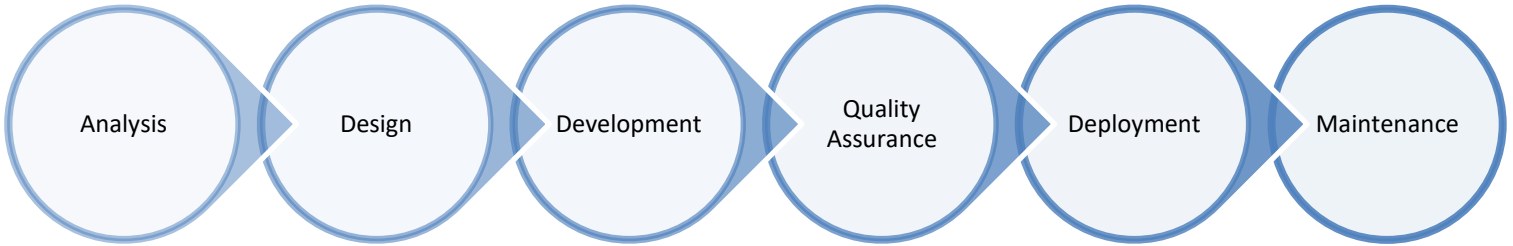
SDLC - Environments

- An environment is a group of machines with the same purpose
- The number and name of environments is different in each organization
- The environments have to be "**equal**" to each other
- **Software Promotion** is the action to move a software application to the next environment



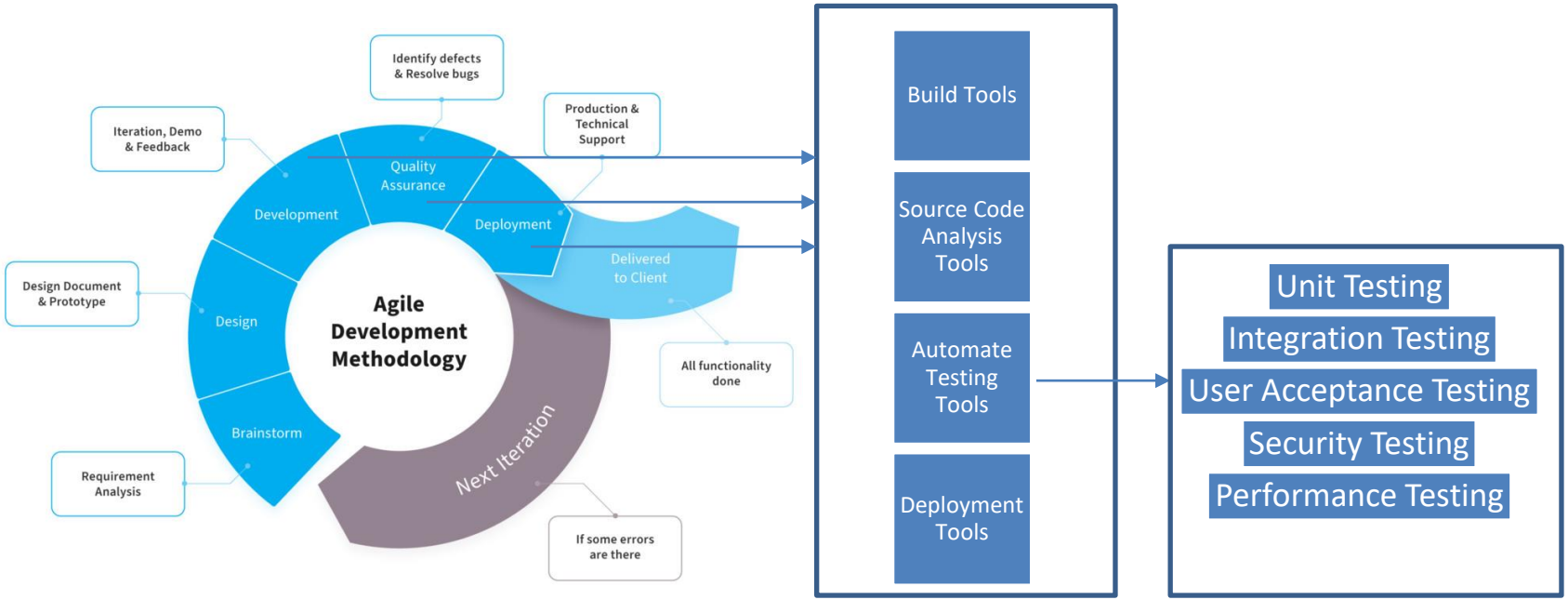
SDLC – Waterfall Methodology

- En esta URL están los detalles de su activación



SDLC - Agile Methodologies

- Agile methodology shorts delivery lifecycles
- It makes even more important tasks automation

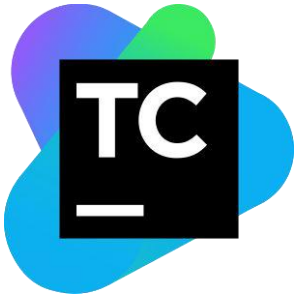


Continuous Integration - CI

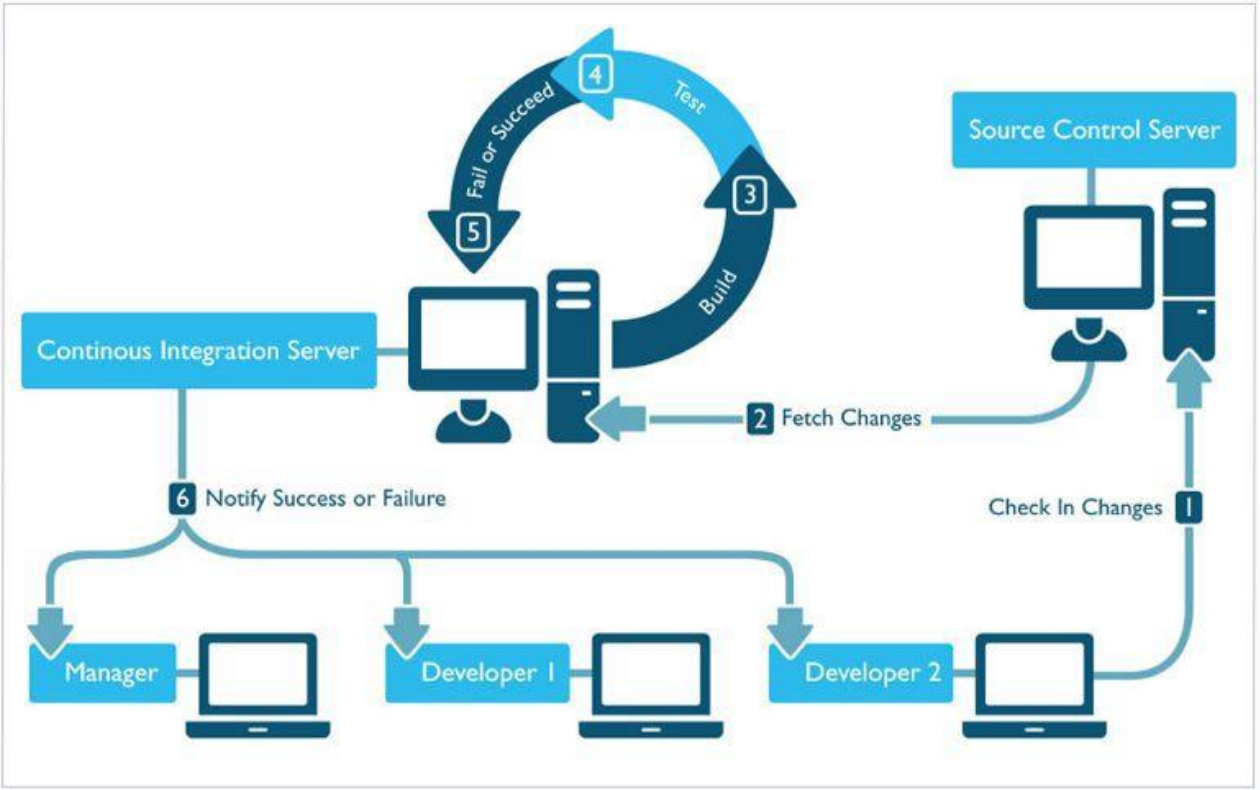
- Continuous integration is a coding philosophy and set of practices that drive development teams to implement small changes and check in code to version control repositories frequently

- The idea is to establish a consistent and automated way to build, package, and test applications

- The developer's changes are validated by creating a build and running automated test against the build.

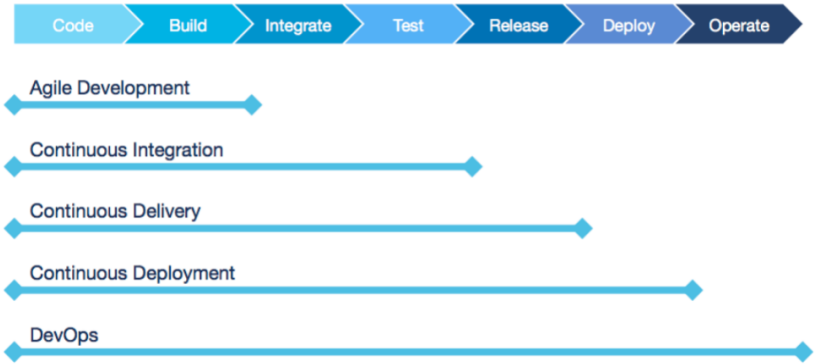


Continuous Integration - CI

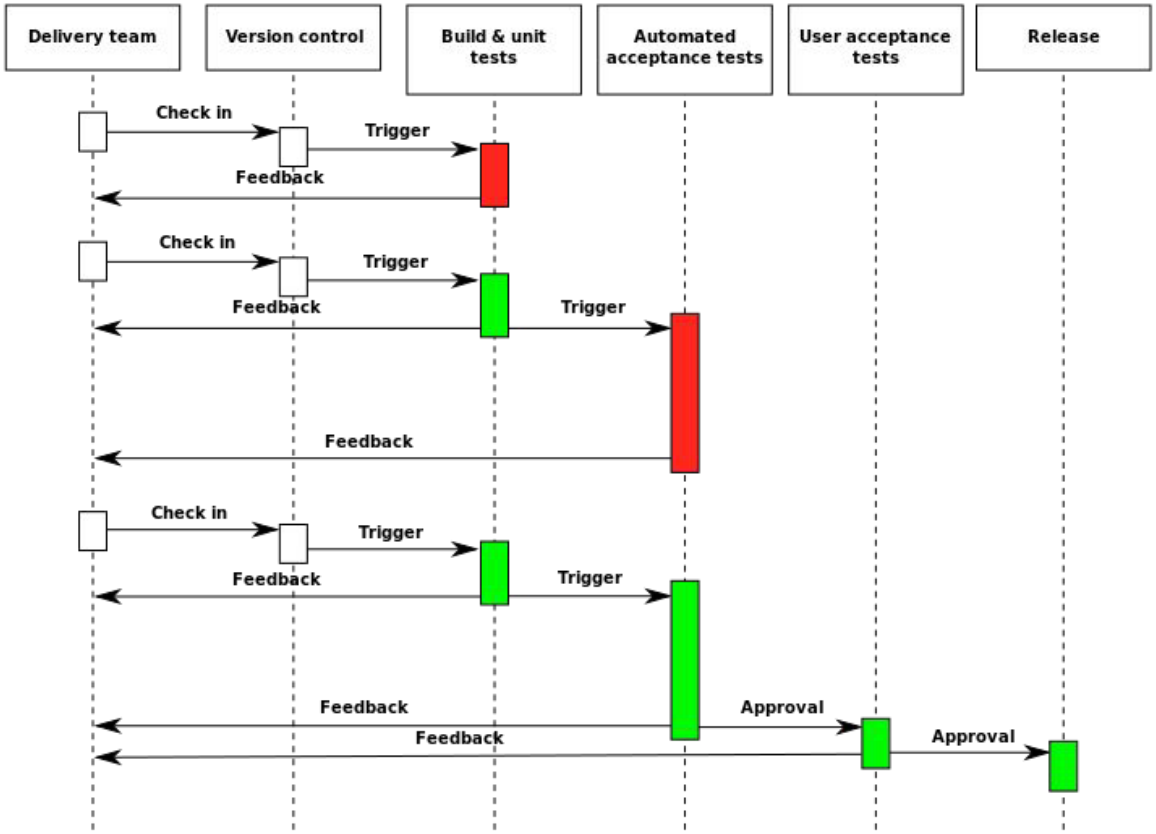


Continuous Delivery - CD

- Continuous delivery picks up where CI ends. CD automates the delivery of applications to selected infrastructure environments.
  - Most teams work with multiple environments other than productions, such as development and testing environments
- CD ensures there is an automated way to push code changes to them
- Enables new test types
- You can decide to release daily, weekly, etc.



CI - CD

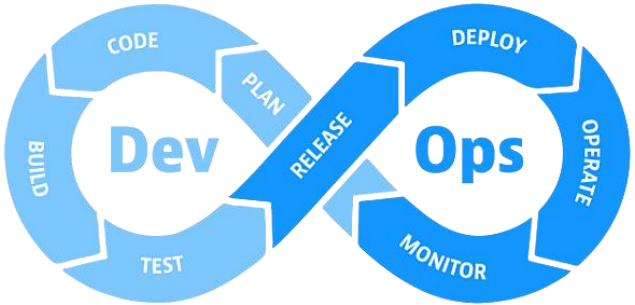

Delivery team
Version control
Build & unit tests
Automated acceptance tests
User acceptance tests
Release
Check in
Trigger
Feedback
Check in
Trigger
Feedback
Trigger
Feedback
Check in
Trigger
Feedback
Trigger
Feedback
Approval
Feedback
Approval

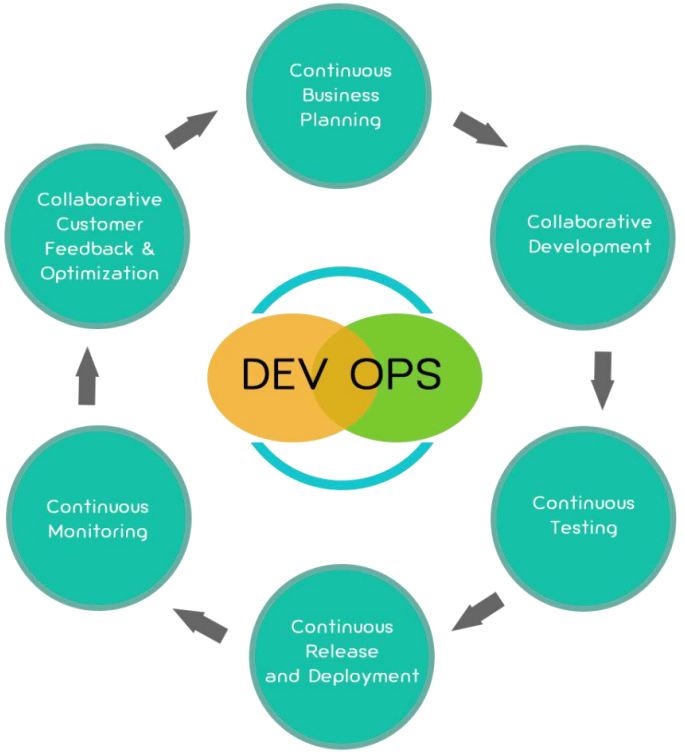
2

DevOps

DevOps

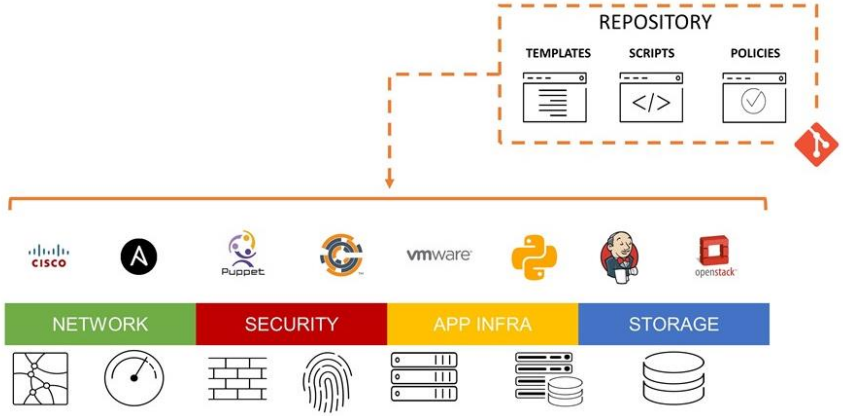
- **DevOps** (“Development“ and “Operations”) improve communication, collaboration, integration and automation between Developers and Other IT Professionals
- DevOps focuses teams to have the **same goal**: Release Quality Software Fast





DevOps – Infrastructure as Code

- IaC means writing code to manage configurations and automate provisioning of infrastructure and deployments



- Apply the same good development practices and tools to infrastructure (including a CD Pipeline)

- Virtualization enables to develop and test within simulated environments.

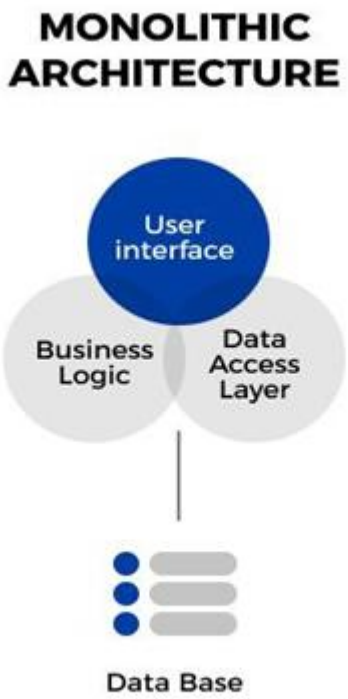
- This level of accuracy in testing makes for vastly reduced deployment times and increased stability


Automation
Jenkins
TeamCity
TRAVIS
Configuration Management
Chef
puppet labs
ANSIBLE
Compute Virtualization
vmware
VAGRANT
docker
AWS
openstack
Data Virtualization
DELPHIX
OpenZFS
Flocker

3 Modern Applications

Monolithic Architecture

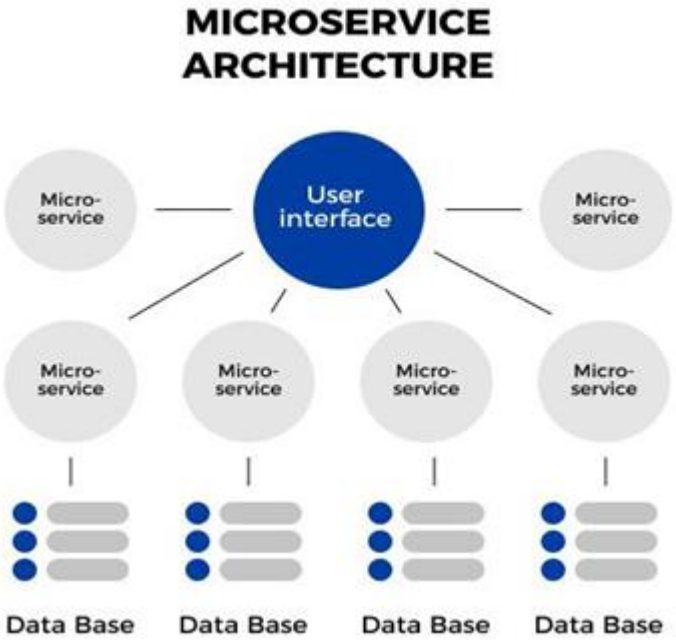
- Everything from **user interface, business codes** and **database calls** is included in the **same codebase**.
- All application concerns are contained in a **single big deployment**
- **Disadvantages:**
  - Difficult to scale
  - Difficult to test
  - Difficult to evolve and add new feature
  - Technology coupling



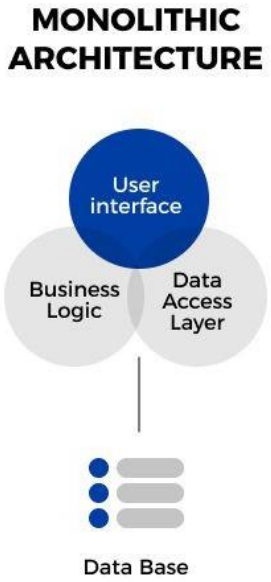
Microservice Architecture

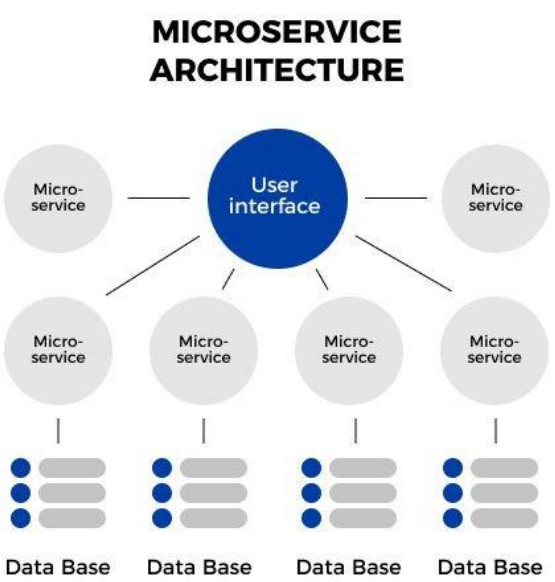
- Microservice Architecture is an architectural style that structures an application as a collection of services that are
  - Highly maintainable and testable
  - Loosely Coupled
  - Independently deployable
  - Organized around business capabilities
  - Owned by a small team

- The microservice architecture enables the rapid, frequent and reliable delivery of large, complex applications



Microservice Architecture





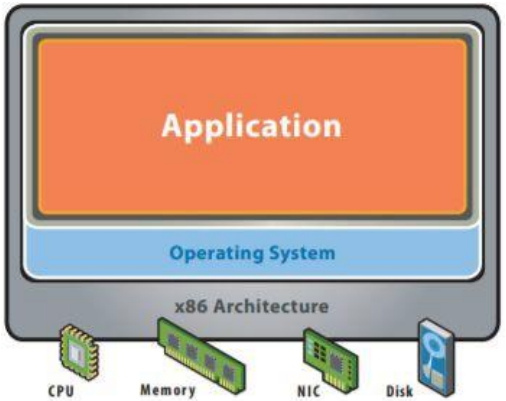
- However, Microservice Architecture is **much more complex** to manage

4 Virtual Machines

Before Virtualization

- Servers would traditionally run one application on one server with one operating system
  - Even one or more applications and an operating system would run on their own unique physical server

- Expensive hardware were being purchased, but not used
  - Depending on application, most of resources were unused



Before Virtualization

- It was not unusual to see a physical server using less than five percent, or even ten percent, of its CPU and/or memory

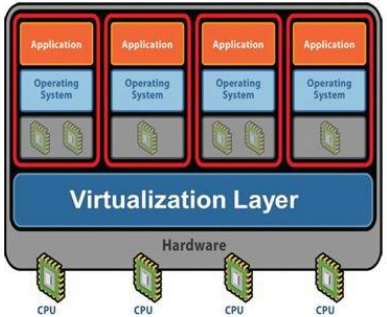
- Multiple applications in a single OS, in one operating system have an impact in terms of security

What is the Virtualization?

- Virtualization is the process of creating a software-based, or virtual, **representation of something**, such as virtual applications, servers, storage and networks

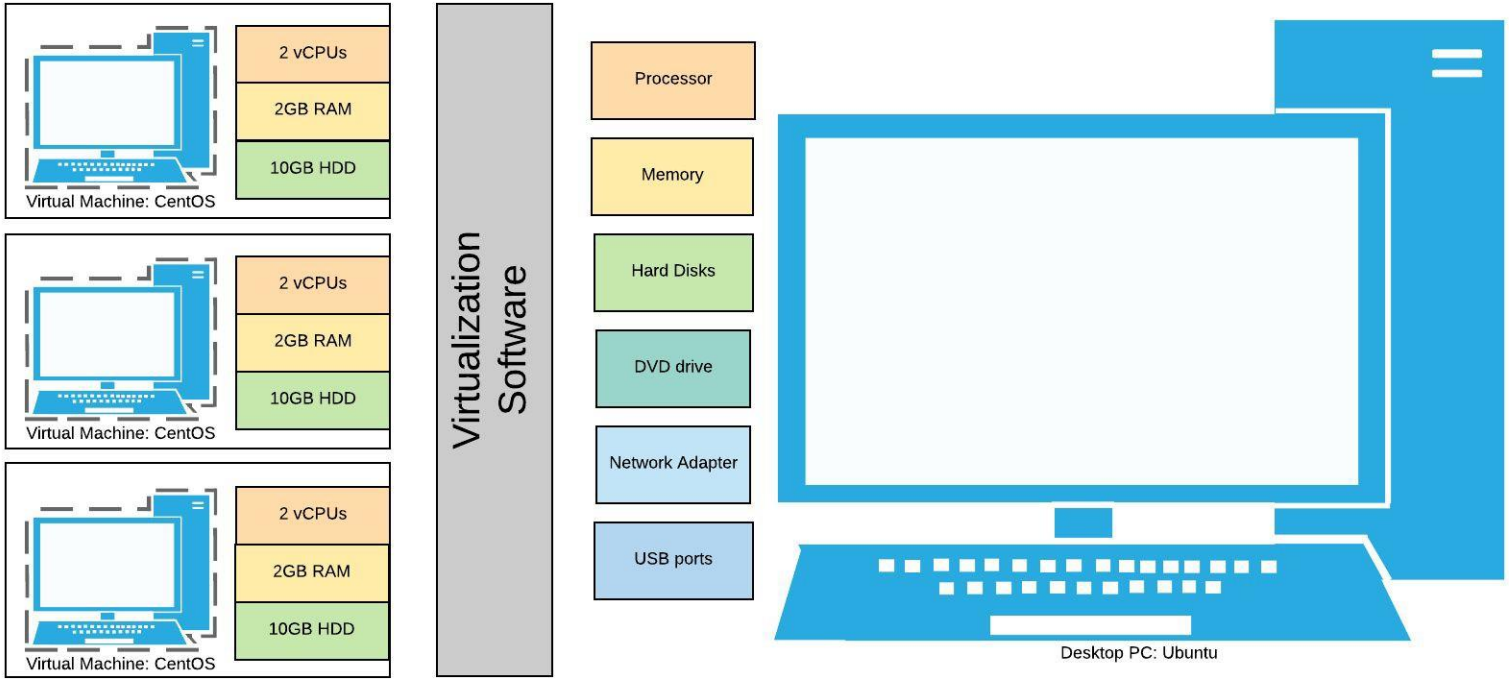
- In general, the idea behind virtualization is to make **many from one**

- It's the single **most effective way to reduce IT expenses** while boosting efficiency and agility for all size businesses

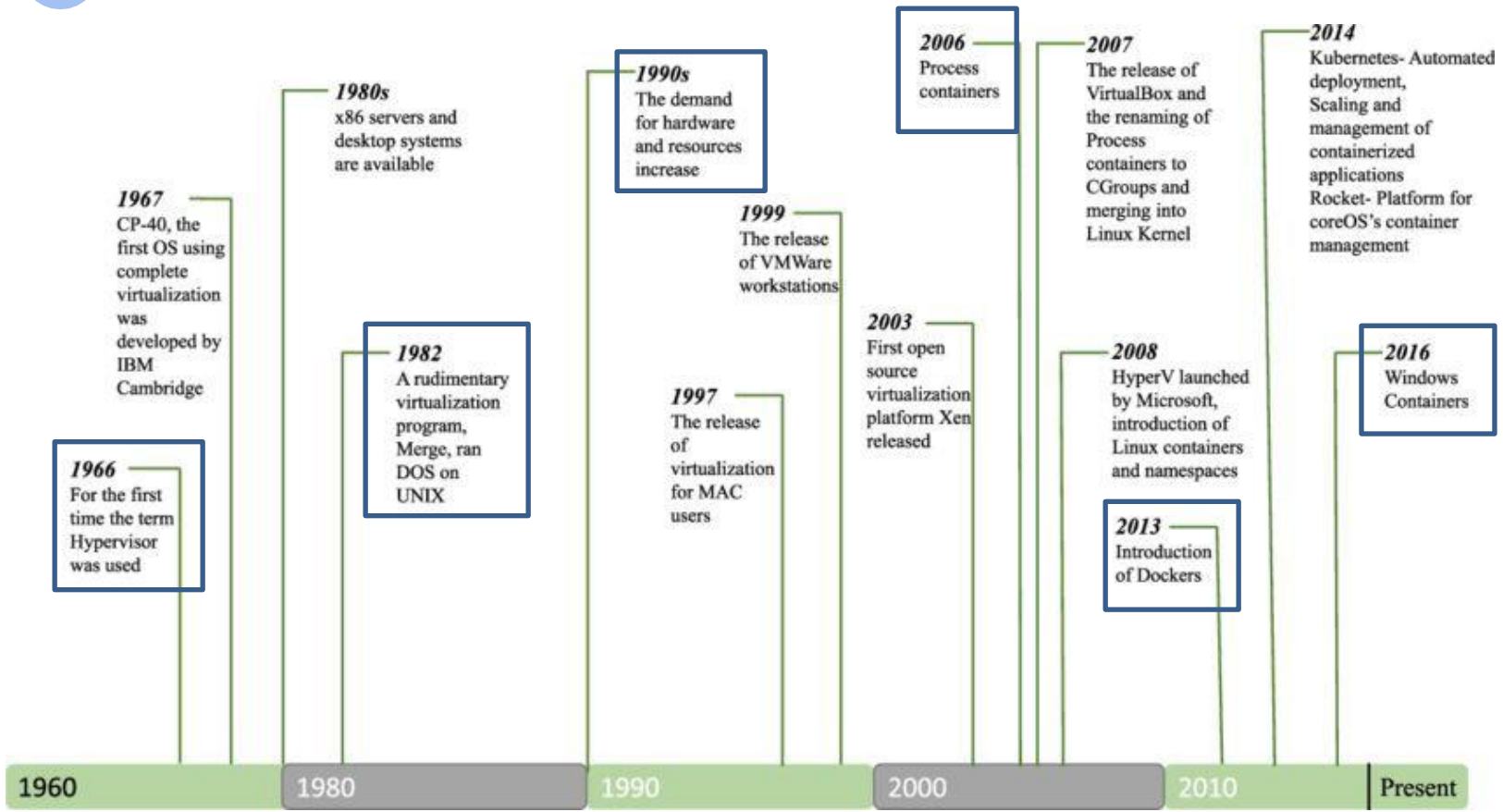


What is the Virtualization?

Hardware Virtualization: a Desktop Virtualization Example



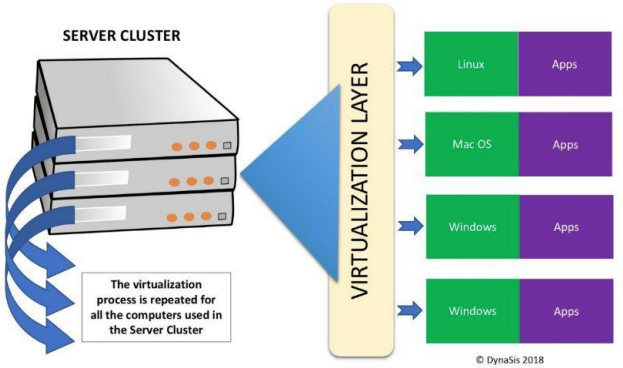
Origins of Virtualization



Why Virtualization?

- Issues with traditional systems:
  - Running multiple applications on same machine often creates conflict
  - Underutilized resources
  - Inflexible and costly infrastructure
  - Software and hardware tightly coupled

- Virtualization lets you run more applications on fewer physical servers.
  - Rather than **one** application running on **one** server with **one** operating system**, multiple** VMs run **multiple** apps and operating systems on **one** physical server



Types of Virtualization

- **Server Virtualization**
  - Enables multiple operating systems to run on a single physical server
  - Reduced operating costs
  - Higher server availability
- **Network Virtualization**
  - Reproducing a physical network
  - Allows applications to run on a virtual network
- **Desktop Virtualization**
  - Enables IT organizations to respond faster to changing workplace needs and emerging opportunities
- **Storage Virtualization**
  - Logical view of the physical storage resources

5 Hypervisor

What is a Hypervisor?

- A hypervisor is computer software, firmware or hardware that creates and runs virtual machines

- It's a process that separates a computer's operating system and applications from the underlying physical hardware
  - Even though VMs can run on the same physical hardware, they are still logically separated from each other
  - That means that if one VM experiences an error, crash or malware attack, it doesn't extend to other VMs on the same machine

Microsoft Hyper-v

vmware

Hypervisors

	VMware	VirtualBox	Hyper-V
Facilidad de uso	Medio	Fácil	Complicado
Rendimiento	Bueno	Medio	Bueno
Instantáneas	Si	Si	No
Compartir archivos	Si	Si	Si, pero complicado.
Integración con Windows	Si	Si	No
Cifrado	Si	Si (a través de Guest Additions)	Si
Sistemas compatibles	Windows, Linux, macOS	Windows, Linux, macOS	Windows y Linux (este con limitaciones)
Precio	Gratis / De pago	Gratis	Gratis
Otros	Excelente seguridad	OpenSource	Solo en Windows 10 Pro Soporte WSL y WSL2 W

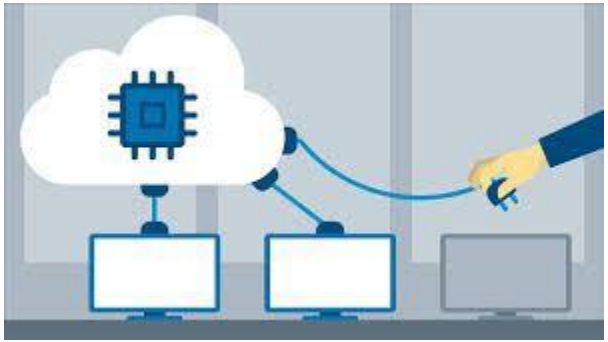
VirtualBox

- En esta URL os lo podéis descargar

6 Virtualization in Cloud

Virtualization in Google Cloud

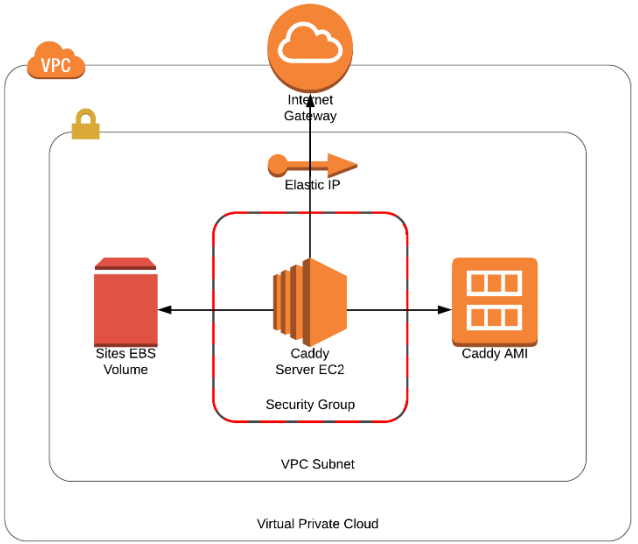
- **Google Compute Engine - GCE**
  - It's the Infrastructure as a Service (IaaS)
  - Enables users to lanch Virtual Machines on demand
  - VMs can be launched from the **standard images** or **custom images**
  - An image is a persistent disk that contains the OS and root file system that is necessary for starting an instance



Virtualization in AWS

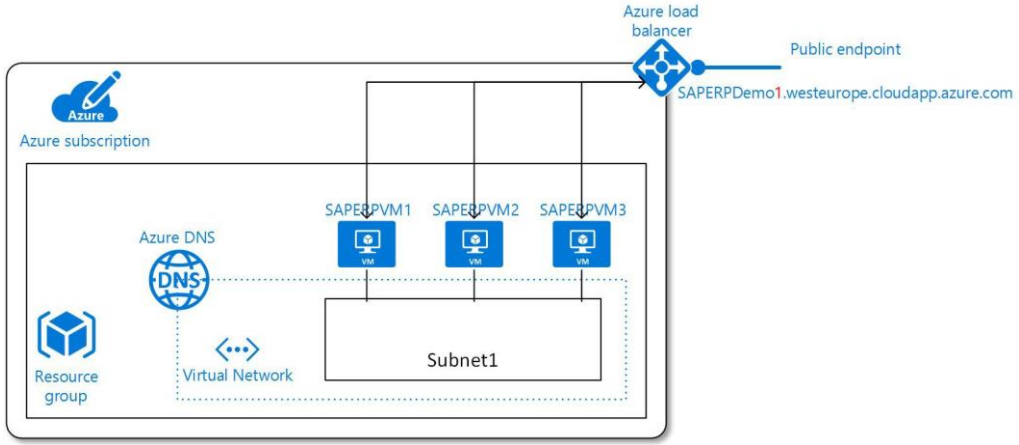
- **Amazon Elastic Compute Cloud – EC2**
  - Provides scalable computing capacity in AWS
  - Launch as many or as few virtual servers (instances) as you need
  - Preconfigurable templates for your instances
  - Amazon Machine Images (AMIs)

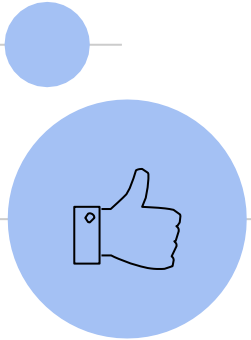
Amazon
EC2



Virtualization in Azure

- **Azure Virtual machines**
  - Provides scalable computing capacity in Azure
  - Deploying virtual machines featuring up to 416vCPUS and 12TB memory
  - Templates for your instances





Thanks!

Any Questions ?

You can find me at

https://www.linkedin.com/in/alberto-hernandez-cantos-9502a8a3/

alhercan@gmail.com