1

Introducción a la computación en la nube

Conceptos y mecanismos

1 Descripción

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

"a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service to external customers using Internet technologies"

"a standardized IT capability (services, software, or infrastructure) delivered via Internet technologies in a pay-per-use, self-service way"

"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction"

"Cloud computing is a specialized form of distributed computing that introduces utilization models for remotely provisioning scalable and measured resources."

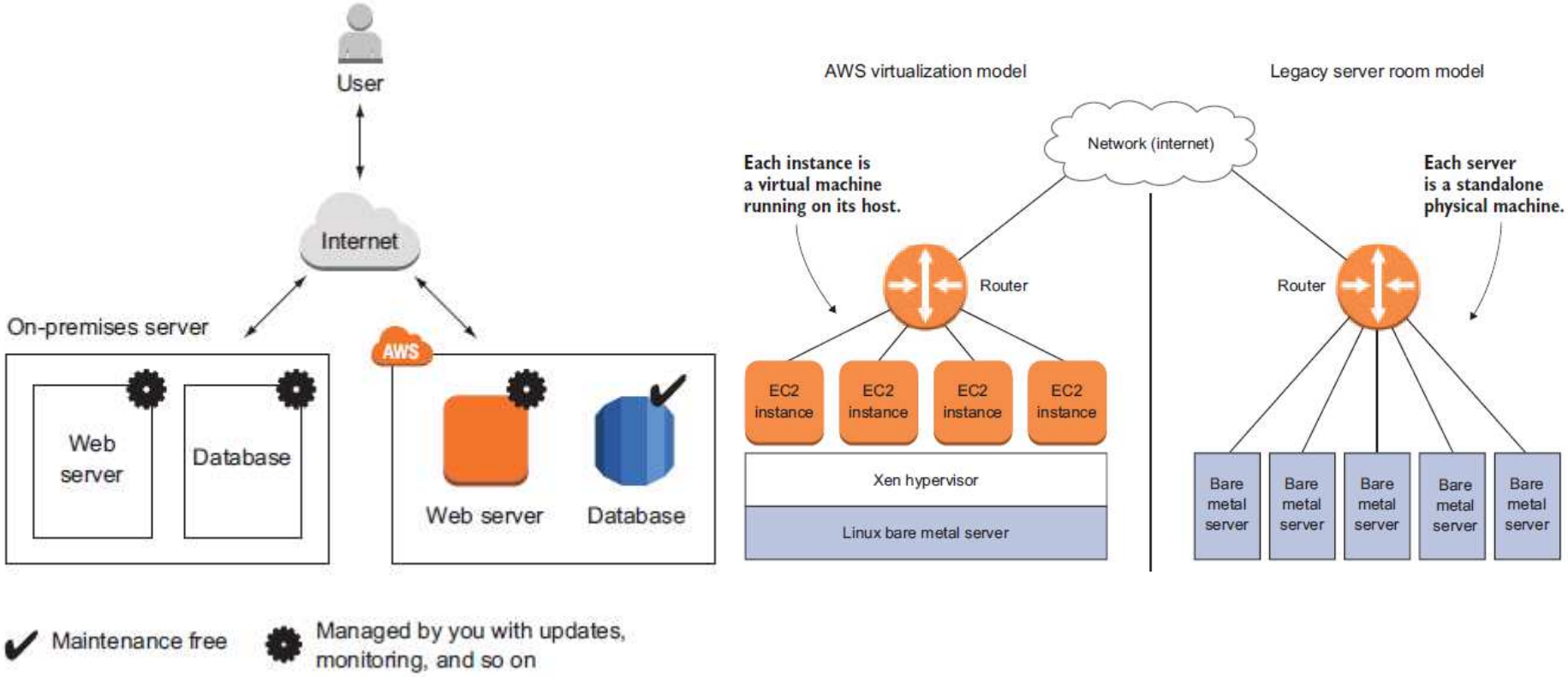
1 Conceptos básicos

- ¿Que es el Cloud?
- En 2006amazon comienza a alquilar y vender sus recursos IT mediante el uso de API y herramientas

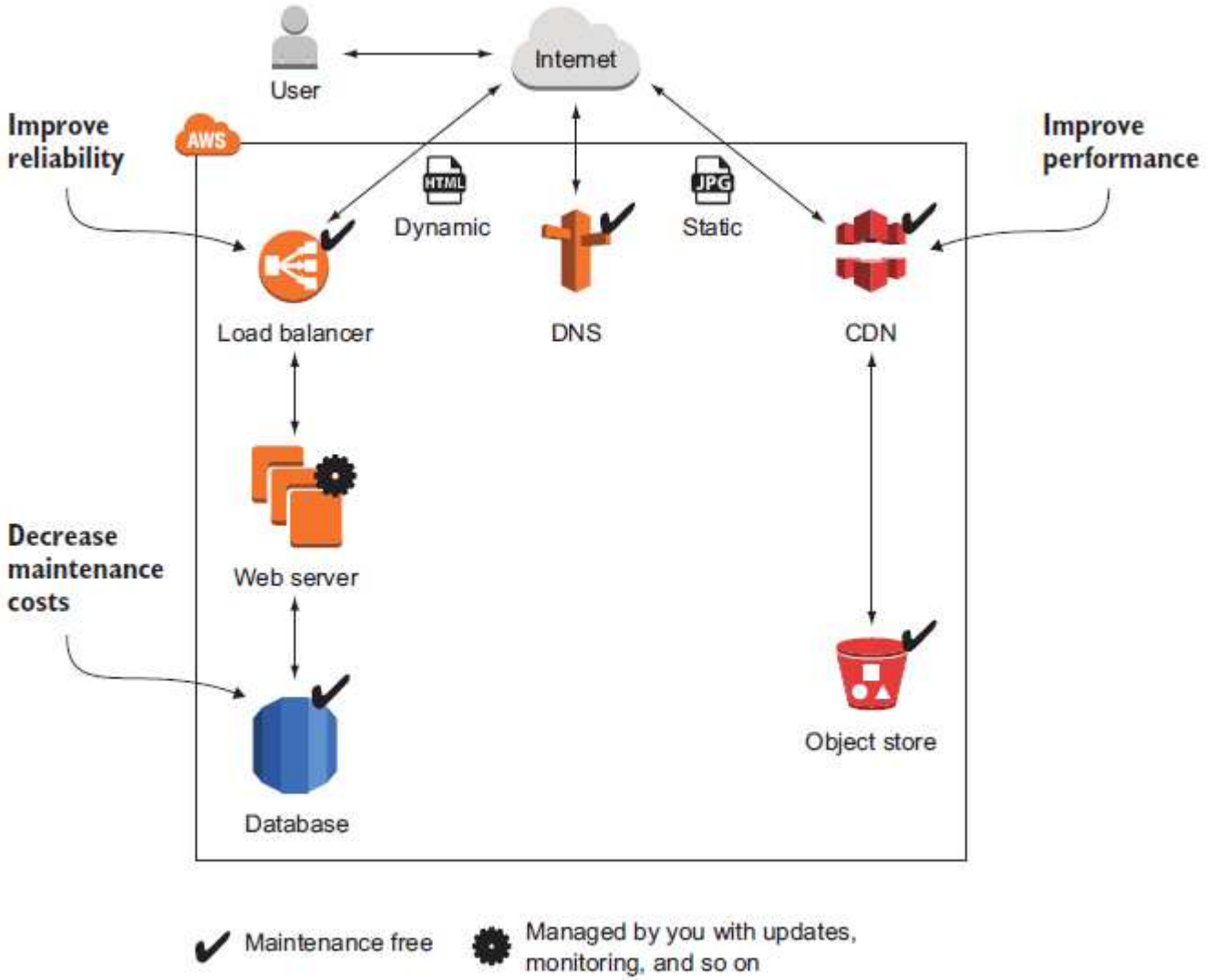
https://aws.amazon.com/es/what-is-cloud-computing/

1 Conceptos básicos

- Cloud vs On-Premise



1 Servicios Cloud y Beneficios



1 Práctica

Práctica 1.1 "*Despliegue de un blog Wordpress en la nube mediante el servicio **IAAS** EC2 de AWS*"

Pre-requisito: *Cuenta Alumno AWS Educate (Starter Account or Classrooms)*

Objetivo: Obtener una visualización inicial de como están organizados los servicios de un proveedor CLOUD para facilitar la transición a la tecnología CLOUD. Utilizar un servicio IAAS con el objetivo de entender los fundamentos y elementos principales de los servicios CLOUD. Entender que es un servicio CLOUD

- Link a los pasos a realizar??

1 Beneficios

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- Gestión de la capacidad de los recursos digitales
  - Demanda vs Capacidad
- Reducción de costes y mantenimiento de los recursos digitales
  - Pago por uso
  - Alquiler de recursos
- Agilidad de operaciones en la empresa
  - Gestión de costes

1.1 Beneficios

Trade capital expense for variable expense

Benefit from massive economies of scale

Stop guessing about capacity

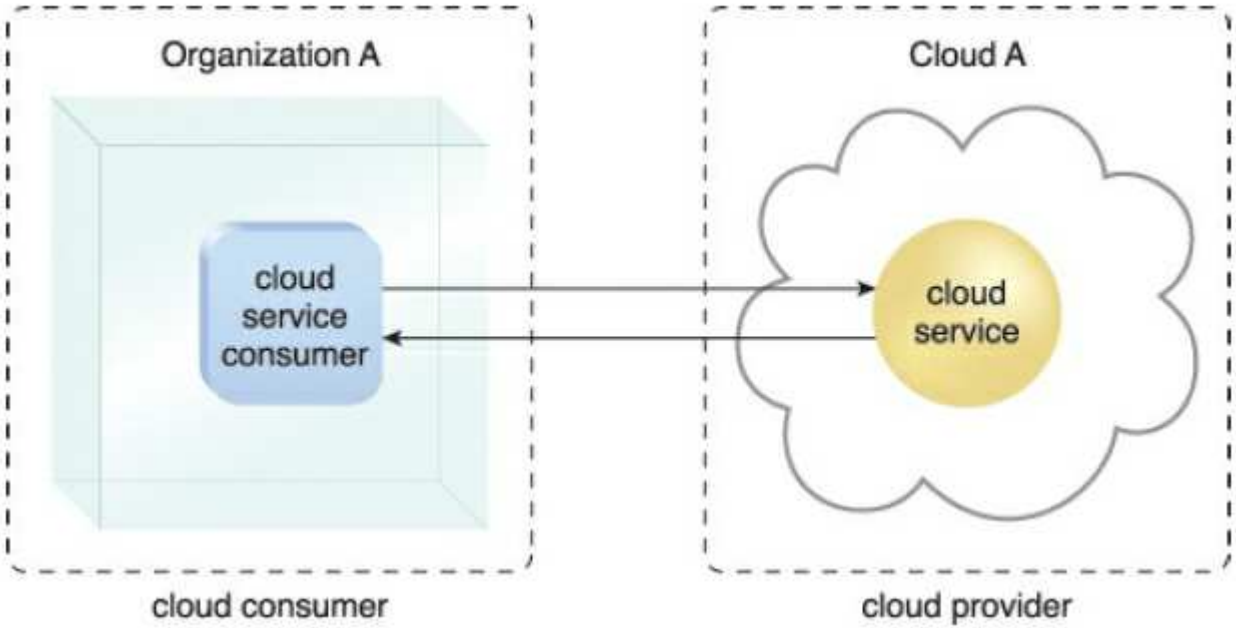
Increase speed and agility

Focus on what matters

Go global in minutes

1 Roles Principales

- Cloud Provider vs Cloud Consumer



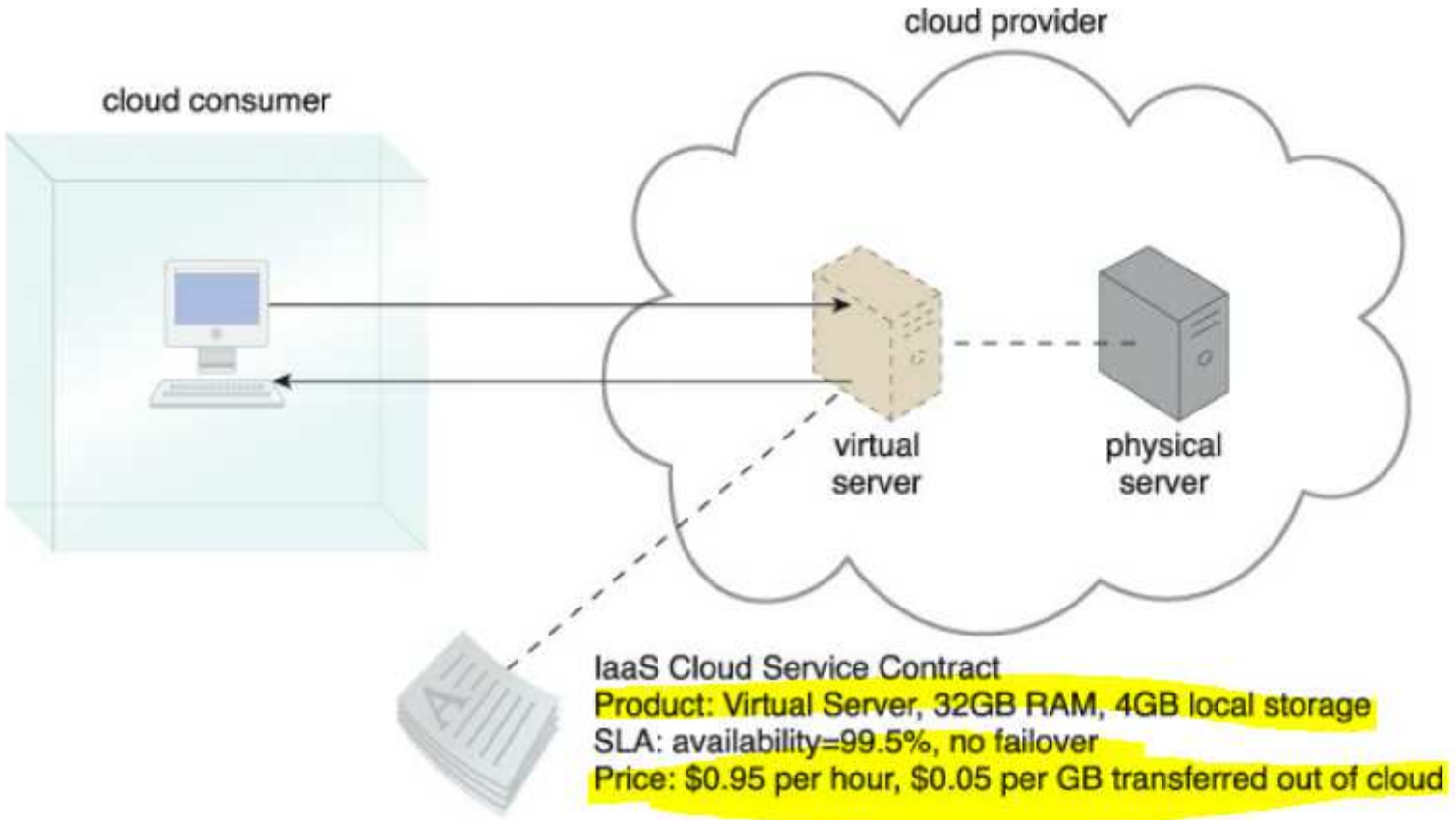
1 Cloud Delivery Model

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- **IaaS**
  - Ej. Servicio EC2 de AWS , Elastic Block Storage, Auto-Scalling , Elastic Load Balancing,…
  - Requiere crear los servidores , la infraestructura de red , etc
  - Ofrece las herramientas para crear la infraestrucutra
- **PaaS**
  - Ej. Servivio Elastic Beanstalk de AWS , Heroku , …
  - Ofrece servidores con los SDK necesarios para el desarrollo. Son servidores listos para trabajar
    - SDK de Python , Node , Java , PHP , …
  - No requiere configuración del sistema
- **SaaS**
  - Ej.: Gmail, Google Docs , …
  - Uso de software por demanda
  - AWS SaaS Partner Program https://aws.amazon.com/es/partners/saas-factory/ https://aws.amazon.com/es/partners/saas-factory/saas-architecture-overview/ https://www.youtube.com/watch?v=kmVUbngCyOw https://github.com/aws-quickstart/saas-identity-cognito https://aws-quickstart.s3.amazonaws.com/saas-identity-cognito/doc/saas-identity-and-isolation-with-cognito-on-the-aws-cloud.pdf
  - https://d36cz9buwru1tt.cloudfront.net/SaaS_whitepaper.pdf

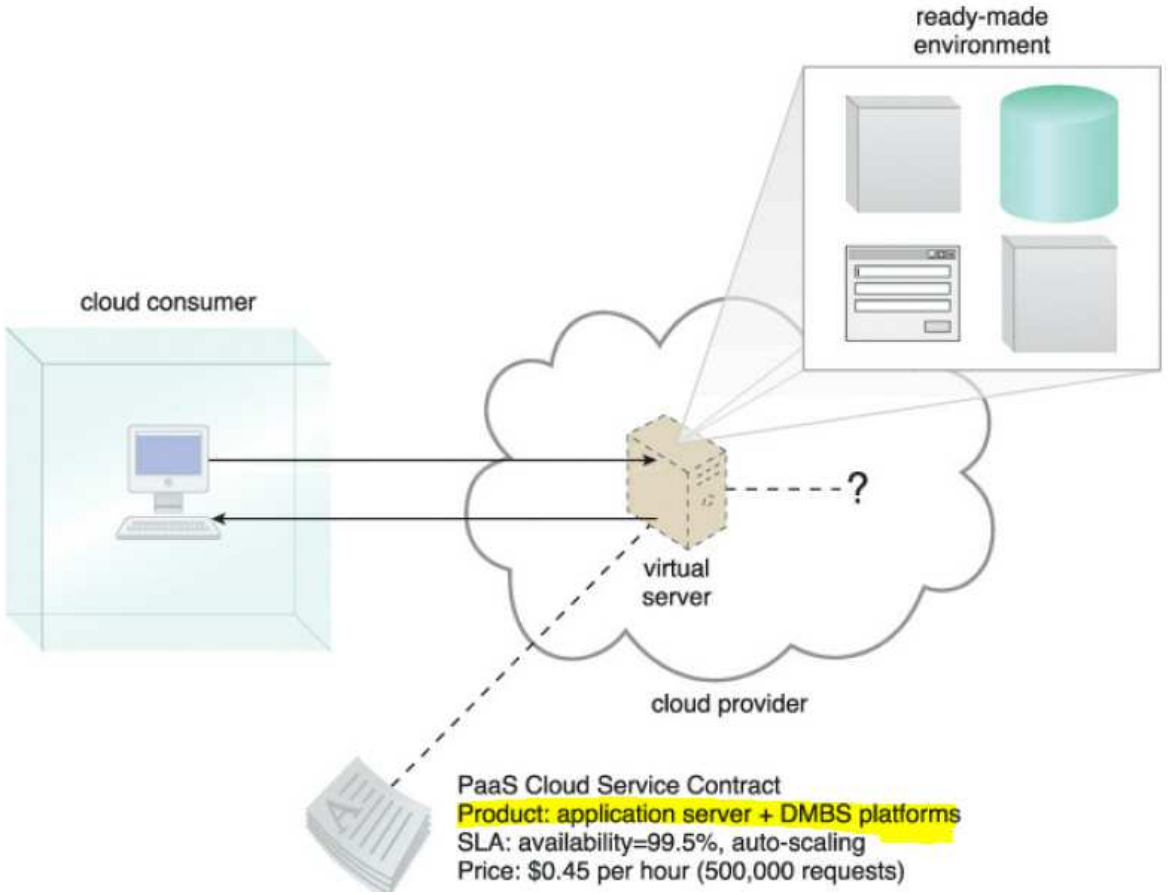
1 Cloud Delivery Model

- IaaS



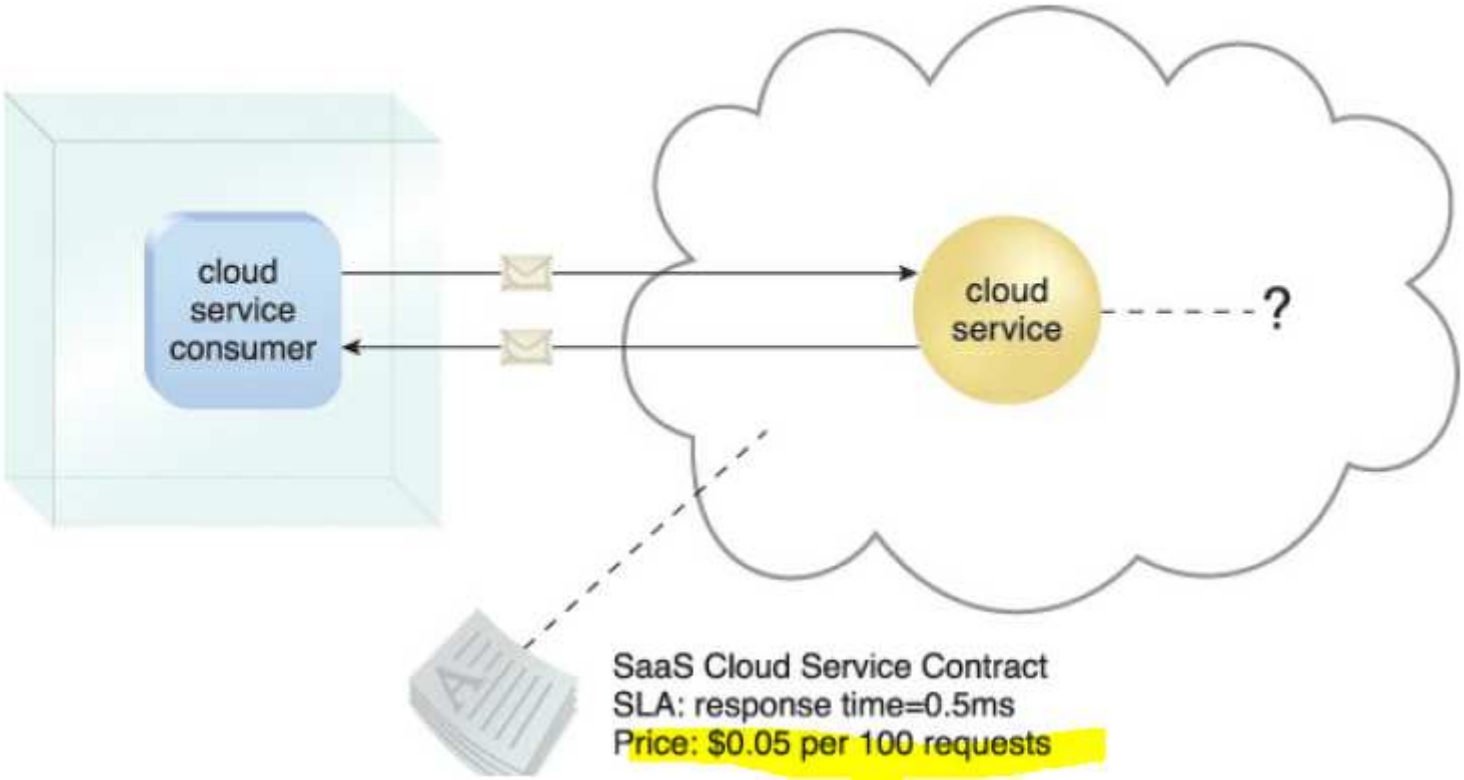
1 Cloud Delivery Model

- PaaS



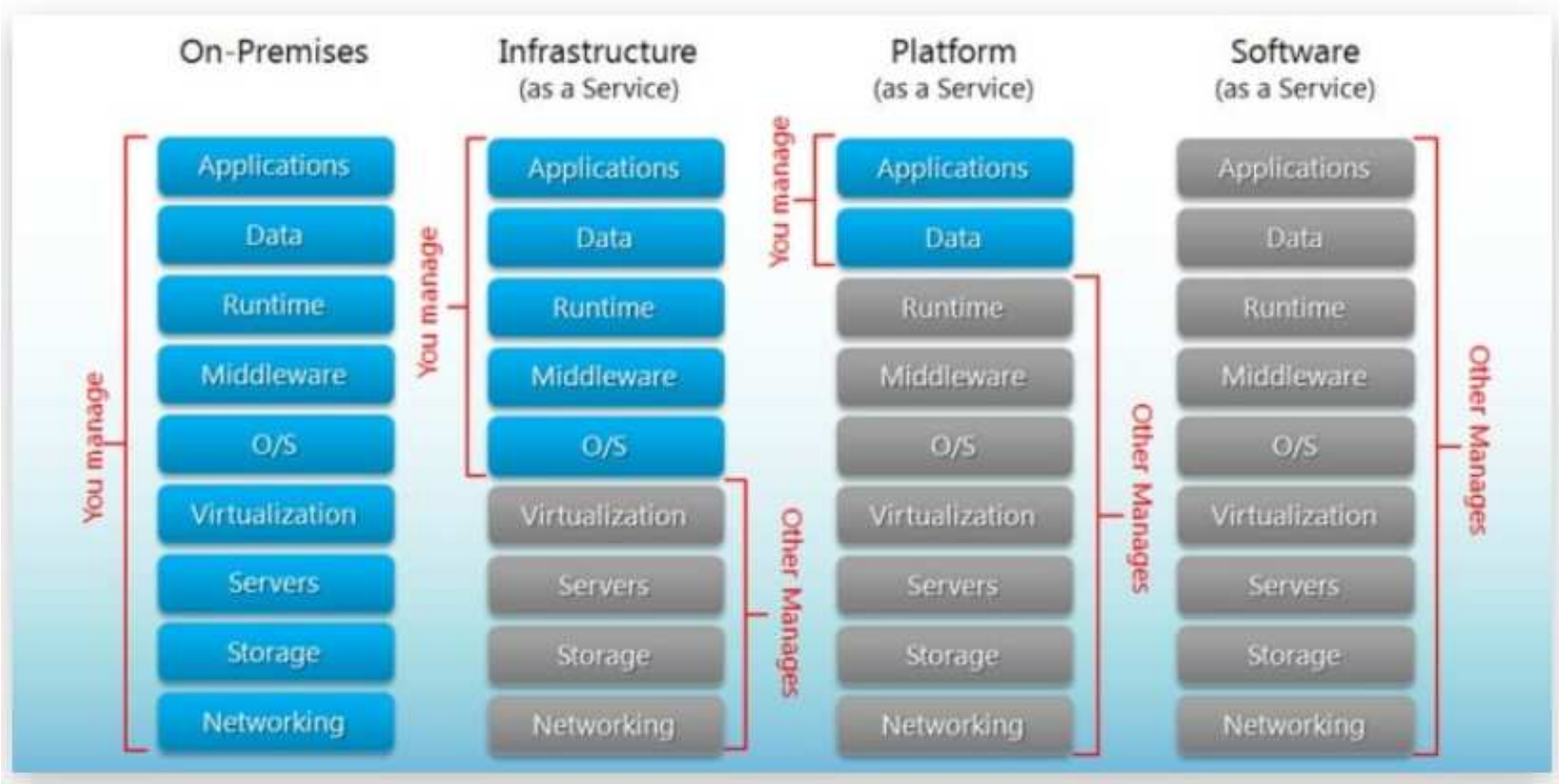
1 Cloud Delivery Model

- SaaS



1 Cloud Delivery Model

- **Punto de vista Usuario/Consumidor**



1 Cloud Delivery Model

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- Tipo de acceso y control

Cloud Delivery Model	Typical Level of Control Granted to Cloud Consumer	Typical Functionality Made Available to Cloud Consumer
SaaS	usage and usage-related configuration	access to front-end user-interface
PaaS	limited administrative	moderate level of administrative control over IT resources relevant to cloud consumer's usage of platform
IaaS	full administrative	full access to virtualized infra-structure-related IT resources and, possibly, to underlying physical IT resources

1 Cloud Delivery Model

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- **Actividades**

Cloud Delivery Model	Common Cloud Consumer Activities	Common Cloud Provider Activities
SaaS	uses and configures cloud service	implements, manages, and maintains cloud service monitors usage by cloud consumers
PaaS	develops, tests, deploys, and manages cloud services and cloud-based solutions	pre-configures platform and provisions underlying infrastructure, middleware, and other needed IT resources, as necessary monitors usage by cloud consumers
IaaS	sets up and configures bare infrastructure, and installs, manages, and monitors any needed software	provisions and manages the physical processing, storage, networking, and hosting required monitors usage by cloud consumers

1 Cloud Deployment Model

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- **Cloud Publico , Cloud Privado , Híbridos**
- Proveedores CLOUD públicos:
  - AWS , Google Cloud, Digital Ocean , Heroku , …
  - https://www.zdnet.com/article/top-cloud-providers-2019-aws-microsoft-azure-google-cloud-ibm-makes-hybrid-move-salesforce-dominates-saas/
- Para crear CLOUD privados herramientas como OpenStack

1 Tecnologías necesarias

- Clustering
- Grid Computing
- Tecnología de Virtualización
- Tecnología Multitenant
- Isolation
- Broadband networks and internet architecture
- Data Center Technology
  - Virtualization
  - Remote managment and operation
  - High availability
  - Computing Hardware
  - Storage Hardware
  - Network Hardware
- Tecnología WEB
- Tencolgía de Servicios (APIs)
- Seguridad

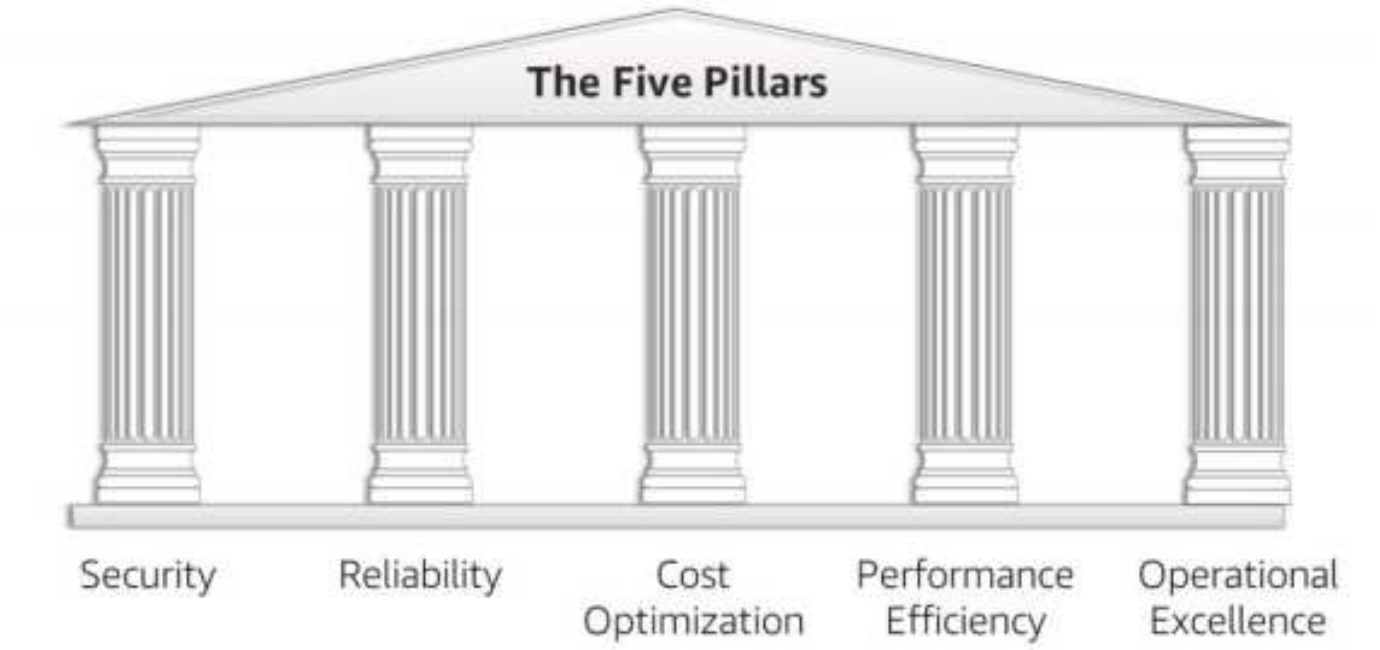
1 Características de los servicios CLOUD

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- Escalabilidad
  - Horizontal*
  - Vertical
- Elasticidad (auto-scaling)
- High Availability
  - Regiones
  - Zonas
- Automatización de operaciones
- Seguridad
- Monitorización
- Pago por uso

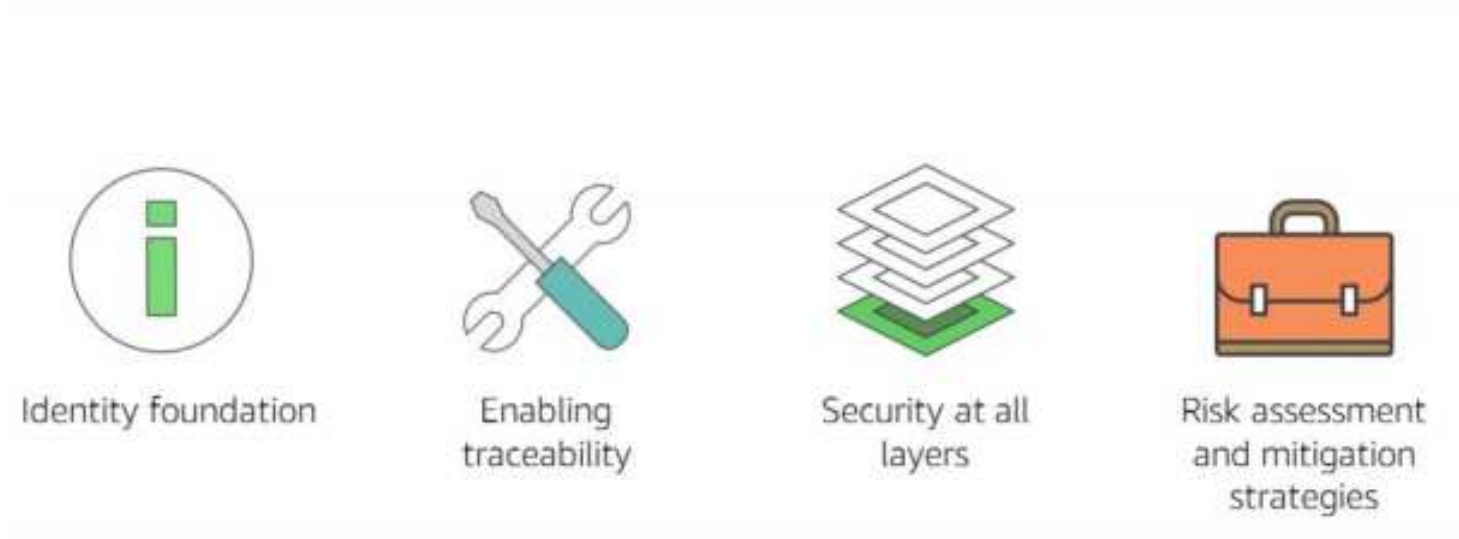
1 Características de los servicios CLOUD

- Conceptos a tener en cuenta en el uso de los servicios CLOUD: Cloud Well-Architected-Framnework
- En el PBL se os preguntara por estos 5 pilares



1 Cloud Well-Architected-Framnework

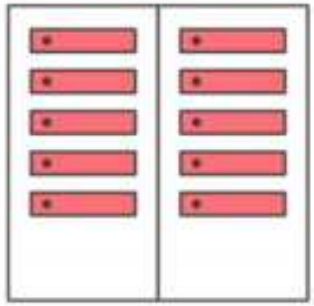
- Security



1 Cloud Well-Architected-Framnework

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- Reliability
  - Dynamically acquire computing resources to meet demand
  - Recover quickly from infrastructure or service failures
  - Mitigate disruptions such as:
    - Misconfigurations
    - Transient network issues



1 Cloud Well-Architected-Framnework

Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- Cost-Efficiency
  - Measure efficiency
  - Eliminate unneeded expense
  - Consider using managed services

1 Cloud Well-Architected-Framnework

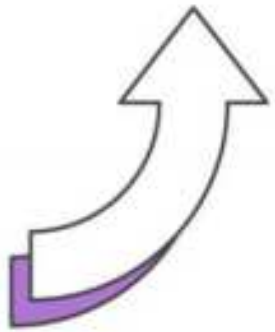
- Excelencia operacional

  - The ability to run and monitor systems
  - To continually improve supporting process and procedures

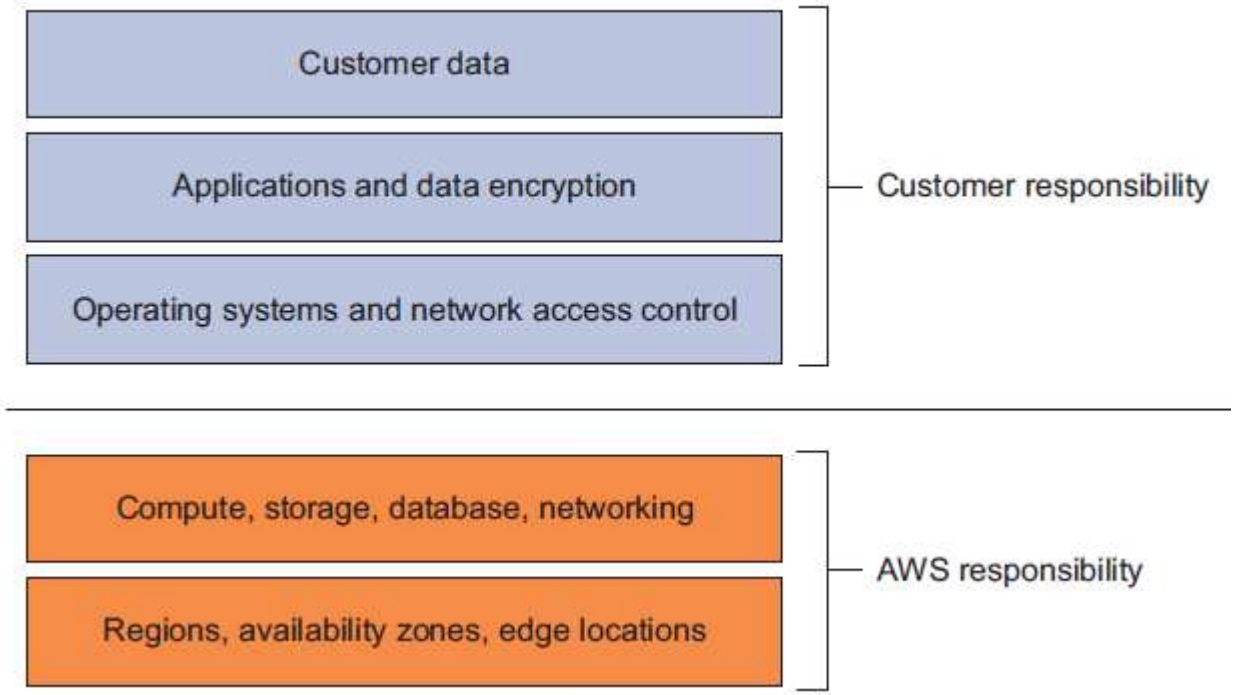
1 Cloud Well-Architected-Framnework

- Eficiencia del rendimiento

  - Choose efficient resources and maintain their efficiency as demand changes
  - Democratize advanced technologies
  - Mechanical sympathy

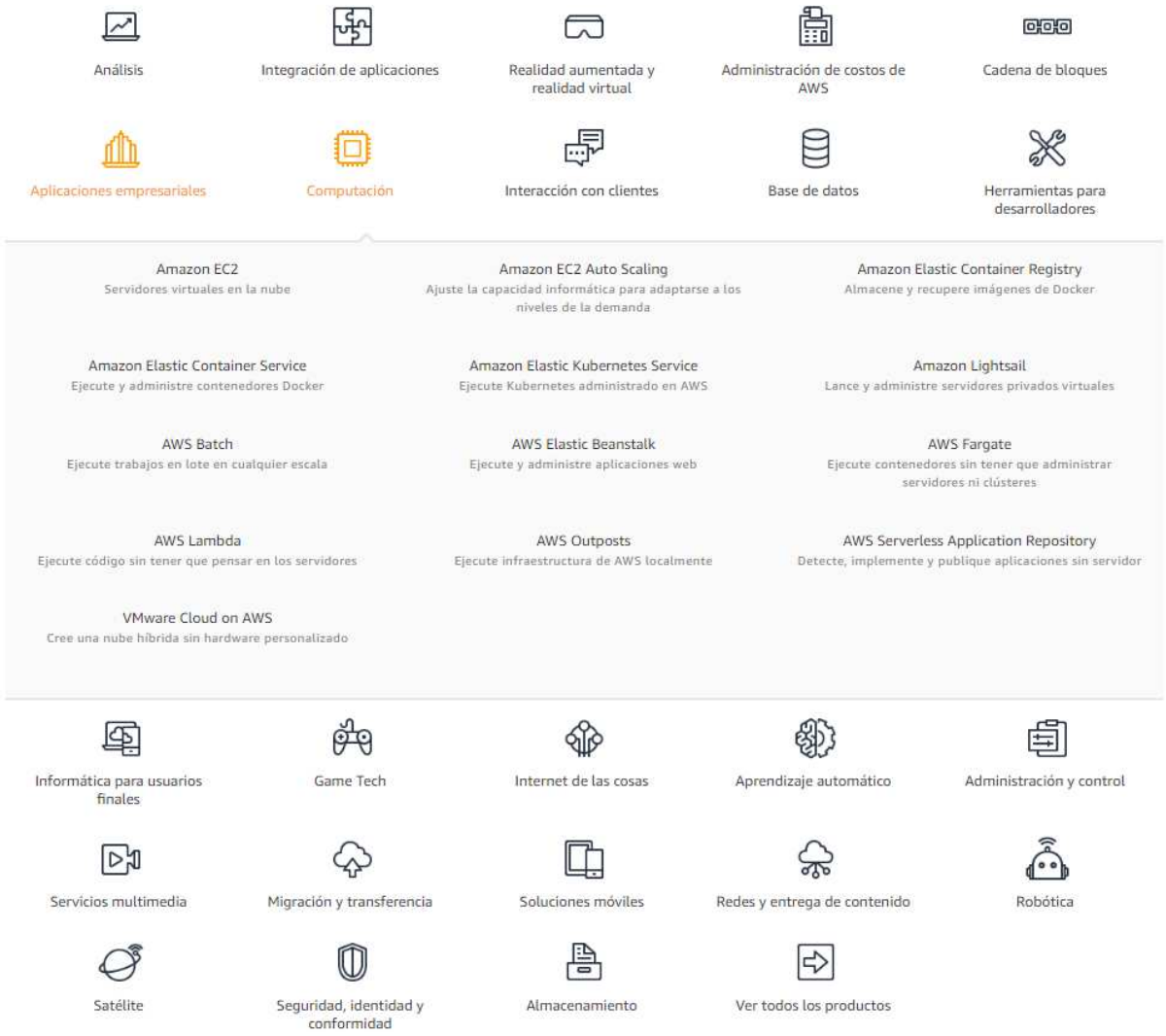


1 Responsabilidades de operaciones



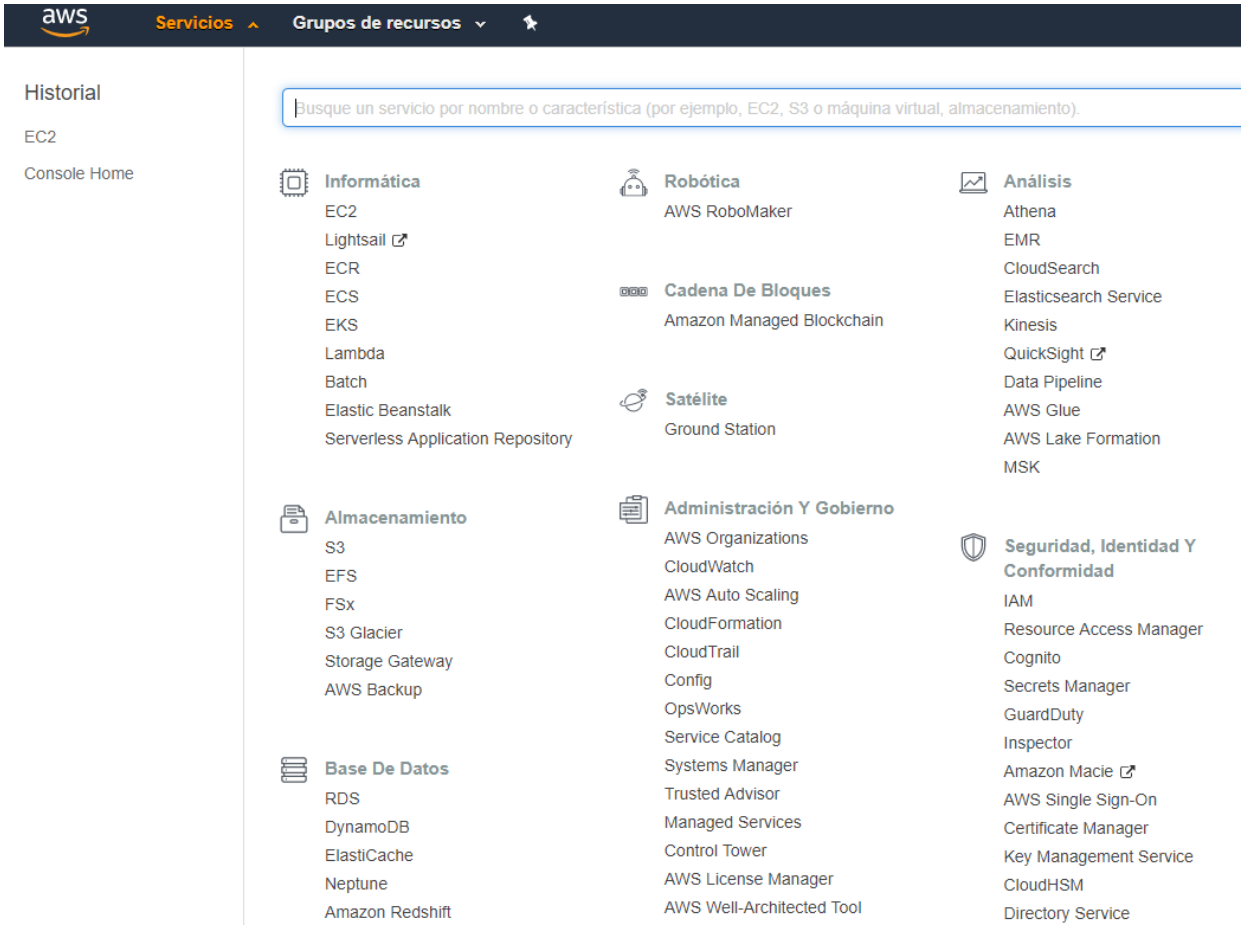
1 Servicios CLOUD

- Ejemplo AWS



1 Servicios CLOUD

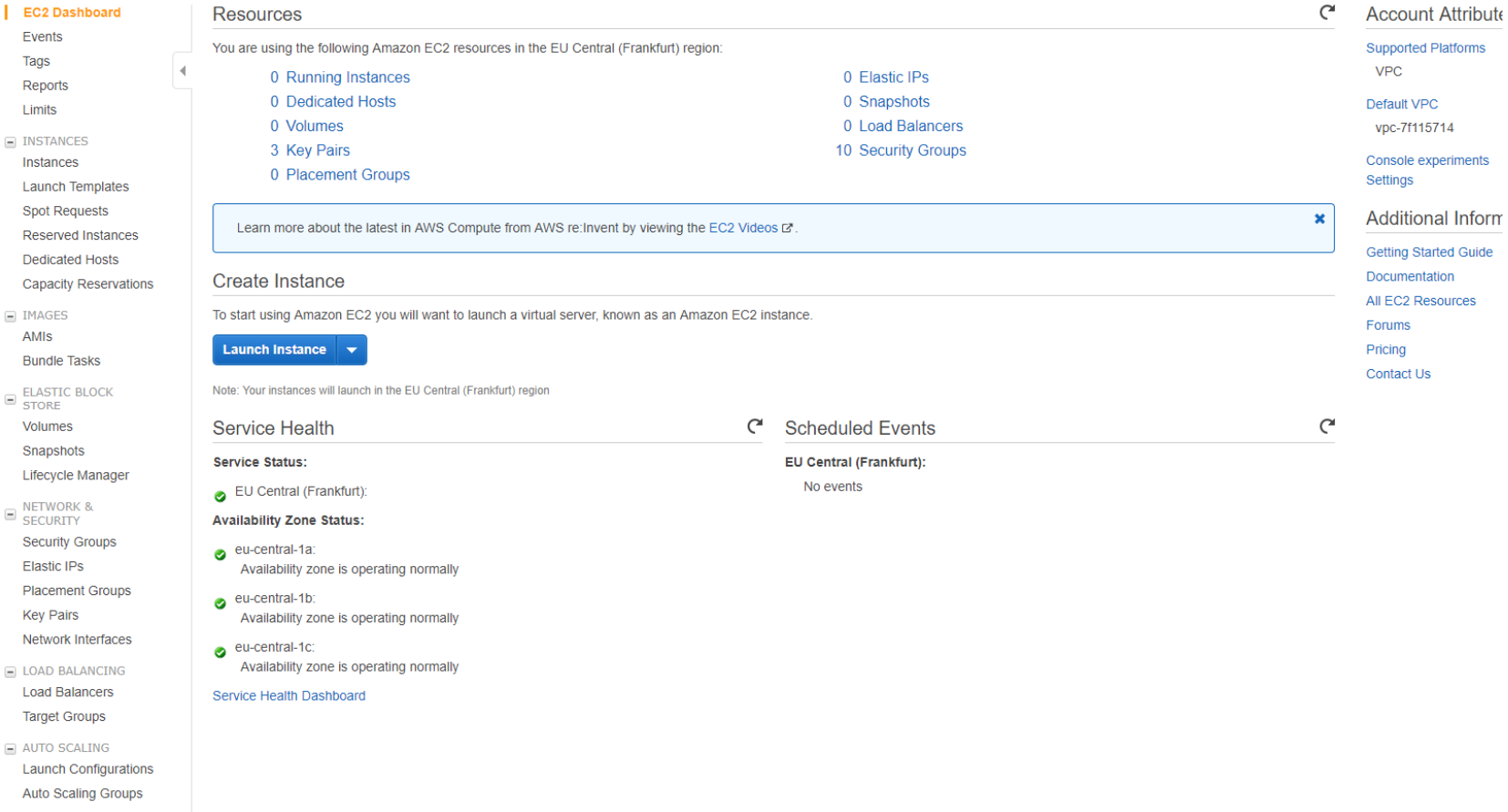
- Consola administración AWS



1 Servicios CLOUD

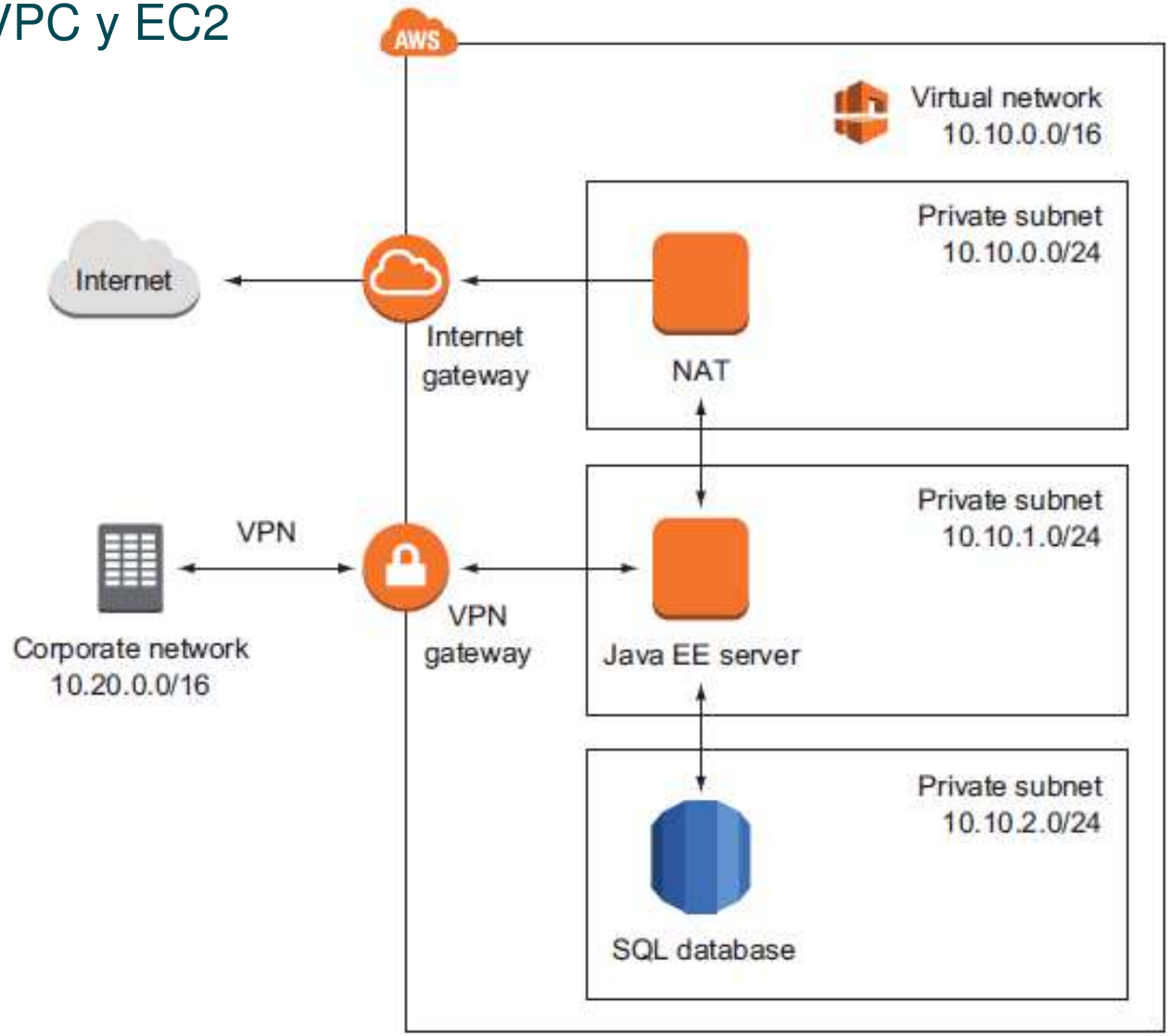
Mondragon Unibertsitatea
Goi Eskola Politeknikoa

- Ejemplo AWS EC2



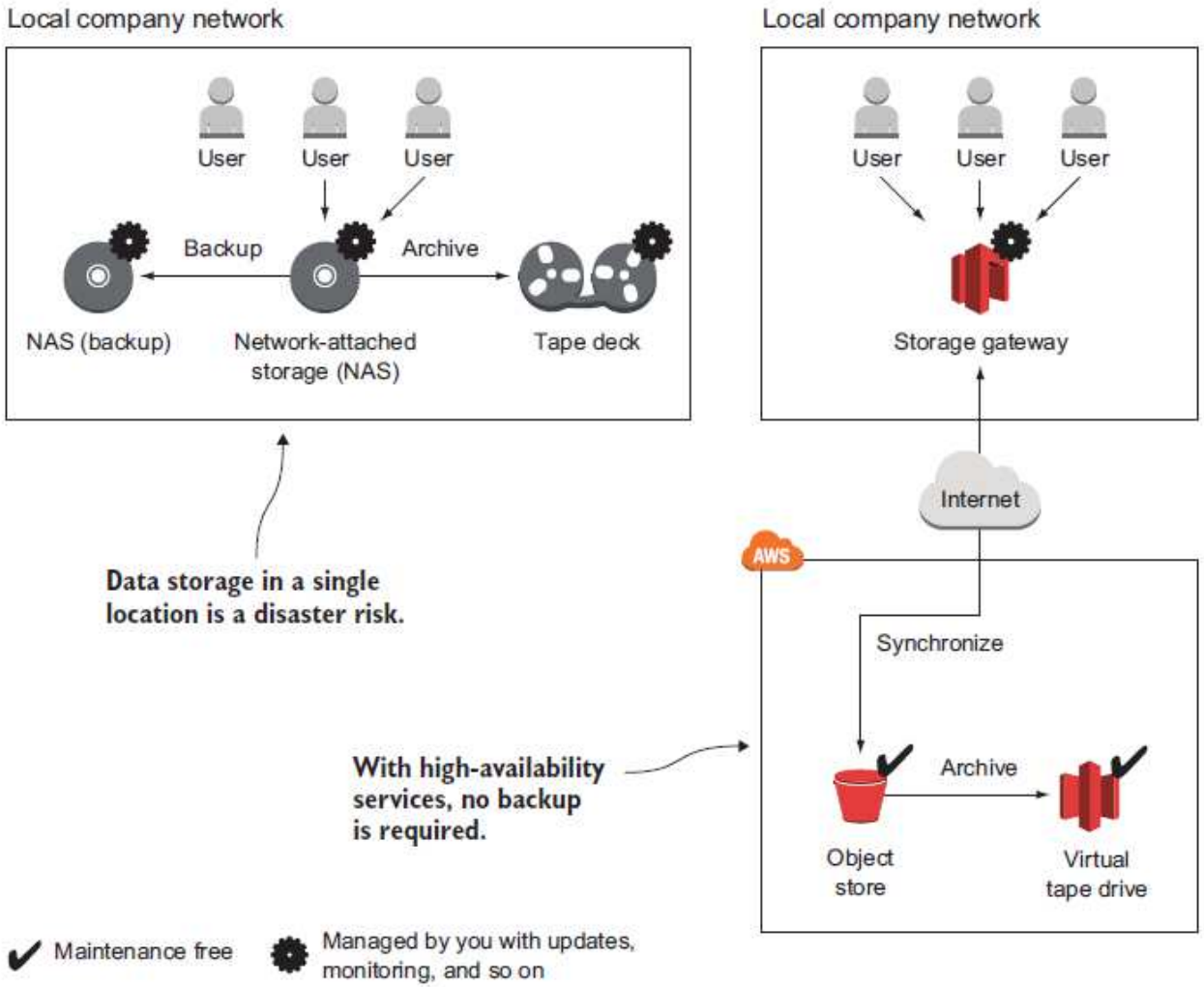
1 Servicios CLOUD

- VPC y EC2



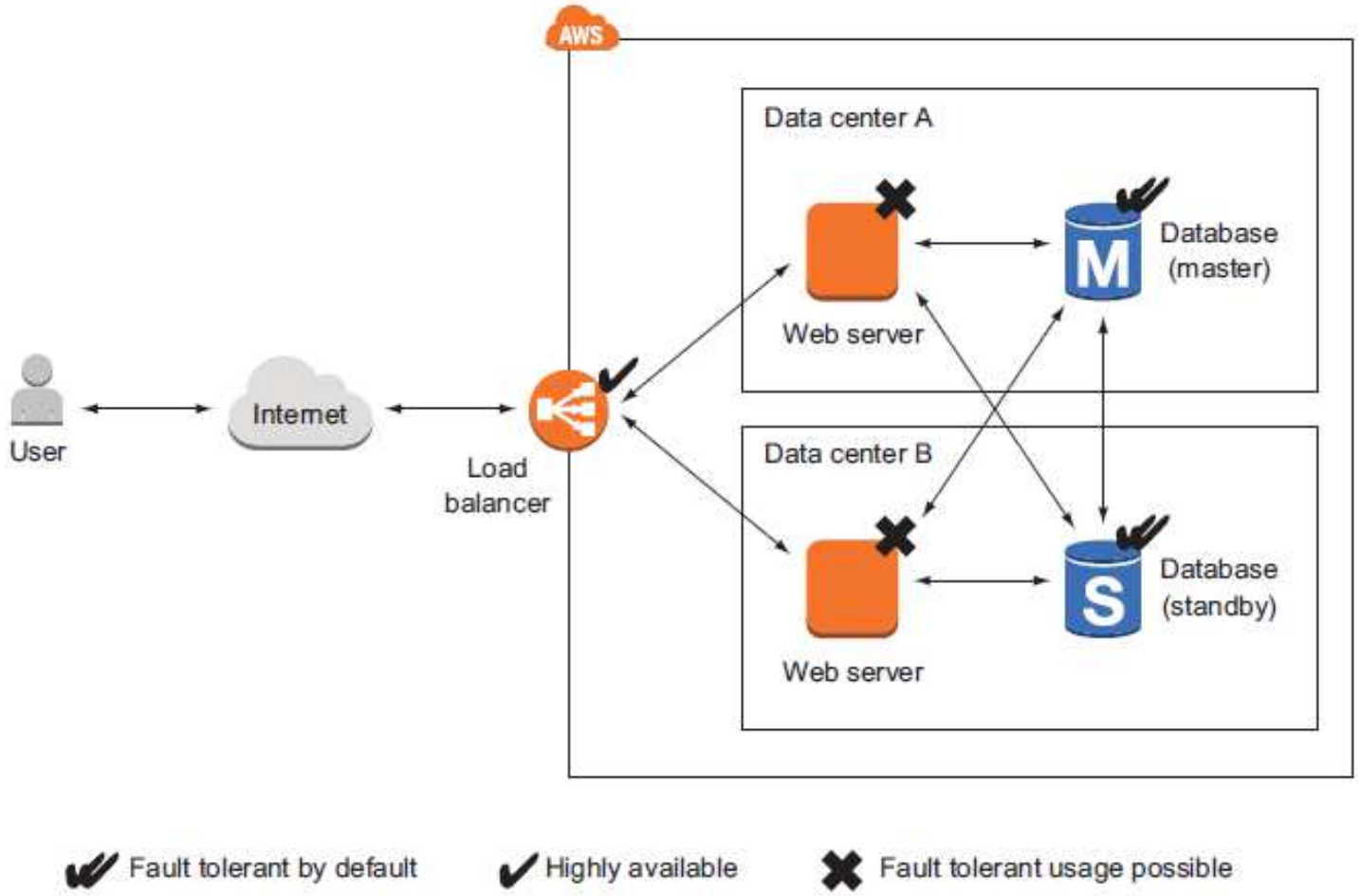
1 Servicios CLOUD

- Alamacenamiento



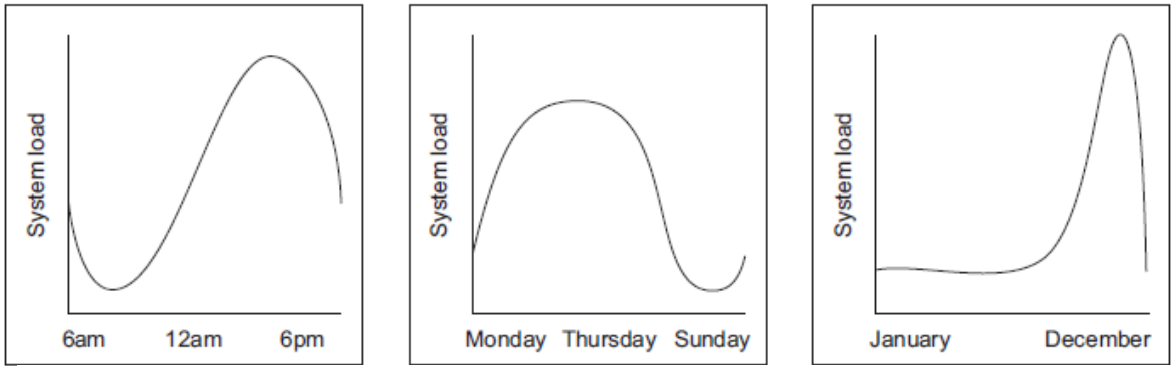
1 Servicios CLOUD

- Balanceo de carga y disponibilidad



1 Servicios CLOUD

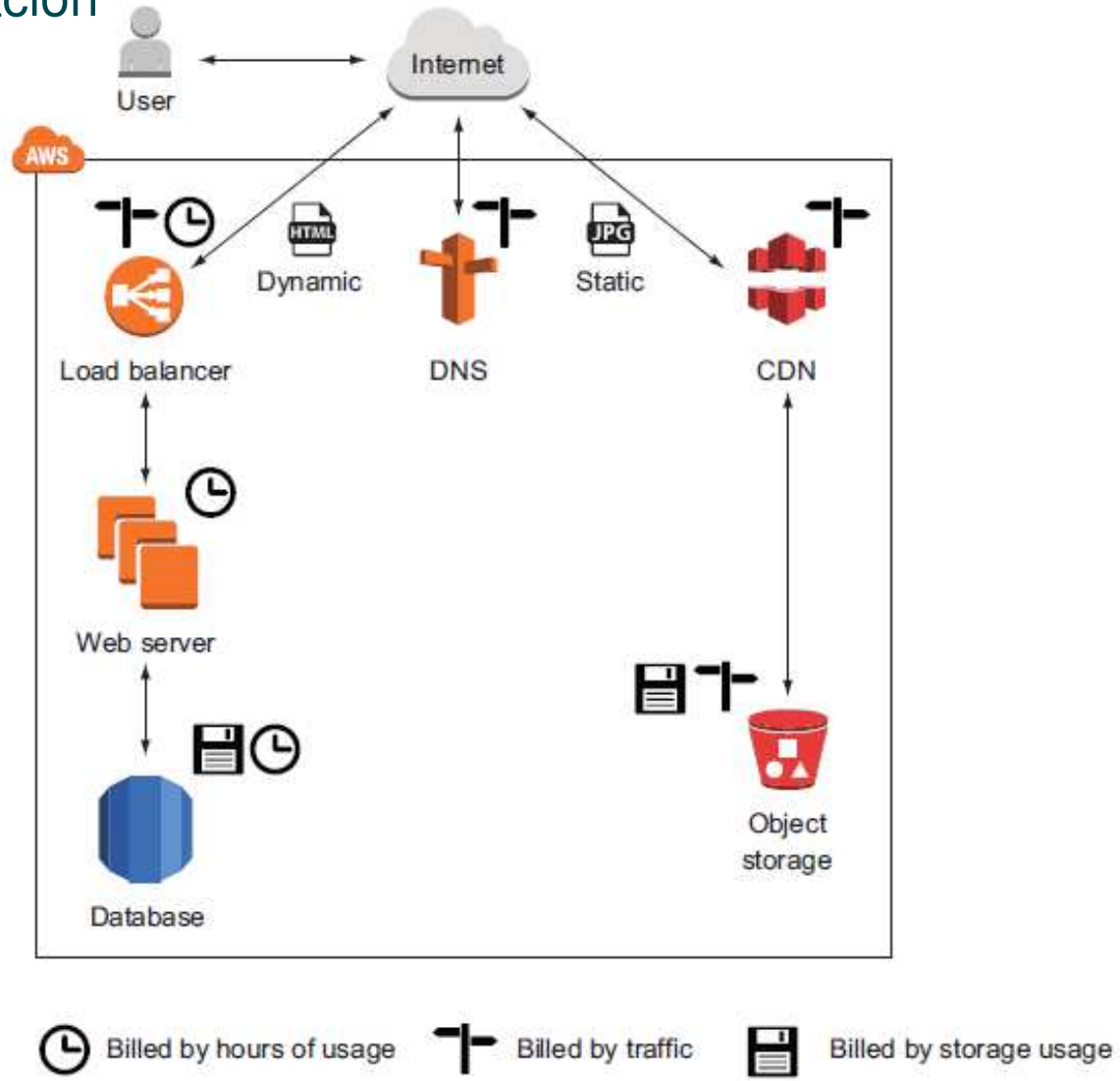
- Escalabilidad y costo



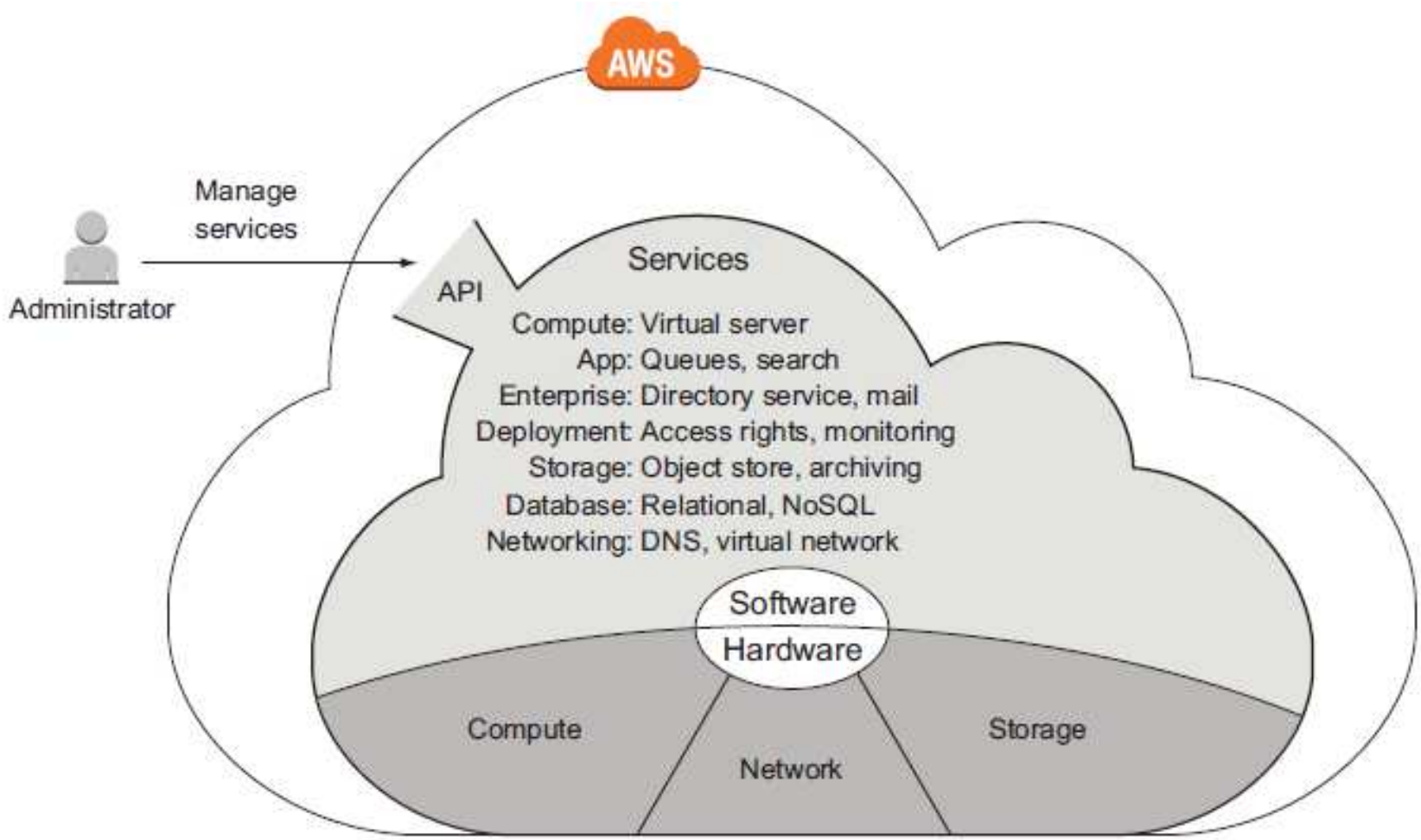
Service	January usage	February usage	February charge	Increase
Visits to website	100,000	500,000		
CDN	26 M requests + 25 GB traffic	131 M requests + 125 GB traffic	113.31 USD	90.64 USD
Static files	50 GB used storage	50 GB used storage	1.50 USD	0.00 USD
Load balancer	748 hours + 50 GB traffic	748 hours + 250 GB traffic	20.30 USD	1.60 USD
Web servers	1 server = 748 hours	4 servers = 2,992 hours	204.96 USD	153.72 USD
Database (748 hours)	Small server + 20 GB storage	Large server + 20 GB storage	170.66 USD	128.10 USD
Traffic (outgoing traffic to internet)	51 GB	255 GB	22.86 USD	18.46 USD
DNS	2 M requests	10 M requests	4.50 USD	3.20 USD
Total cost			538.09 USD	395.72 USD

1 Servicios CLOUD

- Facturación

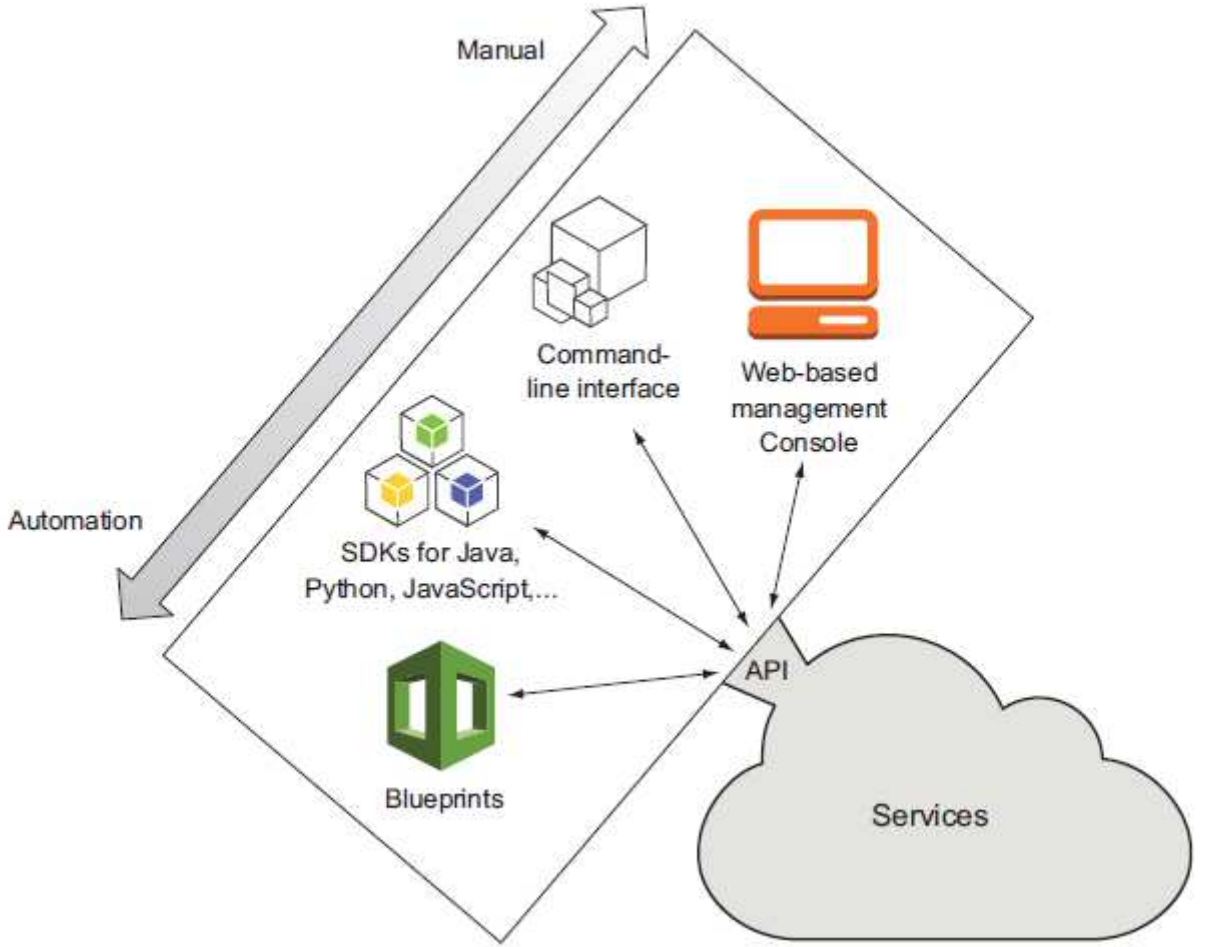


1 Servicios CLOUD



1 Servicios CLOUD

- Uso de los servicios



1 Objetivo del Modulo

- Ejemplo con AWS