1. Cloud
2. Cloud Computing
3. Cloud Native

A B C

Solutions

Advantage Business Consultancy

1
Cloud

2
Storage &
Server @Edge
Cloud Computing

3
Network
Storage & Server
Cloud Native

Cloud vs Cloud Native vs Cloud computing

▶ **Cloud** is the process of virtualization, or decoupling hardware from the software applications

Cloud computing infrastructure (hardware/servers), storage, databases and APPs services via the internet eg AWS, Microsoft Azure, Google GCP.

▶ **Cloud Native** is the network architecture for assembling and optimize the cloud-based components. It's not about the servers, but the services. Cloud Native is the goal for enterprises looking to modernize their infrastructure and process, and even organizational culture,

▶ **Containers:** after defining the service-based architecture SBA, it needs to containerise them. Containers isolate an application and its dependencies, even its own operating system, into a self-contained unit that can run on any platform, anywhere. Meaning that you can host and deploy duplicate containers worldwide (thanks to your IaaS!) so your operations are flexible, reliable and fast.

▶ **Microservices**: use microservices to break up a monolithic entity into smaller distinct pieces. Ideally, some of these parts can be acquired as an on-demand as-a-service in the cloud.

▶ **Automation:** cloud to deploy more quickly and frequently. If you haven't fully automated your deployment processes, then suddenly your ops staff are spending all that time they save by no longer managing those on-premises servers to instead manually deploy your new, expedited production cycle. Automated deployment takes the grunt work out of constant implementation, while automated testing finds problems before they become crises.

▶ **Orchestration:** Once microservices architecture is in place and containerised, it is time to orchestrate the pieces. This is where Kubernetes comes in, and it is one of the very last things to be done in a Cloud Native migration:
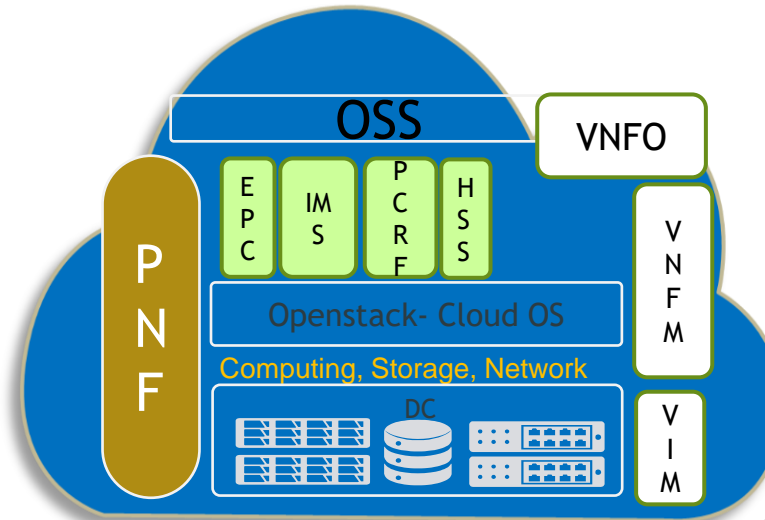
Cloud or Virtualization

▶ From Dedicated and combined Hardware and SW for specific applications

▶ Towards Decouplled HW from Software for multiple applications

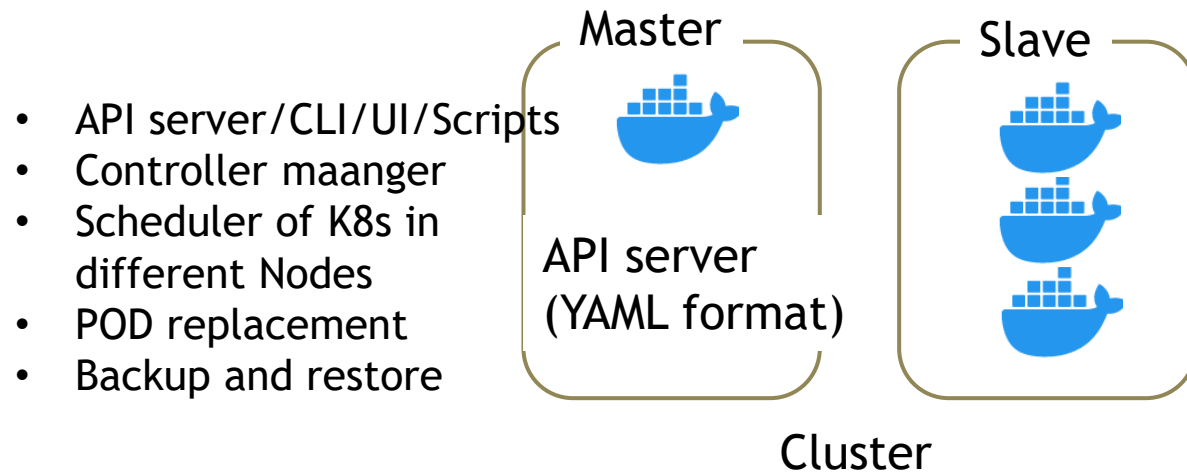Today Core Network:

Multiple networks for Voice, data, sms
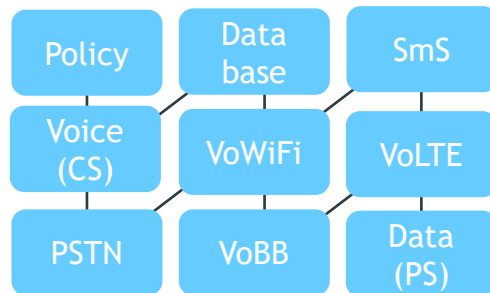
Virtualization (Cloudification)

Edge & Cloud Computing

▶ Virtualized Cloud Computing decomposed in small independent applications (microservices) that run in multiple environment. Based on Containers/Kubernetes/Dockers

  ▶ Open source container orchestration tool to manage CNF (Container network function)

▶ No downtime – high availability of applications → Bandwidth on demand/Dynamic network slicing

▶ Fast loading – high scalability → MEC/Enterprise applications/private networks

▶ Back up and restore – DR Disaster recovery → Cybersecurity solution

- API server/CLI/UI/Scripts
- Controller maanger
- Scheduler of K8s in different Nodes
- POD replacement
- Backup and restore

Master

API server
(YAML format)

Slave

Cluster

- POD: small unit to configure/ multiple containers/extraction layer of containers
- 1 POD per Applications. Each POD with own IP address. New POD gets a new IP address
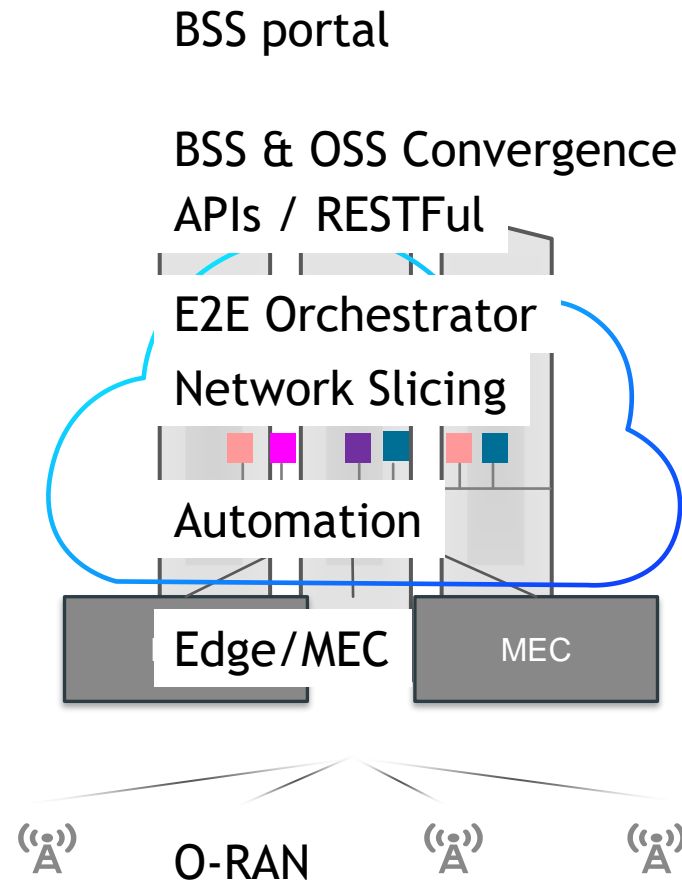- POD+ Service (IP permanent address + Load balance)

5G Cloud Native overview

① Cloud Architecture

- **Service Based architecture SBA**
- **Microservices**
- **HTTP/2 SBI Interface**
- **Cloud with 99.999% reliability and Agility**

② Convergence

- **RAN 2G/3G/4G/5G NSA +SA Convergence**
- **Charging Convergence**
- **Unified Policy convergence**

BSS portal

BSS & OSS Convergence
APIs / RESTFul

E2E Orchestrator

Network Slicing

Automation

Edge/MEC   MEC

O-RAN

③ E2E Orchestration

- **Services in real time**
- **Dynamic & Flexible Multi-dimensional slicing E2E**

④ Automation

- **Autonomous Network**
- **AI enabled**
- **ML enabled**

5G is delivered for specific services

2018 … 2021	2019… 2023	2021… 2026

Readines & maturity is improving as we go along

Cloud is the first step (Core Network)

Edge/ Cloud computing for initial ROI on B2B

Cloud Native to revolutionaise the whole industry
Automation / DevOps/ CI CD for Operational Transformation
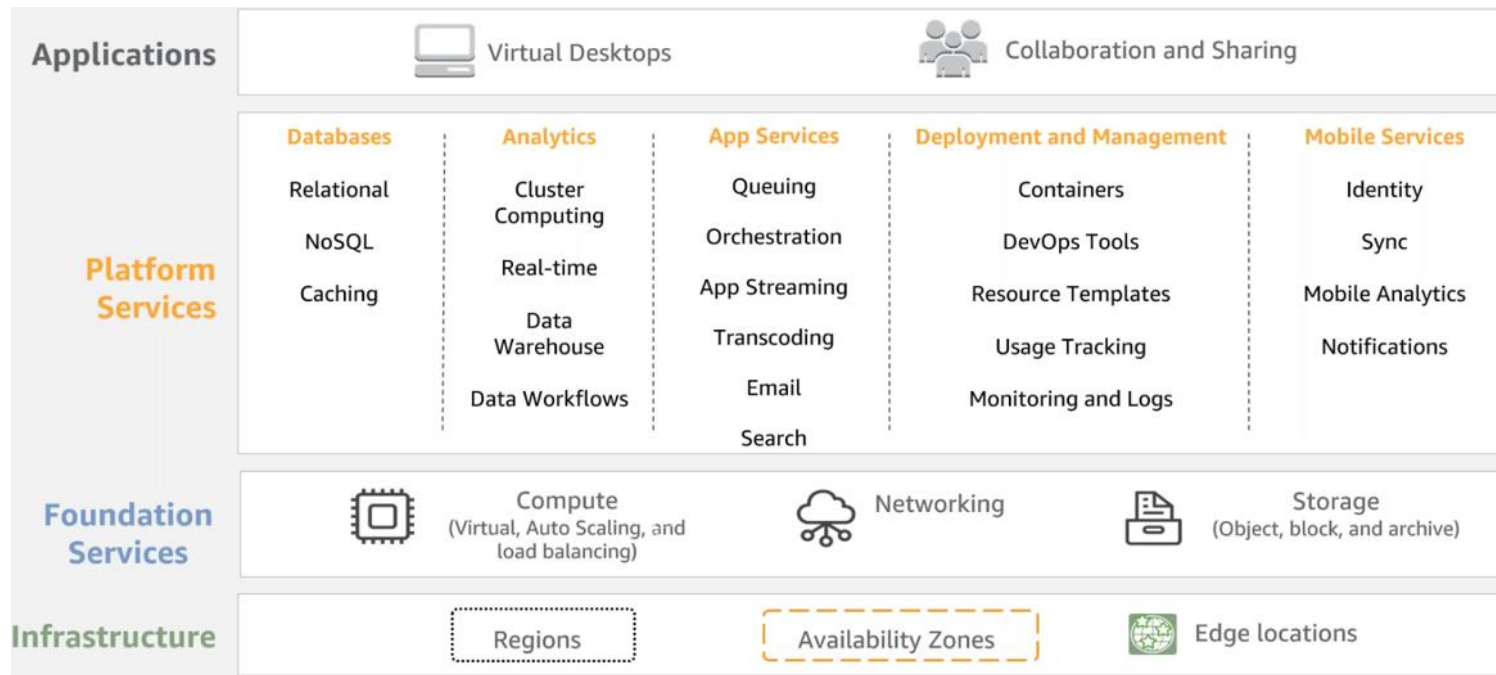
Packaging with Containers
Practices with microservices, monitoring

O-RAN with disaggregation (HW and SW) and openess of all Ifs,
expecailly towards RNC & programmable

E2E Orchestrator/ E2E network Slides / OSS/BSS/ MEC
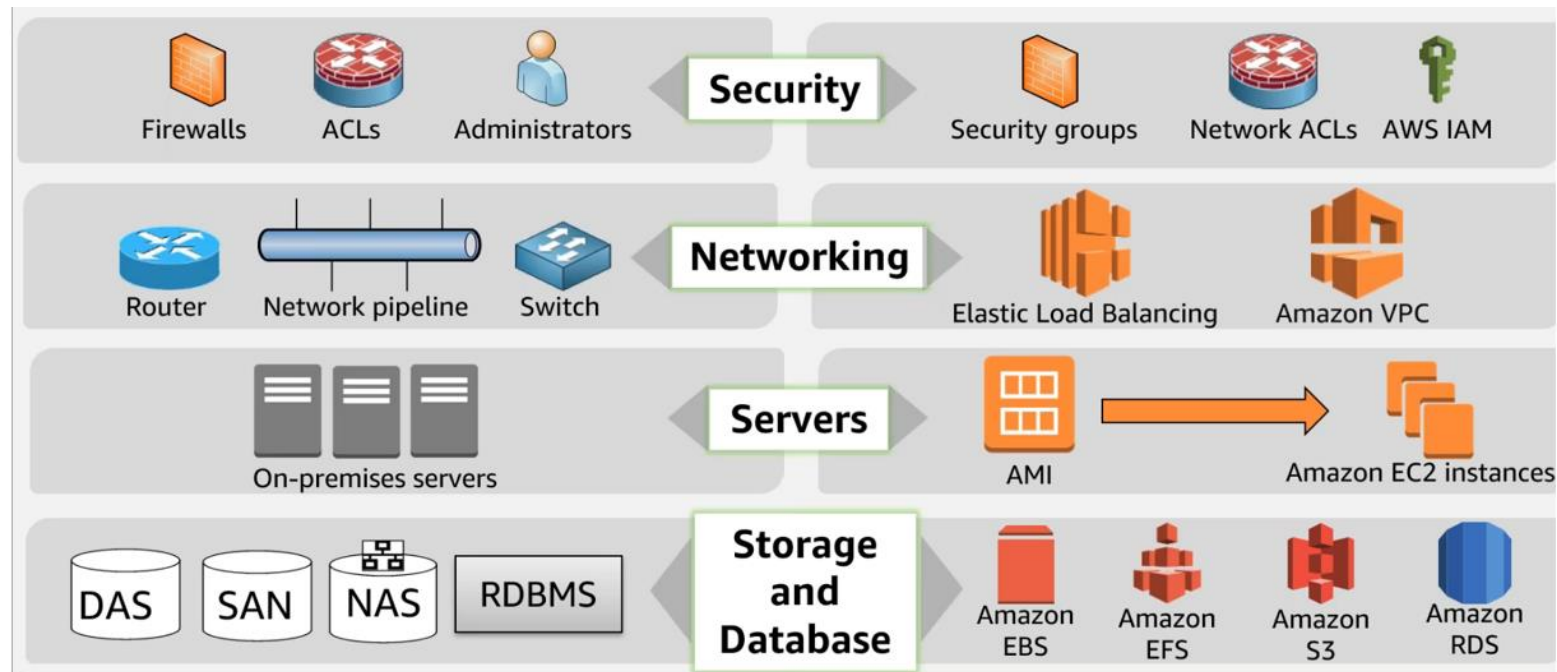
Technology: Cloud Computing and Private Cloud

▶ Extend connections to SME vs Pull the edge closer to SME

▶ Security (Shared responsibility model, DDoS) and Agility (scaling up/down resources +adapting to any change request over time)

▶ Elastic Cloud (autoscaling, Load balancing, SNS,SQS)

▶ Storage & Data base/DB (Elastic store, simpler storage, elastic file storage, Relational DB, Serve less DB, Migration DB)

Applications					
	Virtual Desktops			Collaboration and Sharing	

Platform Services	Databases	Analytics	App Services	Deployment and Management	Mobile Services
	Relational	Cluster Computing	Queuing	Containers	Identity
	NoSQL	Real-time	Orchestration	DevOps Tools	Sync
	Caching	Data Warehouse	App Streaming	Resource Templates	Mobile Analytics
		Data Workflows	Transcoding	Usage Tracking	Notifications
			Email	Monitoring and Logs	
			Search		

Foundation Services			
	Compute (Virtual, Auto Scaling, and load balancing)	Networking	Storage (Object, block, and archive)

Infrastructure			
	Regions	Availability Zones	Edge locations

AWS source

Operation: Cloud Computing and Private Cloud

▶ Key Cloud Applications (IaaS with API, PaaS on-boarding API, SaaS lock-in /Microsoft&Cisco, Bigdata, DB, DR) with Corporate Strategy

▶ 9 Steps in Design a Private Cloud effectively (incl Adaptative, Elastic, Automation, Storage, Business model, support

▶ The perfect Business model to use with Public Cloud is Opex based

▶ How to select the right Cloud service provider (CSP) : self managing & support

▶ Private Cloud Pros and Organization transformation

AWS source

Strategy: Cloud Computing and Private Cloud

▶ Key successful strategy for Public Cloud: Strategy matches service applications

▶ Pros and cons of Private Cloud?

Strategy
• Reliable partner / service reach, security, type of implementation.
• Stability of the platform.
• Economies of scale with PayUse
• Standardized service
• Flexibility for expansion

Pros
• Data Security, storage, customization
• flexibility &agility / autoscaling
• accessibility everywhere
• global collaboration
• Efficiency

Cons
• Transformation
• Investment & Cost
• Training & Organization transformation

ABC Solutions Consultancy

Key Players: Cloud Computing and Private Cloud

► AWS (size of Org, reliable services, multi-cloud), Azure (hybrid-cloud), Google (small size, reliable services), Huawei(Multi-cloud medium size)
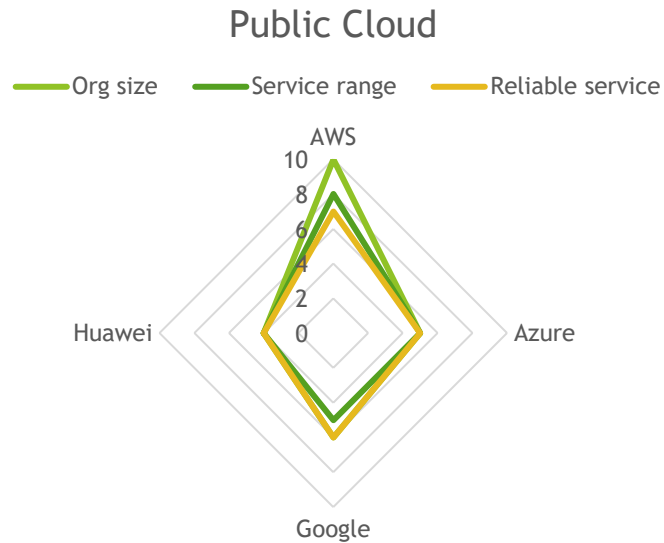
AWS
- Developer, engagement, and management tools
- Machine learning and predictive analytics
- Databases and storage solutions
- Business productivity tools
- App integration
- Compute

Azure
- Big data and predictive analytics
- Game and app development
- Scalable data warehousing
- Blockchain technology
- DevOps
- IoT integration

Google
- Data management and storage
- App development
- SMB business analytics and AI
- Productivity and workload management tools

Huawei
- Developer, Integration implementation service.
- Data base and storage solutions
- DevOps
- IoT Integration

Public Cloud

— Org size   — Service range   — Reliable service

AWS
10
8
6
4
2
0

Huawei   Azure

Google

5G is a long technological journey

5G NSA
Cloud/Virtualization
RAN: new spectrum/low,medium, high spectrum/MIMO
Core: 4G
Public cloud

FWA services, B2C
5G low traffic
Low ROI

2018 ... 2021

5G Edge
Cloud computing
Private Cloud/ Hybrid Cloud

Campus, manufacturing, .. FWA B2B services

Not optimiized for dynamic Bandwidth on demand /AI/Automation

B2C+B2B → medium 5G traffic / Medium ROI

2019... 2023

5G SA
Cloud native
Multi Cloud
O-RAN/ SBA /K8s
Network slicing
E2E Orchestrator
(OSS/BSS/RAN/TRP/CN)
Automation, AI
MEC
Flexible open APIs

Bandwidth on denad
5G High traffic
High ROI

2021... 2026