24 September 2020

Rise Of
Cloud Data Centre

Shift to Decentralized Disaggregated Data Centre Infrastructure

Know the Team

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CTO – Network Service Business

He is a recognized technology leader and has several US patents to his name. In his earlier role he held leadership positions with CISCO systems, IBM, and Huawei. Currently he is leading STL technology team

Amit Kar

General Manager, Technology Solutions

An Industry expert in telecom with experience in designing and deployment of Datacenters & networks for Telcos, Defence, Smart cities, Bharatnet and PSUs. He currently heads the active technology team in STL

AGENDA

Context – STL Overview & Recap

Data Centre ***Evolution*** to Cloud Native

Cloud Native DC – Key ***Technology*** Components

Real World ***Use Cases***

CNDC and ***System Integrators***

STL Overview and Recap

Starting from optical fibres
We now build digital networks globally

1988
Established in Aurangabad

1995
Optical Fibre Plant In Aurangabad

2012
Expansion in China

2014
Optical Fibre Centre of Excellence

2017
Centre for Smarter Networks

2019
Semiconductor Grade Industry 4.0 Glass Plant

European Data Centre Services IDS Acquisition

Community Memberships for Programmable Networks

2020

vRAN Investment in ASOCS, Israel

5G Virtualization and 5G Radio Partnership

2018

Integration of OF Plant in Italy

2015

Telecom Software Acquisition

2013

Expansion in Brazil

2004

Data Cable in Dadra

1993

Optical Fibre Cable Plant in Silvassa

Recap - Our Data Centre Capabilities

30+
Brownfield data centers

100+
Partner Ecosystem

10+
Greenfield data centers

Speciality
Products

End to end
Implementation framework

Our Strategic Acquisition

IDS Impact Data Solutions (U.K.)

Enhance our capability for next-gen data centre services with

- Network Infrastructure
- Design consultancy
- Onsite management, relocation, security
- Containment Solution

2500 Projects

650 Customers

275 Super engineers

136 Cities covered

Microsoft ORACLE EQUINIX BOEING JPMorganChase colt

3 Part Data Centre Webinar Series

Recap – What we covered in the previous Webinar

India Market Size and DC Floor Space is growing **1.5x and 3.x** respectively

DC Infrastructure is evolving rapidly to a more hybrid, distributed, API driven, automated model

STL has the experience and expertise in your **E2E DC Life Cycle**

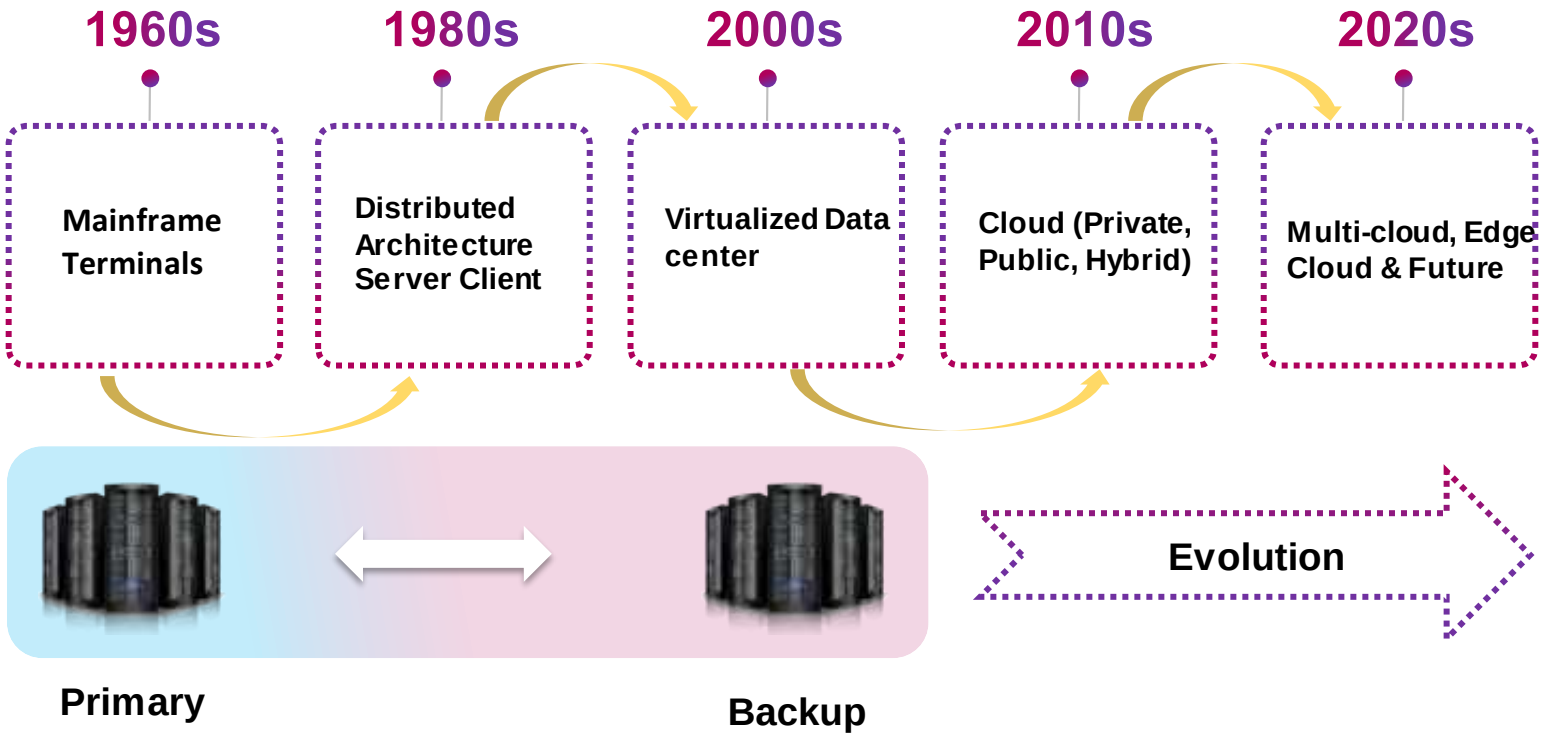
Design Considerations - **Integrated Infrastructure, abstraction, multi-cloud, DR, Capacity, E2E, Principles**

Data Center Evolution to Cloud Native

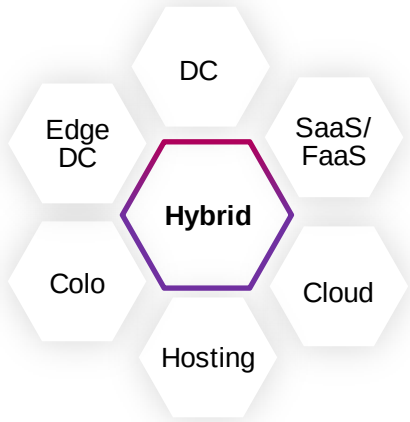
Applications and Infrastructure

Evolution of Data Center

From Datacenters to Centers of Data to Cloud Native Datacenters



CNDC



Past

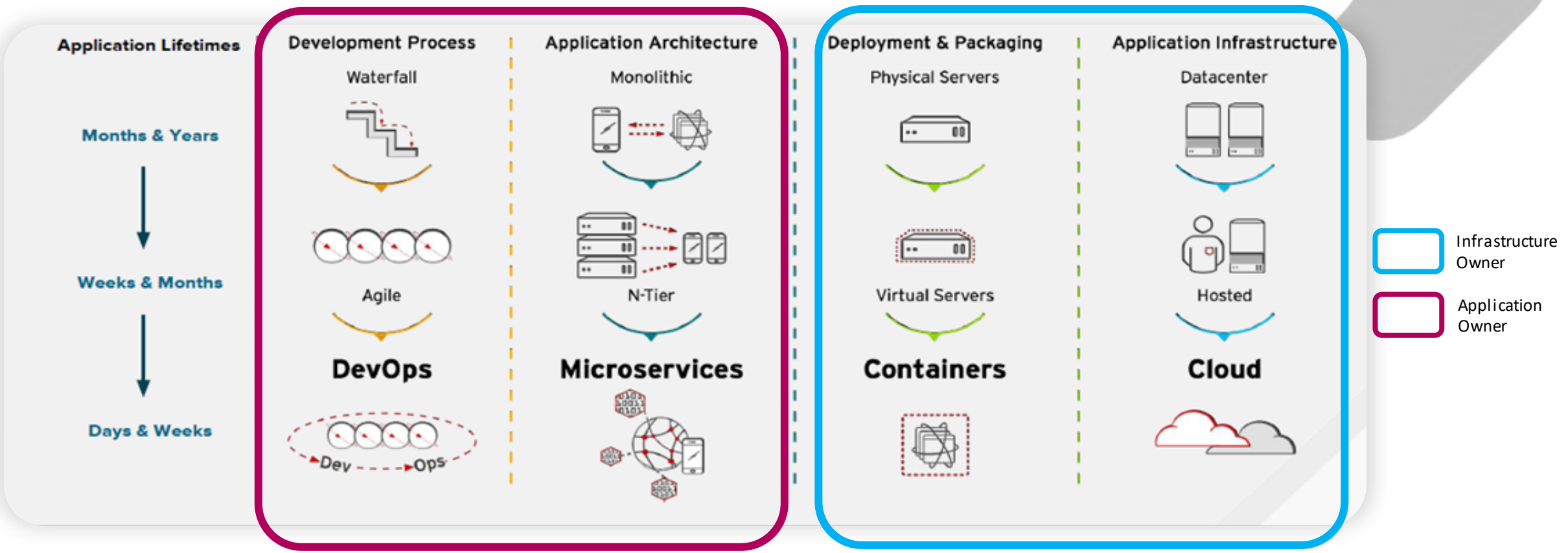
- Centralized
- Manual
- Slow and rigid

Future

- Distributed – Many Centers of Data
- Automated, Software Defined, API
- Agile, Scalable, Modular, Resilient

Evolution of IT Journey

Infrastructure must evolve to meet application needs



Hours & Minutes

GitOps

FaaS

Orchestration

Hybrid Cloud

Serverless

Multi Cloud

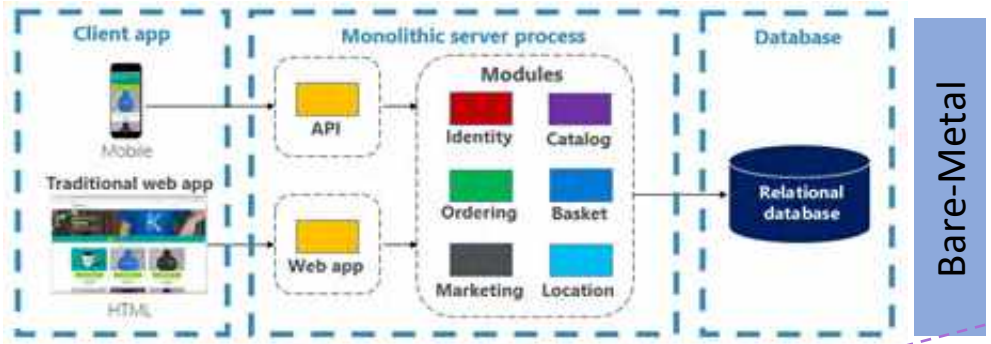
From Datacenters to Centers of Data to Cloud Native Datacenters

Cloud Native DC – Key Technology Components

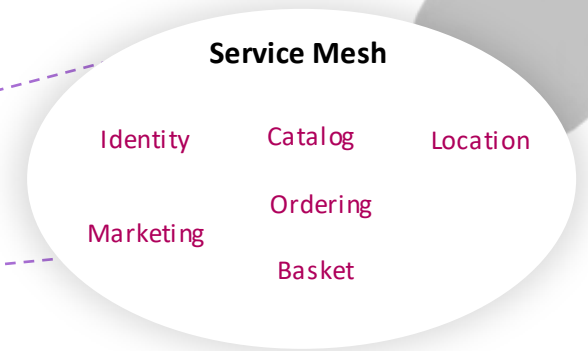
Micro-Service
Containerisation
Orchestration & Automations

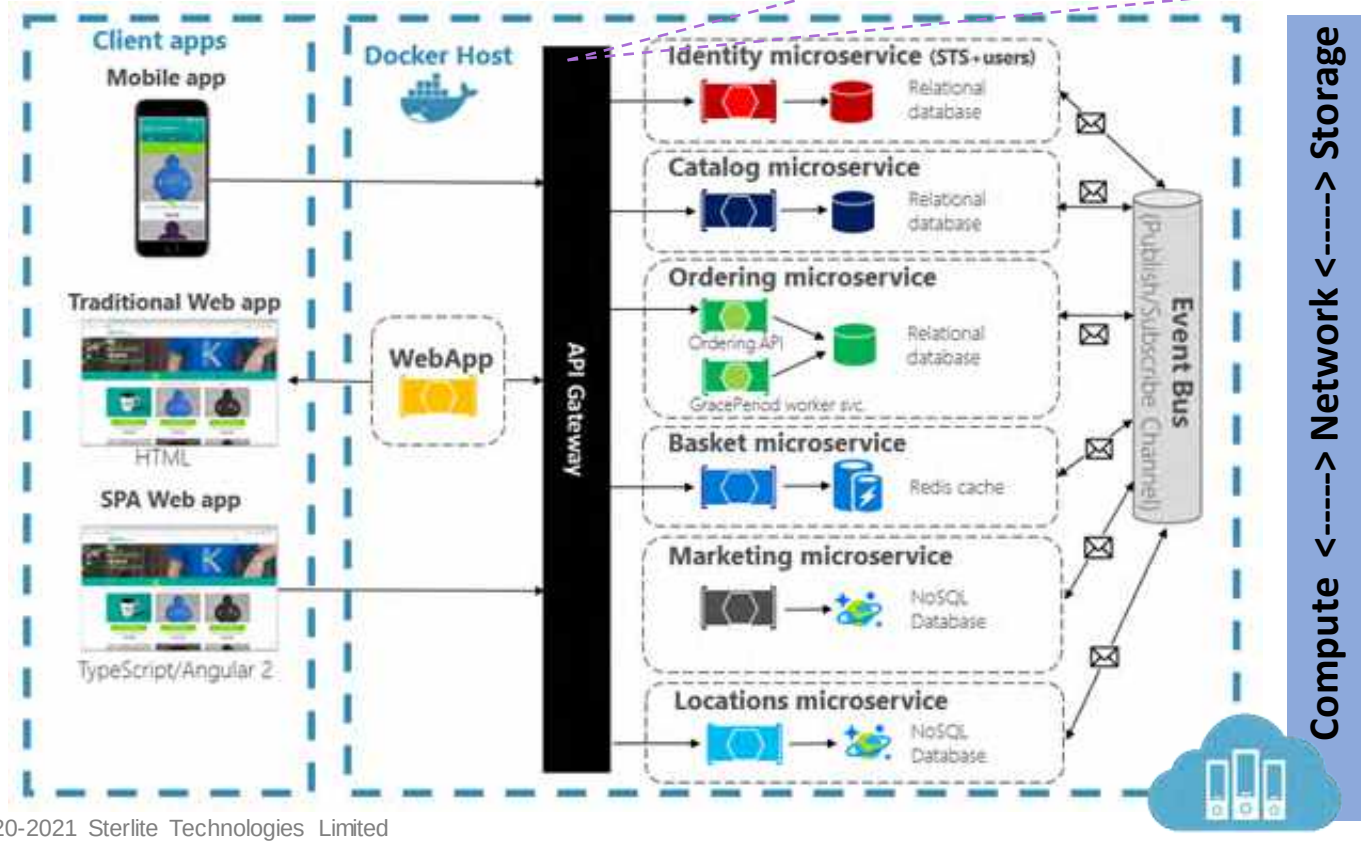
Monolithic to Microservices ..

Modular, Elastic, Resilient Application Architecture



Bare-Metal



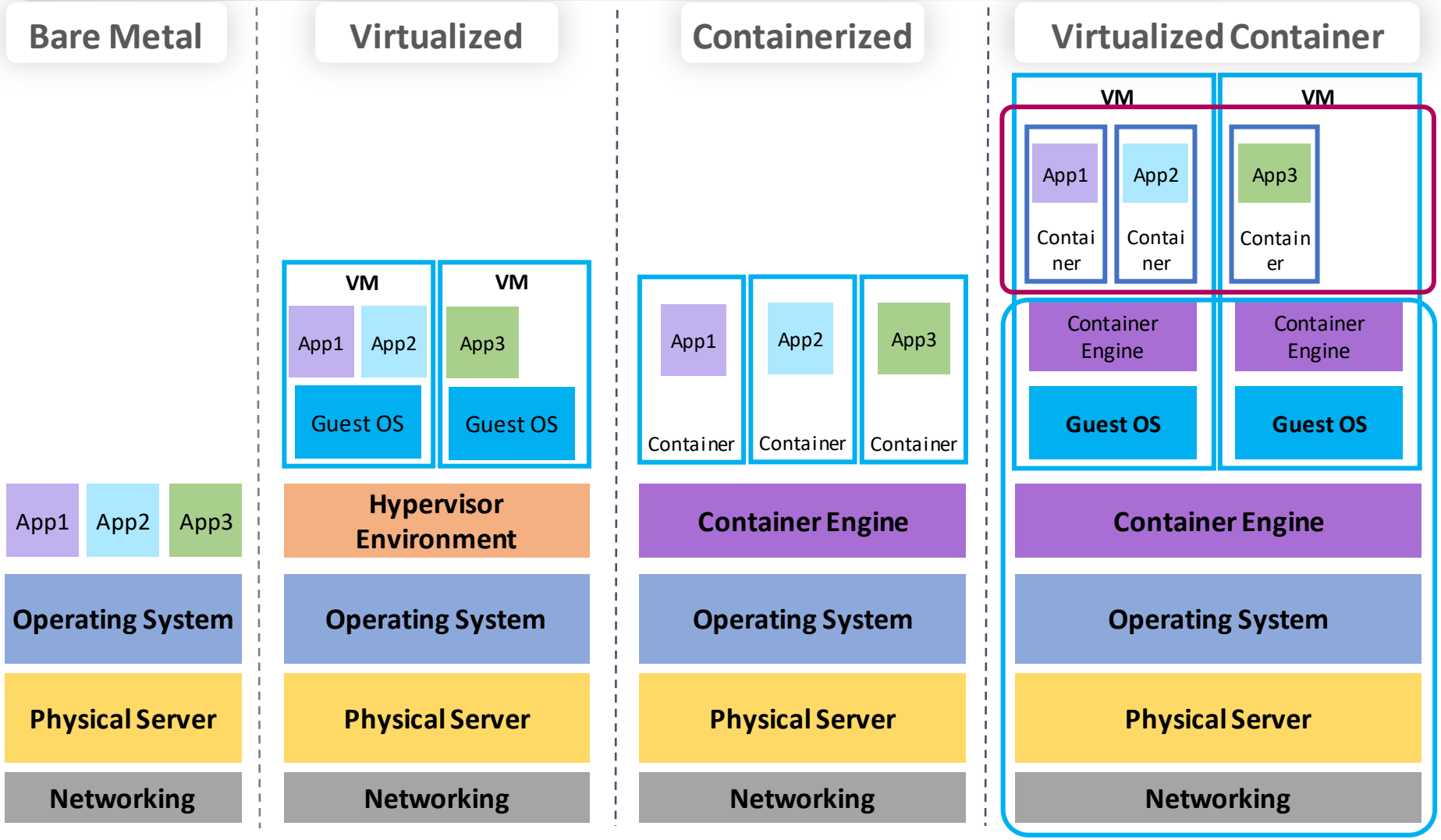


Compute <-----> Network <-----> Storage

Uber has **1000+** services deployed **thousand** times each **week**

Netflix manages over **600+ Micro services**, deploys **100 times/day**

Containerization



Examples:

- Docker Platform
- Redhat Openshift
- Container Linux
- Open Container

Benefits:

- Savings on virtualization, OS, App licenses cost
- Platform Independent
- Less Overhead
- Increase Portability
- Greater Efficiency
- Faster Deployment
- More Consistent Operations

Infrastructure Owner

Application Owner

Micro VM & Container on Bare Metal is the directional shift

What other benefits are provided by containerization platforms like Docker?

- **Continuous delivery**
  - Deliver software more often and with fewer errors
  - No time spent on dev-to-ops handoffs
- **Improved Security**
  - Containers help isolate each part of your system and provide better control of each component of your system
- **Run anything, anywhere**
  - All languages, all databases, all operating systems
  - Any distribution, any cloud, any machine
- **Reproducibility**
  - Reduces the time, we say “it worked on my machine”

Poll Question - 1

Can micro services run only on containers ?

A. Yes

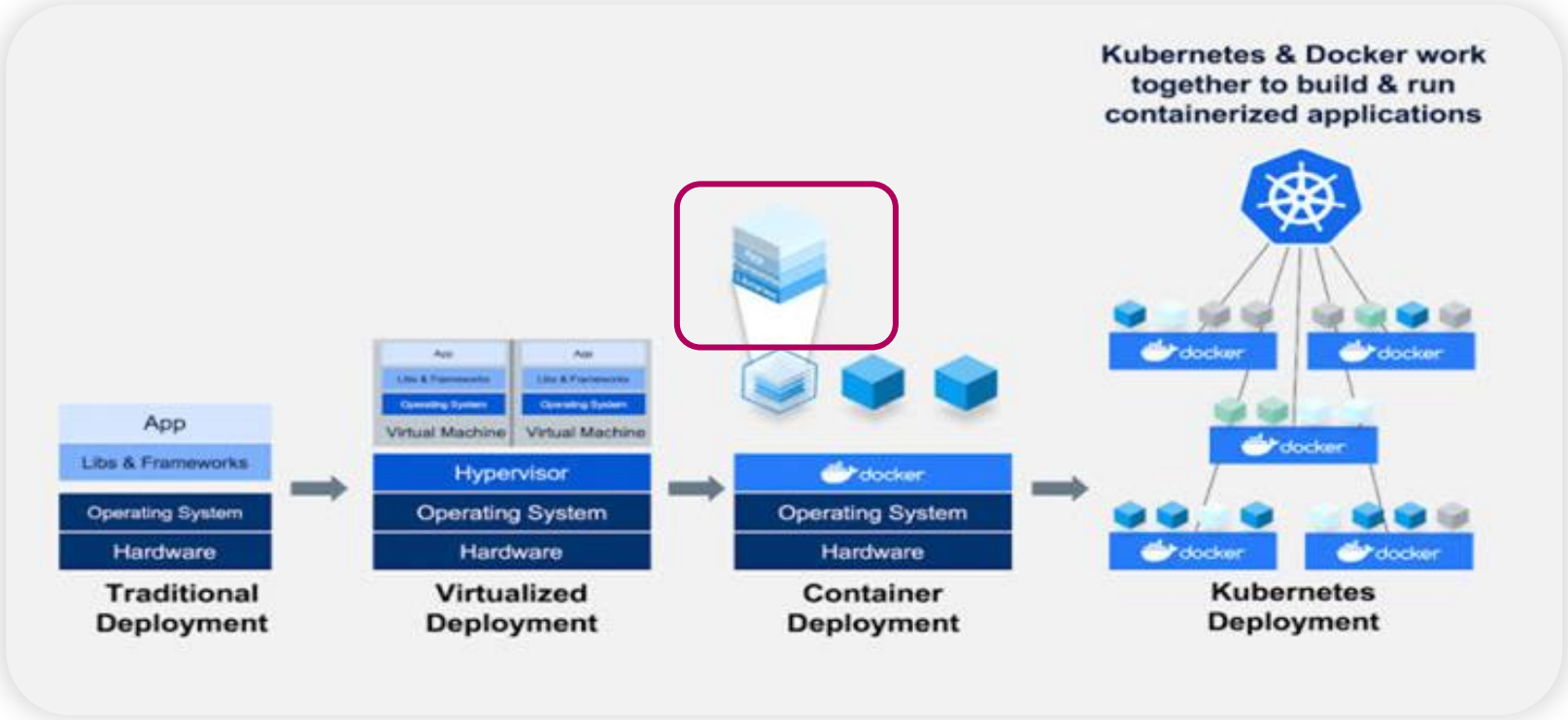
B. No

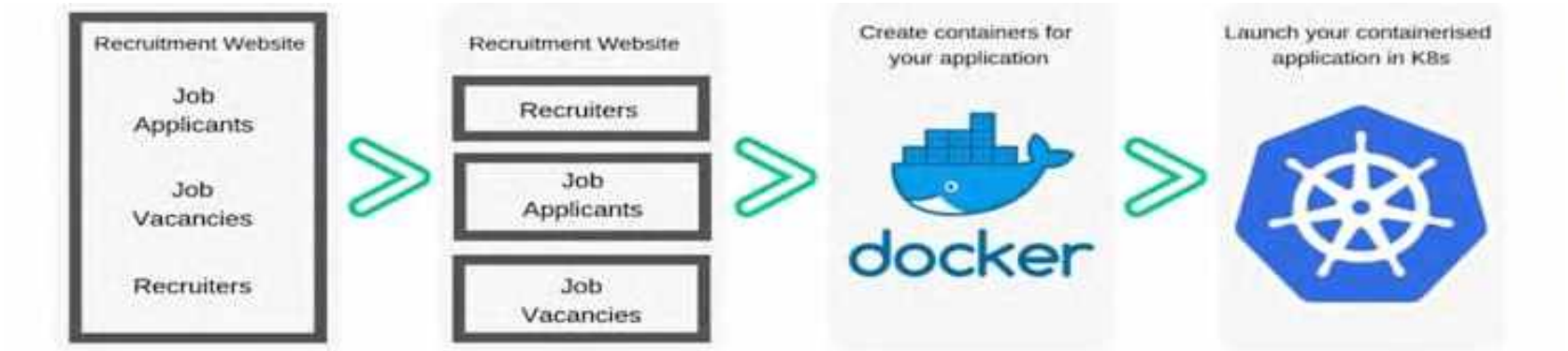
Container Management Solution

- Managing Scale
- Abstract hardware
- Manage state/health/lifecycle
- Automation & Orchestration
- Manage networking, discoverability, etc.
- Monitor & Manage sensitive data

Container Orchestration & Automation

Enables containerization at scale





Examples:

- Kubernetes
- Google Kubernetes Engine
- Azure Kubernetes

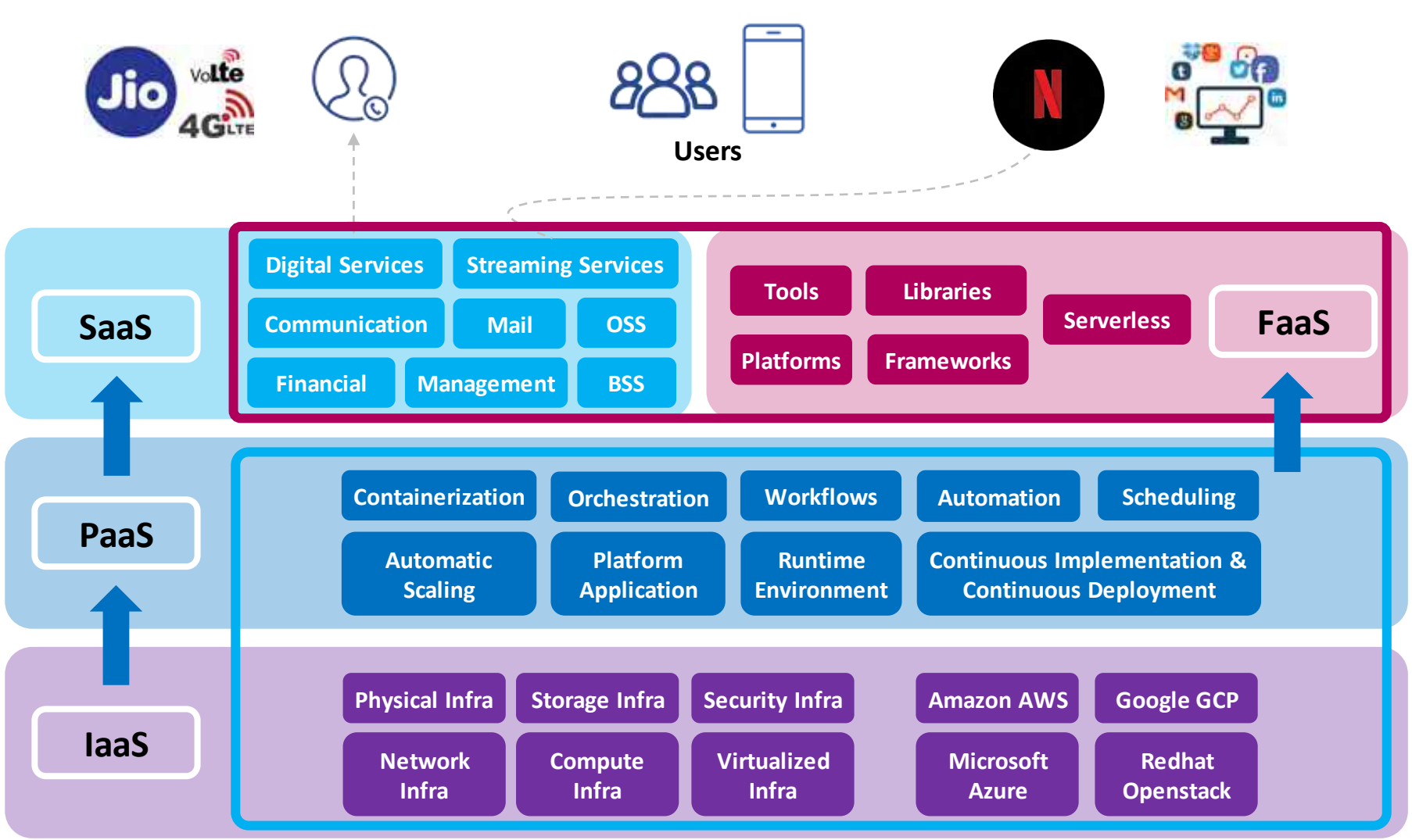
Benefits:

- Operational Consistency
- Auto - Scaling
- Self Healing of Application
- 100% Availability of Services
- Enables Service Oriented Architecture
- Seamless & Rapid deployments
- CI/CD deployment/Testing

Application Owner

Cloud Native Infra Environment

Infrastructure and Application – Bringing all together



AWS Lambda, Google Cloud Functions, Azure Functions, Redhat OpenFunctions

Google Apps, Dropbox, Salesforce, WebEx, Netflix, Zoom, Office 365

AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, OpenShift

DigitalOcean, Linode, Rackspace, Amazon AWS, Cisco Metapod, Microsoft Azure, Google Compute Engine (GCE)

Stakeholder & Scope: What is a role of SI to fill the gap (Complexities, E2E Network, Sw, Sec, Infra)

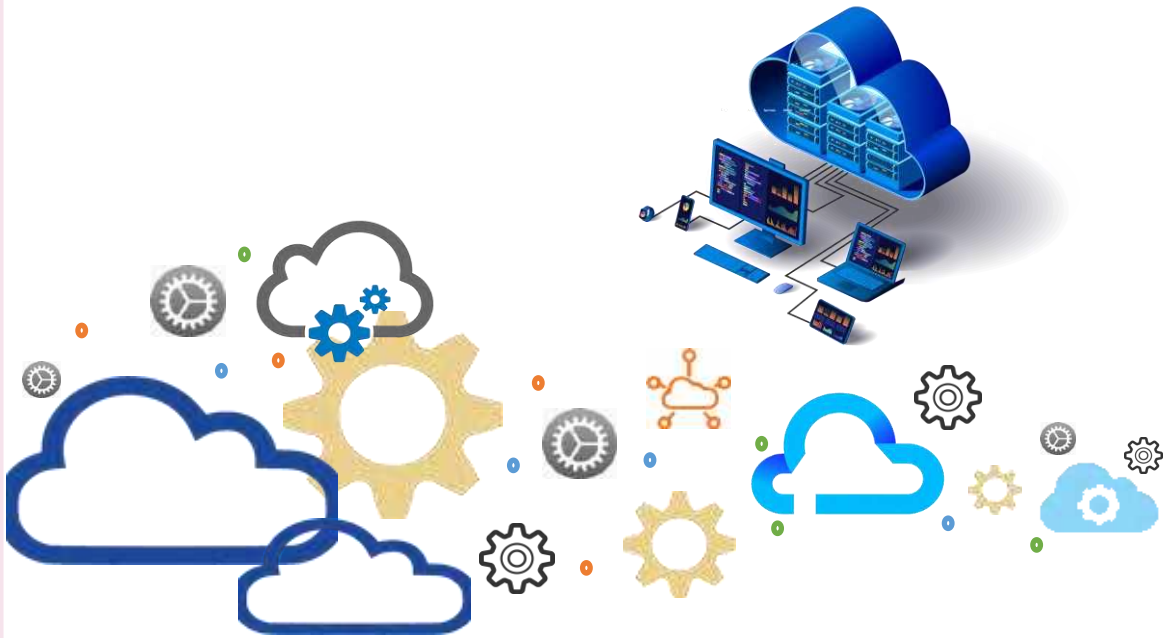
So … what is CNDC ?

Cloud-Native

is the approach to build the applications and services that packaged in containers which deployed as microservices in the cloud environment

Cloud-Native DC

includes DC infrastructure, deployment & configuration environment that enabled with microservices, service mesh, containers that support the end-to-end life cycle of Cloud-Native applications.



CNDC Summary: Key Technology Components

Containerization

1. Build applications once and run anywhere
2. Predictable application deliveries
3. 70% Faster deployment cycles – From days to hours

Orchestration

1. Single touch automated rollouts and rollbacks of new versions
2. Self-healing capabilities for application instances running
3. Auto-scaling for the deployed application

Cloud Infra

1. Cloud enablement for application
2. On demand infrastructure provisioning
3. Ability to deploy applications on any cloud platform (Private or Public)

Serverless

1. Rapid deployment of serverless containers
2. Automatic scaling up and down to zero
3. Point-in-time snapshots of deployed code and configurations

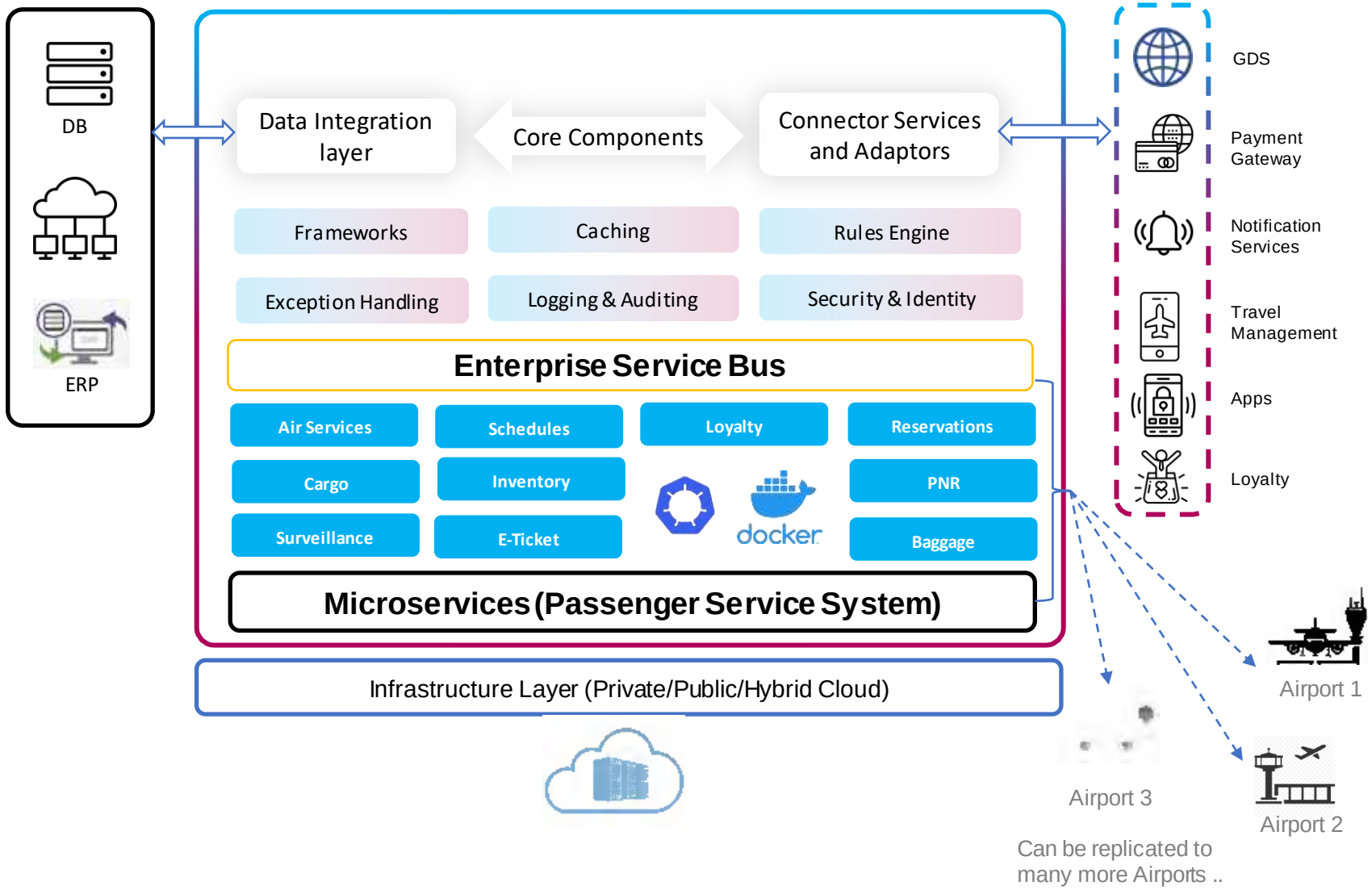
Real World Use Cases

Airports
Smart / Safe Cities
Telcos

Potential Vertical Application

- Telecom
- Airport
- Smart & Safe City
- Healthcare
- BFSI
- IT
- Government
- Defence

CNDC Applications and Infrastructure in Airports



Drivers

- Passenger Experience
- Agility for safety/security services

Benefits:

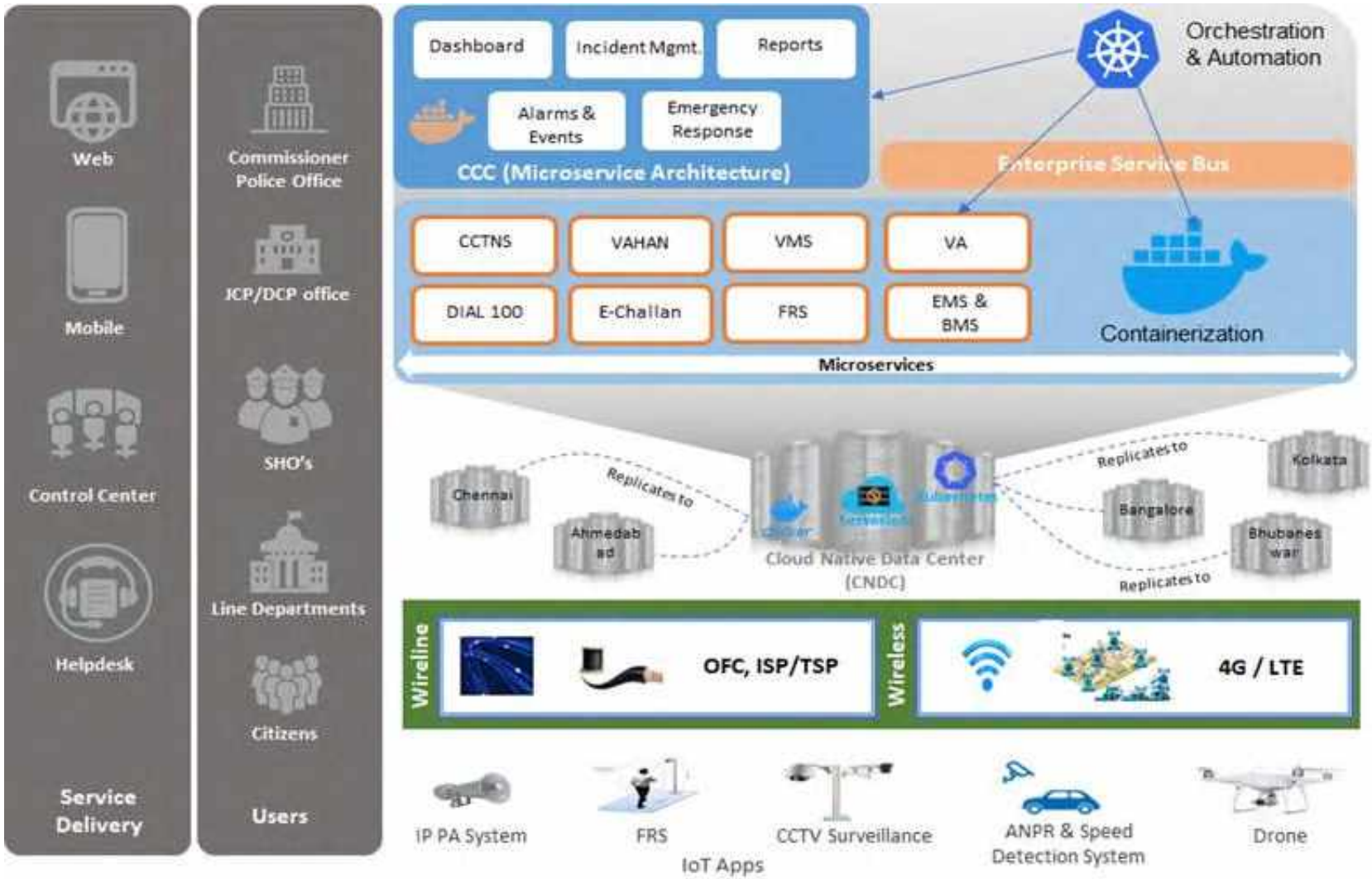
- Reduced time-to-market for any new services
- Facilitates seasonal scalability requirements
- Resource optimization
- Reduced Infra utilization
- Operational efficiency

Feature Sets:

- Passenger Centric Solution
- Auto scalability
- Faster deployment
- Ready to use a model
- Easy upgrade-downgrade
- Security intact

Smart Cities / Safe Cities

CNDC making Cities Smarter and Safer



Drivers

- Replicable to multiple cities
- Faster time to services (Citizen)
- Significant cost optimization

Benefits:

- Less time to launch any new production service
- Focus developers on code instead of infrastructure
- Operational efficiency
- Strengthen the security posture

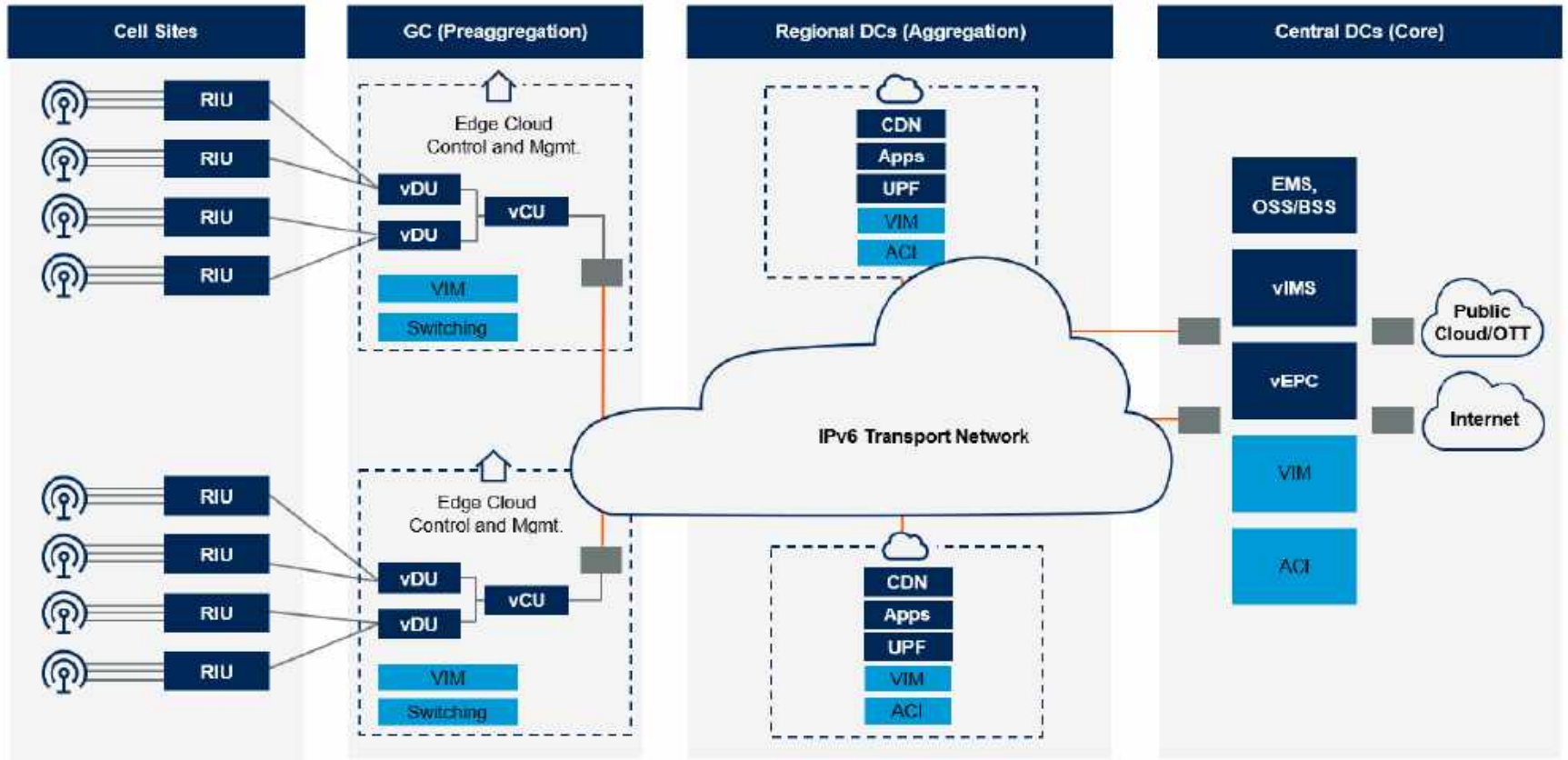
Feature Sets:

- Reduced Infra utilization
- Auto scalability
- Faster deploy model
- Ready to use environment
- Easy & Faster integration

CNDC in Telco Infrastructure

A disruption is in progress – End-to-end CN Deployment

Open, Disaggregated and Virtualized RAN



Source: Gartner (February 2020)
ACI = Application-centric infrastructure; BSS = business support system; CDN = content delivery network; DC = data center; GC = Group Unit Center; EMS = element management system; Mgmt. = management; OSS = operation support system; OTT = over-the-top; RAN = radio access network; RIU = Radio Interface Unit; UPF = User Plane Function; vCU = virtualized central unit; vDU = virtualized distributed unit; vIMS = virtualized IP Multimedia Subsystem; VIM = Virtual Infrastructure Manager; vEPC = virtual Evolved Packet Core

Drivers

- Legacy Operator Consolidation
- Closer interoperability with public cloud providers

Features

- 5G Ready with Cloud Native Infrastructure and Virtualization (NFV, vRAN, oRAN, SDN. Edge Compute)
- Common horizontal and Carrier Grade Telco Cloud Native infrastructure from RAN to Core
- Microservices architecture for DU, CU, CDN, NAT, EPC, IMS, OSS using containers and orchestration

Benefits

- Enabling Agile, CI/CD dev-ops
- Cost – Opex and Capex
- Unified OSS/BSS
- Vendor (no)Lock-In - # of SKUs

Poll Question - 2

What is the status of containerization in your organization ?

A. Already have

B. Currently implementing

C. Planning in near future

D. Not sure as of now

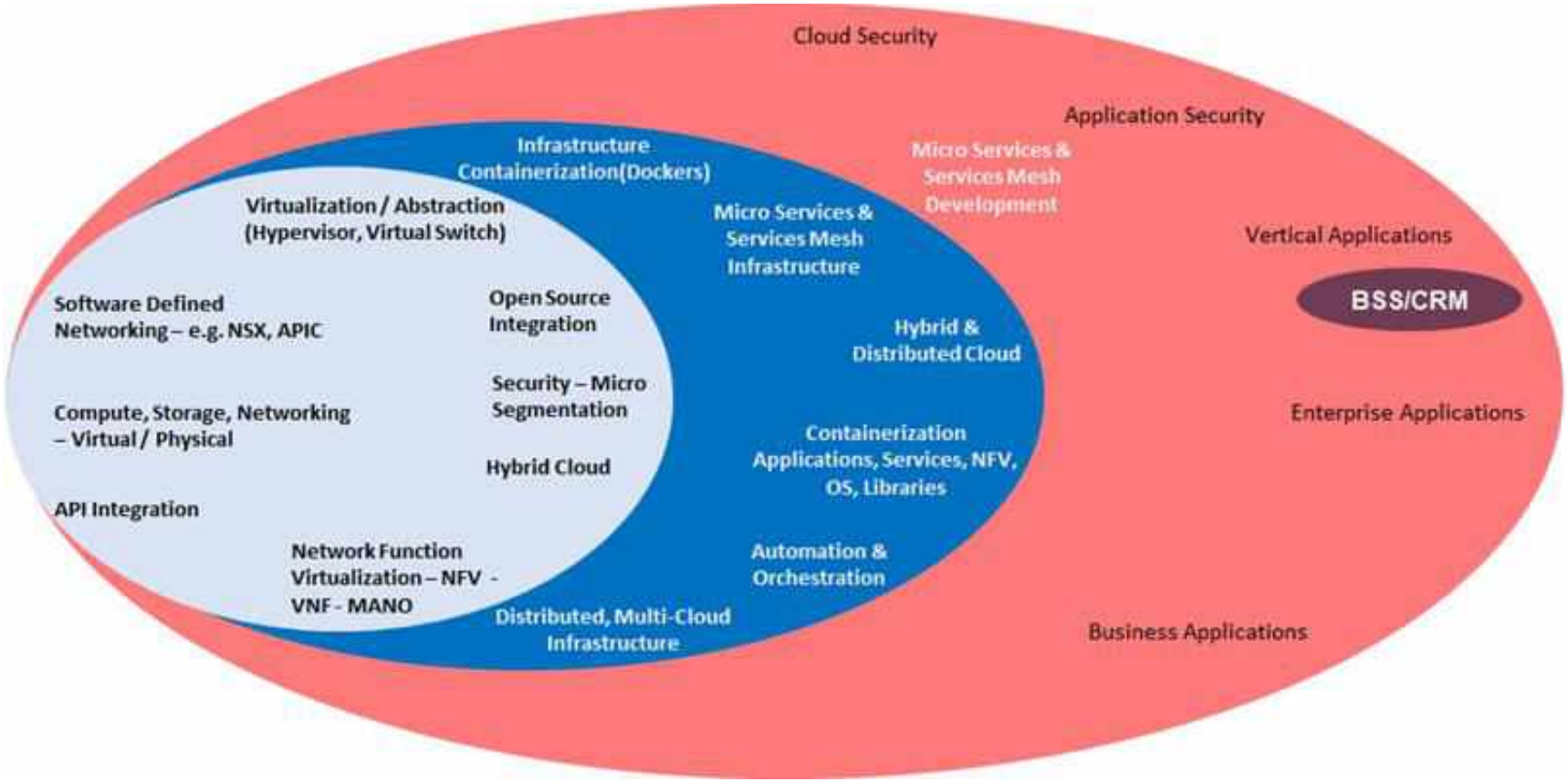
System Integrators

Evolving capabilities

Evolving role of System Integrators in CNDC

Infrastructure and Applications – Shift in capabilities

Infrastructure | SI Capabilities | Applications



Benefits

- Unique Expertise Requirement from multiple domains
- Multi-Cloud is being added to Multi-Vendor/ Multi-technology Integration
- API / Automation is a critical source of value addition
- Business Use Case Driven Approach is essential

Key Takeaways

a). Cloud Native DC is a milestone in **Evolution of Cloud Architecture**

b). Infrastructure and Applications need to be programmatically "in-sync" to provide **Modularity, Scale, and Resiliency**

c). Key Technology Components include **Micro-Services, Containers, Cloud Platforms (-as-aS)**

d). **Systems Integrators like STL,** are ready to meet the capabilities shift in the entire CNDC ecosystem – **from Infrastructure to Applications**

Next in this series will cover

Innovation in Disaster Recovery Network & Power Optimization

beyond tomorrow