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5G Monetization

for a Digital Economy Powered by Multi-Sided Business Models

Know the Speakers

Tilemachos Koulouris

Vice President, Europe & CIS, STL

A seasoned leader in the technology, media, and telecoms market with more than 23 years of international experience, Tilemachos Koulouris is STL's Vice President for the SW business. During the past two decades, he has been working closely with global CSPs, consulting and helping clients on their digitalization transformation strategy & execution.

Ravi Shankar

Head - Product Management, OSS/BSS, STL

Ravi Shankar is a seasoned professional with customer-first approach & proven track record of product and portfolio management, technology development and digital transformation in enterprise & network software domain. Being a strong advocate of people-first, digital lifestyle and equitable access to resources, Ravi is passionate about using technology to bring extreme agility, data-driven decision making and significant cost savings to the enterprises.

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Company History

1988
Established in Aurangabad

1995
Optical Fibre Plant In Aurangabad

1993
Optical Fibre Cable Plant in Silvassa

2004
Data Cable in Dadra

2012
Manufacturing set up in China

2013
Manufacturing set up in Brazil

2014
Optical Fibre Centre of Excellence

2015
Telecom Software Acquisition

2017
Centre for Smarter Networks

2018
Acquisition of Metallurgica Bresciana s.p.a., Italy

2019
Semiconductor Grade Industry 4.0 Glass Plant

2020
vRAN Investment in ASOCS

European Data Centre Services IDS Acquisition

5G Virtualization and 5G Radio Partnership

Community Memberships for Programmable Networks

Acquisition of Optical Interconnect Company Optotec S.p.A Italy

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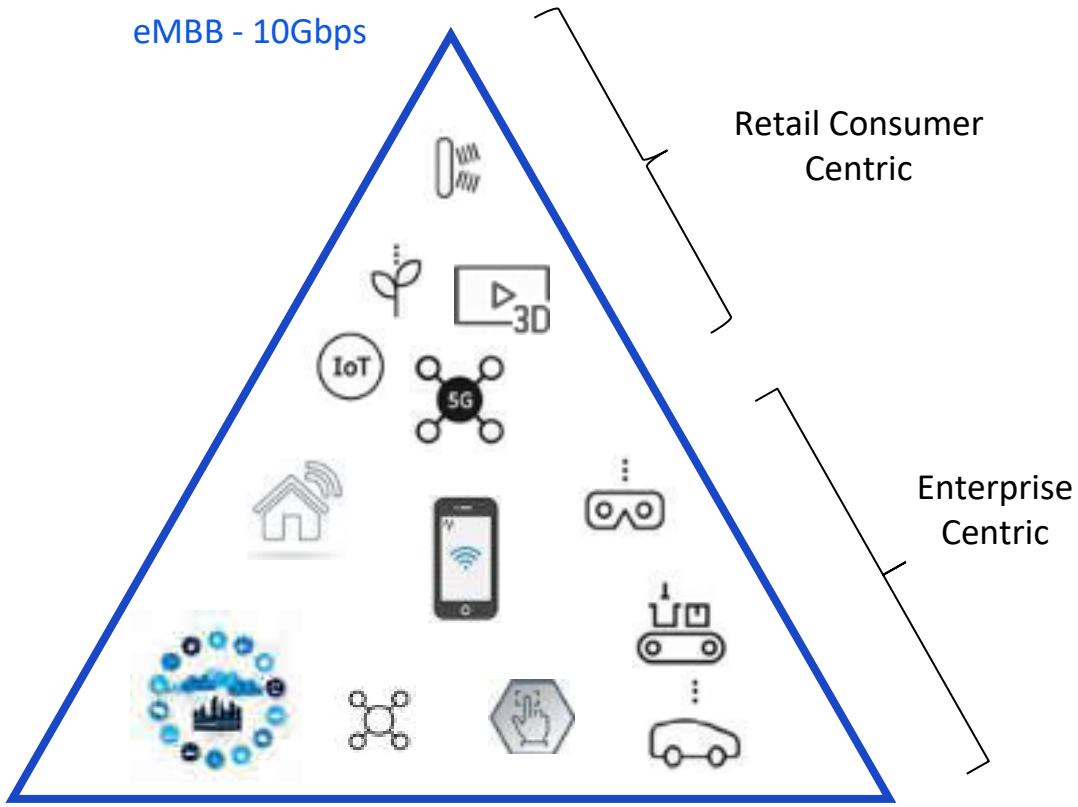
Agenda

1. **5G Use Cases**
2. **Network Slicing –** generating value
3. **Policy Control & Charging –** capturing value
4. **Monetization Levers –** the big picture
5. **Recommendations –** built for Cloud, Edge & Open Platforms

5G Use Cases

New generation of applications with diverse and stringent requirements



Maximum
Downlink & Uplink
throughputs
20Gbps & 10Gbps, respectively

Latency below 5 ms
endpoint over the air to the radio access network (RAN)

Massive scalability
(initial deployments may be less ambitious)

New system architecture that includes core
Network slicing & Edge computing.

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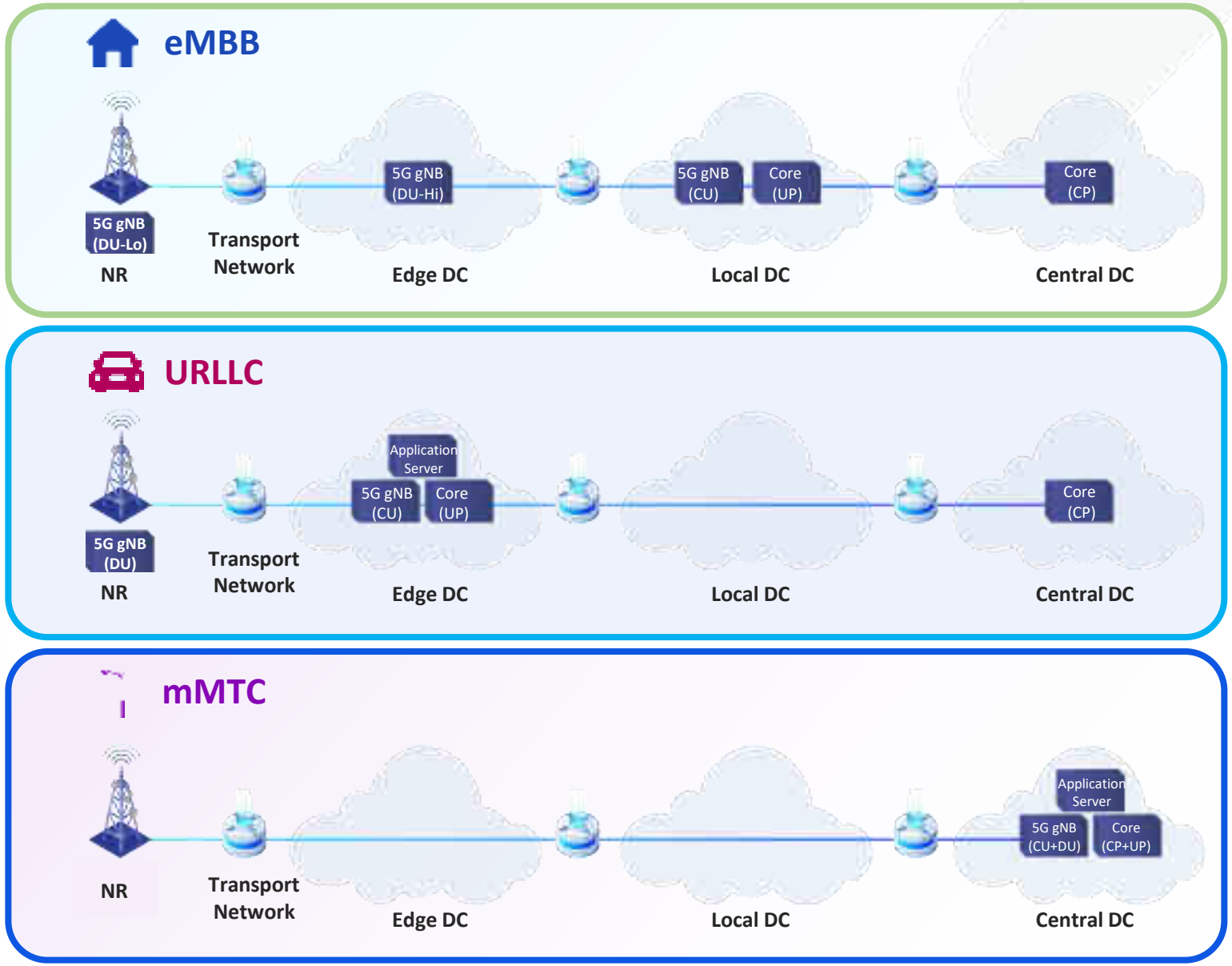
Network Slicing: "Serving Exactly What Application Demands"

Network Slice

- Set of logical Network Functions (Access & Core) & Transport Network
- Dynamic & On Demand
- Tailored for a Specific Service or Group of Services
- Logically Isolated from Each Other



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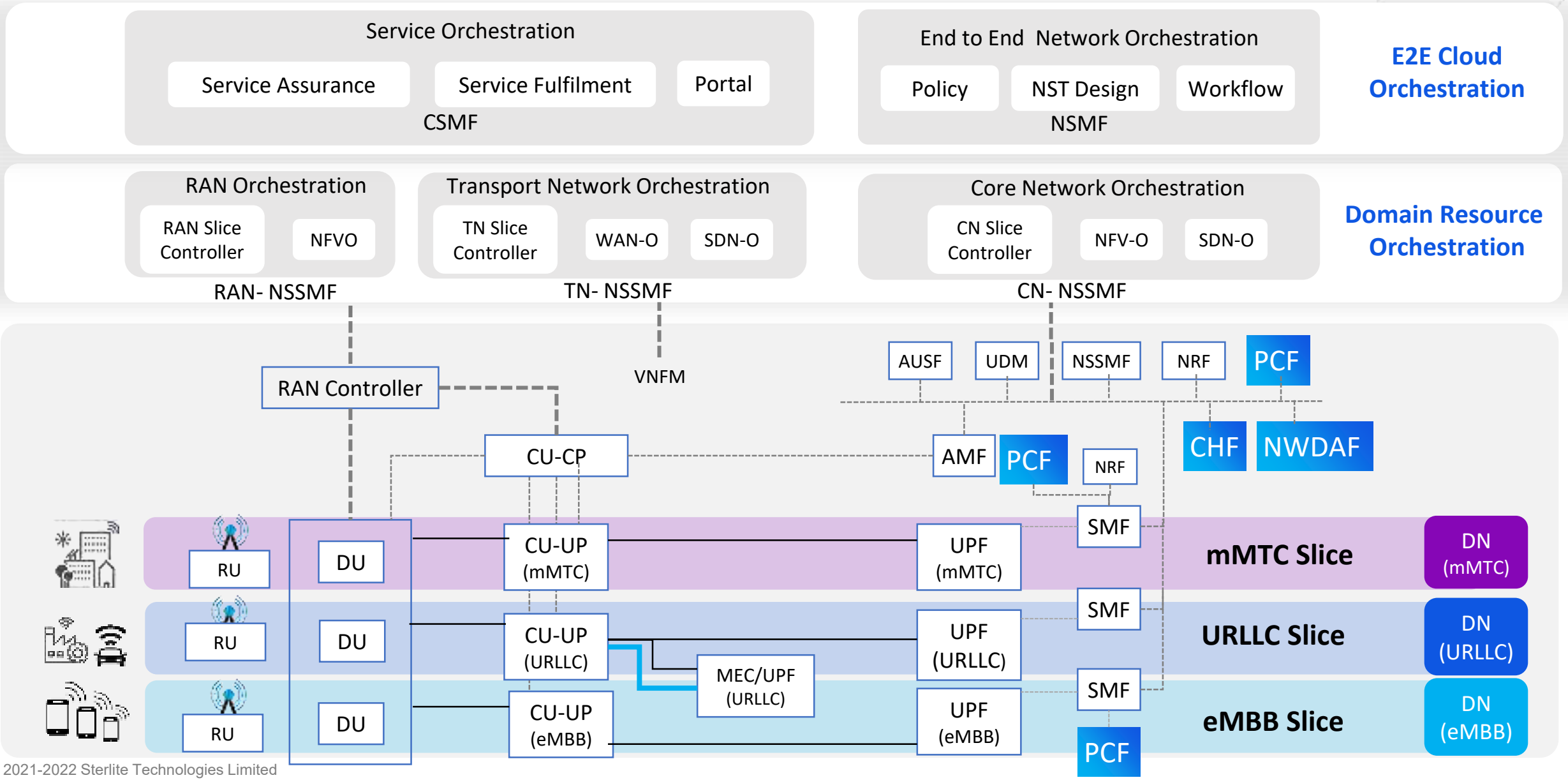
End to End Network Slicing



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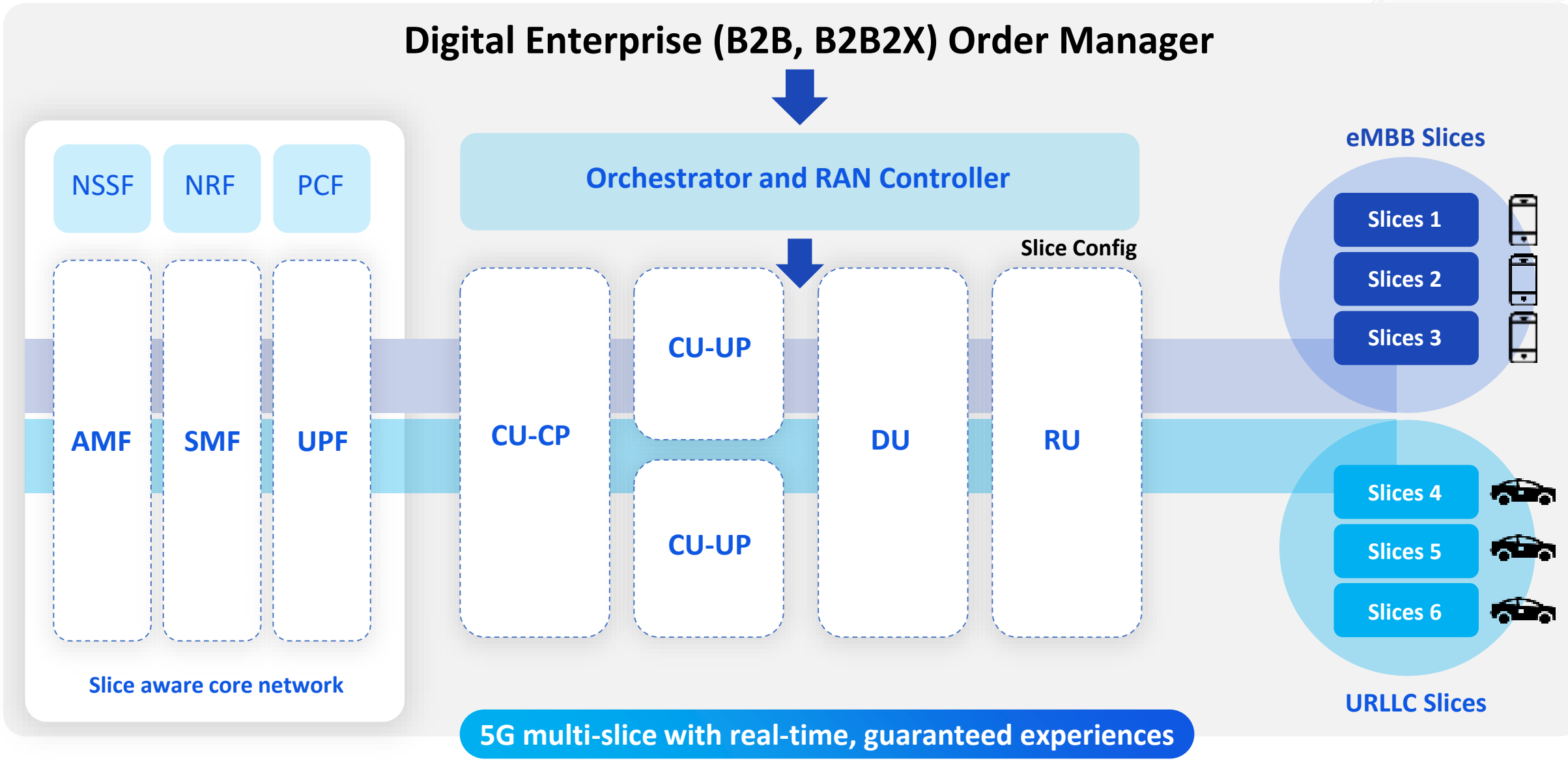
E2E Network Slicing in Action



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Network Slicing Attributes

Slice Identifiers for Differentiated Charging

NSSAI (Network Slice Selection Assistance Information)

Set of Network Slices. Contains a set of S-NSSAI

S-NSSAI(Single NSSAI)

Used to uniquely identify a Network Slice.

SST (Slice/Service Type)

Ddefines the expected behaviour of the Network Slice, in terms of specific features and services. Standardized SST values are as below:

1= eMBB (enhanced Mobile Broadband)

2= URLLC (Ultra Reliable Low Latency Communications)

3= mMTC (massive Machine Type Communications)

SD (Slice Descriptor)

Optional Information. Slice Descriptor is directly related to the SST and is used as an additional differentiator if multiple network slices carry the same SST value.

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Policy Control & Charging in 5G

Network functions for harnessing 5G potential

Policy Control Function

E2E Policy Management
End-to-End Policy Management (From UE to Application)

Service Exposure
Service Exposure to External World Applications

Slice Driven Policies
Provides Slice-Specific Policies.

Real-time Analytics
PCF can use the Real-time Anlytics information from NWDAF

ANDSF
ANDSF is Inbuilt Policy in PCF.

The Most Intelligent NF in whole 5GC

Charging Function

Charge Anything
Capability to charge for anything in any unit of measurement (UOM)

Multi-Dimensional
Multi-party B2B2X charging for multi-sided business models.

5G Charging
Slice & Flow Based Charging

Charging over REST
Freedom from telco pit.

Real-time
Invoicing, taxation and settlements.

Redefining Charging Paradigm

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Policy & Charging: Predecessor vs 5G

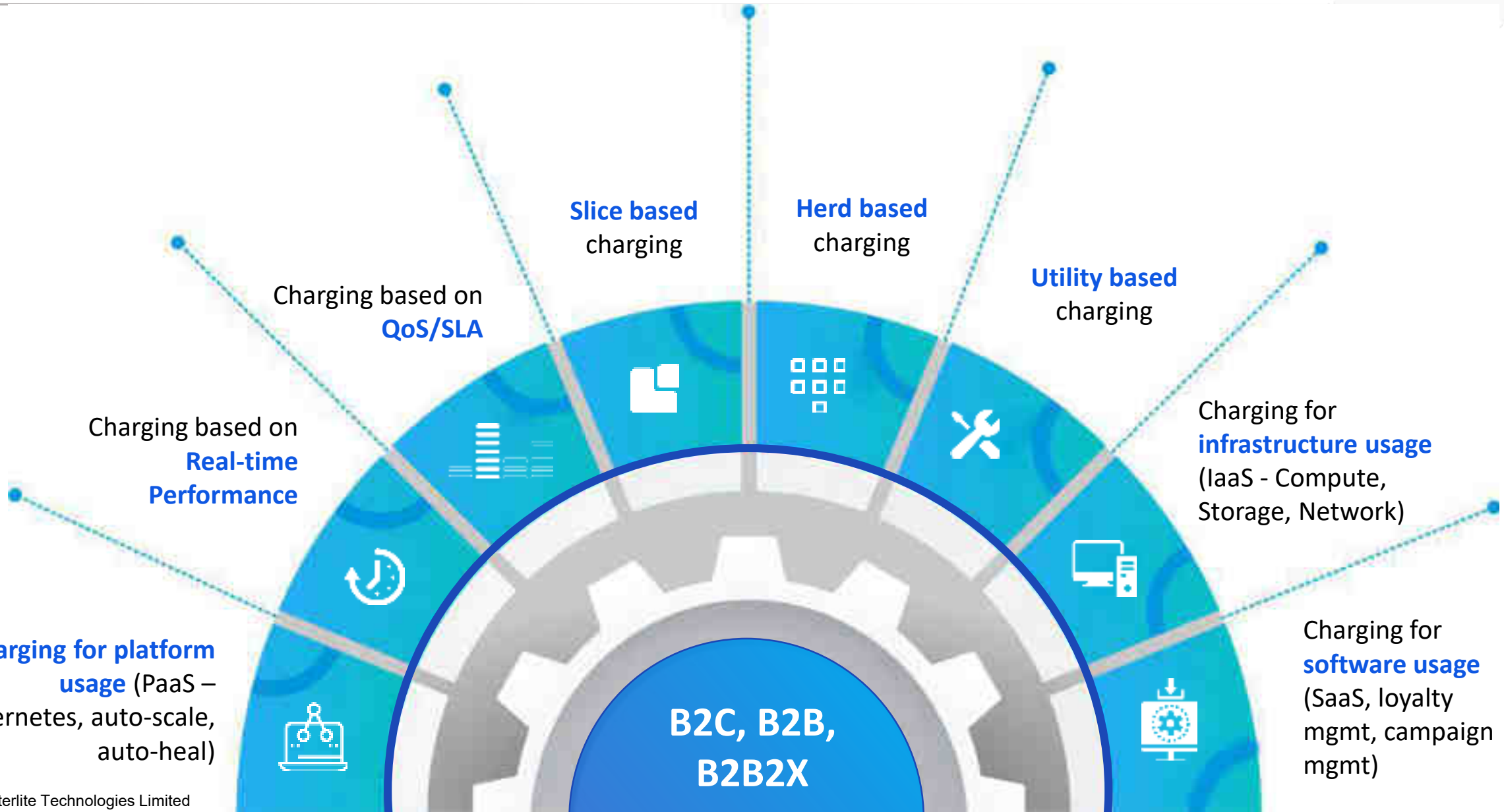
Policy Control

Parameter	4G	5G
Protocol	RADIUS, Diameter	HTTP/2
Policies	Session-Based	+ Access-Based, UE-Policy, Background-Data-Policy
Policy Rules	PCC-Rules	+ ANDSP, RFSP, URSP, WLANSP, BDTP
Flow-Control	IPv4, v6	+ L2(Ethernet)
Database	SPR (Dedicated)	UDR (Centralized for all NFs)
Service Type	GBR, Non-GBR	+Delay Critical GBR
New	-	Real-time Analytics Feed from NWDAF
	-	QoS Notification Request
	-	AF Controlled Notifications
	-	Service Exposure towards AF via NEF
	-	Reflective QoS

Charging

Parameter	4G	5G & IoT
Protocol	CAP, Diameter	HTTP/2, REST
Chargeable	Voice, Data, Content	Utilities, Infra, Services
Unit of Measure	Seconds, Bytes, Events	Km, Litre, Squire-Meter, KWH, Any
Dimensions	Single	Multiple
Type of Business	B2C	B2C, B2B, B2B2X
Target Segment	Telco (3G, 4G), FTTx	5G, Slice Based Charging, Consumer IoT, Verticals (Auto, Social-Security, Healthcare etc.)
Architecture	Virtual	Cloud Native
Offering	CAPex, Hybrid	SaaS, Service-Led

New Charging Capabilities Required for 5G



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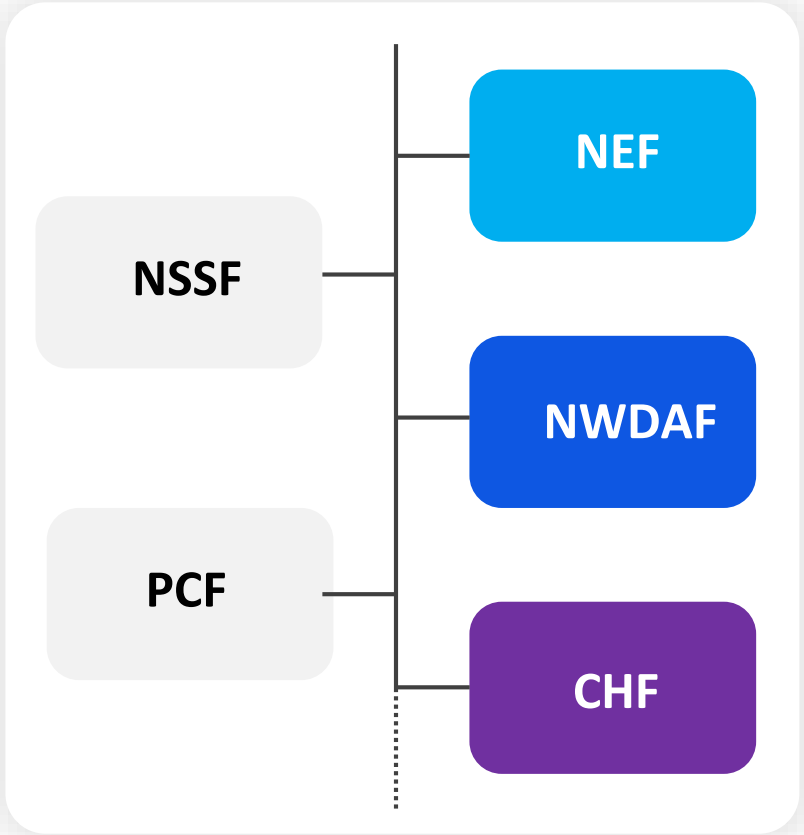
Additional Coordination between PCC and Analytics



Informational Data

Network Exposure Function
- Bi-directional feed
- Provides unprecedented control
- Data provided via myriad APIs

Actionable Data

Networks Data Analytics Functions
- Bi-directional feed
- Access to real-time network analytics
- Able to drive in session decisions

Chargeable Data

Charging Function
- Dedicated instances
- Can be edge - enabled
- Real-time focus

Policy and charging decisions driven by enriched contextual input

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5G Applications

Partnership enabled use cases

Enterprise Retail

Mobility & Public Transport

- Autonomous Driving
- Remote monitoring Of infrastructure
- Real time traffic Management

Public Safety

- HD Real time video Surveillance
- Improved disaster Alert and response
- Vulnerable road user (VRU) discovery

Healthcare

- Telemedicine and rehabilitation
- Remote patient Monitoring
- Connected Ambulance

Energy & Utilities

- Smart Grid
- Intelligent Traffic
- Virtual Power Plant

Education

- Virtual Reality/ Augmented Reality
- Remote Tutoring/ Learning
- Virtual Classrooms

Tourism & Retail

- Augmented Reality Guided tours
- Automatic delivery Robots and drones
- Virtual reality visits

Media & Entertainment

- 4K/8K Mobile Streaming
- Smart Stadion
- Virtual Reality Multiplayer Games

Industry & Agriculture

- Extended IoT and M2M
- Autonomous Plant
- Drones in agriculture And maintenance

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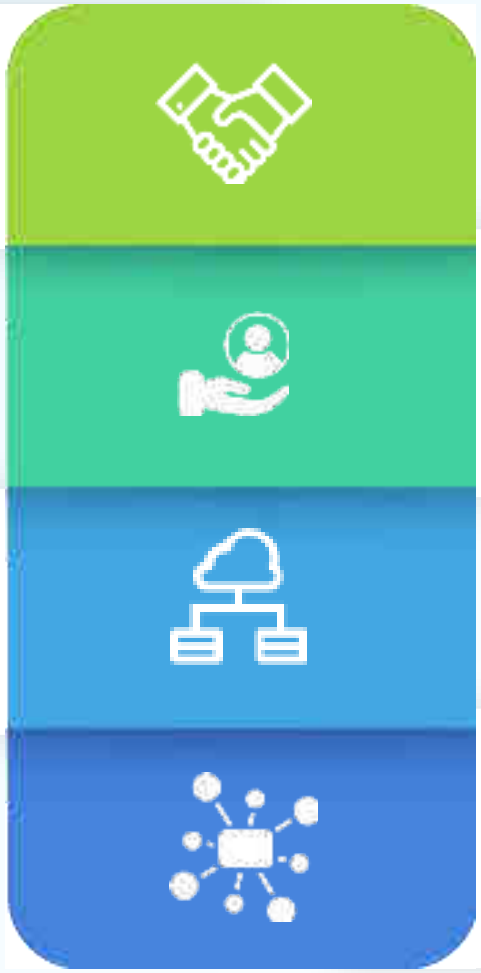
4 Key Enablers for 5G Monetization

Leveraging the platform, network & market access for growth

Partnership Driven

- **PLTV, SLA**, volume and QoS based
- Product type, service type**, inventory & infrastructure** based
- Location, demand, payment channel based
- API/Service consumption based



Customer Driven

- CLTV, Engagement Index
- **UE/MAC address**, inventory & infrastructure based
- **Location, demand, Time-of-Day**, payment channel based
- **SLA** & points based

Platform Enabled

- **Customer journey stage based**
- **API Consumption** based
- Insight consumption based
- Location and infra-sharing based

Network Enabled

- **Network slice, QoS based**
- **# of connections, frequency of data** tx
- Location precision, # of location requests
- **Real-time vs non-real-time** ops based

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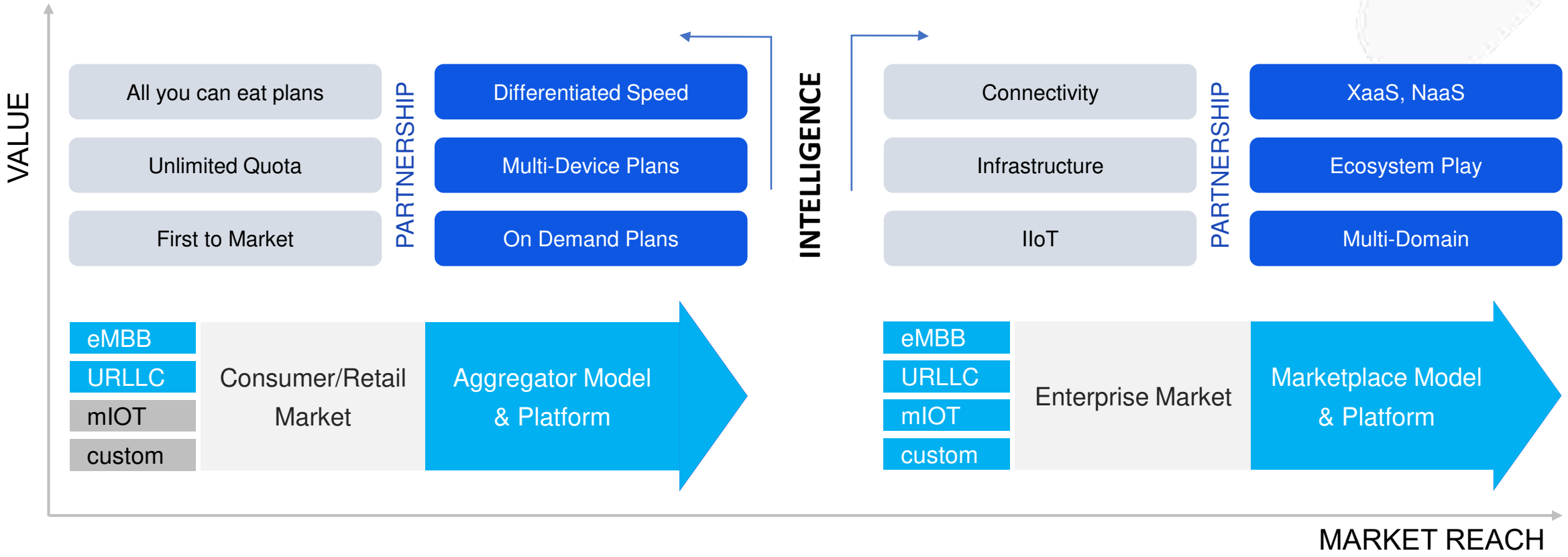
New Models enabled by Service Driven Network Design

Creating new opportunities for both retail and enterprise



Monetization of 5G requires partnership & platforms with embedded intelligence

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Dimensions for Revenue Share & Settlement

Creating a partner economy for monetization

Revenue share between parties based on multiple dimensions

Customer Journey Stage	New Customer Purchase vs Existing Customer Cross-sell/up-sell	Payment Channel	Payment Timing (Pay-in-advance, Pay-on-delivery)
Payment Milestone	Location (new market vs existing market)	Rental vs Purchase (devices)	Customer Origin (Partner, Marketing Campaign, Unknown)
Partner Lifetime Value	Partner Experience Index	Points	Gamification

Revenue Share — Percentage | Flat | Tiered | Volume

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5G Policy Control & Charging

Cloud Native, Designed for Edge, Open Architecture

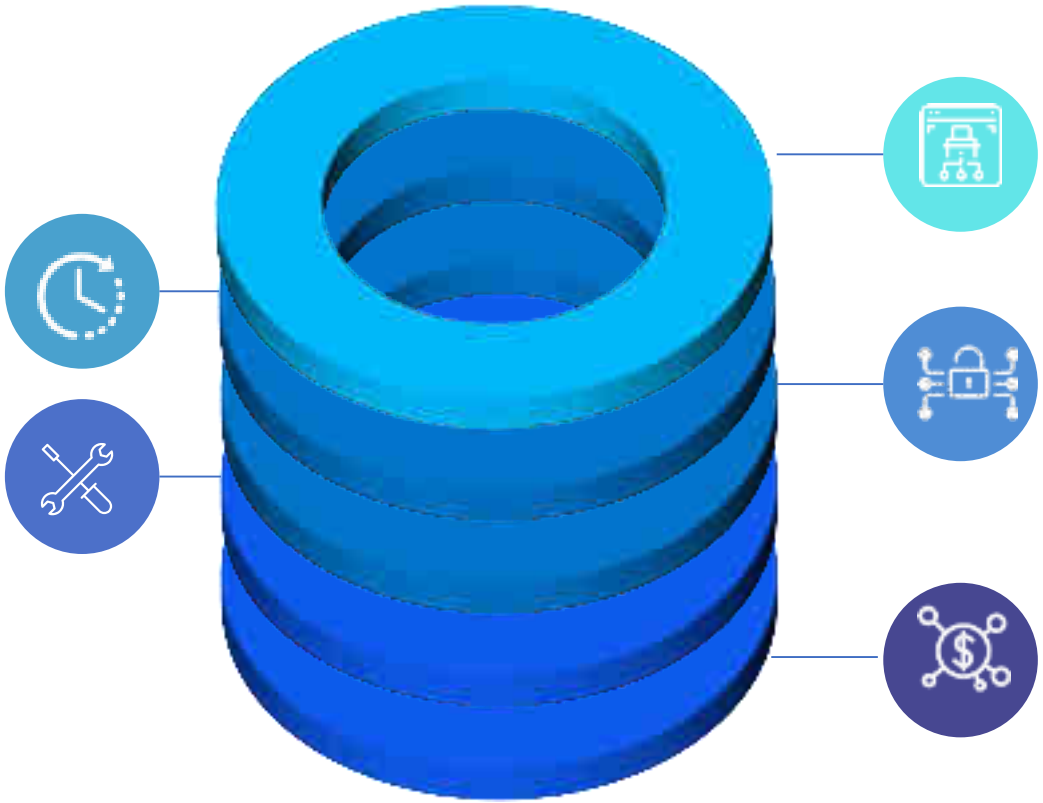
With Microservices architecture, charging gets extended to support complex B2B2X use cases allowing CSPs to define an interworking of different services offered to partners, considering all contributions instantly.

RAPID ONBOARDING

Supports rapid onboarding for partners. templates simplify initial configurations necessary for the various settings (ex: access control)

REALTIME

Resulting accountability allows complex models with dynamically changing partners. Potential Revenue leakage can be reduced. Partners have immediate overview and control of their revenue flow



OPEN

Provides charging for services used over OPEN network APIs, allowing CSP to monetize network and infrastructure services. partners can be charged based on usage and individual success

OPEN API FRAMEWORK

Allows Charging and related services to be offered as service to partners. Partners can self manage prices / services, can add Instant gratifications to push service usage in dimensions today unavailable for them. Access to shared customer profile data / analytics offers additional benefits.

ONE PRICING ENGINE

calculates contributions for each party involved in the complex business model in real-time

Suppliers | Content Partner | Dealer/ Reseller | Roaming Partner | Device/Infra Partner

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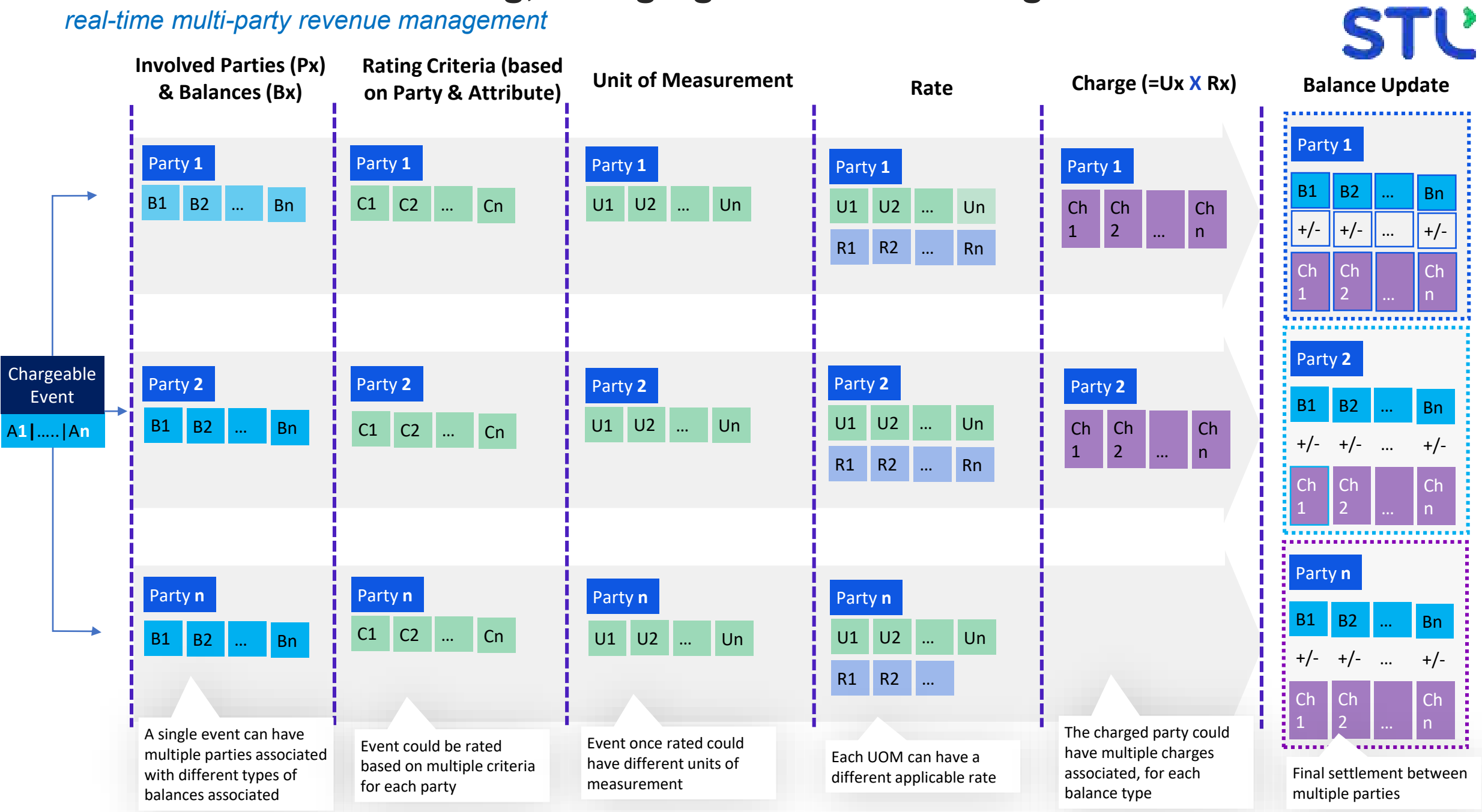
Multi-Dimensional Rating, Charging & Balance Management

real-time multi-party revenue management



Technology & Platform (Open, Disaggregated, Cloud Native)

Automation for scale & efficiency

01

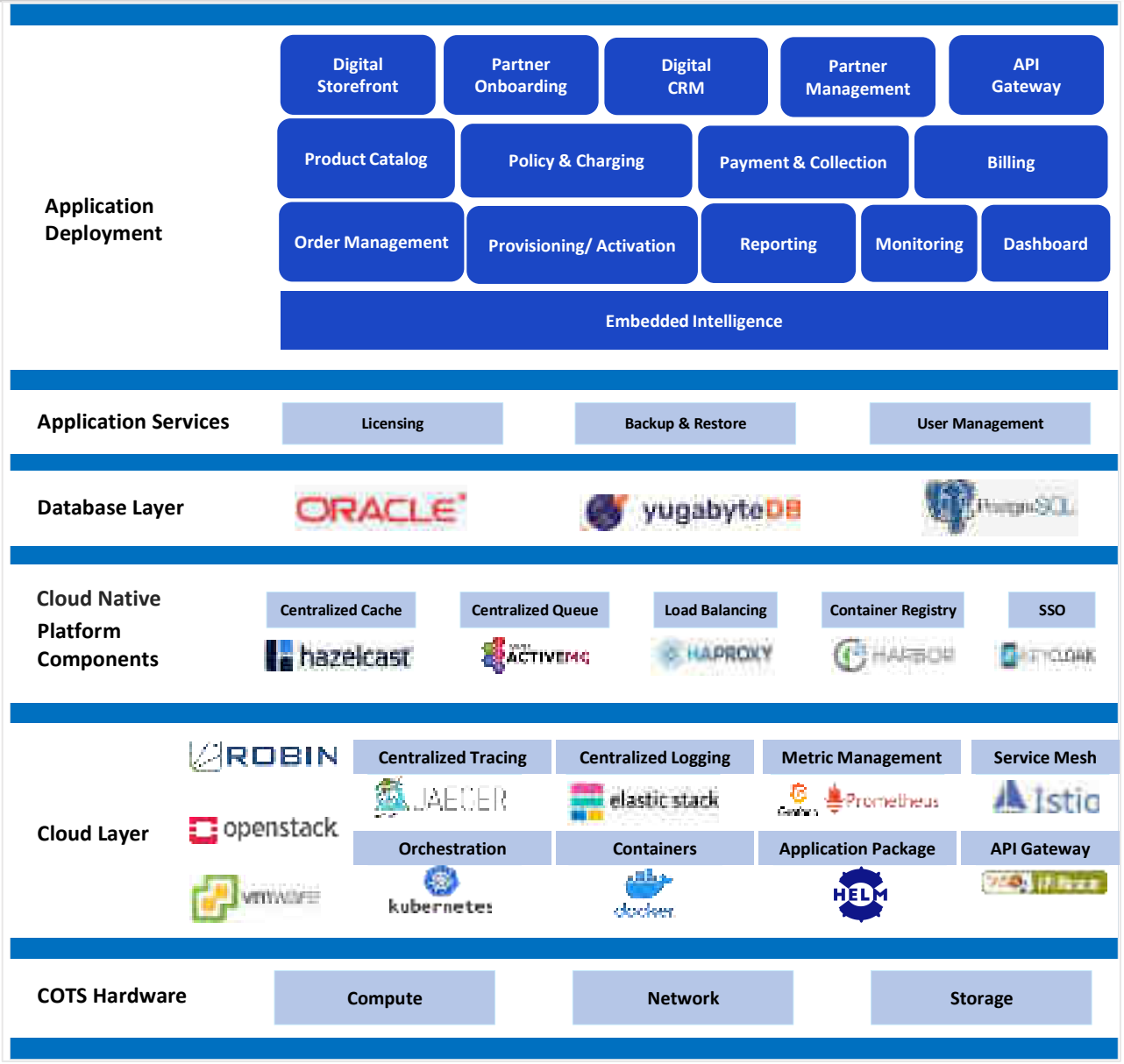
Web-Scale and Containerized

02

Cloud Native & Open Source Complaint

03

Auto Scale
Auto Heal
Zero Downtime
Single Touch Deployment



CI/CD Pipeline Automation

GitLab

JUnit

sonarqube

Jenkins

LIQUIBASE

Gradle

JFrog ARTIFACTORY

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5G Monetization

for a Digital Economy Powered by Multi-Sided Business Models

Questions?

STL is an industry-leading integrator of digital networks. We design and integrate these digital networks for our customers. With core capabilities in Optical Interconnect, Virtualized Access Solutions, Network Software and System Integration, we are the industry's leading end-to-end solutions provider for global digital networks. We partner with global telecom companies, cloud companies, citizen networks and large enterprises to deliver solutions for their fixed and wireless networks for current and future needs. We believe in harnessing technology to create a world with next generation connected experiences that transform everyday living. With intense focus on end-to-end network solutions development, we conduct fundamental research in next-generation network applications at our Centre of Excellence. STL has a strong global presence with next-gen optical preform, fibre and cable manufacturing facilities in India, Italy, China and Brazil, optical interconnect capabilities in Italy, along with two software-development centers across India and one data center design facility in the UK.

beyond tomorrow