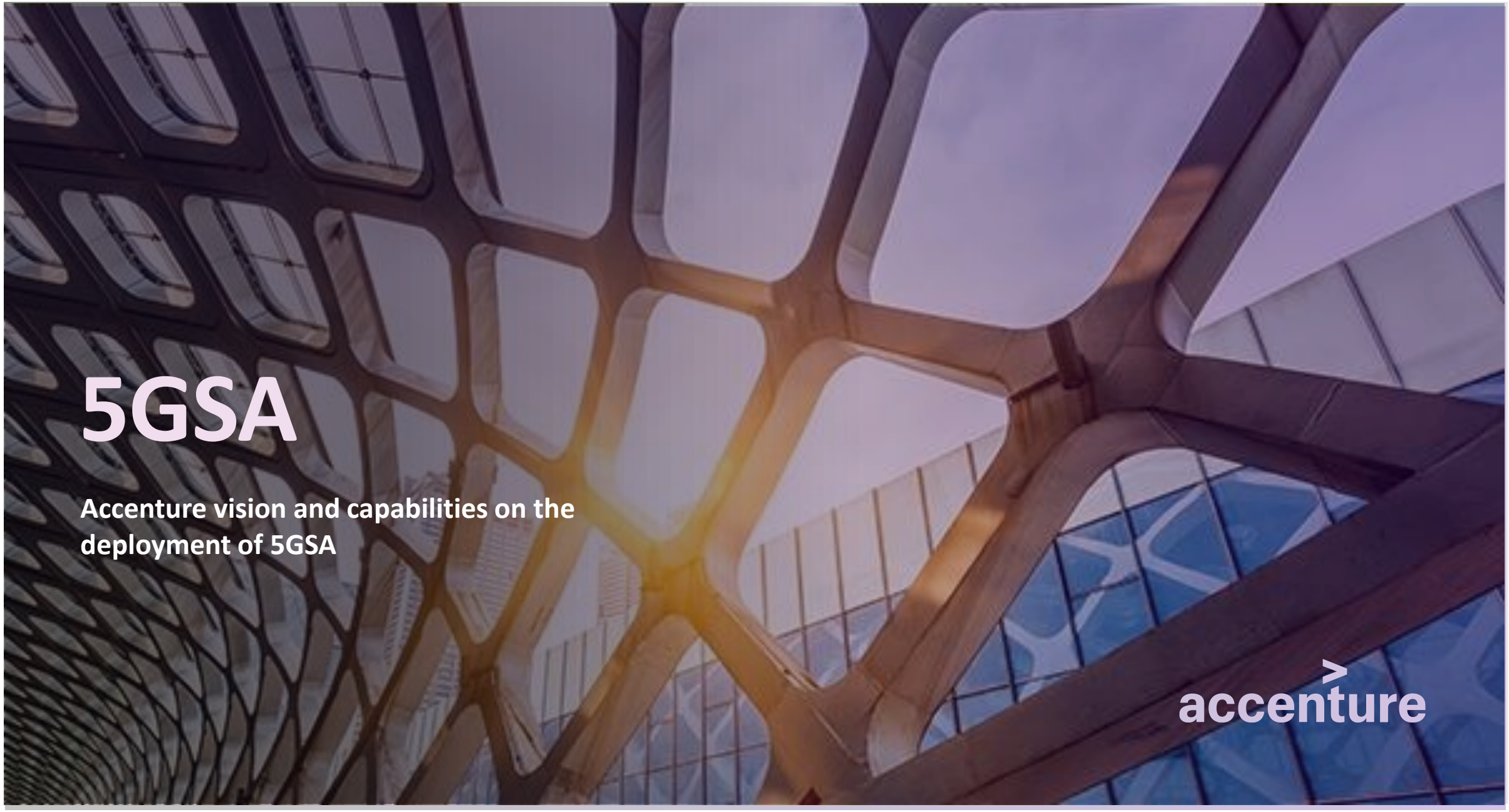

5GSA
Accenture vision and capabilities on the deployment of 5GSA
accenture

Agenda

3G Sunset

01 About us

02 The Need for 3G Shutdown

03 Factors for consideration

04 Our Approach

Accenture Cloud First Network Comms Industry At a Glance

40+

Global 5G Innovation hubs
(US, Germany, India, Singapore)

4+

5G Driven Acquisitions

AFD.TECH Part of Accenture
umlaut
Arca. Part of Accenture
Northstream

10+

Industry Accreditations

ctia
GSMA
3GPP
ONAP
TELECOM INFRA PROJECT
O-RAN ALLIANCE
Open Source MANO
tmforum

8K+

Network Professionals

175+

Alliance Partners

Microsoft
Google Cloud
Rakuten
NOKIA
DELL
aws
SAMSUNG
AVENIR
intel
Hewlett Packard Enterprise
vmware
Red Hat
servicenow
cisco
JUNIPER NETWORKS

Everest Group PEAK MATRIX — **Leader in 5G Engineering Services 2021**

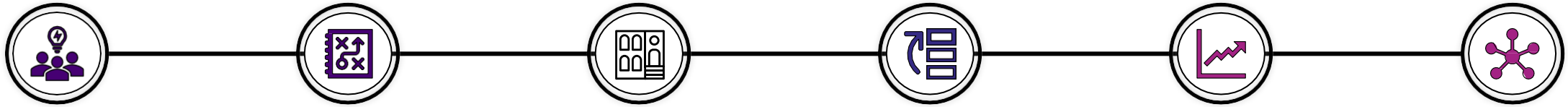
Gartner — **Leader in IT Services for Communication Service Providers 2021**

IDC — **Leader in Cloud Professional Services 2022**

OUR END-TO-END SERVICE PROPOSITION…

PROVIDING END-TO-END ADVISORY AND ENGINEERING SERVICES

Strategy & Design | **Build & Transform** | **Operate**



STRATEGY

- Strategy development
- Business plan/model
- Network evolution
- RFx support
- Market & technology research
- Training & workshop

PLANNING

- Vendor Selection
- Network design
- Network planning
- Asset management
- Regulatory
- EMF compliance
- SLA assessment

IMPLEMENTATION

- Contract & Vendor Management
- E2E Device & Network readiness
- Core test center
- Vendor interworking
- Cluster acceptance
- Roll-out monitoring

TESTING & VALIDATION

- Service acceptance & validation
- Quality of service
- Network capabilities
- Drive- & walk-testing
- Crowdsourcing & GIS Analytics
- 5G Native Application

OPTIMIZATION

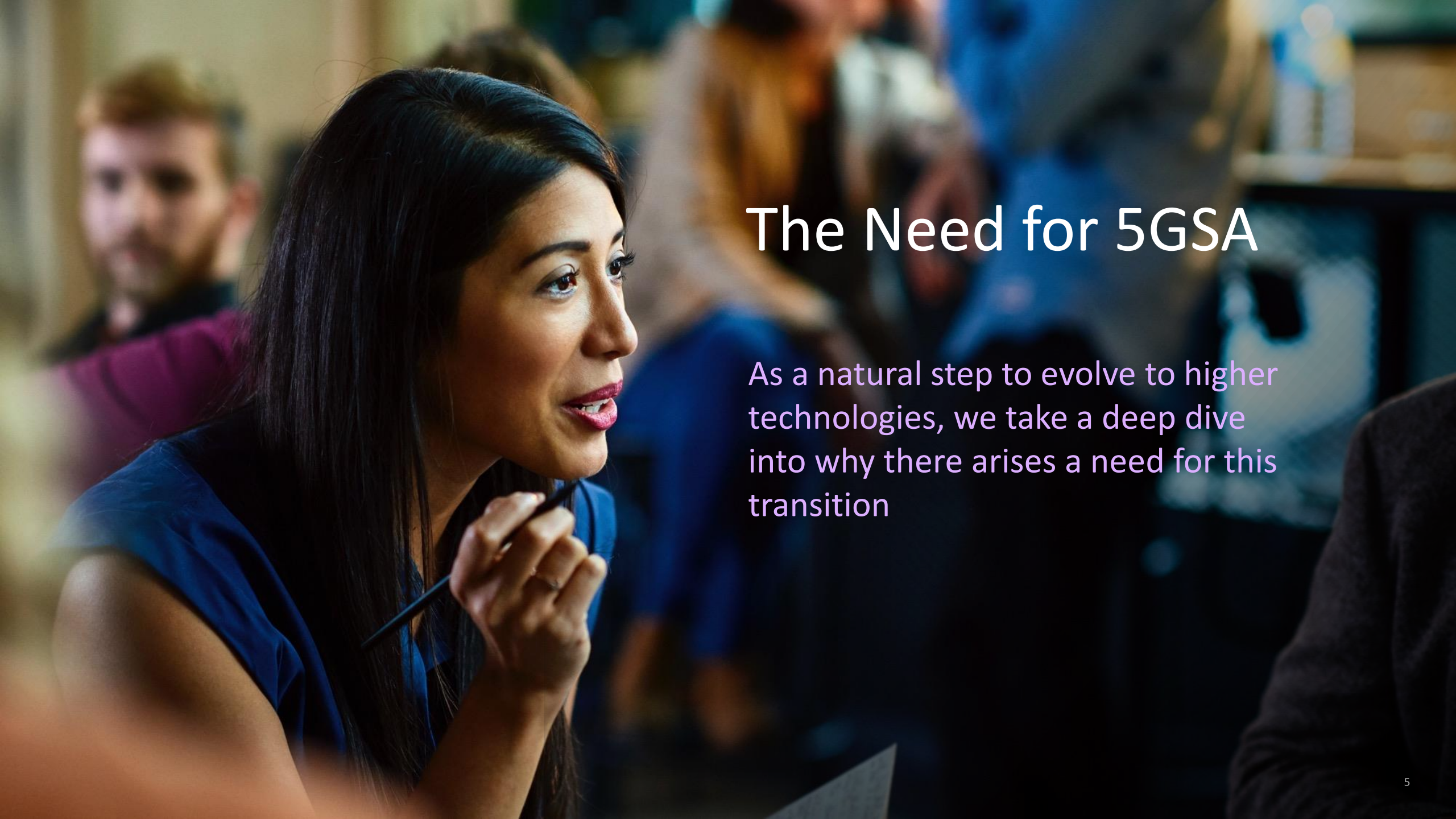
- Service maintenance & network operations
- Big data analytics
- Technical assessment
- E2E service optimization
- Customer journey
- Automated RF & RAN optimization

SERVICES

- Mobile Edge Services
- Smartphone
- Fixed Wireless
- IoT & digitalization
- KPIs Standardization, Validation & Reporting

Security Design & Enablement | Project Management & PMO

End-to-End Services



The Need for 5GSA

As a natural step to evolve to higher technologies, we take a deep dive into why there arises a need for this transition

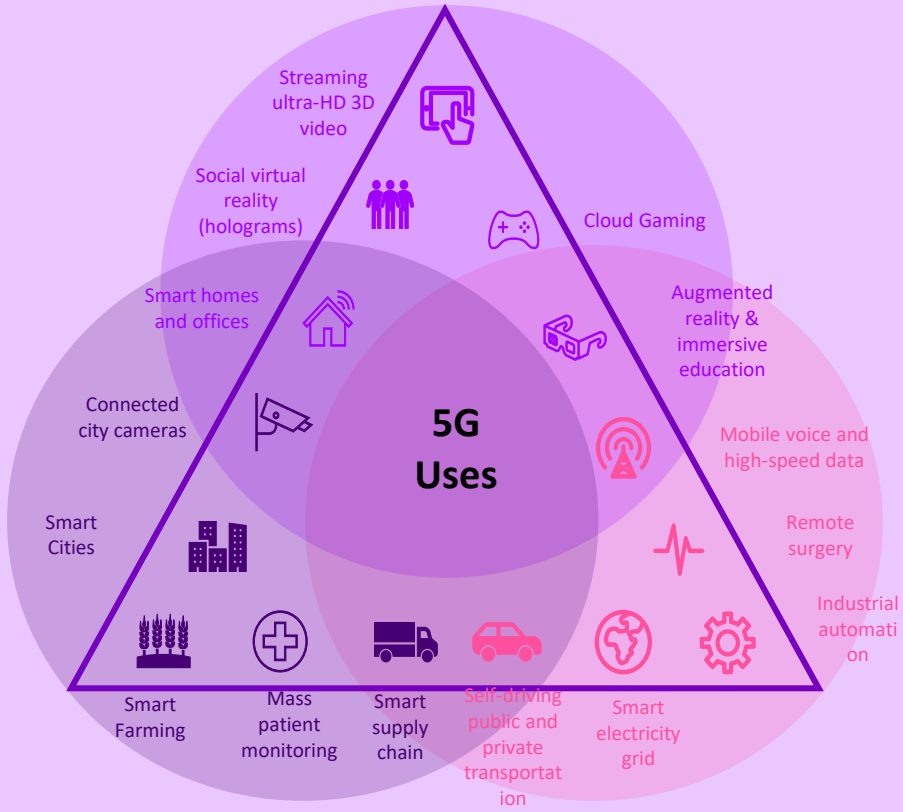
Why 5GSA?

The need for a transition from 5GNSA to 5GSA to culminate the spectrum investment and modernize the Network and services, improve performance and monetization

1 **Efficiency**: 5GNSA is not a complete deployment, since it relies on 4G Core (EPC), which limits its capabilities in terms of Latency, Throughput and overall efficiency

2 **Features**: Full realization of 5G technology unlocking it's full potential, providing native 5G capabilities like ultra-low latency, massive IoT support, and network slicing, which increases opportunities on Private Networks

3 **Roadmap:** 5GSA sets the foundation for future 6G capabilities, including the use of AI-driven networks, edge computing, and more efficient service delivery.



5GSA provides multiple Benefits

True 5G Core Architecture (SBA)

Cloud-native core allows for greater flexibility, scalability, and automation.

Network Slicing

Ability to create multiple virtual networks on the same physical infrastructure, each tailored to specific use cases, increasing operational efficiency.

Ultra-Low Latency

Latency as low as 1ms, enabling critical use cases like autonomous driving and remote surgeries.

Support on Massive IoT Deployments

Supports billions of devices with different connectivity needs, perfect for smart cities, agriculture, and industrial IoT applications

Enhanced Throughput

Higher data rates due to access to both sub-6 GHz and mmWave spectrum and out-of LTE infrastructure opertion

Energy Efficiency

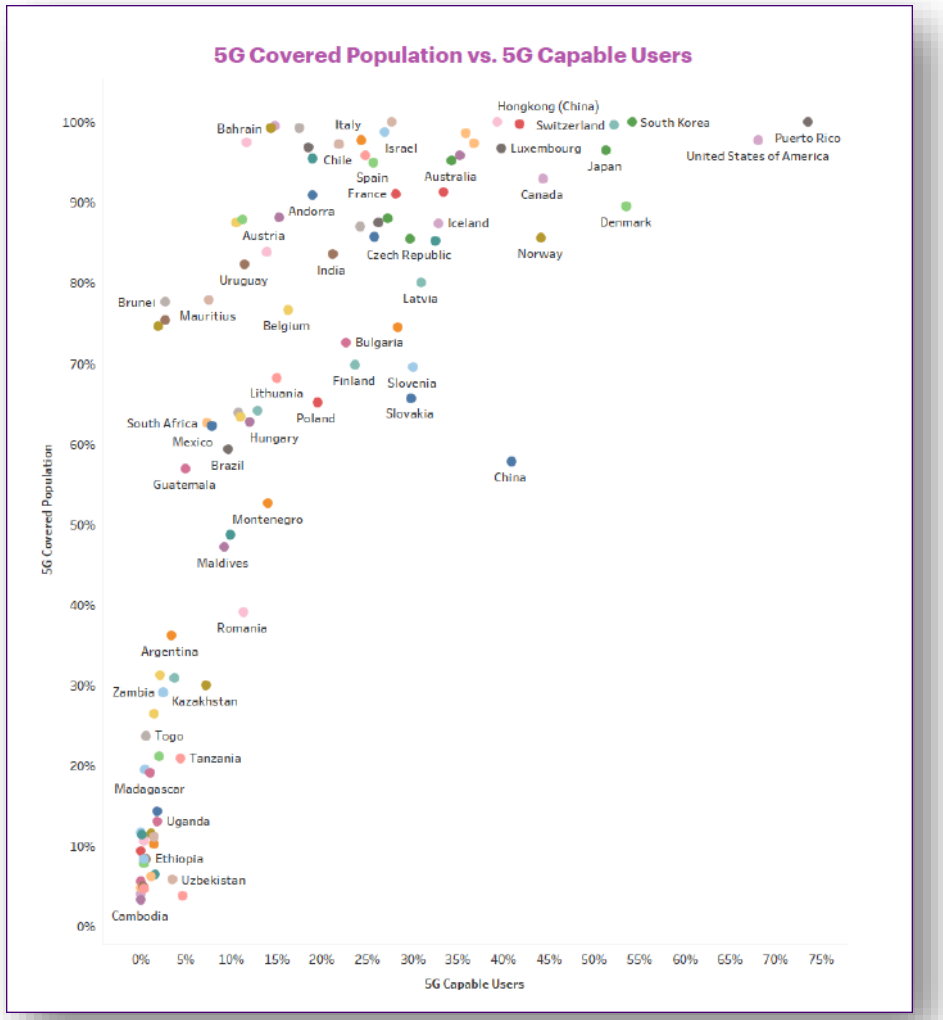
More efficient use of resources, resulting in reduced power consumption, contributing to greener networks.

Global 5G Status

An overview of the market development and end user acceptance

5G Status Worldwide

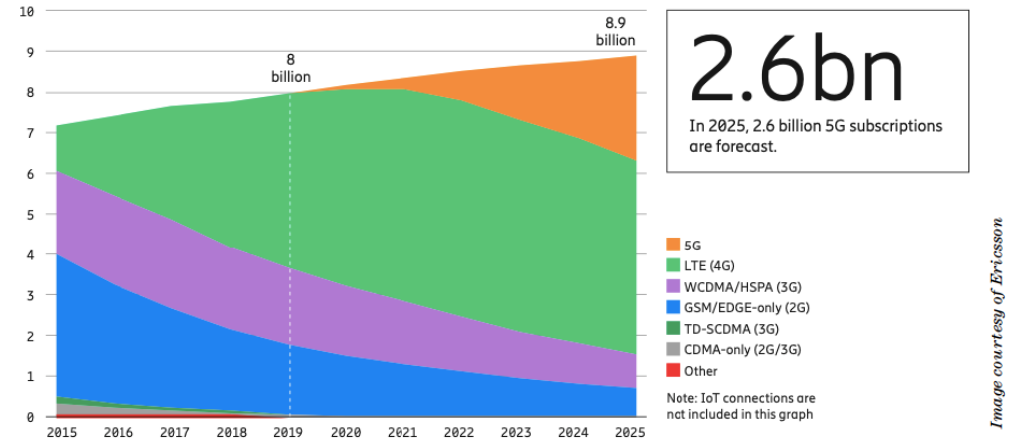
5G Networks are widely deployed in most of the countries, however with low amount of subscribers



Reference : umlaut Crowd Data

Mobile Subscriptions by Technology

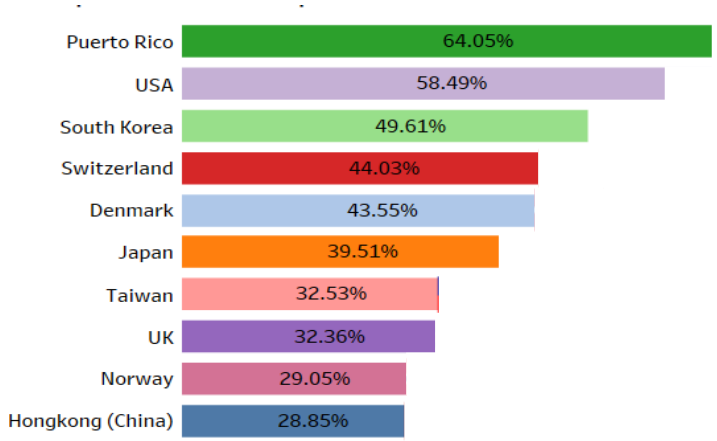
Global trend



Reference : Ericsson

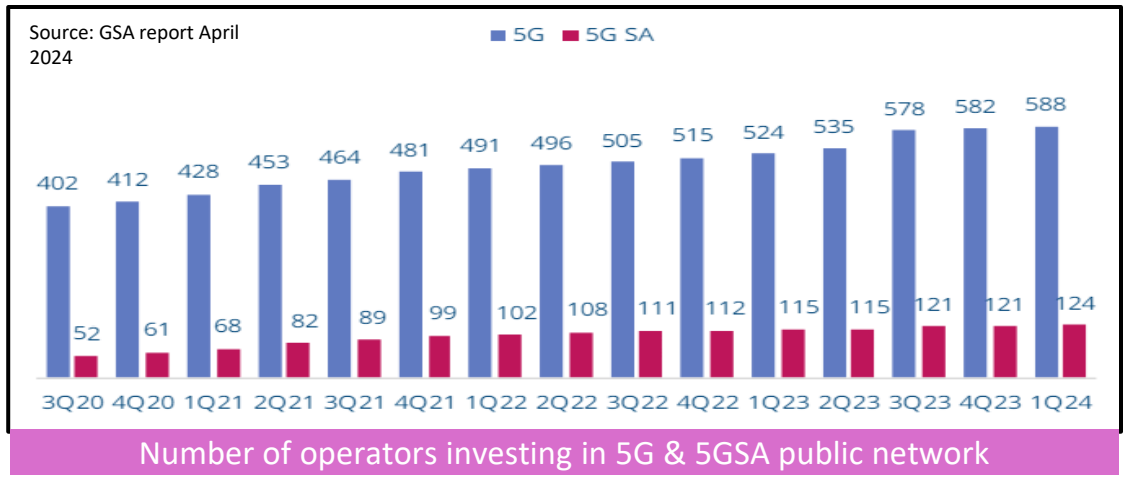
Image courtesy of Ericsson

Top 10 Countries 5G subscribers

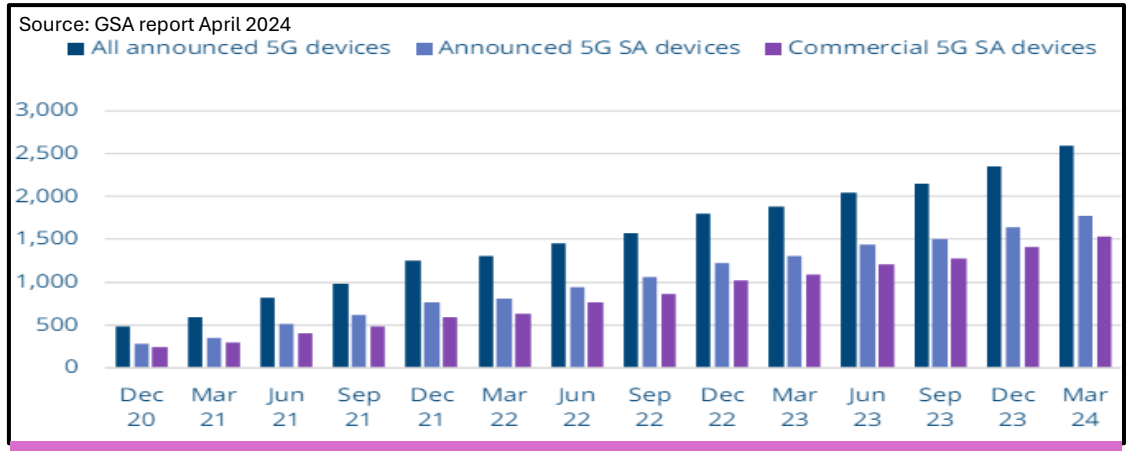


5GSA Status Worldwide

GSA identified 1,764 announced devices with claimed support for 5G SA. Of those, 1,535 devices are already commercially available.



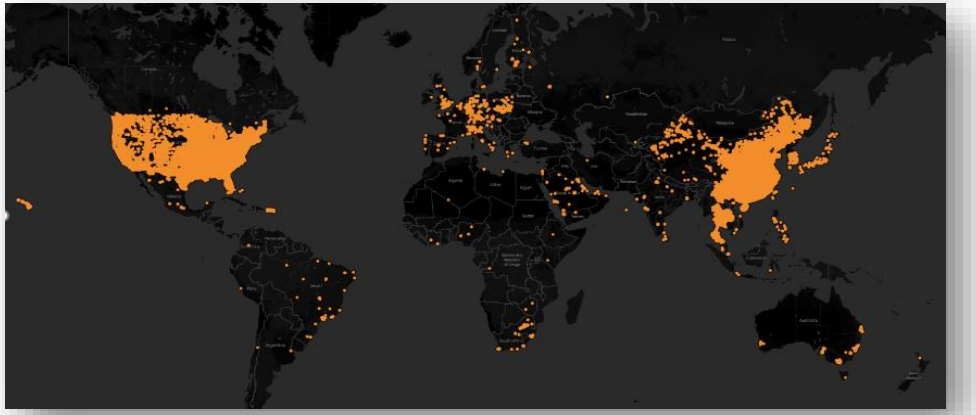
Number of operators investing in 5G & 5GSA public network



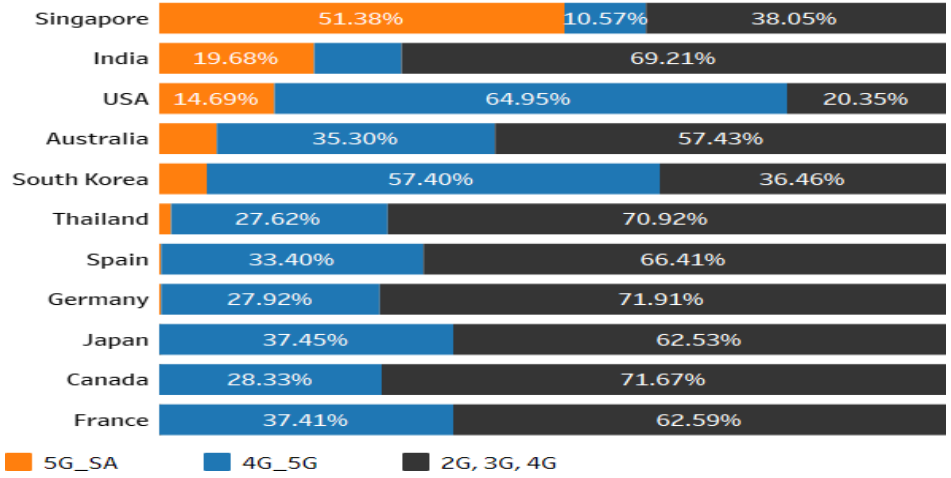
Commercially available 5GSA

Reference : umlaut Crowd Data

5G- SA Roll-out Status

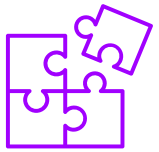


Reference : Ericsson




5GSA
Challenges
accenture

5GSA also brings substantial challenges



SPECTRUM ALLOCATION

Availability of mid- and high-band spectrum is critical for high throughput, but this spectrum is often limited..

INTEGRATION WITH LEGACY NETWORKS

4G LTE networks and devices are still dominant, making smooth interworking a challenge

DEVICE ECOSYSTEM MATURITY

Limited support for carrier aggregation in 5GSA mode and the maturity of 5G-capable devices

COVERAGE ISSUES

Incomplete coverage due to spectrum limitations in many countries.

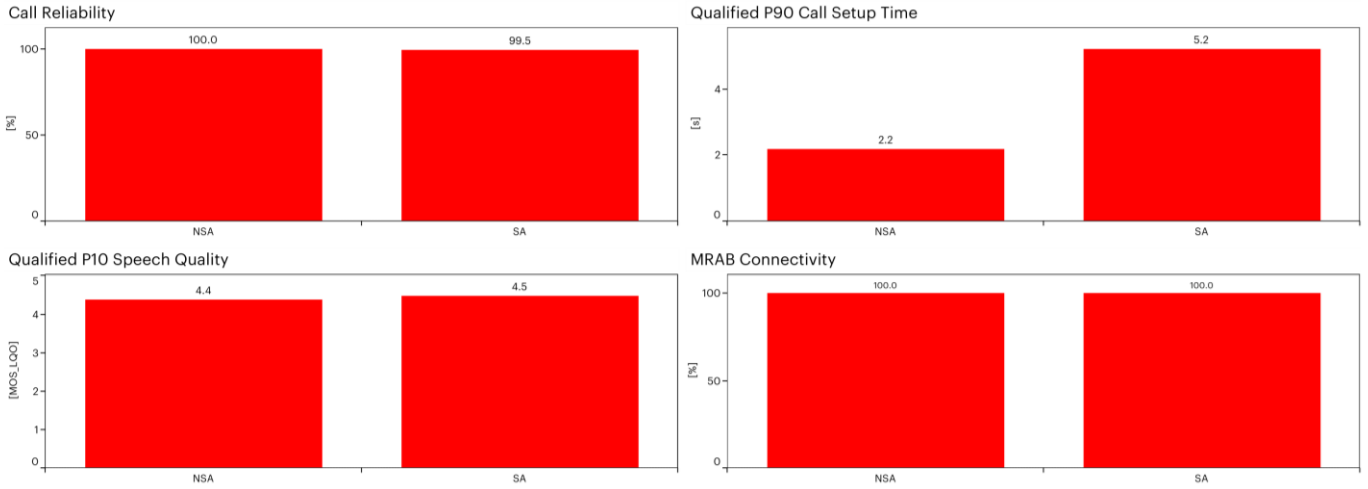
ENERGY CONSUMPTION

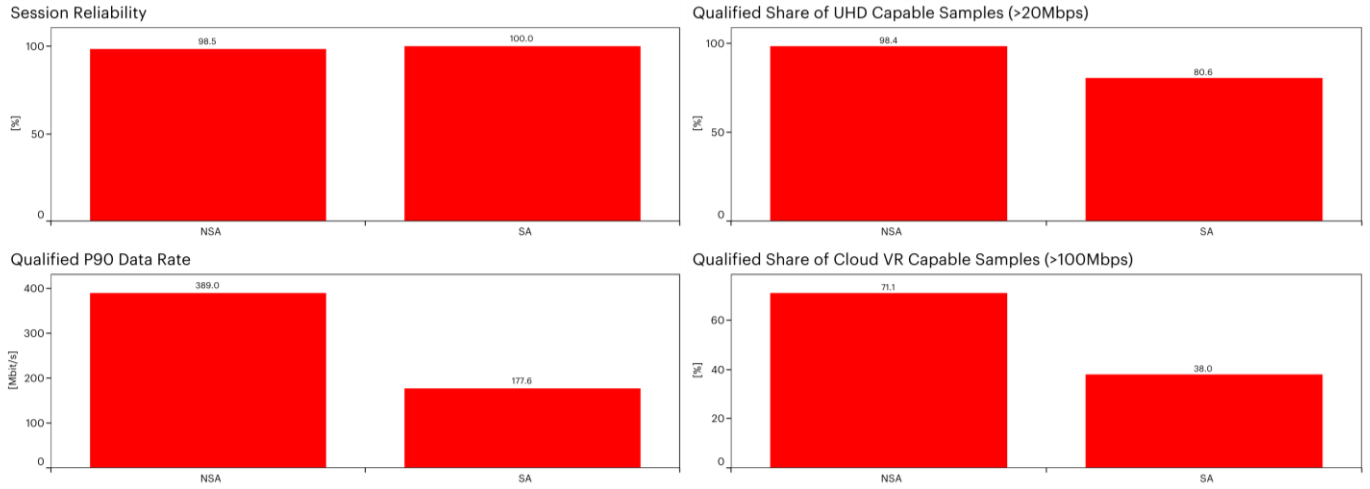
While 5GSA offers better energy efficiency, the infrastructure required is costly and complex to implement at scale.

SA and NSA performance comparison- Country 1

Direct Comparison of performance using SA and NSA locked devices

Negative Impact of low band SA on Voice for key KPIs, call reliability, call setup time due to features and software maturity in both Core and RAN, lack of contiguous coverage





Negative impact of SA on data performance due to
- low 5G available spectrum in early stage of deployment
- limited device support for different CA combo in SA mode
- lack of contiguous coverage

Our Approach

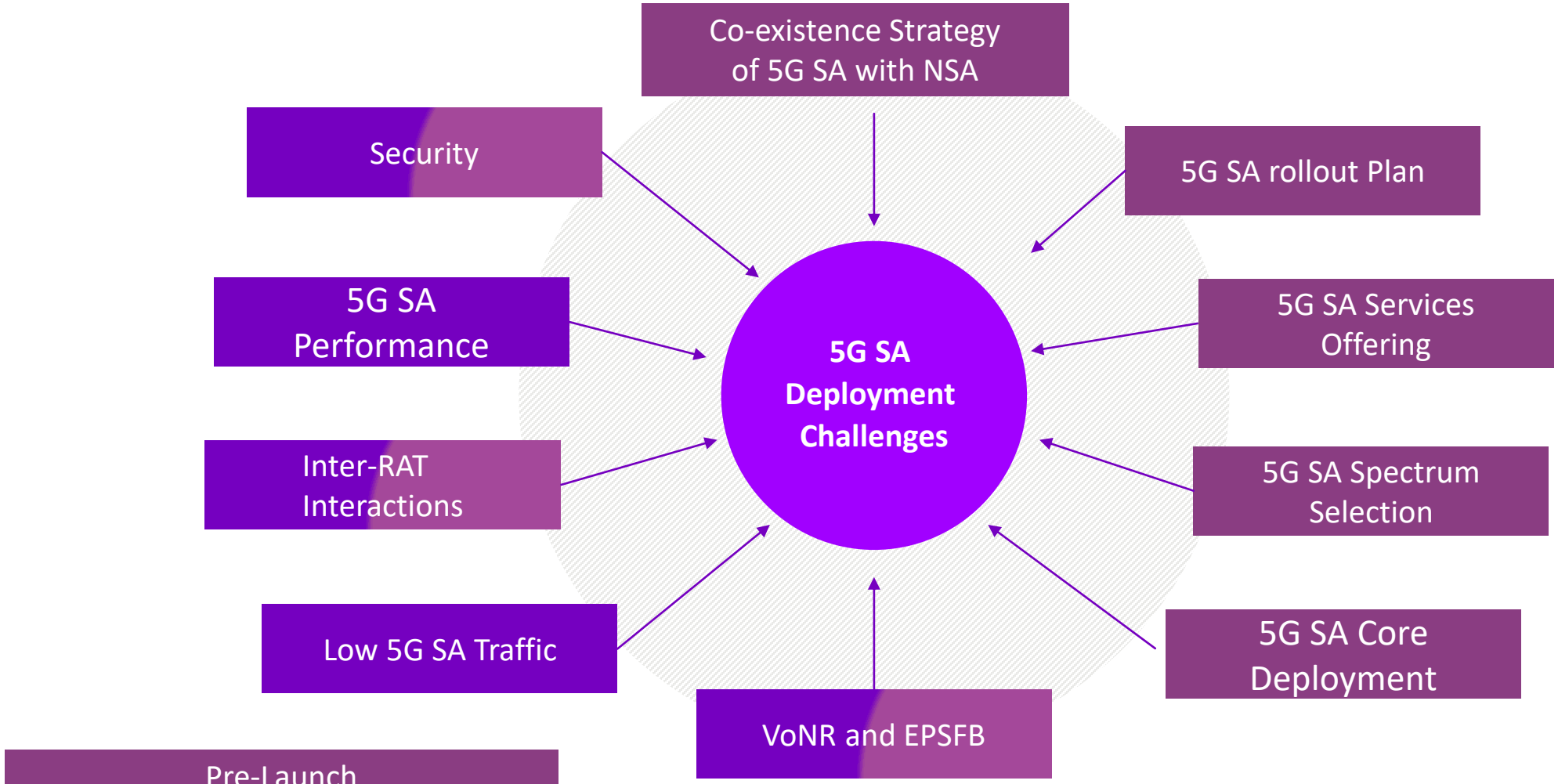
Accenture 5GSA Validation, Verification and Optimization Framework

5GSA Optimization Portfolio

Summary/Overview

	E2E Acceptance Testing	Core Optimization	RAN Optimization
Description	**Testing** to ensure 5GSA networks meet the required performance standards and identify potential optimization areas or systematic issues	Evaluation and tuning of service protocols, session management, and mobility handovers to maximize network efficiency	Solutions to improve mobility, throughput, and accessibility across different 5G spectrum bands

5G SA Deployment Challenges



5G SA Core Validations

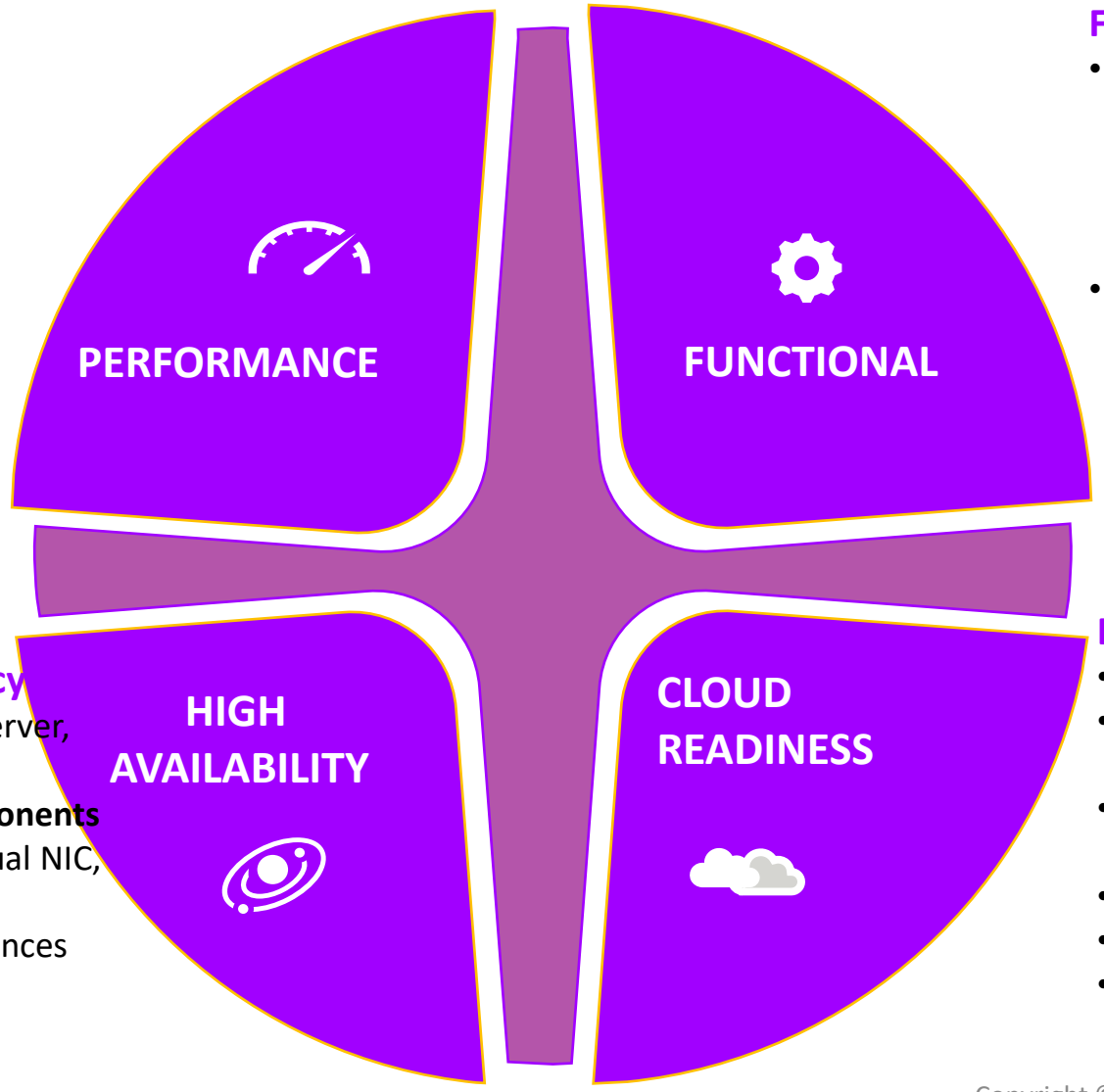
Four Areas of Validation

Validation of solution Performances

- **Control plane load tests** with traffic model (transactions per second) based on production model
- **User plane performance** with specific call models:
  - Throughput, pps, latency, subscriber's number
- **Single user** throughput
- **Stability** (long run) testing, crash tests

Verification of overall redundancy

- **Failover of physical components** (server, TOR, NIC, link)
- **Failover of virtual and logical components** from NFVI and VNF/CNF layers (virtual NIC, VMs)
- **Impact** on the service and performances



Functional validation

- **Functional behavior:**
  - **Session management**
  - **Mobility management**
  - **Charging, Policy enforcement…**
  - **Features testing…**
- **Integration testing:**
  - **SBI validation**
  - **OSS integration**
  - **Specific integration** (Int./Nat. Roaming)

Evaluation of Cloud Readiness

- **VNF/CNF Instantiation** and **Onboarding**
- **Scaling** (leveraging orchestrators or VNF/CNF Manager)
- **Self-healing** (leveraging orchestrators or VNF/CNF Manager)
- **In-service upgrade**
- **Rollback**
- **Termination and resources release**

5G SA Core optimization service components

KPI Audit/optimization

- SBA & NRF
- Mobility
- Slicing and MEC

Configuration/Parameter audit & Tuning

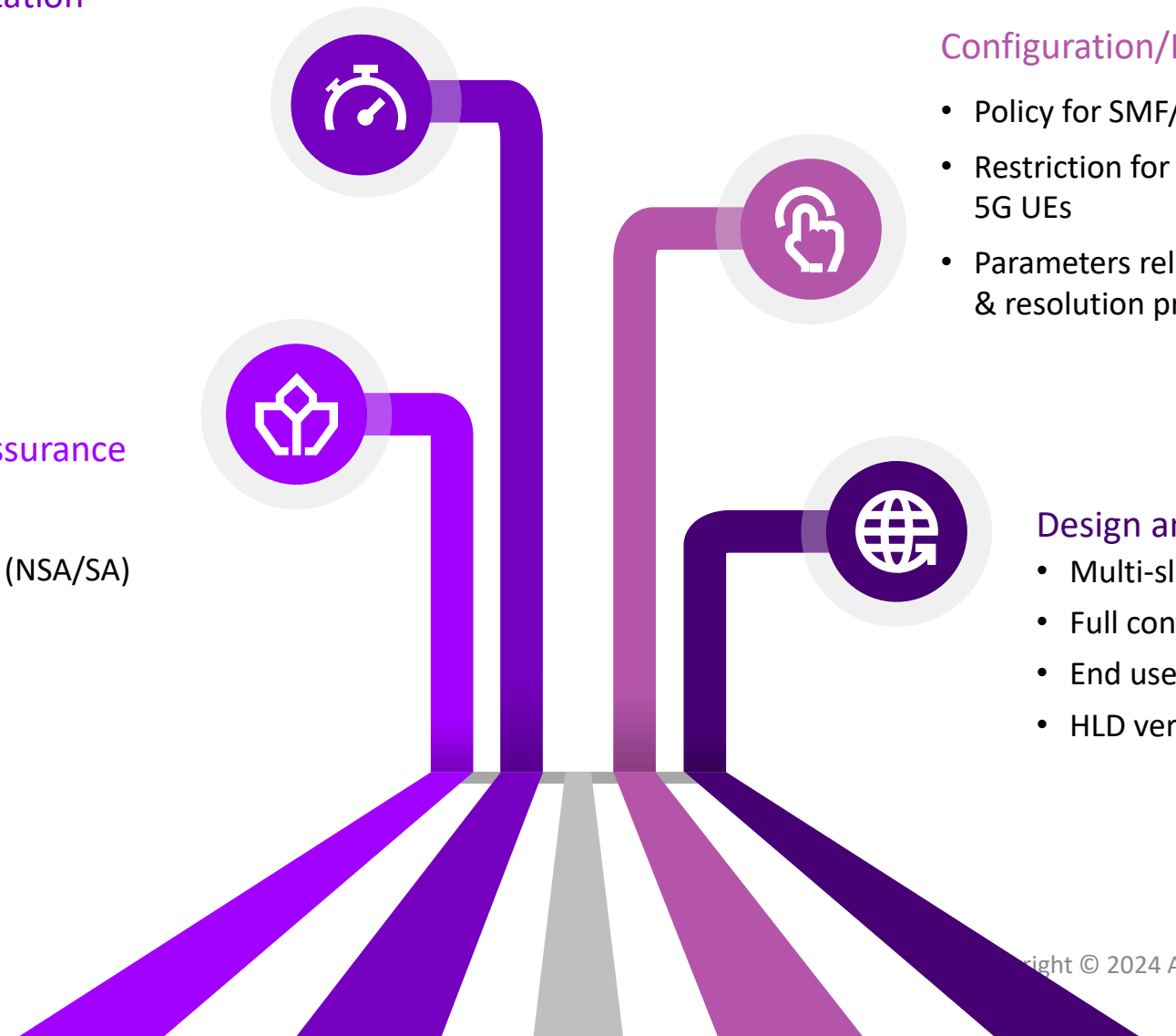
- Policy for SMF/PGW-C selection
- Restriction for SMF/PGW-C selection of non-5G UEs
- Parameters related to the DNS domain name & resolution procedure

Interoperability and services assurance

- NR signaling fine-tuning
- Reselection between LTE and 5G (NSA/SA)
- VoLTE Continuity Assurance

Design and service evaluation

- Multi-slice evaluation
- Full convergency check
- End user experience analysis
- HLD verification



5G SA RAN E2E Optimization

- Idle mode strategy Optimization for intra-system and inter-system
- 5G SA Band limitations and specific optimization
- 5G DL Throughput Optimization
- 5G UL Throughput Optimization
- Inter-system Handover strategy Optimization
- Intra-system Handover Strategy Optimization

- 4G←→ 5G Redirection strategy Optimization
- VoNR Optimization
- Maximizing the 5G utilization to improve the user perception
- 5G CA Optimization
- 5G Drop Rate Analysis and Optimization
- 5G Accessibility Optimization

Thank You

Q&A