
5G Consultancy Services

Network & Business Transformation



Briskwave
For a better telecom deal

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Executive Summary

This document outlines Briskwave's series of 5G Consultancy Service packages to help wireless carriers in their planning, vendor selection, and deployment efforts of their 5G business & network transformation.

1.0 Introduction

BriskWave Consulting is teaming up with network operators, solutions providers, and investors to form the right technology and business strategies for a new time in the industry – a time when waves of promising new technologies and market opportunities are converging with a new financial rigor, and demanding a fresh approach to everything from strategic planning and technology and supplier selection, through to network design and service deployment.

BriskWave offers a rare blend of technical and business know-how, enabling clients to focus on the high-performance technologies and solutions that will bring high-return investments and enhance competitive differentiation.

BriskWave applies a strong financial discipline to the design, selection, development, and deployment of innovative telecom solutions and processes, including IP-based wireless technology and services. With a broad range of services, BriskWave helps clients rapidly take advantage of new opportunities, design cost-effective networks and efficient operational processes, and accelerate acceptance and deployment of new services and solutions.

We understand the technologies, market drivers, and business priorities, and we know how to bring them together successfully. Our seasoned telecom veterans use their vast international experience to help a wide range of businesses – from start-ups to large global companies. Our consultants have unique bench strengths in bringing together and applying the specialized disciplines of business and technology. We help clients improve business cases and network designs, and we provide effective planning of new services and products from end-to-end, including requirements specifications, vendor selection and contract negotiations, and program management.

For more information please visit www.briskwave.com.

ABOUT LUC SAMSON

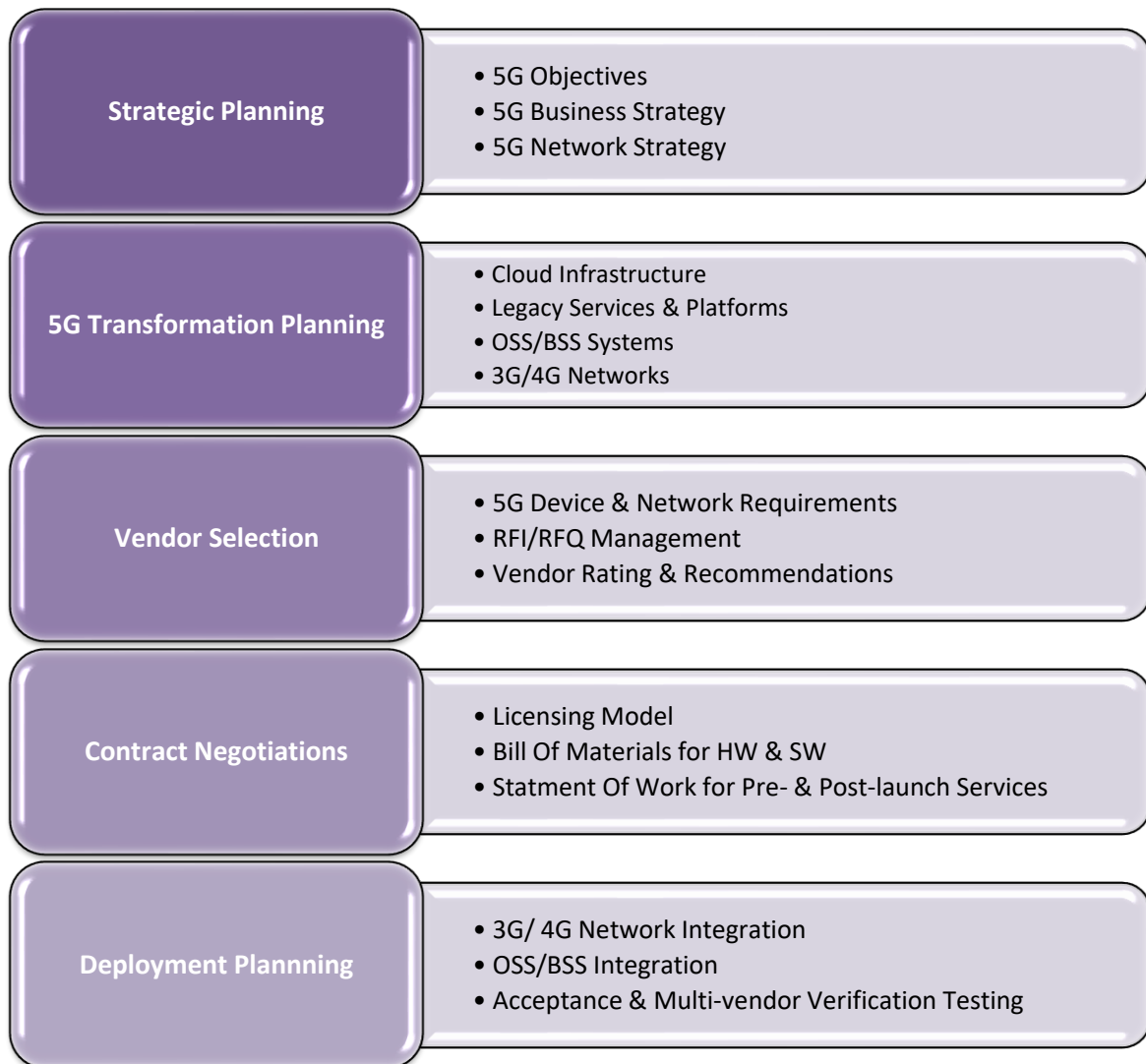
Luc Samson is a partner in Briskwave, a consulting firm that helps wireless carriers rapidly take advantage of new opportunities, design cost-effective networks and efficient operational processes, and accelerate acceptance and deployment of new services and solutions. Luc's expertise lies in managing strategic initiatives in technology evolution, vendor selection, and solution deployment with a focus on 5G transformation and network sharing. He is currently involved in planning 5G with carriers and enterprises in North-America, and has extensive experience in successful VoLTE and MOCN programs.

Prior to Briskwave, Luc was instrumental in helping Nortel and its customers around the globe, in different management and professional services roles. His 20+ years of experience covers business planning, product & service planning, and network engineering for all major wireless technologies, including 5G, LTE, HSPA, GSM/GPRS, CDMA, EVDO, 802.11 and 802.16. Luc holds has a Master degree in applied sciences, he is the author of numerous technical papers, and he owns 2 patents.

Luc speaks fluent French, English, and German.

2.0 5G Services Packages - Overview

The figure below presents Briskwave’s 5G Service Packages regrouped in 5 categories. Each service package can be executed individually or can be bundled with one or more service packages. Depending on the specifics of the overall project, interdependencies may exist between the service packages. Furthermore, the scope of each service can be reduced and/or expanded to meet the particular needs of the wireless carrier.



3.0 Strategic Planning Services

3.1 5G Objectives

Through a series of training and workshop sessions with key stakeholders including the marketing, engineering, and operations groups, the 5G Objectives package is to define the objectives of the 5G strategy considering the applicable 5G business drivers, and to identify the essential 5G technology enablers that are required to address them.

1. 5G Business Drivers

- a. Expanding Business Models across the following provider models:
 - i. Enhanced Connectivity Provider: enhanced connectivity with differentiated feature set (ultra-low-latency, ultra-high broadband speeds, high reliability,) and enhanced self-configurability
 - ii. Asset Provider: IaaS, NaaS, PaaS, or network sharing
 - iii. Partner Service Provider: enriching partner's applications and services with network exposure capabilities
- b. Broadening the range of device types supported: smartphones, Fixed Wireless Access CPEs, cars, machines, meters, sensors, point-of-sale terminals, consumer electronics and wearables
- c. Expanding the addressable market segments: consumers, enterprises, market verticals, industry 4.0
- d. Reducing the cost per device, per connection, per data volume and per bit/sec
- e. Delivering new services based on improved network performance, data privacy and network reliability
- f. Shortening the time and reducing the costs to deploy and deliver new services (Time-To-Market), and to provision end-users (Time-To-Customer)
- g. Creating an open and agile service creation environment for the third-party development of innovative services or applications that exploit AI, big data, and context-awareness
- h. Allowing customers to create and manage their own customized services with a granularity never-seen-before
- i. Facilitating the convergence of IT and Network Infrastructures allowing applications and services to automatically provision and adapt to network capabilities and resources, thus allowing the on-boarding of new business partners
- j. Simplifying network operations and management via network automation and self-adaptability

2. 5G Technology Enablers

- a. 5G NR

- b. Cloud-native
- c. Open-source
- d. Service-Based Architecture
- e. Network Slicing
- f. Network Exposure
- g. Multi-Access Edge Computing (MEC)
- h. Fixed-mobile convergence
- i. Big Data & Analytics
- j. AI & Machine Learning
- k. Access-agnostic
- l. Service and Network Management Automation
- m. Software-Defined Networking (SDN), Network Function Virtualization (NFV) and Management and Orchestrator (MANO)
- n. Open APIs

3.2 5G Business Strategy

Based on the objectives of the 5G Strategy, the 5G Business Strategy Work Package includes the following activities & deliverables:

1. Identifying the usage scenarios per market segments / verticals
 - a. Augmented Reality (AR) / Virtual Reality (VR)
 - b. Immersive Gaming
 - c. Infotainment
 - d. Autonomous cars
 - e. High-speed Vehicles
 - f. Fleet Management/Logistics
 - g. Massive-Scale Mobile Video Surveillance & Analytics
 - h. 4KK/8K video streaming
 - i. Broadcast-like Services
 - j. Telehealth & Remote Surgery
 - k. Remote Object Manipulation
 - l. Connected Robotics
 - m. Asset Tracking
 - n. Industrial Automation
 - o. Remote Industrial Control

- p. Bandwidth-Intensive & Latency-Sensitive Field Applications
 - q. Wearables
 - r. Others
2. Identifying the Service Management use-case scenarios
- a. App-store style to customize and self-manage 5G services & SLA
 - b. "Plug-and-play" service creation environment
 - c. Applications, catalog development, and billing capabilities for third-party providers
 - d. Automation of service configuration, pricing, and quoting
3. 5G Business Case
- a. Marketing forecasts of subscriber counts, usage & traffic demands, service packages & pricing on a per market segment basis
 - b. High-level 5G RAN & Core network planning, including roll-out plan, spectrum & antenna plan, site count based on link budget analysis, as well as coverage and capacity requirements, service & QoS modelling
 - c. Financial analysis, including, CAPEX & OPEX modelling, Return On Investment, Net Present Value, and cash-flow analysis.

3.3 5G Network Strategy

The 5G Network Strategy Work Package includes the following activities & deliverables:

1. Mapping the usage scenarios to 5G Service classes
 - a. Enhanced Mobile Broadband (EMBB)
 - b. Ultra Reliable Low Latency Communication (URLLC)
 - c. Massive Machine Type Communication (MMTC)
 - d. enhanced Vehicle-to-X communications (eV2X)
2. Identifying the Network Operation Use-cases
 - a. Automated creation and scaling of Network Slicing
 - b. Zero-touch Network Management
 - c. Data analytics
 - d. Auto-scaling of network capacity
 - e. Auto-healing of network failure
 - f. Predictive traffic congestion
 - g. Predictive network maintenance

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- h. Automation of network performance optimization
 - i. Automated SW upgrades & testing
 - j. Automatic testing
 - k. Others
3. Producing a target architecture showing the functional network elements:
- a. gNB
 - b. 5GC
 - c. MEC
 - d. EMS
 - e. NMS
 - f. OSS/BSS
 - g. NFVI and Orchestration
4. Producing a 5G Network Deployment & Migration Strategy, with an assessment of each option against pros & cons, risks & opportunities, and recommendation of the optimal deployment strategy with regards to :
- a. RAN-level 4G/5G Interworking: Migration from NSA to SA Options
 - b. Core-level EPC-5GC Interworking: Use-cases and Integration Points
 - c. Fixed Wireless Convergence
 - d. Voice & SMS support
 - e. Single-vendor vs multi-vendor
 - f. Evolution to dual-mode 5G Core
 - g. Roaming support
 - h. Others

4.0 5G Transformation Planning

The intent of the 5G Transformation Work Package is to identify all additions, changes, upgrades, and replacements to legacy systems, networks, and services impacted by 5G and required to make them 5G-ready. Changes can be for capacity, functional, or integration purposes. It also involves identifying new business processes and people's skillsets required by the 5G transformation.

It includes the following activities & deliverables:

1. The Cloud Infrastructure
 - a. Private cloud, public cloud, or hybrid (i.e. private & public) cloud
 - b. NFVi supporting VNF or CNF
 - c. Management and Orchestration (MANO): NFVO + NFVM + VIM
 - d. Single-domain or multi-domain Orchestrator
 - e. Orchestrator requirements: shared vs dedicated, single-vendor vs multi-vendor, single-tenant vs multi-tenant infrastructure
2. Legacy Services - Evolution to 5G
 - a. VoLTE to VoNR
 - b. SMS over 5G
 - c. E911, NG 911
 - d. Lawful Intercept
 - e. Wireless Priority Alerting System
 - f. Non-3GPP Access
 - g. Network Sharing
 - h. Device-positioning services
 - i. Roaming
 - j. Others
3. Legacy OSS/BSS Systems
 - a. Full Automation of Network & Service Management and Operation, using tools and methods such as auto-scaling and auto-healing, Artificial Intelligence (AI), Machine Learning (ML) and Big Data analytics
 - b. BSS evolution to support a larger and more diverse group of stakeholders beyond consumers, resellers and partners, to include service creators and application developers
 - c. Real-time and automated management of network slicing

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- d. Service assurance
 - e. Charging & Billing
 - f. Customer Relationship Management
 - g. Others
4. Legacy Networks & Service Platforms
- a. eNB
 - b. EPC
 - c. Transport & IP
 - d. SMS-C
 - e. Others
5. People Skillset & Business Processes
- a. Open-source
 - b. DevOps & Continuous Delivery and Deployment (CI/CD) practices
 - c. Artificial Intelligence (AI), Machine Learning (ML) and Big Data analytics
 - d. Virtualization
 - e. Vertical-specific competencies
 - f. Others

5.0 Vendor Selection Services

5.1 5G Device & Network Requirements

The purpose of the 5G Device & Network Requirements Work Package is to define the RFQ requirements and/or establish the Bill-Of-Materials to be ordered; it includes the following activities & deliverables:

1. Review & assessment of current commercial 5G device & network product offerings by major vendors, in terms of functionalities, capacity, availability timeframe, etc;
2. Review of carrier's specific requirements with regards to service offering, 4G network integration points, OSS/BSS integration points;
3. Finalize the list of mandatory and desirable featured.

5.2 RFI/RFQ Management

The 5G RFI/RFQ Management Work Package includes the following activities & deliverables:

1. Publishing the 5G RFI/RFQ based on the carrier's requirements;
2. Manage vendor interactions with regards to the communications, the schedule, the questions & answers, bid defences, responses to the RFI/RFQ;
3. RFI/RFQ Evaluation & Scoring matrix.

5.3 Vendor Rating & Recommendations

The Vendor Rating & Recommendations Work Package includes the following activities & deliverables:

1. Validate vendor's RFQ responses through bid defence meetings, lab visits, product demo or trials, and reference calls; modify the RFQ scoring accordingly;
2. Rate vendors according to both the revised RFQ scoring (i.e. alignment of solutions to carrier's requirements) and other strategic & commercial criteria such as vendor credibility, market presence, pricing and commercial terms, and others.
3. Final recommendations on vendor selection i.e. short-list.

6.0 Contract Negotiation Services

In support to carrier's procurement team in the contract negotiation phase, the services described in this section cover critical technical inputs to the contract necessary to guarantee that the contract will reflect carrier's needs.

6.1 Licensing Model

The purpose of the Licensing Model Work Package is to align all vendors to a licensing model that matches carrier's requirements in term of simplicity, manageability, predictability, price-point, traffic metrics, size of capacity steps, and many others.

This is a key component of the procurement efforts to guarantee that the 5G solution will ultimately match carrier's 5G business case.

The Licensing Model Work Package includes the following activities & deliverables:

1. Define the key metrics for licenses, on a per network element basis;
2. Align vendors' licensing models to the required models;
3. Evaluate risks by running what-if traffic scenarios and evaluate cost impacts;
4. Set maximum target price for each license metrics.

6.2 Bill Of Materials for HW & SW

The purpose of this activity is to align all vendors' Bill Of Materials (BoM) to match carrier's requirements.

This is a key component of the procurement efforts to guarantee that the 5G solution will ultimately match carrier's 5G requirements.

The BoM Work Package includes the following activities & deliverables:

1. Define carrier's functional and capacity requirements;
2. Review proposed vendors' BoMs against the functional and capacity requirements;
3. Align vendor's BoMs to carrier requirements;
4. Identify gaps and value-added functions beyond carrier's requirements.

6.3 SOW – Pre-launch & Post-launch Services

The purpose of the *SOW – Pre-launch & Post-launch Services* Work Package is to align vendors' service offering with regards to service definition and Statement Of Works (SoW) to match carrier's service requirements.

This is a key component of the procurement efforts to guarantee that the 5G solution will ultimately match carrier's 5G service requirements.

The *SOW – Pre-launch & Post-launch Services* Work Package includes the following activities & deliverables:

1. Define the generic set of carrier’s service requirements, for both pre- and post-launch phases;
2. Review proposed vendors’ SoW against the service requirements;
3. Align vendor’s SoW to carrier’s requirements;
4. Identify gaps and value-added services below and beyond requirements.
5. Pre-launch & post-launch services covered by this work package can include:
 - a. Site Engineering
 - b. Shipment to Site
 - c. Installation
 - d. Configuration
 - e. Integration
 - f. Commissioning
 - g. Acceptance Testing
 - h. Network Design
 - i. Network Optimization
 - j. Project Management
 - k. Support & Maintenance - SLA
 - l. Training & Documentation

7.0 Deployment Planning Services

7.1 3G/4G Network Integration

The purpose of the *3G/4G Network Integration Work Package* is to guarantee that the vendor's 5G solution is fully integrated with the carrier's 3G and 4G networks. This service can be partially integrated into the *Acceptance Testing –Launch Services*, depending on the specifics.

This Work Package includes the following activities & deliverables:

1. Identify all integration points between the 3G/ 4G and the 5G networks;
2. Define use cases and data flows involving the integration points;
3. Define the requirements on all integration points between the 3G/ 4G and the 5G networks;
4. Translate integration requirements into specific functional, configuration, and capacity requirements required on the 3G & 4G and 5G network elements;
5. Define detailed project plan for the procurement, activation, and availability of those requirements;
6. Define the detailed test cases & scenarios, including procedures to verify that the integration test criteria are met (*);

(*) The integration test criteria, but not necessarily the detailed test scenarios, shall have been defined in the SoW for Pre-launch services prior to the start of deployment and already included in the contract terms.

7.2 OSS/BSS Integration

The purpose of the *OSS/BSS Integration Work Package* is to guarantee that the vendor's 5G solution is fully integrated with carrier's OSS & BSS systems. This service can be partially integrated into the *Acceptance Testing –Launch Services*, depending on the specifics.

This Work Package includes the following activities & deliverables:

1. Identify all integration points between carrier's OSS&BSS systems and the 5G network;
2. Define use cases and data flows involved on the integration points; use cases shall cover all applicable OSS & BSS domains such as Fault, Configuration, Performance, Accounting, Security, and Provisioning Management
3. Define the requirements on all integration points between carrier's OSS&BSS systems and the 5G network;
4. Translate integration requirements into specific functional, configuration, and capacity requirements required on carrier's OSS&BSS systems;
5. Define detailed project plan for the procurement, activation, and availability of those requirements;

6. Define the detailed test cases & scenarios, including procedures to verify that the integration test criteria are met (*);

(*) The integration test criteria, but not necessarily the detailed test scenarios, shall have been defined in the SoW for Pre-launch services prior to the start of deployment and included in the contract terms.

7.3 Acceptance Testing

The purpose of the *Acceptance Testing –Launch Services Work Package* is to guarantee that the vendor’s 5G solution meets carrier’s operational requirements before product acceptance and commercial launch.

This Work Package includes the following activities & deliverables:

1. Define the overall and detailed product acceptance test strategy with regards to lab, pre-production and production networks;
2. Define the detailed test cases & scenarios, including procedures to verify that the acceptance test criteria are met (*);
3. Manage the troubleshooting for both single-vendor and multi-vendor scenarios;
4. Follow-up on issue resolution until carrier’s full satisfaction.

(*) The acceptance test criteria, but not necessarily the detailed test scenarios, shall have been defined in the SoW for Pre-launch services prior to the start of deployment and included in the contract terms.

8.0 Some Customer References

"With a broad and deep knowledge of the wireless technology and business, BriskWave is able to manage Subject Matter Experts from all domains into very effective multi-group taskforces and activities. BriskWave's background working with equipment makers was instrumental in our negotiating high-value contracts with vendors. I can only recommend BriskWave to anyone looking for a technically-savvy, results-focused, and organizationally effective consultant."

Wireless Network Planning Director



"As we embarked into our HSPA network sharing program, one of the most significant programs in our history, I turned to BriskWave's consultancy services once again. BriskWave's contribution was key to launch our HSPA network on time."

OSS Director



"I am very pleased with my decision to hire BriskWave, and I can recommend this company to anyone looking for a business analyst coupled with strong network engineering and planning skills. BriskWave's contribution will translate into substantial improvement in our operational efficiency."

Director Network Support Systems



"BriskWave Consultant was instrumental in closing our first contract with Orange, and later on successfully project-managed our first commercial deployment – on schedule and without any issue. BriskWave's know-how, skills, and experience helped us successfully go through a turning point in our company's history."

VP Research & Development



9.0 Briskwave Contacts

All inquiries concerning this service proposal should be directed to:

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