Service Description: Cisco RAN Planning and Optimization Support Service

This document describes Cisco’s RAN (Radio Access Network) Planning and Optimization Support Service.

Related Documents: This document should be read in conjunction with the following documents also posted at www.cisco.com/go/servicedescriptions/: (1) Glossary of Terms; (2) List of Services Not Covered; and (3) Severity and Escalation Guidelines. All capitalized terms in this description have the meaning ascribed to them in the Glossary of Terms.

Direct Sale from Cisco. If you have purchased these Services directly from Cisco, this document is incorporated into your Master Services Agreement (MSA) or equivalent services agreement executed between you and Cisco. In the event of a conflict between this Service Description and your MSA or equivalent services agreement, this Service Description shall govern.

This Cisco RAN Planning and Optimization Support Service is intended to supplement a current support agreement for Cisco products and is only available where all Product(s) in Customer’s Network is supported by Cisco’s Foundation Technology Service Provider Optimization Service. Cisco shall provide the RAN Planning and Optimization Support Services described below as selected and detailed on the Purchase Order for which Cisco has been paid the appropriate fee. Cisco shall provide a Quote for Services (“Quote”) setting out the extent of the Services and duration that Cisco shall provide such Services. Cisco shall receive a Purchase Order that references the Quote agreed between the parties and that, additionally, acknowledges and agrees to the terms contained therein. Availability of Services described herein and service delivery may vary by geographical region.

Cisco RAN Planning and Optimization Support Service

Service Summary
Cisco RAN Planning and Optimization Support Services provides Mobile Wireless-specific support for Radio Network operations in the form of RAN Benchmarking, RAN Audit and Health Checks, RAN Operation Optimization, RAN Expansion and Planning Support, and Continuous Learning. These services offer RAN Optimization capabilities beyond those offered in Cisco’s QSON solution.

Services performed under this Service Description that are comparable to those services performed under Cisco's Foundation Technology Service Provider Optimization Service will build upon the original service support therein and will be focused on the specific technology described in this Service Description.

Cisco Responsibilities
Cisco’s RAN Planning and Optimization Support Service consists of the provision of, at a minimum, Design Support, from the Services described below, which Cisco shall provide for the Customer's Network during Standard Business Hours (unless stated otherwise). Cisco shall provide the following General Support provisions for all Services selected by Customer under the Cisco RAN Planning and Optimization Support Service:

General Support

- Designate an engineer (“Cisco Network Consulting Engineer”) to act as the primary interface with the Cisco project manager appointed for the Customer.
- Participate in regular visits to the Customer as required by the project manager either via phone or in-person to review proactive deliverables and activities and to plan for next quarter. Any in-person visits not to exceed number of days identified in the Quote. Additional visits will be mutually agreed at Cisco’s then-current travel and labor rates.
- Participate in periodic conference calls (usually weekly) to review Customer’s Network status, planning and the Services being provided.
- Monitor a Customer-specific Cisco email alias to facilitate communication with primary Cisco Network Consulting Engineer as well as the engineers on the Cisco’s RAN/SON support team.
- Cisco Network Consulting Engineer may utilize Customer provided data, scripts or internal tools to assist in collecting data from the Network.

RAN Benchmarking
Cisco will perform vendor agnostic audit of operator’s current performance and benchmark it with Cisco’s best practices and global references. As part of this service, Cisco will run multiple subscriber audits using drive test data, crowd sourcing data, geo location data,
performance metrics and coverage analysis to get base line of operator’s network health. Based on these audits and assessments, Cisco will provide benchmarking analysis and reports and provide recommendations and follow-up actions plans. Recommendations may include further analysis or deep dive and audit into specific areas of RAN to target performance and Network Health improvements.

- **RAN Drive Test Data Analysis**
  - Analysis and exports of standard metrics (RSCP/RSRP/RSRQ/ECNO/CINR and, call failure events etc) and MAPs representation of them.

- **RAN Coverage and Interference Analysis**
  - Drive data and geo analysis for coverage holes and areas with Interference issues.

- **RAN Benchmarking Analysis/Recommendations**
  - Based on UE’s field data and statistical data available from the Network for Network/ RNC/MME/Cell Level to benchmark the performance and identify areas with loss of performance or user experiences.

**RAN Audit and Health-Check**

Cisco will provide vendor and technology independent audit of Customer’s radio assets, which can assist Customer in identification of trends. Cisco will provide appropriate recommendations to mitigate these potential trouble spots in near term and identify needs for longer terms changes.

- **RAN Health Audit Reports**
  - The audit highlights network traffic and mobility dynamics and trending. Cisco will provide following reports at regular frequency with recommendations as applicable and agreed with Customer:
    - Top N worst performers per IMSI, IMEI, UE, Cell, APN Roamer, KPI
    - Intra/Inter System Intra/Inter band neighbor relations
    - Identify Cell level changes in Traffic Intra-Technology / Inter-Carrier traffic balancing opportunities
    - Cells congestion & high utilization on CS and PS domains
    - Application level QoS report (if applicable) from probe analysis and DPI

- **RAN Parameter Audit and Recommendations**
  - This audit identifies RAN configuration issues by checking the existing RAN elements configuration against best practice guidelines formulated by Cisco field engineers with extensive deployment experience across various technologies in global networks. Cisco will audit following system and device level parameters and provide recommendations to fix them where needed:
    - Golden values recommendation based on best practices to suit the network conditions and traffic dynamics
    - Audit and recommendations for parameters data of BSC, BTS, RNC, NodeB, eNodeB etc.

- **RAN Top Offender Analysis for Major KPIs**
  - Cisco will generate reports for top offenders in RAN with highest drop-call rate (DCR), access failures and low data throughput issues. Frequency of such reports and analysis would be tied up with the service contract.
  - If applicable, optimize relevant SON settings to get KPI improvements on these offenders
  - Recommend preliminary solutions to Customer for these top offenders could be parameters, hardware issue fix or design changes as applicable.

- **RAN Performance Audits and Recommendations**
  - Cisco will collect and analyze available configuration, performance management, alarm, exception and fault management data from RAN over a specified timeframe and check for the issues in terms of hardware failures, Capacity issues, or other identified issues which are directly related to RAN stability and availability
    - KPI metrics for RNCs and Network level
    - Post checks related to operational activity support such as Rehome/OSS migration/Femto retune/Frequency retune or site configuration changes and antenna changes.
    - Cisco will provide major RAN KPI analysis such as Accessibility (ACC), Retainability (RET) & throughput evaluations along with footprint and site coverage validations
    - RAN Exception Reports like Boomers, PSC collisions, Sector Swaps reports will be provided based on Customer’s request and service agreement.
    - Audits of existing network elements capacity ranging from NodeB/ENodeB/RNC/MME and hardware elements.
    - Audits of interfaces like lUr, luCS, luPS luB, S1 and associated transport and backhaul paths to identify any misconfiguration or bottlenecks.
    - Cisco will analyze Alarm and Fault data and provide recommendations to mitigate brewing problems and issues early on.
• Alarm/Fault Identification analysis and reporting to customer operations team for resolution and follow-up.

RAN Operations Optimization
Leveraging RAN Benchmarking, Auditing and Health-Check reports, Cisco will provide RAN Operational Optimization Support.

• RAN Resource Optimization Balancing Support
  o Support Customer with resource balance and management between technologies, on different cells and layers across same technology to reduce the congestion and improve the RAN KPIs and performance
  o Provide action reports for the sites and suggest any long term changes needed in the area by deployment off additional capacity needed for Customer review.
  o Support capacity dimensioning based on services purchased.
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• RAN Trace Data Analysis
  o Cisco will support Customer with Call Trace Data Analysis support as agreed. This will be based on available vendor data to list down major events and root cause analysis.
  o VIP Area and VIP subscriber investigation and optimization

• Special Event Support
  o Cisco will provide support to Customer for overall RAN Optimization per event basis. Cisco will perform tuning and optimization for venues across multiple technologies and vendors.
  o RAN parameter and design recommendations
  o Real time performance monitoring and optimization as applicable
  o Offloading solutions across available technologies.
  o Identify traffic patterns and fine tune Radio parameters to optimize further.
  o Suggest long term strategies to achieve ongoing optimal performance.

• RAN Traffic Forecasting Support
  Future-proof Customer RAN by optimizing it based on marketing trends, forecast and traffic growth.
  o Cisco will provide support to Customer for scenario comparisons, subscriber profile analysis and correlation with marketing trends available from Customer’s network.
  o Vendor neutral recommendations will be provided to Customer to fine tune existing infrastructure to leverage maximum possible utilization out of it.
  o Identify areas with additional capacity needs such as hot spots for possible small cell and WiFi Hotspots deployments
  o Mobility Trend Analysis
  o Analyze traffic dynamics and historical traffic trends to proactively identify areas or sites requiring augmentation of additional capacity in near future.

• RAN New Site Planning, Carrier Expansion & Design Support
  o Cisco will provide support to Customer design teams and recommend cluster design changes along with baseline parameter set using appropriate RF planning and prediction tools.
  o New site build planning
  o Additional carrier and newer technology planning support

• RAN On-Site Optimization Support
  Cisco will provide the following activities as a part of the On-site Optimization Support provided under this Service:
  o Network pre and post launch optimization
  o Network operations and troubleshooting
  o Interference analysis, pilot pollution analysis
  o Geo-location ata (Coverage Predictions, Drive Test Data, Map Data, Trace Data) root cause identification
  o IRAT, Borders Mobility Neighbor Tuning (2G/3G/4G)
  o Resource utilization tuning
  o Neighbor planning and ongoing optimization

• RAN RF Shaping Support
  o Cisco will provide RF shaping audit support to identify interference or coverage hole in the clusters for agreed markets/regions.
  o Cisco will recommend design changes to create dominant servers and reduce overshooting and interference

RAN Expansion and Planning Support
Cisco will provide RAN Expansion and Planning Support to address Customer’s identified growth and expansion plans.

• RAN Intelligent Capacity Dimensioning
Continuous Learning

- **RAN Planning & Design Support**
  - System expansion design support
  - New site planning and parameter design support – Neighbor Planning, IRAT Planning, Cell Planning, Traffic Planning & Baseline Parameter Planning for 2G, 3G, 4G cell sites along with Network coverage and interference planning support
  - Spectrum and resource planning support - (Frequency, BSIC, Scrambling Code, PN Codes & PCI)
  - Re-banding and frequency carving design support and optimization

- **RAN Propagation Modeling & Prediction Planning Support**
  - Cisco will audit parameters of different selected models and provide recommendations on optimal values to be used
  - Cisco will help fine tune existing propagation models and templates from Carrier Wave and other available data using prediction and planning tools.

**Customer Responsibilities**

- **General Responsibilities**

  - Service deliverables archive — customer-specific/account-specific content
  - eLearning courses
  - Sidebar Content:
    - White Papers
    - Case Studies
    - Design Guides
    - Configuration Guides
    - Training Documents
    - Deployment Guides
    - Online textbooks and/or manuals
    - Video and audio clips (different from the Multimedia Clips)
  - Assist in account creation/entitlement for authorized viewers for the Portal, prior to use during the duration of the Service. Customer is responsible for security, network connection, IP address assignment and any required firewall or access control list changes required on their network in order for the end-users to access the Portal.
  - Assign a delivery Point of Contact ("PoC") who will assist in on-boarding the Customer to the Portal. Cisco delivery PoC will obtain the necessary information to entitle Cisco CCO logins of authorized viewers to login to the Portal.
  - Hold a “Kick-off meeting” to train and demonstrate the tool for authorized viewers. During this kick-off meeting a detailed demo of the Portal and the content contained within it will be conducted for the Customer.
  - Make available a Customer-specific deliverables archive resulting from subscription-based Cisco Advanced Services provided separately to Customer.
  - Host new Content and provide preventative maintenance in accordance with Cisco’s normal maintenance schedules and procedures. At the same time, old content may be refreshed or removed depending on its relevance.
  - Provide technical assistance and troubleshoot issues submitted to Cisco through provided e-mail alias tkl-support@cisco.com.
  - Updated Content. Cisco may revise, update and/or remove previously-released Multimedia Clips and/or Sidebar Content ("Updated Content"). Cisco will make any Updated Content available to Customer as a part of the Services. The Updated Content will exclude the previously-released Multimedia Clips and Sidebar Content (where applicable) that the Updated Content was intended to supersede. Customer should discontinue any use of the superseded Multimedia Clips and/or Sidebar Content.
Designate at least two (2) but not more than six (6) technical representatives in each area covered under RAN, who must be Customer's employees in a centralized Network support center (Customer's technical assistance center), to act as the primary technical interface to the Cisco RAN Network Consulting Engineer(s). Customer will designate as contacts senior engineers with the authority to make any necessary changes to the Network configuration. One individual, who is a senior member of management or technical staff, will be designated as Customer's primary point of contact to manage the implementation of services selected under this Service Description (e.g., chair the weekly conference calls, assist with prioritization of projects and activities).

Customer's technical assistance center shall maintain centralized network management for its Network supported under this Service Description, capable of providing Level 1 and Level 2 support.

Provide reasonable electronic access to Customer's Network to allow the Cisco RAN Network Consulting Engineer to provide support.

If Cisco provides Data Collection Tools or scripts located at Customer's site, Customer shall ensure that such Data Collection Tools or scripts are located in a secure area, within a Network environment protected within a firewall and on a secure LAN, under lock and key and with access restricted to those Customer employee(s) or contractor(s) who have a need to access the Data Collection Tools and/or a need to know the contents of the output of Data Collection Tools. In the event Data Collection Tool provided by Cisco is Software, Customer agrees to make appropriate computers available and download Software as needed. Customer shall remain responsible for any damage to or loss or theft of the Data Collection Tools while in Customer's custody.

Provide a Network topology map, configuration information, and information of new features being implemented as needed.

Notify Cisco RAN Network Consulting Engineer of any major Network changes (e.g., topology, configuration, new OSS / RAN software releases.).

In the event the Network composition is altered, after the Services selected under this Service Description have become effective, Customer is responsible to notify Cisco in writing within ten days (10) of the change. Cisco may require modifications to the fee if the Network composition has increased beyond the original pricing quote for Services.

Create and manage an internal email alias for communication with Cisco RAN Network Consulting Engineer.

Retain overall responsibility for any business process impact and any process change implementations.

Customer should respond to all of the Cisco requests or queries within 5 business days.

Customer should provide access to internal RAN performance monitoring tools.

**RAN Benchmarking:**

In addition to the General Responsibilities, Customer shall provide the following:

- **RAN Drive Test Data Analysis**
  - Provide Access to Field and Benchmarking data as available along with Operator tools

- **RAN Coverage Analysis**
  - Provide access to planning and design data along with the trace/geo data available

- **RAN Benchmarking Analysis/Recommendations**
  - Access to the Available datasets

**RAN Audit & Health-check:**

In addition to the General Responsibilities, Customer shall provide the following:

- **RAN Fault & Performance Management Data Analysis**
  - Access to the O&M and OSS Systems and Other relevant nodes to collect all such data in automated manner.

- **RAN Parameter Audit and Recommendations**
  - Access to the OSS and Configuration data from the network

- **RAN Health Audit Reports**
  - Access to historical reports and trends along with connectivity to the OSS and required nodes with any HLD/LLD documents

**RAN Operations Optimization:**
In addition to the General Responsibilities, Customer shall provide the following:

- **RAN Resource Optimization & Balancing Reports**
  - Access to the performance data and resource utilization data for the cells/nodes.

- **RAN Trace Data Audit & Recommendations**
  - Access and permission to collect any existing trace data and setup new traces or events as needed.

- **Special Event Support**
  - Access to the special event zone planning and antenna placement locations along with Design data for the venue. Also, access to the performance data and if needed on site access would be required.

- **RAN Traffic Forecasting Support**
  - Operator forecast traffic trends and models used for the projection including marketing data inputs.

- **RAN New Site Planning & Design Support**
  - Access to Design / planning data and tools along with required inputs for new site planning.

- **RAN Capacity Planning & Bottleneck Mitigation Support**

- **RAN On-Site Optimization Support**
  - Access to the Cisco Customer Engineer to the customer network and Intranet or VPN.

**RAN Expansion & Planning Support:**
In addition to the General Responsibilities, Customer shall provide the following:

- **RAN Planning & Design Support**
  - Access to the Planning Database and Tools.

- **RAN Propagation Modeling & Prediction Planning Support**
  - Access to the available models, tools and field CW data for tuning as desired.

- **RAN Resource Planning Support**
  - Access to the PM/CM and other network configuration data and design documents.

- **RAN RF Shaping Support**
  - Access the Systems, Tools, and Data as would be required.

**Continuous Learning**

- **Knowledge Transfer and Mentoring.**
  - Details of Customer requirements on the topics it wants to see covered through transfer and mentoring together with background information on the skill sets of the audience.
  - Ensure that facilities and equipment are available to host the informal technical update sessions.

- **TKL Module.**
  - Customer is responsible for testing of the Portal interface.
  - Provide on-boarding information as follows: contact name, title, address, telephone number, e-mail address of primary and secondary team lead, Email ids and name of the Authorized Viewers who will need access to the Portal.
  - Install the Digital Rights Management (“DRM”) software on as needed basis which allows to view the DRM-protected content on the Portal.
  - Participate in training and/or feedback sessions with Cisco team to enable Cisco to understand the needs of the Authorized Viewers for the Portal.
  - Notify Cisco of any technical support requests or troubleshooting issues related to the Services by sending an e-mail to Cisco team at tkl-support@cisco.com