Nokia Cloud RAN: Services for commercial delivery

NOKIA

Gearing up for commercial deployments of Cloud RAN

It is an exciting time for the mobile networks industry. After early trials in labs and live networks, Cloud RAN is entering the commercial deployment phase.

Nokia's end-to-end 5G Cloud RAN solution is based on the anyRAN approach. It comes with pre-integrated and fully tested reference designs, making it a safe, future-proof investment.

Nokia offers comprehensive services for designing, deploying, operating and supporting Cloud RAN solutions for communications service providers (CSP) and enterprises.

With our digital tools ecosystem, we create the end-to-end solution architecture, customize project-specific designs, and deploy and maintain the solution with state-of-the-art automation.

Our Cloud RAN trials with customers have provided us with deep insights into the challenges in production environments.

Based on these learnings, we have further enhanced our solutions and capabilities to design and deploy Cloud RAN solutions at scale.
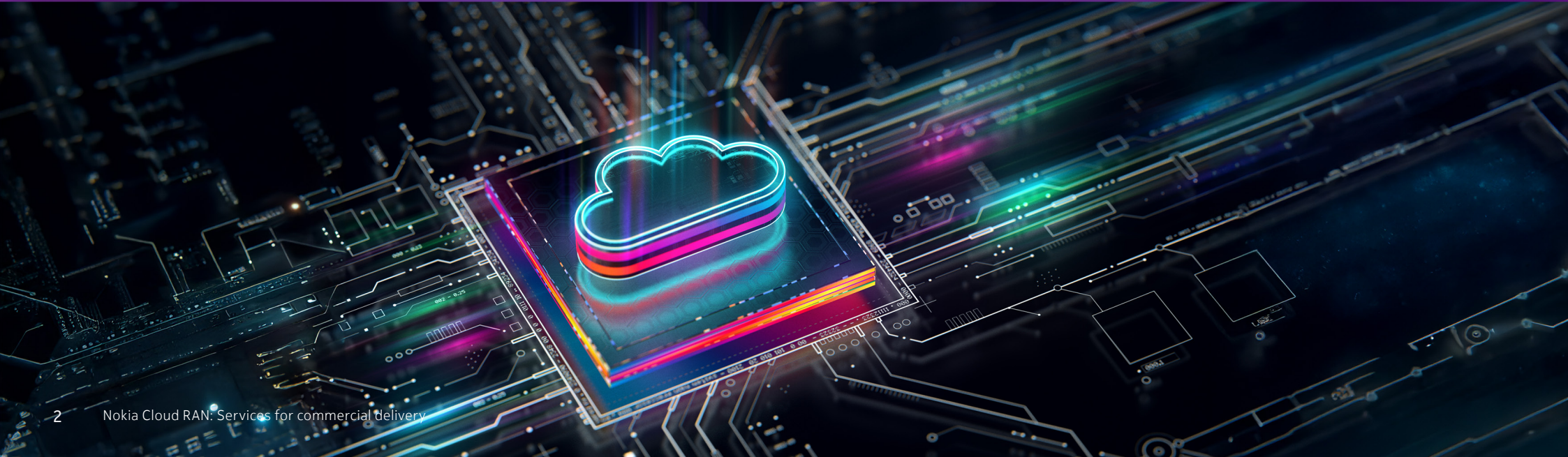
Nokia provides end-to-end services for Cloud RAN

Network planning and optimization

Existing RAN services

- Mobile network access design
- RF Design
- Site optimization and acceptance
- Cluster and network optimization

New Cloud RAN services

- Cloud RAN topology design
- Cloud RAN dimensioning
- Cloud RAN IP design
- Solution Customization Services

Deployment

Existing RAN services

- Project management
- Site acquisition
- Construction works
- Telecom implementation
- Site engineering

New Cloud RAN services

- COTS HW installation at the Edge, Far Edge, and Cell Site
- Enhanced deployment and lifecycle management (LCM) of CaaS and RAN (vCU & vDU)

Technical support

Existing RAN services

- Software and hardware incident handling
- Software updates and upgrades
- Hardware repair and return services
- Spare part supply
- Technology training

New Cloud RAN services

- Issue isolation within the Cloud RAN solution
- Incident handling for vDU, vCU, RU, MantaRay NM, CaaS
- Cloud RAN certification

Nokia is ready to support commercial Cloud RAN deployments in customer networks

END-TO-END SERVICE PORTFOLIO FOR CLOUD RAN

Comprehensive service capabilities including network planning, optimization, deployment and technical support.

HIGH-QUALITY SOLUTION DESIGN WITH DIGITAL TOOLS

Proven and fully tested Cloud RAN reference designs as a basis for each customer-specific project design.

A PARADIGM SHIFT IN COMPETENCE DEVELOPMENT

Significant investments in ramping up the competencies of end-to-end solutions architects and full-stack integration engineers.
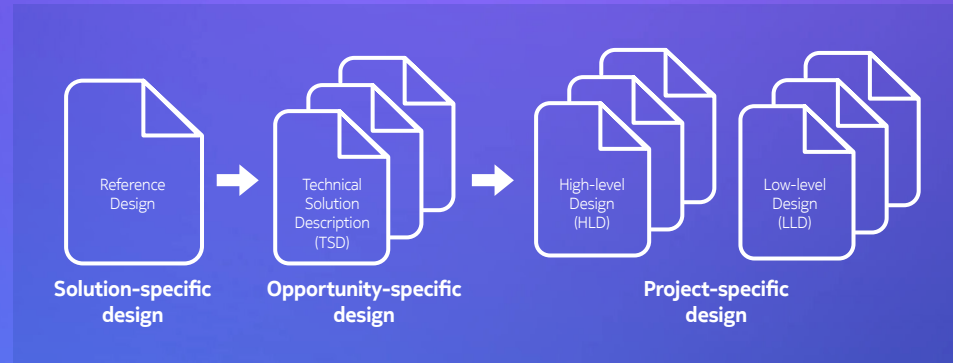
HOLISTIC AUTOMATION SOLUTIONS

Nokia and our partners provide a full suite of management and automation components with a zero-touch provisioning (ZTP) procedure.

Maximizing the left shift of solution design

Cloud RAN solutions are complex and should be architected with precision as early as possible. Nokia's three-step approach maximizes design left shift.
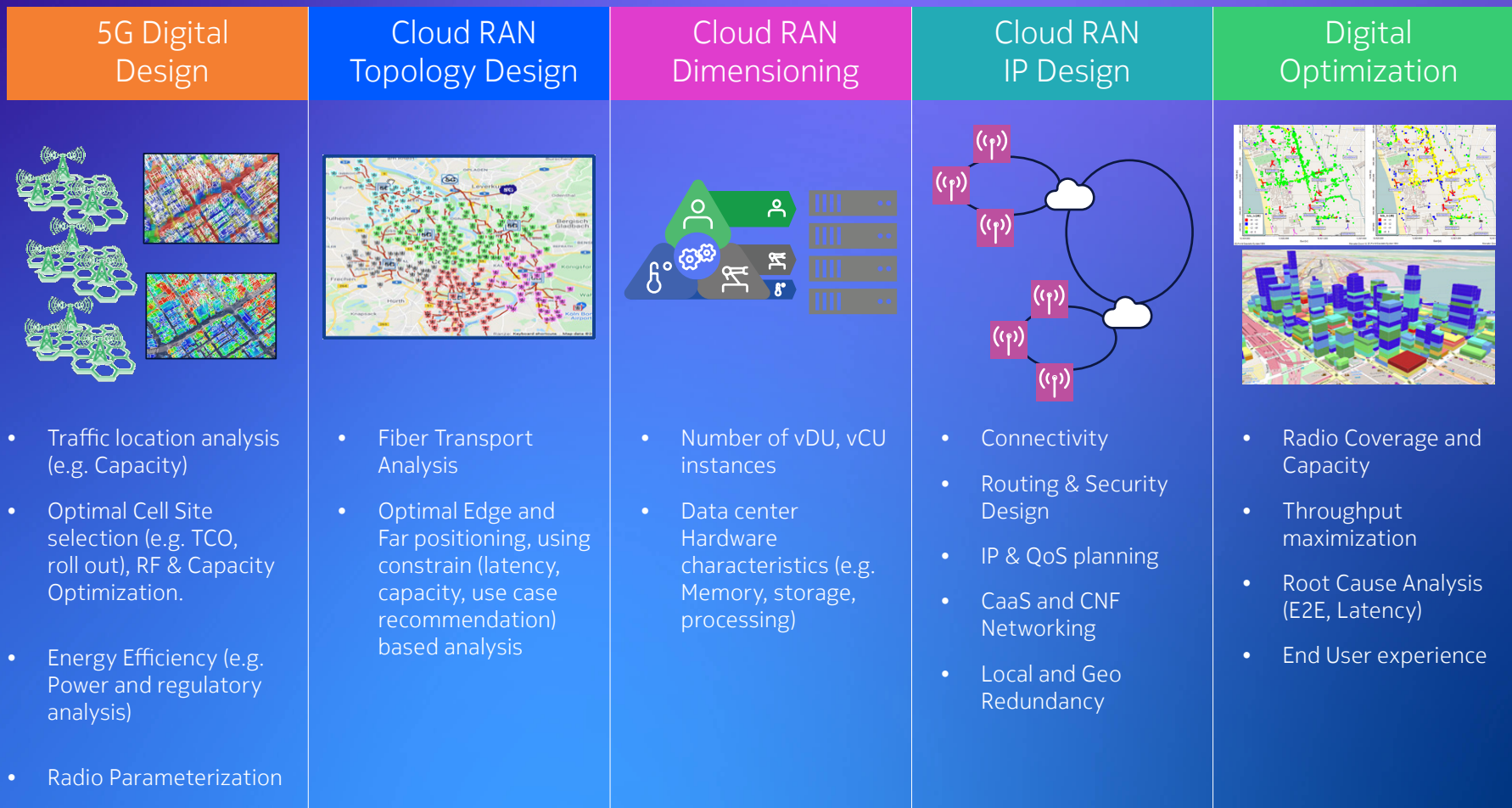

1. Solution-specific design is a reference design prepared by the R&D team during the productization phase. It includes the end-to-end solution architecture, product-specific information for each subsystem and engineering guidelines for implementation.

2. Opportunity-specific designs or technical solution descriptions are created in the pre-contract phase based on the reference design. They include customer-specific content related to the requirements stated in the customer's request for proposal (RFP) or request for quotation (RFQ).

3. The detailed project-specific design provides exact guidance for deploying the solution in the commercial network. It is based on the technical solution description and consists of high-level design (HLD) and low-level design (LLD).

Network Planning & Optimization
CloudRAN Solution Design and Optimization

E2E Solution from Cell Site/Edge/Far-Edge location selection to dimensioning to Radio & IP design up to optimization

5G Digital Design	Cloud RAN Topology Design	Cloud RAN Dimensioning	Cloud RAN IP Design	Digital Optimization
• Traffic location analysis (e.g. Capacity) • Optimal Cell Site selection (e.g. TCO, roll out), RF & Capacity Optimization. • Energy Efficiency (e.g. Power and regulatory analysis) • Radio Parameterization	• Fiber Transport Analysis • Optimal Edge and Far positioning, using constrain (latency, capacity, use case recommendation) based analysis	• Number of vDU, vCU instances • Data center Hardware characteristics (e.g. Memory, storage, processing)	• Connectivity • Routing & Security Design • IP & QoS planning • CaaS and CNF Networking • Local and Geo Redundancy	• Radio Coverage and Capacity • Throughput maximization • Root Cause Analysis (E2E, Latency) • End User experience

A paradigm shift in competence development

To date, the generational changes in RAN technology have been relatively gradual. Organizations have ramped up skills in cadence with the "next G" using traditional processes and techniques.

Transitioning to a Cloud RAN environment involves a shift towards software-centric solutions and numerous new technologies such as Kubernetes.

This poses new capability challenges as traditional radio engineers may not have been exposed to these technologies.

At Nokia, we have invested heavily in enhancing the competencies and capabilities of our Services organization to address these challenges head-on and establish best practices. We advocate for an approach to transitioning the incumbent engineering workforce, which is competent on the RAN application layer, into so-called full-stack integrators and architects.

Full-Stack integration engineers

Our solutions architects produce end-to-end Cloud RAN solution designs that cover both cloud infrastructure and RAN functions, as well as all adjacent components including transport, Core, management, automation and security.

Our integration specialists, then deploy these solution designs, navigating any unexpected challenges that may surface during the implementation phase.

Our optimization experts have the skills to fine-tune the Cloud RAN solution and its performance at each layer of the stack.

We are also sharing our best practices for competence development with customers who are planning to upskill their IT engineers on RAN technologies or RAN engineers on IT technologies.

Transitioning RAN integration engineers into full-stack integration engineers

RAN integration engineer

Full stack integration engineer

Automation | vCU | vDU

Cloud SW

Cloud HW

Immersive, continous and collaborative enablement program

vCU | vDU | Automation

Cloud SW

Cloud HW

Holistic automation for Cloud RAN deployments at scale

Deploying a Cloud RAN solution requires a robust management and automation solution.

The O-RAN Alliance is defining the Service Management and Orchestration (SMO) framework, which is expected to perform all the required functions in a multi-supplier landscape.

In the early stages of commercial Cloud RAN implementations, cloud-native automation tools will be provided by the respective subsystem suppliers.

Nokia's Cloud RAN reference designs comprise a full suite of management and automation components that work in harmony to execute the bring up of the solution's vertical stack.

Our Cloud RAN services professionals are working very closely with our webscale partners to design and develop robust and efficient end-to-end ZTP solutions that integrate multi-supplier components into a holistic automation solution.

The critical role of systems integration

Systems integration plays a crucial role in ensuring clear accountability and trust at each phase of a Cloud RAN deployment.

The three typical approaches include:

1. CSP manages the systems integration. This is a CAPEX-intensive approach that requires strong competencies.

2. An independent third party takes the role of the systems integrator. They typically have software-centric competencies, however, they may lack RAN expertise.

3. The baseband supplier becomes the systems integrator. RAN suppliers have strong technical competencies that touch each layer of the Cloud RAN solution, making this the recommended option in most situations.

System integration does not end with the first deployment of the end-to-end Cloud RAN solution.

Particular considerations in a disaggregated, multi-supplier deployment include interlocking and aligning the roadmaps of each subsystem supplier, end-to-end performance optimization and lifecycle management to ensure the interworking of each subsequent release.

In some cases, it may be beneficial to work with several system integrators. A typical example is that a CSP selects one system integrator for the virtualized RAN environment and another one for integrating the SMO components, which requires specific expertise.

Why Nokia:

Accelerated Cloud RAN deployments with proven and fully tested reference designs.

Best practices for the design and deployment of Cloud RAN with deep insights from customer trials.

Holistic automation solution based on close collaboration and integration with leading industry partners.

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

With truly open architectures that seamlessly integrate into any ecosystem, our high-performance networks create new opportunities for monetization and scale. Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.