# Netcracker Open vRAN Domain Orchestration Solution

## Solution Brief

**Netcracker**

# 1. OSS needs to change to support Open vRAN

Open vRAN is a highly disruptive technology that will bring many benefits to CSPs, especially during the evolution to 5G. By opening up the RAN to multiple vendors and virtualizing the software, costs will be significantly reduced, highly dynamic services will be enabled, and the RAN domain will experience far greater levels of innovation.

Open vRAN will introduce many technology and architecture changes, however, these benefits can only be achieved with a new OSS/orchestration environment that brings automation and agility to the RAN:

- **Highly distributed RAN architecture:** By virtualizing the RAN software (eNB) and further disaggregating the eNB into near and far edge locations, the RAN becomes highly distributed. OSS/orchestration systems need to intelligently place resources at the optimal location and provide end-to-end assurance.

- **Dynamic cloud/virtual resources:** Open vRAN will comprise physical, virtual (VNFs) and cloud native functions (CNFs) that need xNF OSS/orchestration to automate design, deployment and lifecycle management events such as scaling, healing and upgrades. Over time, Open vRAN edge nodes will evolve into highly intelligent MEC platforms hosting a variety of value-added services and MEC applications.

- **Multivendor:** By opening up the RAN, CSPs will work with more vendors than before and opt for a best-of-breed approach. OSS/orchestration systems need to use open APIs, standards and DevOps tools to simplify onboarding, interoperability and continuous upgrades and optimize costs.

- **Evolution to 5G:** Open vRAN OSS/orchestration will need to accommodate both 4G and 5G and enable a smooth evolution to 5G that extends to the RUs, gNBs, RAN sharing and the ability to support dynamic network slicing.

## 2  Netcracker's approach with Open vRAN Domain Orchestration

Netcracker delivers a modernized Digital OSS portfolio with key attributes that are essential to supporting Open vRAN automation. Netcracker Digital OSS is cloud native, designed to run on any Kubernetes cloud platform, with open APIs and standards conformance (including 3GPP, O-RAN Alliance and YANG service models), greatly simplifying integration with any Open vRAN vendor.  Central to the portfolio is the use of ML/AI/analytics and real-time network discovery to automate lifecycle events, support predictive assurance, automate root cause analysis and optimize the RAN network.

Based on the Digital OSS portfolio, Netcracker has built an Open vRAN Domain Orchestration solution that brings together the orchestration, OSS and analytics functions needed to fully automate all aspects of the RAN domain from planning and design to activation, assurance and optimization. The solution leverages the expertise of Netcracker's parent company, NEC, and pre-integration has been completed with many industry-leading Open vRAN partners such as Altiostar, Red Hat and Dell.
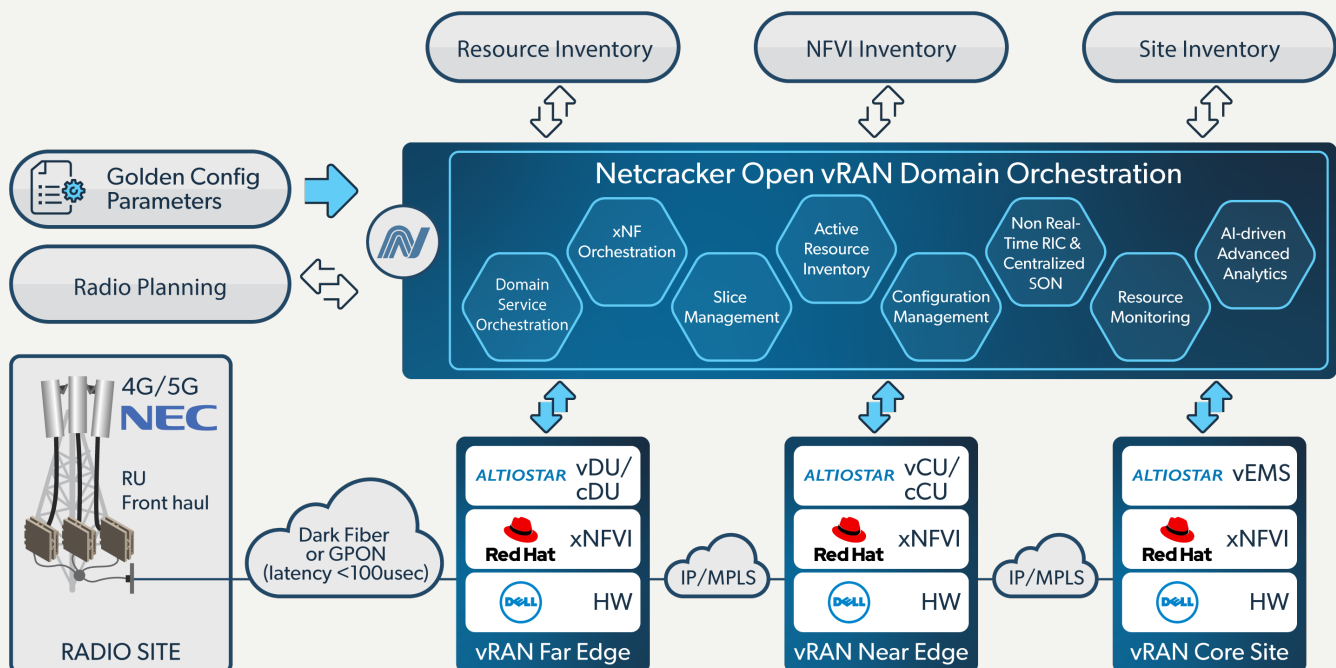
Netcracker's Open vRAN Domain Orchestration  solution provides a common automated operations environment for 4G and 5G RAN including gNB and 5G RUs. Service Orchestration for the domain supports the 3GPP Network Slice Subnet Management Function to enable dynamic network slicing that works with cross-domain Service Orchestration for end-to-end network slicing.
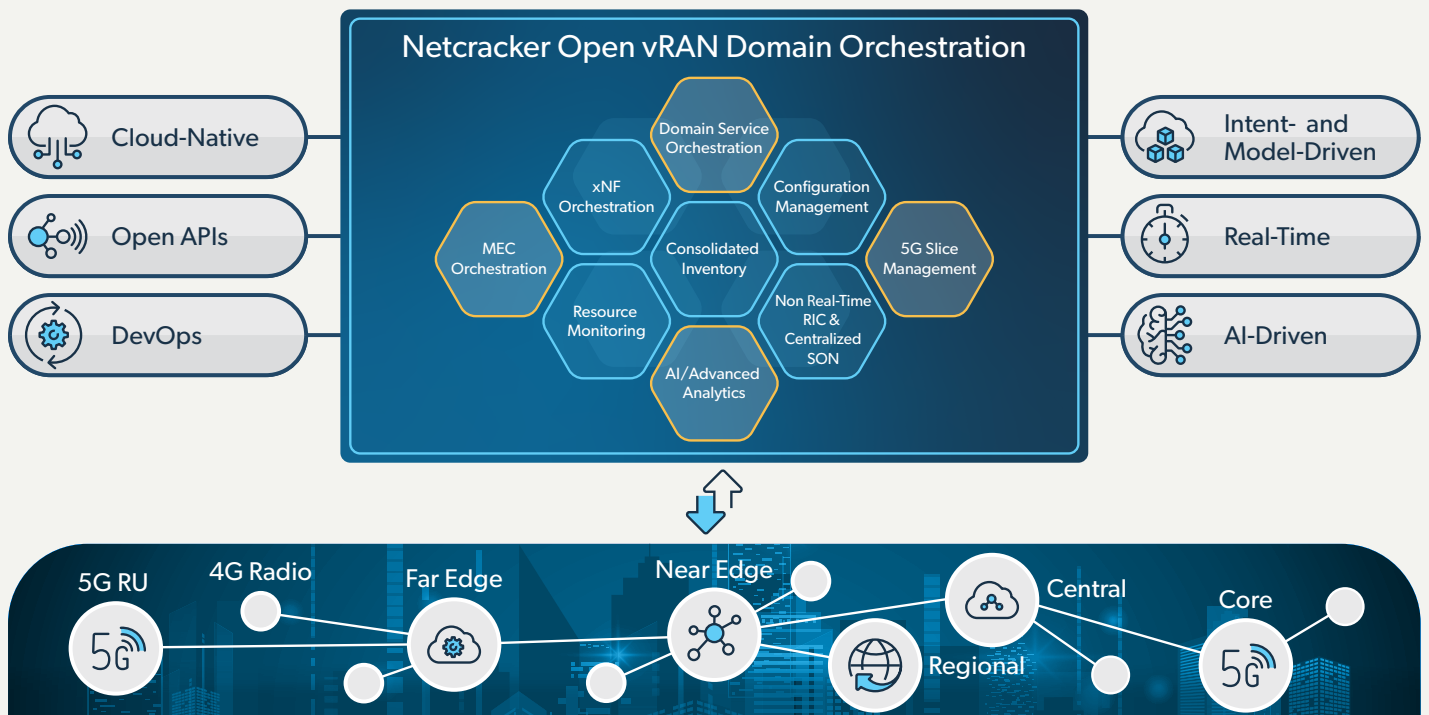
# 3 A proven Open vRAN reference architecture

Netcracker has partnered with Altiostar, Red Hat, Dell and NEC to create an Open vRAN reusable reference architecture shown below. The architecture details have been published to support and advance CSP Open vRAN PoCs and deployments.

The reference model used the combination of Dell's open hardware as the foundation of the architecture, Red Hat's Open Stack for the virtualization platform and Altiostar's Open vRAN virtualized eNB software. Netcracker provided the end-to-end operations environment through its Open vRAN Domain Orchestration solution to automate VNF deployment, configuration, lifecycle management and radio resource optimization across edge locations. NEC provided the radio units and brought together the overall Open vRAN ecosystem enablement responsible for optimal and best-of-breed vendor neutral model designing, system integration and the delivery of a secure and mission-critical carrier-grade network.

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## 4 Bringing end-to-end automation to the RAN domain

Netcracker's Open vRAN Domain Orchestration solution automates the end-to-end service lifecycle from planning and design to activation, optimization and assurance across the entire multivendor Open vRAN domain.

### Automated planning and design to meet business KPIs

Netcracker Active Resource Inventory consolidates information for RAN design and planning from many sources, including radio and network planning, physical RAN, eNB/gNB EMS and NFVI. The consolidated information can be visualized in different ways, including real-time geographic views to highlight the most problematic or business-critical RAN zones. Netcracker Planning and Design systems are used to manage the physical RAN assets and include special procedures for acceptance management by reporting discrepancies between the planned and current RAN network.

### Fast activation of multivendor physical and virtual RAN network functions

Deployment and activation of VNF/CNF resources are automated using Netcracker Network and Service Orchestration at far and near edge sites. Each physical and virtual network element is then configured in a central manner with specific parameters using Netcracker Configuration Management. Netcracker Service Orchestration brings together the physical and virtual assets to enable automated service provisioning and service lifecycle management across the Open vRAN domain. Netcracker uses its extensive DevOps processes, tools and best practices, with CSPs and ecosystem partners in the solution. This new mode of collaboration is vital to simplify the complexity of a multivendor solution and ensure that software updates and new features are implemented quickly.

### End-to-end visualization and optimization to maximize performance

With Netcracker's Active Inventory, together with Resource Monitoring and AI/Advanced Analytics, information is consolidated from many different sources including real-time topology changes. The information can be displayed in many visual ways to show problems, optimize planning, predict events, simplify analysis and ensure business KPIs can be maintained. Any changes will automatically trigger lifecycle events and optimization processes. Netcracker has also added a new O-RAN complaint function called Non Real-Time RIC and Centralized SON. With this function and Netcracker's AI/ML tools, CSPs can optimize QoE by minimizing drive tests and further improving RAN performance.

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## 5 A platform for new revenue growth

Open vRAN creates new opportunities for CSPs to leverage their investments in edge compute to deploy a variety of high-value applications at the network edge. By evolving to a Multi-Access Edge Compute (MEC) cloud environment, gNB resources can coexist with cloud and highly demanding MEC applications to enable a new ecosystem of innovative 5G services for consumers, enterprises and vertical markets.

MEC applications include cloud gaming, VR/AR collaboration and video analytics, which can only be delivered with the right combinations of low latency, high throughput and real-time radio information. And by combing MEC technology with 5G network slicing, CSPs can offer differentiated services to many industry verticals on the same network infrastructure with guaranteed SLAs, creating a sizable market opportunity.

Netcracker's Open vRAN Domain Orchestration solution can incorporate additional functions to support MEC applications and network slicing. The MEC Orchestration function is compliant with the evolving ETSI ISG standard (MEAO) and supports placement and lifecycle management of MEC applications at the optimal edge, region or central location. The Network Slice Subnet Management Function, based on emerging 3GPP standards, supports dynamic instantiation and lifecycle management of slices within the Open vRAN domain and works with higher level slice management functions for cross-domain services.

## 6 Preparing for Open vRAN

With our advanced technology and proven expertise, we can help you get the most out of your evolution to Open vRAN. From the automation of planning and design to continuous RAN optimizations, our Open vRAN Domain Orchestration solution can help you achieve your RAN modernization goals today and enable new service innovation and market growth.

### About Netcracker Technology

With more than 25 years of experience, Netcracker is a market leader in business and operations support systems (BSS/OSS) and orchestration software for service providers (telcos, IT providers, integrators and resellers) around the world. We help our customers execute on their digital transformation goals, enabling them to unlock opportunities in the cloud, virtualization and the evolving 5G digital ecosystem. For more information, visit  www.netracker.com