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Robin, QCT Aid MNOs in Cloud Native 5G Evolution

Robin's Cloud Native Platform and Multi-Data Center Automation Platform running on QCT servers, powered by 3rd Gen Intel® Xeon® Scalable processors, introduce hyper automation of cloud native 5G systems

5G is seeing rapid adoption, with industry analyst firm Omdia reporting that globally there were 401 million 5G connections at the end of 2020, and that number is expected to be 619 million by the end of 2021.[1] This momentum and the scale of deployment required to support it demands significantly more infrastructure than previous cellular generations. Some industry estimates show that 50 base stations will be required per square kilometer to meet the stringent speed and coverage promised by 5G.[2]

Legacy methods of network function deployment and life cycle management can't scale up to support the full promise of 5G. The traditional, homogenous approach of mobile network operators (MNOs) relying on a single vendor supplying hardware that requires manual deployment does not lend itself well to the rapid and extensive buildout of 5G.

Instead, MNOs are reducing ongoing operational expenses through virtualized platforms that feature extensive management and automation. With the increased number of base stations expected to be deployed, it is not cost effective to send technicians to these locations to make changes.

Traditional automation was focused on a single or a limited aspect of the 5G software stack. A concept called hyper automation has emerged to allow the MNO to remotely control the entire software and hardware stack. With hyper automation, MNOs are able to achieve "one-click" service delivery and deployment in order to rapidly scale the network.

Intel® Network Builders ecosystem partners Robin and Quanta Cloud Technology (QCT) have jointly developed a hyper-automation-based cloud native platform, leveraging 3rd generation Intel® Xeon® Scalable processors. This solution enables MNOs to scale 5G deployments with automation of all aspects of software and hardware system and life cycle management of network functions, saving capital expenditures and improving efficiencies.

Robin Technologies Provide Managed Cloud Environments

Robin's core technologies include its Cloud Native Platform (CNP) and Multi Data Center Automation Platform (MDCAP) (see Figure 1) that work together to provide hyper automation cloud native service delivery and management for 5G applications. Both software packages are designed to utilize minimal compute resources. This allows MNOs to deliver their applications and network functions "as-a-service" with one-click deployment simplicity. The Robin solution removes complexity, accelerates deployment times, and significantly reduces operating and capital expenditures.

The CNP is an enhanced Kubernetes distribution platform with capabilities to support efficient deployment and life cycle management of container and virtual network functions (CNFs and VNFs). The platform empowers application deployment from a self-service app store in minutes, without relying on infrastructure teams that can often require weeks to source and install single-function network appliances.
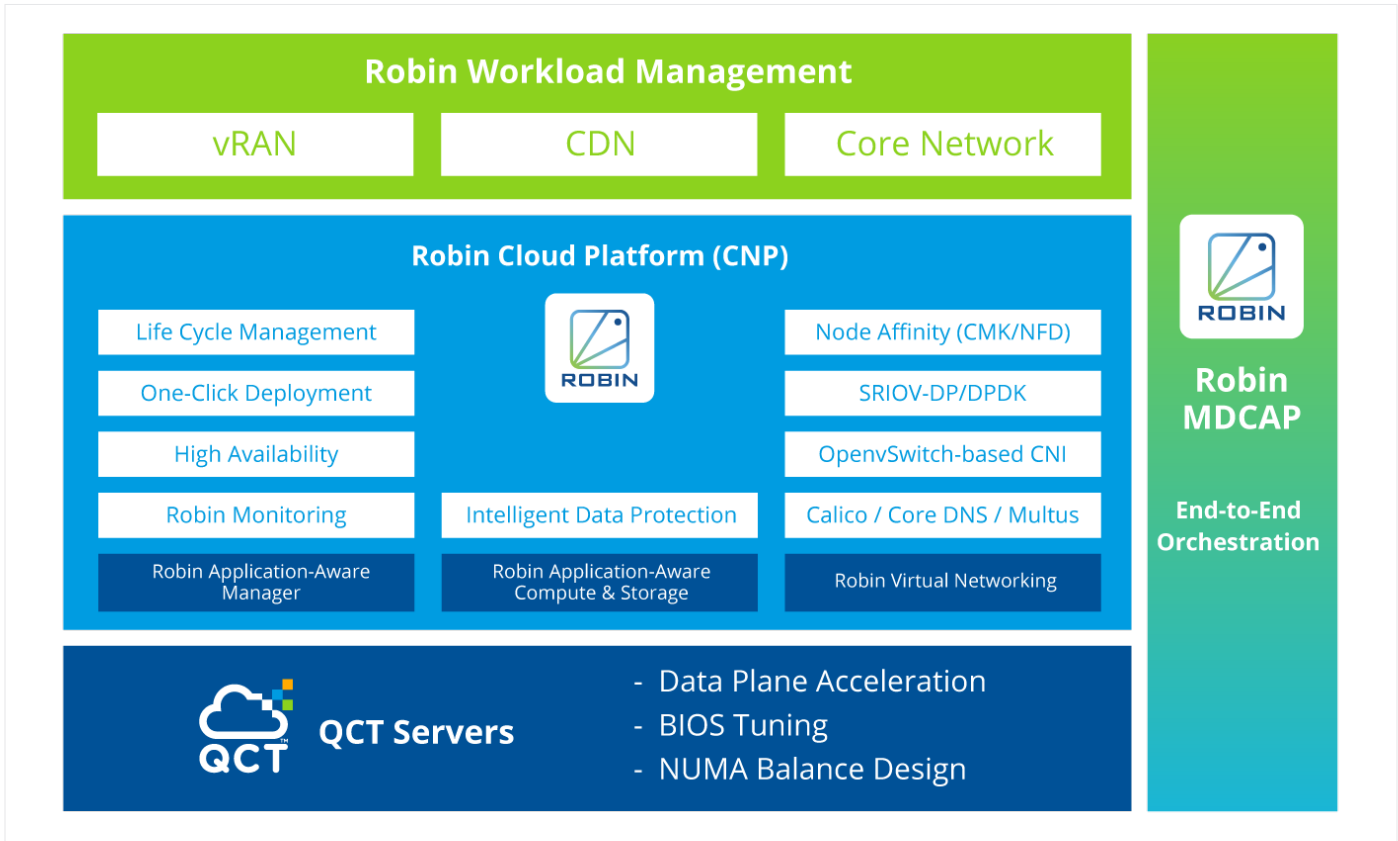
Figure 1. Robin CNP and MDCAP block diagram.

The platform can be deployed on bare-metal servers or virtual machines on-premises or on any public cloud and can host radio access network (RAN) distributed unit (DU) and centralized unit (CU) functions, 5G core functionality, and edge applications at scale. The platform combines application-aware storage, virtual networking, and application workflow automation built on Kubernetes.

The MDCAP is an end-to-end orchestrator that automates deployment and life cycle management of a very large number of clusters and devices and provides key operational services, including metal-to-service orchestration. MDCAP can enable RAN-as-a-service, core-as-a-service, bare-metal-as-a-service, and a method of procedures (MOPs) manager that can auto-perform thousands of tasks with one-click or one-API call.

The CNP is hosted in far edge, edge, and central data centers, and the MDCAP manages the service orchestration and life cycle management of all of the data centers from the central data center.

Robin has incorporated Intel® Smart Edge Open in its stack on top of QCT servers in such a way that these servers are not only deployable at scale, but also hyper automated. Intel® Smart Edge Open is a royalty-free edge computing software toolkit that enables highly optimized and performant edge platforms to onboard and manage applications and network functions with cloud-like agility across any type of network.

QCT Cloud Native Optimized Servers

QCT has a comprehensive end-to-end 5G server portfolio that extends from data center to the edge site. QCT's servers provide powerful compute performance and low-latency data processing for Robin to fulfill the demanding requirements of 5G use cases from regional data center to the far edge.

QCT extends the automation capabilities built into the Robin CNP and MDCAP with its IronCloud-Robin solution to accelerate cloud native transformation in telco. IronCloud supports virtual machine and container coexistence to enable resource sharing and unified automation. IronCloud-Robin is an entire MNO network stack, with both CNFs and VNFs for 4G and 5G services such as core network, virtual RAN (vRAN), content delivery networks, and more.

Robin has integrated its CNP on QCT's QuantaGrid D53XQ-2U as a worker node and QuantaGrid D53X-1U as primary node. These servers use 3rd generation Intel Xeon Scalable processors, built with the performance needed to deliver flexible and scalable solutions to address multi-cloud, 5G, and virtual networking workloads. QCT's servers also offer AI acceleration, supporting up to two dual-width GPUs for added performance.

With QCT's servers, Robin can orchestrate and manage day two operations for MNO applications with network intensive requirements. MDCAP can deliver metal-to-service orchestration at scale using QCT's bare metal API to automate infrastructure delivery and life cycle management at hundreds of thousands of nodes, including deployment and configuration of Intel accelerators and real-time operating system and network interfaces required.

Intel® Technologies Provide Performance, Security Features, Visibility

QCT Servers are based on 3rd generation Intel® Xeon® Scalable processors, which offer a balanced architecture that delivers performance along with built-in advanced security capabilities that allow enterprises to place workloads where they perform best—from edge to cloud.

The latest 3rd generation Intel Xeon Scalable processors are engineered for modern network workloads, targeting low latency, high throughput, deterministic performance, and high performance per watt. For organizations ready to drive 5G networking to the next level, these CPUs offer increased 5G user plane function (UPF) performance vs. the prior generation.[3]

In addition to 3rd generation Intel Xeon Scalable processors, Robin and QCT leverage Intel® Platform Firmware Resilience (Intel® PFR), an Intel® FPGA-based solution, to reduce firmware-related security risks.

Robin and QCT also leverage Intel® Software Guard Extensions (Intel® SGX), a set of instructions that increases the security of application code and data, giving them more protection from disclosure or modification. This allows for the partition of sensitive application data in memory.

Finally, enhanced platform awareness (EPA) provides a methodology that allows Robin software to catalog and target intelligent platform capability, configuration, and capacity consumption to improve the performance and reduce latency for container-based workloads

Tier 1 MNO Uses Robin and QCT to Build Cloud Native Mobile Network

One Tier 1 MNO that has built a cloud native, open vRAN software 4G/5G network, leveraged QCT servers with Robin's CNP and MDCAP. The network uses the Robin platforms to create a cloud native deployment model that is optimized with Robin's innovative application-aware storage and carrier-grade networking.

The MNO is using Robin CNP to support deployment and life cycle management of CNFs and VNFs. The software can host 5G RAN DU and CU, and core and edge applications at scale.

The MNO utilizes MDCAP for end-to-end orchestration capabilities that automate deployment and life cycle management of a very large number of clusters and devices and provide key operational services, including metal-to-service orchestration. The entire network can be seen in Figure 2.
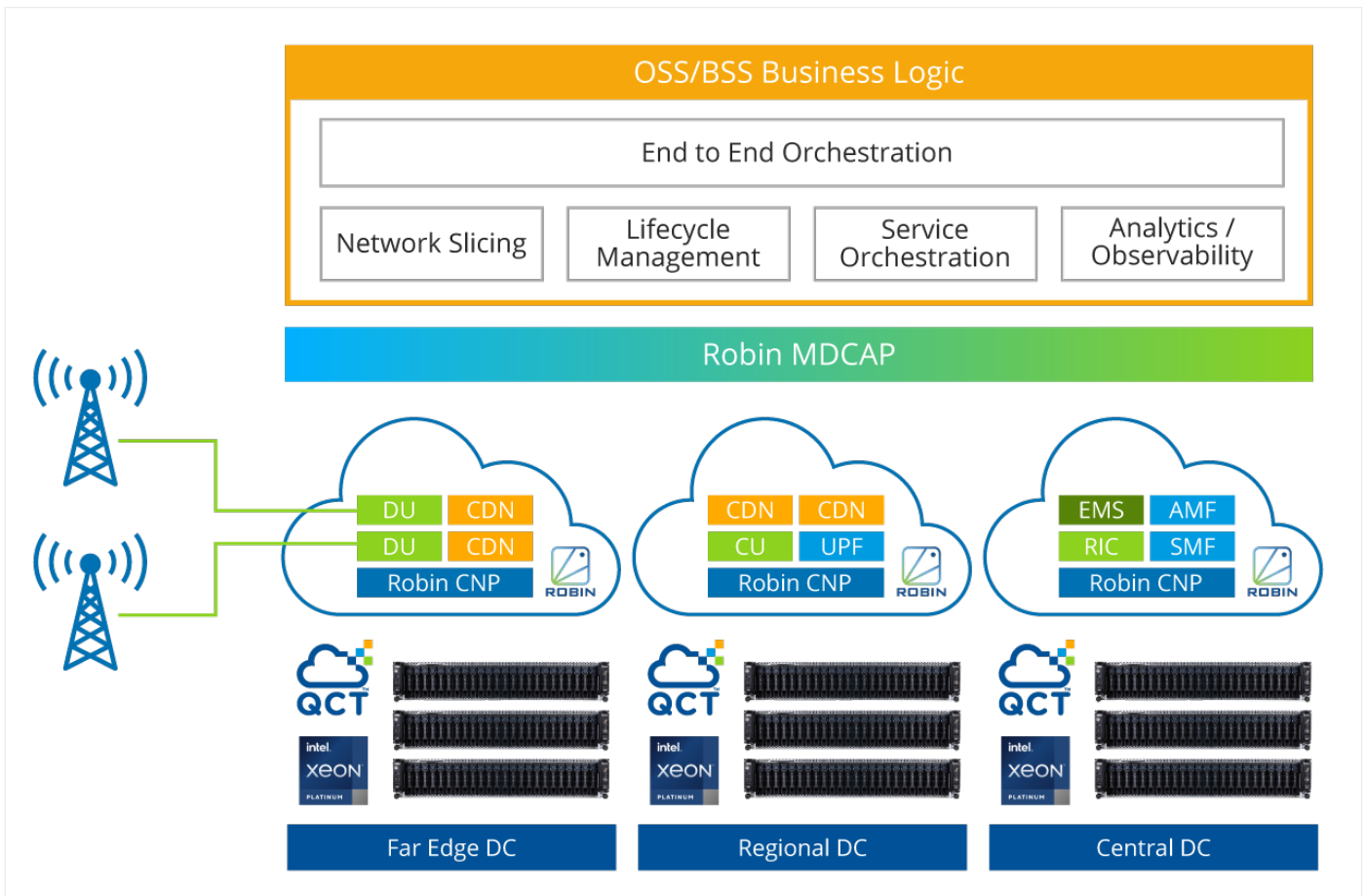

Figure 2. Robin and QCT deployment in a Tier 1 MNO network.

Delivering Hyper Automation

The combined hyper automation capability from Robin and QCT supports virtual machine and container coexistence to enable resource sharing and unified automation. It provides an entire MNO network stack, with both CNFs and VNFs for 4G and 5G services such as core network, vRAN, and content delivery networks.

Robin software, on QCT servers, can orchestrate, and instantiate and manage applications with network-intensive requirements such as Open RAN CU/DU as well as edge and multi-access edge computing (MEC) applications. Robin MDCAP can deliver bare metal to service orchestration at scale using QCT's bare metal API to automate infrastructure delivery and lifecycle management at hundreds of thousands of nodes, including deployment and configuration of Intel accelerators and real-time operating system and network interfaces required.

When a workload is created to be used in a base station, for example, the workload is executed using the bare metal API from QCT that can all be tracked using the bare metal manager, without any intervention from the MNO. When a new piece of hardware is added to the network, it is automatically included in the inventory, and all the steps that are part of the workload are automated in the Robin MDCAP.

Conclusion

The rapid scale of 5G is compelling MNOs to virtualize either through NFV, or increasingly, through containers. With the Robin, QCT, and Intel solution for 5G, MNOs can leverage hyper automation to deploy applications and server functions quickly without waiting for infrastructure teams. By removing complexity and accelerating deployment, the solution significantly reduces operating and capital expenses and allows MNOs to keep pace with the fast-changing needs of new 5G networks.

Learn More

Intel® Network Builders

QCT Telco Infrastructure Solution (IronCloud-Robin)

Robin Resources

Robin 5G Services