JUNIPER CLOUD-NATIVE ROUTER DATASHEET

Product overview

The challenges of [5G](#) deployment have pushed the industry to rethink networks. To meet the scale, distribution, and cost requirements of 5G rollout and expansion, [service providers](#) are integrating cloud-native infrastructure in D-RAN sites where space, power, and cooling are limited. Additionally, 5G data center expansion into cloud hyperscalers adds new requirements for cloud-native routing in their environments. The [Juniper Cloud-Native Router](#) empowers service providers to overcome these challenges through CapEx and OpEx savings and easy adoption in cloud-native environments, while integrating operations seamlessly with [Junos operating system](#) for the overall physical/ cloud-native hybrid network.

Product Description

Adding 5G requires significant network expansion by service providers as the distance requirements between radio tower and users are much shorter than previous-gen technologies. This smaller span has made it necessary for services providers to redefine their network designs to meet the expansion requirements for 5G rollouts. To reduce both CapEx and OpEx for the expansion, they are disaggregating the radio access network (RAN) and turning to hyperscalers for some of their 5G RAN data center needs. These changes require the use of a hybrid routing infrastructure with both physical and cloud-native routers. The Juniper® Cloud-Native Router gives service providers the flexibility required to roll out 5G.

The Cloud-Native Router is a performant software-based router using Juniper's proven routing technology with the [Junos® containerized routing protocol daemon (cRPD)](#) and a high-performance Contrail® Data Plane Development Kit (DPDK) vRouter forwarding plane for x86 processors. It is implemented in Kubernetes and interacts seamlessly with a Kubernetes container network interface (CNI) framework.

The Cloud-Native Router takes full advantage of container economics and the operational efficiencies inherent in cloud-native environments. The software-based router also complements Juniper physical routers, providing a routing option that delivers advanced networking features in environments where space, power, and cooling are limited, and a cloud-native infrastructure is in place. Based on the same Junos operating system routing technology, these hybrid networks provide a single end-to-end experience.

Use Cases

RAN

A 5G RAN environment typically consists of a mix of C-RAN and D-RAN sites. The C-RAN sites use bandwidth-intensive fronthaul connections and will continue to take advantage of physical routers. Some larger D-RAN sites may also use physical routers. However, providers will often take advantage of smaller D-RAN sites, that can easily number in the tens of thousands, to access user populations.

With a large number of D-RAN sites, cost is a key factor—both CapEx and OpEx must be optimized. Providers often use small, leased sites with limited space, power, and cooling to reduce expenses. To further save costs, they use leased lines and take advantage of less bandwidth-intensive midhaul connections. Cloud-Native Router is easily installable on an existing 1 U server integrated with the optical channel data unit (ODU) as a cloud-native solution. This design significantly reduces the power, space, and cooling needed to meet the needs of the service provider.

Telco virtual private cloud (VPC)

As infrastructure expands to support 5G, more radio sites are required, and data centers need to be expanded. One option is to build out data centers in hyperscaler public cloud environments; however, the current cloud-native routing within these environments does not support the full routing functionality required for telco VPCs such as MPLS, quality of service (QoS), L3 VPN, IP address management, and others.

Prior to Cloud-Native Router, the other option was to use virtual routers within virtual machines (VMs) but these are not desirable in the hyperscaler network as they are not truly cloud-native and have complicated management and other drawbacks. Cloud-Native Router solves these issues, integrating directly into the cloud as a CNI in Kubernetes on the same server as the application and can be managed as a cloud-native Kubernetes component for simpler deployment. It also integrates the advanced routing capabilities to meet telco VPC requirements and eliminates the drawbacks of a VM solution in this environment.
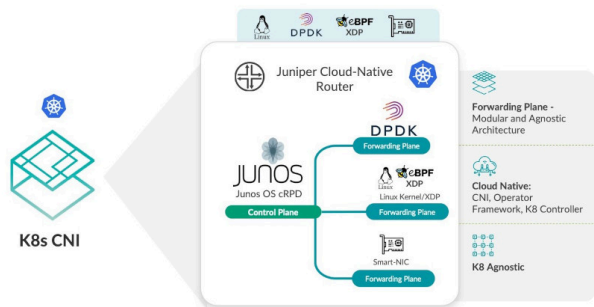
Architecture and Key Components

Figure 1. Juniper Cloud-Native Router overview

Features and Benefits

Junos OS Routing with CNI Functionality

Cloud-native, off-the-shelf advanced networking services that are easily integrated into cloud applications reduce development time while increasing reliability.

DPDK Forwarding Plane

Cloud-Native Router includes an integrated, high-performance Contrail DPDK forwarding plane, which is industry-proven and hardened for reliable performance.

Light Footprint

Cloud-Native Router can be deployed anywhere compute is available and takes advantage of fragmented resources. This flexibility makes it ideal for cloud-native deployments on existing servers in the D-RAN and cloud data centers.

Deployment Simplicity

Implemented in Kubernetes, Cloud-Native Router meets deployment and management needs, working in both Operations 1.0 and 2.0 environments.

- Operations 1.0 using Junos OS CLI or Network Configuration Protocol (NETCONF)
- Operations 2.0 using Kubernetes Manifest or Terraform

Specifications

Hardware Platforms

- x86—Intel
- Network interface cards (NICs)—Intel Columbiaville E810 (Westport Channel and Silicom STS-2/4) and Intel X710
- Forwarding—2P cores (4 in total including siblings)

Ordering Information

All SKUs for Cloud-Native Router are in the Advanced tier offering advanced routing functions and RIB scale:

Features: Standard cRPD host routing and performant forwarding plan (user-space or hardware-assisted (SmartNIC))

Scale: There are no specified limits on the BGP peers, equal-cost multipath (ECMP), or routing information base (RIB) (also known as routing table) scale.

SKU	Description
S-CRPD-10-A1-PF-1	SW, cRPD, 10GbE, advanced performant forwarding, includes BGP, OSPF, IS-IS, MPLS/SR, IPv4/v6, one server, with SVC Customer Support, 1 Year
S-CRPD-10-A1-PF-3	SW, cRPD, 10GbE, advanced performant forwarding, includes BGP, OSPF, IS-IS, MPLS/SR, IPv4/v6, one server, with SVC Customer Support, 3 Years
S-CRPD-10-A1-PF-5	SW, cRPD, 10GbE, advanced performant forwarding, includes BGP, OSPF, IS-IS, MPLS/SR, IPv4/v6, one server, with SVC Customer Support, 5 Years

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security, and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability, and equality.

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