JUNOS CONTAINERIZED ROUTING PROTOCOL DAEMON DATASHEET

Product Overview

Network operators are expected to meet growing demands for bandwidth and offer differentiated services while minimizing operational complexity. While different tools and applications that configure and manage network operations have existed for years, the underlying complexity remains. It takes special skills and the right system infrastructure, as well as a well-defined network architecture, to translate this into time and revenue. The Junos containerized routing protocol daemon accelerates innovation with a simplified and automated cloud-native routing platform that addresses multiple unique networking challenges faced by network operators today.

Product Description

The explosion of bandwidth consumption and the emergence of 5G are forcing network operators to scale up and increase operational agility. With innovations from hyperscale cloud providers and the emergence of telco cloud, service providers and enterprises alike are looking at best practices employed by these cloud providers. One such strategy is migrating to white box routers and containerizing the network applications needed to create scalable, agile, efficient networks.

Containers have emerged as the de facto microservices format for cloud-native environments. There are multiple factors contributing to the emergence of containers. First, containers provide better performance; one can be booted up in about 10 seconds (compared to several minutes for virtual machines). Second, containers offer a smaller footprint—a few hundred megabytes versus the gigabytes required by virtual machines, ensuring better resource management. Lastly, containers improve scale-out management with proven web-scale management systems like Kubernetes.

The Junos® containerized routing protocol daemon (cRPD) offers deployment-hardened, feature-rich routing functionality in a container for cloud-native deployments. Decoupling the control plane from the data plane offers platform flexibility, simplicity, automation, elastic scalability, and operational efficiency, delivering a true "One Junos" experience in routers, servers, or any Linux-based device. By packaging Juniper Networks® Junos operating system applications and their related routing stacks as a Docker container, Juniper extends traditional disaggregation by creating a flexible consumption model for network applications that can be easily scaled out. Service providers, cloud operators, and enterprises can deploy Junos cRPD in their existing server-based environments to address their unique requirements.

Use Cases

The Junos cRPD supports a high-performance, scalable, resilient, control plane stack for both off-box use cases such as routing at the host as well as on-box use cases with SONiC-enabled network hardware.

Off-Box Use Cases

- **Host-based routing**: In most data centers, connections between servers and leaf devices are traditionally Layer 2, resulting in a variety of complexities and deployment challenges. The Junos cRPD drastically reduces this complexity by replacing L2 connectivity with L3 connections between servers and leaf nodes.
- **Egress peer engineering**: Egress peer traffic engineering allows a central controller to instruct an ingress router within a domain to direct traffic towards a specific egress router and external interface in order to reach a particular destination outside the network. The Junos cRPD enables egress peer traffic engineering to select the best advertised egress route and map that route to a specific egress point. Load balancing is implemented at the ingress, ensuring optimum utilization of the advertised egress routes.

- **Route reflector**: Deploying the Junos cRPD as a route reflector can resolve scaling issues that arise when adding a new iBGP node to networks that require full meshed iBGP neighbors. In transit networks built as clusters of a spine and leaf architecture for large cloud customers, the Junos cRPD can be deployed in each cluster to control inter-cluster traffic. Two transit centers deployed within a single region provide redundancy. With Junos cRPD, all address families supported by BGP can be reflected by the route reflector.

On-Box Use Case

Junos cRPD provides a scalable, feature-rich routing stack for SONiC-enabled network hardware.

Features and Benefits

End-to-End Simplicity

Junos cRPD delivers Juniper routing applications in a container that can run on a white box with SONiC or a server running the Linux operating system, providing a single routing stack across the infrastructure independent of the underlying hardware.

Trusted Rich Routing Technology

Junos cRPD is a fully functional routing stack that supports protocols such as OSPF, IS-IS, BGP, MP-BGP, and more. Built with proven technology and undergoing rigorous testing, cRPD delivers vendor-supported routing across open or mixed infrastructures. As a result, Junos cRPD supports use cases such as egress peer engineering to select the best path for service routes, route reflector for scale-out fabric, routing redundancy, and application high availability with routing on the host.

Advanced Automation and Management

In addition to orchestration by Kubernetes and OpenShift, Junos cRPD uses Juniper Extension Toolkit API, Network Configuration Protocol (NETCONF), RESCONF, and others to automate network operations, simplify workflows, and optimize network infrastructure to reduce downtime and ensure high performance. To further increase manageability, Junos cRPD provides deep OpenConfig-based telemetry for accurate decision making.

Open Programmability

Junos cRPD support for OpenConfig and SONiC are concrete proof points of Juniper's commitment to open programmability.

Elastic Scalability

As a containerized solution with fast startup and a small software footprint supporting up to 200 million IPv4 or IPv6 routes, Junos cRPD is rapidly scalable across the infrastructure by easily adding new instances.

High-Performance Routing Solution

Junos cRPD is designed to maximize routing performance. For example, it is capable of reflecting 10 copies of Internet routes to 1000 BGP peers in less than 60 seconds.

Operational Efficiency

Junos cRPD allows a standardized routing stack across Juniper and non-Juniper hardware, increasing simplicity and reducing both OpEx and CapEx.

Features	Benefits
Disaggregation	Provides ultimate freedom of choice and flexibility while allowing faster innovation adoption, independent of the underlying hardware.
Agility	Enables service boot up in seconds, ensuring faster deployment.
Scalability	Imposes small footprint and minimal resource reservation requirements, enabling high scalability at peak demand.
Density	Supports higher density without requiring resource reservation on the host, compared to VM-based solutions.
Reliability	Delivers market-proven routing, switching, security, and analytics.
Linux-based	Runs on any Linux distribution system that supports Docker.

Specifications

- OS: Linux/SONiC
- Minimum requirements:
  - CPU: 1 core
  - Memory: 256 MB
  - Disk space: 256 MB
  - Kernel: version 4.6+
- Routing: IPv4, IPv6, MPLS, segment routing
- VPN: L3VPN, L2VPN, EVPN
- BGP route reflector in the Linux container
- BGP add-path, multipath, graceful restart helper mode
- BGP, OSPF, OSPFv3, IS-IS, and Static
- BGP-LU
- BGB Flowspec
- RIB Sharding, UpdIO
- BMP, BFD (centralized mode), and Linux-FIB
- MPLS LSP, L3VPN
- Multitopology routing
- Equal-cost multipath (ECMP)
- JET for programmable RPD
- Junos CLI support
- Management using open interfaces NETCONF and SSH
- Kubernetes integration

RIB Route Scale	Minimum Memory
32,000	256 MB
64,000	512 MB
128,000	1024 MB
1,000,000	2048 MB
100,000,000	32 GB
200,000,000	64 GB

Ordering Information

Host Routing

The SKUs below, for routing on the host, egress peer engineering, and similar use cases, have a subscription term and include Juniper support. The Standard tier includes features such as BGP, IS-IS, OSPF, telemetry, programmability, automation with limited BGP peers, equal-cost multipath (ECMP), and 4 million routing information base (RIB) (also known as routing table) scale. The Advanced tier offers enhanced MPLS features, BGP sharding with no specified limit on the BGP peers, ECMP, and RIB scale.

SKU	Description
S-CRPD-S-HR-1	Junos containerized RPD for host, Standard 1 year
S-CRPD-S-HR-3	Junos containerized RPD for host, Standard 3 year
S-CRPD-100-S-HR-1	Junos containerized RPD for host, Standard Bulk (100 instances) 1 year
S-CRPD-100-S-HR-3	Junos containerized RPD for host, Standard Bulk (100 instances) 3 year
S-CRPD-1K-S-HR-1	Junos containerized RPD for host, Standard Bulk (1000 instances) 1 year
S-CRPD-1K-S-HR-3	Junos containerized RPD for host, Standard Bulk (1000 instances) 3 year
S-CRPD-10K-S-HR-1	Junos containerized RPD for host, Standard Bulk (10,000 instances) 1 year
S-CRPD-10K-S-HR-3	Junos containerized RPD for host, Standard Bulk (10,000 instances) 3 year
S-CRPD-A-HR-1	Junos containerized RPD for host, Advanced 1 year
S-CRPD-A-HR-3	Junos containerized RPD for host, Advanced 3 year
S-CRPD-100-A-HR-1	Junos containerized RPD for host, Advanced Bulk (100 instances) 1 year
S-CRPD-100-A-HR-3	Junos containerized RPD for host, Advanced Bulk (100 instances) 3 year
S-CRPD-1K-A-HR-1	Junos containerized RPD for host, Advanced Bulk (1000 instances) 1 year
S-CRPD-1K-A-HR-3	Junos containerized RPD for host, Advanced Bulk (1000 instances) 3 year
S-CRPD-10K-A-HR-1	Junos containerized RPD for host, Advanced Bulk (10,000 instances) 1 year
S-CRPD-10K-A-HR-3	Junos containerized RPD for host, Advanced Bulk (10,000 instances) 3 year

Route Reflector and Route Server

The SKUs below, for route reflector and route server use cases, have a subscription term and include Juniper support. The licenses include features such as BGP, IS-IS, OSPF, telemetry, programmability, automation, enhanced MPLS, and BGP Sharding with no specified limit on the BGP peers, ECMP, and RIB scale.

SKU	Description
S-CRPD-4M-A-RR-1	SW, cRPD, 4M RIB scale, Advanced Route Reflector with SVC Customer Support, 1 year
S-CRPD-4M-A-RR-3	SW, cRPD, 4M RIB scale, Advanced Route Reflector with SVC Customer Support, 3 year
S-CRPD-4M-A-RR-5	SW, cRPD, 4M RIB scale, Advanced Route Reflector with SVC Customer Support, 5 year
S-CRPD-10M-A-RR-1	SW, cRPD, 10M RIB scale, Advanced, Route Reflector with SVC Customer Support, 1 year
S-CRPD-10M-A-RR-3	SW, cRPD, 10M RIB scale, Advanced, Route Reflector with SVC Customer Support, 3 year
S-CRPD-10M-A-RR-5	SW, cRPD, 10M RIB scale, Advanced, Route Reflector with SVC Customer Support, 5 year
S-CRPD-NL-A-RR-1	SW, cRPD, no limit on RIB scale, Advanced Route Reflector with SVC Customer Support, 1 year
S-CRPD-NL-A-RR-3	SW, cRPD, no limit on RIB scale, Advanced Route Reflector with SVC Customer Support, 3 year
S-CRPD-NL-A-RR-5	SW, cRPD, no limit on RIB scale, Advanced Route Reflector with SVC Customer Support, 5 year

cRPD as Routing Stack for SONiC

Juniper cRPD is available for SONiC-enabled hardware. For pricing information, please contact your Juniper sales representative.

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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