Release Notes

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Juniper BNG CUPS 24.4R1 and 24.4R2

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Introduction

Juniper BNG CUPS disaggregates the broadband network gateway (BNG) function running in Junos OS into separate control plane and user plane components. The control plane is a cloud-native application that runs in a Kubernetes environment. The user plane component continues to run on Junos OS on a dedicated hardware platform.

In Juniper BNG CUPS, the BNG functions are split into the BNG CUPS Controller (control plane) functions and the BNG User Plane (user plane) functions. The management, state and control packet interfaces operate between the BNG CUPS Controller and the BNG User Planes.

The benefits of Juniper BNG CUPS are the following:

- A centralized BNG CUPS Controller provides for more efficient use of network resources. Following are some examples:
  - Address allocation
  - Load balancing
  - Resiliency and high availability
  - Management and control
- Increased scale—The cloud environment that Juniper BNG CUPS utilizes, enables you to increase the number of subscribers supported.
- Locational independence and separate life-cycle management and maintenance.
- Throughput and latency optimization—Because the BNG User Planes are closer to the subscribers, throughput and latency is optimized.

These release notes accompany the Juniper BNG CUPS releases 24.4R1 and 24.4R2.

They describe new features and known problems.

Installation

IN THIS SECTION

BNG CUPS Controller Requirements

Juniper BNG CUPS 24.4R1 and 24.4R2 installation requires the minimum system requirements listed in this section.

The BNG CUPS Controller can be installed on a single Kubernetes cluster or on a multiple geography, multiple cluster setup. The installation requirements and installation process for these two types of setups are different.

For information on how to install Juniper BNG CUPS, see Juniper BNG CUPS Installation Guide.

BNG CUPS Controller installs on a Kubernetes cluster comprised of physical or virtual machines (VMs).

For the Kubernetes cluster requirements for your setup, see the following:

- Single Geography Kubernetes Cluster Setup Requirements on page 2
- Multiple Geography Kubernetes Cluster Setup Requirements on page 5

Table 1: Single Kubernetes Cluster Setup Requirements

Category	Details
Cluster	A single cluster with 3 hybrid nodes.

Table 1: Single Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details

Kubernetes node	The Kubernetes nodes require the following:
	• For the operating system, you can use either of the following:
	  • Ubuntu 22.04 LTS (for a BBE Cloudsetup cluster)
	  • Red Hat Enterprise Linux CoreOS (RHCOS) 4.16 or later (for an OpenShift Container Platform cluster)
	• CPU: 16 cores
	• Memory: 64 GB
	• Storage: 512 GB storage partitioned as 128 GB root (/), 128 GB /var/lib/docker, and 256 GB /mnt/longhorn(application data
	• Kubernetes role: Control plane etcd function and worker node
	This specification establishes a cluster that can run BNG CUPS Controller as well as its companion applications such as BBE Event Collection and Visualization and Address Pool Manager (APM) simultaneously.

Table 1: Single Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details

Jump host	The jump host requires the following:
	• Operating system: Ubuntu version 22.04 LTS
	• CPU: 2 core
	• Memory: 8 gibibytes (GiB)
	• Storage: 128 gibibytes (GiB)
	• Installed software:
	  • Python 3.10-venv
	  • Helm utility
	  • Docker utility
	  • OpenShift CLI. Required if you are using a Red Hat OpenShift Container Platform cluster.

Cluster software	The cluster requires the following software: • RKE version 1.3.15 (Kubernetes 1.24.4)—Kubernetes distribution • MetalLB version 0.13.7—Network load balancer • Keepalived version 2.2.8—Kubelet HA VIP Controller • Longhorn version 1.2.6—CSI • Flannel version 0.15.1—CNI • Registry version 2.8.1—Container registry • OpenShift version 4.16 or later—Kubernetes Distribution for RHOCP. Uses compatible versions of Longhorn (CSI), and MetalLB, OVN (CNI), and OpenShift Image Registry

Table 1: Single Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details
Jump host software	The jump host requires the following software: • Kubectl version 1.28.6+rke2r1—Kubernetes client • Helm version 3.12.3—Kubernetes package manager • Docker-ce version 20.10.21—Docker engine • Docker-ce-cli version 20.10.21—Docker engine CLI • OpenShift version 4.16 or later—Kubernetes distribution for RHOCP clusters.
Storage	A storage class named jnpr-bbe-storage.
Network load balancer address	Two for TCP and UDP load balancing services.
Registry storage	Each BNG CUPS Controller release requires 2 gibibytes (GiB) of container images.

Table 2: Multiple Geography Kubernetes Cluster Setup Requirements

Category	Details
Cluster	The multiple cluster consists of three clusters with each cluster consisting of 3 hybrid nodes. The three clusters must consist of one management cluster and two workload clusters. **NOTE**: Make sure that the cluster and service CIDRs for each workload cluster do not overlap. The cluster internal networks of each workload cluster are connected by a Submariner IP tunnel. The internal CIDRS must be distinct.

Table 2: Multiple Geography Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details

Management cluster, Kubernetes node	The management cluster Kubernetes node requires the following:
	• For the operating system, you can use either of the following:
	  • Ubuntu 22.04 LTS (for a BBE Cloudsetup cluster)
	  • Red Hat Enterprise Linux CoreOS (RHCOS) 4.16 or later (for an OpenShift Container Platform cluster)
	• CPU: 8
	• Memory: 24 GB
	• Storage: 256 GB of storage partitioned according to the following:
	  • On a Rancher Kubernetes Engine 2 (RKE2) system—64 GB root (/), 96 GB /var/lib/rancher, and 96 GB /var/lib/longhorn (application data)
	  • On a RHOCP system—64 GB root (/), 96 GB /var/lib/containers, and 96 GB /var/lib/longhorn
	• Kubernetes role: Control plane etcd function and worker node
	This specification establishes a cluster that can run Karmada and ECAV simultaneously.

Table 2: Multiple Geography Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details

Workload cluster, Kubernetes node	The workload cluster Kubernetes node requires the following:
	• For the operating system, you can use either of the following:
	  • Ubuntu 22.04 LTS (for a BBE Cloudsetup cluster)
	  • Red Hat Enterprise Linux CoreOS (RHCOS) 4.16 or later (for an OpenShift Container Platform cluster)
	• CPU: 16 cores
	• Memory: 64 GB
	• Storage: 512 GB of storage, partitioned according to the following:
	  • On a RKE2 system— 128 GB root (/), 128 GB /var/lib/rancher, 256 GB /var/lib/longhorn;
	  • On a RHOCP system—128 GB root (/), 128 GB /var/lib/containers, and 256 GB /var/lib/longhorn
	• Kubernetes role: Control plane etcd function and worker node
	This specification establishes a cluster that can run BNG CUPS Controller as well as its companion applications such as BBE Event Collection and Visualization and APM simultaneously.

Table 2: Multiple Geography Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details

Jump host	The jump host requires the following:
	• Operating system: Ubuntu version 22.04 LTS
	• CPU: 2 core
	• Memory: 8 gibibytes (GiB)
	• Storage: 128 gibibytes (GiB)
	• Installed software:
	  • Python 3.10-venv
	  • Helm utility
	  • Docker utility
	  • OpenShift CLI. Required if you are using a Red Hat OpenShift Container Platform cluster.

Table 2: Multiple Geography Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details

Cluster software	The cluster requires the following software:
	• RKE2 version 1.28.6+rke2r1—Kubernetes distribution
	  • MetalLB version 0.14.3—Network load balancer
	  • Kube-vip version 0.7.1—Kubelet HA VIP Controller
	  • Longhorn version 1.6.0—CSI
	  • Canal—CNI (part of RKE2 distribution)
	  • Registry version 2.8.1—Container registry
	• OpenShift version 4.16 or later—Kubernetes Distribution for RHOCP. Uses compatible versions of Longhorn (CSI), and MetalLB, OVN (CNI), and OpenShift Image Registry.
	• Karmada version 1.13.1—Multiple cluster orchestration. Required for the management cluster.
	• Submariner version 0.20.0—Layer 3 tunneling.

Table 2: Multiple Geography Kubernetes Cluster Setup Requirements *(Continued)*

Category	Details
Jump host software	The jump host requires the following software: • Kubectl version 1.28.6+rke2r1—Kubernetes client. • Helm version 3.12.3—Kubernetes package manager. • Docker-ce version 20.10.21—Docker engine. • Docker-ce-cli version 20.10.21—Docker engine CLI. • OpenShift CLI Tool (oc) version 4.16 or later—Kubernetes distribution for RHOCP clusters. • Subctl version 0.20.0—Submariner CLI utility. • Kubectl Karmada version 1.13.1—Kubectl karmada plug-in.
Storage	A storage class named jnpr-bbe-storage
Network load balancer address	Two for the TCP and UDP load balancing services for each workload cluster. One for the TCP load balancing service for the management cluster
Registry storage	Each BNG CUPS Controller release requires 2.5 gibibytes (GiB) of container images. Required for each cluster.

New and Changed Features

IN THIS SECTION

Learn about new features or enhancements to existing features in Juniper BNG CUPS 24.4R1 and 24.4R2. For more information about a feature, click the link in the description. See the Juniper BNG CUPS Installation Guide and Juniper BNG CUPS User Guide for more details about new and changed features.

New and Changed Features

We've introduced the following in Juniper BNG CUPS 24.4R1:

- Support for Red Hat Openshift Container Platform. Juniper BNG CUPS can use the Red Hat Openshift Container Platform to set up the Kubernetes cluster environment in to which the BNG CUPS Controller is deployed.
- Support for intelligent load sharing with redundancy enhanced load balancing capabilities across multiple BNG User Planes. This feature allows you to configure load balancing ports as part of resilient subscriber groups with active and backup BNG User Planes, enabling you to minimize service disruption and traffic loss.
- Added compliance for the Broadband Forums TR-459 Issue 2—TR-459 Issue 2 compliance for Juniper BNG CUPS ensures that your broadband network gateway implementation adheres to the standards set by the Broadband Forum, leveraging PFCP (Packet Forwarding Control Protocol) and General Packet Radio Service (GPRS) tunneling protocol on the user plane, for efficient subscriber state management and control packet tunneling.
- The number of BNG User Planes supported by a BNG CUPS Controller increases to 32.
- Support for geographic redundancy—The BNG CUPS Controller can maintain continuous operation across multiple geographically distributed Kubernetes clusters. By utilizing a multiple cluster architecture managed by Karmada for orchestration and Submariner for inter cluster networking, this feature ensures that BNG CUPS Controllers can failover in the event of a data center outage.

- Extends the capabilities of Juniper BNG CUPS to support static IPv4 and IPv6 address pools for DHCP and DHCPv6 local server access models and dynamic relay configurations. It introduces the ability to configure static address pools and prefixes, assign route tags, and prioritize control packets over the network. The feature enables BNG CUPS to handle diverse access models and meet resiliency requirements.
- BNG CUPS telemetry for subscriber and service accounting. Introducing Junos telemetry interface (JTI) sensor support for accounting statistics information on the BNG CUPS Controller. Using this feature, you can stream actual subscriber transit statistics, firewall filter statistics, and subscriber metadata.

Open Issues

This section lists the known issues in the following Juniper BNG CUPS releases.

The following known issues exist in Juniper BNG CUPS Release 24.4R1 and 24.4R2:

- BNG CUPS Controller command processing issue when commands are entered incorrectly. PR1806751
- When using the BNG User Plane: mode user-plane transport routing-instance configuration, a reboot is required. PR1819336

Resolved Issues

The following issues are resolved in Juniper BNG CUPS 24.4R1:

- BNG User Planes do not validate if the BNG User Plane line card supports subscriber groups subscriber over subscription. PR1791676
- PFCP association is stuck in a disconnecting state for a BNG User Plane when the BNG CUPS Controller becomes unreachable to other BNG User Planes. PR1812890
- When running over long periods of time, jdhcp service cores are seen. PR1813783
- Unable to commit any configuration changes. Also, no change commits are failing in a BNG User Plane with active subscribers. PR1814006
- The show system subscriber-management route summary command displays a negative gateway route count in the new master Route Engine after a BNG User Plane GRES. PR1814125

- The gateway route is incorrectly installed in the subscriber group's backup BNG User Plane's backup Route Engine. PR1814279
- After back to back subscriber group switchovers, discard and gateway routes are removed in the active BNG User Plane's backup Route Engine. PR1814342
- jdhcpd cores occur when the show dhcpv6 server binding command is executed. PR1816995

Requesting Technical Support

IN THIS SECTION

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active Juniper Care or Partner Support Services support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the JTAC User Guide located at https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf.
- Product warranties—For product warranty information, visit https://www.juniper.net/support/warranty/.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: https://www.juniper.net/customers/support/

- Search for known bugs: https://prsearch.juniper.net/
- Find product documentation: https://www.juniper.net/documentation/
- Find solutions and answer questions using our Knowledge Base: https://supportportal.juniper.net/s/knowledge
- Download the latest versions of software and review release notes: https://www.juniper.net/customers/csc/software/
- Search technical bulletins for relevant hardware and software notifications: https://supportportal.juniper.net/s/knowledge
- Join and participate in the Juniper Networks Community Forum: https://www.juniper.net/company/communities/
- Create a service request online: https://supportportal.juniper.net/

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: https://entitlementsearch.juniper.net/entitlementsearch/

Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit https://support.juniper.net/support/requesting-support/
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see https://support.juniper.net/support/requesting-support/.