

Contrail Release 3.2.15 Release Notes

Release 3.2.15
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Introduction

Juniper Networks Contrail is an open, standards-based software solution that delivers network virtualization and service automation for federated cloud networks. It provides self-service provisioning, improves network troubleshooting and diagnostics, and enables service chaining for dynamic application environments across enterprise virtual private cloud (VPC), managed Infrastructure as a Service (IaaS), and Networks Functions Virtualization (NFV) use cases.

These release notes accompany Release 3.2.15 of Juniper Networks Contrail. They describe new features, limitations, and known problems.

These release notes are displayed on the Juniper Networks Contrail Documentation Web page at https://www.juniper.net/documentation/en_US/contrail3.2/information-products/topic-collections/release-notes/index.html.

New and Changed Features

The features and enhancements listed in this section are new or changed as of Contrail Release 3.2. A brief description of each new feature is included.

- [New and Changed Features in Contrail Release 3.2.15 on page 4](#)
- [New and Changed Features in Contrail Release 3.2.14 on page 5](#)
- [New and Changed Features in Contrail Release 3.2.13 on page 5](#)
- [New and Changed Features in Contrail Release 3.2.12 on page 5](#)
- [New and Changed Features in Contrail Release 3.2.11 on page 5](#)
- [New and Changed Features in Contrail Release 3.2.10 on page 5](#)
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- [New and Changed Features in Contrail Release 3.2.7 on page 6](#)
- [New and Changed Features in Contrail Release 3.2.6 on page 6](#)
- [New and Changed Features in Contrail Release 3.2.5 on page 8](#)
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- [New and Changed Features in Contrail Release 3.2.3.2 on page 9](#)
- [New and Changed Features in Contrail Release 3.2.3 on page 9](#)
- [New and Changed Features in Contrail Release 3.2.2 on page 9](#)
- [New and Changed Features in Contrail Release 3.2.1 on page 9](#)
- [New and Changed Features in Contrail Release 3.2 on page 10](#)

New and Changed Features in Contrail Release 3.2.15

The features listed in this section are new as of Contrail Release 3.2.15.

[Linux Kernel 3.13.0-171 Support for Ubuntu](#)

Ubuntu based deployments in Contrail Release 3.2.15 support the 3.13.0-171 kernel.

[Support for CentOS-7.6](#)

Contrail Release 3.2.15 supports deployment on CentOS-7.6 distribution and kernel 3.10.0-957.21.3.

New and Changed Features in Contrail Release 3.2.14

The features listed in this section are new as of Contrail Release 3.2.14.

[Linux Kernel 3.13.0.-156 Support for Ubuntu](#)

Ubuntu based deployments in Contrail Release 3.2.14 support the 3.13.0.-156 kernel.

[Support for CentOS-7.5](#)

Contrail Release 3.2.14 supports deployment on CentOS-7.5 distribution.

[Log End User IP in Config Object Logs](#)

The config object log now logs the end user system IP address instead of Web UI node IP address in the config object logs.

New and Changed Features in Contrail Release 3.2.13

There are no new features in Contrail Release 3.2.13.

New and Changed Features in Contrail Release 3.2.12

The feature listed in this section is new as of Contrail Release 3.2.12.

[Updates to Qemu and Libvirt](#)

Qemu and libvirt are updated to fix Spectre and Meltdown vulnerabilities. Ubuntu Kilo-installation uses qemu 2.5 instead of qemu 2.3 which was used in earlier releases.

New and Changed Features in Contrail Release 3.2.11

There are no new features in Contrail Release 3.2.11.

New and Changed Features in Contrail Release 3.2.10

There are no new features in Contrail Release 3.2.10.

New and Changed Features in Contrail Release 3.2.9

The feature listed in this section is new as of Contrail Release 3.2.9.

[Support for CentOS-7.4](#)

Contrail Release 3.2.9 supports the CentOS-7.4 release.

Mitigation of Spectre and Meltdown Vulnerabilities

Contrail release 3.2.9 supports the following OpenStack releases and corresponding Linux kernel versions to mitigate Spectre and Meltdown vulnerabilities.

- Linux kernel versions 3.13.0-142 and 4.4.0-116 in Ubuntu OS
- Linux kernel versions 3.10.0-693.17.1, qemu 1.5.3, libvirt 3.2.0-14 in CentOS-7.4
- Linux kernel versions 3.10.0-693.17.1, qemu 1.5.3, libvirt 3.2.0-14 in Red Hat-7.4

Support for TLS Encryption for Discovery Service Transactions

Contrail Release 3.2.9 supports TLS encryption for Discovery service transactions in CentOS-7.4.

New and Changed Features in Contrail Release 3.2.8

The feature listed in this section is new as of Contrail Release 3.2.8.

Mergeable Buffer support in Data Plane Development Kit vRouter

Contrail Release 3.2.8 supports Jumbo Maximum Transmission Unit (MTU) in non-Data Plane Development Kit (DPDK) VMs attached to a DPDK vRouter.

New and Changed Features in Contrail Release 3.2.7

There are no new features in Contrail Release 3.2.7.

New and Changed Features in Contrail Release 3.2.6

The feature listed in this section is new as of Contrail Release 3.2.6.

vRouter Support for Fragmented IPv6 Packets

The vRouter code is enhanced to handle fragmented IPv6 packets.

Role and Resource Based Access Control Enhancements

Contrail Release 3.2.6 includes the following enhancements to the role and resource-based access control (RBAC) functionality:

- Rule Aggregation
 - RBAC rules are configured at the project, domain, or **global-system-config** levels.
 - These rules are aggregated against object type. For example, an R permission is assigned for a virtual-network object and a `_member_role` at the **global-system-config** level. For the same object and member, a U permission is assigned at domain level, and a C permission is assigned at project level. This means that the `_member_role` has an aggregate permission of CUR for the virtual-network object. Suppose, the **global-system-config** for a virtual-network object, role R1 has R permission and role R2 has R permission. At domain level, role R1 has C permission and role R2 has R permission, and at project level, role R1 has U permission, role R2 has UD permissions,

and role R3 has CRUD permissions. The aggregated rule will assign CRU permissions for role R1 and RUD permissions for role R2, and CRUD permissions for role R3.

- Requests are subjected to aggregated rules for API level RBAC access.
- Access permissions are prioritized from more specific rules to less specific rules. For example, consider the same four roles we discussed earlier; R1, R2, R3, and R4. Assume that roles R1, R2, and R3 has rules defined for virtual-network API object as mentioned previously, and suppose role R4 has a wild card rule with CRUD permissions. Role R4 cannot access the virtual-network object as the aggregated rule for the virtual-network object doesn't have permissions for role R4. In summary, if an object type rule is defined for certain roles, R1, R2, and R3 roles as in the above case, only those roles have permissions on that object, even though role R4 has wild card permission. Wildcard permission applies only for those objects that do not have any rules configured at project, domain, or **global-system-config** levels.
- Object Ownership
 - Once a request gets past API level RBAC access, object level RBAC applies. RBAC defines an owner field in each object to limit the scope of object access. The access scope is limited to that owner by any role that passes API level RBAC access check.
 - You are recommended to explicitly configure the owner while the objects are being created. However, if the ownership is not defined, the ownership is assigned in a particular order. The ownership is derived from the parent owner. If the object is domain children, such as VirtualDNS and ServiceTemplate, the owner is the project in which the object is created. The scope of the object is limited to the project context in which it is created if there is no parent for an object. To extend the scope of the object access, that object is shared across tenants or domains with various permission levels. Objects that do not match any of the previously mentioned criteria have **cloud-admin** as the owner.
 - Objects from outside the scope of the owner cannot be accessed, unless they are shared. However **cloud-admin** has no restrictions and can access any object.
- **Perms2.global_access** and **is_shared**
 - **Perms2.global_access** and **is_shared** are expected to be in sync. A setting on one either one standard API calls, results in setting in another and bringing them in sync with each other.
 - For objects that existed before RBAC, a new **Perms2** property is created. Full **global_access** permissions are assigned if **is_shared** is true. This is done as part of **dbe_resync** upon restarting the api-server.

BGPaaS Enhancements

You can perform the following steps for moving from BGPaaS with an image not supporting shared VMI to an image supporting shared VMIs.

1. Delete all BGPaaS configuration associated to VMIs.
2. Create a new BGPaaS configuration with multiple VMIs associated to it and the shared flag enabled.
3. Configure VRRP IP as allowed address pair on all VMIs.
4. Change the configuration on the BGP application inside the VM to use VRRP IP address as source IP address.

Keystone Version 2 Deployments Require auth_url Configuration

For deployments using Keystone version 2, installing or upgrading to Contrail 3.2.6 requires **auth_url** to be set to Keystone version 2 in **contrail-keystone-auth.conf**, because the Keystone middleware used by **contrail-api** needs this setting to send Keystone version 2 requests. Without this setting, Keystone middleware defaults to version 3, resulting in 401 error responses from **contrail-api**.

Example `auth_url=http://<keystone server IP>:35357/v2.0`

New and Changed Features in Contrail Release 3.2.5

The feature listed in this section is new as of Contrail Release 3.2.5.

Support for DPDK 17.02

Contrail Release 3.2.5 includes support for DPDK 17.02 for the following NICs:

- Intel 82599
- Intel Fortville i40e 4x10G and 2x25G
- Broadcom bnxt 2x25G

The supported platforms are Ubuntu-14.04.5 and Redhat 7.4.

New and Changed Features in Contrail Release 3.2.4

The feature listed in this section is new as of Contrail Release 3.2.4.

Implementing DPDK vRouter With RHOSP and Contrail-TSN

In Contrail Release 3.2.4, you can bring up a DPDK vRouter in a Red Hat OpenStack Platform (RHOSP) environment including Contrail-TSN. For more information, see <https://github.com/Juniper/contrail-tripleo-heat-templates/tree/dpdk4#dpdk-special>.

To use Contrail-TSN, you must set the Contrail-TSN count with the parameter **ContrailTsnCount** in **contrail-services.yaml**. See https://www.juniper.net/documentation/en_US/contrail3.2/topics/concept/deploy-rhospd10.html.



NOTE: In Contrail Release 3.2.4, you must manually generate and copy certificates on the QFX device.

New and Changed Features in Contrail Release 3.2.3.2

There are no new features in Contrail Release 3.2.3.2.

New and Changed Features in Contrail Release 3.2.3

The features listed in this section are new as of Contrail Release 3.2.3.

New Driver-Support

Contrail Release 3.2.3 supports the following drivers:

- i40e driver for Intel Ethernet Network Adapter XXV710 cards
- bnxt driver for Broadcom 25G NICs

Support for CentOS 7.3

Contrail Release 3.2.3 is supported on CentOS 7.3 for OpenStack Liberty and OpenStack Mitaka platforms.

New and Changed Features in Contrail Release 3.2.2

The features listed in this section are new as of Contrail Release 3.2.2.

Support for Red Hat OpenStack Platform 8

Contrail Release 3.2.2 is supported on OpenStack Liberty RHOSP8 release.

For information on Contrail bring up on RHOSP8 using Red Hat OpenStack Platform Director, see:

- <https://github.com/Juniper/contrail-tripleo-heat-templates/blob/master/Juniper%20Test%20Env%20for%20Contrail%20BOSP%20Deployments%20.pdf>
- https://github.com/Juniper/contrail-tripleo-heat-templates/blob/master/RHT_JNPR%20-%20OSP8%20Contrail%203.0.pdf

Support for Red Hat OpenStack Platform 10

Contrail Release 3.2.2 is supported on OpenStack Newton RHOSP10 release. For more information, see [Contrail bring up on RHOSP10 using Red Hat OpenStack Platform Director](#).

New and Changed Features in Contrail Release 3.2.1

The feature listed in this section is new as of Contrail Release 3.2.1.

[Support for Ubuntu 14.04.5 and Kernel 3.13.0-106](#)

Contrail Release 3.2.1 is qualified on Ubuntu 14.04.5 and kernel version 3.13.0-106.

New and Changed Features in Contrail Release 3.2

The feature listed in this section is new as of Contrail Release 3.2.

[Allowed Address Pair](#)

An allowed address pair extension is an OpenStack feature supported by Contrail. By default, there is no way to specify additional MAC and IP address pairs that are allowed to pass through a port in Neutron, because ports are locked down to their MAC address and the fixed IPs associated with their port for anti-spoofing reasons. This locking can sometimes prevent protocols such as VRRP from providing a high availability failover strategy. Using the allowed address pair extension enables additional MAC and IP address pairs to be allowed through ports in Neutron.

For more information, see [Service Chain Version 2 with Port Tuple](#).

[BGP Persistence with Graceful Restart/Long-lived Graceful Restart, Beta](#)

Graceful restart and long-lived graceful restart features are supported for the control node in Contrail Release 3.2. The graceful restart features can be used to ensure that traffic is not affected by temporary outage of processes.

In Release 3.2, this feature is a Beta version, focused on graceful restart of the Contrail control node. Graceful restart of vrouter agents will be available in a future release.

See [Configuring Graceful Restart for BGP Persistence](#).

[In-Service Software Upgrade \(ISSU\) Support](#)

You can use an in-service software upgrade to upgrade Contrail networking components with minimal traffic disruption during the upgrade.

See [Contrail In-Service Software Upgrade](#)

[Mirroring Enhancements](#)

Parameter options are added to mirroring to control the addition of a Juniper header to mirrored packets and to determine whether the next hop is dynamic or static.

See [Mirroring Enhancements](#).

[Multiqueue Virtio Interfaces in Virtual Machines](#)

Contrail Release 3.2 with OpenStack Mitaka adds support for multiple queues with the DPDK-based vRouter. Virtio is a Linux platform for I/O virtualization, providing a common set of I/O virtualization drivers. Multiqueue virtio is an approach that enables the processing of packet sending and receiving to be scaled to the number of available virtual CPUs (vCPUs) of a guest, through the use of multiple queues.

See [Multiqueue Virtio Interfaces in Virtual Machines](#).

QoS Queuing

Contrail Release 3.2 supports QoS vSW traffic classification, copy of IP precedence bits, and QoS queuing.

See [Quality of Service in Contrail](#).

Role- and Resource-Based Access Control

Contrail Release 3.2 provides role- and resource-based access control (RBAC) with configuration -level access control.

See [Role- and Resource-Based Access Control](#).

Using Gateway Mode with vCenter

You can use the gateway mode with active-backup vRouter when using Contrail with VMware vCenter. The VMware virtual machines are the remote instances, and traffic can be configured to arrive VLAN-tagged at the gateway node.

See [Using Gateway Mode to Support Remote Instances](#).

Supported Platforms

Table 1 on page 11 lists the operating system versions and the corresponding Linux or Ubuntu kernel versions supported by Contrail Release 3.2 on OpenStack Kilo, Liberty, Mitaka, Newton, and VMware vCenter releases.

Table 1: Supported Platforms

Contrail Release	Orchestrator Release	Operating System and Kernel Versions
Contrail Release 3.2.15	OpenStack Kilo	<ul style="list-style-type: none"> Ubuntu 14.04.5—Linux kernel versions 3.13.0-171-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.6—Linux kernel version 3.10.0-957.21.3 Ubuntu 14.04.5—Linux kernel versions 3.13.0-171-generic
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.6—Linux kernel version 3.10.0-957.21.3
Contrail Release 3.2.14	OpenStack Kilo	<ul style="list-style-type: none"> Ubuntu 14.04.5—Linux kernel versions 3.13.0-156-generic and 4.4.0-116-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.5—Linux kernel version 3.10.0-862 Ubuntu 14.04.5—Linux kernel versions 3.13.0-156-generic and 4.4.0-116-generic
Contrail Release 3.2.13	OpenStack Kilo	<ul style="list-style-type: none"> Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.4—Linux kernel version 3.10.0-693.17.1 Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic

Table 1: Supported Platforms (continued)

Contrail Release	Orchestrator Release	Operating System and Kernel Versions
Contrail Release 3.2.12	OpenStack Kilo	<ul style="list-style-type: none"> Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.4—Linux kernel version 3.10.0-693.17.1 Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
Contrail Release 3.2.11	OpenStack Kilo	<ul style="list-style-type: none"> Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.4—Linux kernel version 3.10.0-693.17.1 Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
Contrail Release 3.2.10	OpenStack Kilo	<ul style="list-style-type: none"> Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.4—Linux kernel version 3.10.0-693.17.1 Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.4—Linux kernel version 3.10.0-693.17.1
	VMware vCenter	<ul style="list-style-type: none"> ESXi 6.0 and ESXi 6.5 Ubuntu 14.04.4 kernel version 3.13.0-142-generic
Contrail Release 3.2.9	OpenStack Kilo	<ul style="list-style-type: none"> Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.4—Linux kernel version 3.10.0-693.17.1 Ubuntu 14.04.5—Linux kernel versions 3.13.0-142-generic and 4.4.0-116-generic
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.4—Linux kernel version 3.10.0-693.17.1
	VMware vCenter	<ul style="list-style-type: none"> ESXi 6.0 and ESXi 6.5 Ubuntu 14.04.4 kernel version 3.13.0-142-generic

Table 1: Supported Platforms (continued)

Contrail Release	Orchestrator Release	Operating System and Kernel Versions
Contrail Release 3.2.8	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.4—Linux kernel version 3.10.0-693
Contrail Release 3.2.7	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.4—Linux kernel version 3.10.0-693

Table 1: Supported Platforms (continued)

Contrail Release	Orchestrator Release	Operating System and Kernel Versions
Contrail Release 3.2.6	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.4—Linux kernel version 3.10.0-693
Contrail Release 3.2.5	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1 Red Hat 7.3—Linux kernel version 3.10.0-514.6.2 VMware vCenter 5.5, 6.0, 6.5—Ubuntu 14.04.4 kernel version 3.13.0-110-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-110-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.4—Linux kernel version 3.10.0-693

Table 1: Supported Platforms (continued)

Contrail Release	Orchestrator Release	Operating System and Kernel Versions
Contrail Release 3.2.4	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1 Red Hat 7.3—Linux kernel version 3.10.0-514.6.2 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.3—Linux kernel version 3.10.0-514.6.2
Contrail Release 3.2.3.2	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1 Red Hat 7.3—Linux kernel version 3.10.0-514.6.2 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.3—Linux kernel version 3.10.0-514.6.2

Table 1: Supported Platforms (continued)

Contrail Release	Orchestrator Release	Operating System and Kernel Versions
Contrail Release 3.2.3	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1 Red Hat 7.3—Linux kernel version 3.10.0-514.6.2 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.3—Linux kernel version 3.10.0-514.6.2 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.3—Linux kernel version 3.10.0-514.6.2
Contrail Release 3.2.2	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.2—Linux kernel version 3.10.0-327.10.1 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1 Red Hat 7.3—Linux kernel version 3.10.0-514.6.2 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.2—Linux kernel version 3.10.0-327.10.1 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
	OpenStack Newton	<ul style="list-style-type: none"> Red Hat 7.3—Linux kernel version 3.10.0-514.6.2

Table 1: Supported Platforms (continued)

Contrail Release	Orchestrator Release	Operating System and Kernel Versions
Contrail Release 3.2.1	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux kernel version 3.10.0-229 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.1—Linux kernel version 3.10.0-229 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.2—Linux kernel version 3.10.0-327.10.1 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-106-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.2—Linux kernel version 3.10.0-327.10.1 Ubuntu 14.04.5—Linux kernel version 3.13.0-106-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1
Contrail Release 3.2	OpenStack Kilo	<ul style="list-style-type: none"> CentOS 7.1—Linux Kernel version- 3.10.0-229 Ubuntu 14.04.4—Linux kernel versions 3.13.0-85-generic and 4.4.0-34-generic Red Hat 7.1—Linux Kernel version- 3.10.0-229 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-85-generic
	OpenStack Liberty	<ul style="list-style-type: none"> CentOS 7.2—Linux kernel version 3.10.0-327.10.1 Ubuntu 14.04.4—Linux kernel versions 3.13.0-85-generic and 4.4.0-34-generic Red Hat 7.2—Linux kernel version 3.10.0-327.10.1 VMware vCenter 5.5, 6.0—Ubuntu 14.04.4 kernel version 3.13.0-85-generic
	OpenStack Mitaka	<ul style="list-style-type: none"> CentOS 7.2—Linux kernel version 3.10.0-327.10.1 Ubuntu 14.04.4—Linux kernel version 3.13.0-85-generic



NOTE: If the stock kernel version of your Ubuntu system is other than the required version, the following Fabric task can be used to upgrade the kernel version in all nodes after initial package installation:

```
cd /opt/contrail/utils; fab upgrade_kernel_all
```

Known Behavior

This section lists known limitations with this release. Bug numbers are listed and can be researched in [Launchpad.net](https://launchpad.net) at <https://bugs.launchpad.net/juniperopenstack>.

- [Known Behavior in Contrail Release 3.2.15 on page 18](#)
- [Known Behavior in Contrail Release 3.2.14 on page 20](#)
- [Known Behavior in Contrail Release 3.2.13 on page 22](#)
- [Known Behavior in Contrail Release 3.2.12 on page 24](#)
- [Known Behavior in Contrail Release 3.2.11 on page 26](#)
- [Known Behavior in Contrail Release 3.2.10 on page 28](#)
- [Known Behavior in Contrail Release 3.2.9 on page 30](#)
- [Known Behavior in Contrail Release 3.2.8 on page 31](#)
- [Known Behavior in Contrail Release 3.2.7 on page 33](#)
- [Known Behavior in Contrail Release 3.2.6 on page 36](#)
- [Known Behavior in Contrail Release 3.2.5 on page 38](#)
- [Known Behavior in Contrail Release 3.2.4 on page 39](#)
- [Known Behavior in Contrail Release 3.2.3.2 on page 40](#)
- [Known Behavior in Contrail Release 3.2.3 on page 40](#)
- [Known Behavior in Contrail Release 3.2.2 on page 41](#)
- [Known Behavior in Contrail Release 3.2.1 on page 41](#)
- [Known Behavior in Contrail Release 3.2 on page 42](#)

Known Behavior in Contrail Release 3.2.15

- JCB-170431 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- JCB-171539 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- JCB-182594 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- JCB-184593 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>
- JCB-184776 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by

the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.

- JCB-195919 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.
- JCB-181984 VNC API sends an update of all subfields in a field, such as `virtual_network_properties` and not the updated subfield alone, such as `allow_transit` of `vn_properties`. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of `virtual_network_properties` except `allow_transit` and then call the `vn_obj.set_virtual_network_properties()`.
 2. Use RestApi or Contrail-UI instead of `vnc_api`.
- JCB-215311 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:
 1. **`ironic node-delete <node name>`**
 2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities" : "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **`openstack baremetal import --json <.json_filepath>`**
 4. **`openstack baremetal introspection bulk start`**
- JCB-204502 When you use the `vifdump` utility with the `grep` command and pipe `vifdump` results to `grep`, it stimulates a `segfault`.
 - CEM-6580 When upgrading to Contrail Release 3.2.15, the user must explicitly upgrade the qemu packages using the following procedure.

On kernel computes:

```
cd /opt/contrail/contrail_install_repo
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

On DPDK computes:

```
cd /opt/contrail/contrail_install_repo_dpdk
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

- CEM-7353 IPv6: Intra-vn ping loss occurs after disabling policy and deactivating default security-group.

Known Behavior in Contrail Release 3.2.14

- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>

- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP 10. As a workaround, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720990 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.

- 1721620 VNC API sends an update of all subfields in a field, such as `virtual_network_properties` and not the updated subfield alone, such as `allow_transit` of `vn_properties`. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of `virtual_network_properties` except `allow_transit` and then call the `vn_obj.set_virtual_network_properties()`.
 2. Use RestApi or Contrail-UI instead of `vnc_api`.
- 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:
 1. **`ironic node-delete <node name>`**
 2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities" : "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **`openstack baremetal import --json <.json_filepath>`**
 4. **`openstack baremetal introspection bulk start`**
- 1745051 When you use the `vifdump` utility with the `grep` command and pipe `vifdump` results to `grep`, it stimulates a **`segfault`**.
 - 1793638 When upgrading to Contrail Release 3.2.12, you need to explicitly upgrade the `qemu` packages using the following procedure.

On kernel computes:

```
cd /opt/contrail/contrail_install_repo
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

On DPDK computes:

```
cd /opt/contrail/contrail_install_repo_dpdk
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

Known Behavior in Contrail Release 3.2.13

- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>

- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP 10. As a workarround, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720990 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.
- 1721620 VNC API sends an update of all subfields in a field, such as virtual_network_properties and not the updated subfield alone, such as allow_transit of vn_properties. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of virtual_network_properties except allow_transit and then call the vn_obj.set_virtual_network_properties().
 2. Use RestApi or Contrail-UI instead of vnc_api.
- 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes

from ironic configuration and re-add them with right configuration. Use the following commands:

1. **ironic node-delete <node name>**
2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities": "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **openstack baremetal import --json <.json_filepath>**
 4. **openstack baremetal introspection bulk start**
- 1745051 When you use the **vifdump** utility with the **grep** command and pipe **vifdump** results to **grep**, it stimulates a **segfault**.
 - 1793638 When upgrading to Contrail Release 3.2.12, you need to explicitly upgrade the **qemu** packages using the following procedure.

On kernel computes:

```
cd /opt/contrail/contrail_install_repo
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

On DPDK computes:

```
cd /opt/contrail/contrail_install_repo_dpdk
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

- 1796257 Starting with Release 3.2, Contrail does not support Service Chain Version 1 (v1).

Known Behavior in Contrail Release 3.2.12

- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:
<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>
- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP 10. As a workaroud, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720990 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.
- 1721620 VNC API sends an update of all subfields in a field, such as virtual_network_properties and not the updated subfield alone, such as allow_transit of vn_properties. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of virtual_network_properties except allow_transit and then call the vn_obj.set_virtual_network_properties().
 2. Use RestApi or Contrail-UI instead of vnc_api.
- 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:

1. `ironic node-delete <node name>`
2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities" : "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. `openstack baremetal import --json <.json_filepath>`
 4. `openstack baremetal introspection bulk start`
- 1745051 When you use the `vifdump` utility with the `grep` command and pipe `vifdump` results to `grep`, it stimulates a `segfault`.
 - 1793638 When upgrading to Contrail Release 3.2.12, you need to explicitly upgrade the `qemu` packages using the following procedure.

On kernel computes:

```
cd /opt/contrail/contrail_install_repo
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

On DPDK computes:

```
cd /opt/contrail/contrail_install_repo_dpdk
dpkg -i qemu*
dpkg -i libvirt*
apt-get -f install
```

- 1796257 Starting with Release 3.2, Contrail does not support Service Chain Version 1 (v1).

Known Behavior in Contrail Release 3.2.11

- 1699603 The nodemgr processes run as user **contrail:contrail** instead of **root user** in previous releases.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.
- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for ContrailDpdkCoremask variable must be mentioned as string within quotes.

For example: ContrailDpdkCoremask: "0x3f"
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>
- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP 10. As a workaoround, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720990 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.
- 1721620 VNC API sends an update of all subfields in a field, such as virtual_network_properties and not the updated subfield alone, such as allow_transit of vn_properties. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:

1. Delete the attributes which are not updated from the field class, such as all the attributes of `virtual_network_properties` except `allow_transit` and then call the `vn_obj.set_virtual_network_properties()`.
 2. Use RestApi or Contrail-UI instead of `vnc_api`.
- 1722877 In case of RHOSP 10 and RHOSP 11, the current provisioning code does not support SR-IOV provisioning. However, the steps to manually provision SR-IOV is validated in this release.
 - 1724108 End-to-end health check on a dual stack (IPv4, IPv6) service chain is not supported.
 - 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:
1. **ironic node-delete <node name>**
 2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities" : "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **openstack baremetal import --json <.json_filepath>**
 4. **openstack baremetal introspection bulk start**
- 1745051 When you use the `vifdump` utility with the `grep` command and pipe `vifdump` results to `grep`, it stimulates a **segfault**.
 - 1753064 The Floating IP tab in the Network Create page in the UI is moved under a separate tab named Floating IP.

Known Behavior in Contrail Release 3.2.10

- 1699603 The nodemgr processes run as user **contrail:contrail** instead of **root user** in previous releases.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.
- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for ContrailDpdkCoremask variable must be mentioned as string within quotes.

For example: ContrailDpdkCoremask: "0x3f"
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>
- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP 10. As a workaoround, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720990 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.
- 1721620 VNC API sends an update of all subfields in a field, such as virtual_network_properties and not the updated subfield alone, such as allow_transit of vn_properties. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:

1. Delete the attributes which are not updated from the field class, such as all the attributes of `virtual_network_properties` except `allow_transit` and then call the `vn_obj.set_virtual_network_properties()`.
 2. Use RestApi or Contrail-UI instead of `vnc_api`.
- 1722877 In case of RHOSP 10 and RHOSP 11, the current provisioning code does not support SR-IOV provisioning. However, the steps to manually provision SR-IOV is validated in this release.
 - 1724108 End-to-end health check on a dual stack (IPv4, IPv6) service chain is not supported.
 - 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:
1. **ironic node-delete <node name>**
 2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities" : "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **openstack baremetal import --json <.json_filepath>**
 4. **openstack baremetal introspection bulk start**
- 1745051 When you use the `vifdump` utility with the `grep` command and pipe `vifdump` results to `grep`, it stimulates a **segfault**.
 - 1753064 The Floating IP tab in the Network Create page in the UI is moved under a separate tab named Floating IP.

Known Behavior in Contrail Release 3.2.9

- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.
- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for ContrailDpdkCoremask variable must be mentioned as string within quotes.

For example: ContrailDpdkCoremask: "0x3f"

- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>

- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP 10. As a workaround, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720990 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.
- 1721620 VNC API sends an update of all subfields in a field, such as virtual_network_properties and not the updated subfield alone, such as allow_transit of vn_properties. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of virtual_network_properties except allow_transit and then call the vn_obj.set_virtual_network_properties().
 2. Use RestApi or Contrail-UI instead of vnc_api.

- 1722877 In case of RHOSP 10 and RHOSP 11, the current provisioning code does not support SR-IOV provisioning. However, the steps to manually provision SR-IOV is validated in this release.
- 1724108 End-to-end health check on a dual stack (IPv4, IPv6) service chain is not supported.
- 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:

1. **ironic node-delete <node name>**
2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities" : "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **openstack baremetal import --json <.json_filepath>**
 4. **openstack baremetal introspection bulk start**
- 1745051 When you use the **vifdump** utility with the **grep** command and pipe **vifdump** results to **grep**, it stimulates a **segfault**.
 - 1753064 The Floating IP tab in the Network Create page in the UI is moved under a separate tab named Floating IP.

Known Behavior in Contrail Release 3.2.8

- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1664452 Ceilometer sample-list and meter-list do not work on OpenStack Liberty.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.

- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1706221 VMs cannot be launched due to an issue in libvirt package version change in CentOS 7.3 Mitaka cluster. As a workaround:

1. Go to compute node.
2. Change **conf.script = ""** to **conf.script = None (line 61)** in **/usr/lib/python2.7/site-packages/nova/virt/libvirt/designer.py**.
3. Reboot libvirt.

```
service libvirtd restart
```

4. Reboot Nova compute.

```
service openstack-nova-compute restart
```

- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for ContrailDpdkCoremask variable must be mentioned as string within quotes.
For example: ContrailDpdkCoremask: "0x3f"
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>

- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP 10. As a workaround, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720990 With policy-based mirroring with ECMP destinations, one of the destination vRouters drops packet with invalid NH.

- 1721620 VNC API sends an update of all subfields in a field, such as `virtual_network_properties` and not the updated subfield alone, such as `allow_transit` of `vn_properties`. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of `virtual_network_properties` except `allow_transit` and then call the `vn_obj.set_virtual_network_properties()`.
 2. Use RestApi or Contrail-UI instead of `vnc_api`.
- 1722877 In case of RHOSP 10 and RHOSP 11, the current provisioning code does not support SR-IOV provisioning. However, the steps to manually provision SR-IOV is validated in this release.
- 1724108 End-to-end health check on a dual stack (IPv4, IPv6) service chain is not supported.
- 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:
 1. **ironic node-delete <node name>**
 2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities": "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **openstack baremetal import --json <.json_filepath>**
4. **openstack baremetal introspection bulk start**

Known Behavior in Contrail Release 3.2.7

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.

- 1664452 Ceilometer sample-list and meter-list do not work on OpenStack Liberty.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.
- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1706221 VMs cannot be launched due to an issue in libvirt package version change in CentOS 7.3 Mitaka cluster. As a workaround:
 1. Go to compute node.
 2. Change **conf.script = ""** to **conf.script = None** (line 61) in **/usr/lib/python2.7/site-packages/nova/virt/libvirt/designer.py**.
 3. Reboot libvirt.

```
service libvirtd restart
```

4. Reboot Nova compute.

```
service openstack-nova-compute restart
```

- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for ContrailDpdkCoremask variable must be mentioned as string within quotes.
For example: ContrailDpdkCoremask: "0x3f"
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>

- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP10. As a workaround, deploy the stack with computes and DPDK first. Then change the VrouterPhysicalInterface, add the TSN nodes, and update the stack.
- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This

leads to the whole packet being dropped on the receive side leading to the first packet loss.

- 1720356, 1721705 BGPaaS object is shared across multiple VMIs. This feature is used only for use-cases with the same BGPaaS object shared with VMIs from different compute nodes.
- 1721620 VNC API sends an update of all subfields in a field, such as `virtual_network_properties` and not the updated subfield alone, such as `allow_transit` of `vn_properties`. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of `virtual_network_properties` except `allow_transit` and then call the `vn_obj.set_virtual_network_properties()`.
 2. Use RestApi or Contrail-UI instead of `vnc_api`.
- 1722877 In case of RHOSP 10 and RHOSP 11, the current provisioning code does not support SRIOV provisioning. However, the steps to manually provision SRIOV is validated in this release.
- 1724108 End-to-end health check on a dual stack (IPv4, IPv6) service chain is not supported.
- 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:
 1. **ironic node-delete <node name>**
 2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities": "profile:compute-dpdk",
      "pm_user": "admin",
      "pm_addr": "10.87.122.164",
      "pm_password": "admin",
      "pm_type": "pxe_ipmitool"
    }
  ]
}
```

3. **openstack baremetal import --json <.json_filepath>**
4. **openstack baremetal introspection bulk start**

Known Behavior in Contrail Release 3.2.6

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1664452 Ceilometer sample-list and meter-list do not work on OpenStack Liberty.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.
- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come up. The **service supervisor-vrouter restart** command brings the service back online.
- 1706221 VMs cannot be launched due to an issue in libvirt package version change in CentOS 7.3 Mitaka cluster. As a workaround:

1. Go to compute node.
2. Change **conf.script = ""** to **conf.script = None (line 61)** in **/usr/lib/python2.7/site-packages/nova/virt/libvirt/designer.py**.
3. Reboot libvirt.

```
service libvirtd restart
```

4. Reboot Nova compute.

```
service openstack-nova-compute restart
```

- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for **ContrailDpdkCoremask** variable must be mentioned as string within quotes.
For example: **ContrailDpdkCoremask: "0x3f"**
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:
<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>
- 1709974 TSN support in RHOSP-based clusters is available up to RHOSP10. As a workaround, deploy the stack with computes and DPDK first. Then change the **VrouterPhysicalInterface**, add the TSN nodes, and update the stack.

- 1716308 When the head fragment is received in the vRouter, the head fragment is enqueued to the assembler immediately upon arrival. The flow is created as hold flow and then trapped to the agent. If fragments corresponding to this head fragment are already in the assembler or if new fragments arrive immediately after the head fragment, the assembler releases them to flow module. If agent does not write flow action by the time the assembler releases fragments to the flow module, fragments get enqueued in the hold queue. As a maximum of only three fragments are enqueued in the hold queue, rest of the fragments from the assembler get dropped in the flow module. This leads to the whole packet being dropped on the receive side leading to the first packet loss.
- 1720356, 1721705 BGPaaS object is shared across multiple VMIs. This feature is used only for use-cases with the same BGPaaS object shared with VMIs from different compute nodes.
- 1721620 VNC API sends an update of all subfields in a field, such as `virtual_network_properties` and not the updated subfield alone, such as `allow_transit` of `vn_properties`. Hence, a match against all the subfields causes the user to not be able to update a subfield. As a workaround, perform the following steps:
 1. Delete the attributes which are not updated from the field class, such as all the attributes of `virtual_network_properties` except `allow_transit` and then call the `vn_obj.set_virtual_network_properties()`.
 2. Use RestApi or Contrail-UI instead of `vnc_api`.
- 1722877 In case of RHOSP 10 and RHOSP 11, the current provisioning code does not support SRIOV provisioning. However, the steps to manually provision SRIOV is validated in this release.
- 1724041 In case of Keystone v3, the API server uses domain-scoped authentication to sync projects and domains. Hence, `domain_id` or `domain_name` need to be specified in `/etc/contrail/contrail-keystone-auth.conf` instead of the `project_domain_name`.
- 1724108 End-to-end health check on a dual stack (IPv4, IPv6) service chain is not supported.
- 1724357 While provisioning a RHOSP10 cluster with DPDK nodes, the DPDK node power state goes down during introspection stage. As a workaround, delete the DPDK nodes from ironic configuration and re-add them with right configuration. Use the following commands:
 1. **`ironic node-delete <node name>`**
 2. Create a JSON file configuration for all DPDK nodes as shown in the following example:

```
{
  "nodes": [
    {
      "mac": [
        "90:e2:ba:4c:67:3d"
      ],
      "name": "compute3-dpdk",
      "capabilities" : "profile:compute-dpdk",
```

```

    "pm_user": "admin",
    "pm_addr": "10.87.122.164",
    "pm_password": "admin",
    "pm_type": "pxe_ipmitool"
  }
]
}

```

3. **openstack baremetal import --json <.json_filepath>**
 4. **openstack baremetal introspection bulk start**
- 1724408 LBaaS v2 creation fails as provisioning does not populate proper "AUTHN_TOKEN_URL" in "auth" section of vnc_api_lib.ini. As a workaround, populate it in vc_api_lib.ini.

Known Behavior in Contrail Release 3.2.5

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1664452 Ceilometer sample-list and meter-list do not work on OpenStack Liberty.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.
- 1699366 On a scaled cluster configured with XMPP over TLS, the XMPP session gets restarted with decryption failed or bad record-MAC messages.
- 1705795 On an RHOSP10 provisioned cluster, if the vrouter-agent gets restarted, vhost0 interface does not come online. You can use the **service supervisor-vrouter restart** command to bring the service back online.
- 1706221 VMs cannot be launched due to an issue in libvirt package version change in CentOS 7.3 Mitaka cluster. As a workaround, perform the following steps:
 1. Go to compute node.
 2. Change **conf.script = ""** to **conf.script = None (line 61)** in **/usr/lib/python2.7/site-packages/nova/virt/libvirt/designer.py**.
 3. Reboot libvirt.

```
service libvirtd restart
```

4. Reboot Nova compute.

```
service openstack-nova-compute restart
```

- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for ContrailDpdkCoremask variable must be mentioned as string within quotes.

For example: ContrailDpdkCoremask: "0x3f"

- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.
- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>

Known Behavior in Contrail Release 3.2.4

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1664452 Ceilometer sample-list and meter-list do not work on OpenStack Liberty.
- 1673239 On a RHOSP10 cluster provisioned with Red Hat OpenStack Platform Director, the LBaaS service fails to come up if Selinux is enabled on the compute nodes. As a workaround, disable Selinux on the compute nodes.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.
- 1695008 Keystone V3 deployments must be patched after provisioning. See <https://github.com/Juniper/contrail-controller/commit/27cd511e8a570d68c11461782dd670da93f46094>.
- 1705795 On an RHOSP10 provisioned cluster, if the grouter-agent gets restarted, vhost0 interface does not come online. You can use the **service supervisor-vrouter restart** command to bring the service back online.
- 1706794 On an RHOSP10 provisioned cluster the Contrail introspect ports are not reachable as they are blocked due to non-permissive **iptables** rules. This can be avoided by adding the permissive rule for the introspect ports.
- 1706880 While deploying a DPDK compute on an RHOSP10 cluster, the value for ContrailDpdkCoremask variable must be mentioned as string within quotes.
For example: ContrailDpdkCoremask: "0x3f"
- 1707022 While deploying a DPDK compute in an RHOSP10 environment, deployment might stop due to vRouter not able to reach the controller. Restarting the corresponding vRouter and redeploying will bring the cluster back online.

- 1707049 On an RHOSP10 cluster, if provisioning fails due to mysqld going down on os-controller, restarting mysqld and redeploying completes the provisioning.
- 1707073 On an RHOSP10 provisioned cluster, VM launch might fail. Applying the patch in the following location fixes the issue:

<https://github.com/Juniper/nova/commit/a8fe392917da7a046156daa122ac99a3c1427f39>

Known Behavior in Contrail Release 3.2.3.2

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1648728 On vCenter-only, upon fresh installation with kernel 4.4.0-34, compute VM/vRouter may be down.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1664452 Ceilometer sample-list and meter-list do not work on OpenStack Liberty.
- 1673239 On a RHOSP10 cluster provisioned with Red Hat OpenStack Platform Director, the LBaaS service fails to come up if Selinux is enabled on the compute nodes. As a workaround, disable Selinux on the compute nodes.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.

Known Behavior in Contrail Release 3.2.3

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1648728 On vCenter-only, upon fresh installation with kernel 4.4.0-34, compute VM/vRouter may be down.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1664452 Ceilometer sample-list and meter-list do not work on OpenStack Liberty.
- 1673239 On a RHOSP10 cluster provisioned with Red Hat OpenStack Platform Director, the LBaaS service fails to come up if Selinux is enabled on the compute nodes. As a workaround, disable Selinux on the compute nodes.
- 1675224 VMs in non-HA cluster in SHUTOFF are in shutdown state after upgrade. As a workaround, set **resume_guests_state_on_host_boot = True** in the **nova.conf** file of the compute node, for the guest VMs to be resumed.

Known Behavior in Contrail Release 3.2.2

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1648728 On vCenter-only, upon fresh installation with kernel 4.4.0-34, compute VM/vRouter may be down.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1668271 Server Manager: Unable to log in to virtual machine console with error in nova-novncproxy.
- 1668510 For OpenStack Kilo-based deployments, while provisioning Contrail using Server Manager, disable Ceilometer provisioning. After contrail provisioning is done, if Ceilometer service is required to be running, bring up Ceilometer service separately by following OpenStack Ceilometer bring-up procedure.
- 1673239 On a RHOSP10 cluster provisioned with Red Hat OpenStack Platform Director, the LBaaS service fails to come up if Selinux is enabled on the compute nodes. As a workaround, disable Selinux on the compute nodes.

Known Behavior in Contrail Release 3.2.1

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1623695 In case of RBAC enabled clusters, user should create network-ipam in their own tenant configuration instead of using the default network-ipam for which the user doesn't have permissions.
- 1624148 In case of RBAC enabled clusters, service instance automatically created by the system on behalf of a user will not be visible in the UI.
- 1650420 In case of RBAC enabled clusters, objects created through LBaaS plugin are created with Neutron ownership.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1661426 After a Contrail software upgrade, if an upgrade of the Contrail storage packages fails, the Contrail WebUI doesn't display, because the versions of WebUI and storage are not compatible.

The workaround:

1. Comment out the following 3 lines:

```
/usr/src/contrail/contrail-web-core/config/config.global.js
```

2. Restart **supervisor-webui**. WebUI should now display, because it is not trying to display an incompatible version of storage.

3. Perform the storage upgrade, then uncomment the 3 lines, and restart **supervisor-webui**.
- 1663408 Underlay-overlay correlation: Multiple physical switches show the same vRouter.
 - 1664932 Analyser Wireshark does not decode Juniper header.
 - 1668510 For OpenStack Kilo-based deployments, while provisioning Contrail using Server Manager, disable Ceilometer provisioning. After contrail provisioning is done, if Ceilometer service is required to be running, bring up Ceilometer service separately by following OpenStack Ceilometer bring-up procedure.

Known Behavior in Contrail Release 3.2

- 1573901 Jumbo MTU setting inside a non-DPDK VM running on a DPDK compute is not supported. This leads to packets getting dropped.
- 1623695 In case of RBAC enabled clusters, user should create network-ipam in their own tenant configuration instead of using the default network-ipam for which the user doesn't have permissions.
- 1624148 In case of RBAC enabled clusters, service instance automatically created by the system on behalf of a user will not be visible in the UI.
- 1650420 In case of RBAC enabled clusters, objects created through LBaaS plugin are created with Neutron ownership.
- 1650709 DPDK is not supported in Contrail Release 3.2 for 4.4.0-34 Kernel.
- 1651258 On CentOS 7.2 HA cluster, sometimes **rabbitmq** fails after provisioning. As a workaround, re-cluster **rabbitmq** using the **fab setup_rabbitmq_cluster:force=yes** command.
- 1657393 Routes are not leaked when policy is attached to virtual networks.
- 1661426 After a Contrail software upgrade, if an upgrade of the Contrail storage packages fails, the Contrail WebUI doesn't display, because the versions of WebUI and storage are not compatible.

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- 1663408 Underlay-overlay correlation: Multiple physical switches show the same vRouter .

Resolved Issues

This section lists limitations that are resolved with this release.

- [Resolved Issues in Contrail Release 3.2.15 on page 43](#)
- [Resolved Issues in Contrail Release 3.2.14 on page 43](#)
- [Resolved Issues in Contrail Release 3.2.13 on page 43](#)
- [Resolved Issues in Contrail Release 3.2.12 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.11 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.10 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.9 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.8 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.7 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.6 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.5 on page 44](#)
- [Resolved Issues in Contrail Release 3.2.4 on page 45](#)
- [Resolved Issues in Contrail Release 3.2.3.2 on page 45](#)
- [Resolved Issues in Contrail Release 3.2.3 on page 45](#)
- [Resolved Issues in Contrail Release 3.2.2 on page 45](#)
- [Resolved Issues in Contrail Release 3.2.1 on page 45](#)
- [Resolved Issues in Contrail Release 3.2 on page 45](#)

Resolved Issues in Contrail Release 3.2.15

The following issues are resolved with Contrail Release 3.2.15.

CVE-2019-11477, CVE-2019-11478 & CVE-2019-11479, CVE-2018-12130, CVE-2018-12126, CVE-2018-12127, and CVE-2019-11091.

Resolved Issues in Contrail Release 3.2.14

You can research limitations that are resolved with Contrail Release 3.2.14 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.14.0>

Resolved Issues in Contrail Release 3.2.13

You can research limitations that are resolved with Contrail Release 3.2.13 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.13.0>

Resolved Issues in Contrail Release 3.2.12

You can research limitations that are resolved with Contrail Release 3.2.12 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.12.0>

Resolved Issues in Contrail Release 3.2.11

You can research limitations that are resolved with Contrail Release 3.2.11 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.11.0>

Resolved Issues in Contrail Release 3.2.10

You can research limitations that are resolved with Contrail Release 3.2.10 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.10.0>

Resolved Issues in Contrail Release 3.2.9

You can research limitations that are resolved with Contrail Release 3.2.9 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.9.0>

Resolved Issues in Contrail Release 3.2.8

You can research limitations that are resolved with Contrail Release 3.2.8 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.8.0>

Resolved Issues in Contrail Release 3.2.7

You can research limitations that are resolved with Contrail Release 3.2.7 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.7.0>

Resolved Issues in Contrail Release 3.2.6

You can research limitations that are resolved with Contrail Release 3.2.6 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.6.0>

Resolved Issues in Contrail Release 3.2.5

You can research limitations that are resolved with Contrail Release 3.2.5 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.5.0>

Resolved Issues in Contrail Release 3.2.4

You can research limitations that are resolved with Contrail Release 3.2.4 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.4.0>.

Resolved Issues in Contrail Release 3.2.3.2

You can research limitations that are resolved with Contrail Release 3.2.3.2 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.3.2>.

Resolved Issues in Contrail Release 3.2.3

You can research limitations that are resolved with Contrail Release 3.2.3 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.3.0>.

Resolved Issues in Contrail Release 3.2.2

You can research limitations that are resolved with Contrail Release 3.2.2 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.2.0>.

Resolved Issues in Contrail Release 3.2.1

You can research limitations that are resolved with Contrail Release 3.2.1 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.1.0>.

Resolved Issues in Contrail Release 3.2

You can research limitations that are resolved with Contrail Release 3.2 in Launchpad at:

<https://launchpad.net/juniperopenstack/+milestone/r3.2.0.0-fcs>.

Deprecated Items

The following features are scheduled to be changed in the current or forthcoming release (4.x) of Contrail. This information is provided to help your future planning.

- Service Chain v1 is deprecated in Contrail Release 3.2.
- In a forthcoming release (4.x), the Contrail controller will be distributed as a Docker container. The controller host must have Docker installed.

- In a forthcoming release (4.x), Contrail Discovery Services will be removed. Any Discovery APIs will cease to work.
- In a forthcoming release (4.x), vCenter 5.5 support will be deprecated.

Upgrading Contrail Software

Use the following procedure to upgrade an installation of Contrail software from one release to a more recent release. This procedure is valid for upgrading Contrail Release 3.0 and later to Contrail Release 3.2.



NOTE: If you are installing Contrail for the first time, refer to the full documentation and installation instructions in *Installing the Operating System and Contrail Packages*.

Instructions are given for both CentOS and Ubuntu versions. The Ubuntu versions supported for upgrading are Ubuntu 14.04.4 and Ubuntu 14.04.5.

To upgrade Contrail software from Contrail Releases 3.0 and later to Release 3.2:

1. Download the **contrail-install-packages-x.x.x.x-xxnoarch.rpm | deb** file from <https://www.juniper.net/support/downloads/?p=contrail#sw> and copy it to the /tmp directory on the config node, as follows:

```
CentOS : scp <id@server>:/path/to/contrail-install-packages-x.x.x.x-xxnoarch.rpm /tmp
```

```
Ubuntu : scp  
<id@server>:/path/to/contrail-install-packages-x.x.x.x-xx~<openstack_version>_all.deb /tmp
```



NOTE: The variables x.x.x.x-xx and so on represent the release and build numbers that are present in the name of the installation packages that you download.

2. Install the **contrail-install-packages**, using the correct command for your operating system:

```
CentOS: yum localinstall /tmp/contrail-install-packages-x.x.x.x-xx.noarch.rpm
```

```
Ubuntu: dpkg -i /tmp/contrail-install-packages_x.x.x.x-xx~_all.deb
```

3. Set up the local repository by running the **setup.sh**:

```
cd /opt/contrail/contrail_packages; ./setup.sh
```

4. Ensure that the **testbed.py** file that was used to set up the cluster with Contrail is intact in the **/opt/contrail/utils/fabfile/testbeds/** directory.

See *Setting Up the Testbed Definitions File*.

5. In release packages prior to Contrail Release 3.0, the packaged Cassandra version is 1.2.11. In the 3.0 release, the packaged Cassandra version is 2.1.9. Upgrading Cassandra from 1.2.11 to 2.1.9 directly is not supported by Cassandra. For more information, refer to [DataStax Upgrade Guide, Cassandra 2.1.x restrictions](#).

The **fab upgrade_contrail** command sequence enables upgrading Cassandra from 1.2.11 to 2.1.9 by performing necessary intermediate upgrades. Consequently, during the Contrail upgrade procedure (**fab upgrade_contrail**), the Cassandra SSTables are upgraded, which takes a long time if the Cassandra data is huge (usually because the Contrail Analytics keyspace is huge).

There is an option to minimize upgrade down time by dropping the Contrail Analytics keyspace before the upgrade, by issuing the following fab command:

fab drop_analytics_keyspace

6. Upgrade the software, using the correct set of commands to match your operating system and vRouter, as described in the following:

Change directory to the **utils** folder:

**cd /opt/contrail/utils; **

Select the correct upgrade procedure from the following to match your operating system and vRouter. In the following, *<from>* refers to the currently installed release number, such as 3.0.2.0, and so on:

CentOS Upgrade Procedure:

fab upgrade_contrail:<from>,/tmp/contrail-install-packages-x.x.x.x-xxnoarch.rpm;

Ubuntu 14.04 Upgrade, Two Procedures:

There are two different upgrade procedures for the upgrade to Contrail Release 3.2, depending on which vRouter (**3.13.0-X-generic** or **contrail-vrouter-dkms**) is installed in your current setup. Both procedures can use the command **fab upgrade_kernel_all** to upgrade the kernel.

In Contrail Release 3.2, the recommended kernel version for an Ubuntu 14.04-based system is 3.13.0-85. In Contrail Release 3.2.1, the recommended kernel version for an Ubuntu 14.04-based system is 3.13.0-110.

In Contrail Release 3.2.9, the recommended kernel version for an Ubuntu 14.04 based system is 3.13.0-142.

Use the following upgrade procedure for Contrail systems based on Ubuntu 14.04 Contrail vRouter 3.13.0-142-generic installed in the previous Contrail release. The command sequence upgrades the kernel version and also reboots the compute nodes when finished.

```
fab
install_pkg_all:/tmp/contrail-install-packages-x.x.x.x-xx~<openstack_version>_all.deb;

fab migrate_compute_kernel;

fab
upgrade_contrail:<from>,/tmp/contrail-install-packages-x.x.x.x-xx~<openstack_version>_all.deb;

fab upgrade_kernel_all;

fab restart_openstack_compute;
```

Use the following upgrade procedure for Contrail systems based on Ubuntu 14.04 with **contrail-vrouter-dkms** installed. The command sequence upgrades the kernel version and also reboots the compute nodes when finished.

```
fab upgrade_contrail:
<from>,/tmp/contrail-install-packages-x.x.x.x-xx~<openstack_version>_all.deb;
```

All nodes in the cluster can be upgraded to kernel version 3.13.0-142, by using the following **fab** command:

```
fab upgrade_kernel_all
```

7. (For Contrail Storage option, only.)

Contrail Storage has its own packages.

To upgrade Contrail Storage, download the file:

```
contrail-storage-packages_x.x.x.x-xx*.deb
```

from <https://www.juniper.net/support/downloads/?p=contrail#sw>

and copy it to the **/tmp** directory on the config node, as follows:

```
Ubuntu: scp <id@server>:/path/to/contrail-storage-packages_x.x.x.x-xx*.deb /tmp
```

Use the following statement to upgrade the software:

```
cd /opt/contrail/utils; \
```

```
Ubuntu: fab
```

```
upgrade_storage:<from>,/tmp/contrail-storage-packages_x.x.x.x-xx~<openstack_version>_all.deb;
```

Upgrading Contrail Release on Red Hat OpenStack Platform

While upgrading Contrail Release 3.2.2 to 3.2.4 or 3.2.4 to 3.2.9 in an RHOSP environment, if Red Hat OpenStack Platform Director is the sole life cycle management tool, you must

ensure that you initiate the upgrade from Red Hat OpenStack Platform Director using the following upgrade instructions:

https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux_openstack_platform/7/html/director_installation_and_usage/sect-updating_the_overcloud#sect-Updating_the_Overcloud_Packages

The upgrade commands must include the following:

```
rm -rf /var/www/html/contrail/*
sudo tar zxvf <new-contrail-image.tgz> -C /var/www/html/contrail/
openstack overcloud update
```

Minimal OS Installation

When installing an operating system in preparation for installing Contrail, install a CentOS or Ubuntu minimal distribution as desired on all servers. Typically, for CentOS this is a basic ISO install; for Ubuntu, use a core server install, with only OpenSSH and no other packages. Follow the published operating system installation procedure on the website for the selected operating system. See https://www.juniper.net/documentation/en_US/contrail3.2/topics/task/installation/install-steps-iso-vnc.html.

Installing Contrail with Kernel 4.4.0-116 on Ubuntu-14.04.5 Computes

The **upgrade_kernel_all** step while installing Contrail boots the compute kernel to the default kernel of the release. For Contrail Release 3.2, the default kernel is 3.13.0-85. To boot the compute with kernel 4.4.0-116, add “version=4.4.0-116” to the **fab upgrade_kernel_all** command as shown below:

```
fab upgrade_kernel_all:version=4.4.0-116
```

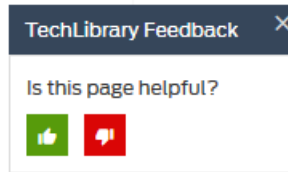
Special Character Support in Project Name Definition

While defining project names in Contrail, you can use special characters such as “\ ! # \$ % & ' () = - ~ ^ | @ ` { [; + * } < , > . / ? and _”. You cannot use “:”.

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

- Online feedback system—Click TechLibrary Feedback, on the lower right of any page on the [Juniper Networks TechLibrary](#) site, and do one of the following:



- Click the thumbs-up icon if the information on the page was helpful to you.
- Click the thumbs-down icon if the information on the page was not helpful to you or if you have suggestions for improvement, and use the pop-up form to provide feedback.
- E-mail—Send your comments to techpubs-comments@juniper.net. Include the document or topic name, URL or page number, and software version (if applicable).

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or Partner Support Service 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 <http://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://kb.juniper.net/>
- 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://kb.juniper.net/InfoCenter/>

- Join and participate in the Juniper Networks Community Forum:
<https://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <https://www.juniper.net/cm/>

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

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <https://www.juniper.net/cm/>.
- 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://www.juniper.net/support/requesting-support.html>.

Revision History

July 2019—Revision 1, Contrail 3.2.15

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