

CONTRAIL ENTERPRISE MULTICLOUD

Product Overview

Contrail Enterprise Multicloud automates the transformation of multiple independent cloud infrastructures into a seamless managed multicloud, providing full control of and visibility into all services. Leveraging the principles of SDN and network overlays, Contrail Enterprise Multicloud extends managed infrastructures from private clouds to physical network devices in data centers, cloud interconnects, WANs, and public clouds. Built on open APIs and standard protocols, Contrail Enterprise Multicloud removes the complexity of networking and automation by abstracting the operation of cloud environments, allowing users to focus on meeting mission need.

Product Description

Government IT teams are under increasing pressure to adopt multicloud architectures that allow them to deliver internal and citizen-facing application services. For most agencies, managing private cloud infrastructure is a business requirement, as data and core business applications are considered a strategic asset. However, the price of a secure, well-controlled application delivery infrastructure through a private cloud is the operational overhead required to build, manage, automate, and operate these private clouds. Additionally, as public clouds mature and adoption rates climb, many agencies are leveraging existing Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) offerings to complement their own private clouds. This has led to a growing disconnect between internally-owned core business assets and applications running in the agency data centers, and the purpose-built application-specific environments offered by public cloud providers, completely independent of their internal IT/cloud department. IT users expect these heterogeneous infrastructures—whether physical or virtual, internal or third-party hosted—to be completely automated so they can focus on their core business applications and services. Their objective is to migrate from a traditional mode of operations for their cloud environments to a more mission-centric view of the multicloud without having to rip and replace their existing physical infrastructure. This may impose considerable costs for the equipment and mission-critical applications, as well as a need for operational expertise.

Juniper® Contrail® Enterprise Multicloud addresses these challenges with a holistic programmatic approach for the various cloud infrastructures: private clouds with data center devices, servers, and hypervisors with physical and virtual compute platforms; public clouds managed by the cloud provider; and wide area networks interconnecting private and public cloud environments. Contrail Enterprise Multicloud manages these disparate infrastructures as a unified fabric. Users can create application-to-application networking services (also known as overlays) and manage them all as a single seamless cloud, monitoring their performance and behavior and automating their delivery with point-and-click simplicity. Contrail Enterprise Multicloud follows a pure software-defined approach that spans physical or virtualized public and private cloud infrastructures, providing Network as a Service (NaaS) for workloads running on physical, virtualized, or containerized form factors in any cloud environment. Contrail Enterprise Multicloud integrates with widely used orchestration tools such as OpenStack, Kubernetes, Mesos, OpenShift, and VMware cloud management systems, as well as popular DevOps tools like Ansible and Helm. It unifies the semantics and policy automation capabilities of application-to-application networking independent of the cloud environment using a common and consistent data model for overlay services/policies while employing cloud-specific language to program and control the network.

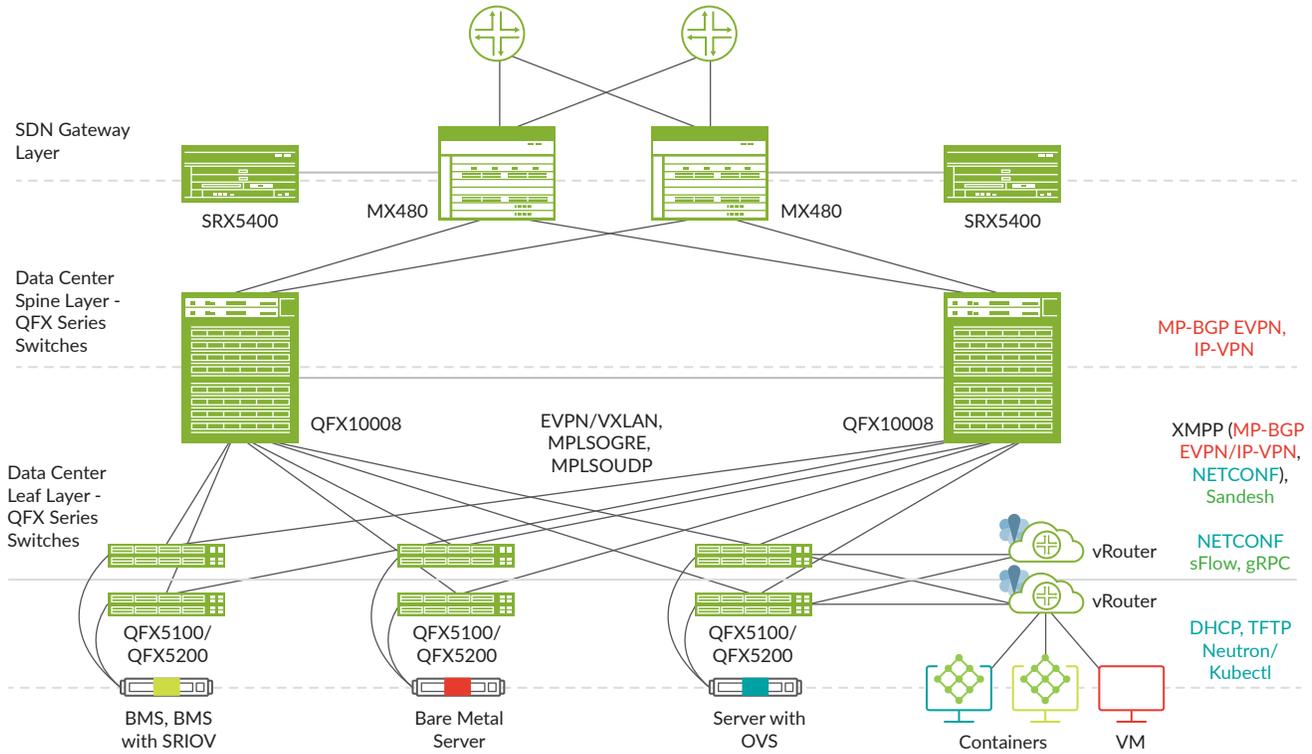


Figure 1: Contrail Enterprise Multicloud as a fabric management and SDN overlay for data center infrastructure.

Architecture and Key Components

Contrail Enterprise Multicloud is built using the following components:

- Juniper Contrail Networking™, including Contrail vRouter for running virtualized/containerized workloads in a compute environment; fabric management (device, physical network function/virtual network function management) on fabric and overlay configurations on devices; and managing public clouds to deploy and manage Contrail vRouter as a VPC virtual gateway or as a compute platform in Amazon Machine Interface (AMI).
- Juniper AppFormix® analytics package to collect, correlate, and visualize information related to infrastructure and overlay usage within and across cloud environments.
- Contrail Command, a simple UI designed to make cluster, infrastructure, public cloud, and overlay management, as well as analytics and troubleshooting, intuitive and easy.
- Compatible with orchestration platforms such as Kubernetes, OpenShift, Mesos, OpenStack, VMware vSphere/vRealize operations. Integrations are built, certified, and tested working in conjunction with technology alliance partners such as Red Hat, Mirantis, Canonical, NEC, and others. Contrail Networking sits under these orchestration systems and integrates northbound via published REST APIs.

Features and Benefits

Key Features

- **Open and customizable:** Contrail Enterprise Multicloud uses open, standard, and mature protocols and data models. Device operations are based on Ansible playbooks that users can clone or customize, as needed. Users do not need to wait for release upgrades to benefit from customization; the ability to assign roles to devices and network functions makes Contrail a perfect fit for any deployment scenario or architecture.
- **Standards-based fabric management:** Contrail Enterprise Multicloud leverages mature standards and protocols such as BGP EVPN/VXLAN to normalize data center and fabric operations. Through customizable roles, users can decide where and when to implement different network virtualization overlay architectures (CRB, ERB, Ethernet, IP).
- **Support for Day 0 operations:** Contrail Enterprise Multicloud discovers and imports data center devices, servers, appliances, and public cloud tenants. Both greenfield and brownfield device life cycles are supported.
- **Data center software upgrades through a single pane of glass:** Contrail Enterprise Multicloud reduces data center device outages related to software upgrades by managing upgrade rollouts through a single pane of glass

- **Server life-cycle management:** Contrail Enterprise Multicloud supports server life-cycle management by integrating components such as Ironic, Glance, switch for server PXE boot, and image management.
- **Multitenant networking service management across all workloads:** Contrail Enterprise Multicloud supports consistent overlay services using EVPN and Virtual Extensible LAN (VXLAN) (L2, L2/L3, L3) across all workload types, whether virtual machines or containers running on vRouters, bare-metal servers, or other hypervisor platforms. Depending on the cloud infrastructure and workload type, Contrail automates the delivery of networking services by applying configurations and through consistent route leaking using overlays.
- **High availability:** Contrail components are highly available and offer active/active redundancy. High availability is extended to workloads in the data center, leveraging active/active server multihoming.
- **Analytics services:** Insightful visualization and diagnostics of virtual overlay and physical underlay networks enable real-time and historical infrastructure analytics that can be consumed through REST APIs or Apache Kafka. Users can also very easily set up live packet captures of traffic between virtual networks using built-in GUI features.
- **API services:** REST APIs for configuration, operation, and analytics provide seamless integration with popular or customized orchestration systems. This includes AWS VPC API compatibility for seamless deployment of applications in a hybrid cloud platform.

Key Benefits

- **High scale and performance:** Contrail is field-proven, deployed in some of the world's most massive data center clouds.
- **Unified multicloud policy:** In order to achieve one IT platform, there must be functional and nonfunctional similarity between application platforms in both private and public clouds. Contrail Networking is an excellent choice as a multicloud automation solution for implementing private cloud with software-defined infrastructure. It can also be deployed in any cloud—private or public—to create environmental parity, maximizing DevOps automation and application portability within the hybrid cloud platform.
- **Seamless integration:** Contrail has been integrated, tested, and certified with a wide variety of software for orchestration, automation, operating systems, and virtualization or containerization. Contrail also interoperates with industry-standard routing and switching systems to bridge overlay virtual networks to any other networks you have.

Key Functionality

- **Open source, open standards for seamless interoperability:** Contrail Enterprise Multicloud eliminates the need to rip-and-replace by supporting standards-based protocols, enabling interoperability in a multivendor physical infrastructure to maximize investment protection. It supports open standard interfaces for configuration control and management (NETCONF/RPC), using Ansible playbooks; REST/HTTPS APIs; XMPP), routing (BGP, BGP IP-VPN, and BGP EVPN for routing control); forwarding (VXLAN with EVPN control plane, MPLSoUDP, MPLSoGRE, plain IP, IP over IPsec); and analytics (JTI, OpenConfig, SNMP, sFlow, J-Flow, gRPC, system logging).
- **Network virtualization:** Contrail Enterprise Multicloud provides a robust network virtualization solution by leveraging the EVPN/VXLAN and L3VPN standard for Ethernet/ IP overlays. The virtual network segments provide a clean approach to microsegmentation and multitenancy, and alleviate the challenges associated with a VLAN-based or L2-based segmentation approach. Contrail allows network virtualization overlays to be extended across cloud infrastructures by using a common, consistent network model for overlays in all cloud environments, whether a data center fabric on a set of vRouter computes, or in a public cloud.
- **Public cloud management:** For public clouds, Contrail Enterprise Multicloud manages the tenant/virtual private cloud (VPC) as a fabric “ready for service,” where the underlay infrastructure is managed by a third party. There are many options for leveraging the public cloud as a remote cloud infrastructure, and Contrail Enterprise Multicloud supports all of them. Contrail automates both the infrastructure (transport and routing) as well as the overlays (workloads and services). Public clouds can be “plain vanilla” VPCs (with no Contrail software component); they can leverage Juniper software (such as Contrail vRouter, vSRX, or vMX) as the virtual gateway; or they can be used as a cloud-hosted infrastructure where a Contrail Enterprise Multicloud cluster provides overlay networking services between public cloud instances.
- **Network programmability and automation:** Contrail Enterprise Multicloud implements the concept of “intent compiler” by translating abstract high-level workflows into specific rules/policies to automate the provisioning of workloads and enable network and security service chaining. For example, you can request workload-to-workload connectivity without getting into details about underlying elements like ports, VLANs, subnets, switches, routers, etc. In addition, a unified model for configuration, operation, and analytics is exposed through REST APIs, as

well as libraries in various programming languages such as Python, Go, Javascript, and Ansible.

- **Infrastructure analytics and visualization:** Contrail Enterprise Multicloud leverages AppFormix to provide insights into different cloud infrastructures and the overlay services running across clouds, simplifying operations and decision making through proactive planning and predictive diagnostics. The analytics engine is designed for very large-scale ingest and querying of structured and unstructured data. It is exposed using REST APIs and a GUI-based query engine.

Contrail Enterprise Multicloud Use Cases

Contrail Enterprise Multicloud offers a dynamic and easy to use solution that allows agencies to automate their cloud infrastructures, as well as the services delivered through them. The most common use cases are:

- Automation of a data center build-up or scale-out in just minutes:
 - Discover, import, and configure newly added devices so that you can start delivering services through them
 - Remove the complex, error-prone operations of data center device configurations-
 - Gain visibility into how the data center infrastructure is performing, and how customers are being served

- Automate services across clouds:
 - Connect data centers to each other or to clouds with no human intervention
 - Seamlessly move workloads between clouds (across data centers, data center to private clouds, and vice versa)
 - Visualize how each infrastructure is being used to predict and estimate cost of operations
- Speed-up BMSaaS offering:
 - Automate BMS life-cycle management (and associated device configurations) so you can deliver BMSaaS efficiently and quickly
 - Visualize server and network device traffic and predict scale-out needs to anticipate the demand

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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