



JUNIPER NETWORKS-NETCRACKER SD-WAN SOLUTION

Combining automation with a new digital experience

Challenge

Traditional connectivity requires greater bandwidth and on-demand availability to support the high number of enterprise applications in the cloud. As enterprises seek alternative solutions, service providers must act fast to retain and grow market share.

Solution

Working together, Juniper and Netcracker deliver a full-stack SD-WAN solution that allows service providers to create real value from SD-WAN. This powerful technology combination enables faster time to market and competitive service offerings for a superior digital user experience.

Benefits

- Faster time to market with proven on-cloud hosting solutions ready in up to 12 weeks
- Lower fulfillment, operations, and integration costs through automation, end-to-end orchestration, and integrated OSS/BSS
- Higher revenue with fully automated lead-to-cash business processes
- Lower risks with fully integrated security
- Quick, automated migration strategy using Netcracker's Business Cloud

As more enterprises move their applications and platforms to multicloud environments, they are finding that there is a pervasive need to modernize the WAN to be more scalable, secure, and application-aware. Likewise, service providers need to transform their traditional MPLS-based businesses into higher-value, lower-cost, and on-demand software-based service delivery systems that provide a foundation for introducing new value-added services.

The use of SD-WAN technology will accomplish these goals, transforming connectivity for enterprise applications. With automation intelligence and application awareness, SD-WAN can deliver connectivity solutions faster and reduce operating costs, while ensuring the highest levels of security and service-level agreement (SLA) compliance.

The Challenge

Enterprise customers are increasingly using private and public clouds to host their applications, requiring them to modernize their WAN connectivity. They want the ability to use connectivity options such as MPLS, Internet, xDSL, and 4G/LTE, enjoying the same experience afforded by more traditional solutions. And they want to define service-level agreement (SLA) policies for their applications while keeping their traffic secure on top of a resilient network. This scenario presents service providers with the following challenges:

- Complex management of different connectivity options
- Prolonged time to connect branches and virtual private clouds
- Complex VPN segmentation deployment and operations
- Excessively high OpEx
- Limited visibility into and control over user and application policies/SLAs
- Lack of control over and management of on-demand bandwidth
- Lack of IT expertise at customer site locations
- Need for additional onsite visits to update existing or add new services

Traditional deployment approaches not only result in long wait times for customers and higher operational costs for service providers, they are also subject to human errors. Customers expect quick service delivery and want to manage their services via self-service portals. They also want to apply strict SLAs to critical applications, with the ability to automatically reroute traffic in case link conditions deteriorate or fail completely.

SD-WAN technology simplifies service assurance and offers reliable engineering through visibility, analytics, and automation. To complete the SD-WAN solution, service providers must complement the technology with integrated security, GUI-based management, E2E orchestration and reporting tools, redundancy and failover capabilities, and zero-touch provisioning (ZTP) features.

For some service providers, SD-WAN poses a potential threat to their managed services revenue as increased competition in a maturing, commoditized market—from lower-cost Ethernet-based services and even basic Internet access—is placing pressure on MPLS prices. However, these service providers can turn this threat into an opportunity to offer new network services such as advanced security or onboarding third-party multivendor stacks, while expanding their footprint to reach more customers.

Service providers implementing SD-WAN face the following challenges:

- Deploying SD-WAN as a new technology is highly complex.
- Customers are not waiting for service providers, going directly to vendors or doing it themselves, placing time-to-market pressure on service providers.
- Service providers lack the ability to incorporate multivendor virtualized network function (VNF) applications themselves.

The Juniper Networks-Netcracker SD-WAN Solution

Juniper Networks and Netcracker have combined Juniper’s security, networking, and automation strengths with the orchestration and advanced business support system (BSS) expertise of Netcracker to deliver a truly integrated and automated end-to-end SD-WAN solution that allows service providers to fulfill their business customers’ expectations.

Juniper provides the customer premises equipment (CPE) and hub/gateway solutions as well as the SD-WAN controller. Juniper Networks® SRX Series Services Gateways and vSRX Virtual Firewall, as well as Juniper Networks NFX Series Network Services Platform, are used as SD-WAN CPE elements. Additionally, the SRX Series and vSRX, along with Juniper Networks MX Series 5G Universal Routing Platforms, are used as SD-WAN Operation, Administration, and Maintenance (OAM)/data hubs as well as gateways (SRX Series or vSRX). Finally, Juniper’s Network Service Controller—a component of Juniper Contrail® Service Orchestration—serves as SD-WAN controller, responsible for CPE life-cycle management, ZTP, and connectivity and route management.

This solution is orchestrated and monetized through Netcracker’s Business Cloud solution, which includes Network and Service Orchestration, VNF License Management, a unified Self-Service Portal, a Digital Marketplace, and integration with the service provider’s operations/business support systems (OSS/BSS) environment. Through a Self-Service Portal, customers can define services on demand as well as service

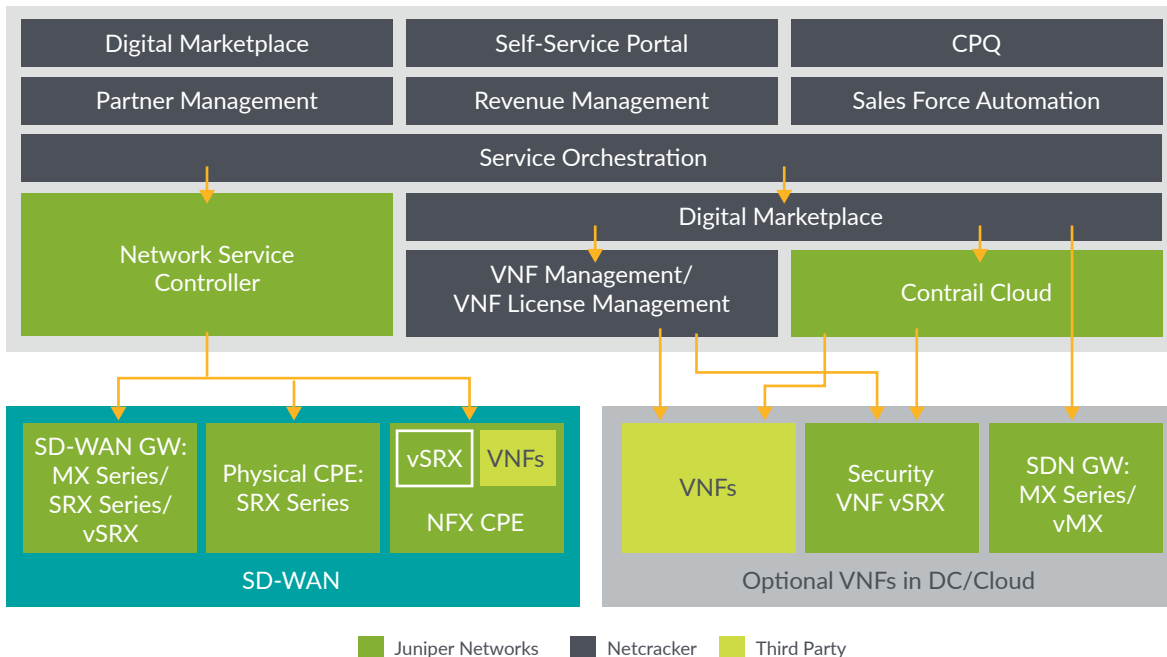


Figure 1: SD-WAN joint solution architecture

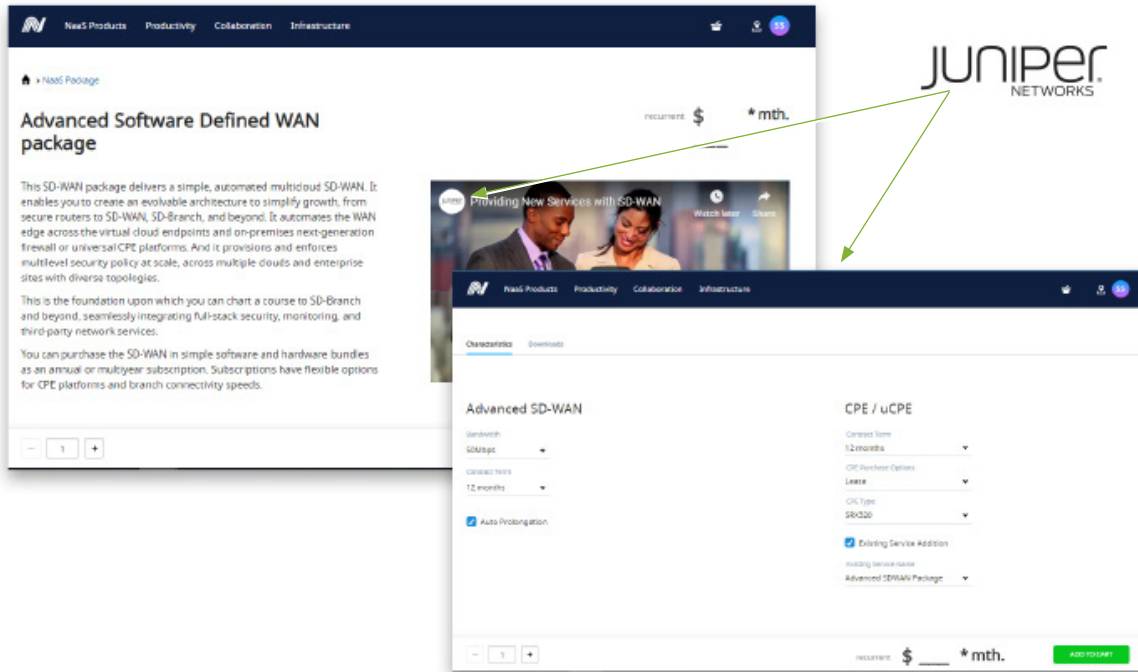


Figure 2: SD-WAN joint solution—Netcracker Digital Marketplace

SLAs, controlling and managing services with access to network topology, branches, and device lists as well as different VPN and Internet traffic statistics, WAN usage, and security information.

The Service Orchestrator manages the end-to-end solution over all physical and virtual components, sending execution tasks to the Network Service Controller through REST APIs and templates. The Network Service Controller automates the configuration of SD-WAN services (via ZTP) and performs service monitoring; customers can later add valuable new services such as application firewall, antivirus, antispam, application quality of service (QoS), dual WAN, application-aware routing, Web/content filtering, and so on. Through the Network Service Controller, it is also possible to enable service chaining with third-party VNFs in universal CPEs such as the NFX Series platforms.

As SD-WAN evolves to include additional third-party VNFs, Netcracker offers an ETSI MANO-compliant Network Orchestration and VNF Management. Third-party VNFs can be onboarded centrally in a data center (powered by the award-winning Juniper Contrail Cloud solution) or distributed via universal CPE platforms such as the NFX Series.

Netcracker also offers a catalog-driven Digital Marketplace featuring configuration, pricing, and quotation (CPQ) capabilities. This e-commerce platform enables service providers to monetize Juniper and third-party VNFs as well as third-party cloud and IoT applications.

Features and Benefits

- **Faster time to market:** Customers can choose between proven, pre-integrated on-cloud or on-premises hosting models. The on-cloud hosted solution can be delivered in just 12 weeks.
- **Lower OpEx:** Provisioning and life-cycle management automation (including ZTP) reduce deployment costs for site visits and specialist technical resources. It also reduces delays related to human intervention. Link switchover due to SLA degradation protects customer-critical applications automatically; the customer has simple, direct access to statistics and alarms via self-service portal.
- **New revenue generation:** This joint solution offers new services such as basic or advanced security (including new next-generation firewall with unified threat management options), as well as additional VNFs, cloud, and IT applications for a portfolio of services.
- **New markets:** Service providers can expand their off-net market with a flexible CPE portfolio and secure connectivity.
- **Differentiated digital user experience that protects the customer base and creates stickiness:** The joint solution de-risks connection services by enhancing their value with support for multiple connection types and locations. The environment can be customized based on customer needs, driving up average revenue per user.

- **Reduced risk of implementing end-to-end cloud solution:** Juniper and Netcracker deliver a fully integrated solution, from the customer self-service portal down to the CPEs and VNFs, including integration with critical OSS/BSS components.

The solution supports both hub-and-spoke and full-mesh topologies and includes all Juniper SD-WAN features such as multitenancy, multihoming, high availability and dual-CPE, dynamic path selection, application visibility, integrated L7 security and unified threat management (UTM), multicloud access, and third-party VNF integration.

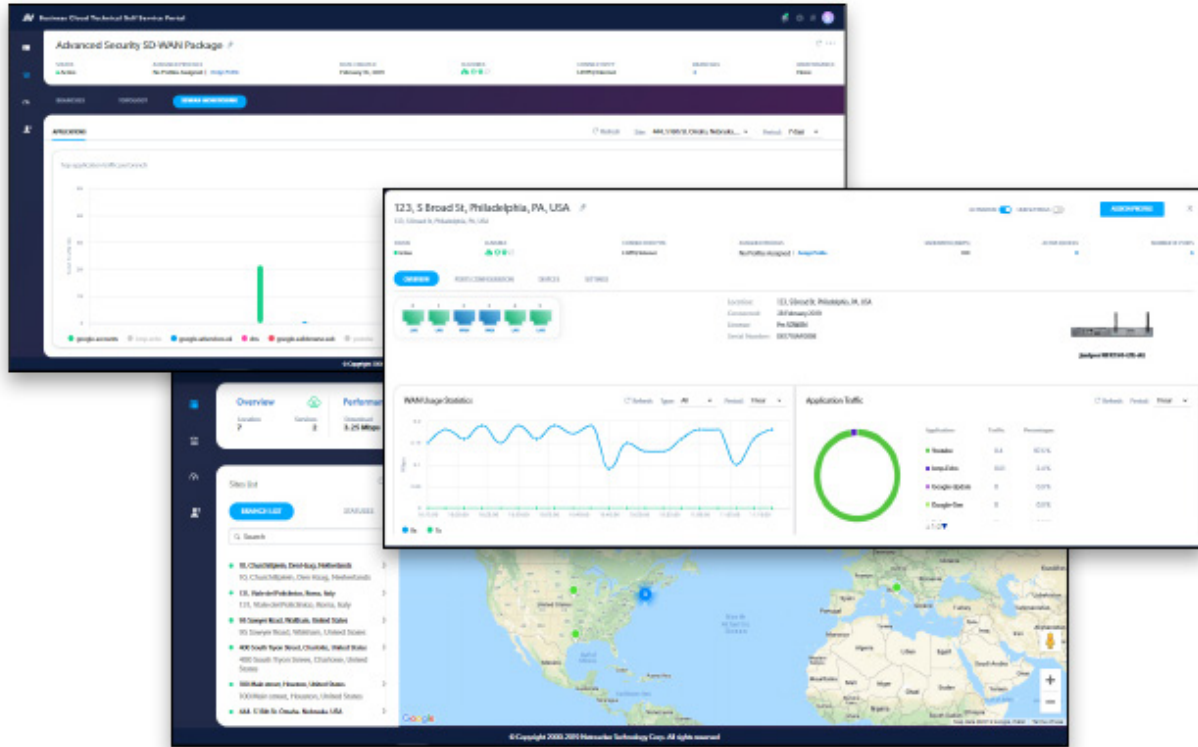


Figure 3: SD-WAN joint solution—Netcracker Self-Service Portal

Solution Components

Components	Description
Juniper Network Service Controller	SD-WAN controller, responsible for CPE life-cycle management including ZTP and configuration, connectivity management, and route management.
Juniper Networks NFX Series Network Services Platform	Secure, software-driven, on-premises CPE platform capable of supporting multiple VNFs, including the Juniper Networks vSRX Virtual Firewall.
Juniper Networks SRX Series Services Gateways	High-performance firewalls that serve as both edge CPE device (spoke) and hub or gateway. The SRX Series provides scalable, secure, and easy-to-manage connectivity with integrated next-generation firewall and UTM capabilities.
Juniper Networks vSRX Virtual Firewall	High-performance security gateway commonly used as a next-generation firewall for securing virtualized and cloud environments. Can be used as a virtual branch router as well as a VNF for value-added security services such as Web filtering, antivirus, and deep-packet inspection. The vSRX can also be used as an SD-WAN spoke, hub, or gateway. As a spoke element, the vSRX can be deployed in public clouds such as AWS and Azure.
Juniper Networks MX Series 5G Universal Routing Platforms	Revolutionary carrier-grade routing for enterprise and service provider networks. In an SD-WAN topology, MX Series routers can be used as a hub.
Netcracker Service Orchestration	End-to-end service orchestration that provides smooth integration of virtual environment and existing infrastructure, tying together all the pieces—existing BSS/OSS, MANO, and SDN controllers. Service orchestration allows for cross-domain service life-cycle management across all hybrid network domains, including legacy networks, SDN networks, cloud, and NFV Infrastructure (NFVI) environments.
Netcracker NFV Orchestration	ETSI MANO-compliant NFV orchestrator that supports multivendor VNF onboarding and end-to-end life-cycle management. Responsible for managing virtualized network services life cycle, namely orchestrating network services components (VNFs, connectivity) within designated NFVI domains.
Netcracker VNF Management	Generic, ETSI-compliant VNF manager, responsible for initiating necessary VNF onboarding and creating initial configurations via the VNF manager. Designed to support onboarding of third-party VNFs using YANG description.

Components	Description
Netcracker VNF License Management	Centralized virtual service activation, termination, assignment, and reservation functions. Communication service providers (CSPs) can manage virtual services from multiple vendors, automating the VNF life cycle and avoiding service outages from expired licenses.
Netcracker Digital Marketplace	Centralized product catalog with portal-driven shopping experience offering well-governed partner ecosystem digital products. Also supports licensing automation, services life-cycle management, and revenue management.
Netcracker Self-Service Portal	Cloud-based unified customer portal that provides self-service capabilities including service ordering, service administration, and service monitoring.
Netcracker Revenue Management	Real-time converged platform that monetizes innovative new services, optimizes customer experience, and provides a foundation for business agility. This next-generation solution provides all capabilities required to enable multidimensional convergence across different types of subscribers, networks, and services, and supports complex supply and value chains.
Netcracker Partner Management	Solution that simplifies and automates the entire partner life-cycle management process, including end-to-end partner life-cycle management, agreement management, and reliability tracking.
Netcracker Configure Price Quote	Comprehensive functionality and a user-friendly UI to ensure smooth quotation management. Pre-integration with the product catalog and order processing engine allows for ZTP and activation of purchased services and products.
Netcracker Salesforce Automation	An offering that facilitates the service provider's sales management and operations processes with sales plans and pipeline tracking tools, commissions management, and quota management capabilities.

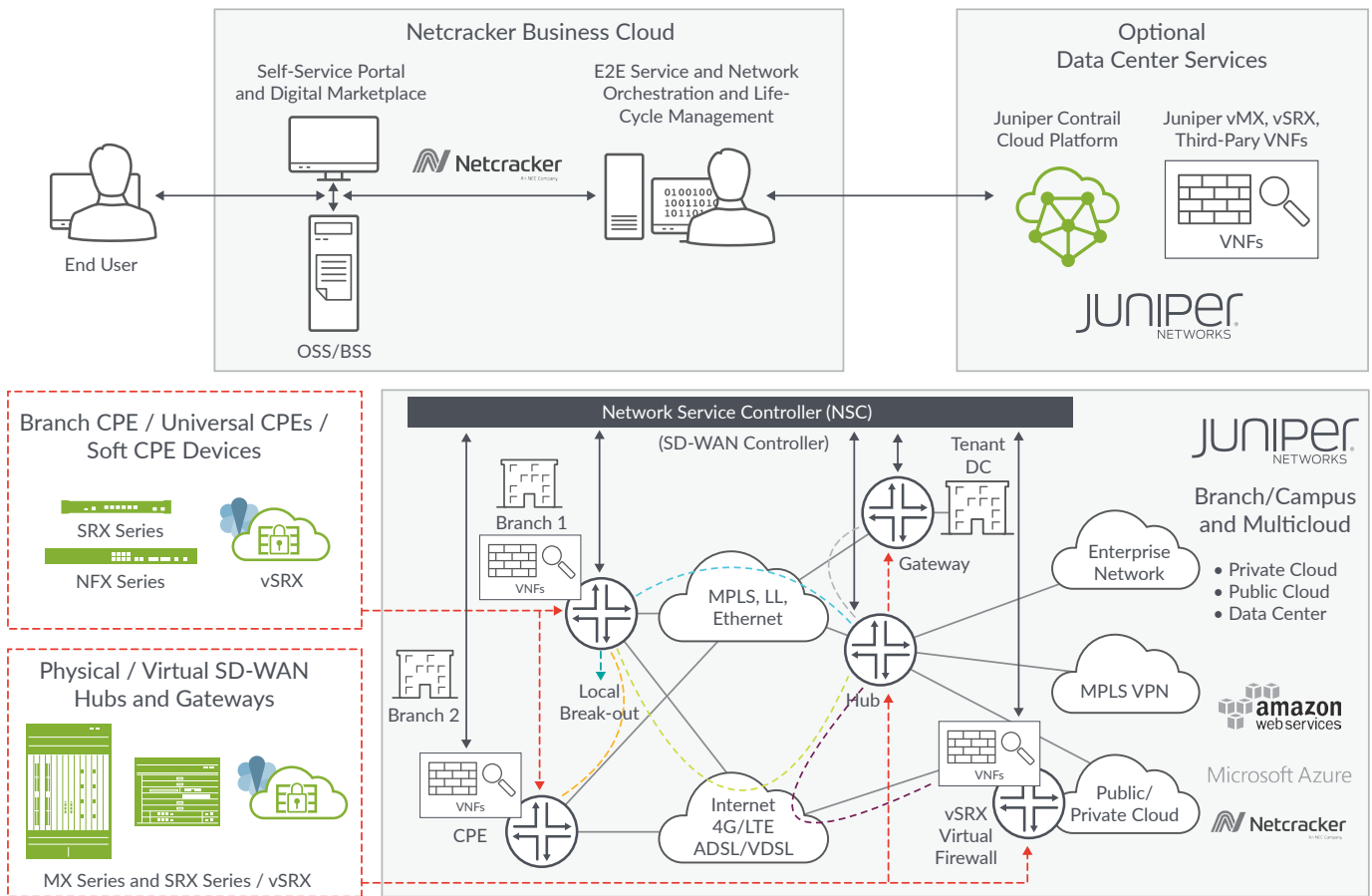


Figure 4: SD-WAN joint solution scenario

Optional Components in a Central Data Center or in the Cloud

Additional optional components complement the primary elements to create a more complete solution.

Components	Description
Juniper Contrail Cloud	Contrail Cloud delivers an integrated solution of Contrail SDN controller with Red Hat Open Stack Suite, both of which have been tested and integrated into the solution.
Juniper Networks vMX Virtual Router	The revolutionary carrier-grade vMX Virtual Router for enterprise and service provider networks can be used as a gateway between physical and virtual networks. Physical MX Series platforms, listed above, can also be used in this role, allowing service providers to leverage existing investments.
Juniper Networks vSRX Virtual Firewall	This high-performance security gateway, commonly used as a next-generation firewall for securing virtualized and cloud environments, can also be used as a VNF for value-add security services such as Web filtering, antivirus, and deep-packet inspection.

Summary

By choosing the full-stack SD-WAN solution from Juniper Networks and Netcracker, enterprises and service providers gain the agility and flexibility provided by an automated application-aware WAN solution controlled by a cloud architecture—all delivered through best-of-breed components that have been integrated into an end-to-end-solution.

Next Steps

For more information, please contact your Juniper Networks or Netcracker representative.

About Netcracker

Netcracker Technology, a wholly owned subsidiary of NEC Corporation, is a forward-looking software company, offering mission-critical solutions to service providers around the globe. Netcracker's comprehensive portfolio of software solutions and professional services enables large-scale digital transformations, unlocking the opportunities of the cloud, virtualization, and the changing mobile ecosystem. With an unbroken service delivery track record of more than 20 years, Netcracker's unique combination of technology, people, and expertise helps companies transform their networks and enable better experiences for their customers.

For more information, please visit www.netcracker.com.

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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