

# Visualize Your Hybrid WAN with ThousandEyes for Juniper Cloud CPE

Gain visibility into network performance and application delivery across your changing hybrid WAN

## Challenge

Business-critical applications are rapidly shifting to hybrid WAN and cloud environments. With the application experience growing more dependent on network performance, network engineering teams need enhanced visibility to troubleshoot and plan effectively.

## Solution

Juniper automates service delivery with a scalable, carrier-grade Cloud CPE solution that, combined with ThousandEyes network intelligence, provides deep insights into internally hosted and SaaS applications traversing wide area networks and the Internet.

## Benefits

- Automated VNF provisioning and monitoring replaces time-consuming truck rolls with simple mouse rolls.
- Embedded vSRX Virtual Firewall provides edge-to-edge encryption to protect data in transit.
- Visibility into Internet and WAN topologies, as well as critical traffic paths, allows users to quickly locate and find root causes of DNS, BGP, MPLS, and IP service delivery issues.
- Live data sharing to internal and external teams reduces meantime to repair (MTTR).

Enterprise networks are changing rapidly. Hybrid cloud models, data center consolidation, and software-defined WANs are evolving. The popular adoption of Software as a Service (SaaS) and unified communications (UC) technologies such as Office365, Skype for Business, and Salesforce is putting a strain on the network. With all of this change, network operations teams are losing visibility into how network performance impacts service delivery and the user experience.

Juniper Networks® Cloud CPE solution with ThousandEyes provides network intelligence to both WAN and Internet segments, supporting diverse application flows and network architectures. Network intelligence provides insights into both application and network layers, giving enterprises the visibility they need to understand service delivery. With easy deployment on Juniper Networks NFX250 Network Services Platform, the ThousandEyes solution provides insight into service topology and performance across the enterprise WAN, whether connected by MPLS, VPN, or direct Internet access. With this powerful joint solution, you can pinpoint problems, accelerate root cause analysis, and effectively monitor your changing hybrid network.

## The Challenge

Customer premises equipment (CPE) is essential to most managed service delivery models. However, CPE deployment is a time-consuming and manual process. Devices must be shipped to each location, where they have to be configured and provisioned with a complex and manual set of steps that require highly specialized skills. Any additional functionality requires new hardware, while ongoing maintenance and operations contribute their own unique challenges. In short, the order and fulfillment process is not compatible with the speed at which businesses must operate.

Network Functions Virtualization (NFV) technologies have broken down many of these barriers, revolutionizing the managed service delivery and life cycle operation. Enterprise customers can choose from a wide variety of innovative and customized services, available on demand. Thanks to NFV, service providers and enterprises are less dependent on rigid, physical-only network infrastructure, manual workflows, and service silos, making them more relevant to their customers. NFV empowers service providers with a more software-centric approach to service delivery, accelerating innovation that ultimately increases competitiveness, revenue, and profitability.

## The Juniper Networks-ThousandEyes Cloud CPE Solution

Juniper Networks Cloud CPE solution is the industry's most dynamic service creation platform. It automates service creation and simplifies the service life cycle, enabling service providers to quickly conceive and create highly customizable services in just minutes. Service performance capacities can be dynamically updated, improving the scalability and flexibility of managed services.




Working together, the Cloud CPE solution and the ThousandEyes solution deliver a network intelligence platform for wide area and Internet-centric networks. This joint solution easily visualizes and isolates network problems hop-by-hop from a branch office or data center within the enterprise network. It also extends visibility across the Internet to hosted data centers and cloud-based applications.

The ThousandEyes solution easily deploys on NFX250 Network Services Platform branch routers, providing monitoring vantage points throughout the WAN. Juniper Networks Contrail® Service Orchestration automates the provisioning, operations, and management of virtualized network functions (VNFs), enabling rapid instantiation of a service chain that combines ThousandEyes VNFs with Juniper Networks vMX Virtual Routers and vSRX Virtual Firewalls.

The Cloud CPE solution is based on an open-standard framework that is easily integrated into existing operations and business support systems (OSS/BSS), providing an open ecosystem supporting best-in-class third-party VNFs.

## Features and Benefits

### Security

The Juniper Networks Cloud CPE solution features vSRX—the industry’s highest performing virtual firewall (up to 100 Gbps)—to provide scalable, secure protection across the network. The vSRX serves as an advanced programmatic platform in a single VNF instance for scale-up and scale-out growth. With the built-in service design capabilities of Contrail Service Orchestration, the vSRX can be easily configured to support a myriad of security applications, including next-generation firewall, Network Address Translation (NAT), path performance monitoring, dynamic application-based routing, application detection, intrusion prevention system (IPS), content filtering, antivirus, and unified threat management (UTM).

### Revenue Growth

Unlike traditional managed CPE solutions, where service deployment is a lengthy and manual process, the Cloud CPE solution drastically shrinks new service delivery time from months to just minutes. This frees service providers to adopt a fast-fail approach toward service creation with very little risk, introducing customized services and a potentially rapid path to revenue for innovative new services and target segments.

### Reduced Operational Expenditure

The Cloud CPE solution reduces OpEx by adopting automation along with centralized service management and orchestration. Automation improves all facets of the service life cycle, simplifies operations, and eliminates extensive manual processes such as provisioning, configuration, equipment installation, service delivery, and back-end database administration.

### Deployment Flexibility

Business requirements often change to reflect market dynamics. The Cloud CPE solution lets service providers react and respond to these changes in near real time, quickly moving from a one-size-fits-all model to a highly personalized reactive model that transforms service providers into a trusted partner. ThousandEyes VNF can be deployed in a distributed virtual deployment on a Juniper NFV deployment or on a physical appliance to peer with the NFX250 NFV instance at the far end.

### Reliability

The Cloud CPE solution enables highly dynamic multi-deployment models with Zero Touch Provisioning (ZTP) and management, accelerating remote and branch office deployments. End-to-end visibility into network performance enables proactive detection and maintenance of application performance on the premises or in the cloud.

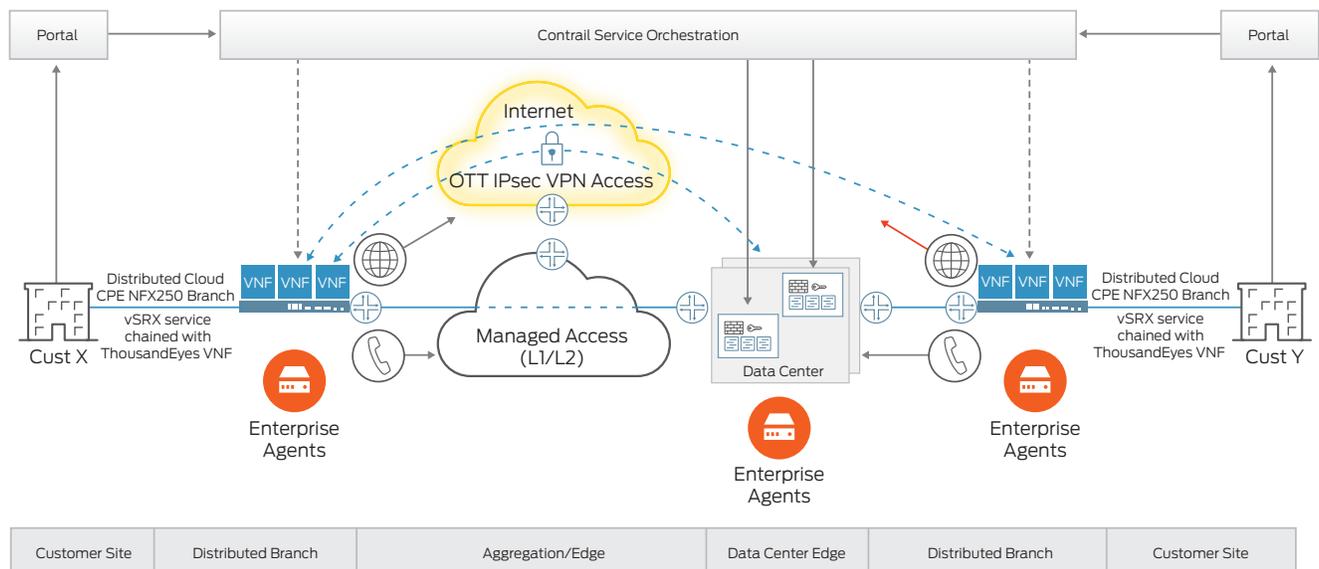


Figure 1: ThousandEyes Enterprise Agents, installed on NFX250 branch routers, provide WAN visibility.

The combination of NFX250 branch routers and ThousandEyes monitoring for the WAN gives operations teams:

- Visibility into the network health and traffic paths across WANs and Internet segments
- Metrics for loss, latency, jitter, and available bandwidth that identify problem network owners and interfaces
- Insight into MPLS networks and connectivity to branch offices
- Automated Internet outage detection using global performance data
- Reports on connection errors and timing for HTTP, FTP, SIP, and RTP-based critical applications
- The ability to perform root-cause analysis of issues relating to Domain Name System (DNS) availability, BGP routing, HTTP servers, IP forwarding, and maximum transmission unit (MTU) misconfigurations

## Solution Components

Juniper Networks Cloud CPE solution revolutionizes traditional managed services, overcoming the challenges associated with service deployment, management, and evolution by simplifying and automating customizable service creation and delivery from a comprehensive, vertically integrated, open NFV solution. The Cloud CPE multi-deployment solution supports flexible deployment models with unprecedented scale for expanding onsite and scaling up in the cloud with advanced routing, comprehensive security capabilities, and an open ecosystem for additional third-party VNFs. By focusing on simplified service creation, automated service delivery, and an open framework supported by a highly scalable end-to-end NFV solution, the Cloud CPE solution enhances network performance, lowers costs, and delivers differentiated services that elevate customer satisfaction and ultimately lead to increased profitability.

ThousandEyes complements the Juniper Networks Cloud CPE solution by monitoring WANs and the Internet using active monitoring. By sending test traffic from a variety of sensors or agents, ThousandEyes measures network performance and maps out network topologies. These agents craft HTTP, FTP, RTP, SIP, TCP, UDP, and Internet Control Message Protocol (ICMP) packets to monitor a variety of services and metrics. ThousandEyes

has Enterprise Agents for fixed locations throughout the WAN, Endpoint Agents for end-user devices, and Cloud Agents for Internet vantage points.

- ThousandEyes SaaS platform collects all performance data and makes it available via UI, API, alerts, and reports.
- ThousandEyes Enterprise Agents are installable on NFX250 Network Services Platform branch routers, as well as on servers supporting Docker, ESXi, Hyper-V, Linux, and Windows Server.

## Summary—Get Complete Visibility into Your Hybrid WAN

With changing WAN architectures, network operations teams need to be able to monitor performance and troubleshoot network problems wherever they occur. The integrated solution from Juniper Networks and ThousandEyes addresses this challenge, providing comprehensive network visibility across the corporate WAN and the Internet required to ensure performance of critical applications.

### Next Steps

For more information about Juniper Networks Cloud CPE solution, please contact your Juniper representative, or go to [www.juniper.net/us/en/solutions/nfv/cloudcpe/](http://www.juniper.net/us/en/solutions/nfv/cloudcpe/).

### About ThousandEyes

ThousandEyes is a network intelligence platform that delivers visibility into every network an organization relies on, enabling them to optimize and improve application delivery, end-user experience, and ongoing infrastructure investments. More than 40 members of the Fortune 500 use ThousandEyes to improve performance and availability of their business-critical applications and network infrastructure.

### About Juniper Networks

Juniper Networks challenges the status quo with products, solutions and services that transform the economics of networking. Our team co-innovates with customers and partners to deliver automated, scalable and secure networks with agility, performance and value. Additional information can be found at [Juniper Networks](http://Juniper Networks) or connect with Juniper on [Twitter](https://twitter.com/juniper) and [Facebook](https://facebook.com/juniper).

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