JUNIPER CLOUD METRO AS THE EXPERIENCE SENSOR

Improve service quality by embedding active service assurance into the network

Challenge

To improve service quality and reduce costs, network operations teams must pivot from focusing on the infrastructure to actively measuring service quality over the data plane. When they do that, they can validate service levels and make sure the network meets customers' service quality needs.

Solution

With the enhanced active testing and monitoring functionalities in Juniper Cloud Metro platforms, organizations can use a Juniper cloud metro network as the experience sensor for ensuring the best user experiences—all centrally managed through our Paragon Active Assurance Control Center.

Benefits

- *Gain immediate access to active testing through Juniper Cloud Metro from Day 1*
- *Guarantee service quality across the end-to-end network*
- *Understand customer experience from an end-user perspective using synthetic L2 through L7 traffic*
- *Resolve problems more quickly with cloud-native operational agility and closed-loop automation, before they impact services and customer experience*

Solution Brief

With metro traffic growing four times faster than anything else on the network, network engineers need innovative solutions to provide high-quality consumer and business services. Existing capacity is not meeting demand and separate architectures for business, residential, and mobile services are difficult to maintain and monitor. Metro networks are being converged into a single, multiservice architecture that delivers consistent user experiences through network slicing, service-aware technologies, and cloud-scale capabilities.

The Juniper® Cloud Metro combines a scalable IP service fabric, service intelligence, and automation. This unique combination provides guaranteed end-to-end services and exceptional user experiences. By transforming a retro metro network to a Juniper Cloud Metro, service providers and operators gain an ideal entry point for deploying active assurance technology. In fact, they can turn their cloud metro network into the experience sensor which actively measures and detects reliability and performance issues that prevent the network from delivering amazing end-user experiences from device to cloud.

With an active assurance solution, operators can measure the quality of end-to-end services and slices directly on the data plane from an end-user perspective. When service and network operations teams have active testing, they can continually measure and monitor what truly matters when dynamically provisioning services and slices. They also gain a highly effective solution with network automation that helps them proactively prevent issues from occurring before they impact customers. They can rapidly identify, locate, troubleshoot, and resolve issues before they affect services and customer experiences.

The Challenge

Juniper Cloud Metro provides the versatility of a shared infrastructure for distributed cloud services across multiple business lines. With resources becoming distributed and the lines between domains blurring, siloed architectures for business, residential, and mobile services no longer make operational sense. To deliver exceptional user experiences over a converged, service-intelligent network, cloud-ready network automation with active assurance is paramount, especially for innovative new 5G and cloud applications that are differentiated by their quality of experience.

Service operations, IT, and operations support systems (OSS) are ready to transition to automated assurance. However, in many of today's operations practices, automating assurance is coming later in network rollout plans due to complexity, time-to-market, and cost concerns. In addition, planning, procuring, and deploying these solutions can take anywhere from a few weeks to several months.

What if we could eliminate these problems and make active assurance available immediately? If automated network testing and active assurance is done by the network itself as it is rolled out, network operators could launch new services more quickly and more cost effectively. Operators could meet performance requirements and service-level agreements (SLAs) for the new services the first time, and every time. These objectives are easily reached when operators make the network the experience sensor with active assurance.

The Juniper Cloud Metro as the Experience Sensor Solution

Active testing solves the problem of improving SLA assurance of end-to-end services through all the network domains that connect each service. Juniper Paragon Active Assurance measures service quality from access to metro to transport to core (including partner networks). It also covers the data center service chains connecting cloud applications, whether in private clouds or on a public cloud platform like Amazon Web Services, Microsoft Azure, or Google Cloud.

Through the native integration of Paragon Active Assurance Test Agent software within the Junos® OS Evolved portfolio, starting with the Juniper Networks® ACX7000 line, active testing capabilities are now available within the network itself. This eases automated assurance deployment and immediately enables network operators to measure what really matters directly on the data plane from Day 1, while deploying and managing their network transformation at scale. By embedding active assurance as the experience sensor into Juniper IP fabric and providing a cloud-ready portal for management and visualization, the network can provide native visibility on service experience and self-monitor, self-diagnose, self-remediate, and self-optimize—ensuring the best user experiences.

Without active assurance, many misconfigurations and non-optimal configurations go undetected, leading to service impacting issues or silent performance issues that are difficult to pinpoint. For example, there is no network alarm for a non-optimal quality-of-service (QoS) or routing policy configuration, or for a misconfigured traffic engineering metric or firewall rule. Active assurance helps operations quickly detect and resolve these types of issues before customers notice a problem.

Active testing for the Juniper Cloud Metro enables the network to inherently test on the data plane and provide service-centric measurements that identify service quality from an end-user perspective. With active assurance, operators gain fine-grained measurements that help create richer network key performance indicators (KPIs) to improve network performance and SLA adherence. In addition, as part of service activation, load testing is possible using synthetic peak-demand traffic volumes. Testing with synthetic traffic helps validate and ensure that service objectives for bandwidth availability, latency, jitter, delay, loss, and other performance metrics can be met. Problem detection down to an errored second's count granularity along with customizable thresholds that reduce false positives and trigger automation when truly needed is also possible.

Use cases for leveraging active testing through the Juniper Cloud Metro include those for the provider edge/service edge to validate VPNs, mobile service assurance, as well as Internet and cloud interconnect services. In addition, enterprise customers can run additional test agents on their CPEs and in data centers (for cloud providers). The solution spans customer premises, edge, and application locations.

Features and Benefits

Use the network as the experience sensor for active testing that delivers the following capabilities and business benefits.

Capabilities	Business Benefits
Zero-touch dy-namic deploy-ment	Instantiate active test agents automatically as part of service creation with test agents on Junos OS Evolved network infrastructure or additionally deployed either as containers or virtual machines (VMs).
Measurement through the data plane	Active test agents send traffic through the data plane. Traffic is encapsulated in the same way as end-user application traffic.
Fine-grained measurements and richer KPIs	Solution isolates issues with different protocol layers from the link layer (L2) to the application layer (L7).
Load testing be-fore service acti-vation	Load testing allows you to inject a peak demand volume of synthetic traffic onto your network before turning up services to validate that performance objectives and SLAs will be met.
Performance at scale	You can scale each active test agent to thousands of concurrent parallel streams or sessions to support use cases based on reflection technologies (TWAMP, Y.1731, UDP Echo, ICMP Echo) toward existing network elements.
Coverage of the full operational life cycle	Operators avoid complex integrations of multiple-point solutions, while combining turn-up testing, ongoing real-time active monitoring, and troubleshooting into a single solution.
Centralized test and API monitor-ing	Network automation frameworks and orchestrators can leverage active assurance.
Small footprint and minimal re-source require-ments	The solution only consumes a fraction of available resources.

Capabilities	Business Benefits
Service chains compatibility	Additional test agents can be deployed to act as a small virtualized network function (VNF) in service chains. In this way, operators gain full visibility into the data plane traversing individual VNFs in the service chain, as well as the complete service chain data plane KPIs.
Accurate timestamping and high resolu-tion	One-way delays are confirmed in mid-haul networks, measured with sub-millisecond accuracy and precision. Solution uses hardware timestamping on physical network interfaces.
IPv6-only support	Environments where only IPv6 is available are supported.
Mobile service assurance	For validating that network slices deliver on SLAs, 5G operators must be able to send traffic through the 5G user plane. With this feature, you can use synthetic traffic from emulated user equipment (UEs) and gNodeBs to verify that new slice instances deliver expected KPIs across the end-to-end service, including the distributed 5G RAN and 5G core network functions.

Solution Components

Active testing for the Juniper Cloud Metro can be fully implemented in your network by natively integrating Paragon Active Assurance with your existing network and service assurance solution.

The core component of Paragon Active Assurance is a cloud-ready multitenant Control Center, which provides a user-friendly Web portal GUI where operations staff can run on-demand tests and view real-time and aggregated results as well as KPIs and SLA monitoring metrics. The Control Center includes a feature-rich API, allowing external OSS and Network Functions Virtualization (NFV) orchestrators to easily automate distributed activation tests or monitoring scenarios.

The Control Center remotely controls the software-based and traffic-generating test agents, which provide distributed measurement metrics. It also displays detailed, real-time results and statistics actively measured by test agents and reflector streams across multiple applications, services, and interfaces.

The test agent natively pre-integrated in Junos OS Evolved-based network equipment gives network operators an easy way to use active testing, monitoring, and troubleshooting on the data plane. It goes beyond traditional embedded test functionality for basic Two-Way Active Measurement Protocol (TWAMP) and Y.1731 use cases by providing more fine-grained measurements for richer network KPIs, including load testing using target traffic volumes before service activation. Test agent support includes real-time performance monitoring and operation, administration, and maintenance (OAM), specifically TWAMP, User Diagram Protocol (UDP), transmission control protocol (TCP), HTTP, Domain Name System (DNS), Ping, PathTrace, IPTV, and over-the-top (OTT) video.

Remote software-based test agent capabilities include service activation (Y.1564, MEF 48), network performance (UDP, TCP, Y.1731, TWAMP, path trace), Internet performance (HTTP, DNS), and rich media (IPTV, OTT video). These remote test agents may be deployed in strategic locations across your network for continuous quality monitoring. They may also be deployed on demand for temporary purposes, such as activation testing of newly deployed mobile services and slices. Test agents are available in several formats—as software to be run as a virtual machine on a hypervisor, as a container application, or as a software appliance for installation on dedicated x86 hardware. They are also available for all public clouds. The test agent is also natively pre-integrated into Junos Evolved-based network equipment, starting with the ACX7000 line. Network operators gain an easy and cost-effective solution for immediately deploying active testing, monitoring, and troubleshooting so that service quality can be measured on the data plane just like end-user application traffic.

The Paragon Active Assurance software-only approach to flexible and programmable assurance makes the solution suitable for physical, hybrid, and virtual environments—either on-premises or in distributed edge clouds or centralized clouds (whether private or public). This provides an active testing solution that is suitable for any Juniper Cloud Metro topology and use case today.

Summary—Measure What Matters

With a Juniper Cloud Metro network as the experience sensor, you can effectively differentiate and guarantee services end-to-end from access to metro to transport and through data center service chains connecting cloud applications. The solution enables you to measure what matters directly by performing active testing using synthetic L2 through L7 traffic on the data plane, delivering true mobile service performance visibility from an end-user perspective. Network operations teams gain a highly effective solution to identify, understand, troubleshoot, and resolve issues before they impact services and customer experience.

Proven in more than 200 customer deployments worldwide, Paragon Active Assurance is already in production with many mobile operators. Leverage the solution within the full Juniper Paragon Automation Portfolio across the entire network life cycle to automate and transform customer experiences.

Next Steps

- Learn more about Service-Centric Operations with Paragon Active Assurance.
- Learn more about how to differentiate 5G services with mobile service assurance
- See our Juniper Paragon Active Assurance datasheet for product information.
- Contact your Juniper account representative to schedule a demo today!

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.

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