

Brochure

VIAMI

Fusion Active Test

Synthetic Ethernet Testing and Performance Management for Service Providers and Carrier Managed Enterprise networks.

As Service Providers evolve their product offerings and expand above basic “Layer 2” connectivity, the variety of network configurations, deployment models and the services employed have increased.

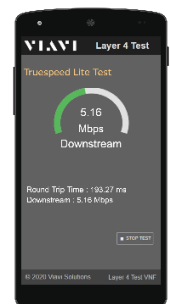
Customer specific services such as private enterprise networks require sophisticated test and performance measurement/monitoring tools to meet the “Customer Experience”/SLA expectations of customers, either retail business customers or interconnected wholesale partners.

“Do nothing” is no longer an option. Using your customers as your test environment is not a plan.

Simple tests of layer 2 connectivity (“packet blaster” style) are still necessary, but definitely no longer sufficient in today’s Carrier and Enterprise Networks. Testing that goes well beyond the basic plumbing (e.g. Network Layer 4 [TCP] and above) play a far more important role than in years past, so the testing deployed needs to reflect that too. It’s essential to be able to test the underlay and overlay aspects of a modern Ethernet transport network.

VIAMI – Assuring Light to Application Performance

Application Layer (L5-7) HTTP, VoIP, Video Client<> Server	<ul style="list-style-type: none"> • Fusion L5-L7 Testing • Carrier Managed Enterprise use cases • “Can I get to xyz.com?”, “Can I make VoIP calls?”, “What’s my Cloud connectivity?”
Transport Layer (L4) TCP/UDP	<ul style="list-style-type: none"> • Test the experience of the end-customer on the L2/L3 services they bought • Fusion provides L4 RFC testing (RFC 6349– industry standard vs. OOKLA or iPERF) • Run tests from T-BERD/MTS or ONX to central testheads/cloud locations • End-users can run diagnostics from their PC’s (no truck roll) • Smart SFPs deployed at customers expand test capabilities (no truck roll)
Link and Network Layers (L2/L3)	<ul style="list-style-type: none"> • Test the layers you are delivering/selling to the end-customer • Standard L2 and L3 “RFC testing” for Birth Certificates/SLA • RFC 2544 and Y.1565 for turnup, test and troubleshooting • Y.1731 and TWAMP for ongoing 24x7 Proactive Monitoring
Lightwaves/RF PHY LAYER (L1)	<ul style="list-style-type: none"> • Fiber Plant monitoring and ongoing health checks • Physical Link Provisioning • Cable acceptance testing during build-out

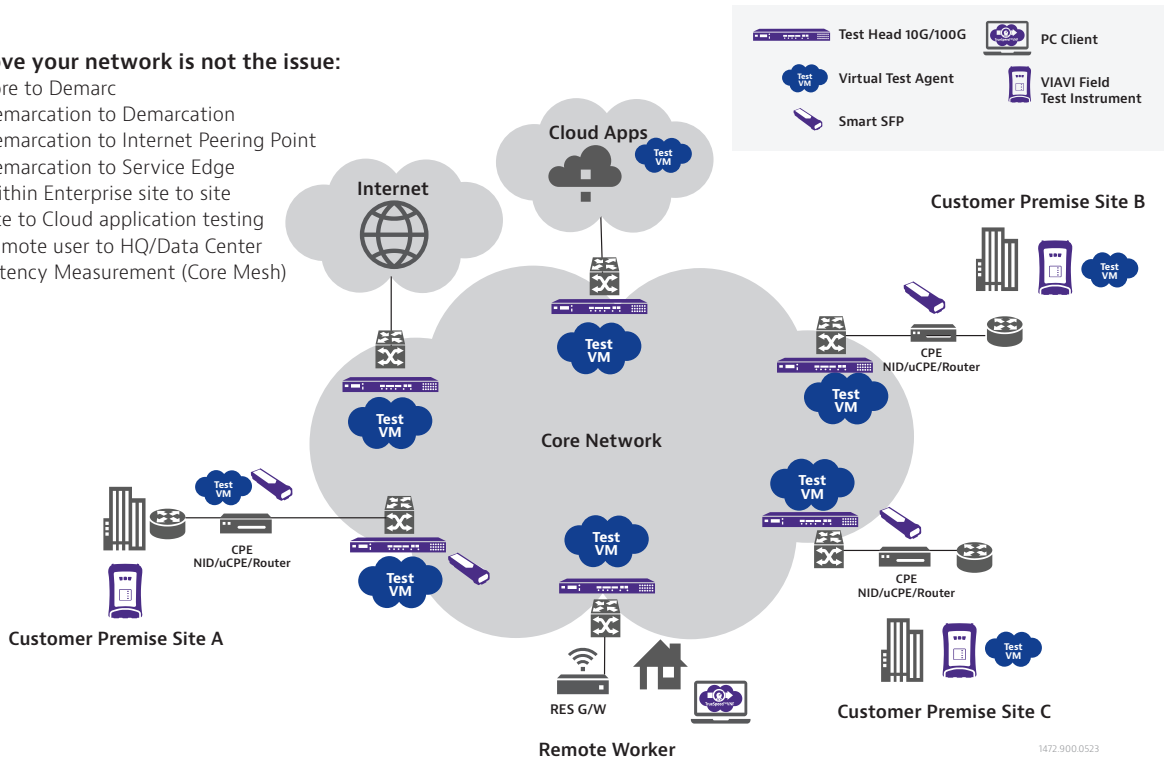


Given the higher layer tests required, it's also necessary to be able to reach over the demarcation point, into the actual end user space (e.g., an end-user PC) to deploy diagnostics to test the real end-to-end path the services are using, including the local network/WiFi etc.

Wide Variety of Service Provider Test Cases

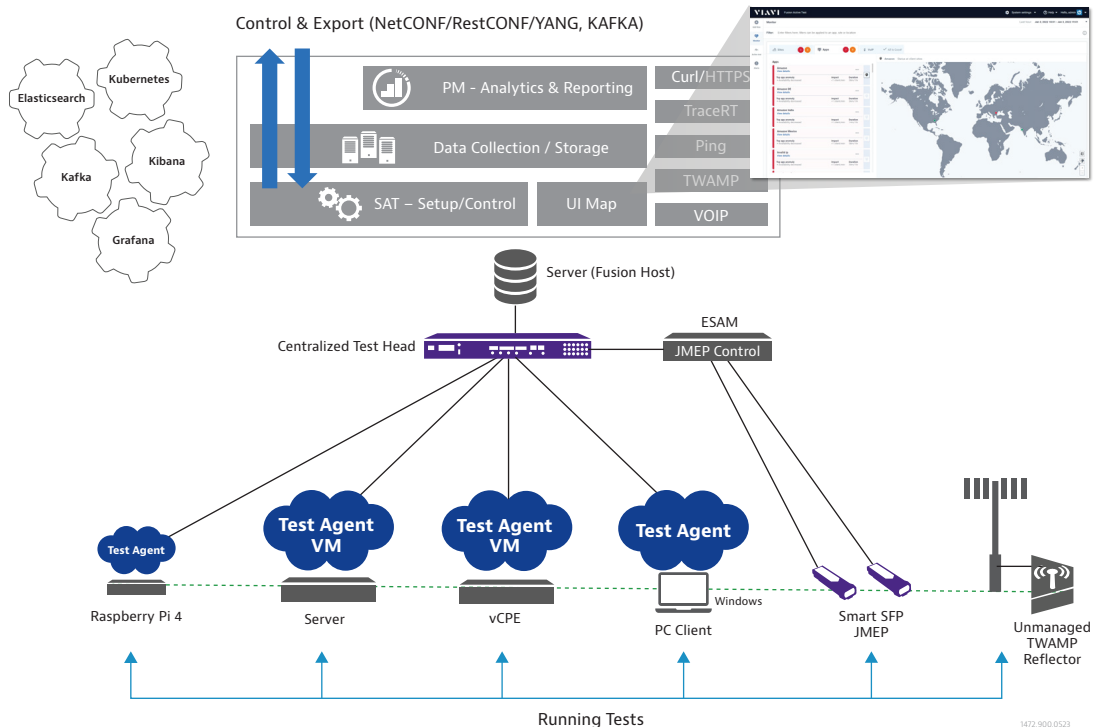
Prove your network is not the issue:

- Core to Demarc
- Demarcation to Demarcation
- Demarcation to Internet Peering Point
- Demarcation to Service Edge
- Within Enterprise site to site
- Site to Cloud application testing
- Remote user to HQ/Data Center
- Latency Measurement (Core Mesh)



To address these challenges Fusion Active Test is a cloud-ready platform with a variety of on- and off-site software agents. In addition, it also works seamlessly with VIAVI smart SFPs, as well as VIAVI instruments, to effectively cover whatever network deployment and Testing is required.

Fusion Active Test — Building Blocks

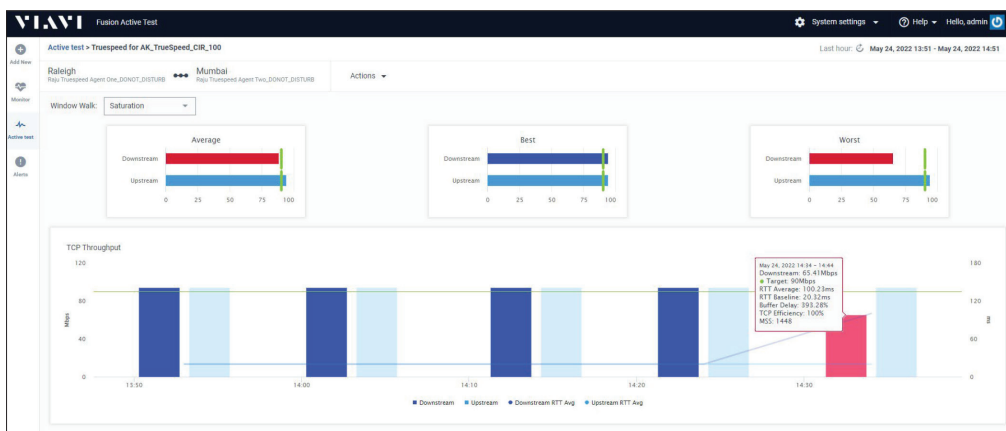


Service Activation Testing and Performance Management in Carrier Managed Private Networks

Testing the Underlay

Regular service provider use cases are more focused on the underlay aspects of operating a network – activating L2/L3 VPNs, Internet services etc., and assuring ongoing performance of those services both in the core and at the network edge/demarcation points with customers.

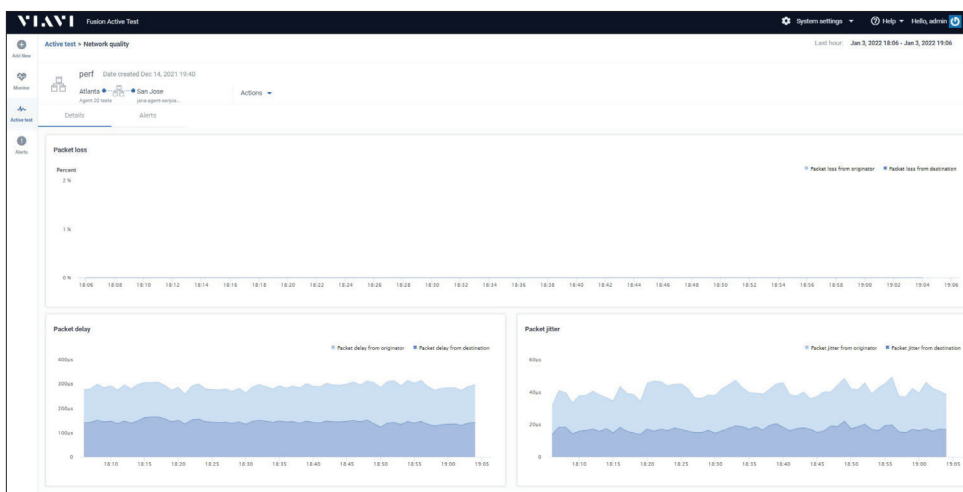
For this environment, throughput is always a key metric, both before the service is operational and after, for troubleshooting. When providing L3 services, service providers must be able to test the real-world customer experience over those links. Therefore, testing at L4 is now mandatory with today's application-rich service offerings. The chart below shows a layer 4 TrueSpeed (RFC.6349 industry standard) speed test in operation. This could be from an end-user PC through to test point at or beyond a demarcation location, or even into the cloud.



Real-time results of Layer 4 throughput (TrueSpeed test)

Other important quality aspects for a network are latency, packet loss and frame delay variation (aka jitter) since they are key determinants of service quality and user experience. For example, jitter has a spectacular impact on packet voice quality.

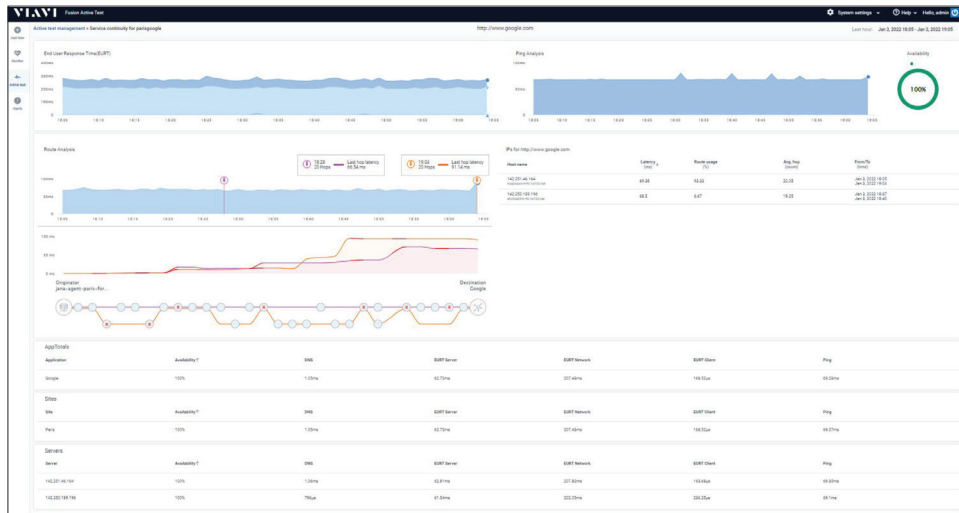
Running TWAMP (Two Way Active Measurement Protocol RFC.5357) testing, injecting small amounts of background test traffic at regular intervals, it's possible to measure latency/loss/jitter network wide, 24x7 – often highlighting issues before end-users raise trouble-tickets.



TWAMP test result (loss, delay, jitter)

Testing the Overlay

Once the basic connectivity has been checked it is essential to focus on the actual traffic running over the network and how it is managed and controlled. Network routing, domain name resolution, proxying and content caching are just a few of the network mechanisms that enable today's Internet transactions. It follows that verifying these mechanisms is a key step in troubleshooting network problems – which route did a flow/transaction take during a particular problem time? How long did it take to resolve a certain domain name? Who was serving a certain request? etc. are just a few questions that must be examined. The diagrams below show the intuitive analysis available where the multiple routes taken by traffic can be displayed at any time selected.



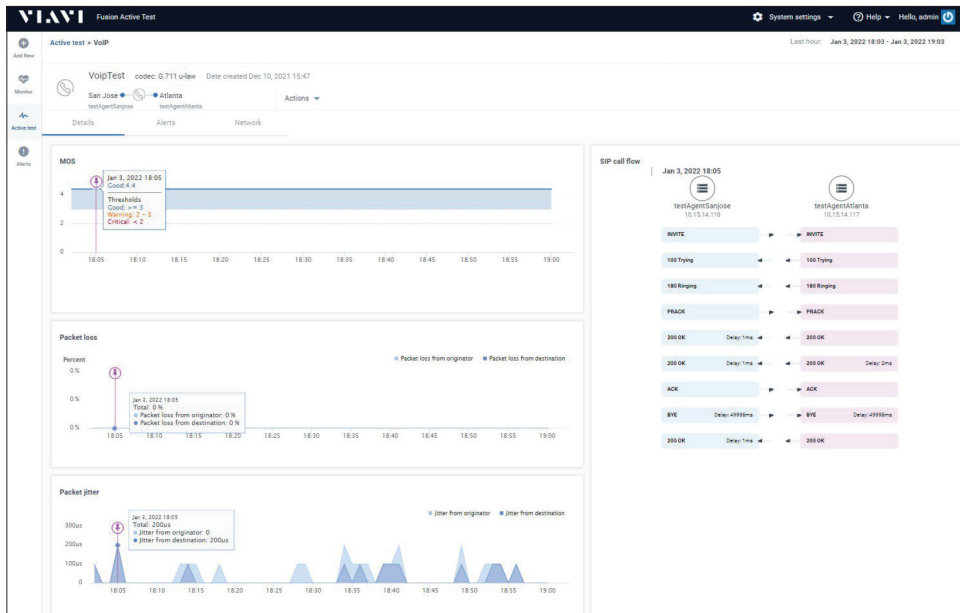
Route analysis

Critical services such as DNS can be analyzed in detail to find specific issues with the variety of servers that often underpin a service.



DNS resolution time

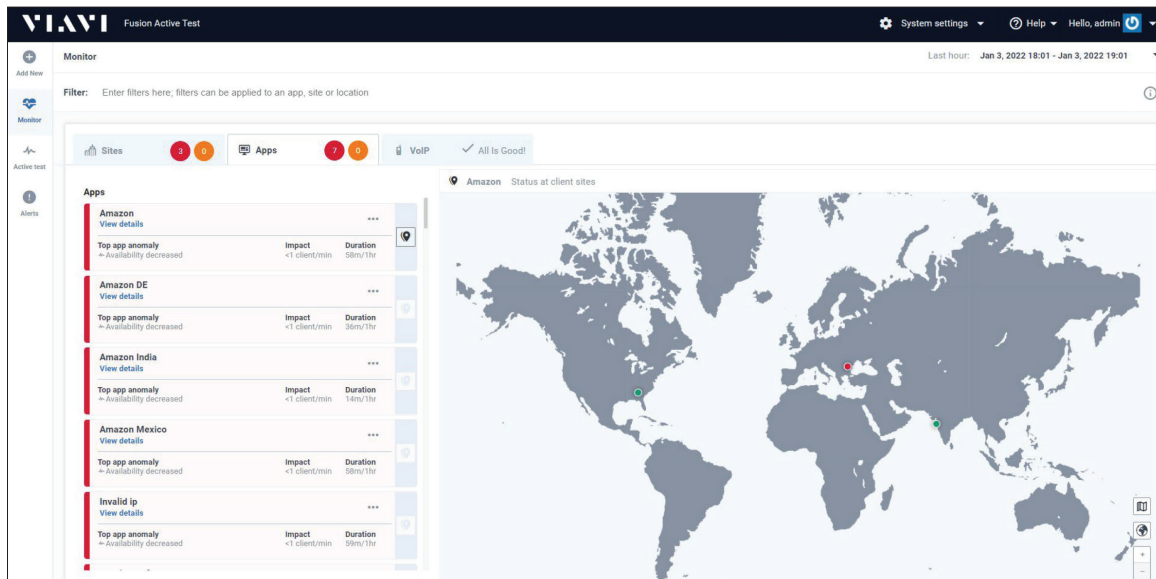
On top of all these network technologies resides the application, such as VoIP or videoconferencing. The Fusion Active Test System provides simulation of such applications – call setup is shown graphically in call sequence diagrams highlighting issues like unanswered transactions or excessive timeouts between packets.



VOIP test (MOS loss, jitter, signaling)

Fusion Active Test – Network Performance Dashboard

Fusion Active Test provides measurements and results for various network layers and customer application scenarios. Fusion aggregates these results into an intuitive user interface that supports a variety of views (sites, apps, services) as shown below.

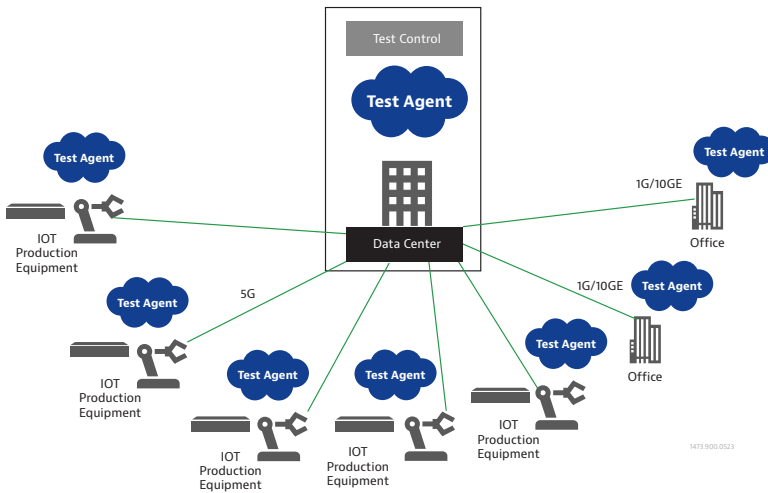


Network health dashboard

Carrier Managed Enterprise – Customer Use Cases

Ethernet networks are the backbone of almost every Enterprise, and the roll-out of ever faster Ethernet technologies contributes to a variety of new and more sophisticated Enterprise network architectures. Dependency on the reliability and performance of these networks is ever increasing so testing and monitoring has likewise grown in importance. The examples below illustrate how new networking technologies and their application in the Enterprise world motivate the usage of Fusion Active test.

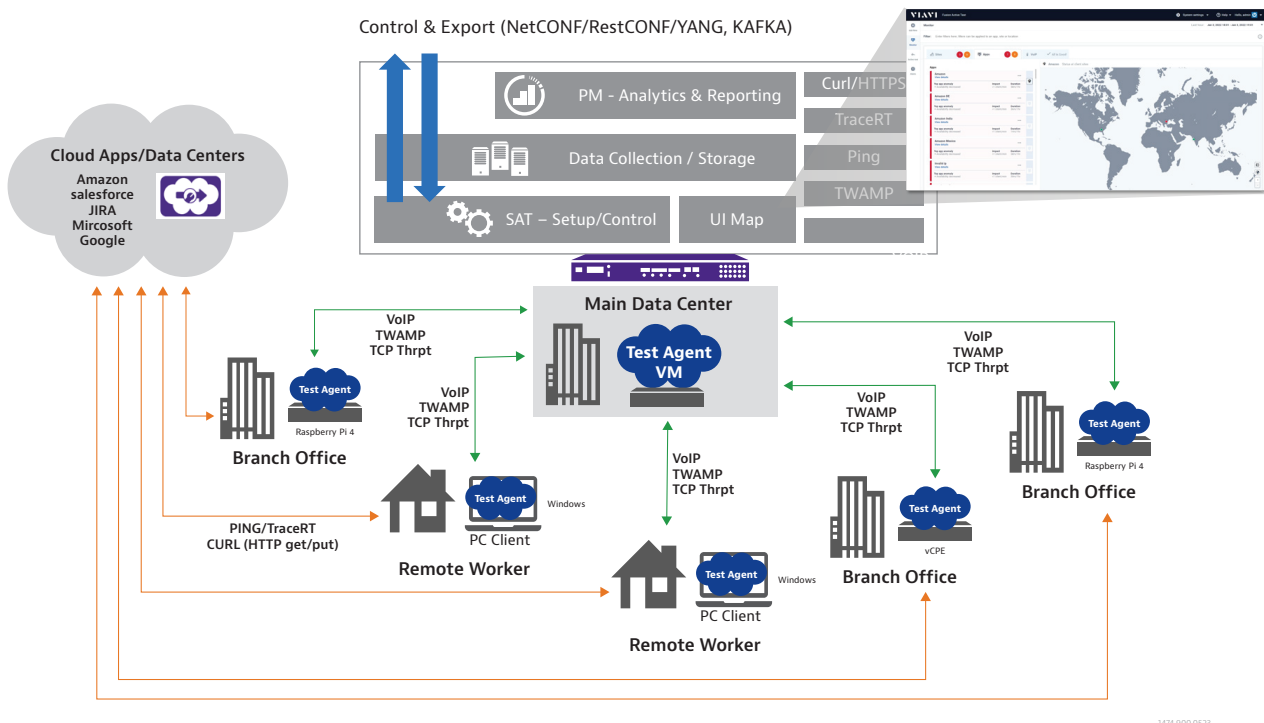
Fusion Active Test for Private 5G Networks



- Production Floor Networking - latency sensitive
- Verify end-to-end performance of IOT connectivity
- Verify end-to-end performance/access to company apps
 - Latency
 - Packet Loss
 - Bandwidth/Throughput
 - Accessibility response of internal servers

Wireless technology (like 5G) enables the connection of industrial devices, like production robots with a central data center, to control and manage the precise activity and tasks of those devices. Since the entire manufacturing process is dependent on those devices functioning reliably, it is essential to permanently monitor their connection to the backbone.

Fusion Active Test — Enterprise Use Case



Every Enterprise today relies on a highly efficient IT engine. Trends like cloudification, global setup and outsourcing drive the need for a proficient IT function married to a robust network infrastructure. Without that engine, the entire operation comes to a standstill. Consequently, the monitoring and testing of such an environment is indispensable.

VIAVI Fusion Active Test Summary

Nowadays, a service provider delivering a managed service to a large, distributed organization is not only responsible for testing the basic connectivity (test the underlay), but also for verifying that end-user application traffic is running smoothly over the WAN (test the overlay).

Increasingly, SLAs between the enterprise and the managed services provider are calling for Layer 4 (TCP) testing, and also higher layers such as access to DHCP, DNS, File downloads, Web sites, VoIP quality testing etc.

By deploying a variety of hardware/software agents it is possible to perform the initial turnup/commissioning of the service (and by implication trigger the billing for the service), and also to remotely troubleshoot issues (domestically and internationally) without immediately scheduling a dispatch/truck-roll.

Key Features

- Remote Service Activation Testing and Performance Management Testing
- Centralized test control and results storage
- Variety of deployment agents – both software- and hardware-based
- Multiple hardware host options – Smart SFPs (JMEP), Raspberry Pi compute, uCPE
- Software agent – virtual image (on uCPE, or Cloud VM), PC client
- Transport tests – L2/L3 Y.1564, TWAMP (RFC5357)
- TCP/Application tests – Ping, CURL, TraceRoute, RFC6349 (TrueSpeed), HTTP(S), VoIP
- Optimized Test Scheduling – run specific tests during maintenance windows / weekends
- Application and Site dashboard

Key Benefits

- OpEx Savings: Minimize dispatches/truck rolls by running tests centrally and allowing end-users to initiate tests from PCs
- Accelerated Time-To-Revenue: Rapid service activation triggers earlier billing
- Easy SLA management: avoid chargebacks and penalties via diligent testing of throughput, latency, jitter, loss, and availability
- Improved End-User Experience: Enhanced application layer performance including page load time, DNS resolution, and voice MOS



Contact Us **+1 844 GO VIAVI**
(+1 844 468 4284)

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visit [viavisolutions.com/contact](https://www.viavisolutions.com/contact)

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