

Infovista's Ipanema Application Aware SD-WAN

Application Control & Dynamic WAN Selection

EXECUTIVE SUMMARY

Your wide area network (WAN) is like a highway with many equal lanes connecting your users to business applications. An application aware network, however, is like a highway that doesn't use lanes to control applications. It allows individual cars to run at different speeds based on car type, without creating congestion. Additionally, cars are allowed to enter and exit the highway as needed based on performance needs and can be directed automatically to alternate roads to further avoid congestion. Without this level of application control your business-critical applications are not going to deliver the user experience required.

Infovista commissioned Tolly to evaluate the intelligent application performance control capabilities of its Ipanema SD-WAN solution. Ipanema is designed to manage application flows dynamically across multiple WAN connections to deliver a business objective-driven user experience using various application aware Quality of Service (QoS), end-to-end prioritization, and path selection techniques. Specifically, Tolly tested two important features: Application Control and Dynamic WAN Selection.

The Ipanema solution demonstrated sophisticated, dynamic management of applications running across the WAN environment that it managed and effectively delivered the desired user experience per application session.

THE BOTTOM LINE

Infovista's Ipanema, the Application Aware SD-WAN:

- 1 Manages WAN resources to deliver required quality of experience for mission-critical applications as defined by business priorities
- 2 Monitors WAN conditions and can migrate critical applications to best performing links dynamically should current WAN conditions degrade
- 3 Dynamically manages application flows based on business-level performance objectives via QoS, end-to-end prioritization, and dynamic path selection techniques
- 4 Adapts dynamically under changing network conditions for both path selection and application control functions to meet user experience objectives

Infovista Ipanema Application Control Test Results

Application	Business Criticality	Applications Conformance to Business Priorities	
		"Before" - Without Ipanema Control	"After" - With Ipanema Control
Skype Video	Top	Skype Video suffers high latency	Skype Video traffic matches quality and bandwidth objectives
SAP	Top	SAP suffers high latency and poor bandwidth	SAP traffic matches quality and bandwidth objectives
SharePoint	High	Sharepoint traffic matches quality and bandwidth objectives	Sharepoint traffic matches quality and bandwidth objectives
HTTP (Web Browsing)	Low	HTTP is served above quality and bandwidth objectives	HTTP traffic matches quality and bandwidth objectives

Notes: Conformance based on detailed analysis of traffic bandwidth and latency.

Source: Tolly, March 2017

Table 1



Background

Wide-area networks (WANs) - AKA "on - ramp to the cloud" -- are important elements of virtually every business network. And while WAN bandwidth continues to grow, application demand for that bandwidth typically grows even faster. Without intelligent control of WAN applications, the quality of user experience is, at best, unpredictable.

Infovista's Ipanema, the Application Aware SD-WAN solution dynamically recognizes changing WAN conditions and manages applications performance at the individual session level. By controlling access to WAN resources, prioritizing critical applications, and applying end-to-end QoS and traffic management techniques to individual application sessions, the Ipanema solution

can mitigate WAN congestion and meet business-defined performance objectives for application performance. Similarly, by monitoring the quality of the WAN, Ipanema can migrate important application sessions to alternative WAN paths. This allows all WAN paths to be used actively for application traffic.

Test Results


Application Control, QoS, & End-to-End Prioritization

In this test, session traffic from four different application types was sent across the WAN. The traffic consisted of "Top Criticality" priority Skype Video and SAP transaction traffic, "High Criticality" SharePoint traffic

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Tested March 2017

and "Low Criticality" Web browsing (HTTP) traffic.

A baseline test was run where all of the applications had uncontrolled access to the WAN. Testers observed that the resulting performance of the applications did not

Infovista's Ipanema Dynamic WAN Selection Test Results

Application	Business Criticality	"Top Criticality" Applications Migrated To Secondary Link	
		"Before" - Without Ipanema Control	"After" - With Ipanema Control
Skype Video	Top	No - Application degrades as link degrades	Yes - Application dynamically migrated to secondary link when primary degrades
SAP	Top	No - Application degrades as link degrades	Yes - Application dynamically migrated to secondary link when primary degrades

Notes: Migration confirmed by analyzing application latency and packet loss. SharePoint and HTTP not included in results analysis as those applications were not configured for Dynamic WAN selection.

Source: Tolly, March 2017

Table 2



match the business priorities. Low priority applications consumed excessive resources and the performance of higher priority applications suffered.

Engineers configured the Ipanema solution with the appropriate application priority objectives and enabled the application control function. Engineers observed that with Ipanema controlling the WAN, the application performance matched the business requirements. See Table 1.

In the "before" scenario, applications received bandwidth on a "first come, first served" basis. (This is how networks work.) Less important but bandwidth-hungry Web browsing can take WAN resources that result in degraded performance for important SAP transaction and Skype video sessions. This is illustrated in the "before" case.

After Infovista's Ipanema SD-WAN solution is activated, low priority Web browsing was intentionally given less access to WAN resources effectively "slowing down" the application, while critical high priority applications received the desired performance.

Dynamic WAN Selection

It is increasingly common to have multiple WAN connections or hybrid WANs. Having a secondary "backup" WAN connection is only beneficial if applications get to use it.

While many older systems can provide failover in the event of a failed link, they cannot detect a degraded link condition.

Infovista's Ipanema SD-WAN solution can monitor the health of a WAN link (e.g. packet loss, congestion, latency, jitter) and make link routing selection decisions based on that quality for each individual application session.

In this test, the Ipanema solution was configured to migrate "Top Criticality" applications - in this case Skype Video and SAP transactions - to a secondary link in the face of degraded link conditions.

In this test, the primary WAN link was deliberately degraded. The packet loss was set to 2% and the latency/delay was set to 120ms. The Ipanema SD-WAN solution detected this condition and seamlessly migrated top criticality apps to an alternate, secondary WAN link. See Table 2.

Test Methodology & Detailed Results

Infovista's Ipanema solution components and version levels are listed in Table 3.

The Test Methodology, including details of application flows, along with the detailed results of each test scenario can be found in companion document Tolly #217119 Infovista SD-WAN Proof Of Concept Report. The document is available at no charge from Tolly and Infovista.

Ipanema's Application Control

The purpose of Ipanema's Application Control is to enforce traffic protection of each application session across the network. The enterprise defines application performance objectives in a centralized way for each application or group of applications. These objectives include technical objectives (minimum bandwidth, jitter, delay, losses, ...) and business objectives (criticality level).

Ipanema monitors in real time app performance across the entire network, and computes the total bandwidth usage and the per user applications activity. With this information, the Ipanema appliances enforce, in real time, the traffic policies to ensure each and every application session receives the expected bandwidth and QoS. If the network resource doesn't allow the serving of all sessions at the required level of quality, the most business critical applications are protected first, resulting in selective degradation of the least business critical flows. This approach is proven to be more efficient than traditional Class of Service (CoS) solutions that shape traffic flows according to static allocation rules without providing the enterprise with the ability to differentiate application usage by each end user.

Source: Infovista

Test Equipment Summary

Vendor	Product	Web
Ixia	IxChariot v5.9	http://www.ixiacom.com

Solution Under Test: Infovista's Ipanema Application Aware SD WAN

Appliances	ip engine and nano engine (one appliance on either side of the simulated WAN)
Firmware	9.1.2.2 (both appliances)
Management	SALSA domain configuration version 9.1.2 (release 46004) installed on one Windows Server 2012 R2 6.3

Source: Tolly, March 2017

Table 3



About Tolly

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You can reach the company by E-mail at sales@tolly.com, or by telephone at +1 561.391.5610.

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Infovista is the leading provider of cost-effective network performance and application performance orchestration solutions that help large enterprises meet the challenge of providing optimal user experience (UX) for business critical applications by increasing the efficiency of their network infrastructure in full alignment with business priorities. Infovista's Ipanema, the Application Aware SD-WAN, is designed to orchestrate the performance and user experience of any application, for every user, over any network, according to business objectives, powering the digital transformation for every large enterprise.

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