

The new equation for faster IT problem-solving

Today organisations are increasingly dependent on the performance of their business applications – which, in turn, depend on the performance of their network. To keep the business running smoothly, the performance of both applications and the network must be maintained at the highest levels. The traditional approach has been to monitor network and application performance separately, using different systems run by different teams. However, the increasing interdependency of applications and networks mean that organisations need an integrated solution if they are to identify the source of any performance problems quickly and solve them before incurring costly downtime.

A new acronym has been defined for the solutions that address this space: Application Aware Network Performance Management (AANPM). Gartner Group has now begun tracking this as a new sector, which they have termed Network Performance Monitoring and Diagnostics, and are developing a Magic Quadrant on the solutions available. This White Paper examines the need for AANPM and how it helps organisations to optimise the performance of business critical applications while speeding up network and application trouble-shooting and minimising downtime.

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The increasing interdependence of applications and networks

Organisations are becoming increasingly dependent on the performance of their critical business applications. These are continually developing to meet the changing needs of the business; new applications are created, new users and features added and new ways of accessing the applications introduced, such as BYOD.

However, no technology changes come without a price, and today's complex applications put an increasing strain on the organisation's network and server infrastructure. Take the growth of BYOD: every device brings new applications, each requiring access to a different set of network assets. Many organisations are introducing Voice over IP (VoIP) to reduce costs, but using the existing network to transport voice as well as data can significantly affect the performance of other business critical applications.

These changes, combined with user expectations of rapid response times, mean that the network infrastructure is no longer just the 'plumbing'. It supports business-critical applications, provides the data on which decisions are made and facilitates communications with customers, partners, suppliers and co-workers, making it a strategic asset to the business. Any downtime or degradation in network or application performance will directly impact on an organisation's bottom line.

Networks are becoming more complex, with virtualisation extending from the data centre to the desktop and a continued growth in cloud services – both making visibility across the network more difficult. When application problems occur in a hybrid cloud environment, how does the organisation determine if the problem is located in their infrastructure or that of their cloud provider? Performance problems may result from a proliferation of WiFi devices, excessive use of bandwidth by unauthorised applications, configuration errors, poor application delivery infrastructure or many other sources. The increasing inclusion of voice and video adds more complexity and pushes bandwidth to its limits.

To keep the business running smoothly, organisations need to monitor both application and network performance and maintain it at the required level, with any problems identified and resolved as quickly as possible. Applications and networks have traditionally been managed separately, using different systems run by different teams. However, their increasing interdependency make this both inefficient and ineffective, and trying to ascertain who owns a problem when all groups are reporting green KPIs is becoming increasingly difficult and time-consuming.

The limitations of separate monitoring systems

Historically the network has been considered as a separate, well-defined entity, making it relatively straightforward to write tools to understand and analyse its performance. These fall into two categories: Network Management Systems (NMS) and packet capture and analysis tools.

Most NMS have been infrastructure focused, addressing device monitoring, capacity planning, configuration management, fault management, analysis of interface traffic etc. and ignoring the applications and data traversing the network. They do not perform analytics on application response time, TCP errors and other issues that impact applications. Some NMS are so complex to set up that they can only manage down to Layer 3 devices, so switches are not monitored at Layer 2. Polling data is aggregated over many minutes, hiding the impact of usage spikes. Additionally, because an NMS is centrally located, measurements made with the intention of understanding end user response times are inaccurate because the test is using a different part of the network to reach the device under investigation.

To obtain more detailed information, the network engineer has to turn to complex packet capture and analysis tools. They require skilled and experienced engineers and are time consuming to use, as the result can be too much data – millions of packets to examine, displayed through different user interfaces.

When a problem occurs, network engineers can use the NMS and packet analysis to prove that the problem is not the network, but find it difficult to assist in troubleshooting application issues because they cannot see and analyse live traffic at the transactional level. Analysis of past data can be valuable, but does not help them understand what is actually happening, nor identify and address issues before they become a major problem.

Research carried out by Fluke Networks among approx. 3,000 network professionals found that 82% of respondents ranked network and application performance problems as a concern or critical issue.



A recent survey by Aberdeen Group¹ showed similar results. They asked companies to list the top challenges they face when understanding and managing network performance. While the top two were around over-stressed networks that lack the ability to grow (both of concern to 36% of respondents), almost as important were the lack of tools to resolve network events (35% of respondents) and lack of visibility into network activities (34% of respondents).

Application Performance Management Systems typically support auto-discovery of all the applications in the network, providing transaction analysis, application usage analysis, end-user experience analysis, user-defined transaction profiling and the basic functions to monitor the health and performance of all configured application infrastructure assets. However, if an application is running slowly they find it difficult to identify if the problem is application or network based.

Whereas separate systems were once sufficient to stay on top of problems, the increased interdependency of network and applications and cost of downtime means it is no longer enough to use a discrete tool and say “it’s not the network” or ‘my servers are fine”. These tools are not designed to manage the interplay between network and applications environments, which needs to be understood and managed to optimise the user experience. IT teams need to work together using correlated data to find root cause and solve issues quickly before they impact the business. By solving problems more quickly, they will also save the organisation money, as according to Cisco², 49% of the total cost of ownership (TCO) of operating a network is labour costs.

THE COST OF DOWNTIME	
Average cost of data center downtime per minute	\$5,600
Average reported downtime	90 minutes
Average reported cost of incident	\$505,000
Cost of partial data center outage, averaging 59 minutes	Approx. \$258,000
Cost of total data center outage, with average recovery time 134 minutes	Approx. \$680,000
Percent without tools they need for quick, accurate problem resolution	55%
Percent who say non-collaborative results and finger-pointing slow troubleshooting	70%

Source: Ponemon Institute 2011³

Introducing AANPM

Tackling the issues facing applications and the network infrastructure they run on requires complete end-to-end visibility across layers 1-7, from the data center to the branch office.

The solution that has emerged is termed AANPM: Application Aware Network Performance Management. AANPM is a method of monitoring, analysing and troubleshooting both networks and applications. It takes an application-centric view of everything happening across the network, providing end-to-end visibility of the network and applications and their interdependencies, and enabling engineers to monitor and optimise the end user experience. It does not look at applications from a coding perspective, but in terms of how they are deployed and how they are performing.

By leveraging data points from both application and network performance methodologies, AANPM helps all branches of IT work together to ensure optimal performance of applications and network.

It helps engineers overcome the visibility challenges presented by virtualisation, BYOD and cloud based services and identify problems anywhere along the network path. It also provides application performance data to identify when a user is experiencing poor response times and which application component is contributing to the delay.

This actionable performance data can be shared with the applications team to identify what led to the problem and which component needs attention.

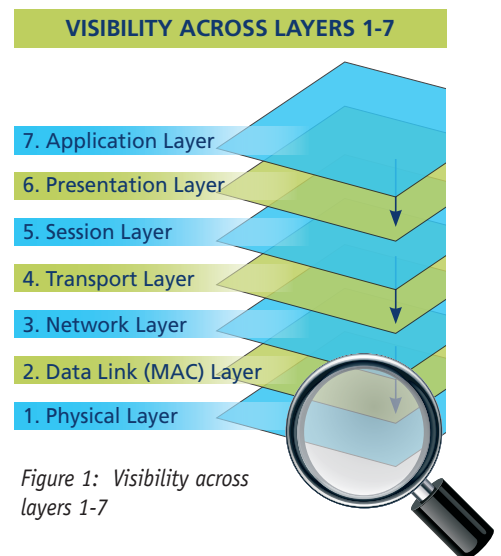


Figure 1: Visibility across layers 1-7

Two companies already using AANPM solutions are Belgian container terminal MSC Home Terminal and a major global call centre.

The infrastructure manager for MSC Home Terminal says:

“Historically, every time there was a problem the network was the first to blame, but with the complex application and different support organisations, pinpointing the actual cause of any particular problem was labour intensive and time consuming. Our solution provides us with an independent view across the entire application, so we are able to quickly pinpoint the problem area and fix it instead of wasting time going back and forth between departments.”

The senior network manager at the call centre company says:

“Instead of following the traditional approach of starting at layer 1 or troubleshooting every aspect at the same time, a few clicks of the mouse can tell us if it's a network, application or service response issue. The right team jumps on it and the rest of us focus on our other important tasks. When you think about how much time and manpower can be saved just by looking in the right area, the impact is immense.”

The business benefits of AANPM

As these examples show, AANPM offers specific, tangible business benefits, which can be summarised as follows.

- End-to-end visibility of the IT infrastructure - an AANPM solution brings together the key data points from NMS and Application Performance Management systems, providing a single dashboard view of critical applications and the underlying infrastructure. Engineers can 'see' what is going on in their network, who is using it, where they are connected and the path from 'here' to 'there'. Reporting can be provided at a granular level, helping to monitor KPIs and track device performance and usage – particularly useful in understanding the performance of virtualised equipment.
- Faster problem solving - when a performance problem hits a key application, AANPM's cross-platform visibility gives engineers all the information they need to track down root cause quickly – from the wireless environment (in some solutions), across LAN and WAN connections, through the network infrastructure (both physical and virtual), and into all tiers of the server and application environment. Instead of debating where the problem may be – a situation which can quickly create a blame culture and a toxic environment – IT teams can work together using common tools to resolve the issue.
- Improved user experience - today's applications can exist in many different places and different infrastructure tiers, making it difficult to discover root cause when a user experiences a problem. AANPM provides a comprehensive view of all infrastructure elements and how data and messages move between them, enabling IT teams to monitor the end user experience and identify the source of problems more quickly. By proactively examining performance, they can also identify and fix small problems before they have a significant impact on users.
- Enhanced productivity - by finding root cause more quickly and speeding up MTTR (mean time to resolution), an AANPM system reduces expensive downtime (see Table 1) and improves overall quality of service. It also gives engineers more time to work on strategic projects to optimise performance and benefit the business.
- Cost savings - Gartner advise that, because poor network and application performance impact infrastructure costs as well as productivity, organisations need to focus on the user experience and capture data that enables them to fix the “right” problem first. For example, if two routers are performing badly – one at a remote office and one supporting a critical business application – engineers need to fix the one that has the biggest business impact (i.e. cost) first. They can only do this if they can identify the location of the problems correctly – which AANPM helps them to do. Additionally, a single AANPM system replaces multiple separate systems, providing a significant cost saving.
- More time and data to support infrastructure optimisation - an AANPM system can collect and correlate all types of critical performance data. As well as giving engineers the breadth and depth of visibility to find root cause more quickly, it enables them to spot poor performance and identify where the paths of applications or servers are running slowly, so that the slowest and most critical paths can be addressed. This can be used to prioritise and make the business case for projects such as server upgrades, verify that they have been implemented and have not reduced performance elsewhere, and prove (or otherwise) the impact of changes such as virtualisation, WAN optimisation or data centre consolidation. The data also supports capacity planning, helping engineers identify where more bandwidth is needed.

- Better business understanding of the value of IT - an integrated AANPM system helps IT and business executives to understand the cost of running critical applications and the associated impact if they go offline for maintenance or due to problems. It also makes it easier to understand the relationships and dependencies between critical applications and the infrastructure which supports them.

The key features of an AANPM system

Comprehensive real-time and historic data

An AANPM system gives engineers the information they need to analyse everything happening across the enterprise network and the applications it supports. This includes critical performance data from both network and applications, including stream-to-disk packet storage, application response time analytics, IPFIX (NetFlow) and SNMP. As well as providing traffic analysis (including virtual traffic flows), it monitors the health of every link, device and interface in the network. By storing historic data, it enables both real-time and retrospective data analysis.

Automated discovery and infrastructure diagramming

In an AANPM system, data can be shown on a single customisable dashboard that gives users in all IT functions cross-platform visibility of network and application performance metrics. Individual users can create a dashboard customised to their level of responsibility, but also have visibility into adjacent areas of responsibility. This supports collaboration by enabling cross-functional teams to work together on performance problems and track back from effect to cause, quickly isolating and resolving problems.

The dashboards are supported by a performance map, which enables engineers to view the entire enterprise network. The faster they can 'see' what is going on in the network, know who is using it, where they are connected and what the path is from 'here' to 'there', the faster they can get to root cause. For example, they can see links with errors or high utilisation, and use a mouse to dive deeper into the transaction that is introducing latency to all upstream transactions that are awaiting a response. The AANPM solution developed by Fluke Networks provides automated discovery of all network elements, connectivities and applications, creating performance baselines from the actual packets, which greatly simplifies configuration.

Problem domain isolation

Every device in the path can be analysed, across the WAN, through the virtual infrastructure and into the application environment. Simple logical workflows allow engineers to identify the problem domain and the root cause with a few clicks of a mouse. They can isolate a problem down to the individual network element, transaction or even packet behind any performance event – real time or historic. Graphical packet filtering gives more detailed visibility when needed.

Event reconstruction to solve intermittent and historic problems

By storing all data flows, transactions and packets, an AANPM solution makes it easy for engineers to reconstruct web content, database queries and N-Tier application transactions, use flow forensics for back-in-time identification of traffic on key links, and even play back VoIP calls and video streams. This is particularly helpful in solving problems in the past, which only come to the engineer's attention hours after they have occurred, and in identifying and resolving nagging, intermittent problems that can 'hide' in the network and reduce both productivity and the credibility of the IT department.

Monitoring internal and cloud service delivery

IT teams are under continual pressure to meet SLAs. AANPM provides instant real-time bandwidth usage reports on top applications, conversations and hosts, helping them to see where and how the network is busy and distinguish critical business usage from recreational or non-critical usage. This enables them to:

- identify which links need additional bandwidth and which can be reduced, as well analyse historic growth and budget for future expansion
- monitor cloud service delivery and ensure providers are meeting their SLAs through monitoring the link to the cloud and providing QoS/CoS reporting
- manage VoIP QoS, with pre- and post-deployment assessment of traffic levels and performance and playback analysis providing actionable insights into the causes of poor call quality.

Visibility across the WLAN

AANPM is defined as giving visibility across LAN, WAN and data centre environments – including all tiers of the server and application environment, whether virtual or physical – as well as layers 1-7, while supporting rates from 1 to 10Gbps. The AANPM solution developed by Fluke Networks extends this further by adding the ability to monitor and troubleshoot the wireless infrastructure and to support remote locations through a portable form factor if more in-depth visibility is needed – providing comprehensive visibility from the user device to the data centre.

References

1. *Network on a wire: using real-time live network data to boost management and application performance, Aberdeen Group August 2013*
2. *Cisco infographic http://www.flickr.com/photos/cisco_pics/6231020843/sizes/o/in/photostream/*
3. *Ponemon Institute 2011*

About Fluke Networks

Fluke Networks is the world-leading provider of network test and monitoring solutions to speed the deployment and improve the performance of networks and applications. Leading enterprises and service providers trust Fluke Networks' products and expertise to help solve today's toughest issues and emerging challenges in WLAN security, mobility, unified communications and datacenters. Based in Everett, Washington, the company distributes products in more than 50 countries.

For more information on our network and application performance solutions, visit www.FlukeNetworks.com/instantvisibility

Solutions from Fluke Networks

Fluke Networks offers a range of complementary network and performance management solutions: TruView and OptiView. These are dedicated custom hardware with support and interfaces that provide both 1Gbps and 10Gbps connectivity.

Visual TruView™ Appliance

TruView provides the ability to track, baseline, trend and monitor individual application performance of every end user experience, enterprise-wide through a highly customizable dashboard. It also provides high volume packet archival at 10Gbps line rate and comprehensive VoIP/Video monitoring and troubleshooting.

More information at www.flukenetworks.com/truview



OptiView XG® – Automated network and application analysis

The OptiView XG is the first tablet specifically designed for the Network Engineer. It automates root-cause analysis of network and application problems allowing the user to spend less time on troubleshooting and more time on other initiatives. It is designed to support deployment of new technologies, including unified communications, virtualization, wireless and 10 Gbps Ethernet. The result is that new initiatives get up and running faster and network stay productive even in these days of smaller teams.

More information at www.flukenetworks.com/xg



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3. It enhances team collaboration through a simple web-remote interface and easy-to-use inline packet capture capabilities.

More information at www.flukenetworks.com/OneTouchAT



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