



Traffic Visibility Networking (TVN) can Simplify and Scale IT Operations in a Networked World

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Introduction: The Era of Networked Computing Is Here

IT has been through several major transitions since the birth of computing. Corporate IT has gone from mainframe computing to client server computing to Internet computing, and now the industry is in the midst of another major computing transition — the shift to networked computing. In the era of networked computing, corporate workers are untethered from traditional IT models. Users finally have the ability to access any application, from any device over any network, allowing users to work or play at any time, from anywhere. There was no tipping point for the rise of the networked computing era; instead it will continue to be driven by the following IT trends:

- **Virtualization:** Virtualization technology has been around for about a decade, but has primarily been used as a tactical technology to consolidate servers. Virtualization technology has evolved past simple server consolidation to touch more IT resources including network appliances, security applications and other resources. Virtualization can be used to create a very fluid IT model where resources can be allocated to any application, as the business requires.
- **Cloud computing:** This is the ultimate manifestation of virtualization. As more IT resources are virtualized, it will be more common to see resources pushed to the cloud.
- **Wireless access:** Wireless access (4G and Wi-Fi) has evolved rapidly over the past 24 months. With the ratification of the 802.11n Wi-Fi standard and the commercial availability of 4G services, it's now possible to accomplish almost any task without having to rely on a wired connection. This has given rise to a fast-growing mobile worker population, as the difference in user experience between wired and wireless access speeds is now negligible for most corporate applications.
- **Consumerization of IT:** The use of consumer technologies is now commonplace. ZK Research indicates that 55 percent of CIOs support the use of consumer devices in the workplace. This is a marked attitude change from just a few years ago when most IT executives resisted the idea.

These trends converge to create an IT “perfect storm” that makes it possible for workers to accomplish any task from any location over any network (see Exhibit 1, below). Workers are also free to integrate their personal lives with their professional personas to create a truly blended work/life environment.

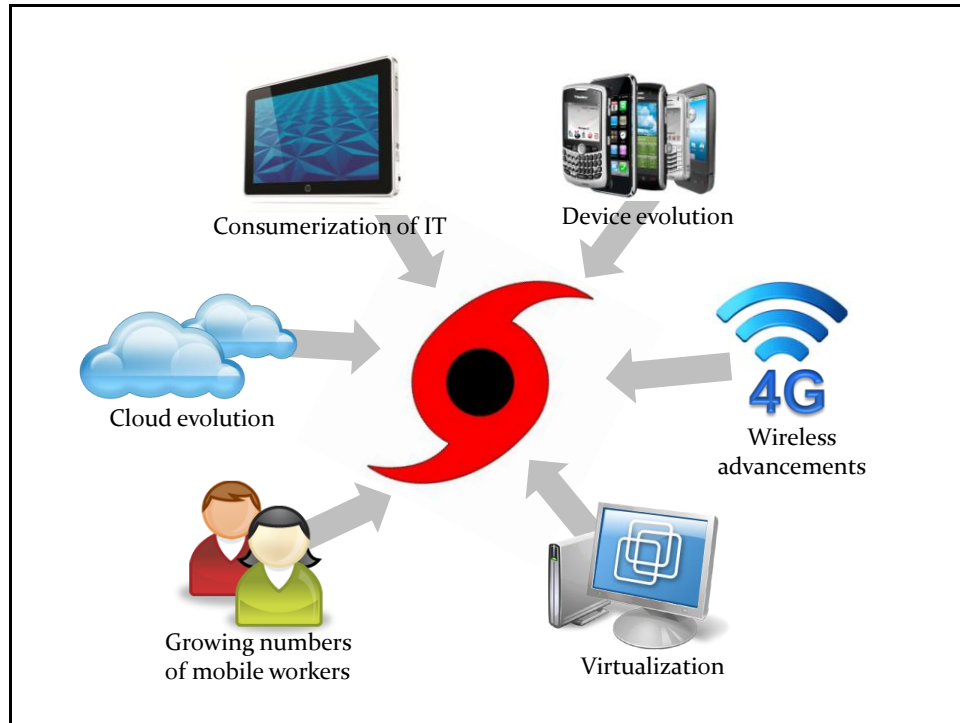
This IT shift will forever change the way people live, work and learn. However, as this trend continues to accelerate, IT managers need better visibility into the network to effectively understand network traffic, speed up troubleshooting and have a good understanding of the end-user experience.

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Influence and insight through social media

Exhibit 1: The IT Perfect Storm

Source: ZK Research, 2012

Section II: IT Complexity Is on the Rise

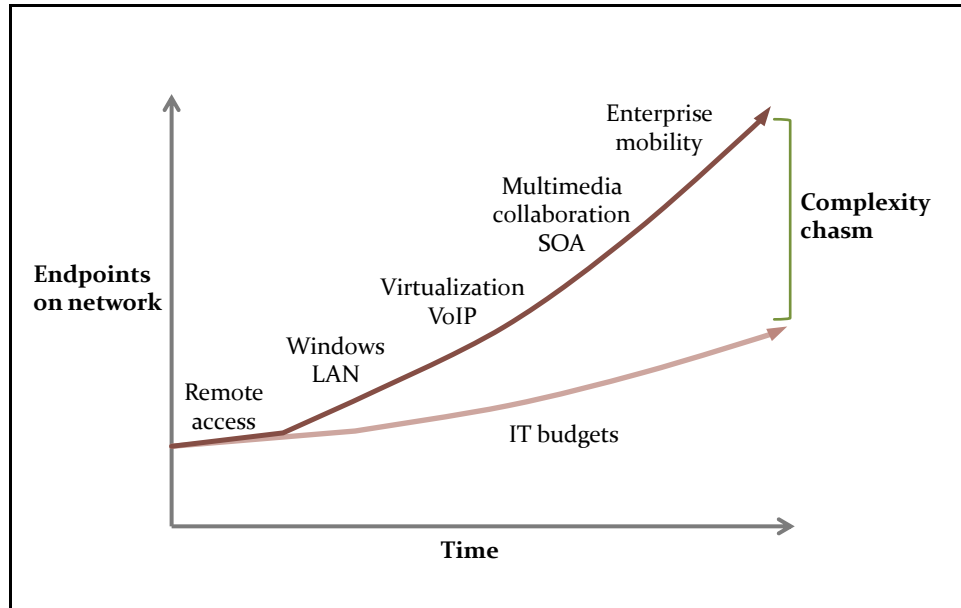
Advancements in IT over the past decade allow companies to do much more with technology than ever before. Workers can accomplish things today that were impossible just a few years ago. However, complexity has continued to grow for the IT professional. Where fixed technology is now mobile, physical infrastructure is now mobile, and tightly integrated systems are now virtual, understanding and solving problems is much more difficult.

For example, consider corporate voice as an application. The historical deployment model for this was a fixed phone, a PBX, which was a self-contained unit with processors, storage, memory, etc., and a cable that connected the phone to the PBX. If a user was experiencing a problem, it was likely to be the PBX, phone or the cable. The architecture was relatively simple, and so was diagnosis and repair.

Now consider a modern unified communications (UC) system. The solution is comprised of multiple

servers. Some may be running on virtual machines, some on dedicated servers; the application could be running in a hosting center, corporate data center or even in the cloud. Users can connect over a fixed cable, cellular link, Wi-Fi or any other access method. The end point can be a fixed IP phone, cellular phone, softphone client or mobile phone client. The worker can be located in an office, branch office, at home or virtually anywhere in the world. Identifying the root cause of a problem in a system with so many variables is difficult, if not impossible with legacy management tools.

Looking into the near future, as application development continues to shift from monolithic applications to smaller, mash-up style applications and as desktop infrastructure begins to go virtual with virtual desktop infrastructure (VDI) technology, the complexity chasm will continue to grow at an accelerated pace (see Exhibit 2, below).

Exhibit 2: The IT Complexity Chasm Continues to Grow

Source: ZK Research, 2012

Complexity will increase not just in one area of IT, but in all areas, specifically:

- **Networks** historically are architected to be fixed and static. Workers came to a specific place and performed their jobs, and network flows were predictable. Today's network is fluid, mobile and dynamic. Enterprise connectivity extends past the physical confines of headquarters and branch offices and over the public Internet, to the campus and into peoples' homes. This creates unpredictable traffic flows and brings new challenges to managing the network.
- **Servers** were deployed on an application-by-application basis, and physical hardware was dedicated to specific applications. Today, through virtualization, any physical server can support dozens of virtual machines, with the ability to create new virtual machines, move existing ones, or delete them as the business requires.
- **Applications** were deployed in tightly integrated infrastructure silos that were predictable and manageable. These same applications are now pushed into the private or public cloud for IT agility, cost benefits and scalability. However, most organizations do not have application-level network visibility, making user experience management difficult.
- **Storage** continues to grow at an exponential rate due to an increase in video traffic, social media and content creation. This increased capacity puts an additional burden on the network.

Organizations are also looking to converge their storage and data networks to bring an additional level of cost-effectiveness and control the spiraling costs of exponential growth.

- **End-user devices** were always procured, managed and controlled by internal IT. This is no longer true, as the consumerization wave has become an unstoppable force. This means the device is no longer an effective place for IT to deploy agents to manage user experience.

IT has gained a tremendous amount of flexibility to allow the business to achieve unprecedented levels of collaboration and productivity. However, as the business continues to leverage the networked computing era, IT needs better visibility into who is on the network, what traffic is traversing the network, where information is accessed from and where it is going to, and when these events occur.

For the necessary insight into these issues, organizations should leverage the network as the main resource for information.

Section III: The Role of the Network in Understanding User Experience

Managing IT infrastructure and understanding the user experience was historically done by monitoring the various IT elements, such as devices, storage, servers and the network, and IT attempted to correlate the information manually. This was not ideal, but it was effective when IT infrastructure was static and deployed in tightly defined silos. Today, legacy management tools are ineffective. To understand how IT is performing, it is critical management strategy is network-centric. The network is ideally suited for the following reasons:

- The network is the single IT resource that reaches everywhere. It is the only resource that understands the origin and destination of all data.
- The ability to bridge the physical and virtual infrastructure is best done through understanding network traffic flows. In many ways, the network is virtualization agnostic, and can see blind spots in the compute infrastructure.
- User experience can be measured from network performance. If accurate baselines are established for any service, any deviation from this baseline indicates degradation.

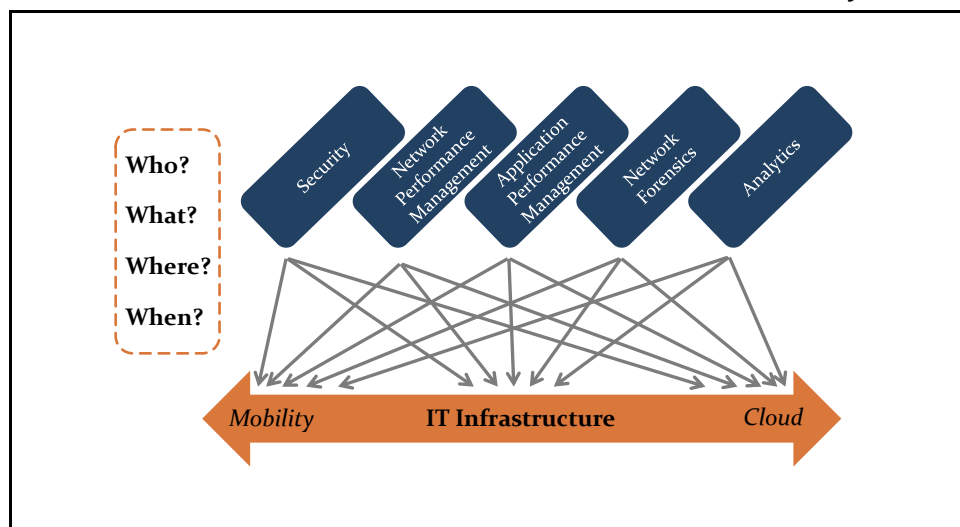
The shift to networked computing makes the network the most cost-effective, scalable place to

enable end-to-end visibility and understand the who, what, where and when issues.

Organizations that set forth to establish visibility deployed a wide range of tools that gave part of the picture. These were tools such as security appliances, performance management systems, network forensic applications, application monitoring solutions and network analytic systems. These systems were limited in value to the type of information and traffic fed into the system. If the traffic was limited to a specific LAN segment or branch, the visibility of the tool was limited to that LAN segment or branch.

This solution was adequate in a static IT world, as network managers could connect the tool in the area where value would be maximized. However, in today's networked computing environment where resources are always on the move, the area where value can be maximized can change frequently and in real time, significantly limiting the value of the tools. With IT shifting to the cloud and outside the physical confines of the corporate walls, the problem is exacerbated, and understanding the who, what, where, when of the problem becomes almost impossible (see Exhibit 3, below).

Exhibit 3: The Multifaceted Problem with Network Visibility



Source: ZK Research, 2012

The most effective way to gain end-to-end visibility through the network is to build a traffic visibility fabric.

Section IV: The Traffic Visibility Fabric

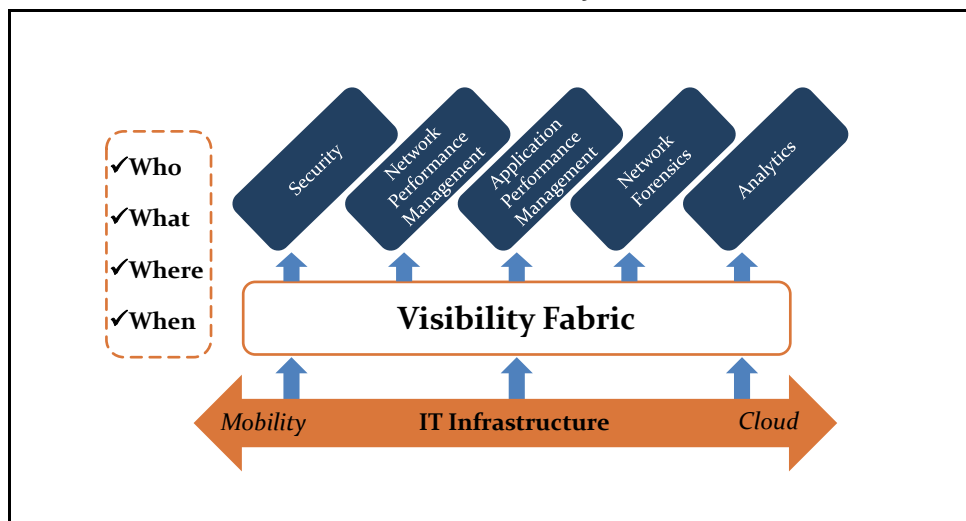
The traffic visibility fabric can be thought of as visibility middleware that sits between the IT infrastructure and the tools that need the data.

The visibility fabric delivers the necessary level of visibility essential for operating, maintaining, securing and optimizing the current IT environment. The fabric can deliver pervasive visibility from the millions of flows, thousands of events and hundreds of changes that occur within the increasingly complex IT infrastructure in real time. Additionally, the visibility fabric can prioritize critical traffic flows over nonessential ones, and one application over another, while also optimizing packet information.

It can see across physical and virtual borders, removing blind spots created by virtualization. Lastly, the visibility fabric can see into mobile and cloud environments so IT organizations have the clarity and visibility that is crucial to secure, operate and optimize IT services and applications (see Exhibit 4, below).

With the visibility fabric in place, the systems and tools that were recently limited by the number of connection points, volume of traffic and by the performance enhancements on the network can deliver their full value, increasing ROI.

Exhibit 4: The Visibility Fabric



Source: ZK Research, 2012

Without the visibility fabric layer, enterprises often wind up over-buying analytic, management or security tools to establish more functionality in more locations. End-to-end breadth was accomplished through additional spend, not through more efficient utilization of the tools already purchased. While this can partially solve the problem, it drives the total cost of network operations higher and higher.

Other major benefits of a visibility fabric are:

- Ability to understand the criticality of traffic flows and prioritize them at the flow, packet or application level. Simply adding more information doesn't always add more value. The ability to send the right information to the right tool optimizes system performance and provides the best intelligence and clarity.
- Provides visibility across the physical and virtual worlds. Managing the physical and virtual IT environments is often done with separate tools. Each tool is blind to the other. This means any kind of correlation between the physical and virtual world must be done manually. The visibility fabric can deliver a single view.
- Extends visibility into the cloud. While the appeal of the cloud is strong, the fact is, IT departments cannot manage cloud-based resources with legacy management tools. A visibility fabric is the critical missing element needed to shift more IT resources to the cloud.

- Can direct the right information to IT management and analytic tools, increasing the ROI of these investments. Organizations have spent millions of dollars on analytical, security and management tools. Instead of spending more on these tools, a visibility fabric can deliver the right information to these tools (which may have missed some this information before), increasing overall value.
- Enable IT to become predictive rather than reactive. Discrete information stores and tools can help IT troubleshoot problems and fix them quickly. However, the visibility fabric enables IT to predict when service is degrading and fix the problem before users call about the problem. ZK Research finds 75 percent of IT infrastructure and application problems are currently reported by the end user, not the IT department. Shifting to a fabric-based approach can significantly reduce that percentage.

Section V: What to Look For in a Solution Provider

The decision to implement to a visibility fabric is a critical step in being able to manage IT in the networked computing era. However, the choice of solution provider may not be an obvious one. Below are some of the more important factors to consider when selecting a solution provider.

- An intelligent and versatile solution: Visibility nodes must understand what traffic is important and what isn't, which flows have value and which ones do not, and which applications should be prioritized over others.
- The ability to be the traffic cop: Sending all of the data and information to all of the tools is not optimal. The solution must be able to understand what traffic is relevant to the various management and security systems and direct it accordingly. This will optimize the performance of the management and security tools.
- A solution that goes beyond simple ingress and egress traffic filtering: The visibility fabric should apply intelligence to the flows to remove duplicates, mask sensitive information and truncate traffic if necessary.
- Ability to span network boundaries: The corporate network has expanded outside traditional walls. The visibility fabric must also span mobile and fixed boundaries, the physical and virtual boundary, and the public and private clouds.
- Should be managed as a single fabric instead of a collection of devices: Some visibility solutions will claim to be a system, but parts must be managed independently. Evaluators should pay particular attention to the software interface, as this is critical for the ability to manage the solution as a single fabric.
- Extensible fabric: The visibility fabric must have enterprisewide breadth, but most organizations will want to start with a focused deployment. The solution must allow adopters to start with a single node and then migrate to a large, multinode deployment easily.
- Wide range of products: As with network technology, one size definitely does not fit all. The solution provider must have a wide range of products from purpose-built, fixed form-factor visibility nodes to large chassis-based systems for high-density high-performance environments.
- A nonblocking solution: More and more applications rely on the network for delivery. A visibility fabric solution needs to handle millions of traffic flows per second without performance degradation. As the fabric continues to grow in value, a nonblocking solution becomes a must-have.

Section V: Conclusion and Recommendations

IT is going through significant transformation — the shift to network computing. This shift is driven by the IT megatrends of increased performance of wireless access, virtualization, cloud computing and consumerization. Businesses can accomplish much more than ever, and are moving closer to the ultimate goal of permitting workers to accomplish any task from any location with any device.

However, increased flexibility and improved resource utilization does have a price. The complexity chasm IT faces is growing wider at an accelerated pace. As mobility and cloud computing continue to grow, it is critical for organizations to have an increased level of network visibility. This allows IT managers to understand who is on the network, what traffic is traversing the network, where information is being accessed from and where it is going to, and when these events occur.

With this understanding, ZK Research makes the following recommendations:

- Shift IT management strategy away from discrete tools and deploy a traffic visibility fabric. This will maximize existing investment in management, security and analytic tools.
- Know your network. Understanding how traffic flows, what normal baselines are, and what changes are taking place will help network managers be more predictive. IT will be able to address problems before they impact users.
- Focus management on user experience. Understanding how the infrastructure is performing has IT value, but no direct business value. Focusing on user experience provides IT with the ability to more directly measure the value of technology and create measurable ROI. A visibility fabric makes it possible to do this in a scalable, cost effective way.