



AppFlow: next-generation application performance monitoring



Introduction: monitoring application performance has become more complex

In today's always-on and connected world, organizations are investing in IT to better reach and serve new and existing customers, optimize employee productivity and operational efficiency and drive competitive differentiation and profits. Organizations are looking to IT to maintain application availability, provide answers to key questions and deliver the business intelligence needed to make meaningful and data-driven decisions. For example:

- As datacenter boundaries blur and disappear, cloud services are introduced, and use of mobile access devices proliferate, how can SLAs be monitored and ensured?
- How can one obtain clear end-to-end operational visibility from users to application services, in real-time, with existing tools, and without a huge investment in network taps and agents?
- Who's accessing application resources? Where are they coming from? What type of browsers and devices are they using? What are their usage patterns? How are the applications performing for those users?
- Given knowledge about users' profiles and behavior, are the apps aligned with the users' needs? In other words, are the apps optimized to deliver the best experience possible?

The answers to these questions are hard to synthesize. What's making it even more challenging is the transformation of IT. As application portfolios expand to include mobile applications, virtual desktops, and cloud-delivered services, traditional tools are no longer suited to provide the application service performance monitoring and management needed. What is required is an open, standards-based and non-intrusive approach. One that has the flexibility to be deployed in public and private clouds and that is not locked to a set of proprietary tools. It's time to reexamine what it takes to achieve application visibility and what kind of end-to-end holistic data is needed to answer the questions business are asking for in this new era.

Requirements for next-generation application performance monitoring

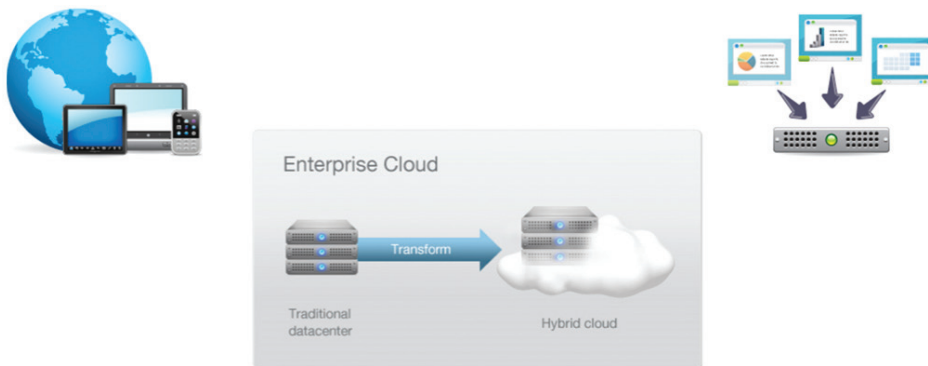
Enterprise IT is aggressively embracing new operational and business intelligence solutions. As these solutions are rolled out, IT managers are now realizing the need for commensurate advancements in the underlying infrastructure in order to provide a complete picture of the application and service performance demanded by their business partners. The tools available today provide some application or network visibility, but each has a limited view of data, and so can only report on specific aspects of your IT environment. This limits the range of business problems that each tool can help to solve.

For example, if revenue for the web site begins to decline, web logging data alone can't show any particular reason. Networking data from NetFlow alone won't show any particular issue. However, combining the two might suddenly reveal that iPhone users are experiencing bad network conditions and as a result aren't completing potential revenue-generating transactions.

The only way to get this data today is to leverage costly network taps, devices that watch the network and the applications that run on it at a packet level. Taps can be very expensive, and with the growing use of public and private cloud technologies, may not be able to be used at all. Can you imagine calling your cloud provider and asking for access to a network tap?

This macro-shift in datacenter topologies, increased demand for business intelligence data and cost reduction initiatives means re-thinking application performance visibility and how to achieve it. What you need is useful and flexible end-to-end application performance monitoring for modern enterprise networks—monitoring that encompasses the full range of applications that you depend on—using solutions that are:

- Cost effective
- Cloud compatible
- Standards-based



IT Transformation

Cost effectiveness: taps are an expensive solution

Capturing data today requires monitoring each step of a transaction along the network path. Network taps watch the network at a packet level and feed complex analysis systems that reassemble transactions to produce a complete picture of what's going on for both the end user and the application.

The most visible cost in this equation are the taps—devices that simply make visible what the network already knows. Despite this redundancy, organizations often spend millions of dollars a year to extract this information. Getting rid of these devices and leveraging existing footprints in the network becomes a key requirement to achieving the goal of cost reduction. Alternatively, the right solution should leverage the application and transaction data already captured in the network itself enabling business and operational intelligence for enterprise and cloud services. Pulling data from existing networking devices transforms enterprise and cloud networks into an invaluable source of real-time data, reduces the overall solution cost, provides rich end-to-end data on each application flow and reduces the complexity of the network.



Cloud compatibility: enterprises are increasingly leveraging the cloud

An informal survey done by a major cloud performance metrics vendor in early 2011 found that up to 30 percent of enterprise web applications were already using some element of the cloud, whether intentionally or not. That percentage is set to continue growing.

The shift towards the cloud requires a shift in how you think about analytics and the datacenter. You just can't get data from taps in a public cloud, because no such thing exists. To be cost-effective, cloud components must follow a standard deployment model, and taps would require deviations from the cloud's pre-planned network. Security issues further complicate matters, as tenants in a cloud wouldn't want others seeing raw packet data from the shared network.

If you're using private clouds, the same obstacles to implementing taps apply. The key to reducing costs is a standard network configuration that is replicated everywhere, and expensive taps simply cannot be a component of a cost-effective network.

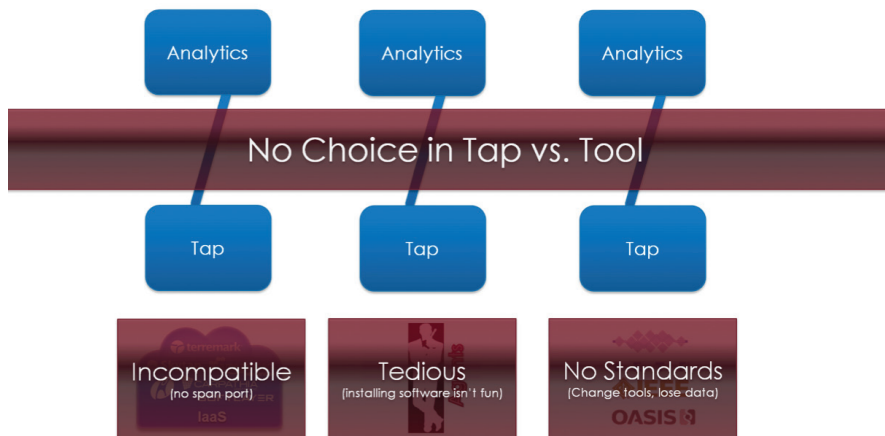
Cloud compatibility is fast becoming a key requirement for application performance management. As applications either move to the cloud or use cloud-hosted elements, you need software-based virtual network appliance options. By using a virtual appliance deployed into a cloud network, you can capture records for each application flow, without any need to 'touch' the cloud network infrastructure.

Standards: key for getting the right business intelligence

Tools for garnering business intelligence from end-user activity, networks and application servers vary widely in what they report. Rarely does one size fit all when it comes to reporting. This makes sense, because different organizations are looking for different kinds of data.

Though tools don't need to be standardized, they would benefit from standards for gathering data. Today, standards exist for getting application log data (W3C), systems log data (syslog) and core packet data (NetFlow/IPFIX). However, the realm between the network and the application remains a standards-absent zone where network taps and reassembly of application transactions still need to take place using proprietary tools and protocols. This limits the number of vendors and the kinds of tools available for pulling together the full range of business intelligence.

Standards must emerge before you can get true choice in this market. Standards democratize data and allow market choice.



Introducing the AppFlow standard

Now there's a new standard that can fill this need. AppFlow is a new industry standard for unlocking application transactional data processed by the network infrastructure. Because AppFlow is an extension to IPFIX—also known as NetFlow, a well established standard for capturing network flow data—a wide array of tools is already able to accept AppFlow data with little incremental work from IT. Once these tools can draw on application-level flow data, they begin to offer business intelligence about the links between the application and the network.

AppFlow addresses the three requirements of effective application performance management:

- **No need for costly network taps** – administrators can get the data they need by leveraging existing network footprints—without investing in costly taps that replicate network span ports. Eliminating taps can save millions of dollars depending on the size of the organization. Even for smaller organizations, eliminating network taps can save a significant amount of money.
- **Inherently cloud-friendly** – as an increasing number of infrastructure vendors move to offering virtualized components and their customers adopt them, datacenters can leverage these footprints to extract AppFlow streams by simply enabling the feature. With AppFlow, you can make the transition to virtualized cloud-ready infrastructure without losing visibility.
- **Standards-based** – AppFlow is an extension to IPFIX, an IETF standard for exporting flow records. AppFlow is meant to be a truly open standard; its complete specification is open to the public and available for networking and performance monitoring vendors to adopt it in their analytics tools and infrastructure products. The AppFlow community supports the standard with active participation from customers, AppFlow vendors and industry experts. An open industry site, www.appflow.org, anchors the community with sharing of best practices, new AppFlow tools and expert implementation guidance.



Details of AppFlow

AppFlow records have two parts. The first provides the TCP information pertinent to each application flow. This includes source and destination data, packet counts, timing information, latency and transaction and connection IDs.

The second is application-specific. Network devices can generate application identifiers for any application. All application transactional information, such as URL, user agent and server response times, are tightly coupled with the network data, correlated per user session and connection and exported to an AppFlow solution.

Current tool vendors can get a quick start by leveraging the reports that they already have, because existing implementations of IPFIX can automatically skip the AppFlow data without issue. As vendors parse the AppFlow-specific data, the nature and depth of their reports will become richer and increase their potential for delivering true business intelligence.

Potential business benefits of using AppFlow

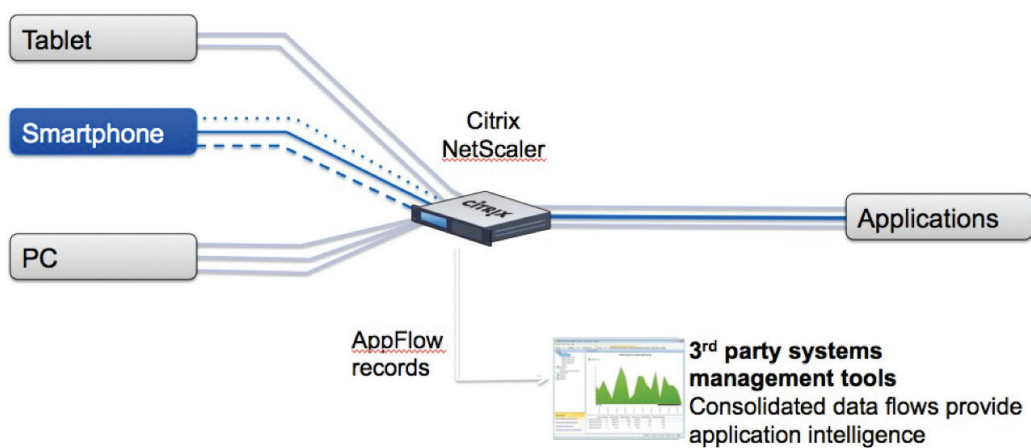
AppFlow opens up an exciting range of possibilities in application data analytics that traditional traffic monitoring tools could never offer. With AppFlow, you can:

- Quickly identify application response times that exceed SLAs, impacting overall user experience and leading to loss of revenue or page views.
- Granularly monitor the performance and availability of applications delivered to each virtual desktop to maintain the best user experience and support the migration from traditional desktop models to VDI.
- Determine whether changes in the environment, such as newly added support for IPv6 or 2048-bit SSL migration, have slowed down any application. You can now pinpoint the exact cause of performance degradation for quick remediation and restoration of enterprise SLAs.
- Immediately identify aborted application customer transactions, so that you can fix problems and customer support representatives can contact affected customers.
- Automatically identify sources of application requests that are negatively impacting the overall responsiveness of the application. For example, you can determine if large file uploads or page downloads are impacting site performance and take corrective action by routing problem requests to dedicated resources in a way that isolates all other users and maintains SLAs.
- Quickly generate Top-N reports, including top applications being requested, top application pages/resources, top sources of application demand and top browsers (including version) accessing each application to better understand how users are leveraging your online resources.

Citrix® and AppFlow™

As the creators of AppFlow, Citrix has been aggressive in incorporating AppFlow support in its products. Citrix NetScaler® is AppFlow-ready, with all NetScaler appliances and editions supporting AppFlow.

NetScaler and other Citrix networking products, including Branch Repeater WAN optimization controllers are the right place to start with AppFlow because of their strategic role in the network. Combined, they have a ‘line of sight’ for all application traffic, giving you visibility into all flows, users and transactions. AppFlow automatically records and exports data correlating client-side traffic metrics with server-side performance metrics to provide a true end-to-end, real-time application visibility.



Summary: AppFlow helps support application performance in today's complex environments

Managing application performance is just as important as ever, but organizations today are under new pressures to cut costs, incorporate cloud-based applications, and gather more extensive business intelligence. These shifts in businesses' requirements and datacenter infrastructure call for a new approach to collecting application performance data.

AppFlow answers the call, making it possible to access true business intelligence about the end-user experience and the resulting business impact. By building on the IPFIX standard and drawing on multiple log formats, AppFlow starts with an established ecosystem of application analytics tools and extends their reach and potential without expensive taps. Instead, AppFlow leverages in-place footprints within existing infrastructure, working in virtualized environments such as clouds and delivering the data in an industry standard format that makes application performance monitoring accessible to all organizations.

For more information on AppFlow, visit www.appflow.org or www.citrix.com/netscaler

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