A BUSINESS CASE FOR NETWORK & APPLICATION PERFORMANCE MANAGEMENT

Testimonials & Use cases

NOVEMBER 2012
FOREWORD

Almost any organization that relies on IT to conduct its business operations has a need for network and application performance management.

Among the challenges of IT management, here are the ones having a direct impact on Performance Management:

- Large variety of applications
- High sensitivity to availability and performance
- Many applications have a large impact on operational productivity
- Fast pace change (merge, concentration, IT integration)
- Limited IT resources
- Open systems to outside users / partners

Why is Performance Management essential in IT management tool set?

- Avoid operational & productivity loss
- Help handle complexity
- Need to have collaborative resolution processes (internally and with external partners)
- Deal with changes appropriately

This white paper is based on customer feedbacks collected through years of collaboration and present a set of use cases using Performance Vision of SecurActive.
IT PERFORMANCE CHALLENGES

MASSIVE VARIETY OF APPLICATIONS
Organizations have a growing number of applications running on their infrastructure: any organization now has tens of applications and this figure can reach more than hundreds in large entities.

Each entity / department now has specific application(s) that supports its operations. In some cases, distinct departments may use different application vendors for the same operations.

The outcome of this situation is that the infrastructure is used by an outstanding variety of applications; hence it is hard for administrators of IT infrastructure to have a complete understanding of how each application runs over the network. Furthermore many application vendors are very specialized and relatively small companies, whose technological basis may be outdated and sometimes inadequate to new deployment conditions (e.g. WAN delivery, Wi-Fi, remote access, etc…). This variety ends up into an exceptionally high complexity for infrastructure administrators.

HIGH SENSITIVITY TO AVAILABILITY AND PERFORMANCE
By definition many organizations are run 24 hours, 7 days a week, with no exception and all their operations have to be permanently available.

Time is a critical element to deliver products and also to be able to support processes that support services you deliver.

Many applications have a large impact on staff:

- Some applications are mission critical and their unavailability or malfunction may translate into direct revenue loss.
- Other applications that are not mission critical drive directly the staff’s productivity and link directly into critical flows / processes.

FAST PACE CHANGE
Organizations have rapidly adopted computer applications to support many processes. Few processes are now independent from IT applications. IT and operations are now tightly integrated with large productivity gains, but also a large dependency on the IT infrastructure.

**THE NECESSITY TO SHARE AND OPEN IT SYSTEMS**

Organizations now have to offer the ability to share information outside their corporate network; for example, partners, agents, customers located in other locations need to access data to be able to conduct their business with the organization.

**LIMITED IT RESOURCES**

Despite the computerization of the operations and the overall growth / merge of organizations, the size of the IT administration team has been fairly stable.
WHAT CAN PERFORMANCE MANAGEMENT BRING?

Performance Management solutions help IT staff to:

- Understand the performance experienced by end users,
- Quickly pinpoint the root cause of slowdowns,
- Understand the use of their infrastructure,
- And continuously improve the overall performance.

Given the complexity of IT systems and the resources available, N/APM solutions are necessary to help the IT infrastructure team to provide the right basis for operations.

Organizations implementing network based N/APM solutions usually go through the following 4 phases to leverage their N/N/APM solution to improve performance:

PERFORMANCE ASSESSMENT

Right after implementing the N/APM tool, teams usually start collecting data about the current performance status of their IT system. They usually identify a large list of pain points, which got accumulated through time and the different IT migrations performed over the years. Some may have an impact on end users; some may not or not yet.

Within a few days, they identify:

- Worst performing applications
  - Transparent view of the worst performing applications for end users.
  - Clear view of the origin of the slowdown / sloppy performance rates (server, application, network, etc...)

- Network Performance holes
  - Which segments are impacted?
  - For which applications?
• Name resolution performance issues
  o DNS/WINS server performance
  o Wrong DNS targets
  o System level DNS configuration (e.g. no cache)

• Misconfigured hosts / servers
  o Systems with inherited and inadequate configuration
  o Poor network configuration
  o Blocked network traffic

• Misuse / bandwidth
  o Unexpected network usage (illegitimate applications)
  o Over-consuming applications
  o Flows taking place in bad time window (e.g. backups).

After this first assessment, the IT infrastructure team usually gets a clear picture of a certain number of performance pain points and can establish a roadmap to improve the overall IT performance.
The email received from the IT Director of the Chirec Hospital in Brussels provides us with a good example of the results of a performance assessment performed with a network based N/APM:

Customer testimonial

Mr Luc D’Haene – IT Director at the Chirec Hospital – Brussels

Our performance monitoring platform is now in place; even if its configuration is not finalized yet, it already made it possible to:

- Identify anomalies at the application and at the network levels;
- Open discussions with software vendors based on concrete data and help them optimize their applications;
- Confirm or deny work hypothesis.

Here is a list of findings after the first weeks of performance monitoring with Performance Vision:

- Web antivirus running out of resources in our virtualized datacenter;
- ARP storm: we have been able to take some actions; one of our PA8X providers corrected its configuration; we still have to solve the cluster heartbeats issue.
- Some excessive data transfer times drove us to start an external audit of our network and pursue a more in-depth thinking of our 5-year plan for the new hospital;
- Some TCP/IP errors impacting several departments;
- Malfunction in our intersite Wi-Fi connection;
- Backup of one of our critical applications in day time: we are now aware of the issue; the resolution is in progress as part of the migration of the backup flows to a separate 10Gbps network. We could easily notice the impact on the network and application performance rates.
- Nursing file application: the software vendor recognized that their application had to be optimized (archiving of closed files, Database issue and excessive memory consumption);
- Billing application: our main server had no throughput issue (but some poorly coded SQL queries…), while our Tomcat front-end was running slowly. Since the vendor’s action, performance has gone back to acceptable rates…. Even if there is still quite a lot to be done.
- Other details of our day-to-day life: as an example, the confirmation of an issue on our main server (blocked by a database lock);

The objectives of our performance monitoring project were:

- Proactive monitoring, improve the resolution process involving several internal and external players (software vendors, network operators ...). We have provided all players with a limited view of our performance reporting (direct access to the information; they now have no excuse not to take action, when it is required).
- Update support project (not yet in place) : service management, change and release management, capacity planning, change impact analysis, etc...

Overall, we are delighted with the quality and skills provided by SecurActive’s team, as well as the service rendered by the probe.

Business Value for Money = Top!

Thanks also to our infrastructure manager, Mr Pineiro to have found this high value solution and thank you to all those took part in its implementation: some tough work days, a real “sprint” but highly rewarding! This is a real privilege to work in these conditions.”
FASTEN RESOLUTION AND REDUCE OPERATIONAL LOSS

Once the N/APM solution is in place, it should reduce the time during which end users are impacted by performance degradations. The cost of performance degradations is directly related to resolution time (please check the following white paper for more information: “The cost of performance degradations”).

The solution should impact the MTTR (Mean Time To Resolve) at several stages of the resolution process:

REDUCE THE REACTION TIME

Organizations that are not equipped with a performance monitoring device for their network and all their critical applications will be informed of the degradation by end users.

This information channel is slow for many reasons:

- Users will wait until they are exasperated before they make the call.
- As performance claims are based on a subjective feedback from the users, IT administrators will not consider it as reliable information, before it does impact many users or it gets escalated.
- The users’ feedback will remain too fuzzy and not specific enough for IT administrators to conduct a diagnostic. Their feedback is often limited to “the network is slow”, when IT administrators would need clear information about the degradation: for which application, at what time, running which precise transaction, execution time, etc...
- Performance degradations are very often intermittent; hence, even if degradation is reported, without an adequate solution, IT administrators will not be in a position to diagnose what just happened.

An N/APM solution is going to reduce reaction time in many ways:

- Administrators get informed of the strongest degradations before users even pick up the phone.
- Administrators can rely on an objective, unquestionable metric to evaluate the quality of experience and identify degradations.
- Administrators have historical and detailed information about what happened and can start diagnosing.
FIND THE ORIGIN OF DEGRADATION

This is the part where most unequipped organizations fail: as performance remain subjective, as it is usually intermittent and as traditional monitoring tools focus on availability and resource consumption (but do not keep track of performance), the different departments within IT will probably not notice anything abnormal within their perimeter (network, server, database, etc...) and will focus on showing that the perimeter of the infrastructure they have in charge is not responsible for the degradation.

Until this gets escalated and a clear decision to diagnose the issue is taken, several days or weeks of user’s productivity are going to be lost, generating subsequent operational productivity loss, as well as raising the frustration of both users and administrators.

A Performance Management solution is going to keep track of the evolution of Quality of Experience and will offer an easy-to-use facility to break it down into a set of metrics, allowing administrators to answer the following questions within a single click from the main dashboard:

- Is there a performance degradation?
- For which applications?
- For which users?
- Where is the root cause of the degradation? (network, server, quantity of data, etc...)

A couple of additional clicks should drive administrators to dive into the activities of a single user and its transactions. Once you have all this information automatically spread to all stake holders (internal & external), your resolution process can be collaborative and each department takes ownership of an issue which comes from their perimeter.
PINPOINT THE ROOT CAUSE

Once you can easily access all the information above and your Performance Monitoring automatically kept a trace of the transactions that were slow, it becomes easy to pinpoint the root cause. You will certainly have to cumulate this information with logs, configuration files and graphs produced by traditional monitoring devices to pinpoint the root cause.

Use Case

We received this screenshot from one of our customers, who wanted to share this with us, as it is full of learnings. Here we can see the evolution of the Quality of experience (End User Response Time) through a day for a given application.

- We can see that from the beginning of that day, the Server response time (in blue) increases throughout the morning and that the number of transactions which get processed remains limited.
- At 12:15pm the application crashes.
- After 15 minutes, the application restarts and the Server response time gets back to normal level (in blue) and many more transactions get processed to catch up with the ones that could not be processed in the morning.

Our customer explained us that this application can make a “non-optimal” use of RAM as any file opened by an operator and not closed afterwards (this seems to be the case of a large number of them) remains stored in RAM. Over a certain number, this becomes impossible and the server starts to use swap on the hard drives and slows down.
PROACTIVE MANAGEMENT

Once an organization is able to deal with performance degradations, the next step is to protect users from degradations. A Performance Management solution can help achieve this by raising the attention of administrators on potential pain points and helping them to improve performance, even if there is no explicit complaint from users. Indeed users take the action of complaining when low performance severely impact their productivity. It is important to look for improvement on the most critical applications to contribute the overall efficiency of the organization.

Performance Management solutions will provide you with:

- Tracking of errors / pain points in your infrastructure
- Actual performance levels and drivers
- Ability to communicate and report clear data on performance rates

A performance management solution will report issues, even if they do not cause any formal complaints from users: misconfigurations such as systems calling a primary DNS server that does not respond, lack of cache in a system, instant unavailability of a system in an application chain, bandwidth rogues, misuse of network capacity; it is likely that these issues are generating a severe slowdown now, but in addition to other issues, they may cause a performance degradation in the future. By pinpointing these issues, a Performance Management solution can help avoid future degradations.

A performance Management solution will also report on trends and performance drivers for the performance of a specific application. Based on this, clever adjustments can be performed to proactively improve the performance of that application.

If these reports are widely communicated between IT departments as well as with external partners, you can involve all stakeholders in the continuous improvement of your application performance.

Here is a short extract from a presentation received from a SecurActive customer – a 2500 user organization. They use SecurActive Performance Vision to assess the use & performance of their network infrastructure, as well as the efficiency of their critical applications. In a first phase, it helped them identify pain points in their infrastructure, but also difficulties which were caused by parts provided by third parties: telecom operators and software vendors.

With a specific focus on phenomena impacting severely end user productivity, their internal IT team has started to work with their external providers in order to solve each of them.

Step by step, they have solved numerous issues, following up on their improvement through reports provided by their Performance Vision appliance.

The extract presented hereunder comes from a presentation provided by the software vendor of a critical application; the main purpose of the whole document is to demonstrate the improvement they have already made to their code from a performance standpoint... to materialize the improvement, they use ... our customer’s Performance Vision appliance.
In this slide, the software vendor is pointing out, that the peaks in Server Response Time (blue part of the cumulative graph) of nearly 800ms have disappeared. The Server performance is now much more stable (see second graph) and rarely exceeds 60ms (with increased application activity – from 12k transactions in peak times to 16k).

(Note: in this graph, 3 colors appear: blue for the Server response time, pink for Data Transfer Time, and yellow for Network response time. Obviously the actions taken by the software vendor, mainly impact the server response time and can only impact the data transfer time if the change in code reduces the volume of data sent to the server).

Extract of Software vendor presentation showing the reduction of the average SRT

In the second slide, the software vendor shows the reduction of the average Server Response Time from approximately 160ms to 40ms.

According to our customer, the feedback from end users has already been improved in a sensible way. They are also working on improving their network infrastructure to reduce data transfer time values.
CHANGE MANAGEMENT

Organizations face rapid and multiple changes every year; they may vary in size but always imply some risk for the performance level delivered to end users. The changes that the IT team deals with ranges from simple application version release, application migration to IT system merger.

To be able to limit the risks attached to these changes, IT administrators need to be able to evaluate the current status of their infrastructure (usage level, current issues, network and application performance rates), the impact of the change and control the actual impact during and after the migration. Not having such a visibility drives either to performance degradations or oversizing capacities and wasting budget resources.

Customer Testimonial

Mr Dewez, Paris Police Headquarters: “We started by making an assessment of all applications to understand their respective behavior: we pointed out a certain number of design faults, which had a negative impact on users despite good server and network performance. We also built a baseline and worked out the normal behavior of each application.

We also implemented a daily reporting on our most critical applications to check that their performance and behavior remained in line with the baseline.

Secondly, we proceeded to a large « house cleaning » operation : we got rid of large volumes of DNS errors, corrected the configuration of many workstations (which were using bad URLs or IP addresses for updates), as well as the one of certain servers relying on IP addresses instead of domain names, etc…

Performance has then been a central tool in many operations:

• While deploying a HR software, it enabled us to validate the localization and intensity of the different user groups on our network;
• As part of the troubleshooting of a slowdown on our mapping application, Performance Vision helped us to deal with complaints of slow performance and disconnections by providing an objective measure of the quality of experience and clear items for diagnosis.
• On a regular basis, Performance Vision gives us objective items to support our discussions with external software vendors. These elements enable our project managers to implement corrective actions faster. This avoids getting into lengthy back and forth discussions.
• As part of a QoS configuration optimization project, Performance Vision provided all the necessary data about bandwidth used by the different applications.
• As part of the management of the intranet sites by our webmasters, Performance Vision helped identify high consumers (excessive image format, videos, etc…) and made it possible to solve these issues faster.”
WHAT ARE THE CRITERIA TO SELECT YOUR PERFORMANCE MANAGEMENT SOLUTIONS?

DIFFERENT PERFORMANCE MANAGEMENT APPROACHES

There are three main approaches to Performance Monitoring; all three are based on different methods to collect data and measure response times:

- **End User Experience monitoring** (a robot replays predefined scenarios to evaluate the overall end user transaction time.)

- **Network & Application Performance Monitoring** (A set of probes captures the application traffic over the network (between clients and front server and eventually within the application chain).

- **Agent based Application Performance Monitoring** (Agents on all servers in the application chain monitor the execution of the application at code and system resource level.)
Obviously in an ideal world (unlimited time and human & financial resources), you would cumulate all three approaches; as this is rarely the case, one has to prioritize. Here are the advantages / drawbacks attached to each approach:

<table>
<thead>
<tr>
<th>N/APM Type</th>
<th>End User Experience</th>
<th>Agent-based</th>
<th>Network-based</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions answered</td>
<td>• What is the evolution of Quality of experience for the standard operations of my key application?</td>
<td>• What part of the application chain is causing the slowdown? • What transaction is slow? • What part of the code is executed slowly?</td>
<td>• Is there a slowdown? • Which applications and users are impacted? • What is causing the slowdown (network, server, data transfer) • For which transactions?</td>
</tr>
<tr>
<td>Limits</td>
<td>• Not in line with real use • Not explanatory (does not tell you why or what is failing)</td>
<td>• No vision of application delivery on the network • No vision of application environment (network, other applications...)</td>
<td>• No vision of the root cause when server driven degradation (code, server resources...)</td>
</tr>
<tr>
<td>Constraints</td>
<td>• Agent deployed on each client or robot • Configuration of each scenario</td>
<td>• Agent deployed on each server • Impact on server performance • Pricing per server or application chain</td>
<td>• Traffic capture by SPAN or TAP</td>
</tr>
<tr>
<td>Scope</td>
<td>One or few critical applications</td>
<td>One or few critical applications</td>
<td>All applications distributed over the network</td>
</tr>
<tr>
<td>Main Users</td>
<td>Helpdesk, reporting for management</td>
<td>Development teams, Q/A.</td>
<td>Infrastructure team, helpdesk</td>
</tr>
</tbody>
</table>

**WHY NETWORK & APPLICATION PERFORMANCE MONITORING IS MORE ADEQUATE FOR MOST ORGANIZATIONS?**

Among the different Performance Management solutions we believe that the network based approach is the more adapted to most organizations; here are the items that make these solutions more relevant:

- Number of applications: hospitals cannot afford to make a deployment for each application chain; it would be too costly to deploy server agents or to maintain robots with these many scenarios, from a financial and human resources point of view.

- Network delivery is key: to many applications. The network based approach is the only one which deals with this approach.

- TCO: most organizations cannot afford to spend massive investments and human resources on Performance monitoring; they need easy-to-deploy and maintain solutions.
CRITERIA TO CHOOSE YOUR PERFORMANCE MANAGEMENT SOLUTION

When selecting network and application performance monitoring solution, it is critical to choose one that deal with your specifics

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Number of applications</strong></td>
<td>A Performance Management solution has to deal with tens or hundreds of different applications; you should discard approaches based on filtering applications to limit the performance measurement to a few critical ones. Many applications are critical; infrastructure teams are not always aware a priori of the ones that are critical to each department. It is crucial that the solution gathers performance metrics on all the flows it captures. In the same way, the analysis perimeter should be restricted to a set of predefined applications (HTTP, SQL) but should have ways to report performance metrics on any TCP application.</td>
</tr>
<tr>
<td><strong>IT resources required</strong></td>
<td>The solution should not require additional resources but save time to your current resources; it is very important that all aspects of the administration of the performance management solution remain extremely simple: Ease of installation Ease of administration (updates etc...) Integration to your SNMP monitoring devices Etc...</td>
</tr>
<tr>
<td><strong>TCO</strong></td>
<td>The cost of the solution has to remain in line with the overall IT budget of the organization. You should consider the cost of extending the coverage of the Performance Management solution to your future architecture (e.g. multiple active datacenters, virtualized server farm, etc...).</td>
</tr>
<tr>
<td><strong>Distributed solution</strong></td>
<td>The solution should be able to be distributed with a reasonable additional cost.</td>
</tr>
<tr>
<td><strong>Support of virtualization</strong></td>
<td>The solution should offer several options to collect virtual traffic to be able to take in account inter Virtual machine traffic.</td>
</tr>
</tbody>
</table>
ABOUT SECURACTIVE

SecurActive is the leading European vendor of application and network performance analysis solutions. SecurActive has designed Performance Vision, a pragmatic and easy to use solution which helps IT teams to have a global visibility on both network traffic and application & network performance. Today, more than 500 customers in Europe use SecurActive solutions to monitor their IT performance. For more information, visit the SecurActive website at www.securactive.net.