Business Value of Performance – The Network Physics Experience

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Many vendors claim to manage the performance of networked applications - but what does that really mean for your business? NetForecast's mission is to quantify the value of better performance.

Before you purchase performance management technology, you must be confident that it will deliver maximum business benefit. Vendor-provided data is helpful, but there is no better information source than actual user experience. For this reason NetForecast interviewed Network Physics customers to learn first hand how Network Physics' solution delivers business value.

Business Value and Performance

Enterprises buy new applications to operate a business. The investment in cash, people, and time is often substantial—and the resulting benefits are typically linked to business process improvements enabled by a new application. Much is at stake when an enterprise deploys a new application, so management routinely does due diligence to understand the business benefits as well as the risks of deployment.

When deploying a new application, all eyes are usually on a high level goal (e.g. increasing sales or improving profitability), with research focused on how the new application can achieve that goal. It is usually just assumed that the application will perform well. After all, with so many people working hard to achieve the high-level goal, *surely* they made the right choices along the way to ensure adequate application performance. Performance is taken for granted, but often it is not specifically designed for and verified.

Soon after the application goes live, management often is surprised to learn that expectations are not being met, and starts asking why. The answer often centers around the way the application is delivered. Applications are often deployed without a complete support system in place to ensure success. This is like marching troops into battle without first ensuring they will be fed.

Continually managing the performance of business applications is vital to business success and inadequate knowledge about application performance jeopardizes that success. And managing performance must begin with understanding performance.

The most prevalent approach to performance measurement and management relies on traditional element managers, and applies the following process:

- We have a mental model of how the system works
- We monitor each part of the system
- Each part reports that it is working
- We conclude that performance is as good as possible

Troubleshooting with this approach entails looking for bottlenecks in the system (i.e. high utilization /overload of a particular element). If a bottleneck is found, resources are added to relieve it and performance is again assumed to be as good as possible. If no bottlenecks are found, it is assumed that the user complaints are groundless.

This "stovepipe" approach to performance analysis has the following flaws.

- It is unlikely that the system still operates as it did when the mental model of how things work was set.
- When all system elements report that "all is working well," it does not necessarily mean that the end-to-end user experience is a good one.
- The search for bottlenecks is often a search for a red herring that does not affect the user experience.

If not addressed, poor performance of a business application can jeopardize the business itself. Often, chronic performance issues turn into user, customer, or business partner problems.

There are better ways to measure and manage performance.

This study explored how Network Physics addresses the measurement and management of performance, and the customer-perceived business value of the Network Physics solution.

The Network Physics Solution

The NP-2000 is a flow-based appliance for managing network applications across large, complex, and dynamic networks. Its software monitors every flow between IP addresses (i.e., server and client, user and application, etc.) in internal and external enterprise networks and displays the resulting performance, utilization, route and packet metrics in the context of the business services, functions, users, and sites impacted.

The NP-2000 can be installed via spanning port or fiber or copper tap on a network switch, imposing no burden on the network. The appliance is typically installed at points of traffic concentration such as the edge of the data center as shown in Figure 1. The flow-based nature of the Network Physics technology makes it largely independent of changes in the physical infrastructure, maintaining its business-level visibility even when devices change or fail.
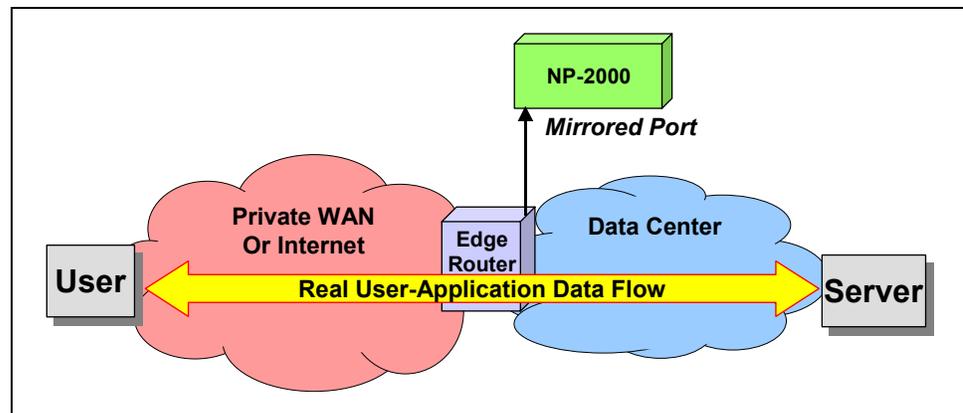

Figure 1 – Where Network Physics is Deployed

The NP-2000 takes advantage of the bi-directional views it has from its strategic location in the user-server application flow. New flows are identified as new packets arrive from the user. Tracking how well the system of switches, load balancers, SSL boxes, proxies, Web servers, application servers, database servers, and storage devices respond determines the data center half of the performance picture. Then, timing the packets

arriving from the data center and tracking how well the system of routers, Internet access lines, ISPs, peering points, user access networks, and user desktop respond provides the second half of the performance picture: the WAN.

The NP-2000 monitors actual network flows–all traffic, all the time–in real time, at speeds up to 750 Mbps. Recording over 50 network metrics in the context of the related flow, the NP-2000 intelligently synthesizes the data to reduce data volume by orders of magnitude, while maintaining its business relevance at every scale, from high-level business service performance down to packet-level granularity. The automated, per-flow reports include response time, utilization, and congestion measurements. Data can also be collected at the packet level via packet capture, the route level from traceroute, and AS level (Autonomous System) from BGP.

The NP-2000 allows managers to assign groups of flows, identified by their IP addresses and ports, to Business Groups, representing key business entities (e.g., business groups, offices, users, customers, data centers, server farms, etc.). It uses these business-level definitions to create the data collection policies for the underlying high-speed data acquisition engine. By biasing data collection towards the data most critical to the business, Network Physics overcomes the inherent data complexity by reducing the flood of data to manageable proportions, while preserving its business relevance at all scales of observation, from the highest business entities to the packet level.

Asset Management –Provisioning, Efficiency, Protection

Network Physics gathers detailed information on route/path provisioning, particularly for Web and Web Services on the Internet, where the NP-2000's BGP peering information is unique. This gives the customer deep insight into ISP performance and provisioning, topology, ISP peering, and MPLS provisioning (ingress/egress, AS info, intra-hop delay, etc.). In addition, the tool tracks connection rates, connection failures, and various connection statistics that indicate the establishment of a service. It also baselines those connections and can detect unexplained connection drop-offs that indicate a service failure or interruption.

Experience Management–Accessibility, Quality, Safety

User experience or transactional application quality are provided by good measurements of response time, loss, round trip times, server response time, network transfer time, etc. TCP control and setup components are sufficient to understand and extract an accurate representation of the end-to-end experience. Both client-server and peer-to-peer applications are treated the same, unlike so many other tools, since Network Physics does not assume a client-server model, but implicitly detects who is acting as the sender and receiver during any connection. This differs from most other models, which assume the server is inside the data center or require you to explicitly define the server. VoIP measurements focus on the control and setup back to the call manager, which is a TCP flow and critical for troubleshooting.

The NetForecast Methodology

NetForecast performed primary research to gather information about the business benefits experienced by enterprises using the Network Physics product. We completed in-depth telephone interviews with technical professionals responsible for application performance in five enterprises. The information submitted was cross-analyzed and integrated into this report.

We asked a series of questions to identify the business motivation for choosing the Network Physics technology, to determine what benefits enterprises actually experienced,

and to determine how each enterprise translated the improved performance they experienced into business value.

The Companies We Interviewed

The companies we interviewed included:
- An insurance firm
- A major computer manufacturer
- A media production and distribution company
- An international commercial bank
- An on-line business news provider.

The surveyed companies ranged in size from multi-million to multi-billion dollar corporations, and were using Network Physics' technology to monitor an array of applications including:
- Insurance claims processing,
- CRM
- ERP and sales force automation
- Email
- Employee surfing habits
- Online commerce.

Three of the companies interviewed were using Network Physics to monitor applications traversing their private networks plus Internet-facing applications, and two were using it to support applications running exclusively over their internal networks.

Key Findings

Faster, more accurate troubleshooting of performance issues was the most important benefit enterprises experienced using the Network Physics product. The second most important benefit was improved IT staff effectiveness, followed by more efficient IT resource utilization. Improved security, increased user satisfaction, and improved application user productivity also were cited as important benefits. For the customers interviewed, the ROI resulting from a combination of these product benefits was between three and six months.

Most of the companies interviewed expressed satisfaction with the ability Network Physics gave them to see and analyze network traffic by application. As one customer described it:

> *"It's like having a great magic mirror that you can hold up to the wire to see what's going through it. A lot of people are amazed. Even in places where they think they have a great handle, [people] are quite shocked that there are things sliding under the radar because they [couldn't] actually see what's there over time."*

ROI Results

Before purchasing the Network Physics product, most of the customers interviewed performed a return on investment analysis based on only one benefit. The benefits used to calculate this initial ROI included: staff savings from faster troubleshooting; savings in infrastructure expenses such as bandwidth; and cost savings from quickly detecting worms and viruses. These single benefit-based ROI projections fell into the six-to-twelve month range.

Once the product was installed, customers who re-calculated the Network Physics ROI based on the product's actual track record, found that the multiple benefits they experienced reduced the ROI time by approximately one half. So the actual ROI was achieved in a mere three to six months.

Faster Troubleshooting

Three of the customers interviewed listed faster troubleshooting as the primary benefit they experienced after installing the Network Physics product—and the remaining two cited it as second in order of importance. Customers found the Network Physics product provided information needed to identify application performance problems and quickly pinpoint their cause. Understanding the performance of an application from the end-user's perspective provides the detail required to properly identify performance issues, determine their root cause, and verify that system changes rectified the problem.

Interviewees reported that troubleshooting tasks that previously took hours were completed in minutes with Network Physics. According to one customer:

> *"What used to take one to two hours, now takes three to five minutes." Said another: "Every time we [had] a big problem it [was] taking us 20 minutes or an hour to isolate or even determine that we [had] a problem, and then start fixing it. Now if we have a problem, within minutes an operator looking at the screen who doesn't even know what they're looking at exactly can [determine if] we have a big problem or just a small anomaly."*

Increased Staff Effectiveness

Network Physics provided the companies we interviewed with previously unavailable performance information that allowed their IT staff to work more efficiently. Several of those interviewed found this touched off positive organizational culture changes. One network manager described the Network Physics induced changes his organization experienced.

> *"Before we had the Network Physics, any performance-type issues were immediately sent to the networking people as: "it must be a network issue." Then we would spend a lot of time in the network group trying to verify or identify whether it was a network issue or not. Now, because of Network Physics and the track record we have for identifying what the issues are, the number of first contacts with problems has reduced dramatically."*

Improved IT Resource Utilization

A consistent theme among the users interviewed was the ability Network Physics gave them to understand how IT resources were being used, and to correct inefficiencies. For example, one customer told us:

> *"It gave us insight into what was really happening and how it was happening, which was quite different from what everyone thought should have been happening. This is a really valuable thing because there were a tremendous number of assumptions about how it was working—that was how it was supposed to work, but that wasn't how it was working. Before we had the Network Physics box, we had no way to know that. A lot of very costly inefficiencies were corrected once we got Network Physics in place."*

The customer went on to describe how his staff was able to find and correct a situation in which Citrix users were thought to be accessing a server in their home city, but actually were accessing a server in a city hundreds of miles distant.

Several customers expressed surprise at what they learned about resource utilization once they installed the Network Physics product.

> *"The single biggest surprise to us was the number of things that were going on that we didn't know about. I don't want to imply that we were naïve— we weren't. It was the fact that a lot of things don't work the way you expect them to."*

Benefits Compared to Other Approaches

The Network Physics customers interviewed valued the fact that the information the product provides is real and continuous rather than synthetic testing, or the result of sampling. They also considered it a plus that the performance data is user and application specific, and that the data can be mined in as many ways as needed.

Business-oriented reporting was also seen also a key differentiator from other approaches, and several of those interviewed found the ability to see information by business function to be extremely useful in IT investment planning.

Summary of Benefits

Customers interviewed considered Network Physics essential in troubleshooting performance problems quickly and accurately, and they highly valued it as a tool to streamline their IT staff and infrastructure. Other important business benefits customers experienced include:

- A typical three-to-six-month return on investment.
- Increasing business value as customers learn firsthand what it can do in their environment.
- Cultural migration from "finger pointing" to collaborative problem solving.
- Real user and real-time information (rather than synthetically-generated data) to help customers understand true performance issues.
- Business-oriented reporting to help customers plan IT investments.

Overall, customers interviewed found that the Network Physics product was well worth the investment, and that the information the product generates benefits their operations.

Additional Business Value Observations

Hard cost savings in staff, bandwidth, and manageability are relatively easy to quantify, and often directly justify the purchase of measurement and management technology. However, the full benefit of these advanced tools is not realized without commensurate advances in management processes. New flow-oriented tools provide data that finally links IT performance to business performance. Although difficult to quantify, the long-term business benefits of process and organizational streamlining enabled by well-executed application performance measurement can be enormous, and should be factored into buying decisions.