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A Solutions Provider, to a Business & IT Equation

WHITE PAPER

# Green Your Infrastructure for Immediate Savings

Whether it's rooted in a commitment to the environment, pangs of social responsibility, a resolution to reduce dependence on foreign oil, stalwart support to end global warming, or simply the necessity to reduce power utility and operational costs in a down economy, "going green" has matured past fad status to become a viable corporate strategy for companies of all sizes. Regardless of the critical mass or the amount of careful consideration that went into answering the original question of whether green was right for your company, answering the question of "how" is the next logical step and is likely to be more bewildering and fraught with uncertainty of its own.

In determining the "how," you are committing to a strategy with all its implied costs. You are setting the stage for the ultimate success or failure of your green initiative, so fully understanding where your infrastructure is currently (the status quo), what you can expect to reasonably achieve, where there are quick "wins" and high-value opportunities, and formulating a methodology to appropriately manage expectations will greatly improve your odds of success. Although the questions likely far outweigh the answers at this point, formulating a well-informed plan with adequate insight is easily achievable with the help of network management technology designed to include power consumption and device usage details along with traditional capacity planning metrics.

This white paper will answer many of the common questions surrounding implementation of green IT initiatives and offer practical advice to establishing quantifiable and realistic goals. It will present a methodology for creating a business case for green IT as well as tips to successfully plan, deploy, and improve an initiative for your company with a roadmap to hard-dollar savings.

## Should I Do This?

Although there may be more altruistic reasons behind your motivation, perhaps a better way to phrase this question is, "Does it make business sense to initiate a green IT policy?" There are certainly societal or eco-centric rewards to environmental friendliness, but your management, company executives, and those funding the project are more likely influenced by economic arguments. Put simply, if it pays for itself or generates savings, your green IT project will likely get the nod.

A simple litmus test for green IT can be found in one parameter: power consumption. Servers, workstations, and end-user computers should certainly come to mind, but any device on the network drawing power contributes as well. The wider you cast your net of consideration, the greater the end result and possible return. By including infrastructure devices, your initial estimates will also be closer to the actual outcome, proving your forecasting capability and boosting your credibility as a knowledgeable resource for future projects.

While power consumption can vary widely for servers, workstations, and end-user computers, a common industry average for power consumption of a typical PC is approximately 2000 watt-hours (Wh) or 2 kilowatt-hours (kWh) per day. Considering a total of 20 working days per month will result in 40kWh of power consumption. Including the weekend, the same PC will consume an additional 20kWh per month. At an average of 10-cents per kWh, the cost is about $6.00 per PC per month or approximately $72.00 per year. This provides a conservative baseline in comparison to published studies of $100 per year in utility costs for moderately used PCs.

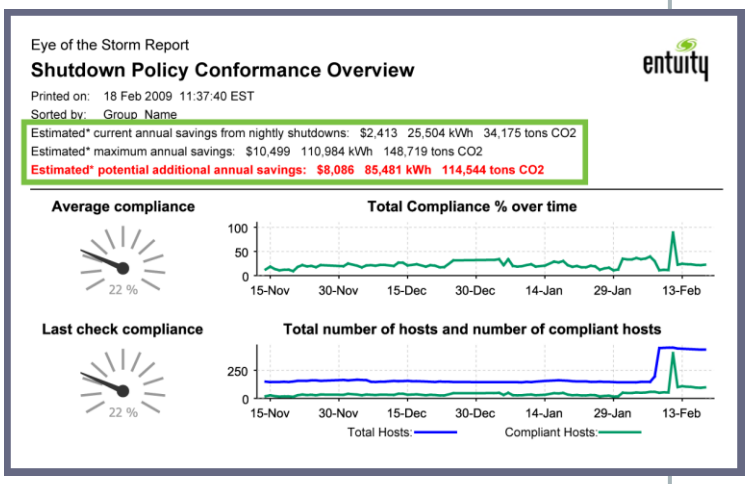


***Figure 1:*** *More than $10,000 per year in savings is clearly identified for a typical SMB company.*

A straight-forward way to reduce this cost would be to turn off all non-essential PCs, servers, and workstations at night and over the weekend. This would save approximately 47kWh or $4.70 per month per computer. Even for companies with as few as 50 PCs, the savings could easily add up to $2820 per year.

Similarly, all network devices consume electricity. A typical router or switch consuming 200 watts (W) would cost about $10 per month to operate. With an average of 30 network devices in a small

company's network, that represents $300 a month in utility costs. Although identifying which of these devices are currently underutilized may prove challenging, it could be well worth the effort in helping to reveal potential candidates for consolidation or retirement and leading to additional savings on your energy bill.

While you could physically walk around your facility counting all the workstations, servers, PC's, and network devices then tally up their usage and run the calculations by hand, this approach is only practical on small, centralized enterprises. If your facility has more of a campus configuration or is a distributed enterprise, any "clipboard" approach is impracticable. Current generation network management solutions are available for this contemporary need. By automatically recording key utilization characteristics, forecasting green IT solutions immediately identifying power consumption statistics. Their associated costs are quickly evident from the abundance of data being accumulated

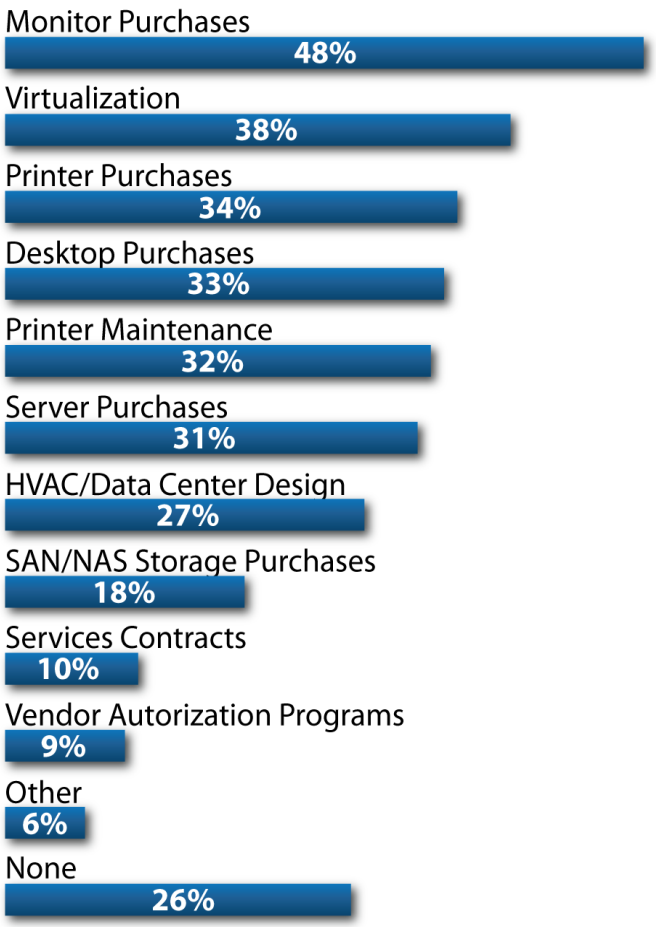


***Figure 2:*** *Programs or Purchasing Changed to Accommodate Green Initiatives*

**Source:** "The Eco-Enterprise and the Reality of Green IT" published by Information Week Analytics

Returning to the original question of "Should I do this?" – with tens of thousands of dollars in potential savings at stake for your company, greening your infrastructure is certainly worth closer inspection. Since 2004, the United States national average rate for electricity has jumped 44%, so the faster you get started, the more you will save.

## How Will I Do This?

With today's industry focus on green, there are a broad range of approaches available for getting started. Answering the question of "How will I do this?" correctly – or at least reasonably – is of utmost importance. In answering the "how," you are committing the expense, resources, and required effort for the project. If you under commit, there will be little perceived benefit, and if you over commit, the costs will outweigh the benefit.

A recent study entitled "The Eco-Enterprise and the Reality of Green IT," published by *Information Week Analytics,* surveyed more than 400 business technology professionals on their current green landscape. One of the survey questions sought to quantify programs or purchasing plans that were changed to accommodate green initiatives.

Shown in the chart in Figure 2, the majority of respondents are limiting their green considerations to hardware purchases – monitors, printers, desktops, servers, and SAN/NAS. During the procurement cycle for these items, the energy efficiency or energy star rating is a requirement for purchase. While this is certainly admirable in that every effort counts, the difference in operational costs between two energy star rated devices or even a rated versus non-rated device over their lifecycles may be negligible. To overcome any skepticism and prove the legitimate business value of your green initiative, your "how" should focus on quick wins within your existing infrastructure – generating the greatest bang for your buck.

An excellent way to show a quick win by reducing operational costs, maintenance costs, and power consumption is by retiring underutilized servers and network devices. However, care must be exercised to ensure the servers are not still hosting mission critical enterprise applications.

There are several key performance indicators that will allow you to easily ascertain the feasibility of retiring servers. System operational characteristics such as CPU utilization, memory utilization, or number of running processes are all good indicators of a server's current load. The number of users accessing the server and the network traffic rate of data to/from the server also help support a thorough assessment. Prioritizing servers for consideration then becomes a matter of comparing each of the variables.

EYE of the Storm Report

**Underutilized Servers**

Printed on: 23 Feb 2009 08:36:18 EST
View: Data Center
Sorted by: Average ranking
Days covered: 7

| Server name | Management IP | Network traffic rate (Kbytes/S) | CPU% | Used memory (Mbytes) | Procs | Users | Average ranking |
|---|---|---|---|---|---|---|---|
| condor | 192.168.3.67 | 0 | 0.5 | 95 | 41.0 | 0.0 | 1.6 |
| lon-dev-tst01 | 10.44.1.132 | 1 | 0.2 | 543 | 35.0 | 1.0 | 2.8 |
| lonxptest02 | 10.44.1.127 | 1 | 1.3 | 470 | 40.0 | 4.0 | 3.2 |
| w2k-eots | 192.168.3.68 | 1 | 15.7 | 195 | 50.6 | 2.0 | 4.6 |
| eye1 | 10.44.2.10 | 8 | 1.1 | 907 | 47.1 | 1.0 | 5.6 |
| entlonex02 | 10.44.2.6 | 53 | 7.5 | 853 | 55.0 | 5.3 | 6.6 |
| support | 10.44.2.102 | 192 | 1.2 | 1013 | 55.6 | 7.0 | 7.6 |
| storm | 10.44.1.67 | 86 | 4.1 | 965 | 67.7 | 2.0 | 8.0 |
| XPS | 192.168.1.3 | 13 | 24.9 | 633 | 89.2 | 3.0 | 9.2 |
| alika | 10.44.2.152 | 10 | 16.3 | 1050 | 58.0 | 2.0 | 10.2 |
| lon-dev-tst06 | 10.44.1.112 | 17 | 7.0 | 1367 | 70.0 | 2.5 | 11.4 |
| lonsoltest07 | 10.44.1.13 | 20 | 17.1 | 1257 | 74.8 | 0.5 | 11.8 |
| lonsoltest08 | 10.44.1.17 | 16 | 17.9 | 1345 | 82.7 | 0.9 | 12.8 |
| lonsolfs02 | 10.44.1.37 | 81 | 12.9 | 1441 | 73.5 | 6.4 | 12.8 |
| lon-dev-tst02 | 10.44.1.134 | 14 | 10.6 | 1546 | 88.5 | 3.0 | 13.8 |
| vortex | 10.44.1.119 | 8 | 1.8 | 1848 | 112.3 | 1.0 | 14.0 |

***Figure 3:*** *Operational Characteristics Classify Underutilized Servers*

Select current generation network management solutions can automate and greatly simplify this process by presenting these key performance indicators in a dynamically sorting report. Historical utilization for each server is automatically captured over time. Within any desired timeframe, each server is tabulated along with its associated key performance indicators. Initially sorted by an average ranking of all variables, this data may be dynamically reordered in ascending or descending order for each desired variable by simply selecting the desired headings. This method allows you to quickly explore the impact of any variable and create prioritized lists to meet any objective. Those variables showing little or no use can be retired without negative impact. Those with high CPU utilization but minimal network traffic are acting as compute servers. Their processes can be offloaded to another server before retiring.

Regardless of your final decision on "how", having the requisite accurate data empowers well informed decisions and gives you the documentation to execute contemporary business initiatives and save money.

## In What Other Ways Can I Reduce Energy Consumption?

Just as the number of servers supporting any enterprise tends to creep up over time, so does the number of network devices comprising a company's infrastructure. Unlike servers that are visible to most people in an organization because users connect to them to access applications, storage, or business services, the configuration and distribution of routers, switches, bridges, gateways, hubs, firewalls, or wireless access points are invisible to all but a handful of the most technically advanced personnel. Networks also tend to slowly expand over time to meet new infrastructure demands. Once they are up and running, the user community gives the IT group little reason to revisit, but periodic capacity reviews can ensure cost-effective operation. Without easy access to utilization data, informed capacity planning is unachievable – let alone practical – so infrastructure devices continue to consume energy and operational cost.

Answering the question of spare capacity and its associated power consumption will easily allow you to identify and prioritize an action plan to eliminate costly and power-hungry devices while maintaining maximum capacity and throughput from your network. Armed with this insight, you can ensure users have uninterrupted access to the services they need on a daily basis, adequately budget spare capacity to handle emergency situations, and reduce utility and maintenance costs.

EYE of the Storm Report

**Spare Ports and Estimated Power Consumption overview**

Printed on: 18 Feb 2009 12:20:16 EST
Sorted by: Used Port Percentage
*Note that only switches and routers are included in this report*

| View | Device count | Port count | Used ports | Used port% | Spare ports | Spare port% | Total power* (kW) | Power* per used port (W) |
|---|---|---|---|---|---|---|---|---|
| USA | 6 | 122 | 52 | 42 | 70 | 57 | 0.7 | 12.7 |
| UK | 11 | 237 | 115 | 48 | 122 | 51 | 2.8 | 24.0 |
| Regional | 25 | 620 | 371 | 59 | 249 | 40 | 7.5 | 20.3 |

***Figure 4:*** *Reports Including Total Power Identify Power Hungry Network Segments*

However, the dimension of power consumption is not traditionally included in most commercial management solutions. With this addition, current generation network management capacity planning reports give insight to key utilization statistics of user-definable network segments. The data not only identifies the number of devices in

use, the port count, and the number of ports in use, but also the total estimated power consumption and power consumption by port. This granularity of data enables immediate identification and prioritization of network segments requiring further inspection.

EYE of the Storm Report

**Spare Ports and Estimated Power Consumption by View**

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Printed on: 18 Feb 2009 12:21:50 EST
View: USA
Sorted by: Device Name
*Note that only switches and routers are included in this report*

| Device name / Location | Manufacturer / Model | Port count | Spare ports | Spare port% | Device power* (W) | Power* per used port (W) |
|---|---|---|---|---|---|---|
| 192.168.3.33 / Comms Rm., Wiring Closet, 8 West 38th | cisco / WS-C4003 | 82 | 70 | 85.4 | 400 | 33.3 |
| BOSTON | cisco / 2501 | 4 | 0 | 0.0 | 40 | 10.0 |
| CHICAGO | cisco / 2501 | 4 | 0 | 0.0 | 40 | 10.0 |
| CHICAGO_SWITCH_1 | cisco / catalyst 2912R | 14 | 0 | 0.0 | 70 | 5.0 |
| SANFRAN / london test lab | cisco / 2501 | 4 | 0 | 0.0 | 40 | 10.0 |
| SANFRAN_SWITCH_1 | cisco / catalyst 2912R | 14 | 0 | 0.0 | 70 | 5.0 |

***Figure 5:*** *Resource Leveling of Individual Devices Is Now Achievable Against Power Consumption*

Drilling down for further insight, analyzing the data by view offers distinct visibility to individual devices in need of scrutiny. In the example shown in Figure 5, the Cisco WS-C4003 switch has more than 85% of its ports unused, resulting in more than 33 watts per port being consumed by the ports that are in use. Moving those 12 ports to another available device identified in the report would enable this device to be eliminated from the network. Alternatively, the ports in use on another lower density device can be moved to the C4003, reducing the overall power consumption per port. In either scenario, this level and range of data is pivotal in developing efficient and effective capacity planning that reduces power consumption and saves money.

## How Can I Promote Participation?

Regardless of how effective you are at designing, implementing, and maintaining your green infrastructure, there will always be those in your company who don't share in the agenda. Whether it's because they are simply unaware of the program, unappreciative of the impact of their lack of participation, or simply too busy to understand the program's implications, the result is that it prohibits your company from achieving maximum savings.

Electricity has become like water; it's always there and running. People have come to expect its availability, so they don't often give a second thought to its cost. Have you ever walked around your office and counted the number of devices plugged into electrical outlets? Chances are there are several power strips lain about, including plugs to which you can't identify devices. Don't feel bad if you answered "no" because the majority of people have not. Traditionally, the facilities organization has been charged with the responsibility of managing energy usage, so the IT department and end users have always just been consumers. This doesn't mean that the average person is an eco-terrorist or that they are careless about energy consumption; most are just unaware of how much electricity they are using on a daily basis.

Many times simply providing disconnected users with an "ah-ha" moment will be the impetus required for them to feel ownership in your green infrastructure program and encourage their participation. Providing periodic reports of group or even an individual's participation can inform and encourage compliance as well.

EYE Enterprise Edition Report

**Shutdown Policy Conformance Overview**

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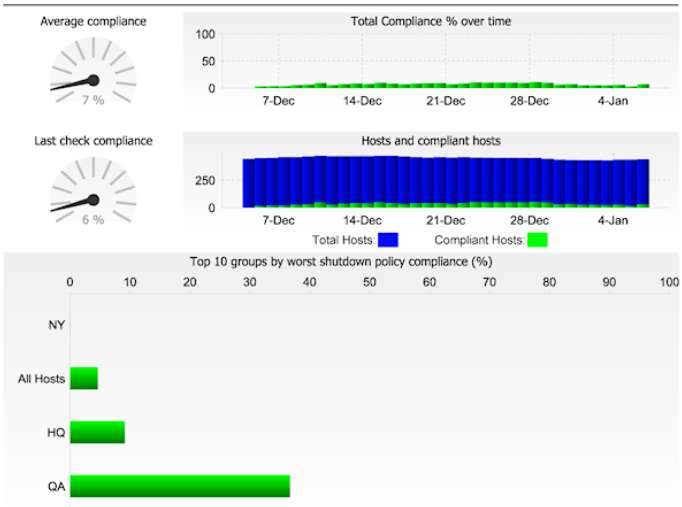
Printed on: 6 Jan 2010 09:23:09 EST
Sorted by: Group_Name
Estimated* current annual savings from nightly shutdowns: $1,779 18,804 kWh 14 tons CO2
Estimated* maximum annual savings: $25,036 264,647 kWh 190 tons CO2
Estimated* potential additional annual savings: $23,257 245,843 kWh 177 tons CO2




**Conformance of all shutdown policy groups**

| Group name | Average group size | Average % compliance | Compliance trend (slope) | Estimated annual savings Current | Maximum |
|---|---|---|---|---|---|
| All Hosts | 354 | 4.7 | Improving (0.04) | $914 | $19,600 |
| HQ | 67 | 9.1 | Improving (0.34) | $341 | $3,733 |
| NY | 5 | 0.0 | Flat | $0 | $276 |
| QA | 25 | 36.7 | Improving (0.10) | $524 | $1,426 |

***Figure 6:*** *Verify Compliance of Groups to Green IT Policies*

Using a contemporary network management solution specifically tuned to tracking power utilization, you can easily establish representative groups and deliver automated periodic progress reports. The network management system can automatically check compliance with established

shutdown policies and provide reports in varying levels of granularity for documentation and distribution.

Even a quick glance at the bar graph shown in Figure 6 is enough to know that the New York group is performing the worst. Creation of groups is customizable to you particular environment, so they can represent corporate divisions, departments, buildings, customers, or even individual offices or floors within offices. Tabular details provide additional insight to historic trends, dollars saved, and – more importantly – additional potential savings.

When it does become necessary to gently persuade individual participation, the Compliance by Host report shown in Figure 7 graphically provides clear visibility to the violation trends, as well as detailed chronological documentation to each occurrence.

Whether used as a "carrot" or a "stick," group reports that highlight current savings along with potential additional savings or individual reports bringing visibility to non-conformance can both help bring awareness to the implications and costs of inaction. Putting clear documentation in front of users and their management can encourage overall participation and maximum savings.

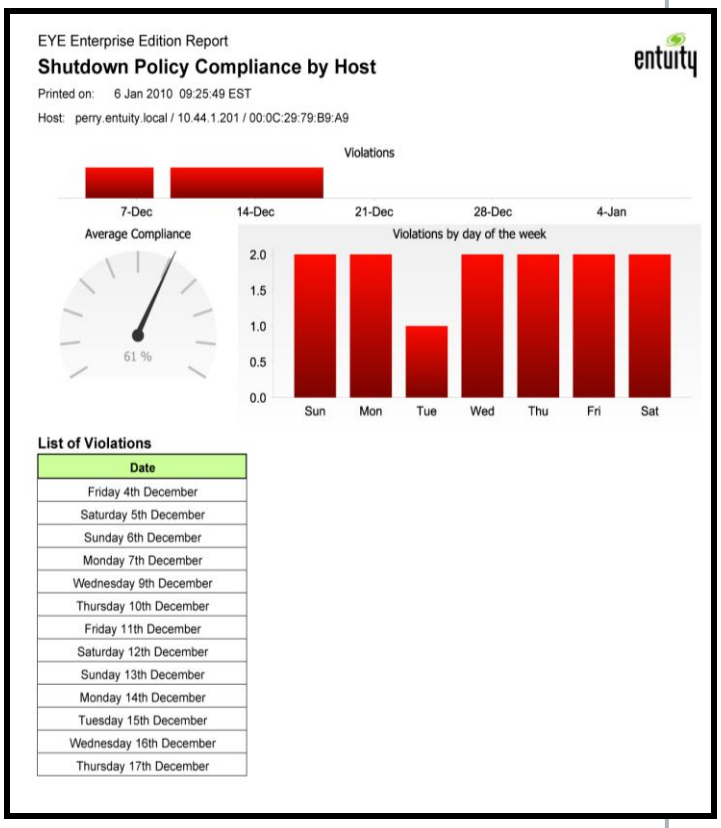


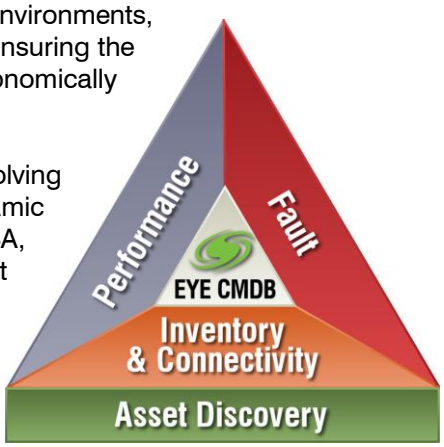

***Figure 7:*** *Violation Trends and Occurrences are Automatically Captured and Documented*

## Conclusion

Going green doesn't have to be exclusively about environmental friendliness and isn't just about energy star rated appliances. With the right current generation network management solutions, you can include your infrastructure in your plans to maximize impact on your company and hard-dollar savings. With the proper documentation, including an eye toward power consumption, you can fully understand the status quo of your infrastructure, what you can expect to reasonably achieve, where the quick wins and high-value opportunities are located. This will help you formulate a methodology that appropriately manages expectations to greatly improve your initiative's success. Creating a well-informed plan with adequate insight is easily achievable with the help of network management technology designed to include power consumption and device usage details along with traditional capacity planning metrics. Armed with these details, you'll easily be able to first establish a business case and then successfully plan, deploy, and manage your own green infrastructure delivering hard-dollar savings to your company and diminishing your environmental impact.

## Eye of the Storm Summary

Entuity offers a complete line of contemporary network management solutions for reducing operational costs while improving services delivery – affordable enterprise class management. Eye of the Storm® (EYE) network management solutions enable IT organizations to quickly and materially reduce costs, and to deliver - and prove - the service levels expected by its customers. EYE gives you insight, control, and predictability of your network's performance and availability - from the core to the edge - with a range of products at price points to match your business model. The EYE product line helps businesses realize the maximum benefit of today's distributed applications, virtualized environments, network-based services, and contemporary data sharing strategies by ensuring the foundational resource for all these initiatives – the network – is economically deployed and optimally performing.




Entuity's customers include Global 2000 companies proactively solving mission-critical business initiatives, leveraging complex and dynamic distributed network environments. A sampling includes: ABB, ACSA, Amtrak, Astra Zeneca, BMC Software, IBM Global Services, Perot Systems, The Royal Bank of Scotland, SASSA, Sony, Visteon, and WorldPay.

## Eye of the Storm Enterprise Network Suite

EYE Enterprise Network Suite is the company's flagship scalable, multi-server solution for medium to large enterprises managing the largest and most dynamic networks for some of the most demanding organizations in the world. EYE Enterprise delivers network control and predictability enabling enterprises, system integrators and MSPs to manage network services and assets, meet service level commitments, implement best practices in service delivery, and even develop and monitor Green IT initiatives.
EYE automatically and continually discovers and captures in-depth network data and analytics, and provides integrated fault, device- and flow-based performance management capabilities that help enterprises, service providers, and system integrators reduce network downtime, commit to, deliver, assure and prove service levels, and ensure network configuration compliance. Real-time notifications of physical network and configuration changes, visibility to virtual servers and environments, and open data accessibility prevent user-impacting business service interruptions and enable transparent business-level reporting through high level and detailed reports, corporate dashboards, or mash-ups.

## EYE NPE Integrated SME Network Suite

The Entuity Eye of the Storm Network Professional Edition (EYE NPE) is a new class of network management solution focused on the needs of small to medium enterprises (SMEs). It allows SMEs to manage their networks using enterprise-class technology at an affordable price. EYE NPE provides SMEs with a live, accurate view of their network in order to reduce network downtime and ensure optimal network operation so critical business initiatives can be effectively deployed and efficiently maintained.

EYE NPE provides a succinct suite of the most important functionality for network management, presented in an easy to use, quickly to deploy format. EYE NPE delivers extremely fast time to value and low total cost of ownership, resulting in superior overall price-performance. Its wide range of capabilities are the practical middle ground between single function point utilities and tools that are difficult and costly to integrate, and heavily laden frameworks that are difficult to deploy, learn, use, and expensive to support. EYE NPE enables SMEs to quickly and optimally manage their networks.

To learn more about EYE NPE for SMEs or Eye of the Storm Enterprise for medium and large enterprises, please contact your local Entuity Partner, Technosys at 0207 993 2016.

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