

How to Ensure Your IT Infrastructure Optimizes Users' Experiences and Minimizes Costs

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Table of Contents

Challenges IT Must Surmount Today	1
Users Demand Instant Gratification	1
The Cost of Downtime and Slowdowns Rises	1
The Rising Need for IT Infrastructure Strategic Planning.	2
How to Select an IPM Tool for Your Organization	3
Everyday Maintenance and Management and Must-Haves for All Uses	3
•Planning to Maximize Performance and ROI	4
•Cloud Migration	5
•Data Center Migration	6
•Mergers, Acquisitions, and Divestitures	6
Galileo Infrastructure Performance Management Suite	8
About the Author	9
About Galileo	9

Challenges IT Must Surmount Today

Today's IT leaders are feeling the pressure. Users are more demanding of technology, disruptions in IT service delivery are inflicting greater damage on bottom lines, and cost containment is a high priority. With the digital world taking a lead role in corporate success, enterprises are becoming increasingly cognizant of the importance of actively monitoring and managing their IT environments today and planning strategically for future success.

Users Demand Instant Gratification

As the days of dial-up have receded into users' memories and today's applications serve up responses in a flash, expectations have escalated. Research shows people will wait two seconds for a web page to load. After that, every second delay reduces conversions by seven percent.¹ This is just one example of how technology now needs to provide almost instant gratification. The IT game has changed. While tracking downtime is still important, it falls far short of what's necessary to keep customers happy and employees productive. IT can no longer simply gather information on individual IT elements, such as servers and storage. They need to understand how the whole application delivery chain works to provide a satisfying user experience.

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The Cost of Downtime and Slowdowns Rises

Application performance issues depress revenues by up to nine percent, reduce employee productivity and customer satisfaction, and tarnish brand reputations.² As technology has become more intricately woven into our lives and the complexity of data centers has increased accordingly, the mean cost per minute of downtime has climbed from \$5,517 a minute in 2010 to \$8,815 in 2016.³ Downtime losses range from \$1 million a year for typical mid-sized companies to a staggering \$60 million for large enterprises.⁴ When measuring losses, however, downtime costs just scratch the

1 Thomas Fisher. Embracing a New Generation of APM Strategies. [http://enterprisesystemsmedia.com/article/embracing-a-new-generation-of-apm-strategies#sr=g&m=o&cp=or&ct=-tmc&st=\(opu%20qspwjefe\)&ts=1470749681](http://enterprisesystemsmedia.com/article/embracing-a-new-generation-of-apm-strategies#sr=g&m=o&cp=or&ct=-tmc&st=(opu%20qspwjefe)&ts=1470749681). Accessed 8/9/2016.

2 Aberdeen Group. Organizations Need More Visibility Into the Business Impact of Application Performance. 4/8/2009.

3 Emerson Network Power. 2016 Cost of Data Center Outages. <http://www.emersonnetworkpower.com/en-US/About/NewsRoom/NewsReleases/Pages/Emerson-Network-Power-Study-Says-Unplanned-Data-Center-Outages-Cost-Companies-Nearly-9000-Per-Minute.aspx>. Accessed 8/9/2016.

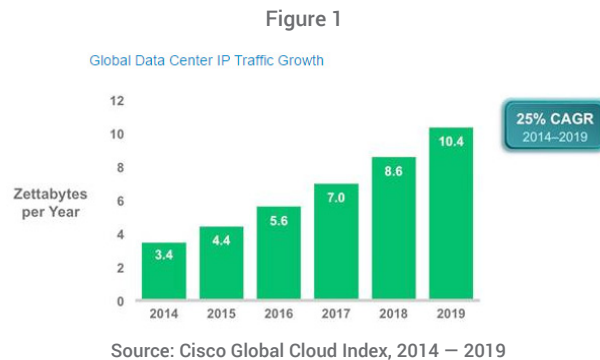
4 Cost of Server, Application and Network Downtime North American Enterprise Survey Calculator. IHS, Inc. 1/24/2016. https://technology.ihs.com/551385/the-cost-of-server-application-network-downtime-survey-calculator-2015?utm_campaign=PR_001&utm_medium=press_release&utm_source=BusinessWire.

surface. As indicated by the two-second web-response rule, the more elusive cost of slowdowns may be as or more harmful.

The Rising Need for IT Infrastructure Strategic Planning

In 2016, capital spending for IT is not expected to budge from 2015, headcounts are only increasing slightly, per-user spending is declining,⁵ and overall IT budgets are flat.⁶

At the same time as organizations are corraling their resources, the demands placed on data centers are intensifying. Cisco reports that data center IP traffic will grow at a compounded annual growth rate (CAGR) of 25% from 2014 to 2019.⁷ That's an 85% increase from 2016 to 2019.



Rising volume and higher end user requirements coupled with flattening budgets compel IT leaders to do more with less. So strategic money-saving initiatives, such as capacity planning, and cloud and data center migrations, are moving to the forefront. More than half of companies (56%) are boosting the amount they plan to spend on cloud applications while a mere 10% are doing the same for data center infrastructure.⁸ By 2019, cloud data centers will process most of the workloads (86 percent).⁹ Also, as the ever increasing speed of technology promises savings, companies are consolidating data centers. In 2016, the data center population is expected to decline while the average size of each center expands.¹⁰

Also fueling the need for IT strategic planning is a business environment that's attractive for mergers and acquisitions.¹¹ More than half of acquisitions disappoint shareholders, failing to produce value due to poor execution. This often stems from weak IT integration, which can lead to customer dissatisfaction and rising costs. "While the overall strategy and upfront due-diligence may actually be solid, it's the execution that goes off the rails. Nowhere is this experienced more acutely than in the

5 Computer Economics. IT Spending and Staffing Benchmarks: 2016/2017: IT Budget/Cost Metrics and Other Key Performance Indicators by Industry and Organization Size. Accessed 8/5/2016 from <http://www.computereconomics.com/page.cfm?name=it%20spending%20and%20staffing%20study>.

6 SpiceWorks. The 2016 State of IT. Accessed 8/5/2016 from <https://www.spiceworks.com/marketing/state-of-it/report/>.

7 Cisco. Cisco Global Cloud Index: Forecast and Methodology, 2014-2019. April 21, 2016. http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/Cloud_Index_White_Paper.html#Trend1_Global_Data_Center_IP_Traffic.

8 Charles McLellan. IT budgets 2016: Surveys, software and services. ZDNet. <http://www.zdnet.com/article/it-budgets-2016-surveys-software-and-services/>. October 1, 2015.

9 Cisco. Cisco Global Cloud Index: Forecast and Methodology, 2014-2019 White Paper. http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/Cloud_Index_White_Paper.html. Accessed 8/8/2016.

10 451 Research, Inc. 2016 Trends in Datacenter Technologies. October 2015. <https://451research.com/report-long?icid=3561&task=download&file=summary>

11 J.P. Morgan. 2016 M&A Global Outlook. Accessed 8/5/2016 from <https://www.jpmorgan.com/global/insights/maglobaloutlook>

business and IT integration which ultimately determines the degree to which any M&A transaction will succeed,” writes Charlie Mayes, managing director of DAV Management.¹² It requires detailed planning of IT infrastructure to execute a merger, acquisition or divestiture successfully.

Infrastructure performance management tools (IPM) are critical for creating a strategy that optimizes the end user experience and mitigates the costs of IT disruptions, as well as capital and operating expenses. These tools help oversee IT infrastructures, measuring performance and its effect on application delivery to the end user. Also, they are instrumental in providing the data and analytics necessary to make strategic decisions about the IT environment which can reduce costs while improving performance.

How to Select an IPM Tool for Your Organization

Because of the silos within IT organizations, it’s a rare company that looks at the big picture when considering their needs for IPM tools. Instead, they select a patchwork of solutions to monitor servers, storage, SAN and applications separately.

They might even slice and dice their tools further by technology brand. By taking a broad view and assessing the whole organization’s needs, however, you are more likely to find a monitoring solution that provides the comprehensive data you need. So, before purchasing an IPM tool, think broadly about whether it can provide value for day-to-day maintenance and management, capacity and infrastructure planning, cloud and data center migration analysis, planning for mergers, acquisitions, and other strategic initiatives. Below are several ways you might want to use IPM tools along with features to consider.

Everyday Maintenance and Management and Must-Haves for All Uses

The physicians’ mantra “First, do not harm” applies to IPM tools—they must not impair performance or add to workloads. So look for IPM tools that selectively monitor the IT environment. Because unselective monitoring eats up capacity, it causes a sluggish response similar to that of a computer that’s chugging through a full virus scan. Instead, your tool should work efficiently in the background, prioritizing the issues most likely to affect performance. Also, the tool should not create more work for IT staffers. Since it’s burdensome to manage one more application, and the associated data and hardware, it’s best to look for a cloud-based solution that you do not have to maintain.

¹² Charlie Mayes. How to get IT right in mergers and acquisitions. Computer Weekly.

Also, because technology is interconnected with one part influencing how the next operates, you need to have a unified vision across your whole infrastructure that furnishes applications to end users. This requires a solution that monitors the configuration, capacity, and performance of all brands of servers, storage, SAN and applications. It needs to provide a picture of the elements of your global IT environment whether on-premises, hybrid or in the cloud. Only such a broad solution enables you to correlate performance with changes anywhere in your infrastructure and to diagnose problems. Another benefit is that it's easier to learn and manage one cohesive tool than multiple tools.

Not only do you need to monitor everything, but also you need to do so all the time. Around-the-clock surveillance and data collection enables you to spot performance trends and aberrations quickly. The longer you can keep your data, the better your ability to establish reasonable performance thresholds, and foretell and avert potential disasters. Your historical data should include a high degree of granularity—snapshots every five minutes or so. If one or two statistical outliers skew your data, this enables you to see beyond the averages that misrepresent reality.

Finally, while enterprise-wide tools give you a bird's-eye view of your infrastructure, they often do not provide the ability to drill deeply enough to solve problems. Your solutions must allow you to home in on root causes of problems, enabling you to resolve issues before they disrupt the user experience or increase costs. Ideally, the tool should present this information in a visually appealing dashboard that presents the right data, allowing you to gain insights rapidly.

Address Strategic IT Infrastructure Issues

To address strategic issues that affect overall costs and the user experience, you will once again need an IPM tool that provides a comprehensive, granular, around-the-clock vision and allows you to dig deeply to answer questions. It should also enable you to tag and group technology assets, creating virtual environments where you can learn about their requirements and performance. Ideally, you should be able to perform the analyses that form the foundation for the planning process within your tool rather than creating complex spreadsheets and exporting data.

- **Planning to Maximize Performance and ROI**

An IPM tool that meets the criteria above allows you to look back over a couple of years of data to identify the trends and spikes in utilization, capacity, and I/OPS.

While this is the foundation on which to build a technology plan that aligns with

future needs, you also have to determine how the metrics for each component in your infrastructure correlate with the end-user experience.

IT leaders have traditionally assumed a one-to-one relationship between employee or sales growth and technology requirements. Since such guestimates are rarely accurate, they can lead to a misalignment of capacity and needs. The result is either over-spending or customer dissatisfaction. With the right data and analytics at your fingertips, however, you may discover that a heavy workload causes performance erosion even when 50 percent of capacity is still available. Such information along with knowledge of future business requirements and growth patterns empowers you to adjust capacity requirements, creating a robust IT infrastructure plan that will keep users happy while minimizing costs.

Another wrinkle in the planning process is the reality that change is constant in technology. For instance, you might intend to make upgrades that could significantly impact your infrastructure requirements. If so, you need a way to find answers to questions about how upgrades will shape performance.

Perhaps, for example, your business executes 10,000 transactions a second with a disc response time of one millisecond. To improve the user experience, you want to reduce response time 100 microseconds. Because it can increase response times by 90%, you are preparing to upgrade to flash storage. However, you want to know how the boost in performance will alter your customer's experience—the transaction time. To answer such questions, make sure your IPM enables you to adjust your I/OPS and other variables to ascertain their impact.

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- **Cloud Migration**

Before following the crowd on the cloud migration path, IT leaders must assess the costs and benefits for their particular situation. To do so, first identify small technology groupings that support low-risk applications, generally those not related to operations. This requires a monitoring tool that allows you to tag and virtually group technology assets to ascertain their requirements and performance. Rather than assuming, for example, that you are at 100 percent utilization, this

process allows you to provide potential vendors with your actual requirements and negotiate based on hard facts.

If you find two suppliers that appear to meet your cost and performance criteria, ask them both for a 30-day trial and split or duplicate your test group. You will need a vendor-agnostic, cloud-based IPM tool to monitor performance at each vendor. Because the cloud is dynamic, especially in multi-tenanted situations, continue monitoring performance after you have signed on the dotted line. You do not want your users' experience to decline just because your cloud provider is acquiring new customers.

- **Data Center Migration**

You cannot project the future without a full understanding of your existing storage and server assets and their capacity and utilization. So, for data center migration planning, you will again need an IPM tool that allows you to create and view virtual technology groupings. With this capability, as well as historical data, you can ask the critical questions to create an informed data migration plan. Would we have enough capacity if we consolidated these data centers? What could we eliminate?

- **Mergers, Acquisitions, and Divestitures**

If your company is planning an acquisition, you are likely concerned about whether you have the capacity to absorb the new organization's technology needs into your infrastructure, or you need to buy new assets. For mergers, you must determine how to consolidate assets most effectively. Lastly, for divestitures, you want to know if you can afford to lose the IT assets associated with the business entity you are severing from your corporation.

In each situation, you need a detailed history of your IT infrastructure metrics and the ability to virtually group assets you will be absorbing or divesting. This information will enable you to understand the technology you plan to buy or sell along with their utilization, capacity, and performance. Without creating a sophisticated analysis from scratch or enlisting the assistance of a consultant, you will be able to look at different scenarios quickly to determine the optimal approach.

Based on how you plan to use the IPM tool and other resource constraints, consider the following questions when evaluating a purchase:

Figure 2

What to Consider When Selecting an IPM Tool	Uses				
	Maintenance and Management	Strategic Planning	Cloud Migration	Data Center Migration	Mergers, Acquisitions and Divestitures
Questions to Ask					
Resource Requirements					
Does the IPM tool require a full time employee to run it?	✓	✓	✓	✓	✓
Will the IMP tool cause any performance or capability problems due to excessive monitoring?	✓	✓	✓	✓	✓
Comprehensive Oversight (broad and deep)					
Is the IPM tool inclusive of servers, storage, SAN and applications?	✓	✓	✓	✓	✓
Does the IPM tool allow you to monitor multiple brands?	✓	✓	✓	✓	✓
Does it monitor the environment 24/7/365?	✓	✓	✓	✓	✓
Does it offer a high degree of granularity to avoid skewed data?	✓	✓	✓	✓	✓
Are you able to keep historical data as long as you like?	✓	✓	✓	✓	✓
Can you drill deeply to determine root causes?	✓	✓	✓	✓	✓
Can you monitor cloud, hybrid and on-premises environments?	✓	✓	✓	✓	✓
Ease of Use					
Does it enable you to set thresholds for easy monitoring and prevention of business disruptions?	✓	✓	✓	✓	✓
Does it include visually appealing dashboards that provide key insights at-a-glance?	✓	✓	✓	✓	✓
Do the dashboards distill the most critical information?	✓	✓	✓	✓	✓
Does the company offer services to support you?	✓	✓	✓	✓	✓
Data Precision					
Is the data granular enough that you can avoid skewed data that can mislead you?	✓	✓	✓	✓	✓
Advanced Analytics for Planning					
Can you tag and group assets from part of your IT environment virtually for analyses?			✓	✓	✓
Can you execute "what if?" scenarios without exporting data to a spreadsheet?			✓	✓	✓

Galileo Infrastructure Performance Management Suite

Galileo Suite is a cloud-based IPM solution that enables you to monitor servers, storage, and SAN from a single pane of glass—a workstation or smartphone. It offers operational intelligence about the performance of your IT environment whether on your premises, in the cloud, or in a hybrid or virtual environment.

User-friendly, visually engaging dashboards distill data and provide **at-a-glance insights** and enable you to **drill down and pinpoint threatening issues in minutes**. Plus, you can shape how you view information according to your needs.

Thresholds provide advanced warnings on when you need to take action to optimize performance, so you never have to fight fires again. Galileo stores historical data, enabling you to **view trends and deviations that may signal a need to take action**.

It's like having a crystal ball for your entire enterprise infrastructure that empowers you to keep operations running without a hitch.

You can **assign custom tags to any storage, server, SAN, or application assets** to determine how a project, business unit, environment, or other entity uses them. See the configuration, performance, and capacity of any asset within your defined context for valuable insight into planning, management, and more.

What's more, the monthly subscription pricing is a fraction of what you would invest in an enterprise-wide solution, and a modular approach allows you to customize your subscription to your needs.

Find out how to keep your servers running efficiently, make your job easier, and put your mind at ease with Galileo Suite.

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About the Author

Chris Churchey, Co-Founder and Principal of ATS Group and the Galileo Division, has over 35 years of IT experience in enterprise open systems and storage technologies. His emphasis is on operating systems, virtualization, large-scale systems/storage architecting, design and integration, and performance optimization of computer resources. Chris holds numerous IBM Certifications and is a subject matter expert (SME) in Server/Storage Consolidation, Performance, AIX, Linux, Power, Virtualization, and IBM Storage technologies. Before ATS, Chris was with IBM for 23 years. As a Consultant Systems Architect, he provided architecture, design, and IT consulting services to IBM Commercial and Federal customers. Chris was recognized as IBM Systems Engineer of the Year in 1991.

About Galileo

Tim Conley and Chris Churchey, former IBM systems architects and engineers, are co-founders of Galileo Performance Explorer®. Conley specializes in storage performance and Churchey in server performance. Together, they have more than six decades of experience in system implementations, upgrades/migrations, backup/recoveries, performance analysis, and capacity planning. With a thorough understanding of user needs, Conley and Churchey originally developed Galileo as a proprietary tool to help clients of the ATS Group, a systems integration firm that they founded in 2001. Now available to everyone, Galileo was the industry's first integrated and cloud-based IPM suite. It has gained wide popularity with SMBs, Fortune 500 companies, government agencies and everything in between.



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