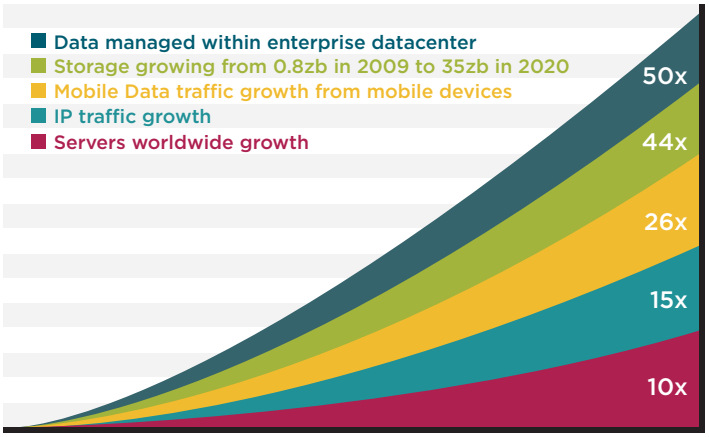
Application-centric Infrastructure Performance Management (IPM)

Ensuring Applications and Infrastructure Perform Better Together Through Comprehensive Visibility and Authoritative Insight

WHITEPAPER

Enterprise IT Agility Challenges: Cost, Complexity, Convergence

Technology and application trends such as cloud, big data, storage and server growth, mobile applications, bring-your-own-device (BYOD) and software-defined everything are the biggest disrupters of enterprise IT today. The resultant pressure on IT teams is to deliver excellent user experiences, and enable agile business and innovation while guaranteeing performance and availability in a perpetually changing IT landscape.



Now, more than ever, the digital business is "the business." Compounding the complexity and risk of this "new normal" state on mission-critical application infrastructures are complex interdependencies and technology advances —leading to blindingly fast servers, converging infrastructure components, mass adoption of virtualization, and rapid migration to cloud and hybrid-cloud models. The key drivers behind all of these trends is demand for any time, anywhere, application access and flawless performance—from any device. These factors exponentially increase application infrastructure performance requirements. The result is a never-ending pace of rapid transformation, and explosive increase in complexity and risk.

The "New Normal"

IT infrastructures are at a point where the entire system, from server to storage fabric and storage arrays have all been virtualized and abstracted to the extent that proactive performance management and confident issue resolution are on-going challenges. As multi-vendor, multi-layer data center architectures perpetually change, views from the user, administrator and application are increasingly de-coupled from the actual physical architectures. As a result, an accurate and unbiased understanding of the physical infrastructures, the workloads they support, and how they are performing, is difficult to achieve. Moreover, this "new normal" state makes it nearly impossible to manage with confidence and authority. These circumstances create inherent gaps in visibility that must be addressed in order to guarantee performance and availability.

Managing the "New Normal"

It is now business-critical for enterprises to have a purpose-built Infrastructure Performance Management (IPM) platform. One that

Summary

Enterprise IT Agility Challenges: Mission-critical IT application infrastructures are being virtualized at a break-neck pace, and are increasingly abstracted and complex. Requirements to enable agile development and innovation means that changes are continual, and these same infrastructures are required to deliver a flawless end-user experience characterized by hyper-responsive performance and availability.

Capabilities Required in an AC-IPM Platform: Actionable information derived from accurate application workload analysis, system-wide data collection for correlation and analysis - to enable insightful decision support.

Benefits of an AC-IPM Platform: Provides immediate ROI to the business for both CAPEX and OPEX savings and optimization; guarantees performance, mitigates risk, and aligns IT infrastructures with business and application requirements.

VirtualWisdom® and Enterprise Platforms: The industry's leading analytics platforms for actionable insights

ensures applications and infrastructure perform better together, and that is specifically designed for granular, real-time monitoring of performance throughout the infrastructure that supports mission critical applications and business processes. It must also be one that assures system-wide performance and availability. It must enable infrastructure teams (focused on server, storage, virtualization or performance) to de-risk mission critical workloads across physical, virtual and cloud computing environments. At the same time, an AC-IPM platform must provide comprehensive visibility into application performance in the changing infrastructure, so that the risk of deploying new technologies is minimized. Leveraging such a platform must enable IT organizations to align with agile business demands and application requirements, and solidify their position as a trusted business partner in driving growth.

Impediments to Aligning IT Organizations with Business Goals: Minding and Managing the Gaps

Three main factors impede alignment — people, processes and technology — and any one of them can prevent IT organizations from reaching a state of maturity such that they are valued by the broader organization as a business enabler that can deliver exacting, cost-optimized service levels back to the organization.

- **People and Organizational Structure:** The IT organization itself can impact business alignment, particularly if resources and management are functionally siloed. For example, organizations are often divided into application, server, network, and storage administrators. If there is a performance problem, the various administrators tend to make sure that it is not occurring in their domain. This structure pits teams against each other and results in finger pointing. This predicament is antagonized by device-specific system administration tools that provide a biased, myopic focus on only one facet of an IT infrastructure. When it comes to interrelated and interdependent systems, without a holistic and unbiased view of the environment, it is nearly impossible to proactively manage and ensure performance — let alone quickly find root causes of problems or set accurate SLAs.
- **Process and IT Maturity:** IT organizations are forever focused on providing cost appropriate service levels, but many lack the processes or authoritative analytics to fully realize their commitments. The reasons range from a lack of executive sponsorship, to over-allocated or mis-allocated resources, to little or no institutionalized business collaboration processes. In all cases, teams must focus on finding and resolving specific problems. However, in many cases, they lack the proper instrumentation and processes for fast and conclusive resolution.
- **Yesterday's Technology and Tools Managing Today's Complexity:** Systems Analytics tools have traditionally focused on specific components of an infrastructure, such as provisioning and monitoring server resources, managing storage capacity, or utilization of the storage and network fabric. In most cases, these legacy device-specific tools have been marketed as performance monitoring, even though they only monitor utilization. Neither singularly or combined do these tools provide the required performance analytics that performance teams need to understand how their mission-critical systems are actually performing. They lack understanding of infrastructure response times and workload performance. They have scalability limitations, are often agent-based and vendor-biased. These cobbled together toolsets are used to show that the overall IT environment is working fine, with the right capacities and resources provisioned. However, if application response is poor, related IT service levels are still deemed unsatisfactory.
- **A Moment of Clarity:** Performance versus Utilization: Infrastructure monitoring tools use utilization metrics to imply the potential impact on performance. Since they are not measuring true performance, it leads teams to over-provision resources in order to ensure that utilization doesn't impact performance. The days of over-provisioning to ensure performance are gone, since it is no longer viable with hyper data growth and accompanying cost pressures — especially when the fundamental promise of virtualization and the cloud is to drive down costs and achieve greater utilization against existing assets.
- **Requirements for IT to be Ever-Agile:** Another important factor placing everything at risk is the ever-changing IT infrastructure landscape. Systems Analytics tools were originally designed for monitoring physical elements, but with the advent of virtualization and cloud architectures, those tools are neither appropriate nor useful for managing the related complexities. The continued virtualization and abstraction of the infrastructure and underlying physical elements, makes proactive performance management, problem avoidance, root cause problem analysis, and remediation of the physical elements all the more difficult.

AC-IPM: Defined

Application-centric Infrastructure Performance Management is the ability to continuously capture, correlate and analyze—in real-time—the system-wide performance, utilization and health of heterogeneous physical, virtual and cloud computing environments in the context of the application. Ultimately, AC-IPM delivers the comprehensive visibility and definitive insights that enable IT to establish and maintain the service levels that the business requires—while driving the systems level optimization and agility that is the promise of virtualization and the cloud.

AC-IPM: Managing Through Compounding Complexity and Risk to Assure IT Business Value and Alignment

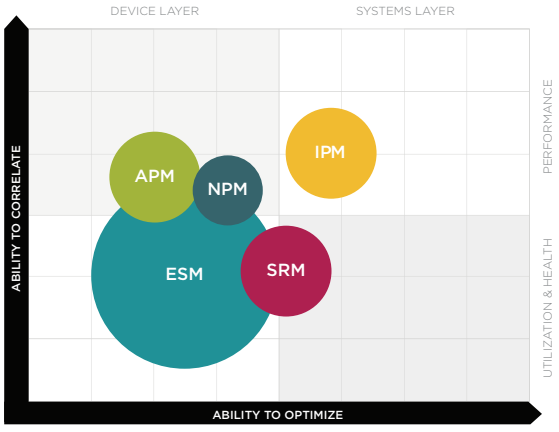
Infrastructure operations and management teams are forever under pressure to deliver IT service levels that are aligned with enterprise business goals and application workload and performance requirements. Business processes and application teams often set IT priorities in terms of availability and performance. Moreover, new IT infrastructure compute models include hybrid environments where portfolios of applications migrate between and reside within hybrid environments simultaneously. The result is compounded complexities in monitoring, managing and reporting—necessitating an AC-IPM platform for assuring performance optimization, risk mitigation and sustainable SLAs.

Trying to manage through this complexity forces the device-specific management tools of yesterday to change. Traditionally, management tools focused on capacity, utilization and management of individual physical components. With the move to virtualization and new deployment models, Application Performance Management (APM) and Network Performance Management (NPM) have been trying to extend and fill-in for what is missing. The challenge is that neither delivers a comprehensive view of the underlying IT infrastructure. So, between all of these tool sets that address device, application and network performance, there is still a huge gap in understanding system-wide performance.

Real-Time AC-IPM Platform Requirements

An IPM platform must provide a comprehensive and unbiased view of system-wide infrastructure performance, from virtual machine, to server, to switch fabric, to storage array to logical unit of storage. And, it must provide definitive insights that are accurate and actionable.

- **Continuous, Granular Monitoring and Measurement:** The most important metric for IT Infrastructure performance is infrastructure response times. For any monitoring to be effective, organizations need to capture the minimum, maximum and average at no greater than one second intervals for accurate insight into the overall infrastructure performance.
- **Unbiased and Heterogeneous:** An AC-IPM platform must collect data from various devices without vendor or product-specific bias or dependencies. It must deliver an unbiased, vendor independent view of the whole system—with precise metrics that enable understanding of what is happening throughout the system.
- **System-Wide Data Collection, Visibility and Analytics:** The AC-IPM platform must correlate and analyze metrics from all infrastructure components. This means from the virtual machine, server, fabric, storage arrays and logical unit number. Further, the data must be presented in a way that clearly describes interdependencies in context of system-wide performance. The AC-IPM platform must track all granular end-to-end I/O activity across highly virtualized infrastructures—from server transmission, through the switch to storage and back—and leverage an analytics framework for contextual understanding, correlation and discovery.
- **Scalability:** A typical virtualized enterprise IT infrastructure is comprised of thousands to hundreds-of-thousands of servers and switch and storage I/O ports, and petabytes of storage. An AC-IPM platform must be able to handle the large number of installed physical devices and the associated metrics without a hiccup and without risk of hitting a limit.



Benefits of an AC-IPM platform: Ensuring Applications and Infrastructure Perform Better Together

An AC-IPM platform delivers numerous CAPEX and OPEX benefits to both IT and the business:

- **Operational Efficiency and Effectiveness:** Cross-domain system visibility enables comprehensive measurement of the infrastructure performance from the virtual machine all the way to the storage LUN. Performance bottlenecks should be identified and corrected proactively before impacting the business—resulting in significantly higher performance—and enabling higher utilization of existing infrastructure assets. Additionally, AC-IPM helps IT improve infrastructure response times, proactively avoid outages, quickly and definitively identify root cause, remediate performance issues, and drive continuous improvement in reliability.
- **Risk Mitigation:** AC-IPM enables highly accurate baseline testing to proactively identify the impact of any and all changes to the infrastructure.

  Application performance has an interdependent relationship with the infrastructure it runs on. Different application workloads require different resource quality, and compete for resources with other applications, so it is important to manage the infrastructure accordingly. By leveraging authoritative insights from AC-IPM analytics it is possible to model application performance and ensure that business processes are executing as they should. This is equally applicable whether the change process spans months of engineering design, test and rollout, or as it becomes more real-time in highly automated cloud environments.
- **BusinessAlignment:** AC-IPM helps IT quickly identify root causes, and proactively (and significantly) reduce mean time to resolution. By improving system-wide performance and increasing utilization, reducing over-provisioning, and making the correct decisions on infrastructure spend versus performance required, CAPEX is significantly reduced. Having an AC-IPM platform helps cut through virtualization complexity, accelerates transformation and minimizes risks.

The AC-IPM Platform: Enabling IT Organizations for Ever-Agile Business Alignment

Though it is still important to understand utilization and how it affects performance, it is now essential to understand it within the context of true infrastructure response times. It is critical to understand how the infrastructure is delivering the resources required by the applications relying on it, and if the resources are delivering the right service levels. Virtual Instruments' AC-IPM Platform was purpose-built from the ground up to address all of the challenges and gaps resulting from the circumstances and evolutionary scenarios described above. It delivers a continuous real-time understanding of application behavior at the protocol level. Whereas other management tools focus on utilization and health at the device layer, the Virtual Instruments AC-IPM Platform looks at the entire compute environment from a systems level—focusing on interdependencies of performance, utilization and health overall.

The benefits for IT organizations are multi-fold, as they are now enabled to:

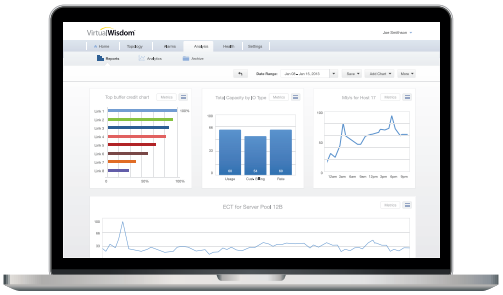
- Right size and align infrastructure capacity and resource quality
- Drive greater utilization against existing assets and resources
- Accurately measure I/O traffic, correlate system-wide data and monitor trends
- Improve infrastructure response times
- Proactively, accurately and quickly identify and remediate problems.
- Deliver the right level of performance at the appropriate cost
- Establish SLAs aligned with business requirements
- Effectively partner with and contribute to the success of the business

VirtualWisdom and Enterprise: the Award Winning AC-IPM Platforms

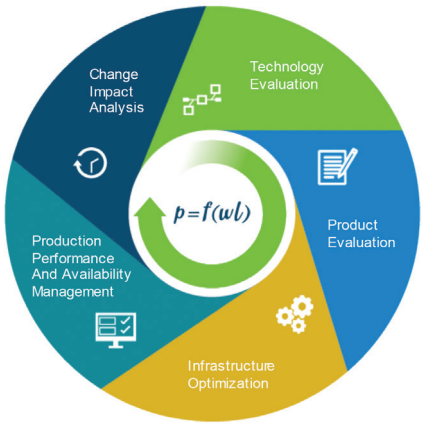
VirtualWisdom is the industry's leading monitoring platform for AC-IPM. It empowers customers to deliver on the complex requirements of their application infrastructure. The platform provides insights into the performance and availability of the end-to-end system—across physical, virtual and cloud environments. It intelligently correlates and analyzes an unmatched breadth and depth of data, transforming data into answers and actionable insights. This enables IT teams to promote and guarantee performance-based SLAs, changing the value of the infrastructure. With definitive insights, customers are taking control of their environment, accurately informing collaborative dialogues, and driving business outcomes.

VirtualWisdom's unique combination of software and hardware probes correlates and analyzes a breadth and depth of data never before possible—collected from throughout the end-to-end infrastructure. This highly accurate and comprehensive solution enables customers to start managing performance, stop reactive troubleshooting, and achieve cost optimization across their infrastructure.

Load DynamiX Enterprise empowers storage



engineers and architects with the essential insight needed to optimize the cost and assure the performance of storage infrastructure. Enterprise is comprised of workload analysis, workload modeling, and workload generation products that provide unparalleled insight into the relationship between workload behavior and storage performance. Enterprise enables intelligent storage purchasing and deployment decisions and accelerates problem resolution. Enterprise gives you the data to confidently evolve your infrastructure with the most innovative storage technologies such as flash, hybrid, cloud, software defined and converged offerings.



Regardless of function (application, server, storage, or virtualization), you can collaboratively fine-tune infrastructure performance based on business, application, workload and SLA requirements.

Delivering on the Promise of Agility and Business Alignment

While transitions to virtualized and cloud environments help improve agility and reduce CAPEX growth in physical hardware, they don't address the increasing complexity and interdependence driving increased CAPEX and OPEX in software and staff. In fact, there's often a corollary risk of revenue impact from unacceptable performance or even downtime. The unintended consequences of aggressive consolidation, migration, and new technology adoption is increased risk without demonstrable improvements in cost or cycle time.

For senior IT executives and architects, VirtualWisdom and Enterprise accelerate enterprise transformation by helping you guarantee reduced capital expenditures, lower operational costs, and accelerate business agility. Managing infrastructure performance is the most critical factor for ensuring application performance and thus, business performance. By directly measuring a comprehensive level of system-wide transaction workflows, VirtualWisdom cuts-through the haze of virtualization and cloud to provide an end-to-end view of how applications and infrastructure are performing. This enables you to mitigate risk and guarantee performance, at a lower total cost.

Performance teams must manage perpetual complexity in their heterogeneous IT infrastructures, and require a sophisticated set of capabilities to measure and ensure application performance. The larger the shared server, SAN and NAS infrastructures, the greater the risk of performance degradation and downtime.

For infrastructure operations and application managers, VirtualWisdom provides definitive and continuous, real-time measurement of performance, health and utilization across VM, server, network and storage. This enables you to reduce system-wide latency, proactively prevent outages, and dramatically improve resource utilization. VirtualWisdom provides the insight required to define and deliver on true application performance requirements.

For More Information

For more information on Infrastructure Performance Analytics or how Virtual Instruments can benefit your organization, please call 1.888.522.2557 or email us at info@virtualinstruments.com.

VIRTUAL INSTRUMENTS

Sales
sales@virtualinstruments.com
1.888.522.2557

Training
training@virtualinstruments.com

Website
virtualinstruments.com