IBM Global Technology Services
Thought leadership white paper

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Key technical support considerations for the cognitive era

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Executive summary

Today, everything computes. Intelligence has been infused into things no one would recognize as computers: appliances, cars, roadways, clothes, even rivers and cornfields. Tomorrow, many of these things will think, thanks to breakthroughs in cognitive computing. Even the things that don't think themselves will continue collecting and reporting the massive quantities of data that feed cognitive systems.

We are entering a new era of computing. Following the programmable and tabulating systems eras, cognitive computing represents a huge leap forward. This new era brings with it fundamental differences in how systems are built and interact with humans. Cognitive-based systems build knowledge and learn, understand natural language, and reason and interact more naturally with human beings than traditional programmable systems.

Although in its infancy, cognitive computing is here. This innovative capability is becoming ubiquitous in our everyday lives—fundamentally changing how we perform our jobs, engage and interact with others, learn and make decisions. Pioneering organizations across industries and around the world are already leveraging its capabilities to realize significant business value and help solve some of society's greatest challenges.[1]

To prepare for and benefit from cognitive computing, enterprises are taking entirely new approaches to their IT infrastructures. The foundation is an IT infrastructure that enables digital business by supporting big data and analytics, mobile and social. Traditional systems and new architectures are integrated into a dynamic, open-standards-based infrastructure. Cloud—public, private and hybrid—is a fundamental component, providing the agility that enables innovation today, and cognitive tomorrow.

"With cognitive computing and the power of IBM Watson™, we will be able to use tremendous amounts of data to diagnose and fix our clients' problems even faster—surpassing their high expectations."

– Rick Ruiz, General Manager, IBM Technical Support Services

No one says this is easy. CIOs also universally acknowledge that some of their most important objectives often seem to clash: How can we support the growing demand for service 24 hours a day, 7 days a week while maintaining security and availability? How can we reduce costs while improving service delivery? How can we balance the need for proactive support while serving as catalysts for innovation? The ultimate question then becomes: What is the best path available to achieve these goals?

One compelling answer to that question is the strategy for a dynamic, responsive and integrated IT infrastructure from IBM. This smarter IT infrastructure can help:

- Ensure high availability and quality of existing services
- Meet customers' expectations for real-time, dynamic access to innovative new services
- Contain operational cost and complexity
- Enable breakthrough productivity gains through integrated service management, optimization, virtualization, energy stewardship and flexible delivery choices
- Provide the basis for organizations to gradually evolve their infrastructures to become more resilient, powerful, flexible and cost-effective
- Employ automation and cognitive computing to take time and cost out of IT support operations

This white paper discusses the different support challenges that can confront you when implementing an infrastructure that includes new solutions like mobile, social, cloud initiatives and other new breeds of computer models, including cognitive. To keep these solutions running daily, you should consider the level of support that will be required. With technology clearly growing in complexity, can your internal teams adequately support your operational needs now and still concentrate on innovation projects? Will you be able to grow and retain the skills needed to keep these systems running? You may need support on the front end or someone you can team with to address end-to-end, ongoing support. Will you have to work with multiple vendors in different locations, or will you have a single vendor and support contract? And finally, how do you ensure that you are optimizing the value from the new technology you have implemented?

Because no two organizations face the same business context—or have the same infrastructure—no two will take the same path in the pursuit of an IT infrastructure that can support digital business and cognitive workloads. The results, however, will generally be the same: to achieve more with less—higher service levels, reduced costs and proactively mitigated business risks of many kinds.

New support and maintenance challenges

The higher levels of complexity that come with a hybrid IT infrastructure tax IT staffs more than ever. Analytics and cognitive systems require massive amounts of data to be captured, linked and made available in real time. Systems must be integrated and available 24 hours a day, 7 days a week to deliver ever-increasing services. Growing numbers of servers, storage and an explosion of devices must be invested in, managed and redirected to meet internal and external demands. Even the solutions to some of these challenges—virtualization, consolidation and cloud computing—bring additional complexities that must be effectively managed.

This will come as no surprise to the student of technology history. Invariably, as newer, better solutions are developed, technical support becomes more complex in tandem. Consider automobiles. Originally pretty basic and simple, the automobile has evolved into an incredibly complex mix of interconnected and interdependent systems enabled by a million lines of code. Today's automobiles are smart enough to sense an impending obstacle and respond by braking to avoid a collision. No one would argue that the backyard mechanic is long gone, replaced by a highly skilled technician who utilizes a seemingly complex array of diagnostic and repair equipment. And while we may pine for simpler days, few of us would give up the sophisticated transportation system embodied in a modern automobile.

The same is true of today's IT infrastructure. Once comprised of a relatively simple combination of homogeneous products, today's IT infrastructure has become a collection of interrelated hardware and software systems that comprise a whole. This level of integration introduces new challenges and an integrated support concept—rather than supporting hardware or software, you must now support the solution. Going forward, entirely new platforms and classes of solutions will be in place, all requiring skilled and informed support. Enhanced and adaptive support concepts are therefore required to leverage the full value of this IT infrastructure and address its new support complexities.

The traditional box-by-box break-fix approach is clearly not sufficient to maintain and support this advanced infrastructure. Instead it requires a holistic service and support management approach that is focused on application availability for the end user rather than isolated box availability.

Newly adopted technologies bring the need for new management tools. The adoption of cloud computing and virtualization unchains resources such as processing power, storage, memory or network capacity from physical assets and allows the organization to allocate resources in a dynamic manner in response to changing business needs. This has the effect of adding another layer of sophistication to the IT architecture for support teams to handle. According to most analysts, problem and incident management are therefore among the top five challenges in a virtualized environment—and are often underestimated by many organizations. For instance, isolating technical problems and identifying root causes require new capabilities and supporting automation. Technical complexity formerly spread out among hundreds of physical servers is now focused in fewer physical devices, but still involves separate operating systems, middleware, applications and data.

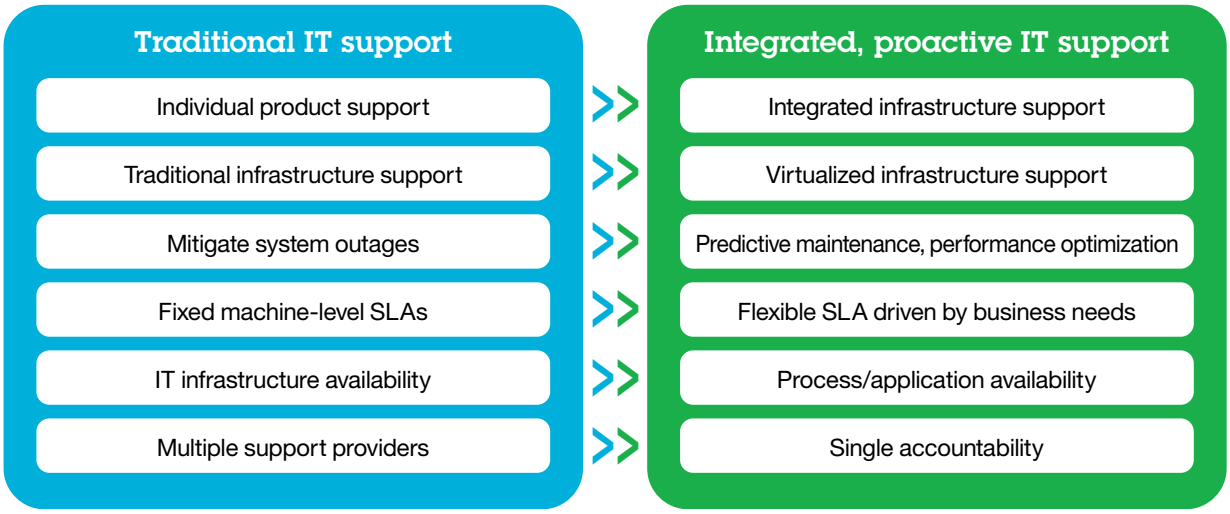

Figure 1. An integrated, open and dynamic IT infrastructure introduces both great benefits and new support complexities to IT.

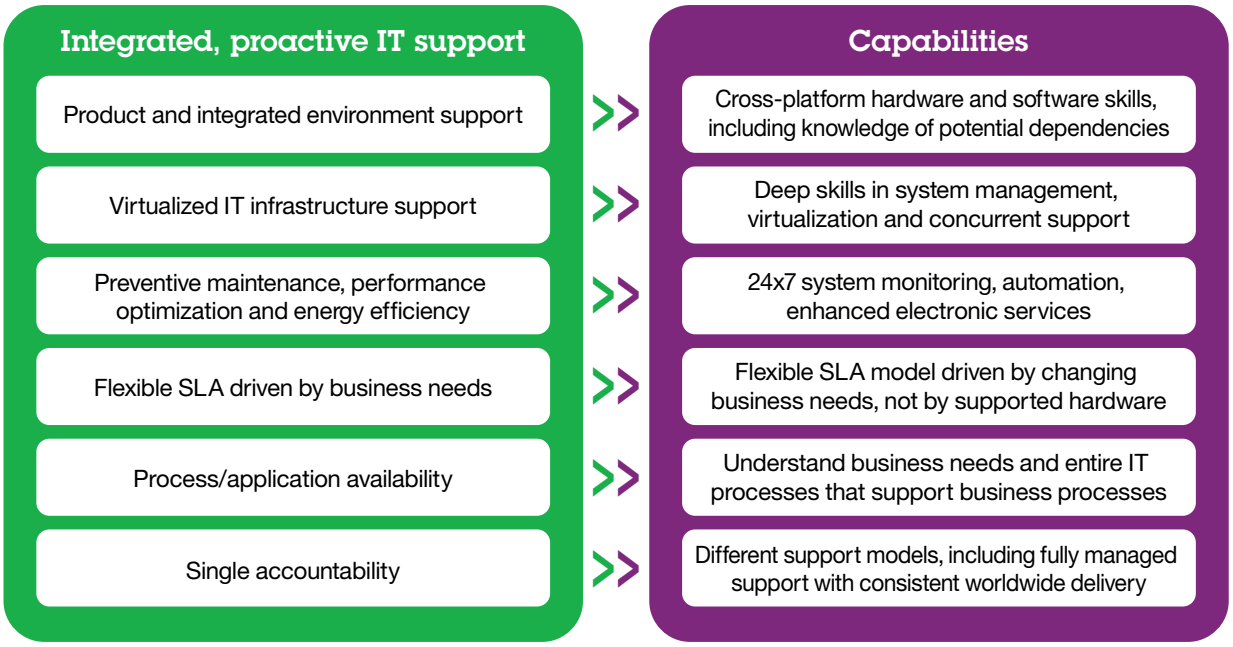

Figure 2. An integrated, open and dynamic IT infrastructure brings new support and maintenance challenges.

Cascading failure is another complexity to consider, which can occur when services and resources are integrated across what had been isolated domains. Such integration helps to reduce costs while achieving higher agility, flexibility and scalability. However, it also means that older management tools and processes may no longer work properly, because they presume services are created and managed within one domain, or via one system, and that is no longer true.

For instance imagine a system's hard drive fails. In the past only the services and applications supported by the particular system with that particular drive would be affected. In a highly integrated IT infrastructure, though, that hard drive may represent one small part of a pool of aggregated, virtualized storage. Should that hard drive fail, the impact may no longer be confined to a single service.

A deep transparency and understanding of the interrelation between applications and infrastructure components is prerequisite to mitigate the risk of domino effects in a virtualized infrastructure.

Change management represents a third complexity. As new solutions or software versions are deliberately introduced to the infrastructure, each represents a new possible point of failure. The effect of this can be multiplied when numerous domains, each contributing to the delivery of what is now an integrated service, introduce changes concurrently. The result can be increased (and often unacceptable) business risk. Improper orchestration of changes means problems can begin at one logical point, application or service, and soon expand to encompass others. One example is the management of dependencies between microcode and release levels of all the interrelated infrastructure elements. A new software version or a firmware update on one element might cause unpredictable issues elsewhere. Furthermore a virtualized environment often requires that updates are consistently performed in a concurrent mode because you cannot simply take particular systems out of production.

Seamless integrated hardware and software support, including cross-platform microcode and release management, is therefore one of the key contributors to high availability in a complex IT infrastructure.

Even *implementing new capabilities*—a special and exceptionally extensive form of change management—can itself represent a very real challenge to support and maintenance teams. Such a large transition requires considerable time, energy and expertise to accomplish. Furthermore, the transition must be made in an effective and cost-effective way; it must take place in the least time possible, and create the least impact on the performance and availability of key services. Most maintenance and support teams will lack the expertise required to accomplish this.

A bank in Spain simplifies its contract-management process while achieving significant annual savings when IBM consolidates multiple service contracts into a single contract for hardware maintenance and software support.

Problem resolution through vendor support will also become more complex. Many organizations have relied on multiple vendors (solution providers) to support the once simple combination of homogeneous products. When a problem arises with a particular product, IT works with that particular vendor to hopefully come to a speedy and effective resolution. But in a virtualized, consolidated and integrated environment, problems may not easily be isolated to a particular element, and vendors may fail to take responsibility—instead passing the buck to others. Such a situation will inevitably slow time to solution, reducing service levels or even leading to extended, complete outages, just when the organization's dependency on reliable IT services is at an all-time high.

A single point of accountability across vendors based on agreed upon and consistently monitored service levels can significantly improve availability management.

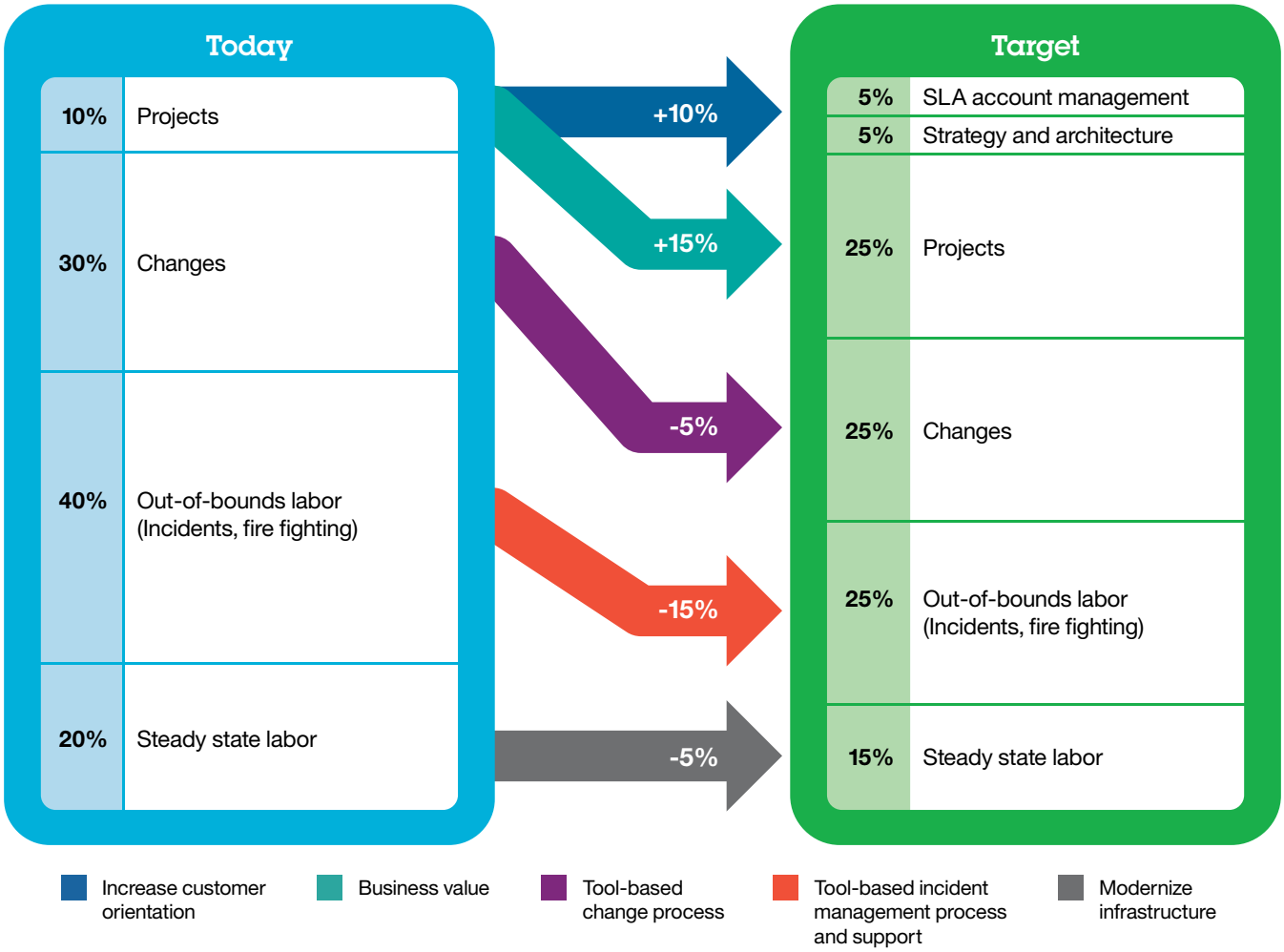

Figure 3. A comparison of the relative spending of labor to operate an IT infrastructure.

Already in today's infrastructure, typically 40 percent of labor cost to operate IT is spent on "out-of-bounds" tasks like incident management and firefighting to keep the IT operation ongoing.[2] By implementing automated, analytic and cognitive-based service management and support concepts, there is enormous potential to free up resources and cost in IT operations and redirect them into strategy and projects. The mounting complexity adds to the significant amount of time staff spends on support. In addition, IT support staff skills may be a concern. Having a support partner who can supplement skills, offload tasks and mask complexity is key.

New solutions and strategies can mitigate support complexities

Many new solutions and strategies are available to help resolve these and many other complexities that can arise in a highly virtualized and integrated hybrid IT infrastructure—if the IT support and maintenance team has both the tools and expertise.

Proactive monitoring, for instance, can help to reduce or virtually even eliminate the business impact of technical problems by continually tracking the health of the IT infrastructure. This monitoring can help anticipate future problems, and notify IT staff by email or cell phone to take preventative, rather than corrective, action. The health and status levels of key IT-enabled business services can be monitored in real-time dashboards, which deliver easy-to-understand, color-coded reflections of how well (or how poorly) those services and applications are performing against business objectives.

Advanced support capabilities are also useful in this context for automated event aggregation and analysis. Just as with any other aspect of the business, the introduction of intelligent automation, which consistently executes many common tasks, can dramatically improve both the effectiveness and efficiency of IT maintenance and support.

One powerful example: log parsing and analysis. Many applications, systems and services create ongoing event logs, reflecting changes as they occur in real time. However, manual analysis of those logs will generally be complex, slow and error prone. It is also very difficult to gain a holistic understanding of a complex problem by manually examining and integrating information from such logs. A better outcome can be obtained via automated analysis. Logged events are recognized by intelligent monitoring tools and are correlated to reveal signs of impending failure. Subsequently, the results can be escalated to appropriate IT personnel—reducing the business impact of technical problems, and in some cases, eliminating it entirely.

This is an example of how traditional diagnostic competencies must evolve and grow to support today's IT infrastructure. Conventional IT teams may require some assistance via new solutions or supplemental expertise in order to accelerate the learning curve needed to utilize them. In some cases, where the competency in question is not core to the IT organization's strategy, best results may come from out-tasking these functions altogether.

Supporting clients with cognitive solutions

IBM support center agents are using Watson to help analyze and resolve issues. So far, we are seeing nearly a 40 percent reduction in problem determination time and more accurate answers.

IBM is also employing dynamic automation to address repetitive and routine incidents, such as fixing a file system that is full or handling increased storage usage. This "virtual engineer" is addressing 64 percent of incidents automatically, reducing time to resolve a situation by 80 minutes on average.

Expertise in fulfillment of service-level agreements is possible with virtualized or cloud environments supported by informed, effective maintenance and technical expertise. Service-level agreements (SLAs) can be linked dynamically to shifting workloads. Rather than being defined by static information that does not reflect changing demand levels, the service level can fluctuate in response to real-time information. Such enhanced flexibility in creating and fulfilling SLAs can translate into cost reductions and form the foundation of optimized demand management.

Flexible support models can help clients accomplish complex tasks, manage tasks for clients, or out-task individual processes that are problematic. Pursuing such possibilities, however, will require the tools and knowledge to address the full range of new support complexities, which will simply be beyond the expertise of many in-house IT support and maintenance teams.

For this reason, organizations interested in developing an advanced IT infrastructure that supports and is supported by cognitive computing will need a source of trusted support—one that offers deep technical knowledge and proven expertise to help enable growth and innovation while optimizing IT support costs and optimizing system availability.

Why IBM?

IBM is exceptionally well-positioned as a trusted team member to help you balance the conflicting priorities of managing costs, providing service and fostering innovation. As a leading provider of single-support accountability to cover today's IT infrastructure in all its aspects, IBM can offer a comprehensive range of sourcing options.

IBM has extensive experience in service management, virtualization, cloud computing, IT optimization and business processes, dealing with thousands of organizations globally in virtually every major business sector. This enables over 23,000 services and support professionals with IBM to capitalize on key insights and strategies with direct access to research and development in a collaborative model across all infrastructure elements.

IBM maintenance and support services are driven by proven, consistent methods. These methods, which provide a collaborative framework based on situation appraisal, problem analysis, decision analysis and potential problem analysis, are designed for the complex support challenges that arise in a highly virtualized, interdependent IT infrastructure. As a result, IBM is empowered not merely to solve clients' technical problems more quickly and cost-effectively, but also to help them link services and applications in new ways, or introduce new services and applications, with minimal business risk or impact on ongoing operations. These methods thus support change over time, helping the infrastructure become more dynamic in the ways the organization requires.

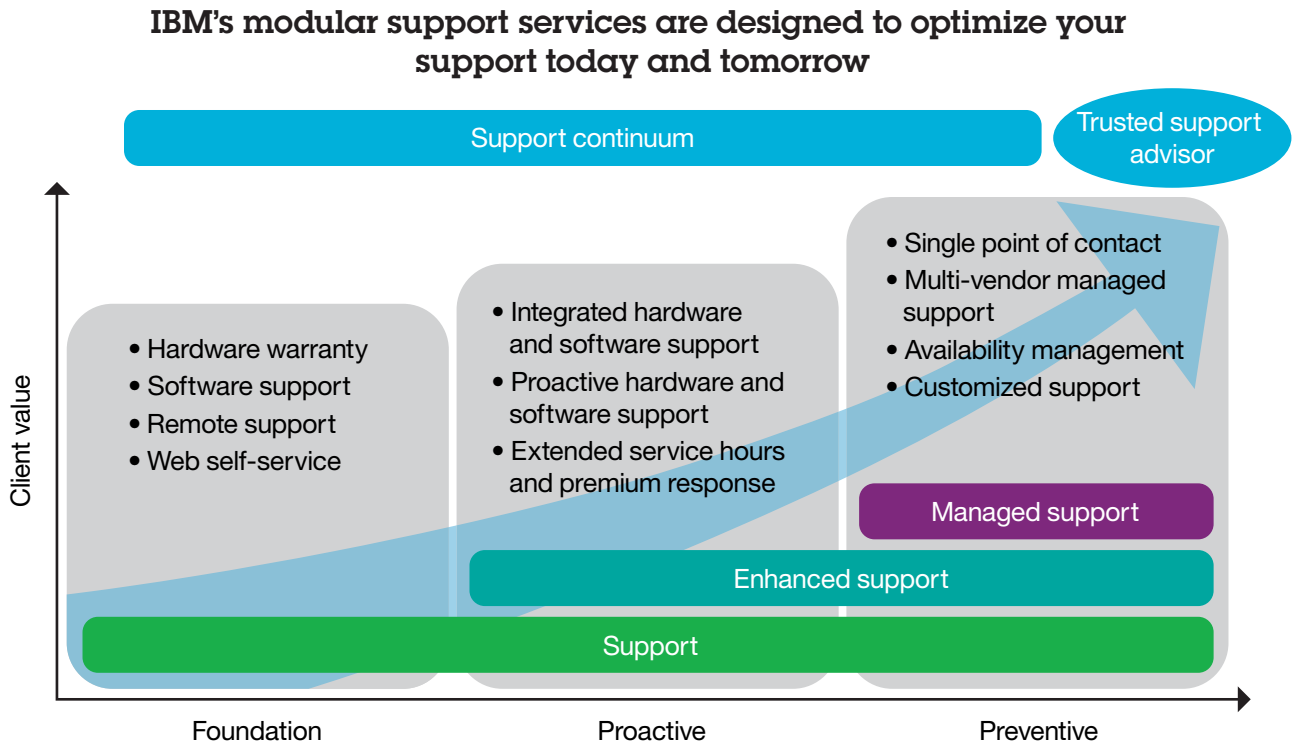

Figure 4. Modular support services from IBM are designed to optimize support for today and tomorrow.

Capabilities provided by IBM are enhanced through the use of leading support management technology—including cognitive computing and Watson—and proprietary databases of technical information, available to address particular maintenance and support concerns such as aggregated event analysis, reporting and proactive monitoring. Cross-brand, cross-platform and multi-vendor support is available for a wide range of environments and platforms, from servers, storage and networking hardware to Microsoft Windows, Linux and VMware. What's more, we support over 30,000 multi-vendor devices. This comprehensive range translates into quantified actionable intelligence concerning which services are performing well, which require attention, and the anticipated business impact. Because IBM support services are continually enhanced by close links with IBM product development and IBM Research, they provide an even more comprehensive, swift and accurate level of support in cases where organizations have deployed IBM technology in the infrastructure. Additionally, IBM can solve the change management puzzle—keeping track of the technical details related to how the infrastructure changes over time via integrated inventory and change management.

IBM can *centralize* all support operations, giving the organization a single point of accountability while reducing costs. Consider, for example, an organization supported by a large complex infrastructure comprised of many solutions from many vendors. In such a case, IBM can serve as the central liaison among all the vendors involved; when problems occur in any portion of the infrastructure, IBM will work with the vendors to solve those problems, from initial problem reporting to subsequent problem resolution. Managed Support solutions can further include service elements like contract and invoice management, inventory management, consistent service level management with relevant reports and reviews. Consolidating multiple support contracts into a single agreement typically saves 10 – 15-plus percent of maintenance budgets while increasing the availability by 5 – 10 percent.

IBM support offerings are modular, customizable and available at multiple levels to meet organizational needs, strategies and budget. IBM coverage for all supported hardware and software—both IBM and major non-IBM vendor products—is available in three forms: Foundation, addressing basic needs; Proactive, for more extensive, integrated support designed to drive service levels to new heights; and Preventive, intended to precisely match specific organizational requirements and contexts.

A virtualized, integrated hybrid IT infrastructure can provide organizations with many opportunities and eventually help them to evolve their infrastructures to become more resilient, powerful, flexible and cost-effective. Organizations that develop a maintenance and technical support relationship with IBM can thus do so with confidence. They will know that as a leading service provider and technology innovator, IBM will continue to deliver extraordinary maintenance and support performance that is driven by a deep commitment to meeting customer needs both today and tomorrow.

Next steps

Where should you begin on the road to an optimized maintenance and technical support strategy?

A logical first step is an evaluation to determine problem hot spots and identify the most pressing business priorities for revision, as well as opportunities for cost savings. In cases where organizations are considering migration to a more advanced IT infrastructure, it should be coordinated with a new maintenance and technical support strategy.

A quantified assessment from dedicated professionals is essential in the development of such a strategy. A Managed Technical Support Workshop provides a way to begin establishing objectives holistically, with respect to business goals and priorities. This workshop provides a definition of business processes involved, establishes their requirements with respect to IT (including SLAs), determines IT service elements and their associated objectives and defines the key performance indicators (KPIs) needed to verify objectives are met.

IBM can work with your organization to create an optimized maintenance and support plan that is right for your business—leveraging the full power of the IBM services and solutions portfolio to help reduce costs, increase service levels and proactively mitigate business risks.

For more information

To learn more about the IBM Technical Support Services, please contact your IBM marketing representative or IBM Business Partner, or visit the following website:
ibm.com/services/techsupport

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[1] Your cognitive future: How next-gen computing changes the way we live and work, IBM Institute for Business Value, January 2016.

[2] IBM IT Management Consulting customer study.

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