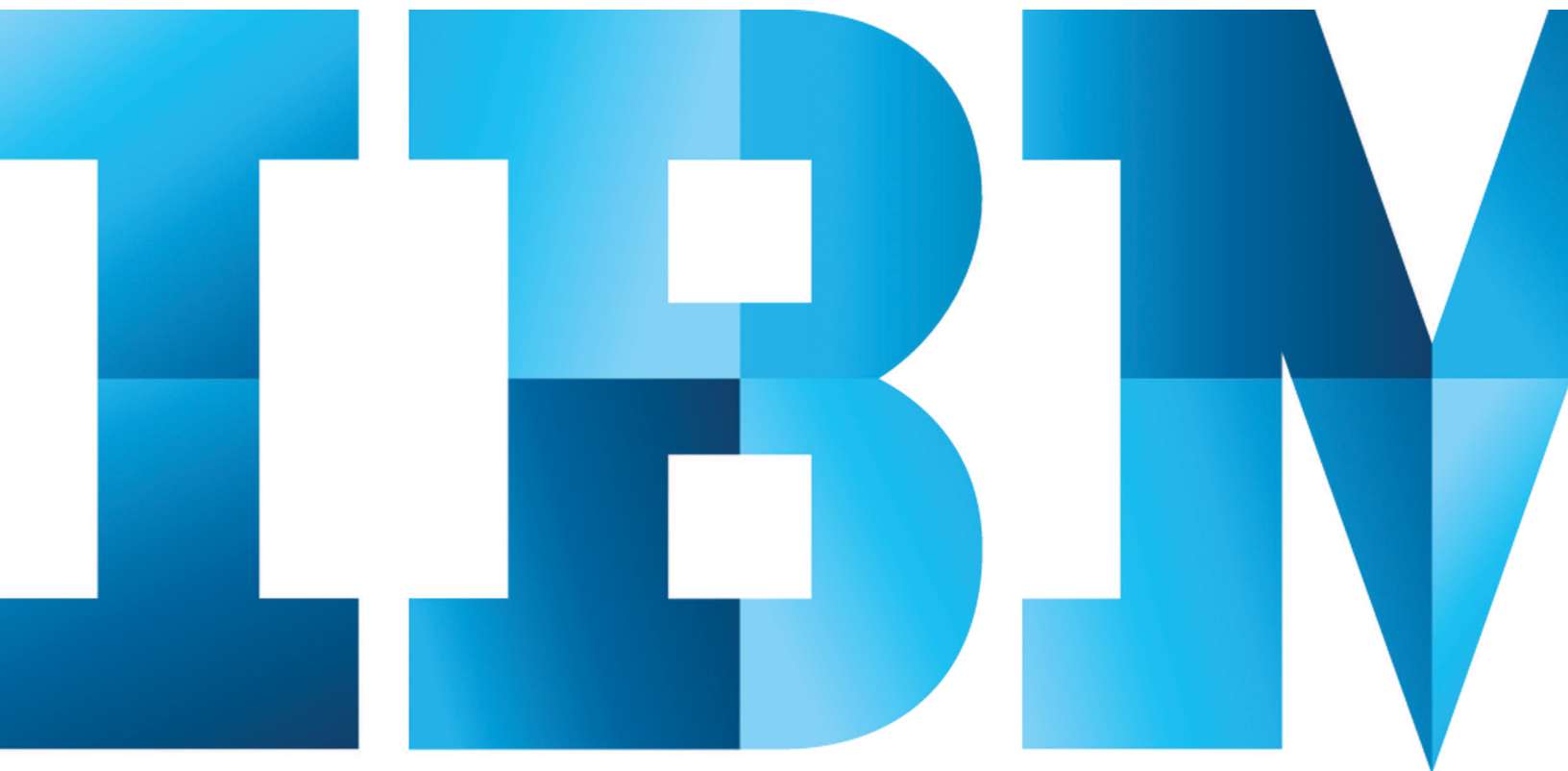# IBM PureFlex System

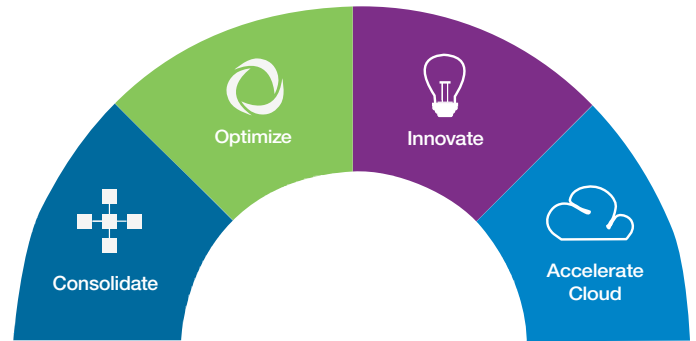*The infrastructure system with integrated expertise*

IBM

IT is moving to the strategic center of business

Over the last 100 years information technology has moved from a specialized tool to a pervasive influence on nearly every aspect of life. From tabulating machines that simply counted with mechanical switches or vacuum tubes to the first programmable computers, IBM has been a part of this growth, while always helping customers solve problems. Today, as the planet has become smarter, IT is a constant part of business and of our lives. IBM expertise in delivering solutions—solutions across infrastructure, middleware and applications—has helped the planet become smarter. And as organizations seek to extract more value from their data, business processes and other key investments, IT is moving to the strategic center of business.

Today, the IT systems we all depend on must adapt and perform in the face of constant change and growing complexity in the business environment. These factors place enormous strain on traditional computing models. Businesses must drive innovation and address new opportunities faster and better than ever before. Users in all realms of their lives—business, personal, entertainment—are raising their expectation levels for IT. They want their needs to be met now and they want to specify how those needs are met. IT must be able to meet these expectations—adapting to new requirements quickly, growing capabilities elastically, and still meeting basic reliability and affordability demands.

Current IT models offer a range of approaches: you can use the flexibility of general purpose systems to tune your own systems, optimizing them for the business environment. But the time, effort and skills this approach demands can be significant. You maintain your own experts, dedicated to tuning these systems. On the other end of the spectrum are appliances—purpose-built systems that are designed to be easy to deploy and manage. But appliances can limit your ability to adapt to changes in your business. Cloud computing is another option, deploying applications on flexible, pooled computing resources. But cloud services can create a shared dependence where you don't have full control over your own data assets.

"Over the years our IT systems have become complex and difficult to manage, and as a consequence IT is increasingly finding itself in the position of being a barrier to innovation rather than an enabler of it."[1]

—Gary Barnett, the Bathwick Group, The road to Smarter Computing

Many organizations find they are spending too much time, money and effort simply "keeping the lights on" which prevents them from putting the effort you want into innovation:

- More than 70 percent of IT budgets are spent on operations and maintenance[2]
- When we do bring new capabilities on board—it takes too long
- Complexity in IT solutions is inhibiting change and adaptation

The result? You can't deliver new business innovation at a pace that meets the demands of the marketplace. To meet today's demands, you need a solid foundation of server, storage, networking and software resources that can quickly and automatically adapt to changing conditions. You need access to—and the ability to take advantage of—broad expertise and proven best practices in systems management, applications, hardware maintenance and more.

A new category of IT systems: expert integrated systems

The time has come for a new category of systems: systems with integrated expertise that combine the flexibility of general purpose system, the elasticity of cloud and the simplicity of an appliance tuned to the workload—fundamentally changing the experience and economics of IT. IBM PureSystems are the first family of systems in this category, offering:

- **Built-in expertise:** capturing and automating what experts do—from the infrastructure to the application
- **Integration by design:** designed together, the deeply integrated and tuned hardware and software is delivered in a ready-to-go, workload-optimized system
- **Simplified experience:** making every part of the IT lifecycle easier with management integration across the entire system and a broad ecosystem of optimized solutions, all designed to work with your existing IT investments

Expert integrated systems are more than a static stack of well-tuned components—a server, some storage, networking and database software, serving a fixed application at the top. Instead, these systems are based on "patterns of expertise" which can dramatically improve the responsiveness of the business.

Patterns of expertise help deliver value simply and efficiently

Patterns of expertise can automatically balance, manage and optimize the elements necessary—from the underlying hardware resources up through the middleware and software—to help deliver and manage today's modern business processes, services and applications. They do so by encapsulating, into a repeatable and deployable form, proven best practices and expertise gained from decades of optimizing the deployment and management of data centers, software infrastructures and applications around the world. These patterns aren't just a blueprint or set of instructions to help you—the expertise is built in and ready to help you achieve:

- **Agility:** As companies look to innovate to bring products and services to market faster, they need fast time-to-value. Expertise built into a solution eliminates manual steps, automates delivery and supports innovation.
- **Efficiency:** To reduce costs and conserve valuable resources, you need to get the most out of your systems with energy efficiency; simple management and fast, automated response to problems. Built-in expertise optimizes your critical business applications to help you get the most out of your investments.

- **Simplicity:** You need a less complex environment. Patterns of expertise help you easily consolidate diverse servers, storage and applications onto an easy to manage, integrated system.
- **Control:** Optimized patterns of expertise accelerate cloud implementations to lower risk by improving security and reducing human error.

Expert integrated systems are formed from patterns of expertise that represent the collective knowledge of thousands of deployments, established best practices, innovative thinking, IT industry leadership, and the distilled expertise of business partners and solution providers. These building blocks span compute, storage, networking and management resources. There are three types of patterns:

- Infrastructure patterns bridge the base system infrastructure elements like servers, storage, network, virtualization and management
- Platform patterns support the middleware—database, application servers and more
- Application patterns bring in expertise at the business application level

IBM PureSystems

Combining advanced IBM hardware and software along with patterns of expertise, IBM PureSystems are available in two types of expert integrated systems:

- **Infrastructure systems:** preintegrated compute, storage, networking, virtualization and management
- **Platform systems:** optimized middleware preintegrated on an infrastructure system

With expertise built directly into the systems, you staff will be able to focus on driving innovation for your business, instead of devising, testing and tuning custom integrated solutions.

Designed for the cloud, these systems are based on open architectures for ease of integration with existing environments. The end result is a simplified experience, from system setup and solution deployment and through to day-to-day management and ongoing enhancements and upgrades.

IBM PureFlex System

An IBM PureFlex System combines compute, storage, networking, virtualization and management into a single infrastructure system that is expert at sensing and anticipating resource needs to optimize your infrastructure.

A PureFlex System includes integrated patterns of expertise designed to automate and optimize the deployment and maintenance of your workloads. Deployment expertise can accelerate your time to value up to 100 times versus traditional systems[3]. Consolidation and management expertise from thousands of successful data center optimizations drives automation to significantly reduce manual processes that consumes too many staff hours. Optimization expertise also allows your infrastructure to flex to address unexpected demands without requiring expensive surplus capacity.

This system is designed to provide a simplified experience and reduce IT complexity without compromising the flexibility you need. By delivering both simplicity and flexibility in a system with integrated expertise, you can rapidly deploy IT services and keep them running at the performance levels your business demands while still managing cost.

Simplicity, control, efficiency and agility

The power of a PureFlex System is the combination of a virtualized, open architecture that provides choice along with deep integration and dynamic and simple management from a single vantage point. These solutions deliver built-in virtualization across compute, storage and networking within the system, so you get superior automation and simple workload optimization. Open and flexible, a PureFlex System is designed

to work with existing investments. And PureFlex Systems offer a choice of system architectures, operating systems and hypervisors, so you can carefully suit your solution to your workloads. This architecture is designed to offer you four key benefits:

Simplicity
A PureFlex System ships as a comprehensive, preintegrated infrastructure system designed to be deployed in hours. As a system that is integrated by design, a PureFlex System is simpler by nature:

- Components are configured to work together to optimize performance
- Management integration from a single console streamlines administration, enabling users to provision, deploy and monitor resources and workloads
- Based on patterns of expertise, the system can also intelligently optimize workloads and recommend the best resources to support new workloads, reducing manual effort

Key tasks are designed to be simpler. Administrators can provision a new virtual machine or deploy a predefined image from an image library with the click of a button. From a single interface, you can manage workloads across physical and virtual resources, spanning multiple architectures, hypervisors and operating systems. System administrators can create customized

alerts based on resource thresholds and automate responses to many events. When more intervention is needed, you can find detailed information on the system as a whole from a single interface.

Control
A PureFlex System is designed to give you a simplified experience so you get control and choice without increasing complexity. You aren't limited to a single architecture or single vendor's middleware; you can choose from a selection of servers, operating systems and hypervisors, and design systems truly optimized for the needs of your business. You can run and optimize a broad range of workloads on a PureFlex System, and you can adapt when your business needs change.

This combination of choice and control gives you an ideal platform for consolidation. No matter what architectures and operating systems you rely on now, you can consolidate the workloads from many resource-consuming servers onto a single, efficient PureFlex System. You can also consolidate storage into your PureFlex System and virtualize storage across other storage systems you might already have. And you control it all from a single unified interface. Because the system is open, it can fit into almost any existing infrastructure, supplementing current needs and replacing systems as they are retired. You choose the pace of your implementation.

With the powerful yet easy-to-use management interface, administrators can manage both physical and virtual resources—even multiple systems. You can define a collection of virtual server, storage and networking resources for a specific workload and manage that collection as a single resource. For example, an SAP landscape—the SAP database, application resources, and associated development and test resources—can be defined as a single workload.

Efficiency
IBM infused the expertise gained from its development of server, storage and networking systems into the PureFlex System so you get high resource utilization, reliability and performance. Integration by design means that you get efficiency on all levels of system design.

• Deep physical integration shrinks the IT footprint, saving valuable data center floor space and requiring less energy for operations
• Tuning to the task helps drive greater performance and improve IT economics
• Dynamic resource allocation allows the system to adapt to handle workload spikes, reducing the need for purchasing additional resources
• Fewer cables, built-in networking, preloaded virtualization and factory integration give you a simple package that can be installed and running in hours

But this integration also extends to system availability. For example, the system can proactively sense an impending hardware failure. With built-in expertise, it can then relocate workloads that depend on that hardware, giving an administrator the opportunity to replace the failing hardware without downtime. These kinds of capabilities are designed to give you enterprise-class availability while still giving you the simplicity of an appliance.

The PureFlex System is also designed to improve efficiency in system management. The combination of integrated infrastructure and advanced systems management capabilities are designed to eliminate management and administration costs, so you can redirect your experts for more important business priorities. Some key capabilities include:

• Automated processes triggered by events help simplify management and reduce repetitive administrative tasks
• Integrated service management can speed the test and deployment of applications
• Centralized management and deep integration can dramatically cut down on skills and training required for managing and deploying the system
• Virtualization support for not only compute, but also storage and networking assets enables workload mobility and automated provisioning

Agility
The PureFlex System was "born virtualized" to offer extraordinary agility and make your solution ready for cloud computing. Through the centralized management capabilities, you can control virtualized compute, storage and networking resources, and built-in expertise allows you to automate their provisioning. This means you can rapidly deploy new services, speeding time to market and improving responsiveness to changing business conditions. And this flexibility also helps you protect your IT investment by addressing IT and business needs now and into the future—at a rate and pace of adoption that you control.

For example, if your software development organization needed to rapidly build up and tear down development and test environments, you could quickly provision such environments and deploy application images from an internal image library in seconds. This speed and agility supports dramatically increased business velocity so you can respond quickly to IT and business needs and take advantage of marketplace opportunities.

And this value goes beyond IBM. There are tens of thousands of applications supported by the available hypervisors and operating systems available on the PureFlex System. Many key applications have been optimized for the PureFlex System so you can get built-in expertise not just from IBM but from IBM Business Partners as well. Expertise in tuning, configuration and optimization of these applications can be built into your system so you get fast application deployments, improved application performance, and faster application upgrades.

A PureFlex System offers simplified acquisition

The simplicity of a PureFlex System begins with acquisition. You can choose one of three preintegrated, optimized configurations as your starting point. Your solution ships to you as a complete, tested package of compute, storage and networking resources on which you and IBM Business Partners can customize a solution. With built-in patterns of expertise for deployment, management and optimization—including cloud capabilities—to simplify key tasks across all of your IT resources, your system is designed to deploy quickly and be easy to manage. You can select the capabilities you need based on your target workload and environment—each configuration is available with your choice of POWER7-based or Intel processor-based compute nodes.

Express
The Express configuration is designed for small and medium businesses and is the most affordable entry point into a PureFlex System.

Standard
The Standard configuration is optimized for application servers with supporting storage and networking and is designed to support your key ISV solutions.

Enterprise
The Enterprise configuration is optimized for scalable cloud deployments and has built-in redundancy for highly reliable and resilient operation to support your critical applications and cloud services.

No-compromise building blocks – integrated by design

The PureFlex System is built from no-comprise building blocks based on reliable IBM technology that support open standards and offer confident roadmaps. Your PureFlex System is designed for multiple generations of technology, supporting your workload today and ready for the future demands of your business.

Management
IBM Flex System™ Manager is designed to optimize the physical and virtual resources of your IBM PureFlex System while simplifying and automating repetitive tasks. From easy system set-up procedures with wizards and built-in expertise, to consolidated monitoring for all of your resources—compute, storage, networking, virtualization and energy—Flex System Manager provides core management functionality along with automation. It's an ideal solution that allows you to reduce administrative expense and focus your efforts on business innovation. From a single user interface you get:

• Intelligent automation
• Resource pooling
• Improved resource utilization
• Complete management integration
• Simplified setup

Compute nodes
Taking advantage of the full capabilities of POWER7 processors or Intel processors, the PureFlex System compute nodes are designed to offer the performance you need for your critical applications. With support for a range of hypervisors, operating systems and virtualization environments, the compute nodes provide the foundation for:

• Virtualization solutions
• Database applications
• Infrastructure support
• Line of business applications

Storage
The storage capabilities of a PureFlex System allow you to gain advanced functionality with storage nodes in your system while taking advantage of your existing storage infrastructure through advanced virtualization.

Your PureFlex System simplifies storage administration with a single user interface for all your storage with a management console that is integrated with the comprehensive management system. This allows you to virtualize third-party storage with non-disruptive migration of the current storage infrastructure. You can also take advantage of intelligent tiering so you can balance performance and cost for your storage needs. The system also supports local and remote replication and snapshots for flexible business continuity and disaster recovery capabilities.

Networking

With a range of available adapters and switches to support key network protocols, you can configure your PureFlex System to fit in your infrastructure while still being ready for the future. The networking resources in the PureFlex System are standards-based, flexible and fully integrated into the system so you get no-compromise networking for your solution. Network resources are virtualized and managed by workload. And these capabilities are automated and optimized to make your network more reliable and simpler to manage. Key capabilities include:

- Supports the networking infrastructure you have today, including Ethernet, Fibre Channel and InfiniBand
- Offers industry-leading performance with 1 Gb, 10 Gb and 40 Gb Ethernet; 8 Gb and 16 Gb Fibre Channel and FDR InfiniBand
- Provides pay-as-you-grow scalability so you can add ports and bandwidth when needed

Infrastructure

The Flex System Enterprise Chassis is the foundation of a PureFlex System, supporting intelligent workload deployment and management for maximum business agility. The 14-node, 10U chassis delivers high-performance connectivity for your integrated compute, storage, networking and management resources. The chassis is designed to support multiple generations of technology and offers independently scalable resource pools for higher utilization and lower cost per workload.

Decades of experience delivering essential IT

With decades of experience helping clients around the world in almost every industry transform their businesses, IBM can help you take the next step in your smarter computing journey. We've invested billions of dollars on research and development of systems, software and processes and we've taken the knowledge, expertise and technology gained from that experience and investment and put it into our solutions. And we do all of this with a commitment to open standards so you are free to make the choices you need to make—not only to integrate with other elements of your own environment, but the vast network of systems that are part of your extended network of partners, customers and suppliers.

With a broad ecosystem of partners with technical and industry expertise and the unique ability and skill to integrate it all together for you—along with an unwavering commitment to your success—you can rely on IBM and your IBM PureFlex System.

For more information

To learn more about the IBM Pure FlexSystem family, visit: **ibm.com**/ibm/puresystems or contact your IBM representative or IBM Business Partner

IBM

[1] The Bathwick Group, The road to Smarter Computing, Gary Barnett, June 2011.

[2] IBM Market Intelligence Time to Value Study, National Analysts, November 2011

[3] Based on IBM client experience compared to existing offering.

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