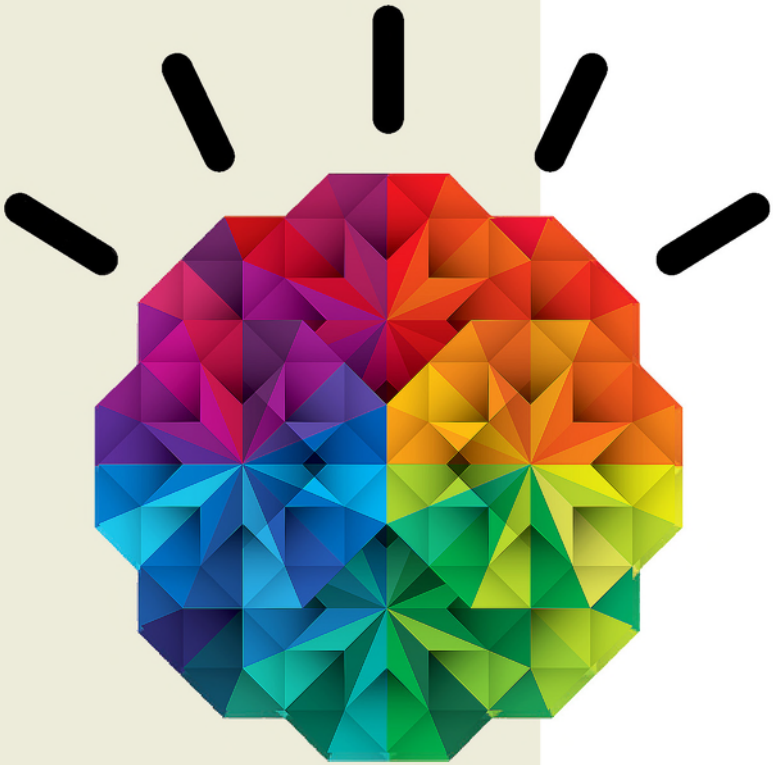
March 2014

IBM PureSystems

Business Partner Guide

Your Roadmap to Success with IBM Expert Integrated Systems

Max Facts™ eBook



Edited by Jim Hoskins

IBM PureSystems Business Partner Guide

Other Titles of Interest

More IBM Titles of Interest

- *IBM Power Systems Business Partner Guide*
- *IBM Storage Business Partner Guide*
- *IBM Smarter Workforce Business Partner Guide*

For more information, email us at info@maxpress.com.

IBM PureSystems Business Partner Guide

Fifth Edition

Your Roadmap to Success with IBM Expert Integrated Systems

Edited by Jim Hoskins

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Introduction

About This Guide

This MaxFacts™ interactive guide brings together—all in one place—the resources you need to be successful as an IBM PureSystems Business Partner. It contains information gathered and adapted with permission from multiple IBM and non-IBM sources. Also, there are embedded links to more-detailed information and news available on the Internet, so you always have the most current information at your fingertips. We are confident you will find this a useful reference tool.

As we are always working to better help you succeed, please forward any comments on or suggested improvements to this guide to info@maxpress.com.

Check for Updated Editions of This Guide

This guide has the ability to check for more current editions which are released periodically. Simply click on the "More on the Web" link provided here (or the link on the cover) and this guide will automatically check to see if you have the most current edition. If you don't, you will be able to download the latest edition immediately.

More On The Web

- Check for updated editions of this guide

How to Use This MaxFacts™ Interactive Guide

This guide has been specially designed to be read on your computer screen using the free Adobe Acrobat Reader software or a supporting Web browser. Alternately, you can print this guide on almost any printer and read the material anywhere.

Reading on a computer screen at your desk isn't as cozy as reading a printed page while lying on a towel at the beach. If you give it a fair chance, however, you will find that navigating the bookmarks along the left side of the screen provides an effective way to get to the information you need—quickly. Further, the instant access to expanded information provided by the many embedded Web links, along with the "search" function, also makes using this guide "on screen" worthwhile. We recommend that you copy this PDF file to your desktop so it will always be only "one click away." If you still want a hard copy, you can print it out on almost any printer.

Links provided throughout this guide (anywhere you see a "More on the Web" box or embedded within some figures) will lead you to additional information related to the topic at hand resident on the Web. In this way, this guide is a "three-dimensional guide" providing you with information about the topics at the level of detail you choose. To follow a link, simply click on it and a Web browser window will appear on your screen with the requested information. If the link brings you to a password-protected area (e.g., on the IBM PartnerWorld or COMP Web sites), you will be prompted to enter your IBM-issued user ID and password before you are presented with information.

When you are finished exploring, just close or minimize the Web browser window and you will arrive back at the guide. You are encouraged to explore all links that interest you to get the most out of this guide. You must have an active connection to the Internet to use the embedded links.

To navigate around within this guide, you can:

- Step forward or backward a page at a time using the standard Acrobat Reader navigation toolbar
- Click on the "Bookmark" links shown on the left side of your screen to go directly to that part of the guide.
- Click on the "Table of Contents" section and click on the links to go directly to that part of the guide
- Search for keywords in the document using the Acrobat Reader "Find" function (found on the toolbar).

Reader Feedback

We welcome your feedback on any aspect of this guide, so please email your comments or suggestions to info@maxpress.com.

To see our full line of IBM titles, we invite you to visit our Web site, maxpress.com. From all of us at Maximum Press, thank you for your interest.

More on the Web

- email us (info@maxpress.com)
- Maximum Press Web site

1

IBM PureSystems Basics

In this chapter, we cover some basics about the IBM PureSystems family.

The Journey to Become Smarter

Today, all around us, profound changes are taking place as industry after industry embarks on the transformational journey to become smarter. While the changes by industry may vary dramatically, they generally have one thing in common: the central role that IT plays in each.

The Economics and Experience of IT Must Change

Organizations are challenged to both innovate to take advantage of new opportunities and optimize their approach to IT in the context of unprecedented rate of change. Line-of-business leaders are under increasing pressure to respond rapidly to opportunities and challenges to grow both revenue and profit, while at times seeing their own IT as being too slow to support their rapidly changing needs. Yet, CEOs recognize technology is the leading force for driving business innovations. Since our IBM global CEO Study series began, technology—in its widest sense—has progressively risen on CEOs' radar. It

now ranks as the number one factor impacting organizations with CEOs around the world[1]—above things like people skills, market factors, macro-economic factors, regulatory concerns, globalization, etc.

It's clear that mobile, social, big data and analytics are redefining client engagement. Big Data is the planet's "new natural resource" and advanced analytics is the way to "mine it." Social and mobile have become the new platform for work.

In the face of this, another shift is occurring. Cloud computing has become the new IT delivery mechanism for this converged set of transformations. An IBM GBS Institute of Business Value (IBV) Study, surveying business and technology leaders on cloud, indicated that 90 percent plan to implement cloud by 2015.[2] There's no question IT is moving to cloud delivery, the real question really is how to do it more simply—making the transition quicker and more effective.

IT is faced with another fundamental problem—the increasing time and effort spent integrating, tuning, deploying, running, and maintaining today's increasingly complex IT infrastructure. Today, 68 percent of IT operating costs in 2013 will be for management and administration—this is up from 29 percent in 1996.[3] This problem needs to be solved to have the time and resources to deliver what the business needs today and enable the cloud transformation to occur.

1. IBM CEO Study 2012

2. 2011 IBM GBS IBV Study, "The power of cloud: driving business model innovation

3. IDC; Converged Systems: End-User Survey Results presentation; September 2012; Doc #236966

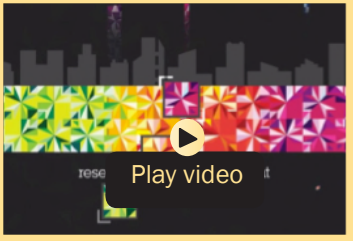
The Time Has Come for a New Class of System

The IBM PureSystems family is a new class of systems that helps address these client imperatives. They are expert integrated systems that are built for cloud, big data and analytics. They combine the flexibility of a general purpose system, the elasticity of cloud, and the simplicity of an appliance tuned to the workload.

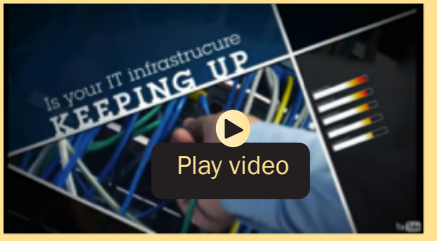
These expert integrated systems fundamentally improve the experience and economics of IT by simplifying the entire IT project lifecycle to reduce time, cost, and risk. What separates PureSystems from other approaches in the industry is delivery of three truly unique attributes:

- **Built-in expertise**—Capturing and automating what experts do. Think of PureSystems as representing 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.
- **Integration by design**—Deeply integrating and tuning hardware and software. All of the integration is done for you, by experts.
- **Simplified experience**—Making every part of the IT lifecycle easier. The entire experience is much simpler from initial design and purchase through setup, operation, maintenance, and upgrading over time.

More on the Web



Patterns of Expertise (1:07)



IBM PureSystems—A smarter approach to IT management (2:35)

IBM's PureSystems family members include:

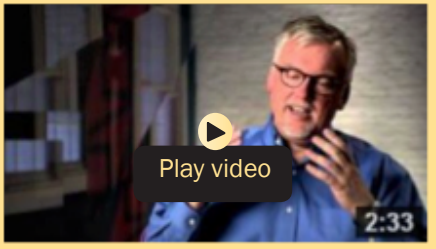
- IBM PureFlex System
- IBM PureApplication System
- IBM PureData System
- IBM Flex System.

Let's take a quick look at each.

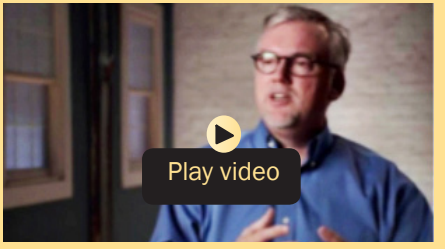
IBM PureFlex System

IBM PureFlex System is a complete, flexible cloud infrastructure system with integrated expertise. The system integrates and optimizes all compute, storage, and networking resources to deliver infrastructure-as-a-service (IaaS) out of the box saving time and reducing effort throughout the IT lifecycle. These systems combine advanced IBM hardware and systems management software, integrating them into an optimized configuration that is simple to acquire and deploy so you get

More on the Web



IBM PureFlex Systems Overview with Jeff Howard, Vice President Marketing (2:33)



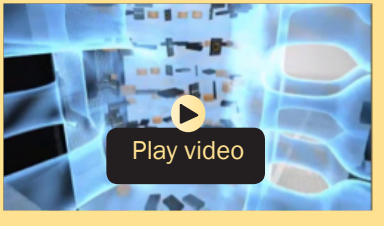
PureFlex System: Infrastructure (2:51)

fast time-to-value for your solution. "Open choice" gives you the ability to configure your PureFlex System with a wide variety of elements from IBM and IBM Business Partners. Choices in critical areas such as architecture, storage, operating systems, hypervisors, and networking allow systems to be optimized and tuned to the enterprise.

IBM PureApplication System

IBM PureApplication System is a cloud application platform that can dramatically accelerate time-to-value and automate deployment and life cycle management for a broad range of applications. These systems pre-integrate a full application platform set of middleware and expertise with a single management console. It is a workload aware, flexible platform that is

More on the Web



What are IBM PureApplication Systems (4:06)

designed to be easy to deploy, customize, safeguard, and manage in a traditional or private cloud environment, ultimately providing superior IT economics. With the IBM PureApplication System, you can provision your own patterns of software, middleware, and virtual system resources.

IBM PureData System

Big Data along with systems capable of processing it properly can reveal a whole new world of business insights. The new IBM PureData System is optimized exclusively for just that. Like each of the IBM PureSystems, it offers built-in expertise, integration by design, and a simplified experience throughout its life cycle. However, PureData System models have been designed, integrated, and optimized to deliver data services to today's demanding applications: transactions, analytics, and operational analytics.

More on the Web

PureData System Product Overview (2:53)

IBM Flex System: The Building Blocks

IBM Flex System is the right fit to custom-build and tune a configuration to meet specific requirements, using the most advanced blade server on the market with maximum x86 and POWER compute and memory performance. IBM Flex System is not referred to as an Expert Integrated System because it is not configured, integrated, and tested at the factory by

IBM experts using IBM expertise and experience, and unlike IBM PureFlex, IBM PureApplication System, and IBM PureData System, it doesn't contain the solution layer installed/integrated, etc., and the value that brings to a client in terms of time-to-value (across several dimensions).

More on the Web

Partnering with IBM on Flex System—Anatomy of a deal (3:48)

Why IBM?

For more than 100 years, IBM has been at or near the center of every major turning point in computer science. We introduced the first computer designed specifically for businesses in 1953, but we haven't remained in the forefront by clinging to the past. IBM understands that lasting economic value is not created simply by deploying a new piece of hardware or a new software program. We understand the importance of applying core principles of an architecture approach across entire IT systems. With our clients, we've been working with deeply integrated systems long enough to know that a software company can't simply acquire a hardware company, package those products together and call it integration. Expertise is required to turn a collection of software and hardware components into something useful and create significant business value.

IBM designs, builds, and integrates products for nearly every element of an organization's computing portfolio, including microprocessors, servers and storage devices, operating

systems, software programming tools, middleware, business intelligence applications, and industry-specific software frameworks.

With expert integrated systems, we're doing much more than integrating or packaging technology components. We're simplifying virtually every aspect of the client experience—from procurement to deployment to management to upgrade and support—without sacrificing flexibility or choice. We accomplish this by capturing and automating the collective knowledge gained through large investments in research and thousands of actual solution deployments. This expertise is actually packaged within the solution itself and delivered to our clients as a deeply integrated and tuned system vastly simplifying the IT lifecycle.

The depth and breadth of IBM solutions, services, and expertise, as well as our ecosystem of Business Partners, positions us as a technology leader capable of delivering on the promise of expert integrated systems. We work side by side with IBM Business Partners to create distinctive client value through our combined capabilities, experience, and offerings. IBM will continue to build out this broad, open-application ecosystem to provide our clients with a portfolio of solution providers that serve both cross-industry and industry-specific solution areas, addressing the need for choice and flexibility.

IBM's value proposition is clear: for organizations seeking to transform their IT economics, we offer advanced solutions that are simple, flexible, open, and efficient.

2

PureSystems Tools and Resources

This chapter provides you with some general information and valuable resources that will help you as you sell IBM products.

IBM PureSystems on PartnerWorld

PartnerWorld is IBM's information portal for Business Partners worldwide. On the site you will find the latest presentations and marketing materials (such as brochures, data sheets, and case studies) as well as competitive information, consultant reports, IBM white papers, education and events, tools, technical support, and much more.

Business Partners who invest the most in IBM receive higher-value benefits and resources. This investment is recognized through three PartnerWorld membership levels: Member, Advanced, and Premier. Qualification for these membership levels is based on the Business Partner's attainment according to a point system. Points are earned by acquiring skills, develop-

More on the Web

- PureFlex portal on PartnerWorld
- Flex System portal on PartnerWorld
- PureApplication portal on PartnerWorld

ing and selling solutions, driving IBM revenue, and achieving customer satisfaction.

You will need your IBM-assigned user ID and password to access some areas of PartnerWorld. If you don't have your user ID and password, you can contact IBM PartnerWorld for help.

Education & Certification

As with almost any endeavor, time spent educating yourself and your team on appropriate topics such as selling techniques and PureSystems product offerings will help you succeed. In this section, we discuss options for you to obtain the PureSystems-related education you need.

Education for all IBM systems offerings can be found in PartnerWorld Systems College. PureSystems is no exception. The education will provide product details as well as how to position and sell PureSystems to your customers.

When you open the links below, you will find a "What's New" section, which lists all of the training added within the last three months. You will also find a tab with education "Roadmaps" to help guide you through the courses. The roadmaps are organized in basic and intermediate tracks. The last tab, "Job Role Course Catalog" tab, provides access to all available education. You can use this area to perform keyword searches for educational material.

More on the Web

- Solution Sales Representative
- Technical Sales Support Specialist/Consultant
- Implementer/Systems Engineer
- eLearning Modules

The PureSystems section of Systems College was established on the day of the launch. You should continue to check back periodically to see new content updates.

In addition to the content in Systems College, we offer occasional live virtual sessions as well as face-to-face events. The STG Education newsletter is a good place to stay on top of new offerings.

Systems Connect

Systems Connect is a personalized education portal designed specifically for our IBM Business Partners. We simplify the IBM learning experience by focusing on the priority education and learning roadmaps you need to effectively sell and technically support the sale of IBM PureFlex Systems. You can also gain rewards for learning in Systems Connect by simply signing up for the Know Your IBM program.

More on the Web

- Systems Connect info on PartnerWorld

Systems Connect makes it easy for Business Partners to find product specific education for both sales and technical, news, product announcements, tools, resources, and more—preparing them to address client issues with the knowledge of the latest IBM Technology on System x, Storage, Power or PureSystems.

Know Your IBM (KYI)

Know Your IBM is a permission-based interactive marketing and selling resource designed for you, our Business Partner sellers. It provides net, customized, online education modules

focusing on strategic product and solution areas, while rewarding our business partners for taking the time to learn and then to sell selected products.

More on the Web

- "Know Your IBM"

The education helps increase your understanding and awareness of the key features and business benefits of IBM products, solutions, and offerings. Incentives offered in conjunction with Know Your IBM are designed to encourage you to complete the education modules and provide rewards for your sales performance. Incentives are awarded at the individual rep level, not to the firm.

Certification

IBM Certifications are an important validation of your skills to perform key roles as the sales or presale technical representative. While preparing for these certification helps the sales teams ensure they have the skills to win deals quickly, the certifications also help the firm.

In order to be authorized to sell the PureSystems family, business partners must build their skills and pass exams. Systems Connect can show the sales or technical represen-

More on the Web

- IBM Business Partner Certification site on PartnerWorld
- Current list of all certifications eligible for PartnerWorld credit
- Find a PVUE testing center and register to take a test
- Professional certification for PureFlex

tative which certifications they should consider, and provide quick access to the roadmap of free online education to help with the skills development.

For IBM PureFlex

Effective January 2, 2014, the IBM Professional Certification Program will transition certification exam delivery to Pearson VUE (PVUE). All IBM mastery and certification exams will be delivered, worldwide, in Pearson VUE Test Centers (PVTC).

Pearson VUE has test centers worldwide in over 165 countries. You can find a PVTC near you, and register to take a test, by visiting the Pearson VUE Web site listed in the "More on the Web" box.

For IBM PureApplication System

The PureApplication System Sales Mastery and Technical Sales Mastery (TSM) exams are available and we are encouraging partners to get certified.

Sales Configurator Tools for Building Solutions

The IBM Configurator for e-business (e-config) has been enhanced to help you configure, price, and place an order for the PureFlex System.

Should you require Build to Order (BTO) Flex System products, they may be configured using the Standalone Solutions Configuration Tool (SSCT), the IBM System x &

More on the Web

- Sales Tools

Configurators

- SSCT
- x-config
- IBM Hardware Configurator
- e-config

More on the Web

- PureApplication System Sales Mastery (SM) exam
- PureApplication System Technical Sales Mastery (TSM) exam

Test preparation links:

- IBM PureApplication System Sales Kit—Client Presentation, Data Sheet, Demos, Education, etc. (2.5 hours)
- developerWorks PureSystems—Features (2.0 hours)
- PureApplication Systems—Video Series (2.5 hours)
- developerWorks PureSystems—Preparing for PAS (2.0 hours)
- IBM PureApplication System Technical Sales Master Study Guide available on Sales Kit—(6.0 hours)

Cluster Solution Configurator (x-config), the IBM Configurator for e-business (e-config), or the IBM Hardware Configurator.

Ordering

All PureFlex System offerings will be ordered in Partner/Commerce/Server or via your local ordering system.

Should you require Build to Order (BTO) Flex System products, they will be ordered in Partner Commerce, EDI, or via your local ordering system.

Sales Support

Sales support is available from your distributor, your business partner sales representative, and the IBM PureSystems Tiger Teams. Follow the link in the More on the Web box to find out who to contact.

Also, IBM has created a variety of sales enablement assets to help you along the sales cycle—for a complete directory, go to our asset library link.

More on the Web

- Key Contact listing on PartnerWorld
- Asset library
- Positioning

Especially helpful when starting to consult with clients on their IT challenges, is to understand how the PureSystems family is positioned within the IBM family of offerings, as well as against competition in the marketplace. For a better understanding of this positioning, you may check out the "positioning" link.

IBM PureFlex System Sales Kit

The IBM PureFlex Sales Kit consolidates all of the relevant assets and deliverables related to the PureFlex offerings into one easy to search document on PartnerWorld. In the sales kit you will find product brochures, white papers, links to client references and case studies, videos, proposal inserts and solution briefs, and more, as well as links to other relevant assets to help you in your sales efforts. The IBM Flex System Sales Kit is the repository to help IBM and IBM Business Partner sellers sell the compute node, chassis, networking, storage, and management nodes. All content is kept up-to-date in this repository.

More on the Web

- IBM PureFlex System Sales Kit on PartnerWorld
- IBM Flex System Sales Kit

IBM PureFlex Sales Scenario Tactics

Identify opportunities, generate leads, and win business with "quick start" sales tactics. Leverage high-impact sales assets for specific sales scenarios and deliver compelling value proposition to your clients. Convert your "opportunities" to "wins."

Identify target clients and prospects in your local region, and pursue opportunities with a focused set of sales tactics and assets.

More on the Web

- PureFlex Sales Scenario Tactics
- x86 to Flex Tactic
- Pure Power Tactic
- Managed Service Providers (MSPs) Tactic
- Large Deal Injection Tactic

IBM PureFlex System Sales Plays

The IBM PureFlex System Sales Plays help you match business needs with PureFlex solutions. Each play describes the different target audiences within a client business, their pain points associated with the initiative, and the unique features and benefits of PureFlex System that address those concerns. The plays also contain links to assets which support your sales efforts.

More on the Web

- PureFlex Sales Plays and Kits on PartnerWorld

If you want to sell with the power of IBM behind you, please look at these sales plays. IBM creates these plays to provide you with the support you need to win and win big!

Here are a few examples of PureFlex sales plays:

- **Cloud**—Increase efficiency of cloud deployments with IBM PureFlex and Flex System.
- **Pure Infrastructure**—Leverage IBM PureFlex and Flex System to target virtualization infrastructure consolidation and competitive migration opportunities.
- **Pure Solutions**—Value selling leading with key workload solutions across ERP, Collaboration, and analytics.
- **SAP Hana**—Joint IBM and SAP in-memory computing appliance provides real-time analytics for ground-breaking, real-time decision-making, flexibility, agility and control for SAP application environments.
- **MSP Migration to Pureflex**—Simplify deployment and reduce complexity using systems integrated with expertise.
- **X6 Workload Optimization**—Ultra-fast performance with superior scalability and resiliency for analytics, virtualization, database, and ERP/CRM enterprise workloads.

Competitive Marketing Information

The competitive section of PartnerWorld is a worldwide portal for information that will help you win in competitive marketing situations. It includes a searchable set of reports, presentations, and quick reference cards about the marketplace, competitors, and competitive products. You will find materials developed by IBM as

More on the Web

- IBM Competitive portal

well as outside sources such as Gartner, IDC, DH Brown, and IDEAS International.

IBM also publishes the Competitive Sales Guide for eligible business partners, which provides much useful information.

Web Content Syndication

IBM PureSystems digital marketing content is now available for syndication on your Web site. Web Content Syndication combines the power of content syndication, automatically sending and updating content, with built-in lead response tracking capabilities. It keeps prospects on your Web site and leads go directly to you. Currently syndicating Business Partners can simply go to their partner console and select the PureSystems Showcase. IBM Business Partners who want to start using Web Content Syndication should register on PartnerWorld. This is a free benefit for all PartnerWorld members. Be the first to start syndicating content for the new PureSystems offerings!

More on the Web

- Web Content Syndication

Social Media Resources for IBM Business Partners

Social media is quickly growing in importance for businesses of all sizes. Whether you are already involved in social media or just getting interested, the "More on the Web" box provides some links that will be of interest to you.

More on the Web

- Tweekchat Twitter host @IBMPureSystems, Chat hashtag: #ExpertSysChat
- PureSystems Social Media Aggregator
- PureSystems Flickr
- Communities for Business Partners
- Search blog for mentions of your business or competitors

IBM Global Financing

With IBM Global Financing at your side, you can lead your clients into the world of smarter computing while helping grow your business to become more profitable. In fact, IBM Market Intelligence data demonstrated that the odds of winning deals greater than $100,000 increased by 36 percent when Business Partners include IBM Global Financing in the sale *(source: IBM Market Intelligence Data Analytics "Win More" study of Seibel opportunities)*.

Simply put, recommending IBM Global Financing to finance IBM PureSystems is a win-win situation for both you and your clients.

Client Benefits

When clients combine a Fair Market Value lease with a 90-day payment deferral, they can:

- Lower their total cost of ownership by as much as 16 percent. *(Represents Net Present Value savings over a 36-month pe-*

riod for an IT infrastructure Fair Market Value lease, "best credit" customer. Current IBM Global Financing monthly rates for IBM hardware used to calculate present value savings. Savings can vary according to hardware platform).

- Conserve cash to use for other strategic needs and investments.
- Maximize cash flow and accelerate time-to-value with payment terms that align PureSystems costs with anticipated benefits.
- Add capacity or upgrade, often at little or no increase in monthly payments.
- Reduce the risk of technological obsolescence.
- Dispose of unneeded technology without hassle or risk.

Note: *90-day deferral for PureSystems financing subject to client credit approval. Interest accrues during deferral period. Restrictions may apply. Contact IBM Global Financing for more details.*

Business Partner Benefits

By providing your clients the benefits of financing through IBM Global Financing, you'll be able to:

- Open up opportunities for larger deals since your clients will have more purchasing power.
- Maintain account control—Clients that finance tend to become repeat customers.

- Eliminate credit risk—IBM Global Financing will handle all credit approvals and assume the risk of collection.
- Reduce pressure to discount as clients can obtain solutions through affordable monthly payments.
- Reduce your Days Sales Outstanding (DSO)—IBM Global Financing will pay you in an average of five days vs. 60–90 days in which your clients pay you. This puts more operating cash into your business.
- Earn commission fees when clients finance eligible transactions.

IBM Global Financing can help finance consulting and migration services for your clients—from IBM as well as Business Partners.

More on the Web

- Rapid Financing mobile app: financing on the go!

IBM Global Financing offerings are provided through IBM Credit LLC in the United States and other IBM subsidiaries and divisions worldwide to qualified commercial and government clients. Rates and availability are based on a client's credit rating, financing terms, offering type, equipment and product type and options, and may vary by country. Non-hardware items must be one-time, non-recurring charges and are financed by means of loans. Other restrictions may apply. Rates and offerings are subject to change, extension, or withdrawal without notice and may not be available in all countries.

IBM Global Services

IBM Global Technology Services (GTS) subject matter experts served as a key source of the expertise and intelligence infused into PureSystems. And now they're ready to help you enable your clients to take advantage of this technology and accelerate the value of their PureSystems investment.

IBM GTS has decades of IT services experience gained as one of the world's largest systems integrators and managers of IT infrastructure. As a result, we can help you deliver complete end-to-end PureSystems solutions to your clients—across design & architecture, complex migrations, technical support, resiliency, and cloud.

Attaching IBM Global Technology Services to your IBM solution sales gives you a way to enhance your productivity, accelerate sales, and increase deal size today while creating ongoing revenue opportunities for the future—creating offerings that are more attractive to your clients than ever before.

Technical Support Services for IBM PureFlex Systems

IBM Technical Support Services offers world-class remote and on-site technical support to maximize the agility, efficiency, simplicity, and control offered by PureSystems. In addition to the Next Business Day warranty service that is included with the PureFlex and Flex Systems, our three Global Centers of Competence are set up to provide integrated support for the IBM Flexible System Manager.

Each IBM PureFlex System configuration contains predefined Technical Support Services that need to be included in every solution sale. Additional Technical Support Service op-

tions are also available for both IBM Flex and PureFlex Systems. These services include:

- Warranty service upgrades (WSU)
- Software maintenance (SWMA)
- Software support (Support Line)
- Enhanced technical support (ETS)
- Hard Drive Retention Services.

Integrated Technology Services for IBM PureSystems

IBM has deep IT services skills in providing cloud services, infrastructure assessment, design and architecture services, resiliency, networking and implementation services. We can partner with you on PureSystems to help your clients in these key areas:

- **Confidently add PureSystems to your enterprise IT landscape**—IBM strategy and design services can help clients adopt PureSystems to optimize their infrastructure by creating a strategy, business case, and architecture that lets them minimize risk and maximize ROI.
- **Prioritize workload transition to PureSystems**—IBM research-based workload analysis services can help clients map the right workload to the right platform, prioritize workload transition to PureSystems, and integrate these systems into existing service management processes.
- **Ready your data center facility for PureSystems**—IBM facilities assessment and design services can help quickly

deploy high density PureSystems technology while optimizing cooling efficiencies and reducing related power consumption to help increase system uptime by potentially reducing outages caused by high heat conditions.

- **Fast-track PureSystems implementation and minimize risk**—IBM implementation services can help clients customize PureSystems to their IT environment, accelerating the time to value by helping clients understand how to leverage its new functionality.
- **Prepare your networks for PureSystems**—IBM network strategy and optimization services can combine business plans for PureSystems with an assessment of clients' current network to identify, design, and deploy any necessary network specific actions.
- **Enhance PureSystems resiliency**—IBM automated cloud-based recovery services for PureSystems can help reduce recovery time and improve the reliability of clients' recovery infrastructure through a fully managed recovery solution and security-rich managed protection of critical data.
- **Enhance cloud delivery**—PureSystems and IBM SmartCloud Services allow clients to develop and implement their own flexible and secure hybrid cloud strategy across private, public, and hybrid deployments to optimize performance.

Business Partner Technical Support

The path for support starts with Techline, then CTSS/FTSS/CTS, then Tiger Team, and then ATS/Centers. Business Part-

ner opportunities are treated like direct opportunities from a technical pre-sales support point of view.

Techline

Skilled specialists provide voice and email support for product information and positioning, solution design, configuration validation, pricing and performance, education, solution assurance, competitive solutions, and more.

Ask PureFlex

You can get assistance by emailing askPureFlex@us.ibm.com.

CTS

CTS is Channel Technical Sales. If the business partners are not aware of their CTS, they can engage them through their CRP or iCRBP. CTS Customer Technical Support will be engaged if the end user is assigned that resource. 888-771-7705.

Solution Assurance

Pre-sale Technical and Delivery Assessments (TDAs) are required for all PureFlex Foundation opportunities. Make sure you are familiar with the Solution Assurance Process and that you check the Solution Assurance Trigger Criteria and Designated Product List for the most current requirements for PureSystems.

- The PureSystems family is listed on the Trigger Criteria and Designated Product List under the Cross-brand category.

- The PureFlex Pre-sale TDA checklist is posted in the Solution Assurance Library in PartnerWorld. The checklist contains pre-sale and pre-install questions. If your opportunity is for a Proof-of-Concept (PoC), then use the streamlined set of questions highlighted in yellow and marked with (PoC).
- For more information on the Solution Assurance Process, consult your Distributor or visit the links provided in the "More on the Web" box.

Analysis Tools

Following is a listing of some tools to help you consult with customers about IBM PureSystems solutions.

More on the Web

• Alinean IBM PureFlex System TCO Analysis	This analysis tool compares the total cost of ownership for the IBM PureFlex Solution versus a traditional dedicated or virtualized IT infrastructure by collecting information about the current computing needs and then projecting the TCO for the two alternatives.
• ATS SCON Monitor Tool	Comprehensive server consolidation data collection and reporting; a free tool in the form of a service offering that provides customers with a report detailing the workload and utilization of their production systems.
• IBM Systems Workload Estimator	Web-based sizing tool for IBM Power System, System x, IBM PureFlex System, IBM Flex System, and System z. It can be used to size new systems, upgrades/migrations from existing systems, and consolidations.
• Power Configurator	Tool used to calculate energy savings.
• IBM Sizing Guides	IBM Sizing Guides provide point-and-click access to software solution specific hardware requirements to meet customer immediate and growth requirements on IBM systems.
• Visio stencil collection	IBM's Visio stencil collection has been updated to include Flex.

Data Collection/Analytics

• Insight for SAP	Free service offering that provides customers with a report detailing the workload and utilization of their production SAP system.
• Insight for OracleDatabase	Free service offering that provides customers with a report detailing the workload and utilization of their Oracle database servers.

Sizing, Competitive Consolidation

• Disk Magic	Enables you to estimate IBM disk subsystem performance. The tool models IBM disk controllers in z Series, i Series, and Open environments. The IBM disk controllers supported are DS8000, DS6000, DS5000, DS4000, SVC, V7000, and SAN attached N Series.

3

PureSystems Quick Reference

In this chapter, we will explore the specific offerings in the IBM PureSystems family.

PureFlex System

IBM PureFlex System is a complete, flexible cloud infrastructure system with integrated expertise. The system integrates and optimizes all compute, storage, and networking resources to deliver infrastructure-as-a-service (IaaS) out of the box. These fully integrated, optimized solutions can be configured for your specific business need and may be complemented by a package of support services. These purchased services include flexible choices for warranty service upgrades (WSU), and microcode analysis to ensure your PureFlex deployment maintains the latest levels of software and firmware.

IBM PureFlex System is a complete, flexible cloud infrastructure system with integrated expertise. The system integrates and optimizes all compute, storage, and networking resources to deliver infrastructure-as-a-service (IaaS) out of the box. These fully integrated, optimized solutions can be configured for your specific business need and may be

IBM Flex Systems Specifications

IBM Flex System Compute Nodes	p260, p270, p460, x220, x222, x240, x440
IBM PureFlex System Rack	Optional 42U, 25U or no rack
IBM Flex System Chassis	Single or scalable/multiple
Integrated 10 Gb or 1 Gb Networking Switch	Selectable option with redundancy
Integrated 16 Gb Fibre Channel Switch	Selectable option with redundancy
Integrated IBM Flex System Converged Scalable Switch (FCoE)	Selectable option with required redundancy
Integrated Management Node	Yes
IBM Flex System Manager Edition (SW)	Flex System Manager Standard
Power supplies (std/max)	2/6
80 mm fans (std/max)	4/8
Chassis Management Modules	2
IBM Storwize V7000 Disk System Flex System V7000	Required with a selectable option
IBM Storwize V7000 Software	Required

complemented by a package of support services. These purchased services include flexible choices for warranty service upgrades (WSU), and microcode analysis to ensure your PureFlex deployment maintains the latest levels of software and firmware.

IBM PureFlex System is designed to help support big data, social, mobile, analytics, and the flow of critical information. For small and medium businesses, Pure-

More on the Web

- PureFlex System sales assets info on PartnerWorld
- PureFlex System portal on PartnerWorld
- PureFlex info on IBM.com
- PureFlex System Competitive Insights
- PureFlex System build-to-order configurations
- PureFlex HW/SW compatibility
- PureFlex System blog search
- PureFlex System Twitter search

Flex may be configured in an affordable single chassis. PureFlex System can be optimized for scalable cloud deployments and has built-in redundancy for highly reliable and resilient operation to support demanding applications and cloud services required by many enterprises. PureFlex System provides the scalability, flexibility, and versatility you demand for business-critical workloads.

Here are some quick PureFlex System facts:

- Integration by design: deeply integrated compute, storage, and networking resources so you can deploy in hours instead of days
- Built-in expertise: automated management and deployment expertise for physical and virtual resources so your experts can focus on innovation
- Simplified experience: optimized configurations to accelerate purchase, deployment and time to value for your solution.

PureApplication System

As mentioned in Chapter 1, IBM PureApplication System is a cloud application platform that can dramatically accelerate time to value and automate deployment and life cycle management for a broad range of applications.

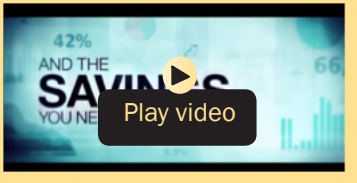
At a high level there are two kinds of expertise in the IBM PureApplication System:

1. Embedded expertise, as the system contains a balanced amount of compute, storage, and network for workloads it is designed for.

2. Application and platform patterns for a particular type of application or workload, i.e., the PureApplication System has a "web app" pattern that allows client applications to utilize the pattern for rapid deployment, automated scaling, or improved operations and management of web applications.

"Patterns of expertise" are an industry unique way of capturing and automating the many steps of deploying and managing an application. It represents a breakthrough in the speed in which new applications can be deployed and goes far beyond the way the industry thinks about things like virtual appliances today. The value of patterns begins with deployment but extends to provide a much broader, end-to-end means to simplify and eliminate work across the IT lifecycle. This spans deployment, monitoring, management, and maintenance.

More on the Web



IBM PureApplication System simplifies cloud deployment (1:15)

IBM is delivering patterns for its key software capabilities covering social, mobile, analytics, data management, business process management, application infrastructure, asset and facilities management, and more—representing the collective wisdom gained from decades of client engagements, recorded best practices, research and development, data center optimizations, and IBMer efforts globally.

For example, The IBM Web Application Deployment Pattern codifies best practices for dynamic scalability, high-availability, high-security, and other deployment configurations, replacing our clients' high-value personnel's time and expertise

with captured and automated best practices, codified as patterns of expertise.

And we are providing IBM Business Partners and clients the tools they need to develop and customize patterns for their use, allowing them to reap the benefit of this new approach. Over 440 solutions from over 300 leading ISV partners across a broad set of industries have been optimized and made available in the PureSystems Centre—a catalog and solution showcase that simplifies deployment of partner and IBM applications. PureSystems Centre is the central location through which clients can access IBM and partner solutions—both for initial installation and for maintenance and upgrades.

More on the Web

- IBM PureSystems Centre

PureApplication management is integrated across the entire solution stack of hardware and software. This integrated approach provides a single point of management with roles-based security and tasks, real-time system monitoring, and application centric infrastructure and middleware provisioning.

IBM PureApplication System is available in various configurations which enable you to choose the size and compute power that meets your application environment needs. You can upgrade to the next size when your organization requires more capacity, and in most cases, you can do so without taking an application downtime. Configurations are based on processor type, with x86 and Power processors providing two strong options in that regard. Additionally, within each processor family, you can choose your system based on the processor core counts that are pre-integrated into the Pure-

Application System (from 32 and 64 cores in our "mini" rack, and 96 up to 608 cores in our large rack). Additional core configurations are available for upgrade purposes.

Leverage extensibility from a broad, open ecosystem of partners ready and able to provide industry expertise and solutions to clients. Take advantage of PureSystems Centre, a PureSystems catalog and solution showcase that simplifies deployment of partner applications, to deliver value even faster.

PureApplication System is built for cloud and has a complete set of private cloud platform-as-a-service (PaaS) capabilities. Not only does PureApplication provide cloud infrastructure as a service via foundational capabilities, but it's the first fully integrated PaaS box in the industry. Following is a summary list of the key characteristics of a cloud environment, all of which are built into the PureApplication System:

More on the Web

- PureApplication System info on PartnerWorld
- PureApplication System info on IBM.com
- PureApplication System Competitive Insights
- PureApplication System blog search
- PureApplication System Twitter search

- Dynamic resource scalability
- Highly standardized infrastructure
- Multi-tenancy
- Virtualization
- Automated provisioning of IT resources
- Catalog of services

- User-based self-service
- Service level management
- Usage-based reporting.

PureData System

As described in Chapter 1, the new IBM PureData System is optimized exclusively for delivering data services to today's demanding applications. Like each of the IBM PureSystems, it offers built-in expertise, integration by design, and a simplified experience throughout its lifecycle.

The new PureData System comes in different models that have been designed, integrated, and optimized to deliver data services to today's demanding applications with simplicity, speed, and lower cost.

More on the Web

- PureData System info on PartnerWorld
- PureData System info on IBM.com

IBM PureSystems—PureData System Overview w/Inhi Cho Suh (5:45)

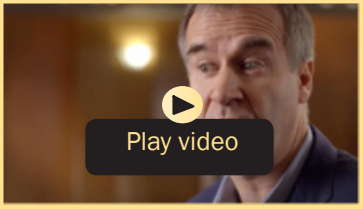
PureData System for Transactions

The IBM PureData System for Transactions—part of the IBM PureSystems family—is a highly reliable and scalable database platform designed to help reduce complexity, accelerate time-to-value, and lower data management costs. The system enables IT departments to easily deploy, optimize, and manage

data-intensive workloads. These expert integrated systems set a new standard in workload-optimized systems, delivering value with:

More on the Web

- PureData System for Transactions info on PartnerWorld
- PureData System for Transactions info on IBM.com



IBM PureData System for Transactions Tour with Tim Vincent (4:30)

- Built-in database management expertise that enables the system to do many of the ongoing administration tasks automatically, freeing up database staff from routine work
- Integration by design that results in factory-optimized systems designed for high reliability and scalability out of the box, streamlining system integration efforts
- A simplified experience from design to purchase to maintenance, which helps reduce total cost of operations.

The PureData System for Transactions combines the simplicity of a workload-optimized appliance with the flexibility of tailor-made systems, providing both fast time-to-value and customization for specific business needs.

PureData System for Analytics

The IBM approach to data analysis is patented and proven. Minimize data movement, while processing it at physics speed. Do this in parallel, on a massive scale, inside an

easy-to-use data warehouse appliance—extremely fast and at a low cost. And run business intelligence (BI) and advanced analytics that were previously impossible or impractical.

More on the Web

- PureData System for Analytics info on IBM.com

IBM PureData System for Analytics (2:17)

Here are some quick PureData System for Analytics N1001 facts:

- Easy to deploy and manage; dramatically simplifies your data warehouse and analytic infrastructure
- Arrives ready to go with expert integration
- Powerful platform for unifying business intelligence and advanced analytics
- Support for thousands of users and complex analytic workloads
- Simplified analytic development with default parallelized analytics and modules; no need for parallel programming
- Powered by Netezza technology.

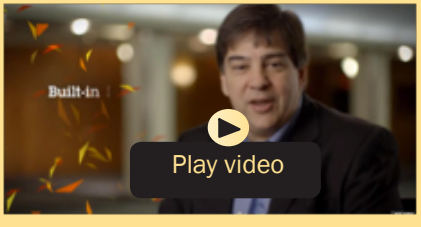
The PureData System for Analytics N2002 is a new, smaller model being offered as a lower entry point. It provides all of the same capabilities as the N2001 with a smaller storage capacity.

PureData System for Operational Analytics

The IBM PureData System for Operational Analytics—a member of the IBM PureSystems family—helps organizations meet these complex requirements with an expert integrated data system that is designed and optimized specifically for the demands of an operational analytics workload. Built on IBM Power Systems servers with IBM System Storage and powered by IBM DB2-based InfoSphere Warehouse software, the system is a complete, out-of-the-box solution for operational analytics that provides both the simplicity of an appliance and the flexibility of a custom solution. Designed to handle more than 1,000 concurrent operational queries, it delivers mission-critical reliability and scalability with outstanding performance.

More on the Web

- PureData System for Operational Analytics info on PartnerWorld
- PureData System for Operational Analytics info on IBM.com



IBM PureData System for Operational Analytics with Phil Francisco (4:35)

Here are some quick PureData System for Operational Analytics facts:

- Provides an integrated, optimized, ready-to-use system with built-in expertise for operational analytics

- Delivers outstanding performance and throughput for in-database analysis of large data sets that include both historic and operational data
- Continuously ingests data to support near-real-time responsiveness to dynamic business environments
- Designed as a modular, scalable system that can grow with your business
- Designed to handle more than 1,000 concurrent operational queries
- Integrated and simplified monitoring and maintenance
- Compatible with market-leading analytic and BItools, applications, and infrastructure
- Powered by IBM DB2–based IBM InfoSphere Warehouse software and IBM POWER7 processor-based IBM Power Systems servers.

PureData System for Hadoop

IBM PureData System for Hadoop H1001 is built to optimize Apache Hadoop data services for big data analytics and online archive with appliance simplicity.

IBM PureData System for Hadoop combines IBM InfoSphere BigInsights and IBM System x hardware for an integrated Hadoop system. It delivers enterprise Hadoop capabilities with easy-to-use analytic tools and visualization for business analysts and data scientists. It includes rich developer tools, powerful analytic functions, and exceptional administration

and management capabilities, as well as the latest versions of Hadoop and associated projects. In addition, IBM PureData System for Hadoop provides extensive capabilities with enhanced big data tools for monitoring, development, and integration with many more enterprise systems.

More on the Web

- PureData System for Hadoop info on PartnerWorld
- PureData System for Hadoop info on IBM.com

IBM PureData System for Hadoop overview (2:28)

IBM PureData System for Hadoop:

- Provides an exploratory environment for data analysts to help understand new and emerging data sources
- Provides a landing area for data from other sources, enabling aggregation, initial integration, visualization, and exploration before data moves to other parts of the analytic ecosystem
- Provides an integrated management console for the entire system
- Provides built-in analytics and enterprise functionality, on top of Hadoop technology, to help meet big data enterprise requirements
- Integrates advanced hardware cluster management capabilities with IBM InfoSphere BigInsights

- Incorporates integrated data archiving and transfer capabilities with connectivity to enterprise data warehouse systems
- Integrates with IBM DB2, IBM Netezza, IBM PureData System for Analytics, and IBM InfoSphere Guardium.

PureFlex System and IBM Flex System Solutions

IBM PureFlex System and IBM Flex System solutions bring together servers, storage, and systems networking capabilities that support open standards to easily fit into your existing data center.

Deploy SAP faster. Simplify the virtualization of your desktop infrastructure. Gain management efficiency by accelerating your cloud deployments. IBM PureSystems Solutions help you get the IT solution you need faster, more simply, and with better performance.

More on the Web

- PureFlex and Flex solutions

Flex System: The Building Blocks

The fundamental building block of IBM PureSystem solutions is the IBM Flex System Enterprise Chassis, complete with compute nodes, networking, and storage. In this section, we look at the components used in IBM PureSystems.

More on the Web

- Flex System info on IBM.com
- Flex System Information Center
- Product guides about the components of IBM Flex System
- IBM Flex System Interoperability Guide

Flex System Enterprise Chassis

The IBM Flex System Enterprise Chassis provides a high-performance, integrated infrastructure platform that supports a mix of compute, storage, and networking resources to meet the demands of your applications.

Available on either your IBM PureFlex System or IBM Flex System, the solution is easily scalable with the addition of another chassis with the required nodes. With the IBM Flex System Manager, multiple chassis can be managed from a single console. The 14-node, 10U chassis delivers high-speed performance complete with integrated servers, storage, and networking. And with IBM Flex System Manager, multiple chassis can be managed from a single console—reducing your administrative demands and costs.

More on the Web

- Enterprise Chassis specifications
- Enterprise Chassis info on PartnerWorld
- Enterprise Chassis info on IBM.com
- Enterprise Chassis Competitive Insights
- Enterprise Chassis configuration details
- Enterprise Chassis options
- Enterprise Chassis blog search
- Enterprise Chassis Twitter search

Here are some quick IBM PureFlex Enterprise System facts:

- Outstanding flexibility and efficiency with choice of compute, storage, networking, and management nodes

- No compromise design that can easily scale capabilities with business needs
- Designed for multiple generations of technology.

Compute Nodes

Taking advantage of the full capabilities of IBM Power and Intel processors, the 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.

In this section, we explore the different compute nodes available.

x86 Compute Nodes

More on the Web

- Flex System x86 compute nodes on IBM.com

In this section, we take a look at the IBM Flex System compute nodes that leverage the x86 family of processors.

Flex System x220 Compute Node

The IBM Flex System x220 compute node has a versatile, cost-optimized design for infrastructure and entry virtual-

ization workloads. The Flex System x220 compute node is available in either the PureFlex System or IBM Flex System solutions.

With the Flex System x220 compute node, it is simpler than ever to get started. The Flex System x220 compute node features a no-compromise design for processor, memory, and networking resources to allow your business to do more. Automated power management with onboard sensors gives you more control over power and thermal levels across the system. These capabilities, combined with memory capacity up to 192 GB, are designed to help you get the most out of your systems.

Upgrading to 10 Gigabit Ethernet (GbE) Virtual Fabric allows you to take advantage of up to 32 ports of virtual networking capabilities and leverage multiple protocols, including Ethernet, Fibre Channel over Ethernet, and iSCSI. The system also allows you to enable features on demand for a more flexible I/O solution. Virtual networking can require up to 75 percent fewer adapters, cables, and upstream switch ports to help control costs. You also get significantly simpler management with reduced cabling and fewer components to manage.

More on the Web

- x220 info on PartnerWorld
- x220 info on IBM.com
- x220 Competitive Insights
- x220 configuration details
- x220 options
- x220 blog search
- x220 Twitter search

x220 Specifications

Processor	2/2, Intel Xeon E5-2400 Series Processor
Level 2 (L2) cache	256 KB per core
Level 3 (L3) cache	2C—5 MB, 4C—10 MB, 6C—15 MB, 8C—20 MB
Chipset	Intel C600
Form factor	Flex System standard node
Memory	12 DDR3/DDR3L LP, 192 GB max with 16 GB RDIMMs
Internal storage	2 x HS 2.5 inch (SAS/SATA/SSD)
Internal RAID	SW RAID, RAID 0/1—Optional HW RAID, ServeRAID H1135, RAID 0/1; Optional ServeRAID M5115/RAID 0, 1, 5, 6, 10, 50 with LSI SAS2208 Controller
Internal USB	2 x Standard USB Flash Key; 1 x Front Access USB Key
Ethernet	Broadcom Dual 1 GbE
Chassis support	Flex System Enterprise Chassis
I/O expansion	2 x Mezz Cards (x8 + x4) + x4 PCI Express 3.0 1 x PCIe Expansion Node Connector (x16 PCI Express 3.0)
Power management	AEM, Active Energy Management
Management	iMM V2, RTMM KVM Dongle
RAS features	Chassis redundant/hot plug power & cooling; front panel & FRU/CRU LEDs
Operating systems	MS Windows Server, SUSE, RedHat Enterprise Linux, VMware
Warranty	3 year

Built-in storage is available through two 2.5-inch hot swap hard drives or solid state drives. Available optional features include support for RAID 0, 1, 5, 6, 10, and 50 fully backed by cache and a high-density application acceleration solution with IBM Flex System Flash. These features allow you to tailor internal storage to match your specific capacity, performance, and reliability needs and support applications such as distributed database without sacrificing system density.

Here are some quick x220 facts:

- Optimized for infrastructure and entry virtualization workloads

- Simple virtualization solution with embedded dual hypervisors
- Designed for simplified deployment and management.

Flex System x222 Compute Node

The IBM Flex System x222 compute node has been designed to cost-effectively supply the compute and virtualized resources you need now, in a platform designed to support your future needs.

Each Flex System x222 compute node features two independent twin compute nodes, enabling the equivalent of up to 28 independent compute nodes in a 10U Flex System Enterprise Chassis. There is no need for additional switching hardware or connectivity options—simply enable additional ports to the existing networking hardware via Feature on Demand offerings. This helps reduce the cost of the overall solution.

More on the Web

- x222 info on PartnerWorld
- x222 info on IBM.com
- x222 Competitive Insights
- x222 configuration details
- x222 options
- x222 blog search
- x222 Twitter search

Here are some quick x222 facts:

- Optimized for virtual desktop and virtualization density
- Double-dense design that can support the equivalent of 28 nodes per IBM Flex System Enterprise Chassis
- Designed to reduce operational costs.

x222 Specifications

Processor/cores	Up to two, Intel Xeon E5-2400 Series Processor per twin node; 16 cores per twin node
Level 2 (L2) cache	256 KB per core
Level 3 (L3) cache	2C—5 MB, 4C—10 MB, 6C—15 MB, 8C—20 MB
Chipset	Intel C600
Form factor	Flex System standard node with two 2-socket twin nodes
Memory	12 DDR3/DDR3L LP, 384 GB max with 32 GB LRDIMMs per twin node
Internal storage	1 x 2.5-inch (SATA/SSD), 2 x hot-swap 1.8-inch SSD per twin node
Internal USB	2 x standard USB Flash Key + 1 x front access USB Key per twin node
Ethernet	IBM Virtual Fabric 2 x 10 GbE LOM per twin node
Chassis support	Flex System Enterprise Chassis
I/O Expansion	1 x Mezzanine cards (2 ports 8 Gb/16 Gb Fibre Channel 1-port QDR/FDR InfiniBand) per twin node
Management	iMM V2, RTMM KVM Dongle
Operating systems	Microsoft Windows Server, SUSE, Red Hat Enterprise Linux, VMware

Flex System x240 Compute Node

The Flex System x240 compute node delivers maximum performance—up to 50 percent performance boost over previous generation servers. This enables businesses to get more out of their compute environment for a broad set of workloads. Features such as automated power management with onboard sensors give you more control over power and thermal levels across the system. These capabilities, combined with memory capacity up to 768 GB, help you get the most out of your compute environment.

With integrated virtual fabric you can take advantage of up to 32 ports of virtual networking capabilities. With 10 Gigabit Ethernet (GbE) onboard, you get multiple protocols, including

x240 Specifications

Processor	2/2, Intel Xeon E5-2600 v2 Series Processor
Level 2 (L2) cache	256 KB per core
Level 3 (L3) cache	4 cores–6 cores: 15 MB, 6 cores–10 cores: 25 MB, 12 cores: 30 MB
Chipset	Intel C600
Form factor	Flex System standard node
Memory	24 DDR3/DDR3L LP, 768 GB max with 32 GB LRDIMM
Internal storage	2 x hot-swap 2.5 inch (SAS/SATA/SSD)
Internal RAID	LSI 2004, RAID 0/1 Optional ServeRAID M5115/RAID 0, 1, 5, 6, 10, 50 with LSI SAS2208 Controller
Internal USB	2 x Standard USB Flash Key; 1 x Front Access USB Key
Ethernet	IBM Virtual Fabric 2 x 10 GbE LOM
Chassis support	Flex System Enterprise Chassis
I/O expansion	2 x Mezz Cards (x16 + x8 PCI Express 3.0) 1 x PCIe Expansion Node Connector (x16 PCI Express 3.0)
Power management	AEM, Active Energy Management
Management	iMM V2, RTMM KVM Dongle
RAS features	Chassis redundant/hot plug power & cooling; Front panel & FRU/CRU LEDs
Operating systems	MS Windows Server, SUSE, RedHat Enterprise Linux, VMware

Ethernet, Fibre Channel over Ethernet, and iSCSI. The system also allows you to enable features on demand for a more flexible I/O solution. Virtual networking can reduce up to 75 percent of adapters, cables, and upstream switch ports to help control costs. In addition, you also get significantly simpler management with reduced cabling and fewer components to manage.

More on the Web

- x240 info on PartnerWorld
- x240 info on IBM.com
- x240 Competitive Insights
- x240 configuration details
- x240 options
- x240 blog search
- x240 Twitter search

Here are some quick x240 facts:

- Optimized for virtualization, performance, and highly scalable networking
- Embedded IBM Virtual Fabric allows breakthrough I/O flexibility
- Designed for simplified deployment and management.

Flex System x440 Compute Node

The IBM Flex System x440 compute node is optimized for high-end virtualization, mainstream database deployments, and memory-intensive high performance environments. The Flex System x440 compute node is a price-performance optimized 4-socket compute node with flexible I/O options to help you match system capabilities to workloads without compromise. With a dense design, the Flex System x440 compute node can help reduce floor space used and lower data center power and cooling costs. The Flex System x440 is available on either the PureFlex System or IBM Flex System solution.

The Flex System x440 compute node is performance-tuned and features no compromise compute, memory, and I/O capacity to meet your needs. It is designed to deliver an outstanding combination of performance, built-in capabilities, and cost-effectiveness, featuring automated power management with onboard sensors to give you more control over power and thermal levels across the system. Combined with

memory capacity up to 1.5 TB, the Flex System x440 compute node is designed to help you get the most out of your systems.

With integrated virtual fabric you can take advantage of up to 64 virtual network adapters while making use of multiple protocols, including Ethernet, Fibre Channel over Ethernet, and iSCSI. The system also allows you to enable features on demand for a

More on the Web

- x440 info on PartnerWorld
- x440 info on IBM.com
- x440 Competitive Insights
- x440 configuration details
- x440 options
- x440 blog search
- x440 Twitter search

x440 Specifications

Processor	4/4, Intel Xeon E5-4600 Series Processor
Level 2 (L2) cache	256 KB per core
Level 3 (L3) cache	4C—10 MB, 6C—15 MB, 8C—20 MB
Chipset	Intel C600
Form factor	Flex System standard node
Memory	48 DDR3/DDR3L LP, 1.5 TB (32 GB LRDIMMs)
Internal storage	2 x HS 2.5 inch (SAS/SATA/SSD)
Internal RAID	LSI 2004, RAID 0/1 Optional ServeRAID M5115/RAID 0, 1, 5, 6, 10, 50
Internal USB	2 x Standard USB Flash Key; 1 x Front Access USB Key
Ethernet	Two IBM Virtual Fabric (2x10 GbE) LOMs, total of 4x10 GbE ports, LOM-less models available
Chassis support	Flex System Enterprise Chassis
I/O expansion	4 x Mezz Cards (x16 + x8 PCI Express 3.0)
Power management	AEM, Active Energy Management
Management	iMM V2, RTMM KVM Dongle
RAS features	Chassis redundant/hot plug power & cooling; Front panel & FRU/CRU LEDs
Operating systems	MS Windows Server, SUSE, RedHat Enterprise Linux, VMware
Warranty	3 year

more flexible I/O solution. Virtual fabric can require up to 75 percent fewer network adapters, cables, and upstream switch ports to help control costs. You also get significantly simpler management with reduced cabling and fewer components to manage.

Built-in storage is available through two 2.5-inch hot swap hard drives or solid state drives. Available optional features include support for RAID 0, 1, 5, 6, 10, and 50 fully backed by cache and a high-density application acceleration solution with IBM Flex System Flash. These features allow you to tailor internal storage to match your specific capacity, performance, and reliability needs and support distributed database applications without sacrificing system density.

Here are some quick x440 facts:

- Optimized for high-end virtualization and mainstream databases
- No compromise design with available 1.5 TB memory capacity and up to 64 virtual network adapters
- Designed for simplified deployment and management.

Power Compute Nodes

In this section, we explore the IBM Flex System compute nodes built using the IBM POWER microprocessor family.

p24L Compute Node (PowerLinux)

To meet today's complex and ever-changing business demands, you need a solid foundation of compute, storage, networking, and software resources that is simple to deploy

and can quickly and automatically adapt to changing conditions. You also need to be able to take advantage of broad expertise and proven best practices in systems management, applications, hardware maintenance, and more. The IBM PureFlex System combines leading edge compute capabilities, advanced IBM storage hardware and storage management, along with patterns of expertise and integrates them in complete, optimized solutions.

IBM Flex System p24L Compute Node is a POWER7-based server optimized for virtualization, performance, and extraordinary efficiency. The node supports Linux operating environments and is designed to run a wide variety of workloads in your PureFlex System or IBM Flex System solution.

Here are some quick p24L facts:

- Integration by design: compute nodes are deeply integrated with storage, networking, and management resources so your solution deploys quickly and are easy to manage
- Built-in expertise: engineering expertise allows you to extract the full capability of the IBM POWER7 processor

More on the Web

- p24L info on PartnerWorld
- p24L info on IBM.com
- p24L Competitive Insights
- p24L blog search
- p24L Twitter search

p24L Specifications

Form factor	Flex System standard node
Machine Type/Model	1457-7FL
Processor cores	8 or 16 64-bit POWER7 cores with AltiVec SIMD and Hardware Decimal Floating-Point acceleration Configuration options: 6-core 3.7 GHz or 8-core 3.2 GHz or 8-core 3.5 GHz
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	4 MB per processor core
Memory (min/max)	8 GB up to 512 GB, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz
Internal disk storage	Up to two 2.5” hard disks or two 1.8” Solid State Drives
Networking/expansion	2 PCI-E expansion slots
Systems management	Integrated systems management processor, light path diagnostics, Predictive Failure Analysis (PFA), Cluster Systems Management (CSM), serial over local area network (LAN), Intelligent Platform Management Interface (IPMI) compliant
RAS featuers	Chassis redundant/hot plug power & cooling; front panel and field-replaceable unit (FRU)/customer replaceable unit (CRU) light emitting diodes (LEDs); concurrent code update; processor deallocation; ITE hot plug; dual AC; power supply; auto reboot on power loss; Internal and chassis-external temperature monitors; 64B marking ECC code supporting x8 IS DDR3 DIMMs; system mgmt alerts; IBM Chipkill ECC detection and correction
Operating systems	RHEL 5.7, 6.2 SLES11 SP2
Energy management	EnergyScale energy management

- Simplified experience: systems management can automatically discover the node for simple configuration and quick deployment.

p260-p460 Compute Nodes

IBM Flex System p260 and p460 compute nodes are POWER7 and POWER7+-based servers optimized for virtualization, performance, and extraordinary efficiency. The nodes support IBM AIX, IBM i, or Linux operating environments and are

designed to run a wide variety of workloads in your PureFlex System or IBM Flex System solution.

The IBM Flex System p260 compute node is a two-socket server that supports up to 16 cores with outstanding energy efficiency and flexibility in a standard-width form factor. With two PCIe expansion slots, support for Dual VIOS and a choice of internal drives, it is the ideal choice for running multiple application and infrastructure workloads in a virtualized environment—including today's compute-intensive combination of business transactions along with social and mobile activity for UNIX, IBM, and Linux operating environments. The IBM Flex System p260 compute node offers large memory capacity, outstanding performance of the POWER7+ processor, industrial-strength virtualization, and workload-optimizing capabilities.

The IBM Flex System p460 compute node is a four-socket server that supports up to 32 cores and is an outstanding offering for mid-market clients desiring a high-performance, reliable, secure system that is cloud-enabled and has room for handling their business growth. With excellent virtualization capabilities and the flexibility to run proven solu-

More on the Web

- p260 info on PartnerWorld
- p460 info on PartnerWorld
- p260 and p460 info on IBM.com
- p260 Competitive Insights
- p460 Competitive Insights
- p260 blog search
- p460 blog search
- p260 Twitter search
- p460 Twitter search

Specifications

	Flex System p260	Flex System p460
Form factor	Flex System standard node	Flex System double-wide node
Processor cores	2, 4, 8 or 16 cores, POWER7+, 64-bit processors with VSX, Memory Expansion acceleration and Encryption acceleration Configuration Options: 2-core 4.0 GHz 4-core 4.0 GHz 8-core 3.6 GHz 8-core 4.1 GHz 256 KB per processor core	16 or 32 cores, POWER7 64-bit processors with AltiVec SIMD and Hardware Decimal Floating-Point acceleration 16 or 32 cores, POWER7+, 64-bit processors with VSX, Memory Expansion acceleration and Encryption acceleration Configuration Options: 4-core 3.3 GHz or 4.0 GHz 8-core 3.2 GHz or 3.6 GHz 8-core 3.5 GHz or 4.1 GHz
Level 2 (L2) cache	256 KB per processor core	256 KB per processor core
Level 3 (L3) cache	10 MB per processor core on P7+ offerings	4 MB per processor core on 3.3, 3.2 and 3.5 GHz P7 offerings; 10 MB per processor core on 3.6, 4.0 and 4.1 GHz P7+ offerings
Memory (min/max)	8 GB up to 512 GB, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz plus Active Memory Expansion with hardware assist	16 GB up to 1 TB node, 32 DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz plus Active Memory Expansion with hardware assist
Internal disk storage	Up to two 2.5-inch Hard Disks or two 1.8-inch Solid State Drives	Up to two 2.5-inch Hard Disks or two 1.8-inch Solid State Drives
Networking/expansion	Two PCIe Expansion Slots	Four PCIe Expansion Slots
Operating systems	AIX 6.1, AIX 7.1 IBM i 6.1 and 7.1 RHEL 5.7, 6.2; SLES11 SP2	AIX 6.1, AIX 7.1 IBM i 6.1 and 7.1 RHEL 5.7, 6.2; SLES11 SP2
Energy management	EnergyScale energy management	EnergyScale energy management

tions from thousands of ISVs that support the AIX, IBM i, and Linux operating systems, the Flex System p460 enables companies to get the most out of their systems by increasing utilization and performance while reducing costs.

Here are some quick p260 and p460 facts:

- IBM POWER7+ technology brings faster frequencies and larger L3 cache sizes, which helps improve performance by

over 20 percent on most workloads and hardware assisted memory compression helps reduce memory requirements without penalizing performance.

- Offers tremendous configuration flexibility to meet demanding capacity and growth requirements. Utilizes the full capability of the system by leveraging industrial-strength PowerVM virtualization for AIX, IBM i, and Linux.
- IBM provides the integration and configuration expertise up front so you can get your system deployed faster and get faster time-to-value.

Flex System p270

IBM Flex System p270 compute node is completely new and designed to leverage the leadership performance of the POWER7+ processor. The resulting combination of secure, reliable computing and energy-efficient virtualization make it an ideal solution for virtualized application consolidation and workload environments that need tremendous configuration flexibility to meet demanding capacity and growth requirements. The node supports IBM AIX, IBM i, or Linux operating environments and is designed to run a wide variety of workloads in your IBM Flex System and PureFlex System solution.

More on the Web

- p270 info on PartnerWorld
- p270 info on IBM.com
- p270 Competitive Insights
- p270 blog search
- p270 Twitter search

p270 Specifications

Form factor	Flex System standard node
Processor cores	24 cores, POWER7+, 64-bit processors with VSX, Memory Expansion acceleration and Encryption acceleration Configuration options: 12 x 3.1 GHz POWER7+ processor cores or 12 x 3.4 GHz POWER7+ processor cores
Level 2 (L2) cache	256 KB per processor core
Level 3 (L3) cache	10 MB per processor core
Memory (min/max)	8 GB up to 512 GB, 16 DIMM slots, ECC IBM Chipkill DDR3 SDRAM running at 1066 MHz plus Active Memory Expansion with hardware assist
Internal disk storage	Up to two 2.5 inch hard disks or 2 1.8 inch SSDs
Networking/expansion	Two PCIe Expansion Slots One ETE adapter card slot (provides dedicated Dual VIOS on internal drives with optional adapter)
Systems management	Integrated systems management processor, light path diagnostics, Predictive Failure Analysis, Cluster Systems Management (CSM), Serial Over LAN, IPMI compliant
RAS featuers	Chassis redundant/hot-plug power and cooling; Front Panel and FRU/CRU LEDs; Concurrent code update and Processor deallocation; Compute node hot plug and Dual VIOS support; Dual AC Power Supply; Auto reboot on power loss; Internal and chassis-external temperature monitors; System management alerts; IBM Chipkill ECC detection and correction
Operating systems	AIX 6.1, AIX 7.1; IBM i 6.1, IBM i 7.1; RHEL 6.4, SLES11 SP2
Energy management	EnergyScale energy management

Here are some quick p270 facts:

- IBM POWER7+ technology brings faster frequencies, larger L3 cache sizes, and more processor cores, which helps improve performance by over 20 percent on most workloads and with hardware assisted memory compression helps reduce memory requirements without penalizing performance.
- Easily handles virtualized consolidation of multiple applications and business workloads, is designed for secure applica-

tion availability and delivers reduced requirement for space, cooling, and software costs.

- IBM provides the integration and configuration expertise up front so you can get your system deployed faster and get faster time-to-value.

Expansion Nodes

In this section, we examine the expansion nodes used to add capacity and capabilities to IBM Flex System configurations.

PCIe Expansion Node

The IBM Flex System PCIe Expansion Node is an element of the IBM PureFlex System family, which combines compute, storage, networking, virtualization, and management into a single system that anticipates resource needs to help you optimize your infrastructure. The PCIe Expansion Node allows you to attach additional PCI express adapters, fabric mezzanine adapters, and next-generation graphics processing units (GPU) to an IBM Flex System compute node, which expands the compute node's capability.

More on the Web

- PCIe Expansion Node info on PartnerWorld
- PCIe Expansion Node info on IBM.com
- PCIe Expansion Node Competitive Insights
- PCIe Expansion Node blog search
- PCIe Expansion Node Twitter search

PCI Expansion Node Specifications

Supported bus widths	1x, 2x, 4x, 8x, and 16x
Adapter capacity	Two full-length, full-height x16 Two half-length, half-height x8
Adapter sizes	Standard-height adapters, 4.20-inch (106.7 mm) Low-profile adapters, 2.536-inch (64.4 mm) Half-length adapters, 6.6-inch (167.65 mm) Full-length adapters, 12.283-inch (312 mm)
Adapter quantities	Up to two low-profile adapters Up to two full-height adapters Up to one full-height, doublewide adapters
PCIe standards	Supports 1.1 and 2.0
Generation	Generation 1- and Generation 2-compliant adapters
Power	Supports greater than 75 W PCIe adapters using standard PCIe auxiliary power connectors
Form factor	Flex System standard node
Chassis support	Flex System Enterprise Chassis
I/O Expansion	2X Mezz adapters (x8+x4)
Management	iMM V2, RTMM KVM Dongle
Warranty	3-year customer replaceable unit and on-site service, next business day 9x5, service upgrades available

Here are some quick PCIe Expansion Node facts:

- Expands the capability of IBM Flex System compute nodes
- Offers dedicated attachment for select standard PCIe adapters, fabric mezzanine adapters, and next-generation graphics processing units
- Works in a variety of network and application environments.

Storage Expansion Node

The IBM Flex System Storage Expansion Node is an element of the IBM Flex System family

and the IBM PureFlex System family that combines compute, storage, networking, virtualization, and management into a single system that anticipates resource needs to help you optimize your infrastructure. The IBM Flex System Storage Expansion Node provides dedicated hard disk drives (HDDs) or solid state disk (SSD) storage to an IBM Flex System x220 and x240 compute node, which expands the compute node's capability.

More on the Web

- Storage Expansion Node info on PartnerWorld
- Storage Expansion Node info on IBM.com
- Storage Expansion Node Competitive Insights
- Storage Expansion Node blog search
- Storage Expansion Node Twitter search

Here are some quick Storage Expansion Node facts:

- Expands the capability of IBM Flex System compute nodes

Storage Expansion Node Specifications

Feature on Demand	ServeRAID M5100 Series RAID 6 Upgrade ServeRAID M5100 Series SSD Caching Enabler ServeRAID M5100 Series Performance Accelerator
HDD support	SAS 2.1 at 6 Gbps and SATA
PCIe support	x8 PCIe Gen 3, 8 GTps
Drive modes	JBOD and RAID
RAID modess	RAID-0, 1, 5, 6, 10, 50 and 60
Cache options	512 MB and 1 GB with cache-to-flash super capacitor offload
Form factor	Flex System standard node
Chassis support	Flex System Enterprise Chassis
Systems management	iMM V2, RTMM KVM Dongle
Warranty	3-year customer replaceable unit and onsite limited warranty, next business day 9×5, service upgrades available

- Easily adds dedicated storage capacity for Network Attach Storage workloads
- Flexible storage to match your capacity, performance, and reliability needs.

Storage

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

IBM Flex 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. These management and storage capabilities allow 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 solution also supports local and remote replication and snapshots for flexible business continuity and disaster recovery capabilities.

In this section, we take a look at the storage devices used with IBM Flex System.

V7000 Storage Node

IBM Flex System V7000 Storage Node is a powerful block storage system designed to enable exceptionally rapid storage deployment and breakthrough management simplicity through integration with IBM compute, storage, networking, virtualization, and management infrastructures.

IBM PureFlex System and IBM Flex System represent a new category of computing that integrates multiple server architectures, networking, storage, and system management capabilities into a single system that is easy to deploy and manage. These new-generation integrated systems support open industry standards—such as operating systems, networking and storage fabrics, virtualization, and system management protocols—to easily fit within existing and future data center environments. PureFlex System and IBM Flex System solutions are scalable and extendable with multi-generation upgrades to protect and maximize IT investments.

More on the Web

- V7000 Storage Node info on PartnerWorld
- V7000 Storage Node info on IBM.com
- V7000 Storage Node Competitive Insights
- V7000 Storage Node blog search
- V7000 Storage Node Twitter search

Here are some quick V7000 Storage Node facts:

- Automate and speed deployment with integrated storage for IBM PureFlex System or IBM Flex System
- Simplify management with an integrated, intuitive user interface
- Reduce network complexity with FCoE and iSCSI connectivity
- Store up to five times more active data in the same disk space using IBM Real-time Compression
- Virtualize third-party storage for investment protection

V7000 Storage Node Specifications

Host interface	SAN-attached 8 Gbps Fibre Channel, 10 Gigabit Ethernet (GbE) Fibre Channel over Ethernet, and iSCSI host connectivity
Cache per controller/control enclosure/clustered system	8 GB/16 GB/64 GB
Supported drives	2.5 inch disk drives: • 500 GB and 1 TB 7.2k nearline SAS • 146 GB and 300 GB 15k SAS • 300 GB, 600 GB, 900 GB and 1.2 TB 10k SAS • 200 GB, 400 GB, and 800 GB SSD
Maximum drives supported	240 per control enclosure; 960 per clustered system
Chassis support	IBM Flex System Enterprise Chassis
Management software	IBM Flex System Manager
Advanced features included with each system	Easy Tier, IBM FlashCopy, internal virtualization and thin provisioning, data migration, system clustering
Optional features	Remote mirroring, Real-time Compression, external virtualization

- Optimize costs for mixed workloads, with up to three times better performance with only 5 percent flash storage capacity using IBM Easy Tier
- Improve network utilization for remote mirroring with innovative replication technology.

Storwize V7000 Unified Disk System

IBM Storwize V7000 and Storwize V7000 Unified are virtualized storage systems that allow businesses to respond to the demands of the rapidly changing marketplace. To complement virtualized server environments, the IBM solutions provide extraordinary performance, availability, advanced functions, and highly-scalable capacity never seen before in midrange disk systems.

As members of the Storwize family, Storwize V7000 and Storwize V7000 Unified are powerful midrange disk systems that have been designed to be easy to use and to enable rapid deployment without additional resources. Storwize V7000 supports block workloads, whereas Storwize V7000 Unified consolidates block and file workloads into a single storage system for simplicity of management and reduced cost.

Storwize V7000 and Storwize V7000 Unified offer greater efficiency and flexibility through built-in flash storage optimization, thin-provisioning technologies, and integrated Bridgeworks SANSlide technology that helps optimize network bandwidth for remote mirroring. Integrated Real-time Compression enhances efficiency even further by enabling organizations to store up to five times as much active primary data in the same physical disk space. Storwize V7000 and Storwize V7000 Unified advanced functions also enable nondisruptive migration of data from existing storage, simplifying implementation and minimizing disruption to users. Finally, these systems

More on the Web

- Storwize V7000 info on PartnerWorld
- Storwize V7000 info on IBM.com
- Storwize V7000 Competitive Insights
- Storwize V7000 blog search
- Storwize V7000 Twitter search
- FastBack for Storwize V7000

IBM Storwize V7000 storage efficiency (5:17)

also enable you to virtualize and reuse existing disk systems, supporting a greater potential return on investment (ROI).

Here are some quick Storwize V7000 facts:

- Deliver sophisticated, enterprise-class storage functionality for businesses
- Support your growing business requirements while controlling costs

Storwize V7000 Specifications

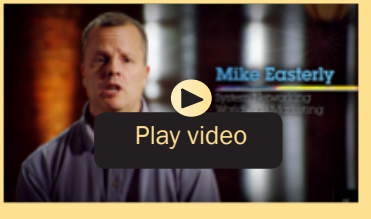
Host interface	SAN-attached 8 Gbps Fiber Channel (FC), 1 Gbps iSCSI and optional 10 Gbps iSCSI/FCoE; NAS-attached 1 Gbps and 10 Gbps Ethernet
User interface	Graphical user interface (GUI)
Supported drives	3.5 inch disk drives: • 2 TB, 3 TB 7.2k Near-Line SAS disk 2.5 inch disk drives: • 146 GB, 300 GB 15k SAS disk • 300 GB, 600 GB, 900 GB 1.2 TB 10k SAS disk • 200 GB, 400 GB, 800 GB E-MLC SSD • 1 TB 7.2k nearline SAS disk
RAID levels	RAID 0, 1, 5, 6 and 10
Maximum drives supported	240 per control enclosure; 960 per clustered system (Block only)
Fans and power supplies	Fully redundant, hot-swappable
Rack support	Standard 19 inch
Management software	Storwize V7000 and Storwize V7000 Unified Software
Cache per controller/ control enclosure/ clustered system	8 GB/16 GB/64 GB
Advanced features included with each system	Easy Tier, FlashCopy, thin provisioning, IBM Active Cloud Engine (Storwize V700 Unified only)
Additional available advanced features	Remote mirroring, external virtualization unified storage, FlashCopy Manager, IBM Tivoli Storage Productivity Center advanced features Select, Tivoli Storage Manager, Tivoli Storage Manager FastBack, IBM Systems Director, Flex System Manager, IBM Real-time Compression

- Provide up to three times performance improvement by moving as little as five percent of data to flash storage
- Enable storing up to five times more active primary data in the same physical disk space using IBM Real-time Compression
- Improve network utilization for remote mirroring with innovative replication technology
- Consolidate block and file storage for simplicity, greater efficiency, and ease of management
- Enable near-continuous availability of applications.

System Networking

With a range of available adapters and switches to support key network protocols, you can configure IBM Flex System to fit in your infrastructure while still being ready for the future. The networking resources in IBM Flex 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. These capabilities are automated and optimized to make your network more reliable and simpler to manage.

More on the Web



IBM PureFlex System Open Choice: Networking (2:35)

Key capabilities include:

- Support for the networking infrastructure that you have today, including Ethernet, Fibre Channel, and InfiniBand
- Plugs into your existing Cisco or Juniper network backbone
- Enables node-to-node communications without running through the top of rack (TOR) switch, reducing system latency
- Industry-leading performance with 1 Gb, 10 Gb, and 40 Gb Ethernet; 8 Gb and 16 Gb Fibre Channel and FDR InfiniBand
- Pay-as-you-grow scalability so you can add ports and bandwidth when needed.

Let's take a look at the system networking components used with IBM Flex System.

Flex System Fabric

IBM can help you reduce cost, complexity, and risk with IBM Flex System Fabric—a portfolio of high performance networking products that can help simplify connectivity of your LAN and SAN infrastructure. The portfolio includes support for Ethernet, Fibre Channel over Ethernet (FCoE), and even Fibre Channel protocols. Flex System Fabric also supports extraordinary convergence of NAS, iSCSI and even FCoE where

More on the Web

- Flex System Networking info on IBM.com
- Report: Flex System switch interoperability with Cisco (PDF 1.42 MB)

the Fibre Channel can be broken out directly in the chassis or upstream in the network. The portfolio offers easy standards-based interoperability with your existing networking environment, including Cisco, Brocade, Juniper, and other networking infrastructures.

SI4093 System Interconnect Module

The IBM Flex System Fabric SI4093 System Interconnect Module enables a simplified integration of the IBM Flex System into your existing networking infrastructure. The default configuration of the SI4093 requires no management for most data center environments, eliminating the need to configure each device or individual ports, thus reducing the number of management points. The device provides a low latency, loop-free interface that does not rely upon spanning tree protocols, thereby removing one of the greatest deployment and management complexities of a traditional switch. The SI4093 offers administrators a simplified deployment experience while maintaining the performance of intra-chassis connectivity, yet provides the simplicity of a single aggregated connection to the upstream network.

More on the Web

- SI4093 System Interconnect Module info on PartnerWorld
- SI4093 System Interconnect Module info on IBM.com
- SI4093 System Interconnect Module Competitive Insights

Here are some quick SI4093 facts:

- Preconfigured device designed for easy network connectivity to reduce deployment time
- Reduces management complexity without compromising performance
- Investment protection with "pay-as-you-grow" scalability with the ability to turn on additional 10 Gb or 40 Gb ports
- Easy interoperability with multi-vendor network infrastructures
- Reduce networking CAPEX by up to 60 percent when compared with a pass-thru.

EN4093R 10 Gb Scalable Switch

The IBM Flex System Fabric EN4093R 10 Gb Scalable Switch provides unmatched scalability and performance, while also delivering innovations to help address a number of networking concerns today and providing capabilities that will help you prepare for the future.

With the growth of virtualization and the evolution of cloud, many of today's applications require low latency and high bandwidth performance. The Flex System Fabric EN4093R is the first blade switch to support sub microsecond latency and up to 1.28 Tbps, while also delivering full line rate performance, making it ideal for managing dynamic workloads across your network. In addition, the switch provides a rich Layer 2 and Layer 3 feature

set that is ideal for many of today's data centers, plus offers industry-leading uplink bandwidth by being the first blade switch to support 40 Gb uplinks.

More on the Web

- EN4093R 10 Gb Scalable Switch info on PartnerWorld
- EN4093R 10 Gb Scalable Switch info on IBM.com
- EN4093R 10 Gb Scalable Switch Competitive Insights

Here are some quick EN4093R 10 Gb Scalable Switch facts:

- "Pay-as-you-grow" scalability with the ability to turn on additional 10 Gb or 40 Gb ports
- Reduce cost and complexity via network convergence, stacking and Virtual Fabric
- Performance and low latency with 1.28 Tbps and less than 1 microsecond latency
- Investment protection when migrating from 1 Gb to 10 Gb and to a converged network
- Designed for FCoE as a transit switch, where FC is broken out further upstream in the network.

CN4093 10 Gb Converged Scalable Switch

The IBM Flex System Fabric EN4093R 10 Gb Scalable Switch provides unmatched scalability and performance, while also delivering innovations to help address a number of networking concerns today and providing capabilities that will help you prepare for the future.

With the growth of virtualization and the evolution of cloud, many of today's applications require low latency and high bandwidth performance. The Flex System Fabric EN4093R is the first blade switch to support sub-microsecond latency and up to 1.28 Tbps, while also delivering full line rate performance, making it ideal for managing dynamic workloads across your network. In addition, the switch provides a rich Layer 2 and Layer 3 feature set that is ideal for many of today's data centers, plus offers industry-leading uplink bandwidth by being the first blade switch to support 40 Gb uplinks.

More on the Web

- CN4093 10 Gb Converged Scalable Switch info on PartnerWorld
- CN4093 10 Gb Converged Scalable Switch info on IBM.com
- CN4093 10 Gb Converged Scalable Switch Competitive Insights

Here are some quick CN4093 10 Gb Converged Scalable Switch facts:

- "Pay-as-you-grow" scalability with the ability to turn on additional 10 Gb or 40 Gb ports
- Reduce cost and complexity via network convergence, stacking, and Virtual Fabric
- Performance and low latency with 1.28 Tbps and less than 1 microsecond latency
- Investment protection when migrating from 1 Gb to 10 Gb and to a converged network

- Designed for FCoE as a transit switch, where FC is broken out further upstream in the network.

Ethernet

More on the Web

- Ethernet switches and adapters info on IBM.com

These high performance Ethernet offerings coupled with on demand scalability offer an easy way to scale as IT requirements grow. IBM Flex System Fabric is:

- Integrated—helps manage discrete aspects of the data center as an integrated system through the built-in management appliance.
- Optimized—high performance scalable offerings with available 1 Gb, 10 Gb and 40 Gb uplinks allow easy integration with existing network. Simple and cost effective scalability for future growth.
- Automated—automate provisioning and setup of both physical and virtual network.

EN6131 40 Gb Ethernet Switch

The IBM Flex System EN6131 40 Gb Ethernet Switch, in conjunction with the EN6132 40 Gb Ethernet Adapter, is designed to offer the performance you need to support clustered databases, parallel processing, transactional services, and high-performance embedded I/O applications, reducing task completion time and lowering cost per operation. This switch offers up to 18 external QSFP 40 Gb ports that enables a non-

blocking network design. It supports all Layer 2 functions so servers can communicate within the chassis without going to a top-of-rack switch. This feature helps improve performance and latency.

More on the Web

- EN6131 40 Gb Ethernet Switch info on PartnerWorld
- EN6131 40 Gb Ethernet Switch info on IBM.com
- EN6131 40 Gb Ethernet Switch Competitive Insights

Clients are also looking for higher utilization of their existing hardware by leveraging virtualization and cloud computing models. As workload density per server increases, it needs to be balanced by appropriate IO throughput. The 40 Gb solution offered by IBM Flex System can deploy more workloads per server without running into IO bottlenecks. In case of failures or server maintenance, clients can also move their virtual machines much faster using 40 Gb interconnects within the chassis.

Here are some quick EN6131 40 Gb Ethernet Switch facts:

- First end-to-end 40 Gb Ethernet Blade solution
- High performance 40 Gb Ethernet switch that can also auto negotiate to 10 GbE speed.
- Less than 0.7 usec latency node-to-node, ideal for clients running Ethernet infrastructure in high speed trading, Web 2.0, Virtualization, and Cloud computing.

EN4091 10 Gb Ethernet Pass-Thru Module

The Flex System EN4091 10 Gb Ethernet Pass-Thru Module offers easy connectivity of the Flex System Chassis to any ex-

ternal network infrastructure. This unmanaged device enables direct connectivity of the compute node in the chassis to an external top-of-rack data center switch. This module can function at both 1 Gb and 10 Gb. It has 14 internal 10 Gb links and 14 external 10 Gb SFP+ uplinks.

The Flex System EN4091 10 Gb Ethernet Pass-Thru Module offers easy connectivity of the Flex System Chassis to any external network infrastructure. This unmanaged device enables direct connectivity of the compute node in the chassis to an external top-of-rack data center switch.

More on the Web

- EN4091 10 Gb Ethernet Pass-Thru Module info on PartnerWorld
- EN4091 10 Gb Ethernet Pass-Thru Module info on IBM
- EN4091 10 Gb Ethernet Pass-Thru Module Competitive Insights

Here are some quick EN4091 10 Gb Ethernet Pass-Thru Module facts:

- Offers easy connectivity of the Flex System Chassis to any external network infrastructure
- Enables direct connectivity of the compute node in the chassis to an external top-of-rack data center switch
- Can function at both 1 Gb and 10 Gb
- Provides 14 internal 10 Gb links, and 14 external 10 Gb SFP+ uplinks.

EN4023 10 GB Scalable Switch

The IBM Flex System EN4023 10 Gb Scalable Switch is designed for easy integration into a Brocade VCS environment. Brocade Virtual Cluster Switching (VCS) Fabric technology simplifies network design and operations for a more automated and efficient network. This switch offers flexibility via Dynamic Ports on Demand (DPOD). You can start with a base 24-port entitlement that can be applied to any of the internal or external ports. The switch also offers investment protection via available 40 Gb uplinks for easy transition to future high bandwidth networks.

The IBM Flex System EN4023 10 Gb Scalable Switch allows clients to configure ports based on their needs. For example, clients that deploy the IBM Flex System x222 Compute Node can configure up to 10 nodes in the chassis with four 10 Gb uplinks using just the base switch. The x222 is a double dense server, therefore clients are able to connect up to 20 independent servers using just the base switch. This allows clients to effectively manage their switch port licenses for both internal and external connections.

More on the Web

- EN4023 10 Gb Ethernet Pass-Thru Module info on PartnerWorld
- EN4023 10 Gb Ethernet Pass-Thru Module info on IBM.com
- EN4023 10 Gb Ethernet Pass-Thru Module Competitive Insights

Here are some quick EN4023 10 GB Scalable Switch facts:

- Streamlines network deployment and operation using Brocade Virtual Cluster Switching (VCS) technology in a Brocade VDX environment
- Provides port configuration flexibility for up to 42 internal ports and up to 16 external ports
- Helps improve network utilization, reduce latency, and increase overall network performance by using multi-path capabilities at multiple network layers.

EN2092 1 Gb Ethernet Scalable Switch

The IBM Flex System EN2092 1 Gb Ethernet Scalable switch provides outstanding flexibility allowing you to buy one switch today and enhance its functionality in the future. The scalable architecture allows you to support two-port or four-port 1 Gb adapters with this switch. The EN2092 supports up to 28 server ports and up to twenty 1 Gb uplinks and four 10 Gb uplinks. Designed with top performance in mind, the EN2092 provides high availability with legendary IBM quality and switch failover capability.

This switch is an exceptionally flexible integrated switch with extreme scalability and

More on the Web

- EN2092 1 Gb Scalable Switch info on PartnerWorld
- EN2092 1 Gb Scalable Switch info on IBM.com
- EN2092 1 Gb Scalable Switch Competitive Insights

performance, while also delivering best-in-class networking innovations to help you address today's networking requirements. It also provides advanced capabilities to address future needs.

Here are some quick 1 Gb Scalable Switch facts:

- "Pay-as-you-grow" scalability with the ability to turn on additional 1 Gb ports or 10 Gb capacity
- Simpler management with IBM's innovative VMready virtualization-aware networking for automated Virtual Machine mobility
- Investment protection for your 1 Gb or 10 Gb network infrastructure
- Integrated network management allowing network administrators to manage servers, storage, and networks together as one logical unit.

Cisco Nexus B22 Fabric Extender for IBM Flex System

The Cisco Nexus B22 Fabric Extender for IBM Flex System offers a choice for clients who require Cisco connectivity for the Flex System Chassis. With the addition of the Cisco Nexus B22 Fabric Extender for IBM Flex System to the IBM portfolio, companies relying on a Cisco-only Unified Fabric network topology are now free to choose IBM Flex System server and storage configurations that are the best choice for the workloads they need to run. You can get the extraor-

dinary choice and flexibility of IBM Flex System compute power, storage capability, and networking solutions in a next-generation chassis that is designed for the next decade of data center technologies.

More on the Web

- Cisco Nexus B22 Fabric Extender info on PartnerWorld
- Cisco Nexus B22 Fabric Extender info on IBM.com
- Cisco Nexus B22 Fabric Extender Competitive Insights

Here are some quick Cisco Nexus B22 Fabric Extender facts:

- Integrates IBM Flex System Chassis seamlessly into Cisco Nexus environments
- Enables Flex System solutions with a broad set of ecosystem partners
- Provides connectivity for the Flex System Chassis into converged network deployments
- Offers unmanaged Cisco device for clients deploying.

Fibre Channel

Fibre Channel is the dominant choice for storage connectivity today. The IBM Flex System portfolio offers both 8 Gb and 16 Gb SAN connectivity offerings for seamless integration with your SAN

More on the Web

- Fibre channel switches and adapters on IBM.com

environment. Supporting a range of technologies and performance levels, these offerings are:

- Integrated—help manage the LAN and SAN network via a single integrated tool. Advanced licensing features enable advanced SAN functions and monitoring.
- Optimized—high performance scalable offerings offer 8 Gb and 16 Gb Fibre Channel connectivity to support easy integration with your existing SAN and simple and cost effective scalability for future growth.
- Automated—advanced virtualization features enable both physical and virtual SAN setup and management.

FC5022 8/16 Gb SAN Scalable Switch

The IBM Flex System FC5022 SAN Scalable Switch meets the demands of hyper-scale, private cloud networked storage environments by delivering market-leading 16/8 Gbps Fibre Channel technology as well as expert optimized, automated, and integrated capabilities. The switch is designed to support highly virtualized computing and Storage Area Network (SAN) environments with high performance, reliability, and usability. The IBM Flex System FC5022 SAN Scalable Switch is available as a 12-port base model, 24-port model, and

More on the Web

- 8/16 Gb SAN Scalable Switch info on PartnerWorld
- 8/16 Gb SAN Scalable Switch info on IBM.com
- 8/16 Gb SAN Scalable Switch Competitive Insights

a 24-port Enterprise model. The enterprise model includes a powerful enterprise software bundle of advanced SAN fabric services. Through Feature on Demand license keys, customers can now activate additional ports on the base switch, or enable advanced capabilities such as fabric watch and ISL trunking, by applying software license keys.

Here are some quick 1 Gb Scalable Switch facts:

- Provides exceptional value, flexibility, simplicity, and enterprise-class functionality
- Enables fast, easy, and cost-effective scaling from 12 to 48 ports
- Simplifies compute node connectivity and storage area networks (SAN) scalability
- Through Feature on Demand license keys, customers can now activate additional ports or enable advanced capabilities such as fabric watch and ISL trunking.

FC3171 8 Gb SAN Switch/Pass-Thru Module

The IBM Flex System FC3171 8 Gb SAN Switch and FC3171 8 Gb SAN Pass Thru provide an integrated, simple connection to existing SAN fabrics and storage. Based on QLogic's proven fibre channel expertise, these switch modules set up quickly and are easy to manage. These high performance integrated switch solutions minimize time and risk, supporting faster access to your data and quicker and better business decisions. The IBM Flex System FC3171 8 Gb SAN Switch is an

ideal solution when connecting directly to fibre channel based storage. It is easy to deploy and manage using the IBM management appliance or Qlogic tools. The SAN Switch provides the full management, enhanced security, and zoning capabilities found with a SAN fabric. Full featured and cost effective, it provides high performance connectivity to your existing SAN environment.

More on the Web

- 8 Gb SAN Switch/Pass-Thru Module info on PartnerWorld
- 8 Gb SAN Switch/Pass-Thru Module info on IBM.com
- 8 Gb SAN Switch/Pass-Thru Module Competitive Insights

Here are some quick 8 Gb SAN Switch facts:

- Seemless low cost connectivity to storage at 8 Gb or 4 Gb speed
- Two offerings to match client requirement—switch mode and pass-thru mode
- Enhanced N_Port ID Virtualization (NPIV) capability across 14 ITEs
- Auto-StreamGuard to guarantee streaming data operations
- Port aggregation—combine ports to increase bandwidth
- Automatic failover preconfigured for peace of mind.

InfiniBand

The network architecture on the IBM Flex System platform has been specifically designed to address data center challenges, giving you a very scalable way to integrate, optimize, and automate your data center. Trading volumes keep rising,

bringing existing systems to their limits. IBM Flex System enables next generation InfiniBand offerings for the high performance and low latency required for HPC and financial services applications.

More on the Web

- Infiniband switches and adapter info on IBM.com

IB6131 InfiniBand Switch

The IBM Flex System IB6131 InfiniBand Switch is designed to offer the performance you need to support clustered databases, parallel processing, transactional services, and high-performance embedded I/O applications, reducing task completion time and lowering cost per operation. Virtual Protocol Interconnect also simplifies system development by serving multiple fabrics with one hardware design. This switch is designed for low latency, high bandwidth, and computing efficiency for performance-driven server and storage clustering applications. Combined with the InfiniBand FDR adapter, your organization can achieve efficient computing by offloading from the CPU protocol processing and data movement overhead such as RDMA and Send/Receive semantics allowing more processor power for the application. CORE-Direct brings the next level of performance improvement by offloading ap-

More on the Web

- IB6131 Switch info on PartnerWorld
- IB6131 Switch info on IBM.com
- IB6131 Switch Competitive Insights

plication overhead, such as data broadcasting and gathering, as well as global synchronization communication routines.

Here are some quick InfiniBand Switch facts:

- High performance FDR (fourteen data rate) speed that can auto negotiate to QDR (quad data rate) speed also
- Offers up to 18 uplinks ports for 14 servers, allowing high speed throughput with zero oversubscription
- Suited for clients running InfiniBand infrastructure in high performance computing and financial services
- Less than 0.7 usec latency node-to-node—nearly half of QDR InfiniBand latency.

Flex System Manager

Flex System Manager is designed to help you get the most out of your IBM PureFlex System or IBM Flex System by automating repetitive tasks, and providing visibility and control across compute, storage, network, and virtualization functions within the data center. With more automation and integrated management across infrastructure elements, IT administrators can focus a greater portion of their time on programs that drive innovation and business advantage.

Flex System Manager allows you to improve administrator efficiency and reduce total cost of ownership across compute, storage, and networks by consolidating management tools, automating repetitive and error-prone tasks, and minimizing unplanned downtime. Flex System Manager simplifies infrastructure management across multiple virtualization technolo-

gies, freeing you from "silos of virtualization" and delivering visibility and control across each layer of the virtualized ecosystem. For PowerVM and KVM environments, IBM provides comprehensive virtualization management and introduces the concept of system pools. System pools define a group of virtualized system components that are managed as a single entity. With the system pool in place, end users can initiate the deployment of PowerVM or KVM virtual machines and Flex System Manager will automatically assign the resources needed to support the virtualized workload. If a particular server requires maintenance, Flex System Manager can migrate virtualized workloads to other nodes in the cluster without service interruption.

Here are some quick Flex System Manager facts:

- Single point of control: management of physical and virtual compute, storage, and networking resources from a single management console.
- Smart provisioning: simple and repeatable hardware configuration and bare metal provisioning for server nodes, and five click creation and zoning of storage volumes.

More on the Web

- Flex System Manager info on PartnerWorld
- Flex System Manager info on IBM.com
- Flex System Manager Competitive Insights

Discover IBM Flex System Manager (8:00)

- Upward integration: integrate hardware management functions with VMware vCenter or Microsoft System Center.
- Mobile management: monitor your infrastructure from anywhere using iOS, Android, and Blackberry mobile devices.
- Increased scalability: manage up to 16 IBM Flex System virtualized chassis, 224 compute nodes, and a total of 5,000 end points from a single Flex System Manager.

Fabric Manager

IBM Fabric Manager is an easy-to-use server provisioning I/O management tool. Unlike performing deployment steps manually, the parameters are configured automatically. Fabric Manager offers automatic provisioning of I/O addresses, pre-defined configurations of I/O parameters, I/O parameter and VLAN migration to standby compute nodes, and other features.

More on the Web

- Fabric Manager info on PartnerWorld
- Fabric Manager info on IBM.com
- Fabric Manager Competitive Insights

Here are some quick Fabric Manager facts:

- Automates deployment steps by loading parameters
- Monitors data center operations with event notifications and automatic server failover
- Manage risk to keep your business running with automated I/O failover to standby compute nodes.

4

IBM Systems Lab Services and STG Technical Training

In this chapter we take a look at the Systems Lab Services and STG Technical Training for IBM PureSystems.

Lab Services

IBM Systems Lab Services offers deployment services which ensure the end client is able to take advantage of all the robust capabilities and provide some skills transfer on configuration and key tools such as the FSM and other vital systems. The goal is to help clients maximize the use of the PureFlex technology quickly within their IT departments and start seeing a return on their investment as quickly as possible.

More on the Web

- IBM Systems Lab Services info on PartnerWorld
- IBM Systems Lab Services info on IBM.com

PureFlex configuration & deployment services can be performed by qualified business partners or IBM Services. This allows partners to build out high value services around PureFlex and Flex systems and to grow margin while providing flexibility to meet clients' needs.

STG Technical Training

IBM's award-winning classes and industry-renowned technical events help you fully exploit the power of your IBM technology investment. Our comprehensive portfolio of skills and career accelerators are designed to meet all your training needs—individual, departmental, and organizational.

More on the Web

- PureFlex course descriptions, schedules, and pricing

About the Editor

Jim Hoskins is the founder of Maximum Press, a premier publisher of books, ebooks, and rich media that help businesses apply technology profitably. Jim has been involved with computer technology design, implementation, and education for over 25 years. He is the author of many articles and books covering a wide range of technology and Internet business topics. Jim spent a decade with IBM designing computer systems and directly helping businesses of all sizes design and implement real-world solutions. He is the author/editor of the popular *Exploring IBM* series, which has sold over 350,000 copies in 12 languages. Jim has a degree in electrical engineering from the University of Florida and resides in Gulf Breeze, Florida, with his wife and five children. You can reach Jim via email at jimh@maxpress.com.