

# Platform as a Service with IBM PureApplication System

## IBM Redbooks Solution Guide

Cloud-computing providers are classified according to the service layers or delivery models that are offered. The range extends from the basic infrastructure services to the platform and application services. The National Institute of Standards and Technology (NIST) defined the service layers and agreed on the following three service models:

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

Through an integrated system of hardware and software, IBM® PureApplication™ System provides a single interface to control the platform and infrastructure elements. This interface adds further value to the software patterns concept by managing all of the underlying hardware infrastructure components when deploying applications in a private cloud environment. PureApplication System is also a consolidation platform with the capacity to support multiple Platform as a Service (PaaS) instances that host various enterprise applications. This IBM Redbooks® Solution Guide describes the PureApplication System and its capacity to support PaaS. When using the PaaS model in a PureApplication System, the objective is to supply the necessary components for rapidly building and deploying applications in the cloud, as shown in Figure 1.

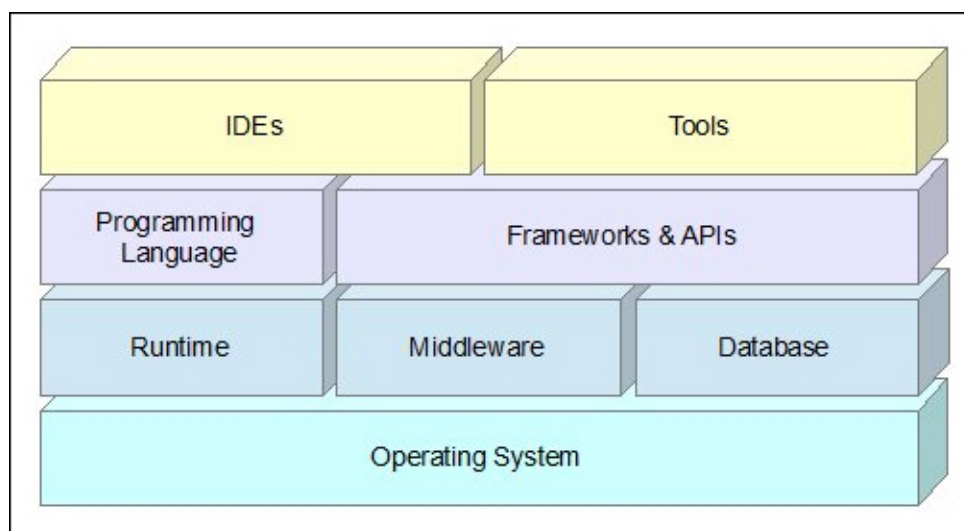


Figure 1. Platform as a Service model and components

## Did you know?

IBM PureApplication System is pre-optimized for IBM application patterns that ship with the system. More than 200 patterns that are optimized by independent software vendors (ISVs) and IBM Business Partners are also available online through the IBM PureSystems™ Centre at <http://www.ibm.com/PureSystems/Centre>, which is a repository of products that are built for the PureSystems family.

## Business value

IBM PureApplication System implements the PaaS layer to provide superior IT economies when operating in traditional or private cloud environments. With the PureApplication System, customers can create their own patterns of software, middleware, and virtual resources. Customers can provide and share these patterns within a unique framework that is shaped by IT guidelines, preferred practices, and industry standards.

These practices have been gathered from many years of IBM experience with thousands of clients around the world and are infused throughout the system. IBM PureApplication System provides the following advantages:

- **Agility:** By automating key processes such as operating system installation, middleware configuration, and application deployment, PureApplication System can reduce the cost and time that is required to manage the platform.
- **Efficiency:** With PureApplication built-in expertise, customers can optimize critical business processes and conserve valuable resources to get the most from the systems in terms of energy efficiency, maintenance, and fast response to problems.
- **Simplicity:** PureApplication built-in patterns of expertise can help customers easily consolidate different servers, storage, and applications into an easy-to-manage, integrated system that can be controlled from a single management console.
- **Scalability:** By defining a high-level set of parameters and policies, administrators can use PureApplication System features to scale the application up and down automatically according to the workload.
- **Reliability:** IBM PureApplication System provides a more reliable platform for your applications by automating the manual processes that are identified as causes of failure or problems.

Figure 2 shows the value from IBM PureSystems offerings.

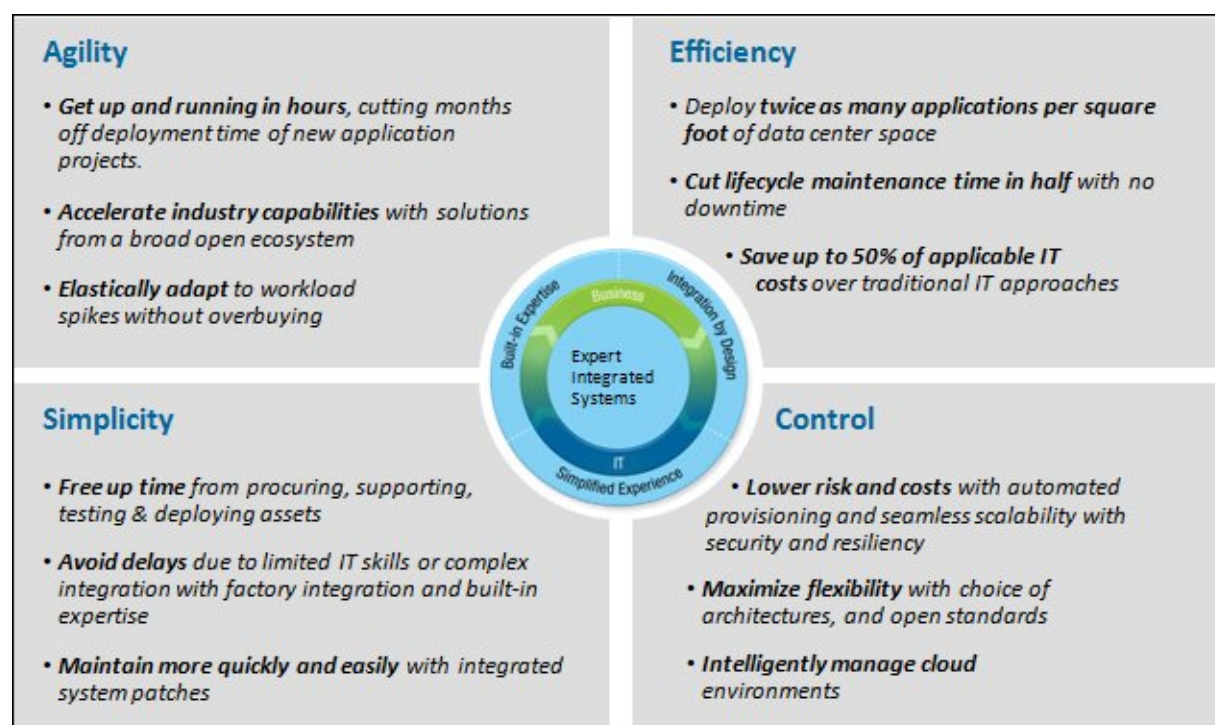


Figure 2. IBM PureSystems offering values

## Solution overview

When you consider migrating or creating an application, it is important to understand why you need to put your application in a cloud infrastructure that is provided by the IBM PureApplication System. One reason is to support fast business response and dynamic workload demands by using the cloud capabilities of the system. You can enable cloud service providers to serve your application as a PaaS by using infrastructure, platform, and application patterns in a fast deployment configuration with provisioning.

Whenever possible, use the optimization and convenience of a virtual application pattern, as it always provides the lowest total cost of ownership (TCO) and shortest time to value. However, there are scenarios where you require detailed configurations and decide to use the elaborated control that is available with virtual system patterns.

Patterns simplify and automate tasks across the lifecycle of the application. Customers and Business Partners are seeing significant reductions in cost and time across the application lifecycle with the deployment of a PureApplication System. Here are some of the benefits of deploying a PureApplication System:

- Adjusting to rapid changes, such as application usage spikes, in near real time
- Identifying problems faster and deploying solutions quickly
- Reducing maintenance time and cost

Figure 3 shows the advantages of using the IBM PureApplication System solution.

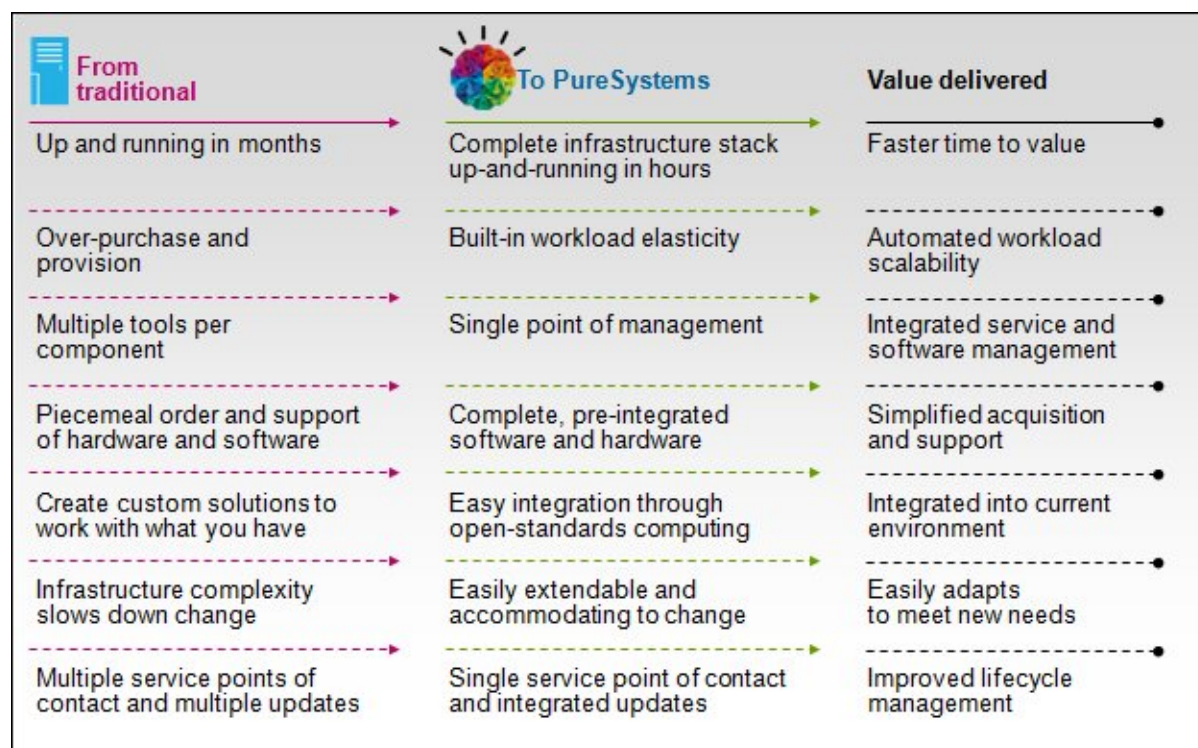


Figure 3. Value delivered

## Solution architecture

IBM PureApplication System architecture is based on three principles:

- Built-in expertise: Capture and automate what experts do where infrastructure and application expertise enhance application time to value.
- Integration by design: Deeply integrate and tune hardware and software.
- Simplified experience: Make every part of the IT lifecycle easier by using an integrated management and an open solution ecosystem to broaden choices.

IBM PureSystems are built including patterns of expertise. Patterns of expertise accelerate the time to value of applications, services, and business processes by encapsulating guidelines and preferred practices into a repeatable and deployable form. They can automatically configure, manage, and optimize the elements of a solution, from the infrastructure resources up through the middleware and applications. Basically, they are categorized in three types, one for each service layer:

- Infrastructure patterns, which are used in IaaS
- Platform patterns, which are used in PaaS
- Application patterns, which are used in SaaS

Figure 4 shows the relationship between the patterns and IBM PureSystems products.

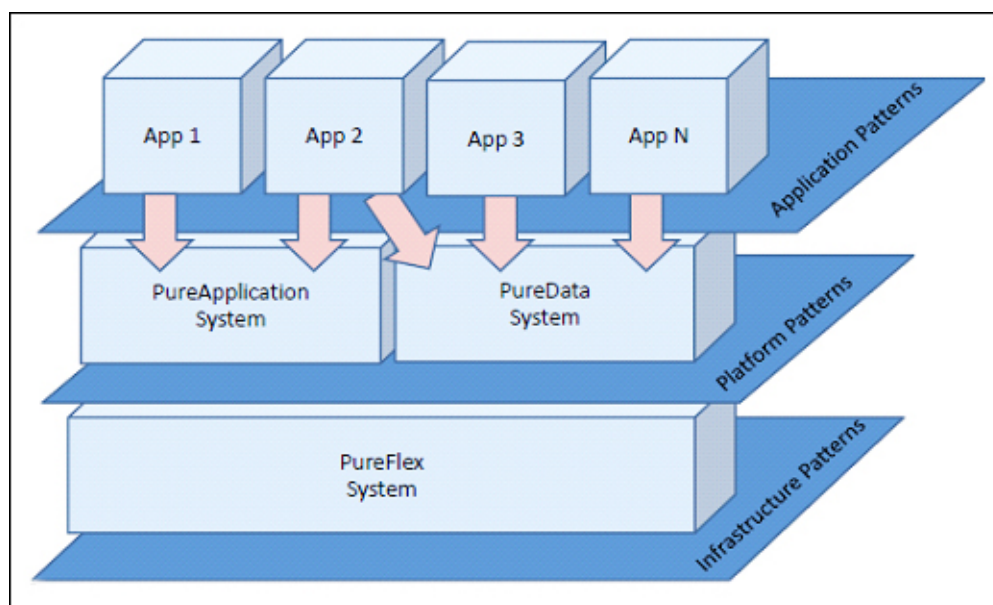


Figure 4. Patterns of expertise and IBM PureSystems products

## Usage scenarios

Organizations can use the IBM PureApplication System to rapidly deliver an application-aware cloud with expert application patterns to users to achieve quick time to value and reduce cost and risk. Expert application patterns that are offered by IBM and IBM Business Partners are the basis for PaaS and SaaS, and dramatically reduce the effort and expense that are required for deploying and maintaining a private cloud.

For example, organizations can use the IBM Business Intelligence Pattern on the IBM PureApplication System to deploy business intelligence (BI) applications in an optimized, fault-tolerant environment in minutes. Created for the deployment of IBM Cognos® BI software, the pattern reduces the time, effort, and cost of building and deploying an enterprise-grade, proven BI solution.

Integrated support for resource contention is automated to help ensure the performance of the most critical applications. A company can port hundreds of applications to the cloud and rely on the IBM PureApplication System to track and manage all of the shared resources. Automated data governance policies help reduce compliance risk.

Organizations using IBM PureApplication System for Web Application Server applications benefit from the removal of manual steps and automated delivery for fast time to value and increased agility in responding to business opportunities. Costs and resource requirements are reduced with the pre-integrated and optimized environment, and the patterns that are built into the system reduce the amount of in-house expertise that is needed. The system also enables applications to be implemented in a repeatable, optimized way that lowers the risk of human error. Real-world experiences show how the value adds up.

With IBM PureApplication System:

- Pre-integration and rapid implementation meet demanding timelines.
- The system successfully meets the extreme peaks and troughs inherent in analytics workloads.
- Costs are reduced across the development and operations lifecycle.



Figure 5 shows the value that is delivered through use case examples.





Initiative	Use Case EXAMPLE	PureApplication System Value
 Consolidate	Consolidate 100s of applications on single system	Single system supports 100s of virtualized application instances support up to 2x higher system utilization.
 Optimize	Upgrade and optimize current web application	Manage, tune, and upgrade with no downtime of your platform resources via a single management console to drive 55% reduction in cost and required management time and 98% reduction in unplanned outages.*
 Innovate	Deploy new web application	Up to 20-30x faster web application deployments with IBM's web application pattern of expertise capabilities*
 Accelerate Cloud	Deliver IT services	Reduction in application server environment provisioning time from 45 days to minutes with IBM's patterns of expertise and virtualization capability*
* Based on existing offering capabilities leveraged in the IBM PureApplication System		

Figure 5. Value of IBM PureApplication System

The IBM PureApplication System is an innovative, new approach that reduces the time that is required to develop, configure, test, and integrate applications. The system allows impressive efficiency gains and cost savings:

- Your organization can have the IBM PureApplication System up and running in hours.
- Administrators can deploy a three-tier web application in under 15 minutes.
- It allows concurrent management of more than 1,000 virtual machines (VMs) on a single W1500-608 system.
- Your company can see up to 60 percent better price and performance while running typical web and database applications (over a competitor's configuration).

With the IBM PureApplication System, organizations can accelerate the shifting of IT resources (people and budgets) from management and maintenance burdens to strategic activities that add value. This platform has the following benefits:

- Reduces provisioning times from 45 days to minutes
- Requires 47 percent fewer labor hours for application deployments
- Requires 73 percent fewer total IT management labor hours

By providing patterns of expertise for consolidation, optimization, innovation, and cloud acceleration, the IBM PureApplication System changes both the experience and the economics of IT for the better.

## Integration

IBM PureApplication System is an integrated hardware and software solution that provides an application-centric computing model in a cloud environment. An application-centric system is an efficient way to manage complex applications and the tasks and processes that are invoked by the application. The entire system implements a diverse virtual computing environment, in which different resource configurations are automatically tailored to different application workloads. The application management capabilities of the PureApplication System platform make deployment of middleware and other application components quick, easy, and repeatable.

PureApplication System provides virtualized workloads and scalable infrastructure that is delivered in one integrated system:

- The virtualized system and application workloads includes the following benefits:
  - Integrated middleware, such as IBM WebSphere® Application Server, web server, IBM DB2®, and hypervisor images
  - Elastic data, such as dynamically adding processor and memory resources
  - Application-centric workloads that are created by using pattern types, such as web application patterns, database application patterns, and topology patterns
- The scalable infrastructure includes the following benefits:
  - Optimized hardware that is tuned for running workloads
  - Isolated networking for secure communications
  - Server resiliency to prevent overload or failures
  - Dynamic storage
- The integrated delivery includes the following benefits:
  - A factory assembled and wired system
  - A system that is tuned for maximum efficiency of data, storage, workload execution, and retrievability
  - A simple approach to managing all integrated components and monitoring the health of the system
  - A "single pane of glass" management for administration and application deployment

The following products are delivered as integrated patterns and available for deployment on PureApplication System. A purchase of a particular configuration of PureApplication System includes entitlement to run the following products up to the total capacity of that configuration:

- IBM WebSphere Application Server Hypervisor Edition V7.0, V8.0, and V8.5
- IBM DB2 Enterprise Server Edition 9.7 FP5 and 10.1
- IBM Web Application Pattern V1.0 and V2.0
- IBM Transactional Database Pattern V1.1
- IBM Data Mart Pattern V1.1
- IBM Application Pattern for Java V1.0
- IBM Mixed Language Application Modernization Pattern V1.0

ISV applications that are optimized for use in PureApplication System can be found and acquired from PureSystems Centre.

### **PureApplication System: Deep integration of DB2 and WebSphere Application Server**

In the PureApplication System, these two components are deeply integrated and tuned so that your IT staff no longer needs to understand the interdependencies and connections between the two subsystems. Using the PureApplication System, organizations can take advantage of the benefits of this deep integration immediately.

Here are some examples of the deep integration between WebSphere Application Server and DB2:

- The ability to establish a trusted connection between WebSphere Application Server and DB2 to use connection pooling and minimize the performance penalty of closing and reopening connections with a different identity.
- Use of a single sign-on token between WebSphere Application Server and DB2 to ensure that access is being enforced at both the application and database level.
- Targeted, integrated testing and verification of WebSphere Application Server and DB2 versions, releases, and fix packs to provide easy, fast, and less error-prone installation of upgrades and maintenance.
- Integrated, end-to-end tracing and monitoring for easy problem determination and resolution.
- Automatic client reroute, which automatically redirects client applications from a failed server to an alternative server so the applications can continue to work with minimal interruption.
- Common integrated tools and application development environment to help improve developer productivity.

## Supported platforms

PureApplication System is available on multiple platforms and several configurations that are tuned to fit specific needs.

The PureApplication System is available for both x86 and IBM POWER® platforms. The PureApplication System optimized configurations provide pre-integrated and optimized business benefits for emerging markets, mid-size, or large enterprises.

All configurations can be maintained and updated through a single console. It is highly scalable and designed specifically for transactional web and database applications. It is a workload-aware, flexible platform that is easy to deploy, customize, safeguard, and manage.

## Ordering information

This product is only available through IBM Passport Advantage®. For more information, contact your WebSphere sales representative or organizational Passport Advantage representative.

Ordering information is shown in Table 1.

Table 1. Ordering part numbers and feature codes

Program name	PID number	Charge unit description
IBM PureApplication System W1500	5725-G32	Per appliance installation
IBM PureApplication System W1700	5725-846	Per appliance installation



## Related information

For more information, see the following documents:

- *IBM PureApplication System Best Practices*, SG24-8145  
<http://www.redbooks.ibm.com/abstracts/sg248145.html>
- *Adopting IBM PureApplication System V1.0*, SG24-8113  
<http://www.redbooks.ibm.com/abstracts/sg248113.html>
- *Creating Composite Application Pattern Models for IBM PureApplication System*, SG24-8146  
<http://www.redbooks.ibm.com/abstracts/sg248146.html>
- IBM PureApplication System product page  
[http://www.ibm.com/ibm/puresystems/us/en/pf\\_pureapplication.html](http://www.ibm.com/ibm/puresystems/us/en/pf_pureapplication.html)
- IBM Offering Information page (to search on announcement letters, sales manuals, or both):  
[http://www.ibm.com/common/ssi/index.wss?request\\_locale=en](http://www.ibm.com/common/ssi/index.wss?request_locale=en)

On this page, enter PureApplication System, select the information type, and then click **Search**. On the next page, narrow your search results by geography and language.

# Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service. IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

*IBM Director of Licensing, IBM Corporation, North Castle Drive, Armonk, NY 10504-1785 U.S.A.*

**The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:** INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you. This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk. IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you. Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products. This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

## COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

**© Copyright International Business Machines Corporation 2013. All rights reserved.**

Note to U.S. Government Users Restricted Rights -- Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

This document was created or updated on August 29, 2013.

Send us your comments in one of the following ways:

- Use the online **Contact us** review form found at:  
[ibm.com/redbooks](http://ibm.com/redbooks)
- Send your comments in an e-mail to:  
[redbook@us.ibm.com](mailto:redbook@us.ibm.com)
- Mail your comments to:  
IBM Corporation, International Technical Support Organization  
Dept. HYTD Mail Station P099  
2455 South Road  
Poughkeepsie, NY 12601-5400 U.S.A.

This document is available online at <http://www.ibm.com/redbooks/abstracts/tips1019.html> .

## Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both. These and other IBM trademarked terms are marked on their first occurrence in this information with the appropriate symbol (® or ™), indicating US registered or common law trademarks owned by IBM at the time this information was published. Such trademarks may also be registered or common law trademarks in other countries. A current list of IBM trademarks is available on the Web at <http://www.ibm.com/legal/copytrade.shtml>.

The following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

Cognos®  
DB2®  
IBM®  
Passport Advantage®  
POWER®  
PureApplication™  
PureSystems™  
Redbooks®  
Redbooks (logo)®  
WebSphere®

The following terms are trademarks of other companies:

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Java, and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Other company, product, or service names may be trademarks or service marks of others.