Private, Hybrid and Public Cloud with IBM

Composable business, BlueMix and WebSphere Application Server

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Current IT challenges

Challenges	Associated factors to address
Improving operational efficiency	▪ Underutilization of IT and provisioned to meet peak demand ▪ Effort-intensive and error-prone manual management processes ▪ Limited self-service and support
Developing new products, services, and business models	▪ Significant lead time to procure IT resources ▪ Environments not easily available to do proof of concepts ▪ Need for a completely different technology stack
Expansion in new markets and geos and beat competition	▪ Significant changes required to the business model ▪ Provisioning and management of IT resources is difficult and time consuming
Reduce total cost of ownership	▪ Upfront capital expenses required to procure IT resources ▪ Higher support costs ▪ Effort required for maintaining IT ▪ More than 10 times increase in data

Cloud computing helps overcome IT challenges

Cloud helps address the challenges using virtualization, standardization, and automation.

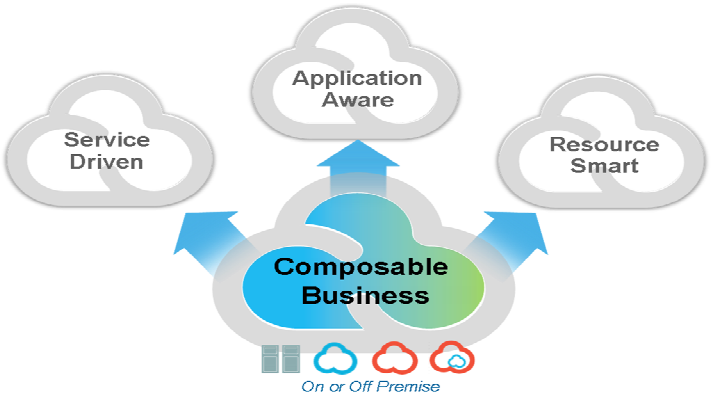
Virtualized
Doing more with less
- Higher utilization
- Economy-of-scale benefits
- Lower capital expense
- Lower operating expense

Standardized
Providing higher quality services
- Easier access
- Flexible pricing
- Reuse and sharing
- Easier integration

Automated
Achieving breakthrough agility and reducing risk
- Faster cycle times
- Lower support costs
- Improved compliance
- Optimized security
- Better user experience

Future trend

It is estimated that by 2016, more than one-fourth of the world's applications will be available in the cloud, and 85 percent of new software is now being built for cloud deployment.



What is cloud computing?

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (such as networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

5 Characteristics

1. On-demand self-service
2. Ubiquitous network access
3. Location-independent resource pooling
4. Rapid elasticity
5. Measured service with flexible pricing models

4 Service Models

1. Business Process as a Service (BPaaS)
2. Software as a Service (SaaS)
3. Platform as a Service (PaaS)
4. Infrastructure as a Service (IaaS)

3 Delivery Models

1. Public Cloud
2. Private Cloud
3. Hybrid Cloud

Cloud service models

Infrastructure as a Service (IaaS)
In IaaS, you outsource the hardware. In such cases, it is not just the computing power that you rent; it also includes power, cooling, networking, and cloud storage. When you choose to run your applications at this cloud service level, you are responsible for everything on the stack that is required to operate above it.

Platform as a Service (PaaS)
In the middle, we have Platform as a Service, or PaaS. At this service level, the vendor takes care of the underlying infrastructure for you, giving you only a platform with which to build and host your application(s).

Software as a Service (SaaS)
Software applications that are available only over the internet, fall into the Software as a Service category, or SaaS. The simplest example to understand is email.

Cloud delivery models

Customers are choosing a variety of cloud models to meet their unique needs and priorities

Private Cloud
On or off premises cloud infrastructure operated solely for an organization and managed by the organization or a third party

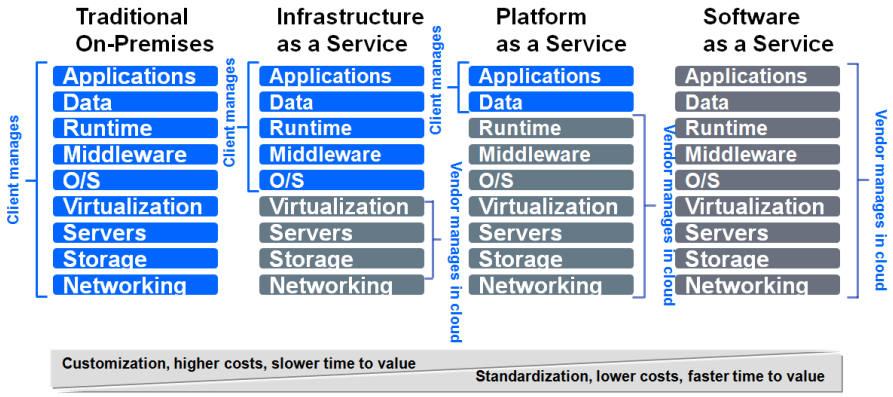
Public Cloud
Available to the general public or a large industry group and owned by an organization selling cloud services

Hybrid Cloud
Traditional IT and clouds (public and private) that remain separate but are bound together by technology that enables data and application portability

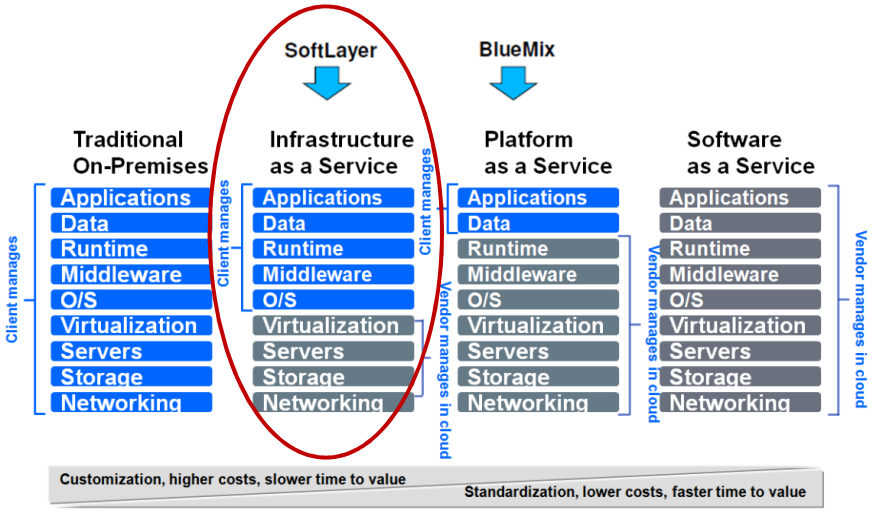
Traditional IT
Appliances, pre-integrated systems and standard hardware, software, and networking

Cloud computing and traditional IT

Cloud has three service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).



IBM-provided cloud services models



SoftLayer at a glance

Organization

- Founded in 2005, SoftLayer is the largest privately held computing infrastructure provider in the world with a diverse customer portfolio from Web startups to global enterprises
- Headquartered in Dallas, TX
- Data centers and network points of presence in the United States, Asia and Europe

Capabilities

SoftLayer unified platform gives clients cloud computing without compromise (virtual/bare metal, public/private), deployed on demand, billed hour-to-hour or month-to-month, with a single pane of glass for systems management.

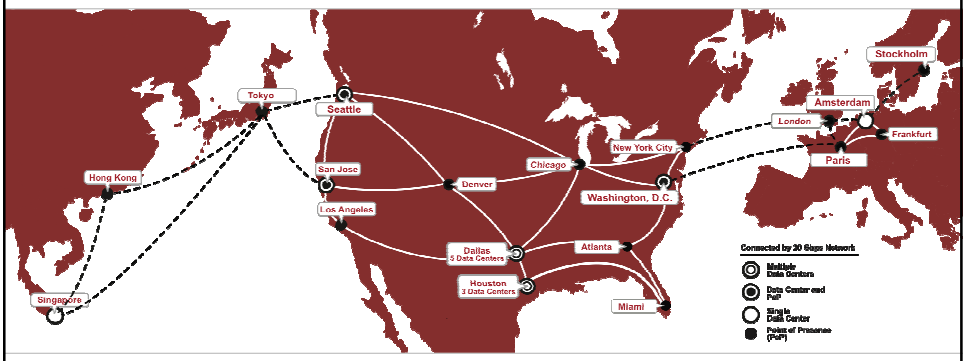
Technology

SoftLayer delivers its services through a tightly integrated model leveraging its IMS software stack, global network infrastructure and 13 standardized data centers.

Customers

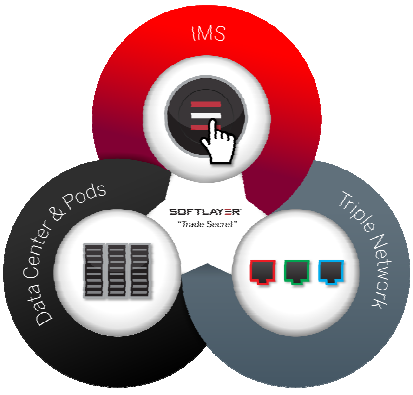
- Approximately **21,000** customers worldwide
- **Strong Internet-centric and SMB client base** across e-business, SaaS, mobile, social media and entertainment
- Emerging penetration in the enterprise space

SoftLayer network and global presence



- 13 data centers
  - Tier III+
  - SOC2 Compliant
- 10 additional points of presence WW
- 100,000 servers, > 22M domains
- 21,000 customers

How It All Fits Together



Infrastructure Management System (IMS SW)
- Bare metal provisioning
- Integrated BSS/OSS
- Comprehensive network management

Data Center & Pods
- Standardized, modular hardware configs
  - Lower inventory carrying costs
  - Maximize asset utilization & profitability
  - Increase provisioning flexibility
  - Simplify capacity management
- Globally consistent service portfolio

Triple Network
- Proprietary network architecture
- Pod design allows customers to grow across multiple racks or rows in the same layer2/3 domain as needed.

SoftLayer Technology Capabilities Overview

A dedicated bare metal server, custom configured to your spec
- Wide selection, from low range to GPU, etc
- You can install anything you want and use it as a building block
- Network: public or private
- Time to provision: 2-4 hours
- Billing: monthly

A Public Cloud Virtual Machine (aka Cloud Computing Instance, CCI)
- Part of CloudLayer, integrated with SoftLayer's IMS, API, based on Xen virtualization and Citrix XenServer
- Max: 2 direct attached hard drives, 1Gb NIC, 48 G RAM
- Time to provision: 5-15 minutes
- Billing: hourly or monthly

A Bare metal CCI
- Few configuration options, but true bare metal
- Max: 2 direct attached hard drives, 1 Gb nic, 64 G RAM
- Time to provision: 1-4 hours
- Billing: hourly or monthly

A private (hybrid, hosted by SoftLayer) Cloud
- Based on Xen CloudServer, automatically installed and configured
- User manages their own VMs, no integration with BSS

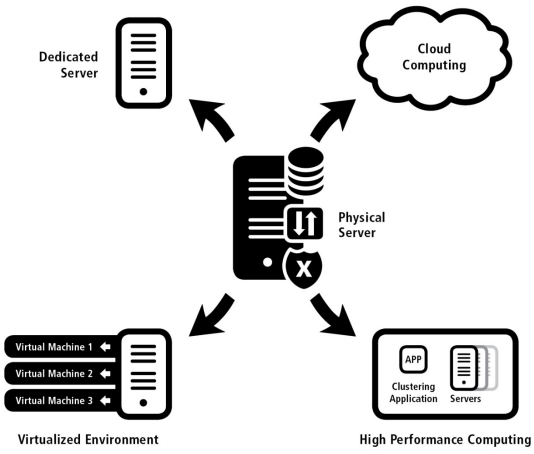
SoftLayer Technology Capabilities Overview (cont'd)

Nearly any hypervisor can be preinstalled on bare metal
Hardware Firewalls and Load Balancers
IP addresses, subnets, VLANs
Services
- Backup
- Vulnerability scans
- Managed Object Store
- Monitoring service
- Messaging service
- Content Delivery Network (CDN)
- Transcoding service
- Physical media shipping service
- Email delivery service
- Anti-virus software
- DNS

SoftLayer Capabilities: billing types by service

Capability	hourly	monthly
Virtual Cloud Compute Instances	X	X
Bare metal instances	X	X
Dedicated Bare Metal		X
Local load balancer		X
Global Load Balancer		X
IP addresses, subnets, vlans		X
Hardware firewalls (shared or dedicated)		X
DNS		X
NAS		X
ISCSI		X
CDN	Usage-based	
eVault		X
Transcoding service	Usage-based	
Data transfer service	Usage-based	

The Dedicated Bare Metal Server is the core building block



Bare metal servers

- Provision in 2-4 hours; choose from components such as memory, disk controllers, OS / storage options…
- Upgrade / replace components when needed
- Use FlexImages to clone systems
- Use passwords or SSH keys to access
- Remote console access, OS reloads…
- Full networking support – VLANs, external IPs, firewalls..
- Serves as a key building block
- Pricing monthly (dedicated, custom servers) or hourly

Server Types

- Single-processor servers
- Dual processor
- Quad
- Redundant power
- Private
- Xpress – 1U
- Mass storage
- HPC / GPU

Virtual Servers (the CCI offering)

A public cloud based on Citrix Xen Server technology.

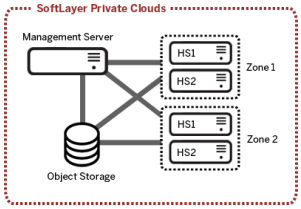
- Integrated with the SoftLayer API
- Provisioning in minutes
- Local Storage via RAID 10
- Isolation on the per-core basis
- No CPU / RAM overvprovisioning
- Stop, power off, suspend / resume

Self-managed virtualized environments (Private Clouds)

- The Private Clouds product provides customers the ability to order and deploy a complete private cloud (for deploying and managing virtual servers) with just one push of a button.

The system automatically:

- provisions your Host Servers and installs each host's hypervisor.
- provisions your Management Server and installs its management system.
- registers your Host Servers with the Management Server.
- Provisions and integrates an Object Storage account tied to solution
- completes additional network and resource management tasks.



Storage Options

A bare metal server installed with any software you like (e.g. NFS, GPFS…)

[Managed by SL] Object Storage
- Based on OpenStack Swift + indexing & CDN integration

QuantaStor Storage OS over a bare metal server – central storage
- SAN (iSCSI) and NAS (NFS) access
- Advanced and easy to use web administration
- Thin provisioning of storage volumes
- Asynchronous replication of storage volumes
- Dynamic expansion of storage pools
- Software and hardware integrated – QuantaStor manages the RAID controller

iSCSI Shared SAN [managed by SL] – fast off-server storage
- Remote mounted, reliabie, enterprise grade, fast, 1 TB or less

Shared NAS / FTP [managed by SL] - Archives
- Mounted on more than one target (over CIFS), cost effective, reliable, 2 TB or less

- Dedicated SAN (EqualLogic or NetApp (Isilon is being phased out))
- > 30 TB

All SoftLayer servers are multi-homed

- **Every host has a unique IP Address**
  - **one public, one private**
  - **Additional "floating" IPs could be made available**
- **IPv4 supported**
  - 4.3×10^9 IP addresses available
  - Example: 192.168.1.1
- **IPv6 supported**
  - 3.4×10^{38} IP addresses available
  - Example: 2001:db8:1f70::999:de8:7648:6e8
  - The SoftLayer platform is IPv6 ready

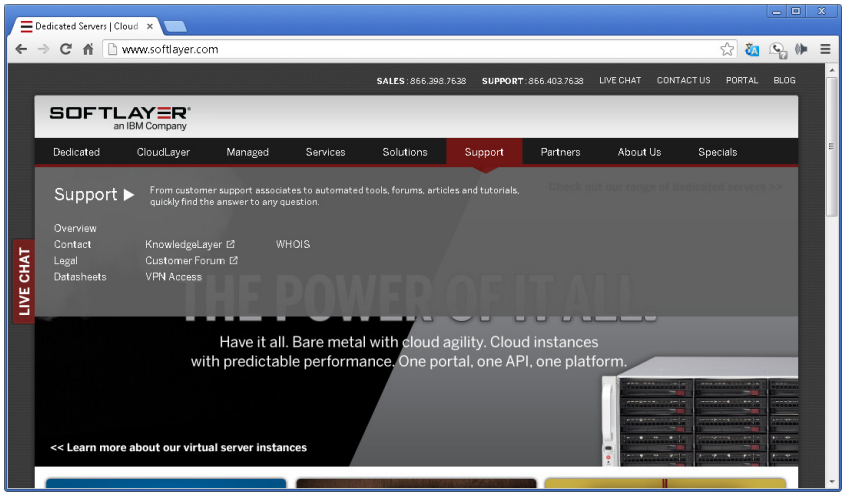
Load Balancing options

Global Load Balancing
- Distribute traffic between data centers
- Configured instantly
- Round robin, weighted round robin, geography, failover

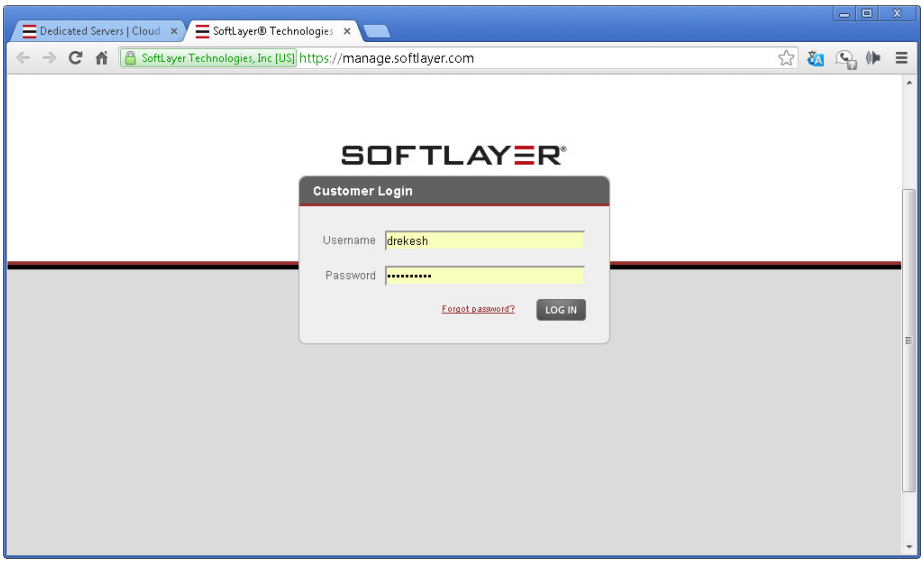
Local Load Balancing
- Distribute traffic within a data center pod
- Configured instantly
- Additional Policies: lowest latency, least connections, shortest response, persistence IP

Citrix NetScaler VPS
- Maximum flexibility
- L7 traffic management, SSL offloading..
- Content caching, compression, firewall..

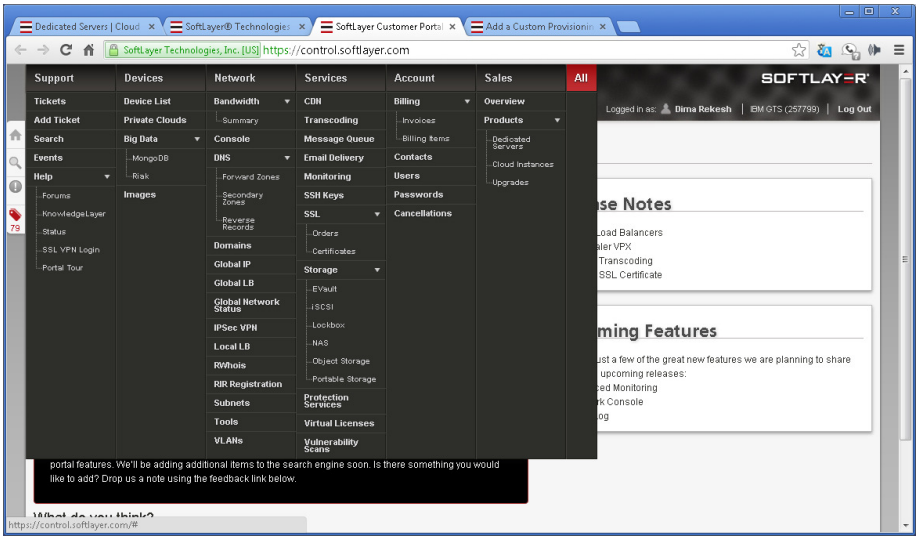
Finding the information: the SL Support Tab



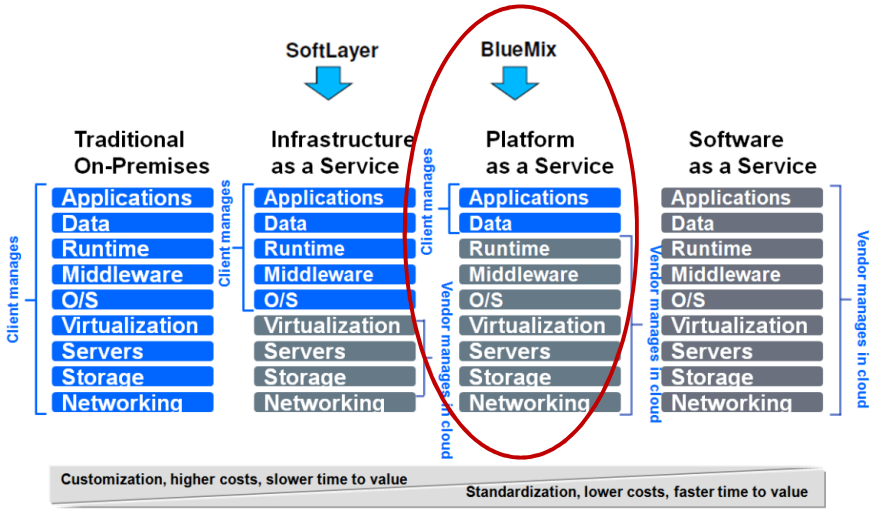
The login



The next generation Portal

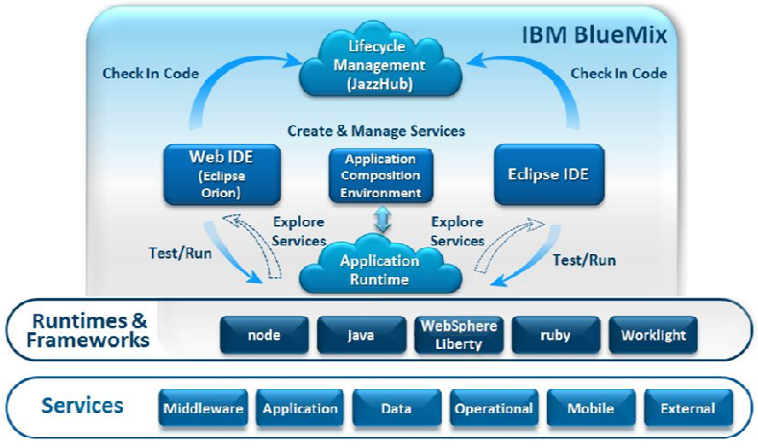


IBM-provided cloud services models



BlueMix overview (1 of 3)

BlueMix is IBM's new PaaS solution that combines the power of Cloud Foundry with popular languages and IBM SaaS.



BlueMix overview (2 of 3)

BlueMix

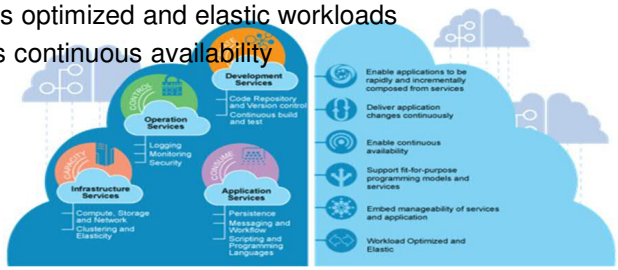
BlueMix:

- Is used for developing and deploying omni-channel applications, such as mobile and web applications
- Delivers a set of pre-built services ready for immediate use and hosting infrastructure to host application and business logic for mobile and web developers
- Is built on the Cloud Foundry open source technology and offers more control to developers
- Runs on IBM SoftLayer infrastructure. SoftLayer, an IBM company, provides cloud infrastructure as a service from 13 data centers in the United States, Asia, and Europe

BlueMix overview (3 of 3)

BlueMix:

- Enables web and mobile applications to be rapidly and incrementally composed of services
- Offers scalability through quick provisioning through its **SoftLayer** cloud layer
- Supports fit-for-purpose programming models and services
- Delivers application changes continuously
- Embeds manageability of services and applications
- Provides optimized and elastic workloads
- Enables continuous availability



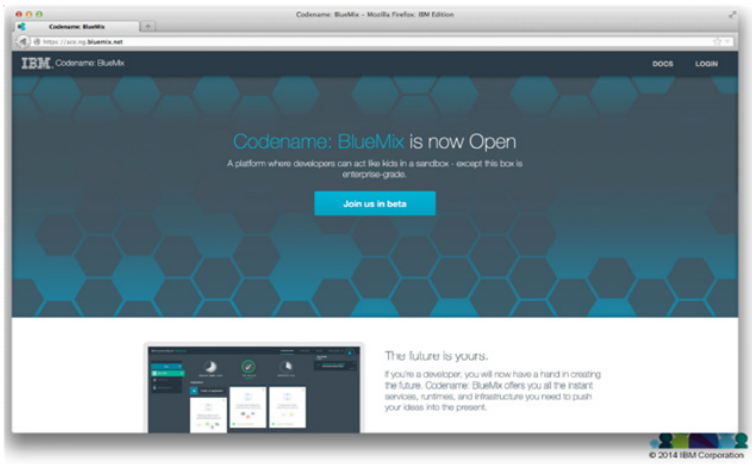
Example scenarios for BlueMix

Scenarios	Examples
Systems of engagement applications (Mobile, social, Web) that integrate with systems of record applications within enterprises	▪ Mobile self-care application providing end-to-end service across channels to customers ▪ Facebook application that collects and transfers leads into enterprise lead management systems
Internet of Things Machine-to-Machine (M2M) scenarios involving events collection and front end interactive user interfaces	▪ Vehicle APIs to which consumer and fleet vehicles post real-time diagnostics data for driving analysis and insights ▪ Track and Trace applications
Rapid proof of concept development of systems of engagement applications in agile model	▪ Insurance quotes application used by field agents as a point of contact (POC) for collecting opinions and feedback
Cloud API development, deployment, and management	▪ Product catalog APIs exposed by a retail company for partner integration and third-party store fronts ▪ Enterprise APIs exposed for external consumption (consumers, partners, and more)
Self-contained systems of engagement applications composed from external or third-party APIs	▪ Digital taxi solution that integrates Google APIs and shows location co-ordinates of taxis

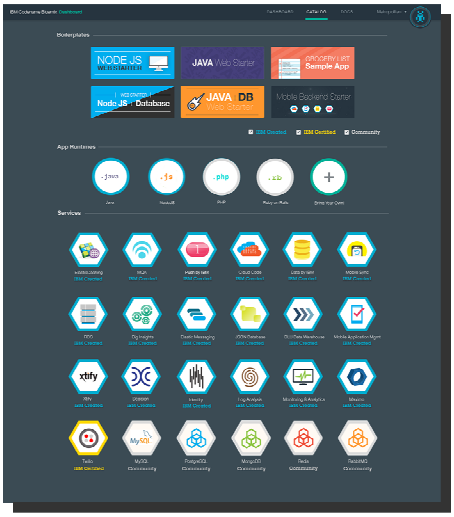
***Based on current functionality and features of BlueMix**

BlueMix user interface (Page 1 of 3)

The BlueMix user interface combines style and function.



BlueMix user interface (Page 2 of 3)



Run time

The developer can chose any language runtime or bring their own. Just upload your code and go.

DevOps

Development, monitoring, deployment, and logging tools allow the developer to run the entire application.

APIs and Services

A catalog of open source, IBM, and third-party APIs services allow a developer to stitch together an application in minutes.

BlueMix user interface (Page 3 of 3)

Cloud Integration

Build hybrid environments. Connect to on-premises systems of record plus other public and private clouds. Expose your own APIs to your developers.

Extend SaaS Apps

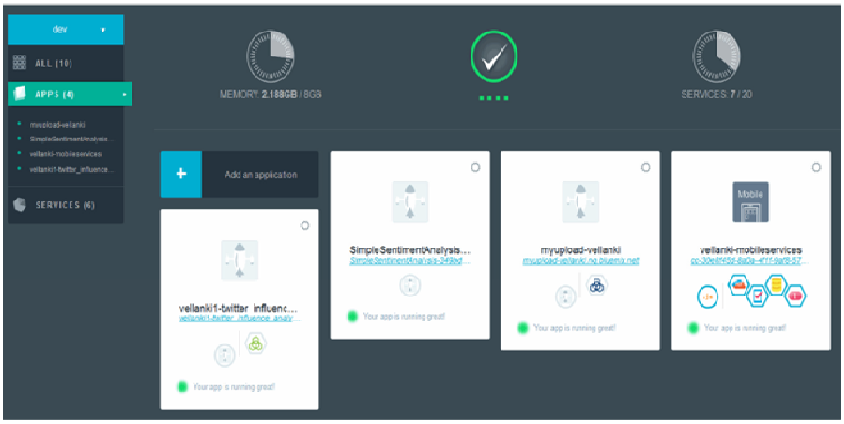
Drop in SaaS App SDKs and extend to new use cases (for example, Mobile, Analytics, and web).

BlueMix key concepts: Applications

- An application represents the artifact that the end developer is building.
- In case of mobile, an application runs outside the BlueMix environment, but leverages the services that are exposed to the mobile application. These services typically act in concert, and represent the back-end projection of that application.
- In web context, an application is the code that is uploaded into BlueMix for the purpose of hosting it. The application consists of all of the code that is required to be executed or referenced at run time.

Applications on your dashboard

The graphic below shows an example of the applications displayed on your dashboard.



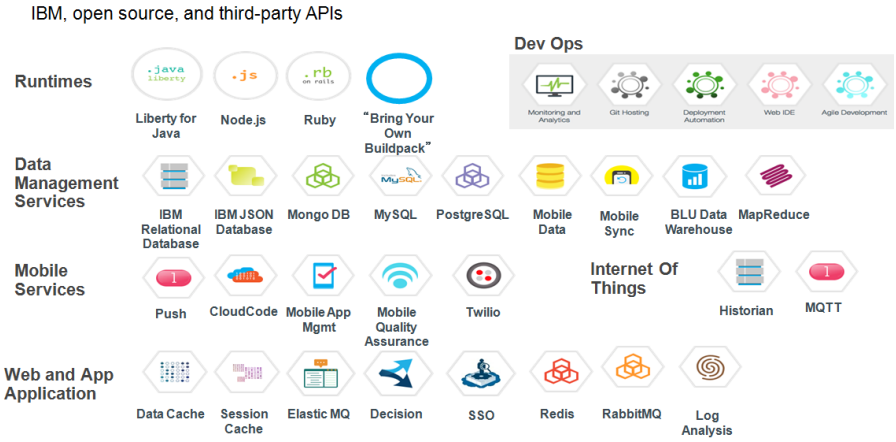
BlueMix key concepts: Services

- A service is a piece of code that BlueMix hosts. A service offers a piece of readymade functionality for applications to use.
- BlueMix provides a set of predefined services that you can use directly. For example, push notification in a mobile application or elastic caching in a web application.
- You can create your own services in BlueMix. A custom service may offer a simple functionality, such as the utility functions you might see in a run-time library, or it can handle complex business logics that you might see in a business process modeling or in a database.
- BlueMix simplifies the use of services by managing the **provisioning** of new instances of the service and the **binding** of those service instances to your application.
- BlueMix automatically manages the services it hosts. For all available services in BlueMix, see the Services in the BlueMix catalog on the BlueMix user interface.

Services offered in the BlueMix catalog

Sample list of cloud platform services on BlueMix

The following diagram shows just a sample of many cloud platform services on BlueMix.



BlueMix key concepts: Buildpacks and runtimes

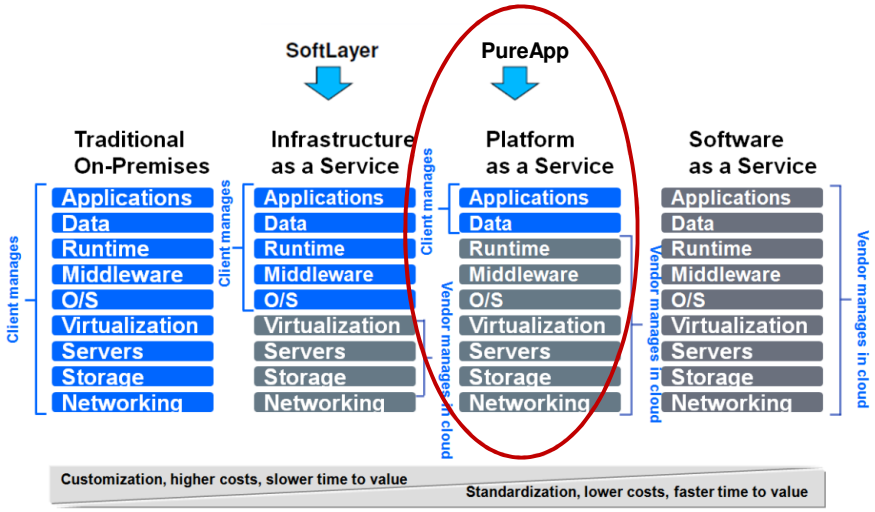
Buildpacks

- For applications that require a PaaS environment, a buildpack is a collection of scripts that prepare your code for execution on the target PaaS.
- By using buildpacks, you can deploy your applications to the cloud more easily.
- A buildpack includes the run-time environment that is needed by your application, and can also include specialized frameworks.
- BlueMix provides buildpacks for Liberty and Python.

Runtimes

- Runtimes in BlueMix represent different buildpacks that are provided.
- Each runtime is an application with a starter application code deployed. A starter application is a template that you can use directly with the existing buildpack from the BlueMix user interface.

IBM-provided cloud services models



IBM PureApplication System: the ideal cloud application platform

Expert Integrated System:

- Integration by design
  - Application server
  - Database services
  - Integrated infrastructure
- Built-in expertise
  - Infrastructure, platform, and application patterns
- Simplified experience
  - Simplifying lifecycle deployment and management of applications
  - Single point of management

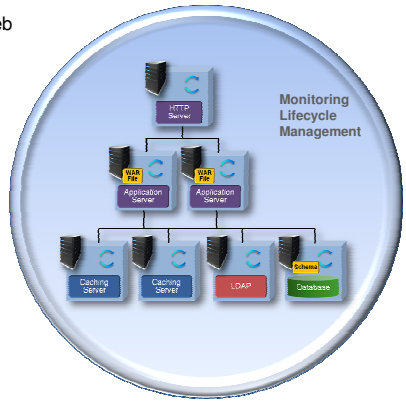
Pattern-based deployment
Catalog of services
User-based self-service
Multi-tenancy
Service level management
Usage-based reporting
Common cloud platform
Virtualization
Dynamic resource scalability
Automated IaaS
Automated IT resource provisioning

PureApplication
Cloud Application Platform (PaaS)

Patterns of Expertise: Proven best practices and expertise for complex tasks learned from decades of client and partner engagements that are captured, lab tested and optimized ***into a deployable form***

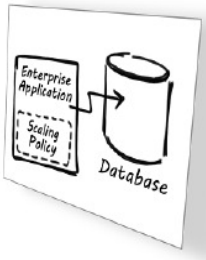
What is a Pattern?

- The pre-defined architecture of an application
- For each component of the application (i.e. database, web server, etc)
  - Pre-installation on an operating system
  - Pre-integration across components
  - Pre-configured & tuned
  - Pre-configured Monitoring
  - Pre-configured Security
  - Lifecycle Management
- In a **deployable form**, resulting in **repeatable deployment** with **full lifecycle management**

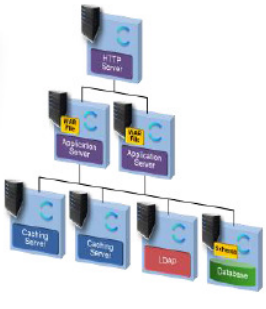


Patterns are a Key Capability for Cloud Application Platforms

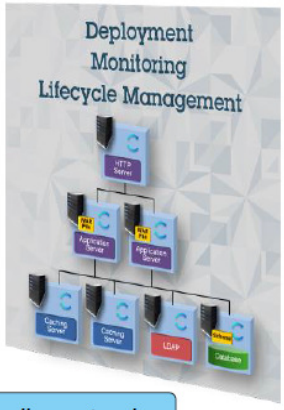
What the business wants…



What's required…

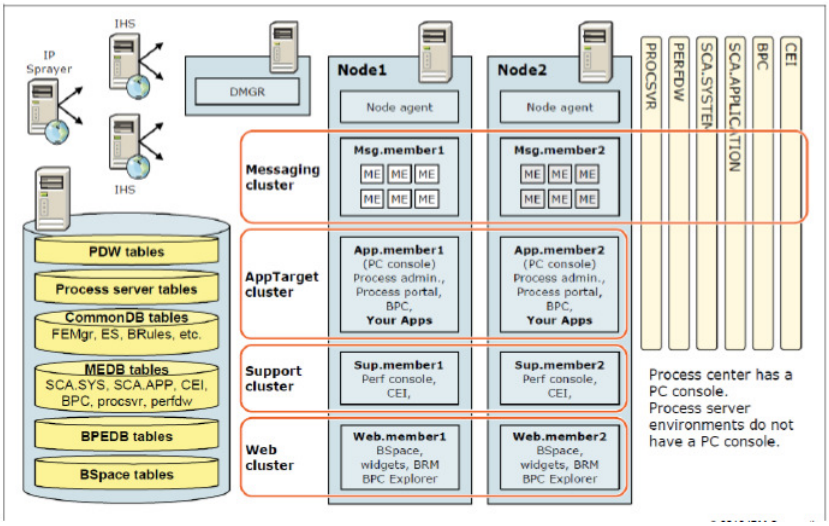


A pattern automates…

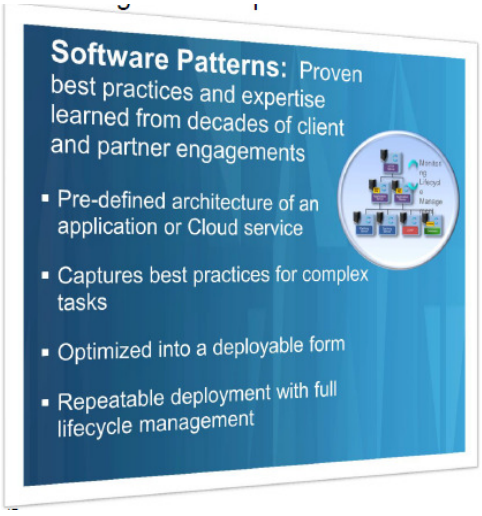


Patterns impact both top line revenue growth and bottom line cost saving

Example: IBM BPM Best Practice (Golden) Topology



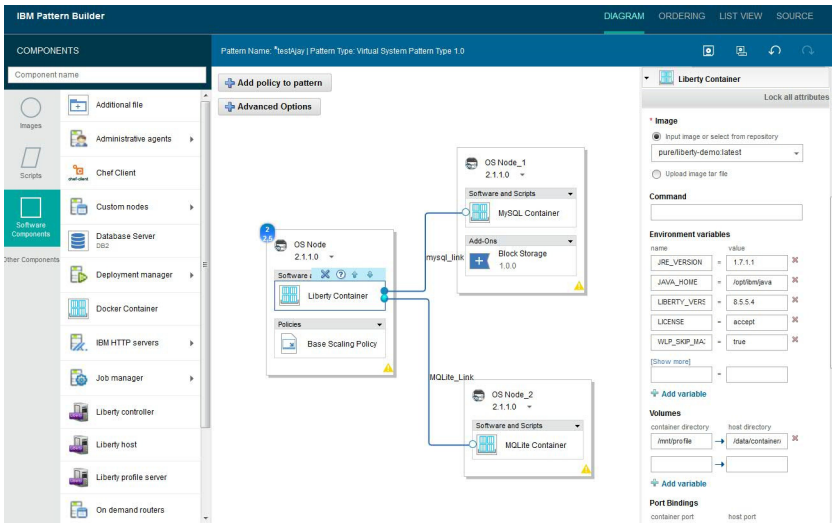
From individual infrastructure components to software patterns



Three ways to get the value of patterns of expertise

- Use **IBM** patterns of expertise throughout the system
- Patterns Add **third-party** application patterns of expertise
- Capture **your own** expertise

PureApplication System console



Cloud Enabled IT with PureApplication

Seamlessly deploy & move workloads between on & off-premises without change:
- **PureApplication System**
- **PureApplication Service**
- **PureApplication Software** NEW

A **hybrid cloud** app platform for easily deploying **applications and middleware** with **enterprise grade qualities of service**

- Automated elasticity
- Multi-site deployment
- High availability & disaster recovery
- Monitoring
- License management
- Intelligent placement
- Centralized logging
- Security

200+ IBM and 3rd party patterns including:
- Portal
- BPM
- Cognos
- DataPower
- Mobile
- WAS
- DB2
- Oracle
- MQ
- IIB / Message Broker

+ any Red Hat/AIX/Windows software

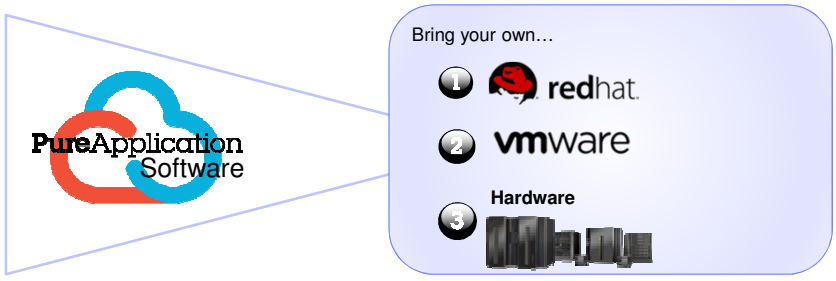
The path to hybrid cloud can be easier than you thought

1. **Capture Application into a Pattern**
   Create Once Deploy Anywhere

2. **Select an automated Hybrid Cloud *Application Platform that simplifies deployment and management***

Automate the complexity of deploying and managing applications in the cloud

PureApplication Software – Offering Details



Values	• Similar speed / simplicity as System / Service, for deploying and managing workloads: patterns, lifecycle management (scaling, monitoring, caching…) • Flexibility to run on your own HW
Differences from PureApp System or Service	• Client has to install / config vs pre-integrated System / Service experience • Client responsible for the integration / configuration / management of storage, network and compute • Client will not get the same time to market or TCO as System or Service

PureApplication System, Service, Software
A Flexible Enterprise Hybrid Cloud

PureApplication Common Technology
Cloud application platform to provide simple to use, end to end application lifecycle management

1 PureApplication System
Pre-integrated hardware & software platform for enterprise applications on POWER & x86

2 PureApplication Service on Softlayer
Dedicated pre-integrated and managed hardware and software platform in SoftLayer datacenters worldwide

Off-Prem

3 PureApplication Software NEW
Cloud application platform software that can run on your own hardware

On-Prem

PureApplication v2.1 Themes
System, Service, and Software

Accelerate Application Delivery with Open Technology

- Docker support to combine, deploy and manage Docker containers with Patterns for:
  - Up to 10X faster deployments, scaling & upgrades
  - Seamless portability across clouds
  - Access to 14,000+ pre-built apps
- Enhanced Chef support to integrate and leverage Chef investments

Enterprise-Strength Hybrid Cloud

- Faster connectivity between hybrid environments
- Secure fine grain access control to on-premises data by off-premises applications
- Off-premise backup and restore for improved business continuity
- Out of the box Denial of Service protection for improved security

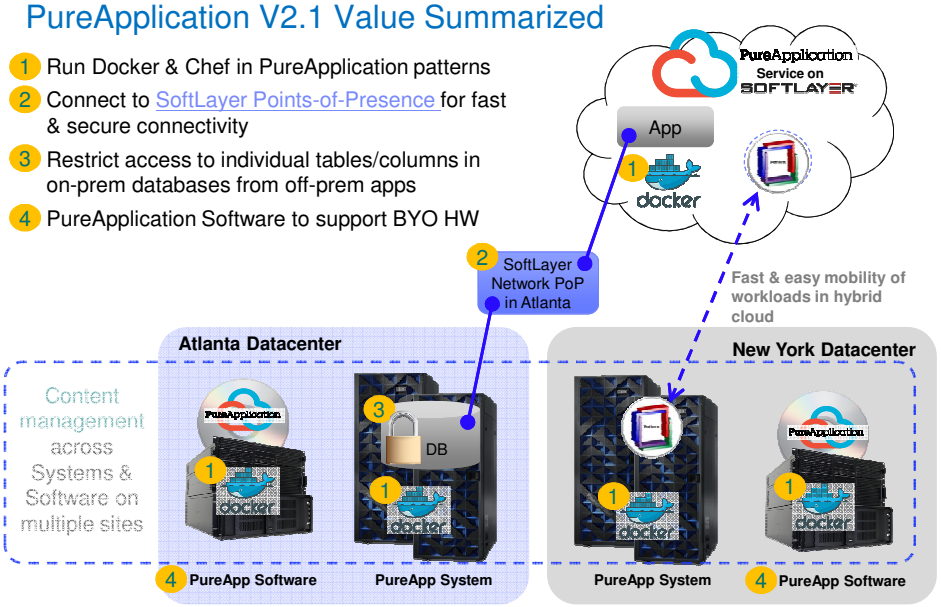
Simplify Operations with Flexibility of Choice

- New support for BYOHW to write applications once, deploy
  … on an off-prem cloud,
  … on a pre-integrated system,
  … on your own hardware,
  … or anywhere Docker containers can run

IBM Systems - **Middleware**

PureApplication V2.1 Value Summarized

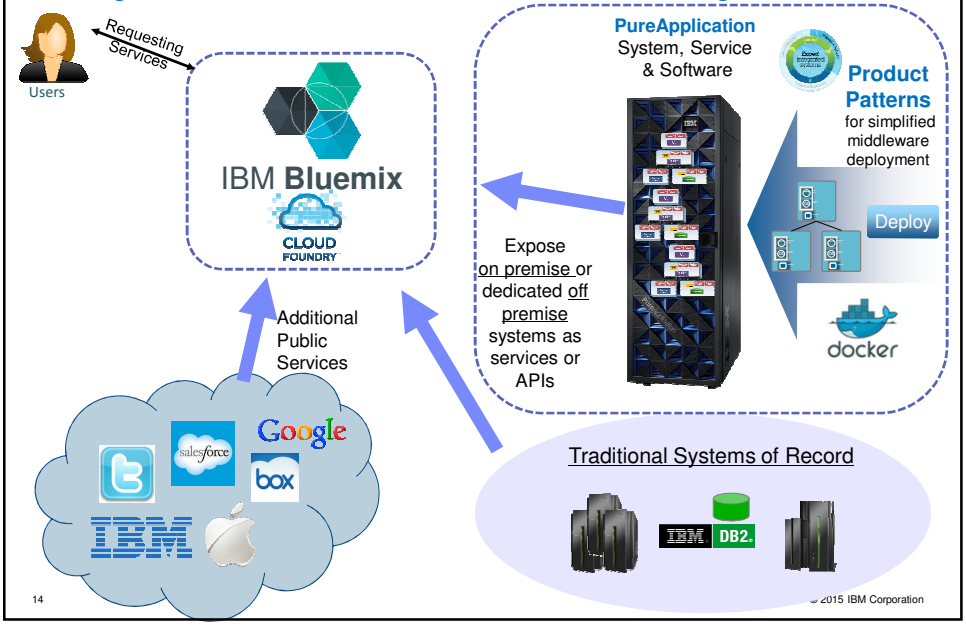
1. Run Docker & Chef in PureApplication patterns
2. Connect to SoftLayer Points-of-Presence for fast & secure connectivity
3. Restrict access to individual tables/columns in on-prem databases from off-prem apps
4. PureApplication Software to support BYO HW



13

IBM Systems - **Middleware**

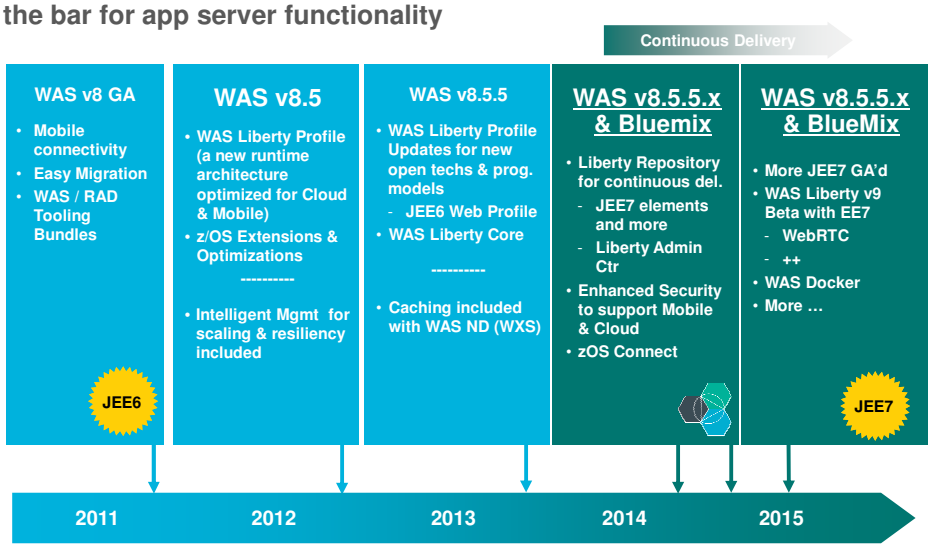
Moving Towards a Seamless & Borderless Managed IBM Cloud



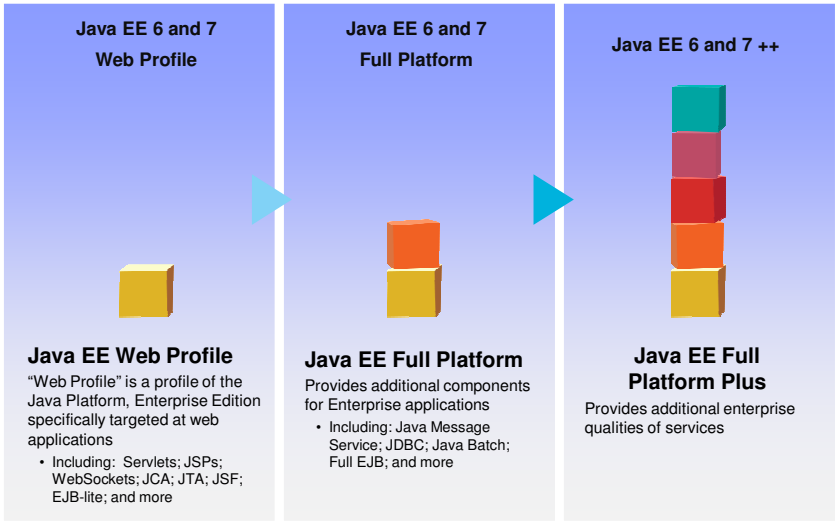
14

Recent WAS History and Java EE

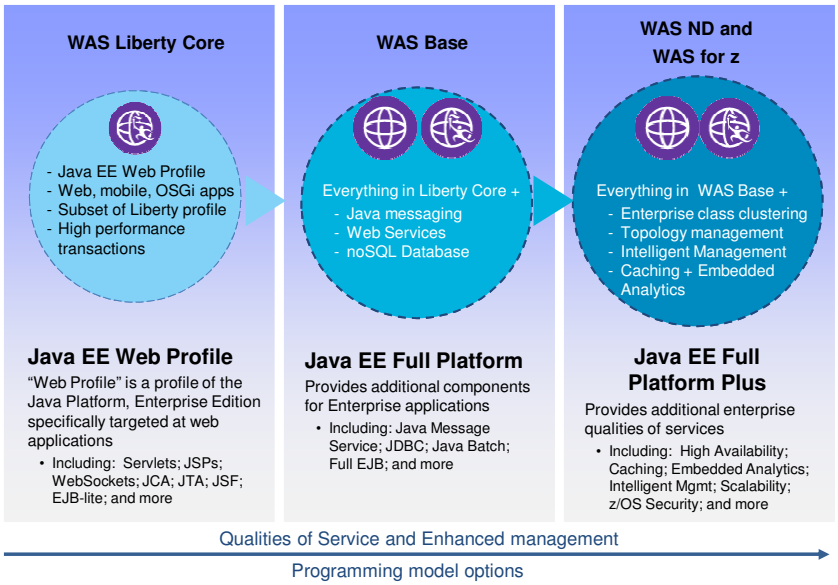
Going on 16 years of leading the industry and setting the bar for app server functionality



Java EE – Simple to Mission Critical Apps



WebSphere Application Server 2015



WebSphere App Server – InterConnect 2015

Delivering continuous business value for Web, Cloud and Mobile apps

Empower Developers

Java EE7

docker

- New components on WAS Liberty Repository & WAS Liberty V9 Beta with JEE7
- Statement of Direction on Java EE 7 support for Traditional WAS Profile
- Docker container support (higher performance, scaling and density)
- Enhanced tooling support for remote deployments to on-premises and cloud
- No charge WAS Liberty for limited production (< 2gb of memory per enterprise)
- Java SE 8

WebSphere App Server – InterConnect 2015

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Accelerate Delivery

- Write applications once
  - Deploy Anywhere (Bare Metal, VM, patterns, containers)
  - Location flexibility (on-premises, off-premises)
  - Consumption Models (Bluemix, monthly, perpetual, WAS aa Svc Beta)
- For each WAS license owned, run an equivalent amount on SoftLayer or PureApplication Service on SoftLayer at no additional charge for 6 months

IBM Systems + Middleware

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Dynamic Scale

- Intelligent Management in WAS ND Liberty for optimized scaling and routing
- Embedded analytics for faster problem determination
- Rock solid security, Oauth, OpenID and OpenID Connect and SPNEGO support for easy authenticating of web & mobile users
- Support for new IBM Power8 and IBM z Systems z13
- WAS v8.5.5 enhancements to reduce operational TCO
- Caching for optimized performance and data intensive scenarios

IBM Systems - **Middleware**

IBM

Promotion: IBM WebSphere on SoftLayer

Use your WebSphere PVUs both on-premise and in IBM cloud!

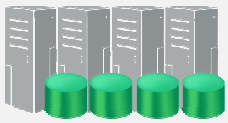
WAS 2-for-1 offer

No additional charge during promotion

Promotion period: **Mar. 09 - Sept. 09, 2015**

On-Premises

Total Control
Maximum Flexibility
Maximum Security



IBM Cloud

Public Cloud
Economies
Time to Market

IaaS – SoftLayer
BYOS&L – WebSphere App Server

SOFTLAYER

PureApplication Service SOFTLAYER

- No restrictions on use. Support through your S & S
- No need to contact IBM or "order" anything. Customers track "dual usage" of PVUs
- Cost of the cloud infrastructure is not included as part of the promotion
  - Requires SoftLayer. PureApplication Service is optional
- When promotion ends, customer will need to purchase additional WebSphere PVUs to continue running in the cloud.
- Announcement Letter Number: ZAAM5188A

21

Thank You

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