

Transformation For Growth

Compete in
the Era of
SMART.

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IBM Software Defined Environments Next Generation of Automation for Cloud

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Software Defined Environments

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New Applications Bring New Business Opportunity



Cloud

80% of new applications
will include cloud delivery
or deployment



Mobile

95% of mobile
traffic is data



Big Data & Analytics

2,500 petabytes of big data are
being generated every day



Social

500 million Tweets a day;
7 million apps and websites
integrated with Facebook



Today's Business



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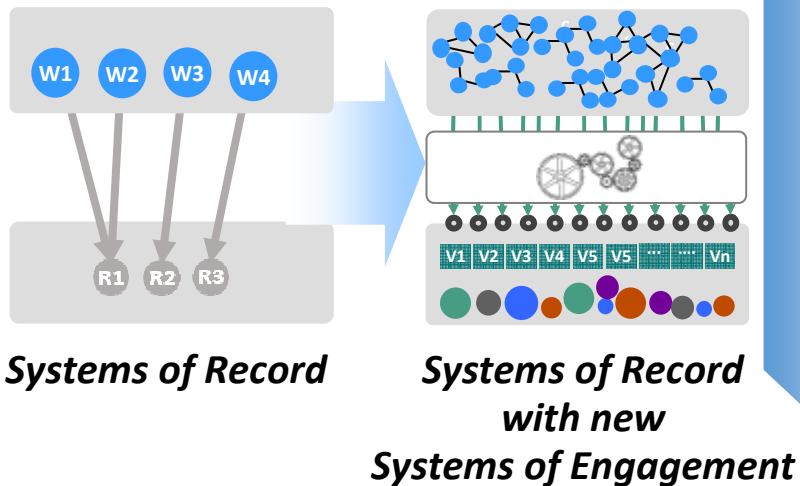
A New Era of Applications Bring Disruptive New IT Challenges

Data is the new
natural resource

Hybrid Cloud computing is the
new Enterprise IT

Mobile and social apps
are changing the
world's behavior

Workload View



Increasing Complexity

- Heterogeneous environments
- Organizational silos & skill gaps

Massive Scale

- Users, transactions, types of data
- Rapid, unpredictable demand cycles

Rapid Pace

- Accelerating business needs
- Immediate response expectations



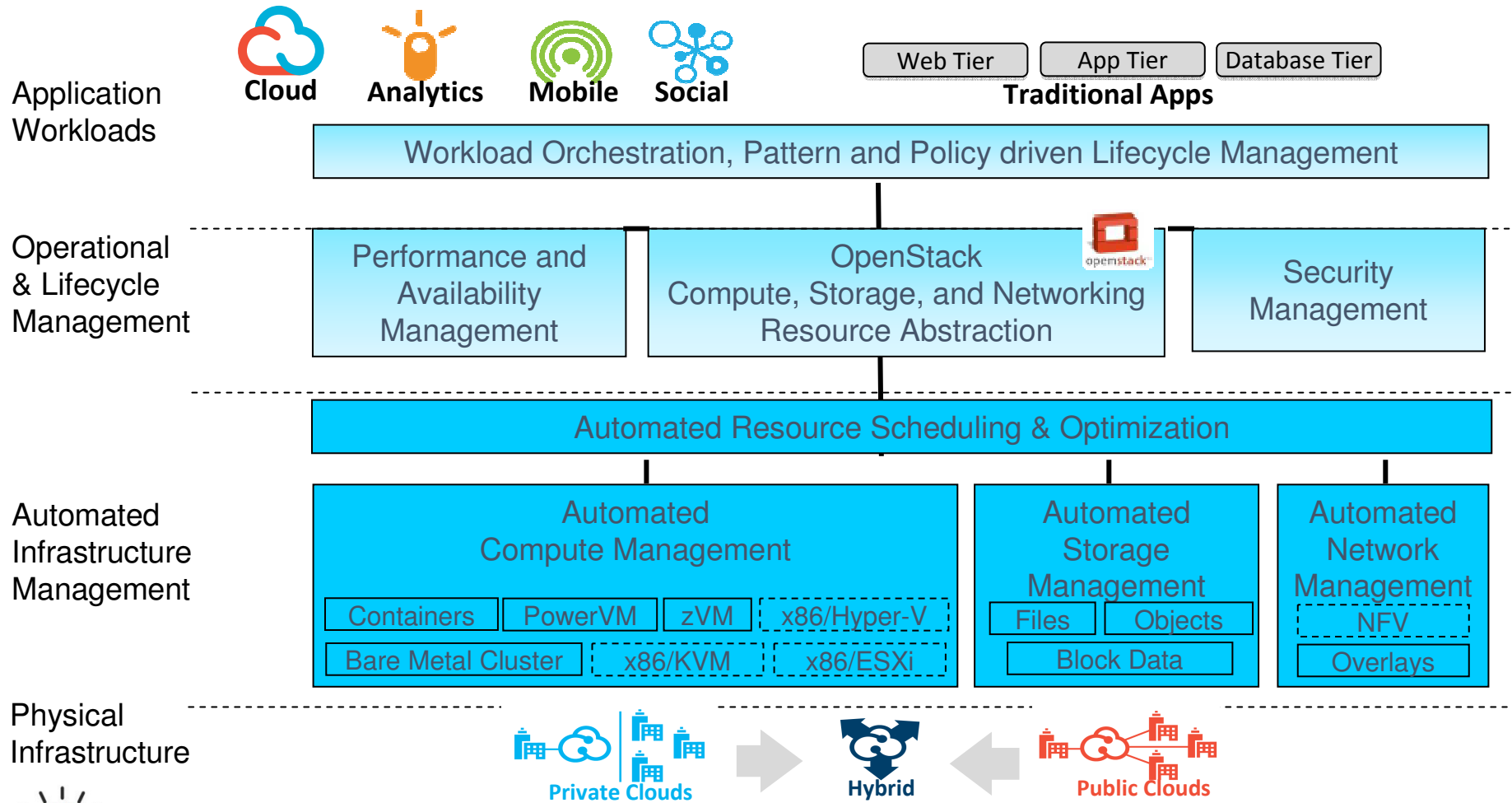
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IBM Software Defined Environment capabilities Span Application, Infrastructure Lifecycles and Hybrid Clouds

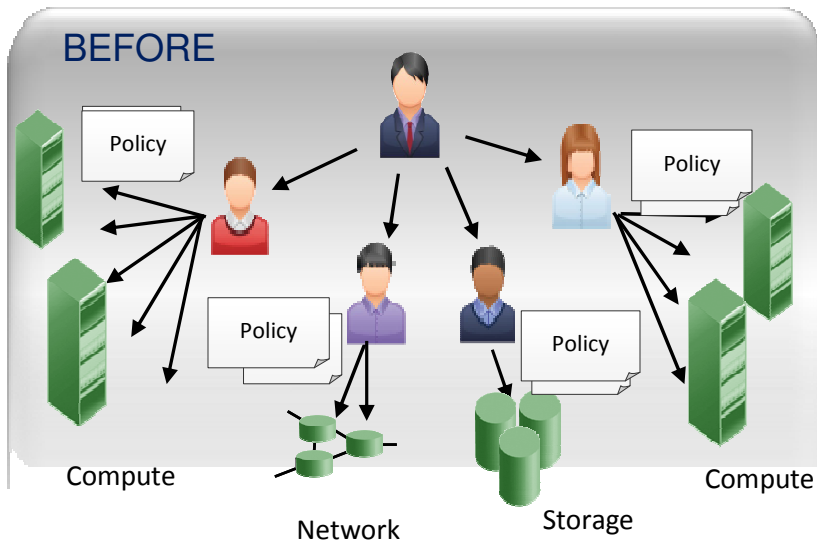


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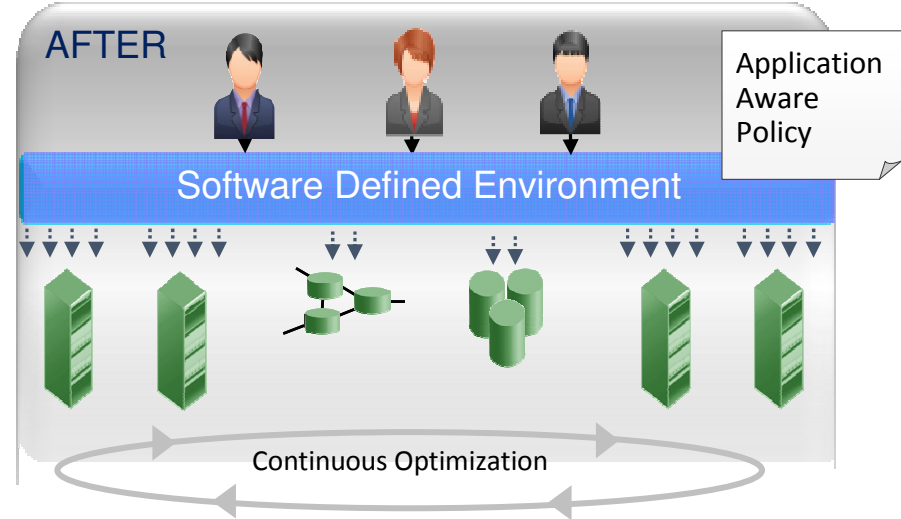
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Automated IT Delivers Greater Speed, Efficiency and Simplicity



Traditional Infrastructure

- Slow and manual
- Reactive administration
- IT silos and costly specialization



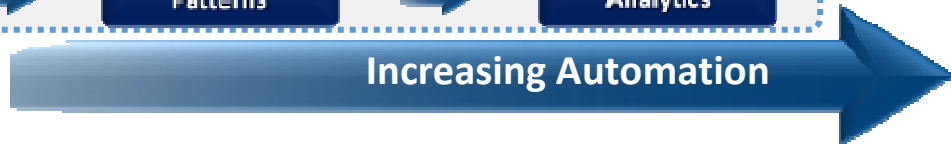
Infrastructure As A Service

- Rapid, repeatable and automated
- Proactive administration
- Fully integrated management

Policy Enforcement



Increasing Automation

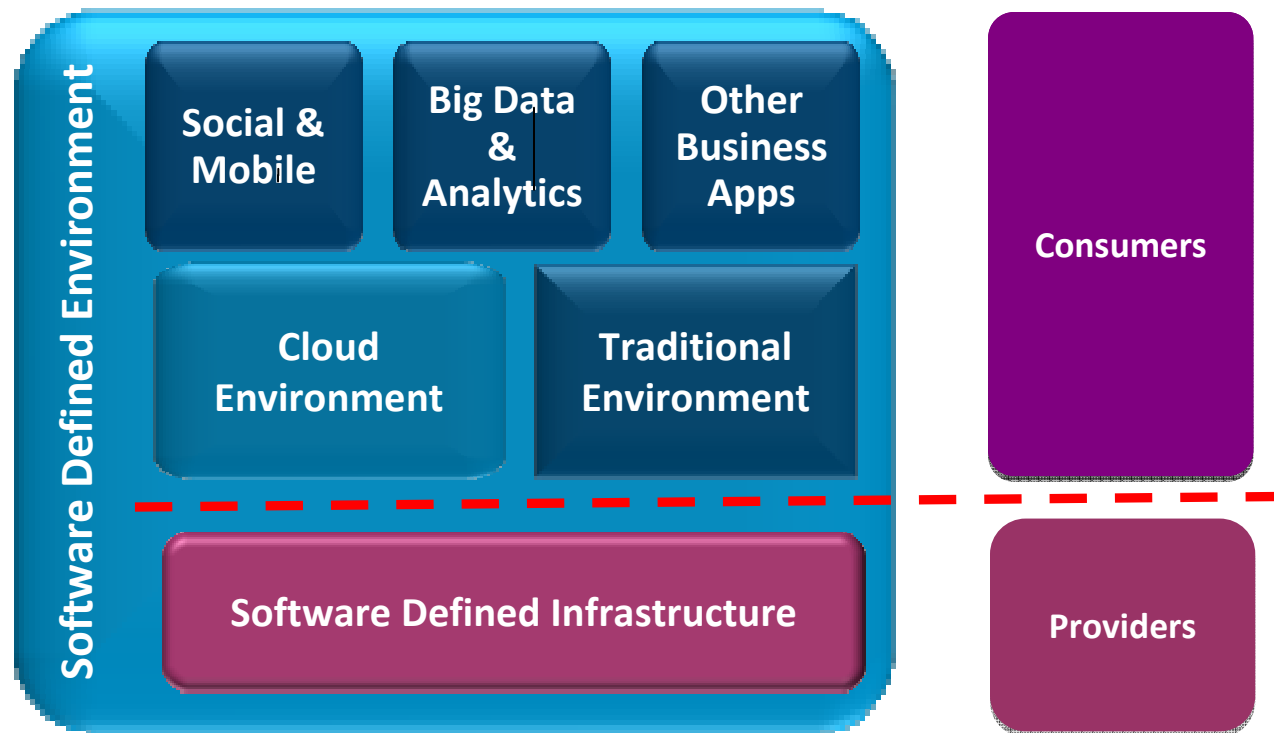


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A Software Defined Environment for Today's Applications

Improves business agility by enabling rapid change and accelerating the application lifecycle

Provides the most efficient and scalable cloud solutions



Programmable, open standards-based infrastructure



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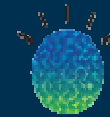
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IBM is addressing cloud needs across the enterprise

Think it. Build it. Tap into it.

Business
Process
as a Service

Enabling business
transformation



Smarter
Commerce



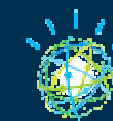
Smarter
Workforce

Software
as a Service

Marketplace of high value
consumable business applications



Smarter
Analytics



Watson
Solutions

Platform
as a Service

Composable and integrated
application development platform



BlueMix

Infrastructure
as a Service
(SDE)

Enterprise class, optimized
infrastructure, Software
Defined



Infrastructure Services



IBM Cloud
Managed Services

IBM Systems and
Software

Public. Private. Hybrid.

IBM

Open Communities Drive Innovation and Enable Choice



Client value:

Interoperability, agility, and flexibility through a common cloud computing stack

- 380+ IBMers working on OpenStack
- IBM is #2 in contributions



Client value:

Unified, open, interoperable SDN platform to create an ecosystem of automated network services

- IBM is a platinum member and active contributor
- Contributing OpenDOVE technology



OpenPOWER Consortium

Client value:

Enables broader innovation in the industry for advanced data center technology

- New, broader ecosystem of tools through collaborative innovation
- Enables choice of architectures



Client value:

Enterprise-grade, cost effective, open virtualization alternative

- IBM founding and governing Board member
- OVA moving into Linux

Foundation to target broader industry visibility



Client value:

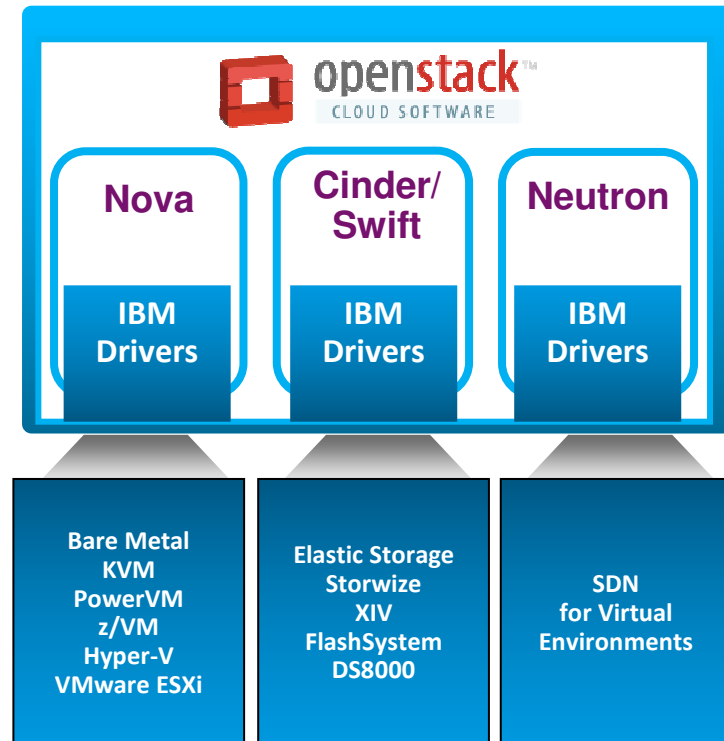
Provide cloud users freedom of choice, flexibility, and openness as they have with traditional IT

- 400+ organizations participate
- IBM founding sponsor



IBM Cloud Manager with OpenStack

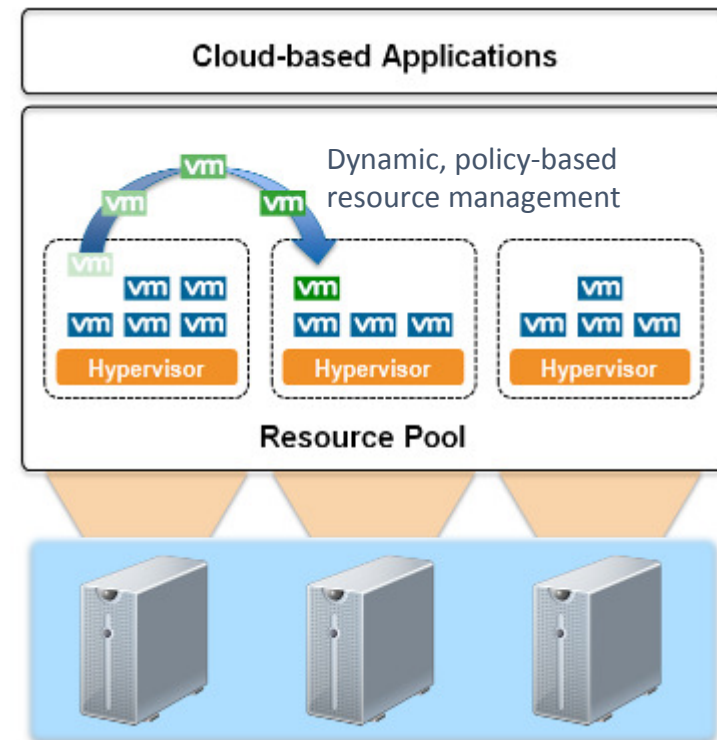
- ▶ IBM Cloud management solutions deliver OpenStack with open access to APIs
- ▶ IBM Systems support consistent OpenStack management
 - System x
 - Power Systems
 - Systems z
 - IBM Storage Systems
- ▶ OpenStack optimizations and value-add
 - Template driven installation speeds time to value
 - Efficiently manage IT resources using Advanced Scheduling
 - Live upgrades
 - Security and authentication



Resource Scheduling through OpenStack Provides Dynamic Resource Management

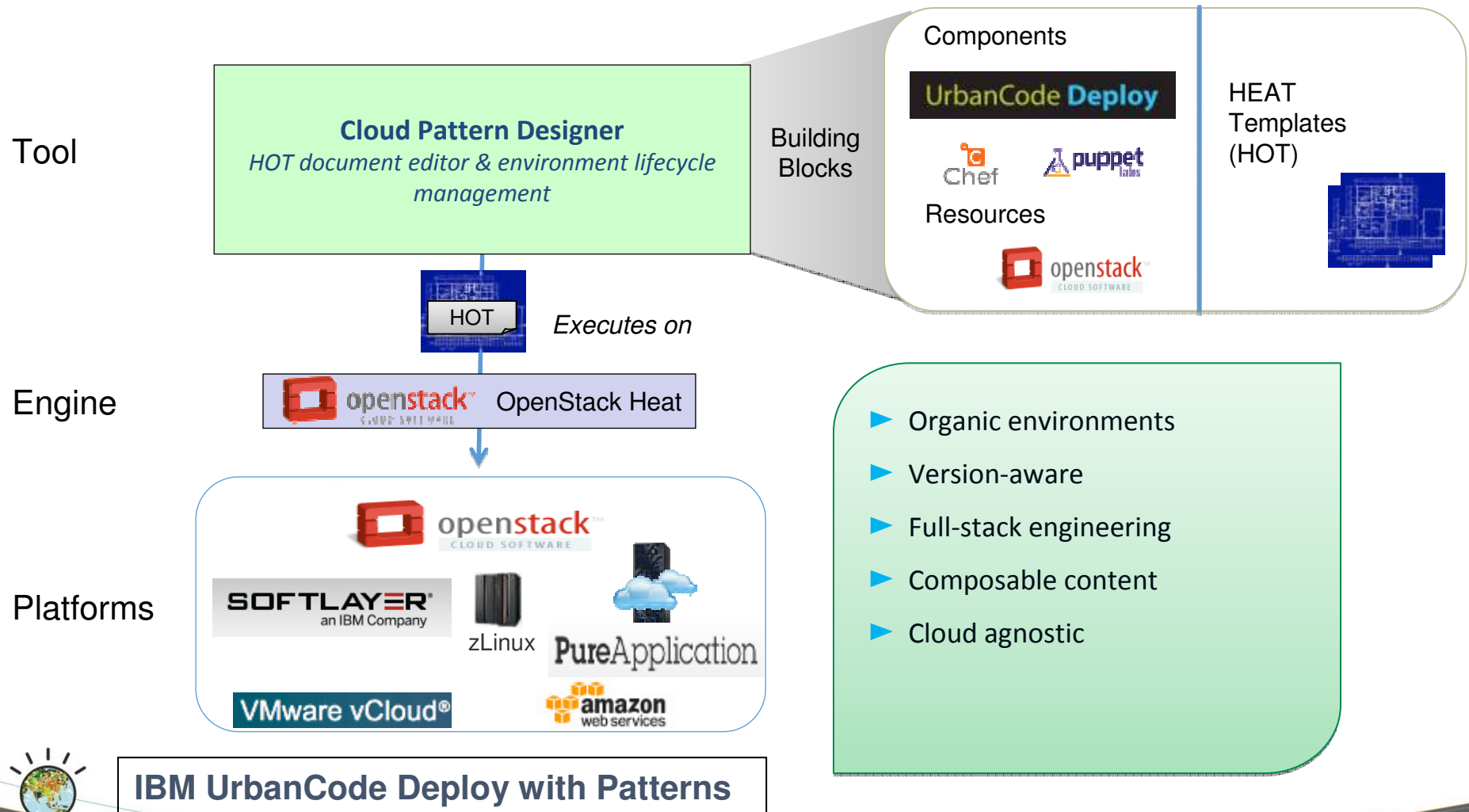
- ▶ Optimizes OpenStack-based Hybrid Cloud environments
- ▶ Optimizes server utilization and increases availability through policy driven workload placement
- ▶ Provides comprehensive policies
- ▶ Delivers multi-tenant secure isolation
- ▶ Provisions virtual and bare-metal environments

IBM Platform Resource Scheduler



Pattern development and lifecycle management

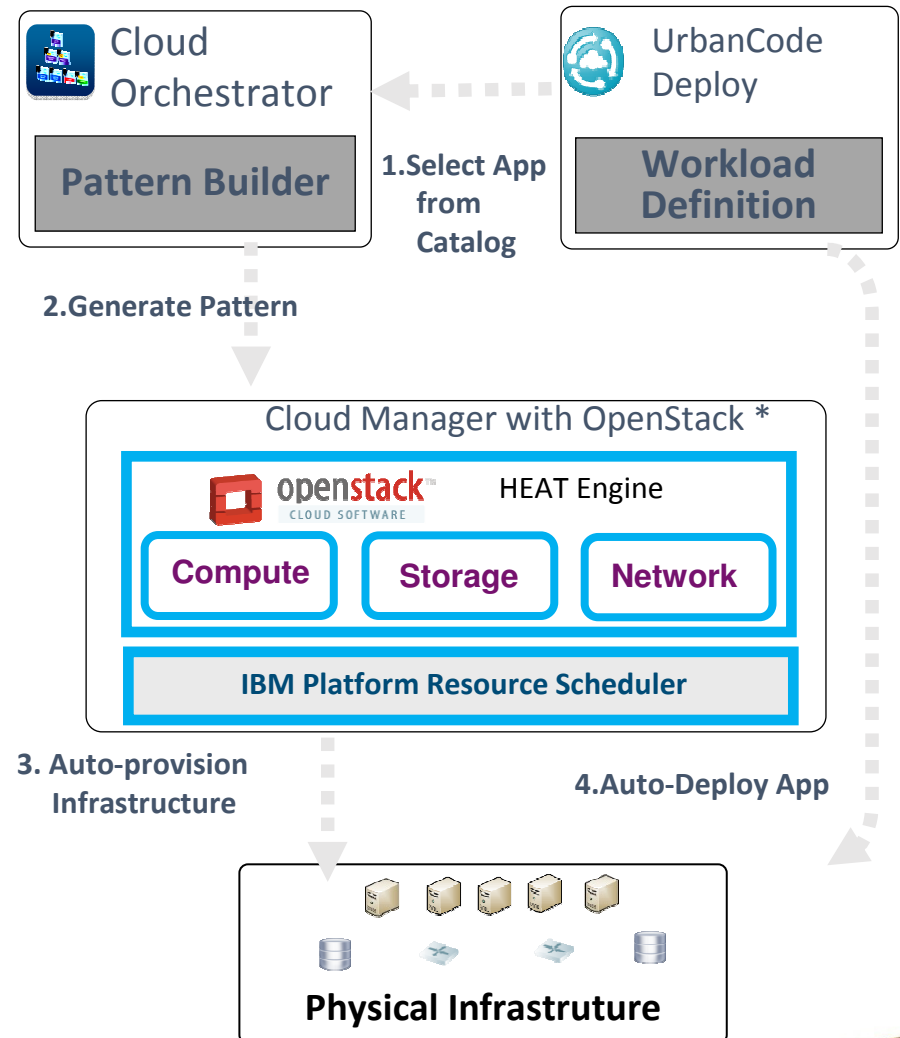
A full-stack engineering solution for designing, deploying, and managing environments



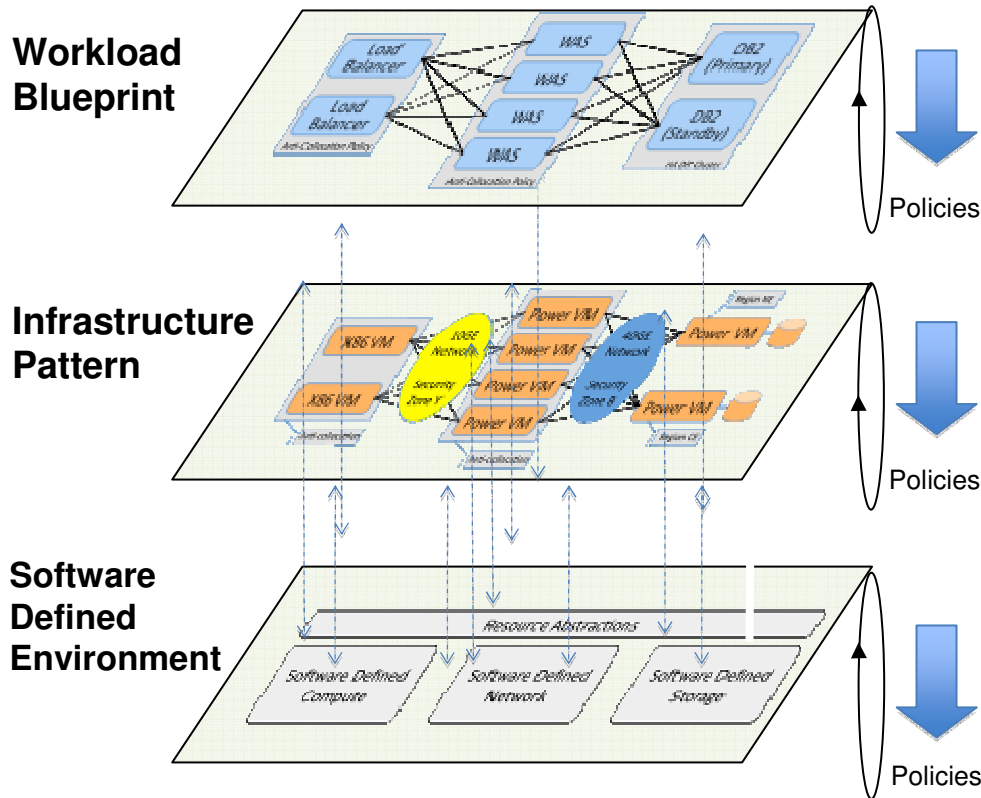
Accelerating the DevOps cycle for continuous delivery

- ▶ IBM Cloud Orchestrator defines patterns with associated policy
- ▶ IBM UrbanCode Deploy manages code asset life cycles
- ▶ Policies are interpreted by the resource scheduling layer
- ▶ Pattern and policy implementations are converging on OpenStack HEAT standards

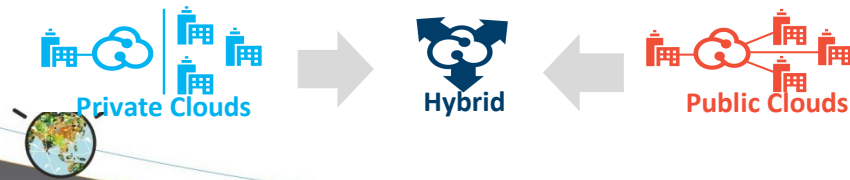
IBM UrbanCode Deploy & IBM Cloud Orchestrator
* Includes IBM Cloud Manager with OpenStack



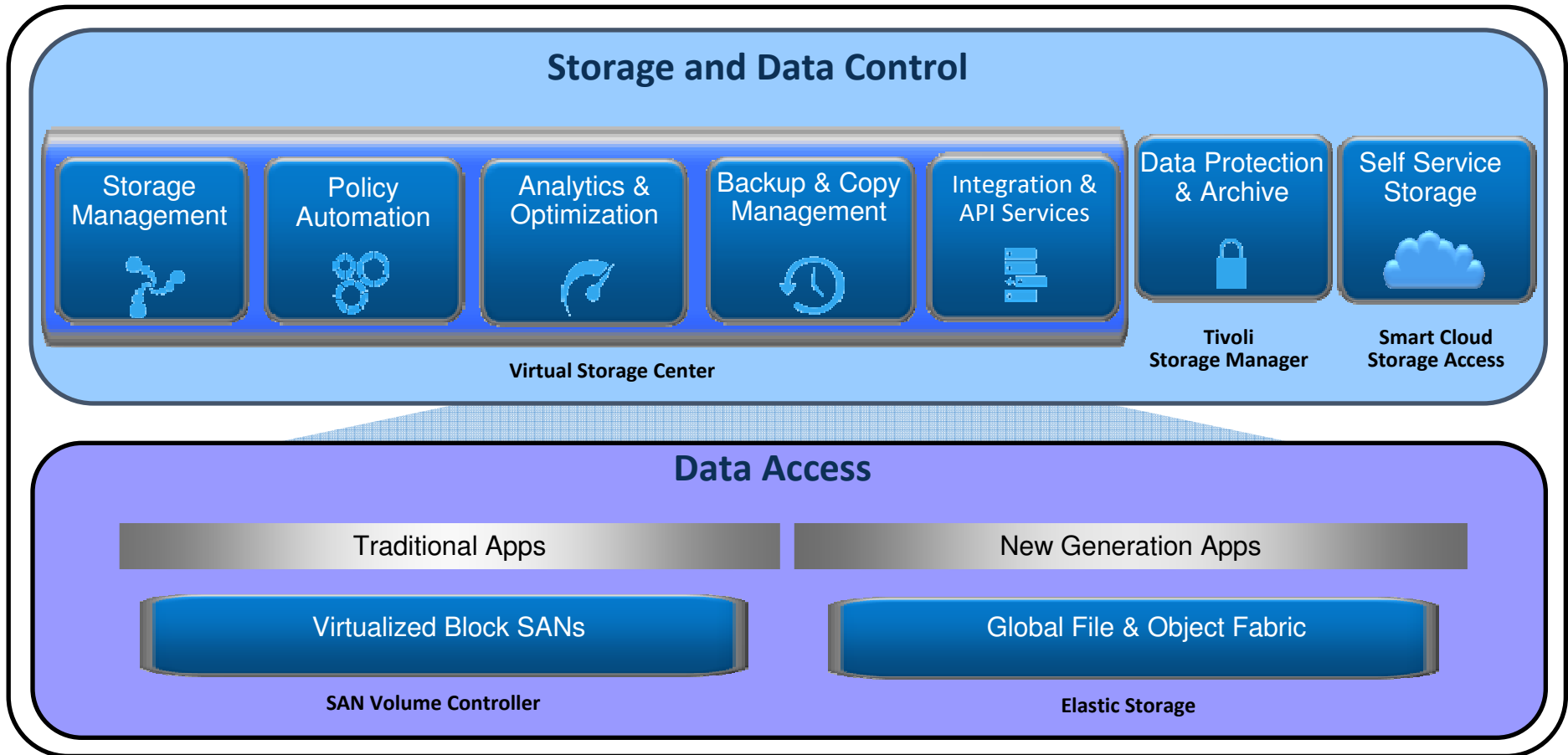
Software Defined Environments are Application Aware, Automating Best Practices via Patterns of Expertise



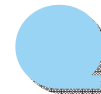
- **Workload Blueprint** describes software solution components and infrastructure resources required by the solution in a industry standard format (**Heat Orchestration Template**)
- **Infrastructure Pattern** maps software pattern to optimal infrastructure based on business rules (policies)
- **Infrastructure** hosts multiple workloads in a shared environment
- **Software Defined Environments** automatically orchestrate deployment and update of workloads



IBM Software Defined Storage



Flexibility to use IBM and non-IBM Servers and Storage or as Cloud Services

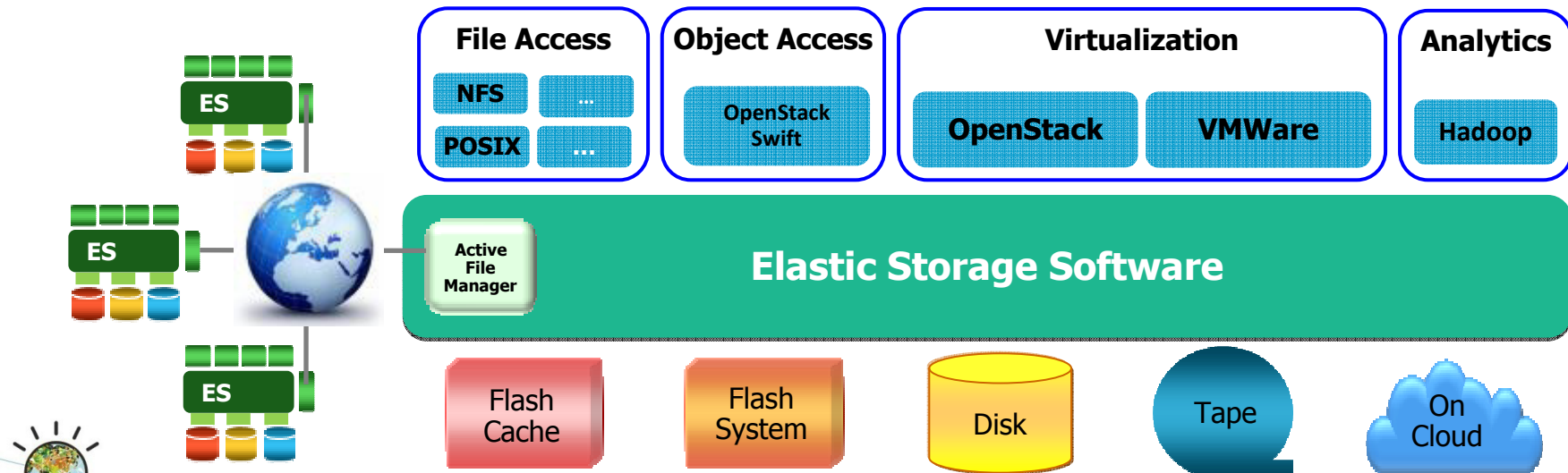


Elastic Storage: Rich Storage Capabilities for Cloud

- A single scale-out data plane for individual or globally distributed data centers
- Policy based automation to put data in the best location, on the best tier for optimal performance & cost
- Unifies objects and files – including VM images, Hadoop data and clustered databases & data warehouses
- Single name space no matter where data resides
- **As software, as a service on the IBM Cloud, or in an integrated Elastic Storage Server**

IBM Elastic Storage

Single Global Name Space



Software Defined Networks Accelerate New Solutions

- ▶ Delivers a unified architecture supporting networking solutions
- ▶ Supports physical or virtual appliances for a broad range of networking applications
- ▶ Incorporates OpenDaylight components to leverage a growing ecosystem of network services and providers
- ▶ Integrates with OpenStack to control both virtual overlay and physical OpenFlow networks

IBM SDN for Virtual Environments



Intrusion
Detection



Routers
Optical SDN



Network
Monitoring



Firewalls
VPN

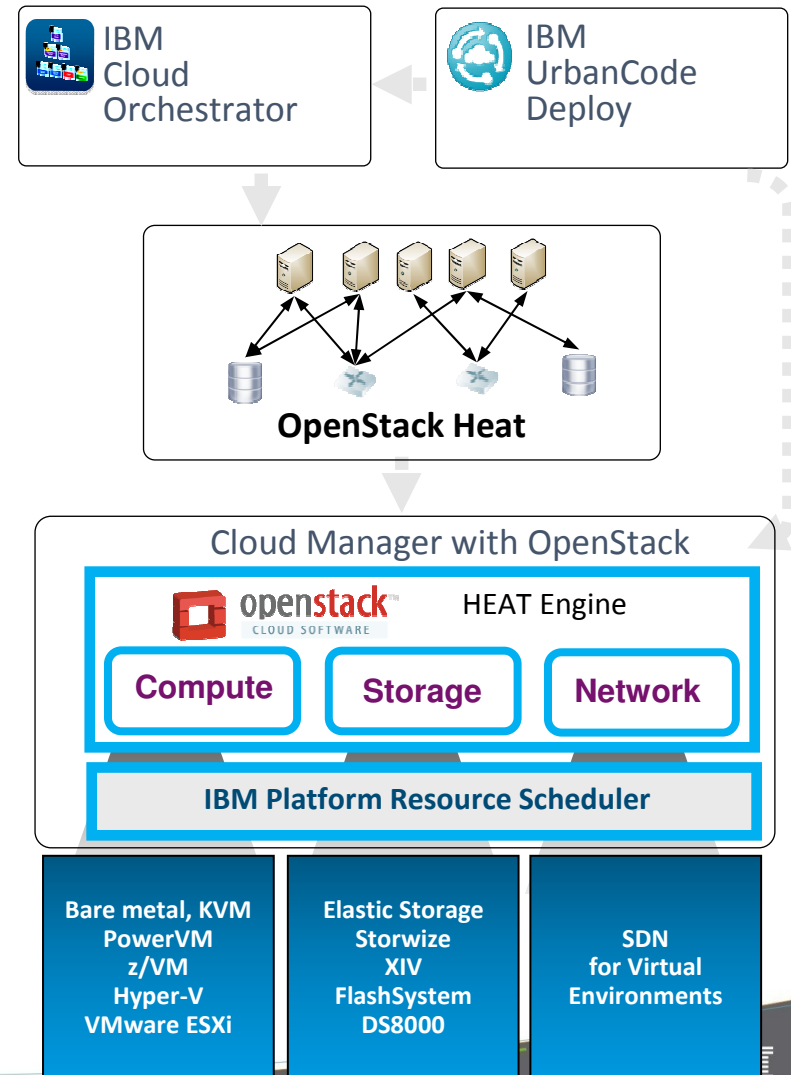


Load Balancers
App Delivery



Software Defined Environments Provide Next Generation Automation for Cloud

- ▶ Improves agility of business applications
- ▶ Manages the lifecycle of business applications through rapid change
- ▶ Captures best practices and policies for application workload and infrastructure
- ▶ Automates infrastructure across compute, storage and network
- ▶ Elastically scales resources to optimize business growth



Increased ETL Job throughput using Smart Scheduling on Optimized Resources

Client Issue

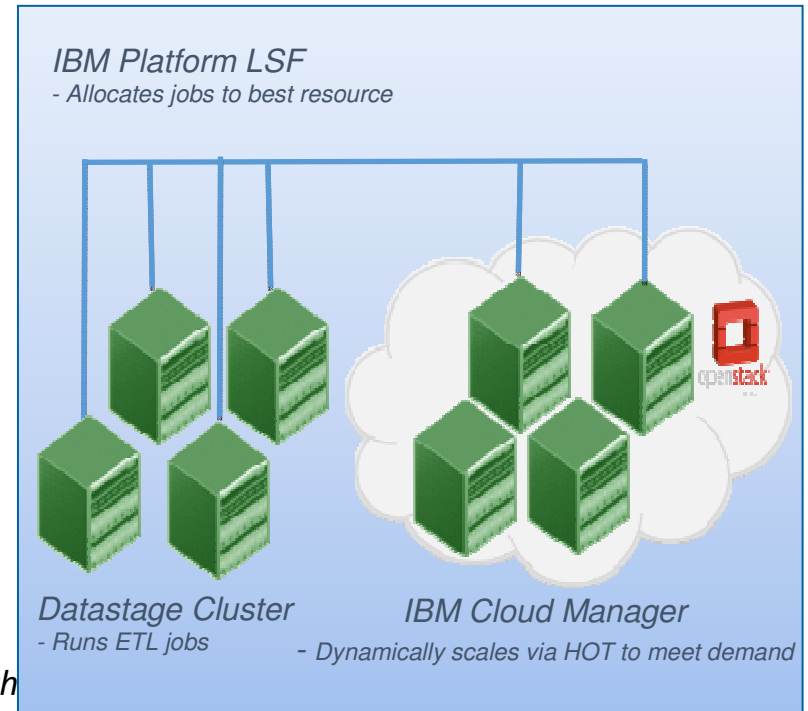
- Datastage ETL jobs had to be divided and submitted to separated clusters manually
- A job could only run on a maximum two nodes
- No job scheduling or resource sharing

Client benefit

- All jobs can be submitted to a single mgmt node automatically
- Smart job scheduling increases job processing throughput
- Jobs share resources on an unified OpenStack platform with other applications.
- The DataStage cluster can be scaled out or in automatically per job loads

IBM solution

- *Smart job scheduling within an integrated Datastage cluster with Platform LSF. Dynamic scale out/in via HOT pattern to tap into additional virtual compute resources in a IBM Cloud Manager with Openstack private cloud.*



Next Steps

- Add additional web applications to shared cloud
- Include x86 and Power targets in the cloud
- Add storage virtualization via SVC



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Large US Retailer

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Rapid availability and growth of cost effective storage for cloud scale data

Client issue

- Time required to allocate and grow storage capacity for users
- Growing costs due to inefficient use of storage resources
- Expensive and Scarce Expertise needed to manage and tune storage resources

Client benefit

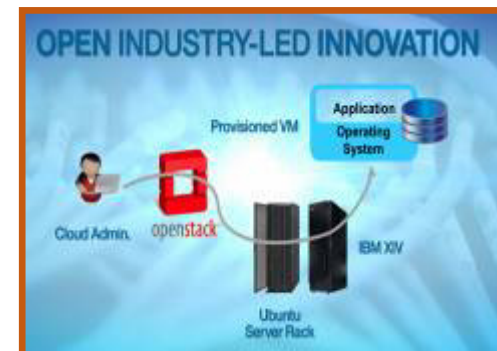
- Faster availability and growth of storage capacity
- Lower Cost through increased utilization
 - Fewer storage servers
 - Less space, energy, and cooling
- Fewer experts required due to open, automated management software

IBM solution

- Automated management of IBM XIV Storage via OpenStack APIs

Client Quote

“XIV is able to ingest any workload without having to configure LUNs... others do not give the same level of ease of use, performance, or predictability of I/O.”



Lessons Learned

Clients value the programmable aspects of infrastructure even if it is in incremental steps.

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IBM Software Defined Environment Differentiators

	Values
Hybrid Environment	<ul style="list-style-type: none">▪ Seamless experience across On and Off Premise▪ Integrated and automated provisioning and management▪ Self-service with security, reliability, scalability and serviceability
Automated DevOps	<ul style="list-style-type: none">▪ Continuous iteration to accelerate value and reduce waste▪ Integrated solution life cycle to reduce process and workflow delays▪ Automation across roles to reduce information loss and human error
Open	<ul style="list-style-type: none">▪ Investment in and rapid adoption of open standards▪ Vendor neutrality and transparency allowing freedom of movement▪ Rapid integration of new technology to transform existing IT

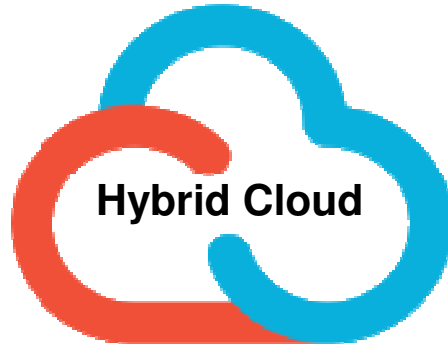


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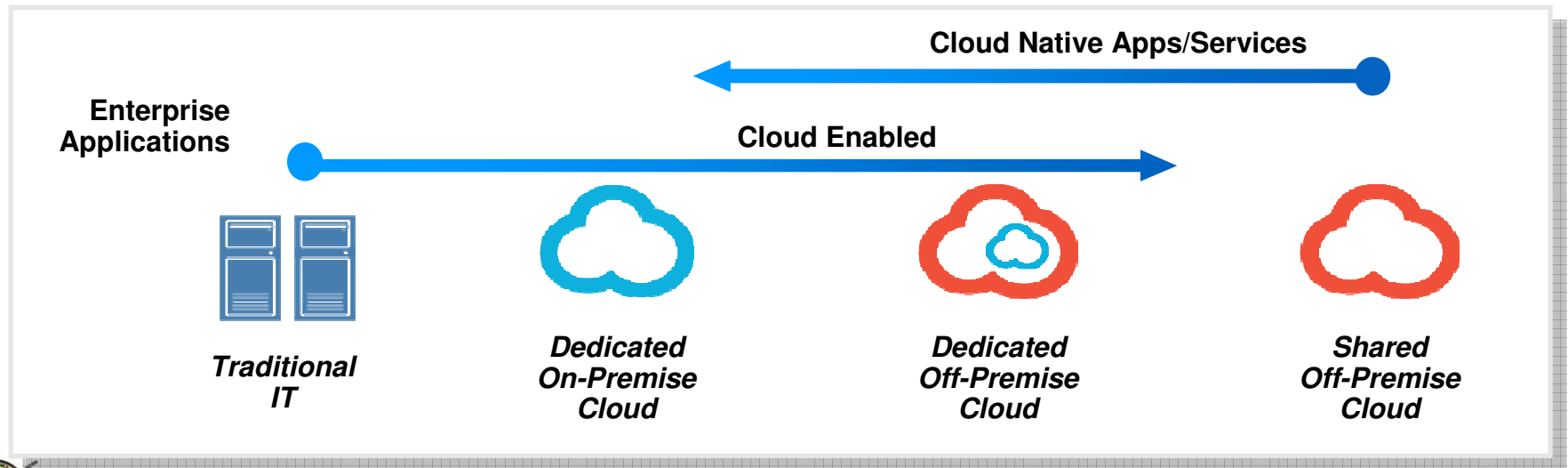
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Hybrid Cloud computing is the new Enterprise IT



Seamlessly extends enterprise IT with Cloud for changing business needs:

- Acts as one dynamically managed, secure environment
- Flexible choice of delivery models
- Interoperable through open standards



The right mix to optimize business value



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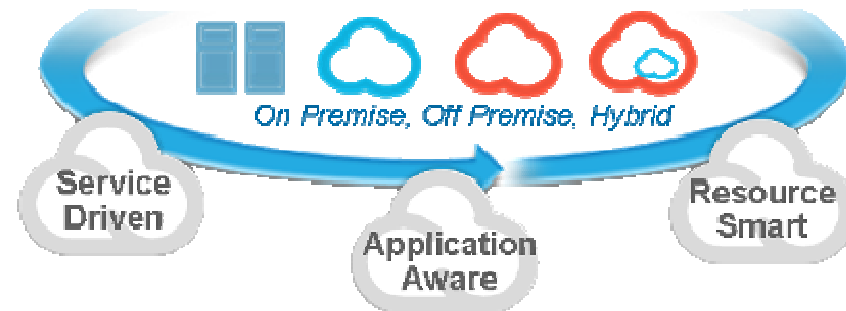
Off Premise

- ▶ Rapid access
- ▶ Low entry cost
- ▶ Highly elastic



On Premise

- ▶ Fully customizable
- ▶ Robust management
- ▶ Scalable



- Encapsulating expertise into patterns
- Open, extensible hybrid model
- Enabling choice of bare metal, virtual servers and containers
- Building on Software Defined capabilities that are delivering client value today



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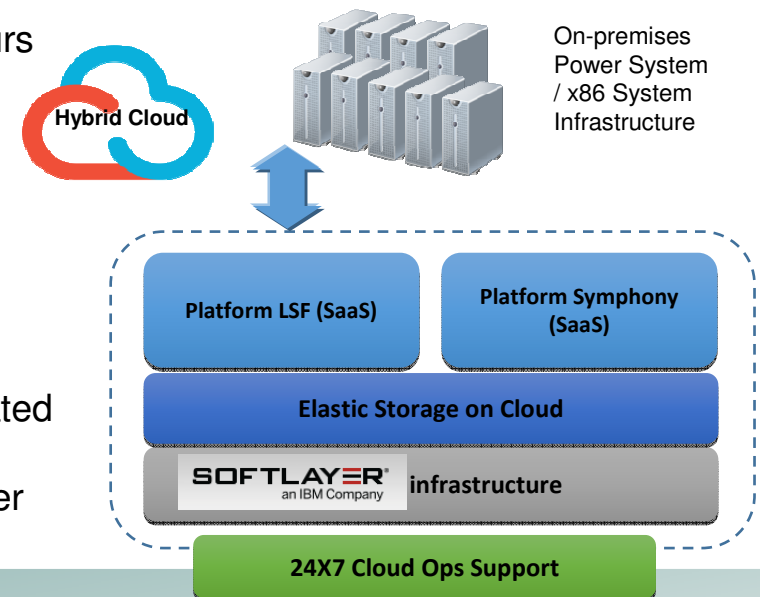
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IBM® Platform™ Computing Cloud Service

Ready to use Hadoop, analytics and technical computing clusters



- **Build** - Add compute & storage capacity in as little as a few hours
- **Manage** - Transparent user experience with a single workload manager and seamless file transfer between local resources & the Cloud
- **Support** - Single source of support for the entire Cloud-based cluster
- **Protect** - Security through physical isolation provided by dedicated machines & network, as well as native encryption and choice of data center location



- IBM Platform LSF & Platform Symphony workload management for seamless job management to, from & within the Cloud
- Full integration with Elastic Storage on Cloud data management software for enhanced performance, capacity and security
- Non-shared physical machines and dedicated InfiniBand network for improved application performance and security
- Aspera support for fast data transfer between on-premises and cloud-based resources

Public, private, and hybrid cloud on SoftLayer

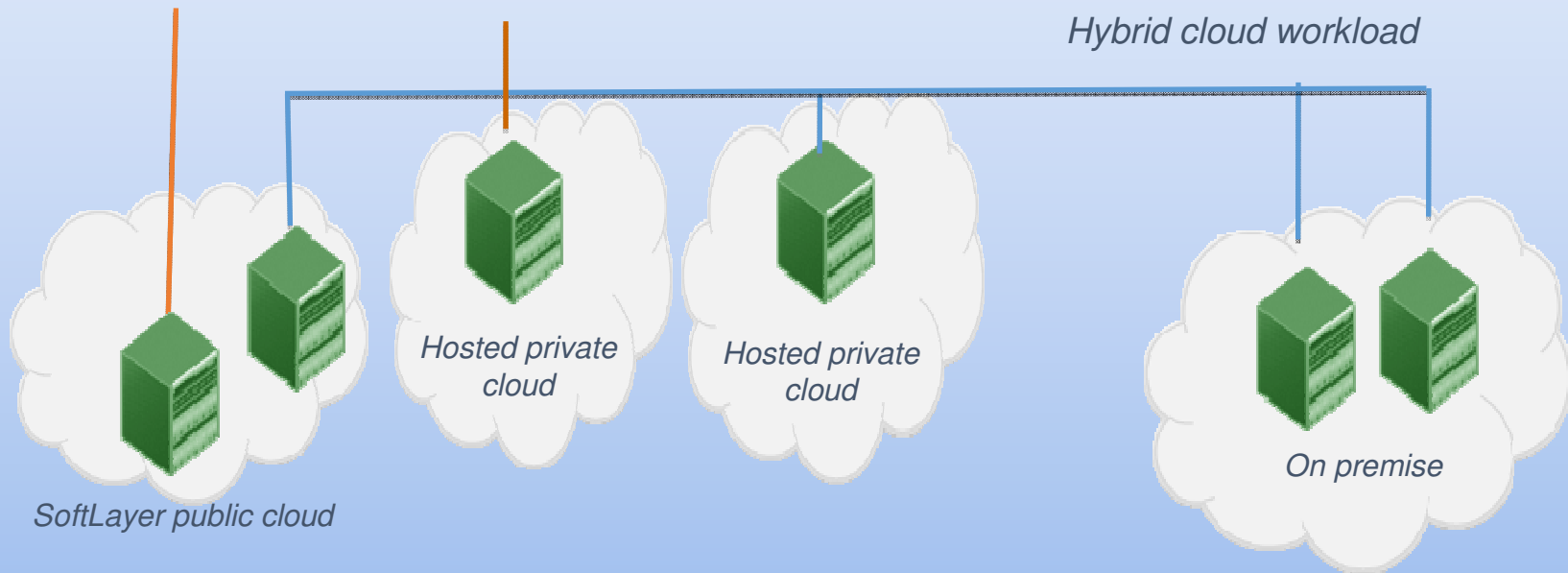
Intelligent resource scheduling/orchestration leveraging core infrastructure

Core infrastructure: compute, storage, network

Public cloud workload

Hosted private cloud workload

Hybrid cloud workload

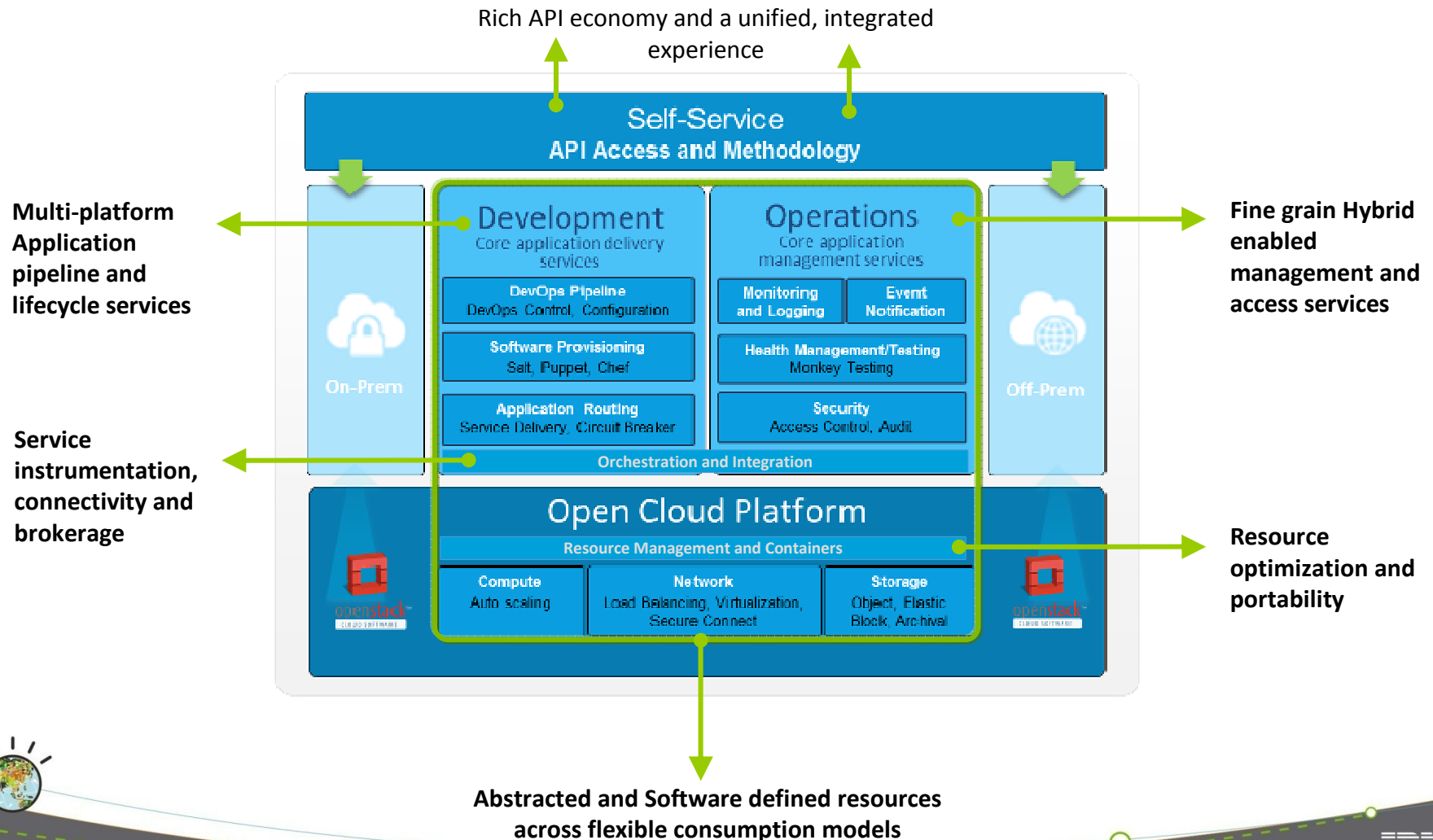


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Foundational Services built on an Open Cloud Platform enables a unified, integrated build, run and manage experience across a Hybrid Enterprise



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OpenStack is at the heart of an “Open Cloud Platform” as a consistent, software defined consumption model to a variety of delivery options – container technologies offer next level of flexibility and portability



On-Prem

Integrated System
(Available now)

Build Your Own
(Available now
inc. Support for
System P and Z)



Managed OpenStack
(2H 2014 – Project Zenith)
Cloud Management AAS
(3Q/4Q- ICM, ICO)

SoftLayer OpenStack
(Open project - Jumpgate)



Off-Prem

Open Cloud Platform
Compute, Storage and Network resources



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Thank You



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