Windows Azure and private cloud

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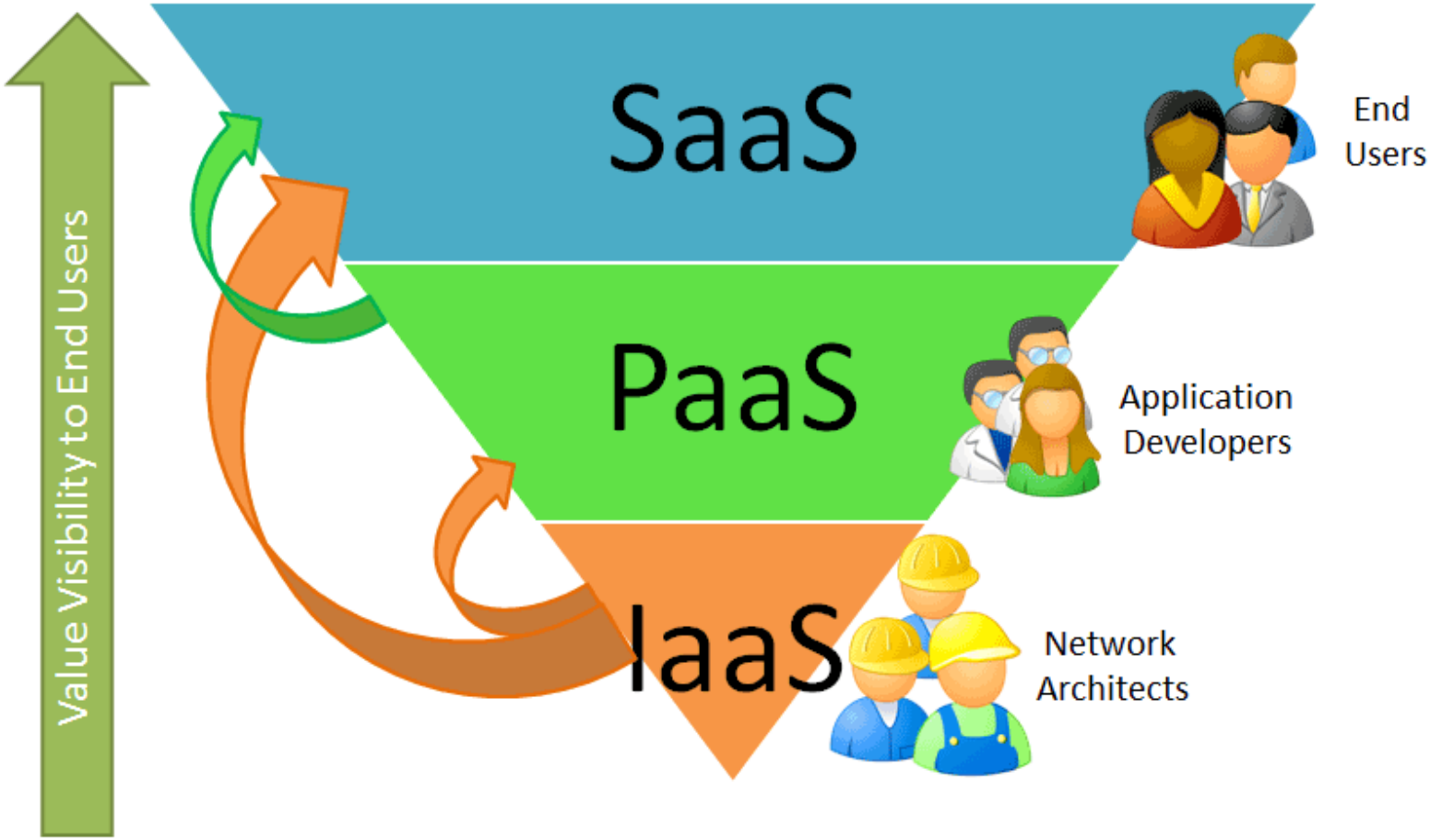
Agenda

- Cloud Computing Fundamentals
- Windows Azure
- How Windows Azure works
- Private Cloud in your own network

Cloud Computing Fundamentals



Cloud: Efficiency Versus Control

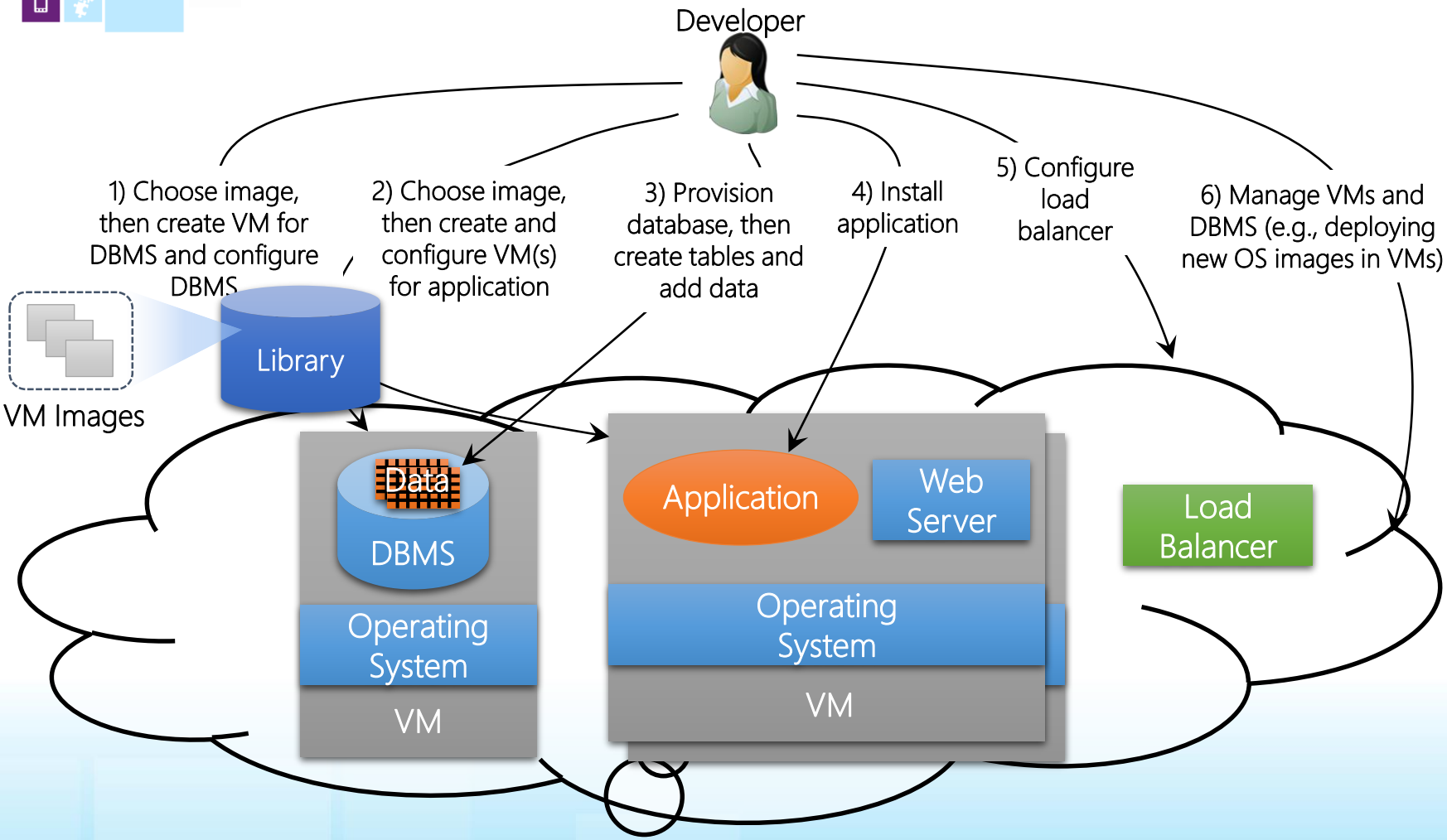
Windows Azure

= Managed for You	Standalone Servers	IaaS	PaaS	SaaS
Applications	✗	✗	✗	✓
Runtimes	✗	✗	✓	✓
Database	✗	✗	✓	✓
Operating System	✗	✗	✓	✓
Virtualization	✗	✓	✓	✓
Server	✗	✓	✓	✓
Storage	✗	✓	✓	✓
Networking	✗	✓	✓	✓

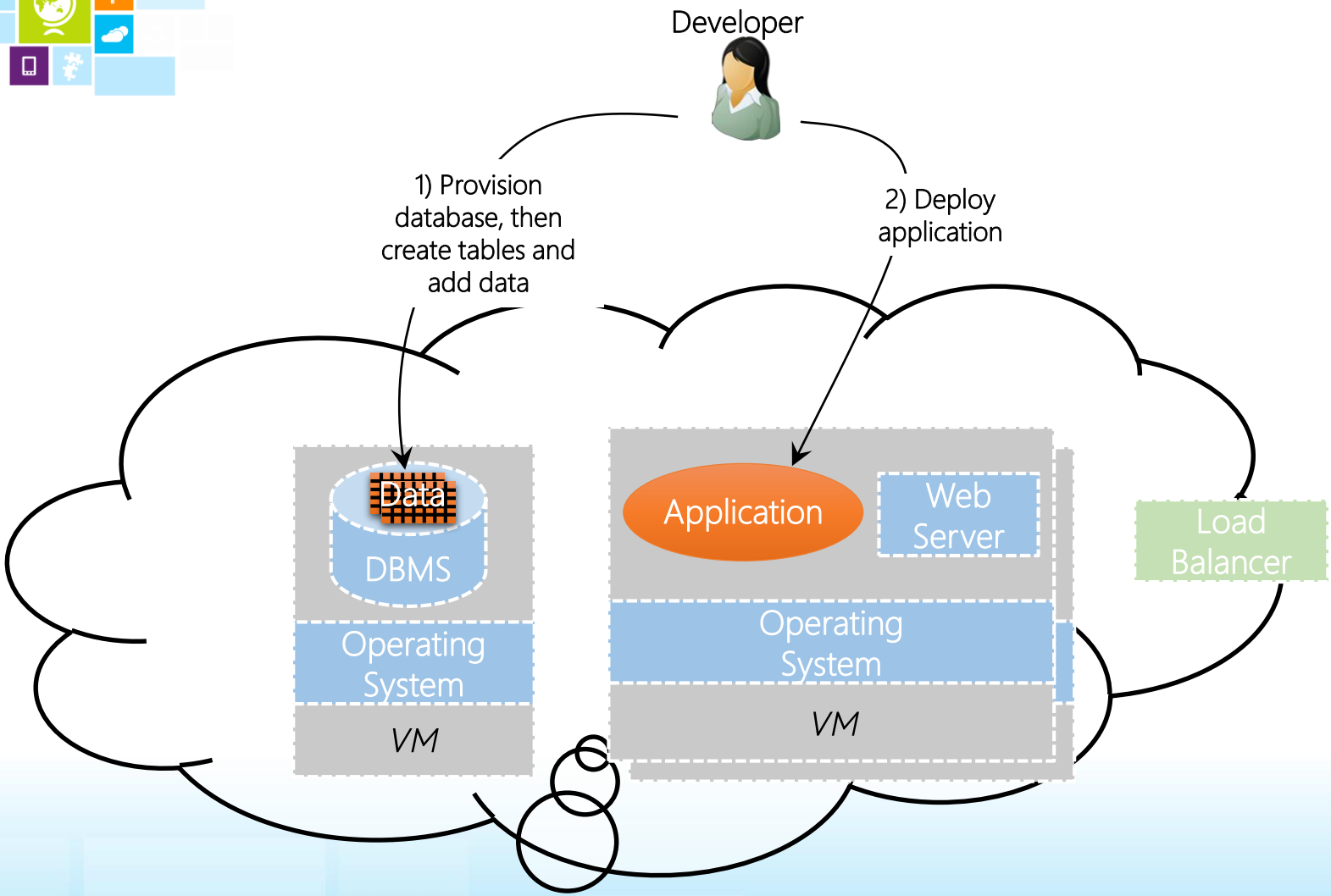
Efficiency →

← Control + Cost

IaaS

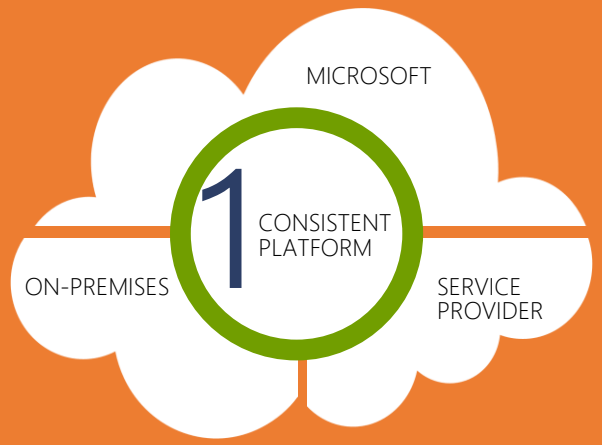

Developer
1) Choose image, then create VM for DBMS and configure DBMS
2) Choose image, then create and configure VM(s) for application
3) Provision database, then create tables and add data
4) Install application
5) Configure load balancer
6) Manage VMs and DBMS (e.g., deploying new OS images in VMs)
VM Images
Library
Data
DBMS
Operating System
VM
Application
Web Server
Operating System
VM
Load Balancer

PaaS

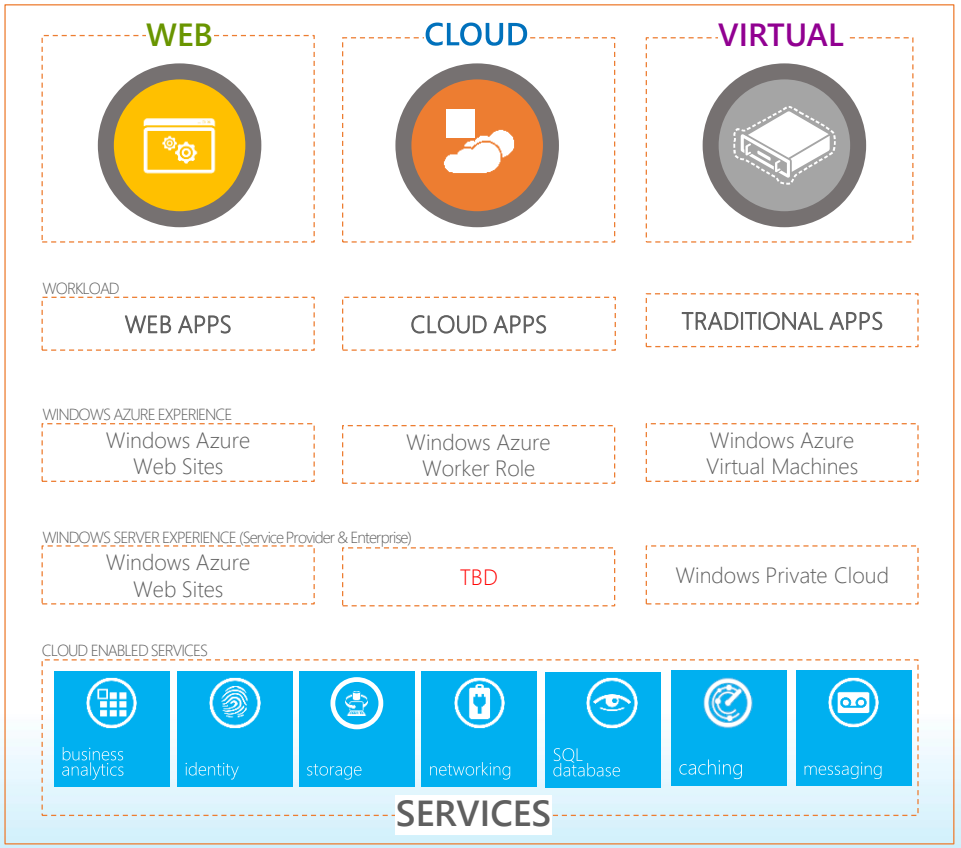

Developer
1) Provision database, then create tables and add data
2) Deploy application
Data
DBMS
Operating System
VM
Application
Web Server
Operating System
VM
Load Balancer

Microsoft Cloud Consistency Vision - Applications

One Consistent Platform …



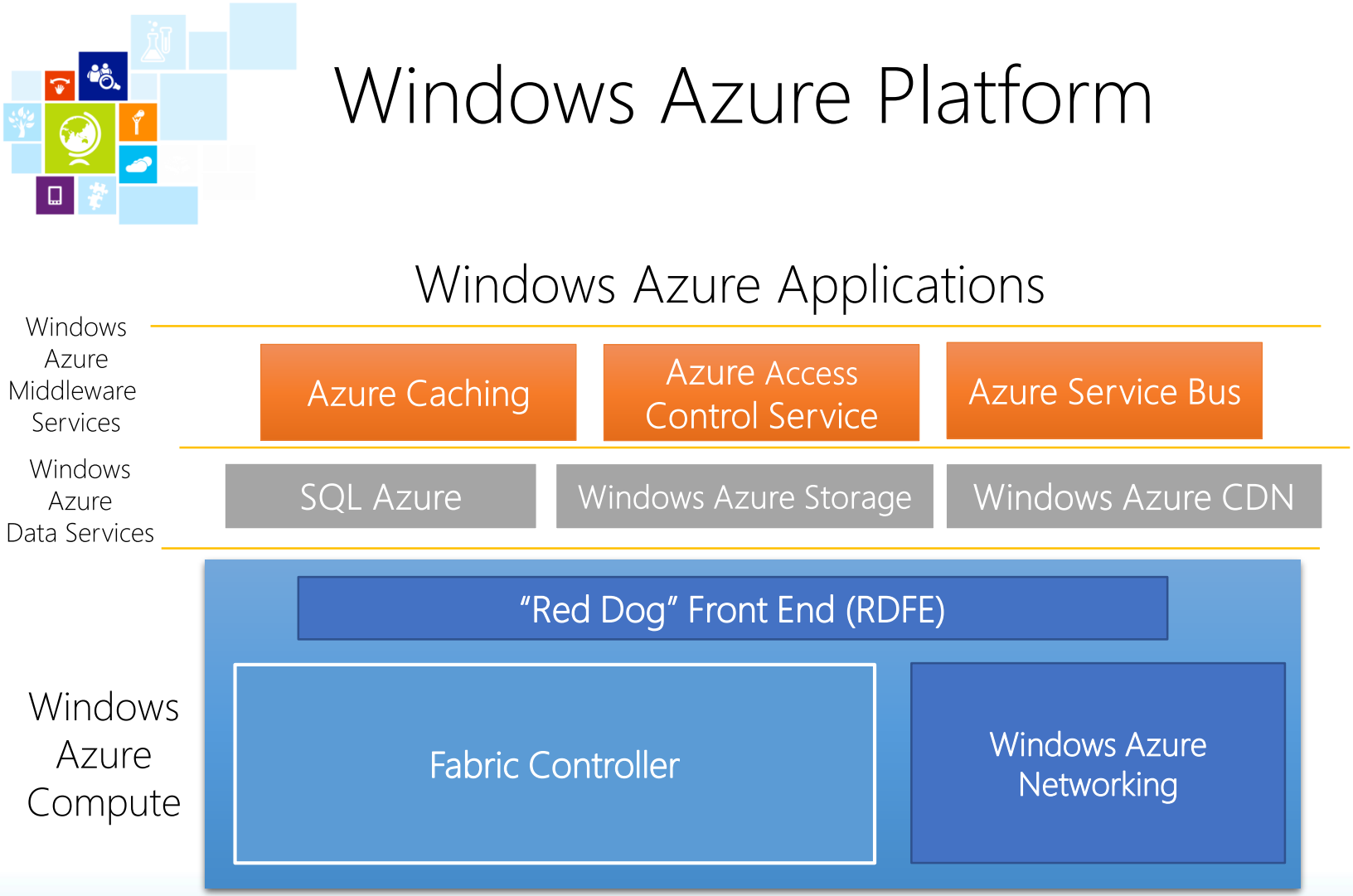
… For Application Delivery



Windows Azure

- Windows Azure is an OS for the data center
  - Handles resource management, provisioning, and monitoring
  - Manages application lifecycle
  - Allows developers to concentrate on business logic
- Provides common building blocks for distributed applications
  - Reliable queuing, simple structured storage, SQL storage
  - Application services like access control, caching, and connectivity

Windows Azure Platform



The Windows Azure Service Model

The Windows Azure Service Model

- A Windows Azure application is called a "service"
  - Definition information
  - Configuration information
  - At least one "role"
- Roles are like DLLs in the service "process"
  - Collection of code with an entry point that runs in its own virtual machine
- Windows Azure compute SLA requires two instances of each role
  - 99.95% for connectivity to two instances
  - Achieved with update and fault domains

Role Types

- There are currently three role types:
  - Web Role: IIS7 and ASP.NET in Windows Azure-supplied OS
  - Worker Role: arbitrary code in Windows Azure-supplied OS
  - VM Role: uploaded VHD with customer-supplied OS
- VM Role: is it a VM?
  - No, because it is stateless
  - Good for:
    - Long install (5+ minutes)
    - Manual install/config
    - Fragile install/config

Windows Azure Storage

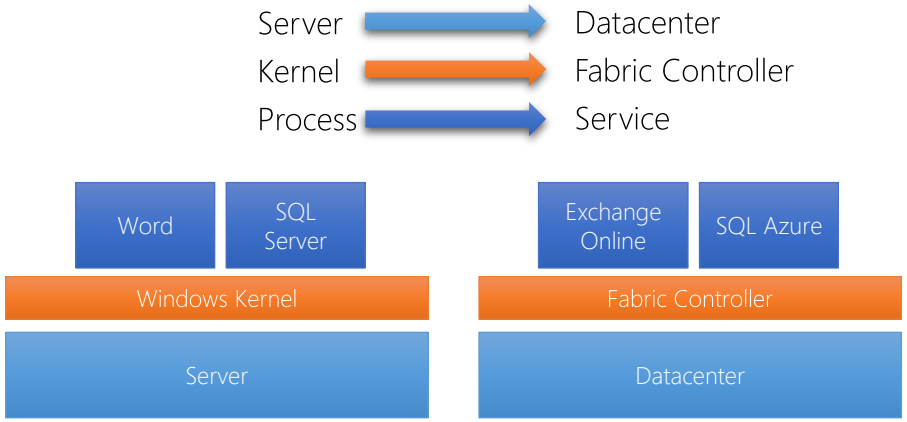
Windows Azure Storage Fundamentals

- Storage characteristics
  - Durable – replicated three times
  - Scalable (capacity and throughput)
  - Highly available
- Simple and familiar programming interfaces
  - REST (HTTP and HTTPS)
  - .NET accessible

High Availability and Windows Azure Services

The Fabric Controller (FC)

- The "kernel" of the cloud operating system
  - Manages datacenter hardware
  - Manages Windows Azure services
- Four main responsibilities:
  - Datacenter resource allocation
  - Datacenter resource provisioning
  - Service lifecycle management
  - Service health management

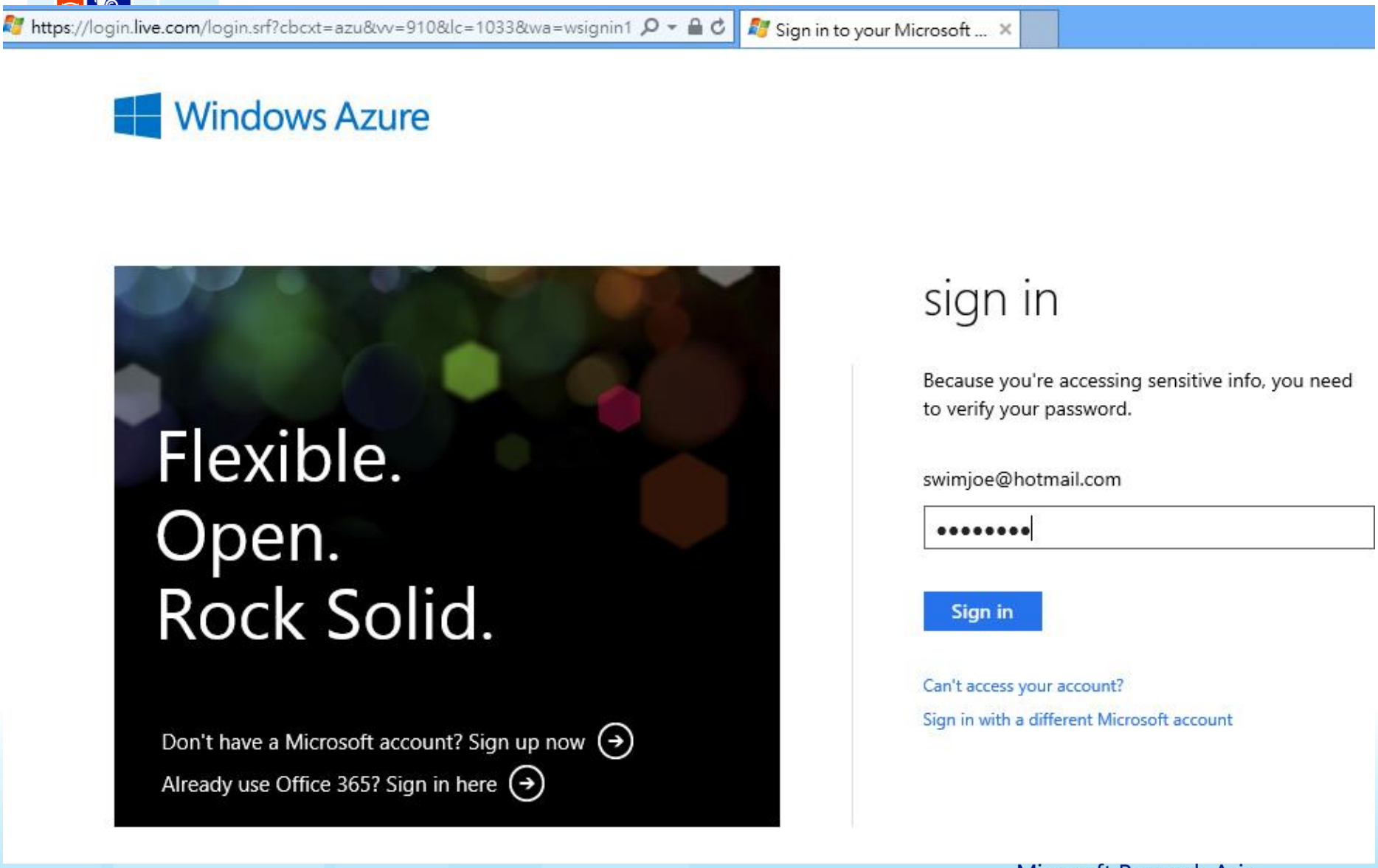


- Inputs:
  - Description of the hardware and network resources it will control
  - Service model and binaries for cloud applications

Node and Role Health Maintenance

- FC maintains service availability by monitoring the software and hardware health
  - Based primarily on heartbeats Automatically "heals" affected roles

Problem	Fabric Detection	Fabric Response
Role instance crashes	FC guest agent monitors role termination	FC restarts role
Guest VM or agent crashes	FC host agent notices missing guest agent heartbeats	FC restarts VM and hosted role
Host OS or agent crashes	FC notices missing host agent heartbeat	Tries to recover node FC reallocates roles to other nodes
Detected node hardware issue	Host agent informs FC	FC migrates roles to other nodes Marks node "out for repair"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Windows Azure
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Rock Solid.
Don't have a Microsoft account? Sign up now
Already use Office 365? Sign in here
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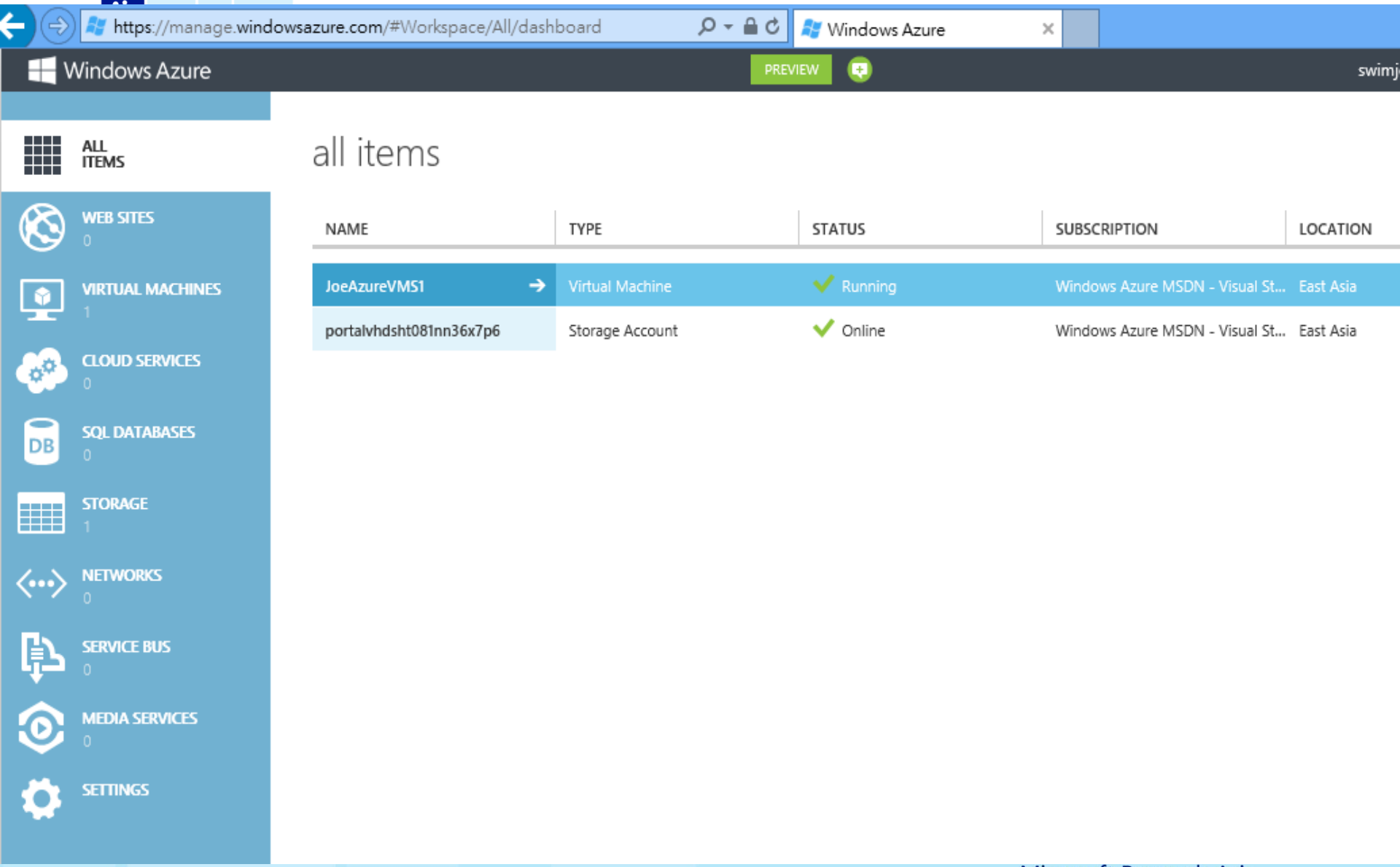
Because you're accessing sensitive info, you need to verify your password.
swimjoe@hotmail.com
Sign in
Can't access your account?
Sign in with a different Microsoft account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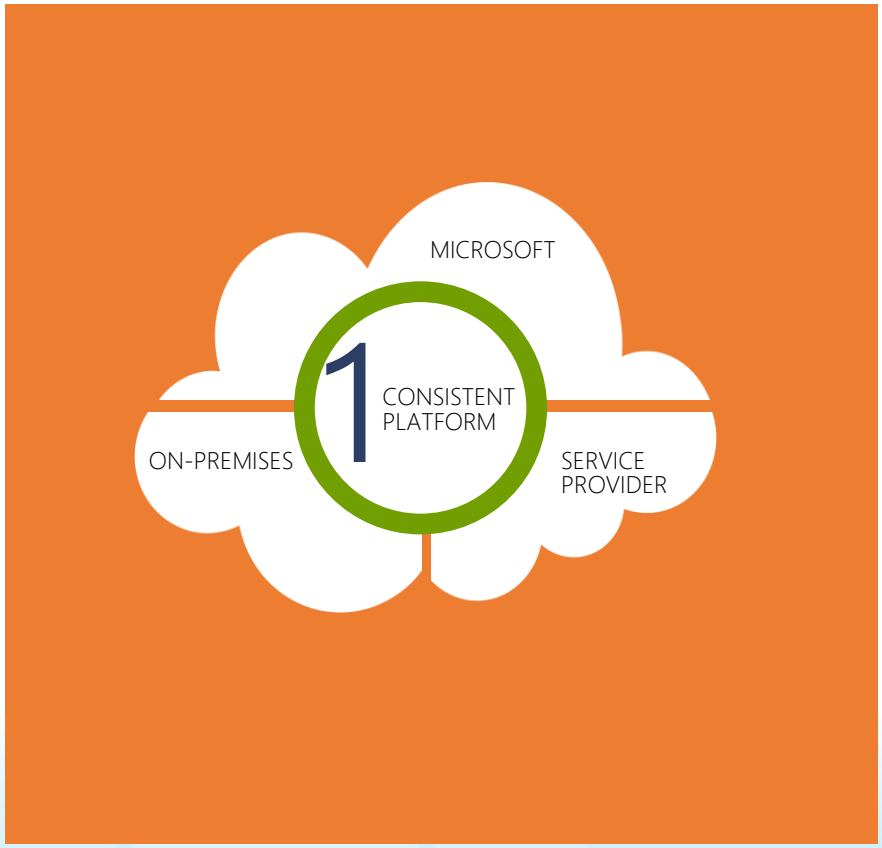
One Consistent Platform …



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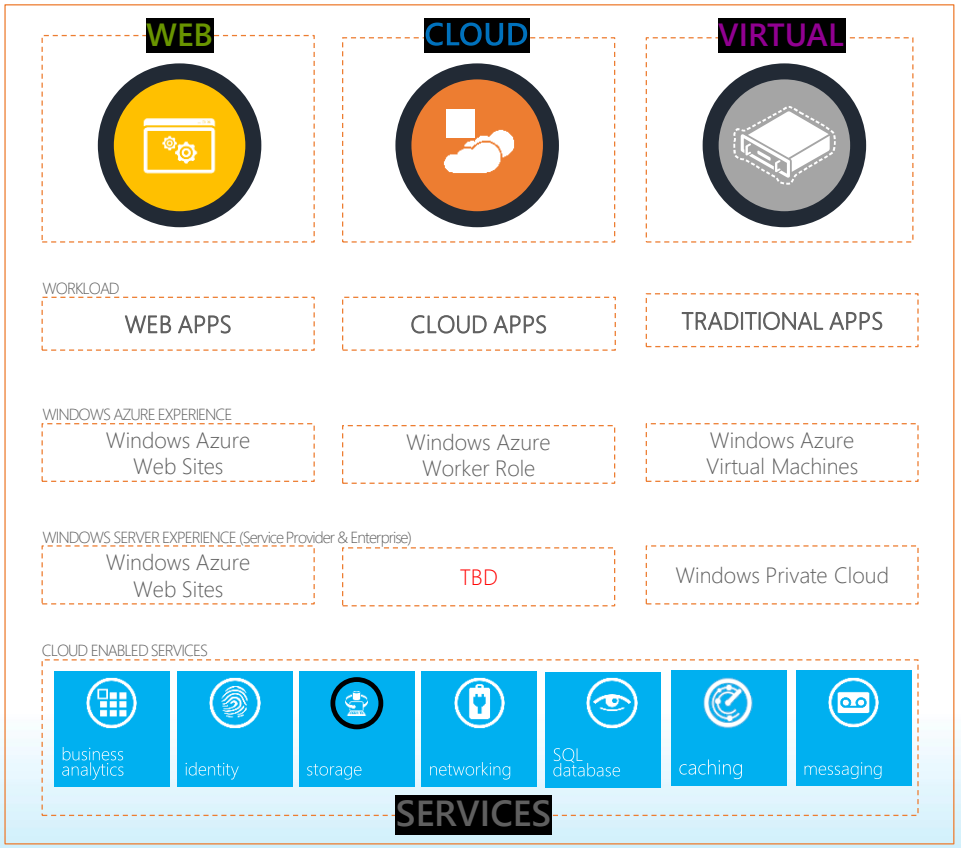

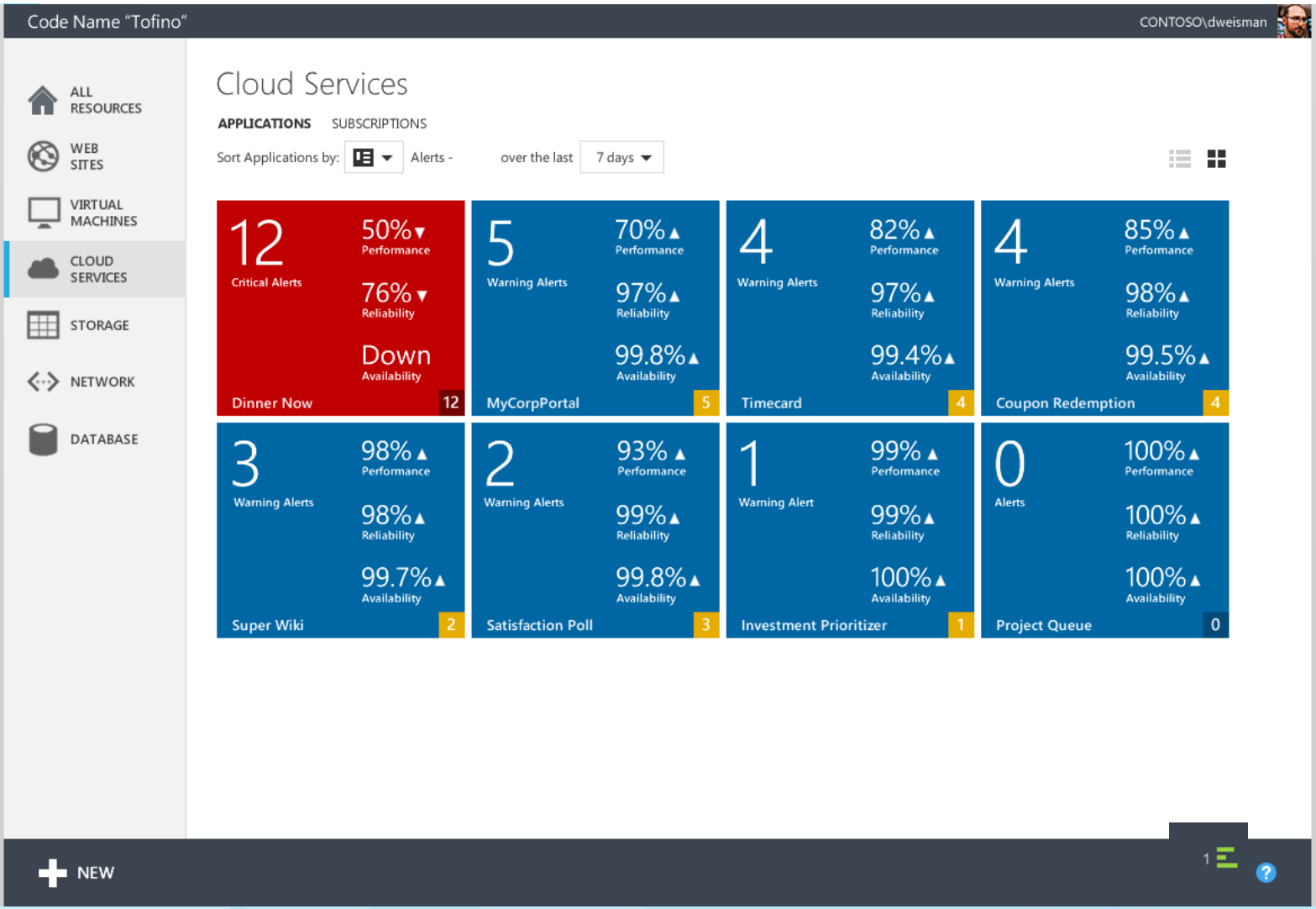
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VIRTUAL MACHINES
CLOUD SERVICES
STORAGE
NETWORK
DATABASE
Cloud Services
APPLICATIONS
SUBSCRIPTIONS
Sort Applications by:
Alerts -
over the last
7 days
12
Critical Alerts
50%▼ Performance
76%▼ Reliability
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97%▲ Reliability
99.8%▲ Availability
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Timecard
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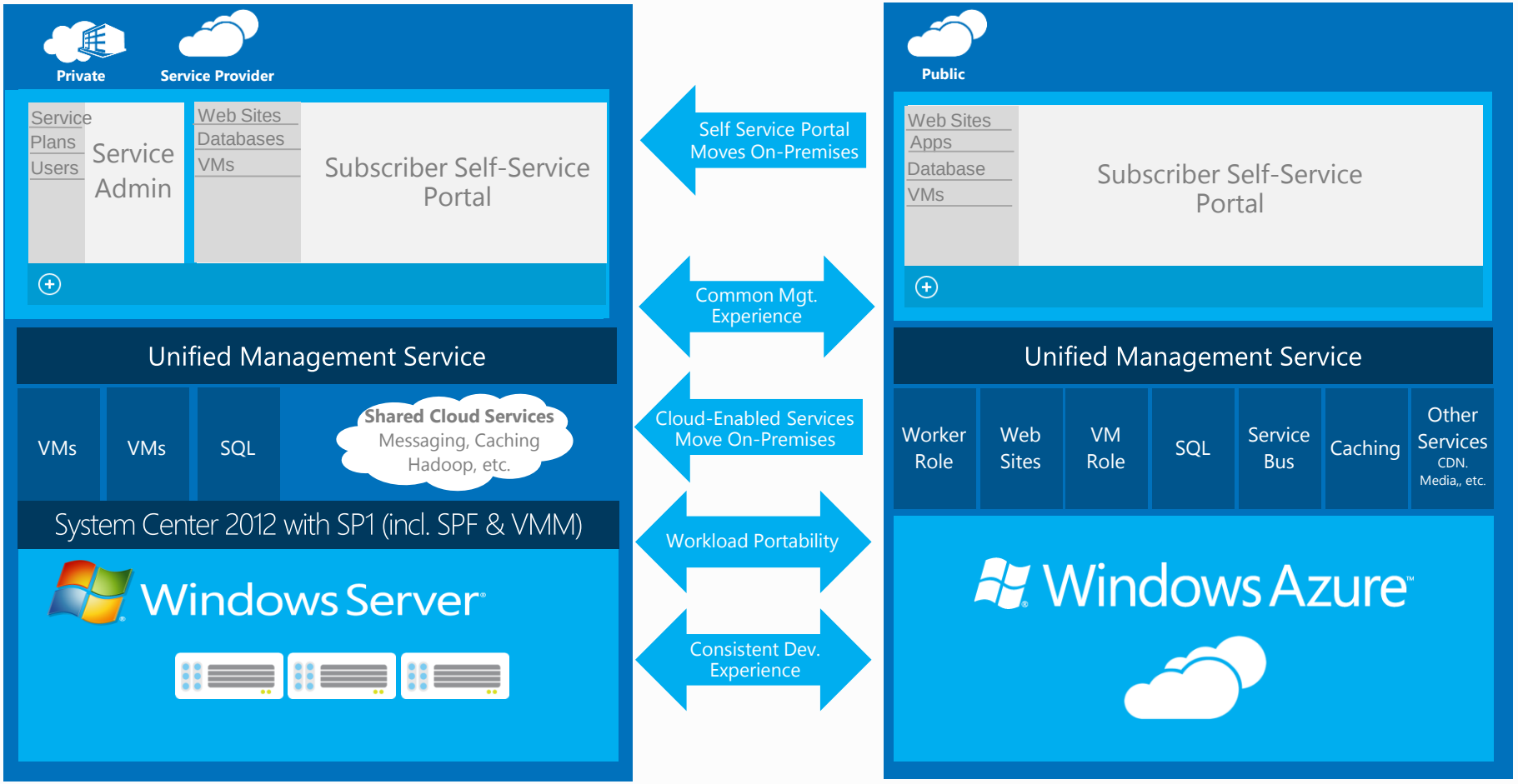
Cloud Application Consistency with Initial Katal Delivery



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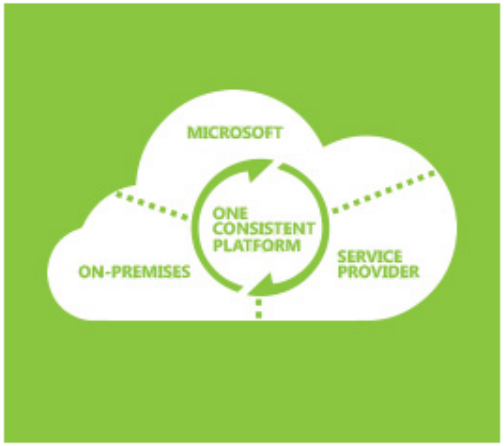

Bringing Windows Azure Services to

Windows Server

for Hosting Service Providers

Free Download

Microsoft is committed to delivering customers a consistent platform regardless of deployment location and calls this vision the Cloud OS. As part of this strategy, Microsoft is now enabling Hosting Service Providers to use Windows Server and System Center to deliver the same great experiences already found in Windows Azure. The first two of these finished services are high density website hosting and virtual machine provisioning and management. Hosting Service Providers enable these modules through the new Service Management API and optional portal, which will continue to add more services from Microsoft and 3rd party providers over time.

Web Sites

Create high scale, multi-tenant website hosting services that are simple to deploy and administer, operating tens of

Virtual Machines

Create extensible 'Infrastructure as a Service' offerings for Windows Server and Linux Virtual Machines. Leverage the

Service Management Portal and API

Administer Web Sites and Virtual Machine services on Windows Server while also offering customers the same

Conclusion

- Platform as a Service in Windows Azure is all about reducing management and operations overhead
- The Windows Azure Fabric Controller is the foundation for Windows Azure's PaaS
  - Provisions machines
  - Deploys services
  - Configures hardware for services
  - Monitors service and hardware health
- It is extremely easy to use Windows Azure and Window Azure alike environment in your own network

Resources

- Windows Azure
  - http://www.windowsazure.com/en-us/
- Bring Windows Azure Services to Windows Server
  - http://www.microsoft.com/hosting/en/us/services.aspx
- Download installation guide
  - http://download.microsoft.com/download/E/6/6/E666B18B-B0DE-483C-A7B1-F2645F90DB43/Service_Management_Portal_Service_Management_API_Web%20Sites_Installation_Guide_Beta.pdf

Q&A