Deploying Web Application

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WINDOWS AZURE

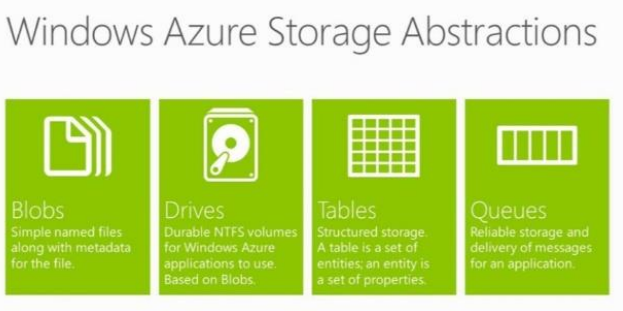
Microsoft's Public Cloud Platform

Microsoft Windows Azure

- Fast-growing public cloud from Microsoft
- Provides rich PaaS platform
  - Mainly for .NET developers
  - Provides also Java, PHP, Python, and Node.js APIs
  - Databases, storage, mobile back-ends, CDN, …
- Provides IaaS cloud (Windows VMs)
- No free version, only 1 month trial (credit card required)

Windows Azure Services

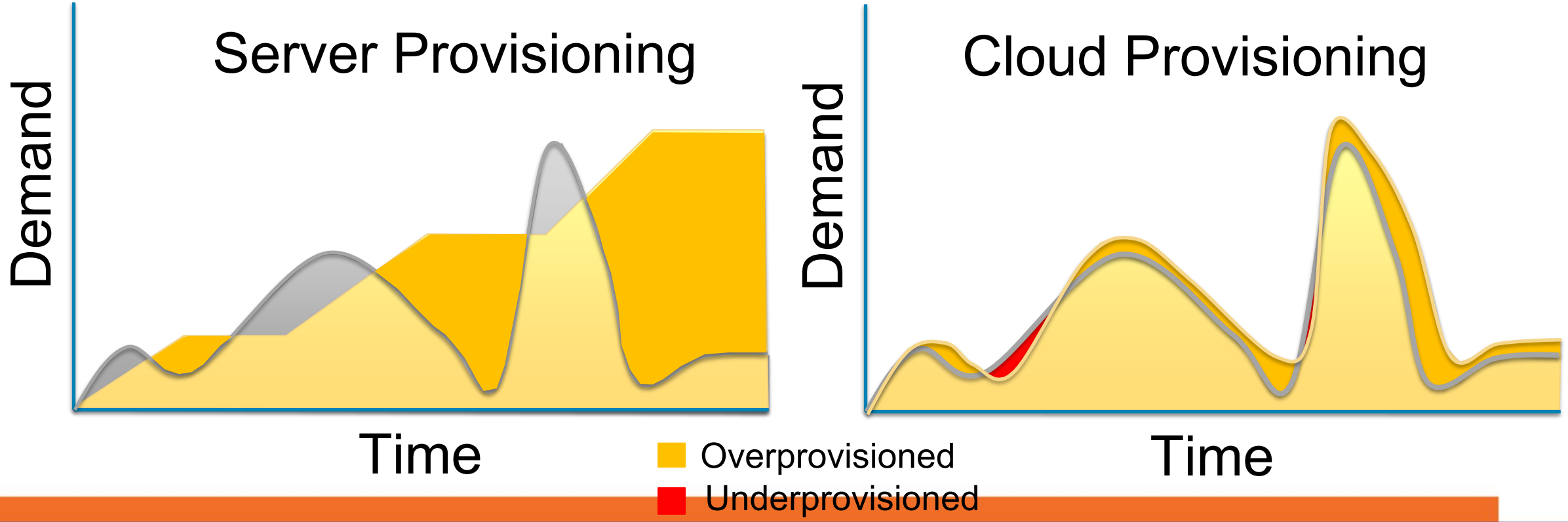
- Azure Compute – VMs in the Azure cloud
- Storage services
  - SQL Database – cloud version of SQL Serve
  - Azure Table Storage (NoSQL database)
  - Azure Queue Storage – message queue services
  - Azure Blobs / Drives – blob / file storage, NTFS volumes
- Azure CDN – content delivery network
- Azure Caching – distributed, in-memory, application cache



Cloud Computing Fundamentals

What is a “Cloud”?

- Cloud: on-demand, scalable, multi-tenant, self-service compute and storage resources



Cloud Terminology

- Infrastructure as a Service (IaaS): basic compute and storage resources
  - On-demand servers
  - Amazon EC2, VMWare vCloud
- Platform as a Service (PaaS): cloud application infrastructure
  - On-demand application-hosting environment
  - E.g. Google AppEngine, Salesforce.com, Windows Azure
- Software as a Service (SaaS): cloud applications
  - On-demand applications
  - E.g. Office 365, GMail, Microsoft Office Web Companions

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Cloud: Efficiency Versus Control

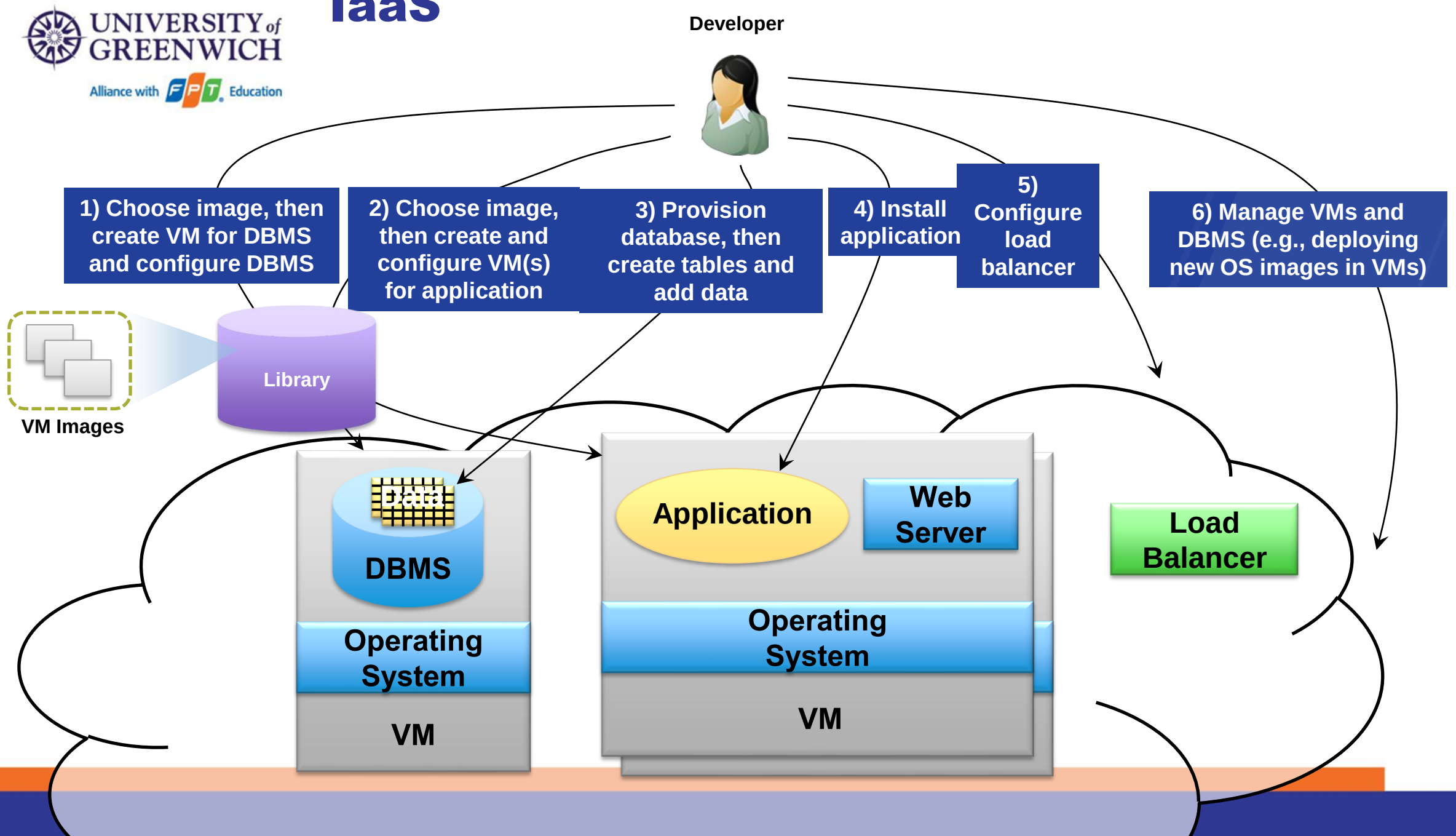
Windows Azure

= 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)
Library
VM Images
Data
DBMS
Operating System
VM
Application
Web Server
Operating System
VM
Load Balancer

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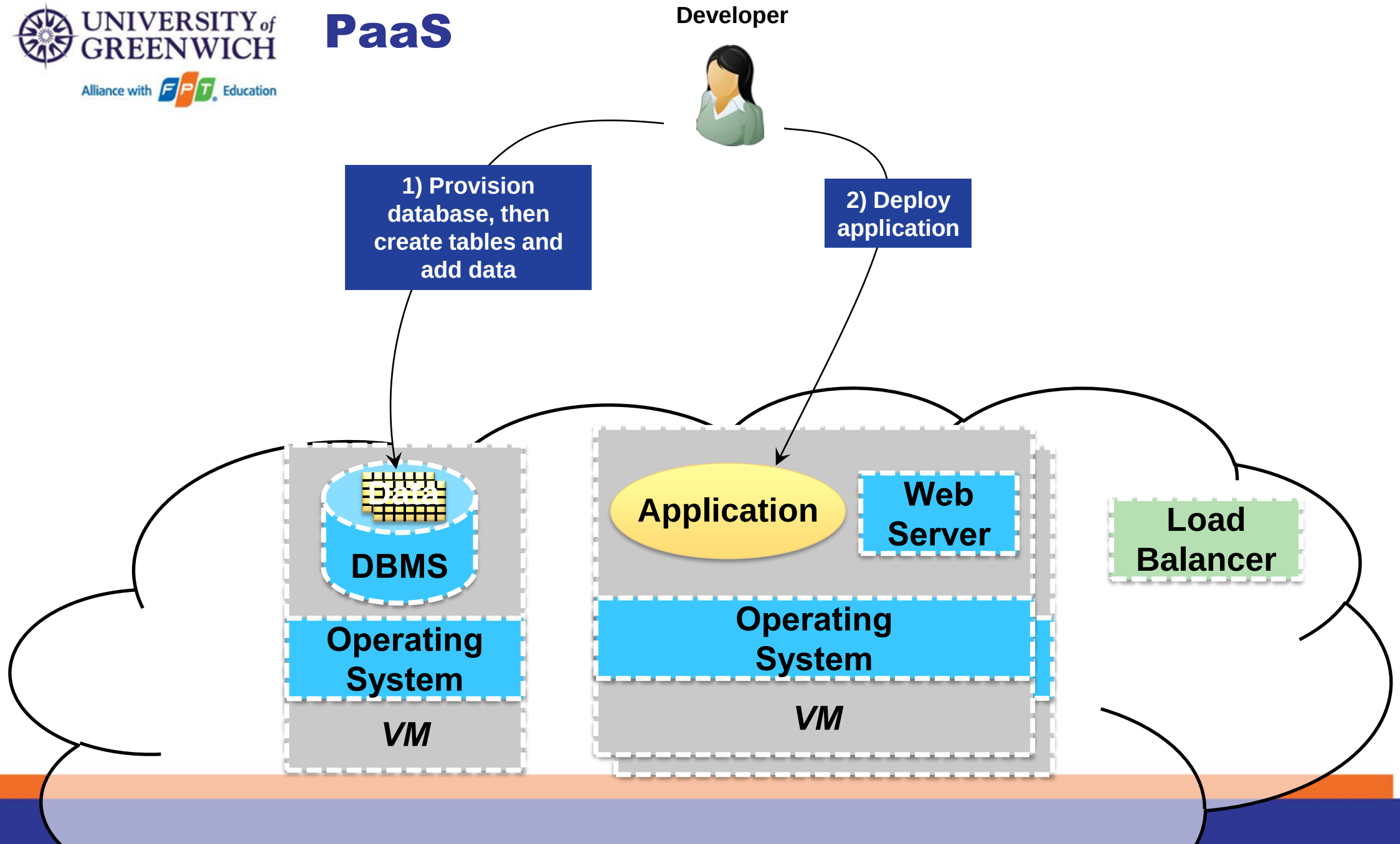
PaaS



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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

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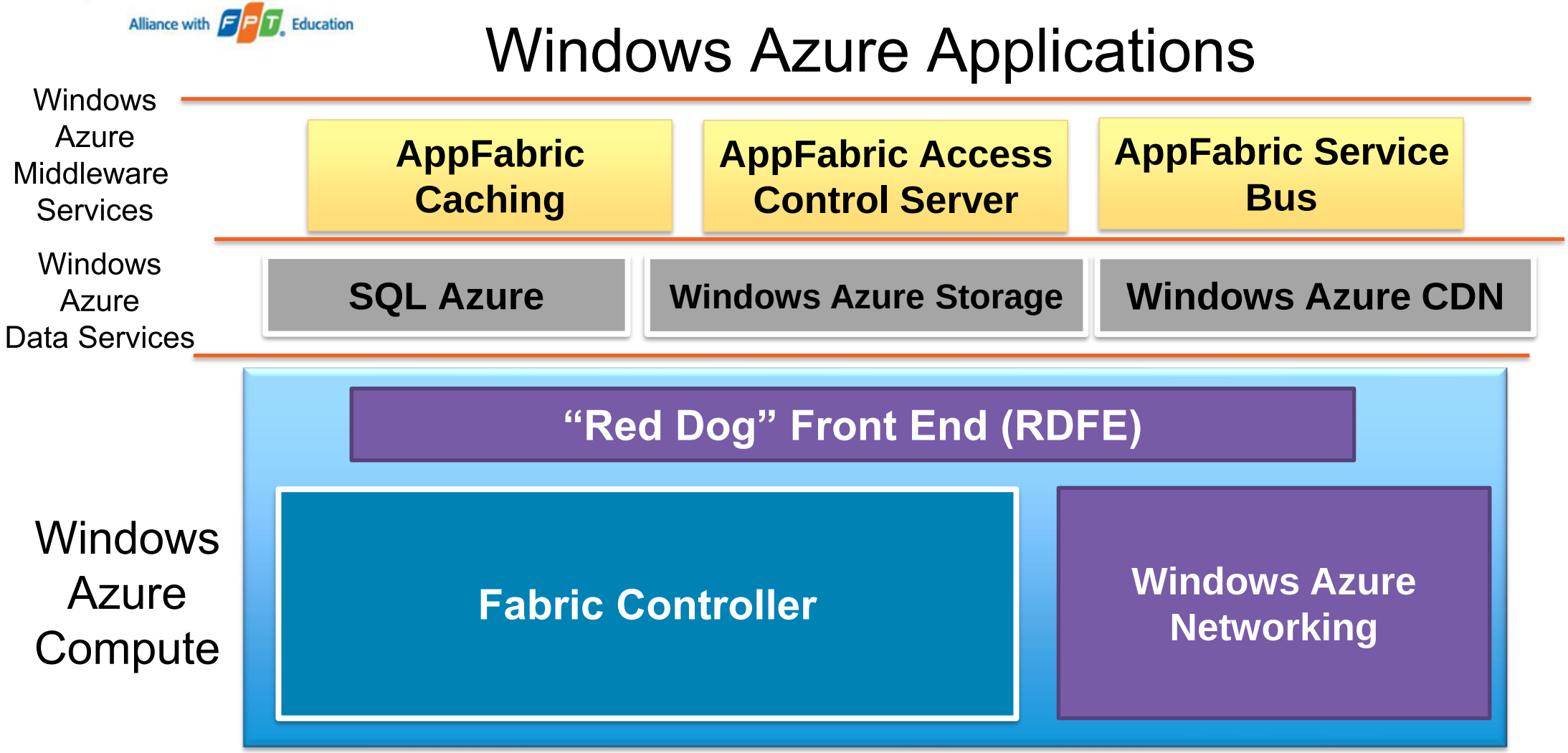
Windows Azure Platform



The Windows Azure Service Model

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Windows Azure Application Philosophy: Design for Failure

- Scale out for capacity
- Scale out for redundancy
- Asynchronous communication
- Short time outs with retries
- Idempotent operations
- Stateless with durable external storage

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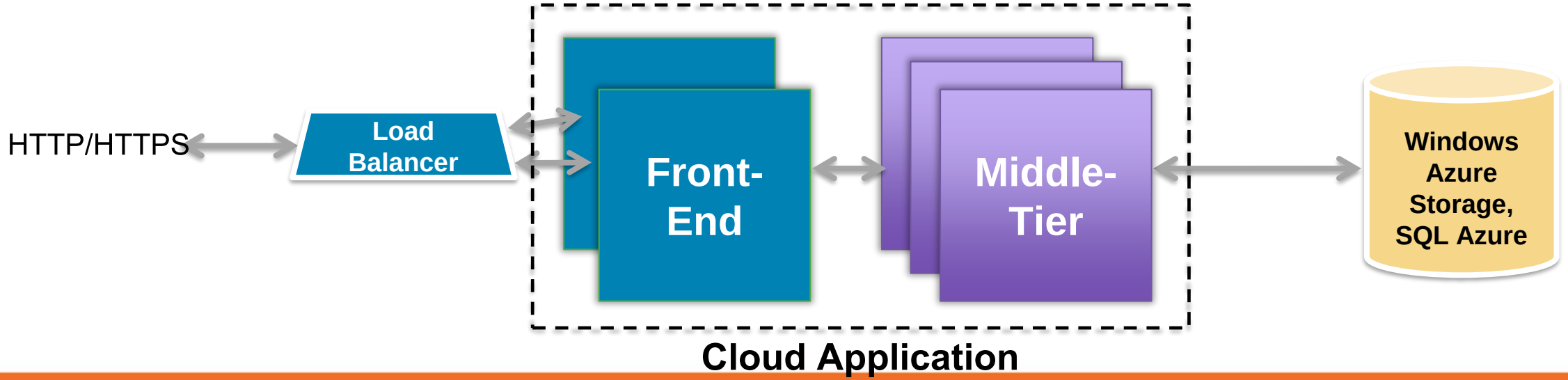
Let's Make a Cloud Application!

- Marketing wants to catch branding violations
  - Take as input an uploaded PowerPoint file and scan it for "branding violations" (use of "Azure" without "Windows" or "SQL" prefix)
- Requirements:
  - High availability
  - IIS/MVC2 web site
  - Scalable violation scanning workers

Multi-Tier Cloud Application

- A cloud application is typically made up of different components
  - Front end: e.g. load-balanced stateless web servers
  - Middle worker tier: e.g. order processing, encoding
  - Backend storage: e.g. SQL tables or files
  - Multiple instances of each for scalability and availability



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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

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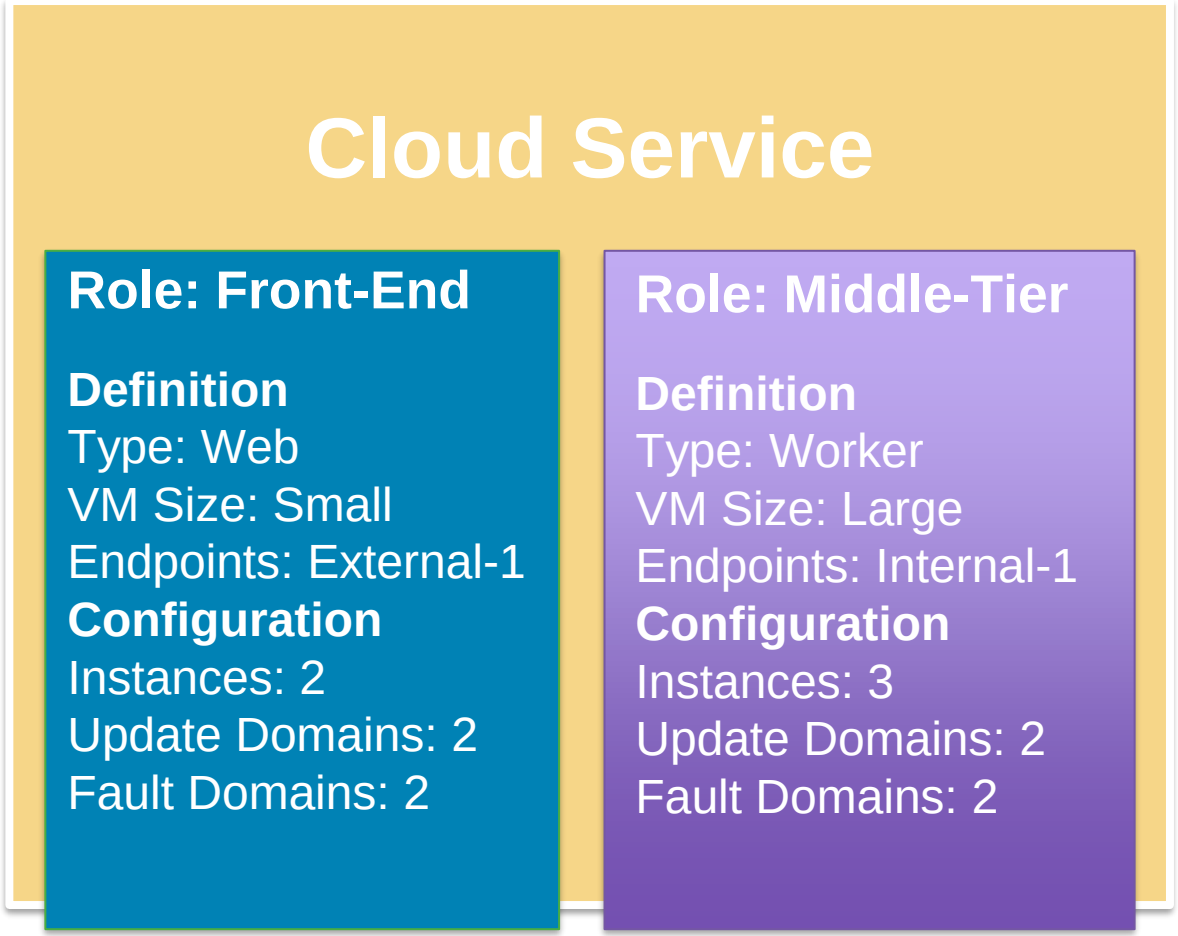
Role Contents

- Definition:
  - Role name
  - Role type
  - VM size (e.g. small, medium, etc.)
  - Network endpoints
- Code:
  - Web/Worker Role: Hosted DLL and other executables
  - VM Role: VHD
- Configuration:
  - Number of instances
  - Number of update and fault domains



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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

AZURE WEB APPS

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What is Azure Web Apps?

- Azure Web Sites is a platform as a service (PaaS)
- Cloud computing based platform for hosting websites
- Allows publishing web apps written in different platforms
  - .NET, node.js, Java, PHP, Python

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What does Azure Web Apps give us?

- Create new sites in seconds
- Easily manage and scale your sites
- Automatic load balancing and shared storage across instances
- Use ASP.NET, ASP, PHP, or Node.js
- Supports any Web development tool on any platform
  - Windows, OSX, Linux
- SQL Azure or MySQL databases

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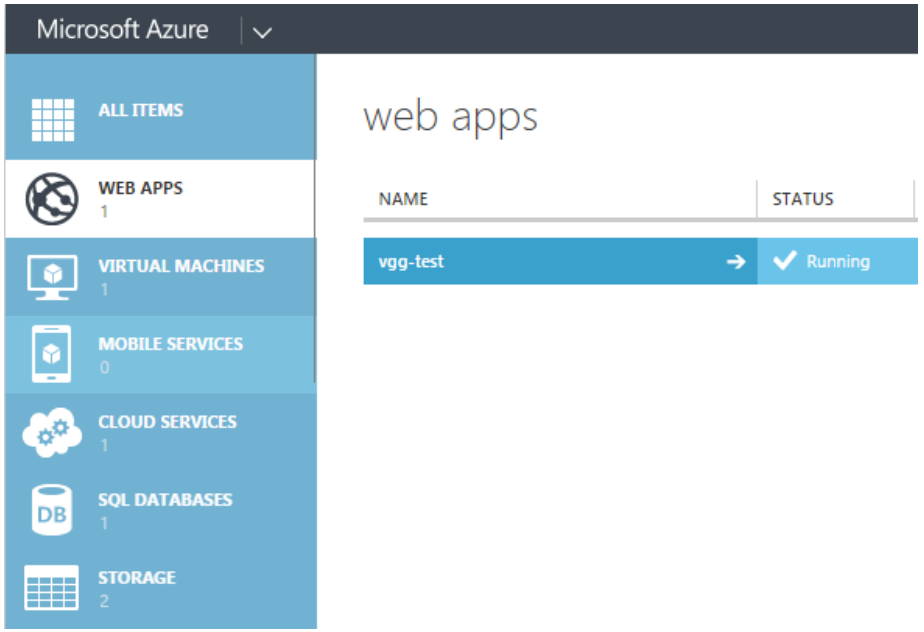
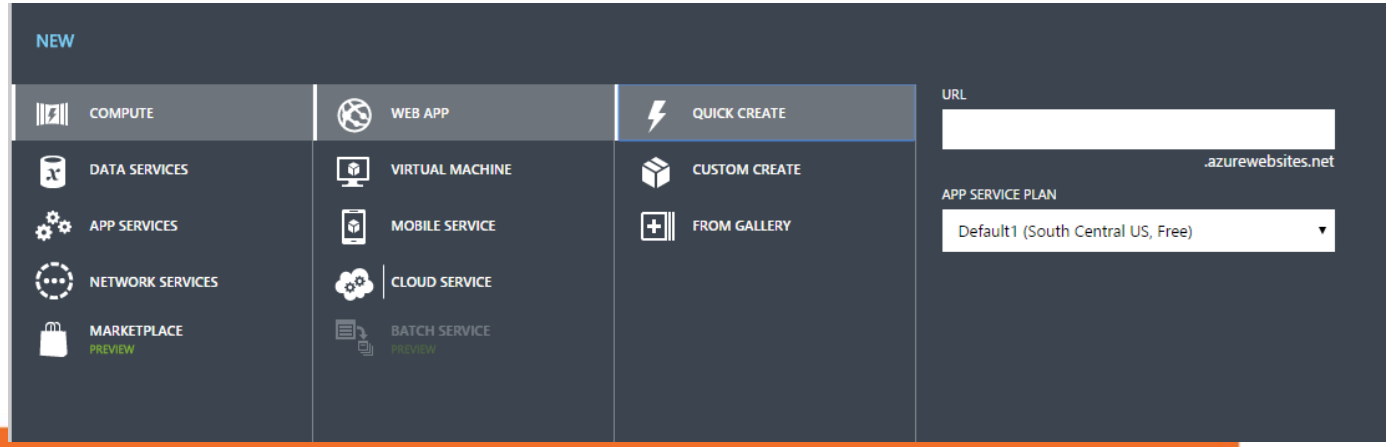
How to deploy application?

1. Register in Microsoft Azure
2. Go to Azure Portal
3. Go to Web Apps
4. Create new web app
5. Create new database
6. Set connection string
7. Allow Azure IP
8. Deploy to web app





Azure Web Apps Configuration

- You can use .NET, Java, PHP, Python
- SSL certificates can be uploaded
  - SSL bindings to custom domains
- Only custom domains can be used
- Connection strings can be configured
- You can configure Azure Authentication / Authorization
- You can scale your web application (cores, memory, instances)
- You can add web jobs

Azure Monitoring

- You can monitor you application:
  - CPU Time
  - Data In
  - Data Out
  - HTTP Server Errors
  - Requests
  - …