Leveraging Windows Azure PaaS for Large-scale Seasonal Applications

Asrita Chetan Avasarala

Mahindra Satyam

asrita_chetan@mahindrasatyam.com

Agenda

- Cloud Computing

- Windows Azure

- Scalable Applications on Azure

- Benefits of Azure

- Case Study

What is Cloud?

Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software and information are provided to computers and other devices as a utility (like the electricity grid) over a network (typically the Internet).

Cloud Characteristics

- Flexible, on-demand infrastructure
- Reduce capital and operations costs
- Cost effectively handling usage spikes
- Scalability and reliability
- Deployment and management
- Pay per use model

Public Cloud

Hybrid Cloud

Private Cloud

Types of Cloud Services

IaaS	PaaS	SaaS

System Infrastructure: Virtualized system software, also called Infrastructure-as-a-Service
Application Infrastructure: Vendor capabilities are bundled into an integrated platform to support application development, deployment, management and runtime, also called Platform-as-a-Service
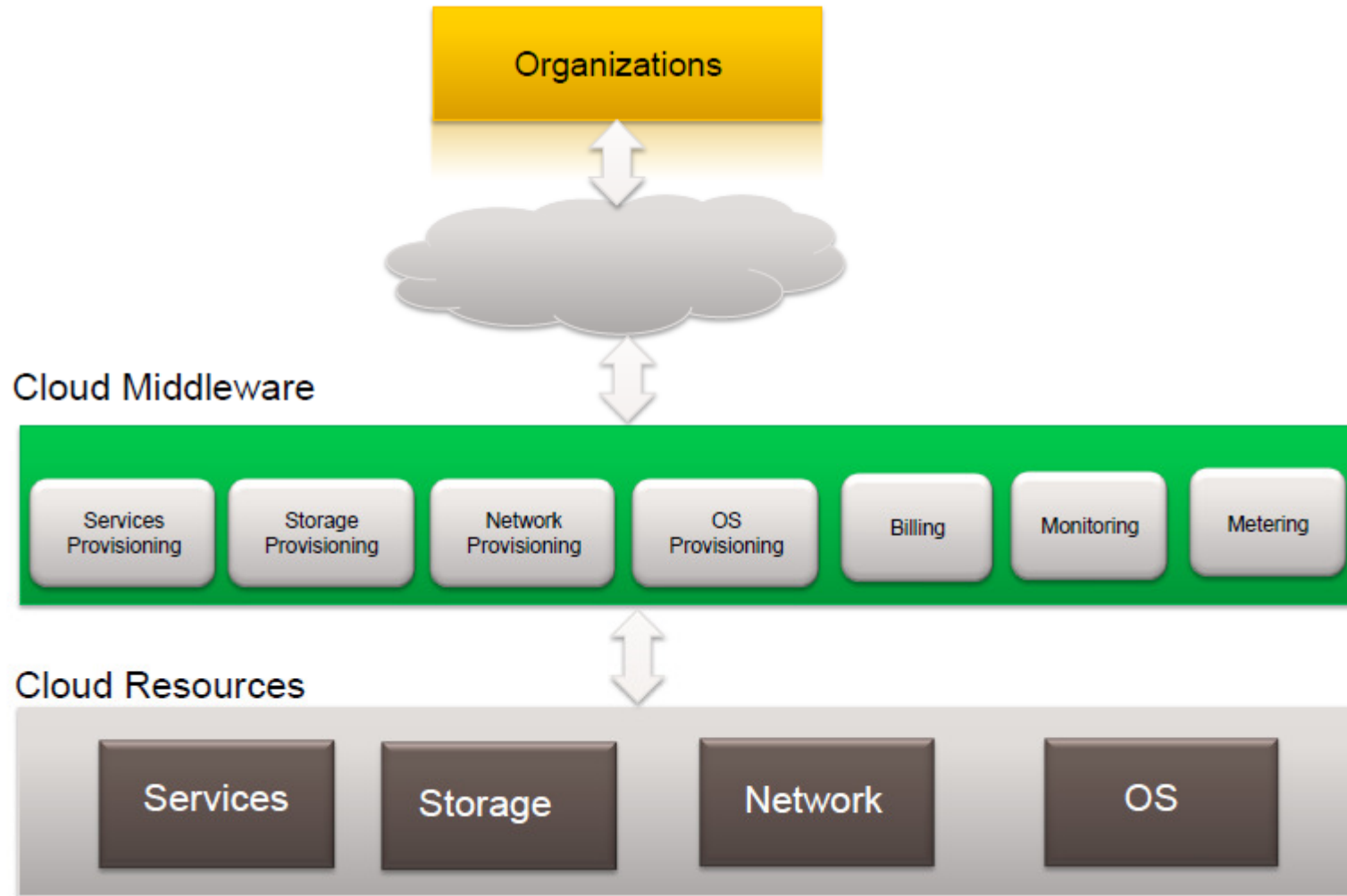**Applications**: Software-as-a-Service

Information: Services that are delivered as feeds to other Web models
Business Process: Any business process delivered as scalable or elastic service
Management and Security: Services to manage the access, consumption, delivery and service levels

Cloud Architecture

```
                              Organizations
                                   ↕

                              (cloud)
                                   ↕

Cloud Middleware

  Services      Storage      Network       OS
  Provisioning  Provisioning Provisioning  Provisioning   Billing   Monitoring   Metering

                                   ↕

Cloud Resources

     Services        Storage        Network          OS
```

Introducing Azure Services Platform

Azure Services Platform

An internet-scale cloud services platform hosted in Microsoft data centers, which provides an operating system and a set of developer services that can be used individually or together.
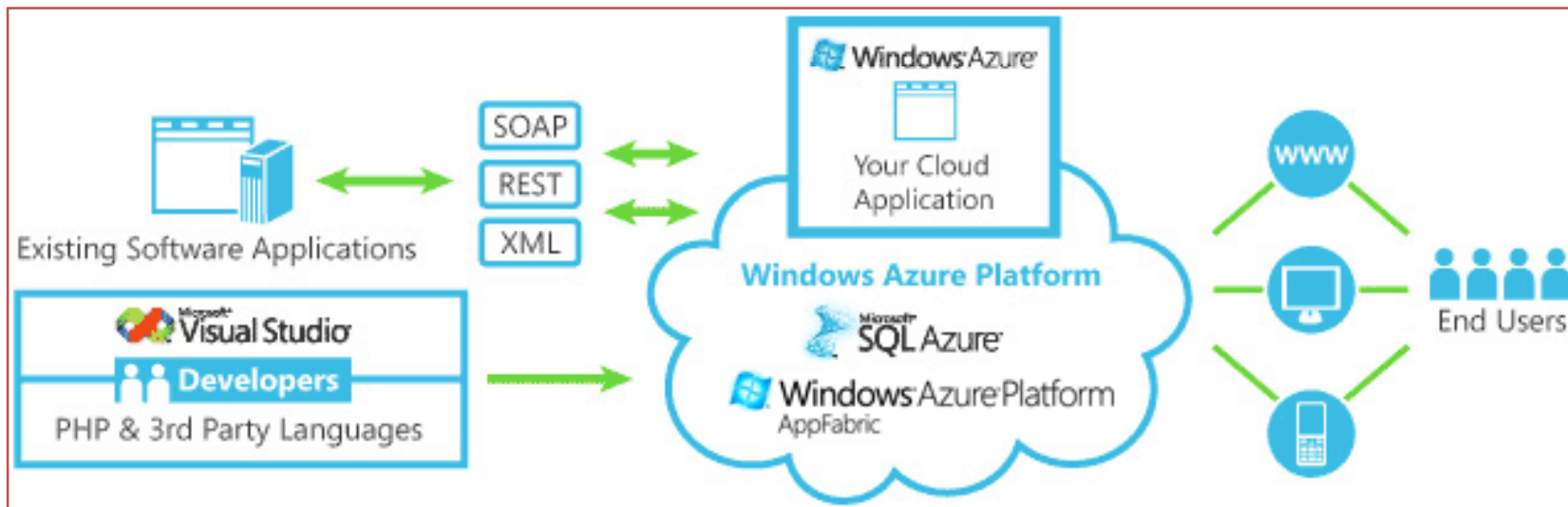
Source: Microsoft Corporation

Windows Azure Services

Compute
- Web Role: Internet-facing web application or service
- Worker Role: Cloud-based workload processing service

Non-Relational Storage
- Three types of storage – Blobs, Tables and Queues
- Allow access through REST-based API

Relational Storage
- SQL Azure: On-cloud relational database

Other Services
- Service Bus – Connectivity with on-premise services
- Access Control Service – Helps federate authentication
- Azure Connect – Virtual network with on-premise servers
- VM Role – Custom VM hosting service
- Cache – In-memory cache on Cloud

Web Role

- Web role is the face of a Azure cloud application
- Web role instance accepts incoming HTTP/HTTPS requests through IIS7
- Web role can be implemented using ASP.NET, Windows Communication Foundation (WCF), or another .NET Framework technology that works with IIS
- At runtime, all web role instances work spread across connected infrastructures hosted from the Microsoft data center
- Azure provides built-in load balancing to spread requests across web role instances that are part of the same application
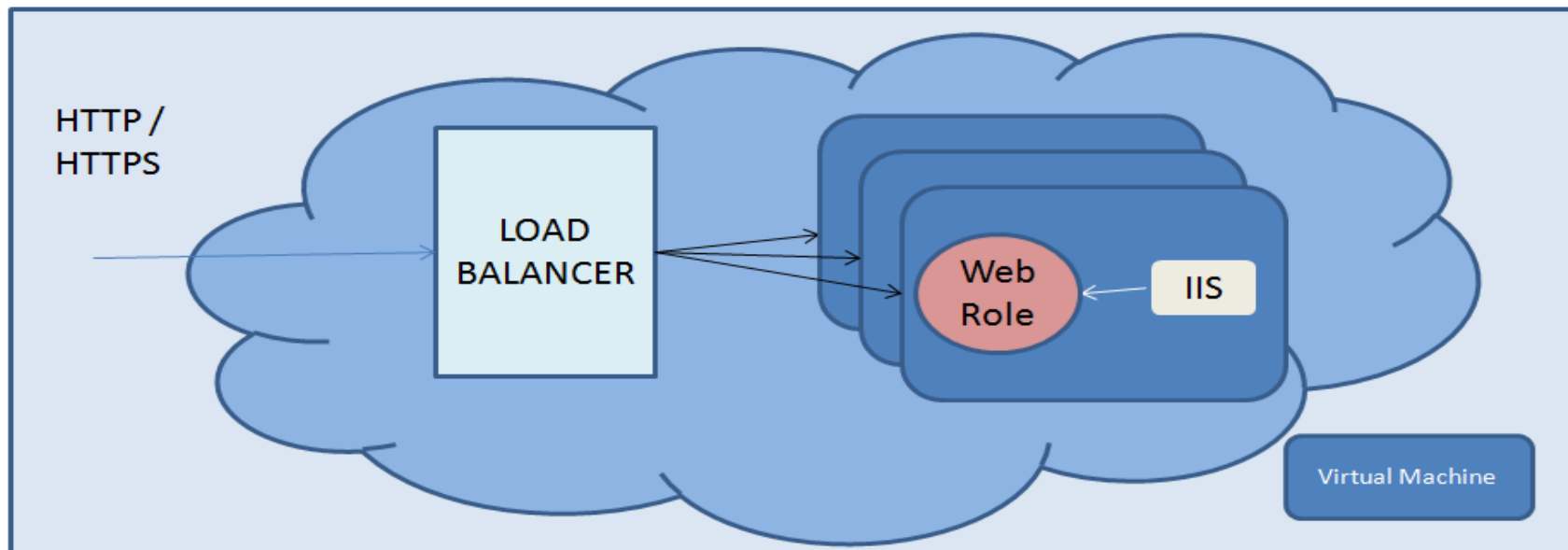
Worker Role

- Worker role is the background processor of a Azure cloud application
- Worker role instance cannot accept requests directly from the outside world
- Worker role gets input from a web role instance, typically via a Azure Storage Queue
- Output results of a worker role can be written to Azure storage(Blob, Table, Queue)
- They can also be sent to the outside world directly; outgoing network connections are not prohibited for a worker role.

HTTP / HTTPS

LOAD BALANCER

Worker Role

Virtual Machine
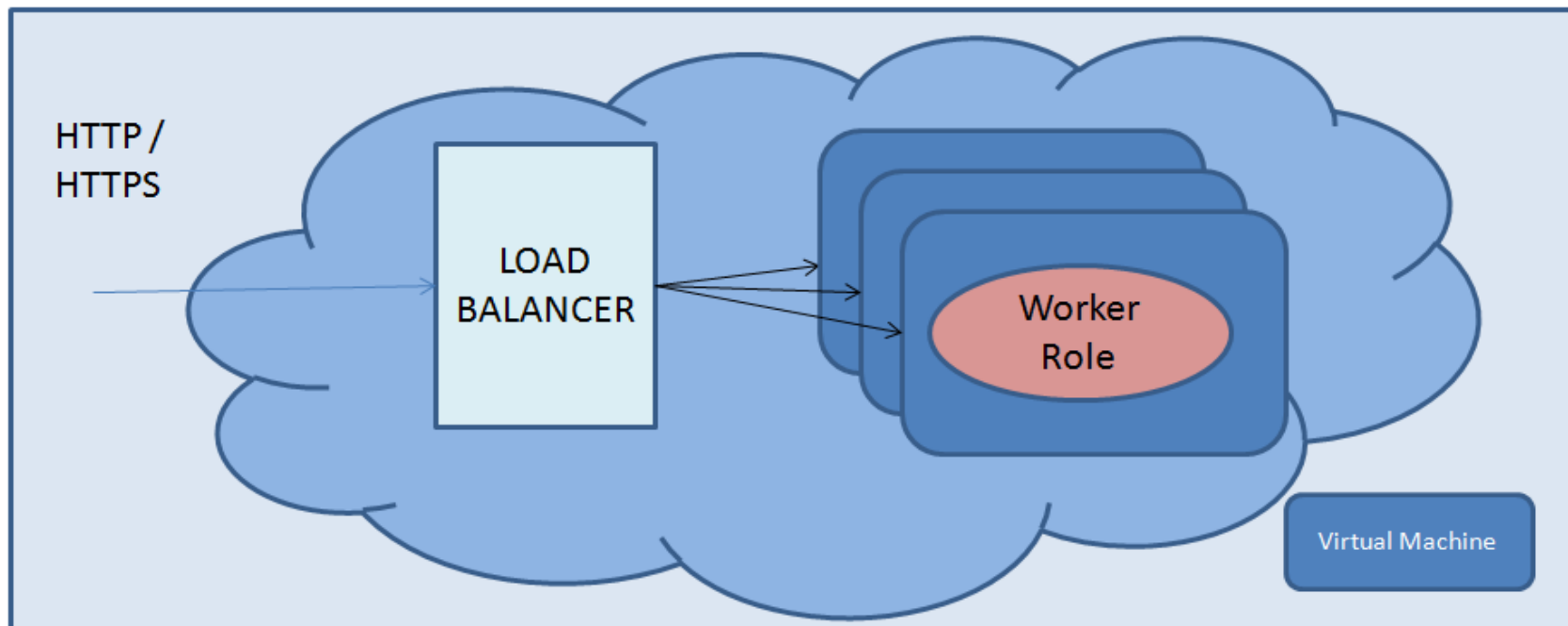
Azure Storage Services

Tables

- Provide large and scalable data storage but is NOT relational
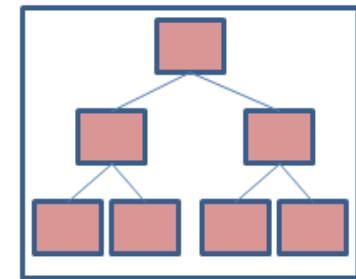- Types supported include Binary, Bool, DateTime, Double, GUID, Int, Int64, and String

Blobs

- Allows storage of binary large objects
- Blobs are stored in containers within an account
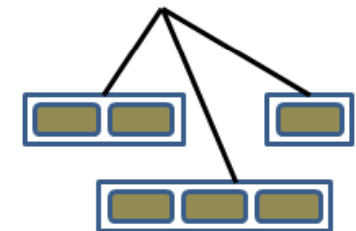- Two types of containers – Public or Private

Queues

- Allows communication between different parts of Azure application
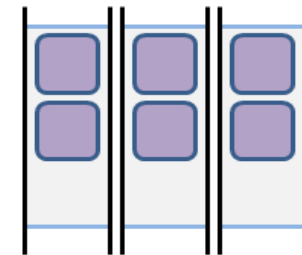- Does NOT support conventional FIFO semantics

Table
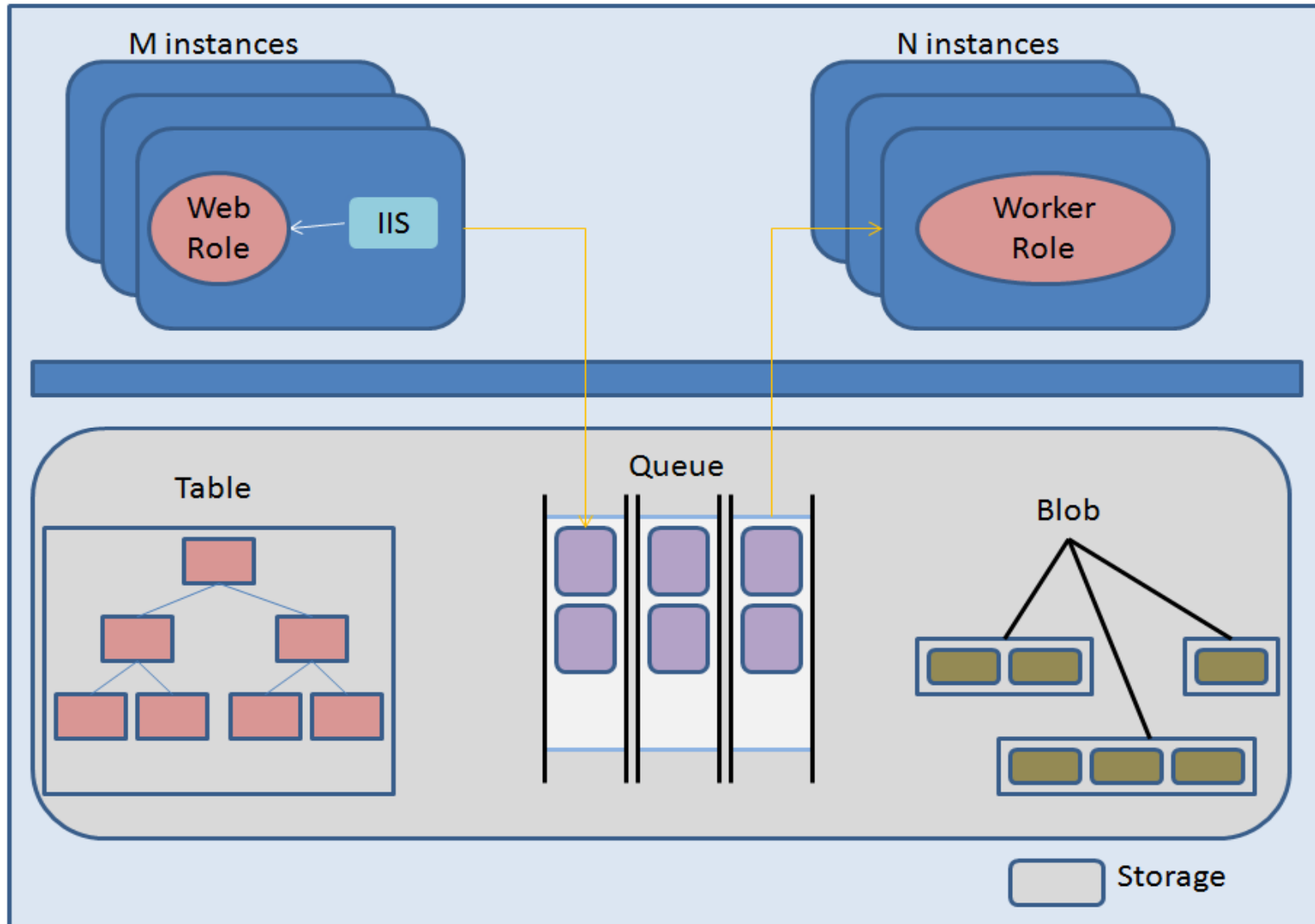
Blob

Queue

Scalable Web Application Architecture

Azure and SQL Azure Development Best Practices

- Switching to service components
  - Design autonomous, loose coupled components
- Architecting for a stateless environment
  - Design for instance failures
- Keeping computational costs in control
  - Use runtime automatic provisioning of services
- Keeping transaction costs in control
  - Design for reduced transactions to storage resources

- Create SQL Azure Server in the Same location/datacenter where application resides.
- Design application such a way that To and Fro traffic between application and database is less
- Block inbound connections on TCP port 1433: Only outbound connections on TCP port 1433 are needed for applications to communicate with SQL Azure database

Applications Suitable for Azure

- Applications which are well connected to the Internet are good candidates for Azure
- SaaS applications are ideal candidates to be built on Azure
- Seasonal applications are well suited
- Geographically distributed enterprises can take advantage of round-the-clock services
- Large volume, highly transactional or computation-intensive applications can benefit
- Small and medium enterprises where return on infrastructure and resource investments is low
- Applications with lower security restrictions or without major statutory constraints

Benefits of Azure

- Helps move from one-time infrastructure cost model to pay-as-you-go model
- Allows for fluctuating storage and/or compute requirements over longer periods of time
- Scalability and availability are no longer organization's responsibility
- Helps organizations focus on core business by outsourcing infrastructure and platform services
- Not restricted by organizational domains
- Helps in optimizing infrastructure costs by reducing costs related to
  - Infrastructure setup
  - Monitoring and Maintenance
  - Backup and recovery
  - Power and space management
  - Upgrade
  - Human resources
- Besides Microsoft web technologies, supports Java and other popular technologies

eElection POC
A Case Study

What is eElection?

- eElection is an electronic voting system for electing leaders of Indian governing bodies such as Lok Sabha, Rajya Sabha, State Assemblies, Municipal Corporations , etc.
- eElection aims to leverage on the immense power of cloud computing available today
- eElection is SaaS application which is based on Windows Azure platform
- eElection is a touch-screen based application
- It is highly scalability and can be deployed for seasonal use
- In remote areas where there is no internet access, the voters' choice is captured in an on-premise database and is synchronized with the SQL Azure at day end using the Sync Framework
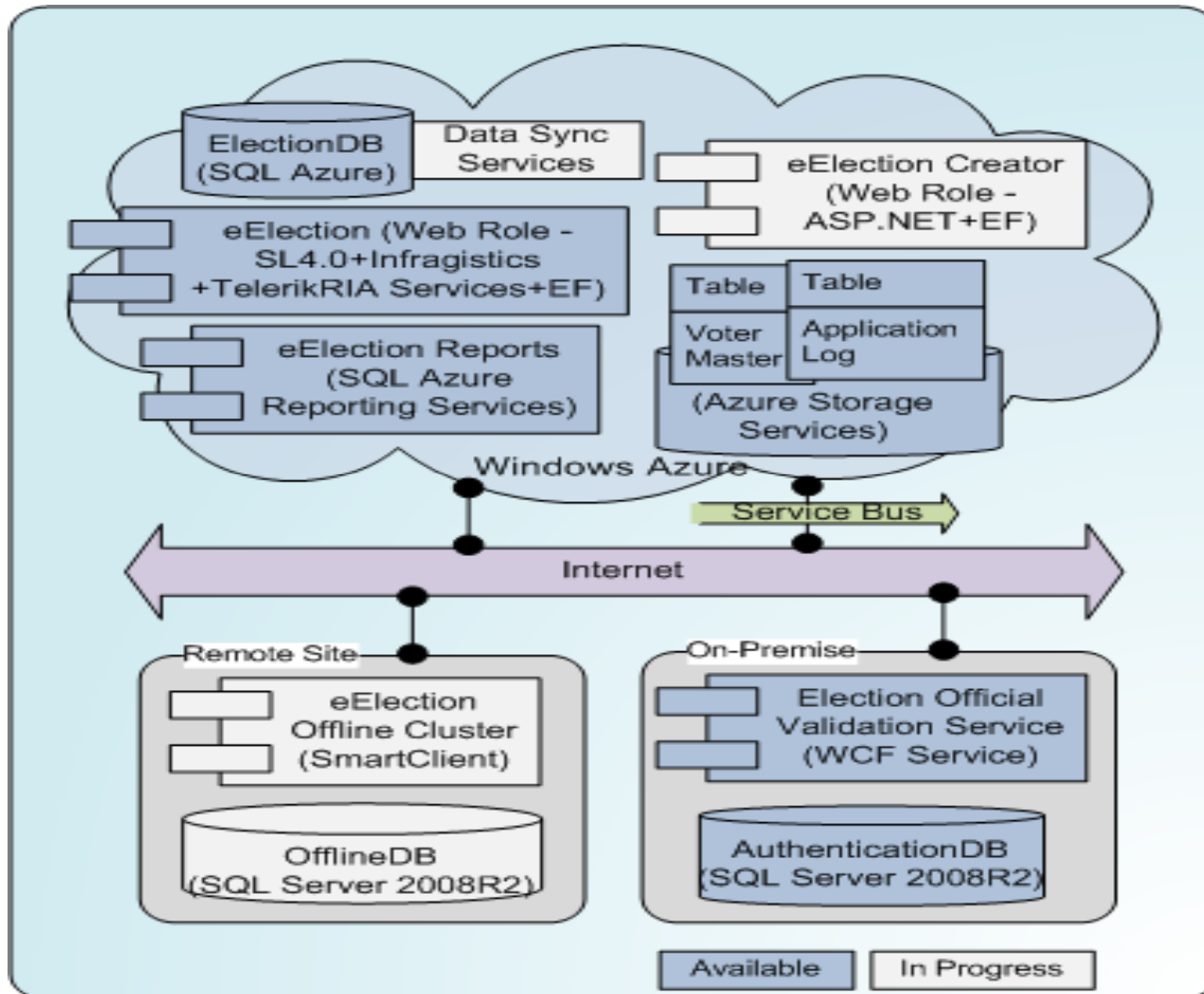
eElection Major Subsystems
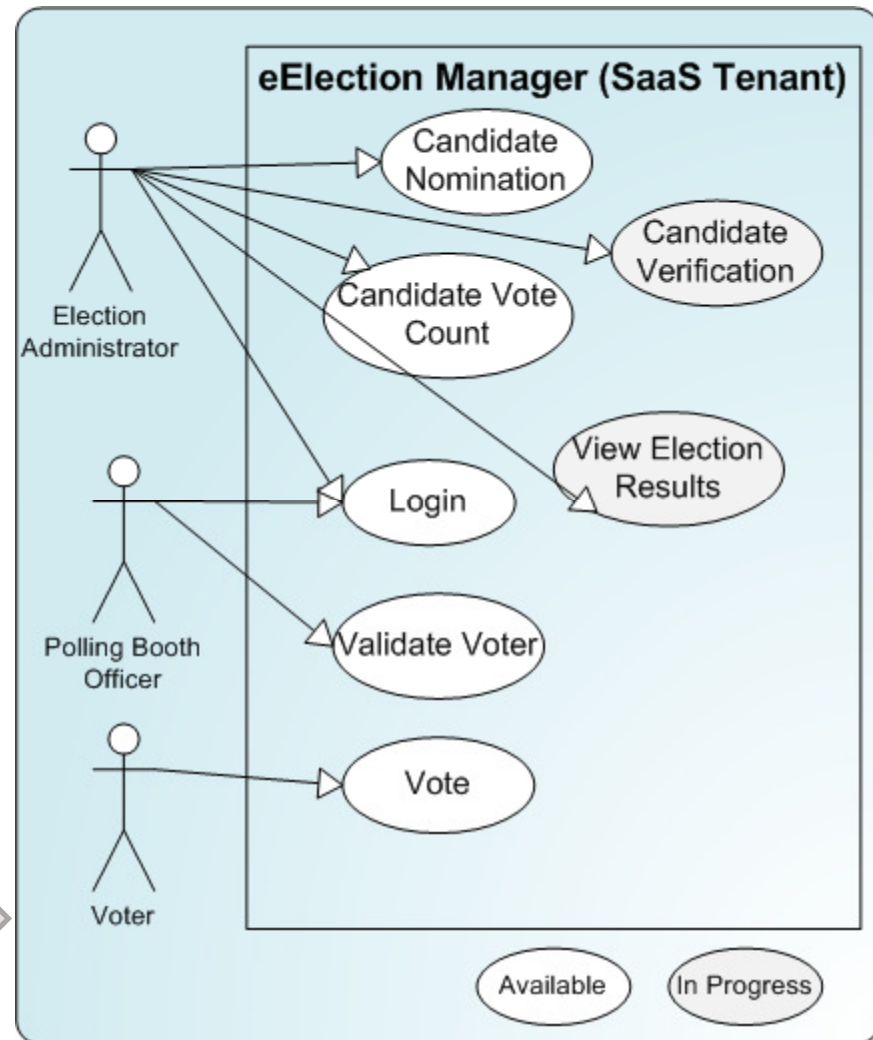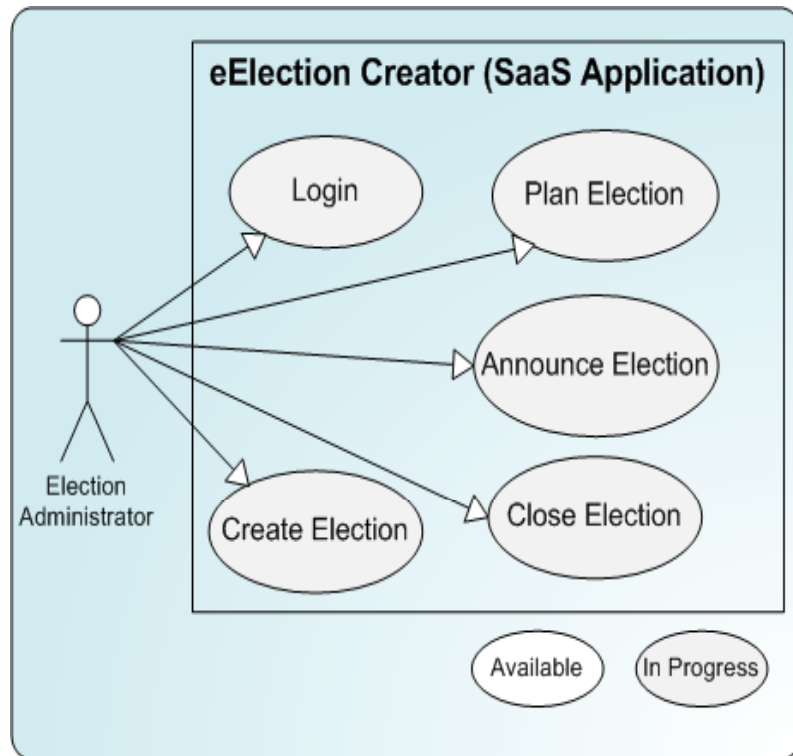
- Spin off a new election process
- Create a new application and publish URL

eElection Architecture

Q & A

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Thank You

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