Cloud Computing using Microsoft Azure

Nagaraju B
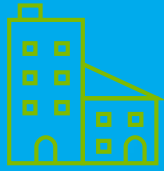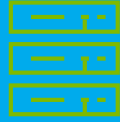
http://nbende.wordpress.com

http://fb.com/nbende

Serverless Computing

Serverless computing promises agility & power in building next generation of solutions

The evolution of application platforms

On-Premises   IaaS   PaaS   Serverless
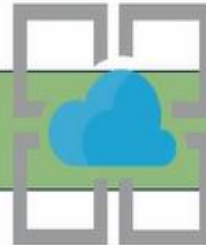
Data center | Virtual machines | IaaS | PaaS | Serverless
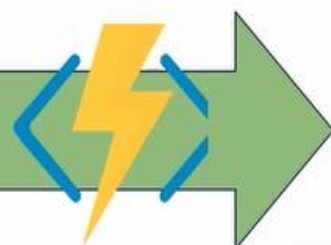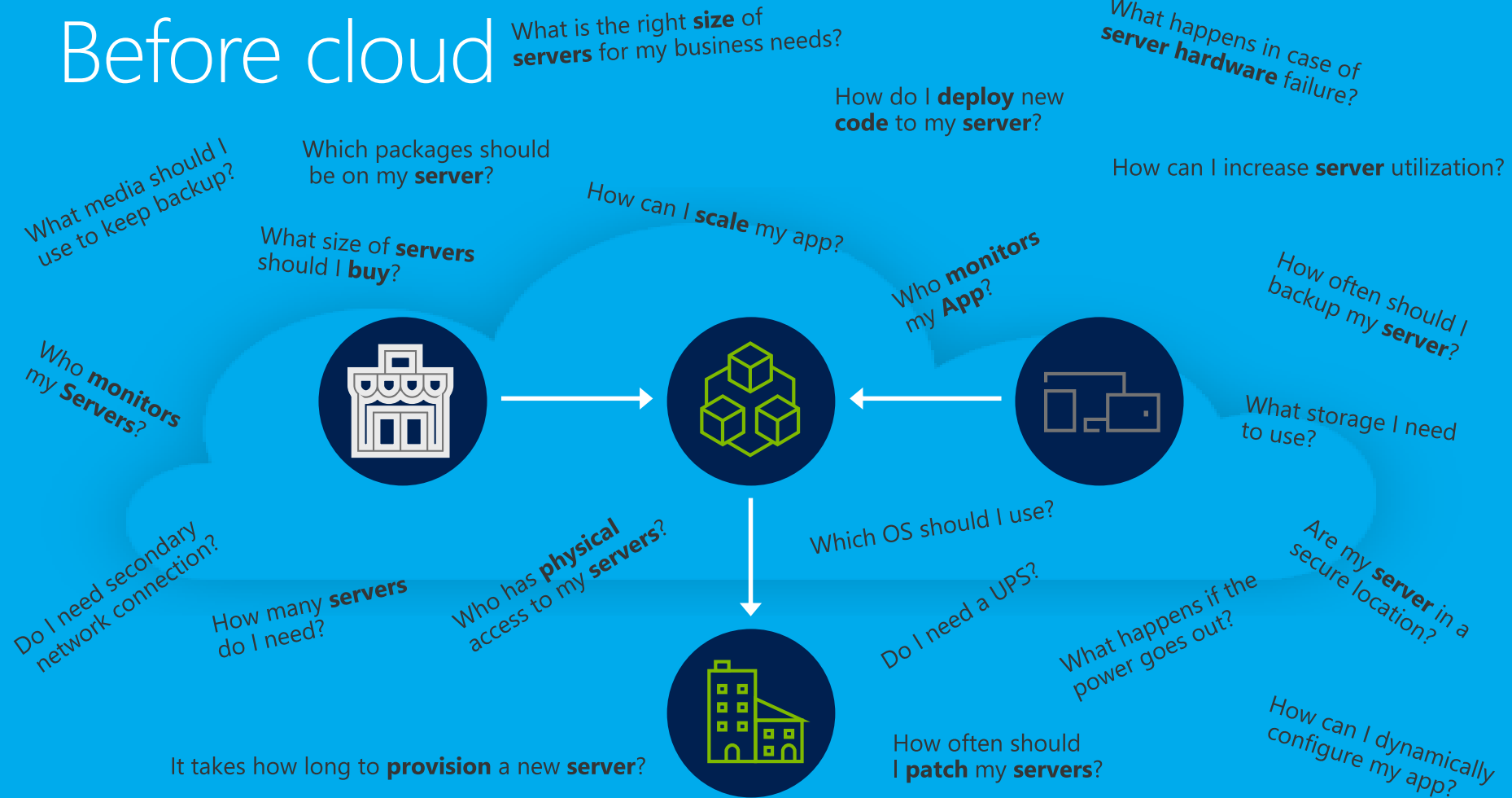
More host flexibility
Less deployment flexibility
Capital expense

Less host flexibility
More deployment flexibility
Operational expense

Then came IaaS—table stakes for digital business

What is the right **size** of **servers** for my business needs?

How can I increase **server** utilization?

How many **servers** do I need?

How can I **scale** my app?
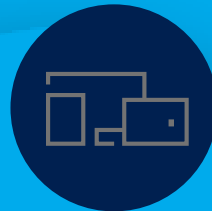
How often should I **patch** my **servers**?

How often should I backup my **server**?

Which packages should be on my **server**?

How do I **deploy** new **code** to my **server**?

Which OS should I use?

Who **monitors** my App?

Then PaaS, critical for digital transformation

What is the right **size** of **"servers"** for my business needs?

How can I increase **"server"** utilization?

How many **"servers"** do I need?

How can I **scale** my app?

What is Serverless?

Abstraction
of servers

Event-driven/
instant scale

Sub-second
billing

Benefits of Serverless?
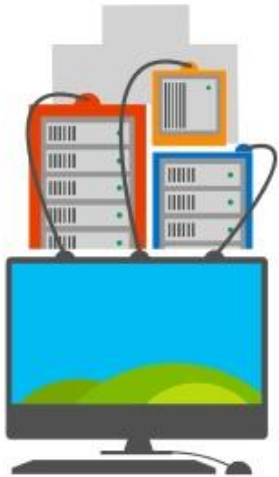
Reduced
DevOps

Focus on
Business
Logic
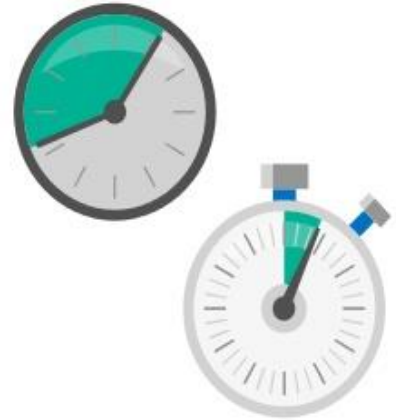
Reduced Time
To Market

Azure offerings for serverless computing

- Azure Functions
- Azure Logic Apps

combination of these services is the best way to rapidly build a scalable, full-featured integration solution

Functions

Serverless Compute

Logic Apps

Serverless Workflow

Event Grid

Serverless Events

Introducing Azure Functions

Code

Azure Functions

Events + data

+

Serverless Computing (FaaS)

- Function as a Service (Azure Functions)
- Platform to develop, run, and manage application
- Without the complexity of building and maintaining the infrastructure
- Azure Functions can also be a delivery mechanism for microservices

Similar Technologies

- AWS Lambda
- Google Cloud Functions
- Open Whisk (IBM)

Triggers and Bindings

Type	Service	Trigger	Input	Output
Schedule	Azure Functions	✓		
HTTP	Azure Functions	✓		✓
Blob Storage	Azure Storage	✓	✓	✓
Events	Azure Event Hubs	✓		✓
Queues	Azure Storage	✓		✓
Queues and topics	Azure Service Bus	✓		✓
Storage tables	Azure Storage		✓	✓
No-SQL DB	Azure CosmosDB		✓	✓
Push notifications	Azure Notification Hubs			✓
Twilio SMS Text	Twilio			✓
SendGrid email	SendGrid			✓

Automatically referenced packages

- These assemblies are automatically referenced:
  - `mscorlib`
  - `System`
  - `System.Core`
  - `System.Xml`
  - `System.Net.Http`
  - `Microsoft.Azure.WebJobs`
  - `Microsoft.Azure.WebJobs.Host`
  - `Microsoft.Azure.WebJobs.Extensions`
  - `System.Web.Http`
  - `System.Net.Http.Formatting`

Functions Programming Model

- Function as a single unit of work
- Functions are executed per trigger
- Functions have inputs and outputs
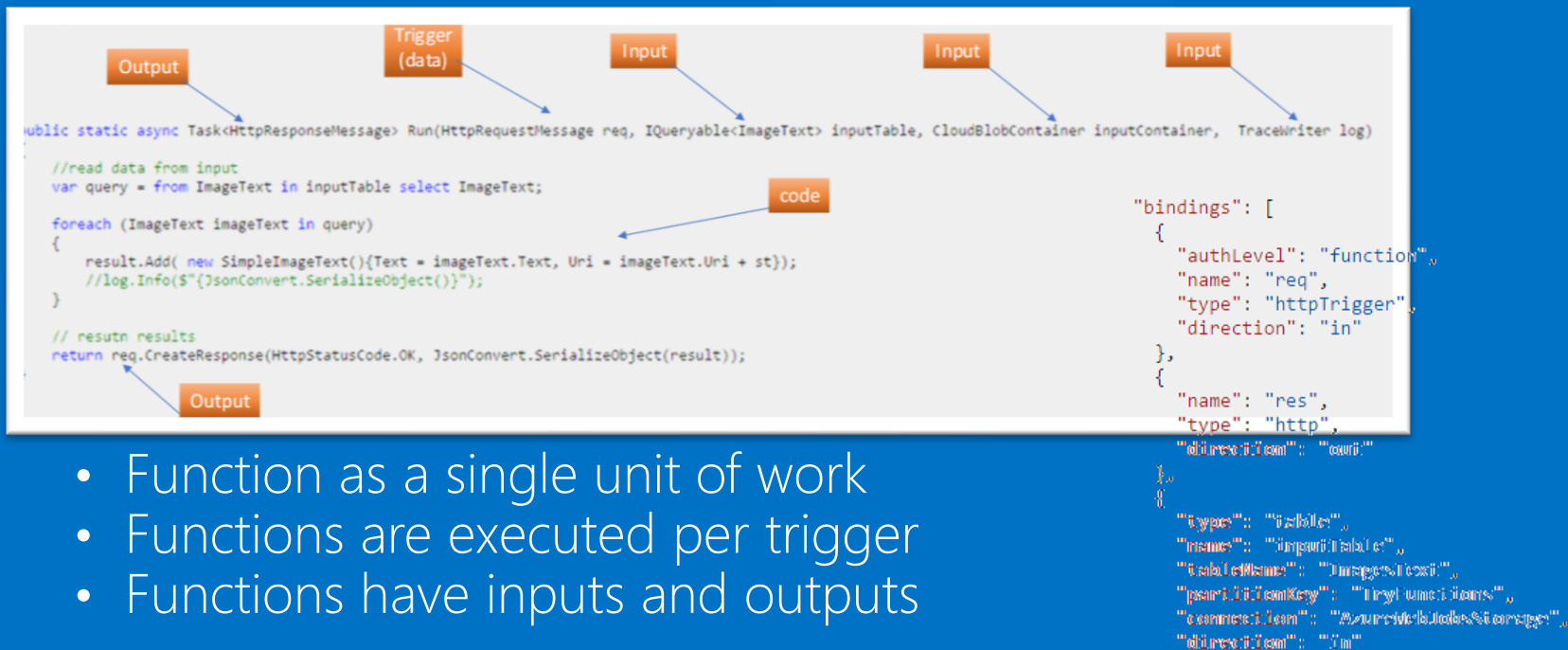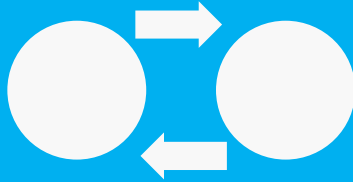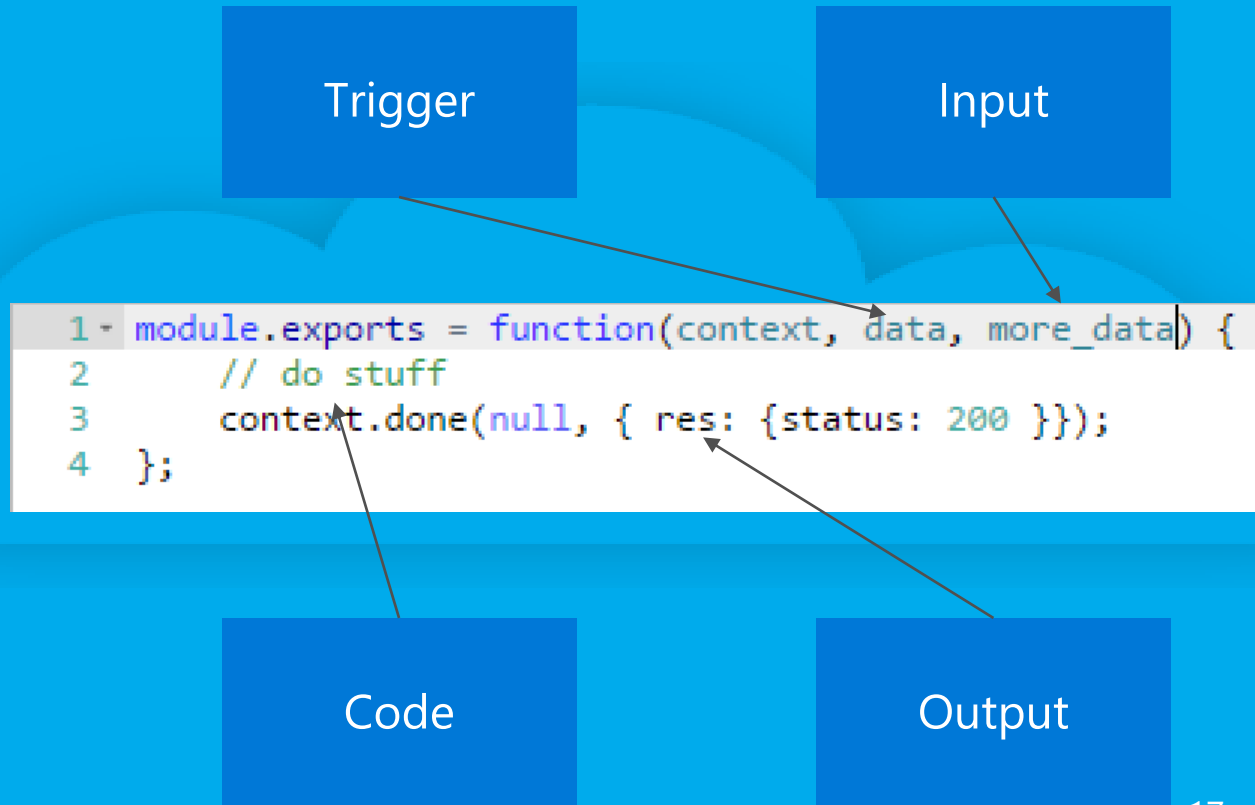
Best practices for the "Functions" model

- Functions *should* "do one thing"
- Functions *should* be idempotent
- Functions *should* finish as quickly as possible

Functions programming concepts

Trigger

Input

```
1 ▾ module.exports = function(context, data, more_data) {
2       // do stuff
3       context.done(null, { res: {status: 200 }});
4  };
```

Code

Output

17

Visual Studio 2017 Tooling

```csharp
public class AnalyzeImage
{
    /// Function entry point. Review image and text and set inputDocument.isApproved.
    [FunctionName("ReviewImageAndText")]
    public static async Task ReviewImageAndText(
        [QueueTrigger("%queue-name%")]  ReviewRequestItem queueInput,
        [Blob("input-images/{BlobName}", FileAccess.Read)]  Stream image,
        [DocumentDB("customerReviewData", "reviews", Id = "{DocumentId}")] dynamic inputDocument)
    {
        bool passesText = await PassesTextModeratorAsync(inputDocument);

        (bool containsCat, string caption) = await PassesImageModerationAsync(image);
        inputDocument.IsApproved = containsCat && passesText;
        inputDocument.Caption = caption;

        EmitCustomTelemetry(containsCat, passesText);
    }
}
```

ConsoleKey	
ConsoleKeyInfo	
ConsoleModifiers	
ConsoleSpecialKey	
containsCat	(local variable) bool containsCat
ContentModeratorFunction	

VSTS

- Build and deploy with VSTS

Demos

Resources

- Microsoft Docs – https://docs.microsoft.com
- Azure Functions – https://functions.azure.com
- GitHub Repo – https://aka.ms/func-github
- Twitter - @AzureFunctions
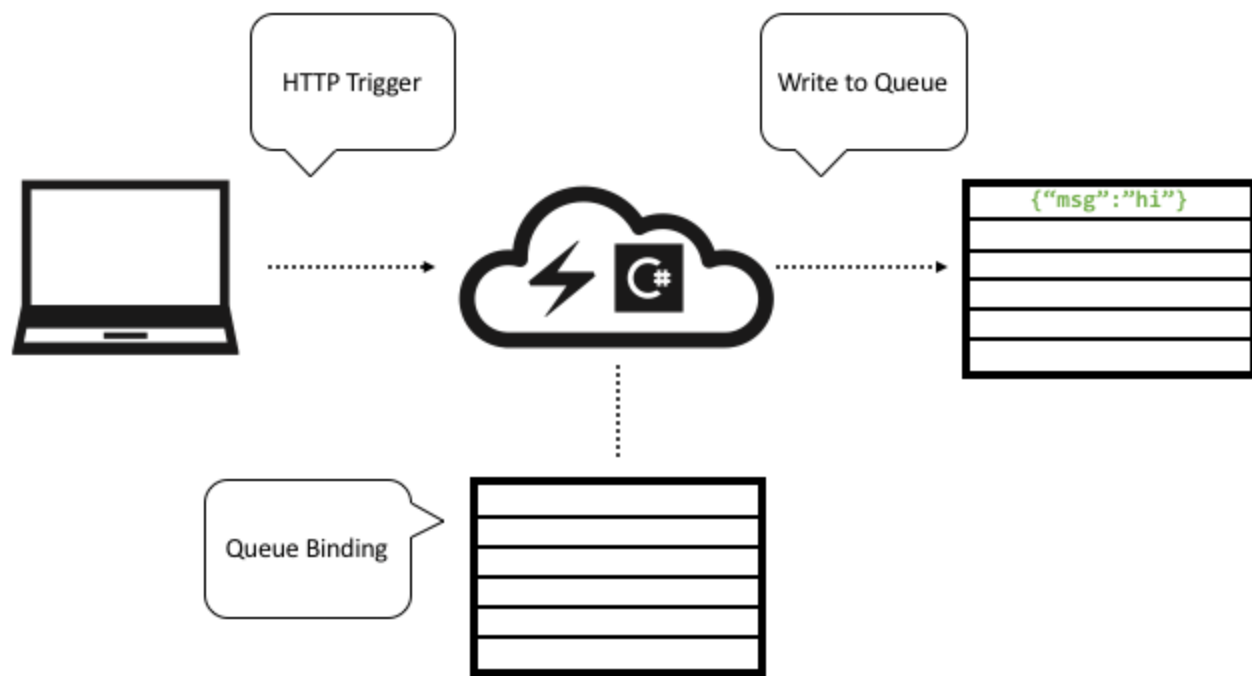
Programming Model Differences

WebJobs SDK

✓ C# only

✓ Attributes for configuring bindings

✓ Traditional .NET developer experience (Visual Studio, NuGet, MSBuild)

✓ Many functions per class
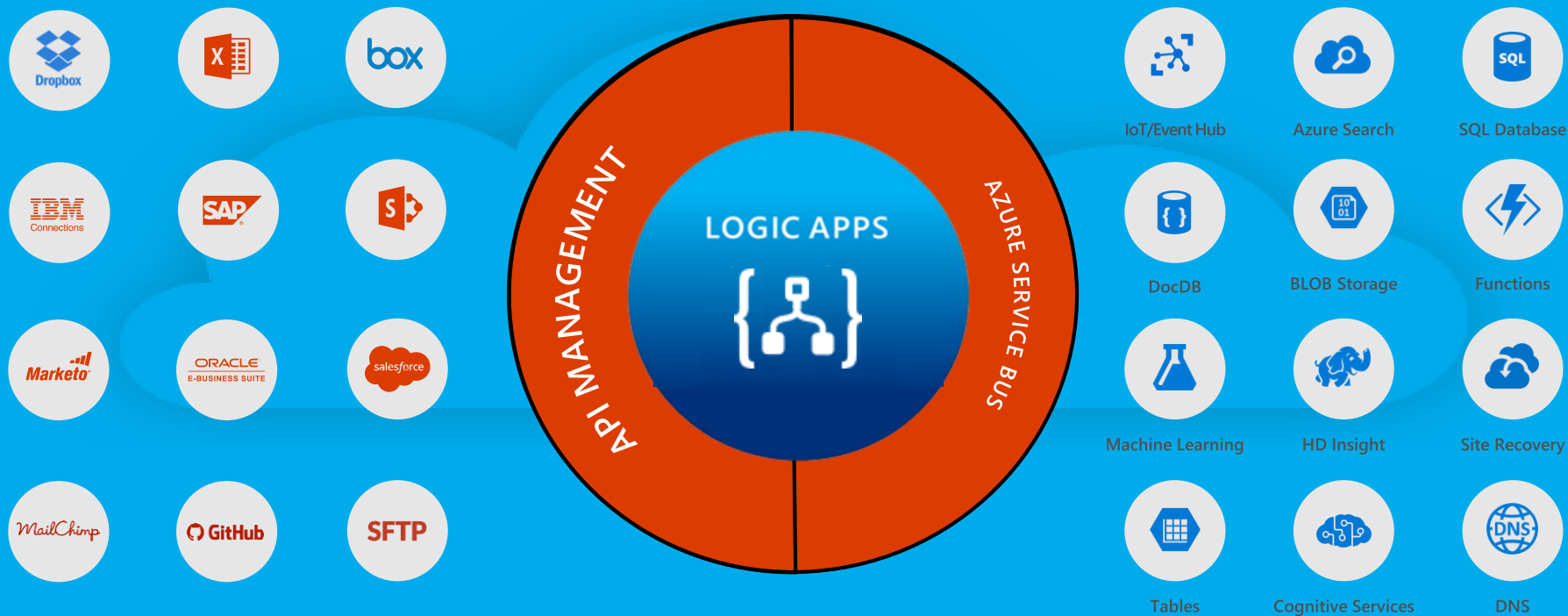
✓ Can access and manipulate many core SDK features

✓ Can't listen for HTTP requests*

Azure Functions

✓ C# & Node.js + more

✓ Config files for configuring bindings

✓ More diverse development experience (Web portal, VSCode, dynamically builds itself)

✓ Limited access to manipulate core SDK features, but (C# only) still some access

✓ Supports HTTP!

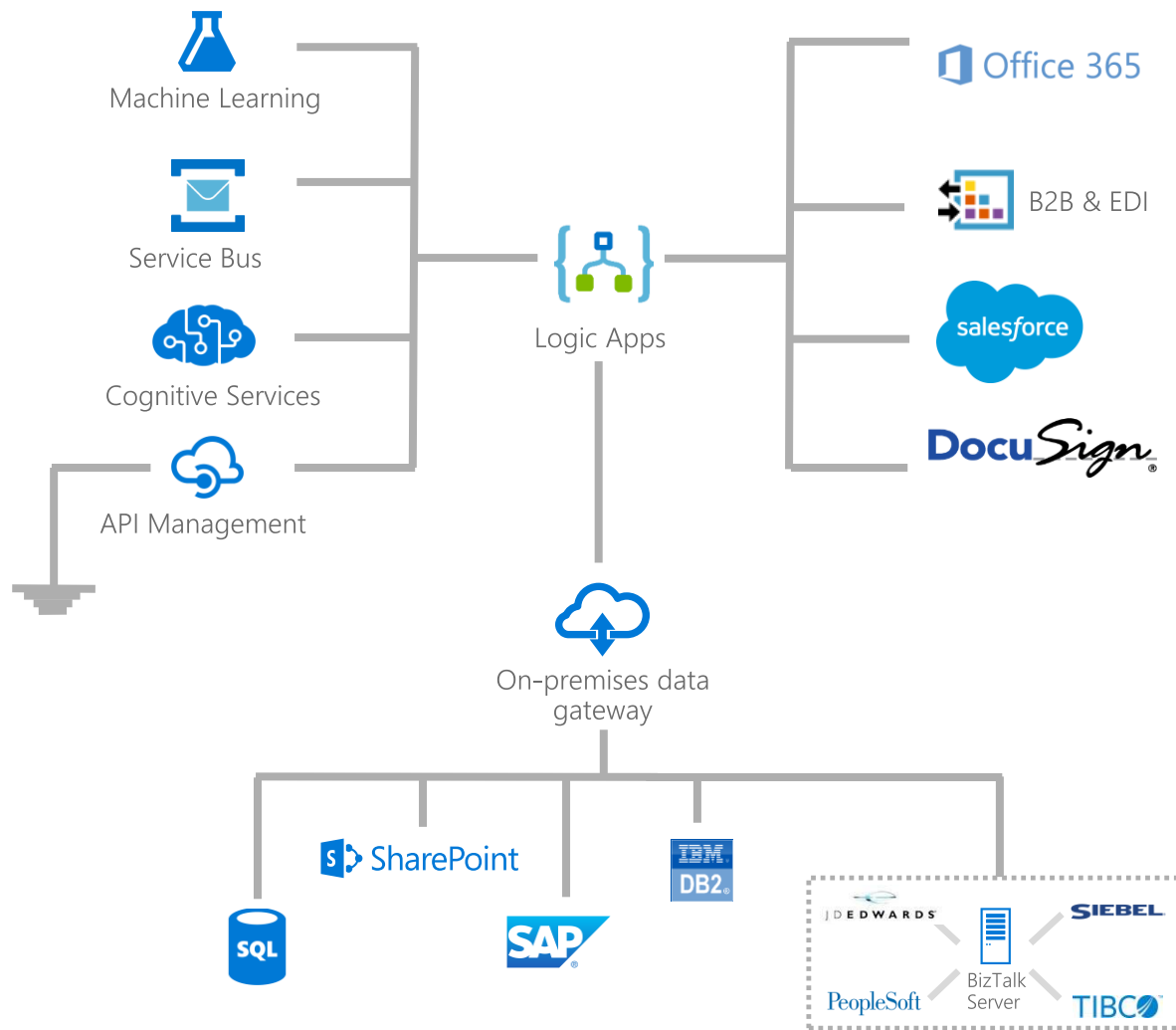About 39% of developers are focused on building cloud based Application integration
Microsoft's Cloud Integration Platform

Hybrid

Secure Gateway

As easy as connecting to cloud services

Machine Learning

Service Bus

Cognitive Services

API Management

Logic Apps

Office 365

B2B & EDI

salesforce

DocuSign

On-premises data gateway

SharePoint

IBM DB2

SQL

SAP

JD EDWARDS

BizTalk Server
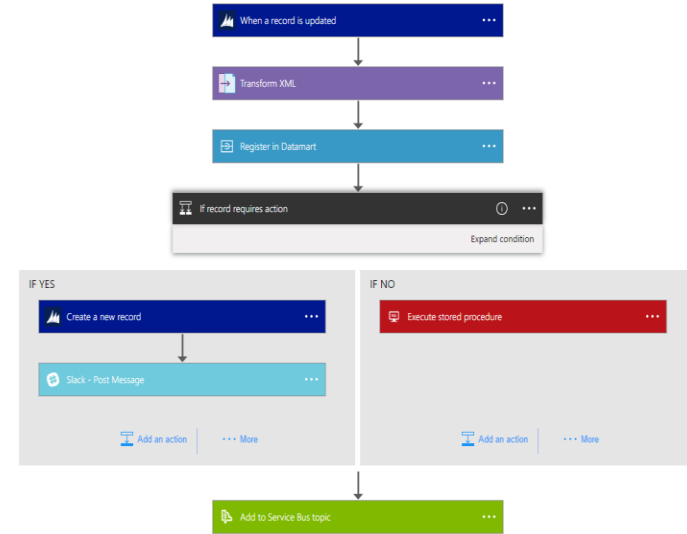
SIEBEL

PeopleSoft

TIBCO

Introducing Azure Logic Apps

Powerful Integration.
Hyperscale Workflow Engine, born in Azure

- Faster integration using innovative Visual Designer

- Easy workflow creation with triggers and actions

- Mashup applications, data and services

- Built for mission critical Enterprise Integration

- Create, deploy, manage and monitor

Logic Apps

Cloud APIs and platform functionality

Over 120 built-in connectors

Hosted and managed within the platform

Scales to meet your needs

First class designer experience

Rapid development

API connections

Authenticate once and reuse

Differentiate connection configuration

Simple to deploy

Portal experience for managing API Connections

SaaS

- 10to8
- Act!
- appFigures
- Asana
- Azure Active Directory
- Azure API Management
- Azure App Services
- Azure Automation
- Azure Cognitive Face API
- Azure Cognitive LUIS
- Azure Cognitive Text Analytics
- Azure Cognitive Vision
- Azure Data Lake Store
- Azure Document DB
- Azure Event Hubs
- Azure Functions
- Azure Machine Learning
- Azure Resource Manager
- Azure Service Bus
- Azure SQL
- Azure Storage Blob
- Azure Storage Queues
- Basecamp2&3
- Benchmark Email
- Bing Search
- BitBucket
- Bitly
- Blogger
- Box
- Buffer
- Campfire
- CapsuleCRM
- Chatter
- Common Data Service
- Disqus
- DocuSign
- Dropbox
- Dynamics AX Online
- Dynamics CRM Online

- Dynamics CRM Service Bus
- Dynamics Financials
- Dynamics Operations
- Easy Redmine
- Eventbrite
- Facebook
- FreshBooks
- Freshdesk
- GitHub
- Gmail
- Google Calendar
- Google Contacts
- Google Drive
- Google Sheets
- Google Tasks
- GoTo Meeting
- GoTo Training
- GoTo Webinar
- Harvest
- HelloSign
- HipChat
- Infusionsoft
- Inoreader
- Insightly
- Instagram
- Instapaper
- Intercom
- JIRA
- LeanKit
- LiveChat
- MailChimp
- Mandrill
- Medium
- Microsoft Translator
- MSN Weather
- Muhimbi PDF
- Nexmo
- Office 365
- Office 365 Users
- Office 365 Video

- OneDrive
- OneDrive for Business
- OneNote
- Outlook.com
- Outlook Customer Manager
- Outlook Tasks
- PagerDuty
- Paylocity
- Pinterest
- Pipedrive
- Pivotal Tracker
- Power BI
- Project Online
- Redmine
- Salesforce
- Salesforce Chatter
- SendGrid
- SharePoint Online
- Slack
- SmartSheet
- SparkPost
- Stripe
- Survey Monkey
- Teradata
- Todoist
- Toodledo
- Trello
- Twilio
- Twitter
- Typeform
- UserVoice
- Vimeo
- VS Team Services
- Webmerge
- Wordpress
- Wunderlist
- Yammer
- YouTube
- Zendesk

Protocols/Native

- HTTP, HTTPS
- HTTP Webhook
- FTP, SFTP
- SMTP
- RSS
- Compose, Parse JSON
- Query, Join, Table, Select
- Schedule, Wait
- Terminate
- Workflow

XML & EDI

- XML Validation
- Transform XML (+Mapper)
- Flat File Encode
- Flat File Decode
- X12
- EDIFACT
- AS2
- Integration Account Artifact Lookup

Hybrid

- BizTalk Server
- File System
- IBM DB2
- Informix
- Oracle DB
- SharePoint Server
- SQL Server
- SAP
- Websphere MQ