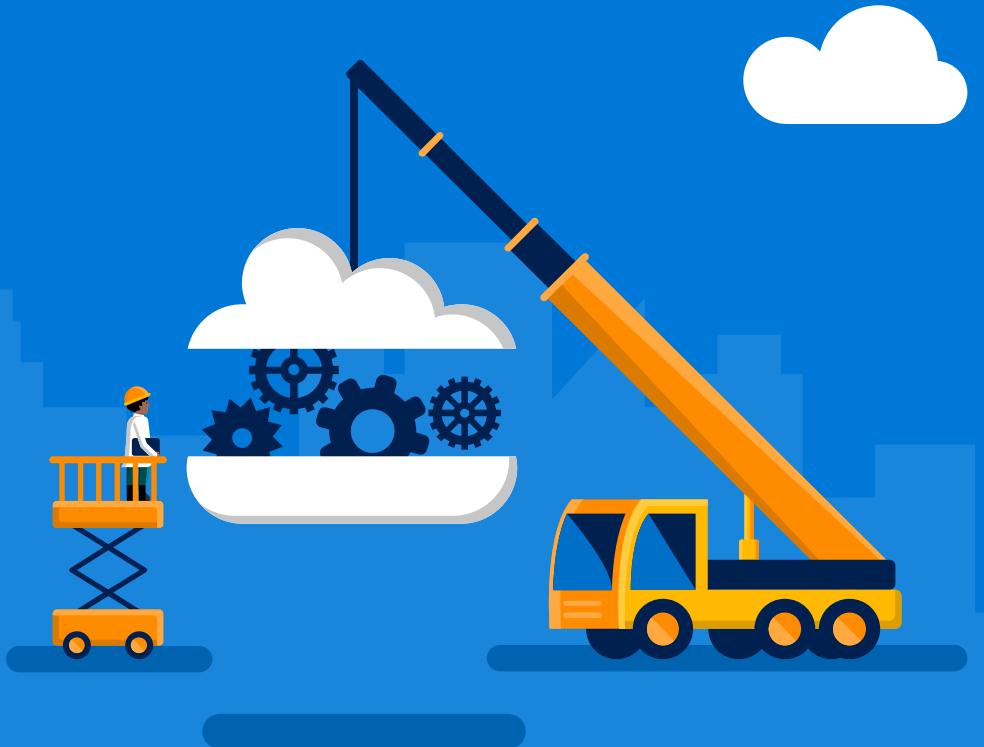


# Linux on Azure Fundamentals

Ray Kao  
Open Source Software TSP  
Azure Global Black Belt  
**Microsoft Canada**



# OSS Canada Leadership Team – [CanadaOpenSource@Microsoft.com](mailto:CanadaOpenSource@Microsoft.com)



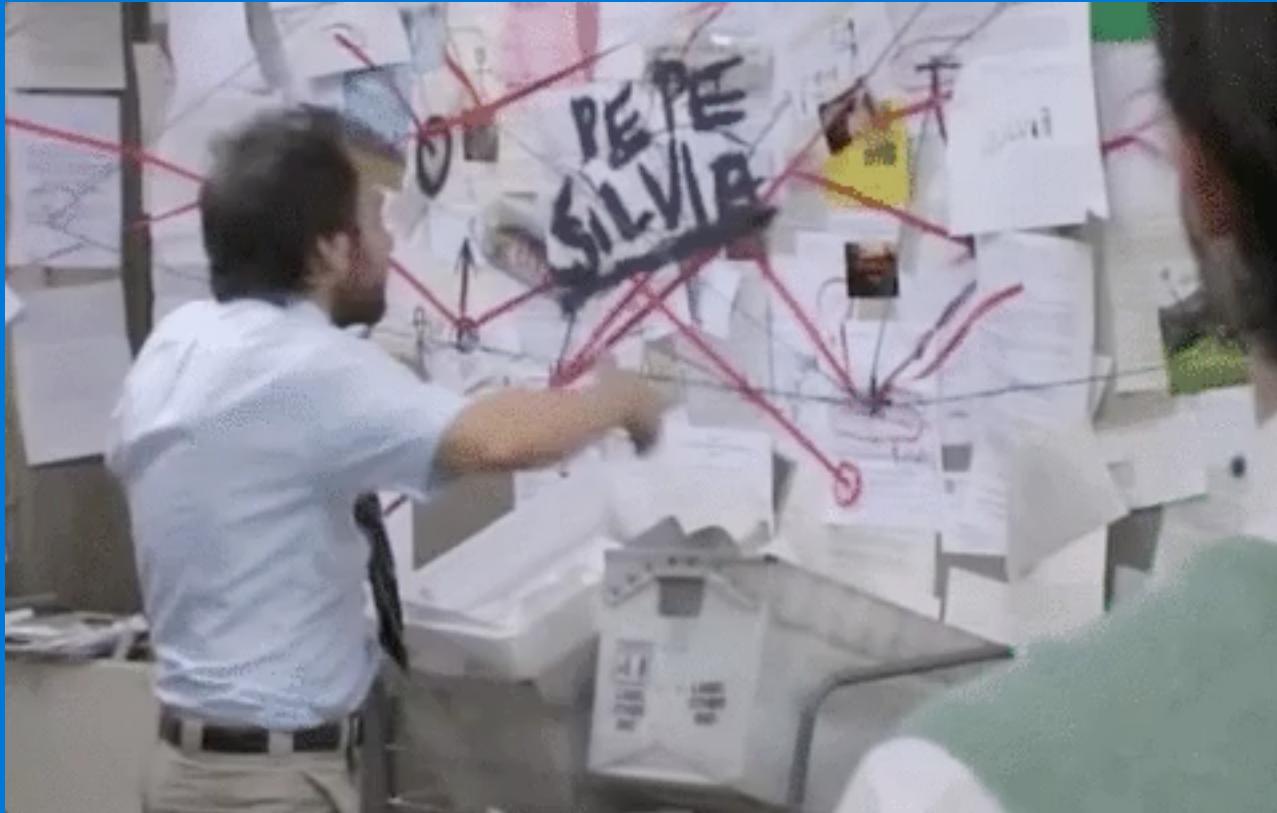
**Noureen Syed**  
OSS Business Lead  
Azure Cloud & Enterprise  
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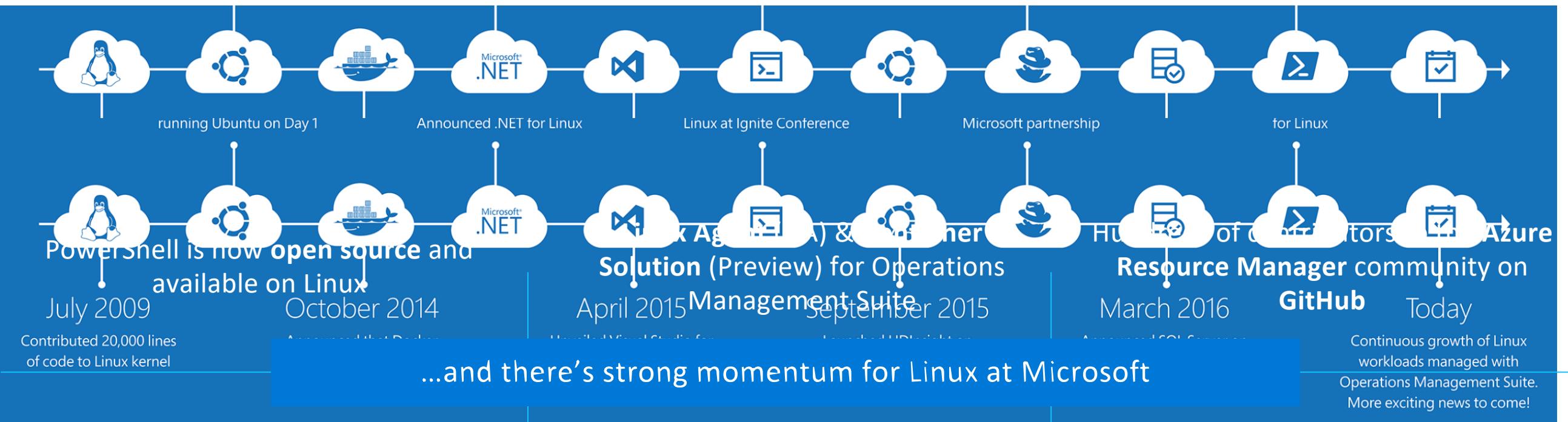
**Ray Kao**  
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**Kevin Harris**  
OSS – Cloud Native Dev  
Azure Global Black Belt  
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# Microsoft <3 Linux: It's been a journey



4x growth in **container** customers in Azure since January, all with Docker on Linux!

~40% VMs in Azure run **Linux** today

60% of Azure Marketplace Images are **Linux based!**

# Ray's view of Open Source and Azure



- Microsoft Azure – Plethora of products and solutions
- 1<sup>st</sup> and 3<sup>rd</sup> Party solutions
- Inexpensive to premium
- Re-Platform, Re-Architect, Re-Build
- Value of Azure is we're everywhere (52+ Regions) and we wear aprons



# Microsoft

## Most Open Source Contributors

### Organizations with the most open source contributors

	Microsoft	16,419
	facebook	15,682
	docker	14,059
	angular	12,841
	google	12,140
	atom	9,698
	FontAwesome	9,617
	elastic	7,220
	Apache	6,999
	npm	6,815

# Microsoft Joins Cloud Foundry Foundation

Got a tip? [Let us know.](#)

News ▾ Video ▾ Events ▾ Crunchbase

**EQUIFAX** • \$19.95 per month •  
**Equifax Complete™** Credit Monitoring + ID Protection  
FREE 30-Day Trial when you subscribe to Equifax Complete

**DISRUPT SF** Two weeks left for Extra Early Bird savings on Disrupt SF tickets [Get Yours Now](#)

foundation  
open source  
Microsoft  
cloud foundry  
Cloud

Popular Posts

 Behind the new Call of Duty: WWII  
10 hours ago

 VR's killer app: business services  
2 hours ago

 Talking with Alda Leu Dennis, the newest partner at Initialized Capital  
4 hours ago

 Headspace's revamped app helps busy

## Microsoft joins the open source Cloud Foundry Foundation

Posted Jun 13, 2017 by [Frederic Lardinois \(@fredericl\)](#)



Microsoft today announced that it is joining the Cloud Foundry Foundation, the non-profit behind the open source Cloud Foundry platform, and investing in the organization's

# Microsoft Joins Cloud Foundry Foundation

# Microsoft Joins Cloud Native Computing Foundation as Platinum Member

By cncf | July 26, 2017 | Announcement

*Microsoft Azure Joins Other Cloud Leaders and CNCF Members Google, Alibaba, and*

**San Francisco – July 26, 2017** – The [Cloud Native Computing Foundation](#) technologies to orchestrate containers as part of a microservices architecture a platinum member to help further enterprise adoption of cloud native

“Microsoft is committed to helping organizations of all sizes achieve modern development as a way to enable this,” said Corey Sanders, Partner Director of native projects, including Kubernetes, Helm, containerd, and gRPC, and the Cloud Native Computing Foundation is another natural step on our open source journey, engaging with the community on a deeper level as a CNCF member.”

Containers are quickly changing the way companies build and deploy their applications that mark Microsoft’s growing support for Kubernetes. Following Microsoft’s initial contribution to the project, the company founded Kubernetes and grew it into one of the most popular open source projects in the industry. Microsoft also announced the general availability of its Azure Container Service (ACS) in late 2016.

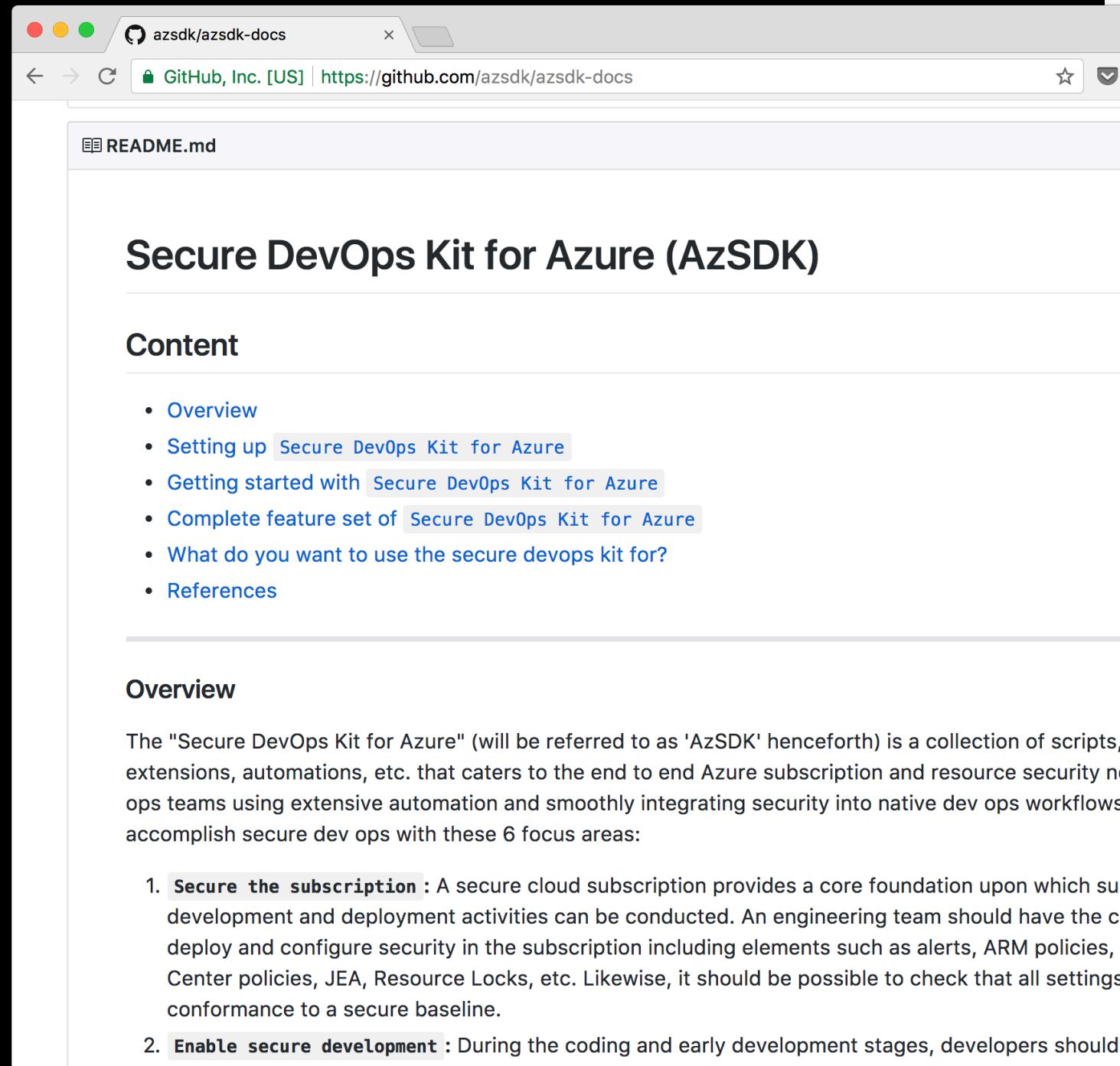
More recently Microsoft deepened its container expertise with the acquisition of

# Microsoft

# AzSDK – Open Source

# Framework for Secure

# DevOps on Azure



The screenshot shows a web browser window with the title bar "azsdk/azsdk-docs". The address bar displays "GitHub, Inc. [US] | https://github.com/azsdk/azsdk-docs". The main content area is titled "README.md" and contains the following text:

## Secure DevOps Kit for Azure (AzSDK)

### Content

- Overview
- Setting up [Secure DevOps Kit for Azure](#)
- Getting started with [Secure DevOps Kit for Azure](#)
- Complete feature set of [Secure DevOps Kit for Azure](#)
- What do you want to use the secure devops kit for?
- References

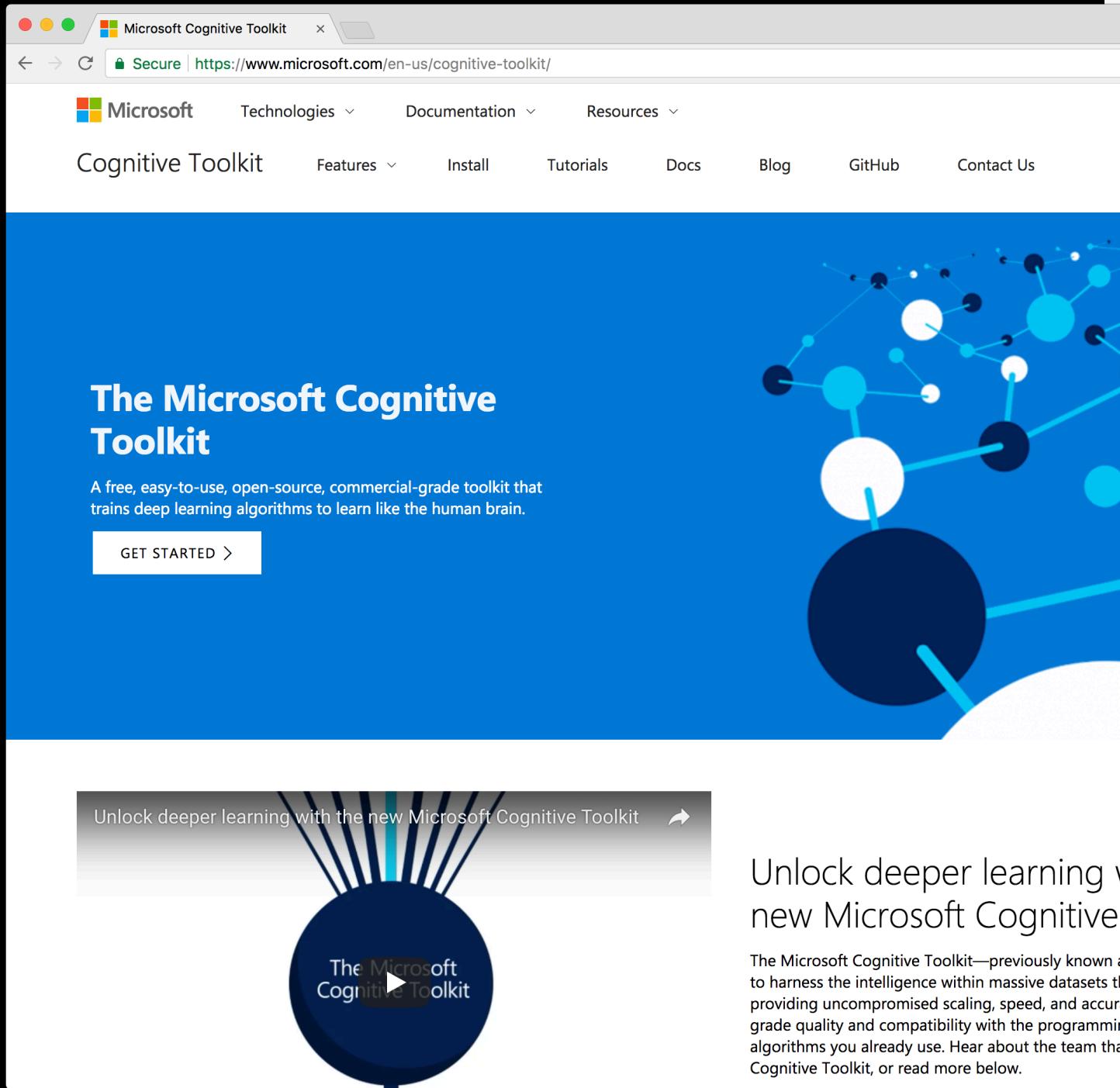
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### Overview

The "Secure DevOps Kit for Azure" (will be referred to as 'AzSDK' henceforth) is a collection of scripts, extensions, automations, etc. that caters to the end to end Azure subscription and resource security needs of ops teams using extensive automation and smoothly integrating security into native dev ops workflows. To accomplish secure dev ops with these 6 focus areas:

1. **Secure the subscription** : A secure cloud subscription provides a core foundation upon which subsequent development and deployment activities can be conducted. An engineering team should have the capability to deploy and configure security in the subscription including elements such as alerts, ARM policies, Center policies, JEA, Resource Locks, etc. Likewise, it should be possible to check that all settings conform to a secure baseline.
2. **Enable secure development** : During the coding and early development stages, developers should

# Microsoft Microsoft Cognitive Toolkit (CNTK)



The screenshot shows the Microsoft Cognitive Toolkit website. At the top, there's a navigation bar with the Microsoft logo, Technologies, Documentation, and Resources dropdowns, Cognitive Toolkit, Features, Install, Tutorials, Docs, Blog, GitHub, and Contact Us.

The main content area has a blue background featuring a network graph of nodes and connections. The title "The Microsoft Cognitive Toolkit" is displayed prominently in white text. Below the title is a subtitle: "A free, easy-to-use, open-source, commercial-grade toolkit that trains deep learning algorithms to learn like the human brain." A "GET STARTED >" button is located below the subtitle.

At the bottom of the page, there's a video player with the text "Unlock deeper learning with the new Microsoft Cognitive Toolkit" and a play button labeled "The Microsoft Cognitive Toolkit". To the right of the video player, there's a call-to-action: "Unlock deeper learning with the new Microsoft Cognitive Toolkit".

The footer contains a detailed description of the toolkit: "The Microsoft Cognitive Toolkit—previously known as CNTK—is a deep learning toolkit designed to harness the intelligence within massive datasets through providing uncompromised scaling, speed, and accuracy, grade quality and compatibility with the programming algorithms you already use. Hear about the team that built the Microsoft Cognitive Toolkit, or read more below."

Microsoft  
**Visual Studio Code**



Integrate + Enable  
=  
Choice + Flexibility

DevOps



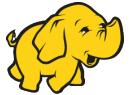
Applications



App Frameworks



Databases & Middleware



The power behind the moment.

Infrastructure



Windows Server



# Azure App Platform

## Stakeholders

### Developers



Virtual  
Machines

Stateful and  
stateless one-  
off solutions

VM Scale  
Sets

Scalable  
solutions

Container  
Service

Scalable,  
orchestrated  
Docker images  
deployed into  
containers

### Operations



Batch

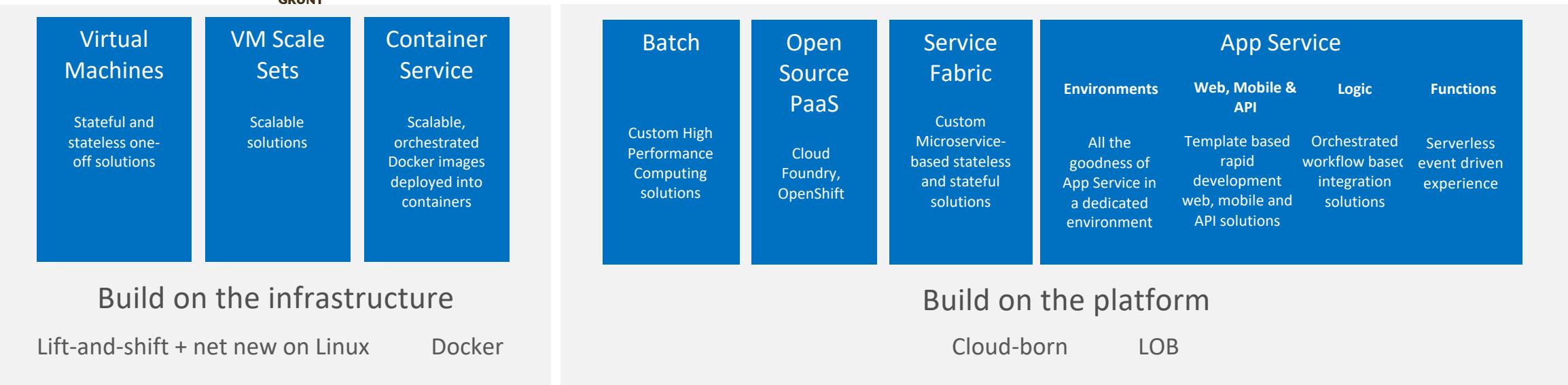
Custom High  
Performance  
Computing  
solutions

### DBAs and data scientists



### Business

Office  
PowerBI



Microsoft Azure

# The Architect Toolkit



Data servers are just part of the story. How do you define your infrastructure and deployment at cloud scale and the speed of business?

**Configuration | Image Creation | Initialization | Resource Provisioning at Scale**



# Developers! Developers! Developers!

Data Scientists are  
Developers too!!  
They just don't know it!

Data in isolation brings no value to your organization or customers. Developers will elevate your data and help you and your audience achieve more

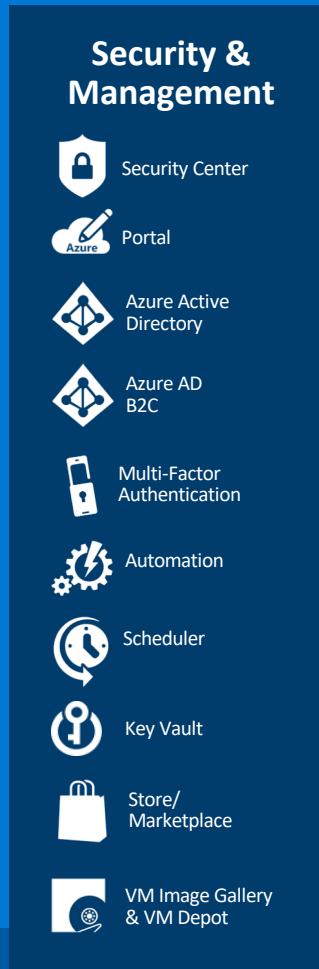
**Any Language, Any Platform, Anywhere!**

# The Data Scientist Toolbelt

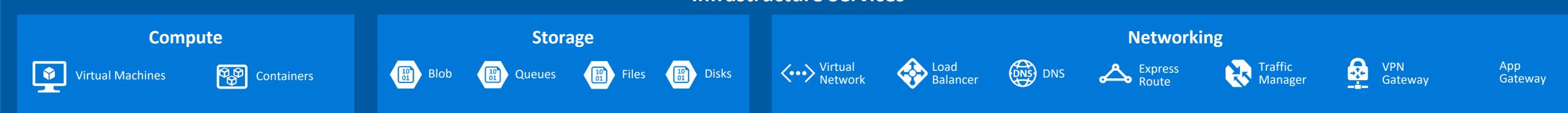
Elegant tools for practitioners of data science.  
Pipe data to where you need it when you  
need with agility, speed and consistency



**Write | Model| Stream| Batch | Store | On-Demand Compute**



## Platform Services



## Datacenter Infrastructure



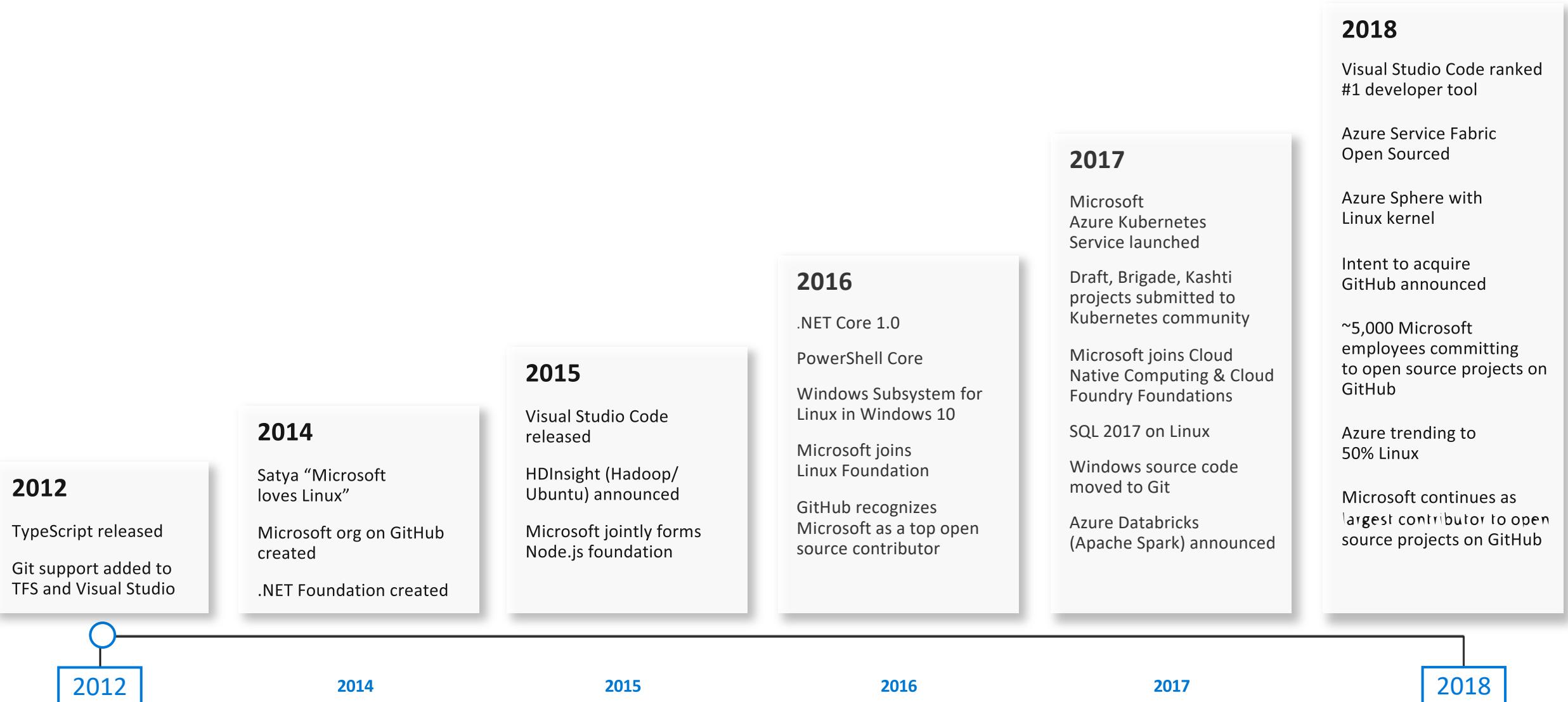
# Achieve global scale, in local regions

54

Azure regions



# Microsoft ❤️ Open Source



# Linux on Azure landscape

# Supported Linux Distributions



CentOS



# Azure Marketplace

- VM Appliances
- On-Demand/BYOL
- Become a provider
- Over 60% are Linux based

The screenshot shows the Microsoft Azure Marketplace interface. The left sidebar lists various services: Create a resource, All services, Favorites, Dashboard, Recent, Resource groups, Virtual machines, Storage accounts, Azure Cosmos DB, Azure Active Directory, App Services, Function Apps, App Service plans, Container registries, Templates, All resources, Security Center, Monitor, Cost Management + Billing, and Subscriptions. The main area is titled 'Compute' and shows a search bar with 'linux' entered. Below the search bar is a 'Results' section with a table. The table has columns for NAME, PUBLISHER, and CATEGORY. The results listed are:

NAME	PUBLISHER	CATEGORY
Kali Linux	Kali Linux	Virtual Machine Images
Clear Linux OS Basic	Clear Linux Project	Virtual Machine Images
Clear Linux OS - Containers	Clear Linux Project	Virtual Machine Images
Clear Linux OS - Machine Learning	Clear Linux Project	Virtual Machine Images
Red Hat Enterprise Linux 7.3	Red Hat	Recommended
Red Hat Enterprise Linux 7.4	Red Hat	Recommended
Red Hat Enterprise Linux 7.2	Red Hat	Recommended
Oracle Linux 6.9.0.0.2	Oracle	Virtual Machine Images
Oracle Linux 6.8.0.0.1	Oracle	Virtual Machine Images
Oracle Linux 7.4.0.0.1	Oracle	Virtual Machine Images
Oracle Linux 7.3.0.0.0	Oracle	Virtual Machine Images
CoreOS Linux (Stable)	CoreOS	Operating Systems
Oracle Linux 6.9.0.0.0	Oracle	Virtual Machine Images
Red Hat Enterprise Linux 6.7	Red Hat	Recommended

MAKE ME A SANDWICH.

SUDO MAKE ME  
A SANDWICH.



WHAT? MAKE  
IT YOURSELF.

OKAY.



# Labs

- Linux Essentials Lab (Commands and File System)
- Create a Linux VM
  - Azure Portal
  - Azure CLI
- Configuration Management

# The Architect Toolkit



Data servers are just part of the story. How do you define your infrastructure and deployment at cloud scale and the speed of business?

**Configuration | Image Creation | Initialization | Resource Provisioning at Scale**

# How to scale VMs on Azure

- Size Up your VM
  - Vertical Scale
- Create VMs in an Availability Set (AS) or Scale Set (VMSS)
  - Horizontal Scale and High Availability
  - Provisions on different Fault/Update Domain
  - Allows you to auto scale up/down based on resources (VMSS)
  - Manually scale via Azure-CLI (VMSS)
- Leverage Azure Load Balancers/Azure Traffic Manager
  - Allows you to send traffic based on a tuple to a VMSS (ALB)
  - Direct traffic to Azure DC nearest to you (Azure Traffic Manager)

# What about custom Images for VMs?

- Absolutely
- Linux Integration Services (LIS) drivers for Hyper-V already included in upstream Linux Kernel by Microsoft
- Requires Linux VM Agent for Azure to be installed (GitHub)
- VHD-format virtual hard disks only
- Upload and Store to Azure Storage

# Deployment Tooling



# Developers! Developers! Developers!

Data Scientists are  
Developers too!!  
They just don't know it!

Data in isolation brings no value to your organization or customers. Developers will elevate your data and help you and your audience achieve more

**Any Language, Any Platform, Anywhere!**

# The Data Scientist Toolbelt

Elegant tools for practitioners of data science.  
Pipe data to where you need it when you  
need with agility, speed and consistency



**Write | Model| Stream| Batch | Store | On-Demand Compute**

# Anatomy of a Terraform Template

# Azure Open Source Container Portfolio

Developer & Data Agility with Containers in the Cloud

## Developers



## Operations



## Data scientists



### Docker VM Extension for Azure

Easy and programmatic way to add Docker capabilities to your VMs



### Open source container-based PaaS platforms in Azure

Container-ready application platforms that benefit from Azure's native partitioning, capacity management and high availability



### Azure Container Service

Optimized container hosting in the cloud with familiar tooling and your choice of orchestrator



### Azure Marketplace container partners

Partner solutions that address management challenges of containers



Microsoft Azure



Workload portability



Cross-cloud orchestration



Tools integration

Windows Server (preview)

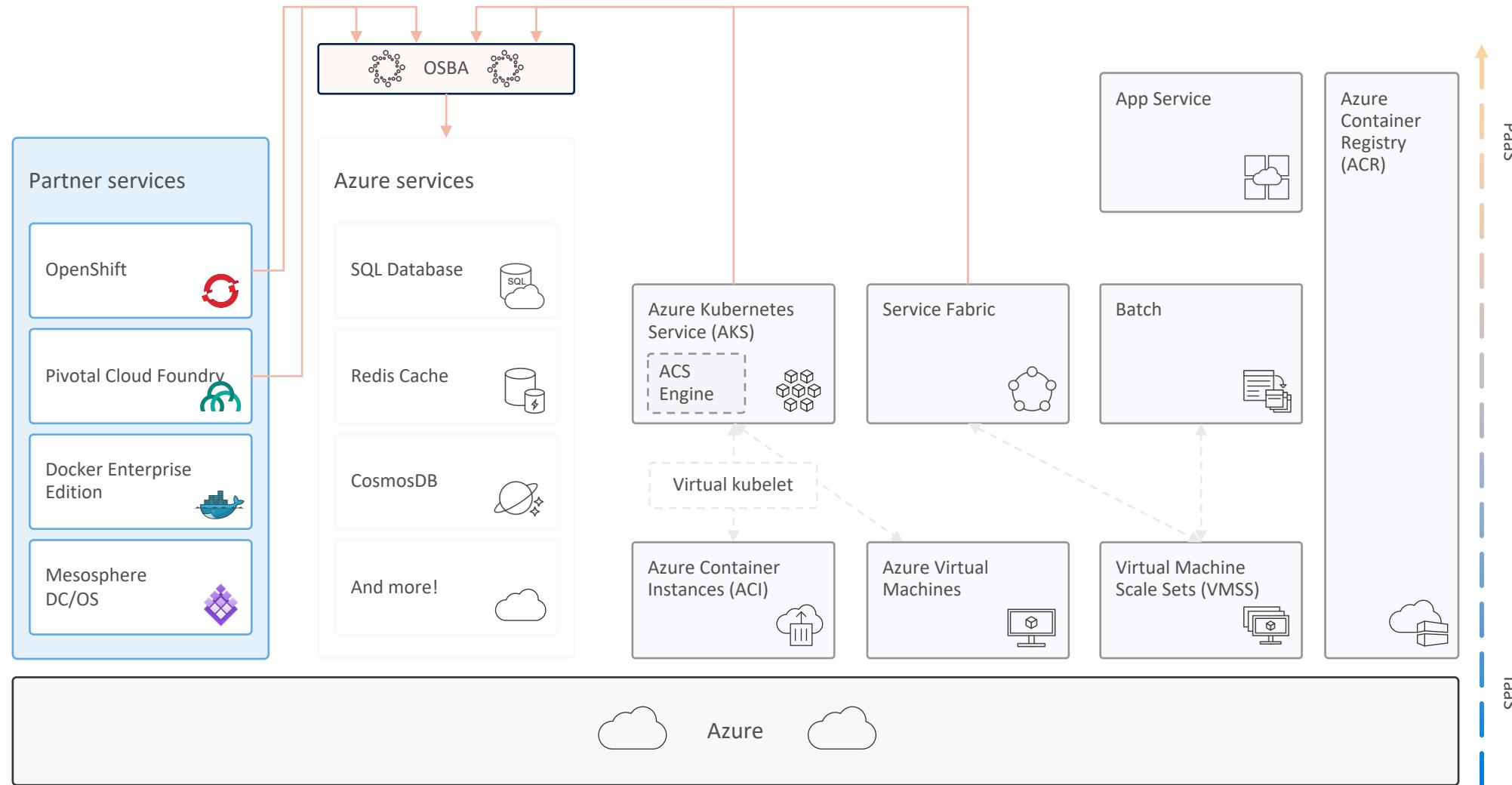
Azure Stack

DC/OS

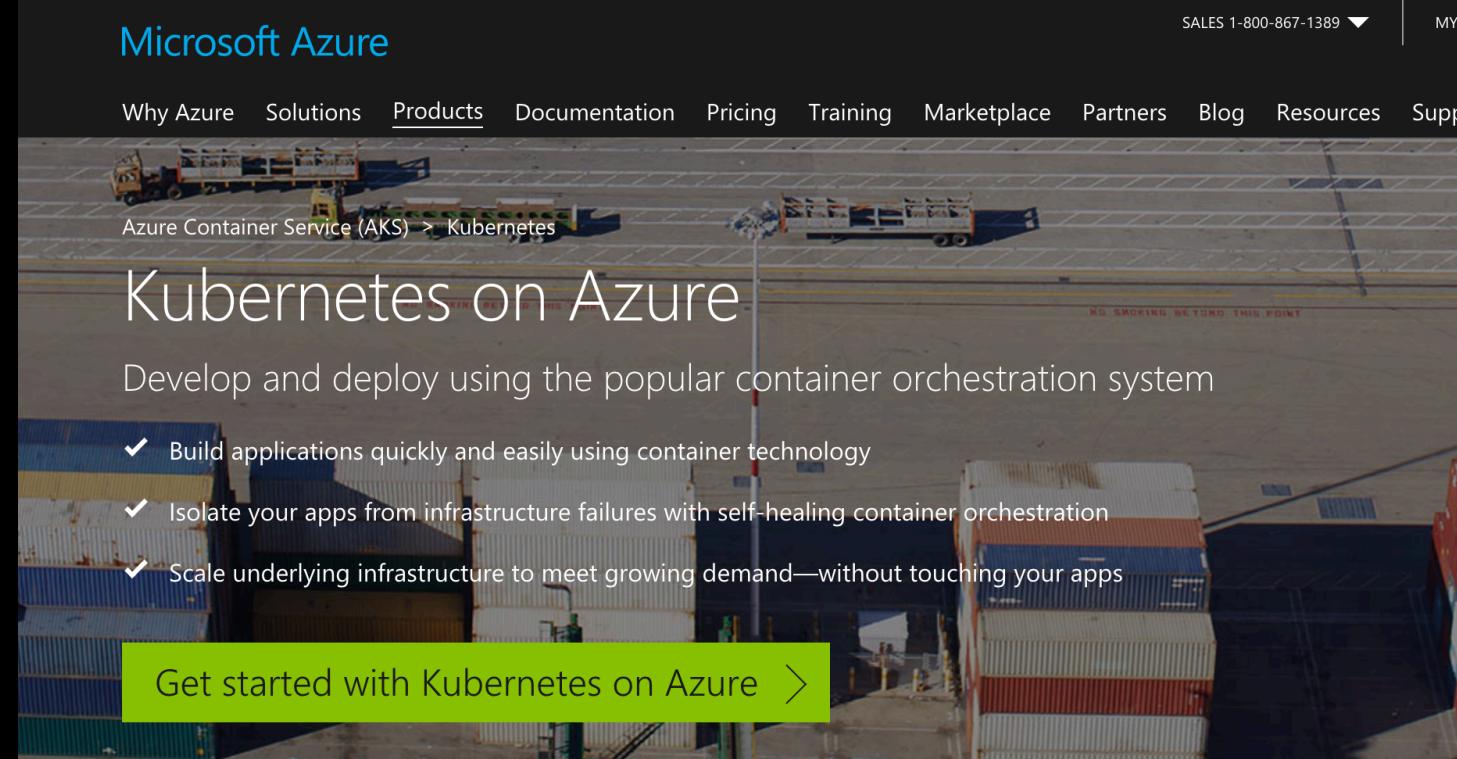
Your own platform



# Azure container ecosystem



# Microsoft Kubernetes + Microsoft Managed Kubernetes Clusters on Azure



The screenshot shows the Microsoft Azure homepage with a focus on the "Kubernetes on Azure" section. The top navigation bar includes links for Why Azure, Solutions, Products (underlined), Documentation, Pricing, Training, Marketplace, Partners, Blog, Resources, and Support. A sub-navigation menu for "Azure Container Service (AKS) > Kubernetes" is visible. The main heading "Kubernetes on Azure" is displayed over a background image of shipping containers and a truck. Below the heading, the text "Develop and deploy using the popular container orchestration system" is followed by a bulleted list of benefits:

- ✓ Build applications quickly and easily using container technology
- ✓ Isolate your apps from infrastructure failures with self-healing container orchestration
- ✓ Scale underlying infrastructure to meet growing demand—without touching your apps

A green button at the bottom of the section says "Get started with Kubernetes on Azure >".

## Why use Kubernetes on Azure?

Application containers have grown significantly in popularity over the last few years, and Kubernetes has emerged as a favorite container orchestration system. It simplifies the deployment, scaling, and operations of application containers and is well supported by a large community of users. Microsoft is a significant contributor to Kubernetes open source projects, helping shape the technology's future and ensuring it runs great on Azure. Plus, when you use Kubernetes on Azure, you also get the support of Microsoft to facilitate your success.



## Get started easily with Azure Co

Quickly create a Kubernetes cluster, and begin developing and deploying any framework and language using Azure Container Service. Get your app up and running in minutes, or click a few clicks, or deploy a Kubernetes cluster from the Azure Cloud Shell using the command line.

# Microsoft RedHat + Microsoft Azure RedHat OpenShift (ARO)



The image shows a press release from Red Hat. At the top, there are navigation links: CUSTOMERS, PARTNERS, DEVELOPERS, OPEN SOURCE, and STORE. Below these are four main menu items: redhat. (with a logo), Technologies (underlined), Services & support, and Success stories. A large red diagonal bar across the top contains the text "PRESS RELEASE". The main title of the article is "Red Hat and Microsoft Simplify Container Adoption Across Datacenter Infrastructure and Microsoft Azure with New Capabilities". Below the title, a sub-headline reads "Enterprise leaders collaborate to enable container adoption across datacenter infrastructure and Microsoft Azure with new capabilities". In the bottom left corner of the main content area, there is a "IN SHORT" section which states: "Microsoft and Red Hat expand alliance to help enterprises adopt cloud-native applications and embrace hybrid cloud." To the right of this, there is a larger text block about the partnership and its goals.

**IN SHORT**

Microsoft and Red Hat expand alliance to help enterprises adopt cloud-native applications and embrace hybrid cloud.

**MENTIONED IN THIS ARTICLE**

REDMOND, Wash., and RALEIGH, N.C. – August 22, 2017 – Microsoft Corp. (NASDAQ: MSFT) and Red Hat Inc. (NYSE: RHT) today announced an expansion of the two companies' strategic alliance with new initiatives aimed at enabling enterprises to more easily adopt container technologies. The companies will now offer Windows Server containers on Red Hat OpenShift, Red Hat OpenShift Container Platform and Red Hat OpenShift Container Storage, and Microsoft SQL Server on Red Hat Enterprise Linux and Red Hat OpenShift Container Storage. The companies' joint roadmap will focus on simplifying container technologies to help enterprises accelerate their digital transformation using hybrid cloud.



Merci!  
Thank You!

@RayKao  
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# Questions?

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  - Kevin Harris [kevin.harris@microsoft.com](mailto:kevin.harris@microsoft.com)
  - [CanadaOpenSource@Microsoft.com](mailto:CanadaOpenSource@Microsoft.com)

