

Cloud-Native Event-Driven Java Architecture with Spring On Azure

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Event Driven Examples are Everywhere

Ordering
coffee



Processing
loans



Handling
customer
complaints



Receiving
email



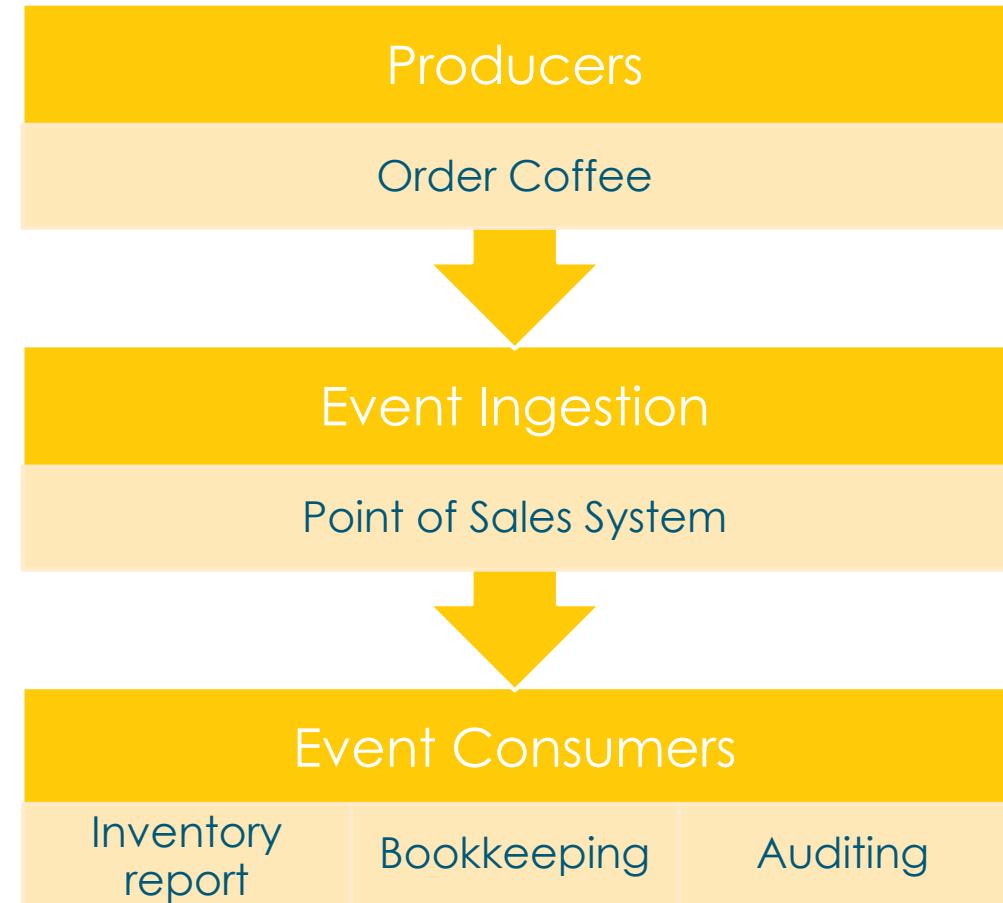
Event-Driven Architecture Style

Event Producers

- Pub/Sub Messaging
- Event Streaming

Event Consumers

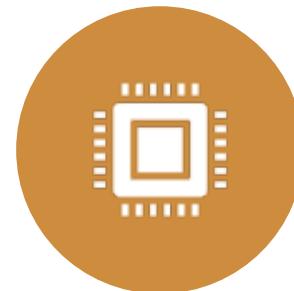
- Messaging
- Complex event processing
- Event stream processing



When to use Event-Driven?



Multiple subsystems
processing the same
events



Want systems
responding to what
happened (events)



Complex event
processing (pattern
matching, aggregation
over a time period)



High volume and high
velocity of data



What do you
want in an
event-driven
architecture?

Architectural Characteristics and Benefits

- Decoupled components
- Trigger-friendly systems
- Scalable infrastructure
- Stateless and streaming handlers
- Flexible storage options
- Simple extensibility
- Observability and traceability
- Subsystems with independent views of event streams



How can Microsoft Azure help?

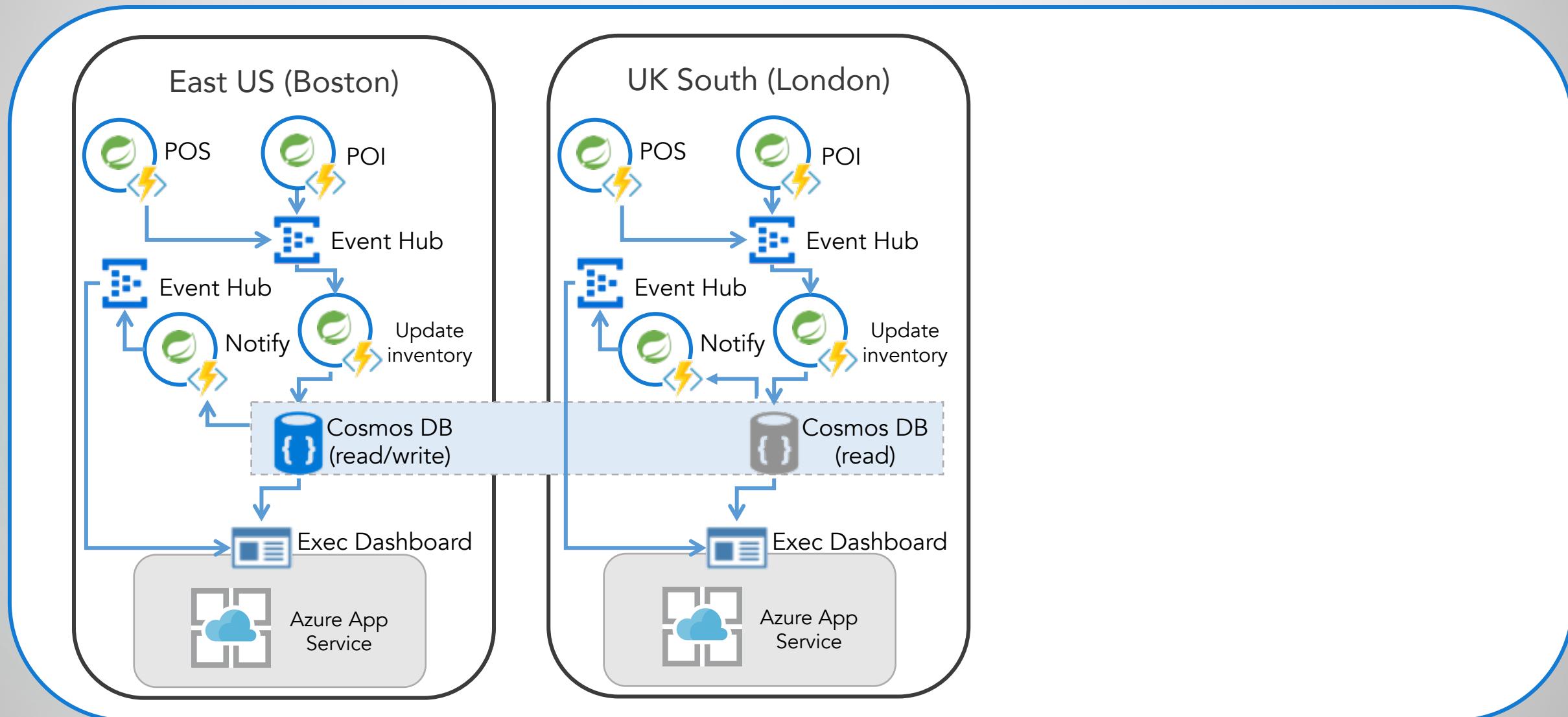
- Distinct (managed) services to ingest, process, and store data
- Global, instant scale
- Robust functions platform
- High throughput, reliable event processing
- Virtually limitless data storage
- Comprehensive security and monitoring services



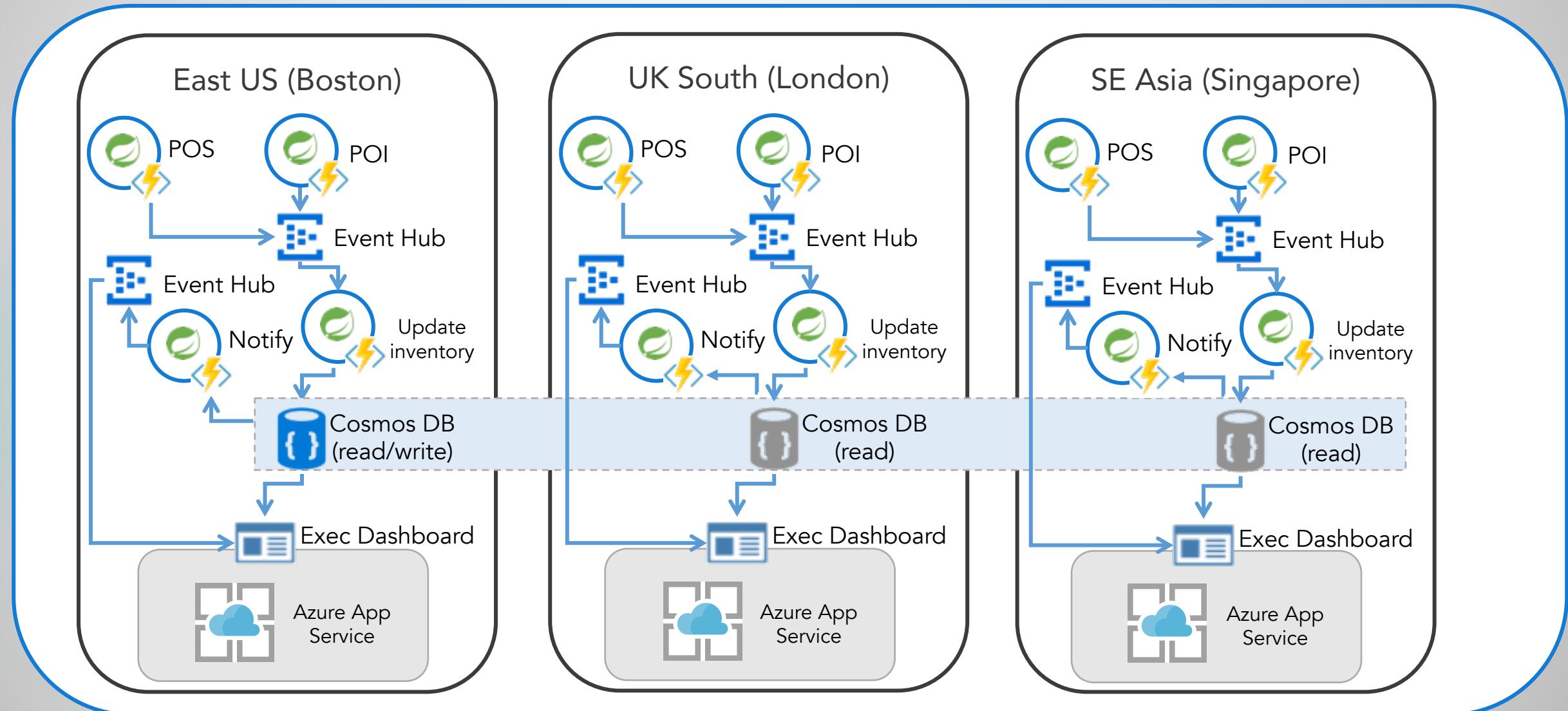
How can Spring on Microsoft Azure help?

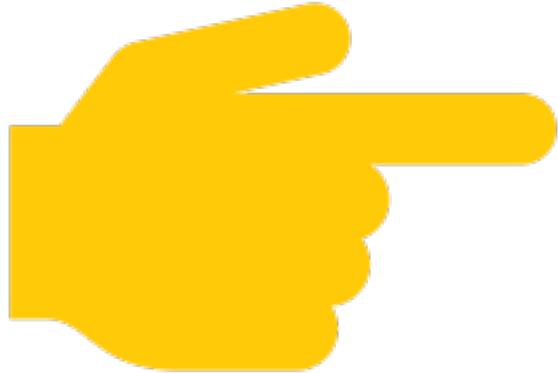
- Spring has libraries for Reactive, stream-oriented applications
- Spring Cloud Stream Binder for Azure Event Hubs, Kafka, Service Bus and more
- Function paradigm for event-driven workloads
- Spring Data support for SQL Database, MySQL, PostgreSQL, Cosmos DB, MongoDB and Gremlin
- Spring Security using Azure Active Directory (AAD) and AAD B2C
- ...

Stargazer Cafe - event-driven architecture



Stargazer Cafe - event-driven architecture





DEMO TIME!

<https://aka.ms/ihub>

<https://aka.ms/ihub-events>

Components of an Event-Driven Architecture



Spring



What is Spring ?

- The leading app development framework for Java. Spring Boot is the opinionated launcher for Spring with auto-configuration, sensible default, executable JARs, and more.

Why is Spring important for Event-Driven apps?

- Comprehensive support for traditional web apps, reactive web apps, batch apps, streaming apps, and more.
- Simple access to a wide range of data stores, message brokers, and event stream processors.
- Robust security schemes for authn/authz, encryption, and more.
- Built in observability with powerful Actuators
- Spring Cloud projects introduce microservices machinery for config management, service discovery, distributed tracing, API gateway, and so much more.



Spring on Azure

<http://cloud.spring.io/spring-cloud-azure/>

Spring Data	R2DBC	Spring Resource	Spring Cache	Spring Messaging
<ul style="list-style-type: none">• SQL Database• MySQL• PostgreSQL• Maria DB• Cosmos DB<ul style="list-style-type: none">• SQL• MongoDB• Cassandra• Gremlin	<ul style="list-style-type: none">• SQL Database• PostgreSQL	<ul style="list-style-type: none">• Storage	<ul style="list-style-type: none">• Redis Cache	<ul style="list-style-type: none">• Service Bus
Spring Boot		Spring Cloud	Spring Security	Micrometer
	<ul style="list-style-type: none">• Virtual Machines• Containers in AzureKubernetes Service (AKS)• App Service on Linux• PCF on Azure	<ul style="list-style-type: none">• App Configuration• Event Hubs• Service Bus• Storage• Redis• Functions	<ul style="list-style-type: none">• Active Directory (ADD)• ADD - B2C• Microsoft 365• Microsoft Account	<ul style="list-style-type: none">• Monitor (includes Log Analytics)



Azure Cosmos DB

<https://azure.microsoft.com/en-us/services/cosmos-db/>



What is Cosmos DB?

- Globally distributed multi-model, multi-master data storage service

Why is Cosmos DB important for Event-Driven apps?

- Multi-region replication, requests are served from local regions
- Multiple, well-defined consistency choices
- Elastically scalable storage and throughput
- Multi-model and multi-API – key-value, document and graph + SQL, Cassandra, MongoDB, Table and Gremlin
- Schema-agnostic, automatic indexing
- Always encrypted at rest and in motion

Azure Event Hubs

<https://azure.microsoft.com/en-us/services/event-hubs/>

What is Event Hubs?

- Fully managed cloud scale ingestion of data that can handle volume, variety and velocity

Why is Event Hubs important for Event-Driven apps?

- Suitable for hyperscale telemetry ingestion, processing real-time
- Supports multiple languages including Java
- Option to use a Kafka endpoint interface for publishers and subscribers
- Integrates with other Azure services



Azure Functions

<https://azure.microsoft.com/en-us/services/functions/>



What is Azure Functions?

- Serverless “managed” compute service to run code on-demand without provisioning or managing any infrastructure
-

Why is Azure Functions important for Event-Driven apps?

- Run in response to any event
- Functions can be triggered by any events including Storage, Cosmos DB, Event Hubs, Service Bus, Event Grid, HTTP etc.
- Native input and output binding integrations with many cloud services
- Support multiple programming languages including Java, C#, F#, and Node
- Use tools and technologies that Java devs know and love to deploy – Maven, VS Code, IntelliJ, Eclipse, Jenkins etc.

Spring Cloud Functions



Spring Cloud®

What is Spring Cloud Functions?

- Spring project to help you implement business logic as functions

Why is Spring Cloud Functions important for Event-Driven apps?

- Brings power of Spring Boot (auto-config, dependency injection) to serverless platforms
- Can create executable beans from input strings (dynamic compilation)
- Run the same code exposed as web endpoint or stream processor
- Keeps a registry of functions, consumers, and suppliers
- Works with public cloud Function-as-a-Service runtimes (like Microsoft Azure!)

Azure App Service on Linux

<https://azure.microsoft.com/en-us/services/app-service/>

What App Service?

- Fully managed app service platform

Why is App Service important for Event-Driven apps?

- Supports multiple languages
- Java JAR and WAR packages
- Managed **Java SE, Tomcat and WildFly/JBoss** environments
- Use tools and technologies that Java devs know and love to deploy
 - **Maven, VS Code, IntelliJ, Eclipse, Jenkins**, etc.
- Built-in **auto scale and load-balancing** with **auto-patching** of the underlying stack
- **Secure apps** using Azure Active Directory
- Use APMs of your choice - **New Relic, App Dynamics or Dynatrace**



Azure Monitor

<https://azure.microsoft.com/en-us/services/monitor/>



What is Azure Monitor?

- Serverless “managed” compute service to run code on-demand without provisioning or managing any infrastructure

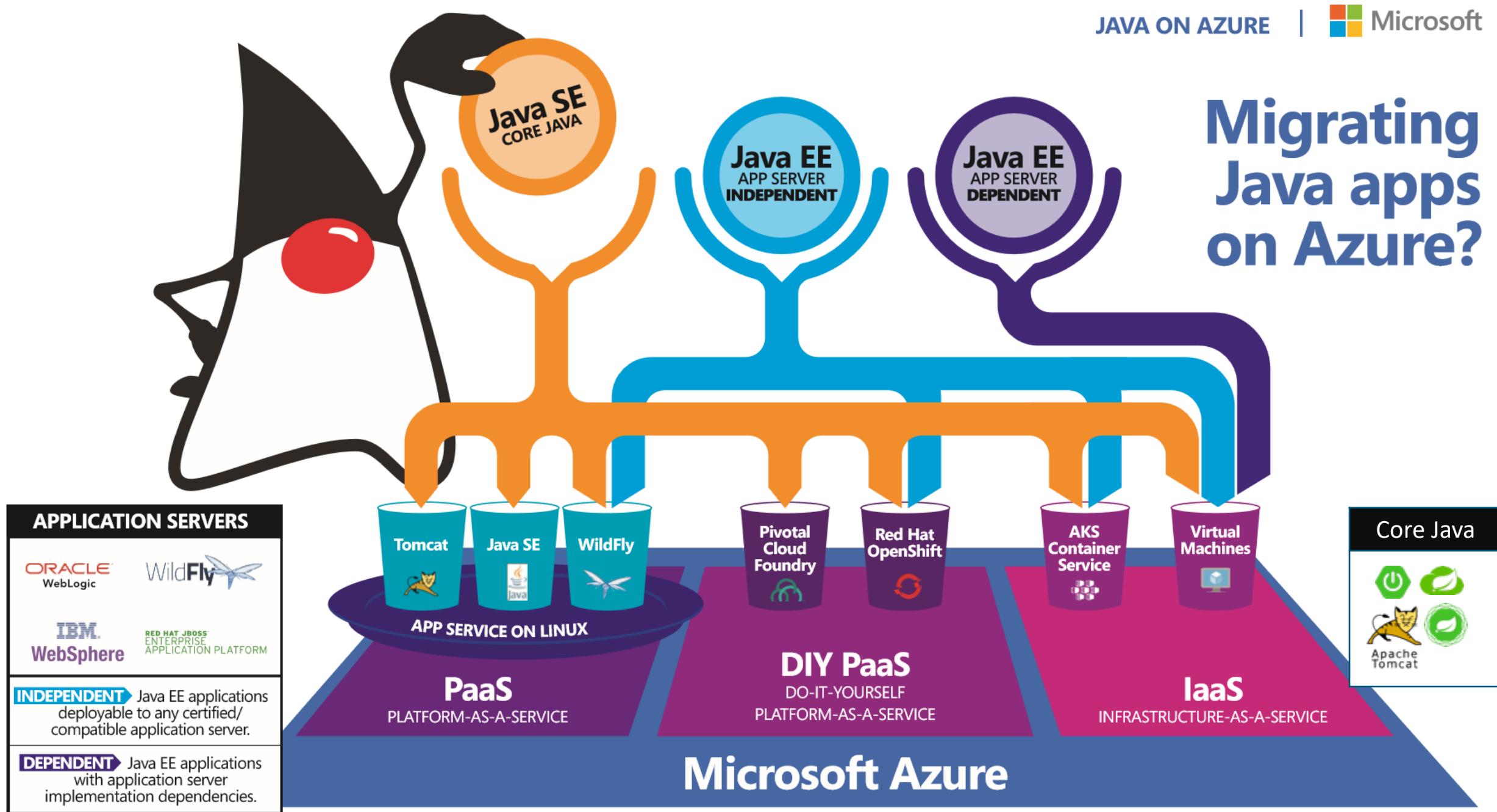
Why is Azure Monitor important for Event-Driven apps?

- Azure Log Analytics and Azure Application Insights are **integrated** features within Azure Monitor
- Provides DevOps and SRE teams the **observability** they need for complex modern applications
- **One Metrics** - Metrics are collected automatically from most of the Azure services you use, and you can send custom metrics
- **One Logs** - Azure Monitor is now the central platform for collecting logs from across monitoring, management, security and all other log types
- **One Alerts** - The new alert management experience is now available for all resources in Azure



Build New
or
Migrate?

Migrating Java apps on Azure?



What type of Java apps are you running?



Java SE

Core Java

- Spring Framework
- Spring Cloud
- Spring Boot
- Tomcat



Java EE

App Server
Independent

Java EE applications deployable to any certified or compatible application server.



Java EE

App Server
Dependent

Java EE applications with application server implementation specific dependencies.

Partnerships and Collaborations

Pivotal	Red Hat	Azul Systems
<ul style="list-style-type: none">▪ Pivotal Cloud Foundry (PCF)▪ Spring Framework▪ Spring Cloud▪ Spring Boot	<ul style="list-style-type: none">▪ Red Hat OpenShift Cloud Platform▪ Red Hat JBoss EAP▪ Red Hat Enterprise Linux (RHEL)▪ Red Hat Ansible▪ Red Hat Terraform▪ Red Hat Windows SQL support	<ul style="list-style-type: none">▪ Azul Zulu Enterprise▪ More to come...

Your Azure Options

PaaS (Platform-as-a-service)

- Azure App Service

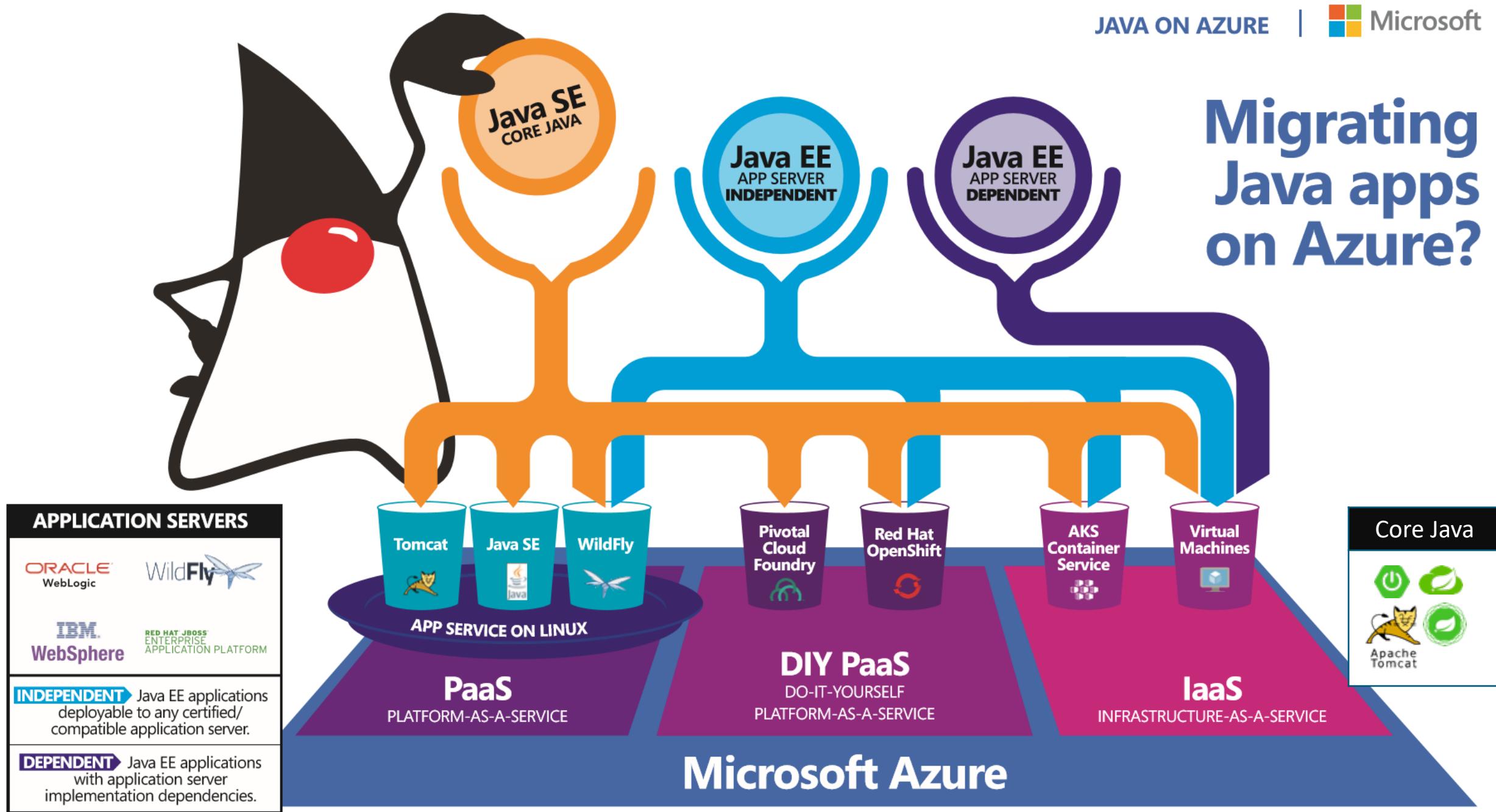
Self-managed PaaS

- Pivotal Cloud Foundry
- Red Hat OpenShift Platform

IaaS (Infrastructure-as-a-service)

- Azure Kubernetes Service (container service)
- Virtual machines

Migrating Java apps on Azure?





Free Java LTS on Azure

- Free support for all Java LTS versions
- Available for all environments, cloud and on-premise development machines
- Supported OS: Win, Linux, MacOS
- Supported Platform: Microsoft Azure, Azure Stack
- Technical preview for non-LTS versions
- Upstream changes pushed to OpenJDK by Azul Systems

OpenJDK™

Available now, supported until...



LTS

Available now

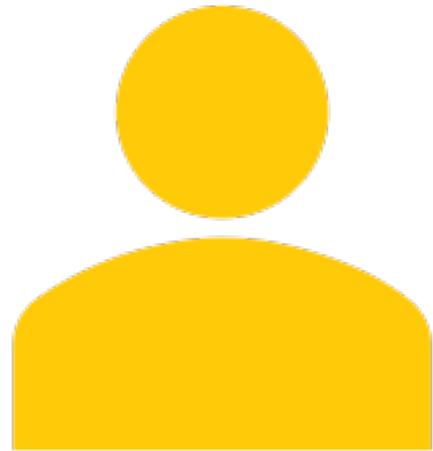


Non-LTS

Survey

[HTTPS://AKA.MS/SEAJUG-2019](https://aka.ms/seaJUG-2019)





We are hiring

[HTTPS://AKA.MS/JAVAONAZURE-JOBS](https://aka.ms/javaonazure-jobs)

[HTTPS://PIVOTAL.IO/CAREERS/OPENINGS/ENGINEERING](https://pivotal.io/careers/openings/engineering)

What's next?

- ▶ Download and try out - [Inventory Hub project](#)
- ▶ Spring on Azure -
<http://cloud.spring.io/spring-cloud-azure/>
- ▶ Dev goodies - [Azure for Java developers](#)
- ▶ Free trial – [Azure.com/Free](#)
- ▶ Create new Spring Boot projects (with Azure dependencies) w/ [Spring Initializr](#).
- ▶ Check out [spring.io](#), and [Pivotal's site](#) for all things Spring
- ▶ **SpringOne Platform, Oct 7-10. \$1P200_Java to save \$200 on registration!**

Pivotal



[**Java on Microsoft Azure**](#)

Stay in touch



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