Microsoft + vmware

Azure Spring Cloud on Learn TV

Accelerate Spring Apps to Cloud at Scale – Discussion with Azure Spring Cloud Customers

Adib Saikali -- Principal Platform Architect, VMware @asaikali
Asir Selvasingh -- Principal PM Architect, Java on Azure, Microsoft @asirselvasingh

Adib Saikali

Principal Platform Architect

Adib is helping customers build cloud native applications using Spring Cloud.

Adib is a co-organizer of the Toronto Java User Group and Toronto Cloud Foundry Meetup

VMware Tanzu

Asir Selvasingh

Principal PM Architect

Java on Microsoft Azure

On-point for everything developers need to build, migrate and scale Java applications on Azure.

Started software engineering career in the early days of Java, in 1995, and built enterprise products, applications and open source projects.

Microsoft Azure

Azure Spring Cloud - GA

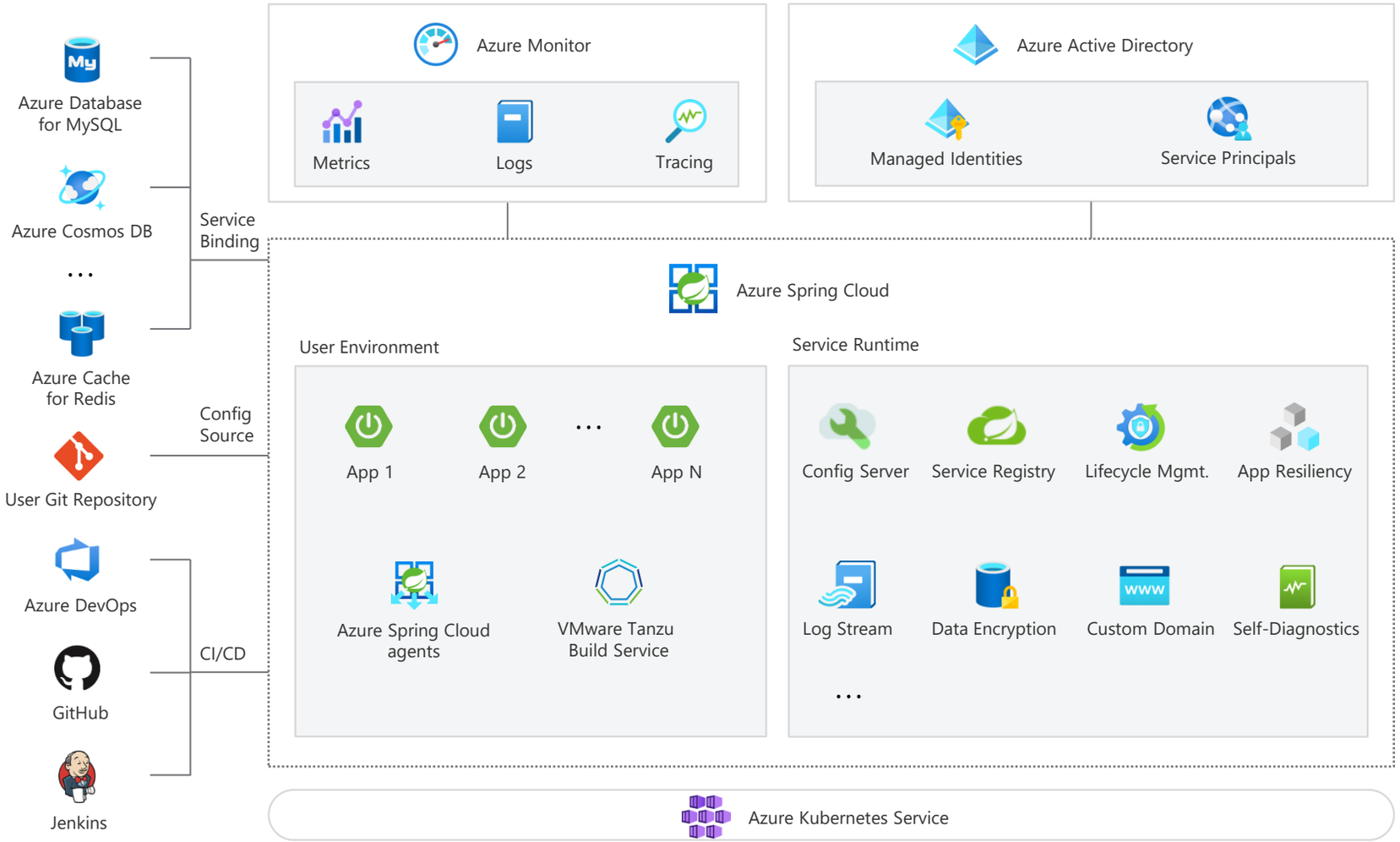
A fully managed service for Spring Boot microservices

More choices and full integration into Azure's ecosystem and services

Enterprise ready

Fully Managed Infrastructure – Azure Spring Cloud

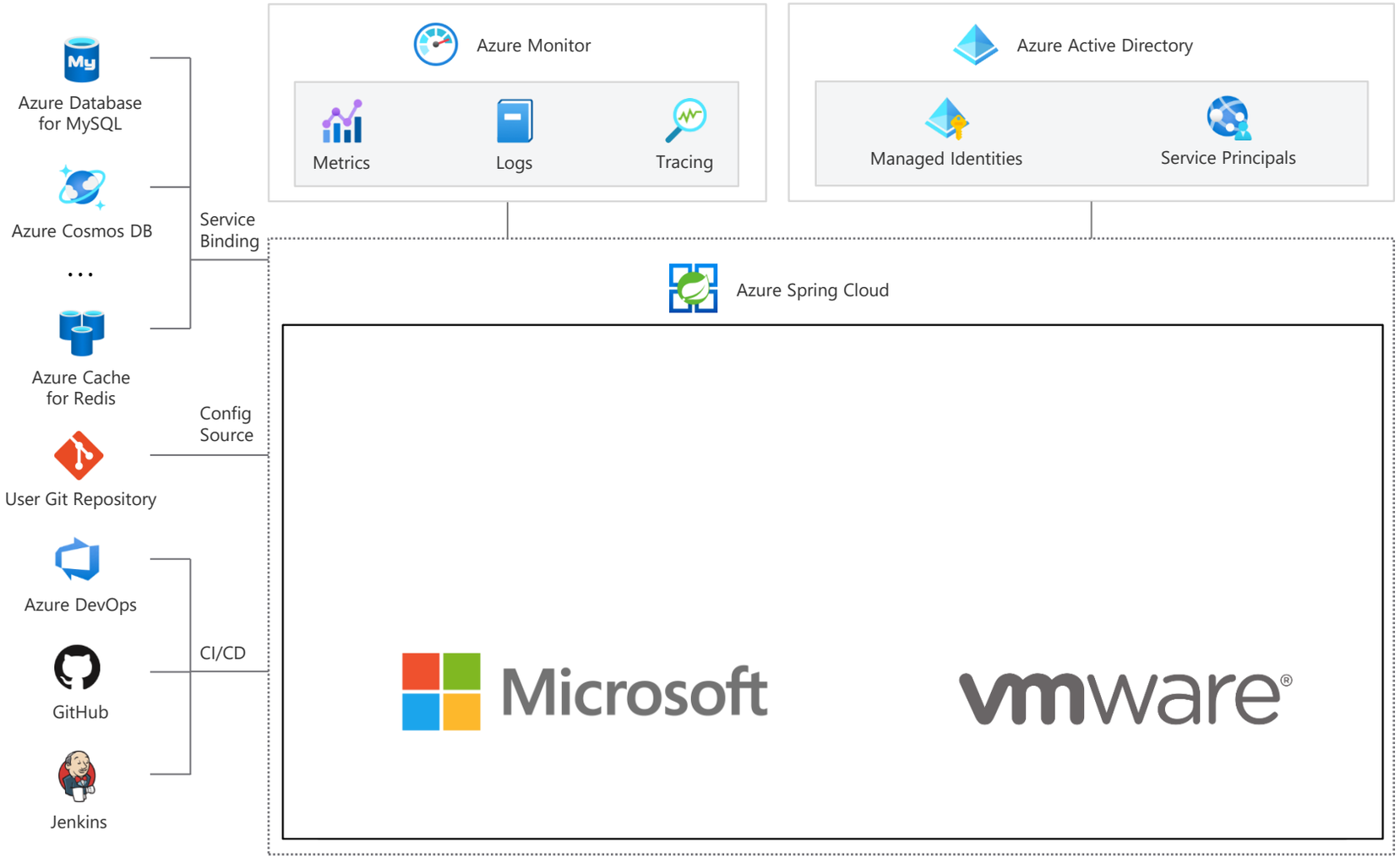
- Built-in native Spring Cloud components
  - Config Server
  - Service Registry
  - Distributed Tracing
  - Circuit Breaker (upcoming)
- Blue/Green for zero downtime
- Auto Horizontal Scale based on metrics or schedule
- VNET (private network) to secure your app and traffic



Simplify your cloud development for Spring applications

Responsibilities	DIY with Spring Boot	Azure Spring Cloud Service
Application iteration, debugging		
CI/CD		
Build and manage Clusters		
Host Spring Cloud Middleware		
Monitoring and logging		
Scaling		
Patching		
Support		

Customer VMware Microsoft



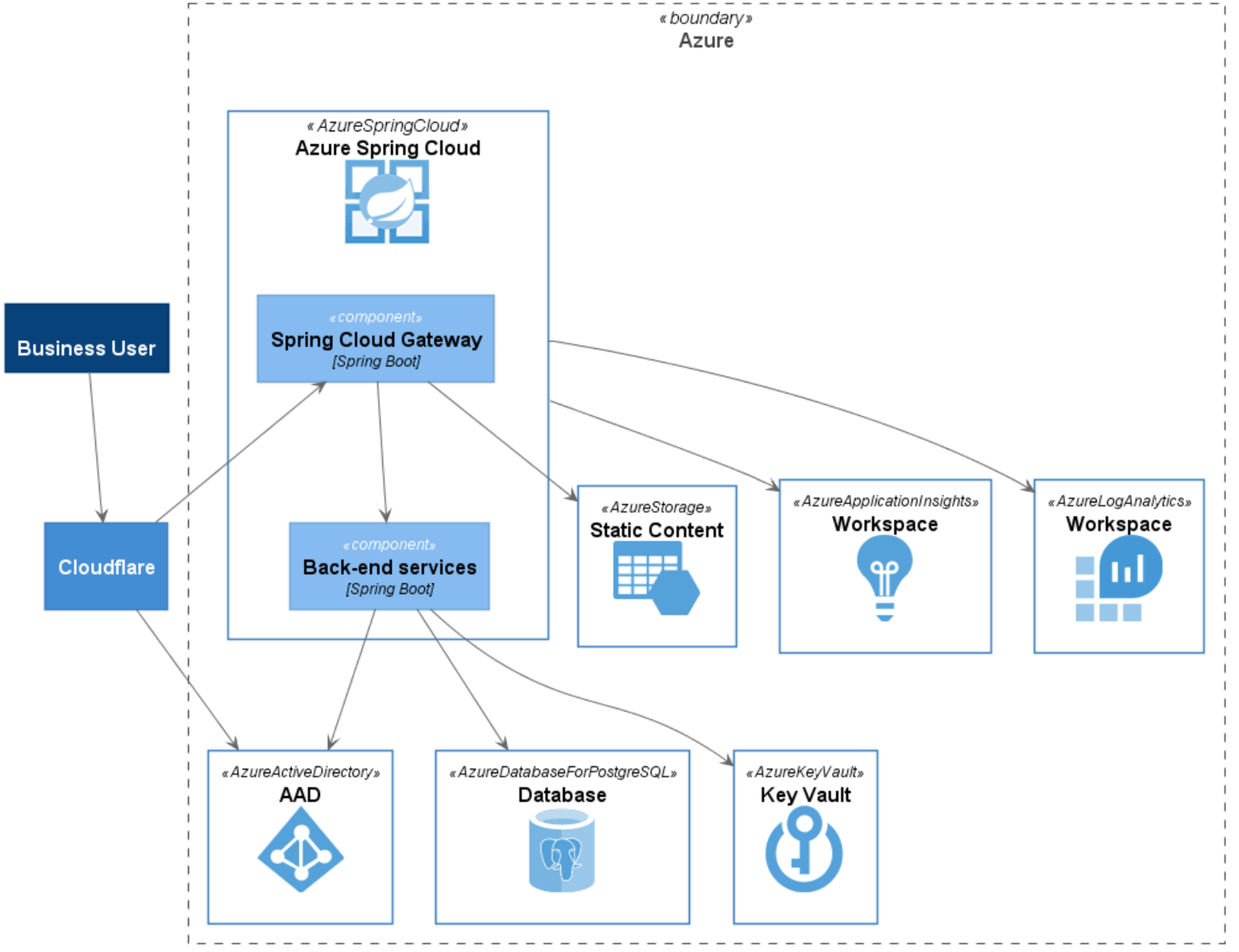
Jonathan Jones

Technical Lead, Group Finance IT

Jonathan is currently the technical lead for the Group Finance Target Architecture (GFTA) programme, which is re-building Swiss Re's Group Finance business area to be cloud native.

Before this Jonathan has held various lead Java developer roles, all in the financial services sector.

Swiss Re



- Cloudflare proxies requests to the Spring Cloud Gateway application
- Spring Cloud Gateway routes to the back-end services using the Eureka service registry
- Back-end services can call other back-end services via Eureka look-ups
- The managed identities of the back-end services are used to access Key Vault, Microsoft Graph and to retrieve static content from Azure Storage
- Azure Spring Cloud ensures logs and metrics are sent to Log Analytics and Application Insights, respectively
- Azure Database for PostgreSQL is accessed via JDBC

Swiss Re - Azure Spring Cloud Architecture

Armando Guzman

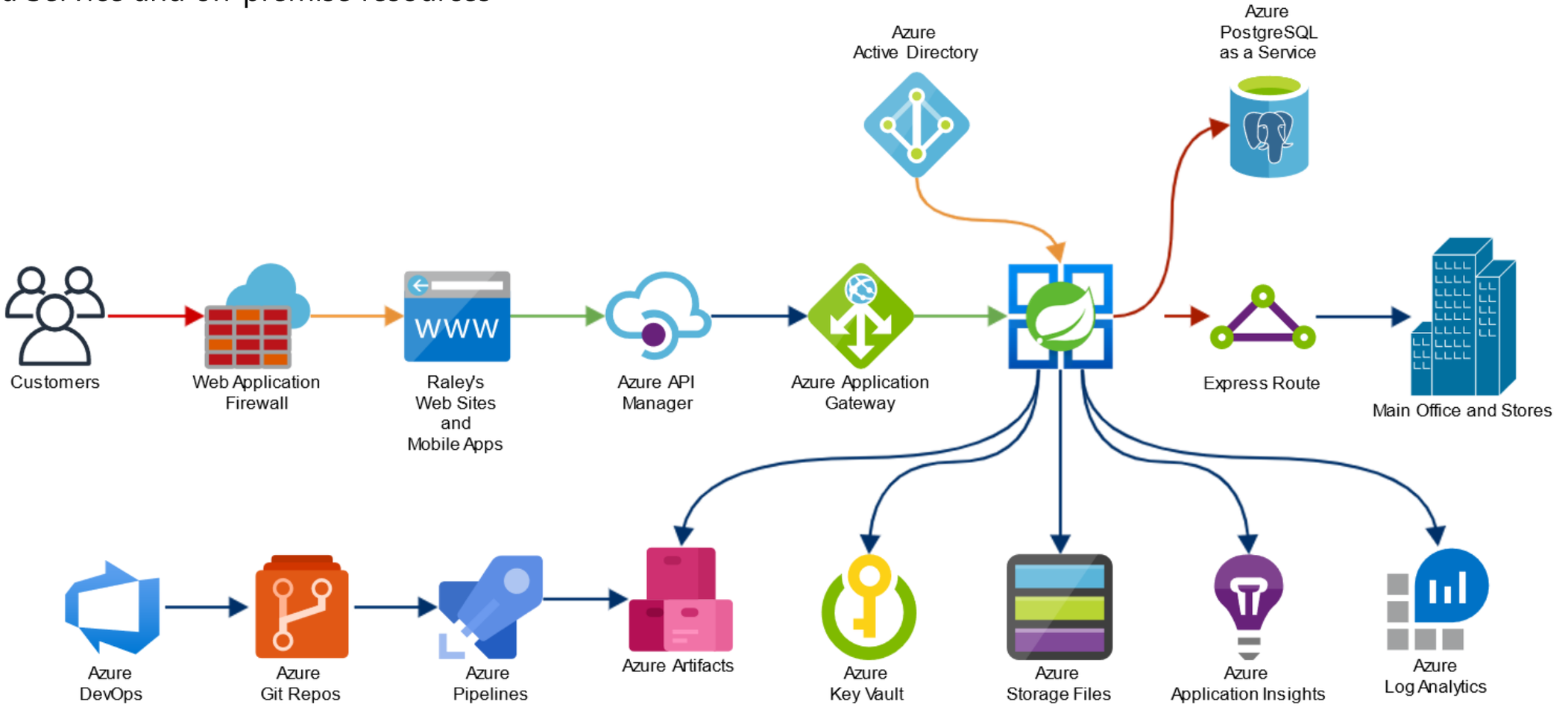
Principal Software Engineer

Armando is modernizing and securing the technology used by 131 grocery stores employing over 10,000 team members.

He is responsible for the approach, development, and implementation of the technical solution for both eCommerce and overall online digital presence leveraging Azure.

Raley's

- Azure Spring Cloud in a VNet
- Azure Spring Cloud hosts our Web Services
- Azure Spring Cloud Apps connect to Azure Postgres as a Service and on-premise resources

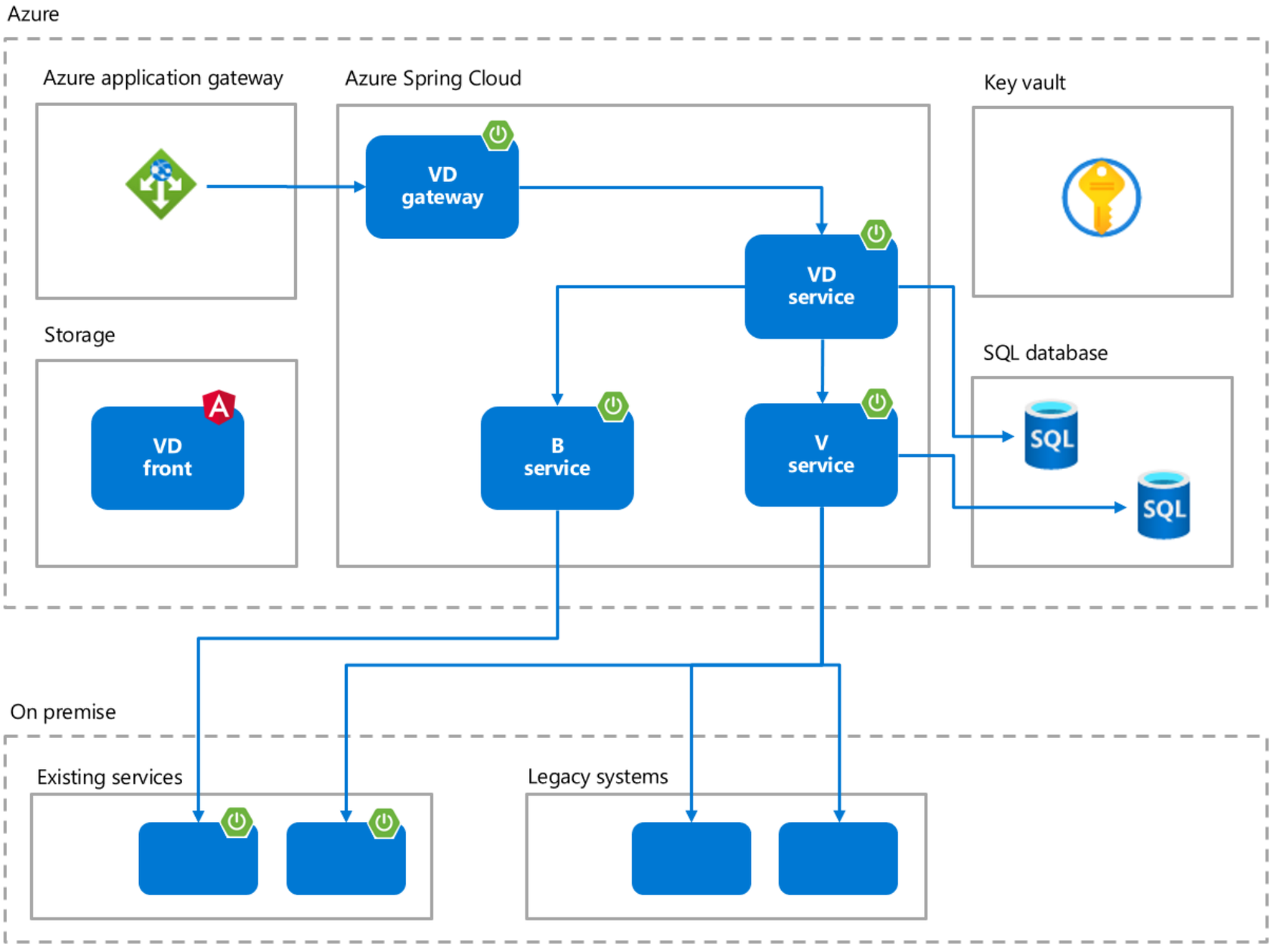


Peter Verstraete

Java Software Crafter

Peter is lead developer of a team responsible for delivering a major new application that will support an important Liantis business process. And this with a clear focus on realizing a solution which is ready to be hosted on the Azure platform.

liantis



liantis

- Azure Spring Cloud to host the microservices
- SQL Server databases
- Application gateway to direct traffic and protect the microservices
- Key vault for storing secrets
- VNET support to facilitate the connectivity to on premise

Microsoft Azure + vmware

Tell us about your workflow. What tools are you using and how often do you deploy?

Jonathan Jones
Technical Lead, Group Finance IT – Swiss Re

Armando Guzman
Principle Software Engineer – Raley's

Peter Verstraete
Java Software Crafter – Liantis

Microsoft Azure + vmware

How do you keep your end users happy and achieve SLOs? How do you fix issues?

Peter Verstraete
Java Software Crafter – Liantis

Jonathan Jones
Technical Lead, Group Finance IT – Swiss Re

Armando Guzman
Principle Software Engineer – Raley's

Microsoft Azure + vmware

What were your security considerations in using Azure Spring Cloud?

Armando Guzman
Principle Software Engineer – Raley's

Peter Verstraete
Java Software Crafter – Liantis

Jonathan Jones
Technical Lead, Group Finance IT – Swiss Re

Microsoft Azure + vmware

What does cloud native software development mean to you and what advice do you have for Spring devs considering cloud?

Jonathan Jones
Technical Lead, Group Finance IT – Swiss Re

Armando Guzman
Principle Software Engineer – Raley's

Peter Verstraete
Java Software Crafter – Liantis

Microsoft + vmware

Get started – build your cloud-native solutions today!

- Get started with Azure Spring Cloud using quickstart: aka.ms/azure-spring-cloud-start
- Learn using a self-paced workshop on GitHub: aka.ms/azure-spring-cloud-github
- Learn about implementing solutions on Azure Spring Cloud: aka.ms/azure-spring-cloud-docs
- Migrate your apps to Azure Spring Cloud
  - Spring Boot: aka.ms/azure-spring-cloud-migrate-springboot
  - Spring Cloud: aka.ms/azure-spring-cloud-migrate-springcloud
  - Tomcat: aka.ms/azure-spring-cloud-migrate-tomcat
- Wire Spring apps to interact with Azure services: aka.ms/spring-integrations

- For feedback and questions, please reach out to spring-team@microsoft.com

Discussion Questions and Answers

Microsoft Azure + vmware

Tell us about your workflow. What tools are you using and how often do you deploy?

Swiss Re, Raley's and Liantis

Jonathan Jones, Swiss Re

- All our Java developers work with IntelliJ. Our Angular developers mainly use VS Code. We use Azure DevOps, so all of our git repositories; work items and pipelines are hosted there. Our software is built using Maven.
- In Azure DevOps we use Azure Pipelines (so, maybe regrettably, we have lots of YAML). We separate Continuous Integration and Deployment into separate pipelines. So our CI pipelines execute with each commit and run all the unit tests and integration tests, etc. The pipeline artifact produced by that pipeline is then automatically deployed to our development subscription by its respective CD pipeline.
- One thing that is extremely important to us is automated testing. We practice Test Driven Development and have the basic principal that you need to be able to write good tests with good assertions for anything you deliver. With Spring Boot we have an excellent framework that supports this strategy. We are productive thanks to the fact we have a lot of very experienced and capable Java developers in our teams.
- Our infrastructure is deployed via the terraform task in Azure DevOps and we were happy that a provider was available early for Azure Spring Cloud.

Armando Guzman, Raley's

- Raley's uses Jira for Agile Planning, Terraform for Infrastructure as Code, IntelliJ as an IDE, Azure DevOps for source control and CI/CD. Our Java applications are built using Maven and stored in Azure Artifacts.
- Our pipelines in Azure DevOps are a mixture of classic and YAML pipelines but we are migrating all builds to be YAML based. We are also investigating migrating from classic releases to YAML.
- Developers can deploy to our Development Environment from topic branches. Deployments to our Staging Environment are automatic and triggered by a pull request merging to master. Deployments to Production are also done with Pipelines but are triggered by a product owner approving the release.
- Our infrastructure is deployed using Terraform in Azure DevOps pipelines and we rely on the Azure providers. We have separate repos for Terraform modules we want to reuse and separate pipelines for each logical resource in Azure. For example we have a pipeline each for API Manager, Application Gateway and Azure Spring Cloud.
- Raley's is an Azure shop, and we continue to find Azure meets all our infrastructure and development needs.

Peter Verstraete, Liantis

- Mature software factory used by 15+ agile development teams, with:
  - IntelliJ for both Java and Angular development, Maven as build tool.
  - Bitbucket (GIT) as VCS, using GIT Flow workflow practices (PR's to ensure code quality).
  - Jenkins with CI jobs (including multibranch pipelines), custom deploy jobs, automation tool to generate/manage jobs
  - SonarQube for additional quality assurance.
  - Nexus as repository manager.
  - Integration between JIRA, Bitbucket and Jenkins.
- Deploy to PROD: responsibility of agile development team
- Azure provides building block that help to extend our current software factory
- POC: Jenkins 'Infrastructure as Code' pipeline to create/destroy an Azure Spring Cloud setup.

Microsoft Azure + vmware

How do keep your end users happy and achieve SLOs? How do you fix issues?

Liantis, Swiss Re and Raley's

Peter Verstraete, Liantis

- When it comes to keeping the end users happy, dynamic scaling to handle peak loads is very important. Azure Spring Cloud covers this prerequisite by providing the Auto Scaling in/out feature (now in preview). We've been able to evaluate this feature successfully by doing several load tests with various ramp up/down scenarios. One of the nice things is you can scale up a service based on metrics of another service (or even another resource), which gives the possibility to anticipate on coming load to the first service.

- What is appealing about application monitoring is that everything you need is available through the Azure portal:
  - Distributed tracing with Application map as a starting point, to investigate performance/failures.
  - Drilldown to transaction details.
  - Access to logs.
  - Performance monitoring via metrics.
  - Currently we are further looking into the possibilities of alerts and custom dashboards.
  - The integration of log streaming into the Azure Toolkit for IntelliJ plugin is very helpful during functional testing of deployed services.

Jonathan Jones, Swiss Re

- At all times, but especially during financial closing periods it's important we run a stable, accurate and performant service for our business.
- We expose Spring Boot actuator endpoints on all our services, including the Spring Cloud Gateway. These are automatically monitored, and any failures raise tickets in our incident management system.
- The application map feature of Application Insights provides distributed tracing and enables us to get a mostly clear picture of how applications inside our instance are working with each other. We are looking forward to Azure Spring Cloud implementing the latest version of the App Insights Java agent, so we get monitoring of the JDBC calls too.
- Recently we have started to integrate the Azure Spring Cloud horizontal autoscale. Some of our services during financial closing periods get particularly busy and the ability to adjust the number of instances based on metrics (like heap size, number of requests) should enable us to meet peak demand without manual work or over provisioning of resources.
- We also have the application logs sent to a Log Analytics workspace and to have more real time feedback the Log Stream feature of Azure Spring Cloud is used often, especially in development environments.
- Ultimately, we keep our end users happy by running a reliable and performant system but also by providing an environment where we gain the businesses trust to allow a regular deployment of features, which work as intended.

Armando Guzman, Raley's

- As part of the Unified Commerce team I am responsible for enrollment in our Loyalty program, Order Processing and Personalized Offers. All these services must remain stable and online 24 hours a day. It's amazing how many customers shop for groceries in the middle of the night!

- We also have reoccurring events, product offers, $5 Mondays. These events drive customers to our site on a regular basis resulting in predictable peaks. These known events are monitored closely, and we use Azure Monitor to send alerts whenever thresholds are exceeded. Currently we ensure enough headroom is always available to handle our peaks, but we are investigating Azure Spring Cloud autoscaling and moving to Application Gateway 2.0 since that also supports autoscaling.

- Our developers are very happy with Log Stream and Log Aggregation in Azure Spring Cloud to help debug and pinpoint problems quickly. All defect fixes must be peer reviewed using Pull Requests, deployed to our staging environment and communicated before deploying to production.

- Azure Spring Cloud has allowed Raley's to quickly develop and deploy new apps while exceeding customer and developer expectations. The beauty of Azure Spring Cloud is that Raley's can take advantage of K8S but we do not need to learn how to manage a K8S deployment.

Microsoft Azure + vmware

What were your security considerations in using Azure Spring Cloud?

Raley's, Liantis and Swiss Re

Armando Guzman, Raley's

- A major component of security involves protecting the network and zero trust. Azure Spring Cloud supports deploying to private VNets allowing Raley's to utilize Azure API Manager and Azure Application Gateway to protect our services from outside and inside the network.

- Azure Spring Cloud also natively supports Azure Key Vault. Raley's was able to move application secrets to Azure Key Vault. After adopting Azure Key Vault for our Spring Applications we also migrated our Azure DevOps Pipeline secrets to Azure Key Vault.

- Azure Spring Cloud also supports Spring Configuration Server allowing us to keep our configuration in git repos and update configuration using Pull Requests and Azure Pipelines.

- Azure Spring Cloud allows us to meet and improve on our security posture while providing peace of mind that our services are secure.

Peter Verstraete, Liantis

- When it comes to identity and access management, Liantis has a solution in place based on one of the leading IAM providers. Using a custom Spring Boot starter, integrating this solution with Spring Security is a smooth process. It works perfectly in services deployed in Azure Spring Cloud.

- For now secrets are stored in configuration. Although they are protected by encryption, we decided to move our secrets to Azure Key Vault. This makes the management of secrets much easier.

  At Liantis we have company-wide and component-specific secrets. We decided to store the different kind of secrets in separate Azure Key Vaults. Recently, Microsoft released a new version of its Key Vault SpringBoot starter which supports such an approach.

Jonathan Jones, Swiss Re

- Clearly in a move to the public cloud security is one of our primary considerations. Swiss Re are following the CSA CCM (Cloud Security Alliance, Cloud Controls Matrix) and anything we do has to be compliant with that. All the Spring Boot applications we deploy are checked for CVEs and we simply can't deploy the software should there be any known vulnerabilities. We also have automated smoke tests after new deployments, which check that key aspects of our security policy have not been mutated by the deployment.
- By using a PaaS like Azure Spring Cloud we try to lower our attack surface by delegating activities like network management and compute management to Microsoft. The less moving parts we must configure and maintain, the better. This is demonstrated further by Microsoft taking responsibility for patching the Java versions and exposing a fine-grained permission model for Azure Spring Cloud.
- The system assigned managed identity Azure Spring Cloud provides to each application is important, as we use this to bootstrap access to Azure Key Vaults, access Microsoft Graph and authenticate to where we store the static content in Azure Storage.
- Important as well is we minimize the exposure of our applications, so all the back-end services run on private IP addresses. All ingress comes through our Spring Cloud Gateway application which is shielded by Cloudflare; whose capabilities include a Web Application Firewall (WAF).

Microsoft Azure + vmware

What does cloud native software development mean to you and what advice do you have for Spring devs considering cloud?

Swiss Re, Raley's and Liantis

Jonathan Jones, Swiss Re

- Well firstly for me cloud native doesn't necessarily mean microservices. Our teams are building services that are decomposed to a level which makes sense to us. We want to take advantage of the public cloud, but we want to maximize the time we spend on interacting with our business and delivering value through software. "Cloud native" ultimately must provide tangible results which our business sponsors recognize. Clearly platforms like Azure Spring Cloud help, as they take away implementation and management effort which is not our core competency.
- In terms of what we do:
    1) we try and give our product teams autonomy and ownership. Self-service is a critical factor – we have to be able to make progress without waiting for service requests and long fulfilment chains
    2) We remove as much friction as possible from the development process
    3) We have no magic. Everything we create and deploy must have a representation in git.
    4) All of our services expose clean and consistent APIs
    5) We never compromise on security. So we create a baseline, which we maintain and improve over time
    6) We automate the monitoring of our software as much as possible
- I think one piece of advice that has worked well for us is whether you target the cloud or not is to get the basics right i.e. start off from day one doing all the "right" things i.e. everything in git, automated tests, automated builds, automated deployments.

Armando Guzman, Raley's

- Cloud native to me means creating applications that can take advantage of Cloud Services. Cloud native software development must facilitate rapid development, CI/CD, and autoscaling to name a few key features. Cloud native software development allows developers to focus on the application logic, innovate and quickly bring value to the business team.

- Azure Spring Cloud supports all these feature while eliminating the need to spend infrastructure and development resources deploying, configuring and testing to ensure features are setup correctly.

- Adopting Azure Spring Cloud has made our developers more productive, allowed them to focus on the application and business logic without needing to worry about the underlying infrastructure all while adding in demand technologies and skills to their resumes!

- Adopting Azure Spring Cloud shifts the management of Kubernetes, OS patches and updates to the experts at Azure making our development and business teams more productive.

Peter Verstraete, Liantis

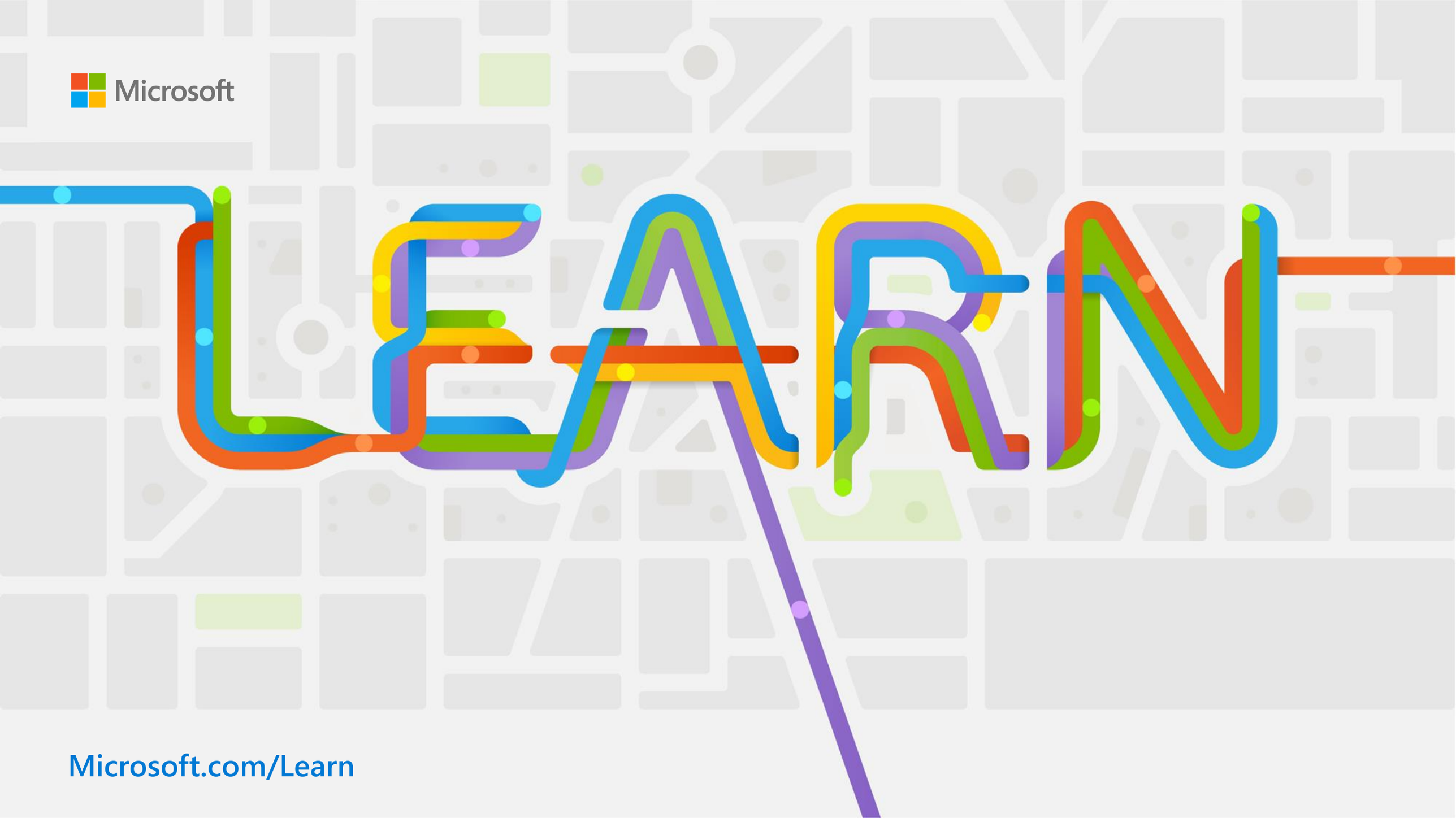
- The Spring Framework together with Spring Boot and Spring Cloud helps to improve the application or microservice development process. Different kind of boilerplate aspects are taken care of. And the frameworks help developers to use architectural principles, design patterns, enterprise integration patterns or distributed system patterns more easily.
  A supporting platform/ecosystem (with capabilities such as DevOps pipelines, centralized logging & monitoring, security, discovery, centralized configuration, scaling, ...) is a must:
  - to streamline the development process.
  - to act as the hosting platform for the developed microservices.

- By adding Azure and Azure Spring Cloud to the trio Spring/Boot/Cloud, you remove a major burden from your IT organization to setup/maintain such a supporting ecosystem.

- It allows our agile development teams to focus on producing business value/functionality without worries.

Microsoft Azure + vmware®

Thank you, everyone!!


Microsoft
LEARN
Microsoft.com/Learn