

Enterprise Application Development in the Cloud

Workshop Training

v0.1



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Agenda

- ▶ Expectations
- ▶ What You Will Learn
- ▶ Planned Workshops

* Workshop Session 1:

- Architecture and Reference SDK Overview



Expectations

- We will meet once a week for an hour.
- You can attend locally or remotely via Zoom Video Conferencing.
- We will meet for about 4 weeks.
- We will review frameworks, technologies, and walk through the code for the reference apps that are included in the SDK.
- You will then be given resources so that you can then build your own IoT apps.
- You are expected review the workshop materials and build the apps outside of the workshop.
- You are expected to setup tools and cloud accounts (these are all free and require no credit card).
- You are expected to bring questions to the workshop or work with me via email.

What Will You Learn?

- Java Spring Framework (Core and JDBC).
- Maven Build and Dependency Mgmt. Tool.
- GitHub Version Control System.
- JAX-RS to build a REST based Server App in Java.
- Apache Tomcat Java Server.
- LavaChart and Guzzle libraries to build a Reporting app in Laravel PHP (or you can use plain PHP).
- Codenvy Cloud IDE (or you can use Eclipse).
- OpenShift PaaS Cloud.
- Foundation to build other IoT or Cloud based applications.



More Expectations

- You are free to hook into my Raspberry Pi where I can post IoT data to your IoT Server App or you can use your own Pi.
- My Raspberry Pi IoT app is designed to connect to an array of backend Cloud Servers so you will need to build your IoT Server app to the specifications in the SDK.
- You are free to build and deploy the reference apps in the SDK and study as well as modify them as desired.
- You all know Java so you should not have any challenges learning how to build the IoT Server app.
- If you do not know Laravel you are free to build the IoT Reporting app in plain PHP.



Planned Workshop Sessions

- #1 - Architecture Overview / IoT Device App. (Python)
- #2 - IoT Services App. (JAX-RS, Spring, Maven)
- #3 - IoT Reporting App. (LavaReporting, Guzzle)
- #4 - Debug.....Next Steps



**Questions?
Are You Ready?**



Workshop Session 1

Architecture and Reference SDK Overview



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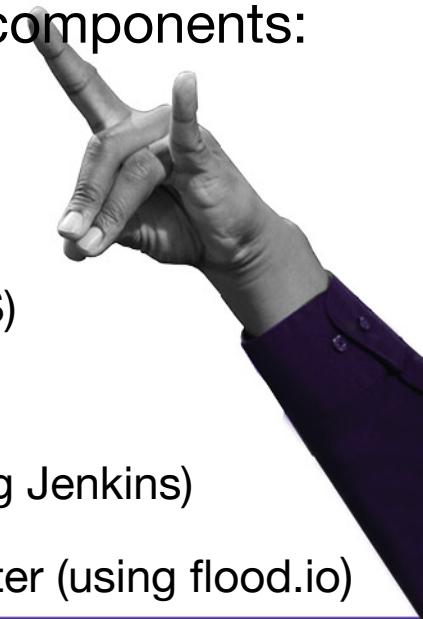
Workshop Session 1

- Review the SDK and Reference Architecture:
 - Overview of the Cloud Architecture
 - Overview of the IoT Apps
 - Overview of the Development Tools
 - Overview of SDK structure
- Code walk through of IoT Device App
- Action Items/Homework



Introduction

- The next generation Development Platform for developing Enterprise Applications will likely be browser and most certainly cloud based.
- This Workshop will demonstrate what this Development Platform will look like and give you a hands on opportunity to experience this platform.
- The Development Platform will consist of the following components:
 - ★ Cloud based IDE - Codenvy
 - ★ Cloud based Development Runtimes - Codenvy
 - ★ Cloud based Production Runtimes - Redhat OpenShift (on PaaS)
 - ★ Cloud based Source Control System - Github
 - ★ Cloud based Automated Build System - Redhat Openshift (using Jenkins)
 - ★ Cloud based DevOps Automation - Jenkins, JUnit, Maven, JMeter (using flood.io)



Reference Architecture and SDK

The Workshop will leverage a Reference SDK as a teaching tool:

- ★ Fully functioning end to end system using one IoT application and two enterprise applications
- ★ Applications were written in Java and PHP (languages you already know)
- ★ Fully documented in a Reference SDK
- ★ The SDK will be used as guide and for a reference in the class materials
- ★ The SDK provides you with all the scaffolding to get your Cloud development started:
 - ✓ Spring Frame application template (can be cloned from a GIT repository)
 - ✓ Laravel Application application template (can be cloned from a GIT repository)
 - ✓ Requirements and Documentation
 - ✓ Step by step instructions for how to get started

Reference Applications

The following applications will be built in the Workshop using the Cloud based Development Platform:

★ IoT Services App - Using Tomcat Application Server, written in Java leveraging the JAX-RS API, JSON, and the Spring Framework

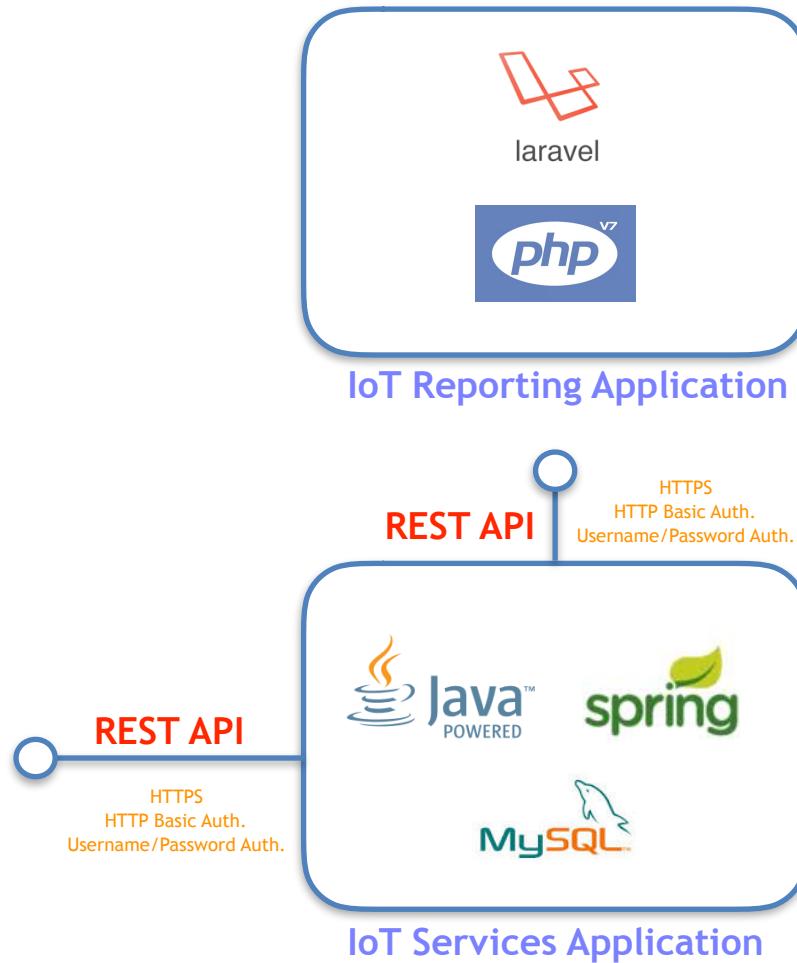
★ IoT Reporting App - Responsive browser based written in PHP leveraging Bootstrap (for responsive support), Guzzle (for HTTP Client to REST API), LavaCharts (for charting), and the Laravel Framework

* An IoT App using a Raspberry Pi 3 written in Python will be consuming a REST API published on the IoT Server that will be available for use in the Workshop.

*If you build your own IoT App using your own Raspberry Pi then I am assuming you will build this outside of the Workshop.



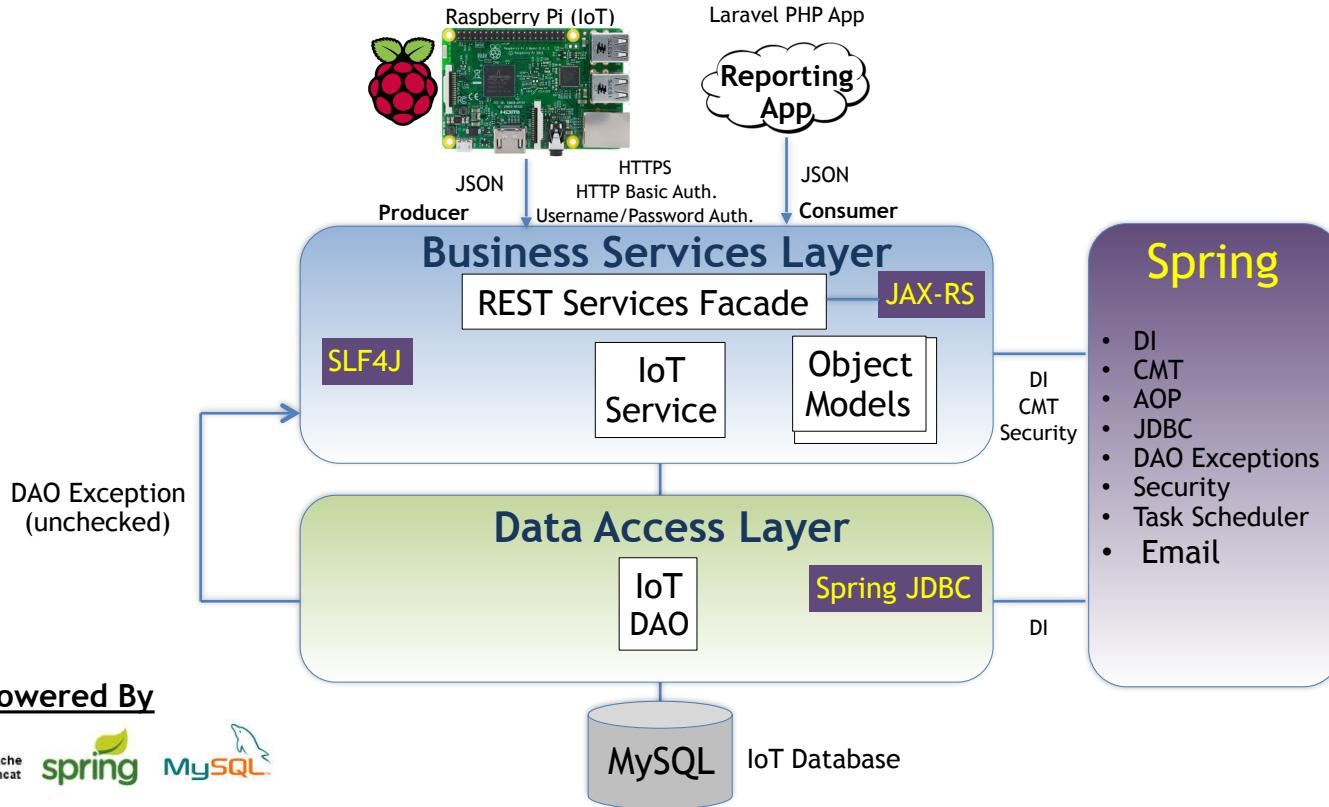
IoT Logical Architecture



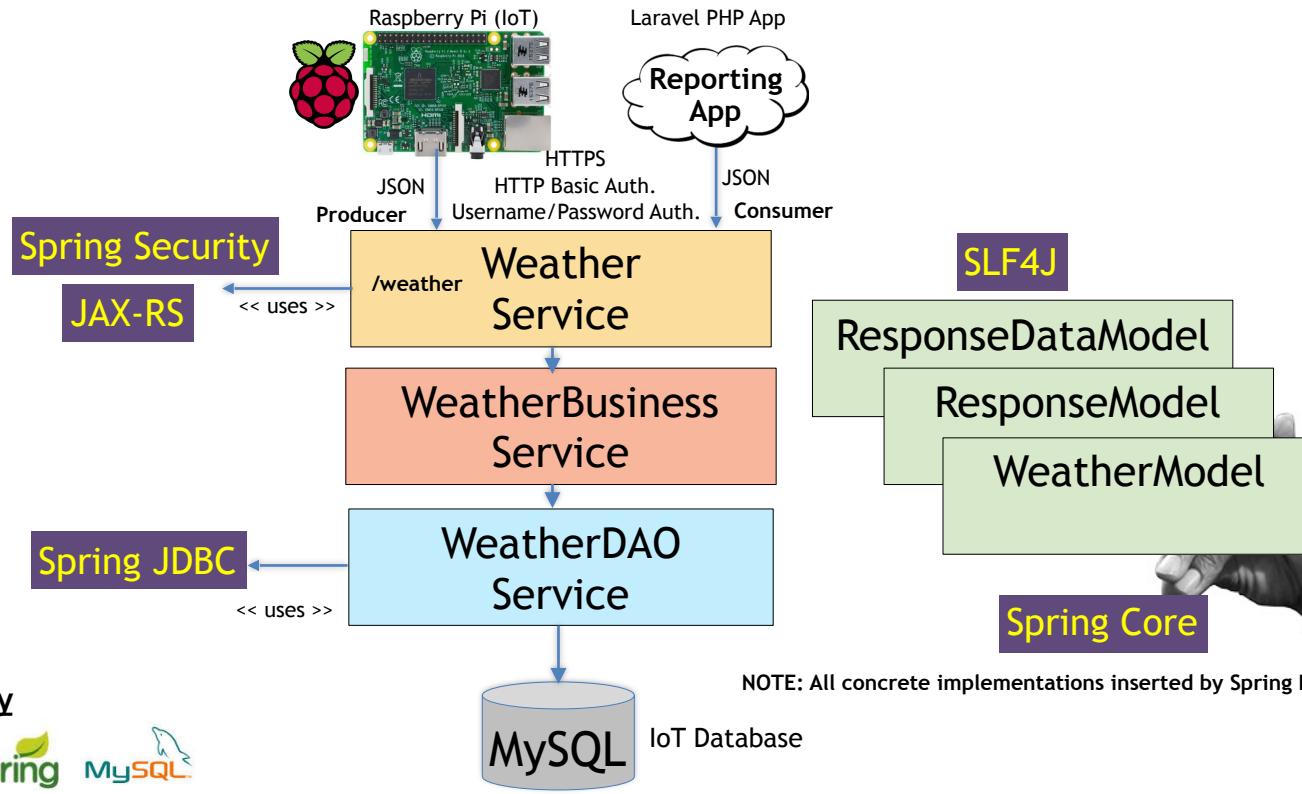
SDK

- Reference Apps
- Developer Templ.
- Docs
- Tools

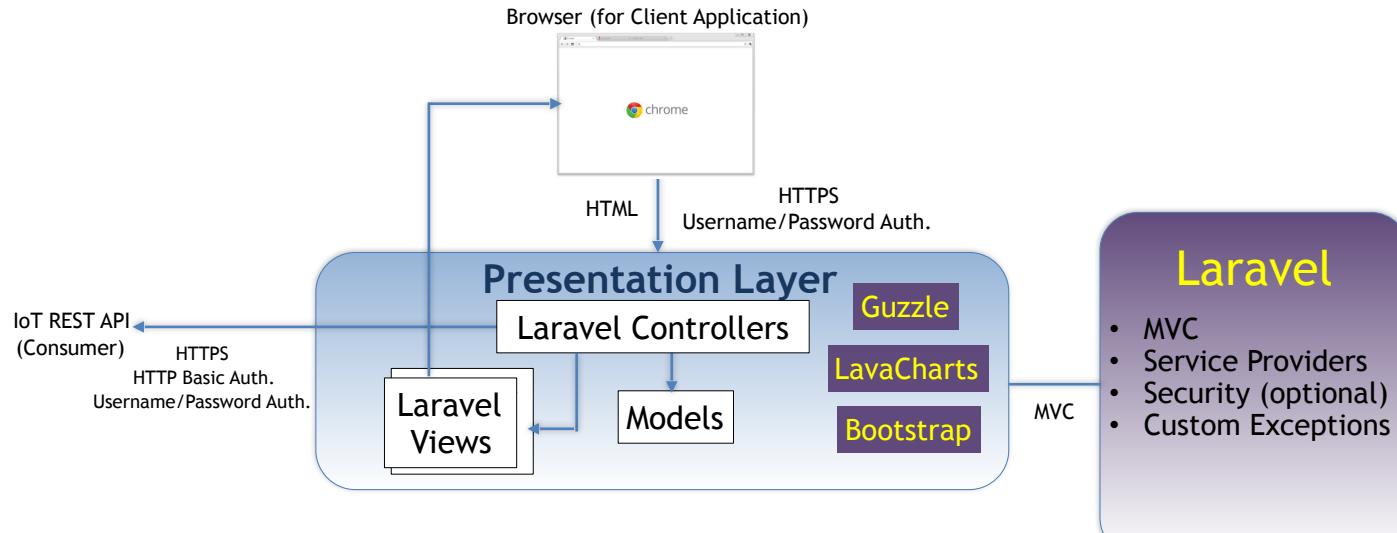
IoT Services App Logical Architecture



IoT Services App Logical Architecture



IoT Reporting App Logical Architecture

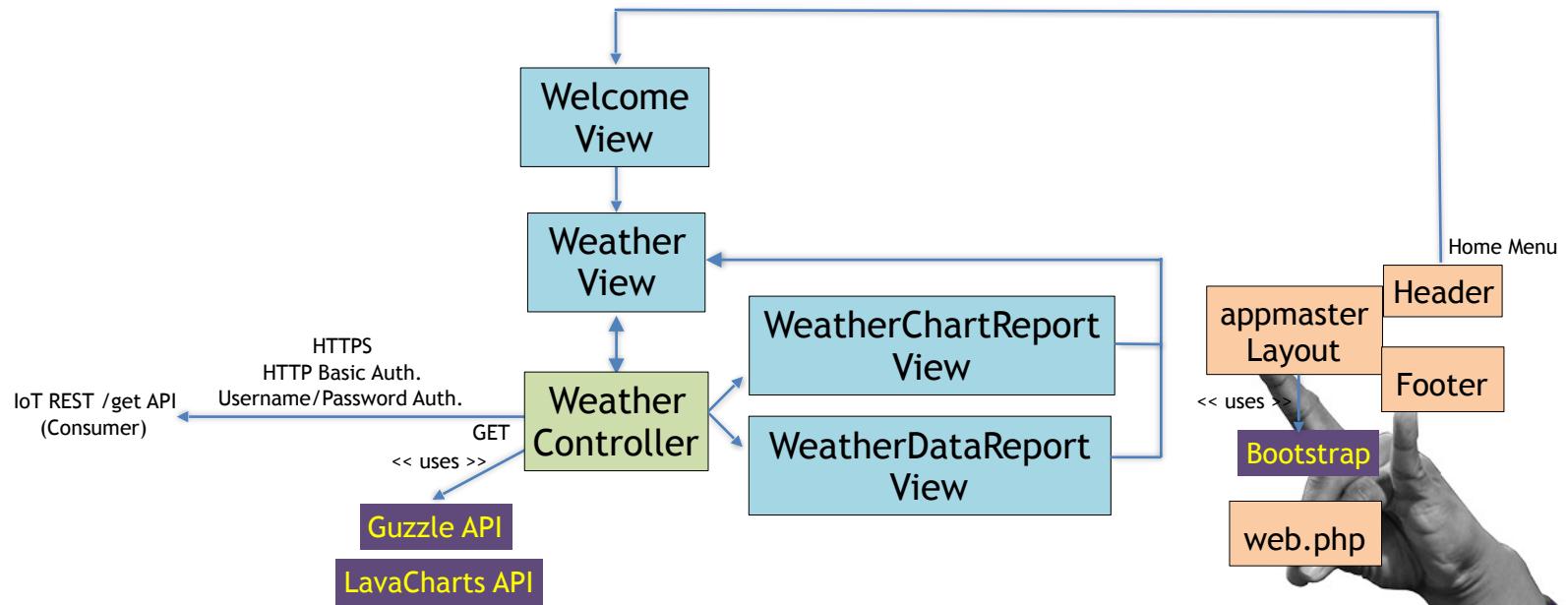


NOTE: No backend services are required for this application!

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IoT Reporting App Logical Architecture



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SDK Layout

- Go to <https://github.com/markreha/cloudworkshop>.
- You can clone or download the SDK from here.
- See the README.md file to how to get started.
- Folders of interest:

sdk	Root - See README.md
└ developer/templates	App Templates
└ docs	All docs, see README.md
└ pi	Reference Raspberry Pi App
└ tools	Misc. tools, doc tools

Let's Walk Through the SDK!

SDK Reference Apps

- **IoT Services App:**
 - Go to <https://github.com/markreha/cloudservices>.
 - You can clone or download the SDK from here.
- **IoT Reporting App:**
 - Go to <https://github.com/markreha/cloudapp>.
 - You can clone or download the SDK from here.
- **IoT Device App:**
 - Available under /sdk/pi directory in your SDK.

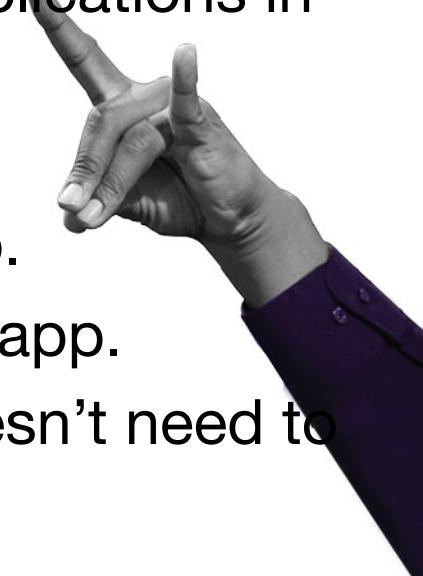
Development Tools

- * You don't need to install too much.....
 - ✓ You can use Eclipse on your desktop.
- * You don't need to install anything.....
 - ✓ I would encourage you to also develop and build some or all of your code using the Cloud based Codenvy IDE.
 - ✓ The beauty of the Cloud based IDE is that you don't need to install anything! And you can always snapshot your environment if it gets messed up!

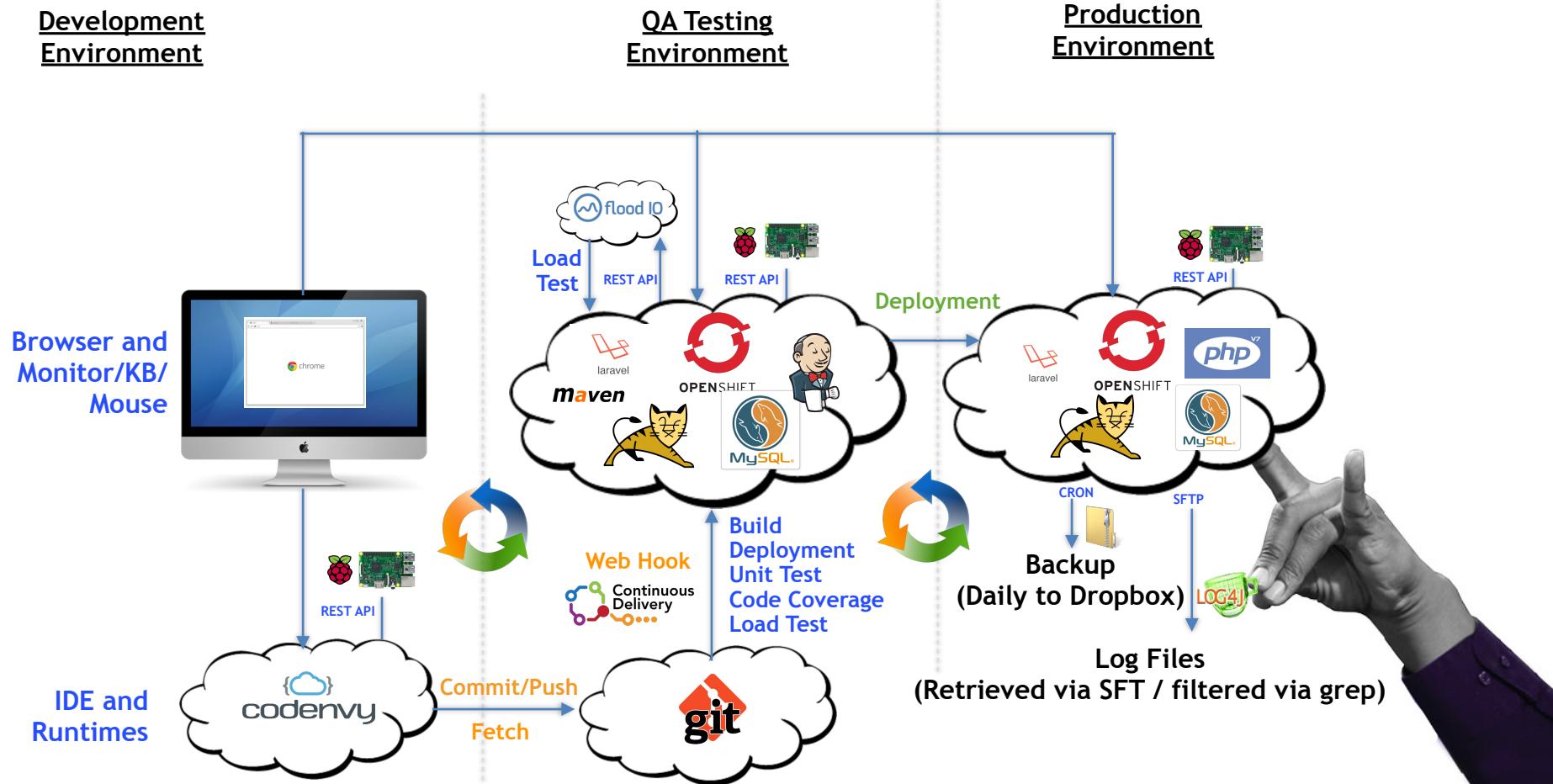


Deployment Environment

- * You (or IT) doesn't need to install anything.....
 - ✓ We will use a Cloud PaaS.
 - ✓ We will use Redhat's Public OpenShift Cloud.
 - ✓ Once you have “procured” your OpenShift Containers, setup your database, and done some minimal configuration you will be ready to build and deploy your applications in the Cloud.
 - ✓ OpenShift uses GitHub for all its build.
 - ➡ Uses Maven if you are building a Java app.
 - ➡ Uses Composer if you are building a PHP app.
 - ✓ The beauty of the Cloud is that you (or IT) doesn't need to install anything!

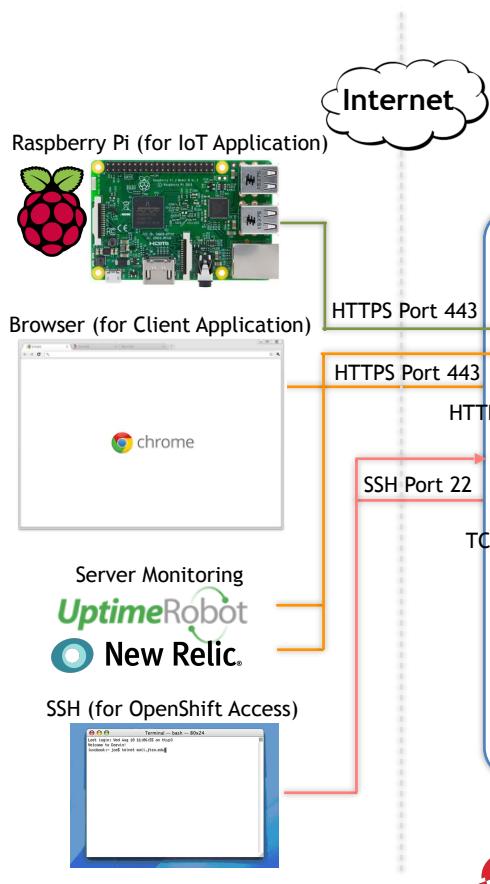


Cloud Based Development Platform

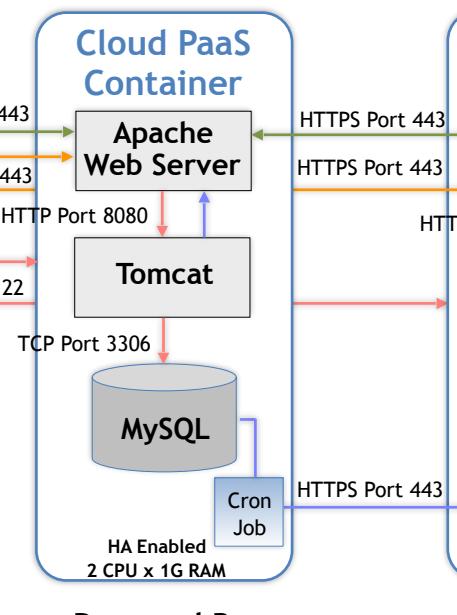


Physical Cloud Architecture

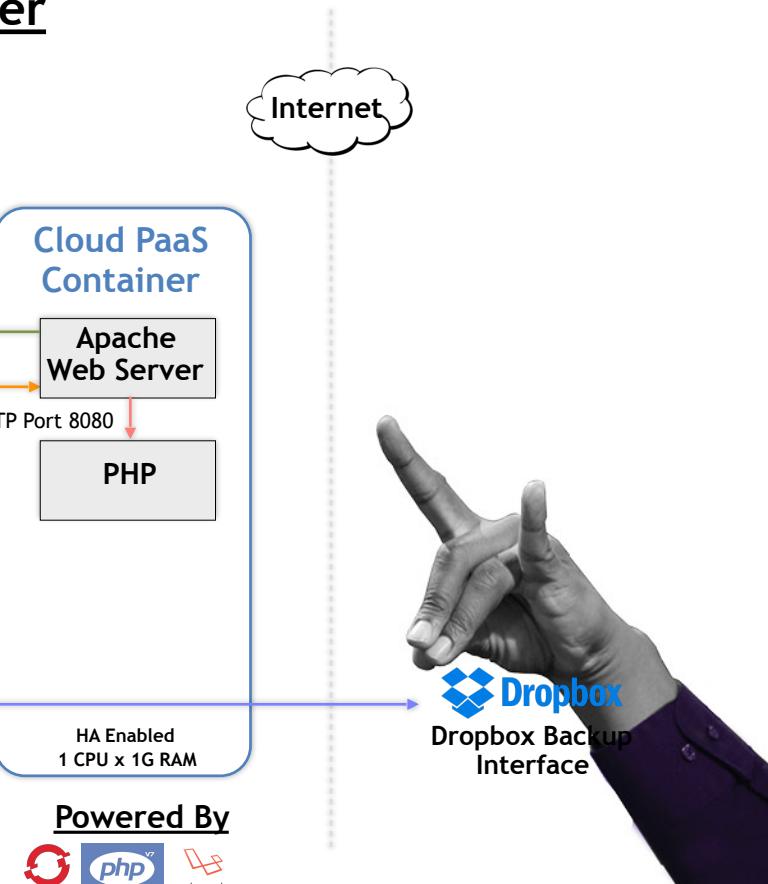
Client Tier



Web-App Tier and Database Tier

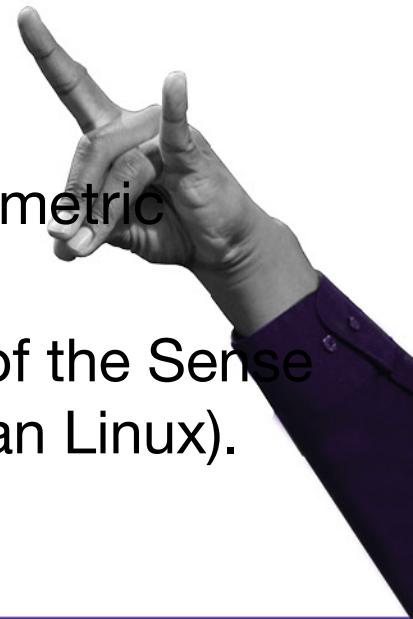


Integration Tier



IoT Device

- IoT Device is a Raspberry Pi 3 with a Sense HAT.
- IoT Device App is written in Python 3.
- IoT Sense HAT features:
 - Temperature, Humidity, and Barometric pressure
 - Gyroscope, Accelerometer, and Magnetometer
 - LED Display
 - Joystick
- IoT Device polls for Temperature, Humidity, and Barometric pressure IoT Data every 30 minutes.
- IoT Device App is actually pretty simple because all of the Sense HAT API's are built into the Raspberry Pi OS (Raspbian Linux).
- I connect to the Raspberry Pi remotely using VNC.

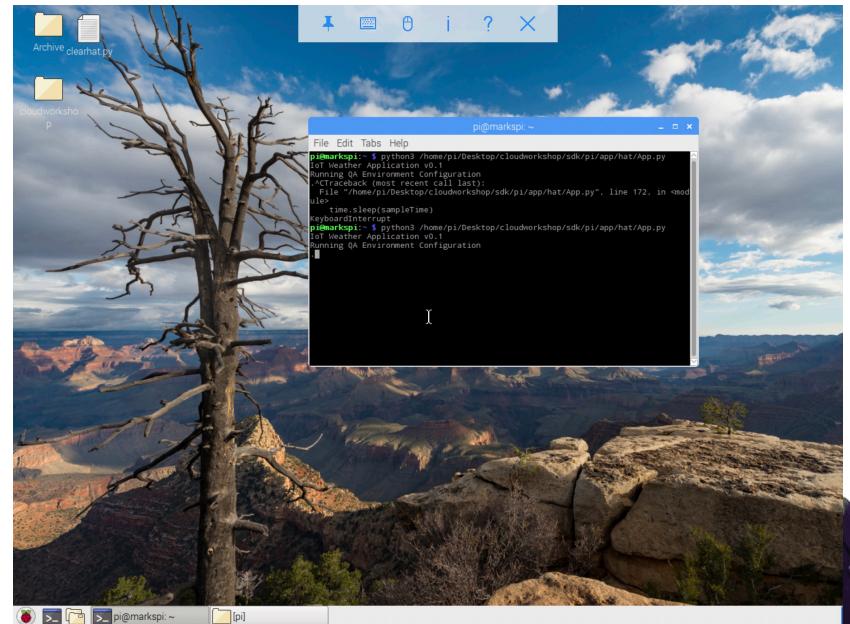


IoT Device Code Walkthrough



Sense HAT

Raspberry Pi 3



Connected via VNC

Let's Walk Through the Code!

Action Items / Homework

1. Setup the following Cloud accounts:

- Github account (go to <https://github.com>).
- Codenvy account (go to <https://codenvy.com>).
- OpenShift account (go to <https://www.openshift.com>).
 - Be prepared to setup 2 accounts so you can deploy Java/MySQL and PHP apps.

2. Install the following tools if you plan on using desktop tooling:

- See README.md in the */sdk* and */sdk/docs/development* directories in the SDK.
- Install Eclipse EE edition and Tomcat.
- Install Eclipse PHP edition.

3. Go through the following tutorials:

- Go thru Maven Tutorials (see Reference Resources).
- Go thru Spring Tutorials (see Reference Resources).
- Go thru REST Tutorials. (see Reference Resources)

4. Start using the SDK:

- Clone the SDK from GitHub (see link from previous slide).
- See README.md in the */sdk* and */sdk/docs/development* directories in the SDK.
- Import the IoT Services App. from the SDK. Review the code then build the app.



Reference Materials

- Maven Tutorials:
 - [Tutorial from TutorialsPoint](#)
 - [What Is Maven?](#)
 - [Maven In 5 Minutes](#)
 - [Maven Home Page](#)
- Spring Tutorials:
 - [Tutorial from TutorialsPoint](#)
 - [Another Tutorial from TutorialsPoint](#)
 - [Spring Framework Documentation](#)
 - [Spring Framework Home Page](#)
- REST Tutorials:
 - [Tutorial from TutorialsPoint](#)
 - [Tutorial from Oracle](#)
 - [JAX-RS Specification](#)



Next Up

- Workshop Session 2 will be scheduled for next week.
 - We will be reviewing the IoT Services App. code.
 - We will start building the IoT Services App.
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- Shoot me an email if you have questions and cannot get something working.
 - Be ready with questions for the next session.



Workshop Session 2

IoT Services App



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