



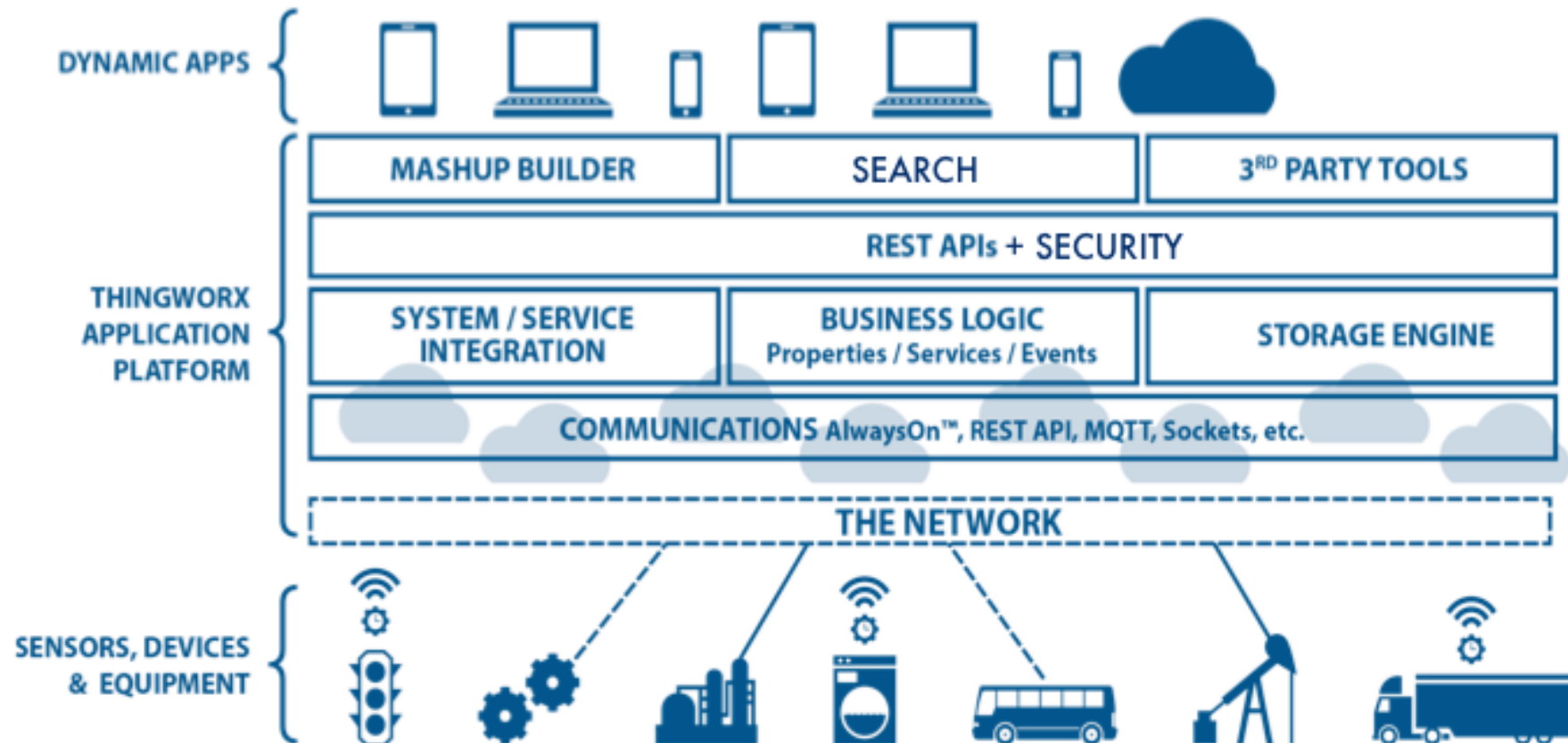
What is ThingWorx?

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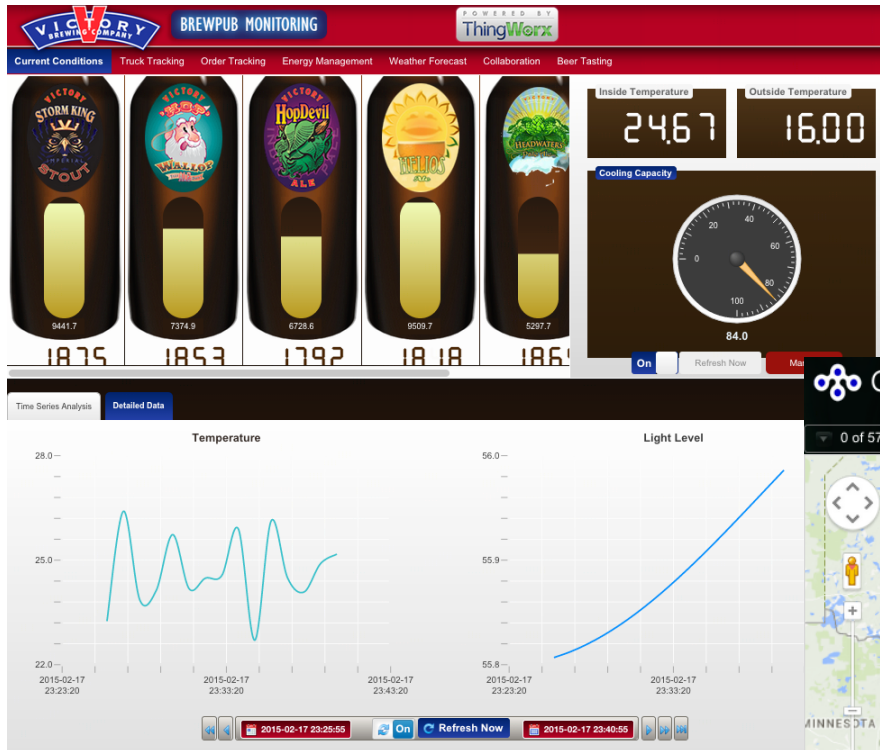
What Can ThingWorx Do For You?

- **Provide a compelling web interface for your device**
 - Graph data for analysis
 - Configure your device
 - Share your data as a web
 - Integrate your device with external resources
- **Collect and Store Data from Your device**
 - Provide a data modeling and development environment
 - Collect acquired data for future use
 - Monitor and alert you when conditions occur
 - Manage Multiple Devices
- **Simplify communications between you and your device**
 - Real time communications from your device to the server
 - Fast, firewall friendly and encrypted connections

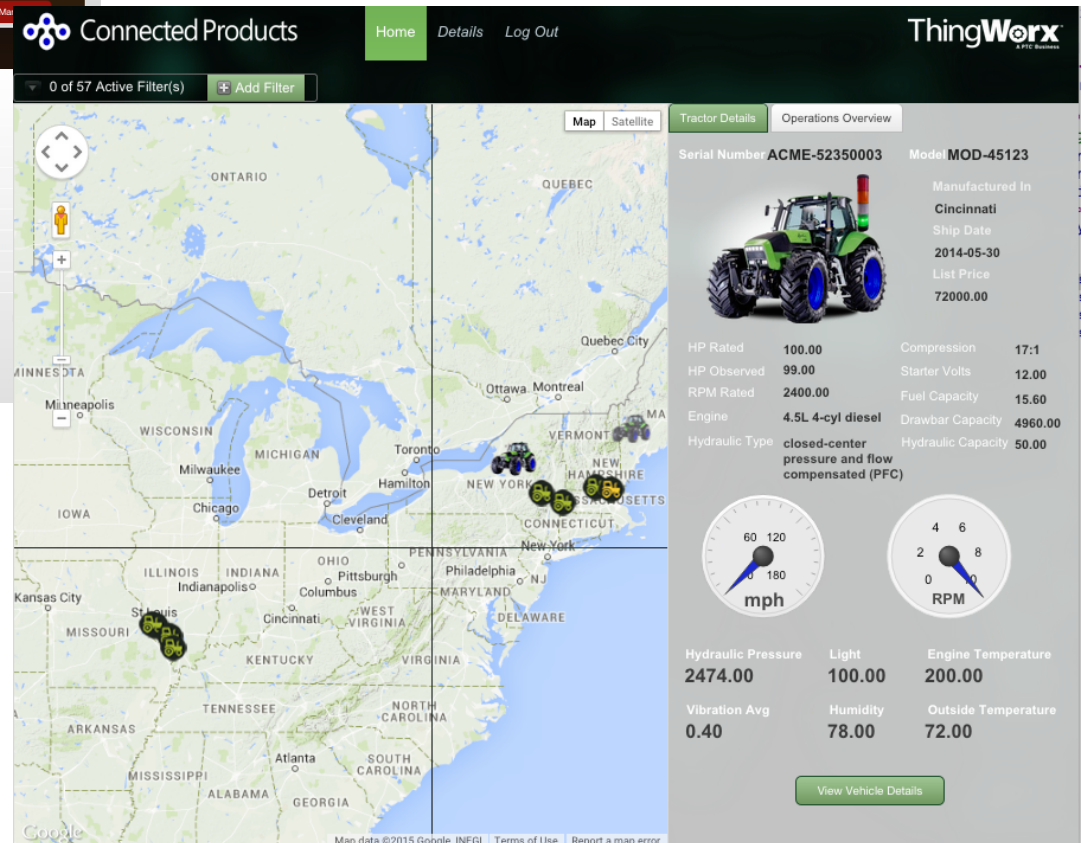
The ThingWorx Stack



Building Rich Clients



- Web Applications without HTML
- Data Modeling & High Performance Storage without SQL
- External Integrations



- Rich Library of Widgets
- Browser Based Development
- User Authentication and Security Built In

Some ThingWorx Terminology

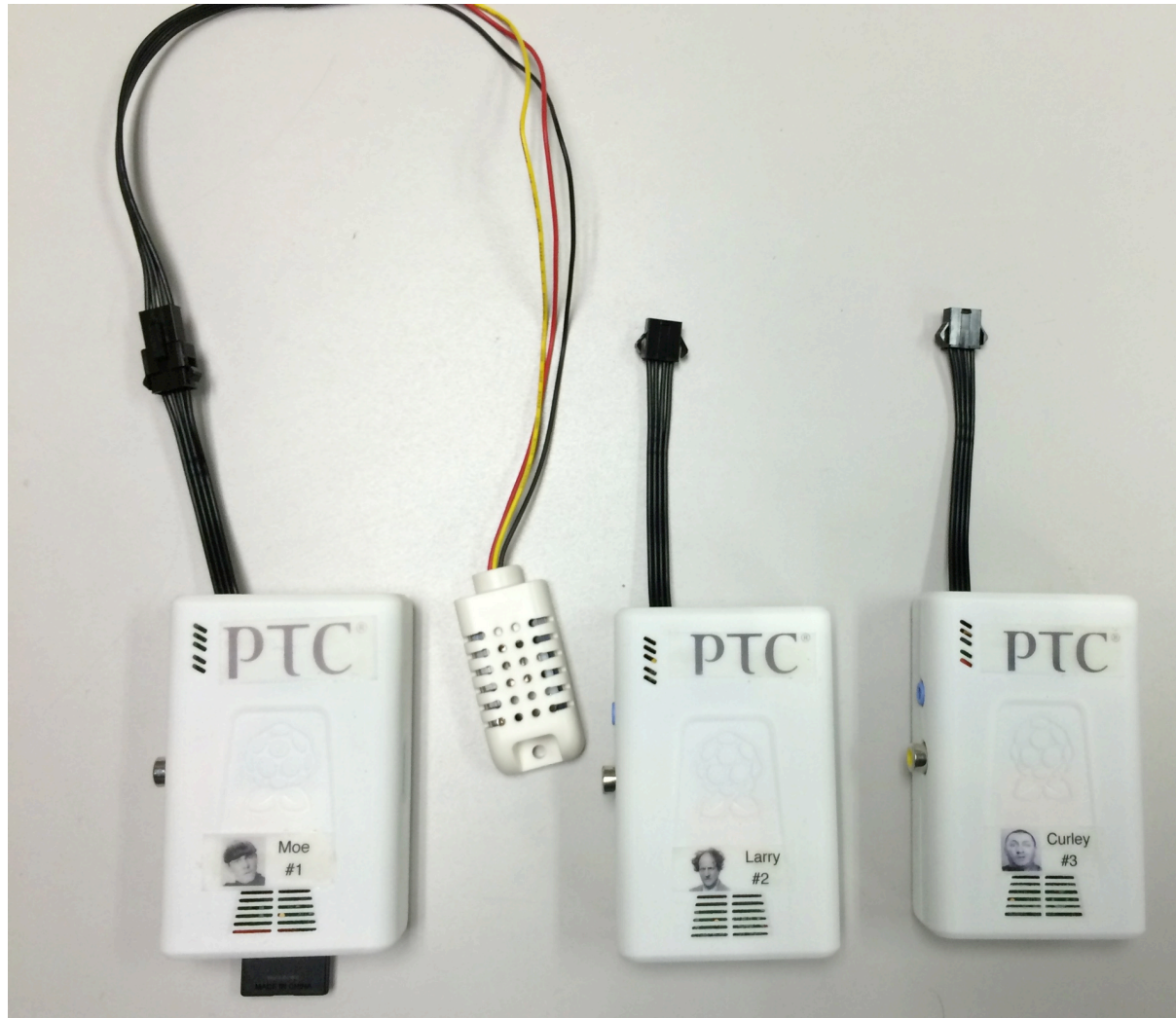
- A **Thing** represents a device, physical asset, system or business process
- An example of a **Thing** could be this Portable Weather Station....



- **ThingTemplates** – Like base classes in a Object oriented language
- **Edge Micro Server (EMS)** – A device embeddable service providing a real time data channel to the ThingWorx server.
 - Available in C, Objective C, Java, and .NET versions
- **The Composer** – A Web Based Modeling and Development Environment
- **MashUps** – Web Pages constructed with **Widgets** that know how to connect with data on the ThingWorx server
- **Streams** – Fast data storage used to capture the **Properties** of your Things as they change over time.

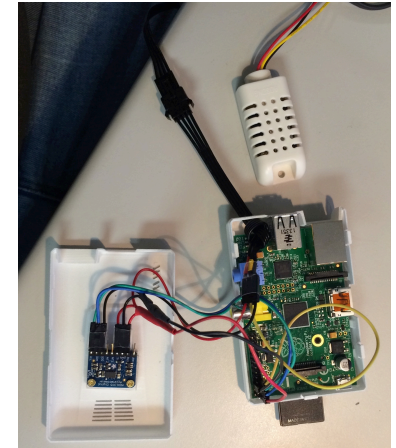
My Three Weather Stations

- Meet Moe, Larry and Curley

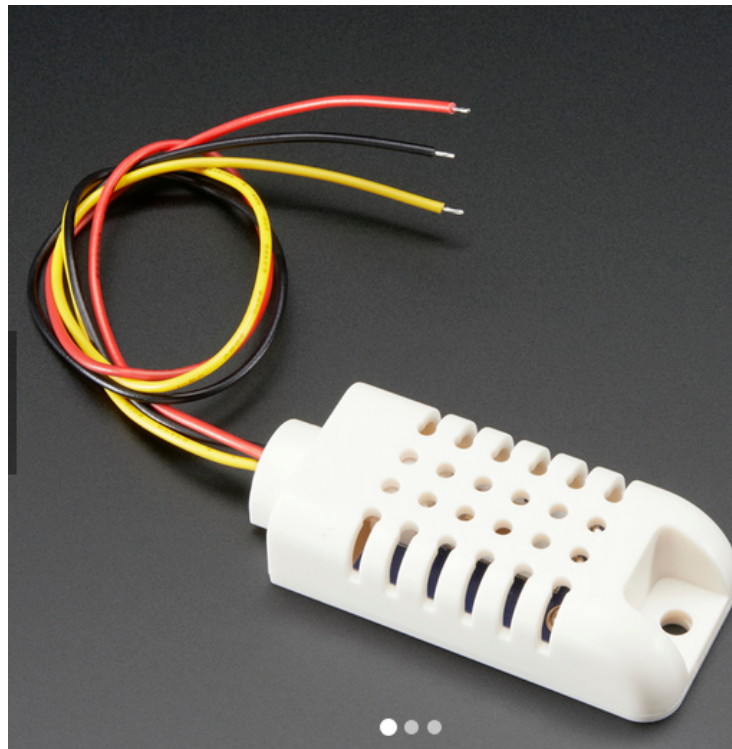


Lets Build Something...

- A Simple Weather Station consisting of:
 - A Raspberry PI with:
 - A Temperature & Humidity Sensor
 - An Edge Micro Server (EMS)
- A ThingWorx Server
 - A Data Model (Thing) representing the Station
 - A Stream Recording Its Readings
 - A Single Page Mashup Displaying These Values



- **Java Based EMS Running on as Raspberry PI**
- PI has an AM2302 temperature & Humidity Sensor
- Communicates with the PI over the I²C Bus



- Source Code for this EMS Available at http://www.thingworx.com/academic_content/r-pi-weather-app/

- Review Java Edge Server Code
- Discuss Properties and How they are collected
- Discuss deployment and setup on the PI

Creating The Mashup

- Discuss Composer
- Import WeatherStationTemplate ThingTemplate
- Create WeatherStationLog Value Stream
- Create MoeWeatherStation Thing
- Build Mashup



Temperature C

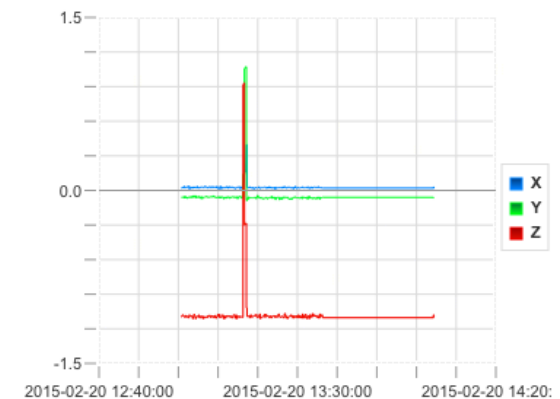
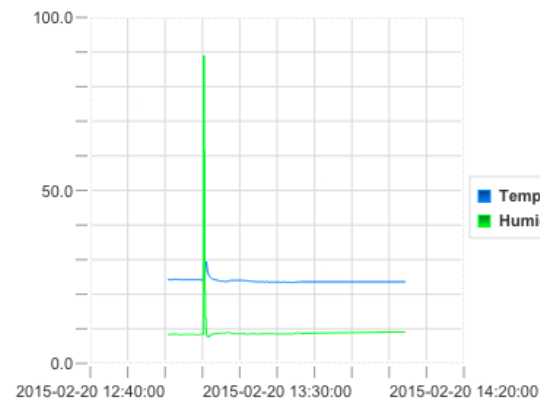
23.70

On

Refresh Now

Humidity

9.10



Using the Composer

- In the composer we Bind Widgets to Services

The screenshot displays the ThingWorx Composer interface for a mashup named 'WeatherStationMashup'. The interface is divided into several sections:

- Top Bar:** Contains tabs for 'WeatherStationMoe', 'WeatherStation', 'WeatherStationLog', 'WeatherStationMashup' (active), and 'WeatherStationPicture'. Below these are buttons for 'Design', 'Info', 'View Mashup', 'Save', and 'Cancel Edit'.
- Left Panel:** A 'Widgets' pane with a 'Category' dropdown set to 'All' and a 'Filter Widgets' search bar. It lists various widget categories like 'Auto Refresh', 'Blog', 'Button', 'Checkbox', 'Contained Mashup', 'Dashboard', 'Data Export', 'Data Filter', 'Date Time Picker', 'Divider', 'Entity Picker', 'Event Chart', 'Expression', 'Fieldset', 'File Upload', 'Folding Panel', and 'Gauge'.
- Central Canvas:** The main workspace showing the mashup design. It includes a photo of a weather station, two digital displays for 'Temperature C' and 'Humidity' (both showing '0.00'), a green 'ON' button, a 'Refresh Now' button, and two 'Time Series Chart' widgets. A dashed box indicates a widget is being dragged or positioned.
- Right Panel:** A 'Data' pane showing the 'Things_WeatherStationMoe' service. It lists properties such as 'AccelX', 'AccelY', 'AccelZ', 'description', 'Humidity', 'isConnected', 'lastConnection', 'name', 'tags', 'Temperature', and 'thingTemplate'. The 'QueryPropertyHistory' service is highlighted, showing its parameters and returned data.

- **Students?** – Schools can register to use ThingWorx in their programs at no cost with the ThingWorx Academic Program
<http://www.thingworx.com/academics/>
- **FIRST Robotics Teams and Individuals?** – ThingWorx is available at no cost for all teams and select Makers through the ThingWorx Academic Program
<http://www.thingworx.com/academics/>
- **Businesses** – See if the ThingWorx Platform is right for you by requesting a Self Guided Experience Tutorial along with a 15 day free trial of the product at <http://www.thingworx.com>
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