



# vCampus **Live!** 2012

## Developing Windows 8 Mobile Apps for the PI System

Presented by **Lonnie A. Bowling, DST Controls**



Start

Lonnie  
Bowling

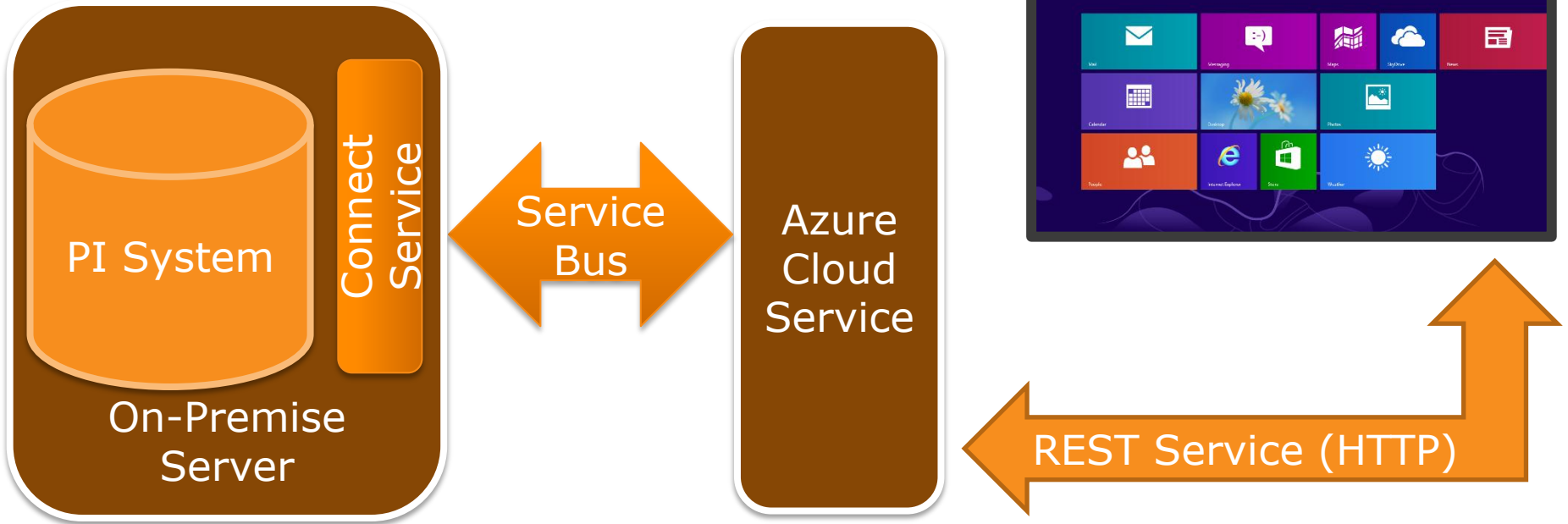


# Introduction

## Objectives

- Extend a PI System to Azure
- Create a REST type Service
- Create Windows 8 Store App for a Tablet
- Getting motivated to start writing your own applications

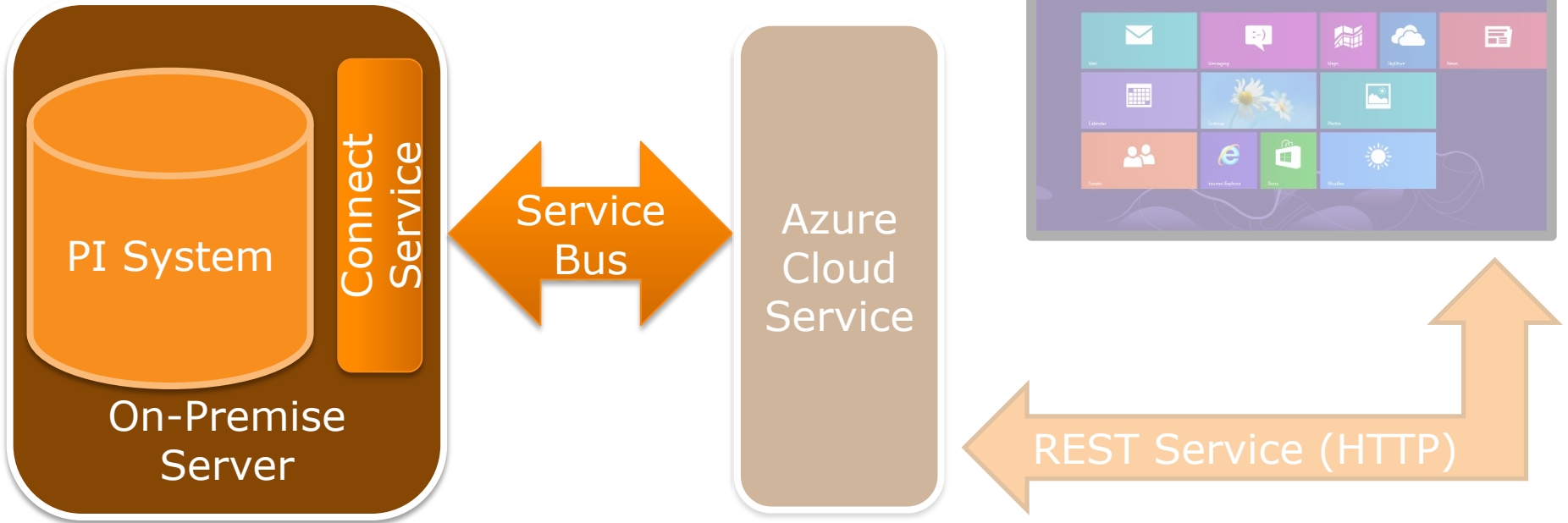
# System Architecture



# Mobile + = Cloud

- Want a HTTP REST service
- Cross-Platform capabilities
- Keep our PI System secure
- Remove client-server dependencies

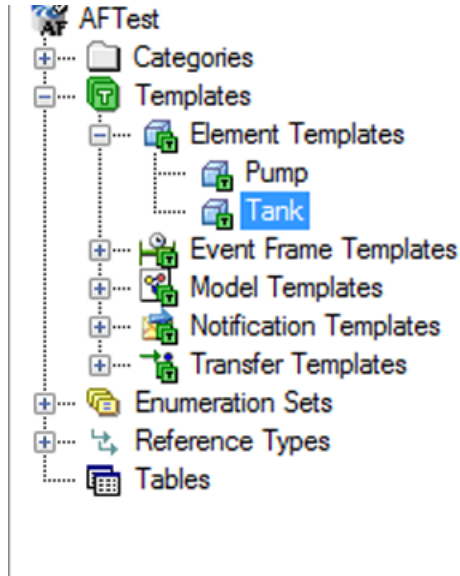
# On Premise Server



# Connector Service Steps

- Get an Azure account, install SDK
- Create PI AF Templates and Assets
- Create a service using WCF and the PI AF SDK
- Connect service to an Azure service bus
- See my [vCampus Blog](#) for more details

# Location PI AF Template



General Attribute Templates Ports

Filter

	i Name	Description	Default Value
	Description		
	i  GPS Coordinates		False
	Latitude		0
	Longitude		0
	Level		0 in
	Name		



# PI AF GPS Attribute

The screenshot displays the PI AF interface. On the left, the 'Elements' tree shows a hierarchy: Elements > California > T4002. On the right, the 'T4002' details panel is open, showing tabs for General, Child Elements, Attributes, Ports, and Version. The 'Attributes' tab is active, displaying a table of attributes for T4002. The 'GPS Coordinates' attribute is highlighted with a dashed border.

Name	Value
Description	South Napa Transfer Tank T4002
GPS Coordinates	True
Latitude	38.30412
Longitude	-122.29798
Level	112.160827636719 in
Name	T4002

# Code... PIService Interface

```
[ServiceContract(Namespace="PIService")]
interface IPIService
{
    [OperationContract]
    List<PIValue> GetPlotValues(string Tag, DateTime StartTime,
                               DateTime EndTime, int Interval);

    [OperationContract]
    List<PIAsset> GetAssetsByLocation(double Latitude,
                                     double Longitude, double Radius);

    .
    .
    .
}
```

# Code... PIService Implementation

```
PIValues PVS = Srv.PIPoints[Tag].Data.PlotValues(StartTime,
                                                    EndTime, Interval);
List<PIValue> PlotValues = new List<PIValue>();
foreach (PISDK.PIValue pp in PVS)
{
    if (pp.IsGood())
    {
        PIValue oValue = new PIValue();
        oValue.Value = pp.Value;
        oValue.TimeStamp = pp.TimeStamp.LocalDate.ToUniversalTime();
        PlotValues.Add(oValue);
    }
}
```

# Code... PIService Implementation

```
AFAttributeValueQuery[] GPSIsSet = new AFAttributeValueQuery[1];
GPSIsSet[0].AttributeValue = 1;
GPSIsSet[0].AttributeTemplate = db.ElementTemplates["Tank"]
    .AttributeTemplates["GPS Coordinates"];

GPSIsSet[0].Operator = OSIssoft.AF.Search.AFSearchOperator.Equal;

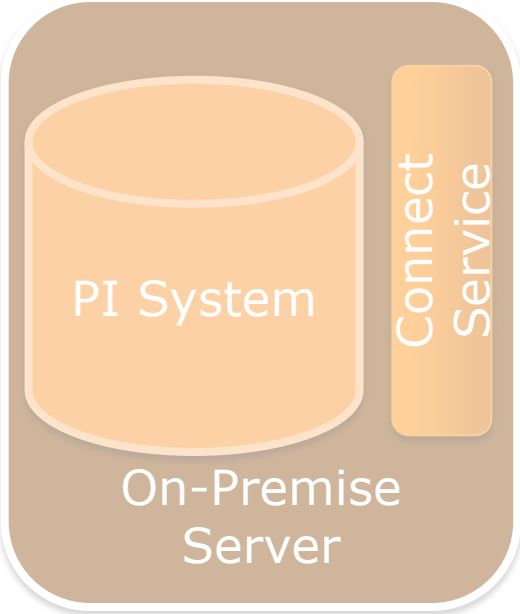
var AssetsFound = AFElement.FindElementByAttribute(null, "*",
    GPSIsSet, true,
    AFSortField.Name,
    AFSortOrder.Ascending, 10000);
```

# Code... connecting to a service bus

```
ServiceHost sh = new ServiceHost(typeof(PIService));

sh.AddServiceEndpoint(
    typeof(IPIService), new NetTcpRelayBinding(),
    ServiceBusEnvironment.CreateServiceUri("sb", "PISpark", "service"))
    .Behaviors.Add(new TransportClientEndpointBehavior
    {
        TokenProvider = TokenProvider.CreateSharedSecretTokenProvider
            ("owner", "Pz4nCcvG4obB9TSNL...")
    });
sh.Open();
```

# Azure Cloud Service



# Azure as a cloud platform

Platform for developing cloud based solutions

- Web and Worker Roles
- Services Buses
- Access Control (ACS)
- Blob Storage and Table Space
- SQL Database

# Cloud Service Steps

- Create an Azure Cloud Service Project
- Connect to our Service Bus
- Use **ASP.Net Web API** for REST calls
- Deploy to Azure!
- (see my vCampus Blog for details)

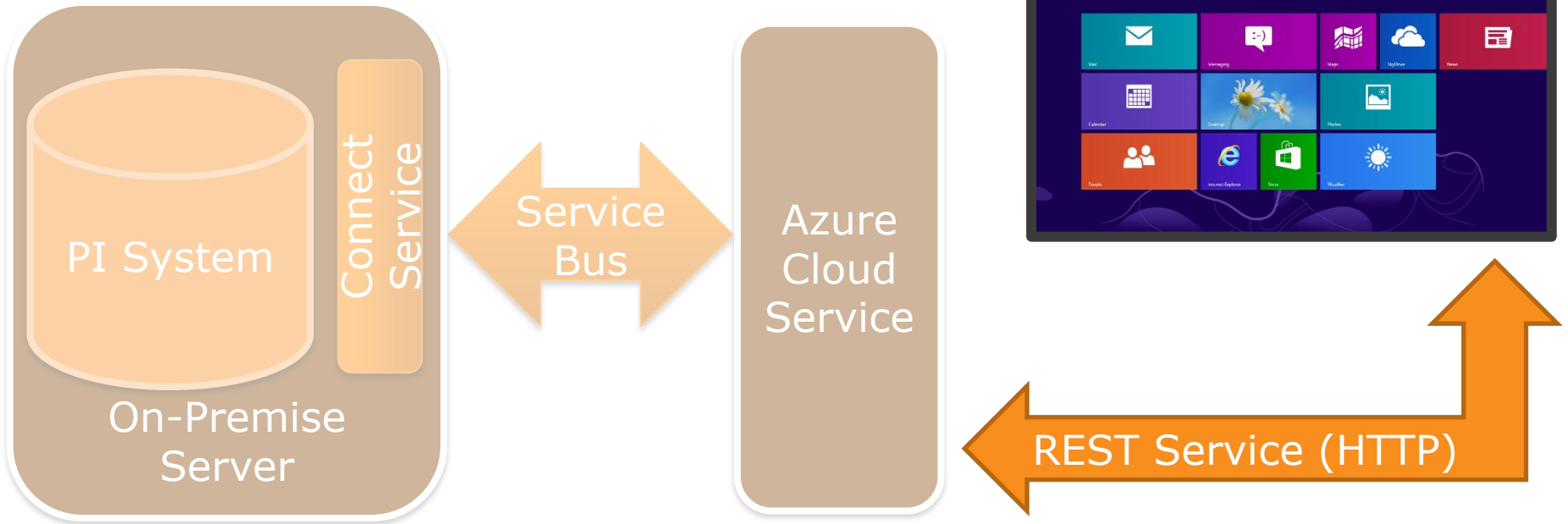




DEMO



# Windows Store Apps



# Programming Windows 8

- You can build off of what you know
  - XAML (WPF, Silverlight, Windows Phone)
  - C# (the worlds greatest programming lang)
  - Javascript/HTML, even C++

# What is a Windows Store App?

- Designed for the “Metro” side
- Aimed at tablet and other touch UI devices
- Can be side-loaded or delivered via the Store

# What our App will do:

- Use our Web API REST service
- Get assets by location
- Show assets on a map
- Show a trend for a given asset value



DEMO



# Review

- Create a connector service
  - WCF, PI System SDKs, Azure Service Bus
- Deployed a ASP.Net Web API service
  - Web Role, RESTful Service
- Created a Windows 8 Tablet
  - Location based search and trending

# Let OSISOFT know our needs...

- This REST service is not production Ready
  - Lacks security
  - Is not versatile
- OSISOFT and ODATA solution in the works
- Helpful to provide feedback
- See Steve Pilon's ODATA lab, tomorrow 10am



# What next?

- Data logging
- Event Frames
- Near Field Communications
- Give feedback to OSISOFT

# Lonnie A. Bowling

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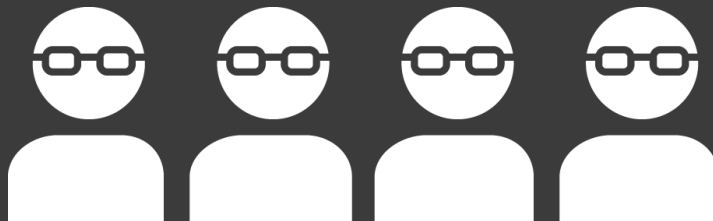
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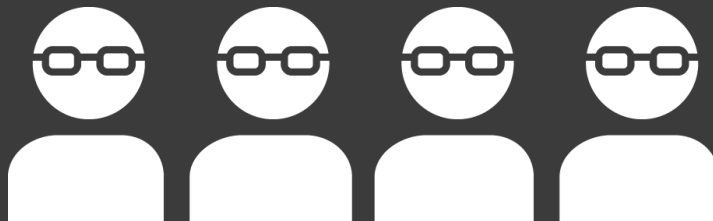


# THANK YOU





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