

# vCampus **Live! 2012**

## RESTful Web Services Coming to the PI System with OData

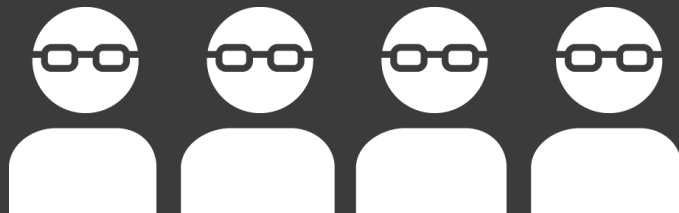
Presented by **Steve Pilon**, Product Manager



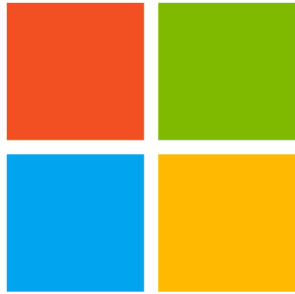


# vCampus **Live! 2012**

**WHERE PI GEEKS MEET**

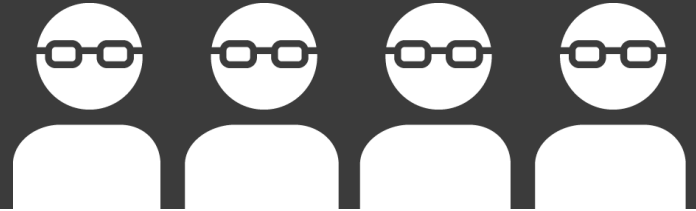


# Platinum Sponsor



Microsoft

# RESTful??



# Web Services Landscape



# By definition...

## SOAP

- Simple Object Access Protocol (protocol specification)

## REST

- REpresentational State Transfer (architectural style)

# In clear...

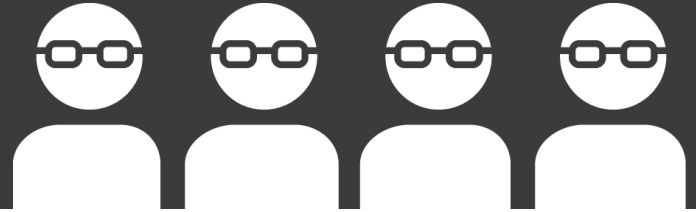
## SOAP

- Exposes methods with inputs and outputs (operation-centric)
- Well-defined, discoverable calling sequences
- Thought of as "official, serious, for large enterprises"

## REST

- Exposes resources, collections, relationships (data-centric)
- No predefined format, but using URIs (with verbs and nouns ) and focus on readability
- Thought of as "easy, simple, free-form"

# The Open Data (OData) Protocol







# OData

- Protocol specification for RESTful, data-centric service
- Exposing entities (with relationships) and operations
- Queryable via URIs (browser or code) or client libraries
- Full CRUD possibility
  - HTTP verbs (GET, POST, PUT, DELETE)
- Undergoing standardization at OASIS (Microsoft, SAP, IBM, Citrix, Red Hat and more)

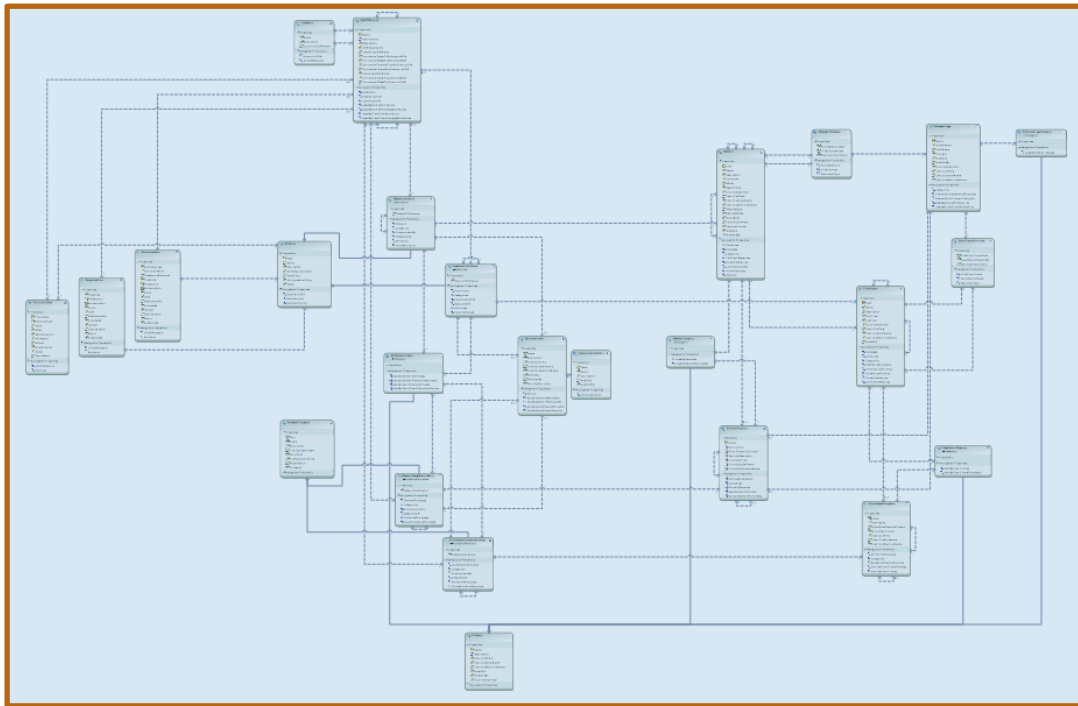
# Use Cases

- Mobile Application Development  
(and development of distributed apps in general)
- Data Exchange and Cloud-Based Apps
- Line-of-Business Systems Integration  
(including Asset Synchronization)
- Business Intelligence and Reporting
- Windows vs. Non-Windows Platforms

# Proposal: a 2-feed approach

## Catalog (Servers/Databases)

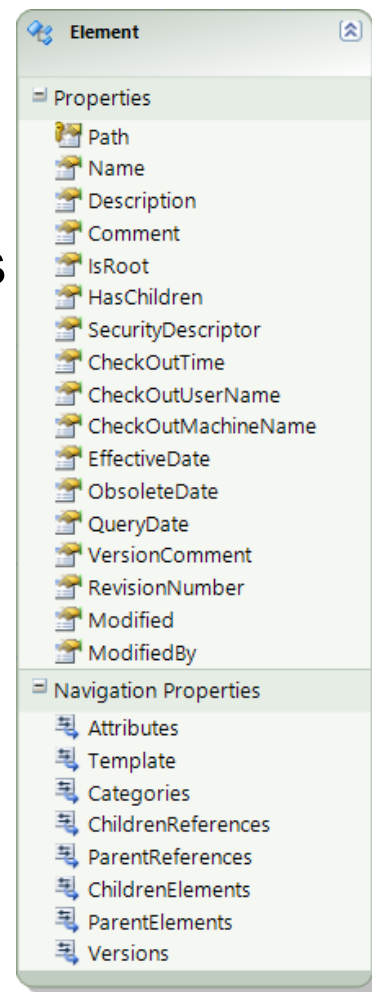
Each Database has  
an "endpoint" for  
the other feed



## Data (Elements, Event Frames, etc.)

# Entities

- Queryable and updatable, analogous to SQL tables
- Navigation properties to walk through entities
- Available entities:
  - Elements and Attributes
  - ElementTemplates and AttributeTemplates
  - Categories
  - UnitsOfMeasure and UOMClasses
  - EnumerationSets and EnumerationSetValues
  - EventFrames
  - ElementReferences, EventFrameReferences  
ReferenceTypes



# Operations

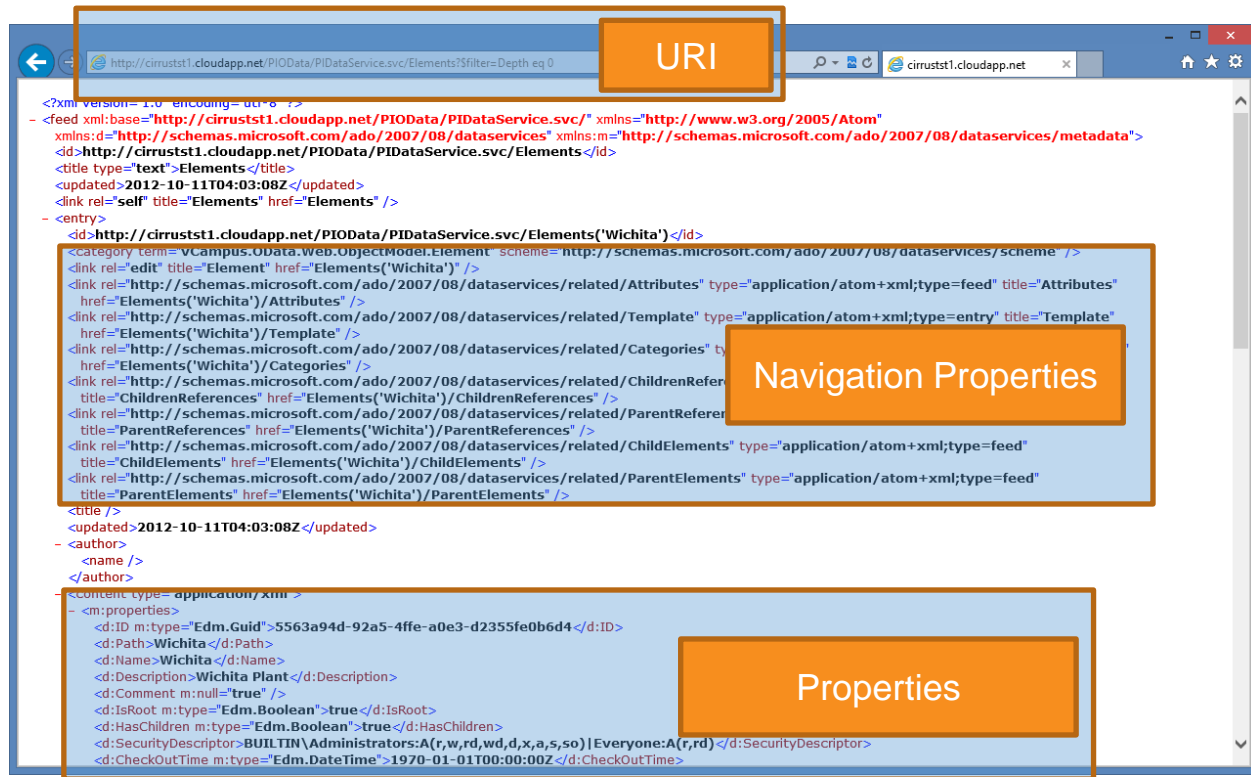
- Analogous to methods
  - Mandatory and optional parameters
- Available operations:
  - RecordedValues
  - RecordedValue
  - InterpolatedValues
  - SummaryValue
  - SummaryValues
  - PlotValues

## RecordedValues

- **Path:** string (multiple paths can be separated by a semicolon ‘;’)
- **startTime:** string (PI Time notation)
- **endTime:** string (PI Time notation)
- **filterExpression:** string
- **desiredUoM:** string (UoM name)
- **includeFilteredValues:** bool (True | False)
- **maxCount:** int

# Query via URIs

- Rich query and filtering semantics
- Web browser or code
- AtomPub or JSON

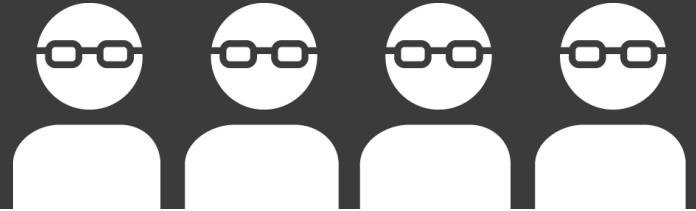




DEMO



# Using OData





# Application Development

## Generic HTTP

- Manually issue HTTP requests and handle the returned AtomPub or JSON payload

## OData client libraries

- Generally object-oriented and strongly-typed (generated from service metadata)

### MOBILE DEV



WP7



Android



iOS

### APP DEV



Silverlight



.NET



JavaScript



Java



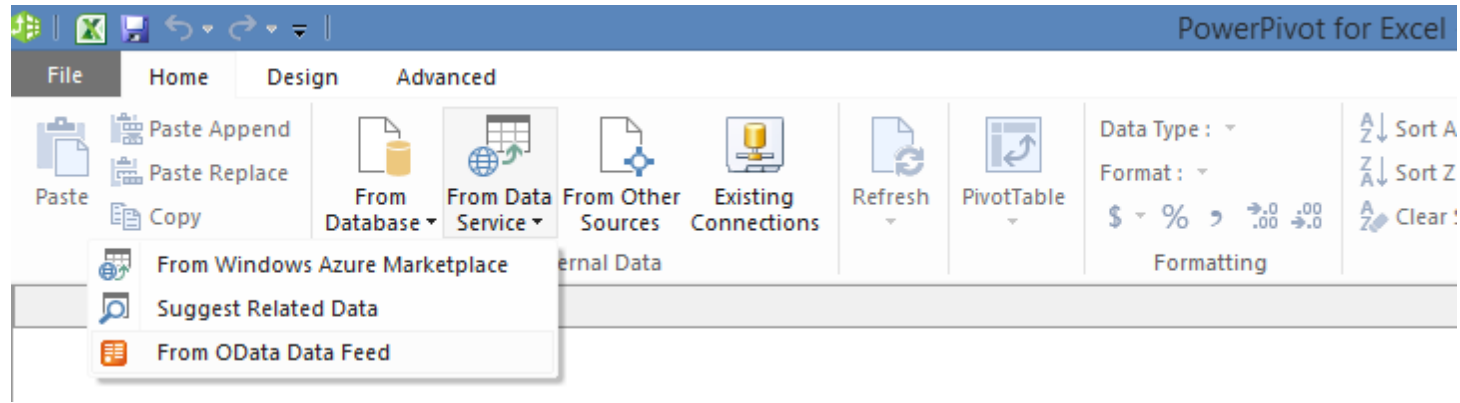
PHP



Ruby

# Line-of-Business Systems

- Growing number of OData producers and consumers
  - Microsoft, SAP, IBM, Telerik, Tableau, and others



# Data Markets and Other Feeds

- Open Government Data Initiative (ODGI)
  - Several government agencies and municipalities (USA, Canada, Columbia, Portugal, France, etc.)
- Microsoft Azure Data MarketPlace
- On the geeky side:
  - eBay, Netflix, Stack Overflow, twitpic, NerdDinner

# In the Hands-On Lab

- Tomorrow at 10am
- PI OData Service [prototype]
- Need your feedback!

November 30		
Time	Hands-On Track 1	
7:30 - 9:00		
9:00 - 9:45		
10:00 - 11:30	RESTful Web Services Coming to the PI System with OData - Lab Developer Level: 300	

# Steve Pilon

Product Manager

OSIsoft, LLC

[spilon@osisoft.com](mailto:spilon@osisoft.com)



# THANK YOU

