



Web Services

Ray Verhoeff

Director, Development – Data
Access

Steve Mohr

Senior Software Engineer

Empowering Business in Real Time
PI Infrastructure for the Enterprise

Data Service Goals

- Expose what we are already doing
 - Create nothing new
- Supports clients that are:
 - Built with many development environments
 - On Windows and others
 - Code-free
- Synchronous and asynchronous
- Friendly to common IT architectures

Support our Value Themes

- System Scaling
- Security
- 64-bit support
- Asset-based PI



Many Operating Systems...

- Any Windows Desktop O/S
- Windows Mobile
- Linux
- UNIX
- Embedded system platforms
 - VX Works
 - QNX

Many Development Environments...

- Microsoft Visual Studio
- Eclipse
- Netbeans
- Many others...



Data Service Design Pattern

- Simple. Everything in one call.
 - In: “Query”
 - **Out:** Data

Data Service Methods*

GetValue (Paths, Contexts, Manners) ;

GetValueSeries (Paths, Contexts, Manners) ;

Path

- Path: (n), string descriptor of a unique stream of data within the PI System

“a way beaten, formed, or trodden by the feet of persons or animals.”

-www.dictionary.com

Path

- PI tag
- AF Element Attribute
- PI Notification
- Event Frame

Path Syntax Examples

- PI tag:

pi: \\casaba\sinusoid
\\casaba\sinusoid

- AF Element Attribute

af: \\server\dbname\tank501.level
af: \\server\dbname\?.level

Context

- Constraints or refinements that enable *selective* retrieval of data from a Path

- Examples:

- Time
- Time Range
- AF Element

Origin:

1375–1425; late ME < L contextus **a joining together**, scheme, structure, equiv. to contex(ere) to join by weaving (con- [CON-](#) + texere to plait, weave) + -tus suffix of v. action; cf. [TEXT](#)

-www.dictionary.com

Complex Context

- Simple Types:
 - E.g. Time Range, AF Element
- Complex Types
 - E.g. Notification
 - Includes: Time Range, AF Element

Manner

- Application-specific details of data retrieval
 - Example: for PI timeseries:
 - Mode
 - e.g. compressed, interpolated, summary
 - Interval
 - if Interpolated or Summarized

“a way of doing, being done, or happening;
mode of action, occurrence, etc.”

-www.dictionary.com

Timestamps

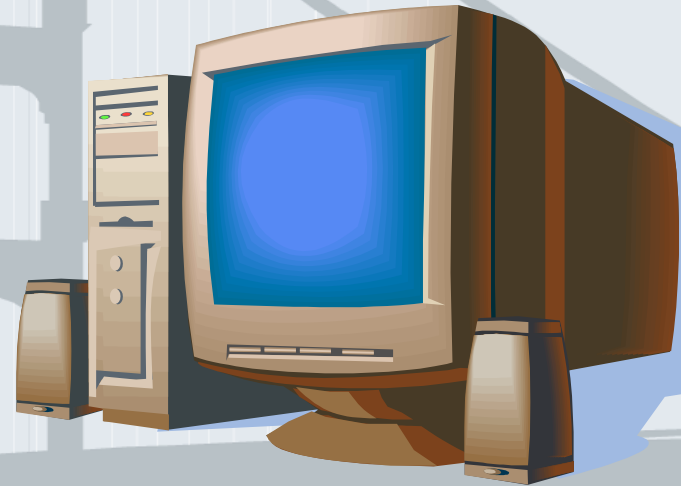
- ISO 8601 *preferred*
 - E.g. **2009-04-01T09:15:00-7:00**
 - **Input:** your choice
 - **Output:** Zulu (“Z” = UTC)
- PI timestamp string format
- Standard PI Absolute and Relative times

Two Data Services

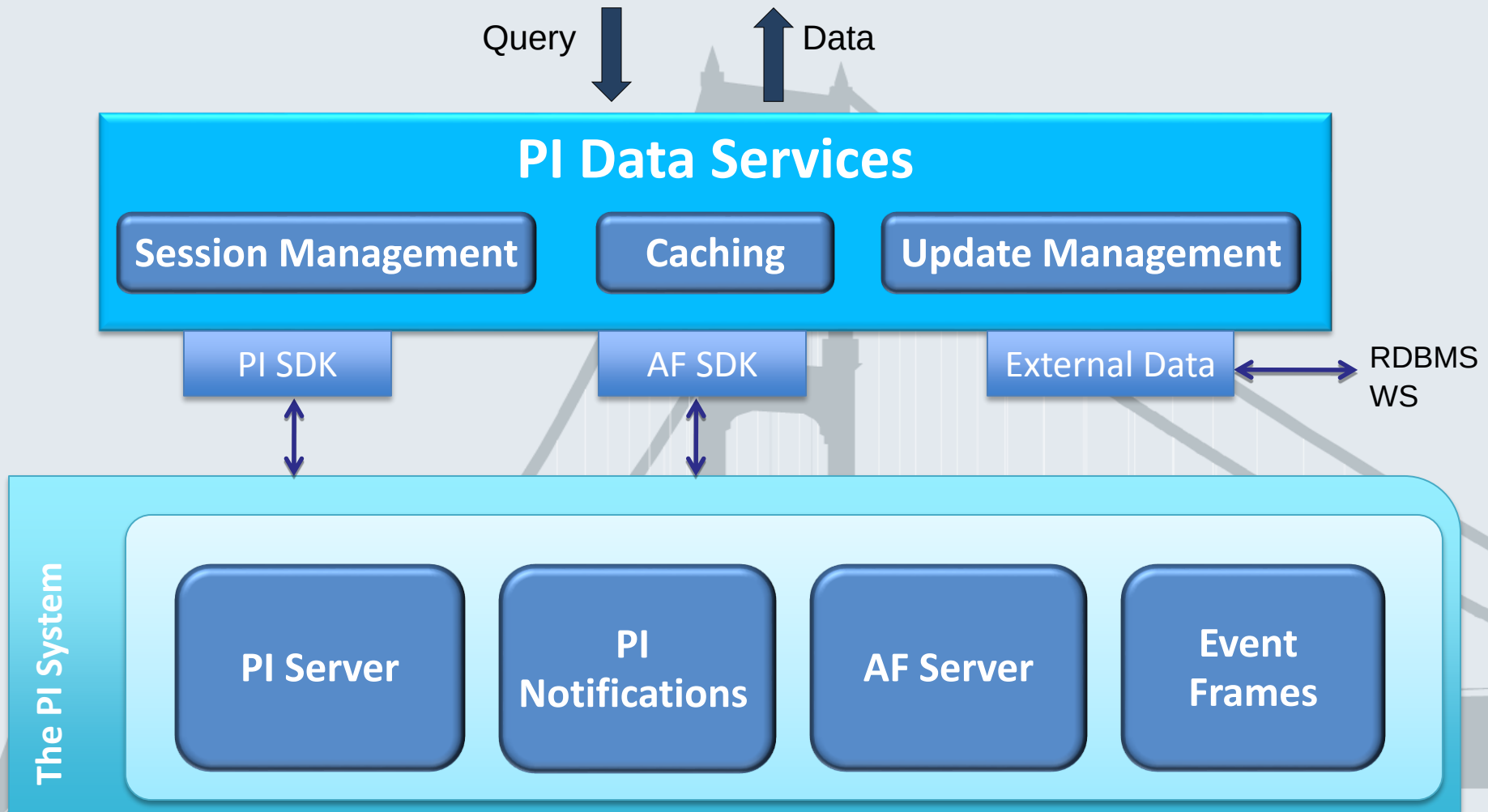
- **IPExtendedServices**
 - Full support for extensible Context and Manner types
- **IPClientServices**
 - Simplified Context and Manner for use in code-free environments

Demo

- Microsoft Visual Studio 2008
- Microsoft InfoPath



PI Data Services



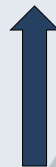
PI Data Services

Direct calls to methods
in PI Data Services .NET assemblies

Query



Data



Web methods implemented using
PI Data Services .NET assemblies

Query



Data



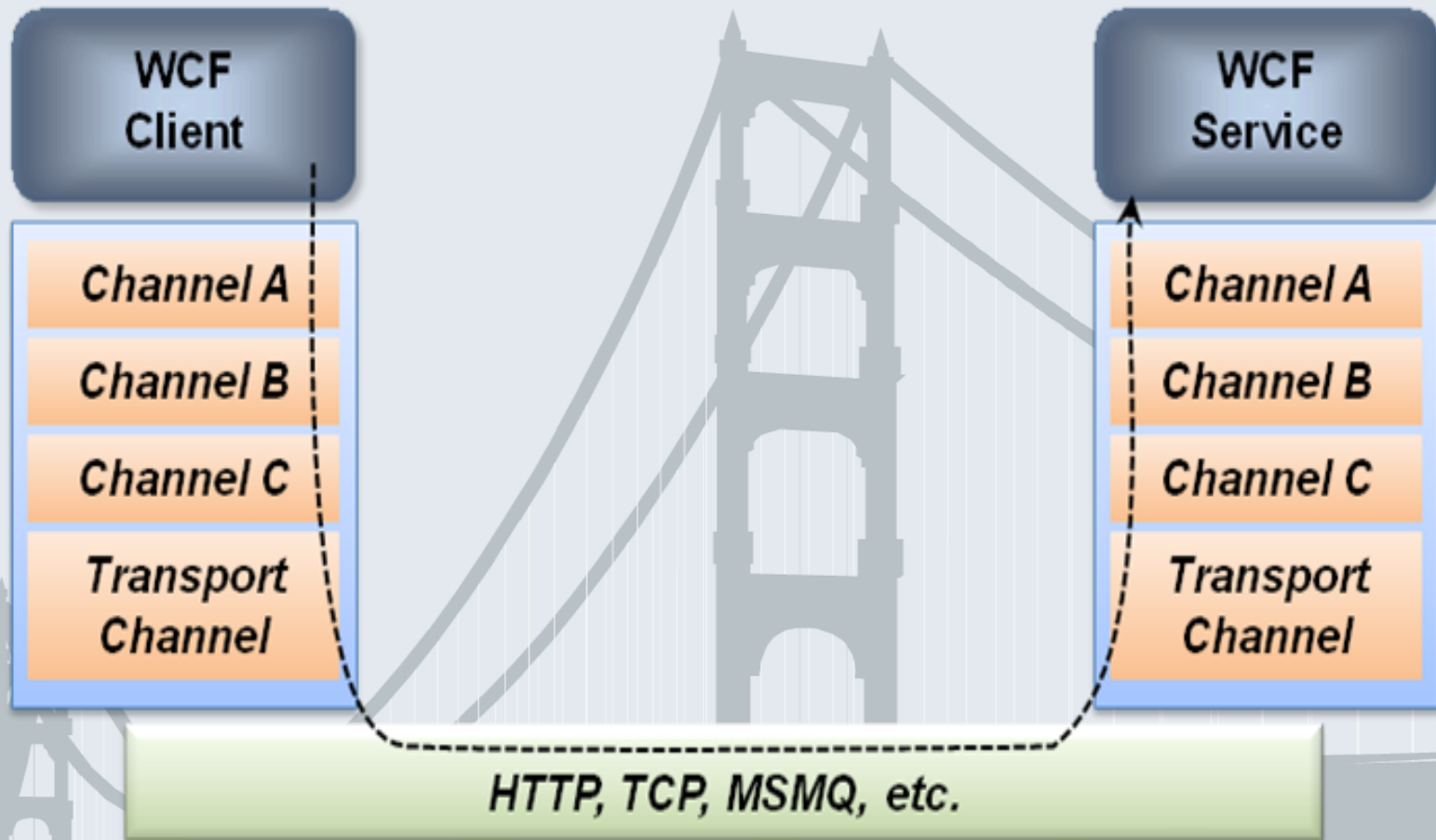
Web Service

PI Data Services

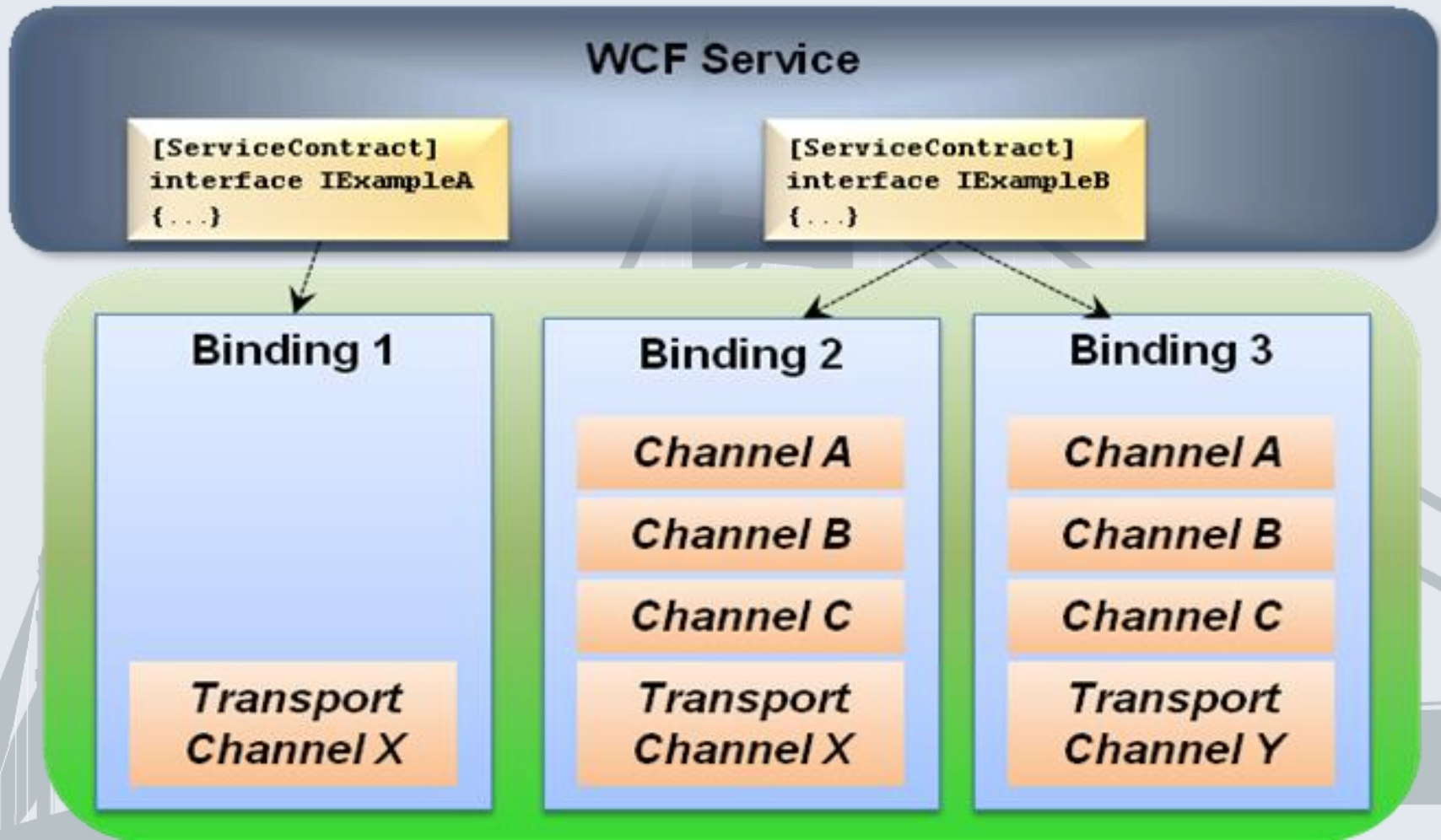
Security

- Same as PI Data Services
- Compatible with PI 3.4.380 Security
- Kerberos delegation
- What about WS-*?

Windows Communication Foundation



Windows Communication Foundation



Data by Exception

- “request updates” flag in Manner
- Re-issue query using “handle”



PE Expressions as a “Path”

pe: \\server\' sinusoid\' /2

Still to Do

- Filtered Data
- Data Entry



Release Plan

- 3Q2009
 - PI tags only
 - No data by exception
- 4Q2009
 - PI tags and AF Element Attributes
 - Data by Exception (if possible)

Possible Futures

- PI System Search
- Create, Read, Update & Delete (CRUD)



Thank you!

Please visit us in the
Data Access demo pod

Empowering Business in Real Time
PI Infrastructure for the Enterprise