Building a BI Infrastructure Part 1: Warehousing, ETL, and Cube Building

Presented By:

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Agenda

- Introduction to Multidimensional Analysis / BI

- OSIsoft / Microsoft BI Stack and Toolkit

- PI OLEDB Demonstration

- Cube Building Demonstration

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Multidimensional Analysis

Quick, ad-hoc, aggregation of vast amounts of interesting data, based on user selected criteria, to identify business opportunities.

Monetize your PI data. *$$$*

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BI Continuum

- Real Time Stream Processing
  - ❑ PI for StreamInsight
  - ❑ PI Notifications

- Online Analytics
  - ❑ PI ACE
  - ❑ PI Performance Equations / Datasets
  - ❑ PI AF Formula Data References

Real time and near real time calculations and history for generally less than 10 tags or attributes.

Examples: Totals, Averages, Alerts

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BI Continuum

- Analysis and Report Building
  - ❑ PI DataLink
  - ❑ PI DataLink Server

- Import Data into 3rd Party Tools
  - ❑ PI OLEDB Enterprise
  - ❑ PI Web Services

Offline and near real time analysis and reporting for hundreds of points

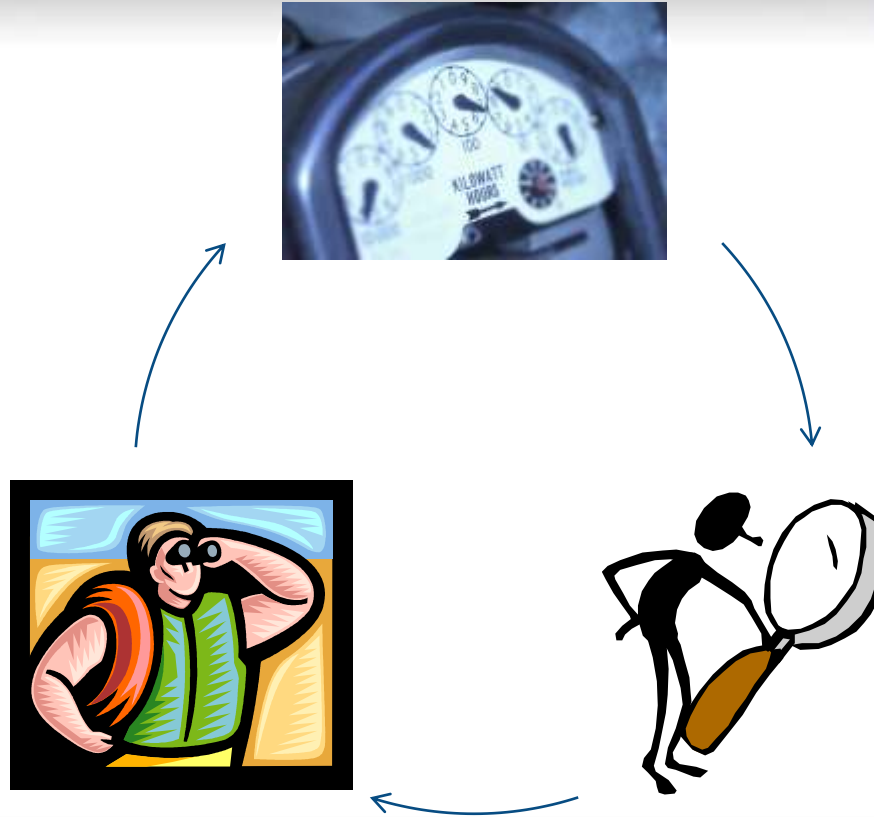*Examples: Reports, Summaries*

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BI Continuum

- Data Discovery and Deep Dive
  - ❑ PI OLEDB Enterprise
  - ❑ PI Web Services

- KPI Finding and Defining

- Correlations and Data Mining

Offline multi-dimensional analysis for entire PI Systems along with external business systems
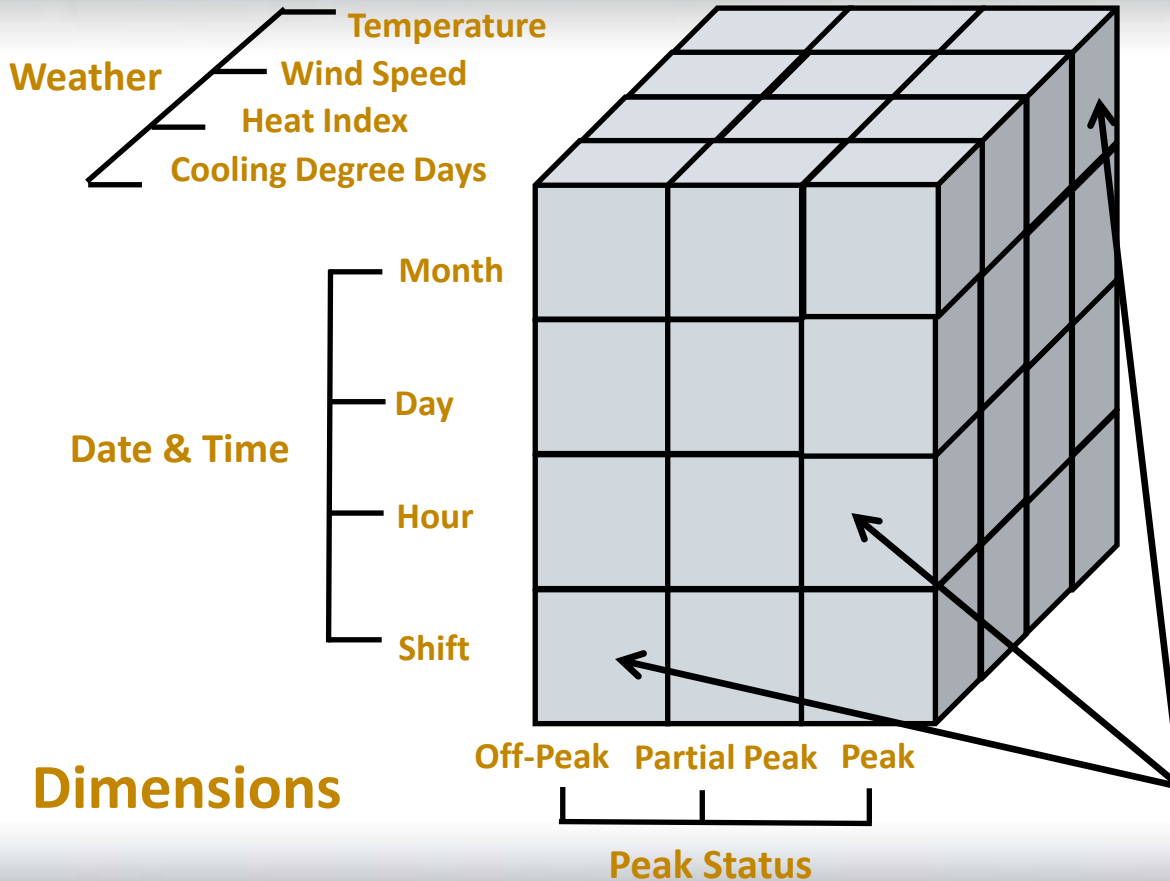
Examples: Correlations, Data mining

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BI Continuum

Energy Cost Data Cube

Weather
- Temperature
- Wind Speed
- Heat Index
- Cooling Degree Days

Date & Time
- Month
- Day
- Hour
- Shift

Off-Peak   Partial Peak   Peak

Peak Status

Dimensions

Facts

Show me the total energy cost
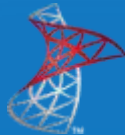
For the first shift

During Peak Status

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Microsoft® **SharePoint** 2010

Microsoft® **Excel** 2010

Microsoft® **SQL Server** 2008 R2

PI for Office 2010
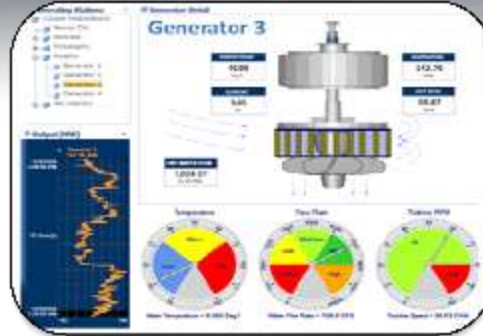
PI System 2010

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BI Toolkit for the PI System

- Dimensions and Facts
  - PI Asset Framework (PI System 2010)

- Datasets for BI Data Extraction
  - PI OLEDB Enterprise 2010 (PI for Office 2010)

PI for Office 2010

PI DataLink for Excel 2010

PI WebParts for SharePoint 2010

PI DataLink Server 2010

The PI Sytem and PowerPivot

PI Data Access Technologies

PI System Access License

PI AF & Warehousing Summary

- Transform PI Data into atomic and aggregatable facts

- Creating BI queries using PI OLEDB Enterprise 2010
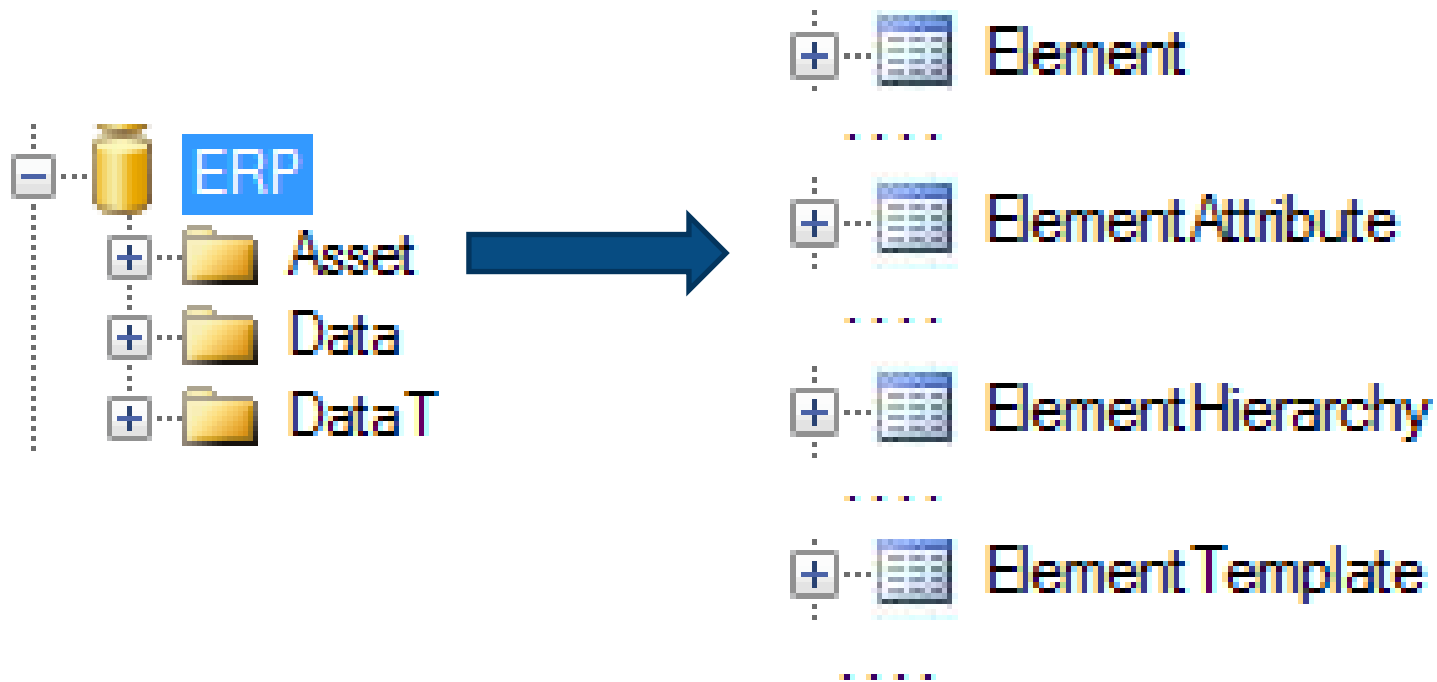
- Create dimensionality from Time Series data
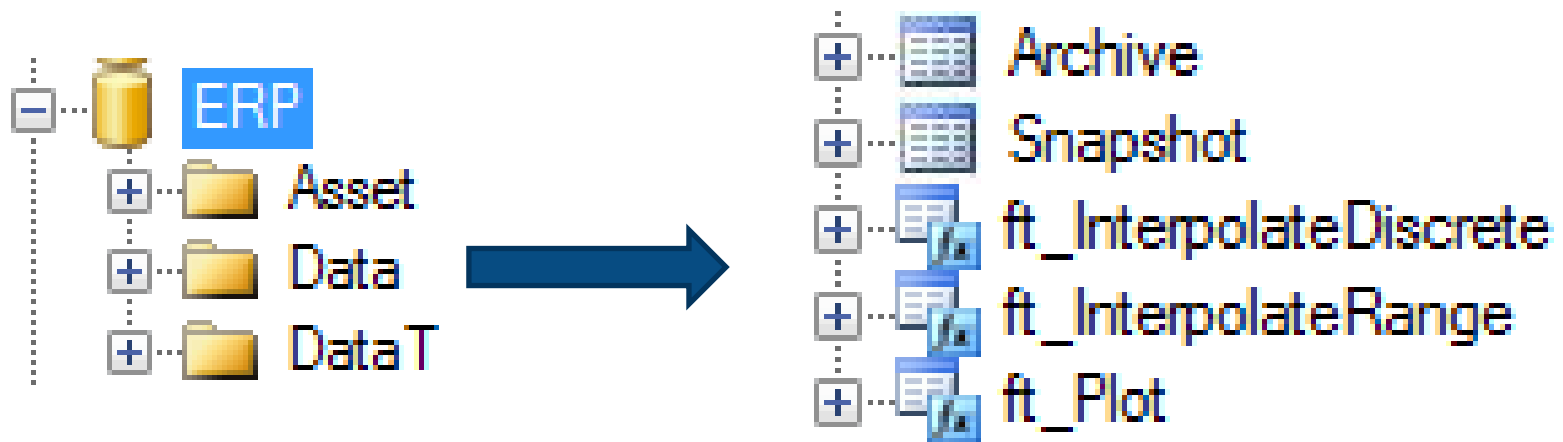
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Facts and the "Grain"

Start Time	End Time	Average Load	Total Energy Consumed
10:00 AM	10:15 AM	250 kW	= (10:15 AM - 10:00 AM) * 250 kW * (1 hr / 60 min) = 41.7 kWh
10:15 AM	10:30 AM	255 kW	42.5 kWh
10:30 AM	10:45 AM	280 kW	46.7 kWh

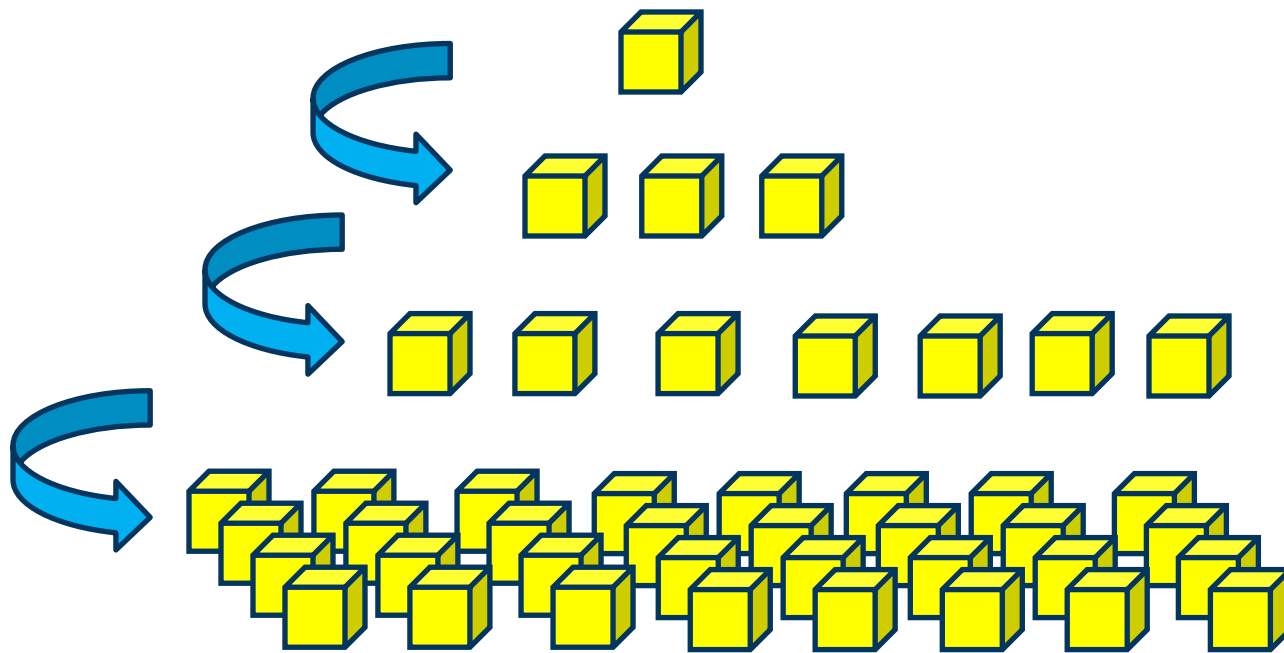15 minute grain … lowest level of detail available.

PI OLEDB Enterprise 2010

PI OLEDB Enterprise 2010

Query Construction
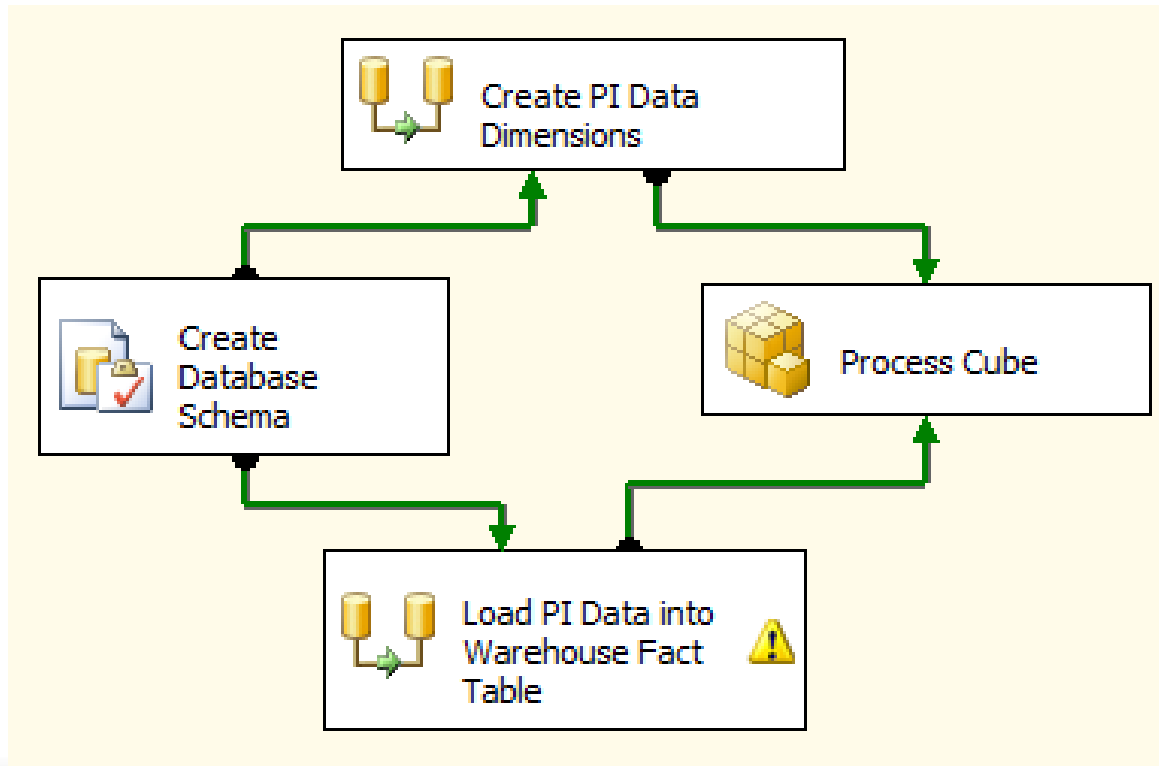

ElementHierachy

Element

ElementAttribute

Data Tables

Performance

- Depends on the query

- Depends on location where query is executed
  - SSIS provides greater speed and better memory management than PI SQL Commander for bulk loads

- Roughly 3K – 30K rows per second

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Demos - Putting it All Together

Thank You!

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