Asset and Operations Real Time Analytics (AORTA) Project

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WIPRO
Applying Thought

Agenda

- About Wipro
- Project AORTA
  - Customer challenges
  - Legacy system landscape
  - AORTA solution
  - PI Tools used
  - Screen shots
  - How PI helped
- Phase 2 project
- Future plans for PI
- Questions

About Wipro

Background

1945 Incorporation of Western India Vegetable Products Limited

1980 Wipro enters the IT Hardware Business

1984 Wipro enters the IT Software Business

2000 Wipro listed in the NYSE
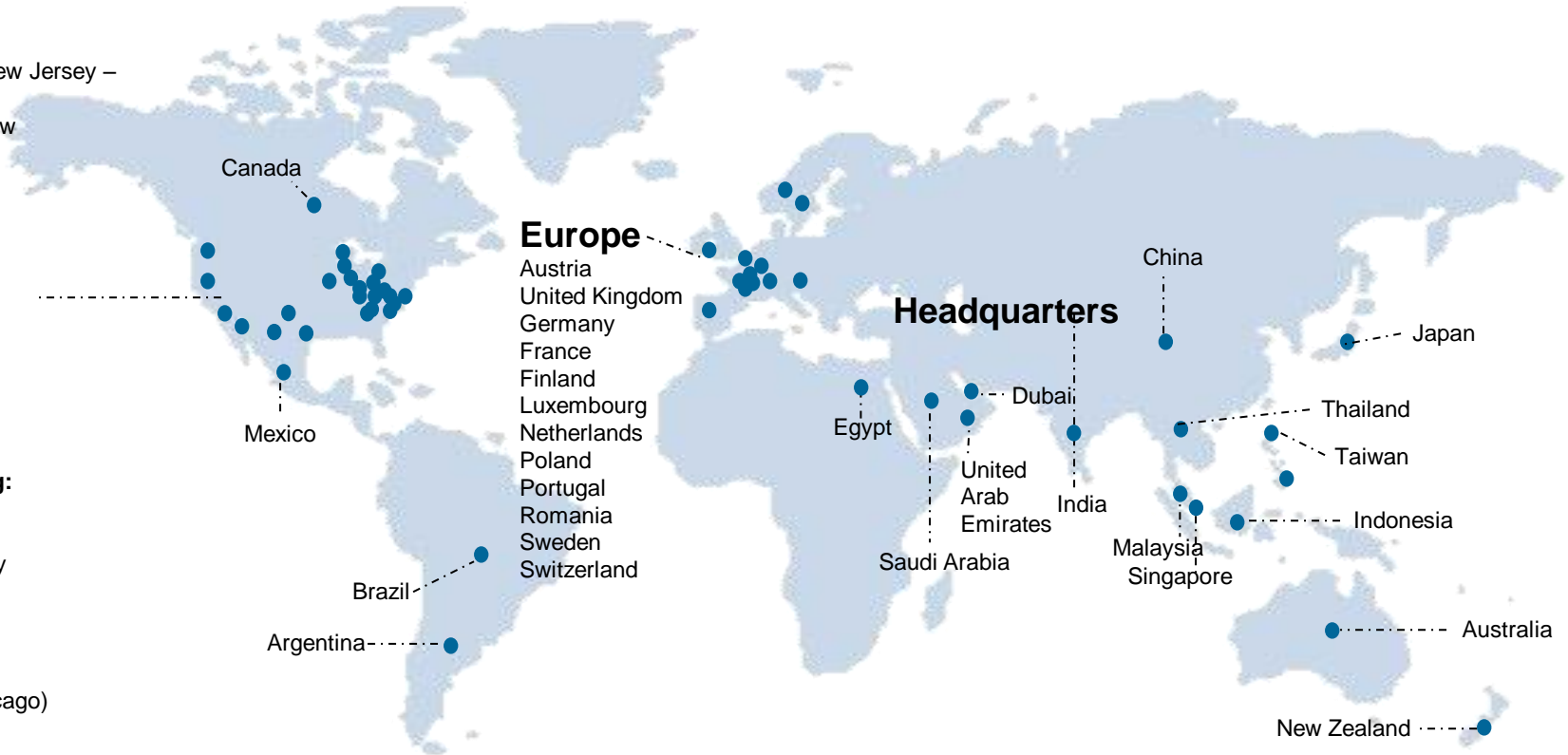
2001 Wipro enters BPO Business

- *Launched Eco Energy business in 2008*
- *Wipro is a strategic partner to 5 of the top 10 most innovative companies in the world*
- *One of the most preferred employers for top class talent (ranked among top 5 in a Business Today 2011 survey)*

Global delivery

USA
New York, New Jersey –
Headquarter
Mountain View
Seattle
Chicago
Dallas
Houston
Minneapolis
Atlanta
Boston
Columbus
Miami
Nashville
Troy
Brea
Infocrossing:
Broomfield
Dayton
Jefferson City
Leonia
Norcross
Omaha
Phoenix
Roselle (Chicago)
Tampa
Tempe
Westwood
Woodland Hills

Canada

Europe
Austria
United Kingdom
Germany
France
Finland
Luxembourg
Netherlands
Poland
Portugal
Romania
Sweden
Switzerland

Headquarters

Mexico

Brazil

Argentina

Egypt

Dubai

United
Arab
Emirates

Saudi Arabia

India

China

Japan

Thailand

Taiwan

Indonesia

Malaysia
Singapore

Australia

New Zealand

54 countries, 72 Global Delivery Centers
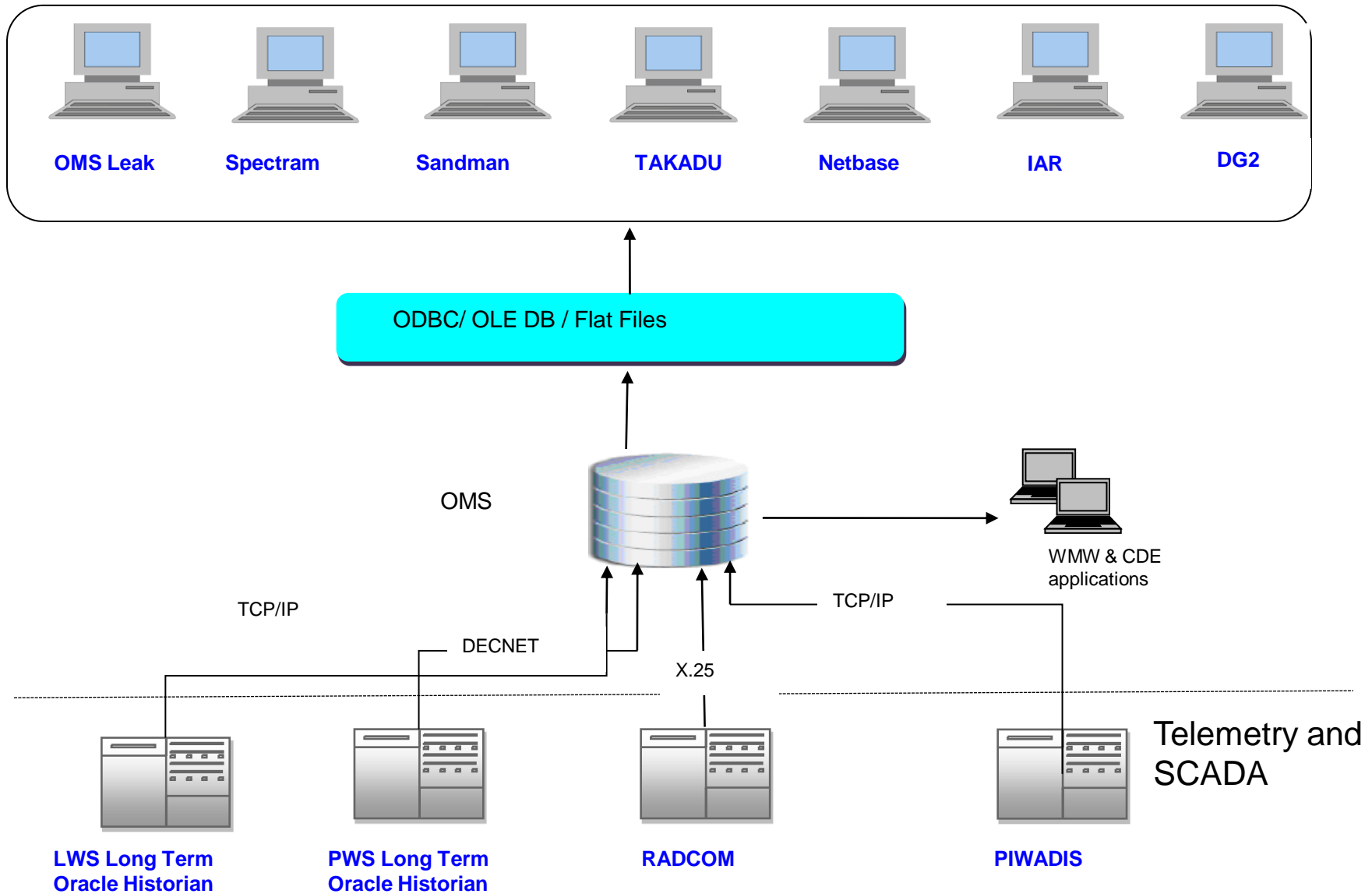
Some Key facts

- Leading global service provider of Consulting, IT Services, BPO and R&D Services
- Largest independent R&D services provider in the world
- Largest India based Remote Infrastructure Management (RIM) service provider
- Largest offshore Testing Service provider
- Leading Enterprise Information Strategy Services Provider
- Leading offshore Information Security Solutions provider
- Among the few companies in the world to be assessed at maturity level 5 for CMMI V1.2 across offshore and near shore development centres
- Energy, Natural Resources & Utilities is one of the Fastest growing industry focused Business Unit
- A dedicated **Water vertical** is formed to provide Water specific business solutions

Project AORTA

Customer challenges

- Using a historian, Operational Management System (OMS) for 20 years to hold flow, pressure, turbidity and reservoir levels information collected from clean water network

- The information is then presented into calculations and schematics to the end users

- Interface application systems collected data from OMS to produce business-critical regulatory reports

- OMS was at the peak of the operating limits and was unsupported by the vendors which posed a high risk to the business for regulatory reporting

- As OMS was not scalable there were other interface systems getting the data from OMS for slow sand bed filters(Sandman), leakage reporting (OMS Leak, Netbase and Takadu) that were built around OMS

Legacy System Landscape

OMS Leak   Spectram   Sandman   TAKADU   Netbase   IAR   DG2

ODBC/ OLE DB / Flat Files

OMS

WMW & CDE applications

TCP/IP

DECNET

X.25

TCP/IP

Telemetry and SCADA

LWS Long Term Oracle Historian   PWS Long Term Oracle Historian   RADCOM   PIWADIS

AORTA solution

- Wipro, the IS partner for the customer carried out detailed analysis of the systems to replace OMS and its surrounding interface systems

- Wipro project team engaged the relevant stake holders to get the confirmation of the requirements

- Customer followed the OJEU process for product selection and Wipro helped with the relevant inputs

- OSI PI was selected as a replacement product for OMS and its legacy interface functionality

- There was a legacy PI System called PiWadis at customer place. The project provided an opportunity to migrate the PI functionality to PI2010

- The 20 years data from OMS was migrated to PI 2010 with thorough validations and data checks

- The network SCADA data was currently stored in Oracle database. The project has migrated 7 years time series data and enabled the live data collection from the Oracle SCADA historians

AORTA Solution – contd..

- About 120 K tags have been validated and incorporated into PI archive for regular monitoring

- Close to 500 schematics representing the areas have been re-validated, merged and implemented in PI 2010

- 3500+ daily calculations for leakage, regulatory, demands, flows have been incorporated in PI using ACE, AF, SMT and other tools

- The slow Sandbed filtration process was implemented with PI Process Book screens

- Tools have been built for network analysis and optimisation

- Required training was provided to teams using new PI application

AORTA - Solution contd..
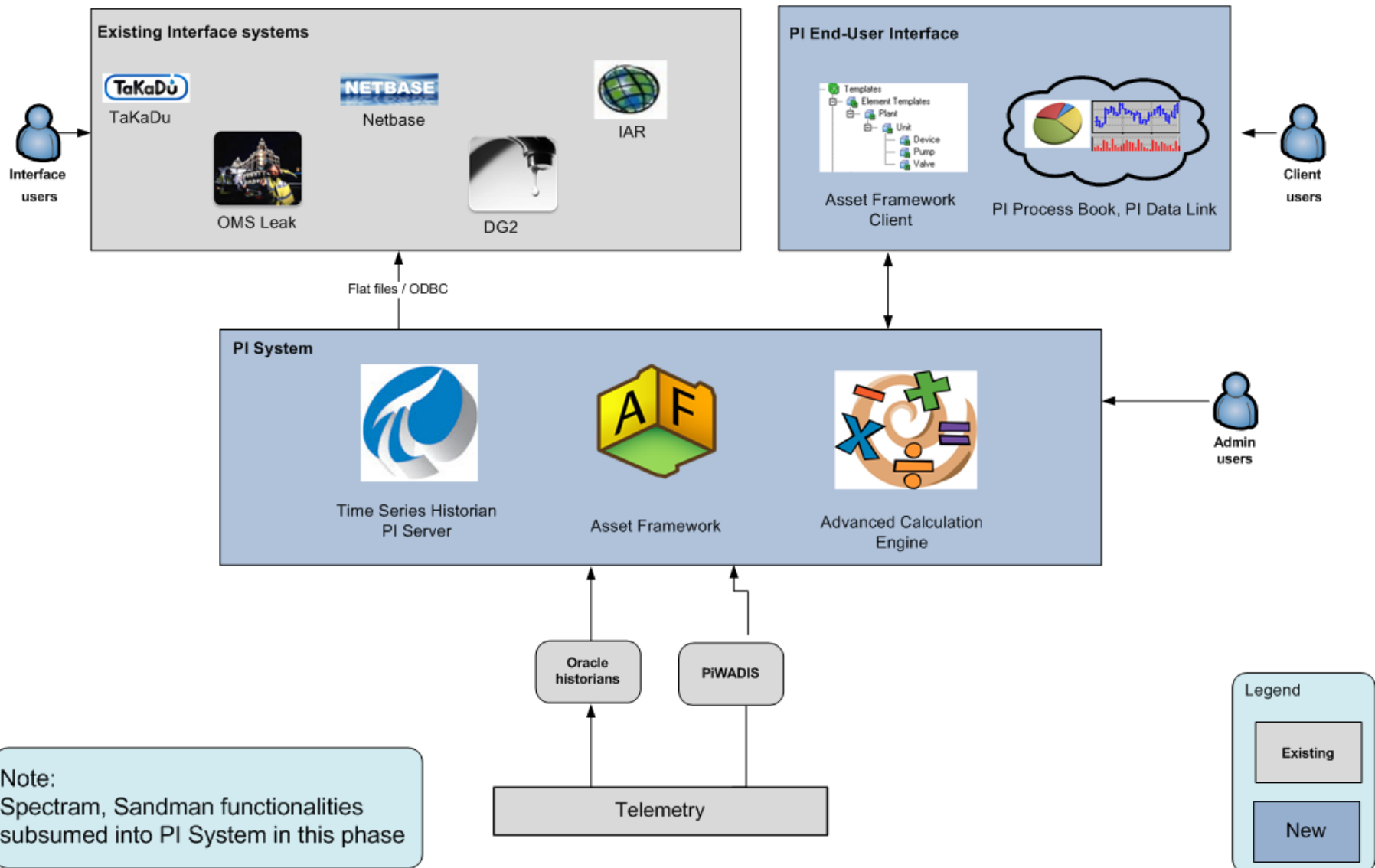
AORTA technical architecture

- Logical separation of business rules and data presentation

- Data collection from discrete data sources

- Data storage and compression

- Common user interface

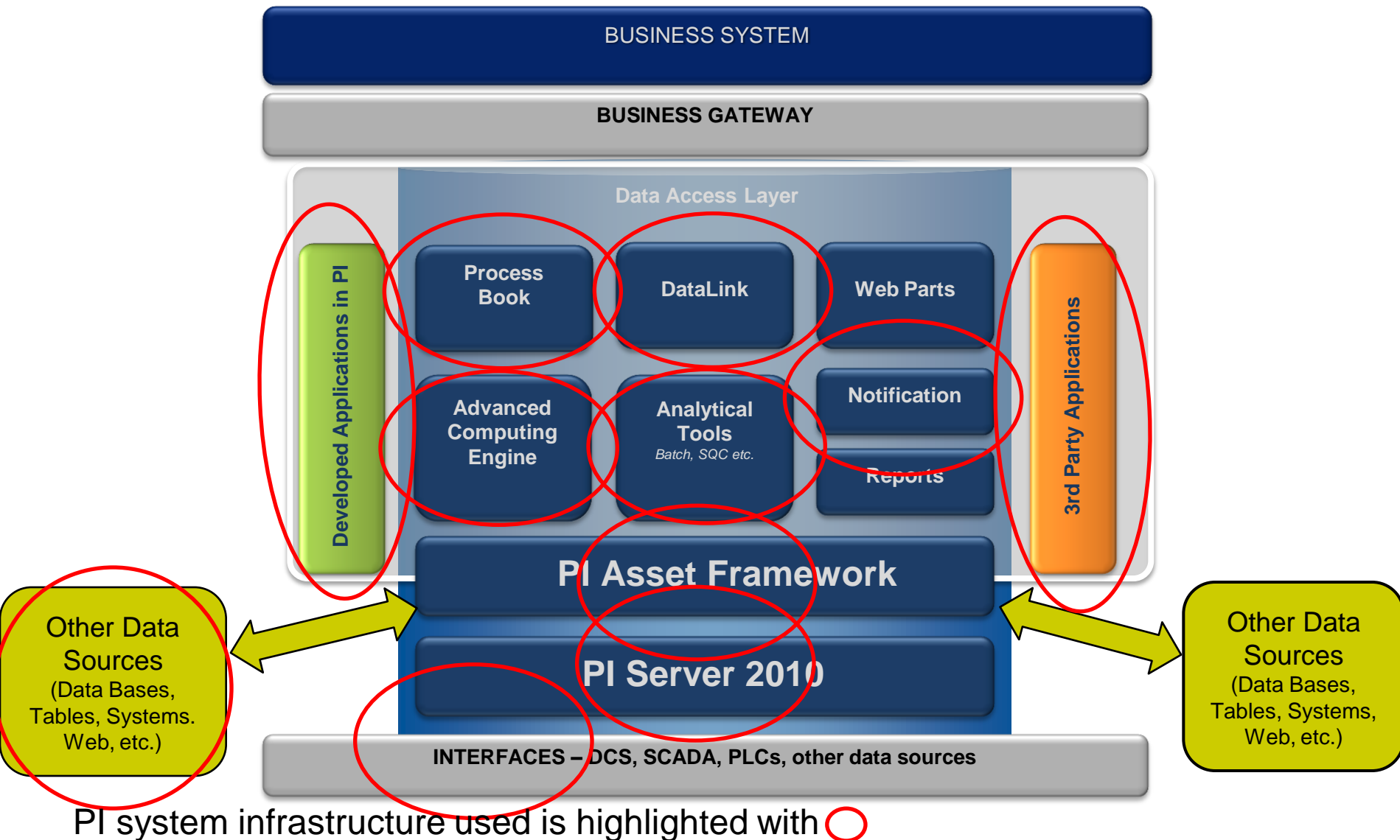- Enterprise Connectivity and single version of truth
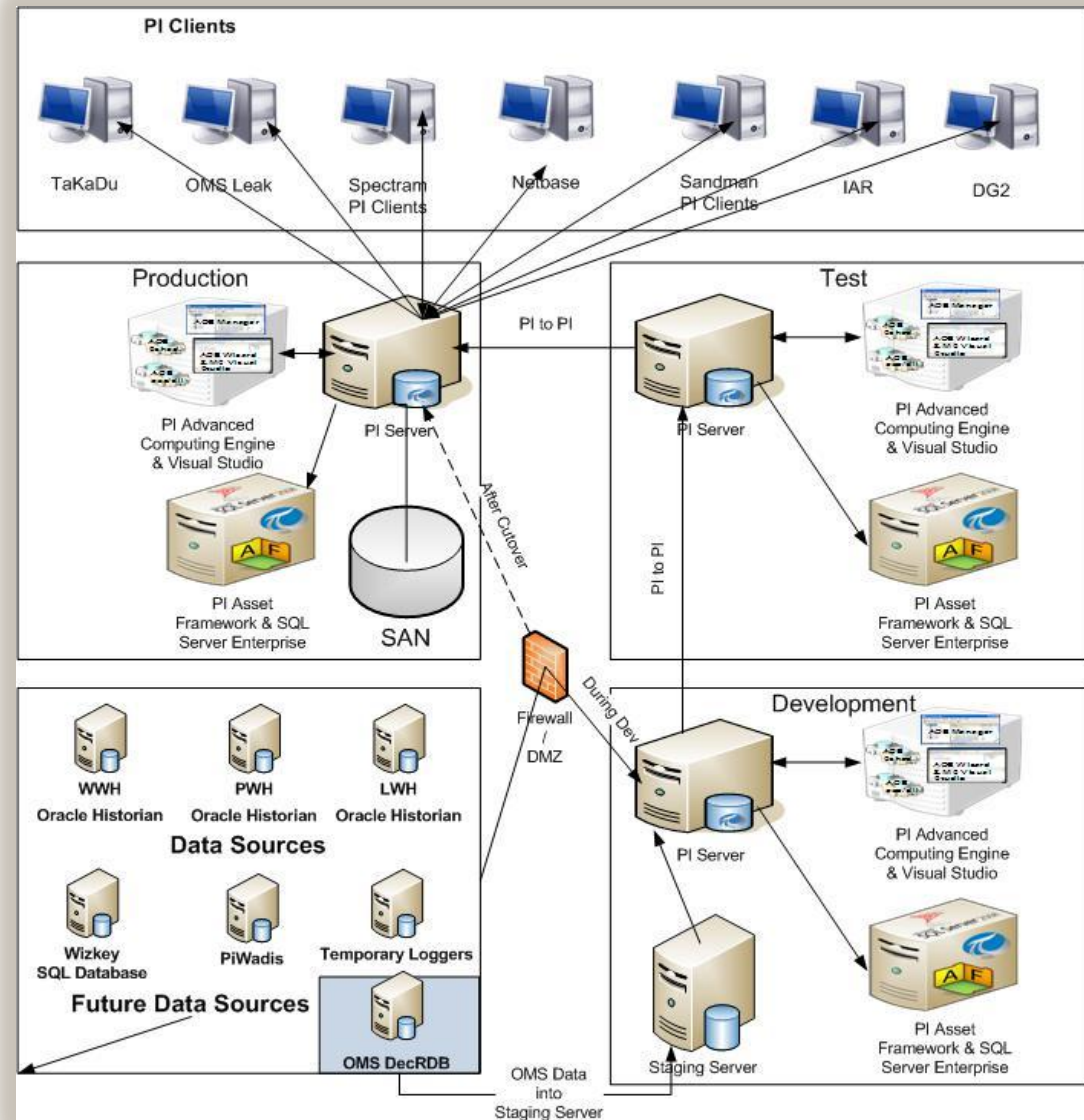
AORTA Data Flows

- Near real-time data for online users

- DG2 low pressure updates

- Daily demands

- Flow and pressures

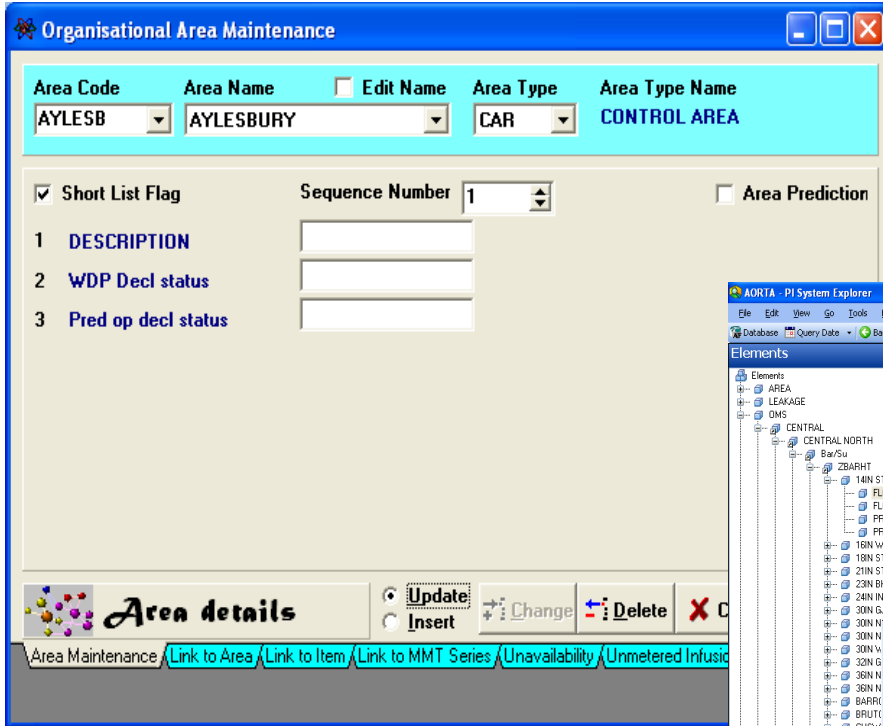- Derived reservoir flows
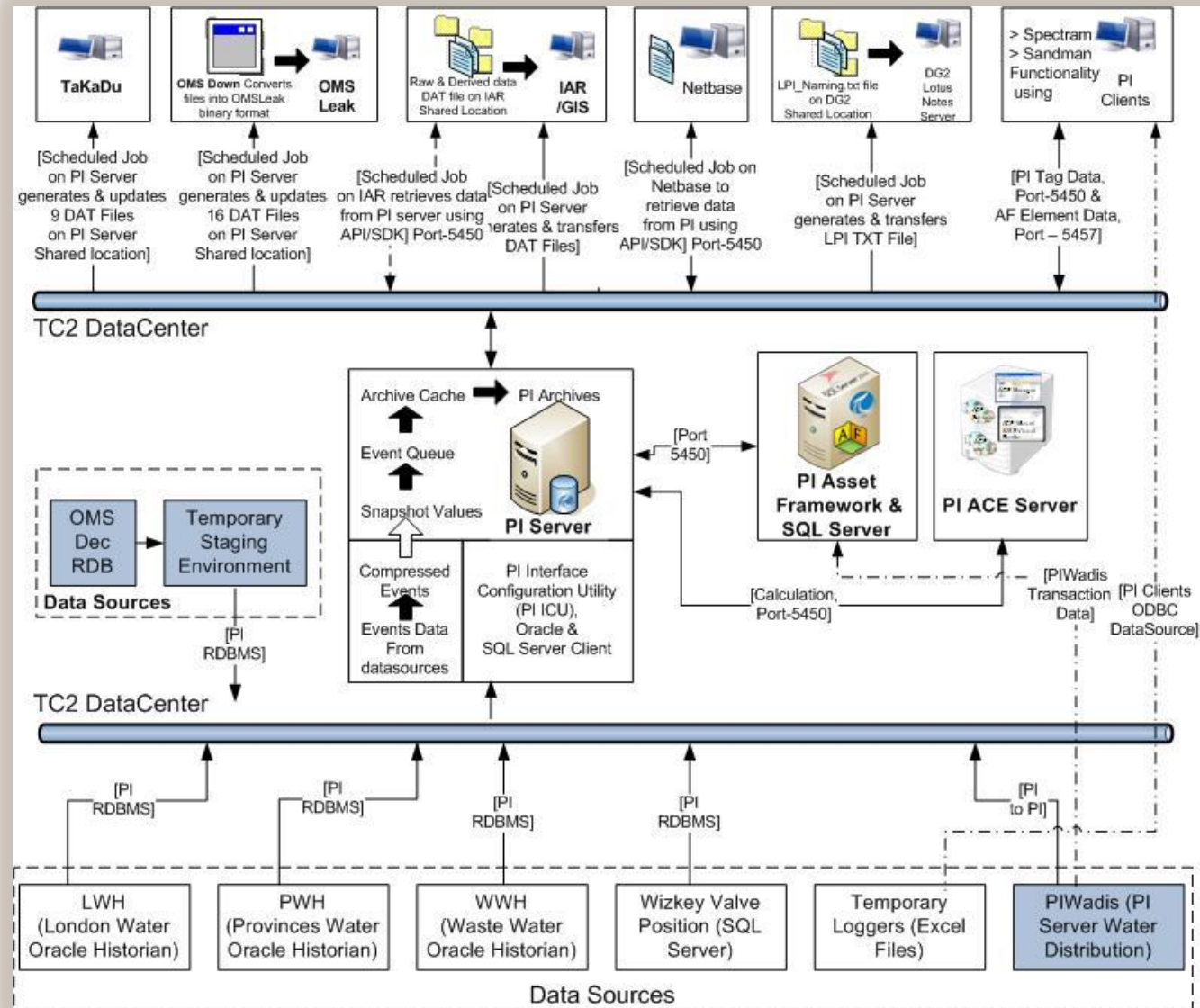
PI Tools used

- PI Server: Datastream repository

- PI Asset Framework : configured about 10,000+ assets

- PI ProcessBook: For schematic displays and trending, legacy functionality from OMS, Sandman, PIWADIS and Spectram

- PI DataLink: For the data retrieval and updates by administrators

- PI ACE (Advanced Computing Engine): For reservoir calculations

- PI SDK, API and OLE DB : For the migration of legacy and interface functionality into PI

- PI RDBMS & PI to PI: To collect SCADA data from legacy historians

- PI SMT tools: For the administration
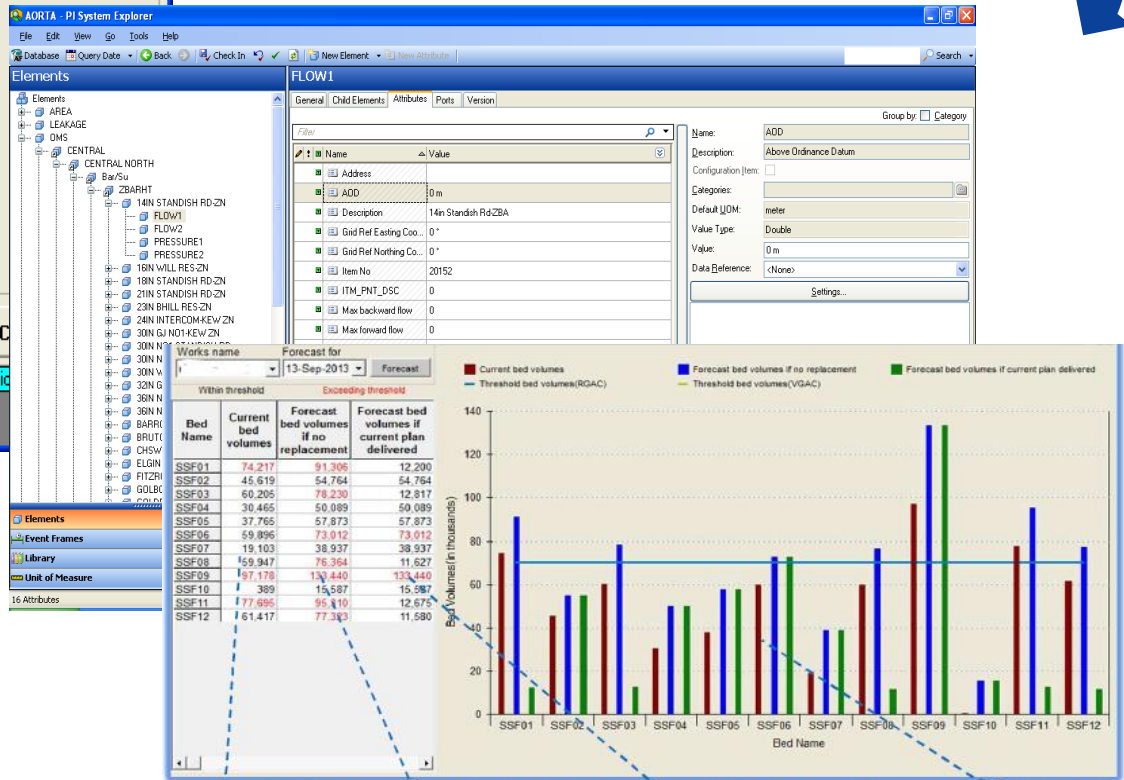
PI System infrastructure used

BUSINESS SYSTEM

BUSINESS GATEWAY

Data Access Layer

Developed Applications in PI

Process Book

DataLink

Web Parts

Advanced Computing Engine

Analytical Tools
Batch, SQC etc.

Notification

Reports

3rd Party Applications

PI Asset Framework

PI Server 2010

Other Data Sources
(Data Bases, Tables, Systems. Web, etc.)

Other Data Sources
(Data Bases, Tables, Systems, Web, etc.)

INTERFACES – DCS, SCADA, PLCs, other data sources

PI system infrastructure used is highlighted with

Screen shots

Before

AORTA

After

Simpler and visual creation of Asset hierarchy

Visual Representation

Summary based on current status
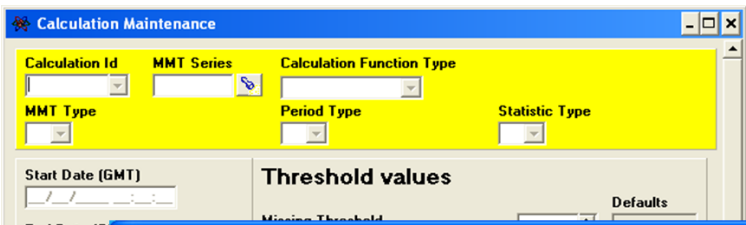
Forecast summary for the date selected
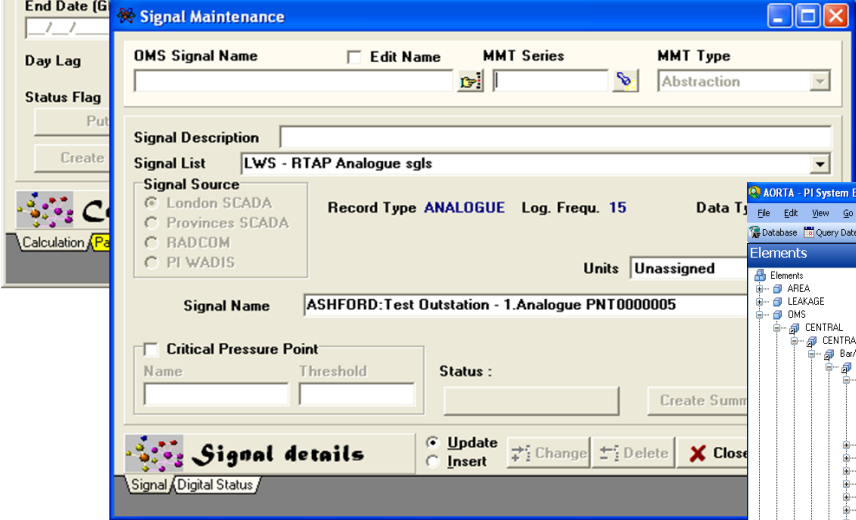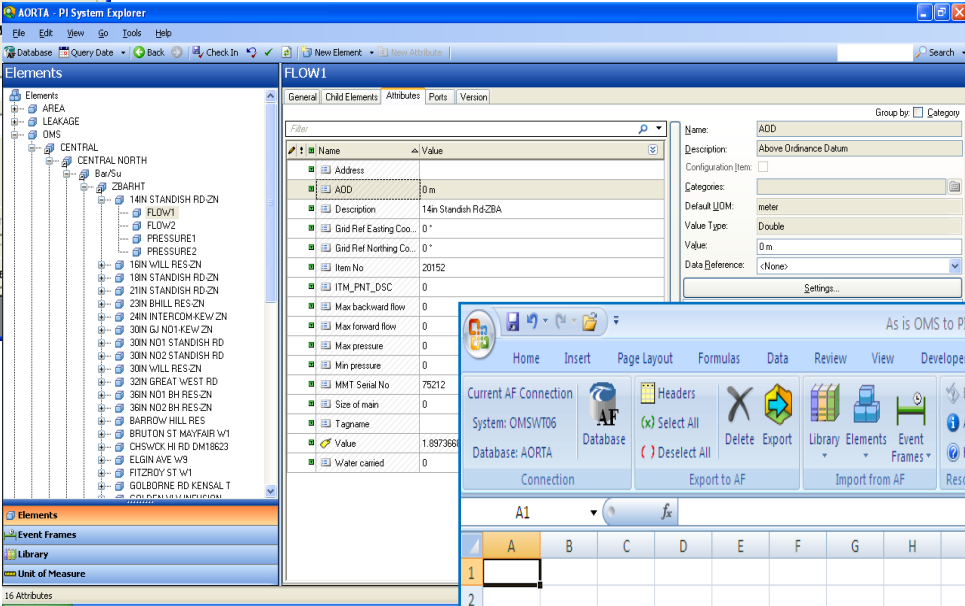
Forecast summary if current plan delivered

Graphical representation along with thresholds

Screen shots - Administration

Before

AORTA
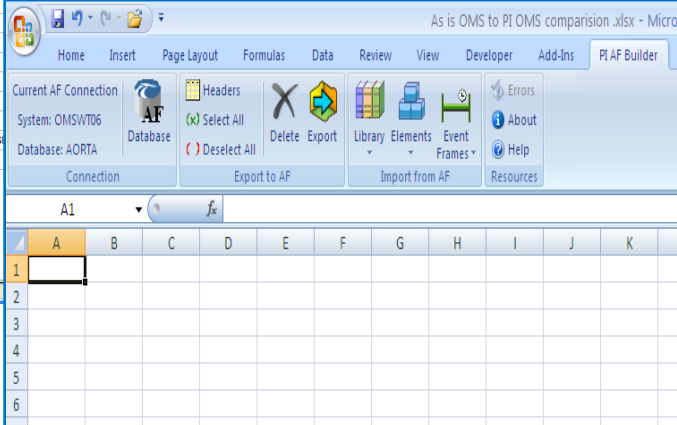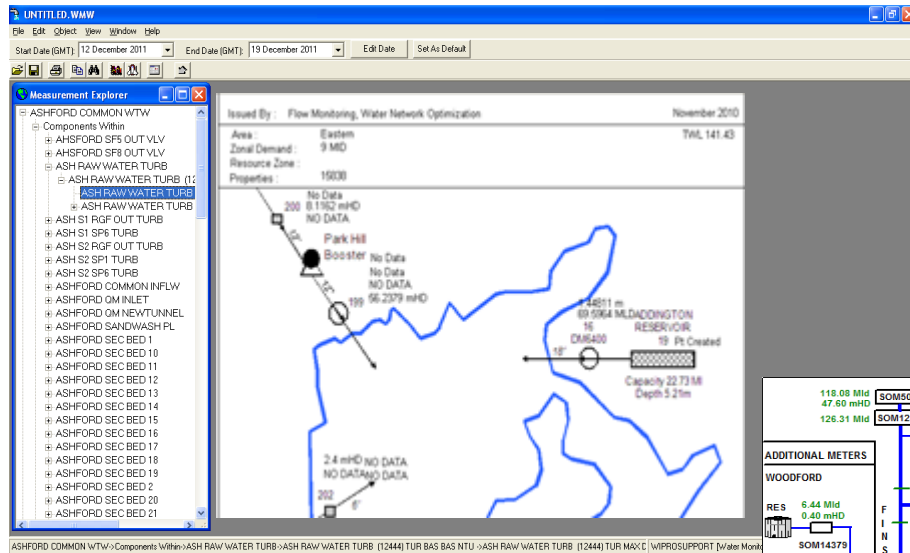
After

Simpler and visual creation of Asset hierarchy

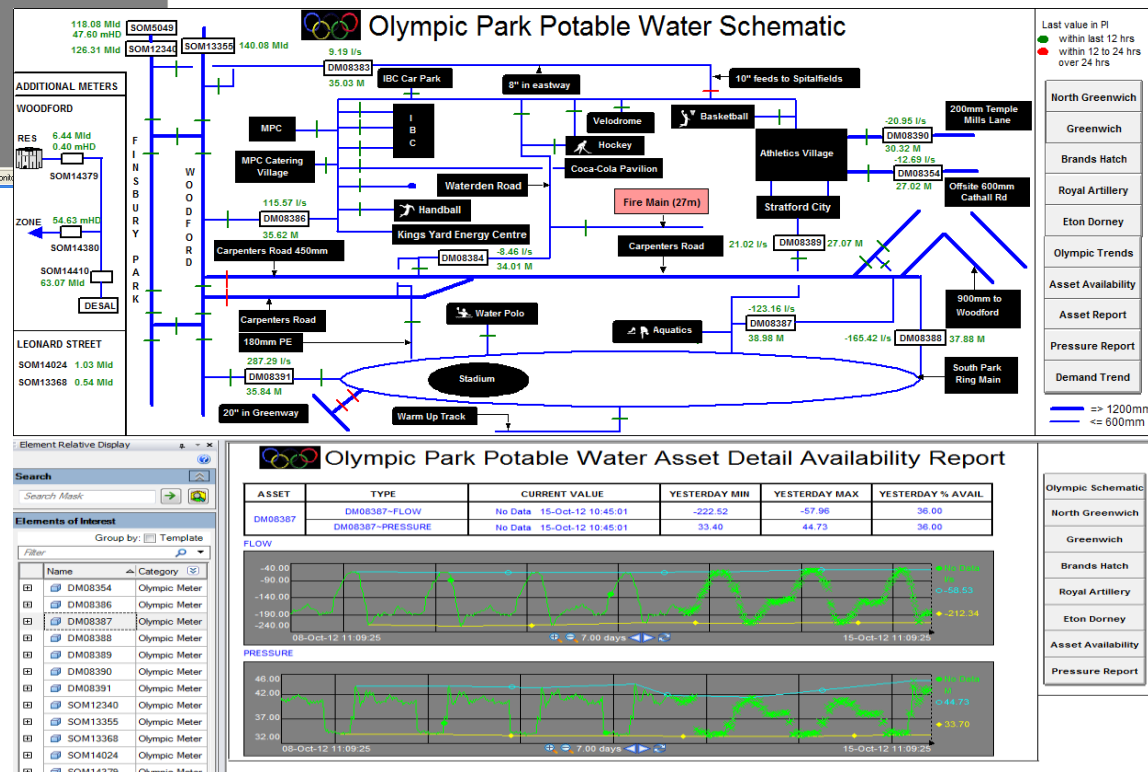**Bulk configuration of Signals/Calculations**

Screen shots - GUI

Before

AORTA

After

Ability to display the data in schematics views representing real life entities

Easy to use User interface

(more features added, not mentioned here)

How PI helped

- Risk avoidance from aging systems (OMS, Delphi 5 based legacy applications)

- With OSI Soft technology, the 20 years information is on just on few clicks and seconds for both clean and waste water data

- Single version of truth – All data in PI now, no desktop based downloads

- Olympics Village schematics – Modelled the Olympics village for operations teams and control

- Daily demand flows – The daily totals for demands are on click of button

- Ease of access to data for user specific analysis using data link

- Reservoir calculations and derived reservoir flow are available overnight

- Simplified administration – many system administrators to few identified

Phase 2 project and Future plans
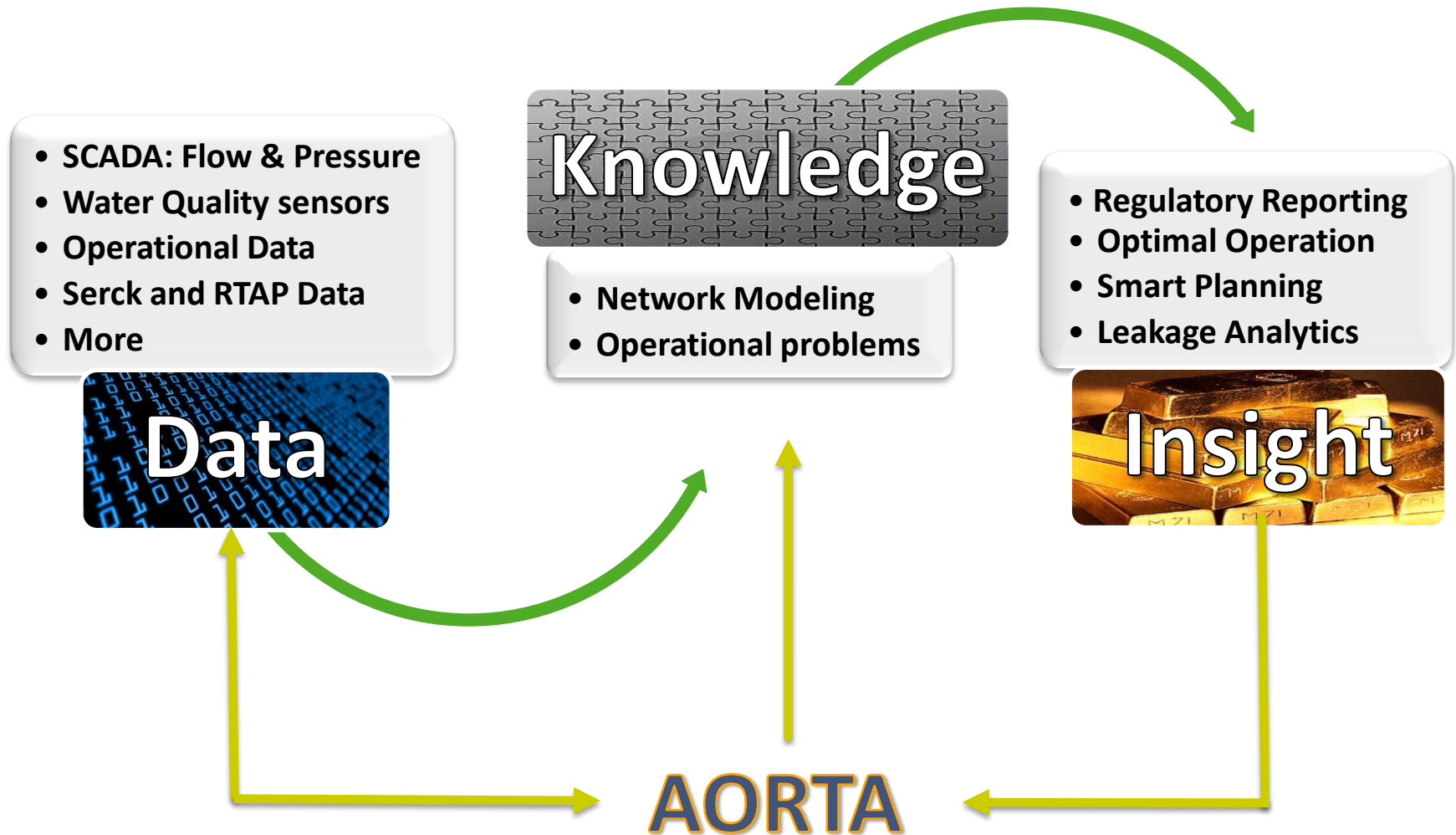
Phase 2 Solution

- Subsume below legacy applications to be implemented in Phase 2

    - Rapid Gravity Filters and Slow Sand filter monitoring and scheduling

    - GAC scheduling and maintenance

    - Dissolved Oxygen monitoring

- Identified the KPI reports to be migrated from SCADA Historians to PI2010

People working on old systems that were very difficult to maintain or update

New system built to suit customer context, scalable, …

Future plans for PI – Frame work

Data
- SCADA: Flow & Pressure
- Water Quality sensors
- Operational Data
- Serck and RTAP Data
- More

Knowledge
- Network Modeling
- Operational problems

Insight
- Regulatory Reporting
- Optimal Operation
- Smart Planning
- Leakage Analytics

AORTA

Future plans for PI – contd…

Reporting

Interactive Data Landscape

PI Utilities

Process Book   Data Link

PI Tag Library

Oracle Historians

Daily Monitoring

Production Planning
Abstraction
Pressure Monitoring
Distribution Input
Water In Supply
Mass Balances
Event Monitoring

Control Systems

Selective Metering Data

Regional SCADA

RTU Data

PLC Data

Energy

RTAP

SERCK

Future plans for PI – contd…

- AF Centric solutions approach

- KPI Analysis and weekly reporting

- Energy sub-meters data into the PI System for Monitoring

- Leakage Reporting from the PI System

THANK YOU

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