Turning insight into action.
Creating Calculations to Solve Business Problems: PI Advanced Computing Engine (PI ACE)

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What problems does PI ACE solve?

*Implements processes and reduces costs*

- Manage using KPIs & roll-ups for assets and processes
- Condition based maintenance
  - Users Conference 2010 talk by Alliance Pipeline
- Analyze data based on batches imported from external systems
- Damage Monitoring system
  - Users Conference 2009 talk by Korea Electric Power Corporation
<table>
<thead>
<tr>
<th>Configuration</th>
<th>Programming</th>
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<tbody>
<tr>
<td>PI Performance Equations</td>
<td>PI Advanced Computing Engine (PI ACE)</td>
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<tr>
<td>PI Totalizers</td>
<td>Microsoft StreamInsight &amp; PI for StreamInsight*</td>
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<tr>
<td>PI Real-time Statistical Quality Control</td>
<td></td>
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<tr>
<td>PI AF formula data reference</td>
<td>PI AF custom data reference</td>
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PI ACE by Example
Calculation requirement

- How effective are the Gas Turbines at full throttle?
  - Calculate base load fraction
- Calculation requirements
  - Multiple lines of logic
  - Math function
    - **Temperature correction curve**
  - Write results back to PI System
  - Apply calculation to multiple gas turbines

![Temp. Correction Curve](attachment:image.png)
## Choosing PI ACE

<table>
<thead>
<tr>
<th>Features and Capabilities</th>
<th>Benefit</th>
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<tr>
<td>Programming environment - Visual Studio .NET</td>
<td>Flexibility of a programming language</td>
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<tr>
<td>Incorporate internal or 3rd party libraries</td>
<td>Reuse existing analytics</td>
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<td>Write once, apply to many</td>
<td>Use the same calculation for multiple assets</td>
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<td>Incorporate non-PI System data</td>
<td>Programmatic access to other data sources</td>
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<td>Recalculation (manual and automatic)</td>
<td>Ability to perform calculation when events arrive out of order</td>
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<td>Wizard</td>
<td>Assist implementation of calculations</td>
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<tr>
<td>Manager</td>
<td>Configure calculations including deployment</td>
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</table>
PI ACE and PI Module Database

PI ACE uses the PI Module Database (MDB) for configuration and calculation metadata
Create assets in PI Module Database (MDB)

- Create manually
- PI System Management Tools MDB Excel add-in
- Replicate from PI AF using PI AF Link Subsystem
Demo

- Create a new calculation
- How effective are the Gas Turbines at full throttle?
Who are the users of PI ACE?

• Development of calculations
  – Developer
  – IT savvy user who can be guided by a wizard and can enter calculation logic
  – You and your colleagues trained by OSIsoft

• Management of calculations
  – End User, no development knowledge required
PI Asset Framework View
PI ACE and PI Asset Framework (AF)

PI ACE uses the PI Module Database (MDB) for configuration and calculation metadata.
PI ACE and PI Asset Framework (AF)

PI Server 2010 enables MDB to AF link and synchronization
PI ACE 2010 R2 Enhancements

• Scalability – Multiple PI ACE Schedulers
• Performance - Use less resources and run more calculations
• Native 64-bit support
  – More calculations per PI ACE executable
• Microsoft Visual Studio 2010 Support
PI ACE 2010 R2 – Performance

- Improved calculation throughput
  - Up to an order of magnitude*
  - Faster start-up
  - Faster cache access

- Perform more calculations!
PI ACE 2010 R2 – Scalability

• Run more calculations
  – per PI Server

• Scale out calculations
  – Distribute the calculation load across machines
PI ACE 2010 R2

• Released last week
• PI Server 2010
  – PI ACE 2010 R2 inside!
• More information
  – Demo pod at the Product Expo
  – OSIsoft vCampus presentation, webinar and forums
    • vCampus.osisoft.com
Why would you use PI ACE?

• Flexibility of a programming language
  – Incorporate in house and 3rd party libraries

• Assisted implementation
  – Wizard and Manager - Assist implementation
  – Reuse the same calculation for multiple assets

Solve problems and save money for your company!
Thank you
Turning **insight** into **action**.