

Best Practices when Implementing Asset Analytics

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Agenda

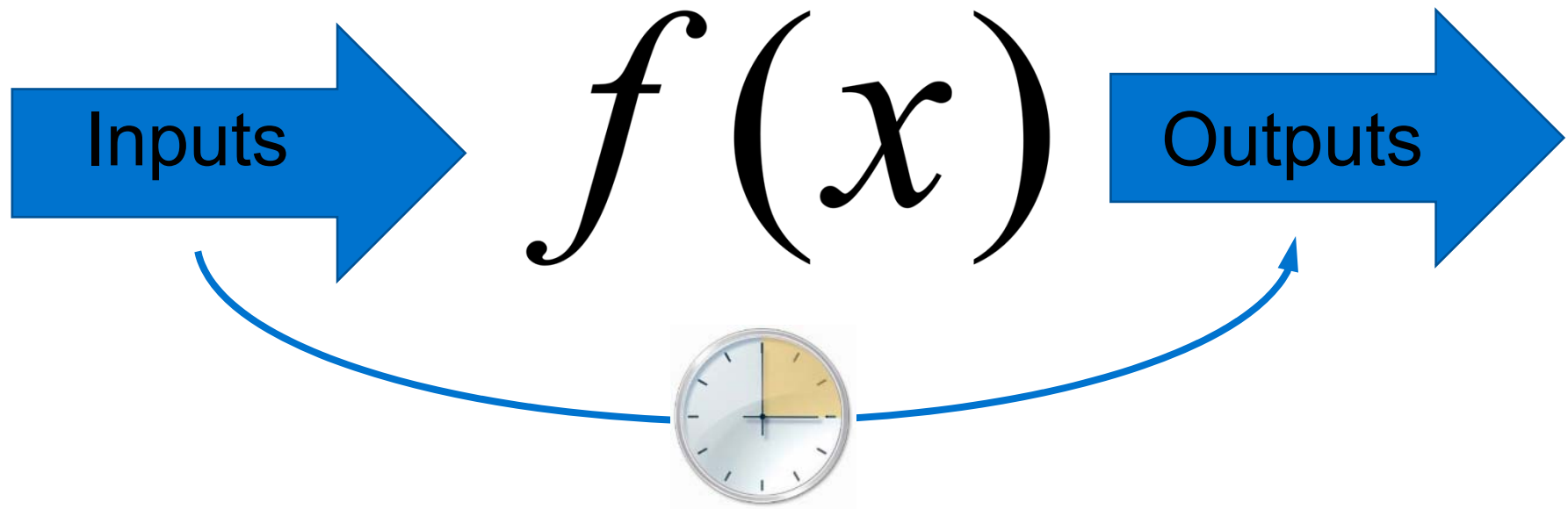
- Initial design principles
- Best practices
 - Planning
 - Tradeoffs – what to do, what not to do
 - Focus areas
 - Avoiding problems
- Summary

Initial Design Principles

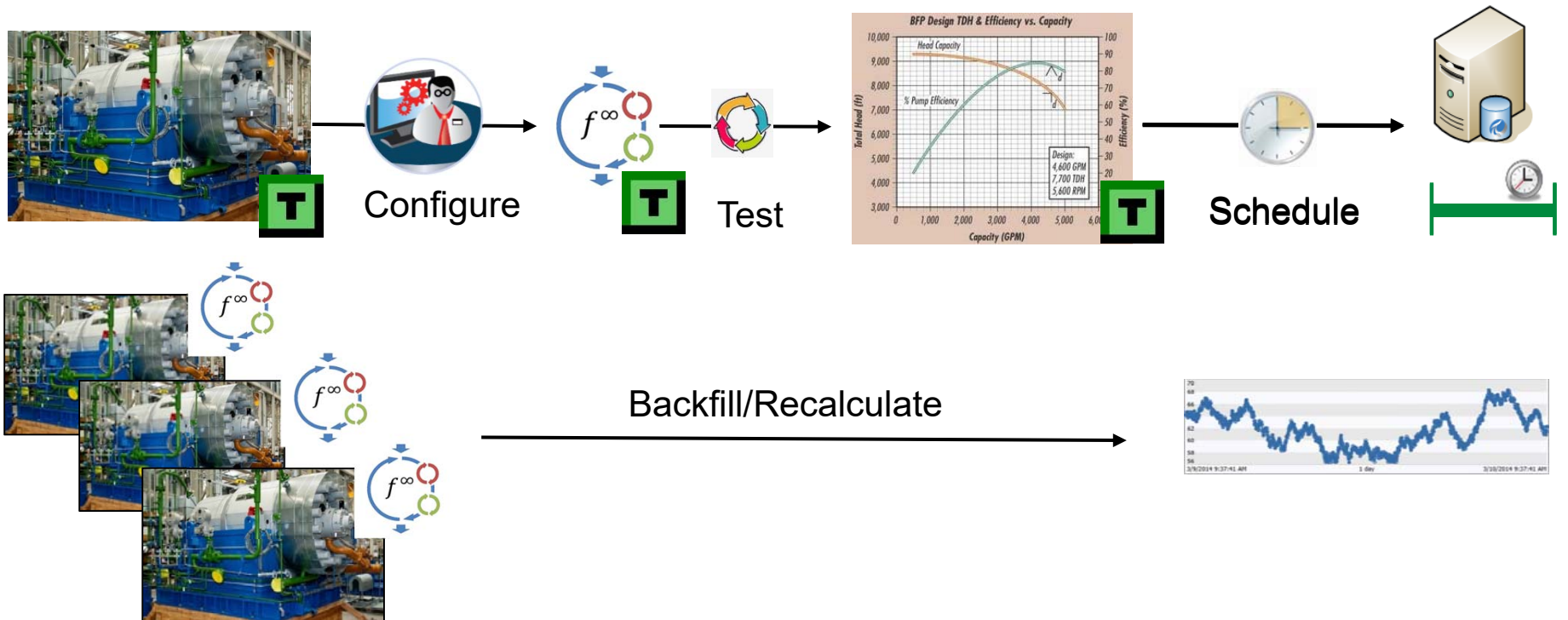
- Leverage AF for context and event capture
- Easy to use
- Performance Equation function signature
- High performance
- 1 Analysis Service per 1 AF Server
- Auto backfills for restarts



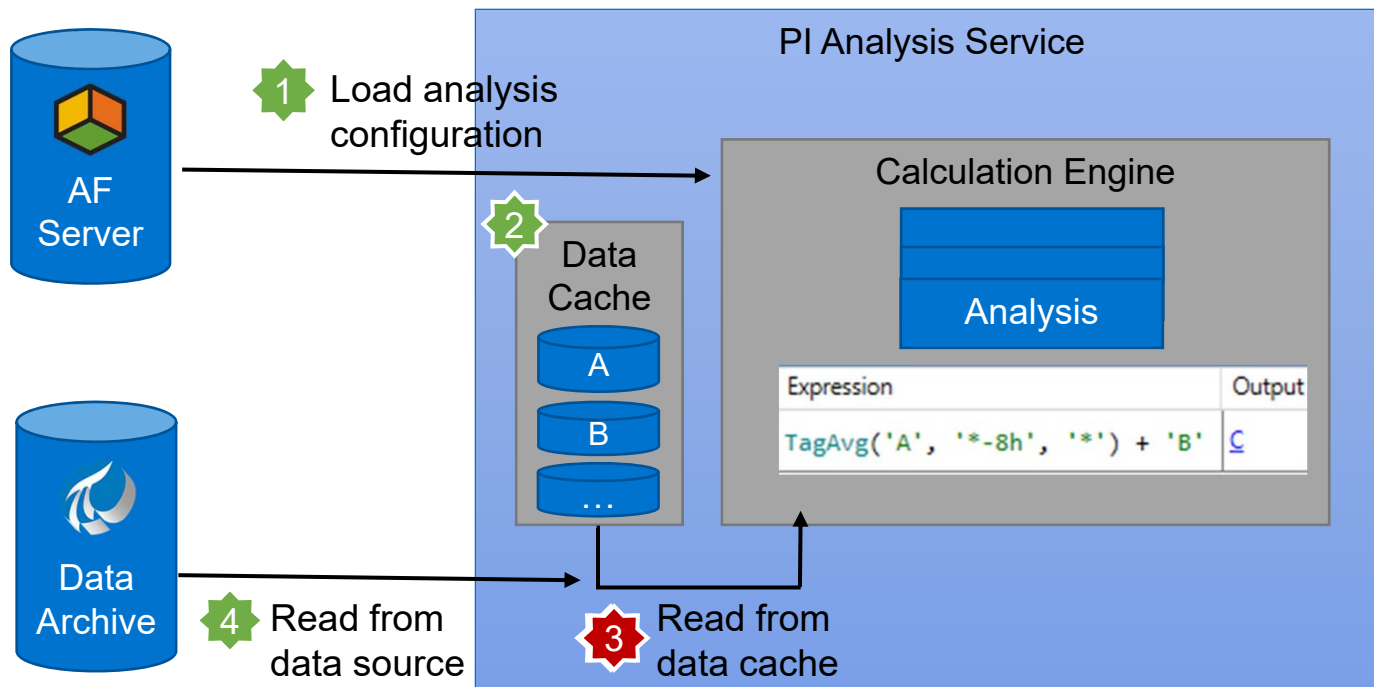
Basic Concept



Workflow



PI Analysis Service



Design Tradeoffs

Optimized for

- Streaming analytics use case
- Prioritize real-time calculations over backfills/recalculations
- Leverage Data Cache
- Easy configuration



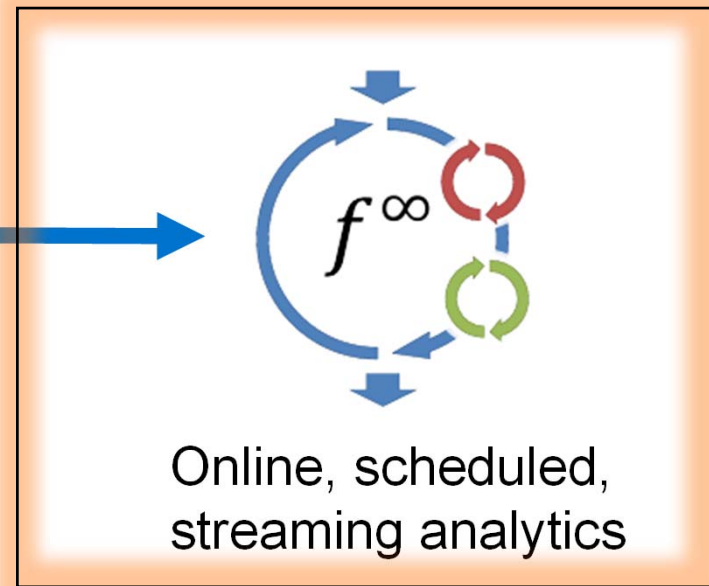
Not suitable for

- Executing queries across really large number of attributes
- Extracting large amounts of time series data
- Ad-hoc calculations

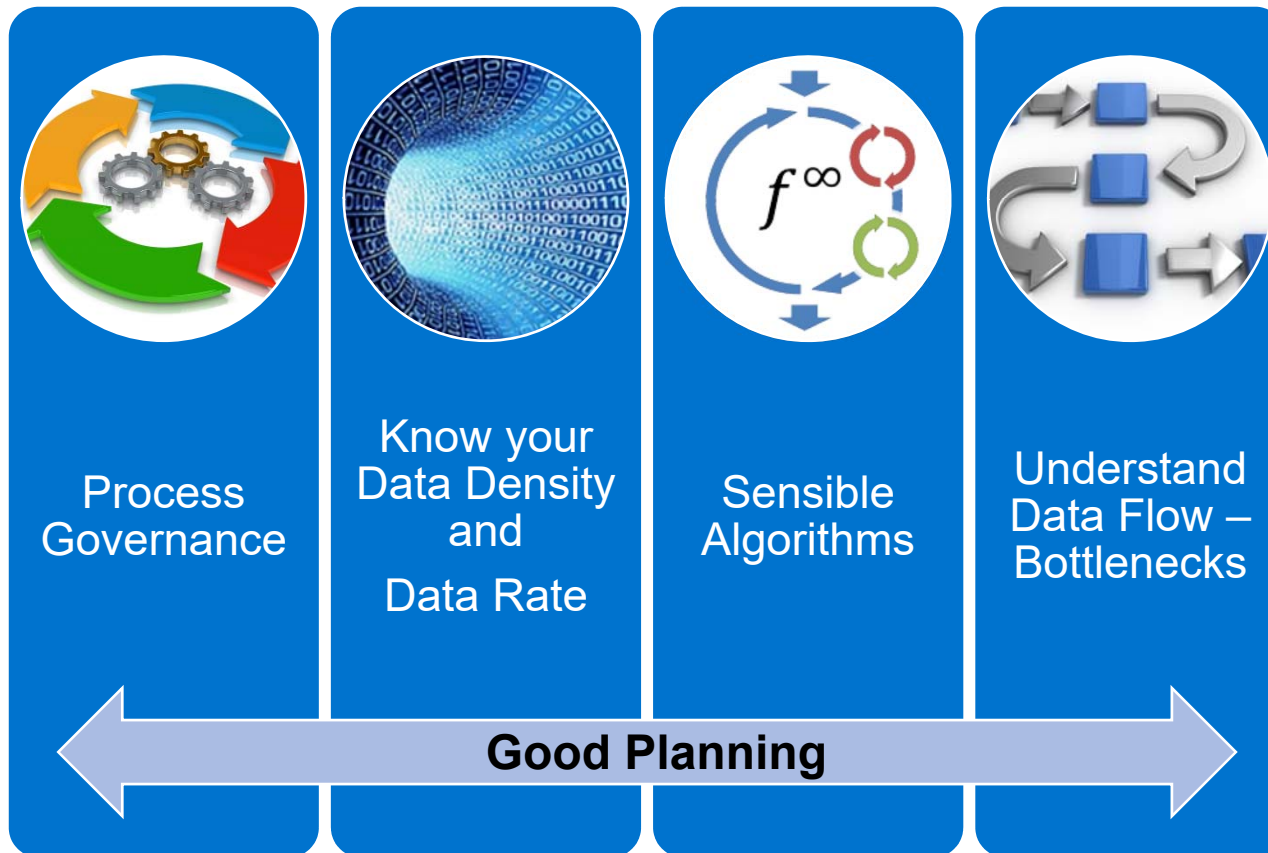
Use cases: Streaming vs. Adhoc



Adhoc investigation and analytics development



Online, scheduled, streaming analytics



Change Management



- Consider setting up Dev or Test environment
 - Allows for experimentation while developing calculations
 - Many engineers could be writing calculations
 - Frequent changes can cause churn for the production system
 - Easier to isolate issues

Best Practices: Use Templates

- Provide manageability, consistency and governance
- Use templates for any repetitive work or for future extensions.
- A modification to the template is applied to all analyses from that template.
- Searching and filtering in UI is also easier with templates.
- Higher performance.



Best Practices: Configuration

- Retain tribal knowledge
 - Expressions should be written for readability
 - Add comments as appropriate
- Use PI Points for outputs – Higher efficiency and stores history
- Exit when you're done – don't continue to run calculations
- Use Categories for filtering

Understand the Impact of your Analyses

- Some functions such as summary functions (TagAvg etc.) might require a lot of data to perform a calculation on the client side
 - Use a smaller range or evaluating less often if the range is larger
- Hit the cache and not I/O to Data Archive
- Do not trigger faster than evaluation rate
- Watch out for dependent analyses
- Plan for out of order data – recalculation

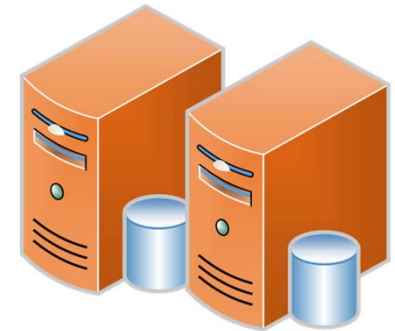
Avoid Common Bottlenecks

- Inputs from slow data references, e.g. Table Lookup
- Inputs requiring round trip to Data Archive (I/O bound)
- Too many analyses triggering at the same time
- Sudden slug of triggering inputs



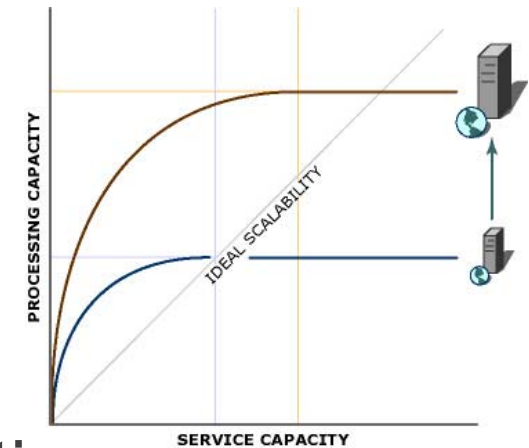
High Availability

- PI Analysis Service supports failover using Windows Server Failover Clustering (WSFC)
- Use PI Buffer Subsystem for writing PI Point outputs



Lastly

- Nothing scales forever
 - Use multiple systems if needed
- Optimizing single system has limitations
 - Hard to recover from a perturbation



Summary

- Governance – Test + production system
- Sensible data density and data rate
- Streaming vs. adhoc calculations
- Only calculate what's needed
- Avoid round trips to Data Archive for inputs
- Highly tuned system may be susceptible to small perturbations



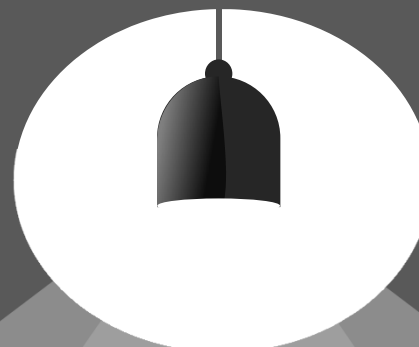
→ Customer Talks

How We Built An Automated
Recommender With Real-Time Data
Analytics Using PI AF & PI Vision

Predictive Maintenance in GTs
Compressors

Atlantic LNG Energy Management System
(ARTEMIS) based on Pi Asset Framework

Using PI analytics to create a more
efficient and optimized Wastewater
Treatment Plant



→ Product Labs

Optimizing Asset Analytics for
Better Performance

Usage-based, Condition-Based
and Predictive Maintenance using
the PI System

See the Light, Easy Wins to
Improve your Asset Framework
Experience

Communicate with OSIsoft Product Managers



<https://feedback.osisoft.com>

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If it is not shared on the feedback portal, it didn't happen!



- **Stephen Kwan**
- skwan@osisoft.com
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An advertisement for the OSISOFT PI World app. It features a dark blue background with white text. On the right, a smartphone displays the app's logo, which consists of a stylized white atom symbol above the text "OSISOFT PI World". Below the text, there are two buttons: "Download on the App Store" with the Apple logo and "GET IT ON Google Play" with the Google Play logo.

