



Designing for Data Quality, Flexibility, and Scalability in Performance Measurement and Attribution Platforms

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A Passion to Perform.

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Introduction

Pete Kelso – Global CIO Investments DeAM

- Responsible for “Front-Office” technology and operations for DeAM on a global basis
 - Decision Support and Portfolio Construction systems
 - Order Management and Investment Compliance systems
 - Credit and Research Analysis
 - Measurement Systems
 - Control and Active Risk
 - Performance and Performance Attribution
 - Middle Office
- 4 Continents, 7 Countries, 9 locations



Goals

Discuss our implementation of a new Performance Measurement and Attribution complex.

- Explain challenges we faced.
- Detail the design pattern and techniques used to implement the platform.
- Answer any questions about why and how.
- Introduce the challenges of creating an infrastructure for global use but focus on the Frankfurt based project.



Global Strategy – Local Implementation

Three Year global Performance Systems strategy

- GIPS Complaint Performance
- Daily-Transactional Attribution
- Installed in every major DeAM hub
 - Frankfurt, New York, Singapore
- Leverage same base platforms, architecture, and operations
- Start with Frankfurt



Frankfurt-based Project

High level goals

- Automate, automate, automate – keep any manual process to one-offs and at an extreme minimum.
- Create processes to ensure consistent high data quality.
- Provide for flexible, customer-oriented report design.
- Where manual checks/data scrubbing are necessary, enable them through offshore support.
 - Take advantage of the sun.
- Create the basis for international implementation.
- Speed to market important for Equity Attribution solution.



Systems and Timelines

Project Divided into 5 major Phases:

- Phase I – Frankfurt managed Equity/Balanced Attribution
 - Started at the end of Q3 2006 with goal of Q1 2007
 - Factset as the engine
- Phase II – GIPS Complaint Performance
 - Started in Q1 2007 with goal of Q4 2007 delivery
 - StatPro as the engine
- Phase III – Fixed Income Attribution
 - Started in Q2 2007 with goal of Q1 2008 delivery
 - StatPro as the engine
- Phase IV – Singapore Performance Measurement & Attribution
- Phase V – US Performance Measurement & Attribution



Designing the system architecture

What we knew

- 90% of the project would be about data.
 - True in all Performance projects, but especially true for daily-transactional Attribution.
- The core source systems, the Accounting platforms, would be in flux during the project.
 - Not only was there more than one, but accounts would migrate while both during implementation and after Phase I.
- We had short time frames and needed to work fast.
- Each source system had a potential for different access methodologies.
- High volume of data (1,200+ accounts)



Designing the system architecture

What we thought we knew

- No matter how much analysis was done or how good the source systems, there would always need to be both *a priori* and xhuman review and some intervention.
- The data would probably not sit in a single location for us to pull. Even after the accounting system consolidation.
- There would have to be a good bit of data transformation necessary between source and destination.



Designing the system architecture

What we didn't know but had to design for...

- Support for new benchmarks/blends for yet unplanned new funds.
- What new security types would be traded over the ensuing years.
- What new hubs, acquisitions, or mergers would we have to absorb over the life of the platform.





Many-to-Many Conundrum

- Multiple source systems supplying data to multiple Performance engines
- Different data access methods for each source system
 - Direct access (via flash copy)
 - File extracts
- Different data storage paradigms for each source system
 - Treatment of backdated transactions
 - Storage of Derivative (multi-leg vs single)
- Different data requirements for each Performance engine



Highlights of particular logic needed

- Aggregation of transactions according to the particular financial instrument for Performance engine
- Specific accounting system's portfolio aggregation particularly multi-class / master and sub-funds
- Transformation of transaction types into Performance engine structure
- Handling of multi leg instruments
- Accounting for backdated transactions based upon methodology of each Accounting system
- Transformation of dynamic branch structures



Data Complexity

- Managing the content from multiple sources
 - Don't want multiple support teams to support either the content from the Accounting platforms or the needs of the Performance engines.
 - Issues would potentially be common to the platforms and missed.
- Need to have a process to fix the root issue.
 - Not just patch in the Performance engine or data warehouse directly.





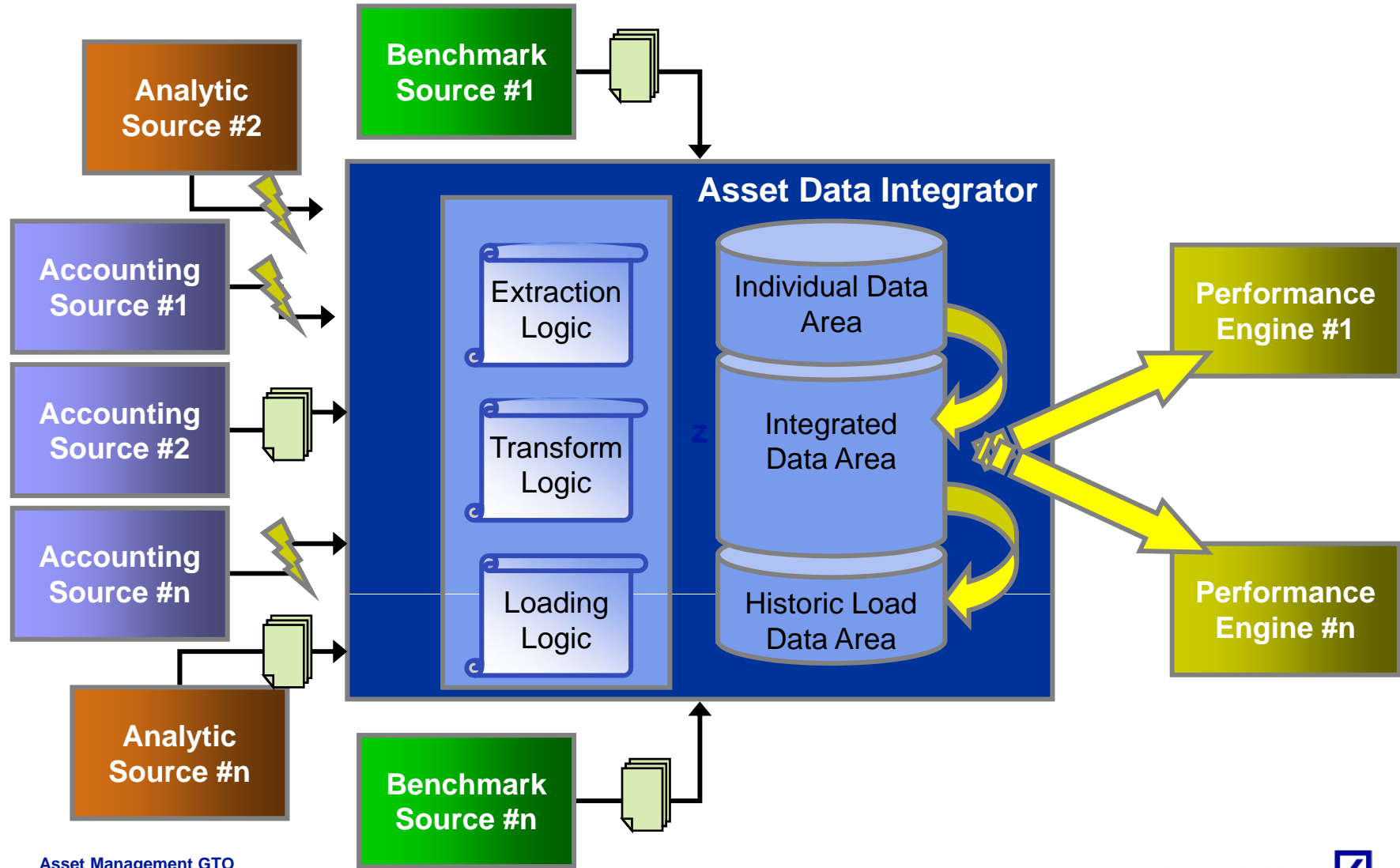
Technical Architecture

Removing the many-to-many relationship

- Partnered with adept consult to build out a central, Performance specific, Asset Data Integration hub and ETL tool.
 - Manages the extraction in various forms from the source systems.
 - Persists the raw extracted data.
 - Performs the transforms to normalize that data into destination format.
 - Persists the normalized format.
 - Extracts from the ADI to create load files for the Engines.



ETL tool on steroids

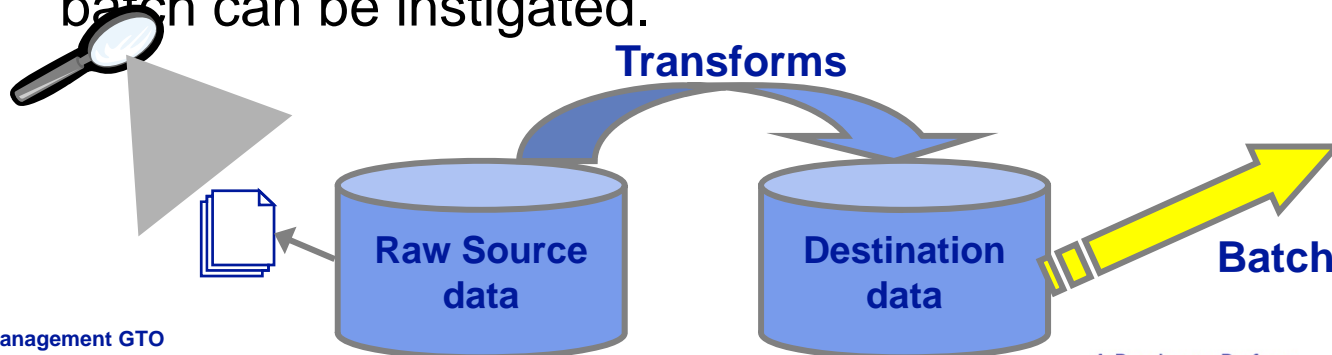


Technical Architecture

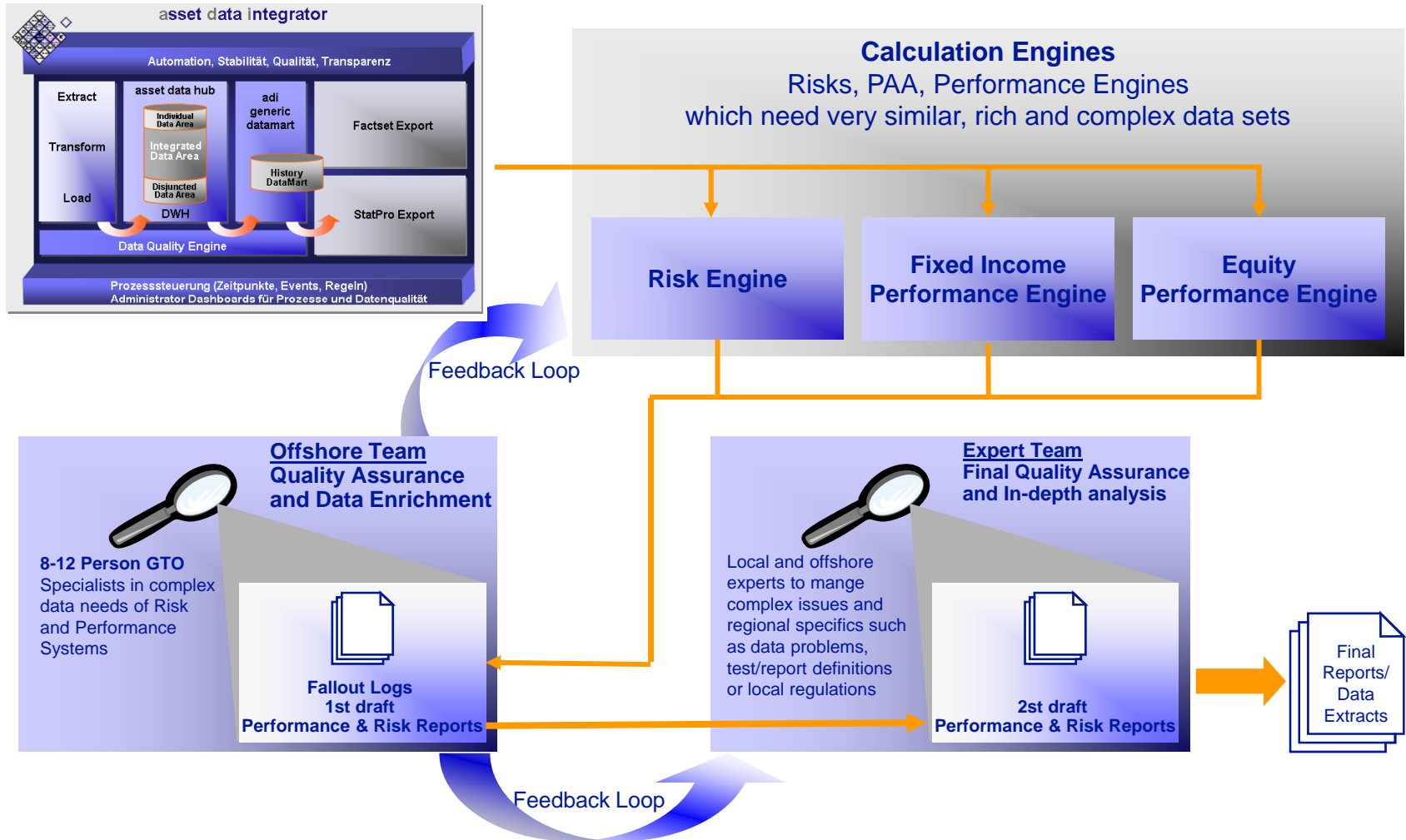
Extract → Persist → Transform → Persist → Load

■ Equity as an example:

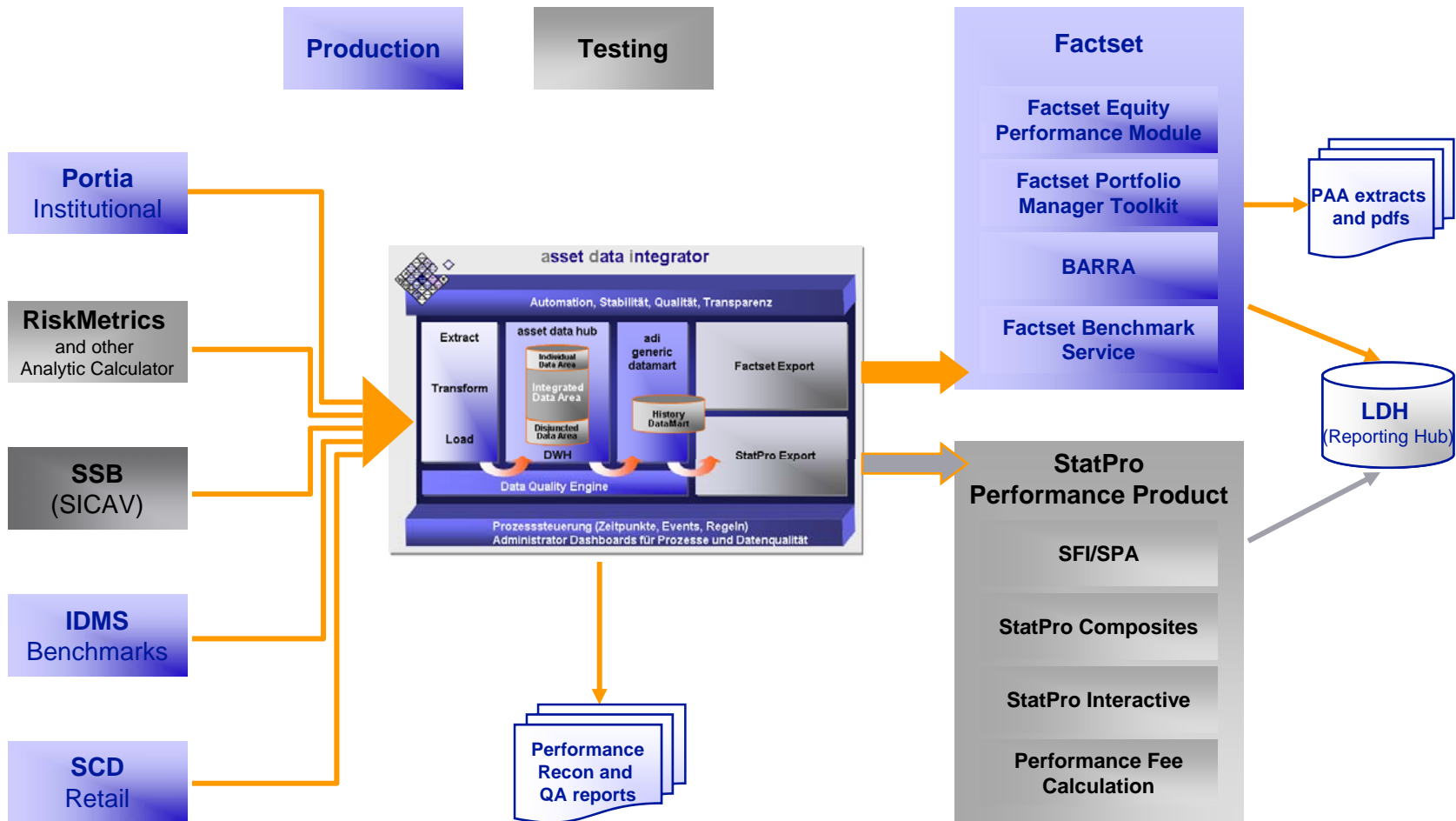
- First level of Persistence allows for automated data quality checks like 0's, nulls, blanks, out of range values, etc.
- Transforms take the same data set and create Factset and Statpro results. The systems have different needs.
- Those two persisted data sets then are available for loads to the Engines. From these, restarts, repairs, recovery in the batch can be instigated.



Data review workflow



Current Implementation Status



Experiences from the Phase I project

- Dealing with large number of accounts and daily-transactional Attribution means extremely large data sets.
 - Pay attention to Performance as development/testing progresses
- Data acquisition is the project.
 - Can't underestimate the quantity and quality of data needed.
- Automated handling for backdated transactions is indispensable.
 - Seems obvious, but different accounting systems treat these differently and most of the error conditions are from backdating transactions or the typing of cash events.
- Dialog and dashboard functions for the Operations and Performance teams required in order to coordinate work.
 - Fix root problems in core systems. No shortcuts.

