



# Introduction to DMA and AMF

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**Theme:** Innovation / Challenges  
**Topic:** Improving Cost Effectiveness



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**Introduction to DMA and AMF** – Data within IV&V are stored in a variety of forms by a variety of stakeholders with a variety of intents. Data management solutions that reduce duplications of efforts, standardize analysis data, and improve utilization of resources are needed. The Analysis & Management Framework (AMF) is an IV&V solution providing a meta-model of IV&V processes and data. The Data Management Architecture (DMA) project attempts to migrate the activities of performing IV&V and managing an IV&V project to a more data-driven process.



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## ■ Data Management Architecture

- Seeks to lay the foundation to support a data driven approach to IV&V
- The DMA is focused on defining the necessary components to support the principle activities of performing IV&V and managing an IV&V project.
  - In some cases, that's translating documented processes into business logic (e.g. AMF business layer).
  - In other cases, it means defining/documenting those processes (e.g. Assurance Strategy)
- Umbrella for three efforts:
  - Analysis & Management Framework
  - Operational Data Source
  - Data Warehouse



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## ■ Problem statement:

- Data within IV&V are stored in a variety of forms by a variety of stakeholders with a variety of intents. Using data from another stakeholder and getting a program-wide, 360° view is possible, but is inefficient. Knowing what data is available is haphazard, and finding it requires fore-knowledge of its existence and location. Historical data is not leveraged efficiently or effectively.

## ■ Data Management Architectures:

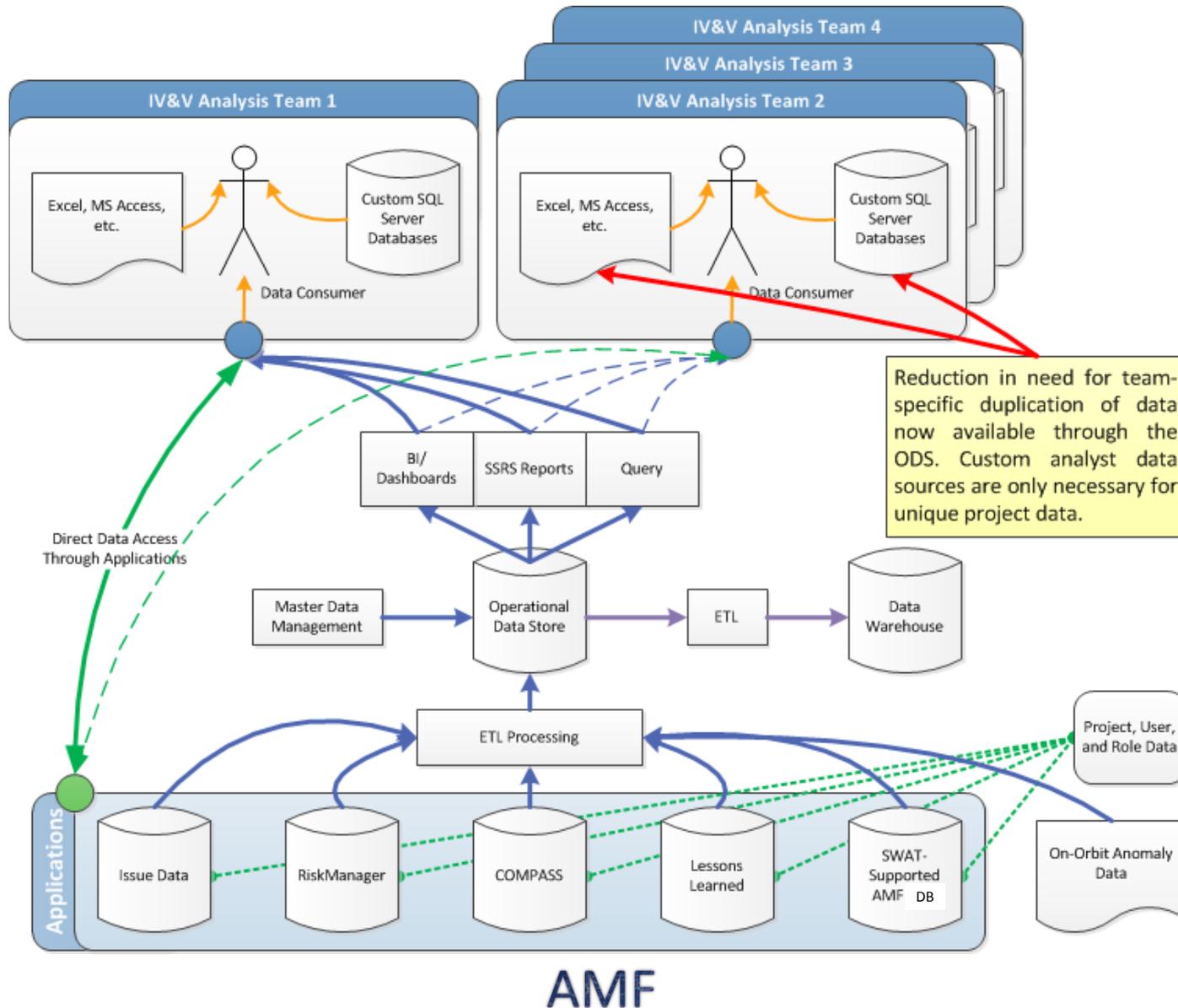
- Various solutions comprise the set of data management architectures available. In other words, Data Management Architecture is the term for the set of solutions available – not the name of a particular solution.

## ■ Why now?

- The efficiencies available go far beyond the efficiencies to be gained in handling data more efficiently – they include the efficiencies to be gained within the program from the transformative portrayals of the program that will emerge, with DMA being an enabler. By exposing data relationships and discovering new relationships, the DMA will allow data to be used as a driving input vs a post-facto outcome.



# Operational Data Store / Data Warehouse



# Analysis & Management Framework (AMF)

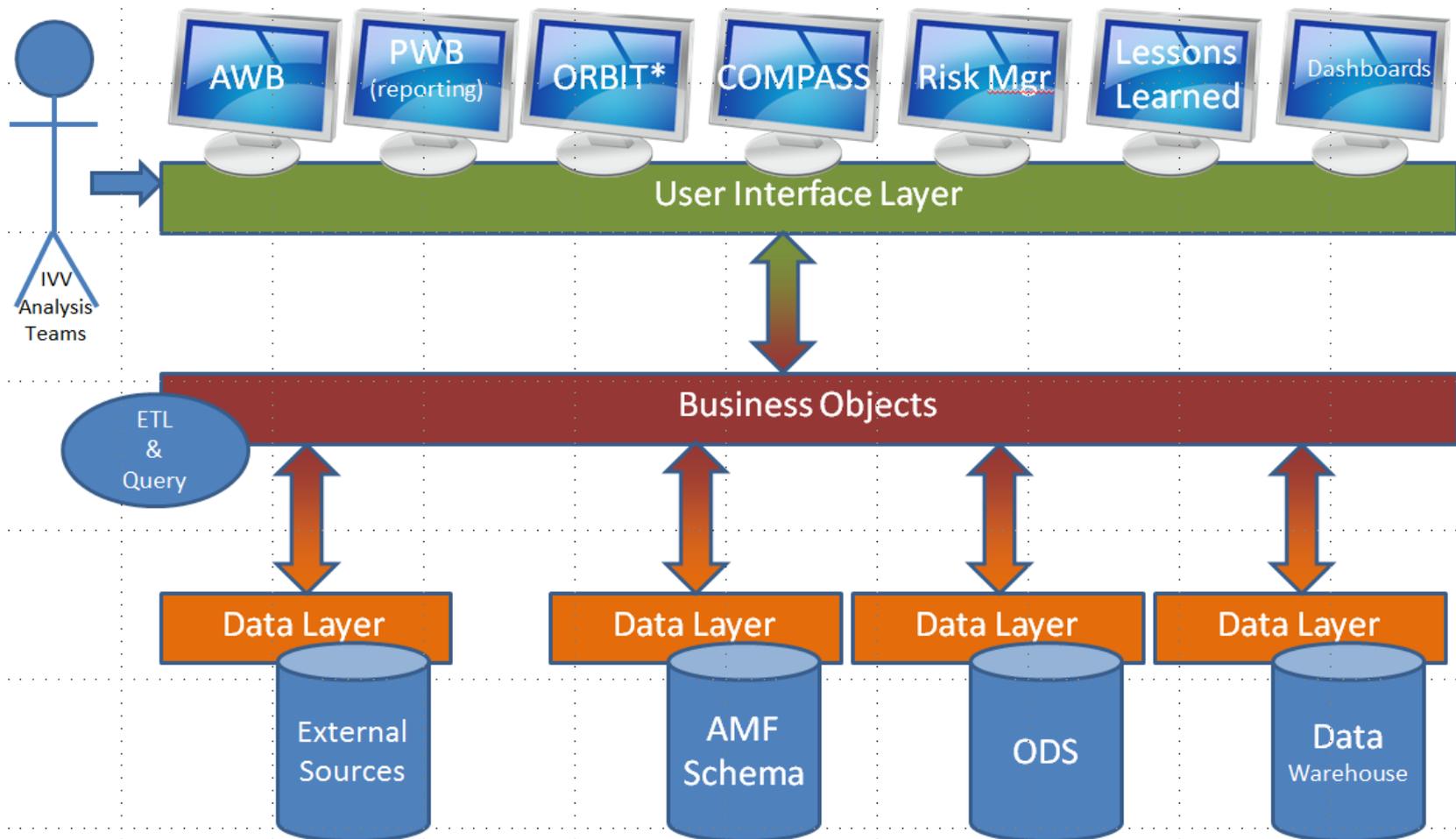
- Within the IV&V Office (IVVO), analysis work, management of analysis work, and reporting results can all be considered for support by the AMF. The NASA IV&V Management System (IMS) and the IV&V Catalog of Methods (CoM) are primary sources for identifying support and/or improvement by the AMF. The DMA special project, as well as projects using AMF inspired tools can all make requests for additional AMF functionality.
- The AMF divides its definition via the three layer architecture:
  - **User Interface Layer** provides a way for shareholders to interact with IV&V data via screens, reports or dashboards. There are currently three primary user interfaces, an eclipse plugin – the Analyst Workbench (AWB), and a series of MS Office plugins for Word and Excel and JIRA.
  - **Business Layer** provides a medium of communicating data from different sources in a common format to facilitate data flow across various technologies. The domain model of IV&V is implemented in the business layer. The IV&V domain model is extracted from IMS content, CoM content, and via suggestions from the DMA project.
  - **Data Layer** provides the interface for accessing various IV&V data sources and/or technologies. The following technologies have functioning data layers: SQL Server, JIRA, MS Word, MS Excel, and text files for sql scripting.
- This framework enables supporting operational scenarios for the entire IVVO project life-cycle from planning activities (e.g., heritage review and PBRA) to project closeout (final report).



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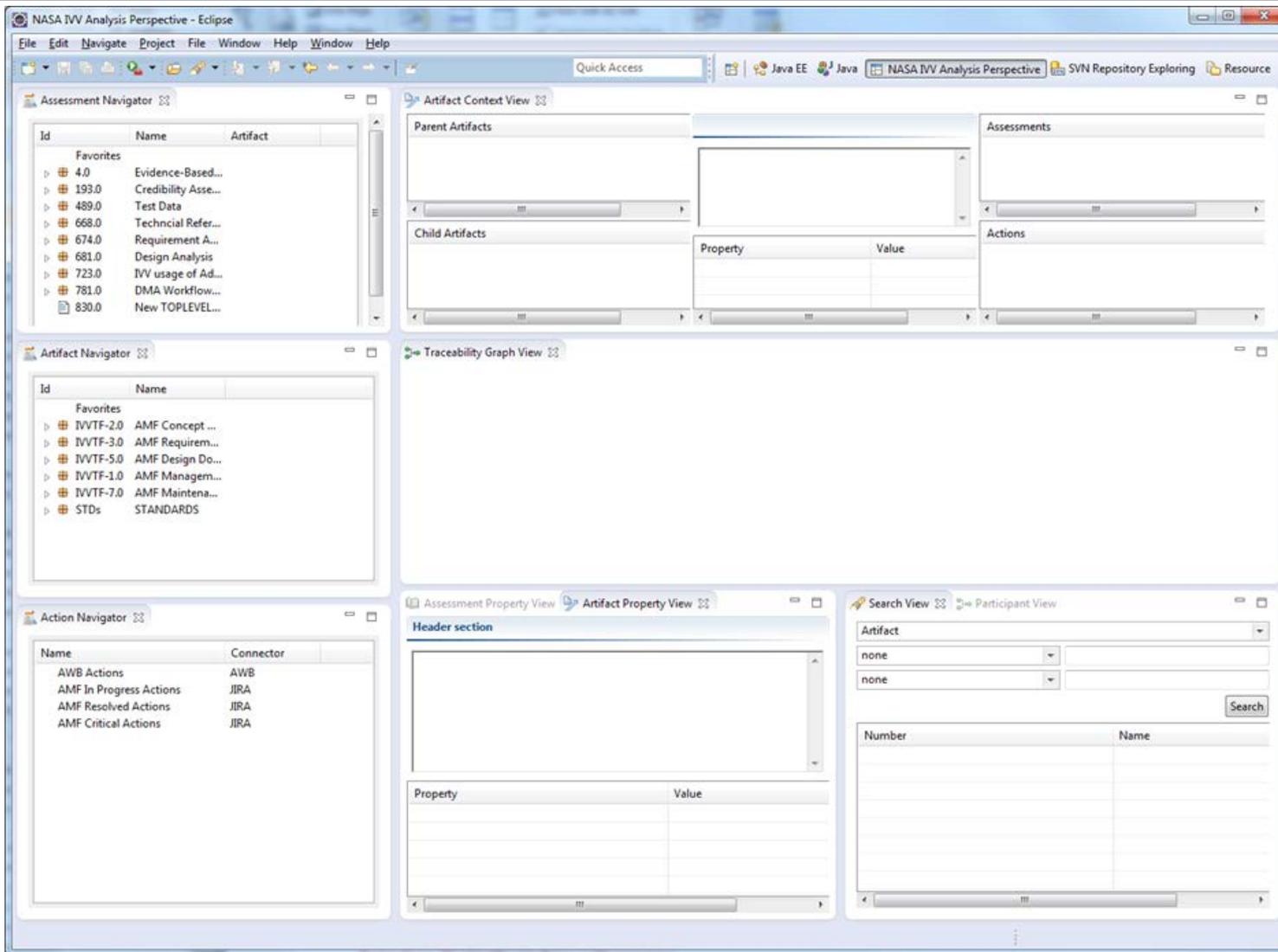
# AMF Conceptual Overview



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# Analyst Workbench – An AMF User Interface with multiple data sources



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# Improving Flow of Information

- FY13 – Focused on IVV 09-1
  - Concept through Implementation
- FY14 – Focused on
  - Heritage Review
  - Portfolio Based Risk Assessment
  - Risk Based Assessment
  - IV&V Project Execution Plan
  - Assurance Strategy
  - Technical Scope and Rigor
  - Scheduling and Reporting



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# Improving Flow of Information

- Workflow Assessment
- Integration of Data
  - Move towards database approach
  - Eliminate spreadsheets
- Identify Gaps in workflows
- Improve information sharing between workflows



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# Heritage Review

- Heavily dependent on the analysts knowledge of NASA projects
- Currently search up to 16 sources per heritage project
  - Each source contains many pieces of relevant information
  - Cross referencing of information is costly and error prone
- Identify sources of information
- Extract useful data



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# Cost Efficiencies

- Data gathering is the hidden cost of IV&V
  - Not tracked on a spreadsheet
  - Effort varies based on form, format and size of artifacts
- For example: Heritage Review is a data gathering effort
  - Let's see how a data driven approach would improve our efficiencies



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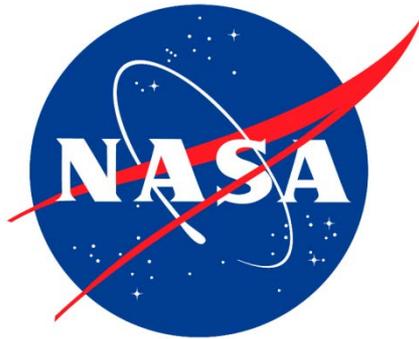
# Summary

- A data driven approach will be more cost efficient
- First time through may appear to slightly increase costs
  - Many of these may have been previously hidden costs
- Subsequent uses in the IV&V project life cycle reduce costs which out weigh initial cost increases
- Data Warehouse enables decreased costs on future projects



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