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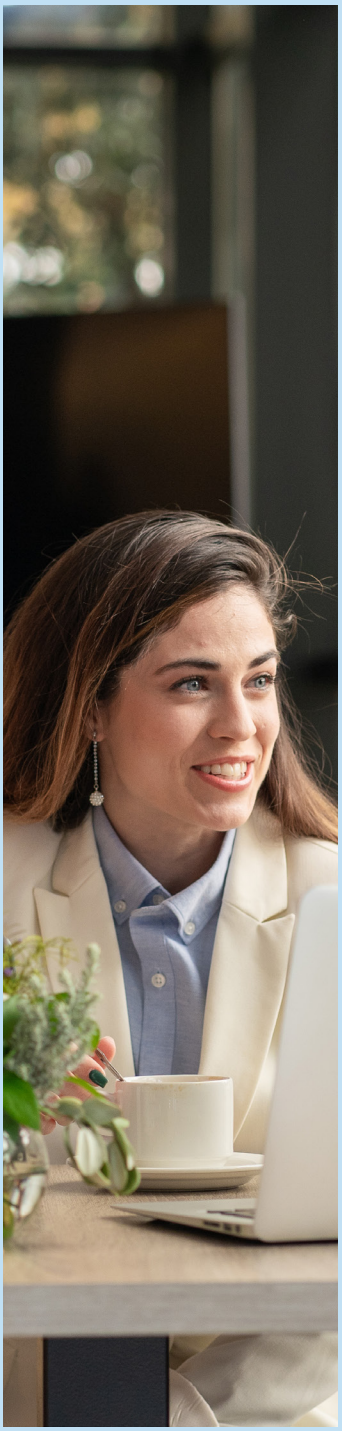

STRATEGIC CHOICES IN ENTERPRISE ASSET MANAGEMENT – MASTER DATA GOVERNANCE

Abstract

For asset-intensive enterprises, effective asset master data governance is foundational to operational excellence, regulatory compliance, and digital transformation. This paper explores strategic approaches to implementing Master Data Governance (MDG) within SAP Enterprise Asset Management (EAM) environments. It examines the benefits of structured data governance, highlights potential overheads, and compares centralized and embedded MDG models. By presenting practical insights into data harmonization and key decision factors, the paper helps organizations make informed, context-specific choices to enhance asset performance and strengthen long-term business resilience.

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Introduction

Asset master data is not just data; it is the DNA of asset-intensive enterprises. For such organizations, this is more than a metaphor; it is a strategic reality.

Organizations using SAP Enterprise Asset Management (SAP EAM) to manage large asset bases must establish a structured solution framework.

Such a framework should ensure consistency in master data, strong governance, and alignment with recognized industry standards. These standards include ISO 14224 for reliability data, ISO 55000 for asset management, and the Capital Facilities Information Handover Specification (CFIHOS) for asset data exchange.

Master Data Governance (MDG) plays a central role in this setup by governing critical master data. It ensures the data is accurate, standardized, compliant, and aligned across the enterprise. In doing so, MDG becomes a key enabler of asset performance and long-term business resilience.

The benefits drive and further establish the critical importance of establishing the MDG solution framework for EAM organizations:

Improved data quality and standardization: Enhances the accuracy, consistency, and completeness of master data while reducing duplication

Controlled master data lifecycle management: Provides end-to-end control over the EAM master data lifecycle

Greater data quality transparency: Improves transparency and supports data validation and audit readiness

Reduced maintenance costs and downtime: Supports long-term cost savings, enhances accuracy, and boosts operational efficiency of maintenance processes

Streamlined governance through workflows: Enables transparent processes that scale across plants and regions, with support for localization

Faster asset onboarding: Reduces delays in commissioning and maintenance readiness through predefined templates and data validation powered by artificial intelligence (AI)

Stronger compliance with industry standards: Supports alignment with regulatory requirements and industry frameworks for asset data exchange and reliability

Weighing the Overheads

Despite the benefits, implementing MDG comes with certain overheads. These should be factored in as upfront costs that impact total cost of ownership (TCO). This is particularly relevant when MDG is adopted as a strategic initiative to fulfill business or compliance requirements. Typical overheads include:

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People impact: Creating new roles, such as data stewards, and managing training as well as change management initiatives

Process overhead: Defining workflows and approvals that can increase process complexity

Technology and tools overhead: Implementing, integrating, and maintaining MDG tools, which require technical effort and investment

Making the Right MDG Choice for SAP EAM

MDG can either drive enterprise performance and resilience or, if misaligned with business needs, become an administrative burden. Organizations must therefore make a deliberate, strategic decision when selecting an MDG approach for SAP EAM. There are two primary solution options, as outlined in Table 1. Depending on the enterprise context, a single option or a hybrid approach may be the best fit.

Table 1: MDG options for implementing SAP EAM effectively

Option 1 MDG system integrated with SAP EAM	**Best suited for organizations that:** • Have a large asset base • Operate across multiple sites or plants • Manage EAM master data from multiple data sources • Belong to regulated industries where compliance risks are tied to asset data quality **This approach offers:** • A structured and scalable solution for MDG • Reduced compliance risk and improved data standardization • Compatibility with tools such as Prospecta MDO, Utopia MDG, Informatica MDG or custom SAP Fiori-based solutions
Option 2 Embedding MDG features within native SAP EAM	**Best suited for organizations that:** • Have a small asset base • Do not have regulatory compliance requirements • Onboard limited master data from diverse data sources **This approach offers:** • A lightweight, cost-effective alternative for master data maintenance • Minimal TCO • No integration or approval workflow overhead

Option 1: EAM master data governed in the MDG system, integrated with SAP

Designed for large enterprises that require centralized control over EAM master data through an integrated MDG system. Figure 1 lists the characteristics and illustrates the process flow where master data is created in the MDG system and then distributed to the SAP EAM system and other downstream systems for transactional use and analytics.

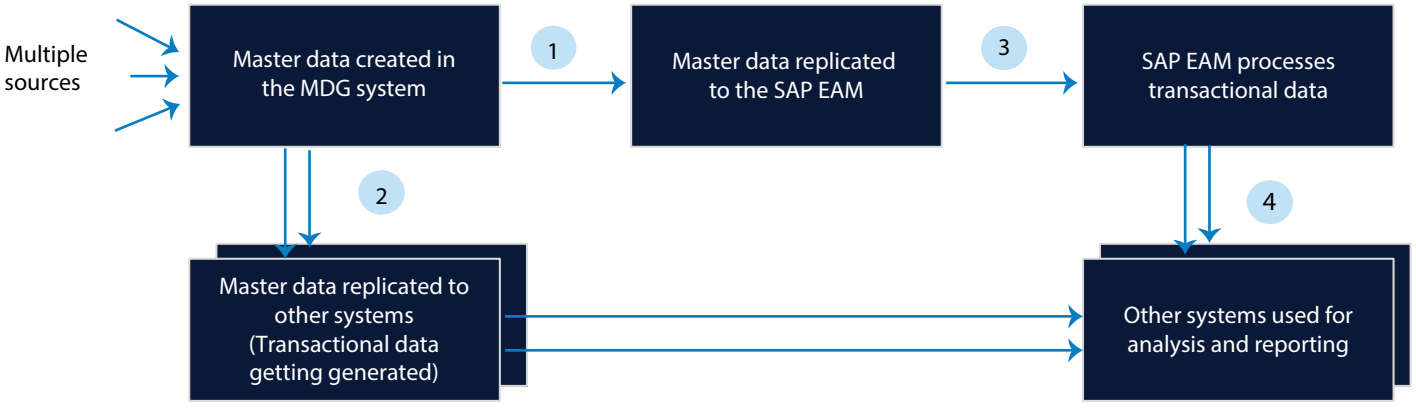

Fig 1: Option 1: Master data flow from MDG to SAP EAM and other systems

EAM master data is created in the MDG system integrated with SAP and then distributed to SAP EAM and other connected systems.

- Designed for compliance-driven, regulated environments and large enterprises with multiple data sources
- Master data is created in the MDG system and distributed to SAP EAM and other connected systems
- Provides a centralized repository for structured asset data such as asset hierarchies, equipment specifications, classifications, bill of materials, task lists, maintenance plans, and measuring points
- Ensures consistency and scalability in maintaining functional locations, equipment hierarchies, and asset types
- Supports compliance with industry standards, including ISO 14224, ISO 55000, and CFIHOS
- Improves data quality, eliminates duplication, and establishes standardized data governance with clear data ownership
- Enables strategic asset planning and decision making
- Integrates validated and enriched data into SAP EAM for planning, execution, analytics, and tracking

Option 2: EAM master data governance embedded within SAP

Embedded master data governance directly within SAP EAM, making it ideal for leaner or cost-sensitive environments. As shown in Figure 2, this approach begins with master data creation in SAP itself, followed by replication to other connected systems.

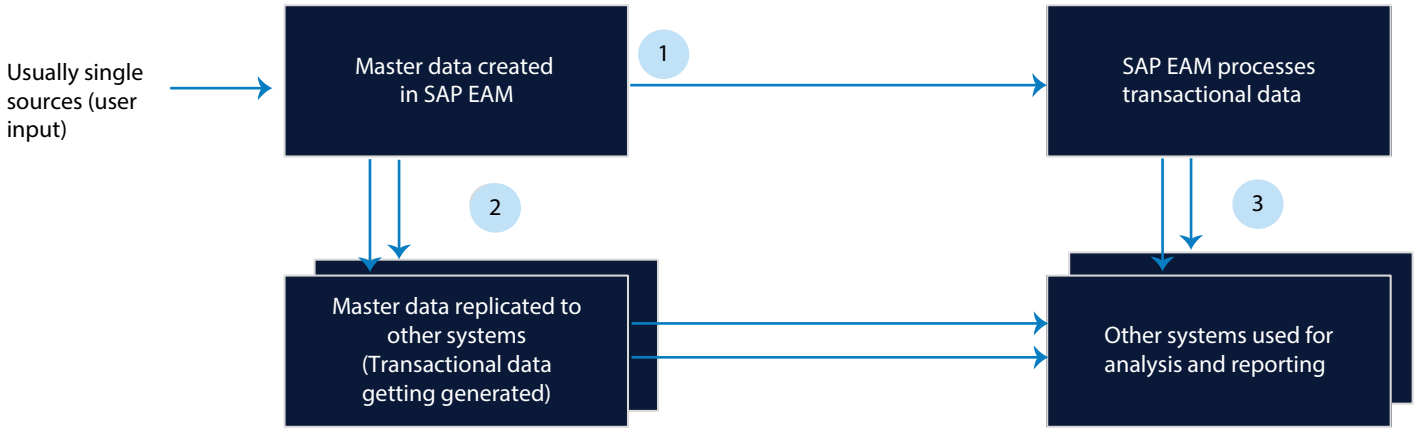

Fig 2: Option 2: Master data flow within SAP EAM with minimal integration overhead

EAM master data is created and managed directly in SAP using manual controls or embedded governance supported by standard workflows and custom validations.

Best suited for:

- Contained, agile, or cost-sensitive environments
- Smaller setups with stable datasets and limited data sources, typically across a few plants
- Scenarios where the master dataset is relatively small, stable, and infrequently changed

- EAM master data is created and managed directly in the SAP EAM
- SAP EAM serves as the system of record, with no separate MDG solution required
- Governance and maintenance functions are localized within a single system
- Asset master data is replicated from the SAP EAM system to other applications for integration and analysis

MDG options: Comparative analysis and key considerations

A side-by-side comparison of the two MDG options is provided in Table 2, highlighting key criteria such as scalability, compliance, and TCO.

Table 2: Comparative overview of MDG implementation options

	MDG solution for EAM data governance		Governance embedded within SAP EAM	
Data Governance & Quality	Centralized governance with rules, workflows and validation ensuring high quality data	↑	Governance is decentralized or embedded in SAP EAM with limited controls and quality varies on user discipline and local procedures	↓
Consistency Across Systems	MDG ensures standardization before distribution	↑	Risk of inconsistent data if multiple systems access or change data independently	↓
Audit & Compliance	Easier to enforce and track due to central workflows	↑	Harder to trace changes unless SAP EAM instance has strong audit features	↓
Data Maintenance	Governance and approval workflows may slow down updates	↓	Immediate changes possible in the Standard SAP EAM instance without going through external workflows	↑
Integration Complexity	Requires interface from MDG to SAP EAM (initial setup effort) adding technical and process overhead	↓	Simpler architecture but may lack scalability	↑
Cost	Additional cost of maintaining MDG system (as SAP MDG doesn't cater to Asset data and need partnered products to be used on top of SAP MDG)	↓	Avoids the investment and overhead of setting up an MDG platform	↑
Analytics	High-quality, standardized data improves reporting and decision-making	↑	Lack of controls can sometimes affect reporting	↓

Table 3 below lists key factors organizations must consider when selecting an MDG approach, including organizational size, asset base complexity, and compliance requirements.

Table 3: Key considerations for choosing the right MDG model

	MDG solution for EAM data governance	Governance embedded within SAP EAM
Asset Data Volume	**High** (e.g., >20,000 equipment records across multiple sites)	**Low to moderate** (e.g., <10,000 equipment records, 1–2 sites)
Organizational Scale	Enterprise or **multi-country** operation	**Single business** unit or site
Compliance Requirements	**High** (regulated industries, audit trails required. Needs conformity with standards like ISO 14224, ISO 55000, CFIHOS)	**Low to moderate** (internal controls only)
Governance Needs	**Formal approval** workflows, validation, and roles	**Informal or minimal or limited** governance and data ownership requirements
Frequency of changes	**Frequent updates**, additions, and deletions	**Infrequent,** occasional changes
IT Resources & Budget	**Higher cost of implementation** for MDG solution implementation, support & training	**Lower cost of implementation and resource requirement** for data management
Data Entry Points	**Multiple departments**/systems entering asset data	Centralized or **single team** managing data.
Data Quality Issues	**Existing system challenges** with duplication/inconsistency	Data **quality is manageable** within SAP EAM
Future Scalability	Plans for growth, new business, acquisition, reengineering, etc.	**Stable scope**, no major expansion planned

Designing an Enterprise Data Harmonization Approach

Large, distributed organizations often have EAM master data spread across multiple, disconnected systems. Over time, this data is created using varying templates and data models, leading to inconsistencies and fragmentation. In such cases, harmonizing the data becomes critical for successful enterprise transformation and system consolidation.

Developing a data harmonization blueprint is a key precursor to migration planning. Comprehensive harmonization is essential to ensure consistency and reliability across systems during and after transformation.

In this approach, data from various systems or disconnected sources is consolidated and aligned to a common template or data model within an enterprise MDG solution. This harmonized data then serves as the single source of truth for the SAP EAM system and other connected applications following migration.

The enterprise MDG system continues to play a key role during the sustainment phase, supporting ongoing data governance and quality. Figure 3 captures the data harmonization process, which consolidates disparate master data sources onto a unified model.

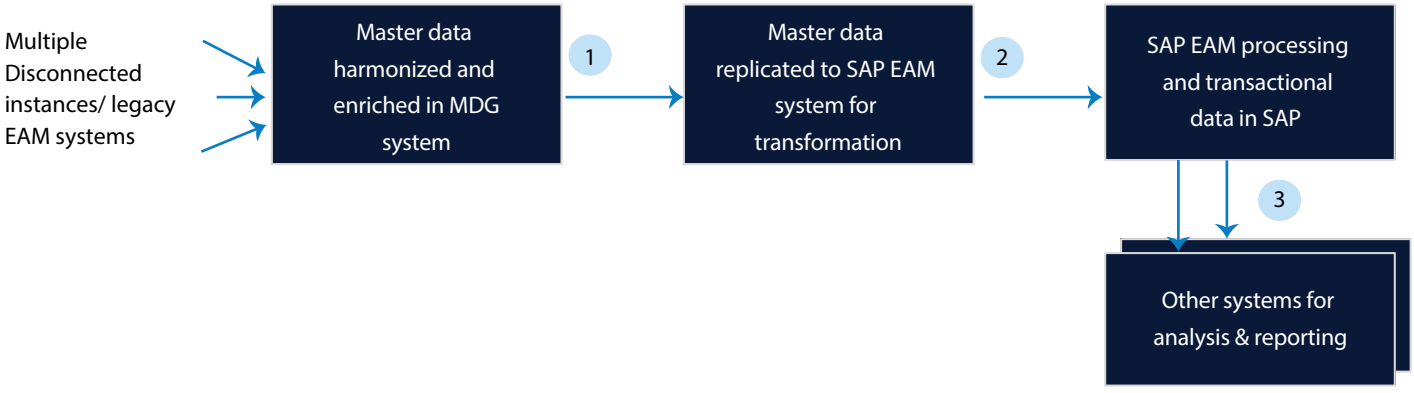

Fig 3: Process flow for enterprise data harmonization

Strategic Approaches and Recommendations for EAM MDG leveraging the MDG Options

Every organization has its own data governance requirements, data quality needs, and industry compliance obligations. Based on these factors, different strategic approaches may be suitable. Each approach leverages one or more EAM MDG solution options outlined earlier. Table 4 summarizes strategic approaches to MDG implementation tailored to specific enterprise contexts and needs.

Table 4: MDG adoption approaches based on enterprise needs

MDG Solution and Centralized Data Governance Approach	Embedded Data Governance Approach	Hybrid MDG Solution Approach	Enterprise Data Harmonization Approach
• Master data is maintained through enterprise MDG solutions and then distributed to all connected systems (Option 1). • This approach is useful for ensuring high control over data quality, ensuring auditability and compliance with industry standards. • This would lead to a high TCO and would require specific data stewardship roles.	• Data Governance directly in SAP for EAM master data (Option 2). • Simpler data governance framework and fast adoption. • Governance and scalability is limited to single system. Relies on user discipline and validation for ensuring sustained da quality.	• Critical master data is maintained through enterprise MDG solution while non-critical and highly localized master data is created and governed directly in SAP (Mix of Option 1 and 2). • This approach is helpful to accommodate high localization requirements and is not resource intensive, thereby keeping the process agile. • Inherits data quality challenges for local instances and brings in master data synchronization overhead.	• Specifically useful when data has been built up over the years in different (and possibly disconnected) systems in silos (Enterprise Data Harmonization) • This is effective for migration and for organizations having a distributed structure. • Resource intensive approach for data harmonization and standardization.
Recommended usage Complex and Diverse System Architecture with multiple systems and regulatory compliance	**Recommended usage** Single SAP EAM system without regulatory compliance requirement and infrequent data changes.	**Recommended usage** Highly localized master data across diverse systems without global regulatory compliance requirement.	**Recommended usage** Enterprise transformation and SAP migration with multiple disconnected legacy data sources.

Conclusion: The Path Forward for Enterprise Asset Data Management

Effective enterprise asset data governance is not a matter of choice for asset-intensive organizations. It is a strategic imperative. By aligning MDG implementation with business goals, compliance requirements, and operational needs, enterprises can improve data quality, streamline processes, and enhance asset performance. Choosing the right governance approach, whether centralized, embedded, or hybrid, empowers organizations to strengthen resilience, reduce maintenance costs, and support ongoing digital transformation.

About the Author

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Venkatesh is a seasoned professional with 27 years of experience, including 20 years in SAP consulting and 7 years in the Utilities domain industry.

As a Senior Principal – Enterprise Applications he leads large transformation programs and leads the Center of Excellence for SAP Enterprise Asset Management & APM capability, while also serving as a Solution Architect for strategic SAP proposals in the Utilities sector. With deep expertise across global markets, he has successfully delivered SAP implementations, rollouts and optimization initiatives across Utilities, Energy and other asset intensive industries.

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