CluedIn

Understanding the Four Foundational Master Data Management (MDM) Implementation Styles

Pages: 11 | Reading time: 18min

Understanding the Four Foundational Master Data Management (MDM) Implementation Styles

Master Data Management (MDM) plays a vital role in modern organizations by ensuring consistent, accurate, and reliable data across various systems and applications. MDM provides a framework to manage and govern master data, such as customer information, product data, and employee records. Four foundational MDM styles have emerged as popular approaches to managing master data: consolidated, registry, centralized, and co-existence.

Consolidated MDM:

Consolidated MDM, also known as Analytical MDM, focuses on integrating and harmonizing master data from multiple sources into a single, authoritative view. This style aims to create a unified and consistent representation of master data across the enterprise. Data integration techniques such as data cleansing, data matching, and data merging are employed to ensure data quality and eliminate redundancies. Consolidated MDM provides a centralized data repository that serves as the single source of truth for master data. This approach is particularly useful in organizations with diverse data sources and a need for accurate and consistent information across departments.

Benefits of Consolidated MDM:

1. Improved data quality and accuracy through data cleansing and standardization processes.
2. Enhanced data governance and control with a single source of truth.
3. Simplified data integration and interoperability across systems.
4. Facilitates better decision-making and reporting with consistent data.

Challenges of Consolidated MDM:

- **Data Modelling:** Traditionally Consolidated MDM has necessitated that data teams model their data upfront in order to determine the data model the MDM system must follow. This data model is then applied rigidly without the flexibility to evolve or adapt as more data is ingested.

- **Data Integration Complexity:** Consolidated MDM requires integrating data from various disparate sources, which can be challenging due to differences in data formats, structures, and quality. Data integration efforts may involve complex ETL (Extract, Transform, Load) processes and require data cleansing and harmonization.

- **Data Governance:** Establishing robust data governance practices can be a significant challenge in consolidated MDM. It requires defining data standards, policies, and ownership roles across the organization. Ensuring compliance with data governance principles and maintaining data quality over time can be complex.

- **Reliance on technical teams:** Consolidated MDM centralizes control within a single master data hub, and it is usually the responsibility of architects, data engineers, and stewards to manage and prepare the data for use. This places MDM squarely in the IT sphere, making it less accessible to domain experts and business users and forcing IT to support the system and user requests.

Use Case Example: A multinational corporation with multiple subsidiaries and disparate data sources aims to create a unified customer view across its business units. By implementing consolidated MDM, they can integrate and cleanse customer data from various systems, ensuring accurate and up-to-date information across the organization.
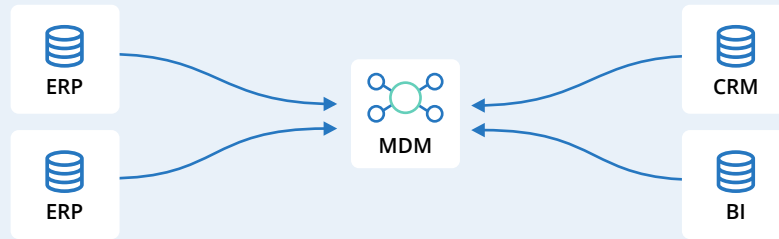
CONSOLIDATION

How CluedIn solves Consolidated MDM challenges:

CluedIn addresses common Consolidated MDM challenges in the following ways:

- By easily ingesting data from potentially thousands of different sources directly into the platform.

- By eradicating the need to model your data up front. As a Graph-based system, CluedIn allows the relationships between the data to emerge as a natural data model. This model will evolve over time as more data is ingested.

- Automated matching, merging, cleaning, and enrichment of the data.

- Automated rule-building, including AI-based rules to minimize repetitive manual data fixing. Poor quality data is readily accepted by the system and will either be automatically fixed using existing rules, or in the case of a new issue it will be flagged as requiring a manual fix which will then be used to create a new rule.

The end result is that CluedIn becomes the central location for trusted data, and is able to accurately report on that data either within the CluedIn platform or stream it out in near real-time to Business Intelligence platforms such as Power BI.

Registry MDM:

Registry MDM focuses on maintaining a centralized index or registry of master data across multiple systems without physically consolidating the data. It serves as a virtual repository of metadata and data location information rather than storing the actual master data. Registry MDM provides a framework for data discovery, data access, and data synchronization. It enables real-time data integration and supports distributed data governance and stewardship. This style is beneficial when multiple systems or applications need to access and reference master data without replicating it.

Benefits of Registry MDM:

1. Efficient data integration without the need for physical data consolidation.
2. Real-time data synchronization across systems, ensuring data consistency.
3. Simplified data governance with centralized data governance policies and controls.
4. Scalability and flexibility to accommodate new systems and applications seamlessly.

Challenges of Registry MDM:

- **Data Source Heterogeneity:** Registry MDM relies on data source connectivity and metadata management. Integrating and managing diverse data sources with varying schemas, protocols, and APIs can be complex. Achieving real-time data synchronization and ensuring data accuracy across systems can be challenging.

- **Data Ownership and Stewardship:** Defining data ownership and stewardship responsibilities can be complex in a registry MDM environment. Since the data remains in its respective systems, clarifying who is responsible for maintaining data quality, resolving conflicts, and enforcing data governance policies is often difficult.

- **Performance and Scalability:** As the number of systems and applications accessing the registry increases, scalability and performance can become an issue. Ensuring efficient data access, synchronization, and maintaining acceptable response times can be demanding.

Use Case Example: A large financial institution wants to ensure consistent customer data across its various banking applications while maintaining data in its respective systems. Registry MDM enables them to create a centralized index of customer data, allowing all applications to access and update the data in real-time.
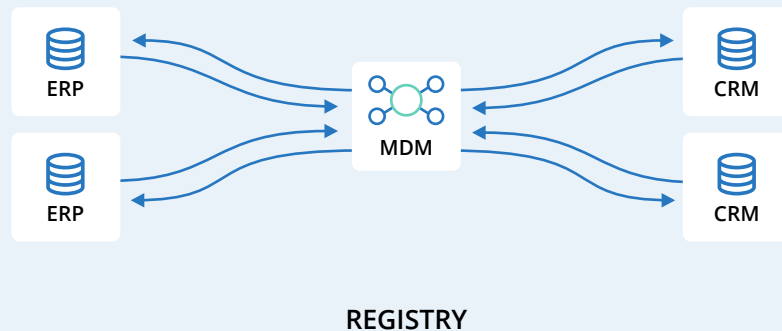
REGISTRY

How CluedIn solves Registry MDM challenges:

- By default, CluedIn creates an internal ID for all data coming into the platform, before cleaning and matching of the data occurs.

- CluedIn has extensive data lineage capabilities and can match the source IDs with CluedIn's internal unique ID.

- Without sending data back to the source system, using information about the records that match from CluedIn, corresponding changes can be manually made in source systems.

- Graph is key to registering records in one place as it provides a schema registry. In addition, CluedIn's Streaming and GraphQL layers allow you to easily work with the registered data from any system.

Centralized MDM:

Centralized MDM involves establishing a centralized repository for master data while allowing individual systems to maintain local copies for operational purposes. This approach ensures a single version of master data while allowing decentralized data management. Centralized MDM supports data consolidation, data quality management, and data governance in a controlled and governed manner. Local systems can synchronize data with the centralized repository periodically or in real-time to ensure consistency.

Benefits of Centralized MDM:

1. Provides a centralized master data repository for consistency and control.
2. Allows operational systems to maintain local copies for performance and autonomy.
3. Enables data governance and stewardship at a central level.
4. Streamlines data integration and data sharing across systems.

Challenges of Centralized MDM:

- **Data Modelling:** Similar to Consolidated MDM, in the past the Centralized style has dictated that data teams model their data upfront – before they have even started to use the MDM system itself. This process can take six months or more, by which time the likelihood is that the model is out of date and of little use.

- **Data Synchronization:** Centralized MDM requires synchronization between the central repository and the local copies in operational systems. Ensuring timely and accurate data updates across systems can be challenging, especially in distributed environments.

- **Operational System Autonomy:** Balancing the need for centralized control and governance with the autonomy of operational systems can be complex. Ensuring that local systems can maintain and update their data while adhering to data standards and governance policies requires careful coordination and communication.

- **Change Management:** Implementing centralized MDM may require significant changes to existing systems and processes. Managing change, addressing resistance, and ensuring smooth transition and adoption by stakeholders can be challenging.

Use Case Example: An e-commerce company with multiple online stores wants to maintain centralized control over product data while allowing each store to manage its inventory. Centralized MDM enables them to have a single, authoritative product catalog, while individual stores can update their local inventory as needed.
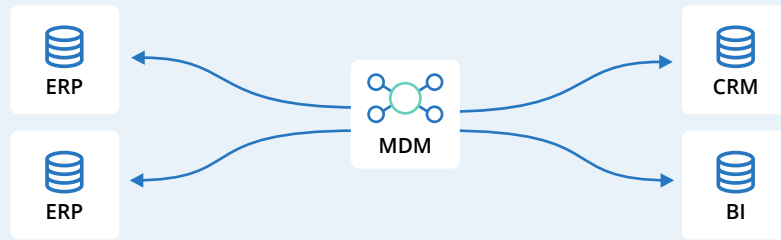
CENTRALISED

How CluedIn solves Centralised MDM challenges:

- CluedIn can create Manual Data Entry forms for the creation of new data directly into the platform.

- Data can also be created by Excel Plugin or by Power Apps. We use our Power Platform integration via Power Apps and Power Automate to support this.

- Newly created data can be streamed to source systems using the most appropriate integration pattern for the receiving system.

Co-existence MDM:

Co-existence MDM recognizes that different domains or business units within an organization may have unique requirements for managing master data. This style allows multiple MDM systems to coexist independently, each focusing on a specific domain or business unit. Co-existence MDM supports data federation, data synchronization, and data sharing across independent MDM systems. It provides flexibility and autonomy for different business units while maintaining some level of data integration and consistency.

Benefits of Co-existence MDM:

1. Flexibility to accommodate diverse data management requirements within an organization.
2. Allows independent MDM systems to operate with their own governance and processes.
3. Supports data sharing and collaboration across different business units.
4. Enables scalable and modular MDM deployments.

Challenges of Co-existenceMDM:

- **Data Consistency and Integration:** Co-existence MDM involves managing multiple independent MDM systems. Ensuring data consistency and integration across these systems can be extremely difficult. Managing data conflicts, data duplication, and ensuring data quality can be complex in a co-existence environment.

- **Collaboration and Governance:** Co-existence MDM requires establishing effective collaboration mechanisms and governance models to enable data sharing and alignment across the independent MDM systems. Ensuring coordination, data stewardship, and consistent data governance practices demands that there still be a global hub with responsibility for coordination across the different models.

- **Complexity and Maintenance:** Managing multiple MDM systems can introduce complexity in terms of system maintenance, upgrades, and interoperability. Ensuring that changes in one system do not negatively impact others and managing dependencies is an ongoing concern.

- **Cost:** Multiple MDM systems will invariably mean higher operational costs and multiple suppliers to manage. Companies that take this approach also need to ensure that each business unit has its own team of data experts on hand to manage the system. Attracting and retaining technical talent is difficult at the best of times, and often the option to have dedicated data scientists and engineers within separate teams is only feasible for the largest of organizations.

Use Case Example: A global conglomerate with multiple business units wants to implement MDM independently in each unit to cater to their specific needs. Co-existence MDM allows each business unit to manage its master data while enabling collaboration and data sharing across the organization when required.
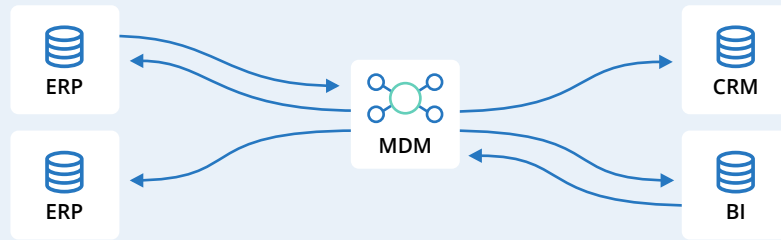
CO-EXISTENCE

How CluedIn solves Co-existence MDM challenges:

- Once again, Graph is key to solving many of the hurdles associated with Co-existence. As a combination of the Centralized and Consolidated MDM implementation styles, CluedIn solves many of the inherent challenges using capabilities like zero upfront modeling, easy ingestion, automated matching, merging and deduplication, and automated rule building.
- Using Power Automate, CluedIn can also write data back to source systems once it has been fixed, which is the primary feature missing from the Registry implementation style.

How to decide which implementation style is right for you

Understand Your Data Landscape:

Assess your organization's data landscape, including the types of master data you need to manage, the sources of data, and the data integration requirements. Consider the complexity and diversity of your data environment to determine which MDM style aligns best with your needs.

Define Business Requirements:

Identify your organization's specific business requirements and goals. Determine the level of data consistency, governance, and integration needed across systems. Consider factors such as data quality, real-time access, scalability, and autonomy for business units. The chosen MDM approach should align with these requirements.

Evaluate Organizational Structure:

Take into account your organization's structure and how data is managed across different departments or business units. If there is a need for centralized control and governance over master data, consolidated or centralized MDM styles may be more suitable. If independent units require autonomy and flexibility, co-existence or registry MDM might be a better fit.

Assess Data Governance Capabilities:

Consider your organization's data governance capabilities, including policies, processes, and resources. Evaluate whether you have the necessary infrastructure and expertise to support a particular MDM style. Some styles, such as consolidated MDM, may require more robust data governance frameworks than others.

Analyze Integration and Interoperability Needs:

Evaluate the level of integration and interoperability required across your systems and applications. If real-time data synchronization and access are critical, registry or centralized MDM styles can provide the necessary capabilities. If you have existing systems with data dependencies, consider the impact of implementing a particular MDM style on those systems.

Scalability and Future Growth:

Consider your organization's growth plans and scalability requirements. Assess whether the chosen MDM approach can accommodate future data sources, applications, and business units. Look for flexibility and extensibility in the MDM solution to support evolving needs.

Budget and Resources:

Evaluate the budget and resources available for implementing and maintaining the MDM solution. Consider the cost implications of each MDM style, including software, infrastructure, and ongoing maintenance. Determine whether you have the necessary resources and expertise to implement and manage a particular approach effectively.

In summary

As detailed above, there is no one size fits all approach to implementing MDM. The best approach for you will depend upon your specific requirements, what you want to achieve, and your existing organizational structure. In many cases, a combination of different styles will prove to offer the optimum results. Whichever route you chose to take, you should look for an MDM system that accommodates them all, and which has a proven track record of eliminating most – if not all – of the challenges associated with each style.

As a Graph-based, modern MDM platform, CluedIn takes away much of the complexity and manual work that characterizes traditional MDM deployments. Get in touch with the team to find out more.

Get In Touch