



Mastering your Data is Mastering your Business
SAP's solution for Enterprise Master Data Management



The Best-Run Businesses Run SAP™

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1. MANAGEMENT SUMMARY

Enterprise Master Data Management (eMDM), according to leading industry analysts is a rapidly growing market. After years of first mover's implementations, the market is starting to see mainstream adoption. With a growing number of customers undertaking master data management projects, there is an increasing diversity of MDM use cases, increasing the demand for specialization.

In order to address this market from an enterprise information management perspective, SAP extended its eMDM portfolio to provide the most comprehensive, complete and integrated offering in the industry. SAP solutions for master data management comprise usage scenarios that range from process-driven and domain-specific applications that are integrated with the SAP Business Suite to full enterprise scale use in very heterogeneous system landscapes. Furthermore, the SAP eMDM portfolio provides industry and business initiative-specific packages. These packages include preconfigured, domain-specific business content and applications. Packages include: optimized supplier spend, aggregate physician spend, collaborative material data maintenance, customer data integration, and global data synchronization.

By leveraging SAP's in-memory technology (SAP HANA), SAP eMDM solutions going forward will address all relevant master data management use cases, organizational styles, and IT landscapes.

Why SAP

Only SAP offers a fully integrated master data solution with the SAP Business Suite, which will enable our clients to solve any data related business issues as described above. Because of the full integration with SAP Business Suite, no new technology needs to be introduced: existing business logic can be reused, existing SAP knowledge can be leveraged and your users will adopt the new functionality fast.

References

SAP's has a wide adoption of our Master Data solutions within our customer base. SAP has about 700 customers worldwide working with SAP MDM daily, amongst those Dutch customers are CSM, Philips, Unilever, Royal TNT, Uniqema and Staples.

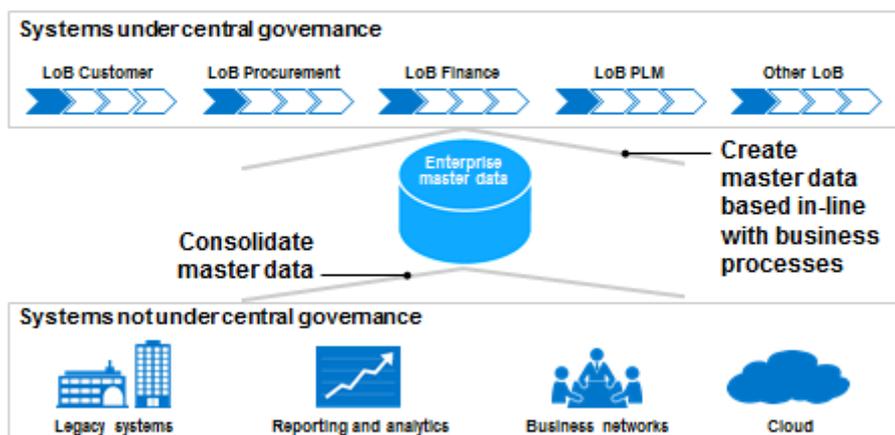
2. SAP ENTERPRISE MASTER DATA MANAGEMENT OVERVIEW.

Master data management, according to leading industry analysts is a rapidly growing market. After years of first mover’s implementations, the market is starting to see mainstream adoption. With a growing number of customers undertaking master data management projects, there is an increasing diversity of MDM use cases, increasing the demand for specialization.

Today in the master data management market, we are seeing two fundamentally different approaches in terms of the ways in which organizations are approaching a master data solution. There are two main centers of gravity for master data ownership. On the one hand, there is master data that is created across disparate systems within and from outside the enterprise, that needs to be consolidated into a harmonized view in order to be consumed for various business purposes such as global reporting, Global Data Synchronization, and business analytics.

For a decade organizations have generally taken that approach with master data. On the other hand, there is master data that needs to be created up-front of line of business processes in order to have a correct, consistent, and complete master data foundation for business transactions. The latter represents an additional approach that is needed for end-to-end enterprise master data management, and is a paradigm shift that is gaining broad adoption. SAP Enterprise Master Data Management (SAP eMDM) is a solution portfolio that today addresses both approaches to master data management.

Enterprise master data landscape



Solution today

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Solution Portfolio and Positioning

In order to address this market from a solution perspective, SAP extended its MDM portfolio to provide the most comprehensive, complete and integrated offering in the industry. SAP solutions for master data management comprise usage scenarios that range from process-driven and domain-specific applications that are tightly integrated with the SAP Business Suite to enterprise scale use in heterogeneous system landscapes.

Furthermore, the SAP eMDM portfolio provides industry and business initiative-specific packages. These packages include preconfigured, domain-specific business content and applications. Packages include: optimized supplier spend, aggregate physician spend, collaborative material data maintenance, customer data integration, and global data synchronization.

By offering solutions and technologies that address a variety of use cases, organizational styles, and IT landscapes, SAP helps our customers to address their manifold needs.

Key requirements that customers want to address include:

Generic MDM Scenarios and Requirements

Basic description

<p>Master Data Consolidation</p> <ul style="list-style-type: none"> ■ Load master data from client systems ■ Identification and consolidation of similar or identical objects ■ Provision of key mapping for unified, company-wide analytics and business operations 	<p>Aggregate master data across SAP and non-SAP systems into a centralized master data repository. Once data is consolidated, you can search for data across linked systems, identify identical or similar objects across systems, and provide key mapping for reliable companywide analytics and reporting.</p>
<p>Master Data Harmonization</p> <ul style="list-style-type: none"> ■ Master Data Consolidation plus ■ Distribution of consolidated data to client systems ■ Local completion of master data with application-specific information 	<p>Consolidate and harmonize master data from heterogeneous systems. Ensure high quality master data by distributing harmonized data that is globally relevant using distribution mechanisms. Allow subscribing applications to enrich master data with locally relevant information.</p>
<p>Controlled Data Creation</p> <ul style="list-style-type: none"> ■ Controlled creation of master data e.g. through integration with SAP NetWeaver Business Process Management, enabling master data processes with automated and human activities ■ Distribution to client systems and local completion with application-specific information 	<p>Support company quality standards by ensuring the central control of master data, including maintenance and storage. Distribute master data to client systems as required using distribution mechanisms.</p>

Key solution offerings that address the above requirements are:

SAP Master Data Governance

SAP Master Data Governance is the industry's first governance application to create, maintain, and replicate master data through a governed process up-front of Line of Business applications for both SAP Business Suite as well as non-SAP applications.

SAP Master Data Governance is built on Line of Business processes and business rules across Supplier, Customer, Material, Finance, and custom domains, allowing for a "deep" create of master data that understands the process and data integrity of the applications.

SAP NetWeaver Master Data Management

SAP NetWeaver MDM enables the consolidation of master data from disparate systems. SAP NetWeaver MDM enables a broad set of business usage scenarios to aggregate, harmonize, and enrich master data (e.g., master data key cross-referencing, global reporting, Global Data Synchronization, PIM).

This is the proven multi-domain solution for master data management in application-agnostic contexts and heterogeneous environments. The combination of SAP NetWeaver MDM and SAP MDG will typically cover all requirements of enterprise MDM.

SAP Data Services

This is SAP's strategic go-forward data integration and data quality solution. With its capabilities to access, transform, cleanse, and enrich any type of data and its data profiling, impact analysis and data lineage features SAP Data Services is perfectly suited as a data integration and data quality layer with in any MDM initiative

SAP NetWeaver Business Process Management

Can be integrated with SAP NetWeaver Master Data Management and SAP MDG when it comes to collaboratively controlled data creation/ maintenance in heterogeneous system landscapes. In addition, it can serve in an end-to-end governance scenario where SAP NetWeaver MDM can be leveraged as enterprise MDM hub keeping the enterprise-relevant attribute sets. This can be complemented with SAP MDG to extend the master data information to SAP Business Suite attribute sets. The entire process is controlled by single-workflow governance based on SAP NetWeaver BPM.

SAP Information Steward

Provides the tools you need to understand and analyze the trustworthiness of your enterprise information. The software offers comprehensive functionality for data profiling to improve information trustworthiness and reduce the risk of propagating bad data. It allows you to manage metadata, to consolidate, integrate, and audit your metadata from all relevant sources. You can analyze root causes and their impact by determining the origin of data quality problems and how they impact downstream processes or information assets. Define data validation rules against data sources and apply rules continuously to monitor data quality. Create a metadata business glossary to promote a common understanding and acceptance of business terms and build a central location for organizing them. Create and reuse the rules, patterns, and dictionary that comprise data cleansing packages.

Solution Strategy and Roadmap

The MDM market is still far from being mature and many market forces and trends impact master data management solutions. The key trends that influence and impact SAP's future MDM solutions we hear from our customers as well as from leading industry observers include:

Cloud computing

For MDM in the coming years it is key to help integrate on demand solutions with on premise solutions, like salesforce.com with SAP ERP based on private cloud. This requirement will put new demand towards scalability in MDM.

Mobile

As of today, approximately 60% of the world's population is using mobile phones and other mobile computing devices. Data traffic already exceeds voice on many mobile networks. And it is predicted to increase 1000-fold within a decade as wireless becomes the world's primary method of Internet access. For MDM that creates two primary opportunities. At one hand, we need to look into MDM supporting integration of the mobile world with the on demand and on premise world to get to fully integrated networked solutions. On the other hand, increasingly we will see mobile MDM scenarios, e.g. mobile creation steps using manual entry, or automated creation using bar code or business card scanners, mobile approval workflows, etc.

In-memory computing

Massive innovations with in-memory computing, combined with more and more affordable large in memory systems pave the way to a next generation of computing systems that are able to relate any information source, including transactional, analytical and unstructured in real real-time and on massive volumes. A new level of information transparency will enable business scenarios beyond today's imagination, at the same time these systems will introduce challenges around **big data** that add another level of complexity around volume, highly variable information formats, data velocity, variable latencies of different sources and the complexity of individual data types. Like with mobile, we foresee that MDM will become an integral element in future in-memory computing systems, and contribute significantly to integrating various information types in order to meet the value proposition of in memory computing

Social networking

It can be leveraged for enterprise purposes for example in CRM, where social data can be combined with structured customer information to support sales, marketing and customer service organizations. Also in this new world, a key role for MDM in CRM is to help integrate various sources of social data into a consolidated 360° view of a consumer. A focus on consumer together with social data puts again big demands on scalability and complexity of data on the solution, as well as it requires text analytics capabilities such as sentiment analysis.

From this, we derive 3 core themes for our future development:

Versatile Solutions



- Horizontal and vertical use
- Preconfigured content
- In cloud and on premise

Data Governance



- End-to-end stewardship
- Visualized knowledge
- Active quality control

Information Platform



- Big data
- Integrate social media
- Seamless information flow

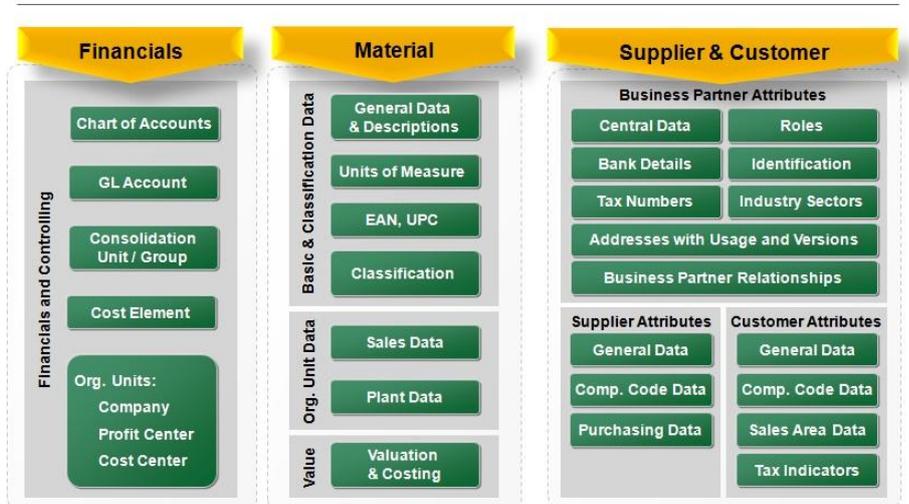
SAP eMDM Approach to Innovation: Themes

MDM Solutions

SAP offers industry-vertical as well as Line-of-Business solutions in the MDM area at different levels. These range from pre-defined data models, to ETL and EAI integration scenarios with the SAP Business Suite and non-SAP applications, to turn-key, pre-configured solutions including workflow and UI definitions, as well as readymade applications in the context of the SAP Business Suite.

As of today, SAP NetWeaver MDM ships with 6 pre-defined models supporting customer, vendor, material, and employee as well as a more generic business partner model and product data model.

SAP Master Data Governance Integrated Object Model



For Line of Business centric master data processes, SAP has released readymade applications, shipped with the SAP Business Suite Enhancement Package 6, for financial, material, supplier and customer management.

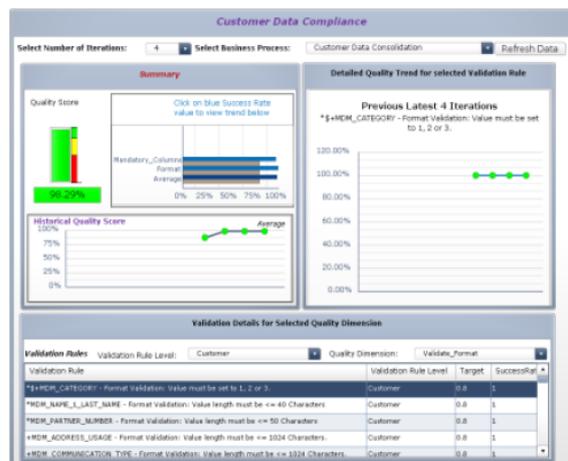
SAP also continues to invest in building out horizontal and industry specific Rapid Deployment Solutions to address the needs of enterprise data management.

A rapid deployment solution provides implementation templates comprising data model, data integration and quality, as well as workflow and UI configurations in order to address specific customer needs, complemented with a fixed scope and fixed price implementation services, so that we can offer a turn-key solution, with limited risk.

SAP NetWeaver Master Data Management rapid Deployment solution for customer data integration

A compelling master data management solution delivered quickly and affordably

- Preconfigured software to eliminate the guesswork
- Rapid deliver in as little 8 weeks, using SAP consulting
- An affordable, fixed priced solution
- Limited scope to jump start
- A clear path to your full customer data integration vision



Data Governance

For SAP, data governance is the discipline to safeguard data assets along their lifecycle, in order to enhance their usefulness to the business, to achieve operational excellence, to enhance decision making, and to accelerate business change.

SAP's Data Governance approach based on six distinct steps...

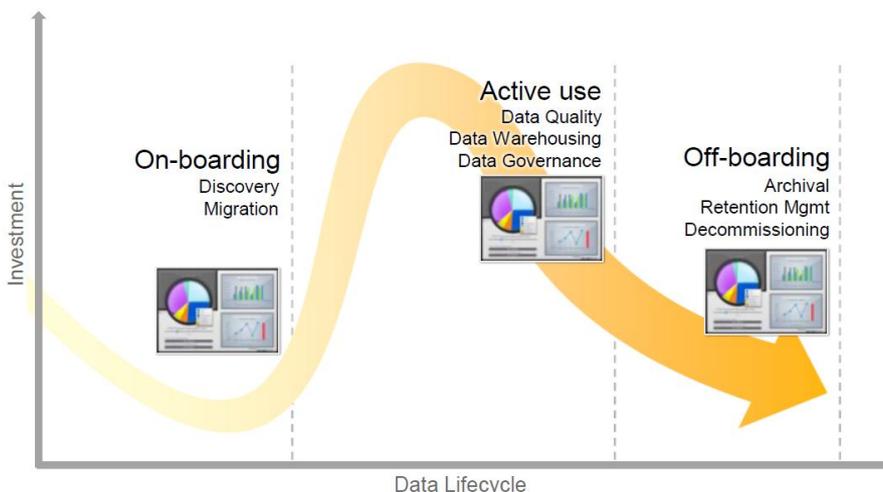
Data Governance is the discipline to safeguard data assets of an enterprise along their lifecycle, to maximize their use for the business



As such, data governance defines the organization, processes, roles, and business rules to discover, define, validate, manage, monitor and improve a company's key data assets, as well as metrics to define and validate success.

Master data management is a key element of any data governance approach, and targets at creating and maintaining a single common view of key data entities, such as customer, supplier, product, material, and employee, and distributing and harmonizing the golden record in your enterprise and beyond. Master data management as such targets at defining, managing, monitoring and improving these data elements.

SAP Enterprise MDM is a key constituent of a larger Information Management Offering



Information Platform

SAP considers master data management as one component within SAP's larger Information Management portfolio. This portfolio comprises products and solutions that help manage information as a strategic asset all along its lifecycle: from on-boarding, through active use, to the end-of-life of information.

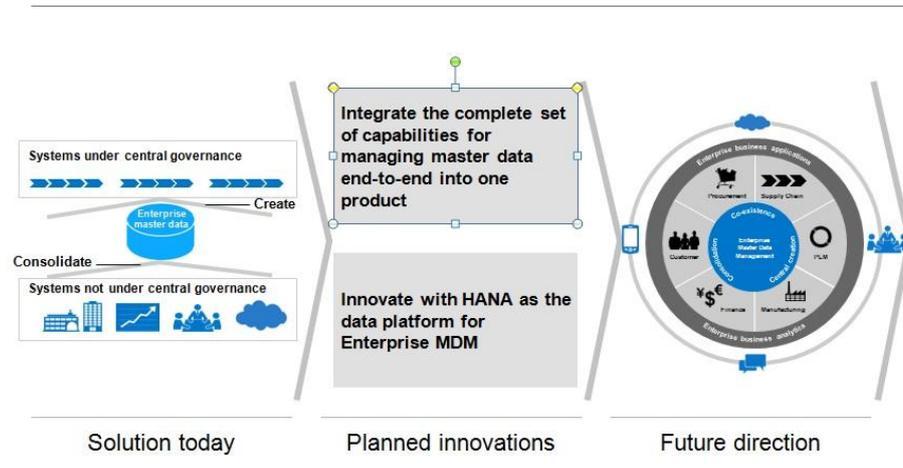
SAP's strategy is to develop its portfolio of information management products and solutions into an information management suite. For master data management that means, those MDM solutions from

SAP will embed and use data quality and data integration capabilities, profiling, metadata management, data quality dashboards, as well as workflow coming from SAP Data Services and SAP NetWeaver BPM. This will help to accelerate our innovation speed in Master Data Management considerably, and to match future requirements coming from on-demand, mobile and in-memory integration scenarios.

MDM Roadmap

SAP's MDM roadmap follows the themes that were outlined before: Solutions, Governance and Information Platform.

Overview of SAP road map for Enterprise MDM

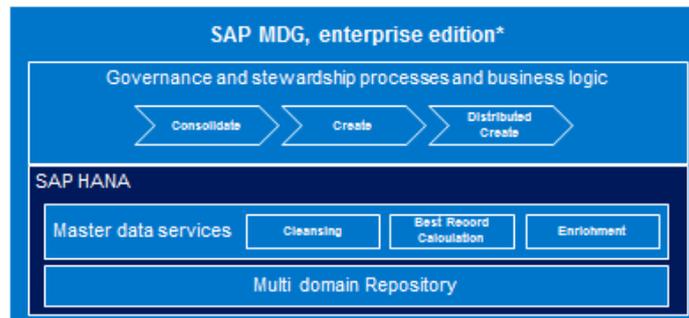


Planned innovations are mid-term deliveries that we intend to release to market in the next 6 to 18 months, while future direction describes long term vision and product direction that we estimate to release no sooner than 18 to 36 months from now.

The focal point of our future investments will be to complement SAP Master Data Governance with data consolidation and data harmonization capabilities, and to extend it to a true Enterprise Master Data Governance solution. Through this, “SAP Master Data Governance, Enterprise Edition” (final product naming pending) will become a single integrated product that covers all MDM domains, implementation styles and use cases. It will work tightly integrated into SAP’s Business Suite, as well as in open, heterogeneous environments. This innovation will be realized on SAP’s HANA platform. SAP HANA is SAP’s new platform for real-time analytics and business applications. The platform leverages state-of-the-art in-memory computing technology that enables real-time computing by bringing together online transaction processing applications and online analytical processing applications. Combining the advances in hardware technology with in-memory computing empowers the entire business, from shop floor to boardroom, by giving business processes instantaneous access to data.

We will provide Master Data Services, such as search, matching, or cleansing directly in the HANA platform, moving expensive data management operations directly to the data that is stored in memory, instead of doing heavy data lifting before a search or matching operation.

Extending SAP MDG for Big Data and multi-vector MDM



* Not yet officially named

Planned Innovations

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Through this, SAP HANA also becomes the foundation of SAP's Information Management portfolio delivering enhanced value adding capabilities (such as high performance of duplicate checks, real-time consolidation of master data, avoiding dialog processes in batch). SAP Master Data Governance (SAP MDG) is already available on HANA. With its unique performance and scalability, SAP HANA enables companies to run complex system landscapes, consisting of several operational systems, as well as data warehouses and master data management solutions on a single, shared in-memory platform. This leads to a new architecture approach that – from a data management and data quality perspective – shifts the focus from “after the fact data quality corrections in batch” to “real-time data quality processing at source”.

Furthermore, SAP continues to invest in complementing SAP MDG's pre-delivered applications and data models, creating industry and Line-of-Business specific flavors for MDG, enhancing SAP MDG's foundation and workbench to allow for more flexibility and easier enhancements, improve mass data maintenance processes, as well as mobile access.

As SAP continues to invest in SAP NetWeaver MDM, we continue to strongly integrate it with SAP Data Services and Information Steward. Incremental innovation will be defined in close collaboration with our user groups and delivered through annual feature packs.

With the planned innovations around “SAP Master Data Governance, Enterprise Edition”, SAP will create a truly differentiating master data management solution that is running on SAP's HANA in-memory platform, tightly integrated with SAP Business Suite, open to heterogeneous environments, and key constituent of a larger Information Management Suite that provides SAP Data Services and SAP Information steward to round off the capabilities.

Being able to combine in-memory MDM with in-memory BI, transactions and analytics on one instance will enable business scenarios beyond today's imagination, and lead our way into Networked Solutions. At its core, the role of master data management in Networked Solutions is to integrate and harmonize master data across on premise, on demand and on device software. This requires innovation both on MDM, as well as on the application side, where we foresee MDM-aware applications that are easily pluggable into an MDM infrastructure.

SAP Master Data Governance for Central Creation, Maintenance and Distribution of Master Data —Solution Details ¹⁾

SAP Master Data Governance (SAP MDG) is a solution that centralizes the creation and management of corporate data for the SAP Business Suite as well as for non-SAP environments. With SAP MDG companies are enabled to define and enforce data governance responsibilities centrally, i.e. to determine who is supposed to maintain, validate and distribute corporate data in order to facilitate compliance to the company's standards, rules, and policies.

SAP MDG provides centralized and role based governance for selected master data domains (financial, supplier, customer, and material master data, for example) as well as for custom domains. It is based on core SAP business technology and consistently uses SAP's standard data models.

It provides master data maintenance capabilities allowing companies to guide and maximize the efficiency of their business processes.

SAP MDG uses SAP Business Workflow to establish and execute governance processes within the application. The solution comes with prepackaged workflows for the central master data creation and maintenance process for key data domains. The workflows typically involve multiple people adding their expertise regarding master data (one person edits a material's classification information and another adds units of measurement, for example). The workflows also include workflow steps for approval of changed data. SAP MDG tracks all changes to approvals of data records for subsequent audits.

In the following, we discuss SAP Master Data Governance key capabilities and associated topics, including;

- Predefined solutions.
- Application and Data Model Extensibility.
- Data Quality Management Capabilities.
- Data Integration and Synchronization Capabilities.
- User Interface, Business Services and Workflow.
- Data Governance and Stewardship Capabilities.
- Technology and Architecture.
- Enterprise readiness capabilities.
- Pricing Model and Maintenance Fee.

Pre-defined Solutions

SAP Master Data Governance is a family of master data management applications that provide centralized governance for selected master data domains based on SAP's standard data models. The applications come with a native integration with the SAP Business Suite, using existing business logic and customer-specific configuration for validation of master data while it is being created. SAP MDG integrates with SAP Business Objects Data Services (DS) for data quality and enrichment. It uses the data quality engine in DS to inform the user about duplicate data sets and uses DS's rich address enrichment features to support users in entering correct addresses for their business partners.

As of today (with the general availability of SAP ERP 6.0 Enhancement Pack 6 and SAP MDG 6.1) SAP Master Data Governance provides pre-build solutions for:

- Supplier data.
- Financial data.
- Material data.
- Customer data

All of these process-driven governance solutions are built for a central creation, maintenance and distribution MDM implementation style providing master data ready for use in the SAP Business Suite and SAP ERP. Key design principles of MDG include ²⁾:

- Native **integration** with SAP Business Suite and SAP ERP.
- **Re-use** of SAP data model, UI and existing business logic and configuration for creation and validation of master data.
- Upfront **data governance**, compliance and transparency through integrated staging, workflow-steered approval processes and central audit trail.
- Integration with SAP Data Services for data quality and data enrichment.
- Can complement and extend SAP NetWeaver MDM.
- In short, the solution scope comprises the following key processes based on governance principles.
- Perform file upload for initial load, system consolidation, or data on-boarding.
- Search and display master data.
- Centrally change and create master data.
- Perform mass changes.

1) The screen shots used in the following sections show SAP MDG for material data , but the concepts in on SAP Master Data Governance apply to all of the domains supported by the solution, including the future customer data release, unless explicitly stated otherwise.

During the central creation and change workflows and change requests document and steer the complete process of maintenance and approval. The non-approved data is kept in the inactive "staging" area, from where it is distributed after approval into the active data sets and to other systems.

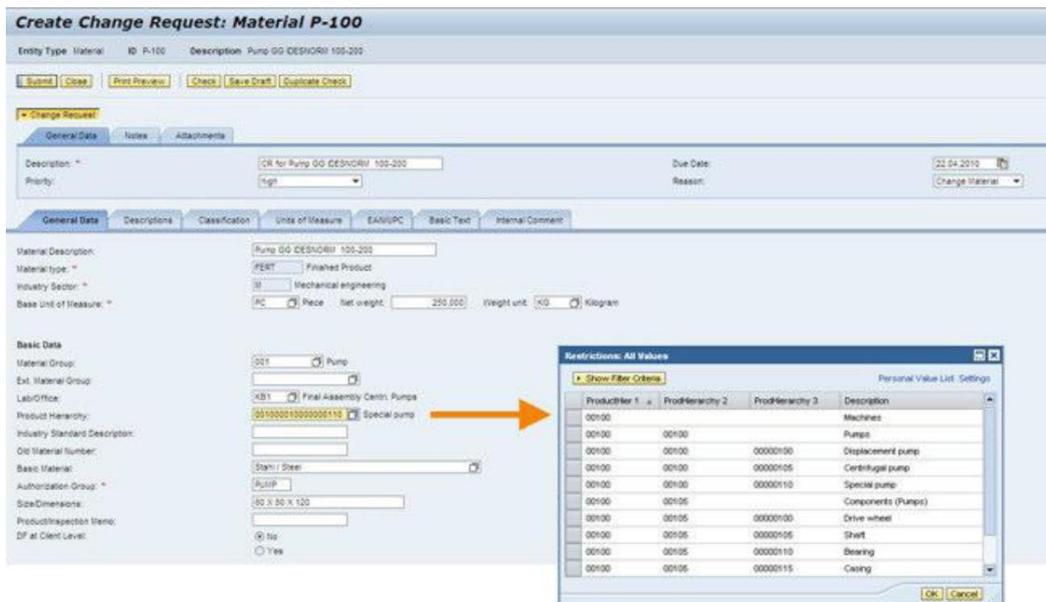


Fig: Editing an attribute, reusing the SAP ERP value help to only provide allowed values

Potential next processors of the change request workflow are informed of their due changes through personalized work list. Along with the workflow, the progress of each change request can be tracked and all changes are recorded for later auditing purposes.

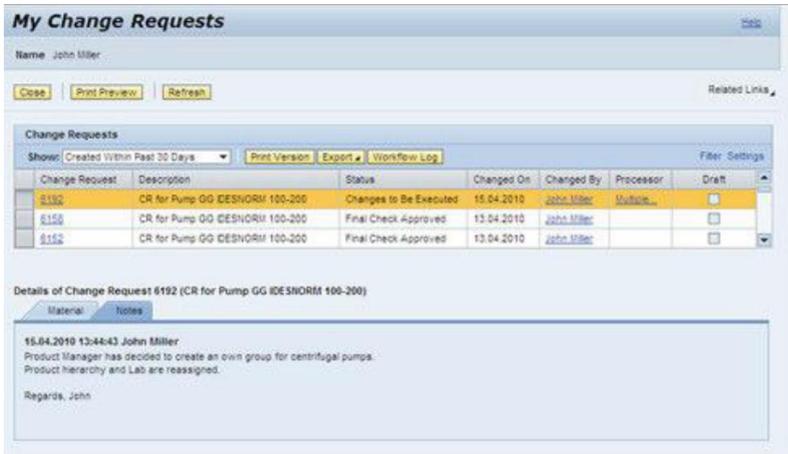


Fig: You can access the change requests that you triggered yourself to track their progress

Application and Data Model Extensibility

Generally, SAP Master Data Governance are pre-defined master data management applications that use pre-configured data models, user interface configurations, workflows, and data distribution schemes. When changes are required, customers can extend the existing models with your own master data attributes, change the UI configuration to your users' needs, and customize the workflow and distribution to define your specific governance processes.

Master Data Governance Application Framework

SAP MDG applications are built by SAP using a dedicated framework: the Master Data Governance Application Framework. With Suite 7 Innovation 2010, this framework has been opened up for customers to build their own MDG applications based on their own master data models. These custom models could be completely self-defined by the customer, they could be extensions of the standard models in MDG, or the models could be standard SAP ERP models, where SAP has not (or not yet) built the standard MDG content.

Customers can use the framework to define the appropriate data models, generate the staging area and user interfaces based on these models. They can define appropriate workflows and the roles that will provide access to the user interfaces. They can use DRF to distribute the data that has been maintained. They can build their own validations, or extend existing ones based on the Business Rules Framework (BRFplus). Finally, there are also Business Add-Ins (BADIs) provided, to include custom ABAP code into MDG's processes.

The SAP Master Data Governance application framework is the foundation for extending your central master data management processes, including UI modifications like adding or deleting fields from role-specific UIs, extension of pre-delivered data models by own attributes, extension of pre-delivered models by entire new concepts, changing or adding workflows, etc.

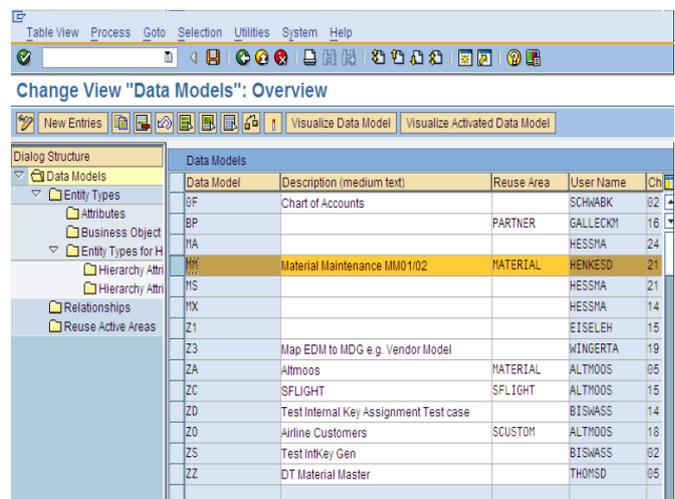


Fig: Changing data models

Data Quality Management Capabilities

Data quality is a key capability of any master data management solution. As such, ensuring data quality is also crucial for SAP Master Data Governance which is about avoiding data inconsistencies upfront.

In this context, SAP Master Data Governance prevents duplicates by high-quality detection of matches using Enterprise Search or SAP Data Services (e.g. Universal Data Cleanse). In the creation or change process, SAP MDG directly validates data against SAP Business Suite logic, wrapped by the Business Rules Framework (BRFplus) and supported by SAP Data Services (like address verification and completion) or external services (like DUNS numbers). Customer specific validation logic can be added. During validation the system also checks for duplicates – optionally again using SAP Data Services. Data can be enriched using BRFplus. Key mapping services are being provided, that ensure that central data can be distributed to corporate client systems, and that global keys are being mapped to local keys during that operation. Comprised data quality capabilities are:

- Data Validations.
- Matching and de-duplication.
- Key mapping.
- Integration with SAP Data Quality Management.
- Integration with 3rd party products.

Data Validations

SAP MDG provides pre-built validation logic as well as a generic framework for building out custom specific validation rules.

All data can be validated based on the customer’s custom-defined validation rules (like integrity rules, derivations or other simple checks) using the rule modeling tool of SAP’s Business Rules Framework Plus (BRFplus).

BRFplus provides a comprehensive framework for defining and processing business rules. It allows you to model rules in an intuitive way and to reuse these rules in different MDG applications. This re-use is being provided by a BRFplus function that encapsulated the entire business logic of a rule, no matter how complex it may be. A BRFplus function can be re-used in many different MDG application contexts, as well as in custom applications.

BRFplus supports features such as simulation, trace, transport, XML export and import.

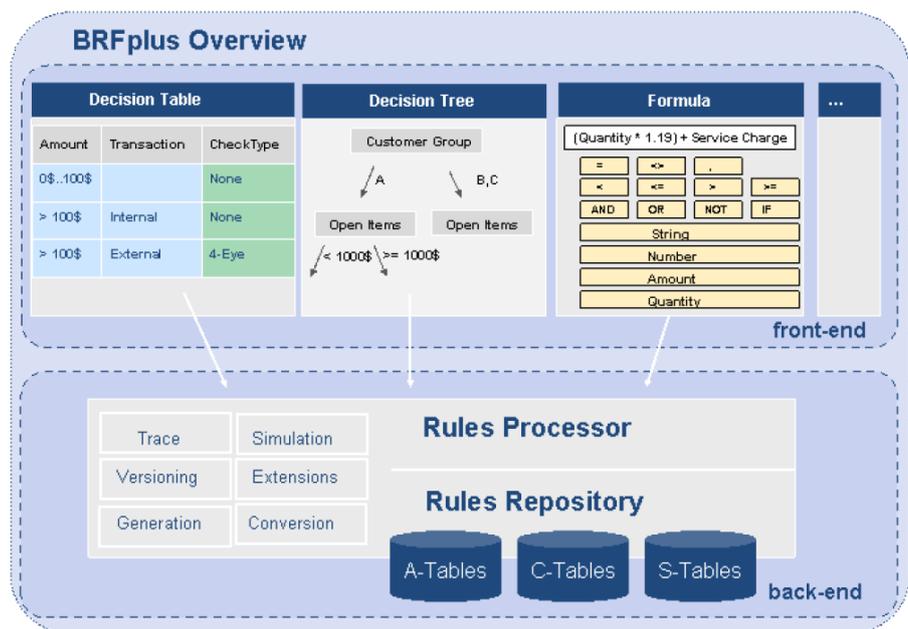


Fig: BRFplus overview

Pre-built validation rules make use of SAP’s extensive business logic based on ABAP application code and leveraging all relevant configuration settings of the systems.

Pre-built validation logic is being wrapped into validation rules in the generic validation framework, and provided as BRFplus functions, and as such can easily be shared and re-used across MDG.

Matching and De-duplication

SAP MDG provides built in services for duplicate detection and prevention, as well as openness to connect to external services for matching and de-duplication, such as SAP Data Services.

Built-in matching services are based on an embedded search service that includes duplicate detection based on fuzzy search logic. The same fuzzy rules apply both for match operations as well as for search, which result in a superior user experience.

Advanced matching services are being provided by SAP Data Services, e.g. phonetic search and matching, as well as advanced standardization of data prior to matching.

Key mapping

In business scenarios that involve several application systems, each object instance in SAP MDG supports one-to-many object identifiers (keys) to ensure it can be identified and mapped to other object instances in remote systems, where the same logical object instance might use a different physical object ID (key).

SAP MDG's key mapping capability provides.

- Manual creation, editing, and deletion of key mapping information.
- Direct access to key mapping information via search UIs.
- A key mapping Application Programming Interface (API) that provides a key mapping service to custom applications.
- Remote access to key mapping Information from any SAP client system.
- Key mapping services during data replication, that automatically map the object instance IDs from the central MDG hub to the object instance IDs of the remote systems.

Integration with SAP Data Quality Management

SAP MDG provides native integration with SAP Data Quality Management for validations (e.g. address cleansing and standardization) as well as matching. Since EhP6, this integration with SAP Data Quality Management is being provided on a generic data enrichment framework that is available for all pre-build MDG data domains, as well as for custom data models in MDG.

Integration with 3rd party products

SAP MDG provides integration with 3rd party data quality products for address cleansing and matching of data.

Data Integration and Synchronization Capabilities

Key features in data integration and synchronization are:

- Mass data load.
- Data Replication Framework.
- Application Link Enabling.
- Integration with SAP NetWeaver Process Integration and SAP Data Services.
- Openness to 3rd party products.

Mass Data Load

SAP MDG implements a central authoring, and distribution implementation style. In data migration scenarios during a MDG implementation, you can upload data into SAP MDG via file or services, and then further process (or enrich) the data in SAP MDG. This is also relevant to integrate SAP MDG with SAP NetWeaver MDM or integration middleware in more advanced enterprise-wide MDM deployments.

SAP MDG provides a mass data load interface that supports loading of XML data in batch operations into the SAP MDG system. During mass data load, key mapping and data validations can be applied.

Data Replication Framework

Generally, approved and activated data changes can be replicated to SAP systems (delivered out-of-the-box) and non SAP systems. The replication is controlled by the Data Replication Framework (DRF). This provides the flexibility to replicate selected data only to specific client systems by defining filters. It supports peer-to-peer communication as well as replication via a broker (like SAP NetWeaver PI). Replication can be handled via various means (like Enterprise Services, ALE / IDOC, RFC, or file) all control through the same framework. The DRF supports Key Mapping and Value Mapping and monitors replication activities, failures etc. through all channels. Replication can be started manually, or can be scheduled, or can be automatically triggered as part of a workflow. In order to support flexibility in data ownership, some data can be maintained in the MDG hub, other data would be added in the client systems after replication.

Application Link Enabling (ALE) and Integration Services

Today, SAP Master Data Governance makes reuse of existing technologies for the replication of the master data and related data to other connected business systems.

- ALE for connected SAP ERP or 3rd Party systems.
- CIF to connect to SAP SCM.
- Middleware to connect to SAP CRM or SAP SRM.

Reusing these technologies ensures for MDG the standard compatibilities that are offered by the business suite to former releases.

Integration with SAP NetWeaver Process Integration, and SAP Data Services

SAP MDG provides integration with SAP NetWeaver PI, as well as with SAP DataServices for A2A data integration and batch data replication based on File adapters, ALE/IDoc interfaces, as well as based on web-services.

Integration with 3rd party products

SAP MDG provides integration with 3rd party data integration and application integration middleware based on File adapters, ALE/IDoc interfaces, as well as based on web-services.

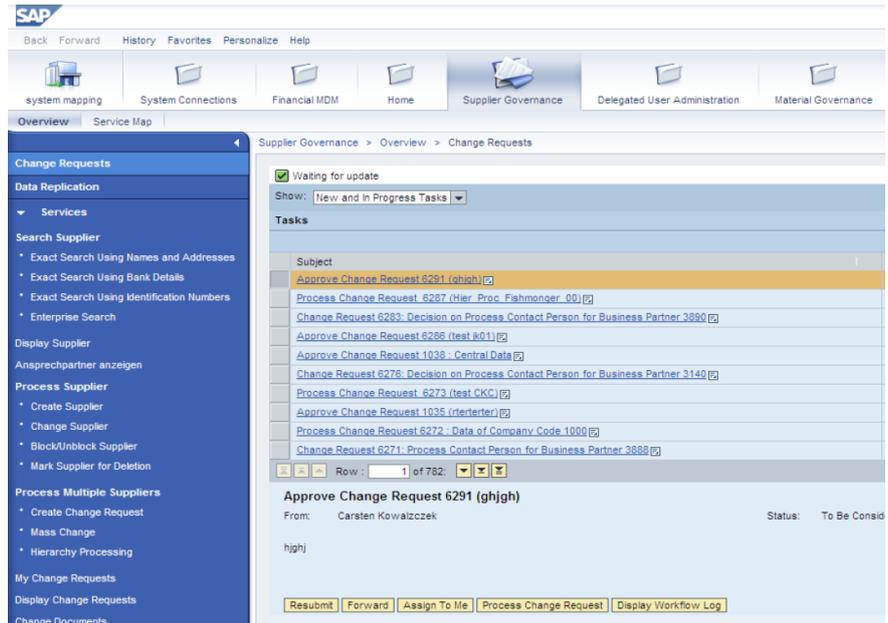
User Interface, Business Services and Workflow

User-Centric Design

SAP MDG follows a user-centric design approach with work centers that provide work lists and include easy search capabilities as well as the necessary applications / or services.

Users will typically either work down their work list triggered by the system, or they are triggered by other events – like a customer or supplier calling and asking to change their address. In that case they will use the menu to start the according Change Request themselves. SAP MDG also provides a powerful search application. This will help users to identify whether a potential new customer, material, supplier, etc. already exists in the system and will prevent them from creating duplicates.

Fig: MDG welcome screen when a user starts working in MDG – in this example MDG for Supplier Data.



On the right hand side you can see a work list that provides the user with exactly those MDG Change Requests that currently wait for him or her to take action on them.

On the left hand side you see the menu that allows the user to launch the applications within MDG – like “Create a New Supplier (or Customer)” or “Do Mass Changes on Many Suppliers (or Customers)”.

There are two ways to access SAP MDG as an end-user, as we provide the according roles for:

- SAP NetWeaver Portal.
- SAP NetWeaver Business Client (NetWeaver BC).

User Interface and UI Generator

SAP MDG offers you master data maintenance capabilities through a role-based domain-specific WebDynpro user interfaces or through Internet Service Request (ISR) forms. You can access the screens either through SAP NetWeaver Portal or through SAP NetWeaver Business Client. User interfaces can be generated or tailored using Web Dynpro Floorplan Manager, which is a model-driven UI generator to create and manage custom UIs based on pre-defined repository definitions

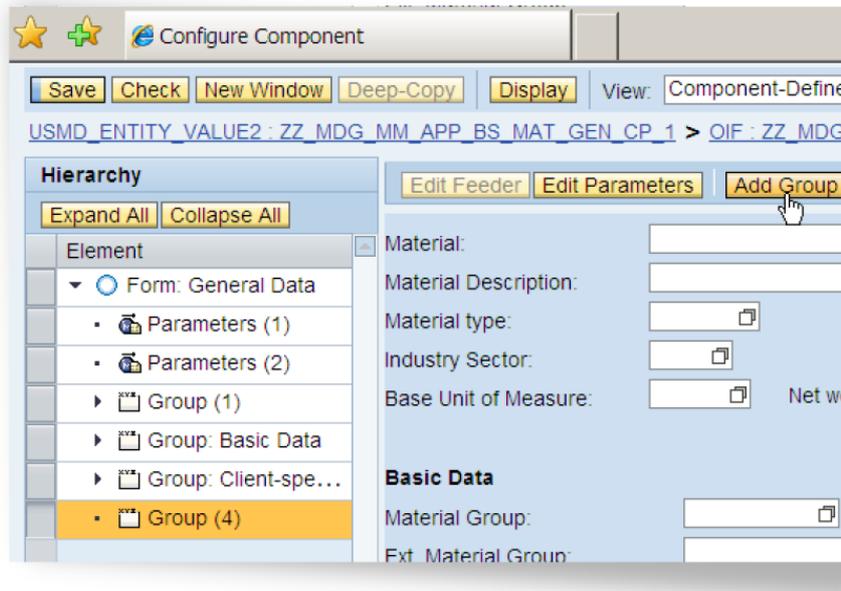


Fig: Generating WebDynpro user interfaces using Floorplan Manager

The Floorplan Manager insures that all SAP Master Data Governance applications follow a consistent pattern or road map. The UI pattern approach was designed to make applications easily recognizable, clearly structured and simple to use. As a result, needs for end-user training or documentation are greatly reduced.

Floorplan Manager gives you the following advantages:

- Model-driven design of all user interfaces through Floorplan Manager.
- UI design and layout follows the SAP user interface design guidelines.
- Users of such applications benefit from a high level of recognition, which enables them to quickly and easily familiarize themselves with new applications.
- Support of design templates such as floorplans and generic user interface building blocks to accelerates the creation of user interfaces and also ensures that the user interfaces behave the same way in all applications.

Search Services

SAP MDG supports various options for search, including embedded search services as well as external search services. These include database search, exact or fuzzy search via SAP Enterprise Search, and a fuzzy address search via SAP Data Services Address Services.

Workflow

SAP MDG allows for designing workflows for the central master data creation or maintenance process. The workflows include workflow steps for approval of the changed data. Until the approval, the data is kept in a staging area, separate from productive master data, and only after approval it will be posted to the master data tables in the SAP system and distributed to all systems that subscribed to these master data changes. Through this, SAP MDG delivers consistent definition, authorization and replication to corporate systems, like SAP Business Suite and non-SAP systems. Through tracking all changes and approvals, SAP MDG supports compliance and a complete audit trail

For flexibility in operation, SAP Master Data Governance provides adaptable business services and workflow concepts.

The entire master data governance process is flexible and can be adapted and tailored based on defined responsibilities existing in a company across various business units. The underlying, built-in SAP Business Workflow is rules based. For example that means that the next step can be derived from results in the rules framework (BRFplus). Besides the actual maintenance and approval, workflows can include steps such as activation, replication etc.

Data Governance and Stewardship Capabilities

SAP Master Data Governance ensures that new data is only published after passing the required enrichment and approval steps. Such workflows typically involve multiple people adding their expertise to complex master data. This also holds true for approval of the changed data. Until the approval, the data is kept in a so called staging area, separate from productive master data, and only after approval it will be posted to the master data tables in the SAP system and distributed to all systems that subscribed to these master data changes. Through this, MDG delivers consistent definition, authorization and replication to corporate systems. Through tracking all changes and approvals, MDG supports compliance and a complete audit trail.

During the maintenance, MDG supports the users to enter high quality data by re-using existing business logic to check the data for business integrity based on the current customizing settings of the customer. This combination of system-supported quality insurance and collaborative maintenance process involving multiple contributors and gate keepers makes the solution a master data “governance” solution.

In terms of general governance and stewardship, key capabilities include:

- Change management and change tracking
- Release and edition management
- Embedded analytics and reporting
- Active quality control via integration with SAP Information Steward

Change Management and Change tracking

Change Requests organize the data changes and the workflow across the various users and they document all changes for auditing purposes. Typically Change Requests are for a single master data object, SAP MDG also supports change requests for handling mass updates that involve multiple master data objects.

SAP MDG provides complete change functionality and reporting on the change requests and change logs.

Release & Edition Management

Data in process through so called Change Requests is stored in a separated repository (staging area), and will be transferred to active area after approval. Active area can be the operational SAP database (“re-use option”) or generated within SAP MDG (“flexibility option”). SAP delivers standard data models and user interface configurations out-of-the-box. These data models are based on SAP Business Suite (financial data, business partner data, and material data) and can be extended by customers. Also the user interfaces can be changed to meet the users' needs. Single item maintenance as well as mass maintenance is available.

Data can be validated against certain rules during entry or maintenance. Validation is done against SAP Business Suite logic, wrapped by the Business Rules Framework (BRFplus) and supported by SAP Data Services (like address verification and completion) or external services (like DUNS numbers). Customer specific validation logic can be added. During validation the system also checks for duplicates – optionally again using SAP Data Services. Data can be enriched using BRFplus.

Embedded Analytics and Reporting

SAP MDG provides embedded analytics on change requests that help you to manage and improve overall master data process quality. You can e.g. measure average and peak process duration, for key master data management processes and change request types in the MDG system.

Active quality control via Integration with SAP Information Steward

For active quality control and stewardship for master data (e.g. statistical monitoring/visualization of quality KPIs , definition of follow-up activities) , SAP Master Data Governance can integrate with SAP Information Steward.

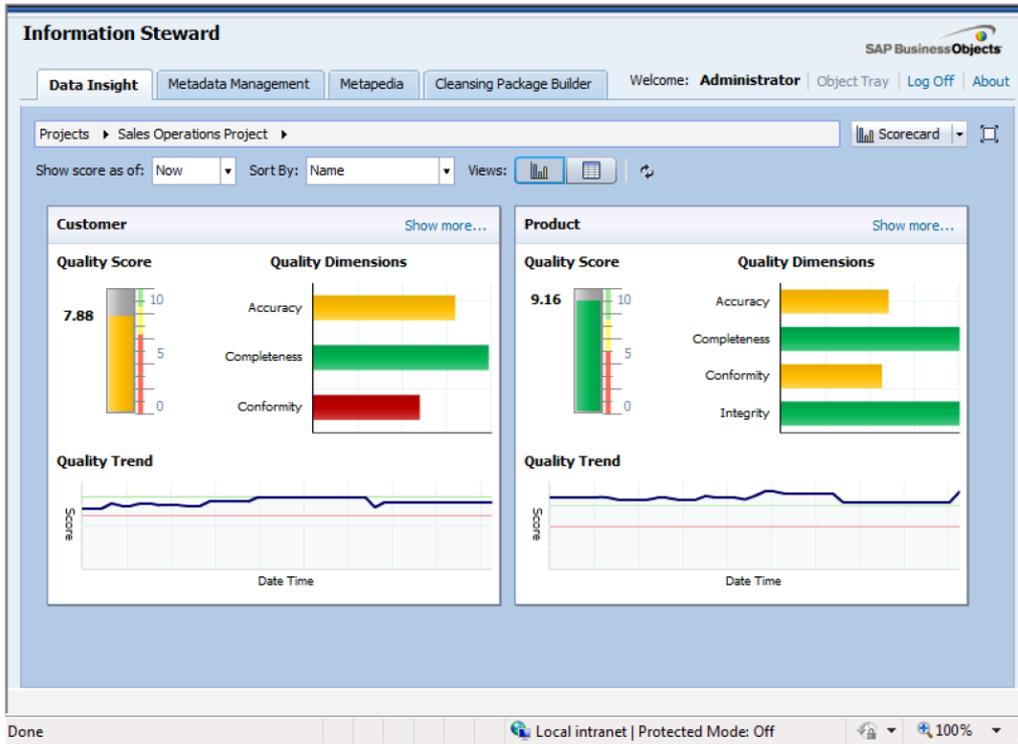


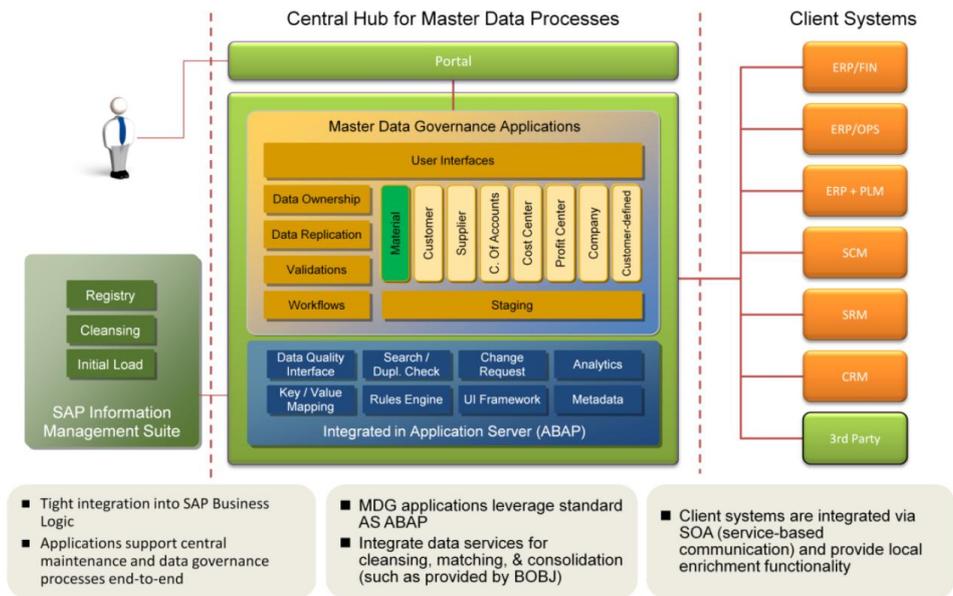
Fig: SAP Information Steward ensuring active data quality control

Technology and Architecture

From an architectural perspective, SAP MDG is built as a natural extension of the SAP Business Suite. Accordingly, it is based on Web AS ABAP and fully integrated in SAP lifecycle management & solution operations (such as monitoring, transport management etc.) SAP MDG is based on three-tier client server architecture (database server, application server, presentation client).

Fig: SAP Master Data Governance architectural overview

SAP Master Data Governance can be deployed on top of operational SAP ERP system or as a standalone hub. Customers can deploy SAP MDG as a dedicated master data hub and distribute master data to all operative systems from there, or identify one of their SAP ERP's as the master for a particular domain, enhance this with SAP MDG and create and distribute master data from there.



Enterprise readiness capabilities

Being a natural extension of the SAP Business Suite, SAP Master Data Governance is built on Web AS ABAP. Therefore, it provides SAP's proven enterprise readiness capabilities of SAP ERP 6.0.

Application Server Support

SAP Master Data Governance supports SAP Web Application Server for ABAP.

RDBMS Support

SAP Master Data Governance supports a broad range, same as SAP ERP 6.0 (see: <http://service.sap.com/pam>)

OS/Hardware Server Support

SAP Master Data Governance supports a broad range, same as SAP ERP 6.0 (see: <http://service.sap.com/pam>)

Unicode Support, Language Support -- which languages/character sets

SAP Master Data Governance supports Unicode. Support for more than 30 languages, same as SAP ERP 6.0 (see: <http://service.sap.com/pam>)

Pricing Model and Maintenance Fee

Pricing metrics include object domain type, number of de-duplicated records, and usage scenario.

For example, pricing for the customer object domain is different from supplier. Prices vary widely depending on factors named above.

There is a pricing option that combines SAP Data Services with SAP Master Data Governance. Also, there is a pricing option that combines SAP NetWeaver MDM with SAP Master Data Governance.

SAP NetWeaver Master Data Management to support data consolidation and registry type implementations— Solution Details

SAP NetWeaver Master Data Management (SAP NW MDM) is a key component alongside with SAP MDG for managing and governing master data. The focus of SAP NW MDM is consolidating and harmonizing master data in application and system agnostic contexts, as well as to enable registry type implementations, to ensure trustworthy data for enterprise reporting in analytical scenarios, for example. Hence, SAP NW MDM is used as a platform to consolidate, cleanse and synchronize a single version of the truth for master data (“golden records”) within a heterogeneous application landscape. SAP NW MDM supports all domains for master data consolidation, harmonization, and stewardship, covering several business initiatives such as, mergers and acquisitions.

As such SAP NetWeaver MDM provides flexible capabilities in data modeling, data quality and integration while complying with data governance and stewardship principles.

SAP NetWeaver MDM provides your enterprise with continuous access to a single unified view of customer data to help sales & marketing and compliance initiatives. You can build a reliable customer-data repository to efficiently coordinate various dependent processes across business units and locations. With an accurate picture of your customers, you can impact the top line with accurate cross-selling and up-selling support, make better-informed decisions, and improve your sales and marketing processes.

SAP offers a complete solution for managing customer information with the ability to consolidate, cleanse and enrich customer data, as well as subsequently syndicate this data to any system. The application helps users to easily leverage the master data with a number of applications from both SAP and non-SAP alike as a web service.

SAP NetWeaver MDM delivers data modeling capabilities to model complex products with associated taxonomies and hierarchies. The support of multiple main tables provides extended flexibility for data modeling and complex objects, allowing you to employ a single master-data management repository for multiple data domains. SAP NetWeaver MDM enables management of any kind of structured content with aggregated master data that can be imported from various SAP and non-SAP sources. Single-pass data normalization with built-in units of measures and conversions and high-performance parametric search enables users to have an interactive method of working with rich product information. Information can be presented through predefined roles for security and governance considerations.

SAP NetWeaver MDM is generally available on 7.1 release version Service Pack 10.

Consolidate Master Data

SAP NetWeaver MDM is integrated with SAP Data Services software, delivering a leading master-data management solution with unparalleled data integration and data quality functionality. SAP Data Services enables you to effectively move and improve your enterprise data in preparation for your master-data management initiative with advanced features that extract, transform, cleanse, and load your enterprise data. SAP NetWeaver MDM aggregates master data from disparate sources; SAP and non-SAP, using predefined or 100% customizable data models for products, materials, suppliers, customers, and other master data object types.

You can import entire customer data schemas or structures as well as master-data values, hierarchies and relationships of customer records. During data cleansing, you can carry out various operations, such as de-duplication and normalization, ID mapping, matching and merging, staging, interactive data-quality analysis, and ad hoc consolidation services.

Consolidating customer data dramatically improves search performance with multiple search mechanisms. In seconds, you can easily search an entire repository for any customer or group of customers -- even repositories that contain millions of records. You can consolidate master data and leverage it with transactional information using the SAP NetWeaver Business Warehouse (SAP NetWeaver BW) component. Now integrated with SAP BusinessObjects BI solutions, SAP NetWeaver MDM provides critical business insights about your customers.

Data stewards can work within the intuitive SAP NetWeaver MDM Data Manager or use iView portlets or Java Web Dynpro components within SAP NetWeaver Enterprise Portal or other UI containers to create, read, update, and delete changes to the master data repository. In addition the data stewards can monitor quality of customer data through dashboards that are enabled through integration with SAP Data Services. Trend analysis, score-carding and data lineage can all be delivered through this out of the box integration.

Harmonize Master Data

SAP NetWeaver MDM harmonizes customer data using a powerful syndication model that updates master data in systems running SAP and non-SAP software. Syndication uses industry standard XML and can be configured to run interactively or automatically. The syndication functionality leverages data workflow, enabling multitier, role-based models to maintain master data from a system of record and act as a central hub for automatically updating information in other systems.

Messaging to systems running SAP and non-SAP software is pre-integrated and provided through the SAP NetWeaver Process Integration (SAP NetWeaver PI) component. SAP NetWeaver MDM enables administrators to manage and monitor the import and syndication servers. A full-featured interface allows users to simultaneously work with single master data records and large sets of data and then extract information to SAP NetWeaver BW and SAP BusinessObjects BI solutions for analysis.

Registry-style MDM Implementations

SAP NetWeaver MDM provides a rich set of application programming interfaces, e.g. for search, or data create/read/update/delete operations. Using these interfaces, SAP NW MDM also supports registry style implementations. In this implementation style, typically master data is being created in several disparate systems with no clear ownership. At the time of a master data create in one of these systems, the system would issue a lookup to NW MDM in order to avoid creating duplicate records. If a master data record already exists in NW MDM, it can be copied to the local system, if it does not exist, it will get created on the local system as well as on the NW MDM registry simultaneously.

In the following, we discuss SAP NetWeaver MDM key capabilities and associated topics, including:

- Business Level Data Modeling and Data Model Extensibility.
- Data Quality Management Capabilities.
- User Interfaces, Business Services and Workflow.
- Data Governance and Stewardship Capabilities.
- Technology and Architecture.
- Enterprise readiness capabilities.
- Pricing Model and Maintenance Fee.

Business Level Data Modeling and Data Model Extensibility

SAP NetWeaver MDM allows data experts to set up master data based on Business level data modeling. This means that models are encapsulated on an abstraction layer that SAP NetWeaver MDM maps to a physical data base schema, rather than building the physical database models within the database itself. To ensure flexibility and data model extensibility, SAP NetWeaver MDM is based on the following basic concepts:

Key master data entities in MDM are organized via main tables and look-up tables. A main table contains the primary information about a business object, such as a product, customer, employee, or supplier. Look-up tables provide additional information directly referencing the main table. Look-up tables can be shared across multiple main tables.

- MDM supports use of multiple main tables for managing different master domains within one repository where records of different main tables can reference one another, e.g. a customer can be related to several products or services.
- With support of hierarchy management and “parent-child” relationships between main table entities, , SAP NetWeaver MDM ensures the definition and representation of hierarchically structured data such as customer data organized by sales hierarchies with sales regions, market units, market regions, and sales representatives.
- The MDM repository supports to describe “parent-child” and “sibling” relationships within one data entity (main table), or in-between various data entities (main tables) within one repository. This supports for example, that customer records can be grouped into households.
- Support of nested structures, and multi-valued attributes. Multi-valued nested structures support for example modeling of a customer in the B2B industry that has several contact persons with phone number, e-mail, etc.

Data Quality Management Capabilities

SAP NetWeaver provides in-built data quality services and integration with SAP Data Services. Comprised data quality capabilities are:

- Normalization during data import.
- Data validations.
- Matching and de-duplication.
- Key mapping.
- Integration with SAP Data Services.
- Integration with 3rd party data quality services.

Normalization during Data Import

SAP NetWeaver MDM provides normalization and standardization of incoming data with the MDM Import Manager. Users can create mappings for structure and values of source data interactively using the Import Manager UI and import the data interactively. This simplifies configuration time by giving a real time look at the data in the repository and the source. They can import the data immediately or save the maps to be run automatically when new data arrives from a particular source. If the mapping is incomplete for given records, MDM will put aside the offending records as “exceptions” allowing the rest to be imported. These exception records can then be loaded using the interactive mode, updating the mappings at the same time.

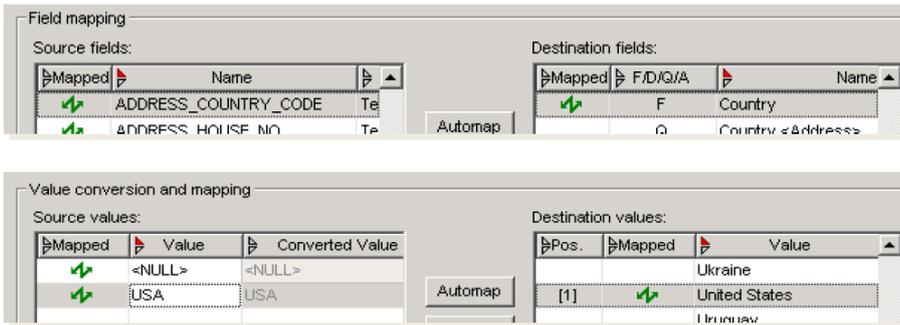


Fig: Standardizing and mapping incoming data and applying value conversions

Data Validations

In addition, it features a built-in validation engine, where users can create atomic data validation rules using a simple expression language (also based on the meta model) and run them ad hoc on records to assess data quality on the fly. Non-compliant records are highlighted accordingly. Once those rules are refined and organized they can be configured to be enforced automatically, either based on change events or as part of a workflow.

Matching and De-duplication

SAP NetWeaver MDM also provides rules-based matching capabilities, data comparison views and interactive merging into a golden record.

Records						
	[Count]	[Class]	[Score]	Supplier Name	Supplier Number	Supplier Address
	2	High	60	DDR Supply	SN885465433	[1] -
	2	High	60	DDR Supply Inc.	SN738476630	[2] - Headquarters; California Office
	2	High	50	DDR_Supply	SN992374759	[2] - USA; Office Deutschland
	1	Low	10	Jet Equipment & Tools	SN837508873	[1] - Chicago

Fig: Rules-based matching with matching scores

	Merge	Transformations	Rules	Strategies	Workflows	Search Selections
	[Merged Record]		SN885465433	SN738476630	SN992374759	
Supplier Name	DDR Supply Inc.	DDR Supply	DDR Supply Inc.	DDR_Supply		
Supplier Number	SN738476630	SN885465433	SN738476630	SN992374759		
Supplier Address	[2] - Headquarters; Cal...	[1] -	[2] - Headquarters; Californi...	[2] - USA; Office Deutschland		
Email	[2] - info@ddr-supply...		[2] - info@ddr-supply...			
Phone	[1] - 06227-7 42888		[1] - 06227-7 42888			
Fax	[1] - 06227-7 44487		[1] - 06227-7 44487			

Fig: Interactive merge into golden record

Key Mapping

Records created in SAP NetWeaver MDM (SAP MDM Data Manager) are each assigned a unique identifier. SAP MDM also maintains key mappings to this ID in the event MDM records are formally merged. This central key mapping service manages the local IDs of identical records spread across the heterogeneous system landscape and ensures, for example, that client systems can be fed with consolidated master data information.

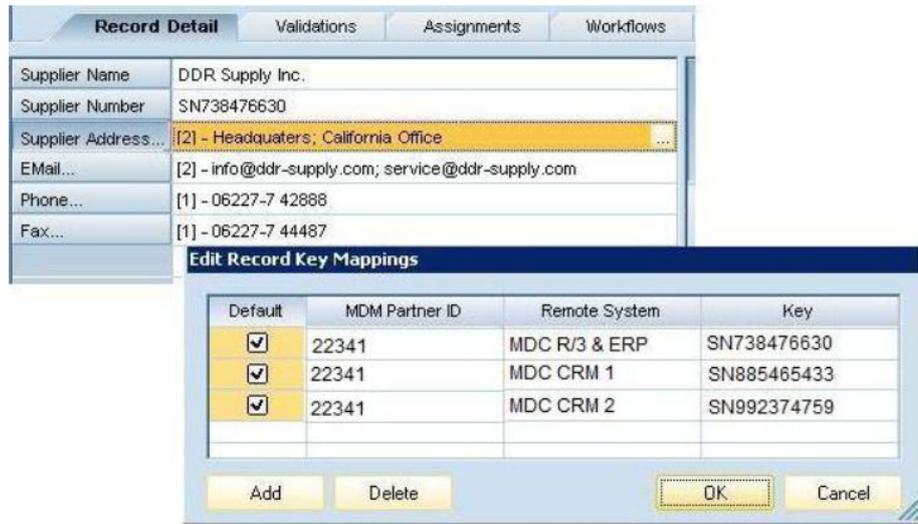


Fig: Key Mapping in SAP NetWeaver MDM (Data Manager)

Integration with SAP Data Services

These native data quality capabilities can be enhanced by integrating SAP Data Services.

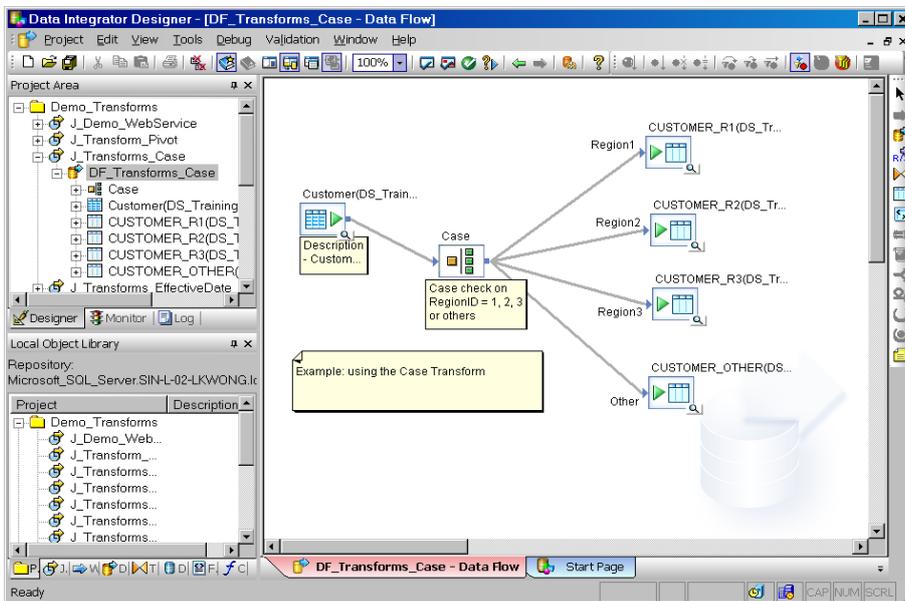


Fig: SAP Data Services

SAP Data Services integrate with SAP NetWeaver MDM, bringing additional value to the native MDM capabilities, e.g. for pre-cleansing prior to data imports or to perform periodic cleansing in MDM. Additional benefits come from features such as:

- Out-of-the-box 3rd party system connectors.
- Data validation and enrichment against proven address directories on international-scale.
- Fuzzy matching.
- House-holding.
- Survivorship rules.
- Auto merge.
- Quality control and periodic cleansing of MDM repository

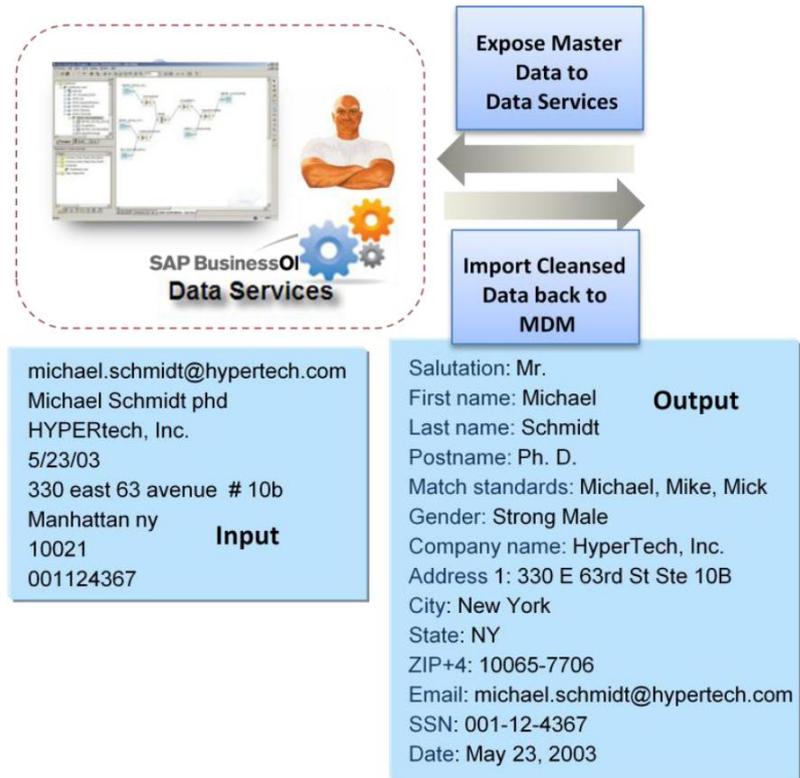


Fig: Integrating SAP Data Services with SAP NetWeaver MDM

A perfect example of beneficial interaction between SAP Data Services and SAP NetWeaver MDM is the Rapid Deployment Solution for Customer Data Integration. SAP brings together software and services in an offering that provides essential customer data integration functionality quickly and affordably. In particular it offers:

- Preconfigured software to eliminate the guesswork.
- Rapid delivery in as little as 8 weeks, using SAP consulting.
- An affordable, fixed priced solution.
- Clearly defined scope to jump start.

This software and service bundle, available as of March 2011, provides options to consolidate inbound customer data, statistically track data quality to perform active quality control on the MDM repository, and run duplicate checks in SAP CRM against the global MDM repository. Cross-enterprise governance workflows are pre-configured in SAP NetWeaver BPM.

Fig: Predefined data flows in the SAP Data Services Designer comprising DQ steps for customer data persisted in the MDM repository, including extraction, cleansing, validation, matching, statistics and follow-up action (as part of Rapid Deployment Solution specified above).

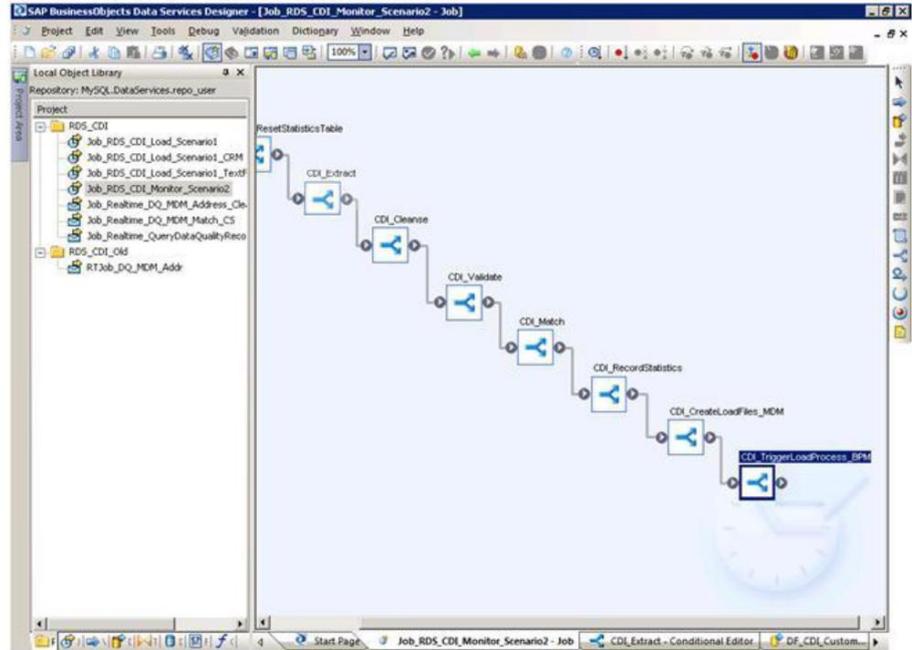


Fig: Global duplicate check against MDM repository performed in SAP CRM (as part of Rapid Deployment Solution specified above)

More integration and quality control aspects are covered in the upcoming section about data governance and stewardship.

First name	Last name	ID	Match sc...	Company..	Street	House nu..	Post code	City	Region	Country
Matthias	Langer	641	60		Harborvie...	100	54601-4051	La Crosse	Wisconsin	United St...
Matthias	Langer	641	60		Harborvie...	100	54601-4051	La Crosse	Wisconsin	United St...
John	Adams	664	100		Harborvie...	100	54601-4051	La Crosse	Wisconsin	United St...
Sachin	Matade	649	70		Harborvie...	100	54601-4051	La Crosse	Wisconsin	United St...
Sachin	Matade	649	70		Harborvie...	100	54601-4051	La Crosse	Wisconsin	United St...

Integration with 3rd party data quality services

SAP NetWeaver MDM can be integrated with 3rd party data quality services and products, e.g. D&B, via the MDM enrichment architecture.

Data Integration and Synchronization Capabilities

Mass Data Load

The MDM Import Manager features an intuitive user interface allowing data experts to import data from virtually any flat or relational electronic source file (e.g. Access, Excel, delimited text, SQL, XML, and any

ODBC-compliant source), and to completely restructure, cleanse, normalize, and rationalize raw data into rich master data as part of the import process itself. Once mappings have been established, imports can be automated using the MDM Import Server.

Data Synchronization

To ensure the outbound data transfer process for safe information exchange between the central MDM repository and connected business applications the MDM Syndicator allows data experts to select record data from an MDM repository and completely restructure it to fit the needs of any remote system without modifying the source data itself. Using reusable syndication maps, the actual syndication of data can be performed by users without intimate knowledge of the data or its structure. Moreover, the entire syndication process can be automated using the MDM Import Server.

Integration with SAP NetWeaver Process Integration and SAP Data Services

SAP NetWeaver MDM provides integration with SAP NetWeaver PI, as well as SAP Data Services for A2A data integration. In this context, SAP Data Services can be integrated for ETL processes, i. e., replication and synchronization in batch and real-time of bulk data with embedded data quality transforms (cleansing, matching), whereas SAP NetWeaver PI can be leveraged as an EAI middleware, i. e., for event-driven, message-based application integration in real-time, perfectly suited for integrating with SAP Business Suite systems.

Integration with 3rd Party Products

As already pointed out, data can be imported from virtually any flat or relational electronic source file (e.g. Access, Excel, delimited text, SQL, XML, and any ODBC-compliant source).

SAP NetWeaver MDM can integrate with any 3rd party data integration product based on web service integration, XML or file adapters.

User Interfaces, Business Services and Workflow

To ensure flexible operation, SAP NetWeaver MDM provides UIs, business services and workflow technology tailored to user needs.

User Interfaces

For flexibility in operation, SAP NetWeaver MDM provides specific roles and appropriate user interfaces, tailored to the needs and requirements of data experts, data stewards, LOB data owners and casual users. Generally, SAP NetWeaver MDM can be accessed via portal or using administrative rich clients.

Highly customizable web-based WebDynpro UIs can easily be generated using the MDM WebDynpro Configurator tool. MDM Web Dynpro Components can be used as stand-alone Web Dynpro application, for consumption in SAP NetWeaver MDM workflows, or for consumption in an SAP NetWeaver Business Process Management (BPM) processes.

Fig: Access via rich client (MDM Data Manager)

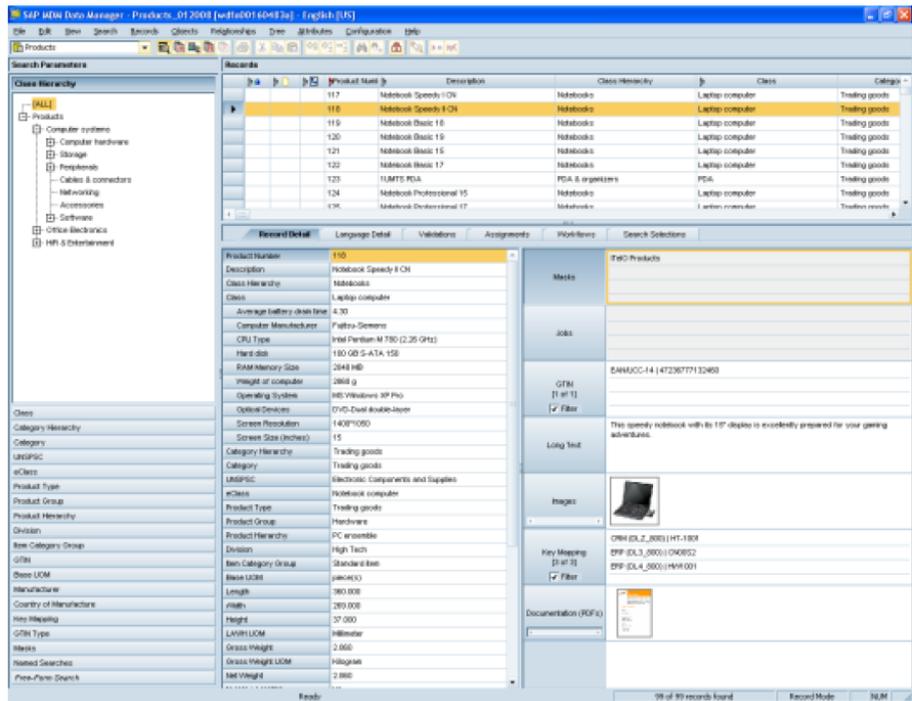


Fig: Access via Portal iView

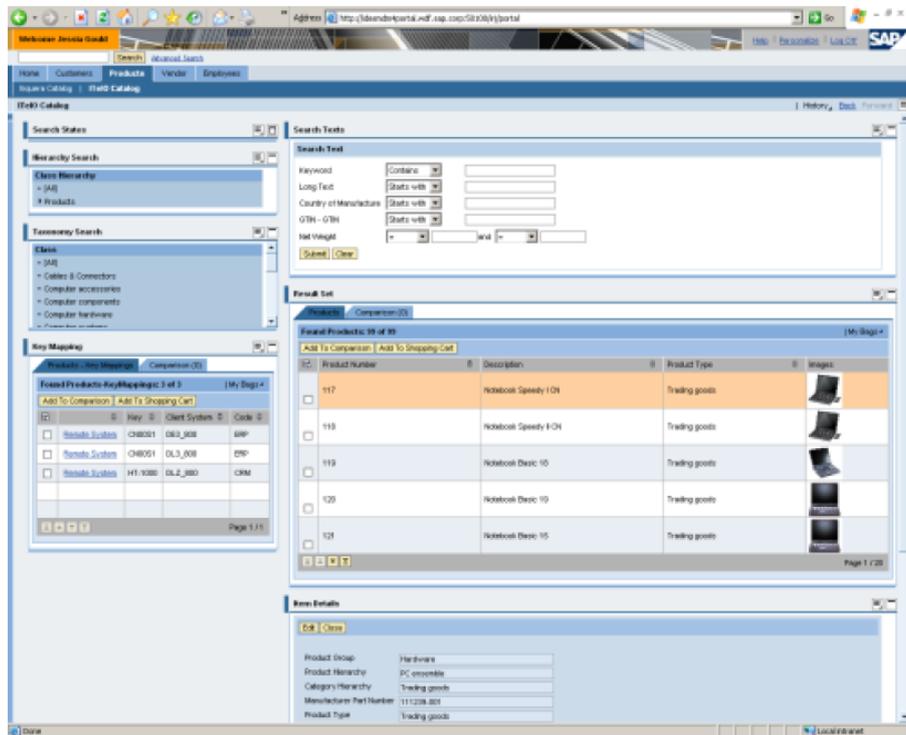


Fig: UI component based on Web Dynpro technology. Such user interfaces can be generated or tailored using an MDM Web Dynpro UI generator.

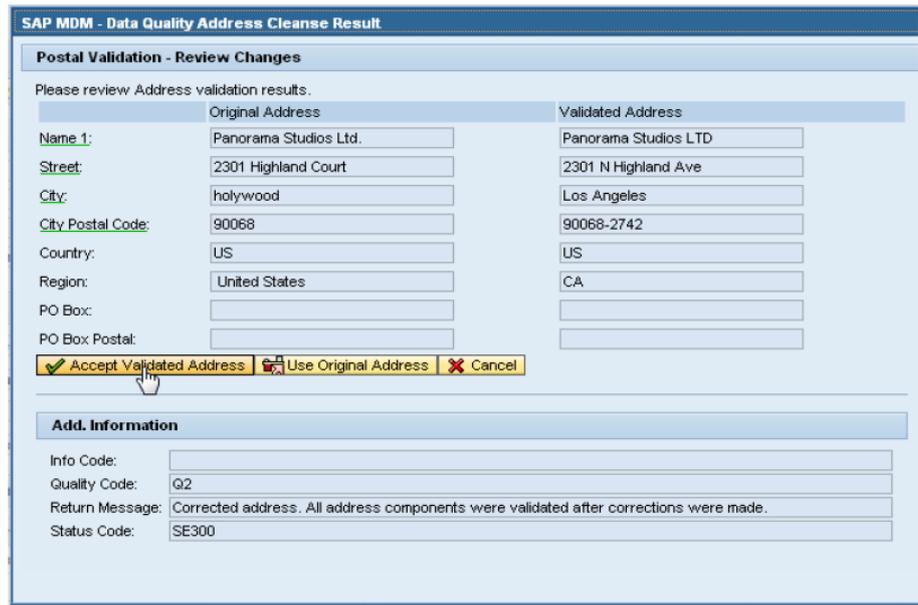
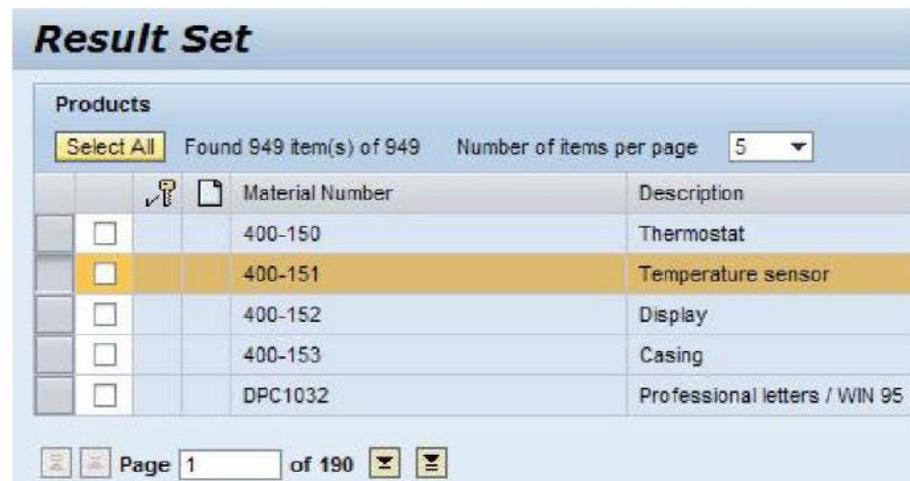


Fig: Configuring a Web Dynpro project prior to configuring a MDM Web Dynpro Component (Item Details, Result Set or Search). The project acts as a container for the configured components.



Fig: During runtime the MDM Web Dynpro Component is displayed according to the configuration.



Granting Remote Access via APIs and Web Services

SAP NetWeaver MDM ensures service-enabled access to MDM data with APIs and Web services. To ensure system openness, MDM APIs (ABAP, Java, and .NET) offer a broad functional coverage to

- Administrate MDM Servers and model repositories.
- Access and modify master data.
- Expose MDM matching capabilities and workflow.

In addition, MDM Web Services are an open interface to the MDM Server. These allow consumption and CRUD operations on master data.

What is more, SAP NetWeaver MDM provides an open interface to connect with 3rd party data quality providers (Dun & Bradstreet), or include SAP Data Services.

Fig: Java API to access (search) master data on the MDM repository

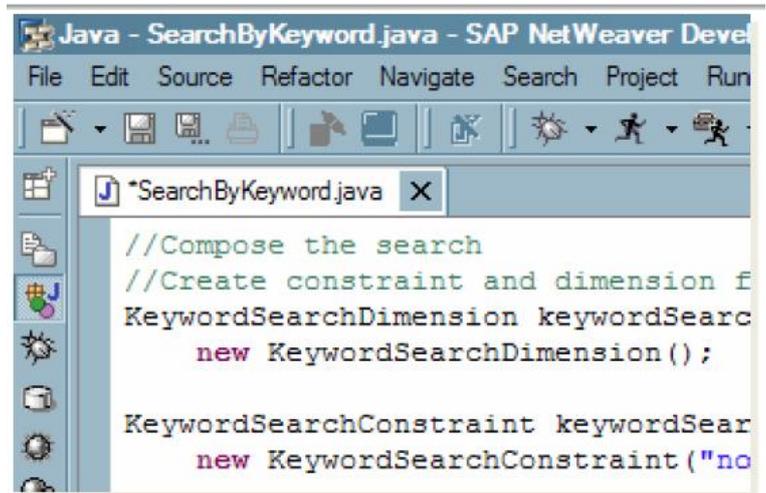
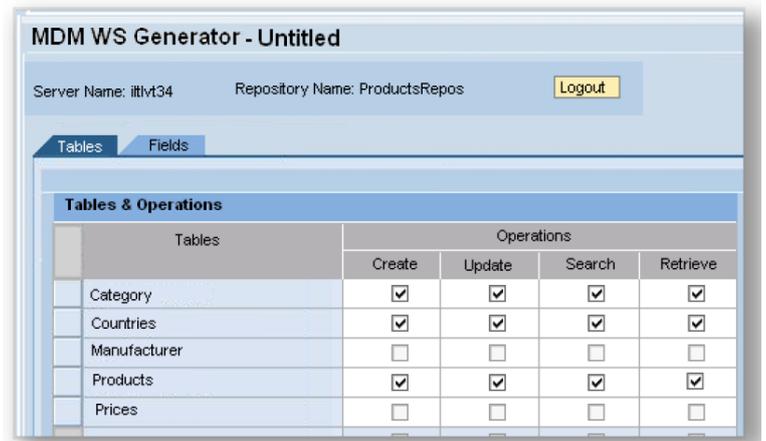


Fig: MDM Web Service Generator to allow CRUD operations defined on table and field level



Search Services

SAP NetWeaver MDM provides native search capabilities with immediate response. Drilldown search, as illustrated in the figure below allows users to start with all of the items in the MDM repository and then effortlessly zoom in on items of interest.

Here, selections can be made simultaneously from among different dimensions (such as category, manufacturer, attributes, and keyword), with selections made in one dimension automatically limiting the valid choices for every other dimension. Drill-down search is complemented by free-form search including a literal search that accepts typed values and a keyword search that can match keywords in any or all of the fields.

In addition, SAP NetWeaver MDM integrates with SAP Enterprise Search to browse unstructured content stored in an MDM repository.

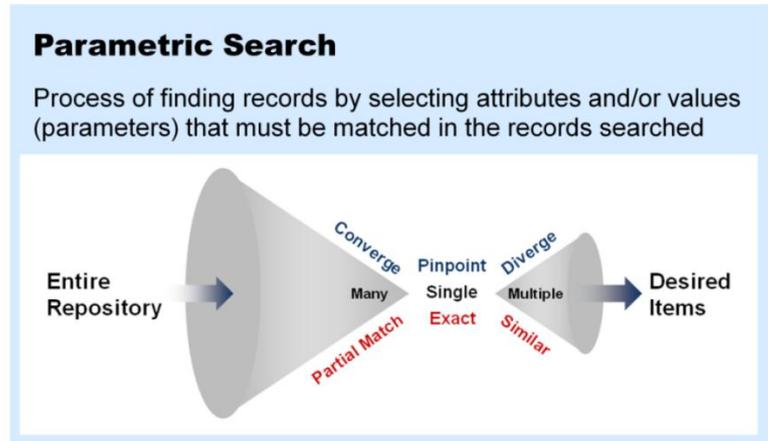


Fig: SAP NetWeaver MDM parametric search

Workflow

According to specific process requirements, SAP NetWeaver MDM provides implementation options for two workflow concepts:

- Built-in workflow.
- Cross-system workflow.

With SAP NetWeaver MDM 7.1, Web-based data governance UI components are available. These components are ready-made, granular UI building blocks that a user can configure with SAP NetWeaver MDM Web Dynpro Configurator. The components are reusable and reduce the effort needed to create custom applications, such as UIs and processes for maintaining master data. These UI components are applicable with both workflow concepts.

Built-in workflow

The built-in MDM workflow is suited to set up internal governance processes. The modeling environment of SAP MDM workflow provides standard activity types (e.g., approve/reject, validate, notify etc.) which are orchestrated into a workflow. The run-time environment is realized within the MDM Data Manager. The routing mechanism is based on MDM users and roles. The usage of roles enables decoupling named users from the process and also facilitates multi-user steps. In terms of workflow consumption, tasks can also be published to the SAP NetWeaver Portal for the execution, processing and tracking of workflow steps.

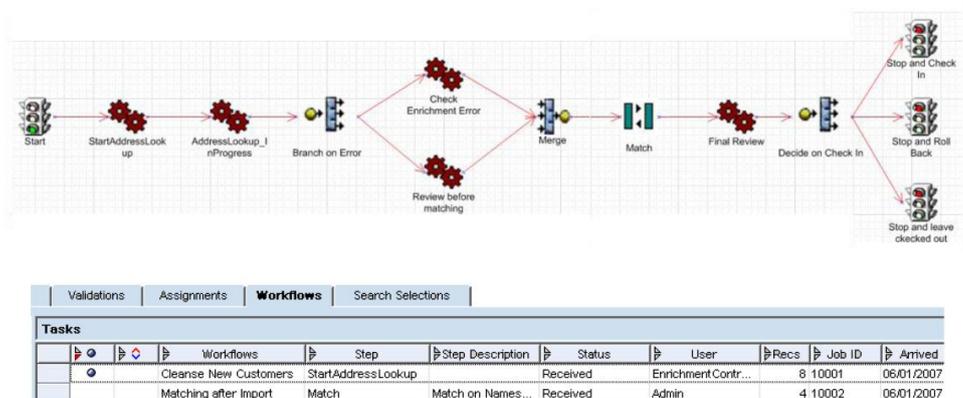


Fig: Example of MDM Workflow Design time and runtime environment

Integration with SAP NetWeaver Business Process Management (workflow)

What is more, connectivity with SAP NetWeaver BPM additionally allows users to flexibly built cross-system workflows in composite processes, for example to set up governed master data management (creation and maintenance) processes in heterogeneous system landscapes.

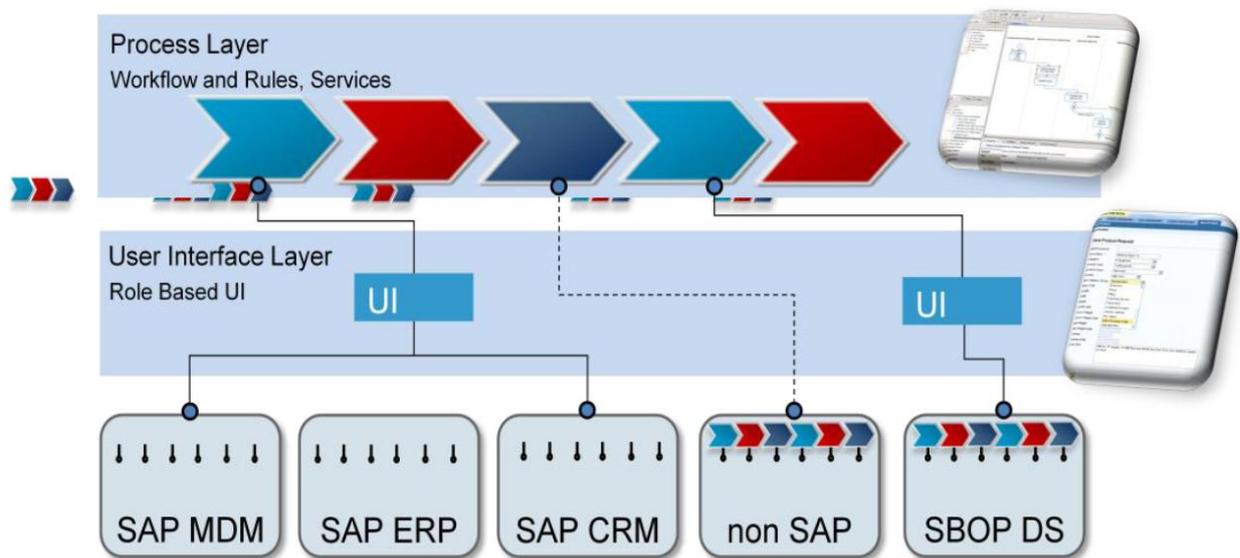


Fig: Integrating BPM Workflow

On the data foundation layer, SAP NetWeaver MDM and SAP Data Services functionality have been exposed as Web services. On the UI layer, Web Dynpro Java serves as the development environment for highly sophisticated UIs. With SAP NetWeaver MDM 7.1, Web-based data governance UI components are available (as of support package 4). These components are ready-made, granular UI building blocks that a user can configure with SAP NetWeaver MDM Web Dynpro Configurator. The components are reusable and reduce the effort needed to create custom applications, such as UIs and processes for maintaining master data. As a result, the implementor doesn't have to reinvent the wheel for each implementation. On the process layer, SAP NetWeaver BPM enables you to combine your UIs and services into a logical, collaborative business process flow. The data creation workflow can be instantiated in SAP NetWeaver Portal, transparent to the end user and independent from the underlying architecture.

Data Governance and Stewardship Capabilities

Data governance comprises all aspects of data process and data quality control needed to comply with corporate standards. In terms of general governance and stewardship, SAP NetWeaver MDM's key capabilities include:

- Change management and change tracking.
- Release and edition management.
- Active quality control via integration with SAP Information Steward.

Change management and change tracking

Generally, data changes can be visualized per change tracking UI, while user- and roles-based maintenance activities are documented in specific audit logs. In the MDM Console administrators define authorization concepts for accessing MDM data.

The screenshot shows the 'MDM Change History' interface. It includes a search bar with 'Reset Search' and 'Search' buttons. Below the search bar are several filters: 'Table' (set to 'Products'), 'Record' (empty), 'Field' (empty), 'Entry Type' (empty), 'User' (empty), 'Locale' (empty), 'Date From' (empty), and 'Date To' (empty). There is also a 'Record Contains' field. Below the filters is an 'Export to Excel' button and a 'Rows per page' dropdown set to '5'. The main area contains a table with the following data:

Change Time	Table	Record	Field	Type	Old Value	New Value	User	Locale
2007-04-26 12:55:41	Products	118	Average battery drain time [Nom]	MA	4	2	RUHLT	
2007-04-26 12:55:41	Products	118	Description	M	Notebook Speedy CN II	Notebook Deluxe VII	RUHLT	engUSUSA
2007-04-26 12:55:41	Products	118	Long Text	M	This speedy notebook with its 15" display is excellently prepared for your gaming adventures!!!	This speedy notebook with its 17" display is excellently prepared for your gaming adventures!!!	RUHLT	
2007-04-26 12:55:41	Products	118	Screen Resolution	MA	143412=1024*768	143520=1600*1200	RUHLT	
2007-04-26 12:55:41	Products	118	Screen Size (inches)	MA	142472=15	142471=17	RUHLT	

At the bottom of the table, there is a 'Row 1 of 319' indicator.

Fig: Change Tracking UI

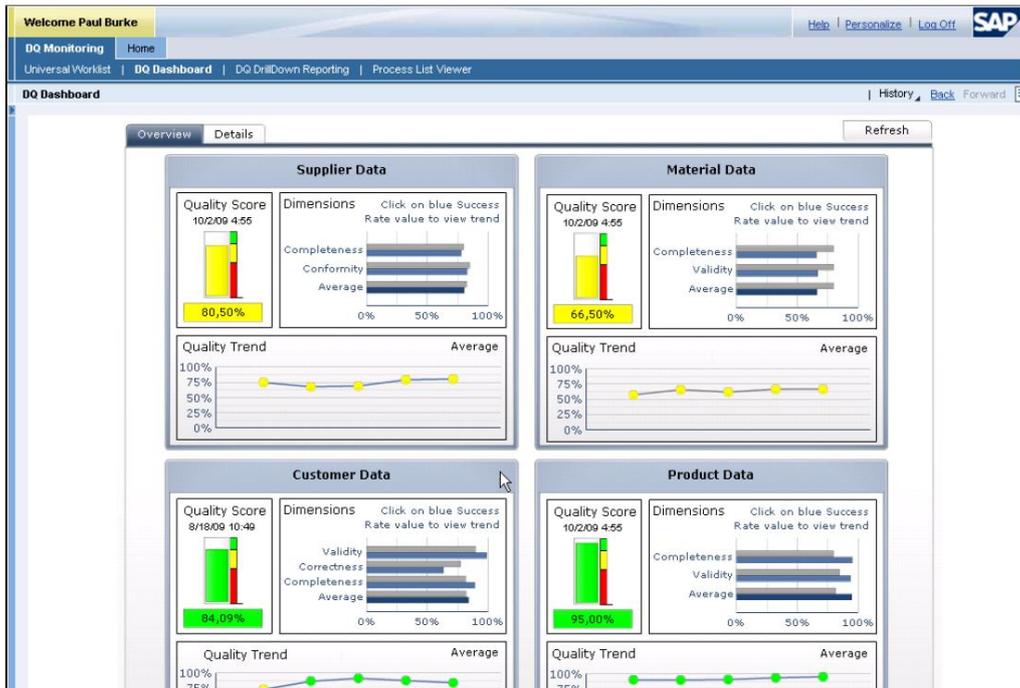
Release and edition management

Data in process, e.g. a customer or material that is currently being edited in a workflow activity is locked from changes and not visible to other users until final release. This is realized in SAP NetWeaver MDM through check-out and check-in functionality. Typically use check out and check in within SAP NetWeaver MDM workflows in order that data can be checked out and inactivated for maintenance. Only after checking in the data becomes active.

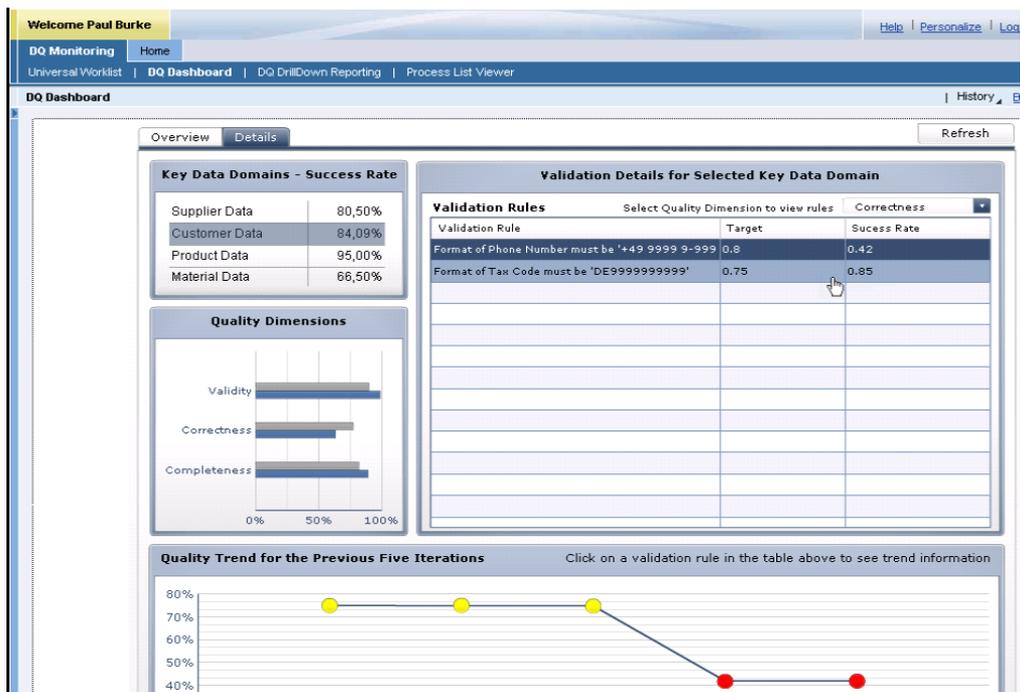
Active quality control via integration with SAP Information Steward

Another crucial governance aspect is the ability to perform active quality control on master data. Besides core management of master data, we consider data quality, workflow, data visualization and manipulation as key capabilities that a company requires in order to implement data stewardship and governance.

The following screenshots visualize how you can implement data stewardship with SAP NetWeaver MDM, SAP Information Steward, Data Services, and SAP NetWeaver BPM.



(1) Dashboard to monitor data quality



(2) Drill-down to business rules behind a specific data quality dimension, such as completeness

Data Validation Drill Down Report - Phone Number Format is Invalid

Legacy ID	Company Name	Address Line 1	Address Line 2	Address Line 3	Address Line 4
107637241	Volksbank Nagoldtal eG Zw.St. Rofelden	Bulacher Weg 1		Ebhausen 72224	
116218480	Tanzschule Jürgen Haas	Wallufer Str. 10		65343	Eitville
14132601	LEG Landesentwicklungsgesellschaft NRW	Molzhausweg 41	Hilden	40724	
15895359	Kutter GmbH	Neuffenstr. 7		Villingen-Schwenni	
20408316	*Geiler Otto GmbH & Co. KG Heizung, Klim	Dessaustr. 41		Braunschweig 381	
40038484	Continentale Versicherung AG Werner Jäh	Dohnaische Str. 58		1796	Pirna
65725064	Mandel GmbH	Neuer Markt 3		42781	Haan
67708741	Schülerhilfe Gesellschaft für Nachhilfeunte	Grohmannstr. 3		1796	Pirna
68136189	D2 - Mobilfunk GmbH	Grohmannstr. 3		1796	Pirna
84107125	Snipes Textil GmbH	Römerstr. 40		53111	Bonn
874130	Volksbank Nagoldtal eG Zw.St. Rofelden	Bulacher Weg 1		Ebhausen 72224	
983470	Wörz GmbH & Co. KG	Dorfstr. 30		Burladingen 72393	

(3) Drill-down to records that did not pass a business rule

Universal Worklist

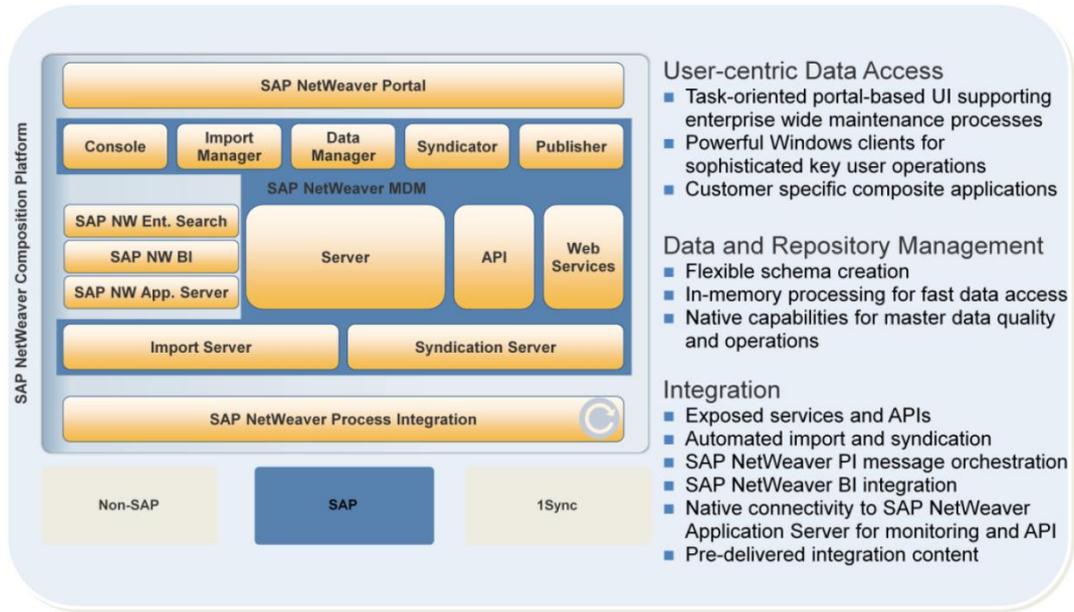
Subject	From	Sent Date	Priority	Due Date	Status
Data Correction Request: IDs 124, 32, 430		Today	Medium		New
Data Correction Request: IDs 872,832,32		Jan 14, 2010	Medium		New
Data Correction Request: ID 124,56,130		Jan 14, 2010	Medium		New
Data Correction Request: IDs 85,344,71		Jan 14, 2010	Medium		New
Customer Creation Request: ID 687		Jan 14, 2010	Medium		New
Data Correction Request		Nov 4, 2009	Medium		In Progress

Data Correction Request: IDs 124, 32, 430
 Sent Date: Today Priority: Medium
 Status: New

(4) Universal worklist showing a workflow item to correct erroneous records



**(5) Data
worklist and
manipulation
screen to
correct data
errors**



Technology and Architecture

From an architectural and technology perspective, SAP NetWeaver MDM is C++ based in its core, providing also Web AS Java based components, for example, MDM Enrichment Architecture for connectivity with 3rd party data providers, Change Tracking, WebDynpro UI, Web Services etc..

As specified above, SAP NetWeaver MDM also provides open interfaces for ABAP, Java, and .NET based applications as well as exposing MDM data via Web Services. In addition, SAP NetWeaver MDM has direct connectivity to SAP Portal, SAP NetWeaver PI and is fully integrated in SAP lifecycle management & solution operations (such as change and transport Management (CTS), solution monitoring etc).

Fig: SAP NetWeaver MDM Major Building Blocks

The core server components are written in C++ adhering to strict cross-platform coding standards that allow us to compile for multiple flavors of Windows and UNIX (see PAM below). The rich-client applications for Windows are developed using C++ and MFC using native Microsoft tools. The Java APIs are written in pure Java code and are compatible with plain-vanilla Java v1.4 using the SAP NetWeaver Java development environment (based on Eclipse). MDM Web Dynpro components are written in Java. The thin-client Portal components (iViews) are written specifically for SAP NetWeaver Portal using the NetWeaver development environment. The ABAP APIs are written in native ABAP. Native .NET APIs are written in C#.

Enterprise readiness capabilities

SAP NetWeaver MDM is built on an industry- proven platform for data management with the core architecture based on “in-memory” technology. From an overall performance perspective, customers confirm SAP NetWeaver MDM 7.1 has made significant progress relative to the prior versions of the product. Performance improvements span core functions such as matching, data import and export. Furthermore, SAP NetWeaver MDM integrates with the core NetWeaver platform to deliver enterprise class security, administration, supportability and robustness demanded by our customers.

Security features in version 7.1 include single-sign-on-like connection for MDM iViews, MDM Web Dynpro components and MDM web services, as well as an ABAP API which connects now via RFC to the MDM server (former connection was trusted TCP/IP). SAP NetWeaver MDM integrates with the SAP NetWeaver administration environment/components such as CTS+. SAP NetWeaver Administration including support of SAP Solution Manager Monitoring for Monitoring & Diagnostics capabilities are delivered thro integration with Solution Manager and Wily Introscope. NetWeaver MDM also integrates with NetWeaver user & identity management. For better support for scheduling is provided by SAP Central Process Scheduling by Redwood. In addition, SAP NetWeaver MDM can be operated in a failover environment to ensure a high availability of the MDM instance.

Application Server Support

SAP NetWeaver MDM provides native support for SAP NetWeaver. With the Java API and .NET API, a customer can run SAP NetWeaver MDM with other application servers. However, with a 3rd party application server, there is no support for features like iViews, which depend on SAP NetWeaver Enterprise Portal, and built-in integration with SAP NetWeaver Process Integration and Business Warehouse.

RDBMS Support:

RDBMS Support: Please see table below.

OS/Hardware Server Support: Please see table below.

	Windows		AIX	HP-UX		Solaris		Linux SUSE SLES10, RedHat EL5				IBM i	z/OS	TRU64
	Server 2008 on x64 (*1)	Server 2003 on x64	5.3/6.1 on Power	11.31 on PA-RISC	11.31 on IA64	10 on SPARC	10 on x64	(Redhat EL5 only) IA64	x86_64	(Redhat EL5 only) Power	zSeries	6.1	1.7, 1.8, 1.9	
32-/64-Bit	64	64	64	64	64	64	64	64	64	64	64	64	64	
Oracle 9.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oracle 10.2	-	X	X	-	X	X	X	X	X	X	-	-	-	-
SQL Server 2000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SQL Server 2005	-	X	-	-	-	-	-	-	-	-	-	-	-	-
DB2 9.5 (*4)	-	X	X	-	X	X	X	X	X	X	-	-	-	-
MaxDB 7.7 (*2)(*3)	-	X	X	-	X	X	X	X	X	X	-	-	-	-
DB2 for i 6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DB2 for z/OS V8, V9	-	APP	APP	-	-	-	-	-	APP	-	-	-	DB	-
Informix	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Legend:
X: Available
APP: Not for DB server. Application server (MDS, MDIS and/or MDSS) with whole SAP NetWeaver stack only.
DB: Database Server only.
SPx: Planned for SAP NetWeaver MDM 7.1 Support Package x.

(*1): Planned to be available with further NetWeaver MDM Release.
(*2): MaxDB version 7.7.02.20 and higher is recommended to be used at least.
(*3): The number of languages for 7.1 is still limited to 17.
(*4): The number of languages for 7.1 is still limited to 24.

Note: As of SAP NetWeaver MDM5.5 SP05 and SP06, the Units of Measurements (UOM) Manager is not available for use with DB2 on zSeries data bases and Oracle running on HP-UX IA64 machines.

Remark:
Information in this Product Availability Matrix is subject to change without notice. SAP AG assumes no responsibility for errors or omissions in these materials. They are provided as is without a warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose, or noninfringement.
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Note:
• TREX can be used on available platforms according to the TREX PAM.

Unicode Support, Language Support -- which languages/character sets

- GUI Clients (except MDM Console). Available: Chinese, English, French, German, Italian, Japanese, Korean, Portuguese, Russian, Spanish, Czech, Danish, Dutch, Finnish, Polish, Swedish.
- MDM Console: English.
- GDS Console: English.
- Matrix Application: English.
- Portal Content: Available: English Chinese, French, German, Italian, Japanese, Korean, Portuguese, Russian, Spanish, Czech, Danish, Dutch, Finnish, Polish, Swedish.

Pricing Model and Maintenance Fee

Pricing metrics include object domain type, number of de-duplicated records, and usage scenario. For example, pricing for the customer object domain is different from supplier. Prices vary widely depending on factors named above.

There is a pricing option that combines SAP Data Services with SAP NetWeaver MDM. Also, there is a pricing option that combines SAP NetWeaver MDM with SAP Master Data Governance.

Software Maintenance and Support

Support Offerings Overview

With SAP support services, you can gain real business value during every stage of your solution lifecycle.

For nearly 40 years, we have successfully delivered and supported solutions. Today, our more than 6,000 support engineers are working worldwide to deliver – 24/7 every day of the year – the mission-critical support that is helping our more than 109,000 customers improve their business processes and support that can help you accelerate your rate of innovation. In working with us, you gain access to one of the industry's best and most comprehensive support and maintenance programs.



How SAP Can Help You

As part of our support commitment, we can provide you with SAP Solution Manager, our application lifecycle management platform for managing, implementing and operating SAP solutions. We also offer advanced diagnostic and root-cause analysis capabilities that can monitor your end-to-end business processes, all by using an infrastructure that allows seamless integration and enables efficient collaboration with SAP and our entire ecosystem.

Our support services can help you improve the performance – while increasing the stability and flexibility – of your IT solutions. As a result, you can more effectively respond to the changing needs of your business and the evolving requirements of today's customers. We can help you accomplish this by working closely with you – throughout your application's entire life cycle – and providing the guidance you may need to become a best-run business.

To support

Our support services can help you improve the performance – while increasing the stability and flexibility – of your IT solutions. As a result, you can more effectively respond to the changing needs of your business and the evolving requirements of today's customers. We can help you accomplish this by working closely with you – throughout your application's entire life cycle – and providing the guidance you may need to become a best-run business.

To support your efforts, we can deliver the following support services:

- SAP Enterprise Support – Provides end-to-end support for an entire platform, including mission-critical processes and partner solutions delivered on demand, on device, or on premise.
- SAP Standard Support – Delivers support services that help enable continuous and effective business operations, providing the services and tools that help businesses keep their systems up and running.
- SAP Safeguarding – Helps manage the technical risks and robustness involved in realizing implementation and upgrade projects, all while simultaneously improving SAP operations.
- SAP MaxAttention – Supports all stages of an SAP solution's lifecycle – from planning and implementation to operations and optimization – via a full range of engineering services that help organizations safeguard complex solutions, plan new releases and updates, deploy continuous improvement, optimize solution operations, and run mission-critical solutions.

Additional Support Options

- Secure support service from SAP – Offers organizations a quality gate, providing the tools and support that can help reduce the costs and mitigate the technical risks commonly encountered when implementing new technology can help reduce the costs and mitigate the technical risks commonly encountered when implementing new technology .

For more information please refer to <http://www.sap.com/services/bysubject/support/index.epx>

www.sap.com

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