SAP Thought Leadership
Master Data g overnance and Business Process Management

INCORPORATING MASTER DATA GOVERNANCE INTO BUSINESS PROCESSES

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Master data is highly interlinked and referenced by people and processes. t his means that data quality issues can have profound effects on the efficiency and quality of your company's operations.

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EXECUTIVE SUMMARY

tackling Master Data Problems

in a recent gartner study of more than 140 companies in various industries and geographic regions, participating organizations estimated they are losing an average of $8.2 million annually as a result of data quality issues.[1] so it's no surprise that many companies are working toward managing their master data more effectively to improve the accuracy, completeness, timeliness, and consistency of master data.

When done well, master data management (MDM) is well defined and well governed and involves every relevant department and business unit, including the it department. ideally, it supports the MDM processes via enabling technologies, such as data repositories, intuitive automation, and role-based applications that simplify and streamline data collection by everyday business users.

But often, master data management is handled in a very chaotic or it-centric (rather than business-centric) manner. this leads to the creation and maintenance of duplicate, incomplete, or erroneous master data that hinders operational efficiency, quality, and agility. this paper explores how you can use business process management to define a flexible master data governance process that business users can drive – and it can support.

> the ultimate goal of establishing a master data governance process is to maintain and improve the quality of master data that's available to all applications, business processes, departments and business units, and employees and partners.

1. gartner, inc. Findings From Primary research study: organizations Perceive significant cost impact From Data Quality issues, ted Friedman, august 14, 2009.

THE INTERRELATIONSHIP BETWEEN MASTER DATA AND PROCESSES

a c o MPlex r el ationshi P

Master data is the essential data that describes your business, including its operations and organizational structure, and the "business entities" that your company uses, sells, or interacts with regularly. For example, master data encompasses information about customers, employees, suppliers and partners, products and services, materials, plant and warehouse locations and configurations, logistics information, and more.

What makes it "master" data is the fact that it serves as the foundation, or organizing structure, for so many other kinds of information, process behaviors, and organizational structures. For example, a customer is a "business entity," and a master data record for this kind of business entity may include company name, address, phone number, primary contact names and titles, account number, and user name and password for your company Web site, among other items. a ll of this master data information is linked to massive amounts of transactional data created within business processes, such as orders, invoices, payment information, production lots, shipping details, and more. it's also linked to other master data, such as master data about the salespeople who made each sale to the customer, sales territories, related managers and executives, shipping and warehouse information, and more.

Looking at Master Data from a Process Point of View

Master data is highly interlinked and referenced by people and processes. t his means that data quality issues can have profound effects on the efficiency and quality of your company's operations.

t o understand why, think of your business as the intersection of people, processes, and information. Business processes are the streams of business activities or tasks performed by people or software to enable efficient business operations. information is the lifeblood of your business – the digital data that's created and stored on computers about everything related to your business and its activities. Data is created and used – including master data, which is the data that's intimately connected to nearly all processes that enable daily business operations.

When there are problems with the processes that **create** or **modify** master data, it leads to master data problems, such as redundancy, inaccuracy, and lack of completeness, which in turn leads to operational problems that hurt competitiveness. t o drive efficient, integrated, and agile operations, the people and processes that use master data need an agreed-upon view, or description, of each business entity, whether it's a customer, supplier, employee, or product.

Learn More About Master Data

For additional information about master data and its significance for today's businesses, download the following papers:

- *Manage a ll your Master Data with o ne integrated s olution,* click here.
- *Master-Data Management: t he l ie Detector of Business,* click here.

a typical Master Data scenario

let's consider a common example of how these process-information interactions work within a sales department. sales representatives typically create and modify customer master data as they enter information about new customers. in addition, other business processes, such as those handled by the customer credit department, create, access, modify, and even delete master data. in either case, the steps involved in master data creation, modification, and deletion can be well governed and effective or ad hoc and ungoverned.

the resulting master data – good or bad – is then used within processes as part of activities such as:

- sales lead routing and tracking
- sales forecasting (which is also affected by sales territory descriptions)
- commission determination and payment
- sales orders creation (which references not only customer master data but also skUs from the product catalog)
- invoicing
- shipping
- customer service

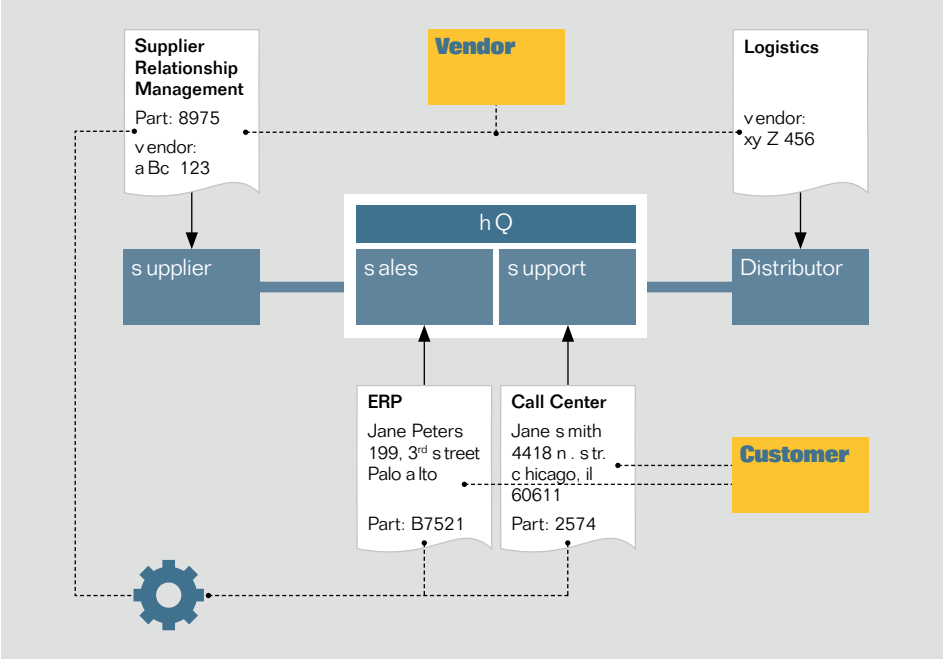

Figure 1: Scattered, Inconsistent Master Data Across All Departments

it's easy to see how poor-quality master data can affect the efficiency and quality of your business operations (see Figure 1). imagine what happens if customer master data entered by sales representatives is incorrect or duplicated by an older entry – does it result in invoicing errors that frustrate customers and hurt your cash flow or in the delivery of orders to the wrong address? can your customer service staff quickly find the customer's history to expedite service? can executives create accurate management reports needed to make critical decisions? can marketing determine exactly who to target for marketing campaigns without sending out duplicate mailers to the same person? Probably not.

it's important to note that even if you take the time to clean up your master data, if you don't fix the underlying processes used to create and maintain it (and clearly define the roles of the people participating in them), your master data quality will simply begin to decay again.

UNDERSTANDING AND ADDRESSING CAUSES OF MASTER DATA PROBLEMS

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Why have so many companies let their master data get out of control by focusing on growing their business but failing to organize their processes at the same time? your company's master data, like its business processes, grows organically. a s your business becomes more sophisticated in terms of its lines of business, the numbers and types of customers, product offerings, and suppliers increase. t his makes describing and maintaining this kind of enterprise information more complex.

Understanding the Importance of Governance in Master Data Management

"t hrough 2012, 70% of service-oriented architecture (s o a) projects in complex, heterogeneous environments will fail to yield expected business benefits unless MDM is included. . . . t hrough 2012, due to the lack of a sufficient business-oriented approach, appropriate governance and an accompanying metrics structure, 60% of MDM programs will be regarded as failures."

Source: Gartner, Inc., *Hype Cycle for Master Data Management*, Andrew White et al., July 24, 2009.

if your company has not invested in developing flexible, well-governed processes for managing its master data, this complexity turns into chaos. in some cases, companies haven't thought through governance at all, so there is no consistent process, business rules, or metadata. Departments and business units may define their own way of handling master data, resulting in large, disconnected caches of data across the enterprise. o ther times, master data governance may be handled by a global team but be managed as a highly manual process with data request forms being sent through e-mail; in these cases, business units become disconnected from the process of governing the master data that they depend upon. a s a result, master data quality naturally deteriorates over time and inhibits a company's agility – for example, by making it difficult to integrate a newly acquired business or improve customer service levels.

Transitioning to Business-Owned Master Data Governance

a s we have shown, master data is very closely related to everyday business processes. t o address master data challenges, you need to put governance of master data back into the hands of those who have a vested business interest in ongoing data quality – for example, by putting customer contact data into the hands of the sales department and customer financial data into the hands of the finance department. t he ultimate goal of establishing a master data governance process is to maintain and improve the quality of master data that's available to all applications, business processes, departments and business units, and employees and partners.

t he question is: how do you get master data into the hands of the business, with it assisting with the appropriate technology? t o get started, your departments and business units need to ask fundamental questions such as:

- Do we really understand all the ways that master data is being created and updated? Do we know how duplicates get created and where errors usually fall through the cracks?
- a re we governing our master data with a process-centric viewpoint that takes into account how our business actually operates?
- a re we defining and automating master data governance in relation to our business processes?

The Essentials of Effective Master Data Governance

establishing an effective master data governance process can improve the quality, availability, and accuracy of your data by enabling cross-organizational collaboration and policy making. it involves:

- Defining the business goals that you need to achieve around master data
- Understanding the location and importance of your master data
- Determining your key master data policies and who governs them
- identifying where governance activities fit in your business processes
- s pecifying who should be responsible for master data governance activities
- Defining and implementing a supporting it infrastructure for master data governance
- identifying key performance indicators and how governance effectiveness is measured

n ext, there must be close collaboration between the business owners of the master data and it regarding how to manage master data creation, modification, and deletion as part of their everyday business processes. From a high-level business process point of view, this means you need to do the following:

- **Designate a single source of truth** – in some cases, companies can simply designate a single system, such as an enterprise resource planning (er P) system, as their master data repository. h owever, when master data bridges more than one system, the best practice for its effective management is to define a separate repository using an MDM solution. t he MDM solution is used to manage the "golden record" of business-critical master data, acting as a single source of truth where data is created, updated, and syndicated out to dependent databases.
- **Establish company-wide metadata descriptions** – a s part of your central data repository designation step, you need to establish clear rules and descriptions of classes of business objects, your metadata. t hese global descriptors of data types enable harmonization of data across the enterprise, and they encompass the requirements of your various heterogeneous data stores and the kinds of data required by the localities where your company does business.
- **Lay out well-defined, adaptable governance processes owned by the business and supported by IT** – you need to establish clear, consistent management of master data through enforced governance: policies, processes, controls, and audits, as well as procedures regarding how to create, update, and make master data available to others while ensuring integrity and security.

t he first two steps are typically led by it . But the last step involving master data governance – which is the process this paper focuses on – requires the close involvement of departments and business units, as they have a vested interest in ensuring master data quality.

BUSINESS PROCESS MANAGEMENT: THE KEY TO MDM GOVERNANCE

DeFinin g B Usiness Pr ocesses For Mas ter D ata c rea tion

to facilitate this collaboration between business and it , leading companies are turning to a business process management approach. Business process management is the practice of defining business processes, describing them in detail, monitoring them with appropriate metrics, and continuously improving business processes to optimize business performance.

For more information about business process management, please refer to *BPM technology taxonomy: a guided tour to the application of BPM* (PDF), click here (login required).

Because business process management helps companies focus on creating well-defined business processes, it's increasingly being used to help them simplify the growing complexity of their businesses and coordinate the work of the employees and partners. in the case of MDM, business and it can use business process management to untangle master data problems, define and manage master data governance in the context of the business processes that generate and use such data, and put MDM back into the hands of the business. as a methodology, it enables both parties to visualize and define "as-is" and "to-be" master data governance for today's digital data environment.

The Need for Business Process Management Software

Many MDM software products provide built-in workflows to support basic data management approvals sufficient for supporting a master data governance team. When companies are looking to automate master data governance in business processes that span many different roles and departments, and there is a requirement to syndicate data between multiple systems, then closer alignment is needed between business and it . in addition, their collaborative teams need more powerful business process management techniques and tools. in such cases, look for business process management environments that:

- support the business process modeling notation (BPMn) standard to enable business and it collaboration
- support industry standards to simplify system integration
- embed support for business rules to enable automated processing

Master data governance processes must be highly adaptable – for example, so you can accommodate changes to your organization resulting from a merger or acquisition. l eading business process management tools, such as the sap n etWeaver® Business Process Management (sap n etWeaver BPM) component, employ a model-driven development approach. t his means that as your business analysts and developers collaboratively define the BPMn process model for a master data governance process, they actually lay out the execution flow for the process automation. t hen developers can leverage service-oriented composition and orchestration to implement process steps through preexisting services provided by the sap® er P application, sap n etWeaver MDM component, and other it applications. at the same time, embedded business rules enable the automation of decisions within a business process, thus allowing automation of common cases and enabling specialists to focus on exceptions and more complex tasks. embedding business rules also allows for simplification of process flows and concentrates the most dynamic parts of a business process – decision making – into an easily modifiable form.

The Power of Business Process Modeling Notation

Using business process modeling notation (BPMn), business and it professionals can jointly describe processes in a summarized, abstract way that can be understood by business people. BPMn also is rich enough to describe processes in sufficient detail so that technologists can use models to automate processes with technology. For example, you can use high-level models to summarize business processes and then create other models that provide increasingly detailed overviews of processes. t he most detailed models have enough expressive power to describe how applications link each process step to a user interface or Web service that helps support the step by providing information or the means to take action.

Managing Business Activities from a Process Point of View

a s illustrated in Figure 2, business process management helps you institute continuous process improvement for any process by establishing a governance process and driving the process management lifecycle.

a n effective business process management methodology – which is based on this lifecycle – can be applied to any business process. t his methodology includes the steps summarized in the following table.

in theory, no technology is required. Business process management methods keep the focus on the business process as the central concept around which all other management thinking and activity takes place. in practice, however, business process management greatly improves adaptability by properly employing the right it tools and infrastructure to model process descriptions, automate processes, track metrics, and make the most of existing enterprise applications. a ll these require technology such as s a P n etWeaver BPM.

Business Process Management Methodology

Business Process Management Step	Description
c alibrate	Before you start, take time to understand your business goals and map them to measurable metrics and key performance indicators so you can assess progress toward goals.
a nalyze	Perform an "as-is" analysis of your business activities across the enterprise and understand the underlying, real business needs.
Design	Develop your "to-be" process design and supporting it architecture to transform how work can get done optimally and consistently.
implement	r apidly develop a supportive it implementation, and roll out the newly designed process to the process participants.
r un and monitor	execute the new processes and constantly monitor their effectiveness, identify and address bottlenecks, and anticipate when the processes may need to be updated.
iterate and begin the cycle again	a nalyze the monitoring data so you can identify opportunities to continuously improve it, as well as adapt your processes swiftly to meet new business needs.

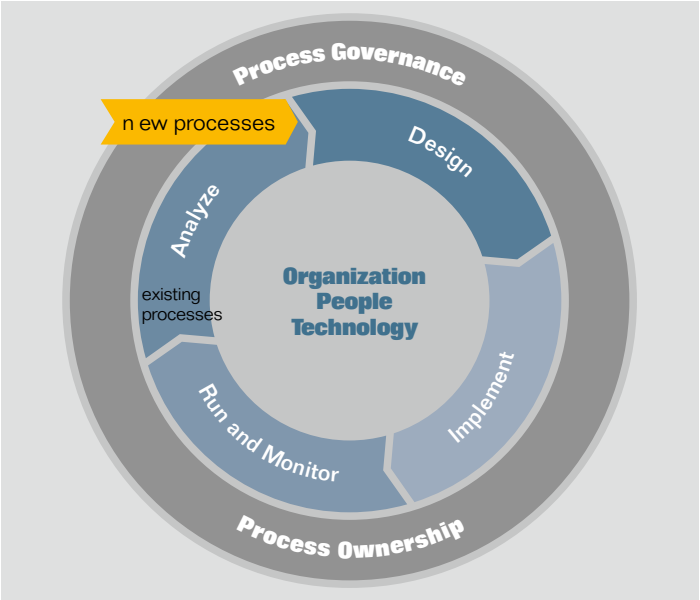

Figure 2: The Process Management Lifecycle

THE VALUE OF BUSINESS PROCESS MANAGEMENT METHODOLOGIES FOR OPTIMIZING MDM

a c o MPosite c ase s t UDy

t o better understand how you can use business process management to set up effective master data governance, let's consider a hypothetical customer example based on s a P's experience with many existing customers. a ssume our case involves a large tire manufacturing company serving over 100 markets. l et's see how s a P can apply a business process management methodology to address this company's master data challenges.

imagine that management at this company wanted to proactively solve master data challenges while completing a roll-out of the s a P er P application. a s a first step, it and business units use the s a P enterprise modeling applications by iDs s cheer to map their business processes and determine how to establish the governance of master data using a single, optimized, global business process.

t o address its master data challenges, the company uses s a P n etWeaver MDM as its central data repository, as well as s a P n etWeaver BPM to support data governance processes driven by business process management. t hey then apply a six-step business process management methodology to define an optimal master data governance process.

Calibrate

t he organization's goal for its master data initiative is to achieve the highest levels of data consistency and reliability by having common definitions of data across the organization. a chieving this would enable more efficient business processes and faster sales cycles while improving overall customer satisfaction. t o monitor progress toward these goals, the company decides to use the following key performance indicators (k Pis) and metrics:

- Process cycle time for creation of approved customer records in s a P er P and the s a P n etWeaver Business Warehouse component.
- error rates in customer invoicing due to incorrect customer data

Analyze

t he company's it department performs a department-by-department analysis of how master data is created and used and leverages s a P enterprise modeling applications by iDs s cheer to document multiple, regional processes for master data management. t his tool supports BPMn so that the team involved (both business and it professionals) can identify and agree on the opportunities for automation, measurement, control, and process flexibility.

During the discovery and planning phases of their er P project, the team maps out a process for managing the creation of customer master data. t hey determine that:

- t his process is unique to their business.
- Many steps in their existing process occur outside the scope of their er P application.
- t hey must build in flexibility for ongoing business change.

a nalysis of their as-is master data activities reveals a number of redundant, fragmented, nonstandard activities across the enterprise. s pecifically:

- t here are multiple "owners" of important master data types (for example, by region and country), which cause confusion, redundancy across different database systems, and hoarding of data.
- it operational costs are higher than they should be, because master data is housed in multiple repository database systems.
- t here are multiple points of entry for master data without any consistent approval procedure, which results in data duplication and incomplete records.
- t he company can't track where master data requests are in the processes for creation or modification or measure process efficiency and effectiveness.
- Because there is insufficient data sharing among systems housing master data, the company creates and maintains multiple versions of customer data, which was causing problems such as impaired customer service.
- t here are no official, single data publication channels to external parties (for example, for sharing customer master data with logistics service providers), causing delayed shipments.
- t he company has no process for delegating and substituting the activities of approvers during their absences.

Design

t he tire manufacturing company then uses s a P n etWeaver BPM to design a to-be MDM process that will transform how master data is created, maintained, and syndicated across the enterprise. t he company uses BPMn , which helps foster the collaboration between business and it by giving everyone a shared language and documentation approach.

a s illustrated in Figure 3, the company's to-be process for customer master data involves the following steps:

- a sales representative or customer service representative initiates a request to create a new customer using a standard template form. t he initiator first checks to see if the customer already exists; if not, he or she fills out the form with the necessary customer information, including general data and sales data.
- s ales management reviews and approves the customer general and sales data.
- t he credit and collection group fills out credit terms and data.
- Finance approves the finance and credit data.
- g eneral customer data is posted to MDM automatically and syndicated to s a P er P after the last management approval.
- a local master data specialist reviews sales and financial portions of the customer data form for compliance and completion, and then the data is posted to MDM and syndicated to s a P er P.
- Finally, a member of the global master data team analyzes the newly created customer data and relates this within business intelligence reporting hierarchies so that it is properly incorporated for analytics purposes.

With the to-be process documented, it can identify the supporting technologies and services required, map the to-be processes to existing solutions and services, and define the to-be system landscape.

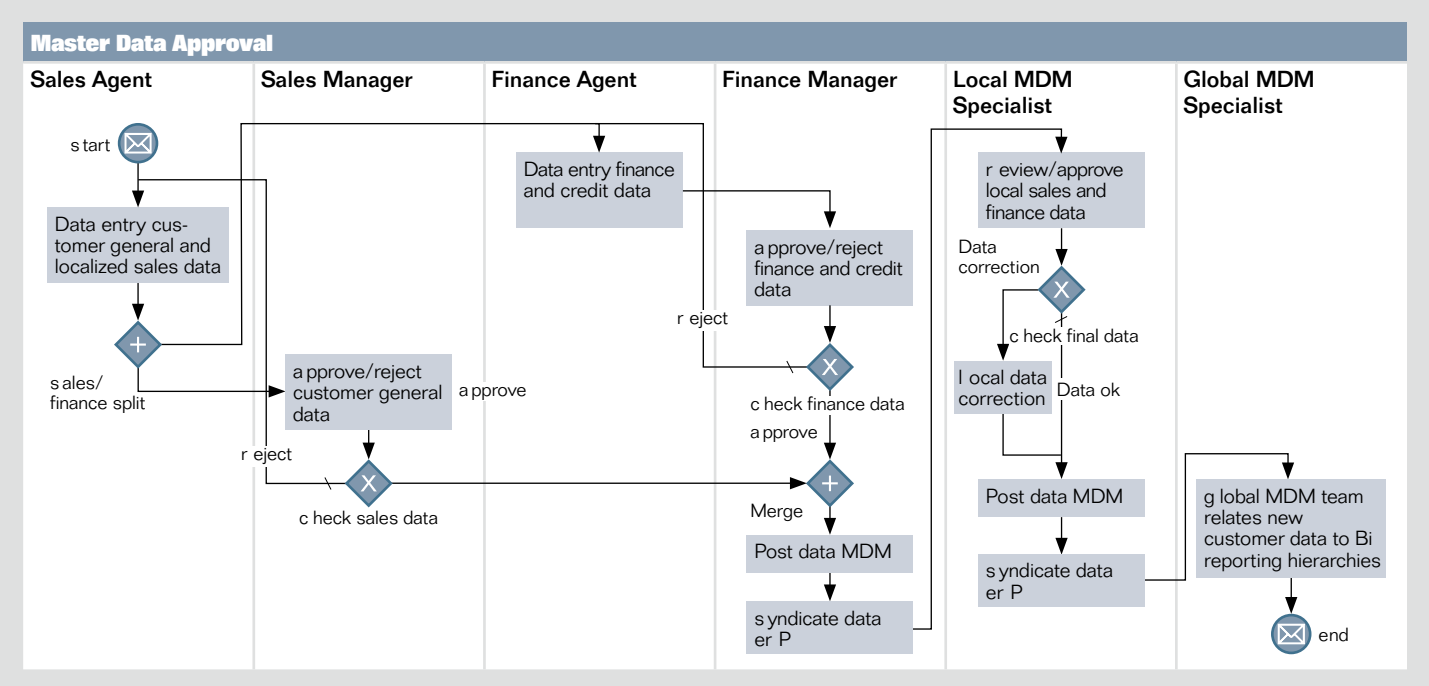

Figure 3: A Documented "To-Be" Governance Process

Implement

now our hypothetical business can bring its optimized to-be processes to life. the company uses saP netWeaver BPM, saP netWeaver MDM, and certain tools, infrastructure, and approaches based on business process management that work especially well when implementing a business process management solution.

typically, an it implementation for a business process management project leverages agile development techniques such as scrum. each development cycle addresses a successively larger scope of requirements over a period of several weeks while taking into account new feedback provided by stakeholders.

typical business process management composition tools provide "model-to-execute" development capabilities, which developers and business experts use to collaborate and lay out the process orchestration for the supporting composite application (in this case, for master data governance). to implement the process steps mapped out in this orchestration, companies will find their service-oriented architecture (soa) infrastructure to be especially valuable; process steps can be implemented by reusing existing functionality from saP applications, saP netWeaver MDM, saP netWeaver Business Warehouse, and other applications involved in the business process.

Technology from SAP Supporting Process-Oriented Master Data Governance

the saP netWeaver® Master Data Management (saP netWeaver MDM) and saP netWeaver Business Process Management (saP netWeaver BPM) components provide an integrated, flexible solution for centralizing master data management and extending governance of globally relevant master data into your company's business processes.

saP netWeaver BPM supports a process-oriented approach to optimizing master data management by helping you model, execute, and monitor your business processes based on a common process model. With saP netWeaver BPM, you can compose process steps, define business rules and exceptions, model process flows using industry-standard business process modeling notation, execute process models efficiently, and support interaction with running processes via personalized user interfaces or interactive forms. you can also monitor business processes to improve process quality and efficiency.

For more information, download the solution brief saP netWeaver Business Process Management at www.sap.com/usa/platform/netweaver/components/sapnetweaverbpm.

saP netWeaver MDM supports an approach based on business process management for master data governance. this approach uses generators that rapidly create Web-based user interface components for data governance and Web services to automate steps in data governance workflows such as data creation or update. these generated components can then be associated in saP netWeaver BPM to implement steps in a business process model, providing screens for user steps and Web services calls for system-centric steps. For more information on how to leverage the latest release of saP netWeaver MDM for business process management, visit the saP® Developer network community at www.sdn.sap.com/irj/scn/weblogs?blog=/pub/wlg/17698.

as is usually the case with an implementation supporting business process management, the hypothetical customer is able to spend a larger portion of implementation time on designing the user experience than would be possible in a traditional implementation. typically started as part of the to-be design phase, this user experience design continues into implementation, with developers and business analysts working together with mock-ups and prototypes to jointly create an effective and engaging interface for the process applications' business users. in this context, sap netWeaver MDM has been designed to work well as part of a business process management approach. sap netWeaver MDM provides code-free generation of user interface components for MDM data governance based on Web Dynpro development environment technology that can be directly consumed by sap netWeaver BPM.

Finally, leveraging existing business intelligence and monitoring software already in place, the customer puts instrumentation in place to measure the kPis and performance metrics once the process is running.

Run and Monitor

the tire manufacturing company now runs its new master data governance process and constantly monitors its effectiveness. Using kPis to track performance and business impacts, management can now identify and address bottlenecks and anticipate when master data governance needs to be updated. the company quickly realizes a number of benefits, including:

- **Reduced cycle time** due to faster turnaround times for master data entry and the availability of new customer data
- **Greater customer satisfaction** because everyone has access to higher-quality customer master data, which enables more efficient, accurate transactions and greater customer satisfaction (for example, by eliminating the need to rework sales orders, which causes shipment delays)
- **Improvements in analytics, reporting, and decision making,** as reports and analyses are now based on up-to-date, high-quality data and users feel more confident making decisions based on them
- **Lower operational IT costs** by consolidating and centralizing all master data to a single database that's accessible globally

Because business process management helps companies focus on creating well-defined business processes, it's increasingly being used to help them simplify the growing complexity of their businesses and coordinate the work of the employees and partners. in the case of MDM, business and it can use business process management to untangle master data problems, define and manage master data governance in the context of the business processes that generate and use such data, and put MDM back into the hands of the business.

Iterate and Begin the Cycle Again

When the tire manufacturing company is ready to begin the next project iteration cycle, it can compare measured results with its business goals and kPis, refine its goals, recalibrate measures, obtain feedback, and refine its MDM processes for even greater efficiency and effectiveness.

PART OF A LARGER ENTERPRISE INFORMATION MANAGEMENT SOLUTION

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t he approach to master data governance based on business process management described above is part of s a P Businesso bjects™ enterprise information management (eiM) solutions. eiM strategies help organizations govern their information assets in ways that maximize reuse and value to the entire business.

s a P offers a complete eiM portfolio of best-of-breed products in the information management market that address the needs of s a P software–focused environments, as well as customers with open and heterogeneous environments. By integrating its eiM products in an information management suite, s a P can provide considerably lower total cost of ownership. For example, s a P offers integrated solutions supporting:

- Data migration
- Data quality
- Business warehousing and data services
- Master data management and governance

For more information about s a P's solutions for eiM, please see www.sap.com/eim.

Learn More

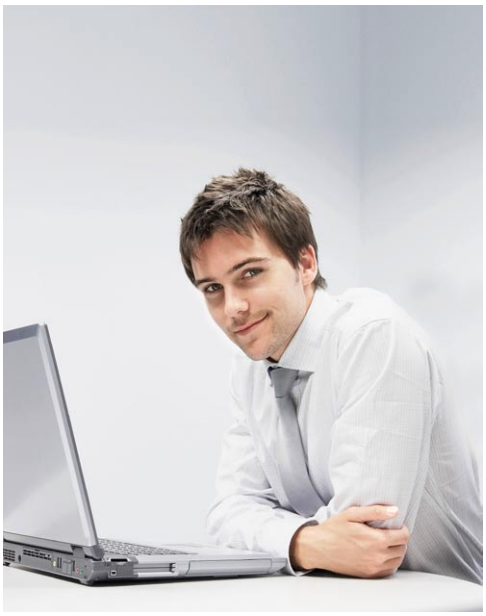
t he previous hypothetical case study illustrates how many companies are using business process management to address their master data issues. Master data management is an ideal first project for it organizations seeking to leverage business process management across their business. o nce in place, you can branch out to optimize the processes that consume and modify master data, such as customer-facing business processes and collaborative processes related to product development and definition.

For more information about a business process management approach and methods, you can:

- v isit the Business Process experts (BPx) community at www.sdn.sap.com/irj/bpx/bpm
- l earn about the business process expert certification process at www.sdn.sap.com/irj/bpx/education
- r ead the s a P Press book *Business Process Management – t he s a P r oadmap* (click here)
- r ead the s a P Press book *a pplying r eal-World BPM in an s a P environment* (click here)

t o learn about business process management tools provided by s a P, visit the s a P Developer n etwork community at www.sdn.sap.com/irj/sdn/nw-bpm.

t o learn about other business process management use cases, visit the business process management use case repository at the BPx community at http://wiki.sdn.sap.com/wiki/display/BPx/Business+Process+Management+Use+c ases.



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