



Data management in the metallurgical industry: The experience of implementing SAP MDG at Metinvest Holding

Mariupol, 2015

METINVEST is an international vertically-integrated group of steel and mining companies that manages every link of the value chain, from mining iron ore and coal to manufacturing semi-finished and finished steel products. The group includes mining and metallurgical companies in Ukraine, Europe, and the USA, and a sales network covering all key world markets.

Metinvest is the largest Ukrainian company according to Forbes and is ranked the 4th among the largest companies in Central and Eastern Europe by Deloitte TOP-500 for 2013.

Metinvest is Ukraine's largest and one of largest producers of iron ore raw materials and steel in the CIS. The Company is among the ten largest producers of iron ore and plate iron and was ranked 25th among the world's largest steel companies by the World Steel Association in 2013.



2014 PRODUCTION RESULTS



COKING COAL

4.10 MILLION
TONS



IRON ORE CONCENTRATE

34.89 MILLION
TONS



CAST IRON

9.21 MILLION
TONS



STEEL

9.20 MILLION
TONS



SEMI-FINISHED PRODUCTS

1.69 MILLION
TONS



FLAT SECTION STEEL

4.62 MILLION
TONS



ROLLED SECTION STEEL

1.85 MILLION
TONS



PIPES

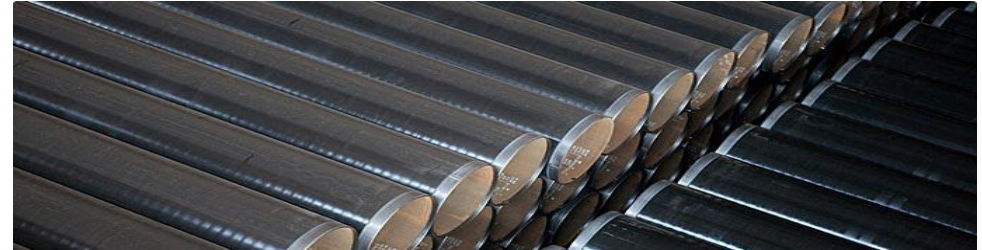
296 THOUSAND
TONS

Structure of METINVEST Group process chain



Mining Division:

- **Inguletskiy Iron Ore Enrichment Plant**
- **Northern Iron Ore Enrichment Plant**
- **Central Iron Ore Enrichment Plant**
- Komsomolskoye Mining Company
- Krasnodon Coal
- United Coal Company



Metallurgical Division:

- Azovstal Iron & Steel Works
- Ilyich Iron & Steel Works
- **Yenakieve Iron & Steel Works**
- Khartsyzsk Pipe Plant
- Promet Steel
- Ferriera Valsider
- Metinvest Trametal
- **Metinvest Steel Service Center**
- Metinvest Resource
- **Avdiivka Coke Plant**
- Inkor & Co.

Goals and objectives:

- create a single analytical nomenclature to integrate and coordinate the actions of the Group companies
- flexible and manageable relations with the business partners based on unified and accurate information about the materials, products and services
- integrating the directory data and business processes will make it possible to automate the processes in SAP and to ensure efficient controls and reliable reporting

Centralized management of master data

Expected results

- 1 Obtaining a single consolidated base for global analytical profiles (procurement cost analysis, product profitability analysis)
- 2 Sales and production forecast for the Group companies
- 3 Unified taxonomy and directory classification to meet the needs of all Group companies for analytics and functionality
- 4 Managing the directory of goods and services purchased and products manufactured in order to optimize the internal and external logistics
- 5 Creating a single naming agreement that provides for the appropriate and sufficient attributes for each of the classifier sections.
- 6 Creating consistent and up-to-date master data at the very first stage
- 7 Determining the quality of the master data, ensuring it is high quality
- 8 Single basis for performing accurate analytics and for SAP functionality to operate effectively
- 9 Verified and integral information in various ERP installations and other information systems

The single directory was developed using the following basic approaches:



- ✿ Assessing the current status of Metinvest Group's local directories, determining the methods for eliminating the weak points

- ✿ ID classification of the directory nomenclature numbers
- ✿ Determining the future structure of the single directory (mandatory fields, their parameters, etc.)
- ✿ Mandatory and sufficient attributes of the nomenclature items

- ✿ Creating nomenclature numbers of the single directory based on the state classifier of products and services of Ukraine
- ✿ Developing a directory classification with greatest possible regard for the needs of all potential consumer companies

- ✿ Developing a single naming agreement
- ✿ Stage-by-stage adjustment by the companies of their local directories in compliance with the naming agreement and receiving the codes of the single directory

- ✿ Creating individual transition plans for the single directory of nomenclatures, depending on the company's involvement in the pilot SAP implementation.
- ✿ Identifying the tools used to maintain the single directory for all Group companies (ERP/MDM)

- ✿ **Creating nomenclature numbers for the single directory based on the state classifier of products and services of Ukraine (DKPP-016:2010)**
- ✿ **The lower level of the DKPP classifier is used to form an external number for a material or service**

Example:

24 Metallurgy products

24.1 Iron, cast iron, steel, and ferroalloys

24.10 Iron, cast iron, steel, and ferroalloys

24.10.1 Primary products of iron and steel

24.10.11 Steel-making and specular cast iron in pigs, blanks and other primary forms

24.10.11-00.00 Steel-making and specular cast iron in pigs, blanks and other primary forms

- ✿ Unified rules for forming a full name were developed: mandatory and sufficient attributes of nomenclature items – **Naming Agreements**.
- ✿ The attributes included in the naming agreements are uploaded to SAP as the classification system features, each class is filled in with the attributes of records included in the naming agreement. Each material master record is assigned a class corresponding to the naming agreement and a set of feature values used in forming a full name in the system.

	Inventory/service name	" " (space)	Type of cast iron	" " (space)	Cast iron, steel condition	FULL NAME
Rules of forming attributes	A material record must begin with a Noun starting with a capital letter and small letters for the rest of the word. Adjectives following the noun are spelled with small letters. There is one space between the words.		The attribute identifies the type of cast iron - steel-making - foundry iron - desulfurized The words "pig", "drain", "without blowing", "blend", etc. are NOT ALLOWED.		The attribute indicates the condition of the cast iron or steel. The attribute is filled in with the values: - liquid	
Indicate whether the attributes are mandatory or optional	OO		O/M		OO	
<i>EXAMPLES:</i>						
24.10.110000	Cast iron		steel-making		liquid	Steel-making liquid cast iron
24.10.110000	Cast iron		foundry		liquid	Foundry liquid cast iron
24.10.110000	Cast iron		desulfurized		liquid	Desulfurized liquid cast iron

Material master record classification: 001 class type

Классификация

[Классы](#) [Значения признака](#)

Вид класса: 001 - Класс материалов

Классы					
Просмотр иерархии классов				Фильтр Настройки	
Класс	Название	Статус	Подробный текст	Документ	
CL_24_10_11-00_00	Чавун переробний і дзеркальний у чушках,	Деблокировано	Посмотреть		
CS_24_ЧУГУН_ЖИД	24 Чугун жидкий	Деблокировано			

Lower level of the DKPP classifier
 Naming agreement

Naming agreement, features, mandatory values, and formation rules of attributes:

Классификация

[Классы](#) [Значения признака](#)

Вид класса: 001 - Класс материалов

Класс: Все классы

Значения признака

- * НАИМЕНОВАНИЕ_ТМЦ/УСЛУГИ: Чугун
- ВИД_ЧУГУНА: передельный
- * СОСТОЯНИЕ/ФОРМА: жидкий

The system saves the mandatory attributes from the naming agreement

Просмотр ПодрТекста (RU)

"В атрибуте указывается вид чугуна
 - передельный
 - литейный
 - десульфурированный
 Указание выражений ""чушковый"", ""сливной"", ""без продувки"", ""усредненный"" и т.п. - НЕ ДОПУСКАЕТСЯ."

Закрыть

[Подробнее](#)
[Подробнее](#)
[Подробнее](#)

When the Details button is pushed, the system shows the rules for forming the attribute from the naming agreement.



Verifying if mandatory features of the naming agreement are all filled in

Материал: нов., &MATNR_DESC&

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Пожалуйста, заполните характеристику класса! : :
 Обязательный признак NAIMENOVANIE_TMC_USLUGI класса CS_04_АЛЬБОМЫ / 001 не заполнен
 Обязательный признак KOLICHESTVO_LISTOV_V_TMC класса CS_04_АЛЬБОМЫ / 001 не заполнен

Общие данные Данные обрабо

Ид. запроса на изменение:

Verification start

Error message

Verifying if a MMR duplicate copy was created in the system

Percentage by which duplicate copy coincides

Number of similar material master records found

Name of material master record created

Name of similar material master record found

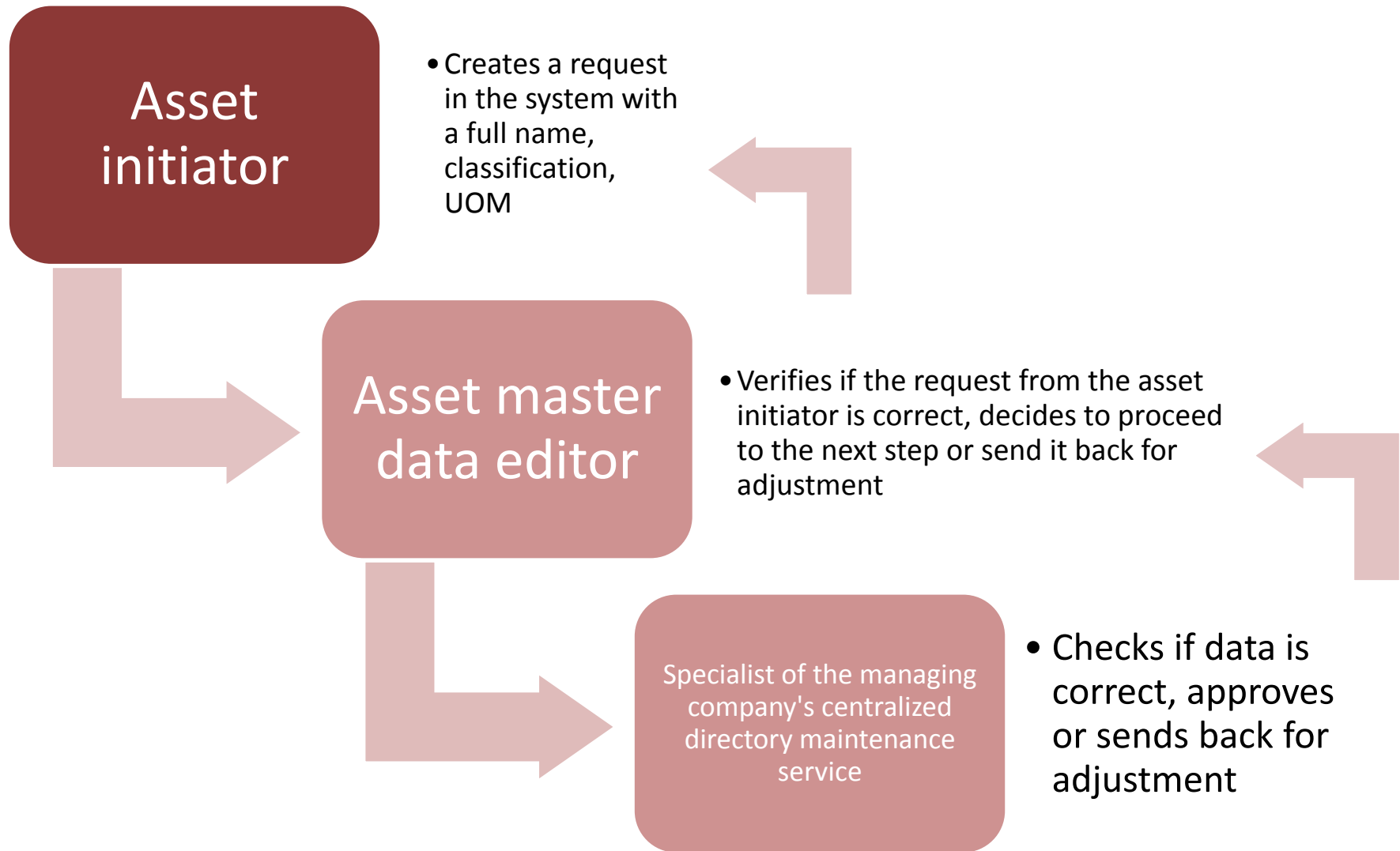
Экспорт в Excel		↓			↓	
% совпад. по наименованию	% совпадения по ЕИ	Материал	Базисная ЕИ	Альт.ЕИ	Исходный текст	Похожий текст
89,29	0	25.94.113400.00017	КГ		Болт М10х20 5.8 ГОСТ 7805	Болт М10х20 5.8 ГОСТ 7805-70
86,21	0	25.94.113400.00010	КГ		Болт М10х20 5.8 ГОСТ 7805	Болт М10х120 5.8 ГОСТ 7805-70
85,71	0	25.94.113400.00062	КГ		Болт М10х20 5.8 ГОСТ 7805	Болт М10х50 5.8 ГОСТ 7805-70
85,71	0	25.94.113400.00085	КГ		Болт М10х20 5.8 ГОСТ 7805	Болт М10х80 5.8 ГОСТ 7805-70
85,71	0	25.94.113400.00051	КГ		Болт М10х20 5.8 ГОСТ 7805	Болт М10х40 5.8 ГОСТ 7805-70

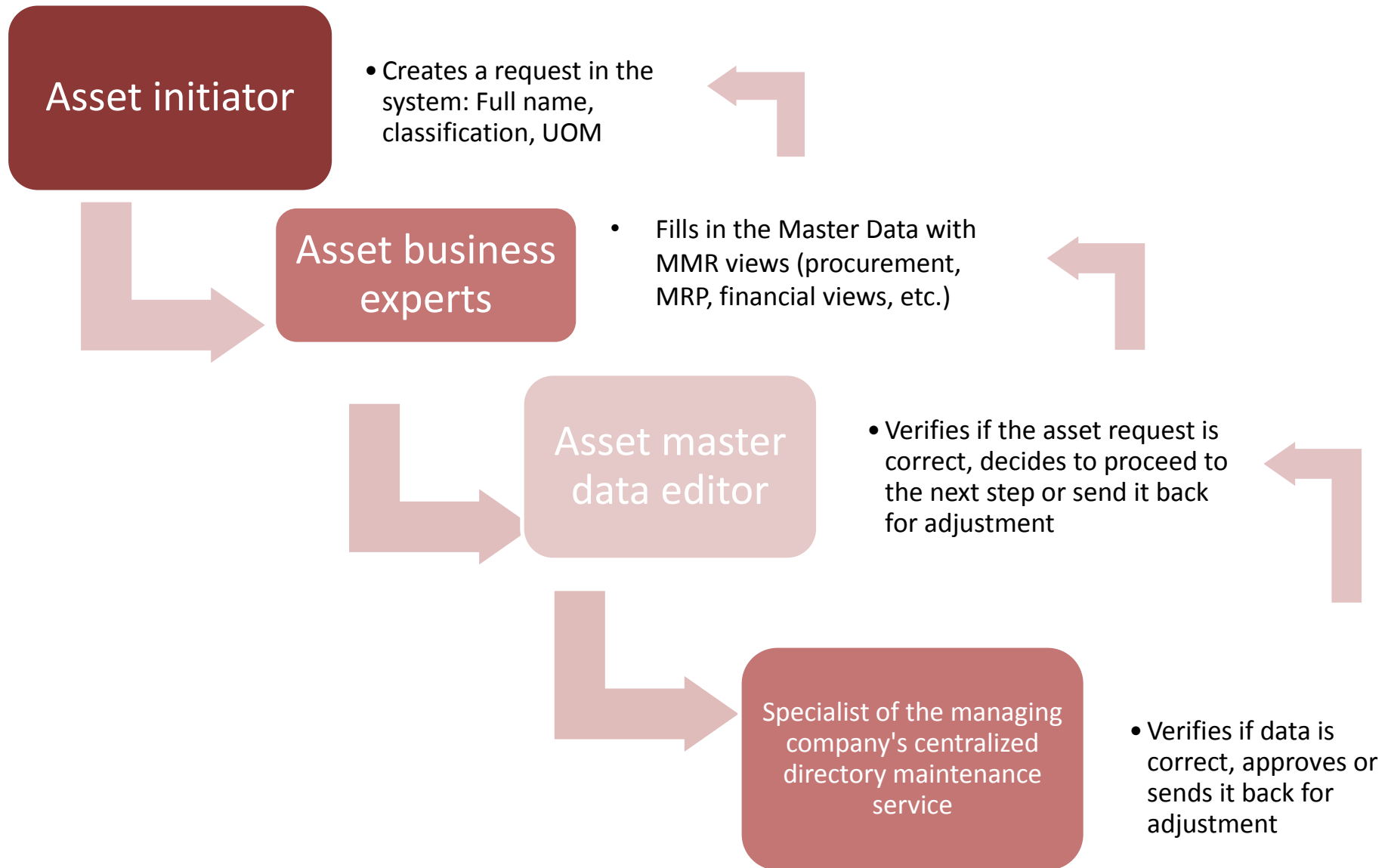
Phase 1 (non-pilot assets)

- MDG 6.0
- Materials directory
- Restricted number of fields
- Simple maintenance of the materials master records / services directory
- Temporary solution

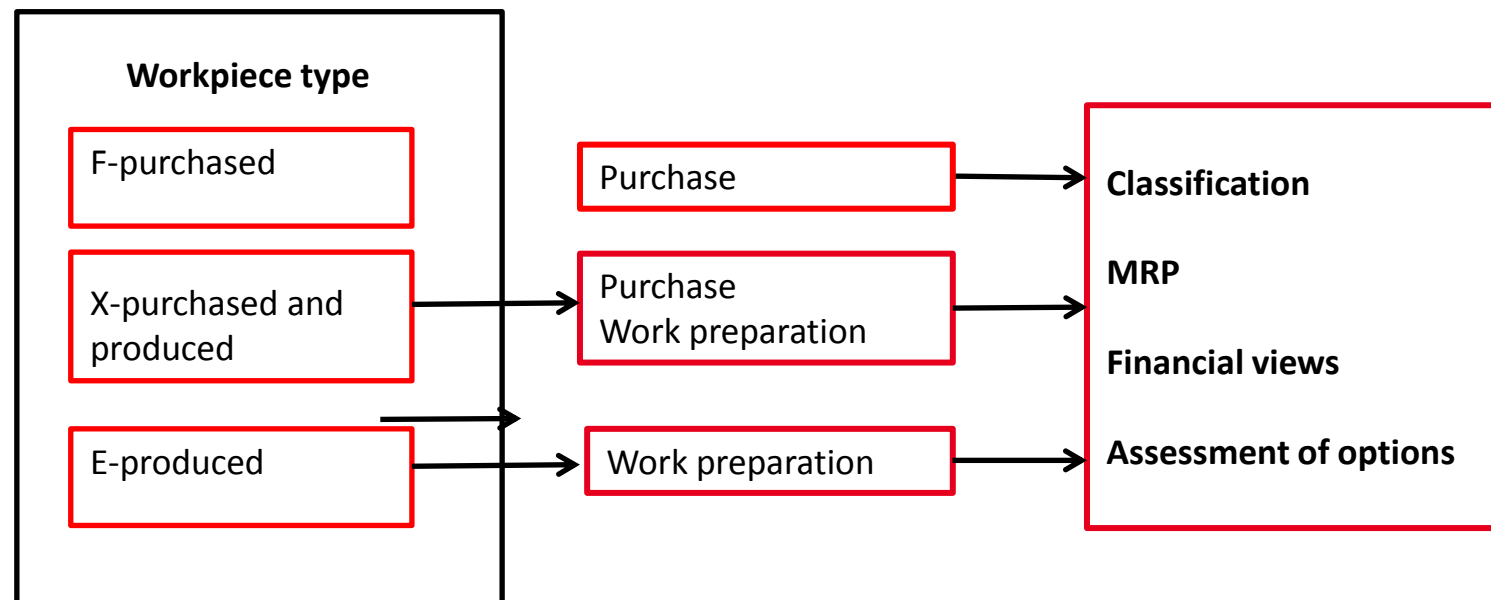
Phase 2 (non-pilot assets) and circulation (pilot assets)

- MDG 6.1
- All directories
- Non-standard type of requests
- MMR views
- Complicated maintenance of directories
- Production system





MMR view is a SAP technical requirement. It is the entity containing the features and attributes that describe certain characteristics and properties of a material or service. A feature may affect the procurement, production, sales and accounting or analytics. A missing or incorrect view may lead to incorrect operation or unavailability (downtime) of a process or analytics.



The methodology for filling in the MMR views is a description of the rules for filling in the MMR views depending on the process in the SAP system.

Field name	Material number	Plant	Rating class	Rating class for the project stock	Rating type
Mandatory (Yes/No)	Yes	Yes	Yes	No	No
<i>Completion instruction for the products purchased for the sales plant based on commission.</i>		Sales plants as per the attached directory	Determined depending on the directory: type of materials, plant, availability account, and cost account.	Determined depending on the directory: type of materials, plant, availability account, and cost account.	Determined depending on the directory type of material, plant, availability account and cost account.
<i>completion instruction for the off-balance recognition of the goods taken on commission.</i>		Off-balance plants as per the attached directory	Determined depending on the directory: type of material, plant, availability account, and cost account.	Determined depending on the directory: type of material, plant, availability account, and cost account.	Always takes the X value.
Reference to the directory		Plants directory A1	Information to the methodology	Information to the methodology	Information to the methodology

Example of reference to the directory:

Workpiece type	Type of material	Material type name	Plant	Rating type	Rating type name	Price determination	Price management	Operating stock		Investment stock	
								Rating class		Rating class	
								Code	name	Code	name
F	2MEIO	Coal concentrate and carbons	1300	D	ΠΦ/ΠΟΚ/Η3Π/ΤΟΒΑΡ_ZMD0	3	V	1503	Coal concentrate	5035	PS: Coal concentrate

General derivation rules in the system

Материал: Болт М10х70 5.8 ГОСТ 7805-70

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Текущие сообщения

Журнал

Сбросить журнал

Вид	ТекстСообщен
Вс...	
<input checked="" type="checkbox"/>	Полю "Группа транспортировки" было присвоено значение "Т170" *Вид материала: ZMC0
<input checked="" type="checkbox"/>	Полю "Вес брутто" было присвоено значение "1"
<input checked="" type="checkbox"/>	Полю "Вес нетто" было присвоено значение "1"
<input checked="" type="checkbox"/>	Полю "Единица измерения веса" было присвоено значение "KG"
<input checked="" type="checkbox"/>	Полю "Иерархия продуктов" было присвоено значение "0601010101" *Вид материала: ZMC0 *Группа материалов: 01003006

Derivation rules depending on the plant

Материал: Болт М10х70 5.8 ГОСТ 7805-70; Завод: 4900

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Текущие сообщения

Журнал

Сбросить журнал

Вид	ТекстСообщен
Вс...	
<input checked="" type="checkbox"/>	Полю "Группа проверки доступности запасов" было присвоено значение "02" *Завод: 4900
<input checked="" type="checkbox"/>	Полю "МВП" было присвоено значение "0000130001" *Завод: 4900 *Группа материалов: 01003006
<input checked="" type="checkbox"/>	Полю "Код горизонта резервного времени" было присвоено значение "000" *Завод: 4900
<input checked="" type="checkbox"/>	Полю "Код вторичной потребности для отдельной и суммарной потребн." было присвоено значение "1" *Завод: 4900
<input checked="" type="checkbox"/>	Полю "Группа транспортировки" было присвоено значение "Т170" *Вид материала: ZMC0

Master data maintenance system

Key tasks for the master data maintenance system:

- Centralized MD maintenance
- Web interface
- Standard ERP structure
- Standard ERP verifications
- Verifications for duplicate copies
- Standard keymapping
- Stable management of a large bulk of data
- Flexible workflow setting system
- Standard role model
- Simple implementation
- Simple support

Alternatives to master data maintenance systems:

SAP MDG

SAP MDM

ABAP program

- **ABAP Program:**

- Difficult to set up a task correctly
- ABAP developers require a lot of time
- Testing is too labor intensive
- May be damaged when updates and notes are installed

- **MDM:**

- Non-ABAP system
- Additional setting of all verifications is required
- Not a standard role model (cannot be connected to GRC)
- Not a standard request transfer model (cannot be connected to CHARM)
- No version control of directories

Why MDG?

MDG is an ERP-based system

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It can be changed by standard transport requests

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It can be changed by standard transport requests

No need for additional verifications or derivations for the ERP part

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It can be changed by standard transport requests

No need for additional verifications or derivations for the ERP part

ABAP & ABAP for Web Dynpro

MDG is an ERP-based system

It can be changed by standard transport requests

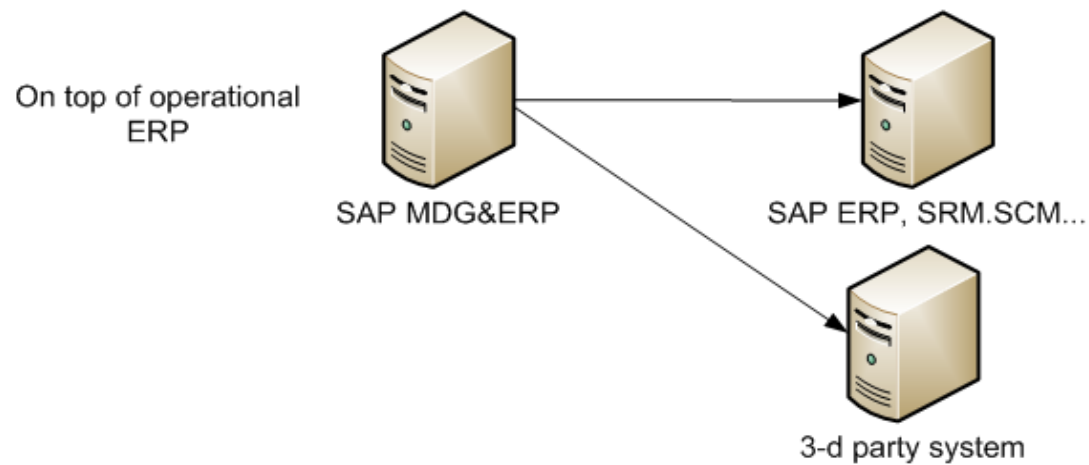
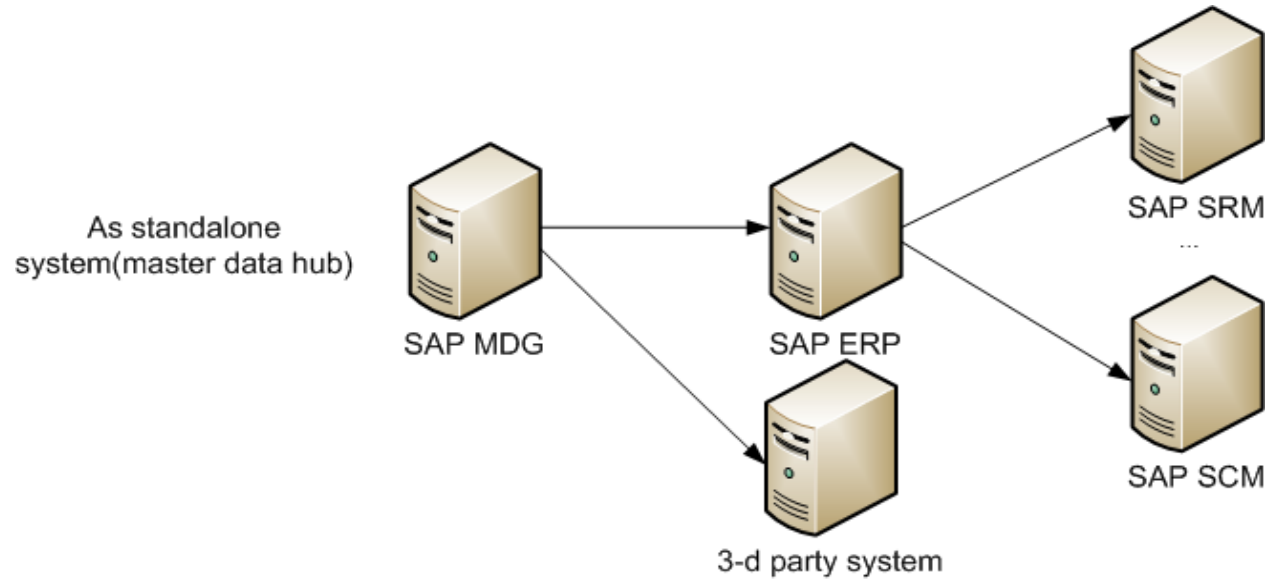
No need for additional verifications or derivations for the ERP part

ABAP & ABAP for Web Dynpro

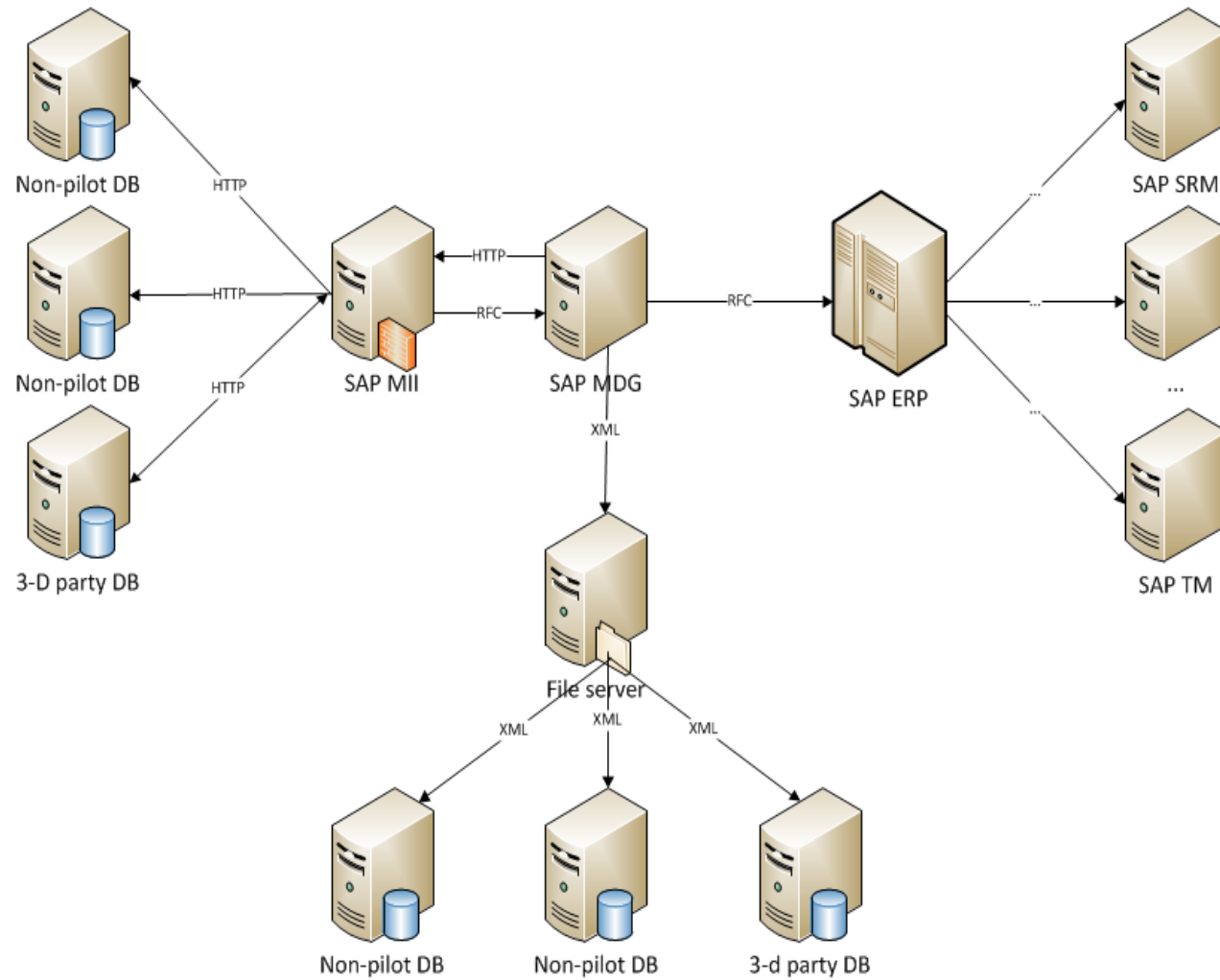
Preset interfaces and processes for directories

System architecture

Two ways to install MDG



The architecture solution implemented



Advantages

Can be updated without updating ERP

All processes run on a separate server and do not affect ERP performance

Not all mandatory ERP pre-requisites are supported by MDG

There may be additional data that must be in ERP

Disadvantages

Settings must be synchronized

Data must be synchronized

Standard ERP verifications cannot be used when a record is used by other ERP processes

Request processing organization

Organization of master data maintenance for Phase 2 of the MDG project

Process requirements:

1. The process must include several data enrichment steps

The request initiator fills in the master data for the material. Additionally, there is a certain number of business experts responsible for filling in individual views. The system provides for the roles of procurement, production, sales, and finance business experts.

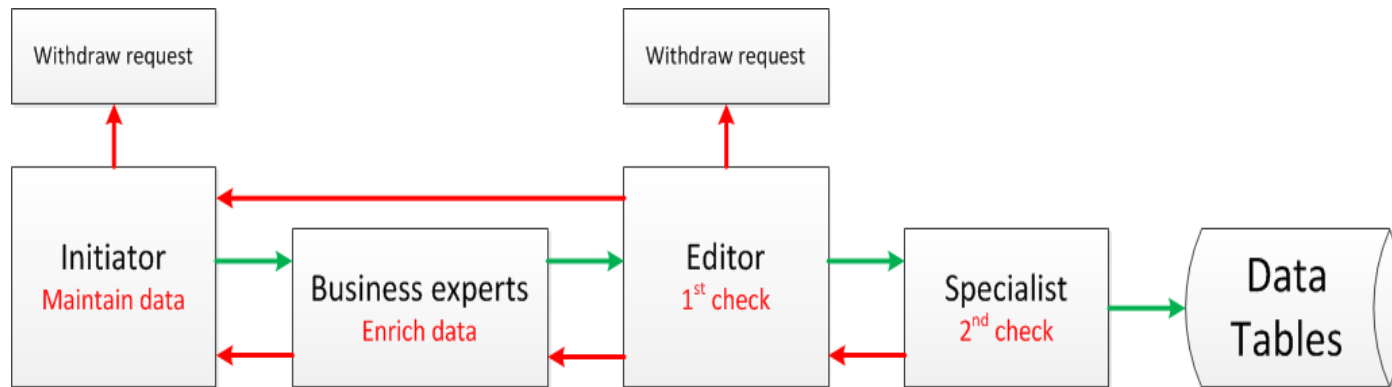
2. There must be an option to choose business experts.

For example, if a material is not being sold, there must be an option to exclude that business expert from the chain.



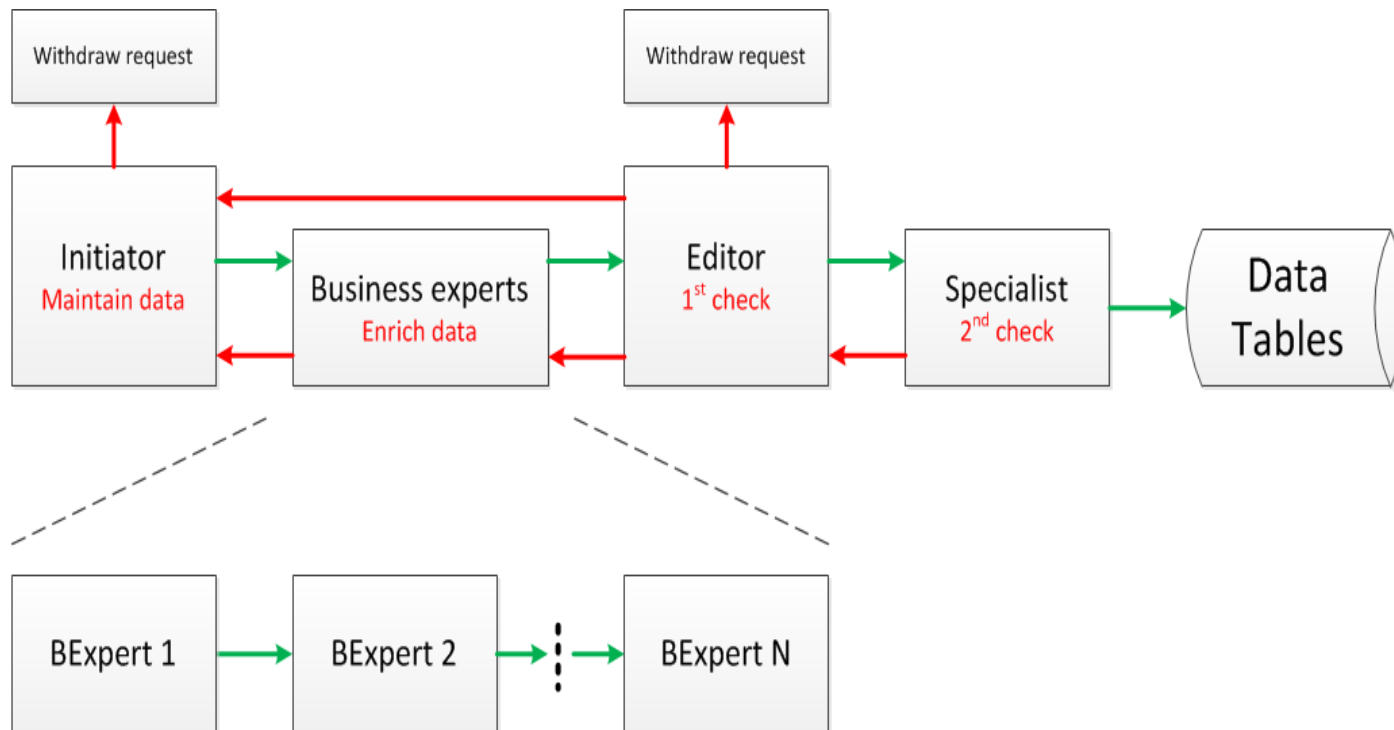
1. The process must have several data enrichment steps.

Request processing



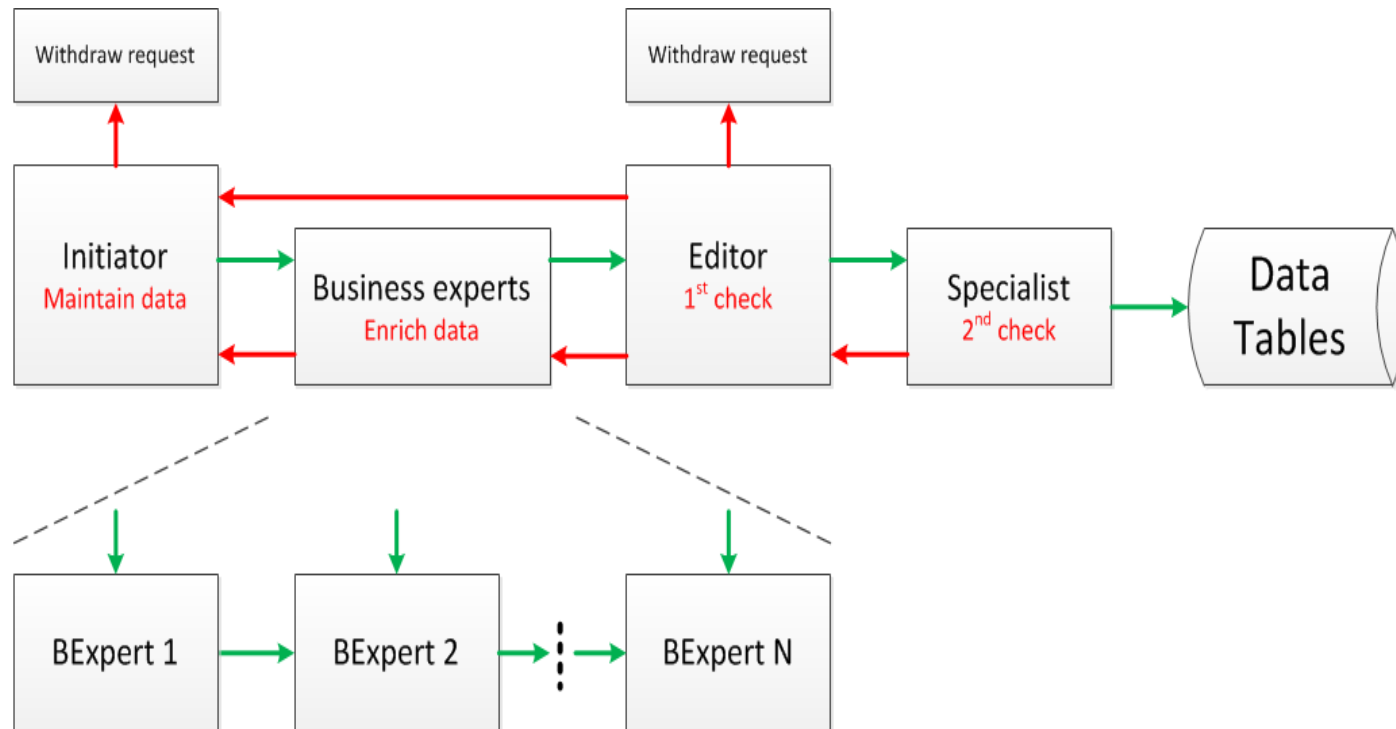
1. The process must have several data enrichment steps.

Request processing



2. There must be a option to choose business experts.

Request processing

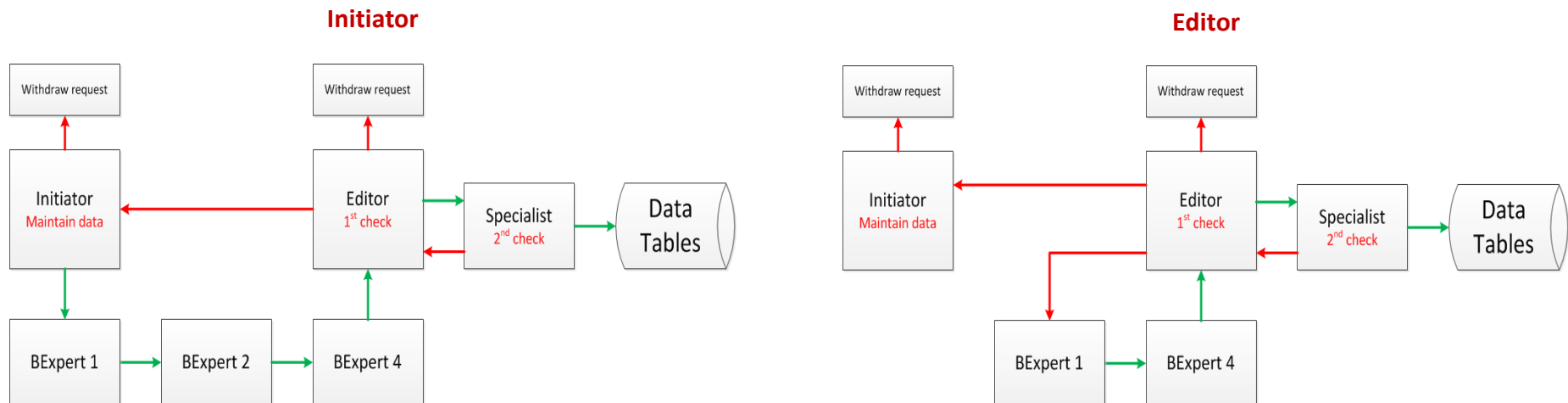


2. There must be a option to choose business experts.

Request processing

EXAMPLE:

1. In all, there are four business experts
2. The initiator and the editor may choose possible experts.
3. The initiator may choose experts 1, 2 and 4
4. The editor may choose experts 1 and 4



2. There must be a option to choose business experts.

Request processing

Add the Code variable

BE1	BE2	BE3	BE4	Code	Process
0	0	0	0	0	EDIT
0	0	0	1	1	BE4
0	0	1	0	2	BE3
0	0	1	1	3	BE3 > BE4
0	1	0	0	4	BE2
0	1	0	1	5	BE2 > BE4
0	1	1	0	6	BE2 > BE3
0	1	1	1	7	BE2 > BE3 > BE4
1	0	0	0	8	BE1
1	0	0	1	9	BE1 > BE4
1	0	1	0	10	BE1 > BE3
1	0	1	1	11	BE1 > BE3 > BE4
1	1	0	0	12	BE1 > BE2
1	1	0	1	13	BE1 > BE2 > BE4
1	1	1	0	14	BE1 > BE2 > BE3
1	1	1	1	15	BE1 > BE2 > BE3 > BE4

Expand the transfer table

PREV_CR_CTEP	CODE	NEXT_CR_STEP
INIT; EDIT	8;9;10;11;12;13;14;15	BE1
INIT; EDIT	4;5;6;7	BE2
INIT; EDIT	2;3	BE3
INIT; EDIT	1	BE4
INIT; EDIT	0	EDIT
BE1	12;13;14;15	BE2
BE1	10;11	BE3
BE1	9	BE4
BE1	8	EDIT
BE2	6;7;14;15	BE3
BE2	5;13	BE4
BE2	4;12	EDIT
BE3	3;7;11;15	BE4
BE3	2;6;10;14	EDIT
BE4	1;3;5;7;9;11;13;15	EDIT



2. There must be a option to choose business experts.

Request processing

Change Request: Reason		
Type of Change Request	Reason	Description
ZMAT1	1	BE4
ZMAT1	10	BE1 > BE3
ZMAT1	11	BE1 > BE3 > BE4
ZMAT1	12	BE1 > BE2
ZMAT1	13	BE1 > BE2 > BE4
ZMAT1	14	BE1 > BE2 > BE3
ZMAT1	15	BE1 > BE2 > BE3 > BE4
ZMAT1	2	BE3
ZMAT1	3	BE3 > BE4
ZMAT1	4	BE2
ZMAT1	5	BE2 > BE4
ZMAT1	6	BE2 > BE3
ZMAT1	7	BE2 > BE3 > BE4
ZMAT1	8	BE1
ZMAT1	9	BE1 > BE4

Change Request: Reason		
Type of Change Request	Reason	Description
ZCUST2	1	BE1
ZCUST2	2	BE2
ZCUST2	3	BE3

Initiator

General Data	
Change Request ID:	2486
* Description:	CR with BE 1,2 and 4
Priority:	<input type="text"/>
Reason:	<input type="text"/>
	BE1
	BE1 > BE2
	BE1 > BE2 > BE3
	BE1 > BE2 > BE3 > BE4
	BE1 > BE2 > BE4
	BE1 > BE3
	BE1 > BE3 > BE4
	BE1 > BE4
	BE2
	BE2 > BE3

Editor

General Data	
Change Request ID:	2486
* Description:	CR with BE 1,2 and 4
Priority:	<input type="text"/>
Reason:	BE1 > BE4



**Thank you
for your attention!**

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