



Workshop: IT systems / Technical Aspects

05 May 2017



The better the question. The better the answer.
The better the world works.

Agenda

- ▶ FAIA Project Start Up
- ▶ FAIA Implementation
- ▶ Implementation specific problems
- ▶ Robotic Process Automation (RPA)

FAIA Project Start Up



Initial Analysis

- ▶ Subject to FAIA?
- ▶ What ERP/Accounting software is used?
- ▶ Is there an existing FAIA-module available?
- ▶ What version of the FAIA needs to be implemented?
- ▶ What data is required in the FAIA and do we have it?
- ▶ Do we have the necessary resources/expertise available?
 - ▶ IT/ERP
 - ▶ VAT/Tax
 - ▶ Accounting

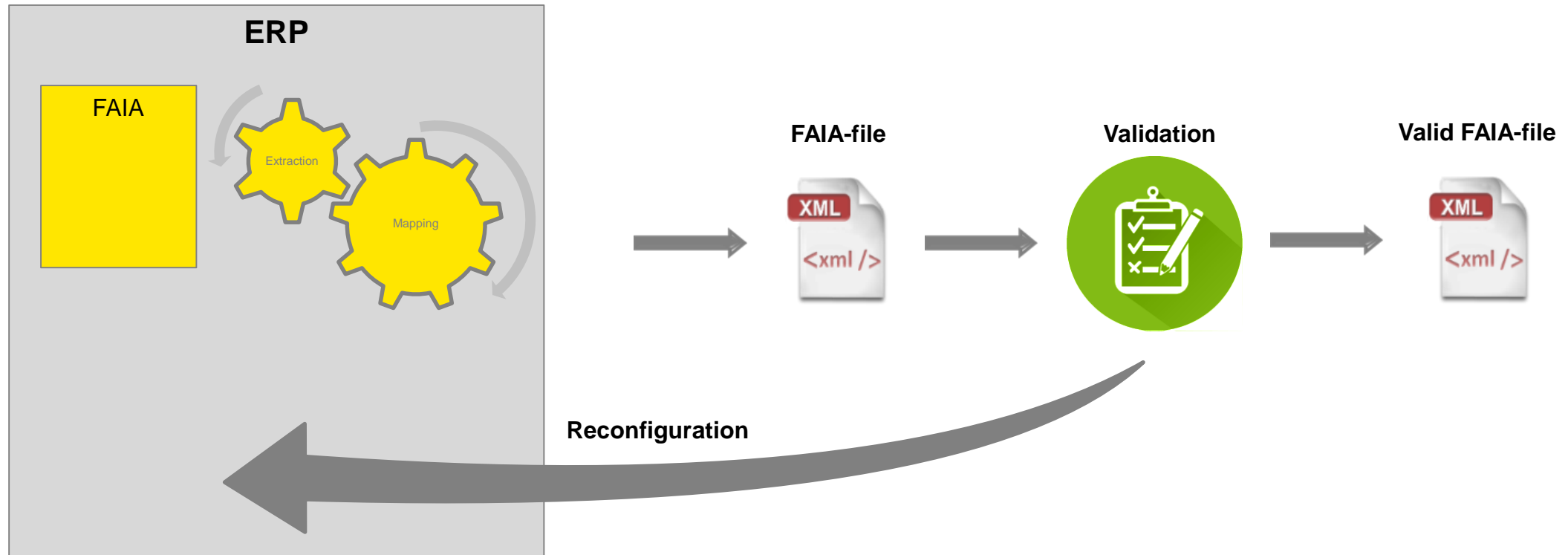
Design Solutions

- ▶ In-house solutions
 - ▶ Built in module
 - ▶ External module
- ▶ External solutions
 - ▶ 3rd party module
 - ▶ Managed service

Built in module

- ▶ Configuration/Mapping for Built in module
 - ▶ Select document types required for specific sections, e.g. Sales Invoices, Payments etc
 - ▶ Select chart of accounts to use (in case more than one exist)
 - ▶ Select basis for inclusion, e.g. posting data or document date
 - ▶ Include/exclude products based on production site
 - ▶ Select if services should be included as products
 - ▶ Etc.

Built in module (cont.)



Built in module - SAP

SAP

- ▶ Built in module RPFIEU_SAFT
- ▶ Originally developed for Portuguese SAF-T
- ▶ Configuration inside module to select data (extraction/mapping)
- ▶ No internal validation
- ▶ Generated files often contain errors
- ▶ Not included in standard installation

SAFT: Identifying Business Cases

SAFT: Specify Business Case

General

Country Key	LU
Company Code	LU10
Validity From	01.01.2011
Validity To	31.12.9999

Master Data

Vendors as Customer
 Service as Products
 Chart of Account Conversion

Main/Alternate Account

Transaction Data

[System Data](#)

Manual FI Invoices

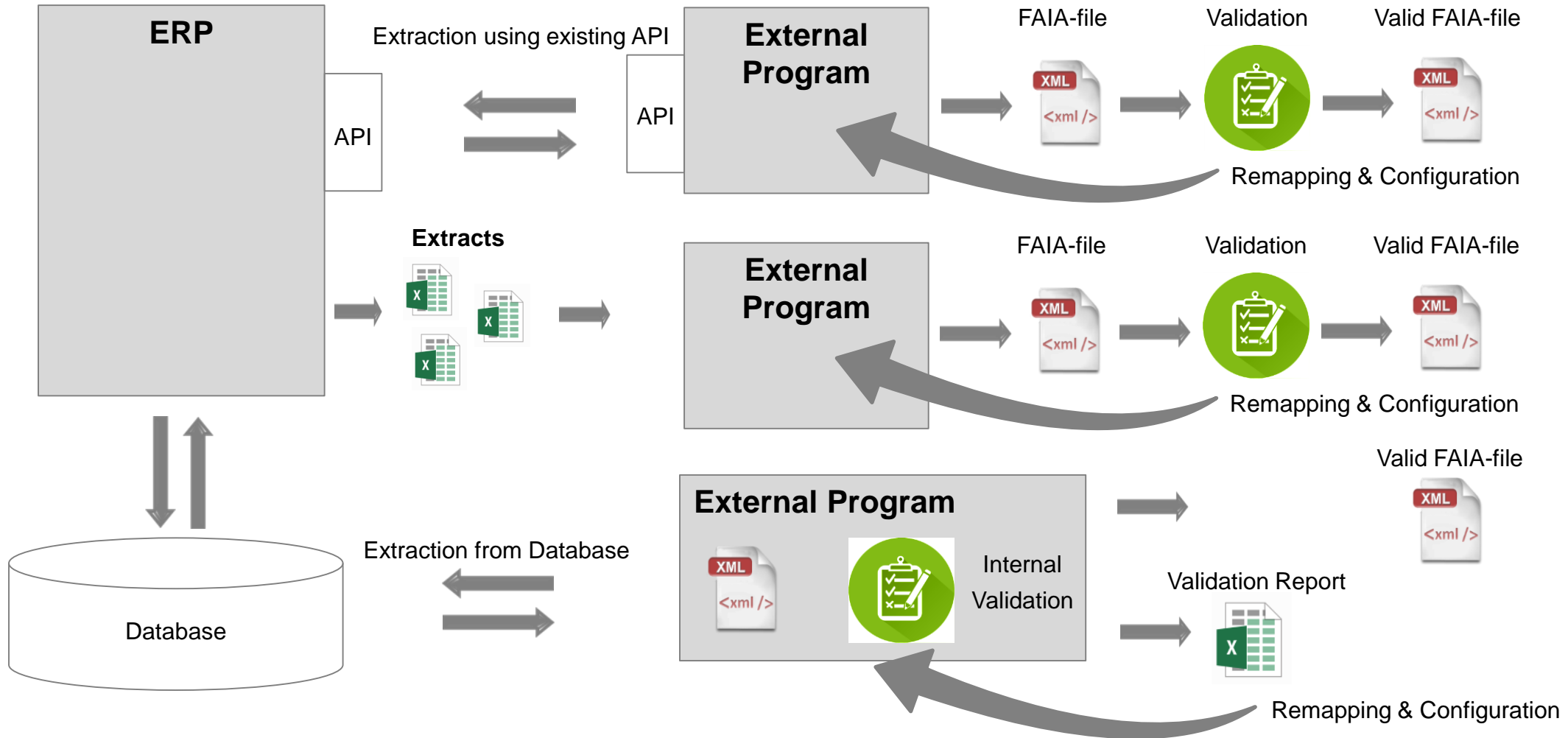
External module

▶ External module

- ▶ Many different options for extraction – File based extracts, e.g. reports etc, existing API*, database connection etc.
- ▶ If no existing API, mapping is done in external module.
- ▶ High initial cost and/or licensing fee
- ▶ Will require updates if changes in FAIA requirement
- ▶ May require updates if changes/updates are done to ERP/Accounting system
- ▶ Validation may or may not be handled by external module

*Application Programming Interface

External module (cont.)

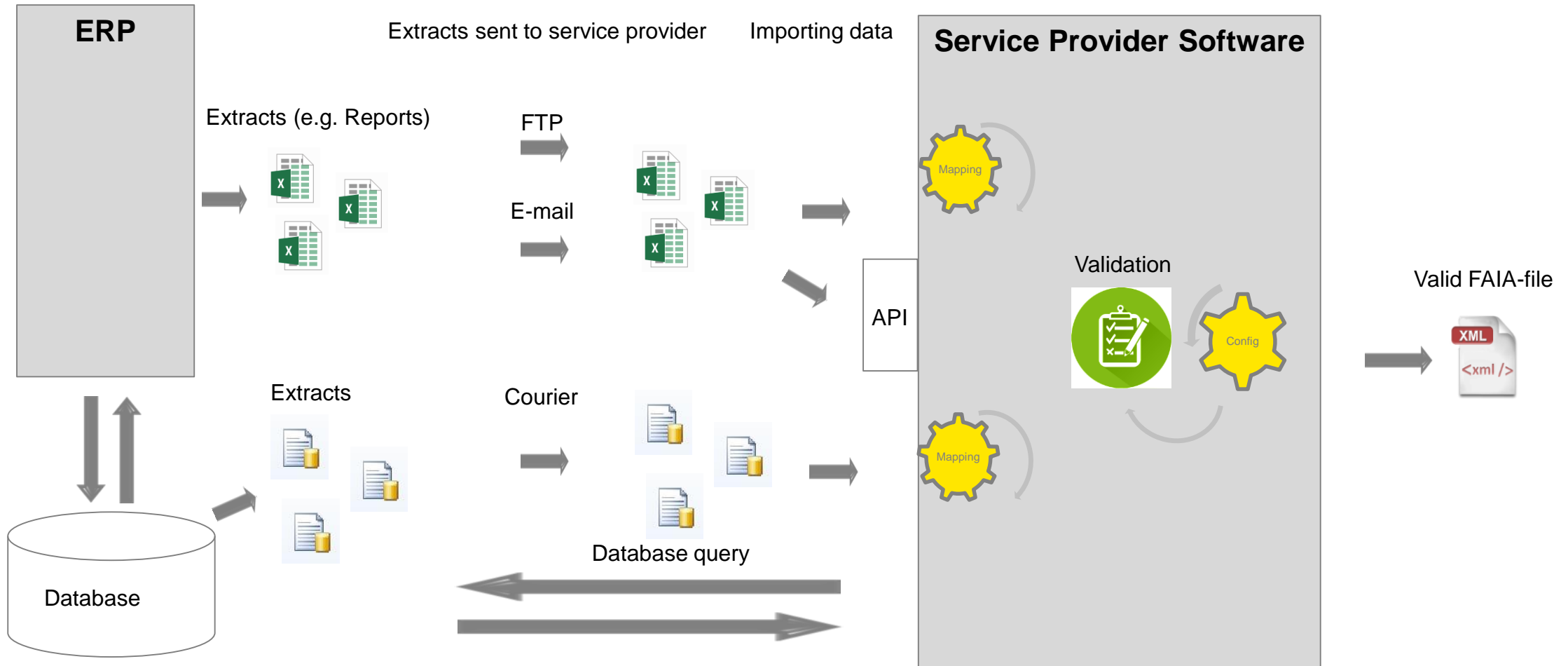


Managed Service

▶ Managed Service

- ▶ Many different options for extraction – File based extracts, e.g. reports etc, existing API, database connection etc.
- ▶ If no existing API, mapping is done in service provider's software.
- ▶ Lower initial cost
- ▶ Potential recurring fees
- ▶ May require updates if changes/updates are done to ERP/Accounting system
- ▶ Validation may or may not be included in service

Managed Service (cont.)



FAIA Implementation



Project Phases

- ▶ Any project for generating the FAIA will generally contain some version of these phases
 - ▶ Extraction – Identifying and extracting the correct data
 - ▶ Mapping – Map the extracted data to the FAIA
 - ▶ Generation – Generate the FAIA based on the extracted information using the mapping
 - ▶ Validation – Validate the generated file

Extraction

- ▶ Identify
 - ▶ Where can the data be taken from?
 - ▶ Multiple sources?
- ▶ Analyse
 - ▶ Does the data meet requirements?
 - ▶ Now and tomorrow?
 - ▶ Differences between historic/current data?
 - ▶ If not, how can data be cleaned/transformed to meet requirements?
 - ▶ New processes needed?
- ▶ Extraction method
 - ▶ Manual extract, e.g. reports, manual SQL queries
 - ▶ Automated solution
 - ▶ Staging area, e.g. Data Warehouse solution?

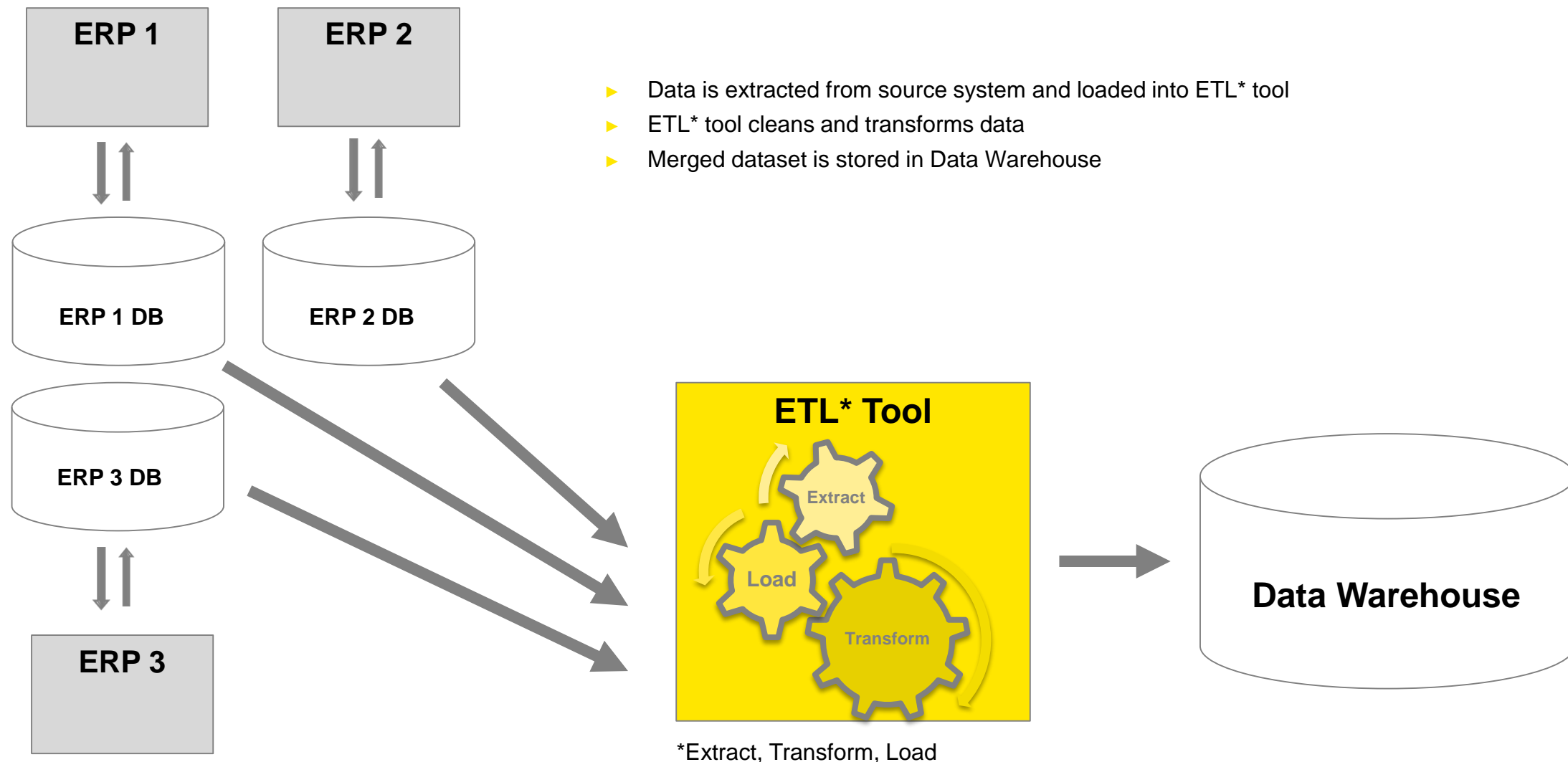
Extraction – Problems & Solutions

- ▶ Multiple source systems, e.g.
 - ▶ Entity with several manufacturing plants
 - ▶ Each plant uses its own ERP

- ▶ Potential problems
 - ▶ Different data structures
 - ▶ Different data formats
 - ▶ Missing data

- ▶ Possible solution
 - ▶ ETL for cleaning/transforming data
 - ▶ DW solution for storing data

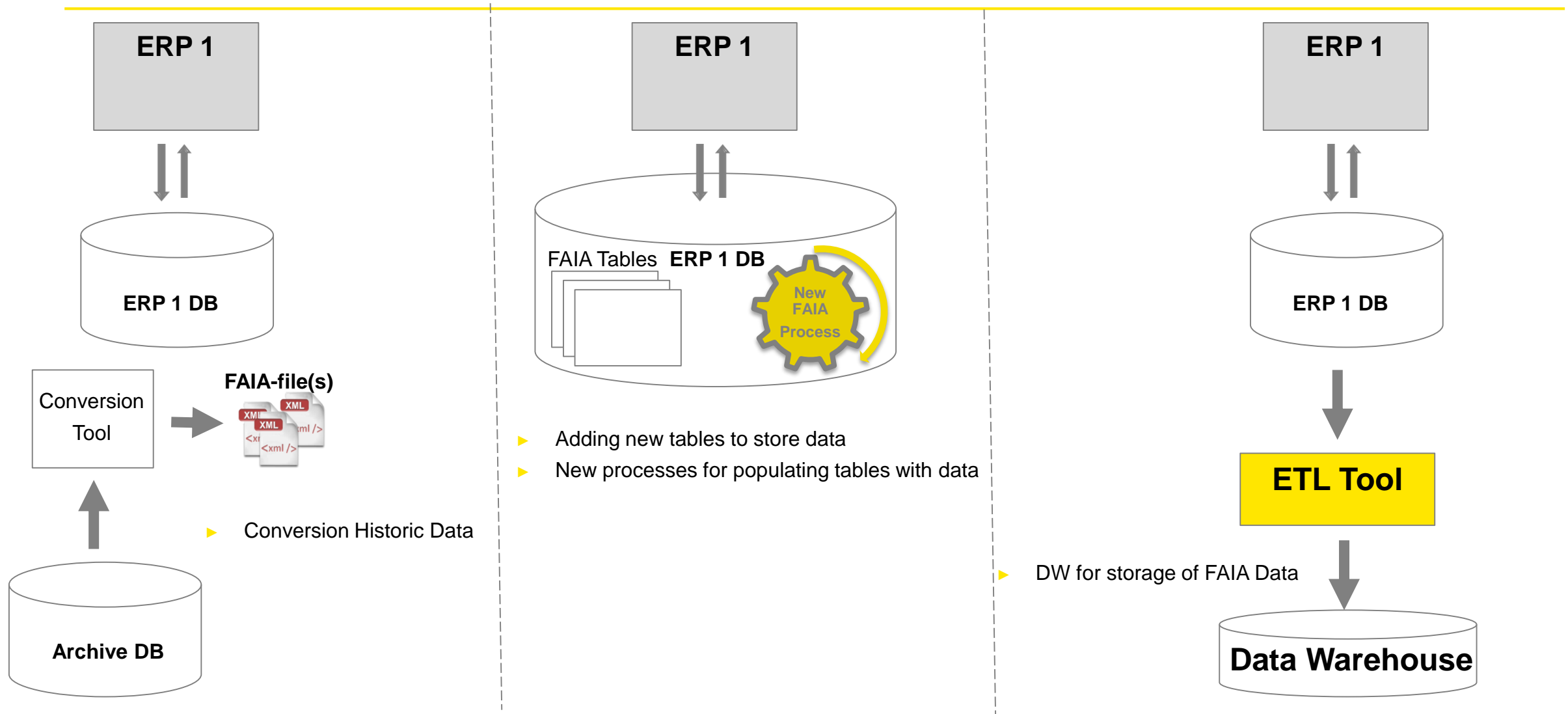
Extraction – Problems & Solutions (cont.)



Extraction – Problems & Solutions (cont.)

- ▶ Temporal Data differences e.g.
 - ▶ Historic data only saved in aggregated form
 - ▶ Data archived after X years, (e.g. stored in other db/other format)
 - ▶ Changes in data due to changes in processes/activities
- ▶ Potential problems
 - ▶ Different data structures
 - ▶ Different data formats
 - ▶ Missing data
- ▶ Possible solutions
 - ▶ One time conversion of data and/or generation of FAIA in advance of request
 - ▶ Add process for storing necessary data
 - ▶ Data warehouse solution

Extraction – Problems & Solutions (cont.)



Mapping

- ▶ Where is the required data?
 - ▶ E.g. Database, DW etc.
- ▶ Is the data in the right format?
 - ▶ E.g. Same structure, correct data type, length, uniqueness etc.
- ▶ Multiple sources?
 - ▶ E.g. from different modules, different tables/views in db,
- ▶ Data quality?
 - ▶ Duplicate entries, missing data, manual/automated processes

Mapping

- ▶ Example of mapping from DB-table to Product and PhysicalStockEntry in FAIA

ProductID	ProductName	UnitsInStock	UnitsOnOrder	SupplierID	CategoryID	QuantityPerUnit
1	Chai	39	0	1	1	10 boxes x 20 bags
2	Chang	17	40	1	1	24 - 12 oz bottles
3	Aniseed Syrup	13	70	1	2	12 - 550 ml bottles
4	Chef Anton's Cajun S	53	0	2	2	48 - 6 oz jars
5	Chef Anton's Gumbo	0	0	2	2	36 boxes
6	Grandma's Boysenbe	120	0	3	2	12 - 8 oz jars
7	Uncle Bob's Organic I	15	0	3	7	12 - 1 lb pkgs.
8	Northwoods Cranber	6	0	3	2	12 - 12 oz jars
9	Mishi Kobe Niku	29	0	4	6	18 - 500 g pkgs.
10	Ikura	31	0	4	8	12 - 200 ml jars
11	Queso Cabrales	22	30	5	4	1 kg pkg.
12	Queso Manchego La	86	0	5	4	10 - 500 g pkgs.
13	Konbu	24	0	6	8	2 kg box
14	Tofu	35	0	6	7	40 - 100 g pkgs.
15	Genen Shouyu	39	0	6	2	24 - 250 ml bottles
16	Pavlova	29	0	7	3	32 - 500 g boxes
17	Alice Mutton	0	0	7	6	20 - 1 kg tins
18	Carnarvon Tigers	42	0	7	8	16 kg pkg.
19	Teatime Chocolate P	25	0	8	2	10 boxes x 12 pieces

(ProductType)	
ProductCode	FAIAMiddle2textType
GoodsServicesID	[0..1] FAIAcodeType
ProductGroup	[0..1] FAIAMiddle2textType
Description	FAIALongtextType
ProductCommodityCode	[0..1] FAIAMiddle1textType
ProductNumberCode	[0..1] FAIAMiddle2textType
ValuationMethod	[0..1] FAIAcodeType
UOMBase	FAIAcodeType
UOMStandard	FAIAcodeType
UOMToUOMBaseConversionFactor	decimal
Tax	[0..*] (TaxType)
any	[0..1]

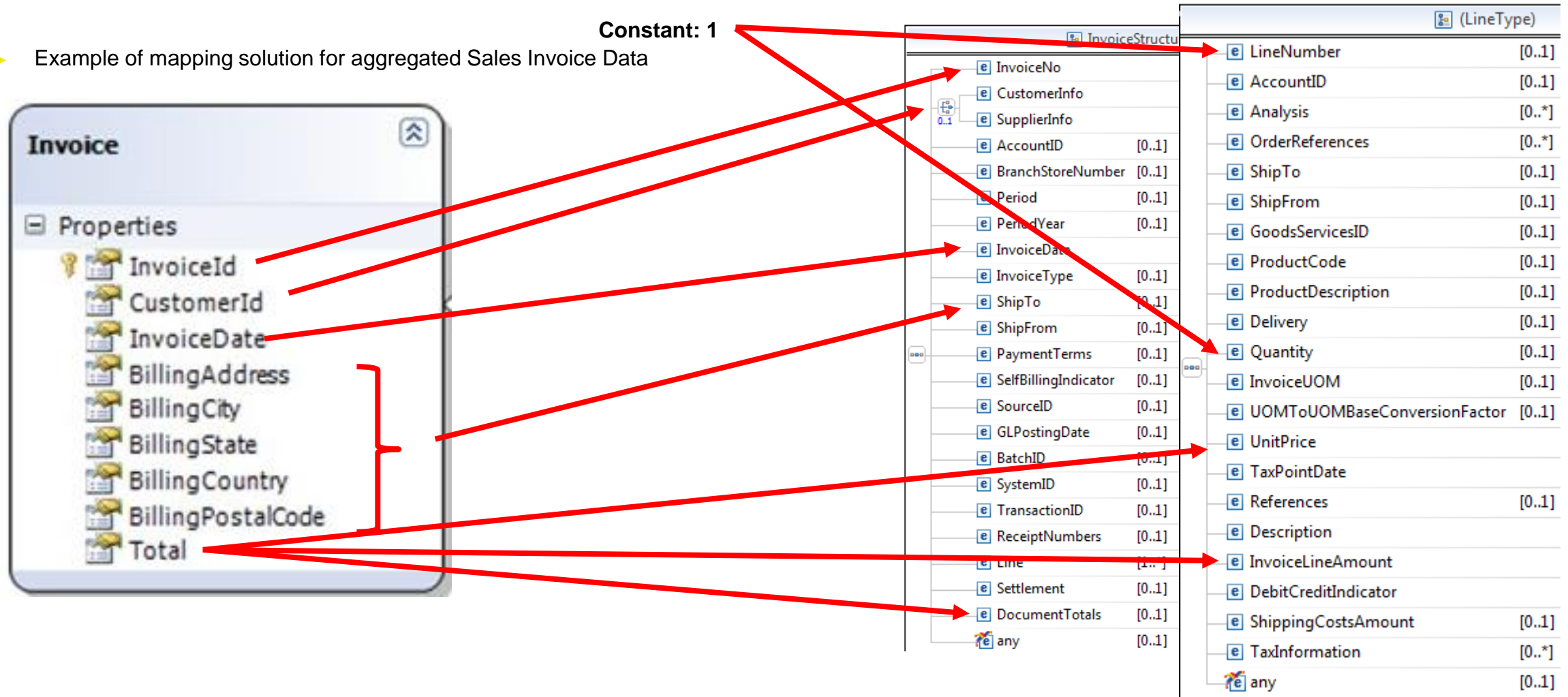
(PhysicalStockEntryType)	
WarehouseID	[0..1] FAIAMiddle1textType
LocationID	[0..1] FAIAshorttextType
ProductCode	FAIAMiddle2textType
StockAccountNo	[0..1] FAIAMiddle2textType
ProductType	[0..1] FAIAshorttextType
ProductStatus	[0..1] FAIAshorttextType
StockAccountCommodityCode	[0..1] FAIAMiddle1textType
OwnerID	[0..1] FAIAMiddle1textType
UOMPhysicalStock	FAIAcodeType
UOMToUOMBaseConversionFactor	decimal
UnitPrice	[0..1] FAIAMonetaryType
OpeningStockQuantity	FAIAquantityType
OpeningStockValue	[0..1] FAIAMonetaryType
ClosingStockQuantity	FAIAquantityType
ClosingStockValue	[0..1] FAIAMonetaryType
StockCharacteristics	[0..1] (StockCharacteristicsType)
any	[0..1]

Mapping – Problems & Solutions

- ▶ Aggregated data, e.g.
 - ▶ Invoice data is aggregated in accounting module/software
 - ▶ Valid FAIA requires information on invoice line level
 - ▶ No immediate mapping options for lower levels, e.g.
 - ▶ If aggregating on invoice level, no immediate mapping options for invoice line level

Mapping – Problems & Solutions (cont.)

- ▶ Example of mapping solution for aggregated Sales Invoice Data



Mapping – Problems & Solutions (cont.)

- ▶ Incompatible data formats e.g.
 - ▶ Tax Code identifiers used in TaxTable are too long
- ▶ Problems
 - ▶ Key – Has to be unique
 - ▶ Keys are not allowed to be modified/truncated
- ▶ Possible solutions
 - ▶ Introduce replacement keys
 - ▶ Remap datastructure

Mapping – Problems & Solutions (cont.)

- ▶ Introduction of replacement key using lookup table
- ▶ Reference to actual key moved to Description

Lookup Table

VAT Code	Replacement Key
LU/17.00/VAT/1-00-0-5	1
LU/15.00/VAT/1-00-0-4	2
etc	



Generation

▶ Generation

- ▶ Generation and validation generally separated,
 - ▶ i.e. errors will only be discovered afterwards
 - ▶ Some implementation may be interactive i.e.
 - ▶ Validation is performed while generating
 - ▶ Under certain conditions some data can be corrected, e.g. truncating too long Names etc

Generation – Problems & Solutions

- ▶ Built in modules
 - ▶ Generation is generally easy
 - ▶ Possible sources of errors:
 - ▶ Customizations
 - ▶ Incorrect configuration/mapping
 - ▶ Missing data/poor data quality

Generation – Problems & Solutions

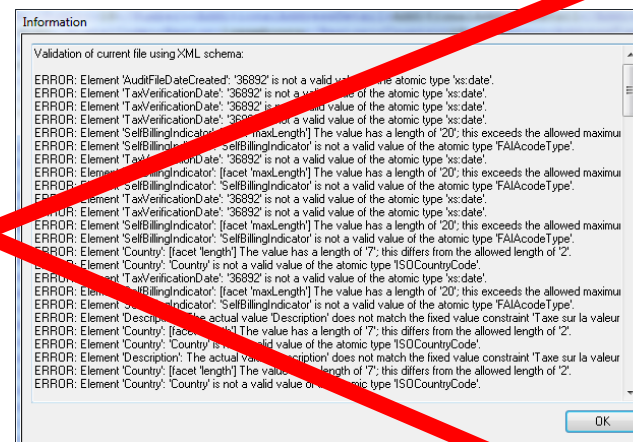
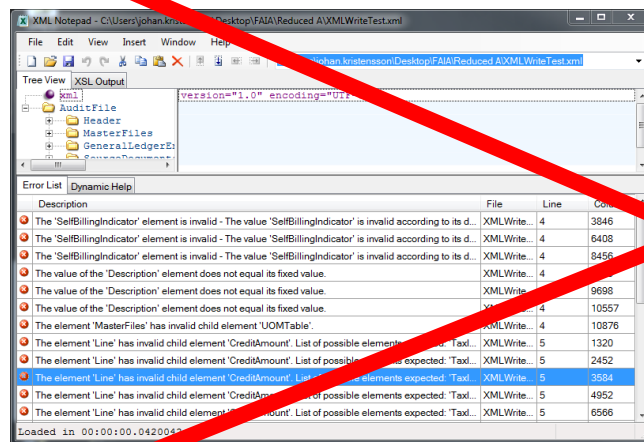
- ▶ 3rd party software
 - ▶ FAIA specific solutions
 - ▶ Possible sources of errors:
 - ▶ Incorrect configuration/mapping
 - ▶ Incorrect data format if using standardized API
 - ▶ Missing data/poor data quality
 - ▶ ETL tools, Data transformation tools etc
 - ▶ Standard functions may not support writing XML-files
 - ▶ Or may not support writing XML files of sufficient complexity, e.g.
 - ▶ Loops within loops, i.e. variable number of occurrences of elements on several levels

Validation

- ▶ Validation against XSD Schema involves verifying:
 - ▶ The structure
 - ▶ The uniqueness of keys
 - ▶ The validity of key references
 - ▶ The restrictions imposed by data types

Validation – Problems & Solutions

- ▶ Full version of FAIA file – 100 000's of lines / Up to 2-3+ Gb
- ▶ Many XML-validators read in whole file at once
 - ▶ Poor performance
 - ▶ Memory problems
 - ▶ Unable to open/read in file



Validation – Problems & Solutions

- ▶ Validation will not find all errors
- ▶ Possible missed errors
 - ▶ Missing data, e.g. missing invoices due to incorrect selection period/configuration
 - ▶ Duplication of non-keys, duplication of line items on invoices, payments etc
 - ▶ Corrupted data, unreadable data due to encoding errors etc.
 - ▶ Mapping errors, elements may be incorrectly mapped but still be valid
 - ▶ Etc

Validation – Problems & Solutions (cont.)

- ▶ Possible further validation
 - ▶ Reconciliation with General Ledger/Annual Accounts
 - ▶ Reconciliation with Annual VAT Return
 - ▶ Accounting checks, e.g.
 - ▶ debits equals credits etc,
 - ▶ transactions account for differences in opening and closing debit/credit
 - ▶ Etc

Implementation Specific Problems



Built in module – Problems and Solutions

▶ Problems/Limitations

- ▶ Generally no internal validation
- ▶ Generally only configurable with regards to selection of data
- ▶ Few or no options for automatically cleaning/correcting data

▶ Possible solutions:

- ▶ External validation
- ▶ Remediation

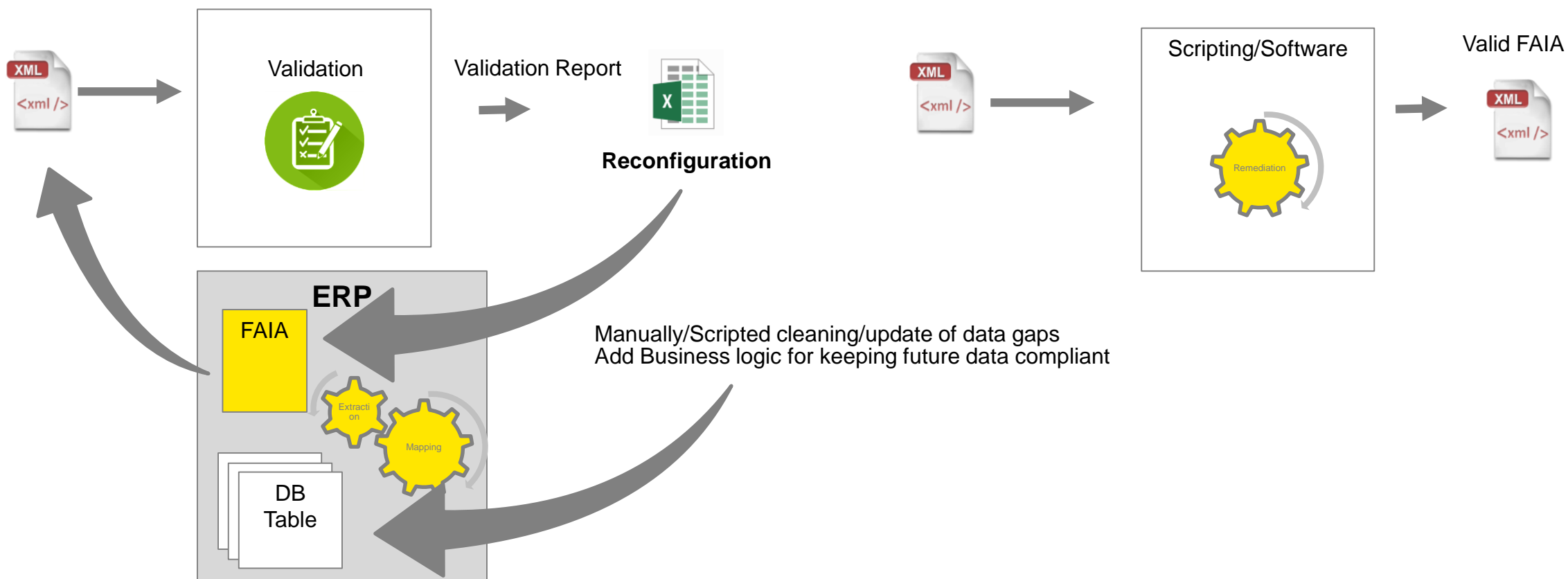
Built in module – Problems and Solutions (cont.)

- Options for external validation

- Managed service
- 3rd party software
- In-house software

- Error Correction options

- Reconfiguration, if possible
- Clean data/Solve data gaps etc
- External remediation



Robotic Process Automation



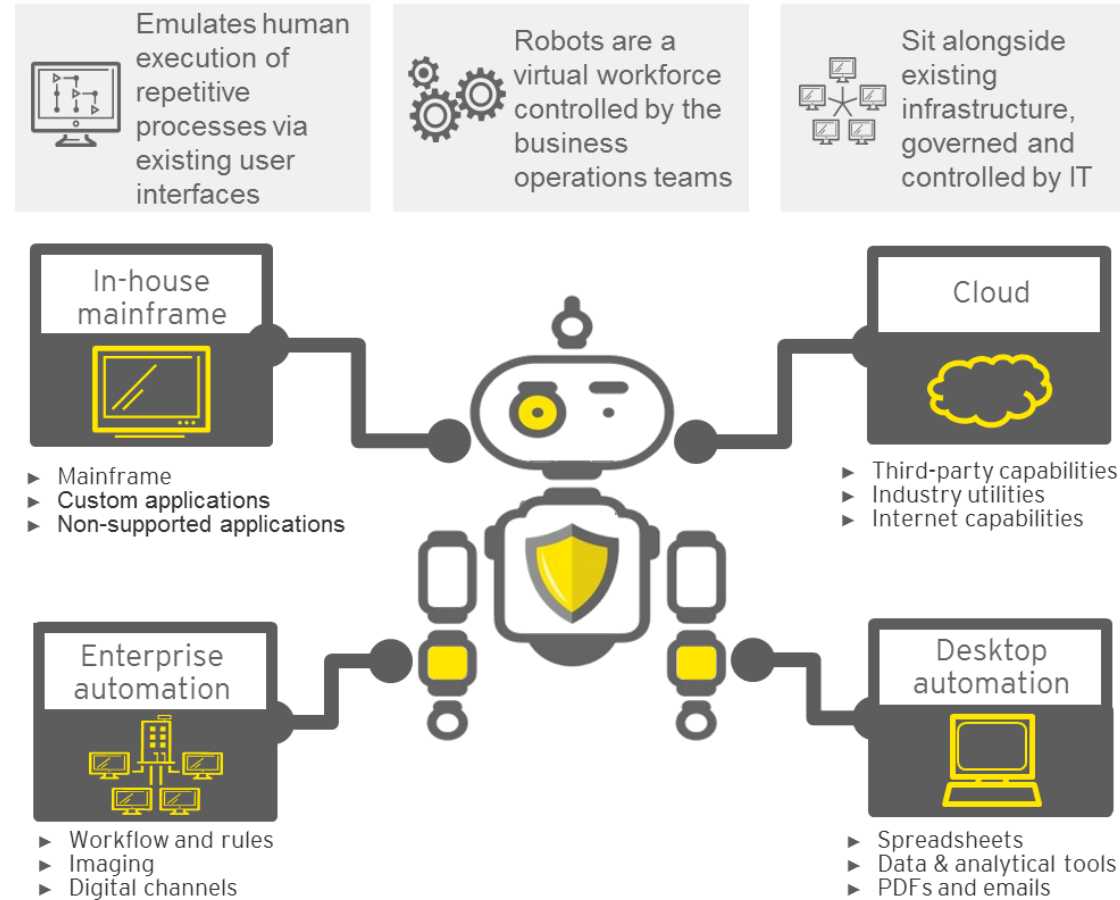
Robotics Process Automation (RPA) is emerging as key transformational technology helping organizations reduce costs and improve efficiency

✓ RPA is..

- Enterprise software...
- ...that replaces repetitive or rules-based tasks...
- ...across multiple systems / applications

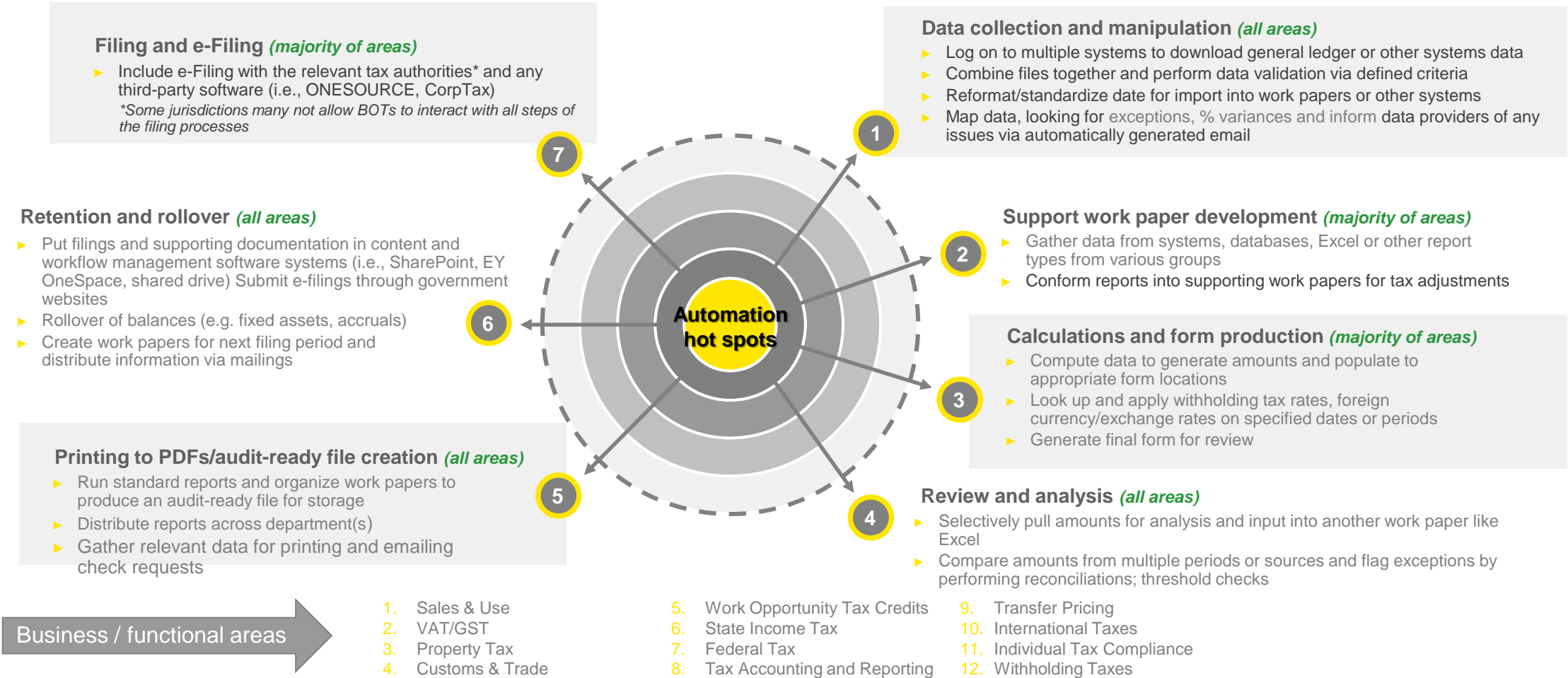
✗ RPA is not..

- Walking, talking robots
- Virtual personal assistant
- Artificial intelligence or voice recognition and reply software



Automation hotspots for the Tax function





Common activities where bots help to drive value








Tax processes that involve high volume, repetitive tasks and recurring deadlines are ideal for BOT implementation.

How RPA works – emulating human execution

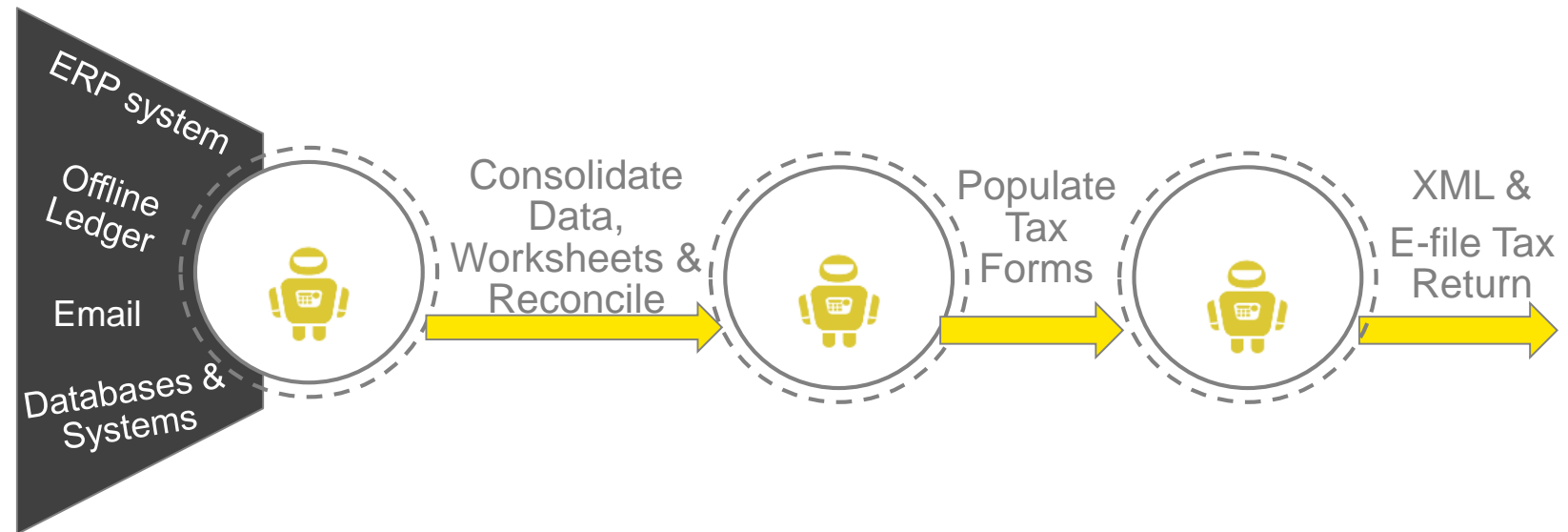
Processes characteristics to consider for RPA

-  High, repetitive transaction volume
-  High manual data entry
-  Multiple systems to perform a task
-  Multiple tasks to perform the process

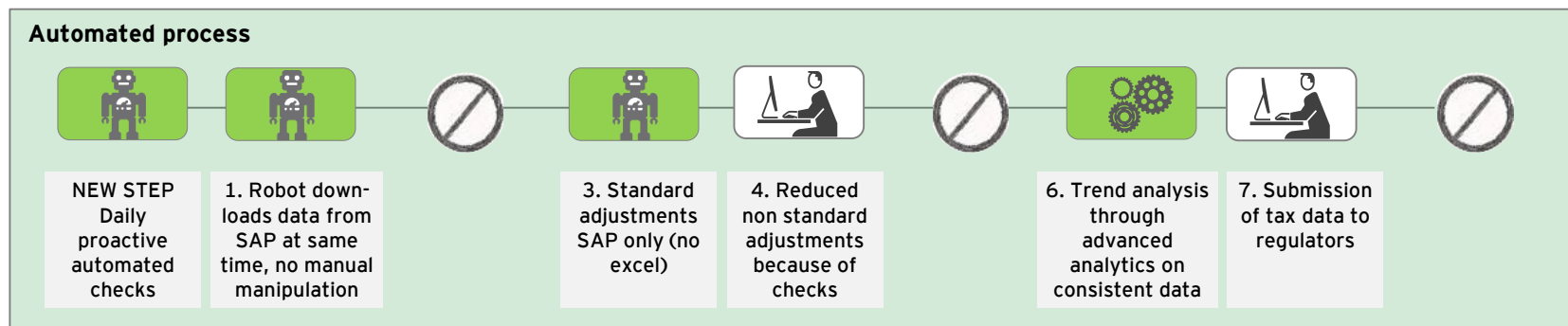
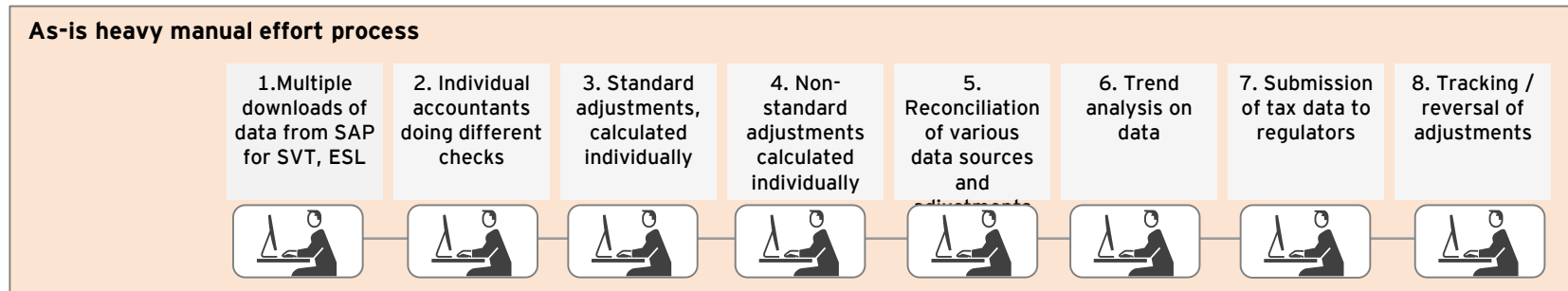
-  Data entry & validation
-  User interface navigation
-  Automated formatting
-  Copy/paste operations
-  Login/logout of applications/ emailing

Activities typically performed by RPA

With robotic automation the virtual software BOT has authorized access rights to perform the activities of it's human predecessor, by moving through and across the relevant applications.



Case Study– Monthly European VAT submissions at global consumer products company



- All steps except for one have been streamlined and simplified e.g. multiple downloads by many people now one download by a robot
- 10%+ direct FTE saving (also improved quality of process e.g. right time first etc.)
- 8 steps down to 6 overall
- Reduction exception postings because of proactive checks



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