



# The migration tools of bit-impulse

Good news first: The migration tools described below are free of charge for my customers! If I am commissioned for migration projects, these tools are part of my "toolbox" and included in the daily rate!

The migration tools from bit-impulse (by me) are based on two main pillars: iQuery, with further components, as a so-called ETL tool and sub-way for the administration of the migration objects.

## iQuery – as ETL tool

The screenshot shows the iQuery web interface. At the top, there is a navigation bar with tabs: Start, Datei, Filter, Tabellen, Spalten, Auswahl, Sortierung, Update, Ergebnis, iSQL, Extras. Below the navigation bar, there is a header area with the text "Abfrage öffnen / speichern / ausführen" and a version string "Version: 3.3.5-B | User: cola | Database: cola.kbbAuto / H2 1.3.168 (2012-07-13)".

Below the header, there is a form for creating or editing a query. The form has the following fields:

- Name: noname
- Beschreibung kurz: (empty)
- Beschreibung lang: (empty)
- Rolle / Benutzer: cola (dropdown)
- Kategorie: [none] (dropdown)

Below the form, there is a table of existing queries. The table has the following columns: Name, Beschreibung kurz, Beschreibung lang, Kategorie, Rolle, Benutz, Angelegt, Geändert. The table contains 20 rows of query information.

Name	Beschreibung kurz	Beschreibung lang	Kategorie	Rolle	Benutz	Angelegt	Geändert
if_bom_bom_header			interface active	cola	cola	24.10.2019	24.10.2019
if_bom_bom_item			interface active	cola	cola	24.10.2019	24.10.2019
if_bom_bom_item_1			interface active	cola	cola	24.10.2019	24.10.2019
if_bom_bom_item_2			interface active	cola	cola	24.10.2019	24.10.2019
if_bpc_company_data	Debitor		interface active	cola	cola	24.10.2019	26.11.2019
if_bpc_credit_management_credit_management			interface active	cola	cola	06.11.2019	06.11.2019
if_bpc_general_data			interface active	cola	cola	24.10.2019	03.11.2019
if_bpc_general_data_1	Kunde		interface active	cola	cola	24.10.2019	03.11.2019
if_bpc_general_data_2	Debitor		interface active	cola	cola	24.10.2019	03.11.2019
if_bpc_general_data_3a	Warenempfänger (Vorzug)		interface active	cola	cola	24.10.2019	03.11.2019
if_bpc_general_data_3b	Warenempfänger (weitere)		interface active	cola	cola	24.10.2019	03.11.2019
if_bpc_general_data_4	Ansprechpartner		interface active	cola	cola	24.10.2019	03.11.2019
if_bpc_identification_numbers			interface active	cola	cola	24.10.2019	24.10.2019
if_bpc_identification_numbers_1	Kunde		interface active	cola	cola	24.10.2019	24.10.2019
if_bpc_identification_numbers_2	Debitor		interface active	cola	cola	24.10.2019	24.10.2019
if_bpc_identification_numbers_3a	Warenempfänger (Vorzug)		interface active	cola	cola	24.10.2019	24.10.2019
if_bpc_identification_numbers_3b	Warenempfänger (weitere)		interface active	cola	cola	24.10.2019	24.10.2019
if_bpc_identification_numbers_4	Ansprechpartner		interface active	cola	cola	24.10.2019	24.10.2019

### iQuery – Overview of existing queries

An ETL tool is the heart of the technical data migration. The three letters stand for **e**xtraction of data from different sources, **t**ransformation of the data into the schema and format of the target system, and **l**oading of the data into the target system.

iQuery fully covers all three required steps, but in most projects focuses on the extraction and transformation steps. Loading of the data is usually done with the import tool of the target system manufacturer.

iQuery extracts the data exclusively from SQL-enabled databases. Wherever the data is stored in another form, e.g. in Excel, such data is therefore first transferred to a database enclosed with the iQuery.



The data required for extraction can come from several source systems. iQuery can access these simultaneously in a single query. This allows, for example, the customer data of an ERP system from an SQL Server database to be linked with the CRM data from an Oracle database.

Start Primär Relationen Lookup Extras

Version: 3.3.5-8 | User: cola | Database: cola-jdbcDB2 / DB2 UDB for AS/400 07.03.0020 V7R3=0

Die Felder zur Verknüpfung angeben. Zuerst ein Feld-von auf der linken, dann ein Feld-nach auf der rechten Seite.

Verknüpfung herstellen

Ausgewählte Bibliothek	CASPDTA0	CASPDTA0		
Ausgewählte Tabellen-Relation	GIDPF01I	GIDPF01G(GID01I)		
Typ Relation	1..n			
1	Ausgewähltes Feld	LGNT1G	LGNT1I	<input checked="" type="checkbox"/>
2	Ausgewähltes Feld	SCPB1G	SCPB1I	<input checked="" type="checkbox"/>
3	Ausgewähltes Feld	CMPN1G	CMPN1I	<input checked="" type="checkbox"/>
4	Ausgewähltes Feld	ITNR1G	ITNR1I	<input checked="" type="checkbox"/>
5	Ausgewähltes Feld	CMNR1G	CMNR1I	<input checked="" type="checkbox"/>
6	Ausgewähltes Feld	CAAL1G	CAAL1I	<input checked="" type="checkbox"/>
7	Ausgewähltes Feld	TXTP1G	IDS'	<input checked="" type="checkbox"/>
8	Ausgewähltes Feld	LNGG1G	D'	<input checked="" type="checkbox"/>
9	Ausgewähltes Feld	TXTY1G	**	<input checked="" type="checkbox"/>
10	Ausgewähltes Feld	POSN1G	0010'	<input checked="" type="checkbox"/>
Frei definierbare Verknüpfung				

Column	Type	Length	Scale	Comment
LGNT1I	A	2	0	Buchungskreis
SCPB1I	A	2	0	Geschäftsbereich
CMPN1I	A	2	0	Werk
ITNR1I	A	18	0	Teilenummer
CAAL1I	P	2	0	Kalk.-Alternative
CMNR1I	A	15	0	Kommissionsnummer
ITTY1I	A	2	0	Teileart
ITMS1I	A	1	0	Teilestatus
ISVY1I	A	10	0	Teileberechtigung
VRSI1I	P	5	0	Änderungsstand - Version
USLC1I	A	10	0	Benutzer letzter Änderung
DTLC1I	P	6	0	Datum letzter Änderung
GIDS1I	A	1	0	Bildstatus 121
ENGU1I	A	10	0	Konstruktions Bearbeiter
ENGG1I	A	10	0	Konstruktions-Gruppe
HIST1I	A	1	0	Historie
HIS1I	A	1	0	Historie
HIS2I	A	1	0	Historie

Column	Type	Length	Scale	Comment
LGNT1G	A	2	0	Buchungskreis
SCPB1G	A	2	0	Geschäftsbereich
CMPN1G	A	2	0	Werk
ITNR1G	A	18	0	Teilenummer
CMNR1G	A	15	0	Kommissionsnummer
CAAL1G	P	2	0	Kalk.-Alternative
TXTP1G	A	3	0	Texttyp intern
LNGG1G	A	3	0	Anwendungssprache
TXTY1G	A	6	0	Textcode
POSN1G	A	4	0	Positionsnummer
TEXT1G	A	50	0	Allgemeiner Text
DKMN1G	A	10	0	Dokument/Memburname
CRDT1G	P	6	0	Anlagedatum
MNDT1G	P	6	0	Letzte Änderung
USLC1G	A	10	0	Benutzer letzter Änderung
FLAG1G	A	1	0	Verwaltungs-KZ

*iRepository – Example of a link*

The development of an export always starts from a primary SQL table, e.g. that of the customer. At a central location, in iRepository, the link between exemplary customer > address and address > country master takes place. This means that for ALL exports, starting with the primary table Customer, address and country master data can be retrieved.



Start Datei Filter Tabellen Spalten Auswahl Sortierung Update Ergebnis iSQL Extras

Version: 3.3.5-B | User: cola | Database: colaJdbcDB2 / DB2 UDB for AS/400 07.03.0000 VTR3m

[if\_purchasing\_conditions\_1\_conditions\_1] Auswahl Spalten zur Tabelle CASPDTA0/PURPF0U0

Auf das Löschen-Symbol klicken um eine ausgewählte Spalte wieder zu entfernen. Auf das Schere-Symbol klicken um eine Spalte in die Zwischenablage zu verschieben. Sobald alle Spalten ausgewählt sind, geht's über einen Klick auf *Continue* weiter.

Zus	Uns	Grp	Spalte	Feld	Tabelle	Typ	Spezifikation	Lng	Nac	Bemerkung	Beschreibung	Erweiterung
1	<input type="checkbox"/>	<input type="checkbox"/>	INFNR	SUPPU7	PURPF2U7	A	HashValuePersistent	10		Legacy Number of purchasing info record*	INFNR	&&cellet{HashValuePers
2	<input type="checkbox"/>	<input type="checkbox"/>	EKORG			A	[none]	80		Purchasing organization*	EKORG	'1000'
3	<input type="checkbox"/>	<input type="checkbox"/>	ESOKZ	PRDT1N	GIDPF01N(PUR2U7)	A	Case	80		Purchasing info record category*	ESOKZ	CASE WHEN &&n = 'Y'
4	<input type="checkbox"/>	<input type="checkbox"/>	WERKS	ITNRU7	PURPF2U7	A	Case	80		Plant*	WERKS	&&_werks
5	<input type="checkbox"/>	<input type="checkbox"/>	KOPOS			S	SerialNumber	2	0	Condition Sequence Number*	KOPOS	&&cellet{SerialNumber,
6	<input type="checkbox"/>	<input type="checkbox"/>	COND_TYPE			A	Lookup	80		Condition Type*	COND_TYPE	'PPR'
7	<input type="checkbox"/>	<input type="checkbox"/>	VALID_FROM	QUFRU7	PURPF2U7	L	AS_NNNNN_ISODE4	8		Valid From*	VALID_FROM	&&cellet{AS_NNNNN_IS
8	<input type="checkbox"/>	<input type="checkbox"/>	VALID_TO			L	[none]	8		Valid To*	VALID_TO	'31.12.9999'
9	<input type="checkbox"/>	<input type="checkbox"/>	KRECH			A	[none]	80		Calculation type	KRECH	'
10	<input type="checkbox"/>	<input type="checkbox"/>	KBETR_EXT	GODPU7	PURPF2U7	S	[none]	31	3	Amount	KBETR_EXT	
11	<input type="checkbox"/>	<input type="checkbox"/>	KONWA	CURCU7	PURPF2U7	A	Case	80		Condition unit (currency or percentage)	KONWA	CASE WHEN &&n = '%'
12	<input type="checkbox"/>	<input type="checkbox"/>	KPEIN	PPCUU7	PURPF2U7	S	[none]	5	0	Condition Pricing Unit	KPEIN	CAST(POWER(10,&&n)

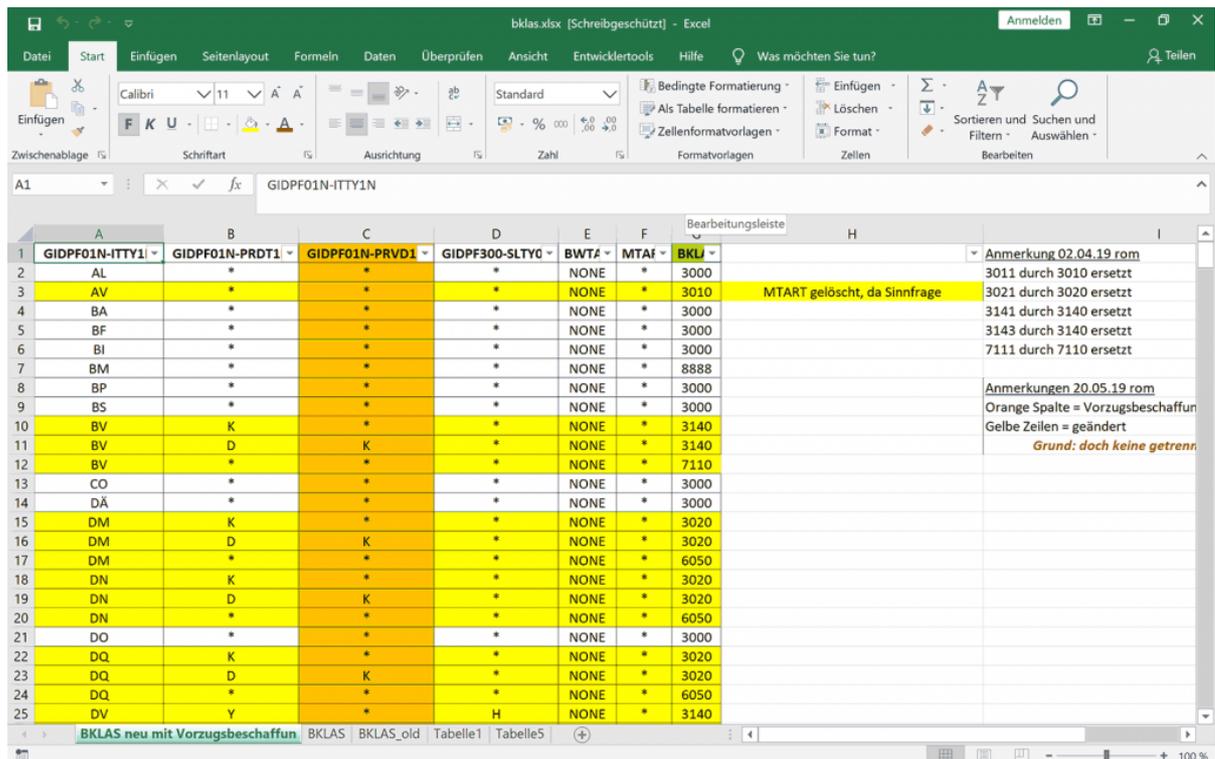
aktuelle Tabelle: PURPF0U0 Primäre Tabelle: PURPF0U0 Sekundäre Tabelle(n):

Column	Type	Length	Scale	Comment
LGNTU0	A	2	0	Buchungskreis
SUPPU0	A	8	0	Lieferant
TODEU0	A	4	0	Lieferbedingung
TOPAU0	A	4	0	Zahlungsbedingung
SHITU0	A	4	0	Versandart
TXTYU0	A	6	0	Textcode
PYDTU0	A	1	0	Zahlungsdatum
TXT1U0	A	6	0	Textcode

iQuery – Example column definition

For each object to be exported, e.g. BOM header, BOM position, BOM position text, an SQL query is created in iQuery. The output fields are arranged according to the import specifications of the manufacturer of the target system. This also applies to the basic formatting of these fields, as alpha fields, numeric fields, date fields, etc., in the respective desired formatting.

The connection between source and target fields is then different. In the simplest case, a direct assignment is made, as for example with the customer name. The country key may not be directly assignable and must be converted from two-digit to three-digit. To make the translation rule known to the tool, an Excel lookup is stored there. The left column(s) of this Excel then contains the previous country key, the right column the new one.



	A	B	C	D	E	F	H
1	GIDPF01N-ITTY1	GIDPF01N-PRDT1	GIDPF01N-PRVD1	GIDPF300-SLTY0	BWTA	MTAf	BKL
2	AL	*	*	*	NONE	*	3000
3	AV	*	*	*	NONE	*	3010
4	BA	*	*	*	NONE	*	3000
5	BF	*	*	*	NONE	*	3000
6	BI	*	*	*	NONE	*	3000
7	BM	*	*	*	NONE	*	8888
8	BP	*	*	*	NONE	*	3000
9	BS	*	*	*	NONE	*	3000
10	BV	K	*	*	NONE	*	3140
11	BV	D	K	*	NONE	*	3140
12	BV	*	*	*	NONE	*	7110
13	CO	*	*	*	NONE	*	3000
14	DÄ	*	*	*	NONE	*	3000
15	DM	K	*	*	NONE	*	3020
16	DM	D	K	*	NONE	*	3020
17	DM	*	*	*	NONE	*	6050
18	DN	K	*	*	NONE	*	3020
19	DN	D	K	*	NONE	*	3020
20	DN	*	*	*	NONE	*	6050
21	DO	*	*	*	NONE	*	3000
22	DQ	K	*	*	NONE	*	3020
23	DQ	D	K	*	NONE	*	3020
24	DQ	*	*	*	NONE	*	6050
25	DV	Y	*	H	NONE	*	3140

*iQuery – Example of a (complex) lookup*

Lookups are an important backbone of iQuery and can be used in a variety of ways. For example, it is always necessary to "invent" data that is required by the target system but is not available in the source system. Such data can be "generated" on the basis of lookups. In such a lookup the desired initial values are defined based on the pattern of several input values.

One of the best things about lookups is that these Excel spreadsheets can be maintained by the specialist department without the need for training in any tools!

In this way, 80 to 90 percent of the data required for export can be "clicked together" with iQuery very quickly. For the more "difficult" cases, there are several procedures:

For recurring tasks, iQuery can be extended, both generally and project-specifically. For example, SAP expects conversions between units of measure as a fraction (numerator and denominator in two fields) and not as a decimal number, as is usually the case. For this purpose, iQuery was extended by this, by no means trivial, functionality: Wherever necessary, the determination of a value can also be done directly in SQL (fragments), which looks like this as an example: `CASE WHEN field < 3 THEN 'A' WHEN field < 7 THEN 'B' ELSE 'c' END`. iQuery then inserts these individual SQL fragments into the generated SQL statement.





Usually not all data sets can be transferred from the source system. Delimitations can be made, for example, by the current status or the timestamp in the data records. Such selections can be easily "clicked together" in iQuery.

But even complex cases can be mapped. For example, a BOM should only be transferred if ALL BOM items have a certain minimum status. Here too, the query can be extended by an SQL snippet such as **EXISTS SELECT \* FROM table ... WHERE ... AND STATUS >= 10.**

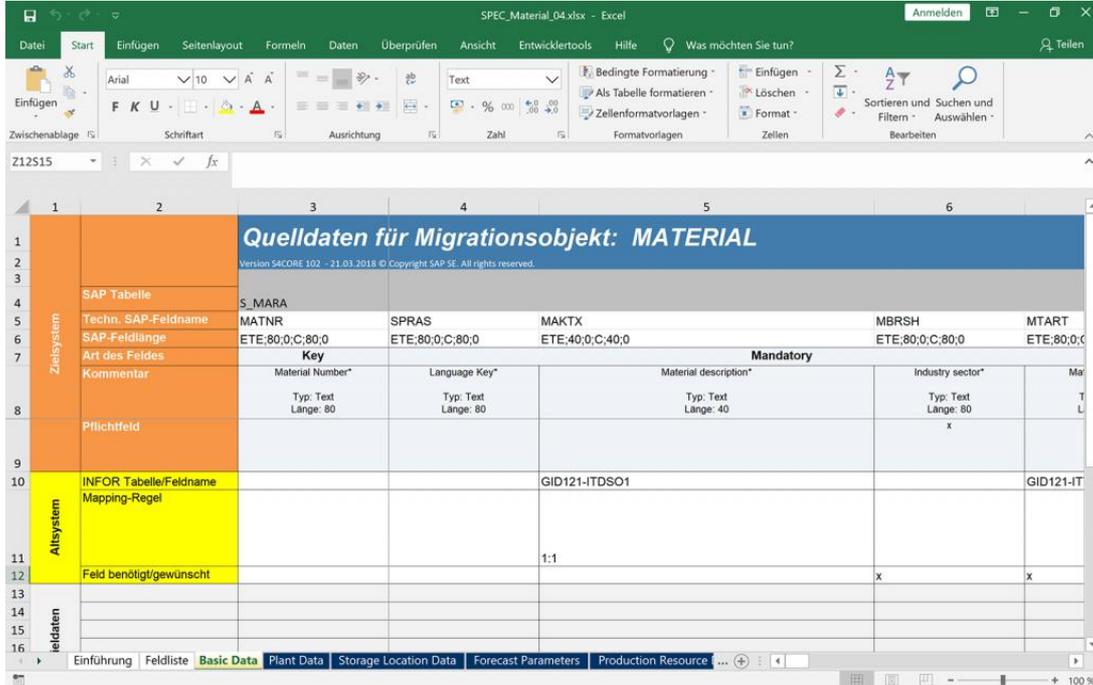
Exports created with iQuery can be validated "on sight" before import into the target system. Typically, the export is converted to Excel and this Excel is then stored centrally or distributed directly. Here iQuery supports the current Excel XLSX format, which allows up to 1.4 million rows in an Excel document.

Finally, the export is done into the desired, technical target format for the import prepared by the manufacturer. iQuery offers various output adapters, e.g. for CSV in all variations, Excel, XML data and also directly into database tables.



## sub-way – as administration tool

Administration and documentation – both terms are rather at the lower end of the popularity scale for migrations than at a popular top position. sub-way therefore contains some functionality to "reward" its application immediately.



The screenshot shows an Excel spreadsheet with the following content:

Quelldaten für Migrationsobjekt: MATERIAL						
Version SACORE 102 - 21.03.2018 © Copyright SAP SE. All rights reserved.						
Zielsystem	SAP Tabelle	S_MARA				
	Techn. SAP-Feldname	MATNR	SPRAS	MAKTX	MBRSH	MTART
	SAP-Feldlänge	ETE;80;0;C;80;0	ETE;80;0;C;80;0	ETE;40;0;C;40;0	ETE;80;0;C;80;0	ETE;80;0;C;80;0
	Art des Feldes	Key		Mandatory		
Pflichtfeld	Kommentar	Material Number*	Language Key*	Material description*	Industry sector*	Material description*
		Typ: Text Länge: 80	Typ: Text Länge: 80	Typ: Text Länge: 40	Typ: Text Länge: 80 x	Typ: Text Länge: 80 x
Altsystem	INFOR Tabelle/Feldname			GID121-ITDSO1		GID121-IT
	Mapping-Regel			1:1		
Zieldaten	Feld benötigt/gewünscht				x	x

sub-way – Example of migration documentation

The migration objects, e.g. customer and address, have to be described in some form. Minimum are the technical properties of the target fields (datatype, length, ...) and the migration-rule to the respective target field.

If this description is done in Excel according to a template provided by sub-way, the documentation and the tool can interlock. If at least the technical properties of the fields of the target system are described clearly, the tool can automatically create the SQL queries of the export in their basic structure and thus save a lot of typing work. It also helps to avoid errors in the otherwise manual transfer.



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Zurück
Schnittstellen | Segmente | Felder | Schnittstellen geändert | Schnittstellen laden | Schnittstellen löschen | Regeln laden | Regel löschen  
Abfragen | Einträge | Legacy Tabellen/Felder | Lookups | Erstellen

SCHNITTSTELLEN GEÄNDERT

<input type="checkbox"/>	Schnittstelle	Version neu	Version alt	
<input type="checkbox"/>	bom	13.0	7.0	
<input type="checkbox"/>	customer	14.0	7.0	
<input type="checkbox"/>	material			
<input type="checkbox"/>	purchasi			
<input type="checkbox"/>	routing			
<input type="checkbox"/>	supplier			

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Zurück
Schnittstellen | Segmente | Felder | Schnittstellen geändert | Schnittstellen laden | Schnittstellen löschen | Regeln laden  
Abfragen | Einträge | Legacy Tabellen/Felder | Lookups | Erstellen

FELDER GEÄNDERT

<input type="checkbox"/>	Schnittstelle	Segment	Pos	V.	Name	Länge	Typ	Kommentar	Name Bild	Name Tab.	M
<input type="checkbox"/>	material	alternative ur	0013	20	BRGEW	ENU;13;3;P;13;3		Gross Weight		GIDPF011-W	
<input type="checkbox"/>	material	alternative ur	0014	20	GEWEI	ETE;80;0;C;80;0		Unit of Weight			
<input type="checkbox"/>	material	basic data	0015	20	PRDHA	ETE;80;0;C;80;0		Product hierarchy	GID131-QPR	GIDPF300-O*	
<input type="checkbox"/>	material	basic data	0017	20	BRGEW	ENU;13;3;P;13;3	Basic 1 - Dimension	Gross Weight		GIDPF011-W*	

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*sub-way – Example of a version comparison*

sub-way allows a versioning of the interface objects. This option is very useful for the typically iterative process of defining migration rules. The rules are defined, implemented in the tool, an export is performed. After validation of the export on sight or after a test import into the target system, deficiencies in the rules are detected and adjusted. sub-way can detect the differences of a newer version and provide the differences as an "activity list" on field level for the adjustment of the exports.



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Zurück | Schnittstellen | Segmente | Felder | Schnittstellen geändert | Schnittstellen laden | Schnittstellen löschen | Regeln laden | Regel löschen | Abfragen | Einträge | Legacy Tabellen/Felder | Lookups | Erstellen

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EINTRÄGE

Blatt: [none] v

Feld Legacy: \_\_\_\_\_

Tabelle Legacy: \_\_\_\_\_

Feld SAP: MEINS

<input type="checkbox"/>	Abfrage	Blatt	Spalte	Feld Legacy	Tabelle Legacy	T	Länge	Nachk	Feld SAP
<input type="checkbox"/>	if_bom_bom_item_1	COLUMNS	45	CMPUWD	BOMPF0WD	A	30	0	MEINS
<input type="checkbox"/>	if_bom_bom_item_1	COLUMNS	46			A	30	0	MEINSMISS
<input type="checkbox"/>	if_bom_bom_item_2	COLUMNS	45	MEINS	BOMTBST5	A	256	0	MEINS
<input type="checkbox"/>	if_bom_bom_item_2	COLUMNS	46			A	30	0	MEINSMISS
<input type="checkbox"/>	if_inventory_balance_material_document_item	COLUMNS	7	UOMSBL	SAPPFLBL	A	80	0	MEINS
<input type="checkbox"/>	if_material_basic_data	COLUMNS	12	UOMS1N	GIDPF01N	A	80	0	MEINS
<input type="checkbox"/>	if_purchase_order_components_for_subcontracting	COLUMNS	9	CMPUWD	BOMPF0WD(PU	A	3	0	MEINS
<input type="checkbox"/>	if_purchase_order_item_data	COLUMNS	11	OQUNU3	PURPF3U3	A	80	0	MEINS
<input type="checkbox"/>	if_purchasing_conditions_0_conditions_1	COLUMNS	16			A	80	0	MEINS
<input type="checkbox"/>	if_purchasing_conditions_0_conditions_2	COLUMNS	16			A	80	0	MEINS
<input type="checkbox"/>	if_purchasing_conditions_0_general_data	COLUMNS	7	PQUNU7	PURPF2U7	A	80	0	MEINS
<input type="checkbox"/>	if_purchasing_conditions_1_conditions_1	COLUMNS	16			A	80	0	MEINS
<input type="checkbox"/>	if_purchasing_conditions_1_conditions_2	COLUMNS	16			A	80	0	MEINS
<input type="checkbox"/>	if_purchasing_conditions_1_general_data	COLUMNS	7	PQUNU7	PURPF2U7	A	80	0	MEINS
<input type="checkbox"/>	if_purchasing_conditions_2_conditions_1	COLUMNS	16			A	80	0	MEINS

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*sub-way – Example of a where-used list*

As a rule, migrations must be documented; for example, the auditor requires a transparent view of the transfer of data from the old to the new ERP.

With sub-way, the documentation for the migration can be generated in iQuery at any time based on the existing exports. The documentation then shows which data from the source system, with which translation rules, was exported for the target system.

In addition, a where-used list can be generated for the existing export queries. Which source system tables and fields or which target system fields were used in which queries? Where were which lookups used?



## Collection of further information

The migration tools of bit-impulse are Java-based and therefore run on practically any platform. The application/web server necessary for the browser applications can either "run" on an existing server or a separate server is set up for this purpose. The requirements on system resources are quite moderate.

For the actual export, several queries usually have to be executed in a certain order. For this purpose, CMD files are created on the server in which the individual activities are called up using iQuery commands. The desired properties can be specified in detail by command parameters. For the export, e.g. into the Excel-CSV format, it looks like this:

```
DBToCSV [jdbc:]library/table | [jdbc:]iquery csvfile [key:value]
[charset] [semicolon-delimited|comma-delimited|tab-delimited]
[decimal-comma|decimal-point] [no-quotes] [no-header] [crlf|lf|cr]
[supdate|sdelete] [debug]
```

Where iQuery is used as an ETL tool, it is usually also used as a reporting tool for the migration project. With iQuery, the source data for the creation of the transformation rules can first be viewed according to various criteria. Maybe data has to be adjusted in the source system beforehand – for this purpose iQuery can be used to create the necessary to-do lists.

The migration tools from bit-impulse can be used in projects of different sizes. There were the smallest projects where the software simply ran on the consultant's laptop, up to large projects in a large team with up to 373 queries and 102 lookups.