

DeceSoft Test Data

**Professional Management of Test
Data for automated SAP Business
Process Testing**



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Abstract

A large number of companies have invested in test automation applications to speed up their functional regression testing of SAP solutions. Test tools and procedures have matured over the last years leading to tremendous efficiency gains. However, the provisioning of validated test data for direct consumption in test automation tools remains as a major roadblock. DeceSoft Test Data provides an add-on application for SAP Solution Manager for comprehensive planning of test data which can be used by all test automation tools integrated with SAP Solution Manager.

Key Concept

The scope of DeceSoft Test Data (DTD)¹ covers the planning and provisioning of business process oriented test data for all major test automation applications. DTD provides comprehensive planning of test data for test engineers as well as business analysts with the following complementary planning approaches

- Manual test data planning with value help functionality for data selection from any connected SAP system
- Semi-automatic test data derivation through search and select of business documents already posted in the respective SAP systems
- Offline test data planning via MS Excel down- and upload.

Test data is stored in a central repository and can be validated against any SAP system, such as development, test or pre-production systems used for test execution. Comprehensive validation reports provide guidance how to correct errors detected through online validation. Graphical reports show statistics on data structures used, statistics on test data availability by business process, as well as validation status by SAP system.

Test data planned with DTD can be provided for all major test automation applications

- **Test Option 1:** all test automation applications integrated with SAP Solution Manager through the Test Automation Framework, e.g. SAP eCATT, SAP Component-based Test Automation (CBTA), HP QTP, WorkSoft Certify, etc.
- **Test Option 2:** SAP Test Acceleration and Optimization (SAP TAO) which is integrated with HP Quality Center and SAP Solution Manager.

DeceSoft DTD is deployed as SAP Solution Manager add on. DTD was developed using ABAP OO with a HTML user-interface using WebDynpro ABAP which provides a user-experience very close to Work Centers of SAP Solution Manager. DeceSoft Test Data Release 1 was successfully certified by SAP in Q3 2012.

Test Data Management – SAP customer expectations and challenges

SAP customers need to maintain, update or extend their SAP solutions on a regular basis. To ensure that these changes have no negative impact on crucial business processes, companies perform comprehensive functional regression tests. Besides the traditional approach of using manual tests, many companies have invested in test

¹ www.decesoft.com

automation using test tools from SAP or software partners such as HP. Companies expect that the investment in test automation tools achieve the following objectives:

- higher test efficiency,
- extended test coverage,
- less defects in SAP production systems,
- cost reduction and
- reduced efforts for QA teams and business teams regarding recurring tasks for iterative manual testing.

With the highly increased maturity of test automation tools available for functional SAP solution testing the above expectations can be met to a high degree. Besides these positive aspects a number of obstacles still remain, including

1. setup and refresh of lean test systems from SAP production systems,
2. availability of configuration data, master data and transactional data in test systems and
3. provisioning of test data for test automation tools for automated regression tests of critical business processes.

Whilst obstacles number 1 and 2 can be addressed with existing products such as SAP Test Data Migration Server (SAP TDMS), no comprehensive solution was available for obstacle number 3 to date. Many companies tried to use native MS Excel for test data planning and provisioning purposes, however, come across significant disadvantages including

- custom built MS Excel worksheets for test data planning are difficult to build, hard to maintain and error prone. Worksheets are clumsy with difficult to read field names
- MS Excel worksheets are suitable only for single users, but not usable for enterprise wide access for test data planning
- Many SAP transactions - like VA01 - require test data for tables or structures, which is extremely difficult to handle in MS Excel spreadsheets without additional planning logic
- MS Excel files are cumbersome to distribute between enterprise users
- Missing attributes, search and catalog functions for test data records make it very difficult to find available test data
- No functionality to validate planned test data against SAP test systems
- Very difficult to use unvalidated test data from MS Excel worksheets in test automation tools

DeceSoft Test Data was designed to overcome obstacle number 3 by providing comprehensive capabilities for planning and provisioning of test data for test automation tools.

Test data planning and provisioning

Test data planning and provisioning in 5 steps

DeceSoft Test Data (DTD) provides 5 distinct capabilities for test data planning and provisioning

1. **Test Data DNA:** definition of test data structure (DNA) by selecting relevant SAP table fields of a business process.
2. **Test Data Planning:** data entry or derivation of test data for all screen fields
 - a. DNA-generated online data entry forms for manual planning including value helps to pick valid data from any connected SAP system
 - b. Search of posted business document in any SAP system with semi-automatic derivation of test data
 - c. Offline planning using MS Excel using Test Data DNA generated spreadsheets
3. **Test Data Validation:** online check of test data against one or multiple SAP systems to ensure data validity for the selected systems.
4. **Test Data Statistics:** graphical reporting for Test Data DNA and Test Data Records regarding coverage of business processes, SAP Modules as well as validation status by SAP systems.
5. **Test Data Transformation:** functionality to transform test data planned with DTD into data structures used by various test automation applications.

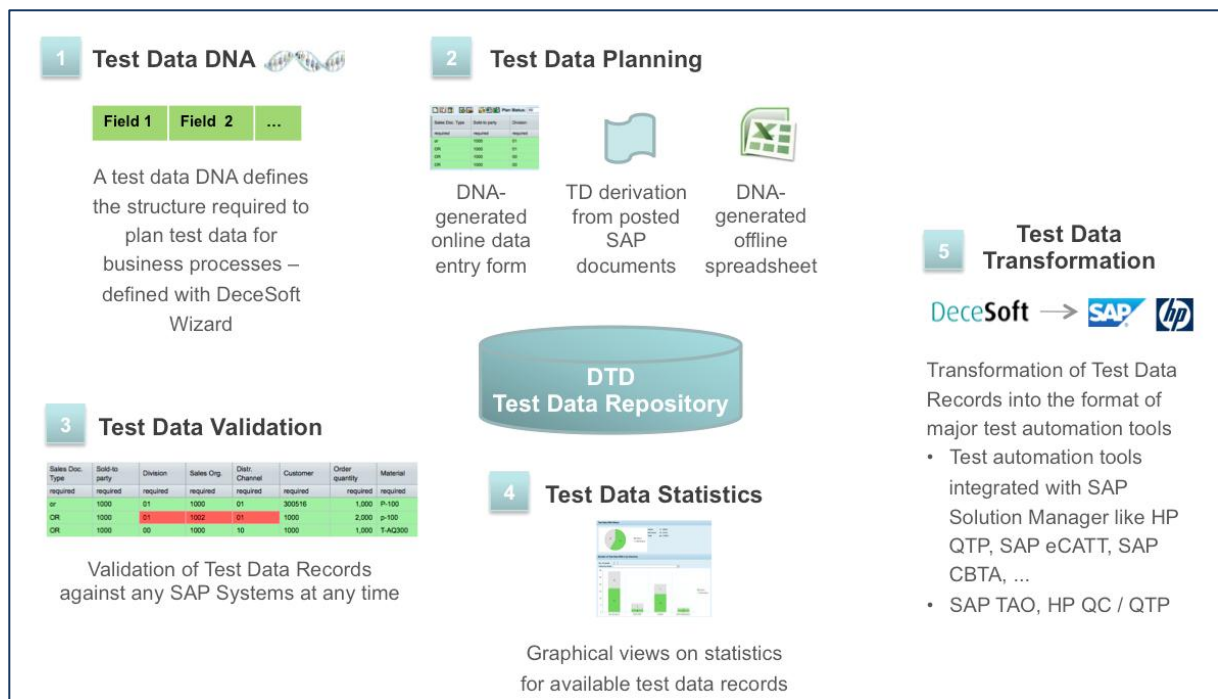


Figure 1: Capabilities of DeceSoft Test Data

Test Data DNA

Before a user can start planning test data for a business process, the relevant fields need to be selected which appear on the screens of the business transaction. DTD provides a generic and powerful way to allow the user select the fields of a business transaction requiring data input. For this it is important to state that a SAP business document is usually stored in many SAP tables and each of these tables include up to several hundred fields. Regardless whether the user would pick the fields for a business transaction from the user-interface or from the underlying SAP tables, it is quite a complicated task.

DTD has solved this problem with a number of innovative approaches provided in a **DNA Setup Wizard** which guides the test engineer through the Test Data DNA setup steps.

- In **Step 1** the user enters the title and description of the new Test Data DNA. Next, the user decides whether the recommended Business Document approach is used to automatically identify the SAP tables for a given business transaction. Alternatively the user can pick the SAP tables manually. In addition DeceSoft allows to enter and upload content with relationship with SAP executables and SAP tables.
- In **Step 2** the user connects to a SAP test system which supports the DNA setup in the following steps. The user enters the business transaction for which test data should be planned, e.g. „Create Sales Order“ (transaction code VA01). Besides the main transaction, the corresponding „display“-type transaction is entered, e.g. „Display Sales Order“ (transaction code VA03). The second transaction allows comprehensive search for already posted business transactions and master data which is used in various modules of the DTD application as well.

Wizard Step 3: User selects SAP Business Document in SAP system

DeceSoft Wizard identifies underlying SAP Tables via SAP Data Dictionary

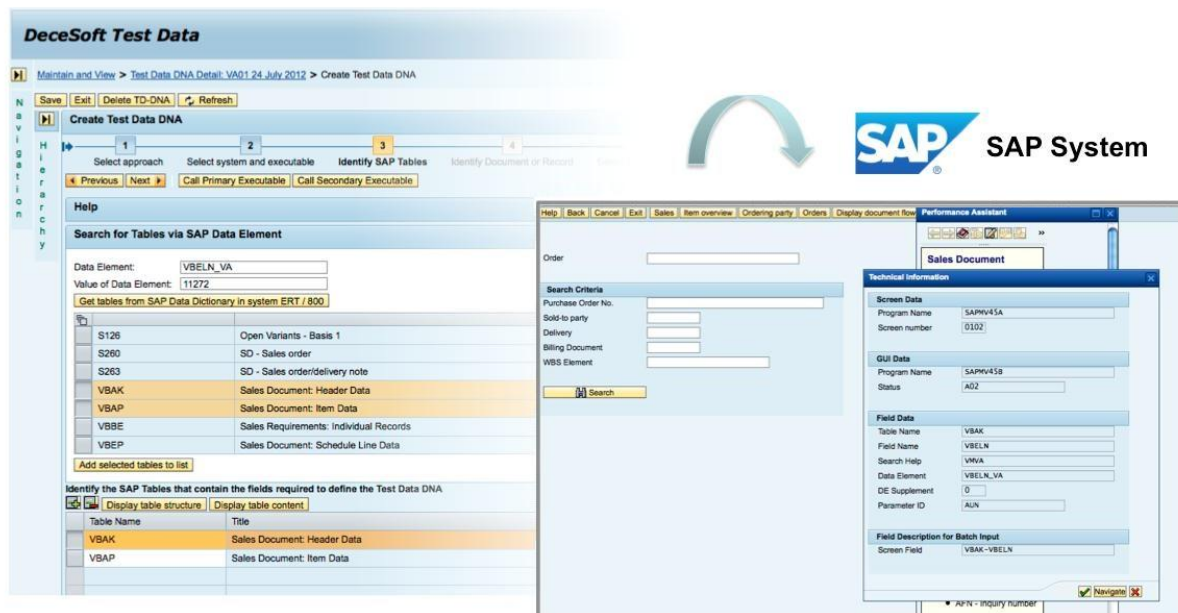


Figure 2: Test Data DNA Setup Wizard – Step 3

- In **Step 3** DTD identifies all SAP tables and fields used to store the values of posted business documents.
 - The user first selects a suitable **business document** that was already posted in the connected SAP system. This can be done directly from DTD through remote function call of the secondary transaction (e.g. VA03), which will be shown in a separate window. Here the user can use standard SAP search functionality to select a suitable business document.
 - In addition the user identifies the **Data Element** for the document number via F1 help (e.g. Order number in transaction VA03) followed by the button „Technical Information“ which shows the used Data Element of the SAP Data Dictionary (e.g. VBELN_VA). Back on the DTD Wizard step 3 the user enters the Data Element and the value of the business document (e.g. VA03 order number).
 - Now DTD performs an analysis of the SAP Data Dictionary in the background and identifies all relevant SAP tables.
- In **Step 4** the user confirms the use of the selected business document or master data record.
- In **Step 5** the user can select the fields that shall be used for test data planning from each SAP table assigned to the Test Data DNA. DTD supports the selection of the relevant fields by showing table fields with the values of the selected business document. Therefore, all empty table fields are clearly shown and can be ignored.
- In **Step 6** the user can review the structure of the Test Data DNA and finally activates the DNA. Now business analysts can start with test data planning for this business transaction.

Wizard Step 6: Test Data DNA for SAP Transaction „Create Sales Order“ (T-Code VA01)

DeceSoft Test Data

Maintain and View > Test Data DNA Detail: VA01 24 July 2012 > Create Test Data DNA

Save Save and activate Exit Delete TD-DNA Refresh

Create Test Data DNA

1 Select approach 2 Select system and executable 3 Identify SAP Tables 4 Identify Document or Record 5 Select active

Previous Next Save and activate

Help

TD-DNA Structure Overview TD-DNA Attributes

Hide technical keys Hide comparison values

Single fields

Sales Doc. Type	VBAP-AUART	OR
Distr. Channel	VBAP-VTWEG	10
Division	VBAP-SPART	00
Sales Org.	VBAP-VKORG	1000
Sold-to party	VBAP-KUNNR	1000

Matrix fields

Order quantity	VBAP-KWMENG	1,000	0,000
Material	VBAP-MATNR	T-AQ300	

SAP Table VBAK

- Document header table
- Example: Sales Organization (DNA single field)

SAP Table VBAP

- Document detail table
- Example field: Material (DNA matrix field)

Figure 3: Test Data DNA Setup Wizard – Step 6

Test Data Planning

The Test Data Records module of DTD enables Business Analysts and Test Engineers to view, plan and validate Test Data Records (TDR). To start test data planning, the user selects from the hierarchy a Test Data DNA that fits to the business process for which test data shall be planned. The following three test data planning approaches are available:

- **Approach 1: Manual Planning** – allowing business analysts to easily plan test data using automatically generated data entry forms.
- **Approach 2: Derivation of test data from SAP business documents** – a business analyst can easily search for posted SAP business documents in SAP systems. DTD automatically retrieves the document data and creates new test data records in DTD.
- **Approach 3: Offline planning using MS Excel** – business analysts can use MS Excel for convenient offline planning of test data.

TDR planning Approach 1: Manual Planning

The user can easily plan test data by DTD using automatically generated data entry forms. For each Test Data DNA representing a SAP business transaction to be tested, DTD automatically generates a data entry form, where the user can plan multiple Test Data Records. The form's columns represent the respective test data fields of the DNA whilst the rows contain the Test Data Records – see figure 4.

The diagram illustrates the manual test data planning process. A Business Analyst is shown interacting with the DeceSoft Test Data Records interface. The interface is titled 'Test Data Records for Test Data DNA: Create Sales Order'. It features a 'Statistics' tab and a 'Test Data Records' tab. The 'Test Data Records' tab contains a table with columns: #, Plan stat., Sales Doc. Type, Sold-to party, Division, Sales Org., Distr. Channel, Customer, Order quantity, and Material. The table shows four rows of test data records. To the right of the table, there are buttons for 'Save', 'Cancel', 'Display Mode', 'Call Primary Executable', and 'Call Secondary Executable'. Below these buttons, there is a 'Help' section with the text 'Plan new TD-Records via search & select of existing Business Documents / Master Data Records' and 'SAP System for value help and field validation'. A 'System and Client' dropdown is set to 'ERT / 800'. A 'Connect' button is next to it. To the right of the interface, there is a SAP logo and two arrows pointing to the interface with the text 'value help for field values to support data entry' and 'online data validation'.

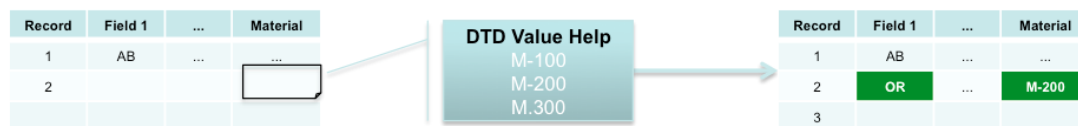
#	Plan stat.	Sales Doc. Type	Sold-to party	Division	Sales Org.	Distr. Channel	Customer	Order quantity	Material
1	△	required	required	required	required	required	required	required	required
2	△	OR	1000	01	1000	01	300516	1,000	P-100
3	△	OR	1000	01	1000	01	1000	2,000	p-100
4	△	OR	1000	00	1000	10	1000	1,000	T-AQ300

Figure 4: Manual test data planning (approach 1)

Even when the user enters test data manually, DTD provides a convenient option to enter data through value help, similar to the F4 help known from SAP systems. The value help fetches valid field values from the connected SAP system for the user to select from (figure 5). With this important DTD feature, the user can plan correct test data in significantly shorter time as well as higher quality.

Validation during online planning

Test Data Records for transaction xyz



- User selects values via DTD Value Help
- DTD connects to **SAP** System and provides **valid** entries

Figure 5: Value Help and validation during online planning

Test Data Planning Approach 2: Derivation of test data from SAP business documents

Compared to the manual planning approach, the possibility to leverage existing SAP business documents in SAP test or production systems represents a much more efficient and convenient option to create valid test data.

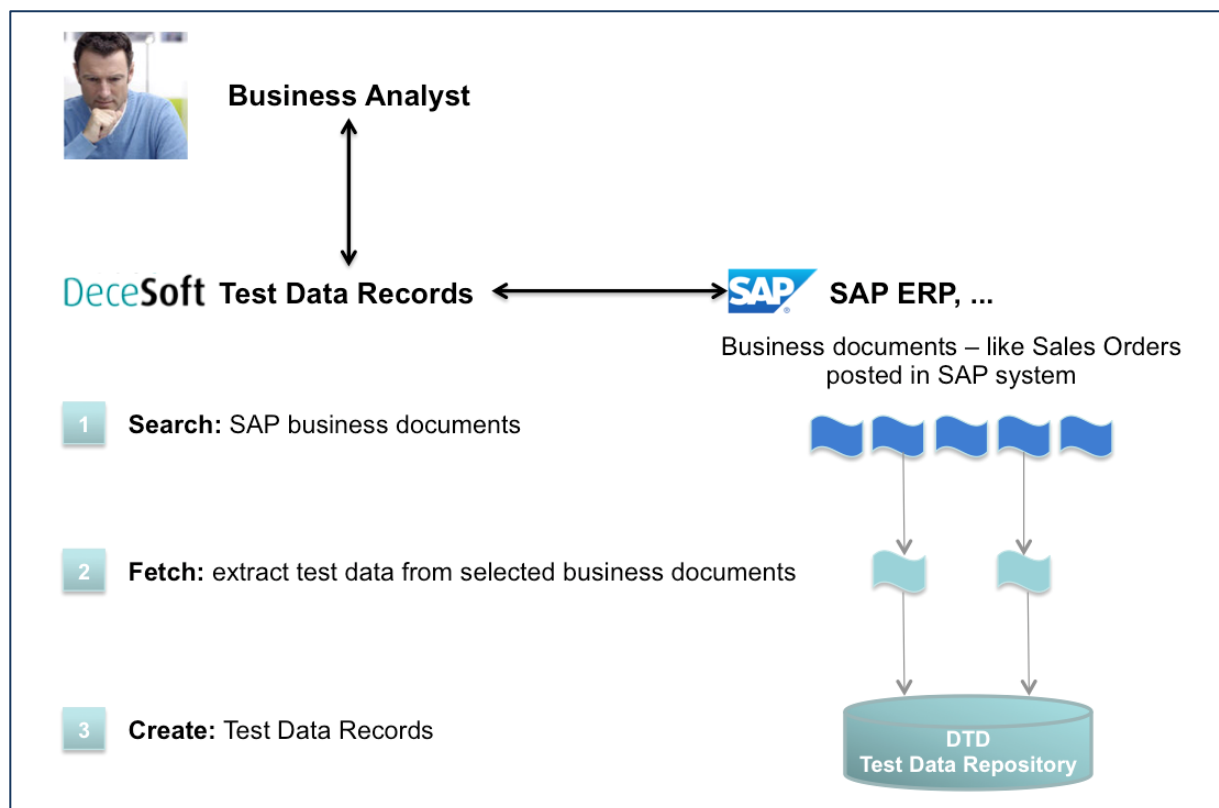


Figure 6: Deriving test data from posted business documents (planning approach 2)

In a first step, the user can search for business documents or master data records that have been posted in the respective SAP system. To perform this action, DTD automatically launches the display transaction (assigned to the DNA), which includes standard SAP search capabilities for available business documents besides standard display functionality.

Examples for process step “Sales Order”:

- DNA primary executable: Create Sales Order – transaction code VA01
- DNA secondary executable: Display Sales Order – transaction code VA03

After the user identifies suitable business documents, DTD automatically extracts all the document data from the SAP system and creates new test data records in DTD repository (figure 7).

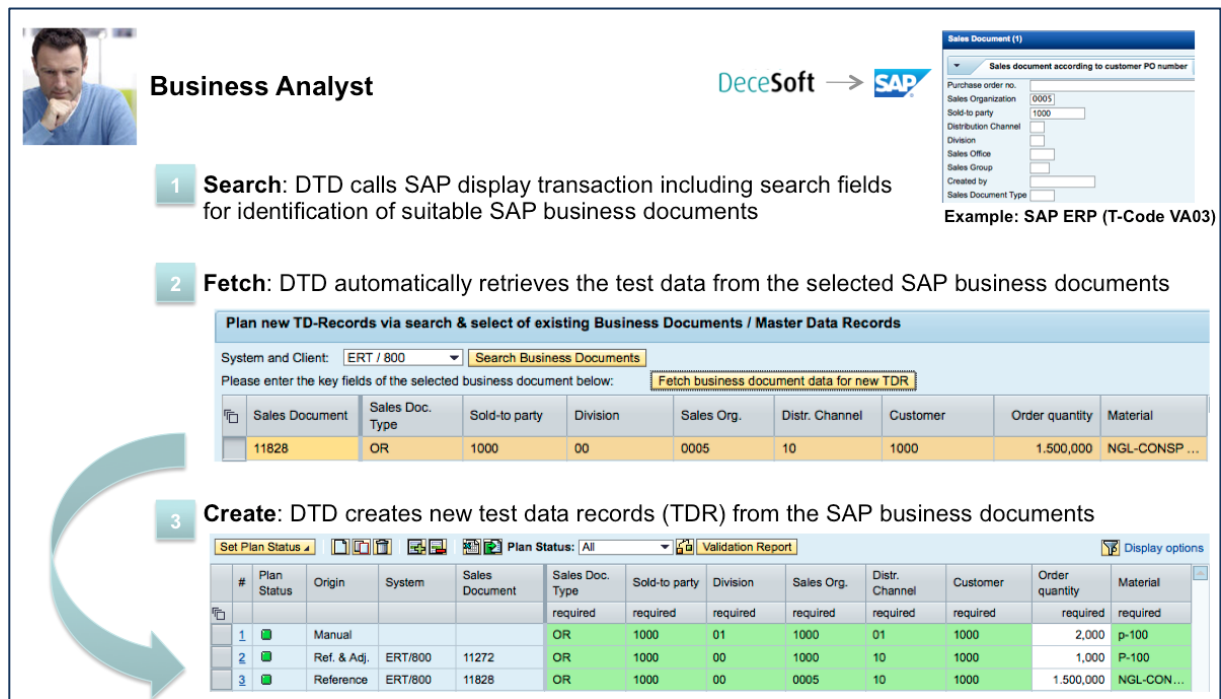


Figure 7: Derivation of test data from available business documents (planning approach 2)

With this approach the user can create bulks of valid test data. The user can copy and adjust these Test Data Records through manual interaction and therefore create more data variations needed for solid regression tests.

Test Data Planning Approach 3: Offline planning using MS Excel

In practice, business analysts often plan and provision test data for automated test tools using a spreadsheet file. As mentioned before, this method is convenient for the planner but also highly error-prone and complex to manage test data at an enterprise level. DTD offers a solution that offers the convenience of offline test data planning while making sure the planning process is managed properly and the data generated offline is correct and reliable.

Complementing the manual and business document-based test data planning options, DTD enables the user to plan test data offline (without being connected to DTD), using a Test Data DNA structured MS Excel file generated automatically by DTD.

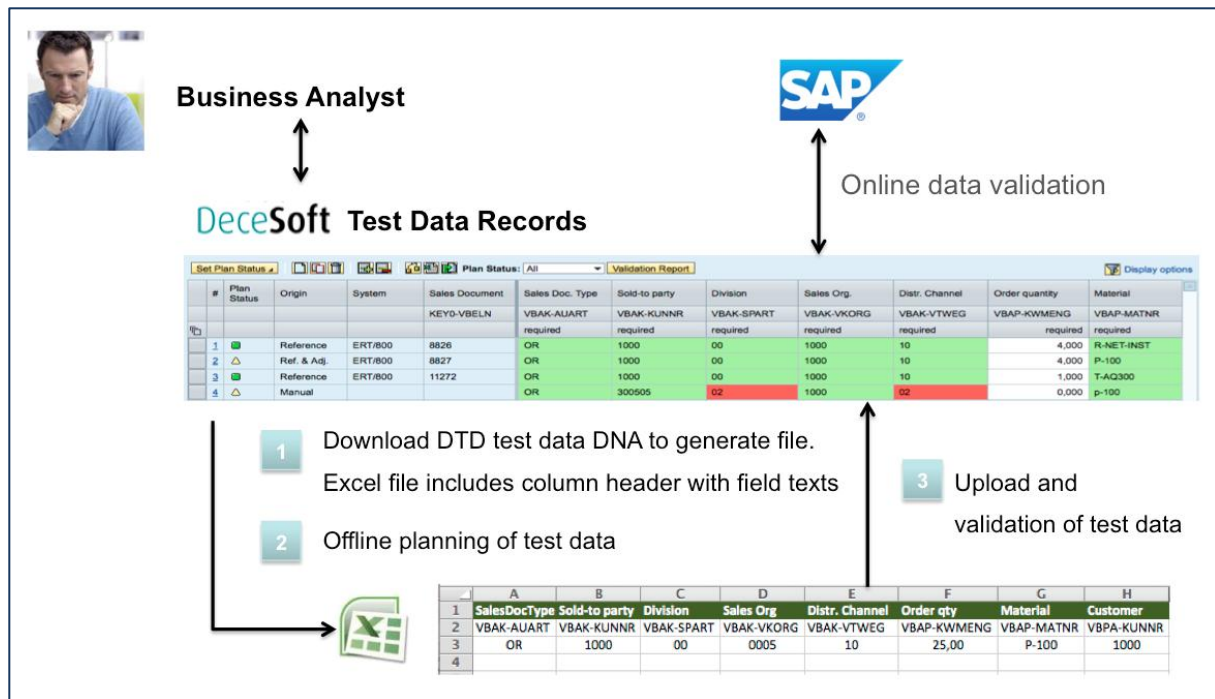


Figure 8: Offline planning of test data using MS Excel (planning approach 3)

The user opens the downloaded file locally to enter test data via the standard spreadsheet functionality. Within the spreadsheet, the user can change values of any Test Data Records downloaded, delete records and/or add new ones in offline mode, not connected to DTD. Finally, the user uploads the file back to DTD and validates the test data planned offline against the SAP system of choice (see also the section on Test Data Validation below).

Test Data Validation

Test Data Validation is a very powerful functionality in DTD, helping the user making sure that the planned test data is reliable and does not cause problems during test execution e.g. by making sure that all the respective master data values planned as test data are indeed available in the tested SAP system.

A good example would be the test of business transaction “Create Sales Order”, where a tester or an automated test tool enters an incorrect Sales Organization during test execution that does not exist in the SAP test system. This would cause the test to fail, but not because of a defect in the test system, but due to a problem with the test data itself. To avoid this pitfall, DTD offers the user the functionality to connect to the respective SAP systems and check the validity of the planned test data.

In DTD, the user can trigger **Test Data Validation** in two ways:

1. directly during test data planning - as described above, this “embedded” validation capability helps the user conveniently to continuously check test data validity in the respective SAP system during online test data planning (figure 9)
2. performing a dedicated **Test Data Record Validation** for bulk validation of (large) numbers of test data records across multiple SAP systems (figure 10).

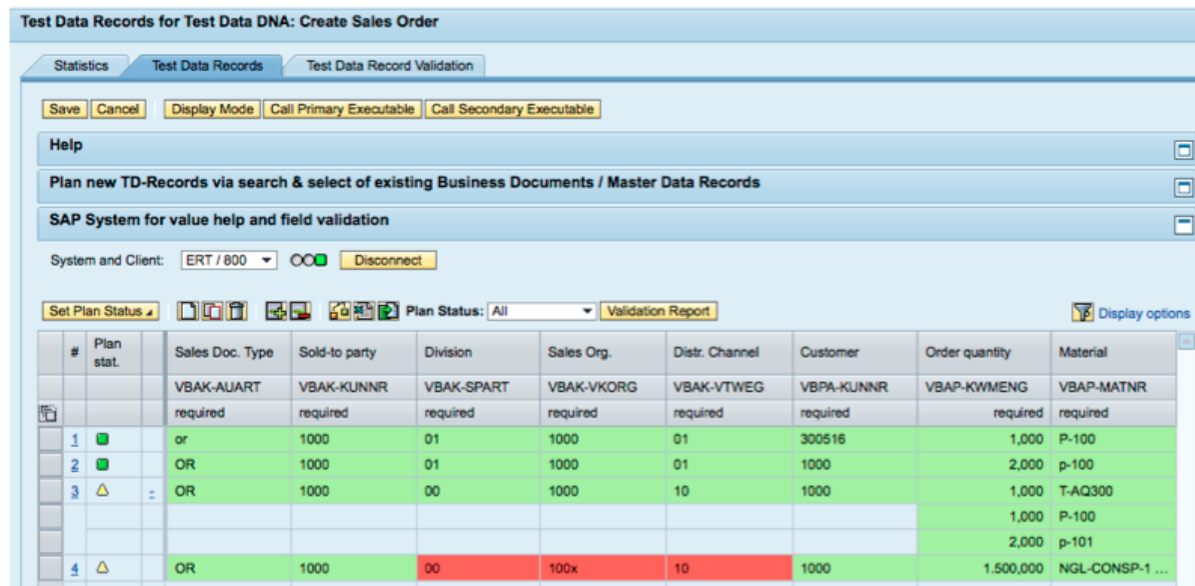


Figure 9: Validation during online planning

During test data planning (see figure 9) the user can enter or adjust field values of test data records manually or through the value help feature that retrieves valid data from the assigned SAP system. During the test data planning activity the user can leverage the DTD Validation functionality in an ad-hoc fashion, where DTD performs checks of all fields of the test data records by validating field values using the connected SAP system. Once DTD Validation has been performed, the background color of each TDR field indicates its validation status:

- red: validated with errors, i.e. field value not valid in connected SAP system
- green: validated ok
- white: not yet validated or not validation relevant which is the case for quantity or text fields without SAP check tables.

In addition to single field validation, DTD provides validation of field combinations in case the the SAP transactions requires valid combinations which often causes data availability issues. The following simple example illustrates such a situation for business transaction "Create Sales Order" (T-Code VA01) using the following required data entry fields:

Data entry field	invalid combination	valid combination
Sales Organization	2000	1000
Distribution Channel	01	01
Division	01	01

In this situation it is not sufficient to show correct values for each individual field in the value help, since each individual field value may be correct, however, the combination may not be valid. To overcome this issue the DTD value help shows only valid combinations of the selected SAP system / client to the user. DTD test data planning and validation functions work hand-in-hand by first avoiding incorrect data entries and then followed by advanced validations that can handle complex data combinations. This is even of higher importance when test data is planned manually or offline, i.e. without using the DTD value help feature.

The second TDR validation option enables validations of test data records for multiple SAP systems. This is of importance when leveraging automated tests in various SAP systems. The QA team might want to first run a subset of tests in the development system, followed by the main regression test in the test system. Additional test runs might be performed in pre-production systems. Depending on the master and configuration data in each of these systems, a set of test data records may lead to different validation status' (figure 10).

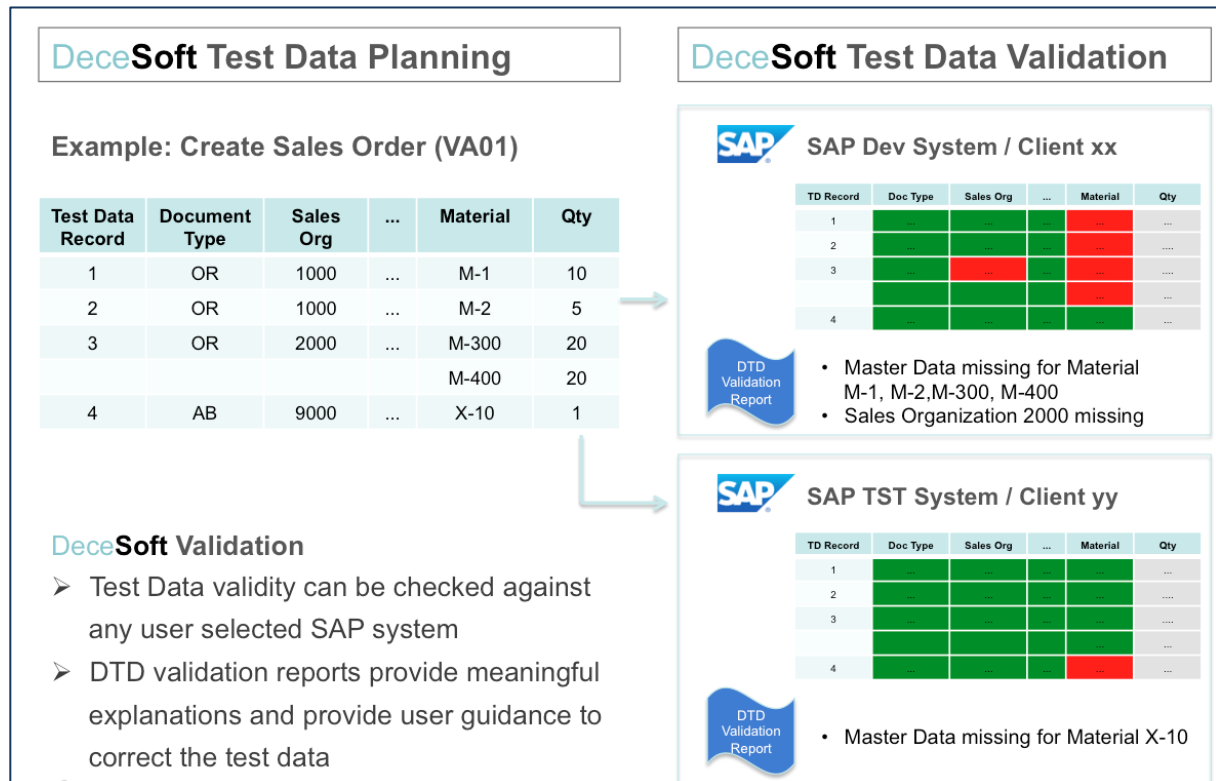


Figure 10: Validation across multiple SAP Systems

As highlighted in figure 10, the DTD validation detects missing materials M-1, M-2, M-300, M-400 and missing Sales Organization 2000 in the SAP development system for a selected set of test data records. Other combinations of field values lead to correctly validated test data records in the SAP development system. The same set of test data records are validated with a green status in the SAP test system, since the Materials and Sales Organizations are available there, except for one “unusal” material X-10. The QA team can easily react using DTD validation on-screen analysis as well as validation reports, including the following activities

- restricting the selection of test data records to green validation status for a specific SAP system
- adding missing master data in the respective SAP system which caused the validation error. Subsequently this leads to green validation status of the selected TDRs.

Since DTD stores the validation status by SAP system and client, a similar set of test data records can be used in multiple systems.

For more insight on validation results and any validation errors detected, the user can call a detailed DTD validation report.

Test Data Statistics

Statistics for Test Data DNA

Test Engineers can get an overview on Test Data DNAs available for various business transactions or master data transactions using DTD graphical and list type reports.

Figure 11 shows the statistic of available DNAs with bar charts for each SAP Module. Color-code helps the user to differentiate between active DNAs which are ready for test data planning and those DNAs which are still to be edited.

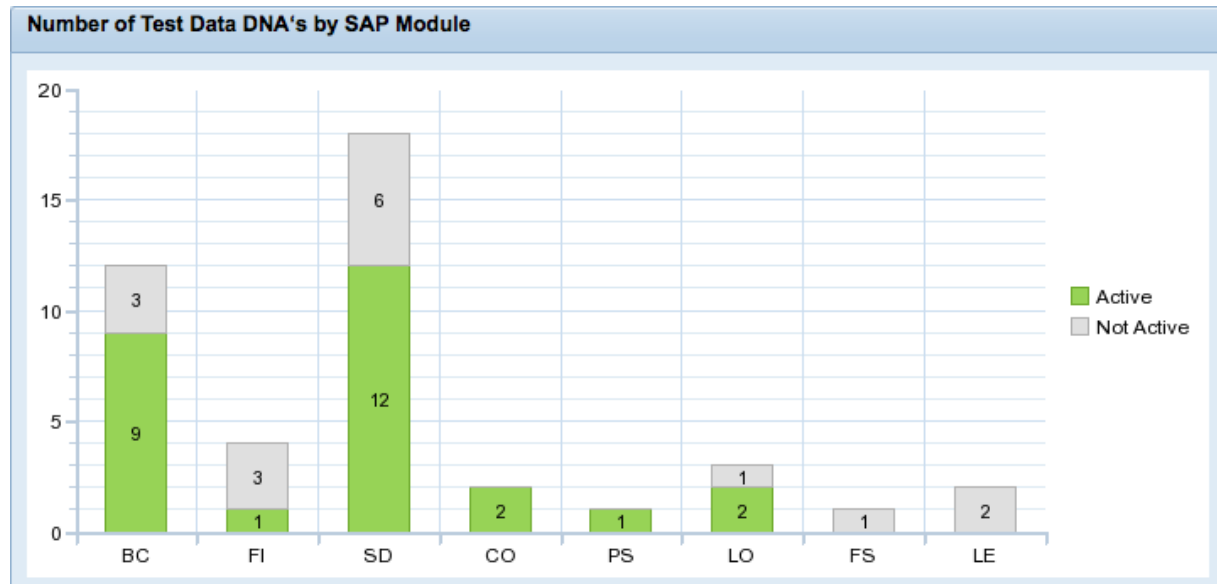


Figure 11: Statistic for Test Data DNAs by SAP Module

Figure 12 shows a custom-defined hierarchy with DNA at the lowest level. The list view shows whether the DNA is active and thus ready to be used, the business transaction or master data transaction for which the DNA contains the test data planning relevant fields, as well as the SAP Module to which the business transaction belongs. At each hierarchy level aggregated information about the number of active DNAs is shown.

Test Data DNA Overview							
DNA Hierarchy		Total	Active	Not Active	Primary Executable	Executable Title	SAP Module
▼ DTD Hierarchy		43	27	16			
▼ My structure		43	27	16			
▼ SAP ERP		8	4	4			
▼ Master Data		2	2	0			
▪ Material	■				MM01	Create Material &	LO-MD-MM
▪ Cost Center	■				KS01	Create cost center	CO-OM
▼ Logistic		6	2	4			
▼ Order to Cash		6	2	4			
▼ 1 Quotation		1	0	1			
▪ Quotation	◆				VA21	Create Quotation	SD-SLS
▼ 2 Sales Order		2	2	0			
▪ Sales Order V1 Sales Doc 11272	■				VA01	Create Sales Order	SD-SLS
▪ Sales Order V2 all fields	■				VA01	Create Sales Order	SD-SLS
▼ 3 Delivery		1	0	1			
▪ Delivery	◆				VL01N	Create Outbound Div. with Order Ref.	LE-SHP
▼ 4 Goods Issue		1	0	1			
▪ Goods Issue	◆				VL02N	Change Outbound Delivery	LE-SHP
▼ 5 Billing		1	0	1			
▪ Billing	◆				VF01	Create Billing Document	SD-BIL

Figure 12: Statistic for Test Data DNAs by custom hierarchy

Statistics for Test Data Records

Fast overviews of available Test Data Records (TDR) are provided by DTD Statistics in graphical format (Figure 13) including

- **Plan Status:** number of TDR by plan status completed (green), in planning (yellow) and outdated (grey)
- **Validation Status:** number of TDR by SAP System / Client and validation status validated (green), validated with errors (red) and not validated (grey)

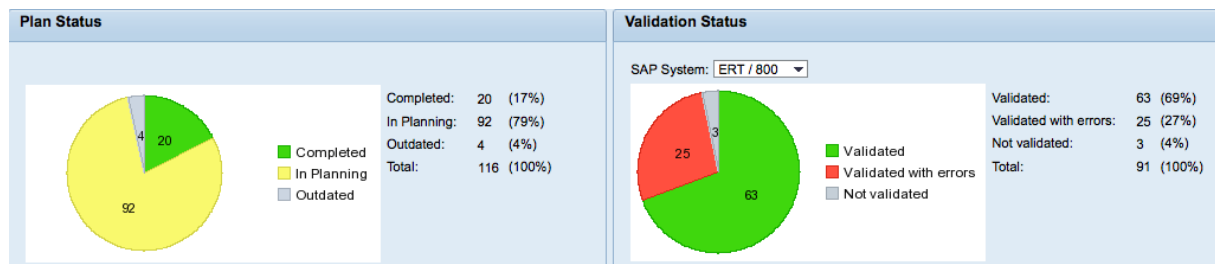


Figure 13: Graphical overview of Test Data Records by plan and validation status

Detailed information about available TDR by status can be obtained by DTD list views

- **TDR – Plan Status Overview:** number of Test Data Records by business transaction and plan status active, in planning and outdated (Figure 14)
- **TDR – Validation Status Overview:** number of Test Data Records by SAP System / Client, business transaction and validation status validated, validated with errors and not validated (Figure 15)

Test Data Records – Plan Status Overview								
DNA Hierarchy	Total	Active	In Planning	Outdated	Primary Executable	Executable Title	SAP Module	
▼ DTD Hierarchy	116	20	92	4				
▼ My structure	116	20	92	4				
▼ SAP ERP	40	4	36	0				
▼ Master Data	4	1	3	0				
▪ Material		1	0	0	MM01	Create Material &	LO-MD-MM	
▪ Cost Center		0	3	0	KS01	Create cost center	CO-OM	
▼ Logistic	36	3	33	0				
▼ Order to Cash	36	3	33	0				
▼ 2 Sales Order	36	3	33	0				
▪ Sales Order V1 Sales Doc 11272		0	33	0	VA01	Create Sales Order	SD-SLS	
▪ Sales Order V2 all fields		3	0	0	VA01	Create Sales Order	SD-SLS	

Figure 14: List-type overview of Test Data Records by plan status

Test Data records – Validation Status by System								
SAP System: <input type="text" value="ERT / 800"/>								
DNA Hierarchy	Total	Validated	Validated with errors	Not validated	Primary Executable	Executable Title	SAP Module	
▼ DTD Hierarchy	91	63	25	3				
▼ My structure	91	63	25	3				
▼ SAP ERP	38	26	12	0				
▼ Master Data	2	2	0	0				
▪ Cost Center		2	0	0	KS01	Create cost center	CO-OM	
▼ Logistic	36	24	12	0				
▼ Order to Cash	36	24	12	0				
▼ 2 Sales Order	36	24	12	0				
▪ Sales Order V1 Sales Doc 11272		24	9	0	VA01	Create Sales Order	SD-SLS	
▪ Sales Order V2 all fields		0	3	0	VA01	Create Sales Order	SD-SLS	

Figure 15: List-type overview of Test Data Records by SAP System / Client and validation status

Test Data Transformation

Test Data that have been planned with DTD can be transformed into the format of all major test automation applications. As shown in Figure 16, DTD provides test data for test automation applications integrated into the following test management applications

1. SAP NetWeaver
2. SAP Solution Manager
3. HP Quality Center and SAP TAO

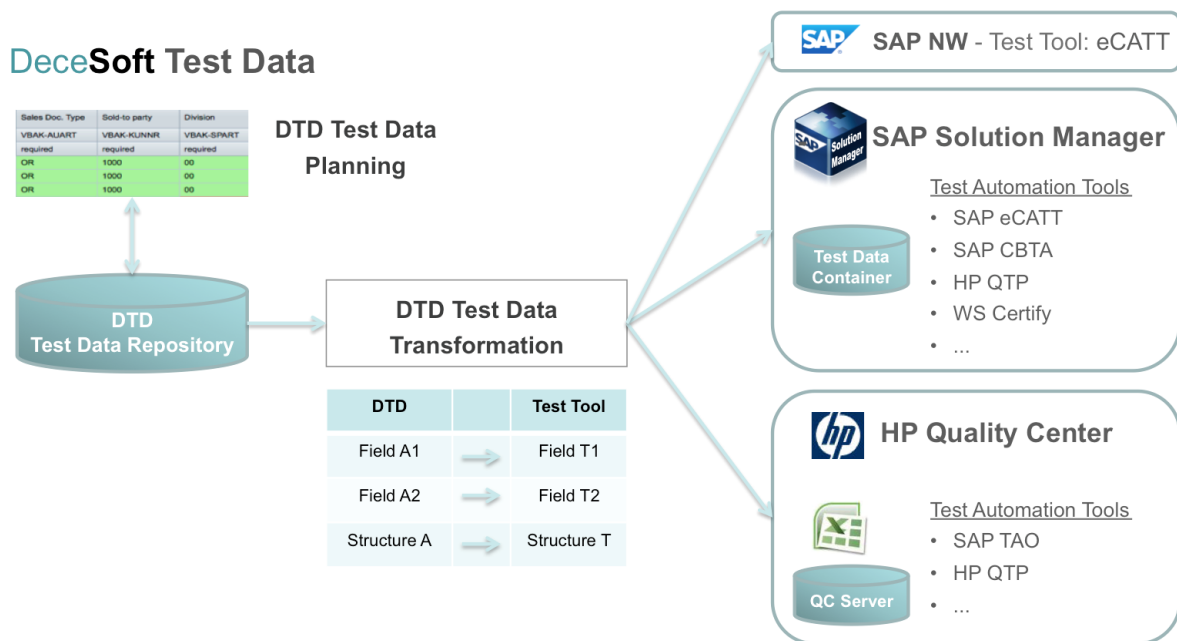


Figure 16: DTD Test Data Transformation for multiple test automation applications

Test Data Transformation for SAP Solution Manager

Companies using SAP Solution Manager as their test management application (Test Option 1) can integrate many test automation tools from SAP or 3rd party vendors through the Test Automation Framework including

- SAP eCATT
- SAP Component-based Test Automation (CBTA)
- HP Quick Test Professional (HP QTP)
- Worksoft Certify
- ...

Test Configurations² which are included in Test Plans / Test Packages for test execution consist of 3 parts

1. Test Script – created by one of the above test automation tools include input parameters which require test data as input during test execution
2. Test Data – provided through **Test Data Container (TDC)** of SAP Solution Manager
3. System Under Test – compilation of SAP development and test systems defined via the System Data Container (SDC) of SAP Solution Manager

² Test Configuration is the term used by SAP Solution Manager for automated test cases

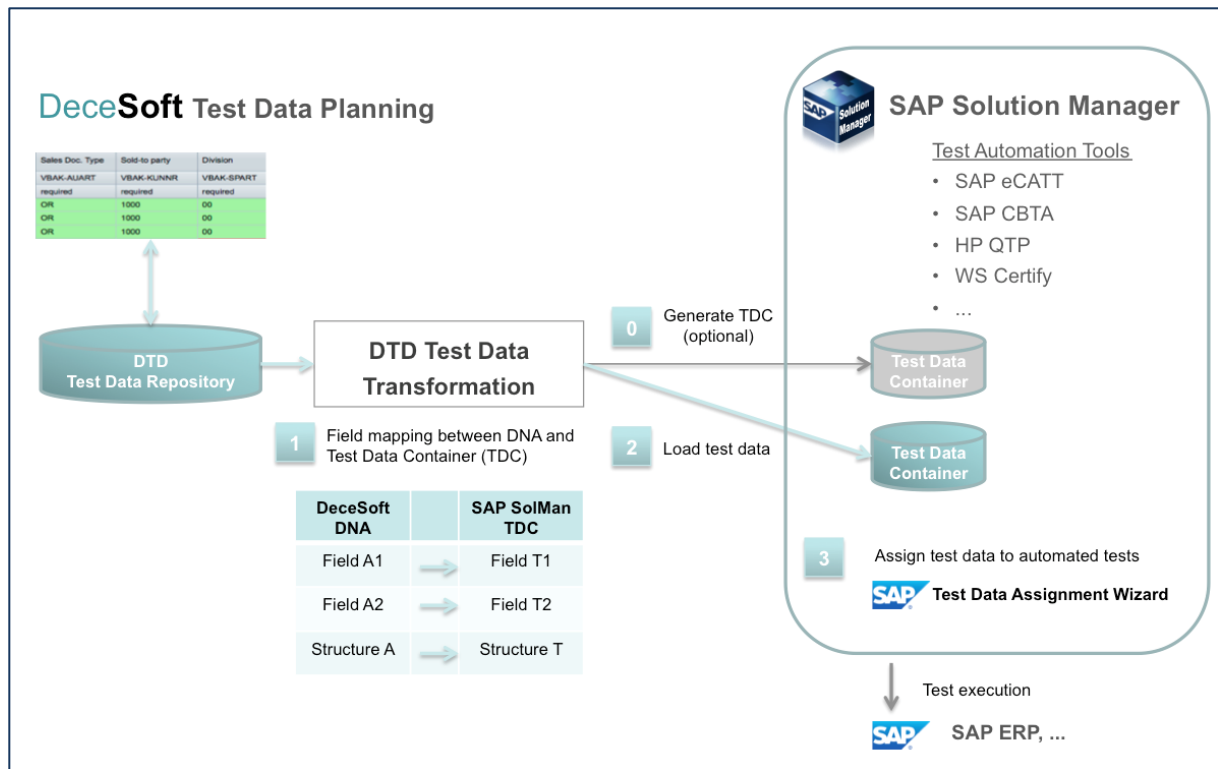


Figure 17: Test data provisioning for test automation tools integrated with SAP Solution Manager

DTD follows a straight forward procedure for test data provisioning

- **Step 0** (optional): in case suitable Test Data Containers (TDC) for your test cases have not been defined, DTD can automatically generate the TDC in SAP Solution Manager. The TDC parameter definition is generated from the DNA structure. After this step test data can be entered into the TDC.
- **Step 1**: as a one time effort, the Test Engineer defines a DTD Transformation where DNA fields and structures are mapped to the TDC parameters. This is done automatically when the TDC was generated by DTD. Otherwise DTD suggests a proposal for the mapping which the user can refine.
- **Step 2**: a user can select suitable test data from the DTD Test Data Repository. The selection criteria include all fields of the DNA as well as plan status and validation status. The selected Test Data Records are displayed for user confirmation and subsequently loaded into the assigned Test Data Container of SAP Solution Manager.
- **Note**: all following steps are standard activities within SAP Solution Manager and not related to test data planning using DeceSoft Test Data.
- **Step 3**: In this step the Test Engineer selects the test data records stored in a TDC and maps the TDC parameters to the parameters of the Test Configuration. SAP Solution Manager 7.1 SP07 includes a new **Test Data Assignment Wizard**, which guides the user in an easy fashion through these steps (search for suitable TDC, parameter mapping between TDC and Test Configuration, selection of test data record).

After step 3 is performed, the Test Configuration can be executed standalone or as part of a Test Package.

It is important to note, that test data records are not copied to Test Configurations, but references link the test data of the TDC to the Test Configuration. This provides a very important advantage that test data that is not valid any longer (e.g. material that was discontinued) can be easily changed centrally and all assigned Test Configurations will benefit from the updated test data immediately. The change would be performed in DTD first, followed by an online validation and data transfer into the Test Data Container.

Test Data Transformation for SAP TAO

Companies using HP Quality Center as their test management application (Test Option 2) in combination with SAP TAO for test automation can use DTD to manage their test data. The user can select DTD test data records and export them into the format of the **SAP TAO file** for subsequent test execution (figure 18).

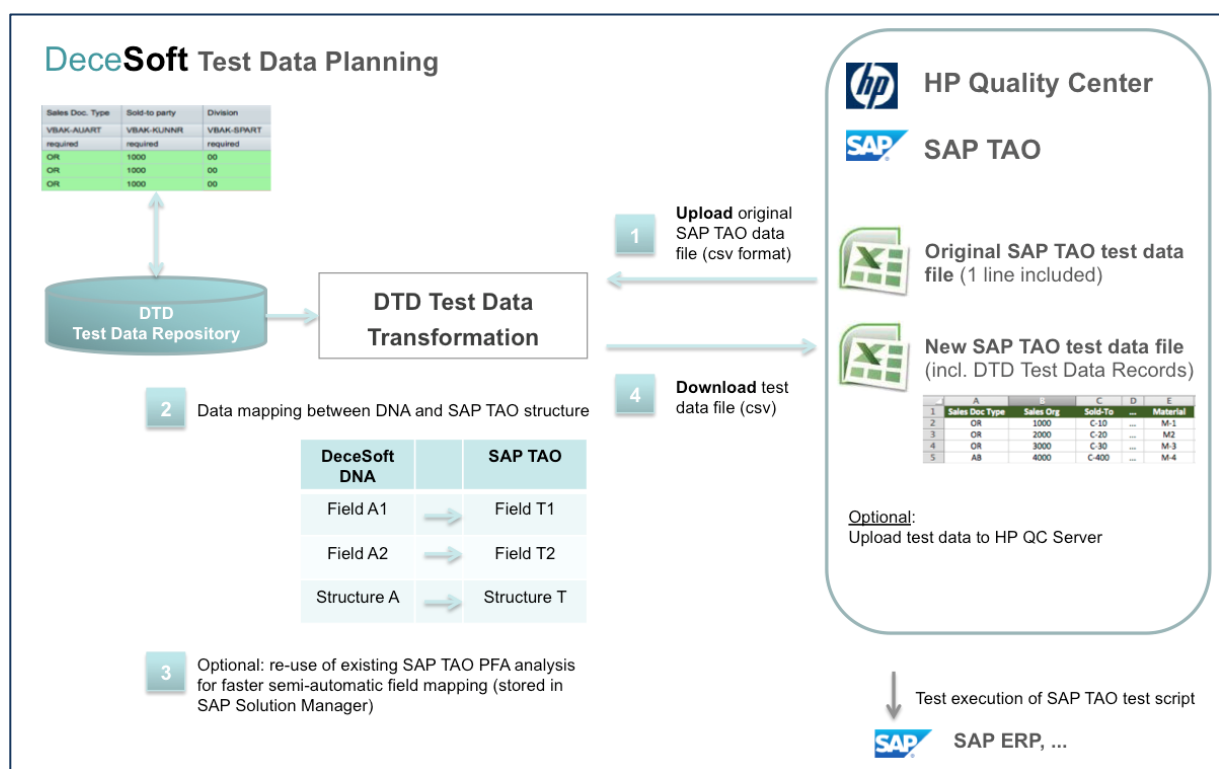


Figure 18: Test data provisioning for SAP TAO

The following steps need to be performed to provide DTD test data for SAP TAO

- **Step 1:** Similar to the other Test Data Transformation options, the user defines a DTD transformation rule to map the DNA structure with the SAP TAO data format as a one-time activity. As part of the transformation definition, the user uploads the SAP TAO data file (converted to .xml or .csv) which was created during SAP TAO test script generation. This original SAP TAO data file contains probably only 1 default test data record.
- **Step 2:** Next, the user defines the mapping how the receiver fields of the SAP TAO data file are populated by the sender fields of the Test Data DNA. DTD provides a field mapping proposal to accelerate this step. If no appropriate Test Data DNA field is available for some SAP TAO parameters, the user can indicate a fixed value or an input variable to be used. SAP data dictionary table and field information is displayed in addition for Test Data DNA fields, allowing proper

mapping to SAP TAO file parameters. The user can also display information on the underlying data structures (Data Element, Length) in additional columns.

- **Step 3:** as an additional option the user can select an existing SAP TAO Process Flow Analysis (PFA) stored in SAP Solution Manager to enable fast, convenient and semi-automatic data mapping, since the PFAs contain precise SAP table field information used by the SAP TAO data file.
- **Step 4:** finally, the user executes the DTD Transformation to download test data into the SAP TAO file for subsequent test execution. The user can select suitable Test Data Records based on filtering for all fields of the Test Data DNA as well as the respective plan status and validation status. Finally, the selected Test Data Records are exported in the SAP TAO file (figure 19) and can be executed by SAP TAO test scripts.

J	G	H	I	J	K	L	M	N	O	P
1	DT_SAPTRANSACTIONCODE	DT_EXP	DT_VA01_0101_ORDER_TYPE	DT_VA01_0101_SALES_ORGANIZATION	DT_VA01_0101_DISTRT	DT_VA01_0101_0	DT_VA01_0101_4701_SOLDTO_PARTY	DT_VA01_0101_4701_SOLDTO_PARTY	DT_VA01_0101_4701_SOLDTO_PARTY	DT_VA01_0101_4701_SOLDTO_PARTY
2	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
3	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
4	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
5	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
6	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
7	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
8	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
9	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
10	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
11	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
12	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
13	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
14	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
15	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
16	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
17	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
18	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
19	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
20	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
21	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
22	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
23	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300
24	VA01	VA01	OR	1000	12	00	12345	2300	2300	1400-200
25	VA01	VA01	OR	1000	10	00	12345	1000	1000	T-AQ300

Figure 19: SAP TAO data file with test data downloaded from DTD

Summary

Many SAP customers have automated their manual tests to speed up regression tests of SAP business processes. During test execution they realize that test data with low quality leads to test failures and delays and thus lowering the test efficiency significantly. The quality of the required test data can be enhanced using DeceSoft Test Data which provides advanced functionality for test data planning, validation and provisioning for all major test automation tools. DTD is an add-on application for SAP Solution Manager and was certified by SAP in 2012.

About DeceSoft

DeceSoft GmbH is a Germany based independent software company (ISV) with development facilities in various European countries. The DeceSoft team has long-ranging experience with SAP solutions and is specialized in the development of add-on software products that compliments and extends functionality provided by SAP solutions. DeceSoft can be reached via the following E-Mail address: info@decesoft.de Company website: www.decesoft.com

Appendix

Appendix 1: DTD software deployment as SAP Solution Manager add-on

DeceSoft Test Data (DTD) Release 1.0 consists of two software packages which are deployed in your SAP system landscape as add-ons.

DTD core application

The main functionality of DTD labeled as DTD core application is deployed as add-on to your SAP Solution Manager system. DTD comes with its own set of functions and tables in the DeceSoft namespace. No modifications to SAP objects or any other software components result from the deployment of the DTD core application. DTD does not interfere or alter any SAP standard functions or content of SAP tables. Data created through DTD will be stored in DTD tables only.

DTD plug-in

DTD test data planning functionality provides advanced planning features in the context of your SAP Business Suite systems. To enable this functionality, DTD requires read access to these SAP systems which is realized via a DTD plug-in and deployed in SAP systems of your choice. The DTD core application communicates through standard remote function calls (RFC) with the DTD plug-in of the SAP systems. The DTD plug-in performs read actions only and does not change any data in the connected SAP Business Suite system. The DTD plug-in concept follows the same architecture approach as the SAP Solution Manager plug-in ST-PI. Please note that DTD plug-in needs to be deployed on SAP Solution Manager as well.

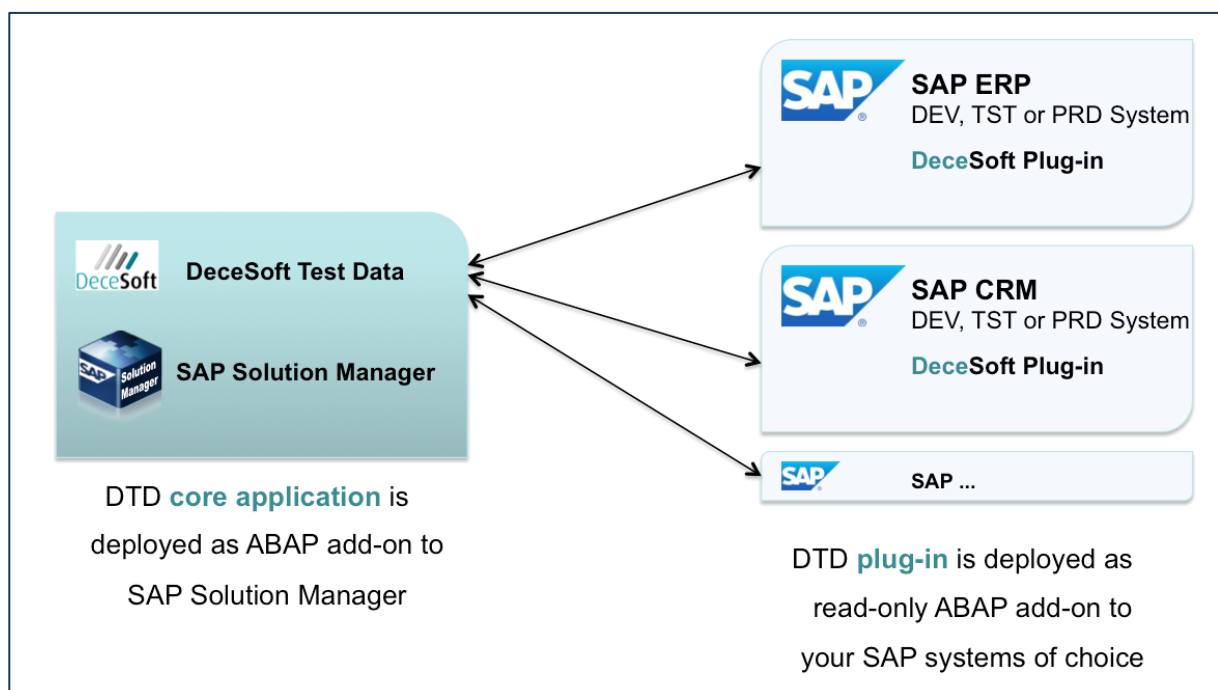


Figure 20: Deployment of DTD core application and DTD plug-in

The integration between DTD Release 1.0 and SAP was certified by SAP in 2012. You can view the certification status in the SAP Partner Information Center as shown in figure 21 below.

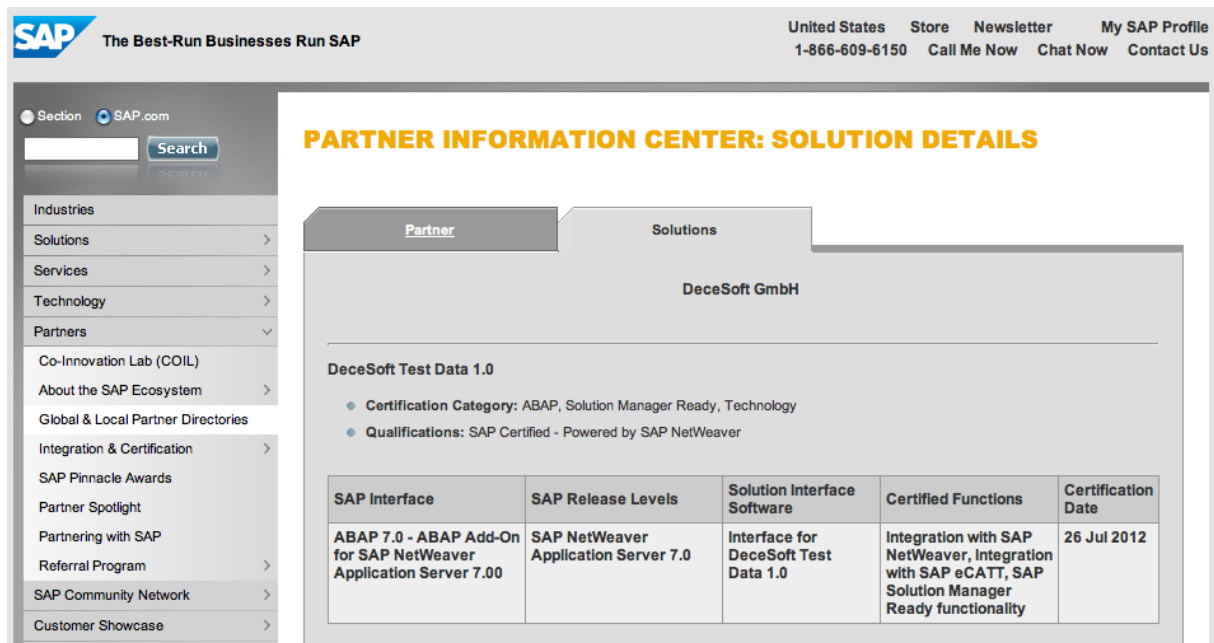


Figure 21: SAP Partner Information Center – DTD Release 1.0 certification

Appendix 2: Setup of DeceSoft Test Data

After deployment of the DTD software the following DTD setup activities shall be performed in DTD view "Administration":

1. User Defaults (optional)
2. Test Data DNA Hierarchies (optional)
3. SAP Systems with deployed DTD Plug-in for your user
4. Relation Process Step – SAP Tables (optional)

DTD view Administration - User Defaults

In this optional view the user can specify a SAP Business Suite system and client that shall be used by DTD as default SAP system for test data planning activities. In addition the user can select a SAP Solution Manager Project and its assigned Business Blueprint as a secondary hierarchy for Test Data DNA assignments.

DTD view Administration - Test Data DNA Hierarchies

In this optional view the user can flag whether the Business Blueprint of a SAP Solution Manager Project shall be used as secondary hierarchy for Test Data DNA assignments

DTD view Administration - SAP Systems with deployed DTD Plug-in for your user

This view allows the user to perform access checks to SAP Business Suite systems, which are called „managed systems“ in the SAP Solution Manager terminology. The purpose of this check is to verify that the current user has access rights to managed systems and that the DTD plug-in is installed and can be reached by the user. The access check can be performed for all managed systems registered in SAP Solution Manager (DTD button „Check SAP Systems“) or for one particular managed system (DTD button „Add Single System“). The access check results are displayed including

- SAP system and client
- RFC used to access the managed system
- Flag „Active“ indicating that the DTD Plug-in is active in the SAP system
- Flag „Trusted System“ shows which systems are accessed via trusted RFC. This entry will only be shown in case your user is setup accordingly.

- Time stamp of the access check
- Button to perform another access check for the selected SAP system

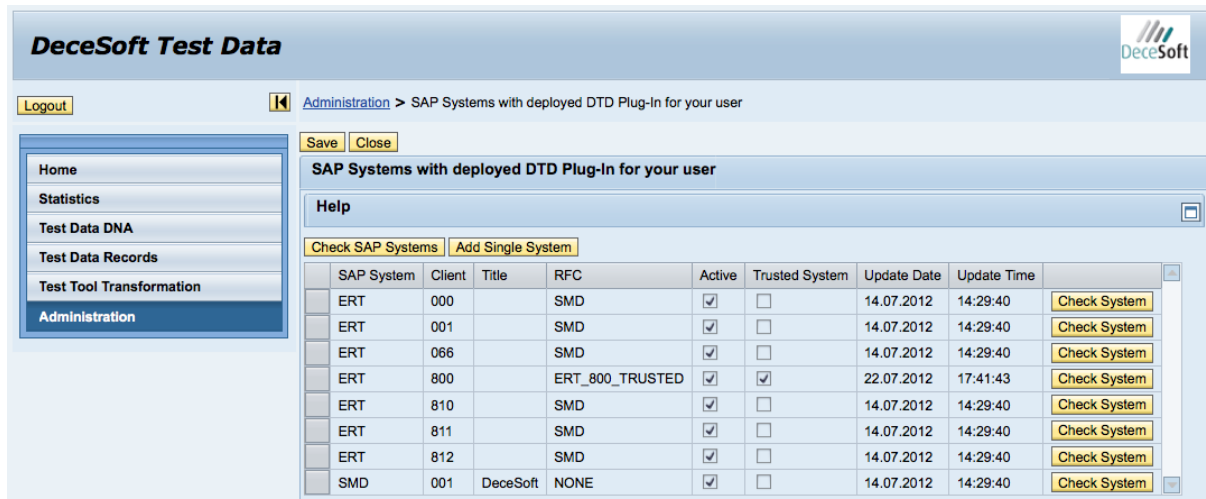


Figure 22: DTD Administration - SAP Systems with DTD Plug-In

DTD view Administration - Relation Process Step – SAP Tables

DTD identifies SAP tables used by Process Steps (executables like transactions, reports, etc.) during setup of Test Data DNA. The identified SAP tables are automatically stored in the DTD Admin view „Relation Process Step – SAP Tables“.

DTD differentiates SAP tables in „Single Field Tables“, i.e. SAP tables including fields that appear on the screen of a SAP business transaction as single fields and allow the user to enter only 1 value. One of these tables are flagged by DTD as „Top Single Table“. The second type of SAP tables is labeled by DTD as „Matrix Field Tables“ containing fields that are used by SAP business transactions in the user interface as structure or tables, allowing the user to enter multiple rows of data.

Besides the relationship of process step and SAP tables, this view stores the „Secondary Executable“ which represents in most circumstances the „display transaction“. The secondary executable is used by DTD to allow the user to find suitable business documents that have been posted in the selected SAP system.

The content listed in this DTD view is used to speed up the definition of DNAs for business transactions that have been used before to define DNAs.

The user can use this administration view for the following purposes:

1. Overview of primary and secondary executables, e.g. create and display transaction
2. Overview of SAP tables are associated for a selected business transactions which has been used to define a Test Data DNA.
3. The user can download the content to MS Excel(.csv format).
4. The user can create additional content and uploads a local file (.xml or .csv format).

DeceSoft Test Data

DeceSoft

Administration > Relation Process Step - SAP Tables > Edit SAP tables

ViewDetailNew RowDelete RowDownloadUpload local file (.xml or .csv)SaveClose

Relation Process Step – SAP Tables

Help

Filter

	Type Primary Executable	Primary Executable	Type Secondary Executable	Secondary Executable	Top single fields table 1	Single fields table 2	Single fields table 3	Matrix fields table 1	Matrix fields table 2	Matrix fields table 3
	Transaction	KS01	Trans ...	KS03	CSKS			CSKT		
	Transaction	ME21N	Trans ...	ME23N	EKKO			EKET	EKKN	EKPO
	Transaction	ME51N	Trans ...	ME53N	EBAN			EBKN		
	Transaction	MIGO	Trans ...	MB51	MKPF			MSEG		
	Transaction	MIRO	Trans ...	MIR4	RBKP					
	Transaction	MM01	Trans ...	MM03	MARA			MARC	MARD	
	Transaction	SU01	Trans ...	SU01D	US ...	ADRP	US ...	UST04		
	Transaction	VA01	Trans ...	VA03	VBAK			VBAP		
	Transaction	VA21	Trans ...	VA23	VBAK			VBAP	VBEP	

Figure 23: DTD Administration – Relation Process Step – SAP Tables

From the overview list shown in figure 23, the user can select an entry and to view the information with additional information such as the transaction and table texts.

DeceSoft Test Data

DeceSoft

Administration > Relation Process Step - SAP Tables > Edit transaction VA01

ViewRead textsView Table ContentSaveBack

Relation Process Step – SAP Tables

Help

	Executable Type	Executable ID	Executable Text
Primary Executable	Transaction	VA01	Create Sales Order
Secondary Executable	Transaction	VA03	Display Sales Order
Single fields table			
	Table	Table Text	
1 (Top Table)	VBAK	Sales Document: Header Data	
2			
3			
4			
5			
Matrix fields table			
	Table	Table Text	
1	VBAP	Sales Document: Item Data	
2			
3			
4			
5			

Figure 24: DTD Administration – Relation Process Step – SAP Tables – Detail for VA01

Example 1: Relation Process Step – SAP Tables for Business Process „Order to Cash“

Process Step	Primary executable	Secondary executable (display)	Top single fields table	Matrix table 1	Matrix table 2	Matrix table 3
Quotation	VA21	VA23	VBAK	VBAP	VBEP	
Sales Order	VA01	VA03	VBAK	VBAP	VBEP	VBBE
Delivery	VL01N	VL03N	LIKP	LIPS		
Goods Issue	VL02N	MB03	MKPF	MSEG		
Billing	VF01	VF03	VBRK	VBRP		

Figure 25: Relationship between SAP transactions and SAP tables for business process Order to Cash. (Disclaimer: only the most important SAP tables are listed)

Example 2: Relation Process Step – SAP Tables for Business Process „Procure to Pay“

Process Step	Primary executable	Secondary executable (display)	Top single fields table	Matrix table 1	Matrix table 2	Matrix table 3
Purchase Requisition	ME51N	ME53N	EBAN	EBKN		
Purchase Order	ME21N	ME23N	EKKO	EKPO	EKKN	EKET
Goods Receipt	MIGO	MB51	MKPF	MSEG		
Invoice Receipt	MIRO	MIR4	RBKP			
Outgoing Payment	F-58	FB03	BKPF	BSIS		

Figure 26: Relationship between SAP transactions and SAP tables for business process Procure to Pay. (Disclaimer: only the most important SAP tables are listed)

Appendix 3: DTD Test Data DNA for SAP business transaction „Create Sales Order“

A Test Data DNA compiles all fields (single fields) and structures (matrix fields) for which values are required during execution of the business transaction triggered by the automated test script. The DNA is therefore the data structure and foundation for test data planning. When building test scripts for SAP transactions, the Test Engineer will decide which fields are required for the variant of the test script. The following examples show a simple DNA for SAP business transaction „Create Sales Order“ (T-Code VA01)

Type	DNA field	Field name	Example value	Example value
Single fields				
	VBAK-AUART	Sales Document Type	OR	
	VBAK-VTWEK	Distribution Channel	10	
	VBAK-SPART	Division	00	
	VBAK-VKORG	Sales Organization	1000	
	VBAK-KUNNR	Sold-to-Party	CUST-01	
Matrix fields				
	VBAP-KWMENG	Order Quantity	50	60
	VBAP-MATNR	Material	p-100	p-200

Figure 27: DTD Test Data DNA – structure overview

Please note:

DTD differentiates between SAP tables that contain fields where only 1 field value is required for a business transaction (Single field table) and SAP tables where field values from multiple rows are used when executing a business transaction (Matrix field table).