Direct Link User Guide

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Direct Link User Guide

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1. Getting started

Direct Link enables you to locate and retrieve data from SAP ERP systems for further analysis in *ACL*.

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1.1. About *Direct Link*

Direct Link adds SAP ERP data selection and extraction capabilities to the data access, analysis, and reporting capabilities of *ACL*. It allows you to connect to your SAP system and extract data for use in *ACL*.

Direct Link extracts data based on queries you create by selecting tables, fields, and filters. Your SAP security authorization determines which tables you can access. You can run your query immediately and download the results to an *ACL* table, or you can run the query as a background process and store the extracted data on the SAP server to retrieve later.

Creating a *Direct Link* query typically involves the following steps:

1. Connect to the SAP system and log in.

2. Add one or more tables to your query. If you add more than one table, you need to identify the relationships between the tables.

3. Select the fields to include in the query.

4. Add filters to limit the results returned by the query.

5. Submit the query to the SAP system.

6. Use *ACL* to analyze the data produced by the query.

Benefits to your organization

The following are some of the advantages and benefits your company will gain from using *Direct Link*:

- **Empowers users** – *Direct Link* provides direct and seamless access to SAP tables and displays additional information about SAP fields and tables.

- **Saves time and resources** – *Direct Link* reduces requests for customized ABAP extracts and extract programs.

- **Minimizes data analysis costs** – *Direct Link* does not require any expensive middleware or hardware. The product is quick to install and easy to learn, offering a rapid return on investment.

- **Ensures data integrity** – *Direct Link* provides users with read-only access to the SAP source data, which ensures that they cannot make changes to the original data.

- **Respects existing SAP security authorizations** – *Direct Link* limits users to the tables in the SAP system that they have the appropriate SAP security authorizations to view and extract data from.

1.2. User interface overview

When you work with *Direct Link* you will use the main window to create your queries. The main window titlebar displays the name of the SAP system you are connected to and the name of the active query.

Figure 1. Main *Direct Link* window
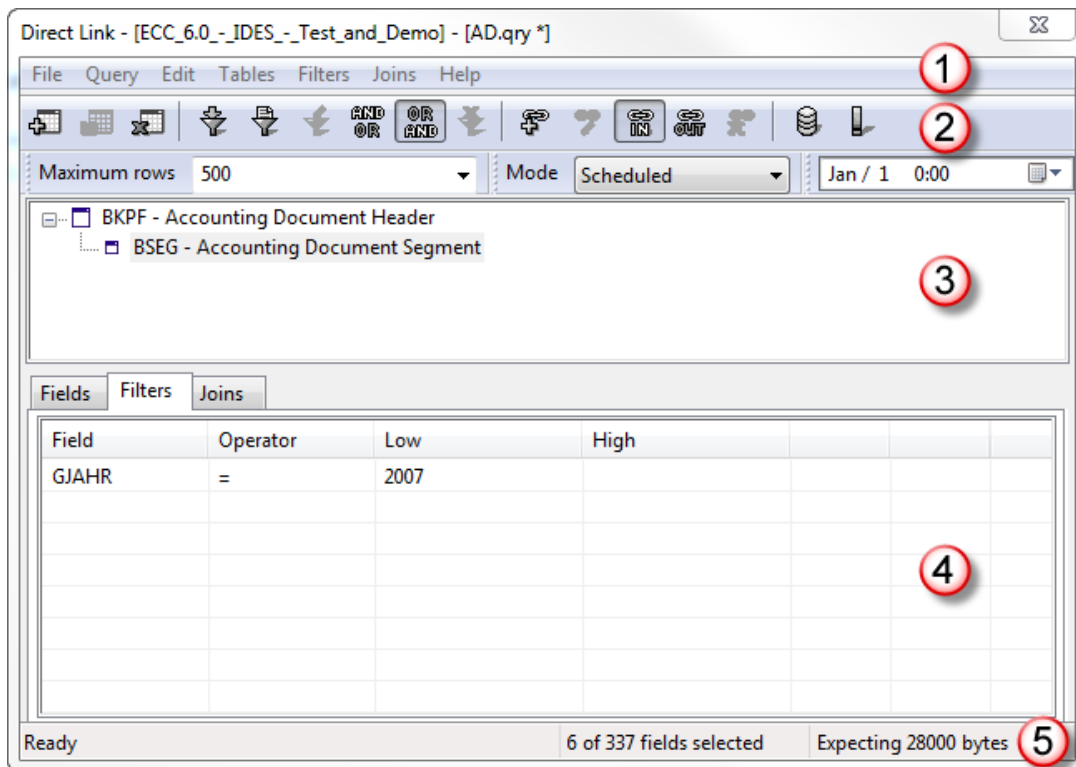
The main *Direct Link* window (Figure 1) includes the following user interface elements:

1. **Main menu** – The main menu provides access to all of the commands you can use to create, work with, and save your queries.

2. **Toolbar** – The first row of the toolbar provides quick access to commonly used commands. The second row allows you to specify the maximum number of rows a query can retrieve, and allows you to select the extraction mode for the query.

> **Important**
>
> Limiting the value in the **Maximum rows** text box is useful for reducing the amount of data returned when you are creating and modifying queries. However, when you are submitting queries where the result will be used in your analysis, you must ensure that the All option is selected to ensure that all of the matching records are returned.

3. **Table treeview** – The table treeview lists the tables included in the query.

4. **Query tabs** – There are three tabs in this area that list the following information:

   - **Fields** – This tab displays the fields that are available for inclusion in the query. Fields included in the query are identified by a checkmark in the first column.

   - **Filters** – This tab displays the filter(s) that will be applied when the query is submitted. Information about each filter includes the field being filtered on and the filter criteria.

   - **Joins** – This tab list the fields that are being used to join tables together.

5. **Status bar** – The status bar displays the number of fields selected and the estimated size of the query results.

Related tasks

Configuring Direct Link options

1.3. Usage guidelines

Direct Link gives you the ability to perform queries on SAP tables, many of which contain large amounts of data. You must use caution when querying your SAP ERP system.

You may negatively impact the performance of the SAP system if you create a query that retrieves all of the records from a table, or group of tables. You should adhere to the following guidelines to minimize your impact on the SAP system:

- Understand your data. If you are not sure of the table data you want, research prior to constructing your query. Perform small queries (first 100 records without filters) until you are confident that you have isolated the data you want. Once you have isolated the data, you can retrieve the full data set.

- Whenever possible, construct queries that join tables, or filter, on columns that are indexed to improve query performance.

- Refine your query on a test system (if you have access to one), prior to submitting it to the production system.

- Avoid submitting queries during peak usage periods for the SAP system. Consult your SAP Basis Administrator to determine your company's peak hours.

- Consult your SAP Basis Administrator prior to submitting large queries. There may be a preferred time to submit large queries.

- Retrieve the results of your background queries. Files not retrieved take up excessive room on the SAP server, and the *Direct Link* directory may run out of space.

1.4. Character encoding of SAP data

Direct Link enables users to work with both non-Unicode and Unicode SAP ERP systems. The way *Direct Link* reads character fields from these systems depends on the edition of *ACL* you are using.

ACL Unicode Edition

If you are using the Unicode edition of *ACL*, data is always read directly from the SAP system. When you connect to a Unicode SAP system, data is downloaded as Unicode and displayed as Unicode data in *ACL*. When you connect to a non-Unicode system, data is downloaded in the code page it is encoded in and displayed in *ACL* using that code page. The Unicode edition of *ACL* supports ASCII, EBCDIC, and Unicode character data.

ACL Non-Unicode Edition

If you are using the non-Unicode edition of *ACL* to access a SAP system, the behavior depends on the type of system you are accessing. If you access a non-Unicode SAP system, data is downloaded in the code page it is encoded in and displayed in *ACL* using that code page.

If you access a Unicode SAP system, the Unicode SAP fields must be converted before they can be read in *ACL* because the non-Unicode edition of *ACL* does not include a Unicode data type. When you run a *Direct Link* query on a Unicode SAP system from the non-Unicode Edition of *ACL*, character fields are converted from Unicode to ASCII fields when the query results are extracted from the SAP system. The character encoding of the computer that submits the query determines the code page used to encode the results of the query. For example, if you submit a query to a Unicode SAP system from a workstation where the language is set to English (United States), the code page will be set to Windows-1252, which is the code page for displaying English ASCII characters in Windows.

You need to keep the following points in mind if you need to import data from a Unicode SAP system with the non-Unicode edition of *ACL*:

- The **Regional and Language Options** settings in the Windows **Control Panel** determine the code page setting on the computer. *Direct Link* gets this code page information when a query is submitted and converts the data from Unicode to the appropriate code page when the data is extracted.

- If the characters in your SAP data span more than one code page (e.g., a column has some rows with Russian text and others with Chinese text) some of the data (i.e., the text that doesn't use the code page the computer is set to) will not be interpreted correctly and will be displayed as unrecognizable characters.

- The record length and field length cannot be calculated accurately for double-byte code pages that do not always use two characters.

- If a character cannot be converted to the destination code page, it will be replaced by a number sign character (#).

- Only text fields are affected by code page conversions. Numeric and datetime fields are not affected.

1.5. Starting *Direct Link*

You need to start *ACL* and log in to a SAP ERP system to use *Direct Link*.

To start *Direct Link*:

1. Open *ACL*.

2. Do one of the following:

   - Select **Data** > **External Data** > **SAP** > **Create Query**.

   - Select **File** > **New** > **Table** to start the **Data Definition Wizard**. If the **Select Platform for Data Source** page is displayed, select **Local** and click **Next**. In the **Select Local Data Source** page, select **SAP** and click **Next** to launch *Direct Link*.

- Click **Create Query** in the *ACL* toolbar (if you have customized the toolbar to include this option).

3. In the **Logon** dialog box, select the SAP system you want to connect to and click **OK**. If you want to update the dialog box with the latest system information configured for the SAP GUI, click **Refresh** and then click **OK** in the confirmation dialog box.

Note

You must be logged in as an Administrator, or run ACL as an Administrator, to refresh the values in the **Login** dialog box.

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4. In the **SAP Logon** dialog box, enter the following information:

   - **User name** – The username required to access the SAP system.

   - **Password** – The password required to access the SAP system.

   - **Client** – The number assigned to the SAP subsystem you want to connect to.

   - **Language** – The one or two letter character code for the language you want to use to access the SAP system. The code must correspond to a language configured on the SAP system.

Note

The information required in the **SAP Logon** dialog box is the same as the information required to log in to the SAP system through the SAP Logon Pad.

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5. Click **OK**.

   If you log in successfully, *Direct Link* starts and the **Add Table** dialog box is displayed. You will not be prompted for your SAP logon credentials until you end the session by closing the *Direct Link* window.

2. Working with SAP tables

The topics in this section cover how to use *Direct Link* to select the tables you need from the SAP system, and to identify the relationships between related tables in the SAP system.

Section contents

2.1. About SAP tables

Direct Link enables you to create queries that allow you to access data from all of the tables you have been granted rights to in a SAP ERP system.

Direct Link provides several ways to locate and access the data you need in your SAP system. You can use the **Add Table** dialog box to search for particular tables or fields, or you can browse for particular tables by the application area they are associated with in the SAP system.

After you add a parent table to your query, you can use the **Related** tab to select child tables that have common columns with the parent table. A parent table is the main table for your query, and is also the first table you add. Child tables are tables that share common columns with the parent table. You can select child tables to join to the parent table to create a single table in *ACL* with data from both SAP tables.

Related tasks

Adding tables by searching
Adding tables by browsing
Deleting tables

2.2. Adding tables by searching

You can use the **Search** tab to locate the data you need in the SAP system. You can search for tables by table name or table description, or for fields by field name or field description.

The tables you can access depend of the level of your SAP security authorization. Restricted tables are not displayed in the search results. Contact your SAP Basis Administrator if you want to request access to restricted tables.

To add a SAP table by searching:

1. Select **Tables** > **Add**.
2. In the **Add Tables** dialog box, click the **Search** tab.
3. Select one of the following options from the **Search by** drop-down list:
   - **Table Name** – Searches the names of SAP tables.
   - **Table Description** – Searches the descriptions of SAP tables.
   - **Field Name** – Searches the names of fields in SAP tables.
   - **Field Description** – Searches the descriptions of fields in SAP tables.
4. Enter the search string you want to find in the **Search for** text box.

You can enter the exact string, or you can use the wildcard character (*) and enter only part of the name or description you are searching for. If you do not use the wildcard character, the search only locates tables that exactly match the search string. The search string is case-sensitive for table description and field description searches. It is not case-sensitive for table name and field name searches.

Tip

If you leave the **Search for** text box blank, the system displays all of the table names you are authorized to view.

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5. Select the table types you want to search from the following list. All table types are selected by default.

   - **Transparent** – Logical tables that have the same structure as the underlying physical table structure. Transparent tables typically store data that has commercial relevance.

   - **Pooled** – Logical tables in the ABAP Dictionary that are assigned to a table pool. Pooled tables are used to store internal application data, such as screen sequences, program parameters, and documentation.

   - **Clustered** – Logical tables that are assigned to a table cluster. Clustered tables are used to store internal application data, such as screen sequences, program parameters, and documentation.

   - **Views** – Virtual tables created from the results of stored queries. Views can include a subset of the data in a single table, or data from multiple physical tables joined into a single virtual table.

6. Click **Search**.

7. Select the table to add to your query from the list of results and click **OK**.

Related concepts

About SAP tables

2.3. Adding tables by browsing

You can use the **Application Areas** tab to browse tables in the SAP system by application area.

Browsing for tables is useful when you do not know, or cannot remember, the name of a particular table, but you know the type of data it contains.

A lock icon is displayed next to any application areas that you do not have the necessary SAP security authorizations to access. To request access to restricted tables, contact your SAP Basis Administrator.

To add a SAP table by browsing:

1. Select **Tables** > **Add**.

2. In the **Add Tables** dialog box, click the **Application Areas** tab.

3. Navigate through the treeview and select the table you want to add to your query.

4. Click **OK**.

Related concepts

About SAP tables

2.4. About related tables

Related tables allow you to include fields from a number of SAP tables in your *ACL* table. After you add a parent table to your query, you can add related tables to it.

Normally, you can add up to seven tables in a query, including the parent table. However, if you add a clustered or pooled table to your query, the maximum is five tables. A related table is also called a child table.

In *Direct Link*, a table can be a related table if it meets one, or both, of the following criteria:

- There must be at least one corresponding field in the child table's primary key and the primary key of the parent table.

- There must be a relationship between the child table and the parent table in the SAP data model.

Related tasks

Adding related tables

2.5. Adding related tables

You can use the **Related** tab in the **Add Table** dialog box to add tables that are related to the parent table.

The **Related** tab is only enabled after you add a parent table.

To add a related table:

1. Select **Tables** > **Add**.

2. In the **Add Child Table** dialog box, select the related table to add and click **OK**.

3. In the **Selected Joins** dialog box, click **Yes** to join the tables on the column(s) *Direct Link* has identified, or click **No** to create the join manually.

4. If you clicked **No** in the previous step, you need to complete the following steps to manually create at least one join between the tables in the **Add Join** dialog box:

    a. Select the field you want to include in the join from the **Parent** drop-down list.

    b. Select the field you want to include in the join from the **Child** drop-down list.

    c. Click **OK**.

5. If you need to join the table on additional fields, select **Joins** > **Add** and specify the appropriate columns in the **Parent** and **Child** drop-down lists and click **OK**.

Related concepts

About related tables

2.6. About joining tables

Direct Link enables you to join two related tables in the SAP system as a single table in your query.

Direct Link supports the following two types of joins:

- **Inner join** – Creates a record in the joined table for each record in the child table that has a matching record in the parent table.

- **Left Outer Join** – Creates a record in the joined table for each record in the child table that has a matching record in the parent table, plus a record for every unmatched record in the parent table. You cannot join more than two tables using a Left Outer Join.

  Note

  The Left Outer Join option is not supported for clustered or pooled tables.

When you add a related child table to a master table, *Direct Link* compares the primary key fields in the two tables. If any of the fields match, *Direct Link* displays a dialog box suggesting that you join the tables on the matching fields.

  Tip

  You can configure *Direct Link* to automatically join the tables on the matching fields by selecting the **Accept system suggested joins** checkbox in the **Options** dialog box. If this option is selected the **Suggested Joins** dialog box will not be displayed.

Direct Link suggests columns to use to join tables by applying rules to compare the columns in the two tables. In some cases, you will want to join the tables on these suggested fields. In many cases, however, you need to understand your data so you can determine whether some, or all, of the suggested fields should be included in the join. You can accept the suggested join and delete the joins that are not required, or you can join the tables manually on some of the suggest fields, or you can select different fields to join the tables on. If *Direct Link* does not identify any matching fields, you need to select the fields to join the tables on. The fields you join on must be of the same data type and size, but the names can be different.

The **Joins** tab lists the fields used to join the parent and child tables.

Related tasks

Joining tables
Editing joins
Deleting joins
Configuring Direct Link options

2.7. Joining tables

You can create a join between two tables with related information when you want to include information from both tables in a single *ACL* table. You can join tables on a single column, or on more than one column.

To create a join manually:

1. In the *Direct Link* window add a parent table and at least one child table. The **Joins** > **Add** menu item is disabled until a child table is added.

2. Select the child table you want to join to the parent table in the table treeview and select **Joins** > **Add**.

3. If the **Suggested Joins between [Parent table] and [Child table]** dialog box is displayed, click **Yes** to join on the suggested columns or **No** to specify the columns to join on individually.

4. If you clicked **No** in the **Suggested Joins** dialog box, or the dialog box was not displayed, the **Add Join Between [Parent table] and [Child table]** dialog box is displayed. Select the fields from the parent table and the child table to join on and click **OK**.

   To join on a field, the field in the parent table and the child table must have the same data type and length.

5. Click **OK**.

6. Repeat steps 4 and 5, if necessary, to join the tables on additional columns.

7. By default the join type is a Inner Join. If you want to specify a Left Outer Join, select **Joins** > **Left Outer Join**.

   The two type of joins return different result sets. An Inner join returns a record for every match between the child table and the parent table. A Left Outer Join returns a record for every match between the parent and child table, plus a record for every record in the parent table that does not have a match in the child table.

Related concepts

About joining tables

2.8. Editing joins

You can edit a join if you want to change the column in the parent table or child table that is included in the join.

To edit a join:

1. In the *Direct Link* window, select the child table you want to remove the join from in the table treeview.

2. Select the **Joins** tab.

3. Select the join you want to edit.

4. Select **Joins** > **Edit**.

5. Modify the selected columns in the **Edit Join** dialog box and click **OK**. You must ensure that the selected columns have the same data type and length.

Related concepts

About joining tables

2.9. Deleting joins

You can delete a join between the parent table and child table if you do not want to link the tables based on the specified column.

If you remove the last join from a child table, a message is displayed indicating that the child table will be removed.

To delete a join:

1. In the *Direct Link* window, select the child table you want to remove the join from in the table treeview.
2. Select the **Joins** tab.
3. Select the join(s) you want to delete. You can select an individual join, or **Ctrl+click** to select multiple joins.
4. Select **Joins** > **Delete**.
5. Click **Yes** in the confirmation dialog box.

Related concepts

About joining tables

2.10. Viewing indices

You can use the **Indices** dialog box to view the indexes that are associated with the selected table.

You can use this information to optimize the speed of your query if the columns the tables are joined on, or filtered on, correspond to the columns in an index. A table is always indexed on the primary key columns, but one or more additional indexes may be associated with a table.

To view the indices for a table:

1. In the *Direct Link* window, select the table you want to view indices for in the table treeview.
2. Select **Tables** > **Show Indices** to display the **Indices** dialog box.

   If any indexes are associated with the table, they are displayed in the **Indexes for [table name]** dialog box. If the dialog box is empty, no additional indexes are associated with the table.
3. When you have finished viewing the indices, select **Tables** > **Show Indices** again to close the dialog box.

2.11. Deleting tables

You can delete tables from your query if you add the wrong table from the SAP system, or if you added a table you do not want to include.

To delete a table from your query:

1. In the *Direct Link* window, select the table you want to delete in the table treeview.
2. Select **Tables** > **Delete**.
3. Click **Yes** in the confirmation dialog box.

Related concepts

About SAP tables

3. Working with SAP queries

The topics in this section cover how to work with queries in *Direct Link* to retrieve SAP data.

Section contents

Opening existing queries
Displaying queries
Saving queries
About fields
Selecting fields
About filters
Adding individual filters
Adding multiple filters
Editing filters
Deleting filters

3.1. Opening existing queries

You can open previously saved queries in *Direct Link* if you want to submit them to the SAP system again, or use them as a starting point for creating a new query.

To open an existing query:

1. Select **File** > **Open**.

   Note

   If you already have a query open with unsaved changes, you will
   be prompted to save the changes.

2. In the **Open** dialog box, select the *Direct Link* query you want to use and click **Open**.

Direct Link queries use .qry for the file extension and the **Open** dialog box filters on this extension by default.

3.2. Displaying queries

You can view the SQL statement used by *Direct Link* to select data from the SAP system.

Viewing the SQL syntax used in the query can assist with troubleshooting if you do not get the results you expect when you run the query.

To display a query:

1. Select **Query** > **Show**.
2. When you have finished viewing the query, click **OK** to close the **Show Query** dialog box.

3.3. Saving queries

You can save the queries you create in *Direct Link* whenever necessary.

To save a query:

1. Select **File** > **Save**.

   Changes to previously saved queries will be saved automatically to their save location in the file system. If the queries has not been saved yet, the **Save As** dialog box is displayed.

2. If the **Save As** dialog box is displayed, select the folder to save the query in, enter a file name, and click **Save**.

3.4. About fields

The **Fields** tab displays all of the columns in the selected SAP table. The **Fields** tab indicates each field's SAP data type and the equivalent *ACL* data type.

Table 1 lists the supported SAP data types, and the corresponding data types for both the non-Unicode and Unicode editions of *ACL*. When extracting fields, *Direct Link* converts SAP data types into the equivalent *ACL* data types.

Direct Link displays the following information about each field in the **Fields** tab:

- **Name** – The name of the field.

- **Description** – The description of the field.

- **SAP Data Type** – The SAP data type of the field in the SAP system.

- **ACL Data Type** – The *ACL* data type that corresponds to the SAP data type.

- **Length** – The field length specified as the number of bytes. For non-Unicode data, this value is equivalent to the number of characters. For Unicode data, this value is double the number of characters, since each character is represented by two bytes.

- **Decimals** – The number of decimal places included. This value is only displayed for numeric types.

Table 1. SAP to *ACL* field mappings

SAP Data Type	ACL Data Type	ACL Unicode Data Type	Description
ACCP	ASCII	Unicode	Posting Period YYYYMM
CHAR	ASCII	Unicode	Character string
CLNT	ASCII	Unicode	Client
CUKY	ASCII	Unicode	Currency key, referenced by CURR fields
CURR	Print	Print	Currency field, stored as DEC
DATS	Datetime	Datetime	Date field (YYYYMMDD) stored as char(8)
DEC	Numeric	Numeric	Counter or amount field with comma sign
FLTP	ASCII	Unicode	Floating point numeric, accurate to 8 bytes
INT1	Numeric	Numeric	1-byte integer, integer number <=254
INT2	Numeric	Numeric	2-byte integer
INT4	Numeric	Numeric	4-byte integer, signed integer
LANG	ASCII	Unicode	Language key
LCHR	ASCII	Unicode	Long character string
LRAW	Unsupported	Unsupported	Long byte string
NUMC	ASCII	Unicode	Character string with only digits
PREC	Numeric	Numeric	Precision of a QUAN field
QUAN	Numeric	Numeric	Quantity field
RAW	ASCII	Unicode	Uninterpreted sequence of bytes
RAWSTRING	Unsupported	Unsupported	Byte string of variable length
SSTRING	Unsupported	Unsupported	Short character string of variable length
STRING	Unsupported	Unsupported	Character string of variable length
TIMS	Datetime	Datetime	Time field (hhmmss), stored as char(6)
UNIT	ASCII	Unicode	Unit key for QUAN fields
VARC	ASCII	Unicode	Long character string

Related tasks

Selecting fields

3.5. Selecting fields

After you add one or more tables to your query, you need to select the fields to include in the query.

You should only select the fields that you want to include in your *ACL* table when the data is imported into *ACL*.

To select fields:

1. Click the **Fields** tab if it is not already displayed.
2. Choose the appropriate option(s) from the following list to select the fields to include in your query:

   - Select or deselect individual fields by clicking the checkboxes in the first column.
   - Select all fields by selecting the checkbox in the first column header, or by selecting **Edit** > **Select All Fields**.
   - Deselect all fields by deselecting the checkbox in the first column header, or by selecting **Edit** > **Deselect All Fields**.

Related concepts

About fields

3.6. About filters

You can use filters to extract a subset of records from a SAP table based on the criteria you specify. For example, you can use a filter to create a query that only returns records created after a certain date, or records where the filtered column is over a certain value.

If you specify multiple filters, you can also choose how the filters should be processed from the following options:

- **Filters** > **(Or) And (Or)** – Records are returned if both the first and the second condition are true.
- **Filters** > **(And) Or (And)** – Records are returned if either the first or the second condition is true.

If more than two filter conditions are specified, each pair of conditions will be evaluated from left to right. For example, if you have the following filter conditions they are evaluated in groups according to the two specified fields (BUKRS and GJAHR):

```
BUKRS=1000
```

```
GJAHR=1999
BUKRS=2000
GJAHR=2001
```

The default **(OR) AND (OR)** option evaluates the filters in the following way and returns records where both of the conditions are true:

```
(BUKRS=1000 OR BUKRS=2000) AND (GJAHR=1999 OR GJAHR=2001)
```

The **(And) Or (And)** option evaluates the filters in the following way and records where one of the conditions is true:

```
(BUKRS=1000 AND BUKRS=2000) OR (GJAHR=1999 AND GJAHR=2001)
```

You need to keep the following points in mind when creating filters:

- All filter values are case-sensitive.

- The format used in date and time fields in the **Add Filter** dialog box corresponds to your Windows date and time settings. To change the date and time format in *Direct Link*, you need to modify the date and time settings in the **Regional and Language Options** dialog box, which you can access through the Windows **Control Panel**.

Related tasks

Adding individual filters
Adding multiple filters
Editing filters
Deleting filters

3.7. Adding individual filters

You can create filters to restrict the records returned from SAP tables based on specific criteria.

To add a filter:

1. Select **Filters** > **Add**.
2. Select the field you want to filter on from the **Field** drop-down list.
3. Select the appropriate operator from the **Operator** drop-down list.
4. Enter the appropriate values in the **Low** and **High** text boxes.

   The selected operator determines the requirements of the **Low** and **High** fields. The **High** field is only enabled when the Between operator is selected.

   Table 1 lists the fields you are required to complete for each operator and the data types supported. If you use the Contains operator, you must include at least one wildcard character (*) with your filter value. For example, to locate all records where the letter **E** is the last character in the field, you need to enter ***E** in the **Low** field.

5. Click **OK**.

   The new filter is added to the Filters tab.

   Table 1. Filter operators

Operator	Name	Low field	High field	Data types supported
=	Equal to	Required	Not applicable	All types
<>	Not equal to	Required	Not applicable	All types
<	Less than	Required	Not applicable	All types
<=	Less than or equal to	Required	Not applicable	All types
>	Greater than	Required	Not applicable	All types
>=	Greater than or equal to	Required	Not applicable	All types
Between	Between	Required	Required	All types
Contains	Contains	Required	Not applicable	ASCII or Unicode only

6. If you have added more than one filter, you can specify how the filters should be evaluated from the following options:

- **Filters > (Or) And (Or)** – Records are returned if both the first and the second condition are true.

- **Filters > (And) Or (And)** – Records are returned if either the first or the second condition is true.

Related concepts

About filters

Related tasks

Adding multiple filters
Editing filters
Deleting filters

3.8. Adding multiple filters

If you need to filter on several values in a field, such as a list of client ID numbers, you can use the **Add List** command to create several filters for the field at once.

When you create a filter list, the equal to (=) operator is selected by default, but you can change the operator value for individual filter entries after they are created.

To add multiple filters:

1. Select **Filters** > **Add List**.
2. Select the SAP column you want to filter on from the **Field** drop-down list.
3. In the **Filter List** text box, enter each filter entry on a new line.
4. Click **OK**.

   Each filter entry in the **Filter List** text box is created as an individual entry in the **Filters** tab. Once the filters are created, you can edit them as necessary. For example, you can change the operator type.

5. You can specify how the filters should be evaluated from the following options:

- **Filters** > **(Or) And (Or)** – Records are returned if both the first and the second condition are true.

- **Filters** > **(And) Or (And)** – Records are returned if either the first or the second condition is true.

Related concepts

About filters

Related tasks

Adding individual filters
Editing filters
Deleting filters

3.9. Editing filters

You can edit filters in the **Filters** tab if you want to modify the results returned by your query.

To edit a filter:

1. Select the filter from the list, then select **Filters** > **Edit**.
2. Modify the filter values, as necessary, and click **OK**.
3. You can specify how the filters should be evaluated from the following options:

- **Filters** > **(Or) And (Or)** – Records are returned if both the first and the second condition are true.

- **Filters** > **(And) Or (And)** – Records are returned if either the first or the second condition is true.

Related concepts

About filters

Related tasks

Adding individual filters
Adding multiple filters
Deleting filters

3.10. Deleting filters

You can delete filters from the **Filters** tab if you want to remove restrictions placed on your query.

To delete a filter:

1. In the **Filters** tab in the main window, select the filter you want to delete.
2. Select **Filter** > **Delete**.
3. Click **Yes** in the confirmation dialog box.

Related concepts

About filters

Related tasks

Adding individual filters
Adding multiple filters
Editing filters

4. Retrieving SAP data

The topics in this section cover how to retrieve the data produced by your SAP queries.

Section contents

About submitting queries
Counting records
Submitting queries in Extract Now mode
Submitting queries in Background mode
Submitting queries in Scheduled mode
Retrieving Background mode query results
Refreshing SAP data

4.1. About submitting queries

There are three modes you can use to submit your queries using *Direct Link*: Extract Now, Background, and Scheduled. These modes determine how data is extracted from the SAP ERP system.

When you submit a query, you must select one of these modes:

- **Extract Now** – When this mode is selected, data is automatically retrieved from the SAP system and displayed in an *ACL* table. This mode is recommended for data extracts that are 488KB or less. You cannot perform other tasks in *ACL* while the query is running.

- **Background** – When this mode is selected, the SAP system stores the extracted data in a file for you to download at a later time. This mode is appropriate for data extracts larger than 488KB. You can perform other tasks in *ACL* while the query is running.

- **Scheduled** – When this mode is selected, the query is run at a specified time in the future. After the query is complete, the SAP system stores the extracted data in a file for you to download at a later time. This mode is appropriate for data extracts larger than 488KB.

Related tasks

Submitting queries in Background mode
Retrieving Background mode query results
Submitting queries in Extract Now mode

4.2. Counting records

You can count the number of records that will be returned by a query, before the query is submitted to the SAP system. This allows you to adjust your query if too many records will be returned, or select the appropriate mode to use based on the number of records.

To count the number of records in a table:

1. Add the table and add any necessary filters to your SAP query.

2. Click **Count Records** .

4.3. Submitting queries in Extract Now mode

You should submit queries in Extract Now mode when you want to immediately display the results of a small query (less than 488KB) in a new *ACL* table.

You should use Background mode for queries that return larger result sets.

To submit a query in Extract Now mode:

1. In the *Direct Link* window, select **Extract Now** from the **Mode** drop-down list.

2. Select **Query** > **Submit**.

3. In the **Save As** dialog box, enter the file name for the *ACL* data file, modify the location if necessary, and click **Save**.

4. Enter a name for your new *ACL* table and click **OK**.

   The results of the query are displayed in the new *ACL* table.

Related concepts

About submitting queries

4.4. Submitting queries in Background mode

Displaying the results of a Background mode query in *ACL* is a two-step process. First, you need to submit the query in background mode, and then after the query runs you need to retrieve the query results from the SAP system.

Note

You should submit queries in Background or Scheduled mode if the results of the query are greater than 488KB.

To submit a query in Background mode:

1. In the *Direct Link* window, select **Background** from the **Mode** drop-down list.

2. If you are required to submit the query to a specific server or server group, click **Servers** in the main toolbar and enter the **Server** name or **Server** group value and click **OK**.

3. Select **Query** > **Submit**.

4. In the **Save As** dialog box, enter the file name for the *ACL* data file, modify the location if necessary, and click **Save**.

5. Enter a name for your new *ACL* table and click **OK**.

   The *ACL* table and associated *ACL* data file are created, but the data file is empty until you retrieve the results of the query from the SAP system. The SAP system stores the extracted data in a file for you to retrieve when the query is complete.

Related concepts

About submitting queries

Related tasks

Retrieving Background mode query results

4.5. Submitting queries in Scheduled mode

Displaying the results of a Scheduled mode query in *ACL* is a two-step process. First, you need to submit the query in Scheduled mode, and then after the query runs you need to retrieve the query results from the SAP system.

Note

You should submit queries in Background or Scheduled mode if the results of the query are greater than 488KB.

To submit a query in Scheduled mode:

1. In the *Direct Link* window, select **Scheduled** from the **Mode** drop-down list.

2. Enter the date and time to run the query by doing any of the following:

   - Click the calendar drop-down menu and select the date to schedule the job in the calendar.

- Select the month or day value in the date and time field and use the up and down arrows to select the date to schedule the job.

- Select the hour or minute value and enter the scheduled time, or use the up and down arrows to select the hour and minute values to schedule the job.

3. If you are required to submit the query to a specific server or server group, click **Servers** in the main toolbar and enter the **Server** name or **Server** group value and click **OK**.

4. Select **Query** > **Submit**.

5. In the **Save As** dialog box, enter the file name for the *ACL* data file, modify the location if necessary, and click **Save**.

6. Enter a name for your new *ACL* table and click **OK**.

   The *ACL* table and associated *ACL* data file are created, but the data file is empty until you retrieve the results of the query from the SAP system. The SAP system stores the extracted data in a file for you to retrieve when the query is complete.

4.6. Retrieving Background mode query results

Before you can view the results of a Background mode query in *ACL*, you need to retrieve the result data from the SAP system.

> **Tip**
>
> If you know the name of the *ACL* table associated with the Background mode query you want to retrieve, you can double-click the table in the **Overview** tab in *ACL* to retrieve the query results from the SAP system.

To retrieve the results for a background query:

1. Do one of the following:

   - Select **Data** > **External Data** > **SAP** > **Retrieve Query Results**.

   - Click **Retrieve Query Results** in the *ACL* toolbar (if you have customized the toolbar to include this option).

2. In the **Retrieve Query Results** dialog box, select the table layout to retrieve and click **Retrieve**.

3. In the **SAP Logon** dialog box, enter your password for accessing the SAP system and click **OK**.

   The results of the background query are downloaded from the SAP system and displayed in the associated *ACL* table.

Related concepts

About submitting queries

Related tasks

Submitting queries in Background mode

4.7. Refreshing SAP data

You can update contents of an *ACL* table that was originally created by a *Direct Link* query with current data from the SAP system.

Refreshing an *ACL* table that was created using *Direct Link* will re-execute the *Direct Link* query used to create the table.

To refresh SAP data in an *ACL* table:

1. In the **Overview** tab in the *ACL* **Project Navigator**, right-click the table you want to refresh and select **Refresh from Source**.
2. Click **Yes** in the confirmation dialog box.
3. In the **SAP Logon** dialog box, enter your password for accessing the SAP system and click **OK**.

   The *ACL* table is updated with current data from the SAP system.

Related reference

REFRESH command

5. Configuring *Direct Link*

You can customize the default behavior of *Direct Link*, such as the way queries are submitted and the default settings for the **Add Tables** dialog box. You can also add the *Direct Link* command buttons to the *ACL* toolbar.

Section contents

Configuring Direct Link options
Customizing the ACL toolbar

5.1. Configuring *Direct Link* options

You can modify the default behavior of *Direct Link* in the **Options** dialog box.

To modify the default *Direct Link* options:

1. In the *Direct Link* window, select **Edit** > **Options**.
2. Specify the default options for the way SAP queries are handled in the **Query Submission** panel:

   - **Mode** – Specify the default extraction mode: Extract Now, Background, or Scheduled.

- **Maximum Rows** – Specify the default maximum number of records that queries return. The default value is 500.

3. Specify the default options for the **Add Tables** dialog box in the **Add Table Dialog** panel:

- **Default Tab (master)** – The tab selected by default when the dialog box is displayed before adding a master table.

- **Default Tab (child)** – The tab selected by default when the dialog box is displayed.

- **Next n rows** – The number of results to display when searching for tables in the dialog box. The value entered in this field is used in the button label in the dialog box. For example, if you enter 100 the button is called **Next 100**, and each time you click the button, the next 100 results from the query are displayed. The default value is 10.

- **Select all fields on add** – Specifies that all fields in the table should be automatically selected in the **Fields** tab when a table is added using the dialog box. If this option is not selected, none of the fields are selected when a table is added to a query.

4. Specify miscellaneous *Direct Link* options in the **Other** panel:

- **Descriptive column headers** – Display the field descriptions, rather than the field names, for the column headings of extract results.

- **Accept system suggested joins** – Automatically use the primary key fields identified by *Direct Link* to join tables.

- **Prompt to save query** – *Direct Link* will prompt you to save queries before they are submitted, if they have changes.

- **Sort by field descriptions** – Field lists in the **Add Filter** and **Add Join** dialog boxes will be automatically sorted by field description. If this option is not selected, field lists will be sorted by field name.

- **Allow empty tables** – Specifies that an empty table will still be created in *ACL* for queries that do not return any results. If this option is not selected, an error message is displayed when queries do not return any results.

- **Refresh Logon Pad** – Click this button to update the information displayed in the *Direct Link* **Logon** dialog box with the current SAP system information configured in the **SAP Logon Pad**.

5. Click **OK**.

Related concepts

User interface overview

5.2. Customizing the *ACL* toolbar

You can customize the *ACL* toolbar to include the *Direct Link*-specific **Create Query** and **Retrieve Query Results** toolbar buttons.

Clicking the **Create Query** toolbar button launches *Direct Link* and displays the **Logon** dialog box. Clicking the **Retrieve Query** toolbar button displays the **Retrieve Query Results** dialog box, which you can use to retrieve the results of queries run in Background mode from the SAP system.

To customize the *ACL* toolbar with *Direct Link* commands:

1. Start *ACL* and select **Tools** > **Customize**.
2. In the **Customize Toolbar** dialog box, complete one, or both, of the following steps:
   - Select **Create Query** in the **Available Toolbar Buttons** list and click **Add**.
   - Select **Retrieve Query Results** in the **Available Toolbar Buttons** list and click **Add**.
3. If you want to rearrange the order of the toolbar buttons, select the button you want to reorder and click **Move Up** or **Move Down**.
4. Click **Close**.

   The new commands are added to the *ACL* toolbar.

6. Automating *Direct Link* queries

You can use *ACL*Script commands to define *ACL* tables from SAP ERP data, refresh existing *ACL* tables, and optionally retrieve the results of background mode queries.

Section contents

About ACLScript commands
IMPORT SAP command
RETRIEVE command
REFRESH command

6.1. About *ACL*Script commands

You can use *ACL*Script commands to automate data access and analysis of *Direct Link* data, enabling you to automate repetitive tasks and standardize processes.

You can use the following *Direct Link*-specific *ACL*Script commands to access SAP data in your scripts:

- **IMPORT SAP** – Defines an *ACL* table based on a query that retrieves data from one or more SAP ERP tables.
- **RETRIEVE** – Retrieves the results of a query that was previously submitted for background processing.
- **REFRESH** – Refreshes the results of a pre-existing query in a script.

You can create scripts that *Direct Link*-specific commands and other *ACL*Script commands to preform additional data access or analysis tasks. For information about creating scripts, see "Working with scripts" in the *ACL Analytics User Guide*. For more information about *ACL*Script, see the *ACL Language Reference*.

6.2. IMPORT SAP command

Use this command to define *ACL* tables by importing data from SAP ERP systems.

Syntax

```
IMPORT SAP PASSWORD <n> TO <table_name> SOURCE "SAP AGENT" <import_details>
```

Parameters

PASSWORD *n*

> Specifies the password required to access the SAP system. If the required password value is not defined before the IMPORT SAP command is executed, *ACL* will prompt the user for their SAP password.

> **Tip**
>
> Use the `SET PASSWORD` command to define the password in the script before using the IMPORT SAP command, or specify the password on the ACL command line before running the script.

TO *table_name*

> The name of the table to create in *ACL* when the query is completed.

SOURCE "SAP AGENT"

> A required parameter for importing SAP data. "SAP AGENT" is the only available option.

import_details

> Contains the details of the query. The *import_details* string is composed of many tags, which are enclosed by the <q></q> tags. Because a query can be very complex, this string may be up to 16KB in length.

Remarks

The easiest way to insert an IMPORT SAP command into a script is to copy a complete IMPORT SAP command from the command log. Because the *import_details* parameter can be very long (up to 16 KB), it is usually impractical to type the entire command manually. You can import a table into *ACL* using the **Data Definition Wizard**, and then copy the appropriate line from the **Log** tab and paste it into your script. You can then edit the command, as necessary, in the script window.

The *import_details* parameter is the portion of the IMPORT SAP command that describes the query. Table 1 describes the usage of each tag and indicates when tags are required. The Required? column in the table indicates when the tag must be present using the following values:

Y = Required

N = Optional

M = Required for multi-table queries only.

B = Required, but no value should be passed.

W = Optional when filters are utilized.

S = Required when scheduled mode is specified.

Table 1. Direct Link query tags

Name	Tag	Required?	Description
Table Alias	\<a\>	M	The alias that uniquely identifies the table within the query. This allows the same table to be used more than once. The maximum length is 6 characters.
All Rows	\<ar\>	Y	Indicates that all matching rows should be returned as part of the query's result set. A value of 1 overrides the value Maximum rows. A value of 0 returns the number of records specified in the \<r\> tag. This tag always appears after the \<r\>\</r\> tag.
Client	\<c\>	N	The client within the SAP system.
Child Table Alias	\<ca\>	M	The alias of the child table.
Child Table Field	\<cf\>	M	The field in the child table that the join condition is based on.
Client Filename	\<cf\>	Y	Identifies the target file on the client system where the results of the query will be stored.
Child Table	\<ct\>	M	The child table in the join condition.
Destination	\<d\>	N	Identifies a destination in the saprfc.ini file that is used by the SAP RFC libraries to locate an SAP system.
Data Length	\<dl\>	B	The number of characters in each row, including the carriage return and line feed characters (CR+LF or the hexadecimal characters OD+ OA) that are inserted at the end of each record to indicate the end of the record.
Date	\<dt\>	S	Required when using scheduled mode. Specifies the time to run the SAP job. Must be formatted as yyyymmdd. For example, 20141231 is January 31, 2014.
Expected Rows	\<e\>	B	The expected number of rows the query will return.
Field Name	\<f\>	Y	The native field name.
Filter Field	\<f\>	W	The native field name that the filter applies to.
Fields	\<fs\>	Y	The list of fields in the table that will be returned as part of the query results.
High Value	\<h\>	W	Contains the high value when using the Between operator. Ignored when using any other operator.

Name	Tag	Required?	Description
Join Condition	<jc>	M	The join condition.
Job Count	<jcount>	B	Used internally by SAP to identify a Background mode query.
Job Name	<jname>	B	Used internally by SAP to identify a Background mode query.
Join Relationships	<js>	Y	The list of join conditions that link tables within the query.
Join Switch	<jw>	N	Numeric equivalent of the join switch enumerated type. Valid values are: 0 – Inner Join 1 – Left Outer Join
Low Value	<l>	W	Contains either the lowest value when using the Between operator or the value when using any other operator.
Language	<lg>	Y	Language identifier used to determine the locale of fields in the SAP database.
Mode	<m>	Y	Numeric equivalent of the submission mode enumerated type. Valid values are: 0 – Extract Now 1 – Background 2 – Scheduled
Server Group Name	<sg>	N	The name of the server group. Maximum 20 characters.
Server Name	<sn>	N	The name of the server. Maximum 20 characters.
Table Name	<n>	Y	The native table name.
Operator	<o>	W	Numeric equivalent of the operator enumerated type. Valid values are: 0 – Equal to (=) 1 – Not equal to (<>) 2 – Less than (<) 3 – Less than or equal to (<=) 4 – Greater than (>) 5 – Greater than or equal to (>=) 6 – Between 7 – Contains
Parent Table Alias	<pa>	M	The alias of the parent table.
Parent Table Field	<pf>	M	The field in the parent table the join condition is based on.
Parent Table	<pt>	M	The parent table in the join condition.
Query	<q>	Y	Encapsulates a query.
Maximum Rows	<r>	Y	The maximum number of rows the query should return.
Selected	<s>	Y	If the <s> tag appears below the <f> tag, it indicates whether the field will be returned as part of the query's result set.
System	<s>	Y	If the <s> tag appears below the <q> tag, it identifies the type of system this query is used against (currently only SAP is supported).
Server Filename	<sf>	B	Identifies the file on the server that holds the results of a Background mode query.

Name	Tag	Required?	Description
Table	<t>	Y	The table.
Table Description	<td>	Y	The table description from the SAP data dictionary. It should always appear below the <a> tag.
Time	<tm>	S	Required when using scheduled mode. Specifies the time to run the SAP job. Must be formatted as hhmmss. For example, 143000 is 2:30 pm.
Tables	<ts>	Y	The list of tables from which the query will extract data.
Username	<u>	N	The user's logon name.
Filter	<w>	W	The filter applied to the table's data.
Filter Switch	<ws>	N	Numeric equivalent of the filter switch enumerated type. Valid values are: 0 – (Or) And (Or) 1 – (And) Or (And)
Filters	<wc>	W	The list of filters that will be applied to the data contained within the table.

Example

The following example illustrates a multi-table query using the IMPORT SAP command. The correct order and nesting of the tags is necessary to create a valid query string. The example includes an IMPORT SAP command with the tags nested in the correct order. Use this example to determine the required order of the query tags.

Although this example spans multiple lines, this is done for readability only. The command in your script must be entered on a single line.

> **Tip**
> The syntax for the IMPORT SAP command is typically very complex. The best way to add IMPORT SAP commands to your scripts is to copy an existing IMPORT SAP command from the **Log** tab in *ACL*, then edit the query tags as necessary.

```
IMPORT SAP PASSWORD 1 TO Purchasing_doc SAP SOURCE "SAP AGENT"
<q version="6.0">
  <s>0</s>
  <d>IDES</d>
  <u>mzunini</u>
  <c>800</c>
  <lg>en</lg>
  <cf>C:\ACL Data\Purchasing_doc.fil</cf>
  <sf>E:\Data\DL_JSMITH111107.DAT</sf>
  <jcount>11110701</jcount>
  <jname>DL_JSMITH111107.DAT</jname>
  <dl>75</dl>
  <m>2</m>
  <dt>20140321</dt>
  <tm>142200</tm>
  <r>500</r>
  <ar>0</ar>
  <e>500</e>
  <ts>
    <t>
```

```
        <n>EKKO</n>
        <a>T00001</a>
        <td>Purchasing Document Header</td>
        <fs>
          <f>EBELN</f>
          <f>BUKRS</f>
          <f>BSTYP</f>
          <f>BSART</f>
          <f>STATU</f>
          <f>WKURS</f>
        </fs>
        <wc>
          <w>
            <f>BUKRS</f>
            <o>0</o>
            <l>1000</l>
            <h></h>
          </w>
        </wc>
      </t>
      <t>
        <n>EKPO</n>
        <a>T00002</a>
        <td>Purchasing Document Item</td>
        <fs>
          <f>EBELP</f>
          <f>WERKS</f>
          <f>MENGE</f>
          <f>BRTWR</f>
        </fs>
        <wc></wc>
      </t>
    </ts>
    <js>
      <jc>
        <pt>
          <pa>T00001</pa>
          <pf>EBELN</pf>
        </pt>
        <ct>
          <ca>T00002</ca>
          <cf>EBELN</cf>
        </ct>
      </jc>
    </js>
  </q>
```

6.3. RETRIEVE command

Use this command to retrieve the results of *Direct Link* queries submitted for background processing.

Syntax

```
RETRIEVE table_name PASSWORD n
```

Parameters

table_name

>   Specifies the name of the table originally created in *ACL* by the *Direct Link* query.

PASSWORD *n*

>   Specifies the password required to access the SAP system. If the required password
>   value is not defined before the RETRIEVE command is executed, *ACL* will prompt the
>   user for their SAP password.

>>   **Tip**
>>
>>   Use the SET PASSWORD command to define the password in the
>>   script before using the RETRIEVE command, or specify the
>>   password on the command line before running the script if you are
>>   running it from a Windows shortcut.

Example

The following example sets the password and then retrieves the Background mode query
results for an *ACL* table named DD02T_Data.

```
SET PASSWORD 1 = "pwd"
RETRIEVE DD02T_Data PASSWORD 1
```

6.4. REFRESH command

Use this command to refresh the data in *ACL* tables that were originally created by *Direct Link*
queries.

Syntax

```
REFRESH <table_name> <PASSWORD n>
```

Parameters

table_name

>   The name of the table that was originally created in *ACL* by the *Direct Link* query.

PASSWORD *n*

>   Specifies the password required to access the SAP system. If the required password
>   value is not defined before the REFRESH command is executed, *ACL* will prompt the
>   user for their SAP password.

> **Tip**
>
> Use the `SET PASSWORD` command to define the password in the
> script before using the REFRESH command, or specify the
> password on the command line before running the script.

Example

The following line shows an example of the REFRESH command:

```
REFRESH DD02T_Data PASSWORD 1
```

Related tasks

Refreshing SAP data