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Informatica® PowerExchange for HANA
10.5.9

User Guide for PowerCenter

Informatica PowerExchange for HANA User Guide for PowerCenter
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Preface

Use the *Informatica® PowerExchange® for HANA User Guide for PowerCenter®* to learn how to read from or write to SAP HANA by using PowerCenter Client. Learn to create a HANA ODBC connection, develop mappings, and run sessions in an Informatica domain.

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CHAPTER 1

Introduction to PowerExchange for HANA

This chapter includes the following topics:

PowerExchange for HANA Overview

PowerExchange for HANA provides connectivity between PowerCenter and SAP HANA. You can use PowerExchange for HANA to read from or write to SAP HANA database tables and views. You can also read data from SAP HANA modelling views, such as attribute views, analytical views, and calculation views.

PowerExchange for HANA uses the HANA ODBC driver to connect to SAP HANA. You must select the ODBC subtype as SAP HANA in the ODBC connection properties. When you run a session, the PowerCenter Integration Service uses the configured HANA ODBC data source name to read from or write to SAP HANA.

Introduction to SAP HANA

SAP High Performance Analytical Application (SAP HANA) is a secure modern data platform that simplifies operations, leverages advanced data processing engines for business, and processes data in-memory. It is a single platform for trans-analytic applications, with built-in advanced analytics and multi-model data processing engines that you can leverage to develop next-generation applications for the intelligent enterprise.

CHAPTER 2

PowerExchange for HANA Configuration

This chapter includes the following topic:

PowerExchange for HANA Configuration Overview

PowerExchange for HANA installs with PowerCenter. You can use PowerExchange for HANA on Windows or UNIX.

You must also configure the HANA ODBC driver and create the HANA ODBC data source names to connect to the SAP HANA database.

Prerequisites

You must complete the prerequisites before you can use PowerExchange for HANA.

Note: Ensure that you have the PowerExchange for HANA license.

1. Install PowerCenter.
2. On Windows, download and install the Microsoft Visual C++ 2010 Redistributable Package in server and client machines from the Microsoft website. For example, download the `vc_redist_x86.exe` file.
3. Verify that you have read, write, and execute permissions on the following directories:
   - `<PowerCenter Installation Directory>/server/bin`
   - `<PowerCenter Installation Directory>/server/bin/Plugin`
4. Configure the HANA ODBC driver on the machines where you install the Informatica services and clients.
   a. Configure the HANA ODBC 32-bit driver on the Informatica client machine.
   b. Configure the HANA ODBC 64-bit driver on the machine where PowerCenter Integration Service runs.

   For more information about product requirements and supported platforms, see the Product Availability Matrix.

Configuring the HANA ODBC Data Sources

Create the HANA ODBC data source name in the HANA ODBC driver properties to connect to the SAP HANA database. The data source contains the connection credentials that you need to access the database, such as the SAP HANA database name, user name, and password.

You must configure both the HANA ODBC 32-bit and 64-bit drivers. The PowerCenter Designer uses the HANA ODBC 32-bit driver to import HANA tables and views as source or target definitions. The PowerCenter Integration Service uses the HANA ODBC 64-bit driver to extract data from or load data to SAP HANA.

The ODBC driver also varies based on the operating system.

The following table lists the SAP HANA ODBC driver that you must configure for different platforms:

Platform	SAP HANA ODBC Driver
32-bit Windows	HDBODBC32
64-bit Windows	HDBODBC
64-bit UNIX	libodbcHDB **Note:** The file extension varies based on the UNIX platform.

Download and Install the HANA ODBC Drivers

SAP HANA ODBC drivers are packaged with the SAP HANA client software.

1. Download and install the SAP HANA client software version 2.0 or later from the SAP Software Download Center.

   You must have an account with SAP to download the software.
2. Create the HANA ODBC 32-bit data source on the machine that contains the Informatica client software installation.
3. Create the HANA ODBC 64-bit data source on the machine that runs the PowerCenter Integration Service.

Creating a HANA ODBC Data Source on Windows

On Windows, use the ODBC Data Source Administrator to create an ODBC data source.

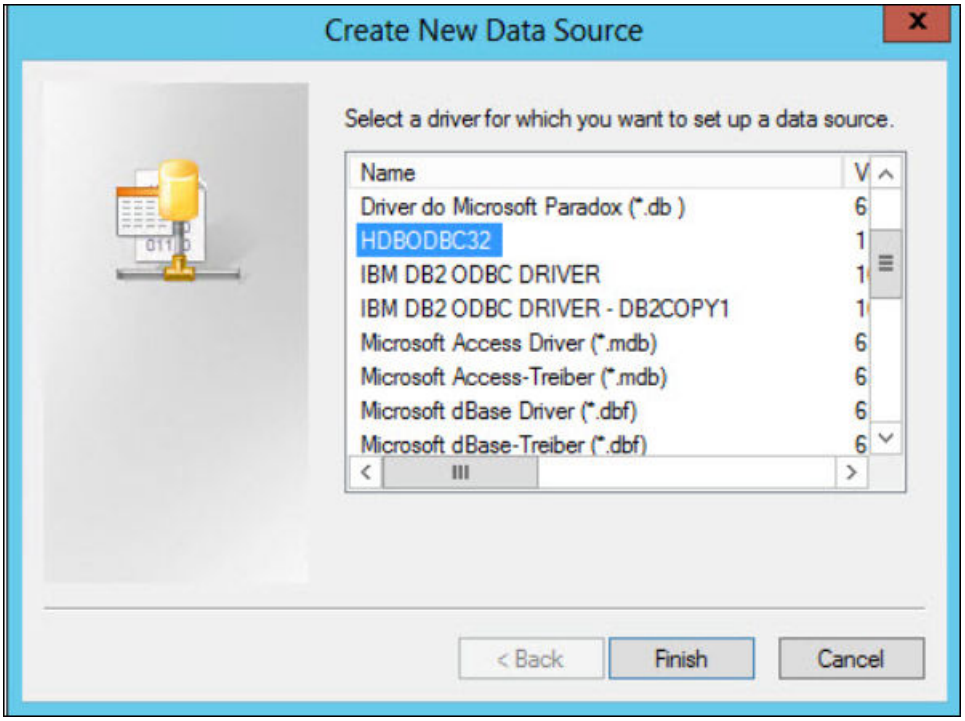
To open the ODBC administrator, perform the following tasks:

1. Select **Start > Administrative Tools** > **Data Source (ODBC)**.

   The ODBC Data Source Administrator dialog box appears.
2. Click the **System DSN** tab, and then click **Add**.

   The Create New Data Source dialog box appears.

3. Select the HANA ODBC driver HDBODBC for 64-bit Windows or driver HDBCODBC32 for 32-bit Windows to set up the SAP HANA data source.

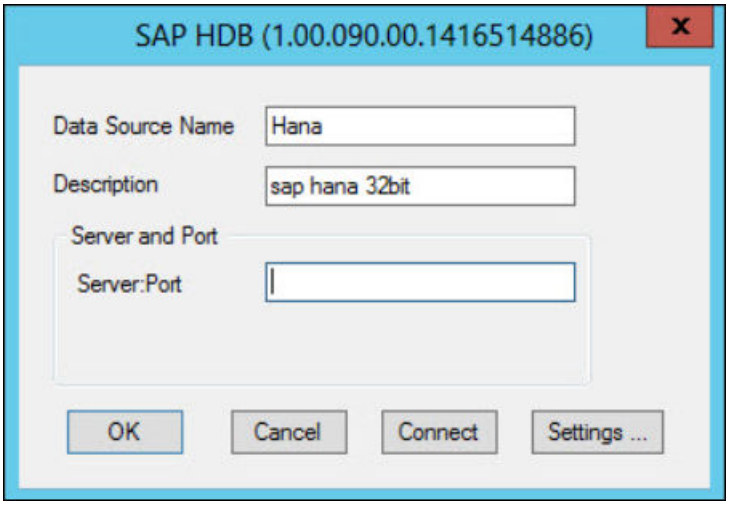


4. Click **Finish**.

   The SAP HDB dialog box opens.

5. Enter the data source name, description, and server and port fields required to access SAP HANA.

   Additionally, click the **Connect** button to verify that a successful ODBC connection can be established with the server.



6. Click **OK** to complete the driver configuration.

Create a HANA ODBC Data Source on UNIX

On UNIX, set the ODBCHOME, ODBCINI, and shared library environment variables. Add the data source entries to the `odbc.ini` file in the system `$ODBCHOME` directory.

Set the following environment variables:

ODBCHOME

Set the variable to the ODBC installation directory.

For example, `setenv ODBCHOME /export/home/qamercury/Informatica/10.4.1/ODBC7.0`

ODBCINI

Set the variable to point to the directory that contains the odbc.ini file.

For example, `setenv ODBCINI /export/home/qamercury/MBUGB_ODBCINI/10.4.1/odbc.ini`

LD_LIBRARY_PATH, LIBPATH, or SHLIB_PATH

Set the shared library environment variable to the directory where the SAP HANA ODBC driver is installed.

For example, `setenv LD_LIBRARY_PATH ".:${PM_HOME}:${JAVA_HOME}/lib:${ORACLE_HOME}/lib:/usr/sap/hdbclient:"`

After you set environment variables, add data source entries to the odbc.ini file found in the system $ODBCHOME directory.

For SAP HANA, add the following entry to the odbc.ini file:

```
[SAP HANA source]
Driver=/usr/sap/hdbclient/libodbcHDB.so
DriverUnicodeType=1
ServerNode=<server_node>:<port>
```

Note: The operating system user that runs Informatica processes must have read and execute permissions on the HANA ODBC driver file.

CHAPTER 3

HANA Sources and Targets

This chapter includes the following topics:

HANA Sources and Targets Overview

You can import HANA tables, views, or modelling views as an ODBC source definition in the Designer. You can configure advanced read options in the ODBC driver configuration before you import the data.

HANA Data Modelling Views

When you use PowerExchange for HANA, you can read from the following HANA data modelling views:

Attribute views

Attribute views are built on top of dimension tables. You can use attribute views to define joins between tables and to select a subset of columns and rows from a table.

Analytic views

Analytic views are optimized for aggregating mass data. You can use analytical views if you need aggregated data from the underlying table.

Calculation views

Calculation views are layered on top of one or more analytic or attribute views and allow you to perform calculations after grouping at the attribute level and after aggregation at the analytic level.

Input Types for Data Modelling Views

You can use the following input types when you read data from SAP HANA modelling views:

Variables

A variable is a filter. A variable is associated with an attribute column, for example, company name, of the view. However, a variable does not appear in the source metadata in the PowerCenter Designer.

Provide the variable value in the attribute column that you specified in SAP HANA.

Parameters

An input parameter is a placeholder to the query. You can use parameters to insert values for analytical views and calculation views. The data type for an input parameter in PowerCenter is `char`.

Specify the data for input parameters in the format that you defined in SAP HANA.

Input Parameter Types

When you select a HANA modelling view, Informatica adds a prefix to the parameter name. The prefix is used to indicate the parameter type.

You can use the following types of parameters:

- Mandatory Parameter. A parameter for which you are required to specify a value. For example, in the field `PARAM_M_ip_param_4_empID1`, `PARAM_M` is the prefix for a mandatory parameter that Informatica adds. `ip_param_4_empID1` is the parameter name that is a part of HANA modelling views.
- Optional Parameter. A parameter for which you do not need to provide a value. For example, in the field `PARAM_O_par_4_sal_hike`, `PARAM_O` is the prefix for an optional parameter that Informatica adds. `par_4_sal_hike` is the parameter name that is a part of HANA modelling views.

Importing HANA Source or Target Definitions

Before you import HANA source or target definitions, ensure that you have installed the 32-bit HANA ODBC driver. Use the 32-bit ODBC data source to import HANA tables, views, or HANA modelling views.

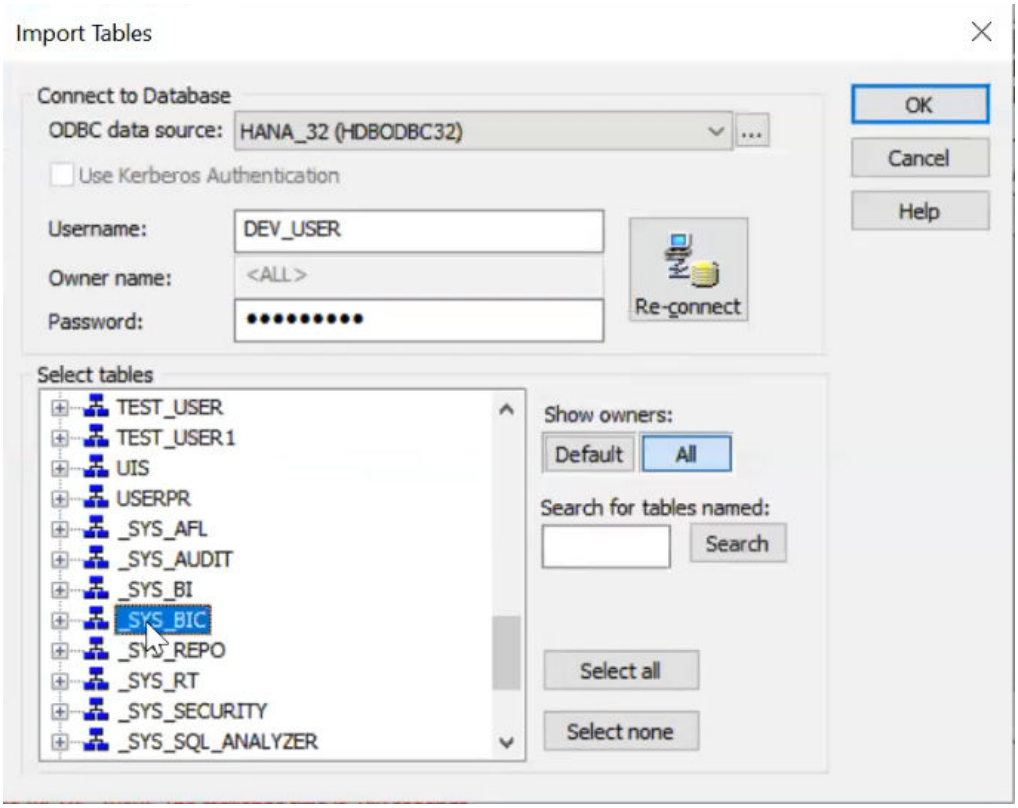
For example, perform the following tasks to import HANA modelling views into the Designer.

1. Click **Sources** > **Import from Database**.
2. Select the 32-bit ODBC data source.
3. Enter the username and password.
4. Click **Connect**.

   The **Select tables** list appears.
5. From the **Select tables** list, select **_SYS_BIC**.

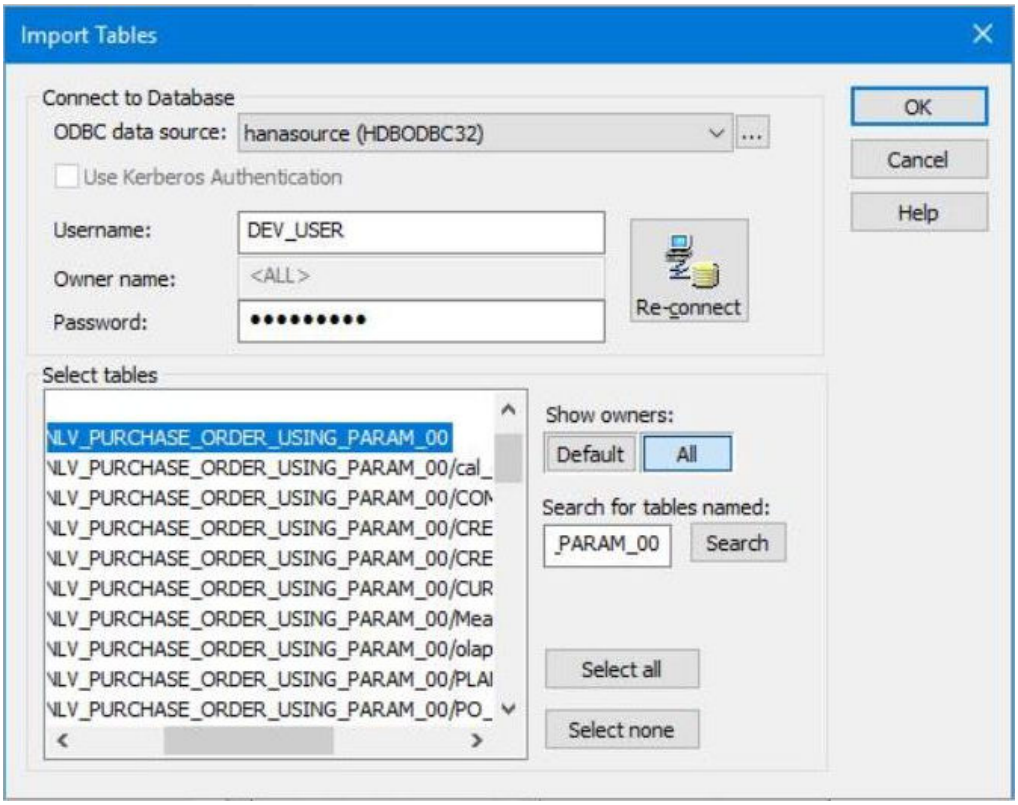
   Note: The modelling views are listed under the _SYS_BIC schema and not under the user schema.

The following image shows the _SYS_BIC schema under the **Select tables** list:



6. Click the icon next to the _SYS_BIC schema.
7. Click the icon next to **Views** to select the column view name in the table list.
8. Select a basic view that you have created in SAP HANA. Do not select a view name that has a hierarchy.

   The following image shows the `ANLV_PURCHASE_ORDER_USING_PARAM_00` view selected from the list of views:



9. Click **OK** to import the source definition for the modelling view.

Rules and Guidelines for HANA Modelling Views

Consider the following rules and guidelines when you read data from SAP HANA modelling views:

- You cannot use parameters with lookups.
- SAP HANA adds a `row.count` field when you import a view in the calculated column. If you do not create a calculated column for a view, the `row.count` field does not appear in the source metadata.

CHAPTER 4

HANA Mappings

This chapter includes the following topics:

HANA Mappings Overview

After you import a HANA source or target definition into the PowerCenter repository, create a HANA mapping.

In a mapping, you can join multiple HANA tables by specifying a join condition. You can also enter a filter condition to reduce the number of source rows the PowerCenter Integration Service returns from HANA sources. You can enter a single filter condition or a series of conditions.

Configure the source filter and join in the Application Source Qualifier.

Creating a HANA Mapping

After you import the HANA table, view, or modelling view, create a mapping.

To read from modelling views in SAP HANA, you must select a source filter that you configured in HANA and specify the variables or parameters in the source qualifier.

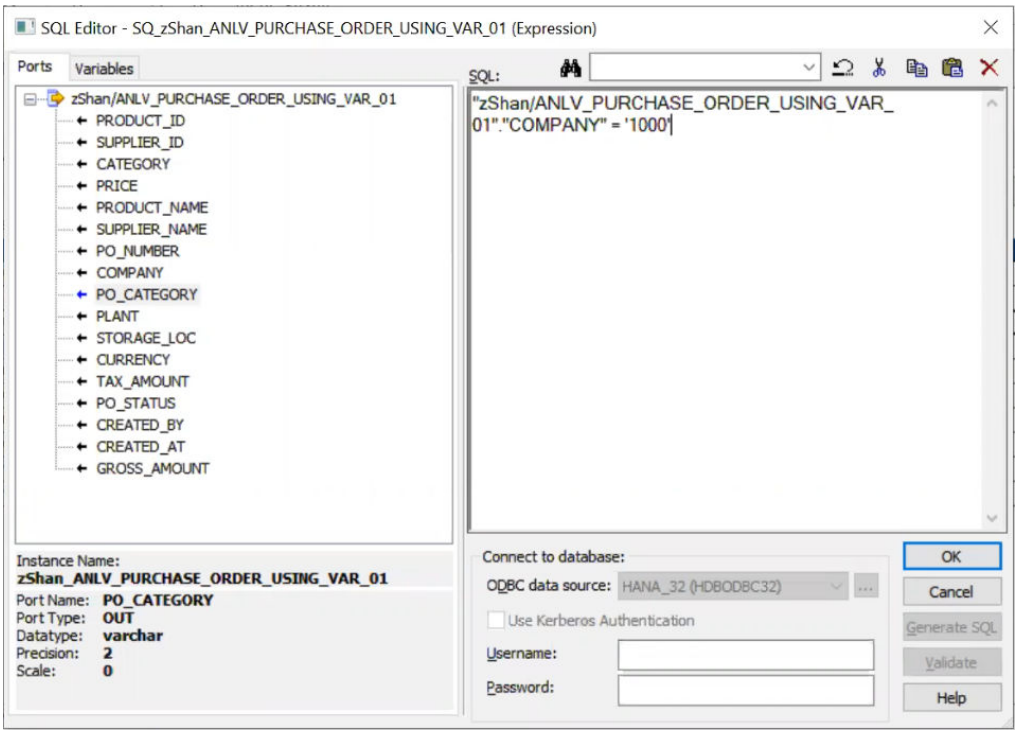
Perform the following tasks to create a mapping to read from HANA modelling views:

1. Create a mapping.

   Note: If you use input parameters, do not connect the input parameters in the Source Qualifier to the output fields. Otherwise, the mapping fails.
2. To edit the Source Qualifier, click the **Properties** tab in the **Edit Transformations** window.
3. Click the  icon next to the **Source Filter** field.

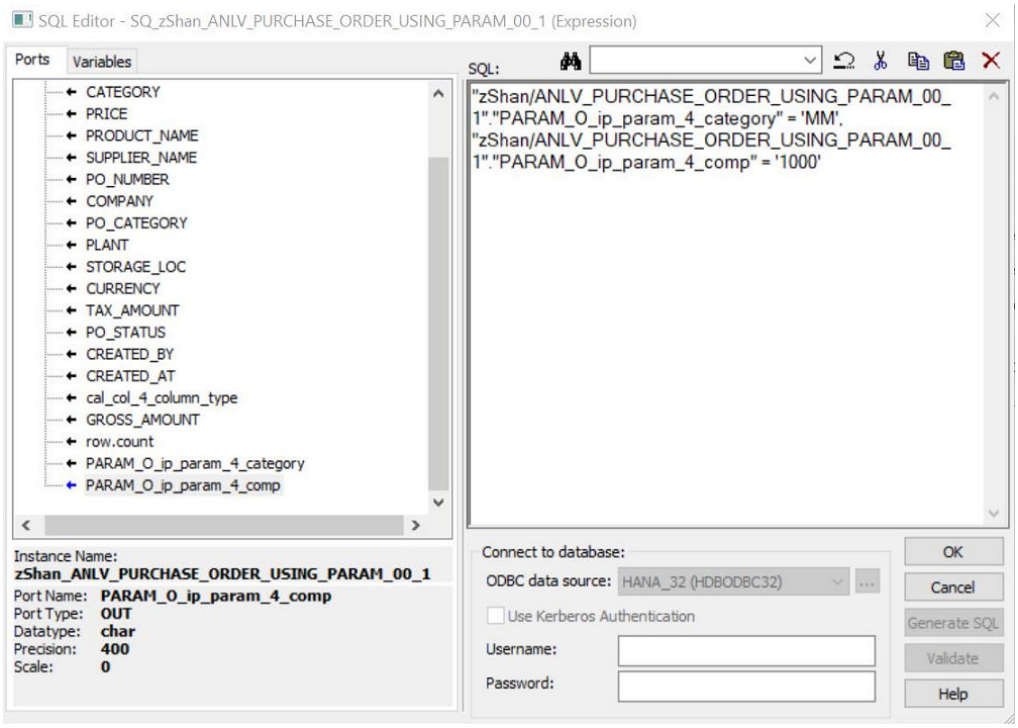
   The **SQL Editor** page appears.
4. Select the column view in which you want to apply a filter from the list of column views on the left pane.
5. Specify the variable name or input parameter name in double quotes. Specify the variable value or input parameter value in single quotes. When you want to specify more than one variable or parameter, separate the variables or parameters using commas.

The following image shows a source filter for a variable value:



In the above figure, the view `ANLV_PURCHASE_ORDER_USING_VAR_01` has a variable `COMPANY` with a value of `1000`.

The following image shows a source filter for parameter values:



In the above figure, the view `ANLV_PURCHASE_ORDER_USING_PARAM_00_1` has a parameter `PARAM_0_ip_param_4_category` with a value of `MM`. The view also has a parameter `PARAM_0_ip_param_4_comp` with a value of `1000`.

6. Click **OK**.
7. Click **Apply**.

   The fields are mapped.

CHAPTER 5

HANA Sessions

This chapter includes the following topics:

HANA Sessions Overview

After you create mappings, you can create a session to read from or write to SAP HANA.

You must configure a HANA connection in the **Workflow Manager** and then define the properties in a session to determine how the PowerCenter Integration Service must extract from or load data to the HANA source.

PowerExchange for HANA Connections

You must configure a HANA ODBC data source before you can import HANA sources.

The following table describes the HANA ODBC connection properties:

Property	Decription
Name	Name you want to use for this connection. The connection name cannot contain spaces or other special characters, except for the underscore.
Type	Read-only. Type of database. For SAP HANA, this property is set to ODBC.
User Name	Database user name with the appropriate read and write database permissions to access the database. To define the user name in the parameter file, enter session parameter $ParamName as the user name, and define the value in the session or workflow parameter file. The Integration Service interprets user names that start with $Param as session parameters.

Property	Decription
Use Parameter in Password	Indicates that the password for the database user name is a session parameter, $ParamName. Define the password in the workflow or session parameter file, and encrypt it by using the pmpasswd CRYPT_DATA option. Default is disabled.
Password	Password for the database user name. Must be in 7-bit ASCII.
Connect String	Connect string used to communicate with the SAP HANA database.
Code Page	Code page the Integration Service uses to read from a source database or write to a target database.
Connection Environment SQL	Runs an SQL command with each database connection. Default is disabled.
Transaction Environment SQL	Runs an SQL command before the initiation of each transaction. Default is disabled.
Connection Retry Period	Number of seconds the Integration Service attempts to reconnect to the database if the connection fails. If the Integration Service cannot connect to the database in the retry period, the session fails. Default value is 0.
ODBC Subtype	Type of database to which ODBC connects. Select **SAP HANA**.

Configuring a HANA ODBC Connection

Configure a HANA ODBC connection in the Workflow Manager. When you create a connection object, choose the connection type in the Connection Browser. An ODBC connection includes the connection subtypes. For SAP HANA, create a relational connection with subtype ODBC. In the ODBC connection properties, select SAP HANA as the ODBC subtype.

Install the 64-bit HANA ODBC driver and use the 64-bit ODBC data source in the ODBC connection.

1. In the Workflow Manager, connect to a repository.
2. Click **Connections** > **Relational**.

   The **Relational Connection Browser** dialog box appears.
3. Click **New**.

   The **Select Subtype** dialog box appears.
4. Select **ODBC** from the **Select Subtype** list.
5. Click **OK**.

   The **Connection Object Definition** dialog box appears.
6. Enter the connection details.
7. Click **OK**.

   The database connection appears in the **Connection Browser** list.

Creating a HANA Session

You must use the HANA ODBC connection with the SAP HANA ODBC subtype to run a session that reads from or writes to SAP HANA.

1. In the PowerCenter Workflow Manager, click **Tools** > **Task Developer**.
2. Click **Tasks** > **Create**.
3. Select **Session** as the task type to create.
4. Enter the session name and click **Create**.

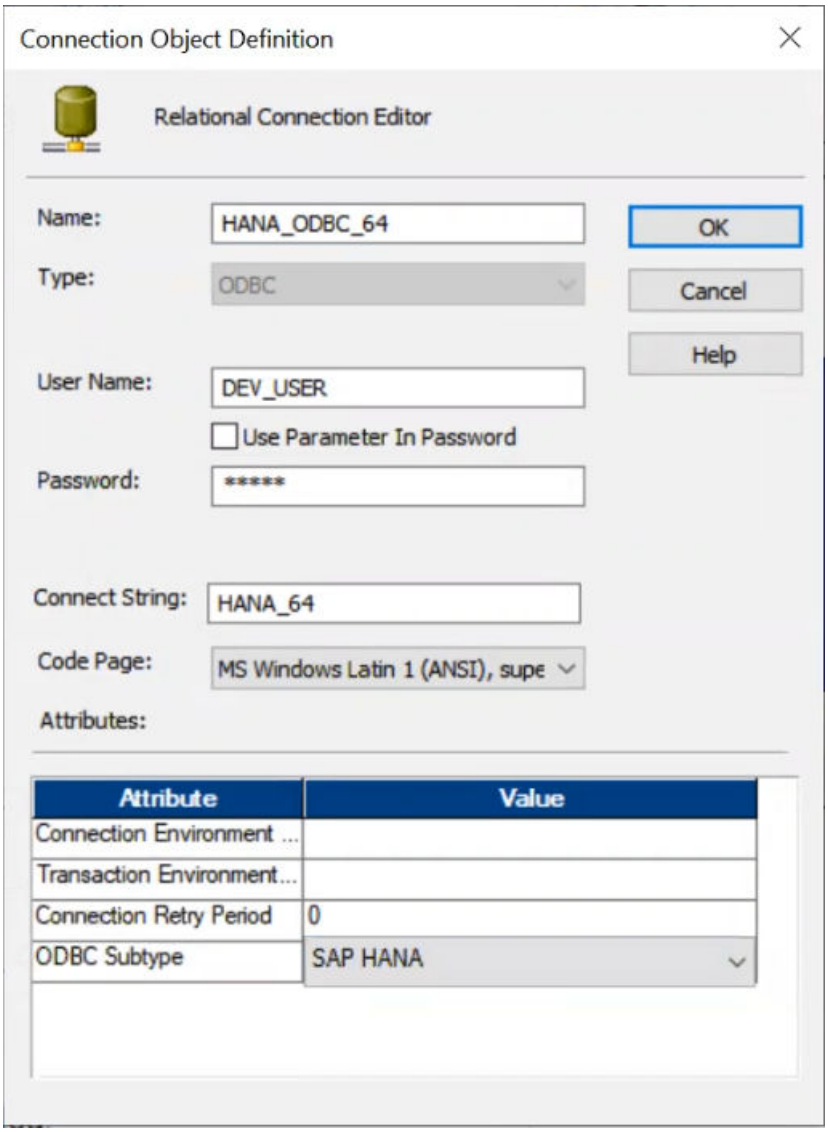
   The **Mappings** dialog box appears.
5. Select the required mapping and click **OK**.
6. Click **Done** in the **Create Task** dialog box.
7. In the workspace, double-click the session you created.
8. On the **Mappings** tab, select **Sources** in the Transformations pane on the left.
9. Select the source as **Relational Reader**.
10. To select the source connection name in the **Connections** pane, click **Edit**.

    The **Connection Object Definition** page appears.
11. Enter the source connection name.
12. Enter the username and password.
13. In the **Connect String** field, specify the 64-bit ODBC data source.

    Note: You must install the 64-bit HANA ODBC driver to use the 64-bit ODBC data source.
14. Select the ODBC subtype as **SAP HANA**.

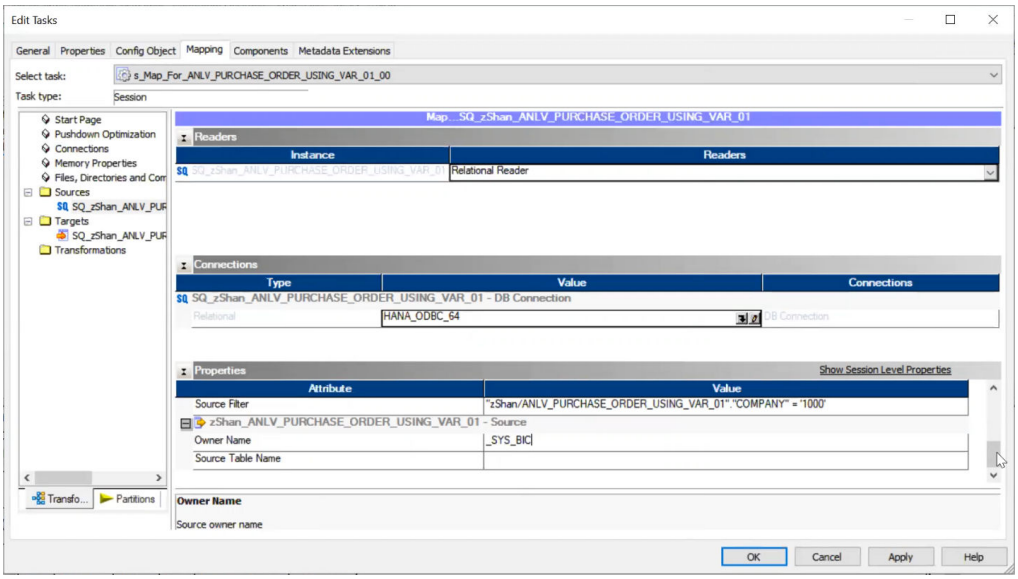
    Note: If you do not select the ODBC subtype as SAP HANA, the session fails.

    The following image shows the ODBC subtype selected for the connection:



15. Click **OK**.
16. In the **Properties** pane for the source connection, specify the **Owner Name** as **_SYS_BIC**.

    The following image shows the owner name for the source connection in the **Properties** pane:



17. Select a target.
18. Click **OK** to save and close the session properties.
19. Create a workflow.
20. Run the workflow.

Enabling Array Upsert for PowerExchange for HANA

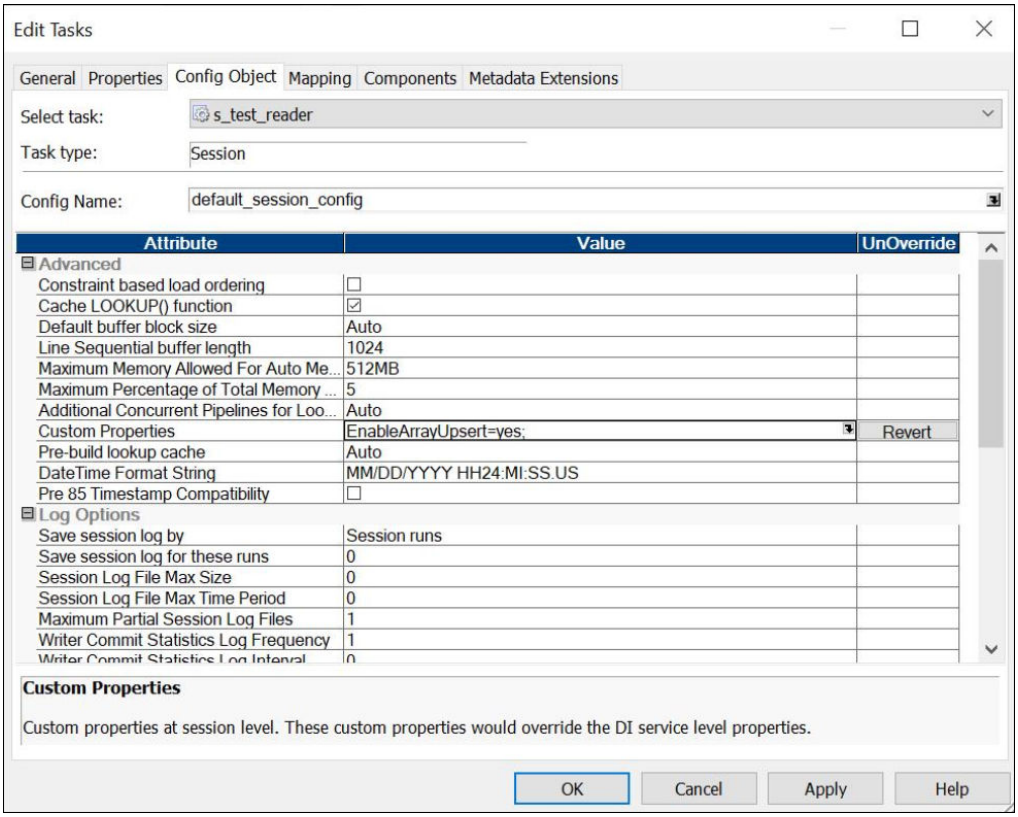
You can configure an upsert operation to upsert data in bulk and improve the session performance

Before you upsert data into SAP HANA targets, configure the following properties:
EnableArrayUpsert=Yes

Add the EnableArrayUpsert custom property and set the value to yes for the PowerCenter Integration Service in the Administrator tool.

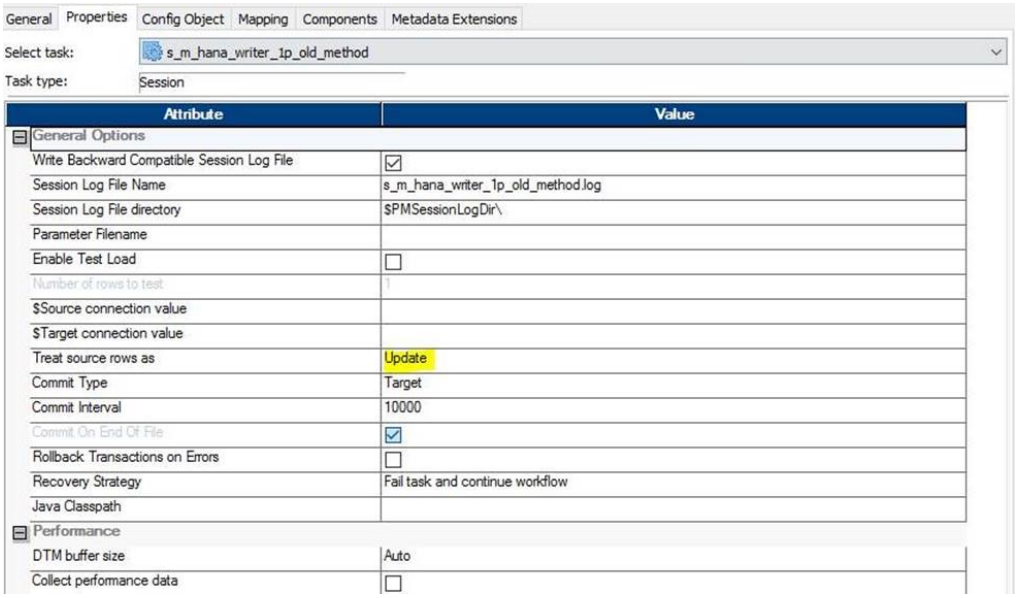
If you want to set the custom property in the HANA session properties, click the **Properties** tab in the HANA session properties.

In the advanced section, in the **Custom Properties** field, add the attribute **EnableArrayUpsert** and set the value to **yes**.



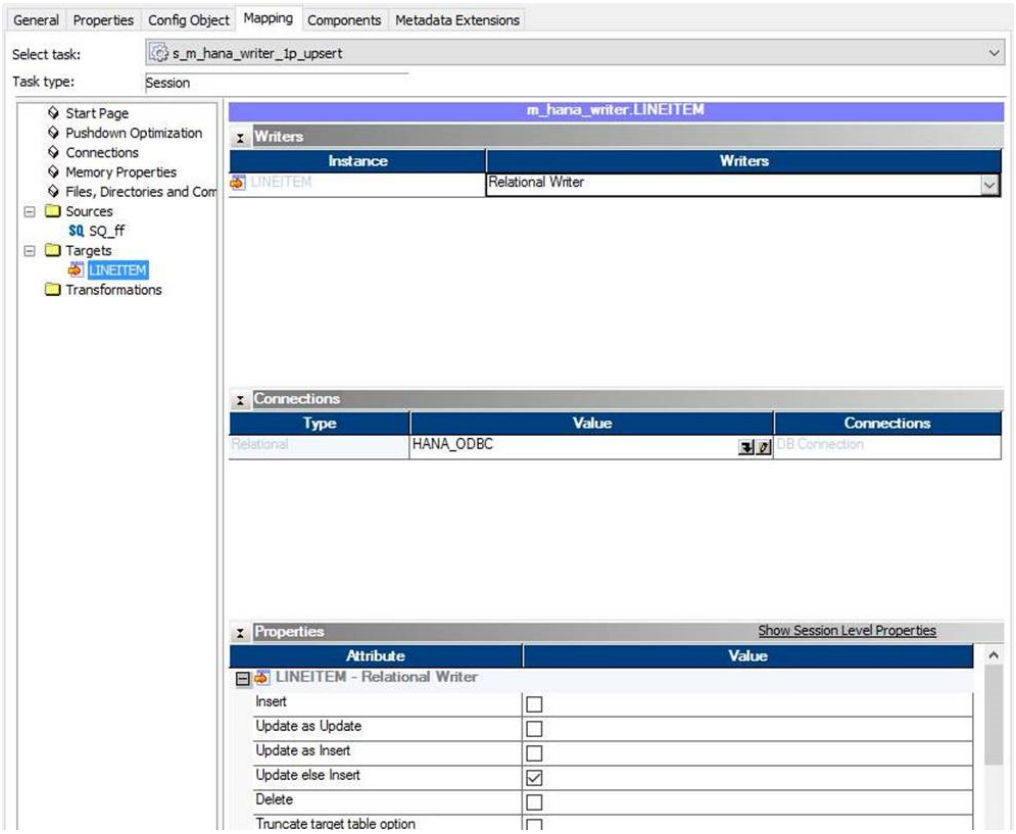
Treat Source Rows As

In the General options section, enter **Update** as the **Treat Source Rows As** property.



Update Else Insert

On the **Mapping** tab, select the target and then enable the **Update Else Insert** property.



CHAPTER 6

HANA Pushdown Optimization

This chapter includes the following topics:

Pushdown Optimization Overview

To optimize the performance of a HANA session in PowerCenter, you can push the transformation logic to an SAP HANA source or target database. You can use source, target, or full pushdown optimization for the HANA session that uses the ODBC connection with the ODBC subtype SAP HANA.

Pushdown Optimization Functions

When you use pushdown optimization, the PowerCenter Integration Service converts the expression in the transformation or workflow link by determining equivalent operators and functions in the database.

PowerExchange for HANA supports the following pushdown functions in a SAP HANA database:

Function	Pushdown	Function	Pushdown	Function	Pushdown
ABORT()	-	INITCAP()	-	REG_MATCH()	-
ABS()	X	INSTR()	-	REG_REPLACE	-
ADD_TO_DATE()	-	IS_DATE()	-	REPLACECHR()	-
AES_DECRYPT()	-	IS_NUMBER()	-	REPLACESTR()	-
AES_ENCRYPT()	-	IS_SPACES()	-	REVERSE()	-
ASCII()	-	ISNULL()	X	ROUND(DATE)	-
AVG()	X	LAST()	-	ROUND(NUMBER)	-

Function	Pushdown	Function	Pushdown	Function	Pushdown
CEIL()	X	LAST_DAY()	-	RPAD()	-
CHOOSE()	-	LEAST()	-	RTRIM()	-
CHR()	-	LENGTH()	-	SET_DATE_PART()	-
CHRCODE()	-	LN()	-	SIGN()	-
COMPRESS()	-	LOG()	-	SIN()	X
CONCAT()	-	LOOKUP	X	SINH()	-
COS()	X	LOWER()	X	SOUNDEX()	-
COSH()	-	LPAD()	-	SQRT()	X
COUNT()	X	LTRIM()	-	STDDEV()	-
CRC32()	-	MAKE_DATE_TIME()	-	SUBSTR()	-
CUME()	-	MAX()	X	SUM()	X
DATE_COMPARE()	X	MD5()	-	SYSDATE()	-
DATE_DIFF()	X	MEDIAN()	-	SYSTIMESTAMP()	X
DECODE()	X	METAPHONE()	-	TAN()	X
DECODE_BASE64()	-	MIN()	X	TANH()	-
DECOMPRESS()	-	MOD()	-	TO_BIGINT	-
ENCODE_BASE64()	-	MOVINGAVG()	-	TO_CHAR(DATE)	-
EXP()	X	MOVINGSUM()	-	TO_CHAR(NUMBER)	-
FIRST()	-	NPER()	-	TO_DATE()	-
FLOOR()	-	PERCENTILE()	-	TO_DECIMAL()	-
FV()	-	PMT()	-	TO_FLOAT()	-
GET_DATE_PART()	-	POWER()	X	TO_INTEGER()	-
GREATEST()	-	PV()	-	TRUNC(DATE)	-
IIF()	X	RAND()	-	TRUNC(NUMBER)	-
IN()	X	RATE()	-	UPPER()	X
INDEXOF()	-	REG_EXTRACT()	-	VARIANCE()	-

Note: Columns marked with an X indicate that the PowerCenter Integration Service can push the function to the SAP HANA database by using source-side, target-side, or full pushdown optimization. Columns marked

with a dash (-) symbol indicate that the PowerCenter Integration Service cannot push the function to the database.

Pushdown Optimization Transformations, Operators, and Variables

When you use pushdown optimization, the PowerCenter Integration Service converts the expression in the transformation or workflow link by determining equivalent operators, functions, and variables in the database.

PowerExchange for HANA supports the following transformations for pushdown optimization:

Transformations Supported	Pushdown Type
Aggregator	Source, Target, Full
Expression	Source, Target, Full
Filter	Source, Target, Full
Joiner	Source, Target, Full
Lookup	Source, Target, Full
Sorter	-
Union	Source, Target, Full
Router	Source, Target, Full
Update Strategy	Source, Target, Full
Source Qualifier	

The PowerCenter Integration Service can push the following arithmetic, comparison, and logical pushdown operators to an SAP HANA database by using source-side, target-side, or full pushdown optimization:

+, -, *, /, %, ||, >, =, >=, <=, !=, AND, OR, NOT, ^=.

The PowerCenter Integration Service can push the following variables to an SAP HANA database by using source-side, target-side, or full pushdown optimization:

- SESSSTARTTIME
- SYSDATE

APPENDIX A

HANA Datatype Reference

This appendix includes the following topics:

HANA Data Type Reference Overview

PowerCenter uses the following data types in HANA mappings:

- HANA native data types. SAP HANA data types appear in HANA definitions in a mapping.
- Transformation data types. Set of data types that appear in the transformations. They are internal data types based on ANSI SQL-92 generic data types, which the PowerCenter Integration Service uses to move data across platforms. They appear in all transformations in a mapping.

When the PowerCenter Integration Service reads source data, it converts the native data types to the comparable transformation data types before transforming the data. When the PowerCenter Integration Service writes to a target, it converts the transformation data types to the comparable native data types.

SAP HANA and Transformation Datatypes

The following table compares SAP HANA datatypes and transformation datatypes:

SAP HANA Datatype	Range	Transformation Datatype	Range
Alphanum	Precision 1 to 127	Nstring	1 to 104,857,600 characters
Bigint	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807	Bigint	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807 Precision 19, scale 0
Bintext	-	String	Precision 32000
Binary	Used to store bytes of binary data	Binary	1 to 104,857,600 bytes
Blob	Up to 2 GB	Binary	1 to 104,857,600 bytes

SAP HANA Datatype	Range	Transformation Datatype	Range
Boolean	True/False	Integer	Boolean (True/False) values, precision 10
Clob	Up to 2 GB	Text	1 to 104,857,600 characters
Date	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. Precision 10, scale 0	Date/Time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. (precision to the nanosecond)
Decimal (precision, scale) or Dec (p, s)	Precision 1 to 34	Decimal	Precision 1 to 28, scale 0 to 28
Double	Specifies a single-precision 64-bit floating-point number	Double	Precision 15
Float	Precision 1 to 53	Double	Precision 15
Integer	-2,147,483,648 to 2,147,483,647	Integer	-2,147,483,648 to 2,147,483,647 Precision 10, scale 0
NClob	Up to 2 GB	Ntext	1 to 104,857,600 characters
Nvarchar	Precision 1 to 5000	Nstring	1 to 104,857,600 characters
Real	Specifies a single-precision 32-bit floating-point number	Real	Precision 7, scale 0
Seconddate	0001-01-01 00:00:01 to 9999-12-31 24:00:00	Date/Time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. (precision to the nanosecond)
Shorttext	Specifies a variable-length character string, which supports text search and string search features	Nstring	1 to 104,857,600 characters
Smalldecimal	Precision 1 to 16	Decimal	Precision 1 to 28, scale 0 to 28
Smallint	-32,768 to 32,767	Small Integer	Precision 5, scale 0
Text	Specifies a variable-length character string, which supports text search features	Text	1 to 104,857,600 characters
Time	24-hour time period	Date/Time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. (precision to the nanosecond)
Timestamp	0001-01-01 00:00:00.0000000 to 9999-12-31 23:59:59.9999999	Date/Time	Jan 1, 0001 A.D. to Dec 31, 9999 A.D. (precision to the nanosecond)
Tinyint	0 to 255	Small Integer	Precision 5, scale 0

SAP HANA Datatype	Range	Transformation Datatype	Range
Varchar	Precision 1 to 5000	String	1 to 104,857,600 characters
Varbinary	1 to 5000 bytes	Binary	1 to 104,857,600 bytes

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