



TIBCO® Data Virtualization

SAP HANA Adapter Guide

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TDV SAP HANA Adapter

Introduction

This section explains the various connection and configuration options of the datasource SAP HANA as well as the capabilities:

[Datasource Configuration](#)

[Obtain and Install the Driver for SAP Hana](#)

[SAP HANA Data Source Limitations and Characteristics](#)

[Data Type Mappings](#)

[SAP HANA Function Support](#)

[References](#)

Datasource Configuration

This section explains the connection properties that are defined while setting up a datasource.

Basic Tab

The following table and the sections below lists and explains the connection properties that are in the Basic Tab of the New Data Source Window.

Datasource Name	The name of the Datasource.
Server	Name or IP address of the machine hosting the data source.

Port	Port number for the data source to connect with the host. The Port number for SAP HANA is 30015.
Database Name	Name or alias of the underlying data source. TDV Server uses this name to find and connect to the data source.
Instance Number	
Login/User, Password	User name and password required to access the data source.
Pass-through Login	Flag to indicate whether pass-through login is enabled or not.
Transaction Isolation	The degree to which transactions are isolated from data modifications made by other transactions.
Create tables with this number of partitions:	

Datasource Name

The name of the data source.

Data Type

string

Default Value

""

Server

Name or IP address of the machine hosting the data source.

Data Type

String

Default Value

""

Remarks

None

Host

Name of the host machine or the host machine's IP address.

Data Type

string

Default Value

""

Port

The Port number

Data Type

string

Default Value

""

Database Name

Name or alias of the underlying data source. TDV Server uses this name to find and connect to the data source.

Data Type

string

Default Value

""

Instance Number

Data Type

Numeric

Default Value

""

Remarks

None

Login/User, Password

User name and password required to access the data source.

Data Type

string

Default Value

“”

Remarks

When the data source is used as a target for cache tables or data ship, the user must also have permission to create tables, execute DDL, and perform other required tasks. Refer to the individual data source descriptions for details.

Transaction Isolation

The degree to which transactions are isolated from data modifications made by other transactions.

Data Type

string

Default Value

NONE

Remarks

Valid values are:

- Read Uncommitted—Dirty reads, nonrepeatable reads, and phantom reads can occur.
- Read Committed—Nonrepeatable reads and phantom reads can occur.
- Repeatable Read—Only phantom reads can occur.
- Serializable—Dirty reads, nonrepeatable reads, and phantom reads are prevented.
- None

Pass-through Login

Flag to indicate whether pass-through login is enabled or not.

Data Type

string

Default Value

""

Remarks

Disabled (default)—This allows automated provisioning of a connection pool. Open connection threads can be used by authorized users after the validation query verifies connection status. If pass-through login is disabled, the Save Password check box is not available.

Enabled—A new connection to the data source uses the credentials supplied by the client when data is requested from that data source for the first time. Subsequent requests by the same user reuse the existing connection. When another user attempts to connect to a data source, a new connection is created.

See “Managing Security for TDV Resources” in the TDV Administration Guide for details.

Create tables with this number of partitions:

Data Type

Numeric

Default Value

0

Remarks

Use 0 for none, 3-5 per node is recommended.

Advanced Tab

The following table and the sections below lists and explains the connection properties that are in the Advanced Tab of the New Data Source Window.

Connection URL Pattern	A template for generating a URL to connect to the physical data source.
Connection URL String	The URL string generated from the connection URL pattern with the connection information you provide.
JDBC Connection Properties	Lets you specify property-value pairs to pass to the JDBC data source
Connection Pool Minimum Size	Minimum number of connections in the pool even when the pool is inactive.
Connection Pool Maximum Size	Maximum number of connections (both active and idle) allowed for the data source. When the maximum is reached, new requests must wait until a connection is available.
Connection Pool Idle Timeout	Number of seconds that a connection can remain idle without being dropped from the pool when there are more than the minimum number of connections.
Maximum Connection Lifetime	The number of minutes that a connection that was returned to the pool persists if there are more open connections than the minimum pool size.
Connection Validation Query	A data-source-specific query that the TDV query engine sends to see if the data source connection is valid. This query is executed every time a connection is checked out from the pool. Enter a query that returns quickly.
Execution Timeout	The number of seconds an execution query on the data source can run before being canceled.
Connection Checkout Procedure	A procedure that returns a valid SQL statement that can be used to initialize the connection.

Supports Star Schema	Check only if this data source supports very large predicates and very large cardinalities for star schema semijoins.
Max Source Side Cardinality for Semi Join	See the documentation for semijoins and the TDV Administration Guide for more information.
Min Target to Source Ratio for Semi Join	Sets the minimum target-to-source ratio of cardinality for semijoins. Refer to the TDV Administration Guide for more information.
Max Source Side of Semi Join To Use OR Syntax	See the documentation for semijoins and the TDV Administration Guide for more information.
Enable Native Data Loading	Let the data source use its proprietary functionality to optimize performance.
Collation Sensitive	TDV does not use the SORT MERGE join algorithm if any data source involved in the join is marked Collation Sensitive.

Connection URL Pattern

A template for generating a URL to connect to the physical data source.

Data Type

string

Default Value

jdbc:<DATA SOURCE>://<HOST>:<PORT>/<DATABASE_NAME>

Remarks

TDV does not validate modifications at the time of configuration. The data source adapter might not validate changes.

Connection URL String

The URL string generated from the connection URL pattern with the connection information you provide.

Data Type

string

Default Value

“”

Remarks

This string is used by the JDBC adapter to connect to the physical data source. This field cannot be edited. For details, see the section “Connecting through JDBC Adapters” in the *TDV Administration Guide*.

JDBC Connection Properties

Lets you specify property-value pairs to pass to the JDBC data source.

Data Type

string

Default Value

“”

Remarks

Click to add custom connection properties for any JDBC data source. Commonly used properties are populated with default values. Use the Add Argument button to specify other properties and values.

TDV does not validate property names. Some data source adapters ignore invalid property names or values; others return an error.

The driver properties specify connection timeout settings required by specific drivers. To avoid leaving connections open indefinitely, specify properties explicitly for your data source.

Connection Pool Maximum Size

Maximum number of connections (both active and idle) allowed for the data source. When the maximum is reached, new requests must wait until a connection is available.

Data Type

Numeric

Default Value

100

Remarks

If the maximum number of connections is in use when a request comes in (even with pass-through authentication), the new request is blocked and queued until a connection is available or the Connection Pool Idle Timeout is reached.

If no connection was made available within the specified timeout, a check is made for an available connection by the same user. If none is available, the least recently used connection for another user is dropped and a new connection is opened.

Studio reuses pooled connections if they continue to be valid after changes (such as connection name), but JDBC requests are forced to use new connections if any part of the data source connection configuration has changed.

Connection Pool Minimum Size

Minimum number of connections in the pool even when the pool is inactive.

Data Type

Numeric

Default Value

0

Remarks

When a connection has been idle, a validation query is used to verify whether an open connection is still valid just prior to submission of a request. If the connection is invalid, the connection is discarded and another is used.

Connection Pool Idle Timeout

Number of seconds that a connection can remain idle without being dropped from the pool when there are more than the minimum number of connections.

Data Type

Numeric

Default Value

30

Maximum Connection Lifetime

The number of minutes that a connection that was returned to the pool persists if there are more open connections than the minimum pool size.

Data Type

Numeric

Default Value

30

Remarks

The duration is calculated from connection creation. Default value is 60 minutes. Set a smaller value if the pool is likely to run out of connections. Be sure to add a validation query. Set a larger value if you want the connections to be held for a longer period. Set a value of 0 to keep connections alive indefinitely.

Connection Validation Query

A data-source-specific query that the TDV query engine sends to see if the data source connection is valid. This query is executed every time a connection is checked out from the pool. Enter a query that returns quickly.

Data Type

string

Default Value

""

Remarks

If this query returns a non-error result, the data source connection is considered valid. If this query fails, the connection is discarded and a new connection is checked out from the available pool.

No one SELECT statement works with all data sources. To verify that TDV is running and that it can connect to the data source, devise a query against a published table from that data source.

Enable Native Data Loading

Let the data source use its proprietary functionality to optimize performance.

Data Type

Bool

Default Value

True

Remarks

See the User Guide, Chapter About Data Source Native Load Performance Options” for more details,.

Collation Sensitive

TDV does not use the SORT MERGE join algorithm if any data source involved in the join is marked Collation Sensitive.

Data Type

Bool

Default Value

False

Remarks

None

Concurrent Request Limit

Works with the Massively Parallel Processing engine configuration parameters to control the amount of parallelization for the queries for a particular data source.

Data Type

Numeric

Default Value

0

Remarks

None

Execution Timeout

The number of seconds an execution query on the data source can run before being canceled.

Data Type

Numeric

Default Value

0

Remarks

None

Execute SELECTs Independently

Lets a SELECT statement be executed using a new connection from the connection pool, and committed immediately after completion. INSERT and UPDATE statements are executed using the same connection as part of the transaction.

Data Type

Bool

Default Value

True

Remarks

None

Connection Checkout Procedure

A procedure that returns a valid SQL statement that can be used to initialize the connection.

Data Type

string

Default Value

""

Remarks

The signature of the initialization procedure should be:

```
(IN ds_name VARCHAR, OUT sqlText VARCHAR)
```

Give the full path to the procedure in the Connection Check-out Procedure box.

Connection Checkout Timeout

Time that a connection doing a checkout can remain idle without being dropped.

Data Type

Numeric

Default Value

45

Remarks

None

Max Source Side Cardinality for Semi Join

Data Type

Numeric

Default Value

Remarks

None

Max Source Side of Semi Join To Use OR Syntax

Data Type

Numeric

Default Value

2147483647

Remarks

None

Min Target to Source Ratio for Semi Join

Sets a minimum ratio to trigger use of semi join optimization.

Data Type

Numeric

Default Value

Remarks

None

Supports Star Schema

Check only if this data source supports very large predicates and very large cardinalities for star schema semijoins.

Data Type

Bool

Default Value

False

Remarks

Refer to the section Star Schema Semijoin in the User Guide, for more information.

Obtain and Install the Driver for SAP Hana

Refer to the Installation guide for more details about the supported versions.

Obtain and install the JDBC driver for SAP Hana

Obtain or locate your copy of the SAP Hana SPS 09 ngdbc.jar file. Typically it is included in the SAP Hana client install.

1. Copy the JAR file to:

```
<TDV_install_dir>\conf\adapters\system\sap_hana_sps_09
```

2. Restart the TDV Server.

SAP HANA Data Source Limitations and Characteristics

These notes pertain to SAP HANA SPS 09:

- SAP HANA DATETIME types have an ABAP-specific special value of EMPTY, which is not the same as NULL. The SAP HANA JDBC driver passes both EMPTY and NULL values to TDV as NULL, and so the results of some calculations made in TDV versus in SAP HANA may differ.

For example, the function ADD_DAYS (DATE_ADD in TDV), when given an EMPTY value and 1 as arguments, returns 0001-01-02 when executed in SAP HANA, and NULL when executed in TDV, because TDV sees the first argument as NULL.

- SAP HANA supports the return of cursors from procedures. You need to expand the cursor signature and save that change on the procedure; otherwise, the procedures will not display the results. You can check Design Mode in Studio and then use Design by Example to do this. See [Defining a Cursor for Projection, page 218](#), and [Designing a Cursor by Example, page 219](#).
- SAP HANA analytical views are multidimensional objects similar to OLAP cubes. A simple “SELECT *” query or “Show Contents” on such a view does not work. A valid query against an analytical view must contain an aggregate function and a GROUP BY clause.
- The following TDV functionality cannot be used with SAP HANA analytical views due to their multidimensional nature:
 - Caching
 - Statistics gathering
 - Discovery

SAP HANA Caching Characteristics

Cache target tables in SAP HANA are created as column-store tables, rather than the row-store tables more commonly used in relational databases. If partitions are used, SAP HANA

uses round-robin partitioning to equally distribute rows to partitions. The table used for caching does not have to have primary keys.

Data Type Mappings

SAP HANA Data Types

The following table shows the mapping from SAP HANA data types to TDV data types.

SAP HANA Data Type	TDV Data Type
ALPHANUM	VARCHAR
BIGINT	BIGINT
BINARY	BINARY
BINTEXT	CLOB
BLOB	BLOB
CHAR	CHAR
CLOB	CLOB
DATE	DATE
DECIMAL	DECIMAL
DOUBLE	DOUBLE
FLOAT	DOUBLE
INTEGER	INTEGER

SAP HANA Data Type	TDV Data Type
NCHAR	CHAR
NCLOB	CLOB
NVARCHAR	VARCHAR
REAL	FLOAT
SECONDDATE	TIMESTAMP
SHORTTEXT	VARCHAR
SMALLDECIMAL	FLOAT
SMALLINT	SMALLINT
TIME	TIME
TIMESTAMP	TIMESTAMP
TINYINT	SMALLINT
VARBINARY	VARBINARY
VARCHAR	VARCHAR

SAP HANA Cache Mapping

This section discusses the data type mappings for caches stored on SAP HANA.

Data Type	Native Type
DATE	DATE
TIME	TIME

Data Type	Native Type
TIMESTAMP	TIMESTAMP
BIT	TINYINT
TINYINT	SMALLINT
SMALLINT	SMALLINT
INTEGER	INTEGER
BIGINT	BIGINT
DECIMAL	DECIMAL(p,s)
DECIMAL_PROMOTE	CLOB
NUMERIC	DECIMAL(p,s)
NUMERIC_PROMOTE	CLOB
REAL	FLOAT(24)
FLOAT	DOUBLE
DOUBLE	DOUBLE
CHAR	NCHAR(length)
CHAR_PROMOTE	CLOB
VARCHAR	NVARCHAR(length)
VARCHAR_PROMOTE	CLOB
LONGVARCHAR	CLOB
BINARY	BINARY(length)

Data Type	Native Type
BINARY_PROMOTE	BLOB
VARBINARY	VARBINARY(length)
VARBINARY_PROMOTE	BLOB
BLOB	BLOB
CLOB	CLOB
XML	CLOB
BOOLEAN	TINYINT
INTERVAL_DAY	VARCHAR(30)
INTERVAL_DAY_TO_HOUR	VARCHAR(30)
INTERVAL_DAY_TO_MINUTE	VARCHAR(30)
INTERVAL_DAY_TO_SECOND	VARCHAR(30)
INTERVAL_HOUR	VARCHAR(30)
INTERVAL_HOUR_TO_MINUTE	VARCHAR(30)
INTERVAL_HOUR_TO_SECOND	VARCHAR(30)
INTERVAL_MINUTE	VARCHAR(30)
INTERVAL_MINUTE_TO_SECOND	VARCHAR(30)
INTERVAL_SECOND	VARCHAR(30)
INTERVAL_YEAR	VARCHAR(9)
INTERVAL_YEAR_TO_MONTH	VARCHAR(12)

Data Type	Native Type
INTERVAL_MONTH	VARCHAR(9)

SAP HANA Function Support

The tables in this section point out where TDV functions (which would appear in views defined in Studio) is mapped to native SAP HANA SPS 09 functions of a different name. For example, the HANA conversion function HEXTOBIN is listed in the Notes column as “Mapped from HEX_TO_BINARY.”

TDV supports the following types of functions for SAP HANA:

- [SAP HANA Aggregate Function Support](#)
- [SAP HANA Analytical Function Support](#)
- [SAP HANA Binary Function Support](#)
- [SAP HANA Character Function Support](#)
- [SAP HANA Conditional Function Support](#)
- [SAP HANA Conversion Function Support](#)
- [SAP HANA Date Function Support](#)
- [SAP HANA Numeric Function Support](#)

SAP HANA Aggregate Function Support

TDV supports the aggregate functions listed in the table below for SAP HANA.

SAP HANA Aggregate Function	Notes
AVG	
CORR	

SAP HANA Aggregate Function	Notes
CORR_SPEARMAN	
COUNT	
MAX	
MEDIAN	
MIN	
STDDEV	
SUM	
VARIANCE	

SAP HANA Analytical Function Support

TDV supports the analytical and analytical aggregate functions listed in the table below for SAP HANA.

SAP HANA Analytical Function	Notes
AVG	
CORR	
CORR_SPEARMAN	
COUNT	
CUME_DIST	
DENSE_RANK	

SAP HANA Analytical Function	Notes
FIRST_VALUE	
LAG	
LAST_VALUE	
LEAD	
MAX	
MEDIAN	
MIN	
NTILE	
PERCENT_RANK	
PERCENTILE_CONT	
PERCENTILE_DISC	
RANK	
ROW_NUMBER	
STDDEV	
SUM	
VAR	Mapped from VARIANCE.

SAP HANA Binary Function Support

TDV supports the binary functions listed in the table below for SAP HANA.

SAP HANA Binary Function	Notes
BITAND	Mapped from INT1AND, INT2AND, INT4AND, INT8AND.
BITCOUNT	
BITNOT	Mapped from INT1NOT, INT2NOT, INT4NOT, INT8NOT.
BITOR	Mapped from INT1OR, INT2OR, INT4OR, INT8OR.
BITXOR	Mapped from INT1XOR, INT2XOR, INT4XOR, INT8XOR.

SAP HANA Character Function Support

TDV supports the character functions listed in the table below for SAP HANA.

SAP HANA Character Function	Notes
ASCII	
CHAR	Mapped from CHR.
CONCAT	
LCASE	
LEFT	
LENGTH	Mapped from CHAR_LENGTH, CHARACTER_LENGTH, or LENGTH.
LIKE_REGEX	Mapped from REGEXP.

SAP HANA Character Function	Notes
LOCATE	Mapped from FIND, INSTR, LOCATE, or POSITION.
LOWER	
LPAD	
LTRIM	
NCHAR	Mapped from UNICHR.
REPLACE	
REPLACE_REGEXPR	Mapped from REGEXP_REPLACE.
RIGHT	
RPAD	
RTRIM	
SUBSTR	
SUBSTR_REGEXPR	Mapped from REGEXP_EXTRACT.
SUBSTRING	In the 3-argument form, if the second argument is 0 or negative, SAP HANA's results deviate from SQL standard. To prevent nonstandard results, add OPTION STRICT to the query.
TRIM	
UCASE	
UNICODE	

SAP HANA Character Function	Notes
UPPER	

SAP HANA Conditional Function Support

TDV supports the conditional functions listed in the table below for SAP HANA.

SAP HANA Conditional Function	Notes
COALESCE	
GREATEST	
IFNULL	
LEAST	
NULLIF	

SAP HANA Conversion Function Support

TDV supports the conversion functions listed in the table below for SAP HANA.

SAP HANA Conversion Function	Notes
BINTOHEX	Mapped from TO_HEX.
CAST	
HEXTOBIN	Mapped from HEX_TO_BINARY.

SAP HANA Conversion Function	Notes
TO_DATE	
TO_TIMESTAMP	
TO_VARCHAR	Mapped from FORMAT_DATE, PARSE_DATE, PARSE_TIME PARSE_TIMESTAMP, or TO_CHAR.

SAP HANA Date Function Support

TDV supports the date functions listed in the table below for SAP HANA.

SAP HANA Date Function	Notes
ADD_DAYS	Mapped from DATE_ADD.
ADD_MONTH	
CURRENT_DATE	
CURRENT_TIME	
CURRENT_TIMESTAMP	
CURRENT_UTCTIMESTAMP	Mapped from GETUTCDATE.
DAYNAME	
DAYOFMONTH	
DAYOFYEAR	Mapped from EXTRACT (DOYFROM).
DAYS_BETWEEN	
EXTRACT (DAY FROM)	

SAP HANA Date Function	Notes
EXTRACT (HOUR FROM)	
EXTRACT (MINUTE FROM)	
EXTRACT (MONTH FROM)	
EXTRACT (SECOND FROM)	
EXTRACT (YEAR FROM)	
HOUR	
LAST_DAY	
MINUTE	
MONTH	
MONTHNAME	
NOW	
QUARTER	
SECOND	
WEEK	
WEEKDAY	Mapped from DAYOFWEEK.
YEAR	

SAP HANA Numeric Function Support

TDV supports the numeric functions listed in the table below for SAP HANA.

SAP HANA Numeric Function	Notes
ABS	
ACOS	
ASIN	
ATAN	
ATAN2	
CEIL	Mapped from CEIL or CEILING.
COS	
COT	
EXP	
FLOOR	
LN	
LOG	
MOD	
POWER	Mapped from POW or POWER.
RAND	Mapped from RAND or RANDOM.
ROUND	
SIGN	
SIN	
SQRT	

SAP HANA Numeric Function	Notes
TAN	

SAP HANA Specific Properties

This section describes the connection properties that are specific to the SAP HANA data source.

Port	Port number for the data source to connect with the host. The Port number for SAP HANA is 30015.
Server	Name or IP address of the machine hosting the data source.
Transaction Lock Wait Timeout	The length of time a transaction is to wait on the lock before quitting.

References

Refer to the following Guides for further details about the capabilities of the data source:

Capabilities	Section
Query Engine	User Guide, Chapter <i>TDV Query Engine Optimizations</i>
Data ship	User Guide, Chapter <i>Data Ship Performance Optimization</i>
Caching	User Guide, Chapter <i>TDV Caching</i>

Capabilities	Section
Performance Optimization	User Guide, Chapter <i>Performance Tuning</i>
TDV Massively Parallel Processing Engine	User Guide, Chapter <i>Configuring the TDV MPP Engine</i>

TIBCO Product Documentation and Support Services

For information about this product, you can read the documentation, contact TIBCO Support, and join the TIBCO Community.

How to Access TIBCO Documentation

Documentation for TIBCO products is available on the [TIBCO Product Documentation](#) website, mainly in HTML and PDF formats.

The [TIBCO Product Documentation](#) website is updated frequently and is more current than any other documentation included with the product.

Product-Specific Documentation

The following documentation for this product is available on the [TIBCO® Data Virtualization](#) page.

- **Users**
 - TDV Getting Started Guide
 - TDV User Guide
 - TDV Web UI User Guide
 - TDV Client Interfaces Guide
 - TDV Tutorial Guide
 - TDV Northbay Example
- **Administration**
 - TDV Installation and Upgrade Guide
 - TDV Administration Guide
 - TDV Active Cluster Guide
 - TDV Security Features Guide
- **Data Sources**

TDV Adapter Guides

TDV Data Source Toolkit Guide (Formerly Extensibility Guide)

- **References**

TDV Reference Guide

TDV Application Programming Interface Guide

- **Other**

TDV Business Directory Guide

TDV Discovery Guide

- *TIBCO TDV and Business Directory Release Notes* Read the release notes for a list of new and changed features. This document also contains lists of known issues and closed issues for this release.

How to Contact TIBCO Support

Get an overview of [TIBCO Support](#). You can contact TIBCO Support in the following ways:

- For accessing the Support Knowledge Base and getting personalized content about products you are interested in, visit the [TIBCO Support](#) website.
- For creating a Support case, you must have a valid maintenance or support contract with TIBCO. You also need a user name and password to log in to [TIBCO Support](#) website. If you do not have a user name, you can request one by clicking **Register** on the website.

Release Version Support

TDV 8.5 is designated as a Long Term Support (LTS) version. Some release versions of TIBCO® Data Virtualization products are selected to be long-term support (LTS) versions. Defect corrections will typically be delivered in a new release version and as hotfixes or service packs to one or more LTS versions. See also

https://docs.tibco.com/pub/tdv/general/LTS/tdv_LTS_releases.htm.

How to Join TIBCO Community

TIBCO Community is the official channel for TIBCO customers, partners, and employee subject matter experts to share and access their collective experience. TIBCO Community offers access to Q&A forums, product wikis, and best practices. It also offers access to extensions, adapters, solution accelerators, and tools that extend and enable customers to gain full value from TIBCO products. In addition, users can submit and vote on feature requests from within the [TIBCO Ideas Portal](#). For a free registration, visit [TIBCO Community](#).

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