



# TIBCO Data Virtualization®

## SQL Server Adapter Guide

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# TDV SQL Server Adapter

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## Introduction

This section explains the various connection and configuration options of the datasource SQL Server as well as the capabilities:

[Datasource Configuration, page 3](#)

[Obtain and Install the Driver for SQL Server, page 19](#)

[Connecting to SQL Server datasource using an Active directory Login, page 20](#)

[Microsoft SQL Server 2008 Limitation, page 21](#)

[Data Type Mappings, page 21](#)

[Microsoft SQL Server Function Support, page 25](#)

[References, page 32](#)

## Datasource Configuration

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

## Common Properties

The following table and the sections below lists and explains the connection properties that are common to all data sources:

**Basic Connection Properties**

Datasource Name	The name of the Datasource.
Host	Name of the host machine or the host machine's IP address.
Port	The Port number.
Database Name	Name or alias of the underlying data source. TDV Server uses this name to find and connect to the data source.
Login/User, Password	User name and password required to access the data source.
Transaction Isolation	The degree to which transactions are isolated from data modifications made by other transactions.
Pass-through Login	Flag to indicate whether pass-through login is enabled or not.
Authentication Type	The type of Authentication used by the datasource.

## **Advanced Connection Properties**

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 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 Minimum Size	Minimum number of connections in the pool even when the pool is inactive.
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.
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.
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.
Execution Timeout	The number of seconds an execution query on the data source can run before being canceled.

<a href="#">Execute SELECTs Independently</a>	Lets a SELECT statement be executed using a new connection from the connection pool, and committed immediately after completion. INSERT, UPDATE, and DELETE statements are executed using the same connection as part of the transaction.
<a href="#">Connection Checkout Procedure</a>	A procedure that returns a valid SQL statement that can be used to initialize the connection.
<a href="#">Connection Checkout Timeout</a>	Time that a connection doing a checkout can remain idle without being dropped.
<a href="#">Max Source Side Cardinality for Semi Join</a>	See the documentation for semijoins and the <i>TDV Administration Guide</i> for more information.
<a href="#">Max Source Side of Semi Join To Use OR Syntax</a>	See the documentation for semijoins and the <i>TDV Administration Guide</i> for more information.
<a href="#">Min Target to Source Ratio for Semi Join</a>	Sets the minimum target-to-source ratio of cardinality for semijoins. Refer to the <i>TDV Administration Guide</i> for more information.
<a href="#">Supports Star Schema</a>	Check only if this data source supports very large predicates and very large cardinalities for star schema semijoins.

### **Datasource Name**

The name of the data source.

#### **Data Type**

string

#### **Default Value**

""

### **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**

""

**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.

**Authentication Type**

Indicates the type of authentication used by the data source.

**Data Type**

String

**Default Value**

BASIC

**Remarks**

Select BASIC or Kerberos authentication method, where offered.

See the *TDV Administration Guide* for more information about Kerberos authentication.

**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.

**SQL Server Connection Properties**

This section describes the connection properties that are specific to the SQL Server data source.

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Host	<p>If the user has a named instance defined, it has to be appended to the host:</p> <p>&lt;host&gt;\&lt;named instance&gt;</p>
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Port	Port number for the data source to connect with the host. The Port number for SQL Server is 1433.
Service Principal Name	This field is available only if you choose Kerberos authentication.
Keytab File	This field is available only if you choose Kerberos authentication. Use to enable Kerberos security through keytab files. Type the full path to the keytab file.
Enable Bulk Import/Export	Related to the data ship feature capability. Several fields are available only if others are checked. For details, see the section Data Ship Performance Optimizations in the User Guide.
Select mode	Direct or Cursor Direct—Sends all results to the adapter in one request. Each statement establishes its own connection to the database using the same connection properties as the original connection, with auto-commit enabled. Java Transaction API (JTA) is not supported. Direct mode does not support operations where the adapter creates a second statement internally. A typical exception message is “Cannot start a cloned connection while in manual transaction mode.” Cursor—Allows you to work with a smaller set of rows that are returned by the SQL statements.
Show All Databases	Check to list all databases accessible using these credentials during introspection. If a SQL Server database is off-line for the instance you are attempting to introspect, you might see NPE exceptions in the log file.
Is dataship source	Indicates whether the physical data source might be used as a source of shipped tables to another data ship enabled data source

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Lower bound/Upper bound	TDV uses <b>Explain Plan</b> to arrive at a numeric estimate of the cost of shipping data from a node to the Data Virtualizer. When the cost of shipping a federated query node falls between the limits of the <b>Lowerbound</b> and <b>Upperbound</b> , it is considered eligible for shipment so that it can be processed locally.
Is dataship target	Indicates whether the physical data source might be used to receive shipped tables from another data ship enabled data source.
Schema path for Temp Tables	A relative path to set the location of the temp tables on the data source. It is the name of a schema in the data source.
Temp Table Prefix	A character string addition to temporary table names so that they are recognized if they are needed.

## Obtain and Install the Driver for SQL Server

### Obtain and install the JDBC driver for SQL Server

1. Visit the following URL for the Microsoft JDBC Driver for SQL Server Web page and download the JDBC driver for your version of SQL Server:  
<http://msdn.microsoft.com/en-us/data/aa937724.aspx>

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

2. Follow the instructions provided to extract the files for your version of SQL Server.
3. Locate the JAR file for your version.

Version	JAR File
2008, 2012, 2014	sqljdbc4.jar or sqljdbc_<version>_<language>.tar.gz
2019	mssql-jdbc-7.4.1.jre11.jar mssql-jdbc-7.4.1.jre11.jar

4. Put the JAR file in the directory appropriate to the version:  
`<TDV_install_dir>\conf\adapters\system\microsoft_sql_server_<ver>`

For UNIX, navigate to the directory where you want the driver unpacked, and type:

```
gzip -d sqljdbc_<version>_<language>.tar.gz.
```

5. Restart the TDV Server.
6. If integrated security is required, it is recommended the you keep the SQL server JDBC drivers in a common location. For example, <TDV\_install\_dir>\apps\dlm\cis\_ds\_mssql\lib.

## Connecting to SQL Server datasource using an Active directory Login

Follow these steps to connect to a SQL Server datasource using an Active Directory login:

1. Download the Microsoft jTDS JDBC driver
2. From Studio, create a new data source
3. Select "New Adapter" using the "Microsoft SQL Server <desired version>" parent adapter
4. Modify the "Adapter Class Name" to: net.sourceforge.jtds.jdbc.Driver
5. Modify the Connection URL Pattern to:  
jdbc:jtds:sqlserver://<HOST>:<PORT>/<DATABASE\_NAME>;tds=8.0;lastupdatecount=true
6. Copy the jTDS driver to /conf/adapters/custom/<name of the new adapter>
7. Restart TDV
8. Create a new data source from the new adapter
9. Supply the following details in the data source panel:
  - Host:
  - Port:
  - Database Name:
  - Login: <user name (no domain)>
  - Password: <user's password>

10. In the Advanced tab, add a JDBC Connection Property:
  - Property: domain
  - Value: <domain name of AD user>

## Microsoft SQL Server 2008 Limitation

There is a known problem with Microsoft related to JRE that results in disabling of the 3DES\_EDE\_CBC transport layer security algorithm. If you encounter this problem, you can enable 3DES\_EDE\_CBC in <TDV\_install\_dir>/jdk/conf/security/java.security.

### To re-enable 3DES\_EDE\_CBC

1. Navigate to the <TDV\_install\_dir>/jdk/conf/security/java.security.
2. Open the file and remove 3DES\_EDE\_CBC from the jdk.tls.disabledAlgorithms setting.
3. Restart the TDV Server.

## Data Type Mappings

### Microsoft SQL Server to TDV Data Types

The following table shows the mapping from SQL Server data types to TDV data types.

Microsoft SQL Server Data Type	TDV Data Type	Notes
BIGINT	BIGINT	
BINARY	BINARY	
BIT	BIT	
CHAR	CHAR	
DATE	DATE	SQL Server 2008 and 2012.

Microsoft SQL Server Data Type	TDV Data Type	Notes
DATETIME	TIMESTAMP	
DATETIME2	TIMESTAMP	SQL Server 2008 and 2012.
DATETIME2(0) – DATETIME2(7)	TIMESTAMP	SQL Server 2008 and 2012.
DATETIMEOFFSET	VARCHAR	SQL Server 2008 and 2012.
DATETIMEOFFSET(0) – DATETIMEOFFSET(7)	VARCHAR	SQL Server 2008 and 2012.
DECIMAL	DECIMAL	
FLOAT	DOUBLE	
IMAGE	BLOB	
INT	INTEGER	
INT IDENTITY	INTEGER	
MONEY	DECIMAL	
NCHAR	CHAR	
NTEXT	CLOB	
NUMERIC	NUMERIC	
NVARCHAR	VARCHAR	
REAL	FLOAT	
SMALLDATETIME	TIMESTAMP	
SMALLINT	SMALLINT	
SMALLMONEY	DECIMAL	
SQL_VARIANT	OTHER	ODBC does not fully support this data type.
TABLE	OTHER	

Microsoft SQL Server Data Type	TDV Data Type	Notes
TEXT	CLOB	
TIME	TIME	SQL Server 2008 and 2012.
TIME() – TIME(7)	TIME	SQL Server 2008 and 2012.
TIMESTAMP	VARBINARY	
TINYINT	SMALLINT	
UNIQUEIDENTIFIER	CHAR	
VARBINARY	VARBINARY	
VARCHAR	VARCHAR	
XML	XML	

## Microsoft SQL Server Cache Mapping

This section discusses the data type mappings and restrictions for caches stored on Microsoft SQL Server 2000, 2005, or 2008. Overrides for the 2008 version are indicated in square brackets.

- SQL Server’s page size limits the number of bytes that can be stored directly in a column—so executing DDL causes an error if the resulting table requires a row size greater than this limit. The solution is to either raise the page size for the database, or to use indirect storage types such as TEXT and IMAGE. TDV chooses TEXT and IMAGE types if a value requires more than 255 bytes of storage for this reason, although SQL Server does allow VARCHAR and VARBINARY up to 8,000 bytes. Hand-tuning of the data types used in a table can improve storage efficiency.
- Microsoft SQL Server TINYINT has a range 0 to 255, and TDV TINYINT is -128 to 127, so these types are not compatible.
- DATETIME has only 3.33ms accuracy, so rounding error may occur.

Data Type	Preferred Native Type	Other Allowed Native Types
BIGINT	BIGINT	DECIMAL(19+,0), larger INTEGER types, VARCHAR(20+), NVARCHAR(20+)



Data Type	Preferred Native Type	Other Allowed Native Types
BINARY(n)	BINARY(n); IMAGE [if n > 255]	BINARY(n+), IMAGE
BIT	BIT	DECIMAL(1+,0), larger INTEGER types
BLOB	IMAGE	
BOOLEAN	BIT	TINYINT, SMALLINT, INTEGER, BIGINT
CHAR(n)	CHAR(n); TEXT [if p > 38]	CHAR(n+), NCHAR(n+), VARCHAR(n+), NVARCHAR(n+), TEXT, NTEXT
CLOB	TEXT	NTEXT
DATE	DATE [2008] VARCHAR(10)	VARCHAR(10+)
DECIMAL(p,s)	DECIMAL(p,s); TEXT [if p > 38]	DECIMAL(p+,s+), VARCHAR(p+3+), NVARCHAR(n+), TEXT, NTEXT
DOUBLE	FLOAT	VARCHAR(24+)
FLOAT	REAL	FLOAT, VARCHAR(24+)
INTEGER	INTEGER	DECIMAL(10+,0), larger INTEGER types, VARCHAR(20+), NVARCHAR(20+)
NUMERIC(p,s)	DECIMAL(p,s); TEXT [if p > 38]	DECIMAL(p+,s+), VARCHAR(p+3+), NVARCHAR(p+3+), TEXT, NTEXT
OTHER	[cannot be cached]	
SMALLINT	SMALLINT	DECIMAL(5+,0), larger INTEGER types, VARCHAR(20+), NVARCHAR(20+)
TIME	TIME [2008] VARCHAR(15)	VARCHAR(15+)

Data Type	Preferred Native Type	Other Allowed Native Types
TIMESTAMP	DATETIME2 [2008] DATETIME	
TINYINT	SMALLINT	DECIMAL(3+,0), larger INTEGER types, VARCHAR(20+), NVARCHAR(20+)
VARBINARY(n)	VARBINARY(n); IMAGE [if n > 255]	VARBINARY(n+), IMAGE
VARCHAR(n)	VARCHAR(n); TEXT [if n > 255]	VARCHAR(n+), NVARCHAR(n+), TEXT, NTEXT
XML	TEXT	VARCHAR(*) [Truncates data if column is too small], TEXT

## Microsoft SQL Server Function Support

TDV supports the following types of functions for Microsoft SQL Server:

- [Microsoft SQL Server Aggregate Function Support, page 26](#)
- [Microsoft SQL Server Analytic Function Support, page 26](#)
- [Microsoft SQL Server Analytic Aggregate Function Support, page 27](#)
- [Microsoft SQL Server Character Function Support, page 28](#)
- [Microsoft SQL Server Conditional Function Support, page 29](#)
- [Microsoft SQL Server Conversion Function Support, page 29](#)
- [Microsoft SQL Server Date Function Support, page 30](#)
- [Microsoft SQL Server Encryption Function Support, page 31](#)
- [Microsoft SQL Server Numeric Function Support, page 31](#)
- [Microsoft SQL Server Time Function Support, page 32](#)

## Microsoft SQL Server Aggregate Function Support

TDV supports the aggregate functions listed in the table below for Microsoft SQL Server.

Microsoft SQL Server Aggregate Function	Notes
AVG	Unique identifiers not supported.
COUNT	Unique identifiers not supported.
MAX	
MIN	
SUM	Unique identifiers not supported.

## Microsoft SQL Server Analytic Function Support

TDV supports the analytic functions listed in the table below for Microsoft SQL Server 2005 and 2008.

Microsoft SQL Server Analytic Function	Notes
AVG	
COUNT	
DENSE_RANK	
MAX	
MIN	
NTILE	
RANDOM	
RANK	
ROW_NUMBER	
STDDEV	
SUM	

Microsoft SQL Server Analytic Function	Notes
VAR_POP	
VARIANCE	

## Microsoft SQL Server Analytic Aggregate Function Support

TDV supports the analytic aggregate functions listed in the table below for Microsoft SQL Server.

Microsoft SQL Server Analytic Aggregate Function	Notes
CUM_DIST	SQL Server 2012 and 2014.
FIRST_VALUE	SQL Server 2012 and 2014.
LAG	SQL Server 2012 and 2014.
LAST_VALUE	SQL Server 2012 and 2014.
LEAD	SQL Server 2012 and 2014.
PERCENTILE_CONT	SQL Server 2012 and 2014.
PERCENTILE_DISC	SQL Server 2012 and 2014.
STDDEV	
STDDEV_POP	
STDDEV_SAMP	
VARIANCE	
VARIANCE_POP	
VARIANCE_SAMP	

## Microsoft SQL Server Character Function Support

TDV supports the character functions listed in the table below for Microsoft SQL Server.

Microsoft SQL Server Character Function	Notes
ASCII	<ul style="list-style-type: none"> <li></li> </ul>
CONCAT	<ul style="list-style-type: none"> <li>Unique identifiers not supported.</li> <li>When the input timestamp value has no fractional seconds (hh:mm:ss), TDV does not print the fractional part. This is the way many data sources handle this situation. However, SQL Server <i>does</i> add the fractional part (hh:mm:ss.fff).</li> </ul>
LENGTH	
LOWER	
POSITION	
REPLACE	
RTRIM	
SOUNDEX	
SPACE	
SUBSTRING	
TRIM	
UPPER	
CHARINDEX	

## Microsoft SQL Server Conditional Function Support

TDV supports the conditional functions listed in the table below for Microsoft SQL Server.

Microsoft SQL Server Conditional Function	Notes
COALESCE	
DECODE	Mapped to CASE.
ISNULL	
ISNUMERIC	
NULLIF	NULL literal cannot be the first argument to NULLIF function. NULLIF does not support IMAGE, NTEXT, or TEXT.
NVL	

## Microsoft SQL Server Conversion Function Support

TDV supports the conversion functions listed in the table below for Microsoft SQL Server. These conversion functions do not support unique identifiers.

Microsoft SQL Server Conversion Function	Notes
CAST	<ul style="list-style-type: none"> <li>TINYINT is cast to SMALLINT.</li> <li>Cannot cast a number to DOUBLE.</li> <li>Cannot cast a string to any integer data type.</li> <li>Cannot cast floating point to DOUBLE.</li> </ul>
FORMAT_DATE	
PARSE_TIMESTAMP	
TO_CHAR	
TO_DATE	
TO_NUMBER	

Microsoft SQL Server Conversion Function	Notes
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TO_TIMESTAMP	
--------------	--

## Microsoft SQL Server Date Function Support

TDV supports the date functions listed in the table below for Microsoft SQL Server.

Microsoft SQL Server Date Function	Notes
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CURRENT_DATE	
--------------	--

CURRENT_TIMESTAMP	
-------------------	--

DATEADD	SQL Server 2014 only.
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DATEDIFF	SQL Server 2008, 2012, 2014. DATEDIFF (DATEPART, STARTDATE, ENDDATE)
----------	---

DATEPART	SQL Server 2014 only.
----------	-----------------------

DAY	
-----	--

DAYNAME	SQL Server 2014 only.
---------	-----------------------

DAYOFMONTH	SQL Server 2014 only.
------------	-----------------------

DAYOFWEEK	SQL Server 2014 only.
-----------	-----------------------

HOUR	SQL Server 2014 only.
------	-----------------------

MINUTE	SQL Server 2014 only.
--------	-----------------------

MONTH	
-------	--

MONTHNAME	SQL Server 2014 only.
-----------	-----------------------

QUARTER	SQL Server 2014 only.
---------	-----------------------

SECOND	SQL Server 2014 only.
--------	-----------------------

WEEK	SQL Server 2014 only.
------	-----------------------

YEAR	
------	--

## Microsoft SQL Server Encryption Function Support

TDV supports the encryption functions listed in the table below for Microsoft SQL Server 2008. If the SQL Server string data type is not CHAR or VARCHAR, the results are different when function is not pushed.

Microsoft SQL Server Encryption Function	Notes
HASHMD2	
HASHMD5	
HASHSHA	
HASHSHA1	

## Microsoft SQL Server Numeric Function Support

TDV supports the numeric functions listed in the table below for Microsoft SQL Server.

### Notes:

- These numeric functions do not support unique identifiers.
- Microsoft SQL Server 2005, 2008, and 2012 support floating point and numeric data types for both arguments of a modulo (%) operator.

Microsoft SQL Server Numeric Function	Notes
ABS	
ACOS	
ASIN	
ATAN	
CEILING	
COS	
COT	
DEGREES	
EXP	



Microsoft SQL Server Numeric Function	Notes
FLOOR	
LOG	
PI	
POWER	
RADIANS	
ROUND	
SIN	
SQRT	
TAN	

## Microsoft SQL Server Time Function Support

TDV supports the time function listed in the table below for Microsoft SQL Server.

Function	Notes
EXTRACT	

## 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>
Kerberos	Administration Guide Chapter <i>Configuring Kerberos</i>



# TIBCO Product Documentation and Support Services

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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.

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