



Informatica® Data Integration - Free & PayGo

Microsoft SQL Server Connector

© Copyright Informatica LLC 2017, 2023

This software and documentation are provided only under a separate license agreement containing restrictions on use and disclosure. No part of this document may be reproduced or transmitted in any form, by any means (electronic, photocopying, recording or otherwise) without prior consent of Informatica LLC.

U.S. GOVERNMENT RIGHTS Programs, software, databases, and related documentation and technical data delivered to U.S. Government customers are "commercial computer software" or "commercial technical data" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, the use, duplication, disclosure, modification, and adaptation is subject to the restrictions and license terms set forth in the applicable Government contract, and, to the extent applicable by the terms of the Government contract, the additional rights set forth in FAR 52.227-19, Commercial Computer Software License.

Informatica, the Informatica logo, Informatica Cloud, and PowerCenter are trademarks or registered trademarks of Informatica LLC in the United States and many jurisdictions throughout the world. A current list of Informatica trademarks is available on the web at <https://www.informatica.com/trademarks.html>. Other company and product names may be trade names or trademarks of their respective owners.

Portions of this software and/or documentation are subject to copyright held by third parties. Required third party notices are included with the product.

See patents at <https://www.informatica.com/legal/patents.html>.

DISCLAIMER: Informatica LLC provides this documentation "as is" without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of noninfringement, merchantability, or use for a particular purpose. Informatica LLC does not warrant that this software or documentation is error free. The information provided in this software or documentation may include technical inaccuracies or typographical errors. The information in this software and documentation is subject to change at any time without notice.

NOTICES

This Informatica product (the "Software") includes certain drivers (the "DataDirect Drivers") from DataDirect Technologies, an operating company of Progress Software Corporation ("DataDirect") which are subject to the following terms and conditions:

1. THE DATADIRECT DRIVERS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT.
2. IN NO EVENT WILL DATADIRECT OR ITS THIRD PARTY SUPPLIERS BE LIABLE TO THE END-USER CUSTOMER FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR OTHER DAMAGES ARISING OUT OF THE USE OF THE ODBC DRIVERS, WHETHER OR NOT INFORMED OF THE POSSIBILITIES OF DAMAGES IN ADVANCE. THESE LIMITATIONS APPLY TO ALL CAUSES OF ACTION, INCLUDING, WITHOUT LIMITATION, BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY, MISREPRESENTATION AND OTHER TORTS.

The information in this documentation is subject to change without notice. If you find any problems in this documentation, report them to us at infa_documentation@informatica.com.

Informatica products are warranted according to the terms and conditions of the agreements under which they are provided. INFORMATICA PROVIDES THE INFORMATION IN THIS DOCUMENT "AS IS" WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND ANY WARRANTY OR CONDITION OF NON-INFRINGEMENT.

Publication Date: 2023-04-04

Table of Contents

Preface	4
Informatica Resources.	4
Informatica Documentation.	4
Informatica Intelligent Cloud Services web site.	4
Informatica Intelligent Cloud Services Communities.	4
Informatica Intelligent Cloud Services Marketplace.	4
Data Integration connector documentation.	5
Informatica Knowledge Base.	5
Informatica Intelligent Cloud Services Trust Center.	5
Informatica Global Customer Support.	5
 Chapter 1: Introduction to Microsoft SQL Server Connector.....	6
Microsoft SQL Server Connector assets.	6
Rules and guidelines for Microsoft SQL Server tasks.	6
 Chapter 2: Microsoft SQL Server connections	7
Microsoft SQL Server connection properties.	7
 Chapter 3: Mappings and mapping tasks with Microsoft SQL Server Connector	10
Microsoft SQL Server sources in a mapping.	10
Microsoft SQL Server lookups in mapping.	12
Pushdown optimization.	13
Full pushdown.	14
Source pushdown.	14
Pushdown optimization functions.	14
Pushdown optimization variables.	17
Configuring pushdown optimization.	17
Rules and guidelines for pushdown optimization.	18
 Chapter 4: Data type reference.....	20
Microsoft SQL Server and transformation data types.	20
 Index.....	23

Preface

Use *Microsoft SQL Server Connector* to learn how to read from Microsoft SQL Server by using Data Integration. Learn to create a connection, develop mappings, and run mapping and data transfer tasks. You can also learn how to configure pushdown optimization to a Microsoft SQL Server database.

Informatica Resources

Informatica provides you with a range of product resources through the Informatica Network and other online portals. Use the resources to get the most from your Informatica products and solutions and to learn from other Informatica users and subject matter experts.

Informatica Documentation

Use the Informatica Documentation Portal to explore an extensive library of documentation for current and recent product releases. To explore the Documentation Portal, visit <https://docs.informatica.com>.

If you have questions, comments, or ideas about the product documentation, contact the Informatica Documentation team at infa_documentation@informatica.com.

Informatica Intelligent Cloud Services web site

You can access the Informatica Intelligent Cloud Services web site at <http://www.informatica.com/cloud>. This site contains information about Informatica Cloud integration services.

Informatica Intelligent Cloud Services Communities

Use the Informatica Intelligent Cloud Services Community to discuss and resolve technical issues. You can also find technical tips, documentation updates, and answers to frequently asked questions.

Access the Informatica Intelligent Cloud Services Community at:

<https://network.informatica.com/community/informatica-network/products/cloud-integration>

Developers can learn more and share tips at the Cloud Developer community:

<https://network.informatica.com/community/informatica-network/products/cloud-integration/cloud-developers>

Informatica Intelligent Cloud Services Marketplace

Visit the Informatica Marketplace to try and buy Data Integration Connectors, templates, and mapplets:

<https://marketplace.informatica.com/>

Data Integration connector documentation

You can access documentation for Data Integration Connectors at the Documentation Portal. To explore the Documentation Portal, visit <https://docs.informatica.com>.

Informatica Knowledge Base

Use the Informatica Knowledge Base to find product resources such as how-to articles, best practices, video tutorials, and answers to frequently asked questions.

To search the Knowledge Base, visit <https://search.informatica.com>. If you have questions, comments, or ideas about the Knowledge Base, contact the Informatica Knowledge Base team at KB_Feedback@informatica.com.

Informatica Intelligent Cloud Services Trust Center

The Informatica Intelligent Cloud Services Trust Center provides information about Informatica security policies and real-time system availability.

You can access the trust center at <https://www.informatica.com/trust-center.html>.

Subscribe to the Informatica Intelligent Cloud Services Trust Center to receive upgrade, maintenance, and incident notifications. The [Informatica Intelligent Cloud Services Status](#) page displays the production status of all the Informatica cloud products. All maintenance updates are posted to this page, and during an outage, it will have the most current information. To ensure you are notified of updates and outages, you can subscribe to receive updates for a single component or all Informatica Intelligent Cloud Services components. Subscribing to all components is the best way to be certain you never miss an update.

To subscribe, go to <https://status.informatica.com/> and click **SUBSCRIBE TO UPDATES**. You can then choose to receive notifications sent as emails, SMS text messages, webhooks, RSS feeds, or any combination of the four.

Informatica Global Customer Support

You can contact a Customer Support Center by telephone or online.

For online support, click **Submit Support Request** in Informatica Intelligent Cloud Services. You can also use Online Support to log a case. Online Support requires a login. You can request a login at <https://network.informatica.com/welcome>.

The telephone numbers for Informatica Global Customer Support are available from the Informatica web site at <https://www.informatica.com/services-and-training/support-services/contact-us.html>.

CHAPTER 1

Introduction to Microsoft SQL Server Connector

You can use Microsoft SQL Server Connector to connect to Microsoft SQL Server databases from Data Integration. Use Microsoft SQL Server connector to read data from the Microsoft SQL Server databases.

You can also use a Microsoft SQL Server connection to connect to Microsoft Azure SQL Database. You can connect to audit-enabled Azure SQL Database and pre-V12 Azure SQL Database. You can connect to Azure SQL Database from Secure Agents deployed on Azure virtual machines. You can also connect to an Azure SQL Database managed instance.

You can use Microsoft SQL Server objects as sources for mappings, mapping tasks, and data transfer tasks.

Microsoft SQL Server Connector assets

Create assets in Data Integration to integrate data using Microsoft SQL Server Connector.

When you use Microsoft SQL Server Connector, you can include the following Data Integration assets:

- Data transfer task
- Mapping
- Mapping task

For more information about configuring assets and transformations, see *Mappings*, *Transformations*, and *Tasks* in the Data Integration documentation.

Rules and guidelines for Microsoft SQL Server tasks

Consider the following rules and guidelines when you configure a task:

- When you use a custom or saved query in a task and the query contains * instead of a column list, NULL values are returned. You must use a column list instead of * in the query.
- When the source column name that you read has hyphens and you use the **Create New at Runtime** option to create a target, the hyphens in the table name are converted to underscores in the target column.

CHAPTER 2

Microsoft SQL Server connections

Create a Microsoft SQL Server connection to connect to Microsoft SQL Server so that the Secure Agent can read data from Microsoft SQL Server. You can also use a Microsoft SQL Server connection to connect to Microsoft Azure SQL Database.

You create a Microsoft SQL Server connection on the **Connections** page. Use the connection when you create the mappings, mapping tasks, and data transfer tasks.

Microsoft SQL Server connection properties

When you set up a Microsoft SQL Server connection, configure the connection properties.

The following table describes the Microsoft SQL Server connection properties:

Property	Description
Connection Name	Name of the connection. Each connection name must be unique within the organization. Connection names can contain alphanumeric characters, spaces, and the following special characters: _ . + -, Maximum length is 255 characters.
Description	Description of the connection. Maximum length is 4000 characters.
Type	Type of connection. Select Microsoft SQL Server from the list.
Runtime Environment	The name of the runtime environment where you want to run the tasks. Specify a Secure Agent or a Hosted Agent.
SQL Server Version	Microsoft SQL Server database version.

Property	Description
Authentication Mode	<p>Authentication method to access Microsoft SQL Server.</p> <p>Select one of the following methods:</p> <ul style="list-style-type: none"> - SQL Server Authentication. Uses your Microsoft SQL Server user name and password to access Microsoft SQL Server. - Windows Authentication (Deprecated). Uses the Microsoft Windows authentication to access Microsoft SQL Server. This option is available when you access Data Integration by using Microsoft Windows. <p>When you choose this option, you don't need to enter credentials to access Microsoft SQL Server and ensure that the user account that starts the Secure Agent service is available in the Microsoft SQL Server database.</p> <p>Note: Windows authentication is not certified for Microsoft SQL Server 2017 version hosted on Linux.</p> <ul style="list-style-type: none"> - Active Directory Password. Uses the Azure Active Directory user name and password to authenticate and access the Microsoft Azure SQL Database. - Windows Authentication v2. Uses this authentication method to access Microsoft SQL Server from Data Integration using the agent hosted on a Linux or Windows machine. <p>When you choose this option on Linux, enter your domain name and Microsoft Windows credentials to access Microsoft SQL Server.</p> <p>When you choose this option on Windows, ensure that the user account that starts the Secure Agent service is available in the Microsoft SQL Server database.</p>
Domain	<p>Applies to Windows Authentication v2.</p> <p>The domain name of the Windows user.</p>
User Name	<p>User name for the database login. The user name can't contain a semicolon.</p> <p>To connect to Microsoft Azure SQL Database, specify the user name in the following format: username@host</p> <p>For Windows Authentication v2, specify the Windows NT user name.</p> <p>Note: This property is not applicable if you use the Windows Authentication mode to access Microsoft SQL Server.</p>
Password	<p>Password for the database login. The password can't contain a semicolon.</p> <p>For Windows Authentication v2, specify the Windows NT password.</p> <p>Note: This property is not applicable if you use the Windows Authentication mode to access Microsoft SQL Server.</p>
Host	<p>Name of the machine hosting the database server.</p> <p>To connect to Microsoft Azure SQL Database, specify the fully qualified host name.</p> <p>For example, vmjcmwxsfboheng.westus.cloudapp.azure.com.</p>
Port	<p>Network port number used to connect to the database server.</p> <p>Default is 1433.</p>
Instance Name	<p>Instance name of the Microsoft SQL Server database.</p>
Database Name	<p>Database name for the Microsoft SQL Server target. Database name is case-sensitive if the database is case-sensitive. Maximum length is 100 characters.</p> <p>Database names can include alphanumeric and underscore characters.</p>
Schema	<p>Schema used for the target connection.</p>

Property	Description
Code Page	The code page of the database server.
Encryption Method	The method that the Secure Agent uses to encrypt the data sent between the driver and the database server. You can use the encryption method to connect to Microsoft Azure SQL Database.
Crypto Protocol Version	Cryptographic protocols to use when you enable SSL encryption.
Validate Server Certificate	<p>When set to True, Secure Agent validates the certificate that is sent by the database server. If you specify the HostNameInCertificate parameter, Secure Agent also validates the host name in the certificate.</p> <p>When set to false, the Secure Agent doesn't validate the certificate that is sent by the database server.</p>
Trust Store	The location and name of the truststore file. The truststore file contains a list of Certificate Authorities (CAs) that the driver uses for SSL server authentication.
Trust Store Password	The password to access the contents of the truststore file.
Host Name in Certificate	Host name of the machine that hosts the secure database. If you specify a host name, the Secure Agent validates the host name included in the connection with the host name in the SSL certificate.
Metadata Advanced Connection Properties	<p>Additional properties for the JDBC driver to fetch the metadata.</p> <p>If you specify more than one property, separate each key-value pair with a semicolon.</p>
Runtime Advanced Connection Properties	<p>Additional properties for the ODBC driver to run mappings.</p> <p>If you specify more than one property, separate each key-value pair with a semicolon.</p>

CHAPTER 3

Mappings and mapping tasks with Microsoft SQL Server Connector

Use the Data Integration Mapping Designer to create a mapping. When you create a mapping, you configure a source to represent a Microsoft SQL Server object.

Describe the flow of data from source and target along with the required transformations before the agent writes data to the target. When you create a mapping task, select the mapping that you want to use. Use the Mapping Task wizard to create a mapping task. Validate and run the mapping to read data from sources and write to a target. The mapping task processes data based on the data flow logic you define in the mapping.

Microsoft SQL Server sources in a mapping

To read data from a Microsoft SQL Server database, configure a Microsoft SQL Server object as the Source transformation in a mapping. You can use the source or full pushdown optimization to read data from Microsoft SQL server.

Specify the name and description of the Microsoft SQL Server source. Configure the source, query options, and advanced properties for the source object.

The following table describes the source properties that you can configure for a Microsoft SQL Server source:

Property	Description
Connection	<p>Name of the source connection.</p> <p>You can select an existing connection, create a new connection, or define parameter values for the source connection property.</p> <p>If you want to overwrite the source connection properties at runtime, select the Allow parameter to be overridden at run time option.</p> <p>Specify the parameter file directory and name in the advanced session properties.</p>
Source Type	<p>Type of the Microsoft SQL Server source object available. You can choose from the following source types:</p> <ul style="list-style-type: none"> - Single - Multiple - Query - Parameter
Parameter	<p>A parameter file where you define values that you want to update without having to edit the task. Select an existing parameter for the source object or click New Parameter to define a new parameter for the source object.</p> <p>The Parameter property appears only if you select parameter as the source type.</p> <p>If you want to overwrite the parameter at runtime, select the Allow parameter to be overridden at run time option.</p> <p>When the task runs, the Secure Agent uses the parameters from the file that you specify in the advanced session properties.</p>
Object	Name of the Microsoft SQL Server source object.
Filter	<p>Configure a simple filter or an advanced filter to remove rows at the source. You can improve efficiency by filtering early in the data flow.</p> <p>A simple filter includes a field name, operator, and value. Use an advanced filter to define a more complex filter condition, which can include multiple conditions using the AND or OR logical operators.</p>
Sort	Select the fields and type of sorting to use. To sort data for a parameterized source, you must use a parameter for the sort options.
Select distinct rows	Select this option to extract only distinct rows.

The following table describes the advanced source properties that you can configure for a Microsoft SQL Server source:

Property	Description
Tracing level	Amount of detail that appears in the log for this transformation. You can choose terse, normal, verbose initialization, or verbose data. Default is normal.
Pre SQL	Pre-SQL command that must be run before reading data from the source.
Post SQL	Post-SQL command that must be run after reading data from the source.

Property	Description
Output is Deterministic	Relational source or transformation output that does not change between session runs when the input data is consistent between runs. When you configure this property, the Secure Agent does not stage source data for recovery if transformations in the pipeline always produce repeatable data.
Output is repeatable	Relational source or transformation output that is in the same order between session runs when the order of the input data is consistent. When output is deterministic and output is repeatable, the Secure Agent does not stage source data for recovery.
SQL Override	The SQL statement to override the default query generated from the specified source type to read data from the Microsoft SQL Server source.

Microsoft SQL Server lookups in mapping

You can create lookups for objects using a Microsoft SQL Server connection. You can retrieve data from a Microsoft SQL Server lookup object based on the specified lookup condition.

When you configure a lookup in Microsoft SQL Server, you select the lookup connection and lookup object.

Note: You can't configure a Lookup transformation in a data transfer task.

The following table describes the Microsoft SQL Server lookup object properties that you can configure in a Lookup transformation:

Property	Description
Connection	Name of the lookup connection. You can select an existing connection, create a new connection, or define parameter values for the lookup connection property. If you want to overwrite the lookup connection properties at runtime, select the Allow parameter to be overridden at run time option. Specify the parameter file directory and name in the advanced session properties.
Source Type	Type of the Microsoft SQL Server lookup object available. Select one of the following lookup object types: <ul style="list-style-type: none"> - Single Object - Query - Parameter When the lookup source is large, you can use a custom query to reduce the number of columns to query.

Property	Description
Parameter	<p>A parameter file where you define values that you want to update without having to edit the task. Select an existing parameter for the lookup object or click New Parameter to define a new parameter for the lookup object.</p> <p>The Parameter property appears only if you select parameter as the source type.</p> <p>If you want to overwrite the parameter at runtime, select the Allow parameter to be overridden at run time option.</p> <p>When the task runs, the Secure Agent uses the parameters from the file that you specify in the advanced session properties.</p>
Lookup Object	Name of the Microsoft SQL Server lookup object.
Multiple Matches	<p>The behavior when the lookup condition returns multiple matches.</p> <p>You can select one of the following options:</p> <ul style="list-style-type: none"> - Return first row - Return last row - Return any row - Return all rows - Report error
SQL Override	The SQL statement to override the default query that creates lookup data from a Microsoft SQL Server source.

Pushdown optimization

When you read data from a Microsoft SQL Server source, transform the data, and write the data to a target, you can configure pushdown optimization to push the transformation logic to the source or target database system. If the source and target databases are the same, you can configure full pushdown optimization for improved performance.

When the Secure Agent applies pushdown optimization, it pushes transformation logic to a database. The Secure Agent translates the transformation logic into SQL queries and sends the SQL queries to the database. The database runs the SQL queries to process the transformations.

Pushdown optimization improves mapping performance when the database can process the transformation logic faster than the Secure Agent. The Secure Agent also reads less data from the database.

The amount of transformation logic that the Secure Agent pushes to the database depends on the database, the transformation logic, and the mapping task. The Secure Agent processes all transformation logic that it cannot push to a database.

When you configure pushdown optimization for the mapping, the Secure Agent analyzes the optimized mapping from the source to the target or until it reaches a downstream transformation that it cannot push to the source database. The Secure Agent generates and executes a SELECT statement for each source that has transformation logic pushed down. Then, it reads the results of this SQL query and processes the remaining transformations in the mapping.

Full pushdown optimization is enabled by default in mapping tasks.

The Secure Agent can push the following transformation logic to a Microsoft SQL Server source:

Transformations	Supported Pushdown Type
Aggregator	Source, Full
Expression	Source, Full
Filter	Source, Full
Joiner	Source, Full
Sorter	Source, Full
Union	Source, Full
Router	Full

Full pushdown

When the Secure Agent applies full pushdown optimization, it pushes all the transformation logic in the mapping to the target database.

Full pushdown optimization is enabled by default in mapping tasks.

Source pushdown

When the Secure Agent applies source pushdown, it analyzes the mapping from source to target or until it reaches a downstream transformation it cannot push to the source database.

The Secure Agent generates and executes a SELECT statement based on the transformation logic for each transformation it can push to the database. Then, it reads the results of this SQL query and processes the remaining transformations.

You can configure a mapping to use source pushdown if the source and target reside in different databases. For example, if a mapping contains a Microsoft SQL Server source and an Oracle target, you can configure source pushdown to push some transformation logic for processing to the Microsoft SQL Server source.

Pushdown optimization functions

When you use pushdown optimization, the Secure Agent converts the expression in the transformation by determining equivalent functions in the database. If there is no equivalent function in the database, the Secure Agent processes the transformation logic.

The following table summarizes the availability of pushdown functions in Microsoft SQL Server:

Functions	Pushdown Type
ABS()	Source, Full
ADD_TO_DATE()	Full
ASCII() ¹	Full

Functions	Pushdown Type
AVG()	Source, Full
CEIL() ¹	Full
CHR()	Full
CONCAT() ¹	Full
COS()	Source, Full
COSH()	Full
COUNT()	Source, Full
DATE_COMPARE()	Source, Full
DATE_DIFF() ²	Full
DECODE()	Source, Full
EXP()	Source, Full
FIRST()	Full
FLOOR() ¹	Full
GET_DATE_PART()	Full
IIF()	Source, Full
IN()	Source, Full
INSTR()	Full
IS_DATE() ²	Full
IS_NUMBER() ²	Full
ISNULL()	Source, Full
LAST_DAY() ²	Full
LENGTH() ¹	Full
LN()	Full
LOG()	Full
LOWER()	Source, Full
LPAD() ²	Full
LTRIM() ¹	Full

Functions	Pushdown Type
MAX()	Source, Full
MIN()	Source, Full
MD5() ²	Source, Full
MOD() ¹	Full
POWER()	Source, Full
REPLACECHR() ²	Full
REPLACESTR() ²	Full
ROUND(NUMBER)	Full
RTRIM() ¹	Full
SIGN()	Full
SIN()	Source, Full
SINH()	Full
SOUNDEX()	Full
SQRT()	Source, Full
STDDEV()	Full
SUBSTR()	Full
SUM()	Source, Full
SYSTIMESTAMP() ¹	Full
TAN()	Source, Full
TANH()	Full
TO_BIGINT	Full
TO_CHAR(DATE) ¹	Full
TO_CHAR(NUMBER) ¹	Full
TO_DATE()	Full
TO_DECIMAL()	Full
TO_FLOAT()	Full
TO_INTEGER()	Full

Functions	Pushdown Type
TO_NUMBER()	Full
TRUNC(NUMBER)	Full
UPPER()	Source, Full
VARIANCE()	Full
¹ Applies also in Expression transformations for mappings enabled with source pushdown optimization.	
² Applies only in an Expression transformation.	

Pushdown optimization variables

When you use pushdown optimization, the Secure Agent converts the expression in the transformation by determining equivalent variables in the database. If there is no equivalent variable in the database, the Secure Agent processes the transformation logic.

The following table summarizes the availability of pushdown variables in Microsoft SQL Server:

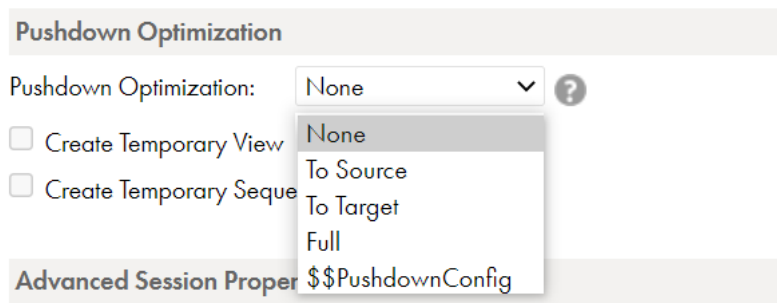
Variables	Pushdown Type
SESSSTARTTIME	Full
SYSDATE	Full

Configuring pushdown optimization

To optimize a mapping, add the mapping to a task, and then configure pushdown optimization in the mapping task. Full pushdown optimization is enabled by default in mapping tasks.

1. In the **Schedule** tab of the Mapping task, navigate to the **Pushdown Optimization** section.
2. From the **Pushdown Optimization** list, select the required type of pushdown optimization.

The following image shows the types of pushdown optimization that you can configure:



Rules and guidelines for pushdown optimization

Consider the following rules and guidelines when you configure pushdown optimization for a Microsoft SQL Server mapping:

- When you push down transformation logic to the database, ensure that the database has enough resources to process the queries faster. Otherwise, there could be a performance degradation.
- If the following transformation or mapping conditions is true, the Secure Agent processes a logic instead of pushing it to the database:
 - The transformation contains a variable port.
 - The transformation is not a Sorter transformation, Union transformation, or target in a mapping.
 - The transformation downstream from a Sorter or Union transformation, or contains a distinct sort.
 - A configured mapping task to override the default values of input or output ports.
 - The database does not have an equivalent operator, variable, or function to use in an expression in the transformation.
 - The mapping contains too many branches. The Secure Agent can't generate an SQL query for a mapping that contains more than 64 two-way branches, 43 three-way branches, or 32 four-way branches. If the number of branches exceeds these limitations, the Integration Service processes the downstream transformations.
 - A mapping task to log row errors.

Consider the following rules and guidelines when you configure full pushdown optimization for a Microsoft SQL Server mapping:

- You can't push the LTRIM(), RTRIM(), or MOD() function that contains more than one argument.
- To push the MOD() function to the Microsoft SQL Server database, the argument that you pass must be of the Integer data type.
- When you push the INSTR() function, you can only define string, search_value, and start arguments.

Consider the following rules and guidelines when you use an Expression transformation in a Microsoft SQL Server mapping enabled with full pushdown optimization:

- When you push the IS_DATE() function that contains the Text or Ntext data type, the IS_DATE() function returns 0.
- When you push the IS_DATE() and IS_NUMBER() functions and the values in the argument contain NULL, the functions return 0.
- You can't get a case-sensitive return value for the REPLACECHR() or REPLACESTR() functions.
- When you push the MD5() function that contains the nchar data type, the function returns a different value for the nchar data type as compared to a mapping that runs without pushdown optimization.
- To get the same return value for the nchar and char data types when you push the MD5() function, enter the `ConvertToVarcharForMD5InPDO=Yes` property in the mapping task.
- When you push the LPAD() function that contains the second_string argument, the function truncates the second string from left to right.
For example, for the LPAD('Infa',9,'RELATIONAL CONNECTIVITY') expression, the function returns the following value: IVITYInfa
- When you push the DATE_DIFF() function that contains the date1 and date2 arguments, the function returns the following different values as compared to a mapping that runs without pushdown optimization:
 - The function returns a negative number when the value of date1 is later than the value of date2.

- The function returns a positive number when the value of date1 is earlier than the value of date2.

CHAPTER 4

Data type reference

Data Integration uses the following data types in mappings and mapping tasks with Microsoft SQL Server:

Microsoft SQL Server native data types

Microsoft SQL Server data types appear in the source transformations when you choose to edit metadata for the fields.

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 Secure Agent uses to move data across platforms. Transformation data types appear in all transformations in a mapping.

When Data Integration reads source data, it converts the native data types to the comparable transformation data types before transforming the data.

Microsoft SQL Server and transformation data types

The following table lists the Microsoft SQL Server data types that Data Integration supports and the corresponding transformation data types:

Microsoft SQL Server Data Type	Description	Transformation Data Type	Description
Bigint	-9223372036854775808 to 9223372036854775807	Bigint	-9223372036854775808 to 9223372036854775807 Precision 19, Scale 0
Binary	1 to 8000 characters	Binary	1 to 104857600 bytes Precision 1 to 8000
Bit	0 to 1	Integer	0 to 1 Precision 10, Scale 0
Char	1 to 8000 characters	String	1 to 104857600 characters
Date	0001-01-01 to 9999-12-31	Date/Time	0001-01-01 to 9999-12-31 Precision 29, Scale 9

Microsoft SQL Server Data Type	Description	Transformation Data Type	Description
Datetime	Date range: January 1, 1753 to December 31, 9999 Time range: 00:00:00 to 23:59:59.997 Precision 23, scale 3	Date/Time	Date range: 0001-01-01 to 9999-12-31 Time range: 00:00:00 to 23:59:59.9999999 Precision 29, Scale 9
Datetime2	Date range: 0001-01-01 to 9999-12-31 Time range: 00:00:00 to 23:59:59.9999999 Precision 27, scale 7	Date/Time	Date range: 0001-01-01 to 9999-12-31 Time range: 00:00:00 to 23:59:59.9999999 Precision 29, Scale 9
Decimal(P,S)	Precision 1 to 28, Scale 0 to 28	Decimal	Precision 1 to 28, Scale 0 to 28
Float	-1.79E+308 to 1.79E+308	Double	Precision 15, Scale 0
Int	-2147483648 to 2147483647	Integer	-2147483648 to 2147483647 Precision 10, Scale 0
Money	-922337203685477.5808 to 922337203685477.5807	Decimal	-922337203685477.5808 to 922337203685477.5807 Precision 19, Scale 4
Nchar	1 to 4000 characters	String	1 to 104857600 characters
Ntext	1 to 1073741823 bytes	Text	1 to 104857600 characters Default is 32000
Numeric(P,S)	Precision 1 to 28, Scale 0 to 28	Decimal	Precision 1 to 28, Scale 0 to 28
Nvarchar	1 to 4000 characters	String	1 to 104857600 characters
Real	-3.40E+38 to 3.40E+38	Decimal	Precision 7, Scale 0
Smalldatetime	Date range: 1900-01-01 to 2079-06-06 Time range: 00:00:00 to 23:59:59	Date/Time	Date range: 0001-01-01 to 9999-12-31 Time range: 00:00:00 to 23:59:59.9999999 Precision 29, Scale 9
Smallint	-32768 to 32767	Integer	-32768 to 32767 Precision 10, Scale 0
Smallmoney	-214748.3648 to 214748.3647	Decimal	-214748.3648 to 214748.3647 Precision 10, Scale 4
Text	1 to 2147483647 bytes	Text	1 to 104857600 characters Default is 32000

Microsoft SQL Server Data Type	Description	Transformation Data Type	Description
Time	00:00:00.0000000 to 23:59:59.9999999	Date/Time	Date range: 0001-01-01 to 9999-12-31 Time range: 00:00:00 to 23:59:59.9999999 Precision 29, Scale 9
Tinyint	0 to 255	Integer	0 to 255 Precision 10, Scale 0
Varbinary	1 to 8000 characters	Binary	1 to 104857600 bytes Precision 1 to 8000
Varchar	1 to 8000 characters	String	1 to 104857600 characters

INDEX

C

Cloud Application Integration community
URL [4](#)
Cloud Developer community
URL [4](#)
connections
Microsoft SQL Server [7](#)

D

Data Integration community
URL [4](#)
data type reference
overview [20](#)

F

functions
pushdown optimization [14](#)

I

Informatica Global Customer Support
contact information [5](#)
Informatica Intelligent Cloud Services
web site [4](#)

M

maintenance outages [5](#)
mapping
mapping task [10](#)
Microsoft SQL Server
assets [6](#)
connection properties [7](#)
data types [20](#)
Microsoft SQL Server connections
overview [7](#)
Microsoft SQL Server connector
rules and guidelines [18](#)

Microsoft SQL Server Connector
overview [6](#)
Microsoft SQL Server sources
mapping [10](#), [12](#)

P

pushdown optimization
functions [14](#)
variables [17](#)
pushdown optimization method
full pushdown [14](#)
source pushdown [14](#)

S

status
Informatica Intelligent Cloud Services [5](#)
system status [5](#)

T

trust site
description [5](#)

U

upgrade notifications [5](#)

V

variable
pushdown optimization [17](#)

W

web site [4](#)