Informatica®

Informatica® Cloud Data Integration

SAP HANA Connector

Informatica Cloud Data Integration SAP HANA Connector
April 2024

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Preface

Use *SAP HANA Connector* to learn how to read from or write data to SAP HANA database by using Cloud Data Integration. Learn to create an SAP HANA connection, develop mappings, and run mapping tasks and data transfer tasks in Cloud Data Integration.

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CHAPTER 1

Introduction to SAP HANA Connector

You can use SAP HANA Connector to read from or write data to SAP HANA databases. SAP HANA Connector is a hybrid connector that uses JDBC at design time and ODBC at run time.

You can use SAP HANA Connector to perform the following operations:

- Read or lookup data from SAP HANA database tables and views.
- Read data from external views that are created by SAP BW CompositeProviders in the SAP system. For more information about how to create views for CompositeProviders, see Generating SAP HANA Views for CompositeProviders in the SAP documentation.
- Read data from the following HANA database modelling views:
  - Attribute views
  - Analytical views
  - Calculation views

You can use SAP HANA objects as sources, targets, or lookups in mappings and mapping tasks. You can switch mappings to advanced mode to include transformations and functions that enable advanced functionality.

SAP HANA Connector assets

Create assets in Data Integration to integrate data using SAP HANA Connector.

When you use SAP HANA 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.

CHAPTER 2

SAP HANA Connector administration

Before you use an SAP HANA connection to process SAP HANA data, ensure to complete certain prerequisites.

An SAP administrator must perform the following tasks based on the Windows or Linux machine where the Secure Agent is installed:

1. Install the 64-bit HANA ODBC driver. SAP HANA Connector uses the ODBC driver during run time.
2. If the Secure Agent is installed on a Linux machine, you need to additionally append the HANA details in the `odbcinst.ini` file on Linux.
3. Download and configure the `ngdbc.jar` file.

After the administrator completes the configurations, you can set up and use an SAP HANA connection in mappings and mapping tasks.

Appending HANA driver details to the odbcinst.ini file on Linux

To use SAP HANA Connector on a Secure Agent machine on Linux, install the 64-bit HANA ODBC on this machine. Additionally, you need to add the HANA driver details to the `odbcinst.ini` file on this machine.

The `odbcinst.ini` file is available in Secure Agent installation directory.

Append the following HANA driver details to the `odbcinst.ini` file to connect to the HANA database as shown in the following example:

```
[HDBODBC]
Driver=/usr/sap/hdbclient/libodbcHDB.so
Description=HANA Driver
Setup=/usr/sap/hdbclient/libodbcHDB.so
CPTimeout=0
```

Note: In the example, the following path is the location for the driver installation: `/usr/sap/hdbclient/`

Ensure that the `odbc.ini` and `odbcinst.ini` files are in the same location.

Downloading and configuring the ngdbc.jar file

SAP HANA Connector uses JDBC to import the metadata. Hence, to read data from the SAP HANA database, you must download the `ngdbc.jar` file and configure it on the Secure Agent machine. Contact SAP Customer Support if you encounter any issues with downloading the file.

1. Go to the SAP Service Marketplace: http://service.sap.com/connectors

   Note: You need SAP credentials to access the Service Marketplace.
2. Download the `ngdbc.jar` file on the Linux or Windows machine where the Secure Agent runs.

   Verify that you download the most recent version of the file.
3. Copy the `ngdbc.jar` file to the following directory:

   `C:\Program Files\Informatica Cloud Secure Agent\apps\Data_Integration_Server\ext\deploy_to_main\bin\rdtm-extra\HANA`

   Create the `deploy_to_main\bin\rdtm-extra\HANA` directory if it does not already exist.
4. Restart the Secure Agent.

Prerequisites to configure serverless runtime environment

Before you configure a SAP HANA connection using the serverless runtime environment, you need to perform certain prerequisites.

1. Create the following structure for the serverless agent configuration in AWS or Azure:
   `<Supplementary file location>/serverless_agent_config`
2. Add the libraries in the Amazon S3 bucket or Azure container in the following directory in your AWS or Azure account: `<Supplementary file location>/serverless_agent_config/hana`
3. Copy the following code snippet to a text editor:

```
version: 1
agent:
  dataIntegrationServer:
    autoDeploy:
      sap:
        hanas:
          - fileCopy:
              sourcePath: sap/jco/ngdbc.jar
        odbcInst:
          drivers:
            - fileCopy:
                sourcePath: ODBC/libodbcHDB.so
          dsns:
            - name: "HDBODBC"
              entries:
                - key: Driver
                  value: libodbcHDB.so
                - key: Description
                  value: "HANA Driver"
                - key: CPTimeout
                  value: 0
```

   where the source path is the directory path of the library files in AWS or Azure.

4. Ensure that the syntax and indentations are valid, and then save the file as `serverlessUserAgentConfig.yml` in the following AWS or Azure directory: `<Supplementary file location>/serverless_agent_config`

   When the .yml file runs, the libraries are copied from the AWS or Azure directory to the serverless agent directory.

For more information about serverless runtime environment properties, see the *Administrator* help.

CHAPTER 3

SAP HANA connections

Create an SAP HANA connection to connect to and read data from SAP HANA. You can use an SAP HANA connection in mappings and mapping tasks.

You can create an SAP HANA connection on the **Connections** page and create a mapping or mapping task.

Use the **SAP HANA** connection type to connect to SAP HANA.

SAP HANA connection properties

When you set up an SAP HANA connection, configure the connection properties.

The following table describes the SAP HANA 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 SAP HANA from the list.
Runtime Environment	The name of the runtime environment where you want to run the tasks. Select a Secure Agent or serverless runtime environment.
Host	SAP HANA server host name.
Port	SAP HANA server port number.
Database Name	Name of the SAP HANA database.
Current Schema	SAP HANA database schema name. Specify **_SYS_BIC** when you use SAP HANA database modelling views.
Code Page	The code page of the database server defined in the connection. Select the UTF-8 code page.

Property	Description
Metadata Advanced Connection Properties	The optional properties for the JDBC driver to fetch the metadata. If you specify more than one property, separate each key-value pair with a semicolon. For example, `connectTimeout=180000`
Run-time Advanced Connection Properties	The optional properties for the ODBC driver to run the mappings. If you specify more than one property, separate each key-value pair with a semicolon. For example, `charset=sjis;readtimeout=180`
Username	User name of the SAP HANA account.
Password	Password of the SAP HANA account. The password can contain alphanumeric characters and the following special characters: ~ ` ! @ # $ % ^ & * ( ) _ - + = { [}] | : ; ' < , > . ? / **Note:** You can't use a semicolon character in combination with a left brace or right brace character.

CHAPTER 4

Mappings and mapping tasks with SAP HANA Connector

Use the Data Integration Mapping Designer to create a mapping. When you create a mapping, you configure a source or target to represent an SAP HANA object.

In advanced mode, the Mapping Designer updates the mapping canvas to include transformations and functions that enable advanced functionality.

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.

SAP HANA sources in mappings

To read data from an SAP HANA database, configure an SAP HANA object as the Source transformation in a mapping.

Specify the name and description of the SAP HANA 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 an SAP HANA source:

Property	Description
Connection	Name of the SAP HANA source connection.
Source Type	Type of the SAP HANA source object available. You can choose from the following source types: - Single - Multiple - Query - Parameter
Object	Name of the SAP HANA source object.

Property	Description
Filter	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. Use single quotes to specify a filter value.
Select distinct rows only	Select this option to extract only distinct rows.

When you configure a mapping, you can configure the advanced source properties. The following table describes the SAP HANA advanced source properties:

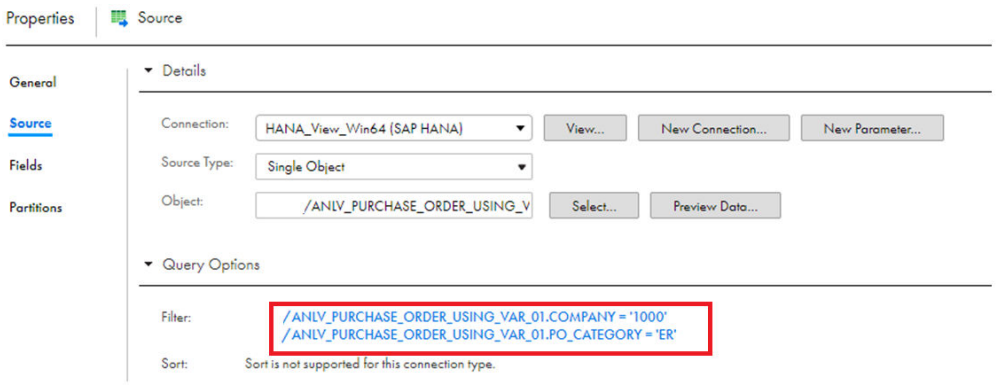
Property	Description
Pre SQL	Pre-SQL command to run before reading data from the source.
Post SQL	Post-SQL command to run after reading data from the source.
Output is Deterministic	When you configure this property, the Secure Agent does not stage source data for recovery if transformations in the pipeline always produce repeatable data.
Output is repeatable	When the output is deterministic and the output is repeatable, the Secure Agent does not stage the source data for recovery.
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.

Input types for HANA modelling views

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

- Variables. A variable is a filter. A variable is associated with a field, for example, company name, of the view.
  Provide the variable value in the field that you specified in SAP.

  The following image shows the variable `VAR_01` associated with `COMPANY` and `PO_CATEGORY` fields:



- 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 Data Integration is `char`. Specify the data for input parameters in the format that you defined in SAP.
  When you create a mapping and use input parameters, do not connect the input parameters in the source to the output fields. Otherwise, the mapping fails. For more information, see "Input parameter types" on page 14.

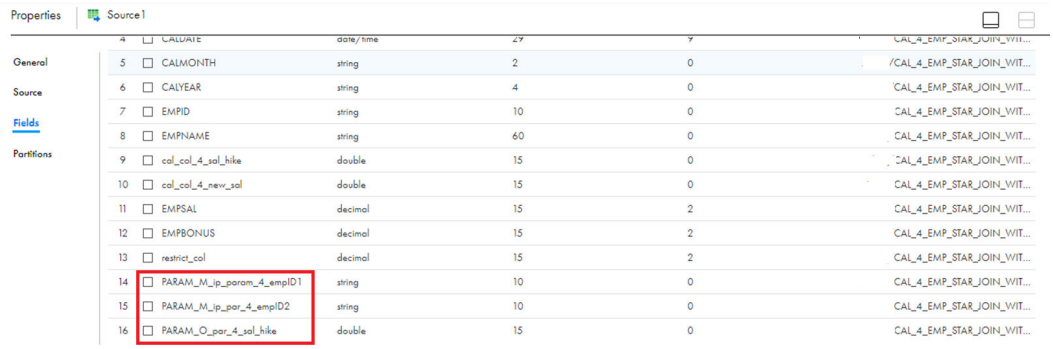
Input parameter types

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.

The following image shows the mandatory parameter `PARAM_M_ip_param_4_empID1` and the optional parameter `PARAM_O_par_4_sal_hike`:



SAP HANA targets in mappings

To write data to an SAP HANA database, configure an SAP HANA object as the Target transformation in a mapping.

Specify the name and description of the SAP HANA target. Configure the target and advanced properties for the source object.

The following table describes the source properties that you can configure for an SAP HANA source:

Property	Description
Connection	The name of the SAP HANA target connection.
Target Type	The type of the SAP HANA target object available. You can choose from the following target types: - Single Object - Parameter **Note:** Multiple objects target type is not applicable.
Object	The name of the SAP HANA target object. You can select an existing target object or create an SAP HANA target at runtime with an object name that you specify.
Operation	The target operation. You can choose from the following operations: - Insert - Update - Upsert - Delete - Data Driven
Truncate target	The Secure Agent truncates the target before writing the data.

When you configure a mapping, you can configure the advanced target properties. The following table describes the SAP HANA advanced target properties:

Property	Description
Pre SQL	The SQL statement that you want to run before reading data from the source.
Post SQL	The SQL statement that you want to run after writing data into the target.
Success File Directory	Not applicable.
Error File Directory	Not applicable.
Forward Rejected Rows	Determines whether the transformation passes rejected rows to the next transformation or drops rejected rows. By default, the agent forwards rejected rows to the next transformation.

SAP HANA lookups in mappings

When you configure field mappings, you can create a lookup to an SAP HANA object. Lookups are only supported for SAP HANA database tables and views. You cannot configure lookups for SAP HANA database modelling views.

Rules and guidelines for SAP HANA mappings

Consider the following rules and guidelines when you configure an SAP HANA mapping:

- When you create a target using the **Create New at Runtime** option, you can't use records with the Time data types.
- You can't read or write data that contains Unicode characters in the SAP HANA table name or the column name.
- When you configure a mapping with the **Create New at Runtime** option and the source table type is a row or column, the Secure Agent creates a row-based table, irrespective of the source table type.
- When you create a target using the **Create New at Runtime** option, ensure that the length of any of the columns in the HANA target table must not exceed 5000 characters.
- You can't override the source and target object parameters in an SAP HANA mapping at run time with values specified in a parameter file.
- You can't override the SAP HANA connection in a mapping at run time with values specified in a parameter file.
- If you want to configure an advanced filter using both input parameters and field conditions to read data from an SAP HANA modelling view, the filter conditions must have the following query syntax:
  `"<Package name>/<Modelling view name>".<Input parameter name> = '<Input parameter value>' AND "<Package name>/<Modelling view name>"."<Field name>" = '<Field value>'`
- To run a mapping that reads data from or writes data to an SAP HANA table, ensure that the SAP HANA table name does not contain the double quote character at the beginning of the table name. Otherwise the mapping fails at run time.
- To filter data from an SAP HANA modelling view using a simple data filter that contains an integer type input parameter, enclose the input parameter value in single quotes in the filter expression.
- Do not configure nested in-out parameters in the query source type when you read from SAP HANA.

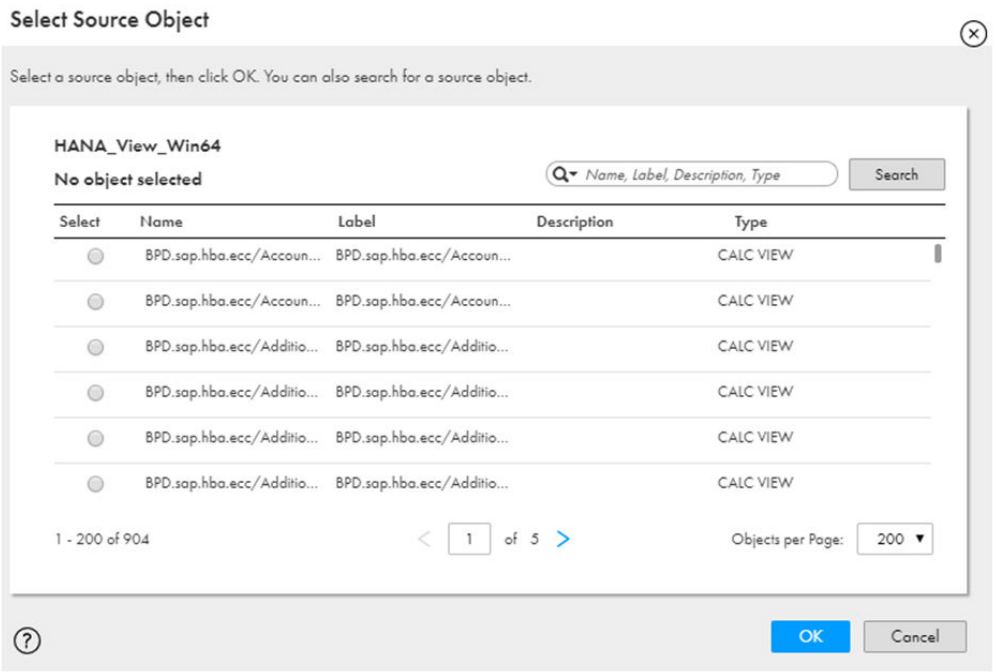
Creating an SAP HANA mapping with modelling views

You can use an SAP HANA object as a source in mappings and mapping tasks. Perform the following steps to create a mapping:

1. Click the Data Integration service.
2. Click **New** > **Mappings** > **Create**.
3. Click **Source** in the Design pane.
4. Click **Source** in the Properties pane.
5. Select a connection.
6. Select the **Source Type** as **Single Object**.
7. Click **Select** to select the object name.

   The **Select Source Object** page appears.
8. Select a source object from the list of objects.

A list of objects is shown in the following image:



The SAP HANA database modelling views for the source object that you created are displayed under the **Type** column. An analytical view is displayed as **OLAP VIEW**, an attribute view is displayed as **JOIN VIEW**, and a calculation view is displayed as **CALC VIEW**.

9. Click **OK**.
10. Add objects to the mapping as needed.
11. Save and run the mapping.

CHAPTER 5

SAP HANA SQL ELT optimization

You can configure SQL ELT optimization for an SAP HANA task to push the transformation logic to the source or target SAP HANA database. SQL ELT optimization enhances the mapping performance.

You can enable full or source SQL ELT optimization in an SAP HANA task that uses an SAP HANA connection in the mapping.

The amount of transformation logic that you can push to the database depends on the database, transformation logic, and task configuration. The task processes all transformation logic that it cannot push to the database.

You cannot configure SQL ELT optimization for mappings in advanced mode.

Configuring SQL ELT optimization for an SAP HANA mapping task

Perform the following steps to configure SQL ELT optimization for an SAP HANA mapping task:

1. Create an SAP HANA connection.
2. Create a mapping to read data from an SAP HANA source and write data to an SAP HANA target.
3. Create a mapping task.
   a. Select the configured mapping.
   b. In the **Runtime Options** page, in the SQL ELT optimization section, set the SQL ELT optimization value to **Full** or **Source**.
   c. Save the task and click **Finish**.

When you run the mapping task, the transformation logic is pushed to the SAP HANA database.

SQL ELT optimization supported operations, functions, operators, and transformations

The following table lists the supported operations:

Operation	SQL ELT optimization
Read	Yes
Write	Only the Insert operation is supported.

The following table summarizes the availability of functions that you can push to an SAP HANA database using full or source SQL ELT optimization.

Function	Function	Function
ABS()	INSTR()	SQRT()
AVG()	ISNULL()	STDDEV()
CHR()	LOG()	SUM()
CONCAT()	LOOKUP()	SYSDATE()
COS()	LOWER()	SYSTIMESTAMP()
COUNT()	MAX()	TAN()
DATE_COMPARE()	MIN()	TO_BIGINT
DATE_DIFF()	POWER()	TO_DECIMAL()
DATE_GET_PART()	ROUND()	TO_FLOAT()
DECODE()	SIN()	TO_INTEGER()
EXP()	SINH()	TRUNC()
IIF()	SOUNDEX()	UPPER()
-	-	VARIANCE()

The following table lists the operators that can be used in an SAP HANA database. Columns marked with an X indicate that the operator can be pushed to the SAP HANA database by using full **SQL ELT optimization**.

Operator
+
-

Operator
*
/
%
||
>
<
=
>=
<=
!=
AND
OR
NOT

The following table lists the transformations that you can push to SAP HANA:

Transformations
Aggregator
Expression
Filter
Joiner
Lookup
Router
Sorter
Union

CHAPTER 6

Data type reference

Data Integration uses the following data types in mappings and mapping tasks with SAP HANA:

SAP HANA native data types

SAP HANA data types appear in the Source transformation 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.

SAP HANA and transformation data types

SAP HANA data types map to transformation data types that the Secure Agent uses to move data across platforms.

The following table compares SAP HANA data types and transformation data types:

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
Binary	Used to store bytes of binary data	Binary	1 to 104,857,600 bytes
Bintext	-	String	Precision 32000
Blob	Up to 2 GB	Binary	1 to 104,857,600 bytes
Boolean	True/False	Integer	Boolean (True/False) values, precision 10
Clob	Up to 2 GB	String	1 to 104,857,600 characters

SAP HANA Datatype	Range	Transformation Datatype	Range
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 For transformations that support precision up to 38 digits, the precision is 1 to 38 digits, and the scale is 0 to 38. For transformations that support precision up to 28 digits, the precision is 1 to 28 digits, and the scale is 0 to 28. If you specify the precision greater than the maximum number of digits, the Secure Agent converts decimal values to double in high precision mode.
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	String	1 to 104,857,600 characters
Nvarchar	Precision 1 to 5000	String	1 to 104,857,600 characters
Real	Specifies a single-precision 32-bit floating-point number	Double	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	String	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	Integer	Precision 5, scale 0
Text	Specifies a variable-length character string, which supports text search features	String	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)

SAP HANA Datatype	Range	Transformation Datatype	Range
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	Integer	Precision 5, scale 0
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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