



Informatica® PowerExchange for Microsoft
Azure Data Lake Storage Gen1
10.2

User Guide

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Table of Contents

Preface	6
Informatica Resources.	6
Informatica Network.	6
Informatica Knowledge Base.	6
Informatica Documentation.	6
Informatica Product Availability Matrixes.	7
Informatica Velocity.	7
Informatica Marketplace.	7
Informatica Global Customer Support.	7
 Chapter 1: Introduction to PowerExchange for Microsoft Azure Data Lake Store.....	 8
PowerExchange for Microsoft Azure Data Lake Store Overview.	8
Introduction to Microsoft Azure Data Lake Store.	8
Administration of Microsoft Azure Data Lake Store Connector.	9
 Chapter 2: PowerExchange for Microsoft Azure Data Lake Store Configuration.....	 10
PowerExchange for Microsoft Azure Data Lake Store Configuration Overview.	10
Prerequisites.	10
 Chapter 3: Microsoft Azure Data Lake Store Connections.....	 11
Microsoft Azure Data Lake Store Connections Overview.	11
Microsoft Azure Data Lake Store Connection Properties.	12
Creating a Microsoft Azure Data Lake Store Connection.	13
 Chapter 4: PowerExchange for Microsoft Azure Data Lake Store Data Objects.....	 14
Microsoft Azure Data Lake Store Data Object Overview.	14
Microsoft Azure Data Lake Store Data Object Properties.	15
Microsoft Azure Data Lake Store Data Object Read Operation.	15
Microsoft Azure Data Lake Store Object Read Operation Properties.	15
Source Properties of the Data Object Read Operation.	16
General Properties - Source.	16
Ports Properties - Source.	16
Advanced Properties - Source.	17
Microsoft Azure Data Lake Store Data Object Write Operation Properties.	17
Input Properties of the Data Object Write Operation.	17
Ports Properties - Input Write.	18
Run-time Properties.	18
Advanced Properties - Target.	18

Importing a Microsoft Azure Data Lake Store Data Object. 19

Creating a Microsoft Azure Data Lake Store Object Read or Write Operation. 19

Chapter 5: Microsoft Azure Data Lake Store Mappings..... 21

Microsoft Azure Data Lake Store Mapping Overview. 21

Mapping Validation and Run-time Environments. 21

Microsoft Azure Data Lake Store Mapping Example. 22

Appendix A: Microsoft Azure Data Lake Store Datatype Reference..... 23

Datatype Reference Overview. 23

Microsoft Azure Data Lake Store and Transformation Data Types. 24

Index. 25

Preface

The *Informatica PowerExchange® for Microsoft Azure Data Lake Store User Guide* provides information about reading data from and writing data to Microsoft Azure Data Lake Store. It is written for administrators and developers who create mappings to read from or write data to a Microsoft Azure Data Lake Store resource.

This guide assumes that you have knowledge of Microsoft Azure Data Lake Store and Informatica.

Informatica Resources

Informatica Network

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As a member, you can:

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Informatica Velocity is a collection of tips and best practices developed by Informatica Professional Services. Developed from the real-world experience of hundreds of data management projects, Informatica Velocity represents the collective knowledge of our consultants who have worked with organizations from around the world to plan, develop, deploy, and maintain successful data management solutions.

If you are an Informatica Network member, you can access Informatica Velocity resources at <http://velocity.informatica.com>.

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CHAPTER 1

Introduction to PowerExchange for Microsoft Azure Data Lake Store

This chapter includes the following topics:

- [PowerExchange for Microsoft Azure Data Lake Store Overview, 8](#)
- [Introduction to Microsoft Azure Data Lake Store, 8](#)
- [Administration of Microsoft Azure Data Lake Store Connector, 9](#)

PowerExchange for Microsoft Azure Data Lake Store Overview

All the occurrences of *PowerExchange for Microsoft Azure Data Lake Store* in this document denote *PowerExchange for Microsoft Azure Data Lake Storage Gen1*.

Use PowerExchange for Microsoft Azure Data Lake Store to read data from and write data to Microsoft Azure Data Lake Store. You can collate and organize the details from multiple input sources and use PowerExchange for Microsoft Azure Data Lake Store to write data to Microsoft Azure Data Lake Store.

You can use Microsoft Azure Data Lake Store objects as sources and targets in mappings. When you use Microsoft Azure Data Lake Store objects in mappings, you must configure properties specific to Microsoft Azure Data Lake Store. You can validate and run mappings in native or Hadoop environments.

Introduction to Microsoft Azure Data Lake Store

You can use Microsoft Azure Data Lake Store to store data irrespective of size, structure, and format. Use Microsoft Azure Data Lake Store to process large volumes of data to achieve faster business outcomes.

The Microsoft Azure Data Lake Store is a combination of following primary services:

Microsoft Azure Data Lake Store: Microsoft Azure Data Lake is an Hadoop Distributed File System (HDFS) compatible data repository that stores structured, semi structured, and unstructured data of your

organization in native format. Data scientists and data analysts can use data in the Data Lake to find out specific patterns before you move the analyzed data to a data warehouse.

Azure HDInsight: Azure HDInsight is an Apache Hadoop distributed system that is configured with cloud. HDInsight supports the Hadoop components such as Apache HBase, Apache Spark, and Apache Storm and other technologies under the Hadoop system.

Data Lake Analytics: Data Lake Analytics manages the distributed infrastructure. You can dynamically allocate and de-allocate resources with Microsoft Azure Data Lake Store Analytics so that you can pay for services that you use.

Administration of Microsoft Azure Data Lake Store Connector

Before you use PowerExchange for Microsoft Azure Data Lake Store, perform the following tasks:

- Create a Microsoft Azure Data Lake Store.
- Authorize users to access the Microsoft Azure Data Lake Store and the directory in the Data Lake Store.
- Create an Azure AD web application for service-to-service authentication with Azure Data Lake Store. For information on service-to-service authentication of your web application, see, <https://kb.informatica.com/howto/6/Pages/20/512374.aspx>.

Note: Ensure that you have superuser privileges to access the folders or files created in the application using PowerExchange for Microsoft Azure Data Lake Store.

CHAPTER 2

PowerExchange for Microsoft Azure Data Lake Store Configuration

This chapter includes the following topics:

- [PowerExchange for Microsoft Azure Data Lake Store Configuration Overview, 10](#)
- [Prerequisites, 10](#)

PowerExchange for Microsoft Azure Data Lake Store Configuration Overview

PowerExchange for Microsoft Azure Data Lake Store installs with the Informatica services and clients.

To configure PowerExchange for Microsoft Azure Data Lake Store, complete the prerequisites.

Prerequisites

Before you use PowerExchange for Microsoft Azure Data Lake Store, you must complete the following prerequisites:

- Install and configure the Informatica services.
- Install and configure the Developer tool. You can install the Developer tool when you install Informatica clients.
- Create a Data Integration Service and a Model Repository Service in the Informatica domain.

CHAPTER 3

Microsoft Azure Data Lake Store Connections

This chapter includes the following topics:

- [Microsoft Azure Data Lake Store Connections Overview, 11](#)
- [Microsoft Azure Data Lake Store Connection Properties, 12](#)
- [Creating a Microsoft Azure Data Lake Store Connection, 13](#)

Microsoft Azure Data Lake Store Connections Overview

Microsoft Azure Data Lake Store connection enables you to read data from or write data to Microsoft Azure Data Lake Store.

You can use Microsoft Azure Data Lake Store connections to create data objects and run mappings. The Developer tool uses the connection when you create a data object. The Data Integration Service uses the connection when you run mappings.

You can create a Microsoft Azure Data Lake Store connection from the Developer tool or the Administrator tool. Create and manage connections in the Preferences dialog box or the Connection Explorer view.

Microsoft Azure Data Lake Store Connection Properties

When you set up a Microsoft Azure Data Lake Store connection, you must configure the connection properties.

The following table describes the Microsoft Azure Data Lake Store connection properties:

Property	Description
Name	The name of the connection. The name is not case sensitive and must be unique within the domain. You can change this property after you create the connection. The name cannot exceed 128 characters, contain spaces, or contain the following special characters: ~ ` ! \$ % ^ & * () - + = { [] \ : ; " ' < , > . ? /
ID	String that the Data Integration Service uses to identify the connection. The ID is not case sensitive. It must be 255 characters or less and must be unique in the domain. You cannot change this property after you create the connection. Default value is the connection name.
Description	The description of the connection. The description cannot exceed 4,000 characters.
Location	The domain where you want to create the connection.
Type	The connection type. Select Microsoft Azure Data Lake Store.

The following table describes the properties for metadata access:

Property	Description
ADLS Account Name	The name of the Microsoft Azure Data Lake Store.
ClientID	The ID of your application to complete the OAuth Authentication in the Active Directory.
Client Secret	The client secret key to complete the OAuth Authentication in the Active Directory.
Directory	The Microsoft Azure Data Lake Store directory that you use to read data or write data. The default is root directory.
AuthEndpoint	The OAuth 2.0 token endpoint from where access code is generated based on based on the Client ID and Client secret is completed.

For more information on creating a client ID, client secret, and auth end point, contact your Azure administrator or see <https://docs.microsoft.com/en-us/azure/data-lake-store/data-lake-store-authenticate-using-active-directory>.

Creating a Microsoft Azure Data Lake Store Connection

Create a Microsoft Azure Data Lake Store connection before you create a Microsoft Azure Data Lake Store data object.

1. In the Developer tool, click **Window > Preferences**.
2. Select **Informatica > Connections**.
3. Expand the domain in the **Available Connections**.
4. Select the connection type **Enterprise Application > ADLS**, and click **Add**.
5. Enter a connection name and an optional description.
6. Select Microsoft Azure Data Lake Store as the connection type.
7. Click **Next**.
8. Configure the connection properties.
9. Click **Test Connection** to verify the connection to Microsoft Azure Data Lake Store.
10. Click **Finish**.

CHAPTER 4

PowerExchange for Microsoft Azure Data Lake Store Data Objects

This chapter includes the following topics:

- [Microsoft Azure Data Lake Store Data Object Overview, 14](#)
- [Microsoft Azure Data Lake Store Data Object Properties, 15](#)
- [Microsoft Azure Data Lake Store Data Object Read Operation, 15](#)
- [Microsoft Azure Data Lake Store Data Object Write Operation Properties, 17](#)
- [Importing a Microsoft Azure Data Lake Store Data Object, 19](#)
- [Creating a Microsoft Azure Data Lake Store Object Read or Write Operation, 19](#)

Microsoft Azure Data Lake Store Data Object Overview

A Microsoft Azure Data Lake Store data object is a physical data object that represents Microsoft Azure Data Lake Store table as a source or target. A Microsoft Azure Data Lake Store data object is the representation of data that is based on a Microsoft Azure Data Lake Store object. You can configure the data object read and write operation properties that determine how data can be read from Microsoft Azure Data Lake Store or loaded to Microsoft Azure Data Lake Store.

To read data from the Microsoft Azure Data Lake Store, create a data object read operation based on the Microsoft Azure Data Lake Store data object. Configure the read operation properties to determine how the Data Integration Service must read data from the Microsoft Azure Data Lake Store table. Add the read operation as a Read transformation in a mapping.

To write data to the Microsoft Azure Data Lake Store, create a data object write operation based on the Microsoft Azure Data Lake Store data object. Configure the write operation properties to determine how the Data Integration Service must write data to the Microsoft Azure Data Lake Store. Add the write operation as a Write transformation in a mapping.

Microsoft Azure Data Lake Store Data Object Properties

The Microsoft Azure Data Lake Store Overview view displays general information about the Microsoft Azure Data Lake Store data object and the object properties that apply to the Microsoft Azure Data Lake Store table you import.

General Properties

You can configure the following properties for a Microsoft Azure Data Lake Store data object:

- Name. Name of the Microsoft Azure Data Lake Store data object.
- Description. Description of the Microsoft Azure Data Lake Store data object.
- Connection. Name of the Microsoft Azure Data Lake Store connection.

Microsoft Azure Data Lake Store Data Object Read Operation

The Data Integration Service reads data from a Microsoft Azure Data Lake Store table based on the data object read operation properties that you specify.

When you create a data object read operation, the Developer tool creates a Source transformation and an Output transformation.

The Source transformation represents the data that the Data Integration Service reads from the Microsoft Azure Data Lake Store table.

The Output transformation represents the data that the Data Integration Service passes into the mapping pipeline.

Microsoft Azure Data Lake Store Object Read Operation Properties

The Data Integration Service reads data from a Microsoft Azure Data Lake Store object based on the data object read operation. The Developer tool displays the data object read operation properties of the Microsoft Azure Data Lake Store data object in the Data Object Operation view.

You can view or configure the data object read operation from the source and output properties.

Source properties

Represents data that the Data Integration Service reads from the Microsoft Azure Data Lake Store object. Select the source properties to view data, such as the name and description of the Microsoft Azure Data Lake Store object, the ports, and advanced properties.

Output properties

Represents data that the Data Integration Service passes into the mapping pipeline. Select the output properties to edit the port properties of the data object read operation. You can also use the Tracing Level advanced property to set the amount of detail that the Data Integration Service writes in the log.

Source Properties of the Data Object Read Operation

When you create a data object, the source properties populate based on the Microsoft Azure Data Lake Store object that you add. The source properties of the data object read operation include general, column, and advanced properties that apply to the Microsoft Azure Data Lake Store object.

You can view the source properties of the data object read operation from the **General**, **Column**, and **Advanced** tabs.

General Properties - Source

The following table describes the source general properties of the data object read operation:

Property	Description
Name	Name of the Microsoft Azure Data Lake Store source object.
Description	Description of the data object read operation.

Ports Properties - Source

The column properties display the data types, precision, and scale of the source property in the data object read operation.

The following table describes the source column properties of the data object read operation:

Property	Description
Name	Name of the column.
Type	Native data type of the column.
Precision	Maximum number of significant digits for Numeric data types, or maximum number of characters for String data types. For numeric data types, precision includes scale.
Scale	Maximum number of digits after the decimal point for numeric values.
Description	Description of the column.

Advanced Properties - Source

You can use the advanced properties to specify data object read operation properties to read data from a Microsoft Azure Data Lake Store server.

The following table describes the Advanced source column properties of the data object read operation:

Property	Description
Tracing Level	Overrides the tracing level for each transformation in the mapping. The tracing level determines the amount of information the Data Integration Service sends to the mapping log files. By default, the tracing level for every transformation is Normal. Change the tracing level to a Verbose setting when you need to troubleshoot a transformation that is not behaving as expected. Set the tracing level to Terse when you want the minimum amount of detail to appear in the log.

Microsoft Azure Data Lake Store Data Object Write Operation Properties

The Data Integration Service writes data to a Microsoft Azure Data Lake Store object based on the data object write operation. The Developer tool displays the data object write operation properties for the Microsoft Azure Data Lake Store data object in the Data Object Operation section.

You can view the data object write operation from the Input and Target properties.

Input properties

Represent data that the Data Integration Service reads from a Microsoft Azure Data Lake Store directory server. Select the input properties to edit the port properties and specify the advanced properties of the data object write operation.

Target properties

Represent data that the Data Integration Service writes to Microsoft Azure Data Lake Store. Select the target properties to view data, such as the name and description of the Microsoft Azure Data Lake Store object.

Input Properties of the Data Object Write Operation

Input properties represent data that the Data Integration Service writes to a Microsoft Azure Data Lake Store directory server. Select the input properties to edit the port properties of the data object write operation. You can also specify advanced data object write operation properties to write data to Microsoft Azure Data Lake Store objects.

The input properties of the data object write operation include general properties that apply to the data object write operation. Input properties also include port, source, and advanced properties that apply to the data object write operation.

You can view and change the input properties of the data object write operation from the **General**, **Ports**, **Targets**, **run-time**, and **Advanced** tabs.

Ports Properties - Input Write

The input ports properties list the data types, precision, and scale of the data object write operation.

The following table describes the input ports properties that you must configure in the data object write operation:

Property	Description
Name	Name of the port.
Type	Data type of the port.
Precision	Maximum number of significant digits for numeric data types, or maximum number of characters for string data types. For numeric data types, precision includes scale.
Scale	Maximum number of digits after the decimal point for numeric values.
Description	Description of the port.

Run-time Properties

The run-time properties display the name of the connection used for write transformation.

The following table describes the run-time properties that you configure for a Microsoft Azure Data Lake Store write operation:

Property	Description
Connection	Name of the Microsoft Azure Data Lake Store connection.

Advanced Properties - Target

You can use the advanced properties to specify data object write operation properties to write data to a Microsoft Azure Data Lake Store server.

The following table describes the advanced properties that you configure for a Microsoft Azure Data Lake Store write operation:

Property	Description
Tracing Level	By default, the tracing level for every transformation is Normal. Change the tracing level to a Verbose setting when you need to troubleshoot a transformation that is not behaving as expected. Set the tracing level to Terse when you want the minimum amount of detail to appear in the log.
Maintain row order	NA
If file exists	If the target exists overwrites the file or appends the data to the existing file.

Importing a Microsoft Azure Data Lake Store Data Object

Import a Microsoft Azure Data Lake Store data object to add to a mapping.

1. Select a project or folder in the **Object Explorer** view.
2. Click **File > New > Data Object**.
3. Select **ADLS Data Object** and click **Next**.
The **ADLS Data Object** dialog box appears.
4. Enter a name for the data object.
5. Click **Browse** next to the **Location** option and select the target project or folder.
6. Click **Browse** next to the **Connection** option and select the Microsoft Azure Data Lake Store connection from which you want to import the Microsoft Azure Data Lake Store resource metadata.
7. To add a resource, click **Add** next to the **Selected Resources** option.
The **Add Resource** dialog box appears.
8. From the Package Explorer, select a naming context from which you want to import the schema.
9. You can Perform one of the following tasks to import an Microsoft Azure Data Lake Store table, and then click **OK**:
 - Navigate to the Microsoft Azure Data Lake Store table that you want to import.
 - Search for the Microsoft Azure Data Lake Store table, enter the name of the Microsoft Azure Data Lake Store table entity that you want to add and click **OK**.
10. Click **Finish**.
The data object appears under Data Objects in the project or folder in the **Object Explorer** view.

Creating a Microsoft Azure Data Lake Store Object Read or Write Operation

You can add a Microsoft Azure Data Lake Store data object read or write operation to a mapping or mapplet as a source. You can create the data object read or write operation for one or more Microsoft Azure Data Lake Store data objects.

Before you create a Microsoft Azure Data Lake Store data object read or write operation, you must create at least one Microsoft Azure Data Lake Store data object.

1. Select the data object in the Object Explorer view.
2. Right-click and select **New > Data Object Operation**.
The **Data Object Operation** dialog box appears.
3. Enter a name for the data object read or write operation.
4. Select **Read** or **Write** as the type of data object operation.
5. Click **Add**.
The **Select Resources** dialog box appears.

6. Select the Microsoft Azure Data Lake Store object for which you want to create the data object read or write operation and click **OK**.
7. Click **Finish**.

The Developer tool creates the data object read or write operation for the selected data object.

CHAPTER 5

Microsoft Azure Data Lake Store Mappings

This chapter includes the following topics:

- [Microsoft Azure Data Lake Store Mapping Overview, 21](#)
- [Mapping Validation and Run-time Environments, 21](#)
- [Microsoft Azure Data Lake Store Mapping Example, 22](#)

Microsoft Azure Data Lake Store Mapping Overview

After you create the Microsoft Azure Data Lake Store data object with a Microsoft Azure Data Lake Store connection, you can develop a mapping. You can define the following types of objects in the mapping:

- A Read transformation of the Microsoft Azure Data Lake Store data object to read data from Microsoft Azure Data Lake Store in native or Hadoop run-time environment.
- A Write transformation of the Microsoft Azure Data Lake Store data object to write data to Microsoft Azure Data Lake Store in native or Hadoop run-time environment.

Note: If you use multiple connections in a mapping, verify that all connections point to the same Microsoft Azure Data Lake Store. If you run a mapping on the HDInsight cluster that uses Microsoft Azure Data Lake Store file system, the Microsoft Azure Data Lake Store connector must point to the same Microsoft Azure Data Lake Store.

Validate and run the mapping. You can deploy the mapping and run it or add the mapping to a Mapping task in a workflow. When you read data from Microsoft Azure Data Lake Store and terminate the mapping, the Data Integration Service downloads the entire data set and deletes the data set after long time.

Mapping Validation and Run-time Environments

You can validate and run mappings in the native environment or a Hadoop environment.

You can validate a mapping in the native environment, Hadoop environment, or both. The Data Integration Service validates whether the mapping can run in the selected environment. You must validate the mapping for an environment before you run the mapping in that environment.

When you run a mapping in the native environment, the Data Integration Service runs the mapping.

When you run a mapping in a Hadoop environment, you can select the Spark engine. The Data Integration Service pushes the mapping to the Spark engine for processing.

Microsoft Azure Data Lake Store Mapping Example

You work as a data analyst for a large financial enterprise. The enterprise performs risk management, fraud detection, and other analysis with Microsoft Azure Data Lake Analytics. You need to write the data to Microsoft Azure Data Lake Store to perform the analytics. Create a mapping to read data from a flat file source and write data to Microsoft Azure Data Lake Store. After the data is available in the Microsoft Azure Data Lake Store, you can perform the data analytics.

You can use the following objects in a Microsoft Azure Data Lake Store mapping:

Flat file input

The input file is a flat file that contains the customer names and other details about customers.

Create a flat file data object. Configure the flat file connection and specify the flat file that contains the customer data as a resource for the data object. Drag the data object into a mapping as a read data object.

Transformations

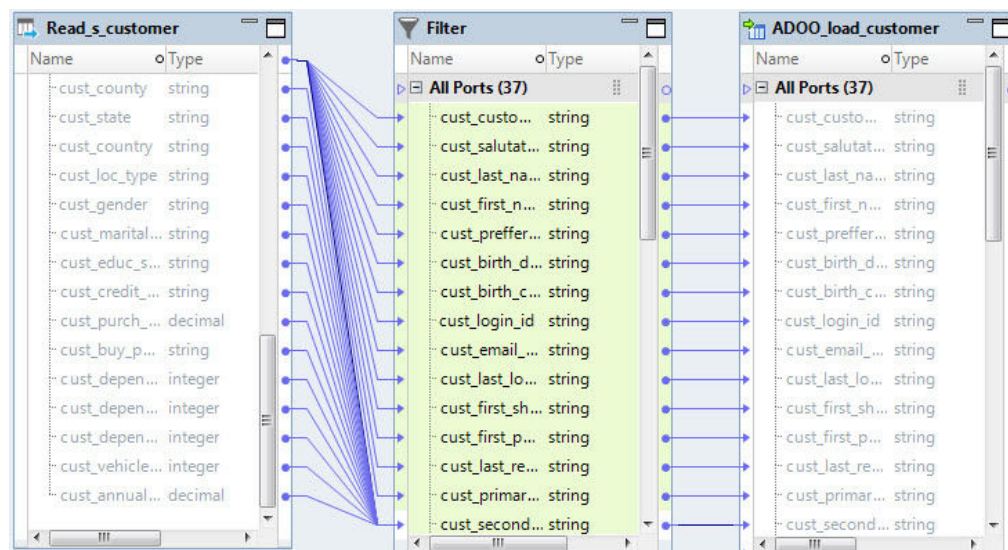
Add Filter transformation to get customer data in a particular region.

The Filter transformation filters the source data based on the value you specify for the region ID column. The Data Integration Service returns the rows that meet the filter condition.

Microsoft Azure Data Lake Store output

Create a Microsoft Azure Data Lake Store data object write operation. Configure the Microsoft Azure Data Lake Store connection and specify the Microsoft Azure Data Lake Store object as a target for the data object. Drag the data object into a mapping as a target data object.

The following image shows the Microsoft Azure Data Lake Store mapping example:



When you run the mapping, the customer records are read from the flat file and written to the Microsoft Azure Data Lake Store table.

APPENDIX A

Microsoft Azure Data Lake Store Datatype Reference

This appendix includes the following topics:

- [Datatype Reference Overview, 23](#)
- [Microsoft Azure Data Lake Store and Transformation Data Types, 24](#)

Datatype Reference Overview

Informatica Developer uses the following data types in Microsoft Azure Data Lake Store mappings:

- Microsoft Azure Data Lake Store native data types. Microsoft Azure Data Lake Store data types appear in the physical data object column properties.
- 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 Data Integration Service uses to move data across platforms. Transformation data types appear in all transformations in a mapping.

When PowerExchange for Microsoft Azure Data Lake Store reads source data, it converts the native data types to the comparable transformation data types before transforming the data. When PowerExchange for Microsoft Azure Data Lake Store writes to a target, it converts the transformation data types to the comparable native data types.

Microsoft Azure Data Lake Store and Transformation Data Types

The following table lists the Microsoft Azure Data Lake Store data types that the Data Integration Service supports and the corresponding transformation data types:

Microsoft Azure Data Lake Store Native Data Type	Transformation Data Type	Range
String	string	1 to 104,857,600 characters
Number	Decimal	Precision 1 to 28 digits, scale 0 to 28
Binary	Binary	1 to 104,857,600 bytes The binary data type is applicable when you run a mapping in the native environment.

INDEX

A

advanced properties
 Azure Blob Container Name [17](#)
 Field Delimiter [17](#)

C

create
 Microsoft Azure Data Lake Store connection [13](#)
creating
 Microsoft Azure Data Lake Store data object read operation [19](#)

D

data object read operation
 creating [19](#)

G

General properties [16](#)

I

importing
 Microsoft Azure Data Lake Store data object [19](#)
input properties [17](#)

M

mapping example
 Microsoft Azure Data Lake Store [22](#)
Microsoft Azure Data Lake
 introduction [8](#)
Microsoft Azure Data Lake Store
 create [13](#)
 importing a data object [19](#)
Microsoft Azure Data Lake Store connection
 overview [11](#)

Microsoft Azure Data Lake Store connection (*continued*)
 properties [12](#)
Microsoft Azure Data Lake Store Connector
 administration [9](#)
Microsoft Azure Data Lake Store data object
 overview [14](#)
Microsoft Azure Data Lake Store data object read operation
 creating [19](#)
Microsoft Azure Data Lake Store data types
 comparing with transformation data types [24](#)
 overview [23](#)
Microsoft Azure Data Lake Store mappings
 overview [21](#)
Microsoft Azure Data Lake Store run-time environment
 description [21](#)
Microsoft Azure Data Lake Store validation environment
 description [21](#)
Microsoft Azure Data Lake Store write operation
 properties [17](#)

O

Output properties [15](#)
overview
 Microsoft Azure Data Lake Store connection [11](#)

P

Ports properties [16](#)
PowerExchange for Microsoft Azure Data Lake Store configuration
 overview [10](#)
 prerequisites [10](#)

S

source properties [16](#)