



Informatica® PowerExchange for Cassandra
10.1

User Guide

© Copyright Informatica LLC 1993, 2018

This software and documentation contain proprietary information of Informatica LLC and are provided under a license agreement containing restrictions on use and disclosure and are also protected by copyright law. Reverse engineering of the software is prohibited. 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. This Software may be protected by U.S. and/or international Patents and other Patents Pending.

Use, duplication, or disclosure of the Software by the U.S. Government is subject to the restrictions set forth in the applicable software license agreement and as provided in DFARS 227.7202-1(a) and 227.7702-3(a) (1995), DFARS 252.227-7013(1)(ii) (OCT 1988), FAR 12.212(a) (1995), FAR 52.227-19, or FAR 52.227-14 (ALT III), as applicable.

The information in this product or documentation is subject to change without notice. If you find any problems in this product or documentation, please report them to us in writing.

Informatica, Informatica Platform, Informatica Data Services, PowerCenter, PowerCenterRT, PowerCenter Connect, PowerCenter Data Analyzer, PowerExchange, PowerMart, Metadata Manager, Informatica Data Quality, Informatica Data Explorer, Informatica B2B Data Transformation, Informatica B2B Data Exchange Informatica On Demand, Informatica Identity Resolution, Informatica Application Information Lifecycle Management, Informatica Complex Event Processing, Ultra Messaging, Informatica Master Data Management, and Live Data Map are trademarks or registered trademarks of Informatica LLC in the United States and in jurisdictions throughout the world. All 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, including without limitation: Copyright DataDirect Technologies. All rights reserved. Copyright © Sun Microsystems. All rights reserved. Copyright © RSA Security Inc. All Rights Reserved. Copyright © Ordinal Technology Corp. All rights reserved. Copyright © Aandacht c.v. All rights reserved. Copyright Genivia, Inc. All rights reserved. Copyright Isomorphic Software. All rights reserved. Copyright © Meta Integration Technology, Inc. All rights reserved. Copyright © Intalio. All rights reserved. Copyright © Oracle. All rights reserved. Copyright © Adobe Systems Incorporated. All rights reserved. Copyright © DataArt, Inc. All rights reserved. Copyright © ComponentSource. All rights reserved. Copyright © Microsoft Corporation. All rights reserved. Copyright © Rogue Wave Software, Inc. All rights reserved. Copyright © Teradata Corporation. All rights reserved. Copyright © Yahoo! Inc. All rights reserved. Copyright © Glyph & Cog, LLC. All rights reserved. Copyright © Thinkmap, Inc. All rights reserved. Copyright © Clearpace Software Limited. All rights reserved. Copyright © Information Builders, Inc. All rights reserved. Copyright © OSS Nokalva, Inc. All rights reserved. Copyright Edifecs, Inc. All rights reserved. Copyright Cleo Communications, Inc. All rights reserved. Copyright © International Organization for Standardization 1986. All rights reserved. Copyright © ej-technologies GmbH. All rights reserved. Copyright © Jaspersoft Corporation. All rights reserved. Copyright © International Business Machines Corporation. All rights reserved. Copyright © yWorks GmbH. All rights reserved. Copyright © Lucent Technologies. All rights reserved. Copyright (c) University of Toronto. All rights reserved. Copyright © Daniel Veillard. All rights reserved. Copyright © Unicode, Inc. Copyright IBM Corp. All rights reserved. Copyright © MicroQuill Software Publishing, Inc. All rights reserved. Copyright © PassMark Software Pty Ltd. All rights reserved. Copyright © LogiXML, Inc. All rights reserved. Copyright © 2003-2010 Lorenzi Davide, All rights reserved. Copyright © Red Hat, Inc. All rights reserved. Copyright © The Board of Trustees of the Leland Stanford Junior University. All rights reserved. Copyright © EMC Corporation. All rights reserved. Copyright © Flexera Software. All rights reserved. Copyright © Jinfonet Software. All rights reserved. Copyright © Apple Inc. All rights reserved. Copyright © Telerik Inc. All rights reserved. Copyright © BEA Systems. All rights reserved. Copyright © PDFlib GmbH. All rights reserved. Copyright © Orientation in Objects GmbH. All rights reserved. Copyright © Tanuki Software, Ltd. All rights reserved. Copyright © Ricebridge. All rights reserved. Copyright © Sencha, Inc. All rights reserved. Copyright © Scalable Systems, Inc. All rights reserved. Copyright © jqWidgets. All rights reserved. Copyright © Tableau Software, Inc. All rights reserved. Copyright © MaxMind, Inc. All Rights Reserved. Copyright © TMate Software s.r.o. All rights reserved. Copyright © MapR Technologies Inc. All rights reserved. Copyright © Amazon Corporate LLC. All rights reserved. Copyright © Highsoft. All rights reserved. Copyright © Python Software Foundation. All rights reserved. Copyright © BeOpen.com. All rights reserved. Copyright © CNRI. All rights reserved.

This product includes software developed by the Apache Software Foundation (<http://www.apache.org/>), and/or other software which is licensed under various versions of the Apache License (the "License"). You may obtain a copy of these Licenses at <http://www.apache.org/licenses/>. Unless required by applicable law or agreed to in writing, software distributed under these Licenses is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the Licenses for the specific language governing permissions and limitations under the Licenses.

This product includes software which was developed by Mozilla (<http://www.mozilla.org/>), software copyright The JBoss Group, LLC, all rights reserved; software copyright © 1999-2006 by Bruno Lowagie and Paulo Soares and other software which is licensed under various versions of the GNU Lesser General Public License Agreement, which may be found at <http://www.gnu.org/licenses/lgpl.html>. The materials are provided free of charge by Informatica, "as-is", without warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

The product includes ACE(TM) and TAO(TM) software copyrighted by Douglas C. Schmidt and his research group at Washington University, University of California, Irvine, and Vanderbilt University, Copyright (©) 1993-2006, all rights reserved.

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (copyright The OpenSSL Project. All Rights Reserved) and redistribution of this software is subject to terms available at <http://www.openssl.org> and <http://www.openssl.org/source/license.html>.

This product includes Curl software which is Copyright 1996-2013, Daniel Stenberg, <daniel@haxx.se>. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at <http://curl.haxx.se/docs/copyright.html>. Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

The product includes software copyright 2001-2005 (©) MetaStuff, Ltd. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at <http://www.dom4j.org/license.html>.

The product includes software copyright © 2004-2007, The Dojo Foundation. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at <http://dojotoolkit.org/license>.

This product includes ICU software which is copyright International Business Machines Corporation and others. All rights reserved. Permissions and limitations regarding this software are subject to terms available at <http://source.icu-project.org/repos/icu/icu/trunk/license.html>.

This product includes software copyright © 1996-2006 Per Bothner. All rights reserved. Your right to use such materials is set forth in the license which may be found at <http://www.gnu.org/software/kawa/Software-License.html>.

This product includes OSSP UUID software which is Copyright © 2002 Ralf S. Engelschall, Copyright © 2002 The OSSP Project Copyright © 2002 Cable & Wireless Deutschland. Permissions and limitations regarding this software are subject to terms available at <http://www.opensource.org/licenses/mit-license.php>.

This product includes software developed by Boost (<http://www.boost.org/>) or under the Boost software license. Permissions and limitations regarding this software are subject to terms available at http://www.boost.org/LICENSE_1_0.txt.

This product includes software copyright © 1997-2007 University of Cambridge. Permissions and limitations regarding this software are subject to terms available at <http://www.pcre.org/license.txt>.

This product includes software copyright © 2007 The Eclipse Foundation. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at <http://www.eclipse.org/org/documents/epl-v10.php> and at <http://www.eclipse.org/org/documents/edl-v10.php>.

This product includes software licensed under the terms at <http://www.tcl.tk/software/tcltk/license.html>, <http://www.bosrup.com/web/overlib/?License>, <http://www.stlport.org/doc/license.html>, <http://asm.ow2.org/license.html>, <http://www.cryptix.org/LICENSE.TXT>, <http://hsqldb.org/web/hsqLicense.html>, <http://httpunit.sourceforge.net/doc/license.html>, <http://jung.sourceforge.net/license.txt>, http://www.gzip.org/zlib/zlib_license.html, <http://www.openldap.org/software/release/license.html>, <http://www.libssh2.org>, <http://slf4j.org/license.html>, <http://www.sente.ch/software/OpenSourceLicense.html>, <http://fusesource.com/downloads/license-agreements/fuse-message-broker-v-5-3-license-agreement>, <http://antlr.org/license.html>, <http://aopalliance.sourceforge.net/>, <http://www.bouncycastle.org/licence.html>, <http://www.jgraph.com/jgraphdownload.html>, <http://www.jcraft.com/jsch/LICENSE.txt>, http://jotm.objectweb.org/bsd_license.html, <http://www.w3.org/Consortium/Legal/2002/copyright-software-20021231>, <http://www.slf4j.org/license.html>, <http://nanoxml.sourceforge.net/orig/copyright.html>, <http://www.json.org/license.html>, <http://forge.ow2.org/projects/javaservice/>, <http://www.postgresql.org/about/licence.html>, <http://www.sqlite.org/copyright.html>, <http://www.tcl.tk/software/tcltk/license.html>, <http://www.jaxen.org/faq.html>, <http://www.jdom.org/docs/faq.html>, <http://www.slf4j.org/license.html>, <http://www.iodbc.org/dataspace/iodbc/wiki/IODBC/License>, <http://www.keplerproject.org/md5/license.html>, <http://www.toedter.com/en/jcalendar/license.html>, <http://www.edankert.com/bounce/index.html>, <http://www.net-snmp.org/about/license.html>, <http://www.openmdx.org/#FAQ>, http://www.php.net/license/3_01.txt, <http://srp.stanford.edu/license.txt>, <http://www.schneider.com/blowfish.html>, <http://www.jmock.org/license.html>, <http://xsom.java.net>, <http://benalman.com/about/license/>, <https://github.com/CreateJS/EaselJS/blob/master/src/easeljs/display/Bitmap.js>, <http://www.h2database.com/html/license.html#summary>, <http://jsoncpp.sourceforge.net/LICENSE>, <http://jdbc.postgresql.org/license.html>, <http://protobuf.googlecode.com/svn/trunk/src/google/protobuf/descriptor.proto>, <https://github.com/rantav/hector/blob/master/LICENSE>, <http://web.mit.edu/Kerberos/krb5-current/doc/mitK5license.html>, <http://jibx.sourceforge.net/jibx-license.html>, <https://github.com/lyokato/libgeohash/blob/master/LICENSE>, <https://github.com/hjiang/jsonxx/blob/master/LICENSE>, <https://code.google.com/p/lz4/>, <https://github.com/jedisct1/libsodium/blob/master/LICENSE>, <http://one-jar.sourceforge.net/index.php?page=documents&file=license>, <https://github.com/EsotericSoftware/kryo/blob/master/license.txt>, <http://www.scala-lang.org/license.html>, <https://github.com/tinkerpop/blueprints/blob/master/LICENSE.txt>, <http://gee.cs.oswego.edu/dl/classes/EDU/oswego/cs/dl/util/concurrent/intro.html>, <https://aws.amazon.com/ssl/>, <https://github.com/twbs/bootstrap/blob/master/LICENSE>, <https://sourceforge.net/p/xmlunit/code/HEAD/tree/trunk/LICENSE.txt>, <https://github.com/documentcloud/underscore-contrib/blob/master/LICENSE>, and <https://github.com/apache/hbase/blob/master/LICENSE.txt>.

This product includes software licensed under the Academic Free License (<http://www.opensource.org/licenses/afl-3.0.php>), the Common Development and Distribution License (<http://www.opensource.org/licenses/cddl1.php>), the Common Public License (<http://www.opensource.org/licenses/cpl1.0.php>), the Sun Binary Code License Agreement Supplemental License Terms, the BSD License (<http://www.opensource.org/licenses/bsd-license.php>), the new BSD License (<http://opensource.org/licenses/BSD-3-Clause>), the MIT License (<http://www.opensource.org/licenses/mit-license.php>), the Artistic License (<http://www.opensource.org/licenses/artistic-license-1.0>) and the Initial Developer's Public License Version 1.0 (<http://www.firebirdsql.org/en/initial-developer-s-public-license-version-1-0/>).

This product includes software copyright © 2003-2006 Joe Walnes, 2006-2007 XStream Committers. All rights reserved. Permissions and limitations regarding this software are subject to terms available at <http://xstream.codehaus.org/license.html>. This product includes software developed by the Indiana University Extreme! Lab. For further information please visit <http://www.extreme.indiana.edu/>.

This product includes software Copyright (c) 2013 Frank Balluffi and Markus Moeller. All rights reserved. Permissions and limitations regarding this software are subject to terms of the MIT license.

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.

Publication Date: 2018-09-26

Table of Contents

Preface	5
Informatica Resources.	5
Informatica Network.	5
Informatica Knowledge Base.	5
Informatica Documentation.	5
Informatica Product Availability Matrixes.	6
Informatica Velocity.	6
Informatica Marketplace.	6
Informatica Global Customer Support.	6
 Chapter 1: Introduction to PowerExchange for Cassandra.....	 7
PowerExchange for Cassandra Overview.	7
Introduction to Cassandra.	7
PowerExchange for Cassandra Implementation.	8
Virtual Tables.	9
 Chapter 2: PowerExchange for Cassandra Configuration.....	 10
PowerExchange for Cassandra Configuration Overview.	10
Prerequisites.	10
Configuring the Informatica Cassandra ODBC Driver on Linux.	11
Configuring Data Source Name on Windows.	11
Using the Sample Informatica Cassandra DSN.	13
 Chapter 3: Cassandra Read Operations.....	 14
Cassandra Read Operations Overview.	14
Example: Analyzing Data Stored in a Cassandra Database.	14
 Chapter 4: Cassandra Write Operations.....	 16
Cassandra Write Operations Overview.	16
Example: Read Data from Flat Files Generated from Sensors and Write to Cassandra.	16
 Chapter 5: Virtual Table Operations.....	 18
Virtual Table Operations Overview.	18
Supported Virtual Table Operations.	18
Virtual Table Operations Examples.	19
 Appendix A: Data Type Reference.....	 23
Cassandra, ODBC, and Transformation Data Types.	23
 Index.....	 25

Preface

The *Informatica PowerExchange for Cassandra User Guide* describes how to use PowerExchange for Cassandra with Informatica Data Services to extract data from and load data to Cassandra. The guide is written for database administrators and developers who are responsible for developing mappings and workflows. This guide assumes that you have knowledge of Cassandra and Informatica.

Informatica Resources

Informatica Network

Informatica Network hosts Informatica Global Customer Support, the Informatica Knowledge Base, and other product resources. To access Informatica Network, visit <https://network.informatica.com>.

As a member, you can:

- Access all of your Informatica resources in one place.
- Search the Knowledge Base for product resources, including documentation, FAQs, and best practices.
- View product availability information.
- Review your support cases.
- Find your local Informatica User Group Network and collaborate with your peers.

Informatica Knowledge Base

Use the Informatica Knowledge Base to search Informatica Network for product resources such as documentation, how-to articles, best practices, and PAMs.

To access the Knowledge Base, visit <https://kb.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 Documentation

To get the latest documentation for your product, browse the Informatica Knowledge Base at https://kb.informatica.com/_layouts/ProductDocumentation/Page/ProductDocumentSearch.aspx.

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

Informatica Product Availability Matrixes

Product Availability Matrixes (PAMs) indicate the versions of operating systems, databases, and other types of data sources and targets that a product release supports. If you are an Informatica Network member, you can access PAMs at

<https://network.informatica.com/community/informatica-network/product-availability-matrices>.

Informatica Velocity

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>.

If you have questions, comments, or ideas about Informatica Velocity, contact Informatica Professional Services at ips@informatica.com.

Informatica Marketplace

The Informatica Marketplace is a forum where you can find solutions that augment, extend, or enhance your Informatica implementations. By leveraging any of the hundreds of solutions from Informatica developers and partners, you can improve your productivity and speed up time to implementation on your projects. You can access Informatica Marketplace at <https://marketplace.informatica.com>.

Informatica Global Customer Support

You can contact a Global Support Center by telephone or through Online Support on Informatica Network.

To find your local Informatica Global Customer Support telephone number, visit the Informatica website at the following link:

<http://www.informatica.com/us/services-and-training/support-services/global-support-centers>.

If you are an Informatica Network member, you can use Online Support at <http://network.informatica.com>.

CHAPTER 1

Introduction to PowerExchange for Cassandra

This chapter includes the following topics:

- [PowerExchange for Cassandra Overview, 7](#)
- [Introduction to Cassandra, 7](#)
- [PowerExchange for Cassandra Implementation, 8](#)

PowerExchange for Cassandra Overview

Use PowerExchange for Cassandra to connect to a Cassandra database. You can read data from or write data to column families in a Cassandra keyspace through the Data Integration Service.

PowerExchange for Cassandra supports Cassandra Query Language (CQL) to write queries to the Cassandra database. You can create virtual tables to normalize data in Cassandra collections, such as a list, set, or map.

You can use PowerExchange for Cassandra in the following data integration scenarios:

- Your organization needs to extract data from Cassandra and aggregate data into a data warehouse or data mart for interactive data exploration and analysis.
- Your organization needs to load data from flat files, relational database, or message queues to Cassandra.
- Your organization needs to ensure consistency between your SQL data store and Cassandra data store.

Introduction to Cassandra

Cassandra is an open source, NoSQL database that is highly scalable and provides high availability. You can use Cassandra to store large amounts of data spread across data centers or when your applications require high write access speed.

In a Cassandra database, a column family is similar to a table in a relational database and consists of columns and rows. Similar to the relational database, each row is uniquely identified by a row key. The column name uniquely identifies each column in the column family. The number of columns in each row can vary, and client applications can determine the number of columns in each row.

You can read, write, and manipulate a group of data by using collections in Cassandra. The Cassandra database supports the following collection types:

- Set
- List
- Map

To effectively query data, you can use the dynamic column family feature in Cassandra. For example, the following CQL definition creates a column family that can store information about users and their friend lists.

```
CREATE TABLE users_list(  
    username text PRIMARY KEY,  
    friendlist list<text>);
```

Each row in the `users_list` column family contains a user name and the corresponding list of friends for each user. The `friendlist` column is a collection of list type. The rows in the `users_list` column family can contain different number of `friendlist` columns, and each row effectively represents a snapshot of a query on a user's friend list.

The following CQL insert statement inserts a row that contains a user name and the corresponding friend list:

```
insert into users_list (username, friendlist) values(user1,{ 'userxyz', 'userabc',  
userqwe' });
```

PowerExchange for Cassandra Implementation

To extract and load Cassandra data, create a Cassandra data object in the Developer tool. You can include the data object as a source or target in a mapping. You can run the mapping or add the mapping to a workflow to process the data.

PowerExchange for Cassandra includes the Informatica Cassandra ODBC driver that connects to the Cassandra database. You can create an ODBC connection to extract data from or load data to a Cassandra database.

Note: If the table names or column names in the Cassandra database contain reserved key words, mappings fail. When you create a Cassandra ODBC connection, select quotes as the SQL identifier character and select the Support mixed-case identifiers option to avoid mapping failure.

You can also configure the multinode Cassandra server setup with the corresponding replication strategy. The Data Integration Service can fail over to secondary servers if the primary server fails.

The Developer tool imports a column based on the schema that you set for the column family. If a column contains a collection such as a set, list, or map, the Developer tool creates a virtual table and imports the collection as columns at the same level as other columns. The Developer tool creates a virtual table for each collection in the column family.

You can identify sets, lists, and maps with the naming convention of the column. The naming convention of a collection is `<top level element name>.<collection>`.

When you run a mapping, the Data Integration Service uses the Cassandra ODBC data source name in the machine that runs the Data Integration Service to extract data from or load data to a Cassandra database.

Virtual Tables

The Informatica Cassandra ODBC driver creates virtual tables if the column family contains collections such as set, list, or map.

Virtual tables depict the normalized view of a Cassandra collection. You can import virtual tables as an ODBC data object and create mappings. The Informatica Cassandra ODBC driver creates a virtual table for each collection in the column family. The virtual table for a collection uses the following naming convention by default: `<original column family name>_vt_<original collection name>`

Each virtual table has a key column that references back to the primary key column in the original column family. The virtual table has an index column that shows the position of the data within the original array. The index column uses the following naming convention by default: `<original column name>_index`. Other columns in the virtual table represent the elements in the array and are named after the array element. If the array is of scalar type, the data column uses the following naming convention by default: `<original column name>_value`

Example

The following CQL statement defines a Cassandra column family that contains a set:

```
CREATE TABLE users_list(  
    username text PRIMARY KEY,  
    first_name text,  
    last_name text,  
    city text,  
    last_login timestamp,  
    emails set<text>  
);
```

When you use the Informatica Cassandra ODBC driver to import the column family, the driver creates the `users_list_vt_emails` virtual table for the `users_list` table.

The following table shows the denormalized view of the `users_list_vt_emails` virtual table:

username	emails_value
user1	xyz@gmail.com
user1	abc@hotmail.com
user1	qwe@yahoo.com
user2	zxc@gmail.com
user2	jkl@hotmail.com

CHAPTER 2

PowerExchange for Cassandra Configuration

This chapter includes the following topics:

- [PowerExchange for Cassandra Configuration Overview, 10](#)
- [Prerequisites, 10](#)
- [Configuring the Informatica Cassandra ODBC Driver on Linux, 11](#)
- [Configuring Data Source Name on Windows, 11](#)

PowerExchange for Cassandra Configuration Overview

You can use PowerExchange for Cassandra on Windows or Linux. You must configure PowerExchange for Cassandra before you can extract data from or load data to a Cassandra database.

The Informatica Cassandra ODBC driver is installed on the machines on which you installed Informatica services and clients. PowerExchange for Cassandra supports the version of the CQL that the Cassandra database supports. Configure the connection and advanced properties for the Informatica Cassandra ODBC driver on those machines.

Prerequisites

PowerExchange for Cassandra installs with the Informatica services and clients.

Before you can use PowerExchange for Cassandra, perform the following tasks:

- Install or upgrade the Informatica services.
- Create a Data Integration Service and a Model Repository Service in the Informatica domain.
- Ensure that you have the PowerExchange for Cassandra license file. You do not require a separate ODBC license to use PowerExchange for Cassandra.

For more information about product requirements and supported platforms, see the Product Availability Matrix on Informatica Network:

<https://network.informatica.com/community/informatica-network/product-availability-matrices/overview>

Configuring the Informatica Cassandra ODBC Driver on Linux

You must configure the Informatica Cassandra ODBC driver with details of the Cassandra database and ODBC driver manager before you can run Cassandra mappings.

Edit the `odbc.ini` file to configure the driver in the following location: `<INFA_HOME>/tools/cassandra/Setup`

1. Enter the correct `ODBCInstLib` for the ODBC Driver Manager in all the `.ini` files.
2. Replace `<INFA_HOME>` with the path to the Informatica services installation directory in all the `.ini` files.
3. Add the following information to the `LD_LIBRARY_PATH` environment variable:
 - `<INFA_HOME>/tools/cassandra/lib`
 - 64-bit library directory of the ODBC Driver Manager
4. Add the path of the `odbc.ini` file to the `ODBCINI` environment variable.
5. Add entries for all the Cassandra data sources in the `odbc.ini` file.

The following section shows a sample entry in the `odbc.ini` file:

```
[Sample Informatica Cassandra DSN]
Description=Informatica Cassandra ODBC Driver DSN
Driver=<INFA_HOME>/tools/cassandra/lib/libinformaticacassandraodbc64.so
Host=[Host]
Port=9042
DefaultKeyspace=[keyspace]
uid=[user id]
UseSslIdentityCheck=0
BinaryColumnLength=4000
StringColumnLength=4000
QueryMode=2
UseSqlWVarchar=0
EnablePaging=1
RowsPerPage=10000
TunableConsistency=1
VTTableNameSeparator=_vt_
```

Configuring Data Source Name on Windows

Configure the connection properties, advanced properties, and keyspace when you create a data source name.

1. Run the 64-bit ODBC Data Source Administrator.
2. Click the **Drivers** tab and verify that Informatica Cassandra ODBC Driver appears in the alphabetical list of driver names.
3. Click the **User DSN** tab to create a data source name that the current Windows user can use.
4. Click **Add**.

The **Create New Data Source** dialog box appears.

5. Select Informatica Cassandra ODBC Driver and click **Finish**.

The **Informatica Cassandra ODBC Driver Setup** dialog box appears.

6. Specify the following Cassandra ODBC connection properties:
 - a. Enter a name for the data source.
 - b. Enter a description for the data source.
 - c. Enter the host name or IP address of the server on which the Cassandra instance runs.
 - d. Optionally, enter the host names of the secondary Cassandra servers, separated by the comma delimiter.
 - e. Enter the port number from which you can access Cassandra.
 - f. Enter the name of the Cassandra keyspace to use by default.
 - g. Enter the user name and password for the Cassandra database if you select the authentication mechanism as **User Name and Password**.
7. Click **Advanced Options** and enter the following Cassandra ODBC advanced properties:
 - a. In **Query Mode**, select the query mode used by the ODBC drive:
 - SQL**

The ODBC driver treats all incoming queries as SQL and does not accept any CQL query syntax that is not standard SQL-92 syntax.
 - CQL**

The ODBC driver treats all incoming queries as CQL and does not accept any non-CQL syntax.
 - SQL with CQL Fallback**

The driver attempts to treat the incoming query as SQL. If an error occurs while handling the query as SQL, the driver then passes the original query to Cassandra to execute as CQL. SQL with CQL fallback is the default query mode used by the ODBC driver.
 - b. In **Tunable**, select the consistency level to use when you read data from or write data to a Cassandra database. You can specify the following consistency levels:
 - ANY**

Indicates that data must be written to at least one replica.
 - ONE**

Indicates that data must be written to at least one replica and data must be read from the closest replica.
 - TWO**

Indicates that data must be written to at least two replicas and data must be read from two closest replicas.
 - THREE**

Indicates that data must be written to at least three replicas and data must be read from three closest replicas.
 - QUORUM**

Indicates that data must be written to the required number of replica nodes and read from the required number of replica nodes.
 - LOCAL QUORUM**

Indicates that data must be written to the quorum in the same data center and read from the quorum in the same data center.

EACH QUORUM

Indicates that data must be written to the quorum in all data centers and read from the quorum in all data centers.

ALL

Indicates that data must be written to all replicas and read from all replicas.

LOCAL ONE

Indicates that data must be sent to and successfully acknowledged by at least one replica node in the local data center.

- c. In **Binary Column Length**, enter the length to report when exposing BLOB columns.
 - d. In **String Column Length**, enter the length to report when exposing ASCII, TEXT, and VARCHAR columns.
 - e. In **Virtual Table Name Separator**, enter the separator in the virtual table name.
Default is `_vt_`.
 - f. Select **Use SQL_WVARCHAR for string data type** to specify whether to use SQL_WVARCHAR for data types that support Unicode character sets.
 - g. In **Enable Paging**, enter the number of rows that the ODBC driver reads or writes per page from the Cassandra database for large volumes of data.
 - h. In **SSL**, do not enter any of the provided options.
Ensure **No Verification** is selected by default. PowerExchange for Cassandra does not support SSL.
 - i. Click **OK**.
8. To enable logging, click **Logging Options** and then perform the following steps:
- a. Select the **Log Level** value that indicates the level of information to write to the log file.
 - b. In **Log Path**, enter the location to save the log file.
 - c. In **Log Namespace**, type the name of the component for which to log messages.
 - d. Click **OK**.
9. Click **Test** to verify the connection to Cassandra.
10. Click **OK** to close the **Informatica Cassandra ODBC Driver Setup** dialog box.
11. Click **OK** to close the **ODBC Data Source Administrator** dialog box.

Using the Sample Informatica Cassandra DSN

You can configure and use the sample Informatica Cassandra DSN instead of creating a new data source name.

- 1. Run the 64-bit ODBC Data Source Administrator.
- 2. Click the **System DSN** tab.
- 3. Select the **Sample Informatica Cassandra DSN** and then click **Configure**.
The **Informatica Cassandra ODBC Driver Setup** dialog box appears.
- 4. Configure the Cassandra ODBC connection properties.
- 5. Configure the **Advanced Options** and **Logging Options**.
- 6. Click **Test** to verify the connection to Cassandra.
- 7. Click **OK** to close the **Informatica Cassandra ODBC Driver DSN Setup** dialog box.
- 8. Click **OK** to close the **ODBC Data Source Administrator** dialog box.

CHAPTER 3

Cassandra Read Operations

This chapter includes the following topics:

- [Cassandra Read Operations Overview, 14](#)
- [Example: Analyzing Data Stored in a Cassandra Database, 14](#)

Cassandra Read Operations Overview

You can import a Cassandra column family as an ODBC data object in the Developer tool and use it as a source in a mapping.

When you run a Cassandra mapping, the Data Integration Service uses the Informatica Cassandra ODBC data source to extract data from Cassandra.

You can configure the optimization levels at the following locations:

- Mapping run-time configuration in the Developer tool
- Data viewer run-time configuration in the Developer tool
- Mapping deployment in application settings in the Developer tool
- Mapping configuration of an application in the Data Integration Service through the Administrator tool

Example: Analyzing Data Stored in a Cassandra Database

To store real-time data on weather, you need to store data on a database that supports multiple and fast write operations.

Your organization uses a Cassandra database to store real-time data from a weather station. You need to fetch the weather data for a specific period of time and represent the data in a graphical format for analysis.

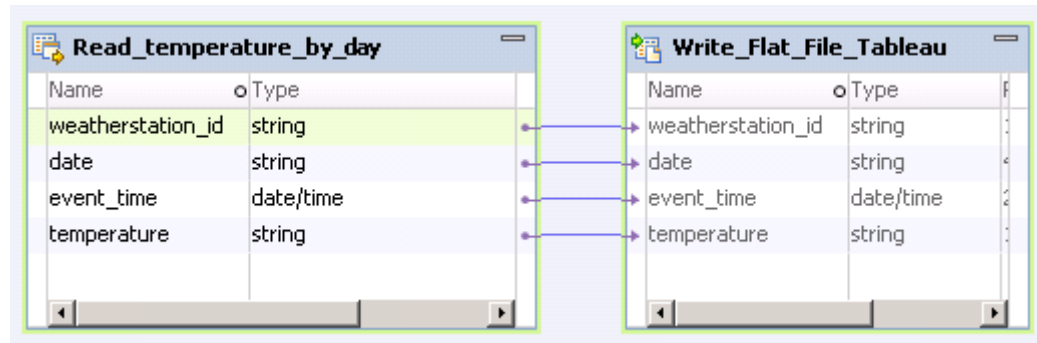
The weather station stores the temperature at a particular time period in a Cassandra column family. The following is the definition of the temperature_by_day column family:

```
CREATE TABLE temperature_by_day (  
    weatherstation_id text,  
    date text,  
    event_time timestamp,
```

```
temperature text,
PRIMARY KEY ((weatherstation_id,date),event_time));
```

Create a mapping to read data from Cassandra and write it to a flat file. You can use Tableau to read the flat file and create a time-series graph for temperature.

The following image shows the mapping:



Mapping Input

The mapping source is a column family in the Cassandra database. The source contains information for your organization, including weatherstation ID, time, and temperature. Source columns include columns such as weatherstation ID, date, event time, and temperature.

The following table describes the contents of the temperature_by_day column family:

Field	Data type
weatherstation_id	String
date	String
event_time	Date/Time
temperature	String

Mapping Output

The mapping output is a flat file data object. The flat file data object contains the same columns as the source. When you run the mapping, the Data Integration Service reads weather information from the Cassandra database and writes the data to a flat file. Analysts can use the flat file in Tableau to create a time-series graph for temperature.

CHAPTER 4

Cassandra Write Operations

This chapter includes the following topics:

- [Cassandra Write Operations Overview, 16](#)
- [Example: Read Data from Flat Files Generated from Sensors and Write to Cassandra, 16](#)

Cassandra Write Operations Overview

You can import a Cassandra column family as an ODBC data object and create mappings in the Developer tool to write data to Cassandra.

You must configure the ODBC driver before you import Cassandra column families.

When you run a Cassandra mapping, the Data Integration Service uses the Informatica Cassandra ODBC data source to load data to the Cassandra database.

When you run Cassandra mappings, ensure that the optimization level is set to none. If you do not set the optimization level as none, the mappings might fail.

You can configure the optimization levels at the following locations:

- Mapping run-time configuration in the Developer tool
- Data viewer run-time configuration in the Developer tool
- Mapping deployment in application settings in the Developer tool
- Mapping configuration of an application in the Data Integration Service through the Administrator tool

Example: Read Data from Flat Files Generated from Sensors and Write to Cassandra

A weather channel uses flat files with comma-separated values to store real-time weather details generated from sensors. To provide better performance and scalability, the weather channel needs to migrate data from the flat file to a Cassandra database.

The weather channel stores the real-time temperature details in a flat file.

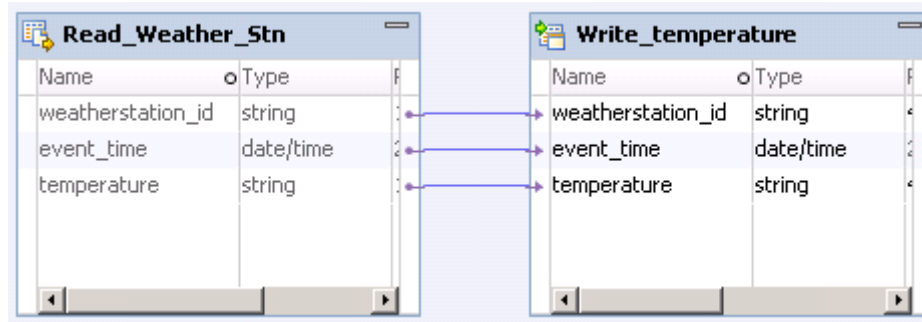
The following table describes the content of a flat file that stores temperature details:

WeatherStation_ID	String
Event_time	Timestamp
Temperature	String

Create a mapping to extract data from the flat file and load it to a Cassandra column family. Create a flat file data object in read mode and create a Cassandra data object in write mode. The following is the definition of the temperature column family:

```
CREATE TABLE temperature (  
    weatherstation_id text,  
    event_time timestamp,  
    temperature text,  
    PRIMARY KEY (weatherstation_id,event_time)  
);
```

The following image shows the mapping:



Mapping Input

The mapping source is a comma-separated flat file. The source contains information on weather station, time, and temperature. Source columns include columns such as weatherstation_id, date, event_time, and temperature.

Mapping Output

The mapping output is a Cassandra data object to write data to the temperature column family in the Cassandra database. When you run the mapping, the Data Integration Service reads weather information from the flat file and writes the data to the Cassandra database.

CHAPTER 5

Virtual Table Operations

This chapter includes the following topics:

- [Virtual Table Operations Overview, 18](#)
- [Supported Virtual Table Operations, 18](#)
- [Virtual Table Operations Examples, 19](#)

Virtual Table Operations Overview

The Informatica Cassandra ODBC driver creates a separate virtual table for each collection type in the column family. When you use a virtual table in a mapping, you can perform read, write, append, update, or delete operations.

Supported Virtual Table Operations

You can use virtual table operations to access, write, or delete rows from a virtual table.

You can perform the following operations in a virtual table:

Read

Use the read operation to retrieve rows from a virtual table.

Insert

Use the insert operation to add one or more rows to a virtual table. Each row that you insert must correspond to a primary key in the source table. If you insert data into a row key that contains data, Cassandra overwrites the original data in the row with the new data.

Note: Cassandra database treats all insert operations as upsert operations.

Update

Use the update operation to update rows in a virtual table. Use the DD_UPDATE strategy in an update strategy expression to update rows in a virtual table.

Note: If the collection type is list, sort the corresponding source or target virtual table data in descending order before you pass data to the Update Strategy transformation.

Append

Use the append operation to add an element to the end of the list type.

Delete

Use the delete operation to remove one or more rows from a virtual table. You can use the DD_DELETE strategy in an update strategy expression or use a delete command, such as a Pre SQL or Post SQL command, to remove rows.

Note: If the collection type is list, sort the corresponding source or target virtual table data in descending order before you pass data to the Update Strategy transformation.

Virtual Table Operations Examples

The example mappings illustrate the operations that you can perform on a virtual table.

The login details of users are stored in a Cassandra column family. You need to read, insert, update, append, or delete values from the location column.

The following users_list table represents a Cassandra column family that contains a collection of type list:

username	first_name	last_name	city	last_login	location
user1	john	doe	SFO	2014-8-03 01:30:00	0.0.0.0, 123.123.123.2
user2	jane	smith	NYC	2014-8-03 01:40:00	123.88.99.2, 0.0.0.0
user3	brian	lee	SFO	2014-8-04 11:15:00	123.123.2.2, 127.0.0.0
user4	james	adam	NYC	2014-8-05 05:22:00	123.123.1.2, 127.0.0.0

The Informatica Cassandra ODBC driver creates the users_list main table and users_list_vt_location virtual table.

The following image displays the users_list main table:

	Name	Native Type	Precisi...	Scale	Primar...	Nullable	Description
1	username	varchar	4000	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2	city	varchar	4000	0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	first_name	varchar	4000	0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	last_login	timestamp	29	9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	last_name	varchar	4000	0	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

The following image displays the users_list_vt_location virtual table:

Columns							
	Name	Native Type	Precisi...	Scale	Primar...	Nullable	Description
1	username	varchar	4000	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
2	location_index	integer	10	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
3	location_value	varchar	4000	0	<input type="checkbox"/>	<input type="checkbox"/>	

The following example mappings and data preview illustrate the virtual table operations:

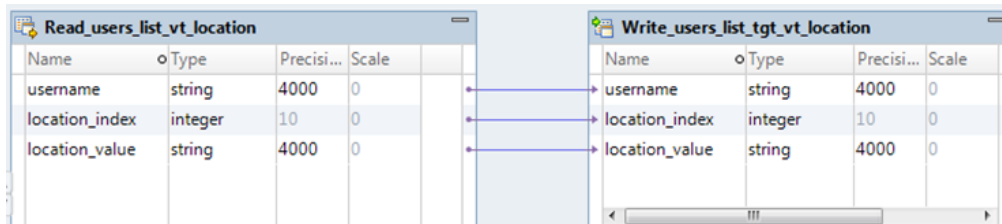
Read Operation

The data preview of the users_list_vt_location virtual table displays the following output:

Output			
Name: users_list_vt_location			
	username	location_index	location_value
1	user2	0	123.88.99.2
2	user2	1	0.0.0.0
3	user4	0	123.123.1.2
4	user4	1	127.0.0.0
5	user1	0	123.123.123.2
6	user1	1	0.0.0.0
7	user3	0	123.123.2.2
8	user3	1	127.0.0.0

Insert Operation

The following pass-through mapping inserts rows into a virtual table:



The mapping source is the users_list_vt_location table. The mapping target is the users_list_tgt_vt_location table.

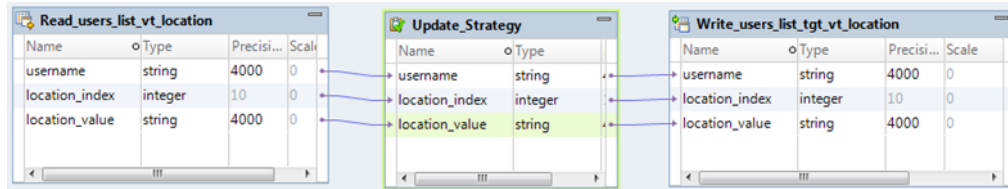
The following image displays the data preview of the target virtual table:

Output			
Name: users_list_tgt_vt_location			
	username	location_index	location_value
1	user2	0	123.88.99.2
2	user2	1	0.0.0.0
3	user4	0	123.123.1.2
4	user4	1	127.0.0.0
5	user1	0	123.123.123.2
6	user1	1	0.0.0.0
7	user3	0	123.123.2.2
8	user3	1	127.0.0.0

Update Operation

You can use a DD_UPDATE strategy in an Update Strategy transformation to update rows in a virtual table.

The following mapping uses an Update Strategy transformation to update rows in a virtual table:

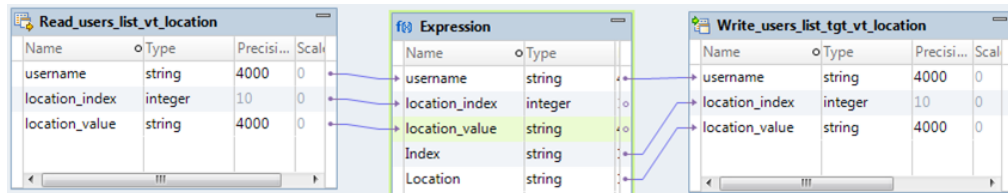


The mapping source is the users_list_vt_location table. The DD_UPDATE strategy in the update strategy expression updates rows in the target virtual table. The mapping target is the users_list_tgt_vt_location table.

Append Operation

You can append rows only to virtual tables created for list type.

The following mapping appends the location 99.99.99.0 to all the lists in the users_list_tgt_vt_location table:



The mapping source is the users_list_vt_location table. The Expression transformation sets the list index to -1. The mapping target is the users_list_tgt_vt_location table.

The following image displays a data preview of the rows in the target table before you append rows to the target table:

Output			
Name: users_list_tgt_vt_location			
	username	location_index	location_value
1	user2	0	0.0.0.0
2	user4	0	0.0.0.0
3	user1	0	0.0.0.0
4	user3	0	0.0.0.0

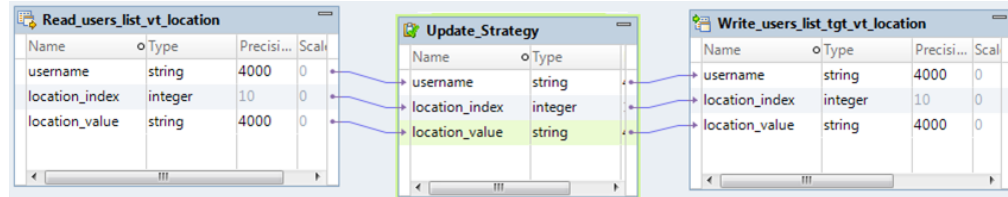
The following image displays a data preview of the rows appended to the target virtual table:

Output			
Name: users_list_tgt_vt_location			
	username	location_index	location_value
1	user2	0	0.0.0.0
2	user2	1	99.99.99.0
3	user4	0	0.0.0.0
4	user4	1	99.99.99.0
5	user1	0	0.0.0.0
6	user1	1	99.99.99.0
7	user3	0	0.0.0.0
8	user3	1	99.99.99.0

Delete Operation

You can use a DD_DELETE strategy in an Update Strategy transformation to delete rows from a virtual table.

The following mapping uses an Update Strategy transformation to delete rows from a virtual table:



The mapping source is the users_list_vt_location table. The DD_DELETE strategy in the update strategy expression deletes rows from the target virtual table. The mapping target is the users_list_tgt_vt_location table.

APPENDIX A

Data Type Reference

This appendix includes the following topic:

- [Cassandra, ODBC, and Transformation Data Types, 23](#)

Cassandra, ODBC, and Transformation Data Types

When you import a Cassandra column family as a data object, the transformation data types corresponding to the ODBC data types appear in the Developer tool.

The Informatica Cassandra ODBC driver reads Cassandra data and converts the Cassandra data types to ODBC data types. The Data Integration Service converts the ODBC data types to transformation data types.

The following table lists the Cassandra data types and the corresponding ODBC and transformation data types:

Cassandra Data Types	ODBC Data Types	Transformation Data Types
ASCII	Varchar	Varchar
Bigint	Bigint	Bigint
Blob	Varbinary	Varbinary
Boolean	Bit	Bit
Decimal	Decimal	Decimal
Double	Double	Double
Float	Real	Real
Inet	Varchar	Varchar. Cassandra Inet data type supports IP addresses in IPv4 and IPv6 formats. Informatica Cassandra ODBC driver does not support reading or writing IP addresses in IPv6 format.
Int	Integer	Integer
Text	Wvarchar	Varchar

Cassandra Data Types	ODBC Data Types	Transformation Data Types
Time stamp	Varchar	Time stamp. The Informatica Cassandra ODBC driver treats the Time stamp data type values in Coordinated Universal Time (UTC) format.
Uuid	Varchar	Varchar. When you use comparison operators in data of Uuid data type, enclose values of Uuid data type within single quotation marks. For example, in the following query, the value for the Uuid data type is enclosed within single quotation marks: DELETE from pc.map_nesting_tgt_vt_col_map2 where pc.map_nesting_tgt_vt_col_map2.col_uuid='152d2030-14e6-11e4-aef1-fd88d8253a43';
Timeuuid	Varchar	Varchar
Varchar	Wvarchar	Varchar
Varint	Numeric	Numeric

INDEX

C

Cassandra
 introduction [7](#)
 configure DSN
 Windows [11](#)
 configuring Informatica Cassandra ODBC driver
 Linux [11](#)

P

PowerExchange for Cassandra
 overview [7](#)
 prerequisites [10](#)

R

read operation
 example [14](#)

read operation (*continued*)
 overview [14](#)

V

virtual table
 collection [9](#)
 list [9](#)
 map [9](#)
 operations [18](#)
 set [9](#)

W

write operation
 example [16](#)
 overview [16](#)