Hadoop Connector

Software Version 12.0

Administration Guide

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Contents

Chapter 1: Introduction

This section provides an overview of the Micro Focus Hadoop Connector.

Hadoop Connector

Hadoop Connector is an IDOL connector that automatically aggregates content from a Hadoop file system. The connector sends the files to Connector Framework Server (CFS), which processes the information and indexes it into an IDOL server or IDOL OnDemand.

After the documents are indexed, IDOL server automatically processes them, performing a number of intelligent operations in real time, such as:

- Agents
- Alerting
- Automatic Query Guidance
- Categorization
- Channels
- Clustering
- Collaboration
- Dynamic Clustering
- Dynamic Thesaurus
- Eduction
- Expertise
- Hyperlinking
- Mailing
- Profiling
- Retrieval
- Spelling Correction
- Summarization
- Taxonomy Generation

Features and Capabilities

The Hadoop Connector retrieves data from a Hadoop file system.

Repository	Hadoop (version 1 and version 2)

Supported Actions

The Hadoop Connector supports the following actions:

Action	Supported	Further Information
Synchronize	✓	
Synchronize (identifiers)	✗	
Synchronize Groups	✗	
Collect	✓	
Identifiers	✗	
Insert	✓	Insert Files into Hadoop, on page 46
Delete/Remove	✓	
Hold/ReleaseHold	✗	
Update	✗	
Stub	✗	
GetURI	✓	
View	✓	

Mapped Security

The Hadoop Connector supports Mapped Security.

Display Online Help

You can display the Hadoop Connector Reference by sending an action from your web browser. The Hadoop Connector Reference describes the actions and configuration parameters that you can use with Hadoop Connector.

For Hadoop Connector to display help, the help data file (`help.dat`) must be available in the installation folder.

To display help for Hadoop Connector

1. Start Hadoop Connector.
2. Send the following action from your web browser:

   ```
   http://host:port/action=Help
   ```

   where:

host	is the IP address or name of the machine on which Hadoop Connector is installed.
port	is the ACI port by which you send actions to Hadoop Connector (set by the `Port` parameter in the `[Server]` section of the configuration file).

   For example:

   ```
   http://12.3.4.56:9000/action=help
   ```

OEM Certification

Hadoop Connector works in OEM licensed environments.

Connector Framework Server

Connector Framework Server (CFS) processes the information that is retrieved by connectors, and then indexes the information into IDOL.

A single CFS can process information from any number of connectors. For example, a CFS might process files retrieved by a File System Connector, web pages retrieved by a Web Connector, and e-mail messages retrieved by an Exchange Connector.

To use the Hadoop Connector to index documents into IDOL Server, you must have a CFS. When you install the Hadoop Connector, you can choose to install a CFS or point the connector to an existing CFS.

For information about how to configure and use Connector Framework Server, refer to the *Connector Framework Server Administration Guide*.

Filter Documents and Extract Subfiles

The documents that are sent by connectors to CFS contain only metadata extracted from the repository, such as the location of a file or record that the connector has retrieved. CFS uses KeyView to extract the file content and file specific metadata from over 1000 different file types, and adds this information to the documents. This allows IDOL to extract meaning from the information contained in the repository, without needing to process the information in its native format.

CFS also uses KeyView to extract and process sub-files. Sub-files are files that are contained within other files. For example, an e-mail message might contain attachments that you want to index, or a Microsoft Word document might contain embedded objects.

Manipulate and Enrich Documents

CFS provides features to manipulate and enrich documents before they are indexed into IDOL. For example, you can:

- add additional fields to a document.
- divide long documents into multiple sections.
- run tasks including Eduction, Optical Character Recognition, or Face Recognition, and add the information that is obtained to the document.
- run a custom Lua script to modify a document.

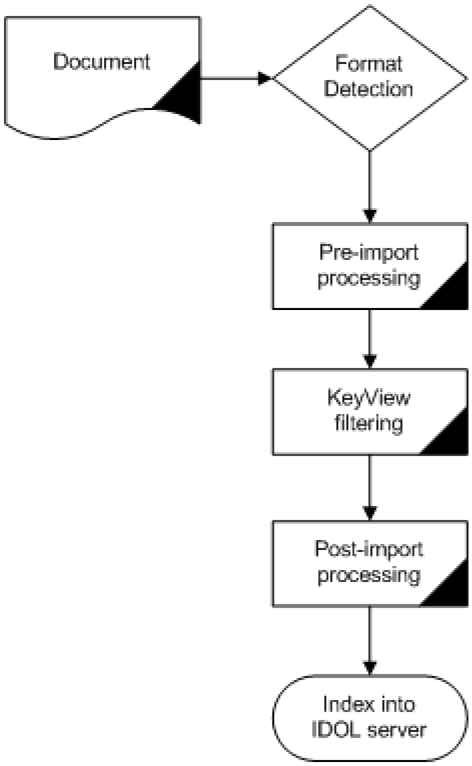
Index Documents

After CFS finishes processing documents, it automatically indexes them into one or more indexes. CFS can index documents into:

- **IDOL Server** (or send them to a *Distributed Index Handler*, so that they can be distributed across multiple IDOL servers).
- **Haven OnDemand**.
- **Vertica**.

Import Process

This section describes the import process for new files that are added to IDOL through CFS.



1. Connectors aggregate documents from repositories and send the files to CFS. A single CFS can process documents from multiple connectors. For example, CFS might receive HTML files from HTTP Connectors, e-mail messages from Exchange Connector, and database records from ODBC Connector.
2. CFS runs pre-import tasks. Pre-Import tasks occur before document content and file-specific metadata is extracted by KeyView.
3. KeyView filters the document content, and extracts sub-files.
4. CFS runs post-import tasks. Post-Import tasks occur after KeyView has extracted document content and file-specific metadata.
5. The data is indexed into IDOL.

The IDOL Platform

At the core of Hadoop Connector is the *Intelligent Data Operating Layer* (IDOL).

IDOL gathers and processes unstructured, semi-structured, and structured information in any format from multiple repositories using IDOL connectors and a global relational index. It can automatically form a contextual understanding of the information in real time, linking disparate data sources together based on the concepts contained within them. For example, IDOL can automatically link concepts contained in an email message to a recorded phone conversation, that can be associated with a stock trade. This information is then imported into a format that is easily searchable, adding advanced retrieval, collaboration, and personalization to an application that integrates the technology.

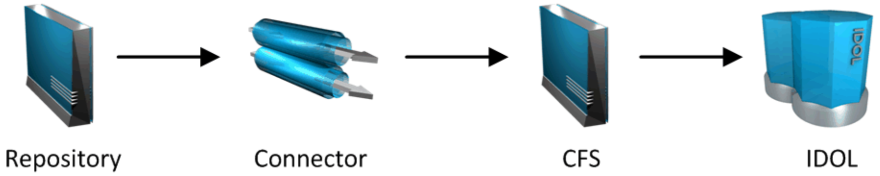
For more information on IDOL, see the *IDOL Getting Started Guide*.

System Architecture

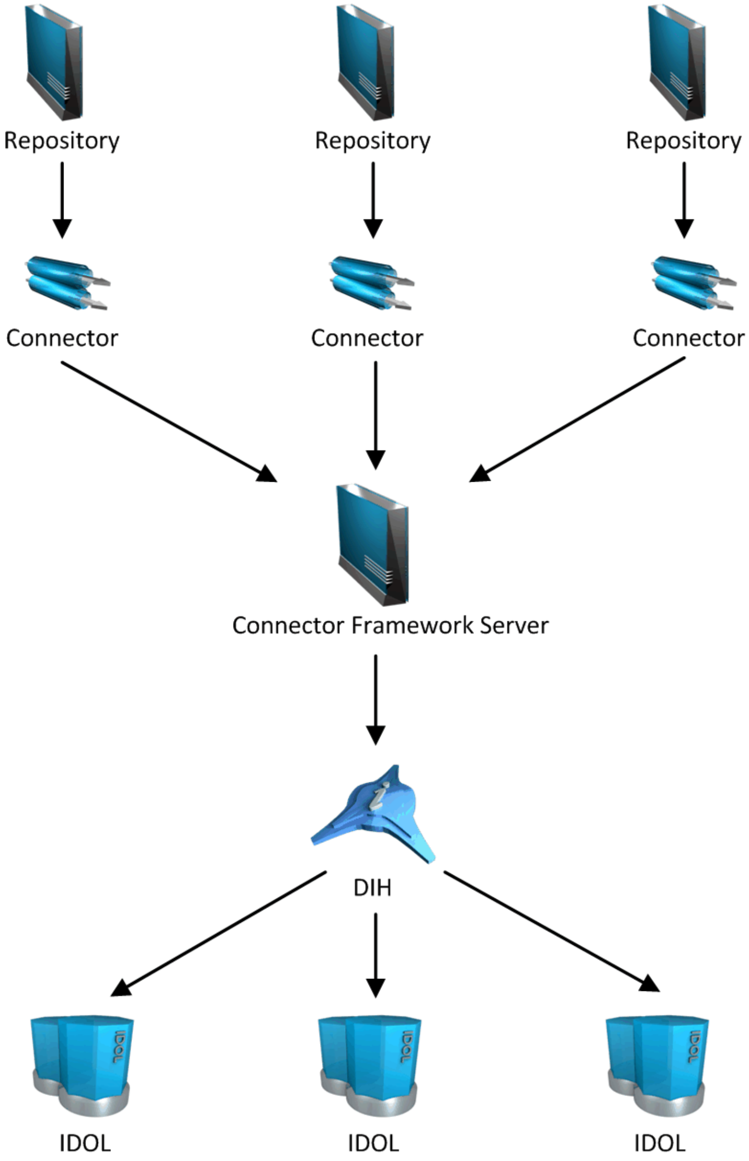
An IDOL infrastructure can include the following components:

- **Connectors**. Connectors aggregate data from repositories and send the data to CFS.
- **Connector Framework Server (CFS)**. Connector Framework Server (CFS) processes and enriches the information that is retrieved by connectors.
- **IDOL Server**. IDOL stores and processes the information that is indexed into it by CFS.
- **Distributed Index Handler (DIH)**. The Distributed Index Handler distributes data across multiple IDOL servers. Using multiple IDOL servers can increase the availability and scalability of the system.
- **License Server**. The License server licenses multiple products.

These components can be installed in many different configurations. The simplest installation consists of a single connector, a single CFS, and a single IDOL Server.



A more complex configuration might include more than one connector, or use a Distributed Index Handler (DIH) to index content across multiple IDOL Servers.



Chapter 2: Install Hadoop Connector

This section describes how to install the Hadoop Connector.

System Requirements

Hadoop Connector can be installed as part of a larger system that includes an IDOL Server and an interface for the information stored in IDOL Server. To maximize performance, Micro Focus recommends that you install IDOL Server and the connector on different machines.

For information about the minimum system requirements required to run IDOL components, including Hadoop Connector, refer to the *IDOL Getting Started Guide*.

Additional requirements for Hadoop Connector are:

- The Hadoop Client must be installed on the same machine as the connector.

Install Hadoop Connector on Windows

To install the Hadoop Connector on Windows, use the following procedure.

To install the Hadoop Connector

1. Run the Hadoop Connector installation program.

   The installation wizard opens.

2. Read the installation instructions and click **Next**.

   The License Agreement dialog box opens.

3. Read the license agreement. If you agree to its terms, click **I accept the agreement** and click **Next**.

   The Installation Directory dialog box opens.

4. Choose an installation folder for Hadoop Connector and click **Next**.

   The Service Name dialog box opens.

5. In the **Service name** box, type a name to use for the connector’s Windows service and click **Next**.

   The Service Port and ACI Port dialog box opens.

6. Type the following information, and click **Next**.

Service port	The port used by the connector to listen for service actions.
ACI port	The port used by the connector to listen for actions.

The License Server Configuration dialog box opens.

7. Type the following information, and click **Next**.

License server host	The host name or IP address of your License server.
License server port	The ACI port of your License server.

The IDOL database dialog box opens.

8. In the **IDOL database** box, type the name of the IDOL database that you want to index data into, and click **Next**.

The Hadoop Connector Task Configuration dialog box opens.

9. Type the following information, and click **Next**.

FileSystemRootUri	The root URI of the file system to connect to. For example, `hdfs://hadoop:8020/`.
FileSystemPath	The point in the file system where you want the connector to start looking for files, for example `/home/hadoop/files`.

The CFS dialog box opens.

10. Choose whether to install a new CFS.

- To install a new CFS, select the **Install a new CFS** check box and click **Next**.

  The Installation directory dialog box opens. Go to the next step.

- To use an existing CFS, clear the **Install a new CFS** check box and click **Next**.

  Type the **Hostname** and **Port** of your existing CFS. Then, click **Next** and go to Step 15.

11. Choose an installation folder for the Connector Framework Server and then click **Next**.

The Installation name dialog box opens.

12. In the **Service name** box, type a unique name for the Connector Framework service and click **Next**. The name must not contain any spaces.

The CFS dialog box opens.

13. Type the following information, and click **Next**.

Service port	The port used by CFS to listen for service actions.
ACI port	The port used by CFS to listen for actions.

14. Type the following information and click **Next**.

IDOL Server hostname	The host name or IP address of the IDOL server that you want to index documents into.
ACI port	The ACI port of the IDOL server.

The Pre-Installation Summary dialog box opens.

15. Review the installation settings. If necessary, click **Back** to go back and change any settings. If you are satisfied with the settings, click **Next**.

    The connector is installed.

16. Click **Finish**.

    You can now edit the connector's configuration file and start the connector.

Install Hadoop Connector on Linux

To install the Hadoop Connector, use the following procedure.

To install Hadoop Connector on Linux

1. Open a terminal in the directory in which you have placed the installer, and run the following command:

   ```
   ./ConnectorName_VersionNumber_Platform.exe --mode text
   ```

2. Follow the on-screen instructions. For information about the options that are specified during installation, see Install Hadoop Connector on Windows. For more information about installing IDOL components, refer to the *IDOL Getting Started Guide*.

Specify the Path to the Hadoop Client JAR Files

The `JavaClassPath` parameter in the Hadoop Connector configuration file must include the path to all the dependencies of the connector.

The Hadoop Connector requires the Hadoop Client JAR files. You must install the Hadoop Client on the same machine as the connector. If you specify the path to the Hadoop Client installation folder during the connector installation process, the `JavaClassPath` parameter is set automatically. If you do not specify the path during the installation, use the following procedure.

To specify the path to the Hadoop Client JAR files

1. Open the connector’s configuration file.

2. In the `[Connector]` section, find the `JavaClassPath` parameter and ensure that it includes the path to the Hadoop Client JAR files. For example:

   ```
   JavaClassPath0=./lib/*.jar
   ```

```
JavaClassPath1=/hadoop/lib/*.jar
```

3. Save and close the configuration file.

Chapter 3: Configure Hadoop Connector

This section describes how to configure the Hadoop Connector.

Hadoop Connector Configuration File

You can configure the Hadoop Connector by editing the configuration file. The configuration file is located in the connector’s installation folder. You can modify the file with a text editor.

The parameters in the configuration file are divided into sections that represent connector functionality.

Some parameters can be set in more than one section of the configuration file. If a parameter is set in more than one section, the value of the parameter located in the most specific section overrides the value of the parameter defined in the other sections. For example, if a parameter can be set in "*TaskName* or FetchTasks or Default", the value in the TaskName section overrides the value in the FetchTasks section, which in turn overrides the value in the Default section. This means that you can set a default value for a parameter, and then override that value for specific tasks.

For information about the parameters that you can use to configure the Hadoop Connector, refer to the *Hadoop Connector Reference*.

Server Section

The [Server] section specifies the ACI port of the connector. It can also contain parameters that control the way the connector handles ACI requests.

Service Section

The [Service] section specifies the service port of the connector.

Actions Section

The `[Actions]` section contains configuration parameters that specify how the connector processes actions that are sent to the ACI port. For example, you can configure event handlers that run when an action starts, finishes, or encounters an error.

Logging Section

The `[Logging]` section contains configuration parameters that determine how messages are logged. You can use *log streams* to send different types of message to separate log files. The configuration file also contains a section to configure each of the log streams.

Connector Section

The `[Connector]` section contains parameters that control general connector behavior. For example, you can specify a schedule for the fetch tasks that you configure.

Default Section

The `[Default]` section is used to define default settings for configuration parameters. For example, you can specify default settings for the tasks in the `[FetchTasks]` section.

FetchTasks Section

The `[FetchTasks]` section lists the fetch tasks that you want to run. A *fetch task* is a task that retrieves data from a repository. Fetch tasks are usually run automatically by the connector, but you can also run a fetch task by sending an action to the connector's ACI port.

In this section, enter the total number of fetch tasks in the `Number` parameter and then list the tasks in consecutive order starting from 0 (zero). For example:

```
[FetchTasks]
Number=2
0=MyTask0
1=MyTask1
```

[*TaskName*] Section

The [*TaskName*] section contains configuration parameters that apply to a specific task. There must be a [*TaskName*] section for every task listed in the `[FetchTasks]` section.

Ingestion Section

The [Ingestion] section specifies where to send the data that is extracted by the connector.

You can send data to a Connector Framework Server, Haven OnDemand, or another connector. For more information about ingestion, see Ingestion, on page 73.

DistributedConnector Section

The [DistributedConnector] section configures the connector to operate with the Distributed Connector. The Distributed Connector is an ACI server that distributes actions (synchronize, collect and so on) between multiple connectors.

For more information about the Distributed Connector, refer to the *Distributed Connector Administration Guide*.

ViewServer Section

The [ViewServer] section contains parameters that allow the connector’s *view* action to use a View Server. If necessary, the View Server converts files to HTML so that they can be viewed in a web browser.

License Section

The [License] section contains details about the License server (the server on which your license file is located).

Document Tracking Section

The [DocumentTracking] section contains parameters that enable the tracking of documents through import and indexing processes.

Related Topics

- Modify Configuration Parameter Values, below
- Customize Logging, on page 64

Modify Configuration Parameter Values

You modify Hadoop Connector configuration parameters by directly editing the parameters in the configuration file. When you set configuration parameter values, you must use UTF-8.

CAUTION:
You must stop and restart Hadoop Connector for new configuration settings to take effect.

This section describes how to enter parameter values in the configuration file.

Enter Boolean Values

The following settings for Boolean parameters are interchangeable:

```
TRUE = true = ON = on = Y = y = 1
```

```
FALSE = false = OFF = off = N = n = 0
```

Enter String Values

To enter a comma-separated list of strings when one of the strings contains a comma, you can indicate the start and the end of the string with quotation marks, for example:

```
ParameterName=cat,dog,bird,"wing,beak",turtle
```

Alternatively, you can escape the comma with a backslash:

```
ParameterName=cat,dog,bird,wing\,beak,turtle
```

If any string in a comma-separated list contains quotation marks, you must put this string into quotation marks and escape each quotation mark in the string by inserting a backslash before it. For example:

```
ParameterName="<font face=\"arial\" size=\"+1\"><b>","<p>"
```

Here, quotation marks indicate the beginning and end of the string. All quotation marks that are contained in the string are escaped.

Include an External Configuration File

You can share configuration sections or parameters between ACI server configuration files. The following sections describe different ways to include content from an external configuration file.

You can include a configuration file in its entirety, specified configuration sections, or a single parameter.

When you include content from an external configuration file, the `GetConfig` and `ValidateConfig` actions operate on the combined configuration, after any external content is merged in.

In the procedures in the following sections, you can specify external configuration file locations by using absolute paths, relative paths, and network locations. For example:

```
../sharedconfig.cfg
K:\sharedconfig\sharedsettings.cfg
\\example.com\shared\idol.cfg
file://example.com/shared/idol.cfg
```

Relative paths are relative to the primary configuration file.

> **NOTE:**
> You can use nested inclusions, for example, you can refer to a shared configuration file that references a third file. However, the external configuration files must not refer back to your original configuration file. These circular references result in an error, and Hadoop Connector does not start.
>
> Similarly, you cannot use any of these methods to refer to a different section in your primary configuration file.

Include the Whole External Configuration File

This method allows you to import the whole external configuration file at a specified point in your configuration file.

To include the whole external configuration file

1. Open your configuration file in a text editor.
2. Find the place in the configuration file where you want to add the external configuration file.
3. On a new line, type a left angle bracket (<), followed by the path to and name of the external configuration file, in quotation marks (""). You can use relative paths and network locations. For example:

   ```
   < "K:\sharedconfig\sharedsettings.cfg"
   ```

4. Save and close the configuration file.

Include Sections of an External Configuration File

This method allows you to import one or more configuration sections from an external configuration file at a specified point in your configuration file. You can include a whole configuration section in this way, but the configuration section name in the external file must exactly match what you want to use in your file. If you want to use a configuration section from the external file with a different name, see Merge a Section from an External Configuration File, on the next page.

To include sections of an external configuration file

1. Open your configuration file in a text editor.
2. Find the place in the configuration file where you want to add the external configuration file section.
3. On a new line, type a left angle bracket (<), followed by the path to and name of the external configuration file, in quotation marks (""). You can use relative paths and network locations. After the configuration file name, add the configuration section name that you want to include. For example:

   ```
   < "K:\sharedconfig\extrasettings.cfg" [License]
   ```

> **NOTE:**
> You cannot include a section that already exists in your configuration file.

4. Save and close the configuration file.

Include a Parameter from an External Configuration File

This method allows you to import a parameter from an external configuration file at a specified point in your configuration file. You can include a section or a single parameter in this way, but the value in the external file must exactly match what you want to use in your file.

To include a parameter from an external configuration file

1. Open your configuration file in a text editor.
2. Find the place in the configuration file where you want to add the parameter from the external configuration file.
3. On a new line, type a left angle bracket (<), followed by the path to and name of the external configuration file, in quotation marks (""). You can use relative paths and network locations. After the configuration file name, add the name of the configuration section name that contains the parameter, followed by the parameter name. For example:

   ```
   < "license.cfg" [License] LicenseServerHost
   ```

   To specify a default value for the parameter, in case it does not exist in the external configuration file, specify the configuration section, parameter name, and then an equals sign (=) followed by the default value. For example:

   ```
   < "license.cfg" [License] LicenseServerHost=localhost
   ```

4. Save and close the configuration file.

Merge a Section from an External Configuration File

This method allows you to include a configuration section from an external configuration file as part of your Hadoop Connector configuration file. For example, you might want to specify a standard SSL configuration section in an external file and share it between several servers. You can use this method if the configuration section that you want to import has a different name to the one you want to use.

To merge a configuration section from an external configuration file

1. Open your configuration file in a text editor.
2. Find or create the configuration section that you want to include from an external file. For example:

   ```
   [SSLOptions1]
   ```

3. After the configuration section name, type a left angle bracket (<), followed by the path to and

name of the external configuration file, in quotation marks (""). You can use relative paths and network locations. For example:

```
[SSLOptions1] < "../sharedconfig/ssloptions.cfg"
```

If the configuration section name in the external configuration file does not match the name that you want to use in your configuration file, specify the section to import after the configuration file name. For example:

```
[SSLOptions1] < "../sharedconfig/ssloptions.cfg" [SharedSSLOptions]
```

In this example, Hadoop Connector uses the values in the `[SharedSSLOptions]` section of the external configuration file as the values in the `[SSLOptions1]` section of the Hadoop Connector configuration file.

> **NOTE:**
> You can include additional configuration parameters in the section in your file. If these parameters also exist in the imported external configuration file, Hadoop Connector uses the values in the local configuration file. For example:
>
> ```
> [SSLOptions1] < "ssloptions.cfg" [SharedSSLOptions]
> SSLCACertificatesPath=C:\IDOL\HTTPConnector\CACERTS\
> ```

4. Save and close the configuration file.

Encrypt Passwords

Micro Focus recommends that you encrypt all passwords that you enter into a configuration file.

Create a Key File

A key file is required to use AES encryption.

To create a new key file

1. Open a command-line window and change directory to the Hadoop Connector installation folder.
2. At the command line, type:

   ```
   autpassword -x -tAES -oKeyFile=./MyKeyFile.ky
   ```

   A new key file is created with the name `MyKeyFile.ky`

> **CAUTION:**
> To keep your passwords secure, you must protect the key file. Set the permissions on the key file so that only authorized users and processes can read it. Hadoop Connector must be able to read the key file to decrypt passwords, so do not move or rename it.

Encrypt a Password

The following procedure describes how to encrypt a password.

To encrypt a password

1. Open a command-line window and change directory to the Hadoop Connector installation folder.
2. At the command line, type:

   ```
   autpassword -e -tEncryptionType [-oKeyFile] [-cFILE -sSECTION -pPARAMETER]
   PasswordString
   ```

   where:

Option	Description
`-t EncryptionType`	The type of encryption to use: • **`Basic`** • **`AES`** For example: **`-tAES`** **NOTE:** AES is more secure than basic encryption.
`-oKeyFile`	AES encryption requires a key file. This option specifies the path and file name of a key file. The key file must contain 64 hexadecimal characters. For example: **`-oKeyFile=./key.ky`**
`-cFILE -sSECTION -pPARAMETER`	(Optional) You can use these options to write the password directly into a configuration file. You must specify all three options. • **`-c`**. The configuration file in which to write the encrypted password. • **`-s`**. The name of the section in the configuration file in which to write the password. • **`-p`**. The name of the parameter in which to write the encrypted password. For example: **`-c./Config.cfg -sMyTask -pPassword`**
`PasswordString`	The password to encrypt.

   For example:

   ```
   autpassword -e -tBASIC MyPassword
   ```

```
autpassword -e -tAES -oKeyFile=./key.ky MyPassword
```

```
autpassword -e -tAES -oKeyFile=./key.ky -c./Config.cfg -sDefault -pPassword
MyPassword
```

The password is returned, or written to the configuration file.

Decrypt a Password

The following procedure describes how to decrypt a password.

To decrypt a password

1. Open a command-line window and change directory to the Hadoop Connector installation folder.
2. At the command line, type:

   ```
   autpassword -d -tEncryptionType [-oKeyFile] PasswordString
   ```

   where:

Option	Description
`-t EncryptionType`	The type of encryption: - **`Basic`** - **`AES`** For example: **`-tAES`**
`-oKeyFile`	AES encryption and decryption requires a key file. This option specifies the path and file name of the key file used to decrypt the password. For example: **`-oKeyFile=./key.ky`**
`PasswordString`	The password to decrypt.

   For example:

   ```
   autpassword -d -tBASIC 9t3M3t7awt/J8A
   ```

   ```
   autpassword -d -tAES -oKeyFile=./key.ky 9t3M3t7awt/J8A
   ```

   The password is returned in plain text.

Configure Client Authorization

You can configure Hadoop Connector to authorize different operations for different connections.

Authorization roles define a set of operations for a set of users. You define the operations by using the `StandardRoles` configuration parameter, or by explicitly defining a list of allowed actions in the

Actions and ServiceActions parameters. You define the authorized users by using a client IP address, SSL identities, and GSS principals, depending on your security and system configuration.

For more information about the available parameters, see the *Hadoop Connector Reference*.

> **IMPORTANT:**
> To ensure that Hadoop Connector allows only the options that you configure in [AuthorizationRoles], make sure that you delete any deprecated *Role*Clients parameters from your configuration (where *Role* corresponds to a standard role name, for example AdminClients).

To configure authorization roles

1. Open your configuration file in a text editor.
2. Find the [AuthorizationRoles] section, or create one if it does not exist.
3. In the [AuthorizationRoles] section, list the user authorization roles that you want to create. For example:

   ```
   [AuthorizationRoles]
   0=AdminRole
   1=UserRole
   ```

4. Create a section for each authorization role that you listed. The section name must match the name that you set in the [AuthorizationRoles] list. For example:

   ```
   [AdminRole]
   ```

5. In the section for each role, define the operations that you want the role to be able to perform. You can set StandardRoles to a list of appropriate values, or specify an explicit list of allowed actions by using Actions, and ServiceActions. For example:

   ```
   [AdminRole]
   StandardRoles=Admin,ServiceControl,ServiceStatus

   [UserRole]
   Actions=GetVersion
   ServiceActions=GetStatus
   ```

   > **NOTE:**
   > The standard roles do not overlap. If you want a particular role to be able to perform all actions, you must include all the standard roles, or ensure that the clients, SSL identities, and so on, are assigned to all relevant roles.

6. In the section for each role, define the access permissions for the role, by setting Clients, SSLIdentities, and GSSPrincipals, as appropriate. If an incoming connection matches one of the allowed clients, principals, or SSL identities, the user has permission to perform the operations allowed by the role. For example:

   ```
   [AdminRole]
   StandardRoles=Admin,ServiceControl,ServiceStatus
   ```

```
Clients=localhost
SSLIdentities=admin.example.com
```

7. Save and close the configuration file.

8. Restart Hadoop Connector for your changes to take effect.

> **IMPORTANT:**
> If you do not provide any authorization roles for a standard role, Hadoop Connector uses the default client authorization for the role (localhost for `Admin` and `ServiceControl`, all clients for `Query` and `ServiceStatus`). If you define authorization only by actions, Micro Focus recommends that you configure an authorization role that disallows all users for all roles by default. For example:
>
> ```
> [ForbidAllRoles]
> StandardRoles=Admin,Query,ServiceControl,ServiceStatus
> Clients=""
> ```
>
> This configuration ensures that Hadoop Connector uses only your action-based authorizations.

Register with a Distributed Connector

To receive actions from a Distributed Connector, a connector must register with the Distributed Connector and join a *connector group*. A connector group is a group of similar connectors. The connectors in a group must be of the same type (for example, all HTTP Connectors), and must be able to access the same repository.

To configure a connector to register with a Distributed Connector, follow these steps. For more information about the Distributed Connector, refer to the *Distributed Connector Administration Guide*.

To register with a Distributed Connector

1. Stop the connector.

2. Open the connector’s configuration file in a text editor.

3. In the `[DistributedConnector]` section, set the following parameters:

`RegisterConnector`	(Required) To register with a Distributed Connector, set this parameter to **`true`**.
`HostN`	(Required) The host name or IP address of the Distributed Connector.
`PortN`	(Required) The ACI port of the Distributed Connector.
`DataPortN`	(Optional) The data port of the Distributed Connector.
`ConnectorGroup`	(Required) The name of the connector group to join. The value of this parameter is passed to the Distributed Connector.

`ConnectorPriority`	(Optional) The Distributed Connector can distribute actions to connectors based on a priority value. The lower the value assigned to `ConnectorPriority`, the higher the probability that an action is assigned to this connector, rather than other connectors in the same connector group.
`SharedPath`	(Optional) The location of a shared folder that is accessible to all of the connectors in the `ConnectorGroup`. This folder is used to store the connectors' datastore files, so that whichever connector in the group receives an action, it can access the information required to complete it. If you set the `DataPortN` parameter, the datastore file is streamed directly to the Distributed Connector, and this parameter is ignored.

4. Save and close the configuration file.

5. Start the connector.

   The connector registers with the Distributed Connector. When actions are sent to the Distributed Connector for the connector group that you configured, they are forwarded to this connector or to another connector in the group.

Set Up Secure Communication

You can configure Secure Socket Layer (SSL) connections between the connector and other ACI servers.

Configure Outgoing SSL Connections

To configure the connector to send data to other components (for example Connector Framework Server) over SSL, follow these steps.

To configure outgoing SSL connections

1. Open the Hadoop Connector configuration file in a text editor.

2. Specify the name of a section in the configuration file where the SSL settings are provided:

   - To send data to an ingestion server over SSL, set the `IngestSSLConfig` parameter in the `[Ingestion]` section. To send data from a single fetch task to an ingestion server over SSL, set `IngestSSLConfig` in a `[`*`TaskName`*`]` section.
   - To send data to a Distributed Connector over SSL, set the `SSLConfig` parameter in the `[DistributedConnector]` section.
   - To send data to a View Server over SSL, set the `SSLConfig` parameter in the `[ViewServer]` section.

   You can use the same settings for each connection. For example:

```
[Ingestion]
IngestSSLConfig=SSLOptions

[DistributedConnector]
SSLConfig=SSLOptions
```

3. Create a new section in the configuration file. The name of the section must match the name you specified in the `IngestSSLConfig` or `SSLConfig` parameter. Then specify the SSL settings to use.

`SSLMethod`	The SSL protocol to use.
`SSLCertificate`	(Optional) The SSL certificate to use (in PEM format).
`SSLPrivateKey`	(Optional) The private key for the SSL certificate (in PEM format).

   For example:

```
[SSLOptions]
SSLMethod=TLSV1.2
SSLCertificate=host1.crt
SSLPrivateKey=host1.key
```

4. Save and close the configuration file.

5. Restart the connector.

Related Topics

- Start and Stop the Connector, on page 33

Configure Incoming SSL Connections

To configure a connector to accept data sent to its ACI port over SSL, follow these steps.

To configure an incoming SSL Connection

1. Stop the connector.

2. Open the configuration file in a text editor.

3. In the `[Server]` section set the `SSLConfig` parameter to specify the name of a section in the configuration file for the SSL settings. For example:

```
[Server]
SSLConfig=SSLOptions
```

4. Create a new section in the configuration file (the name must match the name you used in the `SSLConfig` parameter). Then, use the SSL configuration parameters to specify the details for the connection. You must set the following parameters:

`SSLMethod`	The SSL protocol to use.
`SSLCertificate`	The SSL certificate to use (in PEM format).
`SSLPrivateKey`	The private key for the SSL certificate (in PEM format).

For example:

```
[SSLOptions]
SSLMethod=TLSV1.2
SSLCertificate=host1.crt
SSLPrivateKey=host1.key
```

5. Save and close the configuration file.

6. Restart the connector.

Related Topics

- Start and Stop the Connector, on page 33

Backup and Restore the Connector’s State

After configuring a connector, and while the connector is running, you can create a backup of the connector’s state. In the event of a failure, you can restore the connector’s state from the backup.

To create a backup, use the `backupServer` action. The `backupServer` action saves a ZIP file to a path that you specify. The backup includes:

- a copy of the `actions` folder, which stores information about actions that have been queued, are running, and have finished.
- a copy of the configuration file.
- a copy of the connector’s datastore files, which contain information about the files, records, or other data that the connector has retrieved from a repository.

Backup a Connector’s State

To create a backup of the connectors state

- In the address bar of your Web browser, type the following action and press **ENTER**:

  ```
  http://host:port/action=backupServer&path=path
  ```

  where,

host	The host name or IP address of the machine where the connector is running.
port	The connector’s ACI port.
path	The folder where you want to save the backup.

For example:

```
http://localhost:1234/action=backupServer&path=./backups
```

Restore a Connector’s State

To restore a connector’s state

- In the address bar of your Web browser, type the following action and press **ENTER**:

  `http://`*`host`*`:`*`port`*`/action=restoreServer&filename=`*`filename`*

  where,

`host`	The host name or IP address of the machine where the connector is running.
`port`	The connector’s ACI port.
`filename`	The path of the backup that you created.

  For example:

  ```
  http://localhost:1234/action=restoreServer&filename=./backups/filename.zip
  ```

Validate the Configuration File

You can use the `ValidateConfig` service action to check for errors in the configuration file.

> **NOTE:**
> For the `ValidateConfig` action to validate a configuration section, Hadoop Connector must have previously read that configuration. In some cases, the configuration might be read when a task is run, rather than when the component starts up. In these cases, `ValidateConfig` reports any unread sections of the configuration file as unused.

To validate the configuration file

- Send the following action to Hadoop Connector:

  `http://`*`Host`*`:`*`ServicePort`*`/action=ValidateConfig`

  where:

`Host`	is the host name or IP address of the machine where Hadoop Connector is installed.
`ServicePort`	is the service port, as specified in the `[Service]` section of the configuration file.

Chapter 4: Start and Stop the Connector

This section describes how to start and stop the Hadoop Connector.

> **NOTE:**
> You must start and stop the Connector Framework Server separately from the Hadoop Connector.

Start the Connector

After you have installed and configured a connector, you are ready to run it. Start the connector using one of the following methods.

Start the Connector on Windows

To start the connector using Windows Services

1. Open the Windows Services dialog box.
2. Select the connector service, and click **Start**.
3. Close the Windows Services dialog box.

To start the connector by running the executable

- In the connector installation directory, double-click the connector executable file.

Start the Connector on UNIX

To start the connector on a UNIX operating system, follow these steps.

To start the connector using the UNIX start script

1. Change to the installation directory.
2. Enter the following command:

   ```
   ./startconnector.sh
   ```

3. If you want to check the Hadoop Connector service is running, enter the following command:

```
ps -aef | grep ConnectorInstallName
```

This command returns the Hadoop Connector service process ID number if the service is running.

Verify that Hadoop Connector is Running

After starting Hadoop Connector, you can run the following actions to verify that Hadoop Connector is running.

- GetStatus
- GetLicenseInfo

GetStatus

You can use the `GetStatus` service action to verify the Hadoop Connector is running. For example:

```
http://Host:ServicePort/action=GetStatus
```

> **NOTE:**
> You can send the `GetStatus` action to the ACI port instead of the service port. The `GetStatus` ACI action returns information about the Hadoop Connector setup.

GetLicenseInfo

You can send a `GetLicenseInfo` action to Hadoop Connector to return information about your license. This action checks whether your license is valid and returns the operations that your license includes.

Send the `GetLicenseInfo` action to the Hadoop Connector ACI port. For example:

```
http://Host:ACIport/action=GetLicenseInfo
```

The following result indicates that your license is valid.

```
<autn:license>
       <autn:validlicense>true</autn:validlicense>
</autn:license>
```

As an alternative to submitting the `GetLicenseInfo` action, you can view information about your license, and about licensed and unlicensed actions, on the **License** tab in the Status section of IDOL Admin.

Stop the Connector

You must stop the connector before making any changes to the configuration file.

To stop the connector using Windows Services

1. Open the Windows Services dialog box.
2. Select the ***ConnectorInstallName*** service, and click **Stop**.
3. Close the Windows Services dialog box.

To stop the connector by sending an action to the service port

- Type the following command in the address bar of your Web browser, and press ENTER:

```
http://host:ServicePort/action=stop
```

host	The IP address or host name of the machine where the connector is running.
ServicePort	The connector's service port (specified in the `[Service]` section of the connector's configuration file).

Chapter 5: Send Actions to Hadoop Connector

This section describes how to send actions to Hadoop Connector.

Send Actions to Hadoop Connector

Hadoop Connector actions are HTTP requests, which you can send, for example, from your web browser. The general syntax of these actions is:

```
http://host:port/action=action&parameters
```

where:

host	is the IP address or name of the machine where Hadoop Connector is installed.
port	is the Hadoop Connector ACI port. The ACI port is specified by the `Port` parameter in the `[Server]` section of the Hadoop Connector configuration file. For more information about the `Port` parameter, see the *Hadoop Connector Reference*.
action	is the name of the action you want to run.
parameters	are the required and optional parameters for the action.

> **NOTE:**
> Separate individual parameters with an ampersand (&). Separate parameter names from values with an equals sign (=). You must percent-encode all parameter values.

For more information about actions, see the *Hadoop Connector Reference*.

Asynchronous Actions

When you send an asynchronous action to Hadoop Connector, the connector adds the task to a queue and returns a token. Hadoop Connector performs the task when a thread becomes available. You can use the token with the `QueueInfo` action to check the status of the action and retrieve the results of the action.

Most of the features provided by the connector are available through `action=fetch`, so when you use the `QueueInfo` action, query the `fetch` action queue, for example:

```
/action=QueueInfo&QueueName=Fetch&QueueAction=GetStatus
```

Check the Status of an Asynchronous Action

To check the status of an asynchronous action, use the token that was returned by Hadoop Connector with the `QueueInfo` action. For more information about the `QueueInfo` action, refer to the *Hadoop Connector Reference*.

To check the status of an asynchronous action

- Send the `QueueInfo` action to Hadoop Connector with the following parameters.

`QueueName`	The name of the action queue that you want to check.
`QueueAction`	The action to perform. Set this parameter to **`GetStatus`**.
`Token`	(Optional) The token that the asynchronous action returned. If you do not specify a token, Hadoop Connector returns the status of every action in the queue.

For example:

```
/action=QueueInfo&QueueName=fetch&QueueAction=getstatus&Token=...
```

Cancel an Asynchronous Action that is Queued

To cancel an asynchronous action that is waiting in a queue, use the following procedure.

To cancel an asynchronous action that is queued

- Send the `QueueInfo` action to Hadoop Connector with the following parameters.

`QueueName`	The name of the action queue that contains the action to cancel.
`QueueAction`	The action to perform . Set this parameter to **`Cancel`**.
`Token`	The token that the asynchronous action returned.

For example:

```
/action=QueueInfo&QueueName=fetch&QueueAction=Cancel&Token=...
```

Stop an Asynchronous Action that is Running

You can stop an asynchronous action at any point.

To stop an asynchronous action that is running

- Send the `QueueInfo` action to Hadoop Connector with the following parameters.

`QueueName`	The name of the action queue that contains the action to stop.
`QueueAction`	The action to perform. Set this parameter to **`Stop`**.
`Token`	The token that the asynchronous action returned.

For example:

```
/action=QueueInfo&QueueName=fetch&QueueAction=Stop&Token=...
```

Store Action Queues in an External Database

Hadoop Connector provides asynchronous actions. Each asynchronous action has a queue to store requests until threads become available to process them. You can configure Hadoop Connector to store these queues either in an internal database file, or in an external database hosted on a database server.

The default configuration stores queues in an internal database. Using this type of database does not require any additional configuration.

You might want to store the action queues in an external database so that several servers can share the same queues. In this configuration, sending a request to any of the servers adds the request to the shared queue. Whenever a server is ready to start processing a new request, it takes the next request from the shared queue, runs the action, and adds the results of the action back to the shared database so that they can be retrieved by any of the servers. You can therefore distribute requests between components without configuring a Distributed Action Handler (DAH).

> **NOTE:**
> You cannot use multiple servers to process a single request. Each request is processed by one server.

> **NOTE:**
> Although you can configure several connectors to share the same action queues, the connectors do not share fetch task data. If you share action queues between several connectors and distribute synchronize actions, the connector that processes a synchronize action cannot determine which items the other connectors have retrieved. This might result in some documents being ingested several times.

Prerequisites

- Supported databases:
  - PostgreSQL 9.0 or later.
  - MySQL 5.0 or later.

- If you use PostgreSQL, you must set the PostgreSQL ODBC driver setting `MaxVarChar` to **`0`** (zero). If you use a DSN, you can configure this parameter when you create the DSN. Otherwise, you can set the `MaxVarcharSize` parameter in the connection string.

Configure Hadoop Connector

To configure Hadoop Connector to use a shared action queue, follow these steps.

To store action queues in an external database

1. Stop Hadoop Connector, if it is running.
2. Open the Hadoop Connector configuration file.
3. Find the relevant section in the configuration file:
   - To store queues for all asynchronous actions in the external database, find the `[Actions]` section.
   - To store the queue for a single asynchronous action in the external database, find the section that configures that action.
4. Set the following configuration parameters.

   `AsyncStoreLibraryDirectory`

   The path of the directory that contains the library to use to connect to the database. Specify either an absolute path, or a path relative to the server executable file.

   `AsyncStoreLibraryName`

   The name of the library to use to connect to the database. You can omit the file extension. The following libraries are available:

   - **`postgresAsyncStoreLibrary`** - for connecting to a PostgreSQL database.
   - **`mysqlAsyncStoreLibrary`** - for connecting to a MySQL database.

   `ConnectionString`

   The connection string to use to connect to the database. The user that you specify must have permission to create tables in the database. For example:

   ```
   ConnectionString=DSN=my_ASYNC_QUEUE
   ```

   or

   ```
   ConnectionString=Driver={PostgreSQL};
   Server=10.0.0.1; Port=9876;
   Database=SharedActions; Uid=user; Pwd=password;
   MaxVarcharSize=0;
   ```

   For example:

```
[Actions]
AsyncStoreLibraryDirectory=acidlls
AsyncStoreLibraryName=postgresAsyncStoreLibrary
ConnectionString=DSN=ActionStore
```

5. If you are using the same database to store action queues for more than one type of component, set the following parameter in the `[Actions]` section of the configuration file.

`DatastoreSharingGroupName`	The group of components to share actions with. You can set this parameter to any string, but the value must be the same for each server in the group. For example, to configure several Hadoop Connectors to share their action queues, set this parameter to the same value in every Hadoop Connector configuration. Micro Focus recommends setting this parameter to the name of the component. **CAUTION:** Do not configure different components (for example, two different types of connector) to share the same action queues. This will result in unexpected behavior.

   For example:

   ```
   [Actions]
   ...
   DatastoreSharingGroupName=ComponentType
   ```

6. Save and close the configuration file.

   When you start Hadoop Connector it connects to the shared database.

Store Action Queues in Memory

Hadoop Connector provides asynchronous actions. Each asynchronous action has a queue to store requests until threads become available to process them. These queues are usually stored in a datastore file or in a database hosted on a database server, but in some cases you can increase performance by storing these queues in memory.

> **NOTE:**
> Storing action queues in memory improves performance only when the server receives large numbers of actions that complete quickly. Before storing queues in memory, you should also consider the following:
>
> - The queues (including queued actions and the results of finished actions) are lost if Hadoop Connector stops unexpectedly, for example due to a power failure or the component being forcibly stopped. This could result in some requests being lost, and if the queues are restored to a previous state some actions could run more than once.
> - Storing action queues in memory prevents multiple instances of a component being able to share the same queues.

> - Storing action queues in memory increases memory use, so please ensure that the server has sufficient memory to complete actions and store the action queues.

If you stop Hadoop Connector cleanly, Hadoop Connector writes the action queues from memory to disk so that it can resume processing when it is next started.

To configure Hadoop Connector to store asynchronous action queues in memory, follow these steps.

To store action queues in memory

1. Stop Hadoop Connector, if it is running.
2. Open the Hadoop Connector configuration file and find the `[Actions]` section.
3. If you have set any of the following parameters, remove them:
   - `AsyncStoreLibraryDirectory`
   - `AsyncStoreLibraryName`
   - `ConnectionString`
   - `UseStringentDatastore`
4. Set the following configuration parameters.

`UseInMemoryDatastore`	A Boolean value that specifies whether to keep the queues for asynchronous actions in memory. Set this parameter to **`TRUE`**.
`InMemoryDatastoreBackupIntervalMins`	(Optional) The time interval (in minutes) at which the action queues are written to disk. Writing the queues to disk can reduce the number of queued actions that would be lost if Hadoop Connector stops unexpectedly, but configuring a frequent backup will increase the load on the datastore and might reduce performance.

   For example:

   ```
   [Actions]
   UseInMemoryDatastore=TRUE
   InMemoryDatastoreBackupIntervalMins=30
   ```

5. Save and close the configuration file.

   When you start Hadoop Connector, it stores action queues in memory.

Use XSL Templates to Transform Action Responses

You can transform the action responses returned by Hadoop Connector using XSL templates. You must write your own XSL templates and save them with either an `.xsl` or `.tmpl` file extension.

After creating the templates, you must configure Hadoop Connector to use them, and then apply them to the relevant actions.

To enable XSL transformations

1. Ensure that the `autnxslt` library is located in the same directory as your configuration file. If the library is not included in your installation, you can obtain it from Micro Focus Support.
2. Open the Hadoop Connector configuration file in a text editor.
3. In the `[Server]` section, ensure that the `XSLTemplates` parameter is set to **`true`**.

   > **CAUTION:**
   > If `XSLTemplates` is set to **`true`** and the `autnxslt` library is not present in the same directory as the configuration file, the server will not start.

4. (Optional) In the `[Paths]` section, set the `TemplateDirectory` parameter to the path to the directory that contains your XSL templates. The default directory is `acitemplates`.
5. Save and close the configuration file.
6. Restart Hadoop Connector for your changes to take effect.

To apply a template to action output

- Add the following parameters to the action:

`Template`	The name of the template to use to transform the action output. Exclude the folder path and file extension.
`ForceTemplateRefresh`	(Optional) If you modified the template after the server started, set this parameter to **`true`** to force the ACI server to reload the template from disk rather than from the cache.

  For example:

```
action=QueueInfo&QueueName=Fetch
                &QueueAction=GetStatus
                &Token=...
                &Template=myTemplate
```

  In this example, Hadoop Connector applies the XSL template `myTemplate` to the response from a `QueueInfo` action.

  > **NOTE:**
  > If the action returns an error response, Hadoop Connector does not apply the XSL template.

Example XSL Templates

Hadoop Connector includes the following sample XSL templates, in the `acitemplates` folder:

XSL Template	Description
`LuaDebug`	Transforms the output from the `LuaDebug` action, to assist with debugging Lua scripts.

Chapter 6: Use the Connector

This section describes how to use the connector.

Retrieve Information from Hadoop

To automatically retrieve content from Hadoop, create a new fetch task by following these steps. The connector runs each fetch task automatically, based on the schedule that is configured in the configuration file.

To create a new Fetch Task

1. Stop the connector.

2. Open the configuration file in a text editor.

3. In the `[FetchTasks]` section of the configuration file, specify the number of fetch tasks using the `Number` parameter. If you are configuring the first fetch task, type **`Number=1`**. If one or more fetch tasks have already been configured, increase the value of the `Number` parameter by one (1). Below the `Number` parameter, specify the names of the fetch tasks, starting from zero (0). For example:

   ```
   [FetchTasks]
   Number=1
   0=MyTask
   ```

4. Below the `[FetchTasks]` section, create a new *TaskName* section. The name of the section must match the name of the new fetch task. For example:

   ```
   [FetchTasks]
   Number=1
   0=MyTask

   [MyTask]
   ```

5. In the new section, set the following parameters:

`FileSystemRootUri`	The root URI of the filesystem to connect to.
`FileSystemPath`	The path in the file system to start crawling for files.

   For example:

```
[MyTask]
FileSystemRootUri=hdfs://hadoop:8020/
FileSystemPath=/home/hadoop/files
```

6. (Optional) You can set additional parameters to specify which files are retrieved by the connector. For more information about the parameters you can set, refer to the *Hadoop Connector (CFS) Reference*.

7. Save and close the configuration file. You can now start the connector.

Schedule Fetch Tasks

The connector automatically runs the fetch tasks that you have configured, based on the schedule in the configuration file. To modify the schedule, follow these steps.

To schedule fetch tasks

1. Stop the connector.

2. Open the connector's configuration file in a text editor.

3. Find the `[Connector]` section.

4. The `EnableScheduleTasks` parameter specifies whether the connector should automatically run the fetch tasks that have been configured in the `[FetchTasks]` section. To run the tasks, set this parameter to `true`. For example:

   ```
   [Connector]
   EnableScheduledTasks=True
   ```

5. In the `[Connector]` section, set the following parameters:

   `ScheduleStartTime` The start time for the fetch task, the first time it runs after you start the connector. The connector runs subsequent synchronize cycles after the interval specified by `ScheduleRepeatSecs`.

   Specify the start time in the format H[H][:MM][:SS]. To start running tasks as soon as the connector starts, do not set this parameter or use the value **`now`**.

   `ScheduleRepeatSecs` The interval (in seconds) from the start of one scheduled `synchronize` cycle to the start of the next. If a previous synchronize cycle is still running when the interval elapses, the connector queues a maximum of one action.

   `ScheduleCycles` The number of times that each fetch task is run. To run the tasks continuously until the connector is stopped, set this parameter to **`-1`**. To run each task only one time, set this parameter to **`1`**.

   For example:

```
[Connector]
EnableScheduledTasks=True
ScheduleStartTime=15:00:00
ScheduleRepeatSecs=3600
ScheduleCycles=-1
```

6. (Optional) To run a specific fetch task on a different schedule, you can override these parameters in a *TaskName* section of the configuration file. For example:

   ```
   [Connector]
   EnableScheduledTasks=TRUE
   ScheduleStartTime=15:00:00
   ScheduleRepeatSecs=3600
   ScheduleCycles=-1

   ...

   [FetchTasks]
   Number=2
   0=MyTask0
   1=MyTask1
   ...

   [MyTask1]
   ScheduleStartTime=16:00:00
   ScheduleRepeatSecs=60
   ScheduleCycles=-1
   ```

   In this example, `MyTask0` follows the schedule defined in the `[Connector]` section, and `MyTask1` follows the scheduled defined in the `[MyTask1]` *TaskName* section.

7. Save and close the configuration file. You can now start the connector.

Related Topics

- Start and Stop the Connector, on page 33

Insert Files into Hadoop

The connector's `insert` fetch action inserts files into the Hadoop file system.

To use the `insert` action, you must construct some XML that specifies where to add each file.

The following XML would insert a file named `source_document.txt` as `inserted_file.txt`:

```
<InsertXML>
   <insert>
      <reference>hdfs://hostname/files/inserted_file.txt</reference>
      <file>
         <type>file</type>
         <content>c:\documents\source_document.txt</content>
      </file>
```

```
   </insert>
</InsertXML>
```

Set the `reference` element to the path where you want to insert the file in the Hadoop file system.

Specify the information about the file to insert by using the `file` element. The insert action offers several ways of specifying the source file. For example, you can provide the path and file name of the file, or provide the body of the file base-64 encoded. For more information about the insert action and the elements that you can set in the `InsertXml`, refer to the *Hadoop Connector Reference*.

You must add the XML to the action as the value of the `insertXML` action parameter. The XML must be URL-encoded before being used in the action command. For example:

```
http://host:port/action=Fetch&FetchAction=Insert
                             &ConfigSection=MyTask
                             &InsertXML=URL encoded InsertXML
```

Insert Files from Another Connector Into Hadoop

You can insert files retrieved by other connectors into the Hadoop file system. For example, you could use a File System Connector to retrieve files from a file system and send them to the Hadoop Connector for inserting into Hadoop.

To insert files from another connector, you must configure the other connector:

- Set the ingestion target, in the `[Ingestion]` section of the configuration file, to be the Hadoop Connector.
- Run a Lua scipt on documents, before they are ingested, to modify the document references so that they are suitable for inserting into Hadoop. You can do this with the `IngestActions` configuration parameter.

For example, in the configuration file of the File System Connector:

```
[Ingestion]
EnableIngestion=True
IngesterType=Connector
IngestHost=HadoopConnectorHost
IngestPort=7008
IngestActions=Lua:script.lua
```

The following Lua script is an example that converts the document references produced by the File System Connector into a form that can be used with the Hadoop Connector's insert fetch action:

```
function handler( config, document, params )
       local reference = document:getReference()
       reference = reference:gsub("\\", "/")
       reference = reference:gsub("//", "/")
       reference = reference:gsub(":", "_", 1)
       document:setReference("hdfs://10.1.2.33//"..reference)

       return true
end
```

Chapter 7: Manipulate Documents

This section describes how to manipulate documents that are created by the connector and sent for ingestion.

Introduction

IDOL Connectors retrieve data from repositories and create documents that are sent to Connector Framework Server, another connector, or Haven OnDemand. You might want to manipulate the documents that are created. For example, you can:

- Add or modify document fields, to change the information that is indexed into IDOL Server or Haven OnDemand.
- Add fields to a document to customize the way the document is processed by CFS.
- Convert information into another format so that it can be inserted into another repository by a connector that supports the `Insert` action.

When a connector sends documents to CFS, the documents only contain metadata extracted from the repository by the connector (for example, the location of the original files). To modify data extracted by KeyView, you must modify the documents using CFS. For information about how to manipulate documents with CFS, refer to the *Connector Framework Server Administration Guide*.

Add a Field to Documents using an Ingest Action

To add a field to all documents retrieved by a fetch task, or all documents sent for ingestion, you can use an Ingest Action.

> **NOTE:**
> To add a field only to selected documents, use a Lua script (see Run Lua Scripts, on page 55). For an example Lua script that demonstrates how to add a field to a document, see Add a Field to a Document, on page 58.

To add a field to documents using an Ingest Action

1. Open the connector’s configuration file.
2. Find one of the following sections in the configuration file:
   - To add the field to all documents retrieved by a specific fetch task, find the `[`*`TaskName`*`]` section.
   - To add a field to all documents that are sent for ingestion, find the `[Ingestion]` section.

   > **NOTE:**
   > If you set the `IngestActions` parameter in a `[TaskName]` section, the connector does not run any `IngestActions` set in the `[Ingestion]` section for documents retrieved by that task.

3. Use the `IngestActions` parameter to specify the name of the field to add, and the field value. For example, to add a field named `AUTN_NO_EXTRACT`, with the value `SET`, type:

   ```
   IngestActions0=META:AUTN_NO_EXTRACT=SET
   ```

4. Save and close the configuration file.

Customize Document Processing

You can add the following fields to a document to control how the document is processed by CFS. Unless stated otherwise, you can add the fields with any value.

AUTN_FILTER_META_ONLY

Prevents KeyView extracting file content from a file. KeyView only extracts metadata and adds this information to the document.

AUTN_NO_FILTER

Prevents KeyView extracting file content and metadata from a file. You can use this field if you do not want to extract text from certain file types.

AUTN_NO_EXTRACT

Prevents KeyView extracting subfiles. You can use this field to prevent KeyView extracting the contents of ZIP archives and other container files.

AUTN_NEEDS_MEDIA_SERVER_ANALYSIS

Identifies media files (images, video, and documents such as PDF files that contain embedded images) that you want to send to Media Server for analysis, using a `MediaServerAnalysis` import task. You do not need to add this field if you are using a Lua script to run media analysis. For more information about running analysis on media, refer to the *Connector Framework Server Administration Guide*.

AUTN_NEEDS_TRANSCRIPTION

Identifies audio and video assets that you want to send to an IDOL Speech Server for speech-to-text processing, using an `IdolSpeech` import task. You do not need to add this field if you are using a Lua script to run speech-to-text. For more information about running speech-to-text on documents, refer to the *Connector Framework Server Administration Guide*.

AUTN_FORMAT_CORRECT_FOR_TRANSCRIPTION

To bypass the transcoding step of an `IdolSpeech` import task, add the field `AUTN_FORMAT_CORRECT_FOR_TRANSCRIPTION`. Documents that have this field are not sent to a Transcode Server. For more information about the `IdolSpeech` task, refer to the *Connector Framework Server Administration Guide*.

AUTN_AUDIO_LANGUAGE

To bypass the language identification step of an `IdolSpeech` import task add the field `AUTN_AUDIO_LANGUAGE`. The value of the field must be the name of the IDOL Speech Server language pack to use for extracting speech. Documents that have this field are not sent to the IDOL Speech Server for language identification. For more information about the `IdolSpeech` task, refer to the *Connector Framework Server Administration Guide*.

Standardize Field Names

Field standardization modifies documents so that they have a consistent structure and consistent field names. You can use field standardization so that documents indexed into IDOL through different connectors use the same fields to store the same type of information.

For example, documents created by the File System Connector can have a field named `FILEOWNER`. Documents created by the Documentum Connector can have a field named `owner_name`. Both of these fields store the name of the person who owns a file. Field standardization renames the fields so that they have the same name.

Field standardization only modifies fields that are specified in a dictionary, which is defined in XML format. A standard dictionary, named `dictionary.xml`, is supplied in the installation folder of every connector. If a connector does not have any entries in the dictionary, field standardization has no effect.

Configure Field Standardization

IDOL Connectors have several configuration parameters that control field standardization. All of these are set in the `[Connector]` section of the configuration file:

- `EnableFieldNameStandardization` specifies whether to run field standardization.
- `FieldNameDictionaryPath` specifies the path of the dictionary file to use.
- `FieldNameDictionaryNode` specifies the rules to use. The default value for this parameter matches the name of the connector, and Micro Focus recommends that you do not change it. This prevents one connector running field standardization rules that are intended for another.

To configure field standardization, use the following procedure.

> **NOTE:**
> You can also configure CFS to run field standardization. To standardize all field names, you must run field standardization from both the connector and CFS.

To enable field standardization

1. Stop the connector.
2. Open the connector’s configuration file.
3. In the `[Connector]` section, set the following parameters:

   `EnableFieldNameStandardization` A Boolean value that specifies whether to enable field standardization. Set this parameter to **`true`**.

   `FieldNameDictionaryPath` The path to the dictionary file that contains the rules to use to standardize documents. A standard dictionary is included with the connector and is named `dictionary.xml`.

   For example:

   ```
   [Connector]
   EnableFieldNameStandardization=true
   FieldNameDictionaryPath=dictionary.xml
   ```

4. Save the configuration file and restart the connector.

Customize Field Standardization

Field standardization modifies documents so that they have a consistent structure and consistent field names. You can use field standardization so that documents indexed into IDOL through different connectors use the same fields to store the same type of information. Field standardization only modifies fields that are specified in a dictionary, which is defined in XML format. A standard dictionary, named `dictionary.xml`, is supplied in the installation folder of every connector.

In most cases you should not need to modify the standard dictionary, but you can modify it to suit your requirements or create dictionaries for different purposes. By modifying the dictionary, you can configure the connector to apply rules that modify documents before they are ingested. For example, you can move fields, delete fields, or change the format of field values.

The following examples demonstrate how to perform some operations with field standardization.

The following rule renames the field `Author` to `DOCUMENT_METADATA_AUTHOR_STRING`. This rule applies to all components that run field standardization and applies to all documents.

```
<FieldStandardization>
    <Field name="Author">
        <Move name="DOCUMENT_METADATA_AUTHOR_STRING"/>
    </Field>
</FieldStandardization>
```

The following rule demonstrates how to use the `Delete` operation. This rule instructs CFS to remove the field `KeyviewVersion` from all documents (the `Product` element with the attribute `key="ConnectorFrameWork"` ensures that this rule is run only by CFS).

```
<FieldStandardization>
    <Product key="ConnectorFrameWork">
        <Field name="KeyviewVersion">
            <Delete/>
        </Field>
    </Product>
</FieldStandardization>
```

There are several ways to select fields to process using the `Field` element.

Field element attribute	Description	Example

`name`	Select a field where the field name matches a fixed value.	Select the field `MyField`:
		`<Field name="MyField">`
		`   ...`
		`</Field>`
		Select the field `Subfield`, which is a subfield of `MyField`:
		`<Field name="MyField">`
		`   <Field name="Subfield">`
		`      ...`
		`   </Field>`
		`</Field>`

`path`	Select a field where its path matches a fixed value.	Select the field `Subfield`, which is a subfield of `MyField`.
		`<Field path="MyField/Subfield">`
		`   ...`
		`</Field>`

`nameRegex`	Select all fields at the current depth where the field name matches a regular expression.	In this case the field name must begin with the word `File`:
		`<Field nameRegex="File.*">`
		`   ...`
		`</Field>`

`pathRegex`	Select all fields where the path of the field matches a regular expression.
	This operation can be inefficient because every metadata field must be checked. If possible, select the fields to process another way.
		This example selects all subfields of `MyField`.
		`<Field pathRegex="MyField/[^/]*">`
		`   ...`
		`</Field>`
		This approach would be more efficient:
		`<Field name="MyField">`
		`   <Field nameRegex=".*">`

		`    ...`
		`  </Field>`
		`</Field>`

You can also limit the fields that are processed based on their value, by using one of the following:

Field element attribute	Description	Example

`matches`	Process a field if its value matches a fixed value.	Process a field named `MyField`, if its value matches `abc`.
		`<Field name="MyField" matches="abc">`
		`   ...`
		`</Field>`

`matchesRegex`	Process a field if its entire value matches a regular expression.	Process a field named `MyField`, if its value matches one or more digits.
		`<Field name="MyField" matchesRegex="\d+">`
		`   ...`
		`</Field>`

`containsRegex`	Process a field if its value contains a match to a regular expression.	Process a field named `MyField` if its value contains three consecutive digits.
		`<Field name="MyField" containsRegex="\d{3}">`
		`   ...`
		`</Field>`

The following rule deletes every field or subfield where the name of the field or subfield begins with `temp`.

```
<FieldStandardization>
    <Field pathRegex="(.*/)?temp[^/]*">
        <Delete/>
    </Field>
</FieldStandardization>
```

The following rule instructs CFS to rename the field `Author` to `DOCUMENT_METADATA_AUTHOR_STRING`, but only when the document contains a field named `DocumentType` with the value `230` (the KeyView format code for a PDF file).

```
<FieldStandardization>
    <Product key="ConnectorFrameWork">
        <IfField name="DocumentType" matches="230"> <!-- PDF -->
            <Field name="Author">
                <Move name="DOCUMENT_METADATA_AUTHOR_STRING"/>
            </Field>
        </IfField>
    </Product>
</FieldStandardization>
```

> **TIP:**
> In this example, the `IfField` element is used to check the value of the `DocumentType` field. The `IfField` element does not change the current position in the document. If you used the `Field` element, field standardization would attempt to find an `Author` field that is a subfield of `DocumentType`, instead of finding the `Author` field at the root of the document.

The following rules demonstrate how to use the `ValueFormat` operation to change the format of dates. The first rule transforms the value of a field named `CreatedDate`. The second rule transforms the value of an attribute named `Created`, on a field named `Date`.

```
<FieldStandardization>
    <Field name="CreatedDate">
        <ValueFormat type="autndate" format="YYYY-SHORTMONTH-DD HH:NN:SS"/>
    </Field>
    <Field name="Date">
        <Attribute name="Created">
            <ValueFormat type="autndate" format="YYYY-SHORTMONTH-DD HH:NN:SS"/>
        </Attribute>
    </Field>
</FieldStandardization>
```

The `ValueFormat` element has the following attributes:

`type`	To convert the date into the IDOL AUTNDATE format, specify `autndate`. To convert the date into a custom format, specify `customdate` and then set the attribute `targetformat`.
`format`	The format to convert the date from. Specify the format using standard IDOL date formats.
`targetformat`	The format to convert the date into, when you set the `type` attribute to `customdate`. Specify the format using standard IDOL date formats.

As demonstrated by the previous example, you can select field attributes to process in a similar way to selecting fields.

You must select attributes using either a fixed name or a regular expression:

Select a field attribute by name	`<Attribute name="MyAttribute">`
Select attributes that match a regular expression	`<Attribute nameRegex=".*">`

You can then add a restriction to limit the attributes that are processed:

Process an attribute only if its value matches a fixed value	`<Attribute name="MyAttribute" matches="abc">`
Process an attribute only if its value matches a regular expression	`<Attribute name="MyAttribute" matchesRegex=".*">`
Process an attribute only if its value	`<Attribute name="MyAttribute" containsRegex="\w+">`

contains a match to a regular expression

The following rule moves all of the attributes of a field to sub fields, if the parent field has no value. The `id` attribute on the first `Field` element provides a name to a matching field so that it can be referred to by later operations. The `GetName` and `GetValue` operations save the name and value of a selected field or attribute (in this case an attribute) into variables (in this case `$'name'` and `$'value'`) which can be used by later operations. The `AddField` operation uses the variables to add a new field at the selected location (the field identified by `id="parent"`).

```
<FieldStandardization>
    <Field pathRegex=".*" matches="" id="parent">
        <Attribute nameRegex=".*">
            <GetName var="name"/>
            <GetValue var="value"/>
            <Field fieldId="parent">
                <AddField name="$'name'" value="$'value'"/>
            </Field>
            <Delete/>
        </Attribute>
    </Field>
</FieldStandardization>
```

The following rule demonstrates how to move all of the subfields of `UnwantedParentField` to the root of the document, and then delete the field `UnwantedParentField`.

```
<FieldStandardization id="root">
    <Product key="MyConnector">
        <Field name="UnwantedParentField">
            <Field nameRegex=".*">
                <Move destId="root"/>
            </Field>
            <Delete/>
        </Field>
    </Product>
</FieldStandardization>
```

Run Lua Scripts

IDOL Connectors can run custom scripts written in Lua, an embedded scripting language. You can use Lua scripts to process documents that are created by a connector, before they are sent to CFS and indexed into IDOL Server. For example, you can:

- Add or modify document fields.
- Manipulate the information that is indexed into IDOL.
- Call out to an external service, for example to alert a user.

There might be occasions when you do not want to send documents to a CFS. For example, you might use the `Collect` action to retrieve documents from one repository and then insert them into another. You can use a Lua script to transform the documents from the source repository so that they can be accepted by the destination repository.

To run a Lua script from a connector, use one of the following methods:

- Set the `IngestActions` configuration parameter in the connector’s configuration file. For information about how to do this, see Run a Lua Script using an Ingest Action, on the next page. The connector runs ingest actions on documents before they are sent for ingestion.
- Set the `IngestActions` action parameter when using the `Synchronize` action.
- Set the `InsertActions` configuration parameter in the connector’s configuration file. The connector runs insert actions on documents before they are inserted into a repository.
- Set the `CollectActions` action parameter when using the `Collect` action.

Write a Lua Script

A Lua script that is run from a connector must have the following structure:

```
function handler(config, document, params)
       ...
end
```

The `handler` function is called for each document and is passed the following arguments:

Argument	Description
`config`	A `LuaConfig` object that you can use to retrieve the values of configuration parameters from the connector’s configuration file.
`document`	A `LuaDocument` object. The document object is an internal representation of the document being processed. Modifying this object changes the document.
`params`	The `params` argument is a table that contains additional information provided by the connector: • **TYPE**. The type of task being performed. The possible values are `ADD`, `UPDATE`, `DELETE`, or `COLLECT`. • **SECTION**. The name of the section in the configuration file that contains configuration parameters for the task. • **FILENAME**. The document filename. The Lua script can modify this file, but must not delete it. • **OWNFILE**. Indicates whether the connector (and CFS) has ownership of the file. A value of `true` means that CFS deletes the file after it has been processed.

The following script demonstrates how you can use the `config` and `params` arguments:

```
function handler(config, document, params)
       -- Write all of the additional information to a log file
       for k,v in pairs(params) do
              log("logfile.txt", k..": "..tostring(v))
       end

       -- The following lines set variables from the params argument
       type = params["TYPE"]
       section = params["SECTION"]
       filename = params["FILENAME"]

       -- Read a configuration parameter from the configuration file
       -- If the parameter is not set, "DefaultValue" is returned
       val = config:getValue(section, "Parameter", "DefaultValue")

       -- If the document is not being deleted, set the field FieldName
       -- to the value of the configuration parameter
       if type ~= "DELETE" then
              document:setFieldValue("FieldName", val)
       end

       -- If the document has a file (that is, not just metadata),
       -- copy the file to a new location and write a stub idx file
       -- containing the metadata.
       if filename ~= "" then
              copytofilename = "./out/"..create_uuid(filename)
              copy_file(filename, copytofilename)
              document:writeStubIdx(copytofilename..".idx")
       end

       return true
end
```

For the connector to continue processing the document, the `handler` function must return **`true`**. If the function returns **`false`**, the document is discarded.

> **TIP:**
> You can write a library of useful functions to share between multiple scripts. To include a library of functions in a script, add the code **`dofile("library.lua")`** to the top of the lua script, outside of the `handler` function.

Run a Lua Script using an Ingest Action

To run a Lua script on documents that are sent for ingestion, use an Ingest Action.

To run a Lua script using an Ingest Action

1. Open the connector’s configuration file.
2. Find one of the following sections in the configuration file:

- To run a Lua script on all documents retrieved by a specific task, find the `[TaskName]` section.
- To run a Lua script on all documents that are sent for ingestion, find the `[Ingestion]` section.

> **NOTE:**
> If you set the `IngestActions` parameter in a `[TaskName]` section, the connector does not run any `IngestActions` set in the `[Ingestion]` section for that task.

3. Use the `IngestActions` parameter to specify the path to your Lua script. For example:

   `IngestActions=LUA:C:\Autonomy\myScript.lua`

4. Save and close the configuration file.

Related Topics

- Write a Lua Script, on page 56

Example Lua Scripts

This section contains example Lua scripts.

- Add a Field to a Document, below
- Merge Document Fields, on the next page

Add a Field to a Document

The following script demonstrates how to add a field named “MyField” to a document, with a value of “MyValue”.

```
function handler(config, document, params)
       document:addField("MyField", "MyValue");
       return true;
end
```

The following script demonstrates how to add the field `AUTN_NEEDS_MEDIA_SERVER_ANALYSIS` to all JPEG, TIFF and BMP documents. This field indicates to CFS that the file should be sent to a Media Server for analysis (you must also define the `MediaServerAnalysis` task in the CFS configuration file).

The script finds the file type using the `DREREFERENCE` document field, so this field must contain the file extension for the script to work correctly.

```
function handler(config, document, params)
       local extensions_for_ocr = { jpg = 1 , tif = 1, bmp = 1 };
       local filename = document:getFieldValue("DREREFERENCE");
       local extension, extension_found = filename:gsub("^.*%.(%w+)$", "%1", 1);

       if extension_found > 0 then
               if extensions_for_ocr[extension:lower()] ~= nil then
                  document:addField("AUTN_NEEDS_MEDIA_SERVER_ANALYSIS", "");
               end
       end

       return true;
end
```

Merge Document Fields

This script demonstrates how to merge the values of document fields.

When you extract data from a repository, the connector can produce documents that have multiple values for a single field, for example:

```
#DREFIELD ATTACHMENT="attachment.txt"
#DREFIELD ATTACHMENT="image.jpg"
#DREFIELD ATTACHMENT="document.pdf"
```

This script shows how to merge the values of these fields, so that the values are contained in a single field, for example:

```
#DREFIELD ATTACHMENTS="attachment.txt, image.jpg, document.pdf"
```

Example Script

```
function handler(config, document, params)
       onefield(document,"ATTACHMENT","ATTACHMENTS")
       return true;
end

function onefield(document,existingfield,newfield)
       if document:hasField(existingfield) then
               local values = { document:getFieldValues(existingfield) }

               local newfieldvalue=""
               for i,v in ipairs(values) do
                   if i>1 then
                       newfieldvalue = newfieldvalue ..", "
                   end

                   newfieldvalue = newfieldvalue..v
               end

               document:addField(newfield,newfieldvalue)
       end

       return true;
end
```

Chapter 8: Monitor the Connector

This section describes how to monitor the connector.

IDOL Admin

IDOL Admin is an administration interface for performing ACI server administration tasks, such as gathering status information, monitoring performance, and controlling the service. IDOL Admin provides an alternative to constructing actions and sending them from your web browser.

Prerequisites

Hadoop Connector includes the `admin.dat` file that is required to run IDOL Admin.

IDOL Admin supports the following browsers:

- Internet Explorer 11
- Edge
- Chrome (latest version)
- Firefox (latest version)

Install IDOL Admin

You must install IDOL Admin on the same host that the ACI server or component is installed on. To set up a component to use IDOL Admin, you must configure the location of the `admin.dat` file and enable Cross Origin Resource Sharing.

To install IDOL Admin

1. Stop the ACI server.
2. Save the `admin.dat` file to any directory on the host.
3. Using a text editor, open the ACI server or component configuration file. For the location of the

configuration file, see the ACI server documentation.

4. In the `[Paths]` section of the configuration file, set the `AdminFile` parameter to the location of the `admin.dat` file. If you do not set this parameter, the ACI server attempts to find the `admin.dat` file in its working directory when you call the IDOL Admin interface.

5. Enable Cross Origin Resource Sharing.

6. In the `[Service]` section, add the `Access-Control-Allow-Origin` parameter and set its value to the URLs that you want to use to access the interface.

   Each URL must include:

   - the `http://` or `https://` prefix

   > **NOTE:**
   > URLs can contain the `https://` prefix if the ACI server or component has SSL enabled.

   - The host that IDOL Admin is installed on

   - The ACI port of the component that you are using IDOL Admin for

   Separate multiple URLs with spaces.

   For example, you could specify different URLs for the local host and remote hosts:

   ```
   Access-Control-Allow-Origin=http://localhost:9010
   http://Computer1.Company.com:9010
   ```

   Alternatively, you can set `Access-Control-Allow-Origin=*`, which allows you to access IDOL Admin using any valid URL (for example, `localhost`, direct IP address, or the host name). The wildcard character (`*`) is supported only if no other entries are specified.

   If you do not set the `Access-Control-Allow-Origin` parameter, IDOL Admin can communicate only with the server's ACI port, and not the index or service ports.

7. Start the ACI server.

You can now access IDOL Admin (see Access IDOL Admin, below).

Access IDOL Admin

You access IDOL Admin from a web browser. You can access the interface only through URLs that are set in the `Access-Control-Allow-Origin` parameter in the ACI server or component configuration file. For more information about configuring URL access, see Install IDOL Admin, on the previous page.

To access IDOL Admin

- Type the following URL into the address bar of your web browser:

  http://*host*:*port*/action=admin

  where:

host is the host name or IP address of the machine where the IDOL component is installed.

port is the ACI port of the IDOL component you want to administer.

View Connector Statistics

Hadoop Connector collects statistics about the work it has completed. The statistics that are available depend on the connector you are using, but all connectors provide information about the number and frequency of ingest-adds, ingest-updates, and ingest-deletes.

To view connector statistics

- Use the `GetStatistics` service action, for example:

  ```
  http://host:serviceport/action=GetStatistics
  ```

  where *host* is the host name or IP address of the machine where the connector is installed, and *serviceport* is the connector's service port.

  For information about the statistics that are returned, refer to the documentation for the `GetStatistics` service action.

The connector includes an XSL template (`ConnectorStatistics.tmpl`) that you can use to visualize the statistics. You can use the template by adding the `template` parameter to the request:

```
http://host:serviceport/action=GetStatistics&template=ConnectorStatistics
```

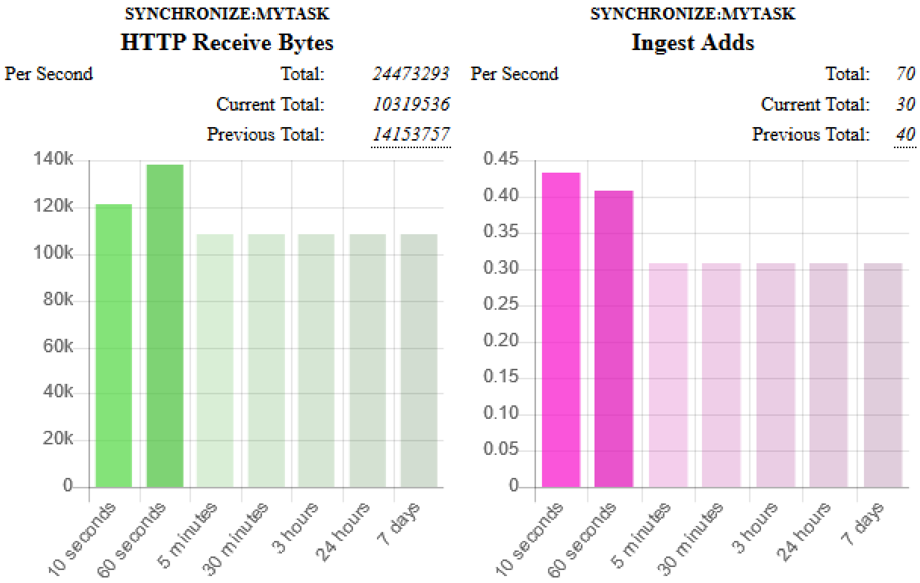
When you are using the `ConnectorStatistics` template, you can also add the `filter` parameter to the request to return specific statistics. The `filter` parameter accepts a regular expression that matches against the string *autnid*`::`*name*, where *autnid* and *name* are the values of the corresponding attributes in the XML returned by the `GetStatistics` action. For example, the following request returns statistics only for synchronize actions:

```
http://host:serviceport/action=GetStatistics&template=ConnectorStatistics
                                                &filter=^synchronize:
```

The following request returns statistics only for the task `mytask`:

```
http://host:serviceport/action=GetStatistics&template=ConnectorStatistics
                                                &filter=:mytask:
```

The following image shows some example statistics returned by a connector:



SYNCHRONIZE:MYTASK
HTTP Receive Bytes

Per Second

Total: *24473293*
Current Total: *10319536*
Previous Total: *14153757*

SYNCHRONIZE:MYTASK
Ingest Adds

Per Second

Total: *70*
Current Total: *30*
Previous Total: *40*

Above each chart is a title, for example `SYNCHRONIZE:MYTASK`, that specifies the action and task to which the statistics belong.

You can see from the example that in the last 60 seconds, the connector has generated an average of approximately 0.4 ingest-adds per second. In the charts, partially transparent bars indicate that the connector has not completed collecting information for those time intervals. The information used to generate statistics is stored in memory, so is lost if you stop the connector.

The following information is presented above the chart for each statistic:

- **Total** is a running total since the connector started. In the example above, there have been 70 ingest-adds in total.
- **Current Total** is the total for the actions that are currently running. In the example above, the synchronize action that is running has resulted in 30 ingest-adds being sent to CFS.
- **Previous Total** provides the totals for previous actions. In the example above, the previous synchronize cycle resulted in 40 ingest-adds. To see the totals for the 24 most recent actions, hover the mouse pointer over the value.

Use the Connector Logs

As the Hadoop Connector runs, it outputs messages to its logs. Most log messages occur due to normal operation, for example when the connector starts, receives actions, or sends documents for ingestion. If the connector encounters an error, the logs are the first place to look for information to help troubleshoot the problem.

The connector separates messages into the following message types, each of which relates to specific features:

Log Message Type	Description
`Action`	Logs actions that are received by the connector, and related messages.
`Application`	Logs application-related occurrences, such as when the connector starts.
`Collect`	Messages related to the `Collect` fetch action.
`Delete`	Messages related to the `Delete` fetch action.
`Insert`	Messages related to the `Insert` fetch action.
`Synchronize`	Messages related to the `Synchronize` fetch action.
`View`	Messages related to the `View` action.

Customize Logging

You can customize logging by setting up your own *log streams*. Each log stream creates a separate log file in which specific log message types (for example, action, index, application, or import) are logged.

To set up log streams

1. Open the Hadoop Connector configuration file in a text editor.
2. Find the `[Logging]` section. If the configuration file does not contain a `[Logging]` section, add one.
3. In the `[Logging]` section, create a list of the log streams that you want to set up, in the format *`N=LogStreamName`*. List the log streams in consecutive order, starting from 0 (zero). For example:

   ```
   [Logging]
   LogLevel=FULL
   LogDirectory=logs
   0=ApplicationLogStream
   1=ActionLogStream
   ```

   You can also use the `[Logging]` section to configure any default values for logging configuration parameters, such as `LogLevel`. For more information, see the *Hadoop Connector Reference*.
4. Create a new section for each of the log streams. Each section must have the same name as the log stream. For example:

   ```
   [ApplicationLogStream]
   [ActionLogStream]
   ```

5. Specify the settings for each log stream in the appropriate section. You can specify the type of logging to perform (for example, full logging), whether to display log messages on the console, the maximum size of log files, and so on. For example:

```
[ApplicationLogStream]
LogTypeCSVs=application
LogFile=application.log
LogHistorySize=50
LogTime=True
LogEcho=False
LogMaxSizeKBs=1024

[ActionLogStream]
LogTypeCSVs=action
LogFile=logs/action.log
LogHistorySize=50
LogTime=True
LogEcho=False
LogMaxSizeKBs=1024
```

6. Save and close the configuration file. Restart the service for your changes to take effect.

Monitor the Progress of a Task

This section describes how to monitor the progress of a task.

> **NOTE:**
> Progress reporting is not available for every action.

To monitor the progress of a task

- Send the following action to the connector:

  ```
  action=QueueInfo&QueueName=fetch&QueueAction=progress&Token=...
  ```

  where,

  `Token` The token of the task that you want to monitor. If you started the task by sending an action to the connector, the token was returned in the response. If the connector started the task according to the schedule in its configuration file, you can use the `QueueInfo` action to find the token (use `/action=QueueInfo&QueueName=fetch&QueueAction=getstatus`).

  The connector returns the progress report, inside the `<progress>` element of the response. The following example is for a File System Connector synchronize task.

  ```
  <autnresponse>
    <action>QUEUEINFO</action>
    <response>SUCCESS</response>
    <responsedata>
      <action>
         <token>MTAuMi4xMDUuMTAzOjEyMzQ6RkVUQ0g6MTAxNzM0MzgzOQ==</token>
         <status>Processing</status>
         <progress>
  ```

```
          <building_mode>false</building_mode>
          <percent>7.5595</percent>
          <time_processing>18</time_processing>
          <estimated_time_remaining>194</estimated_time_remaining>
          <stage title="MYTASK" status="Processing" weight="1" percent="7.5595">
             <stage title="Ingestion" status="Processing" weight="999"
percent="7.567">
                <stage title="C:\Test Files\" status="Processing" weight="6601"
percent="7.567" progress="0" maximum="6601">
                   <stage title="Folder01" status="Processing" weight="2317"
percent="43.116" progress="999" maximum="2317"/>
                   <stage title="Folder02" status="Pending" weight="2567"/>
                   <stage title="Folder03" status="Pending" weight="1715"/>
                   <stage title="." status="Pending" weight="2"/>
                </stage>
             </stage>
             <stage title="Deletion" status="Pending" weight="1"/>
          </stage>
       </progress>
    </action>
  </responsedata>
</autnresponse>
```

To read the progress report

The information provided in the progress report is unique to each connector and each action. For example, the File System Connector reports the progress of a synchronize task by listing the folders that require processing.

A progress report can include several *stages*:

- A *stage* represents part of a task.
- A stage can have sub-stages. In the previous example, the stage "C:\Test Files\" has three stages that represent sub-folders ("Folder01", "Folder02", and "Folder03") and one stage that represents the contents of the folder itself ("."). You can limit the depth of the sub-stages in the progress report by setting the `MaxDepth` parameter in the `QueueInfo` action.
- The `weight` attribute indicates the amount of work included in a stage, relative to other stages at the same level.
- The `status` attribute shows the status of a stage. The status can be "Pending", "Processing", or "Finished".
- The `progress` attribute shows the number of items that have been processed for the stage.
- The `maximum` attribute shows the total number of items that must be processed to complete the stage.
- The `percent` attribute shows the progress of a stage (percentage complete). In the previous example, the progress report shows that MYTASK is 7.5595% complete.
- Finished stages are grouped, and pending stages are not expanded into sub-stages, unless you set the action parameter `AllStages=true` in the `QueueInfo` action.

Monitor Asynchronous Actions using Event Handlers

The fetch actions sent to a connector are asynchronous. Asynchronous actions do not run immediately, but are added to a queue. This means that the person or application that sends the action does not receive an immediate response. However, you can configure the connector to call an event handler when an asynchronous action starts, finishes, or encounters an error.

You can use an event handler to:

- return data about an event back to the application that sent the action.
- write event data to a text file, to log any errors that occur.

You can also use event handlers to monitor the size of asynchronous action queues. If a queue becomes full this might indicate a problem, or that applications are making requests to Hadoop Connector faster than they can be processed.

Hadoop Connector can call an event handler for the following events.

OnStart The `OnStart` event handler is called when Hadoop Connector starts processing an asynchronous action.

OnFinish The `OnFinish` event handler is called when Hadoop Connector successfully finishes processing an asynchronous action.

OnError The `OnError` event handler is called when an asynchronous action fails and cannot continue.

OnQueueEvent The `OnQueueEvent` handler is called when an asynchronous action queue becomes full, becomes empty, or the queue size passes certain thresholds.

- A `QueueFull` event occurs when the action queue becomes full.
- A `QueueFilling` event occurs when the queue size exceeds a configurable threshold (`QueueFillingThreshold`) and the last event was a `QueueEmpty` or `QueueEmptying` event.
- A `QueueEmptying` event occurs when the queue size falls below a configurable threshold (`QueueEmptyingThreshold`) and the last event was a `QueueFull` or `QueueFilling` event.
- A `QueueEmpty` event occurs when the action queue becomes empty.

Hadoop Connector supports the following types of event handler:

- The `TextFileHandler` writes event data to a text file.
- The `HttpHandler` sends event data to a URL.
- The `LuaHandler` runs a Lua script. The event data is passed into the script.

Configure an Event Handler

To configure an event handler, follow these steps.

To configure an event handler

1. Stop the connector.
2. Open the connector’s configuration file in a text editor.
3. Set the `OnStart`, `OnFinish`, `OnError`, or `OnQueueEvent` parameter to specify the name of a section in the configuration file that contains the event handler settings.
   - To run an event handler for all asynchronous actions, set these parameters in the `[Actions]` section. For example:

     ```
     [Actions]
     OnStart=NormalEvents
     OnFinish=NormalEvents
     OnError=ErrorEvents
     ```

   - To run an event handler for specific actions, use the action name as a section in the configuration file. The following example calls an event handler when the *Fetch* action starts and finishes successfully:

     ```
     [Fetch]
     OnStart=NormalEvents
     OnFinish=NormalEvents
     ```

4. Create a new section in the configuration file to contain the settings for your event handler. You must name the section using the name you specified with the `OnStart`, `OnFinish`, `OnError`, or `OnQueueEvent` parameter.
5. In the new section, set the `LibraryName` parameter.

   `LibraryName` The type of event handler to use to handle the event:

   - To write event data to a text file, set this parameter to **`TextFileHandler`**, and then set the `FilePath` parameter to specify the path of the file.
   - To send event data to a URL, set this parameter to **`HttpHandler`**, and then use the HTTP event handler parameters to specify the URL, proxy server settings, credentials and so on.
   - To run a Lua script, set this parameter to **`LuaHandler`**, and then set the `LuaScript` parameter to specify the script to run. For information about writing the script, see Write a Lua Script to Handle Events, on the next page.

   For example:

   ```
   [NormalEvents]
   LibraryName=TextFileHandler
   ```

```
FilePath=./events.txt

[ErrorEvents]
LibraryName=LuaHandler
LuaScript=./error.lua
```

6. Save and close the configuration file. You must restart Hadoop Connector for your changes to take effect.

Write a Lua Script to Handle Events

The Lua event handler runs a Lua script to handle events. The Lua script must contain a function named `handler` with the arguments `request` and `xml`, as shown below:

```
function handler(request, xml)
      ...
end
```

- `request` is a table holding the request parameters. For example, if the request was `action=Example&MyParam=Value`, the table will contain a key `MyParam` with the value `Value`. Some events, for example queue size events, are not related to a specific action and so the table might be empty.
- `xml` is a string of XML that contains information about the event.

Set Up Performance Monitoring

You can configure a connector to pause tasks temporarily if performance indicators on the local machine or a remote machine breach certain limits. For example, if there is a high load on the CPU or memory of the repository from which you are retrieving information, you might want the connector to pause until the machine recovers.

> **NOTE:**
> Performance monitoring is available on Windows platforms only. To monitor a remote machine, both the connector machine and remote machine must be running Windows.

Configure the Connector to Pause

To configure the connector to pause

1. Open the configuration file in a text editor.
2. Find the `[FetchTasks]` section, or a `[`*`TaskName`*`]` section.
   - To pause all tasks, use the `[FetchTasks]` section.
   - To specify settings for a single task, find the `[`*`TaskName`*`]` section for the task.

3. Set the following configuration parameters:

   `PerfMonCounterNameN` The names of the performance counters that you want the connector to monitor. You can use any counter that is available in the Windows `perfmon` utility.

   `PerfMonCounterMinN` The minimum value permitted for the specified performance counter. If the counter falls below this value, the connector pauses until the counter meets the limits again.

   `PerfMonCounterMaxN` The maximum value permitted for the specified performance counter. If the counter exceeds this value, the connector pauses until the counter meets the limits again.

   `PerfMonAvgOverReadings` (Optional) The number of readings that the connector averages before checking a performance counter against the specified limits. For example, if you set this parameter to `5`, the connector averages the last five readings and pauses only if the average breaches the limits. Increasing this value makes the connector less likely to pause if the limits are breached for a short time. Decreasing this value allows the connector to continue working faster following a pause.

   `PerfMonQueryFrequency` (Optional) The amount of time, in seconds, that the connector waits between taking readings from a performance counter.

   For example:

   ```
   [FetchTasks]
   PerfMonCounterName0=\\machine-hostname\Memory\Available MBytes
   PerfMonCounterMin0=1024
   PerfMonCounterMax0=1024000
   PerfMonCounterName1=\\machine-hostname\Processor(_Total)\% Processor Time
   PerfMonCounterMin1=0
   PerfMonCounterMax1=70
   PerfMonAvgOverReadings=5
   PerfMonQueryFrequency=10
   ```

   NOTE:
   You must set both a minimum and maximum value for each performance counter. You can not set only a minimum or only a maximum.

4. Save and close the configuration file.

Determine if an Action is Paused

To determine whether an action has been paused for performance reasons, use the `QueueInfo` action:

```
/action=queueInfo&queueAction=getStatus&queueName=fetch
```

You can also include the optional `token` parameter to return information about a single action:

```
/action=queueInfo&queueAction=getStatus&queueName=fetch&token=...
```

The connector returns the status, for example:

```
<autnresponse>
  <action>QUEUEINFO</action>
  <response>SUCCESS</response>
  <responsedata>
    <actions>
      <action owner="2266112570">
        <status>Processing</status>
        <queued_time>2016-Jul-27 14:49:40</queued_time>
        <time_in_queue>1</time_in_queue>
        <process_start_time>2016-Jul-27 14:49:41</process_start_time>
        <time_processing>219</time_processing>
        <documentcounts>
          <documentcount errors="0" task="MYTASK"/>
        </documentcounts>
        <fetchaction>SYNCHRONIZE</fetchaction>
        <pausedforperformance>true</pausedforperformance>
        <token>...</token>
      </action>
    </actions>
  </responsedata>
</autnresponse>
```

When the element `pausedforperformance` has a value of `true`, the connector has paused the task for performance reasons. If the `pausedforperformance` element is not present in the response, the connector has not paused the task.

Set Up Document Tracking

Document tracking reports metadata about documents when they pass through various stages in the indexing process. For example, when a connector finds a new document and sends it for ingestion, a document tracking event is created that shows the document has been added. Document tracking can help you detect problems with the indexing process.

You can write document tracking events to a database, log file, or IDOL Server. For information about how to set up a database to store document tracking events, refer to the *IDOL Server Administration Guide*.

To enable Document Tracking

1. Open the connector's configuration file.
2. Create a new section in the configuration file, named `[DocumentTracking]`.
3. In the new section, specify where the document tracking events are sent.

- To send document tracking events to a database through ODBC, set the following parameters:

`Backend`	To send document tracking events to a database, set this parameter to **`Library`**.
`LibraryPath`	Specify the location of the ODBC document tracking library. This is included with IDOL Server.
`ConnectionString`	The ODBC connection string for the database.

  For example:

```
[DocumentTracking]
Backend=Library
LibraryPath=C:\Autonomy\IDOLServer\IDOL\modules\dt_odbc.dll
ConnectionString=DSN=MyDatabase
```

- To send document tracking events to the connector's synchronize log, set the following parameters:

`Backend`	To send document tracking events to the connector's logs, set this parameter to **`Log`**.
`DatabaseName`	The name of the log stream to send the document tracking events to. Set this parameter to **`synchronize`**.

  For example:

```
[DocumentTracking]
Backend=Log
DatabaseName=synchronize
```

- To send document tracking events to an IDOL Server, set the following parameters:

`Backend`	To send document tracking events to an IDOL Server, set this parameter to **`IDOL`**.
`TargetHost`	The host name or IP address of the IDOL Server.
`TargetPort`	The index port of the IDOL Server.

  For example:

```
[DocumentTracking]
Backend=IDOL
TargetHost=idol
TargetPort=9001
```

For more information about the parameters you can use to configure document tracking, refer to the *Hadoop Connector Reference*.

4. Save and close the configuration file.

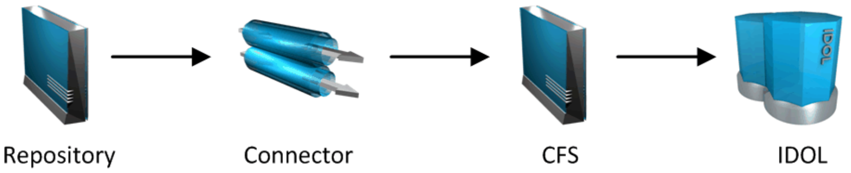
Chapter 9: Ingestion

After a connector finds new documents in a repository, or documents that have been updated or deleted, it sends this information to another component called the *ingestion target*. This section describes where you can send the information retrieved by the Hadoop Connector, and how to configure the ingestion target.

Introduction

A connector can send information to a single ingestion target, which could be:

- **Connector Framework Server**. To process information and then index it into IDOL, Haven OnDemand, or Vertica, send the information to a Connector Framework Server (CFS). Any files retrieved by the connector are *imported* using KeyView, which means the information contained in the files is converted into a form that can be indexed. If the files are containers that contain *subfiles*, these are extracted. You can manipulate and enrich documents using Lua scripts and automated tasks such as field standardization, image analysis, and speech-to-text processing. CFS can index your documents into one or more indexes. For more information about CFS, refer to the *Connector Framework Server Administration Guide*.



- **Haven OnDemand**. You can index documents directly into a Haven OnDemand text index. Haven OnDemand can extract text, metadata, and subfiles from over 1000 different file formats, so you might not need to send documents to CFS.

- **Another Connector.** Use another connector to keep another repository up-to-date. When a connector receives documents, it inserts, updates, or deletes the information in the repository. For example, you could use an Exchange Connector to extract information from Microsoft Exchange, and send the documents to a Notes Connector so that the information is inserted, updated, or deleted in the Notes repository.

> **NOTE:**
> The destination connector can only insert, update, and delete documents if it supports the `insert`,

> update, and delete fetch actions.

In most cases Micro Focus recommends ingesting documents through CFS, so that KeyView can extract content from any files retrieved by the connector and add this information to your documents. You can also use CFS to manipulate and enrich documents before they are indexed. However, if required you can configure the connector to index documents directly into:

- **IDOL Server**. You might index documents directly into IDOL Server when your connector produces metadata-only documents (documents that do not have associated files). In this case there is no need for the documents to be imported. Connectors that can produce metadata-only documents include ODBC Connector and Oracle Connector.
- **Vertica.** The metadata extracted by connectors is structured information held in structured fields, so you might use Vertica to analyze this information.
- **MetaStore**. You can index document metadata into a MetaStore for records management.

Send Data to Connector Framework Server

This section describes how to configure ingestion into Connector Framework Server (CFS).

To send data to a CFS

1. Stop the connector.
2. Open the connector’s configuration file in a text editor.
3. In the [Ingestion] section, set the following parameters:

EnableIngestion	To enable ingestion, set this parameter to **true**.
IngesterType	To send data to CFS, set this parameter to **CFS**.
IngestHost	The host name or IP address of the CFS.
IngestPort	The ACI port of the CFS.

   For example:

   ```
   [Ingestion]
   EnableIngestion=True
   IngesterType=CFS
   IngestHost=localhost
   IngestPort=7000
   ```
4. (Optional) If you are sending documents to CFS for indexing into IDOL Server, set the IndexDatabase parameter. When documents are indexed, IDOL adds each document to the database specified in the document's DREDBNAME field. The connector sets this field for each document, using the value of IndexDatabase.

`IndexDatabase`	The name of the IDOL database into which documents are indexed. Ensure that this database exists in the IDOL Server configuration file.

- To index all documents retrieved by the connector into the same IDOL database, set this parameter in the `[Ingestion]` section.
- To use a different database for documents retrieved by each task, set this parameter in the *`TaskName`* section.

5. Save and close the configuration file.

Send Data to Haven OnDemand

This section describes how to configure ingestion into Haven OnDemand. Hadoop Connector can index documents into a Haven OnDemand text index, or send the documents to a Haven OnDemand combination which can perform additional processing and then index the documents into a text index.

> **NOTE:**
> Haven OnDemand combinations do not accept binary files, so any documents that have associated binary files are indexed directly into a text index and cannot be sent to a combination.

Prepare Haven OnDemand

Before you can send documents to Haven OnDemand, you must create a text index. For information about how to create text indexes, refer to the Haven OnDemand documentation.

Before you can send documents to a Haven OnDemand combination endpoint, the combination must exist. Hadoop Connector requires your combination to accept the following input parameters, and produce the following output.

Input Parameters

Name	Type	Description
`json`	any	A JSON object that contains a single attribute 'documents' that is an array of document objects.
`index`	string	The name of the text index that you want the combination to add documents to. Hadoop Connector uses the value of the parameter `HavenOnDemandIndexName` to set this value.
`duplicate_mode`	string	Specifies how to handle duplicates when adding documents to the text index. Hadoop Connector uses the value of the parameter `HavenOnDemandDuplicateMode` to set this value.

Output

Name	Type	Description
`result`	any	The result of the call to `AddToTextIndex` made by the combination.

Send Data to Haven OnDemand

This section describes how to send documents to Haven OnDemand.

To send data to Haven OnDemand

1. Stop the connector.
2. Open the connector’s configuration file in a text editor.
3. In the `[Ingestion]` section, set the following parameters:

`EnableIngestion`	To enable ingestion, set this parameter to **`true`**.
`IngesterType`	To send data to Haven OnDemand, set this parameter to **`HavenOnDemand`**.
`HavenOnDemandApiKey`	Your Haven OnDemand API key. You can obtain the key from your Haven OnDemand account.
`HavenOnDemandIndexName`	The name of the Haven OnDemand text index to index documents into.
`IngestSSLConfig`	The name of a section in the connector's configuration file that contains SSL settings. The connection to Haven OnDemand must be made over TLS. For more information about sending documents to the ingestion server over TLS, see Configure Outgoing SSL Connections, on page 29.
`HavenOnDemandCombinationName`	(Optional) The name of the Haven OnDemand combination to send documents to. If you set this parameter, Hadoop Connector sends documents to the combination endpoint instead of indexing them directly into the text index. **NOTE:** Haven OnDemand combinations do not accept binary files. Therefore any document that has an associated binary file is indexed directly into the text index. If you don't set this parameter, Hadoop Connector indexes all documents directly into the text index specified by `HavenOnDemandIndexName`.

For example:

```
[Ingestion]
EnableIngestion=True
```

```
IngesterType=HavenOnDemand
HavenOnDemandApiKey=[Your API Key]
HavenOnDemandIndexName=MyTextIndex
IngestSSLConfig=SSLOptions
HavenOnDemandCombinationName=MyCombination

[SSLOptions]
SSLMethod=TLSV1
```

4. Save and close the configuration file.

Send Data to Another Repository

You can configure a connector to send the information it retrieves to another connector. When the destination connector receives the documents, it inserts them into another repository. When documents are updated or deleted in the source repository, the source connector sends this information to the destination connector so that the documents can be updated or deleted in the other repository.

> **NOTE:**
> The destination connector can only insert, update, and delete documents if it supports the `insert`, `update`, and `delete` fetch actions.

To send data to another connector for ingestion into another repository

1. Stop the connector.
2. Open the connector’s configuration file in a text editor.
3. In the `[Ingestion]` section, set the following parameters:

`EnableIngestion`	To enable ingestion, set this parameter to **`true`**.
`IngesterType`	To send data to another repository, set this parameter to **`Connector`**.
`IngestHost`	The host name or IP address of the machine hosting the destination connector.
`IngestPort`	The ACI port of the destination connector.
`IngestActions`	Set this parameter so that the source connector runs a Lua script to convert documents into form that can be used with the destination connector's insert action. For information about the required format, refer to the Administration Guide for the destination connector.

For example:

```
[Ingestion]
EnableIngestion=True
IngesterType=Connector
IngestHost=AnotherConnector
```

```
IngestPort=7010
IngestActions=Lua:transformation.lua
```

4. Save and close the configuration file.

Index Documents Directly into IDOL Server

This section describes how to index documents from a connector directly into IDOL Server.

> **TIP:**
> In most cases, Micro Focus recommends sending documents to a Connector Framework Server (CFS). CFS extracts metadata and content from any files that the connector has retrieved, and can manipulate and enrich documents before they are indexed. CFS also has the capability to insert documents into more than one index, for example IDOL Server and a Vertica database. For information about sending documents to CFS, see Send Data to Connector Framework Server, on page 74

To index documents directly into IDOL Server

1. Stop the connector.
2. Open the connector’s configuration file in a text editor.
3. In the `[Ingestion]` section, set the following parameters:

`EnableIngestion`	To enable ingestion, set this parameter to **`true`**.
`IngesterType`	To send data to IDOL Server, set this parameter to **`Indexer`**.
`IndexDatabase`	The name of the IDOL database to index documents into.

   For example:

```
[Ingestion]
EnableIngestion=True
IngesterType=Indexer
IndexDatabase=News
```

4. In the `[Indexing]` section of the configuration file, set the following parameters:

`IndexerType`	To send data to IDOL Server, set this parameter to **`IDOL`**.
`Host`	The host name or IP address of the IDOL Server.
`Port`	The IDOL Server ACI port.
`SSLConfig`	(Optional) The name of a section in the connector's configuration file that contains SSL settings for connecting to IDOL.

   For example:

```
[Indexing]
IndexerType=IDOL
Host=10.1.20.3
Port=9000
SSLConfig=SSLOptions

[SSLOptions]
SSLMethod=SSLV23
```

5. Save and close the configuration file.

Index Documents into Vertica

Hadoop Connector can index documents into Vertica, so that you can run queries on structured fields (document metadata).

Depending on the metadata contained in your documents, you could investigate the average age of documents in a repository. You might want to answer questions such as: How much time has passed since the documents were last updated? How many files are regularly updated? Does this represent a small proportion of the total number of documents? Who are the most active users?

> **TIP:**
> In most cases, Micro Focus recommends sending documents to a Connector Framework Server (CFS). CFS extracts metadata and content from any files that the connector has retrieved, and can manipulate and enrich documents before they are indexed. CFS also has the capability to insert documents into more than one index, for example IDOL Server and a Vertica database. For information about sending documents to CFS, see Send Data to Connector Framework Server, on page 74

Prerequisites

- Hadoop Connector supports indexing into Vertica 7.1 and later.
- You must install the appropriate Vertica ODBC drivers (version 7.1 or later) on the machine that hosts Hadoop Connector. If you want to use an ODBC Data Source Name (DSN) in your connection string, you will also need to create the DSN. For more information about installing Vertica ODBC drivers and creating the DSN, refer to the Vertica documentation.

New, Updated and Deleted Documents

When documents are indexed into Vertica, Hadoop Connector adds a timestamp that contains the time when the document was indexed. The field is named `VERTICA_INDEXER_TIMESTAMP` and the timestamp is in the format `YYYY-MM-DD HH:NN:SS`.

When a document in a data repository is modified, Hadoop Connector adds a new record to the database with a new timestamp. All of the fields are populated with the latest data. The record describing the older version of the document is not deleted. You can create a projection to make sure your queries only return the latest record for a document.

When Hadoop Connector detects that a document has been deleted from a repository, the connector inserts a new record into the database. The record contains only the `DREREFERENCE` and the field `VERTICA_INDEXER_DELETED` set to `TRUE`.

Fields, Sub-Fields, and Field Attributes

Documents that are created by connectors can have multiple levels of fields, and field attributes. A database table has a flat structure, so this information is indexed into Vertica as follows:

- Document fields become columns in the flex table. An IDOL document field and the corresponding database column have the same name.
- Sub-fields become columns in the flex table. A document field named `my_field` with a sub-field named `subfield` results in two columns, `my_field` and `my_field.subfield`.
- Field attributes become columns in the flex table. A document field named `my_field`, with an attribute named `my_attribute` results in two columns, `my_field` holding the field value and `my_field.my_attribute` holding the attribute value.

Prepare the Vertica Database

Indexing documents into a standard database is problematic, because documents do not have a fixed schema. A document that represents an image has different metadata fields to a document that represents an e-mail message. Vertica databases solve this problem with *flex tables*. You can create a flex table without any column definitions, and you can insert a record regardless of whether a referenced column exists.

You must create a flex table before you index data into Vertica.

When creating the table, consider the following:

- Flex tables store entire records in a single column named `__raw__`. The default maximum size of the `__raw__` column is 128K. You might need to increase the maximum size if you are indexing documents with large amounts of metadata.
- Documents are identified by their `DREREFERENCE`. Micro Focus recommends that you do not restrict the size of any column that holds this value, because this could result in values being truncated. As a result, rows that represent different documents might appear to represent the same document. If you do restrict the size of the `DREREFERENCE` column, ensure that the length is sufficient to hold the longest `DREREFERENCE` that might be indexed.

To create a flex table without any column definitions, run the following query:

```
create flex table my_table();
```

To improve query performance, create real columns for the fields that you query frequently. For documents indexed by a connector, this is likely to include the `DREREFERENCE`:

```
create flex table my_table(DREREFERENCE varchar NOT NULL);
```

You can add new column definitions to a flex table at any time. Vertica automatically populates new columns with values for existing records. The values for existing records are extracted from the `__raw__` column.

For more information about creating and using flex tables, refer to the Vertica Documentation or contact Vertica technical support.

Send Data to Vertica

To send documents to a Vertica database, follow these steps.

To send data to Vertica

1. Stop the connector.
2. Open the connector’s configuration file in a text editor.
3. In the `[Ingestion]` section, set the following parameters:

   `EnableIngestion` To enable ingestion, set this parameter to **`true`**.

   `IngesterType` To send data to a Vertica database, set this parameter to **`Indexer`**.

   For example:

   ```
   [Ingestion]
   EnableIngestion=TRUE
   IngesterType=Indexer
   ```

4. In the `[Indexing]` section, set the following parameters:

   `IndexerType` To send data to a Vertica database, set this parameter to **`Library`**.

   `LibraryDirectory` The directory that contains the library to use to index data.

   `LibraryName` The name of the library to use to index data. You can omit the `.dll` or `.so` file extension. Set this parameter to **`verticaIndexer`**.

   `ConnectionString` The connection string to use to connect to the Vertica database.

   `TableName` The name of the table in the Vertica database to index the documents into. The table must be a flex table and must exist before you start indexing documents. For more information, see Prepare the Vertica Database, on the previous page.

   For example:

   ```
   [Indexing]
   IndexerType=Library
   LibraryDirectory=indexerdlls
   LibraryName=verticaIndexer
   ```

```
ConnectionString=DSN=VERTICA
TableName=my_flex_table
```

5. Save and close the configuration file.

Send Data to a MetaStore

You can configure a connector to send documents to a MetaStore. When you send data to a Metastore, any files associated with documents are ignored.

> **TIP:**
> In most cases, Micro Focus recommends sending documents to a Connector Framework Server (CFS). CFS extracts metadata and content from any files that the connector has retrieved, and can manipulate and enrich documents before they are indexed. CFS also has the capability to insert documents into more than one index, for example IDOL Server and a MetaStore. For information about sending documents to CFS, see Send Data to Connector Framework Server, on page 74

To send data to a MetaStore

1. Stop the connector.
2. Open the connector's configuration file in a text editor.
3. In the `[Ingestion]` section, set the following parameters:

   `EnableIngestion` To enable ingestion, set this parameter to **`true`**.

   `IngesterType` To send data to a MetaStore, set this parameter to **`Indexer`**.

   For example:

   ```
   [Ingestion]
   EnableIngestion=True
   IngesterType=Indexer
   ```

4. In the `[Indexing]` section, set the following parameters:

   `IndexerType` To send data to a MetaStore, set this parameter to **`MetaStore`**.

   `Host` The host name of the machine hosting the MetaStore.

   `Port` The port of the MetaStore.

   For example:

   ```
   [Indexing]
   IndexerType=Metastore
   Host=MyMetaStore
   ```

```
Port=8000
```

5. Save and close the configuration file.

Run a Lua Script after Ingestion

You can configure the connector to run a Lua script after batches of documents are successfully sent to the ingestion server. This can be useful if you need to log information about documents that were processed, for monitoring and reporting purposes.

To configure the file name of the Lua script to run, set the `IngestBatchActions` configuration parameter in the connector's configuration file.

- To run the script for all batches of documents that are ingested, set the parameter in the `[Ingestion]` section.
- To run the script for batches of documents retrieved by a specific task, set the parameter in the `[`*`TaskName`*`]` section.

> **NOTE:**
> If you set the parameter in a `[`*`TaskName`*`]` section, the connector does not run any scripts specified in the `[Ingestion]` section for that task.

For example:

```
[Ingestion]
IngestBatchActions0=LUA:./scripts/myScript.lua
```

For more information about this parameter, refer to the *Hadoop Connector Reference*.

The Lua script must have the following structure:

```
function batchhandler(documents, ingesttype)
   ...
end
```

The `batchhandler` function is called after each batch of documents is sent to the ingestion server. The function is passed the following arguments:

Argument	Description
`documents`	A table of document objects, where each object represents a document that was sent to the ingestion server. A document object is an internal representation of a document. You can modify the document object and this changes the document. However, as the script runs after the documents are sent to the ingestion server, any changes you make are not sent to CFS or IDOL.
`ingesttype`	A string that contains the ingest type for the documents. The `batchhandler` function is called multiple times if different document types are sent.

For example, the following script prints the ingest type (ADD, DELETE, or UPDATE) and the reference for all successfully processed documents to stdout:

```
function batchhandler(documents, ingesttype)
     for i,document in ipairs(documents) do
         local ref = document:getReference()
         print(ingesttype..": "..ref)
     end
 end
```

Glossary

A

ACI (Autonomy Content Infrastructure)
A technology layer that automates operations on unstructured information for cross-enterprise applications. ACI enables an automated and compatible business-to-business, peer-to-peer infrastructure. The ACI allows enterprise applications to understand and process content that exists in unstructured formats, such as email, Web pages, Microsoft Office documents, and IBM Notes.

ACI Server
A server component that runs on the Autonomy Content Infrastructure (ACI).

ACL (access control list)
An ACL is metadata associated with a document that defines which users and groups are permitted to access the document.

action
A request sent to an ACI server.

active directory
A domain controller for the Microsoft Windows operating system, which uses LDAP to authenticate users and computers on a network.

C

Category component
The IDOL Server component that manages categorization and clustering.

Community component
The IDOL Server component that manages users and communities.

connector
An IDOL component (for example File System Connector) that retrieves information from a local or remote repository (for example, a file system, database, or Web site).

Connector Framework Server (CFS)
Connector Framework Server processes the information that is retrieved by connectors. Connector Framework Server uses KeyView to extract document content and metadata from over 1,000 different file types. When the information has been processed, it is sent to an IDOL Server or Distributed Index Handler (DIH).

Content component
The IDOL Server component that manages the data index and performs most of the search and retrieval operations from the index.

D

DAH (Distributed Action Handler)
DAH distributes actions to multiple copies of IDOL Server or a component. It allows you to use failover, load balancing, or distributed content.

DIH (Distributed Index Handler)
DIH allows you to efficiently split and index extremely large quantities of data into multiple copies of IDOL Server or the Content component. DIH allows you to create a scalable solution that delivers high performance and high availability. It provides a flexible way to batch, route, and categorize the indexing of internal and external content into IDOL Server.

I

IDOL

The Intelligent Data Operating Layer (IDOL) Server, which integrates unstructured, semi-structured and structured information from multiple repositories through an understanding of the content. It delivers a real-time environment in which operations across applications and content are automated.

IDOL Proxy component

An IDOL Server component that accepts incoming actions and distributes them to the appropriate subcomponent. IDOL Proxy also performs some maintenance operations to make sure that the subcomponents are running, and to start and stop them when necessary.

Import

Importing is the process where CFS, using KeyView, extracts metadata, content, and sub-files from items retrieved by a connector. CFS adds the information to documents so that it is indexed into IDOL Server. Importing allows IDOL server to use the information in a repository, without needing to process the information in its native format.

Ingest

Ingestion converts information that exists in a repository into documents that can be indexed into IDOL Server. Ingestion starts when a connector finds new documents in a repository, or documents that have been updated or deleted, and sends this information to CFS. Ingestion includes the import process, and processing tasks that can modify and enrich the information in a document.

Intellectual Asset Protection System (IAS)

An integrated security solution to protect your data. At the front end, authentication checks that users are allowed to access the system that contains the result data. At the back end, entitlement checking and authentication combine to ensure that query results contain only documents that the user is allowed to see, from repositories that the user has permission to access. For more information, refer to the IDOL Document Security Administration Guide.

K

KeyView

The IDOL component that extracts data, including text, metadata, and subfiles from over 1,000 different file types. KeyView can also convert documents to HTML format for viewing in a Web browser.

L

LDAP

Lightweight Directory Access Protocol. Applications can use LDAP to retrieve information from a server. LDAP is used for directory services (such as corporate email and telephone directories) and user authentication. See also: active directory, primary domain controller.

License Server

License Server enables you to license and run multiple IDOL solutions. You must have a License Server on a machine with a known, static IP address.

O

OmniGroupServer (OGS)

A server that manages access permissions for your users. It communicates with your repositories and IDOL Server to apply access permissions to documents.

P

primary domain controller

A server computer in a Microsoft Windows domain that controls various computer resources. See also: active directory, LDAP.

V

View

An IDOL component that converts files in a repository to HTML formats for viewing in a Web browser.

W

Wildcard

A character that stands in for any character or group of characters in a query.

X

XML

Extensible Markup Language. XML is a language that defines the different attributes of document content in a format that can be read by humans and machines. In IDOL Server, you can index documents in XML format. IDOL Server also returns action responses in XML format.

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Feedback on Administration Guide (Micro Focus Hadoop Connector 12.0)

Add your feedback to the email and click **Send**.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to swpdl.idoldocsfeedback@microfocus.com.

We appreciate your feedback!