

# Query Manipulation Server

Software Version 12.3

## Administration Guide



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# Part 1: Getting Started

This section describes how to install and set up IDOL Query Manipulation Server (QMS).

- [Introduction](#)
- [Install Query Manipulation Server](#)
- [Run Query Manipulation Server](#)
- [Configure Query Manipulation Server](#)



# Chapter 1: Introduction

This section provides an overview of Query Manipulation Server.

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- [The IDOL Platform](#) ..... 11
- [QMS Architecture](#) ..... 12
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## Query Manipulation Server

QMS allows you to modify queries and results, and to manage promotions. You can use QMS to:

- generate promotions from search results.
- query for promotions.
- ensure that documents appear at desired locations in a results list.
- boost results.
- expand queries to include results from synonymous terms.
- remove terms from queries.

You can use QMS as a stand-alone component or as a part of IDOL Data Admin.

QMS must have access to the IDOL Server Content component and the Promotion Agentstore.

For more information on how to use QMS with IDOL Data Admin, refer to the *IDOL Data Admin User Guide*.

## OEM Certification

Query Manipulation Server works in OEM licensed environments.

## The IDOL Platform

At the core of Query Manipulation Server is the *Intelligent Data Operating Layer* (IDOL).

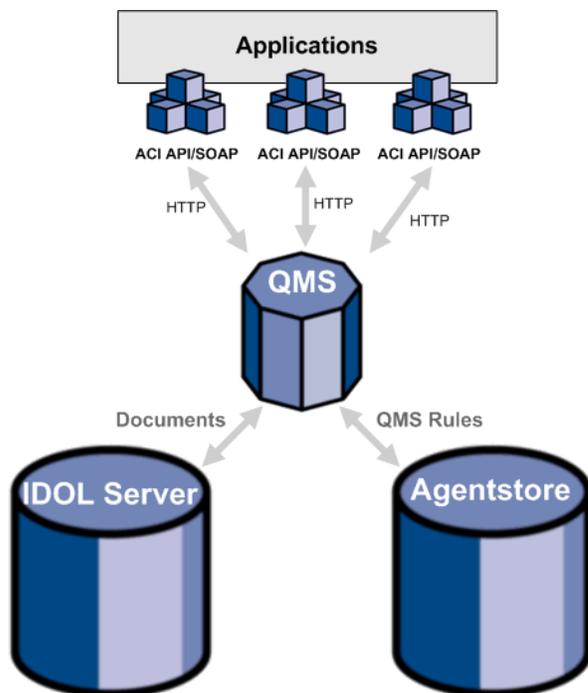
IDOL gathers and processes unstructured, semi-structured, and structured information in any format from multiple repositories using IDOL connectors and a global relational index. It can automatically form a contextual understanding of the information in real time, linking disparate data sources together 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*.

## QMS Architecture

QMS uses the Autonomy Content Infrastructure (ACI) Client API to communicate with custom applications that retrieve data by using HTTP commands. QMS communicates over HTTP by using XML, and can adhere to SOAP.

### Query Manipulation Server architecture



When you use QMS, you send queries to QMS rather than directly to IDOL Server. QMS forwards the queries to IDOL Server and the Promotion Agentstore component, which contains the QMS rules.

The Promotion Agentstore returns any rules that apply to the current query. QMS can then perform one of the following actions:

- modify the current query. For example, QMS can expand the query text with a list of synonyms before it sends the query to IDOL Server.
- modify the result. For example, QMS can insert a document at a particular position in the set of results returned by IDOL Server.

QMS can do either, both, or none of these actions depending on the configuration and the particular query. You can also query for promotions.

QMS can accept HTTP requests sent from a Web browser.

### Related Topics

- [Send Actions to Query Manipulation Server, on page 24](#)

## Query Manipulation Server Components

An IDOL installation for query manipulation includes the following components:

- **Query Manipulation Server.** QMS manages the queries that you send to IDOL Server. It forwards queries to the IDOL Server data index, and retrieves QMS rules from the Promotion Agentstore. It then modifies the query or the results according to the rules.
- **Data Index.** QMS queries the IDOL data index to retrieve documents that match the original query. Depending on rules that you set up, QMS also retrieves promotion documents from the data index.
- **Promotion Agentstore.** The Promotion Agentstore component stores the QMS rules that you set up. QMS queries the Promotion Agentstore to return rules that apply to a query.



## Chapter 2: Install Query Manipulation Server

This section describes how to install QMS by using the IDOL Server installer.

- [Install Query Manipulation Server on Windows](#) ..... 15
- [Install an IDOL Component as a Service on Windows](#) ..... 17
- [Install Query Manipulation Server on UNIX](#) ..... 18
- [Install an IDOL Component as a Service on Linux](#) ..... 20

### Install Query Manipulation Server on Windows

Use the following procedure to install Query Manipulation Server on Microsoft Windows operating systems, by using the IDOL Server installer.

The IDOL Server installer provides the major IDOL components. It also includes License Server, which Query Manipulation Server requires to run.

#### To install Query Manipulation Server

1. Double-click the appropriate installer package:

`IDOLServer_VersionNumber_Platform.exe`

where:

`VersionNumber` is the product version.

`Platform` is your software platform.

The Setup dialog box opens.

2. Click **Next**.

The License Agreement dialog box opens.

3. Read the license agreement. Select **I accept the agreement**, and then click **Next**.

The Installation Directory dialog box opens.

4. Specify the directory to install Query Manipulation Server (and optionally other components such as License Server) in. By default, the system installs on `C:\MicroFocus\IDOLServer-`

`VersionNumber`. Click  to choose another location. Click **Next**.

The Installation Mode dialog box opens.

5. Select **Custom**, and then click **Next**.

The OEM installation dialog box opens.

6. Choose whether to install IDOL for OEM usage.

- To install IDOL for OEM usage
  - a. Select the **OEM installation** check box.
  - b. Select how to provide your license key file by choosing one of the following options:
    - **Copy from file**, then click  to find the licensekey.dat file to use.
    - **Copy the licensekey.dat manually after the installation.**
  - c. Click **Next**.

The Component Selection dialog box opens. Skip to [Step 8](#).

- To install IDOL for standard usage, click **Next**.

The License Server dialog box opens. Proceed to [Step 7](#).

7. Choose whether you have an existing License Server.

- To use an existing License Server
  - a. On the License Server dialog box, click **Yes**, and then click **Next**. The Existing License Server dialog box opens.
  - b. Specify the host and ACI port of your License Server, and then click **Next**.
- To install a new instance of License Server
  - a. On the License Server dialog box, click **No**, and then click **Next**. The Service Name dialog box opens.
  - b. In the Service name box, type the name of the Windows service to use for the License Server, and then click **Next**. The License Server dialog box opens.
  - c. Specify the ports that you want License Server to listen on, and then type the path to your IDOL license key file (`licensekey.dat`), which you obtained when you purchased Query Manipulation Server, or click  and navigate to the location. Click **Next**.

The Component Selection dialog box opens.

8. Click **Next**.
9. Select the check boxes for the components that you want to install, and specify the port information for each component, or leave the fields blank to accept the default port settings.

For the QMS, you can specify the following ports:

<b>ACI Port</b>	The port that client machines use to send ACI actions to the QMS. Default: 16000
<b>Service Port</b>	The port that client machines use to send service requests to the QMS. Default: 16002

If you do not specify a value, the installer uses the specified default ports.

Click **Next** or **Back** to move between components.

10. After you have specified your settings, the Summary dialog box opens. Verify the settings you made and click **Next**.

The Ready to Install dialog box opens.

11. Click **Next**.

The Installing dialog box opens, indicating the progress of the installation. If you want to end the installation process, click **Cancel**.

12. After installation is complete, click **Finish** to close the installation wizard.

## Install an IDOL Component as a Service on Windows

On Microsoft Windows operating systems, you can install any IDOL component as a Windows service. Installing a component as a Windows service makes it easy to start and stop the component, and you can configure a component to start automatically when you start Windows.

Use the following procedure to install Query Manipulation Server as a Windows service from a command line.

### To install a component as a Windows service

1. Open a command prompt with administrative privileges (right-click the icon and select **Run as administrator**).
2. Navigate to the directory that contains the component that you want to install as a service.
3. Send the following command:

```
Component.exe -install
```

where *Component.exe* is the executable file of the component that you want to install as a service.

The `-install` command has the following optional arguments:

<code>-start {[auto]   [manual]   [disable]}</code>	The startup mode for the component. <b>Auto</b> means that Windows services automatically starts the component. <b>Manual</b> means that you must start the service manually. <b>Disable</b> means that you cannot start the service. The default option is <b>Auto</b> .
<code>-username <i>UserName</i></code>	The user name that the service runs under. By default, it uses a local system account.
<code>-password <i>Password</i></code>	The password for the service user.
<code>-servicename <i>ServiceName</i></code>	The name to use for the service. If your service name contains spaces, use quotation marks (") around the name. By default, it uses the executable name.
<code>-displayname <i>DisplayName</i></code>	The name to display for the service in the Windows services manager. If your display name contains spaces, use quotation

marks (") around the name. By default, it uses the service name.

```
-depend Dependency1  
[,Dependency2 ...]
```

A comma-separated list of the names of Windows services that Windows must start before the new service. For example, you might want to add the License Server as a dependency.

For example:

```
Component.exe -install -servicename ServiceName -displayname "Component Display  
Name" -depend LicenseServer
```

After you have installed the service, you can start and stop the service from the Windows Services manager.

When you no longer require a service, you can uninstall it again.

### To uninstall an IDOL Windows Service

1. Open a command prompt.
2. Navigate to the directory that contains the component service that you want to uninstall.
3. Send the following command:

```
Component.exe -uninstall
```

where *Component.exe* is the executable file of the component service that you want to uninstall.

If you did not use the default service name when you installed the component, you must also add the *-servicename* argument. For example:

```
Component.exe -uninstall -servicename ServiceName
```

## Install Query Manipulation Server on UNIX

Use the following procedure to install Query Manipulation Server in text mode on UNIX platforms.

### To install Query Manipulation Server on UNIX

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

```
./IDOLServer_VersionNumber_Platform.exe --mode text
```

where:

*VersionNumber* is the product version

*Platform* is the name of your UNIX platform

**NOTE:**

Ensure that you have execute permission for the installer file.

The console installer starts and displays the Welcome screen.

2. Read the information and then press the `Enter` key.

The license information is displayed.

3. Read the license information, pressing `Enter` to continue through the text. After you finish reading the text, type `y` to accept the license terms.
4. Type the path to the location where you want to install the servers, or press `Enter` to accept the default path.

The Installation Mode screen is displayed.

5. Press `2` to select the Custom installation mode.
6. Choose whether to install IDOL for OEM usage.
  - To install IDOL for OEM usage
    - a. Press `2` to select the OEM installation mode.
    - b. Select how to provide your license key file by choosing one of the following options:
      - **Copy from file.** Press `1`, and then type the location of your `licensekey.dat` file.
      - **Copy the licensekey.dat manually after the installation.** Press `2`.

The Component Selection dialog box opens. Go to [Step 9](#).

- To install IDOL for standard usage, click **Next**.

The License Server screen is displayed. Proceed to [Step 7](#).

7. Choose whether you have an existing License Server.
  - To use an existing License Server, type `y`. Specify the host and port details for your License Server (or press `Enter` to accept the defaults), and then press `Enter`. Go to [Step 9](#).
  - To install a new instance of License Server, type `n`.
8. If you want to install a new License Server, provide information for the ports that the License Server uses.
  - a. Type the value for the ACI Port and press `Enter` (or press `Enter` to accept the default value).

**ACI Port** The port that client machines use to send ACI actions to the License Server.

- b. Type the value for the Service Port and press `Enter` (or press `Enter` to accept the default value).

**Service Port** The port by which you send service actions to the License Server. This port must not be used by any other service.

- c. Type the location of your IDOL license key file (`licensekey.dat`), which you obtained when you purchased Query Manipulation Server. Press `Enter`.
9. The Component Selection screen is displayed. Press `Enter`. When prompted, type `y` for the components that you want to install. Specify the port information for each component, and then press `Enter`. Alternatively, leave the fields blank and press `Enter` to accept the default port settings.

For the QMS, you can specify the following ports:

<b>ACI Port</b>	The port that client machines use to send ACI actions to the QMS. Default: 16000
<b>Service Port</b>	The port that client machines use to send service requests to the QMS. Default: 16002

If you do not specify a value, the installer uses the specified default ports.

**NOTE:**  
These ports must not be used by any other service.

The Init Scripts screen is displayed.

10. Type the user that the server should run as, and then press `Enter`.

**NOTE:**  
The installer does not create this user. It must exist already.

11. Type the group that the server should run under, and then press `Enter`.

**NOTE:**  
If you do not want to generate init scripts for installed components, you can simply press `Enter` to move to the next stage of the installation process without specifying a user or group.

The Summary screen is displayed.

12. Verify the settings that you made, then press `Enter` to begin installation.

The Installing screen is displayed.

This screen indicates the progress of the installation process.

The Installation Complete screen is displayed.

13. Press `Enter` to finish the installation.

## Install an IDOL Component as a Service on Linux

On Linux operating systems, you can configure a component as a service to allow you to easily start and stop it. You can also configure the service to run when the machine boots. The following procedures describe how to install Query Manipulation Server as a service on Linux.

**NOTE:**

To use these procedures, you must have root permissions.

**NOTE:**

When you install Query Manipulation Server on Linux, the installer prompts you to supply a user name to use to run the server. The installer populates the init scripts, but it does not create the user in your system (the user must already exist).

The procedure that you must use depends on the operating system and boot system type.

- For Linux operating system versions that use systemd (including CentOS 7, and Ubuntu version 15.04 and later), see [Install a Component as a Service for a systemd Boot System, below](#).
- For Linux operating system versions that use System V, see [Install a Component as a Service for a System V Boot System, on the next page](#).

## Install a Component as a Service for a systemd Boot System

**NOTE:**

If your setup has an externally mounted drive that Query Manipulation Server uses, you might need to modify the init script. The installed init script contains examples for an NFS mount requirement.

### To install an IDOL component as a service

1. Run the appropriate command for your Linux operating system environment to copy the init scripts to your `init.d` directory.

- Red Hat Enterprise Linux (and CentOS)

```
cp IDOLInstalLDir/scripts/init/systemd/componentname
/etc/systemd/system/componentname.service
```

- Debian (including Ubuntu):

```
cp IDOLInstalLDir/scripts/init/systemd/componentname
/lib/systemd/system/componentname.service
```

where *componentname* is the name of the init script that you want to use, which is the name of the component executable (without the file extension).

For other Linux environments, refer to the operating system documentation.

2. Run the following commands to set the appropriate access, owner, and group permissions for the component:

- Red Hat Enterprise Linux (and CentOS)

```
chmod 755 /etc/systemd/system/componentname
chown root /etc/systemd/system/componentname
chgrp root /etc/systemd/system/componentname
```

- Debian (including Ubuntu):

```
chmod 755 /lib/systemd/system/componentname  
chown root /lib/systemd/system/componentname  
chgrp root /lib/systemd/system/componentname
```

where *componentname* is the name of the component executable that you want to run (without the file extension).

For other Linux environments, refer to the operating system documentation.

3. (Optional) If you want to start the component when the machine boots, run the following command:

```
systemctl enable componentname
```

## Install a Component as a Service for a System V Boot System

### To install an IDOL component as a service

1. Run the following command to copy the init scripts to your `init.d` directory.

```
cp IDOLInstalLDir/scripts/init/systemv/componentname /etc/init.d/
```

where *componentname* is the name of the init script that you want to use, which is the name of the component executable (without the file extension).

2. Run the following commands to set the appropriate access, owner, and group permissions for the component:

```
chmod 755 /etc/init.d/componentname  
chown root /etc/init.d/componentname  
chgrp root /etc/init.d/componentname
```

3. (Optional) If you want to start the component when the machine boots, run the appropriate command for your Linux operating system environment:

- Red Hat Enterprise Linux (and CentOS):

```
chkconfig --add componentname  
chkconfig componentname on
```

- Debian (including Ubuntu):

```
update-rc.d componentname defaults
```

For other Linux environments, refer to the operating system documentation.

# Chapter 3: Run Query Manipulation Server

This section describes how to start and stop QMS, and how to send actions.

- [Start Query Manipulation Server](#) .....23
- [Stop Query Manipulation Server](#) .....24
- [Send Actions to Query Manipulation Server](#) .....24
- [Verify Query Manipulation Server Runs Correctly](#) .....25

## Start Query Manipulation Server

The following sections describe the different ways that you can start QMS.

Before you can start the QMS, you must start the License Server.

### Start QMS on Microsoft Windows

- Double-click the `QMS.exe` file in your component installation directory.
- Start the QMS service from a system dialog box. QMS must be installed as a Windows Service. See [Install an IDOL Component as a Service on Windows, on page 17](#).
  1. Display the Windows **Services** dialog box.
  2. Select the **QMS** service for the component, and click **Start** to start the component.
  3. Click **Close** to close the **Services** dialog box.

**TIP:**

You can also configure the Windows Service to run automatically when you start the machine.

- Start QMS from the command line. For more information, refer to the *IDOL Getting Started Guide*.

### Start QMS on UNIX

- Start the IDOL component service from the command line. The component must be installed as a service. See [Install an IDOL Component as a Service on Linux, on page 20](#). You can use one of the following commands to start the service:
  - On systemd Linux platforms:

```
systemctl start QMS
```
  - On System V Linux platforms:

```
service QMS start
```

- On Solaris platforms (using System V):

```
/etc/init.d/QMS start
```

**TIP:**

You can also configure the service to run automatically when you start the machine.

- Start QMS from the command line. For more information, refer to the *IDOL Getting Started Guide*.
- Use the start script (`start-QMS.sh`).

**NOTE:**

In most cases, Micro Focus recommends that you use the provided init scripts instead.

## Stop Query Manipulation Server

You can stop QMS from running in several different ways.

- (All Platforms) Send the `Stop` service action to the component service port:

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

where *host* is the name or IP address of the host on which QMS is running, and *servicePort* is the component service port (which is specified in the `[Service]` section of the Query Manipulation Server configuration file).

- On Windows platforms, when the component is installed as a service, you can use the system dialog box to stop the service:
  1. Display the Windows **Services** dialog box.
  2. Select the **QMS** service, and click **Stop** to stop Query Manipulation Server.
  3. Click **Close** to close the **Services** dialog box.
- On UNIX platforms, when the component is installed as a service, you can run one of the following commands to stop the service:
  - On systemd platforms:

```
systemctl stop QMS
```
  - On system V platforms:

```
service QMS stop
```
  - On Solaris platforms (using System V):

```
/etc/init.d/QMS stop
```
- On UNIX platforms, you can also use the stop script, `stop-QMS.sh`.

## Send Actions to Query Manipulation Server

You send actions to QMS from your Web browser. The general syntax of these actions is:

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

where,

<i>QMSHost</i>	The IP address or name of the machine where QMS is installed.
<i>port</i>	The ACI port by which you send actions to QMS (set by the <code>Port</code> parameter in the [Server] section of the QMS configuration file). Refer to the <i>QMS Reference</i> for more information.
<i>action</i>	The name of the action to run (for example, <code>addTask</code> ).
<i>parameters</i>	The required and optional parameters for the action.

**NOTE:**

Separate individual parameters with an ampersand (&).

## Verify Query Manipulation Server Runs Correctly

After you set up QMS, you can run the following actions to verify that QMS runs correctly.

### GetRequestLog (GRL)

Send a `GetRequestLog` or GRL action to QMS to return a log of the requests that have been made to it, including:

- the date and time that a request was made.
- the client IP address that made the request.
- the internal thread that handled the action.

For example:

`http://QMSHost:port/action=GRL`

#### **Related Topics**

- [Send Actions to Query Manipulation Server, on the previous page](#)

### GetStatus

You can use the `GetStatus` action to verify that the QMS service is running.

For example:

`http://QMSHost:port/action=GetStatus`

#### **Related Topics**

- [Send Actions to Query Manipulation Server, on the previous page](#)



## Chapter 4: Configure Query Manipulation Server

This section describes how to configure QMS.

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### The QMS Configuration File

QMS is configured by editing its configuration file. This is in the same directory as the QMS executable, and by default is named `qms.cfg`. You can edit the configuration file with a text editor.

The configuration file contains settings that determine the basic details that the QMS needs to run. It includes location and port details for QMS, logging details, and details of the servers that QMS connects to. For information about the configuration parameters, refer to the *QMS Reference*.

The QMS configuration file is divided into several sections, which represent different features that you can configure.

#### [ACIEncryption] Section

You can use the `[ACIEncryption]` section to encrypt communications between ACI servers and any applications that use the ACI API. For example:

```
[ACIEncryption]
CommsEncryptionType=GSS
ServiceName=Kerberos
```

#### [AuthorizationRoles] Section

The `[AuthorizationRoles]` defines roles that enable a particular set of actions for particular clients, SSL identities, and GSS principals. You must create a subsection for each authorization role that you define in the `[AuthorizationRoles]` configuration section.

For example:

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

[AdminRole]
StandardRoles=Admin,Index,ServiceControl
Clients=localhost
SSLIdentities=admin.example.com

[UserRole]
StandardRoles=Query,ServiceStatus
SSLIdentities=admin.example.com,userserver.example.com
```

## [IDOL] Section

The [IDOL] configuration section contains settings that allow QMS to contact the DAH, IDOL Server, or Content component that contains the data index. For example:

```
[IDOL]
Host=localhost
Port=9100
```

## [LanguageTypes] Section

The [LanguageTypes] configuration section determines the language processing settings that QMS uses.

QMS retrieves most language settings from the IDOL Content component.

To use the `OutputEncoding` parameter in your query actions, you must set `LanguageDirectory`. Micro Focus generally recommends that you do not override other language settings in QMS, to ensure that your components use the same language model.

If you do need to change the other language settings in QMS, you can set any parameters in the QMS configuration file that are available in the IDOL Content component [LanguageTypes] configuration. For more information, refer to the *IDOL Server Reference*.

```
[LanguageTypes]
LanguageDirectory=../common/langfiles
```

## [Logging] Section

The [Logging] section lists the log streams that you set up to create separate log files for different log message types (action and application). It also contains a subsection for each of the listed log streams, in which you configure the settings that determine how to log each stream. For example:

```
[Logging]
LogDirectory=./logs
LogTime=True
LogEcho=True
```

```
LogLevel=normal  
LogMaxSizeKBs=1024  
LogExpireAction=compress
```

```
0=ACTION_LOG_STREAM  
1=APP_LOG_STREAM
```

```
[ACTION_LOG_STREAM]  
LogFile=action.log  
LogTypeCSVs=query
```

```
[APP_LOG_STREAM]  
LogFile=application.log  
LogTypeCSVs=application
```

## [PromotionAgentStore] Section

The [PromotionAgentStore] configuration section contains settings that allow QMS to contact the Promotion Agentstore component. For example:

```
[PromotionAgentStore]  
Host=localhost  
Port=20050
```

## [Server] Section

The [Server] configuration section contains general settings for QMS. For example:

```
[Server]  
Port=16000  
DefaultLanguage=ENGLISH  
DefaultLanguageType=GenericUTF8  
AllowedQueryParams=Text,MatchResults  
EngineTimeout=180  
MaxResultsLimit=5000
```

### **NOTE:**

QMS obtains language settings from the Content component on startup. However, if this is not possible because of the security settings of your Content ACI port, or if you want to use sentence breaking libraries for query text processing, you can use the `DefaultLanguageType` parameter in the [Server] section of the QMS configuration file to set the default language type from within QMS itself. For more information, refer to the *QMS Reference*.

You can also list the languages that you use and define some generic parameters in the [LanguageTypes] section in the QMS configuration file. For more information on how to configure language types, refer to the *IDOL Server Reference*.

## [Service] Section

The [Service] configuration section contains settings that determine which machines can use and control the IDOL Server service. For example:

```
[Service]
ServicePort=16002
```

## [SSLOptionN] Section

The [SSLOptionN] configuration section contains settings that allow QMS to receive SSL connections from clients. For example:

```
[Server]
SSLConfig=SSLOptions1
...
[SSLOptions1] //SSL options for incoming connections
SSLMethod=TLSV1.2
SSLCertificate=host1.crt
SSLPrivateKey=host1.key
SSLCACertificate=trusted.crt
```

## Modify Configuration Parameter Values

You modify Query Manipulation Server 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 Query Manipulation Server 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 Query Manipulation Server 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 (including the section headings) 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 of the external configuration file, in quotation marks (""). You can use relative paths and network locations. After the configuration file path, 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 Parameters from an External Configuration File

This method allows you to import one or more parameters from an external configuration file at a specified point in your configuration file. You can import a single parameter or use wildcards to specify multiple parameters. The parameter values in the external file must match what you want to use in your file. This method does not import the section heading, such as [License] in the following examples.

### To include parameters 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 parameters from the external configuration file.
3. On a new line, type a left angle bracket (<), followed by the path of the external configuration file, in quotation marks (""). You can use relative paths and network locations. After the configuration file path, add the name of the section 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
```

You can use wildcards to import multiple parameters, but this method does not support default values. The \* wildcard matches zero or more characters. The ? wildcard matches any single character. Use the pipe character | as a separator between wildcard strings. For example:

```
< "license.cfg" [License] LicenseServer*
```

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 Query Manipulation Server 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, Query Manipulation Server uses the values in the [SharedSSLOptions] section of the external configuration file as the values in the [SSLOptions1] section of the Query Manipulation Server 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, Query Manipulation Server 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.

## Configure Child Servers

To run QMS, you must configure it to communicate with the IDOL Server data index, and the Promotion Agentstore.

You can use one of the following components to access the IDOL Server data index:

- Distributed Action Handler (DAH), which distributes the actions to child IDOL Servers.
- The IDOL Server IDOL Proxy component, which forwards the actions to the IDOL Server Content component.
- The IDOL Server Content component, which stores the data index.

### To configure child servers for QMS

1. Open the QMS configuration file in a text editor.
2. Find the [IDOL] section, or create one if it does not exist.
3. In the [IDOL] section, set the `Host` parameter to the host name or IP address of the server that you use to query the IDOL Server data index (DAH, IDOL Proxy, or the Content component). Set the `Port` parameter to the ACI port of this server.

For example:

```
[IDOL]  
Host=127.0.0.1  
Port=9000
```

4. Find the [PromotionAgentStore] section, or create one if it does not exist.
5. In the [PromotionAgentStore] section, set the `Host` parameter to the host name or IP address of the machine where the Promotion Agentstore component is installed. Set the `Port` parameter to the ACI port of the Promotion Agentstore.

For example:

```
[PromotionAgentStore]  
Host=127.0.0.1  
Port=9050
```

6. If you want to store statistics for QMS, find the [StatisticsServer] section, or create one if it does not exist.
7. (Optional) Specify the query parameters that QMS can pass through to child servers as the value of the `AllowedQueryParameters` parameter in the [Server] section of the QMS configuration file. Separate multiple parameters with a comma.
8. Save and close the QMS configuration file. Restart QMS for your changes to take effect.

Refer to the *QMS Reference* for more information.

### Related Topics

- [The QMS Configuration File, on page 27](#)

## Use a Community Component

If you want to use the QMS intent ranked query or intent based promotions functionality to promote results that are close to the interests of the user to the top of the result set, QMS must be able to communicate with a Community component. To set up communication with a Community component, you must perform one of the following tasks:

- Create a [Community] section in the configuration file, with Host and Port parameters that specify the host and port of the Community component that you want to use.

```
[Community]
Host=...
Port=...
```

Use this option if the [IDOL] section points to a DAH or IDOL Content server.

- Configure the [IDOL] section with the host and port of a unified IDOL server. If you use this option, no further configuration is required.

For more information on intent ranked queries and intent based promotions, see [Intent Based Ranking, on page 86](#) and [Intent Based Promotions, on page 63](#), and refer to the *QMS Reference*.

## Use a Request Cooker

A *request cooker* can arbitrarily modify a request. For example, you can use a request cooker to add extra parameters to any query that is sent to QMS. Request cookers are flexible and allow you to use custom rules to manipulate queries. The request cooker can be an external service, or you can use a Lua script.

When you use a request cooker, QMS sends the original action to the cooker. The cooker returns the modified request, and QMS applies whitelist, then blacklist, and then query text processing to it as necessary.

The cooker must specify the whole action to use.

You can also use an expanded request cooker to modify the request after QMS has applied any rules. See [Use an Expanded Request Cooker, on page 37](#).

## Request Cooker Lua Scripts

The Lua script must provide a globally accessible `cook_request` function, which accepts a string representation of the request as its only argument. The function must return a Lua table. The keys of this table are the parameter names to use in the action (the parameter names must be in lower case). The table values are the corresponding request values.

QMS loads the Lua script for every request that it cooks. This means that any changes to the script are reflected immediately in the query behavior.

The following example request cooker Lua script sets `MaxResults` to 10 for all queries:

```
-- load module that provides string to table request parser
aci = require "autn_aci"
-- Set maxresults to 10 on every query
function cook_request(request_string)
  cooked_request = aci.parse_request_string(request_string)
  cooked_request["maxresults"] = 10
  return cooked_request
end
```

**NOTE:**

This example assumes that the `autn_aci.lua` file is in the same directory as your script.

You can use the IDOL Lua libraries in your Lua scripts. For more information about the available functions and methods, see the *QMS Reference*.

## Configure the Request Cooker

The following procedure describes how to configure QMS to use a request cooker from an external service, or a Lua script.

### To use a request cooker

1. Open the QMS configuration file in a text editor.
2. Add a `[RequestCooker]` section to the QMS configuration file.
  - To use a custom Lua script to manipulate requests, set `Mode` to `lua`, and set `Script` to the path to the script that you want to use. For example:

```
[RequestCooker]
Mode=lua
Script=scripts\cookrequest-maxresults.lua
```

- To use an external server to manipulate requests, set `Mode` to `legacy`, and specify the host and port of the server. For example:

```
[RequestCooker]
Mode=legacy
Host=12.3.4.56
Port=8080
```

3. Send queries to QMS with the `CookRequest` parameter set to `True`.

If you want to cook all requests that you send to QMS, set the `CookAllRequests` configuration parameter to `True`.

**NOTE:**

When you set `CookAllRequests` to `True`, QMS does not retrieve or process cardinal placements.

Refer to the *QMS Reference* for more information on how to configure request cooking.

## Use an Expanded Request Cooker

An expanded request cooker is similar to a request cooker, but it modifies the action after QMS has processed rules and expanded the query according to those rules.

The request cooker is a Lua script that processes the action.

When you use an expanded request cooker, QMS applies whitelist, blacklist, and query text processing to the original action, and then sends the original action, the modified action, and the list of applied rules to the cooker. The cooker processes the query further, and then returns the final modified request.

The cooker must specify the whole action to use.

## Expanded Request Cooker Lua Scripts

The Lua script must provide a globally accessible `cook_expanded_request` function, which accepts three arguments:

- A string representation of the original request that QMS received.
- A string representation of the modified request after QMS applies any rules.
- A table of strings that lists the references of rules that were triggered by the original request.

The function must return a Lua table. The keys of this table are the parameter names to use in the action (the parameter names must be in lower case). The table values are the corresponding request values.

QMS loads the Lua script for every request that it cooks. This means that any changes to the script are reflected immediately in the query behavior.

You can use the IDOL Lua libraries in your Lua scripts. For more information about the available functions and methods, see the *QMS Reference*.

The following example Lua script changes the value of `MaxResults` according to whether a particular rule was activated in the query, and adds additional query terms when other rules were activated.

```
aci = require "lua/autn_aci"
function cook_expanded_request(request, expanded_request, matched_rules)
    req = aci.parse_request_string(expanded_request)

    if matched_rules["fieldexpand"] ~= nil then
        req["maxresults"] = "10"
    else
        req["maxresults"] = "3"
    end

    if matched_rules["synonym1"] ~= nil then
        req["text"] = string.format("%s AND Spain", req["text"])
    end
end
```

```
if matched_rules["finance"] ~= nil then
    req["text"] = string.format("%s OR money", req["text"])
end

return req
end
```

## Configure the Expanded Request Cooker

The following procedure describes how to configure QMS to use a request cooker from an external service, or a Lua script.

### To use a request cooker

1. Open the QMS configuration file in a text editor.
2. Add a `[ExpandedRequestCooker]` section to the QMS configuration file.
3. In the `[ExpandedRequestCooker]` section of the configuration file, set `Script` to the path to the script that you want to use. For example:

```
[ExpandedRequestCooker]
Script=qms\lua\cookrequest-maxresults.lua
```

4. Send queries to QMS with the `CookRequest` parameter set to `True`.

If you want to cook all requests that you send to QMS, set the `CookAllRequests` configuration parameter to `True`.

#### NOTE:

When you set `CookAllRequests` to `True`, QMS does not retrieve or process cardinal placements.

Refer to the *QMS Reference* for more information on how to configure query cooking.

## 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 Query Manipulation Server 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 *Query Manipulation Server 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.

## Configure Client Authorization

You can configure Query Manipulation Server 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 *Query Manipulation Server Reference*.

### IMPORTANT:

To ensure that Query Manipulation Server allows only the options that you configure in [AuthorizationRoles], make sure that you delete any deprecated RoleClients 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 Query Manipulation Server for your changes to take effect.

#### IMPORTANT:

If you do not provide any authorization roles for a standard role, Query Manipulation Server 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=*  
Clients=""
```

This configuration ensures that Query Manipulation Server uses only your action-based authorizations.

## Configure Query Manipulation Server to Receive SSL Connections

You can configure QMS to receive SSL communication from client servers.

### To configure SSL connections

1. Open the QMS configuration file in a text editor.
2. In the `[Server]` section, set the `SSLConfig` parameter to the name of the configuration file section where you specify details of the SSL connections, for example `SSLOptionN`.
3. Create a configuration section with the name that you have specified.
4. Set any SSL configuration parameters.

For example:

```
[Server]  
SSLConfig=SSLOptions1  
...  
  
[SSLOptions1] //SSL options for incoming connections  
SSLMethod=SSLV23  
SSLCertificate=host1.crt  
SSLPrivateKey=host1.key  
SSLCACertificate=trusted.crt
```

5. Save and close the QMS configuration file. Restart QMS for your changes to take effect.



# Part 2: Query Manipulation Server Operations

This section describes the operations that you can perform using QMS.

- [Query Manipulation Server Rules](#)
- [Query Manipulation Server Promotions](#)
- [Modify Queries](#)
- [Manipulate Results](#)
- [Use QMS TypeAhead](#)



## Chapter 5: Query Manipulation Server Rules

This section describes how to create QMS rules and index them into the Promotion Agentstore component.

• <a href="#">Query Manipulation Server Rules Overview</a> .....	45
• <a href="#">Configure Promotion Agentstore</a> .....	45
• <a href="#">Create Query Manipulation Server Rules</a> .....	47
• <a href="#">Match QMS Rules in Queries</a> .....	51
• <a href="#">Monitor Rule Usage</a> .....	52

### Query Manipulation Server Rules Overview

QMS rules contain the information that QMS uses to modify user queries. You store the rules in the Promotion Agentstore.

*Promotion Agentstore* is an IDOL Server Content component. It stores rules in the same way that the Content component stores documents, or the Agentstore components stores agents and categories.

QMS rules are IDX or XML documents that contain the fields that the Promotion Agentstore and QMS need to find and apply rules. You can create QMS rules in IDOL Data Admin, or you can create the IDX documents manually and index them into the Promotion Agentstore.

For details of how to use QMS in IDOL Data Admin, refer to the *IDOL Data Admin User Guide*.

You can create the following types of QMS rules:

- **Static promotions.** Return a specified document or set of documents as a promotion.
- **Dynamic promotions.** Return the results of a query as a promotion.
- **Synonyms.** Modify the query with synonymous terms.
- **Whitelists.** Modify the query to remove terms that do not occur in the whitelist.
- **Blacklists.** Modify the query to remove terms that occur in the blacklist.
- **Boost rules.** Add extra query FieldText.
- **Cardinal placements.** Add a document to a specified position in the results list.
- **Parametric cardinal placements.** Add a parametric value to a specified position in the results list.

### Configure Promotion Agentstore

The Promotion Agentstore is a Content component that stores the QMS rules. You can use the same configuration as the IDOL Server Agentstore component. However, you can improve performance by adding some configuration settings to the Promotion Agentstore component.

## AgentBoolean Fields

QMS rules match queries by using AgentBoolean and FieldText expressions. To optimize this matching process, you can configure the Promotion Agentstore to cache the values of the QMS rules fields that store the expressions.

For details about AgentBoolean fields, refer to the *IDOL Server Administration Guide*.

### To configure AgentBoolean fields

1. Open the Promotion Agentstore configuration file in a text editor.
2. In the [Server] section, add or edit the following configuration parameters:

```
[Server]
AgentBooleanCacheField=*/QMSAGENTBOOL
FieldTextCacheField=*/QMSFIELDTEXT
```

3. Restart the Promotion Agentstore for your changes to take effect.

#### NOTE:

If you change these settings after you index rules into Promotion Agentstore, you must re-index the rules.

## Field Processing

Promotion Agentstore can process different fields in the same way as IDOL Server. You can configure the Promotion Agentstore to process and store the QMS rules fields to optimize their retrieval.

For details about field processing, refer to the *IDOL Server Administration Guide*.

You can use the following fields and field properties to optimize performance:

Fields	Description	Field property
*/QMSTYPE,*/QMSVALUE2	Fields that QMS uses to sort results.	SortType
*/QMSTYPE	Fields that QMS must match exactly.	MatchType

For example:

```
[SetSortFields]
Property=SortFields
PropertyFieldCSVs=*/QMSTYPE,*/QMSVALUE2
```

```
[SetMatchFields]
Property=MatchFields
PropertyFieldCSVs=*/QMSTYPE
```

```
[SortFields]
SortType=True
```

```
[MatchFields]  
MatchType=True
```

## Create Query Manipulation Server Rules

The Promotion Agentstore component stores QMS rules in a similar way to the way in which IDOL Server stores agents and categories.

The QMS rules documents must contain text that defines the queries that they affect. They also define which actions are performed on the queries, and the results for any transformations. For some QMS rules you can also apply a schedule, so that the rule is active only at certain times.

You create QMS rules as IDX documents, which you index into the Promotion Agentstore. If you do not use QMS with IDOL Data Admin, you must manually create IDX documents and index them. For details on how to manually create an IDX document, refer to the *IDOL Server Administration Guide*.

### Create a QMS Rule IDX Document

A QMS document is a text file that includes the required IDX fields, saved with the file name extension .IDX.

The table describes the fields that each QMS rule contains.

#### Required IDX fields for all QMS rule documents

Field	Description
#DREREFERENCE	A unique reference string to identify the rule.
#DRETITLE	A title to identify the rule.
#DREFIELD QMSTYPE="N"	The type of rule. Each rule type has a different value of <i>N</i> . See <a href="#">Values of QMSTYPE</a> , on the next page.
#DREENDDOC	The end of the rule document. Add this field after all the rule fields.

In addition to these standard fields, you must add different fields depending on the type of rule. For example, you must add fields to specify the queries that a rule applies to, and to specify how QMS must modify the query or results.

Add each additional field in the following format:

```
#DREFIELD FIELDNAME="FieldValue"
```

where,

*FIELDNAME* is the name of the field.

*FieldValue* is the value that this field contains.

For example:

```
#DREFIELD QMSAGENTBOOL="panda AND bear"
```

If you include FieldText restrictions in the QMSFIELDTEXT field (or another field), you must also add any fields that you use in the field restrictions as empty fields. For example:

```
#DREFIELD QMSFIELDTEXT="MATCH{poodle}:BREED"  
#DREFIELD BREED=""
```

### Related Topics

- [Values of QMSTYPE, below](#)
- [Schedules for QMS Rules, on the next page](#)
- [Example QMS Rule, on page 50](#)
- [Index QMS Rules, on page 50](#)
- [Query Manipulation Server Promotions, on page 55](#)
- [Modify Queries, on page 65](#)
- [Manipulate Results, on page 81](#)

## Values of QMSTYPE

QMS and the Promotion Agentstore use the value of the QMSTYPE field in each rule document to determine the type of rule that the document describes. You can use the following values for the QMSTYPE field.

1	Cardinal placement (insertion)	Adds or moves a document to a specified position in a results list.
2	Static promotion	Returns a promotion document or set of documents.
3	Dynamic promotion	Returns the results of a query as promotion documents.
4	Synonyms	Modifies the query to include synonymous terms.
5	Whitelist	Removes query terms that do not match the words in the whitelist.
6	Blacklist	Removes query terms that match the words in the blacklist.
7	Boost rules	Expands the query FieldText to include extra terms.
8	Parametric cardinal placement (parametric insertion)	Adds or moves a parametric value to a specified position in a results list.

### Related Topics

- [Cardinal Placement Rules, on page 82](#)
- [Static Promotions, on page 56](#)

- [Dynamic Promotions, on page 60](#)
- [Create Synonym Rules, on page 65](#)
- [Create Whitelist and Blacklist Rules, on page 74](#)
- [Create Boost Rules, on page 77](#)
- [Parametric Cardinal Placement Rules, on page 84](#)

## Schedules for QMS Rules

For rules with a QMSTYPE of 1, 2, or 3 (document cardinal placement or promotions), you can set a schedule to determine when the rule applies.

### IDX fields for schedules

Field	Description	Content type or value
ALWAYSACTIVE	Whether the rule is always active.  If this field is absent or contains the value <code>False</code> , the SCHEDULE field must contain a valid value.	Boolean value
SCHEDULE	The schedule for when the rule applies.	iCalendar format schedule data

- To apply the rule all the time, add the ALWAYSACTIVE document field with the value `True`.
- To apply a schedule, add the SCHEDULE document field. This field is required if the ALWAYSACTIVE field is absent, or if it contains the value `False`.

You must define the schedule in iCalendar format. For details about this format, refer to:

<http://datatracker.ietf.org/doc/rfc5545/>

Separate the parameters and values with colons (:). Separate each parameter and value pair with a plus sign and two backslashes (+\\). For example:

```
SCHEDULE="BEGIN:VCALENDAR+\\PROID:-//Autonomy//schedule  
1.0//EN+\\VERSION:2.0+\\CALSCALE:GREGORIAN+\\BEGIN:VEVENT+\\DTSTAMP:20080319T194426  
Z+\\SUMMARY:+\\DTSTART:20080321T220000+\\DTEND:20080322T060000+\\RRULE:FREQ=WEEKLY;  
UNTIL=20080530T000000Z;INTERVAL=2;BYDAY=TU,FR;WKST=SU+\\END:VEVENT+\\END:VCALENDAR  
+\\"
```

QMS automatically detects whether the iCalendar schedule is percent-encoded.

#### NOTE:

The following iCalendar formats are not available in QMS rules:

- "BYSECOND", "BYMINUTE", "BYHOUR", "BYEARDAY", "BYWEEKNO" and "BYSETPOS" recurrences.
- Weekday numerics, for example:

```
"Last Friday of every month => [FREQ=MONTHLY;BYDAY=-1FR]"  
"Second Tuesday of every year => [FREQ=YEARLY;BYDAY=2TU]"
```

### **Related Topics**

- [Static Promotion Rules, on page 56](#)
- [Dynamic Promotion Rules, on page 60](#)
- [Cardinal Placement Rules, on page 82](#)

## **Example QMS Rule**

The following example of a QMS rule IDX document is a parametric cardinal placement rule that places the value `giant panda` at the top of a parametric list of values of the `species` field.

```
#DREREFERENCE Rule  
#DRETITLE PromotePanda  
#DREFIELD QMSTYPE="8"  
#DREFIELD QMSAGENTBOOL="*" "  
#DREFIELD QMSFIELDTEXT="MATCH{2002}:born"  
#DREFIELD BORN="" "  
#DREFIELD QMSFIELDNAME="species"  
#DREFIELD QMSFIELDVALUE="giant panda"  
#DREFIELD QMSVALUE="1"  
#DREFIELD ALWAYSMATCH="1"  
#DRECONTENT  
#DREENDDOC
```

### **Related Topics**

- [Example Static Promotion Rule, on page 57](#)
- [Example Dynamic Promotion Rule, on page 61](#)
- [Example Synonym Rules, on page 72](#)
- [Example Hyponym Rule, on page 73](#)
- [Example Hypemym Rule, on page 73](#)
- [Example Blacklist Rule, on page 75](#)
- [Example Whitelist Rule, on page 76](#)
- [Example Boost Rule, on page 79](#)
- [Parametric Cardinal Placement, on page 84](#)

## **Index QMS Rules**

You publish QMS rules by indexing them into the `Activated` database in the Promotion Agentstore.

### To index rules into the Promotion Agentstore

- Send a DREADD action. This action takes the following form:

`http://AgentStoreHost:IndexPort/DREADD?FileName=FileName.idx&DREdbName=Database`

where,

<i>AgentStoreHost</i>	is the IP address or host name of the machine on which the Promotion Agentstore is installed.
<i>IndexPort</i>	is the index port of the Promotion Agentstore (specified in the <code>IndexPort</code> parameter in the [Server] section of the Promotion Agentstore configuration file).
<i>FileName</i>	is the name of the IDX file that contains your rules.
<i>Database</i>	is the name of the database in the Promotion Agentstore that contains QMS rules. QMS searches for rules in the <code>Activated</code> database.

For details about the DREADD index action, refer to the *IDOL Server Administration Guide*.

#### Related Topics

- [Create a QMS Rule IDX Document, on page 47](#)

## Match QMS Rules in Queries

The Promotion Agentstore component retrieves rules in the same way that the IDOL Server Agentstore component retrieves categories and agents. You must set up your rules correctly to ensure that your QMS rules return for relevant queries.

When Promotion Agentstore matches query text against rules, it uses the following matching order:

1. It matches the query text against the `Index` fields in the rules (for example `DRECONTENT`).
2. For rules that match in step 1, it matches the query text against the Boolean restrictions in the `QMSAGENTBOOL` field of the rule.
3. For rules that match in step 2, it matches the query text against the `FieldText` restrictions in the `QMSFIELDTEXT` field in the rule (if this field exists).

Promotion Agentstore checks the Boolean restriction only if the rule content matches the query.

To ensure that rules match query text, the `DRECONTENT` field (or another index field) must contain terms that match the Boolean expression. For example, you could add each term from the Boolean expression to the `DRECONTENT` field.

In some cases, it is not possible to include every term that might match your Boolean expression to the `DRECONTENT` field, for example because the expression contains Wildcards. In this case, you can configure an `AlwaysMatchType` field and add this field to your QMS rules.

When a rule contains an `AlwaysMatchType` field, Promotion Agentstore bypasses the first matching step, and checks the Boolean and `FieldText` restrictions for the rule.

For more information about `AlwaysMatchType` fields in `AgentBoolean` queries, refer to the *IDOL Server Administration Guide*.

**NOTE:**

In boost rules, you must configure and use an `AlwaysMatchType` field. QMS uses this value to retrieve these rules, and you do not need to add extra terms.

In whitelist and blacklist rules, you do not need to set `DRECONTENT`, because QMS retrieves the lists directly by using the document reference.

You can optimize the performance of matching rules in the same ways that you optimize `AgentBoolean` agents and categories in IDOL Server. For more information, refer to the *IDOL Server Administration Guide*.

**Related Topics**

- [Boost Rules, on page 76](#)
- [Whitelists and Blacklists, on page 74](#)

## Monitor Rule Usage

You can configure QMS to log a message each time it activates a particular rule in the Promotion Agentstore. QMS uses IDOL document tracking functionality to log a message when a rule is activated.

Alternatively, you can use document tracking (with a Lua script) to send information to a Statistics Server, so that you can monitor the most frequently used rules. For more information about sending data to Statistics Server, see [Record Statistics with Statistics Server, on page 97](#).

### To configure QMS to log rule usage

1. Open the QMS configuration file in a text editor.
2. QMS only writes log messages about rule activations when document tracking is configured to send events to the log. In the `[DocumentTracking]` section, set the `Backend` parameter to `Log`. For example:

```
[DocumentTracking]
Backend=Log
```

3. In the `[Logging]` section, configure a new log stream to log the events. Set `LogTypeCSVs` to `Events`. For example:

```
[Logging]
...
0=ApplicationLogStream
1=QueryLogStream
2=EventsLogStream
```

```
[EventsLogStream]
```

**LogFile=events.log**  
**LogTypeCSVs=events**

For information about the other configuration parameters you can set to configure logging, refer to the *QMS Reference*.

4. Save and close the QMS configuration file. Restart QMS for your changes to take effect.



# Chapter 6: Query Manipulation Server Promotions

This section describes how to use QMS to manage promotions.

- [Promotions Overview](#) .....55
- [Static Promotions](#) .....56
- [Dynamic Promotions](#) .....60
- [Scope Rules](#) .....62
- [Query for Promotions](#) .....62

## Promotions Overview

A *promotion* is targeted content that you want to display to users but is not included in the search results, such as advertisements. QMS promotion rules allow you to return and display promotion documents that are similar to a user query.

You can create promotions in QMS to ensure that certain results return for a particular query. For example, you might want to return a particular set of products when a user queries for phones.

There are two types of promotions:

- *Static promotions* list a specific document or set of documents.
- *Dynamic promotions* contain a query. The promotion documents are the results that return for this query.

When you query QMS for promotions, QMS forwards the query to the Promotion Agentstore. The Promotion Agentstore returns a list of promotions that match the query.

- The static promotions contain a list of document references, which QMS retrieves from IDOL Server and returns as promotions.
- The dynamic promotions contain a query, which QMS sends to IDOL Server. It then returns the results of this query as promotions.

QMS stores promotions in a similar way to cardinal placements. However, when you query for promotions, only the promotion documents return.

When you query the Promotion Agentstore, you can also use *scope rules* to filter the list of results that return according to specific values. For more information on how to set up scope rules and use them in promotions queries, see [Scope Rules, on page 62](#).

### Related Topics

- [Cardinal Placement, on page 81](#)
- [Static Promotions, on the next page](#)
- [Dynamic Promotions, on page 60](#)
- [Query for Promotions, on page 62](#)

## Static Promotions

A *static promotion* returns a specific promotion document or group of documents when a user sends a matching query to IDOL.

The static promotion rule contains a list of document references. QMS retrieves the promotion documents from IDOL Server and returns them to the client.

## Static Promotion Rules

The following table shows all the fields that you must include in the IDX file for static promotion rules.

**NOTE:**

The rule format described in this table assumes that the documents that you want to promote exist in your IDOL Server data index. Micro Focus recommends that you promote only indexed content. However, if required, you can also add promotion items into your static promotion IDX. See [Promote Non-Indexed Content, on page 58](#).

### Required IDX fields for static promotion rules

Field	Description	Content type or value
#DRREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSATYPE	The type of the QMS rule.	2
QMSAGENTBOOL	The AgentBoolean expression used to match the original query text.	Boolean matching expression
QMSFIELDTEXT	The FieldText rules to match the original query text.	FieldText expression
QMSVALUE1	The references of the promotion documents.	Comma-separated list of strings
PROMOTION_NAME	The value that QMS must return in the <code>autn:promotionname</code> element. IDOL Data Admin uses this field value as the promotion type. Use one of the following values: <ul style="list-style-type: none"><li>• <b>Top Promotions.</b> A list of documents that are being promoted internally. Top Promotions are not advertisements.</li></ul>	String

**Required IDX fields for static promotion rules, continued**

Field	Description	Content type or value
	<ul style="list-style-type: none"> <li>• <b>Sponsored.</b> A paid advertisement.</li> <li>• <b>Hotwire.</b> Promoted documents that are shown at the top of a results list for a particular keyword, but are noticeably distinct from the list.</li> </ul>	
QMSUSERTYPE	The value that QMS must return in the <code>autn:userType</code> element.	String
FIELD_CRITERIA_DATABASEMATCH	(Optional) The Content databases that this rule matches. If you include this field, QMS returns the promotions for this rule only if the original query includes a <code>DatabaseMatch</code> parameter with at least one database that matches the <code>FIELD_CRITERIA_DATABASEMATCH</code> . QMS applies this field only when the original query includes the <code>DatabaseMatch</code> action parameter.	String
QMS_SCOPE_RULE	(Optional) You can use this field with the <code>PromotionsScope</code> query parameter to return only promotions that match the text that you specify as the scope rule. This allows you to filter the list of returned promotions by user-defined criteria such as a specific department or job function.	String list. Separate items in the list with a comma.
DRECONTENT	Terms to match the query text.	String

You must also add either:

- the `ALWAYSACTIVE` field with the value `True`.
- a `SCHEDULE` field with iCalendar data.

See [Schedules for QMS Rules, on page 49](#).

**Related Topics**

- [Create Query Manipulation Server Rules, on page 47](#)
- [Create a QMS Rule IDX Document, on page 47](#)
- [Scope Rules, on page 62](#)

**Example Static Promotion Rule**

The following QMS rule returns when you send a query for promotions that contains one or more of the terms *news*, *drama*, or *data* in the query text. QMS then returns the IDOL Server document with the reference 4567389246372.

```
#DREREFERENCE static_promotion
#DRETITLE url_redirect_1
```

```
#DREDBNAME ACTIVATED
#DREOUTPUTENCODING UTF8
#DRELANGUAGETYPE englishUTF8
#DREFIELD QMSAGENTBOOL="news OR drama OR data"
#DREFIELD PROMOTION_NAME="static_promotion_1"
#DREFIELD QMSTYPE="2"
#DREFIELD QMS_PROMOTION_ITEMS=""
#DREFIELD QMS_PROMOTION_ITEM_COUNT=""
#DREFIELD QMSVALUE1="4567389246372"
#DREFIELD ALWAYSACTIVE="True"
#DRECONTENT
NEWS DRAMA DATA
#DREENDDOC
```

For example, the following query to QMS returns this promotion:

```
action=Query&Text=drama&Promotions=True
```

## Promote Non-Indexed Content

In most cases, Micro Focus recommends that you set up promotions that promote content that exists in your IDOL Server data index. However, in some cases you might need to promote a document that you do not want to index.

To promote content that does not exist in an index, you can use the same rule format as for other static promotions, except:

- you exclude the QMSVALUE1 field.
- you include the fields described in the following table.

### Additional IDX fields for static promotion rules that promote non-indexed content

Field	Description	Content type or value
QMS_PROMOTION_ITEMS	Data for promotions that do not exist in the Content database.	String list with document fields. Separate items in the list with \n and then percent-encode the list.
QMS_PROMOTION_ITEM_COUNT	The number of promotions included in the QMS_PROMOTION_ITEMS field.	Number

The QMS\_PROMOTION\_ITEMS field contains the promotion content (percent-encoded).

The promotion items have a similar structure to an IDX document, except that field names do not have a hash (#) at the start.

Each promotion item must contain a DOCREFN field., where N is the number of the promotion item (starting from zero).

Promotion items can also optionally contain the fields listed in the following table. Each field in the promotion item must start on a new line.

DOCSUMMARYN	A document summary.
DRETITLEN	The document title.
DOCIMAGEN	A reference to an image file to use in the document.
DREFIELDN <i>SubFieldName</i>	A document field. These fields use the same format as fields in an IDX document.

**TIP:**  
 In query results, you can hide or display these fields in the same way as normal document fields, by using appropriate options in the `Print` query parameter.

### Example Promotion for Non-Indexed Content

The following QMS rule returns when you send a query for promotions that contains one or more of the terms *cat*, *dog*, or *pet* in the query text. QMS then returns two promotion items, which are shown below the text.

```
#DREREFERENCE static_promotion
#DRETITLE pet_promotion
#DREDBNAME ACTIVATED
#DREOUTPUTENCODING UTF8
#DRELANGUAGETYPE englishUTF8
#DREFIELD QMSAGENTBOOL="cat OR dog OR pet"
#DREFIELD PROMOTION_NAME="static_promotion_2"
#DREFIELD QMSTYPE="2"
#DREFIELD QMS_PROMOTION_
ITEMS="DRETITLE0%20All%20Your%20Pet%20Needs%0D%0ADOCREF0%20http%3A%2F%2Fwww.example
.com%2Fpets.html%0D%0ADREFIELD0%20TYPE%20advert%0D%0ADREFIELD0%20PETLISTING%20cats%
20and%20dogs%0D%0ADRETITLE1%20How%20to%20Look%20after%20Your%20Pet%0D%0ADOCIMAGE1%2
0http%3A%2F%2Fwww.example%2Fcom%2Fkitten.jpg%0D%0ADOCREF1%20http%3A%2F%2Fwww.examp1
e%2Fcom%2Fpetcare.html%0D%0ADREFIELD1%20TYPE%20instructional%0D%0ADREFIELD1%20PETLI
STING%20cats%20and%20dogs%0D%0A"
#DREFIELD QMS_PROMOTION_ITEM_COUNT="2"
#DREFIELD ALWAYSACTIVE="True"
#DRECONTENT
CAT DOG PET
#DREENDDOC
```

The two unencoded promotion documents are:

```
DRETITLE0 All Your Pet Needs
DOCREF0 http://www.example.com/pets.html
DREFIELD0 TYPE advert
DREFIELD0 PETLISTING cats and dogs
```

```
DRETITLE1 How to Look after Your Pet
```

```
DOCIMAGE1 http://www.example.com/kitten.jpg
DOCREF1 http://www.example.com/petcare.html
DREFIELD1 TYPE instructional
DREFIELD1 PETLISTING cats and dogs
```

## Dynamic Promotions

A *dynamic promotion* returns documents that match a particular promotion query. When you send a query to QMS that matches the rule, QMS sends a promotion query to IDOL Server or the Content component. QMS then returns the results documents for this query as a promotion.

## Dynamic Promotion Rules

The table shows all the fields that you must include in the IDX file for dynamic promotion rules.

### Required IDX fields for dynamic promotion rules

Field	Description	Content type or value
#DREREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSTYPE	The type of the QMS rule.	3
QMSAGENTBOOL	The AgentBoolean expression used to match the original query text.	Boolean matching expression
QMSFIELDTEXT	The FieldText rules to match the original query text.	FieldText expression
PROMOTION_NAME	The value that QMS must return in the <code>autn:promotionname</code> tag. IDOL Data Admin uses this field value as the promotion type. Use one of the following values: <ul style="list-style-type: none"> <li>• <b>Top Promotions.</b> A list of documents that are being promoted internally. Top Promotions are not advertisements.</li> <li>• <b>Sponsored.</b> A paid advertisement.</li> <li>• <b>Hotwire.</b> Promoted documents that are shown at the top of a results list for a particular keyword, but are noticeably distinct from the list.</li> </ul>	String
QMSUSERTYPE	The value that QMS must return in the <code>autn:usertype</code> tag.	String

**Required IDX fields for dynamic promotion rules, continued**

Field	Description	Content type or value
DYNAMIC_QUERY_TEXT	The query text to send for additional promotions.	String
FIELDTEXTRESTRICTION	The optional field text restriction for the query to send for additional promotions.	Percent-encoded string.
FIELD_CRITERIA_DATABASEMATCH	(Optional) The Content databases that this rule matches. If you include this field, QMS returns the promotions for this rule only if the original query includes a <code>DatabaseMatch</code> parameter with at least one database that matches the <code>FIELD_CRITERIA_DATABASEMATCH</code> . QMS applies this field only when the original query includes the <code>DatabaseMatch</code> action parameter.	String
DYNAMIC_DATABASEMATCH	The databases to query for additional promotions.	String
QMS_SCOPE_RULE	(Optional) You can use this field with the <code>PromotionsScope</code> query parameter to return only promotions that match the text that you specify as the scope rule. This allows you to filter the list of returned promotions by user-defined criteria such as a specific department or job function.	String list. Separate items in the list with a comma.

You must also add the `ALWAYSACTIVE` field with the value `True`, or a `SCHEDULE` field with iCalendar data. See [Create a QMS Rule IDX Document, on page 47](#).

**Related Topics**

- [Create Query Manipulation Server Rules, on page 47](#)
- [Create a QMS Rule IDX Document, on page 47](#)
- [Scope Rules, on the next page](#)

**Example Dynamic Promotion Rule**

The following QMS rule returns when you send a query for promotions that contains one or more of the terms *orange*, *melon*, or *fruit* in the query text. QMS then returns the results of an IDOL Server query for the text *pumpkin* from the `food` database.

```
#DREREFERENCE dynamic_promotion
#DRETITLE dynamic_promo_1
#DREDBNAME ACTIVATED
#DREFIELD QMSAGENTBOOL="orange OR melon OR fruit"
#DREFIELD DYNAMIC_DATABASEMATCH="food"
```

```
#DREFIELD PROMOTION_NAME="Top promotions"  
#DREFIELD QMSTYPE="3"  
#DREFIELD DYNAMIC_QUERY_TEXT="pumpkin"  
#DREFIELD FIELDTEXTRESTRICTION="MATCH{fruit}:TYPE"  
#DREFIELD ALWAYSACTIVE="True"  
#DRECONTENT  
ORANGE MELON FRUIT  
#DREENDDOC
```

For example, the following query to QMS returns this promotion:

```
action=Query&Text=melon&Promotions=True
```

It sends the following query to IDOL Server to retrieve the promotion documents:

```
action=Query&Text=pumpkin&FieldText=MATCH{fruit}:TYPE&DatabaseMatch=food
```

**NOTE:**

For queries where a synonym rule database restriction applies, you can specify multiple databases in the `DatabaseMatch` request parameter by separating them with a plus symbol or a space.

## Scope Rules

You can use scope rules with [Static Promotion Rules](#) and [Dynamic Promotion Rules](#) to specify that a promotion is relevant to a particular set of users. You can then specify in your promotions queries that you want to return only promotions that match the text that you specified as the scope rule. For example, you might want to set up a scope rule for promotions that are of particular relevance to the Human Resources and Legal departments of your company; you can then specify in your query that only promotions that match that scope rule should return.

### To set up scope rules

- Add the `QMS_SCOPE_RULE` field to the IDX file for your promotion rule. Set the value of the field to the term that you want to match on when you query the Promotion Agentstore. You can create multiple `QMS_SCOPE_RULE` fields to specify multiple values. For example:

```
#DREFIELD QMS_SCOPE_RULE="HR"  
#DREFIELD QMS_SCOPE_RULE="Legal"
```

### To use scope rules in your queries

- Send queries with the `PromotionsScope` parameter set to a comma-separated list of terms that you want to match on when you query the Promotion Agentstore, as specified in the `QMS_SCOPE_RULE` fields.

QMS applies only rules that match at least one of the values in the specified `PromotionsScope`.

## Query for Promotions

Use the following procedure to query both static and dynamic promotions.

### To query for promotions

- Send queries with the `Promotions` parameter set to `True` to return promotions.

For example:

```
action=Query&Text=phone&Promotions=True
```

This query searches all published promotions and returns all promotions that match the word *phone*.

When you query for promotions, only the promotion documents return.

### To use scope rules in your query

- Send queries with the `PromotionsScope` parameter set to the value of the scope rules that you want to match on.

For example:

```
action=Query&Text=contract&Promotions=True&PromotionsScope=Legal
```

This query searches all published promotions and returns all promotions where `QMS_SCOPE_RULE` is set to `Legal` that contain the text *contract*. `PromotionsScope=Legal` translates to `FieldText=MATCH{Legal}:QMS_SCOPE_RULE` in the query.

Refer to the *QMS Reference* for more information.

### Related Topics

- [Static Promotions, on page 56](#)
- [Dynamic Promotions, on page 60](#)
- [Scope Rules, on the previous page](#)

## Intent Based Promotions

QMS supports intent based promotions, whereby documents from promotions that are similar to the interests of the user are automatically boosted in the results.

#### NOTE:

Intent based ranking is licensed functionality, and is not available by default. Contact Technical Support for further details.

To run an intent based promotions query, set `IntentRankedQuery` to `True`, and set `Username` to the user name of the user that you want to target. For example:

```
action=Query&Text=phone&Promotions=True&IntentRankedQuery=True&Username=jsmith
```

In this case, QMS queries the Promotion Agentstore a second time, using the profile terms for `jsmith`, against the set of promotion rules originally returned. QMS then returns the IDOL Server documents with the references from the `QMSVALUE1` fields of the static promotion rules that match this second query as intent ranked promotions.

To use intent based promotions, QMS must be able to communicate with a Community component and a Promotions Agentstore component. You can enable this feature in one of the following ways:

- Configure the [IDOL] section of the QMS configuration file with the host and port of an IDOL server.
- Create a [Community] section and a [PromotionAgentStore] section in the QMS configuration file, with Host and Port parameters that specify the host and port of the Community and Promotion Agentstore components that you want to use. Use this option if the [IDOL] configuration file section points to a DAH or IDOL Content component.

**Related Topics**

- [Static Promotions, on page 56](#)

## Chapter 7: Modify Queries

This section describes how to use QMS to modify queries.

For example, QMS can modify queries to add synonymous terms or increase the relevance weighting of certain results.

When QMS receives a query, it forwards the query to the Promotion Agentstore. Any rules that match the query return, and QMS modifies the query according to the rules.

- [Synonyms, Hyponyms, and Hypernyms](#) ..... 65
- [Whitelists and Blacklists](#) ..... 74
- [Boost Rules](#) ..... 76

### Synonyms, Hyponyms, and Hypernyms

You can use QMS to expand queries to include other terms that are synonymous with the other query terms.

The synonym QMS rules allow you to determine a set of keyword terms that the rule applies to, and then to specify how QMS must expand the query. For example, you can use the following types of rules:

- **Synonym rule.** Include the original query term and add a list of synonymous terms. For example, you could expand a query for *dog* to a query for *dog OR hound OR canine*.
- **Hyponym rule.** Exclude the original query term, and replace it with a list of terms that are hyponyms of this term (that is, the original term could describe all the new terms). For example, you could replace a query for *dog* with a query for *poodle OR retriever OR labrador* and so on.
- **Hypernym rule.** Exclude the original query term, and replace it with a single term that is the hypernym of this term (that is, the new term could describe the original term). For example, you could replace a query for *poodle* with a query for *dog*.

### Create Synonym Rules

In all synonym rules, the IDX rule document has the same basic form.

The table shows all the fields that you must include in the IDX file for synonym rules. The value of the `KEYWORDS` and `CONCEPT` fields determines whether the rule is a synonym, hyponym, or hypernym rule.

**Required IDX fields for synonym rules**

Field	Description	Content type or value
#DRREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSTYPE	The type of the QMS rule.	4
QMSAGENTBOOL	The AgentBoolean expression to use to match the original query text.	Boolean matching expression
KEYWORDS	A list of words to match in the original query text.	Comma-separated list of words or phrases.
CONCEPT	The expanded query text that replaces the matched query text.	Replacement string.
DATABASERESTRICTION	(Optional) The Content databases that this rule matches. If you include this field, QMS applies the synonym rule only if the original query includes a DatabaseMatch parameter with at least one database that matches the DATABASERESTRICTION. QMS applies this field only when the original query includes the DatabaseMatch and SynonymDatabaseMatch action parameters.	String
SYNONYMDATABASEMATCH	Set a value for this field to use synonym database matches in this rule. If this field is empty or missing, QMS does not apply the DATABASERESTRICTION for this rule.	
SYNONYMREPLACE	(Optional) A Boolean value that specifies whether to replace the whole query text with the CONCEPT. This field value overrides the value of the SynonymReplace action parameter for queries that match this rule.	TRUE or FALSE

When a query matches the rule, QMS replaces any of the specified KEYWORDS that exist in the text with the value in the CONCEPT field.

**NOTE:**  
 If you set SYNONYMREPLACE to TRUE, the KEYWORDS field is not required, and QMS always replaces the whole query text.

KEYWORDS can be a list of individual words or phrases. Separate each word or phrase with a comma. For example:

```
#DREFIELD KEYWORDS="Software Development Kit,SDK"
```

When you use phrases, the entire phrase must match the query text for QMS to apply the rule. For example, *software* does not match this keyword example.

If your keyword phrase contains a comma, you must percent-encode it in the rule. For example:

```
#DREFIELD KEYWORDS="Hello%2C World,Goodbye"
```

**NOTE:**

QMS does not apply synonyms to exact phrase searches by default. For more information, see [Expand Exact Phrase Searches, on page 70](#).

CONCEPT can be any valid query text string, which QMS inserts into the query text in place of the matching keyword or phrase. For example:

```
#DREFIELD CONCEPT="Software Development Kit" OR SDK"
```

QMS surrounds multiple-word query strings with brackets when it modifies the query. For example, if a user searches for SDK OR API, QMS expands the query to ("Software Development Kit" OR SDK) OR API.

**TIP:**

You can use the SYNONYM query operator in the CONCEPT field. This operator contains a list of synonymous terms. When IDOL Server processes this query, it finds results that contain any of the synonymous terms. For result weighting, IDOL Server treats all the synonyms as if they are a single term, which can improve the result ordering. For example:

```
#DREFIELD CONCEPT="SYNONYM("Software Development Kit" SDK)"
```

For more information, refer to the *IDOL Server Administration Guide*.

You can use the \$QUERYTEXT\$ template string in the CONCEPT field, to insert the original query text. For example, if you have a Wildcard in your AgentBoolean rule, you can include the query text in CONCEPT to capture all possible variations of the wildcard expression without enumerating them individually. For example:

```
#DREFIELD QMSAGENTBOOL "Al* AND Smith"  
#DREFIELD KEYWORDS "Al Smith"  
#DREFIELD CONCEPT "(Alexander Smith) OR ($QUERYTEXT$)"
```

**TIP:**

You might want to use this template string with the SYNONYMREPLACE field, to avoid repeating the original text in the final modified query.

You can use an appropriate combination of KEYWORDS and CONCEPTS to create synonym, hyponym, and hypernym rules.

**To create a synonym rule**

- Set the KEYWORDS field to a list of all the synonymous terms, and set the CONCEPT field to the same list.

QMS expands any query that matches one keyword to include all the other keyword terms.

**To create a hyponym rule**

- Set the `KEYWORDS` field to the parent term, and set the `CONCEPT` field to the list of terms that the parent term describes (the hyponyms).

QMS alters a query that matches the parent term to include all the hyponyms, but not the original term.

#### To create a hypernym rule

- Set the `KEYWORDS` field to a list of the terms that the hypernym describes, and set the `CONCEPT` field to the parent term (hypernym).

QMS alters any query that matches one of the list of child terms to query for the hypernym (and not the original term).

#### Related Topics

- [Example Synonym Rules, on page 72](#)
- [Example Hyponym Rule, on page 73](#)
- [Example Hypernym Rule, on page 73](#)

## Field Dependent Synonym Rules

You can create a synonym rule that matches queries only when certain `FieldText` is present. For example, you might have a synonym list that applies only for game products, and you do not want to apply the synonyms for DVDs.

#### Required `IDX` fields for field dependent synonym rules

Field	Description	Content type or value
<code>#DREREFERENCE</code>	The reference for the rule.	String
<code>#DRETITLE</code>	The title of the rule.	String
<code>QMSTYPE</code>	The type of the QMS rule.	4
<code>QMSAGENTBOOL</code>	The <code>AgentBoolean</code> expression used to match the original query text.	Boolean matching expression
<code>KEYWORDS</code>	A list of words or phrases to match the query text.	Comma-separated list of words or phrases
<code>CONCEPT</code>	The expanded query text that replaces the matched query text.	Replacement string
<code>DATABASERESTRICTION</code>	The databases to query.	String

**Required IDX fields for field dependent synonym rules, continued**

Field	Description	Content type or value
QMSFIELDTEXT	The FieldText expression that must match the original query.	FieldText expression
Referenced Fields	All fields that the QMSFIELDTEXT field references must be present in the rule as a field with blank content.	Empty field
SYNONYMREPLACE	(Optional) A Boolean value that specifies whether to replace the whole query text with the CONCEPT. This field value overrides the value of the SynonymReplace action parameter for queries that match this rule.	TRUE or FALSE

## Send Synonym Queries

QMS can expand a query to include all terms that are synonymous with the query text. For each query, QMS queries the Promotion Agentstore for lists of synonyms for the query text. It adds the synonyms to the query that it sends to IDOL Server.

For example, if a synonym rule states that *dog* is synonymous with *hound*, QMS expands the query for *dog* to (*dog OR hound*) before it sends it to IDOL Server.

Refer to the *QMS Reference* for more information.

### To use synonym queries

1. Create QMS rules containing the synonym lists.
2. Send queries with the ExpandQuery parameter set to True.

If your synonym rules contain a DATABASERESTRICTION field, you must set the SynonymDatabaseMatch parameter to True to apply the restriction. By default, QMS does not apply the database restriction.

For example:

```
action=Query&Text=phone&ExpandQuery=True
```

In this query, QMS searches for synonyms that contain the word *phone*. It includes all synonymous terms in the query and returns results for all terms.

## Send Synonym Queries that Replace Query Text

You can use QMS to replace all the text in a query with the result of a synonym rule.

By default, QMS replaces terms that match the synonym rule `KEYWORDS` field with all terms that match the synonym rule `CONCEPT` field. Other terms in the query are not changed.

You can set the `SynonymReplace` action parameter in the query to replace all the query text with the `CONCEPT`.

For example, if you have set:

```
#DREFIELD KEYWORDS="labrador"  
#DREFIELD CONCEPT="dog"
```

The following query:

```
action=Query&Text=I walk my labrador in the park&ExpandQuery=True
```

expands to:

```
action=Query&Text=I walk my dog in the park
```

However, the following query:

```
action=Query&Text=I walk my labrador&ExpandQuery=True&SynonymReplace=True
```

expands to:

```
action=Query&Text=dog
```

**NOTE:**

If you set the `SYNONYMREPLACE` field in a synonym rule, the value of the field overrides the value of the action parameter when the query matches that rule.

For example, if your query has the `SynonymReplace` action parameter set to `True` and it matches a rule that has the `SYNONYMREPLACE` field set to `FALSE`, QMS ignores the action parameter and does not replace the query text.

## Expand Exact Phrase Searches

QMS does not apply synonym rules to exact phrase searches unless you set the parameter `ExpandPhrases` to `TRUE`. For example, with the default configuration, if a user searches for "software development kit" (including the quotation marks), QMS does not modify the query.

To change the default behavior and apply synonym rules to exact phrase searches, set `ExpandPhrases=TRUE` in the `[Server]` section of the configuration file. The default setting can also be overridden for specific actions by setting the `ExpandPhrases` action parameter.

For example, you might create the following synonym rule:

```
#DRREFERENCE sdk_synonyms  
#DRETITLE sdk synonyms  
#DREDBNAME ACTIVATED  
#DREFIELD QMSTYPE="4"  
#DREFIELD QMSAGENTBOOL="SDK software development kit"  
#DREFIELD KEYWORDS="SDK,software development kit"  
#DREFIELD CONCEPT="SYNONYM(SDK "software development kit")"  
#DREFIELD DATABASERESTRICTION=""  
#DRECONTENT
```

```
SDK software development kit  
#DREENDDOC
```

You can then send queries to QMS:

- The following action demonstrates the default behavior:

```
/action=ExpandText&Text="software development kit"&ExpandPhrases=FALSE
```

QMS returns the following (unmodified) query:

```
"software development kit"
```

- The following action demonstrates `ExpandPhrases=TRUE`.

```
/action=ExpandText&Text="software development kit"&ExpandPhrases=TRUE
```

QMS uses your synonym rule to expand the exact phrase and returns the following (expanded) query:

```
SYNONYM(SDK "software development kit")
```

## Check Synonym Queries

The XML response from QMS includes the tag `autn:expandedQuery`, which shows the expanded query text that QMS sends to IDOL Server.

For example:

```
<autn:expandedQuery>dog hound canine</autn:expandedQuery>
```

You can use the value of this tag to check that QMS applies the synonym rules correctly.

When multiple synonym rules match a query, QMS processes them one by one. The original query text is modified by the first rule. The output from that modification is the query text input for the second rule, and so on.

QMS includes the `<autn:expansionOrder>` tag in the query response to show the order in which it applies the rules to the query. This tag contains `<autn:rule>` tags, which describes the order that the rules are applied.

For example:

```
<autn:expandedQuery>(dog OR hound OR canine) AND (cat  
OR kitten)</autn:expandedQuery>  
-<autn:expansionOrder>  
  <autn:rule rule_type="synonym" reference="catsynonymrule" modified_query="hound  
AND (cat OR kitten)"/>  
  <autn:rule rule_type="synonym" reference="dogsynonymrule" modified_query="(dog  
OR hound OR canine) AND (cat OR kitten)"/>  
</autn:expansionOrder>
```

### Related Topics

- [Synonyms, Hyponyms, and Hypernyms, on page 65](#)

## Example Synonym Rules

The following rule expands any query for the terms *dog*, *hound*, or *canine* to include all three terms.

```
#DREREFERENCE 695120425336110405
#DRETITLE dog synonyms
#DREDBNAME ACTIVATED
#DREFIELD QMSTYPE="4"
#DREFIELD QMSAGENTBOOL="dog hound canine"
#DREFIELD KEYWORDS="dog,hound,canine"
#DREFIELD CONCEPT="SYNONYM(dog hound canine)"
#DREFIELD DATABASERESTRICTION=""
#DRECONTENT
dog hound canine
#DREENDDOC
```

This synonym rule expands the following query:

```
action=Query&Text=hound&ExpandQuery=True
```

to:

```
action=Query&Text=dog hound canine
```

The following rule expands any query for the term *dog*, *hound*, *canine*, or *man's best friend* to include all four terms when the `FieldText` restricts the results to those that contain the term `pets` in the `Type` field.

```
#DREREFERENCE 695120425336110405
#DRETITLE dog synonyms
#DREDBNAME ACTIVATED
#DREFIELD QMSTYPE="4"
#DREFIELD QMSAGENTBOOL="dog hound canine man's best friend"
#DREFIELD KEYWORDS="dog,hound,canine,man's best friend"
#DREFIELD CONCEPT="SYNONYM(dog hound canine "man's best friend")"
#DREFIELD DATABASERESTRICTION=""
#DREFIELD QMSFIELDTEXT="MATCH{pets}:Type"
#DREFIELD Category=""
#DRECONTENT
dog hound canine man's best friend
#DREENDDOC
```

This synonym rule expands the following query:

```
action=Query&Text=dog&FieldText=MATCH{pets}:Type&ExpandQuery=True
```

to:

```
action=Query&Text=SYNONYM(dog hound canine "man's best friend")&FieldText=MATCH
{pets}:Type
```

### **Related Topics**

- [Create Synonym Rules, on page 65](#)

## Example Hyponym Rule

The following rule changes any query for the term *dog* to include the names of different breeds of dog, but removes the term *dog*.

```
#DREREFERENCE 695120425336110405
#DRETITLE dog hyponyms
#DREDBNAME ACTIVATED
#DREFIELD QMSTYPE="4"
#DREFIELD QMSAGENTBOOL="dog"
#DREFIELD KEYWORDS="dog"
#DREFIELD CONCEPT="SYNONYM(poodle "golden retriever" hound boxer labrador terrier
spaniel alsatian chihuahua bloodhound collie)"
#DREFIELD DATABASERESTRICTION=""
#DRECONTENT
dog
#DREENDDOC
```

This hyponym rule expands the following query:

```
action=Query&Text=dog&ExpandQuery=True
```

to:

```
action=Query&Text=SYNONYM(poodle "golden retriever" hound boxer labrador terrier
spaniel alsatian chihuahua bloodhound collie)
```

### Related Topics

- [Create Synonym Rules, on page 65](#)

## Example Hypernym Rule

The following query changes any query for one of the specific breeds of dog to include only the term *dog*.

```
#DREREFERENCE 695120425336110405
#DRETITLE dog hypernyms
#DREDBNAME ACTIVATED
#DREFIELD QMSTYPE="4"
#DREFIELD QMSAGENTBOOL="poodle golden retriever hound boxer labrador terrier
spaniel alsatian chihuahua bloodhound collie"
#DREFIELD KEYWORDS="poodle, golden
retriever, hound, boxer, labrador, terrier, spaniel, alsatian, chihuahua, bloodhound, colli
e"
#DREFIELD CONCEPT="dog"
#DREFIELD DATABASERESTRICTION=""
#DRECONTENT
poodle golden retriever hound boxer labrador terrier spaniel alsatian chihuahua
bloodhound collie
#DREENDDOC
```

This hypernym rule matches the following queries:

```
action=Query&Text=chihuahua&ExpandQuery=True
```

```
action=Query&Text=golden retriever&ExpandQuery=True
```

and changes them to:

```
action=Query&Text=dog
```

### **Related Topics**

- [Create Synonym Rules, on page 65](#)

## **Whitelists and Blacklists**

QMS can apply rules to remove certain words from queries.

A *whitelist* is a list of all words that are allowed in query text. QMS removes all other words from the query.

A *blacklist* is a list of words that are not allowed in query text. QMS removes them from the query.

You can use whitelists and blacklists for the `Query` and the `GetQueryTagValues` action, and QMS applies the rules to the terms in the `Text` parameter.

### **Create Whitelist and Blacklist Rules**

A *whitelist* is a list of words that are allowed in queries. QMS removes any words that are not in the whitelist from the query before it sends the query to IDOL Server. If a rule defines a whitelist, it must have a `QMSTYPE` field with the value 5.

Conversely, a *blacklist* is a list of words that are not allowed in queries. QMS removes any words on the blacklist from the query before it sends the query to IDOL Server. If a rule defines a blacklist, it must have a `QMSTYPE` field with the value 6.

The whitelist or blacklist rule must contain a list of words that form the list. The table shows all the fields that you must include in the IDX file for whitelist and blacklist rules.

#### **Required IDX fields for whitelist and blacklist rules**

<b>Field</b>	<b>Description</b>	<b>Content type or value</b>
#DREREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSTYPE	The type of the QMS rule.	5 (whitelist rule) 6 (blacklist rule)
KEYWORDS	The set of words that form the list.	Comma-separated list of words. Percent-encode spaces and punctuation in the words.

### **Related Topics**

- [Example Blacklist Rule, below](#)
- [Example Whitelist Rule, on the next page](#)

## **Send Whitelist and Blacklist Queries**

When you query QMS, you can add a whitelist or blacklist to the query to modify the query.

### **To use a whitelist or blacklist**

- Send queries with one of the following action parameters:
  - the `Whitelist` parameter set to the name of the whitelist to use.
  - the `Blacklist` parameter set to the name of the blacklist to use.

For example:

```
action=Query&Text=phone&Whitelist=AllowList
```

```
action=GetQueryTagValues&Text=phone&FieldName=MODEL&Whitelist=AllowList
```

These actions apply the `AllowList` whitelist, and remove any terms from the specified `Text` that are not in the whitelist.

```
action=Query&Text=mobile phone&Blacklist=BanList
```

```
action=GetQueryTagValues&Text=phone&FieldName=MODEL&Blacklist=BanList
```

These actions apply the `BanList` blacklist, and remove any terms from the specified `Text` that appear in the blacklist.

Refer to the *QMS Reference* for more information.

## **Check Whitelist and Blacklist Rules**

You can check that QMS has applied a whitelist or blacklist correctly by sending the `GetRequestLog` (or `GRL`) action to IDOL Server or IDOL Content component:

```
http://localhost:9100/action=GRL
```

This action returns a list of all the actions that have been sent to IDOL Server. You can match the query that you sent to QMS to the query that IDOL Server receives from QMS, and check that the correct terms are retained or removed.

You can also check the results list to ensure that the `<autn:links>` tags in each result include only terms that are allowed according to the list that you used. This tag includes a list of all query terms that match in the result document.

## **Example Blacklist Rule**

The following rule removes the terms *beer* and *chicken* from a query, if they are present.

```
#DRREFERENCE 664253145850447559
#DRETITLE blacklist01
#DREDBNAME ACTIVATED
#DREFIELD THRESHOLD="20"
#DREFIELD KEYWORDS="beer,chicken"
#DREFIELD QMSTYPE="6"
#DREFIELD DRELANGUAGETYPE="English"
#DREFIELD DREOUTPUTENCODING="UTF8"
#DRECONTENT
#DREENDDOC
```

This blacklist alters the following query:

```
action=Query&Text=beer wine lemonade&Blacklist=blacklist01
```

to:

```
action=Query&Text=wine lemonade
```

#### **Related Topics**

- [Create Whitelist and Blacklist Rules, on page 74](#)

## **Example Whitelist Rule**

The following rule allows the terms *cow*, *goat*, and *deer* in a query, and removes all other terms.

```
#DRREFERENCE 571071269228798215
#DRETITLE whitelist01
#DREDBNAME ACTIVATED
#DREFIELD THRESHOLD="20"
#DREFIELD KEYWORDS="cow,goat,deer"
#DREFIELD QMSTYPE="5"
#DREFIELD DRELANGUAGETYPE="English"
#DREFIELD DREOUTPUTENCODING="UTF8"
#DRECONTENT
#DREENDDOC
```

This whitelist alters the following query:

```
action=Query&Text=cow goat sheep chicken&Whitelist=whitelist01
```

to:

```
action=Query&Text=cow goat
```

#### **Related Topics**

- [Create Whitelist and Blacklist Rules, on page 74](#)

## **Boost Rules**

QMS can add FieldText to queries that it sends to IDOL Server, for example to boost results for a particular product. Boost rules are also known as FieldText expansion rules.

QMS forwards queries to the Promotion Agentstore, which returns any boost rules that match the query. QMS then appends the FieldText to the query that it sends to IDOL Server.

## Enable Boost Rules

To use boost rules, you must enable them in the QMS configuration file.

### To enable boost rules

1. Open the QMS configuration file in a text editor.
2. In the [Server] section, set the ExpandFieldText parameter to True.
3. Save and close the QMS configuration file. Restart QMS for your changes to take effect.

Refer to the *QMS Reference* for more information.

## Create Boost Rules

Boost rules allow you to add FieldText to queries to IDOL Server. For example, if a user searches for *televisions*, you can add FieldText to the query that boosts results for a particular brand of television.

The table shows all the fields that you must include in the IDX file for boost rules.

### NOTE:

You must add any fields that are referenced in the FieldText expressions to the document as empty fields.

### Required IDX fields for boost rules

Field	Description	Content type or value
#DREREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSTYPE	The type of the QMS rule.	7
QMSAGENTBOOL	The AgentBoolean expression used to match the original query text.	Boolean matching expression. Set this field to * to match all query text.
DATABASERESTRICTION	(Optional) The Content databases that this rule matches. If you include this field, QMS applies the boost rule only if the original query includes a DatabaseMatch parameter with at least one database that matches the DATABASERESTRICTION. QMS applies this field only when the original query	String

**Required IDX fields for boost rules, continued**

Field	Description	Content type or value
	includes the DatabaseMatch and SynonymDatabaseMatch action parameters.	
SYNONYMDATABASEMATCH	Set a value for this field to use database matches in this rule. If this field is empty or missing, QMS does not apply the DATABASERESTRICTION for this rule.	
QMSFIELDTEXT	The FieldText rules to match against.	FieldText expression
Referenced Fields	All fields that the QMSFIELDTEXT field references must be present in the rule as a field with blank content.	Empty field
CONCEPT	FieldText to append.	FieldText expression
AlwaysMatchType field	An AlwaysMatchType field to match the rule.	Any non-empty value of anything other than 0

## Use Boost Rules in Queries

QMS does not apply boost rules by default. You must enable them in individual queries to QMS.

### To use boost rules in your query

- Send queries with the ExpandQuery parameter set to True.

**NOTE:**

The query must have a FieldText parameter to match boost rules. This FieldText can use only the MATCH and EQUAL field operators.

For example:

```
action=Query&Text=phone&FieldText=MATCH{UK}:place&ExpandQuery=True
```

This query searches for boost rules that match the word *phone*, and that contain the FieldText expression MATCH{UK}:place. QMS then adds the additional FieldText from the rule to the query to IDOL Server.

**NOTE:**

This query also searches for synonymous terms.

If your boost rules contain a DATABASERESTRICTION field, set the SynonymDatabaseMatch parameter to True to apply the restriction. By default, QMS does not apply the database restriction.

Refer to the *QMS Reference* for more information.

### Related Topics

- [Create Boost Rules, on page 77](#)
- [Create Query Manipulation Server Rules, on page 47](#)
- [Synonyms, Hyponyms, and Hypernyms, on page 65](#)

## Check Boost Rules

You can check that QMS has applied a boost rule correctly by sending the `GetRequestLog` (or `GRL`) action to IDOL Server:

```
http://IDOLhost:port/action=GRL
```

where,

`IDOLhost` is the IP address or name of the machine on which IDOL Server is installed.

`port` is the ACI port by which you send actions to IDOL Server (set by the `Port` parameter in the `[Server]` section of the IDOL Server configuration file).

This action returns a list of all the actions that have been sent to IDOL Server.

You can match the query that you sent to QMS to the query that IDOL Server receives from QMS, and check that the `FieldText` has been correctly appended.

## Example Boost Rule

The following boost rule adds the `FieldText` `BIASVAL{chicken,70}:MAIN_INGREDIENT` to a query that contains the `FieldText` `MATCH{American}:CUISINE`.

### NOTE:

For this example, the `ALWAYSMATCH` field must be configured in the Promotion Agentstore as an `AlwaysMatchType` field.

```
#DRREFERENCE BOOST_RULE_27_1254181469986_eawn
#DRETITLE boost rule 5
#DREFIELD QMSTYPE="7"
#DREFIELD DATABASERESTRICTION="Recipes"
#DREFIELD QMSAGENTBOOL="*"
#DREFIELD QMSFIELDTEXT="MATCH{American}:CUISINE"
#DREFIELD COUNTRY=""
#DREFIELD CONCEPT="BIASVAL{chicken,70}:MAIN_INGREDIENT"
#DREFIELD ALWAYSMATCH="1"
#DREENDDOC
```

This rule expands the following query:

```
action=Query&Text=fried&ExpandQuery=True&SynonymDatabaseMatch=True&DatabaseMatch=Recipes&FieldText=MATCH{American}:CUISINE
```

to:

```
action=Query&Text=fried&DatabaseMatch=Recipes&FieldText=MATCH{American}:CUISINE AND  
BIASVAL{chicken,70}:MAIN_INGREDIENT
```

## Chapter 8: Manipulate Results

This section describes how to use QMS to manipulate the results that IDOL Server returns. QMS can manipulate results so that they always appear in a specific position in the results list. You can also configure QMS to use intent based ranking so that results that are close to the interests of the user are automatically promoted to the top of the results list.

- [Cardinal Placement](#) .....81
- [Cardinal Placement for Documents](#) ..... 81
- [Parametric Cardinal Placement](#) .....84
- [Intent Based Ranking](#) .....86

### Cardinal Placement

You can use QMS to ensure that a query or parametric query result appears at a specific position in the results list. This process is known as *cardinal placement*.

There are two different types of cardinal placement that you can use in QMS:

- **Cardinal placement for documents.** QMS places a document at a specific location in a results list. For example, if a user queries for *phone*, you can display a result for a specific phone model at the top of the results list.
- **Parametric cardinal placement.** QMS orders a parametric list with an item at a specific position in the list. For example, if a user queries for *phone* and you provide a list of phone models to narrow the search, you can display a specific model at the top of the list.

QMS automatically queries for cardinal placement and parametric cardinal placement rules. If these rules exist, cardinal placements return by default.

#### **Related Topics**

- [Cardinal Placement for Documents, below](#)
- [Parametric Cardinal Placement, on page 84](#)

### Cardinal Placement for Documents

QMS can place selected documents at certain positions in a results list, regardless of document relevance or other factors. For example, you might want a certain car advertisement to be the first result at all times for the query “*sports car*”. Cardinal placement can ensure that this placement occurs.

QMS forwards all queries to IDOL Server or the Content component to retrieve results. It also forwards the queries to the Promotion Agentstore component, which returns any cardinal placement rules for the specified query. When QMS receives the results, it inserts any cardinal placement documents at the correct position in the results list before it returns results to the client.

QMS moves the cardinal placement document to the correct position if it already exists in the result list from IDOL Server.

## Cardinal Placement Rules

Cardinal placement rules allow you to insert documents at a specified location in a results list for a query.

The table shows all the fields that you must include in an IDX file for cardinal placement rules.

### Required IDX fields for cardinal placement rules

Field	Description	Content type or value
#DRREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSTYPE	The type of the QMS rule.	1
QMSAGENTBOOL	The AgentBoolean expression used to match the original query text.	Boolean matching expression
QMSVALUE1	The reference of the document to insert.	String
QMSVALUE2	The position at which to insert the cardinal placement document in the results.	Number (result position)
#DRECONTENT	The content to match the Boolean field.	Keywords from the AgentBoolean string

You must also add the `ALWAYSACTIVE` field with the value `True`, or a `SCHEDULE` field with iCalendar data. See [Create a QMS Rule IDX Document, on page 47](#).

### Related Topics

- [Create Query Manipulation Server Rules, on page 47](#)
- [Create a QMS Rule IDX Document, on page 47](#)

## Field-Dependent Cardinal Placement Rules

You can use a cardinal placement rule to insert a document in a results list based on `FieldText` in the original query. For example, you can insert a value at the top of results when users search for all products in a particular category.

The table shows the fields that you must add to your cardinal placement rule IDX document to include field-dependent rules.

**Required IDX fields for field-dependent cardinal placement rules**

Field	Description	Content type or value
#DRREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSTYPE	The type of the QMS rule.	1
QMSAGENTBOOL	The AgentBoolean expression used to match the original query text.	Boolean matching expression
QMSVALUE1	The reference of the document to insert.	String
QMSVALUE2	The position at which to insert the cardinal placement document in the results.	Number (result position)
#DRECONTENT	The content to match the Boolean field.	Keywords from the AgentBoolean string
QMSFIELDTEXT	FieldText that the query must contain to match this rule.	FieldText expression.
Referenced Fields	All fields that the QMSFIELDTEXT field references must be present in the rule as a field with blank content.	Empty field

**Example Cardinal Placement Rules**

The following cardinal placement rule inserts the document with the reference 21764 as the first result for any query that contains the terms cod, halibut, or haddock.

```
#DRREFERENCE 659768056580090736
#DRETITLE cardinal_placement01
#DREFIELD QMSTYPE="1"
#DREFIELD ALWAYSACTIVE="True"
#DREFIELD QMSVALUE1="21764"
#DREFIELD QMSVALUE2="1"
#DREFIELD QMSAGENTBOOL="cod OR halibut OR haddock"
#DRECONTENT
cod halibut haddock
#DREENDDOC
```

This rule inserts the document with the reference 21764 at the top of the response to the following query:

```
action=Query&Text=halibut
```

The following cardinal placement rule inserts the document with the reference FilmBoxSet as the first result for any query for all products that have DVD in the Category field.

```
#DRREFERENCE 746297379561765222
#DRETITLE cardinal_placement02
#DREFIELD QMSTYPE="1"
#DREFIELD ALWAYSACTIVE="True"
#DREFIELD QMSVALUE1="FilmBoxSet"
#DREFIELD QMSVALUE2="1"
#DREFIELD QMSAGENTBOOL="*"
#DREFIELD ALWAYSMATCH="1"
#DREFIELD QMSFIELDTEXT="MATCH{DVD}:Category"
#DREFIELD Category=""
#DRECONTENT
#DREENDDOC
```

This rule inserts the document with reference `FilmBoxSet` at the top of the response to the following query:

```
action=Query&Text=*&FieldText=MATCH{DVD}:Category
```

## Check Cardinal Placements

When a cardinal placement document returns, the XML response includes a `<autn:qmsstate>`, which indicates how many cardinal placement documents were added to the results.

The cardinal placement document result also includes a `<DOCUMENT>` tag section that specifies that the document is a cardinal placement, and the reference of the rule. For example:

```
<DOCUMENT>
  <INJECTEDPROMOTION>TRUE</INJECTEDPROMOTION>
  <QMSID>cardinal_doc_placement01</QMSID>
</DOCUMENT>
```

This XML section specifies that the result is a cardinal placement, according to the rule `cardinal_doc_placement01`.

## Parametric Cardinal Placement

You can create cardinal placement rules for parametric queries.

In a parametric query, IDOL Server returns a list of all possible values for a field. For example, if documents in IDOL Server contain a `model` field, a parametric query for `model` returns all the possible values of this field that occur in documents. Users can refine their queries by selecting one of the available models.

## Parametric Cardinal Placement Rules

Parametric cardinal placements allow you to insert a parametric value at a particular position in a list. For example, if users restrict their queries by using a list of models of car, a parametric cardinal placement can ensure that a particular model appears at the top of the list.

The table shows all the fields that you must include in the IDX file for parametric cardinal placement rules.

**Required IDX fields for parametric cardinal placement rules**

Field	Description	Content type or value
#DREREFERENCE	The reference for the rule.	String
#DRETITLE	The title of the rule.	String
QMSATYPE	The type of the QMS rule.	8
QMSAGENTBOOL	The AgentBoolean expression used to match the original query text.	Boolean matching expression
QMSFIELDNAME	The name or the parametric field.	String
QMSFIELDVALUE	The field value to insert in the list of results.	String
QMSVALUE	The position at which to insert the cardinal placement value in the results.	Number (result position)
#DRECONTENT	The content to match the Boolean field.	Keywords from the AgentBoolean string

You can also create parametric cardinal placement rules with field text. In this case, you must add fields to determine the FieldText rules to match against in addition to the fields for other parametric cardinal placement rules. You must also add any fields that are referenced within the FieldText as empty fields.

**FieldText fields to add for parametric cardinal placement rules**

Field	Description	Content type or value
QMSFIELDTEXT	The FieldText rules to match against.	FieldText expression
Referenced Fields	All fields that are referenced in the QMSFIELDTEXT field must be present in the rule as a field with blank content.	Empty field

**Related Topics**

- [Create Query Manipulation Server Rules, on page 47](#)

**Example Parametric Cardinal Placement Rule**

The following parametric cardinal placement rule inserts the value `spinach` at the top of a query for the values of the field `VEGETABLE` that includes the terms `carrot` or `broccoli`.

```
#DREREFERENCE automation_cardinal_placement
#DRETITLE cardinal placement 1
#DREFIELD QMSTYPE="8"
#DREFIELD QMSAGENTBOOL="carrot OR broccoli"
#DREFIELD QMSFIELDNAME="VEGETABLE"
#DREFIELD QMSFIELDVALUE="spinach"
#DREFIELD QMSFIELDTEXT=""
#DREFIELD QMSVALUE="1"
#DRECONTENT
carrot broccoli
#DREENDDOC
```

For example, this rule inserts the value `spinach` at the top of the list of values in the following query:

```
action=GetQueryTagValues&Text=broccoli&FieldName=VEGETABLE
```

## Check Parametric Cardinal Placements

You can check that a cardinal placement has occurred correctly by comparing the response from QMS with the result that IDOL Server returns when you send the same query directly to it.

You can also use the request log for the Promotion Agentstore to check that a rule returned. Send the GRL action to the Promotion Agentstore. You can click the query in the log to run it, and see if a parametric cardinal placement rule returns.

## Intent Based Ranking

QMS can support intent based ranking, whereby results that are close to the interests of the user are automatically promoted to the top of the results list.

### NOTE:

Intent based ranking is licensed functionality, and is not available by default. Contact Technical Support for further details.

To use intent based ranking, QMS must be able to communicate with a Community component. You can enable this feature in one of the following ways:

- Configure the [IDOL] section of the QMS configuration file with the host and port of an IDOL server.
- Create a [Community] section in the QMS configuration file, with `Host` and `Port` parameters that specify the host and port of the Community component that you want to use. Use this option if the [IDOL] configuration file section points to a DAH or IDOL Content component.

## Intent Ranked Query Parameters

You can optionally configure the following parameters for intent ranked queries.

Parameter	Description	Required
DefaultIRQCorpusSize	The default value for the IRQCorpusSize action parameter in intent ranked queries.	Yes
IntentRankedQuery	Set IntentRankedQuery to True to activate intent based ranking.	No
IRQCorpusSize	The size of the pool of intent ranked results.	No
RegenerateUsersTermCache	Whether to retrieve the user terms from the Community component for this query.	No
SoftCacheMaxSize	The size (in bytes) of the QMS soft state cache, which is used to store terms for intent ranking.	Yes
Username	For intent ranked queries, the user name of the user that you want to rank the queries for.	Yes

Refer to the *QMS Reference* for more information.

**Related Topics**

- [The QMS Configuration File, on page 27](#)



## Chapter 9: Use QMS TypeAhead

This section describes how to use QMS to provide query completion. You can provide a string to the QMS TypeAhead action, and it returns a list of suggested completions for the string. For example, if you type *go*, it might return *government* and *golf* as possible options.

- [Index Mode](#) .....89
- [Dictionary Mode](#) .....89
- [Answer Bank Mode](#) .....92
- [Filter Results](#) .....92

### Index Mode

In Index Mode, the TypeAhead action uses the configured IDOL Server data index to retrieve suggestion values. The action sends the string that you provide in a TermExpand action to the index Content component or DAH, and returns the expansions as the suggested values.

You can add the Stemming, Type, and Expansion action parameters from the IDOL TermExpand action to your TypeAhead action to modify how QMS requests the terms. You can also add the FieldRestriction parameter to the TypeAhead action to specify the fields that you want the expanded values to come from. For more information, refer to the *QMS Reference*.

#### Related Topics

- [Filter Results, on page 92](#)

### Dictionary Mode

This section describes how to set up and use QMS query completion with a dictionary file.

#### Related Topics

- [Filter Results, on page 92](#)

### Create a Dictionary File

To use the Dictionary mode for the TypeAhead action, you must provide a dictionary file. This file contains a list of the words and phrases that you want to use as suggestions. It optionally also contains a score for each value, to determine the order in which they return in a results list.

The dictionary file must have one phrase on each line, in the format:

*phrase, score*

where *phrase* is the word or phrase that you want to use as a suggestion, and *score* is the score for that word or phrase. The score can be a positive or negative integer (terms with a higher score return first in a results list). If you do not add a score value, the default score is zero. The minimum allowed score value is  $-2^{30}$ , and the maximum allowed score is  $2^{30}-1$

For example:

```
gold,15
gold mine,10
government,25
government agency,20
golf,20
golfer,19
gopher,12
gotcha,-10
gone
```

## Configure the Dictionary File

After you create a dictionary file, you must configure the location of the file in the QMS configuration file.

### *To configure the dictionary file*

1. Open the QMS configuration file in a text editor.
2. Add a [TypeAhead] configuration section.
3. In the [TypeAhead] section, set the DictionaryFile parameter to the path to the dictionary file that you want to use. For example:

```
[TypeAhead]
DictionaryFile=C:\Dictionaries\QMS_Typeahead.txt
```

4. Save and close the QMS configuration file. Restart QMS for your changes to take effect.

## Manage Dictionaries

After you have created and configured the dictionary file, you can use the TypeAheadManage action to modify the dictionary file. This action ensures that you do not have to restart the server when you want to update the dictionary.

### Add Values

To add values to the dictionary, send a TypeAheadManage action with:

- Mode set to **Dictionary**.
- ManageMode set to **Add**.
- Text set to a list of the *word, score* pairs that you want to add to the dictionary. Separate each pair with a semicolon. The score value is optional. If you do not add a score, the term is added with a score of zero. If you include a score, the minimum allowed score value is  $-2^{30}$ , and the maximum allowed score is  $2^{30}-1$ .

For example:

```
action=TypeAheadManage&Mode=Dictionary&ManageMode=Add&Text=goal,25;gothic,5
```

You can also upload the changes to the dictionary in a file. The file must contain the words and scores that you want to add to the dictionary. It must have the same format as the dictionary file (see [Create a Dictionary File, on page 89](#)). You upload the file by using the `ManageFile` parameter. For more information about uploading a file by using the `ManageFile` parameter, refer to the *QMS Reference*.

## Modify Values

To modify the values in the dictionary, send a `TypeAheadManage` action with:

- `Mode` set to `Dictionary`.
- `ManageMode` set to `Edit`.
- `Text` set to a list of the *word, score* pairs that you want to modify in the dictionary. Separate each pair with a semicolon. The score value is optional. If you do not specify a score, the existing score for the term is replaced with the default value of zero. If you include a score, the minimum allowed score value is  $-2^{30}$ , and the maximum allowed score is  $2^{30}-1$ .

For example:

```
action=TypeAheadManage&Mode=Dictionary&ManageMode=Edit&Text=government,15;golf
```

You can also upload the changes to the dictionary in a file. The file must contain the words and scores that you want to modify in the dictionary. It must have the same format as the dictionary file (see [Create a Dictionary File, on page 89](#)). You upload the file by using the `ManageFile` parameter. For more information about uploading a file by using the `ManageFile` parameter, refer to the *QMS Reference*.

## Remove Values

To remove values to the dictionary, send a `TypeAheadManage` action with:

- `Mode` set to `Dictionary`.
- `ManageMode` set to `Remove`.
- `Text` set to a list of the *word, score* pairs that you want to remove from the dictionary. Separate each pair with a semicolon. The score value is optional. If you include a score, the minimum allowed score value is  $-2^{30}$ , and the maximum allowed score is  $2^{30}-1$ .

For example:

```
action=TypeAheadManage&Mode=Dictionary&ManageMode=Remove&Text=gold;golfer
```

You can also upload the changes to the dictionary in a file. The file must contain the words that you want to remove from the dictionary. It must have the same format as the dictionary file (see [Create a Dictionary File, on page 89](#)). You upload the file by using the `ManageFile` parameter. For more information about uploading a file by using the `ManageFile` parameter, refer to the *QMS Reference*.

## Save Changes to the Dictionary

When you have finished making modifications to the dictionary file, you must send another `TypeAheadManage` action to save those changes to disk. If you do not persist the changes, QMS continues to use your updated values for the dictionary, but if you restart the server, the changes are lost.

To save dictionary changes to disk, send a `TypeAheadManage` action with:

- Mode set to **Dictionary**.
- `ManageMode` set to **Persist**.

For example:

```
action=TypeAheadManage&Mode=Dictionary&ManageMode=Persist
```

## Answer Bank Mode

In Answer Bank Mode, the `TypeAhead` action uses a configured Answer Server to retrieve suggestion values from an Answer Bank system.

The Answer Bank system in Answer Server contains a store of question and answer pairs, such as an FAQ. You can use Answer Bank as part of `TypeAhead` to provide suggestions for existing answered questions, to guide your users towards existing answers.

To use Answer Bank type ahead, you must configure an `[AnswerServer]` section in your QMS configuration file, with the host and port of your Answer Server. For example:

```
[AnswerServer]
Host=Answers.example.com
Port=15000
```

You must also configure the `AnswerBankSystem` parameter in the `[TypeAhead]` configuration section of your QMS configuration file. For example:

```
[TypeAhead]
AnswerBankSystem=MyAnswerBank
```

This Answer Bank system must exist in the Answer Server configuration file.

You can then send the `TypeAhead` action with `Mode` set to **Answerbank** to retrieve suggestion values from the Answer Bank.

## Filter Results

In some cases, you might want to restrict the results that a user receives as suggestions. You can apply filters to the `TypeAhead` action, depending on the mode that you are using.

- In **Index** mode, you can use a `SecurityInfo` string with the `TypeAhead` action. QMS forwards this string to the IDOL index, and returns only terms that occur in documents that the user is permitted to see.
- In **Index**, **Dictionary**, and **Answerbank** modes, you can provide a Lua script that filters the suggestions that the `TypeAhead` action returns.

## Use a SecurityInfo String

When you are using the data index to provide suggestions, you can use the IDOL security functionality to ensure that users see only suggestions that occur in at least one document that they are permitted to

see.

You can set the `SecurityInfo` parameter in the `TypeAhead` action. QMS forwards this value to the IDOL Content component, which filters the results according to user permissions. You can generate the `SecurityInfo` string for a user by using the `UserRead` action for the IDOL Server Community component. For more information, refer to the *IDOL Server Reference*.

## Use a Lua Script to Filter Results

You can configure and use a Lua script to filter the suggestions according to your own filtering criteria.

The Lua script that you create to filter results must contain a valid Lua function named `typeahead_filter` that accepts a string value and returns a Boolean value.

QMS calls the Lua script once for each suggestion that the `TypeAhead` action returns. It passes the suggestion to the `prefix` argument of the `typeahead_filter` function. The following script is a very simple example, which filters out the suggestion *gold*, if it returns from QMS:

```
function typeahead_filter (prefix)
  if prefix == "gold" then
    return false
  end
  return true
end
```

When you have a script configured, the `TypeAhead` action returns only suggestions for which the `typeahead_filter` function returns `True`. In the example above, the suggestion *gold* returns `False`, so QMS does not show it in the response for the `TypeAhead` action.

You can use the IDOL Lua libraries in your Lua scripts. For more information about the available functions and methods, see the *QMS Reference*.

### To configure QMS to use a Lua script for filtering

1. Open the QMS configuration file in a text editor.
2. Find the `[TypeAhead]` configuration section, or create one if it does not exist.
3. Set the `Script` parameter to the name of the script file that you want to use. For example:

```
[TypeAhead]
Script=filter_script.lua
```

4. Save and close the QMS configuration file. Restart QMS for your changes to take effect.



# Part 3: Appendixes

This section includes the following appendixes:

- [Record Statistics with Statistics Server](#)



# Appendix A: Record Statistics with Statistics Server

This appendix describes how to set up and use the Statistics Server, and lists its parameters.

• <a href="#">About Statistics Server</a> .....	97
• <a href="#">Install and Configure Statistics Server</a> .....	98
• <a href="#">Define Statistical Criteria</a> .....	98
• <a href="#">Record Statistics from Multiple IDOL Servers</a> .....	99
• <a href="#">Push Events to Statistics Server</a> .....	100
• <a href="#">View Statistical Results</a> .....	103
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## About Statistics Server

The IDOL Statistics Server provides statistics about interactions between end users and one or more IDOL servers. Interactions can occur when:

- users send actions directly to IDOL.
- users interact with IDOL through a front-end application such as Find, or a third-party application.

You can determine what statistics to measure by defining statistical criteria in the Statistics Server configuration file. These statistics can include the following examples:

- actions that do not return any results.
- the top 25 queries in the past day, week, month, and so on.
- the average number of queries in a particular time period.
- the total number of hits for a specific term.

Statistics are entirely user-defined: a flexible set of parameters allows you to measure a wide range of statistics. You can also specify how often the statistics are reported.

In order to compute statistics, information about relevant events must be pushed to the Statistics Server. When a user interacts with IDOL, a script or the front-end application sends the Statistics Server an XML record, known as an *XML event*. If the event matches the criteria of any of the configured statistics, it is included in the statistical tally.

You can use statistics for many reasons; to construct a profile of end users, to see which queries or terms are most popular, to refine promotions, and so on.

You can install Statistics Server when you install QMS with the IDOL Server Installer. It is primarily intended for use with IDOL Data Admin.

**TIP:**

You can view information on ACI requests, errors, and other statistical information about your server or component in the IDOL Admin user interface. For more information, refer to the *IDOL Admin User Guide*.

## Install and Configure Statistics Server

You can install Statistics Server using the IDOL installer, or by downloading and extracting the Statistics Server zip package.

To install Statistics Server as a Windows service, run `statsserver.exe -install` at the command prompt. To uninstall the service, run `statsserver.exe -uninstall`. For more information about these options, refer to the *IDOL Getting Started Guide*.

### To configure basic settings

1. Open the Statistics Server configuration file (the default file name is `statsserver.cfg`).
2. In the `[License]` section, specify the host name or IP address, and ACI port of your License Server. For a list of standard `[License]` parameters, refer to the *Query Manipulation Server Reference*.
3. If you are recording statistics from multiple IDOL components, you must specify the IDOL information in the `[IDOLStatistics]` section of the Statistics Server configuration file. For more information, see [Record Statistics from Multiple IDOL Servers, on the next page](#).
4. In the `[Server]` section, specify which port receives events, and which clients can send events to Statistics Server. For more information, see [Statistics Server Parameters, on page 104](#).
5. Save the configuration file.

## Define Statistical Criteria

You must define criteria for each of the statistics that you want to measure.

### To configure statistics

1. Open the Statistics Server configuration file in a text editor.
2. In the `[Statistics]` section, list the statistics that you want Statistics Server to process. For example:

```
[Statistics]
0=count_queries
1=topn_zerohits
2=count_corrections_month
3=topn_suggestions_day
```

3. Create a section for each statistic, using the name defined in the previous step. In this section,

specify the criteria that define the statistic. For details on the configuration parameters that you can use, see [Statistical Criteria Parameters, on page 110](#).

You must add the `Field`, `Operation`, and `Period` parameters to each section. If you are recording statistics from multiple IDOL components, you must also set the `IDOLName` parameter. For example:

```
[count_queries]
Operation=count
Field=queryinfo/query
Period=3600
IDOLName=myIDOL
```

4. Save the configuration file.

## Record Statistics from Multiple IDOL Servers

If you are working with multiple Query Manipulation Servers, you might want to collect statistics from some or all of them.

### To configure Statistics Server for multiple Query Manipulation Servers

1. Create an `[IDOLStatistics]` section in the Statistics Server configuration file.
2. In the `[IDOLStatistics]` section, set the `Number` and `EventField` parameters. The `Number` parameter specifies the number of servers to collect statistics from. The `EventField` parameter specifies the name of the field, in the event XML, that identifies the source of the event.
3. In the `[Statistics]` section, set the `IDOLName` parameter for each statistic.
4. Save the configuration file.

For example:

```
[IDOLStatistics]
Number=2
EventField=idolname
```

```
[Statistics]
0=querycount1
1=querycount2
```

```
[querycount1]
IDOLName=IDOL1
Field=spellingquery
Operation=count
Period=3600
```

```
[querycount2]
IDOLName=IDOL2
Field=spellingquery
```

```
Operation=count  
Period=3600
```

In this example, Statistics Server collects information from two Query Manipulation Servers. The XML events must have an `<idolName>` field that identifies the Query Manipulation Server. The Statistics Server measures two nearly identical statistics, but `querycount1` records only requests sent to the IDOL1 server, and `querycount2` records only requests sent to the IDOL2 server.

### **Related Topics**

- [Push Events to Statistics Server, below](#)
- [Configuration Parameter Reference, on page 104](#)

## **Push Events to Statistics Server**

There are several ways to push event information to a Statistics Server.

- Use a third-party front end that can generate and send events.
- Write a script to generate and send the events. The Statistics Server installation includes an example Perl script that monitors an IDOL log file (such as an IDOL Content component query log) and sends events to the Statistics Server. The script is named `stats-query.pl`. It runs independently of the component being monitored and of Statistics Server (neither component runs the script, you must start and stop it yourself). For information about how to use this script, see [Use the Example Perl Scripts, on page 102](#).

There are several types of event that you might want to monitor that are specific to QMS. For example, you might want to gather statistics about the promotion or synonym rules that have been used to manipulate queries. You can push this type of event information to a Statistics Server in the following ways:

- (Recommended method) Use the document tracking feature, with the Lua library and a Lua script, to send the events. The QMS installation includes an example Lua script named `qms-rules-statserver.lua`, in the `scripts` directory. For information about how to send events through document tracking, see [Use Document Tracking \(QMS events only\), on the next page](#).
- Write a script to generate and send the events. The Statistics Server installation includes an example Perl script that monitors a QMS log file and sends information about promotion, synonym, and other events. This script should be used to monitor the log file that receives messages from the events log stream (`LogTypeCSVs=events`). The script is named `stats-qms-rules.pl`. However, Micro Focus recommends that you use the document tracking feature instead because document tracking runs as part of QMS. If you use the Perl script you must start or stop the script yourself, because it runs as a separate process.
- Configure the host and port of the Statistics Server in the `[StatisticsServer]` section of the QMS configuration file. Micro Focus recommends that you use the document tracking feature instead because it captures additional event types that are not supported using this method.

The following XML is an example event that might be pushed to the Statistics Server event port.

```
<?xml version='1.0' encoding='ISO-8859-1' ?>  
<events>
```

```
<queryinfo>
  <ver>0.1</ver>
  <id>10385792</id>
  <url>
    <![CDATA[http://content:19352/action=query&text=dog&numhits=6]]>
  </url>
  <action>query</action>
  <terms>
    <term>dog1</term>
  </terms>
  <duration>10</duration>
  <numhits>5</numhits>
  <type>16</type>
  <user>user_name</user>
  <ip>127.0.0.1</ip>
</queryinfo>
</events>
```

In this example, any of the fields in the `<queryinfo>` tag can be used for computing statistics.

## Use Document Tracking (QMS events only)

QMS can push information about events to your Statistics Server through the document tracking feature. To record statistics, you must ensure that Statistics Server is running.

### To push events through document tracking

1. Open the QMS configuration file.
2. In the `[DocumentTracking]` section, set the following configuration parameters:

<code>Backend</code>	The type of document tracking backend to use. Set this parameter to <code>Library</code> .
<code>LibraryPath</code>	The path to the library that you want to use. Set this parameter to <code>dt_lua</code> (on Windows) or <code>libdt_lua</code> (on Linux).
<code>LuaScript</code>	The path of the Lua script to run. There is an example script included with QMS. To use the example script set this parameter to <code>scripts/qms-rules-statsserver.lua</code> .
<code>LuaFunction</code>	The function to run in the Lua script. To use the example script, set this parameter to <code>process</code> .

For example:

```
[DocumentTracking]
Backend=Library
LibraryPath=dt_lua
LuaScript=scripts/qms-rules-statsserver.lua
LuaFunction=process
```

3. If you are using the example Lua script, (`scripts/qms-rules-statserver.lua`), open the script file. At the beginning of the script are some values that you might need to change:

<code>stats_host</code>	The host name or IP address of your Statistics server.
<code>stats_port</code>	The event port of your Statistics server (as defined by the <code>EventPort</code> parameter in the Statistics Server configuration file).

4. Save and close the Lua script and QMS configuration file.

## Use the Example Perl Scripts

This section describes how to push event data to your Statistics Server using one of the example Perl scripts.

To record statistics, ensure that the component you want to monitor and the Statistics Server are both running.

### To push events using the example Perl script

- Run the script, as in the following example:

```
perl script.pl datafile.log host port idolname
```

where,

- `script.pl` is the script to run.
- `datafile.log` is the path of the log file to read events from.
- `host` is the host name or IP address of the Statistics Server.
- `port` is the event port of the Statistics Server.
- `idolname` is the name assigned to the component being monitored. This argument is optional for the `stats-query.pl` script but required for running `stats-qms-rules.pl`. Use the same name as the name you specified with the `IDOLName` parameter in the Statistics Server configuration file (see [Record Statistics from Multiple IDOL Servers, on page 99](#)).

## Configure QMS to Send Statistics

You can configure QMS to send information to a Statistics Server, so that it can collect statistics about the use of promotions and synonym rules.

### NOTE:

Micro Focus recommends that you send the data to Statistics Server through the document tracking feature instead. Document tracking captures additional event types that are not sent by QMS using this method. For information about how to send data to Statistics Server through document tracking, see [Use Document Tracking \(QMS events only\), on the previous page](#).

### To configure QMS to send events to Statistics Server

1. Open the QMS configuration file in a text editor.
2. In the `[StatisticsServer]` section, set the following configuration parameters.

Host      The host name or IP address of the Statistics Server.

Port      The event port (not the ACI port) of the Statistics Server.

For example:

```
[StatisticsServer]
Host=statistics
Port=19871
```

3. Save and close the QMS configuration file. Restart QMS for your changes to take effect.

## View Statistical Results

After you have configured the Statistics Server and have started recording statistics, you can view statistical results.

## Use the Front-end Application

The way in which the data appears depends on the application that you are using. To configure or change the display, refer to the documentation for the application. IDOL Admin has support for viewing collected statistics in graph and tabular forms.

## Use the StatResult Action

If you are not using a front-end application, or you simply want to view results in a Web browser, you can use the [StatResult](#) action.

## Preserve Data during Service Interruptions

Safe mode preserves unreported statistics in case the Statistics Server unexpectedly shuts down or stops responding. Each statistic has a configured time period that determines how often the statistical data is recorded into the report file. If Statistics Server stops responding during the interval, the intermediate data is usually lost. Safe mode preserves this data.

To enable safe mode, set `SafeModeActivated` to `True` in the Statistics Server configuration file. The amount of data preserved in safe mode depends on the time period of the most frequently recorded statistic.

Intermediate data is stored temporarily after every tenth of an interval. For example, if the most frequent statistic has a `Period` value of one hour, intermediate data for all statistics is stored every six minutes.

If Statistics Server shuts down unexpectedly, all information up to the most recent of these intermediate intervals is preserved.

When you restart Statistics Server, it resumes from the end of the most recent intermediate interval. For example, if the most frequent statistic `Period` is one hour and the Statistics Server shuts down at 34 minutes, it resumes recording information from the 30-minute mark when it is restarted; all data received between 30 and 34 minutes is lost.

#### **Related Topics**

- [Period, on page 115](#)
- [SafeModeActivated, on page 108](#)

## **Configuration Parameter Reference**

Statistics Server supports standard logging parameters and log streams. For more information, see [Customize Logging, on page 38](#). It also supports several unique parameters that you must use when you set up the system and configure statistics.

### **Statistics Server Parameters**

Set general parameters to configure machine information, time display options, and data storage locations.

#### **ActionEvent**

Set this parameter to `True` to enable the `Event` action.

<b>Type:</b>	Boolean
<b>Default:</b>	False
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	<code>ActionEvent=True</code>
<b>See Also:</b>	<a href="#">Event, on page 117</a>

#### **DateString**

Set this parameter to `False` to display time in Epoch time, or `True` to display time in YYYY-MM-DD format.

<b>Type:</b>	Boolean
--------------	---------

<b>Default:</b>	False
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	DateString=True

## EventClients

Specify the IP addresses or host names of machines that are permitted to send events to the Statistics Server. Separate multiple values with a comma.

<b>Type:</b>	String
<b>Default:</b>	127.0.0.1
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	EventClients=*. *.*.*.*

## EventField

Specify the field in the XML event that contains the name of the IDOL Server. Use this parameter if you are using multiple IDOL Servers.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[IDOLStatistics]</b>
<b>Example:</b>	EventField=idolname
<b>See also:</b>	<a href="#">IDOLName, on page 107</a> <a href="#">Number, on page 108</a>

## EventPort

Specify the number of the port that receives events.

<b>Type:</b>	Integer
--------------	---------

<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	EventPort=19871

## EventThreads

Specify the number of event threads.

<b>Type:</b>	Integer
<b>Default:</b>	8
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	EventThreads=80

## ExternalClock

The `ExternalClock` parameter determines when Statistics Server begins recording events. If you do not use this parameter, the server begins recording events as soon as it starts. If you set a value (in seconds), the Statistics Server uses that value as a timestamp for each statistic. The first time the server receives an XML event with a `<timestamp>` value equal to or greater than the `ExternalClock` value, it begins recording statistics from that point onward. Each subsequent event must have a `<timestamp>` value greater than the previous one to be recorded.

**NOTE:**

To use `ExternalClock`, configure a `<timestamp>` field in the XML events. For more information, see [Push Events to Statistics Server, on page 100](#).

<b>Type:</b>	Integer
<b>Default:</b>	0
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	ExternalClock=100

## History

Specify the directory in which statistical results are stored.

<b>Type:</b>	String
<b>Default:</b>	./history
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Paths]</b>
<b>Example:</b>	History=./results

## IDOLName

Specify the name of the IDOL component from which the statistic is received. Set this parameter if you are using multiple IDOL components.

**NOTE:**

To use `IDOLName`, you must configure a field that contains the name of the IDOL component in the XML events. For more information, see [Push Events to Statistics Server, on page 100](#).

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	IDOLName=IDOL1
<b>See also:</b>	<a href="#">EventField, on page 105</a> <a href="#">Number, on the next page</a>

## Main

Specify the directory in which database files are stored. The database files contain information about the fields defined in the Statistics server configuration file.

<b>Type:</b>	String
<b>Default:</b>	./main
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Paths]</b>
<b>Example:</b>	Main=./dbfiles

## Number

Specify the number of IDOL components from which to measure statistics. Set this parameter if you are using multiple IDOL components.

<b>Type:</b>	Integer
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[IDOLStatistics]</b>
<b>Example:</b>	Number=2
<b>See also:</b>	<a href="#">EventField, on page 105</a> <a href="#">IDOLName, on the previous page</a>

## Port

Specify the Statistics server ACI port number.

<b>Type:</b>	Integer
<b>Default:</b>	None
<b>Required:</b>	Yes
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	Port=19873

## SafeModeActivated

Set this parameter to True to activate safe mode. See [Preserve Data during Service Interruptions, on page 103](#).

<b>Type:</b>	Boolean
<b>Default:</b>	False
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	SafeModeActivated=True

## StatLifetime

Specify how long you want to keep statistical data stored on disk. After the specified time period has elapsed, all statistical data is removed. You can specify the period that you want to elapse before deleting statistical data by using the following format:

`<number><timeUnit>`

where `<number>` is the number of time units that you want to elapse, and `<timeUnit>` is the time unit to specify. The following units are available:

- second
- seconds
- minute
- minutes
- hour
- hours
- day
- days
- week
- weeks
- month
- months

If you do not specify a `timeUnit`, Statistics Server reads the specified number as seconds. You can also enter -1 for an unlimited time (no data is deleted).

<b>Type:</b>	String
<b>Default:</b>	-1 (no data is deleted)
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	StatLifetime=1week

## TemplateDirectory

Specify the directory that contains an XSL template file, used for reporting.

<b>Type:</b>	String
--------------	--------

<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Paths]</b>
<b>Example:</b>	TemplateDirectory=C:\IDOL\IDOLServer\IDOL\templates

## Threads

Specify the number of ACI threads.

<b>Type:</b>	Integer
<b>Default:</b>	4
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	Threads=100

## XSL Templates

Set this parameter to True to enable XSL reporting.

<b>Type:</b>	Boolean
<b>Default:</b>	False
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[Server]</b>
<b>Example:</b>	XSLTemplates=True

## Statistical Criteria Parameters

Use the following parameters to configure the statistics that you want to measure.

When you configure XML fields for statistic restrictions (AEqualStat, ARangeStat, NEqualStat, NRangeStat, and BitANDStat) in the configuration file, you must provide either the full XML path (excluding the root element) or the last branch name.

For example, to create a statistic for the following XML event:

```
<?xml version='1.0' encoding='ISO-8859-1' ?>
<events>
  <queryinfo>
```

```
<appIDs>  
  <appID>DOMATCH</appID>  
</appIDs>  
</queryinfo>  
</events>
```

You can configure the statistic either by using the full XML path:

```
AEqualStat=queryinfo/appIDs/appID,ARCHIVE
```

or by using the last XML branch:

```
AEqualStat=appID,ARCHIVE
```

**NOTE:**

`AEqualStat=appIDs/appID/,ARCHIVE` is an invalid restriction. As a result, all statistic results are stored on disk, ignoring the restrictions.

On startup, if a statistic restriction setting contains an XML path, a warning message is logged in the `application.log` file to remind the user to check the settings to ensure that it uses a valid path.

## AEqualStat

Specify the field and the string value that the field must contain to trigger the statistic.

Enter multiple field-value pairs as comma-separated variables in the form `fieldN,valueN`:

```
AEqualStat=field1,value1,field2,value2
```

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	<code>AEqualStat=action,query</code>

## ARangeStat

Specify the field and the alphabetical range into which a value must fall to trigger the statistic. To set the range, enter the lower and upper limits as comma-separated values.

Enter multiple field-value combinations as comma-separated variables in the form `fieldN,valueN1,valueN2`:

```
ARangeStat=field1,value1_1,value1_2,field2,value2_1,value2_2
```

<b>Type:</b>	String
--------------	--------

<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	ARangeStat=term,captain,lieutenant

## BitANDStat

Specify the field and bitwise AND value that the field must match to trigger the statistic.

Enter multiple field-value pairs as comma-separated variables in the form `fieldN,valueN`:

`BitANDStat=field1,value1,field2,value2`

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	BitANDStat=MyOption,5

## NEqualStat

Specify the field and the numeric value that the field must contain to trigger the statistic.

Enter multiple field-value pairs as comma-separated variables in the form `fieldN,valueN`:

`NEqualStat=field1,value1,field2,value2`

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	NEqualStat=numhits,0

## NRangeStat

Specify the field and the numeric range into which a value must fall to trigger the statistic. To set the range, enter the lower and upper limits as comma-separated values.

Enter multiple field-value combinations as comma-separated variables in the form `fieldN,valueN1,valueN2`:

`NRangeStat=field1,value1_1,value1_2,field2,value2_1,value2_2`

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	<code>NRangeStat=numhits,10,20</code>

## DynamicField

Specify the XML tag that triggers a dynamic statistic. For dynamic statistics, a substatistic is added when a new value of the dynamic field is recorded.

For example, if you set `DynamicField` to `Location` and Statistics Server records the new value `London` in this field, it creates a substatistic. This substatistic records the information configured in the dynamic statistic for each event that contains the value `London` in the `Location` field.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	<code>DynamicField=location</code>

## Field

Specify the XML tag that triggers the statistic.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	Yes
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	<code>Field=duration</code>

## Offset

Add an offset to the time range that is used to collect data. Specify the date and time when one statistics period ends and the next begins. You can use this parameter to align Statistics Server time periods with the periods for which you want to record statistics.

By default, Statistics Server starts a statistics period at a time when the epoch time is divisible by the period length. If you set `Offset` to a date and time, the statistics period starts at that time, rather than the default start time.

**NOTE:**

Statistics Server starts to collect data immediately when a statistic is created, even if it is in the middle of a period.

You must specify `Offset` in the format `YYYY/MM/DD HH:MM:SS`. This date and time can be in the past.

<b>Type:</b>	String
<b>Default:</b>	0
<b>Required:</b>	No
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	<code>Offset=2010/04/01 12:30</code>
<b>See Also:</b>	<a href="#">Period, on the next page</a>

## Operation

Specify the type of statistic. Enter one of the following values:

- `Count`. The number of results since the previous statistical report.
- `CumulativeCount`. The total number of results.
- `TopN`. The top *N* results in a particular time period. If you enter `TopN`, you must also enter the number you want to measure, separated by a comma. You can enter `all` to list an unlimited number of ranked terms.
- `CumulativeTopN`. The top *N* results for all time. If you enter `CumulativeTopN`, you must also enter the number you want to measure, separated by a comma. You can enter `all` to list an unlimited number of ranked terms.
- `Average`. The average number of results in a particular time period.

<b>Type:</b>	String
<b>Default:</b>	None

<b>Required:</b>	Yes
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	Operation=TopN,100

## Period

Specify the frequency in seconds of statistical reports.

<b>Type:</b>	Long
<b>Default:</b>	3600
<b>Required:</b>	Yes
<b>Configuration Section:</b>	<b>[MyStatistic]</b>
<b>Example:</b>	Period=3600

## Action and Action Parameter Reference

You can send actions to Statistics Server through a Web browser. The actions use the following format:

`http://host:port/action=ActionName&[Parameters]`

where,

<i>host</i>	The IP address or name of the Statistics Server.
<i>port</i>	The ACI port specified in the [Server] section of the Statistics Server configuration file.
<i>ActionName</i>	One of the actions listed below.
<i>Parameters</i>	One or more parameters that might be required by an action.

**NOTE:**  
 Separate parameters with an ampersand (&).

## AddStat

The AddStat action creates a new statistic while Statistics Server is running, and adds the statistic to the Statistics Server configuration file.

## Parameters

The `AddStat` action supports the following parameters.

### Name

The name of the new statistic. A configuration section with the specified name is added to the Statistics server configuration file.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	Yes
<b>Example:</b>	Name=dynamicTopN

### ConfigurationOption

Configuration parameters to add for the new statistic. Add each configuration option that you want to configure as an action parameter for the `AddStat` action. Statistics Server adds these parameters to the configuration section for the new statistic.

You can add the following configuration parameters:

- [AEqualStat](#)
- [ARangeStat](#)
- [BitANDStat](#)
- [NEqualStat](#)
- [NRangeStat](#)
- [DynamicField](#)
- [Field](#)
- [Offset](#)
- [Operation](#)
- [Period](#)

## Example

```
action=AddStat&Name=NewStat&Period=5&Field=Term&Operation=TopN,all
```

This creates the following section in the configuration file.

```
[NewStat]  
Period=5  
Field=Term  
Operation=TopN,all
```

## Event

The `Event` action sends XML events as URL-encoded text strings to the ACI port instead of as XML files to the Event port. This option can be useful if the front-end application uses the IDOL ACI API or something similar.

**NOTE:**

To use `Event`, you must enable the `ActionEvent` configuration parameter. See [ActionEvent](#), on page 104.

## Parameters

The `Event` action supports the following parameters.

### Data

Specify the URL-encoded XML string.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	Yes
<b>Example:</b>	<code>data=encoded_string</code> where <code>encoded_string</code> is the XML event in the form of a URL-encoded text string.

### InflateBytes

If the `Data` string is encoded in Base64 and is compressed with zlib, `InflateBytes` indicates the original size of the string. This value must be specified by the application that compressed the data.

<b>Type:</b>	Integer
<b>Default:</b>	None
<b>Required:</b>	No
<b>Example:</b>	<code>InflateBytes=1024</code>

## Example

```
action=Event&Data=?xml version='1.0' encoding='ISO-8859-1'?><events><queryinfo><ver>0.1</ver><url><![CDATA  
[action=Query&Spellcheck=True&Highlight=SummaryTerms]]></url><action>query</action>  
<terms><term>This</term></terms><terms><term>is</term></terms><terms><term>an</term  
></terms><terms><term>event</term></terms><terms><term>test.</term></terms><numhits
```

```
>12</numhits><ip>127.0.0.1</ip><timestamp>1200398400</timestamp><idolname>myIDOL</i  
dolname></queryinfo></events>
```

## GetDynamicValues

The `GetDynamicValues` action returns the dynamic values associated with each statistic. It can either return values for a particular statistic name, or for all statistics.

### Parameters

The `GetDynamicValues` action supports the following parameters.

#### Name

Restrict results to the specified statistics. The statistics that you enter must exist in the Statistics Server configuration file. Separate multiple entries with commas. By default, Statistics Server returns dynamic values for all statistics.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Example:</b>	Name=DynamicTopN,StandardCount,DynamicCount

### Example

```
action=GetDynamicValues&Name=DynamicTopN,StandardCount
```

## GetStatus

The `GetStatus` action returns information about the Statistics Server configuration settings, as well as the names and types of the statistics set in the configuration file.

### Parameters

`GetStatus` does not support any parameters.

### Example

```
action=GetStatus
```

## StatDelete

The `StatDelete` action allows you to delete statistics data, either from a particular statistic name, or from all statistics.

## Parameters

The `StatDelete` action supports the following parameters.

### Name

Restrict results to the specified statistics. The statistics that you enter must exist in the Statistics Server configuration file. Separate multiple entries with commas.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Example:</b>	Name=count_queries_hour,count_queries_day

### AllStats

Delete all statistics data.

<b>Type:</b>	Boolean
<b>Default:</b>	False
<b>Required:</b>	No
<b>Example:</b>	AllStats=True

## Example

```
action=StatDelete&Name=Stat1
```

## StatResult

The `StatResult` action returns the results of the configured statistics in XML format.

## Parameters

The `StatResult` action supports the following parameters.

### Name

Restrict results to the specified statistics. The statistics that you enter must exist in the Statistics Server configuration file. Separate multiple entries with commas.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No

<b>Example:</b>	Name=count_queries_hour,count_queries_day
-----------------	---

### DateString

Set the timestamp format. Set this parameter to `True` to display the timestamp in human-readable format (DD/MM/YYYY HH:MM:SS), or `False` to display it in epoch time.

<b>Type:</b>	Boolean
<b>Default:</b>	False
<b>Required:</b>	No
<b>Example:</b>	DateString=True

### DynamicValue

The value of the dynamic field. If the field specified in the `Name` parameter is a dynamic field, specify the value of this field for which you want to return results.

<b>Type:</b>	String
<b>Default:</b>	None
<b>Required:</b>	No
<b>Example:</b>	DynamicValue=London

### From

Set a minimum timestamp value. Statistical results must have a timestamp of equal or greater value to be returned.

**NOTE:**

The format in which you must enter a value depends on the `DateString` parameter setting. If it is `False`, you must enter an epoch time value. If it is `True`, you must enter a human-readable format value.

<b>Type:</b>	String
<b>Default:</b>	0 (disabled)
<b>Required:</b>	No
<b>Example:</b>	From=1220433495
<b>See also:</b>	<a href="#">DateString, above</a> <a href="#">UpTo, below</a>

### UpTo

Set a maximum timestamp value. Statistical results must have a timestamp of equal or lesser value to be returned.

**NOTE:**

The format in which you must enter a value depends on the `DateString` parameter setting. If it is `False`, you must enter the an epoch time value. If it is `True`, you must enter a human-readable format value.

<b>Type:</b>	String
<b>Default:</b>	0 (disabled)
<b>Required:</b>	No
<b>Example:</b>	<code>UpTo=1220433505</code>
<b>See also:</b>	<a href="#">DateString, on the previous page</a> <a href="#">From, on the previous page</a>

### MaxResults

Return the last *N* statistical results.

<b>Type:</b>	Integer
<b>Default:</b>	0 (disabled)
<b>Required:</b>	No
<b>Example:</b>	<code>MaxResults=10</code>

### MaxValues

Return only the top *N* values for a `TopN` or `CumulativeTopN` statistic.

Alternatively, set `MaxValues` to `0` to return only the number of unique values for `TopN` or `CumulativeTopN` statistics, without returning the values.

<b>Type:</b>	Integer
<b>Default:</b>	All values are shown
<b>Required:</b>	No
<b>Example:</b>	<code>MaxValues=10</code>

### Example

```
action=StatResult&Name=stat1,stat2&MaxResults=25
```

In this example, Statistics Server returns the most recent 25 results of the `stat1` and `stat2` statistics.



# Glossary

## A

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### **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.

### **agent**

A process that searches for information about a specific topic. An administrator can create agents for users or allow users to create their own agents.

### **agent index**

An index in IDOL Server that stores agents and profiles.

### **AgentBoolean field**

An IDOL Server field that stores Boolean agents (Boolean or Proximity expressions). You can then query IDOL Server with text and an AgentBoolean field to return categories whose Boolean agent matches this text. QMS rules use Boolean agents for matching queries.

## B

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### **blacklist rules**

A rule that allows you to specify a list of disallowed words for queries, and removes any terms that appear on this list.

### **boost rules**

A rule that modifies a query to include extra FieldText criteria, for example to boost the relevance of certain results.

## C

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### **cardinal placement**

A QMS rule that allows you to add a specified result to a specified position in a query results list.

### **Category component**

The IDOL Server component that manages categorization and clustering.

### **Community component**

The IDOL Server component that manages users and communities.

### **conceptual search**

A type of query that allows you to search for documents that match the concept that your query text defines, rather than matching the

particular keywords in your text. See also: query.

### **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**

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### **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.

### **data index**

An IDOL Server index that stores content data. You can customize how data is stored in the data index by configuring appropriate settings in the IDOL Server configuration file.

### **database**

An IDOL Server data pool that stores indexed information. The administrator can set up one or more databases, and specifies how data is fed to the databases. By default

IDOL Server contains the databases Profile, Agent, Activated, Deactivated, News, and Archive.

### **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.

### **Distributed Action Handler**

See: DAH

### **dynamic promotion**

A query that returns a document or set of documents that you want to promote. See Also: static promotions.

## **E**

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### **Extensible Markup Language**

See: XML

## **F**

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### **field**

Fields define different parts of content in IDOL documents, such as the title, content, and metadata information.

### **field operator**

A syntax string that defines a matching criteria in FieldText.

### **FieldText**

A type of query that searches for particular content in a particular document field. See also: query, field.

## H

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### **hypernym rule**

A rule that modifies query text to replace specific terms with a more general term. For example, flower is a hypernym of rose and lily.

### **hyponym rule**

A rule that modifies query text to include terms that are specific instances of the original terms. For example, poodle and labrador are hyponyms of dog.

## I

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### **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.

### **IDX**

A structured file format that you can index into IDOL Server. You can use a connector to import files into this format, or you can manually create IDX files.

### **index**

The IDOL Server data index contains document content and field information for analysis and retrieval.

### **index action**

An IDOL Server command to index data, or to maintain or manipulate the data index.

### **index fields**

Fields that IDOL Server processes linguistically when it stores them. Store fields that contain text which you want to query frequently as Index fields. IDOL Server applies stemming and stop word lists to text in Index fields before it stores them, which allows IDOL Server to process queries for these fields more quickly. Typically DRETITLE and DRECONTENT are fields that are set up as Index fields.

### **indexing**

The process of storing data in IDOL Server. IDOL Server stores data in different field types (for example, index, numeric, and ordinary fields). It is important to store data in appropriate field types to ensure optimized performance.

### **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

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### **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

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### **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.

### **link term**

Also referred to as "links". Terms in query text that are also contained in the result documents that IDOL Server returns for this query.

## O

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### **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

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### **parametric cardinal placement**

A QMS rule that allows you to place a specified parametric field in a specified position in a list.

### **primary domain controller**

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

### **Promotion Agentstore**

The agent index that stores QMS rules.

### **promotions**

Targeted content that you want to display to users but that is not included in the search results, such as advertisements.

## Q

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### **QMS**

An ACI server that manipulates queries and results according to user-defined rules.

### **QMS rules**

A document stored in the Promotion Agentstore that defines how QMS manages a query. Rules can return promotion documents, modify the original query, or modify the results of a query.

### **query**

A string that you submit to IDOL Server, which analyzes the concept of the query and returns documents that are conceptually similar to it. You can submit queries to IDOL Server to perform several kinds of search, such as natural language, Boolean, bracketed Boolean, and keyword.

### **Query Manipulation Server**

See: QMS

## R

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### **reference**

A string that is used to identify a document. This string might be a title or a URL, and allows IDOL to identify documents for retrieval, indexing, and deduplication.

### **ReferenceType field**

Fields used to identify documents. At index time IDOL Server can use ReferenceType fields to eliminate duplicate copies of

documents. At query time IDOL Server can use ReferenceType fields to filter results.

**relevance**

The similarity that a particular query result has to the initial query. IDOL Server assigns results a percentage relevance score according to how closely it matches the query criteria.

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**S**

**scope rules**

A rule that allows you to return results from a promotions query that are relevant to a particular role, department, or other user-defined characteristic.

**static promotion**

A specific document or set of documents that you want to return as a promotion. See Also: dynamic promotions.

**synonym rule**

A rule that modifies query text to include terms that are synonymous with the original terms.

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**T**

**tagging**

The process of adding extra information to documents. The tag might be a category, or entities returned from Education. Tagging usually adds a field to a document, which you can use to search by the name of a tag.

**term**

The basic entity that IDOL Server stores (for example, a word in a document after IDOL Server applies stemming).

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**V**

**View**

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

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**W**

**whitelist**

A rule that allows you to specify a list of allowed words for queries, and to remove any terms that do not appear on this list.

**Wildcard**

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

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**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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