OTRS Update Guide

Release 8.0

OTRS AG

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Contents

CHAPTER 1

Introduction

This manual is intended for use by system administrators. The chapters describe the updating of the OTRS software.

There is no graphical user interface for updating. System administrators have to follow the steps described in the following chapters.

All console commands look like `username> command-to-execute`. Username indicates the user account of the operating system, which need to use to execute the command. If a command starts with `root>`, you have to execute the command as a user who has root permissions. If a command starts with `otrs>`, you have to execute the command as the user created for OTRS.

Warning: Don' t select `username>` when you copy the command and paste it to the shell. Otherwise you will get an error.

We supposed that OTRS is installed to `/opt/otrs`. If OTRS is installed to a different directory, then you have to change the path in the commands or create a symbolic link to this directory.

```
root> ln -s /path/to/otrs /opt/otrs
```

CHAPTER 2

Hardware and Software Requirements

OTRS can be installed on Linux and on other Unix derivates (e.g. OpenBSD or FreeBSD). To run OTRS on Microsoft Windows is not possible.

To run OTRS, you’ ll also need to use a web server as reverse proxy and a database server. Apart from that, you should install Perl and/or install some additional Perl modules on the OTRS machine.

Perl must be installed on the same machine as OTRS. The database back end and the web server may be installed locally or on another host.

For Perl, you will need some additional modules which can be installed either with the Perl shell and CPAN, or via the package manager of your operating system (rpm, yast, apt-get).

OTRS has a console command to check the environment and the missing modules.

```
otrs> /opt/otrs/bin/otrs.CheckEnvironment.pl
```

If some packages are missing, you can get an install command for your operating system, if you run the script with `--list` option.

```
otrs> /opt/otrs/bin/otrs.CheckEnvironment.pl --list
```

If all needed packages are installed, the output of the environment check script shows the installed packages and the version numbers.

```
Checking for Perl Modules:
  o Archive::Tar.....................ok (v2.24)
  o Archive::Zip.....................ok (v1.63)
  o Crypt::Eksblowfish::Bcrypt.......ok (v0.009)
  o Crypt::SSLeay....................ok (v0.73_06)
  o CryptX...........................ok (v0.061)
  o Date::Format.....................ok (v2.24)
  o DateTime.........................ok (v1.50)
  o DBI..............................ok (v1.641)
  o DBD::mysql.......................ok (v4.046)
```

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```
  o DBD::ODBC.......................Not installed!  Use: 'apt-get install -y␣
↪libdbd-odbc-perl' (optional - Required to connect to a MS-SQL database.)
  o DBD::Oracle.....................Not installed!  Use: 'cpan DBD::Oracle'␣
↪(optional - Required to connect to a Oracle database.)
  o DBD::Pg.........................Not installed!  Use: 'apt-get install -y␣
↪libdbd-pg-perl' (optional - Required to connect to a PostgreSQL database.)
  o Digest::SHA.....................ok (v5.96)
  o Encode::HanExtra................ok (v0.23)
  o EV..............................ok (v4.22)
  o IO::Socket::SSL.................ok (v2.060)
  o JSON::XS........................ok (v3.04)
  o List::Util::XS..................ok (v1.46_02)
  o LWP::UserAgent..................ok (v6.35)
  o Mail::IMAPClient................ok (v3.39)
    o Authen::SASL..................ok (v2.16)
    o Authen::NTLM..................ok (v1.09)
  o Moose...........................ok (v2.2011)
  o Net::DNS........................ok (v1.17)
  o Net::LDAP.......................ok (v0.65)
  o Search::Elasticsearch...........ok (v6.00)
  o Specio..........................ok (v0.42)
  o Specio::Subs....................ok (v0.42)
  o Template........................ok (v2.27)
  o Template::Stash::XS.............ok (undef)
  o Text::CSV_XS....................ok (v1.36)
  o Time::HiRes.....................ok (v1.9741)
  o XML::LibXML.....................ok (v2.0132)
  o XML::LibXSLT....................ok (v1.96)
  o XML::Parser.....................ok (v2.44)
  o YAML::XS........................ok (v0.74)

Checking for External Programs:
  o GnuPG...........................ok (v2.2.8)
  o npm.............................ok (v5.8.0)
    o Node.js.......................ok (v8.11.4)
  o OpenSSL.........................ok (v1.1.1/OpenSSL)
```

2.1 Hardware Requirements

Hardware requirements highly depend on the usage of OTRS. OTRS can be used to process a few tickets per month or to process hundreds of tickets per day. The storage requirement also depends on the number of tickets and size of attachments.

We recommend using a machine with:

- AMD Ryzen 7 3700X Octa core or comparable CPU
- 64 GB RAM
- 2 × 1 TB NVMe SSD (Software-RAID 1)
- Gigabit LAN

2.2 Software requirements

Perl

- Perl 5.16.0 or higher
- Perl packages listed by `/opt/otrs/bin/otrs.CheckEnvironment.pl` console command

Web Servers

- Apache2
- nginx
- Any other web server that can be used as a reverse proxy

Databases

- MySQL 5.7 or higher
- MariaDB 10.2 or higher
- PostgreSQL 9.2 or higher
- Oracle 10g or higher

Note: OTRS 9 will not support Oracle as application database anymore.

Other dependencies

- Elasticsearch from version 6.5.x to 7.x (higher versions are not supported)
- Elasticsearch modules `analysis-icu` and `ingest-attachment`
- `Search::Elasticsearch` and `Search::Elasticsearch::Client::6_0` (must have equal Perl package versions)
- Node.js 8.9 or higher

Web browsers

- Apple Safari version 7 or higher
- Google Chrome
- Microsoft Internet Explorer 11
- Microsoft Edge
- Mozilla Firefox version 32 or higher
- Any other modern web browser with JavaScript support

Note: OTRS 9 will not support Internet Explorer anymore.

CHAPTER 3

Installation

Note: **OTRS** is installed by the *Customer Solution Team*. Please contact the *Customer Solution Team* via support@otrs.com or in the OTRS Portal.

CHAPTER 4

Updating

Note: It is highly recommended to perform a test update on a separate testing machine first.

Updating from an earlier version of OTRS 8 You can update directly from any previous to the latest available patch level release.

Updating from OTRS 7 You can update from any OTRS 7 patch level release to the latest available OTRS 8 patch level release.

Updating from OTRS 6 or earlier You cannot update from OTRS 6 or earlier directly to OTRS 8. Full updates to all available minor versions have to be made sequentially instead. For example, if you come from OTRS 5, you first have to perform a full update to OTRS 6, then to OTRS 7 and finally to OTRS 8.

See also:

See the admin manual of the previous versions of OTRS for the update instructions.

4.1 Step 1: Stop All Relevant Services and the OTRS Daemon

Please make sure there are no more running services or cron jobs that try to access OTRS. This will depend on your service configuration and OTRS version.

```
root> systemctl stop postfix
root> systemctl stop apache2
root> systemctl stop otrs-daemon
root> systemctl stop otrs-webserver
```

4.2 Step 2: Backup Files and Database

Create a backup of the following files and folders:

- `Kernel/Config.pm`
- `Kernel/Config/Files/User/*.pm`
- `Kernel/WebApp.conf`
- `var/*`
- as well as the database

Warning: Don’ t proceed without a complete backup of your system. Use the *Backup* script for this.

4.3 Step 3: Install the New Release

You can obtain either `otrs-x.y.z.tar.gz` or `otrs-x.y.z.tar.bz2`. Unpack the source archive (for example, using `tar`) into the directory `/opt`, and create a symbolic link `/opt/otrs` that points to `/opt/otrs-x.y.z`. **Do not forget** to replace the version numbers!

Note: Package `bzip2` is not installed in some systems by default. Make sure, that `bzip2` is installed before unpacking `otrs-x.y.z.tar.bz2`.

Unpack command for `otrs-x.y.z.tar.gz`:

```
root> tar -xzf otrs-x.y.z.tar.gz -C /opt
```

Unpack command for `otrs-x.y.z.tar.bz2`:

```
root> tar -xjf otrs-x.y.z.tar.bz2 -C /opt
```

It is recommended to create a symbolic link named `/opt/otrs` that always points to the latest OTRS version. Using symbolic link makes easy to manage the OTRS updates, because you can leave untouched the directory of the previous version, only the symbolic link needs to change. If you need to revert the update, you can change the target of the symbolic link back.

Execute this command to create a symbolic link:

```
root> ln -fns /opt/otrs-x.y.z /opt/otrs
```

4.3.1 Restore Old Configuration Files

- `Kernel/Config.pm`
- `Kernel/Config/Files/User/*.pm`
- `Kernel/WebApp.conf`

4.3.2 Restore Article Data

If you configured OTRS to store article data in the file system you have to restore the `article` folder to `/opt/otrs/var/` or the folder specified in the system configuration.

4.3.3 Restore Already Installed Default Statistics

If you have additional packages with default statistics you have to restore the stats XML files with the suffix `*.installed` to `/opt/otrs/var/stats`.

```
root> cd OTRS-BACKUP/var/stats
root> cp *.installed /opt/otrs/var/stats
```

4.3.4 Set File Permissions

Please execute the following command to set the file and directory permissions for OTRS. It will try to detect the correct user and group settings needed for your setup.

```
root> /opt/otrs/bin/otrs.SetPermissions.pl
```

4.3.5 Install Required Programs and Perl Modules

Use the following script to get an overview of all installed and required CPAN modules and other external dependencies.

```
root> perl /opt/otrs/bin/otrs.CheckEnvironment.pl
Checking for Perl Modules:
  o Archive::Tar.....................ok (v1.90)
  o Archive::Zip.....................ok (v1.37)
  o Crypt::Eksblowfish::Bcrypt.......ok (v0.009)
...
```

Note: Please note that OTRS requires a working Perl installation with all *core* modules such as the module `version`. These modules are not explicitly checked by the script. You may need to install a `perl-core` package on some systems like RHEL that do not install the Perl core packages by default.

To install the required and optional packages, you can use either CPAN or the package manager of your Linux distribution.

Execute this command to get an install command to install the missing dependencies:

```
root> /opt/otrs/bin/otrs.CheckEnvironment.pl --list
```

OTRS requires a supported stable version of Node.js to be installed. Please refer to the Node.js installation instructions.

4.3.6 Setup Elasticsearch Cluster

OTRS requires an active cluster of Elasticsearch. The easiest way is to setup Elasticsearch on the same host as OTRS and binding it to its default port. With that, no further configuration in OTRS is needed. For more information read the Set up Elasticsearch chapter in the official documentation.

See also:

Please refer to the *Hardware and Software Requirements* chapter for the supported versions.

Additionally, OTRS requires plugins to be installed into Elasticsearch:

```
root> /usr/share/elasticsearch/bin/elasticsearch-plugin install --batch␣
↪ingest-attachment
root> /usr/share/elasticsearch/bin/elasticsearch-plugin install --batch␣
↪analysis-icu
```

Note: Restart Elasticsearch afterwards, or indexes will not be built.

To verify the Elasticsearch installation, you can use the following command:

```
otrs> /opt/otrs/bin/otrs.Console.pl Maint::DocumentSearch::Check
Trying to connect to cluster...
  Connection successful.
```

4.4 Step 4: Run the Migration Script

The migration script will perform many checks on your system and give you advice on how to install missing Perl modules etc., if that is required. If all checks succeeded, the necessary migration steps will be performed. Please also run this script in case of patch level updates.

Run the migration script:

```
otrs> /opt/otrs/scripts/DBUpdate-to-8.pl
```

Warning: Do not continue the upgrading process if this script did not work properly for you. Otherwise malfunction or data loss may occur.

The migration script also checks if ACLs and system configuration settings are correct. In case of an invalid system configuration setting, script will offer you an opportunity to fix it by choosing from a list of possible values. In case the script runs in a non-interactive mode, it will try to automatically fix invalid settings. If this fails, you will be asked to manually update the setting after the migration.

If there are outdated ACLs, the system will not be able to fix them automatically, and they need to be corrected by the administrator. Please see the last step for manual changes for details.

4.5 Step 5: Update Installed Packages

Note: Packages for OTRS 7 are not compatible with OTRS 8 and have to be updated.

You can use the command below to update all installed packages. This works for all packages that are available from online repositories. You can update other packages later via the package manager (this requires a running OTRS daemon).

```
otrs> /opt/otrs/bin/otrs.Console.pl Admin::Package::UpgradeAll
```

4.6 Step 6: Start your Services

Now the services can be started. This will depend on your service configuration, here is an example:

```
root> systemctl start postfix
root> systemctl start apache2
```

Note: The OTRS daemon is required for correct operation of OTRS such as sending emails. Please activate it as described in the next step.

4.7 Step 7: Start the OTRS Daemon and Web Server

OTRS comes with example systemd configuration files that can be used to make sure that the OTRS daemon and web server are started automatically after the system starts.

```
root> cd /opt/otrs/scripts/systemd
root> for UNIT in *.service; do cp -vf $UNIT /usr/lib/systemd/system/; systemctl enable $UNIT; done
root> systemctl start otrs-daemon
root> systemctl start otrs-webserver
```

Now you can log into your system.

4.8 Step 8: Manual Migration Tasks and Changes

Warning: This step is required only for major update from OTRS 7.

With OTRS 8 a new default password policy for agents and customer users is in effect. The password policy rules can be changed in the system configuration (`PreferencesGroups###Password` and `CustomerPersonalPreference###Password`).

Password Policy Rule	Default
PasswordMinSize	8
PasswordMin2Lower2UpperCharacters	Yes
PasswordNeedDigit	Yes
PasswordHistory	10
PasswordTTL	30 days
PasswordWarnBeforeExpiry	5 days
PasswordChangeAfterFirstLogin	Yes

It is also possible to add some password policy exceptions for agents or customer users. Please check the following configuration options for details:

- PasswordPolicy::ExceptAgentPasswordComplexity
- PasswordPolicy::ExceptAgentPasswordTTL
- PasswordPolicy::ExceptAgentPasswordHistory
- PasswordPolicy::ExceptAgentPasswordChangeAfterFirstLogin
- PasswordPolicy::ExceptCustomerPasswordComplexity
- PasswordPolicy::ExceptCustomerPasswordTTL
- PasswordPolicy::ExceptCustomerPasswordHistory
- PasswordPolicy::ExceptCustomerPasswordChangeAfterFirstLogin

Since the old agent interface screens are no longer present, some ACLs need to be corrected manually by the administrator. The migration script already informed you if this is the case.

Affected ACLs are those that refer to a non-existing agent interface screen in their Action setting. This front end Action rule needs to be replaced with a corresponding Endpoint rule. A table with possible mapping is included below.

Action	Endpoint
AgentAppointmentCalendarOverview	No replacement (feature dropped)
AgentLinkObject	No replacement (feature dropped)
AgentSplitSelection	AgentFrontend::TicketArticle::Action::Split
AgentTicketBounce	AgentFrontend::TicketArticle::Action::Redirect
AgentTicketBulk	AgentFrontend::TicketList::Bulk
AgentTicketClose	AgentFrontend::Ticket::Action::Close
AgentTicketCompose	AgentFrontend::TicketArticle::Action::Reply AgentFrontend::TicketArticle::Action::ReplyAll
AgentTicketCustomer	AgentFrontend::Ticket::Action::Customer
AgentTicketEmail	AgentFrontend::TicketCreate::Email
AgentTicketEmailOutbound	AgentFrontend::Ticket::Action::EmailOutbound
AgentTicketEmailResend	No replacement (feature dropped)
AgentTicketForward	AgentFrontend::TicketArticle::Action::Forward
AgentTicketFreeText	AgentFrontend::Ticket::Action::FreeText
AgentTicketHistory	AgentFrontend::Ticket::Action::TicketHistory
AgentTicketLink	AgentFrontend::Ticket::Action::Link
AgentTicketLock	AgentFrontend::Ticket::Action::Lock AgentFrontend::Ticket::Action::Unlock
AgentTicketMerge	AgentFrontend::Ticket::Action::Merge
AgentTicketMove	AgentFrontend::Ticket::Action::Move

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Action	Endpoint
AgentTicketNote	AgentFrontend::Ticket::Action::Note AgentFrontend::TicketArticle::Action::ReplyToNote
AgentTicketOwner	AgentFrontend::Ticket::Action::Owner
AgentTicketPending	AgentFrontend::Ticket::Action::Pending
AgentTicketPhone	AgentFrontend::TicketCreate::Phone
AgentTicketPhoneInbound	AgentFrontend::Ticket::Action::PhoneCallInbound
AgentTicketPhoneOutbound	AgentFrontend::Ticket::Action::PhoneCallOutbound
AgentTicketPlain	AgentFrontend::TicketArticle::Action::Plain
AgentTicketPrint	AgentFrontend::Ticket::Action::Print AgentFrontend::TicketArticle::Action::Print
AgentTicketPriority	AgentFrontend::Ticket::Action::Priority
AgentTicketProcess	AgentFrontend::TicketCreate::Process AgentFrontend::ProcessTicketNextStep
AgentTicketResponsible	AgentFrontend::Ticket::Action::Responsible
AgentTicketSearch	No replacement (feature dropped)
AgentTicketWatcher	AgentFrontend::Ticket::Action::Watch AgentFrontend::Ticket::Action::Unwatch
AgentTicketZoom	AgentFrontend::TicketDetailView AgentFrontend::TicketDetailView::Property

4.9 Recommendation: Convert Your MySQL Database

OTRS 7 and previous versions only supported the utf8 MySQL database character set, which is not able to store all Unicode characters. Since OTRS 8 the utf8mb4 character set is also supported, which removes this limitation. It is recommended to convert your database at your convenience with the built-in migration script.

Running the migration script without options will display only if something needs to be converted.

```
otrs> /opt/otrs/bin/otrs.Console.pl Maint::Database::MySQL::UTF8MB4Migration
The following tasks need to be done:
  - 1 table(s) need to be converted to 'DYNAMIC' row format
  - the database needs to be converted to 'utf8mb4'
  - 411 column(s) need to be converted to 'utf8mb4'
  - 156 table(s) need to be converted to 'utf8mb4'
```

Use the --force option to perform the actual migration.

```
otrs> /opt/otrs/bin/otrs.Console.pl Maint::Database::MySQL::UTF8MB4Migration -
↪-force
...
```

After the migration is done, you need to add a new switch to file Kernel/Config.pm to activate the utf8mb4 support.

```
$Self->{'Database::mysql::utf8mb4'} = 1;
```

Note: OTRS 8 can be operated in the utf8 character set, without this migration. But OTRS 9 will only support the utf8mb4 character set. Therefore this migration needs to be done during the life cycle of OTRS

8 at some point.

4.10 Updating Elasticsearch

Elasticsearch 7.x changed some configuration settings and behaviors. A full list of changes from Elasticsearch 6.x to 7.x can be reviewed in the Elasticsearch Reference.

One of those options is explicitly interesting for OTRS, which is the maximum amount of open scroll contexts, that had a value of 1000 until the latest version of Elasticsearch 6.x and was reduced to 500 in Elasticsearch 7.x.

In normal situations, this value should not be reached, but we recommend to set this value back to 1000 with the following option, that has to be added to the configuration file `elasticsearch.yml`:

```
search.max_open_scroll_context: 1000
```

CHAPTER 5

Backup and Restore

OTRS has built-in scripts for backup and restore. Execute the scripts with `-h` option for more information.

5.1 Backup

Note: To create a backup, write permission is needed for `otrs` user for the destination directory.

```
otrs> /opt/otrs/scripts/backup.pl -h
```

The output of the script:

```
Backup an OTRS system.

Usage:
 backup.pl -d /data_backup_dir [-c gzip|bzip2] [-r DAYS] [-t␣
 ↪fullbackup|nofullbackup|dbonly]

Options:
 -d                      - Directory where the backup files should place to.
 [-c]                    - Select the compression method (gzip|bzip2).␣
 ↪Default: gzip.
 [-r DAYS]               - Remove backups which are more than DAYS days old.
 [-t]                    - Specify which data will be saved␣
 ↪(fullbackup|nofullbackup|dbonly). Default: fullbackup.
 [-h]                    - Display help for this command.

Help:
Using -t fullbackup saves the database and the whole OTRS home directory␣
 ↪(except /var/tmp and cache directories).
```

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```
Using -t nofullbackup saves only the database, /Kernel/Config* and /var␣
 ↪directories.
With -t dbonly only the database will be saved.

Output:
 Config.tar.gz         - Backup of /Kernel/Config* configuration files.
 Application.tar.gz     - Backup of application file system (in case of full␣
 ↪backup).
 VarDir.tar.gz          - Backup of /var directory (in case of no full␣
 ↪backup).
 DataDir.tar.gz         - Backup of article files.
 DatabaseBackup.sql.gz  - Database dump.
```

5.2 Restore

```
otrs> /opt/otrs/scripts/restore.pl -h
```

The output of the script:

```
Restore an OTRS system from backup.

Usage:
 restore.pl -b /data_backup/<TIME>/ -d /opt/otrs/

Options:
 -b                     - Directory of the backup files.
 -d                     - Target OTRS home directory.
 [-h]                   - Display help for this command.
```

CHAPTER 6

Performance Tuning

There is a list of performance enhancing techniques for your OTRS installation, including configuration, coding, memory use, and more.

6.1 Ticket Search Index

OTRS uses a special search index to perform full-text searches across fields in articles from different communication channels.

To create an initial index, use this command:

```
otrs> /opt/otrs/bin/otrs.Console.pl Maint::Ticket::FulltextIndex --rebuild
```

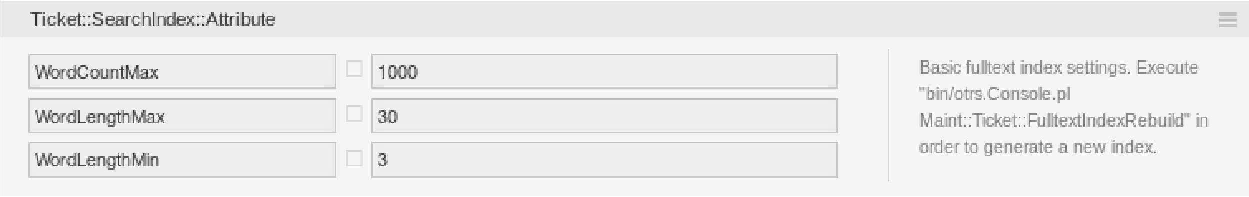
Note: Actual article indexing happens via an OTRS daemon job in the background. While articles which were just added in the system are marked for indexing immediately, it could happen their index is available within a few minutes.

There are some options available for fine tuning the search index:

`Ticket::SearchIndex::IndexArchivedTickets` Defines if archived tickets will be included in the search index (not enabled by default). This is advisable to keep the index small on large systems with archived tickets. If this is enabled, archived tickets will be found by full-text searches.

`Ticket::SearchIndex::Attribute` Basic full-text index settings.

> **Note:** Run the following command in order to generate a new index:
>
> ```
> otrs> /opt/otrs/bin/otrs.Console.pl Maint::Ticket::FulltextIndexRebuild
> ```



Ticket::SearchIndex::Attribute

WordCountMax □ 1000

WordLengthMax □ 30

WordLengthMin □ 3

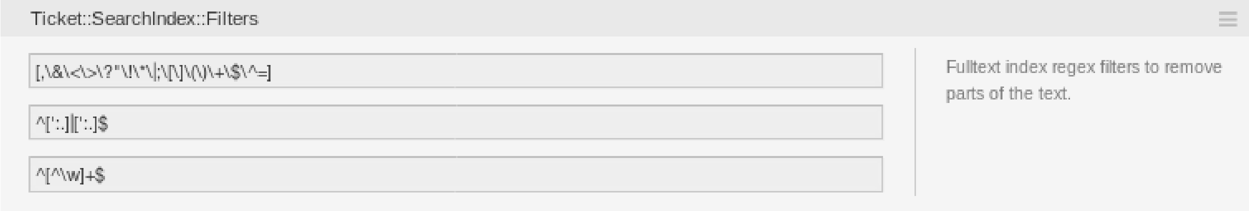
Basic fulltext index settings. Execute "bin/otrs.Console.pl Maint::Ticket::FulltextIndexRebuild" in order to generate a new index.

Fig. 1: `Ticket::SearchIndex::Attribute` Setting

`WordCountMax` Defines the maximum number of words which will be processed to build up the index. For example only the first 1000 words of an article body are stored in the article search index.

`WordLengthMin` and `WordLengthMax` Used as word length boundaries. Only words with a length between these two values are stored in the article search index.

`Ticket::SearchIndex::Filters` Full-text index regular expression filters to remove parts of the text.



Ticket::SearchIndex::Filters

```
[,\&\<\>\?"\!\*\|;\[\]\(\)\+\$\^=]
^[':.]|[':.]$
^[^\w]+$
```

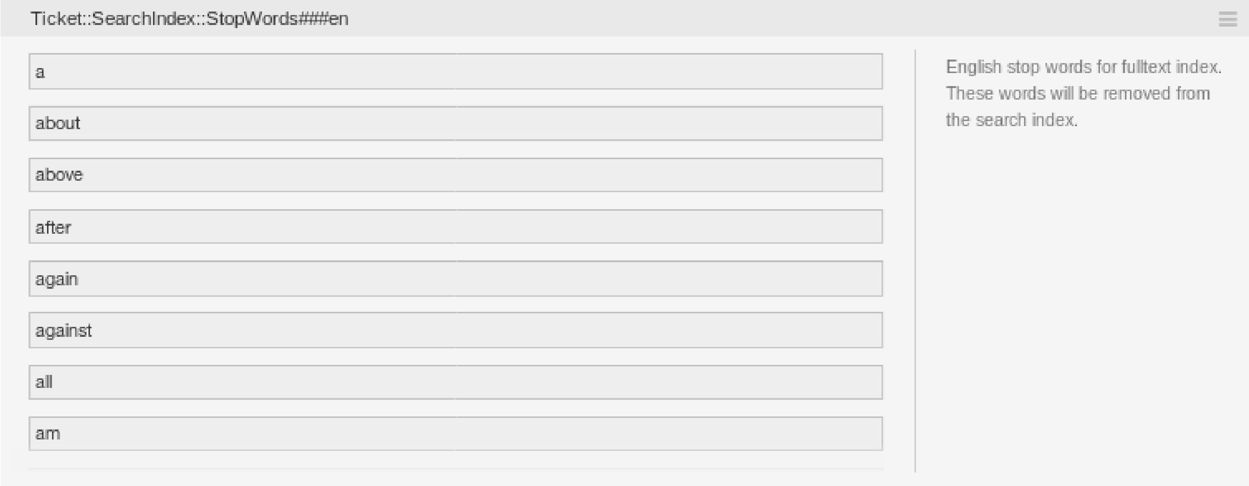
Fulltext index regex filters to remove parts of the text.

Fig. 2: `Ticket::SearchIndex::Filters` Setting

There are three default filters defined:

- The first filter strips out special chars like: , & < > ? ” ! * | ; [ ] ( ) + $ ^ =
- The second filter strips out words which begin or ends with one of following chars: ‘ : .
- The third filter strips out words which do not contain a word-character: a-z, A-Z, 0-9, _

`Ticket::SearchIndex::StopWords` English stop words for full-text index. These words will be removed from the search index.



Ticket::SearchIndex::StopWords###en

a

about

above

after

again

against

all

am

English stop words for fulltext index. These words will be removed from the search index.

Fig. 3: `Ticket::SearchIndex::StopWords###en` Setting

There are so-called stop-words defined for some languages. These stop-words will be skipped while creating the search index.

See also:

If your language is not in the system configuration settings or you want to add more words, you can add them to this setting:

- `Ticket::SearchIndex::StopWords###Custom`

6.2 Document Search

OTRS uses Elasticsearch for its document search functionality. For a good introduction into the concepts, installation and usage of Elasticsearch, please follow the Getting started with Elasticsearch chapter in the official documentation.

6.2.1 Heap Size

Elasticsearch is written in Java and therefore runs in a Java Virtual Machine (JVM) on any cluster node. Such a JVM uses a part of the memory, called *heap*, which size can be configured in configuration file `jvm.options`.

The heap minimum and maximum configurations are by default set to a value of 1 GB and can be modified with the following options:

- `Xms1g`: minimum heap size.
- `Xmx1g`: maximum heap size.

If the `Xms` has a lower value than `Xmx`, the JVM will resize the used heap anytime the current limit is exceeded, until the value of `Xmx` is reached. Such a resizing causes the service to pause until it is finished, which may decrease the speed and reactivity of the search or indexing actions. Therefore it is highly recommended to set those configurations to an equal value.

Warning: If the maximum heap size is exceeded, the related cluster node stops working and might even shutdown the service.

The higher the heap maximum value is set, the more memory can be used by Elasticsearch, which also increases the possible pauses for garbage collection, done by the JVM. Therefore it is recommended to set a value for `Xmx`, that is not higher than 50% of the physical memory.

For more information and good rules of thumb about the heap size, please follow the Setting the heap size chapter in the official documentation.

6.2.2 Disk Allocation

During the run-time of the service, Elasticsearch inspects the available disk space and therefore decides whether to allocate new shards to the related cluster node or even relocate shards away from that particular node. Such behavior will be controlled by the current disk capacity and can be configured in configuration file `elasticsearch.yml`. Enclosed are some important configurations, that come with good default values, but might be important:

`cluster.routing.allocation.disk.watermark.low` Default value of 85%. If this limit is exceeded, Elasticsearch will not allocate more shards to the related cluster node. The operation of that node is not influenced and data can still be indexed and searched.

`cluster.routing.allocation.disk.watermark.high` Default value of 90%. If this limit is exceeded, Elasticsearch will try to relocate existing shards to other nodes (if possible), that have enough space available.

`cluster.routing.allocation.disk.watermark.flood_stage` Default value of 95%. If this limit is exceeded, Elasticsearch will update the configuration of all indices to read-only index blocks `index.blocks.read_only_allow_delete`, that have at least one shard allocated to the related cluster node. Since then, it is not possible to index new data to such indices and restricted to searches and delete actions.

Note: If the flood stage was exceeded and certain indices are configured to read-only mode, such configuration *will not* automatically be changed by Elasticsearch. If the related disks contains enough free space again, due to manual actions, it is needed change the configuration back to normal mode manually.

For more information about disk watermarks and disk-based shard allocation, please follow the Disk-based Shard Allocation chapter in the official documentation.

6.3 Article Storage

There are two different back end modules for the article storage of phone, email and internal articles. The used article storage can be configured in the setting `Ticket::Article::Backend::MIMEBase::ArticleStorage`.

`Kernel::System::Ticket::Article::Backend::MIMEBase::ArticleStorageDB` This default module will store attachments in the database. It also works with multiple front end servers, but requires much storage space in the database.

> **Note:** Don't use this with large setups.

`Kernel::System::Ticket::Article::Backend::MIMEBase::ArticleStorageFS` Use this module to store attachments on the local file system. It is fast, but if you have multiple front end servers, you must make sure the file system is shared between the servers. Place it on an NFS share or preferably a SAN or similar solution.

> **Note:** Recommended for large setups.

You can switch from one back end to the other on the fly. You can switch the back end in the system configuration, and then run this command line utility to put the articles from the database onto the file system or the other way around:

```
otrs> /opt/otrs/bin/otrs.Console.pl Admin::Article::StorageSwitch --target␣
↪ArticleStorageFS
```

You can use the `--target` option to specify the target back end.

Note: The entire process can take considerable time to run, depending on the number of articles you have and the available CPU power and/or network capacity.

If you want to keep old attachments in the database, you can activate the system configuration option `Ticket::Article::Backend::MIMEBase::CheckAllStorageBackends` to make sure OTRS will still find them.

6.4 Archiving Tickets

As OTRS can be used as an audit-proof system, deleting closed tickets may not be a good idea. Therefore we implemented a feature that allows you to archive tickets.

Tickets that match certain criteria can be marked as archived. These tickets are not accessed if you do a regular ticket search or run a generic agent job. The system itself does not have to deal with a huge amount of tickets any longer as only the latest tickets are taken into consideration when using OTRS. This can result in a huge performance gain on large systems.

To use the archive feature:

1. Activate the `Ticket::ArchiveSystem` setting in the system configuration.
2. Define a generic agent job:
   - Click on the *Add Job* button in the *Generic Agent* screen.
   - *Job Settings*: provide a name for the archiving job.
   - *Automatic Execution*: select proper options to schedule this job.
   - *Select Tickets*: it might be a good idea to only archive those tickets in a closed state that have been closed a few months before.
   - *Update/Add Ticket Attributes*: set the field *Archive selected tickets* to *archive tickets*.
   - Save the job at the end of the page.
   - Click on the *Run this task* link in the overview table to see the affected tickets.
   - Click on the *Run Job* button.

   Note: Up to 5000 tickets can be modified by running this job manually.

When you search for tickets, the system default is to search tickets which are not archived.

To search for archived tickets:

1. Open the ticket search screen.
2. Set *Archive search* to *Unarchived tickets* or *All tickets*.
3. Perform the search.

6.5 Tuning the Web Server

The built-in web server of OTRS can handle small and medium setups out of the box. When OTRS serves many users simultaneously, it may be necessary to tweak the web server configuration to increase the number of worker processes, for example.

The web server configuration file is located in `Kernel/WebApp.conf`, and all settings there are documented. The `worker` setting can be increased to deploy more processes for serving HTTP requests on capable servers.

6.6 Caching

OTRS caches a lot of temporary data in `/opt/otrs/var/tmp`. Please make sure that this uses a high performance file system and storage. If you have enough RAM, you can also try to put this directory on a ramdisk like this:

```
otrs> /opt/otrs/bin/otrs.Console.pl Maint::Session::DeleteAll
otrs> /opt/otrs/bin/otrs.Console.pl Maint::Cache::Delete
root> mount -o size=16G -t tmpfs none /opt/otrs/var/tmp
```

Note: Add persistent mount point in `/etc/fstab`.

Warning: This will be a non-permanent storage that will be lost on server reboot. All your sessions (if you store them in the file system) and your cache data will be lost.

6.7 Clustering

For very high loads, it can be required to operate OTRS on a cluster of multiple front end servers. This is a complex task with many pitfalls. Therefore, OTRS Group provides support for clusters in its managed OTRS environment exclusively.