

Cloudera Runtime 7.2.18

## Securing Cloudera Search

Date published: 2015-05-05

Date modified: 2024-04-03

# CLOUDERA

<https://docs.cloudera.com/>

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## Cloudera Search security aspects

Cloudera Search security covers the following security aspects:

- Securing network communication

Cloudera Search supports TLS for encrypting communications over a network.

- Authentication

Cloudera Search supports Kerberos and LDAP for authentication.

- Authorization

Cloudera Search supports Apache Ranger for authorization.

### Related Tasks

[Configuring Ranger authorization for Solr in a DDE Cloudera Data Hub cluster](#)

## Enabling ZooKeeper SSL/TLS for Solr and HBase Indexer

Learn about configuring Solr and HBase Indexer to communicate with ZooKeeper in a secure way.

### Related Information

[Configure ZooKeeper TLS/SSL using Cloudera Manager](#)

## Enabling SSL for Solr ZooKeeper

Learn about enabling secure communications between Solr and ZooKeeper.

### Before you begin

- The Enable TLS/SSL for ZooKeeper and Client Port Unification options must be enabled in the ZooKeeper configuration (These are the default settings for a secure cluster).

### Procedure

1. In Cloudera Manager, select the Solr service for which you want to enable secure communication.
2. Click the Configuration tab.
3. Search for SSL.
4. Find the Enable TLS/SSL for Solr ZooKeeper property and select it to enable TLS/SSL.
5. Click Save Changes.
6. Restart.

## Enabling SSL for HBase Indexer ZooKeeper

Learn about enabling secure communication between HBase Indexer and ZooKeeper.

### Before you begin

- The Enable TLS/SSL for ZooKeeper and Client Port Unification options must be selected in the ZooKeeper configuration (These are the default settings for a secure cluster).
- The Enable TLS/SSL for Solr Zookeeper must be selected for the Solr service used with HBase Indexer. When you disable SSL/TLS for HBase indexer ZooKeeper, make sure that you disable it for the Solr service as well.

### Procedure

1. In Cloudera Manager, select the HBase service for which you want to enable secure communication.
2. Click the Configuration tab.
3. Search for SSL.
4. Find the Enable TLS/SSL for HBase ZooKeeper property and select it to enable TLS/SSL.
5. Click Save Changes.
6. Restart.

## Enable LDAP authentication in Solr

You can configure LDAP-based authentication using Cloudera Manager at the Solr service level.

### Before you begin



**Note:** Depending on how your environment is set up, you may have issues with DNS resolution. You can avoid it by using IP addresses instead of hostnames.

### About this task

Solr supports LDAP authentication for external Solr clients including:

- Command-line tools
- curl
- Web browsers
- Solr Java clients

In some cases, Solr does not support LDAP authentication. Use Kerberos authentication instead in these cases. Solr does not support LDAP authentication with:

- Search indexing components including the MapReduce indexer and Lily HBase indexer.
- Solr internal requests such as those for replication or querying.
- Hadoop delegation token management requests such as GETDELEGATIONTOKEN or RENEWDELEGATIONTOKEN.

### Before you begin

- Configuring LDAP authentication requires that Kerberos authentication is already configured and enabled in Solr.
- For secure LDAP connections, it is a prerequisite that TLS/SSL has been configured and enabled in Solr.

### Procedure

1. In Cloudera Manager, select the Solr service.
2. Click the Configuration tab.
3. Select Scope Solr .
4. Select Category Security .
5. Select Enable LDAP Authentication.

6. Enter the LDAP URL in the LDAP URL property.

To configure a TLS encrypted LDAP connection, select one of the following options:

- `ldaps://<LDAP_SERVER>:<PORT>`

The default port is 636.

OR

- `ldap://<LDAP_SERVER>:<PORT>`

The default port is 389.

Select Enable LDAP TLS. This is not required when using an LDAP URL with prefix `ldaps://`, because that already specifies TLS.

To configure LDAP with unencrypted transmission of usernames and passwords, set `ldap://<ldap_server>:<port>`, without setting Enable LDAP TLS.

7. Configure only one of following mutually exclusive parameters:

- LDAP BaseDN: Replaces the username with a "distinguished name" (DN) of the form: `uid=userid,ldap_base DN`. Typically used for OpenLDAP server installation.
- Active Directory Domain: Replaces the username with a string `username@ldap_domain`. Typically used for Active Directory server installation.

8. Launch the Stale Configuration wizard to restart the Solr service and any dependent services.

## Creating a JAAS configuration file

Certain applications, such as those using the SolrJ library, require a Java Authentication and Authorization Service (JAAS) configuration file.

- If you are authenticating using kinit to obtain credentials, you can configure the client to use your credentials cache by creating a JAAS file with the following contents:

```
Client {
  com.sun.security.auth.module.Krb5LoginModule required
  useKeyTab=false
  useTicketCache=true
  principal="[ ***USER*** ]@[ ***REALM*** ] ";
};
```

- If you want the client application to authenticate using a keytab, create a JAAS file with the following contents:

```
Client {
  com.sun.security.auth.module.Krb5LoginModule required
  useKeyTab=true
  keyTab="[ ***PATH/TO/USER.KEYTAB*** ]"
  storeKey=true
  useTicketCache=false
  principal="[ ***USER*** ]/[ ***HOST NAME*** ]@[ ***REALM*** ] ";
};
```

**[\*\*\*USER\*\*\*]**

is a valid user name in your environment

**[\*\*\*HOST NAME\*\*\*]**

If you use a service principal that includes the host name, make sure that it is included in the `jaas.conf` file (for example, `solr/solr01.example.com@EXAMPLE.COM`).

**[\*\*\*REALM\*\*\*]**

is your Kerberos realm

`[**PATH/TO/USER.KEYTAB**]`

is the path to the keytab file you want to use

## Manage Ranger authorization in Solr

Using Cloudera Manager, you can turn on and off Ranger authorization for your Solr service.

### About this task

Ranger restrictions are consistently applied regardless of the way users attempt to complete actions. For example, restricting access to data in a collection consistently restricts that access, whether queries come from the command line, from a browser, or through the admin console.

### Procedure

1. In Cloudera Manager, select the Solr service.
2. Select Configuration and find the RANGER Service property.
3. To turn on Ranger authorization, select the Ranger service that you want the Solr service to depend on. To turn off Ranger authorization, unselect the Ranger service.
4. Click Save Changes.
5. Restart the Solr service.

### Results

Ranger authorization for Solr is enabled. The Solr service depends on the selected Ranger service for authorization.

## Configuring Ranger authorization for Solr in a DDE Cloudera Data Hub cluster

By default, the Solr service deployed with a Data Discovery and Experience (DDE) cluster is not configured for authorization by Ranger. You can configure authorization manually, using Cloudera Management Console.

### Before you begin

Minimum Required Role: environmentAdmin

### Procedure

1. Navigate to the Ranger service of the data lake where DDE is running.
2. On the **Service Manager** page, click the Add icon next to Solr.
3. Enter the following information on the **Create Service** page:

Service Details

Field name	Description
Service Name	Assign a name to the Solr service you want to create.  Note down the value you define here. You need to enter it later, when specifying the <code>ranger.plugin.solr.service.name</code> parameter in the Solr Service Advanced Configuration Snippet (Safety Valve) for <code>ranger-solr-security.xml</code> option.

Field name	Description
Active Status	Enabled
Select Tag Service	Select cm_tag.

### Configuration Properties

Field name	Description
Username	Assign a placeholder value. This property is not used in case of Kerberos authentication.
Password	Assign a placeholder value. This property is not used in case of Kerberos authentication.
Solr URL	Assign a placeholder value. This property is not used in case of Kerberos authentication.
Add new configurations	Add the following new configurations: <ul style="list-style-type: none"> <li>• policy.download.auth.users = solr</li> <li>• tag.download.auth.users = solr</li> </ul>



#### Note:

Do not click Test connection. In this use case it is not necessary and it does not work.

4. Click Save.
5. Click on the newly added service.  
The **List of Policies** page opens.
6. Under Action click the Edit icon.
7. In Allow Conditions Select User dropdown select hue.  
This is necessary because the Hue service breaks if it has no permission to access Solr.  
To keep the cluster accessible to non-admin users, you can add other users to the default policy or you can define additional policies.
8. Grant full admin privileges to users that you want to be able to access the Solr Admin UI.
  - a) Click Add under Allow Conditions to add a new condition, then add the user or users from the Select User drop-down.
  - b) Click Add Permissions then select the Select/Deselect All option.
  - c) Accept the selection, then click Save.
9. Navigate to the Cloudera Manager UI on the DDE cluster.
10. From Clusters select Solr.
11. Select the **Configuration** tab.
12. In the Search field start typing 'safety'
13. Click Add under Solr Service Advanced Configuration Snippet (Safety Valve).
14. Define the following:
 

**Key**

ranger.plugin.solr.service.name

**Value**

The Solr Service Name you assigned when creating the Solr service in Ranger.
15. Click Save Changes.
16. Click the Status tab to refresh the window.
17. Click the Stale Configuration: Restart needed indicator on top of the page.
18. Click Restart Stale Services.
19. Click Restart Now.



## Enable Ranger document-level authorization for a Solr collection

By default, Ranger authorization works on collection level. Ranger allows you to configure document level security for individual Solr collections. This requires updating the `solrconfig.xml` file belonging to the particular collection. For the authorization to work on existing collections, you need to update the collection as well, by adding the `ranger_auth` parameter with an appropriate value to individual documents.



### Important:

Document-level authorization does not prevent users from modifying documents or performing other update operations on the collection. Update operations are only governed by collection-level authorization.

Document-level authorization can exclusively be used to prevent documents being returned in query results. If users are not granted access to a document, those documents are not returned even if that user submits a query that matches those documents. This does not affect attempted updates.

Consequently, it is possible for a user to not have access to a set of documents based on document-level security, but to still be able to modify the documents using their collection-level authorization update rights. This means that a user can delete all documents in the collection. Similarly, a user might modify all documents, adding their authorization token to each one. After such a modification, the user could access any document using querying.

Therefore, if you restrict access using document-level security, consider granting collection-level update rights only to those users you trust and assume they will be able to access every document in the collection.

### Prerequisites

1. [Define or edit roles on Ranger UI and assign them to users/groups.](#)
2. [Create a new collection configuration](#) or [download an existing one for editing.](#)

### Enabling document-level authorization

1. [Add `ranger\_auth` field to the schema file and add hooks to `solrconfig.xml` that trigger document-level authorization.](#)
2. [Disable Ranger authorization.](#)
3. [Upload the configuration to ZooKeeper.](#)
4. If you updated an existing collection to enable document-level authorization, add appropriate values to the newly created `ranger_auth` field before you turn on Ranger authorization. For example, you can reindex your collection, [using one of the batch-indexing options offered by Cloudera Search.](#)
5. To take document-level authorization into use, [create a collection](#) using the updated configuration (new collections) or [reload your collection](#) (updating an existing collection).
6. [Enable Ranger authorization.](#)

## Modify the schema and `solrconfig` files to enable document-level authorization

To enable document-level Ranger authorization, you need to add a field in the schema file determining the roles that can access a particular document in the collection. You also need to edit the `solrconfig` file to include the hooks that trigger Ranger document level authorization based on the schema field values.

### Before you begin

1. [Disable Ranger authorization.](#)

2. Define or edit roles on Ranger UI and assign them to users/groups.
3. Create a new collection configuration or download an existing one for editing.

## Procedure

1. If you are using Kerberos, kinit as a user with sufficient rights to create or modify collections:

```
kinit [***KERBEROS PRINCIPAL***]@[***EXAMPLE.COM***]
```

Replace `[***KERBEROS PRINCIPAL***]@[***EXAMPLE.COM***]` with your Kerberos principal and your Kerberos realm name respectively.

2. Go to the conf subdirectory of the newly created/downloaded folder to edit the schema file. (In our example it is mycollection/conf)

The file name is either managed-schema or schema.xml based on the schema factory used.

3. Add a field that determines which roles have access to a particular document. In this example we name this field ranger\_auth.

Add the following to the list of fields in your schema, making sure the value of the type property is string; the values of the indexed, stored, and multiValued properties are true:

```
<field name="ranger_auth" type="string" indexed="true" stored="true" required="false" multiValued="true"/>
```

4. Open the solrconfig.xml file for editing
5. Locate the section which contains the list of search components. In the default configuration it starts with a comment block similar to this:

```
<!-- Search Components
      Search components are registered to SolrCore and used by
      instances of SearchHandler (which can access them by name)
      ...
-->
```

6. Add a new SearchComponent:

```
<searchComponent name="queryDocAuthorization" class="org.apache.ranger.authorization.solr.authorizer.RangerSolrAuthorizer">
  <str name="enabled">true</str>
  <!-- The field which contains the role or list of roles which are allowed to query a particular document -->
  <str name="rangerAuthField">ranger_auth</str>
  <!-- If the rangerAuthField contains this value, all roles will be allowed to query that particular document -->
  <str name="allRolesToken">*</str>
</searchComponent>
```

7. Add queryDocAuthorization to the first-components array of the /query, /get, /browse, /tvrh, /terms, and /elevate request handlers as well, in case they are present in your solrconfig.xml.

Locate the request handler /select section:

```
<requestHandler name="/select" class="solr.SearchHandler">
  <!-- default values for query parameters can be specified, these will be overridden by parameters in the request -->
  <lst name="defaults">
    <str name="echoParams">explicit</str>
```

```
<int name="rows">10</int>
```

To the end of this section, before the closing tag, insert `queryDocAuthorization` to the `first-components` array:

```
<arr name="first-components">
  <str>queryDocAuthorization</str>
</arr>
</requestHandler>
```



**Note:** `/get` (real-time get request handler) is implicitly defined even if it does not appear in `solrconfig.xml`. In case of using document level security, Cloudera recommends to also protect the `/get` handler. To do that, you need to explicitly add it to the `solrconfig.xml` and define `queryDocAuthorization` as a first-component:

```
<requestHandler name="/get" class="solr.RealTimeGetHandler">
  <lst name="defaults">
    <str name="omitHeader">true</str>
    <str name="wt">json</str>
    <str name="indent">true</str>
  </lst>
  <arr name="first-components">
    <str>queryDocAuthorization</str>
  </arr>
</requestHandler>
```

#### 8. Locate the `requestParsers` section:

```
<requestParsers enableRemoteStreaming="true"
  multipartUploadLimitInKB="2048000"
  ...
/>
```

Ensure that this section has a boolean attribute called `addHttpRequestToContext` with a value of `true`:

```
<requestParsers enableRemoteStreaming="true"
  multipartUploadLimitInKB="2048000"
  formdataUploadLimitInKB="2048"
  addHttpRequestToContext="true" />
```

### What to do next

1. Upload the configuration metadata to ZooKeeper.
2. Populate the `ranger_auth` field for each document with roles you have defined in Ranger.
3. Create a new collection using the the updated configuration metadata, or update the configuration of an existing collection.
4. Enable Ranger authorization.

### Related Concepts

[Enable Ranger document-level authorization for a Solr collection](#)

## solrconfig.xml.secure file example

You can copy this xml file for editing by clicking the Copy to clipboard icon.

### solrconfig.xml.secure

```
<?xml version="1.0" encoding="UTF-8" ?>
<!--
```

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-->

<!--

For more details about configurations options that may appear in this file, see <http://wiki.apache.org/solr/SolrConfigXml>.

-->

<config>

<!-- In all configuration below, a prefix of "solr." for class names is an alias that causes solr to search appropriate packages, including org.apache.solr.(search|update|request|core|analysis)

You may also specify a fully qualified Java classname if you have your own custom plugins.

-->

<!-- Controls what version of Lucene various components of Solr adhere to. Generally, you want to use the latest version to get all bug fixes and improvements. It is highly recommended that you fully re-index after changing this setting as it can affect both how text is indexed and queried.

-->

<.luceneMatchVersion>8.4.1</luceneMatchVersion>

<!-- <lib/> directives can be used to instruct Solr to load any Jars identified and use them to resolve any "plugins" specified in your solrconfig.xml or schema.xml (ie: Analyzers, Request Handlers, etc...).

All directories and paths are resolved relative to the instanceDir.

Please note that <lib/> directives are processed in the order that they appear in your solrconfig.xml file, and are "stacked" on top of each other when building a ClassLoader - so if you have plugin jars with dependencies on other jars, the "lower level" dependency jars should be loaded first.

If a "./lib" directory exists in your instanceDir, all files found in it are included as if you had used the following syntax...

<lib dir="./lib" />

-->

<!-- A 'dir' option by itself adds any files found in the directory to the classpath, this is useful for including all jars in a directory.

When a 'regex' is specified in addition to a 'dir', only the files in that directory which completely match the regex (anchored on both ends) will be included.

If a 'dir' option (with or without a regex) is used and nothing is found that matches, a warning will be logged.

```

    The example below can be used to load a solr-contrib along
    with their external dependencies.
    -->
    <!-- <lib dir="${solr.install.dir:../../../../../dist/" regex="solr-ltr-
    \d.*\.jar" /> -->

    <!-- an exact 'path' can be used instead of a 'dir' to specify a
    specific jar file. This will cause a serious error to be logged
    if it can't be loaded.
    -->
    <!--
    <lib path="../../a-jar-that-does-not-exist.jar" />
    -->

    <!-- Data Directory

    Used to specify an alternate directory to hold all index data
    other than the default ./data under the Solr home. If
    replication is in use, this should match the replication
    configuration.
    -->
    <dataDir>${solr.data.dir:}</dataDir>

    <!-- The DirectoryFactory to use for indexes.
    solr.StandardDirectoryFactory is filesystem
    based and tries to pick the best implementation for the current
    JVM and platform. solr.NRTCachingDirectoryFactory, the default,
    wraps solr.StandardDirectoryFactory and caches small files in memory
    for better NRT performance.

    One can force a particular implementation via solr.MMapDirectoryFa
    ctory,
    solr.NIOFSDirectoryFactory, or solr.SimpleFSDirectoryFactory.
    solr.RAMDirectoryFactory is memory based and not persistent.
    -->

    <directoryFactory name="DirectoryFactory" class="${solr.directoryFactory
    :org.apache.solr.core.HdfsDirectoryFactory}">
      <str name="solr.hdfs.home">${solr.hdfs.home:}</str>
      <str name="solr.hdfs.confdir">${solr.hdfs.confdir:}</str>
      <str name="solr.hdfs.security.kerberos.enabled">${solr.hdfs.security.ker
      beros.enabled:false}</str>
      <str name="solr.hdfs.security.kerberos.keytabfile">${solr.hdfs.securi
      ty.kerberos.keytabfile:}</str>
      <str name="solr.hdfs.security.kerberos.principal">${solr.hdfs.securit
      y.kerberos.principal:}</str>
      <bool name="solr.hdfs.blockcache.enabled">${solr.hdfs.blockcache.enable
      d:true}</bool>
      <!-- Enable/Disable using one global cache for all SolrCores.
      The settings used will be from the first HdfsDirectoryFactory created.
      -->
      <str name="solr.hdfs.blockcache.global">${solr.hdfs.blockcache.global:tr
      ue}</str>
      <int name="solr.hdfs.blockcache.slab.count">${solr.hdfs.blockcache.sla
      b.count:1}</int>
      <bool name="solr.hdfs.blockcache.direct.memory.allocation">${solr.hdfs.
      blockcache.direct.memory.allocation:true}</bool>
      <int name="solr.hdfs.blockcache.blocksperbank">${solr.hdfs.blockcache.b
      locksperbank:16384}</int>
      <bool name="solr.hdfs.blockcache.read.enabled">${solr.hdfs.blockcache.
      read.enabled:true}</bool>
      <bool name="solr.hdfs.blockcache.write.enabled">${solr.hdfs.blockcache
      .write.enabled:false}</bool>

```

```

    <!-- the buffercount is actually the total size in bytes to used for bu
    ffer caching -->
    <int name="solr.hdfs.blockcache.bufferstore.buffercount">${solr.hdfs.bl
    ockcache.bufferstore.buffercount:0}</int>
    <bool name="solr.hdfs.nrtcachingdirectory.enable">${solr.hdfs.nrtcachi
    ngdirectory.enable:true}</bool>
    <int name="solr.hdfs.nrtcachingdirectory.maxmergesizemb">${solr.hdfs.nrt
    cachingdirectory.maxmergesizemb:16}</int>
    <int name="solr.hdfs.nrtcachingdirectory.maxcachedmb">${solr.hdfs.nrtc
    achingdirectory.maxcachedmb:192}</int>
    <!-- HDFS Block Locality Reporter can be toggled on and off -->
    <bool name="solr.hdfs.locality.metrics.enabled">${solr.hdfs.locality.
    metrics.enabled:false}</bool>
  </directoryFactory>
  <!-- The CodecFactory for defining the format of the inverted index.
  The default implementation is SchemaCodecFactory, which is the offici
  al Lucene
  index format, but hooks into the schema to provide per-field custom
  ization of
  the postings lists and per-document values in the fieldType element
  (postingsFormat/docValuesFormat). Note that most of the alternative
  implementations
  are experimental, so if you choose to customize the index format, it
  's a good
  idea to convert back to the official format e.g. via IndexWriter.ad
  dIndexes(IndexReader)
  before upgrading to a newer version to avoid unnecessary reindexing.
  A "compressionMode" string element can be added to <codecFactory> to
  choose
  between the existing compression modes in the default codec: "BEST_S
  PEED" (default)
  or "BEST_COMPRESSION".
  -->
  <codecFactory class="solr.SchemaCodecFactory"/>

  <!-- ~~~~~~
  Index Config - These settings control low-level behavior of indexing
  Most example settings here show the default value, but are commented
  out, to more easily see where customizations have been made.
  Note: This replaces <indexDefaults> and <mainIndex> from older versi
  ons
  ~~~~~~
  -->
  <indexConfig>
    <!-- maxFieldLength was removed in 4.0. To get similar behavior, include
    a
    LimitTokenCountFilterFactory in your fieldType definition. E.g.
    <filter class="solr.LimitTokenCountFilterFactory" maxTokenCount="10000
    "/>
    -->
    <!-- Maximum time to wait for a write lock (ms) for an IndexWriter. Defa
    ult: 1000 -->
    <!-- <writeLockTimeout>1000</writeLockTimeout> -->

    <!-- Expert: Enabling compound file will use less files for the index,
    using fewer file descriptors on the expense of performance decrea
    se.
    Default in Lucene is "true". Default in Solr is "false" (since 3.6)
    -->
    <!-- <useCompoundFile>false</useCompoundFile> -->

    <!-- ramBufferSizeMB sets the amount of RAM that may be used by Lucene
    indexing for buffering added documents and deletions before they
    are

```

```

        flushed to the Directory.
        maxBufferedDocs sets a limit on the number of documents buffered
        before flushing.
        If both ramBufferSizeMB and maxBufferedDocs is set, then
        Lucene will flush based on whichever limit is hit first. -->
<ramBufferSizeMB>128</ramBufferSizeMB>
<!-- <maxBufferedDocs>1000</maxBufferedDocs> -->

<!-- Expert: ramPerThreadHardLimitMB sets the maximum amount of RAM that
can be consumed
per thread before they are flushed. When limit is exceeded, this
triggers a forced
flush even if ramBufferSizeMB has not been exceeded.
This is a safety limit to prevent Lucene's DocumentsWriterPerThread
from address space
exhaustion due to its internal 32 bit signed integer based memory
addressing.
The specified value should be greater than 0 and less than 2048MB.
When not specified,
Solr uses Lucene's default value 1945. -->
<!-- <ramPerThreadHardLimitMB>1945</ramPerThreadHardLimitMB> -->

<!-- Expert: Merge Policy
The Merge Policy in Lucene controls how merging of segments is done
.
The default since Solr/Lucene 3.3 is TieredMergePolicy.
The default since Lucene 2.3 was the LogByteSizeMergePolicy,
Even older versions of Lucene used LogDocMergePolicy.
-->
<!--
<mergePolicyFactory class="org.apache.solr.index.TieredMergePolic
yFactory">
    <int name="maxMergeAtOnce">10</int>
    <int name="segmentsPerTier">10</int>
    <double name="noCFSRatio">0.1</double>
</mergePolicyFactory>
-->

<!-- Expert: Merge Scheduler
The Merge Scheduler in Lucene controls how merges are
performed. The ConcurrentMergeScheduler (Lucene 2.3 default)
can perform merges in the background using separate threads.
The SerialMergeScheduler (Lucene 2.2 default) does not.
-->
<!--
<mergeScheduler class="org.apache.lucene.index.ConcurrentMergeSched
uler"/>
-->

<!-- LockFactory

This option specifies which Lucene LockFactory implementation
to use.

single = SingleInstanceLockFactory - suggested for a
read-only index or when there is no possibility of
another process trying to modify the index.
native = NativeFSLockFactory - uses OS native file locking.
Do not use when multiple solr webapps in the same
JVM are attempting to share a single index.
simple = SimpleFSLockFactory - uses a plain file for locking

Defaults: 'native' is default for Solr3.6 and later, otherwise
'simple' is the default

```

```

    More details on the nuances of each LockFactory...
    http://wiki.apache.org/lucene-java/AvailableLockFactories
-->
<lockType>${solr.lock.type:hdfs}</lockType>

<!-- Commit Deletion Policy
    Custom deletion policies can be specified here. The class must
    implement org.apache.lucene.index.IndexDeletionPolicy.

    The default Solr IndexDeletionPolicy implementation supports
    deleting index commit points on number of commits, age of
    commit point and optimized status.

    The latest commit point should always be preserved regardless
    of the criteria.
-->
<!--
<deletionPolicy class="solr.SolrDeletionPolicy">
-->
<!-- The number of commit points to be kept -->
<!-- <str name="maxCommitsToKeep">1</str> -->
<!-- The number of optimized commit points to be kept -->
<!-- <str name="maxOptimizedCommitsToKeep">0</str> -->
<!--
    Delete all commit points once they have reached the given age.
    Supports DateMathParser syntax e.g.
-->
<!--
    <str name="maxCommitAge">30MINUTES</str>
    <str name="maxCommitAge">1DAY</str>
-->
<!--
</deletionPolicy>
-->

<!-- Lucene Infostream

    To aid in advanced debugging, Lucene provides an "InfoStream"
    of detailed information when indexing.

    Setting The value to true will instruct the underlying Lucene
    IndexWriter to write its debugging info the specified file
-->
<!-- <infoStream file="INFOSTREAM.txt">false</infoStream> -->
</indexConfig>

<!-- JMX

    This example enables JMX if and only if an existing MBeanServer
    is found, use this if you want to configure JMX through JVM
    parameters. Remove this to disable exposing Solr configuration
    and statistics to JMX.

    For more details see http://wiki.apache.org/solr/SolrJmx
-->
<jmx />
<!-- If you want to connect to a particular server, specify the
    agentId
-->
<!-- <jmx agentId="myAgent" /> -->
<!-- If you want to start a new MBeanServer, specify the serviceUrl -->
<!-- <jmx serviceUrl="service:jmx:rmi:///jndi/rmi://localhost:9999/solr"/>

```



```

-->

<!-- The default high-performance update handler -->
<updateHandler class="solr.DirectUpdateHandler2">

  <!-- Enables a transaction log, used for real-time get, durability, and
  and solr cloud replica recovery. The log can grow as big as
  uncommitted changes to the index, so use of a hard autoCommit
  is recommended (see below).
  "dir" - the target directory for transaction logs, defaults to the
  solr data directory.
  "numVersionBuckets" - sets the number of buckets used to keep
  track of max version values when checking for re-ordered
  updates; increase this value to reduce the cost of
  synchronizing access to version buckets during high-volume
  indexing, this requires 8 bytes (long) * numVersionBuckets
  of heap space per Solr core.
-->
<updateLog>
  <str name="dir">${solr.ulong.dir}</str>
  <int name="tlogDfsReplication">${solr.ulong.tlogDfsReplication:3}</int>
  <int name="numVersionBuckets">${solr.ulong.numVersionBuckets:65536}</
int>
</updateLog>

<!-- AutoCommit
Perform a hard commit automatically under certain conditions.
Instead of enabling autoCommit, consider using "commitWithin"
when adding documents.

http://wiki.apache.org/solr/UpdateXmlMessages

maxDocs - Maximum number of documents to add since the last
commit before automatically triggering a new commit.

maxTime - Maximum amount of time in ms that is allowed to pass
since a document was added before automatically
triggering a new commit.
openSearcher - if false, the commit causes recent index changes
to be flushed to stable storage, but does not cause a new
searcher to be opened to make those changes visible.

If the updateLog is enabled, then it's highly recommended to
have some sort of hard autoCommit to limit the log size.
-->
<autoCommit>
  <maxTime>${solr.autoCommit.maxTime:60000}</maxTime>
  <openSearcher>>false</openSearcher>
</autoCommit>
<!-- softAutoCommit is like autoCommit except it causes a
'soft' commit which only ensures that changes are visible
but does not ensure that data is synced to disk. This is
faster and more near-realtime friendly than a hard commit.
-->

<autoSoftCommit>
  <maxTime>${solr.autoSoftCommit.maxTime:15000}</maxTime>
</autoSoftCommit>

<!-- Update Related Event Listeners

Various IndexWriter related events can trigger Listeners to
take actions.

```

```

        postCommit - fired after every commit or optimize command
        postOptimize - fired after every optimize command
    -->
<!-- The RunExecutableListener executes an external command from a
hook such as postCommit or postOptimize.

    exe - the name of the executable to run
    dir - dir to use as the current working directory. (default=".")
    wait - the calling thread waits until the executable returns.
           (default="true")
    args - the arguments to pass to the program. (default is none)
    env - environment variables to set. (default is none)
-->
<!-- This example shows how RunExecutableListener could be used
with the script based replication...
http://wiki.apache.org/solr/CollectionDistribution
-->
<!--
    <listener event="postCommit" class="solr.RunExecutableListener">
      <str name="exe">solr/bin/snapshooter</str>
      <str name="dir">.</str>
      <bool name="wait">true</bool>
      <arr name="args"> <str>arg1</str> <str>arg2</str> </arr>
      <arr name="env"> <str>MYVAR=val1</str> </arr>
    </listener>
-->

</updateHandler>

<!-- IndexReaderFactory

Use the following format to specify a custom IndexReaderFactory,
which allows for alternate IndexReader implementations.

** Experimental Feature **

Please note - Using a custom IndexReaderFactory may prevent
certain other features from working. The API to
IndexReaderFactory may change without warning or may even be
removed from future releases if the problems cannot be
resolved.

** Features that may not work with custom IndexReaderFactory **
The ReplicationHandler assumes a disk-resident index. Using a
custom IndexReader implementation may cause incompatibility
with ReplicationHandler and may cause replication to not work
correctly. See SOLR-1366 for details.

-->
<!--
<indexReaderFactory name="IndexReaderFactory" class="package.class">
  <str name="someArg">Some Value</str>
</indexReaderFactory >
-->

<!-- ~~~~~~
Query section - these settings control query time things like caches
~~~~~
-->
<query>

    <!-- Maximum number of clauses allowed when parsing a boolean query string.

```

This limit only impacts boolean queries specified by a user as part of a query string, and provides per-collection controls on how complex user specified boolean queries can be. Query strings that specify more clauses than this will result in an error.

If this per-collection limit is greater than the global `maxBooleanClauses` limit specified in `solr.xml`, it will have no effect, as that setting also limits the size of user specified boolean queries.

```
-->
<maxBooleanClauses>${solr.max.booleanClauses:1024}</maxBooleanClauses>
<!-- Solr Internal Query Caches
```

There are two implementations of cache available for Solr, `LRUCache`, based on a synchronized `LinkedHashMap`, and `FastLRUCache`, based on a `ConcurrentHashMap`.

`FastLRUCache` has faster gets and slower puts in single threaded operation and thus is generally faster than `LRUCache` when the hit ratio of the cache is high (> 75%), and may be faster under other scenarios on multi-cpu systems.

```
-->
```

```
<!-- Filter Cache
```

Cache used by `SolrIndexSearcher` for filters (`DocSets`), unordered sets of `*all*` documents that match a query. When a new searcher is opened, its caches may be prepopulated or "autowarmed" using data from caches in the old searcher. `autowarmCount` is the number of items to prepopulate. For `LRUCache`, the autowarmed items will be the most recently accessed items.

Parameters:

class - the SolrCache implementation `LRUCache` or `(LRUCache or FastLRUCache)`

size - the maximum number of entries in the cache

initialSize - the initial capacity (number of entries) of the cache. (see `java.util.HashMap`)

autowarmCount - the number of entries to prepopulate from and old cache.

maxRamMB - the maximum amount of RAM (in MB) that this cache is allowed

to occupy. Note that when this option is specified, the size and initialSize parameters are ignored.

```
-->
<filterCache class="solr.FastLRUCache"
  size="512"
  initialSize="512"
  autowarmCount="0"/>
```

```
<!-- Query Result Cache
```

Caches results of searches - ordered lists of document ids (`DocList`) based on a query, a sort, and the range of documents requested.

Additional supported parameter by `LRUCache`:

maxRamMB - the maximum amount of RAM (in MB) that this cache is allowed to occupy

```
-->
```

```

<queryResultCache class="solr.LRUCache"
    size="512"
    initialSize="512"
    autowarmCount="0"/>

<!-- Document Cache

    Caches Lucene Document objects (the stored fields for each
    document). Since Lucene internal document ids are transient,
    this cache will not be autowarmed.
-->
<documentCache class="solr.LRUCache"
    size="512"
    initialSize="512"
    autowarmCount="0"/>

<!-- custom cache currently used by block join -->
<cache name="perSegFilter"
    class="solr.search.LRUCache"
    size="10"
    initialSize="0"
    autowarmCount="10"
    regenerator="solr.NoOpRegenerator" />

<!-- Field Value Cache

    Cache used to hold field values that are quickly accessible
    by document id. The fieldValueCache is created by default
    even if not configured here.
-->
<!--
    <fieldValueCache class="solr.FastLRUCache"
        size="512"
        autowarmCount="128"
        showItems="32" />
-->

<!-- Custom Cache
    Example of a generic cache. These caches may be accessed by
    name through SolrIndexSearcher.getCache(),cacheLookup(), and
    cacheInsert(). The purpose is to enable easy caching of
    user/application level data. The regenerator argument should
    be specified as an implementation of solr.CacheRegenerator
    if autowarming is desired.
-->
<!--
    <cache name="myUserCache"
        class="solr.LRUCache"
        size="4096"
        initialSize="1024"
        autowarmCount="1024"
        regenerator="com.mycompany.MyRegenerator"
        />
-->

<!-- Lazy Field Loading

    If true, stored fields that are not requested will be loaded
    lazily. This can result in a significant speed improvement
    if the usual case is to not load all stored fields,
    especially if the skipped fields are large compressed text
    fields.
-->
<enableLazyFieldLoading>true</enableLazyFieldLoading>

```

```

<!-- Use Filter For Sorted Query

A possible optimization that attempts to use a filter to
satisfy a search. If the requested sort does not include
score, then the filterCache will be checked for a filter
matching the query. If found, the filter will be used as the
source of document ids, and then the sort will be applied to
that.

For most situations, this will not be useful unless you
frequently get the same search repeatedly with different sort
options, and none of them ever use "score"
-->
<!--
  <useFilterForSortedQuery>true</useFilterForSortedQuery>
-->

<!-- Result Window Size
An optimization for use with the queryResultCache. When a search
is requested, a superset of the requested number of document ids
are collected. For example, if a search for a particular query
requests matching documents 10 through 19, and queryWindowSize is
50,
then documents 0 through 49 will be collected and cached. Any fu
rther
requests in that range can be satisfied via the cache.
-->
<queryResultWindowSize>20</queryResultWindowSize>

<!-- Maximum number of documents to cache for any entry in the
queryResultCache.
-->
<queryResultMaxDocsCached>200</queryResultMaxDocsCached>
<!-- Query Related Event Listeners
Various IndexSearcher related events can trigger Listeners to
take actions.

newSearcher - fired whenever a new searcher is being prepared
and there is a current searcher handling requests (aka
registered). It can be used to prime certain caches to
prevent long request times for certain requests.

firstSearcher - fired whenever a new searcher is being
prepared but there is no current registered searcher to handle
requests or to gain autowarming data from.

-->
<!-- QuerySenderListener takes an array of NamedList and executes a
local query request for each NamedList in sequence.
-->
<listener event="newSearcher" class="solr.QuerySenderListener">
  <arr name="queries">
    <!--
      <lst><str name="q">solr</str><str name="sort">price asc</str></
lst>
      <lst><str name="q">rocks</str><str name="sort">weight asc</str></
lst>
    -->
  </arr>
</listener>
<listener event="firstSearcher" class="solr.QuerySenderListener">
  <arr name="queries">
    <!--

```

```

    <lst>
      <str name="q">static firstSearcher warming in solrconfig.xml</str>
    </lst>
  -->
</arr>
</listener>

<!-- Use Cold Searcher

  If a search request comes in and there is no current
  registered searcher, then immediately register the still
  warming searcher and use it.  If "false" then all requests
  will block until the first searcher is done warming.
  -->
<useColdSearcher>false</useColdSearcher>
<!-- Slow Query Request Logging

  Any queries that take longer than the specified threshold
  will be logged as "slow" queries.
  To disable slow request logging for this Solr config,
  set the value to -1
  -->
<slowQueryThresholdMillis>5000</slowQueryThresholdMillis>

</query>

<!-- Request Dispatcher

  This section contains instructions for how the SolrDispatchFilter
  should behave when processing requests for this SolrCore.

  -->
<requestDispatcher>
  <!-- Request Parsing

    These settings indicate how Solr Requests may be parsed, and
    what restrictions may be placed on the ContentStreams from
    those requests
    enableRemoteStreaming - enables use of the stream.file
    and stream.url parameters for specifying remote streams.

    multipartUploadLimitInKB - specifies the max size (in KiB) of
    Multipart File Uploads that Solr will allow in a Request.

    formdataUploadLimitInKB - specifies the max size (in KiB) of
    form data (application/x-www-form-urlencoded) sent via
    POST. You can use POST to pass request parameters not
    fitting into the URL.

    addHttpRequestToContext - if set to true, it will instruct
    the requestParsers to include the original HttpServletRequest
    object in the context map of the SolrQueryRequest under the
    key "httpRequest". It will not be used by any of the existing
    Solr components, but may be useful when developing custom
    plugins.
    *** WARNING ***
    Before enabling remote streaming, you should make sure your
    system has authentication enabled.

  -->
<requestParsers enableRemoteStreaming="true"
  multipartUploadLimitInKB="2048000"
  formdataUploadLimitInKB="2048"

```

```

        addHttpRequestToContext="true"/>

<!-- HTTP Caching

    Set HTTP caching related parameters (for proxy caches and clients).

    The options below instruct Solr not to output any HTTP Caching
    related headers
-->
<httpCaching never304="true" />
<!-- If you include a <cacheControl> directive, it will be used to
    generate a Cache-Control header (as well as an Expires header
    if the value contains "max-age=")
    By default, no Cache-Control header is generated.
    You can use the <cacheControl> option even if you have set
    never304="true"
-->
<!--
    <httpCaching never304="true" >
        <cacheControl>max-age=30, public</cacheControl>
    </httpCaching>
-->
<!-- To enable Solr to respond with automatically generated HTTP
    Caching headers, and to response to Cache Validation requests
    correctly, set the value of never304="false"

    This will cause Solr to generate Last-Modified and ETag
    headers based on the properties of the Index.

    The following options can also be specified to affect the
    values of these headers...

    lastModFrom - the default value is "openTime" which means the
    Last-Modified value (and validation against If-Modified-Since
    requests) will all be relative to when the current Searcher
    was opened. You can change it to lastModFrom="dirLastMod" if
    you want the value to exactly correspond to when the physical
    index was last modified.

    etagSeed="..." is an option you can change to force the ETag
    header (and validation against If-None-Match requests) to be
    different even if the index has not changed (ie: when making
    significant changes to your config file)
    (lastModifiedFrom and etagSeed are both ignored if you use
    the never304="true" option)
-->
<!--
    <httpCaching lastModifiedFrom="openTime"
        etagSeed="Solr">
        <cacheControl>max-age=30, public</cacheControl>
    </httpCaching>
-->
</requestDispatcher>

<!-- Request Handlers

    http://wiki.apache.org/solr/SolrRequestHandler

    Incoming queries will be dispatched to a specific handler by name
    based on the path specified in the request.

    If a Request Handler is declared with startup="lazy", then it will
    not be initialized until the first request that uses it.

```

```

-->
<!-- SearchHandler
    http://wiki.apache.org/solr/SearchHandler

    For processing Search Queries, the primary Request Handler
    provided with Solr is "SearchHandler" It delegates to a sequent
    of SearchComponents (see below) and supports distributed
    queries across multiple shards
-->

<requestHandler name="/get" class="solr.RealTimeGetHandler">
  <lst name="defaults">
    <str name="omitHeader">true</str>
    <str name="wt">json</str>
    <str name="indent">true</str>
  </lst>
  <arr name="first-components">
    <str>queryDocAuthorization</str>
  </arr>
</requestHandler>

<requestHandler name="/select" class="solr.SearchHandler">
  <!-- default values for query parameters can be specified, these
    will be overridden by parameters in the request
  -->
  <lst name="defaults">
    <str name="echoParams">explicit</str>
    <int name="rows">10</int>
    <!-- Default search field
    <str name="df">text</str>
  -->
    <!-- Change from JSON to XML format (the default prior to Solr 7.0)
    <str name="wt">xml</str>
  -->
  </lst>
  <!-- In addition to defaults, "appends" params can be specified
    to identify values which should be appended to the list of
    multi-val params from the query (or the existing "defaults").
  -->
  <!-- In this example, the param "fq=instock:true" would be appended to
    any query time fq params the user may specify, as a mechanism for
    partitioning the index, independent of any user selected filtering
    that may also be desired (perhaps as a result of faceted searching
    ).

    NOTE: there is *absolutely* nothing a client can do to prevent thes
    e
    "appends" values from being used, so don't use this mechanism
    unless you are sure you always want it.
  -->
  <!--
    <lst name="appends">
      <str name="fq">inStock:true</str>
    </lst>
  -->
  <!-- "invariants" are a way of letting the Solr maintainer lock down
    the options available to Solr clients. Any params values
    specified here are used regardless of what values may be specified
    in either the query, the "defaults", or the "appends" params.

    In this example, the facet.field and facet.query params would

```



be fixed, limiting the facets clients can use. Faceting is not turned on by default - but if the client does specify facet=true in the request, these are the only facets they will be able to see counts for; regardless of what other facet.field or facet.query params they may specify.

NOTE: there is *absolutely* nothing a client can do to prevent these

"invariants" values from being used, so don't use this mechanism unless you are sure you always want it.

```
-->
<!--
  <lst name="invariants">
    <str name="facet.field">cat</str>
    <str name="facet.field">manu_exact</str>
    <str name="facet.query">price:[* TO 500]</str>
    <str name="facet.query">price:[500 TO *]</str>
  </lst>
-->
<!-- If the default list of SearchComponents is not desired, that
      list can either be overridden completely, or components can be
      prepended or appended to the default list.  (see below)
-->
<!--
  <arr name="components">
    <str>nameOfCustomComponent1</str>
    <str>nameOfCustomComponent2</str>
  </arr>
-->
  <arr name="first-components">
    <str>queryDocAuthorization</str>
  </arr>
</requestHandler>

<!-- A request handler that returns indented JSON by default -->
<requestHandler name="/query" class="solr.SearchHandler">
  <lst name="defaults">
    <str name="echoParams">explicit</str>
    <str name="wt">json</str>
    <str name="indent">true</str>
  </lst>
  <arr name="first-components">
    <str>queryDocAuthorization</str>
  </arr>
</requestHandler>

<initParams path="/update/**,/query,/select,/spell">
  <lst name="defaults">
    <str name="df">_text_</str>
  </lst>
</initParams>

<!-- Search Components

Search components are registered to SolrCore and used by
instances of SearchHandler (which can access them by name)

By default, the following components are available:

  <searchComponent name="query"          class="solr.QueryComponent" />
  <searchComponent name="facet"          class="solr.FacetComponent" />
  <searchComponent name="mlt"            class="solr.MoreLikeThisComponent" />
  <searchComponent name="highlight"      class="solr.HighlightComponent" />
  <searchComponent name="termstats"       class="solr.TermStatsComponent" />
  <searchComponent name="spellcheck"      class="solr.SpellCheckComponent" />
  <searchComponent name="debug"           class="solr.DebugComponent" />
  <searchComponent name="update"          class="solr.UpdateComponent" />
  <searchComponent name="extract"         class="solr.ExtractComponent" />
  <searchComponent name="group"           class="solr.GroupComponent" />
  <searchComponent name="dismax"          class="solr.DismaxComponent" />
  <searchComponent name="edismax"         class="solr.EDismaxComponent" />
  <searchComponent name="lucene"          class="solr.LuceneComponent" />
  <searchComponent name="lucene95"        class="solr.Lucene95Component" />
  <searchComponent name="lucene4"         class="solr.Lucene4Component" />
  <searchComponent name="lucene3"         class="solr.Lucene3Component" />
  <searchComponent name="lucene2"         class="solr.Lucene2Component" />
  <searchComponent name="lucene1"         class="solr.Lucene1Component" />
  <searchComponent name="lucene0"         class="solr.Lucene0Component" />
  <searchComponent name="lucene00"        class="solr.Lucene00Component" />
  <searchComponent name="lucene01"        class="solr.Lucene01Component" />
  <searchComponent name="lucene02"        class="solr.Lucene02Component" />
  <searchComponent name="lucene03"        class="solr.Lucene03Component" />
  <searchComponent name="lucene04"        class="solr.Lucene04Component" />
  <searchComponent name="lucene05"        class="solr.Lucene05Component" />
  <searchComponent name="lucene06"        class="solr.Lucene06Component" />
  <searchComponent name="lucene07"        class="solr.Lucene07Component" />
  <searchComponent name="lucene08"        class="solr.Lucene08Component" />
  <searchComponent name="lucene09"        class="solr.Lucene09Component" />
  <searchComponent name="lucene10"        class="solr.Lucene10Component" />
  <searchComponent name="lucene11"        class="solr.Lucene11Component" />
  <searchComponent name="lucene12"        class="solr.Lucene12Component" />
  <searchComponent name="lucene13"        class="solr.Lucene13Component" />
  <searchComponent name="lucene14"        class="solr.Lucene14Component" />
  <searchComponent name="lucene15"        class="solr.Lucene15Component" />
  <searchComponent name="lucene16"        class="solr.Lucene16Component" />
  <searchComponent name="lucene17"        class="solr.Lucene17Component" />
  <searchComponent name="lucene18"        class="solr.Lucene18Component" />
  <searchComponent name="lucene19"        class="solr.Lucene19Component" />
  <searchComponent name="lucene20"        class="solr.Lucene20Component" />
  <searchComponent name="lucene21"        class="solr.Lucene21Component" />
  <searchComponent name="lucene22"        class="solr.Lucene22Component" />
  <searchComponent name="lucene23"        class="solr.Lucene23Component" />
  <searchComponent name="lucene24"        class="solr.Lucene24Component" />
  <searchComponent name="lucene25"        class="solr.Lucene25Component" />
  <searchComponent name="lucene26"        class="solr.Lucene26Component" />
  <searchComponent name="lucene27"        class="solr.Lucene27Component" />
  <searchComponent name="lucene28"        class="solr.Lucene28Component" />
  <searchComponent name="lucene29"        class="solr.Lucene29Component" />
  <searchComponent name="lucene30"        class="solr.Lucene30Component" />
  <searchComponent name="lucene31"        class="solr.Lucene31Component" />
  <searchComponent name="lucene32"        class="solr.Lucene32Component" />
  <searchComponent name="lucene33"        class="solr.Lucene33Component" />
  <searchComponent name="lucene34"        class="solr.Lucene34Component" />
  <searchComponent name="lucene35"        class="solr.Lucene35Component" />
  <searchComponent name="lucene36"        class="solr.Lucene36Component" />
  <searchComponent name="lucene37"        class="solr.Lucene37Component" />
  <searchComponent name="lucene38"        class="solr.Lucene38Component" />
  <searchComponent name="lucene39"        class="solr.Lucene39Component" />
  <searchComponent name="lucene40"        class="solr.Lucene40Component" />
  <searchComponent name="lucene41"        class="solr.Lucene41Component" />
  <searchComponent name="lucene42"        class="solr.Lucene42Component" />
  <searchComponent name="lucene43"        class="solr.Lucene43Component" />
  <searchComponent name="lucene44"        class="solr.Lucene44Component" />
  <searchComponent name="lucene45"        class="solr.Lucene45Component" />
  <searchComponent name="lucene46"        class="solr.Lucene46Component" />
  <searchComponent name="lucene47"        class="solr.Lucene47Component" />
  <searchComponent name="lucene48"        class="solr.Lucene48Component" />
  <searchComponent name="lucene49"        class="solr.Lucene49Component" />
  <searchComponent name="lucene50"        class="solr.Lucene50Component" />
  <searchComponent name="lucene51"        class="solr.Lucene51Component" />
  <searchComponent name="lucene52"        class="solr.Lucene52Component" />
  <searchComponent name="lucene53"        class="solr.Lucene53Component" />
  <searchComponent name="lucene54"        class="solr.Lucene54Component" />
  <searchComponent name="lucene55"        class="solr.Lucene55Component" />
  <searchComponent name="lucene56"        class="solr.Lucene56Component" />
  <searchComponent name="lucene57"        class="solr.Lucene57Component" />
  <searchComponent name="lucene58"        class="solr.Lucene58Component" />
  <searchComponent name="lucene59"        class="solr.Lucene59Component" />
  <searchComponent name="lucene60"        class="solr.Lucene60Component" />
  <searchComponent name="lucene61"        class="solr.Lucene61Component" />
  <searchComponent name="lucene62"        class="solr.Lucene62Component" />
  <searchComponent name="lucene63"        class="solr.Lucene63Component" />
  <searchComponent name="lucene64"        class="solr.Lucene64Component" />
  <searchComponent name="lucene65"        class="solr.Lucene65Component" />
  <searchComponent name="lucene66"        class="solr.Lucene66Component" />
  <searchComponent name="lucene67"        class="solr.Lucene67Component" />
  <searchComponent name="lucene68"        class="solr.Lucene68Component" />
  <searchComponent name="lucene69"        class="solr.Lucene69Component" />
  <searchComponent name="lucene70"        class="solr.Lucene70Component" />
  <searchComponent name="lucene71"        class="solr.Lucene71Component" />
  <searchComponent name="lucene72"        class="solr.Lucene72Component" />
  <searchComponent name="lucene73"        class="solr.Lucene73Component" />
  <searchComponent name="lucene74"        class="solr.Lucene74Component" />
  <searchComponent name="lucene75"        class="solr.Lucene75Component" />
  <searchComponent name="lucene76"        class="solr.Lucene76Component" />
  <searchComponent name="lucene77"        class="solr.Lucene77Component" />
  <searchComponent name="lucene78"        class="solr.Lucene78Component" />
  <searchComponent name="lucene79"        class="solr.Lucene79Component" />
  <searchComponent name="lucene80"        class="solr.Lucene80Component" />
  <searchComponent name="lucene81"        class="solr.Lucene81Component" />
  <searchComponent name="lucene82"        class="solr.Lucene82Component" />
  <searchComponent name="lucene83"        class="solr.Lucene83Component" />
  <searchComponent name="lucene84"        class="solr.Lucene84Component" />
  <searchComponent name="lucene85"        class="solr.Lucene85Component" />
  <searchComponent name="lucene86"        class="solr.Lucene86Component" />
  <searchComponent name="lucene87"        class="solr.Lucene87Component" />
  <searchComponent name="lucene88"        class="solr.Lucene88Component" />
  <searchComponent name="lucene89"        class="solr.Lucene89Component" />
  <searchComponent name="lucene90"        class="solr.Lucene90Component" />
  <searchComponent name="lucene91"        class="solr.Lucene91Component" />
  <searchComponent name="lucene92"        class="solr.Lucene92Component" />
  <searchComponent name="lucene93"        class="solr.Lucene93Component" />
  <searchComponent name="lucene94"        class="solr.Lucene94Component" />
  <searchComponent name="lucene95"        class="solr.Lucene95Component" />
  <searchComponent name="lucene96"        class="solr.Lucene96Component" />
  <searchComponent name="lucene97"        class="solr.Lucene97Component" />
  <searchComponent name="lucene98"        class="solr.Lucene98Component" />
  <searchComponent name="lucene99"        class="solr.Lucene99Component" />
  <searchComponent name="lucene100"       class="solr.Lucene100Component" />
  <searchComponent name="lucene101"       class="solr.Lucene101Component" />
  <searchComponent name="lucene102"       class="solr.Lucene102Component" />
  <searchComponent name="lucene103"       class="solr.Lucene103Component" />
  <searchComponent name="lucene104"       class="solr.Lucene104Component" />
  <searchComponent name
```

```
<searchComponent name="stats"      class="solr.StatsComponent" />
<searchComponent name="debug"      class="solr.DebugComponent" />
```

Default configuration in a requestHandler would look like:

```
<arr name="components">
  <str>query</str>
  <str>facet</str>
  <str>mlt</str>
  <str>highlight</str>
  <str>stats</str>
  <str>debug</str>
</arr>
```

If you register a searchComponent to one of the standard names, that will be used instead of the default.

To insert components before or after the 'standard' components, use:

```
<arr name="first-components">
  <str>myFirstComponentName</str>
</arr>
<arr name="last-components">
  <str>myLastComponentName</str>
</arr>
```

NOTE: The component registered with the name "debug" will always be executed after the "last-components"

```
-->
```

```
<searchComponent name="queryDocAuthorization" class="org.apache.ranger.a
uthorization.solr.authorizer.RangerSolrAuthorizer">
  <str name="enabled">true</str>
  <!-- The field which contains the role or list of roles which are allow
ed to query a particular document -->
  <str name="rangerAuthField">ranger_auth</str>
  <!-- If the rangerAuthField contains this value, all roles will be allo
wed to query that particular document -->
  <str name="allRolesToken">*</str>
</searchComponent>
```

```
<!-- Spell Check
```

The spell check component can return a list of alternative spelling suggestions.

<http://wiki.apache.org/solr/SpellCheckComponent>

```
-->
```

```
<searchComponent name="spellcheck" class="solr.SpellCheckComponent">
  <str name="queryAnalyzerFieldType">text_general</str>
```

```
<!-- Multiple "Spell Checkers" can be declared and used by this
component
```

```
-->
```

```
<!-- a spellchecker built from a field of the main index -->
<lst name="spellchecker">
  <str name="name">default</str>
  <str name="field">_text_</str>
  <str name="classname">solr.DirectSolrSpellChecker</str>
  <!-- the spellcheck distance measure used, the default is the internal
levenshtein -->
  <str name="distanceMeasure">internal</str>
```

```

    <!-- minimum accuracy needed to be considered a valid spellcheck suggestion -->
    <float name="accuracy">0.5</float>
    <!-- the maximum #edits we consider when enumerating terms: can be 1 or 2 -->
    <int name="maxEdits">2</int>
    <!-- the minimum shared prefix when enumerating terms -->
    <int name="minPrefix">1</int>
    <!-- maximum number of inspections per result. -->
    <int name="maxInspections">5</int>
    <!-- minimum length of a query term to be considered for correction -->
  >
    <int name="minQueryLength">4</int>
    <!-- maximum threshold of documents a query term can appear to be considered for correction -->
    <float name="maxQueryFrequency">0.01</float>
    <!-- uncomment this to require suggestions to occur in 1% of the documents
    <float name="thresholdTokenFrequency">.01</float>
    -->
  </lst>

  <!-- a spellchecker that can break or combine words. See "/spell" handler below for usage -->
  <!--
  <lst name="spellchecker">
    <str name="name">wordbreak</str>
    <str name="classname">solr.WordBreakSolrSpellChecker</str>
    <str name="field">name</str>
    <str name="combineWords">true</str>
    <str name="breakWords">true</str>
    <int name="maxChanges">10</int>
  </lst>
  -->
</searchComponent>

<!-- A request handler for demonstrating the spellcheck component.

NOTE: This is purely as an example. The whole purpose of the SpellCheckComponent is to hook it into the request handler that handles your normal user queries so that a separate request is not needed to get suggestions.
IN OTHER WORDS, THERE IS REALLY GOOD CHANCE THE SETUP BELOW IS NOT WHAT YOU WANT FOR YOUR PRODUCTION SYSTEM!
See http://wiki.apache.org/solr/SpellCheckComponent for details on the request parameters.
-->
<requestHandler name="/spell" class="solr.SearchHandler" startup="lazy">
  <lst name="defaults">
    <!-- Solr will use suggestions from both the 'default' spellchecker and from the 'wordbreak' spellchecker and combine them.
    collations (re-written queries) can include a combination of corrections from both spellcheckers -->
    <str name="spellcheck.dictionary">default</str>
    <str name="spellcheck">on</str>
    <str name="spellcheck.extendedResults">true</str>
    <str name="spellcheck.count">10</str>
    <str name="spellcheck.alternativeTermCount">5</str>
    <str name="spellcheck.maxResultsForSuggest">5</str>
    <str name="spellcheck.collate">true</str>
    <str name="spellcheck.collateExtendedResults">true</str>
    <str name="spellcheck.maxCollationTries">10</str>
    <str name="spellcheck.maxCollations">5</str>
  </lst>

```

```

    <arr name="last-components">
      <str>spellcheck</str>
    </arr>
  </requestHandler>
  <!-- Terms Component
    http://wiki.apache.org/solr/TermsComponent

    A component to return terms and document frequency of those
    terms
  -->
  <searchComponent name="terms" class="solr.TermsComponent"/>

  <!-- A request handler for demonstrating the terms component -->
  <requestHandler name="/terms" class="solr.SearchHandler" startup="lazy">
    <lst name="defaults">
      <bool name="terms">true</bool>
      <bool name="distrib">false</bool>
    </lst>
    <arr name="components">
      <str>terms</str>
    </arr>
  </requestHandler>

  <!-- Highlighting Component
    http://wiki.apache.org/solr/HighlightingParameters
  -->
  <searchComponent class="solr.HighlightComponent" name="highlight">
    <highlighting>
      <!-- Configure the standard fragmenter -->
      <!-- This could most likely be commented out in the "default" case -->
      <fragmenter name="gap"
        default="true"
        class="solr.highlight.GapFragmenter">
        <lst name="defaults">
          <int name="hl.fragsize">100</int>
        </lst>
      </fragmenter>
      <!-- A regular-expression-based fragmenter
        (for sentence extraction)
      -->
      <fragmenter name="regex"
        class="solr.highlight.RegexFragmenter">
        <lst name="defaults">
          <!-- slightly smaller fragsizes work better because of slop -->
          <int name="hl.fragsize">70</int>
          <!-- allow 50% slop on fragment sizes -->
          <float name="hl.regex.slop">0.5</float>
          <!-- a basic sentence pattern -->
          <str name="hl.regex.pattern">[-\w ,/\n\&quot;\&apos;]{20,200}</str>
        </lst>
      </fragmenter>

      <!-- Configure the standard formatter -->
      <formatter name="html"
        default="true"
        class="solr.highlight.HtmlFormatter">
        <lst name="defaults">
          <str name="hl.simple.pre"><![CDATA[<em>]]></str>
          <str name="hl.simple.post"><![CDATA[</em>]]></str>
        </lst>
      </formatter>

      <!-- Configure the standard encoder -->
      <encoder name="html"

```

```

        class="solr.highlight.HtmlEncoder" />

<!-- Configure the standard fragListBuilder -->
<fragListBuilder name="simple"
    class="solr.highlight.SimpleFragListBuilder"/>

<!-- Configure the single fragListBuilder -->
<fragListBuilder name="single"
    class="solr.highlight.SingleFragListBuilder"/>

<!-- Configure the weighted fragListBuilder -->
<fragListBuilder name="weighted"
    default="true"
    class="solr.highlight.WeightedFragListBuilder"/>

<!-- default tag FragmentsBuilder -->
<fragmentsBuilder name="default"
    default="true"
    class="solr.highlight.ScoreOrderFragmentsBuilder">
    <!--
    <lst name="defaults">
        <str name="hl.multiValuedSeparatorChar">/</str>
    </lst>
    -->
</fragmentsBuilder>

<!-- multi-colored tag FragmentsBuilder -->
<fragmentsBuilder name="colored"
    class="solr.highlight.ScoreOrderFragmentsBuilder">
    <lst name="defaults">
        <str name="hl.tag.pre"><![CDATA[
            <b style="background:yellow">,<b style="background:lawgreen"
>,
            <b style="background:aquamarine">,<b style="background:magenta">,
            <b style="background:palegreen">,<b style="background:coral">
',
            <b style="background:wheat">,<b style="background:khaki">,<b style="background:lime">,<b style="background:deepskyblue"
>]]></str>
        <str name="hl.tag.post"><![CDATA[</b>]]></str>
    </lst>
</fragmentsBuilder>

<boundaryScanner name="default"
    default="true"
    class="solr.highlight.SimpleBoundaryScanner">
    <lst name="defaults">
        <str name="hl.bs.maxScan">10</str>
        <str name="hl.bs.chars">.,!? &#9;&#10;&#13;</str>
    </lst>
</boundaryScanner>

<boundaryScanner name="breakIterator"
    class="solr.highlight.BreakIteratorBoundaryScanner">
    <lst name="defaults">
        <!-- type should be one of CHARACTER, WORD(default), LINE and SENTENCE -->
        <str name="hl.bs.type">WORD</str>
        <!-- language and country are used when constructing Locale object. -->
        <!-- And the Locale object will be used when getting instance of BreakIterator -->
        <str name="hl.bs.language">en</str>

```

```

        <str name="hl.bs.country">US</str>
      </lst>
    </boundaryScanner>
  </highlighting>
</searchComponent>

<!-- Update Processors
Chains of Update Processor Factories for dealing with Update
Requests can be declared, and then used by name in Update
Request Processors
http://wiki.apache.org/solr/UpdateRequestProcessor

-->
<!-- Add unknown fields to the schema

Field type guessing update processors that will
attempt to parse string-typed field values as Booleans, Longs,
Doubles, or Dates, and then add schema fields with the guessed
field types. Text content will be indexed as "text_general" as
well as a copy to a plain string version in *_str.

These require that the schema is both managed and mutable, by
declaring schemaFactory as ManagedIndexSchemaFactory, with
mutable specified as true.

See http://wiki.apache.org/solr/GuessingFieldTypes
-->
<updateProcessor class="solr.UUIDUpdateProcessorFactory" name="uuid"/>
<updateProcessor class="solr.RemoveBlankFieldUpdateProcessorFactory" na
me="remove-blank"/>
<updateProcessor class="solr.FieldNameMutatingUpdateProcessorFactory" name
="field-name-mutating">
  <str name="pattern">[^\w-\.]</str>
  <str name="replacement">_</str>
</updateProcessor>
<updateProcessor class="solr.ParseBooleanFieldUpdateProcessorFactory" name
="parse-boolean"/>
<updateProcessor class="solr.ParseLongFieldUpdateProcessorFactory" name
="parse-long"/>
<updateProcessor class="solr.ParseDoubleFieldUpdateProcessorFactory" name=
"parse-double"/>
<updateProcessor class="solr.ParseDateFieldUpdateProcessorFactory" name="
parse-date">
  <arr name="format">
    <str>yyyy-MM-dd['T'][HH:mm[:ss[.SSS]]][z</str>
    <str>yyyy-MM-dd['T'][HH:mm[:ss[,SSS]]][z</str>
    <str>yyyy-MM-dd HH:mm[:ss[.SSS]]][z</str>
    <str>yyyy-MM-dd HH:mm[:ss[,SSS]]][z</str>
    <str>[EEE, ]dd MMM yyyy HH:mm[:ss] z</str>
    <str>EEEE, dd-MMM-yy HH:mm:ss z</str>
    <str>EEE MMM ppd HH:mm:ss [z ]yyyy</str>
  </arr>
</updateProcessor>
<updateProcessor class="solr.AddSchemaFieldsUpdateProcessorFactory" name=
"add-schema-fields">
  <lst name="typeMapping">
    <str name="valueClass">java.lang.String</str>
    <str name="fieldType">text_general</str>
    <lst name="copyField">
      <str name="dest">*_str</str>
      <int name="maxChars">256</int>
    </lst>
  <!-- Use as default mapping instead of defaultFieldType -->
  <bool name="default">true</bool>

```

```

</lst>
<lst name="typeMapping">
  <str name="valueClass">java.lang.Boolean</str>
  <str name="fieldType">booleans</str>
</lst>
<lst name="typeMapping">
  <str name="valueClass">java.util.Date</str>
  <str name="fieldType">pdates</str>
</lst>
<lst name="typeMapping">
  <str name="valueClass">java.lang.Long</str>
  <str name="valueClass">java.lang.Integer</str>
  <str name="fieldType">plongs</str>
</lst>
<lst name="typeMapping">
  <str name="valueClass">java.lang.Number</str>
  <str name="fieldType">pdoubles</str>
</lst>
</updateProcessor>

<!-- The update.autoCreateFields property can be turned to false to dis
able schemaless mode -->
<updateRequestProcessorChain name="add-unknown-fields-to-the-schema" defa
ult="${update.autoCreateFields:true}"
  processor="uuid,remove-blank,field-name-mutating,parse-boolean,
parse-long,parse-double,parse-date,add-schema-fields">
  <processor class="solr.LogUpdateProcessorFactory"/>
  <processor class="solr.DistributedUpdateProcessorFactory"/>
  <processor class="solr.RunUpdateProcessorFactory"/>
</updateRequestProcessorChain>
<!-- Deduplication

  An example dedup update processor that creates the "id" field
  on the fly based on the hash code of some other fields. This
  example has overwriteDups set to false since we are using the
  id field as the signatureField and Solr will maintain
  uniqueness based on that anyway.
-->
<!--
<updateRequestProcessorChain name="dedupe">
  <processor class="solr.processor.SignatureUpdateProcessorFactory">
    <bool name="enabled">true</bool>
    <str name="signatureField">id</str>
    <bool name="overwriteDups">false</bool>
    <str name="fields">name,features,cat</str>
    <str name="signatureClass">solr.processor.Lookup3Signature</str>
  </processor>
  <processor class="solr.LogUpdateProcessorFactory" />
  <processor class="solr.RunUpdateProcessorFactory" />
</updateRequestProcessorChain>
-->

<!-- Response Writers

  http://wiki.apache.org/solr/QueryResponseWriter

  Request responses will be written using the writer specified by
  the 'wt' request parameter matching the name of a registered
  writer.

  The "default" writer is the default and will be used if 'wt' is
  not specified in the request.
-->
<!-- The following response writers are implicitly configured unless

```

```

        overridden...
-->
<!--
    <queryResponseWriter name="xml"
                        default="true"
                        class="solr.XMLResponseWriter" />
    <queryResponseWriter name="json" class="solr.JSONResponseWriter"/>
    <queryResponseWriter name="python" class="solr.PythonResponseWriter"/>
    <queryResponseWriter name="ruby" class="solr.RubyResponseWriter"/>
    <queryResponseWriter name="php" class="solr.PHPResponseWriter"/>
    <queryResponseWriter name="phps" class="solr.PHPSerializedResponseWri
ter"/>
    <queryResponseWriter name="csv" class="solr.CSVResponseWriter"/>
    <queryResponseWriter name="schema.xml" class="solr.SchemaXmlResponseWr
iter"/>
-->
<queryResponseWriter name="json" class="solr.JSONResponseWriter">
  <!-- For the purposes of the tutorial, JSON responses are written as
  plain text so that they are easy to read in *any* browser.
  If you expect a MIME type of "application/json" just remove this over
ride.
  -->
  <str name="content-type">text/plain; charset=UTF-8</str>
</queryResponseWriter>
<!-- Query Parsers

    https://lucene.apache.org/solr/guide/query-syntax-and-parsing.html

    Multiple QParserPlugins can be registered by name, and then
    used in either the "defType" param for the QueryComponent (used
    by SearchHandler) or in LocalParams
  -->
  <!-- example of registering a query parser -->
  <!--
    <queryParser name="myparser" class="com.mycompany.MyQParserPlugin"/>
  -->

  <!-- Function Parsers

    http://wiki.apache.org/solr/FunctionQuery
    Multiple ValueSourceParsers can be registered by name, and then
    used as function names when using the "func" QParser.
  -->
  <!-- example of registering a custom function parser -->
  <!--
    <valueSourceParser name="myfunc"
                      class="com.mycompany.MyValueSourceParser" />
  -->

  <!-- Document Transformers
    http://wiki.apache.org/solr/DocTransformers
  -->
  <!--
    Could be something like:
    <transformer name="db" class="com.mycompany.LoadFromDatabaseTransform
er" >
      <int name="connection">jdbc://....</int>
    </transformer>

    To add a constant value to all docs, use:
    <transformer name="mytrans2" class="org.apache.solr.response.transfor
m.ValueAugmenterFactory" >
      <int name="value">5</int>
    </transformer>

```



```

    If you want the user to still be able to change it with _value:something_ use this:
    <transformer name="mytrans3" class="org.apache.solr.response.transform.ValueAugmenterFactory" >
      <double name="defaultValue">5</double>
    </transformer>

    If you are using the QueryElevationComponent, you may wish to mark documents that get boosted. The EditorialMarkerFactory will do exactly that:
    <transformer name="qecBooster" class="org.apache.solr.response.transform.EditorialMarkerFactory" />
  -->
</config>

```

## Configuring LDAP attribute-based document level authorization in Solr

You can enable Ranger-Solr plugin to support LDAP attribute-based document level authorization.

### About this task

In order to enable this feature, you need to make some configuration changes on both Solr and Ranger sides.

### Procedure

1. Configure Usersync to sync additional attributes for users/groups from AD/LDAP.
  - a) In Cloudera Manager, go to Ranger Configuration .
  - b) Add the following safety valve properties in the ugsync-site.xml file:
    - For users:
      - `ranger.usersync.ldap.user.otherattributes` - Takes "," separated values of the attribute names of the users from AD/LDAP. Example values can be `userPrincipalName`, `displayName`, `objectGUID`, and so on.
      - `ranger.usersync.ldap.user.otherattributes.<attribute name>datatype` - This configuration provides flexibility to specify the datatype of specific attribute value. Default data type for all the attribute values is "String". For example, value for `objectGUID` returned by AD is `byte[]`. Hence the corresponding configuration must be `ranger.usersync.ldap.user.otherattributes.objectGUIDdatatype = byte[]`.
    - For groups:
      - `ranger.usersync.ldap.group.otherattributes` - Takes "," separated values of the attribute names of the groups from AD/LDAP.
      - `ranger.usersync.ldap.group.otherattributes.<attribute name>datatype` - Same as user attribute datatype.
2. Restart Usersync.
3. Update Solr service definition configuration to download user/group attributes to Solr service.
  - a) Get the existing service definition from your cluster by using the curl command.

For example,

```
curl -u admin:admin123 -H "Accept: application/json" -H "Content-Type: application/json" -X GET http://sp-718-1.sp-718.root.hwx.site:6080/service/public/v2/api/servicedef/8
```

- b) Save the output to file and update the contextEnricher section with the following information:

```
"contextEnrichers": [{ "itemId": 1, "name": "UserEnricher", "enricher": "org.apache.ranger.plugin.contextenricher.RangerUserStoreEnricher", "enricherOptions":
```

```
{ "userStoreRetrieverClassName": "org.apache.ranger.plugin.contextenricher.RangerAdminUserStoreRetriever", "userStoreRefresherPollingInterval": "60000" }  
}],
```

- c) Update the service definition by using the following curl command:

```
curl -u admin:admin123 -H "Accept: application/json" -H "Content-Type: application/json" -X PUT http://sp-718-1.sp-718.root.hwx.site:6080/service/public/v2/api/servicedef/name/solr -d @/tmp/solrServiceDef.json
```

4. Update Solr service repo configuration to allow Solr service user (solr) to download user or group attributes from Ranger admin.
- Login to Ranger UI as admin user.
  - Go to Access Manager.
  - Click the edit icon for the cm\_solr plugin.
  - On the Edit Service page, click the + icon for Add New Configurations.
  - Add userstore.download.auth.users with the value solr.
  - Click Save.