Discovery

What is DSpace Discovery

The Discovery Module enables faceted searching & browsing for your repository.

Although these techniques are new in DSpace, they might feel familiar from other platforms like Aquabroser or Amazon, where facets help you to select the right product according to facets like price and brand. DSpace Discovery offers very powerful browse and search configurations that were only possible with code customization in the past.

Watch the DSpace Discovery introduction video

Since DSpace 3.0 Discovery is also supported in the JSPUI.

What is a Sidebar Facet

From the user perspective, faceted search (also called faceted navigation, guided navigation, or parametric search) breaks up search results into multiple categories, typically showing counts for each, and allows the user to "drill down" or further restrict their search results based on those facets.

When you have successfully enabled Discovery in your DSpace, you will notice that the different enabled facets are visualized in a "Discover" section in your sidebar, by default, right below the Browse options.

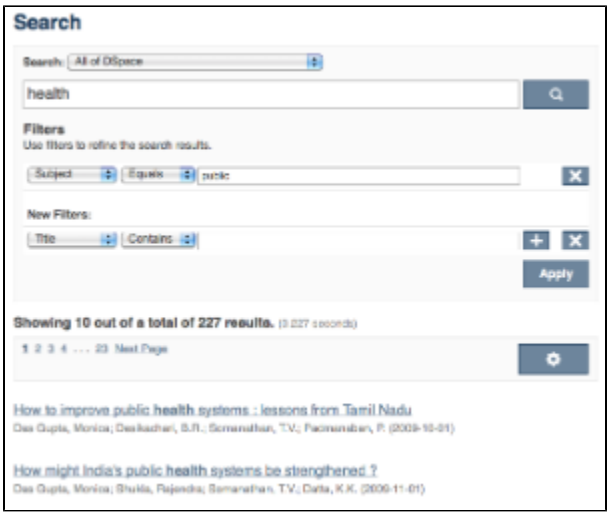
In this example, there are 3 Sidebar Facets, Author, Subject and Date Issued. It's important to know that multiple metadata fields can be included in one facet. For example, the Author facet above includes values from both dc.contributor.author as well as dc.creator.

Another important property of Sidebar Facets is that their contents are automatically updated to the context of the page. On collection homepages or community homepages it will include information about the items included in that particular collection or community.

What is a Search Filter

In a standard search operation, a user specifies his complete query prior to launching the operation. If the results are not satisfactory, the user starts over again with a (slightly) altered query.

In a faceted search, a user can modify the list of displayed search results by specifying additional "filters" that will be applied on the list of search results. In DSpace, a filter is a contain condition applied to specific facets. In the example below, a user started with the search term "health", which yielded 500 results. After applying the filter "public" on the facet "Subject", only 227 results remain. Each time a user selects a sidebar facet it will be added as a filter. Active filters can be altered or removed in the 'filters' section of the search interface.



Another example: Using the standard search, a user would search for something like [**wetland + "dc.author=Mitsch, William J" + dc.subject="water quality"**]. With filtered search, they can start by searching for [**wetland**], and then filter the results by the other attributes, author and subject.

Discovery Changelist

DSpace 1.7

- Sidebar browse facets that can be configured to use contents from any metadata field
  - Dynamically generated timespans for dates
- Customizable "recent submissions" view on the repository homepage, collection and community pages

- Hit highlighting & search snippets

DSpace 1.8

- Configuration moved from dspace.cfg into `config/modules/discovery.cfg` and `config/spring/api/discovery.xml`
- Individual communities and collections can have their own Discovery configuration.
- Tokenization for Auto-complete values (see SearchFilter)
- Alphanumeric sorting for Sidebarfacets
- Possibility to avoid indexation of specific metadata fields.
- Grouping of multiple metadata fields under the same SidebarFacet

DSpace 3.0

Starting from DSpace 3.0, Discovery is also supported in JSPUI.

General improvements:

- Hierarchical facets sidebar facets
- Improved & more intuitive user interface
- Access rights based results
- Authority control & variants awareness (homonyms are shown separately in a facet if they have different authority ID). All variant forms as recognized by the authority framework are indexed. See Authority Framework

XMLUI-only:

- Hit highlighting and search snippets support
- "More like this" (related items)

Bugfixes and other changes

- Auto-complete functionality has been removed in XMLUI from search queries due to performance issues. JSPUI still supports auto-complete functionality without performance issues.

Enabling Discovery

You can independently enable Discovery for XMLUI or JSPUI. Follow the steps below.

Steps required for XMLUI

As with any upgrade procedure, it is highly recommend that you backup your existing data thoroughly. Although upgrades in versions of Solr/Lucene do tend to be forward-compatible for the data stored in the Lucene index, it is always a best practice to backup your `[dspace-install-dir]/solr/statistics` cores to assure no data is lost.

1. Enable the Discovery Aspects in the XMLUI by changing the following settings in `config/xmlui.xconf`
    a. Comment out: `SearchArtifacts`
    b. Uncomment: `Discovery`

```
<xmlui>
    <aspects>
        <!--
            @deprecated: the Artifact Browser has been devided into ViewArtifacts,
            BrowseArtifacts, SearchArtifacts
            <aspect name="Artifact Browser" path="resource://aspects/ArtifactBrowser/" />
        -->
        <aspect name="Displaying Artifacts" path="resource://aspects/ViewArtifacts/" />
        <aspect name="Browsing Artifacts" path="resource://aspects/BrowseArtifacts/" />
        <!--<aspect name="Searching Artifacts" path="resource://aspects/SearchArtifacts/" />-->
        <aspect name="Administration" path="resource://aspects/Administrative/" />
        <aspect name="E-Person" path="resource://aspects/EPerson/" />
        <aspect name="Submission and Workflow" path="resource://aspects/Submission/" />
        <aspect name="Statistics" path="resource://aspects/Statistics/" />

        <!--
            To enable Discovery, uncomment this Aspect that will enable it
            within your existing XMLUI
            Also make sure to comment the SearchArtifacts aspect
            as leaving it on together with discovery will cause UI overlap issues-->
        <aspect name="Discovery" path="resource://aspects/Discovery/" />


        <!--
            This aspect tests the various possible DRI features,
            it helps a theme developer create themes
        -->
        <!-- <aspect name="XML Tests" path="resource://aspects/XMLTest/"/> -->
    </aspects>
```

2. Enable the Discovery Indexing Consumer that will update Discovery Indexes on changes to content in XMLUI, JSPUI, SWORD, and LNI in config /dspace.cfg
    a. Add discovery to the list of event.dispatcher.default.consumers

```
# default synchronous dispatcher (same behavior as traditional DSpace)
event.dispatcher.default.class = org.dspace.event.BasicDispatcher
#event.dispatcher.default.consumers = versioning, search, browse, eperson, harvester
event.dispatcher.default.consumers = versioning, search, browse, discovery, eperson, harvester
```

    b. Change recent.submissions.count to zero

```
#Put the recent submissions count to 0 so that discovery can use it's recent submissions,
# not doing this when discovery is enabled will cause UI overlap issues
#How many recent submissions should be displayed at any one time
#recent.submissions.count = 5
recent.submissions.count = 0
```

3. Check that the port is correct for solr.search.server in config/modules/discovery.cfg
    a. If all of your traffic runs over port 80, then you need to remove the port from the URL

```
##### Search Indexing #####
solr.search.server = http://localhost/solr/search
```

4. From the command line, navigate to the [dspace] directory and run the command below to index the content of your DSpace instance into Discovery.

```
[dspace]/bin/dspace update-discovery-index
```

> NOTE: This step may take some time if you have a large number of items in your repository.

5. Verify that you can see the Sidebar Facets on your DSpace homepage. Note that these are **only visible when you have items in your repository**.

Steps required for JSPUI

As with any upgrade procedure, it is highly recommend that you backup your existing data thoroughly. Although upgrades in versions of Solr/Lucene do tend to be forwards compatible for the data stored in the Lucene index, it is always a best practice to backup your `[dspace-install-dir]/solr/statistics` cores to ensure no data is lost.

1. Enable the Discovery Search processor in the by changing the following settings in `config/dspace.cfg`
    a. Comment out: `org.dspace.app.webui.search.LuceneSearchRequestProcessor`
    b. Uncomment: `org.dspace.app.webui.discovery.DiscoverySearchRequestProcessor`

    ```
    plugin.single.org.dspace.app.webui.search.SearchRequestProcessor = \
            org.dspace.app.webui.discovery.DiscoverySearchRequestProcessor
    ```

2. Enable the Discovery Indexing Consumer that will update Discovery Indexes on changes to content in XMLUI, JSPUI, SWORD, and LNI in config/dspace.cfg
    a. Add discovery to the list of event.dispatcher.default.consumers

    ```
    # default synchronous dispatcher (same behavior as traditional DSpace)
    event.dispatcher.default.class = org.dspace.event.BasicDispatcher
    #event.dispatcher.default.consumers = versioning, search, browse, eperson, harvester
    event.dispatcher.default.consumers = versioning, search, browse, discovery, eperson, harvester
    ```

    As it is not possible in JSPUI to use both search providers (Lucene and Discovery), it is generally more appropriate, but not required, to remove the "search" consumer from the list above. The "browse" consumer can be removed as well if you configure the Browse System to use Solr/Discovery as its backend (see Defining the Storage of the Browse Data)
    b. Enable facet showing in the Repository, Communities and Collections home pages

    ```
    plugin.sequence.org.dspace.plugin.CommunityHomeProcessor = \
            org.dspace.app.webui.components.RecentCommunitySubmissions,\
            org.dspace.app.webui.discovery.SideBarFacetProcessor

    plugin.sequence.org.dspace.plugin.CollectionHomeProcessor = \
            org.dspace.app.webui.components.RecentCollectionSubmissions,\
            org.dspace.app.webui.discovery.SideBarFacetProcessor

    plugin.sequence.org.dspace.plugin.SiteHomeProcessor = \
            org.dspace.app.webui.discovery.SideBarFacetProcessor
    ```

    Please note that JSPUI (in contrast to XMLUI) still relies on the Browse Engine to show "recent submissions". The browse engine can be configured to use Solr/Discovery as its backend (see Defining the Storage of the Browse Data)
    c. Enable a JSON endpoint to provide the autocompletion feature in the search form

    ```
    plugin.named.org.dspace.app.webui.json.JSONRequest = \
        org.dspace.app.webui.discovery.DiscoveryJSONRequest = discovery
    ```

3. Check that the port is correct for solr.search.server in config/modules/discovery.cfg
    a. If all of your traffic runs over port 80, then you need to remove the port from the URL

    ```
    ##### Search Indexing #####
    solr.search.server = http://localhost/solr/search
    ```

4. From the command line, navigate to the [dspace] directory and run the command below to index the content of your DSpace instance into Discovery.

    ```
    ./bin/dspace update-discovery-index
    ```

    NOTE: This step may take some time if you have a large number of items in your repository.

5. Verify that you can see the Sidebar Facets on your DSpace homepage or that an empty search query will return all repository content. Note that these are **only visible when you have items in your repository**.

Configuration files

The configuration for discovery is located in 2 separate files.

- General settings: The `discovery.cfg` file located in the `[dspace-install-dir]/config/modules directory`.
- User Interface Configuration: The `discovery.xml` file is located in `[dspace-install-dir]/config/spring/api/` directory.

Only for JSPUI some enabling configuration are placed in in the `[dspace-install-dir]/config/dspace.cfg file`

General Discovery settings (`config/modules/discovery.cfg`)

The `discovery.cfg` file is located in the `[dspace-install-dir]/config/modules` directory and contains following properties:

Property:	**search.server**
Example Value:	`search.server=[http://localhost:8080/solr/search]`
Informational Note:	Discovery relies on a Solr index for storage and retrieval of its information. This parameter determines the location of the Solr index.
Property:	**index.ignore**
Example Value:	`index.ignore=dc.description.provenance,dc.language`
Informational Note:	By default, Discovery will include all of the DSpace metadata in its search index. In cases where specific metadata is confidential, repository managers can include those fields by adding them to this comma separated list.
Property:	**index.authority.ignore[.field]**

Example Value:	`index.authority.ignore=true`
	
	`index.authority.ignore.dc.contributor.author=false`

Informational Note:	By default, Discovery will use the authority information in the metadata to disambiguate homonyms. Setting this property to false will make the indexing process the same as the metadata doesn't include authority information. The configuration can be different on a field (<schema>.<element>.<qualifier>) basis, the property without field set the default value.
Property:	**index.authority.ignore-prefered[.field]**

Example Value:	`index.authority.ignore-prefered=true`
	
	`index.authority.ignore-prefered.dc.contributor.author=false`

Informational Note:	By default, Discovery will use the authority information in the metadata to query the authority for the prefered label. Setting this property to false will make the indexing process the same as the metadata doesn't include authority information (i.e. the prefered form is the one recorded in the metadata value). The configuration can be different on a field (<schema>.<element>.<qualifier>) basis, the property without field set the default value. **If the authority is a remote service, disabling this feature can greatly improve performance.**
Property:	**index.authority.ignore-variants[.field]**

Example Value:	`index.authority.ignore-variants=true`
	
	`index.authority.ignore-variants.dc.contributor.author=false`

Informational Note:	By default, Discovery will use the authority information in the metadata to query the authority for variants. Setting this property to false will make the indexing process the same, as the metadata doesn't include authority information. The configuration can be different on a per-field (<schema>.<element>.<qualifier>) basis, the property without field set the default value. **If authority is a remote service, disabling this feature can greatly improve performance.**

Modifying the Discovery User Interface (`config/spring/api/discovery.xml`)

The `discovery.xml` file is located in the `[dspace-install-dir]/config/spring/api` directory.

Structure Summary

This file is in XML format, you should be familiar with XML before editing this file. The configurations are organized together in beans, depending on the purpose these properties are used for.
This purpose can be derived from the class of the beans. Here's a short summary of classes you will encounter throughout the file and what the corresponding properties in the bean are used for.

Download the configuration file and review it together with the following parameters

Class:	**DiscoveryConfigurationService**
Purpose:	Defines the mapping between separate Discovery configurations and individual collections/communities
Default:	All communities, collections and the homepage (key=default) are mapped to defaultConfiguration
Class:	**DiscoveryConfiguration**
Purpose:	Groups configurations for sidebar facets, search filters, search sort options and recent submissions
Default:	There is one configuration by default called defaultConfiguration
Class:	**DiscoverySearchFilter**
Purpose:	Defines that specific metadata fields should be enabled as a search filter
Default:	dc.title, dc.contributor.author, dc.creator, dc.subject.* and dc.date.issued are defined as search filters
Class:	**DiscoverySearchFilterFacet**
Purpose:	Defines which metadata fields should be offered as a contextual sidebar browse options, each of these facets has also got to be a search filter
Default:	dc.contributor.author, dc.creator, dc.subject.* and dc.date.issued
Class:	**HierarchicalSidebarFacetConfiguration**
Purpose:	Defines which metadata fields contain hierarchical data and should be offered as a contextual sidebar option

Class:	DiscoverySortConfiguration
Purpose:	Further specifies the sort options to which a DiscoveryConfiguration refers
Default:	dc.title and dc.date.issued are defined as alternatives for sorting, other than Relevance (hard-coded)
Class:	**DiscoveryHitHighlightingConfiguration**
Purpose:	Defines which metadata fields can contain hit highlighting & search snippets
Default:	dc.title, dc.contributor.author, dc.subject, dc.description.abstract & full text from text files.

Default settings

In addition to the summarized descriptions of the default values, following details help you to better understand these defaults. If you haven't already done so, download the configuration file and review it together with the following parameters.
The file contains one default configuration that defines following sidebar facets, search filters, sort fields and recent submissions display:

- Sidebar facets
  - **searchFilterAuthor:** groups the metadata fields dc.contributor.author & dc.creator with a facet limit of 10, sorted by occurrence count
  - **searchFilterSubject:** groups all subject metadata fields (dc.subject.*) with a facet limit of 10, sorted by occurrence count
  - **searchFilterIssued:** contains the dc.date.issued metadata field, which is identified with the type "date" and sorted by specific date values
- Search filters
  - **searchFilterTitle:** contains the dc.title metadata field
  - **searchFilterAuthor:** contains the dc.contributor.author & dc.creator metadata fields
  - **searchFilterSubject:** contains the dc.subject.* metadata fields
  - **searchFilterIssued:** contains the dc.date.issued metadata field with the type "date"
- Sort fields
  - **sortTitle**: contains the dc.title metadata field
  - **sortDateIssued:** contains the dc.date.issued metadata field, this sort has the type date configured.
- defaultFilterQueries
  - The default configuration contains no defaultFilterQueries
  - The default filter queries are disabled by default but there is an example in the default configuration in comments which allows discovery to only return items (as opposed to also communities/collections).
- Recent Submissions
  - The recent submissions are sorted by dc.date. accessioned which is a date and a maximum number of 5 recent submissions are displayed.
- Hit highlighting
  - The fields dc.title, dc.contributor.author & dc.subject can contain hit highlighting.
  - The dc.description.abstract & full text field are used to render search snippets.

Many of the properties contain lists that use references to point to the configuration elements. This way a certain configuration type can be used in multiple discovery configurations so there is no need to duplicate them.

Search filters & sidebar facets Customization

This section explains the properties for search filters & sidebar facets. Each sidebar facet must occur in the reference list of the search filters. Below is an example configuration of a search filter that is not used as a sidebar facet.

```
<bean id="searchFilterTitle" class="org.dspace.discovery.configuration.DiscoverySearchFilter">
    <property name="indexFieldName" value="title"/>
    <property name="metadataFields">
        <list>
            <value>dc.title</value>
        </list>
    </property>
</bean>
```

The id & class attributes are mandatory for this type of bean. The properties that it contains are discussed below.

- **indexFieldName** (Required)**:** A unique search filter name, the metadata will be indexed in Solr under this field name.
- **metadataFields** (Required): A list of the metadata fields that need to be included in the facet.

Sidebar facets extend the search filter and add some extra properties to it, below is an example of a search filter that is also used as a sidebar facet.

```
<bean id="searchFilterAuthor" class="org.dspace.discovery.configuration.SidebarFacetConfiguration">
        <property name="indexFieldName" value="author"/>
        <property name="metadataFields">
            <list>
                <value>dc.contributor.author</value>
                <value>dc.creator</value>
            </list>
        </property>
        <property name="facetLimit" value="10"/>
        <property name="sortOrder" value="COUNT"/>
        <property name="type" value="text"/>
    </bean>
```

Note that the class has changed from **DiscoverySearchFilter** to **SidebarFacetConfiguration** this is needed to support the extra properties.

- **facetLimit** (optional)**:** The maximum number of values to be shown. This property is optional, if none is specified the default value "10" will be used. If the filter has the type **date**, this property will not be used since dates are automatically grouped together.
- **sortOrder** (optional)**:**The sort order for the sidebar facets, it can either be COUNT or VALUE. The default value is COUNT.
    - **COUNT** Facets will be sorted by the amount of times they appear in the repository
    - **VALUE** Facets will be sorted alphabetically
- **type**(optional): the type of the sidebar facet it can either be "date" or "text", "text" is the default value.
    - **text:** The facets will be treated as is
    - **date**: Only the year will be stored in the Solr index. These years are automatically displayed in ranges that get smaller when you select one.

Hierarchical (taxonomies based) sidebar facets

Discovery supports specialized drill down in hierarchically structured metadata fields. For this drill down to work, the metadata in the field for which you enable this must be composed out of terms, divided by a splitter. For example, you could have a dc.subject.taxonomy field in which you keep metadata like "CARTOGRAPHY::PHOTOGRAMMETRY", in which Cartography and Photogrammetry are both terms, divided by the splitter "::". The sidebar will only display the top level facets, when clicking on view more all the facet options will be displayed.

```
<bean id="searchFilterSubject" class="org.dspace.discovery.configuration.HierarchicalSidebarFacetConfiguration">
    <property name="indexFieldName" value="subject"/>
    <property name="metadataFields">
        <list>
            <value>dc.subject</value>
        </list>
    </property>
    <property name="sortOrder" value="COUNT"/>
    <property name="splitter" value="::"/>
    <property name="skipFirstNodeLevel" value="false"/>
</bean>
```

Note that the class has changed from **SidebarFacetConfiguration** to **HierarchicalSidebarFacetConfiguration** this is needed to support the extra properties.

- **splitter** (required)**:** The splitter used to split up the separate nodes
- **skipFirstNodeLevel** (optional)**:** Whether or not to show the root node level. For some hierarchical data there is a single root node. In most cases it doesn't need to be shown since it isn't relevant. **This property is true by default.**

Sort option customization for search results

This section explains the properties of an individual SortConfiguration, like sortTitle and sortDateIssued from the default configuration. In order to create custom sort options, you can either modify specific properties of those that already exist or create a totally new one from scratch.

Here's what the sortTitle SortConfiguration looks like:

```
<bean id="sortTitle" class="org.dspace.discovery.configuration.DiscoverySortFieldConfiguration">
        <property name="metadataField" value="dc.title"/>
        <property name="type" value="text"/>
 </bean>
```

The id & class attributes are mandatory for this type of bean. The properties that it contains are discussed below.

- **metadataField** (Required): The metadata field indicating the sort values
- **type** (optional): the type of the sort option can either be date or text, if none is defined text will be used.

DiscoveryConfiguration

The DiscoveryConfiguration Groups configurations for sidebar facets, search filters, search sort options and recent submissions. If you want to show the same sidebar facets, use the same search filters, search options and recent submissions everywhere in your repository, you will only need one DiscoveryConfiguration and you might as well just edit the defaultConfiguration.

The DiscoveryConfiguration makes it very easy to use custom sidebar facets, search filters, ... on specific communities or collection homepage. This is particularly useful if your collections are heterogeneous. For example, in a collection with conference papers, you might want to offer a sidebar facet for conference date, which might be more relevant than the actual issued date of the proceedings. In a collection with papers, you might want to offer a facet for funding bodies or publisher, while these fields are irrelevant for items like learning objects.

A DiscoveryConfiguration consists out of five parts

- The list of applicable sidebarFacets
- The list of applicable searchFilters
- The list of applicable searchSortFields
- Any default filter queries (optional)
- The configuration for the Recent submissions display

Configuring lists of sidebarFacets and searchFilters

After modifying sidebarFacets and searchFilters, don't forget to reindex existing items by running `[dspace]/bin/dspace update-discovery-index -b`, otherwise the changes will not appear.

Below is an example of how one of these lists can be configured. It's important that each of the bean references corresponds to the exact name of the earlier defined facets, filters or sort options.

Each sidebar facet must also occur in the list of the search filters.

```
<property name="sidebarFacets">
    <list>
        <ref bean="sidebarFacetAuthor" />
        <ref bean="sidebarFacetSubject" />
        <ref bean="sidebarFacetDateIssued" />
    </list>
</property>
```

Configuring and customizing search sort fields

The search sort field configuration block contains the available sort fields and the possibility to configure a default sort field and sort order.
Below is an example of the sort configuration.

```
<property name="searchSortConfiguration">
    <bean class="org.dspace.discovery.configuration.DiscoverySortConfiguration">
        <!--<property name="defaultSort" ref="sortDateIssued"/>-->
        <!--DefaultSortOrder can either be desc or asc (desc is default)-->
        <property name="defaultSortOrder" value="desc"/>
        <property name="sortFields">
            <list>
                <ref bean="sortTitle" />
                <ref bean="sortDateIssued" />
            </list>
        </property>
    </bean>
</property>
```

The property name & the bean class are mandatory. The property field names are discusses below.

- **defaultSort** (optional): The default field on which the search results will be sorted, this must be a reference to an existing search sort field bean. If none is given relevance will be the default. Sorting according to the internal relevance algorithm is always available, even though it's not explicitly mentioned in the sortFields section.
- **defaultSortOrder** (optional): The default sort order can either be asc or desc.
- **sortFields** (mandatory): The list of available sort options, each element in this list must link to an existing sort field configuration bean.

Adding default filter queries (OPTIONAL)

Default filter queries are applied on all search operations & sidebarfacet clicks. One useful application of default filter queries is ensuring that all returned results are items. As a result, subcommunities and collections that are returned as results of the search operation, are filtered out.
Similar to the lists above, the default filter queries are defined as a list. They are optional.

```
<property name="defaultFilterQueries">
    <list>
        <value>query1</value>
        <value>query2</value>
    </list>
</property>
```

This property contains a simple list which in turn contains the queries. Some examples of possible queries:

- search.resourcetype:2
- dc.subject:test
- dc.contributor.author: "Van de Velde, Kevin"
- ...

Access item based results

The items returned by discovery are all the items the user logged in has access to. So the results may differ if you are logged in. This feature can be switched off it isn't requested by going to the [dspace.dir]/config/spring/api/discovery.xml file & commenting out the bean & the alias shown below.

```
<bean class="org.dspace.discovery.SolrServiceResourceRestrictionPlugin" id="solrServiceResourceIndexPlugin"/>

<alias name="solrServiceResourceIndexPlugin" alias="org.dspace.discovery.SolrServiceResourceRestrictionPlugin"/>
```

The Browse Engine only supports the "Access item based results" if the Solr/Discovery backend is enabled (see Defining the Storage of the Browse Data)

Access item based results technical details

The *DSpaceObject* class has an *updateLastModified()* method which will be triggered each time an authorization policy changes. This method is only implemented in the item class where the last_modified timestamp will be updated and a modify event will be fired. By doing this we ensure that the discovery consumer is called and the item is reindexed. Since this feature can be switched off a separate plugin has been created: the *SolrServiceResourceRestrictionPlugin.* Whenever we reindex a DSpace object all the read rights will be stored in the read field. We make a distinction between groups and users by adding a '*g*' prefix for groups and the '*e*' prefix for epersons.

When searching in discovery all the groups the user belongs to will be added as a filter query as well as the users identifier. If the user is an admin all items will be returned since an admin has read rights on everything.

Customizing the Recent Submissions display

This paragraph only applies to XMLUI. JSPUI relies on the Browse Engine to show "recent submissions". This requires that the Solr/Discovery backend is enabled (see Defining the Storage of the Browse Data).

The recent submissions configuration element contains all the configuration settings to display the list of recently submitted items on the home page or community/collection page. Because the recent submission configuration is in the discovery configuration block, it is possible to show 10 recently submitted items on the home page but 5 on the community/collection pages.

Below is an example configuration of the recent submissions.

```
<property name="recentSubmissionConfiguration">
    <bean class="org.dspace.discovery.configuration.DiscoveryRecentSubmissionsConfiguration">
        <property name="metadataSortField" value="dc.date.accessioned"/>
        <property name="type" value="date"/>
        <property name="max" value="5"/>
    </bean>
</property>
```

The property name & the bean class are mandatory. The property field names are discusses below.

- **metadataSortField** (mandatory): The metadata field to sort on to retrieve the recent submissions
- **max** (mandatory): The maximum number of results to be displayed as recent submissions
- **type** (optional): the type of the search filter. It can either be date or text, if none is defined text will be used.

Customizing hit highlighting & search snippets

This paragraph only applies to XMLUI. JSPUI does not currently support "highlighting & search snippets".

The hit highlighting configuration element contains all settings necessary to display search snippets & enable hit highlighting.

Changes made to the configuration will not automatically be displayed in the user interface. By default, only the following fields are displayed: dc.title, dc.contributor.author, dc.creator, dc.contributor, dc.date.issued, dc.publisher, dc.description.abstract and fulltext.

If additional fields are required, look for the "itemSummaryList" template.

Below is an example configuration of hit highlighting.

```
<property name="hitHighlightingConfiguration">
    <bean class="org.dspace.discovery.configuration.DiscoveryHitHighlightingConfiguration">
        <property name="metadataFields">
            <list>
                <bean class="org.dspace.discovery.configuration.DiscoveryHitHighlightFieldConfiguration">
                    <property name="field" value="dc.title"/>
                    <property name="snippets" value="5"/>
                </bean>
                <bean class="org.dspace.discovery.configuration.DiscoveryHitHighlightFieldConfiguration">
                    <property name="field" value="dc.contributor.author"/>
                    <property name="snippets" value="5"/>
                </bean>
                <bean class="org.dspace.discovery.configuration.DiscoveryHitHighlightFieldConfiguration">
                    <property name="field" value="dc.subject"/>
                    <property name="snippets" value="5"/>
                </bean>
                <bean class="org.dspace.discovery.configuration.DiscoveryHitHighlightFieldConfiguration">
                    <property name="field" value="dc.description.abstract"/>
                    <property name="maxSize" value="250"/>
                    <property name="snippets" value="2"/>
                </bean>
                <bean class="org.dspace.discovery.configuration.DiscoveryHitHighlightFieldConfiguration">
                    <property name="field" value="fulltext"/>
                    <property name="maxSize" value="250"/>
                    <property name="snippets" value="2"/>
                </bean>
            </list>
        </property>
    </bean>
</property>
```

The property name & the bean class are mandatory. The property field names are:

- **field** (mandatory)**:** The metadata field to be highlighted (can also be * if all the metadata fields should be highlighted).
- **maxSize** (optional): Limit the number of characters displayed to only the relevant part (use metadata field as search snippet).
- **snippets** (optional)**:** The maximum number of snippets that can be found in one metadata field.

Hit highlighting technical details

The *org.dspace.discovery.DiscoveryQuery* object has a setter & getter for the hit highlighting configuration set in Discovery configuration. If this configuration is given the *resolveToSolrQuery* method located in the *org.dspace.discovery.SolrServiceImpl* class will use the standard Solr highlighting feature (http://wiki.apache.org/solr/HighlightingParameters). The *org.dspace.discovery.DiscoverResult* class has a method to set the highlighted fields for each object & field.

The rendering of search results is no longer handled by the METS format but uses a special type of list named "TYPE_DSO_LIST". Each metadata field (& fulltext if configured) is added in the DRI and IF the field contains hit higlighting the Java code will split up the string & add *DRI highlights* to the list. The XSL for the themes also contains special rendering XSL for the DRI; for Mirage, the changes are located in the *discovery.xsl* file. For themes using the old themes based on structural.xsl, look for the template matching "*dri:list[@type='dsolist']*".

"More like this" configuration

This paragraph only apply to XMLUI. The JSPUI does not currently support the "More like this" feature.

The "more like this"-configuration element contains all the settings for displaying related items on an item display page.
Below is an example of the "more like this" configuration.

```
<property name="moreLikeThisConfiguration">
    <bean class="org.dspace.discovery.configuration.DiscoveryMoreLikeThisConfiguration">
        <property name="similarityMetadataFields">
            <list>
                <value>dc.contributor.author</value>
                <value>dc.creator</value>
                <value>dc.subject</value>
            </list>
        </property>
        <!--The minimum number of matching terms across the metadata fields above before an item is found as
related -->
        <property name="minTermFrequency" value="5"/>
        <!--The maximum number of related items displayed-->
        <property name="max" value="3"/>
    </bean>
</property>
```

The property name & the bean class are mandatory. The property field names are discussed below.

- similarityMetadataFields: the metadata fields checked for similarity
- minTermFrequency: The minimum number of matching terms accross the metadata fields above before an item is found as related
- max: The maximum number of related items displayed

"More like this" technical details

The *org.dspace.discovery.SearchService* object has received a *getRelatedItems()* method. This method requires an item & the more-like-this configuration bean from above. This method is implemented in the *org.dspace.discovery.SolrServiceImpl* which uses the item as a query & uses the default Solr parameters for more-like-this to pass the bean configuration to solr (http://wiki.apache.org/solr/MoreLikeThis). The result will be a list of items or if none found an empty list. The rendering of this list is handled in the *org.dspace.app.xmlui.aspect.discovery.RelatedItems* class.

Discovery Solr Index Maintenance

Command used:	`[dspace]/bin/dspace update-discovery-index [-cbhf[r <item handle>]]`
Java class:	org.dspace.discovery.IndexClient
Arguments (short and long forms):	Description
	called without any options, will update/clean an existing index
`-b`	(re)build index, wiping out current one if it exists
`-c`	clean existing index removing any documents that no longer exist in the db
`-f`	if updating existing index, force each handle to be reindexed even if uptodate
`-h`	print this help message
`-o`	optimize search core
`-r <item handle>`	remove an Item, Collection or Community from index based on its handle

Routine Discovery Solr Index Maintenance

It is strongly recommended to run maintenance on the Discovery Solr index daily (from crontab or your system's scheduler), to prevent your servlet container from running out of memory:

```
[dspace]/bin/dspace update-discovery-index -o
```

Advanced Solr Configuration

Discovery is built as an application layer on top of the Solr open source enterprise search server. Therefore, Solr configuration can be applied to the Solr cores that are shipped with DSpace.
The DSpace Solr instance itself now runs two cores. One for collection DSpace Solr based "statistics", the other for Discovery Solr based "search".

```
solr
 search
    conf
       admin-extra.html
       elevate.xml
       protwords.txt
       schema.xml
       scripts.conf
       solrconfig.xml
       spellings.txt
       stopwords.txt
       synonyms.txt
       xslt
           DRI.xsl
           example.xsl
           example_atom.xsl
           example_rss.xsl
           luke.xsl
    conf2
 solr.xml
 statistics
     conf
         admin-extra.html
         elevate.xml
         protwords.txt
         schema.xml
         scripts.conf
         solrconfig.xml
         spellings.txt
         stopwords.txt
         synonyms.txt
         xslt
             example.xsl
             example_atom.xsl
             example_rss.xsl
             luke.xsl
```