MP-SPARQL - User’s Guide and Reference
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<table>
<thead>
<tr>
<th>ACTION</th>
<th>NAME</th>
<th>DATE</th>
<th>SIGNATURE</th>
</tr>
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</tbody>
</table>

REVISION HISTORY

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>DATE</th>
<th>DESCRIPTION</th>
<th>NAME</th>
</tr>
</thead>
</table>
# Contents

1 Introduction 1

2 Installation 3
   2.1 Installing packages 3
   2.2 Installing from source 3
   2.3 Configuration 4
   2.4 Using the service 5

3 Reference 7
   3.1 sparql 7

A License 13

B GNU General Public License 15
   B.1 Preamble 15
   B.2 TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION 16
      B.2.1 Section 0 16
      B.2.2 Section 1 16
      B.2.3 Section 2 16
      B.2.4 Section 3 17
      B.2.5 Section 4 18
      B.2.6 Section 5 18
      B.2.7 Section 6 18
      B.2.8 Section 7 18
      B.2.9 Section 8 19
      B.2.10 Section 9 19
      B.2.11 Section 10 19
B.2.12 NO WARRANTY Section 11 .................................................. 19
B.2.13 Section 12 ................................................................. 19
B.3 How to Apply These Terms to Your New Programs .................. 20
Abstract

This manual is part of MP-SPARQL version 0.7.
MP-SPARQL is a Metaproxy module that converts Type-1/RPN Queries to SPARQL.
MP-SPARQL is covered by the GNU General Public License version 2.
Chapter 1

Introduction

MP-SPARQL is a Metaproxy module that converts Type-1/RPN queries to SPARQL.
Chapter 2

Installation

MP-SPARQL is available as packages for CentOS/RHEL and most recent Ubuntu/Debian versions. For other systems, the module must be built from source.

2.1 Installing packages

You need to enable the relevant software repositories. For setting up, refer to one of: CentOS 5, CentOS 6, CentOS 7, Ubuntu and Debian

The package is called mp-sparql on RHEL/Debian systems. Install that package, and then you are ready to use filter "sparql" in your setup.

mp-sparql depends on a number of packages created by Index Data and system-provided ones, such as Libxml2. For external software Zorba, no system package exists, so Index Data has packaged that separately. This package is called idzorba. All these dependencies should be automatically installed when the Index Data software repository is set up.

2.2 Installing from source

To build from source, you need metaproxy development packages. Metaproxy can be installed as follows:

```
./configure
make
sudo make install
```

Refer to the Metaproxy documentation for requirements and options.

We are now ready to build the MP-SPARQL module with:

```
cd mp-sparql-version
make MP_CONFIG=/usr/local/bin/mp-config
```

Adjust MP_CONFIG value above for the correct location of installed Metapốcxy’s mp-config. MP_CONFIG can be omitted if Metaproxy was installed in the system PATH.
You can now install the `metaproxys_filter_sparql.so` in a directory searched by Metaproxy daemon. Specifically, that is the directories given by the `dlpath` configuration.

If `dlpath` includes `/usr/lib/metaproxy6/modules`, the module can be installed with:

```
 cp src/metaproxys_filter_sparql.so /usr/lib/metaproxy6/modules
```

**Note**

For RHEL/CentOS systems on 64-bit architectures, the correct paths is: `/usr/lib64/metaproxy6/modules`.

## 2.3 Configuration

If you have installed mp-sparql as a package or have executed `make install` from source, sample configuration can be found in `/usr/share/mp-sparql/bibframe` or `/usr/local/share/mp-sparql/bibframe`. In the following, the prefix `/usr/share` is assumed. Adjust accordingly. The directory contains these files:

- **triplestore.xml** A mature PQF to SPARQL configuration, illustrating a lot of the configuration facilities that are described in the manual page of `sparql(3mp)`.
- **config-sparql.xml** A full metaproxy configuration file that includes `triplestore.xml` configuration for the mp-sparql filter, enables SRU and CQL to PQF conversion.
- **filter-sparql.xml** A partial metaproxy configuration, suitable to be enabled in `/etc/metaproxy/filters-enabled`. This includes `triplestore.xml` as well.

If you want to use the package layout and modular configuration, we suggest you use `filter-sparql.xml` and perform something along the lines of:

```
 cp /usr/share/mp-sparql/bibframe/filter-sparql.xml /etc/metaproxy/ filters-available
 cp /usr/share/mp-sparql/bibframe/triplestore.xml /etc/metaproxy
 vi /etc/metaproxy/triplestore.xml
 ln -s ../filters-available/filter-sparql.xml /etc/metaproxy/filters-enable
 service metaproxy restart
```

A copy of `triplestore.xml` is made. Adjust the `<defaults uri=..` value to the URI of your triplestore.

If you want to create your own top-level configuration, you can copy `config-sparql.xml` to any location you like, and run metaproxy with that. Something like this:

```
 mkdir /etc/myconfig
 cp /usr/share/mp-sparql/bibframe/* /etc/myconfig
 sudo vi /etc/myconfig/triplestore.xml
 metaproxy -c /etc/myconfig/config-sparql.xml
```
Again, a copy of triplestore.xml is made. Adjust the `<defaults uri=..` value to the URI of your triplestore.

---

**Note**

Do not edit files in `/usr/share/mp-sparql/bibframe`. They are only samples and will be overwritten by a package update. Instead copy the files away from there if you need to modify them.

---

### 2.4 Using the service

Either way, unless you have adjusted the metaproxy configuration, Metaproxy can be reached on port 9000.

**Example using yaz-client and PQF/Type-1:**

```
adam@tuna:~$ yaz-client localhost:9000/work
Connecting...OK.
Sent initrequest.
Connection accepted by v3 target.
ID: 81
Name: sparql
Version: 1.9.0/5.14.6 87faebe8ef5cab8f6df86f387e8b919b7b9897a8
Options: search present namedResultSets
Elapsed: 0.000961
Z> f @attr l=bf.anytitle water
Sent searchRequest.
Received SearchResponse.
Search was a success.
Number of hits: 1, setno 1
records returned: 0
Elapsed: 0.279441
Z> s
Sent presentRequest (1+1).
Records: 1
[work]Record type: XML
<?xml version="1.0" encoding="utf-8" ?>
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
  xmlns:ns2="http://bibframe.org/vocab/" >
  <rdf:Description rdf:about="http://bibframe.org/resources/sample-lc\-2/15513351">
    ...
</rdf:Description>
</rdf:RDF>nextResultSetPosition = 0
Elapsed: 0.256142
```

**Example using SRU:** `http://localhost:9000/work?query=bf.anytitle%3Dwater&maximumRecords=1`
Chapter 3

Reference

The material in this chapter is drawn directly from the individual manual entries.

3.1 sparql

sparql — Metaproy Module for accessing a triplestore

DESCRIPTION

This module translates Z39.50 operations (init, search, present) to HTTP requests that access a remote triplestore via HTTP.

This module only inspects Z39.50, while HTTP requests are ignored (passed through). When this module is in effect, the result is HTTP packages. Use the http_client module after this module in the route, in order to contact a remote triplestore via HTTP.

Configuration consists of an optional defaults section and one or more database sections.

The default sections is defined with element defaults and specifies the URL of the triplestore by attribute uri.

A database section is defined with element db. The db element must specify attribute path which is the name of the Z39.50 database. It should also include attribute uri with the URL of the triplestore; unless already specified in the defaults section. The element-set-name / schema for the database may be given with attribute schema. A db configuration may also include settings from another db section - specified by the include attribute. Each database section takes these elements:

<prefix/> Section that maps prefixes and namespaces for RDF vocabularies. The format is prefix, followed by colon, followed by value.

<form/> SPARQL Query formulation selection. Should start with one of the query forms: SELECT or CONSTRUCT.
<criteria/> Section that allows to map static graph patterns for binding variables, narrowing types, etc, or any other WHERE clause criteria static to the Z39.50/SRU database. The final query conversion logic should be able to deduce which optional criteria should be included in the generated SPARQL, by analyzing variables required in the query matching and display fields.

<index type="attribute"/> Section used to declare RPN/Type-1 use attribute strings (indices) and map them to BIBFRAME graph patterns. Items in this section are constructed during RPN query processing and placeholders that are prefixed by a percent sign (%) are expanded. See the section called “EXPANSIONS”. To map a given use attribute (search field) into multiple entity properties, SPARQL constructs like `OPTIONAL` or `UNION` can be used.

<present type="attribute"/> Section used to declare retrieval for a given element-set-name (SRU schema). The CDATA is SPARQL where %u holds the URI of the record. This can be used to construct the resulting record.

<modifier/> Optional section that allows you to add solution sequences or modifiers.

**EXPANSIONS**

%t The term verbatim as it appears in the Type-1 query.

%s Like %t but quoted - for general strings.

%d Term - expecting an integer.

%u Like %t, but with prefix < and suffix > - for URIs.

%v Expands to a SPARQL local variable ?v.... Allows the use of a local SPARQL variable for each Attribute+Term in the Type-1 query.

**SCHEMA**

# Metaproxy XML config file schema

namespace mp = "http://indexdata.com/metaproxy"

filter_sparql =
    attribute type { "sparql" },
    attribute id { xsd:NCName }?,
    attribute name { xsd:NCName }?,
    element mp:defaults {
        attribute uri { xsd:string }?
    }?,
    element mp:db {
        attribute path { xsd:string },
        attribute uri { xsd:string }?,
        attribute schema { xsd:string }?,
attribute include { xsd:string }?,
element mp:prefix { xsd:string }+,
element mp:form { xsd:string }*,
element mp:criteria { xsd:string }*,
element mp:index {
  attribute type { xsd:string },
  xsd:string
}*,
element mp:present {
  attribute type { xsd:string },
  xsd:string
}*,
element mp:modifier { xsd:string }*
}+

EXAMPLE

Configuration for database "Default" that allows searching works. Only the field (use attribute) "bf.wtitle" is supported.

```xml
<filter type="sparql">
  <db path="Default"
    uri="http://bibframe.indexdata.com/sparql/
    schema="sparql-results">
    <prefix>bf: http://bibframe.org/vocab/</prefix>
    <form>SELECT ?work ?wtitle</form>
    <criteria>?work a bf:Work</criteria>
    <criteria>?work bf:workTitle ?wt</criteria>
    <criteria>?wt bf:titleValue ?wtitle</criteria>
    <index type="bf.wtitle">?wt bf:titleValue %v FILTER(contains(%v, %s)) ←</index>
  </db>
</filter>
```

The matching is done by a simple case-sensitive substring match. There is no deduplication, so if a work has two titles, we get two rows.

EXAMPLE

A more complex configuration for database "work". This could be included in the same filter section as the "Default" db above.

```xml
<db path="work" schema="sparql-results">
  <prefix>bf: http://bibframe.org/vocab/</prefix>
  <form>SELECT
```
This returns one row for each work. Titles, authors, and subjects are all optional. If they repeat, the repeated values are concatenated into a single field, separated by semicolons. This is done by the GROUP_DIGEST function that is specific to the Virtuoso back end.

This example supports use attributes 4 (title), 1003 (author), 21 (subject), and 1016 (keyword) which matches any literal in a triplet that refers to the work, so it works for the titleValue in the workTitle, as well as the label in the subject, and what ever else there may be. Like the preceding example, the matching is by a simple substring, case sensitive. A more realistic term matching could be done with regular expressions, at the cost of some readability portability, and performance.

**EXAMPLE**

Configuration for database "works". This uses CONSTRUCT to produce rdf.

```xml
<db path="works" schema="rdf">
    <prefix>bf: http://bibframe.org/vocab/</prefix>
    <form>CONSTRUCT { ?work
        (sql:GROUP_DIGEST (?wtitle, ’ ; ’, 1000, 1)) AS ?title
        (sql:GROUP_DIGEST (?creatorlabel, ’ ; ’, 1000, 1)) AS ?creator
        (sql:GROUP_DIGEST (?subjectlabel, ’ ; ’, 1000, 1)) AS ?subject
      }<criteria>?work a bf:Work</criteria>
</form>
    <criteria> OPTIONAL { ?work bf:workTitle ?wt . ?wt bf:titleValue ?wtitle } </criteria>
    <index type="4">?wt bf:titleValue %v FILTER(contains(%v, %s))</index>
    <index type="1003">?creator bf:label %v FILTER(contains(%v, %s))</index>
    <index type="21">?subject bf:label %v FILTER(contains(%v, %s))</index>
    <index type="1016"> { ?work ?op1 ?child . ?child ?op2 %v FILTER(contains(STR(%v), %s)) } </index>
    <modifier>GROUP BY $work</modifier>
</db>
```
?work bf:instanceTitle ?title .
?work bf:subject ?subjectlabel }
</form>
$criteria>?work a bf:Work</criteria>

$criteria>?work bf:workTitle ?wt</criteria>
$criteria>?wt bf:titleValue ?wtitle</criteria>
<index type="4">?wt bf:titleValue %v FILTER(contains(%v, %s))</index>
$criteria>?work bf:creator ?creator</criteria>
$criteria>?creator bf:label ?creatorlabel</criteria>
<index type="1003">?creator bf:label %v FILTER(contains(%v, %s))</index>
$criteria>?work bf:subject ?subject</criteria>
$criteria>?subject bf:label ?subjectlabel</criteria>
<index type="21">?subject bf:label %v FILTER(contains(%v, %s))</index>
</db>

**EXAMPLE**

Configuration for database "instance". Like "work" above this uses SELECT to return row-based data, this time from the instances. This is not deduplicated, so if an instance has two titles, we get two rows, and if it also has two formats, we get four rows. The DISTINCT in the SELECT

```xml
<db path="instance" schema="sparql-results">
  <prefix>bf: http://bibframe.org/vocab/</prefix>
  <form>SELECT DISTINCT ?instance ?title ?format</form>
  <criteria>?instance a bf:Instance</criteria>
  <criteria>?instance bf:title ?title</criteria>
  <index type="4">?instance bf:title %v FILTER(contains(%v, %s))</index>
  <criteria>?instance bf:format ?format</criteria>
  <index type="1013">?instance bf:format %s</index>
</db>
```

**SEE ALSO**

metaproxy(1)
Appendix A

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