

MP-SPARQL - User's Guide and Reference

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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 Metaproxy's `mp-config`. `MP_CONFIG` can be omitted if Metaproxy was installed in the system `PATH`.

You can now install the `metaproxy_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/metaproxy_filter_sparql.so /usr/lib/metaproxy6/modules
```

Note

For RHEL/CentOS systems on 64-bit architectures, the correct path 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- ↔  
enabled  
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 1=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&maximumR1>

Chapter 3

Reference

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

3.1 sparql

sparql — Metaproxy 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.

```

<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.

```

<db path="work" schema="sparql-results">
  <prefix>bf: http://bibframe.org/vocab/</prefix>
  <form>SELECT

```

```

        ?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
    </form>
    <criteria>?work a bf:Work</criteria>

    <criteria> OPTIONAL {
        ?work bf:workTitle ?wt .
        ?wt bf:titleValue ?wtitle }
    </criteria>
    <criteria> OPTIONAL {
        ?work bf:creator ?creator .
        ?creator bf:label ?creatorlabel }
    </criteria>
    <criteria>OPTIONAL {
        ?work bf:subject ?subject .
        ?subject bf:label ?subjectlabel }
    </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>

```

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.

```

<db path="works" schema="rdf">
  <prefix>bf: http://bibframe.org/vocab/</prefix>
  <form>CONSTRUCT {

```

```

    ?work bf:title ?wtitle .
    ?work bf:instanceTitle ?title .
    ?work bf:author ?creator .
    ?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`

```

<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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Appendix B

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B.3 How to Apply These Terms to Your New Programs

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To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the “copyright” line and a pointer to where the full notice is found.

<one line to give the program’s name and a brief idea of what it does.> Copyright (C) <year> <name of author>

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type “show w”. This is free software, and you are welcome to redistribute it under certain conditions; type “show c” for details.

The hypothetical commands “show w” and “show c” should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than “show w” and “show c”; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a “copyright disclaimer” for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program “Gnomovision” (which makes passes at compilers) written by James Hacker.

<signature of Ty Coon>, 1 April 1989 Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.
