Standard Operating Procedure

Enabling the Z39.50 Server on Koha 23 and Adding a Library to PAKCAT

PakCat – Union Catalogue of Pakistani Libraries
CSTRDLP (Consortium of S&T and R&D Libraries of Pakistan)

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Before You Start – Prerequisites

- Koha 23.x installed and running on Ubuntu/Debian, with root or sudo access.
- Your Koha instance name (e.g. `library`). List instances with: `sudo koha-list`
- yaz-client installed for testing: `sudo apt install yaz`
- The server's **public IP address**. The Z39.50 port must be reachable from the internet for PAKCAT to harvest your records. If your Koha is behind a router or campus firewall, ask your network team to open / forward the Z39.50 port (default 2100) to the Koha server.

Note: This manual shows two ways to publish your catalogue over Z39.50. Use **Method A** (recommended for Koha 23). Use **Method B** only if Method A is not available on your installation. Do not apply both at the same time on the same port.

Method A (Recommended): koha-z3950-responder

Step 1: Enable the Z39.50 responder for your instance

```
sudo koha-z3950-responder --enable <instancename>
```

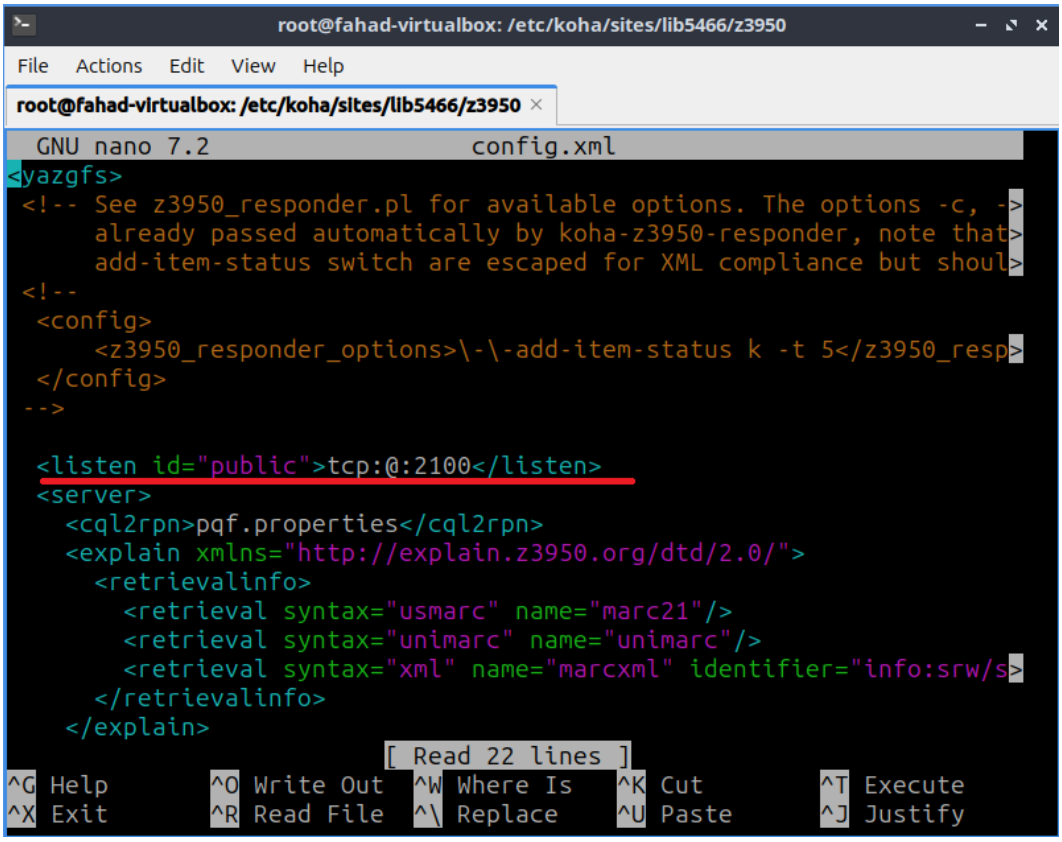
Step 2: Start the Z39.50 server

```
sudo koha-z3950-responder --start <instancename>
```

Step 3: Verify the configuration file

Open the responder configuration and check the listening port:

```
cd /etc/koha/sites/<instancename>/z3950
sudo nano config.xml
```



The line `<listen id="public">tcp:@:2100</listen>` defines the port. The default port is 2100; you may change it if required.

Step 4: Restart the responder if you changed the port

```
sudo koha-z3950-responder --restart <instancename>
```

Step 5: Open the port in the firewall

This step is often missed. Without it, the server works locally but PAKCAT and other libraries cannot connect from outside.

```
sudo ufw allow 2100/tcp
# or, if using iptables:
sudo iptables -A INPUT -p tcp --dport 2100 -j ACCEPT
```

If your server sits behind NAT or a campus/hosting firewall, also open or forward the same port there.

Step 6: Confirm the server is listening

```
sudo ss -tlnp | grep 2100
```

You should see a LISTEN entry on port 2100 (or your custom port).

Method B (Alternative): Classic Zebra publicserver

Add the following block inside `/etc/koha/sites/<instancename>/koha-conf.xml`. Change the highlighted IP address and port number according to your server. Replace `library` in the paths with your own instance name.

```
<listen id="publicserver">tcp:@:2100</listen>
<xi:include href="/etc/koha/zebradb/explain-biblios.xml"
    xmlns:xi="http://www.w3.org/2001/XInclude">
  <xi:fallback>
    <explain xmlns="http://explain.z3950.org/dtd/2.0/">
      <serverInfo>
        <host>YOUR.SERVER.IP.ADDRESS</host>
        <port>2100</port>
        <database>biblios</database>
      </serverInfo>
    </explain>
  </xi:fallback>
</xi:include>

<server id="publicserver" listenref="publicserver">
  <directory>/var/lib/koha/library/biblios</directory>
  <config>/etc/koha/sites/library/zebra-biblios-dom.cfg</config>
  <cql2rpn>/etc/koha/zebradb/pqf.properties</cql2rpn>
  <xi:include href="/etc/koha/marc21-retrieval-info-bib-dom.xml"
      xmlns:xi="http://www.w3.org/2001/XInclude">
    <xi:fallback>
      <retrievalinfo>
        <retrieval syntax="marc21" name="F"/>
        <retrieval syntax="marc21" name="B"/>
        <retrieval syntax="xml" name="F"/>
        <retrieval syntax="xml" name="B"/>
        <retrieval syntax="xml" name="marcxml"
            identifier="info:srw/schema/1/marcxml-v1.1">
          <backend syntax="marc21" name="F">
            <marc inputformat="marc" outputformat="marcxml"
                inputcharset="utf-8"/>
          </backend>
        </retrieval>
        <retrieval syntax="xml" name="dc">
          <backend syntax="marc21" name="F">
            <marc inputformat="marc" outputformat="marcxml"
                inputcharset="utf-8"/>
            <xslt stylesheet="/usr/share/koha/intranet/htdocs/intranet-tmpl/prog/en/xslt/MARC21slim
          </backend>
        </retrieval>
        <retrieval syntax="xml" name="mods">
          <backend syntax="marc21" name="F">
            <marc inputformat="marc" outputformat="marcxml"
                inputcharset="utf-8"/>
            <xslt stylesheet="/usr/share/koha/intranet/htdocs/intranet-tmpl/prog/en/xslt/MARC21slim
          </backend>
        </retrieval>
      </retrievalinfo>
    </xi:fallback>
  </xi:include>
</server>
```

Then add the matching serverinfo block:

```
<serverinfo id="publicserver">
  <ccl2rpn>/etc/koha/zebradb/ccl.properties</ccl2rpn>
  <user>kohauser</user>
```

```
  <password>YOUR_ZEBRA_PASSWORD</password>
</serverinfo>
```

Security note: Do not copy a password from any manual. Use your own Zebra password, which is already present in your instance's koha-conf.xml (look for the existing <serverinfo> block, or check /etc/koha/sites/<instancename>/zebra.passwd).

After saving the file, restart Zebra for this instance:

```
sudo koha-zebra --restart <instancename>
```

Then complete firewall Steps 5 and 6 from Method A for the port you used.

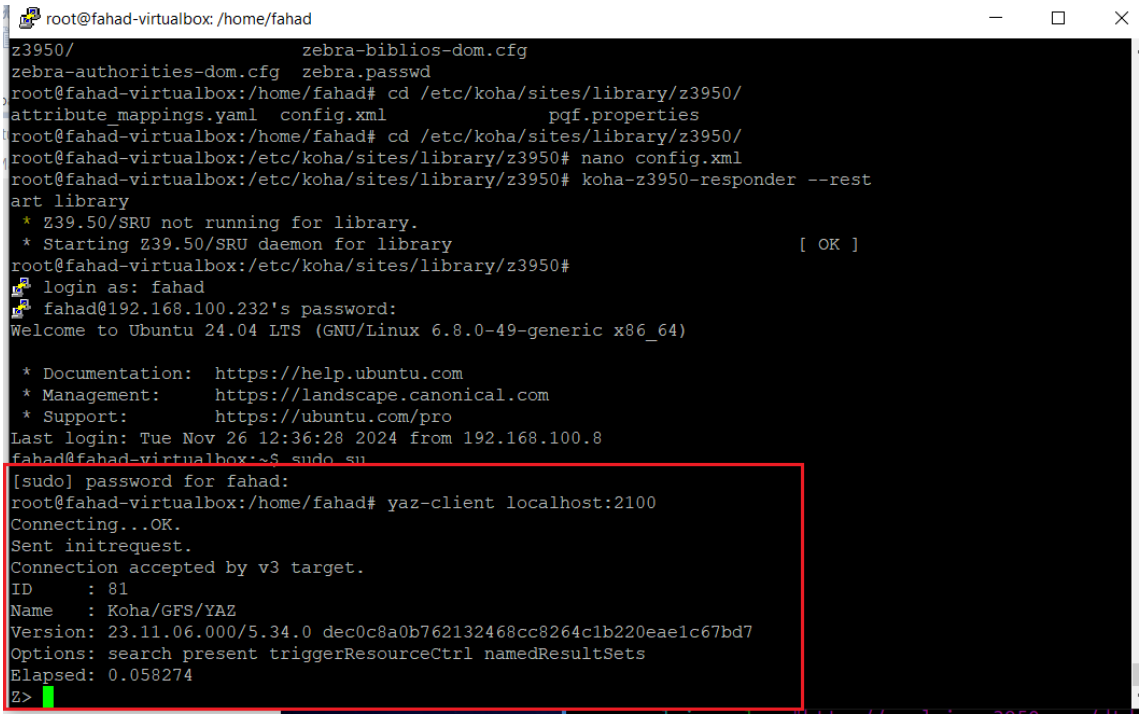
Testing the Z39.50 Server

1. Through the terminal

Type `yaz-client localhost:PORT`, for example:

```
yaz-client localhost:2100
```

If the output looks like the image below (Connecting...OK, connection accepted by v3 target), the Z39.50 server is successfully configured.

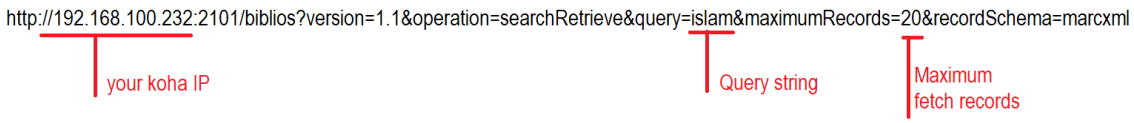


Also test from a different machine using the public IP (`yaz-client YOUR.PUBLIC.IP:2100`) to confirm the firewall is open.

2. Through a web browser (SRU)

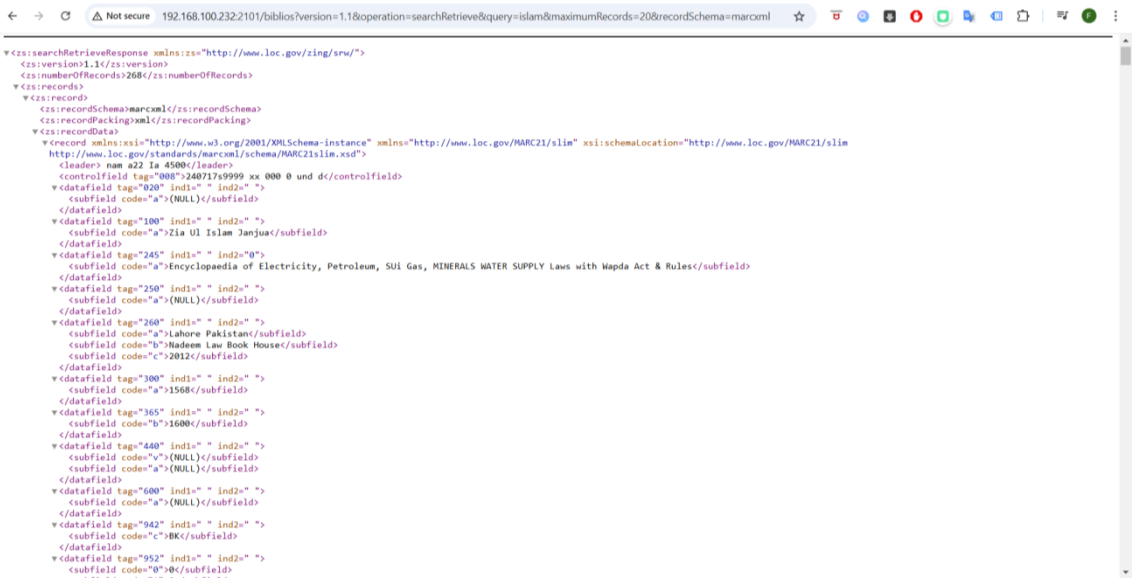
Type in the browser (replace the IP with your Koha server IP; the SRU port is typically the Z39.50 port + 1, e.g. 2101):

```
http://YOUR.SERVER.IP:2101/biblios?version=1.1&operation=searchRetrieve&query=islam&maximumRecords=
```



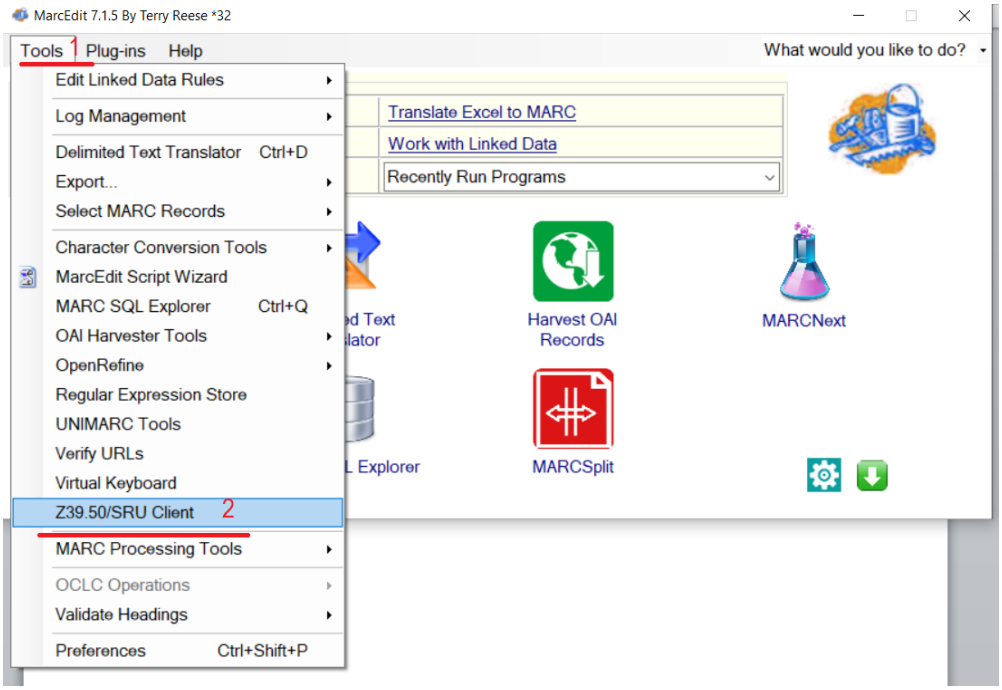
URL parts: your Koha IP, the query string, and the maximum records to fetch.

A successful response returns MARCXML records:

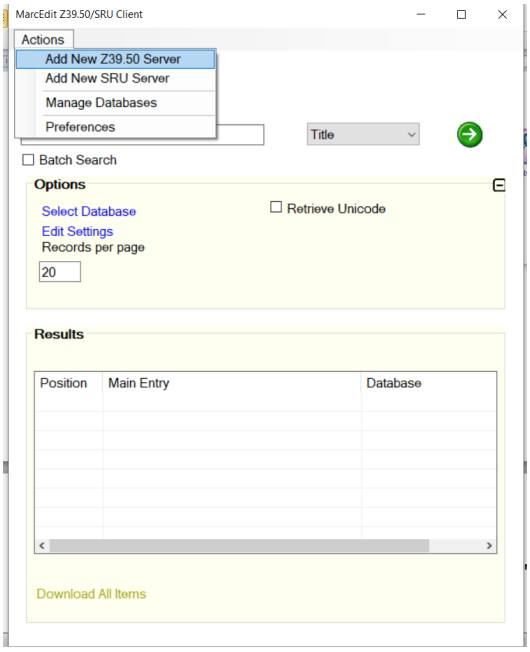

Not secure
192.168.100.232:2101/biblios?version=1.1&operation=searchRetrieve&query=islam&maximumRecords=20&recordSchema=marcxml
<zs:searchRetrieveResponse xmlns:zs="http://www.loc.gov/zing/srw/">
<zs:version>1.1</zs:version>
<zs:numberOfRecords>268</zs:numberOfRecords>
<zs:records>
<zs:record>
<zs:recordSchema>marcxml</zs:recordSchema>
<zs:recordPacking>xml</zs:recordPacking>
<zs:recordData>
<record xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://www.loc.gov/MARC21/slim" xsi:schemaLocation="http://www.loc.gov/MARC21/slim
http://www.loc.gov/standards/marcxml/schema/MARC21slim.xsd">
<leader> nam a22 Ia 4500</leader>
<controlfield tag="008">240717s9999 xx 000 0 und d</controlfield>
<datafield tag="020" ind1=" " ind2=" ">
<subfield code="a">(NULL)</subfield>
</datafield>
<datafield tag="100" ind1=" " ind2=" ">
<subfield code="a">Zia Ul Islam Janjua</subfield>
</datafield>
<datafield tag="245" ind1=" " ind2="0">
<subfield code="a">Encyclopaedia of Electricity, Petroleum, SUi Gas, MINERALS WATER SUPPLY Laws with Wapda Act & Rules</subfield>
</datafield>
<datafield tag="250" ind1=" " ind2=" ">
<subfield code="a">(NULL)</subfield>
</datafield>
<datafield tag="260" ind1=" " ind2=" ">
<subfield code="a">Lahore Pakistan</subfield>
<subfield code="b">Nadeem Law Book House</subfield>
<subfield code="c">2012</subfield>
</datafield>
<datafield tag="300" ind1=" " ind2=" ">
<subfield code="a">1568</subfield>
</datafield>
<datafield tag="365" ind1=" " ind2=" ">
<subfield code="b">1600</subfield>
</datafield>
<datafield tag="440" ind1=" " ind2=" ">
<subfield code="v">(NULL)</subfield>
<subfield code="a">(NULL)</subfield>
</datafield>
<datafield tag="600" ind1=" " ind2=" ">
<subfield code="a">(NULL)</subfield>
</datafield>
<datafield tag="942" ind1=" " ind2=" ">
<subfield code="c">BK</subfield>
</datafield>
<datafield tag="952" ind1=" " ind2=" ">
<subfield code="0">0</subfield>

3. Through MarcEdit 7.15

- Open the application.
- Go to **Tools** from the top menu bar and select **Z39.50/SRU Client** as shown below.

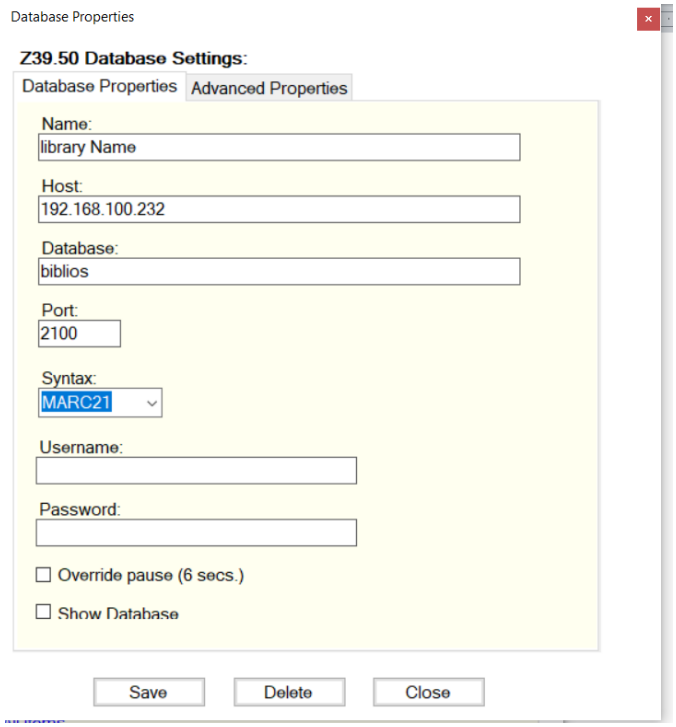


- Click **Actions** from the top menu bar and select **Add New Z39.50 Server**.

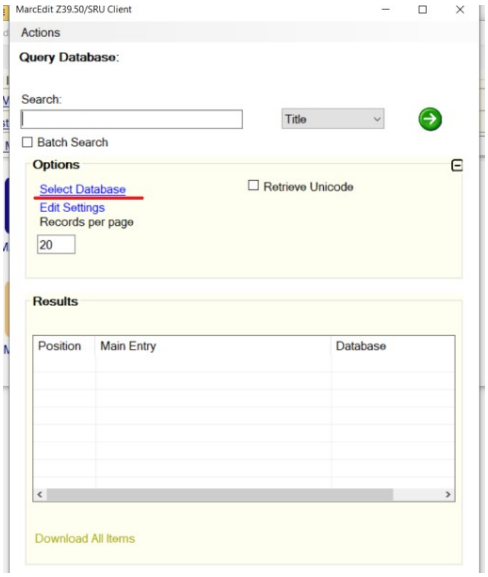


- Enter the following details, then click **Save**:

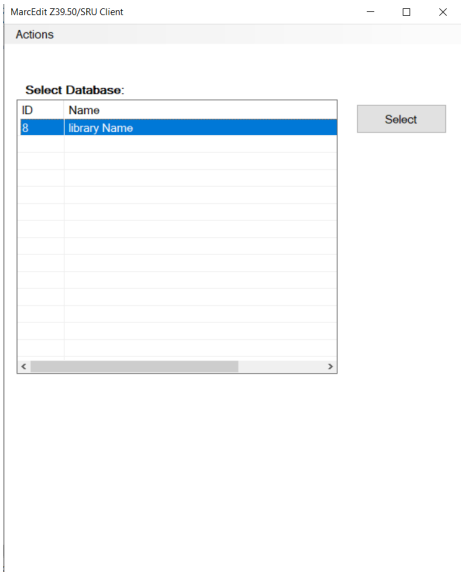
Name: your library name | Host: your server IP | Database: `biblios` | Port: `2100` | Syntax: MARC21. Username and Password stay empty for a public server.



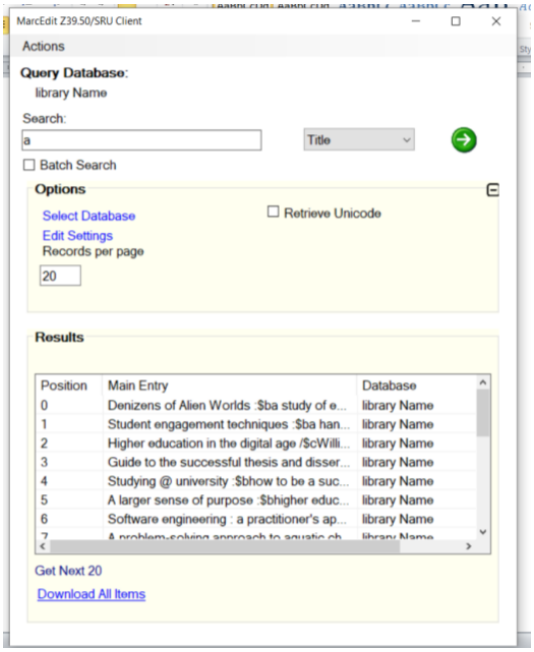
- Click on **Select Database**.



- Select your library from the list.



- Then search anything on the given interface. If results appear, your server is working correctly.



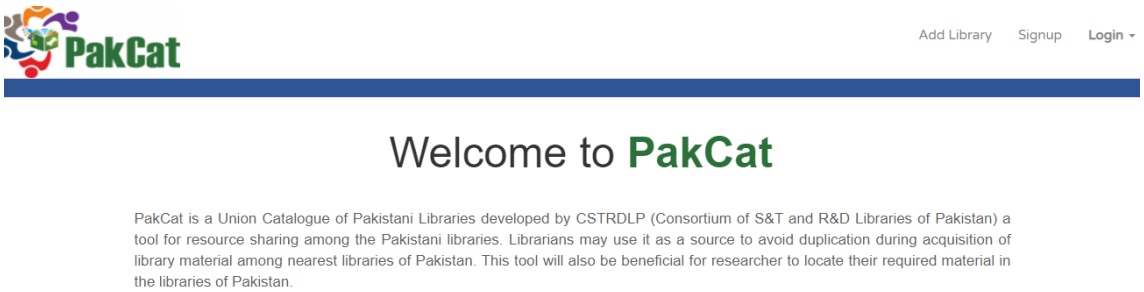
SOP for Adding a Library to PAKCAT

Once your Z39.50 server is running and reachable on a public IP, register the library on PakCat, the Union Catalogue of Pakistani Libraries developed by CSTRDLP. Librarians can use it to avoid duplication during acquisition and researchers can locate material across libraries of Pakistan.

Step 1: Open the following link

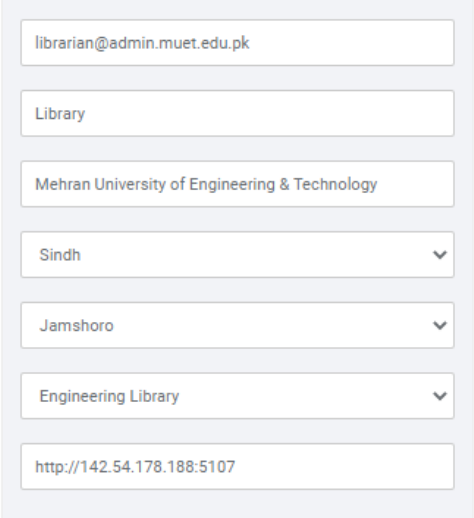
```
http://pakcat.pastic.gov.pk/
```

The screen will look like below.



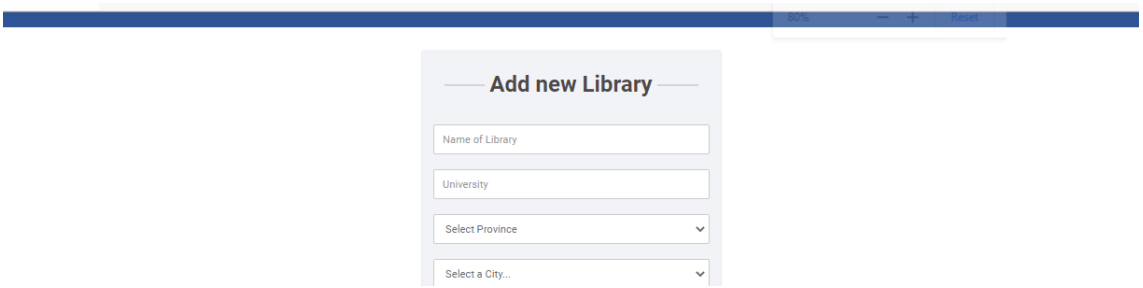
Step 2: Click on "Add Library" in the top right corner

The following form will open.

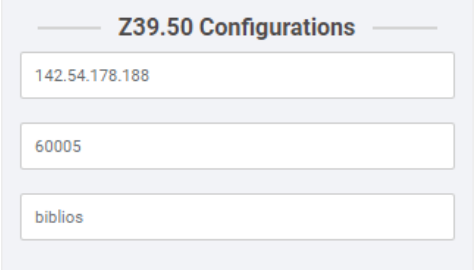


Step 3: Fill in the form as shown in the example below

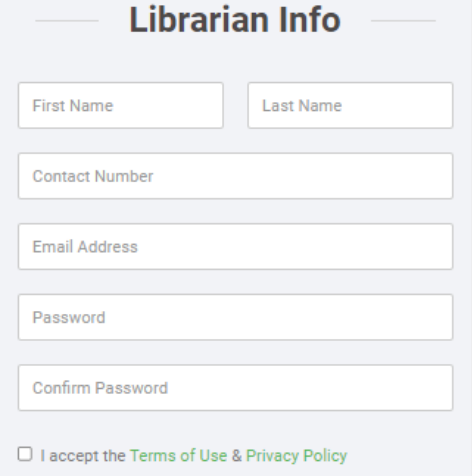
Example (Mehran University of Engineering & Technology): librarian email, library name, university, province, city, library type, and the OPAC/catalogue URL.



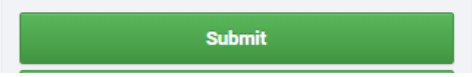
In the **Z39.50 Configurations** section, enter your public IP, the Z39.50 port you opened earlier, and the database name `biblios`:



Fill in the **Librarian Info** section (name, contact number, email, password) and accept the Terms of Use & Privacy Policy:



Step 4: Click on the Submit button



Step 5: Activation and verification

After submission, the request is reviewed by the PASTIC/PakCat team, who will verify that your Z39.50 endpoint is reachable before activating the library on the union catalogue. Keep the Z39.50 service running at all times so that records remain searchable.

Quick Troubleshooting

Problem	Likely cause / fix
yaz-client works on localhost but not from outside	Port not open in firewall/router. Open the port (Step 5, Method A) and confirm with an online port checker.
Connection refused on localhost	Responder not running. Run: sudo koha-z3950-responder --start <instancename>
Search connects but returns no records	Zebra index empty or stale. Run: sudo koha-rebuild-zebra -f -v <instancename>
Changed port but old port still in use	Restart the responder (Method A) or Zebra (Method B) after editing the configuration.

For assistance with Z39.50 setup or PakCat registration, contact: **Nabi Bux, Web Manager, PASTIC** – webmaster@pastic.gov.pk