Qizx/open User's Guide

Qizx/open 1.1

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Note: this document introduces applications distributed with Qizx/open. It is important to remember that because Qizx/open is above all a *library*, these applications are just *examples* of how Qizx/open can be used. Their source code is available and may be extended by users and application developers.

1. Installation

1.1. Requirements

- Java Runtime Environment 1.4.2 or above.
- Memory and processor: this depends on the size of XML documents and the expected performances. Qizx/open can handle very large documents (over 100Mb) with a relatively low memory footprint: about 2.5 times the size of the XML entity in bytes, which means that a 100 Mb document needs about 250 Mb in memory. On a Pentium 4 at 3 MHz, Qizx/open can parse documents at a speed of 8 Mb per second or more.

1.2. Installing on Windows

Qizx/open is supported on Windows XP and 2000.

The installation of Qizx/open on Windows is currently manual. It will be replaced by an installer in future versions.

1. Unpack the Zip archive in a suitable place, namely C:\Program Files: this should create a subdirectory such as qizxopen-1.0 .
2. Executable scripts (e.g. qizxopen_studio.bat or qizxopen_batch.bat) are found in the sub-directory bin. This sub-directory can be added to your PATH environment variable.

1.3. Installing on Unixes

Qizx/open should run on any Unix system supporting the JRE version 1.4.2 +.

The installation of Qizx/open is manual:

1. Unpack the Zip archive in the desired place: this should create a subdirectory such as qizxopen-1.0 .
2. Executable shells (e.g. qizxopen_studio or qizxopen_batch) are found in the sub-directory bin. This sub-directory can be added to your PATH environment variable.

1.4. Contents of the distribution directory

LICENSE.txt	License file. (Mozilla Public License)
docs	Documentation. Contains both PDF and HTML versions of documents. See index.html for details.
bin	Contains launcher scripts for several Qizx/open applications: (.bat extension on Windows). These applications are documented below. • **qizxopen_studio**: graphical interface. • **qizxopen_batch**: batch execution of XQuery scripts. • **qizxopen_server**: XQuery server accessible from remote clients (uses Java RMI).
lib	Main library jar of Qizx/open: qizxopen.jar. Executable with java -jar or by double-click on Windows. Jar for Qizx/open studio: qizxopen_studio.jar. Executable with java -jar or by double-click on Windows. Auxiliary jars: Sun's XML catalog resolver resolver.jar
config	A place for Java resources used by applications (part of classpath). By default contains XML catalogs and DTDs for XHTML et Docbook.
examples	miscellaneous examples and demos.
xqsp	XQuery Server Pages: a J2EE Servlet which runs XQuery scripts directly, bundled with demos. Contains a Ant build file to create the *war* archive.
src	Source code. Contains a Ant build file allowing to recompile Qizx/open. For XQuest, available only with a special license.

1.5. Rebuilding Qizx/open

Qizx/open's XQuery engine and applications are provided with source code (Note: in contrast, the database engine in the commercial version is not open-source).

With little effort, it is possible to recompile the provided source.

1. Using Eclipse (http://www.eclipse.org):

   the structure of the distribution makes it easy to build an Eclipse project.

   - Requirements: Eclipse 3+ and a JSDK 1.4.2+
   - Assuming that you have installed Qizx/open, use Eclipse's menu "New Java Project", give it -for example- the name Qizx/open.

     Then select "Build from existing source" and browse to Qizx/open's distribution.

     Then use button "Next" (*Not* "Finish")
   - On the next page (Java Settings), change the output folder to **build** (*not* **bin**, otherwise the existing contents of **bin** would be deleted).

The jars in lib should be visible in the Source tab.

- Then click Finish and you should obtain a ready Eclipse project.

2. Using Ant.

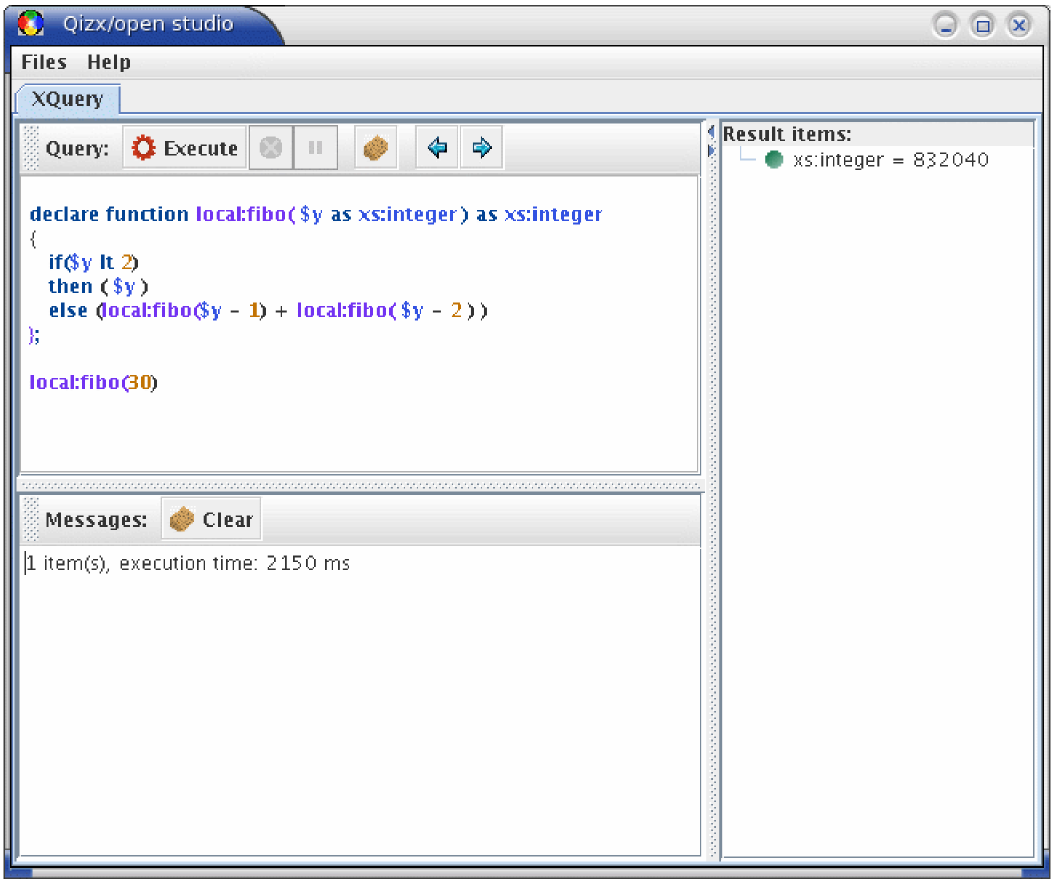
   If you have Ant installed, go to the **src** directory of Qizx/open and type the command "ant", which should compile the sources to a **build** directory at the same level as **src** and **bin**.

In both cases, the scripts in bin should work with the recompiled version (they have **build** in their classpath), so you do not need to edit these scripts.

2. Qizx/open Studio

This is a GUI that allows editing and running of XQuery scripts. In Qizx/open, the purpose is mainly XQuery experimenting and training.

Figure 1. A screenshot of Qizx/studio (Java 5 / Linux look-and-feel)



```
declare function local:fibo( $y as xs:integer) as xs:integer
{
  if($y lt 2)
  then ( $y )
  else (local:fibo($y - 1) + local:fibo( $y - 2 ))
};

local:fibo(30)
```

```
xs:integer = 832040
```

```
1 item(s), execution time: 2150 ms
```

Description of the GUI:

There are two main tabs:

1. *Query tab*: this is a query execution facility. It is composed of 4 areas:

   a. **Query editor:** a XQuery script can be typed here. The editor will perform syntax highlighting.

      It is possible to save the current query into a file, or to load a query from a text file.

The editor also manages a history of executed queries. The two blue arrows navigate in the history. Note: the history is currently not saved at the end of the session.

b. **Execution tool bar**: the "Execute" button runs the edited query. The red "Stop" button aborts the execution.

   The yellow "Pause" button suspends the execution. Once suspended, it becomes green, meaning "Resume".

c. **Message area**: compilation and execution errors are displayed here. It can be erased with the "Clear" button.

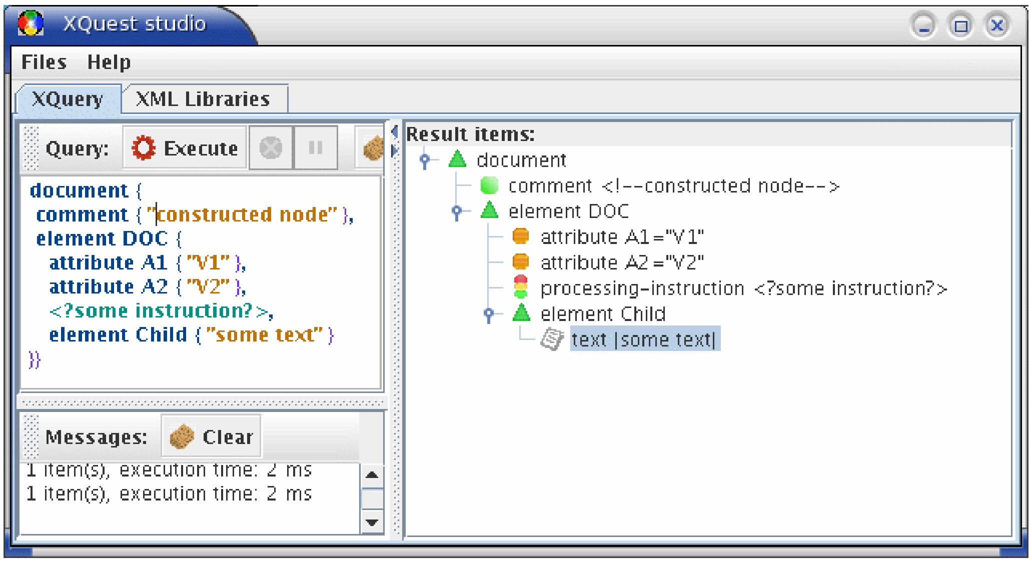
d. **Result area**: displays the results returned by the evaluation of a query. Results are displayed in a tree view:

   - Simple result items are displayed with their type
   - Node items are displayed as a tree structure (not as serialized XML): the nodes of the structure can be expanded and are displayed with different icons according to their type: green triangle for Elements, orange circle for Attributes etc. Example:

2. *XML Library browser*: (absent in Qizx/open): when XQuest studio is connected to a XML Library Server (either remote or embedded), this tab allows you to browse :

   - the XML Libraries managed by the server,
   - the Collections contained in each XML Library,
   - the XML Documents inside Collections.

Figure 2. An example of query execution with Node-type result.



```
document {
 comment { "constructed node" },
 element DOC {
   attribute A1 { "V1" },
   attribute A2 { "V2" },
   <?some instruction?>,
   element Child { "some text" }
}}
```

```
1 item(s), execution time: 2 ms
1 item(s), execution time: 2 ms
```

```
document
  comment <!--constructed node-->
  element DOC
    attribute A1="V1"
    attribute A2="V2"
    processing-instruction <?some instruction?>
    element Child
      text |some text|
```

Option switches

As for other Qizx/open applications, Qizx/open studio can be executed with command-line options:

-server registry_name
connect to a remote server (registry_name: simple name if local registry, or `//host[:port]/name`)

-remote
shorthand for: -server 'XQuestServer'

-secrets <properties_file>

Specifies a file that contains connection "secrets" for a user, i.e. the login name(s) and password(s) for XML Libraries, and possibly a password for the cluster. The logins and passwords are directly taken from this file, thus saving you retyping passwords for each session.

The file has the format of a Java .properties file. This file should of course be *properly protected from unauthorized access*, because it stores passwords *in clear form*.

Recognized properties are:

- **xxx.login** : where xxx is the name of a XML Library; specifies a login for that particular library.
- **xxx.password** : where xxx is the name of a XML Library; specifies a password for that particular library.
- **login** : specifies a default (or fallback) login, which is used if no specific 'login' property is specified for a library. So if all libraries of a cluster have the same logins and passwords, this property (and 'password') are sufficient.
- **password** : specifies a default (or fallback) password for all libraries.
- **server-password**:a password for the cluster.

Example: use **-secrets mysecrets.properties**, the contents of mysecrets.properties being the following:

```
# login for library 'mainlib':
mainlib.login=me
mainlib.password=mypass1
# default login for other libraries:
login=meagain
password=otherpass
# allows me to manage the cluster:
server-password=spass
```

-docbase <path>

define base URI for locating parsed XML documents

-modbase <path>

define base URI for locating XQuery modules

-input <URI>

URI of a document used as default input or by XQuery function input().

-xinput <fragment>

a XML fragment used as default input or by XQuery function input().

-Cname=value

specify a server connection property (e.g. username and password).

-Dvariable_name=value

initialize a XQuery global variable.

-- *(double dash)*

pass all following arguments to XQuery expressions: arguments are available in variable '$arguments', which is a sequence of strings.

-Xoption=value

set a XML serialization option. (See serialization documentation). For example -Xmethod=xhtml.

-timezone *duration*

Defines the *implicit timezone* in the dynamic XQuery context. The value must be in xs:duration form, for example -timezone -PT5H.

-collation *uri*

Defines the default collation for string comparisons.

Collations are supported through Java collators. The URI of a collation follows the Java convention for locales: for example "en" or "fr-CH" can be used as collation URIs. A collation URI can be followed by a "fragment" or "reference" that has the value "primary", "secondary" or "tertiary", defining the "strength" of the collator (see the Java documentation for more details).

For example, the expression `contains("The next café", "CAFE", "en#primary")` should return `true`, because the collation with strength `primary` ignores case and accents.

The special URIs `codepoint` and "`http://www.w3.org/2003/05/xpath-functions/collation/codepoint`" refer to the basic Unicode codepoint matching (or absence of collation). This is the default collation.

-ext <full.class.name>

Authorize specifically this class as a Java extension. Attention: using this switch enables extension control: all classes used as extensions must then be explicitly authorized.

-doc.cache <size_in_Kb>

define the parsed document cache size (default 8 Mb).

-tex

verbose display of exceptions

3. Command Line applications

The purpose of these tools is to run XQuery scripts in batch mode. For learning XQuery or getting accustomed with Qizx/open, it is recommended to use Qizx/open Studio, the GUI Tool.

3.1. Batch XQuery execution

qizxopen_batch is a command-line application of Qizx/open. Its purpose is to run XQuery scripts in batch mode.

This tool is launched by the **qizxopen_batch** wrapper scripts found in sub-directory `bin` (`bin\qizxopen_batch.bat` on Windows and `bin/qizxopen_batch` on Unixes).

Usually the tool will be run with an argument which is the path of a script file:

```
> qizxopen_batch myquery.xq
```

This tool can also be invoked without argument: it starts in interactive mode.

```
> qizxopen_batch
Qizx/open 1.0
[interactive mode]
Query ?
```

It can also be invoked by running directly from the executable xquest Jar archive:

```
java -jar qizxopen.jar arguments...
```

To get help on option switches:

```
qizxopen_batch -help
```

Option switches

-server registry_name

connect to a remote server (registry_name: simple name if local registry, or `//host[:port]/name`)

-remote

shorthand for: -server 'XQuestServer'

-secrets <properties_file>
Specifies a file that contains connection "secrets" for a user, i.e. the login name(s) and password(s) for XML Libraries, and possibly a password for the cluster.

Similar to xquest_studio, see details above.

-input <URI>
URI of a document used as default input or by XQuery function input().

-xinput <fragment>
a XML fragment used as default input or by XQuery function input().

-docbase <path>
define base URI for locating parsed XML documents

-modbase <path>
define base URI for locating XQuery modules

-Cname=value
specify a server connection property (e.g. username and password).

-D*variable_name*=*value*
Defines the value of a global variable. For example if the variable is declared like this:

```
declare variable $output external;
```

then the option -Doutput=foo initializes $output with the string value "foo".

If the variable is declared with a type, an attempt to cast the string value to the declared type is made.

If the variable is declared with an initial value, this value is overridden.

-- ...
The double dash switch is used to pass command-line arguments to a XQuery script. It stores all following command-line tokens into the predefined variable $arguments.

-*Xoption*=*value*
Defines a serialization option for result output. For example -Xmethod=html produces results in HTML markup.

-out *file*
output to a file (defaults to standard output)

-serial
Direct evaluation and serial output (more efficient mode, no tree construction): the query must evaluate as a well-formed document.

-timezone *duration*
Defines the *implicit timezone* in the dynamic XQuery context. The value must be in xs:duration form, for example -timezone -PT5H.

-collation *uri*
Defines the default collation for string comparisons.

Collations are supported through Java collators. The URI of a collation follows the Java convention for locales: for example "en" or "fr-CH" can be used as collation URIs. A collation URI can be followed by a "fragment" or "reference" that has the value "primary", "secondary" or "tertiary", defining the "strength" of the collator (see the Java documentation for more details).

For example, the expression `contains("The next café", "CAFE", "en#primary")` should return `true`, because the collation with strength `primary` ignores case and accents.

The special URIs `codepoint` and "`http://www.w3.org/2003/05/xpath-functions/collation/codepoint`" refer to the basic Unicode codepoint matching (or absence of collation). This is the default collation.

-wrap

wraps the displayed results in description tags. For example with -wrap the expression 1, "a" would display:

```
Query ? 1, "a"
<?xml version='1.0' encoding='UTF-8'?>
<query-results>
  <item type="xs:integer">1</item>
  <item type="xs:string">a</item>
</query-results>
```

instead of:

```
Query ? 1, "a"
1 a
-> 2 item(s)
```

-q

Quiet mode: do not display evaluation times.

-jt

trace load and use of Java extension functions (for debugging).

-tex

verbose display of run-time exceptions (for debugging).

3.2. XQuery Server

The purpose of this application is to provide a XQuery server remotely accessible by clients. It is meaningful mainly for XQuest, so that a XML Library can be queried from different machines.
However Qizx/open can also work as a server: although it can only use parsed documents stored in memory and has no indexes, it can still be quite effective for small applications.

Of course, running in server/client mode is less efficient than using an embedded XQuery engine. It is recommended to minimize exchanges between client and server by executing most of the work on the server and only retrieving final results in the client. The Java API allows to retrieve XML results efficiently as serialized XML text or as trees.

Running Qizx/open in Server/Client mode

The following steps are required:

1. Ensure that rmiregistry is running: Qizx/open server works with Java RMI. The RMI registry is used by clients to locate the desired server by its name.

   Caution: the Java 5.0 registry can crash unpredictably on some platforms. It is recommended to use the 1.4 registry.

2. The server is launched by the **qizxopen_server** wrapper script found in the `bin` sub-directory (`bin\qizx-open_server.bat` on Windows and `bin/qizxopen_server` on Unixes).

   - The server binds to a name in the rmi registry. This name is used by the clients to connect to the server.

     The name can be defined with the -name option when launching the server. By default it is "XQuestServer".

   The maximal memory size for the server is by default 512 Mb, it may be customized by modifying the script.

3. The clients (Qizx/open studio or Qizx/open batch) can then connect to the server by specifying a command-line option `-server server_name` (or the shorthand `-remote` which uses the default "XQuestServer").

Option switches

-name <name>
: define the server name in the rmi registry. A registry on a remote host can be specified in the form: -name `//registry_host[:registry_port]/name`.

-port <port>
: define the server port.

-docbase <path>
: define base URI for locating parsed XML documents

-modbase <path>
: define base URI for locating XQuery modules

-timezone *duration*
: Defines the *implicit timezone* in the dynamic XQuery context. The value must be in xs:duration form, for example -timezone -PT5H.

-collation *uri*
: Defines the default collation for string comparisons.

  Collations are supported through Java collators. The URI of a collation follows the Java convention for locales: for example "en" or "fr-CH" can be used as collation URIs. A collation URI can be followed by a "fragment" or "reference" that has the value "primary", "secondary" or "tertiary", defining the "strength" of the collator (see the Java documentation for more details).

  For example, the expression `contains("The next café", "CAFE", "en#primary")` should return `true`, because the collation with strength `primary` ignores case and accents.

  The special URIs `codepoint` and "`http://www.w3.org/2003/05/xpath-functions/collation/codepoint`" refer to the basic Unicode codepoint matching (or absence of collation). This is the default collation.

-jt
: trace load and use of Java extension functions (for debugging).

-tex
: verbose display of run-time exceptions (for debugging).