Open Object Rexx™

Release Notes
Version 4.0.0

April 15, 2009

1. About The 4.0.0 Release

Open Object Rexx Version 4.0.0 is based on the previous version of ooRexx™ (3.2.0). Version 4.0.0 has both enhancements and bug fixes.

IMPORTANT: If you have a version of IBM Object Rexx™ installed on your system, you must remove it before starting with the installation of this package. The two packages, Object Rexx and ooRexx can not be installed side-by-side.

Note that an *upgrade* type installation is not supported on any platform. If a previous version of ooRexx is installed, it should be completely uninstalled prior to installing 4.0.0. Failure to completely uninstall the previous version will produce unpredictable results.

On a Unix-like system use the appropriate package manager to uninstall the previous version. For instance, on Linux with a rpm install, you could use the command:

```
rpm -iv ooRexx
```

to uninstall ooRexx. On a Debian-based system you could use the `-r` or the `-P` option of `dpkg` to uninstall ooRexx:

```
dpkg -P ooRexx
```

On Windows, when the installation program is started, the installer will recognize that a previous version is installed. It will then present an option to uninstall the previous version before proceeding with the 4.0.0 install. Alternatively, you can completely uninstall the previous version prior to starting the 4.0.0 installation.

1.1. New in this Release

This section describes the changes and enhancements introduced since Open Object Rexx 3.2.0.

You should refer to the CHANGES document accompanying the release for a complete list of the changes and bug fixes. In addition, there is a ReleaseNotes document that contains essentially the same information as this section, but in a text format. These documents are accessible from the *Notes* icon on the SourceForge download page for each ooRexx release. They are also included in the source code for ooRexx when SourceForge is not used.

1.1.1. New Platforms

The code base for the intrepreter has been reworked so that the executables and libraries can be compiled in 64-bit mode. The interprer and external function packages that ship with the interpreter have been built and tested on the following operating systems:

- Linux 64-bit
- AIX 64-bit
- Windows 64-bit

1.1.2. All Platforms

Although not directly visible to the ooRexx programer, much of the code in the interpreter core has been rewritten. This enhances the interpreter in several ways, not the least of which is the ability to compile the interpreter in 64-bit addressing mode. In addition, the rewritten interpreter is now more maintainable and extensible.

For 64-bit mode systems strings larger than 999,999,999 bytes can be created and manipulated.

A new, improved, set of application programming interfaces (APIs) have been added. The programmers guide has been updated accordingly. Although these utilize C++, they are extremely easy to use. All of the external function libraries have been upgraded to use these new APIs.

REXX_PATH (new in 4.0) is an additional path you can set that is used for Rexx program searches.

A new utility class, the Socket class, has been added. New samples are included in the distribution:

- `samples/scclient.rex`
- `samples/scserver.rex`
- `samples/sfclient.rex`
- `samples/sfserver.rex`

1.1.3. Unix Platform

Rxapi now runs as a system wide daemon. The use of shared memory has been eliminated. Rxapi now uses a socket interface for communication.

1.1.4. Windows Platform

Improvements have been made both to ooDialog and OLEObject.

The documentation of the Windows specific classes has been moved out of rexxref to the new document: winextensions.pdf.

1.1.4.1. New Samples

The following new samples are included in the distribution:

- `samples\oodialog\examples\imageButton.rex`
- `samples\winsystem\displayAnyMenu.rex`
- `samples\winsystem\displayWindowTree.rex`
- `samples\winsystem\getTheWindow.rex`
- `samples\winsystem\menuCalc.rex`
- `samples\winsystem\menuNotepad.rex`
- `samples\winsystem\quickCalc.rex`
- `samples\winsystem\quickShowAllMenus.rex`
- `samples\winsystem\windowsSystem.frm`
- `samples\winsystem\winSystemDlgs.h`
- `samples\winsystem\winSystemDlgs.rc`
- `samples\winsystem\writeWithNotepad.rex`
- `samples\misc\fileDrop.rex`

1.1.4.2. Installation Program

The Windows installation program has be enhanced so that it will only remove files installed by the ooRexx package. Files added to the installation directory by the user will no longer be deleted when ooRexx is uninstalled. This behavior will be in effect for the uninstallation of ooRexx 4.0.0 and future versions of ooRexx, there is no change in the 3.2.0 uninstallation. When a 3.2.0, or earlier, version of ooRexx is uninstalled, all files in the installation directory are deleted.

The installation program now correctly sets up the .rex file associations when run with non-Admin privileges. Note however, it is still advised to always run the installation and un-installation program using Admin privileges.

The installation program now sets up Rexx program files with the .rex extension as drop handlers. When a file is dropped on the icon for a Rexx program, the Windows Shell executes the program and passes the complete file name path as the argument to the program.

1.1.4.3. ooDialog

Documentation

Restructuring of the ooDialog reference has started. Some areas have been reviewed for accuracy and corrected / clarified where needed. Anyone using ooDialog is urged to at least read chapter 2, section 4 (2.4) which attempts to provide some information on the future direction of ooDialog.

New Classes

- DlgUtil
- Point
- Rect
- Size
- Image
- ImageList
- ResourceImage

Enhanced Classes

The following existing classes have been reviewed for correct behavior and enhanced to provide all the functionality of the underlying Windows control, as of Windows XP. In essence this entails allowing the control to be created with all of the control styles, providing a way to send all of the messages the control accepts, providing a way to receive all of the event notifications that the control sends.

- ButtonControl and subclasses
- StaticControl
- ProgressBar

The above classes all have new methods and new control styles to use when dynamically creating the control. The button and static controls have new event notifications that can be connected to the dialog. (ProgressBar controls do not send notifications.)

Other New Methods

The following new methods have been added to various classes in the ooDialog framework. Check the index in the ooDialog reference for which class the methods applies to. The list is in no particular order, although related methods are, somewhat, grouped together.

- setItemSysColor(), setSysColor()
- getExStyleRaw()
- getTextSizeScreen(), getTextSizeDlg()
- getFont(), createFontEx()
- setDefaultFont(), getFontName(), getFontSize() (Class methods.)
- fontName(), fontSize() (Attributes.)
- addStatic(), addImage(), getGroupBox()
- addEtchedFrame(), addEtchedHorizontal(), addEtchedVertical()
- connectStaticNotify()

- setImageList(), getImageList() (For several classes.)
- getColumnCount(), getColumnOrder(), setColumnOrder()

1.1.4.4. Windows Scripting Host (WSH)

Note: The Windows Scripting Host support in ooRexx 4.0.0 has been temporarily disabled in this release. This was done after soliciting input from users. Temporarily disabling WSH allows the release of 4.0.0 to be months sooner than it would have been otherwise. The consensus of users was that they would prefer an early release without WSH, than a later release with WSH. The intent is to deliver WSH as soon as possible in a follow-on minor release.

1.1.5. Some possible differences in program behavior

Files loaded by ::requires are loaded by a global package manager, and a given file will only be loaded once in a process. This means multiple programs referring to a ::requires file will be accessing a single set of created classes and routines rather than each ending up with a unique set.

Due to a bug in prior releases of ooRexx and Object Rexx, a negative return code from a Rexx program could be transformed to a positive return code to the operating system. This bug is now fixed.

Due to a bug in prior releases, methods created with ::METHOD ATTRIBUTE or ::ATTRIBUTE did not properly recognize the GUARDED status of methods. All attribute methods behaved as though they were UNGUARDED. This bug has been fixed. **Note**, if you have ooRexx programs that use concurrency and attributes, that hang under 4.0.0, this is the first area to check. It may be that your program is written incorrectly and previously only worked because of the bug. You may have an attribute defined as GUARDED that should be UNGUARDED. Remember that GUARDED is the default if neither GUARDED nor UNGUARDED is specified.

The RxFuncAdd now checks that a registered function can be resolved at registration time and will return a failure if it cannot. This is how many believed it worked originally.

Some returns from the rxMath package were not consistent. As an example, on Windows, NaN (Not a Number) was returned as the string "ERROR" while on Linux the string "nan" was returned. This was fixed so that the string "nan" is returned on all platforms.

On all platforms, +infinity and -infinity are now returned as strings "+infinity" and "-infinity".

1.1.6. Miscellaneous Enhancements

A method that is declared PRIVATE has been enhanced to allow its invocation from any of the following situations:

1. From within a method owned by the same class as the target (i.e., the method is invoked using SELF.) This is the same as ooRexx-3.2 and before.
2. The caller is an instance of the same class that defined the target method (the method's scope). This allows an instance of a class to invoke a private method of another instance of the same class.

3. The caller is a class object that is compatible with the scope of the method. This allows class objects to also access private methods of its own instances. This is useful for specialized class methods that create instances(such as the "fromXxxxxx" methods on DateTime).

`EXTERNAL` is allowed on `::ATTRIBUTE`, `::METHOD`, and `::ROUTINE` directives.

`LIBRARY` allowed on `::REQUIRES` to load external libraries

Two new directives are added - `::CONSTANT` and `::OPTIONS`.

The stream class supports files larger than 4Gb (on both 32-bit and 64-bit platforms).

Builtin functions

- FILESPEC has new options : Location, Extension.
- LASTPOS has a new parameter : length.
- POS has a new parameter : length.
- QUALIFY is new builtin function.
- TIME has a new option : Offset.
- TRANSLATE has new parameters : pos, length.

New classes

- Buffer
- IdentityTable
- Orderable
- Package
- Pointer
- RexxContext
- Routine
- WeakReference

New methods for the Object class

- send
- sendWith
- startWith

New methods for the DateTime class

- offset
- toTimeZone
- utcDate
- utcIsoDate

DateTime also supports a timezone offset on class methods that create new DataTime instances.

New method for the Method class

- package

New methods for the MutableBuffer class

The MutableBuffer class has been enhanced so that it has most, if not all, of the methods of the String class.

New methods for the OLEObject class

- addEventMethod
- connectEvents
- disconnectEvents
- isConnectable
- isConnected
- removeEventHandler
- removeEventMethod

New methods for the RexxQueue class

- empty
- makeArray
- exists
- open

New method for the Stem class

- toDirectory

New method for the String class

- replaceAt

2. Windows Requirements, Installation and Configuration

2.1. Hardware Requirements

- Approximately 38 MB free disk space is needed for a complete installation.
- 8 MB free disk space for the core interpreter.
- 22 MB free disk space for online documentation.
- 7 MB free disk space for all samples.
- 1 MB free disk space for the API headers and libraries.
- IBM-compatible, Pentium or AMD processor, or higher. Both 32-bit and 64-bit processores are supported.

2.2. Software Requirements

- Windows 2000
- Windows 2003
- Windows XP
- Windows Vista

ooRexx version 4.0.0 is not supported on Windows prior to Windows 2000. There is no known reason why this version of ooRexx will not work on Windows NT(R) 4.0, but it has not been tried. Likewise, ooRexx may work on Windows 98 or Windows Me, but there is no support for it.

It is likely that ooRexx version 4.0.0 will work on Windows Server 2008, however it has not been tested.

2.3. Installation and Configuration Information

2.3.1. Pre-Installation Notes

Open Object Rexx cannot coexist with IBM Object REXX. If IBM Object REXX is installed on the system you must first uninstall it.

If a previous version of ooRexx is installed, you *should* uninstall it. If two different versions of ooRexx are installed on the same system, the results are not predictable and the interpreter will *not* work correctly. You could install over the top of the existing installation, but that is not recommended.

A previous version of ooRexx can be uninstalled before starting the new installation. However, the uninstall does not have to be done as a separate step. When the installation program is started it will detect a previous version of ooRexx and offer to uninstall it at that time.

`rxapi` is an important part of ooRexx that runs as a daemon process. The installation program offers the option of installing `rxapi` as a Windows Service. Unless you are a knowledgable user, with a good reason not to, you should elect to install `rxapi` as a Windows Service.

ooRexx should be installed by a user with adminstrator rights. On Vista this is a requirement. It is also a requirement in order to install rxapi as a service. In addition, there are several installation steps that can only be performed with adminstrator rights. They are:

1. The subdirectory that ooRexx is installed into is added to the System PATH environment variable.
2. The environment variable REXX_HOME is set for all users.
3. The file type (ftype) `REXXScript` is defined for the interpreter executable and the file extension `.rex` is assoicated (assoc) with the `REXXScript` file type.
4. The file extension `.rex` is added to the System PATHEXT environment variable.
5. On Windows 2003 / Windows XP, and later, if the installation program is run without administrator rights, ooRexx can not be installed to its default location in `\Program Files\`.

   Note: On Vista when a user starts the installation program, the user is prompted for an administrator password to continue. It is not necessary to actually be logged in as administrator when the installation is started.

It is important that if ooRexx is installed by a user with administrator rights, that ooRexx is uninstalled by a user with administrator rights. Otherwise, the installation steps described above, including removal of rxapi as a service, will not be undone when ooRexx is uninstalled.

ooRexx is compiled both as 32-bit application and as a native 64-bit application. The native 64-bit application can not be installed on a 32-bit version of Windows. Either the 32-bit or the 64-bit ooRexx can be installed on a 64-bit version of Windows . However, to take full advantage of both the operating system and ooRexx, the user should install the 64-bit version of ooRexx on a 64-bit version of Windows. The installation programs for the two types of ooRexx are clearly labeled: `ooRexx400-1-x86_32.exe` and `ooRexx400-1-x86_64.exe`.

2.3.2. Running the Installation Program on Windows

Before starting the installation, review the pre-installation notes if you have not already done so.

The ooRexx installation program is a typical Windows installation program. Download the installation program for your operating system. From Windows Explorer double-click the appropriate installation package: `ooRexx400-1-x86_32.exe` or `ooRexx400-1-x86_64.exe`. Follow the prompts in the installation dialog. Naturally, the program can also be run from a console window by typing the executable name at the command prompt.

> **Note:** If a previous version of ooRexx is installed and the rxapi daemon process is running, the user will be prompted to halt the process. The process *must* be halted to properly install the new version. If necessary, (because a Rexx program is running in the background and you are worried about possible data loss,) cancel the installation and take the appropriate steps to halt the process cleanly. If, on the other hand, you somehow trick the installation program to continue without halting the rxapi process, you will most likely end up with a corrupt installation of ooRexx.

Unattended installation. The Windows installation program can be run from the command line with no user input. This is done by using the `/S` option. Note that in this mode default values are used for all options other than the installation directory. This mode can be used to script automatic installs or multiple installs on different machines. From a script, or from the command line, enter the installation program name followed by the `/S` parameter, and the `/D` parameter if the default installation directory should be changed:

/S : Silent mode

This will install ooRexx without any user intervention using default values for all options.

/D : Default directory

The default installation directory, (C:\Program Files\ooRexx), can be changed using this switch. This must be the last parameter used in the command line and must not contain any quotes, even if the path contains spaces. For example:

```
ooRexx400-1-x86_64.exe /S /D=C:\Program Files\Interpreters\ooRexx
```

2.3.3. Windows Uninstallation Information

From the Control Panel select “Add Remove Programs”, then select “Open Object Rexx for Windows” and select “Remove”.

Alternatively, the ooRexx installation places a menu item in the program folder that can be used to uninstall. Select “Start->All Programs->Open Object Rexx->Uninstall ooRexx”. This is functionally equivalent to using “Add Remove Programs”.

2.4. Running Open Object Rexx as a Child Process of a Service on Windows

`rxapi` in its role as the memory manager for ooRexx can share out some resources among all the ooRexx processes to enable global functions, system exits, subcommand handlers, and global queues. If you start ooRexx from a service, two or more processes might run under different user accounts. Therefore it is required that the memory manager is not protected and can be accessed by every user. This means that ooRexx global data is system global and unsecured.

Note that starting ooRexx from a sevice is different than installing `rxapi` as a service.

If you want ooRexx to be started from a service, ooRexx must be installed as a common program or you must modify the system path manually to include the directory where ooRexx has been installed.

If you are writing a service that calls RexxStart(), ensure that the SERVICE_INTERACTIVE_PROCESS flag is set for your service. To prevent access violations, use a NULL security descriptor and assign it to your service process.

2.5. Open Object Rexx and Other Rexx Interpreters

If you have other Rexx interpreters installed, you may have to set the PATH manually because ooRexx and the other Rexx interpreters may both use the name "rexx" for invoking the interpreter. Interpreter error messages that begin with "Rexx: " indicate that another Rexx interpreter was called instead of ooRexx. You can verify which Rexx interpreter is running either by the form of the error messages, by running `rexxtry.rex` and executing SAY VERSION, or by invoking `rexx /V`, which then should display information about the Rexx interpreter that is invoked. If no information is displayed, it is not ooRexx. If you don't want the other Rexx interpreter to be invoked, you should remove it from the PATH, delete it, or rename `rexx.exe` in the installation directory to `orx.exe` and use `orx` to invoke the interpreter.

2.6. Exploring Open Object Rexx

Once you have installed the ooRexx files you can run Rexx scripts by issuing the command `rexx` followed by the name of your Rexx script at the command prompt. In addition, if you installed ooRexx as recommended, a file type has been associated with the `.rex` extension which allows you to just type the name of your script, without the extension, to run it. For example, if your program was named `addressBook.rex`, the file association will allow you to execute the program as follows:

```
C:\work.ooRexx>addressBook
```

An execution of the program might look like this:

```
C:\work.ooRexx>addressBook
ooRexx Address Lookup, version 1.1.0
  Look up address for: gatch

Tom Gatch
3245 Westfield Dr
Mission Bay CA 92110

  Look up another address? [y/n] n

C:\work.ooRexx>
```

To interactively try Object Rexx statements, enter `rexx rexxtry.rex` on the command line. Enter `exit` to end the program.

To help you explore programming in Open Object Rexx, the following generic sample programs are provided:

`ccreply.rex`

concurrent program using REPLY

`complex.rex`

: complex number class

`drives.rex`

: demonstrates the usage of Sys functions

`factor.rex`

: factorial program

`greply.rex`

: concurrent program using WAIT and NOWAIT

`guess.rex`

: a guessing game

`ktguard.rex`

: concurrent program using START and GUARD

`makestring.rex`

: demonstrated the usage of the makestring method

`month.rex`

: displays a calendar for the month of January

`philfork.rex`

: program that demonstrates Open Object Rexx concurrency

`pipe.rex`

: a pipeline implementation

`properties.rex`

: shows usage of the .Properties class and some Sys functions

`qdate.rex`

: date query program

`qtime.rex`

: time query program

`rexxcps.rex`

: measures Rexx performance

`scclient.rex scserver.rex`

: a client / server demonstration using the .Socket class from socket.cls

`semcls.rex`

semaphore class

`sfclient.rex sfserver.rex`

a client / server demonstration using the external rxsock library

`stack.rex`

program that uses a stack class

`usecomp.rex`

program that uses the complex number class (see note below)

`usepipe.rex`

program that uses the pipeline implementation (see note below)

Note: To run these programs, you must either add the `samples` directory to the PATH or execute them directly from the `samples` directory.

To help you explore using the Windows `WinSystm.cls`, the following sample programs are provided:

`deskicon.rex`

AddDesktopIcon method of the WindowsProgramManager class

`desktop.rex`

uses the WindowsProgramManager class

`displayAnyMenu.rex`

Displays the menu hierarchy for a window that the user picks. The example uses a mixture of ooDialog and WinSystm.

`displayWindowTree.rex`

Allows the user to pick an open top-level window and then displays the window hiearchy for that window. The program uses both ooDialog and WinSystm classes.

`eventlog.rex`

uses the WindowsEventLog class

`getTheWindow.rex`

This example shows how to find a window without using the exact window title.

`menuCalc.rec`

Uses the MenuObject class to display the menu hierarchy of the Windows Calculator application. The menu hierachy for both the Calculator's standard view and its scientific view are printed to the console.

`menuNotepad.rex`

Uses the MenuObject class to displays the hierarchy of the Notepad menu.

`quickCalc.rex`

Demonstrates how to control an application programmatically using the winsystm classes. Does some simple calculations using the Windows Calculator application. This program is similar to userwmgr.rex but more simple to better show what is going on.

`quickShowAllMenus.rex`

Uses the windowsSystem.frm package to print out a menu outline of every open window that has a menu.

`registry.rex`

uses the WindowsRegistry class

`usewmgr.rex`

program that uses the WindowsManager class

`windowsSystem.frm`

A collection of public routines and classes to help work with the winsystm.cls package. This is an example of how to extract common function into a package, and then use the package to help in writting similar programs. A number of the sample programs that use winsystm.cls make use of this framework.

`writeWithNotepad.rex`

Uses classes in winsystm.cls to automate the Windows Notepad application. This is a subset of the usewmgr.rex program designed to be a little easier to understand.

The directory `samples\ole\` and its subdirectories contain a number of samples for the ooRexx OLE / ActiveX interface. The sample programs contain comments to help with learning to use the OLEObject class.

The `samples\oodialog` and it subdirectories contain a relatively large number of example programs that demonstrate the use of OODialog. A subset of these examples can be launched from the ooRexx Program folder in the Start Menu. “Start->All Programs->Open Object Rexx->ooRexx Samples->ooDialog”

There are several examples provided to help with programming external function libraries using the ooRexx native API. These samples are located under the `samples\api` directory, along with two read me files:

- `sample\api\readme.txt`
- `sample\api\callrxnt`
- `sample\api\callrxwn`
- `sample\api\rexxexit`
- `sample\api\wpipe`
- `sample\api\wpipe\readme.txt`

Several of the API samples can be launched from the ooRexx Program folder in the Start Menu. “Start->All Programs->Open Object Rexx->ooRexx Samples->API”

3. Unix-Like (AIX, Linux, etc.,) Requirements, Installation and Configuration

3.1. Hardware Requirements

- 12 MB free disk space for the program (20 MB for AIX)
- 13.5 MB free disk space for online documentation
- IBM-compatible, Pentium or AMD processor, or higher, for an x86 32-bit or 64-bit platform.
- Any system capable of running AIX 5L 5.3 / AIX 6.1 for an AIX platform
- Power 4 processor or higher for a PPC platform
- Sparc processor for a SUN Solaris (Sparc) platform

3.2. Software Requirements

- **Linux**
  - Linux ELF system (i386 or x86_64.) Linux kernel version 2.4.1 or higher, with support for System V IPC.
  - Linux PPC system. Linux kernel version 2.4.1 or higher, with support for System V IPC.
- **AIX**
  - AIX 5L 5.2 TL10 and up.
  - AIX 5L 5.3 TL7 and up.
  - AIX 6.1 TL1 and up.
- **Solaris**
  - Solaris V2.8 or higher.

3.3. Installation and Configuration Information

This new version of Open Object Rexx cannot coexist with a previous installed version of Open Object Rexx or IBM Object REXX on your system. If you have previously installed IBM Object Rexx or Open Object Rexx, you must first deinstall that program.

3.3.1. Installation/Removal of the RPM Package

> **Note:** The installation of Open Object Rexx requires that all steps be run with root authority.

To install the `rpm` package, use your rpm package manager. Refer to your package manager for further information. The package manager adds orexx to your local rpm-database. Select the appropriate package for your system. Although the 32-bit version of ooRexx can be installed on some 64-bit Linux distributions it is recommended that the 64-bit version of ooRexx be installed on all 64-bit Linux systems.

There may be several rpm packages available. Each package name will indicate the processor architecture (i386, x86_64, ppc, etc.,) it is intended for, and the Linux distribution it was built on. In general, the Linux distribution the package was compiled on does not make a difference. The ooRexx rpm will install on any Linux system that supports rpms. However, sometimes, because of the libraries present on a system, the ooRexx rpm will not install. For instance, the Fedora Core 10 rpm may not install on a SuSE 9.3 system. Because of this, when resources are available, the ooRexx project will make available rpm packages built for older Linux distributions.

To install with the command line rpm package manager, a typical command line might be:

```
rpm -i ooRexx-4.0.0-1.i386.fedora10.rpm
```

or

```
rpm -i ooRexx-4.0.0-1.x86_64.fedora10.rpm
```

Open Object Rexx is installed in the directory `/opt/ooRexx`. Links are created in `/usr/lib` and `/usr/bin` for the ooRexx shared libraries and executables respectively. Additional links are created in `/usr/include` for the native API header files.

Use the rpm package manager to remove ooRexx from the system. The command line `rpm` can also be used to remove the package from the system. The command to enter is:

```
rpm -e ooRexx
```

3.3.2. Installation/Removal of the DEB Package

> **Note:** The installation of Open Object Rexx requires that all steps be run with root authority.

Debian based Linux distributions (Kubuntu, Ubuntu, etc.,) use the debian package manager. If you use one of the ... refer to the documentation for that tool. On the other hand, ooRexx installs easily from the command line. Use the following command to install a `.deb` package from the command line:

```
dpkg -i <packageFile>
```

For example:

```
tom@Loon:~/downloads$ dpkg -i ooRexx-4.0.0-1.i386.kubuntu810.deb
```

Open Object Rexx is installed in the directory `/opt/ooRexx`.

The command `dpkg --purge` is used to remove ooRexx from the system. For example:

```
tom@Loon:/$ dpkg --purged ooRexx
```

Or, use the same package manager you used to install to remove ooRexx from a debian based system.

3.3.3. Detailed Installation/Removal Information for AIX

Installation location

This build is installed in `/opt/ooRexx`.

The following links are created from `/opt/ooRexx/bin` to `/usr/bin`:

```
/usr/bin/rexx
/usr/bin/rexx.img
/usr/bin/rxftp.cls
/usr/bin/rxregexp.cls
/usr/bin/socket.cls
/usr/bin/rxapi
/usr/bin/oorexx-config
/usr/bin/rexxc
/usr/bin/rxqueue
/usr/bin/rxsubcom
/usr/bin/rexximage
```

Required xlC runtime level

xlC runtime 9.0.0.9 or higher

This runtime is contained in the April 2009 XL C/C++ Enterprise Edition V8.0 for AIX PTF.
IBM support (http://www-01.ibm.com/support/docview.wss?rs=2239&context=SSJT9L&dc=D400&uid=swg24022586&loc=en_US&cs=u&&lang=en)

xlC runtime 10.1 or higher

This runtime is contained in the Jannuary 2009 IBM C++ Runtime Environment Components for AIX. *IBM support* (http://www-01.ibm.com/support/docview.wss&rs=2239&context=SSJT9L&dc=D400&uid=swg24022049&loc=en_US&cs=&&lang=en)

Installed services

The ooRexx 4.0.0.0 LPP will install the `rxapi` daemon. This daemon is started automatically after the installation. The daemon will be started upon system boot via an entry in `/etc/inittab`.

Comments

If you have any comments or questions please do not hesitate to ask. See the Getting Help sections for places to ask questions. The AIX maintainer can be reached by posting questions to The Developer Mailing List.

To install or remove the `bff` package, use smitty.

```
smitty
-> Software Installation and Maintenance
  -> Install and Update Software
    -> Install Software
```

3.3.4. Installation of the TGZ Package

Note: The installation of Open Object Rexx requires that all steps be run with root authority.

If you have the package maintenance tool `pkgtool` on your system, you can use it to install or deinstall Open Object Rexx via a graphical tool. Start pkgtool as root and install the `ooRexx-4.0.0-1.i386.tar.gz` or `ooRexx-4.0.0-1.x86_64.tar.gz`, as appropriate, package. All files will be copied to the directory `/opt/ooRexx/`.

If `pkgtool` is not available, you can install Open Object Rexx by copying the `ooRexx-4.0.0-1.i386.tar.gz` (or x86_64) file to the root directory (/) and decompress the package with the following command:

```
tar -zxvf ooRexx-4.0.0-1.i386.tar.gz
```

Then, you must manually execute the following commands, or cut and paste the following into a shell script and execute the script:

```
if [ -d /opt/ooRexx ]; then
   ln -sf /opt/ooRexx/bin/rexx                    /usr/bin/rexx
   ln -sf /opt/ooRexx/bin/rexxc                   /usr/bin/rexxc
   ln -sf /opt/ooRexx/bin/rxapi                   /usr/bin/rxapi
   ln -sf /opt/ooRexx/bin/rxqueue                 /usr/bin/rxqueue
   ln -sf /opt/ooRexx/bin/rxsubcom                /usr/bin/rxsubcom
   ln -sf /opt/ooRexx/bin/rexx.img                /usr/bin/rexx.img
```

```
   ln -sf /opt/ooRexx/bin/rexx.cat                        /usr/bin/rexx.cat
   ln -sf /opt/ooRexx/bin/rxregexp.cls                    /usr/bin/rxregexp.cls
   ln -sf /opt/ooRexx/bin/rxftp.cls                       /usr/bin/rxftp.cls
   ln -sf /opt/ooRexx/bin/socket.cls                      /usr/bin/socket.cls
   ln -sf /opt/ooRexx/bin/oorexx-config                   /usr/bin/oorexx-config
   ln -sf /opt/ooRexx/lib/ooRexx/librexx.so.4.0.0     /usr/lib/librexx.so.4.0.0
   ln -sf /opt/ooRexx/lib/ooRexx/librexx.so.4.0.0     /usr/lib/librexx.so.4
   ln -sf /opt/ooRexx/lib/ooRexx/librexx.so.4.0.0     /usr/lib/librexx.so
   ln -sf /opt/ooRexx/lib/ooRexx/librexx.la                   /usr/lib/librexx.la
   ln -sf /opt/ooRexx/lib/ooRexx/librexxapi.so.4.0.0  /usr/lib/librexxapi.so.4.0.0
   ln -sf /opt/ooRexx/lib/ooRexx/librexxapi.so.4.0.0  /usr/lib/librexxapi.so.4
   ln -sf /opt/ooRexx/lib/ooRexx/librexxapi.so.4.0.0  /usr/lib/librexxapi.so
   ln -sf /opt/ooRexx/lib/ooRexx/librexxapi.la                /usr/lib/librexxapi.la
   ln -sf /opt/ooRexx/lib/ooRexx/librxsock.so.4.0.0   /usr/lib/librxsock.so.4.0.0
   ln -sf /opt/ooRexx/lib/ooRexx/librxsock.so.4.0.0   /usr/lib/librxsock.so.4
   ln -sf /opt/ooRexx/lib/ooRexx/librxsock.so.4.0.0   /usr/lib/librxsock.so
   ln -sf /opt/ooRexx/lib/ooRexx/librxsock.la                 /usr/lib/librxsock.la
   ln -sf /opt/ooRexx/lib/ooRexx/librxmath.so.4.0.0   /usr/lib/librxmath.so.4.0.0
   ln -sf /opt/ooRexx/lib/ooRexx/librxmath.so.4.0.0   /usr/lib/librxmath.so.4
   ln -sf /opt/ooRexx/lib/ooRexx/librxmath.so.4.0.0   /usr/lib/librxmath.so
   ln -sf /opt/ooRexx/lib/ooRexx/librxmath.la                 /usr/lib/librxmath.la
   ln -sf /opt/ooRexx/lib/ooRexx/librxregexp.so.4.0.0 /usr/lib/librxregexp.so.4.0.0
   ln -sf /opt/ooRexx/lib/ooRexx/librxregexp.so.4.0.0 /usr/lib/librxregexp.so.4
   ln -sf /opt/ooRexx/lib/ooRexx/librxregexp.so.4.0.0 /usr/lib/librxregexp.so
   ln -sf /opt/ooRexx/lib/ooRexx/librxregexp.la               /usr/lib/librxregexp.la
   ln -sf /opt/ooRexx/lib/ooRexx/librexxutil.so.4.0.0 /usr/lib/librexxutil.so.4.0.0
   ln -sf /opt/ooRexx/lib/ooRexx/librexxutil.so.4.0.0 /usr/lib/librexxutil.so.4
   ln -sf /opt/ooRexx/lib/ooRexx/librexxutil.so.4.0.0 /usr/lib/librexxutil.so
   ln -sf /opt/ooRexx/lib/ooRexx/librexxutil.la               /usr/lib/librexxutil.la
   ln -sf /opt/ooRexx/include/rexx.h                      /usr/include/rexx.h
   ln -sf /opt/ooRexx/include/rexxapidefs.h               /usr/include/rexxapidefs.h
   ln -sf /opt/ooRexx/include/rexxapitypes.h              /usr/include/rexxapitypes.h
   ln -sf /opt/ooRexx/include/rexxplatformapis.h          /usr/include/rexxplatformapis.h
   ln -sf /opt/ooRexx/include/rexxplatformdefs.h          /usr/include/rexxplatformdefs.h
   ln -sf /opt/ooRexx/include/oorexxapi.h                 /usr/include/oorexxapi.h
   ln -sf /opt/ooRexx/include/oorexxerrors.h              /usr/include/oorexxerrors.h
   ln -sf /opt/ooRexx/share/man/man1/oorexx-config.1      /usr/share/man/man1/oorexx-config.1
   ln -sf /opt/ooRexx/share/man/man1/rexx.1               /usr/share/man/man1/rexx.1
   ln -sf /opt/ooRexx/share/man/man1/rexxc.1              /usr/share/man/man1/rexxc.1
   ln -sf /opt/ooRexx/share/man/man1/rxsubcom.1           /usr/share/man/man1/rxsubcom.1
   ln -sf /opt/ooRexx/share/man/man1/rxqueue.1            /usr/share/man/man1/rxqueue.1
   ln -sf /opt/ooRexx/share/ooRexx/rexxtry.rex            /usr/bin/rexxtry.rex
# allow backwards compatibility to Object REXX 2.x
   ln -sf /opt/ooRexx/lib/ooRexx/librexxapi.so.4.0.0  /usr/lib/librexxapi.so.2
fi
if [ -d /etc/rc.d/init.d ]; then
   # Red Hat
   cp /opt/ooRexx/bin/rxapid          /etc/rc.d/init.d
   ln -sf /etc/rc.d/init.d/rxapid    /etc/rc.d/rc3.d/S89rxapid
   ln -sf /etc/rc.d/init.d/rxapid    /etc/rc.d/rc5.d/S89rxapid
   ldconfig
   /etc/rc.d/init.d/rxapid start
else
```

```
   # Suse
   cp /opt/ooRexx/bin/rxapid          /etc/rc.d
   ln -sf /etc/rc.d/rxapid           /etc/rc.d/rc3.d/S89rxapid
   ln -sf /etc/rc.d/rxapid           /etc/rc.d/rc5.d/S89rxapid
   ldconfig
   /etc/rc.d/rxapid start
fi
```

To remove ooRexx after installing using the tar file, just reverse the process. Manually execute, or cut and paste into a shell script the following commands:

```
rm -f /usr/bin/rexx
rm -f /usr/bin/rexxc
rm -f /usr/bin/rxapi
rm -f /usr/bin/rxqueue
rm -f /usr/bin/rxsubcom
rm -f /usr/bin/rexx.img
rm -f /usr/bin/rexx.cat
rm -f /usr/bin/rxregexp.cls
rm -f /usr/bin/rxftp.cls
rm -f /usr/bin/socket.cls
rm -f /usr/bin/oorexx-config
rm -f /usr/lib/librexx.so
rm -f /usr/lib/librexx.4.0.0
rm -f /usr/lib/librexx.4
rm -f /usr/lib/librexxapi.so
rm -f /usr/lib/librexxapi.4.0.0
rm -f /usr/lib/librexxapi.4
rm -f /usr/lib/librxsock.so
rm -f /usr/lib/librxsock.4.0.0
rm -f /usr/lib/librxsock.4
rm -f /usr/lib/librxmath.so
rm -f /usr/lib/librxmath.4.0.0
rm -f /usr/lib/librxmath.4
rm -f /usr/lib/librxregexp.so
rm -f /usr/lib/librxregexp.4.0.0
rm -f /usr/lib/librxregexp.4
rm -f /usr/lib/librexxutil.so
rm -f /usr/lib/librexxutil.4.0.0
rm -f /usr/lib/librexxutil.4
rm -f /usr/share/man/man1/oorexx-config.1
rm -f /usr/share/man/man1/rexx.1
rm -f /usr/share/man/man1/rexxc.1
rm -f /usr/share/man/man1/rxsubcom.1
rm -f /usr/share/man/man1/rxqueue.1
rm -f /usr/include/rexx.h
rm -f /usr/include/rexxapidefs.h
rm -f /usr/include/rexxapitypes.h
rm -f /usr/include/rexxplatformapis.h
rm -f /usr/include/rexxplatformdefs.h
rm -f /usr/include/oorexxapi.h
rm -f /usr/include/oorexxerrors.h
rm -f /usr/bin/rexxtry.rex
```

```
rm -rf /usr/share/ooRexx
if [ -d /etc/rc.d/init.d ]; then
   # Red Hat
   /etc/rc.d/init.d/rxapid stop
   rm /etc/rc.d/rc3.d/S89rxapid
   rm /etc/rc.d/rc5.d/S89rxapid
   rm /etc/rc.d/init.d/rxapid
else
   # Suse
   /etc/rc.d//rxapid stop
   rm /etc/rc.d/rc3.d/S89rxapid
   rm /etc/rc.d/rc5.d/S89rxapid
   rm /etc/rc.d/rxapid
fi
ldconfig
# Do no change this to rm -rf /opt/ooRexx
# If you do you could wipe out the all the /usr subdirs!
if [ -d /opt/ooRexx ]; then
   rm -rf /opt/ooRexx
fi
```

Then delete the ooRexx directory in `/opt`. Be careful you delete what you mean to delete:

```
cd /opt
# Check that the ooRexx directory is there:
ls ooRexx
# If the ooRexx directory is there:
rm -rf ooRexx/
```

3.3.5. Installation/Removal of the PKG Package

> **Note:** The installation of Open Object Rexx requires that all steps be run with root authority.

To install the `pkg` package, use your package-manager. Select the appropriate package for the installation. Refer to your package manager for further information. The package manager adds orexx to your local pkg-database. The basic command for the command line package-manager is:

```
pkgadd -d <packageName>
```

Open Object Rexx is installed in the directory `/opt/ooRexx`.

The command `pkgrm` can also be used to remove the package from the database if it is entered at the command line:

```
pkgrm ooRexx
```

3.4. Configuration

There is nothing to configure for a Unix/Linux installation.

3.5. Open Object Rexx and Other Rexx Interpreters

If you have other Rexx interpreters installed, you may have to set the PATH manually because Open Object Rexx and the other Rexx interpreters may both use the name "rexx" for invoking the interpreter. Interpreter error messages that begin with "Rexx: " indicate that another Rexx interpreter was called instead of Open Object Rexx. You can verify which Rexx interpreter is running either by the form of the error messages, by running `rexxtry` and executing SAY VERSION, or by invoking `rexx -v`, which then should display information about the Rexx interpreter that is invoked. If no information is displayed, it is not Open Object Rexx. If you don't want the other Rexx interpreter to be invoked, you should remove it from the PATH, delete it, or rename the `rexx` binary in the `/usr/bin` directory to `orx` and use `orx` to invoke the interpreter.

3.6. Exploring Open Object Rexx for Unix/Linux

Once you have installed the Open Object Rexx files you can run Rexx scripts by issuing the command `rexx` followed by the name of your script at the command prompt. To interactively try Rexx statements, from a command prompt type `rexx rexxtry`. Enter `exit` to end the program.

To help you explore programming in Open Object Rexx, the following sample programs are provided in the `/opt/ooRexx/share/ooRexx`:

`ccreply.rex`

: concurrent program using REPLY

`complex.rex`

: complex number class

`factor.rex`

: factorial program

`greply.rex`

: concurrent program using WAIT and NOWAIT

`guess.rex`

: a guessing game

`ktguard.rex`

: concurrent program using START and GUARD

`makestring.rex`

: demonstrated the usage of the makestring method

`month.rex`

displays a calendar for the month of January

`pipe.rex`

a pipeline implementation

`properties.rex`

shows usage of the .Properties class and some Sys functions

`qdate.rex`

date query program

`qtime.rex`

time query program

`rexxcps.rex`

measures Rexx clauses per second

`rexxtry.rex`

interactively try out Rexx statements

`scclient.rex scserver.rex`

a client / server demonstration using the .Socket class from socket.cls

`semcls.rex`

implements a semaphore class on ooRexx

`sfclient.rex sfserver.rex`

a client / server demonstration using the external rxsock library

`stack.rex`

program that uses a stack class

`usecomp.rex`

program that uses the complex number class

`usepipe.rex`

program that uses the pipeline implementation

Note: To run these programs, you must either add the `/opt/ooRexx/share/ooRexx` directory to the PATH or execute them directly from the `/opt/ooRexx/share/ooRexx` directory.

4. The `rxapi` Daemon Process

Part of ooRexx is `rxapi` which is a daemon process that manages all data that can persist across interpreter invocations or is used for cross-process communications. The `rxapi` process manages the Rexx data queues, the macrospace, and all of the external function, subcommand handler and exit registrations.

In ooRexx 4.0.0 the interpreter and `rxapi` communicate through a socket interface, rather than through shared memory as in previous versions of ooRexx.

Ideally, `rxapi` should run as a service. When you install ooRexx from a package on Linux, `rxapi` will be set up to run as a system service. When installing the Windows package, the default is to install `rxapi` as a Windows service. In this scenario, the operating system will start the `rxapi` daemon on boot up and shut the daemon down when the system is halted.

If `rxapi` is not installed as a service, the first time the interpreter executes, and needs the function provided by `rxapi`, the intepreter will start the daemon process. Once started, the `rxapi` process will continue to run until the system is halted.

There is little or no point in stopping the `rxapi` process once it is started. **Be aware** that if you do stop the `rxapi` process, all queues, all registered subcommand handlers, system exits, and external functions, and the macrospace, disappear.

When `rxapi` is installed as a service, it can be started and stopped by the user, if the user has the proper authority, in the same manner as other services. On Windows, the services manager can be used to start or stop `rxapi`. Or, from the command line, net stop or net start can also be used:

```
C:\work.ooRexx>net stop rxapi
The RXAPI service is stopping.
The RXAPI service was stopped successfully.

C:\work.ooRexx>net start rxapi

The RXAPI service was started successfully.

C:\work.ooRexx>
```

On Linux, the following can be used from the command line:

```
[root@Falcon work.ooRexx]# /etc/init.d/rxapid stop
Stopping rxapi:                                            [  OK  ]
[root@Falcon work.ooRexx]# /etc/init.d/rxapid start
Starting rxapi:                                            [  OK  ]
[root@Falcon work.ooRexx]#
```

It is likely that your installation of Linux also has a graphical means of starting or stopping services.

If `rxapi` is not installed as a service, it can be stopped by using an appropriate process killer for your platform. Typically the Task Manager on Windows and `kill` on a unix-like system.

5. Known Limitations, Problems and Workarounds

- The global directory .environment is process local, not global to the system.
- Under Unix/Linux only piped "|" input and redirected output (">") can be evaluated by Open Object Rexx. Redirected input ("<") can not be evaluated.

6. Documentation

All documentation is contained in PDF files and zipped HTML package files and is available online at http://www.oorexx.org/docs.html.

The following documents are available:

rexxref.pdf

This is the *Open Object Rexx: Reference*.

rexxpg.pdf

This is the *Open Object Rexx: Programming Guide*.

winextensions.pdf

This is the *Open Object Rexx: Windows Extensions Reference*.

oodialog.pdf

This is the *Open Object Rexx: Windows OODialog Reference*.

rxsock.pdf

This is the *Open Object Rexx: TCP/IP Socket Library Functions Reference*.

rxftp.pdf

This is the *Open Object Rexx: FTP Class Library Reference*.

rxmath.pdf

This is the *Open Object Rexx: Mathematical Functions Reference*.

readme.pdf

This document is in PDF and HTML format.

7. Getting Help

The Open Object Rexx Project has a number of methods to obtain help for ooRexx. These methods, in no particular order of preference, are listed below.

7.1. The Rexx Language Association Mailing List

The *Rexx Language Association* (http://www.rexxla.org/) maintains a mailing list for its members. This mailing list is only available to RexxLA members thus you will need to join RexxLA in order to get on the list. The dues for RexxLA membership are small and are charged on a yearly basis. For details on joining RexxLA please refer to the *RexxLA Home Page* (http://rexxla.org/) or the *RexxLA Membership Application* (http://www.rexxla.org/rexxla/join.html) page.

7.2. The Open Object Rexx SourceForge Site

The Open Object Rexx Project (http://www.oorexx.org/) utilizes *SourceForge* (http://sourceforge.net/) to house the *ooRexx Project* (http://sourceforge.net/projects/oorexx) source repositories, mailing lists and other project features. Here is a list of some of the most useful facilities.

The ooRexx Forums

: The ooRexx project maintains a set of forums that anyone may contribute to or monitor. They are located on the *ooRexx Forums* (http://sourceforge.net/forum/?group_id=119701) page. There are currently three forums available: Help, Developers and Open Discussion. In addition, you can monitor the forums via email.

The Developer Mailing List

: You can subscribe to the oorexx-devel mailing list at *ooRexx Mailing List Subscriptions* (http://sourceforge.net/mail/?group_id=119701) page. This list is for discussing ooRexx project development activities and future interpreter enhancements. It also supports a historical archive of past messages.

The Users Mailing List

: You can subscribe to the oorexx-users mailing list at *ooRexx Mailing List Subscriptions* (http://sourceforge.net/mail/?group_id=119701) page. This list is for discussing using ooRexx. It also supports a historical archive of past messages.

The Announcements Mailing List

: You can subscribe to the oorexx-announce mailing list at *ooRexx Mailing List Subscriptions* (http://sourceforge.net/mail/?group_id=119701) page. This list is only used to announce significant ooRexx project events.

The Bug Mailing List

: You can subscribe to the oorexx-bugs mailing list at *ooRexx Mailing List Subscriptions* (http://sourceforge.net/mail/?group_id=119701) page. This list is only used for monitoring changes to the ooRexx bug tracking system.

Bug Reports

: You can create a bug report at *ooRexx Bug Report* (http://sourceforge.net/tracker/?group_id=119701&atid=684730) page. Please try to provide as much information in the bug report as possible so that the developers can determine the problem as

quickly as possible. Sample programs that can reproduce your problem will make it easier to debug reported problems.

Request For Enhancement

You can suggest ooRexx features at the *ooRexx Feature Requests* (http://sourceforge.net/tracker/?group_id=119701&atid=684733) page.

Patch Reports

If you create an enhancement patch for ooRexx please post the patch using the *ooRexx Patch Report* (http://sourceforge.net/tracker/?group_id=119701&atid=684732) page. Please provide as much information in the patch report as possible so that the developers can evaluate the enhancement as quickly as possible.

Please do not post bug patches here, instead you should open a bug report and attach the patch to it.

7.3. comp.lang.rexx Newsgroup

The comp.lang.rexx (news:comp.lang.rexx) newsgroup is a good place to obtain help from many individuals within the Rexx community. You can obtain help on Open Object Rexx or on any number of other Rexx interpreters and tools.

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