Package 'Rserve'

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Title Versatile R Server

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Depends R (>= 1.5.0)

Suggests RSclient

SystemRequirements libR, GNU make

Description Rserve acts as a socket server (TCP/IP or local sockets)
which allows binary requests to be sent to R. Every
connection has a separate workspace and working
directory. Client-side implementations are available
for popular languages such as C/C++ and Java, allowing
any application to use facilities of R without the need of
linking to R code. Rserve supports remote connection,
user authentication and file transfer. A simple R client
is included in this package as well. In addition, it can
also act as a secure WebSockets and HTTP/HTTPS server.

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URL https://www.rforge.net/Rserve/

BugReports https://github.com/s-u/Rserve

Biarch true

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Contents

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ocap   *Object Capability (OCAP) Functions*

Description

The following functions are only meaningful when used by code that is run inside Rserve in object-capability (OCAP) mode. See Rserve Wiki for details.

ocap registers a function as a capability and returns the reference.

resolve.ocap takes a capability reference and returns the function representing the capability.

Rserve.context retrieves or sets the current context for out-of-band (OOB) messages (see also Rserve.eval for specifying contexts during evaluation).

Usage

```
ocap(fun, name = deparse(substitute(fun)))
resolve.ocap(ocap)
Rserve.context(what)
```

Arguments

fun	function to register
name	description of the function, only for informational and logging purposes
ocap	reference previously obtained by a call to ocap
what	if present, sets the context to the supplied value. If missing, the function returns the current context

Value

ocap returns the new capability reference, it will be an object of the class "OCref".

resolve.ocap returns the function corresponding to the reference or NULL if the reference does not exist. It will raise an error if ocap is not a valid "OCref" object.

Rserve.context returns the current context

Author(s)

Simon Urbanek

Rserve	*Server providing R functionality to applications via TCP/IP or local unix sockets*

Description

Starts Rserve in daemon mode (unix only). Any additional parameters not related to Rserve will be passed straight to the underlying R. For configuration, usage and command line parameters please consult the online documentation at http://www.rforge.net/Rserve. Use R CMD Rserve `--help` for a brief help.

The Rserve function is provided for convenience only.

On Windows the Rserve() function sets up the PATH to include the current R.DLL so that Rserve can be run.

Usage

```
# R CMD Rserve [<parameters>]

Rserve(debug = FALSE, port, args = NULL, quote=(length(args) > 1), wait, ...)
```

Arguments

debug	determines whether regular Rserve or debug version of Rserve (Rserve.dbg) should be started.
port	port used by Rserve to listen for connections. If not specified, it will be taken from the configuration file (if present) or default to 6311
args	further arguments passed to Rserve (as a string that will be passed to the system command - see quote below).
quote	logical, if TRUE then arguments are quoted, otherwise they are just joined with spaces
wait	wait argument for the system call. It defaults to FALSE on Windows and TRUE elsewhere.
...	other arguments to be passes to system.

Details

Rserve is not just a package, but an application. It is provided as a R package for convenience only. For details see http://www.rforge.net/Rserve

Note

R CMD Rserve will only work on unix when installed from *sources* and with sufficient permissions to have write-rights in $R_HOME/bin. Binary installations have no way to write in $R_HOME/bin and thus Rserve() function described above is the only reliable way to start Rserve in that case.

Java developers may want to see the `StartRserve` class in `java/Rserve/test` examples for easy way to start `Rserve` from Java.

Rserve can be compiled with TLS/SSL support based on OpenSSL. Therefore the following statements may be true if Rserve binaries are shipped together with OpenSSL: This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/). This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim Hudson (tjh@cryptsoft.com). They are not true otherwise.

Author(s)

Simon Urbanek

See Also

run.Rserve

Rserve.eval   *Evaluate expressions in a REPL-like fashion*

Description

`Rserve.eval` evaluates a given expression in a way that is very close to the behavior on the console Read/Evaluate/Print Loop (REPL). Among other things this means printing the result of each expression if visible. The function is guaranteed to not raise an error and in case of an error it returns an object of class `Rserve-eval-error` with details including the error and the stack trace.

Usage

```
Rserve.eval(what, where = .GlobalEnv, last.value = FALSE, exp.value = FALSE,
            context = NULL, handlers = list(error=.save.condition))
```

Arguments

what	expressions to evaluate
where	environment to evaluate in
last.value	logical, if `TRUE` then the result of the evaluation is returned, otherwise the evaluation is only performed for its side-efects and returns `TRUE` instead.
exp.value	logical, it `TRUE` then an error object will include the actual expression that triggered the error, otherwise it will only store the index of the expression in `what`.
context	optional object that will be used as the Rserve context for the duration of the evaluation (see Rserve.context).
handlers	optional named list of calling handlers to register for the duration of the evaluation. The default is to register an `error` handlers which stores the error condition so it can be reported in the result - see below.

Details

If what contains one or more expressions, they are evaluated one by one while printing the result of each if visible. Upon error subsequent expressions are not evaluated. If what is not an expression then the only a single evaluation of what is performed and the result is not printed.

The main purpose of this function is to implement console front-ends where the front-end uses parse() + Rserve.eval() to simulate the action of a GUI. Because the function returns in all circumstances it allows clients to rely on a well-define messaging behavior.

Value

If the evaluation triggered an error, the result is an object of class Rserve-eval-error with components:

error	character, error message
traceback	list of contexts in the traceback
expression	if what contains multiple expressions then this will be either an index to the expression that caused the error (exp.value=FALSE) or the actual expression (otherwise).
context	current Rserve context, NULL if none has been set
condition	if any condition has been saved via .save.condition (which is the default) then on error the captured condition object is stored here, NULL otherwise

If the evaluation finished without an error then the result is either TRUE if last.value=FALSE or the value of the last expression otherwise.

Note

Rserve versions up to 1.8-10 did not include the condition component, no calling handlers were registered and there was no condition component in the result. To replicate that behavior or if you don't need that information, you can set handlers=NULL which removes the overhead of adding calling handlers.

No error checking is performed on the handlers parameter, so make sure it is avalid, named list of functions, otherwise an error will occur at evaluation time.

Author(s)

Simon Urbanek

Examples

```
g <- function() stop("foo")
f <- function() g()
(Rserve.eval(expression(f())))
(Rserve.eval(parse(text="1:5\n1+1")))
(Rserve.eval(quote(1+1), last.value=TRUE))

error_with_condition = function(object = NULL) {
  cond = errorCondition("this is a custom error with condition",
```

```
                            object = object,
                            class = "CustomError")
        stop(cond)
    }
    str(Rserve.eval(quote(error_with_condition("hello")), last.value = TRUE))
```

Rserve.http.add.static

Add static file handler to HTTP/HTTPS server

Description

Rserve.http.add.static installs a new static handler to be used by the HTTP/HTTPS servers. It will trigger only if the path prefix matches prefix and will map the subsequent portion of the path in the request URL to a file system location specified by path. If the resulting item in the file system is a directory, then index (if set) will be appended to the path and served instead (if it is a file).

Rserve.http.rm.all.statics removes all static handlers from the current R session.

Usage

```
Rserve.http.add.static(prefix, path, index = NULL, last = FALSE)
Rserve.http.rm.all.statics()
```

Arguments

prefix	string, path prefix for which this handler will be used
path	string, path in the filesystem used as root to serve the content
index	optional string, will be appended to the file system path if the target is a directory (typical value is "index.html").
last	logical, if FALSE then processing continues to other handlers if the target does not exist. If TRUE then all requests for the prefix will be handled only by this handler, possible resulting in "404 not found" result if the reqeusted file does not exist.

Details

The HTTP/HTTPS server supports both static and dynamic handlers. The typical use is to invoke .http.request function in R for dynamic handling, but it also supports static maps of URL paths to file system locations. The static handlers are checked first.

Rserve.http.add.static installs a new static handler, adding it to the list of handlers. The handlers are consulted in the order that they are added.

The static handler supports conditional GETs and relies on the file system modification times to determine if a file has been modified.

Value

The return value is considered experimental and may change in the future: Integer, number of active handlers (which is the same as the index of this handler).

Author(s)

Simon Urbanek

See Also

run.Rserve

Examples

```
## standard handler serving all files in the current working directory
## and consults index.html in directories if no file is specified.
Rserve.http.add.static("/", getwd(), "index.html", TRUE)

## start the server with:
##   run.Rserve(http.port=8080, qap=FALSE)
```

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run.Rserve	*Start Rserve within the current R process.*

Description

run.Rserve makes the current R process into an Rserve instance. Rserve takes over until it is shut down or receives a user interrupt signal. The main difference between Rserve and run.Rserve is that Rserve starts a new process, whereas run.Rserve turns the current R session into Rserve. This is only possible if there are no UI elements or other parts that could interfere with the prepation of Rserve.

stop.Rserve stops currently running background servers. This only applies to servers started using background=TRUE.

Usage

```
run.Rserve(..., config.file = "/etc/Rserve.conf", background = FALSE)
stop.Rserve()
```

Arguments

...	all named arguments are treated as entries that would be otherwise present in the configuration file. So argument foo="bar" has the same meaning as foo bar in the configuration file. The only exception is that logical values can be used instead of enable/disable. Some settings such as uid are not relevant and thus ignored.

config.file   path of the configuration file to load in the Rserve. It will be loaded before the above settings and is optional, i.e. if the file is not present or readable it will be ignored.

background   logical, the default FALSE starts the server and does not return until all servers have been shut down - typically in response to an interrupt. If this argument is set to TRUE then the server is started in teh background of this R session and control is returned immediately (currently not supported on Windows). In that case requests will be only processed if no other computation is running in R, but the R console can be still used to modify the session. Such background servers can be stopped with the stop.Rserve function.

Value

Returns TRUE after the Rserve was shut down.

Author(s)

Simon Urbanek

See Also

Rserve

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self   *Functions usable for R code run inside Rserve*

Description

The following functions can only be used inside Rserve, they cannot be used in stand-alone R. They interact with special features of Rserve. All commands below will succeed only if Rserve has been started with r-control enable configuration setting for security reasons.

self.ctrlEval issues a control command to the Rserve parent instance that evaluates the given expression in the server. The expression is only queued for evaluation which will happen asynchronously in the server (see RSserverEval in RSclient package for details). Note that the current session is unaffected by the command.

self.ctrlSource issues a control command to the Rserve parent instance to source the given file in the server, see RSserverSource in the RSclient package for details.

self.oobSend sends a out-of-band (OOB) message with the encoded content of what to the client connected to this session. The OOB facility must be enabled in the Rserve configuration (using oob enable) and the client must support OOB messages for this to be meaningful. This facility is not used by Rserve itself, it is offered to specialized applications (e.g. Cairo supports asynchronous notification of web clients using WebSockets-QAP1 tunnel to dynamically update graphics on the web during evaluation).

self.oobMessage is like self.oobSend except that it waits for a response and returns the response.

Usage

```
self.ctrlEval(expr)
self.ctrlSource(file)
self.oobSend(what, code = 0L)
self.oobMessage(what, code = 0L)
```

Arguments

expr	R expression to evaluate remotely
file	path to a file that will be sourced into the main instance
what	object to include as the payload fo the message
code	user-defined message code that will be ORed with the OOB_SEND/OOB_MSG message code

Value

oobMessage returns data contained in the response message.

All other functions return TRUE (invisibly).

Author(s)

Simon Urbanek

Examples

```
## Not run:
  self.ctrlEval("a <- rnorm(10)")
  self.oobSend(list("url","http://foo/bar"))

## End(Not run)
```

---

ulog	*Micro Logging*

Description

ulog logs the supplied message using the ulog facility which typically corresponsed to syslog. See ulog Rserve configuration for the various endpoints supported by ulog (local, UDP/TCP remote, ...).

This function is guaranteed to be silent regardless of the ulog setting and is intended to have minimal performance impact.

Note: if Rserve is compiled with -DULOG_STDERR (also implied in the debug build) then ulog messages are also emitted on stderr with "ULOG: " prefix.

Please note that this ulog function is governed by the Rserve settings, and NOT the ulog package settings. The latter is a general port of the ulog logging facility to R, while Rserve::ulog is specific to to the Rserve process.

Usage

```
ulog(...)
```

Arguments

...	message to log

Value

The logged string constructed from the message, invisibly

Author(s)

Simon Urbanek

Examples

```
ulog("INFO: My application started")
```

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