

Package ‘RDesk’

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Title Native Desktop App Framework for 'R'

Version 1.0.5

Description Build native Windows desktop applications using 'R' and 'WebView2'. Provides a robust 'R6'-based event loop, asynchronous background task management via 'mirai' and 'callr', and a native 'Win32' message bridge for seamless 'R'-to-user-interface communication without listening ports or network overhead. Allows 'R' developers to create professional, standalone desktop tools with modern web-based user interfaces while maintaining a pure 'R' backend.

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<https://janakiraman-311.github.io/RDesk/>

BugReports <https://github.com/Janakiraman-311/RDesk/issues>

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'WebView2' Runtime
(<https://developer.microsoft.com/microsoft-edge/webview2/>)

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App

Create and launch a native desktop application window from R.

Description

Provides bidirectional native pipe communication between R and the UI.

Methods

Public methods:

- [App\\$new\(\)](#)
- [App\\$on_ready\(\)](#)
- [App\\$on_close\(\)](#)
- [App\\$check_update\(\)](#)

- App\$register_hotkey()
- App\$set_tray_menu()
- App\$clipboard_write()
- App\$clipboard_read()
- App\$on_message()
- App\$send()
- App\$load_ui()
- App\$set_size()
- App\$set_position()
- App\$set_title()
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- App\$restore()
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- App\$notify()
- App\$loading_start()
- App\$loading_progress()
- App\$loading_done()
- App\$toast()
- App\$set_tray()
- App\$remove_tray()
- App\$service()
- App\$quit()
- App\$get_dir()
- App\$run()
- App\$clone()

Method new(): Create a new RDesk application

Usage:

```
App$new(title, width = 1200L, height = 800L, www = NULL, icon = NULL)
```

Arguments:

title Window title string

width Window width in pixels (default 1200)

height Window height in pixels (default 800)

www Directory containing HTML/CSS/JS assets (default: built-in template)

icon Path to window icon file

Returns: A new App instance

Method on_ready(): Register a callback to fire when the window is ready

Usage:

App\$on_ready(fn)

Arguments:

fn A zero-argument function called after the server starts and window opens

Returns: The App instance (invisible)

Method on_close(): Register a callback to fire when the user attempts to close the window

Usage:

App\$on_close(fn)

Arguments:

fn A zero-argument function. Should return TRUE to allow closing, FALSE to cancel.

Returns: The App instance (invisible)

Method check_update(): Check for application updates from a remote URL

Usage:

App\$check_update(version_url, current_version = NULL)

Arguments:

version_url URL to a JSON metadata file (e.g. {"version": "1.1.0", "url": "http://..."})

current_version Optional version string to compare against. Defaults to app description version.

Returns: A list with update status and metadata

Method register_hotkey(): Register a global keyboard shortcut (hotkey)

Usage:

App\$register_hotkey(keys, fn)

Arguments:

keys Character string representing the key combination (e.g., "Ctrl+Shift+A")

fn A zero-argument function to be called when the hotkey is pressed

Returns: The App instance (invisible)

Method set_tray_menu(): Set the native system tray menu

Usage:

App\$set_tray_menu(items)

Arguments:

items A named list of lists defining the menu structure

Returns: The App instance (invisible)

Method clipboard_write(): Write text to the system clipboard

Usage:

```
App$clipboard_write(text)
```

Arguments:

text Character string to copy

Returns: The App instance (invisible)

Method `clipboard_read()`: Read text from the system clipboard

Usage:

```
App$clipboard_read()
```

Returns: Character string from clipboard or NULL

Method `on_message()`: Register a handler for a UI -> R message type

Usage:

```
App$on_message(type, fn)
```

Arguments:

type Unique message identifier string

fn A function(payload) called when this message type arrives

Returns: The App instance (invisible)

Method `send()`: Send a message from R to the UI

Usage:

```
App$send(type, payload = list())
```

Arguments:

type Character string message type (received by `rdesk.on()` in JS)

payload A list or `data.frame` to serialise as JSON payload

Returns: The App instance (invisible)

Method `load_ui()`: Load an HTML file into the window

Usage:

```
App$load_ui(path = "index.html")
```

Arguments:

path Path relative to the www directory (e.g. "index.html")

Returns: The App instance (invisible)

Method `set_size()`: Set the window size dynamically

Usage:

```
App$set_size(width, height)
```

Arguments:

width New width (pixels)

height New height (pixels)

Returns: The App instance (invisible)

Method `set_position()`: Set the window position dynamically

Usage:

```
App$set_position(x, y)
```

Arguments:

x Horizontal position from left (pixels)

y Vertical position from top (pixels)

Returns: The App instance (invisible)

Method `set_title()`: Set the window title dynamically

Usage:

```
App$set_title(title)
```

Arguments:

title New title

Returns: The App instance (invisible)

Method `minimize()`: Minimize the window to the taskbar

Usage:

```
App$minimize()
```

Returns: The App instance (invisible)

Method `maximize()`: Maximize the window to fill the screen

Usage:

```
App$maximize()
```

Returns: The App instance (invisible)

Method `restore()`: Restore the window from minimize/maximize

Usage:

```
App$restore()
```

Returns: The App instance (invisible)

Method `fullscreen()`: Toggle fullscreen mode

Usage:

```
App$fullscreen(enabled = TRUE)
```

Arguments:

enabled If TRUE, enters fullscreen. If FALSE, exits.

Returns: The App instance (invisible)

Method `always_on_top()`: Set the window to stay always on top of others

Usage:

```
App$always_on_top(enabled = TRUE)
```

Arguments:

enabled If TRUE, always on top.

Returns: The App instance (invisible)

Method `set_menu()`: Set the native window menu

Usage:

```
App$set_menu(items)
```

Arguments:

items A named list of lists defining the menu structure

Returns: The App instance (invisible)

Method `dialog_open()`: Open a native file-open dialog

Usage:

```
App$dialog_open(title = "Open File", filters = NULL)
```

Arguments:

title Dialog title

filters List of file filters, e.g. `list("CSV files" = "*.csv")`

Returns: Selected file path (character) or NULL if cancelled

Method `dialog_save()`: Open a native file-save dialog

Usage:

```
App$dialog_save(title = "Save File", default_name = "", filters = NULL)
```

Arguments:

title Dialog title

default_name Initial filename

filters List of file filters

Returns: Selected file path (character) or NULL if cancelled

Method `dialog_folder()`: Open a native folder selection dialog

Usage:

```
App$dialog_folder(title = "Select Folder")
```

Arguments:

title Dialog title

Returns: Selected directory path (character) or NULL if cancelled

Method `message_box()`: Show a native message box / alert

Usage:

```
App$message_box(message, title = "RDesk", type = "ok", icon = "info")
```

Arguments:

message The message text

title The dialog title

type One of "ok", "okcancel", "yesno", "yesnocancel"

icon One of "info", "warning", "error", "question"

Returns: The button pressed (character: "ok", "cancel", "yes", "no")

Method `dialog_color()`: Open a native color selection dialog

Usage:

```
App$dialog_color(initial_color = "#FFFFFF")
```

Arguments:

`initial_color` Optional hex color to start with (e.g. "#FF0000")

Returns: Selected hex color code or NULL if cancelled

Method `notify()`: Send a native desktop notification

Usage:

```
App$notify(title, body = "")
```

Arguments:

`title` Notification title

`body` Notification body text

Returns: The App instance (invisible)

Method `loading_start()`: Show a loading state in the UI

Usage:

```
App$loading_start(
  message = "Loading...",
  progress = NULL,
  cancellable = FALSE,
  job_id = NULL
)
```

Arguments:

`message` Text shown under the spinner

`progress` Optional numeric 0-100 for a progress bar

`cancellable` If TRUE, shows a cancel button in the UI

`job_id` Optional `job_id` from `rdesk_async()` to wire cancel button

Method `loading_progress()`: Update progress on an active loading state

Usage:

```
App$loading_progress(value, message = NULL)
```

Arguments:

`value` Numeric 0-100

`message` Optional updated message

Method `loading_done()`: Hide the loading state in the UI

Usage:

```
App$loading_done()
```

Method `toast()`: Show a non-blocking toast notification in the UI

Usage:

```
App$toast(message, type = "info", duration_ms = 3000L)
```

Arguments:

message Text to show

type One of "info", "success", "warning", "error"

duration_ms How long to show it (default 3000ms)

Method `set_tray()`: Set or update the system tray icon

Usage:

```
App$set_tray(label = "RDesk App", icon = NULL, on_click = NULL)
```

Arguments:

label Tooltip text for the tray icon

icon Path to .ico file (optional)

on_click Character "left" or "right" or callback function(button)

Returns: The App instance (invisible)

Method `remove_tray()`: Remove the system tray icon

Usage:

```
App$remove_tray()
```

Returns: The App instance (invisible)

Method `service()`: Service this app's pending native events

Usage:

```
App$service()
```

Returns: The App instance (invisible)

Method `quit()`: Close the window and stop the app's event loop.

Usage:

```
App$quit()
```

Returns: The App instance (invisible)

Method `get_dir()`: Get the application root directory (where www/ and R/ are located).

Usage:

```
App$get_dir()
```

Returns: Character string path.

Method `run()`: Start the application - opens the window

Usage:

```
App$run(block = TRUE)
```

Arguments:

block If TRUE (default), blocks with an event loop until the window is closed.

Method `clone()`: The objects of this class are cloneable with this method.

Usage:

```
App$clone(deep = FALSE)
```

Arguments:

deep Whether to make a deep clone.

Examples

```

# Safe logical check (unwrapped)
app_dir <- system.file("templates/hello", package = "RDesk")
if (nzchar(app_dir)) {
  message("Built-in app directory: ", app_dir)
}

if (interactive()) {
  app <- App$new(title = "Car Visualizer", width = 1200, height = 800)

  app$on_ready(function() {
    message("App is ready!")
  })

  # Handle messages from UI
  app$on_message("get_data", function(payload) {
    list(cars = mtcars[1:5, ])
  })

  # Start the app
  app$run()
}

```

 async

Wrap a message handler to run asynchronously with zero configuration

Description

`async()` is the simplest way to make an RDesk message handler non-blocking. Wrap any handler function with `async()` and RDesk automatically handles background execution, loading states, error toasts, and result routing.

`async()` transforms a standard RDesk message handler into a background task. The UI remains responsive while the task runs. When finished, a result message (e.g., `get_data_result`) is automatically sent back to the UI.

Usage

```

async(
  fn,
  app = NULL,
  loading_message = "Working...",
  cancellable = TRUE,
  error_message = "Error: "
)

```

Arguments

fn	The handler function, taking a payload argument.
app	The RDesk App instance. If NULL, tries to resolve from the global registry.
loading_message	Message to display in the UI overlay while working.
cancellable	Whether the UI should show a 'Cancel' button.
error_message	Prefix for toast notifications if the task fails.

Details

To ensure the background worker has access to all application logic, RDesk automatically sources every .R file in the application's R/ directory before executing the task. It also snapshots currently loaded packages (excluding system packages) to recreate the environment.

Value

A wrapped handler function suitable for app\$on_message().

Examples

```
if (interactive()) {
  app$on_message("filter_cars", async(function(payload) {
    mtcars[mtcars$cyl == payload$cylinders, ]
  }, app = app))
}
```

 build_app

Build a self-contained distributable from an RDesk application

Description

Build a self-contained distributable from an RDesk application

Usage

```
build_app(
  app_dir = ".",
  out_dir = file.path(tempdir(), "dist"),
  app_name = NULL,
  version = NULL,
  r_version = NULL,
  include_packages = character(0),
  portable_r_method = c("extract_only", "installer"),
  runtime_dir = NULL,
  overwrite = FALSE,
  build_installer = FALSE,
```

```

publisher = "RDesk User",
website = "https://github.com/Janakiraman-311/RDesk",
license_file = NULL,
icon_file = NULL,
prune_runtime = TRUE,
dry_run = FALSE
)

```

Arguments

app_dir	Path to the app directory (must contain app.R and www/)
out_dir	Output directory for the zip file (created if not exists)
app_name	Name of the application. Defaults to name in DESCRIPTION or "MyRDeskApp".
version	Version string. Defaults to version in DESCRIPTION or "1.0.0".
r_version	R version to bundle e.g. "4.4.2". Defaults to current R version.
include_packages	Character vector of extra CRAN packages to bundle. RDesk's own dependencies are always included automatically.
portable_r_method	How to provision the bundled R runtime when runtime_dir = "download" is used explicitly. "extract_only" requires standalone 7-Zip and never launches the R installer. "installer" allows the legacy silent installer path explicitly.
runtime_dir	Controls which R runtime is bundled with the app. <ul style="list-style-type: none"> • NULL (default) – copies the developer's currently running R installation. Guarantees the bundled packages and the runtime are the same R version, eliminating renv version-mismatch crashes. • A filesystem path – copies that R installation root directly. • "download" – downloads a portable R installer from CRAN (legacy behaviour; requires network; risks version mismatch with renv).
overwrite	If TRUE, overwrite existing output. Default FALSE.
build_installer	If TRUE, also build a Windows installer (.exe) using InnoSetup.
publisher	Documentation for the application publisher (used in installer).
website	URL for the application website (used in installer).
license_file	Path to a license file (.txt or .rtf) to include in the installer.
icon_file	Path to an .ico file for the installer and application shortcut.
prune_runtime	If TRUE, remove unnecessary files (Tcl/Tk, docs, tests) from the bundled R runtime to reduce size (~15-20MB saving). Default TRUE.
dry_run	If TRUE, performs a quick validation of the app structure and environment without performing the full build. Default FALSE.

Value

Path to the created zip file, invisibly.

Examples

```
# Prepare an app directory (following scaffold example)
app_path <- file.path(tempdir(), "MyApp")
rdesk_create_app("MyApp", path = tempdir())

# Perform a dry-run build (fast, no external binaries downloaded)
build_app(app_path, out_dir = tempdir(), dry_run = TRUE)
```

rdesk_async	<i>Run a task in the background</i>
-------------	-------------------------------------

Description

Automatically switches between 'mirai' (persistent daemons) and 'callr' (on-demand processes).

Usage

```
rdesk_async(
  task,
  args = list(),
  on_done = NULL,
  on_error = NULL,
  timeout_sec = NULL,
  app_id = NULL
)
```

Arguments

task	A function to run in the background.
args	A list of arguments to pass to the task.
on_done	Callback function(result) called when the task finishes successfully.
on_error	Callback function(error) called if the task fails.
timeout_sec	Optional timeout in seconds. If exceeded, the job is cancelled and on_error() receives a timeout error.
app_id	Optional App ID used to associate a job with a specific app.

Value

Invisible job ID.

Examples

```
# Fast, non-interactive task check (safe to unwrap)
rdesk_jobs_pending()

if (interactive()) {
  # Run a long-running computation in the background
  rdesk_async(
    task = function(n) { Sys.sleep(2); sum(runif(n)) },
    args = list(n = 1e6),
    on_done = function(res) message("Task finished: ", res),
    on_error = function(err) message("Task failed: ", err$message)
  )
}
```

rdesk_auto_update	<i>Automatically check for and install app updates</i>
-------------------	--

Description

rdesk_auto_update is a high-level function designed for bundled (standalone) applications. It checks a remote version string, compares it with the current version, and if a newer version is found, it downloads and executes the installer silently before quitting the current application.

Usage

```
rdesk_auto_update(
  version_url,
  download_url,
  current_version,
  silent = FALSE,
  app = NULL
)
```

Arguments

version_url	URL to a plain text file containing the latest version string (e.g., "1.1.0")
download_url	URL to the latest installer .exe
current_version	Current app version string e.g. "1.0.0"
silent	If TRUE, downloads and installs without prompting. Default FALSE.
app	Optional App instance for showing toast notifications.

Value

Invisible TRUE if update was applied, FALSE otherwise.

rdesk_cancel_job	<i>Cancel a running background job</i>
------------------	--

Description

Cancel a running background job

Usage

```
rdesk_cancel_job(job_id)
```

Arguments

job_id	The ID of the job to cancel.
--------	------------------------------

Value

Invisible TRUE if cancelled, FALSE if not found.

rdesk_create_app	<i>Create a new RDesk application</i>
------------------	---------------------------------------

Description

Scaffolds a professional RDesk application with a modern dashboard layout. The app includes a sidebar for filters, KPI cards, and an asynchronous ggplot2 charting engine fueled by mtcars (default).

Usage

```
rdesk_create_app(  
  name,  
  path = tempdir(),  
  data_source = NULL,  
  viz_type = NULL,  
  use_async = NULL,  
  theme = "light",  
  open = TRUE  
)
```

Arguments

name	App name. Must be a valid directory name.
path	Directory to create the app in. Default is current directory.
data_source	Internal use. Defaults to "builtin".
viz_type	Internal use. Defaults to "mixed".
use_async	Internal use. Defaults to TRUE.
theme	One of "light", "dark", "system". Default "system".
open	Logical. If TRUE and in RStudio, opens the new project in a new session.

Value

Path to the created app directory, invisibly.

Examples

```
if (interactive()) {
  # Create the Professional Hero Dashboard in a temporary directory
  rdesk_create_app("MyDashboard", path = tempdir())
}

# The following demonstrates just the return value without opening a window
# (Fast and safe - no \dontrun needed for this specific logical check)
path <- file.path(tempdir(), "TestLogic")
if (!dir.exists(path)) {
  # This is just a placeholder example of how to call the function safely
  message("Scaffold path will be: ", path)
}
```

rdesk_df_to_list	<i>Convert a data frame to a list suitable for JSON serialization</i>
------------------	---

Description

Convert a data frame to a list suitable for JSON serialization

Usage

```
rdesk_df_to_list(df)
```

Arguments

df	Data frame to convert
----	-----------------------

Value

A list with 'rows' (list of lists) and 'cols' (character vector)

rdesk_error_plot	<i>Generate a base64-encoded error plot</i>
------------------	---

Description

Generate a base64-encoded error plot

Usage

```
rdesk_error_plot(message = "Error generating plot")
```

Arguments

message Error message to display (optional)

Value

A base64-encoded PNG string

rdesk_is_bundle	<i>Check if the app is running in a bundled (standalone) environment</i>
-----------------	--

Description

Check if the app is running in a bundled (standalone) environment

Usage

```
rdesk_is_bundle()
```

Value

TRUE if running in a bundle, FALSE otherwise

rdesk_jobs_list *List currently pending background jobs*

Description

List currently pending background jobs

Usage

```
rdesk_jobs_list()
```

Value

A data.frame with job ID, started time, backend, and app ID.

rdesk_jobs_pending *Check if any background jobs are pending*

Description

Check if any background jobs are pending

Usage

```
rdesk_jobs_pending()
```

Value

Number of pending jobs.

rdesk_message *Construct a standard RDesk IPC message envelope*

Description

Construct a standard RDesk IPC message envelope

Usage

```
rdesk_message(  
  type,  
  payload = list(),  
  version = getOption("rdesk.ipc_version", "1.0")  
)
```

Arguments

type	The message type/action name
payload	A list representing the message data
version	The contract version (default "1.0")

Value

A list representing the standard JSON envelope

rdesk_parse_message *Parse and validate an incoming RDesk IPC message*

Description

Parse and validate an incoming RDesk IPC message

Usage

```
rdesk_parse_message(raw_json)
```

Arguments

raw_json	The raw JSON string from the frontend
----------	---------------------------------------

Value

A list containing the validated message components, or NULL if invalid

rdesk_plot_to_base64 *Convert a ggplot2 object to a base64-encoded PNG string*

Description

Convert a ggplot2 object to a base64-encoded PNG string

Usage

```
rdesk_plot_to_base64(plot, width = 6, height = 4, dpi = 96)
```

Arguments

plot	A ggplot2 object
width	Width in inches (default 6)
height	Height in inches (default 4)
dpi	DPI resolution (default 96)

Value

A base64-encoded PNG string or a fallback error plot

rdesk_service	<i>Service all active RDesk applications</i>
---------------	--

Description

Processes native OS events for all open windows. Call this periodically if you are running apps with `block = FALSE`.

Usage

```
rdesk_service()
```

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