

Package ‘rgrass’

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Title Interface Between 'GRASS' Geographical Information System and 'R'

Description An interface between the 'GRASS' geographical information system ('GIS') and 'R', based on starting 'R' from within the 'GRASS' 'GIS' environment, or running a free-standing 'R' session in a temporary 'GRASS' location; the package provides facilities for using all 'GRASS' commands from the 'R' command line. The original interface package for 'GRASS 5' (2000-2010) is described in Bivand (2000) <[doi:10.1016/S0098-3004\(00\)00057-1](https://doi.org/10.1016/S0098-3004(00)00057-1)> and Bivand (2001) <<https://www.r-project.org/conferences/DSC-2001/Proceedings/Bivand.pdf>>. This was succeeded by 'spgrass6' for 'GRASS 6' (2006-2016) and 'rgrass7' for 'GRASS 7' (2015-present). The 'rgrass' package modernizes the interface for 'GRASS 8' while still permitting the use of 'GRASS 7'.

Depends R (>= 3.5.0)

Imports stats, utils, methods, xml2

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VignetteBuilder knitr

SystemRequirements GRASS (>= 7)

License GPL (>= 2)

URL <https://osgeo.github.io/rgrass/>, <https://grass.osgeo.org/>,
<https://github.com/osgeo/rgrass>,
<https://lists.osgeo.org/mailman/listinfo/grass-stats>

BugReports <https://github.com/osgeo/rgrass/issues/>

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execGRASS	<i>Run GRASS commands</i>
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Description

The functions provide an interface to GRASS commands run through system, based on the values returned by the `--interface` description flag using XML parsing. If required parameters are omitted, and have declared defaults, the defaults will be used.

Usage

```
execGRASS(
  cmd,
  flags = NULL,
  ...,
  parameters = NULL,
  intern = NULL,
  ignore.stderr = NULL,
  Sys_ignore.stdout = FALSE,
  Sys_wait = TRUE,
  Sys_input = NULL,
  Sys_show.output.on.console = TRUE,
```

```

    Sys_minimized = FALSE,
    Sys_invisible = TRUE,
    echoCmd = NULL,
    redirect = FALSE,
    legacyExec = NULL
  )

stringexecGRASS(
  string,
  intern = NULL,
  ignore.stderr = NULL,
  Sys_ignore.stdout = FALSE,
  Sys_wait = TRUE,
  Sys_input = NULL,
  Sys_show.output.on.console = TRUE,
  Sys_minimized = FALSE,
  Sys_invisible = TRUE,
  echoCmd = NULL,
  redirect = FALSE,
  legacyExec = NULL
)

doGRASS(
  cmd,
  flags = NULL,
  ...,
  parameters = NULL,
  echoCmd = NULL,
  legacyExec = NULL
)

parseGRASS(cmd, legacyExec = NULL)

## S3 method for class 'GRASS_interface_desc'
print(x, ...)

getXMLencoding()

setXMLencoding(enc)

```

Arguments

<code>cmd</code>	GRASS command name.
<code>flags</code>	character vector of GRASS command flags.
<code>...</code>	for <code>execGRASS</code> and <code>doGRASS</code> , GRASS module parameters given as R named arguments directly. For the <code>print</code> method, other arguments to <code>print</code> method. The storage modes of values passed must match those required in GRASS, so a single GRASS string must be a character vector of length 1, a single GRASS

integer must be an integer vector of length 1 (may be an integer constant such as 10L), and a single GRASS float must be a numeric vector of length 1. For multiple values, use vectors of suitable length.

parameters	list of GRASS command parameters, used if GRASS parameters are not given as R arguments directly; the two methods for passing GRASS parameters may not be mixed. The storage modes of values passed must match those required in GRASS, so a single GRASS string must be a character vector of length 1, a single GRASS integer must be an integer vector of length 1 (may be an integer constant such as 10L), and a single GRASS float must be a numeric vector of length 1. For multiple values, use vectors of suitable length.
intern	default NULL, in which case set internally from <code>get.useInternOption</code> ; a logical (not 'NA') which indicates whether to make the output of the command an R object. Not available unless 'popen' is supported on the platform.
ignore.stderr	default NULL, taking the value set by <code>set.ignore.stderrOption</code> , a logical indicating whether error messages written to 'stderr' should be ignored.
Sys.ignore.stdout, Sys.wait, Sys.input	pass extra arguments to system.
Sys.show.output.on.console, Sys.minimized, Sys.invisible	pass extra arguments to system on Windows systems only.
echoCmd	default NULL, taking the logical value set by <code>set.echoCmdOption</code> , print GRASS command to be executed to console.
redirect	default FALSE, if TRUE, add "2>&1" to the command string and set <code>intern</code> to TRUE; only used in legacy mode.
legacyExec	default NULL, taking the logical value set by <code>set.legacyExecOption</code> which is initialised to FALSE on "unix" platforms and TRUE otherwise. If TRUE, use <code>system</code> , if FALSE use <code>system2</code> and divert stderr to temporary file to record error messages and warnings from GRASS modules.
string	a string representing <i>one</i> full GRASS statement, using shell syntax: command name, optionally followed by flags and parameters, all separated by whitespaces. Parameters follow the key=value format; if 'value' contains spaces, then 'value' must be quoted
x	object to be printed
enc	character string to replace UTF-8 in header of XML data generated by GRASS module <code>-interface-description</code> output when the internationalised messages are not in UTF-8 (known to apply to French, which is in latin1)

Details

`parseGRASS` checks to see whether the GRASS command has been parsed already and cached in this session; if not, it reads the interface description, parses it and caches it for future use. `doGRASS` assembles a proposed GRASS command with flags and parameters as a string, wrapping `parseGRASS`, and `execGRASS` is a wrapper for `doGRASS`, running the command through `system` (from 0.7-4, the `...` argument is not used for passing extra arguments for `system`). The command string is termed *proposed*, because not all of the particular needs of commands are provided by the interface description, and no check is made for the existence of input objects. Support for multiple parameter values

added with help from Patrick Caldon. Support for defaults and for direct use of GRASS parameters instead of a parameter list suggested by Rainer Krug.

stringexecGRASS is a wrapper around execGRASS, and accepts a single shell statement as a string (following GRASS's command syntax).

Value

parseGRASS returns a GRASS_interface_desc object, doGRASS returns a character string with a proposed GRASS command - the expanded command name is returned as an attribute, and execGRASS and stringexecGRASS return what system or system2 return, particularly depending on the intern argument when the character strings output by GRASS modules are returned.

If intern is FALSE, system returns the module exit code, while system2 returns the module exit code with "resOut" and "resErr" attributes.

Note

If any package command fails with a UTF-8 error from the XML package, try using setXMLencoding to work around the problem that GRASS modules declare `-interface-description` output as UTF-8 without ensuring that it is (French is of 6.4.0 RC5 latin1).

Author(s)

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See Also

[base::system\(\)](#)

Examples

```
# Run examples if in an active GRASS session in the nc_basic_spm_grass7
Sys.setenv("_SP_EVOLUTION_STATUS_" = "2")
run <- FALSE
GISRC <- Sys.getenv("GISRC")
if (nchar(GISRC) > 0) {
  location_name <- read.dcf(GISRC)[1, "LOCATION_NAME"]
  if (location_name == "nc_basic_spm_grass7") {
    run <- TRUE
  }
}

# Save and set echo command option
echoCmdOption <- get.echoCmdOption()
set.echoCmdOption(TRUE)

if (run) {
  # Read and print GRASS interface description for 'r.slope.aspect'
  print(parseGRASS("r.slope.aspect"))
}
if (run) {
  # Assemble the 'r.slope.aspect' command with specified parameters as a string
```

```

doGRASS(
  "r.slope.aspect",
  flags = c("overwrite"),
  elevation = "elevation.dem",
  slope = "slope",
  aspect = "aspect"
)
}
if (run) {
  # Alternatively, specify parameters as a list
  params <- list(elevation = "elevation",
                 slope = "slope",
                 aspect = "aspect")
  doGRASS("r.slope.aspect",
          flags = c("overwrite"),
          parameters = params)
}
if (run) {
  # Read and print GRASS interface description for 'r.buffer'
  print(parseGRASS("r.buffer"))
}
if (run) {
  # Assemble the 'r.buffer' with specified parameters as a string
  doGRASS(
    "r.buffer",
    flags = c("overwrite"),
    input = "schools",
    output = "bmap",
    distances = seq(1000, 15000, 1000)
  )
}
if (run) {
  # Alternatively, specify parameters as a list
  params <- list(
    input = "schools",
    output = "bmap",
    distances = seq(1000, 15000, 1000)
  )
  doGRASS("r.buffer", flags = c("overwrite"), parameters = params)
}
if (run) {
  # Restore original echo command option
  set.echoCmdOption(echoCmdOption)

  # Try executing 'r.stats' command which will fail because "fire_blocksgg"
  # does not exist in the mapset
  try(res <- execGRASS("r.stats", input = "fire_blocksgg", flags = c("C", "n")),
      silent = FALSE)
}
if (run) {
  # Execute 'r.stats' with legacyExec and print the result
  res <- execGRASS(
    "r.stats",

```

```

    input = "fire_blocksgg",
    flags = c("C", "n"),
    legacyExec = TRUE
  )
  print(res)
}
if (run) {
  # If the command failed, retrieve error message
  if (res != 0) {
    resERR <- execGRASS(
      "r.stats",
      input = "fire_blocksgg",
      flags = c("C", "n"),
      redirect = TRUE,
      legacyExec = TRUE
    )
    print(resERR)
  }
}
if (run) {

  # Use 'stringexecGRASS' to run a command and print the result
  res <- stringexecGRASS("r.stats -p -l input=geology", intern = TRUE)
  print(res)

  stringexecGRASS(
    "r.random.cells --overwrite --quiet output=samples distance=1000 ncells=100 seed=1"
  )
}
if (run) {
  # Alternatively, run the same command using 'execGRASS'
  execGRASS(
    "r.random.cells",
    flags = c("overwrite", "quiet"),
    output = "samples",
    distance = 1000,
    ncells = 100L,
    seed = 1L
  )
}
}

```

gmeta

Reads GRASS metadata from the current LOCATION

Description

GRASS LOCATION metadata are read into a list in R; helper function `getLocationProj` returns a WKT2 string of projection information. The helper function `gmeta2grd` creates a `GridTopology` object from the current GRASS mapset region definitions.

Usage

```
gmeta(ignore.stderr = FALSE, g.proj_WKT = NULL)

getLocationProj(ignore.stderr = FALSE, g.proj_WKT = NULL)

gmeta2grd(ignore.stderr = FALSE)

## S3 method for class 'gmeta'
print(x, ...)

get.ignore.stderrOption()

get.stop_on_no_flags_parasOption()

get.echoCmdOption()

get.useInternOption()

get.legacyExecOption()

get.defaultFlagsOption()

get.suppressEchoCmdInFuncOption()

set.ignore.stderrOption(value)

set.stop_on_no_flags_parasOption(value)

set.echoCmdOption(value)

set.useInternOption(value)

set.legacyExecOption(value)

set.defaultFlagsOption(value)

set.suppressEchoCmdInFuncOption(value)
```

Arguments

<code>ignore.stderr</code>	default FALSE, can be set to TRUE to silence <code>system()</code> output to standard error; does not apply on Windows platforms.
<code>g.proj_WKT</code>	default NULL: return WKT2 representation in GRASS \geq 7.6 and Proj4 in GRASS $<$ 7.6; may be set to FALSE to return Proj4 for GRASS \geq 7.6.
<code>x</code>	S3 object returned by <code>gmeta</code>
<code>...</code>	arguments passed through <code>print</code> method

value logical value for setting options on `ignore.stderr` set by default on package load to `FALSE`, `stop_on_no_flags_params` set by default on package load to `TRUE`, `echoCmd` set by default on package load to `FALSE`. `useIntern` sets the `intern` argument globally; `legacyExec` sets the `legacyExec` option globally, but is initialized to `FALSE` on unix systems (all but Windows) and `TRUE` on Windows; `defaultFlags` is initialized to `NULL`, but may be a character vector with values from `c("quiet", "verbose")` `suppressEchoCmdInFunc` default `TRUE` suppresses the effect of `echoCmd` within package functions, maybe set `FALSE` for debugging.

Value

Returns list of `g.gisenv`, `g.region -g3`, and `g.proj` values.

Author(s)

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Examples

```
run <- FALSE
if (nchar(Sys.getenv("GISRC")) > 0 &&
    read.dcf(Sys.getenv("GISRC"))[1, "LOCATION_NAME"] == "nc_basic_spm_grass7") {
  run <- TRUE
}

if (run) {
  G <- gmeta()
  print(G)
}

if (run) {
  cat(getLocationProj(), "\n")
  cat(getLocationProj(g.proj_WKT = FALSE), "\n")
}

if (run) {
  grd <- gmeta2grd()
  print(grd)
}

if (run) {
  ncells <- prod(slot(grd, "cells.dim"))
  df <- data.frame(k = rep(1, ncells))
  mask_SG <- sp::SpatialGridDataFrame(grd, data = df)
  print(summary(mask_SG))
}
```

initGRASS

*Initiate GRASS session***Description**

Run GRASS interface in an R session not started within GRASS. In general, most users will use `initGRASS` in throwaway locations, to use GRASS modules on R objects without the need to define and populate a location. The function initializes environment variables used by GRASS, the `.gisrc` used by GRASS for further environment variables, and a temporary location.

On Windows, if OSGeo4W GRASS is being used, the R session must be started in the OSGeo4W shell. If not, the non-standard placing of files and of environment variables confuses the function. If `toupper(gisBase)` contains "OSGEO4W64/APPS/GRASS" or "OSGEO4W/APPS/GRASS" (and after converting "\ to /"), but the environment variable `OSGEO4W_ROOT` is not defined, `initGRASS()` will exit with an error before confusion leads to further errors. For further details, see <https://github.com/osgeo/rgrass/issues/16> and <https://github.com/osgeo/rgrass/issues/16>.

The same restriction applies to use of GRASS with QGIS Windows standalone installations, which may be used with `initGRASS` only if the R session is started from the OSGeo4W shell shipped as part of the standalone installer (see <https://github.com/osgeo/rgrass/issues/87>). The function will exit with an error if R was not started from the QGIS OSGeo4W shell before confusion leads to further errors.

The locking functions are used internally, but are exposed for experienced R/GRASS scripters needing to use the GRASS module "g.mapset" through `initGRASS` in an existing GRASS location. In particular, "g.mapset" may leave a `.gislock` file in the current MAPSET, so it may be important to call `unlink(.gislock)` to clean up before quitting the R session. `remove_GISRC` may be used to try to remove the file given in the "GISRC" environment variable if created by `initGRASS` with argument `remove_GISRC=TRUE`.

Usage

```
initGRASS(
  gisBase = NULL,
  home,
  SG,
  gisDbase,
  addon_base,
  location,
  mapset,
  override = FALSE,
  use_g.dirseps.exe = TRUE,
  pid,
  remove_GISRC = FALSE,
  ignore.stderr = get.ignore.stderrOption()
)

get.GIS_LOCK()
```

```

set.GIS_LOCK(pid)

unset.GIS_LOCK()

unlink_.gislock()

remove_GISRC()

```

Arguments

<code>gisBase</code>	The directory path to GRASS binaries and libraries, containing bin and lib sub-directories among others; if NULL, set from environment variable GRASS_INSTALLATION if found, if not found, <code>system("grass --config path")</code> is tried.
<code>home</code>	The directory in which to create the <code>.gisrc</code> file; defaults to <code>\$HOME</code> on Unix systems and to <code>USERPROFILE</code> on Windows systems; can usually be set to <code>tempdir()</code> .
<code>SG</code>	An optional <code>SpatRaster</code> or <code>SpatialGrid</code> object to define the <code>DEFAULT_WIND</code> of the temporary location.
<code>gisDbase</code>	if missing, <code>tempdir()</code> will be used; GRASS GISDBASE directory for the working session.
<code>addon_base</code>	if missing, assumed to be <code>"\$HOME/.grass7/addons"</code> on Unix-like platforms, on MS Windows <code>"\</code> and checked for existence.
<code>location</code>	if missing, <code>basename(tempfile())</code> will be used; GRASS location directory for the working session.
<code>mapset</code>	if missing, <code>basename(tempfile())</code> will be used; GRASS mapset directory for the working session.
<code>override</code>	default FALSE, set to TRUE if accidental trashing of GRASS <code>.gisrc</code> files and locations is not a problem.
<code>use_g.dirseps.exe</code>	default TRUE; when TRUE appears to work for WinGRASS Native binaries, when FALSE for QGIS GRASS binaries; ignored on other platforms.
<code>pid</code>	default as <code>integer(round(runif(1, 1, 1000)))</code> , integer used to identify GIS_LOCK; the value here is arbitrary, but probably should be set correctly.
<code>remove_GISRC</code>	default FALSE; if TRUE, attempt to unlink the temporary file named in the "GISRC" environment variable when the R session terminates or when this package is unloaded.
<code>ignore.stderr</code>	default taking the value set by <code>set.ignore.stderrOption</code> ; can be set to TRUE to silence <code>system()</code> output to standard error; does not apply on Windows platforms.

Details

The function establishes an out-of-GRASS working environment providing GRASS commands with the environment variable support required, and may also provide a temporary location for use until the end of the running R session if the `home` argument is set to `tempdir()`, and the `gisDbase` argument is not given. Running `gmeta` shows where the location is, should it be desired to archive it before leaving R.

Value

The function runs `gmeta6` before returning the current values of the running GRASS session that it provides.

Note

If any package command fails with a UTF-8 error from the XML package, try using `setXMLencoding` to work around the problem that GRASS modules declare `-interface-description` output as UTF-8 without ensuring that it is.

Author(s)

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See Also

[gmeta\(\)](#)

Examples

```
# Run only if GRASS installation is found and 'terra' package is installed
GRASS_INSTALLATION <- Sys.getenv("GRASS_INSTALLATION")
run <- nzchar(GRASS_INSTALLATION) &&
      file.exists(GRASS_INSTALLATION) &&
      file.info(GRASS_INSTALLATION)$isdir &&
      require(terra, quietly = TRUE)

if (run) {
  # Get the terra example dataset
  f <- system.file("ex/elev.tif", package="terra")
  r <- rast(f)
}

# Check for existing GRASS session running
if (run) {
  loc_existing <- try(gmeta(), silent = TRUE)
}

if (run) {
  # Initialize a temporary GRASS project using the example data
  loc <- initGRASS(
    gisBase = GRASS_INSTALLATION,
    home = tempdir(),
    SG = r,
    override = TRUE
  )
}

if (run) {
  # Write the example data to the GRASS database
  write_RAST(r, "elev", flags = "overwrite")
}
```

```

    execGRASS("r.info", map = "elev")
  }

  if (run) {
    # Calculate slope and aspect raster
    execGRASS(
      "r.slope.aspect",
      flags = "overwrite",
      elevation = "elev",
      slope = "slope",
      aspect = "aspect"
    )
  }

  if (run) {
    # Read the results back into R and plot
    u1 <- read_RAST(c("elev", "slope", "aspect"), return_format = "terra")
    plot(u1[["elev"]], col = terrain.colors(50))
  }

  # Restore the original GRASS session
  if (run) {
    if (!inherits(loc_existing, "try-error")) {
      loc <- initGRASS(
        home = tempdir(),
        gisBase = GRASS_INSTALLATION,
        gisDbase = loc_existing$GISDBASE,
        location = loc_existing$LOCATION_NAME,
        mapset = loc_existing$MAPSET,
        override = TRUE
      )
    }
  }
}

```

read_RAST

Read and write GRASS raster files

Description

Read GRASS raster files from GRASS into R `terra::SpatRaster` or `sp::SpatialGridDataFrame` objects, and write single columns of `terra::SpatRaster` or `sp::SpatialGridDataFrame` objects to GRASS. When `return_format="terra"`, temporary binary files `r.out.bin` and `r.in.bin` are used for speed reasons. `read_RAST()` and `write_RAST()` by default use "RRASTER" files written and read by GDAL.

Usage

```

read_RAST(
  vname,
  cat = NULL,

```

```

    NODATA = NULL,
    return_format = "terra",
    close_OK = return_format == "SGDF",
    flags = NULL,
    Sys_ignore.stdout = FALSE,
    ignore.stderr = get.ignore.stderrOption()
)

write_RAST(
  x,
  vname,
  zcol = 1,
  NODATA = NULL,
  flags = NULL,
  ignore.stderr = get.ignore.stderrOption(),
  overwrite = FALSE,
  verbose = TRUE
)

```

Arguments

vname	A vector of GRASS raster file names in mapsets in the current search path, as set by "g.mapsets"; the file names may be given as fully-qualified map names using "name@mapset", in which case only the mapset given in the full path will be searched for the existence of the raster; if more than one raster with the same name is found in mapsets in the current search path, an error will occur, in which case the user should give the fully-qualified map name. If the fully-qualified name is used, @ will be replaced by underscore in the output object.
cat	default NULL; if not NULL, must be a logical vector matching vname, stating which (CELL) rasters to return as factor.
NODATA	by default NULL, in which case it is set to one less than floor() of the data values for FCELL rasters or the range maximum for CELL Byte, UInt16 and UInt32 rasters (with no negative values), and an attempt is made to set NODATA to the upper Int16 and Int32 range if the lower range is occupied; otherwise an integer NODATA value (required to be integer by GRASS r.out.bin).
return_format	default terra, optionally SGDF.
close_OK	default TRUE - clean up possible open connections used for reading metadata; may be set to FALSE to avoid the side-effect of other user-opened connections being broken.
flags	default NULL, character vector, for example overwrite.
Sys_ignore.stdout	Passed to system.
ignore.stderr	default taking the value set by set.ignore.stderrOption; can be set to TRUE to silence system() output to standard error; does not apply on Windows platforms.
x	A terra <code>terra::SpatRaster</code> or sp <code>sp::SpatialGridDataFrame</code> object,

zcol	Attribute column number or name,
overwrite	default FALSE, if TRUE inserts "overwrite" into the value of the flags argument if not already there to allow existing GRASS rasters to be overwritten,
verbose	default TRUE, report how writing to GRASS is specified,

Value

by default returns a SpatRaster object, but may return a legacy SpatialGridDataFrame object if return_format="SGDF". write_RAST silently returns the object being written to GRASS.

Author(s)

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Examples

```
# Run example only if GRASS settings file indicates that the
# nc_basic_spm_grass7 location is active
run <- FALSE
GISRC <- Sys.getenv("GISRC")

if (nchar(GISRC) > 0) {
  location_name <- read.dcf(GISRC)[1, "LOCATION_NAME"]
  if (location_name == "nc_basic_spm_grass7") {
    run <- TRUE
  }
}

# store original environment variables before modifying
GV <- Sys.getenv("GRASS_VERBOSE")
Sys.setenv("GRASS_VERBOSE" = 0)
original_ignore_stderr <- get.ignore.stderrOption()
set.ignore.stderrOption(TRUE)

if (run) {
  # Retrieve GRASS metadata and create a new mapset
  meta <- gmeta()
  location_path <- file.path(meta$GISDBASE, meta$LOCATION_NAME)
  previous_mapset <- meta$MAPSET
  example_mapset <- "RGRASS_EXAMPLES"
  execGRASS("g.mapset", flags = "c", mapset = example_mapset)
}

if (run) {
  # List available mapsets and raster maps
  mapsets <- unlist(
    strsplit(execGRASS("g.mapsets", flags = "p", intern = TRUE), " ")
  )
  print(mapsets)
}

if (run) {
```

```

    execGRASS("g.list", type = "raster", pattern = "soils", flags = "m",
              intern = TRUE)
  }

  if (run) {
    execGRASS("g.list", type = "raster", pattern = "soils@PERMANENT",
              mapset = ".", flags = "m", intern = TRUE)
  }

  if (run) {
    execGRASS("g.list", type = "raster", pattern = "soils",
              mapset = "PERMANENT", flags = "m", intern = TRUE)
  }
# Read/write the GRASS "landuse" dataset as a SpatRaster
if (require("terra", quietly = TRUE)) {
  if (run) {
    v1 <- read_RAST("landuse", cat = TRUE, return_format = "terra")
    print(v1)
    print(inMemory(v1))
  }

  if (run) {
    write_RAST(v1, "landuse1", flags = c("o", "overwrite"))
    execGRASS("r.stats", flags = "c", input = "landuse1")
    execGRASS("g.remove", flags = "f", name = "landuse1", type = "raster")
  }
}

# read the geology and elevation GRASS datasets as SpatialGridDataFrames
if (require("sp", quietly = TRUE)) {
  if (run) {
    nc_basic <- read_RAST(c("geology", "elevation"), cat = c(TRUE, FALSE),
                        return_format = "SGDF")
    print(table(nc_basic$geology))
  }

  if (run) {
    execGRASS("r.stats", flags = c("c", "l", "quiet"), input = "geology")
    boxplot(nc_basic$elevation ~ nc_basic$geology)
  }

  if (run) {
    # Compute square root of elevation and write back to GRASS
    nc_basic$sqdem <- sqrt(nc_basic$elevation)
    write_RAST(nc_basic, "sqdemSP", zcol = "sqdem",
              flags = c("quiet", "overwrite"))
    execGRASS("r.info", map = "sqdemSP")
  }

  if (run) {
    # Read the new raster data and measure read times
    print(system.time(
      sqdemSP <- read_RAST(c("sqdemSP", "elevation"), return_format = "SGDF")
    ))
  }
}

```



```

}

if (run) {
  print(system.time(
    sqdem <- read_RAST(c("sqdemSP", "elevation"), return_format = "terra")
  )
}

if (run) {
  print(names(sqdem))
}

if (run) {
  sqdem1 <- read_RAST(c("sqdemSP@RGRASS_EXAMPLES", "elevation@PERMANENT"))
  print(names(sqdem1))
}

if (run) {
  execGRASS("g.remove", flags = "f", name = "sqdemSP", type = "raster")

  # GRASS r.mapcalc example
  execGRASS("r.mapcalc", expression = "basins0 = basins - 1",
    flags = "overwrite")
  execGRASS("r.stats", flags = "c", input = "basins0")
}

if (run) {
  basins0 <- read_RAST("basins0", return_format = "SGDF")
  print(table(basins0$basins0))
  execGRASS("g.remove", flags = "f", name = "basins0", type = "raster")
}

if (run) {
  # Create and read a test raster
  execGRASS("r.mapcalc", expression = "test_t = 66000",
    flags = "overwrite")
  execGRASS("r.info", flags = "r", map = "test_t", intern = TRUE)
  tt <- read_RAST("test_t")
  execGRASS("g.remove", flags = "f", name = "test_t", type = "raster")
}

if (run) {
  # Restore the previous mapset and clean up
  execGRASS("g.mapset", mapset = previous_mapset)
  if (example_mapset != previous_mapset) {
    unlink(file.path(location_path, example_mapset), recursive = TRUE)
  }
}

# Restore original GRASS settings
Sys.setenv("GRASS_VERBOSE" = GV)
set.ignore.stderrOption(original_ignore_stderr)

```

 read_VECT

Read and write GRASS vector object files

Description

read_VECT moves one GRASS vector object file with attribute data through a temporary GeoPackage file to a `terra::SpatVector` object; write_VECT moves a `terra::SpatVector` object through a temporary GeoPackage file to a GRASS vector object file. vect2neigh returns neighbour pairs with shared boundary length as described by Markus Neteler, in <https://stat.ethz.ch/pipermail/r-sig-geo/2005-October/000616.html>. cygwin_clean_temp can be called to try to clean the GRASS mapset-specific temporary directory under cygwin.

Usage

```
read_VECT(
  vname,
  layer = "",
  proxy = FALSE,
  use_gdal_grass_driver = TRUE,
  type = NULL,
  flags = "overwrite",
  Sys_ignore.stdout = FALSE,
  ignore.stderr = get.ignore.stderrOption()
)

write_VECT(
  x,
  vname,
  flags = "overwrite",
  ignore.stderr = get.ignore.stderrOption()
)

vInfo(vname, layer, ignore.stderr = NULL)

vColumns(vname, layer, ignore.stderr = NULL)

vDataCount(vname, layer, ignore.stderr = NULL)

vect2neigh(
  vname,
  ID = NULL,
  ignore.stderr = NULL,
  remove = TRUE,
  vname2 = NULL,
  units = "k"
)
```

Arguments

vname	A GRASS vector file name.
layer	a layer name (string); if missing the first layer will be used.
proxy	Default is FALSE. Set as TRUE if you need a SpatVectorProxy object.
use_gdal_grass_driver	Default TRUE. The standalone GDAL-GRASS driver for the vector format will be used if it is installed. The advantage is that no intermediate file needs to be written from GRASS GIS and subsequently read into R; instead the vector layer is read directly from the GRASS GIS database. Please read the Note further below!.
type	override type detection when multiple types are non-zero, passed to v.out.ogr.
flags	Character vector containing additional optional flags and/or options for v.in.ogr, particularly "o" and "overwrite".
Sys_ignore.stdout	Passed to system.
ignore.stderr	default the value set by set.ignore.stderrOption; NULL, taking the value set by set.ignore.stderrOption, can be set to TRUE to silence system() output to standard error; does not apply on Windows platforms.
x	A SpatVector object moved to GRASS.
ID	A valid DB column name for unique identifiers (optional).
remove	default TRUE, remove copied vectors created in vect2neigh.
vname2	If on a previous run, remove was FALSE, the name of the temporary vector may be given to circumvent its generation.
units	default "k"; see GRASS 'v.to.db' manual page for alternatives.

Value

read_VECT imports a GRASS vector layer into a SpatVector or SpatVectorProxy object. vect2neigh returns a data frame object with left and right neighbours and boundary lengths, also given class GRASSneigh and spatial.neighbour (as used in spdep). The incantation to retrieve the neighbours list is `sn2listw(vect2neigh())$neighbours`, and to retrieve the boundary lengths: `sn2listw(vect2neigh())$weights`. The GRASSneigh object has two other useful attributes: `external` is a vector giving the length of shared boundary between each polygon and the external area, and `total` giving each polygon's total boundary length.

Note

Be aware that the GDAL-GRASS driver may have some **issues** for vector data. In our experience, the error and warning messages for vector data can be ignored. Further, the returned metadata about the coordinate reference system may currently be incomplete, e.g. it may miss the EPSG code.

Author(s)

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Examples

```

# Run example if in active GRASS nc_basic_spm_grass7 location
run <- FALSE
if (nchar(Sys.getenv("GISRC")) > 0 &&
    read.dcf(Sys.getenv("GISRC"))[1, "LOCATION_NAME"] == "nc_basic_spm_grass7") {
  run <- require(terra, quietly = TRUE)
}

# Store original environment variable settings
GV <- Sys.getenv("GRASS_VERBOSE")
Sys.setenv("GRASS_VERBOSE" = 0)
ois <- get.ignore.stderrOption()
set.ignore.stderrOption(TRUE)

if (run) {
  # Create a new mapset
  meta <- gmeta()
  location_path <- file.path(meta$GISDBASE, meta$LOCATION_NAME)
  previous_mapset <- meta$MAPSET
  example_mapset <- "RGRASS_EXAMPLES"
  execGRASS("g.mapset", "c", mapset = example_mapset)
}

if (run) {
  # Report basic metadata about the schools dataset
  execGRASS("v.info", map = "schools", layer = "1")
  print(vInfo("schools"))
}

if (run) {
  # Read/write as a SpatVector
  schs <- read_VECT("schools")
  print(summary(schs))
}

if (run) {
  try({
    write_VECT(schs, "newsch", flags = c("o", "overwrite"))
  })
  schs <- read_VECT("schools", use_gdal_grass_driver = FALSE)
}

if (run) {
  write_VECT(schs, "newsch", flags = c("o", "overwrite"))
  execGRASS("v.info", map = "newsch", layer = "1")
}

if (run) {
  nschs <- read_VECT("newsch")
  print(summary(nschs))
}

```

```
if (run) {
  print(all.equal(names(nschs), as.character(vColumns("newsch")[, 2])))
}

if (run) {
  # Show metadata for the roadsmajor dataset and read as spatVector
  print(vInfo("roadsmajor"))
}

if (run) {
  roads <- read_VECT("roadsmajor")
  print(summary(roads))
}

# not run: vect2neigh() currently writes 3 new data sources in the PERMANENT
# mapset, despite this mapset not being the active one.
if (FALSE) {
  cen_neig <- vect2neigh("census")
  str(cen_neig)
}

# Cleanup the previously created datasets
if (run) {
  execGRASS(
    "g.remove",
    flags = "f",
    name = c("newsch", "newsch1"),
    type = "vector"
  )
  execGRASS("g.mapset", mapset = previous_mapset)
  if (example_mapset != previous_mapset) {
    unlink(file.path(location_path, example_mapset), recursive = TRUE)
  }
}

# Restore environment variable settings
Sys.setenv("GRASS_VERBOSE" = GV)
set.ignore.stderrOption(ois)
```

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