

# 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 'sgrass6' 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 (>= 3.3.0), XML

**Imports** stats, utils, methods

**Suggests** terra (>= 1.6-16), sp (>= 0.9), knitr, rmarkdown, sf, stars, raster (>= 3.6-3)

**VignetteBuilder** knitr

**SystemRequirements** GRASS (>= 7)

**License** GPL (>= 2)

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

**BugReports** <https://github.com/rsbivand/rgrass/issues/>

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vect\_link\_ng.R initGRASS.R xml1.R

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## R topics documented:

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rgrass-package                      *Interface between GRASS geographical information system and R*

---

## Description

Interpreted interface between GRASS geographical information system, versions 7 and 8, and R, based on starting R from within the GRASS environment, or on running R stand-alone and creating a throw-away GRASS environment from within R. The interface uses classes defined in the sp package to hold spatial data.

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Note that the examples now use the smaller subset North Carolina location: [https://grass.osgeo.org/sampledata/north\\_carolina/nc\\_basic\\_spm\\_grass7.tar.gz](https://grass.osgeo.org/sampledata/north_carolina/nc_basic_spm_grass7.tar.gz)

**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
Sys.setenv("_SP_EVOLUTION_STATUS_"="2")
run <- run && require("terra", quietly=TRUE) && require("sp", quietly=TRUE)
if (run) {
  grd <- gmeta2grd(ignore.stderr=TRUE)
  grd
}
if (run) {
  elevation <- read_RAST("elevation", ignore.stderr=TRUE)
}
if (run) {
  set.seed(1)
  smple <- spatSample(ext(elevation), lonlat=is.lonlat(elevation), size=200,
    method="random", as.points=TRUE)
  values(smple) <- extract(elevation, smple)[,2]
  smple
}
if (run) {
  write_VECT(smple, "sp_dem", flags=c("overwrite", "o"), ignore.stderr=TRUE)
}
if (run) {
  schoolsDF <- read_VECT("schools", ignore.stderr=TRUE)
  summary(schoolsDF)
}
if (run) {
  vInfo("streams", ignore.stderr=TRUE)
}
if (run) {
  vColumns("streams", ignore.stderr=TRUE)
}
if (run) {
  vDataCount("streams", ignore.stderr=TRUE)
}
if (run) {
  streams <- read_VECT("streams", type="line", ignore.stderr=TRUE)
  summary(streams)
}
}
```

## 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 |
| <code>parameters</code> | 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                                    |
| <code>string</code>     | 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   |
| <code>intern</code>     | 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  |

|   |   |
|---|---|
| <code>ignore.stderr</code>  | default NULL, taking the value set by <code>set.ignore.stderrOption</code> , a logical indicating whether error messages written to 'stderr' should be ignored  |
| <code>Sys_ignore.stdout</code> , <code>Sys_wait</code> , <code>Sys_input</code>                   | pass extra arguments to system  |
| <code>Sys_show.output.on.console</code> , <code>Sys_minimized</code> , <code>Sys_invisible</code> | pass extra arguments to system on Windows systems only  |
| <code>echoCmd</code>  | default NULL, taking the logical value set by <code>set.echoCmdOption</code> , print GRASS command to be executed to console  |
| <code>redirect</code>   | default FALSE, if TRUE, add “2>&1” to the command string and set <code>intern</code> to TRUE; only used in legacy mode  |
| <code>legacyExec</code>   | 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 system, if FALSE use <code>system2</code> and divert stderr to temporary file to record error messages and warnings from GRASS modules |
| <code>x</code>  | object to be printed  |
| <code>enc</code>  | 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 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**

[system](#)

**Examples**

```

Sys.setenv("_SP_EVOLUTION_STATUS_"="2")
run <- FALSE
if (nchar(Sys.getenv("GISRC")) > 0 &&
    read.dcf(Sys.getenv("GISRC"))[1,"LOCATION_NAME"] == "nc_basic_spm_grass7") run <- TRUE
oechoCmd <- get.echoCmdOption()
set.echoCmdOption(TRUE)
if (run) {
  print(parseGRASS("r.slope.aspect"))
}
if (run) {
  doGRASS("r.slope.aspect", flags=c("overwrite"),
    elevation="elevation.dem", slope="slope", aspect="aspect")
}
if (run) {
  pars <- list(elevation="elevation", slope="slope", aspect="aspect")
  doGRASS("r.slope.aspect", flags=c("overwrite"), parameters=pars)
}
if (run) {
  print(parseGRASS("r.buffer"))
}
if (run) {
  doGRASS("r.buffer", flags=c("overwrite"), input="schools", output="bmap",
    distances=seq(1000,15000,1000))
}
if (run) {
  pars <- list(input="schools", output="bmap", distances=seq(1000,15000,1000))
  doGRASS("r.buffer", flags=c("overwrite"), parameters=pars)
}
if (run) {
  set.echoCmdOption(oechoCmd)
  try(res <- execGRASS("r.stats", input = "fire_blocksgg", # no such file
    flags = c("C", "n")), silent=FALSE)
}
if (run) {
  res <- execGRASS("r.stats", input = "fire_blocksgg", flags = c("C", "n"),
    legacyExec=TRUE)
  print(res)
}
if (run) {
  if (res != 0) {
    resERR <- execGRASS("r.stats", input = "fire_blocksgg",
      flags = c("C", "n"), redirect=TRUE, legacyExec=TRUE)
    print(resERR)
  }
}

```

```

    }
  }
  if (run) {
    res <- stringexecGRASS("r.stats -p -l input=geology", intern=TRUE)
    print(res)
  }
  if (run) {
    stringexecGRASS(paste("r.random.cells --overwrite --quiet output=samples",
      "distance=1000 ncells=100 seed=1"))
  }
  if (run) {
    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 print method  |
| <code>value</code>         | logical value for setting options on <code>ignore.stderr</code> set by default on package load to FALSE, <code>stop_on_no_flags_paras</code> set by default on package load to TRUE, <code>echoCmd</code> set by default on package load to FALSE. <code>useIntern</code> sets the <code>intern</code> argument globally; <code>legacyExec</code> sets the <code>legacyExec</code> option globally, but is initialized to FALSE on unix systems (all but Windows) and TRUE on Windows; <code>defaultFlags</code> is initialized to NULL, but may be a character vector with values from <code>c("quiet", "verbose")</code> <code>suppressEchoCmdInFunc</code> default TRUE suppresses the effect of <code>echoCmd</code> within package functions, may be set FALSE for debugging. |

**Value**

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

**Author(s)**

Roger S. Bivand, e-mail: <Roger.Bivand@nhh.no>

**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")
}
if (run) {
  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/rsbivand/rgrass/issues/16> and <https://lists.osgeo.org/pipermail/grass-stats/2018-November/001800.html>.

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 <code>bin</code> and <code>lib</code> sub-directories among others; if <code>NULL</code> , set from environment variable <code>GRASS_INSTALLATION</code> 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 <code>GISDBASE</code> directory for the working session  |

|                   |  |
|-------------------|--|
| addon_base        | if missing, assumed to be “\$HOME/.grass7/addons” on Unix-like platforms, on MS Windows “%APPDATA%\GRASS7\addons”, and checked for existence   |
| location          | if missing, <code>basename(tempfile())</code> will be used; GRASS location directory for the working session   |
| mapset            | if missing, <code>basename(tempfile())</code> will be used; GRASS mapset directory for the working session   |
| override          | default FALSE, set to TRUE if accidental trashing of GRASS <code>.gisrc</code> files and locations is not a problem  |
| use_g.dirseps.exe | default TRUE; when TRUE appears to work for WinGRASS Native binaries, when FALSE for QGIS GRASS binaries; ignored on other platforms.  |
| pid               | default as <code>integer(round(runif(1, 1, 1000)))</code> , integer used to identify <code>GIS_LOCK</code> ; the value here is arbitrary, but probably should be set correctly           |
| remove_GISRC      | 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                    |
| ignore.stderr     | 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

```

GRASS_INSTALLATION <- Sys.getenv("GRASS_INSTALLATION")
run <- FALSE
if (nzchar(GRASS_INSTALLATION)) run <- file.info(GRASS_INSTALLATION)$isdir
run <- run && require(terra, quietly=TRUE)
if (run) {
  f <- system.file("ex/elev.tif", package="terra")
  r <- rast(f)
  plot(r, col=grDevices::terrain.colors(50))
}
if (run) {
  (loc <- initGRASS(GRASS_INSTALLATION, home=tempdir(), SG=r, override=TRUE))
}
if (run) {
  write_RAST(r, "elev", flags="overwrite")
  execGRASS("r.info", map="elev")
}
if (run) {
  s <- rast(r)
  values(s) <- values(r)
  write_RAST(s, "elev1", flags="overwrite")
  execGRASS("r.info", map="elev1")
}
if (run) {
  execGRASS("r.slope.aspect", flags="overwrite", elevation="elev", slope="slope", aspect="aspect")
}
if (run) {
  u1 <- read_RAST(c("elev", "slope", "aspect"), return_format="terra")
  plot(u1[["elev"]], col=grDevices::terrain.colors(50))
}

```

---

readRAST

*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, ignore.stderr=get.ignore.stderrOption(),
  return_format="terra", close_OK=return_format=="SGDF", flags=NULL)
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  |
| cat           | default NULL; if not NULL, must be a logical vector matching vname, stating which (CELL) rasters to return as factor   |
| return_format | default "terra", optionally "SGDF"   |
| ignore.stderr | 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   |
| 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  |
| x             | A <b>terra</b> "SpatRaster" or <b>sp</b> "SpatialGridDataFrame" object   |
| zcol          | Attribute column number or name  |
| NODATA        | by default NULL, in which case it is set to one less than <code>floor()</code> 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 <code>r.out.bin</code> ) |
| overwrite     | default FALSE, if TRUE inserts "overwrite" into the value of the <code>flags</code> argument if not already there to allow existing GRASS rasters to be overwritten  |
| flags         | default NULL, character vector, for example "overwrite"  |
| verbose       | default TRUE, report how writing to GRASS is specified   |

**Value**

`read_RAST` 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 <- FALSE
if (nchar(Sys.getenv("GISRC")) > 0 &&
    read.dcf(Sys.getenv("GISRC"))[1,"LOCATION_NAME"] == "nc_basic_spm_grass7") run <- TRUE
GV <- Sys.getenv("GRASS_VERBOSE")
Sys.setenv("GRASS_VERBOSE"=0)
ois <- get.ignore.stderrOption()
set.ignore.stderrOption(TRUE)
run <- run && require("terra", quietly=TRUE)
if (run) {
  v1 <- read_RAST("landuse", cat=TRUE, return_format="terra")
  v1
  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")
}
Sys.setenv("_SP_EVOLUTION_STATUS_"="2")
run <- run && require("sp", quietly=TRUE)
if (run) {
  nc_basic <- read_RAST(c("geology", "elevation"), cat=c(TRUE, FALSE),
    return_format="SGDF")
  print(table(nc_basic$geology))
}
if (run) {
  execGRASS("r.stats", flags=c("c", "l", "quiet"), input="geology")
}
if (run) {
  boxplot(nc_basic$elevation ~ nc_basic$geology)
}
if (run) {
  nc_basic$sqdem <- sqrt(nc_basic$elevation)
}
if (run) {
  write_RAST(nc_basic, "sqdemSP", zcol="sqdem", flags=c("quiet", "overwrite"))
  execGRASS("r.info", map="sqdemSP")
}
if (run) {
  print(system.time(sqdemSP <- read_RAST(c("sqdemSP", "elevation"),
    return_format="SGDF")))
}
if (run) {
  print(system.time(sqdem <- read_RAST(c("sqdemSP", "elevation"),
    return_format="terra")))
}
if (run) {
  execGRASS("g.remove", flags="f", name="sqdemSP", type="raster")
  execGRASS("r.mapcalc", expression="basins0 = basins - 1", flags="overwrite")
  execGRASS("r.stats", flags="c", input="basins0")
}
if (run) {
  basins0 <- read_RAST("basins0", return_format="SGDF")
  print(table(basins0$basins0))
}
if (run) {
  execGRASS("g.remove", flags="f", name="basins0", type="raster")
}
Sys.setenv("GRASS_VERBOSE"=GV)
set.ignore.stderrOption(ois)

```

## 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, type=NULL, flags="overwrite",
          ignore.stderr = NULL)
write_VECT(x, vname, flags="overwrite", ignore.stderr = NULL)
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 set to default of "1"   |
| type          | override type detection when multiple types are non-zero, passed to v.out.ogr   |
| 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  |
| flags         | Character vector containing additional optional flags and/or options for v.in.ogr, particularly "o" and "overwrite"   |
| 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 object into a "SpatVector" 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.

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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
GV <- Sys.getenv("GRASS_VERBOSE")
Sys.setenv("GRASS_VERBOSE"=0)
ois <- get.ignore.stderrOption()
set.ignore.stderrOption(TRUE)
if (run) {
  execGRASS("v.info", map="schools", layer="1")
}
if (run) {
  print(vInfo("schools"))
  schs <- read_VECT("schools")
  print(summary(schs))
}
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) {
  print(vInfo("roadsmajor"))
}
if (run) {
  roads <- read_VECT("roadsmajor")
  print(summary(roads))
}
if (run) {
  cen_neig <- vect2neigh("census")
  str(cen_neig)
}
if (run) {
  execGRASS("g.remove", flags="f", name=c("newsch", "newsch1"), type="vector")
}
Sys.setenv("GRASS_VERBOSE"=GV)
set.ignore.stderrOption(ois)
```

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