Package 'benchmarkme'

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Type Package

Title Crowd Sourced System Benchmarks

Version 1.0.7

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Description Benchmark your CPU and compare against other CPUs. Also provides functions for obtaining system specifications, such as RAM, CPU type, and R version.

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URL https://github.com/csgillespie/benchmarkme

BugReports https://github.com/csgillespie/benchmarkme/issues

Depends R (>= 3.5.0)

Imports benchmarkmeData (>= 1.0.4), compiler, doParallel, dplyr, foreach, graphics, httr, Matrix, methods, parallel, tibble, utils

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R topics documented:

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benchmarkme-package *The benchmarkme package*

Description

Benchmark your CPU and compare against other CPUs. Also provides functions for obtaining system specifications, such as RAM, CPU type, and R version.

Author(s)

<csgillespie@gmail.com>

See Also

https://github.com/csgillespie/benchmarkme

Examples

```
## Benchmark your system and compare
## Not run:
res = benchmark_std()
upload_results(res)
plot(res)

## End(Not run)
```

benchmark_io *IO benchmarks*

Description

Benchmarking reading and writing a csv file (containing random numbers). The tests are essentially `write.csv(x)` and `read.csv(...)` where `x` is a data frame. Of `size`MB.

Usage

```
benchmark_io(
  runs = 3,
  size = c(5, 50),
  tmpdir = tempdir(),
  verbose = TRUE,
  cores = 0L
)

bm_read(runs = 3, size = c(5, 50), tmpdir = tempdir(), verbose = TRUE)

bm_write(runs = 3, size = c(5, 50), tmpdir = tempdir(), verbose = TRUE)
```

Arguments

`runs`	Number of times to run the test. Default 3.
`size`	a number specifying the approximate size of the generated csv. Must be one of 5 or 50
`tmpdir`	a non-empty character vector giving the directory name. Default `tempdir()`
`verbose`	Default TRUE.
`cores`	Default 0 (serial). When cores > 0, the benchmark is run in parallel.

benchmark_std *Run standard benchmarks*

Description

This function runs a set of standard benchmarks, which should be suitable for most machines. It runs a collection of matrix benchmark functions

- `benchmark_prog`
- `benchmark_matrix_cal`
- `benchmark_matrix_fun`

To view the list of benchmarks, see `get_available_benchmarks`.

Usage

```
benchmark_std(runs = 3, verbose = TRUE, cores = 0L)
```

Arguments

runs	Number of times to run the test. Default 3.
verbose	Default TRUE.
cores	Default 0 (serial). When cores > 0, the benchmark is run in parallel.

Details

Setting cores equal to 1 is useful for assessing the impact of the parallel computing overhead.

Examples

```
## Benchmark your system
## Not run:
res = benchmark_std(3)

## Plot results
plot(res)

## End(Not run)
```

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bm_matrix_cal_manip *Matrix calculation benchmarks*

Description

A collection of matrix benchmark functions aimed at assessing the calculation speed.

- Creation, transp., deformation of a 2500x2500 matrix.
- 2500x2500 normal distributed random matrix ^1000.
- Sorting of 7,000,000 random values.
- 2500x2500 cross-product matrix (b = a' * a)
- Linear regr. over a 3000x3000 matrix.

These benchmarks have been developed by many authors. See http://r.research.att.com/benchmarks/R-benchmark-25.R for a complete history. The function benchmark_matrix_cal() runs the five bm functions.

Usage

```
bm_matrix_cal_manip(runs = 3, verbose = TRUE)

bm_matrix_cal_power(runs = 3, verbose = TRUE)

bm_matrix_cal_sort(runs = 3, verbose = TRUE)

bm_matrix_cal_cross_product(runs = 3, verbose = TRUE)

bm_matrix_cal_lm(runs = 3, verbose = TRUE)

benchmark_matrix_cal(runs = 3, verbose = TRUE, cores = 0L)
```

Arguments

runs	Number of times to run the test. Default 3.
verbose	Default TRUE.
cores	Default 0 (serial). When cores > 0, the benchmark is run in parallel.

References

http://r.research.att.com/benchmarks/R-benchmark-25.R

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bm_matrix_fun_fft *Matrix function benchmarks*

Description

A collection of matrix benchmark functions

- FFT over 2,500,000 random values.
- Eigenvalues of a 640x640 random matrix.
- Determinant of a 2500x2500 random matrix.
- Cholesky decomposition of a 3000x3000 matrix.
- Inverse of a 1600x1600 random matrix.

These benchmarks have been developed by many authors. See http://r.research.att.com/benchmarks/R-benchmark-25.R for a complete history. The function `benchmark_matrix_fun()` runs the five `bm` functions.

Usage

```
bm_matrix_fun_fft(runs = 3, verbose = TRUE)

bm_matrix_fun_eigen(runs = 3, verbose = TRUE)

bm_matrix_fun_determinant(runs = 3, verbose = TRUE)

bm_matrix_fun_cholesky(runs = 3, verbose = TRUE)

bm_matrix_fun_inverse(runs = 3, verbose = TRUE)

benchmark_matrix_fun(runs = 3, verbose = TRUE, cores = 0L)
```

Arguments

runs	Number of times to run the test. Default 3.
verbose	Default TRUE.
cores	Default 0 (serial). When cores > 0, the benchmark is run in parallel.

References

http://r.research.att.com/benchmarks/R-benchmark-25.R

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bm_parallel *Benchmark in parallel*

Description

This function runs benchmarks in parallel to test multithreading

Usage

```
bm_parallel(bm, runs, verbose, cores, ...)
```

Arguments

bm	character name of benchmark function to run from get_available_benchmarks
runs	number of runs of benchmark to make
verbose	display messages during benchmarking
cores	number of cores to benchmark. If cores is specified, the benchmark is also run for cores = 1 to allow for normalisation.
...	additional arguments to pass to bm

Examples

```
## Not run:
bm_parallel("bm_matrix_cal_manip", runs = 3, verbose = TRUE, cores = 2)
bm = c("bm_matrix_cal_manip","bm_matrix_cal_power", "bm_matrix_cal_sort",
       "bm_matrix_cal_cross_product", "bm_matrix_cal_lm")
results = lapply(bm, bm_parallel,
                runs = 5, verbose = TRUE, cores = 2L)

## End(Not run)
```

`bm_prog_fib` *Programming benchmarks*

Description

A collection of matrix programming benchmark functions

- 3,500,000 Fibonacci numbers calculation (vector calc).
- Creation of a 3500x3500 Hilbert matrix (matrix calc).
- Grand common divisors of 1,000,000 pairs (recursion).
- Creation of a 1600x1600 Toeplitz matrix (loops).
- Escoufier's method on a 60x60 matrix (mixed).

These benchmarks have been developed by many authors. See http://r.research.att.com/benchmarks/R-benchmark-25.R for a complete history. The function `benchmark_prog()` runs the five `bm` functions.

Usage

```
bm_prog_fib(runs = 3, verbose = TRUE)

bm_prog_hilbert(runs = 3, verbose = TRUE)

bm_prog_gcd(runs = 3, verbose = TRUE)

bm_prog_toeplitz(runs = 3, verbose = TRUE)

bm_prog_escoufier(runs = 3, verbose = TRUE)

benchmark_prog(runs = 3, verbose = TRUE, cores = 0L)
```

Arguments

`runs`	Number of times to run the test. Default 3.
`verbose`	Default TRUE.
`cores`	Default 0 (serial). When cores > 0, the benchmark is run in parallel.

`create_bundle` *Upload benchmark results*

Description

This function uploads the benchmarking results. These results will then be incorparated in future versions of the package.

Usage

```
create_bundle(results, filename = NULL, args = NULL, id_prefix = "")

upload_results(
  results,
  url = "http://www.mas.ncl.ac.uk/~ncsg3/form.php",
  args = NULL,
  id_prefix = ""
)
```

Arguments

`results`	Benchmark results. Probably obtained from `benchmark_std()` or `benchmark_io()`.
`filename`	default `NULL`. A character vector of where to store the results (in an .rds file). If `NULL`, results are not saved.
`args`	Default `NULL`. A list of arguments to be passed to `get_sys_details()`.
`id_prefix`	Character string to prefix the benchmark id. Makes it easier to retrieve past results.
`url`	The location of where to upload the results.

Examples

```
## Run benchmarks
## Not run:
res = benchmark_std()
upload_results(res)

## End(Not run)
```

get_available_benchmarks *Available benchmarks*

Description

The function returns the available benchmarks

Usage

```
get_available_benchmarks()
```

Examples

```
get_available_benchmarks()
```

get_byte_compiler *Byte compiler status*

Description

Attempts to detect if byte compiling or JIT has been used on the package.

Usage

```
get_byte_compiler()
```

Details

For R 3.5.0 all packages are byte compiled. Before 3.5.0 it was messy. Sometimes the user would turn it on via JIT, or ByteCompiling the package. On top of that R 3.4.X(?) was byte compiled, but R 3.4.Y(?) was, not fully optimised!!! What this means is don't trust historical results!

Value

An integer indicating if byte compiling has been turn on. See `?compiler` for details.

Examples

```
## Detect if you use byte optimization
get_byte_compiler()
```

get_cpu *CPU Description*

Description

Attempt to extract the CPU model on the current host. This is OS specific:

- Linux: `/proc/cpuinfo`
- Apple: `sysctl -n`
- Solaris: Not implemented.
- Windows: `wmic cpu`

A value of `NA` is return if it isn't possible to obtain the CPU.

Usage

```
get_cpu()
```

Examples

```
## Return the machine CPU
get_cpu()
```

get_linear_algebra *Get BLAS and LAPACK libraries Extract the the blas/lapack from* `sessionInfo()`

Description

Get BLAS and LAPACK libraries Extract the the blas/lapack from `sessionInfo()`

Usage

```
get_linear_algebra()
```

get_platform_info *Platform information*

Description

This function just returns the outpu of `.Platform`

Usage

```
get_platform_info()
```

get_ram *Get the amount of RAM*

Description

Attempt to extract the amount of RAM on the current machine. This is OS specific:

- Linux: `proc/meminfo`
- Apple: `system_profiler -detailLevel mini`
- Windows: First tries `grep MemTotal /proc/meminfo` then falls back to `wmic MemoryChip get Capacity`
- Solaris: `prtconf`

A value of `NA` is return if it isn't possible to determine the amount of RAM.

Usage

```
get_ram()
```

References

The `print.bytes` function was taken from the **pryr** package.

Examples

```
## Return (and pretty print) the amount of RAM
get_ram()
## Display using iec units
print(get_ram(), unit_system = "iec")
```

get_r_version *R version*

Description

Returns `unclass(R.version)`

Usage

```
get_r_version()
```

get_sys_details *General system information*

Description

The get_sys_info returns general system level information as a list. The function parameters control the information to upload. If a parameter is set to FALSE, an NA is uploaded instead. Each element of the list is contains the output from:

- Sys.info();
- get_platform_info();
- get_r_version();
- get_ram();
- get_cpu();
- get_byte_compiler();
- get_linear_algebra();
- Sys.getlocale()
- installed.packages();
- .Machine
- The package version number;
- Unique ID - used to extract results;
- The current date.

Usage

```
get_sys_details(
  sys_info = TRUE,
  platform_info = TRUE,
  r_version = TRUE,
  ram = TRUE,
  cpu = TRUE,
  byte_compiler = TRUE,
  linear_algebra = TRUE,
  locale = TRUE,
  installed_packages = TRUE,
  machine = TRUE
)
```

Arguments

sys_info	Default TRUE.
platform_info	Default TRUE.
r_version	Default TRUE.

ram	Default TRUE.
cpu	Default TRUE.
byte_compiler	Default TRUE.
linear_algebra	Default TRUE.
locale	Default TRUE
installed_packages	Default TRUE.
machine	Default TRUE

Value

A list

Examples

```
## Returns all details about your machine
get_sys_details()
```

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plot.ben_results *Compare results to past tests*

Description

Plotting

Usage

```
## S3 method for class 'ben_results'
plot(
  x,
  test_group = unique(x$test_group),
  blas_optimize = is_blas_optimize(x),
  log = "y",
  ...
)
```

Arguments

x	The output from a benchmark_* call.
test_group	Default unique(x$test_group). The default behaviour is select the groups from your benchmark results.
blas_optimize	Logical. Default The default behaviour is to compare your results with results that use the same blas_optimize setting. To use all results, set to NULL.
log	By default the y axis is plotted on the log scale. To change, set the the argument equal to the empty parameter string, "".
...	Arguments to be passed to other downstream methods.

Examples

```
data(sample_results)
plot(sample_results, blas_optimize = NULL)
```

`rank_results` *Benchmark rankings*

Description

Comparison with past results.

Usage

```
rank_results(
  results,
  blas_optimize = is_blas_optimize(results),
  verbose = TRUE
)
```

Arguments

`results`	Benchmark results. Probably obtained from `benchmark_std()` or `benchmark_io()`.
`blas_optimize`	Logical. Default The default behaviour is to compare your results with results that use the same blas_optimize setting. To use all results, set to `NULL`.
`verbose`	Default TRUE.

`sample_results` *Sample benchmarking results*

Description

Sample benchmark results. Used in the vignette.

Format

A data frame

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