Installation and Operational Qualification Testing For R Statistical Software
R version 2.15.0 Patched (2012-05-30 r59478)
Architecture: x86_64
Platform: x86_64-apple-darwin9.8.0

June 3, 2012

Contents

1 Introduction

The R software being tested in this report was downloaded from The Comprehensive R Archive Network (CRAN):

http://cran.r-project.org/

or a CRAN mirror:

http://cran.us.r-project.org/mirrors.html

if this is a stable release or from:

http://R.research.att.com/

if a patched release for Apple's OSX operating system.

The R software was installed on this computer in a manner consistent with "The R Installation and Administration Manual" (the Manual) which is available from:

http://cran.r-project.org/doc/manuals/R-admin.html

The Manual provides recommendations for the post-installation testing of R. The procedures for this testing are described in:

http://cran.r-project.org/doc/manuals/R-admin.html#Testing-a-Unix_002dalike-Installation

for Unix, Linux and OSX installations and:

http://cran.r-project.org/doc/manuals/R-admin.html#Testing-a-Windows-Installation

for Windows installations. The results contained within this report are based upon an automated implementation of the procedures described in the Manual.

General guidance for the use of R in regulated clinical trials has been provided by the R Foundation in a document entitled:

R: Regulatory Compliance and Validation Issues
A Guidance Document for the Use of R in Regulated Clinical Trial Environments

which is available from:

http://www.r-project.org/doc/R-FDA.pdf

The above document describes various characteristics of R, including the Software Development Life Cycle (SDLC) and relevant aspects of 21 CFR Part 11 compliance issues as they may pertain to the use of R for statistical analysis applications for clinical trials.

The output on the following pages of this report describe various technical characteristics of the computer upon which R is running, the R installation, current R session information and is followed by a series of tests for the so-called "Base" and "Recommended" packages which are a part of the official R distribution, as released by the R Foundation.

2 Installation Qualification (IQ)

The following is the output of `R.home()`, showing where R was installed on this computer:

```
/Library/Frameworks/R.framework/Resources
```

The following is the output of `system("R -e 'q()'")`, presenting the R welcome banner as displayed from a default R console (terminal) to show the R console correctly running and then exiting:

```
R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
Copyright (C) 2012 The R Foundation for Statistical Computing
ISBN 3-900051-07-0
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

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'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> q()
```

Only "Base" and "Recommended" packages, which are a part of the official R Foundation distribution of R, should be installed while running these tests. A scan of the currently installed packages indicates:

Only Base and Recommended packages are currently installed.

The following is the output of `installed.packages()`.

```
           Package       LibPath                                                                  Version   Priority
KernSmooth "KernSmooth" "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.23-7"   "recommended"
MASS       "MASS"       "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "7.3-18"   "recommended"
Matrix     "Matrix"     "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "1.0-6"    "recommended"
base       "base"       "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
boot       "boot"       "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "1.3-4"    "recommended"
class      "class"      "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "7.3-3"    "recommended"
cluster    "cluster"    "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "1.14.2"   "recommended"
codetools  "codetools"  "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "0.2-8"    "recommended"
compiler   "compiler"   "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
datasets   "datasets"   "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
foreign    "foreign"    "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "0.8-50"   "recommended"
grDevices  "grDevices"  "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
graphics   "graphics"   "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
grid       "grid"       "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
lattice    "lattice"    "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "0.20-6"   "recommended"
methods    "methods"    "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
mgcv       "mgcv"       "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "1.7-17"   "recommended"
nlme       "nlme"       "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "3.1-104"  "recommended"
nnet       "nnet"       "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "7.3-1"    "recommended"
parallel   "parallel"   "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
rpart      "rpart"      "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "3.1-52"   "recommended"
spatial    "spatial"    "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "7.3-3"    "recommended"
splines    "splines"    "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
stats      "stats"      "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
stats4     "stats4"     "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
survival   "survival"   "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.36-14"  "recommended"
tcltk      "tcltk"      "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
tools      "tools"      "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
utils      "utils"      "/Library/Frameworks/R.framework/Versions/2.15/Resources/library" "2.15.0"   "base"
           Depends                                                 Imports
KernSmooth "R (>= 2.5.0), stats"                                   NA
MASS       "R (>= 2.14.0), grDevices, graphics, stats, utils"      NA
Matrix     "R (>= 2.15.0), stats, methods, utils, lattice"         "graphics, grid"
base       NA                                                      NA
boot       "R (>= 2.14.0), graphics, stats"                        NA
class      "R (>= 2.5.0), stats, utils"                            "MASS"
cluster    "R (>= 2.10.0), stats, graphics, utils"                 NA
codetools  "R (>= 2.1)"                                            NA
compiler   NA                                                      NA
datasets   NA                                                      NA
foreign    "R (>= 2.14.0), stats"                                  "methods, utils"
grDevices  NA                                                      NA
graphics   NA                                                      "grDevices"
grid       NA                                                      "grDevices"
lattice    "R (>= 2.14.0)"                                         "grid, grDevices, graphics, stats, utils, methods"
methods    NA                                                      "utils"
mgcv       "R (>= 2.14.0), stats, graphics"                        "nlme, methods, Matrix"
nlme       "graphics, stats, R (>= 2.13)"                          "lattice"
nnet       "R (>= 2.5.0), stats, utils"                            NA
parallel   NA                                                      NA
rpart      "R (>= 2.14.0), graphics, stats, grDevices"             NA
spatial    "R (>= 2.5.0), graphics, stats, utils"                  NA
splines    NA                                                      "graphics, stats"
stats      NA                                                      NA
stats4     "methods, graphics, stats"                              NA
survival   "stats, utils, graphics, splines, R (>= 2.13.0)"        NA
tcltk      NA                                                      NA
tools      NA                                                      NA
utils      NA                                                      NA
           LinkingTo Suggests                                      Enhances
KernSmooth NA        "MASS"                                        NA
MASS       NA        "lattice, nlme, nnet, survival"               NA
Matrix     NA        "expm, MASS"                                  "MatrixModels, graph, SparseM (>= 0.87),
    sfsmisc"
base       NA        NA                                            NA
boot       NA        "MASS, survival"                              NA
class      NA        NA                                            NA
cluster    NA        NA                                            "MASS"
```

```
codetools  NA         NA                                                  NA
compiler   NA         NA                                                  NA
datasets   NA         NA                                                  NA
foreign    NA         NA                                                  NA
grDevices  NA         NA                                                  NA
graphics   NA         NA                                                  NA
grid       NA         "lattice"                                           NA
lattice    NA         "grid, KernSmooth, MASS"                            "chron"
methods    NA         NA                                                  NA
mgcv       NA         "nlme (>= 3.1-64), splines, Matrix, parallel"       NA
nlme       NA         "Hmisc, MASS"                                       NA
nnet       NA         "MASS"                                              NA
parallel   NA         NA                                                  "snow"
rpart      NA         "survival"                                          NA
spatial    NA         "MASS"                                              NA
splines    NA         NA                                                  NA
stats      NA         NA                                                  NA
stats4     NA         NA                                                  NA
survival   NA         NA                                                  NA
tcltk      NA         NA                                                  NA
tools      NA         NA                                                  NA
utils      NA         NA                                                  NA
           OS_type License             Built
KernSmooth NA      "Unlimited"         "2.15.0"
MASS       NA      "GPL-2 | GPL-3"     "2.15.0"
Matrix     NA      "GPL (>= 2)"        "2.15.0"
base       NA      "Part of R 2.15.0" "2.15.0"
boot       NA      "Unlimited"         "2.15.0"
class      NA      "GPL-2 | GPL-3"     "2.15.0"
cluster    NA      "GPL (>= 2)"        "2.15.0"
codetools  NA      "GPL"               "2.15.0"
compiler   NA      "Part of R 2.15.0" "2.15.0"
datasets   NA      "Part of R 2.15.0" "2.15.0"
foreign    NA      "GPL (>= 2)"        "2.15.0"
grDevices  NA      "Part of R 2.15.0" "2.15.0"
graphics   NA      "Part of R 2.15.0" "2.15.0"
grid       NA      "Part of R 2.15.0" "2.15.0"
lattice    NA      "GPL (>= 2)"        "2.15.0"
methods    NA      "Part of R 2.15.0" "2.15.0"
mgcv       NA      "GPL (>= 2)"        "2.15.0"
nlme       NA      "GPL (>= 2)"        "2.15.0"
nnet       NA      "GPL-2 | GPL-3"     "2.15.0"
parallel   NA      "Part of R 2.15.0" "2.15.0"
rpart      NA      "GPL-2 | GPL-3"     "2.15.0"
spatial    NA      "GPL-2 | GPL-3"     "2.15.0"
splines    NA      "Part of R 2.15.0" "2.15.0"
stats      NA      "Part of R 2.15.0" "2.15.0"
stats4     NA      "Part of R 2.15.0" "2.15.0"
survival   NA      "GPL (>=2)"         "2.15.0"
tcltk      NA      "Part of R 2.15.0" "2.15.0"
tools      NA      "Part of R 2.15.0" "2.15.0"
utils      NA      "Part of R 2.15.0" "2.15.0"
```

The following is the output of `Sys.info()`, defining some details about the current system upon which R is running and user information:

```
                                                                                sysname
                                                                               "Darwin"
                                                                                release
                                                                               "11.4.0"
                                                                                version
"Darwin Kernel Version 11.4.0: Mon Apr  9 19:32:15 PDT 2012; root:xnu-1699.26.8~1/RELEASE_X86_64"
                                                                               nodename
                                                                     "MacBookPro.local"
                                                                                machine
                                                                               "x86_64"
                                                                                  login
                                                                    "marcschwartz"
                                                                                   user
                                                                    "marcschwartz"
                                                                    effective_user
                                                                    "marcschwartz"
```

The following is the output of `.Platform`, defining some details of the platform upon which R was built (compiled):

```
$OS.type
[1] "unix"

$file.sep
[1] "/"

$dynlib.ext
[1] ".so"

$GUI
[1] "X11"

$endian
[1] "little"

$pkgType
[1] "mac.binary.leopard"

$path.sep
[1] ":"

$r_arch
[1] "x86_64"
```

The following is the output of `R.version`, defining detailed information on the currently running version of R:

```
1
2  platform       x86_64-apple-darwin9.8.0
3  arch           x86_64
4  os             darwin9.8.0
5  system         x86_64, darwin9.8.0
6  status         Patched
7  major          2
8  minor          15.0
9  year           2012
10 month          05
11 day            30
12 svn rev        59478
13 language       R
14 version.string R version 2.15.0 Patched (2012-05-30 r59478)
15 nickname       Easter Beagle
```

The following is the output of `.Machine`, defining the numerical characteristics of the computer upon which R is running:

```
$double.eps
[1] 2.220446e-16

$double.neg.eps
[1] 1.110223e-16

$double.xmin
[1] 2.225074e-308

$double.xmax
[1] 1.797693e+308

$double.base
[1] 2

$double.digits
[1] 53

$double.rounding
[1] 5

$double.guard
[1] 0

$double.ulp.digits
[1] -52

$double.neg.ulp.digits
[1] -53

$double.exponent
[1] 11

$double.min.exp
[1] -1022

$double.max.exp
[1] 1024

$integer.max
[1] 2147483647

$sizeof.long
[1] 8

$sizeof.longlong
[1] 8

$sizeof.longdouble
[1] 16

$sizeof.pointer
[1] 8
```

The following is the output of `sessionInfo()`, defining current R version, locale information and attached packages:

```
R version 2.15.0 Patched (2012-05-30 r59478)
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

locale:
[1] C

attached base packages:
[1] tools     stats     graphics  grDevices utils     datasets  methods   base
```

3 R Core Operational Qualification - System Tests (OQ)

The following is the output of `testInstalledBasic("both")`, which runs a series of core system-wide operational tests of the R installation, including various regression tests:

```
R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
Copyright (C) 2012 The R Foundation for Statistical Computing
ISBN 3-900051-07-0
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> options(echo = FALSE)
running strict specific tests
  running code in 'eval-etc.R'
  comparing 'eval-etc.Rout' to 'eval-etc.Rout.save' ... OK
  running code in 'simple-true.R'
  comparing 'simple-true.Rout' to 'simple-true.Rout.save' ... OK
  running code in 'arith-true.R'
  comparing 'arith-true.Rout' to 'arith-true.Rout.save' ... OK
  running code in 'lm-tests.R'
  comparing 'lm-tests.Rout' to 'lm-tests.Rout.save' ... OK
  running code in 'ok-errors.R'
  comparing 'ok-errors.Rout' to 'ok-errors.Rout.save' ... OK
  running code in 'method-dispatch.R'
  comparing 'method-dispatch.Rout' to 'method-dispatch.Rout.save' ... OK
  running code in 'd-p-q-r-tests.R'
  comparing 'd-p-q-r-tests.Rout' to 'd-p-q-r-tests.Rout.save' ... OK
running sloppy specific tests
  running code in 'complex.R'
  comparing 'complex.Rout' to 'complex.Rout.save' ... OK
  running code in 'print-tests.R'
  comparing 'print-tests.Rout' to 'print-tests.Rout.save' ... OK
  running code in 'lapack.R'
  comparing 'lapack.Rout' to 'lapack.Rout.save' ... OK
  running code in 'datasets.R'
  comparing 'datasets.Rout' to 'datasets.Rout.save' ... OK
running regression tests
  running code in 'reg-tests-1a.R'
  running code in 'reg-tests-1b.R'
  running code in 'reg-tests-2.R'
  comparing 'reg-tests-2.Rout' to 'reg-tests-2.Rout.save' ... OK
  running code in 'reg-IO.R'
  comparing 'reg-IO.Rout' to 'reg-IO.Rout.save' ... OK
  running code in 'reg-IO2.R'
  comparing 'reg-IO2.Rout' to 'reg-IO2.Rout.save' ... OK
  running code in 'reg-S4.R'
  comparing 'reg-S4.Rout' to 'reg-S4.Rout.save' ... OK
  running code in 'reg-tests-3.R'
  comparing 'reg-tests-3.Rout' to 'reg-tests-3.Rout.save' ... OK
running tests of plotting Latin-1
  expect failure or some differences if not in a Latin or UTF-8 locale
  running code in 'reg-plot-latin1.R'
FAILED
  comparing 'reg-plot-latin1.ps' to 'reg-plot-latin1.ps.save' ...diff: reg-plot-latin1.ps: No such file or
      directory
diff: reg-plot-latin1.ps.save: No such file or directory
OK
running tests of consistency of as/is.*
creating 'isas-tests.R'
  running code in 'isas-tests.R'
  comparing 'isas-tests.Rout' to 'isas-tests.Rout.save' ...2638a2639
> >
running tests of random deviate generation -- fails occasionally
  running code in 'p-r-random-tests.R'
  comparing 'p-r-random-tests.Rout' to 'p-r-random-tests.Rout.save' ... OK
running tests of primitives
  running code in 'primitives.R'
running regexp regression tests
  running code in 'utf8-regex.R'
running tests to possibly trigger segfaults
```

```
creating 'no-segfault.R'
  running code in 'no-segfault.R'


Test suite result: PASS
```

The final line of the above output displays the status of running the above tests. “PASS” indicates a successful running of the tests, a “FAIL” would indicate that an error was detected during the running of the tests.

There may be some tests where the result of performing a “diff” on two files that were being compared demonstrate a content difference that may or may not be relevant and may be dependent upon locale settings. Any such differences displayed in the above output should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

4 R Base Package Operational Qualification - Package Examples (OQ)

The following is the output of `testInstalledPackages(outDir = "IQ-OQ-TestOutput", scope = "base", types = "examples")`, which runs a series of operational tests of the R Base package code examples:

```
R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
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ISBN 3-900051-07-0
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> options(echo = FALSE)
Testing examples for package 'base'
Testing examples for package 'tools'
  comparing 'tools-Ex.Rout' to 'tools-Ex.Rout.save' ... OK
Testing examples for package 'utils'
Testing examples for package 'grDevices'
  comparing 'grDevices-Ex.Rout' to 'grDevices-Ex.Rout.save' ... OK
Testing examples for package 'graphics'
  comparing 'graphics-Ex.Rout' to 'graphics-Ex.Rout.save' ... OK
Testing examples for package 'stats'
  comparing 'stats-Ex.Rout' to 'stats-Ex.Rout.save' ... OK
Testing examples for package 'datasets'
  comparing 'datasets-Ex.Rout' to 'datasets-Ex.Rout.save' ... OK
Testing examples for package 'methods'
Testing examples for package 'grid'
  comparing 'grid-Ex.Rout' to 'grid-Ex.Rout.save' ... OK
Testing examples for package 'splines'
  comparing 'splines-Ex.Rout' to 'splines-Ex.Rout.save' ... OK
Testing examples for package 'stats4'
  comparing 'stats4-Ex.Rout' to 'stats4-Ex.Rout.save' ... OK
Testing examples for package 'tcltk'
Testing examples for package 'compiler'
Testing examples for package 'parallel'


Test suite result: PASS
```

The final line of the above output displays the status of running the above tests. “PASS” indicates a successful running of the tests, a “FAIL” would indicate that an error was detected during the running of the tests.

There may be some tests where the result of performing a “diff” on two files that were being compared demonstrate a content difference that may or may not be relevant and may be dependent upon locale settings. Any such differences displayed in the above output should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

5 R Base Package Operational Qualification - Package Vignettes (OQ)

The following is the output of `testInstalledPackages(outDir = "IQ-OQ-TestOutput", scope = "base", types = "vignettes")`, which runs a series of operational tests of the R Base package vignette code examples:

```
R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
Copyright (C) 2012 The R Foundation for Statistical Computing
ISBN 3-900051-07-0
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

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Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> options(echo = FALSE)
Running vignettes for package 'utils'
Running vignettes for package 'grid'
Running vignettes for package 'parallel'


Test suite result: PASS
```

The final line of the above output displays the status of running the above tests. "PASS" indicates a successful running of the tests, a "FAIL" would indicate that an error was detected during the running of the tests.

There may be some tests where the result of performing a "diff" on two files that were being compared demonstrate a content difference that may or may not be relevant and may be dependent upon locale settings. Any such differences displayed in the above output should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

6 R Recommended Package Operational Qualification - Package Examples (OQ)

The following is the output of `testInstalledPackages(outDir = "IQ-OQ-TestOutput", scope = "recommended", types = "examples")`, which runs a series of operational tests of the R Recommended package code examples:

```
R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
Copyright (C) 2012 The R Foundation for Statistical Computing
ISBN 3-900051-07-0
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

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'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> options(echo = FALSE)
Testing examples for package 'MASS'
  comparing 'MASS-Ex.Rout' to 'MASS-Ex.Rout.save' ...
1535c1535
< factor(subject)2  -4.271e-15  2.828e-01   0.000 1.000000
---
> factor(subject)2  -2.300e-15  2.828e-01   0.000 1.000000
5187c5187
< Achieved convergence tolerance: 4.39e-06
---
> Achieved convergence tolerance: 4.324e-06
Testing examples for package 'lattice'
Testing examples for package 'Matrix'
Testing examples for package 'nlme'
Testing examples for package 'survival'
Testing examples for package 'boot'
  comparing 'boot-Ex.Rout' to 'boot-Ex.Rout.save' ... OK
Testing examples for package 'cluster'
Testing examples for package 'codetools'
Testing examples for package 'foreign'
Testing examples for package 'KernSmooth'
Testing examples for package 'rpart'
  comparing 'rpart-Ex.Rout' to 'rpart-Ex.Rout.save' ... OK
Testing examples for package 'class'
  comparing 'class-Ex.Rout' to 'class-Ex.Rout.save' ... OK
Testing examples for package 'nnet'
Testing examples for package 'spatial'
  comparing 'spatial-Ex.Rout' to 'spatial-Ex.Rout.save' ... OK
Testing examples for package 'mgcv'


Test suite result: PASS
```

The final line of the above output displays the status of running the above tests. “PASS” indicates a successful running of the tests, a “FAIL” would indicate that an error was detected during the running of the tests.

There may be some tests where the result of performing a “diff” on two files that were being compared demonstrate a content difference that may or may not be relevant and may be dependent upon locale settings. Any such differences displayed in the above output should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

7 R Recommended Package Operational Qualification - Package Vignettes (OQ)

The following is the output of `testInstalledPackages(outDir = "IQ-OQ-TestOutput", scope = "recommended", types = "vignettes")`, which runs a series of operational tests of the R Recommended package vignette code examples:

```
1
2  R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
3  Copyright (C) 2012 The R Foundation for Statistical Computing
4  ISBN 3-900051-07-0
5  Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)
6
7  R is free software and comes with ABSOLUTELY NO WARRANTY.
8  You are welcome to redistribute it under certain conditions.
9  Type 'license()' or 'licence()' for distribution details.
10
11 R is a collaborative project with many contributors.
12 Type 'contributors()' for more information and
13 'citation()' on how to cite R or R packages in publications.
14
15 Type 'demo()' for some demos, 'help()' for on-line help, or
16 'help.start()' for an HTML browser interface to help.
17 Type 'q()' to quit R.
18
19 > options(echo = FALSE)
20 Running vignettes for package 'Matrix'
21 Running vignettes for package 'survival'
22
23
24 Test suite result: PASS
```

The final line of the above output displays the status of running the above tests. "PASS" indicates a successful running of the tests, a "FAIL" would indicate that an error was detected during the running of the tests.

There may be some tests where the result of performing a "diff" on two files that were being compared demonstrate a content difference that may or may not be relevant and may be dependent upon locale settings. Any such differences displayed in the above output should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

8 R Base Package Operational Qualification - Package Tests (OQ)

The following is the output of `testInstalledPackages(outDir = "IQ-OQ-TestOutput", scope = "base", types = "tests")`, which runs a series of operational tests of the R Base package code tests:

```
R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
Copyright (C) 2012 The R Foundation for Statistical Computing
ISBN 3-900051-07-0
Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)

R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> options(echo = FALSE)
Running specific tests for package 'tools'
  Running 'undoc.R'
Running specific tests for package 'utils'
  Running 'Sweave-tst.R'
  Running 'completion.R'
Running specific tests for package 'grDevices'
  Running 'ps-tests.R'
  comparing 'ps-tests.Rout' to 'ps-tests.Rout.save' ... OK
  Running 'xfig-tests.R'
  comparing 'xfig-tests.Rout' to 'xfig-tests.Rout.save' ... OK
Running specific tests for package 'stats'
  Running 'NLSstClosest.R'
  Running 'cmdscale.R'
  Running 'drop1-polr.R'
  Running 'ig_glm.R'
  Running 'ks-test.R'
  comparing 'ks-test.Rout' to 'ks-test.Rout.save' ... OK
  Running 'nafns.R'
  Running 'nls.R'
  comparing 'nls.Rout' to 'nls.Rout.save' ... OK
  Running 'offsets.R'
  Running 'ppr.R'
  Running 'simulate.R'
  comparing 'simulate.Rout' to 'simulate.Rout.save' ... OK
  Running 'smooth.spline.R'
  Running 'ts-tests.R'
Running specific tests for package 'methods'
  Running 'S3.R'
  Running 'basicRefClass.R'
  Running 'duplicateClass.R'
  Running 'fieldAssignments.R'
  Running 'mixinInitialize.R'
  Running 'namesAndSlots.R'
  Running 'nextWithDots.R'
  Running 'refClassExample.R'
  Running 'testConditionalIs.R'
  Running 'testGroupGeneric.R'
  Running 'testIs.R'
Running specific tests for package 'grid'
  Running 'bugs.R'
  Running 'reg.R'
  Running 'testls.R'
  comparing 'testls.Rout' to 'testls.Rout.save' ... OK
  Running 'units.R'
Running specific tests for package 'stats4'
  Running 'confint.R'
Running specific tests for package 'compiler'
  Running 'assign.R'
  Running 'basics.R'
  Running 'const.R'
  Running 'envir.R'
  Running 'jit.R'
  Running 'loop.R'
  Running 'switch.R'
Running specific tests for package 'parallel'
  Running 'Master.R'


```

```
78 Test suite result: PASS
```

The final line of the above output displays the status of running the above tests. “PASS” indicates a successful running of the tests, a “FAIL” would indicate that an error was detected during the running of the tests.

There may be some tests where the result of performing a “diff” on two files that were being compared demonstrate a content difference that may or may not be relevant and may be dependent upon locale settings. Any such differences displayed in the above output should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

9 R Recommended Package Operational Qualification - Package Tests (OQ)

The following is the output of `testInstalledPackages(outDir = "IQ-OQ-TestOutput", scope = "recommended", types = "tests")`, which runs a series of operational tests of the R Recommended package code tests:

```
1
2  R version 2.15.0 Patched (2012-05-30 r59478) -- "Easter Beagle"
3  Copyright (C) 2012 The R Foundation for Statistical Computing
4  ISBN 3-900051-07-0
5  Platform: x86_64-apple-darwin9.8.0/x86_64 (64-bit)
6
7  R is free software and comes with ABSOLUTELY NO WARRANTY.
8  You are welcome to redistribute it under certain conditions.
9  Type 'license()' or 'licence()' for distribution details.
10
11 R is a collaborative project with many contributors.
12 Type 'contributors()' for more information and
13 'citation()' on how to cite R or R packages in publications.
14
15 Type 'demo()' for some demos, 'help()' for on-line help, or
16 'help.start()' for an HTML browser interface to help.
17 Type 'q()' to quit R.
18
19 > options(echo = FALSE)
20 Running specific tests for package 'MASS'
21   Running 'confint.R'
22   Running 'fitdistr.R'
23   comparing 'fitdistr.Rout' to 'fitdistr.Rout.save' ... OK
24   Running 'glm.nb.R'
25   Running 'hubers.R'
26   Running 'lme.R'
27   Running 'polr.R'
28   Running 'profile.R'
29   Running 'regression.R'
30   comparing 'regression.Rout' to 'regression.Rout.save' ... OK
31   Running 'rlm.R'
32   Running 'scripts.R'
33 Running specific tests for package 'lattice'
34   Running 'MASSch04.R'
35   Running 'dates.R'
36   Running 'dotplotscoping.R'
37   Running 'levelplot.R'
38   Running 'scales.R'
39   Running 'temp.R'
40   Running 'test.R'
41   Running 'wireframe.R'
42 Running specific tests for package 'Matrix'
43   Running 'Class+Meth.R'
44   Running 'Simple.R'
45   Running 'abIndex-tsts.R'
46   Running 'base-matrix-fun.R'
47   Running 'bind.R'
48   comparing 'bind.Rout' to 'bind.Rout.save' ... OK
49   Running 'dg_Matrix.R'
50   Running 'dpo-test.R'
51   Running 'dtpMatrix.R'
52   Running 'factorizing.R'
53   Running 'group-methods.R'
54   Running 'indexing.R'
55   comparing 'indexing.Rout' to 'indexing.Rout.save' ... OK
56   Running 'matprod.R'
57   Running 'matr-exp.R'
58   Running 'other-pkgs.R'
59   Running 'spModel.matrix.R'
60   Running 'validObj.R'
61   Running 'write-read.R'
62 Running specific tests for package 'nlme'
63   Running 'anova.gls.R'
64   Running 'augPred_lab.R'
65   Running 'augPredmissing.R'
66   Running 'coef.R'
67   Running 'contrMat.R'
68   Running 'data.frame.R'
69   Running 'deparse.R'
70   Running 'getData.R'
71   Running 'gls.R'
72   Running 'lmList.R'
73   Running 'lme.R'
74   comparing 'lme.Rout' to 'lme.Rout.save' ... OK
75   Running 'missing.R'
76   comparing 'missing.Rout' to 'missing.Rout.save' ... OK
77   Running 'nlme.R'
```

```
  comparing 'nlme.Rout' to 'nlme.Rout.save' ... OK
  Running 'predict.lme.R'
  Running 'update.R'
  Running 'updateLme.R'
  Running 'varIdent.R'
Running specific tests for package 'survival'
  Running 'aareg.R'
  comparing 'aareg.Rout' to 'aareg.Rout.save' ... OK
  Running 'anova.R'
  comparing 'anova.Rout' to 'anova.Rout.save' ... OK
  Running 'bladder.R'
  comparing 'bladder.Rout' to 'bladder.Rout.save' ... OK
  Running 'book1.R'
  comparing 'book1.Rout' to 'book1.Rout.save' ... OK
  Running 'book2.R'
  comparing 'book2.Rout' to 'book2.Rout.save' ... OK
  Running 'book3.R'
  comparing 'book3.Rout' to 'book3.Rout.save' ... OK
  Running 'book4.R'
  comparing 'book4.Rout' to 'book4.Rout.save' ... OK
  Running 'book5.R'
  comparing 'book5.Rout' to 'book5.Rout.save' ... OK
  Running 'book6.R'
  comparing 'book6.Rout' to 'book6.Rout.save' ... OK
  Running 'book7.R'
  comparing 'book7.Rout' to 'book7.Rout.save' ... OK
  Running 'cancer.R'
  comparing 'cancer.Rout' to 'cancer.Rout.save' ... OK
  Running 'clogit.R'
  comparing 'clogit.Rout' to 'clogit.Rout.save' ... OK
  Running 'concordance.R'
  comparing 'concordance.Rout' to 'concordance.Rout.save' ... OK
  Running 'counting.R'
  comparing 'counting.Rout' to 'counting.Rout.save' ... OK
  Running 'coxsurv.R'
  comparing 'coxsurv.Rout' to 'coxsurv.Rout.save' ... OK
  Running 'coxsurv2.R'
  comparing 'coxsurv2.Rout' to 'coxsurv2.Rout.save' ... OK
  Running 'coxsurv3.R'
  comparing 'coxsurv3.Rout' to 'coxsurv3.Rout.save' ... OK
  Running 'coxsurv4.R'
  comparing 'coxsurv4.Rout' to 'coxsurv4.Rout.save' ... OK
  Running 'detail.R'
  comparing 'detail.Rout' to 'detail.Rout.save' ... OK
  Running 'difftest.R'
  comparing 'difftest.Rout' to 'difftest.Rout.save' ... OK
  Running 'doaml.R'
  comparing 'doaml.Rout' to 'doaml.Rout.save' ... OK
  Running 'doweight.R'
  comparing 'doweight.Rout' to 'doweight.Rout.save' ... OK
  Running 'expected.R'
  comparing 'expected.Rout' to 'expected.Rout.save' ... OK
  Running 'expected2.R'
  comparing 'expected2.Rout' to 'expected2.Rout.save' ... OK
  Running 'factor.R'
  comparing 'factor.Rout' to 'factor.Rout.save' ... OK
  Running 'factor2.R'
  comparing 'factor2.Rout' to 'factor2.Rout.save' ... OK
  Running 'fr_cancer.R'
  comparing 'fr_cancer.Rout' to 'fr_cancer.Rout.save' ... OK
  Running 'fr_colon.R'
  comparing 'fr_colon.Rout' to 'fr_colon.Rout.save' ... OK
  Running 'fr_kidney.R'
  comparing 'fr_kidney.Rout' to 'fr_kidney.Rout.save' ... OK
  Running 'fr_lung.R'
  comparing 'fr_lung.Rout' to 'fr_lung.Rout.save' ... OK
  Running 'fr_ovarian.R'
  comparing 'fr_ovarian.Rout' to 'fr_ovarian.Rout.save' ... OK
  Running 'fr_rat1.R'
  comparing 'fr_rat1.Rout' to 'fr_rat1.Rout.save' ... OK
  Running 'fr_rat2.R'
  comparing 'fr_rat2.Rout' to 'fr_rat2.Rout.save' ... OK
  Running 'fr_resid.R'
  comparing 'fr_resid.Rout' to 'fr_resid.Rout.save' ... OK
  Running 'fr_simple.R'
  comparing 'fr_simple.Rout' to 'fr_simple.Rout.save' ... OK
  Running 'frailty.R'
  comparing 'frailty.Rout' to 'frailty.Rout.save' ... OK
  Running 'frank.R'
  comparing 'frank.Rout' to 'frank.Rout.save' ... OK
  Running 'infcox.R'
```

```
  comparing 'infcox.Rout' to 'infcox.Rout.save' ... OK
  Running 'jasa.R'
  comparing 'jasa.Rout' to 'jasa.Rout.save' ... OK
  Running 'model.matrix.R'
  comparing 'model.matrix.Rout' to 'model.matrix.Rout.save' ... OK
  Running 'mrtest.R'
  comparing 'mrtest.Rout' to 'mrtest.Rout.save' ... OK
  Running 'nested.R'
  comparing 'nested.Rout' to 'nested.Rout.save' ... OK
  Running 'ovarian.R'
  comparing 'ovarian.Rout' to 'ovarian.Rout.save' ... OK
  Running 'prednew.R'
  comparing 'prednew.Rout' to 'prednew.Rout.save' ... OK
  Running 'pspline.R'
  comparing 'pspline.Rout' to 'pspline.Rout.save' ... OK
  Running 'pyear.R'
  comparing 'pyear.Rout' to 'pyear.Rout.save' ... OK
  Running 'r_capacitor.R'
  comparing 'r_capacitor.Rout' to 'r_capacitor.Rout.save' ... OK
  Running 'r_donnell.R'
  comparing 'r_donnell.Rout' to 'r_donnell.Rout.save' ... OK
  Running 'r_lung.R'
  comparing 'r_lung.Rout' to 'r_lung.Rout.save' ... OK
  Running 'r_peterson.R'
  comparing 'r_peterson.Rout' to 'r_peterson.Rout.save' ... OK
  Running 'r_resid.R'
  comparing 'r_resid.Rout' to 'r_resid.Rout.save' ... OK
  Running 'r_sas.R'
  comparing 'r_sas.Rout' to 'r_sas.Rout.save' ... OK
  Running 'r_scale.R'
  comparing 'r_scale.Rout' to 'r_scale.Rout.save' ... OK
  Running 'r_stanford.R'
  comparing 'r_stanford.Rout' to 'r_stanford.Rout.save' ... OK
  Running 'r_strata.R'
  comparing 'r_strata.Rout' to 'r_strata.Rout.save' ... OK
  Running 'r_tdist.R'
  comparing 'r_tdist.Rout' to 'r_tdist.Rout.save' ... OK
  Running 'r_user.R'
  comparing 'r_user.Rout' to 'r_user.Rout.save' ... OK
  Running 'ratetable.R'
  comparing 'ratetable.Rout' to 'ratetable.Rout.save' ... OK
  Running 'rounding.R'
  comparing 'rounding.Rout' to 'rounding.Rout.save' ... OK
  Running 'singtest.R'
  comparing 'singtest.Rout' to 'singtest.Rout.save' ... OK
  Running 'strata2.R'
  comparing 'strata2.Rout' to 'strata2.Rout.save' ... OK
  Running 'stratatest.R'
  comparing 'stratatest.Rout' to 'stratatest.Rout.save' ... OK
  Running 'summary_survfit.R'
  comparing 'summary_survfit.Rout' to 'summary_survfit.Rout.save' ... OK
  Running 'surv.R'
  comparing 'surv.Rout' to 'surv.Rout.save' ... OK
  Running 'survfit2.R'
  comparing 'survfit2.Rout' to 'survfit2.Rout.save' ... OK
  Running 'survreg2.R'
  comparing 'survreg2.Rout' to 'survreg2.Rout.save' ... OK
  Running 'survtest.R'
  comparing 'survtest.Rout' to 'survtest.Rout.save' ... OK
  Running 'testci.R'
  comparing 'testci.Rout' to 'testci.Rout.save' ... OK
  Running 'testci2.R'
  comparing 'testci2.Rout' to 'testci2.Rout.save' ... OK
  Running 'testnull.R'
  comparing 'testnull.Rout' to 'testnull.Rout.save' ... OK
  Running 'testreg.R'
  comparing 'testreg.Rout' to 'testreg.Rout.save' ... OK
  Running 'tiedtime.R'
  comparing 'tiedtime.Rout' to 'tiedtime.Rout.save' ... OK
  Running 'tt.R'
  Running 'turnbull.R'
  comparing 'turnbull.Rout' to 'turnbull.Rout.save' ... OK
Running specific tests for package 'boot'
Running specific tests for package 'cluster'
  Running 'agnes-ex.R'
  comparing 'agnes-ex.Rout' to 'agnes-ex.Rout.save' ... OK
  Running 'clara-NAs.R'
  comparing 'clara-NAs.Rout' to 'clara-NAs.Rout.save' ...
48c48
<     2.00    27.25   147.50   114.60   188.50   270.00       16
---
```

```
>    2.00   27.25  147.50  114.60  188.50  270.00   16.00
  Running 'clara-ex.R'
  Running 'clara.R'
  comparing 'clara.Rout' to 'clara.Rout.save' ... OK
  Running 'clusplot-out.R'
  comparing 'clusplot-out.Rout' to 'clusplot-out.Rout.save' ... OK
  Running 'daisy-ex.R'
  comparing 'daisy-ex.Rout' to 'daisy-ex.Rout.save' ... OK
  Running 'diana-boots.R'
  Running 'diana-ex.R'
  comparing 'diana-ex.Rout' to 'diana-ex.Rout.save' ... OK
  Running 'ellipsoid-ex.R'
  comparing 'ellipsoid-ex.Rout' to 'ellipsoid-ex.Rout.save' ... OK
  Running 'fanny-ex.R'
  Running 'mona.R'
  comparing 'mona.Rout' to 'mona.Rout.save' ... OK
  Running 'pam.R'
  comparing 'pam.Rout' to 'pam.Rout.save' ... OK
  Running 'silhouette-default.R'
  comparing 'silhouette-default.Rout' to 'silhouette-default.Rout.save' ... OK
  Running 'sweep-ex.R'
Running specific tests for package 'codetools'
  Running 'tests.R'
Running specific tests for package 'foreign'
  Running 'S3.R'
  comparing 'S3.Rout' to 'S3.Rout.save' ... OK
  Running 'arff.R'
  comparing 'arff.Rout' to 'arff.Rout.save' ... OK
  Running 'download.R'
  Running 'minitab.R'
  comparing 'minitab.Rout' to 'minitab.Rout.save' ... OK
  Running 'octave.R'
  comparing 'octave.Rout' to 'octave.Rout.save' ... OK
  Running 'sas.R'
  Running 'spss.R'
  comparing 'spss.Rout' to 'spss.Rout.save' ... OK
  Running 'stata.R'
  comparing 'stata.Rout' to 'stata.Rout.save' ... OK
  Running 'xport.R'
  comparing 'xport.Rout' to 'xport.Rout.save' ... OK
Running specific tests for package 'KernSmooth'
  Running 'bkfe.R'
Running specific tests for package 'rpart'
  Running 'rpartco.R'
  Running 'surv_test.R'
  Running 'testall.R'
  comparing 'testall.Rout' to 'testall.Rout.save' ... OK
  Running 'usersplits.R'
  comparing 'usersplits.Rout' to 'usersplits.Rout.save' ...
174c174
< Timing ratio =  10.6
---
> Timing ratio =  5.9
Running specific tests for package 'class'
Running specific tests for package 'spatial'


Test suite result: PASS
```

The final line of the above output displays the status of running the above tests. “PASS” indicates a successful running of the tests, a “FAIL” would indicate that an error was detected during the running of the tests.

There may be some tests where the result of performing a “diff” on two files that were being compared demonstrate a content difference that may or may not be relevant and may be dependent upon locale settings. Any such differences displayed in the above output should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

10 Summary of Findings

The following table presents the results of the various tests performed in the prior sections.

The column labeled "System Results" is an indication that the individual test batch file was able to be executed (PASS) or that there may have been a system level failure (FAIL) in the execution of the program.

The column labeled "Test Results" is an indication that the test suites themselves either passed (PASS) or failed (FAIL) and should be consistent with the final line output for each section of tests. As noted previously, there may be some tests where the result of performing a "diff" on two files that were being compared demonstrate a content difference that may or may not be relevant. These differences, if present, may or may not be based upon system settings such as locale. Any such differences displayed in the prior sections should be reviewed in detail to determine their relevance to the Operational Qualification of this R installation.

The result for **Installation Qualification** is listed in the "Test Results" column only. The result will be PASS if `system("R -e 'q()'")` ran successfully AND `installed.packages()` shows that only Base and Recommended Packages are currently installed. If BOTH of the requirements are not met, the result will be FAIL.

Table 10.1: Summary of Test Suite Results

Test Suite	System Results	Test Results
Installation Qualification	NA	PASS
Core Operational Qualification - System Tests	PASS	PASS
Base Package Operational Qualification - Package Examples	PASS	PASS
Base Package Operational Qualification - Package Vignettes	PASS	PASS
Recommended Package Operational Qualification - Package Examples	PASS	PASS
Recommended Package Operational Qualification - Package Vignettes	PASS	PASS
Base Package Operational Qualification - Package Tests	PASS	PASS
Recommended Package Operational Qualification - Package Tests	PASS	PASS