



TIBCO® Enterprise Runtime for R **Release Notes**

Software Release 6.0.0

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Documentation and support services

How to Access TIBCO Documentation

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The TIBCO Product Documentation website is updated frequently and is more current than any other documentation included with the product. To access the latest documentation, visit <https://docs.tibco.com>.

System Requirements for Spotfire Products

For information about the system requirements for Spotfire products, visit <http://spotfi.re/sr>.

TIBCO Enterprise Runtime for R documentation

You can find the following documents for TIBCO Enterprise Runtime for R in the TIBCO Documentation Library.

- *TIBCO® Enterprise Runtime for R Technical Documentation*
- *Language Reference* (HTML)
- *Differences Between TIBCO® Enterprise Runtime for R and Open-Source R* (HTML)
- *Release Notes* (PDF)
- *License Agreement* (PDF)

You can also find links to CRAN package compatibility reports for this release on TIBCO Cloud™ Spotfire®. See links in the *TERR Release Notes* for more information.

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- For accessing the Support Knowledge Base and getting personalized content about products you are interested in, visit the TIBCO Support portal at <https://support.tibco.com>.
- For creating a Support case, you must have a valid maintenance or support contract with TIBCO. You also need a user name and password to log in to <https://support.tibco.com>. If you do not have a user name, you can request one by clicking Register on the website.

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For quick access to the TIBCO® Enterprise Runtime for R content, see <https://community.tibco.com/products/terr>.

TIBCO Enterprise Runtime for R Release Notes

The Release Notes for this product version are provided to inform you of new features, known issues, and issues from previous releases that have been closed.

These release notes are for TIBCO® Enterprise Runtime for R (TERR™) version 6.0. They cover Linux® and Microsoft Windows® installations.

(As of version 6.0, TERR is deprecated on macOS and is no longer tested.)

TERR™ is a high-performance statistical engine, which is compatible with open-source R. It can be embedded into a wide range of applications as an enterprise-grade alternative to open-source R, and can run a wide array of packages from CRAN.



This release of TERR focuses on improving compatibility with open-source R.



Open-source R is available under separate open source software license terms and is not part of TERR. As such, open-source R is not within the scope of your license for TERR. Open-source R is not supported, maintained, or warranted in any way by TIBCO Software Inc. Download and use of open-source R is solely at your own discretion and subject to the free open source license terms applicable to open-source R.

New Features

The following features have been added to version 6.0.0 of TERR.

TERR 6.0.0 has changed to accommodate the changes made to open-source R version 4.0.2.

New implementation for R 4.0.2 compatibility

TERR has new functions and changes to existing functions and behavior to match new functions and changes in open-source R 4.0.2.

rtools40 compatibility

TERR has been tested with the rtools40 utilities for building packages with C code under Windows.

Other improvements

TERR `CMD config` now supports the `RANLIB` and `AR make` variables and the C++ related variables for C++20 (similar to the ones for 11, 14, and 17).

New functions in included packages

Package	Name	Details
base	<code>activeBindingFunction(sym, env)</code>	This function retrieves the function for the active binding, the <code>fun</code> argument to <code>makeActiveBinding(sym, fun, env)</code> .
base	<code>chkDots</code>	This function warns the user if unrecognized arguments are passed using the <code>...</code> formal argument.
base	<code>deparse1</code>	This function is like <code>deparse()</code> , except that it always returns a single (perhaps long) string. This function was added to open-source R 4.0.0.
base	<code>globalCallingHandlers</code>	This function is used for establishing session-wide condition handlers. This function was added to open-source R 4.0.0.
base	<code>hasName(x, name)</code>	This function is equivalent to <code>is.element(name, names(x))</code> . Given an object and a name, this function returns if the object has the name.
base	<code>infoRDS</code>	This function provides details about an RDS file made by <code>saveRDS()</code> .
base	<code>...names</code>	This function returns the names attached to the <code>...</code> arguments in the call to a function calling <code>...names()</code> . This function was added to open-source R a short time after the release of open-source R 4.0.0.
base	<code>numToBits</code> <code>numToInts</code>	These functions inspect the bits in double-precision numbers. These functions were added to open-source R after the release of open-source R 4.0.2.
base	<code>str2expression</code> <code>str2lang</code>	These functions provide convenient interfaces for parsing strings into expressions and language objects, respectively.
base	<code>suspendInterrupts(expr)</code> <code>allowInterrupts(expr)</code>	These functions execute an expression while suspending or enabling user interrupts. Finalizers are now executed with interrupts suspended.
base	<code>tryInvokeRestart</code>	This function behaves the same as <code>invokeRestart</code> , except that it silently returns <code>NULL</code> instead of generating an error if the named restart is not found. This function is called in various system functions, preventing errors in some cases. This function was added to open-source R 4.0.0.
base	<code>valid.factor(object)</code>	This function was added to open-source R 3.4.0.
base	<code>withAutoprint</code>	This function is an alternative interface to the <code>source()</code> function, with defaults set to emulate the usual parse-evaluate-print loop used in the command line interface. This function was added to open-source R 4.0.0.
methods	<code>el</code> <code>el<-</code>	These functions have been implemented because they are used by the <code>networkDynamics</code> package. They are wrappers for other

Package	Name	Details
		operators for backwards compatibility and should not be used for new code.
stats	DF2formula	This function was added to open-source R 3.6.0.
tools	package_native_routine_registration_skeleton	This function creates a C code file that registers the compiled routines in a package.
tools	R_user_dir	This function gives standard locations for user- and package-specific directories in which package writers can store folders, files, and objects. This function was added to open-source R 4.0.0.
tools	vignetteInfo	This function parses the <code>%\Vignette*</code> entries in the source file of a vignette.
utils	isS3stdGeneric(<i>f</i>)	This function tells if the function <i>f</i> is a call to <code>UseMethod()</code> .
utils	packageDate	Given a package name, this function returns the date the package was created or built.

New R C API Entries

The following R C API entries are implemented to improve package loading and compatibility. For a complete listing of the Rapi C API entries implemented in TERR, run the following.

```
library(terrUtils)

implementedRapiEntries()
```

R C API entries	Description
CAR0	This RAPI entry is required if you use the Rcpp library built for open-source R 4.0 to load into TERR.
Rf_lgamma	This RAPI entry computes <code>log(gamma(1+x))</code> accurately for small <code>abs(x)</code> .
EXTPTR_PTR	This RAPI entry is used by the Rcpp packages in open-source R 4.0.2.
R_ActiveBindingFunction	This RAPI entry has the same behavior as the open-source R function <code>activeBindingFunction()</code> . This RAPI entry was added to open-source R 4.0.0.
R_ContinueUnwind R_MakeUnwindCont R_UnwindProtect	These RAPI entries are now fully implemented to correctly facilitate unwinding an error and continuing error processing using a continuation object.

R C API entries	Description
<code>GEStrMetric</code>	This RAPI entry is required for the <code>systemfonts</code> package to be loaded. <code>GEStrMetric</code> is not functional, so calls to it do not give expected results; Calls to it result in a warning.
<code>R_removeVarFromFrame</code>	This RAPI entry is used for removing a variable from an environment. This is useful because <code>Rf_defineVar</code> can no longer be used to remove a variable from an environment. This function was added to match the implementation in open-source R 4.0.0.
<code>R_RestoreHashCount</code>	This RAPI entry is needed to load the <code>qs</code> package.
<code>R_tryCatch</code> <code>R_tryCatchError</code>	These RAPI entries were added to open-source R 3.4.0.
<code>R_withCallingErrorHandler</code>	This RAPI entry was added to open-source R 4.0.0.
<code>Rf_FixupDigits</code> <code>Rf_FixupWidth</code>	These RAPI entries were added to open-source R 4.0.0.
<code>Rf_installNoTrChar</code>	(See <code>Rf_installTrChar</code> .)
<code>Rf_installTrChar</code>	This RAPI entry has the same behavior as <code>Rf_installChar</code> . It supports building and loading CRAN packages such as <code>lfe</code> that call <code>installChar</code> , which expands to <code>Rf_installTrChar</code> , beginning with R 4.0.0.
<code>Rf_loglmexp</code>	This RAPI entry computes $\log(1 - \exp(-x))$ for non-negative x with minimal loss of precision.
<code>Rf_onintr</code>	This RAPI entry is fully implemented so it no longer produces a "not implemented" warning. Now, the RAPI entry interrupts the current evaluation. Interrupts created by a call to <code>Rf_onintr</code> , or by pressing an interrupt key combination, are now processed through the condition system, so they can be caught by <code>tryCatch(..., interrupt=...)</code> .
<code>SET_GROWABLE_BIT</code> <code>IS_GROWABLE</code>	These RAPI entries are required to load the <code>readr</code> package v1.4.0.
<code>SETLEVELS</code>	This RAPI entry is needed to load the <code>qs</code> package.
<code>R_EvalSymbol</code>	This R C API symbol is now exported so that packages using it can be loaded into <code>TERR</code> .
<code>Rf_PairToVectorList(SEXP pairlist)</code>	This R C API entry converts a <code>pairlist</code> to a list.
<code>R_Serialize</code> <code>R_Unserialize</code>	These R C API entries are called by the <code>qs</code> and <code>RApiSerialize</code> packages.

R C API entries	Description
R_InitOutPStream R_InitInPStream	


Changes in Functionality, Features, and Compatibility

From release to release, we might change the functionality. In cases where product changes require migration procedures, we provide information for that purpose. The following changes have been made to TERR version 6.0.

Changes in functionality and compatibility

Version 6.0 of TERR was tested with open-source R version 4.0.2. The following changes to functions in TERR were made for compatibility with open-source R 4.0.2 or with Java 11.

Key	Description
TERR-3052	<p><code>file.rename</code> is now vectorized to allow renaming multiple files at once. For example,</p> <pre>file.rename(file.path(tdir, c("File1", "File2")), file.path(tdir, c("File1renamed", "File2renamed")))</pre>
TERR-7593	<p><code>class(<matrix>)</code> now returns <code>c('matrix', 'array')</code>, rather than <code>'array'</code>. This change was made to match the behavior new to R 4.0. S3 dispatching for matrix objects now dispatch to both <code>array</code> and <code>matrix</code> methods. Also new in this release of TERR is the function <code>.class2(x)</code>, which returns the class names used for S3 method dispatching of the object <code>x</code>.</p>
TERR-7628	<p><code>unlist(x, recursive=TRUE)</code> now returns a factor when <code>x</code> is a multi-level list of factors (for example, a list of list of factors). Previously, it returned a factor only when <code>x</code> was a 1-level list of factors. This changes matches the behavior that open-source R has had for several releases.</p>
TERR-7678	<p>TERR now accepts raw string literals such as <code>r'(abc)'</code> to specify the string <code>"abc"</code>. This change matches open-source R version 4.0, and it makes it easier to specify strings containing single and double quotes and backslashes.</p>
TERR-7733	<p>The <code>plot()</code> function was moved from the <code>graphics</code> package to the base package. (A copy is kept in the <code>graphics</code> package for backward compatibility.) This change was made so you can define <code>plot</code> methods without first loading the <code>graphics</code> package. TERR has implemented this change to match open-source R 4.0.</p>
TERR-7744	<p>The functions <code>regexpr</code>, <code>gregexpr</code>, and <code>regexec</code> functions now add the <code>index.type</code> and <code>useBytes</code> attributes to their output. This change is to match open-source R behavior.</p>
TERR-7756	<p>The default value of <code>options("stringsAsFactors")</code> and <code>of default.stringsAsFactors()</code> is now <code>FALSE</code> instead of <code>TRUE</code>. This change affects how <code>data.frame()</code>, <code>read.table()</code>, and other functions that create data.frames treat character columns. This change follows the same change in R-4.0.0.</p>
TERR-7764	<p>TERR now treats Unicode characters according to the Unicode 8.0 standard, as opposed to the Unicode 6.0 standard used by TERR 5.1.</p>
TERR-7770	<p>The C code function <code>Rf_defineVar(sym, R_UnboundValue, env)</code> now gives an error, rather than removing the variable from <code>env</code>. This change matches a change in R 4.0.0.</p>
TERR-7778	<p>The <code>paste()</code> function now includes the argument <code>recycle0=FALSE</code>, to match a change made to R 4.0.1.</p>

Key	Description
TERR-7793	<code>stopifnot(NOT_GOOD = 1 < 0)</code> now prints the error message "NOT_GOOD" instead of "1 < 0 is not TRUE". <code>stopifnot()</code> also has a new argument, <code>exprObject</code> . These changes make <code>stopifnot</code> match the behavior of that function in version in R-4.0.0.
TERR-7794	The <code>prop.table</code> and <code>margin.table</code> functions have new preferred names: <code>proportions</code> and <code>marginSums</code> . Also, you can now use these functions, as well as the functions <code>apply</code> and <code>sweep</code> , to specify the margins by name instead of only by number. (The names must be in <code>names(dimnames(x))</code>).
TERR-7807	The recursive argument to <code>tools::package_dependencies</code> can now be a vector of column names that specify which columns of <code>available.packages</code> to use for recursive dependencies. Also, the <code>which</code> and <code>recursive</code> arguments can use the nicknames "strong", "most", or "all" for commonly-used sets of column names.
TERR-7809	Changes to Java 11 caused a failure accessing TIBCO Spotfire® Statistics Services from the parallel package running under TERR. Because of this issue, support for the parallel package accessing Spotfire® Statistics Services is removed.
TERR-7810	<p>The <code>factor</code> method for the <code>c</code> function has been implemented following a recent change in open-source R. This method combines factor arguments into a new factor whose levels attribute is the union of the levels attributes of the arguments. If all arguments are ordered factors with identical levels, then it returns an ordered factor with those levels.</p> <div>  <p>This change can break old code that used the <code>c</code> function on factors. Previously, <code>c</code> would strip the class and levels attributes and just combine the integer codes of the factors.</p> </div>
TERR-7824	The command-line arguments <code>-s</code> and <code>--no-echo</code> have replaced the deprecated <code>--slave</code> argument. This matches the behavior of open-source R 4.0.0.
TERR-7831	<code>as.list(emptyenv(), sorted=TRUE)</code> no longer gives an error in <code>order(names(retval))</code> . <code>as.list(emptyenv(), sorted=TRUE)</code> now returns a nameless empty list, as it always has when <code>sorted</code> is <code>FALSE</code> .
TERR-7834	If a package declares that it requires one C++ standard in both <code>DESCRIPTION:SystemRequirements</code> and <code>src/Makevars</code> , then the package requirement from <code>src/Makevars</code> is used. Previously, the one in <code>DESCRIPTION</code> was used, which caused problems with some packages with mismatched entries.
TERR-7836	<code>install.packages()</code> now runs the configure and clean steps with <code>TERR_LIBS</code> set to current value of <code>.libPaths()</code> . If the configuration script invokes TERR, then TERR can access all of the same packages that the main process can access. With this change, you can now install recent versions of packages such as <code>prophet</code> and other <code>rstan</code> -dependent packages from source.
TERR-7844	<p>TERR <code>CMD Rscript</code> now processes its command line arguments the same way that open-source R does. In particular, <code>TERR CMD Rscript -e "commandArgs(TRUE)" foo</code>, now prints "foo" instead of treating "foo" as an R-code file to execute.</p> <p>On the TERR command line, you can no longer supply both the <code>-f file</code> and <code>-e expression</code> arguments. You must choose to execute either a file or one or more in-line expressions.</p>
TERR-7845	Factors with duplicated levels are no longer allowed and now return an error instead of a warning. This change matches behavior in open-source R 4.0.2.
TERR-7848	<code>grid::unit()</code> and <code>grid::grob()</code> no longer produce unimplemented function warnings. They are not implemented, but they caused several warnings when TERR loaded packages that imported the <code>ggplot2</code> package. All of the other "unimplemented function" warnings in the <code>grid</code> package have been changed to "unimplemented graphics function" warnings.
TERR-7850	The command line command <code>TERR CMD SHLIB code.cpp</code> now assumes that <code>code.cpp</code> adheres to the C++11 standard. To override this new behavior, in the file <code>Makevars</code> , use <code>CXX_STD=CXX??</code> .

Key	Description
TERR-7853	<code>sample.int(n, ...)</code> can now accept <code>n > .Machine\$integer.max</code> , with limitations. In the <code>n > .Machine\$integer.max</code> case, the return value is a numeric (not an integer) or a vector (but all values are in 1, 2, ..., n). The limitations are that for such large n, one cannot also supply the <code>prob</code> argument, and the sampling is only done with replacement (the <code>replace</code> argument is silently ignored).
TERR-7858	<code>utils::URLencode(URL, ...)</code> and <code>utils::URLdecode(URL)</code> can now handle a vector of URLs, not just a single URL.
TERR-7859	<code>head(x, n)</code> and <code>tail(x, n)</code> , when <code>x</code> is an object with dimensions, allow <code>n</code> to be a vector the length of <code>dim(x)</code> , specifying how many slices of each dimension to return.
TERR-7865	Calling the function <code>drop1()</code> for glm models and with <code>test="Chisq"</code> could result in a mislabeled test statistic column. Now, it labels the test statistic column as open-source R 4.0 does, using "LRT" when <code>scale=1</code> , or when <code>family</code> is specified as either <code>binomial</code> or <code>poisson</code> and <code>scale=0</code> , and using "scaled dev." otherwise.
TERR-7866	Calling the function <code>drop1</code> and specifying a <code>poisson</code> or <code>binomial</code> glm object, and with <code>test="F"</code> , now warns that the test is for a <code>quasipoisson</code> or <code>quasibinomial</code> model. (A Chisq test would be more appropriate here.)
TERR-7872	<code>packBits(x, type)</code> now accepts <code>type="double"</code> , which causes <code>packBits</code> to pack the low order bit of each 64 elements of <code>x</code> into a double-precision numeric value. This is the inverse of the new <code>numToBits(x)</code> .
TERR-7877	If <code>x</code> is equal to the NULL object, then <code>x[[1]] <- vector</code> now always turns <code>x</code> into a list with one entry: <code>list(vector)</code> . Previously, the result depended on the length of <code>vector</code> : if the length was one, then <code>x</code> became a copy of <code>vector</code> ; otherwise, <code>x</code> became <code>list(vector)</code> . In TERR 6.0, the result is independent of the length of <code>vector</code> . This behavior is more consistent and follows the same change in open-source R 4.0.0.
TERR-7889	The R C API function <code>R_ReleaseObject(extPtr)</code> no longer warns if <code>extPtr</code> had not been protected by a previous call to <code>R_Preserver(extPtr)</code> . This change stops unwarranted warnings from code using the <code>xml2</code> package.

Additionally, the value of the `repos` option now includes a URL for the MRAN repository. The default date used in the MRAN URL is based on the TERR build year, month, and day. The order of precedence for installation of packages is now TRAN, MRAN, and CRAN.

Other version updates

Version updates and version compatibility testing include the following.

- OpenSSL updated to version 1.1.1g (Included with TERR).
- Tested with JAVA version 11; however, any compatible version of Java can be used.
- open-source R version 4.0.2.
- RStudio Desktop and Server version 1.3.1093. For more information, see *Configuring RStudio to use TIBCO® Enterprise Runtime for R* in the TERR [documentation](#).

TERR is no longer tested with Spark, KNIME, or Hadoop. See the TERR articles on the [TIBCO Community](#) site for more information about using these tools.

The following packages included with TERR require a bit-matching 32-bit or 64-bit version Java.

- parallel
- sjdbc
- terrJava



Additionally, if you want to use the `rJava` package, or any other CRAN package that requires access to `JAVA_HOME`, this information applies.

To use these packages, you must set the `JAVA_HOME` environment variable to a valid Java installation before you load the packages. You can set `JAVA_HOME` using `TERR` by calling the following in the console:

```
Sys.setenv(JAVA_HOME="path_to_your_JRE_installation")
```

To check if the environment variable is set, call the following in the console:

```
Sys.getenv("JAVA_HOME")
```



As of `TERR` version 4.1, for Windows and Mac installations, if the `JAVA_HOME` environment variable is not set, `TERR` uses system info to identify and load the latest Java installed on the system.

Deprecated and Removed Features

The following features have been deprecated or removed in `TERR` version 6.0.

Deprecated on macOS

As of version 6.0, `TERR` is deprecated on macOS and is no longer tested.

Removed features

The `--slave` command-line argument has been removed. It is replaced by the command-line arguments `-s` and `--no-echo`. This change matches the behavior of open-source R 4.0.0.

Support for the parallel package accessing TIBCO Spotfire Statistics Services has been removed. The `TERR` function `makeTSSSccluster` has been removed, and the function `makeCluster(type="TSS", ...)` gives an error.

The Developer Edition of TIBCO® Enterprise Runtime for R is no longer available on the TAP site. For a trial version of `TERR`, see its entry on the TIBCO [edelivery](#) site.

Update or Reinstall a Version of TERR

When you update to a more recent version of `TERR`, remove the previous version, and follow the guidelines to protect your installed packages.



Installing `TERR` over a previous `TERR` installation without removing it can cause unexpected failures. To remove `TERR`, follow the instructions for your operating system.



For a list of operating systems that `TERR` is supported on, see the [TIBCO Enterprise Runtime for R system requirements](#).

When you update to a new version of `TERR`, follow the guidance in "Package installation locations and recommendations for updating" in the [Package Management](#) section of the *TIBCO® Enterprise Runtime for R Technical Documentation*.

On Linux

- From the command line, run the command `rm -rf <TERR_HOME>`, where `TERR_HOME` is the installation directory.

On Mac

- At the Terminal command prompt, run the following commands.

```
sudo rm -rf /Library/Frameworks/TERR.framework /usr/local/bin/TERR /usr/local/bin/
TERRscript /usr/local/bin/RStudio-TERR
```



As of version 6.0, TERR is deprecated on macOS and is no longer tested.



If you are prompted to supply a password, provide the administrator password for the computer.

The following three specified items are removed.

- The TERR framework package.
- Scripts for running TERR.
- A script to launch RStudio running TERR.

On Windows

- From the Settings app, click **Apps**, and then from the **Apps & features** list, double-click run the listing **TIBCO Enterprise Runtime for R <version#>**.

After uninstalling TERR, run the installer for the version of TERR you want to install.

Package Compatibility

As a standard part of each TERR release, we run all help examples provided in packages in the Comprehensive R Archive Network (CRAN) in the TERR engine from the Windows and Linux platforms.

Beginning with release 5.1, we also run all help examples provided in packages in the Bioconductor (BIOC) list.

Package loading improvements

- To see a list of issues fixed to improve package loading and performance, see [Closed Issues](#).
- To see a list of Rapi C API functions and TERR functions implemented in this release to improve package loading and performance, see [New features](#).
- To see a complete listing of the Rapi C API functions implemented in TERR so far, run the following code.

```
library(terrUtils)
implementedRapiEntries()
```

Package compatibility analysis in Spotfire

We report the results of these tests in visualizations that are available on TIBCO Cloud™ Spotfire® at the following links. You can browse and review the results for the packages you want to use and their Task Views. You can review the results run for every expression in every help file for every CRAN package or BioConductor package for the following platforms.

CRAN packages	BioConductor packages
Windows	Windows
Linux	Linux

The tests run against code examples in the help provide some guidance for determining rates of success. The accuracy of information collected depends on the number and quality of examples in the package reference topics. These analyses are not meant to be the definitive determination of exact compatibility.

For more information about CRAN packages, see <https://cran.r-project.org/web/packages/>

- For more information about BioConductor packages, see <https://www.bioconductor.org/packages/release/bioc/>



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Package compatibility summary in TERR

Alternatively, we provide a summary of our testing results on the TIBCO documentation site in the following CSV-formatted files.

- CRANonTERR-Linux.csv
- CRANonTERR-Win.csv
- BIOConTERR-Linux.csv
- BIOConTERR-Win.csv

TERR console code example for CRAN

You can use the TERR console to quickly access a summary of the information. The following example returns the results for testing the help files for the CRAN package caret. You can change the example to match the platform and package of your choice.

1. Change the CSV file name to match the platform (Linux or Windows).
2. Remove the comment markers for the CSV file name.
3. Provide the name of the package you want to query.

```
# Example: CRAN tests compatibility with this version of TERR
#
#packageCompat <- read.csv("https://docs.tibco.com/pub/enterprise-runtime-for-R/6.0.0/doc/
csv/CRANonTERR-Linux.csv",
#   stringsAsFactors=FALSE)
#
#packageCompat <- read.csv("https://docs.tibco.com/pub/enterprise-runtime-for-R/6.0.0/doc/
csv/CRANonTERR-Win.csv",
#   stringsAsFactors=FALSE)
#
subset(packageCompat, Package.Name=="caret")
## (update)
```

The returned results resemble the following for the above example.

```

Package.Name Version          Status Percent.Successful Total.Executed
1608      caret 6.0-86 Mostly successful          98.5%          205
      Passed Failed Graphics Random.Numbers
1608    202     3      17          100

```

This table shows how to read the results for this example. (Shows sample results for running the example on Linux. Results for Windows can vary slightly.)

Column name	Result
Package.Name	caret
Version	6.0-86
Status	Mostly successful
Percent.Successful	98.5%
Total.Executed	205
Passed	202
Failed	3
Graphics	17
Random.Numbers	100

TERR console code example for BioConductor

You can use the TERR console to quickly access a summary of the information. The following example returns the results for testing the help files for the BioConductor package limma. You can change the example to match the platform and package of your choice.

1. Change the CSV file name to match the platform (Linux or Windows).
2. Remove the comment markers for the CSV file name.
3. Provide the name of the package you want to query.

```

# Example: BioConductor tests compatibility with this version of TERR
#
#packageCompat <- read.csv("https://docs.tibco.com/pub/enterprise-runtime-for-R/6.0.0/doc/
csv/BioConTERR-Linux.csv",
#   stringsAsFactors=FALSE)
#
#packageCompat <- read.csv("https://docs.tibco.com/pub/enterprise-runtime-for-R/6.0.0/doc/
csv/BioConTERR-Win.csv",
#   stringsAsFactors=FALSE)
#
subset(packageCompat, Package.Name=="limma")
## (update)

```

The returned results resemble the following for the above example.

```

Package.Name Version          Status Percent.Successful Total.Executed
901      limma 3.44.3 Mostly successful          96.9          391
      Passed Failed Graphics Random.Numbers
901    379     12      49          75

```

This table shows how to read the results for this example. (Shows sample results for running the example on Linux. Results for Windows can vary slightly.)

Column name	Result
Package.Name	limma
Version	3.44.3
Status	Mostly successful
Percent.Successful	96.9%
Total.Executed	391
Passed	379
Failed	12
Graphics	49
Random.Numbers	75

Closed Issues

This table lists closed issues in version 6.0.0 of TERR. It reflects fixes for issues with package compatibility, open-source R compatibility, and general issues with TERR.

Key	Description
TERR-3978	<code>seq.POSIXt(from=date1, to=date2, by=...)</code> no longer outputs any dates beyond <code>date2</code> .
TERR-5136	A long input line in the console could cause TERR to fail unexpectedly.
TERR-5176	Printing the summary of a <code>Date</code> or a <code>POSIXct</code> or <code>POSIXlt</code> vector with NAs or with a <code>data.frame</code> that contains a column of these types now prints the number of NAs correctly.
TERR-5689	Setting row names for an <code>xts</code> object from the <code>xts</code> package resulted in the error <code>invalid 'dimnames' given for xts</code> . This issue has been fixed.
TERR-6073	The <code>regmatches</code> function now works correctly when its <code>invert</code> argument is <code>NA</code> .
TERR-6114	<code>summary.Date</code> , <code>summary.POSIXct</code> , and <code>summary.POSIXlt</code> now create an object containing the number of NAs as a separate integer attribute, matching open-source R.
TERR-6977	Previously, <code>system2</code> ignored <code>input</code> and <code>stdin</code> arguments on Linux.
TERR-7004	An update to the MK library in TERR 4.5.0 can cause slight differences from <code>nls()</code> compared to earlier versions.
TERR-7044	The <code>source()</code> function now accepts the following arguments that were added to open-source R: <ul style="list-style-type: none"> • <code>exprs</code> • <code>spaced</code> • <code>width.cutoff</code> • <code>deparseCtrl</code>
TERR-7087	<code>system2()</code> returned incorrect results if there were over a certain number of characters in the command line.

Key	Description
TERR-7122	Previously, <code>read.table</code> would give an error when reading a space character as a logical.
TERR-7217	<code>seq.Date</code> and <code>seq.POSIXt</code> now accept specifying the time unit as <code>by="quarters"</code> .
TERR-7508	When you initialize an S4 object with a slot of class <code>vector</code> , or set this slot with <code>slot(obj,nm,check=TRUE)<-newval</code> , the new slot value is coerced to a vector before it is assigned.
TERR-7696	In some obscure cases, calling <code>eval</code> on an expression could generate an error before the expression started evaluation. This issue has been fixed.
TERR-7702	The function <code>setMethod</code> now matches R's behavior when it generates warnings or messages about unknown classes in the method signature. Specifically, no message or warning is generated if an unknown class is specified with a <code>className</code> object.
TERR-7707	The <code>setRefClass</code> function now correctly sets the slots and prototype of the <code>refclass</code> , including information from any non- <code>refclass</code> superclasses.
TERR-7713	<code>ts(x=matrix(), names=NULL)</code> now sets the column names of the output to <code>NULL</code> , not <code>"Series <n>"</code> or to the column names of <code>x</code> . The formatting and printing functions for such objects no longer convert <code>NULL</code> column names to <code>"Series <n>"</code> .
TERR-7719	<code>sprintf("%.0f", c(Inf,-Inf,NA,NaN))</code> no longer truncates the result to zero characters. It now ignores the precision part of the format specifier when rendering special numeric values. This behavior matches that of open-source R.
TERR-7726	<code>seq.POSIXt(from,to,by)</code> could give an extra element beyond the desired sequence of times, depending on the current time zone. This issue has been fixed.
TERR-7731	TERR now allows collecting errors generated within internal OpenMP code, which can lead to errors such as <code>"Error: invalid comparison with complex values (600 times in omp region)"</code> .
TERR-7738	An incorrect error message could be printed when there was a <code>tryCatch</code> call within an <code>on.exit</code> expression.
TERR-7739	Making a <code>data.frame</code> from a recursive list would sometimes drop some parts of the resulting column names.
TERR-7741	The <code>exclude</code> and <code>useNA</code> arguments to <code>table()</code> did not work properly in several ways. For example, <code>exclude=NULL</code> had the side effect of setting <code>useNA</code> to <code>"always"</code> . These arguments now work as they do in open source R. Also, <code>factor(exclude=NA, x)</code> had excluded both <code>NA</code> and <code>NaN</code> from the levels of the resulting factor. This function now excludes only <code>NA</code> .
TERR-7743	The <code>real()</code> , <code>is.real()</code> , and <code>as.real()</code> functions have been removed. They were removed from open-source R in 2013.
TERR-7747	When printing a list containing classed objects or an object with classed attributes, the <code>print</code> method for those classed objects did not get exactly the arguments passed to <code>print</code> : some arguments were omitted and some were added. This issue has been fixed.
TERR-7748	The function <code>as.hexmode("")</code> now gives an error instead of returning 0. This change follows a change in open-source R 3.6.0.
TERR-7750	<code>array(x,dim,dimnames)</code> now requires that <code>dimnames</code> be a list (or pairlist). Previously, <code>array(x,dim,dimnames)</code> ignored non-list <code>dimnames</code> . This change follows a change made in open-source R 3.3.0.
TERR-7754	The functions <code>suppressMessages</code> and <code>suppressWarnings</code> now include the argument <code>classes</code> . This argument is used for suppressing only certain classes of messages or warnings.

Key	Description
TERR-7755	<code>activeBindingFunction(sym,env)</code> This function retrieves the function for the active binding, the fun argument to <code>makeActiveBinding(sym,fun,env)</code> .
TERR-7757	<code>transform.data.frame()</code> now passes arguments to <code>data.frame()</code> . For example, it now passes <code>stringsAsFactors</code> and <code>check.names</code> to <code>data.frame()</code> instead of treating them like new columns in the <code>data.frame</code> it produces.
TERR-7760	The summary method for <code>lm</code> objects now also returns the <code>weights</code> component from the <code>lm</code> object, if it exists.
TERR-7774	The <code>normalizePath</code> function on Windows now returns the capitalization used in the "official" version of the file name. Previously, the capitalization depended on context.
TERR-7777	If you manually edited the DCF created by a call to <code>buildServerSPK</code> , and then rebuilt the SPK from the DCF without explicitly providing a value for the <code>spkName</code> argument, then the function could fail with an error. This issue has been fixed.
TERR-7789	While TERR processes an interrupt, it defines a restart named <code>"resume"</code> . If the function <code>withCallingHandlers</code> defines an interrupt condition handler that invokes this restart, the interrupted computation is resumed.
TERR-7790	If <code>options('interrupt')</code> is set to a function, it is called with no arguments if an interrupt condition is not caught. If this function invokes a restart named <code>"resume"</code> , then the interrupted computation is resumed.
TERR-7795	The argument matching with <code>...</code> and default values have been changed to match open-source R. Also, the <code>lapply</code> and other <code>apply</code> functions have been changed to ignore extra missing arguments specified using <code>'a,i=,b'</code> to match changes made in open-source R version 3.5.0.
TERR-7800	The unexported function <code>utils:::checkHT</code> has been defined so that the code in the Matrix package can call it. The function <code>do.call('[,argList)</code> now works correctly if <code>argList</code> contains missing values for the selection indices.
TERR-7804	Following open-source R 4.0.0, S3 method dispatching for <code>cbind</code> and <code>rbind</code> has changed, so it calls the <code>cbind</code> or <code>rbind</code> S3 method for the first argument that has one, rather than using the default <code>cbind</code> or <code>rbind</code> if multiple arguments have different S3 methods.
TERR-7823	If a C function called with <code>.Call</code> returns the C <code>NULL</code> value, then the open-source R <code>NULL</code> object is returned instead, and a warning is generated.
TERR-7825	On Windows, <code>file.rename(aa,bb)</code> no longer fails if the file <code>bb</code> already exists.
TERR-7828	Several selection and replacement functions defined as TERR natives (such as <code>storage.mode</code> , <code>`\$`</code> , <code>`[<-`</code> , and so on) now return the correct arguments when passed to the <code>args</code> and <code>formals</code> functions.
TERR-7833	<code>contrib.url(type="mac.binary")</code> no longer adds the nickname of a MacOS version in the returned URL.
TERR-7843	TERR now correctly handles CTRL+C interrupts in non-interactive sessions, such as when TERR is started with the options <code>-e</code> , <code>-f</code> , or <code>< file</code> , or when TERR is run in Emacs/ESS.
TERR-7852	The R C API function <code>VECTOR_ELT(x,i)</code> accepts <code>i</code> up to <code>max(TRUELENGTH(x),length(x))-1</code> , not just to <code>length(x)-1</code> , which is needed for the <code>data.table</code> package, version 1.13.0, to work in TERR.
TERR-7854	The Rapi entries <code>TAG</code> and <code>SET_TAG</code> now allow any object to be the 'tag' of a pairlist, rather than giving an error. The Rapi entry <code>R_UnwindProtect</code> does not give an error "bad continuation argument". These changes prevent problems using the <code>vroom</code> and <code>cpp11</code> packages.
TERR-7864	A small memory leak in <code>base::OlsonNames()</code> has been fixed.

Key	Description
TERR-7876	The Rapi entries CAR, CDR, and TAG now work on function objects. The corresponding entries for setting (SETCAR, SETCDR, and SET_TAG) also work on function objects. These entries are called by the qs package.
TERR-7891	Improved error handling in TERR for calling <code>Rf_error</code> while executing a <code>R_new_custom_connection</code> callback method prevents TERR from closing unexpectedly when you use the curl package.
TERR-7893	<code>as.POSIXct("2029-02-29 14:17",format="%Y-%m-%d %H:%M")</code> now returns NA, rather than returning 2029-03-01. This change in behavior now matches open-source R.
TERR-7894	<code>stats::reformulate()</code> now has the argument <code>env=parent.frame()</code> so you can make the environment of the returned formula whatever you want it to be.
TERR-7895	<code>regmatches(x, invert=TRUE, ...)</code> and <code>regmatches(x, invert=NA, ...)</code> would give the error "missing value where TRUE/FALSE needed" when x contained an NA. These functions no longer give an error.
TERR-7906	When <code>utils::unzip</code> has problems unzipping a file when used with <code>install.packages</code> (for example), it now gives an error message containing details about the error. Previously, the errors were printed to the standard error stream and were not part of the error message itself.
TERR-7923	When functions like <code>readLines</code> read UTF-8 characters, they no longer skip illegal Unicode characters (such as 0xFFFD) with a warning, but instead read them as a character (for example, the character 0xFFFD). This change permits loading the package <code>jsonld</code> , which reads a long js script including 0xFFFD characters.
TERR-7930	System Requirements documentation has been updated to reflect required library installation for running the TERR console on RHEL 8, CentOS 8, and SUSE 15.

Known Issues

This section lists known issues in version 6.0.0 of TERR.

In this release, some open-source R functionality is not available, including graphics devices, and some functions from the base and stats packages. Likewise, S4 is not entirely compatible. The following table lists additional known issues.

Issue	Description
TERR-4993	On Linux, you cannot save TERR Command History to a file.
TERR-5488	If you receive the message "SSL certificate problem: unable to get local issuer certificate" when accessing SSL protected URLs (for example, <code>https://</code>), make sure that your system has the latest version of the certificate authority database for your system. On RedHat 5, this should be <code>`yum update openssl`</code> . On RedHat 6, this should be <code>`yum update ca-certificates`</code> .
TERR-6422	Setting breakpoints in RStudio 0.99.903 with TERR on Windows can cause it to crash. When a script is sourced, and if it has breakpoints set, RStudio for Windows can crash. This crash does not occur when breakpoints are set inside a function and the function is called.
TERR-6576	If you try to use an RStudio feature that requires the <code>rmarkdown</code> package or the <code>shiny</code> package, and the required package is not already installed, then this process currently fails if RStudio is configured with the TERR engine. To work around this problem, at the command prompt, call <code>install.packages()</code> to install the <code>rmarkdown</code> and <code>shiny</code> packages.

Issue	Description
TERR-6812	<p>Due to changes in open-source R version 3.5 and resulting compatibility changes in TERR 5.0, packages that are built with a version of TERR prior to 5.0 must be rebuilt.</p> <ul style="list-style-type: none"> To install a binary package from a repository, always call <code>install.packages(pkgname)</code> from TERR. The <code>install.packages</code> function finds the correct binary version in the repository for your version of TERR. Manually downloading the binary package from CRAN can result in errors when you use it with TERR. To install a package from source, try installing it first with TERR (with <code>install.packages</code> in TERR or with <code>TERR CMD INSTALL</code> from a command line). To install a package from source that you cannot build with TERR, install the package with the version of open-source R tested with TERR.
TERR-7077	Certain packages, such as <code>rJava</code> , cannot be installed with TERR from source under Centos. If you encounter a package that does not install with TERR from source, then you can build the package using open-source R, and then install the binary package in TERR.
TERR-7727	When you view help files in Rstudio, some text in the help (for example, the Arguments and the Value sections) might not be visible if you are using an Rstudio Editor theme with a dark background.
TERR-7728	When you run TERR under Rstudio Server, if you end the session using File > Quit Session , the following message is displayed: <i>Session Error, The previous R session was abnormally terminated due to an unexpected crash.</i> This problem can also occur when you open a project using the File > New Project or File > Open Project menu commands.

Package search order

When you install a package using TERR, by default, TERR first checks for the package on TRAN, and then checks on MRAN. TERR installs the first version it finds. This is different than open-source R, which installs packages according to the newest version number available on CRAN. This difference is by design, because occasionally a CRAN package update causes a break with TERR compatibility, so we make available a tested version of the package on TRAN.

If you need to install one of these packages using open-source R (for example, to get source code on Linux), you can install the CRAN package, and then set `options()$repos` to install from only TRAN before reinstalling the package.

See "Specifying an older package on TRAN" in the *TIBCO® Enterprise Runtime for R Technical Documentation* for more information.

When running on RedHat Linux, TIBCO Enterprise Runtime for R processes spawned by the parallel package may immediately crash

We have seen a problem when running TERR on RedHat Linux with versions of Java earlier than 1.7.0_40. If you call the `makeCluster` function in the `parallel` package to spawn new TERR processes, these processes may immediately crash with a fatal Java error. To test if this problem is occurring, try the following:

```
library(parallel)
c1 <- makeCluster(1, outfile="")
# create cluster with one spawned process
# specifying outfile="" to print all output
c1 <- makeCluster(1, outfile="")
clusterEvalQ(c1, 123)
```

If this problem is occurring, you see an error such as the following:

```
> library(parallel)
```

```

> # create cluster with one spawned process
> # specifying outfile="" to print all output from the process
> c1 <- makeCluster(1, outfile="")
Creating 1 TERR cluster nodes at Thu Aug 20 11:31:25 2020
> clusterEvalQ(c1, 123)
1: #
1: # A fatal error has been detected by the Java Runtime Environment:
1: #
1: # SIGSEGV (0xb) at pc=0x0000003ac2cbbfa5, pid=12649, tid=1075054912
1: #1: # JRE version: 7.0_13-b20
1: # Java VM: Java HotSpot(TM) 64-Bit Server VM (23.7-b01 mixed mode linux-amd64
compressed oops)
1: # Problematic frame:
1: # C [libstdc++.so.6+0xbbf5a5] __cxa_allocate_exception+0x55
1: #
1: # Failed to write core dump. Core dumps have been disabled. To enable core
dumping, try "ulimit -c unlimited" before starting Java again
1: #
1: # An error report file with more information is saved as:
1: # /a/seafiler01.na.tibco.com/vol1/vol2/users/jdoe/hs_err_pid12649.log
1: #
1: # If you would like to submit a bug report, please visit:
1: # http://bugreport.sun.com/bugreport/crash.jsp
1: #
Error in waitForClusterReady(c1) : some cluster nodes have crashed or stopped: all crashed

```

The workaround for this problem is to set the LD_PRELOAD environment variable to libstdc++.so.6. This can be done before TERR is started, or within TERR, before the parallel library has been loaded:

```

> Sys.setenv("LD_PRELOAD"="libstdc++.so.6")
> library(parallel)
> c1 <- makeCluster(1, outfile="")
Creating 1 TERR cluster nodes at Thu Aug 20 11:32:56 2020
> # create cluster with one spawned process
> # specifying outfile="" to print all output
> c1 <- makeCluster(1, outfile="")
Creating 1 TERR cluster nodes at Thu Aug 20 11:33:51 2020
> clusterEvalQ(c1, 123)
1: TIBCO Software Inc. Confidential Information
1: Copyright (C) 2011-2020 TIBCO Software Inc. ALL RIGHTS RESERVED
1: TIBCO Enterprise Runtime for R version 6.0.0 for Microsoft Windows 64-bit
1:
1: Type 'help()' for help.
1: Type 'q()' to quit.
1: started engine node pid==15788 at Thu Aug 20 11:33:54 2020
[[1]]
[1] 123
>

```

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