

RTest - Test Adapter example

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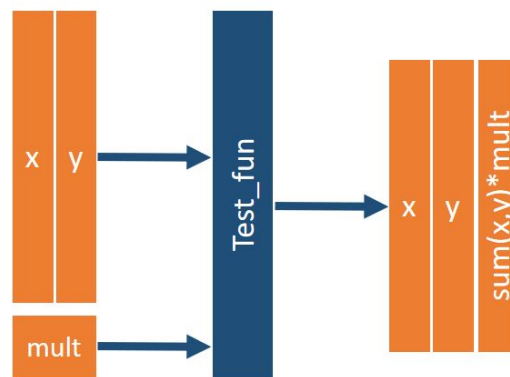
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About

This test case shall explain to you how to construct a test case including a test-adapter.

Basic example

For the first test we would like to test a really simple example. We want to test a function that binds the sum of each row to a data frame as an additional column called `sum` and multiplies it with an additional parameter `mult`. The function shall be called `test_fun`.



```
## Define the functions to be tested
test_fun <- function(dat, mult) { cbind(dat, "sum" = apply(dat, 1, sum)*mult) }

# assign global to work inside vignette
assign("test_fun", test_fun, envir = .GlobalEnv)
```

We want to create a test case that goes through and one that fails to show the RTest functionality.

Create the test case

First an empty test case in RTest contains a synopsis and input-data:

```
<?xml version="1.0" encoding="UTF-8"?>
<RTestCase

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:noNamespaceSchemaLocation="../xsd/RTest.xsd">
  <ID>RTest_TC-01</ID>
```

```

<synopsis>
  <version>01</version>
  <author>Matthias Pfeifer</author>
  <short-description>RTest Template TC</short-description>
  <description>
<![CDATA[
Extended Description of the test case allowing also <some><special>/characters
]]>
  </description>
  <creation-date>2016-01-25</creation-date>
  <change-history>
    <change author="Matthias Pfeifer" date="2016-01-25">Initial Version</change>
  </change-history>
</synopsis>
<input-data>
  <data.frame name="test01">
    <col-defs>
      <coldef name="x" type="numeric" />
      <coldef name="y" type="numeric" />
    </col-defs>
    <row>
      <cell>1</cell>
      <cell>2</cell>
    </row>
    <row>
      <cell>1</cell>
      <cell>2</cell>
    </row>
  </data.frame>
</input-data>
<tests>
  ...
</tests>
</RTestCase>

```

As you can see, the XML file that we'll create links to the RTest.xsd. This allows to pre-write certain parts of the document and define structures, like "What does a data.frame look like?". To visualize XML and XSD we highly recommend using Altova XML Spy. The input data output we created here can be generated using:

```

my_data <- data.frame(x=c(1,2),y=c(1,2))

RTest::xmlWriteData_data.frame("data.frame",my_data,"test01")

```

```

## <data.frame name="test01">
##   <col-defs>
##     <coldef name="x" type="numeric" />
##     <coldef name="y" type="numeric" />
##   </col-defs>
##   <row name="1">
##     <cell>1</cell>
##     <cell>1</cell>
##   </row>
##   <row name="2">
##     <cell>2</cell>
##     <cell>2</cell>

```

```
## </row>
## </data.frame>
```

The next step is to define a test case. As RTest is made for testing packages each test case has to start with a package name node, e.g. RTest. Then you have to define a function to call, e.g. funct_01. These two nodes have to follow like this:

```
<tests>
  <RTest>
    <funct_01 test-desc="First test of funct_01">

    </...>
```

Afterwards we have to define what we want to test in each function. Therefore we need to define input parameters

```
<params>
  <mult value = "1" type="numeric" />
</params>
```

in our case just the value of mult and the reference values.

```
<reference>
  <col-defs>
    <coldef name="x" type="numeric" />
    <coldef name="y" type="numeric" />
    <coldef name="sum" type="numeric" />
  </col-defs>
  <row>
    <cell>1</cell>
    <cell>2</cell>
    <cell>3</cell>
  </row>
  <row>
    <cell>1</cell>
    <cell>2</cell>
    <cell>3</cell>
  </row>
</reference>
```

Additionally we'll have to tell how the function shall be executed (silently, warning, ...). The test case for a working test looks like this:

```
<funct_01 test-desc="First test of funct_01">
  <params>
    <mult value = "1" type="numeric" />
  </params>
  <reference>
    <col-defs>
      <coldef name="x" type="numeric" />
      <coldef name="y" type="numeric" />
      <coldef name="sum" type="numeric" />
    </col-defs>
    <row>
      <cell>1</cell>
      <cell>2</cell>
      <cell>3</cell>
    </row>
```

```

    <row>
      <cell>1</cell>
      <cell>2</cell>
      <cell>3</cell>
    </row>
  </reference>
<testspec>
  <execution execution-type="silent" />
  <return-value compare-type="equal" diff-type="absolute" tolerance="0.001" />
</testspec>
</funct_01>

```

You see that mult is set to “1” and we basically add up the values rowwise.

For a non-working test we can use:

```

<funct_01 test-desc="see test_fun fail">
  <params>
    <mult value = "1" type="numeric" />
  </params>
  <reference>
    <col-defs>
      <coldef name="x" type="numeric" />
      <coldef name="y" type="numeric" />
      <coldef name="sum" type="numeric" />
    </col-defs>
    <row>
      <cell>1</cell>
      <cell>2</cell>
      <cell>5</cell>
    </row>
    <row>
      <cell>1</cell>
      <cell>2</cell>
      <cell>3</cell>
    </row>
  </reference>
  <testspec>
    <execution execution-type="silent" />
    <return-value compare-type="equal" diff-type="absolute" tolerance="0.001" />
  </testspec>
</funct_01>

```

this test shall fail as `<cell>5</cell>` is not the sum of 1 and 2. We are ready with the XML file. You can also get this file by using `paste0(find.package("RTest"), "/xml-templates")`

Create Test Adapter

The test adapter is an R-script that tells RTest how to interpret the XML file. The test adapter shall now use `params`, `reference` and `test-spec` to test the outcome of the function `test_fun`. Therefore we need to

- 1) Create a Test Adapter class - “TestPackageTestClass”
- 2) Create a Test Method - “test.RTest.funct_01” named after the XML structure

Part 1 is fairly simple. For Part2 you need to know some of the RTest functionalities. Please see the following code for an example:

```

## Loading required package: testthat
## Warning: package 'testthat' was built under R version 3.4.4
## Loading required package: magick
## Warning: package 'magick' was built under R version 3.4.4
## Linking to ImageMagick 6.9.9.14
## Enabled features: cairo, freetype, fftw, ghostscript, lcms, pango, rsvg, webp
## Disabled features: fontconfig, x11
## Loading required package: XML
## Thank you for using RTest
## To use a more comprehensive version of the test-report we recommend to run:
## assignInNamespace("as.expectation.logical", RTest::as.expectation.logical, ns="testthat", pos="packa
##
## Attaching package: 'RTest'
## The following object is masked _by_ '.GlobalEnv':
##
##      test_fun
# Create test adapter
setClass(
  Class      = "TestPackageTestCase",
  representation = representation(),
  prototype  = list(),
  contains   = "RTestCase",
  where     = .GlobalEnv
)

TestPackageTestCase <- function(xmlpath){
  RTestCase(xml.fPath=xmlpath)
}

RTest::setTestMethod(
  "test.Pkg_1.funct_01",
  signature = "TestPackageTestCase",
  definition = function(object, inputData, execCache, xmlDef, ...) {

    # Read parameters
    mult <- RTest::xmlReadData_variable(xmlDef[["params"]][["mult"]])

    # Calculate result
    result <- RTest::test_execution(
      what      = test_fun,
      args      = list(c(inputData[[1]], mult)),
      xmlTestSpec = xmlDef[["testspec"]][["execution"]]

    # Read reference
    reference <- RTest::xmlReadData_data.frame(xmlDef[["reference"]])

    # Execute test

```

```

    if(!is.null(xmlDef[["testspec"]][["return-value"]]))
      RTest::test_returnValue_data.frame_cellbycell(
        result,
        reference,
        xmlDef[["testspec"]][["return-value"]]
      )

    # Return result (will be cached)
    return(result)
  },
  where = .GlobalEnv
)

```

```
## [1] "test.Pkg_1.funct_01"
```

As you can see we use `xmlReadData_variable` to read the xml value of `mult`. Instead of `do.call` in `RTest` we use the wrapper function `test_execution` that not only runs code, but also checks, if it runs as expected. You can see that each of our test-methods gets the parameter `inputData` as an input. `inputData` is a list of all values inside the `input-data` section of the XML file. The first value inside our XML file was a data.frame, so we use `inputData[[1]]` to derive its values and hand it over to `test_fun`.

The reference can be compared using `test_returnValue_data.frame_cellbycell` which is the `RTest` wrapper for `expect_equal` for data.frames. All our compare functions start with the name `test_returnValue_` and you can find them by this.

In future we plan on enabling test-cases without test-adapters.

Execute test

We can now create a test collection from the folder where we stored the XML test files. In our case we use the basic example that we provide to you inside the package.

```

# Create test collection
testCollection <- new("RTestCollection",
  project.name = "RTest Vignette",
  project.details = "Example test execution",
  tester = "Example tester",
  test.start = format(Sys.time(), "%Y-%m-%d %H:%M:%S"))

# Import TCs
TCDir <- paste0(find.package("RTest"), "/xml-templates")

testCollection <- importTCsFromDir(testCollection,
  xml.dPath = TCDir, f.pattern="RTest_TC-01.xml")

```

We will then run our test-collection and a lovely Report will be produced.

```

outf <- tempfile(fileext=".html")

# Execute test cases
testCollection <- exec(testCollection, outf.fPath = outf, open=FALSE)

```

Title

RTest Vignette



Project	RTest Vignette	Host	Windows 10 x64
Project Details	Example test execution	Host Version	build 19063
Tester	Example tester	Host Name (User)	RPZM\VO48885 (work25)
Test Start	2019-12-10 19:38:02	R	R Version 3.4.2 (2017-08-28)
Report Generated	2019-12-10 19:38:02	R Architecture	x86_64
No. of Test Cases	1		

GLOBAL TEST STATUS

TEST PASSED
 0 TCs failed (0%)
 1 TCs passed (100%)

EXECUTION SUMMARY

TC	Version	Type	Label	Description	No. of Testgroups	Input	Status		
RTest_TC-01	01	RTestCase	RTest Template TC		1	RTest_TC-01.xml	SUCCESS		
Package	#	Description	Function	SpecID	RowID	#	Description	No. of Tests	Status
RTest	1	First test for Pkg_1	fnct_01			1	First test of fnct_01	2	SUCCESS

EXECUTION DETAILS

RTest_TC-01			
Version:	01	Author(s):	Mathias Pfeifer
Type:	RTestCase	Creation Date:	2019-01-25
Short Description:	RTest Template TC		
Description:	Extended Description of the test case allowing also 4 characters		
Input File:	C:\Programme_2\ROCHE\RRR-3.4.2\package-repository\RTest\m-templates\RTest_TC-01.xml		

DONE!

For any questions refer to the package maintainer.