

R “Validation” Hub Meeting

17 Sept 2019

Attendees:

Andy Nicholls (GSK) – Meeting Chair
Lyn Taylor (Phastar) – Meeting Secretary

Alun Bedding (Roche)
Arne De Roeck (Galapagos)
Bob Engle (Biogen)
Doug Kelkhoff (Roche)
Eric Nantz (Eli Lilly)
Evelyn Du (Teva)
Greg Cicconetti (Abbvie)
Jessica Higgins (Nuventra Pharma Sciences)
Juliane Manitz (Merck Serono)
Keaven Anderson (Merck)
Lin Taft (GSK)
Matthias Trampisch (Boehringer-Ingelheim)
Melvin Munsaka (Abbvie)
Michael Blanks (Beigene)
Min Lee (Amgen) - TransCelerate
Neby Bekele (Gilead)
Niccolo Bassani (Quanticate)
Patric Stracke (Sanofi)
Patrice Kiener (Inmodelia)
Paul Schuette (FDA)
Paulo Bargo (J&J)
Pieter-Jan Stiers (GLPG)
Prabhakar Burma (Acerta Pharma)
Raj Malathker (J&J)
Rebecca Krouse (RHO Inc.)
Reinhold Koch (Roche)
Satish Murthy (J&J)
Tomas Drgon (FDA)
William Henner (AbbVie)
Xiao Ni (Novartis)
Yann Roberts (Servier)

Agenda

- Review of actions / updates from streams (All)
- The riskmetric package (Yilong / Doug) – 20-30 mins
- Validation App (Andy) – 15 mins
- Roadmap (Andy) – 10 mins

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Previous Action Items

Action Item	Assigned team member(s)	Deadline	Status
<p>Communication, dissemination of information about the project to the wider group</p> <ul style="list-style-type: none"> - Looking at applying for funding to develop a shiny app that we will look at later on this call. 	Andy Nicholls/ Lyn Taylor/ Joe Rickert	Sept 2019	Ongoing
<p>Review of the website content: Direct review back to parker via Trello or Slack. Possible future action to get the R consortium website to point to our minutes on our website.</p> <ul style="list-style-type: none"> - Trello board progressed and updates made prior to conference. Will now progress to update to incorporate roadmap and other activities. - Expecting a future overhaul of website – including name change once we can think of an appropriate name for the group. 	Kieran Martin, Min Lee, Juliane Manitz, John Simms, Keaven Andersen, Parker Sims	R in Pharma Conference Aug 21 st .	Ongoing
<p>Risk assessment workstream – Continue work on riskmetric package – considerably progress been made – see updates below</p>	Yilong Zhang , Rebecca Krouse, Doug Kelkhoff, Matthias Trampisch, Eric Nantz	R in Pharma Conference Aug 21 st .	Ongoing
<p>Requirements/tests workstream set objectives + milestones - ACTION: Tilo share tests via GitHub</p> <ul style="list-style-type: none"> - To Be Confirmed, if Tilo can release tests from GSK. Question of whether can turn tests into a package but then has license complications 	Keaven Anderson , Nate Mockler, Tilo Blenk.	Sept 2019	Ongoing
<p>Validation white paper workstream – Target to produce white paper by R in pharma conference.</p> <ul style="list-style-type: none"> - Progress made pre- R in pharma conference. In a near final state. Aim to complete by 18th Oct. 	Andy Nicholls, Paulo Bargo, Lyn Taylor, John Sims	R in Pharma Conference Aug 21 st .	Ongoing
<p>Write blog post on gathering metrics and using these in a risk assessment</p> <ul style="list-style-type: none"> - No post, but website with riskmetric being created so item closed. 	Doug Kelkhoff	TBC	CLOSED

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Discussion

The riskmetric package (Yilong Zhang / Doug Kelkhoff): presented by Doug Kelkhoff.

Doug presented a demo of the package which can be used to collect metrics on packages in order to assess risk and is designed to be readily extensible. The team are encouraged to look it up on GitHub and get involved by doing the following:

- Share the package
- File issues when you encounter bugs
- Weigh in on proposed metrics, or suggest a new one
- Help us devise the best way to summarize risk into a single score
- Help us keep documentation up to date
- Contribute code to tackle the metric backlog

Note there is also an additional vignette “Extending riskmetric” describing how you can add assessments to the package. Doug demonstrated how a new metric (% issues closed in the last 30 days) could be written and added to the package and encouraged the team to consider what metrics they would like adding (what would be useful to you) and contribute to build out the package with additional metrics. In addition to collection of metrics, we also need to consider how to weight these metrics and formulate a score in order to summarize risk. If anything is not clear please also feed that back via GitHub.

More information available at: <https://github.com/pharmaR/riskmetric>



The screenshot shows a web browser window with the address bar displaying `https://pharmaR.github.io/riskmetric/index.html`. The main heading is "Installation". Below the heading, the text reads: "riskmetric is not yet on CRAN. Until it is, install using devtools .". A code block contains the command: `devtools::install_github("pharmaR/riskmetric")`.

Example

Scrape metadata locally or remotely, then assess that metadata and score it to estimate risk. For each package, derive a composite measure of risk, or a collection of individual scores which can be easily used to generate validation reports.

```
library(dplyr)
library(riskmetric)

pkg_ref(c("riskmetric", "utils", "tools")) %>%
  as_tibble() %>%
  assess() %>%
  score() %>%
  mutate(risk = summarize_risk(.))
```

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Package Reference Objects

Before we get started assessing packages, we need a place to aggregate all of our package metadata. To handle this, we use the `pkg_ref` class. As package metadata is requested, it will be housed within this object for reuse, avoiding repeatedly having to scrape, download, parse or derive the same metadata multiple times.

```
library(riskmetric)
pkg_ref("riskmetric")
```

```
#> <pkg_install, pkg_ref> riskmetric v0.1.0.9000
#> $path
#> [1] "/home/user/username/R/3.6/Resources/library/riskmetric"
#> $source
#> [1] "pkg_install"
#> $version
#> [1] '0.1.0.9000'
#> $name
#> [1] "riskmetric"
#> $description...
#> $help...
#> $help_aliases...
#> $news...
```

1. Finding a source for package information `pkg_ref()`

this can be any source of package metadata, such as a

- package repository webportal from which we can scrape metadata
- built and installed package in a local library
- directory containing package source code

2. Assessing the package under validation criteria `assess()`

collect a set of metadata for scoring risk, this might include

- a profile of the number of active users over the last month
- the availability of documentation for package functions
- the use of a unit testing framework
- the test coverage

3. Scoring assessment criteria `score()`

4. Summarize scores into an aggregate risk metric `summarize_risk()`

Patrice Kiener informed the group that there is a registered name of riskmetrics in finance, owned initially by J.P. Morgan and now by MSCI which might result in some conflict issues. Visit: <https://en.wikipedia.org/wiki/RiskMetrics>. In addition, the team should also look at the package “goodpractice” where you may be able to pick up good ideas on metrics, see <https://cran.r-project.org/web/packages/goodpractice/index.html> and collidr which enumerates all function names and checks for collision between function names, see <https://cran.r-project.org/web/packages/collidr/index.html>. Doug confirmed they’d looked at “packagemetrics” and “BiocCheck” but will look into these also.

There was a question regarding if you have to download the package to assess it, however Doug confirmed you can assess them on CRAN and don’t have to download them, hence a set of packages could be assessed to decide which you want to download based on the risk assessment.

Doug also confirmed that for people contributing to the collection of metrics, separate script files on GitHub would be fine.

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Andy asked if Doug or Yilong had encountered any running issues on different operating systems, since packagemetrics had a problem running on Windows, however, this hasn't been tested yet.

Validation App (Andy Nicholls)

Based on the work presented at the R in Pharma conference, Andy presented a demonstration of the protocol application. This demonstrates the concept of an application which would run over the riskmetrics package to organize and report the data in a more usable manner including a graphical interface (better visual appearance). Note that all data is test/dummy to demonstrate the concept so we are not to get hung up on the exact graphics or information presented.

The screenshot shows the 'Risk Assessment' app interface for the package 'haven'. The left sidebar contains navigation options: 'Packages' and 'Assessment Criteria'. The main content area is divided into three sections: 'Choose a Package', 'Package Conclusion', and 'Report Preview'. The 'Choose a Package' section has a dropdown menu set to 'haven', a 'Decision' toggle, and a 'Package Conclusion' section with an 'Enter Text' field. The 'Report Preview' section displays the following information:

- Package: haven
- Version: 2.1.1
- Description: Import foreign statistical formats into R via the embedded 'ReadStat' C library, <https://github.com/WizardMac/ReadStat>.
- Decision: Reject
- Parameter Value table:

Parameter	Value
SystemRequirements	GNU make
Author	Hadley Wickham [aut, cre], Evan Miller [aut, cph] (Author of included ReadStat code), RStudio [cph, fnd]
Maintainer	Hadley Wickham <hadley@rstudio.com>
- Overall Conclusion
- Details
- Package Maintenance table:

Parameter	Metric	Additional Information
Has a Vignette?	Yes	Conversion semantics; Date times

The screenshot shows the 'Risk Assessment' app interface for the package 'dplyr'. The left sidebar is the same as in the previous screenshot. The main content area is divided into three sections: 'Choose a Package', 'Package Conclusion', and 'Report Preview'. The 'Choose a Package' section has a dropdown menu set to 'dplyr', a 'Decision' toggle, and a 'Package Conclusion' section with an 'Enter Text' field. The 'Report Preview' section displays a dashboard with the following information:

- Report Preview
- Maintenance
- Community Usage
- Testing
- Risk Assessment
- Dashboard with six green boxes, each with a thumbs-up icon and 'Yes' status:
 - HAS VIGNETTE(S) Yes
 - HAS WEBSITE Yes
 - HAS NEWS FEED Yes
 - SOURCE CODE MAINTAIN... Yes
 - FORMAL BUG TRACKING Yes
 - COMPANY-APPROVED LIC... Yes
- Releases in past 18 Months: 4 (represented by a gauge chart)
- Number of CRAN Packages by Maintainer: 365 (represented by a gauge chart)
- Number of lines vs R Packages on CRAN: A line graph showing density vs. Number of Lines of Code.

The intention would be to store this information into a database, also documenting our own overall conclusions about the risk of using the package and perhaps a go/ no go decision on its use. The report could be stored in a R markdown document (HTML), available for viewing and also build out the app to

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create a word document/ PDF that generates a auditable report, that provides evidence of the rationale behind why we decided to use this package and how we assessed it.

Next steps are to apply for funding in order to produce the application, linked to the riskmetric package. The aim is to have plans in place by the end of the month. Please give any feedback via GitHub by creating a new issue.

There was discussion over whether metrics should be numeric (possibly weighted to avoid emphasis on less reliable metrics) and hence non-subjective or if we should allow interpretation. Andy gave an example that some packages may appear to have not great metrics, but when examined there is a reason behind and that it may not in all cases be a good reflection of risk. This may end up still a matter of company specific choice.

Doug also noted that if the assessment was based entirely on metrics with no subjective component then an app might not be required at all and the report-writing component could be fully automated. This point is to be debated further via Slack.

Roadmap (Andy Nicholls)

The following will be published on the website shortly. It documents what we've completed to date in addition to our aims for the future.

Phase 1 was working towards white paper, which is now almost complete. Most current work is contributing towards phase 2, and we will be applying for funding in order to progress quickly with this phase.

Roadmap



1. Process and Communication

- ✓ Publish [website](#)
- ✓ Agree high level process
 - Develop white paper [Target 18th October]
 - Ensure content reflected accurately in website
- ✓ Tools at pilot implementation stage

2. Validation / Qualification Suite

- Release metrics package – need to link website from main site. Add agenda item to main meeting to demo/discuss/request help
- Release Shiny app and reporting tools for risk assessment [End Jan / Q1 target]
- Share test suite
- *Build test execution tool*
- *Provide an example deployment*
- Agree criteria used to determine whether a package is fit for the Pharma Repository

3. Repository

- Build Pharma R Repository

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Actions

Action Item	Assigned team member(s)	Deadline	Status
Communication, dissemination of information about the project to the wider group Submit application for funding to develop a shiny app.	Andy Nicholls/ Lyn Taylor/ Joe Rickert	Sept 2019	Ongoing
Review of the website content: Direct review back to parker via trello or slack. Possible future action to get the R consortium website to point to our minutes on our website. Update to include roadmap and progress. Suggestions for change of name – Please!	Kieran Martin, Min Lee, Juliane Manitz, John Simms, Keaven Andersen, Parker Sims	Oct 2019	Ongoing
Risk assessment workstream – Continue work on rickmetrics package – with input from the wider team	Yilong Zhang , Rebecca Krouse, Doug Kelkhoff, Matthias Trampisch, Eric Nantz	Oct 2019	Ongoing
Requirements/tests workstream set objectives + milestones - ACTION: Tilo share tests via GitHub	Keaven Anderson , Nate Mockler, Tilo Blenk.	Oct 2019	Ongoing
Validation white paper workstream – Target publishing of white paper by 18 th Oct	Andy Nicholls, Paulo Bargo, Lyn Taylor, John Sims	Oct 2019.	Ongoing