



A R-Shiny Application: Animate Your Data with SAS Traceability

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Background, Objective
and Scope



Technical Requirements



Workflow



Prototype of the Workflow



Live Demonstration



Key Benefits

Background, Objective and Scope

SAS

- Programming tool of choice over many years
- Accuracy and reliability is trusted by industry and regulatory agencies
- Data and process traceability is ensured by LOG File

R

- Flexible usage of packages
- Scope of developing customizing apps with R Shiny
- R Shiny of its capability of loading data interactively, process and analyzing the clinical trial data

Background, Objective and Scope

- Integration of both platforms
- Platform independent validation
- Production of the validated graphics outputs interactively for clinical trial reporting
- Production of the animation of analysis data



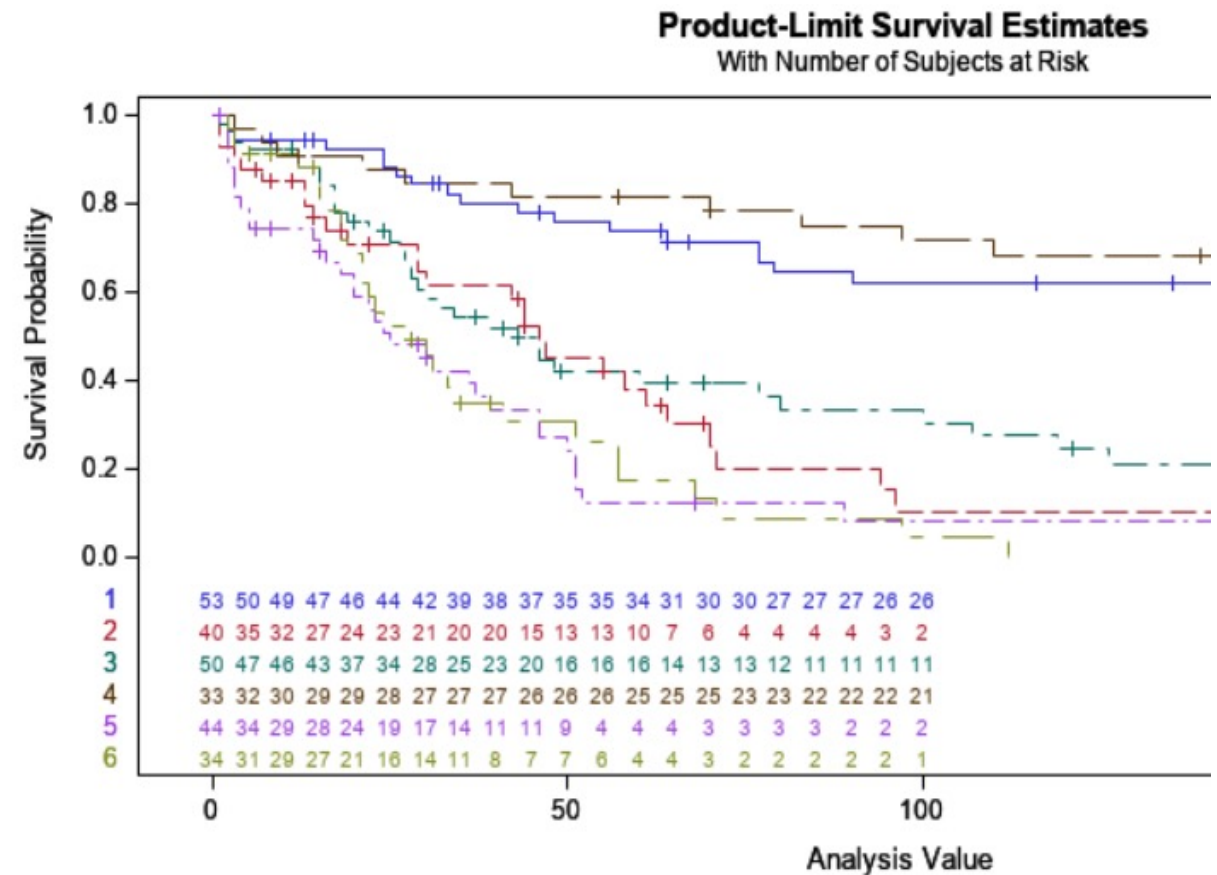
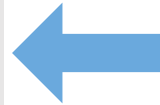
Background, Objective and Scope

Scenario 1:

- The interpretation of a result is difficult from the graphical output

Scope:

- This Application Tool creates animated graph interactively



Background, Objective and Scope

Scenario 2:

- An urgent request from an authority/ agency is received
- Different types of graphics with different endpoints must be produced and validated within short time

Scope:

- This Application Tool produces static graphics interactively by SAS Script which is validated by R Studio Script
- These platform independent validated results can be directly used for a clinical trial reporting



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Key Benefits

Technical Requirements

- R / RStudio/ R Shiny
- SAS 9.4

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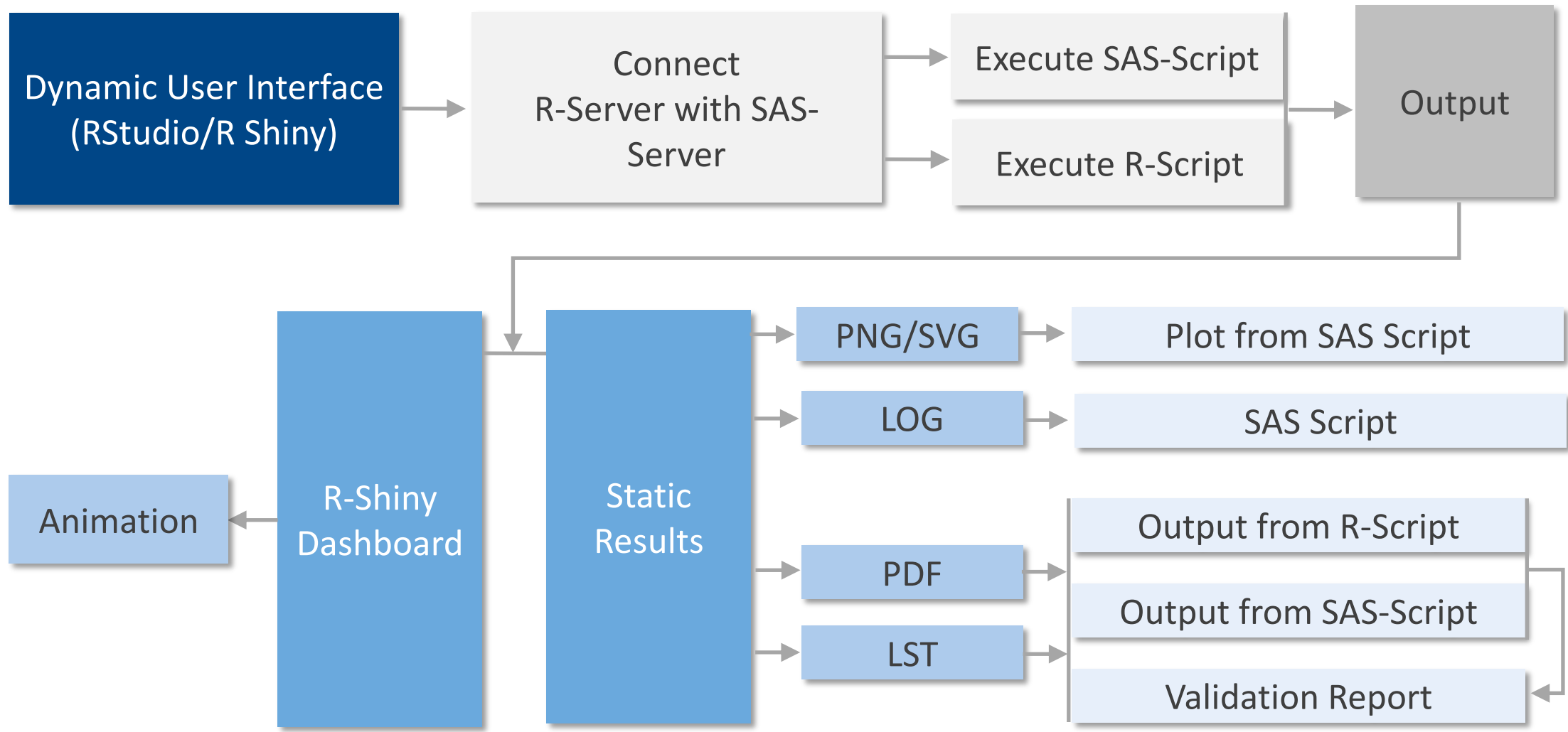


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Key Benefits

Prototype of the Workflow

Overview*

Graphics Type

Graphics Type*

Survival Plot

Types of the Survival Plot*

Kaplan-Meier Plot

Analysis Datasets*

adtte.xpt

Choose Population

SAFFL

Choose Parameter*

PARAM

Choose Population Value

Y

Choose Parameter Value*

Time to first Cardiac Attack

Time to Event*

AVAL

Group

TRTP SEX

Censor Status*

CNSR

Choose Censor Value*

1

X-AXIS Range:

0 100 198

X-AXIS Increment:

0 10 198

Y-AXIS Range:

0 0.8 1

Y-AXIS Increment:

0 0.1 1

Duration of Animation:

4 100

Run Statistical Procedure

User Input

Click Submit Button

Prototype of the Workflow

Overview*

Graphics Type

Graphics Type*

Survival Plot

Types of the Survival Plot*

Kaplan-Meier Plot

Analysis Datasets*

adtte.xpt

Choose Population

SAFFL

Choose Population Value

Y

Choose Parameter*

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Choose Parameter Value*

Time to first Cardiac Attack

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1

X-AXIS Range:

0 100 198

X-AXIS Increment:

0 10 198

Y-AXIS Range:

0 0.8 1

Y-AXIS Increment:

0 0.1 1

Duration of Animation:

4 100

Run Statistical Procedure

Batch SAS - kaplan... — □ ×

Running sas program:
E:\PHUSE SDE\Kaplan-Meier\kaplan_final.sas
Output written to:
E:\PHUSE SDE\Kaplan-Meier\kaplan_final.lst
Log written to:
E:\PHUSE SDE\Kaplan-Meier\kaplan_final.log

Icon Cancel

Batch Submit

Prototype of the Workflow

```
callSAS <- function (f, path=getwd(), workDir=sprintf("E:", sys.info()["user"])) {  
  # Usage:  
  # > callSAS("getClaimsMed.sas")  
  if (grepl(".sas$", f)) {  
    exeFile <- "E:\\Apps\\SASHome\\SASFoundation\\9.4\\sas.exe"  
    sasFile <- sprintf("%s\\%s", path, f)  
    logFile <- sprintf("%s\\%s", path, gsub(".sas$", ".log", f))  
    lstFile <- sprintf("%s\\%s", path, gsub(".sas$", ".lst", f))  
    cmd <- sprintf("%s\\%s -sysin \"%s\\%s\" -log \"%s\\%s\" -print \"%s\\%s\"",  
                  exeFile,  
                  sasFile,  
                  logFile,  
                  lstFile  
                  )  
    system(cmd, invisible=FALSE)  
    cat(readLines(sasFile), sep="\n")  
  }  
}
```

During Batch
Submission

Connect R-Shiny
Server with
SAS-Server

Prototype of the Workflow

```
ods listing close;  
ods output Survivalplot=SurvivalPlotData;  
proc lifetest data=data_use1 alpha=0.05  
  plots=survival(atrisk=&minxaxis. to &maxxaxis. by &incrxaxis.);;  
  time &tte.*&cursor.(&cursorval.);  
  strata &group1.;  
run;  
ods listing;
```



Execute SAS
Method

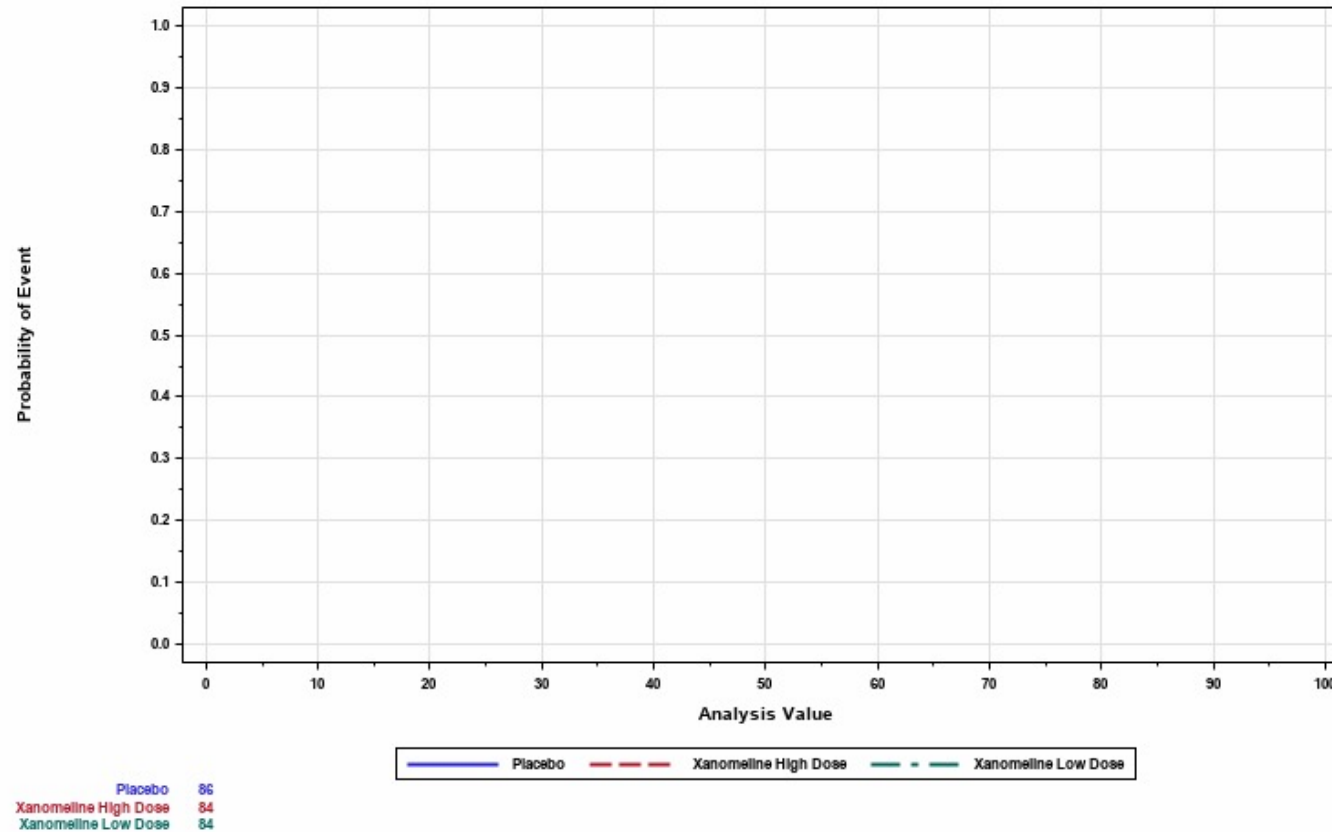
```
inputdata<-data.frame(read_sas("data_use1.sas7bdat"))  
final<- survfit(as.formula(paste("Surv(time=input$kaplanmeierplotxaxis,  
  event=input$kaplanmeierplotyaxis ==  
  input$kaplanmeierplotyaxisval) ~ ",  
  paste(input$kaplanmeierplotgroup))),  
  data=inputdata)|
```



Execute R
Method

Prototype of the Workflow

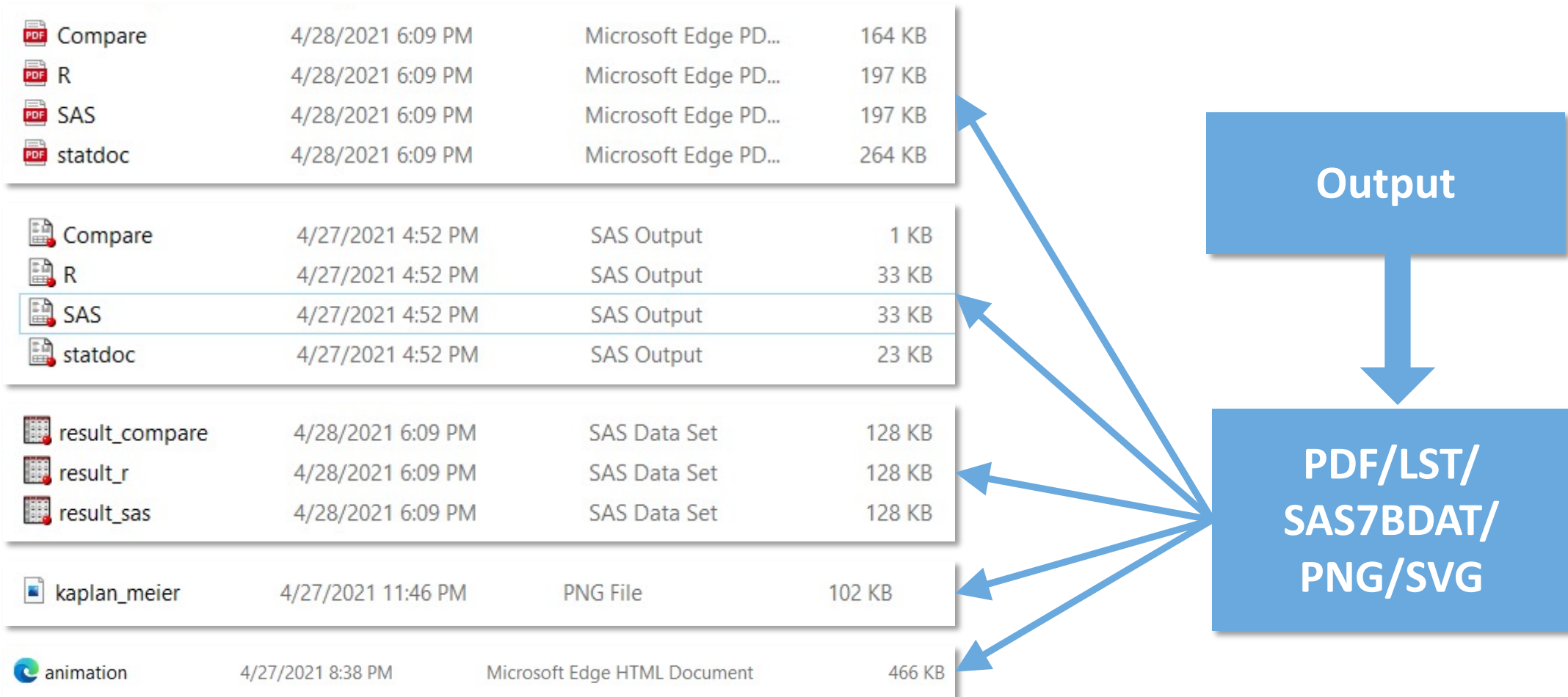
Figure: The Time to First Event of the Parameter Description: 'TimetofirstCardiacAttack' stratified by Planned Treatment



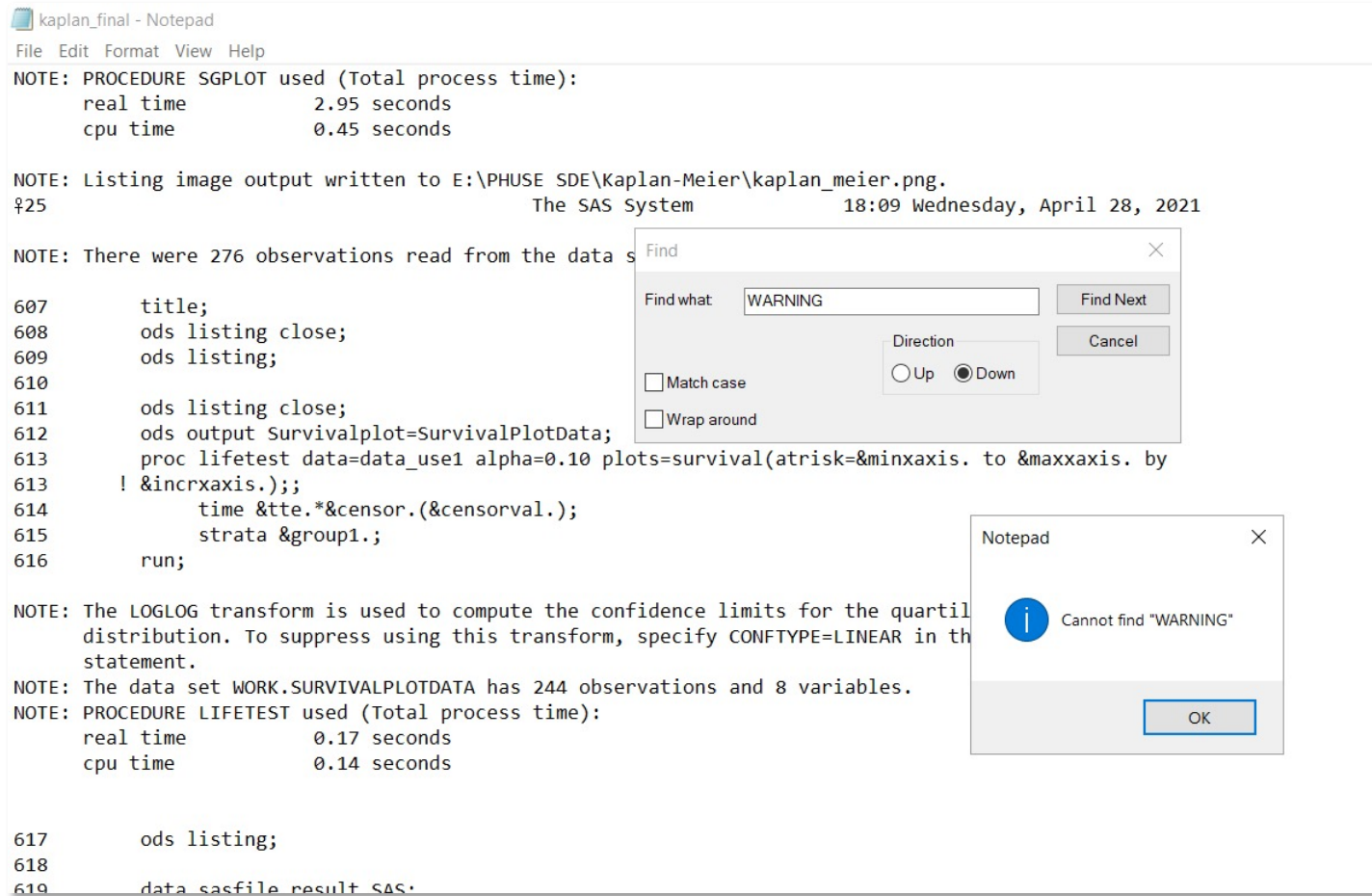
Output

R-Shiny
Dashboard

Prototype of the Workflow



Prototype of the Workflow



kaplan_final - Notepad

File Edit Format View Help

NOTE: PROCEDURE SGPLOT used (Total process time):
real time 2.95 seconds
cpu time 0.45 seconds

NOTE: Listing image output written to E:\PHUSE SDE\Kaplan-Meier\kaplan_meier.png.
%25 The SAS System 18:09 Wednesday, April 28, 2021

NOTE: There were 276 observations read from the data s

```
607 title;  
608 ods listing close;  
609 ods listing;  
610  
611 ods listing close;  
612 ods output Survivalplot=SurvivalPlotData;  
613 proc lifetest data=data_use1 alpha=0.10 plots=survival(atrisk=&minxaxis. to &maxxaxis. by  
613 ! &incrxaxis.);;  
614 time &tte.*&censor.(&censorval.);  
615 strata &group1.;  
616 run;
```

NOTE: The LOGLOG transform is used to compute the confidence limits for the quartil
distribution. To suppress using this transform, specify CONFTYPE=LINEAR in th
statement.

NOTE: The data set WORK.SURVIVALPLOTDATA has 244 observations and 8 variables.

NOTE: PROCEDURE LIFETEST used (Total process time):
real time 0.17 seconds
cpu time 0.14 seconds

617 ods listing;
618
619 data sasfile result SAS;

Find

Find what: WARNING Find Next Cancel

Direction
☐ Up ☒ Down

☐ Match case
☐ Wrap around

Notepad

Cannot find "WARNING"

OK

Traceability



LOG



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Key Benefits

Live Demonstration

ON AIR

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Live Demonstration



Key Benefits

Key Benefits



- Create animated and static statistical graphics interactively
- Receive results from a different platform
- Produce validation report
- Generate log file to ensure data traceability
- Use graphics directly for clinical trial reporting, e.g., for a manuscript, ad hoc analysis or for medical/scientific journals
- Integrate any kind of graphics which can be done with SAS and R within this tool

Thank you for your attention

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Questions?

