Developing internal tools for multi-lingual teams

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rstudio::conf
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bumble

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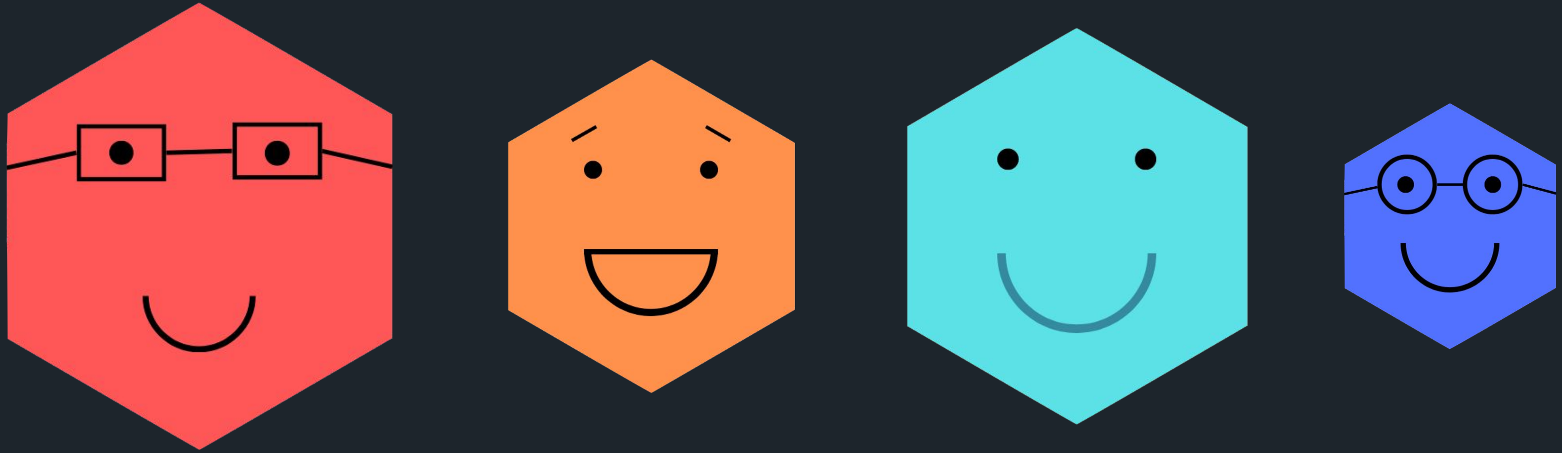
FRUITZ



What strategies can we use to make developing tools simultaneously with Python and R easier?

Idea #1:
Building identical generic functions

print()

print()

summary()

print()

summary()

broom::tidy()

A simple generic function in R

```r
say_hello <- function(x) {
  UseMethod("say_hello")
}
```

```r
say_hello.data.frame <- function(x) {
  print("Hello dataframe!")
}
```

```r
say_hello.data.frame <- function(x) {
  print("Hello dataframe!")
}
say_hello.default <- function(x) {
  print("Hello there!")
}
```

Can we do this in Python?

```python
from functools import singledispatch
from functools import singledispatch


def say_hello(x):
    return "Hello there!"
```

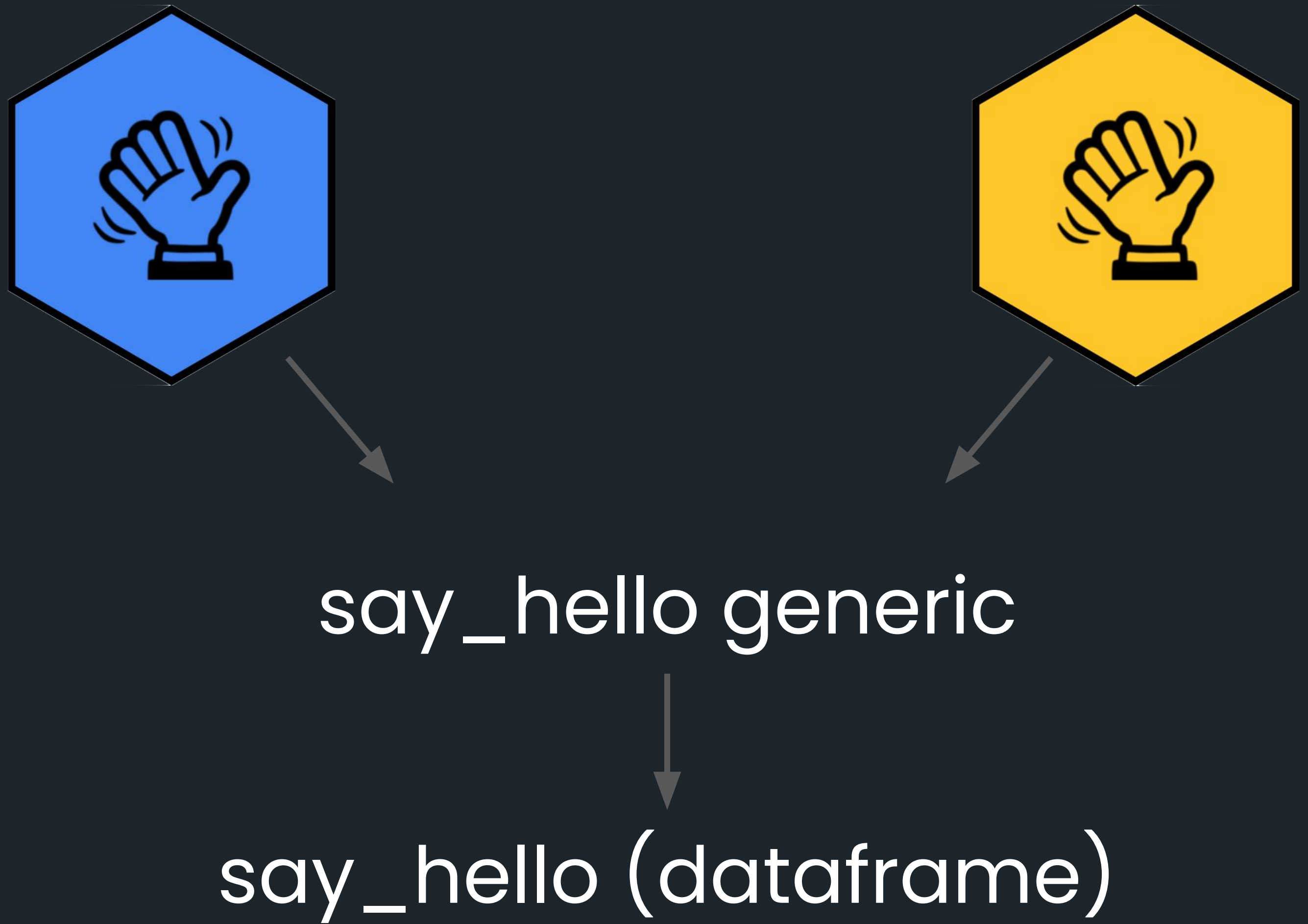
```python
from functools import singledispatch

@singledispatch
def say_hello(x):
    return "Hello there!"
```

```python
import pandas as pd

@say_hello.register(pd.DataFrame)
def greet_df(x):
    print("Hello dataframe!")
```

say_hello generic


say_hello generic
say_hello (dataframe)

```r
# funcs.R
# Method 1


# Method 2


# Method 3
```

```python
# funcs.py
# Method 1


# Method 2


# Method 3
```

Idea #2:
Identical error handling with classes

FileNotFoundError

ZeroDivisionError

KeyError

```python
class MyInternalError(Exception):
    pass
```

```python
raise MyInternalError("Better let IT know.")
```

```
try:
    # Some code goes here
except FileNotFoundError:
    # Code to handle FileNotFoundError
```

Can we do this in R?

```
stop("This throws an error!")
#> Error: This throws an error!

rlang::abort("This throws an error!")
#> Error:
#> ! This throws an error!
```

```
tryCatch(
  error = function(cnd) {
    # Code to run if error is thrown
  },
  # Code running with active error
    # handler
)
```

```r
abort_credentials_missing <- function() {
  rlang::abort(
    class = "error_credentials_missing",
    message = "Credentials not found!")
}
```

```r
abort_credentials_missing <- function() {
  rlang::abort(
    class = "error_credentials_missing",
    message = "Credentials not found!")
}
```

```
abort_credentials_missing()
#> Error in `abort_credentials_missing()`:
#> ! Credentials not found!
```

```r
tryCatch(
  error_credentials_missing = function(cnd) {
    # Code to handle missing credentials
  },
  # Code running with active credentials
  # error handler
)
```

What about error chaining?

```python
try:
    1 / 0
except ZeroDivisionError as e:
    raise MyInternalError("Error!") from e
```

```
try:
    1 / 0
except ZeroDivisionError as e:
    raise MyInternalError("Error!") from e
```

```
ZeroDivisionError: division by zero

The above exception was the direct
cause of the following exception:

MyInternalError
```

```r
rlang::try_fetch(
  error = function(cnd) {
    rlang::abort("An error!", parent = cnd)
  },
  df$x
)
```

```r
rlang::try_fetch(
  error = function(cnd) {
    rlang::abort("An error!", parent = cnd)
  },
  df$x
)
```

```
#> Error:
#> ! An error!
#> Caused by error in `df$x`:
#> ! object of type 'closure' is not subsettable
```

Idea #3: Creating your own internal wrappers

Calling Python from R

Importing Python modules into R

```
pymod <- reticulate::import("py_module")
```

```r
pymod <- reticulate::import("py_module")

# Call internal_function from py_module
pymod$internal_function()
```

```r
# R/zzz.R
pymod <- NULL
```

```r
# R/zzz.R
pymod <- NULL

.onLoad <- function(libname, pkgname) {
    pymod <<- reticulate::import(
              "py_module",
              delay_load = TRUE
    )
}
```

```r
# R/zzz.R
pymod <- NULL

.onLoad <- function(libname, pkgname) {
    pymod <<- reticulate::import(
                         "py_module",
                         delay_load = TRUE
    )
}
```

Sourcing Python files from R

```python
# inst/python/add.py
def add_two(x, y):
  return x + y
```

```r
source_python("inst/python/add.py")
add_two(5, 10)
```

Calling R from Python

rpy2

Importing R libraries into Python

```
from rpy2.robjects.packages import importr
from rpy2.robjects.packages import importr


base = importr("base")
```

```
from rpy2.robjects.packages import importr


base = importr("base")

r_sum = base.sum
```

```
from rpy2.robjects.packages import importr
from rpy2.robjects import IntVector

base = importr("base")

r_sum = base.sum

r_sum(IntVector([10, 10]))
```

Accessing functions from the R environment

```
import rpy2.robjects as ro
import rpy2.robjects as ro

r_code = "my_func <- function() {1}"
```

```python
import rpy2.robjects as ro

r_code = "my_func <- function() {1}"

ro.r(r_code)
```

```python
import rpy2.robjects as ro

r_code = "my_func <- function() {1}"

ro.r(r_code)

py_func = ro.globalenv["my_func"]
```

Defining a temporary package structure

```
from rpy2.robjects.packages import STAP
from rpy2.robjects.packages import STAP

r_code = "my_function <- function() {1}"
```

```
from rpy2.robjects.packages import STAP

r_code = "my_function <- function() {1}"

pack = STAP(r_code, "pack")
```

```
from rpy2.robjects.packages import STAP

r_code = "my_function <- function() {1}"

pack = STAP(r_code, "pack")

pack.my_function()
```

Now for the bad news...

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Two environments

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Two environments

Object conversion

Now for the bad news...

Two environments
Object conversion
Error messages

Generic functions

Errors as classes

Internal wrappers

Thank You