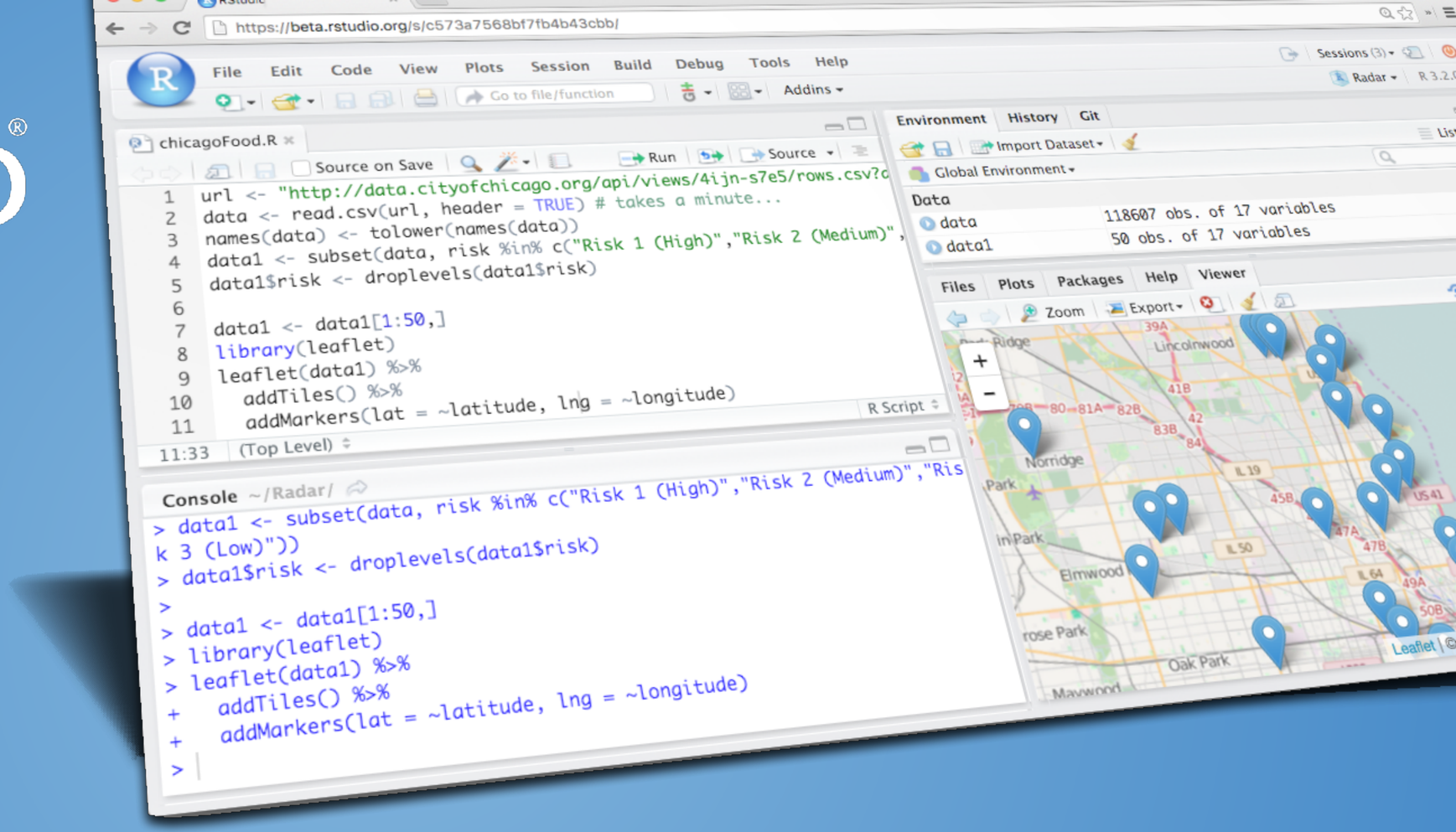
RStudio®



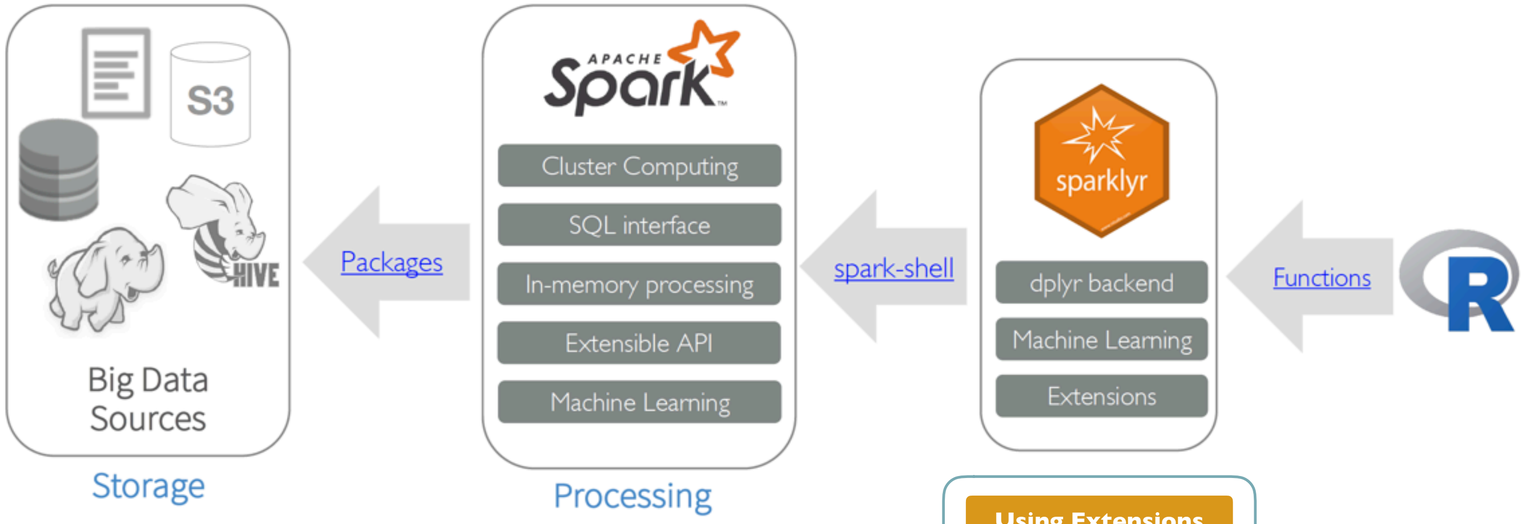
Advanced sparklyr features

Advanced sparklyr Features

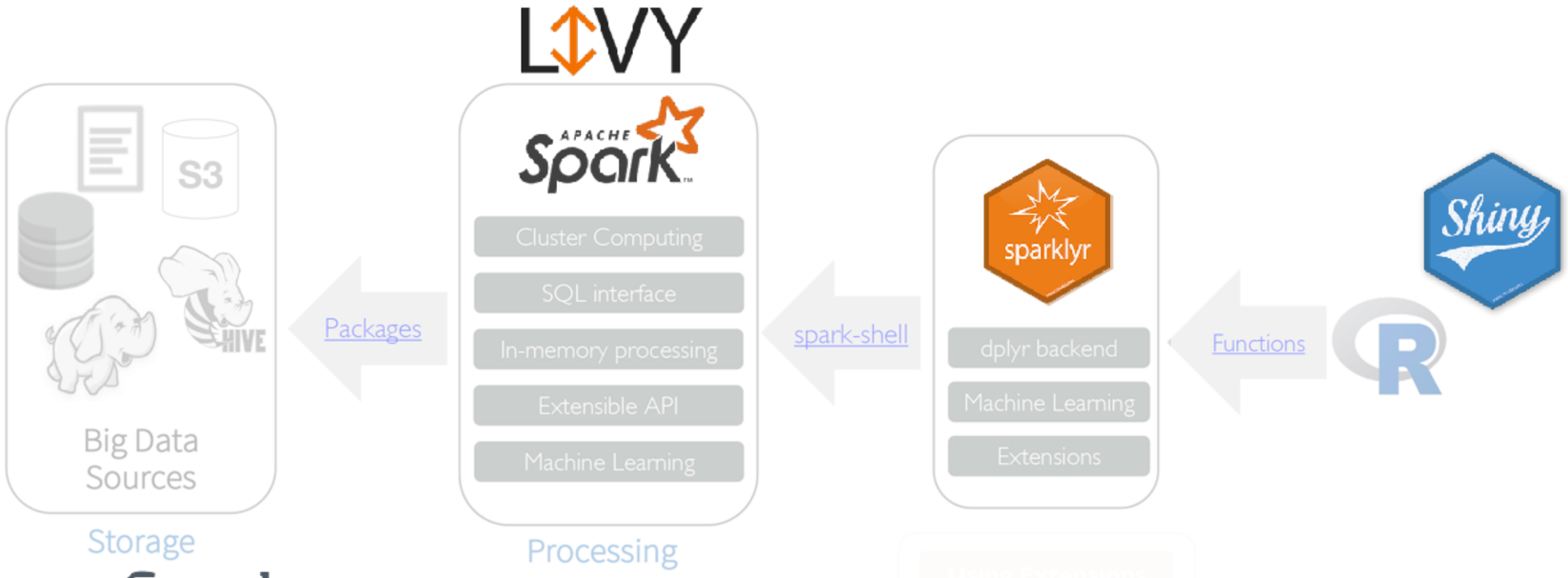
- ✓ Overview
- ✓ Scaling R in Spark with spark_apply()
- ✓ Spark from your desktop using Livy
- ✓ Spark Applications with Shiny
- ✓ Questions

Overview

OVERVIEW


S3
HIVE
Big Data Sources
Storage
Packages
APACHE Spark
Cluster Computing
SQL interface
In-memory processing
Extensible API
Machine Learning
Processing
spark-shell
sparklyr
dplyr backend
Machine Learning
Extensions
Functions
R
Using Extensions
Using R Code
Using Scala Code
Creating R Packages

OVERVIEW



Common Crawl

240 TiB

72K Files

spark_apply()

- ✓ Scaling R in Spark with spark_apply()
- ✓ Spark from your desktop using Livy
- ✓ Spark Applications with Shiny

Scaling R

Use Cases

✓ Leverage R skills

```
1
2  spark_apply(iris_tbl, function(e) sapply(e[,1:4], jitter))
3
```

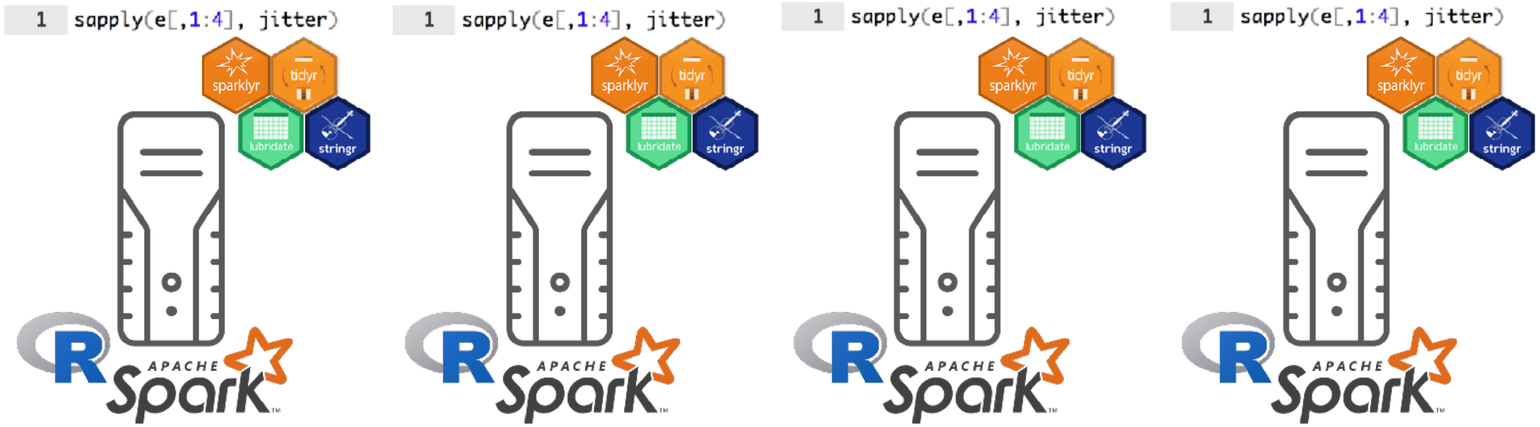
✓ Complement R

```
1
2  spark_apply(
3    iris_tbl,
4    function(e) broom::tidy(lm(Petal_Width ~ Petal_Length, e)),
5    colums = c("term", "estimate", "std.error", "statistic", "p.value"),
6    group_by = "Species"
7  )
8
```

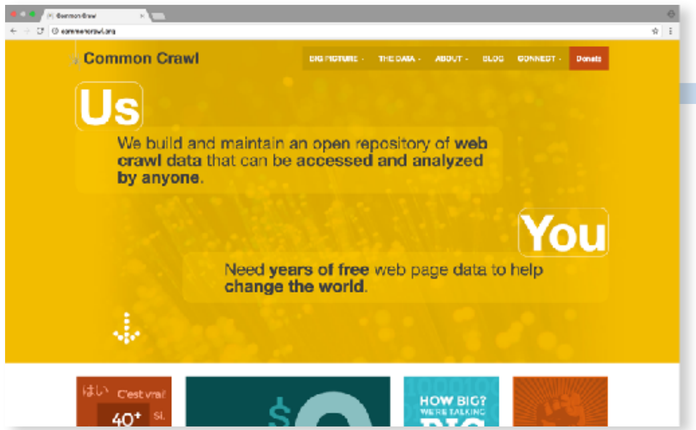
USING SPARK_APPLY()

```
1
2  spark_apply(
3    iris_tbl,
4    function(e) sapply(
5      e[,1:4], jitter
6    )
7  )
8
```

- ✓ Install R in every node, once per cluster.
- ✓ spark_apply() distributes packages, once per session.
- ✓ spark_apply() distributes your code, once per call.



PARSING AND FILTERING THE COMMONCRAWL

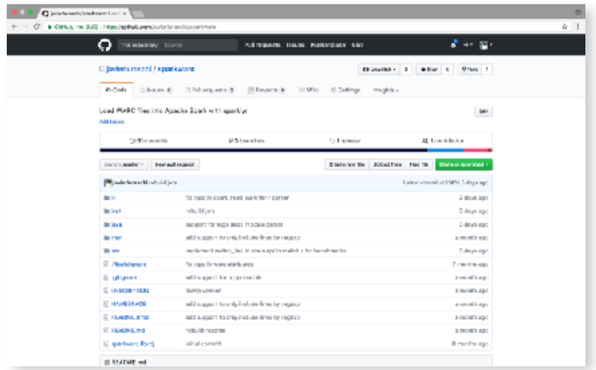


240 TiB
72K Files

```cpp
// [[Rcpp::export]]
DataFrame rcpp_read_warc(std::string path, std::string filter, std::string include) {
  FILE *fp = fopen(path.c_str(), "rb");
  if (!fp) Rcpp::stop("Failed to open WARC file.");
  gzFile gzf = gzdopen(fileno(fp), "rb");
  if (!gzf) Rcpp::stop("Failed to open WARC as a compressed file.");

  const int buffer_size = 4 * 1024;
  char buffer[buffer_size] = {'\0'};
  std::list<std::string> warc_entries;
  const int warc_mean_size = 40 * 1024;
  std::string warc_entry;
  warc_entry.reserve(warc_mean_size);
  bool one_matched = false;
  const std::string warc_separator = "WARC/1.0";

  long stats_tags_total = 0;
  std::list<long> warc_stats;

  while(gzgets(gzf, buffer, buffer_size) != Z_NULL) {
    std::string line(buffer);

    if (!filter.empty() && !one_matched) {
      one_matched = line.find(filter) != std::string::npos;
    }

    if (std::string(line).substr(0, warc_separator.size()) == warc_separator && warc_entry.size() > 0) {
      if (filter.empty() || one_matched) {
        warc_entries.push_back(warc_entry);
        warc_stats.push_back(stats_tags_total);
        stats_tags_total = 0;
      }

      one_matched = false;
      warc_entry.clear();
    }

    if (include.empty() || line.find(include) != std::string::npos)
      warc_entry.append(line);

    std::size_t tag_start = rcpp_find_tag(line, 0);
    while(tag_start != std::string::npos) {
      stats_tags_total += 1;
      tag_start = rcpp_find_tag(line, tag_start + 1);
    }
  }

  if (gzf) gzclose(gzf);
  if (fp) fclose(fp);

  long idxEntry = 0;
  CharacterVector results(warc_entries.size());
  std::for_each(warc_entries.begin(), warc_entries.end(), [&results, &idxEntry](std::string &entry) {
    results[idxEntry++] = entry;
  });

  long idxStat = 0;
  NumericVector stats(warc_stats.size());
  std::for_each(warc_stats.begin(), warc_stats.end(), [&stats, &idxStat](long &stat) {
    stats[idxStat++] = stat;
  });

  return DataFrame::create(Named("tags") = stats, _["content"] = results);
}
```

Rcpp::

or use sparkwarc::



+

```r
df <- spark_apply(paths_tbl, function(df) {
  entries <- apply(df, 1, function(path) {
    if (grepl("s3n://", path)) {
      path <- sub("s3n://commoncrawl/", "https://commoncrawl.s3.amazonaws.com/", path)
      temp_warc <- tempfile(fileext = ".warc.gz")
      download.file(url = path, destfile = temp_warc)
      path <- temp_warc
    }

    sparkwarc::rcpp_read_warc(path, filter = match_warc, include = match_line)
  })

  if (nrow(df) > 1) do.call("rbind", entries) else data.frame(entries)
}, names = c("tags", "content")) %>% spark_dataframe()
```

spark_apply

Livy

Using Livy

✓ LIVY installed in one node

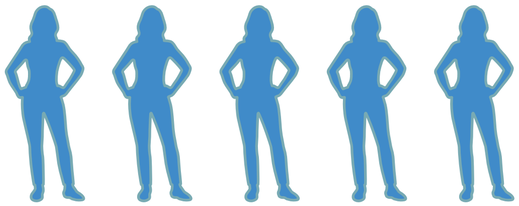
[http]


```
1
2  config <- livy_config_auth("<username>",
3                             "<password">)
4
5  sc <- spark_connect(master = "<address>",
6                      method = "livy",
7                      config = config)
8
```

Shiny

SPARKLYR CONNECTIONS

```
tbl_cache()  ⟶  writeBin()  ⟷  df.cache()
tbl_cache()     readBin()   ⟶  df.cache()
tbl_cache()        ...          ...
tbl_cache()  ⟵  readBin()   ⟵  df.cache()
```



SHINY AND SPARKLYR

```
1
2  library(shiny)
3  library(dplyr)
4  library(sparklyr)
5
6  sc <- spark_connect(master = "local")
7  faithful_tbl <- copy_to(sc, faithful, overwrite = TRUE)
8
9  ui <- fluidPage(
10    titlePanel("Old Faithful Geyser Data"),
11    sidebarLayout(
12       sidebarPanel(
13          sliderInput("bins",
14                      "Number of bins:",
15                      min = 1,
16                      max = 50,
17                      value = 30)
18       ),
19       mainPanel(
20          plotOutput("distPlot")
21       )
22    )
23 )
24
25 server <- function(input, output) {
26    output$distPlot <- renderPlot({
27       x    <- faithful_tbl %>% pull(waiting)
28       bins <- seq(min(x), max(x), length.out = input$bins + 1)
29
30       hist(x, breaks = bins, col = 'darkgray', border = 'white')
31    })
32 }
33
34 shinyApp(ui = ui, server = server)
35
```

Setup

```
3  library(dplyr)
4  library(sparklyr)
5
6  sc <- spark_connect(master = "local")
7  faithful_tbl <- copy_to(sc, faithful, overwrite = TRUE)
```

Server

```
27       x    <- faithful_tbl %>% pull(waiting)
```

Questions

Open Source & Free

Desktop: http://www.rstudio.com/products/rstudio/download/
RStudio Server: http://www.rstudio.com/products/rstudio/download-server/
Shiny Server: http://www.rstudio.com/products/shiny/download-server/
shinyapps.io beta: https://www.shinyapps.io/admin/#/signup

45 Day Evaluation of Pro Products

RStudio Server Pro: http://www.rstudio.com/products/rstudio-server-pro/evaluation/
Shiny Server Pro: http://www.rstudio.com/products/shiny-server-pro/evaluation/

PLEASE STAY IN TOUCH


Blog - http://rviews.rstudio.com/


Blog - http://blog.rstudio.org/


Twitter - @rstudio #rstats http://twitter.com/rstudio/


GitHub - https://github.com/rstudio/


LinkedIn - https://linkedin.com/company/rstudio-inc


Facebook - https://www.facebook.com/pages/RStudio-inc


Google+ - https://plus.google.com/110704473211154995841/posts