Session 2a: Oracle R Enterprise 1.5.1 OREdplyr

Oracle R Technologies

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Agenda

1. What is dplyr?
2. Functionality of OREdplyr
3. Examples using OREdplyr
What is dplyr?
What is dplyr?

• A grammar for data manipulation
• An R package that provides fast, consistent tool for working with data frame like objects, both in memory and out of memory
• Operates on data.frame or numeric vector objects
• Widely used package that also interfaces to database management systems
• [https://cran.r-project.org/web/packages/dplyr/index.html](https://cran.r-project.org/web/packages/dplyr/index.html)

• dplyr + Oracle Database via Oracle R Enterprise...
OREdplyr

• A subset of dplyr functionality extending ORE transparency layer
• Use ore.frames instead of data.frames for in-database execution
• Avoid costly movement of data
• Scale to larger data volumes since not constrained by R Client memory
Functionality of OREdplyr
OREdplyr functions in ORE 1.5.1

- OREDplyr functionality maps closely to CRAN dplyr package, e.g., function and args
- OREDplyr operates on ore.frame or ore.numeric objects
- Functions support non-standard evaluation (NSE) and standard evaluation (SE) interface
  - Difference noted with a _ at the end of function name, e.g.,
    - NSE → select, filter, arrange, mutate, transmute
    - SE → select_, filter_, arrange_, mutate_, transmute_
  - NSE interface is good for interactive use while SE ones are convenient for programming
  - See https://cran.r-project.org/web/packages/dplyr/vignettes/programming.html for details
OREdplyr functions by category

• Data manipulation
  – select, filter, arrange, rename, mutate, transmute, distinct, slice, desc, select_, filter_, arrange_, rename_, mutate_, transmute_, distinct_, slice_, inner_join, left_join, right_join, full_join

• Grouping
  – group_by, groups, ungroup, group_size, n_groups, group_by_

• Aggregation
  – summarise, summarise_, tally, count, count_

• Sampling
  – sample_n, sample_frac

• Ranking
  – row_number, min_rank, dense_rank, percent_rank, cume_dist, ntile, nth, first, last, n_distinct, top_n
Examples using OREdplyr

Content adapted from original dplyr vignettes (e.g., link)
Examples: basic operations

library(OREdplyr)

library(nycflights13)  # contains data sets

# Import data to Oracle Database

ore.drop("FLIGHTS")  # remove database table, if exists
ore.create(as.data.frame(flights), table="FLIGHTS")

dim(FLIGHTS)  # get # rows and # columns
names(FLIGHTS)  # view names of columns
head(FLIGHTS)  # verify data.frame appears as expected

# Basic operations

select(FLIGHTS, year, month, day, dep_delay, arr_delay)
  %>% head()  # select columns

select(FLIGHTS, -year, -month, -day)
  %>% head()  # exclude columns

select(FLIGHTS, tail_num = tailnum)
  %>% head()  # rename columns, but drops others
rename(FLIGHTS, tail_num = tailnum)
  %>% head()  # rename columns

filter(FLIGHTS, month == 1, day == 1)
  %>% head()  # filter rows

filter(FLIGHTS, dep_delay > 240) %>% head()

filter(FLIGHTS, month == 1 | month == 2) %>% head()

arrange(FLIGHTS, year, month, day)
  %>% head()  # sort rows by specified columns

arrange(FLIGHTS, desc(arr_delay))
  %>% head()  # sort in descending order

distinct(FLIGHTS, tailnum)
  %>% head()  # see distinct values

distinct(FLIGHTS, origin, dest)
  %>% head()  # see distinct pairs
OREdplyr caveats

- ‘:’ not supported for range of column specification, e.g., V1:V10
- Variables cannot be referenced within a mutate() and transmute()
  - Restate computation where needed
- Functions supported for summarise when using grouped ore.frame
  - 'min', 'mean', 'max', 'median', 'length', 'IQR', 'prod', 'sum',
    'range', 'quantile', 'fivenum', 'summary', 'sd', 'var', 'all', 'any'
- n_distinct()
  - Works with non-grouped ore.frame
  - Not supported for summarise with grouped ore.frame
    - Work around: use dense_rank, top_n, and unique
      # compute number of distinct planes over destination
      destinations %>% transmute(dest, planes = dense_rank(tailnum)) %>% top_n(1) %>% unique
- filter() does not apply non-ranking function per group
- Use ore.pull instead of dplyr collect
Summary

- OREdplyr provides a subset of dplyr functionality working with ore.frames
- Use popular API conveniently with Oracle Database tables
- Avoid costly movement of data
- Scale to larger data volumes since not constrained by R Client memory
- Use Oracle Database as high performance compute engine
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