# mix_protocols traffic volume

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```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union

## Loading required package: gridExtra

##
## Attaching package: 'gridExtra'

## The following object is masked from 'package:dplyr':
##
##     combine

## Loading required package: viridisLite

##
## Attaching package: 'lubridate'

## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union
```

## R Markdown

Analisar a porcentagem de equisições por protocolo, dividindo por períodos. Essa análise não envolve os payloads, apenas os quantitativos de requisições.

Resultados esperados:

- gráficos de linhas e de barras mostrando a evolução

```
db <- dbConnect(RSQLite::SQLite(), dbname="../db/database-2022-05-11/mix_protocol.sqlite")

data_unfetch <-dbSendQuery(db, "
  SELECT *, CAST(CAST(year AS text) || CAST(period AS text) as integer) as year_period
    FROM (
      SELECT *,  strftime(\"%Y\", tempo_inicio) as year, ((strftime(\"%m\", tempo_final) - 1) / 3) + 1 
        FROM MIX_PROTOCOL
    )
")
data <- fetch(data_unfetch)

dbDisconnect(db)
```

```
## Warning in connection_release(conn@ptr): There are 1 result in use. The
## connection will be released when they are closed
```

```
data['tempo_final_cast'] = as.POSIXct(data[['tempo_final']], format = "%Y-%m-%d %H:%M:%S")
data['tempo_inicio_cast'] = as.POSIXct(data[['tempo_inicio']], format = "%Y-%m-%d %H:%M:%S")

minimum_percentage_as_others = 5
decimals_digits = 2
```

- Agrupamento por trimestre

```
data_grouped_period = data %>%
  mutate(year_period_int = year_period,
         vitima_ip = as.factor(vitima_ip),
         year_period = as.factor(year_period)) %>%
  group_by(year_period) %>%
  summarise(sum_requests_per_attack = sum(requests_per_attack),
            number_of_attacks = n(),
            count_victim = n_distinct(vitima_ip))

data_grouped_period_percentage = data_grouped_period %>%
  ungroup() %>%
  group_by() %>%
  summarise(year_period = year_period,
            number_of_attacks = number_of_attacks,
            sum_requests_per_attack = sum_requests_per_attack,
            count_victim = count_victim,
            sum_count_victim = sum(count_victim),
            sum_all_number_of_attacks = sum(number_of_attacks),
            sum_all_requests_per_attack = sum(sum_requests_per_attack)) %>%
  mutate(number_of_attacks_percentage = (number_of_attacks / sum_all_number_of_attacks) * 100,
         number_of_requests_percentage = (sum_requests_per_attack / sum_all_requests_per_attack) * 100,
         number_of_victim_percentage = (count_victim / sum_count_victim) * 100)

data_grouped_period_percentage_selected = data_grouped_period_percentage %>%
  select('year_period', 'number_of_attacks_percentage', 'number_of_requests_percentage', 'number_of_vic

# data_grouped_period_percentage = data_grouped_period_protocol_percentage %>%
#   mutate(
```

```
#     attack_protocol = case_when(
#       number_of_requests_percentage < minimum_percentage_as_others ~ "OUTROS",
#       TRUE ~ as.character(attack_protocol)
#     )
#   ) %>%
#   group_by(year_period, attack_protocol) %>%
#   summarise(number_of_requests_percentage = sum(number_of_requests_percentage))
```

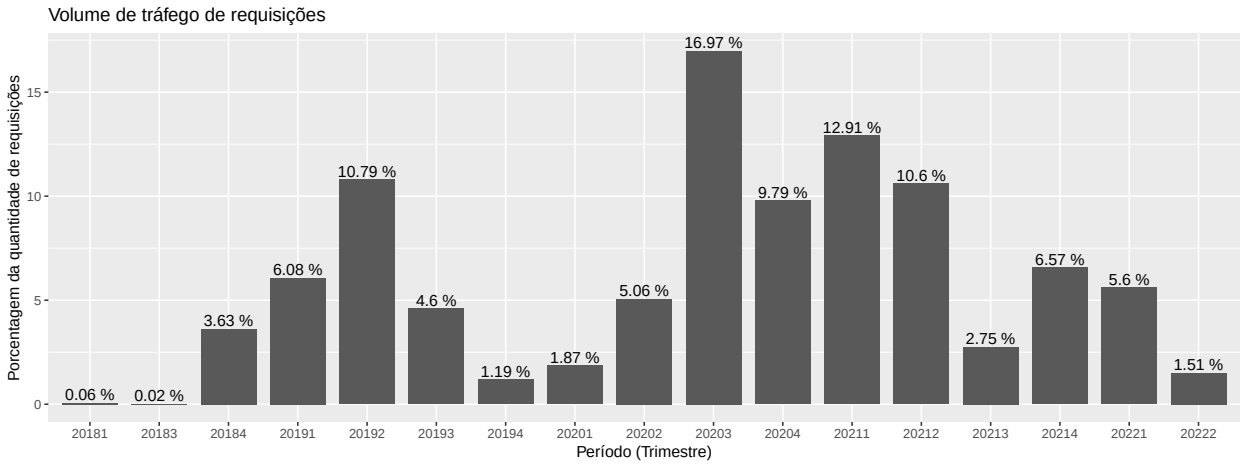
- Todos os trimestres em porcentagem

```
data_grouped_period_percentage_selected %>%
  mutate(number_of_attacks_percentage = round(number_of_attacks_percentage, 2),
         number_of_requests_percentage = round(number_of_requests_percentage, 2),
         number_of_victim_percentage = round(number_of_victim_percentage, 2)) %>%
  rename(attacks = number_of_attacks_percentage,
         requests = number_of_requests_percentage,
         victim = number_of_victim_percentage) %>%
  print(n=17)
```

```
## # A tibble: 17 x 4
##    year_period attacks requests victim
##    <fct>         <dbl>    <dbl>  <dbl>
##  1 20181          0        0.06   0
##  2 20183          0.02     0.02   0.05
##  3 20184          2.01     3.63   2.68
##  4 20191          2.2      6.08   4.8
##  5 20192          3.89    10.8    8.18
##  6 20193          4.69     4.6   12.1
##  7 20194          0.45     1.19   1.15
##  8 20201          2.69     1.87  11.7
##  9 20202          1.68     5.06   4.8
## 10 20203          3.98    17.0    9.23
## 11 20204          7.23     9.79  14.5
## 12 20211          4.11    12.9    8.04
## 13 20212         12.0     10.6    6.91
## 14 20213         12.9      2.75   3.13
## 15 20214         13.4      6.57   5.4
## 16 20221         20.7      5.6    3.47
## 17 20222          8.11     1.51   3.95
```

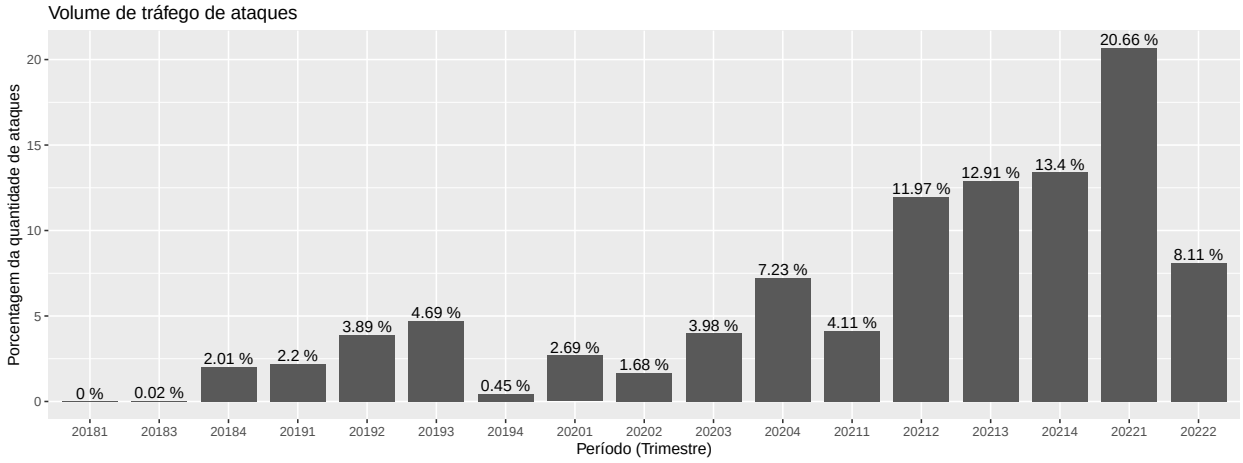
- Total de requisições por trimestre

```
data_grouped_period_percentage_selected %>%
  ggplot( aes(x=year_period, y=number_of_requests_percentage)) +
  geom_bar(stat="identity", width = 0.8, position="dodge") +
  geom_text(aes(label = paste(round(number_of_requests_percentage, decimals_digits), "%"),  vjust = -0.1
  scale_fill_viridis(discrete=TRUE) +
  #theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  ylab("Porcentagem da quantidade de requisições") +
  xlab("Período (Trimestre)") +
  ggtitle("Volume de tráfego de requisições")
```



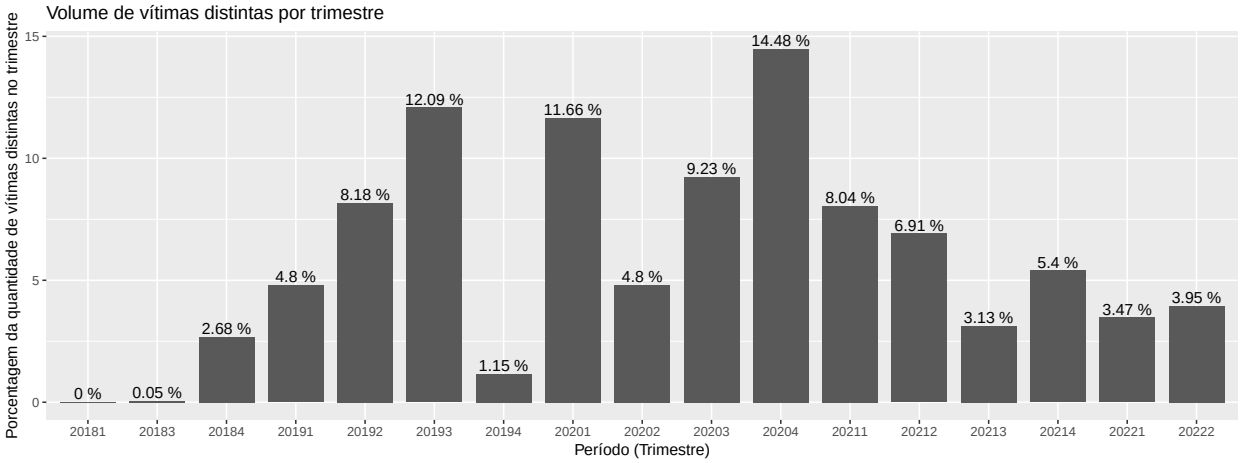

- Total de ataques por trimestre

```
data_grouped_period_percentage_selected %>%
  ggplot( aes(x=year_period, y=number_of_attacks_percentage)) +
  geom_bar(stat="identity", width = 0.8, position="dodge") +
  geom_text(aes(label = paste(round(number_of_attacks_percentage, decimals_digits), "%"),  vjust = -0.25
  scale_fill_viridis(discrete=TRUE) +
  #theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  ylab("Porcentagem da quantidade de ataques") +
  xlab("Período (Trimestre)") +
  ggtitle("Volume de tráfego de ataques")
```




- Total de vítimas distintas por trimestre

```
data_grouped_period_percentage_selected %>%
  ggplot( aes(x=year_period, y=number_of_victim_percentage)) +
  geom_bar(stat="identity", width = 0.8, position="dodge") +
  geom_text(aes(label = paste(round(number_of_victim_percentage, decimals_digits), "%"),  vjust = -0.25
  scale_fill_viridis(discrete=TRUE) +
  #theme(axis.text.x = element_text(angle = 90, vjust = 0.5, hjust=1)) +
  ylab("Porcentagem da quantidade de vítimas distintas no trimestre") +
  xlab("Período (Trimestre)") +
  ggtitle("Volume de vítimas distintas por trimestre")
```


Volume de vítimas distintas por trimestre
Porcentagem da quantidade de vítimas distintas no trimestre
15
10
5
0
0 %
0.05 %
2.68 %
4.8 %
8.18 %
12.09 %
1.15 %
11.66 %
4.8 %
9.23 %
14.48 %
8.04 %
6.91 %
3.13 %
5.4 %
3.47 %
3.95 %
20181
20183
20184
20191
20192
20193
20194
20201
20202
20203
20204
20211
20212
20213
20214
20221
20222
Período (Trimestre)