

Metrics

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Overview:

This document is created to give a brief summary of the possibilities to use R for calculating and reporting the metrics of a department within operations. At this moment there are 3 main elements that are used to “grade” the performance of a department/team/agent, which will be discussed in this document, namely:

- Average number of cases handled per shift
- Average case Handle Time in minutes
- Customer Satisfaction scores

As an addition, several extra plots are added to show:

- The number of cases per language
- The handle time per language, split in Email and Chat
- The number of cases handled per agent grouped by language
- The waiting time (in queue) per language, split in Email and Chat

For this document 3 data sets are created:

1. Pay2 (cases and there main features)
2. CusSat (customer feedback per caseID, NoProduct, NoPolicy and NoAgent mean that there is dissatisfaction due to product, policy or agent.)
3. Time (time registering per agent, hours worked versus TA/sickness)

The 3 datasets look like:

```
Pay2 <- read.csv("C:/Users/User/Desktop/Pay2.csv", sep=";")
kable(head(Pay2), format = "latex")
```

CaseNumber	HandleTime	Wait	Language	Agent	Type
1	5	71	English	A1	Chat
2	3	25	Spanish	A2	Email
3	4	61	Spanish	A2	Chat
4	12	28	Italian	A4	Chat
5	7	68	Portuguese	A1	Chat
6	1	20	Portuguese	A2	Chat

```
CusSat <- read.csv("C:/Users/User/Desktop/CusSat.csv", sep=";")
kable(head(CusSat), format = "latex")
```

CaseID	Agent	Satisfied	NoProduct	NoPolicy	NoAgent
362541	A1	1	0	0	0
362598	A4	0	1	0	0
362613	A1	1	0	0	0
362674	A3	1	0	0	0
362710	A2	0	0	0	1
362769	A2	1	0	0	0

```
time <- read.csv("C:/Users/User/Desktop/Time.csv", sep=";")
Time <- data.frame(time)
kable(head(Time), format = "latex")
```

Date	Agent	Bruto.Hours	Time.Adjustement	Sick	Netto.Hours
21/05/2015	A1	8	0	0	8
21/05/2015	A2	8	0,5	0	7,5
21/05/2015	A3	8	0	0	8
21/05/2015	A4	8	2	0	6
22/05/2015	A1	8	0	8	0
22/05/2015	A2	8	1	0	7

The first element is the number of cases handled per shift.

```
EE <- Pay2 %>%
  group_by(Agent) %>%
  summarise(NumberOfCases = n())

TA <- Time %>%
  group_by(Agent) %>%
  summarise(Shifts = sum(Netto.Hours, na.rm=TRUE)/8)

length(Pay2$Agent); AveCasesperShift<- length(Pay2$Agent)/sum(TA$Shifts)
```

- The overall number of cases handled is 99, done in an overall number of netto shifts of 21.875.
- This results in an average of 4.5257143 cases per shift.

The number of cases separated by agent gives:

```
kable(EE)
```

Agent	NumberOfCases
A1	23
A2	31
A3	20
A4	25

The number of shifts separated by agent gives:

```
kable(TA)
```

Agent	Shifts
A1	4.000
A2	5.625
A3	6.250
A4	6.000

The average number of cases per shift per agents:

```
A1Cases<- length(Pay2$Agent[Pay2$Agent=="A1"])
A2Cases<- length(Pay2$Agent[Pay2$Agent=="A2"])
A3Cases<- length(Pay2$Agent[Pay2$Agent=="A3"])
A4Cases<- length(Pay2$Agent[Pay2$Agent=="A4"])

A1Shift <- TA[1, 2]
A2Shift <- TA[2, 2]
A3Shift <- TA[3, 2]
A4Shift <- TA[4, 2]

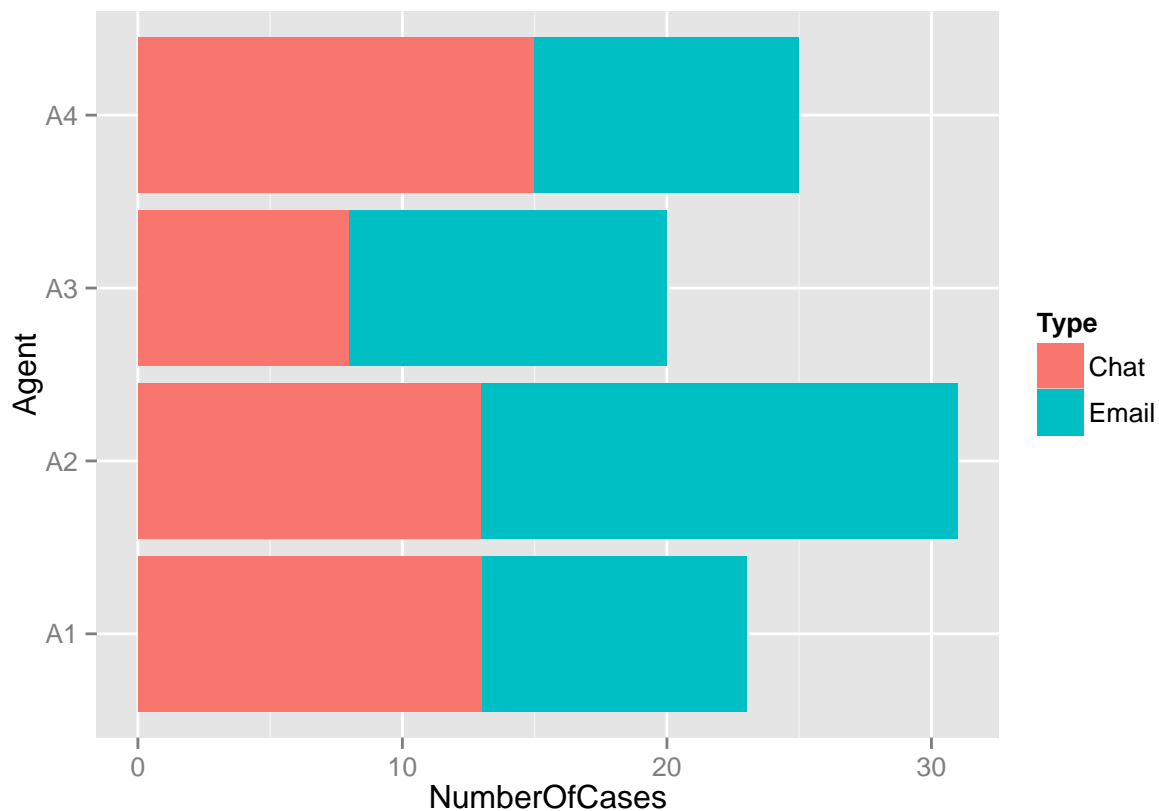
ScoreA1 <- A1Cases/A1Shift
ScoreA2 <- A2Cases/A2Shift
ScoreA3 <- A3Cases/A3Shift
ScoreA4 <- A4Cases/A4Shift
```

- Agent 1 handled an average of 5.75 cases per shifts.
- Agent 2 handled an average of 5.5111111 cases per shifts.
- Agent 3 handled an average of 3.2 cases per shifts.
- Agent 4 handled an average of 4.1666667 cases per shifts.

A plot of cases per agent per type:

```
PP <- Pay2 %>%
  group_by(Agent, Type) %>%
  summarise(NumberOfCases = n())

ggplot(PP, aes(x=Agent, y=NumberOfCases, fill=Type)) +
  geom_bar(stat="identity") + coord_flip()
```



The second element is the Average Handle Time per case in minutes.

Below the overall average Handle Time and the Handle Time per agent:

```
mean(Pay2$HandleTime)
```

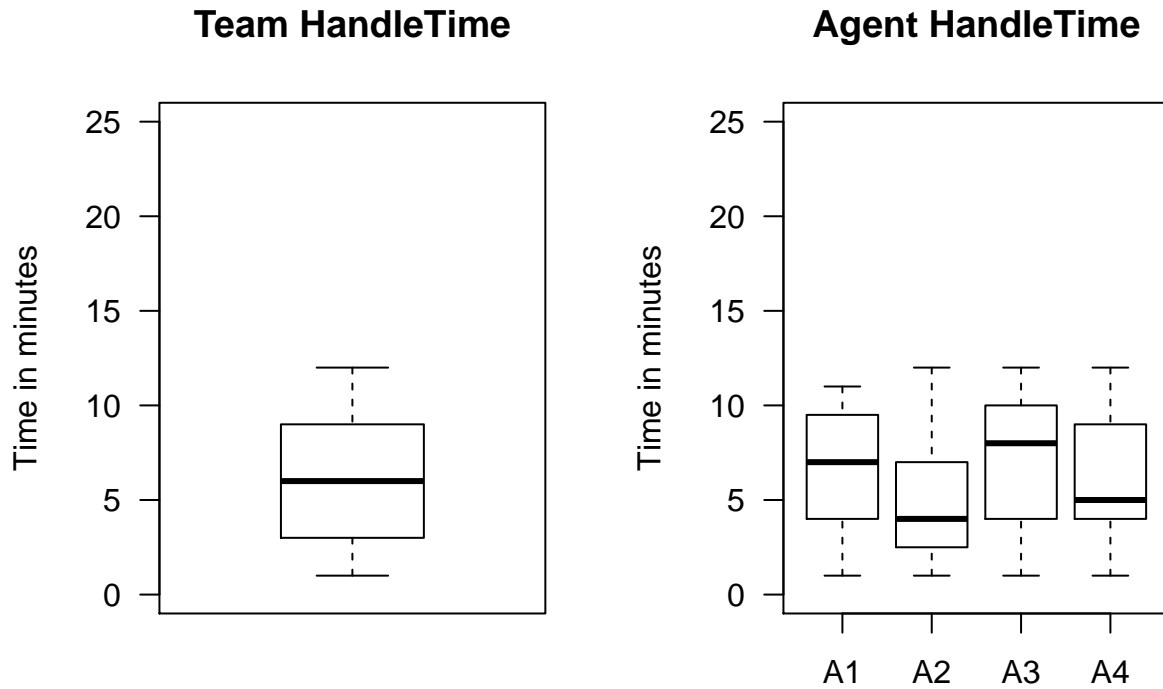
```
## [1] 6.060606
```

```
HH <- Pay2 %>%
  group_by(Agent) %>%
  summarise(avg_handle = mean(HandleTime, na.rm=TRUE))

kable(HH)
```

Agent	avg_handle
A1	6.521739
A2	5.000000
A3	7.250000
A4	6.000000

A boxplot of the overall handle time of the team versus handle time per agent:



The third element is the Customer Satisfaction per Agent

The set goal for a 3 rating is to have equal or less than 3% dissatisfaction.

Below a table with the number of “satisfied/Not agent to blame” Customer reviews, versus the cases in which agent can be blamed.

And the same table expressed in percentages.

```
##
##      0  1
##  A1 27  1
##  A2 26  1
##  A3 26  1
##  A4 25  2
```

	0	1
A1	0.9642857	0.0357143
A2	0.9629630	0.0370370
A3	0.9629630	0.0370370
A4	0.9259259	0.0740741

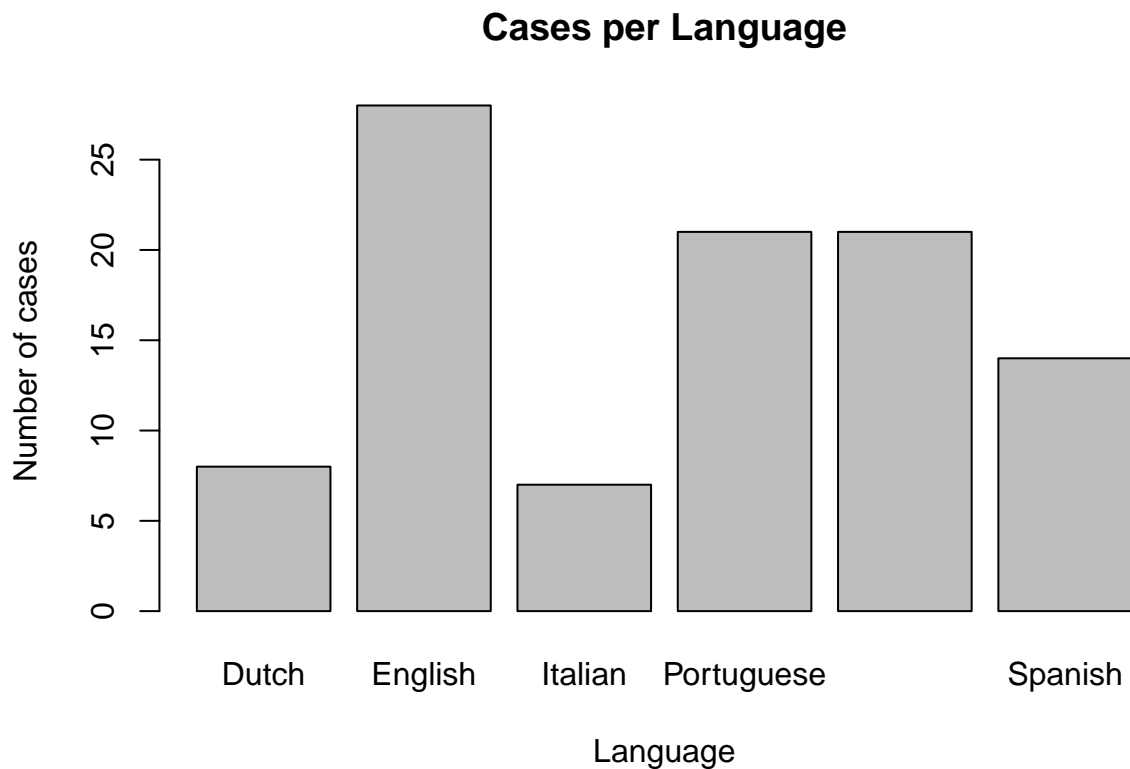
The number of cases per language:

```
YY <-Pay2 %>%  
  group_by(Language) %>%  
  summarise(lang_count = n()) %>%  
  arrange(desc(lang_count))  
kable(YY)
```

Language	lang_count
English	28
Portuguese	21
Russian	21
Spanish	14
Dutch	8
Italian	7

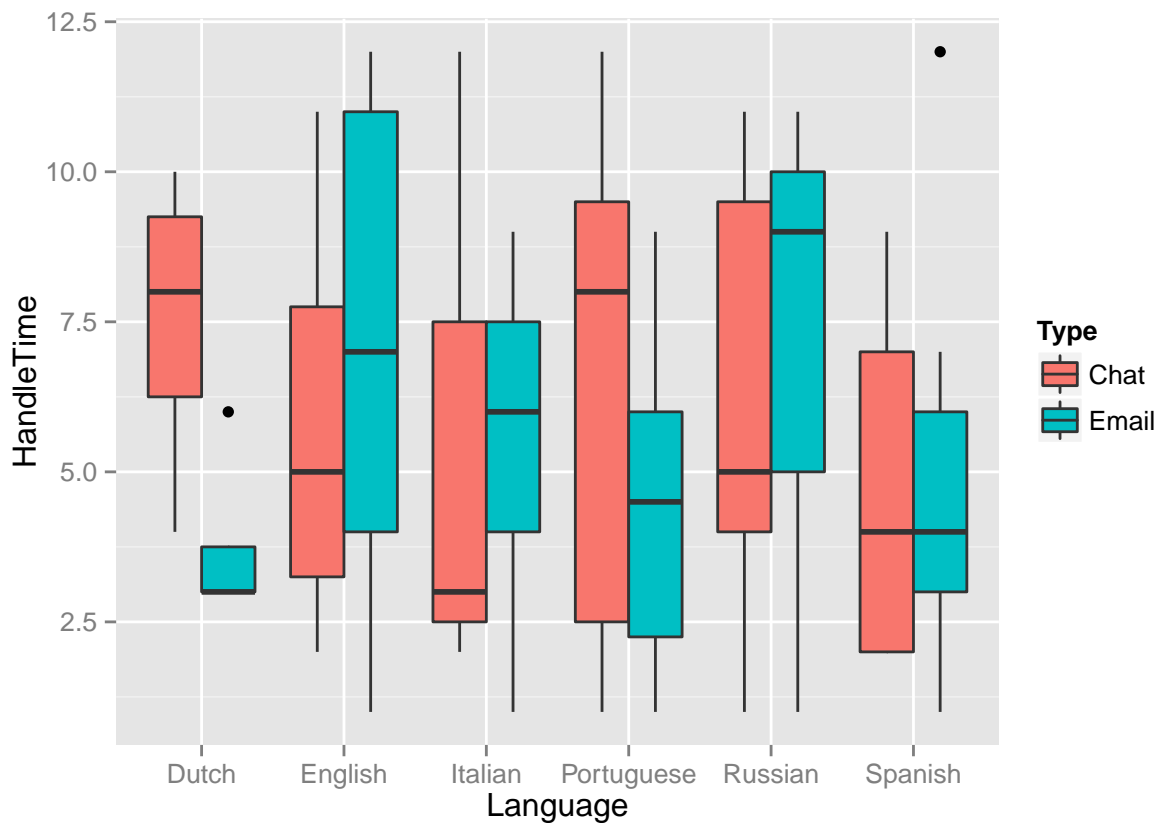
In a barchart:

```
y=table(Pay2$Language)  
barplot(y, main="Cases per Language", xlab="Language", ylab="Number of cases")
```



The handle time per language, split in Email and Chat:

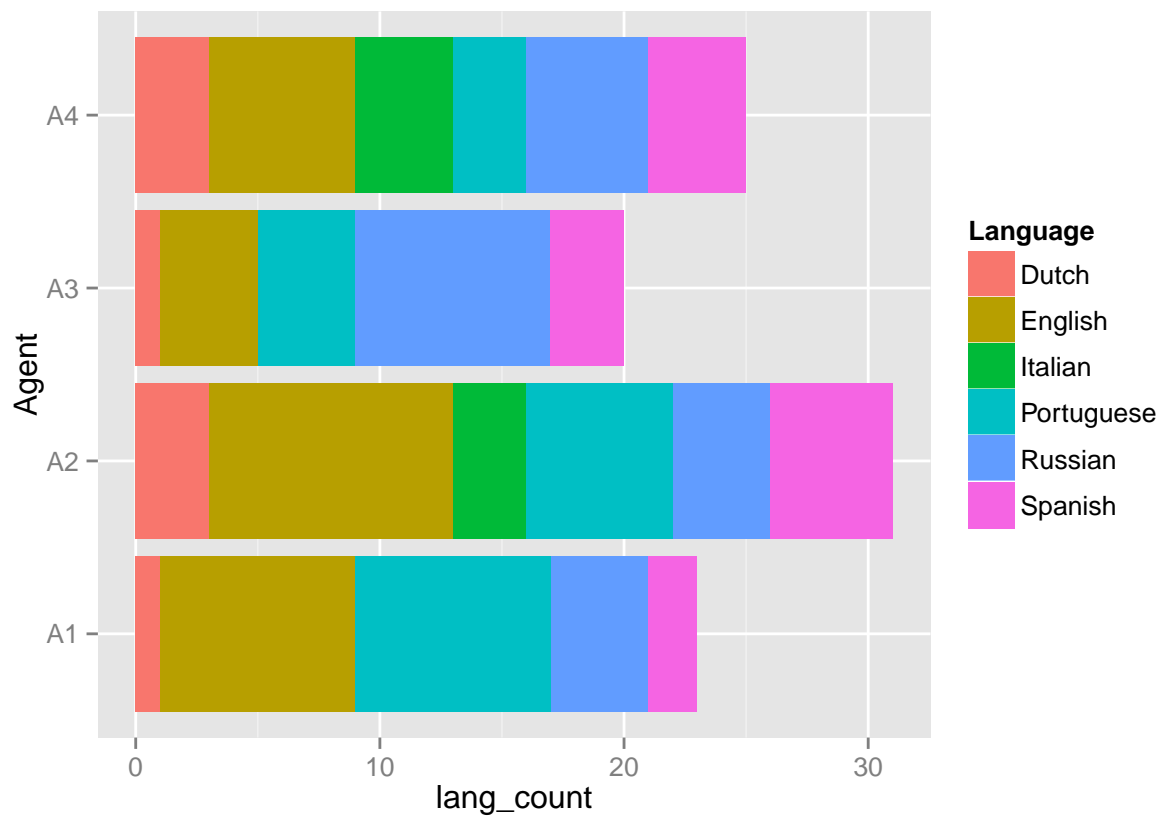
```
a <- ggplot(Pay2, aes(y=HandleTime, x=Language, fill=Type)) + geom_boxplot()
a
```



The number of cases handled per agent grouped by language:

```
FF <- Pay2 %>%
  group_by(Agent, Language) %>%
  summarise(lang_count = n())

ggplot(FF, aes(x=Agent, y=lang_count, fill=Language)) +
  geom_bar(stat="identity") + coord_flip()
```



The waiting time (in queue) per language, split in Email and Chat:

```
b <- ggplot(Pay2, aes(y=Wait, x=Language, fill=Type)) + geom_boxplot()
b
```