

# Software Requirements Specifications

0.0.5

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# 1. Preface

## 1.1 Intended Audience and Reading Suggestions

The intended audience of this document is the team with whom DenteDiLeone is paired, the supervising teacher with the objective to refer and analyze the information, and finally the specific employees like Manager and team leaders of UIConsult.

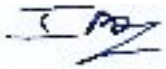
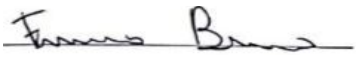
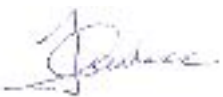


The SRS document was written according to the information provided by UIConsult. It can be used in any case regarding the requirements of the project and the solutions that have been taken. Finally, the document would provide a clear idea about the software that is going to be developed.

## 1.2 Revision history

Date	Description	Comments
16/10/2018	0.0.1	Functional requirements identification
20/10/2018	0.0.2	Functional requirement description
21/10/2018	0.0.3	Creation of the first page, preface, introduction
23/10/2018	0.0.4	Creation of ABNF specification, algebraic specification
03/11/2018	0.0.5	Conclusion, Annex

## 1.3 Document Approval

The following Software Requirements Specification has been accepted and approved by the following:

Signature	Printed Name	Date
	Ian BIALO	04/11/2018
	Francesco BONSO	04/11/2018
	Jacques COUDERC	04/11/2018
	Yassin EL HAMMOUTI	04/11/2018
	Paola GARCIA	04/11/2018

## 2. Introduction

The UIConsult consulting group needs to acquire a tool for the analysis of the communications inside its consultant teams. The group is divided into several teams each led by a team leader.

The team leader has to recurrently produce a report, called "RCom", that contains an analysis of her/his team members' email communication. These are individual level analysis needed to follow the employees' activities, especially for the creation of the quarterly performance assessment interviews.

The company is currently able to access the structure and content of the email box of all the employees, having their informed consent. However, for the team leaders, it's difficult to use the data for the RCom preparation.

UIConsult would also like to extract employees contacts information (email, name and function among other) in order to record them in vCard format (RFC6350).

The aim of the software is to help the team leader to produce the RComs. To achieve this goal, the software has to enable the user to navigate through a large amount of data produced every quarter, create charts and export them.

## 3. Glossary

**Rcom:** Report containing the analysis of employees' email communication.

**ABNF:** Augmented Backus-Naur Form, a metalanguage used to describe a language syntactic rules (see RFC 5234).

## 4. Client level specification

### 4.1 Software functional specification

**SPEC\_1:** The user must be able to select the dataset he will use. (Precondition to all the other specs)

**SPEC\_2:** The user must be able to see the number of emails exchanged (send and received) in a specific period of time.

**SPEC\_3:** The user must be able to see a “top 10” of days where emails have been sent outside the working hours for a specific employee. Hours to consider : 00.00-08.00 and 22.00-23.59.

**SPEC\_4:** The user must be able to see the 10 contacts a user exchanged the most with.

**SPEC\_5:** The user must be able to see the Top 10 of the most used words in an employee's emails subjects.

**SPEC\_6:** The user must be able to see a scatter plot visualization of the number of emails exchanged between all the collaborators.

**SPEC\_7:** The user must be able to see the number of emails sent from all the collaborators (bar chart).

**SPEC\_8:** The user must be able to see the frequency of emails sent in a specific period of time.

**SPEC\_9:** The user must be able to export the charts.

**SPEC\_10:** The user must be able to extract an email list depending on different search criteria.

**SPEC\_10.1:** The user must be able to read the emails in the filtered list.

### 4.2 Software non-functional specification

**SPECNF\_1 :** The software must be written in Javascript and be compatible with the Node.js environment.

## 5. Detailed specification

### 5.1 Functional requirement specification

For each specification below, the actor is the same, it's the user of our Command Line Interface, i.e. the team managers. In order to not overload the tables, we chose to mention that here and not for each specification.

TITLE	Dataset selection over a period of time
ID	<b>SPEC_1</b>
OBJECTIVE	Allow the user to select a dataset in order to analyse it.
PRECONDITION	It must exist at least one dataset.
POSTCONDITION	Dataset loaded in a data structure and ready to be analysed
INPUT	Dataset path(M), period of time(O)
PROCESS	Load the data given in the path and store it in a data structure.
OUTPUT	A structure containing the emails from the dataset within the given period of time.
ERROR HANDLING	An error message is displayed when a given input is not valid.
COMMENTS	Mandatory input (M), Optional input (O). If the period of time is not given, every email will be selected

TITLE	Access the number of exchanged (received and sent) emails of an employee.
ID	<b>SPEC_2</b>
OBJECTIVE	The user would like to access the number of emails exchanged by an employee in order to evaluate his work and his interaction with other team members.
PRECONDITION	A dataset must be selected (SPEC_1).
POSTCONDITION	The number of emails exchanged is displayed.
INPUT	An employee mail or name and a period of time.
PROCESS	It scans all the emails of an employee and counts the number of emails sent and received.
OUTPUT	Displays the employee's name and a table with the numbers of emails sent, received and the total of exchanged mails for this employee on the defined period.
ERROR HANDLING	An error message is displayed when a given input is not valid.

TITLE	Access a list of extra-work days.
ID	<b>SPEC_3</b>
OBJECTIVE	The user would like to access a list of days where employees worked more than what is defined in their contracts, i.e days where emails have been sent out of the working hours.
PRECONDITION	A dataset must be selected (SPEC_1)
POSTCONDITION	A list of 10 dates followed with the number of emails sent is displayed.
INPUT	An employee email or name(M) and a period of time(O).
PROCESS	Scan the days inside the selected period, count the emails sent outside the working hours of the same day: 00.00 - 08.00 and 22.00 to 23.59.
OUTPUT	Displays the list of the 10 days selected and the number of emails sent (outside working hours) for these days.
ERROR HANDLING	An error message is displayed when a given input is not valid.

TITLE	Access the names of the 10 employees an employee exchanged the most emails with.
ID	<b>SPEC_4</b>
OBJECTIVE	See the network of an employee
PRECONDITION	A dataset must be selected (SPEC_1)
POSTCONDITION	A list of ten employee's name followed with the number of exchanged emails
INPUT	An employee name or email.
PROCESS	Scan the emails of an employee and select the 10 contacts he sent/received the most emails.
OUTPUT	Displays the employee name followed with a list of the ten employee's name he/she exchanged the most with. Each employee's name is followed with the number of sent, received and the total of emails exchanged.
ERROR HANDLING	An error message is displayed when a given input is not valid.

TITLE	Access the top 10 words the most used in an employee's emails subject.
ID	<b>SPEC_5</b>
OBJECTIVE	The team leader wants to see the main topics an employee has discussed.
PRECONDITION	A dataset must be selected (SPEC_1).
POSTCONDITION	A list of 10 words is displayed followed by the number and percentage of mail each word appears in.
INPUT	An employee email or name.
PROCESS	Scans the words in the employee emails and count them.
OUTPUT	Displays the list of the 10 most used words in the emails subjects followed with the number and percentage of mail each word appears in.
ERROR HANDLING	An error message is displayed when a given input is not valid.
COMMENTS	The research must be case insensitive Exclude articles, prepositions, pronouns from the results

TITLE	Scatter plot visualization of all the emails exchanged for one employee.
ID	<b>SPEC_6</b>
OBJECTIVE	Have a visual representation of the employee interactions.
PRECONDITION	A dataset must be selected (SPEC_1).
POSTCONDITION	Opens a webpage with the scatter plot visualisation.
INPUT	An employee name or email.
PROCESS	Scans the emails received and sent of the employee and create a visualization of the mails on a scatter plot.
OUTPUT	Displays the scatter plot visualization.
ERROR HANDLING	An error message is displayed when a given input is not valid.



TITLE	Display the number of emails sent from all the collaborators on a daily or a monthly basis
ID	<b>SPEC_7</b>
OBJECTIVE(S)	The user would like to visualize the number of emails sent from all the collaborators
PRECONDITION	A dataset must be selected (SPEC_1)
POSTCONDITION	The chart is displayed
INPUT	Choice between day and month(O), date of beginning and end of the analysis(O)
PROCESS	Loads the number of emails sent each day/month on a period of time
OUTPUT	The chart with the number of emails sent.
ERROR HANDLING	An error message is displayed when a given input is not valid.
COMMENTS	Mandatory input (M), Optional input (O). If the dates of beginning and end are not given, the chart will display the numbers since the first to the last sent email of the dataset. If the // Details on how the chart should be displayed

TITLE	Access the frequency of a user's sent emails on a period of time.
ID	<b>SPEC_8</b>
OBJECTIVE(S)	The user would like to visualize the frequency of a collaborator's sent emails to check if his productivity is steady over a period of time.
PRECONDITION	A dataset must be selected (SPEC_1)
POSTCONDITION	The chart is displayed.
INPUT	The date of the beginning and end of the analysis(O), as well as the collaborator's name or email address(M), must be given.
PROCESS	The number of emails sent each day by the collaborator on the given period of time is loaded. A heatmap chart is then generated from this data.
OUTPUT	The chart with the frequency of the given collaborator's sent emails.
ERROR HANDLING	An error message is displayed when a given input is not valid.
COMMENTS	Mandatory input (M), Optional input (O). If the dates of beginning and end are not given, the period of time will be from the first to the last sent email of the collaborator. // Details on how the chart should be displayed

TITLE	Chart export functionality.
ID	<b>SPEC_9</b>
OBJECTIVE	Enable to export the produced charts in SVG or PNG
PRECONDITION	A chart must have been created.
POSTCONDITION	Chart exported in the specified folder
INPUT	Chart name, new image file name, path
PROCESS	Chart selected and exported.
OUTPUT	The chart saved on an SVG or PNG format // “name of the image”.SVG/PNG.
ERROR HANDLING	An error message is displayed when a given input is not valid.
COMMENTS	Chart name must not contain non-alphanumeric characters.

TITLE	Email research per criteria.
ID	<b>SPEC_10</b>
OBJECTIVE	Enable the team leader to look at all the emails that have a parameter in common, that being a person, a topic or other information.
PRECONDITION	A dataset must be selected (SPEC_1)
POSTCONDITION	The emails list has been created and the user can start the analysis
INPUT	An employee name or email, a word
PROCESS	Scans the emails in the team members mailbox and prints the matching ones.
OUTPUT	List of emails corresponding to given criteria.
ERROR HANDLING	An error message is displayed when a given input is not valid.
COMMENTS	Should print only the sent ones (otherwise there would be the double of matches)

## 5.2 Data format

### Dataset email format :

The emails given in the dataset is formatted with the following ABNF. This format can be useful in order to identify the elements to extract from each email.

```
Email = Donnee CRLF TEXT
Donnee = Identite CRLF Info_Commune CRLF Info_Invisible
Identite = 'Message-ID: <' NUMBER '.' NUMBER '.JavaMail.evans@thyme>'
Info_Commune = Date CRLF Emetteur CRLF Destinataire CRLF Sujet CRLF CopieCarbone
Date = 'Date: ' DATE_FORMAT
Emetteur = 'From: ' MAIL_ADRESS
Destinataire = 'To: ' MAIL_ADRESS *(',', WSP MAIL_ADRESS)
CopieCarbone = (*1'Cc: ' MAIL_ADRESS *(',', WSP MAIL_ADRESS))
Sujet = 'Subject: 'TEXT
Info_Invisible = 'Mime-Version: 1.0' CRLF 'Content-Type: text/plain; charset=%x27'
VCHAR '%x27 CRLF 'Content-Transfer-Encoding: 7bit' CRLF XEmetteur CRLF
XDestinataire CRLF XCopieCarbone CRLF XCopieCarboneInvisible CRLF XFichier CRLF
XOrigin CRLF XFileName

CopieCarboneInvisible = (*1'BCc: ' MAIL_ADRESS *(',', WSP MAIL_ADRESS))
XEmetteur = 'X-From: ' FULL_NAME WSP '<' MAIL_ADRESS '>'
XDestinataire = 'X-To: ' *1(%x22 %x27 FULLNAME %x27 %x22 WSP) *1('<' MAIL_ADRESS
'>') *(',', WSP *1(%x22 %x27 FULLNAME %x27 %x22 WSP) *1('<' MAIL_ADRESS '>'))
XCopieCarbone = (*1 'X-Cc: ' (%x22 %x27 FULLNAME %x27 %x22 WSP) *1('<' MAIL_ADRESS
'>')/ %x22 %x27 FULLNAME %x27 %x22 WSP '<' MAIL_ADRESS '>' 1*(',', WSP *1(%x22 %x27
FULLNAME %x27 %x22 WSP) *1('<' MAIL_ADRESS '>'))
XCopieCarboneInvisible = (*1 'X-Bcc: ' (%x22 %x27 FULLNAME %x27 %x22 WSP) *1('<'
MAIL_ADRESS '>')/ %x22 %x27 FULLNAME %x27 %x22 WSP '<' MAIL_ADRESS '>' 1*(',', WSP
*1(%x22 %x27 FULLNAME %x27 %x22 WSP) *1('<' MAIL_ADRESS '>'))
XFichier = 'X-File: ' FOLDER
XOrigin = 'X-Origin: ' *VCHAR
XFileName = 'X-FileName: ' 1*(VCHAR) '.nef'

NUMBER = 1*DIGIT
TEXT = 1*(WSP/VCHAR/NUMBER) ; TEXT = 1*(WSP/VCHAR/CRLF)
DATE_FORMAT = DAY_NAME ', ' WSP 1*2DIGIT WSP MONTH WSP 4DIGIT WSP TIME WSP '- '
4DIGIT WSP '(' 3VCHAR ')' CRLF
DAY_NAME = 'Mon'/'Tue'/'Wed'/'Thu'/'Fri'/'Sat'/'Sun'
MONTH = 'Jan'/'Feb'/'Mar'/'Apr'/'May'/'Jun'/'Jul'/'Aug'/'Sep'/'Oct'/'Nov'/'Dec'
TIME = 2DIGIT ':' 2DIGIT ':' 2DIGIT
MAIL_ADRESS = 1*atext '@' 1*atext '.' 1*atext
FULL_NAME = 1*VCHAR WSP 1*VCHAR
FOLDER = 2*('\VCHAR) ; FOLDER = 2*(VCHAR)
```

Each specification has an associated command in the CLI.

All the command lines usable in the software must follow the following specifications to be considered as valid.

```
Date = [ [ 2DIGIT '/' ] 2DIGIT '/' ] 4DIGIT
Employee = Fullname / Email
Fullname = *(ALPHA / '-') '_' *(ALPHA / '-')
Email = 1*atext '@' 1*atext '.' 1*atext
Path = *VCHAR
```

SPEC\_1:

```
Command1 = 'loademails' WSP Path [WSP Date WSP Date] CRLF
```

SPEC\_2:

```
Command2 = 'nbemails' WSP Employee [WSP Date [WSP ';' WSP Date]] CRLF
```

SPEC\_3:

```
Command3 = 'buzzydays' WSP Employee [WSP Date WSP Date] CRLF
```

SPEC\_4:

```
Command4 = 'topcontact' WSP Employee CRLF
```

SPEC\_5:

```
Command5 = 'topwords' WSP Employee CRLF
```

SPEC\_6:

```
Command6 = 'emailplot' WSP Employee [WSP Date WSP Date] CRLF
```

SPEC\_7:

```
Command7 = 'sentemails' [WSP Date WSP Date] CRLF
```

SPEC\_8:

```
Command8 = 'activity' WSP Employee [WSP Date WSP Date] CRLF
```

SPEC\_10:

```
Command10 = 'search' WSP Employee WSP '""' *VCHAR '""' CRLF
```

### 5.3 Data semantics

Title: Email

Sort: email

References: String, Date, StringList

Description:

Defines an email type which is characterized by a sender, a receiver, a list of carbon copy receivers (invisible or not), a title, a date and a content. The data type must allow an access to each information contained.

Signatures:

Create: Sender x Receiver x CcReceivers x Title x Date x Content  $\rightarrow$  email

Sender: email  $\rightarrow$  String

Receiver: email  $\rightarrow$  String

CcReceivers: email  $\rightarrow$  StringList

Title: email  $\rightarrow$  String

Date: email  $\rightarrow$  Date

Content: email  $\rightarrow$  String

Axioms:

Sender(Create(s, r, ccr, t, d, c)) = s

Receiver(Create(s, r, ccr, t, d, c)) = r

CCReceivers(Create(s, r, ccr, t, d, c)) = ccr

Title(Create(s, r, ccr, t, d, c)) = t

Date(Create(s, r, ccr, t, d, c)) = d

Content(Create(s, r, ccr, t, d, c)) = c

Title: EmailList(Email)

Sort: emailist

References: Email, Integer

Description:

Defines a list of emails. The emails are pushed at the end of the list and popped at the beginning of it. The available operations are Creating a list, Pushing an email into the list, Popping an email from the list, Getting an email from the list and length which gives the number of emails in the list.

Preconditions: The integer given to the get operation must be inferior to the length of the emailist

Signatures:

Create:  $\rightarrow$  emailist

Push: emailist x email  $\rightarrow$  emailist

Pop: emailist  $\rightarrow$  email

Get: emailist x Integer  $\rightarrow$  email

Length: emailist  $\rightarrow$  Integer

Axioms:

$\text{Pop}(\text{Create}) = \text{Undefined}$  (error empty emailist)

$\text{Length}(\text{Create}) = 0$

$\text{Length}(\text{Push}(L, e)) = \text{Length}(L) + 1$

$\text{Length}(\text{Pop}(L)) = \text{Length}(L) - 1$

$\text{Get}(L, i) = \text{Email}$

## 6. Conclusion

With the development of the provided specifications the software will efficiently ease the team leader's analysis work. Thus, it is fundamental for everyone of them to be present in the final product.

Indeed, UIConsult relied on us to provide them an analysis tool in order to evaluate each of their employee performance. Consequently, we propose them a Command Line Interface capable of providing a synthesis of the activity of the employees for a given period. As the company is already able to extract the structure and the content of the employees' mailboxes, we designed a tool based on this database in order to ease the use of our software for the team leaders.

Through the Software Requirements Specifications we answered the needs of the company which is to be able to visualize the activity of every particular employee but also the global activity of all its employees.

The plurality of the displayed data is important for the team leaders because - first - , it allows them to have precise datas like numbers on their employees such as the number of exchanged emails, and - secondly - it allows them to have an overview of the performance evolution of an employee thanks to the graphics available for each which are easily reusable for RComs.

Besides, as the performance of one employee can't only be based on the quantity of exchanged emails, we provide team leaders more qualitative datas for each employee. Indeed, team leaders can evaluate the quality of an employee interactions with others by accessing the Top 10 of most used words in emails' subject and the Top Ten contacts of an employee.

## 7. Annex

### Data Mockup

In order to guide the development of our CLI, these are examples of what should be displayed after typing the differents commands associated with the Specs.

#### **SPEC\_2 : Number of exchanged mails :**

\$Employee Name	Time period	Sent emails	Received emails	Total of exchanged emails
STRING	DD/MM/YYYY or MM/YYYY or from DD/MM/YYYY to DD/MM/YYYY	INTEGER	INTEGER	INTEGER

#### **SPEC\_3 : List of extra work days :**

Top 10 extra work days :

Rank	Date	Total exchanged emails
1	DD/MM/YYYY	INTEGER
2	DD/MM/YYYY	INTEGER
3	DD/MM/YYYY	INTEGER
4	DD/MM/YYYY	INTEGER
5	DD/MM/YYYY	INTEGER
6	DD/MM/YYYY	INTEGER
7	DD/MM/YYYY	INTEGER
8	DD/MM/YYYY	INTEGER
9	DD/MM/YYYY	INTEGER
10	DD/MM/YYYY	INTEGER



**SPEC\_4 : Top 10 contacts :**

Top Ten \$EmployeeName Contacts

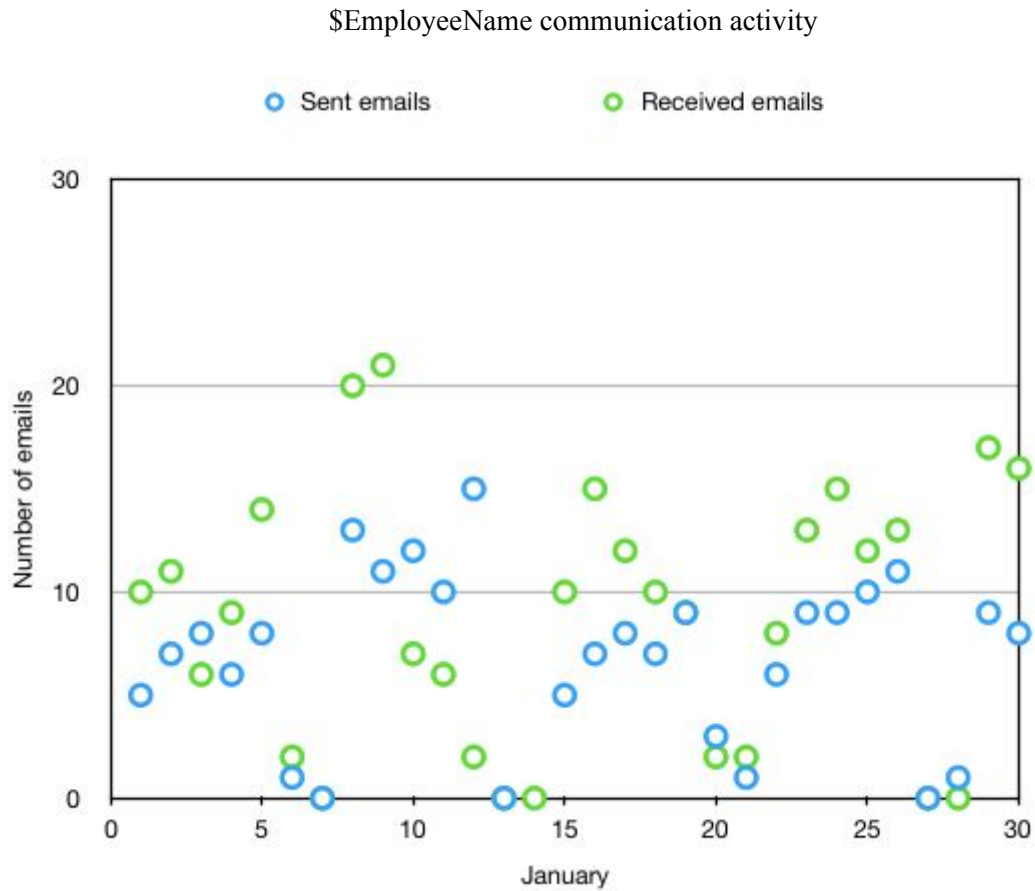
Rank	Employee name	Sent emails	Received emails	Total of exchanged emails
1	STRING	INTEGER	INTEGER	INTEGER
2	STRING	INTEGER	INTEGER	INTEGER
3	STRING	INTEGER	INTEGER	INTEGER
4	STRING	INTEGER	INTEGER	INTEGER
5	STRING	INTEGER	INTEGER	INTEGER
6	STRING	INTEGER	INTEGER	INTEGER
7	STRING	INTEGER	INTEGER	INTEGER
8	STRING	INTEGER	INTEGER	INTEGER
9	STRING	INTEGER	INTEGER	INTEGER
10	STRING	INTEGER	INTEGER	INTEGER

**SPEC\_5 : Most used words in emails' subjects of one employee mailbox :**

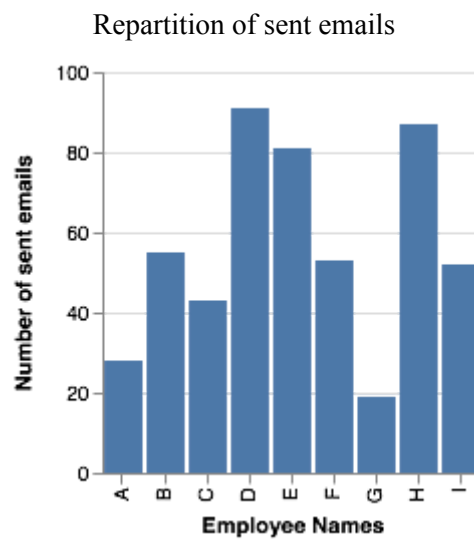
Top 10 most used words in \$EmployeeName emails' subjects

Rank	Word	Appears in \$INTEGER emails	Percentage of appearance
1	STRING	INTEGER	INTEGER%
2	STRING	INTEGER	INTEGER%
3	STRING	INTEGER	INTEGER%
4	STRING	INTEGER	INTEGER%
5	STRING	INTEGER	INTEGER%
6	STRING	INTEGER	INTEGER%
7	STRING	INTEGER	INTEGER%
8	STRING	INTEGER	INTEGER%
9	STRING	INTEGER	INTEGER%
10	STRING	INTEGER	INTEGER%

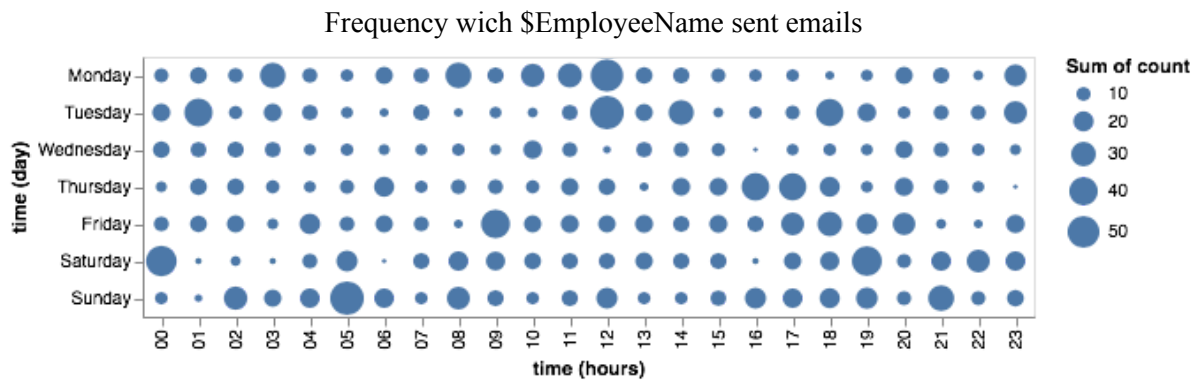
**SPEC\_6 : Scatter plot visualization of one employee's activity :**  
(here, for a period of one month)



**SPEC\_7 : Number of emails sent from all employees for a given period :**



**SPEC\_8 : Frequency of an employee sent mail for a selected period of time**  
 (here for a period of one week)



**SPEC\_10 : Emails research per criteria :**

Research criteria : STRING / INTEGER

Numbers of matching emails : INTEGER

- matchingEmail1
- ...
- matchingEmailn