Masters First Year (2019-2020)
Computer Science for Aerospace

Project Report
On
Web page Energy calculation Plug-in

Under subject of
Software Tools

Submitted by:

1. Duc Thang Nguyen(21906085)
2. Pratvi Kalavadiya (21911764)

Prof. Christina Herzog
Herzog@efficit.com
(Management Faculty Guide)

Prof. Philippe Roose
Philippe.Roose@iutbayonne.univ-pau.fr
(Technical Faculty Guide)

Table of content

1. ABSTRACT..... 2
I. INTRODUCTION 3
1.1 PROBLEM SUMMARY 3
1.2.1 CATEGORIES OF CONSUMPTION..... 3
1.2.1.2 VIDEO ONLINE.....3
1.2.1.3 SEARCH ENGINE 5
1.2.1.4 SOCIAL NETWORK 5
1.2.1.5 OTHERS..... 6
2. MANAGEMENT..... 7
2.1DEFINING SCOPE OF PROJECT..... 7
2.1.1 SCOPE PLANNING..... 7
2.1.2 SCOPE DEFINATION 8
2.1.3 SCOPE DOCUMENTATION..... 8
2.1.4 SCOPE CHANGE MANAGEMNT 9
3.TECHNICAL..... 11
3.1 ANALYSIS PHASE..... 11
3.1.1 USE CASE DIAGRAM 11
3.1.1 ACTIVITY DIAGRAM 12
3.1.2 SEQUENCE DIAGRAM 13
3.2 METAPHORES..... 14
3.3 DEVELOPMENT..... 15
3.3.1 FRONT-END 17
3.3.2 BACK-END..... 17
3.3.3 METAPHORE 21
4.EXTRA FEATURES 22
5.CONCLUSION..... 23

1. ABSTRACT

Nowadays, The Internet is extremely important in almost every field in the world. Our work will stop without connections. It is door to open tremendous changes and improvements in the way of communications, business, education, technology and so on.
On the other hand, the world is getting the millions of transactions per second. So the usage of internet significantly contributed carbon (CO2) into the environment a bad agent for the earth's health (such as greenhouse gases, pollution, etc) and consume a lot of the world's electricity. In this project, our main contributed will propose some metrics functions to convert and illustrate the effects on the planet from user's activities. The second contribution, we will develop an extension (plug-in) **"consumsis"** for the most popular browser: Chrome which will count total energy consumption based on the user's activity (Whether user is visiting webpage or watching video). In order to get successful work management is equally important. This project will be managed using waterfall model and final product will show the consumption by different metaphors. Finally, we hope this will improve the user's activities of environmental protection.

I. INTRODUCTION

1.1 PROBLEM SUMMARY

Here particularly if we analyze one browser Google. Google process 40,000 requests every second from all around the world which effects environment as it uses the energy and concern is growth of carbon dioxide. Usage of internet is increasing rapidly around 3.6 billion people from all around the world are using the internet every day. Using internet itself requires many things like satellites, massive data centers, batteries, phones, routers, switches all electric devices which are needed to fulfill the request. We should take it all into the account. From production to usage it requires and uses energy which indirectly or directly related to emission to the carbon dioxide. According the reports, around 30 billion devices are connected to the internet. And this all devices use total 10% of world's electricity (2018). Data centers uses total 10 % of world's electricity every year and emission of 300 pounds of carbon dioxide per year.

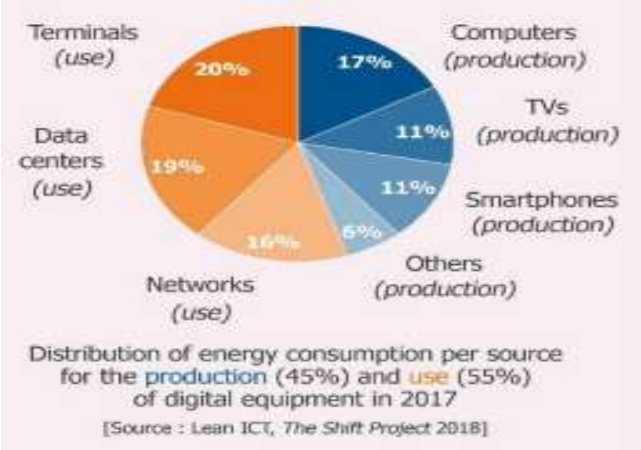


Figure 1. The data of 2017

1.1.1 CATEGORIES OF CONSUMPTION

1.1.1.1 VIDEO/ MUSIC STREAMING

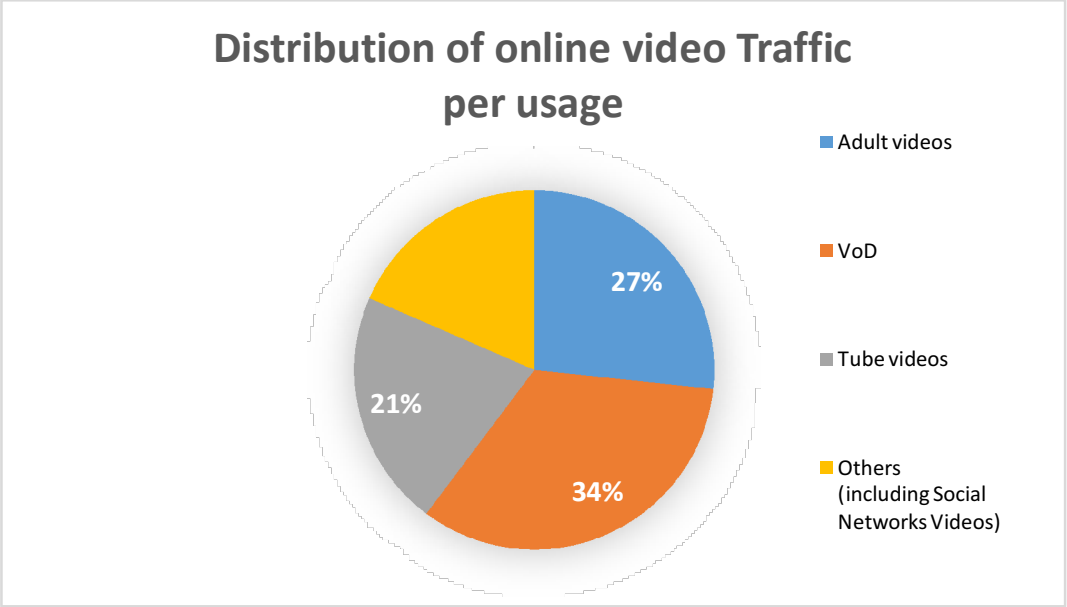
In this section particularly, we are going to represent the consumption used by video streaming major is YouTube, Netflix, and Adult Videos. According to report the total use of video steaming increased by 60%. With good internet speed it leads to more uploads and downloads.

Here is the data it uses and after total consumption it takes:

- **Low** quality is typically 96kbps. On average, Low-quality audio streaming uses **0.72MB per minute or 43.2MB per hour.**
- **Normal** quality is typically 160kbps. Normal-quality music streaming uses **1.20MB per minute or 72MB per hour** on average.

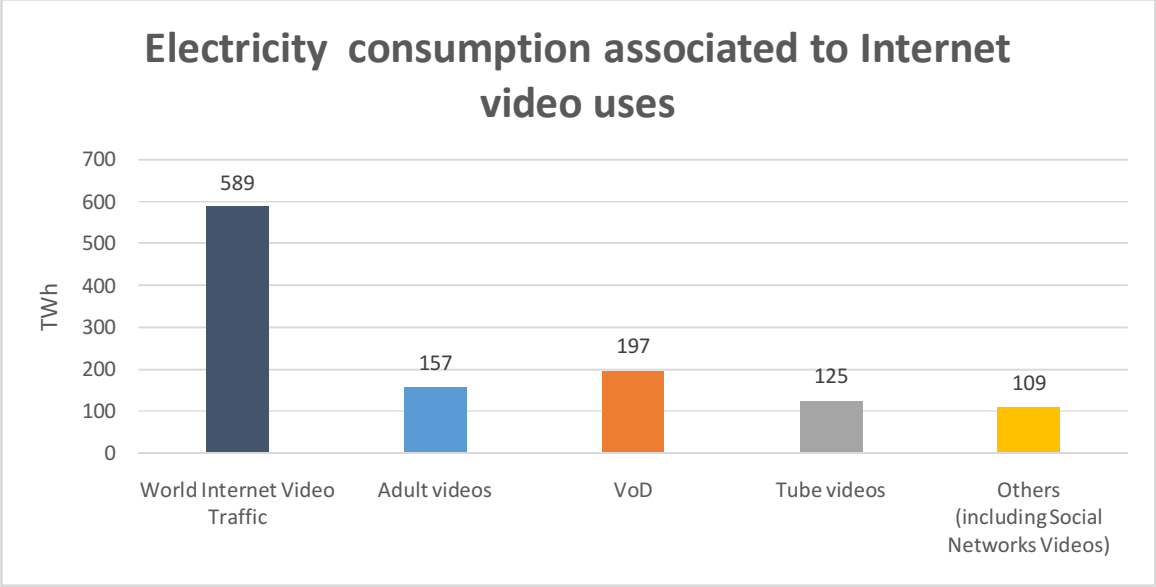
- **High** quality music is typically 320kbps. High-quality streaming music uses **2.40MB per minute or 115.2MB per hour** on average.

1.1.1.2 VIDEO ONLINE



This all types contain the streaming platform that broadcasts film and serial type content, pornographic content, tubes are different types content according to audience's preference.

This generates 306 million tons of CO2 and total GHG (Greenhouse Gases) due to digital technology.



Usage is quite high then it was before and according to one report in 2018 viewing pornographic content videos in the world generated carbon emission of the same magnitude as that the residential sector in France. While Amazon prime and Netflix the same volume of GHGs emission as the entire economy of the country Chile.

1.1.1.3 SEARCH ENGINE

There are two main reasons of internet usage is at pick point. First is availability of higher broadband and mobile speeds it leads to greater downloading and uploads. And "evidence of an increase in the consumption of online video". When we are focusing on search engine its worth to look at Google it is most powerful and getting around and 1.3 trillion every year. For that they already have more than one million servers and every quarter 100000 they are expanding. Replicating files maximize speed of search. Harvard physicist Alex Wisner-Gross, who claimed that a Google search accounts for seven grams of carbon dioxide emissions. Seven grams of CO2 emissions is equivalent to boiling a pot of tea or driving a car 52 feet.

Now, if we consider Google search creates one gram of carbon dioxide emissions it is possible to calculate total impact on atmosphere. With one billion searches everyday it probably emits one billion grams of carbon dioxide. And which is equal to driving a car 2,375,000 miles.

1.1.1.4 SOCIAL NETWORK

As we are considering all the possible ways it is necessary to focus on usage of social media.

Facebook, WhatsApp, Instagram are on the top. It is used battery and ultimately it will reach to consumption of energy. All these applications are trying hard to optimize in such a way that will consume low energy. Below is some data which may help us to take considering this point.

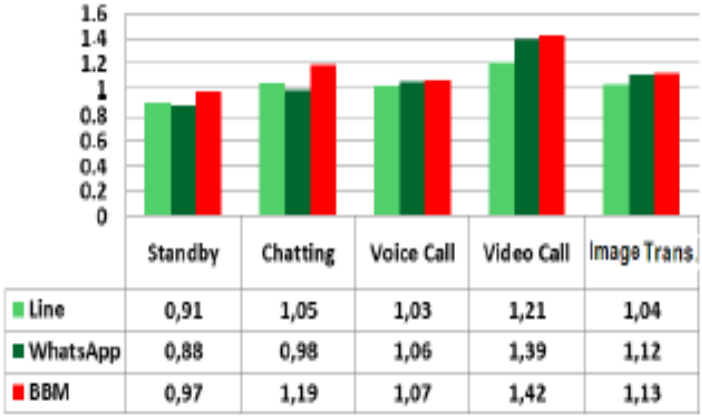


Figure 3. Power consumption comparisons

Table 1. Power consumption of social media application

No.	States	Line	WhatsApp	Blackberry
1	Standby	0.91 W	0.88 W	0.97 W
2	Chatting	1.05 W	0.98 W	1.19 W
3	Voice Call	1.03 W	1.06 W	1.07 W
4	Video Call	1.21 W	1.39 W	1.42 W
5	Image transmission	1.04 W	1.12 W	1.13 W

Above table shows the power consumption by different applications and features. WhatsApp has less power consumption than Line and Blackberry. While in voice call power consumption is less by Line.

1.1.1.5 OTHERS

DATA CENTERS CONSUMPTION

As mentioned above higher bandwidth leads more usage and uploads and downloading as well to handle millions of requests and respond as quick as possible needs data centers to be more powerful and active. Increment in Internet usage leads to more installation of data centers. It is compulsory to focus on the how we can optimize the energy consumption and for that below matrix is useful. It is adopted by most of the data centers to get power usage effectiveness.

Metric		Equation
PUE	Power usage effectiveness [52–56,62]	$= \frac{\sum \text{Facility power}}{\sum \text{IT equipment power}} = \frac{P_{\text{mechanical}} + P_{\text{electrical}} + P_{\text{miscellaneous}} + P_{\text{IT}}}{P_{\text{IT}}}$
ERF	Energy reuse factor [62,64]	$= \frac{\text{Reuse energy outside of the data centre}}{\text{Total data centre source energy}}$
GEC	Green energy coefficient [62]	$= \frac{\text{Green energy used by the data centre}}{\text{Total data centre source energy}}$
SI-EER	Site infrastructure energy efficiency ratio [32]	Same as PUE
DCiE	Data centre infrastructure efficiency [53,54]	$= \frac{1}{\text{PUE}}$
DCeP	Data centre energy productivity [62,65]	$= \frac{\text{Useful work produced in the data centre}}{\text{Total data centre energy consumed producing this work}}$
ScE	Server compute efficiency	$= \frac{\text{No. of samples where server provides a primary service}}{\text{Total no. of samples over the time period}} \times 100$
A primary service is the main service provided by the server, for example the primary service of a mail server is to provide email [60]		
DCcE	Data centre compute efficiency [60]	$= \frac{\sum \text{ScE from all servers}}{\text{Total number of servers}}$
DPPE	Data centre performance per energy [59]	$= \frac{\text{IT equipment utilisation factor} \times \sum \text{IT equipment capacity}}{\sum \text{Data centre energy consumption} - \text{Green energy}}$
DC-EEP	Data centre energy efficiency and productivity [32]	$= \text{SI} - \text{EER} \times \text{IT productivity per embedded Watt}$
CUE	Carbon usage effectiveness [58,62,66]	$= \frac{CO_2 \text{ emitted } (kgCO_2e)}{\text{Unit of energy (kWh)}} \times \frac{\text{Total data centre energy}}{\text{IT equipment energy}}$
WUE	Water usage effectiveness (site) [66,67]	$= \frac{\text{Annual site water usage}}{\text{IT equipment energy}}$
WUE_{source}	Water usage effectiveness (source) [67]	$= \text{WUE} + \frac{\text{Annual source energy water usage}}{\text{IT equipment energy}}$
EDE	Electronics disposal efficiency [63]	$= \frac{\text{Weight of responsibly disposed of IT EEE}}{\text{Total weight of disposed of IT EEE}}$

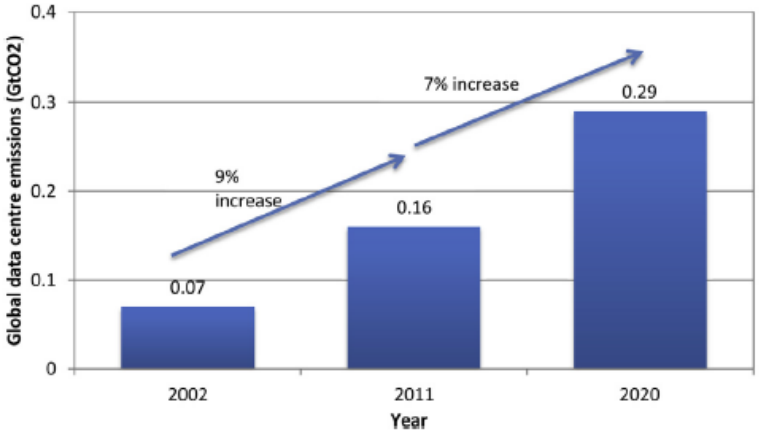


Fig. 10. Growth in data centre GHG emissions – 2002 to 2020.

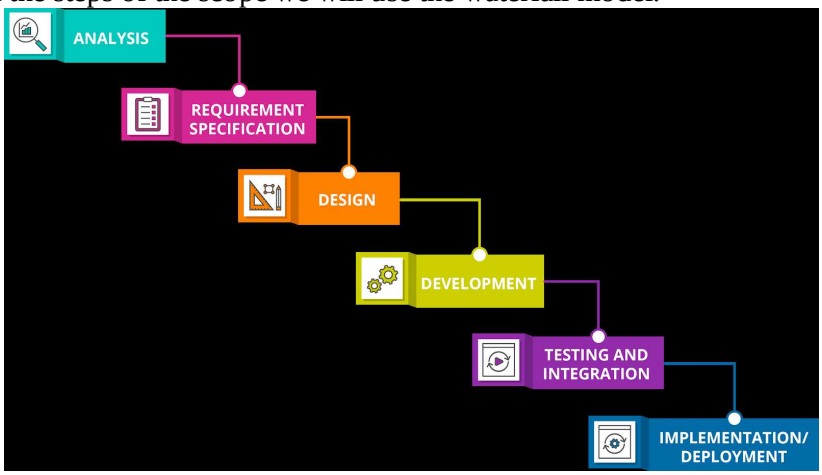
It shows the total global data centers emissions since year 2002 to 2020 and it is obvious that more data centers lead to more emission.

2. MANAGEMENT

2.1 DEFINING SCOPE OF PROJECT AND MODEL

It is very essential step to get the correct project out come. Defining scope of project covers almost all areas starting from the first step to last step which is delivering the right output. Here, we would like to present of out scope in global and give the detailed view.

To handle all the steps of the scope we will use the waterfall model.



Reason to select this model is it is very efficient for the small projects. It is simple and effective. After every step evaluation will be done so transparency will be maintained and it will reduce the risk. Small team and transparency will increase project control. We can achieve high product quality.

2.1.1 Scope planning

This step will include the global view of project including the how the success of project will look like, what are the essential factors to start the project, objective and goals of the project and how ongoing process will be measured.

In current market there is not many plug-in available to measure the correct usage of energy used by the user. Internet is essential part of our life and we cannot survive without it but we should know the effect it does to the environment. Excessive use of anything is harmful. This project will give user the estimation of the total energy consumption done by him/her and represent data by different metaphors so that will may help them to understand how much carbon dioxide emission will be there by their action. This will lead user to use internet for good reasons. This action of thousand people will indirectly helpful to the environment.

Factors to start the project are research about the total consumption is going on to get the correct calculations. Project will be measured by completion of each stem as this project is using the waterfall model. Any inaccuracy will be corrected after every step so chances to get wrong mental model will be less.

2.1.2 Scope definition

This step will include the correct stakeholders, correct requirements of the project and role of each person to get the project done.

Stakeholders:

It is necessary to define correct stack holders in order to drive project in a right way. As our in our project team of only two people. We both took decisions whenever it is needed to change but main authority we would like to consider is the technical guide **prof.Roose** and for management part **Prof.Christina**.

Project Drivers:

Here, for the research part team worked together to collect the data. Now, **Thang** is more focusing on the technical side and **Pratvi** is focusing in the management side to analysis and management as well help to create front-end development.

2.1.3 Scope documentation

After defining work of each person in the team it is mandatory to have regular communication and start with real implementation. In this step we would like to add more details about the estimation, Plan of the project and risks involved in the project.

Plan of the project and estimation is included in the given picture below:

Would like to give more clear estimation:

Total Resources cost estimation:

In the resources have to estimate the cost for equipments and the people working on the project. As the team is of two people (developers) total cost is **3015 Euro**. There is no additional requirements for equipment so it is 0.

Administrative cost:

This cost we can consider for the storing of data after the completion of the project. Like, as per the requirement if we want to go live we have to pay for the storage which will be **1000 Euro** per year. And if we want to do patent about the product Registration and application fees will be around **500 Euro**.

Actual Planning:

	Plan						Real Execution			
	tesk	Start date	End date	Number of hours	Cost calculation(Euro	Role	Work done	work delay	Total hours delay	Loss(cost in Euro)
Initial phase										
	Study on consumption	31/01/2020	5/2/2020	15	225	T/P	done	no	0	0
	Problem analysis	6/2/2020	12/2/2020	10	150	T/P	done	no	0	0
	Research on metaphores	15/02/2020	18/02/2020	14	210	T/P	done	no	0	0
	Develop plan	20/02/2020	22/02/2020	4	60	T/P	done	no	0	0
	Create requirement report	24/02/2020	26/02/2020	6	90	T/P	done	no	0	0
	Staring Development json files	28/02/2020	3/3/2020	2	30	T/P	done	no	0	0
	Development of metaphores	30/03/2020	15/04/2020	20	300	T/P	done	no	0	0
	Feaserch on technoogical recuirements	12/2/2020	14/02/2020	2	30	T/P	done	no	0	0
Analysis Phase										
	Use case diagram	21/03/2020	21/03/2020	2	30	T/P	done	no	0	0
	Sequence diagram	23/03/2020	25/03/2020	5	75	T/P	no	yes	5	75
	Activity Diagram	24/03/2020	28/03/2020	4	60	T/P	done	no	0	0
Development phase										
	Designing GUI	1/4/2020	5/4/2020	25	375	T/P	Started already	no		
	Develop Front end	1/4/2020	5/4/2020	25	375	T/P				
	Develop Backend	5/4/2020	20/04/2020	40	600	T/P				
Testing phase										
	Deploy and test product	21/04/2020	25/04/2020	10	150	T/P				
Final phase										
	Create final report	20/04/2020	25/04/2020	8	120	T/P				
	Create instruction	20/04/2020	25/04/2020	5	75	T/P				
	Publish Plug-in	25/04/2020	26/04/2020	4	60	T/P				
total				201	3015					

Risk Management:

This part is trying to cover the risks relating to the project. Successful Analysis of project and after having blue print of the plan it is best to have risk management which helps to sustain in any situation.
We tried to put the situations which may have chances to occur and actions which will help to get out of it in the table below:

Risk Management			
no	Likelihood	Concequence	Action
1	Requirements	1. System requirement not adequately identified 2. Unclear requirements 3. Incorrect system requirements	more discusstion with proferssor weekly
2	Project complexity	1. Project involves the use of new technology 2. Hight level of technical complexity 3. Immature technology 4. Project involves the use of technology that has not been used prior to	seminar and invite other senior
3	Planining and control	1. Lack of senior management commitment and technical leadership 2. Project process not monitored enough 3. Inadequate estimation of required resources 4. Project milestone are not clear 5. Team members lack specialized skill required by the project	Feedback from employees about project manager update the cost eastimation sheet regularly correct mental model Training
4	Organizational enviroment	1. Change in organizational management during project	flexiblity of team to work and correct guidelines to employees
5	Un expected Situations(COVID-19	May leads to change whole Management plan	Leads to create new workenvironment and adaptibility of team

2.1.4 Scope change management

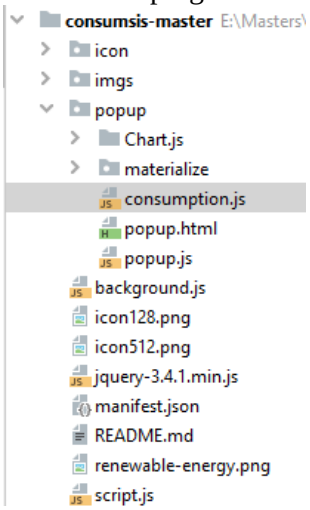
This part covers the part where as a team some decisions went wrong and that leads to change in plan.

This happened in the initial stage of the project. It took bit time to understand the correct requirements. We misunderstood that we need to taken in to account that more traffic leads to

more energy consumption. That is true for some extent but it is not mandatory first to focus in that part. With the guidance of Prof. Roose we cleared the doubt.
Secondly, we went wrong with the cost estimation. We considered only the cost for developers but guidance given by Prof. Christina we have to consider all the costs. We tried to include the administrative cost and correct total estimation is 4515 Euro.

3. TECHNICAL

After successful gathering of total consumption by different sources and having suitable model to handle project technical part will be easier to handle. Execution of technical phase started with the structure of the plug-in and working of each part.
Structure of plug-in will be:



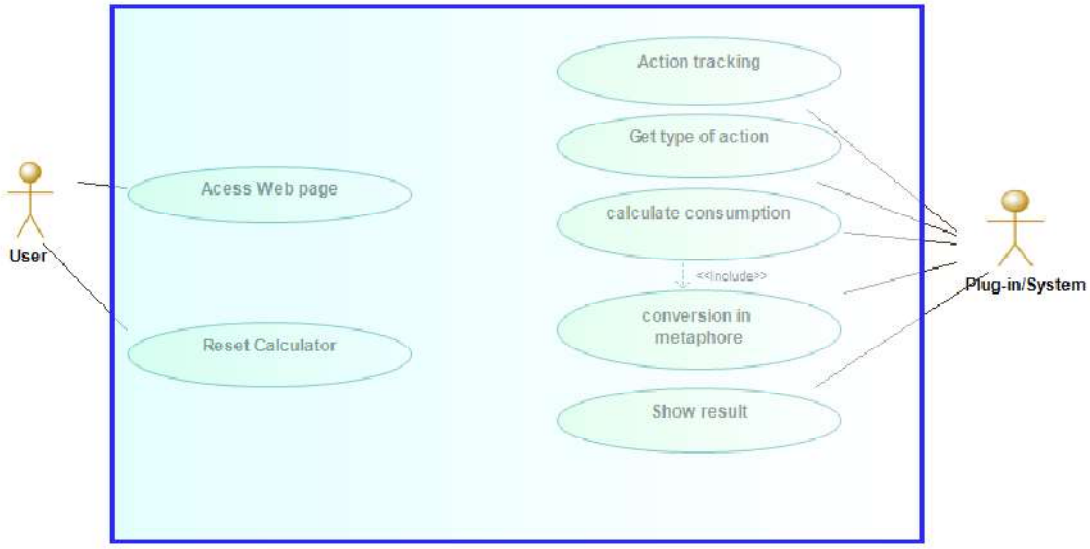
There will be main 7 files will be there:
manifest.json (to handle overall structure)
popup.html (User design)
popup.js (to get info and nevigate)
background.js (allow listening and collect data)
Script.js (reload the page)
Chart.js (representation of chart)
consumption.js (calculation of metaphors)

3.1 ANALYSIS PHASE

Before starting the actual development plan blue print of the development side can be more specified using use case diagram, activity diagram, Sequence diagram.

3.1.2 USE CASE DIAGRAM

This is very simple start of the plug-in by identify general work and who will manage that wok. For user side only two activities will be done after the allowing plug-in into the system. First, user will surf on the internet and second he/she will ask for the result. On the other side of the plug-in(system) it will track all the user activity and calculate all the data. To show result it will calculate and represent by different metaphors.

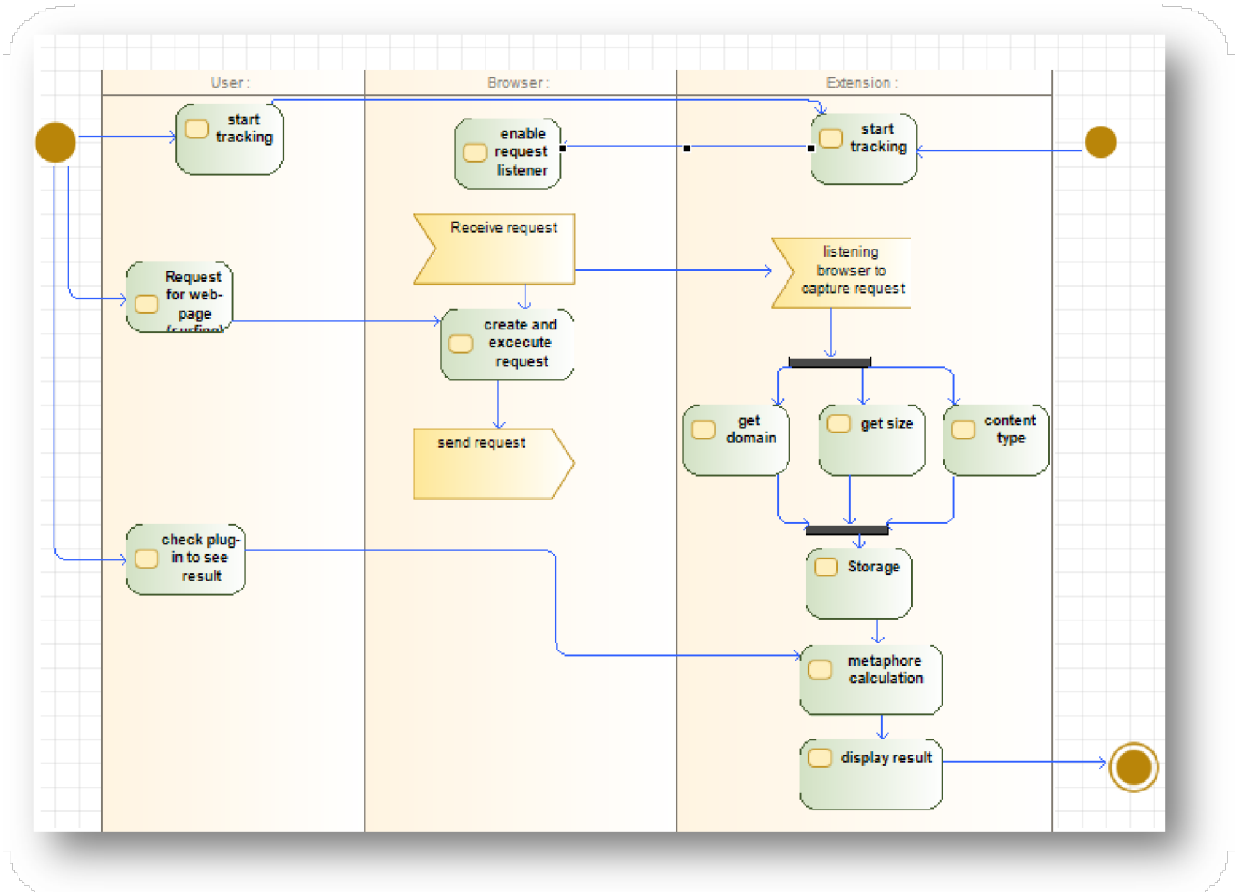


3.1.2 ACTIVITY DIAGRAM

Basic flow is given by the activity diagram. Three main activities will be we have to take care in order to get the consumption.

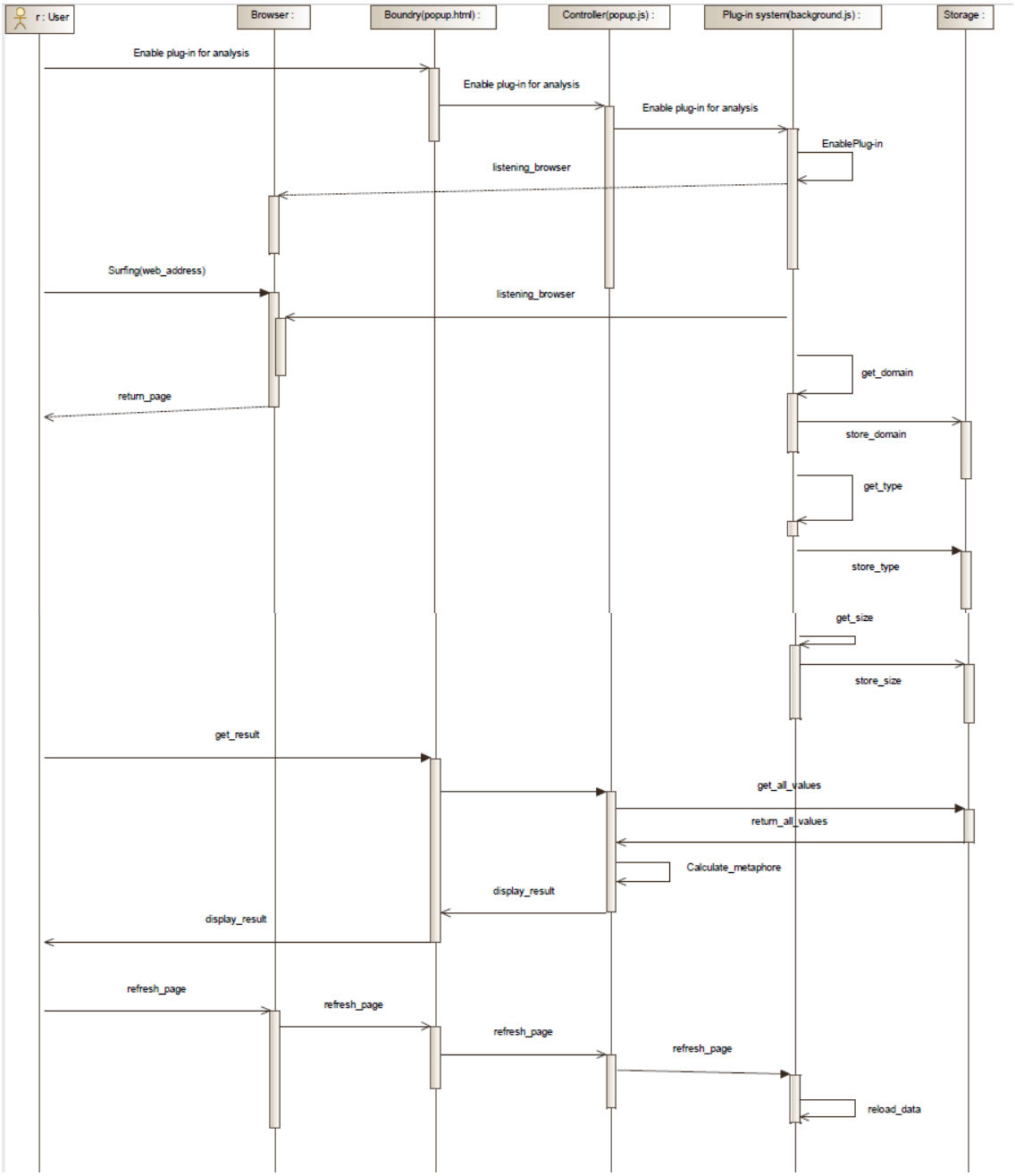
1. Start tracking (to calculate consumption we need the data)
2. Request for web page (listen the user activities)
3. Check page to see result (calculate metaphors)

It all starts with the tracking request from user. Once user is ready and request for tracking plug-in will send request to browser to allow plug-in to listen. After browser will allow plug-in to listen, plug-in will track the user activity (get domain, get size of the page, and content type) as shown in to the implementation section. This all data will be stored in to the local storage. Whenever user will ask for the result stored data will be fetched and calculated for the metaphors.



3.1.3 DETAILED SEQUENCE DIAGRAM

Total detailed view will be given by the detailed sequence diagram. As per the diagram there will be four main files will work. Popup.js, popup.html, background.js and content.js and consumption.js. Popup.html is for user we have to design the GUI in this file. To handle user actions popup.js will be there. As a controller of all activities background.js will be there. Storage is to store the data which will be useful to convert in to the metaphors. Lastly, metaphor calculation will be done in the html.js file. Whenever there is refresh or reload of the page occurs content.js will run in the background. To be more precise, extension (plug-in) will send the request to the browser for listen the activities user is doing. By listening the activities we will get the page _type, domain and size in order to calculate the consumption. After listening will store it into the local storage (for now) as Thang showed in the implementation part. And when user asks for the result popup.js will fetch the stored data and convert into the kwh (kilo-Watt hour) and calculating it into the metaphor by using the different equations in consumption.js.



3.2 METAPHORES

Concept of metaphors is very simple. Not all users are belonging to computer science. To make them understand what the consumption they are doing by using internet is metaphors. All the metaphors here compared with the co2 emission by doing mentioned activity

1. To represent plane can travel in meters
   Airbus 380 can fly ….meters with 516 passengers
2. To represent light a candle
   It can light ….candle based on co2 emission
3. To represent cycling one person can do

It can show person emits ….amount of co2 by cycling in meters

3. To represent car can run on the co2 amount used by user

It can show one Toyota Avensis can run…meters

4. To represent walking one person can do

Person emits amount of co2 by walking….meters

5. To represent 23W bulb can run

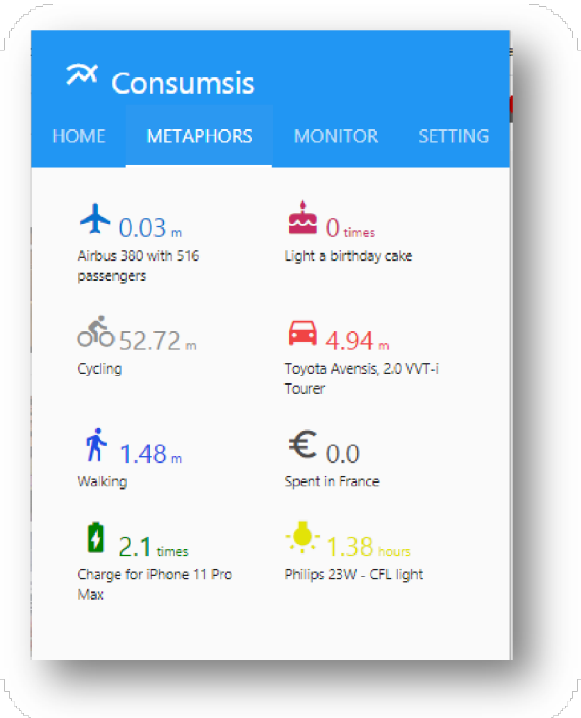
It can run Phillips 23W bulb for ….hours

6. To represent kwh and equivalent money

It can be ….. euro on used kWh by user

7. To represent phone used kwh can charge

It can charge iphone 11 pro…..times



This is what the actual look will be for the user.

3.3 DEVELOPMENT

As per the requirements of plug-in will allow to track user's activities (including income and outcome requests) on browser to analysis. Chromium project is the most popular project with many browsers is based on such as chrome, Microsoft Edge, Opera, and Amazon Silk, so on. For this reason, we decided design and develop a plug-in for chromium project.

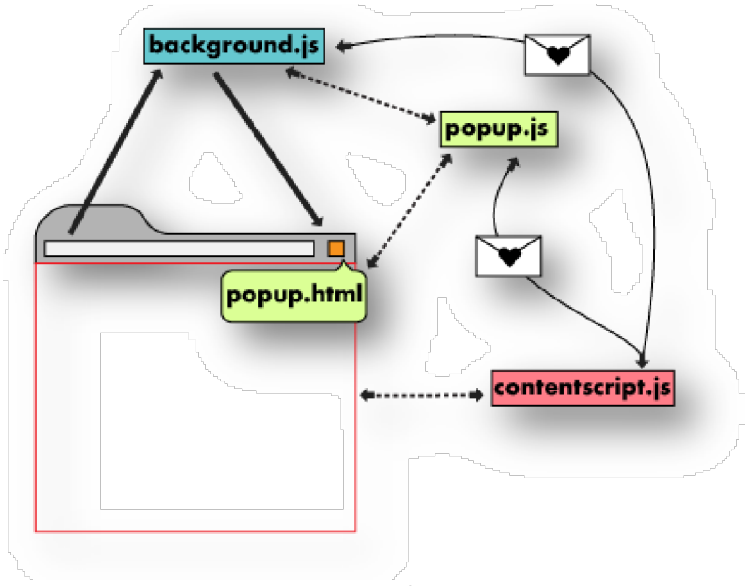


Figure 2. The simple structure of a chrome browser plug-in

An extension is built using web technology and APIs the browser provides to the open web and can use to customize the browsing experience. Figure 1 show a structure of chrome

General working of extension:

- Background script: It works when plug-in is running. It's the extension's event handler or modify/ enhance the chrome browsing experience, …
- Content scripts: It's is called for each request. It can read or modify the DOM of web pages the browser visits.
- Popup UI elements: An extension is user interface should be purposeful and minimal. The UI should customize or enhance the browsing experience without distracting from it.

Extension working in Our project:

- Background script: It enable requesting listener to capture size of page, content type, domain, so on. Then store to database (chrome. Storage)
- Content scripts: It's is called for each request. It can read or modify the DOM of web pages the browser visits.
- Popup UI elements: It allow user to see their consumption information and metaphor visualization. User can take some settings such as set consumption limit, enable notification, save data (ignoring media request), so on.

The browser APIs

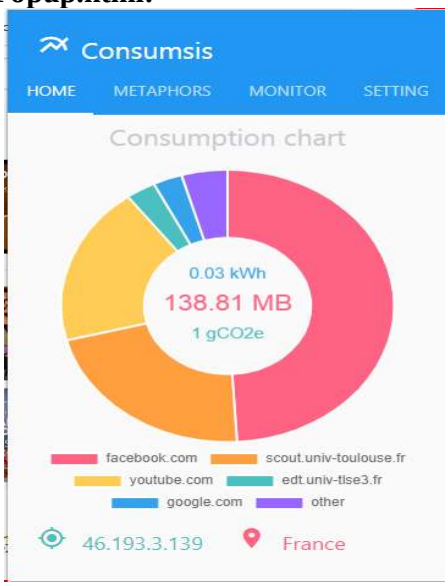
Plug-in must declare the APIs name in the extension manifest to use them. Our plug-in need to declare:

- Storage: It allows plug-in to store data.
- Tabs: It allows plug-in to interact with the browser's tab system. Plug-in can create, modify and rearrange tabs in the browser.
- WebRequest and webRequestBloking: it allow plug-in to access network requests.

3.3.1 FRONT END:

In this part two files will play main role **popup.html** and **popup.js.**

Popup.html:



-This is the front end shows the consumption in MB and kwh as well gram of co2.

-When user is surfing background.js is listening continuously and updating the total consumption like this.

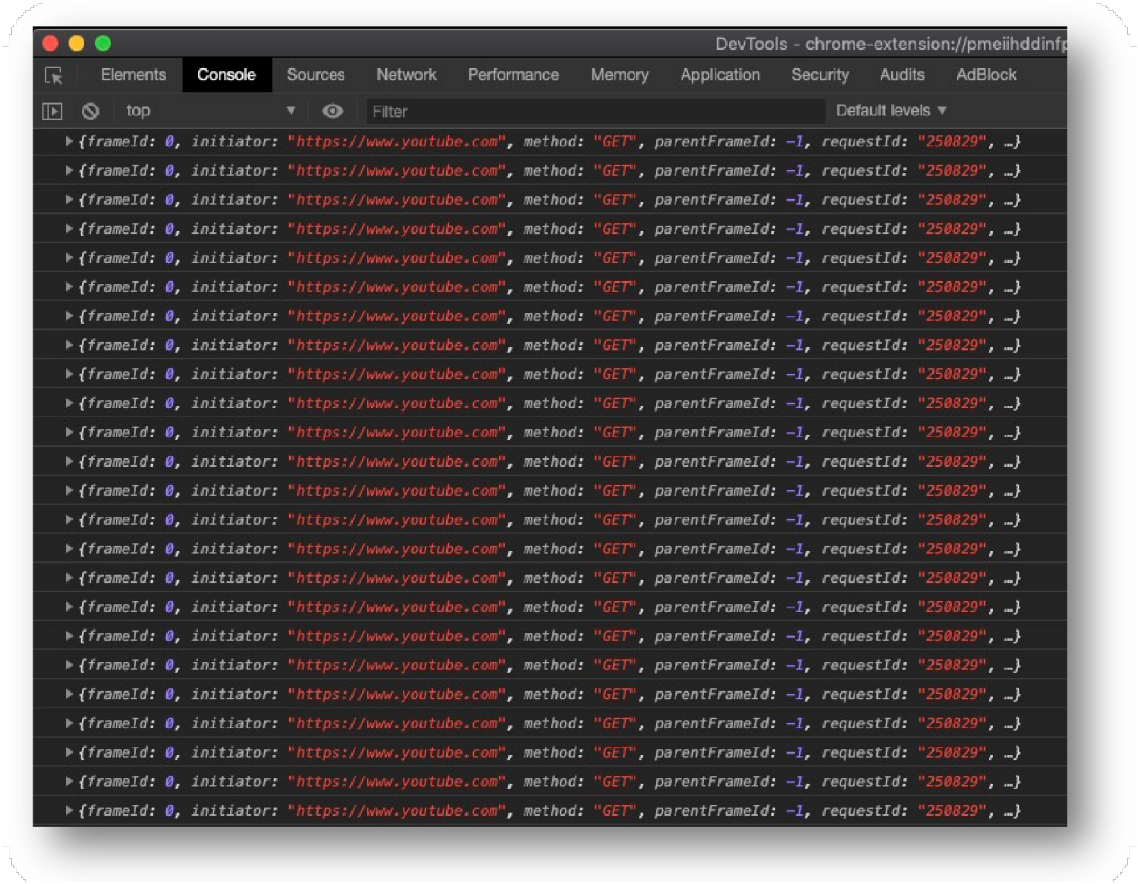
-If user is surfing on Facebook all the external links will be fetched as well by background.js and total will be shown.

3.3.2 BACK END:

User case: Capture request

In background script, we executed a listener to listen the network requests. Any request from browser will be sent to request processing to get important data.
Basically this will listen and track all the data and capture the activity user is doing.

```
chrome.runtime.onMessage.addListener(handleMessage);

handleMessage = (request, sender, sendResponse) => {
  chrome.webRequest.onHeadersReceived.addListener(
    headersReceivedListener,
    {urls: ["<all_urls>"]},
    ["blocking", "responseHeaders"]
  );
};
```

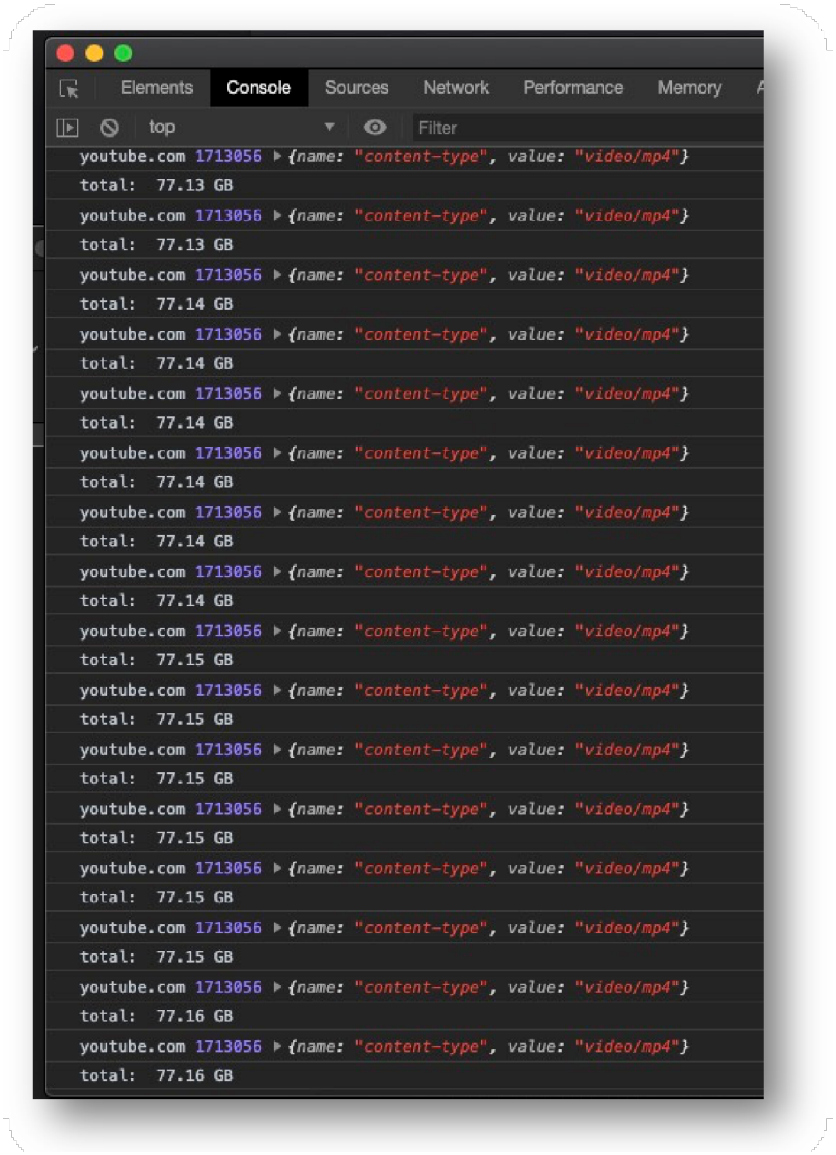


User case: Request processing

In background script, plug-in will receive request blocking. The request will be extract domain, content length, and content type. Then these data will be store to chrome storage.

```
headersReceivedListener = (details) => {

const domain = getDomain(!details.initiator ? details.url : details.initiator);
const content = details.responseHeaders.find(element => element.name.toLowerCase() === "content-length");
const type = details.responseHeaders.find(element => element.name.toLowerCase() === "content-type");
const size = undefined === content ? {value: 0} : content;
const requestSize = parseInt(size.value, 10);

   storeData(domain, requestSize,type);

return {};
};

convertB = (bytes) => {
if (bytes*1e-6<1)
return bytes.toString() + " bytes"
elseif (bytes*1e-6<1000)
```

```
return (bytes*1e-6).toFixed(2).toString() + " MB"
else
return (bytes*1e-9).toFixed(2).toString() + " GB"
}
storeData = (domain, requestSize,types) => {
const mbvalue = localStorage.getItem('mbvalue');
const _total = localStorage.getItem('total');

const mbvalueJson = null === mbvalue ? {} : JSON.parse(mbvalue);
var total = null === _total ? 0 : parseInt(_total);

let bytePerDomain = undefined === mbvalueJson[domain] ? 0 :
parseInt(mbvalueJson[domain]);
   mbvalueJson[domain] = bytePerDomain + requestSize;
   total += requestSize;

   localStorage.setItem('mbvalue', JSON.stringify(mbvalueJson));

   localStorage.setItem('total', JSON.stringify(total));

   chrome.browserAction.setBadgeText({"text":convertB(total)});
};
```



As image depicts, in this phase it is getting the get domain, content type (value)and total GB used by that particular site. This will be stored into the local storage and at the time of conversion it will be converted into kWh and then to metaphors using different equations.

To sum up, these all captured data then converted into metaphors and we already can see the total GB used by user. Conversion in kWh and Co2 consumption is already shown in the plug-in.

3.3.3 METAPHOR:

As per the 3.3.2 we captured the total GB used by the user and stored in to the local storage. This GB will be converted in to kWh and co2 emission to present it to the user.

Equation to convert GB to kWh and co2 will be like given below:

	Energy Impact (in kWh/min)
Smartphone	1.1E-04
Laptop	3.2E-04

```
const kWhPerByteDataCenter = 7.20e-11;
const kWhPerByteNetwork = 1.52e-10;
const kWhPerMin = 3.2e-04;
```

```
convertB = (bytes) => {
    if (bytes*1e-6 < 1)
        return bytes.toString() + " bytes"
    else if (bytes*1e-6 < 1000)
        return (bytes*1e-6).toFixed(2).toString() + " MB"
    else
        return (bytes*1e-9).toFixed(2).toString() + " GB"
}
```

popup.js

Now, to get the metaphors mentioned in section 3.2 we need different equations mentioned the below:

```
const kwhperbattery= 0.01504; //iphone 11 pro max
const kwhpereuro = 0.1765; // France
const co2perplanekm = 38.7;//airbus 380:75g/passenger/km * 516 seats = 38700g
const co2percarkm = 0.224;//Toyota Avensis, 2.0 VVT-i Tourer 224g/km
const co2percyclingkm = 0.021;//21g per km
const co2perwalkingkm = 0.75;//21g per km
const wattsperlignt = 23;//Philips 23W - CFL light
const co2percandy = 0.0106;//8.13 grams/candy * 5 *8.13/352*1100 = 127g/hours ~ 10.6g/5 ms
```

Consumption.js

4 FUTURE WORK

Extra features:

After the blue print of the final plug-in we come to the conclusion and want to give more features to the users which will help to reduce the usage of internet.

Feature 1: To block the selected website after some limits set limit by user

Example: If user sets limit that after 10GB usage of Facebook I want to block Facebook for particular time.

Feature 2: After every 10GB of usage it will automatically pop-up the data usage to remind the user about the consumption.

Feature 3: Show total data usage by last month, last week and previous day

5.CONCLUSION

This Project completed successfully before the deadline. All the user requirements have been completed. During this project we learned a lot. We followed all the steps of management and attended the meetings on time. All reports have been sent on time and this is the only reason that we are able to finish it before the deadline. But this is not the end we are still working on the extra features we want to provide mentioned in the section 4. At last we learnt that to deliver the best, flexibility and follow the steps of management is equally important.

Given below plan shows the work done till now and profit.

After completion:

	task	Start date	End date	Number of hours	Cost calculation(Euro)	Role	Work done	work delay	Total hours delay	Loss/profit(cost in Euro)
Initial phase										
	Study or consumption	31/01/2020	5/2/2020	15	225	T/P	done	no	0	0
	Problem analysis	6/2/2020	12/2/2020	10	150	T/P	done	no	0	0
	Research on metaphores	15/02/2020	18/02/2020	14	210	T/P	done	no	0	0
	Develop plan	20/02/2020	22/02/2020	4	60	T/P	done	no	0	0
	Create requirement report	24/02/2020	26/02/2020	6	90	T/P	done	no	0	0
	Staring Development json files	28/02/2020	3/3/2020	2	30	T/P	done	no	0	0
	Development of metaphores	30/03/2020	15/04/2020	20	300	T/P	done	no	0	0
	Reaserch on technoogical requirements	12/2/2020	14/02/2020	2	30	T/P	done	no	0	0
Analysis Phase										
	Use case diagram	21/03/2020	21/03/2020	2	30	T/P	done	no	0	0
	Sequence diagram	23/03/2020	25/03/2020	5	75	T/P	no	yes	5	75
	Activity Diagram	24/03/2020	28/03/2020	4	60	T/P	done	no	0	0
Development phase										
	Designing GUI	1/4/2020	5/4/2020	25	375	T	done	no	0	375
	Develop Front end	1/4/2020	5/4/2020	25	375	T	done	done Before	0	375
	Develop Backend	5/4/2020	20/04/2020	40	600	T	done(12/04)	done Before	0	600
Testing phase										
	Deploy and test product	21/04/2020	25/04/2020	10	150	T/P	done(12/04)	done Before	0	150
Final phase										
	Create final report	20/04/2020	25/04/2020	8	120	P	done(15/04)		0	120
	Create instruction	20/04/2020	25/04/2020	5	75	T/P				
	Publish Plug-in	25/04/2020	26/04/2020	4	60	T/P				
total				201	3015					Net Profit:1545

This project is completed with the **profit of 1545**. As product development is on time and it took less time then estimated time. Even going through pandemic and crises, proper management and dedicated team made it possible.

We would like to thank our technical and management guide for their valuable comments which allowed us to come up with success in the project.