ÖZYEĞİN UNİVERSİTY
FACULTY OF ENGINEERING

CS400

SUMMER PRACTICE REPORT

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S006708

INTERNSHIP COMPANY & DEPARTMENT:

NETAŞ / Multimedia Call Processing Solutions

07.04.2019-28.05.2019

SUMMER PRACTICE REPORT

STUDENT	
Name	**Mustafa Yıldırım**
Internship Start Date	**07.04.2019**
Internship Completion Date	**28.05.2019**
Total Working Days	**20**
COMPANY	
Name	**Netaş**
Department	**Multimedia Call Processing Sol.**
Address	**Yenişehir Mah. Osmanlı Bulvarı No:11 Kurtköy-Pendik/ İstanbul**
SUPERVISOR	
Name	**Çiğdem Vural**
Title	**Team Leader**
Department	**Multimedia Call Processing Sol.**
Phone	
E-Mail	**cvural@netrd.com.tr**
Signature	

DAILY WORK SUMMARY

DAY	DATE	WORK DESCRIPTION
1	**09.04.2019**	I have started second 20 day internship with the project that I have been working on in previous 20 day internship. I worked on some problems on data transactions.
2	**10.04.2019**	Some new problems are occurred during the development on table view which is made for filter and search pager reports. I had to deal with these problems by using ReactJS tools and extensions.
3	**12.04.2019**	We have discussed the project during the weekly meeting with our supervisor and team members. They asked me some improvements on the UI of the project.
4	**16.04.2019**	We had a scrum meeting with my mentor (Omer Kircali) in the day. He wanted to test the system by entering some values. The data transactions are made without any error. He also requested enhancements on data entrance. I had to implement some checkpoints that asks users “Are you sure to insert or delete”.
5	**17.04.2019**	I have started to add checkpoints or alerts as they called in JavaScript according to meeting in previous day. I have fixed some bugs after the implementation.
6	**19.04.2019**	Weekly meeting is held. The team leader requested improvements in UI and UX. The view of InsertPage is criticized. I have studied on how I can improve the UI part. Then I made my researches on it.
7	**24.04.2019**	I have found some packages that I can use according to my research. React bootstrap is found as a convenient package to enhance UI and UX.
8	**26.04.2019**	The UI enhancement is proceeded via react bootstrap. I have tested to PRT whether there is a side affect occurs or not due to new package. Some side effects were found such as font size problems in table view. I have fixed those bugs.
9	**30.04.2019**	Weekly meeting is held. We have discussed projects’ situation so far. Although, they expected to more improvement that I have done, the next step is decided to go. The step was dumping the reports in old system(TechOps) to the new one which is Pager Report Tool(PRT).
10	**03.05.2019**	We have made our research with one of co-worker (Kaan Bereketli) on how we can dump the data from old system to the new one. He suggested me to use web-scraping technique to do that. I have started to my research om web scraper that we would like to design.

Student’s Name: **Supervisor’s Name:**

Student’s Signature: **Supervisor’s Signature-Stamp:**

DAILY WORK SUMMARY

DAY	DATE	WORK DESCRIPTION
11	**07.05.2019**	Kaan found a tool named beautifulsoup which is written with python. The tool was pretty straightforward to do web scraping. We made researches how to implement it. Also , I did some small trials with other web sites.
12	**08.05.2019**	I had not an account on TechOps to login. Web scrape could not be done without logging in the old system. Kaan had access to it. Therefore, he proceeded implementation of web scrape script. I have supported him with my recommendations.
13	**10.05.2019**	We could able to scrape the data from the old system. Then, we tried to dump the data to sql file in order to load easily our database. Related parts of the script is changed and mapped to our database. Then, we got a sql dump file to import it to our database.
14	**14.05.2019**	We have faced some problems during the import the sql dump file. There was some errors on permission of the database. I have fixed by changing the database permissions according to my research.
15	**15.05.2019**	There were no more implementation is left to done in my opinion. I wanted to show the last situation of the project. They found sufficient the last situation. Also they played with the tool and they made some new recommendation for it.
16	**17.05.2019**	I suggested deploying PRT to a server since there was no more time in my internship. I also tried to do some enhancements but our priority was deploying the system to one of servers in Netas server room.
17	**21.05.2019**	We have searched a free server to upload our system with our co-workers by a provided excel table that shows free servers. However, they said that there may be some problems about free servers. We tried to take a chance to do it in server room. Unfortunately, we would not able to deploy it.
18	**22.05.2019**	Our team leader suggested to deploy it on a old computer and use it a hosting machine. Then I have started to work on it. I have deployed and tested the tool whether the tool is reachable from other computers by ip address that I have provide. They were able to reach it.
19	**24.05.2019**	I have continued on my tests on the system. I have tried to output a production build of the system. I had been using development build before. The production build is more precise and fast.
20	**28.05.2019**	The team wanted me to a small documentation about the new tool in order to maintain the system in case of crashes. I have written the documentation which includes instructions and crash case commands.

Student's Name: **Supervisor's Name:**

Student's Signature: **Supervisor's Signature:**

Abstract

I have started second part of my internship at NETAS. Our supervisor wanted me to design a new Pager Report Tool (PRT) which fulfill their needs. Their needs were mainly about searching previous reports easily and editing them since they would like to benefit from previous reports. I started the project and completed project particularly. However, I had to enhance UI in the second part of my internship. I have completed the requests as much as I can do. These were not major problems. Then, a big problem has been revealed. The problem was that they wanted like to load previous reports from older PRT to the new one which I have developed. The techniques are searched and implemented in order to migrate the data to new PRT during the internship. In addition to that, the PRT must be deployed on a server in order to make it accessible from other coworkers' computers. According to these two duties, I started to my research and we discussed applicable technologies or methods for the problem domain by cooperating with team. The process enhanced my knowledge on web development and other programming languages such as python. The process also helped me to develop my skills on deploying a web project from development to production. I have developed my skills on JavaScript, HTML, python and computer networks.

I. Introduction

In the second part of my internship at NETAS, I had to deal with problems on UI and UX problems on the new PRT -Appx. 1- that I have developed. The second task was data migration from old tool – Appx. 2 to the new one. The second task is implemented with cooperation with team. The third task was deploying the web application on the server to make it reachable from other devices in the same network.

UI and UX problems were existent from first part of my internship. Our supervisor wanted me to enhance the UI and UX for the next phase of my internship period. The view of new PRT was successful nut I had to make it more useful for my coworkers. I added to some menu views drop-down buttons and some other type of buttons to make user experience better. This improved my skillset on front-end design. In Appx. 3 a simple drop-down menu can be seen. These kinds of enhancements increase the speed of usage the tool with few clicks. This means that, the tool has reached its goal on latency and user experience. Apart from, I also changed some css files in the system to make view of the system nice.

I have developed most of the tool and the tool was ready to use. However, there was a big problem ongoing. Our team had approximately 1000 report from old tool. The reports must be migrated to the new tools database. However, our team did not have a permission to access the older tools' database. Then, the solution is found as web scraping technique [1] to solve the problem. We have chosen python [2] to write a web scrape script in order to make it. Then I collaborate with Kaan in our team to scrape data by extracting the model of HTML file of TechOps. Then, we added our data the database system.

The last part of my internship was passed with deploying the system on a server. We have tried to use NETAS servers. However, we would not able to use it due to technical problems in the server that is provided to us. We have used a personal computer as a hosting

machine specified for this job instead of previous solution. I have learned how to deal with local area networks during the process.

II. Company Description

Netas is mainly a telecommunication company that brings solutions to problem of other companies or individual customers. The company is established in 1967 to bring telecommunication solutions to Turkey with Canadian partner Nortel. Also, Netas defines himself as a system integrator. The reason for this definition is that Netas provides services and products for companies in a wide spectrum. The spectrum can be understand via Netas services and products. For instance, Netas has a collaboration with Aselsan on ULAK 4.5G GSM project. It can be said that it is an telecommunication project area. However, Nova Cyber Security project can be given as a different field from telecommunication. These various type of projects from different fields prove that Netas is a system integrator as it defines itself.

I worked in Multimedia Call Processing Solutions department which is under International R&D department in Netas. Our department was focused on giving support for products of Netas in telecommunication field. For instance, Netas provides a software named KandyLink for Ribbon Telecom Company. KandyLink or SPiDR(new name of KandyLink) is real time communication software for individual users or other companies. This product is just one of the product that our department supports. Our department gives the support via bug fixing, testing the software or calls from customers. Besides that, our team was in GPS(Global Product Support) which gives support for the companies. Our team considers incoming problems to solve them. Our team keeps record of those problems as problem reports. There were a lot of unrelated fields in existing report tool as our team told me. Our team needed a solution via a new report tool with reduced fields in order to view source of problem and solution method in previous problems.

My role was described as bringing a new Pager Report Tool (PRT) in order to fulfill new needs of our team. The software that was used in the project decided on together. In addition to that, my second duty was handling data migration from old tool to the new one that I have developed.

III. Pager Report Tool (PRT) Renewal

i. Problem Statement

PRT was ready to use. However, there was still ongoing problems with UI and UX in the tool. The first problem was some bugs on the UI. These problems were not major problems. Therefore, I have tried to solve them immediately to focus on the next problem. The next problem is migration old pager reports to the new system. We can list problems on it as follows:

- TechOps tool does not provide a data migration tool for users.
- The old system data can be viewed by authenticated
- The authentication was allowed for only employees of the company
- There were too many HTML contents unrelated to our new tool

Apart from data migration, the application must be deployed on a server. We did not design the system standalone. The system must be reachable for all team members.

ii. Tools and Techniques Used

We have reached a consensus on programming languages, software, hardware and techniques after discussions with the team. Our decisions as follows for each them:

- Programming languages: JavaScript [3] is decided as the language since the project is requested as a web application. JavaScript was the best choice for a user-friendly UI design. The language gives developers flexibility to deal with HTML pages and components. It is chosen also for back-end design. The reason is that, there was a nice runtime environment named as NodeJS for back-end purposes. Thus, we would not have to deal with incompatibilities between back-end and front-end for a small project with a limited time. The alternative can be seen as JavaEE[4] with its components such as JPA, JSF,EJB. Java was not a suitable choice since it requires huge prior knowledge and it was commonly used for large-scale web projects. Therefore, JavaScript is chosen with benefits as fast development process, less prior knowledge requirement for the environment, large community support for web development-especially for front-end.

- Software: ReactJS [5] view framework is chosen for front-end development. The prominent reason for that was its component-based structure. The structure helps us to develop each part of project separately. This approach makes us proceed step by step and see the results for each part separately. Also, it prevents contagion of a single failure to all parts of tool. Development time is reduced by the framework. There are a lot of alternatives such as VueJS, AngularJS. However, none of them has a large community support as ReactJS. NodeJS [6] is runtime environment is used for back-end purposes with its lightweight structure and compatibility with ReactJS due to JavaScript. The environment gives us ability of easy setup of a server with a few lines of code. Unlike java backend environment (EJBs, Application Servers or Web Servers), it handles communication between database server and ReactJS only by using RESTful API [7]. Thus we gained simplicity in development process. This helps us to detect our problems easily and solve them. NodeJS environment is chosen over JavaEE since the second option is commonly used for large-scale project unlike our lightweight web application. If the second option was chosen, the production and deployment process would be painful more than JavaScript environment. The other beneficial part is that we were able to add needed packages via NPM [8] with just a command to our project. There are a lot of packages in our project. However, there is a prominent package of NPM makes PRT enough for team needs. React-bootstrap-table2 [9] is the package that makes the reports easily readable and editable as the team wants. Apart from those packages, we had to use an IDE in order to write our code. VSCode[10] is chosen for this purpose since it was suitable for JavaScript development. Large amount of JavaScript developers use VSCode for development. Thus, we would able develop our project fast. The development mostly proceed with python [11] and its web scrape tool beautifulsoup [12]. The language and library are used old TechOps pager report tool.

- Hardware: In first stage, our plan was deploying our application on one of Netas servers. However, we could not deploy it on the server due to technical problems on

the server. The deadline was so close after production of the software. Then, we decided to use a PC that I have used in my internship for hosting the web application. The PC has enough specification for use of our team with 8 GB of RAM and Intel i5 CPU.

- Techniques: We have used MERN [13] stack structure with a little change by using MySQL database instead of MongoDB in development. The technique provides us a pattern in order to combine database server, REST API, ReactJS and NodeJS. In this technique, NodeJS server communicates with database. REST API makes a bridge between front-end (ReactJS) and back-end (NodeJS). First of all, we have chosen MySQL instead of MongoDB since we do not really need a No-SQL database. We do not have large amount of data transaction while MongoDB is used for scalable database structures. The second, I can get support easily from the employees since they have knowledge on mostly MySQL. MERN stack technique is a simple technique for CRUD (Create, Update, Delete, Read) operations. PRT simply does nothing other than CRUD operations. Therefore, the technique fits our needs and development process. Another benefit is that, there are a lot of resources about this technique. As a result of this, we were able to find solutions about our problems on CRUD operations immediately. In addition to MERN, we have used web scraping technique in second part of the internship. The method helps to us to parse HTML and gathering data from it. The technique will be discussed in next chapters.

iii. Detailed Explanation

We have completed most challenging part in previous internship period on front-end and back-end side. However, some problems were remained to next part of my internship especially in the UI. Firstly, some resizable components were not working properly. For instance , scrollable components must have been implemented. You can see one of them in Appx. 4. I have changed this kind of retouches in order to make the system stable. There was nothing to do after these changes in UI anymore.

The next problem to focus on was migrating previous reports from TechOps tool in Appx. 5. The old tool does not provide a data migration tool. Therefore, We had to implement a data migration technique that runs automatically in order to get the reports in our database. We decided that beautifulsoup tool is a nice choice to do it. The TechOps requires authentication with an employee account in the company. Therefore, we decided to develop it from an employee's computer. Kaan Bereketli was the employee whom I worked with. An example of a HTML page can be found in Appx 6. The page seems so simple but there were a lot of unrelated fields those I do not include the screenshot. HTML content is parsed via beautiful soup library of python. I cannot provide html content of that the report tools page since I do not have permission on the page. However the process can be understood by sample html content and related beautiful soup code. You can see google's homepage html content below:

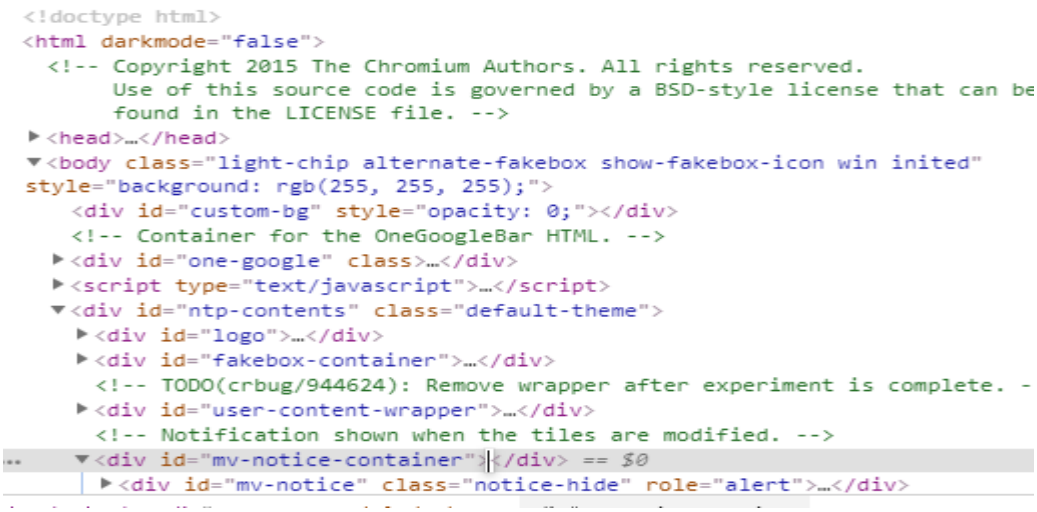


Figure 1HTML content of Google

The content above is specified some keywords such as html, head, body and div. Beautifulsoap is quite beneficial in order to parse the content and take the data inside of the content. In our case, HTML content is grabbed and parsed automatically. The extracted data injected to our database. These techniques are a great technique to avoid manual data transactions. HTML content was shown. The next step is, mapping these keywords to data that we want to grab. There is a sample beautifulsoup code snippet below:

```
soup = BeautifulSoup(response.text, "html.parser")

listings = []

# loop through the table, get data from the columns
for rows in soup.find_all("tr"):
    if ("oddrow" in rows["class"]) or ("evenrow" in rows["class"]):

        name = rows.find("div", class_="name").a.get_text()
        hometown = rows.find_all("td")[1].get_text()
        school = hometown[hometown.find(",")+4:]
        city = hometown[:hometown.find(",")+4]
        position = rows.find_all("td")[2].get_text()
        grade = rows.find_all("td")[4].get_text()

        # append data to the list
        listings.append([name, school, city, position, grade])

return listings
```

Figure 2 Sample Beautifoulsoup code

As it can bee seen above, the snippet can parse the data in HTML easily. Then we can store the data in a list. We stored the data in a list and passed it to the database in our case. The database was in Kaan's computer. However, the development is actually under my computer. We had to dump the data from Kaan's computer to mine. Then we found a technique called database dumping in MySQLWorkbench as it can bee seen Appx. 6.

There was another part after data migration. We had to deploy the application on a server. We went to server room of NETAS for that purpose. However, we would not be able to load our system to a server. We tried to open server's terminal. The problem was that, the server could not run properly even in start up sequence. Then, we thought that we can deploy the app on a computer to use it a hosting machine. I prepared a computer to do it. Then I provide a LAN IPv4 address and I deployed the application on it.

iv. Results

In this part of project three main task are completed as enhancement of UI and UX, data migration from old PRT, deployment of application. The first task was a problem from first period of my internship. I have completed it immediately. Our supervisor criticized it. However, she also said that the next phase must be started as data migration.

Data migration part was completed with Kaan. I had been giving support to him. We cannot show exact code that we were using for web scraping since the script is developed in Kaan's computer. However, process is described in previous parts. It can be seen that, the data migration part completed successfully in Appx. 7. The results shows that, there are 1200+ reports in the system. The solution is brought via web scraping technique. The uploaded data is checked by our colleagues. They approved that there is no error in uploaded data. Our second concern was latency in the system since there were 1200+ reports. I would not be able to test the latency with this amount of data in the first part of my internship. We had concerns whether the system would be stable with that amount of data. However, we saw that, there was no reason to be concerned since 2,6 MiB data is viewed on the system with less than a second which is quite enough for us. The figure below shows data and resource usage for our application:

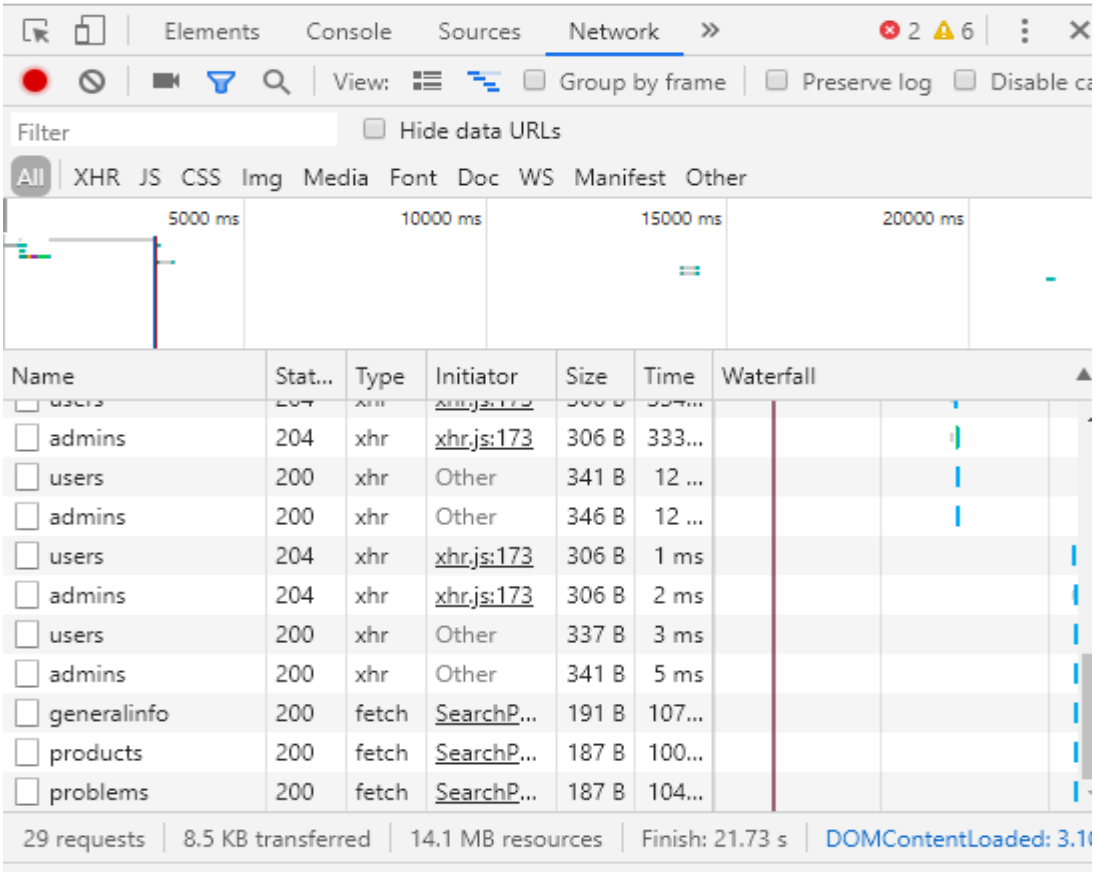


Figure 3 Resource Usage

According to figure 3. 14.1 MB resources are used which includes all the components that I have written and all related packages those are included. I wanted to compare it with SIS system of Ozyegin University which can be seen in Appx 8. SIS used 12.5 mb resources with 218 requests whereas we have used 14.1 mb with 29 requests. This shows that, our system is stable, but the transaction management and resource management could be better.

We started to deal with deployment after data migration. Our first goal was deploying it to NETAS server. However, we could not able to do it due to technical reasons. There was problems with the server which is given us. Then, we tried to deploy it on a computer. The deployment was successful. However, there was a problem. If the computer is shut down, the dynamic ip address of computer changes. We would not be able to solve the problem. The users must change the code after shut down.

IV. Conclusions

I have completed second part of my internship with experience by participating a real work environment. The education that I have get from my school helped me a lot in some critical points of development a software. I have gained basic principle of object-oriented programming (OOP). OOP lightened my perspective to develop a modular system. This perspective is quite important especially where people works with teams. In addition to that, CS222 lecture made my code clear since the lecture taught us how to make code clean and readable. Another big support for my work comes from CS202 database systems lecture in order to solve database problems and understand relational database structure. In the second phase of internship I developed myself on network which I got knowledge from CS458.

If we compare class assignments and internship projects, they are completely different in way of development cycle. The requirements of the project was changed every week by our team. This experience taught me adopting the struggles of development cycle.

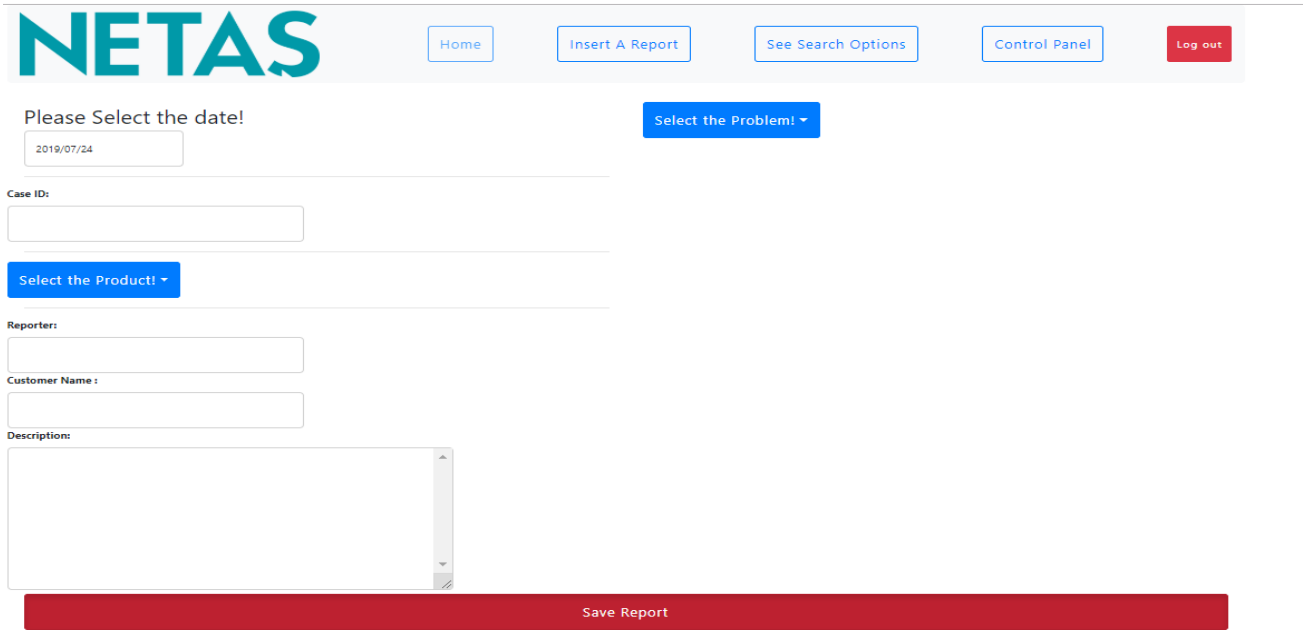
I have learned REST API structure during the internship. The structure showed me that there was no direct communication between components in real software structures. The communication was handled mostly with interfaces.

I had been thinking about being full-stack web developer before the internship. I had eager to do this along my internship period. Although, I have faced struggles during the development, it increased my curiosity about web development and JavaScript.

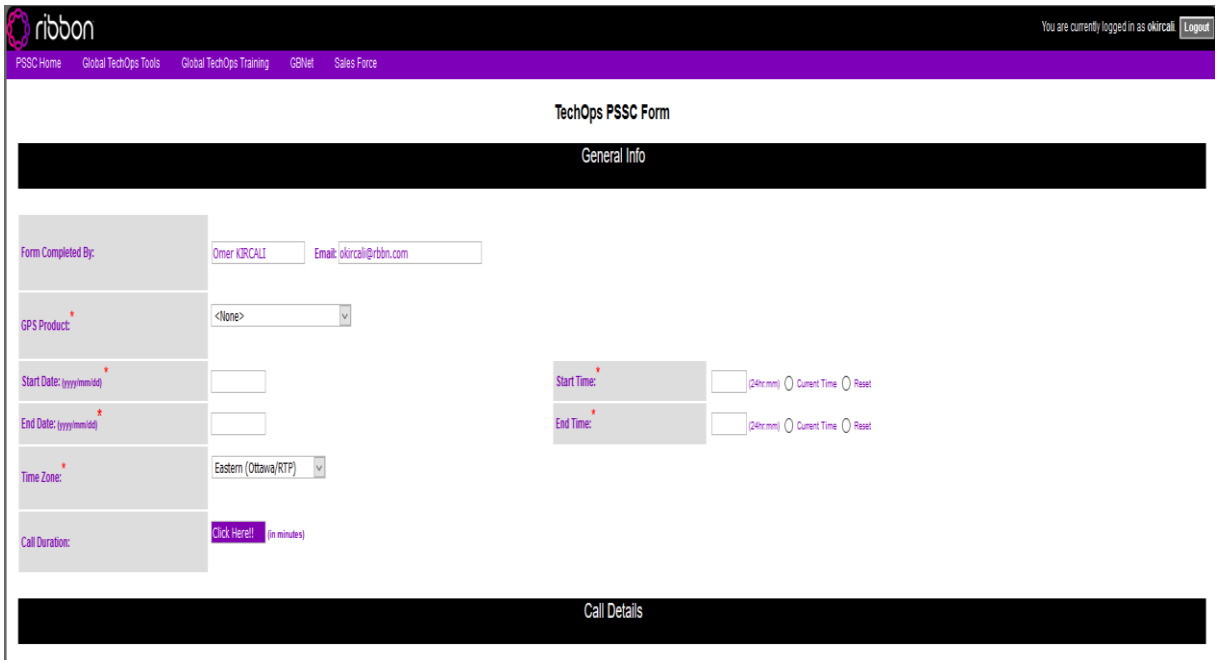
The second phase of my internship is finished with good impressions about the company. The company has flexible work environment and hours. This makes me to learn without forced by other co-workers. I have gained excitement to what I would like to with some constraints.

Appendix

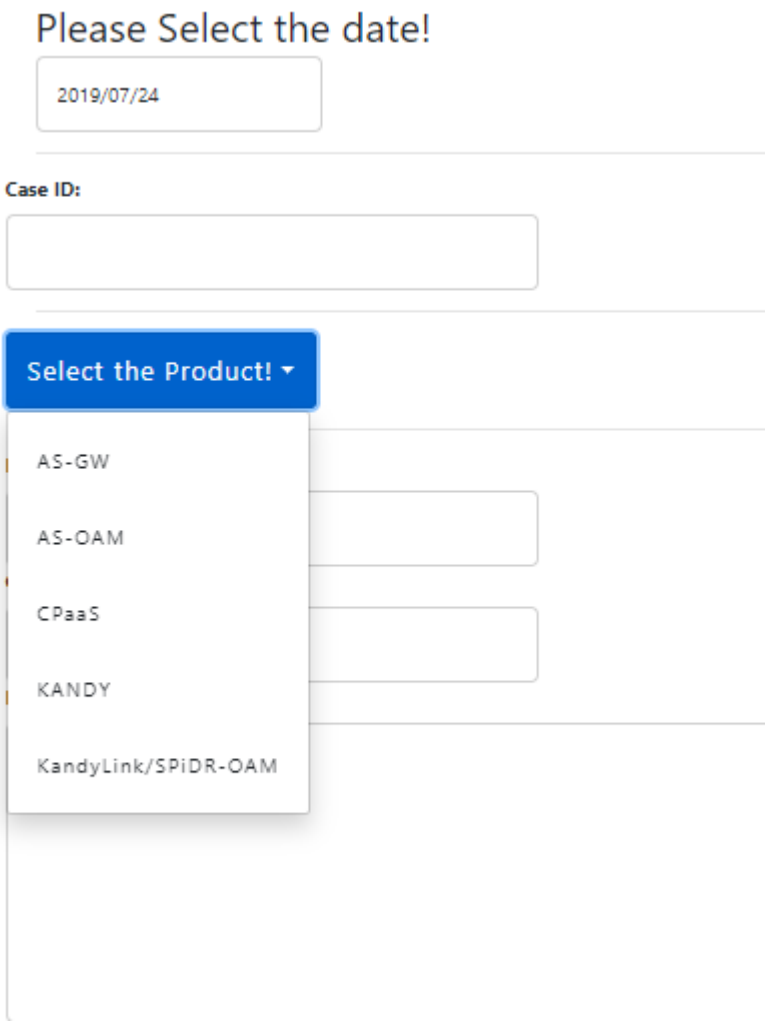
1. Pager Report Tool – the new one



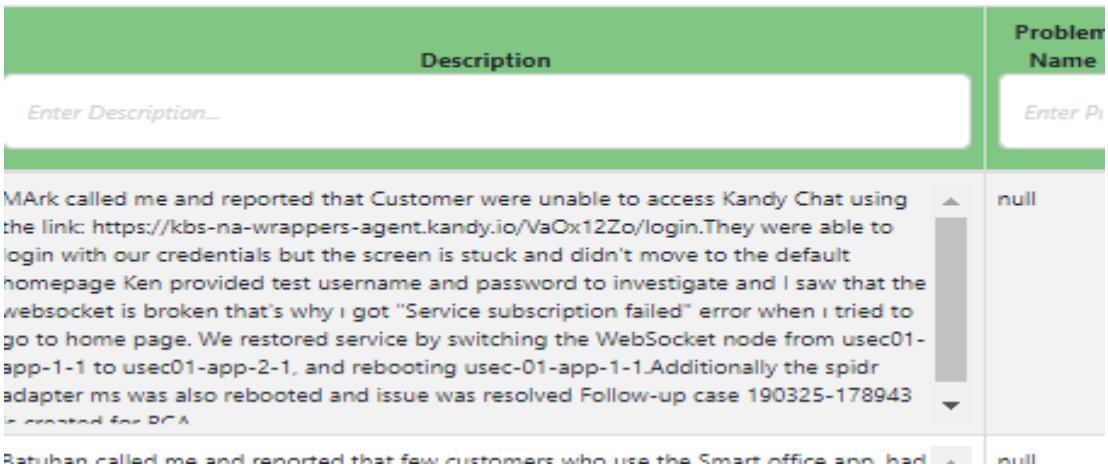
2. Old Pager Report Tool



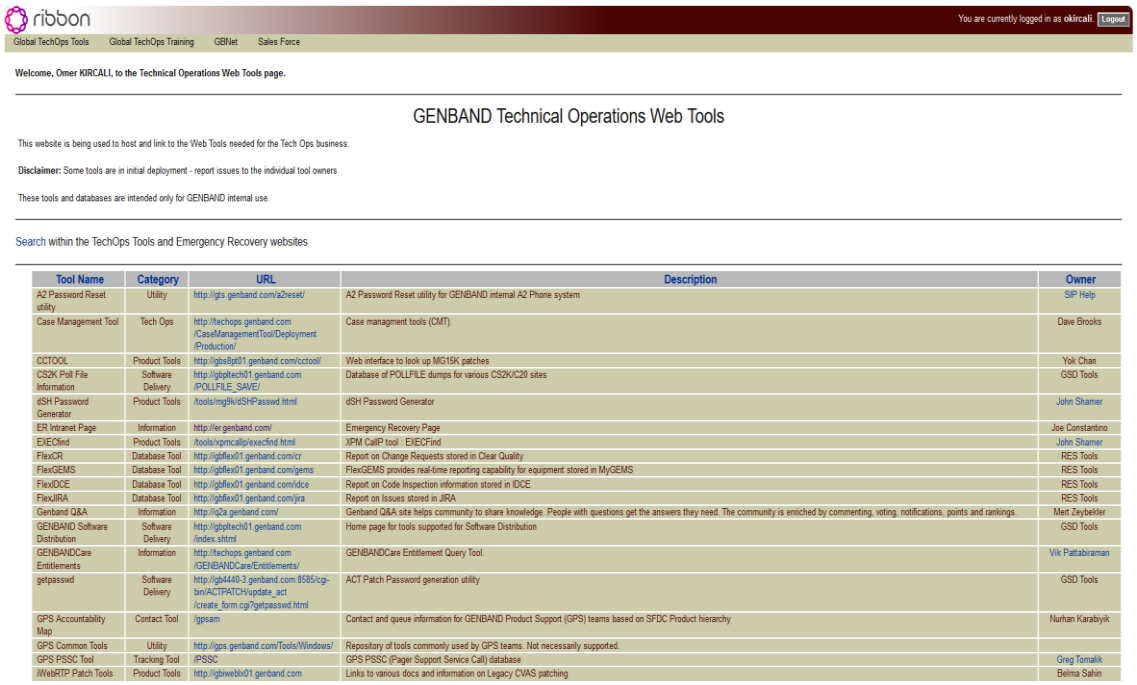
3. A simple drop-down menu that makes the tool different from the old one.



4. Socrollable component

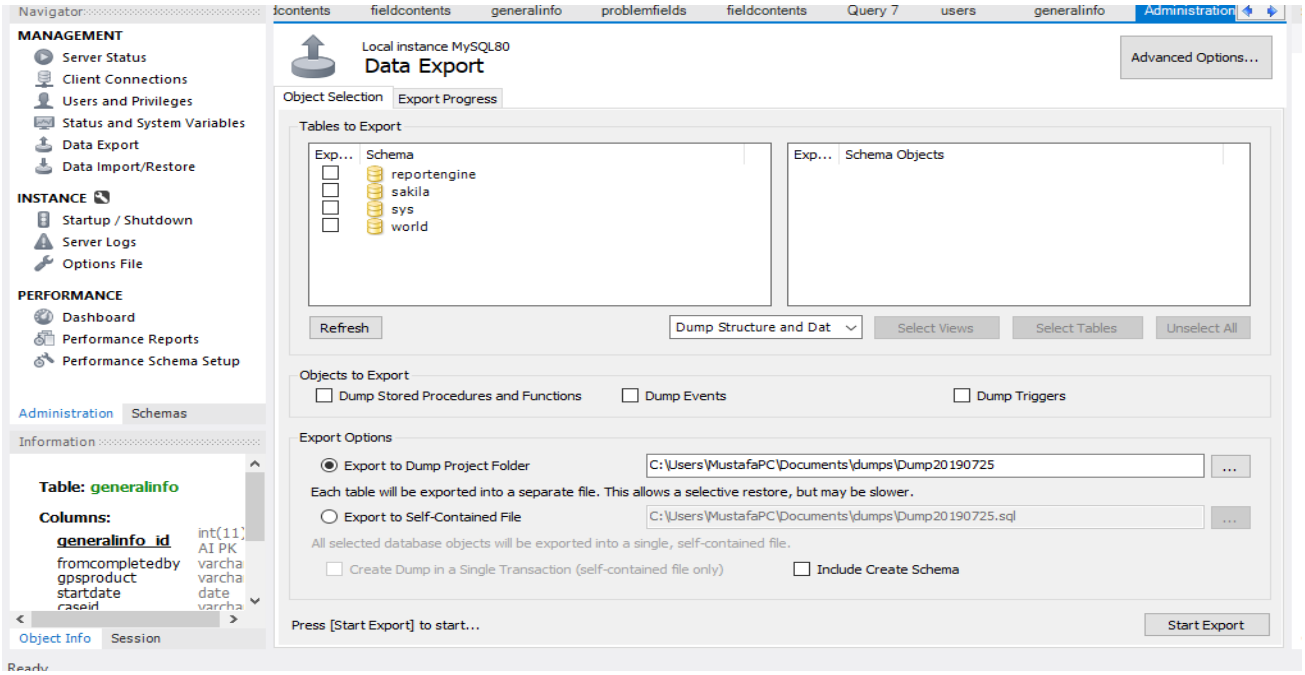


5. TechOps tool



Tool Name	Category	URL	Description	Owner
A2 Password Reset utility	Utility	http://gts.genband.com/a2reset/	A2 Password Reset utility for GENBAND internal A2 Phone system	SIP Help
Case Management Tool	Tech Ops	http://techops.genband.com /CaseManagementTool/Deployment /Production/	Case managment tools (CMT).	Dave Brooks
CCTOOL	Product Tools	http://gbs8pt01.genband.com/cctool/	Web interface to look up MG15K patches	Yok Chan
CS2K Poll File Information	Software Delivery	http://gbpttech01.genband.com /POLLFILE_SAVE/	Database of POLLFILE dumps for various CS2K/C20 sites	GSD Tools
dSH Password Generator	Product Tools	/tools/mg9k/dSHPasswd.html	dSH Password Generator	John Shamer
ER Intranet Page	Information	http://er.genband.com/	Emergency Recovery Page	Joe Constantino
EXECfind	Product Tools	/tools/xpmcallp/execfind.html	XPM CallP tool : EXECFind	John Shamer
FlexCR	Database Tool	http://gbflex01.genband.com/cr	Report on Change Requests stored in Clear Quality	RES Tools
FlexGEMS	Database Tool	http://gbflex01.genband.com/gems	FlexGEMS provides real-time reporting capability for equipment stored in MyGEMS	RES Tools
FlexIDCE	Database Tool	http://gbflex01.genband.com/idce	Report on Code Inspection information stored in IDCE	RES Tools
FlexJIRA	Database Tool	http://gbflex01.genband.com/jira	Report on Issues stored in JIRA	RES Tools
Genband Q&A	Information	http://g2a.genband.com/	Genband Q&A site helps community to share knowledge. People with questions get the answers they need. The community is enriched by commenting, voting, notifications, points and rankings.	Mert Zeybekler
GENBAND Software Distribution	Software Delivery	http://gbpttech01.genband.com /index.shtml	Home page for tools supported for Software Distribution	GSD Tools
GENBANDCare Entitlements	Information	http://techops.genband.com /GENBANDCare/Entitlements/	GENBANDCare Entitlement Query Tool.	Vik Pattabiraman
getpasswd	Software Delivery	http://gb4440-3.genband.com:8585/cgi-bin/ACTPATCH/update_act /create_form.cgi?getpasswd.html	ACT Patch Password generation utility	GSD Tools
GPS Accountability Map	Contact Tool	/gpsam	Contact and queue information for GENBAND Product Support (GPS) teams based on SFDC Product hierarchy	Nurhan Karabiyik
GPS Common Tools	Utility	http://gps.genband.com/Tools/Windows/	Repository of tools commonly used by GPS teams. Not necessarily supported.	
GPS PSSC Tool	Tracking Tool	/PSSC	GPS PSSC (Pager Support Service Call) database	Greg Tomalik
iWebRTP Patch Tools	Product Tools	http://gbiwebtk01.genband.com	Links to various docs and information on Legacy CVAS patching	Belma Sahin

6. Mysql workbench database dump



7. Data migration shows that approximately 1200 reports uploaded

Info ID	Completed By	Product	Date	Case ID	Customer Name	Description	Problem Name
1254	Ozan KAYA	CPaaS	2019-03-25	190324-178919	RIBBON COMMUNICATIONS OPERATING COMPANY, INC.	MArk called me and reported that Customer were unable to access Kandy Chat using the link: https://kbs-na-wrappers-agent.kandy.io/VaOx12Zo/login.They were able to login with our credentials but the screen is stuck and didn't move to the default homepage Ken provided test username and password to investigate and I saw that the websocket is broken that's why ı got "Service subscription failed" error when ı tried to go to home page. We restored service by switching the WebSocket node from usec01-app-1-1 to usec01-app-2-1, and rebooting usec-01-app-1-1.Additionally the spidr adapter ms was also rebooted and issue was resolved Follow-up case 190325-178943	null
1253	Ozan KAYA	CPaaS	2019-04-11	190412-182076	Kandy Business Solutions	Batuhan called me and reported that few customers who use the Smart office app, had an issue where when their extension is called it didn't ring the mobile phone when the phone is locked. it only rings when they were on the app itself. The problem has occurred between Spidr and Cpaas so Cpaas doesn't receive any incoming call or IM notification for a push from EMEA Spidr. in the end client didn't receive any call incoming call or IM notification too. I collected Cpaas and SPIDR logs simultaneously and realized that HTTP direct message had been sent by Cpaas to SPIDR as seen below {"subscribeRequest":{"expires":0,"service":	null
1252	Berat TOPCU	CPaaS	2019-05-05	190505-247186	Kandy Business Solutions	Paged out by ER and reported there is SMS issue on CpaaS prod site that similar issue with the case 190503-247027.The clients can send SMS but incoming SMS cannot received. Contacted with the SMS provide Intelepeer, they started to working on the issue. Validated the webhook for our users, validated our ability to send SMS. Noted immediately that some tests were not being delivered in addition to inbound SMS failures. After extensive testing and review we isolated the issue to the following: When running a TCPDump we can see messages arrive but 85% of the time they are delayed. letting the TCPDump run we can see test SMS from 25 minutes earlier arrive. At some	hardware
1251	Nuri SELCUK	CPaaS	2019-05-10	190510-250970		Kandy wrappers for KBS (https://kbs-na-kl.kandy.io websocket was down). As per Stephen pointed out that websocket requests arrived to CPaaS gw 1-1 and they hang up (10.234.18.23) NA - old system, meanwhile requests arriving at gw-2-1 get response (10.234.18.24). So traffic is disabled sending to gw-1-1 but it didn't makes resolve. Problem keeps happening. So, Dave connected to the site and investigated it. It shows that one of the websocketadapters have errors since other one was fine. Already, Scott's test indicated that issue occured sproadically. One time works then doesn't not work. So, he looked into the websocketms logs. Here is the notification	null

Figure 4 login.js

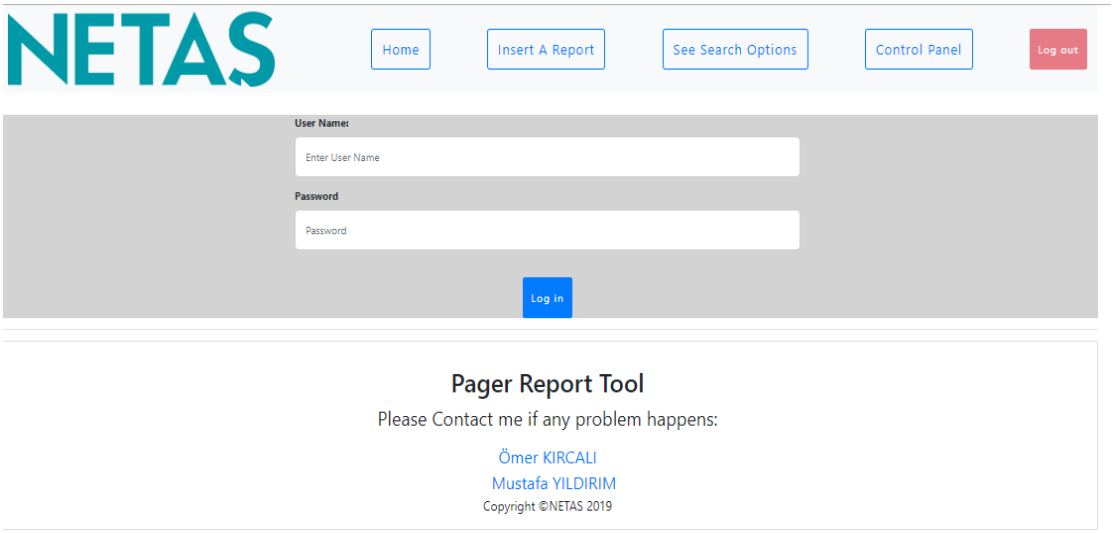
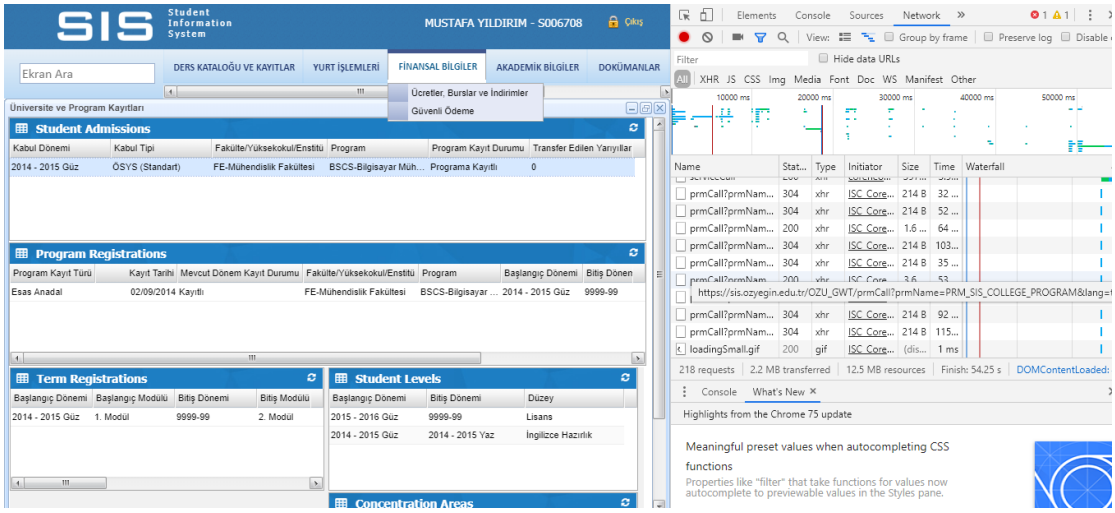


Figure 5 login component

8. Ozyegin University SIS resource usage.



References

[1] https://www.upwork.com/hiring/for-clients/web-scraping-tutorial/
[2] https://towardsdatascience.com/introduction-to-web-scraping-with-beautifulsoup-e87a06c2b857
[3] https://www.javascript.com/
[4] https://www.oracle.com/technetwork/java/javaee/overview/index.html
[5] https://reactjs.org/
[6] https://nodejs.org/en/
[7] https://restfulapi.net/
[8] https://www.npmjs.com/
[9] https://github.com/react-bootstrap-table/react-bootstrap-table2
[10] https://code.visualstudio.com/
[11] https://www.python.org/
[12] https://www.pythonforbeginners.com/beautifulsoup/beautifulsoup-4-python
[13] https://medium.com/codingthesmartway-com-blog/the-mern-stack-tutorial-building-a-react-crud-application-from-start-to-finish-part-2-637f337e5d61