DUBLIN INSTITUTE of TECHNOLOGY

Institiúid Teicneolaíochta Bhaile Átha Cliath

Internship

End of Year Report

SAP

Yassr Shaar

School of Computing

Dublin Institute of Technology

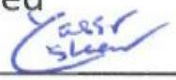
August 2017

Bachelor of Science Computer Science (Infrastructure)

Program Code: DT211C / 3

Declaration A

I hereby certify that this report which I now submit for assessment to the School of Computing, Dublin Institute of Technology on the programme of study leading to the award of Computer Science Infrastructure (DT211C) is entirely my own work and has not been submitted for assessment for any academic purpose other than in particular fulfilment for the stated above.

Signed 

Yassr Shaar

Date 28/07/17

Declaration B

I confirm that this report has been completed without breech of company confidentiality.

Signed 

Jim Byrne

Date 28/07/17

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Introduction

The industry placement allows students to experience many aspects of what it is like to work in the IT Industry and to demonstrate the practical and soft skills they learn at college. The many benefits and skills one learns from the industry placement are not only technical but also practical such as teamwork and project management. The placement process in SAP gives students the opportunity to change teams if they seek to try different aspects of working at SAP or if they have in an interest in a different field meaning that a student never really gets bored working at SAP because of the wide variety of services and teams they can work with. Students are placed into teams and given training to enable them to preform services and work on projects alongside full time employees, giving them a great insight and confidence when working in their team.

The training interns receive when they start working at SAP is the same that new hires receive and it is very beneficial as it covers many of the important skills required for working at SAP giving you a better insight on SAP technologies like in SAPTEC, SAP work processes like in SAP UADM and in SAP's in-memory database technology through SAP HANA L1 training. Along with the mandatory training we also do training on information security when dealing with sensitive data and an online course on business introduction.

Services and projects for interns are made to challenge them but at the same time it is an opportunity to explore the many tools SAP provide us. These tools range from online resources to workshops and talks that teach you how to overcome difficulties you may face. At SAP the culture of the company makes it so that asking anyone for help is extremely easy and everyone is willing to help. This allows for an immersive industry placement experience and makes it so that you never feel completely stuck or helpless when facing a problem.

SAP as a placement has been very engaging and has allowed me to experience many different aspects of working at SAP. For the first half of my internship up until the end of April I was part of the BW (Business Warehouse) Team. The focus of this team is consultancy, optimization, support and upskilling in the many aspects of databases creating efficiency for customer systems. After requesting to partake in a project with the HANA DNA (Design and Application) team, I was assigned to work on a project that required the use of JavaScript, XML, HTML, CSS and the ODATA Database on the UI5 platform. This was a great opportunity for me to see the practical procedure on how a development project takes place in the industry.

Company in Context

The role of an intern in SAP can be very diverse depending on which department they are put into or if they later decide to switch departments. My role in the BW team allowed me to shadow team members and preform services alongside of them for customers. These services help with the optimization and efficient running of customer systems and ensure that the system health is in-check for expansions or day to day running of the customer system. The other role on the BW team that I was partaking in was to create a step by step tutorial on 'Flatfile Data loading, Modelling and Querying on SAP BW, HANA and BEx Query Designer'. I would go on to present this in front of the entire BW team and talk about the different decisions I made while doing this project and any problems that I may have faced. This presentation will be used to teach new hires and future interns on how to get involved in using all these technologies that the BW team would be required to use daily.

As part of the HANA DNA (Design and Application) team the intern's roles were to partake in programming projects using JavaScript, XML, HTML, CSS and the ODATA Database on the UI5 platform. The project were given to teams of two, my team received the project labelled "Open Consultancy Requests". Open Consultancy request ensures full visibility within the CoE on global consultancy request across all regions. It allows CoE's tech leads to communicate with Regional Resource Managers on Customer Deliveries directly making sure the leads receive full visibility on Import Billable delivery. Other than the projects the intern's role in the team was to also perform services on customer system. The service performed was a GLS (Go Live Support). This service is done by completing a series of tests checking the customer system's RAM and CPU usage throughout the day along with checks on their SQL queries to ensure that they are running efficiently and if they would require optimization.

Contribution

While working with the COE HANA DNA team my contribution for the company is the web application which was made as part of the OCR (Open Consultancy Requests) project. This web application simplifies the reading and using of the Open Consultancy Requests excel file. This file contains information regards customers and any open requests that SAP are fulfilling so being able to find exactly the information needed from this excel file is very important. This file contains thousands of Lines and has more than 20 columns which are complicated in height and width for them to be effectively read in excel. The web application allows the use of filters making it user friendly, time efficient and the design to be more aesthetically pleasing.

As part of the COE BW team my contribution for the company was creating an in-depth tutorial on 'Flatfile Data loading, Modelling and Querying on SAP BW, HANA and BEx Query Designer'. This will be used to teach new hires and future interns on how to get involved in using all these technologies that the BW team would be required to use daily. Other than the presentation tutorial I also worked on multiple services for customer systems such as GLS (Go Live Support), GLA (Go Live Assistance) and BPPO (Business Process Performance Optimization).

Primary Business of SAP

SAP is the world leader in Enterprise Business applications. They develop ERP (Enterprise Resource and Planning) solutions and services to their customers. Their solutions support manufacturing, finance, sales and many more processes within a business. SAP has around 883 thousand customers around the world. SAP customers vary from small businesses to very large ones such as global 500 companies. SAP's software solutions are offered in different packages or suites. The largest one being SAP Business Suite and is made to manage complete business processes. This includes ERP which allows all parts of a business process to integrate such as sale and distribution, human resource, manufacturing, finance, accountings, production planning, warehouse management & logistics. Other services SAP offer their customers are SAP CRM (Customer Relationship Management) and SAP PLM (Product Life-cycle Management). In the business of delivering Enterprise Business applications the reason SAP sits at the top is because of its ability to integrate different business software applications and databases that companies may already be using. This means that the company has little to no downtime when upgrading to the SAP HANA Database and software solutions.

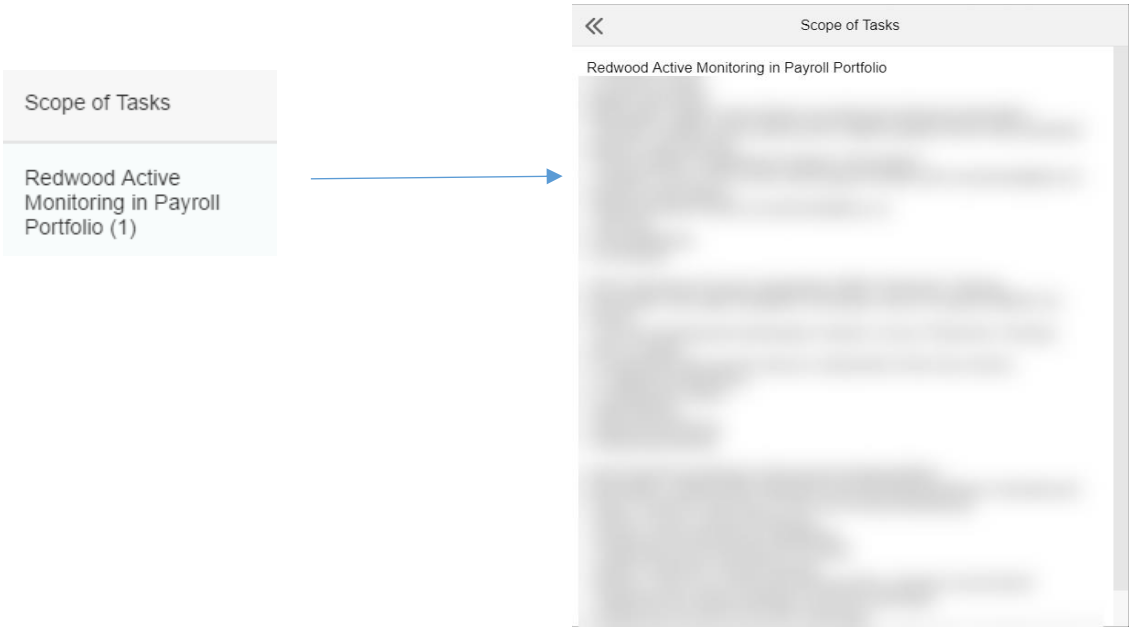
Work Performed

Within the COE BW team I was required to work with queries for performance optimization when providing some of the services. This was in the form of query design using ABAP, SAP's proprietary language. ABAP is an OOP language used for business applications and can be used in many ways that are similar to the use of SQL's database and Java's OOP concepts.

As part of the COE HANA DNA team many of the programming languages used during the OCR project are languages that were introduced to me during my course such as JavaScript, XML, HTML, CSS, jquery and ajax. Modules that covered these have been a reference point for me during my project. The project also involved the ODATA Database which can be used with SQL which ties in with my database module as all of the queries I needed to perform were learnt from that module such as an UPSERT and creating prepared statements to deal with situations such as sql injection.

The OCR project was created because of the need for a faster and easier way to read through and assign work using an excel file called "Open Global Consultancy Requests". This excel file is generated every month, the user has the task to extract information from this document in order to find customer consultancy requests or to assign them to be worked on in the case of a manager or team lead. The excel sheet displays the data in a very messy way that gives an unorganised look to the table, there are many columns and some of them such as 'ScopeofTasks' cannot be restricted to a certain size or shape and so the excel file is extremely difficult to read. The OCR project imports the excel file, using XML as the view and Javascript as the controller this creates a table that is much more aesthetically pleasing. ScopeofTask column is still an issue at this stage, the solution that was used is by limiting the output of 'ScopeofTasks' to 50 characters and turning that column into a button that launches a Dialog that displays the entire contents of the 'ScopeofTasks'.

Text onClick → Dialog (Blurred for confidential reasons)



Based on meetings with managers and team leads a list of filters that would be important for them was drawn out. The filters were implemented in JavaScript and placed in a MasterView side bar. By having the filters in the side bar this allows the table to show the maximum amount of information meaning the usability of it would be at its best. Using JSON for a countries list meant that suggested search can be implemented for the countries filter.

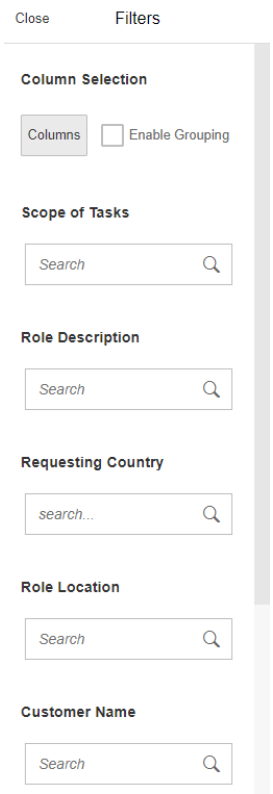


figure. Filters bar

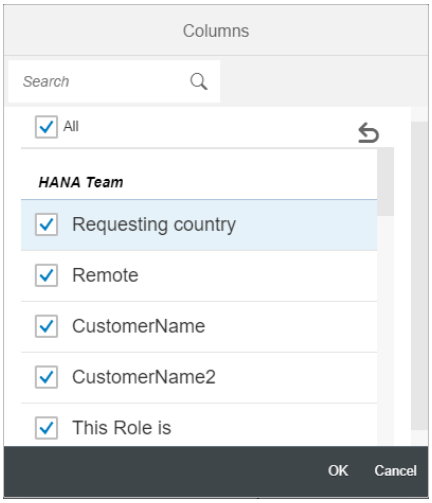


figure. Column filter

The table has 24 columns in it but only a specific amount of these tables will be of use for the managers and team leads and so a column filter was added. This filter allows the user to choose which columns to display and allows the columns to be moved around, additionally the column filter means that when the table is launched only the important columns are preselected.

Finally in-order for the table to be updated with new data an upload feature was added. At the front-end is the upload button where a CSV file is chosen, it is then read in as a string and is split by new line creating rows then split again by commas to create columns this is then sent to the back-end xsjs service using ajax. The back-end then receives the rows and columns from the file uploaded and inserts them through an upsert which checks that there are no duplicates with the current table data before inserting it into the table. To prevent SQL injection a prepared statement was used with variable binding, the SQL Code is defined then the parameters are sent to it. This is adds a layer of protection to ensure that any malicious or accidental SQL injection will not affect the table or insert.

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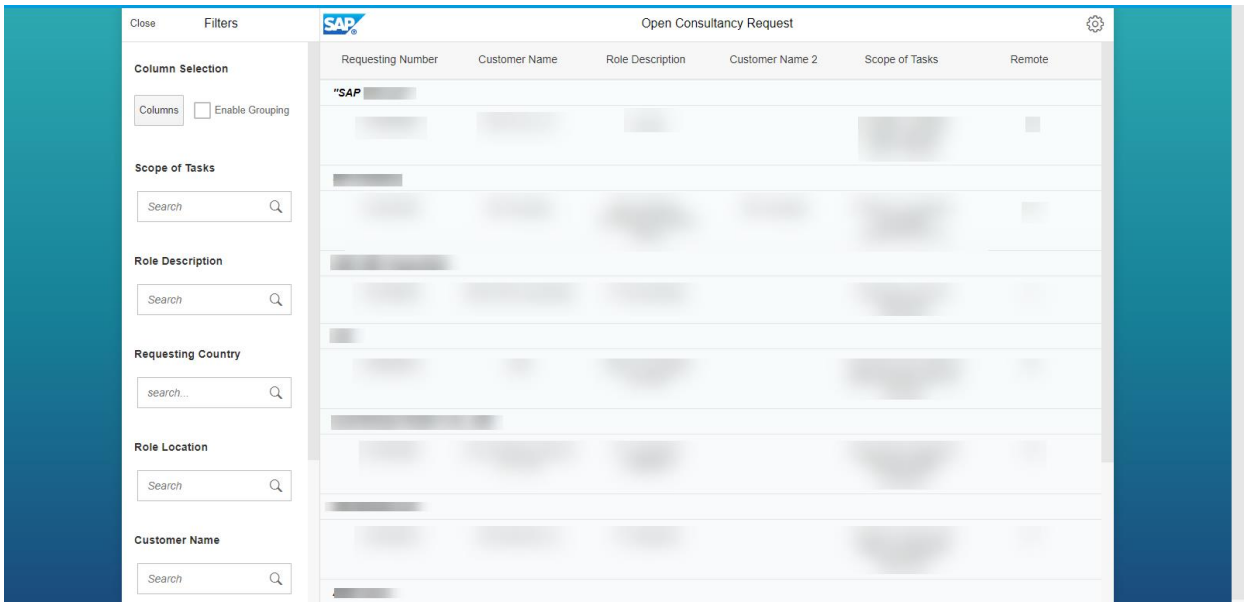

SAP as an industry placement really seek to inform their interns and new hires about the importance of privacy and security when working. At the start of the internship there was multiple online lessons and some in person talks about security and insuring that all of the interns understood its importance. Some of the measures SAP uses for their security is a secure network which means that customer connections and certain applications cannot be accessed unless the user is connected to the SAP network. If one wishes to connect remotely to the network than they must use a VPN that can be accessed with a special code device that all employees are given. This insures that no one who isn't authorised to access the network or customer connections is allowed to connect to them. The laptops given to employees run special daily checks to insure no malware or unauthorised application or programmes are

running on them adding another layer of protection. The most basic form of privacy measure SAP take is the access cards for buildings that only SAP employees have.

As for legal issues employees are all required to sign a Non-Disclosure Agreement, this is a confidentiality agreement that the employee will not share any of the company's internal information regardless if it is sensitive or not. SAP have a requirement for all their documents, presentations and emails to be noted as Internal or not, what this means is that if a document is deemed as internal than it is regarded as sensitive information and employees are to be careful when dealing with it.

Many processes in SAP require documentation, after talking to a customer an email detailing the conversation should be written out and sent. Services require a lot of documentation and a lot of the information is regarded as sensitive information, this documentation is also the same for projects where an operation manual must be written out. The reason for this is to allow other employees to have a further understanding of the project or in the case of a service this allows the customer to know exactly what operations were carried out on their system.

As interns this level of security and privacy is very beneficial for our learning and many aspects of it can be applied to our future projects to aid with adding a layer of protection and having good documentation.

A Typical Day

The first month of the internship all the interns were at training and so a typical day included breakfast at SAP before work then followed by 3 hours of interactive learning. The subject or material was dependant on the course that SAP was providing. Lunch followed after, SAP provide all of their employees with free lunch and various options to choose from. Once lunch is complete another 3 hours of lessons then some quiz questions that would help with the understanding of the material that would be assessed on Friday.

At the COE BW team a typical day included reading and learning about the different aspects of BW. Some of my other colleagues would sit with me and give me one on one lessons for the HANA Database and how it is used with BW and the different breakdowns of objects in the BW work space. In-order to learn about the varies types of services that the BW team deliver to customers I shadow some of my colleagues and try to help them as a Novice for the service. Lastly working on the step by step tutorial on 'Flatfile Data loading, Modelling and Querying on SAP BW, HANA and BEx Query Designer', this is with the aid of my partner that is a new hire for the BW team.

As part of the COE HANA DNA team a typical day consisted of working on the OCR project with my partner. Every morning we look at what we did previously and we discuss what we will aim to achieve for today and the following days. The manager and two team leads come to the HANA DNA team's intern room and discuss with all of us about the project and what we plan to do and what they would like to see implemented. Then the work between me and my partner is split and we begin to work on the project and debugging to try complete one goal at a time.

Critical Analysis

Goals:

During the write up for my original soft skills goals I said that I would like to become more confident speaking in front of a large group and I would like to be more organized and ask more questions. With the OCR project I have had three major presentations in front of large crowds. These presentations were the Alpha Release, Beta Release and the Go Live Release. The presentations were in front of managers, team leads and other members of our teams, the final release was also presented to the head of COE Dublin so it was very big and important. As for being organised the projects required us to work in teams and forced us to be more organised in our coding, commenting and work space. SAP has a culture of openly asking questions to anyone and so I found it very easy to approach people when I had a problem with my project, this helped me a lot.

The soft skills I learnt will be especially helpful for final year of college as the presentation of my final year project will carry a great deal of the marks and having done so many presentations at SAP I feel much more confident when speaking about my code.

For my original technical skill goals I said that I would like to strengthen my database skills and understanding and be able to apply my database skills in a future project. Working as part of the BW team has allowed me to do that as I have had to work with the HANA Database when performing optimization services for customers but also the OCR project involved the ODATA Database which can be used with SQL, jquery and ajax which ties in with my database module as all of the queries I needed to perform were learnt from that module such as an UPSERT and creating prepared statements to deal with situations such as SQL injection.

When writing the original technical skill goals I didn't consider that I might be doing a project that involved using JavaScript, XML, HTML, CSS. Now that the project is complete I have realized that I would like to set a new goal for myself to better learn how to use all of these programming languages when making a new project in the future. Initially when I first started the project I used one Javascript file as both the view and the controller but upon reading and learning more about the different languages I decided to split the view and the controlled to XML and Javascript using the MVC architecture. This helped me a lot and I would like to do a new project where I explore this method in more depth.

For final year of college I feel that these skills will be crucial as I learnt to use different OOP concepts practically and carrying over the experience from my work in SAP I will be able to develop further in using new concepts and applying them where needed.

The OCR project has taught me many things in order to improve the quality and reliability of my work for final year. I have learnt the importance of documenting my work well and using comments for myself and others to ensure that I understand every step in the code. Another thing that I learnt to rely on heavily during my project is console logs and error

handling to ensure that I know if anything goes wrong in my code and prevent the project from crashing. Try and catch have become a must for any of my functions.

My role at SAP has changed drastically since starting as I have moved from the COE BW team to the HANA DNA team. The first focused on providing four different services that are consultancy, optimization, support and upskilling. These are all customer based and worked heavily with databases and queries. As for the HANA DNA team the project was a little more diverse as to how I can approach it. I used many familiar languages and my role was to create an end product that can be used at SAP.

When working on the OCR project I had a lot of difficulty with the ajax calls and using SQL within JavaScript as I didn't fully understand it. Using databases effectively in a project can make a huge difference and I feel that I need to work on that more especially for final year and to implement databases into my final year project.

DIT Placement

DIT enabled the students applying for internships by providing classes and workshops to help with the interviews and CVs. This was a very important step as it allowed the students to express themselves correctly and demonstrate their strengths. Previews of past student experiences and demonstrations of how a correctly made CV and LinkedIn page really helped put into perspective what was expected of the students. DIT also provided a service to the students that allowed them to send their CV and have it corrected and the student would receive feedback about their CV this was especially good as it allowed students to receive constructive criticism about their work and help them move forward.

An improvement that could have been made would be to tell students in advance when they receive an offer. In the case for SAP the students received less than a 24hour notice about their interview and that added a lot of stress to them. Another concern that I have heard of is a student not being notified about a phone interview and being surprised by the call and not knowing what to reply. These things should be avoided and students should know in advance of an interview when to expect calls.

Conclusion

DIT enabled its students by giving them the tools to prepare for the upcoming industry placement. SAP as a company has been very engaging during my industry placement and has allowed me to learn many new technical skills such as database technology, JavaScript, XML, Ajax, HTML and CSS alongside empowering my soft skills and allowing me to become more confident in giving presentations and talking about my work. My experience here has been very fulfilling as I had the opportunity to work in two different teams and learn about the different aspects of working at SAP. I found that trying out different teams was a great decision and it is something I would recommend for future interns. The first team gave me a further understanding for query optimization and efficiency while the second team taught me about the importance of the Model-View-Controller architecture and how to implement it correctly while also working with a database. In conclusion, this internship has been very engaging and beneficial in increasing my understanding of the work expected in the IT Industry and it will be a point of reference for me when moving forward into industry. This opportunity has been fundamental in my growth as a Computer Scientist and will greatly benefit me in my final year and when I am deciding on a career after college

Industry Supervisor's Student Appraisal Form

Student Name Yassr Shaar **Course(Eg:DTxxx):** DT211C/3

Company SAP
Supervisor Jim Byrne
Telephone 086 - 0412955
E- mail jim.byrne@sap.com
Start Date 30/Jan/17 **Finish Date:** 25 Aug 17

Appraisal

Attribute	Unacceptable	Weak	Acceptable	Good	Excellent
Punctuality					✓
Attendance					✓
Time Management					✓
Communication Skill				✓	✓
Technical Writing					✓
Productivity					✓
Willingness to Learn				✓	✓
Ability to Learn				✓	
Initiative					✓
Attention to Detail				✓	
Creativity				✓	
Technical Ability				✓	
Teamwork Attributes					✓
Willingness to Help					✓
Adaptability					✓
Other :					

Overall Comments on Student:

Overall we were very happy with the quality and commitment demonstrated by Yassr during his internship. Yassr successfully passed the relevant certifications and was keen and very willing to upskill and become involved in projects. We hope to see Yassr back in SAP after his studies.

Signed: Jim Byrne