**Undergraduate Work Placement Programme**

**School of Computer Science & Information Technology**

**University College Cork**

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| --- | --- |
| **Student Name** | Nathan Crowley |
| **Student Number** | 118429092 |
| **Company Name** | Clearstream Global Securities Services Ltd |
| **Company Address** | Cork Docklands South, |
| **Company Address** | Albert Quay, Centre, |
| **Company Address** | Cork, Ireland. |
| **Workplace Mentor** | Colum O’Riordan & Martin Allen |
| **Academic Mentor** | Frank Boehme |

**Week 1 (22 March – 26 March)**

**Mon: *Tasks/Activity/Training:***

* HR gave office building tour.
* HR presentations on codes of conduct.
* Presentations on Clearstream’s broad business & departments.

***Skills Learned*:**

* Company knowledge.
* Fund is an investment vehicle. (Hedge/Mutual)

**Tue: *Tasks/Activity/Training:***

* Meeting with Peter & Colum.
* Begin setup with help from Peter.
* Set up “SafeNet MobilePASS” used to generate access tokens.

***Skills Learned:***

* Internally virtual machines (VM’s) are referred to as VDI.

**Wed: *Tasks/Activity/Training:***

* Set up IntelliJ IDE & Git installed.
* Meeting with team at 10am.
* First team meeting sits along.

***Skills Learned:***

* The daily meeting processes.

**Thurs: *Tasks/Activity/Training:***

* Daily stand-up at 10am.
* IT community meeting at 2pm.
* Setup & catch-up meeting at 5pm.
* Set up Maven & environment variables in windows.
* Configured Maven profiles

***Skills Learned:***

* Process to create and map environment variables.

**Fri: *Tasks/Activity/Training:***

* Daily stand-up at 10am.
* Quiz at 4pm – Friday Fun.
* Meeting with Martin at 3.30pm.
* Phone call with HR about CATS.
* Sent IT ticket about CATS access problems.

***Skills Learned:***

* Internal ticketing system & CATS system for logging hours worked.

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**Week 2 (29 March – 2 April)**

**Mon:** ***Tasks/Activity/Training:***

* 5pm meeting with Colum.
* Dev manager is Martin.
* Outline of the jobs over the 6-month placement.

***Skills Learned:***

* Java & Oracle for backend, React & Angular for frontend.

**Tue: *Tasks/Activity/Training:***

* Email Academic mentor to introduce myself.
* Continue work on ‘Install Guide’ & set up process.
* New starter meeting at 2.30pm.

***Skills Learned:***

* What is JBoss servers and how to download & install.

**Wed: *Tasks/Activity/Training:***

* 3.30pm meeting with Martin.
* Presentation on Clearstream’s business and common clients.

***Skills Learned:***

* Cork office is mostly dealing with Hedge Funds.
* No money is transferred just securities.

**Thurs: *Tasks/Activity/Training:***

* Shown how JCCS & CCS operates.
* Flow diagram of Clearstream business model.

***Skills Learned:***

* How the company works and how difference inner processes work such as Contract notes being sent to confirm the transfer of securities.

**Fri: *Tasks/Activity/Training:***

* Scrum meeting at 10am
* Hydrogen meeting at 10.30am.
* JBoss up and running on the VDI.

***Skills Learned:***

* How to implement a JBoss server and configuration.

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**Week 3 (5 April – 10 April)**

**Mon:** ***Tasks/Activity/Training:***

* JBoss installed and working.
* Apache ActiveMQ installed and working.
* Email Peter about CATS access errors.

***Skills Learned:***

* What apache ActiveMQ is.
* How to start it through terminal commands inside IntelliJ.

**Tue: *Tasks/Activity/Training:***

* Stock market meeting 3pm.
* Deutsche Boerse Group (DGB) one of the largest operators in the world.
  + Over 9,000 employees.
  + Services Offered:
    - Pre-IPO
    - Trading
    - Clearing
    - Settlement & Custody [Clearstream]
    - Market data & tech-based services [Clearstream]
    - Information Technology
* Rang help desk about One drive insufficient memory issue.

***Skills Learned:***

* Trading systems – Pre-Trading/Trading/Post Trading.
* Dividends – part of profit paid to shareholders.
* Market segments & indices – Blue-chip indices prime standard (DAX/MDAX/SDAX)

**Wed: *Tasks/Activity/Training:***

* Daily stand-up at 10am.
* Entered CATS hours for first time.

***Skills Learned:***

* Log work hours through CATS system inside App Launcher.

**Thurs: *Tasks/Activity/Training:***

* Daily stand-up at 10am.
* Meeting with Martin about cutovers.
* Meeting with Denise for running and deploy SQL script.

***Skills Learned:***

* Cutovers and how to create SQL scripts inside Oracle developer.

**Fri: *Tasks/Activity/Training:***

* Daily stand-up at 10am.
* Won the Friday quiz!!

***Skills Learned:***

* Improved communication skills participating in the weekly quiz with the team.

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**Week 4 (12 April – 16 April)**

**Mon:** ***Tasks/Activity/Training:***

* Create SQL script that updates LK\_EMAIL\_TEMPLATES database of automated internal emails.
* Add to each automated email a placeholder for confidential text. [ConfidentialText].

***Skills Learned:***

* Cutovers and how to create SQL scripts inside Oracle developer.

**Tue: *Tasks/Activity/Training:***

* Update JCCS Java and XML code.
* Java code is used to retrieve a string from the XML and replace the [ConfidentialText] with this string.
* Created Getters & Setters for the Java code as well as adding @BeanPropertySetters to link the XML.

***Skills Learned:***

* Created first code to be used in the next release implementing Java,XML and SQL.

**Wed: *Tasks/Activity/Training:***

* Learn the process of executing a cutover.
* Use ‘Putty’ to transfer my updated 2107 folder to the Dev environment.
* Perform DDL/DML checks using SOAP UI.

***Skills Learned:***

* DDL/DML checks and how to test cutovers with SOAP UI.

**Thurs: *Tasks/Activity/Training:***

* Update *run\_cutover.sh* to contain ‘echo…execute…echo’ to execute the cutover.
* Add ‘transactions’ to my SQL. (Begin…Commit…Rollback)
* Meeting with Denise on how JCCS&CCS interact.

***Skills Learned:***

* How ‘transactions can improve SQL.
* How to execute cutover script.

**Fri: *Tasks/Activity/Training:***

* Tasked with arranging and generating a general knowledge quiz for the team’s weekly Friday fun.

***Skills Learned:***

* Good interaction with the team and good way to introduce myself through hosting the quiz.

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**Week 5 (19 April – 23 April)**

**Mon:** ***Tasks/Activity/Training:***

* Shown the process for committing to Dev.

***Skills Learned*:**

* GitHub ‘shelf’ can help you set aside some work and return to it.

**Tue: *Tasks/Activity/Training:***

* Daily stand-up.
* Fetch & rebase the most recent IFS2107.

***Skills Learned:***

* GitHub pull process for JCCS using IntelliJ.

**Wed: *Tasks/Activity/Training:***

* Daily stand-up.
* Commit my cutover script and Java/XML changes.

***Skills Learned:***

* GitHub’s commit process through IntelliJ.

**Thurs: *Tasks/Activity/Training:***

* Daily stand-up.

***Skills Learned:***

* Any #300 error solved with instructions inside ‘readme\_DBPrepSteps.txt’ - /local/jcssbin/JCCS\_CUTOVER.

**Fri: *Tasks/Activity/Training:***

* Daily stand-up.
* Friday Fun Quiz.

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**Week 6 (26 April – 30 April)**

**Mon:** ***Tasks/Activity/Training:***

* Meeting with Martin on next project.
* Look at how Mr. T (MessageTransformationEngine) fits into the overall business structure.

***Skills Learned*:**

* Position = positive share balance.
* Mr. T = component to Transformation routing.

**Tue: *Tasks/Activity/Training:***

* Create HTML form ‘file uploader’ in Java.
* Allow Devs to drop files directly into Mr. T speeding up production.

***Skills Learned:***

* Creating an application inside JCCs.

**Wed: *Tasks/Activity/Training:***

* Java JSP form to be created to allow user to select a file/files for upload to Mr. T.
* Send a response to the user confirming their file has been uploaded.

***Skills Learned:***

* What is a Java Servlet /JSP?
* JSP is just a HTML form that allows you to easily create web content that has both static and dynamic components.

**Thurs: *Tasks/Activity/Training:***

* Create a Java Servlet to the handle the actual process of taking in the input file, and outputting it to the correct directory inside Mr. T.
* Add JSP & Servlet to JCCS.

***Skills Learned:***

* Java Servlets used to extend the capabilities of a server.
* How to implement a Servlet into JCCS.

**Fri: *Tasks/Activity/Training:***

* Test the MR. T file uploader locally first to ensure files are not corrupted and are transmitted correctly.

***Skills Learned:***

* Deploying to JCCS localhost and test my components.

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**Week 7 (3 May – 7 May)**

**Mon:** ***Tasks/Activity/Training:***

* Create Java Servlet:

1. Get user’s file.
2. Create Input Stream to retrieve the file.
3. Upload to ‘jccsbin/jcss/data/messagetransformationengine’.
4. Create output HTML response.
5. Map ‘/upload’ URL to servlet.

***Skills Learned*:**

* Servlet development.

**Tue: *Tasks/Activity/Training:***

* Add FileUploadAction.java (Servlet) to CCSEngineWAR/java/web/fileUpload.
* Add file-upload.jsp (JSP) to CCSEngineWAR/webapp/WEB-INF/content/web/fileUpload.

***Skills Learned:***

* WAR files and how to deploy to JCCS.

**Wed: *Tasks/Activity/Training:***

* Create Java JSP:

1. Set *method* to “POST”.
2. Set *enctype* to “multipart/form-data”.
3. Set *action* to ‘/fileupload/\*’.
4. Add HTML form file input tag.
5. Create HTML form submit button.

***Skills Learned:***

* HTML form syntax.
* Ensuring the action=”/fileupload/\*” matches the <url-pattern> in the web.xml.

**Thurs: *Tasks/Activity/Training:***

* Redeploy the CCSEngineEAR file.
* Create link to test code.
* Change file path from ‘testDir’ to ‘realDir’.

***Skills Learned:***

* Testing JSP and Servlets.

**Fri: *Tasks/Activity/Training:***

* Friday fun Quiz.
* Research JSP and Servlet development.

***Skills Learned:***

* Java web and servlet development process.

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**Week 8 (10 May – 14 May)**

**Mon:** ***Tasks/Activity/Training:***

* Further Java research for file uploader.

***Skills Learned*:**

* Research skills.

**Tue: *Tasks/Activity/Training:***

* Further Java research for file uploader.

***Skills Learned:***

* Research skills.

**Wed: *Tasks/Activity/Training:***

* Must override the ‘doPost’ method for handling the file input.
* Create File objects to store the input.
* Create Java Iterator to iterate over the input file and relocate it to Mr. T.

***Skills Learned:***

* Exception handling for Java servlet.

**Thurs: *Tasks/Activity/Training:***

* Project may need two .jar files to be added to ‘WebContent/WEB-INF/lib’.
  + Commons-fileupload-1.3.1.jar
  + Org.apache.commons.io.jar

***Skills Learned:***

* How to add external jars to the IntelliJ JCCS project.

**Fri: *Tasks/Activity/Training:***

* Deploy project in JCCS localhost.
* Update JCCs URL to ‘https://localhost:8443/ccs/web/fileupload/fileupload.do’ to point to the JSP.

***Skills Learned:***

* Process of deploying project to localhost.
* Opening my code inside JCCS localhost.

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**Week 9 (17 May – 21 May)**

**Mon:** ***Tasks/Activity/Training:***

* Committed JSP & Servlet to JCSS.
* Test file upload on Dev.

***Skills Learned*:**

* JCCS Dev testing.

**Tue: *Tasks/Activity/Training:***

* Completed the SOAP UI testing for cutover’s java code.

***Skills Learned:***

* SOAP UI testing.

**Wed: *Tasks/Activity/Training:***

* Catch up meeting with Martin on Mr. T file uploader.
* Add @Action result (location = fax.jsp).
* Look at fax.jsp & servlet for the syntax of a JSP and servlet and how they interact.

***Skills Learned:***

* @Action and its role in @Result inside the JSP.

**Thurs: *Tasks/Activity/Training:***

* Updated the doPOST() method inside the servlet for file input processing.
* Added the ‘include’ properties to the top of the JSP.

***Skills Learned:***

**Fri: *Tasks/Activity/Training:***

* To deploy to Dev:

1. Run the ‘vmdevgss3’ maven build.
2. Copy ‘JCCS\_PreDelivery’ from ‘cs.jccs/distribution/target’.
   * + ‘/tmp’ using WinSCP.
3. Once copied to ‘/tmp’ open Putty.
4. Inside putty **cd ...** to **/**.
5. **cd /local/jcssbin** and run deploy2107.sh.
6. Expected last line is “CLI result is: ‘result’ => ‘running’”
7. Check health at “http://vmdevgcss3:8080/ccs/health-check.do”

***Skills Learned:***

* Deploying to Dev.
* Health checking.

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**Week 10 (24 May – 28 May)**

**Mon:** ***Tasks/Activity/Training:***

* Daily stand up.
* Check that deployment to Dev was completed correctly.

***Skills Learned*:**

* Internal Deployment process.
* Sub custodian is a bank that provides safe keeping in domestic markets to another custodian.

**Tue: *Tasks/Activity/Training:***

* Fund / Financial management meeting.

***Skills Learned:***

* Mutual Funds and their key features. Such as:
  + Small initial investment.
  + Cash is readily available.
  + Policies are narrowly defined.

**Wed: *Tasks/Activity/Training:***

* Daily stand-up.
* Operational Functions meeting.

***Skills Learned:***

* Clearstream aims to be a ‘one-stop-shop’ that offers both functionality for Mutual and Hedge funds.
* **Vestima Plus**  **= Mutual funds.**
* **Vestima Prime**  **= Hedge funds.**
* Hedge funds are high risk investment vehicle.
  + Aggressively managed.
  + Both domestic & international.
  + Consistent high level of return.

**Thurs: *Tasks/Activity/Training:***

* Daily stand-up.
* Trading process meeting.

***Skills Learned:***

* Client places order via Vestima Prime.
* Trade loaded to CCS & enriched with Fund rules.
* Ensure accuracy f orders & adhere to Fund rules.
* Once all Authorized, place the trade (OTF – order to fund).
* Client advised trade is being processed (OTC – order to client).

**Fri: *Tasks/Activity/Training:***

* Friday Fun Quiz.

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**Week 11 (31 May – 4 June)**

**Mon:** ***Tasks/Activity/Training:***

* Meeting with Martin.
* Given task of updating ‘Fund Audit Report’ JCCS page.
* Export button creates a **xlsx file** that needs to contain confidential placeholder in the generated file name.

***Skills Learned*:**

* Solved **xlsx file** by updated the FundAuditReport java source code inside JCCS.

**Tue: *Tasks/Activity/Training:***

* Meeting on the JIRA internal ticketing process.
* JIRA is a software work management tool for a wide range of use cases.

***Skills Learned:***

* JIRA terminology.

**Wed: *Tasks/Activity/Training:***

* JIRA meeting.
* JIRA is great for tracking defects + other internal problems.

***Skills Learned:***

* JIRA process:
  + Ticket is assigned to a developer.
  + Read description and solve the issue.
  + Commit changes.
  + Review started – Link code change & your solution commit url.

**Thurs: *Tasks/Activity/Training:***

* Research for JIRA task.

**Fri: *Tasks/Activity/Training:***

* *Friday fun quiz*
* *Complete confidential placeholder JIRA issued to me.*
* *Committed first JIRA.*

***Skills Learned:***

* First time completing JIRA process.

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**Week 12 (7 June – 11 June)**

**Mon:** ***Tasks/Activity/Training:***

* Daily stand-up.
* Check JIRA system for assigned tickets.

***Skills Learned*:**

* + - JIRA ticketing system.

**Tue: *Tasks/Activity/Training:***

* Prepare for upcoming meeting with Martin about DMS?

**Wed - Fri:** ***Tasks/Activity/Training:***

* Clearstream Cork culture induction meeting.

***Skills Learned:***

* + - 2018 company culture started.
    - Clearstream values customers, results, people, community.
    - With customers engage with them and add value to their business.
    - Management focus on Honest & Integrity, Work as team, Customer focus.
    - Company culture has great events such as: Virtual Quiz, raised €20,000 for charities, Mindfulness with Brezzie, etc.

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**Week 13 (14 June – 18 June)**

***Tasks/Activity/Training:***

* Daily stand ups.
* Prevention of Fraud refresher presentation 2020.
* Fraud Prevention interactive training.
* Requiring a completion rate of 80% or higher to pass the assessment.

***Skills Learned*:**

* Fraud is any attempt to gain funds or information by deception or other illegal means, whether acting alone or in collusion with other parties
* Fraud Prevention training began 2017.
* Learnt regulatory controls and internal policies and procedures.
* Risks of fraud and how to spot and report any irregularities.

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**Week 14 (21 June – 25 June)**

***Tasks/Activity/Training:***

* Began research on the Document Management System, to be used for new IFS Document Library.
* Research REST API and how to store, retrieve and view documents.
* Preference on Cloud capabilities and open source.

***Skills Learned*:**

* + How to structure a professional report and effectively present a matrix of options of DMS.

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**Week 15 (28 June – 2 July)**

**Monday to Friday:**

***Tasks/Activity/Training:***

* Continued Research on Document Management System.

***Skills Learned*:**

* + A Document Management System is a system or process to capture, track, and store electronic documents.
  + How to choose a suitable DMS. Determine your needs, which vendor to choose, manage workflow, etc.
  + Prioritise Security, verify support options.

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**Week 16 (5 July – 9 July)**

**Mon:** ***Tasks/Activity/Training:***

* Daily stand-up meeting.
* Meeting with Siobhan at 2.

**Tue: *Tasks/Activity/Training:***

* Prepare for presentation to Senior management and HR.
* Student 4 Student PowerPoint presentation on Friday.

***Skills Learned:***

* + - In presentation include:
      * Introduce yourself.
      * What college / college course.
      * What Department in Clearstream.
      * What HAVE you done so far?
      * What WILL you do for the next 3 months,
      * What you enjoyed.
      * What can be improved.

**Wed: *Tasks/Activity/Training:***

* Prepare for Student 4 Student presentation.

***Skills Learned:***

**Thurs: *Tasks/Activity/Training:***

* Prepare for Student 4 Student presentation.
* Send copy to Siobhan as backup.
* At end ask other interns questions, expect questions from management,

***Skills Learned:***

**Fri: *Tasks/Activity/Training:***

* Student 4 Student PowerPoint presentation to HR and Senior management at 10 o'clock.
* Presentation went well, got asked question from Mr.Brosnan top management.

***Skills Learned:***

* + - Presentation skills improvement.

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**Week 17 (12 July – 16 July)**

**Monday to Friday:**

***Tasks/Activity/Training:***

* + - Daily stand ups.
    - GDPR Overview meeting & presentation.
      * Who to report Data Protection & GDPR breaches to?
      * What is GDPR?
      * How GDPR & Data Protection differ?
      * Examples of breaches and their penalties?

***Skills Learned*:**

* + - GDPR is any information that could identify a living person.
    - GDPR relates to personal information whereas Data Protection relates to generic data breaches.
    - Consequences of breaches

1. Up to €10 million or 2% of annual revenue.
2. Up to €20 million or 4% of global revenue.
3. Individual also has the right to claim.

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**Week 18 (19 July – 23 July)**

**Monday to Friday:**

***Tasks/Activity/Training:***

* + - Daily stand ups.
    - Research of SSH and REST API to be used for future project.
    - Research Standalone Applications and development process.
    - API research related to interacting and using API in backend applications.

***Skills Learned*:**

* + - SSH is a network communication protocol enabling two computers to communicate.
      * Key feature is encrypted communication.
    - SSH client on your local machine connects to SSH server using command line.
    - SSH clients typically support SCP and SFTP for transferring data.
    - Recommended to use SFTP but SCP will work.
    - API give benefit of added computational power.
    - API using HTTP verbs (GET/POST/DELETE/PUT).
    - Constraints for API to be RESTful:
      * Client-server architecture.
      * Statelessness.
      * Layered System.
      * Ability to cache.
      * Uniform design.
      * Code on demand.

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**Week 19 (26 July – 30 July)**

**Mon:** ***Tasks/Activity/Training:***

* Meeting with Martin & Colum on next project after DMS Research.
* Daily stand-up.

**Tue: *Tasks/Activity/Training:***

* Next step is to convert Research to Proof of Concept of DMS.
* Testing the DMS in a virtual machine using REST API.
* Create a Standalone App for testing.

***Skills Learned:***

* + - What is a proof of concept?
    - How to create a standalone app inside a virtual machine.

**Wed: *Tasks/Activity/Training:***

* *Meeting with Colum & Martin for Proof of Concept.*
* *Requirements for Proof of Concept.*

***Skills Learned:***

* + - UI mostly JCCS anyway.
    - API more important.
    - It will sit in the backend using API calls to interact.
    - How does it store the documents, where does it store them?
    - Cloud exposure?

**Thurs: *Tasks/Activity/Training:***

* Prepare for Proof of Concept.

**Fri: *Tasks/Activity/Training:***

* Friday Fun quiz.
* Get virtual machine requirements and ask Colum to create a VM.

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**Week 20 (2 August – 6 August)**

**Mon – Fri:**

***Tasks/Activity/Training:***

* Get VM credentials and test connection with Putty.
* Back in the office this week.
* Catch up with Martin.
* Take a look at a JIRA for filter problem with template-enquirey.do

***Skills Learned*:**

* + Standalone is an app that runs locally and doesn’t require any externals to operate.
  + SSH is the network communication protocol used to let two computers to communicate.

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**Week 21 (9 August – 13 August)**

**Mon:** ***Tasks/Activity/Training:***

* *Filter problem with template.do JIRA.*
* *Daily stand-up.*

**Tue: *Tasks/Activity/Training:***

* UCC mentor meeting with Frank.
* Go over all work completed so far and ran through my projects.

***Skills Learned:***

* + - Professional to college presentation skills.

**Wed - Fri:** ***Tasks/Activity/Training:***

* Learn LogicalDOC Api calls and functionality.
* Work on JIRA.

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**Week 22 (16 August – 20 August)**

**Mon – Fri: Tasks/Activity/Training:**

* Proof of concept theory.
* Test JIRA with (id=172714).
* Use SQL to test JIRA expected outputs.
* Download LogicalDoc and transfer to VM with WinSCP.
* Check LogicalDoc READ.me for info on installation.

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**Week 23 (23 August – 27 August)**

**Mon:** ***Tasks/Activity/Training:***

* Last week before placement completed.
* Daily stand-up.

***Skills Learned*:**

* + - Communication and office skills.

**Tue: *Tasks/Activity/Training:***

* Ask Colum to sign Work placement Report & Logs.

***Skills Learned:***

**Wed: *Tasks/Activity/Training:***

* Ask Colum may I have a reference & potential Graduate programme.
* Explore LogicalDOC API with curl commands.

***Skills Learned:***

* + - API calls with curl command.

**Thurs: *Tasks/Activity/Training:***

* Work on Proof of Concept.

**Fri: *Tasks/Activity/Training:***

* Final day.
* Hand back Laptop & monitor.
* Thank all the staff for a great placement and learning experience.

***Skills Learned:***

* + - Communication, office work routine, working in a team, independent thinking and problem solving.

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