

2017

# Initial Plan

SECURITY CONCERNS WITH THE INTERNET OF THINGS  
BY CHRISTOPHER HUTCHINGS

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**Module:** CM3203 - One Semester Individual Project, 40 credits;

### **Supervisor Roles**

- Provide general advice in weekly supervised meetings
- Provide project advice
- Provide specific advice concerning the project topic

### **Project Description**

The aim of this project is to investigate the security issues within the Internet of Things (IoT). The project is intended to carry out a survey of security concerns that arise in the area. As well as to investigate use of IoT applets from the If-This-Then-That website (IFTTT). It aims to investigate existing recipes in order to extend these to analyse the implications these applications have on security. Showing how these concerns are significant in practice.

IFTTT uses SSL to encrypt information transmitted on their website.

Applets can access all kinds of things from your devices such as social media (Facebook, Twitter, and Instagram), cloud storage (Dropbox, Google Drive) and in-device services such as your phone's camera or messaging service.

I will explore security policies that could be implemented into my own environment similar to IFTTT that would add an extra security layer to potentially overcome the security concerns found within the IFTTT application. Looking at exploring policy engines and how these can be implemented alongside IFTTT.

The project will also include development of my own applets using the website in order to find ways and areas to focus on in order to create my added security measures. These applets will then be used to help develop my own environment which will carry out similar functions as the applets but with the added security mechanisms.

I will be designing an environment similar to IFTTT application so that when a trigger occurs it will first check the origin of the trigger to ensure it is safe before accepting and continuing with it. It will include some sort of channel encryption so that a user can see a channel but not know what the channel does or triggers. As well as ways of adding context so only certain users can view certain applets at specific times for example. This environment will help to solve the concerns of security raised.

A lot of applets on IFTTT are able to provide pinpoint accuracy regarding a user's location. In order to develop and extend this type of applet I would provide some noise and add this to the location of the user in order to not give the user's exact location. The applet I tried out was able to email me a picture of my exact location.

### **Project Aims and Objectives**

The overall aim of this project is to investigate the security concerns within the Internet of Things field by using the website/application If-This-Then-That to, which will allow me to highlight the security concerns and how significant they are in practice and then to create my own application which adds a layer of security to overcome these concerns.

- Research and produce areas of concern for security within the IoT
  - Able to use this to create strategy for applets to use
- Download and install applets from the If-This-Then-That application
  - These applets will be used to demonstrate the security implications
- Create applets using the IFTTT application on my mobile device
  - My mobile device will be used as a gateway for the IoT
- Create/simulate my own environment similar to IFTTT
  - This environment will allow me to create and use similar applets as IFTTT but with an added layer of security to overcome the limitations discussed above
  - Can be used to push back to the IFTTT website
- Explore security policies that could be used
  - Verify the origin of the triggers, encrypted channels, provide users option to create different views for different contexts

## Work plan

<b>Task</b>	<b>Week</b>	<b>Deliverables</b>
<b>Meet with supervisor</b>	<b>Week 1</b> 23 <sup>rd</sup> - 29 <sup>th</sup> Jan	
<b>Complete initial plan of project</b>	<b>Week 2</b> 30 <sup>th</sup> Jan – 05 <sup>th</sup> Feb	Initial Plan
<b>Start background research</b> <ul style="list-style-type: none"> <li>• Security concerns within IoT</li> <li>• Investigate strategy to select applets</li> <li>• Select possible applets to demonstrate concerns</li> <li>• Meeting with supervisor</li> </ul>	<b>Week 2</b> 30 <sup>th</sup> Jan – 05 <sup>th</sup> Feb	Background research  Potential applets that could be used to demonstrate security concerns  Background section
<b>Meeting with supervisor</b>	<b>Week 3</b> 6 <sup>th</sup> – 12 <sup>th</sup> Feb	
<b>Approach</b> <ul style="list-style-type: none"> <li>• Current approaches out there</li> <li>• What my approach will be</li> <li>• How my approach is different and addresses security concerns</li> <li>• Why I have chosen my approach</li> <li>• Decide upon applets that demonstrate security concerns raised</li> </ul>	<b>Week 3/ 4</b>  6 <sup>th</sup> – 12 <sup>th</sup> Feb  13 <sup>th</sup> – 19 <sup>th</sup> Feb	Current solutions that are available in the area.  Existing applets that I will be using  Approach section  Milestone – Deciding upon the applets that clearly show the security concerns within the Internet of Things through the use of IFTTT
<b>Meeting with supervisor/project review</b>	<b>Week 4</b> 13 <sup>th</sup> – 19 <sup>th</sup> Feb	Current project files
<b>Implementation</b> <ul style="list-style-type: none"> <li>• Create my own applets</li> <li>• Design how my applets address limitations</li> <li>• Run the applet using my mobile phone</li> <li>• Start developing my own environment similar to IFTTT</li> </ul>	<b>Week 5/6</b>  20 <sup>th</sup> – 26 <sup>th</sup> Feb  27 <sup>th</sup> Feb – 05 <sup>th</sup> Mar	Images of my created applet  Running of the applet and how it could deal with limitations of existing applets  Milestone – creating and successfully running my own applet  Milestone – developing and simulating a similar environment to IFTTT
<b>Meeting with supervisor</b>	<b>Week 6</b> 27 <sup>th</sup> Feb – 05 <sup>th</sup> Mar	
<b>Testing</b>	<b>Week 7</b>	Test cases

<ul style="list-style-type: none"> <li>• How my applet will be able to demonstrate overcoming security concerns</li> <li>• Test the applets against the criteria set</li> <li>• Provide evidence of applets working with new security measures</li> </ul>	<b>6<sup>th</sup> – 12<sup>th</sup> Mar</b>	Test criteria  Evidence containing screenshots of tests being passed  Milestone – Test section completed and working correctly
<b>Meeting with supervisor</b>	<b>Week 7</b> <b>6<sup>th</sup> – 12<sup>th</sup> Mar</b>	
<b>Evaluation</b> <ul style="list-style-type: none"> <li>• How my solution answers the question of the project</li> <li>• Why my solution is effective and works</li> <li>• Why I chose to do the project in this way</li> <li>• Strengths and weaknesses of the project</li> </ul>	<b>Week 8</b> <b>13<sup>th</sup> – 19<sup>th</sup> Mar</b>	How well the project meets the overall objectives and aims  Evaluation section  Milestone – evaluation section completed
<b>Meeting with supervisor</b>	<b>Week 8</b> <b>13<sup>th</sup> – 19<sup>th</sup> Mar</b>	
<b>Future Work</b> <ul style="list-style-type: none"> <li>• How would I continue to work on the project</li> <li>• Future improvements I could make</li> <li>• How to further develop the solution and problem</li> </ul>	<b>Week 9</b> <b>20<sup>th</sup> – 26<sup>th</sup> Mar</b>	Future work section  Potential areas of concern that may arise during the project
<b>Meeting with supervisor</b>	<b>Week 9</b> <b>20<sup>th</sup> – 26<sup>th</sup> Mar</b>	
<b>Cleaning up</b> <ul style="list-style-type: none"> <li>• Improve upon all sections by applying feedback</li> <li>• Compile reference lists, appendices, figures and images</li> <li>• Acknowledgements</li> </ul>	<b>Week 10</b> <b>27<sup>th</sup> Mar – 02<sup>nd</sup> April</b>	
<b>Final Report</b> <ul style="list-style-type: none"> <li>• Add all sections into one report</li> <li>• Create introduction and conclusion</li> </ul>	<b>Week 11/12</b> <b>03<sup>rd</sup> – 9<sup>th</sup> April</b>  <b>01<sup>st</sup> – 8<sup>th</sup> May</b>	Final Report  Milestone – main body of report completed