



UNIVERSITY *of* LIMERICK
OLLSCOIL LUIMNIGH

Project log Autumn semester Week 6

MEng Information & Network Security

Thomas Flynn

16117743

Project Supervisor: Sean McGrath

10/10/16- 16/10/16

1 Log Entries

1.1 Entry 11/10/16:

Today I collected various bookmarks for researching Bluemix competitors.

1.2 Entry 12/10/16:

Today I read various bookmarks on Bluemix competitors.

1.3 Entry 13/10/16:

Today I setup git repositories on www.github.com as well as commit and push my Semester 1 week 5 log to the website.

I successfully installed Docker on my ubuntu OS.

1.4 Entry 16/10/16:

This week I managed to get a significant amount of research on databases done for my project.

2 Tasks completed:

Collected Bluemix competitor bookmarks.

Read Bluemix competitor bookmarks.

Create Github repositories.

Take photos of hand written notes.

Finish week 5 log.

Installed Docker.

Amazon container service research.

Microsoft Azure container service research.

IBM Bluemix research.

Docker research.

Initial database research.

NoSQL database research.

Neo4j graph database research.

Layout Autumn report.

3 GIT Repositories:

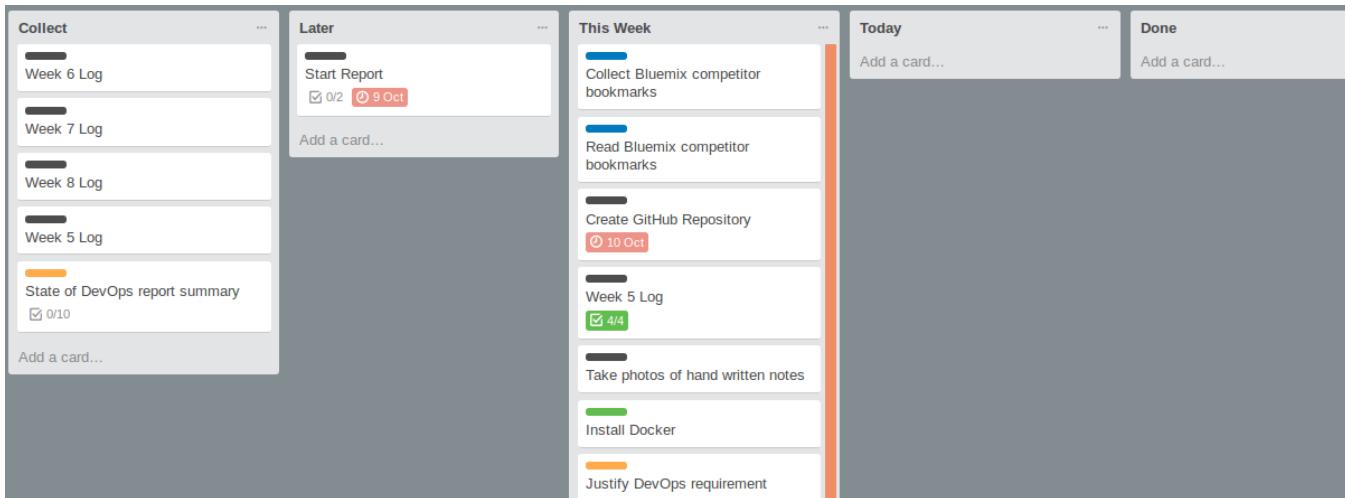
3.1 INS-Thesis-Docmentation

The screenshot shows a GitHub repository page for 'INS-Thesis-Docmentation'. The page includes a navigation bar with links for Code, Issues (0), Pull requests (0), Projects (0), Wiki, Pulse, Graphs, and Settings. It also shows options to Watch (0), Star (0), and copy the URL. A dropdown menu indicates the branch is 'master'. The main content area displays two commit logs. The first log, dated Oct 16, 2016, shows a commit by user 'week-6-log' (16117743) with commit hash '57ddd91'. The second log, dated Oct 13, 2016, shows two commits: one by 'test1' (16117743) with hash '456b15b' and another by 'week-5-log' (16117743) with hash '1847681'.

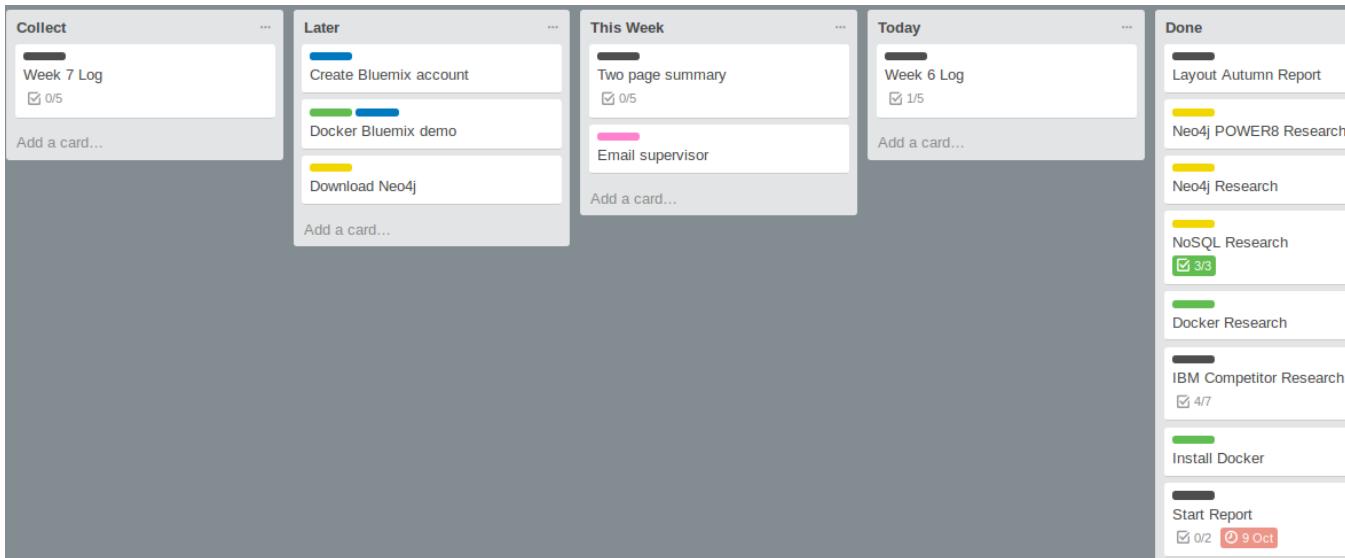
Date	Author	Commit Hash
Oct 16, 2016	week-6-log (16117743)	57ddd91
Oct 13, 2016	test1 (16117743)	456b15b
Oct 13, 2016	week-5-log (16117743)	1847681

4 Trello boards

4.1 Board at the start of the week:

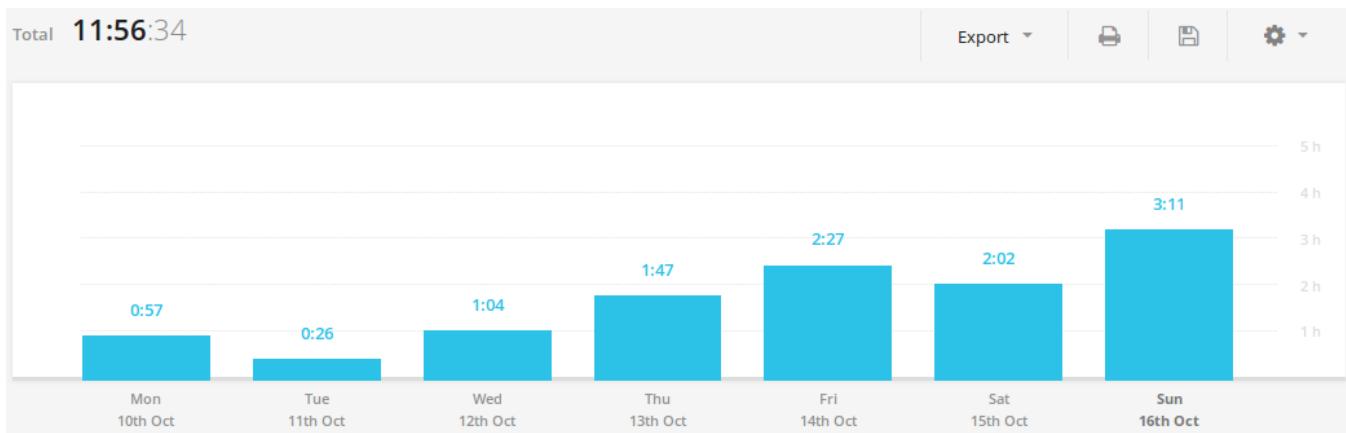


4.2 Board at the end of the week:



5 Toggl Time Logs

5.1 Weekly time Log bar chart:



5.2 Weekly Time Log:

Today 3 h 11 min			
Autumn report	GENERAL	0:53:29	7:40 PM – 8:33 PM
Neo4j Research	DATABASE	1:04:22	5:39 PM – 6:43 PM
Neo4j Research	DATABASE	1:14:00	1:40 PM – 2:54 PM
Yesterday 2 h 02 min			
Autumn report	GENERAL	0:45:20	7:38 PM – 8:23 PM
Database Research	DATABASE	1:16:46	4:37 PM – 5:53 PM
Fri, 14 Oct 2 h 27 min			
Autumn report	GENERAL	1:03:48	3:54 PM – 4:57 PM
Bluemix competitor research	BLUEMIX	1:23:58	12:52 PM – 2:15 PM

Thu, 13 Oct 1 h 47 min

week 6 log	GENERAL	0:19:18	2:27 PM – 2:46 PM
Installing Docker	DOCKER	0:25:29	1:54 PM – 2:20 PM
configuring Git	GENERAL	0:42:42	1:02 PM – 1:44 PM
setting up Github repositories	GENERAL	0:19:54	12:03 PM – 12:22 PM

Wed, 12 Oct 1 h 04 min

reading Bluemix competitor bookmarks	BLUEMIX	1:04:09	8:14 PM – 9:18 PM
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Tue, 11 Oct 0 h 26 min

collecting Bluemix competitor bookmarks	BLUEMIX	0:26:15	7:11 PM – 7:37 PM
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Mon, 10 Oct 0 h 57 min

Week 5 log	GENERAL	0:57:04	7:0  Switch
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5.3 Weekly log Pie Chart:



6 Pictures

6.1 Docker working correctly

```
tom@tom-pc:/etc/apt/sources.list.d$ sudo service docker start
tom@tom-pc:/etc/apt/sources.list.d$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
c04b14da8d14: Pull complete
Digest: sha256:0256e8a36e2070f7bf2d0b0763dbabdd67798512411de4cdcf9431a1feb60fd9
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.
```

6.2 Initial Research page 1

Initial Research

06/10/16

Blue mix is an open-standard, cloud based Public Platform as a Service (PaaS) for ~~bu~~

- 1 - building
- 2 - hosting
- 3 - managing
- 4 - running applications of all types

Docker Mission → "Build, ship and run".

It's a shipping container system for code.

An engine that enables any payload to be encapsulated as a light weight, portable, self-sufficient container.

6.3 Initial Research page 2

Docker Basics

~~Image -~~

~~Image -~~

- A read only snapshot of a container stored in Docker Hub to be used as a template for building containers.

~~Container~~

- The standard unit in which the application service resides or transported.

~~Docker Hub -~~

- Available in SaaS or Enterprise to deploy anywhere.
- Stores, distributes and shares container images.

~~Docker Engine~~

- A program that creates, ships and runs application containers.

- Runs on any physical and virtual machine or server locally, in private or public cloud.

- Client communicates with Engine to execute commands.

~~App portability~~

6.4 Initial Research page 3

Docker Value	IBM Value-add	Customer Value
+ 75000 docker images	<ul style="list-style-type: none"> IBM hosts its registry of IBM images linked to Docker Hub Curated Enterprise-ready images 	- Customers have at their finger tips the images they require.
Self Sufficient LXC container technology	<ul style="list-style-type: none"> Enhanced performance with <u>bare metal</u> deployment Deployment choice with pods & zSpheres. 	Hybrid Cloud choice and flexibility to choose the right mix for their business utilizing the full compliment of Bluemix services.
Build, ship and run Standardized Containers	<ul style="list-style-type: none"> Integrated monitoring & logging Elasticity Life cycle management of containers and data volumes 	<ul style="list-style-type: none"> Docker simplicity and ease of use with the enterprise-level of integrity and confidence to run a business.
Container connections using links and service discovery.	<ul style="list-style-type: none"> Private network communication External IP address 	<ul style="list-style-type: none"> Extends and connects Docker containers to production ready enterprise environments.

Bluemix future

- Bluemix local
- BL... dedicated
- HA for container cloud control plane
- Auto scaling
- Red black deploy
- Analytics & recommendations
- Centralized management of notification service
- Intelligent orchestration and compose
- Further automation of image compliance

6.6 Initial Research of Bluemix page 5

(2)

Q - Do I have to compile an entire new container every time I have a new version and then ship it back to Bluemix?

- You can have a 1 layer (like Ubuntu OS) that might have been updated.

likely → App doesn't work
→ have to ^{update} rebuild again (only have to rebuild app and not underlying layers).

Do I have to choose cloud foundry vs Docker to run my applications in Bluemix, how do I choose between both of them.

Based on your workload and what you need for that particular application, you gonna have to make a choice...

Challenging aspect of Bluemix... too much choice

If you need that portability that containers might offer... depends on workload and what the application needs...

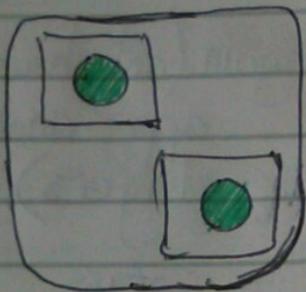
6.7 Initial Research page 6

Microservices Application evolution

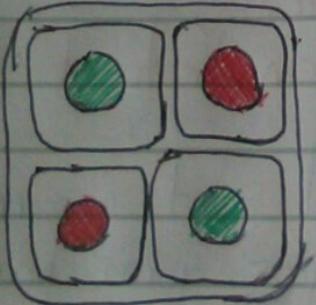
Replacing a monolithic technology stack requires you to re-write the entire application.

- ① Can change the technology stack for an individual service
- ② Stand up new instance of the service
- ③ ↳ if no problems
 ↳ take away old version of that service
 ↳ and migrate across

①

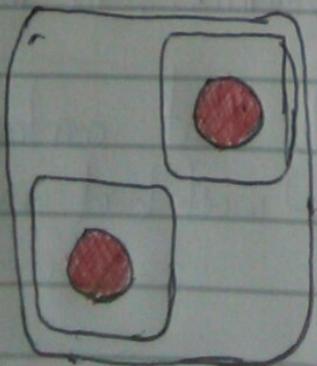


②



→ "Stand up new instance"

③



→ "Replace old if no problems"

6.8 Initial Research page 7

Microservices App Challenges

- increased need for devOps skills among team.
- duplicating effort when lacking communication.
- Operational complexity
- Increased latency
- Fault tolerance
- Eventual consistency
- Service discovery → "in order to invoke one of many Services, we must find an instance of it."
- End to end testing → Teams developing services in parallel,
at what point do you do E2E testing
across those services.