



UNIVERSITY *of* LIMERICK
OLLSCOIL LUIMNIGH

Project log Autumn semester Week 6

MEng Information & Network Security

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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:

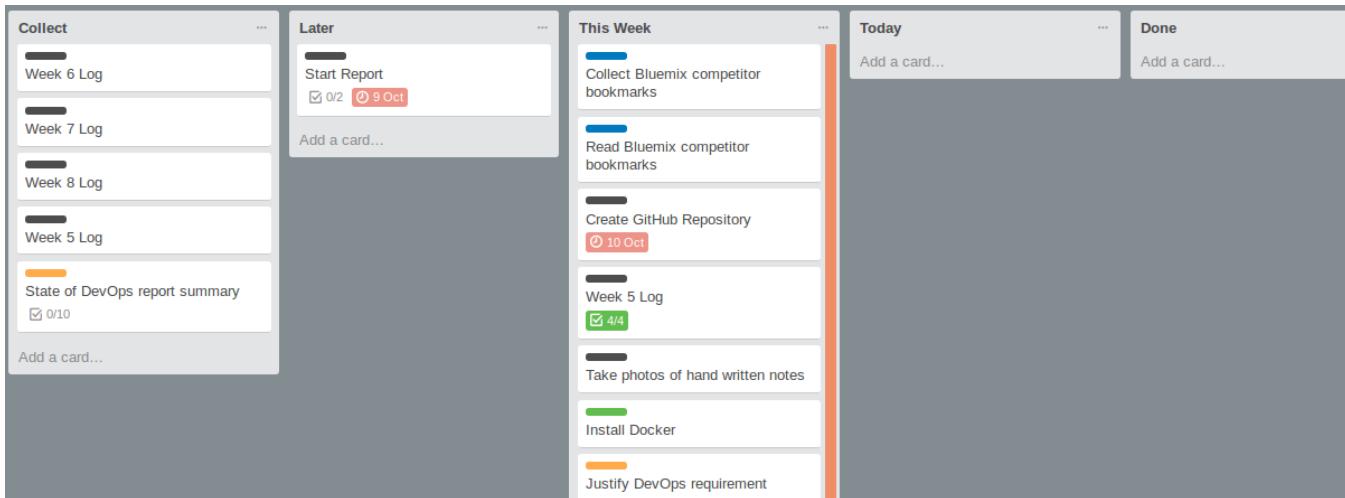
3.1 INS-Thesis-Docmentation

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. A 'Watch' button shows 0 watches, and a 'Star' button shows 0 stars. A 'Branch: master' dropdown is set to '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 commit hash 456b15b, and another by 'week-5-log' (16117743) with commit hash 1847681.

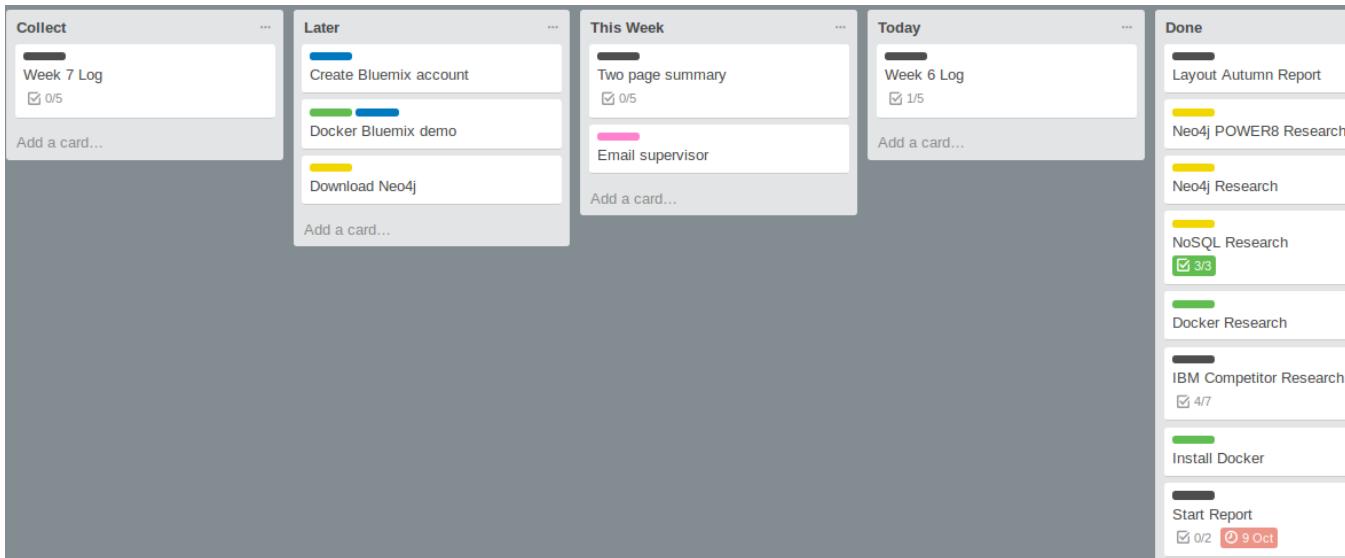
Commit Date	Author	Commit Hash
Oct 16, 2016	week-6-log (16117743)	57ddd91
Oct 13, 2016	test1 (16117743)	456b15b
Oct 13, 2016	week-5-log (16117743)	1847681

4 Trello boards

4.1 Board at the start of the week:

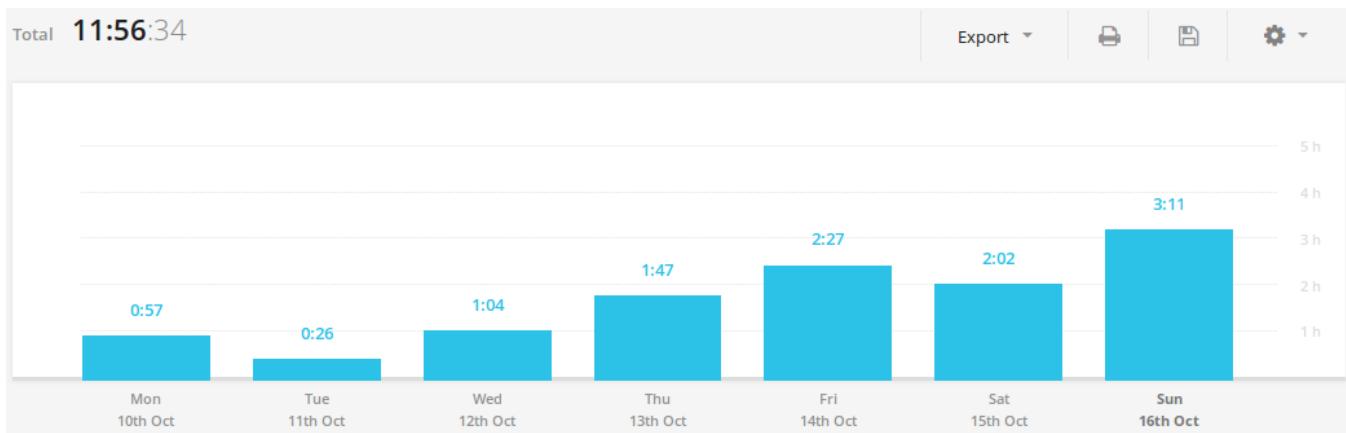


4.2 Board at the end of the week:



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
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↑ Switch

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...

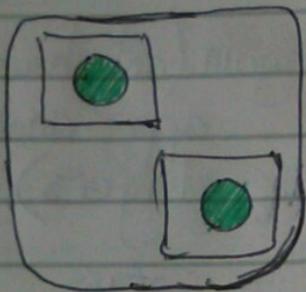
6.7 Initial Research page 6

Microservices Application evolution

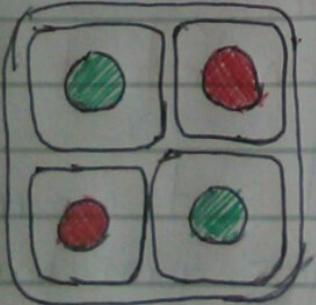
Replacing a monolithic technology stack requires you to re-write the entire application.

- 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

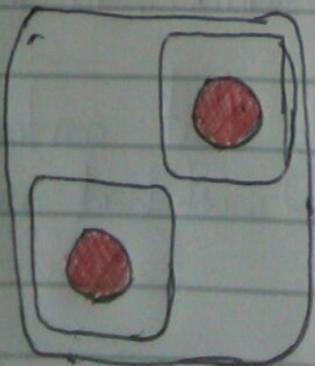


②



→ "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.