

MEng Information & Network Security

Semester 1 Week 6

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10/10/17- 16/10/17

1 Log Entries

1.1 Entry 11/10/17:

Today I collected various bookmarks for researching Bluemix competitors.

1.2 Entry 12/10/17:

Today I read various bookmarks on Bluemix competitors.

1.3 Entry 13/10/17:

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 16/10/17:

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.

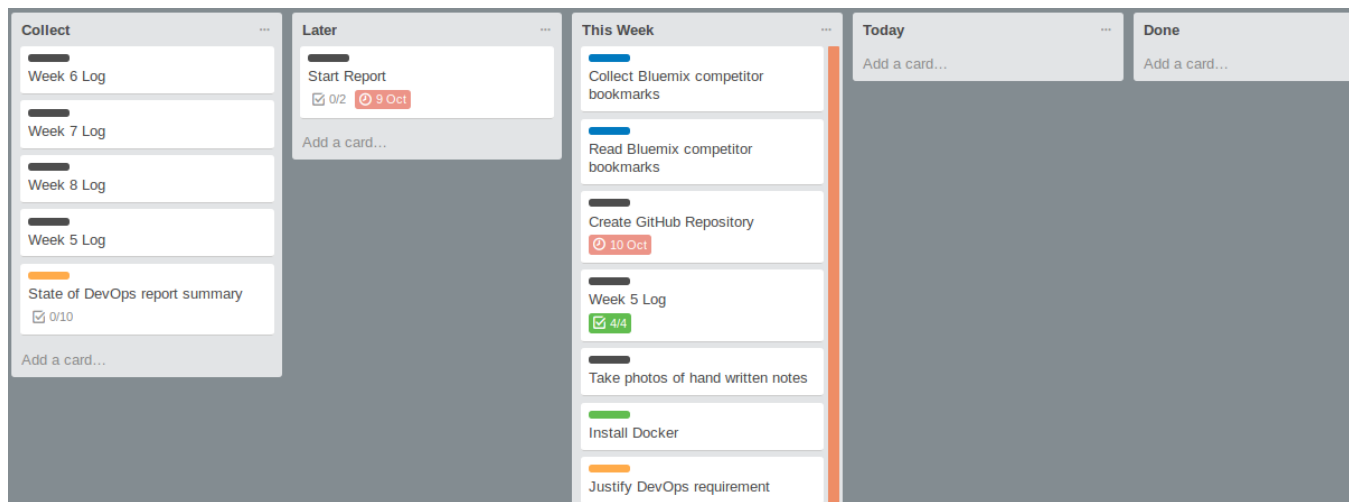
3 GIT Repositories:

3.1 INS-Thesis-Documentation

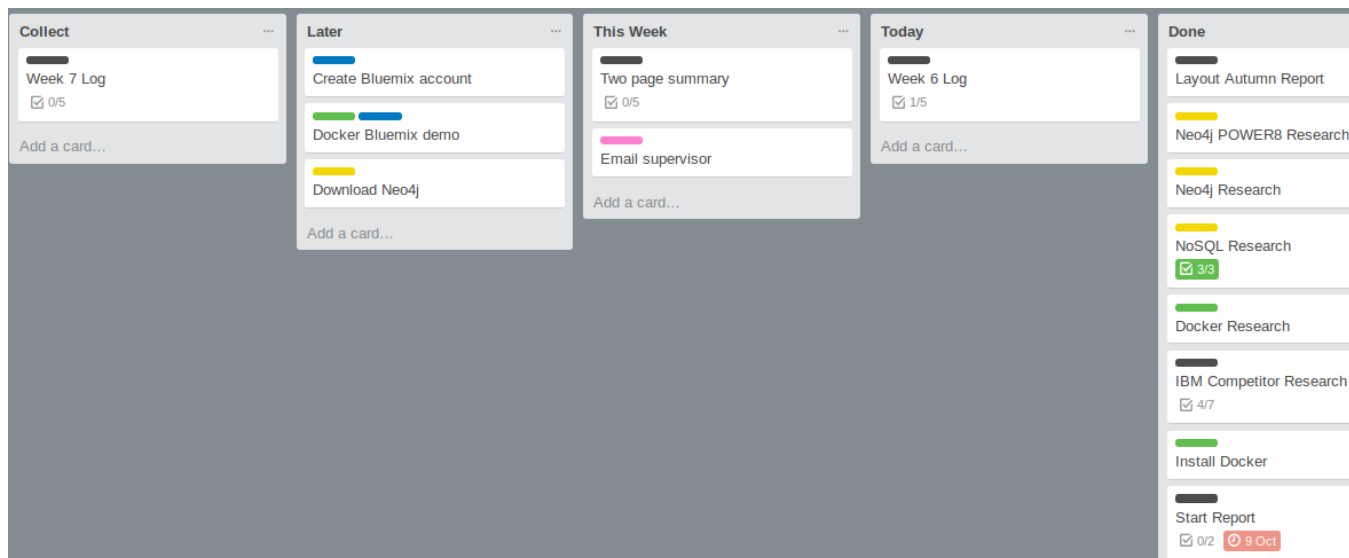
3.2 INS-Thesis

4 Trello boards

4.1 Board at the start of the week:

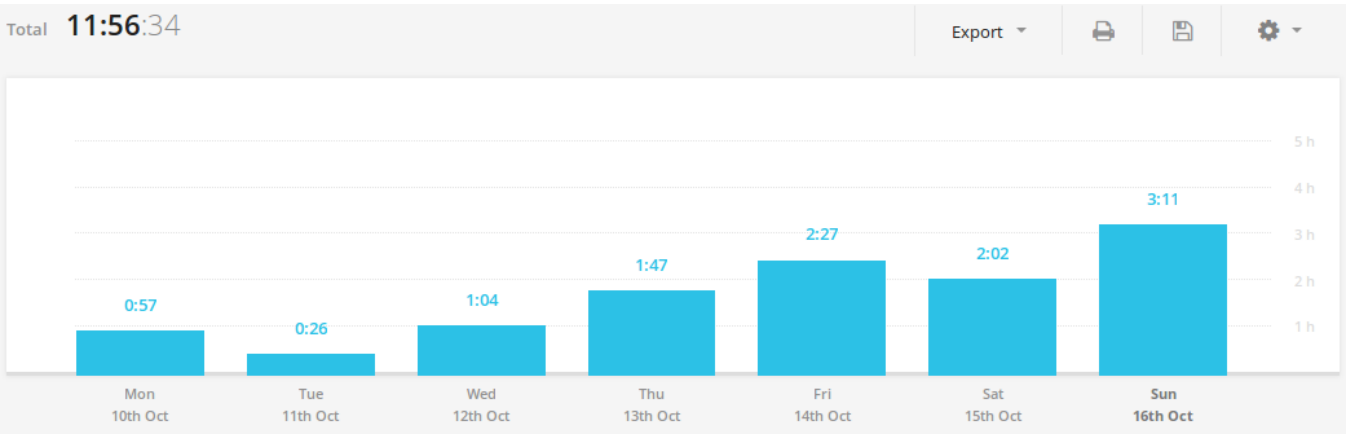


4.2 Board at the end of the week:



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 |
| Tue, 11 Oct 0 h 26 min | | |
| collecting Bluemix competitor bookmarks | BLUEMIX | 0:26:15 7:11 PM – 7:37 PM |
| Mon, 10 Oct 0 h 57 min | | |
| Week 5 log | GENERAL | 0:57:04 7:00 PM – 7:57 PM ↑ Switch to... |

5.3 Weekly log Pie Charts:



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 ~~the~~

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 store 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 as 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 hosted in registry of IBM images linked to Docker Hub• Curated Enterprise-ready images | <ul style="list-style-type: none">- Customers have at their finger 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 pSpheres & zSpheres. | Hybrid Cloud choice and flexibility to choose the right mix for their business utilizing the full complement 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. |

Blue mix future

- Blue mix 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

Q

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

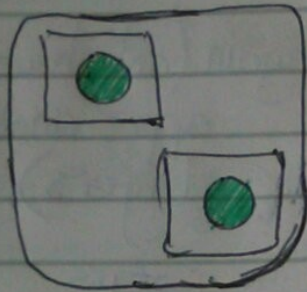
If you need that portability that containers might offer... depends on workload and what the application needs....

Microservices Application evolution

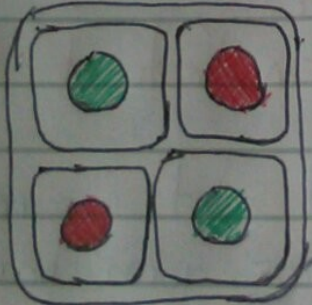
Replacing a monolithic technology stack requires you to re-write the entire application.

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

①

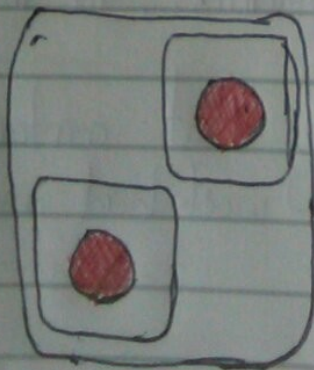


②



↳ "Stand up new instance"

③



↳ "Replace old if no problems"

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.