475 Software Engineering for Industry : Topic 6
Clouds, Containers and Serverless

Assessed - work in a group of 3.

There is a lot of momentum (and hype) in the industry at the moment around moving to the cloud, building "cloud native" applications, and also working at the finer level of granularity provided by containers and related technologies. These things can bring benefits, but there are costs too.

Reading

Netflix is one of the companies most famous for adopting cloud infrastructure, and has pushed a lot of boundaries, and developed new practices and software to deal with working in this way. This post tells some of the story (you can find much more detail in other related articles, talks, etc): https://media.netflix.com/en/company-blog/completing-the-netflix-cloud-migration

Moving to the cloud and creating large "web scale" systems is very popular at the moment, and can definitely have benefits, but in this paper, McSherry et al give us a few words of warning about jumping on the bandwagon: https://blog.acolyer.org/2015/06/05/scalability-but-at-what-cost

Another current trend is towards so called "serverless" deployment, using technologies such as AWS Lambda - these can, in the right circumstances, change both the architecture and the operational costs of running a particular service. Adrian Colyer's Morning Paper blog again provides us with a useful summary of a recent paper on this topic by Adzic and Chatley: https://blog.acolyer.org/2017/10/19/serverless-computing-economic-and-architectural-impact/

Practical

The aim of this week's exercise is to build something interesting using cloud services, we suggest experimenting with "serverless" using AWS Lambda.

You can get free credit for AWS by registering for the AWS Educate programme using your College email address. On registration you should receive a voucher that you can use for AWS resources.

Configuring AWS Lambda itself can be a bit tedious, so there are libraries that you can use to help like Serverless Framework or Claudia.

Build a small service using Lambda that responds to events of some sort. It could be a web API, it could process files when they are uploaded to an S3 bucket, or something else.

One fun thing to try is making a chatbot - here's a quick tutorial for making a very simple chatbot using some Claudia extensions: https://claudiajs.com/tutorials/hello-world-chatbot.html - you could try starting with this and extending it a little bit (perhaps by calling out to another service).

Writing

Once you have done some investigation into cloud-based applications, write up a summary of your thoughts. The submission should be 2 pages (no covers or contents pages please).

On page one, address one of the following questions:

- When do you think adopting a cloud architecture is (or is not) a good idea?
- Does designing applications for the cloud help with continuous delivery? How about operability?
- What benefits/problems come from deploying services in containers, or as serverless functions?

This is not a long essay, just a short statement of your thoughts, with supporting evidence and references. Try to focus on your points and be interesting!

There is not an explicit word limit, but we recommend writing concisely and aiming for around 300 words. Do not go over one page, including your references.

On page two, give a brief description / example of what you built in the practical part. You don't need a lot of writing - perhaps a diagram or a screenshot would be a good way to show it.

This week it is obviously hard to use part 2 to provide an industrial case study for part 1 - but you can still try to link the two parts.

Submission As a group, submit a pdf (`topic6.pdf`) of your 2-page write-up via CATE.

Deadline Monday 25th Feb, 9am.

Discussion During the class on Tuesday 26th Feb, we will discuss your thoughts and experiences. We will ask some groups to briefly present their work, and others to describe their thoughts. We hope for a good discussion amongst the class.

Schedule

Tuesday 19th Feb exercise released
Friday 22nd Feb (9-11am) - lab session (lab 219)
Monday 25th Feb (9am) - deadline for submission to CATE
Tuesday 26th Feb (11am-1pm) - discussion class (lecture theatre 340)

Page 2 of the submission is not graded, but you must demonstrate that you have done something reasonable for that part in order to have page 1 graded.

On page 1 we are looking for you to express your thoughts and ideas based on your reading, experience and discussions, backed up by evidence. The grading scheme is as follows:

Assessment

In your written work we are looking for you to express your thoughts and ideas based on your reading, experience and discussions, backed up by evidence.

F- E

Little or no understanding of the given topic demonstrated.

D

Shows an incorrect or flawed understanding of how or why to apply the given tools/techniques.

C

Shows a reasonable, but limited, understanding of the application of ideas and techniques covered, and the context in which they apply.

B

Shows a good understanding of how to apply these techniques and the problems that they solve. Arguments are well presented and backed up by references.

A

Displays a broad understanding of the use of these techniques, comparing different approaches and the forces that might make them suitable for different situations, displaying evidence of further independent reading and thought, beyond what was suggested and covered in the class.

A*

Gives an excellent and insightful commentary, comparing different tools and approaches and displaying evidence of further independent reading and thought. Demonstrates critical thinking and considered opinion, but backed up by references and practical experience.