475 Software Engineering for Industry : Topic 4
Microservices

Assessed - work in a group of 3

There is a lot of momentum (and hype) in the industry at the moment around moving to architectures based on "microservices". This can bring benefits, but there may be costs too.

Reading

A good introduction to microservices can be found in the following article written by Martin Fowler and James Lewis from ThoughtWorks: https://martinfowler.com/articles/microservices.html

The best-known book on microservices is Building Microservices by Sam Newman. If you can't get hold of the book, you can find many conference talks and articles by Sam online to dip in to.

Many companies these days have adopted (and written about adopting) microservices. The following article from SoundCloud talks about *why* they made this architectural change — and also links to a few other articles giving more technical details of *how* it was done.
http://philcalcado.com/2015/09/08/how_we_ended_up_with_microservices.html

Practical

In this exercise your group should work as a team of consultants. Imagine you have been brought in to advise a company on their technical decisions, in the scenario given below. Think about the situation carefully and sketch out a proposal outlining the advice that you would give your client as to how to move forward technically. We will discuss different teams' ideas in class.

On page 2 of your submission, give one or two "powerpoint slides" that you would use to succinctly present your recommendations to the board and the team.

Scenario

Investera is a fintech startup, founded by a couple of friends who used to work in corporate finance. They met a technical co-founder (who previously worked as a developer in an investment bank) through a meet-up two years ago, and since then they have been working on building a service providing automated investment advice. The first two years have been a bit rocky, but they have a system in production now and are starting to get clients signed up.

The team has now grown to include 6 developers and 12 business/sales people. The developers have built quite a lot of software, mostly in C++ (for the investment analytics) and a large PHP application for the whole web front end, although there are also a few Ruby on Rails admin tools for the sales people, some NodeJS services that run in the background, and a central MySql database. Everything runs on a server that they rent through a hosting company, in a data centre in

east London. There has been a lot of pressure to get something up and running quickly so that they can start getting some revenue in from customers, and it does work, most of the time, but there are often operational problems, and the backlog of new features the business team wants is growing…

Recently Investera took on a round of funding, and with that, some of their investors joined their board. The new board members are starting to ask questions about how the system is architected technically, and how both the software and the development team will scale to support a large international user base and rapid growth. One board member invests in a number of tech companies, and says they are all using "microservices" - she thinks Investera should probably be doing the same. Another board member recently read an article on ft.com saying that everyone should be using Docker these days, and that was the way of the future.

Overall they are a bit worried about the technical leadership in the team. To make sure that their investment is in safe hands, the board has decided to bring you in to provide some consultancy and to give them advice on how the development team should move forward. What direction should the team be taking technically? What do they need to do to make sure that they can respond to the demands of a rapidly growing business? Is changing the system to use microservices a good idea here? What are the risks, benefits and costs of this change? What path should the team follow?

Writing

Once you have come up with a consultancy proposal, think about one of the following questions in relation to microservices . You are limited to **300 words**, so this is not a long essay, just a short statement of your thoughts, with supporting evidence and references.

Address one of the following questions:

- When do you think moving to a microservice architecture is (or is not) a good idea?
- Does adopting microservices help with continuous delivery?
- It is common for teams with many services to have the code for each one in a separate version control repository. What are the pros and cons of this?

300 words is not a lot, so try to focus on your points and be interesting!

Submission As a group, submit a pdf (`topic4.pdf`) of your 2-page write-up via CATE.

Deadline Monday 11th Feb, 9am.

Discussion

During the class on Tuesday Feb 12th, we will discuss your thoughts and ideas. We will ask some groups to briefly present the proposal that they put together for the exercise, and others to describe their thoughts. We hope for a good discussion amongst the class.

Schedule

Tuesday 5th Feb - exercise released
Friday 8th Feb (9-11am) - lab session (lab 219)
Monday 11th Feb (9am) - deadline for submission to CATE.
Tuesday 12th 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.