# 475 Software Engineering for Industry : Topic 5
# Operability

## Assessed - work in a group of 3

We talk a lot about building software, both in technical terms and the processes that development teams follow, but another important concern is *operations*: how we manage running applications in production, and what we do when something goes wrong.

## Reading

This paper by James Hamilton is quite long, and contains a lot of information. Start by having a look at this blog post summarising the paper, and then dip into the paper itself if you want more detail: https://blog.acolyer.org/2016/09/12/on-designing-and-deploying-internet-scale-services/

A common operation challenge with modern systems is "how do I know what is going on in my distributed system / microservices deployment?". If the system is not working properly, how do we find out what is wrong? This post from Netflix talks about how they address this problem. As Adrian Cockroft (former Netflix architect) often likes to say, at Netflix what they ended up building was a highly sophisticated monitoring system that just happened to stream video.
https://medium.com/netflix-techblog/lessons-from-building-observability-tools-at-netflix-7cfafed6ab17

For a different approach, here's a paper from Google about their tracing systems: https://blog.acolyer.org/2015/10/06/dapper-a-large-scale-distributed-systems-tracing-infrastructure/

## Practical

This week's exercise is another consulting job. It is one year on and based on your advice from last week, Investera have scaled up a lot. They are now serving large numbers of customers around the world throughout the day. With the recent investment and upturn in customer numbers they have built out their team to about 50 people, now with 20 developers plus the CTO. They've moved to a fancy new office in Kings Cross. Everything is going well, except when the system stops working…

### Scenario

You get another call from Investera's board. The systems are now serving large numbers of customers, and Investera is making money. But, over the last few months there have been increasing numbers of problems. The business team have been taking calls from angry customers complaining that the system has been down just as they wanted to make a vital investment - a lot of the affected customers are in Singapore, where a recent marketing push has been very effective.

The problem is that when the system goes down, often it takes a long time to figure out what is wrong and get it working again. On a couple of occasions it was down for more than 24 hours,

made worse by the fact that the dev team only found out because an important customer called the CEO directly! On another day, deploying a simple new feature brought down the whole site.

The board is worried about whether Investera's team and system can continue to operate the business successfully. They turn to you for your advice again. What should they do?

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.

## Writing

Once you have come up with a consultancy proposal, think about one of the following questions in relation to operability. 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:

- Do you think that if we write our software correctly, it should run without any problems?
- Do you think that software engineers should handle both development and operations? Or is it better to have specialist teams?
- To what degree can tools and automation help us to recover from system faults?

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

**Submission**

As a group, submit a pdf (`topic5.pdf`) of your 2-page write-up via CATE.

## Discussion

During the class on Tuesday Feb 19th, 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 12th Feb** - exercise released
**Friday 15th Feb (9-11am)** - lab session (lab 219)
**Monday 18th Feb (9am)** - deadline for submission to CATE.
**Tuesday 19th 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.