

Boost flexibility in coding exercises by building containers in real time

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Cloud-based integrated development environments (IDEs) are becoming increasingly popular, both in education and tech industry. They allow unlimited mobility and give the opportunity to work on a programming project anywhere and without troublesome local installation and configuration. The limits of operating systems and hardware requirements are virtually eliminated. They also promote collaborative work and foster exchange between the developers involved. Cloud-based IDEs often execute the code of the users in containers.

These containers are often preconfigured and updates take some time until they are deployed on production systems. Allowing users to flexibly setting up their execution environment there are different ways to achieve this. Either one can provide a single massive container, with all possible dependencies or one could set up the image on runtime to the needs of the user. With a single ever growing image, every new added package might break existing code. This becomes a nightmare to maintain and update. The second approach to build the image based on the needs of the user seems to be more promising. The challenge for this approach is that the time to build the image must be so fast that the user experience is not badly impacted by building this container.

GOALS

The aim of this thesis is to investigate approaches that could be used to tackle the problems of building images based on the configuration provided by the user (either students or lecturers). A prototype should be developed and evaluated.

The core milestones of this project could be:

1. Find a feasible way to build images on runtime based on user configurations.
2. Implement a prototype, which can be used to evaluate your approach.
3. Evaluate the prototype.

PREREQUISITES

CodeExpert is a complex distributed software. Therefore it is necessary to be willing to gain an understanding of the complex architecture. Some knowledge of TypeScript and containerization is beneficial.

OPPORTUNITIES

The project offers the following opportunities:

- Make an important contribution to CodeExpert.
- Gain experience in working on a large web application.
- Work in a team of experienced software engineers.