CS-548: Cloud-native Software Architectures

Computer Science Department • University of Crete
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Website: https://www.csd.uoc.gr/~hy548/

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Assignment 2: Kubernetes

1. Provide the YAML that runs a Pod with Nginx `1.23.3-alpine` as well as the `kubectl` commands needed to:
    a. Install the manifest on Kubernetes and start the Pod.
    b. Forward port 80 locally, so that it answers calls through a browser (or `curl` or `wget`).
    c. See the logs of the running container.
    d. Open a shell session inside the running container and change the first sentence of the default page to "Welcome to MY nginx!". Close the session.
    e. From your computer terminal (outside the container), download the default page locally and upload another one in its place.
    f. Stop the Pod and remove the manifest from Kubernetes.

2. The code that produces the course's website is available on GitHub (https://github.com/chazapis/hy548). Provide the YAML that creates a Job using Ubuntu `20.04`, which when started will run a script (defined in a ConfigMap) that will download the repository (and submodules), hugo (the tool that builds the website), and build the website. Which command can you use to confirm that the Job completed successfully?

3. Following the previous two exercises, provide a single YAML that will run the Pod with Nginx, the above Job with the script, and a CronJob that will refresh the content every night at 2:15 (only if changes have been made to git). The Nginx Pod should serve the web pages produced by the Jobs instead of the default page. Briefly describe how data is communicated between containers.

4. Following on from the previous exercise, embed the Nginx Pods in a Deployment (keeping the Job and Cronjob in the YAML) and use an init container to start the Pods when the web page is finished building. Also add a Service to the manifest. Provide the overall YAML.

Notes:

- The assignment is personal.
- All exercises contribute equally to the overall grade (unless individual percentages are defined).
- A day/time will be set for answering questions and giving clarifications.
- Write down your answers in a Markdown-formatted text file in either Greek or English

and commit it (along with any other files) in a private GitHub repository before the exercise's deadline. Share the repository with the instructor (username "chazapis").