

Next Generation DevOps

Haleh Shahzad

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Agenda

- ❖ **Class introduction**
- ❖ **Modules# 1-4 Review**
- ❖ **Break:** 10:00 – 10:15 AM
- ❖ **Assignment #2.1 – Group Work**
- ❖ **Checkpoint:** 11:45 – 12:00 AM
- ❖ **Lunch:** 12:01 – 01:00 PM
- ❖ **Assignment #2.2 – Group Presentation (12-15 Minutes per Group)**
- ❖ **Break:** 02:15 – 02:30 PM
- ❖ **Activity #1 – LAB 1 (Optional):** 02:30 – 03:30 PM

Class Introduction



Modules# 1-4 Review

DevOps and Site Reliability Engineer (SRE)

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DevOps

- ❖ A set of practices and a culture designed to bridge the gap between developers, operators, and other parts of the organization.

SREs

- ❖ SRE is a discipline that combines the aspects of software engineering and operations to operate large mission-critical systems reliably.

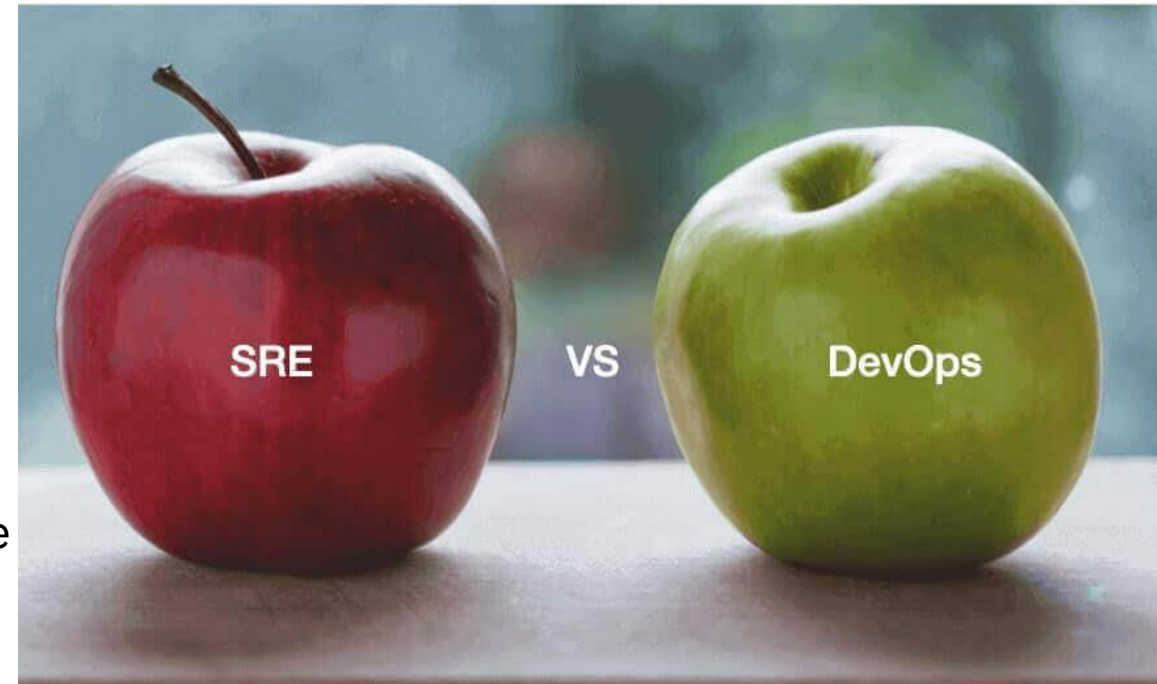


<https://n4stack.io/wp-content/uploads/2018/11/Automation-meme.png>

DevOps and Site Reliability Engineer (SRE)

Class SRE implements DevOps

- ❖ **DevOps**, reduce organization silos. **SRE**, share ownership with developers by using the same techniques across the stack.
- ❖ **DevOps**, accept failure as normal. **SRE**, have a formula for balancing accidents and failures against new releases.
- ❖ **DevOps**, implement gradual change. **SRE**, encourage moving quickly by reducing costs of failure.
- ❖ **DevOps**, leverage tooling and automation. **SRE**, encourages “automating this year’s job away” minimize manual systems work to focus on efforts to bring long-term value to the system.
- ❖ **DevOps**, measure everything. **SRE**, believes that operations is a software problem, and prescriptive ways for measuring availability, uptime, outages, toil, etc.

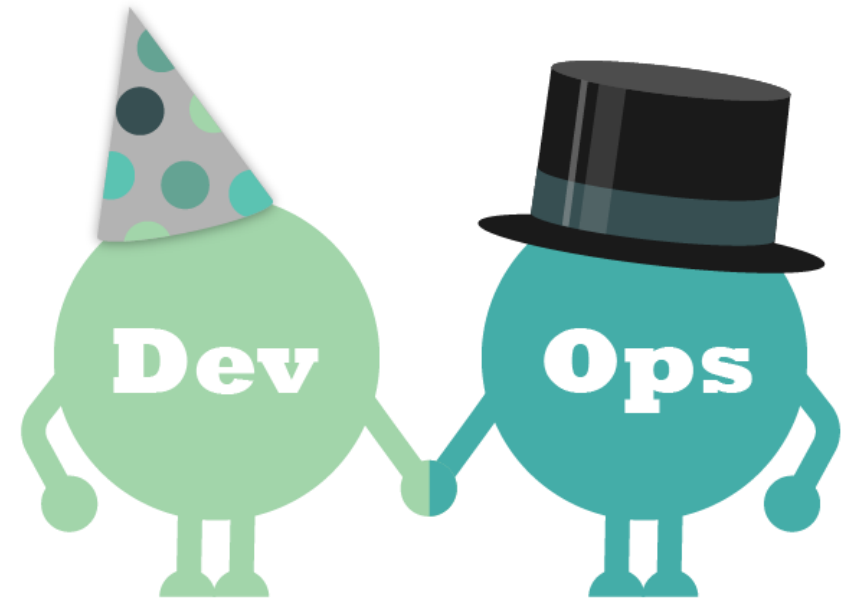


<https://i0.wp.com/techblost.com/wp-content/uploads/2020/04/sre-vs-devops.jpg?fit=879%2C525&ssl=1>

SRE Measurements

SLIs drive **SLOs** which inform **SLAs**

- ❖ Service-Level Indicator (SLI)
 - ❖ Metrics over time which inform about the health of a service
 - ❖ Examples: Request latency, Systems throughput, Availability, Error rate
- ❖ Service-Level Objective (SLO)
 - ❖ Agreed upon bounds for how often SLI's must be met
 - ❖ Example: $SLI < target$
- ❖ Service-Level Agreement (SLA)
 - ❖ Defines the service availability for a customer and the penalties for breaking that availability



vs. SRE?

https://library.scalyr.com/2019/04/05074622/Devops_vs_SRE.png

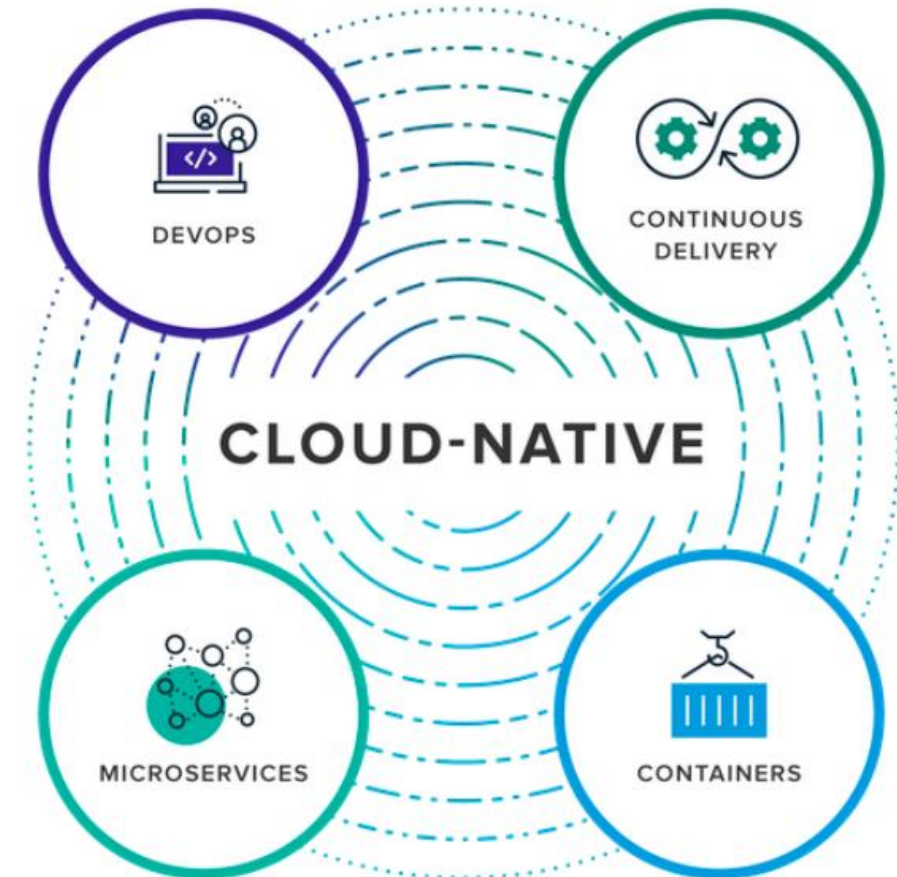
Cloud-Native CI/CD Pipeline

Cloud-Native

Cloud Native (As defined by CNCF)

“Cloud native computing uses an open-source software stack to deploy applications as microservices, packaging each part into its own container, and dynamically orchestrating those containers to optimize resource utilization.”

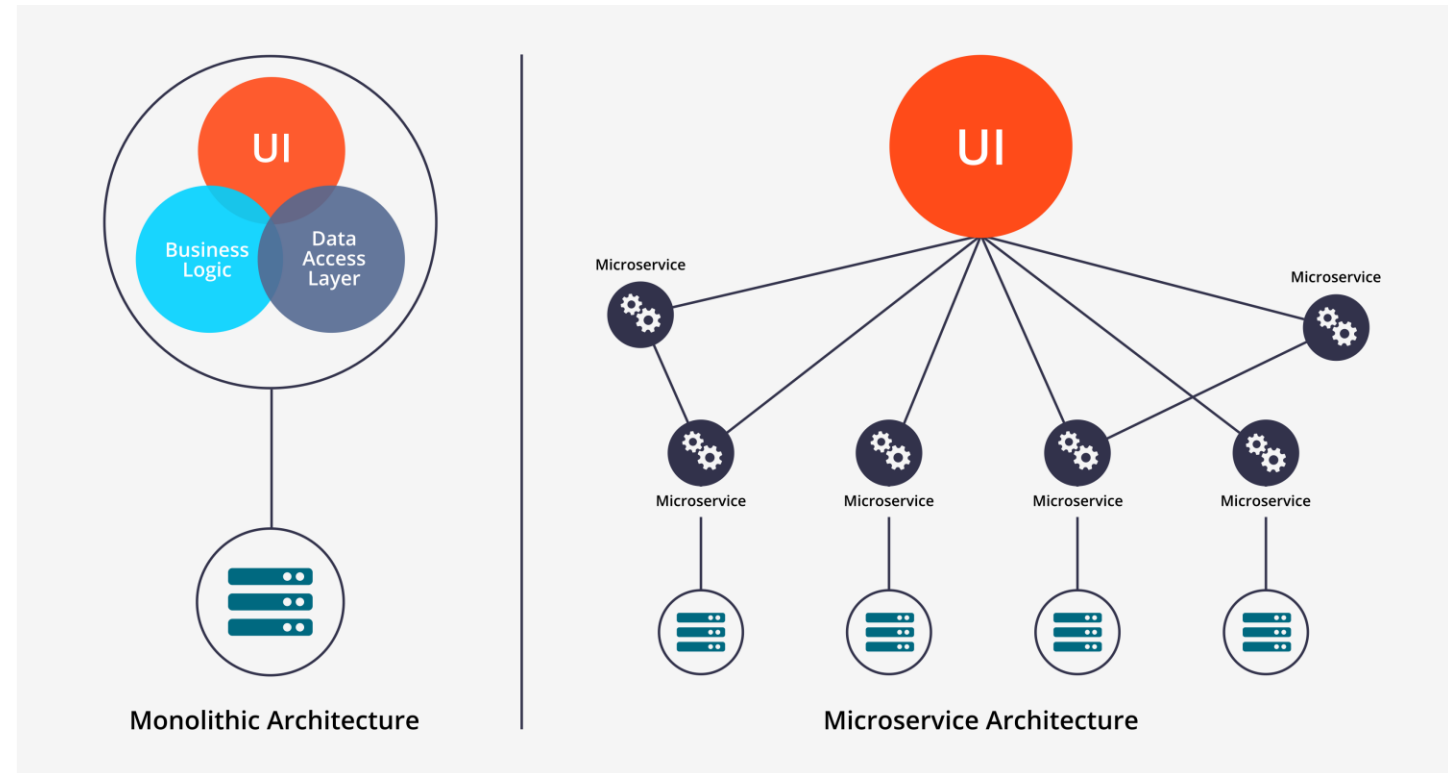
- ❖ Open source
- ❖ Microservices in containers
- ❖ Dynamically orchestrated
- ❖ Optimized resource utilization



<https://cloudn.com.au/img/cloud-native.png>

Microservices

- ❖ Shared Nothing
- ❖ Micro Focus
- ❖ High Autonomy
- ❖ Independent Ownership
- ❖ Immutability
- ❖ High Resilience
- ❖ Failure Isolation
- ❖ Automated
- ❖ Self-Hosting



<https://images.contentstack.io/v3/assets/blt300387d93dabf50e/bltc1f320aca569f087/5913193a59b80e7305b10465/microservices-infographic.png>

Containers

Containers (Microservice in containers)

- ❖ A unit of software
- ❖ A binary and all its dependencies
- ❖ Containers share an OS
- ❖ Run as resource isolated processes

Benefits of Containers

- ❖ Portable, Repeatable
- ❖ Efficient Storage
- ❖ Quick startup time
- ❖ Saving in operational costs compared with running in VMs

Containers and CI/CD

- ❖ All the dependencies you need are in the container
- ❖ All you need to do is run the container



<https://siliconvalve.files.wordpress.com/2017/11/containers1.jpg>

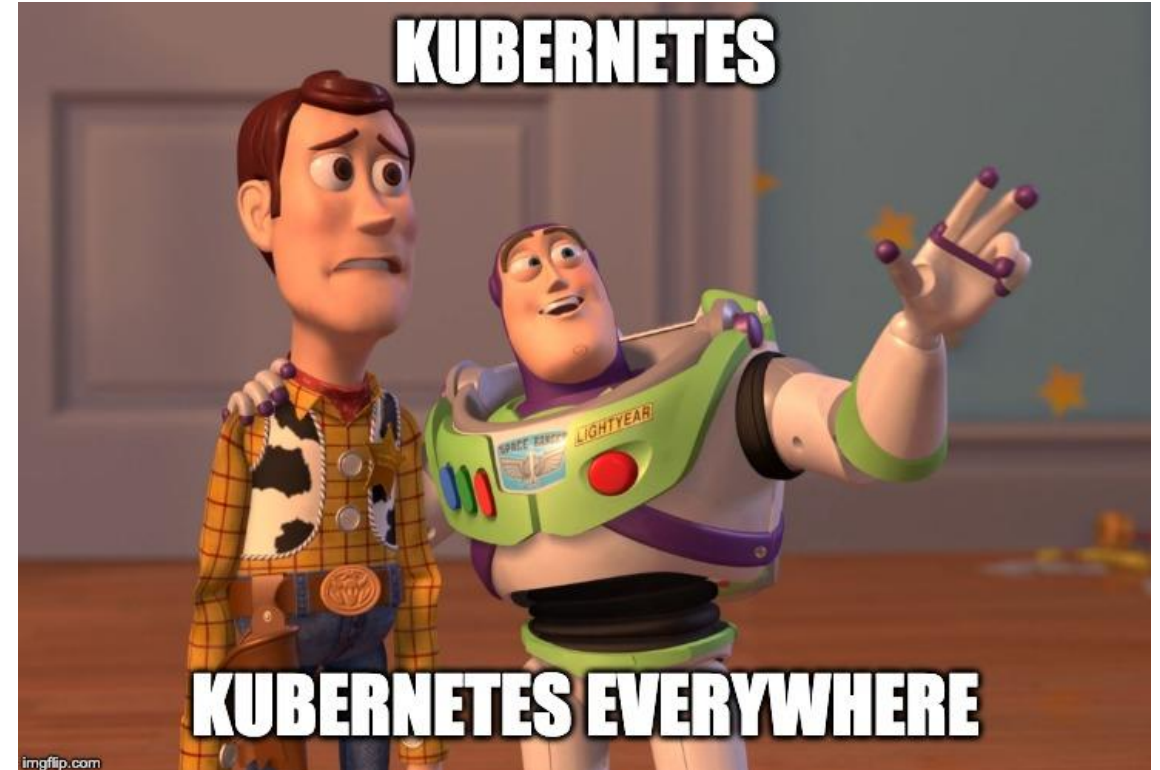
Kubernetes

Dynamically orchestrated with optimized resource utilization

- ❖ Platform for managing containers
- ❖ Tell Kubernetes how to deploy your services and it does it
- ❖ Abstract away the underlying hardware
- ❖ Cloud agnostic

Benefits

- ❖ Standardization
- ❖ Application Portability
- ❖ Rich open-source ecosystem with an innovative and vibrant community
- ❖ Better use of resources

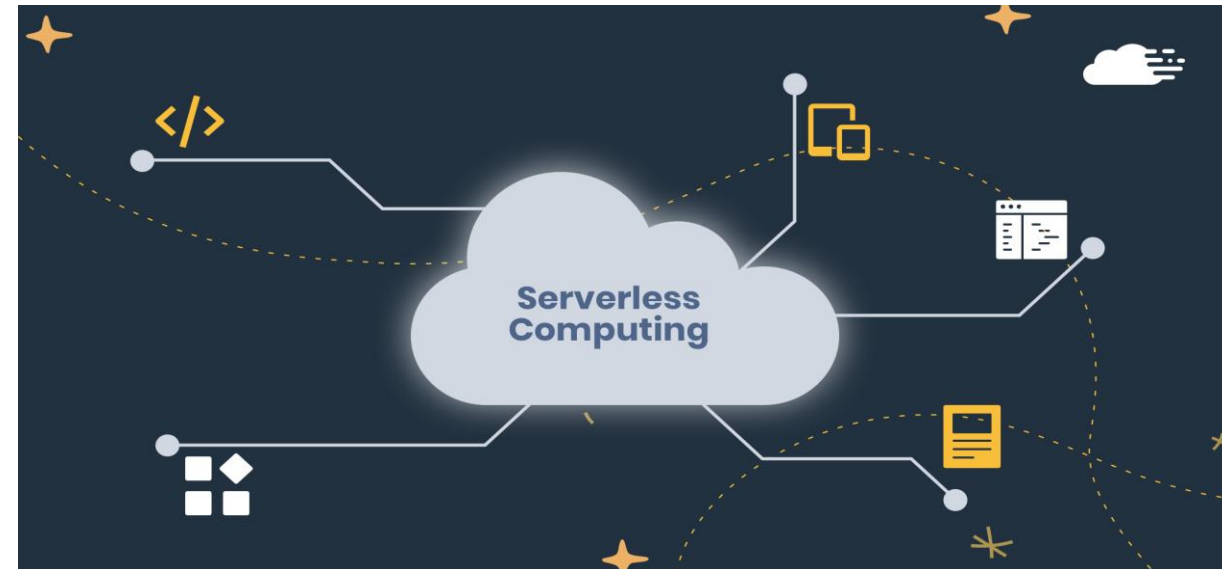


<https://anthonyspiteri.net/wp-content/uploads/2019/07/k8severywhere.jpg>

DevOps and Serverless

Serverless – What?

- ❖ Serverless is different from traditional application architecture; everything is abstracted.
- ❖ Serverless, functions are instantiated when and where needed, for the exact time they are needed.
- ❖ Event-driven workloads.
- ❖ Portable.
- ❖ Focus on Code.
- ❖ Faster time to market, no infrastructure issues involved.
- ❖ For the exact duration of the time they are needed.
- ❖ Pay only for the computing resources used by your functions.



<https://blog.runcloud.io/wp-content/uploads/2019/07/serverlessComputingBanner.jpg>

Serverless – Why?

- ❖ You don't have to worry about maintaining and scaling servers to fit the evolving needs
- ❖ Cost-effective.
- ❖ Improve the performance of your application and the experience of your developers and customers.
- ❖ Applications with an unpredictable amount of server load
- ❖ Cannot scale down a VM based auto-scaling group easily.



<https://www.techexpert.com/wp-content/uploads/2018/12/What-is-Serverless-Computing-Blog.png>

DevOps Services in the Public Cloud

DevOps Services in the Public Cloud

A DevOps strategy for success with the cloud:

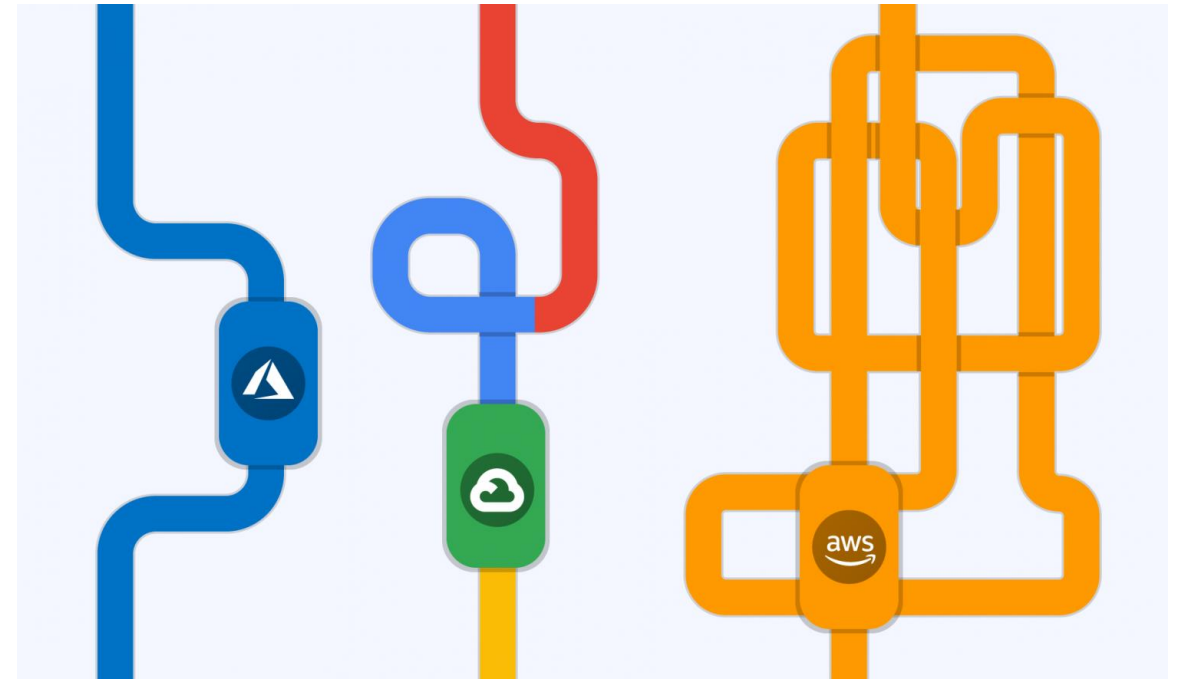
Step 1: Understand your own requirements

Step 2: Define your DevOps process

Step 3: Select and test tools

Step 4: Focus on automated testing

Step 5: Implementation



<https://www.inovex.de/wp-content/uploads/azure-vs-gcp-vs-aws-cloud-native-ci-cd-1500x880.png>

Break

15 Minute Music Coffee Break

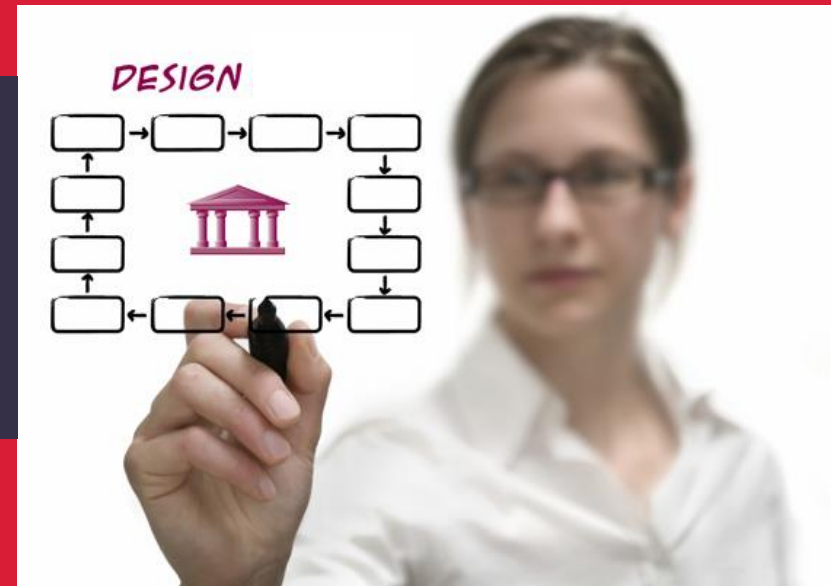


<https://i.ytimg.com/vi/EY8EsOY8Naw/maxresdefault.jpg>

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Assignment #2

5% of Total Grade



Assignment #2.1 – Group Work

Your CIO asked you as a group to do a presentation to raise the awareness in the organization about DevOps practices, CI/CD pipeline process automation and OSS tools. The presentation should at least include the following:

- ❖ What is DevOps, its benefits, and what you need to consider for establishing DevOps practices?
- ❖ How it relates to Agile and SRE?
- ❖ What do you need to consider when building CI/CD Pipeline?
- ❖ A flow diagram for the most innovative CI/CD Pipeline using OSS tools.

Guidelines

- ❖ No more than 15 slides per group.
- ❖ Time to present 12-15 minutes per group.
- ❖ Each member must present at least 1-2 slides.
- ❖ You should nominate a lead, who combine the slides and share screen during the presentation.



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Group Work – In Progress



Checkpoint



Lunch Break 1 Hour



https://imagesaws.s3.amazonaws.com/articles/2020/09/dash_diet_tips.jpg

Group Presentation

Assignment #2.2



Break

15 MINUTE
BREAK

<https://www.facebook.com/pg/fifteenminute/posts/>

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A woman with dark hair pulled back, wearing a black blazer over a white collared shirt, stands on a balcony of a modern building. The balcony has a wooden railing. The background shows the building's architecture with glass and concrete. The entire image is framed by a thick red border.

Activity #1

Optional-Not graded

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Activity #1 – LAB 1 – Setup Jenkins X

❖ Prerequisites

❖ Install the CLI <https://jenkins-x.io/v3/admin/setup/jx3/>

❖ Minikube Start <https://minikube.sigs.k8s.io/docs/start/>

❖ Step 1 (Only): Installation

❖ You need to create a minikube cluster via the following command:

```
minikube start --cpus 4 --memory 8048 --disk-size=100g --addons=ingress --vm=true
```

❖ **Minikube** <https://jenkins-x.io/v3/admin/platforms/minikube/>

❖ Setup

❖ git clone the new repository via HTTPS and cd into the git clone directory

<https://github.com/jx3-gitops-repositories/jx3-minikube/generate>

```
git clone https://github.com/your-git-name/jx3-minikube.git
```

❖ configure the ingress.domain to point to your \$(minikube ip).nip.io:

```
jx gitops requirements edit --domain="$(minikube ip).nip.io"
```

❖ To enable webhooks you need to install and setup ngrok <https://ngrok.com/download>

Activity #1 – LAB 1 – Setup Jenkins X (Cont.)

- ❖ setup a webhook tunnel to your laptop: `ngrok http 8080`

```
Administrator: C:\ngrok-stable-windows-amd64\ngrok.exe - ngrok http 8080
ngrok by @inconshreveable

Session Status      online
Session Expires     1 hour, 57 minutes
Version             2.3.40
Region              United States (us)
Web Interface        http://127.0.0.1:4040
Forwarding            http://[redacted].ngrok.io -> http://localhost:8080
Forwarding            https://[redacted].ngrok.io -> http://localhost:8080

Connections          ttl    opn    rt1    rt5    p50    p90
                     0      0      0.00   0.00   0.00   0.00
```

- ❖ copy your personal ngrok domain name of the form abcdef1234.ngrok.io into the charts/jenkins-x/jxboot-helmfile-resources/values.yaml file in the ingress.customHosts.hosts file so that your file looks like this...

ingress:

customHosts:

hook: abcdef1234.ngrok.io"

...

- ❖ git add, commit and push your changes:

git add *

git commit -a -m "fix: configurations for local minikube"

git push origin main

- ❖ Run: **jx ui**

Questions?