

# Serverless Design

in Cloud

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Lecture #12 out of 16

80 minutes

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Amazon Web Services

Docker Containers

PaaS, IaaS, SaaS, EaaS, etc.

P2P: BitTorrent, Blockchain, and Beyond

Books, Venues, Call-to-Action

Chapter #1:

# Amazon Web Services



## S3]Simple Storage Service (S3)

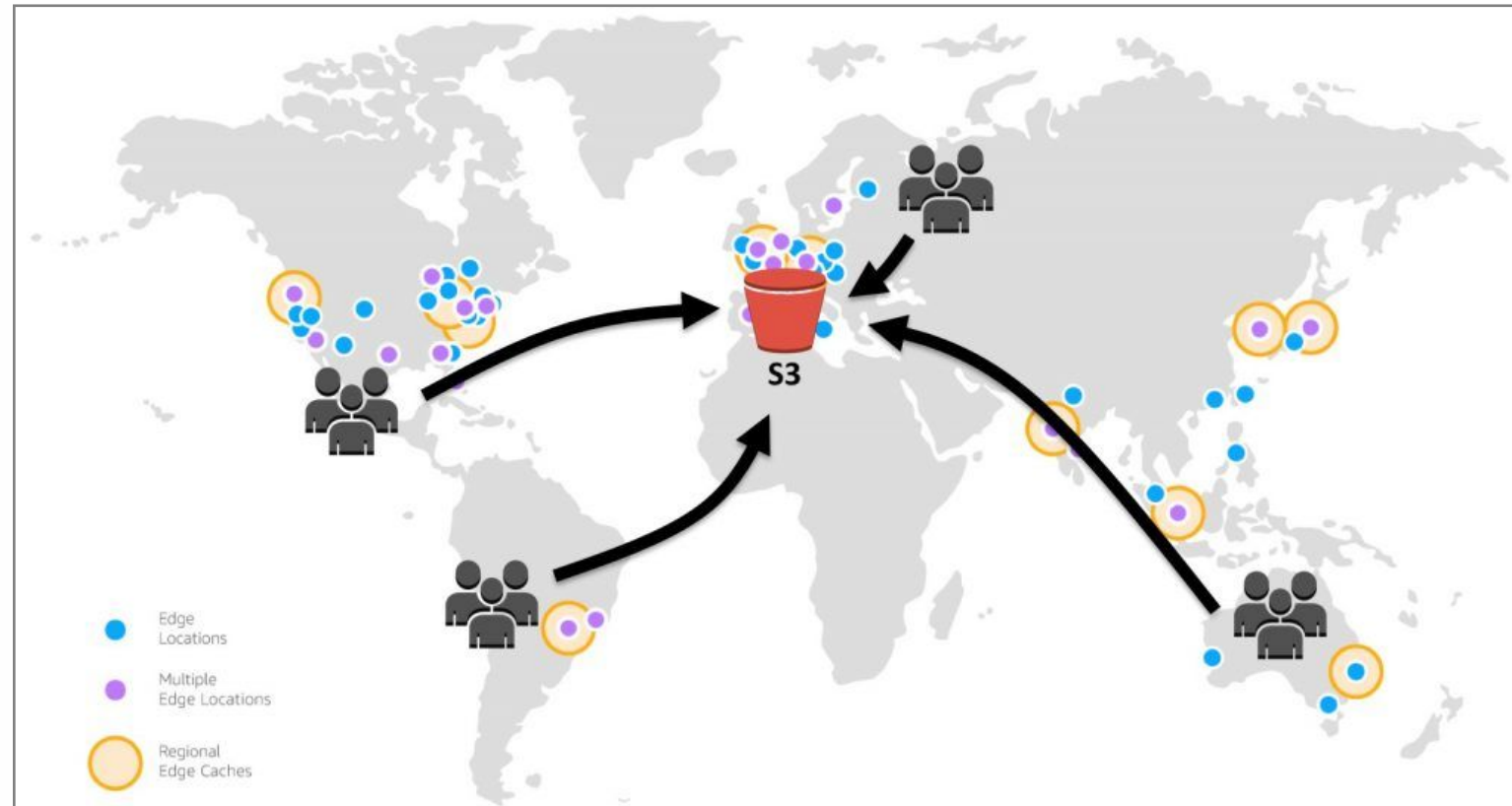
```
def object_uploaded?(s3_client, bucket_name, object_key)
  response = s3_client.put_object(
    bucket: bucket_name,
    key: object_key
  )
  if response.etag
    return true
  else
    return false
  end
rescue StandardError => e
  puts "Error uploading object: #{e.message}"
  return false
end
```



## EC2]Elastic Compute Cloud (EC2)

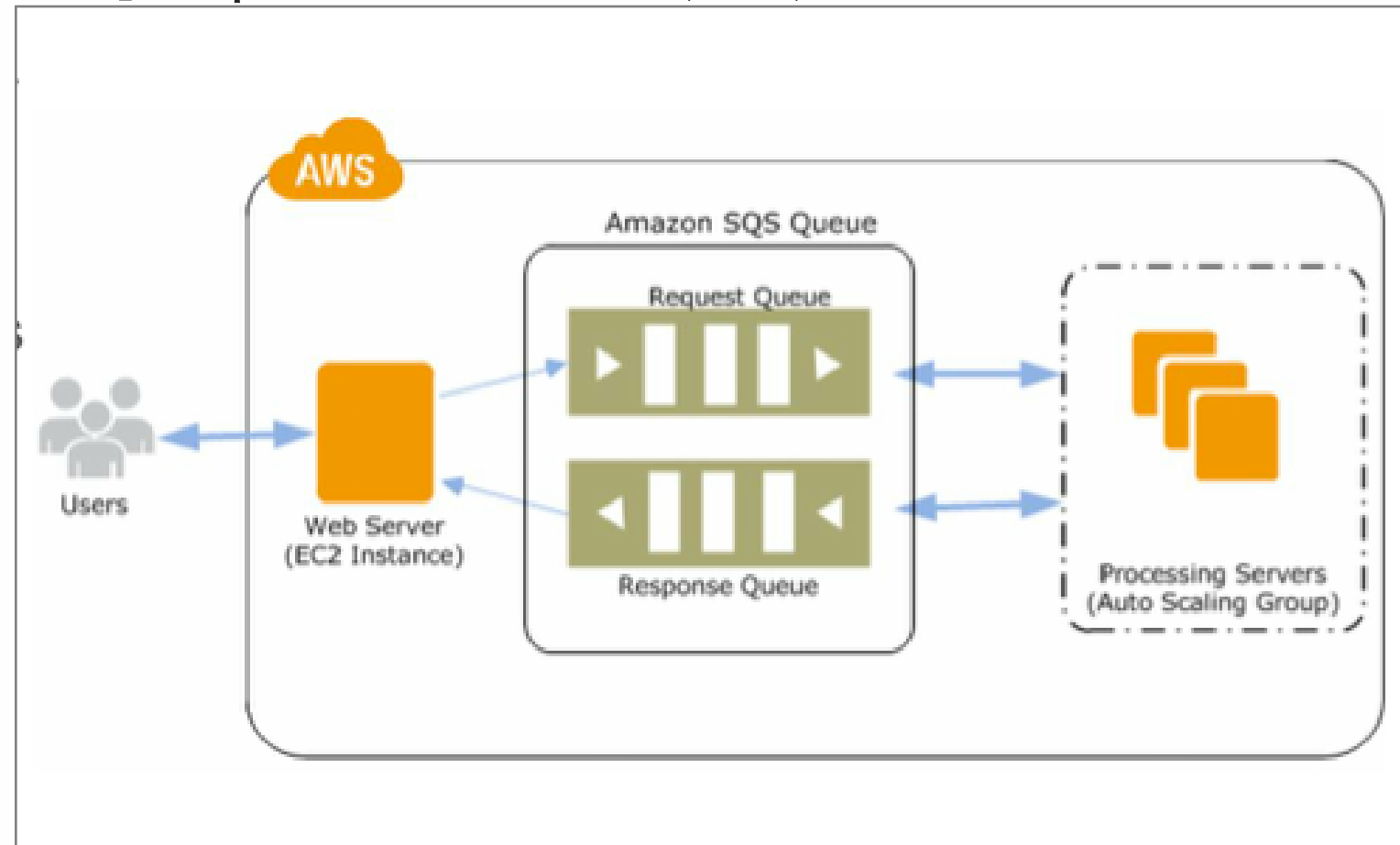
```
instance = ec2_resource.create_instances(  
    image_id: image_id,  
    min_count: 1,  
    max_count: 1,  
    key_name: key_pair_name,  
    instance_type: instance_type,  
    user_data: encoded_script  
)
```

## CloudFront



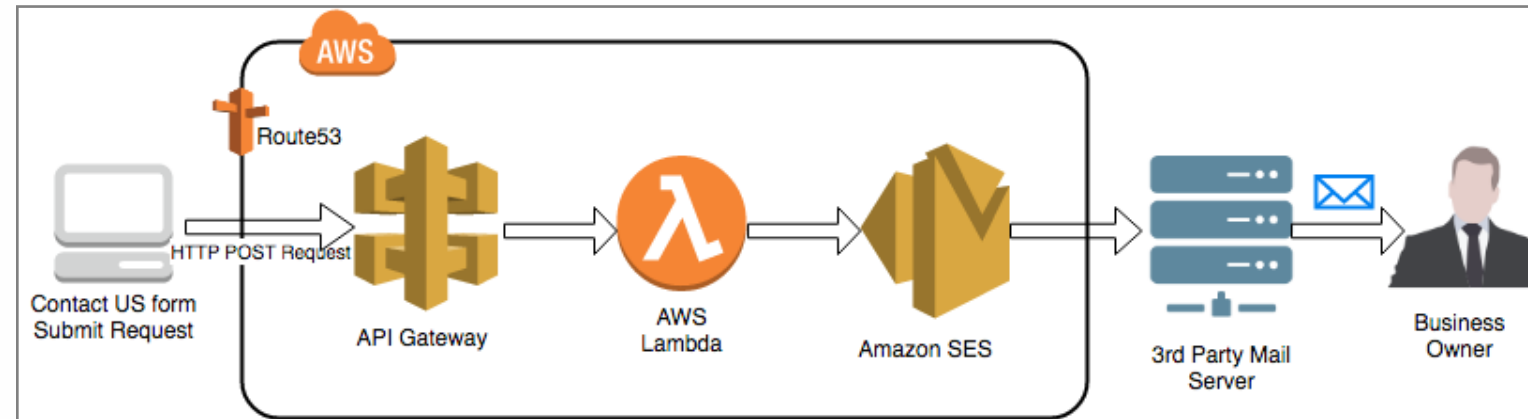


## SQS]Simple Queue Service (SQS)

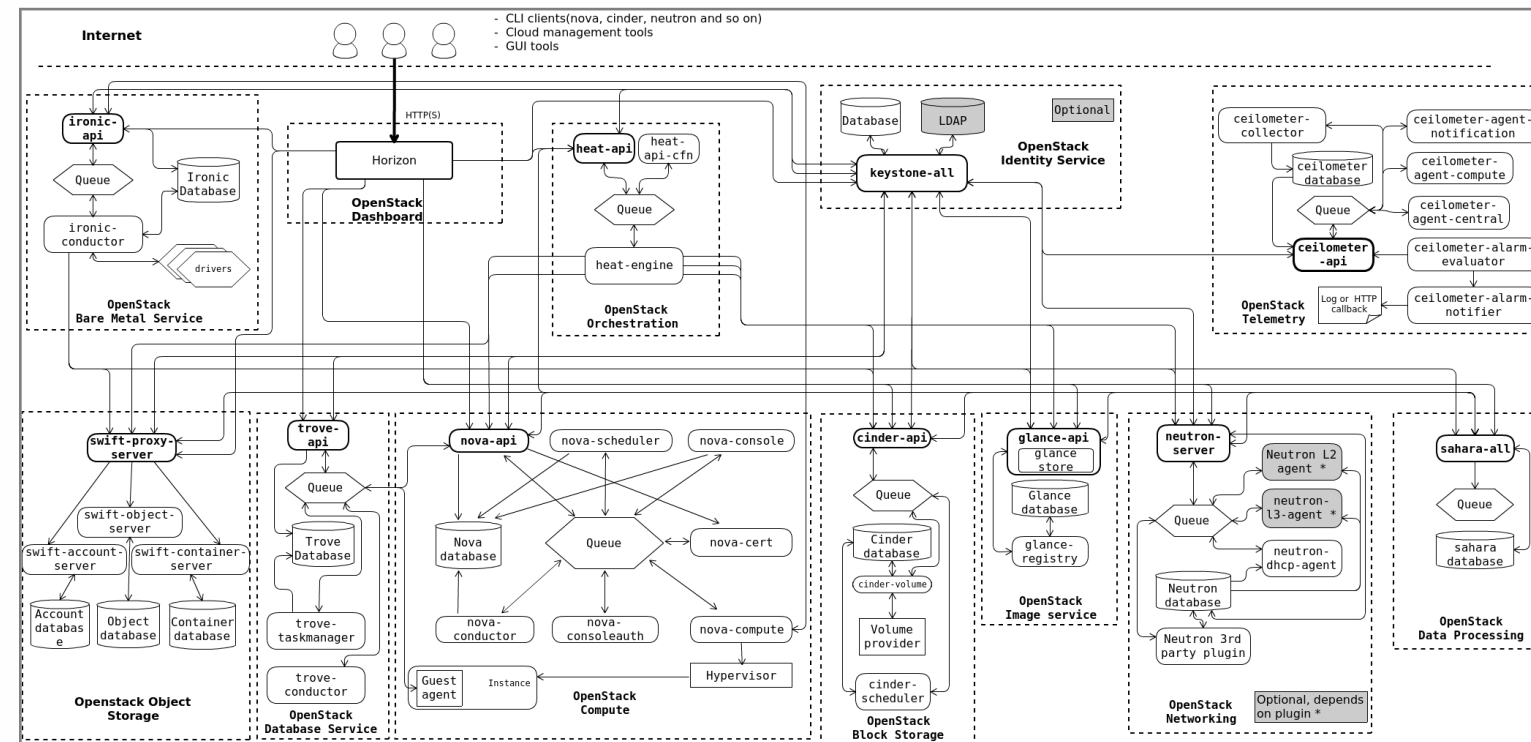




## Lambda



# OpenStack



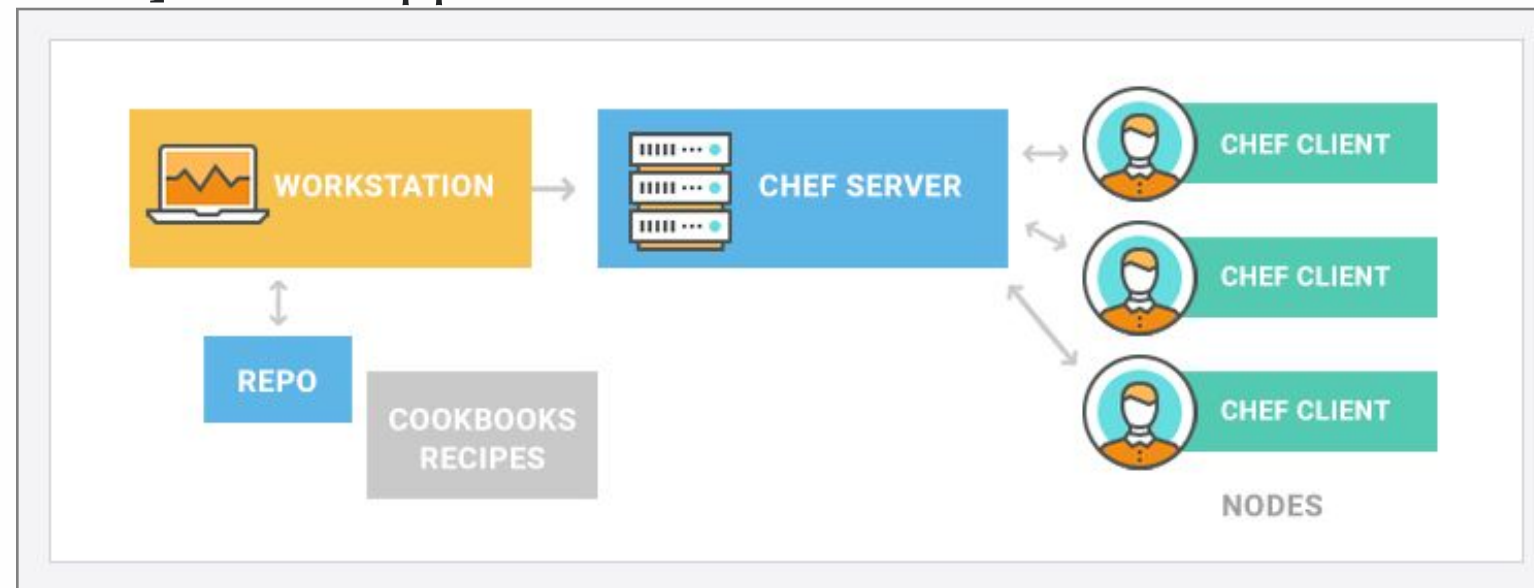
<https://docs.openstack.org/install-guide/get-started-logical-architecture.html>

Chapter #2:

# Docker Containers



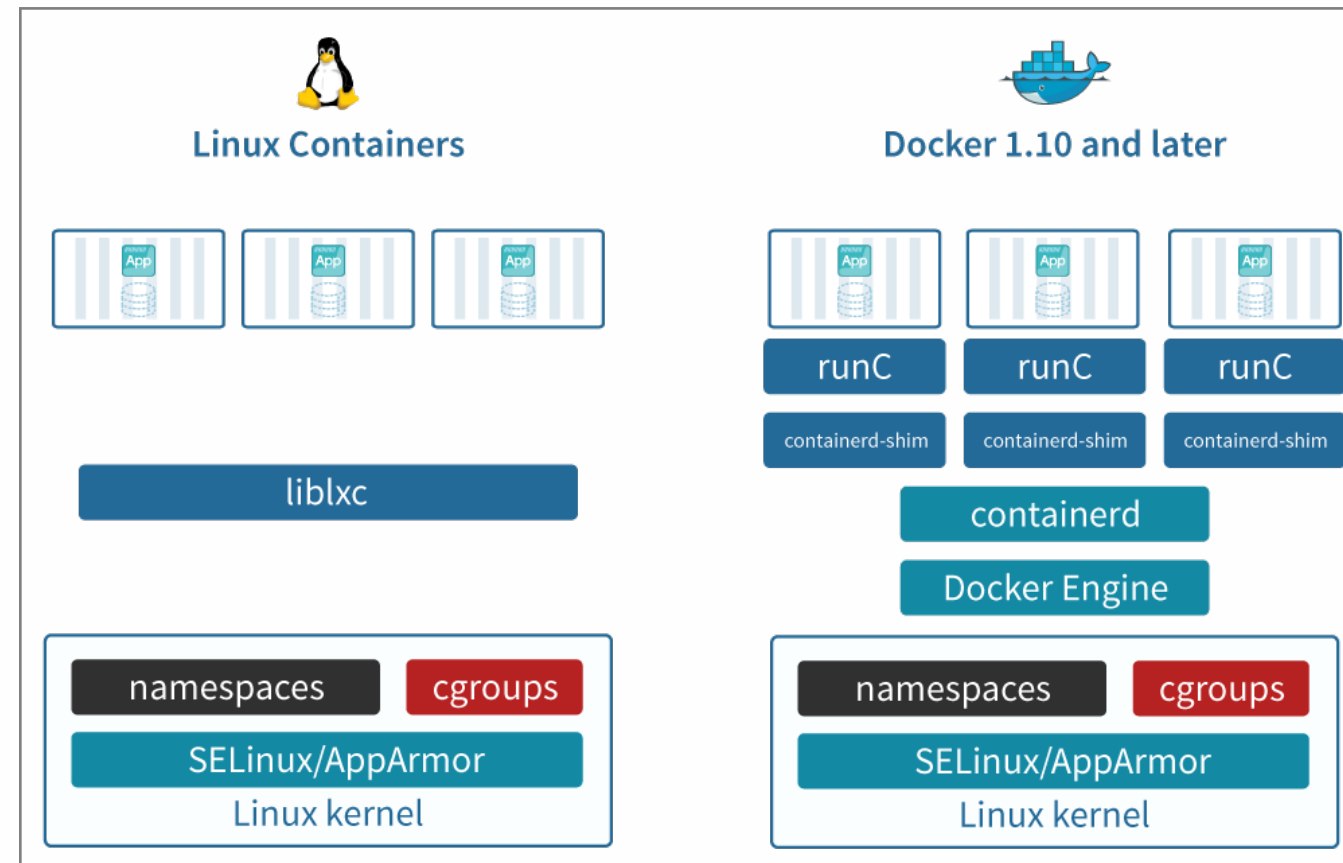
Chef]Chef, Puppet, etc.



# Dockerfile

```
19 FROM yegor256/rultor-image
20 MAINTAINER Yegor Bugayenko <yegor256@gmail.com>
21 LABEL Description="yegor256.com" Vendor="Yegor Bugayenko" Version="1.0"
22
23 ENV DEBIAN_FRONTEND=noninteractive
24
25 RUN sudo apt-get -y update --fix-missing
26 RUN sudo apt-get -y install aspell aspell-en
27 RUN sudo apt-get -y install graphviz
28 RUN sudo apt-get -y update --fix-missing
29 RUN sudo apt-get -y install gnuplot
30 RUN sudo apt-get -y install s3cmd
31 RUN sudo apt-get -y install fontforge liblapack-dev
32
33 RUN sudo apt-get -y install plantuml
34 COPY plantuml.jar /usr/share/plantuml/plantuml.jar
35
36 RUN wget --no-check-certificate --quiet https://cmake.org/files/v3.5/cmake-3.5.1.tar.gz && \
37   tar xf cmake-3.5.1.tar.gz && \
38   rm -rf _cmake-3.5.1 && \
39   mv cmake-3.5.1 _cmake-3.5.1 && \
40   cd _cmake-3.5.1 && \
41   ./configure && \
42   make && \
43   make install
44
45 RUN git clone https://github.com/htacg/tidy-html5.git _tidy-html5 && \
46   cd _tidy-html5/build/cmake && \
47   git checkout 5.1.25 && \
48   cmake ../.. && \
49   make && \
50   make install
51
52 RUN sudo apt-get install -y woff2
53 COPY woff.zip /tmp/woff.zip
54 RUN unzip /tmp/woff.zip -d _sfnt2woff && \
55   cd _sfnt2woff && \
56   make && \
57   cp sfnt2woff /usr/local/bin/
58
59 RUN sudo apt-get -y update --fix-missing
60 RUN sudo apt-get install -y libxml2-utils
61
62 RUN npm install -g cssshrink@0.0.5
63
64 RUN /bin/bash -l -c "gem install jgd -v 1.6.5"
```

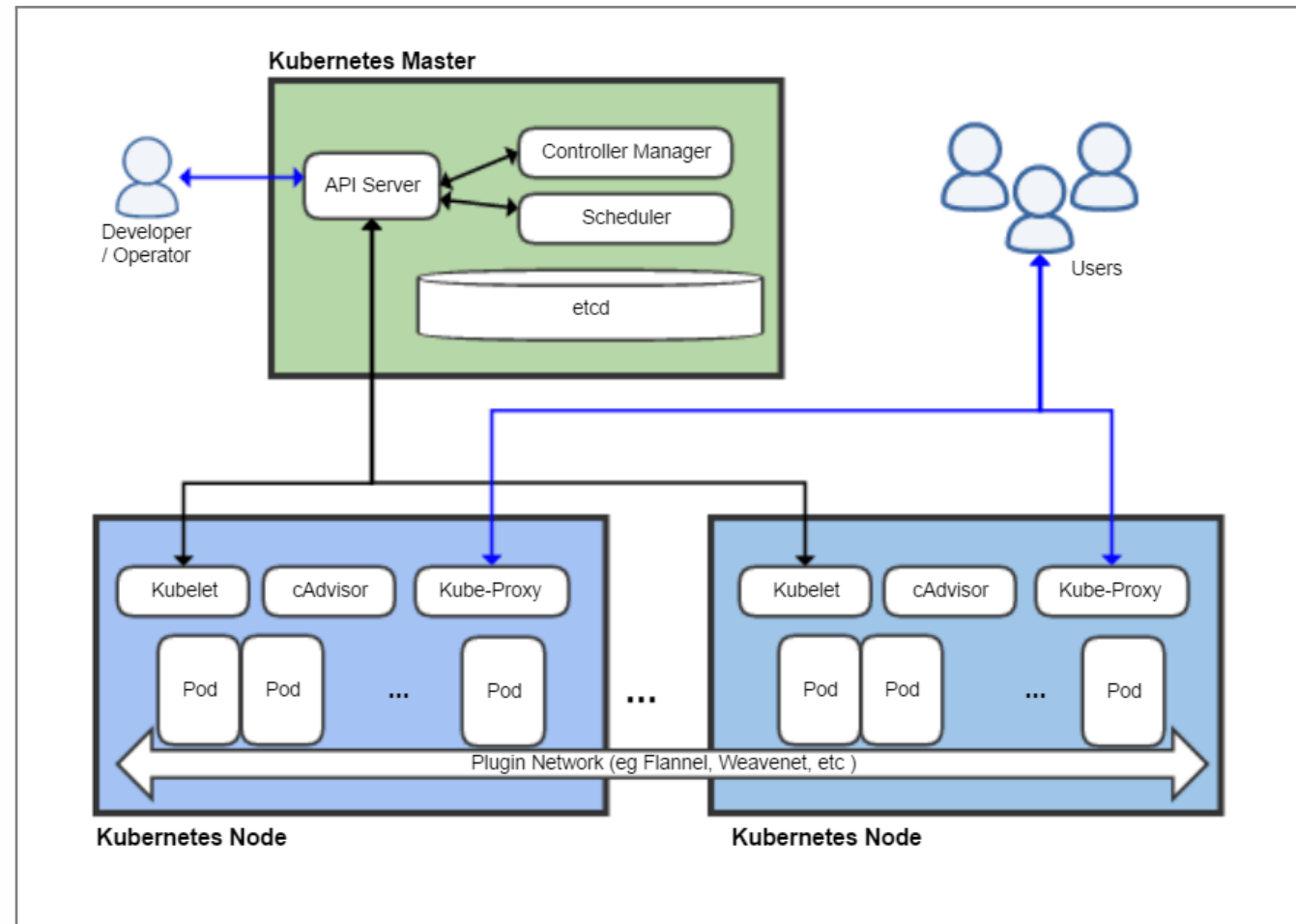
```
RUN git clone https://github.com/htacg/tidy-html5.git _tidy-html5 && \
  cd _tidy-html5/build/cmake && \
  git checkout 5.1.25 && \
  cmake ../.. && \
  make && \
  make install
```

**LXC**

LXC is an operating-system-level virtualization method for running multiple isolated Linux systems on a control host using a single Linux kernel.



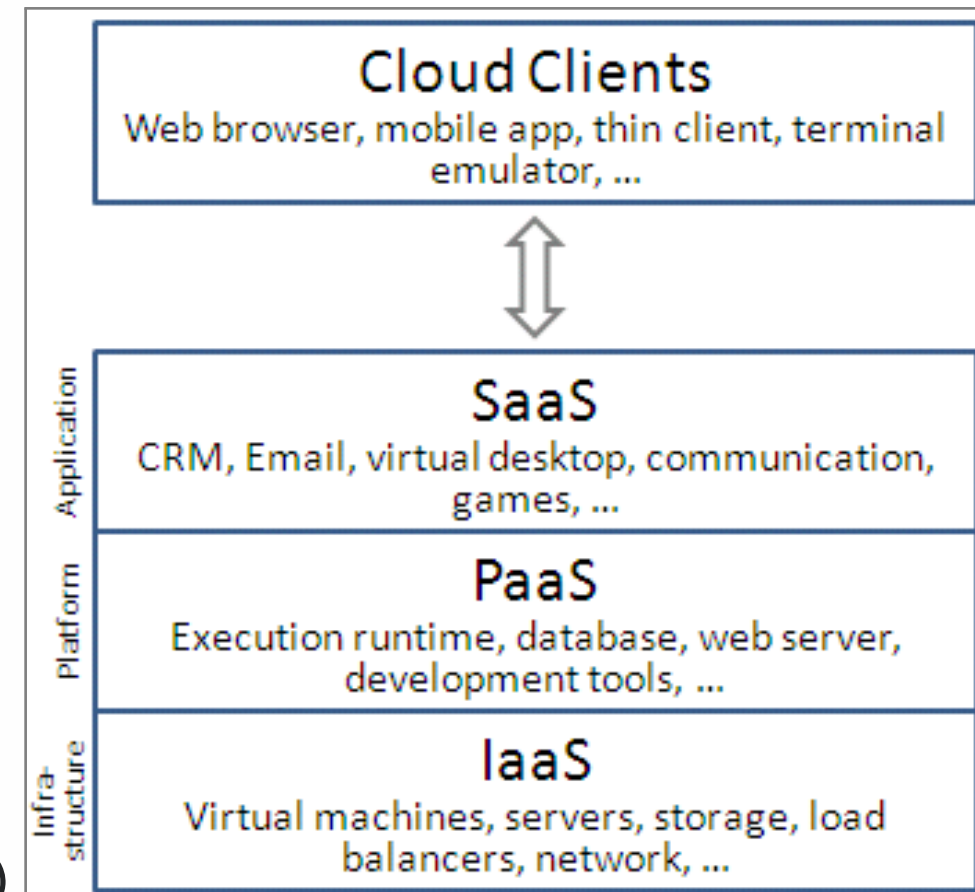
K8s]Kubernetes



Chapter #3:

PaaS, IaaS, SaaS, EaaS, etc.

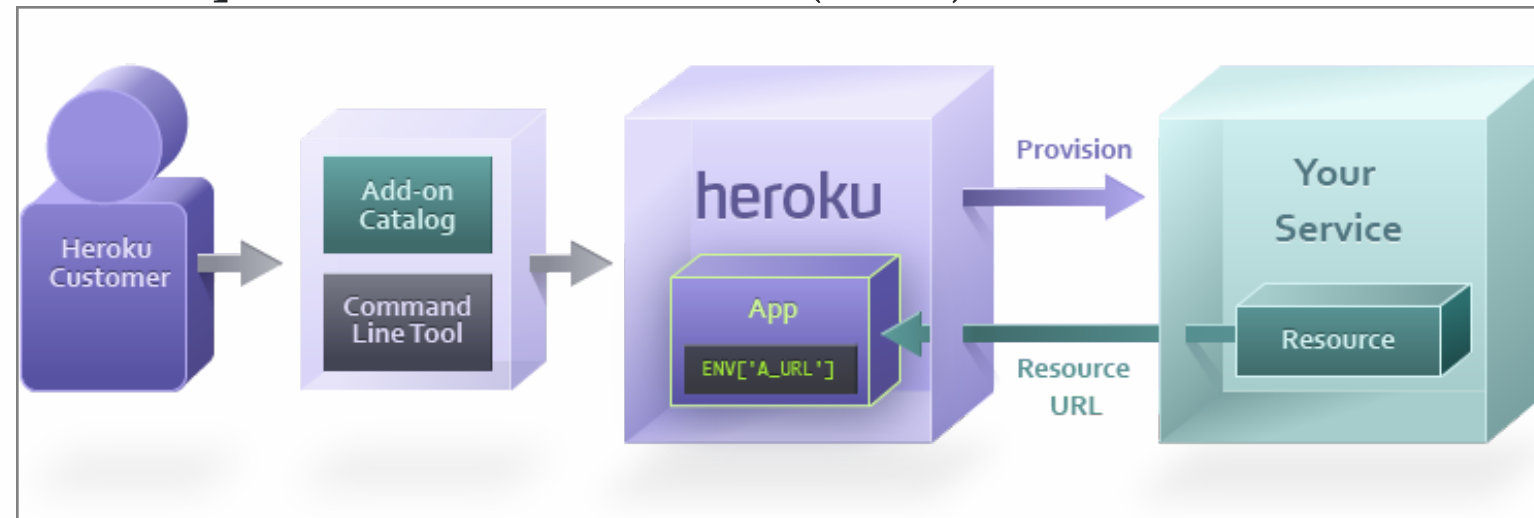




EaaS]Everything as a Service (EaaS)

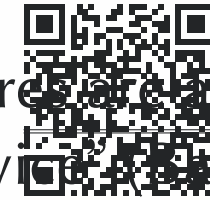


## Heroku]Platform as a Service (PaaS)





Serverless] Serverless Architecture Serverless architectures are application designs that incorporate third-party “Backend as a Service” (BaaS) services, and/or that include custom code run in managed, ephemeral containers on a “Functions as a Service” (FaaS) platform.



<https://martinfowler.com/articles/serverless.html>

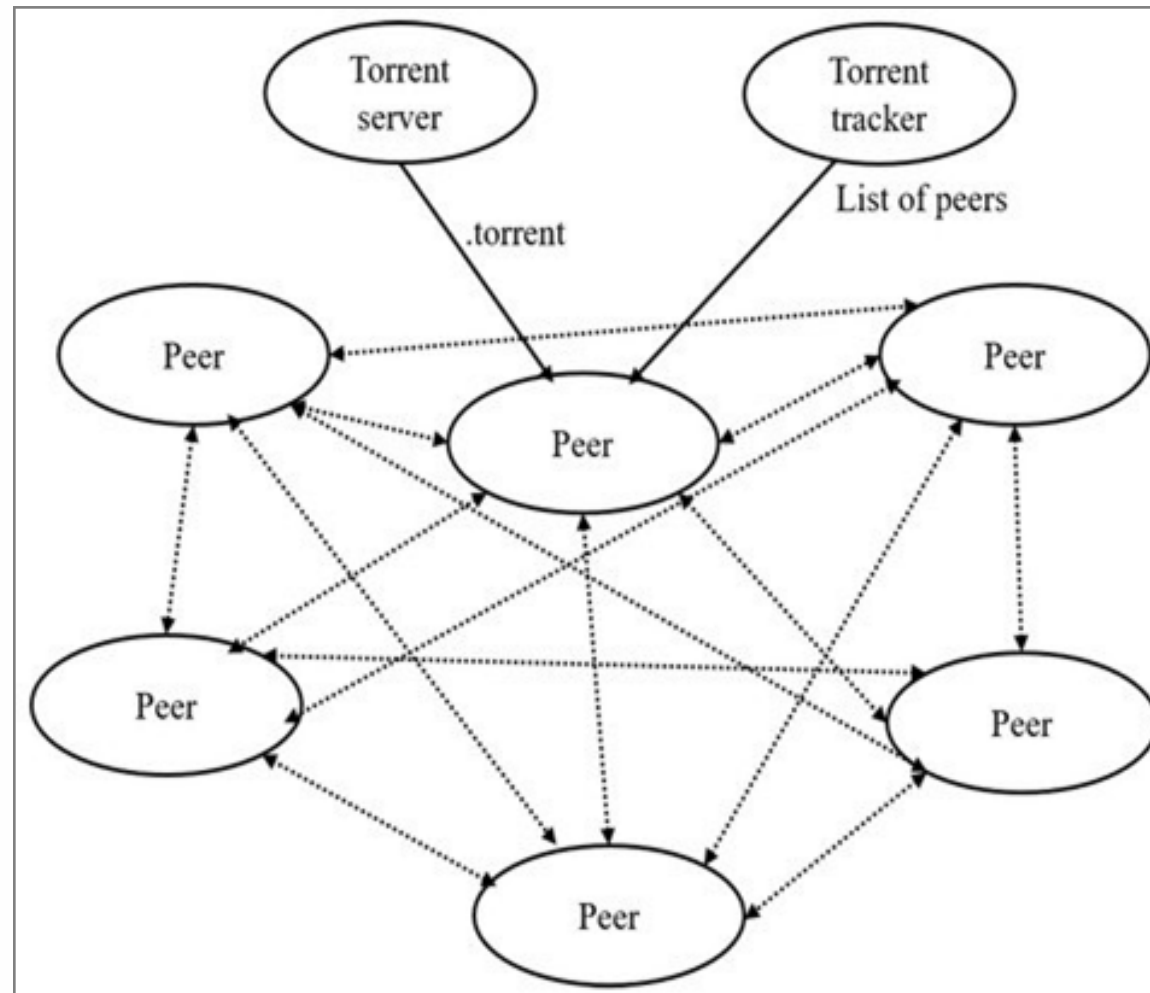
Fundamentally, FaaS is about running backend code without managing your own server systems or your own long-lived server applications.

AWS RDS vs. AWS DynamoDB

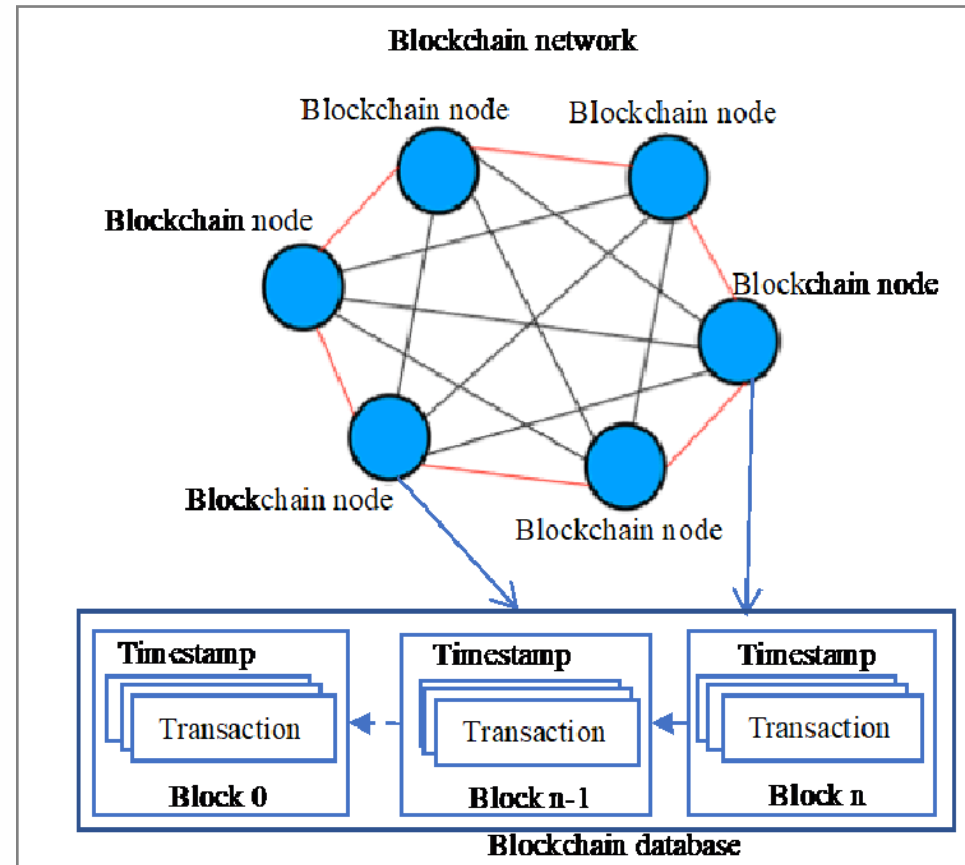
Chapter #4:

## P2P: BitTorrent, Blockchain, and Beyond

## BitTorrent

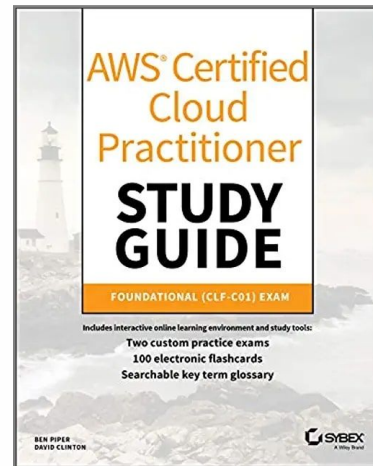


# Blockchain

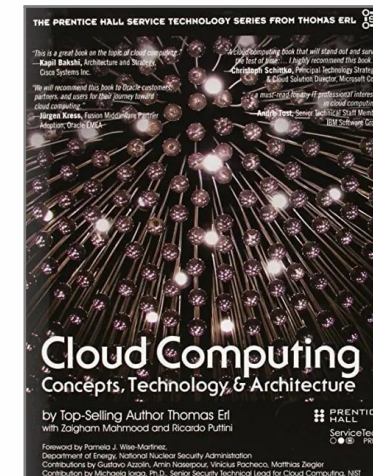


Chapter #5:

## Books, Venues, Call-to-Action



Ben Piper and David Clinton. *AWS Certified Cloud Practitioner Study Guide: CLF-C01 Exam*. Wiley, 2019



Thomas Erl, Ricardo Puttini, and Zaigham Mahmood. *Cloud Computing: Concepts, Technology & Architecture*. Prentice Hall, 2013



Where to go:

AWS Certified Solution Architect

## Call to Action:

Use two AWS services in your app.

## Still unresolved issues:

- How to simplify serverless design?
- How to manage data serverless?
- How to decentralize better than Blockchain?
- How to enable decentralized computing on IoT devices?

# Bibliography

Thomas Erl, Ricardo Puttini, and Zaigham Mahmood. *Cloud Computing: Concepts, Technology & Architecture*.

Prentice Hall, 2013.

Ben Piper and David Clinton. *AWS Certified Cloud Practitioner Study Guide: CLF-C01 Exam*. Wiley, 2019.