Serverless Design

in Cloud

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Lecture #12 out of 16
80 minutes

The slidedeck was presented by the author in this YouTube Video


Cloud
On-premise

- 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

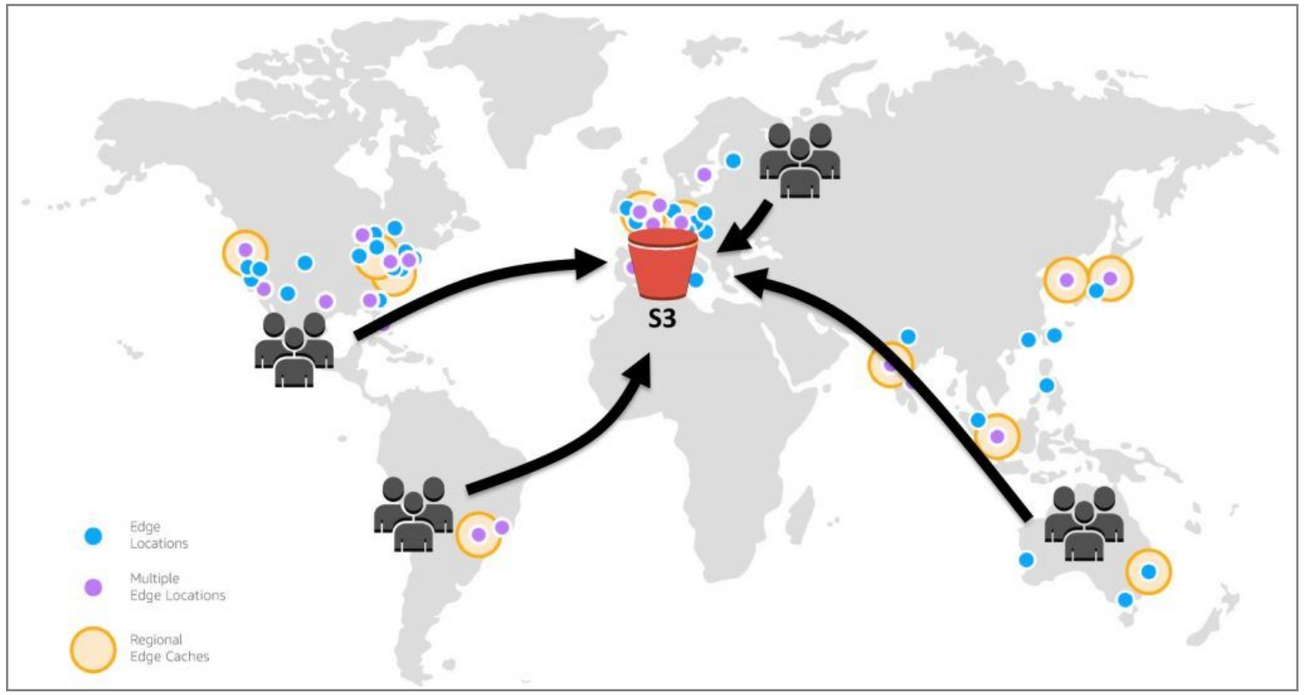
S3]Simple Storage Service (S3)

```ruby
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)

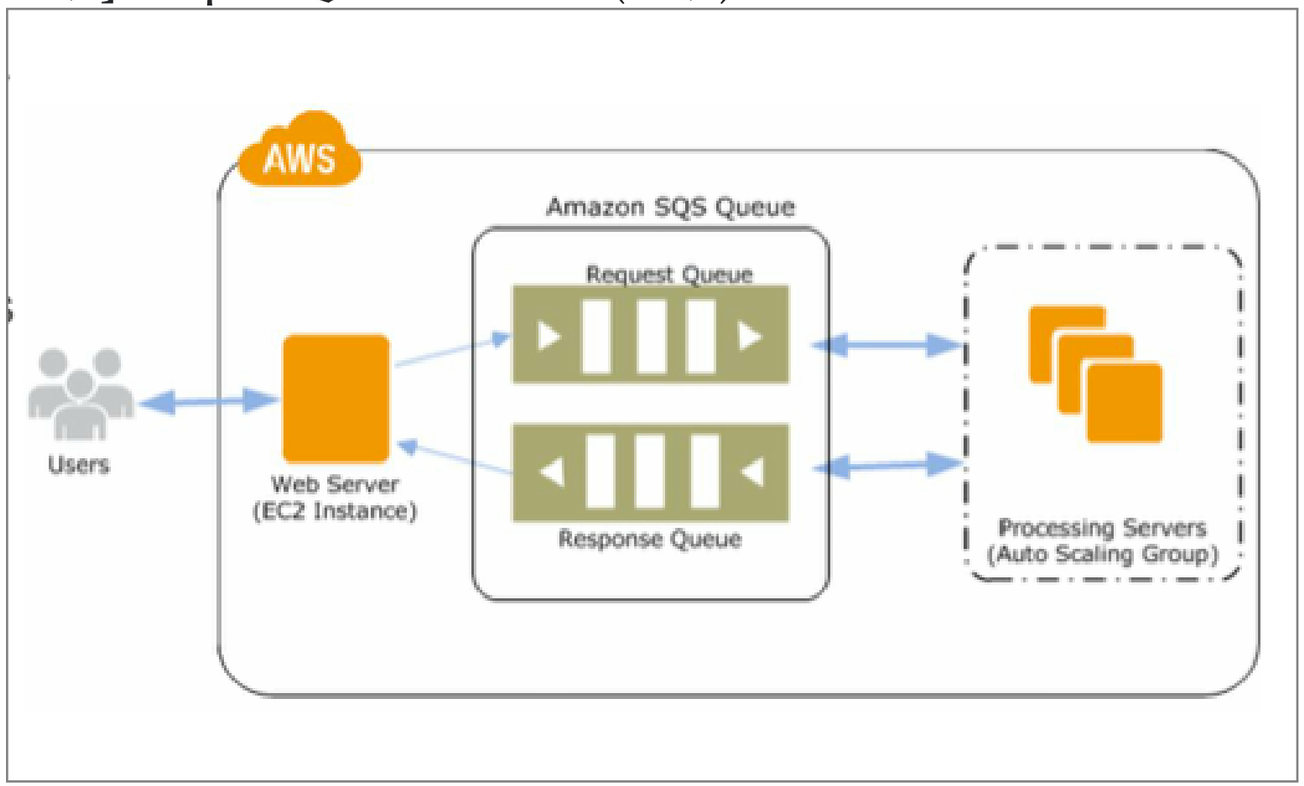
```
instance = ec2_resource.create_instances(
  image_id: image_id,
  min_count: 1,
  max_count: 1,
  key_name: key_pair_name,
  instance_type: instance_type,
  user_data: encoded_script
)
```

CloudFront

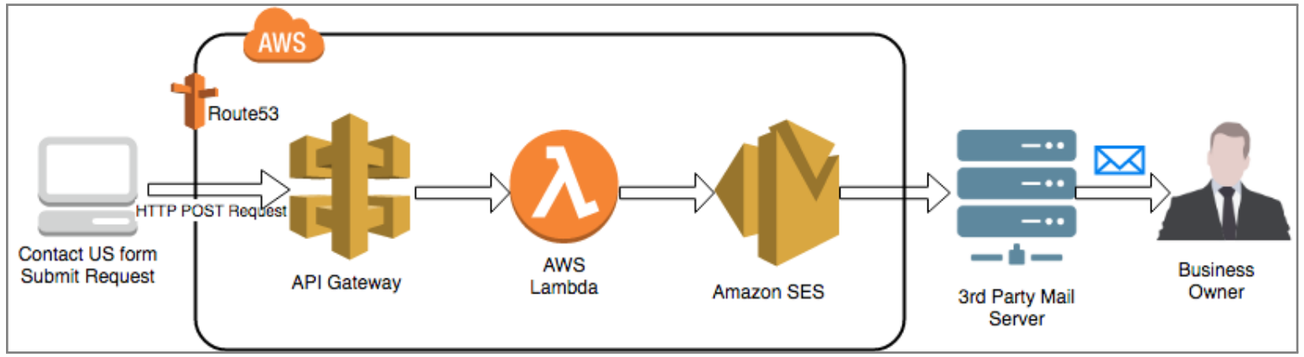

S3
Edge Locations
Multiple Edge Locations
Regional Edge Caches

[

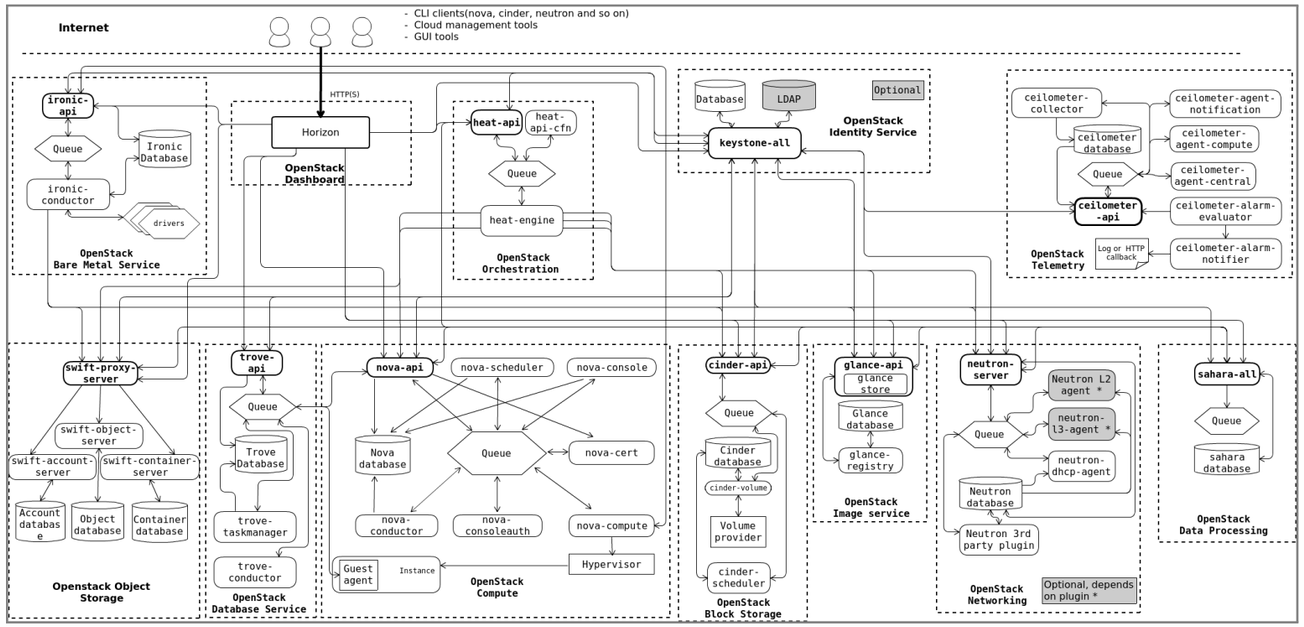
SQS]Simple Queue Service (SQS)



Lambda


AWS
Route53
HTTP POST Request
Contact US form
Submit Request
API Gateway
AWS
Lambda
Amazon SES
3rd Party Mail
Server
Business
Owner

OpenStack

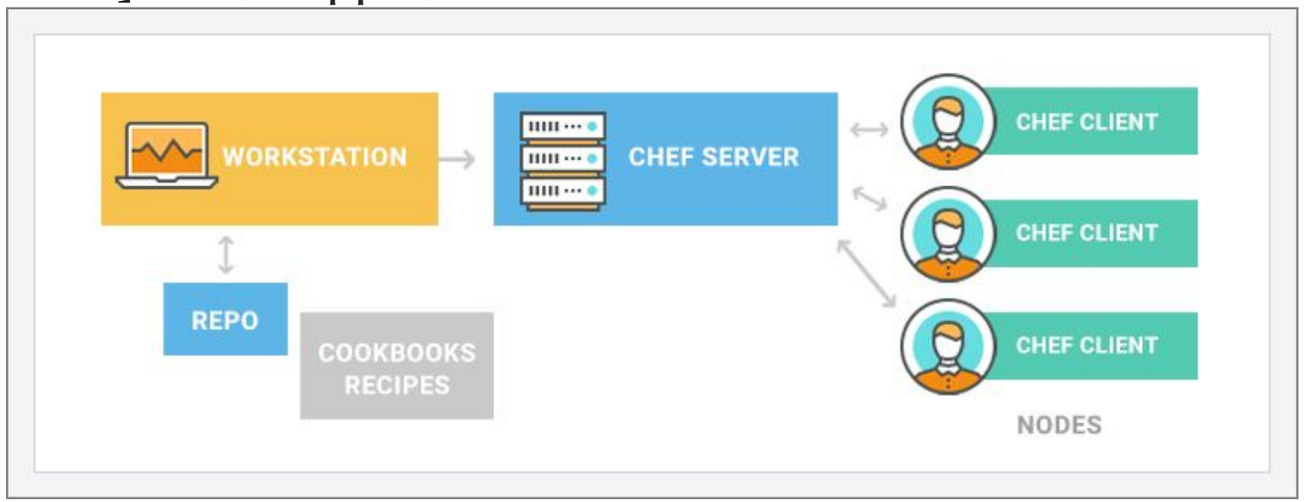


https://docs.openstack.org/install-guide/get-started-logical-architecture.html

Chapter #2:

Docker Containers

Chef]Chef, Puppet, etc.

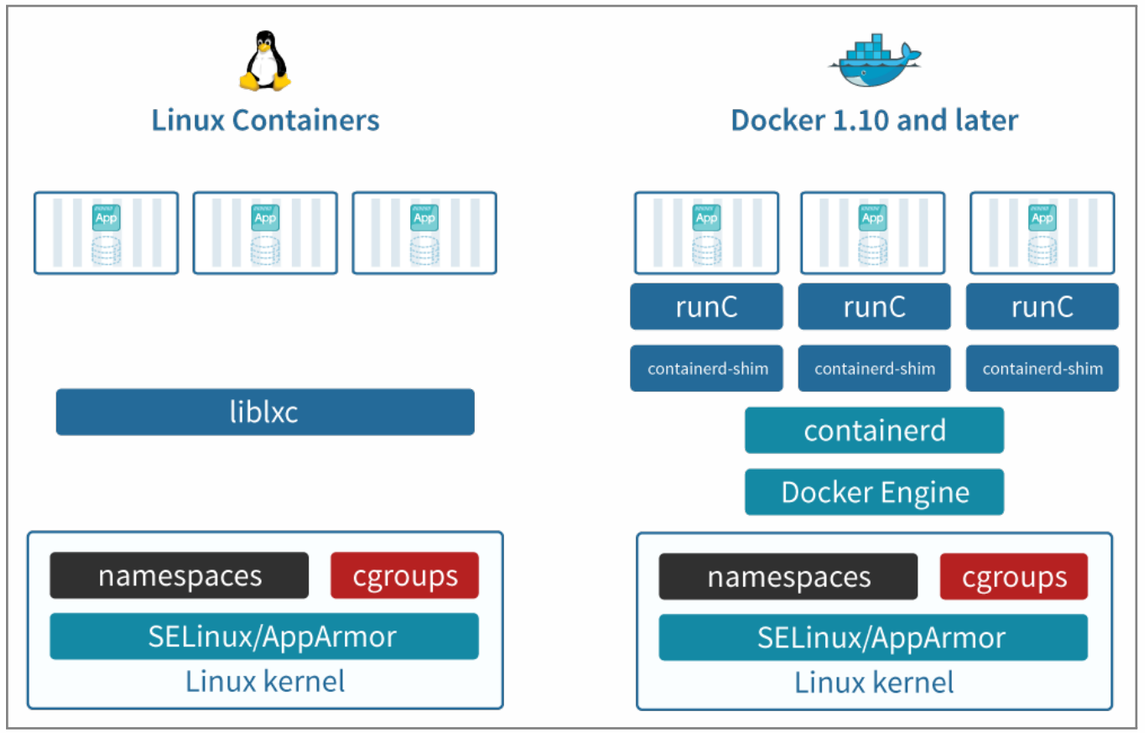


Dockerfile

```
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"
```

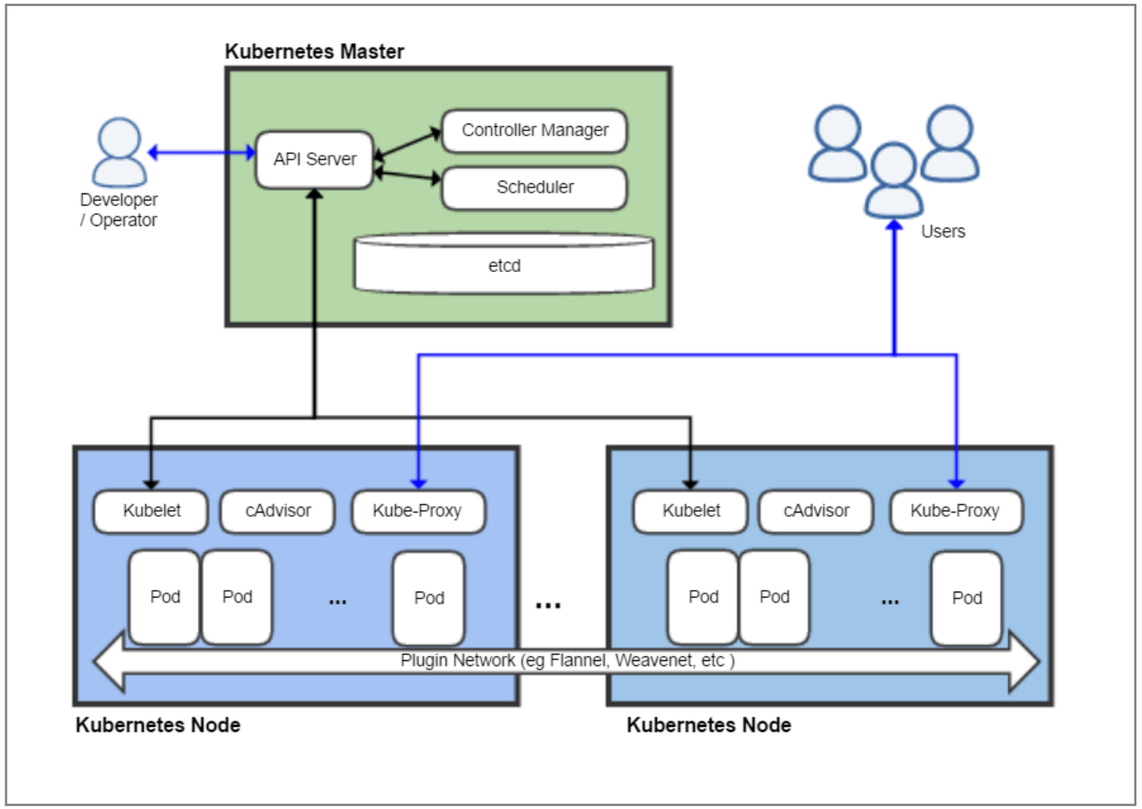
```
RUN git clone https://github.com/htacg/tidy-html5.git _tidy-html5 && \
  cd _tidy-html5/build/cmake && \
  git checkout 5.1.25 && \
  cmake ../.. && \
  make && \
  make install
```

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

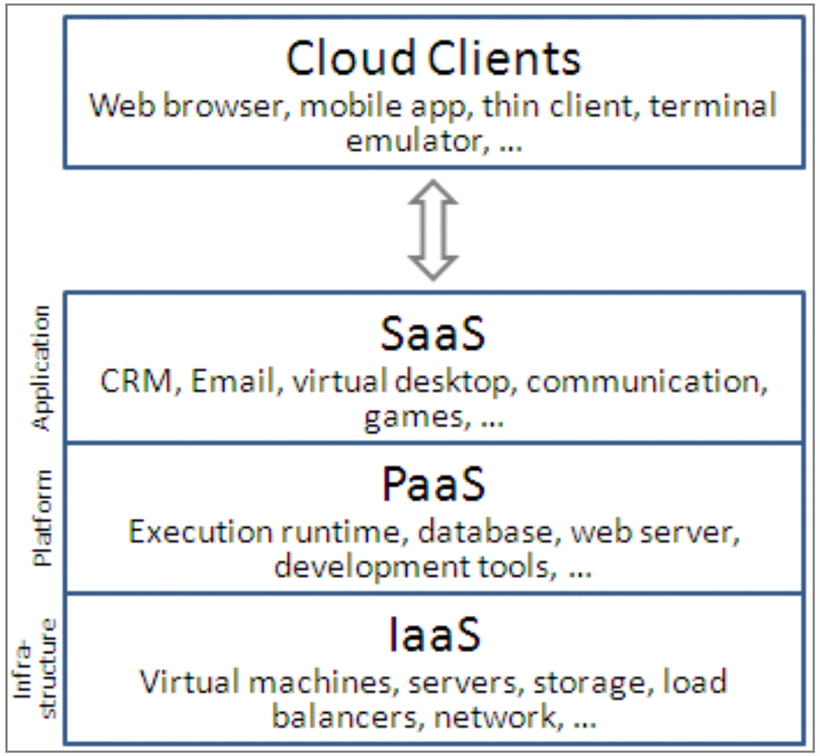


Chapter #3:

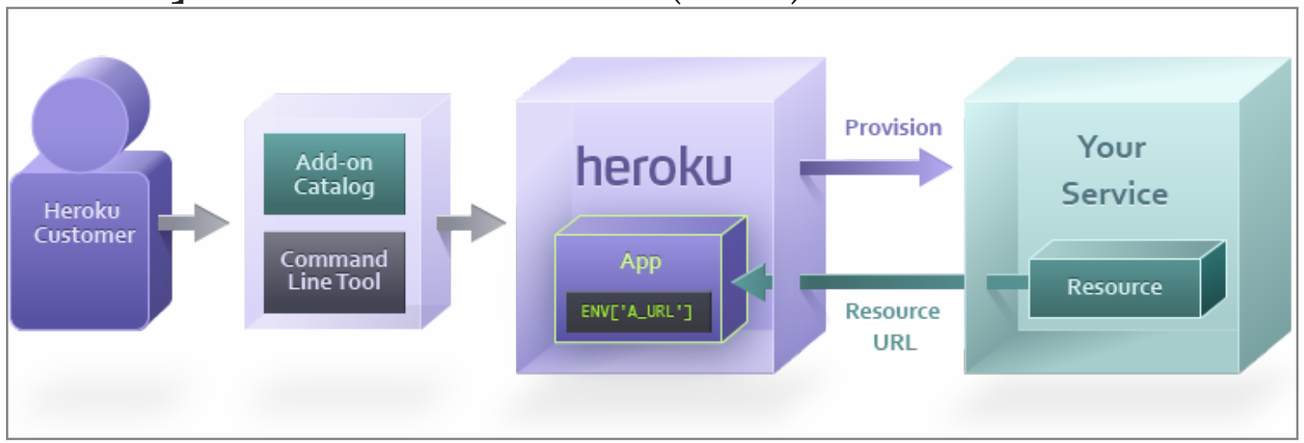
PaaS, IaaS, SaaS, EaaS, etc.

[

EaaS]Everything as a Service (EaaS)



Heroku]Platform as a Service (PaaS)



https://martinfowler.com/articles/serverless.html ⇉

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.

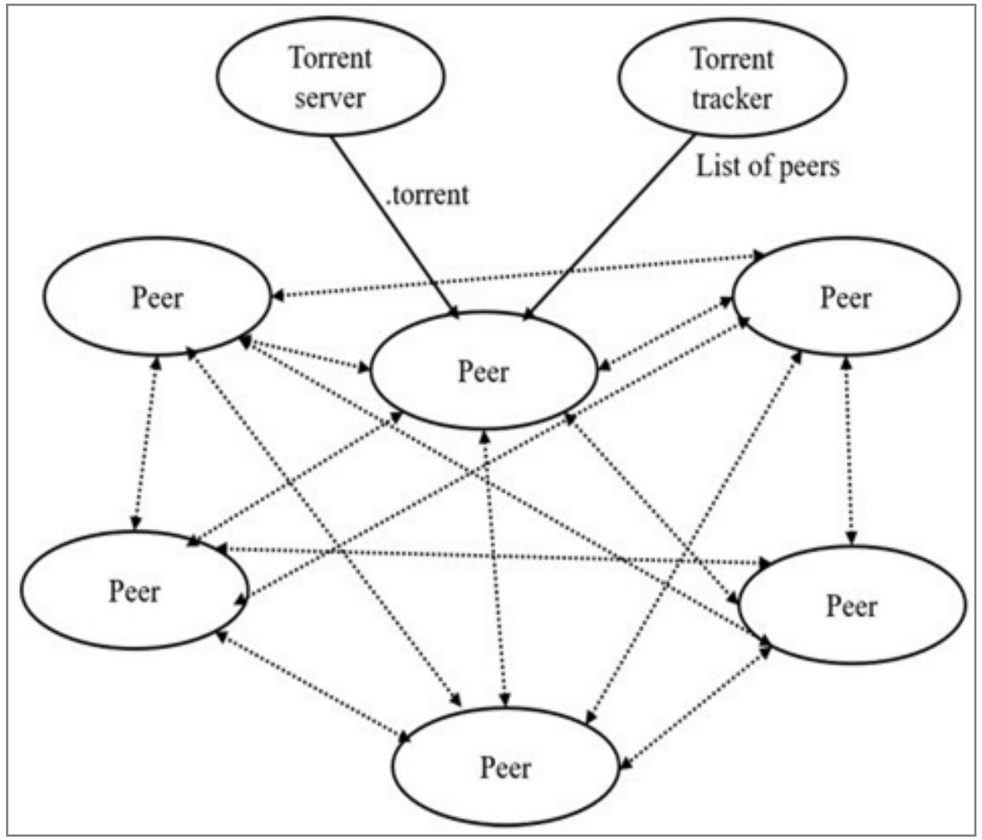
Fundamentally, FaaS is about running backend code without managing your own server systems or your own long-lived server applications.

AWS RDS vs. AWS DynamoDB

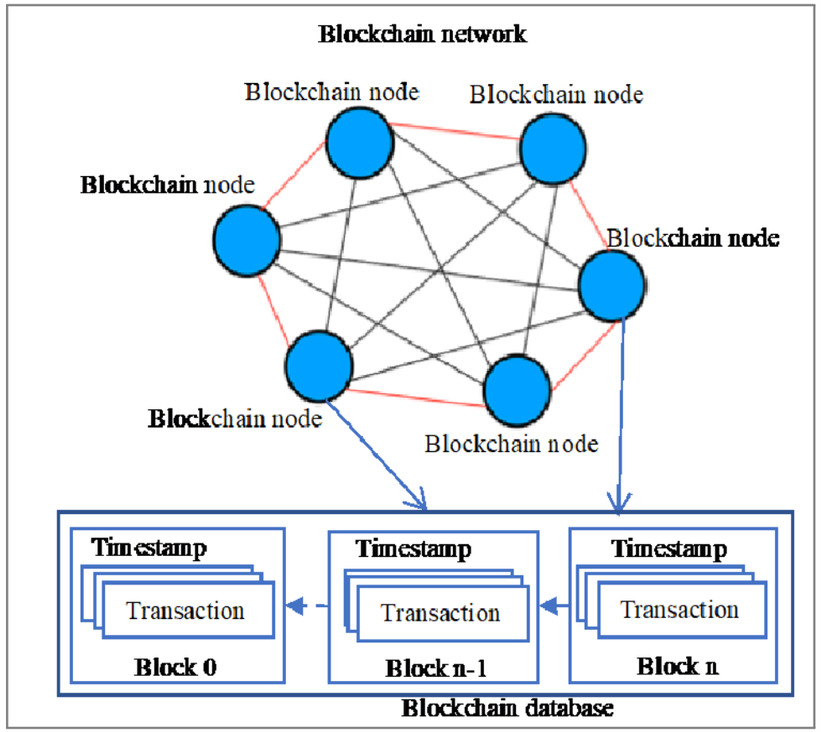
Chapter #4:

P2P: BitTorrent, Blockchain, and Beyond

BitTorrent

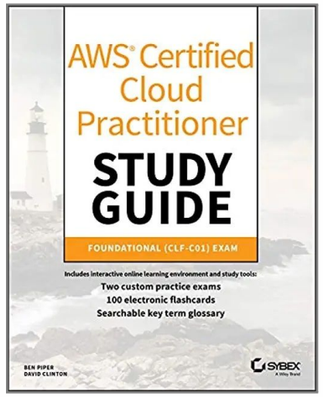

Torrent server
Torrent tracker
.torrent
List of peers
Peer
Peer
Peer
Peer
Peer
Peer

Blockchain

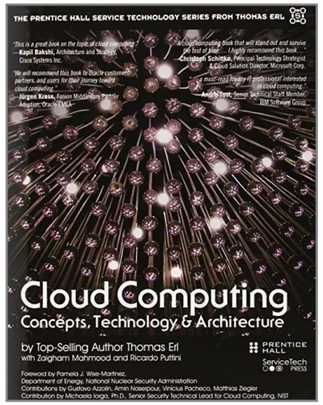

Blockchain network
Blockchain node
Blockchain node
Blockchain node
Blockchain node
Blockchain node
Blockchain node
Timestamp
Transaction
Block 0
Timestamp
Transaction
Block n-1
Timestamp
Transaction
Block n
Blockchain database

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.