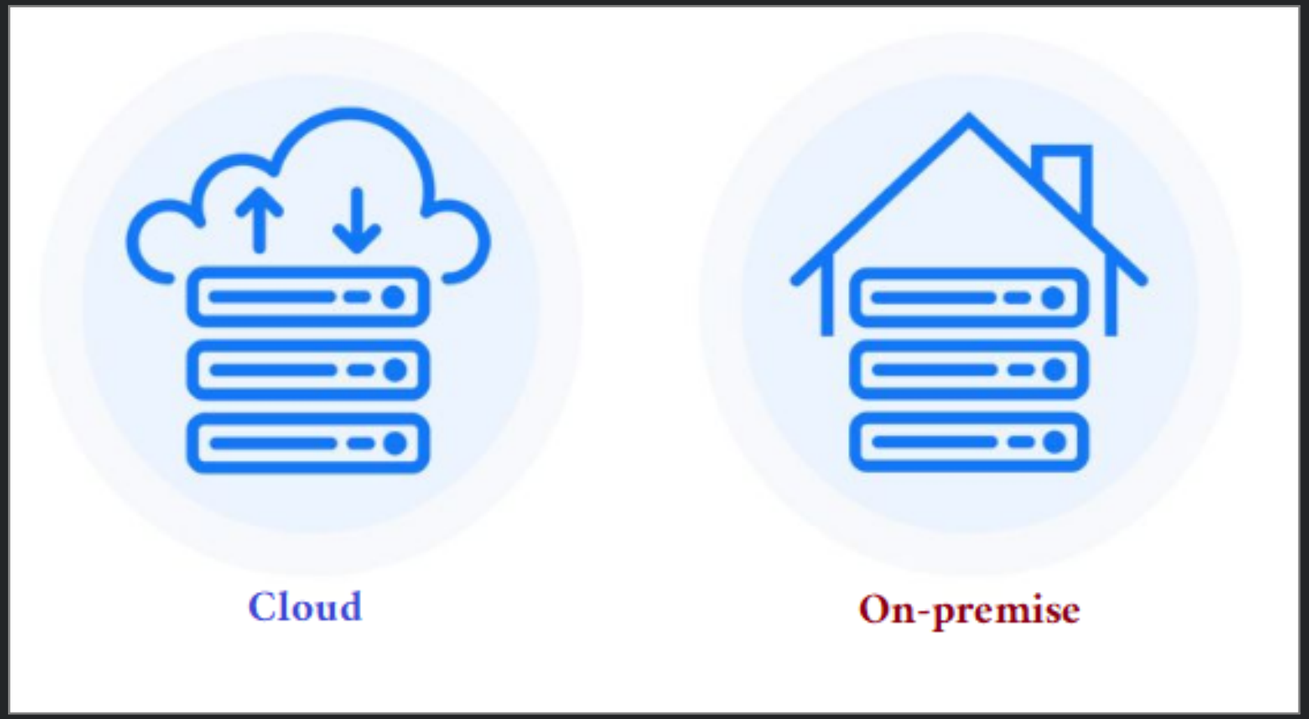
Serverless Design

in Cloud

Yegor Bugayenko

Lecture #12 out of 16
90 minutes

All videos are in this YouTube playlist.


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

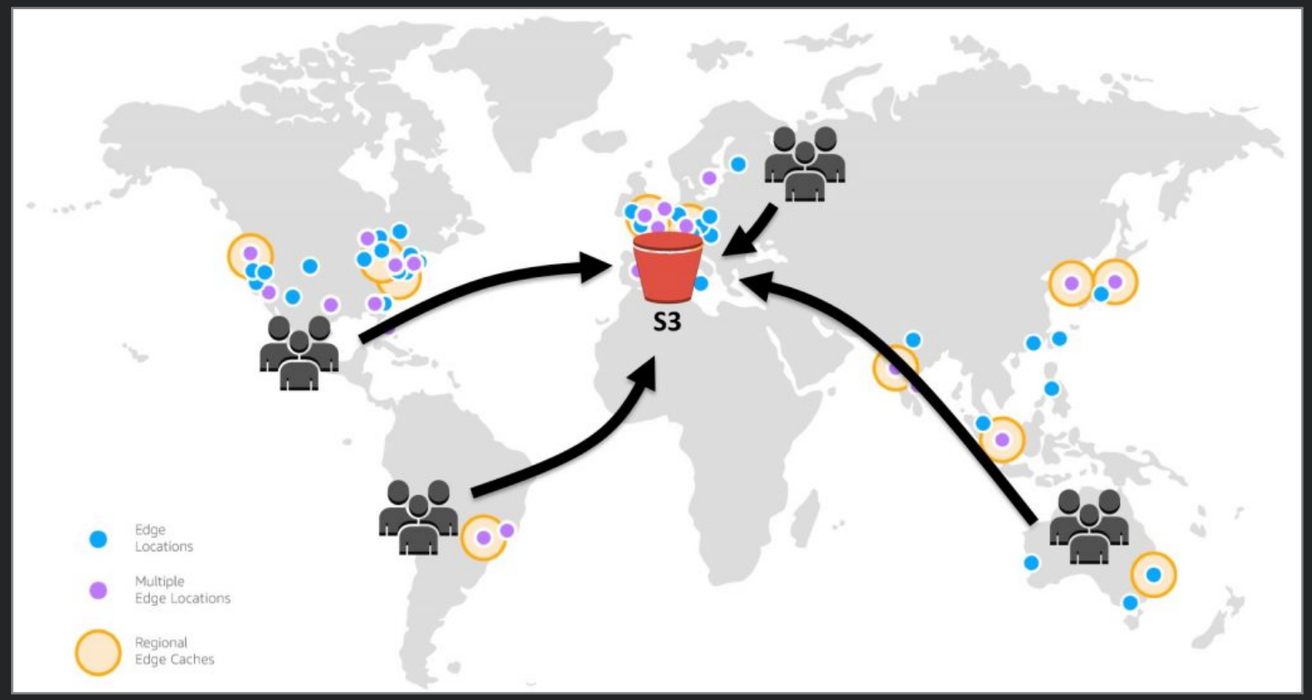
S3]Simple Storage Service (S3)

```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

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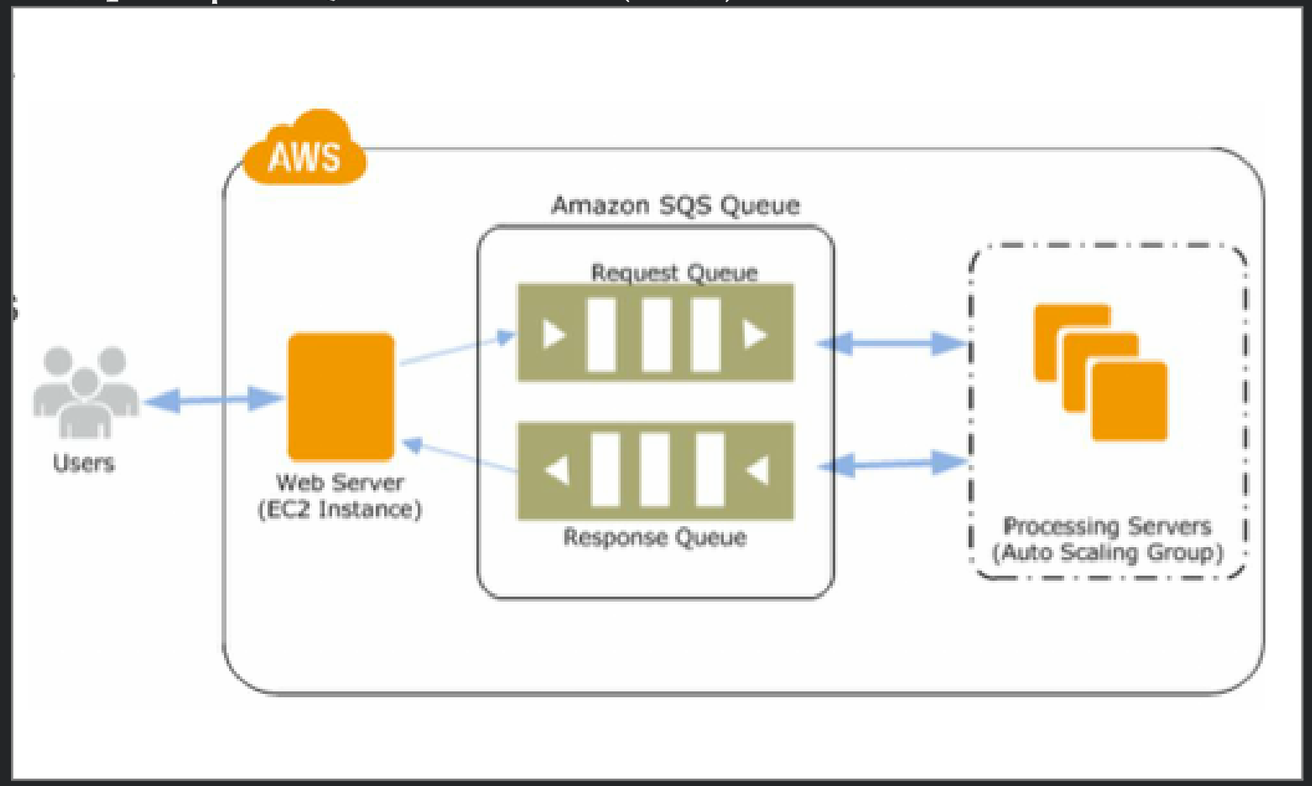
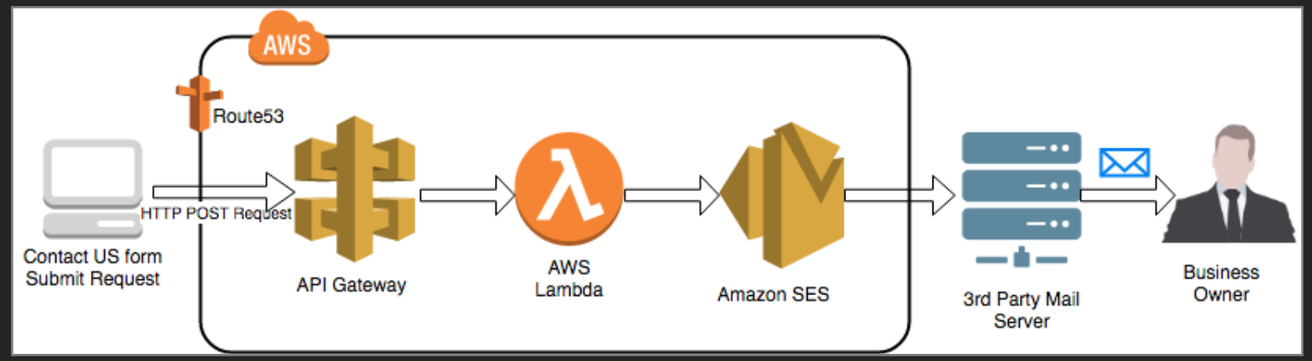
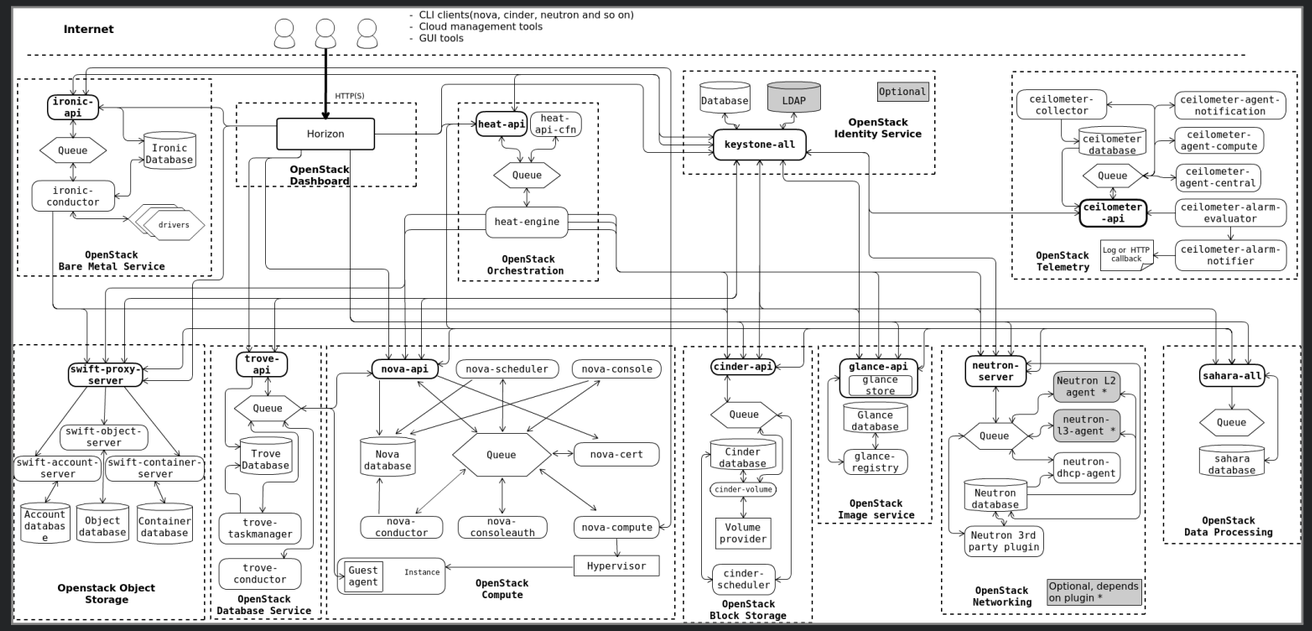
SQS]Simple Queue Service (SQS)



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

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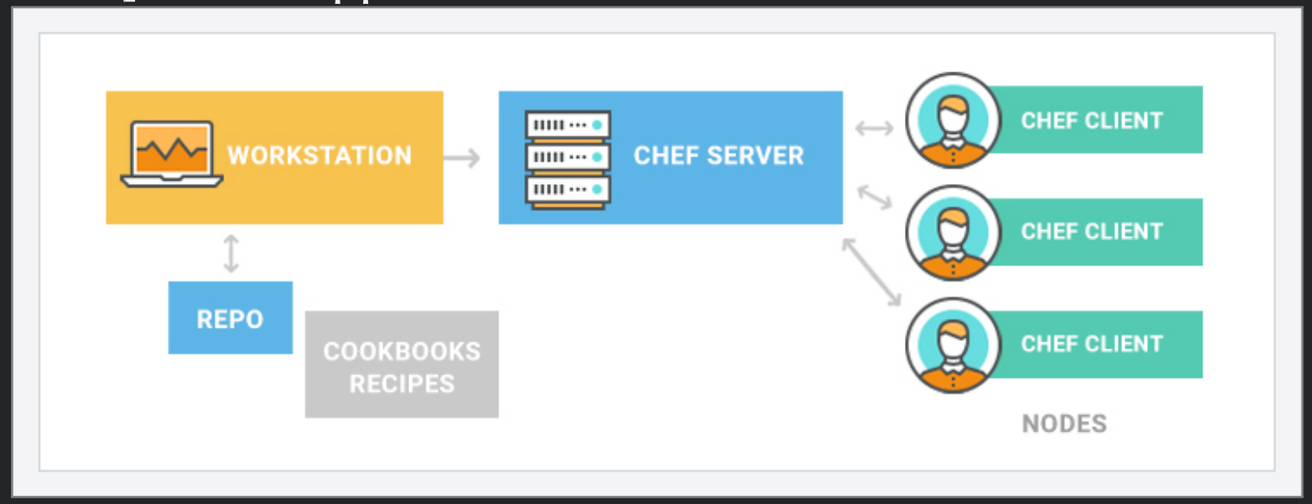
Chef]Chef, Puppet, etc.

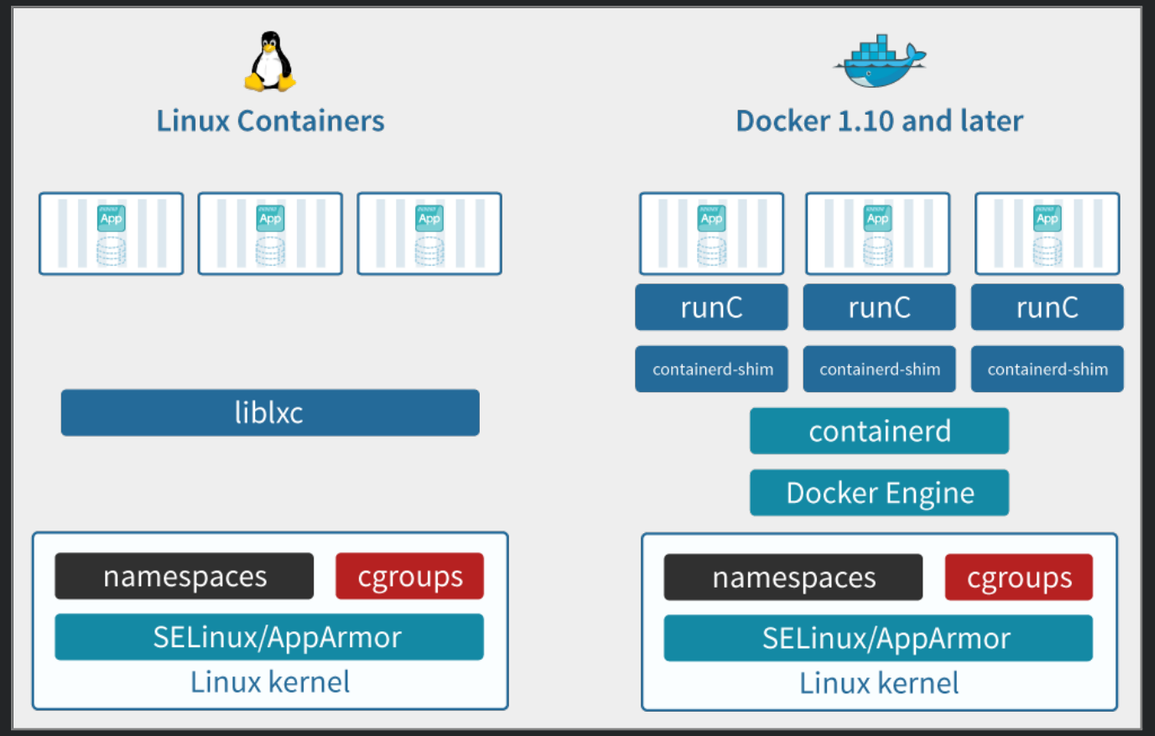


Dockerfile

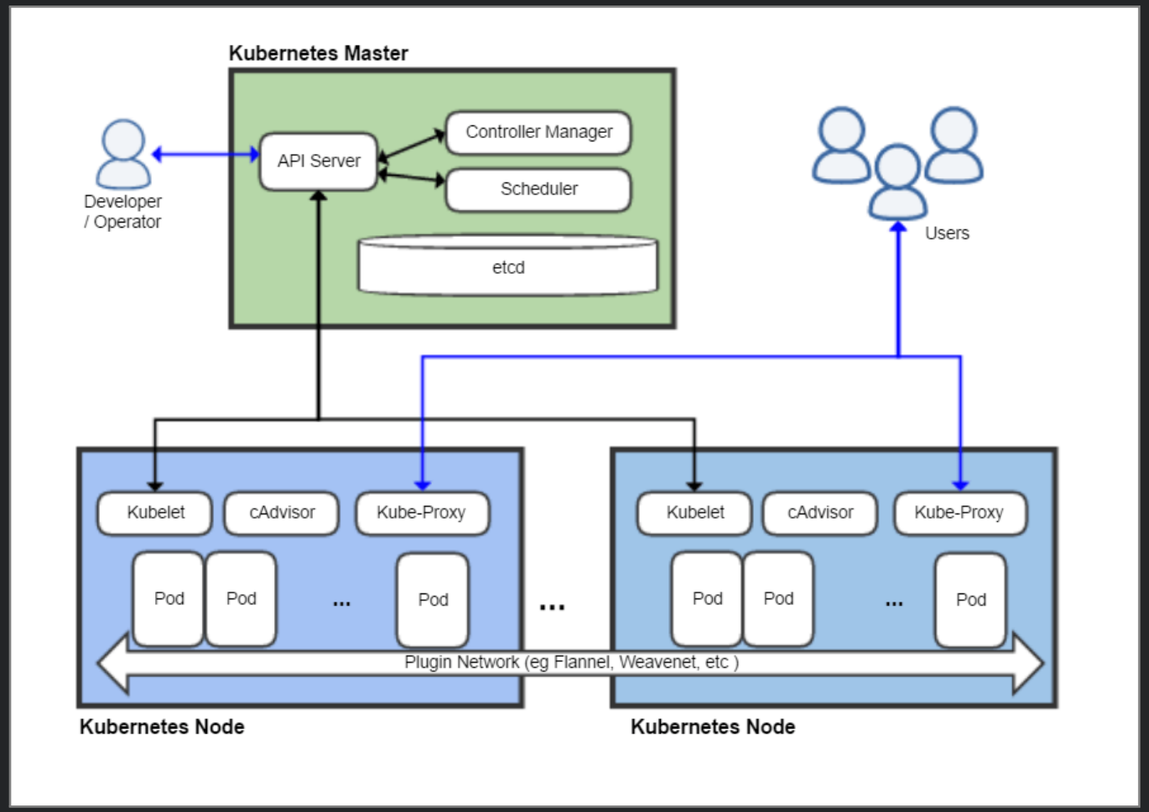
```
FROM yegor256/rultor-image
MAINTAINER Yegor Bugayenko <yegor256@gmail.com>
LABEL Description="yegor256.com" Vendor="Yegor Bugayenko" Version="1.0"

ENV DEBIAN_FRONTEND=noninteractive

RUN sudo apt-get -y update --fix-missing
RUN sudo apt-get -y install aspell aspell-en
RUN sudo apt-get -y install graphviz
RUN sudo apt-get -y update --fix-missing
RUN sudo apt-get -y install gnuplot
RUN sudo apt-get -y install s3cmd
RUN sudo apt-get -y install fontforge liblapack-dev

RUN sudo apt-get -y install plantuml
COPY plantuml.jar /usr/share/plantuml/plantuml.jar

RUN wget --no-check-certificate --quiet https://cmake.org/files/v3.5/cmake-3.5.1.tar.gz && \
  tar xf cmake-3.5.1.tar.gz && \
  rm -rf _cmake-3.5.1 && \
  mv cmake-3.5.1 _cmake-3.5.1 && \
  cd _cmake-3.5.1 && \
  ./configure && \
  make && \
  make install

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

RUN sudo apt-get install -y woff2
COPY woff.zip /tmp/woff.zip
RUN unzip /tmp/woff.zip -d _sfnt2woff && \
  cd _sfnt2woff && \
  make && \
  cp sfnt2woff /usr/local/bin/

RUN sudo apt-get -y update --fix-missing
RUN sudo apt-get install -y libxml2-utils

RUN npm install -g cssshrink@0.0.5

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.

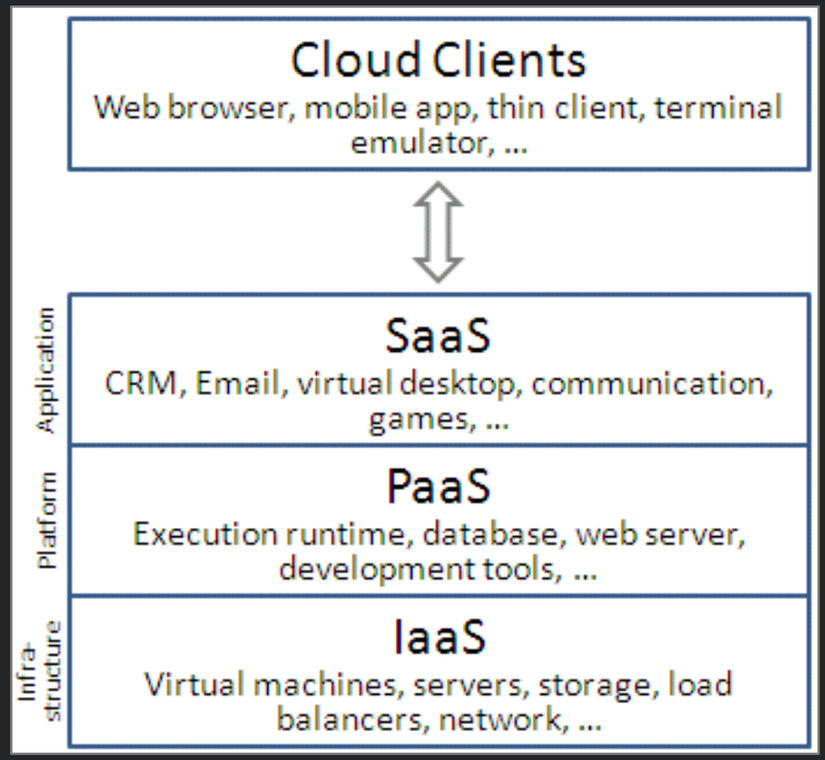


K8s]Kubernetes

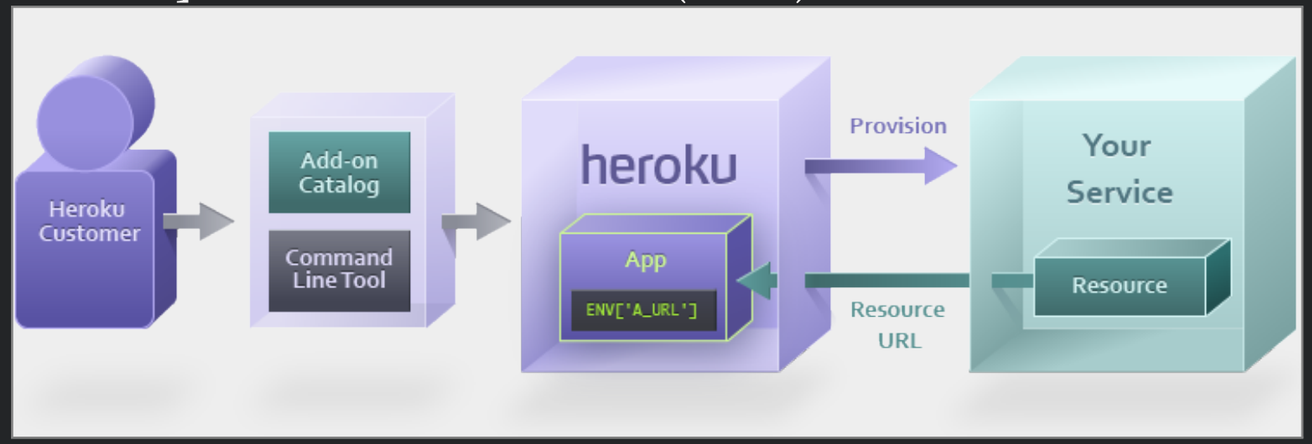
Chapter #3:

PaaS, IaaS, SaaS, EaaS, etc.

EaaS]Everything as a Service (EaaS)



Heroku]Platform as a Service (PaaS)



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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.

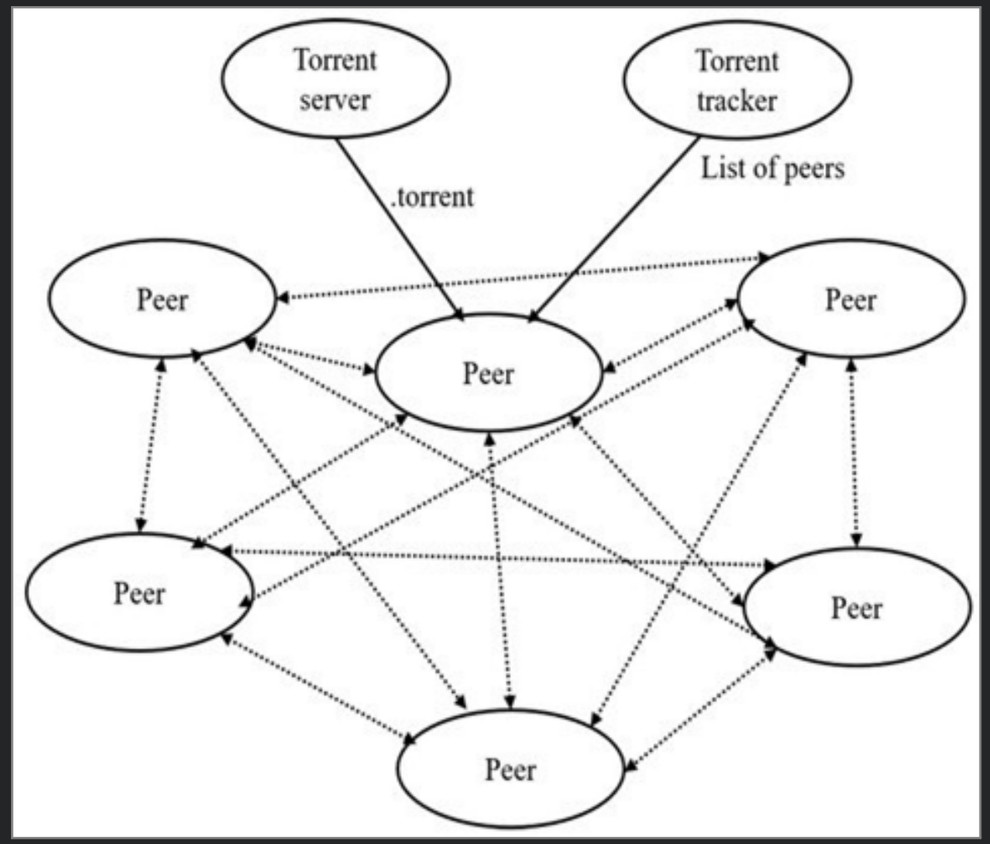
Fundamentally, FaaS is about running backend code without managing your own server systems or your own long-lived server applications.

AWS RDS vs. AWS DynamoDB

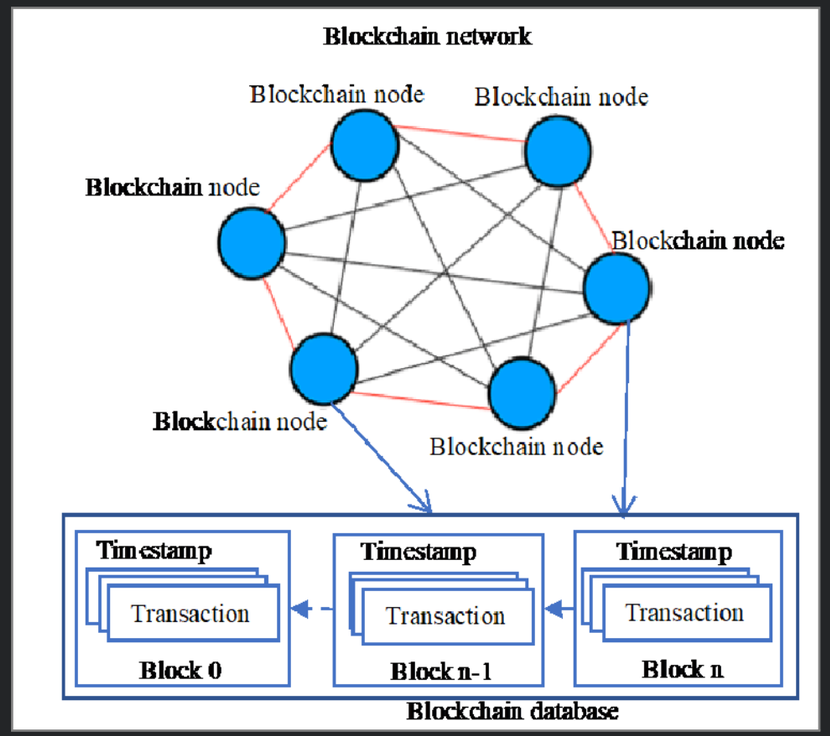
Chapter #4:

P2P: BitTorrent, Blockchain, and Beyond

BitTorrent

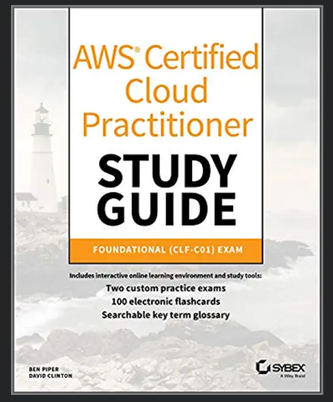

Torrent server
Torrent tracker
.torrent
List of peers
Peer
Peer
Peer
Peer
Peer
Peer

Blockchain

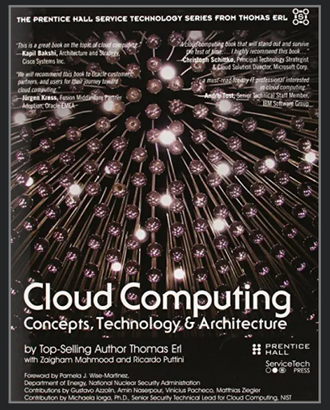

Blockchain network
Blockchain node
Blockchain node
Blockchain node
Blockchain node
Blockchain node
Blockchain node
Timestamp
Transaction
Block 0
Timestamp
Transaction
Block n-1
Timestamp
Transaction
Block n
Blockchain database

Chapter #5:

Books, Venues, Call-to-Action



“AWS Certified Cloud Practitioner, Study Guide: CLF-C01 Exam” by Ben Piper



“Cloud Computing: Concepts, Technology & Architecture” by Thomas Erl et al.

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?