Linux Server Virtualization

INTRODUCTION TO VIRTUALIZATION

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LINUX SYSTEM ADMINISTRATOR

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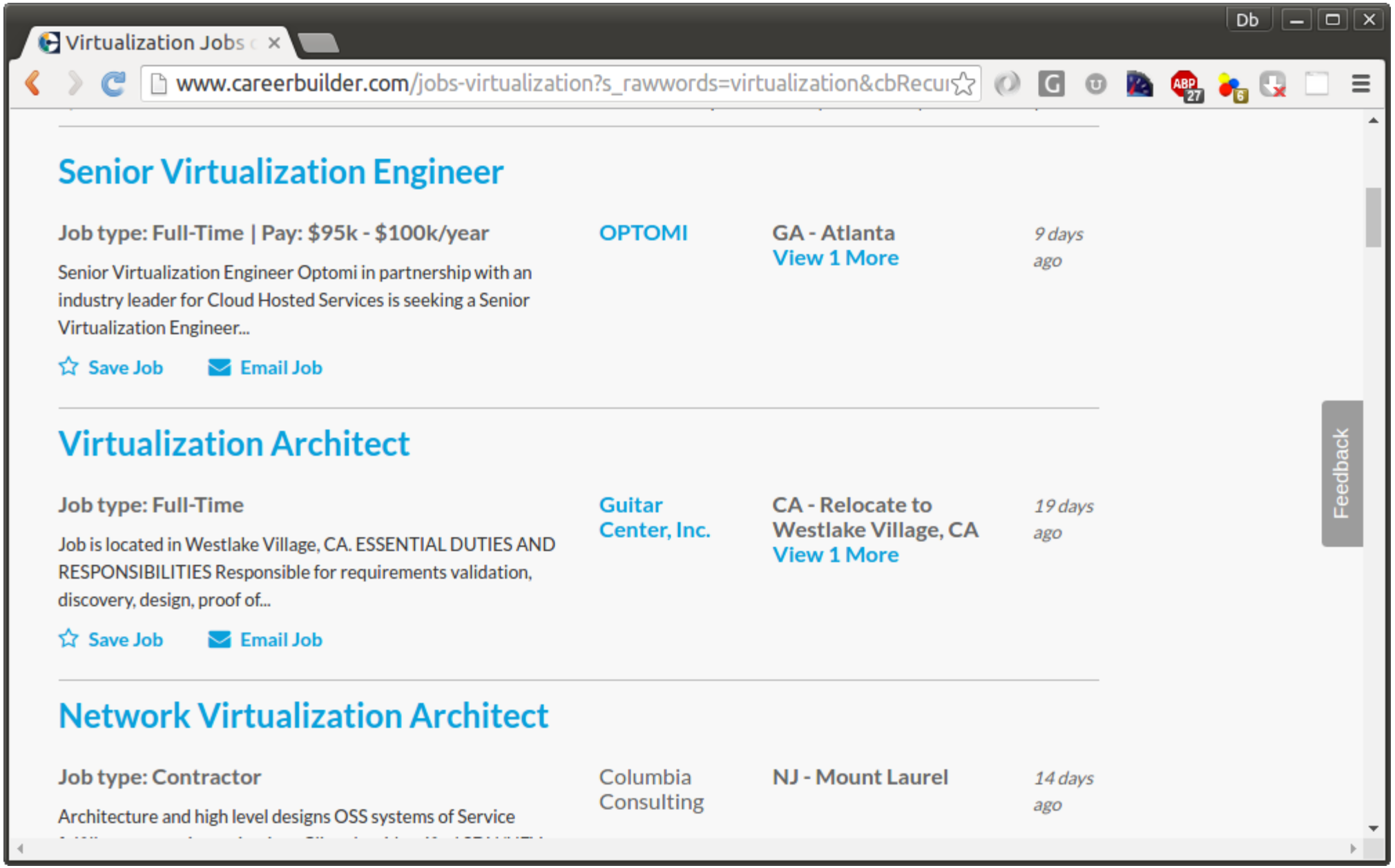
Introduction to Virtualization

Virtualization Jobs



Virtualization Platforms

Hypervisor Platforms:

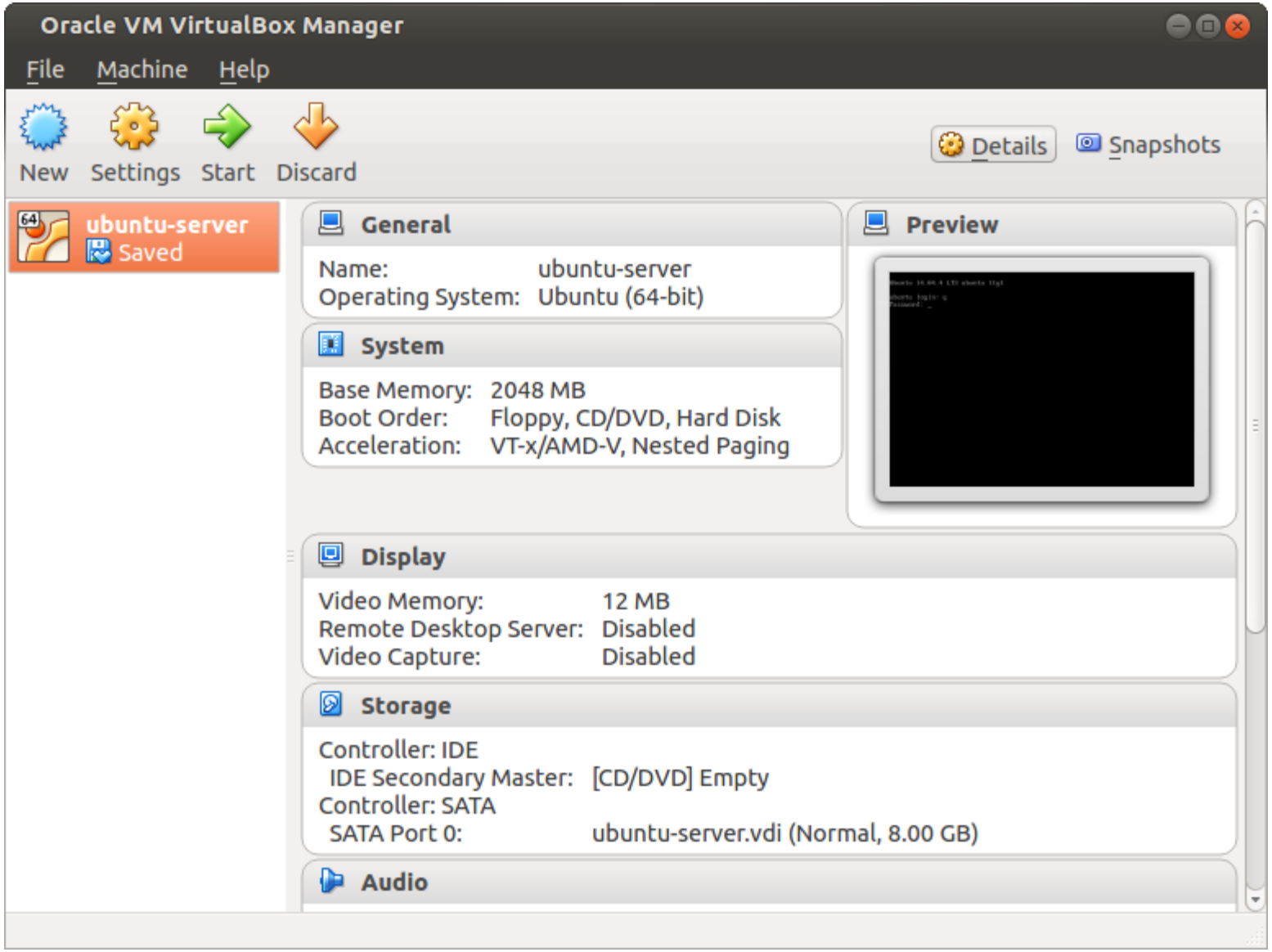
libvirt

Xen

KVM

Container Technologies:

VirtualBox


Oracle VM VirtualBox Manager
File
Machine
Help
New
Settings
Start
Discard
Details
Snapshots
ubuntu-server
Saved
General
Name: ubuntu-server
Operating System: Ubuntu (64-bit)
System
Base Memory: 2048 MB
Boot Order: Floppy, CD/DVD, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging
Preview
Display
Video Memory: 12 MB
Remote Desktop Server: Disabled
Video Capture: Disabled
Storage
Controller: IDE
IDE Secondary Master: [CD/DVD] Empty
Controller: SATA
SATA Port 0: ubuntu-server.vdi (Normal, 8.00 GB)
Audio

Virtualization Platforms

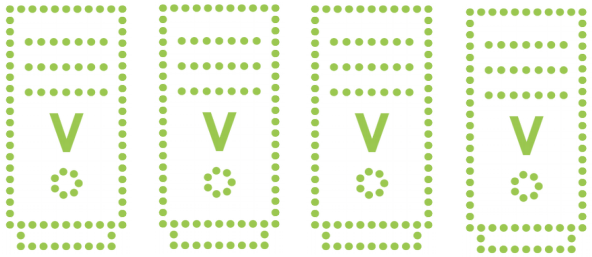
Hypervisor Platforms:

- libvirt
  - Xen
  - KVM

Container Technologies:

- OpenVZ
- LXC
- Docker
- VirtualBox

IT
Demand
Load
(September)

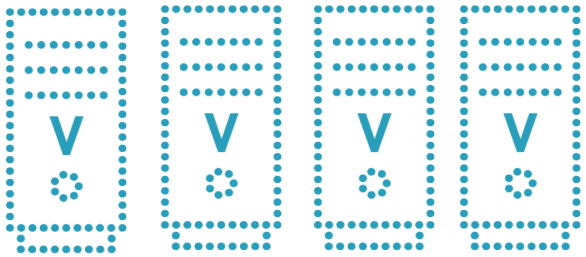


Student Enrollment Servers

Moodle LMS Server

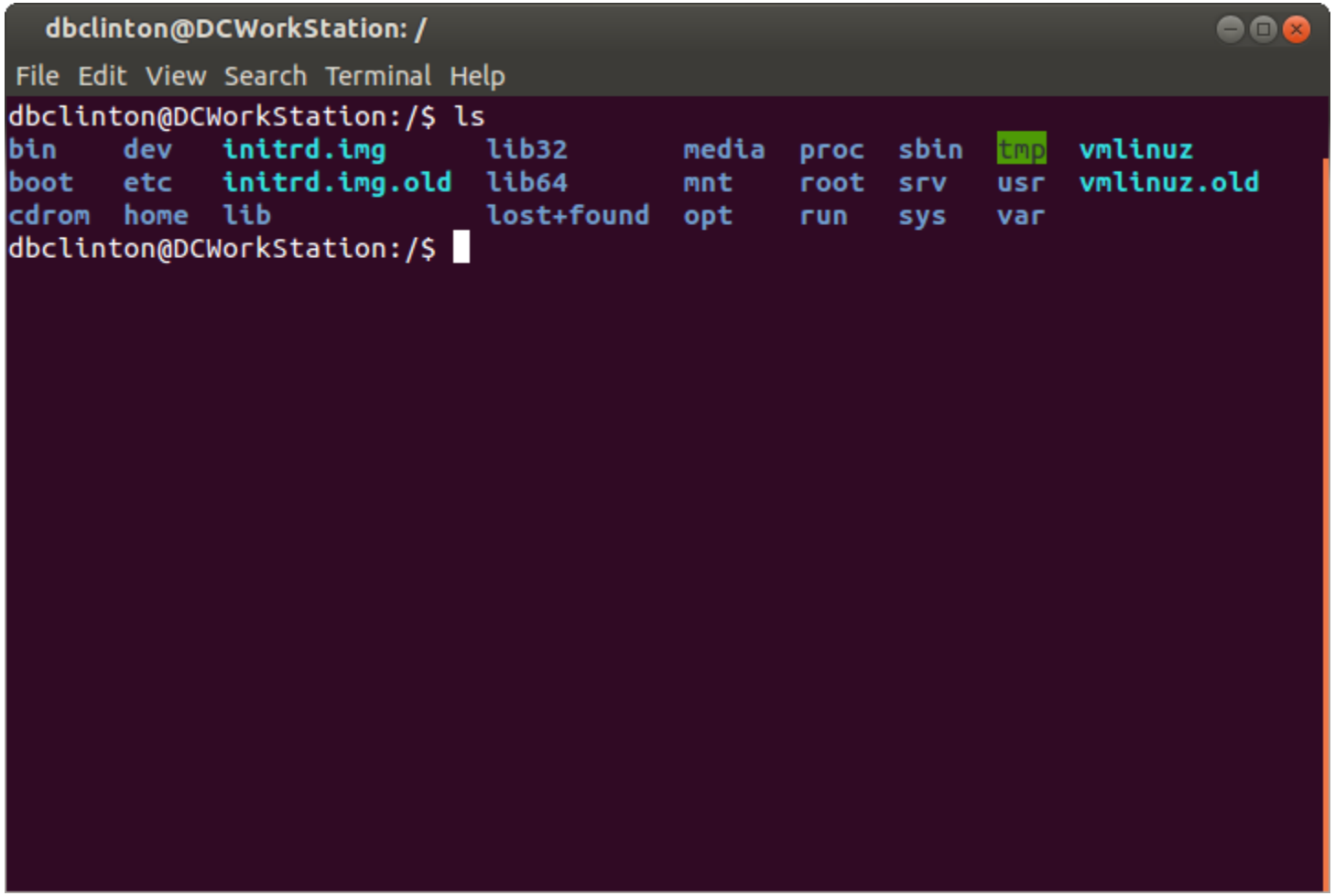
IT
Demand
Load
(April)

Student Enrollment Server



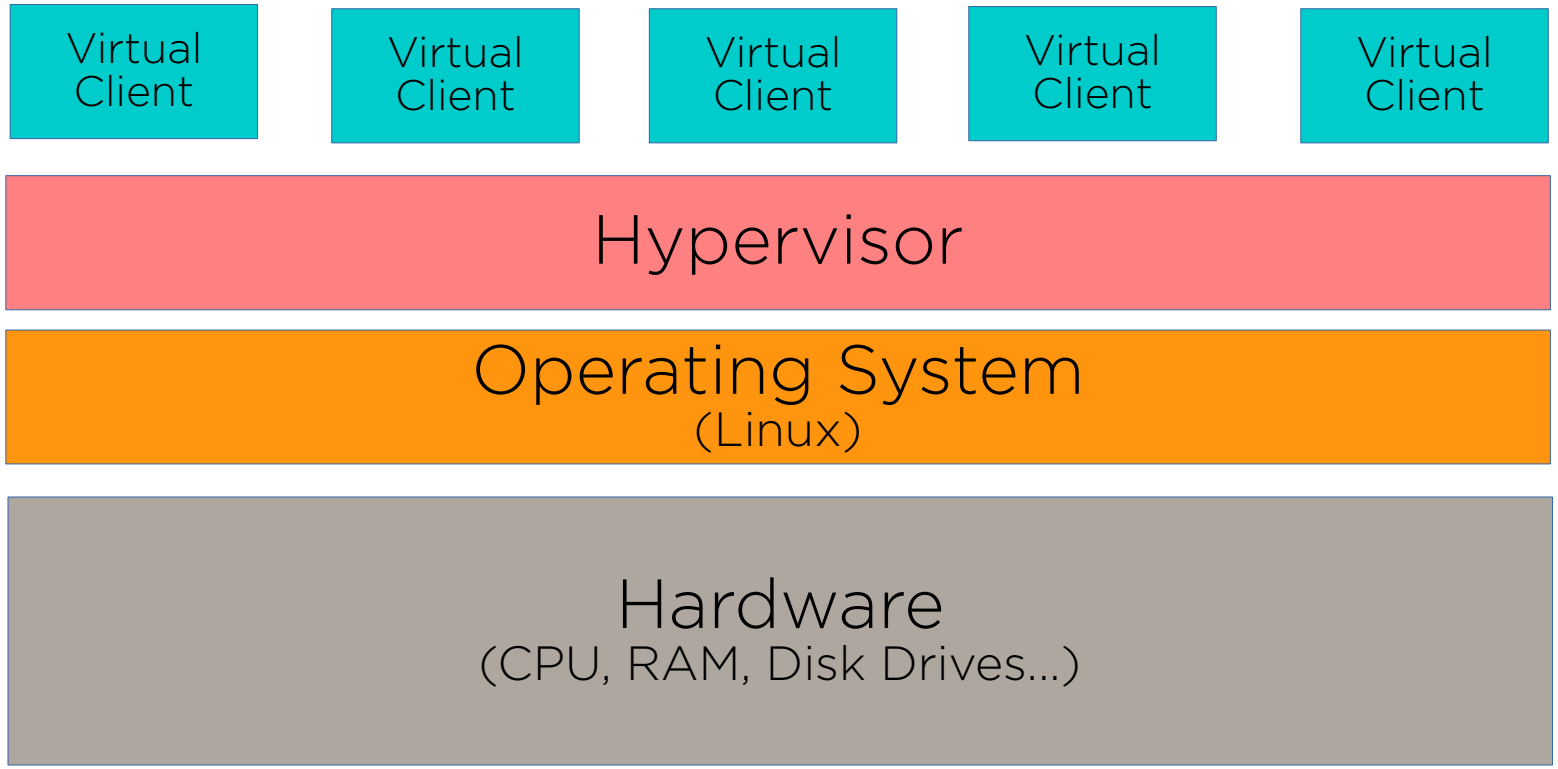
Moodle LMS Servers

Try everything yourself!



Hypervisors

Hypervisor Architecture



Design Considerations

- Fault isolation

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- Fault isolation
- Performance isolation

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- Consistency

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- Fault isolation
- Performance isolation
- Consistency
- Server sprawl control

Hypervisor Categories:

Type-1

Type-2

Hypervisor Categories:

Type-1

"Bare-metal"

Xen

ESXi (vSphere)

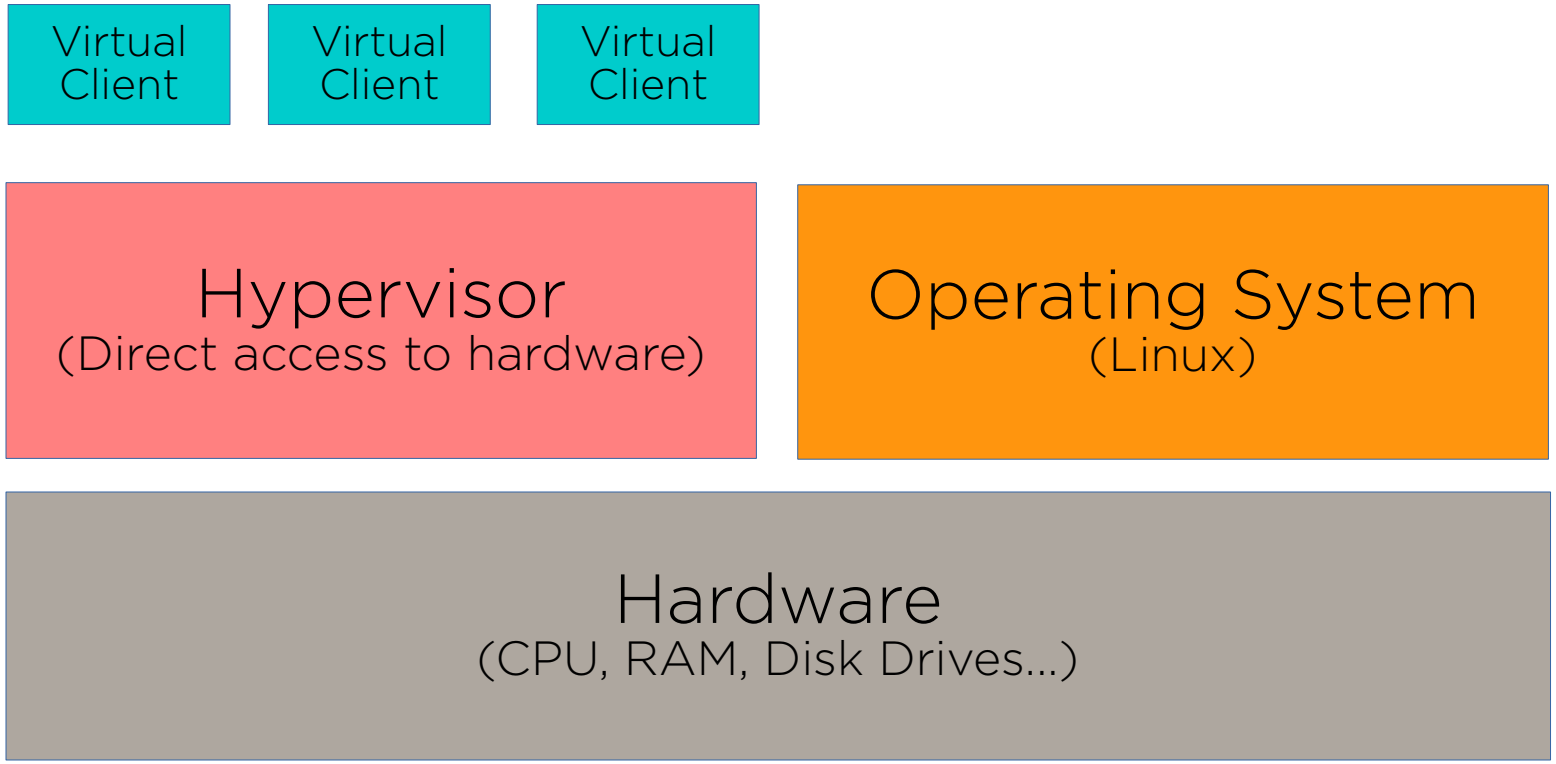
Type-2

Hypervisor Categories:

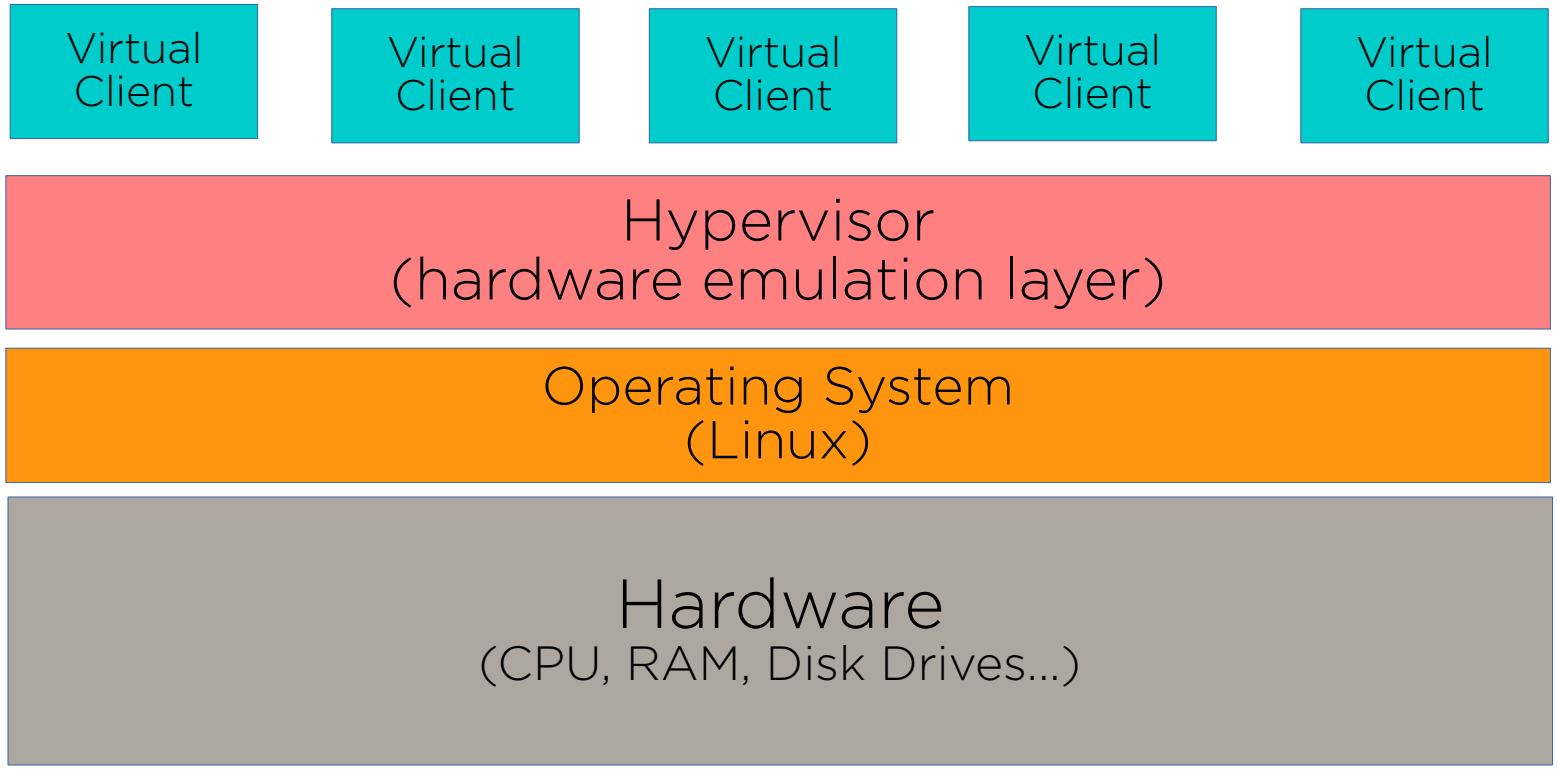
- Type-1
  - "Bare-metal"
    - Xen
    - ESXi (vSphere)
- Type-2
  - System processes
    - VirtualBox
    - QEMU

Paravirtual (PV) vs Hardware Virtual Machines (HVM)

ParaVirtual
(PV)



Hardware Virtual Machines (HVM)



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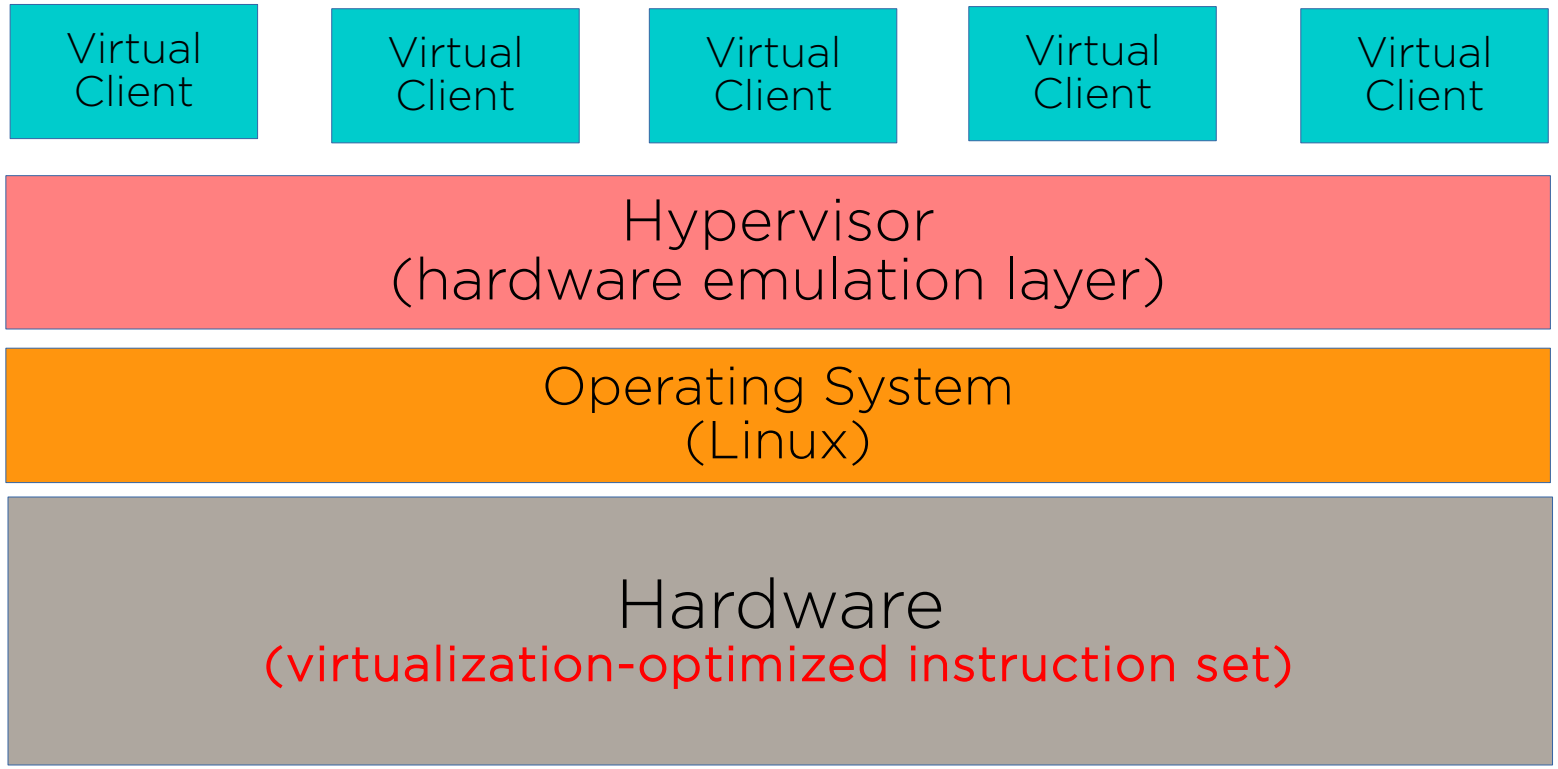
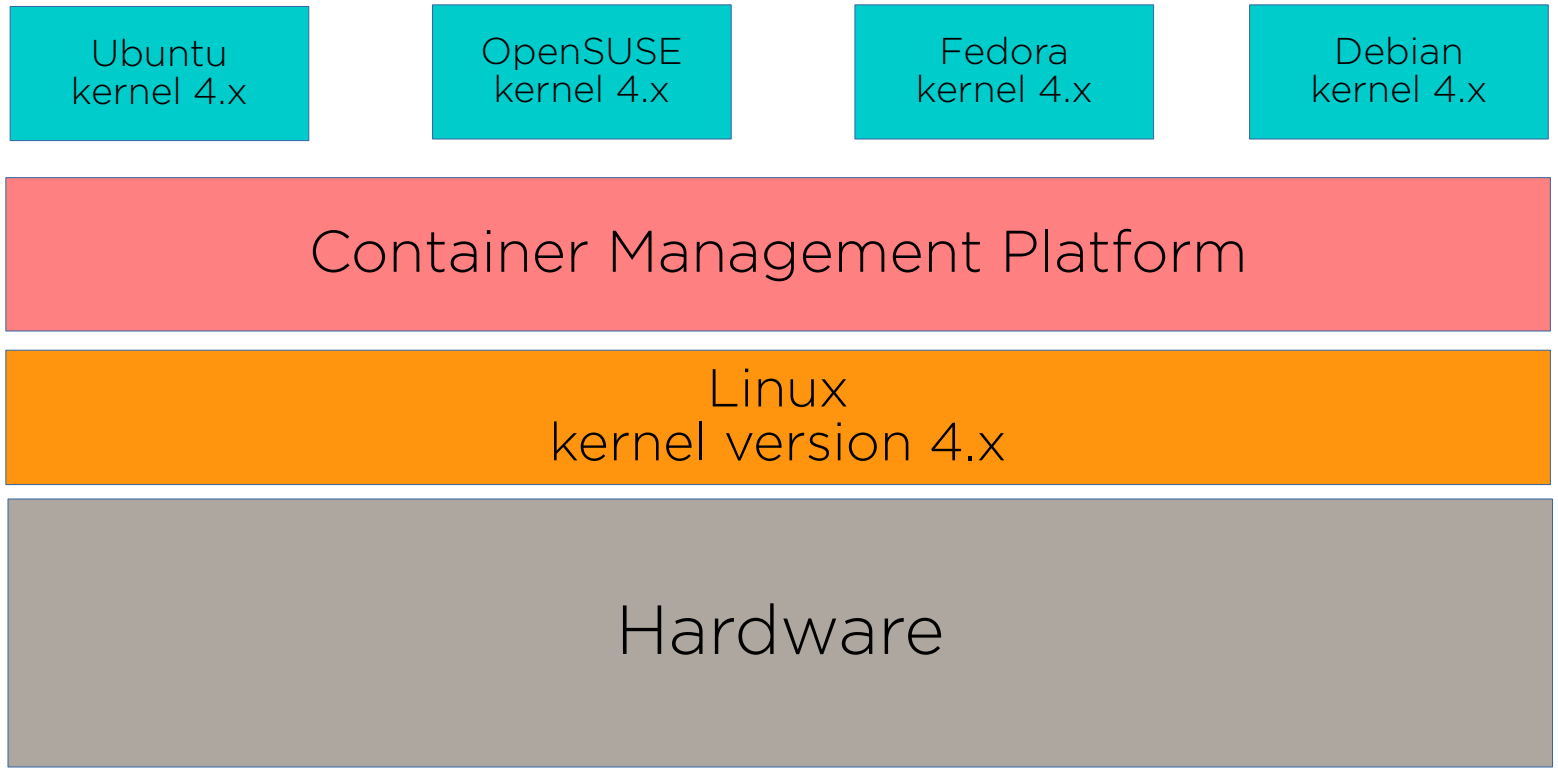
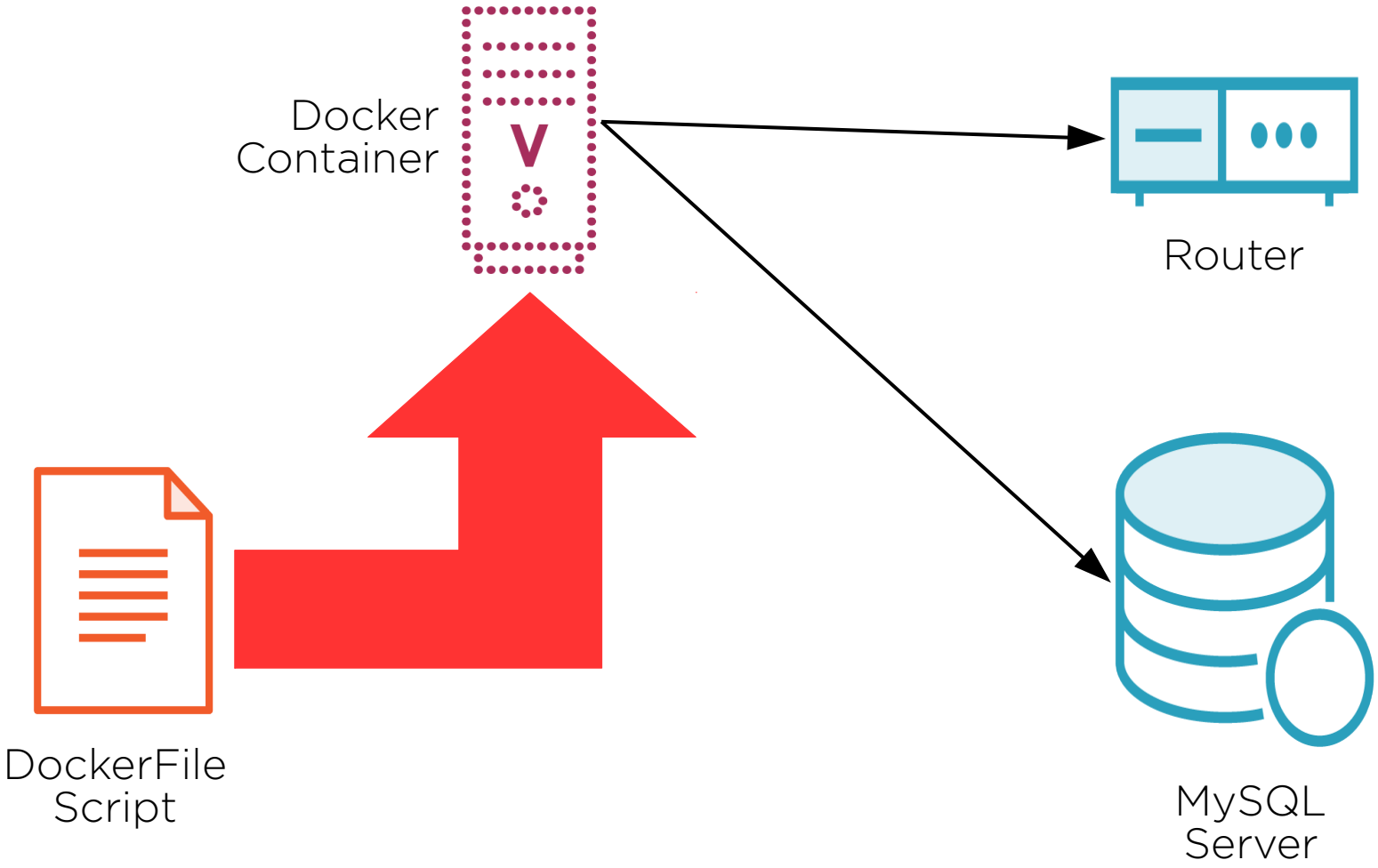


Containers

Kernel-dependent containers



DockerFiles



Cloud Computing Models

Cloud Compute Characteristics

- Virtualized servers

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- (Nearly) no capital expenses

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- On-demand resources
  - self-service

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- Pay-per-use

Cloud Compute Characteristics

- Virtualized servers
- (Nearly) no capital expenses
- On-demand resources
  - self-service
- Pay-per-use
- Instant automated scaling

IaaS:
Infrastructure
as a Service

Virtual servers:

- Pre-loaded with the OS image of your choice
- Design your own virtual networking environment
- Set your own security policies

PaaS:
Platform as a Service

- Fully managed infrastructure
- Controlled through scripts or templates
- You only need to add your code or design

Cloud Compute Models

IaaS (Infrastructure as a Service)
- AWS EC2
- Azure Virtual Machines
- Google Compute Engine

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- Google App Engine
- Cloud Foundry
- Heroku

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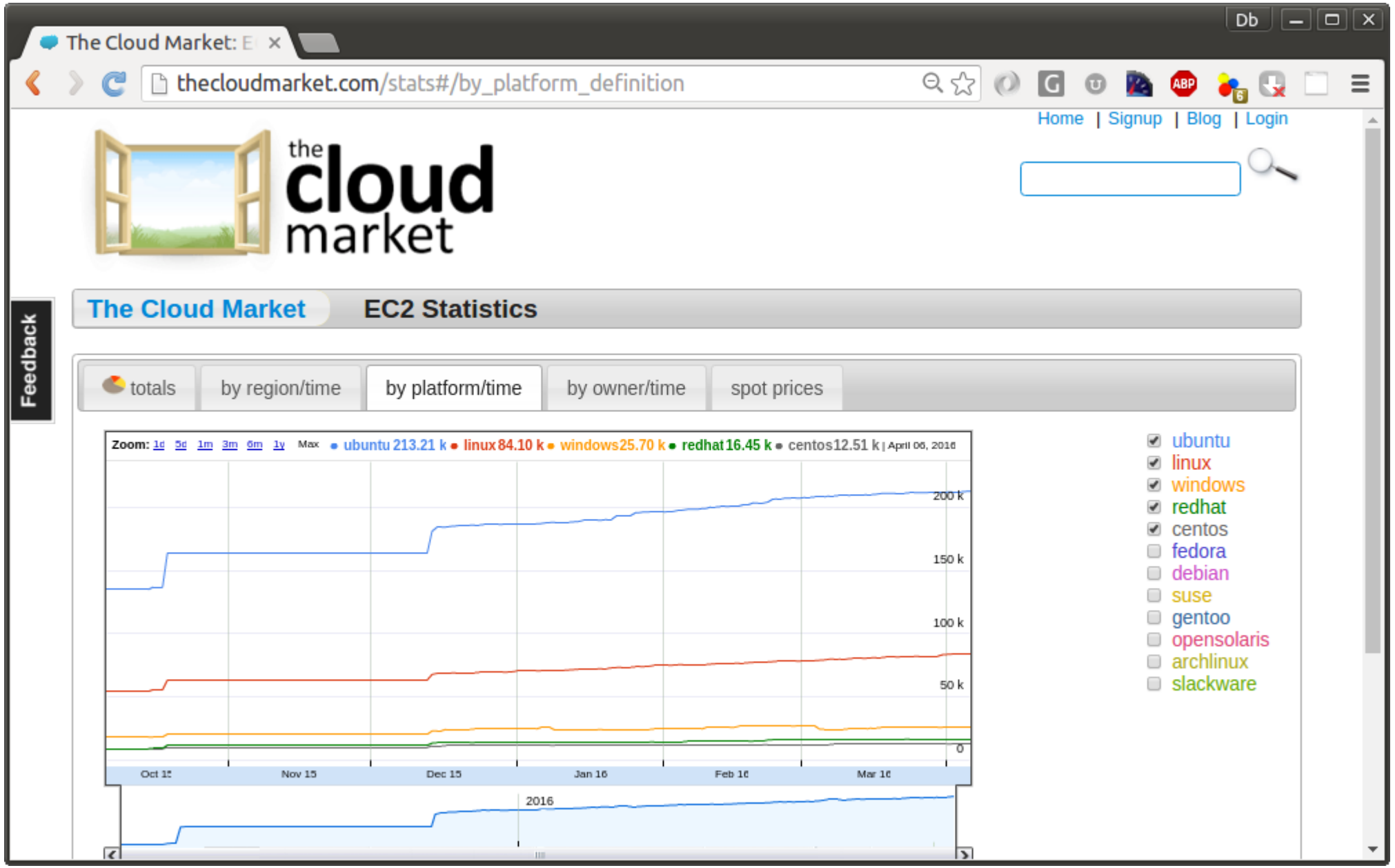
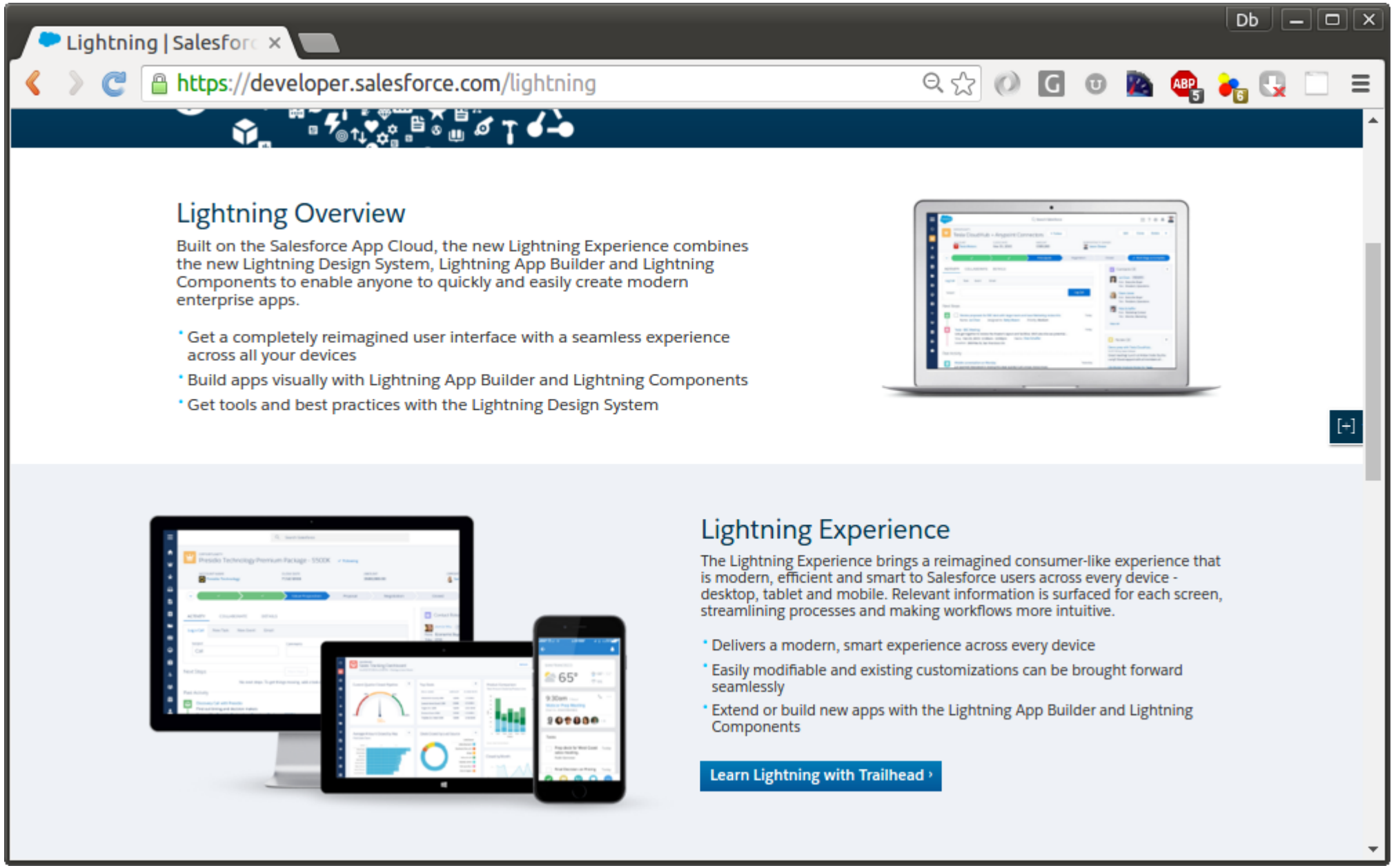
SaaS (Software as a Service)
- Google Apps
- Salesforce
- Dropbox
- WordPress.com

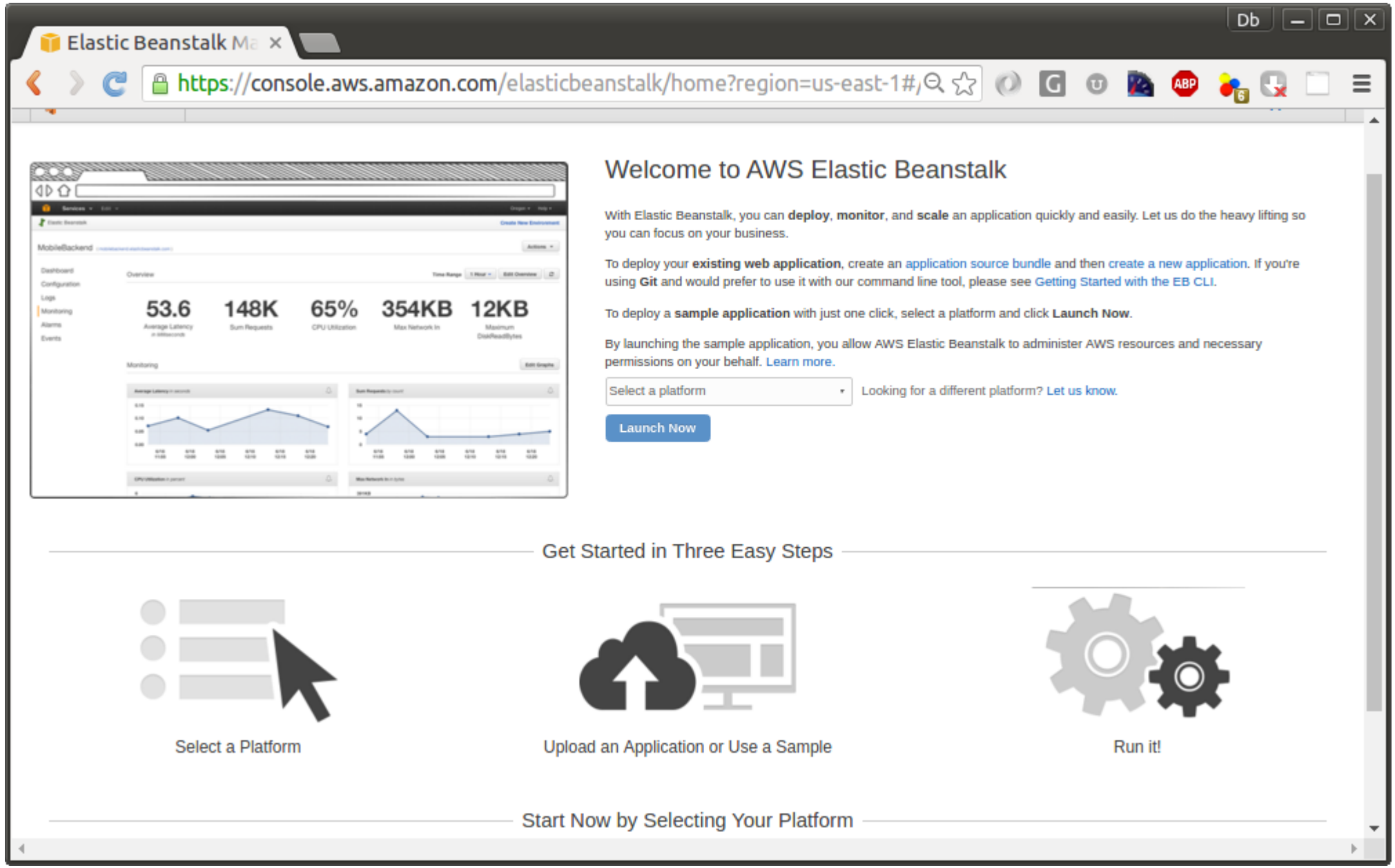
Cloud platform market share



User-facing PaaS services



Back-end PaaS services



Hardware Compatibility

Review

Type 1 Hypervisor (Xen, ESXi)

Type 2 Hypervisor (VirtualBox, QEMU)

Container virtualization (LXC, Docker)

IaaS (AWS EC2, Azure Virtual Machines)

PaaS (AWS Elastic Beanstalk, Salesforce.com)

SaaS (Gmail, WordPress.com)

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