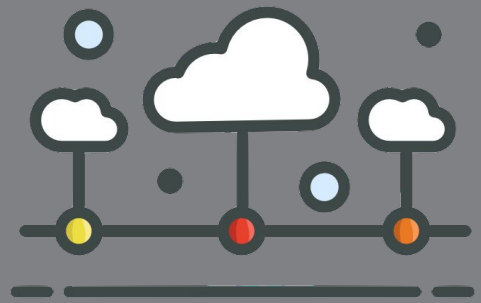
ThoughtWorks®

CONTAINERS

Rise of the Containers *Workshop*

Old Days… server room

Modern data centers



What is cloud?

Cloud is on-demand provisioning of computing power (by means of sharing hardware or device) in remote data center (without any in-person involvement).

Offerings of Cloud services

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

Cloud service model with Pizza analogy

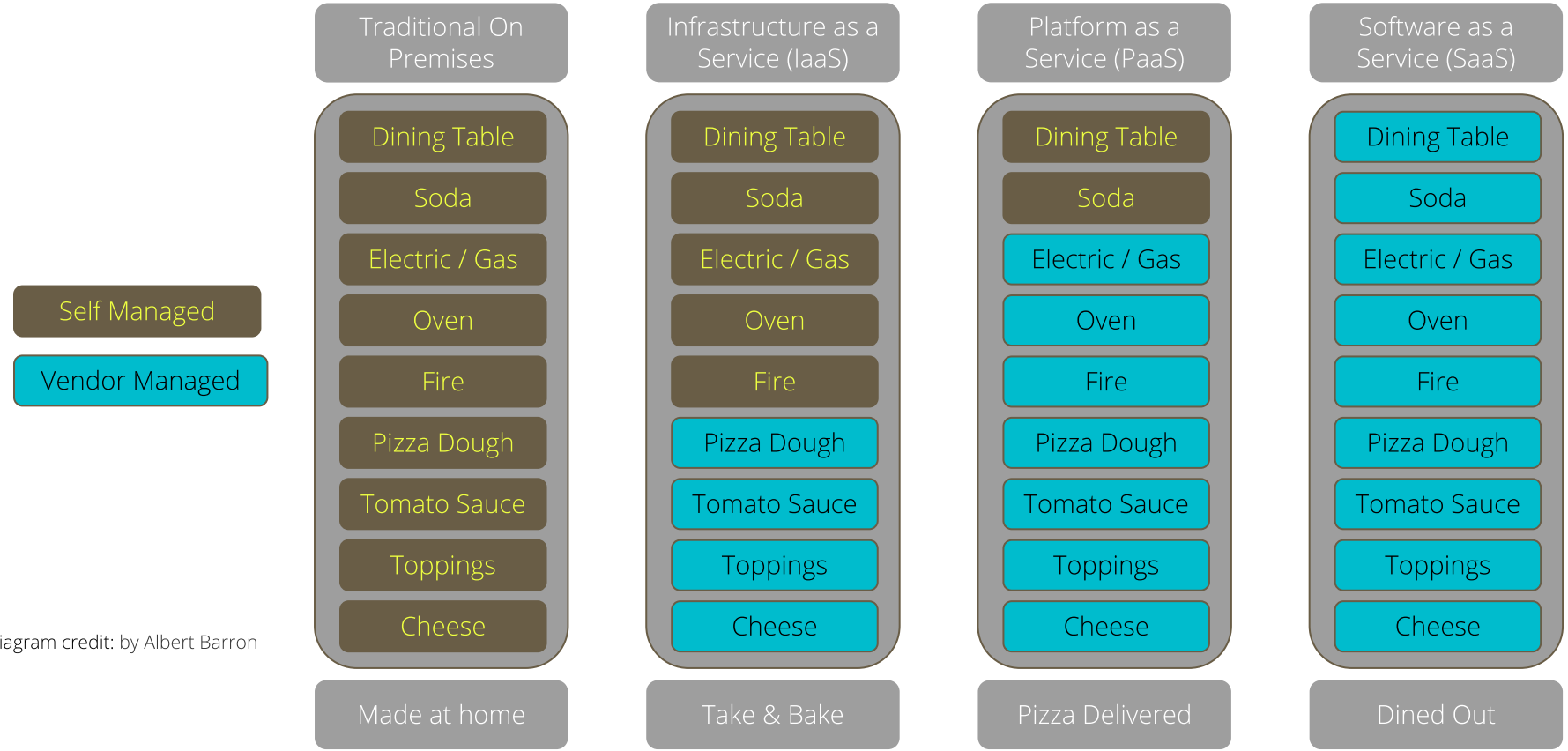
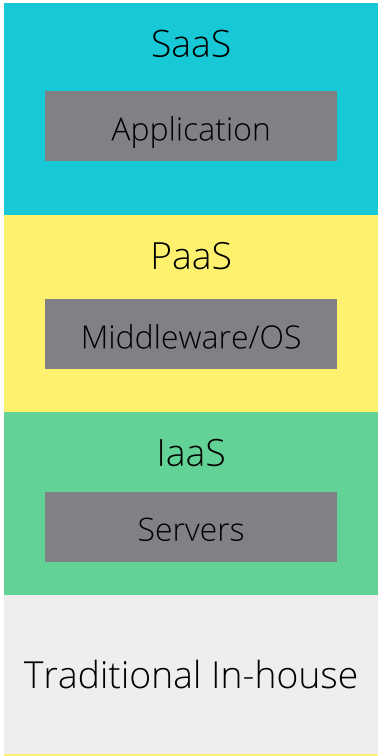
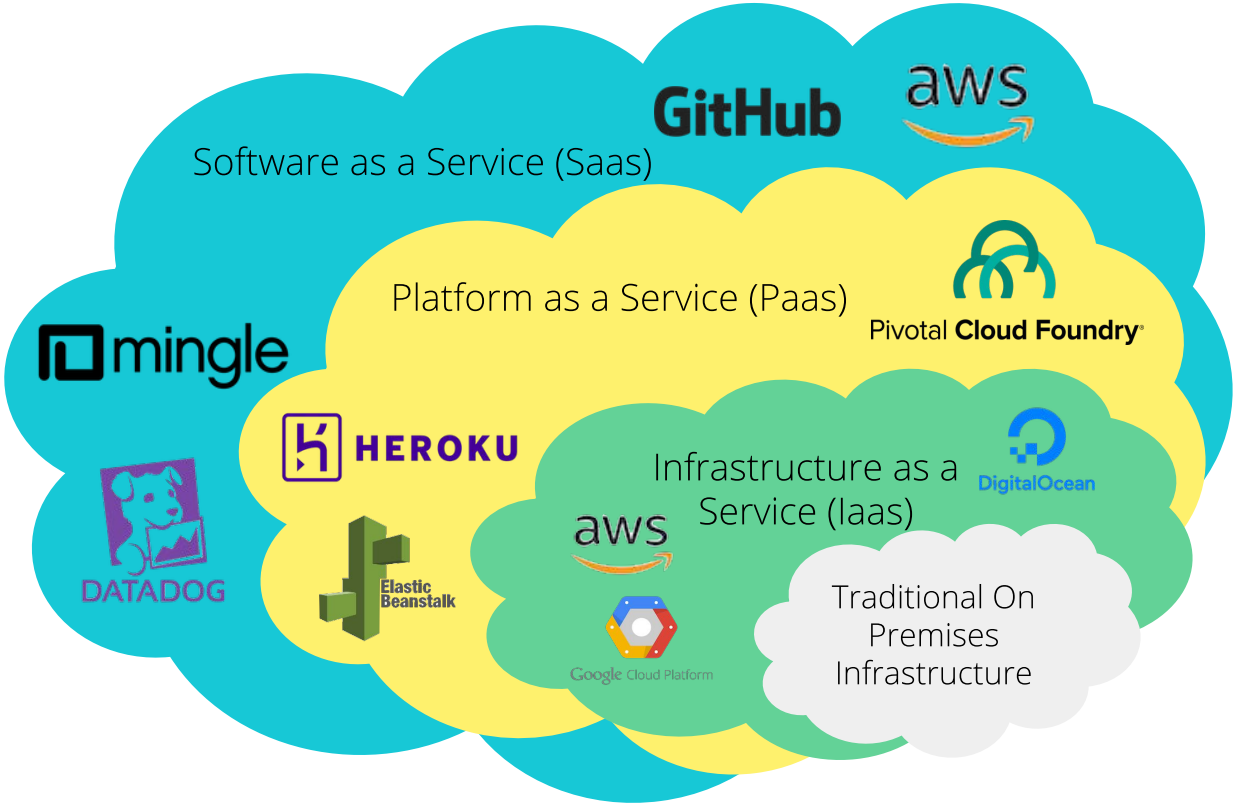


diagram credit: by Albert Barron

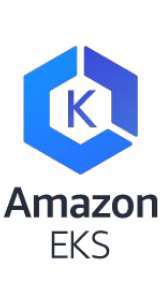
Elastic Infrastructure





New offering of Cloud service

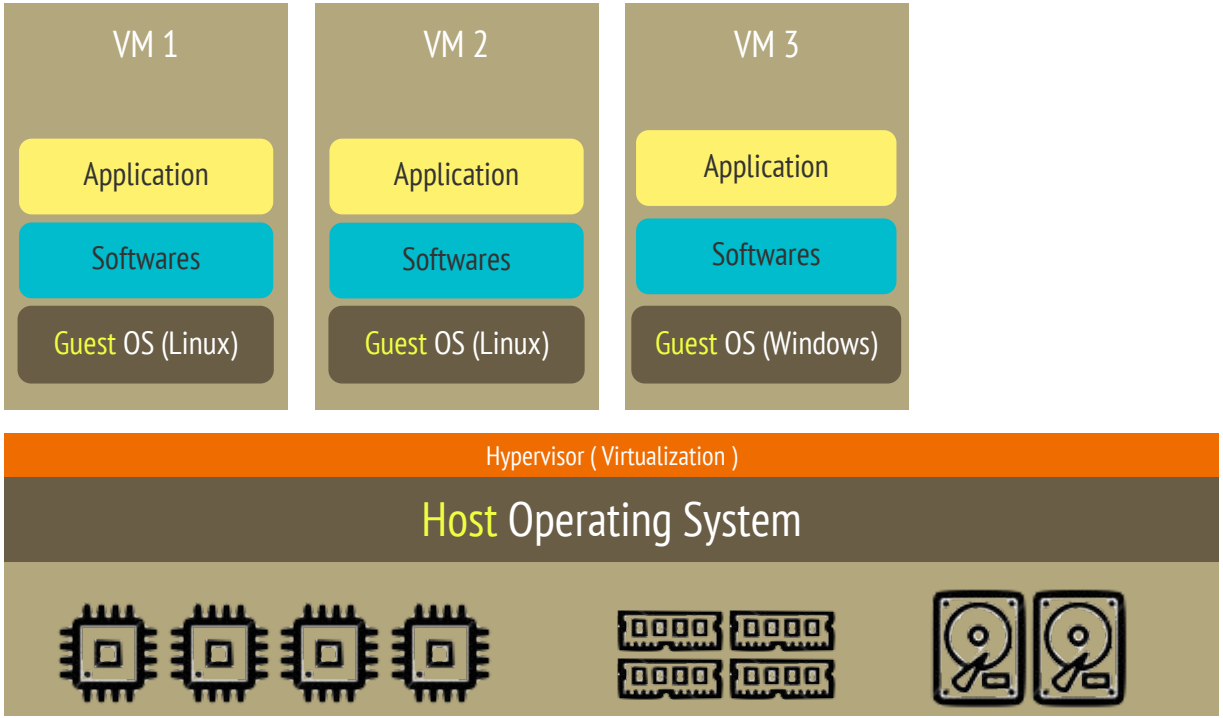
- Infrastructure as a Service (IaaS)
- **Containers as a Service (CaaS)**
- Platform as a Service (PaaS)
- Software as a Service (SaaS)



Infrastructure as a Service

IaaS is on-demand provisioning of building blocks such as computing power (CPU and RAM), storage, networking. This is lowest level (raw form) of service in cloud.

VM based IaaS model



Steps to setup an Environment

1. Provision VM with Guest OS
    - Create user, setup profile, set ulimit, ...
2. Install required Software
    - JDK, Tomcat, Nginx ...
    - Create required database users ...
3. Deploy Application
    - Configure application properties

Challenges with Virtual Machine model?

RESOURCE UTILIZATION

CPU, RAM, Disk consumed by Guest OS

PERFORMANCE OVERHEAD

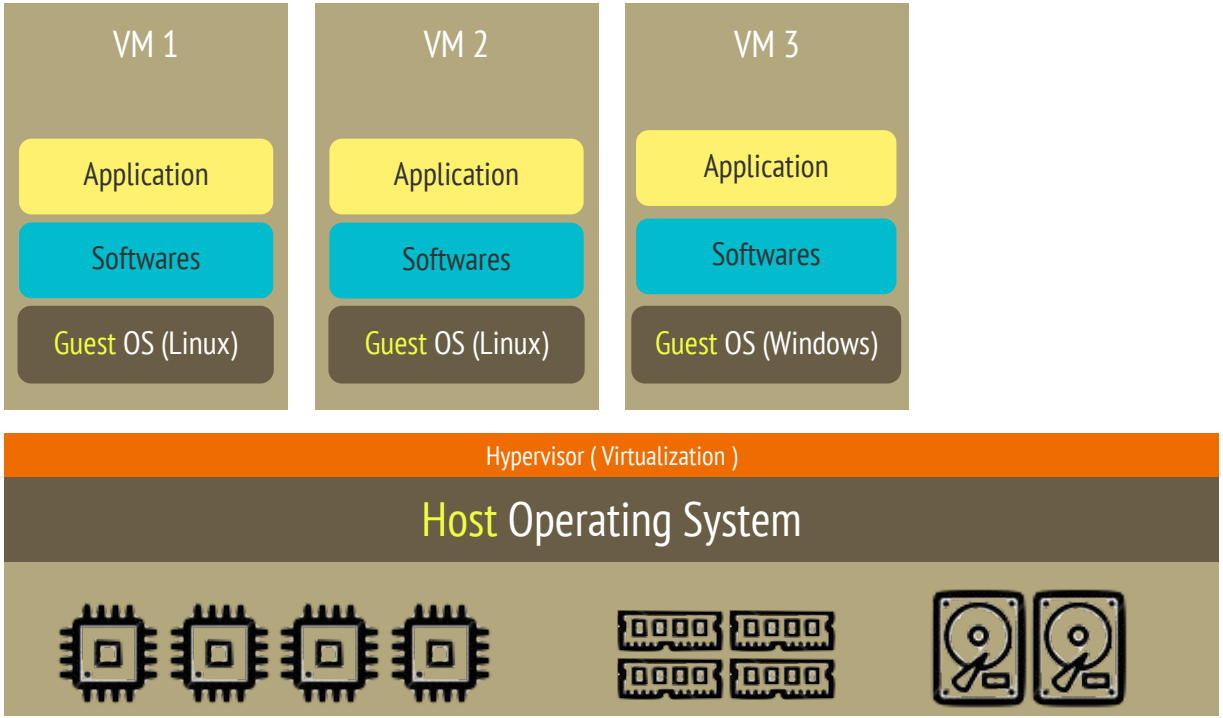
Multiple OS + hypervisor translation layer

COST OVERHEAD

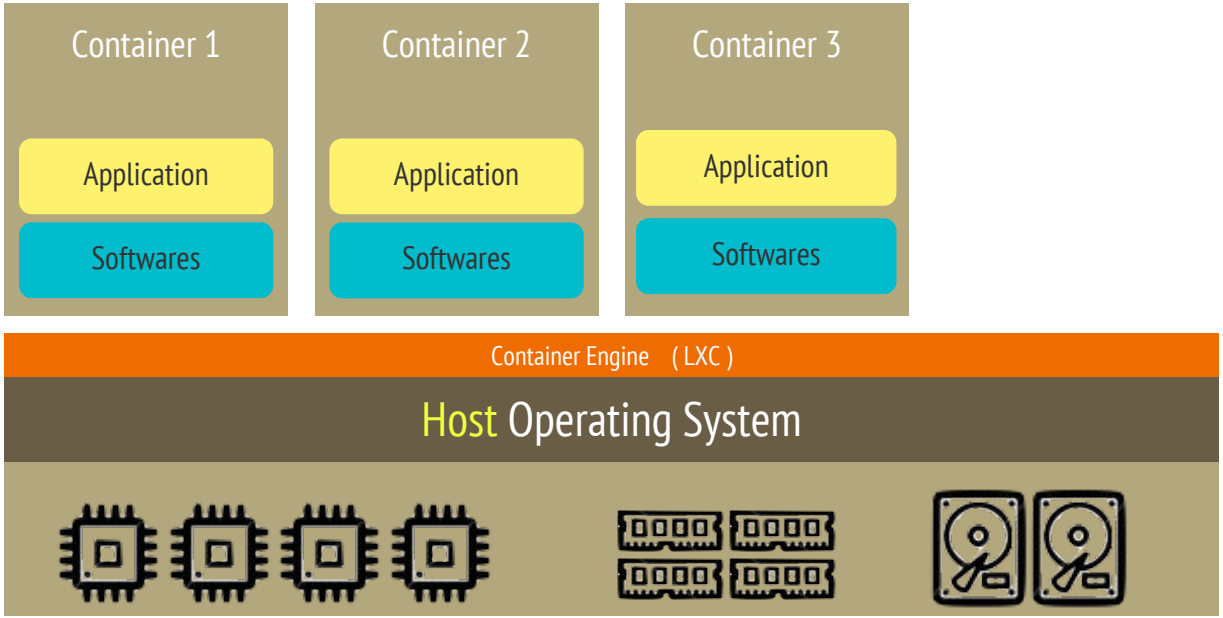
Software licenses (Guest OS) (capex)

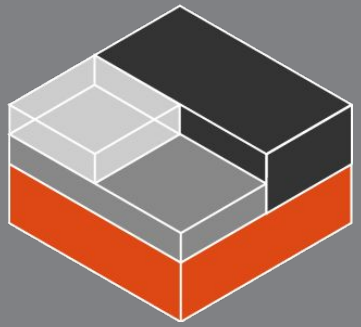
Each VM Maintenance & Upgrade/Patching cost (opex)

VM to Container model



Container model





LXC (Linux containers)

LXC (Linux Containers) is an OS level virtualization method for running multiple isolated Linux systems (containers) on a control host using a single Linux kernel.

LXC (Linux containers)

CGROUPS

allows limitation and prioritization of resources (CPU, memory, block I/O, network, etc.)

NAMESPACE ISOLATION

allows complete isolation of an applications' view of the operating environment, including process trees, networking, user IDs and mounted file systems

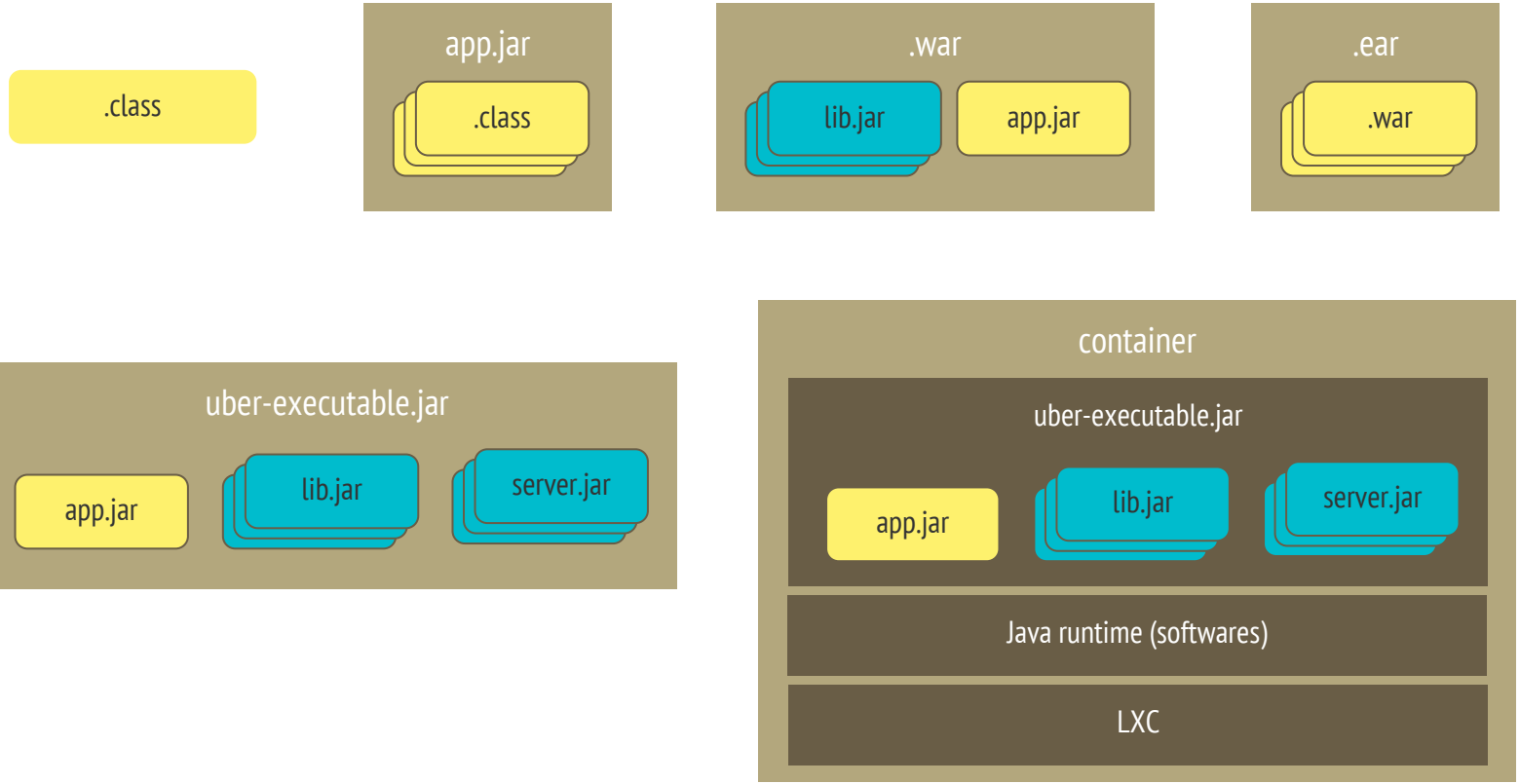
LXC Demo

https://linuxcontainers.org/lxd/try-it/

LXC (Linux containers)

- Each container runs in an sandboxed env using namespace isolation
- Container lifecycle is defined by main process (tightly coupled)
- Boot time is main process start time (OS boot time is reduced)
- Container can have multiple process other than main process
- VM are more secure than Containers (with vulnerability in LXC, host shared kernel can be compromised)
- Resource allocation can be dynamically managed using cgroups

Container packaging



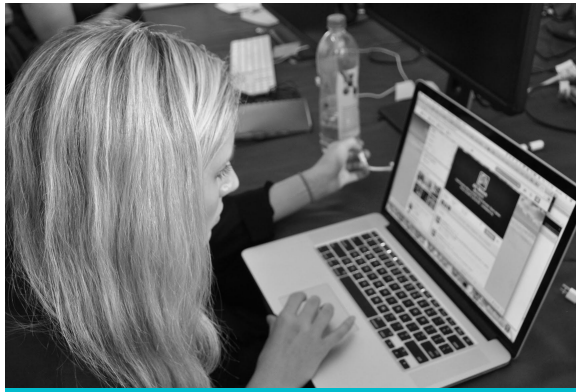
THANK YOU

For questions or suggestions:

Sunit Parekh

sunitp@thoughtworks.com

Three column layout



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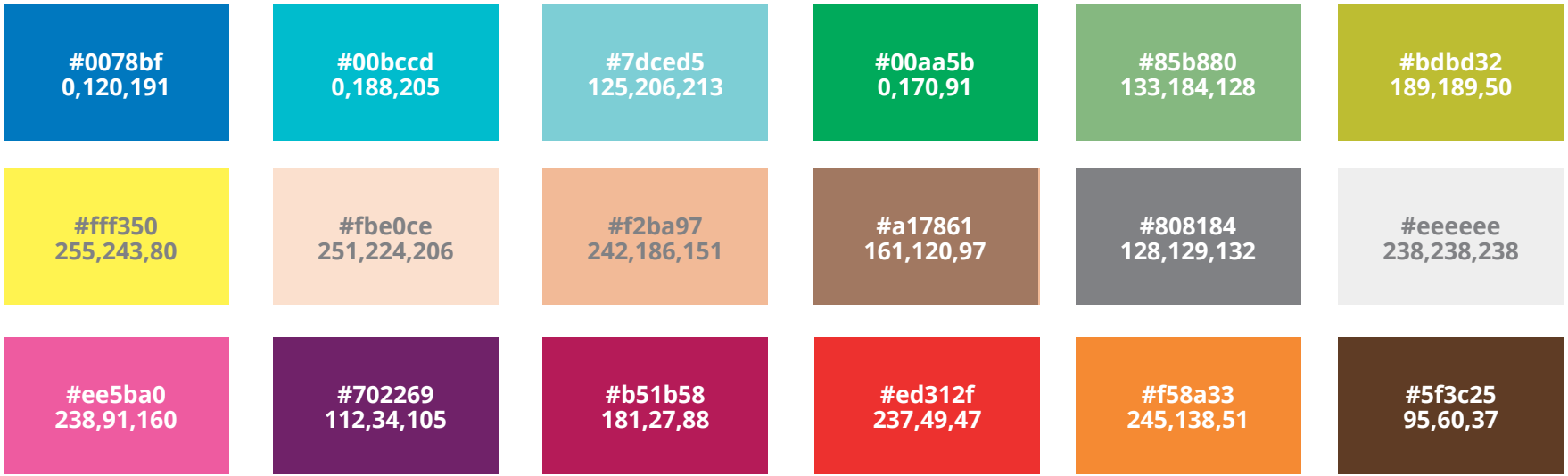
Color Palette



Boxes and Shapes

When placing text boxes on the page, make sure you change the font to Open Sans.

When placing text in a shape, centre the text.

For dark coloured boxes, change your text to white.

Avoid drop shadows, border decorations or reflections.

Make sure elements are evenly distributed and centred on the page

Create a beautiful table

HEADER 1	HEADER 2	HEADER 3	HEADER 4	HEADER 5

Chart Suggestions