Explaining complex technology problems in a simplistic way is a skill I've been working to hone. Marketing approached me to explain to all of their organization "containers" in a simplistic and fun way, as part of a series they called "The Stark Hour", after Tony Stark.

I enjoyed making this deck so much, and the feedback was so positive, it's been used in countless other customer conversations as well as new hire, college graduate programs and more.

This presentation is part of a larger experiment in embracing public, visual personal brand building, available at:

https://mattschneider-visualcv.github.io/

VisualCV started as a Pathfinder's project at Dell Technologies while I was mentoring engineers through our career ladder into roles requiring panel & packet review, Principals & Distinguished.


CONTAINERS

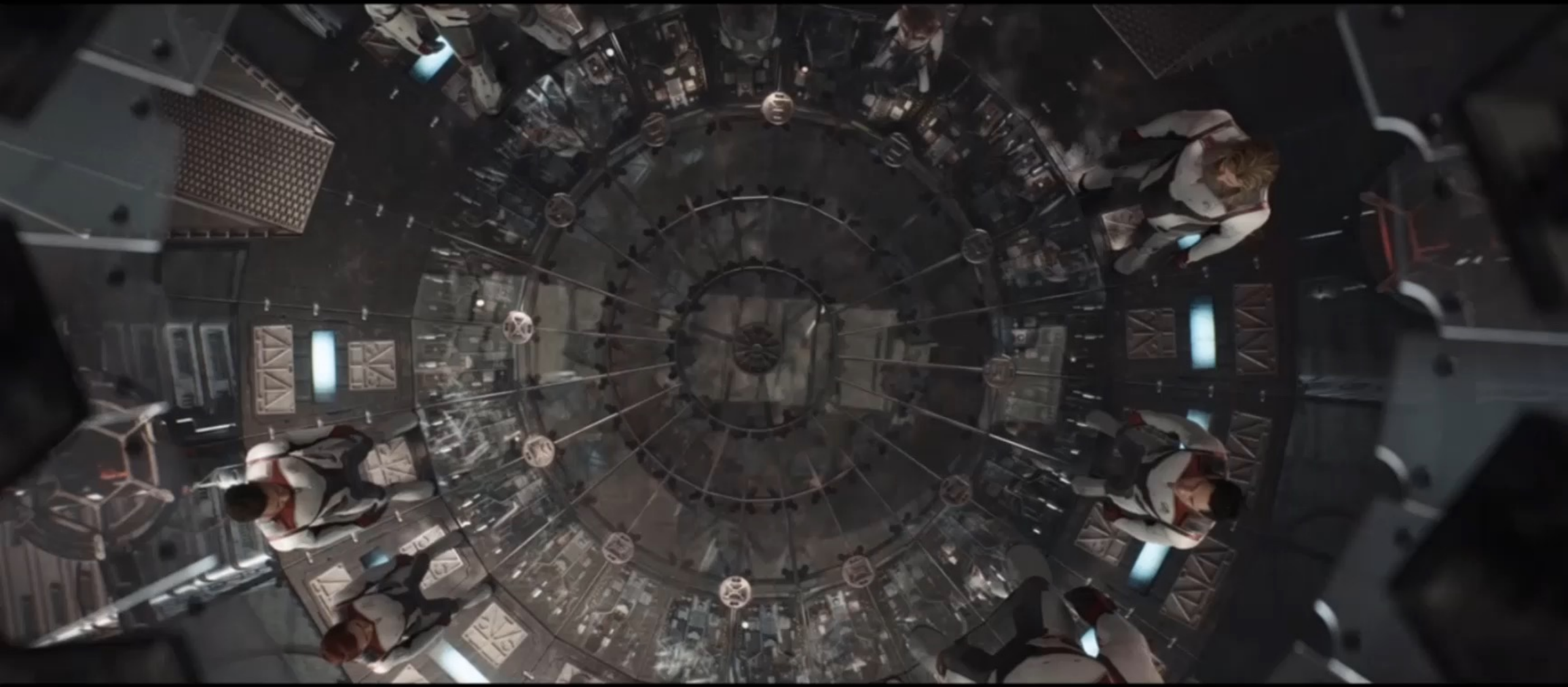

CONTAINERS

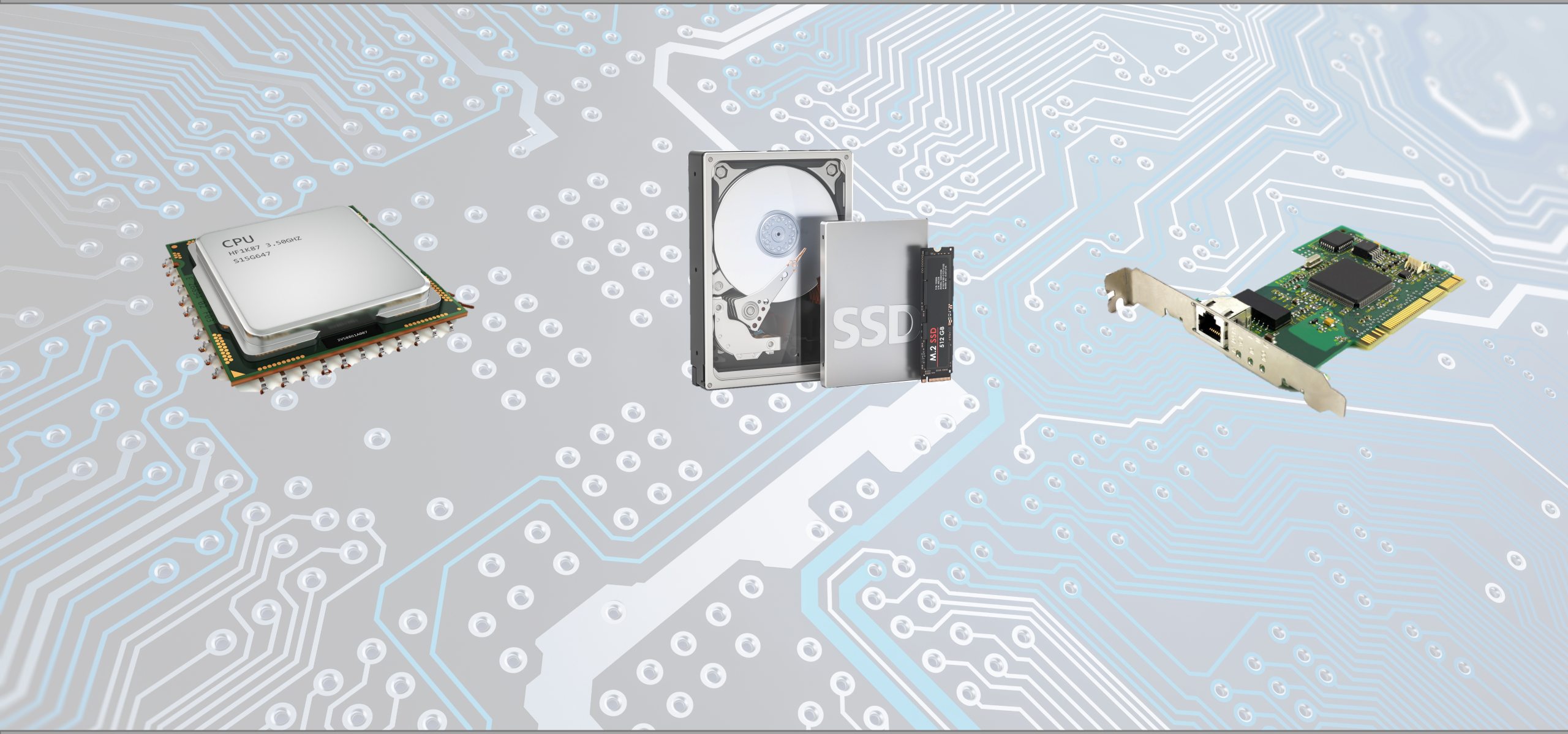

CONTAINERS

Matt Schneider
Field CTO & Principal Engineer
Enterprise Americas Presales
@md_schneider
/in/mdschneider

CTO Ambassadors · 2020 ·

FORWARD PATHFINDER

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SSD
M.2 SSD
512 GB

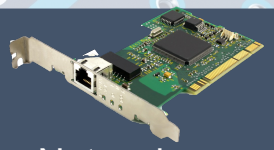
Hardware

Processor

CPU
GPU
FPGA
ASIC

Storage

PMEM
RAM
NVME/SSD
Hard Drive



Network

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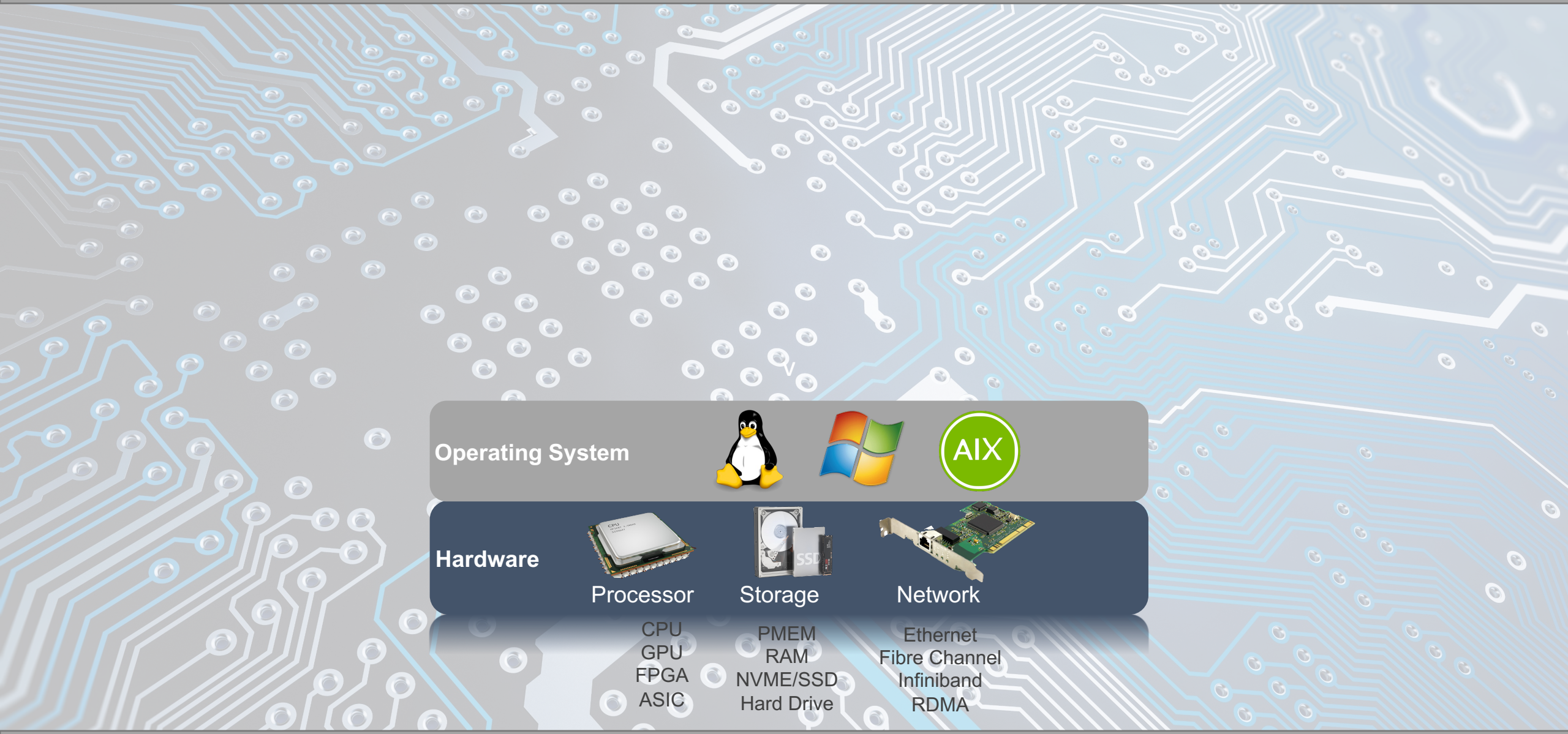
Fibre Channel
Infiniband
RDMA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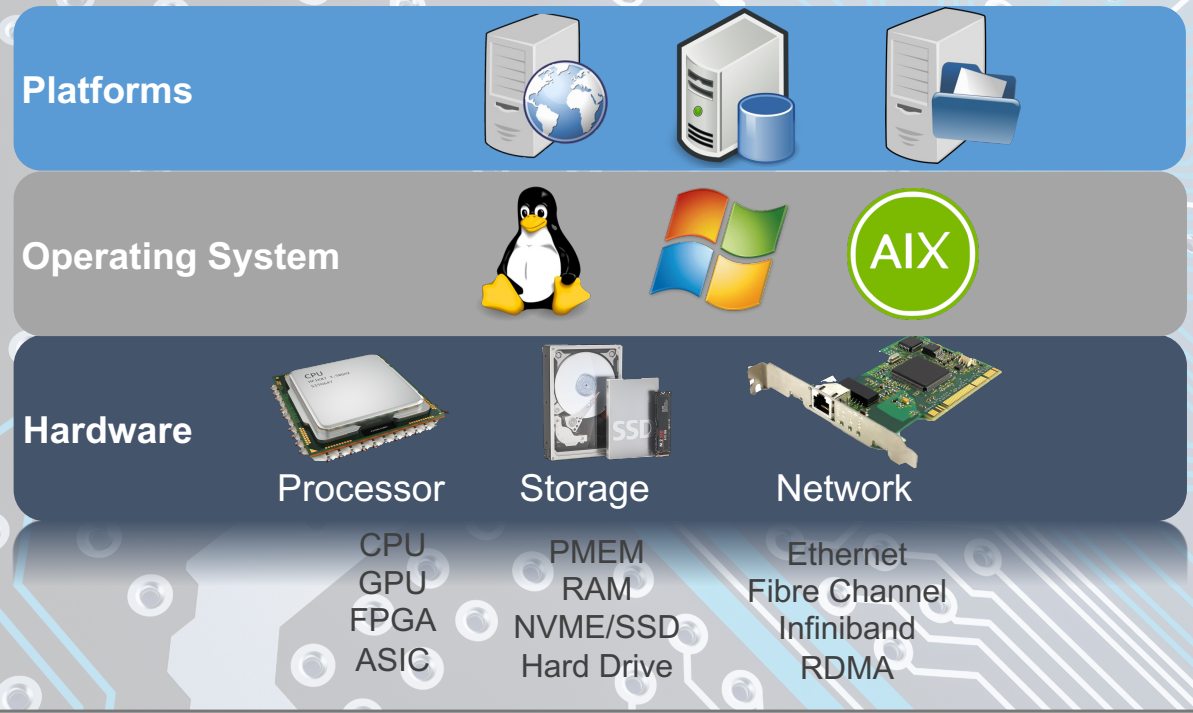
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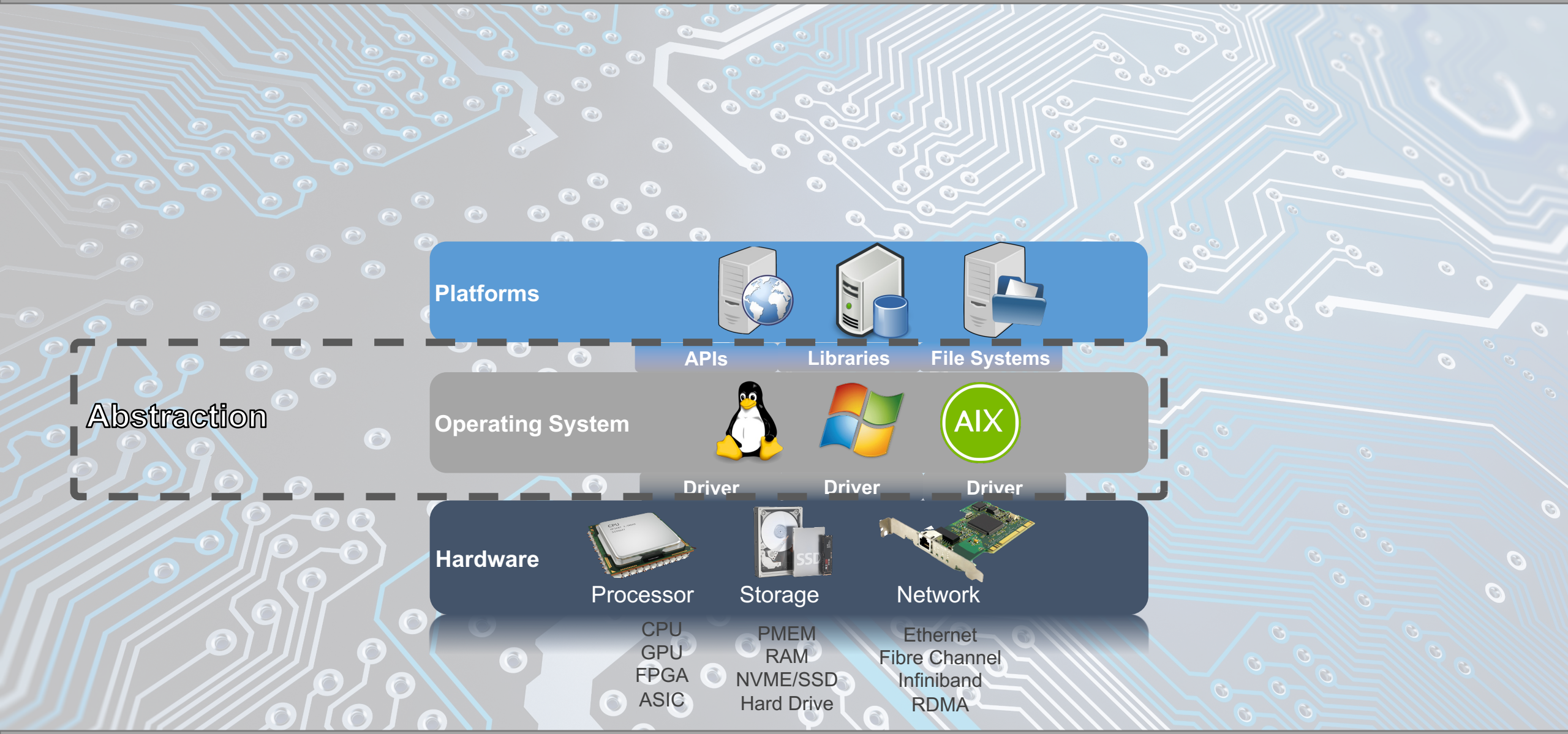
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Infiniband
RDMA


Platforms
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File Systems
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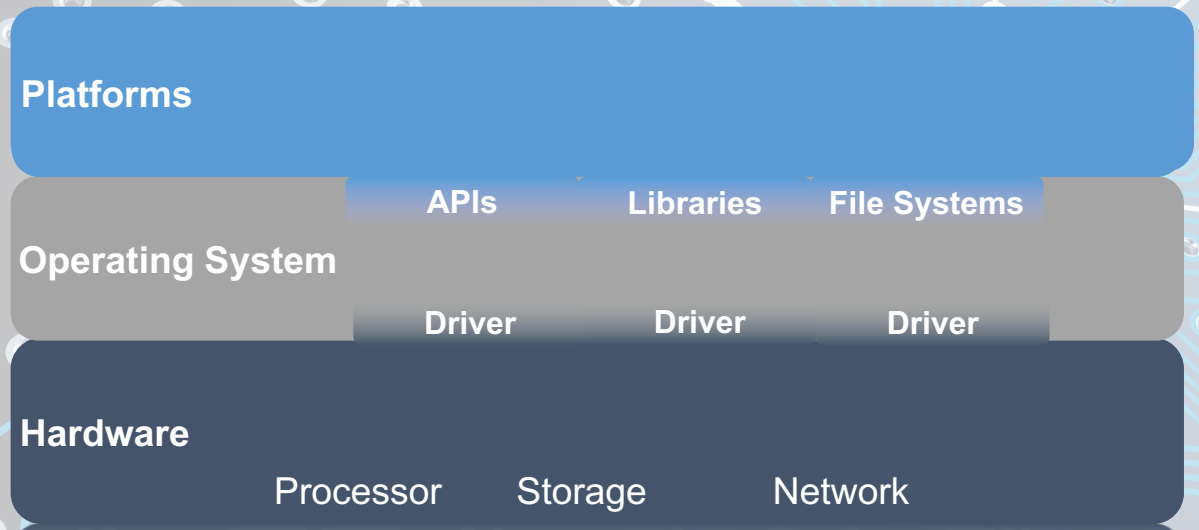
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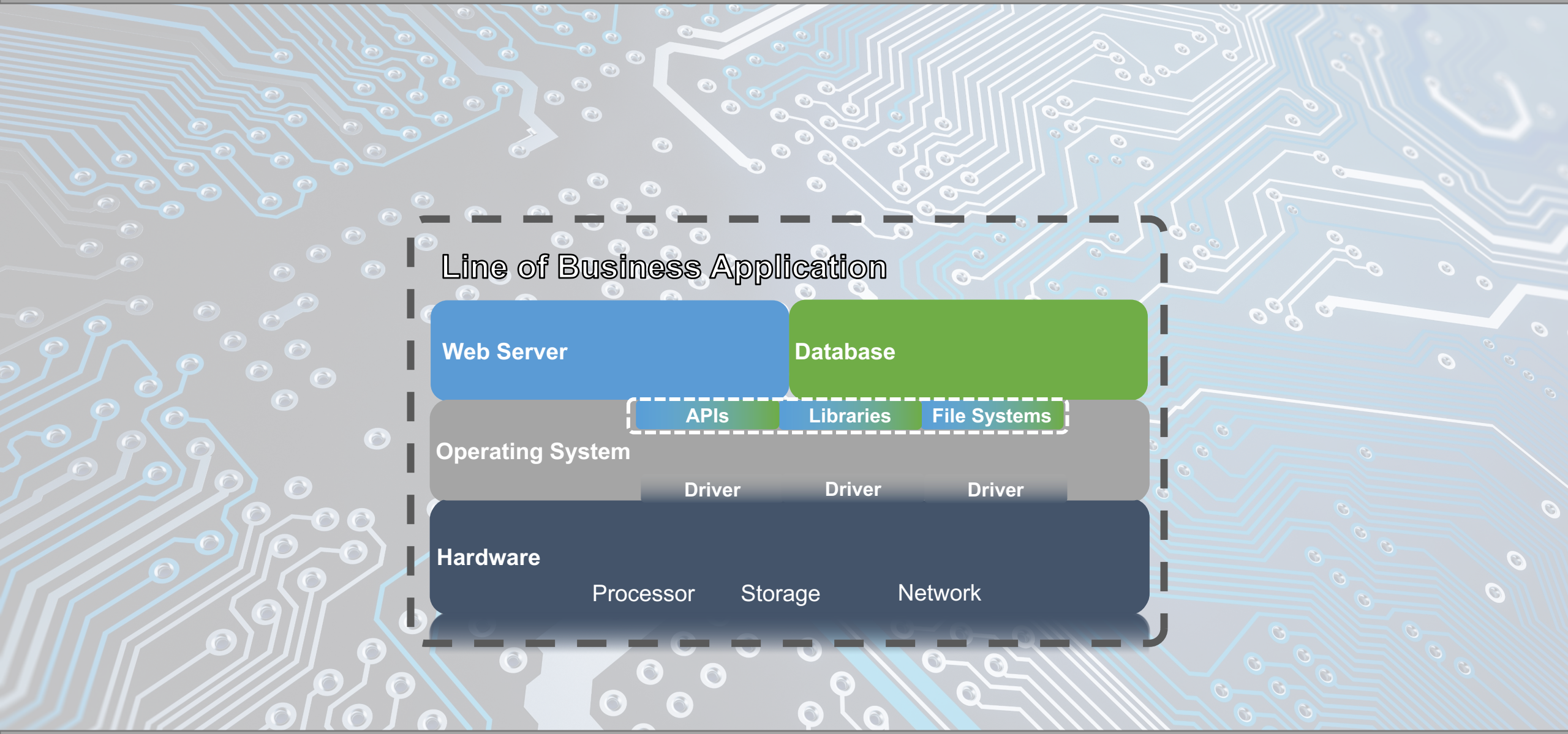
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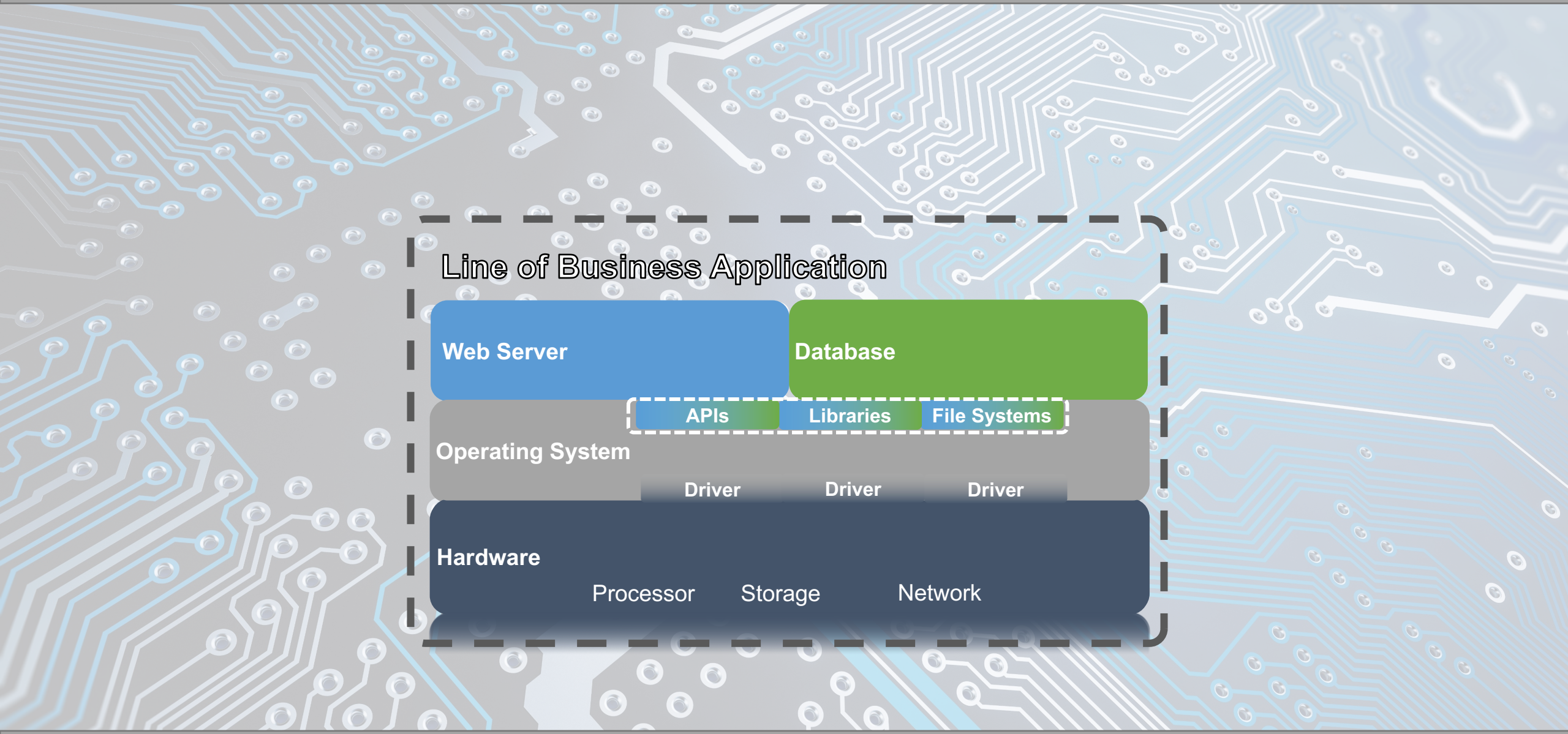
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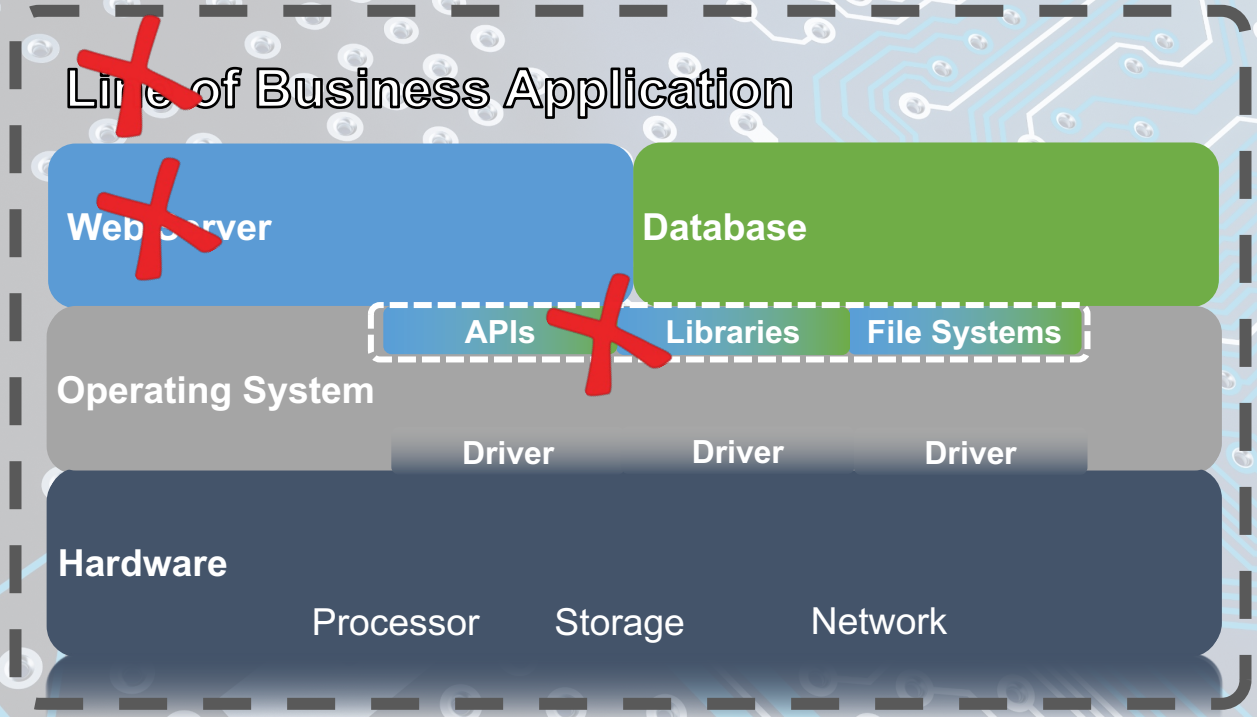
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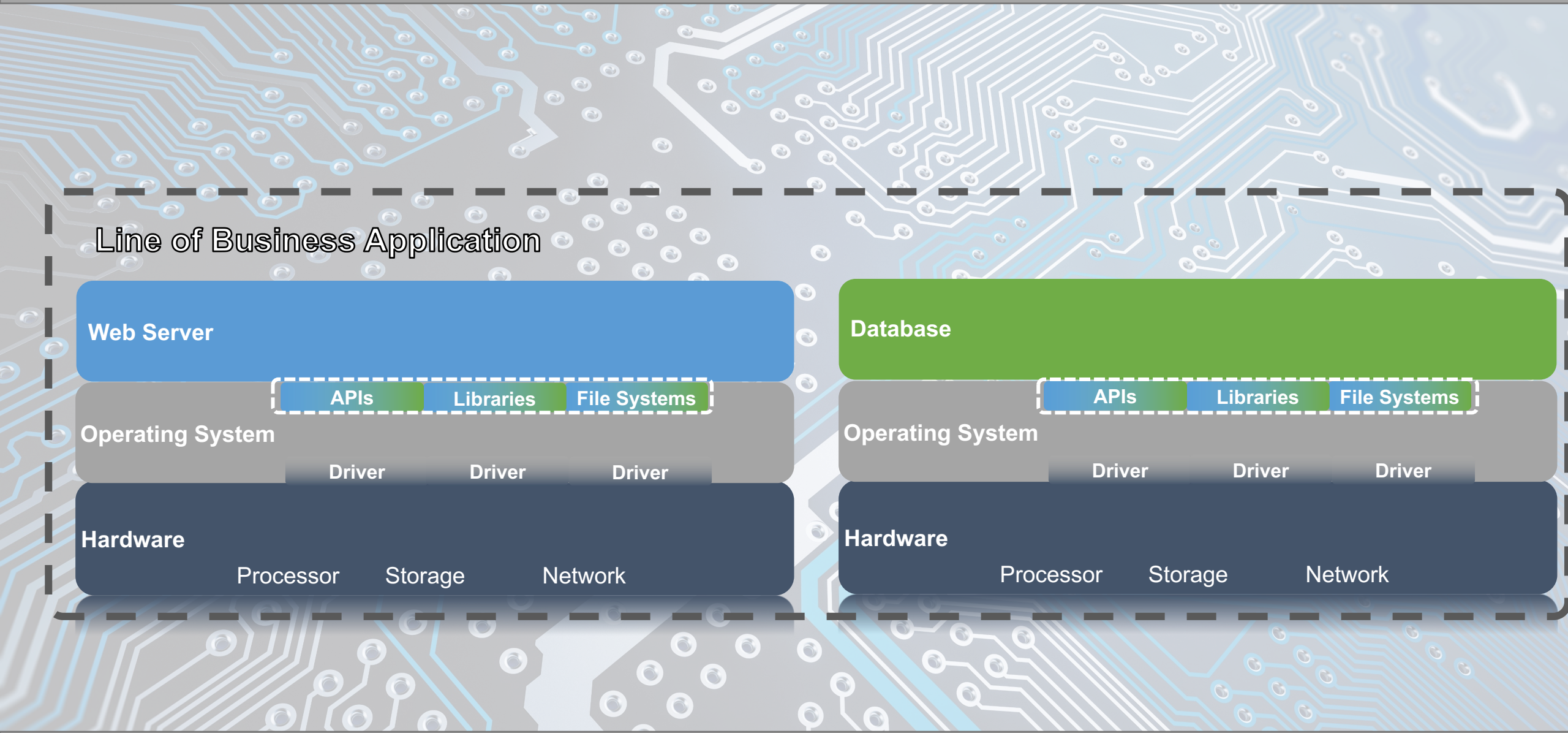
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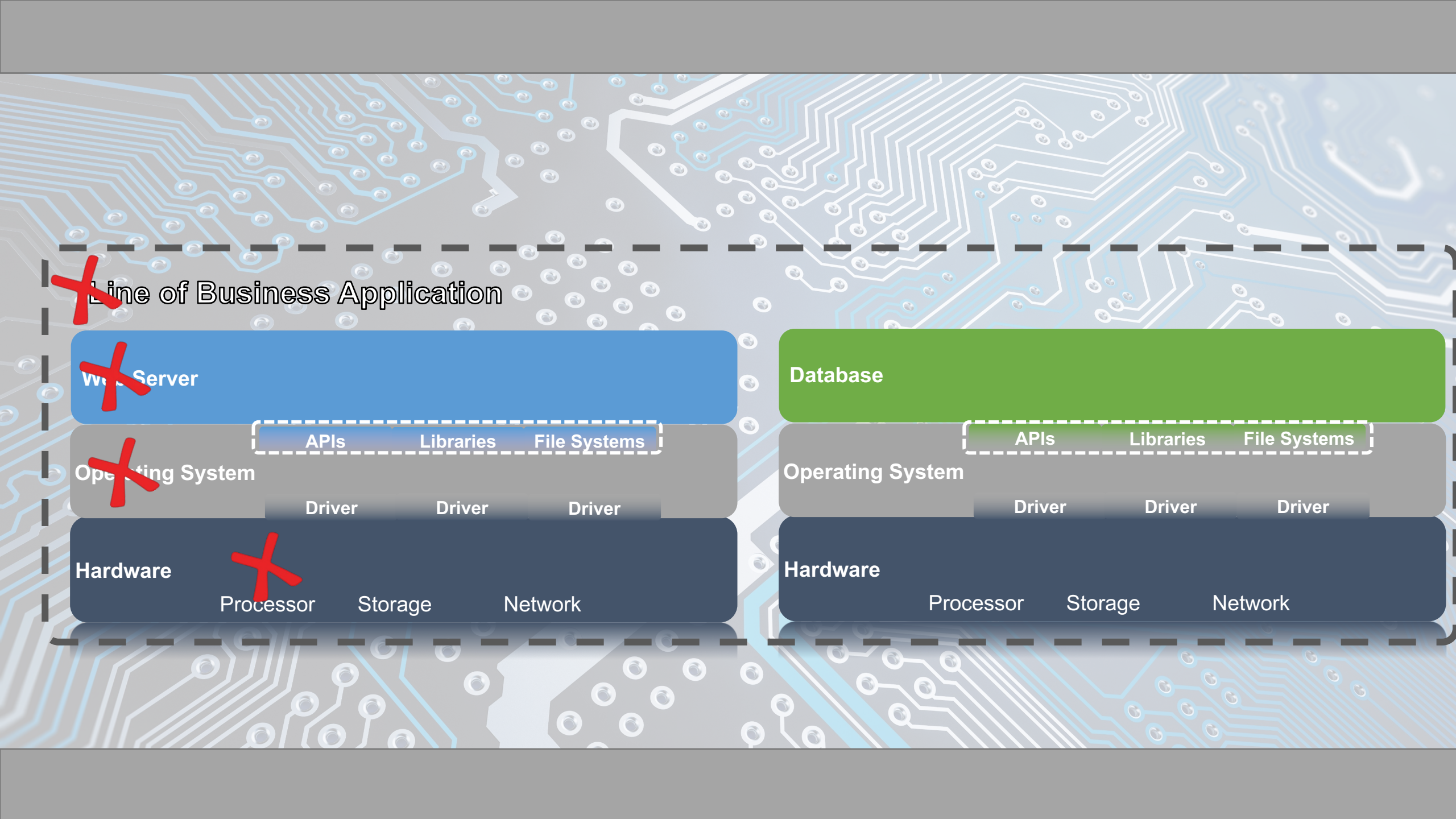
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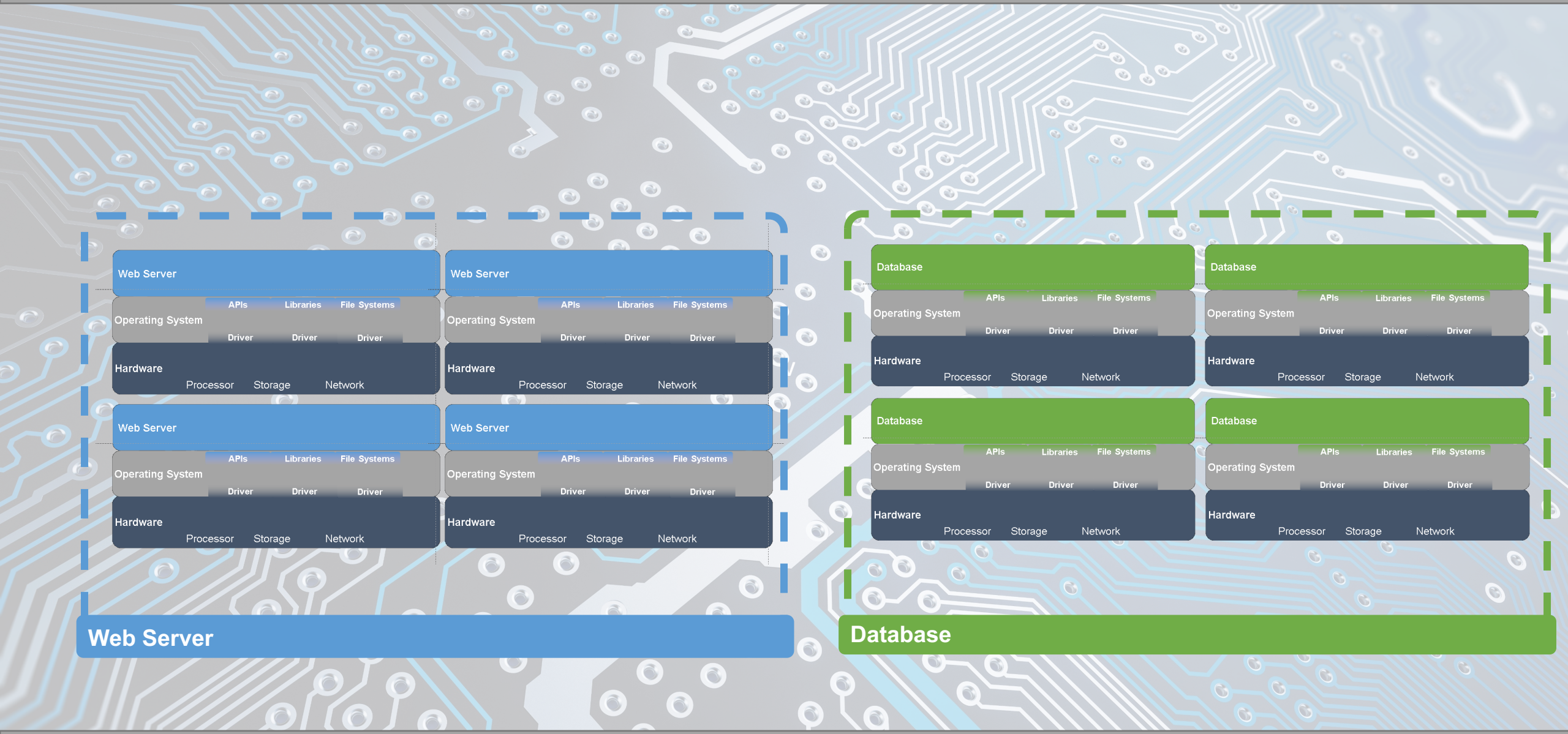
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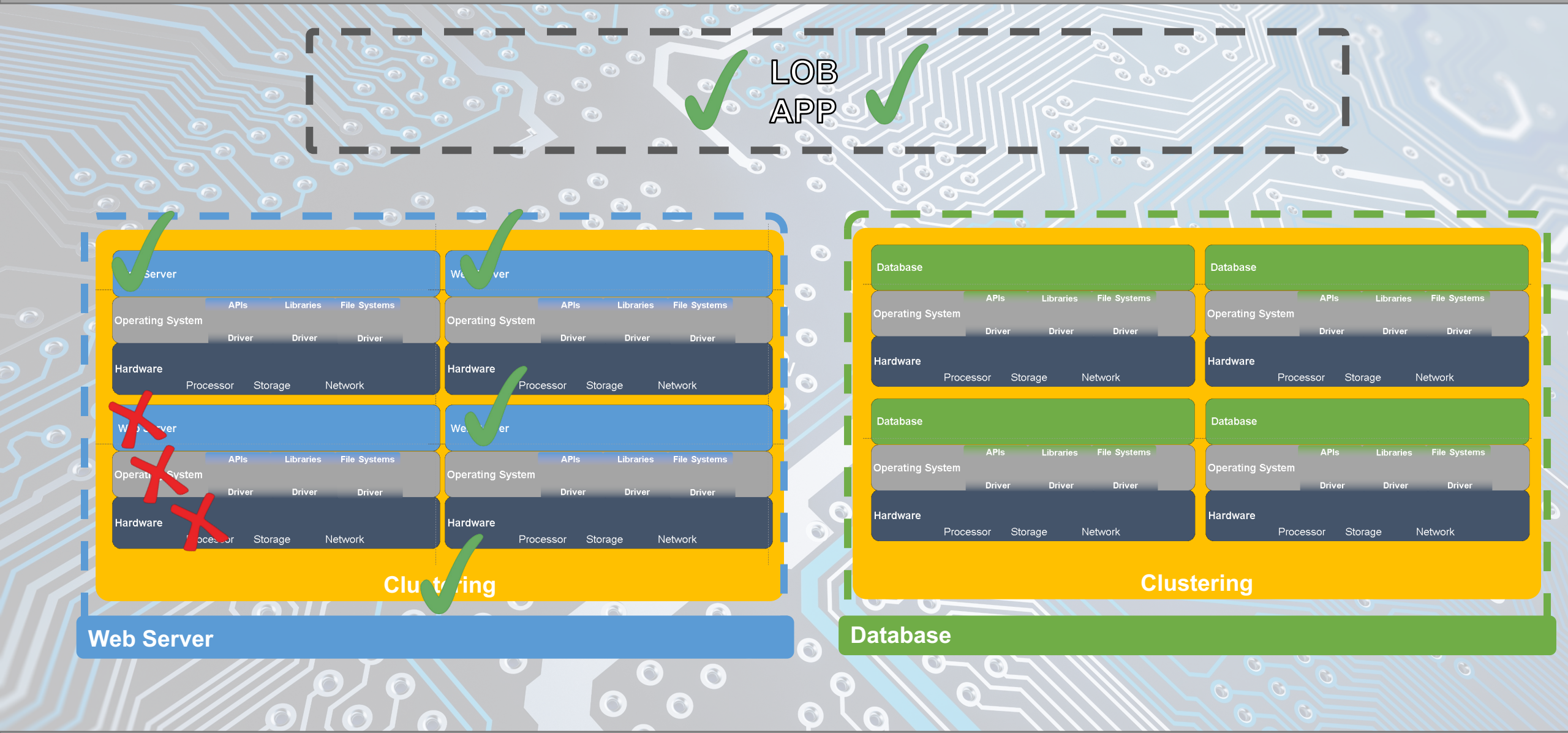
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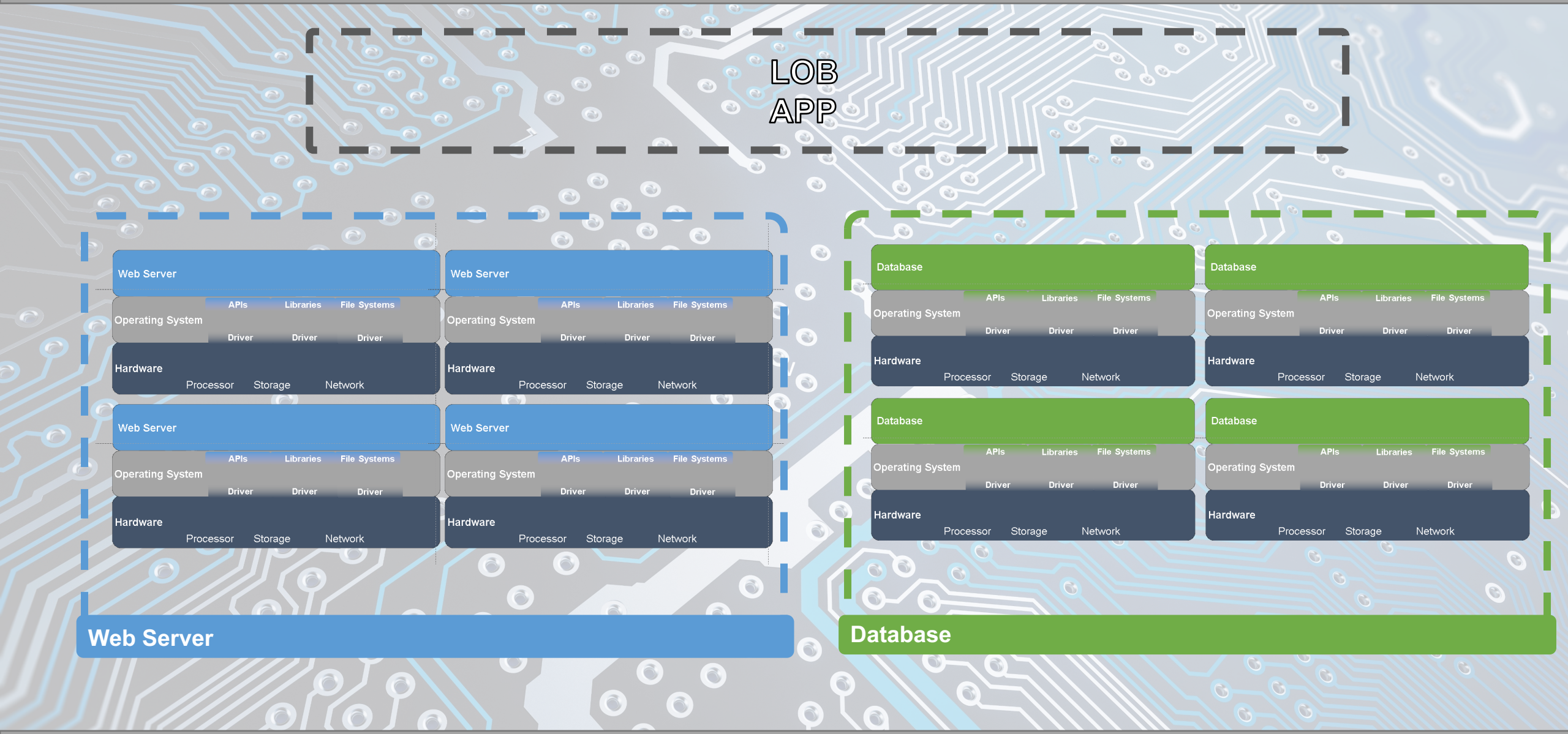
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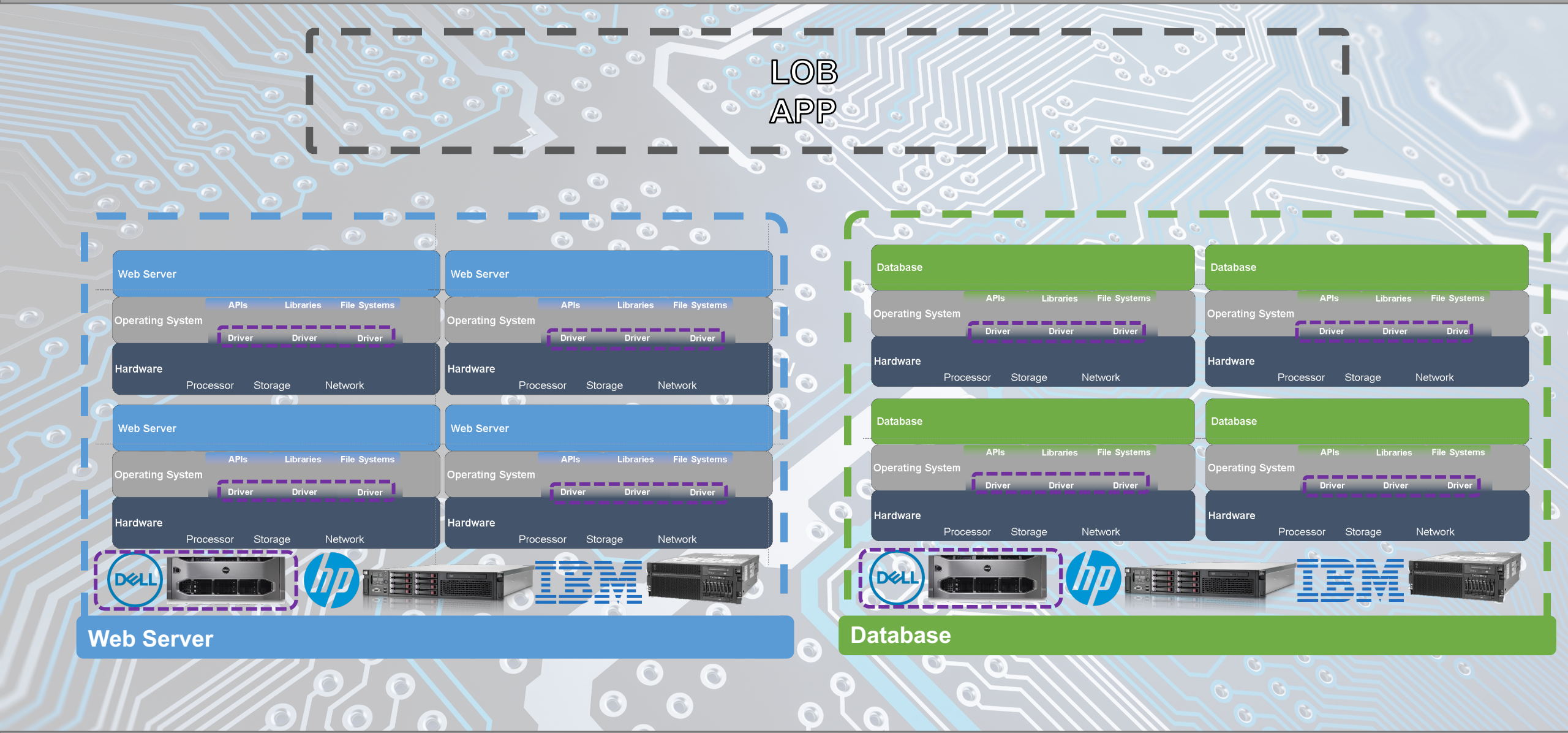
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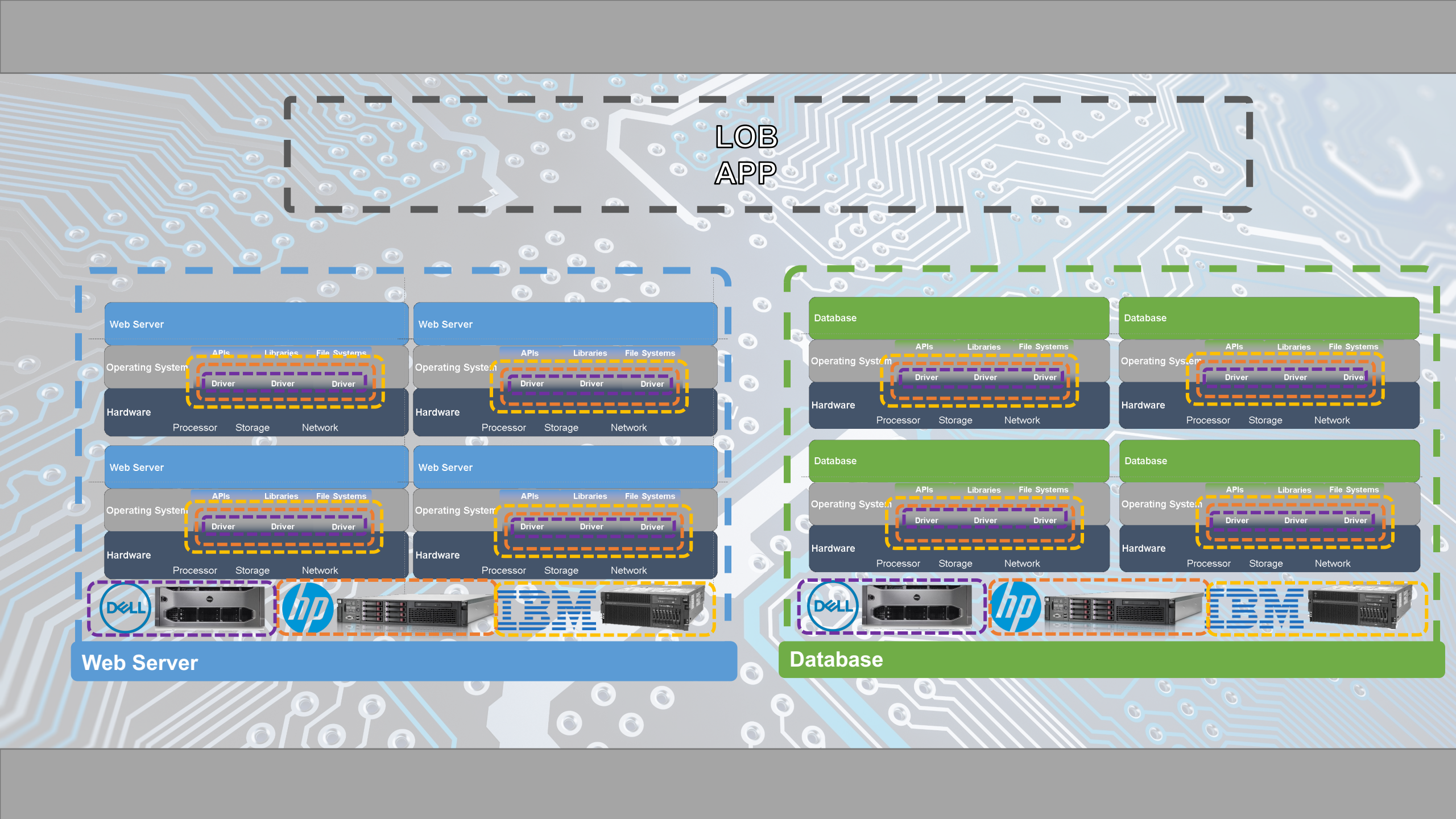
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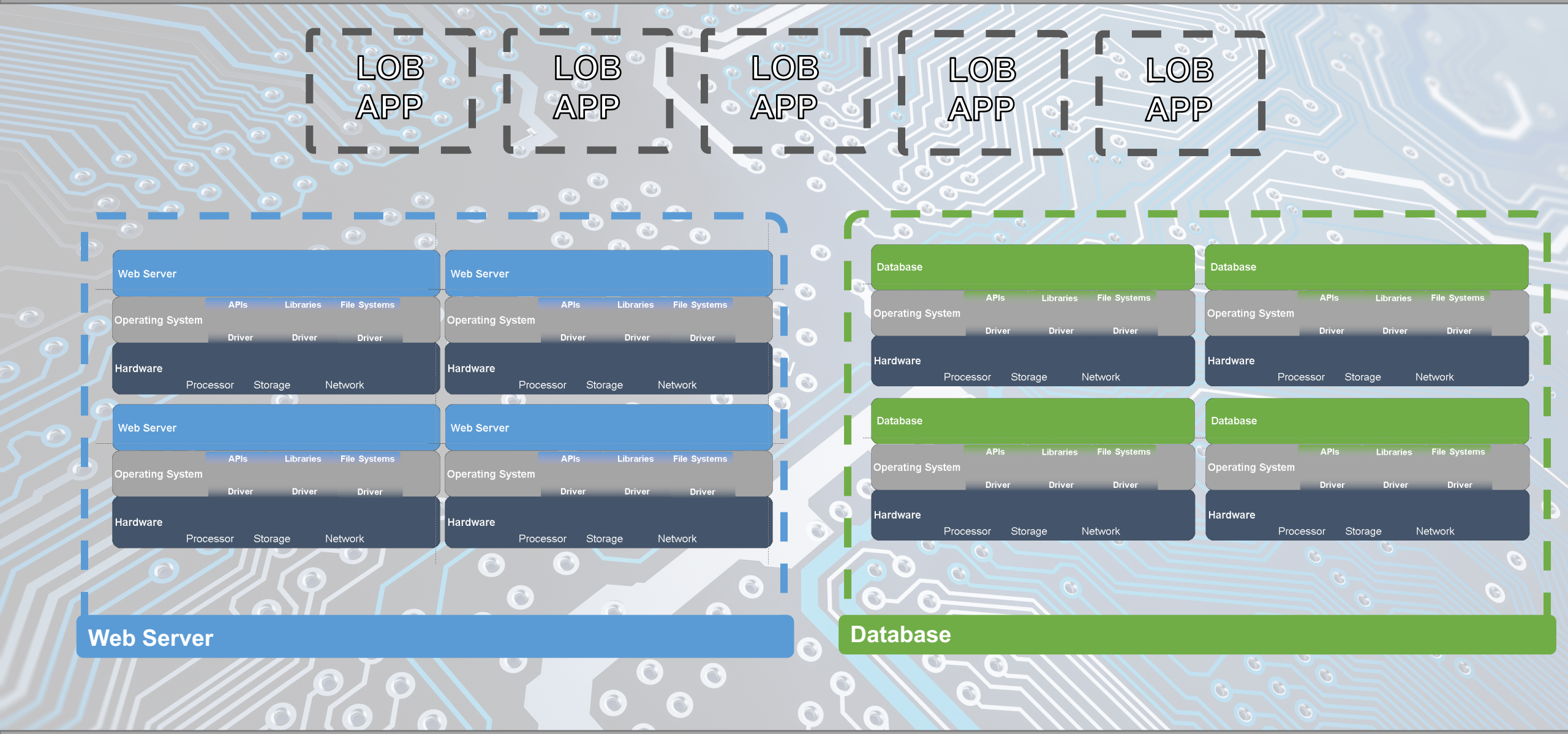
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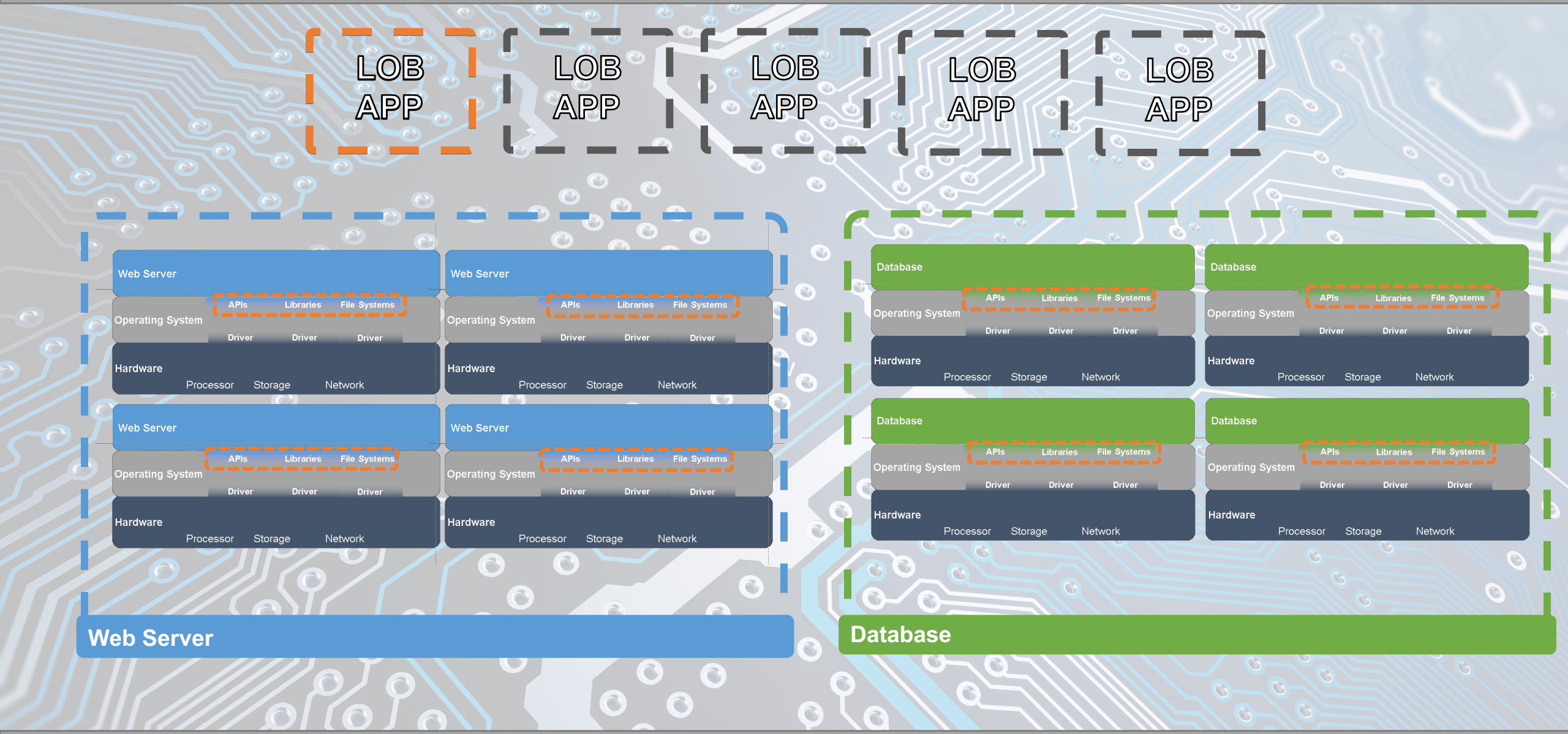
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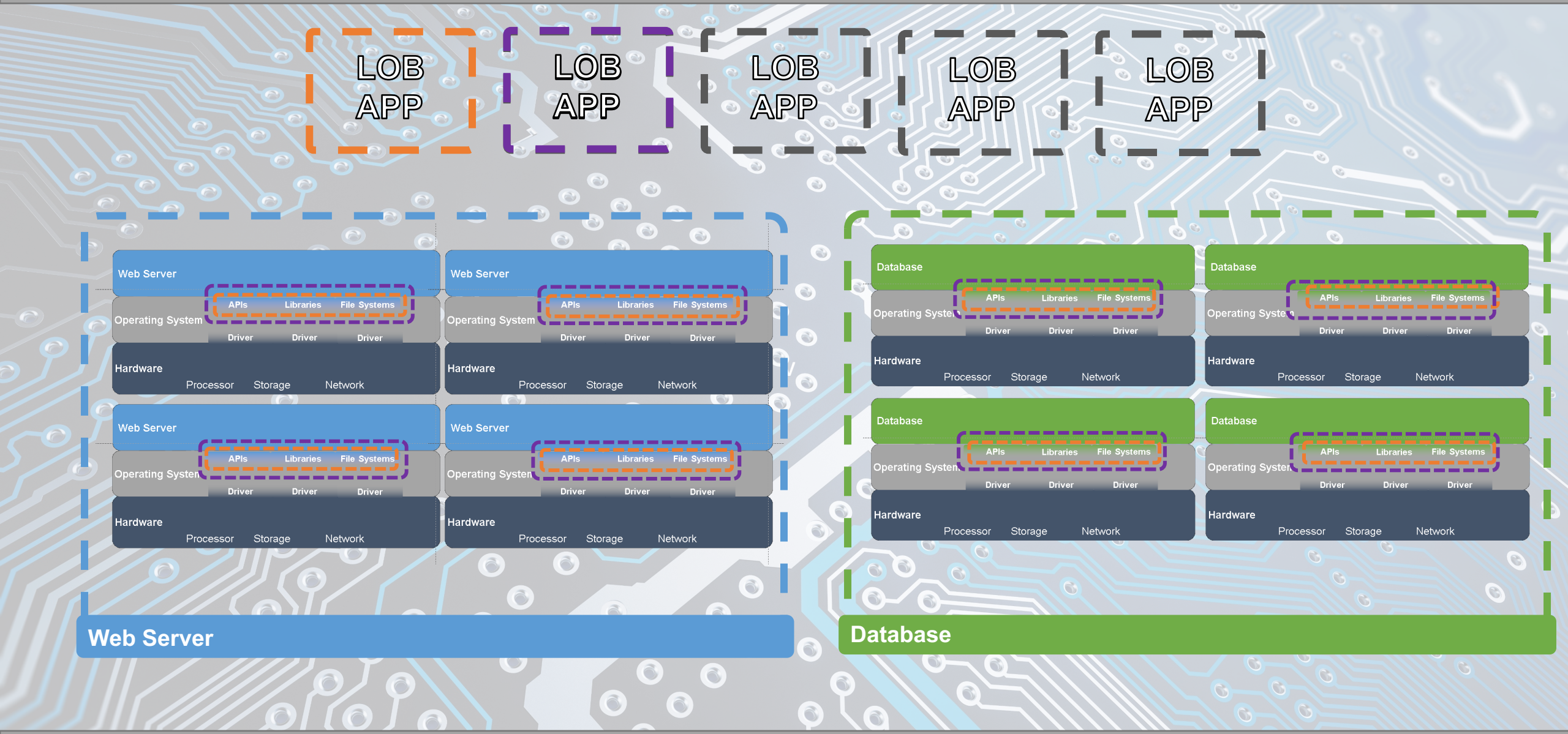
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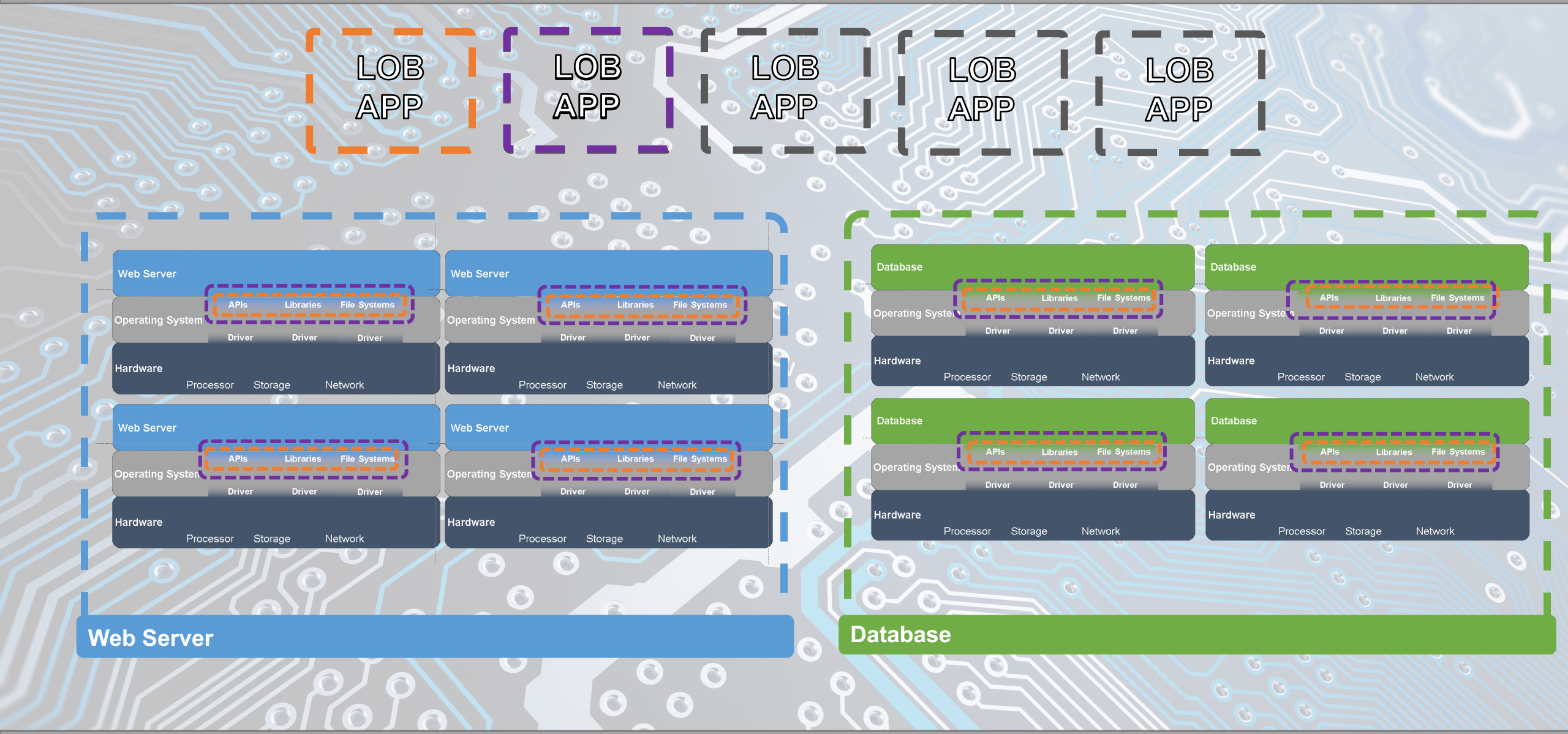
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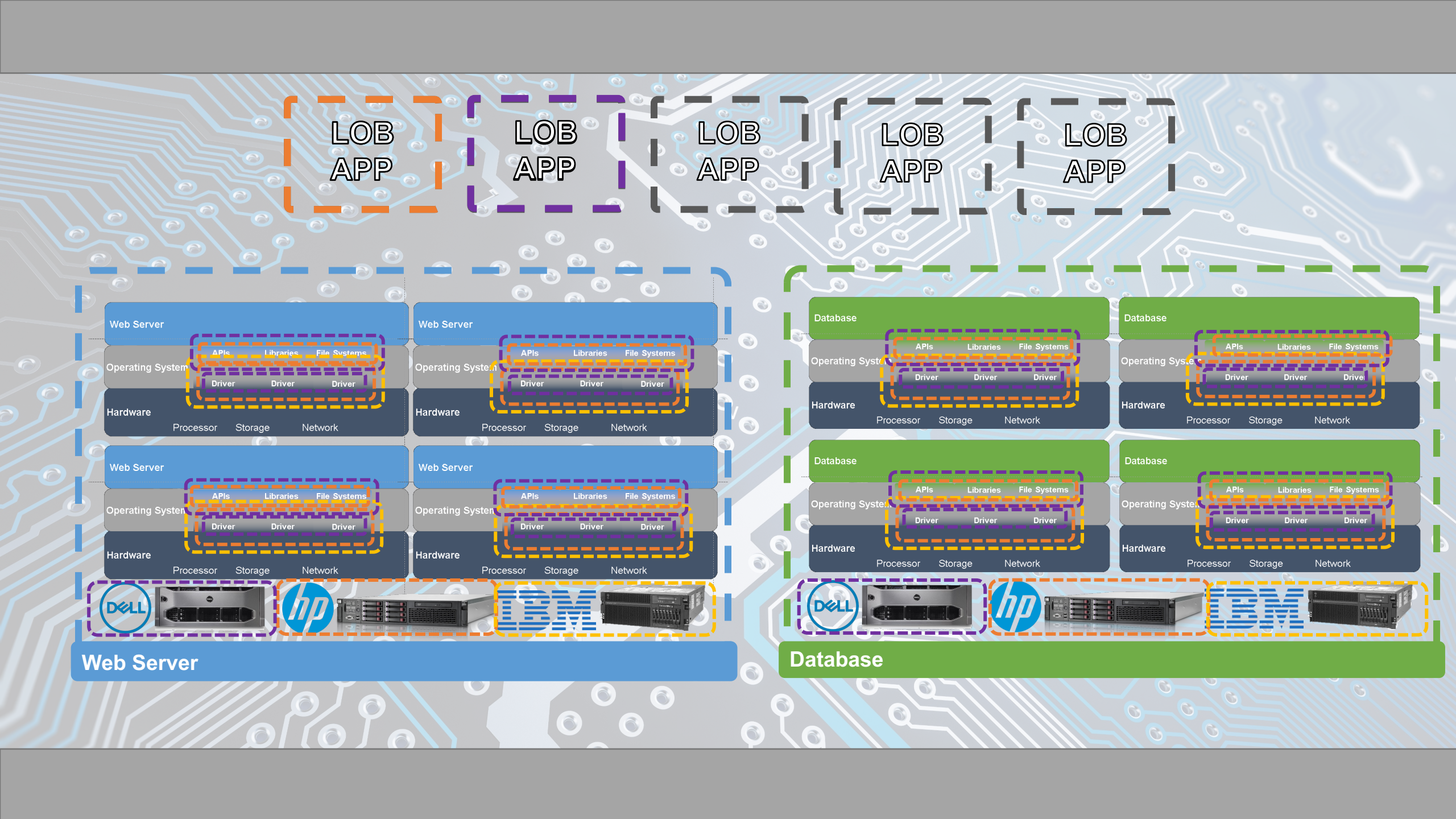
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computer.
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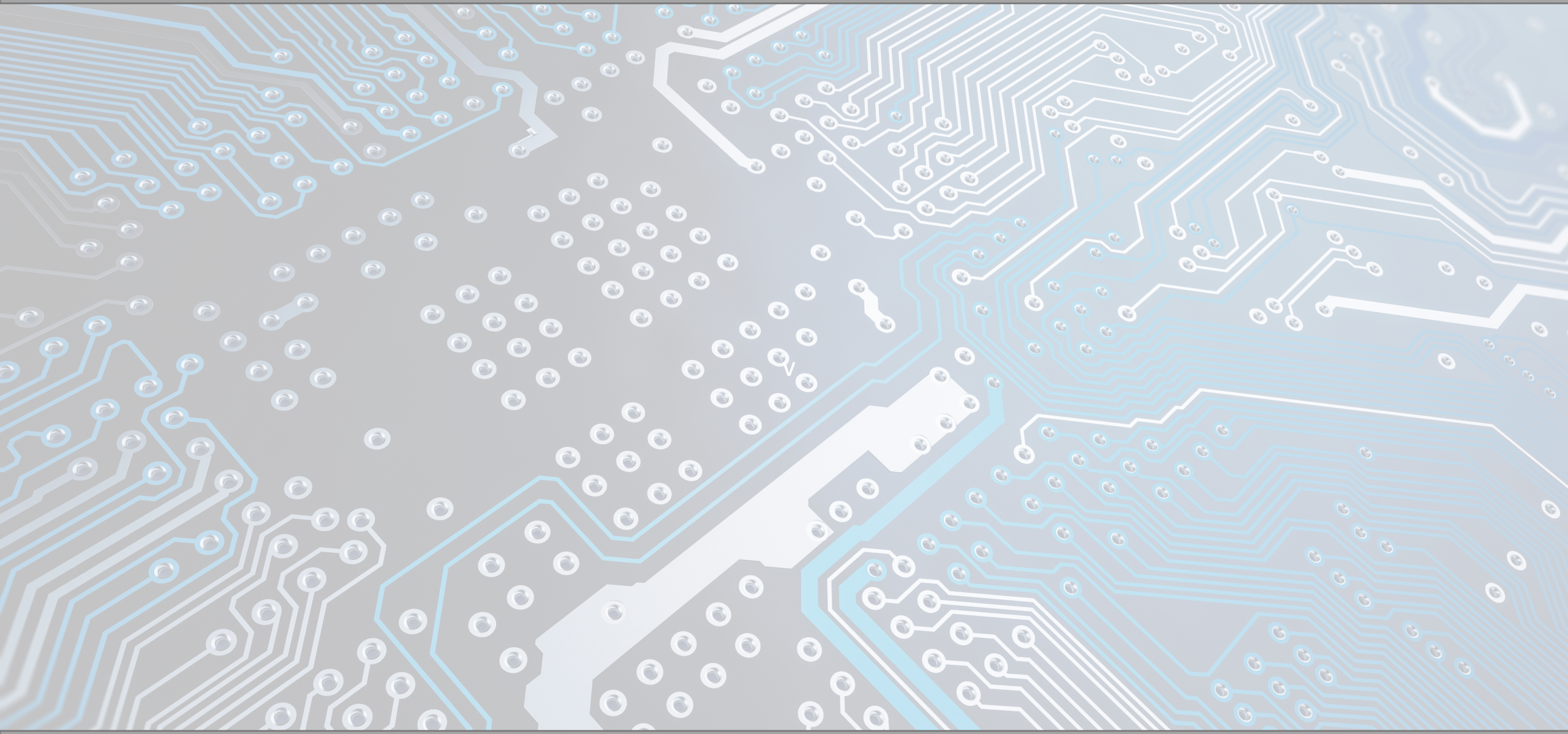

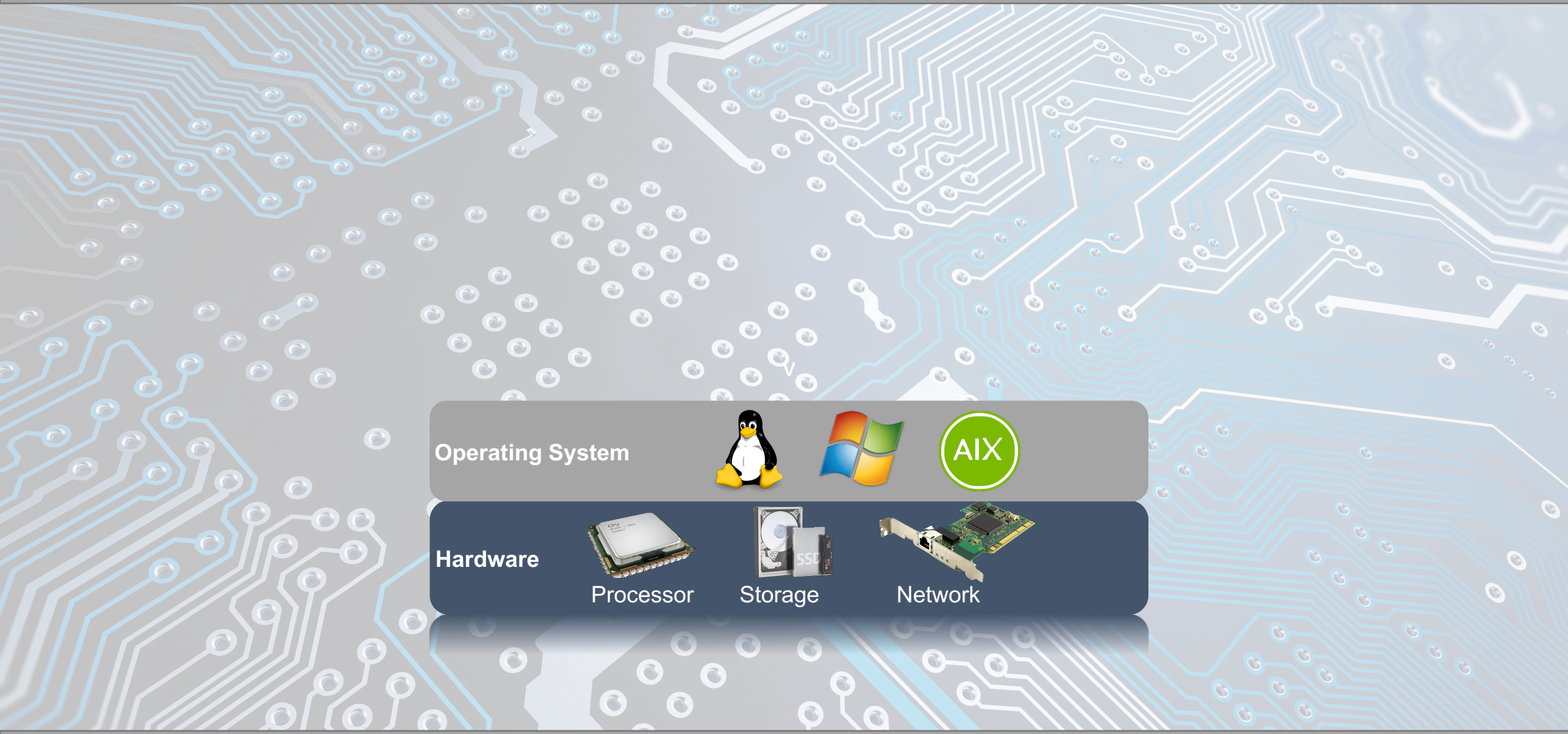
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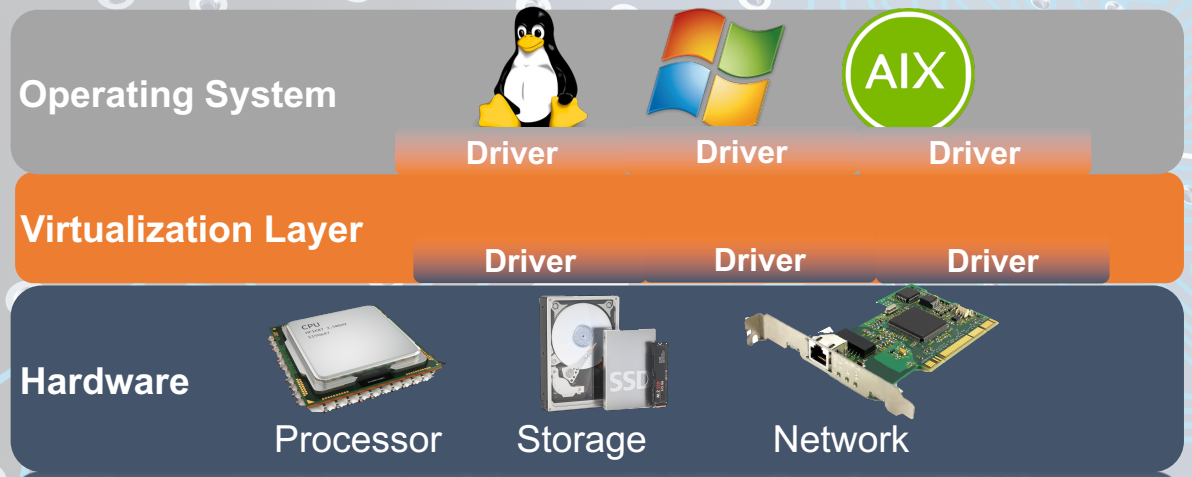
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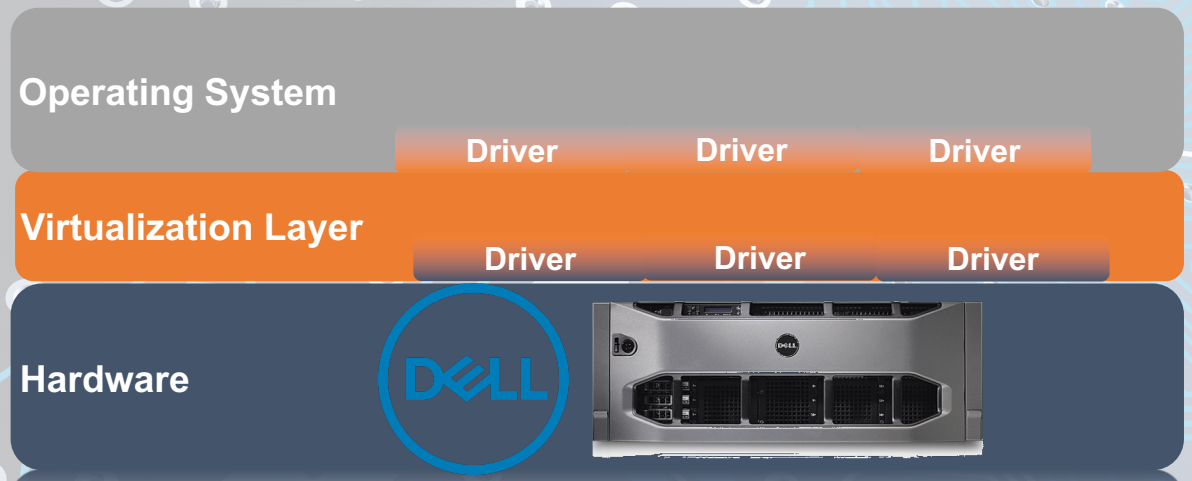
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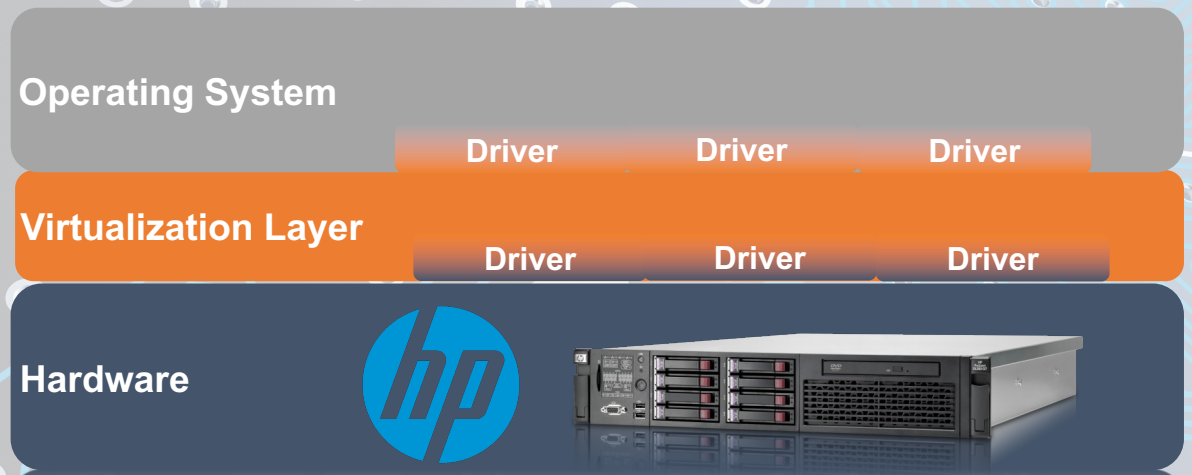
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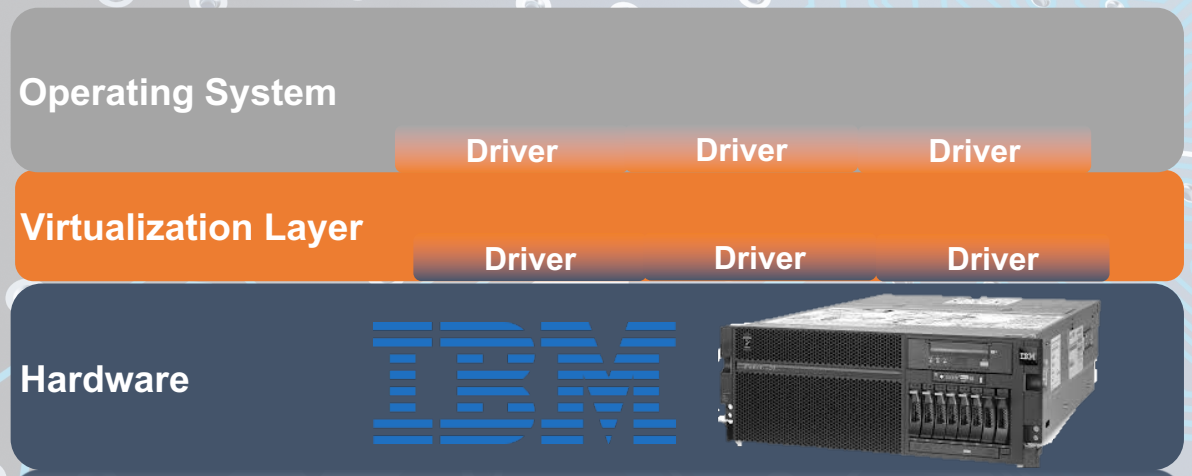
Operating System
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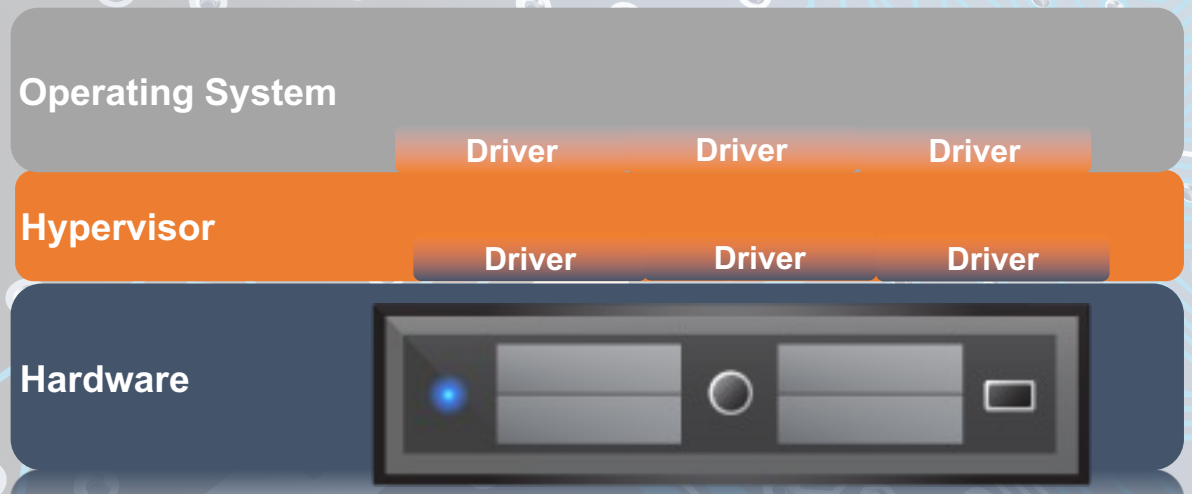
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Hardware

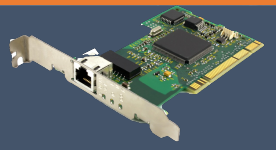
Web Server

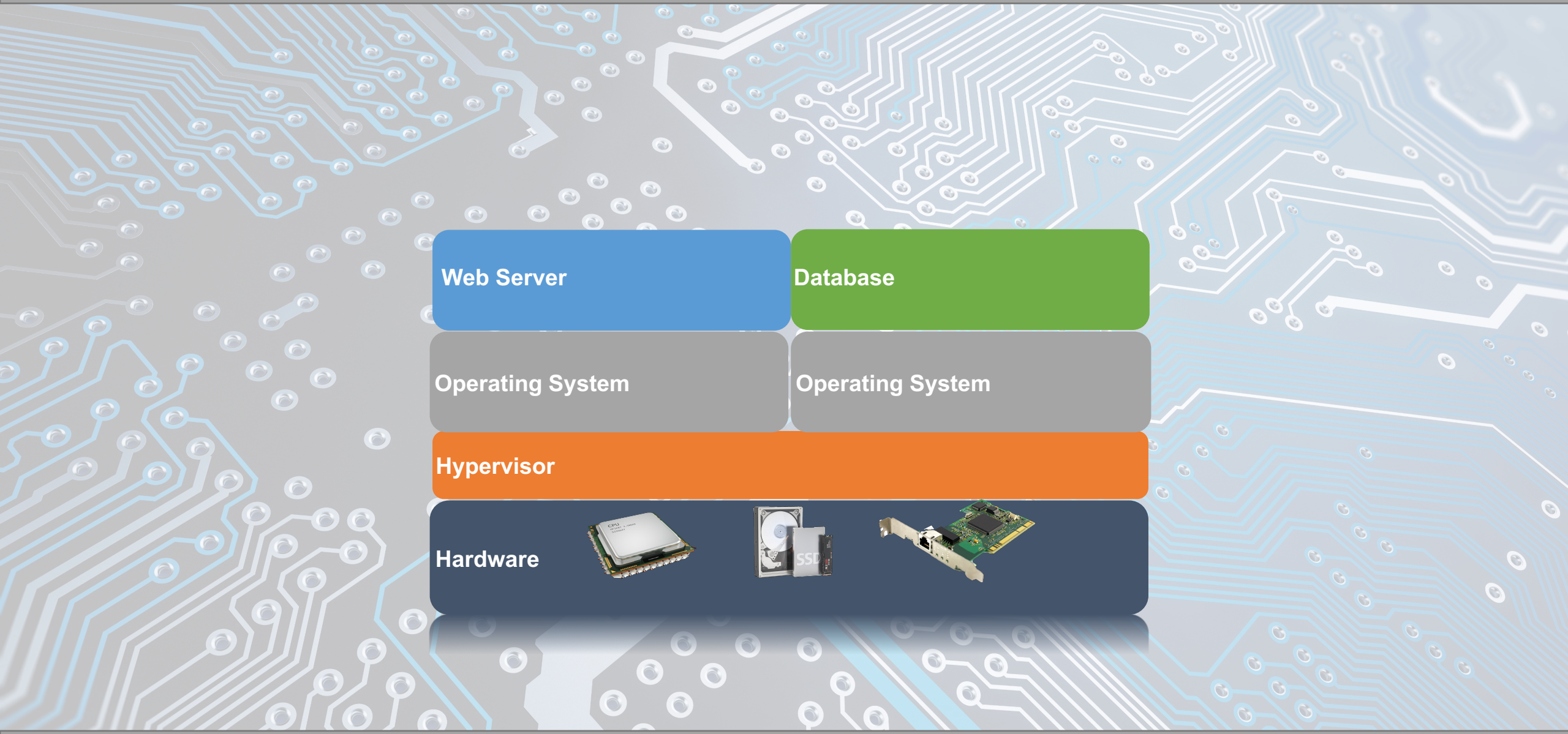
Database

Operating System

Hypervisor

Hardware




Web Server
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Operating System
Hypervisor
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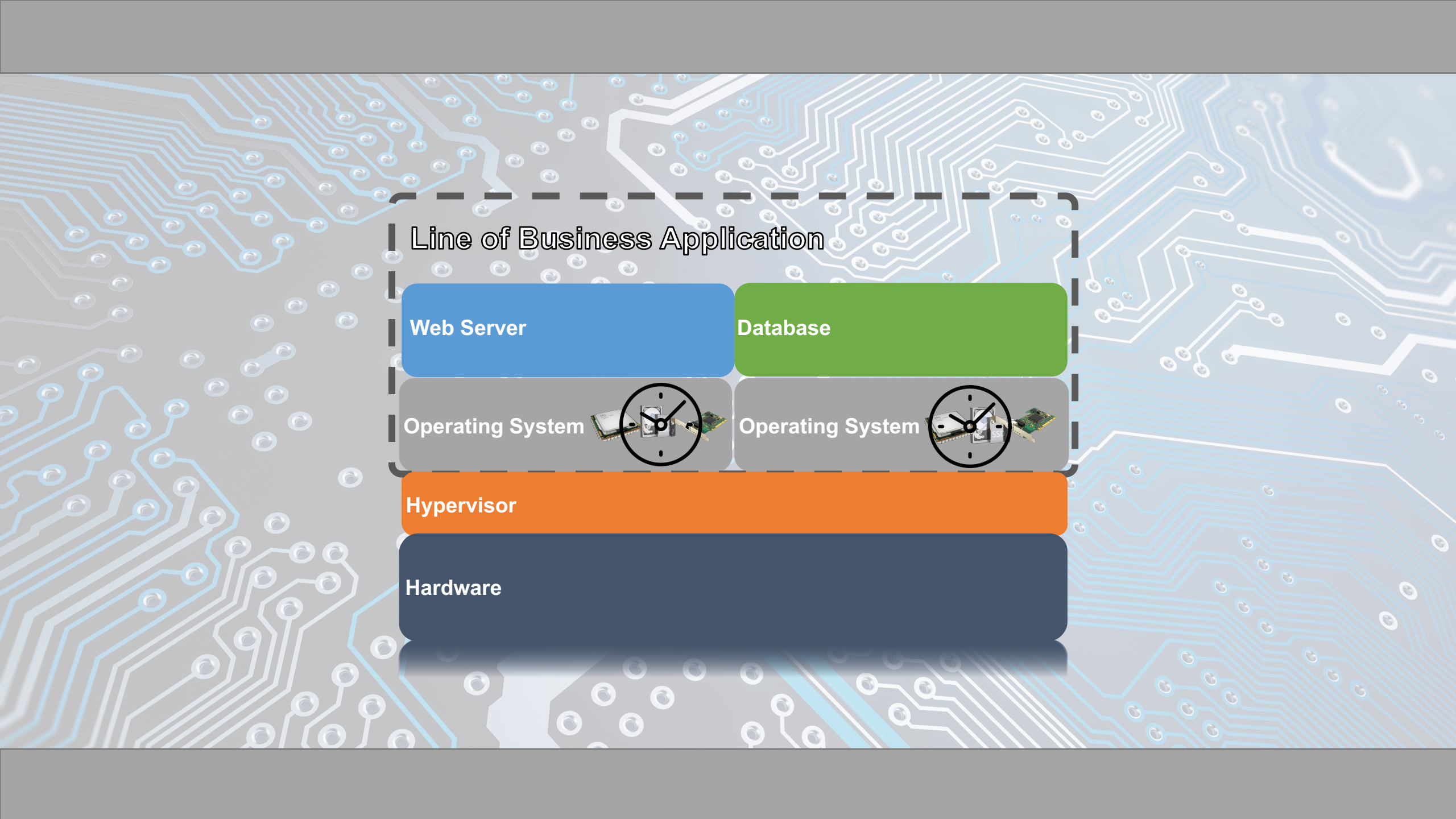
Line of Business Application
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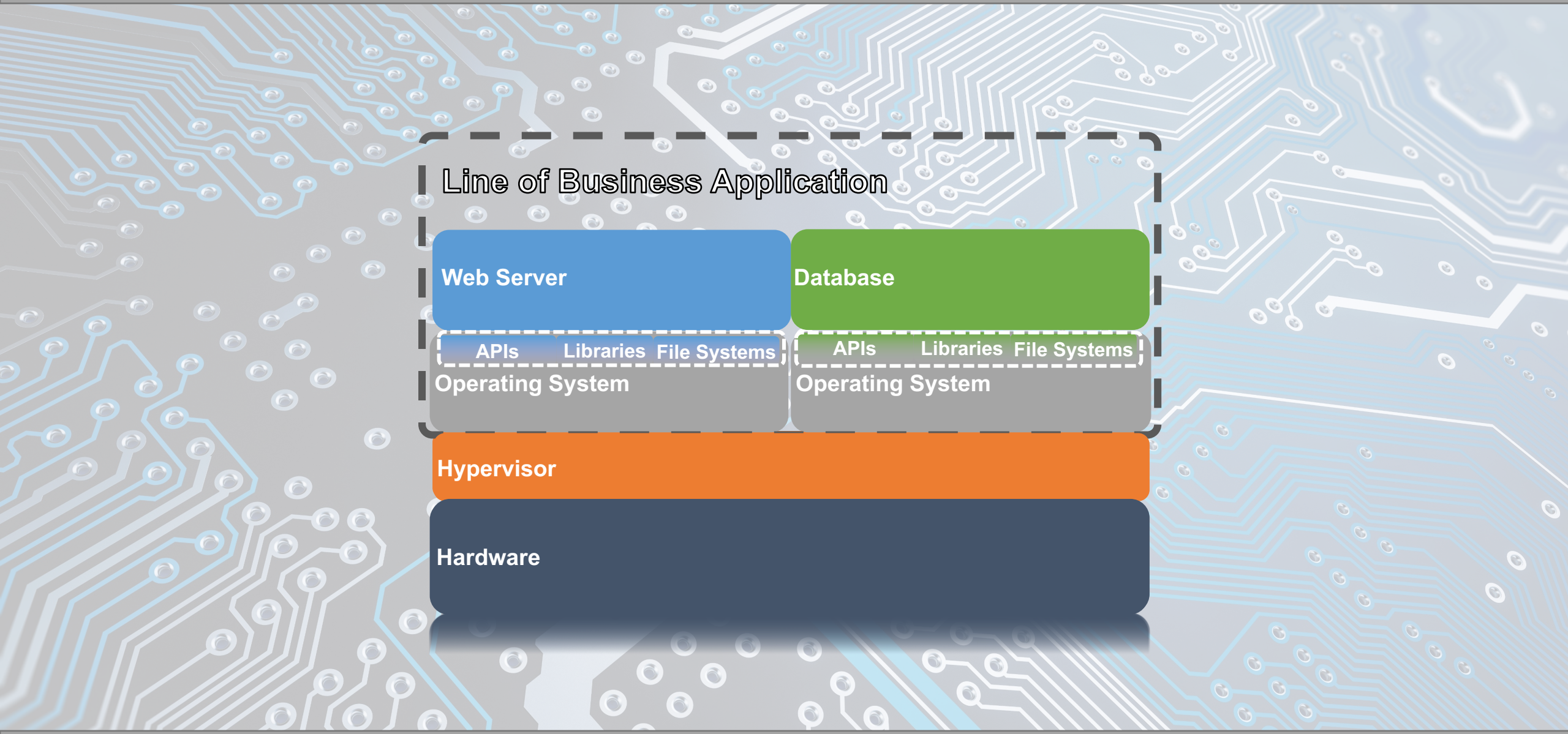
Line of Business Application
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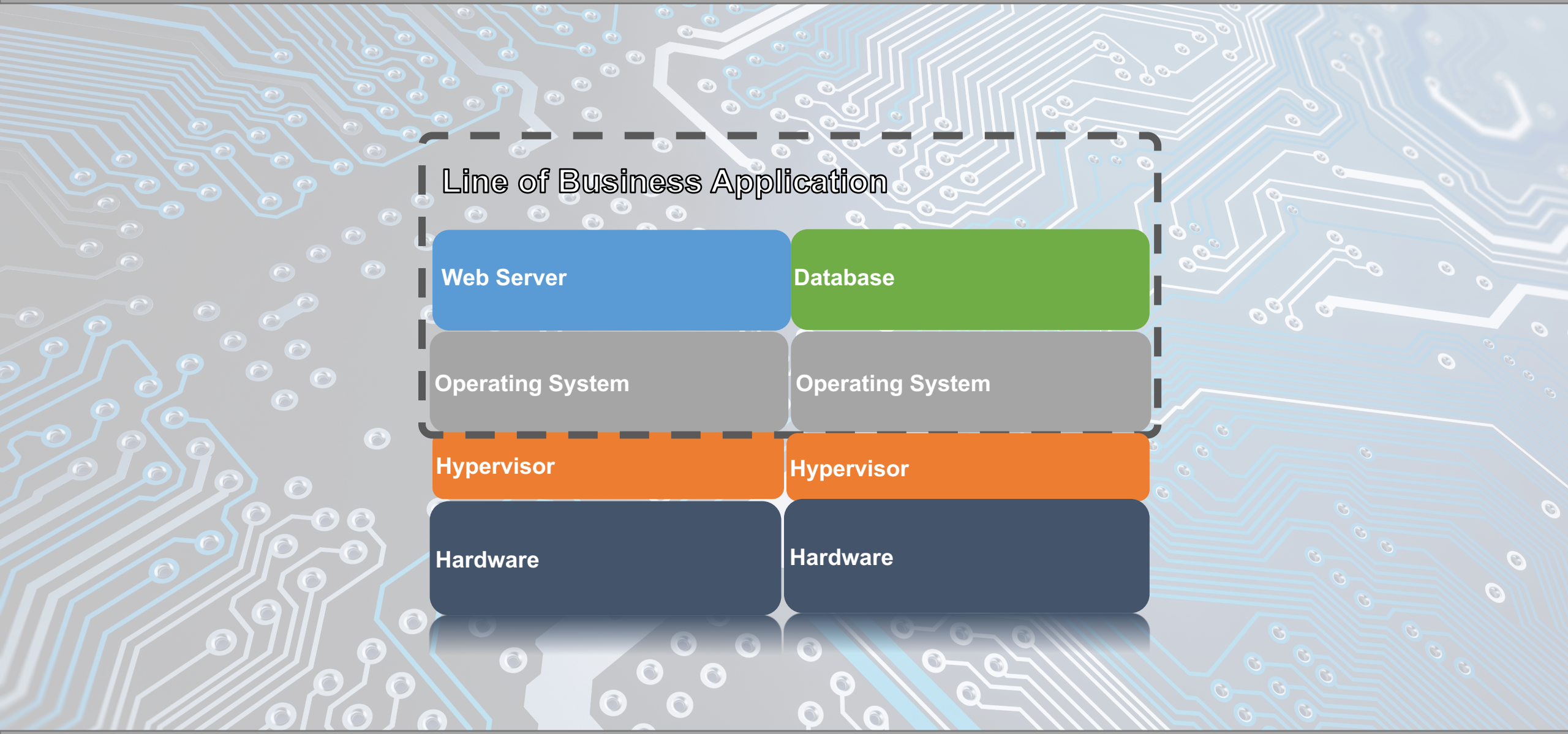
Operating System
Hypervisor
Hardware


Line of Business Application
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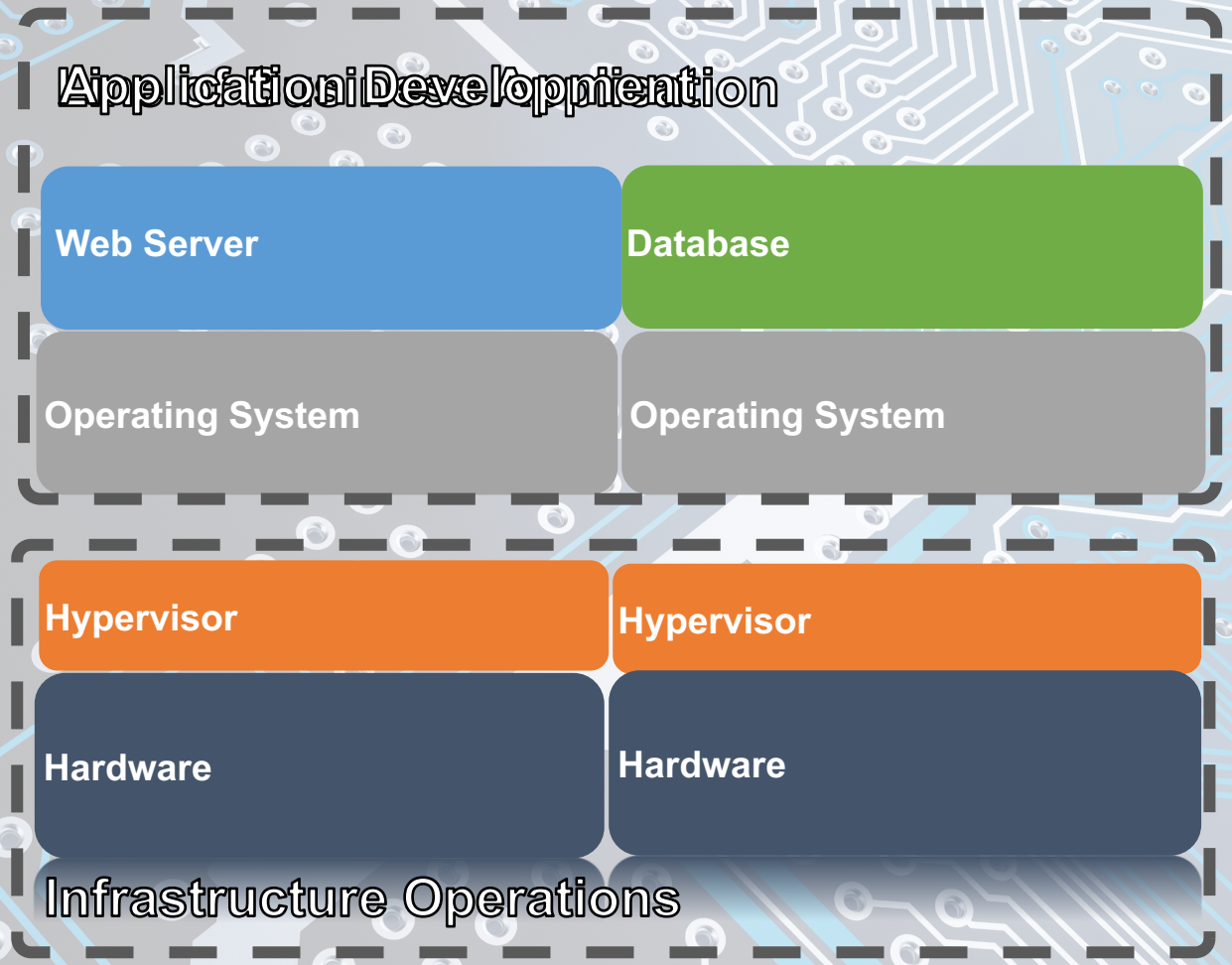
Application Development
Web Server
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Infrastructure Operations


Application Development
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Hypervisor
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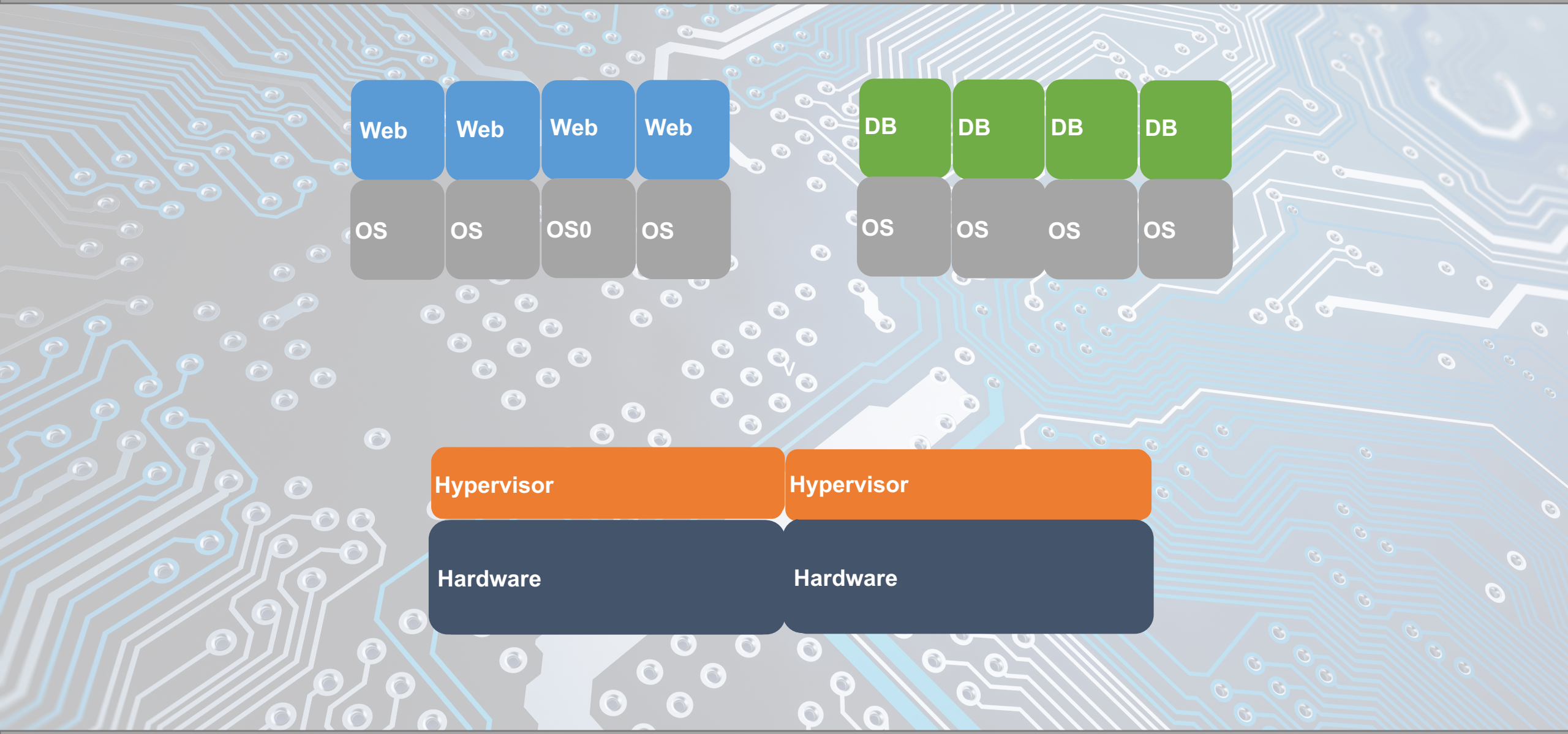
Hardware
Hardware
Infrastructure Operations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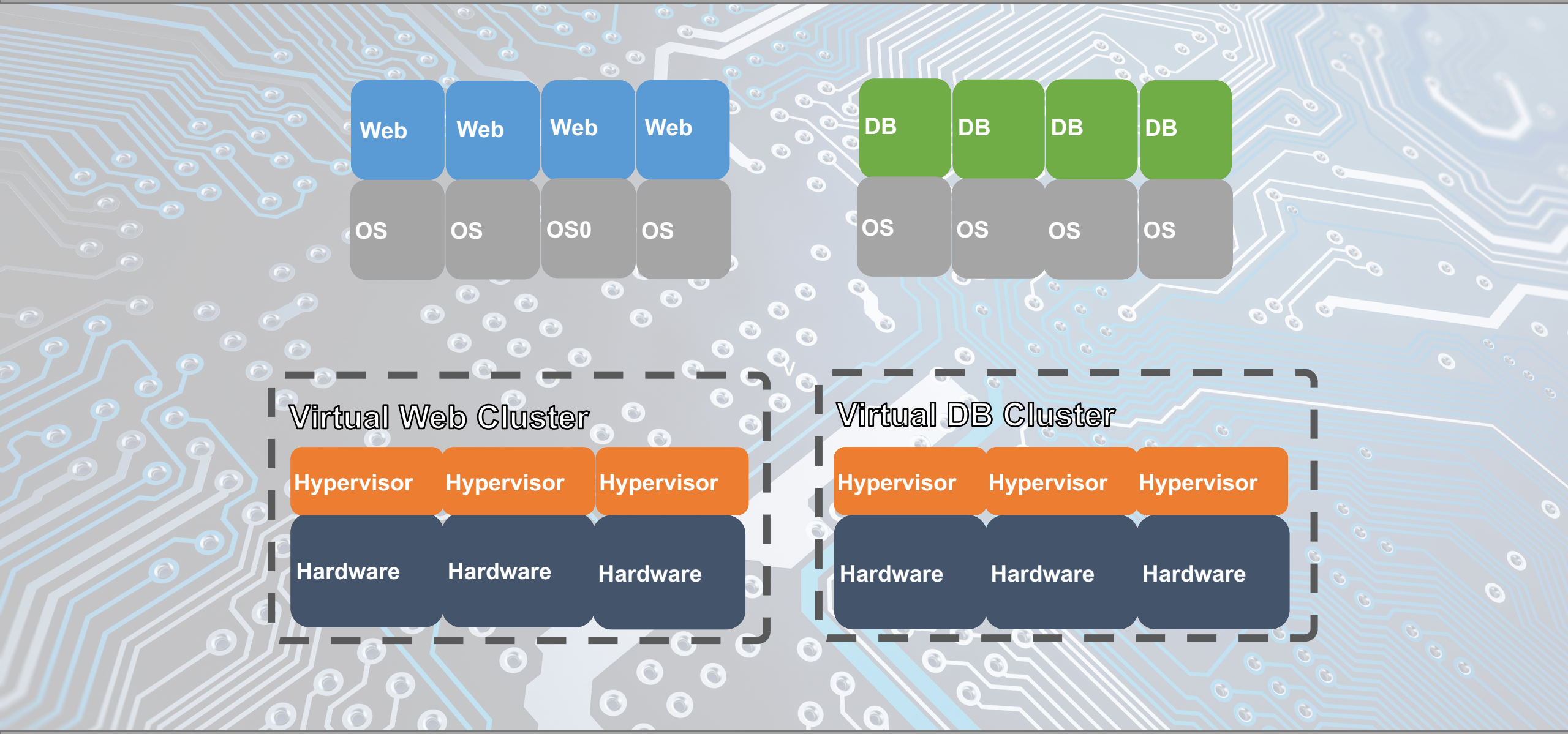
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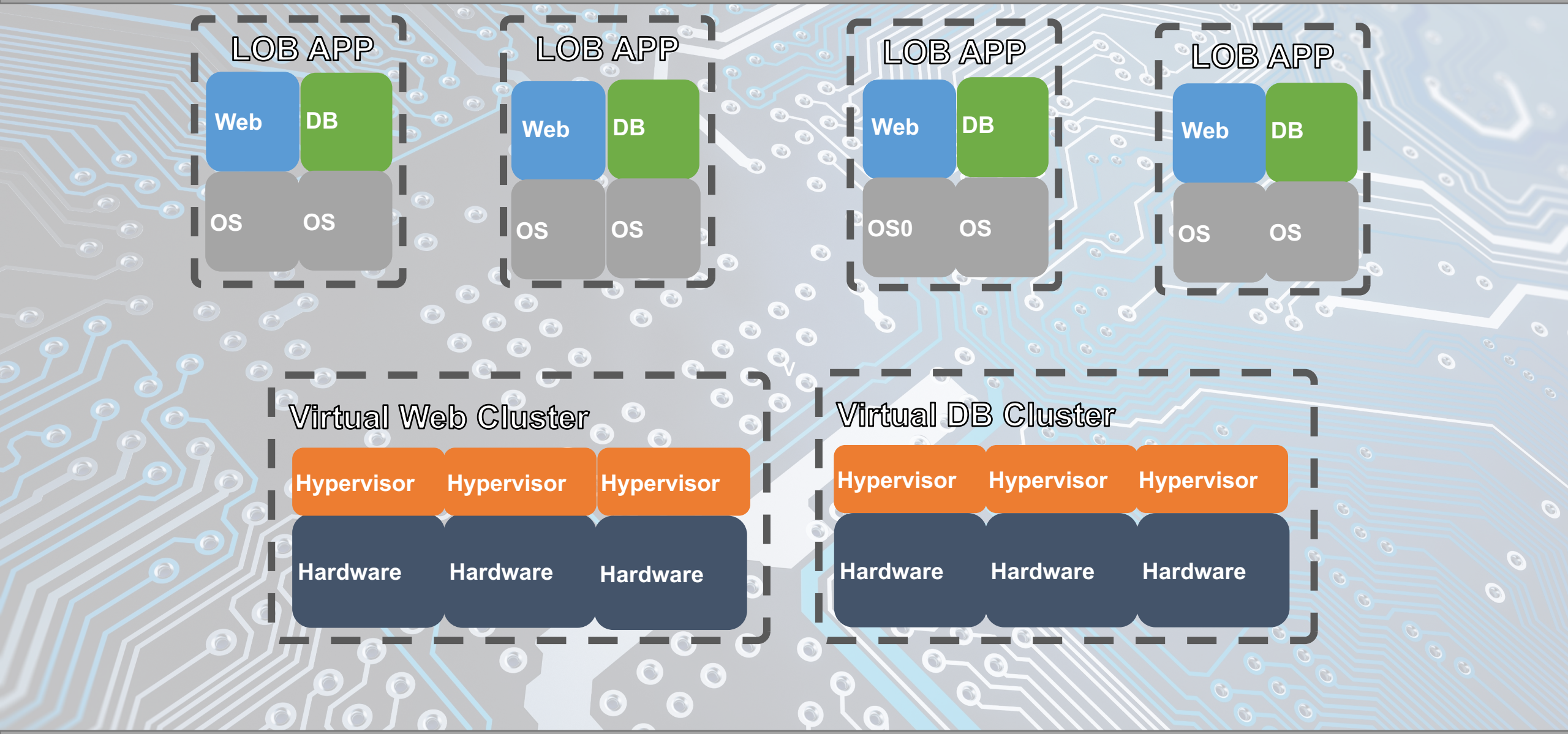
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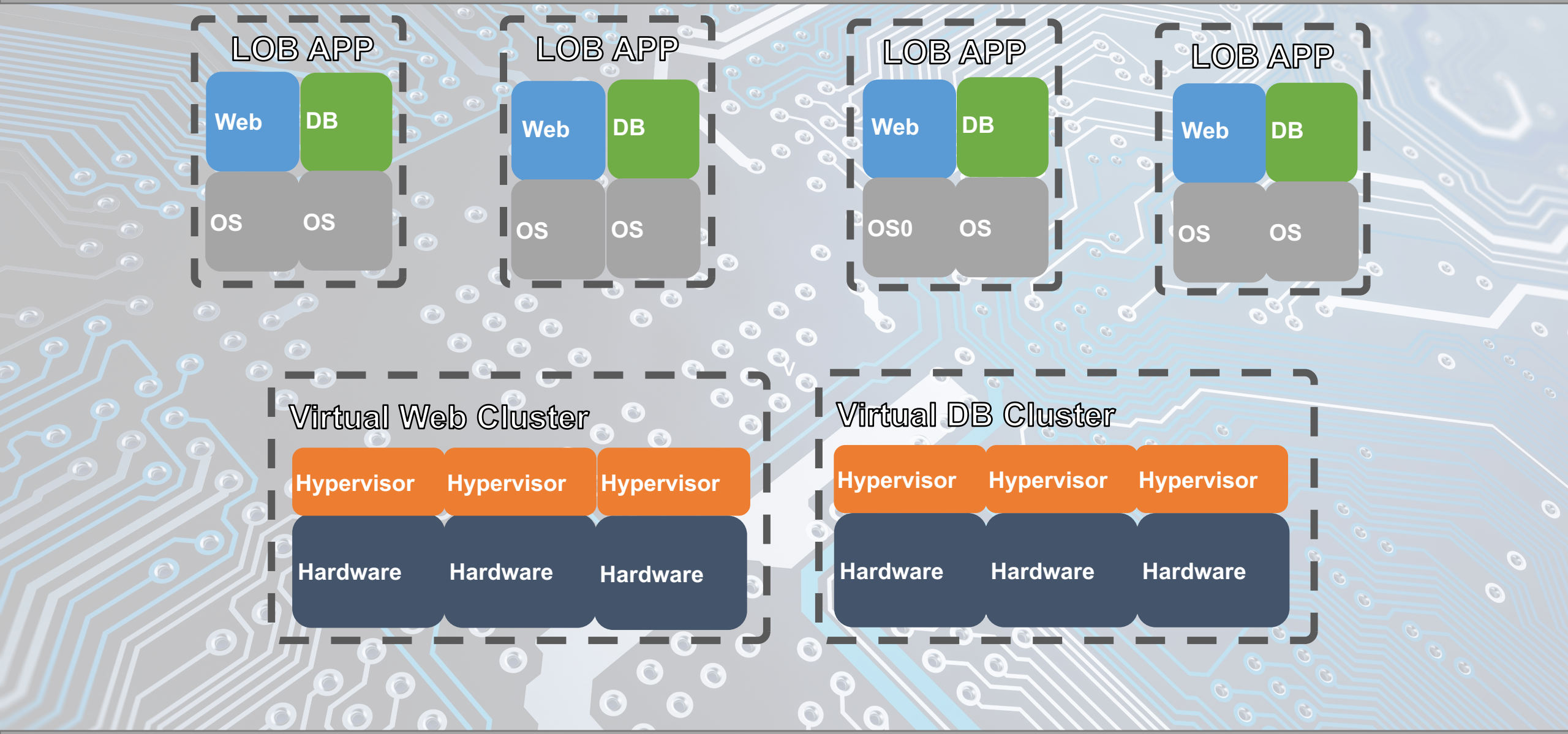
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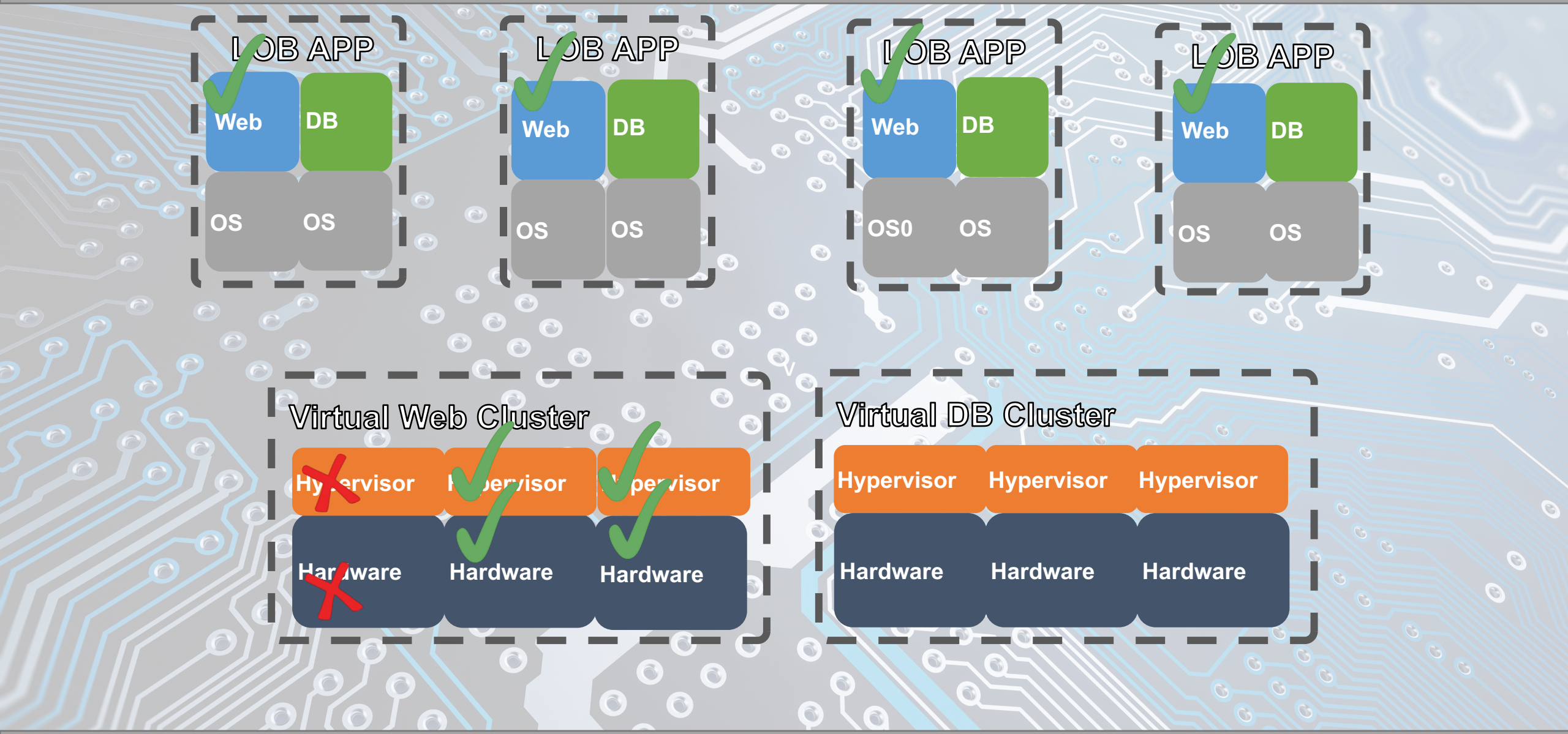
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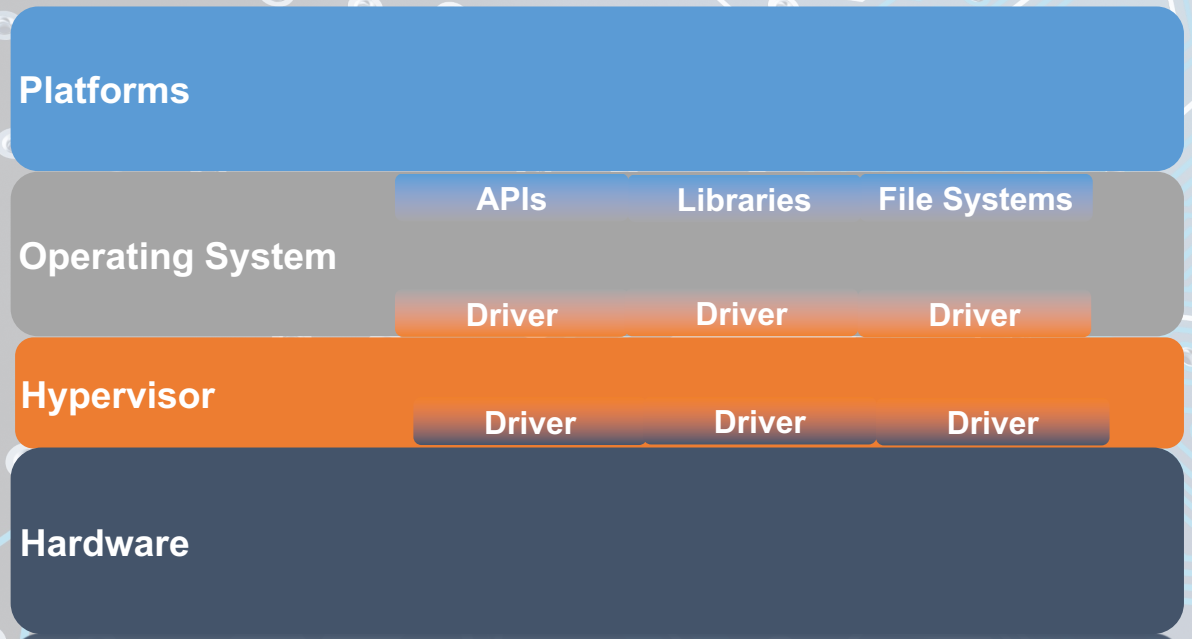
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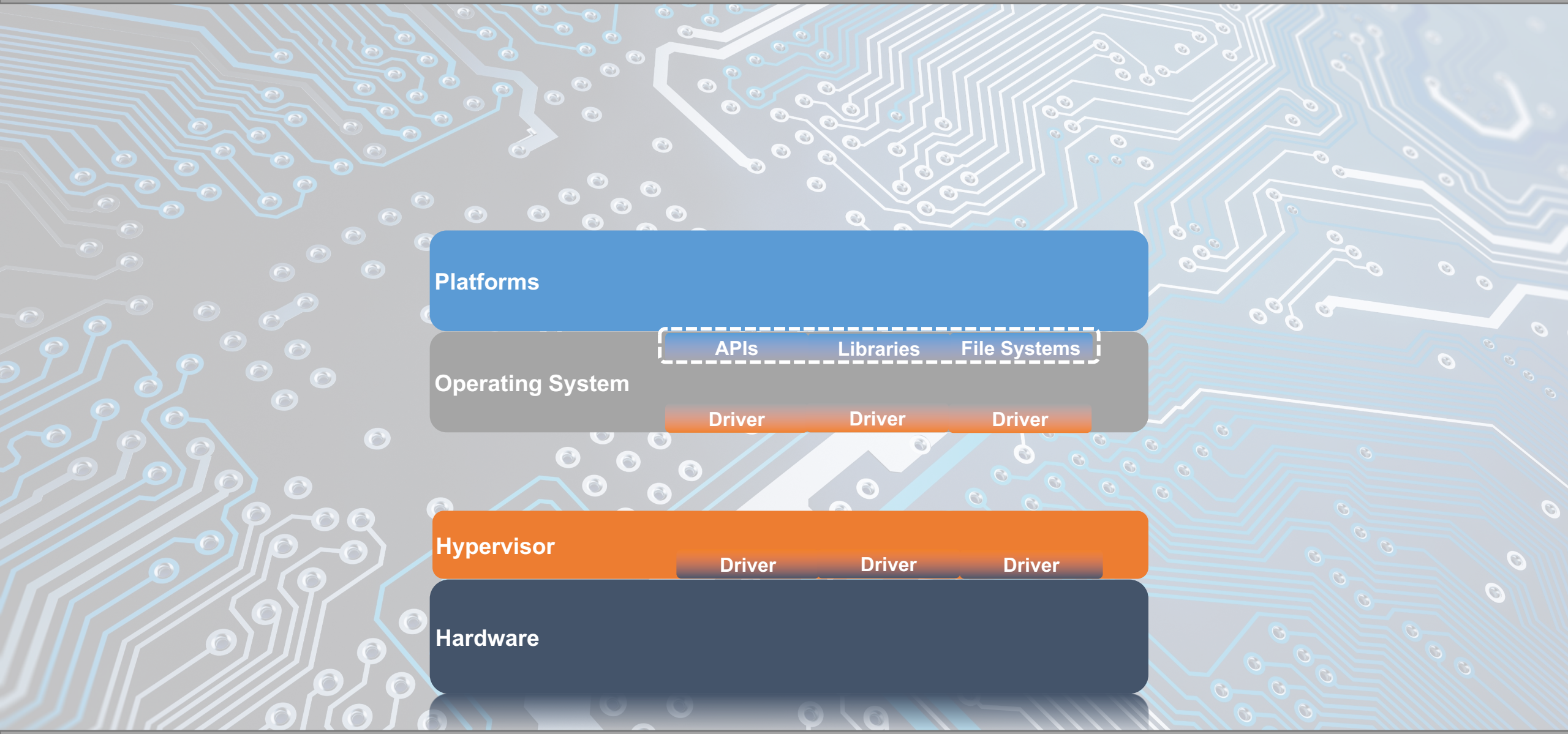
Hardware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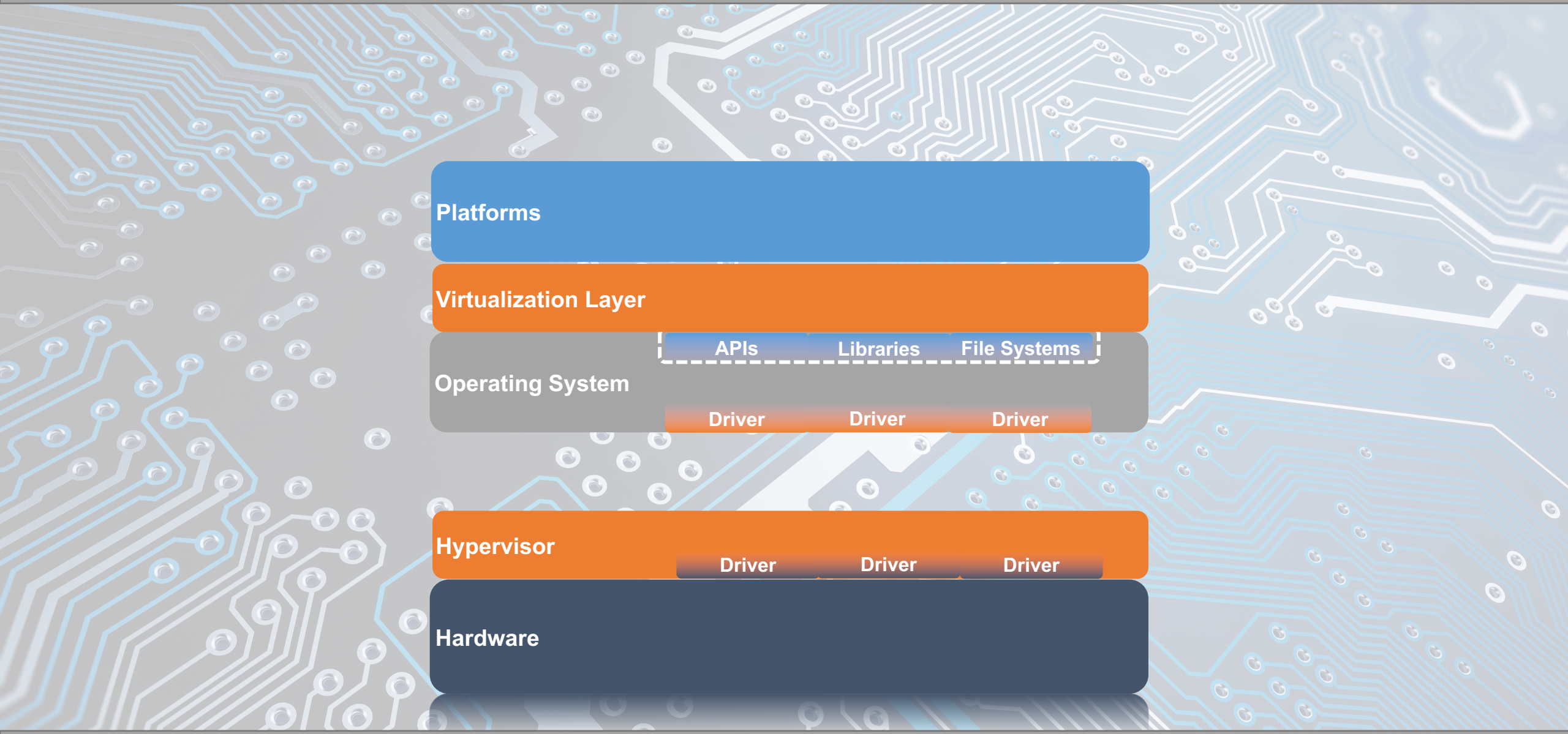
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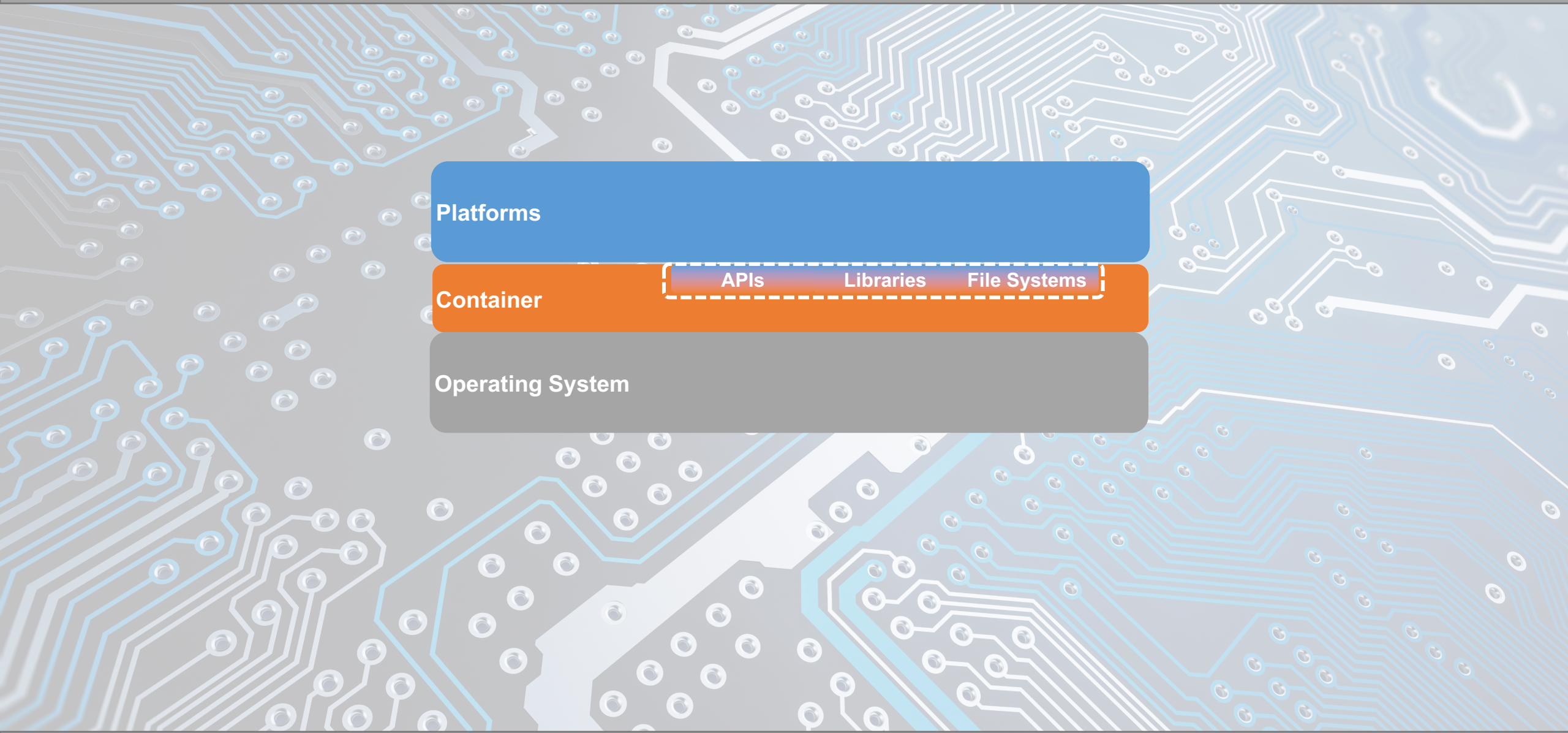
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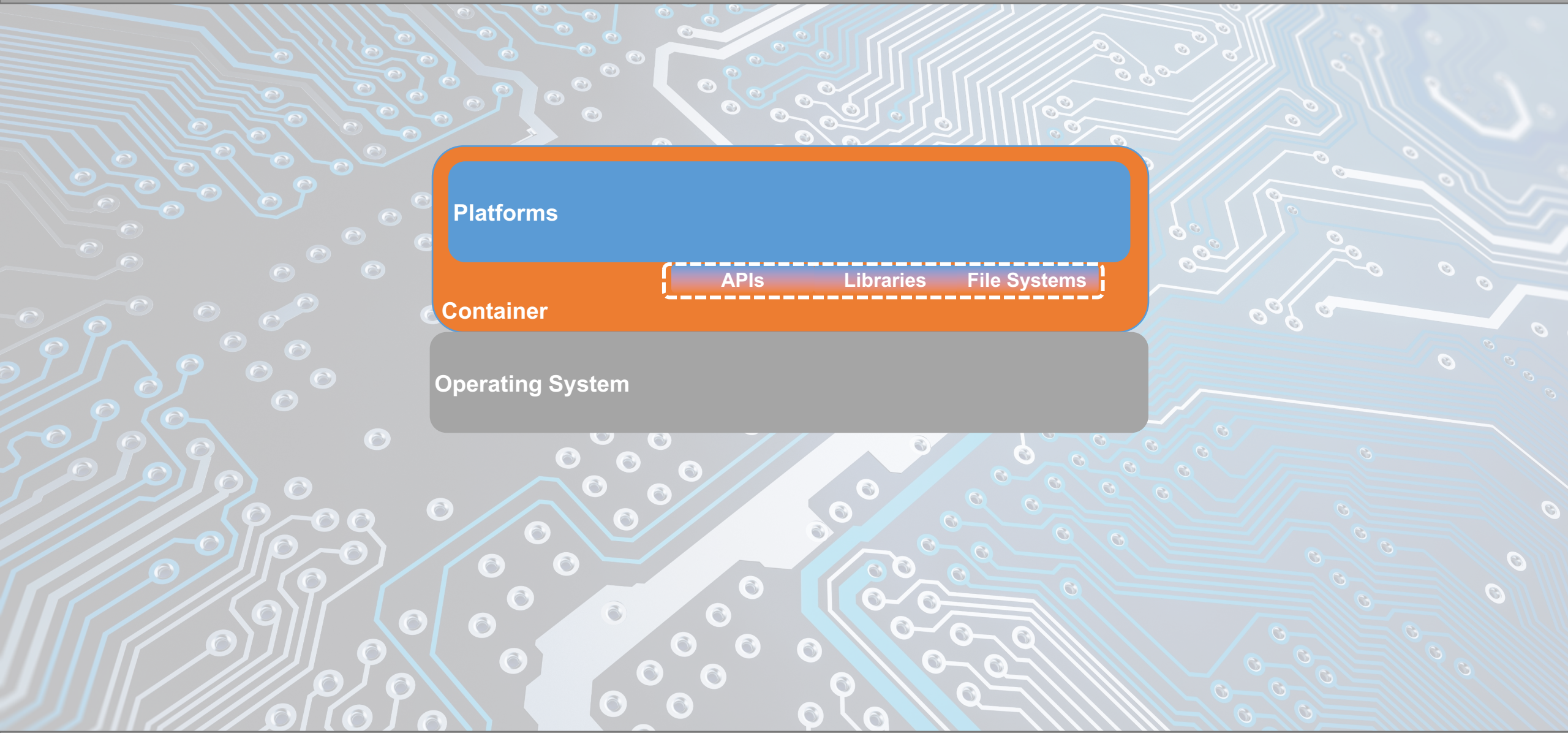
Platforms
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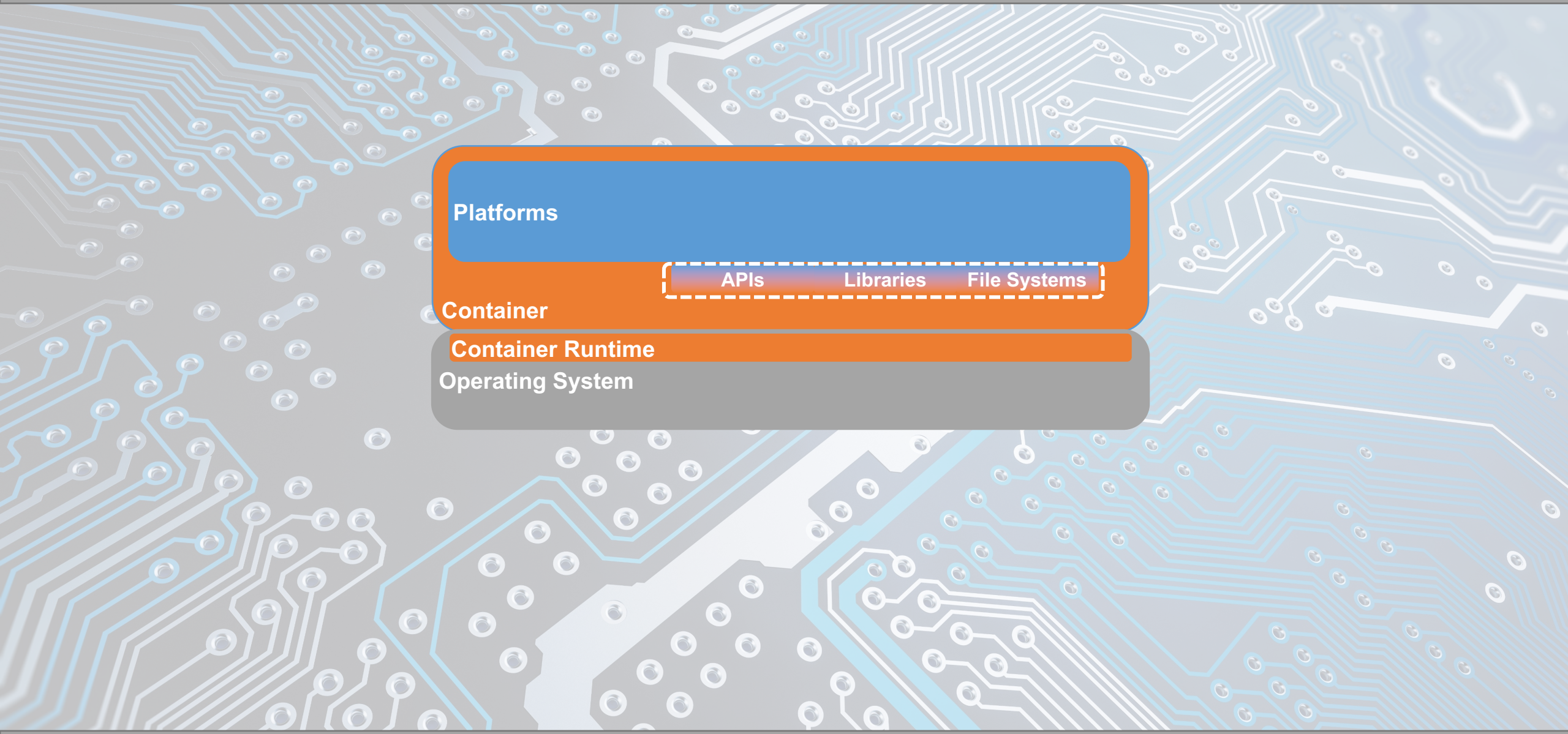
Operating System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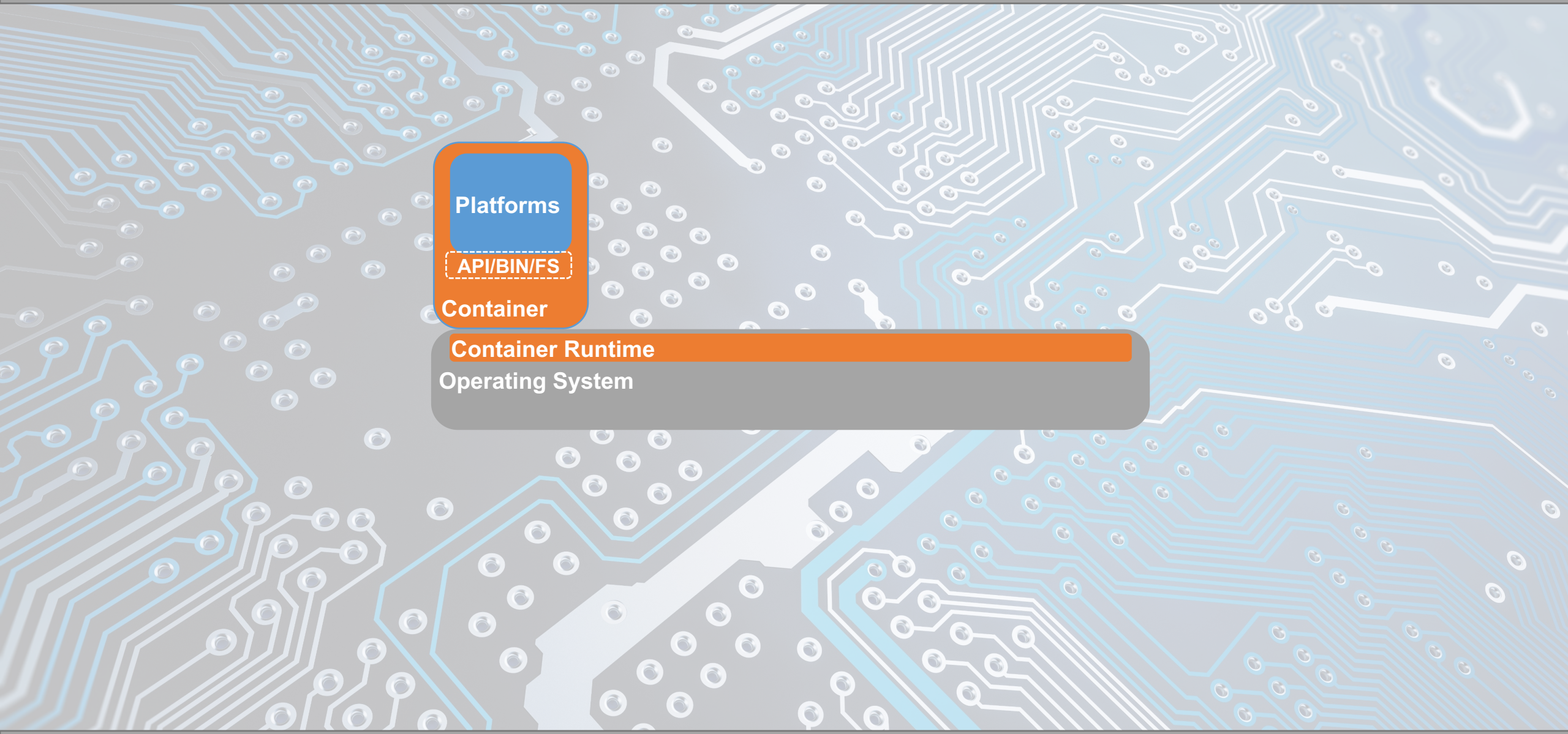
Operating System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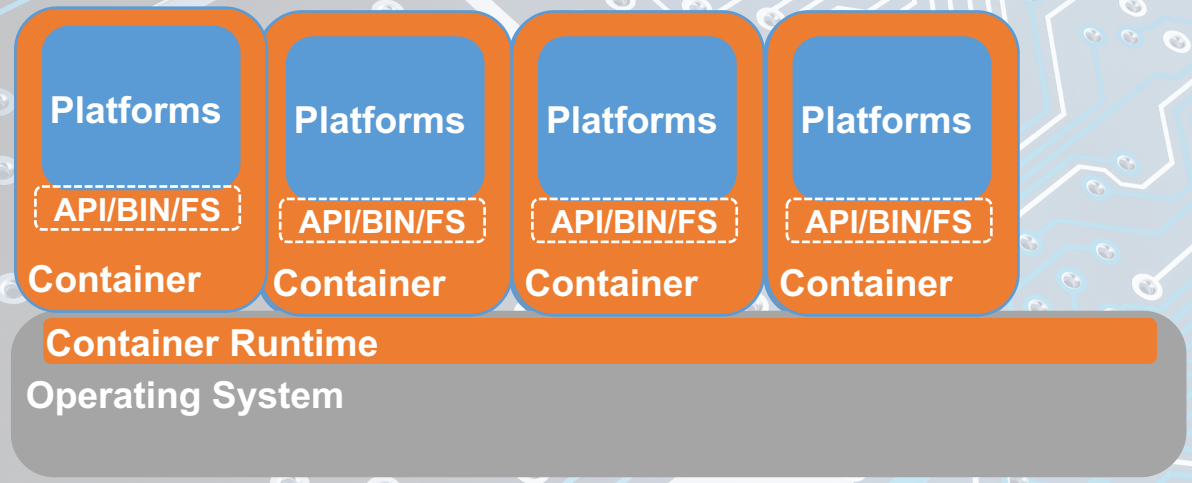
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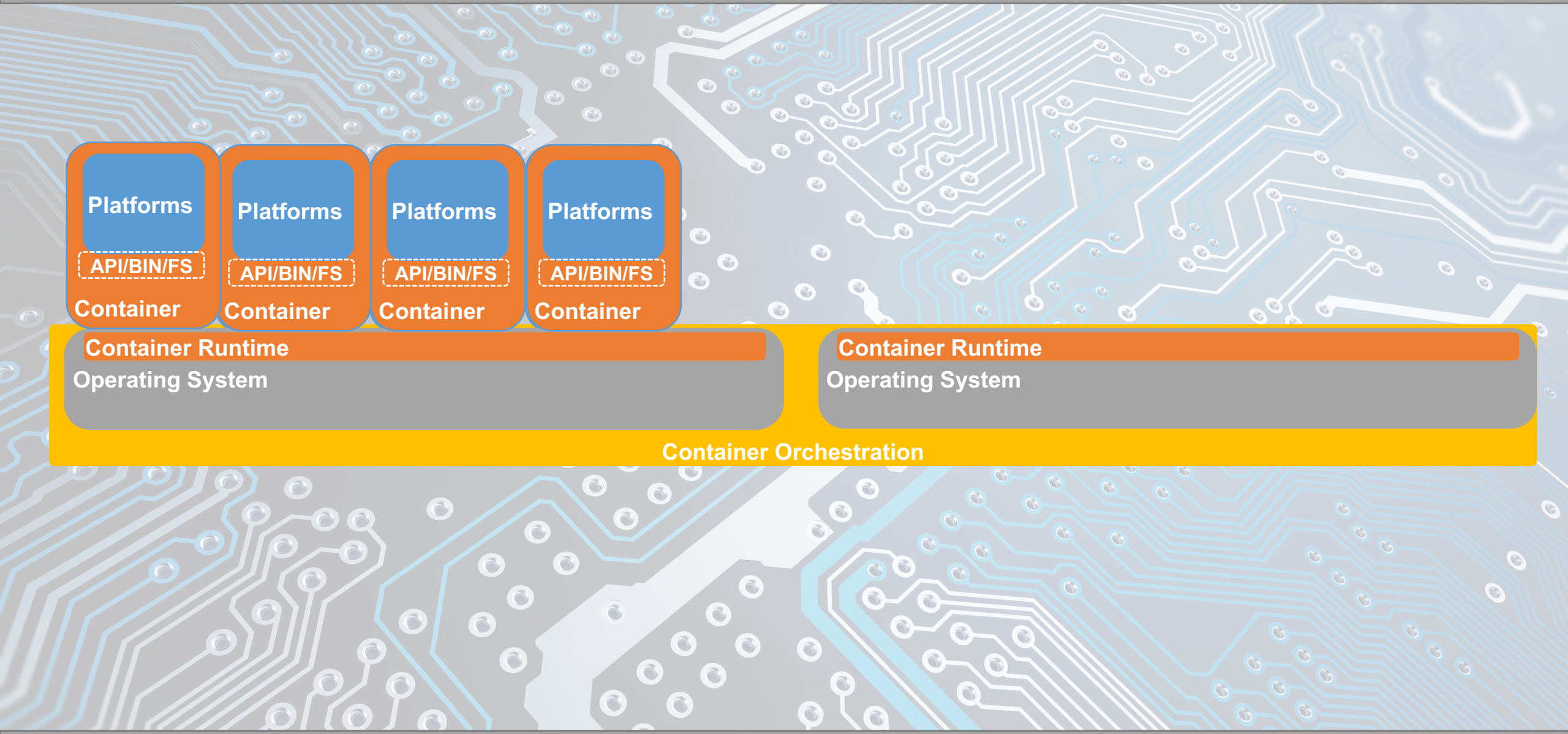
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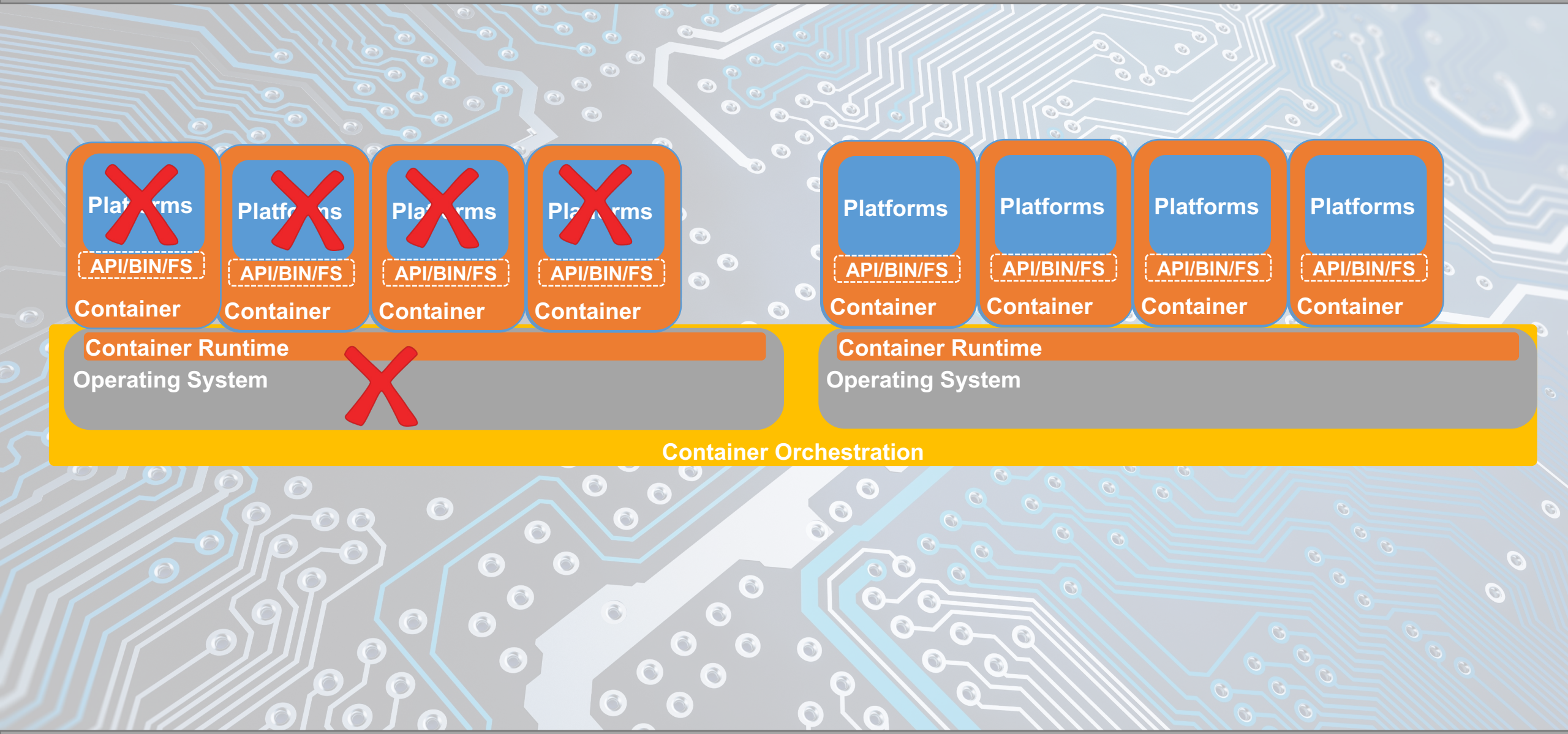
Operating System
Container Orchestration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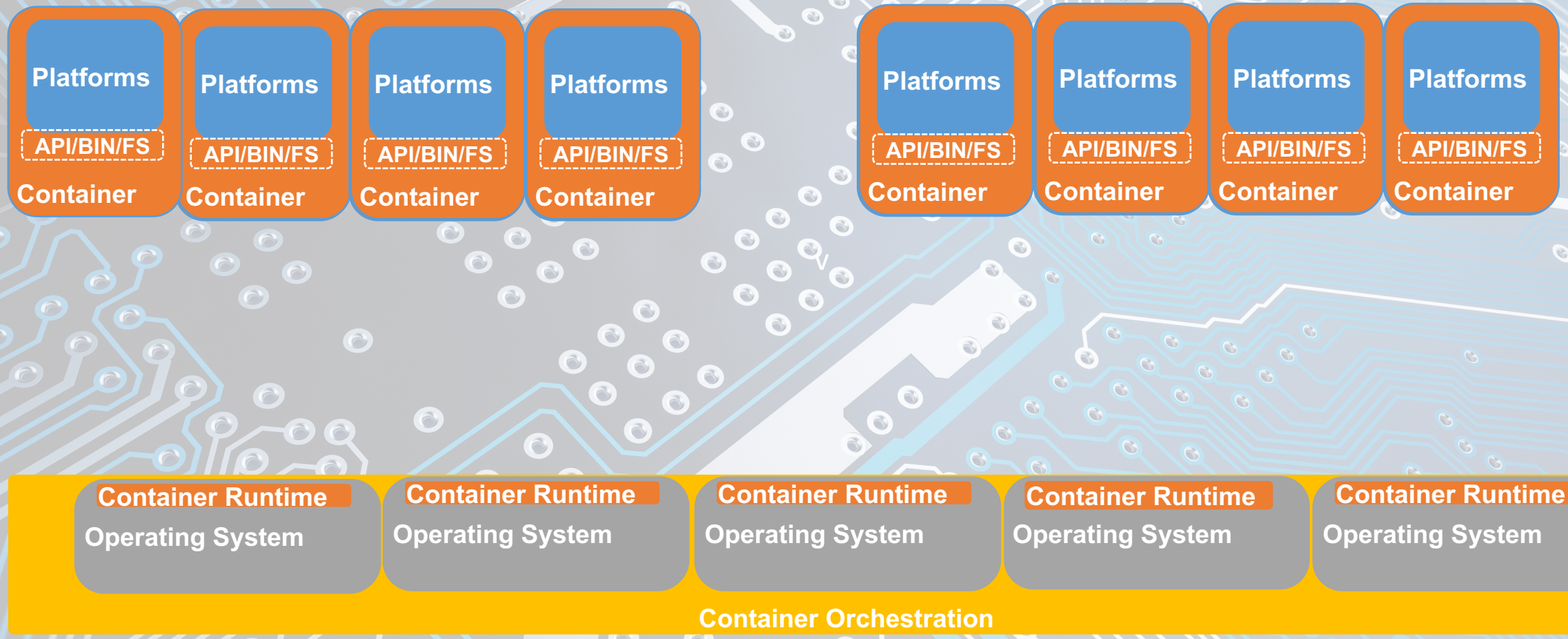
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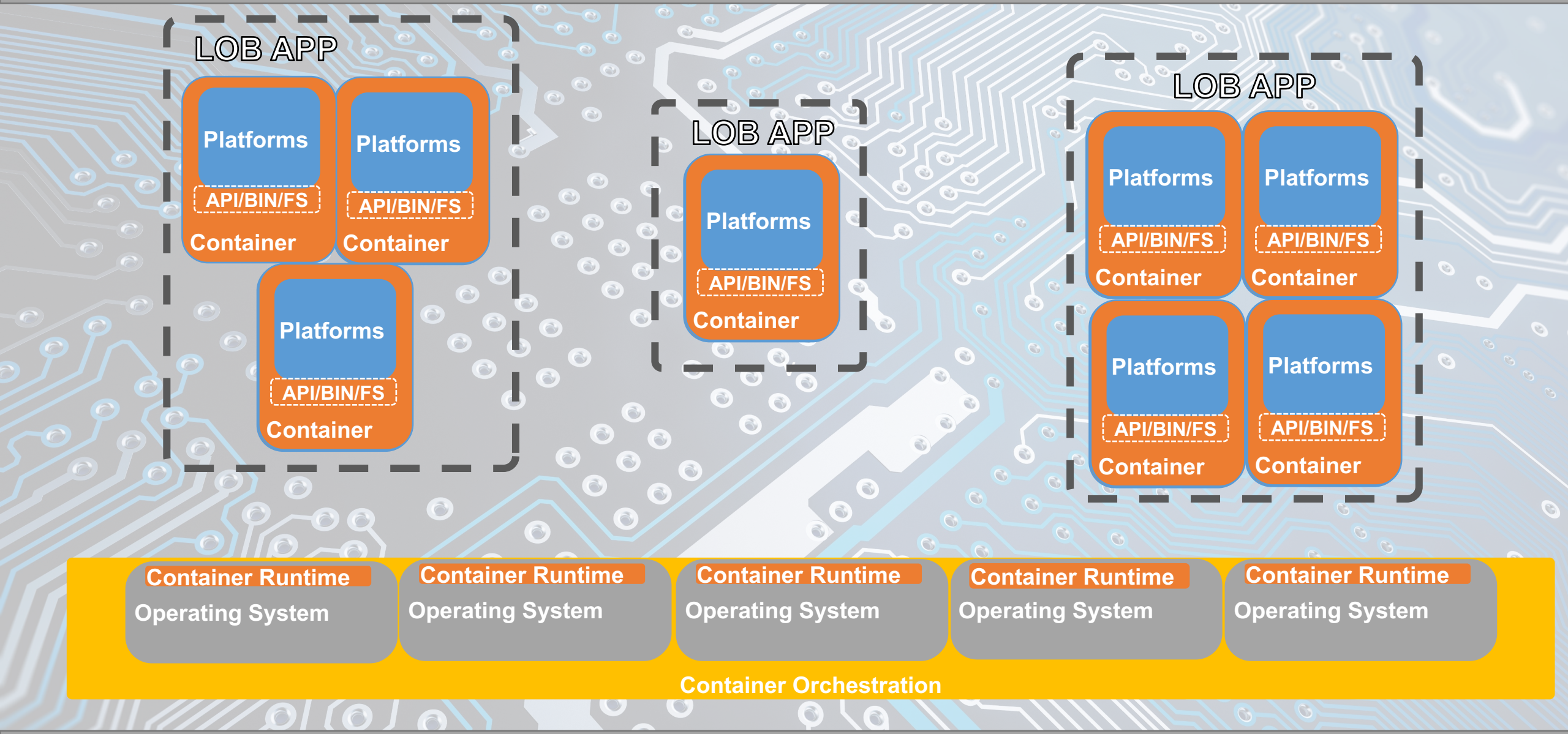
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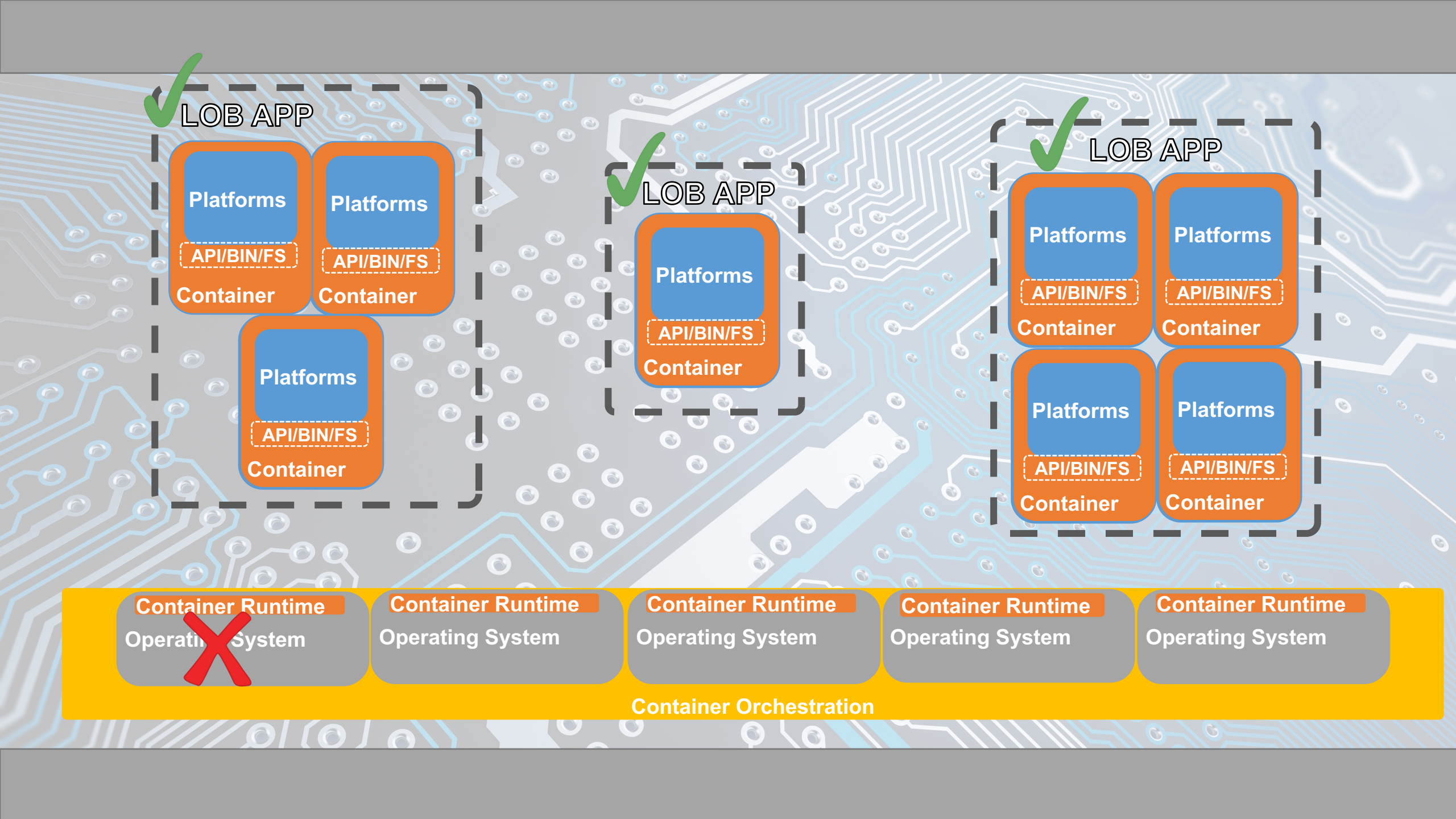
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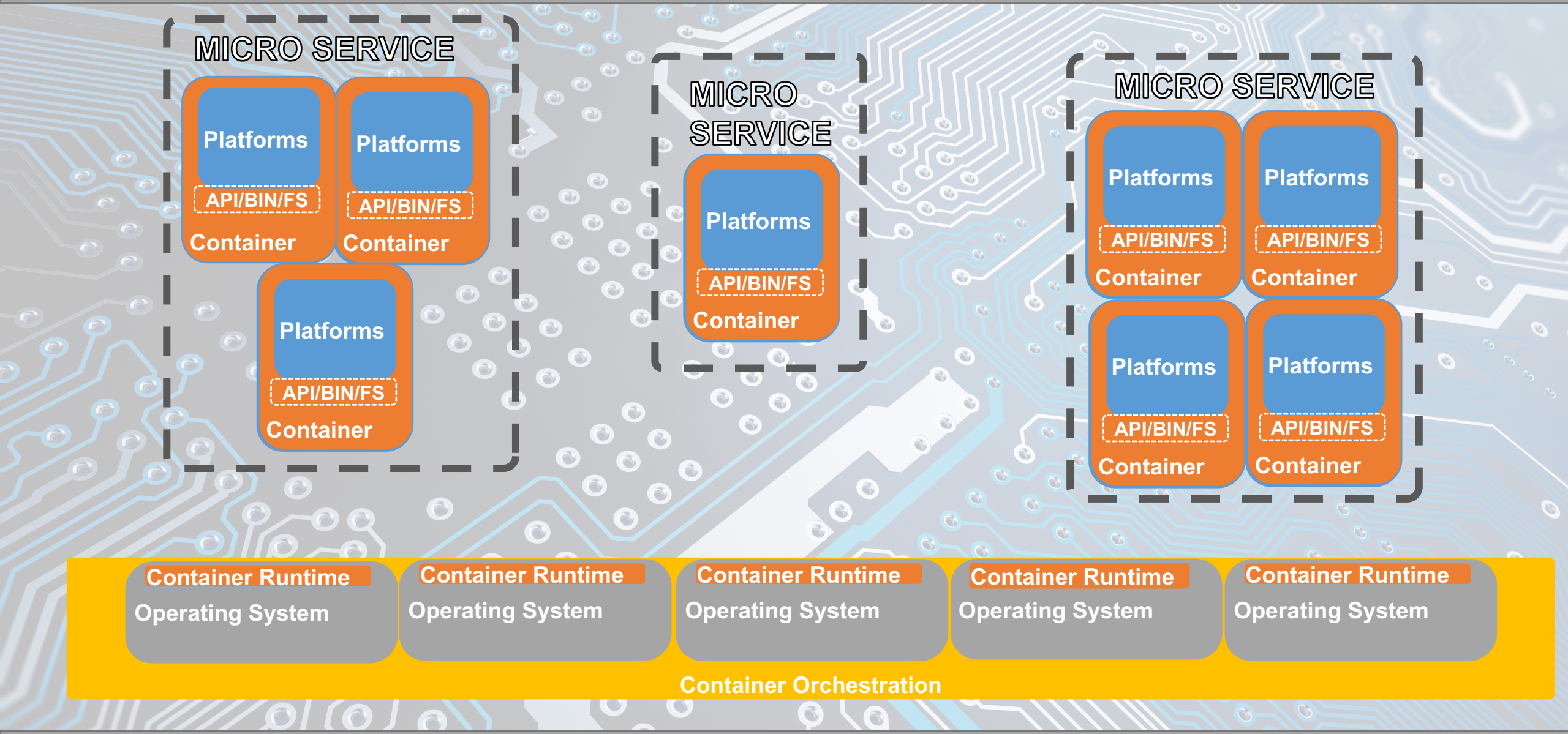
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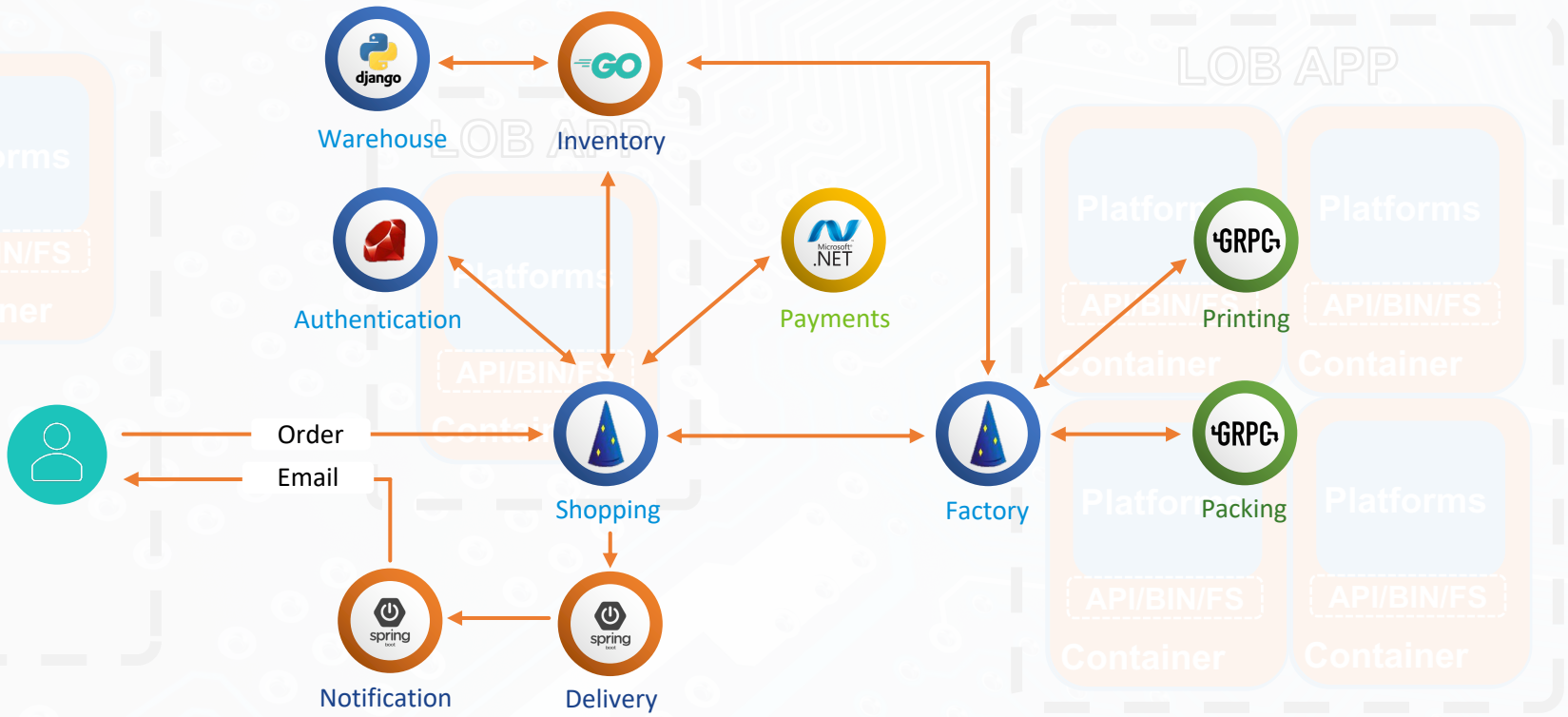
Warehouse
Inventory
Authentication
Payments
Printing
Order
Email
Shopping
Factory
Packing
Notification
Delivery

1979

Development of “chroot”, allowed storage level process isolation

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2000

“jail” command release, extending isolation capability to users, network & more.

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Google begins work on BORG

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Solaris Zones released, providing user, process and filesystem isolation.

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AIX workload partitions release. Providing containers for Power.

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Do

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PYCON US 2013

The future of Linux Containers

presented by

Solomon Hykes

python

DIAMOND SPONSORS

heroku Google

network & more.

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Google replaces “LMCTFY” with Docker engine (libcontainer)

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widespread adoption in enterprises

2019

Vmware announced
Tanzu & Project Pacific

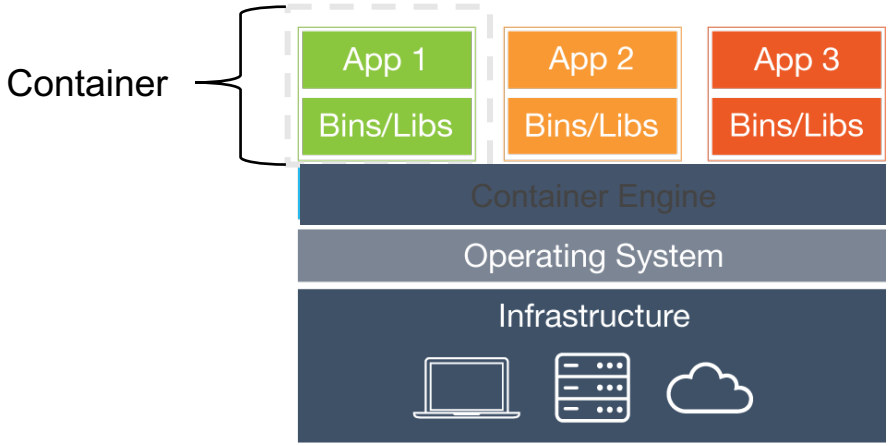
Containers vs VMs

Containers and virtual machines have similar resource isolation and allocation benefits, but function differently because containers virtualize the operating system instead of hardware. Containers are more portable and efficient.

CONTAINERS	VIRTUAL MACHINES
Containers are an abstraction at the app layer that packages code and dependencies together. Multiple containers can run on the same machine and share the OS kernel with other containers, each running as isolated processes in user space. Containers take up less space than VMs (container images are typically tens of MBs in size), can handle more applications and require fewer VMs and Operating systems.	Virtual machines (VMs) are an abstraction of physical hardware turning one server into many servers. The hypervisor allows multiple VMs to run on a single machine. Each VM includes a full copy of an operating system, the application, necessary binaries and libraries - taking up tens of GBs. VMs can also be slow to boot.

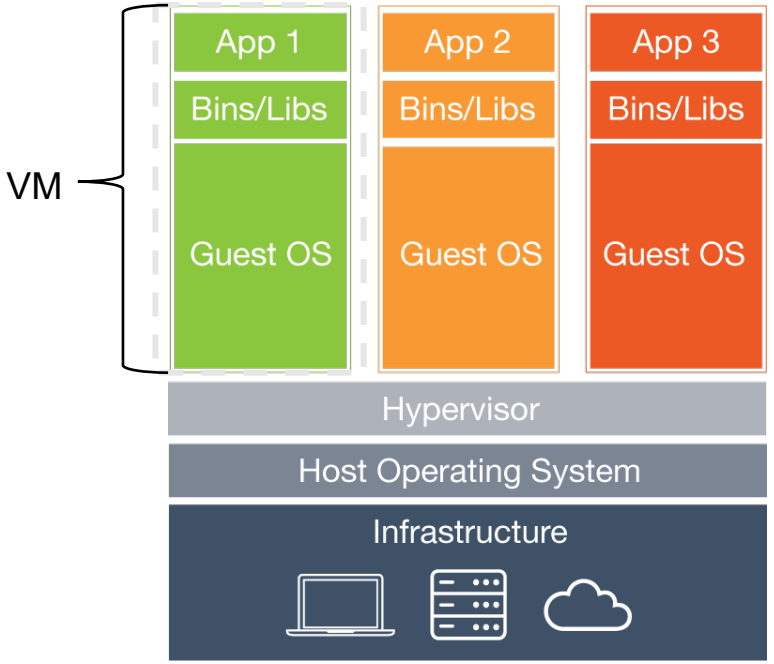
CONTAINERS

- Shared Kernel
- Nascent technology created complexity
- Super fast to create a new container
- Containers are very portable



VIRTUAL MACHINES

- Requires a full operating system
- Mature technology and management eco-system
- Slow to create a new VM
- VMs are not very portable



DECLARATIVE

“I would like some tea”

…Define “tea”

Tea is an infusion of tea[1] leaves in a cup

[1]An infusion is obtained by letting the object steep a few minutes in hot water[2]

[2]Hot water is obtained by pouring it in a container and setting it on stove

IMPERATIVE

Boil some water.
Pour it in a teapot.
Add tea leaves.
Steep for a while.
Serve in a cup

DECLARATIVE

"I would like some tea"

- More complex
- Requires defining before hand
- Run automatically
- Knows current state of all components
- "Orchestration"
- YAML file

IMPERATIVE

Boil some water.
Pour it in a teapot.
Add tea leaves.
Steep for a while.
Serve in a cup

- Much simpler
- Requires scheduled action or human
- Run ad-hoc
- Lacks understanding of current state
- "Automation"
- Script

Consistency and Decoupling Throughout the Process

Define the App Environment

Developers

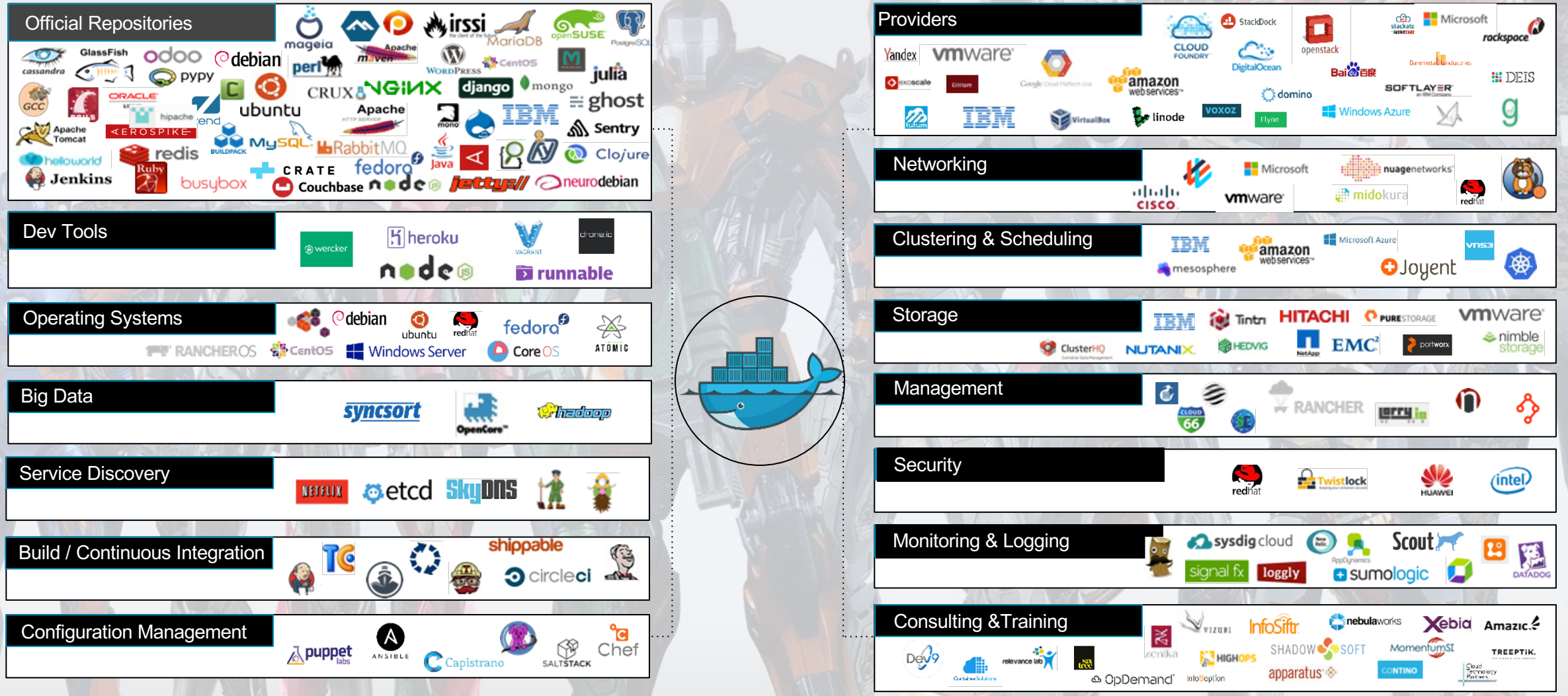
Container maintains consistent environment for application/code throughout the development and deployment process,

Development **Unit Test** **Integration** **Prod**

Container can be deployed and run virtually anywhere

Operations

THE DOCKER ECOSYSTEM



Introducing

VMware Tanzu

Build Modern Apps

Run Enterprise Kubernetes

Manage Kubernetes for Developers

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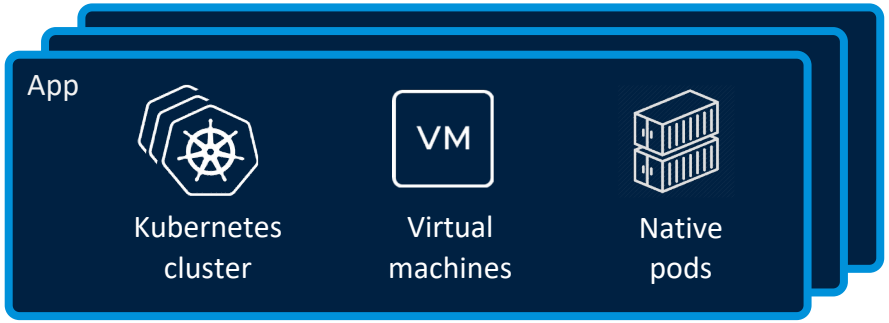
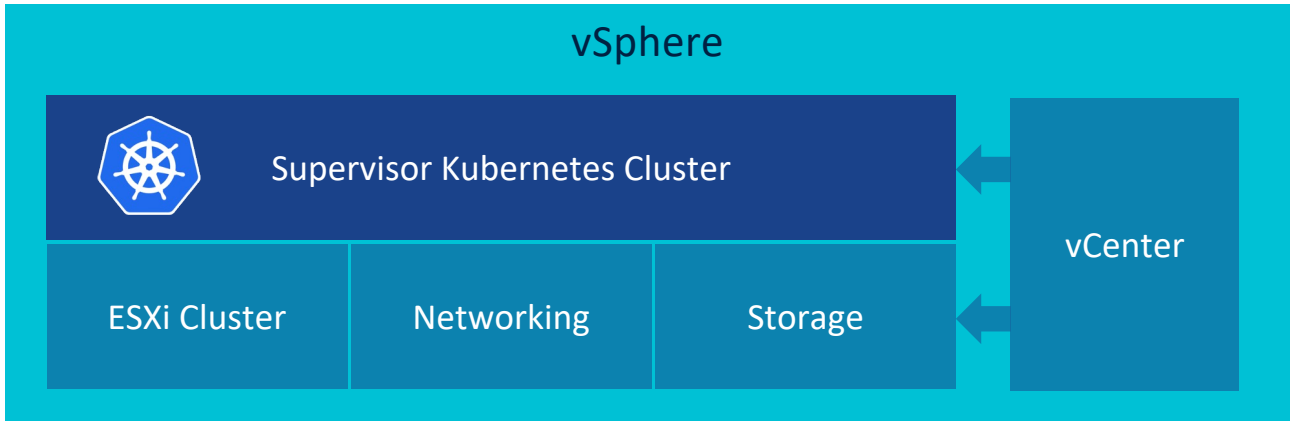
Run Enterprise Kubernetes

Manage Kubernetes for Developers

Project Pacific: Rearchitecting vSphere with Native Kubernetes

Transforming vSphere into the App Platform of the Future





Developer

IT Operator