Container Networking Fundamentals

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Author & Trainer

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“It’s always the network.”

Networks Are...

Huge

Complex

Everywhere

Add Containers...

Huge

Complex

Everywhere

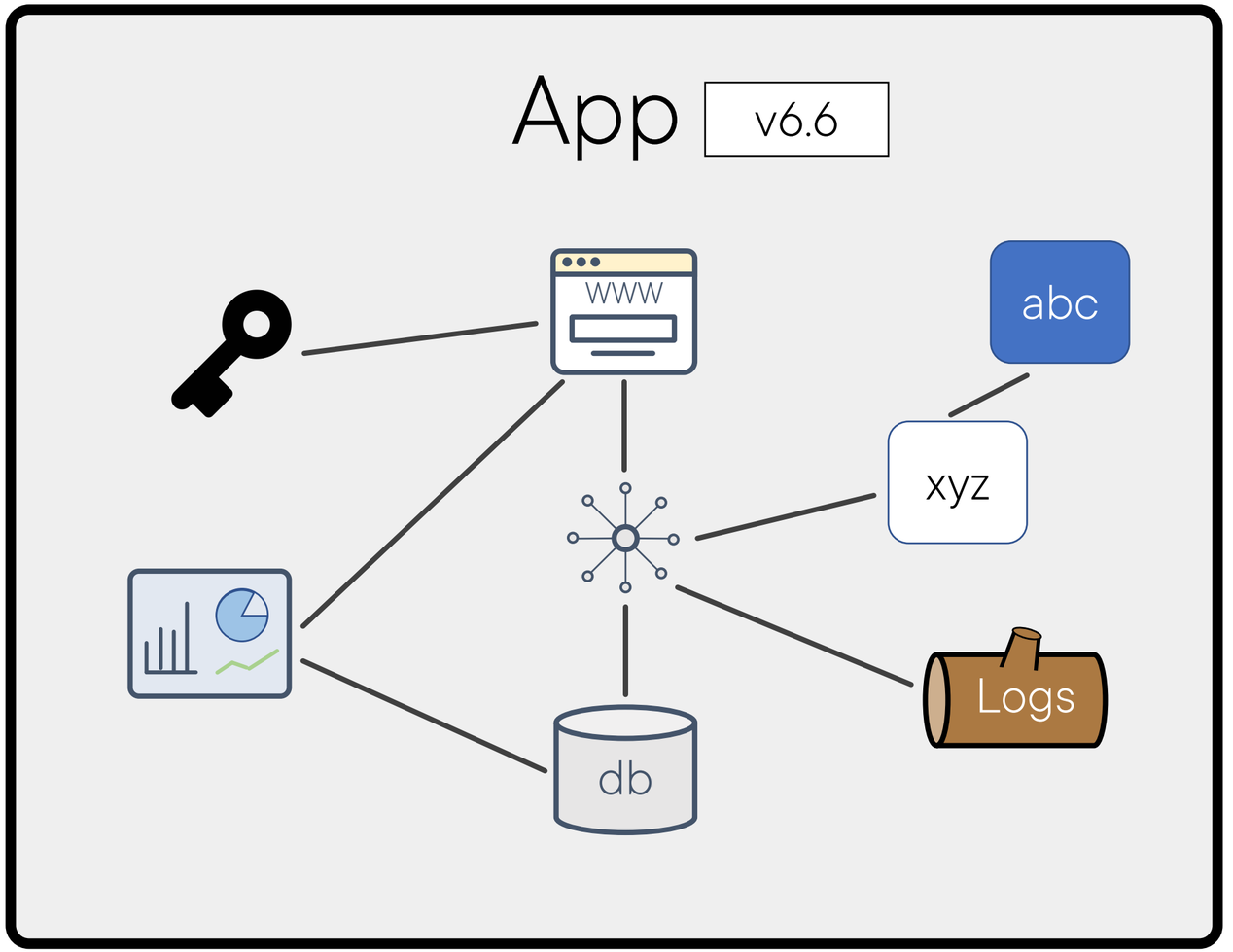
Add Containers...

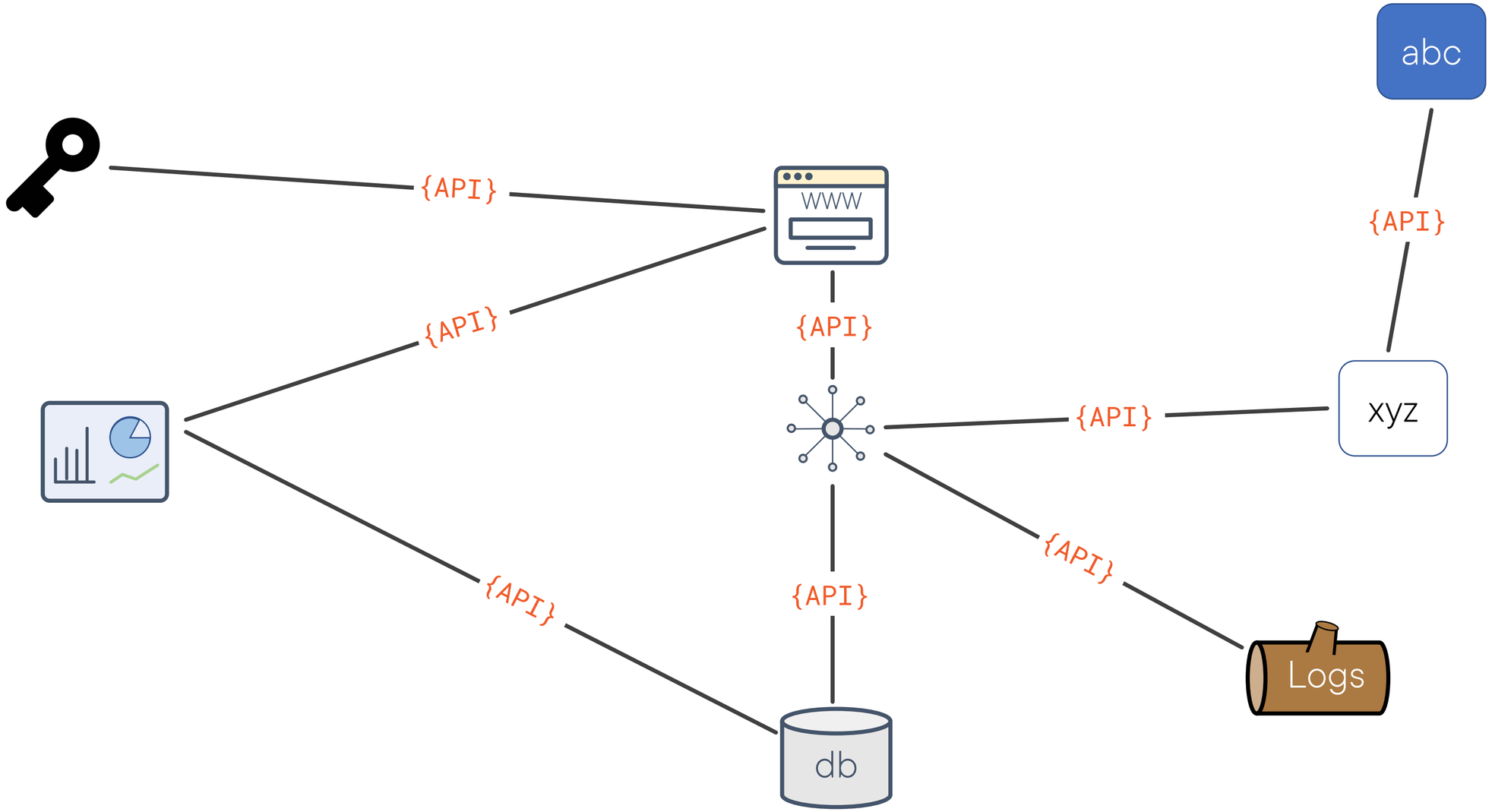
Huger

Complexer

Everywherer

The impact of containers on networking.


App
v6.6
WWW
abc
xyz
Logs
db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WWW
{API}
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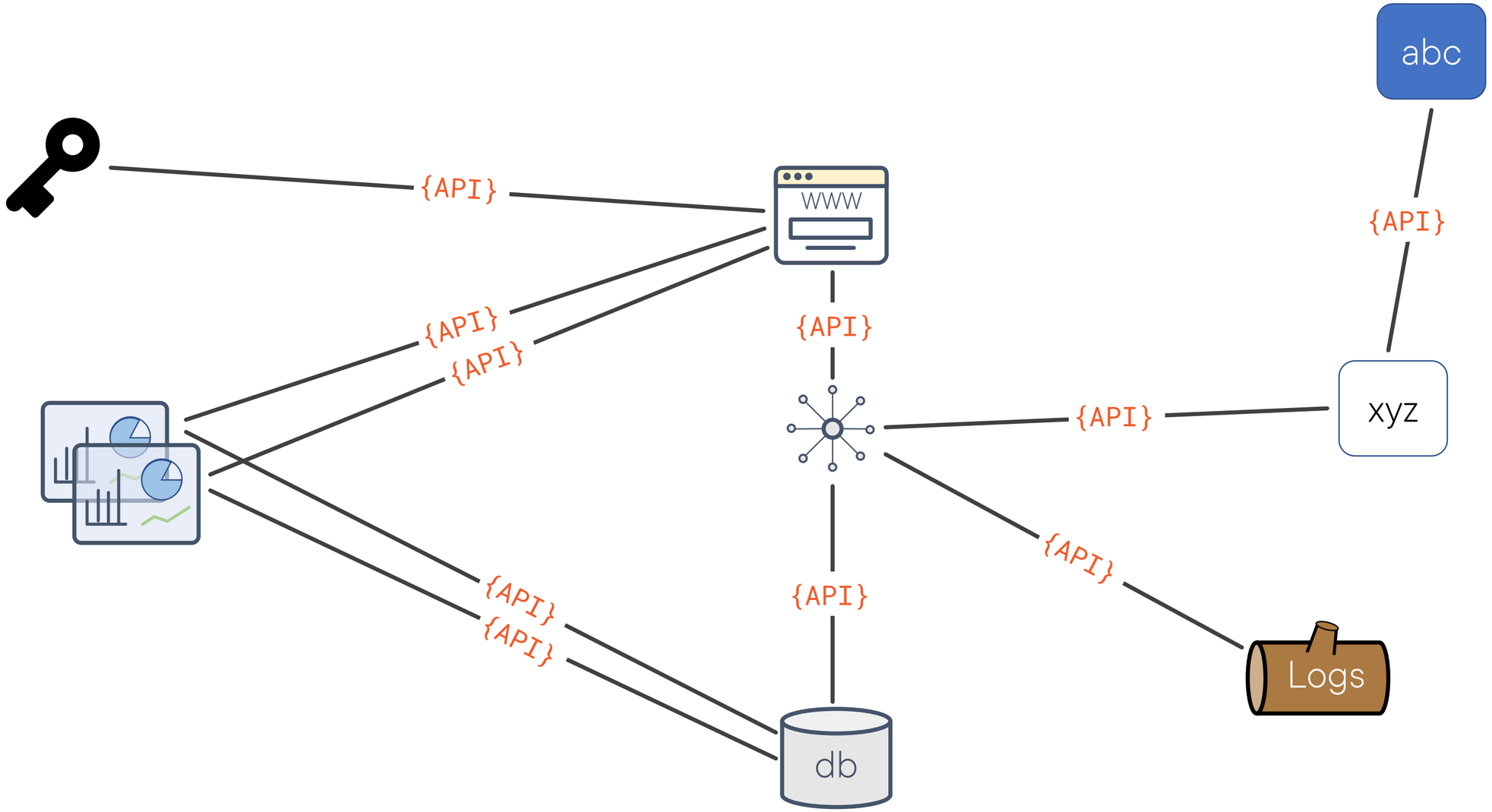
{API}
xyz
{API}
{API}
{API}
Logs
db


abc
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WWW
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xyz
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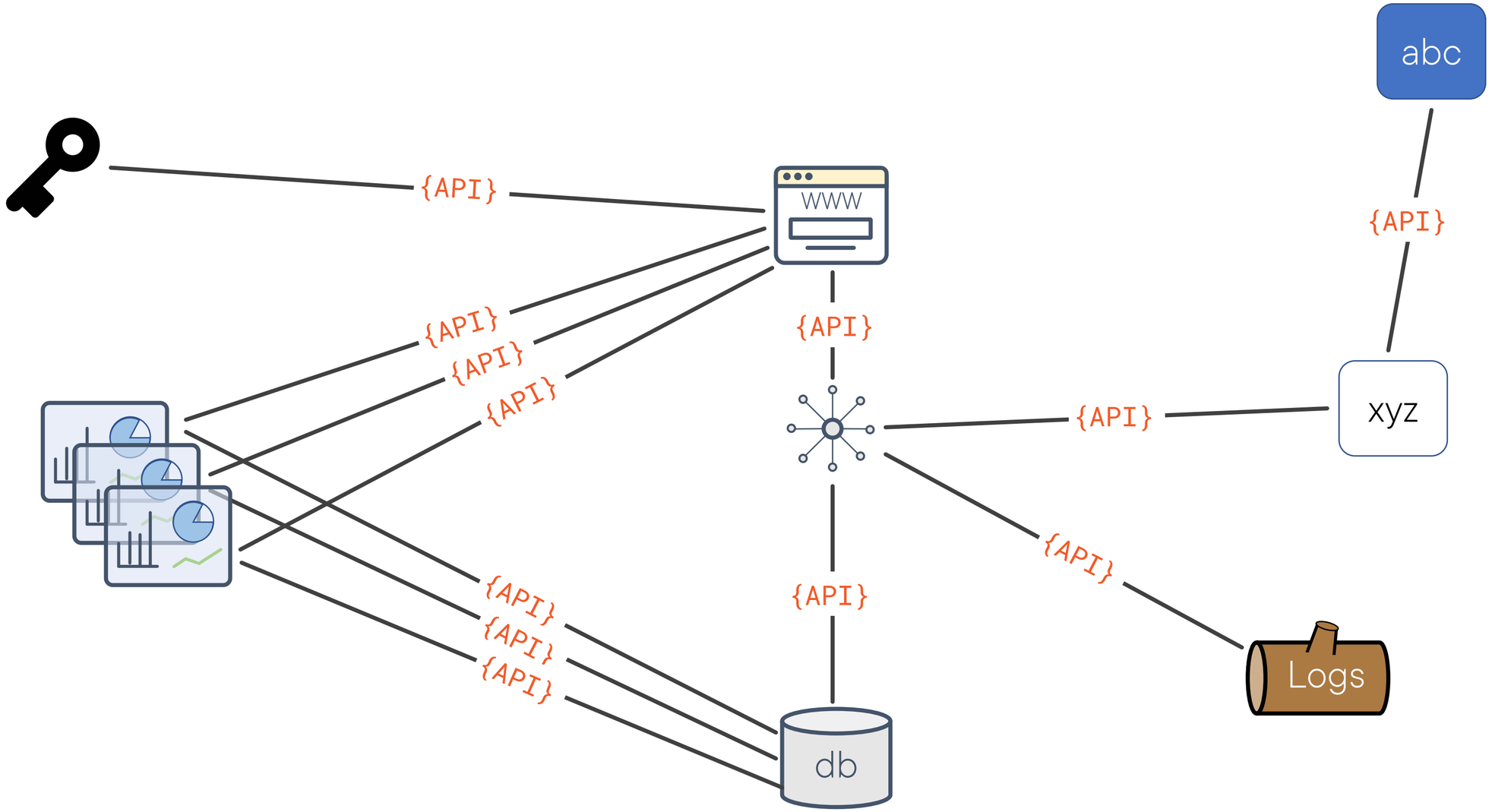
{API}
Logs
db


abc
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{API}
WWW
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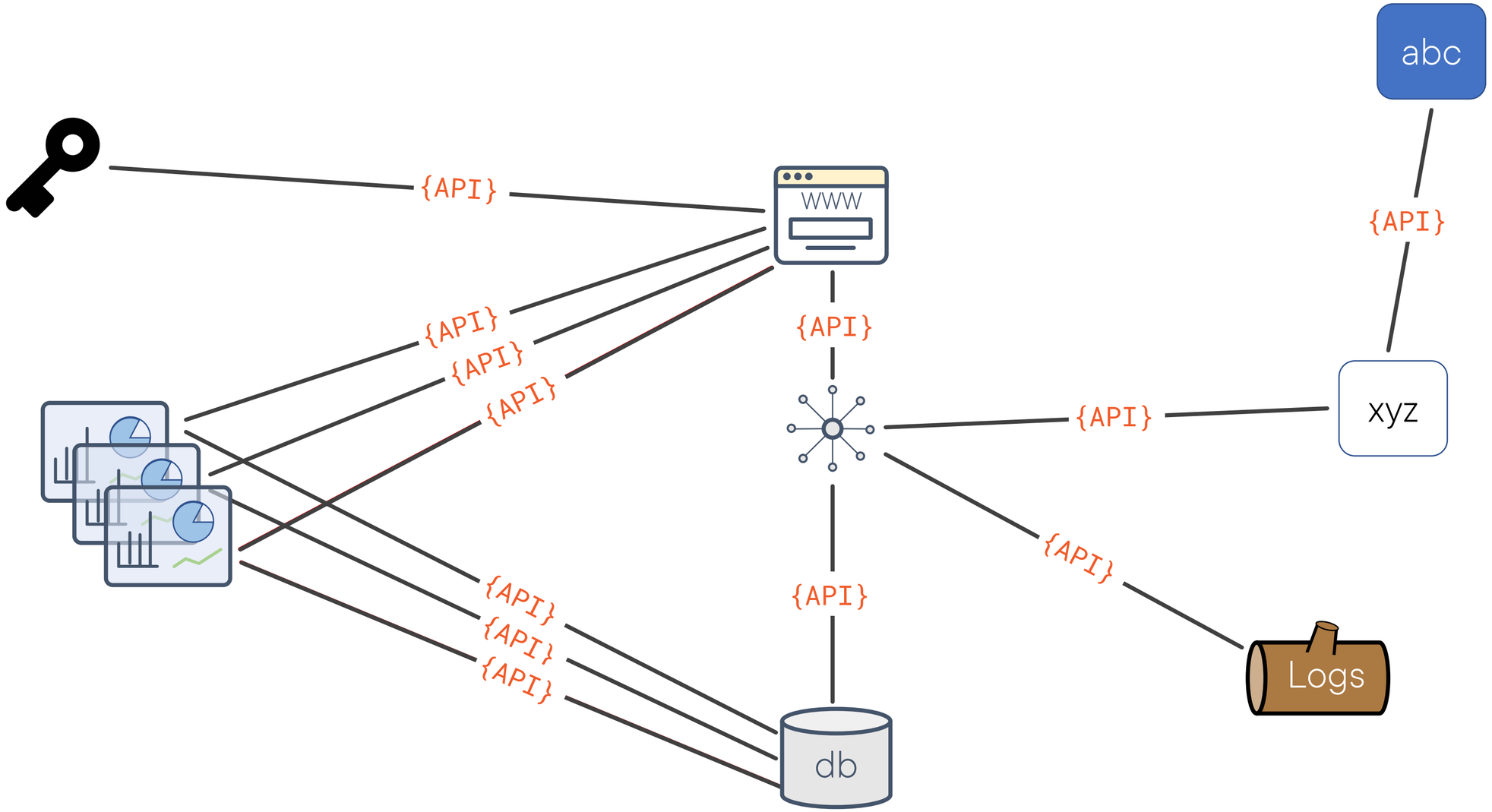
xyz
{API}
{API}
{API}
{API}
{API}
Logs
db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abc
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xyz
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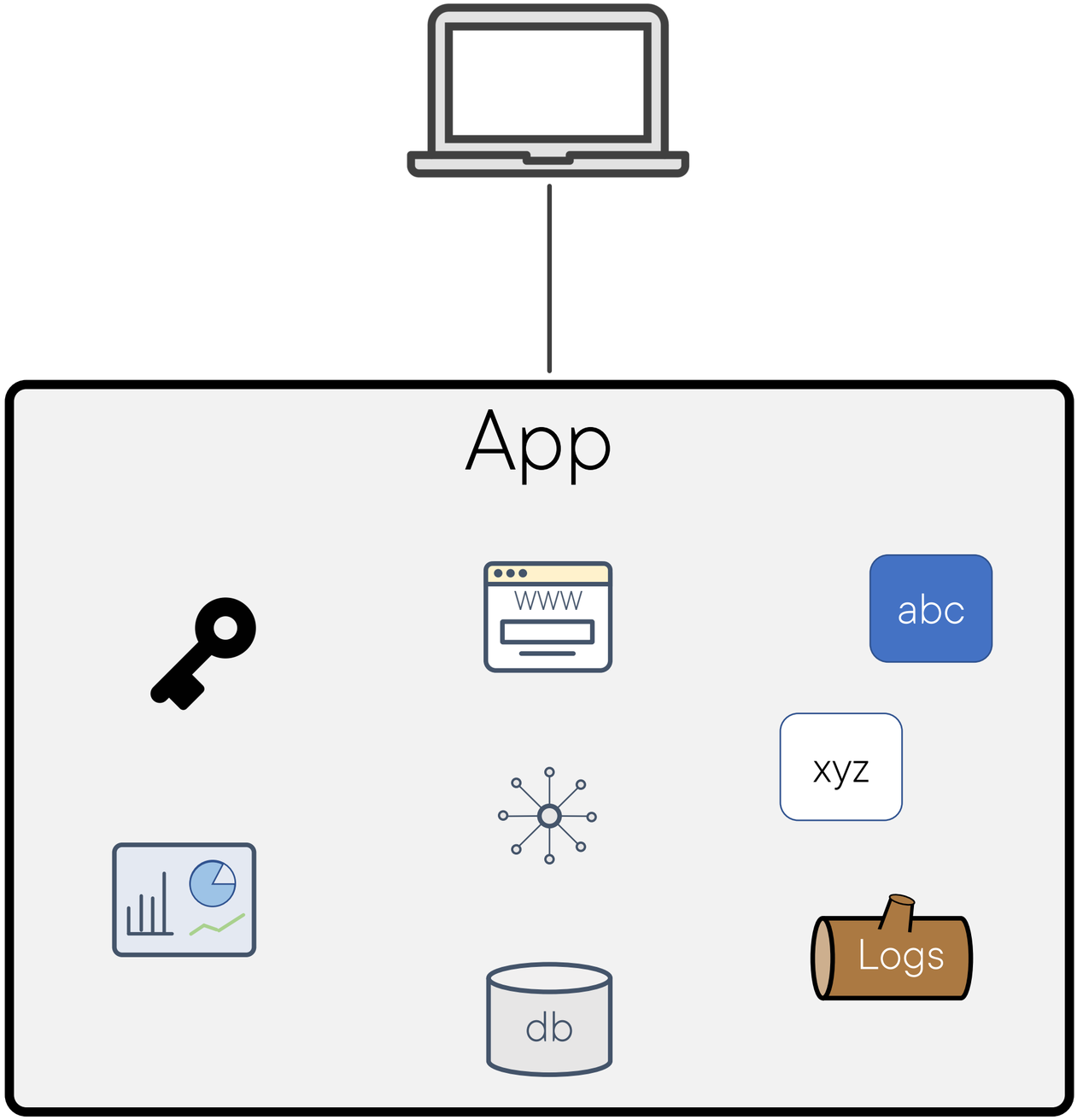
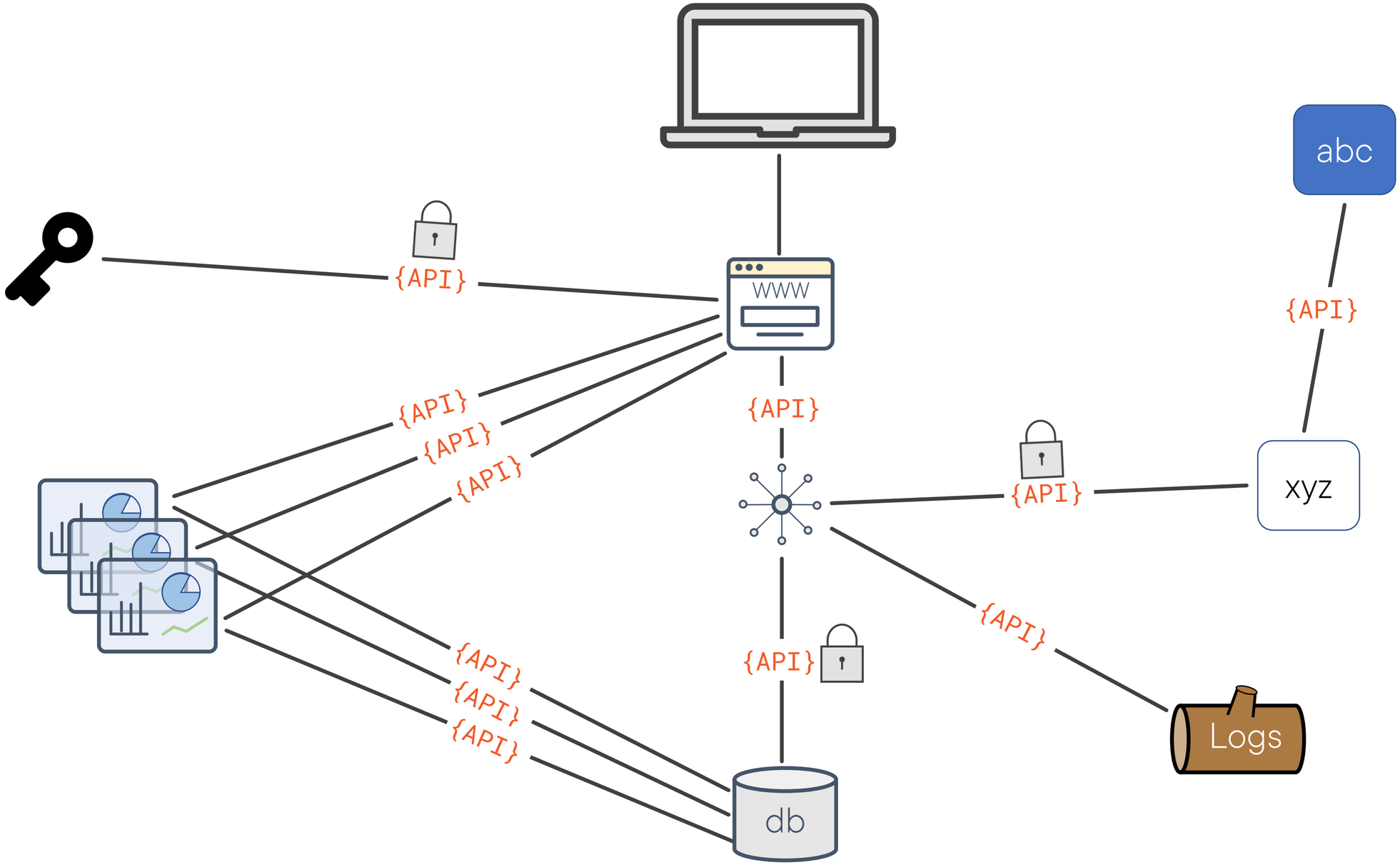
{API}
Logs
db


App
WWW
abc
xyz
Logs
db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WWW
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xyz
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{API}
{API}
{API}
{API}
Logs
db

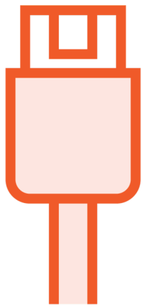
Overview

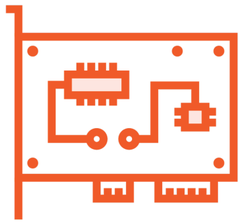
- The Role of Container Networks
- Container Network Model and Architecture
- Network CLI Intro
- Recap

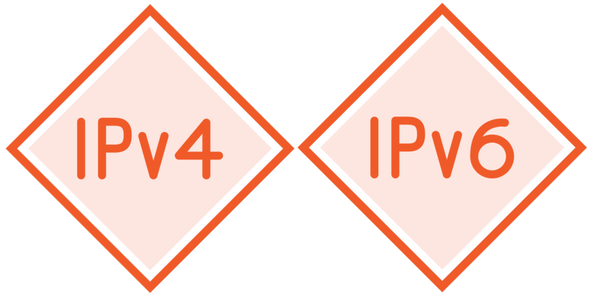
The Role of Container Networks

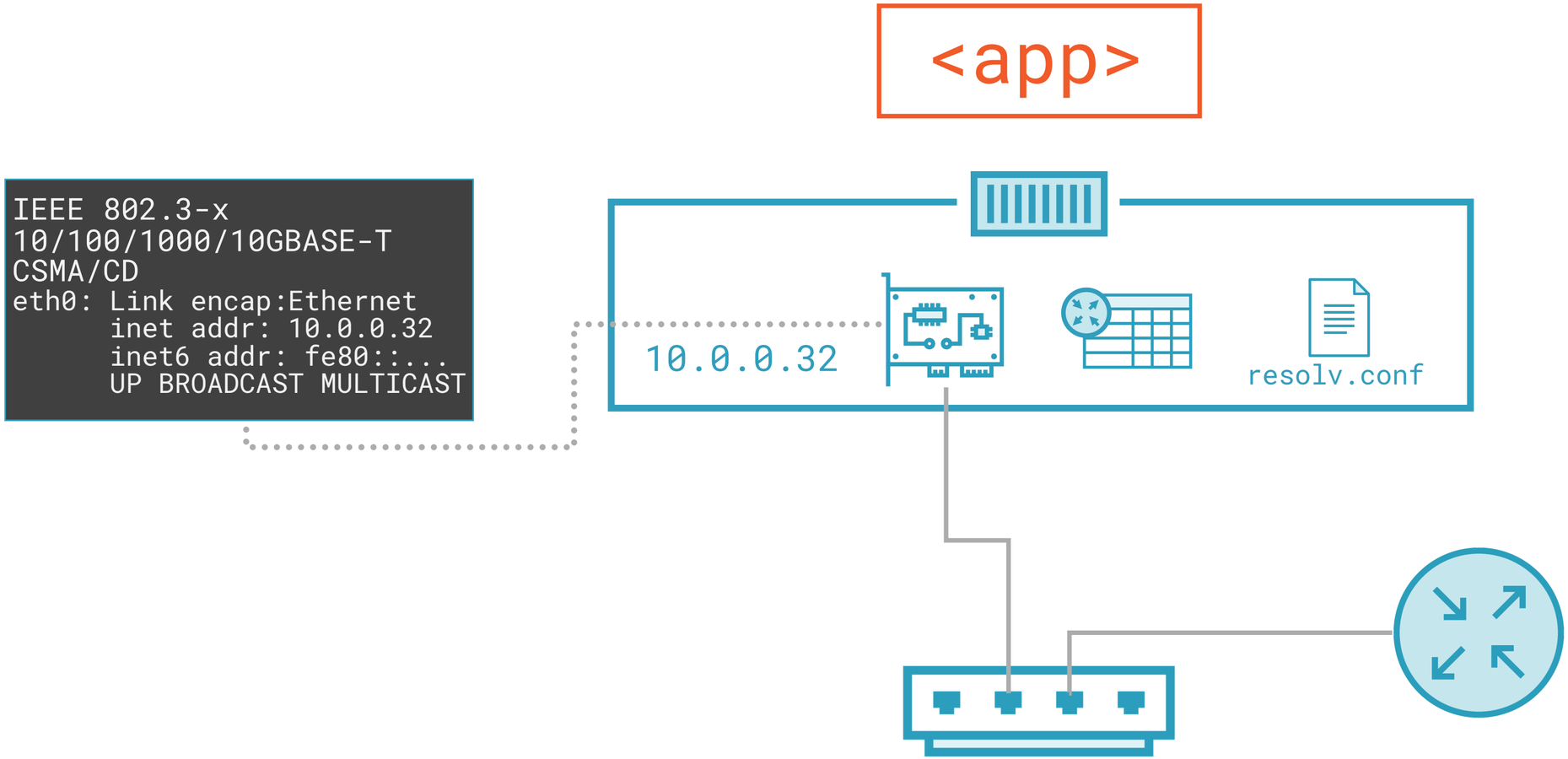
Container Networks...

...built from standard networking components.

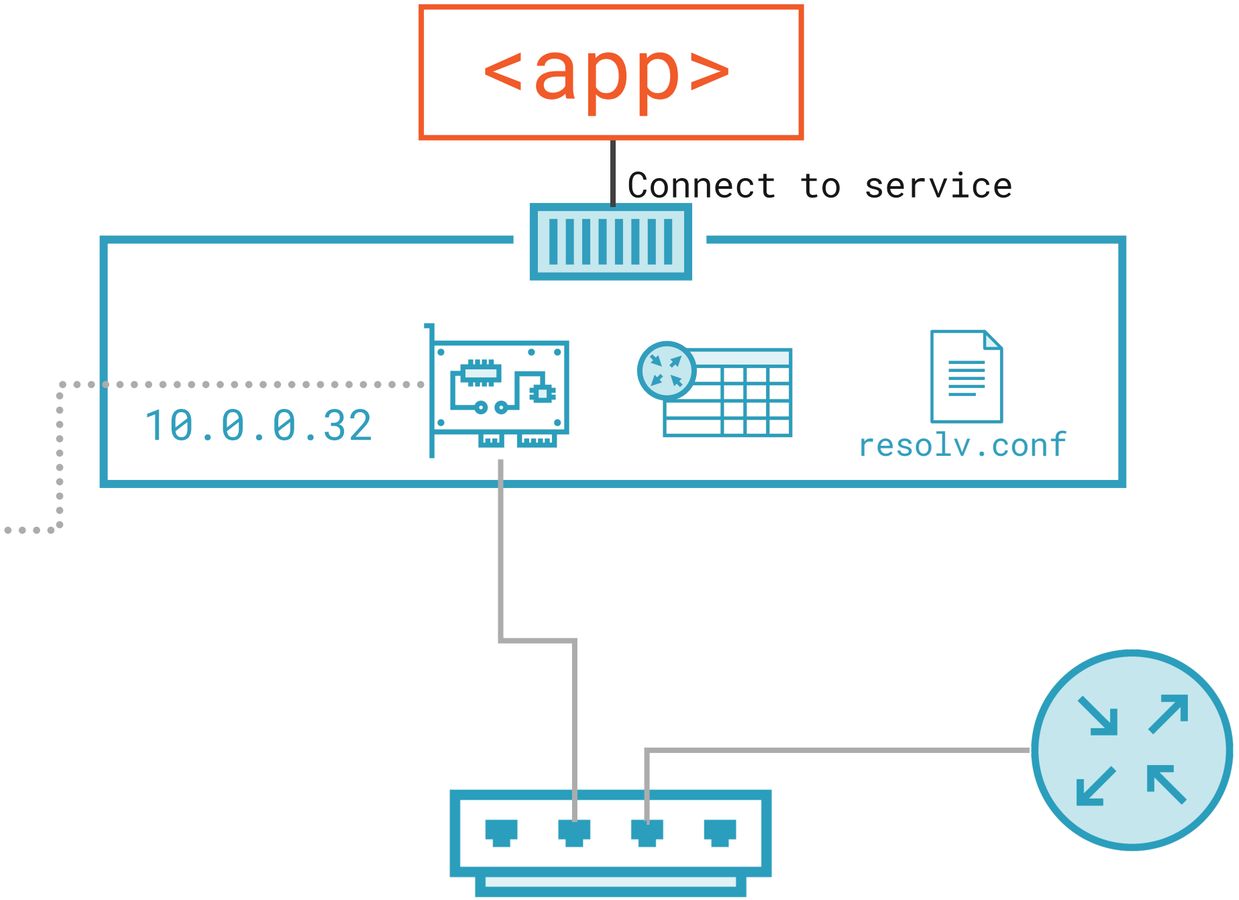


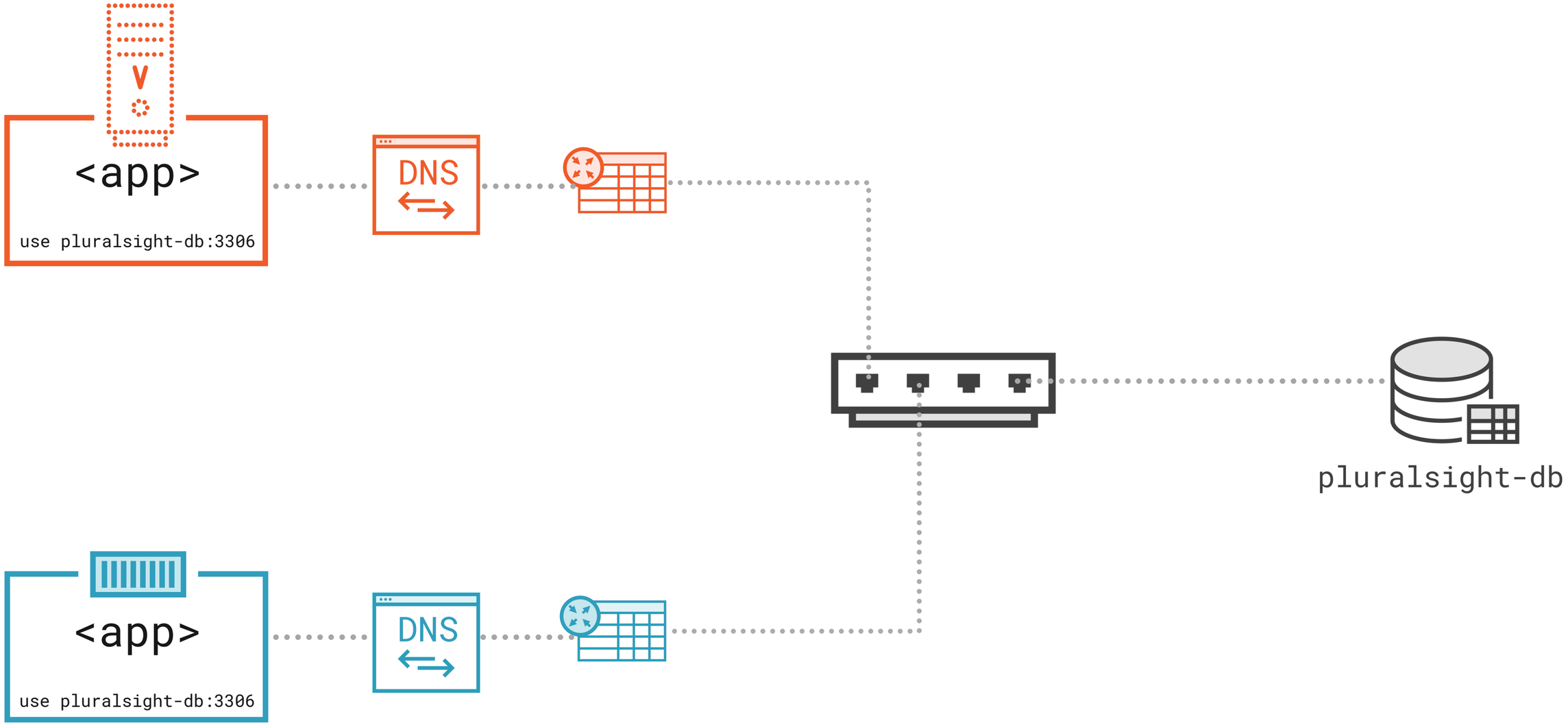


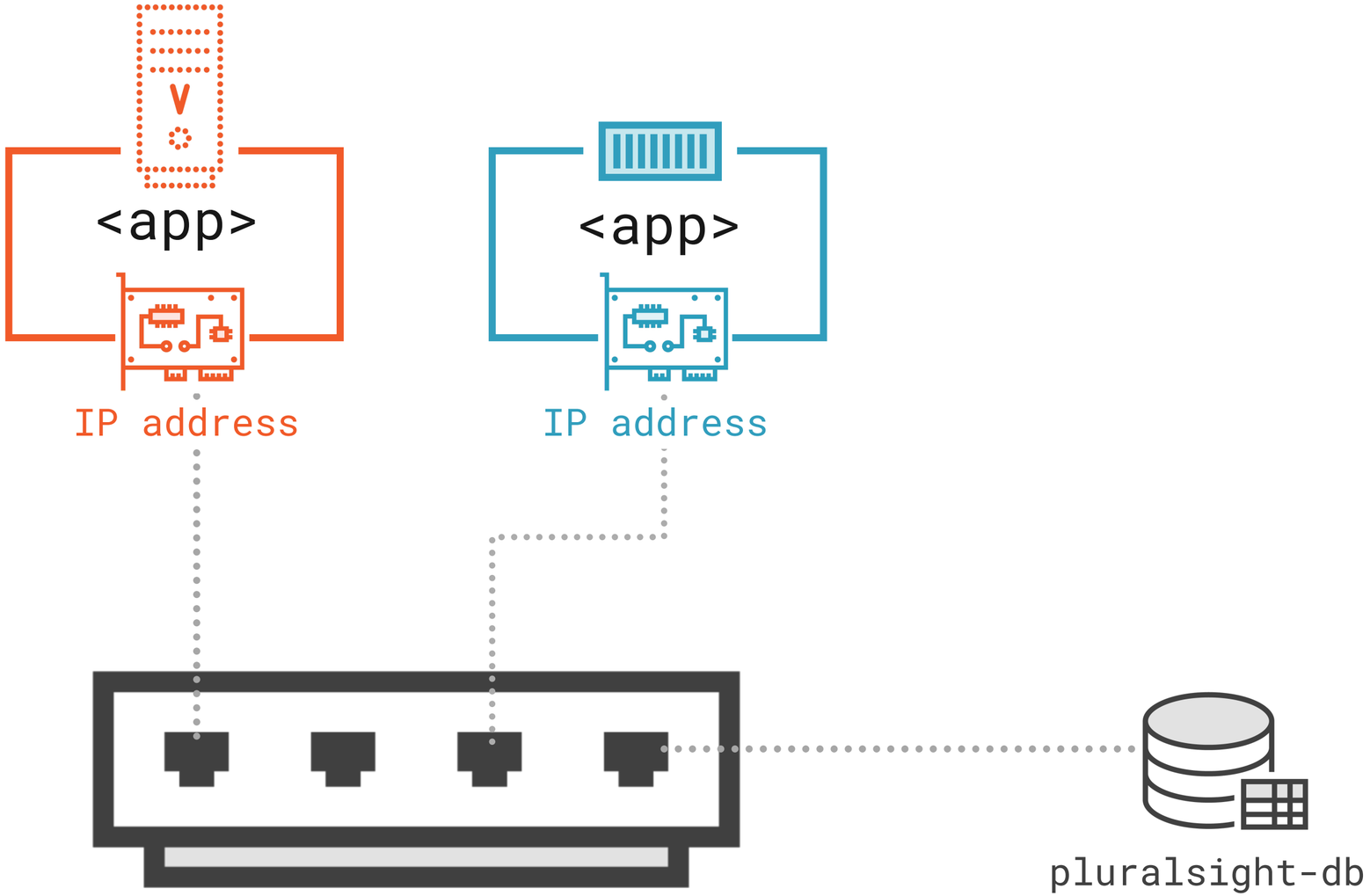


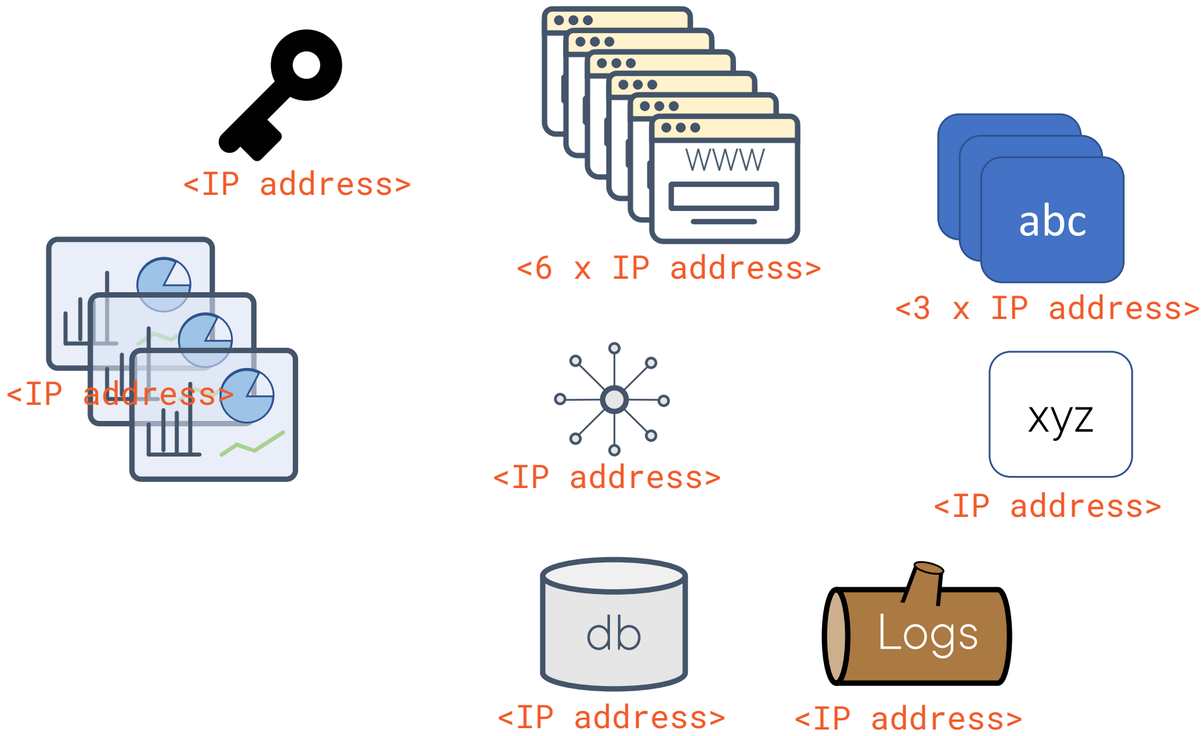

<app>
IEEE 802.3-x
10/100/1000/10GBASE-T
CSMA/CD
eth0: Link encap:Ethernet
inet addr: 10.0.0.32
inet6 addr: fe80::...
UP BROADCAST MULTICAST
10.0.0.32
resolv.conf

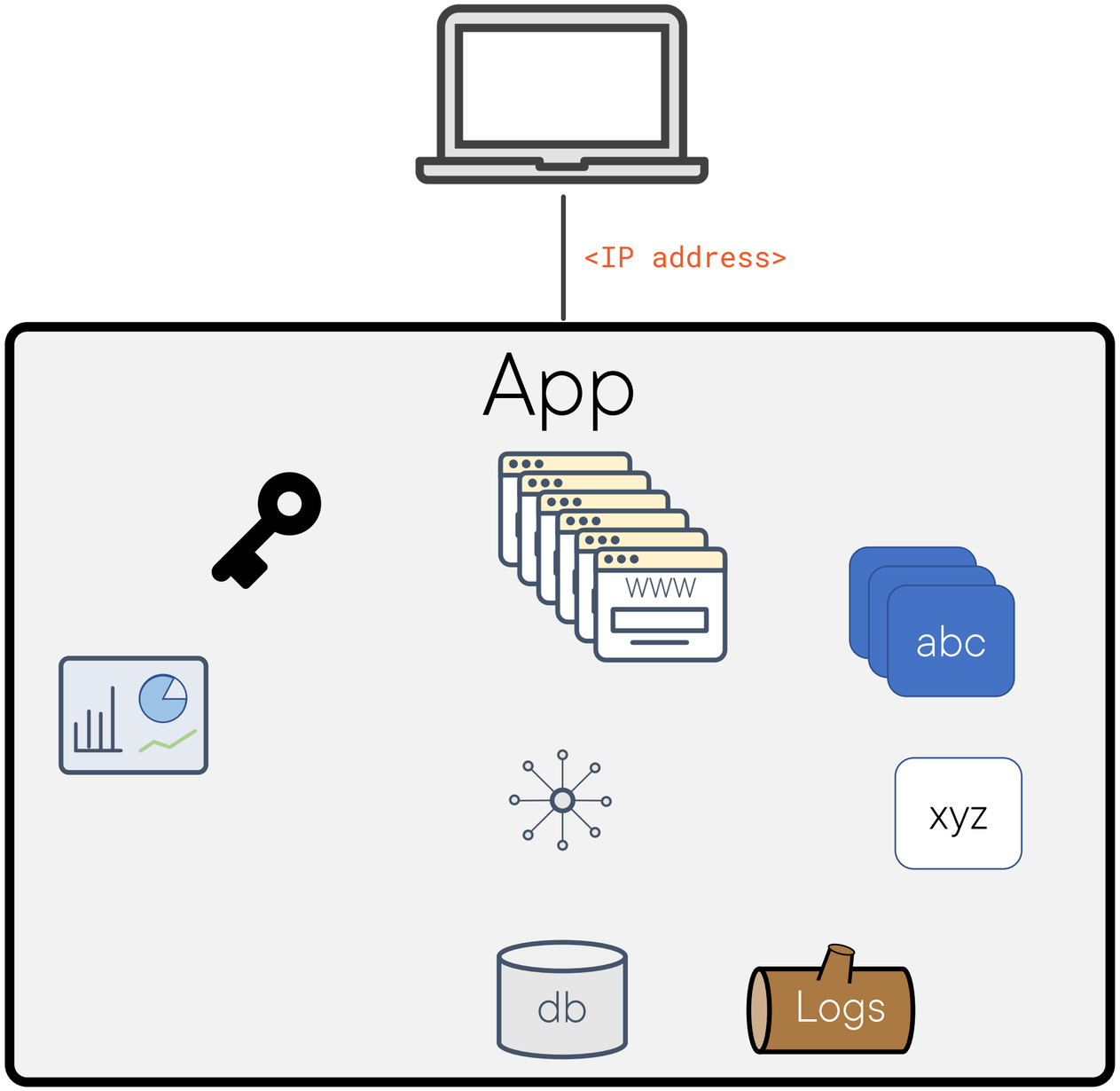
```
IEEE 802.3-x
10/100/1000/10GBASE-T
CSMA/CD
eth0: Link encap:Ethernet
      inet addr: 10.0.0.32
      inet6 addr: fe80::...
      UP BROADCAST MULTICAST
```

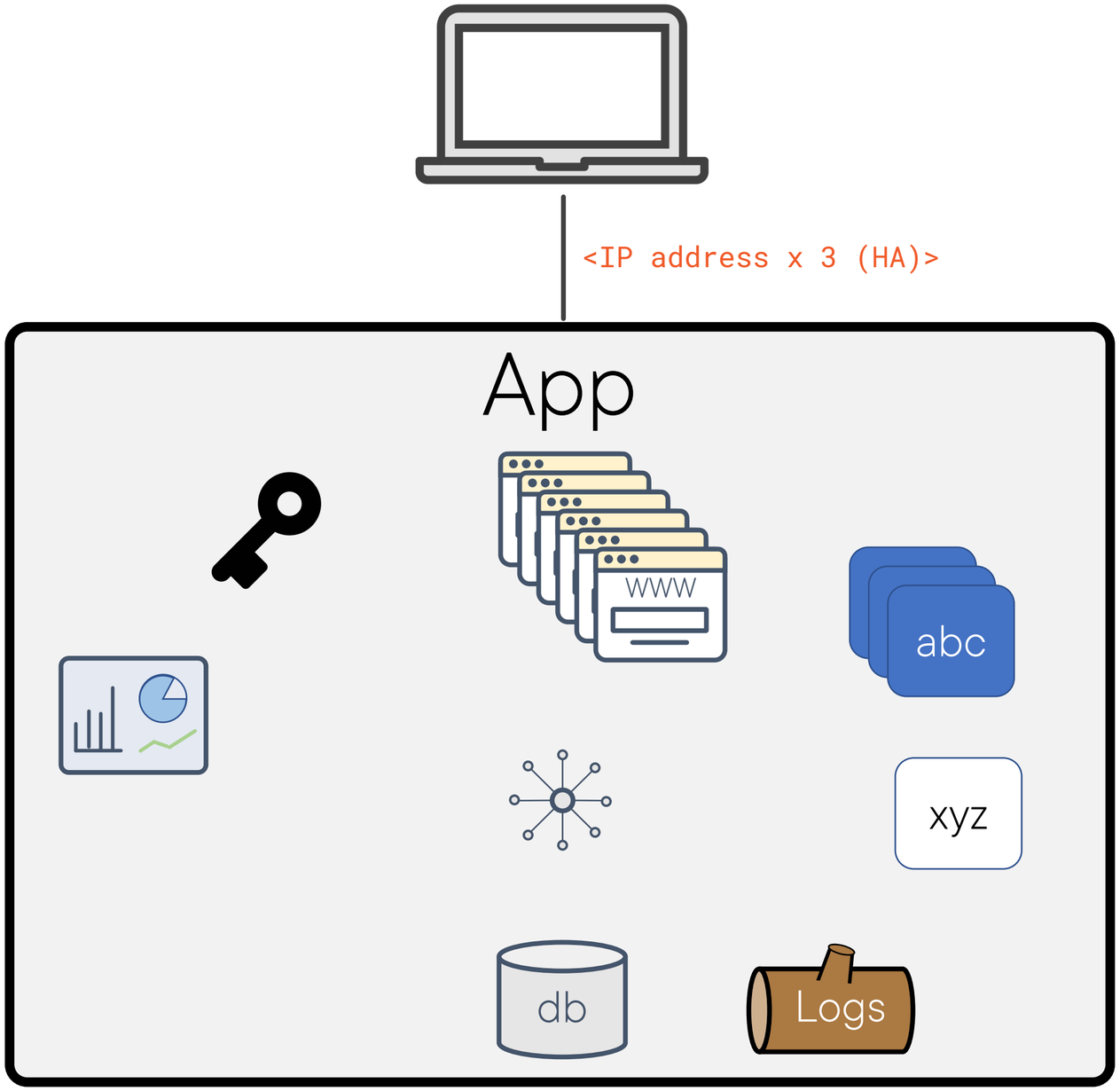



<app>
use pluralsight-db:3306
DNS
<app>
use pluralsight-db:3306
DNS
pluralsight-db


<app>
<app>
IP address
IP address
pluralsight-db


<IP address>
<6 x IP address>
WWW
abc
<3 x IP address>
<IP address>
<IP address>
xyz
<IP address>
db
Logs
<IP address>
<IP address>

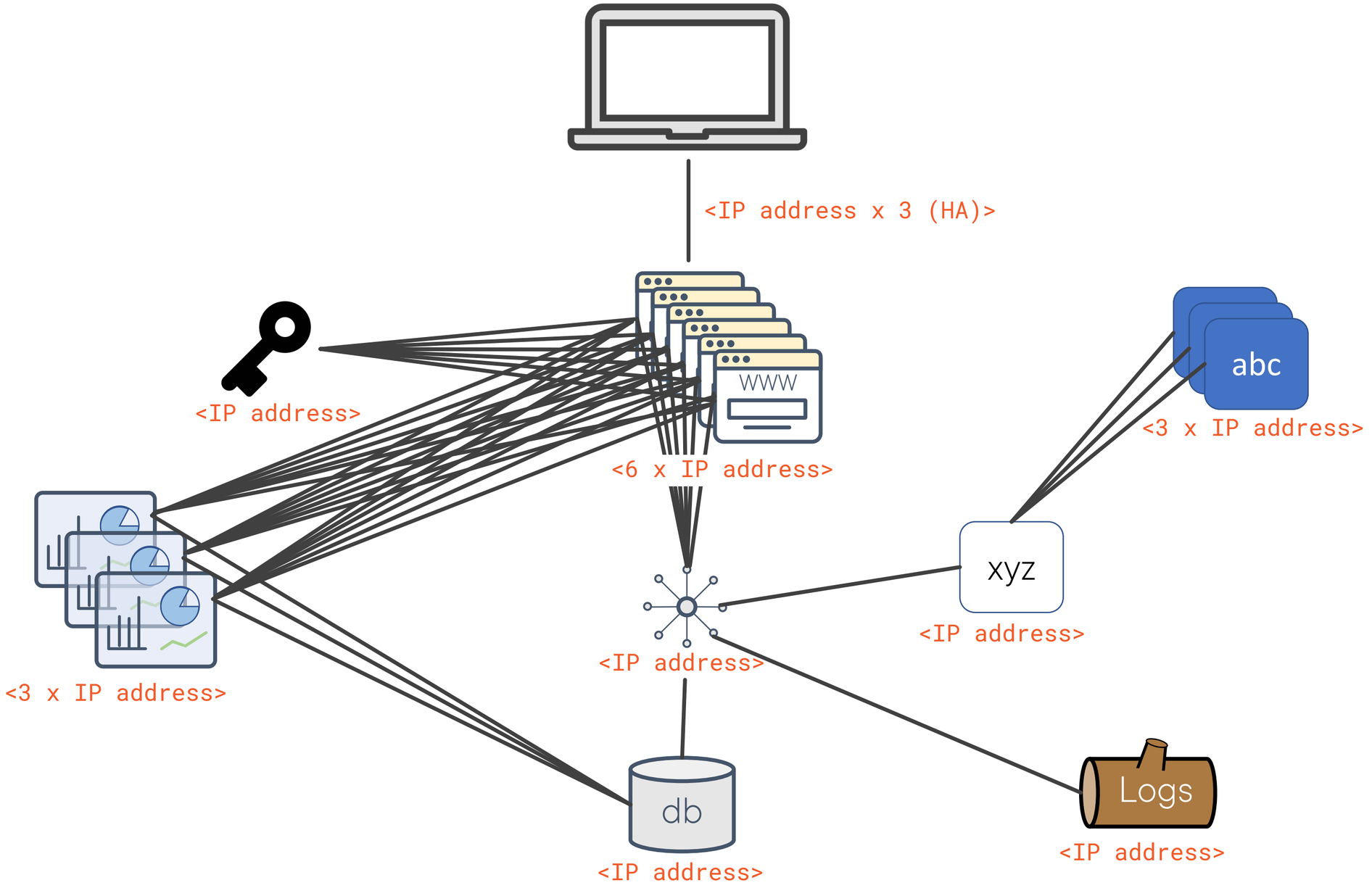

<IP address>
App
WWW
abc
xyz
db
Logs


<IP address x 3 (HA)>
App
WWW
abc
xyz
db
Logs

IPAM

DNS

...

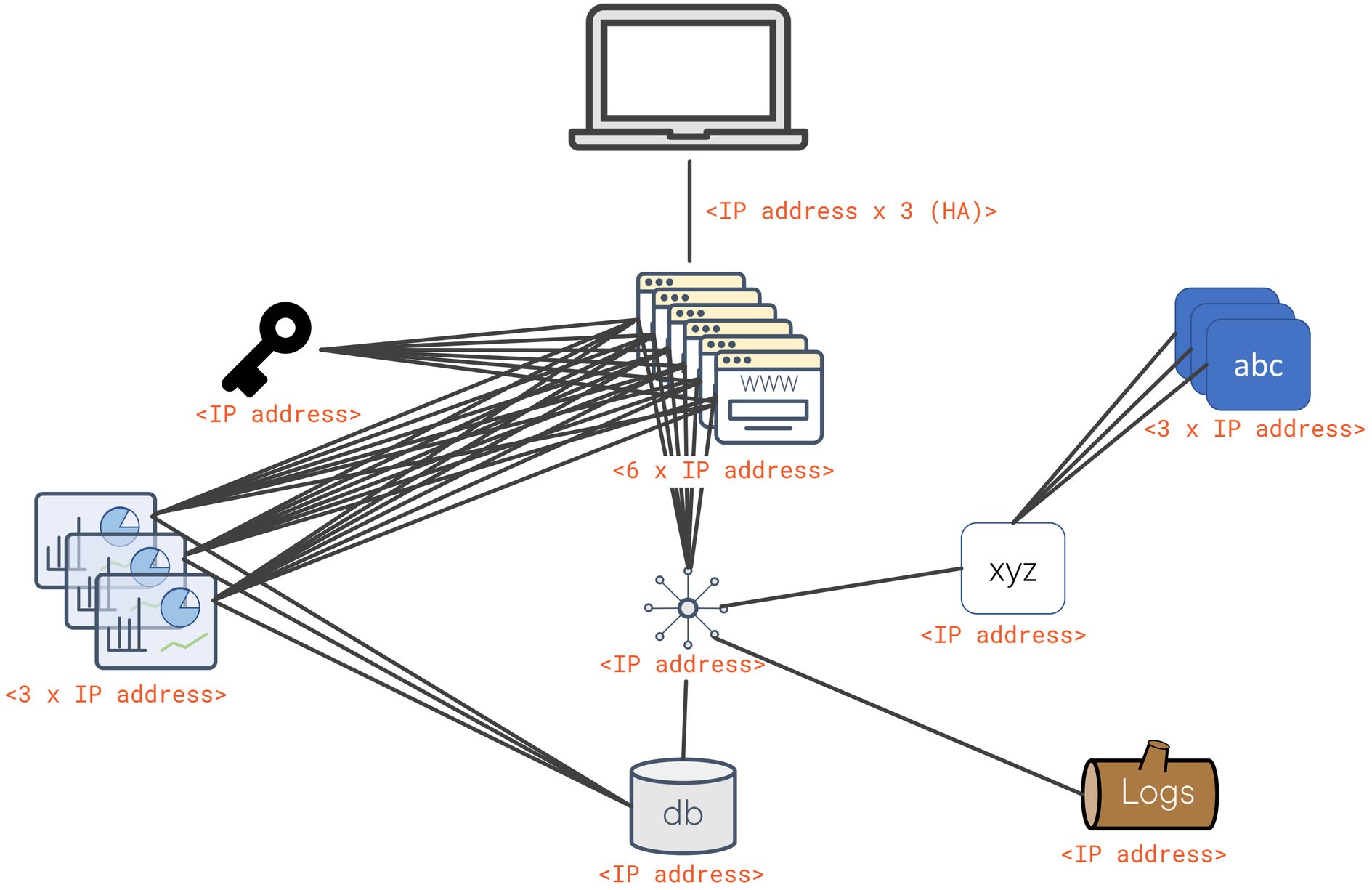

<IP address x 3 (HA)>
<IP address>
WWW
<6 x IP address>
abc
<3 x IP address>
xyz
<IP address>
<3 x IP address>
<IP address>
db
<IP address>
Logs
<IP address>

IPAM

DNS

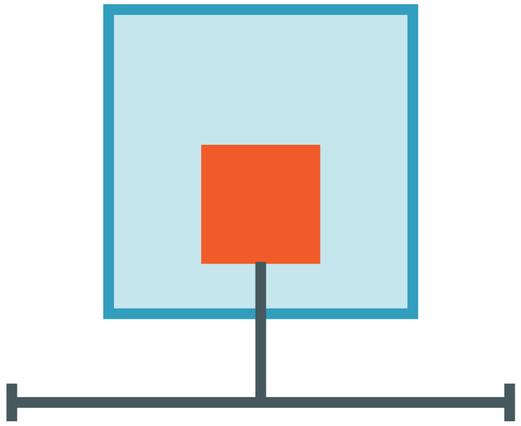
Encrypt

...

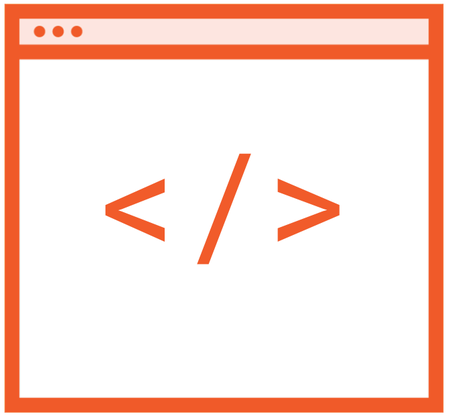


Up Next:
Container Network Model and Architecture

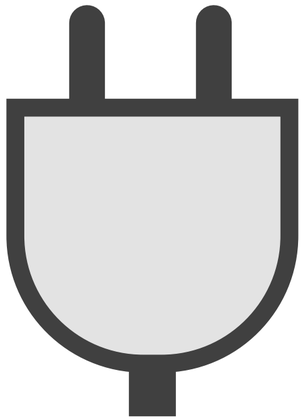
Container Network Model and Architecture



CNM
Design spec



Libnetwork
Implementation



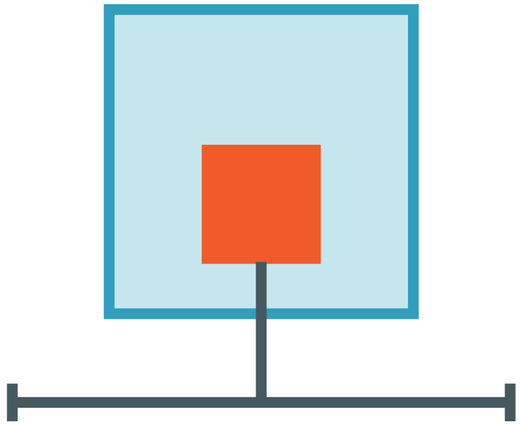
Plugin drivers
Network topology

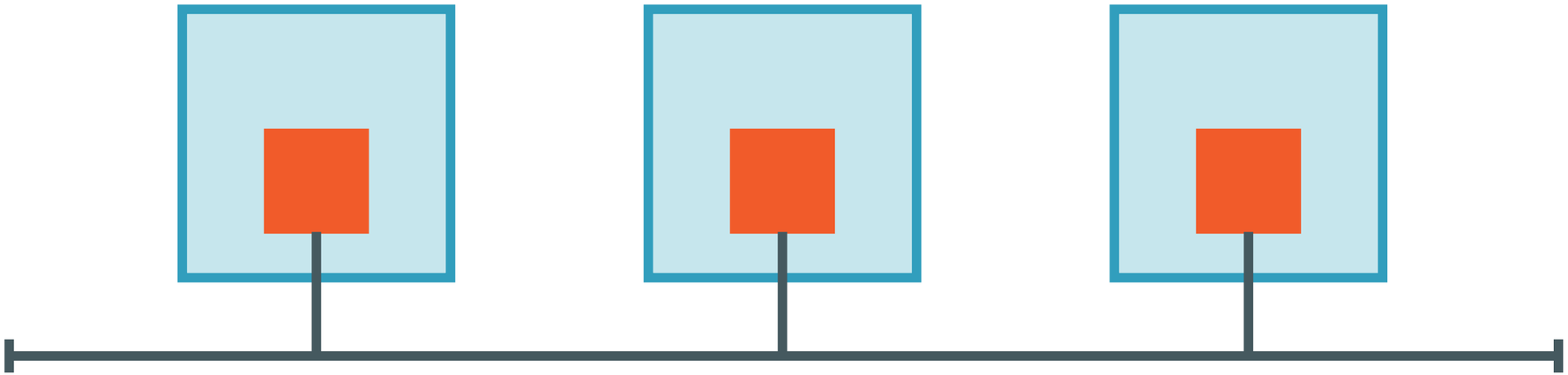
Container Network Model (CNM)

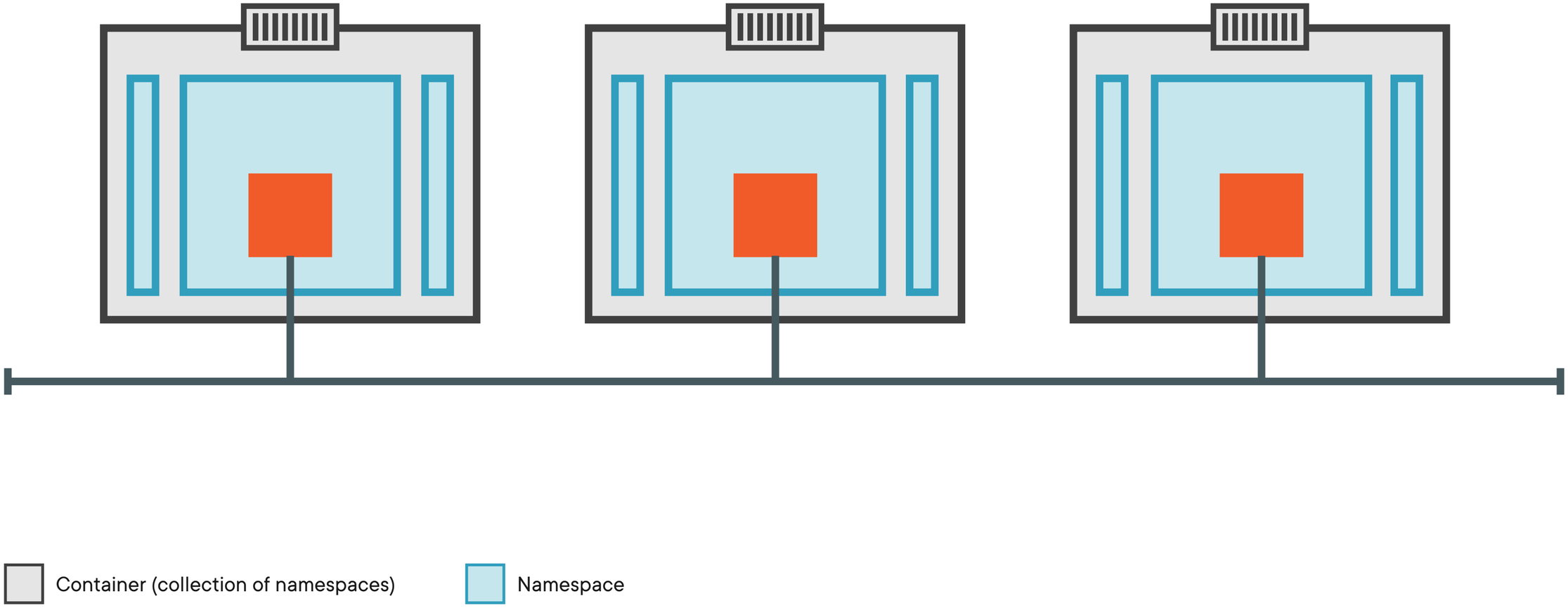
Sandbox
net namespace

Endpoint
veth pair

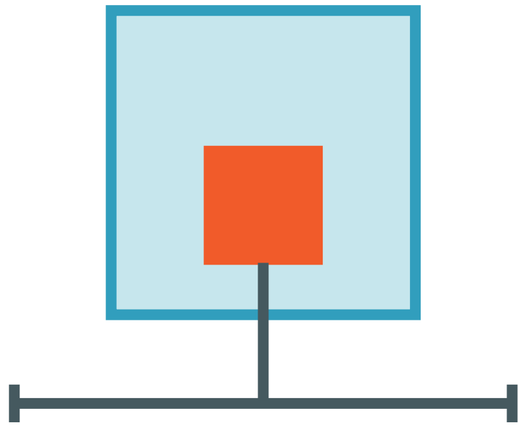
Network






Container (collection of namespaces)
Namespace

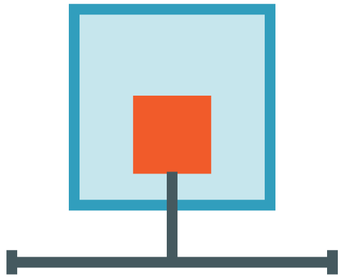
Container Network Model (CNM)

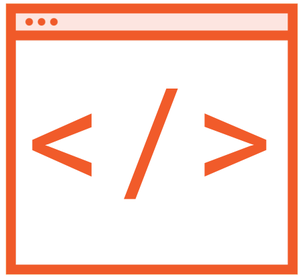


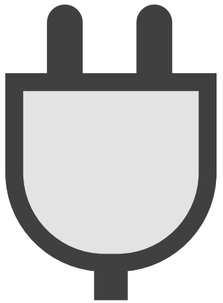
Sandbox (network namespace)

Endpoint (Ethernet interface)

Network (collection of sandbox/endpoints)







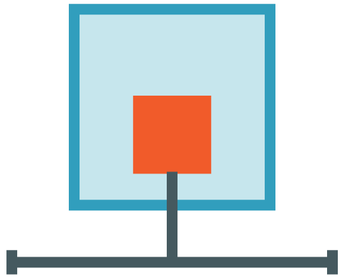
CNM
Design spec

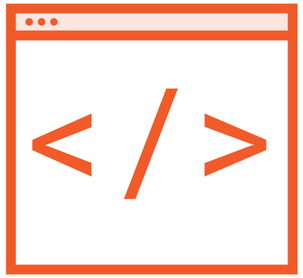
Libnetwork
Implements CNM

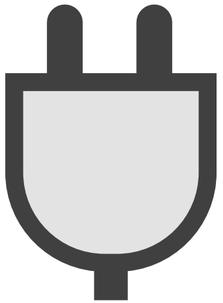
Plugins
Network topology

VXLAN overlay = multi-host networking

MACVLAN = connect to corporate VLANs







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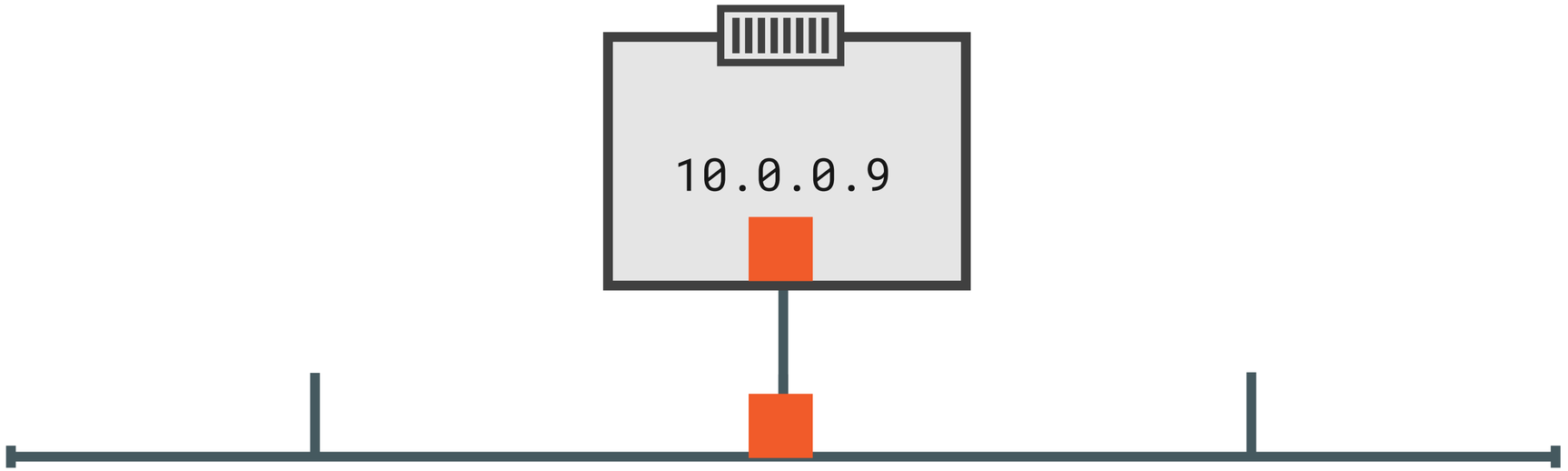
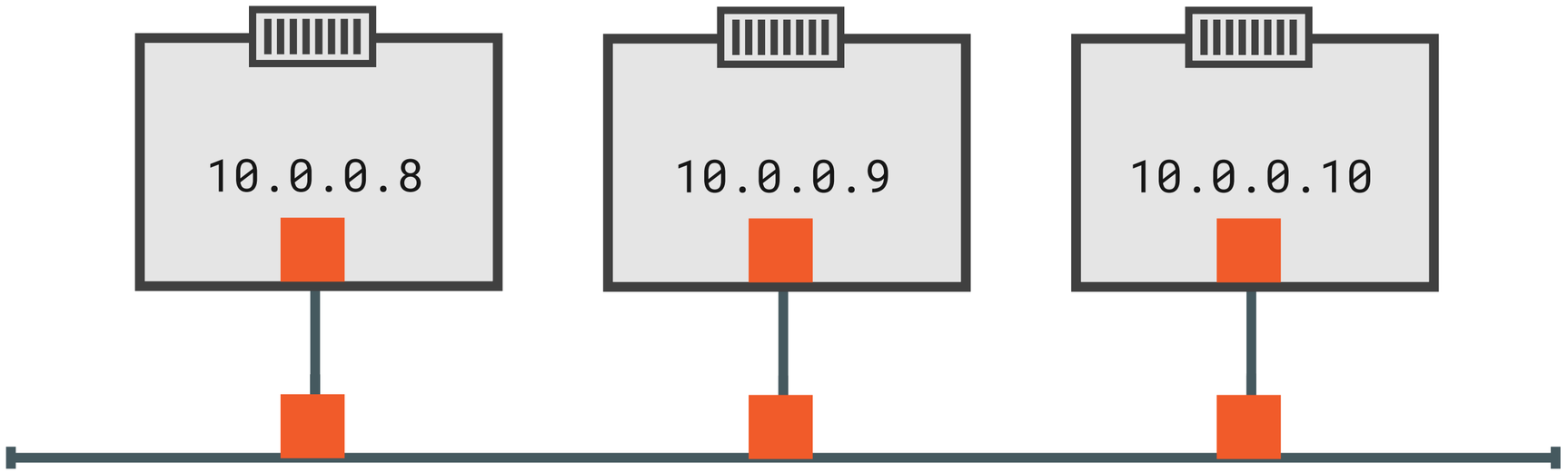


802.1d bridge (a.k.a. layer 2 switch)

IP range: 10.0.0.1/24

...

veth port pair



802.1d bridge (a.k.a. layer 2 switch)

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...

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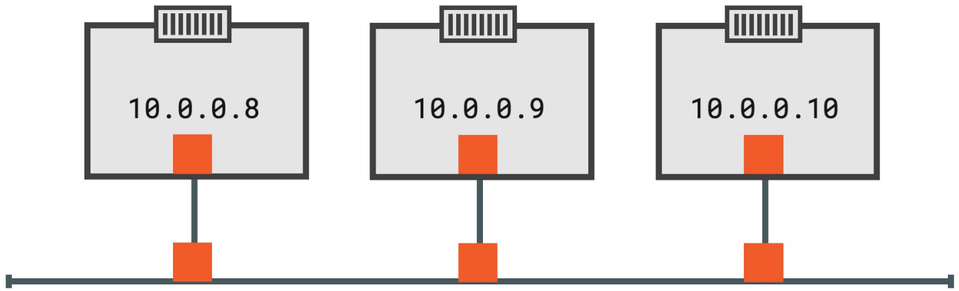

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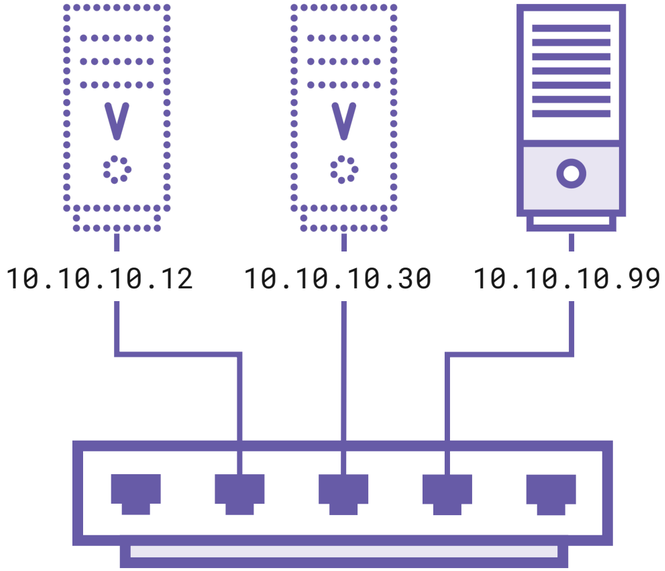


802.1d bridge (a.k.a. layer 2 switch)

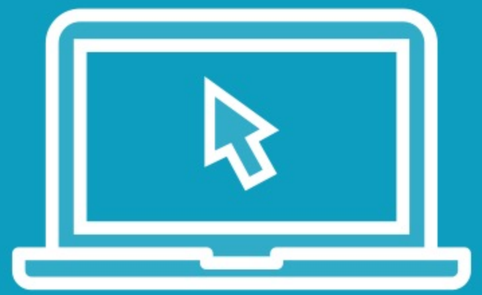
IP range: 10.10.10.0/24

...

Up Next:
Network CLI Intro

Network CLI Intro

Demo



- Create Networks
- Inspect Networks
- Join Networks

***Should work in any Docker environment**

Up Next:
Recap

Recap

Networks Are...

Huge

Complex

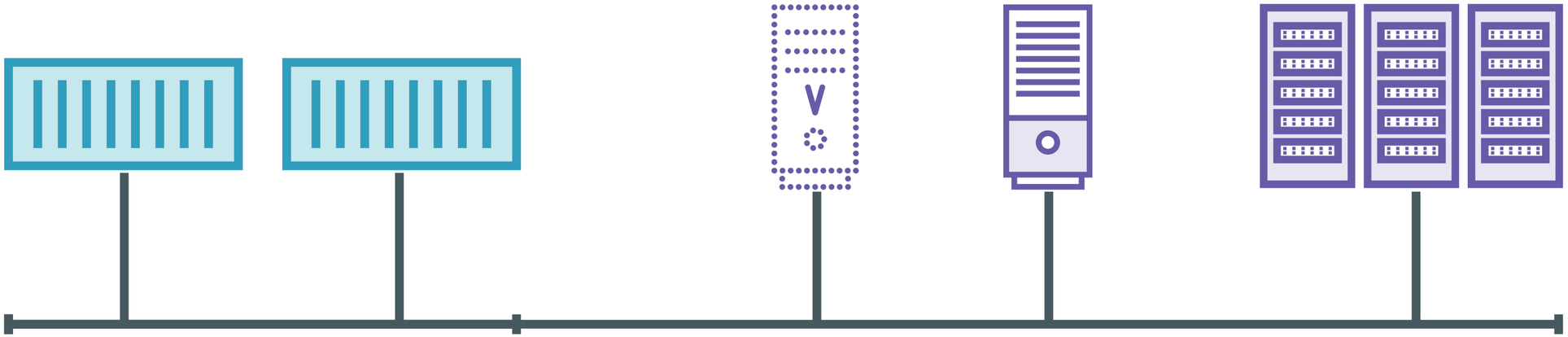
Everywhere

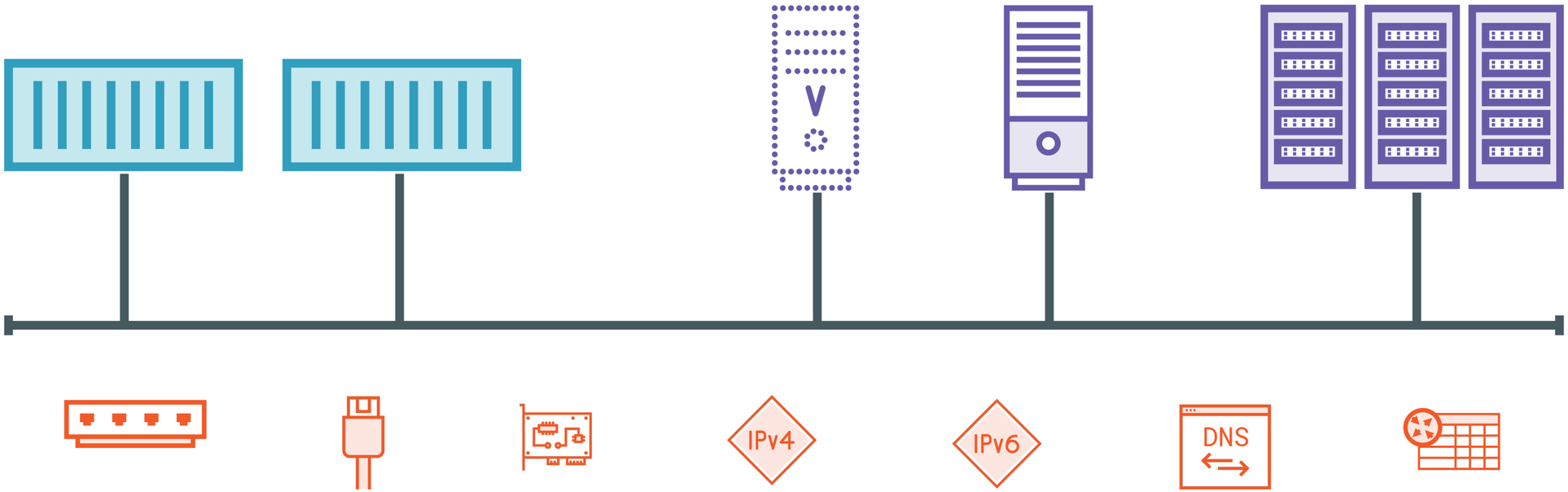
Add Containers...

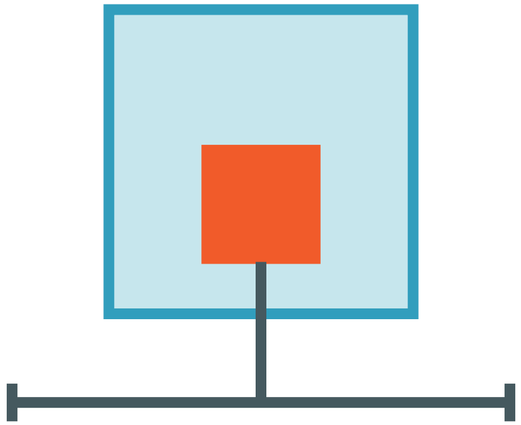
Huger

Complexer

Everywherer

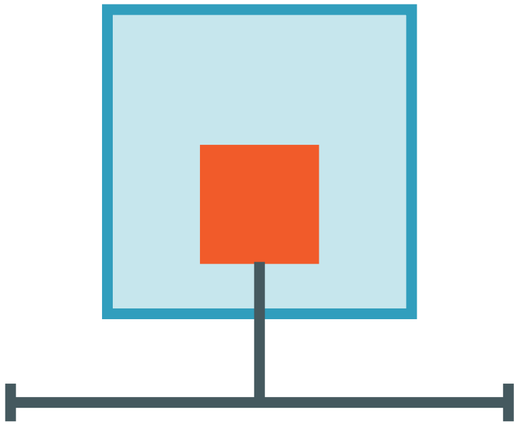



IPv4
IPv6
DNS

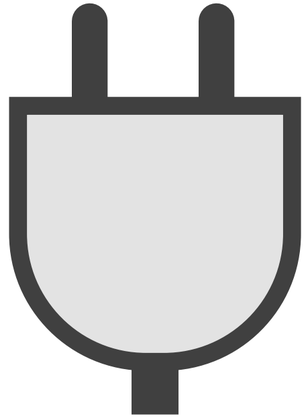


CNM

Design spec



CNM
Design spec



Plugin drivers
Network topology

Up Next:
Use-cases and Hands-on