Clusters and Child Processes

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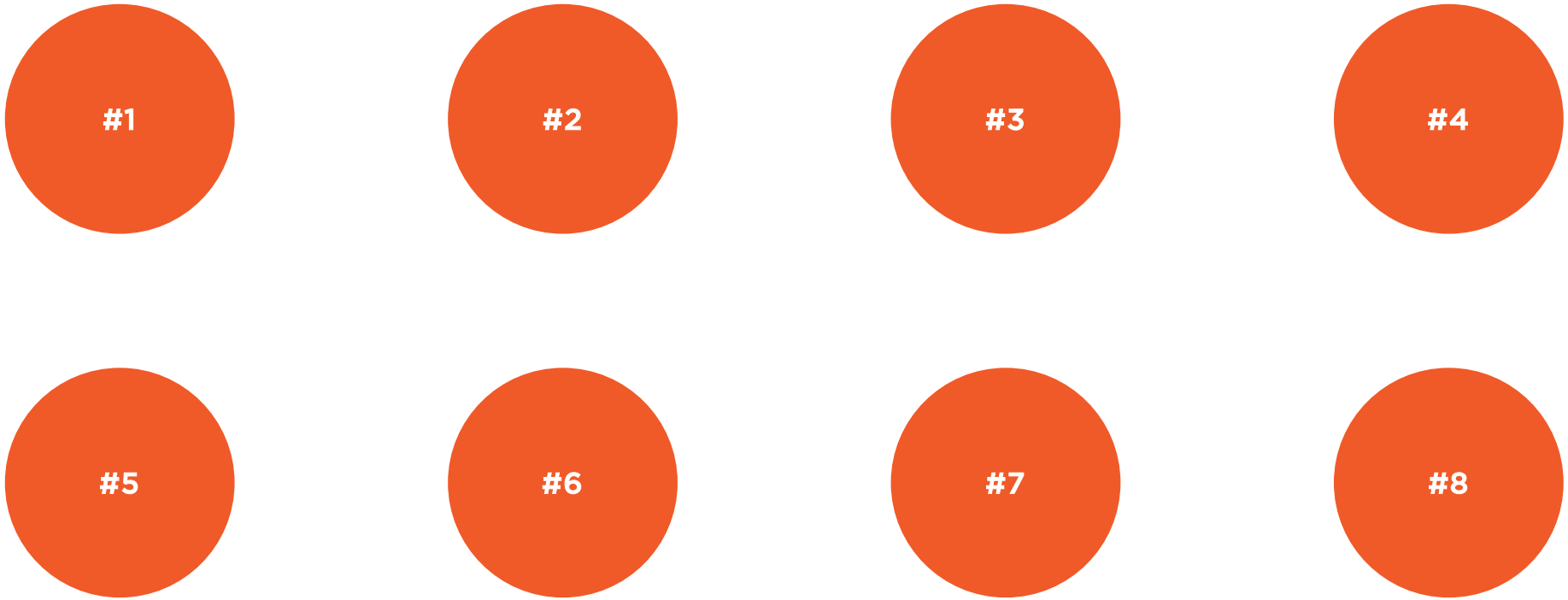
Scaling Node.js Applications

It's all about Nodes



Scalability

Workload

Availability

Fault Tolerance

Scalability Strategies

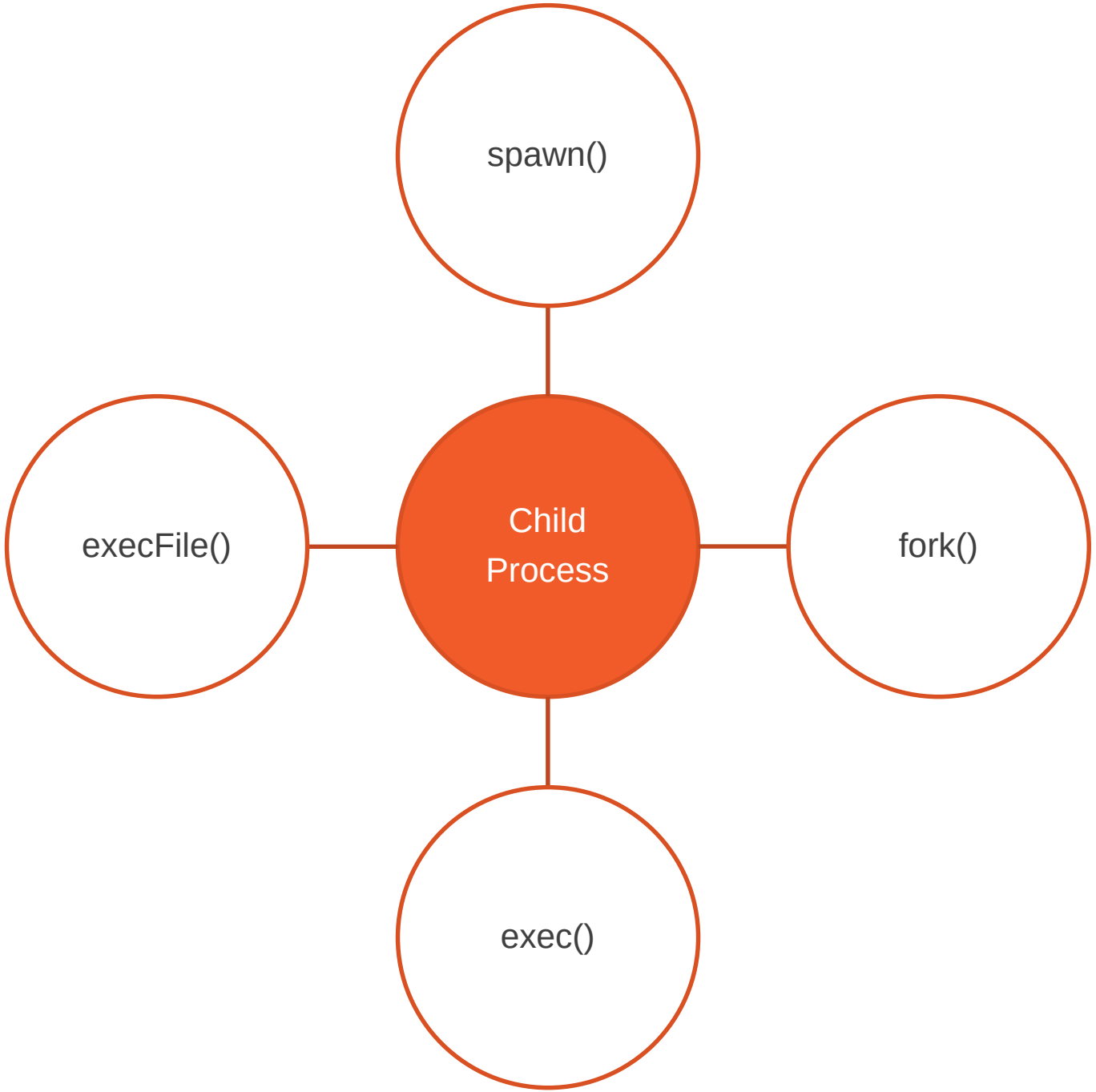
Cloning

Decomposing

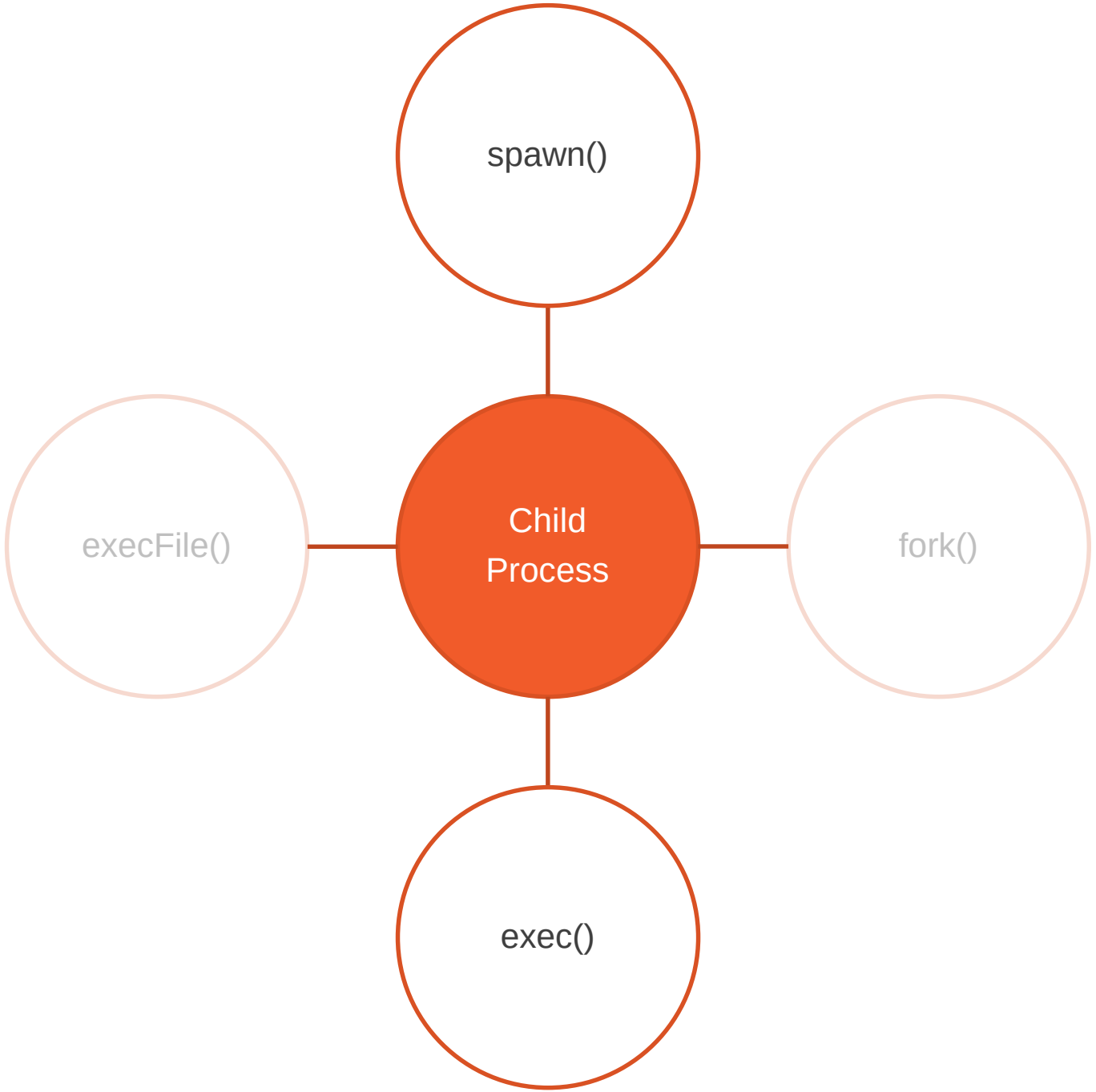
Splitting

Child Processes Events and Standard IO

Node.js and the OS


spawn()
execFile()
Child
Process
fork()
exec()

The Shell Syntax, exec(), and execFile()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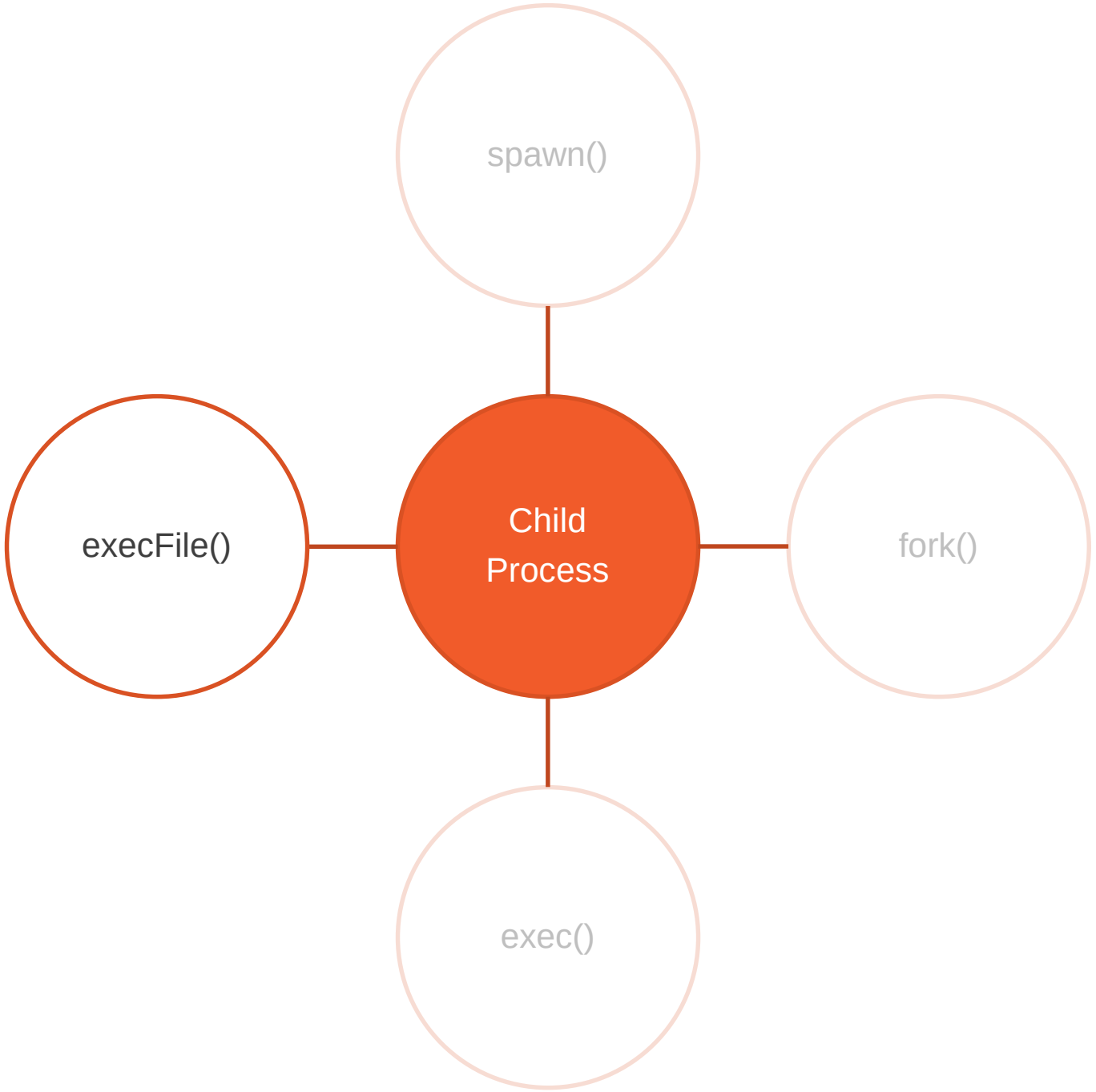
execFile()
Child Process
fork()
exec()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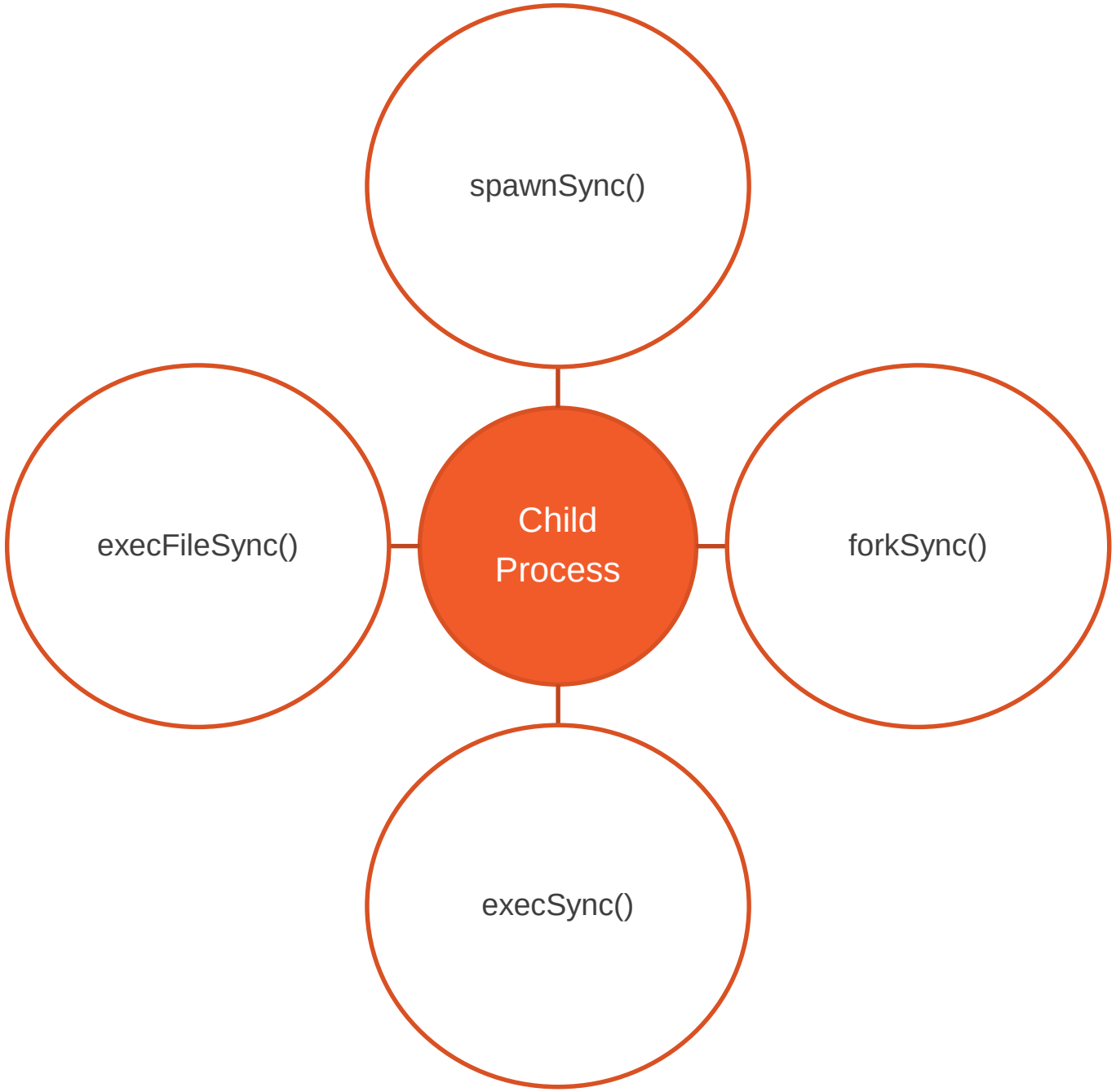
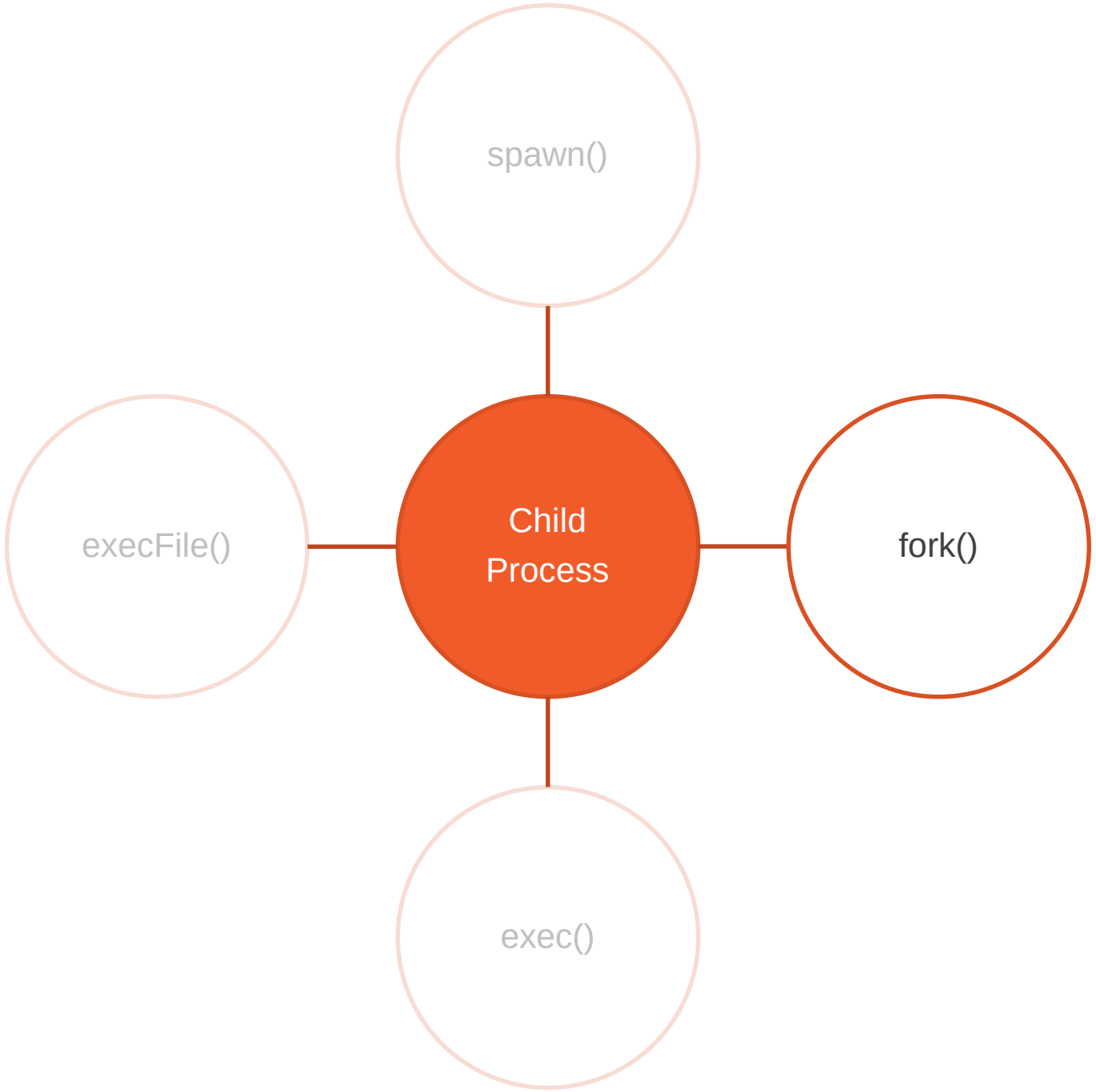
fork()
exec()

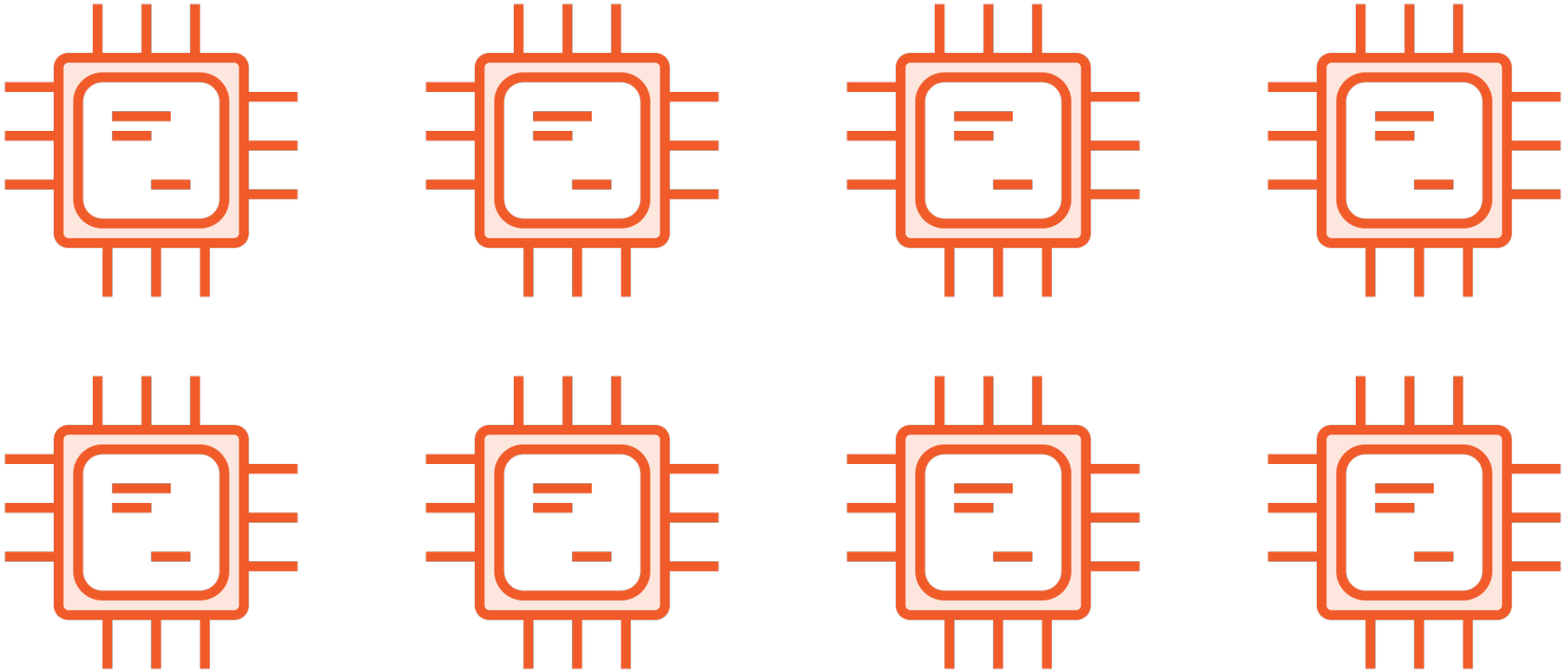

spawnSync()
execFileSync()
Child Process
forkSync()
execSync()

The fork() Function


spawn()
execFile()
Child Process
fork()
exec()

The Cluster Module

When You Have Multiple CPUs



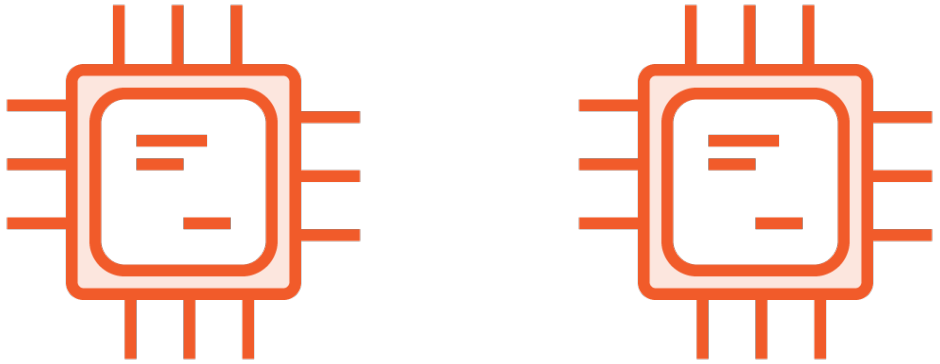
Scalability Strategies

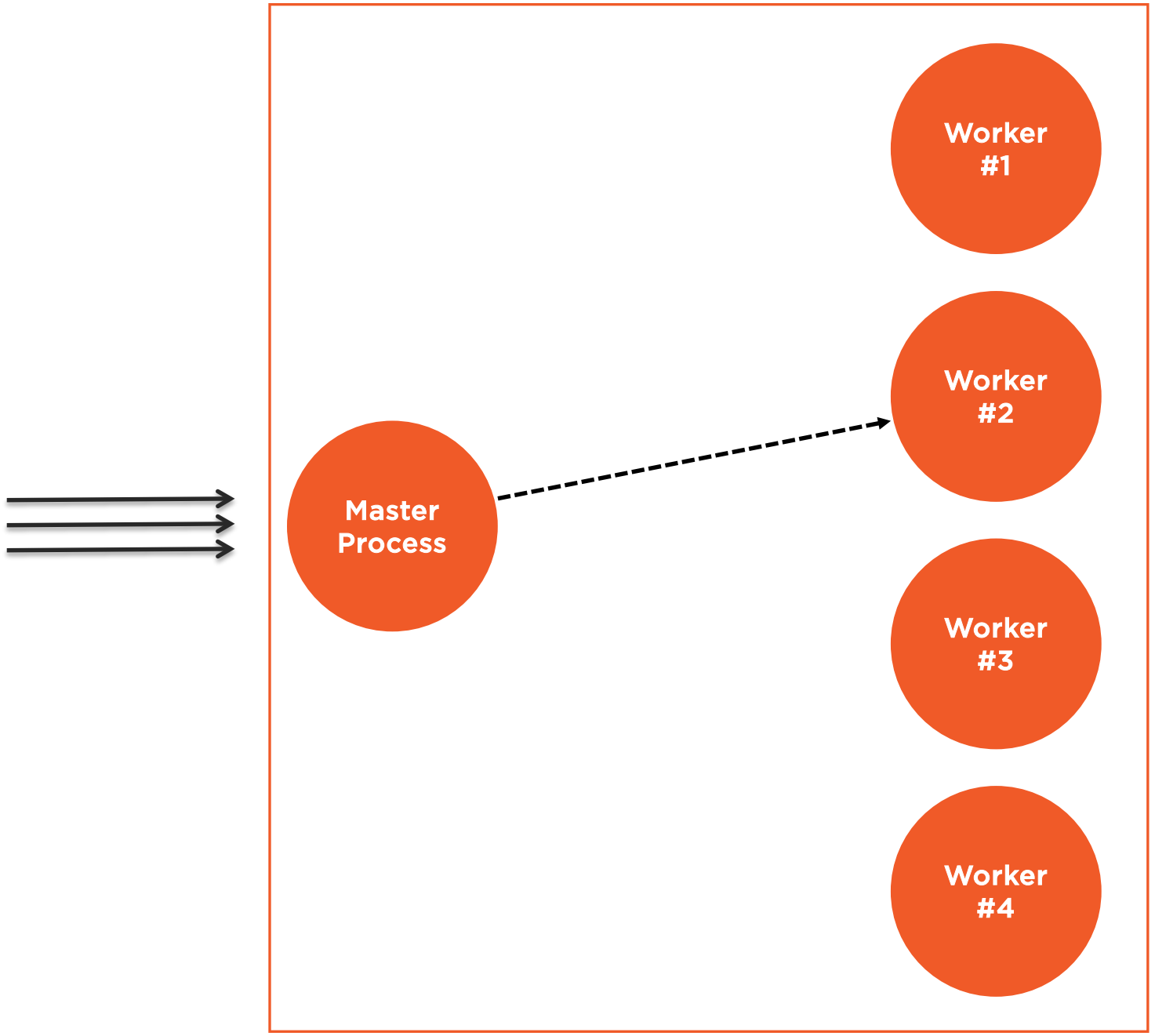
Cloning

Decomposing

Splitting

Always Use the Cluster Module



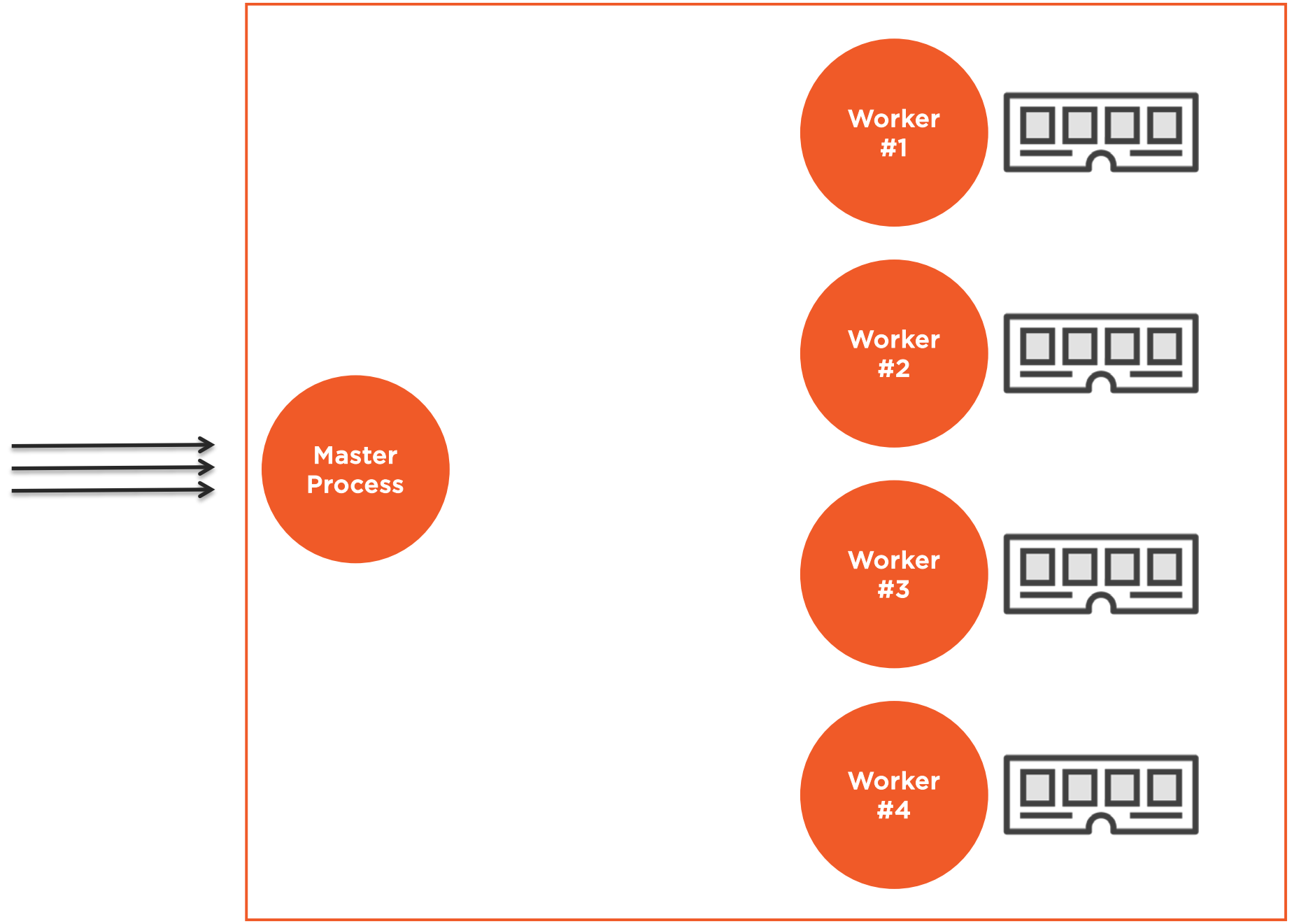

Worker
#1
Worker
#2
Master
Process
Worker
#3
Worker
#4

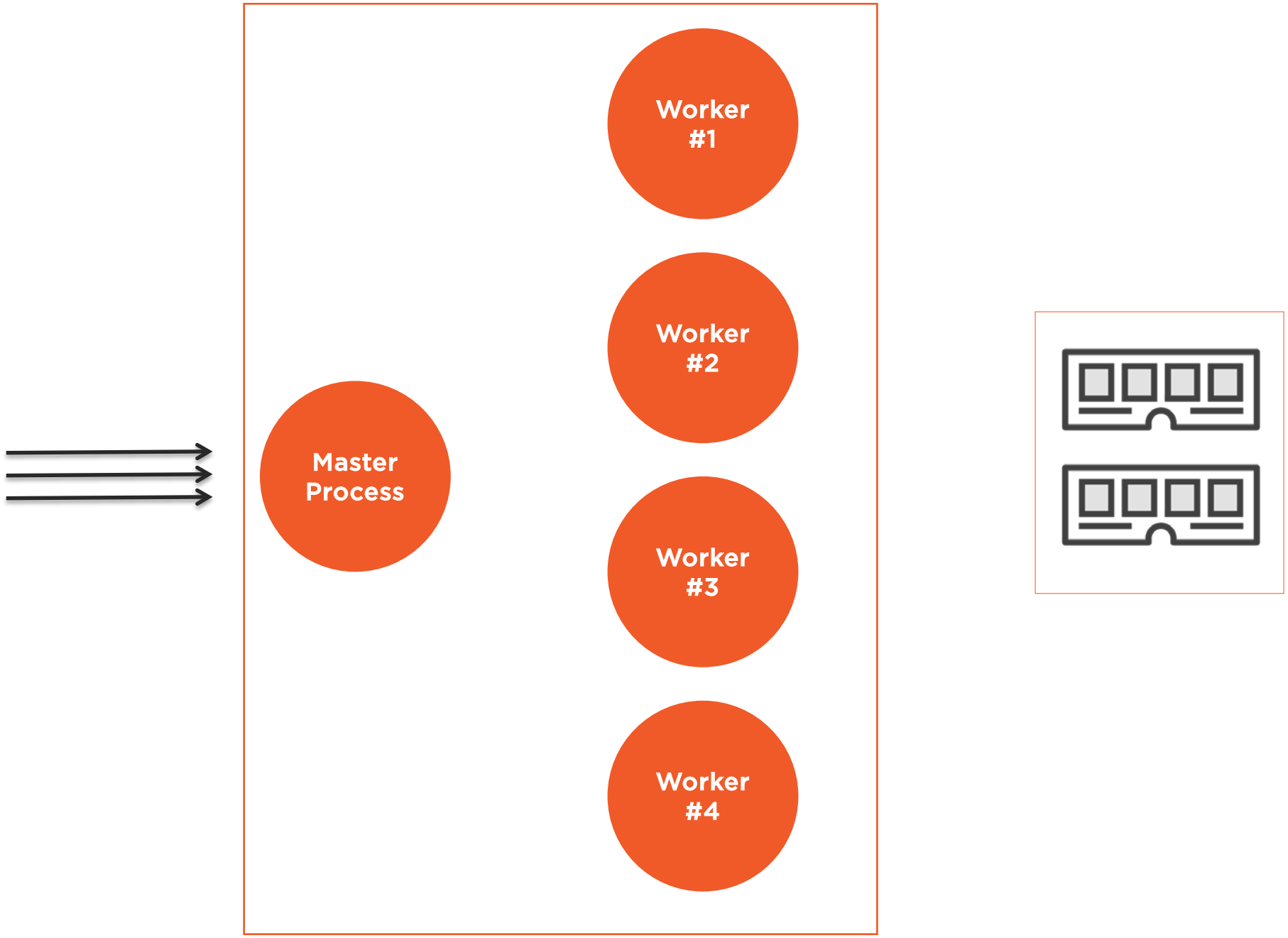
Load-Balancing an HTTP Server

Broadcasting Messages to All Workers

Availability and Zero-downtime Restarts

Shared State and Sticky Load Balancing


Master Process
Worker #1
Worker #2
Worker #3
Worker #4


Master Process
Worker #1
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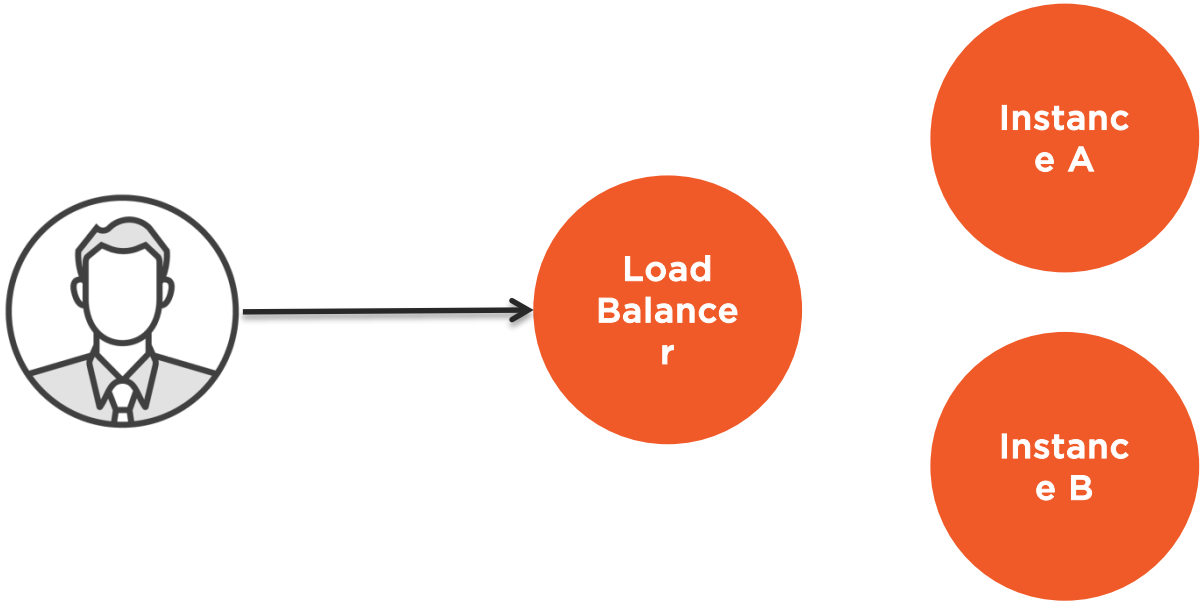
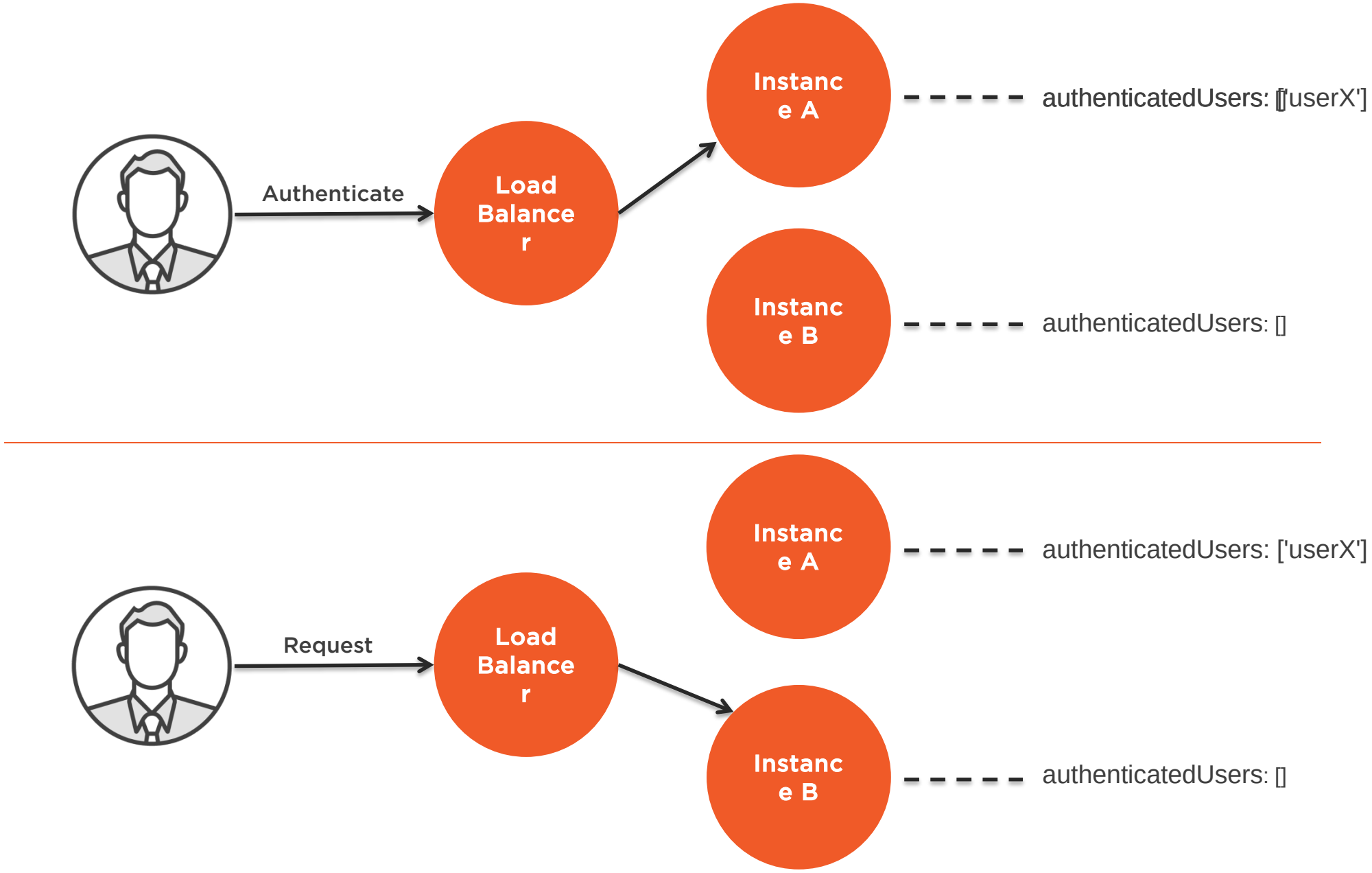
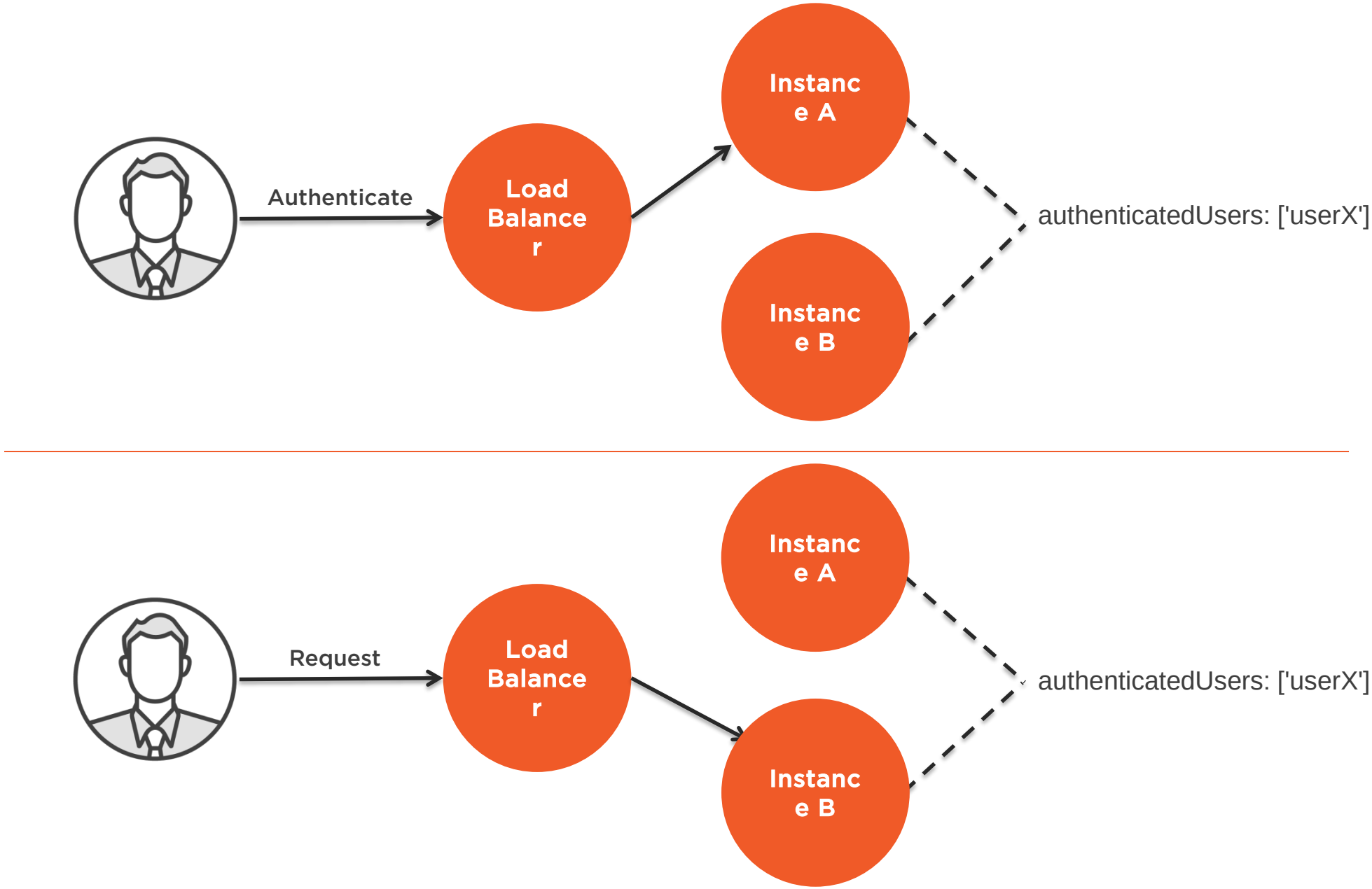
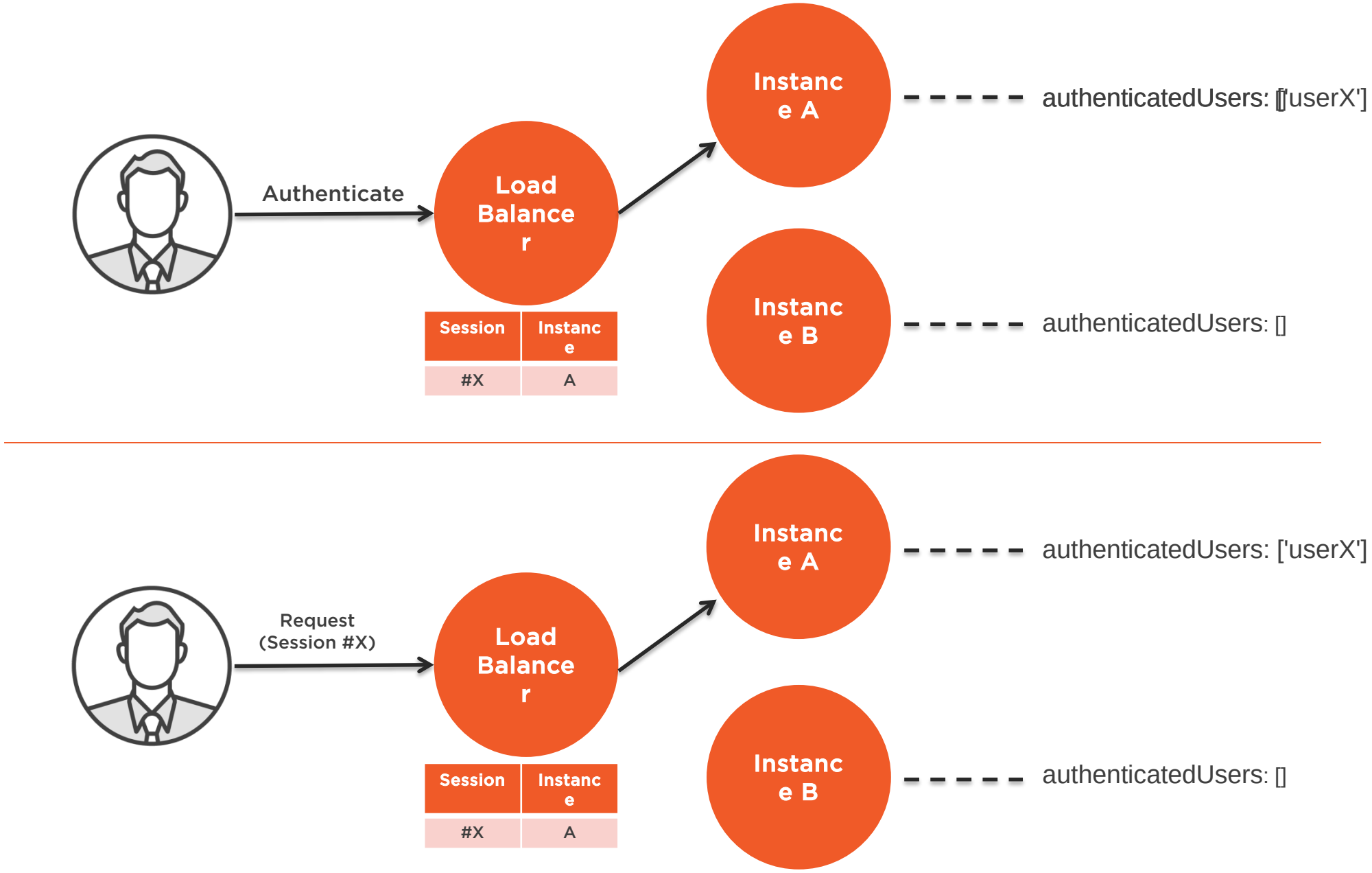
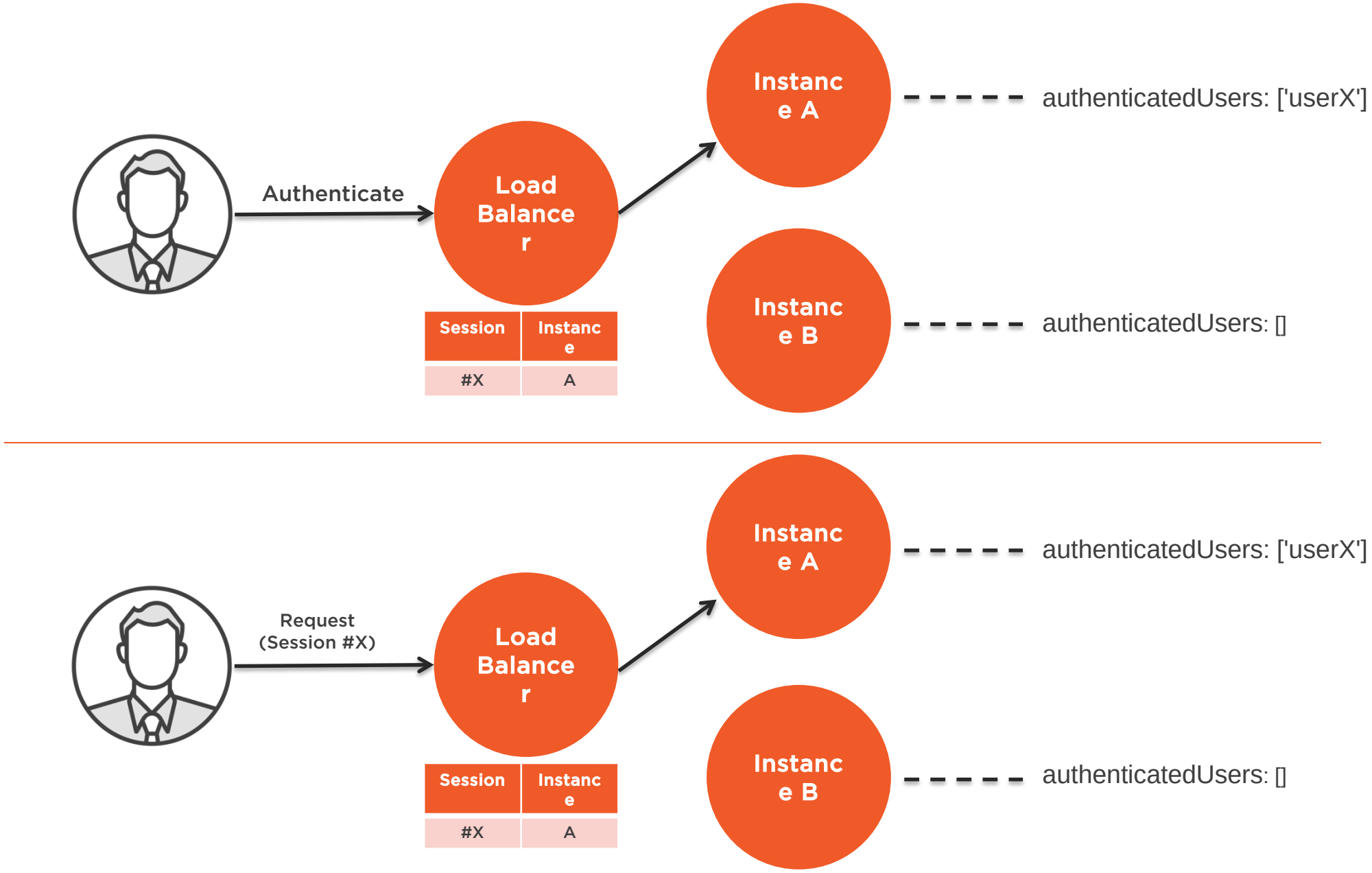

Load Balancer
Instance A
Instance B


Authenticate
Load Balancer
Instance A
authenticatedUsers: ['userX']
Instance B
authenticatedUsers: []
Request
Load Balancer
Instance A
authenticatedUsers: ['userX']
Instance B
authenticatedUsers: []


Authenticate
Load Balancer
Instance A
Instance B
authenticatedUsers: ['userX']
Request
Load Balancer
Instance A
Instance B
authenticatedUsers: ['userX']


Authenticate
Load Balancer
Session
Instance
#X
A
Instance A
authenticatedUsers: ['userX']
Instance B
authenticatedUsers: []
Request (Session #X)
Load Balancer
Session
Instance
#X
A
Instance A
authenticatedUsers: ['userX']
Instance B
authenticatedUsers: []


Authenticate
Load Balancer
Session
Instance
#X
A
Instance A
authenticatedUsers: ['userX']
Instance B
authenticatedUsers: []
Request (Session #X)
Load Balancer
Session
Instance
#X
A
Instance A
authenticatedUsers: ['userX']
Instance B
authenticatedUsers: []

Summary

Scaling Node.js Applications

ChildProcess

- spawn()
- exec(), execFile()
- fork()

The Cluster Module

- Load Balancing
- Communication
- Availability
- Zero-downtime restarts
- Shared State