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Now That I Have Choreography, What Do I Do With It?

Julian Dunn – Product Manager, Chef - @julian_dunn
CfgMgmtCamp 2017 – Gent, BE

Last February...



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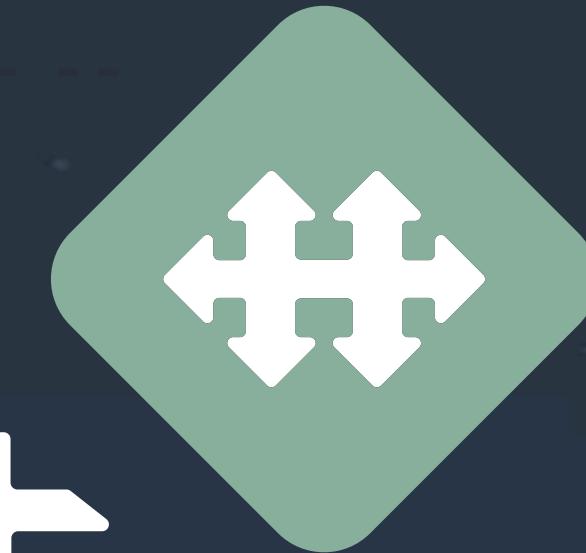
Who Needs Orchestration?
What You Want is Choreography!

Julian Dunn – Product Manager, Chef Software, Inc. – [@julian_dunn](https://twitter.com/julian_dunn)



Last June...

habitat



Open Source Modern Application Automation



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An ordered set of operations*
Across a set of independent machines
Connected to an orchestrator only
via a network

* Hopefully written in code

```
mylaptop:~$ ./disable-load-balancer.sh
mylaptop:~$ ssh db01 do-database-migration.sh
mylaptop:~$ for i in app01 app02; do
> ssh $i do-deployment.sh
> done
mylaptop:~$ ./enable-load-balancer.sh
```



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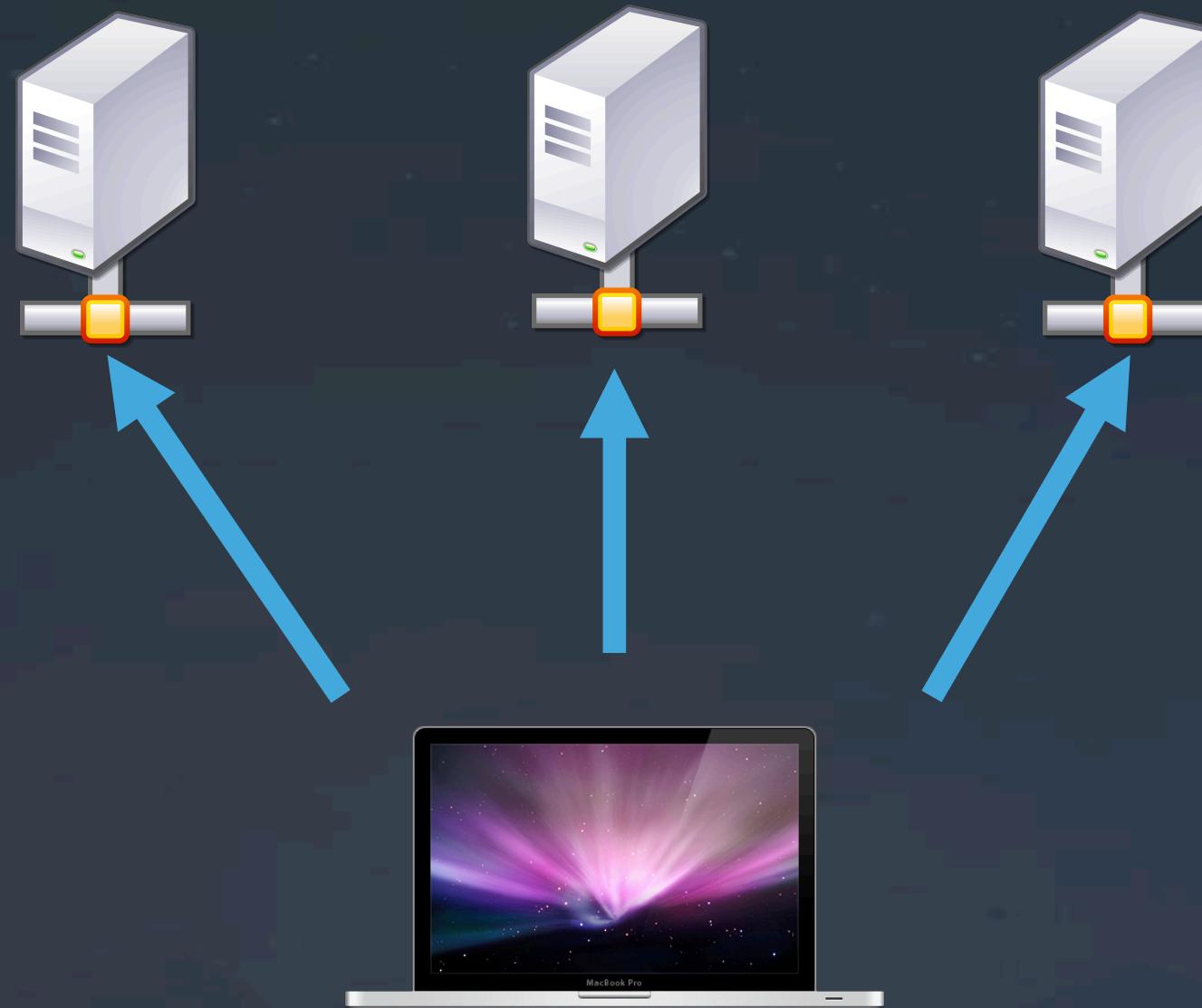
Problems with Orchestration

- Resilience
 - Deployment
 - Operational
- Scalability
 - Technical
 - Cognitive



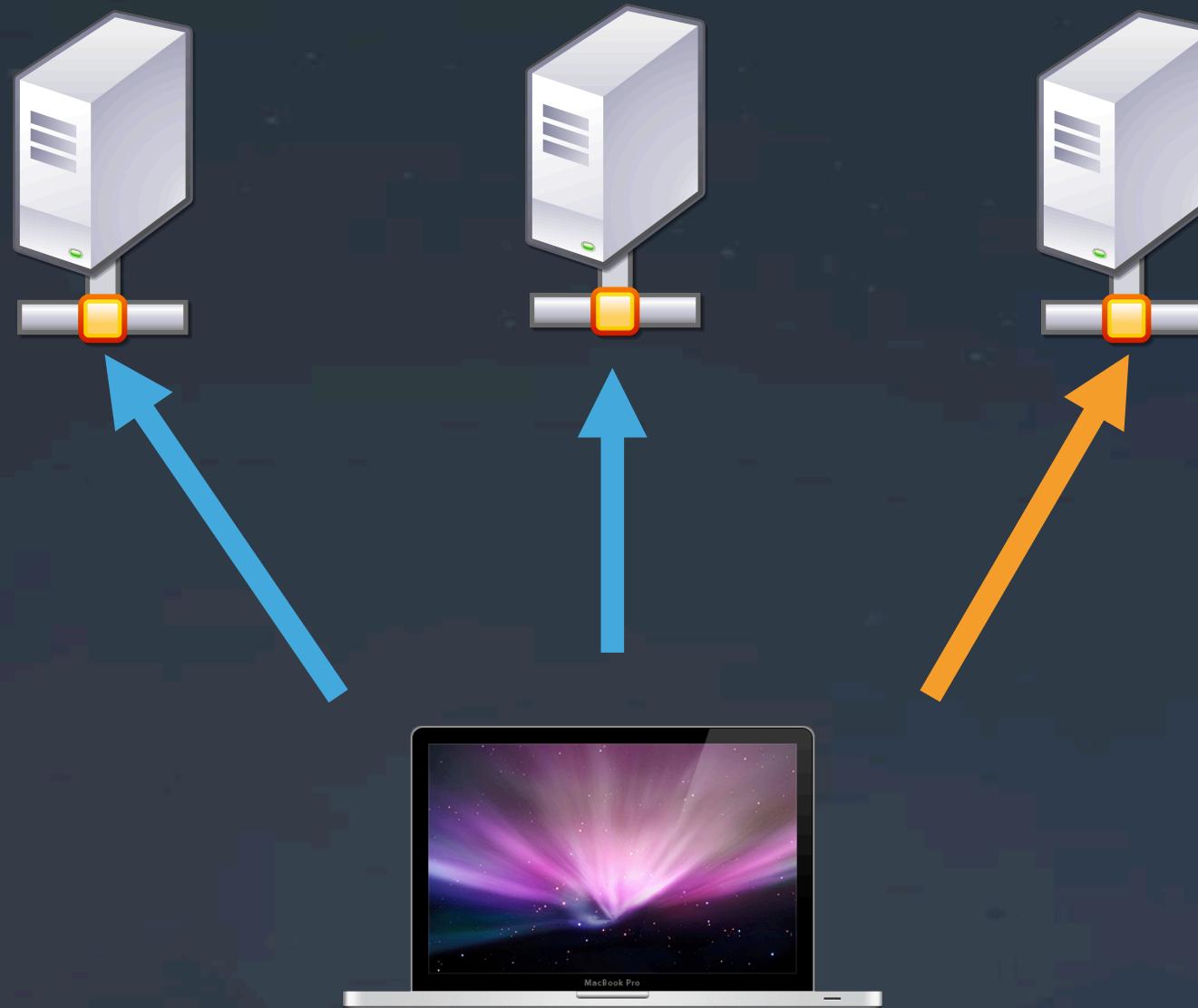
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Deployment Resilience



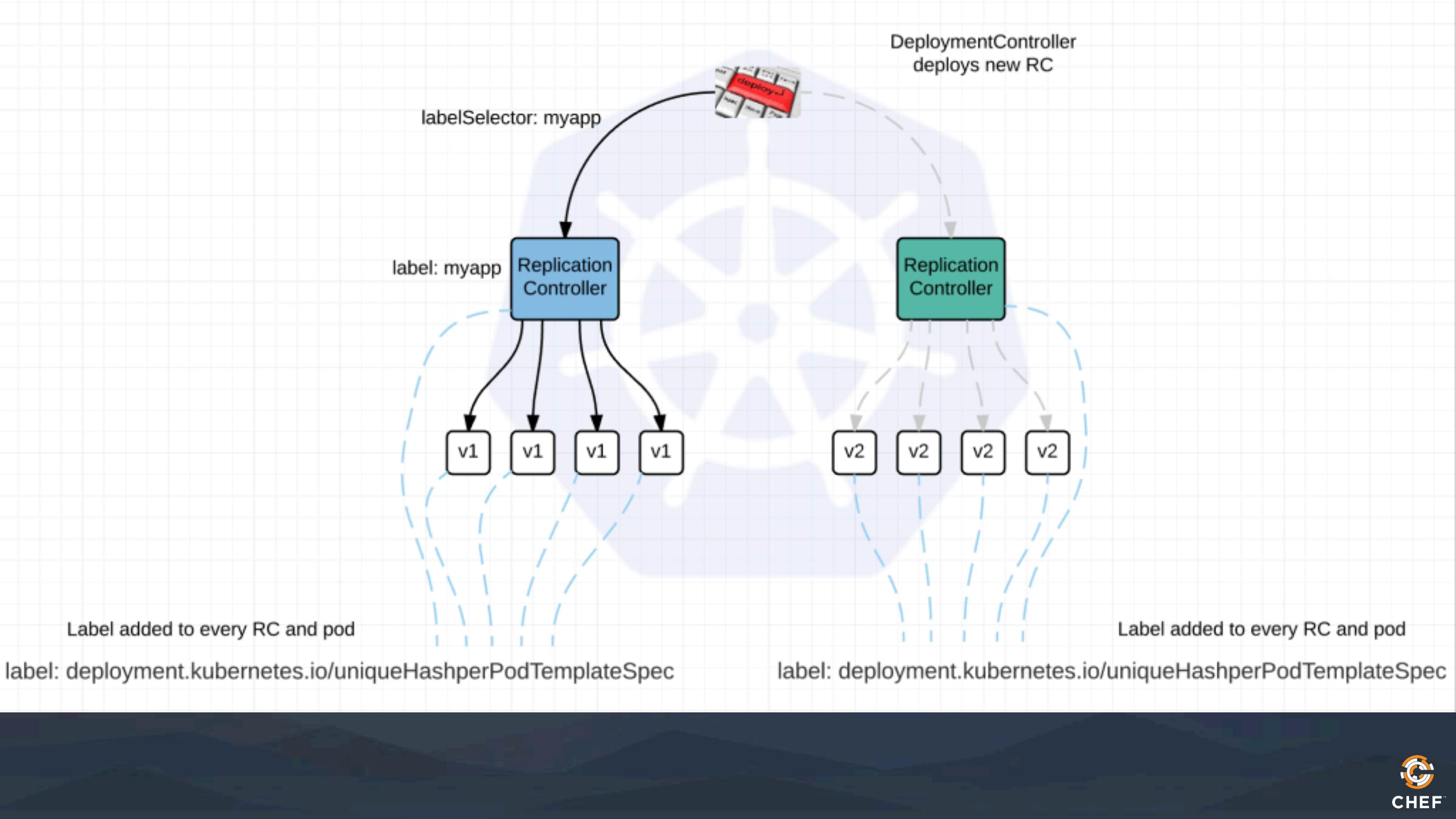
```
for i in app01 app02 app03; do  
  do-deploy.sh -server $i  
done
```

Deployment Resilience

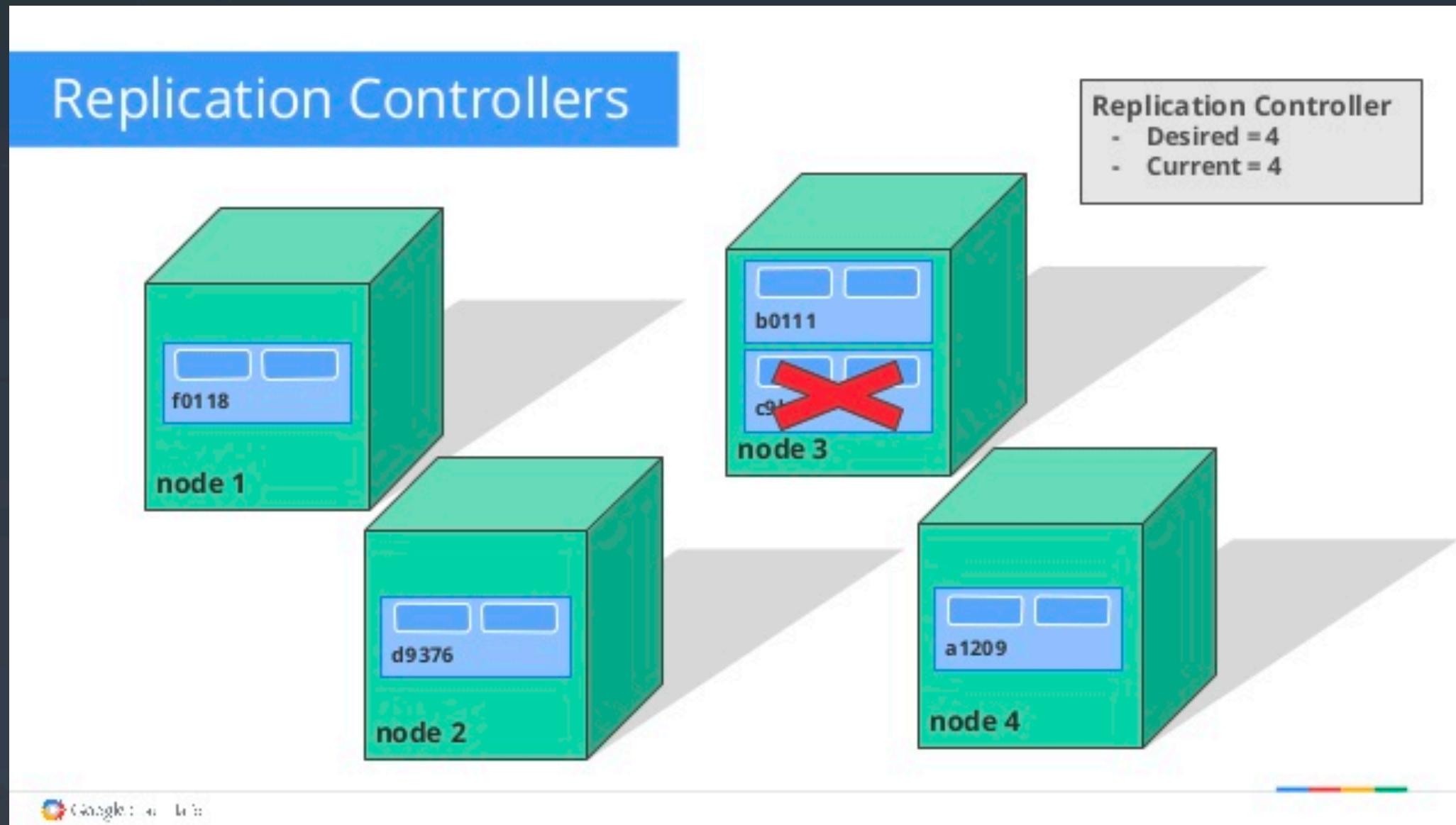


```
for i in app01 app02 app03; do
  do-deploy.sh -server $i
  if $? != 0; then
    failed=$i
    break
  end
done

# what goes down here?
#   roll back $failed?
#   roll back all others?
#   ignore it?
```

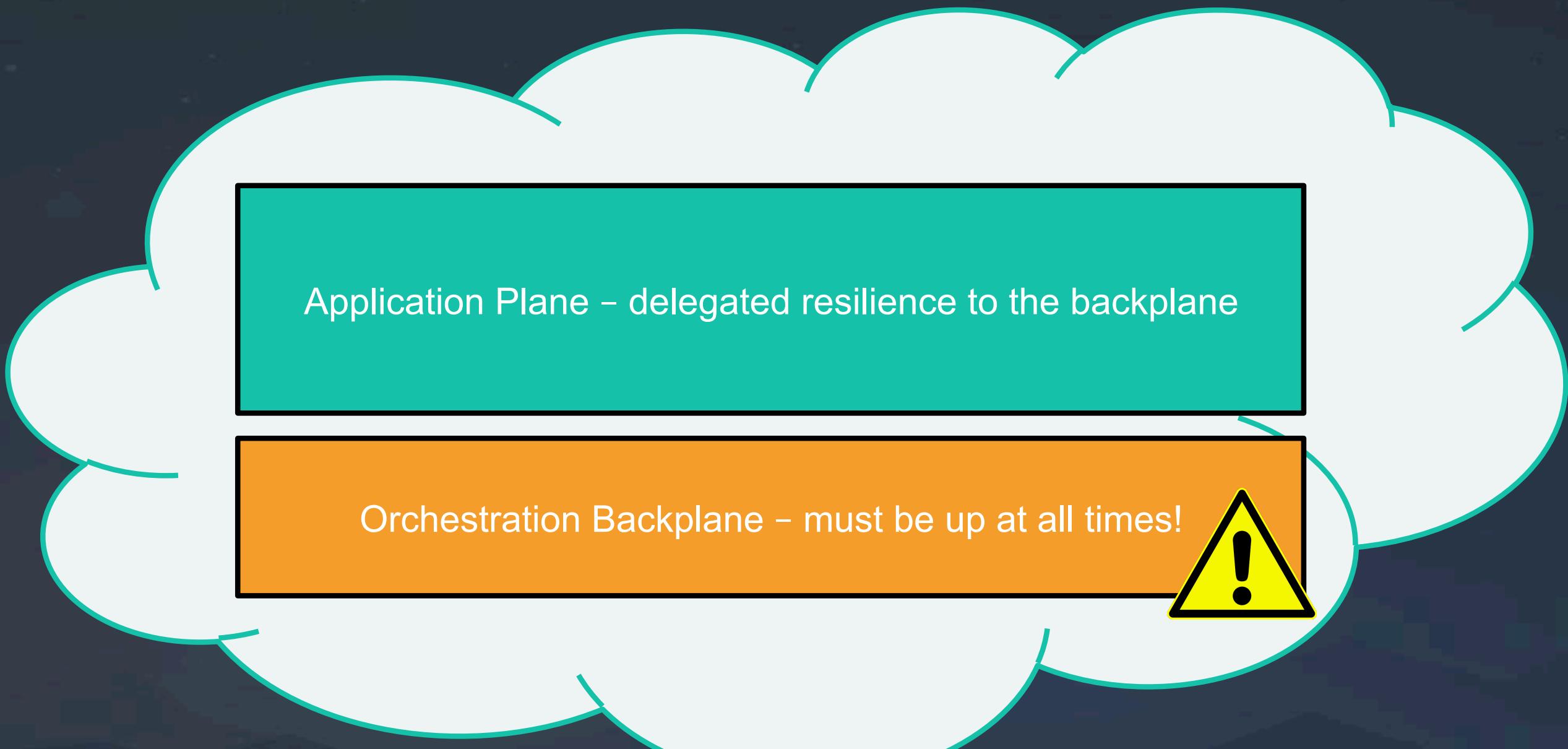


Operational Resilience



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Operational Resilience



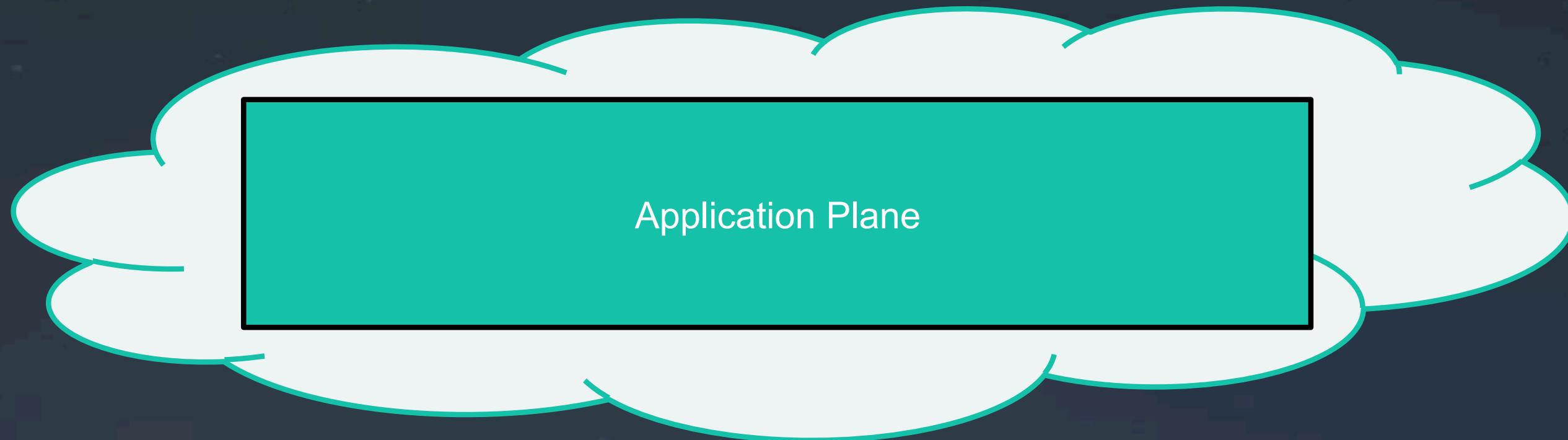
Application Plane – delegated resilience to the backplane

Orchestration Backplane – must be up at all times!



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Operational Resilience





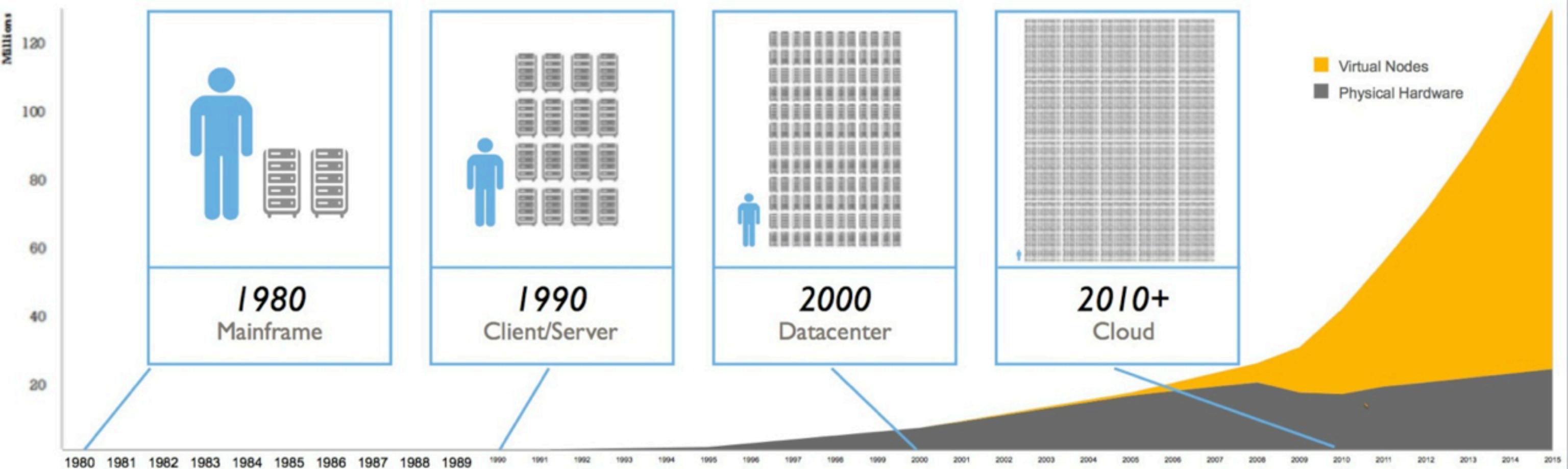
CONTAINER ENGINE FEATURES

Run Docker containers on Google Cloud Platform, powered by Kubernetes.



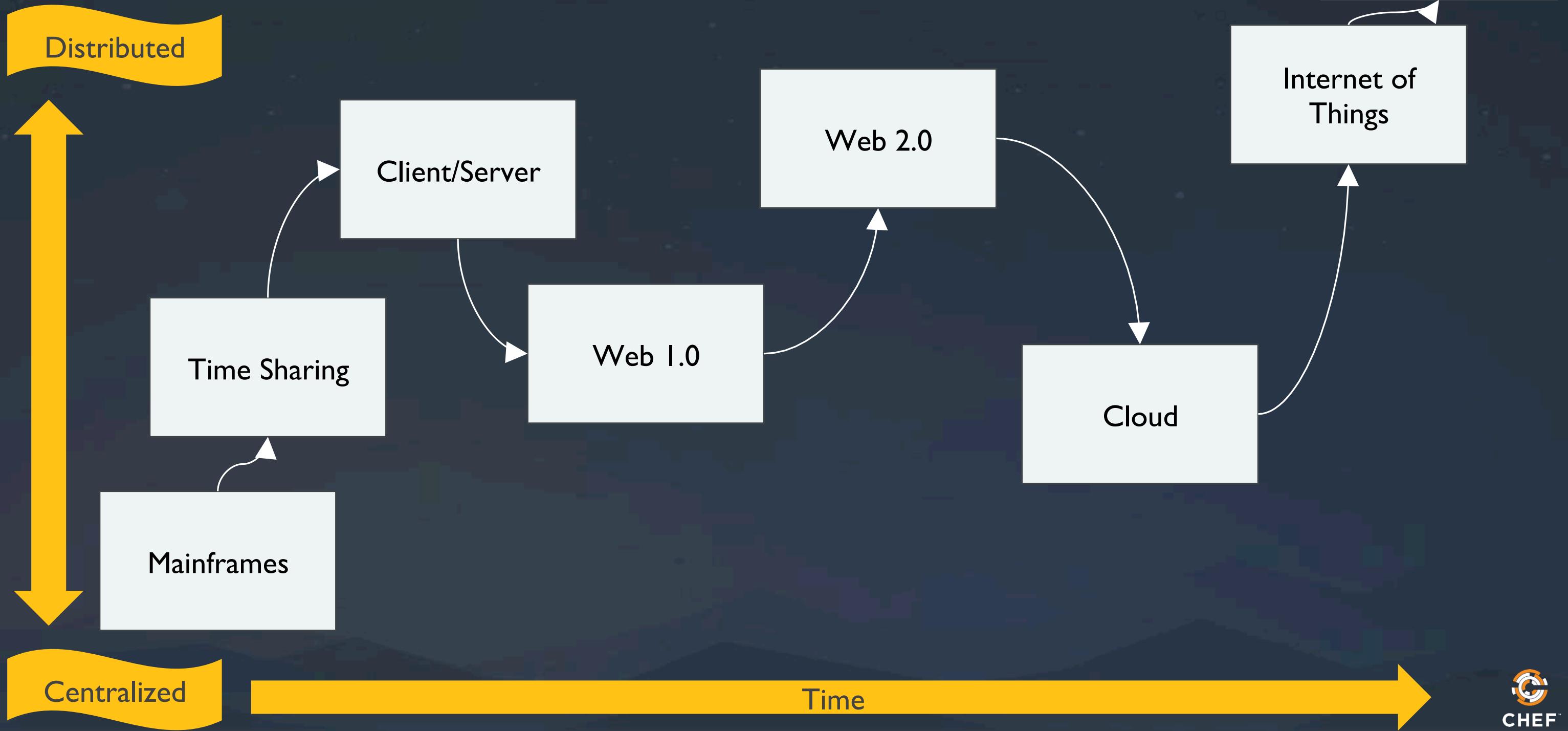
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Technical Scalability



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The Future Is Distributed



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Distributed Devices Need Distributed Management

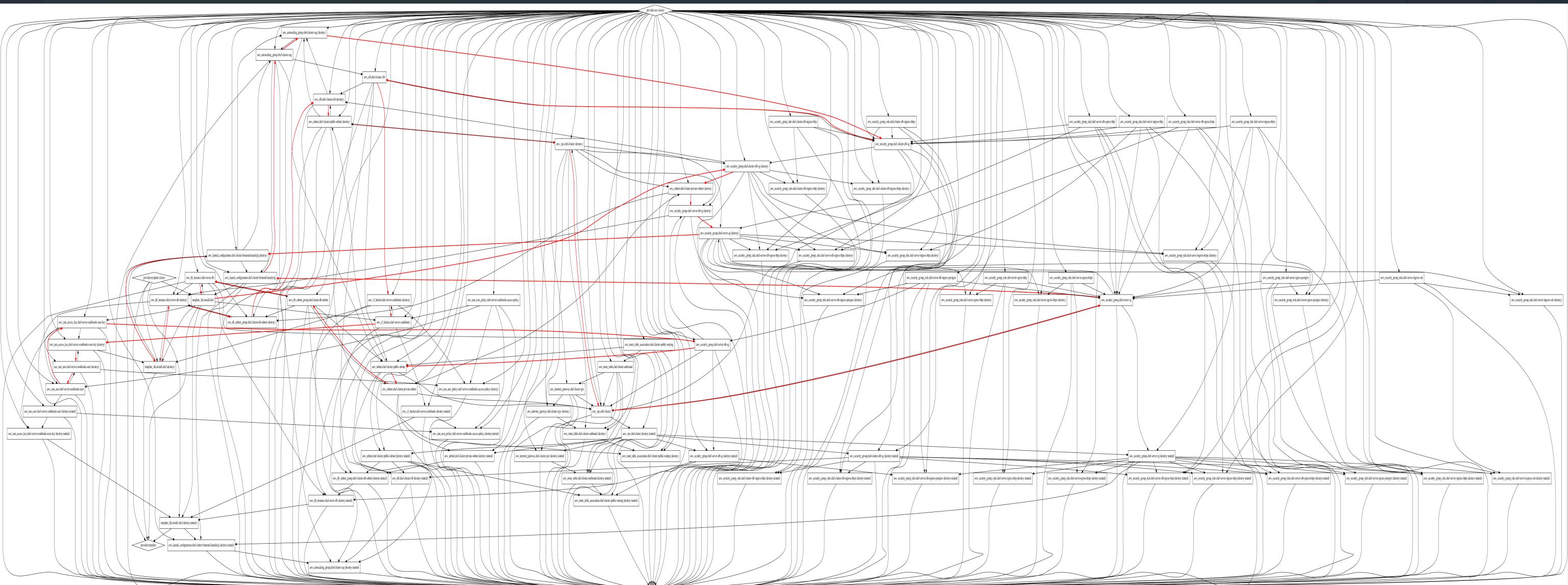


- Adaptive Learning
- Configuration Updates
- Software Updates



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Cognitive Scalability



Cognitive Scalability



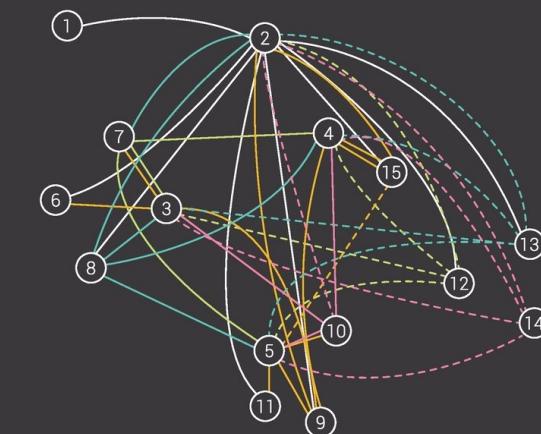
Distributed, Autonomous Systems

- Make progress towards promised desired state
- Expose interfaces to allow others to verify promises
- Can promise to take certain behaviors in the face of failure of others



Promise Theory

Principles and Applications



Jan A. Bergstra and Mark Burgess

CFEngine



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Open Source Modern Application Automation

Build system + runtime system + realtime configuration management

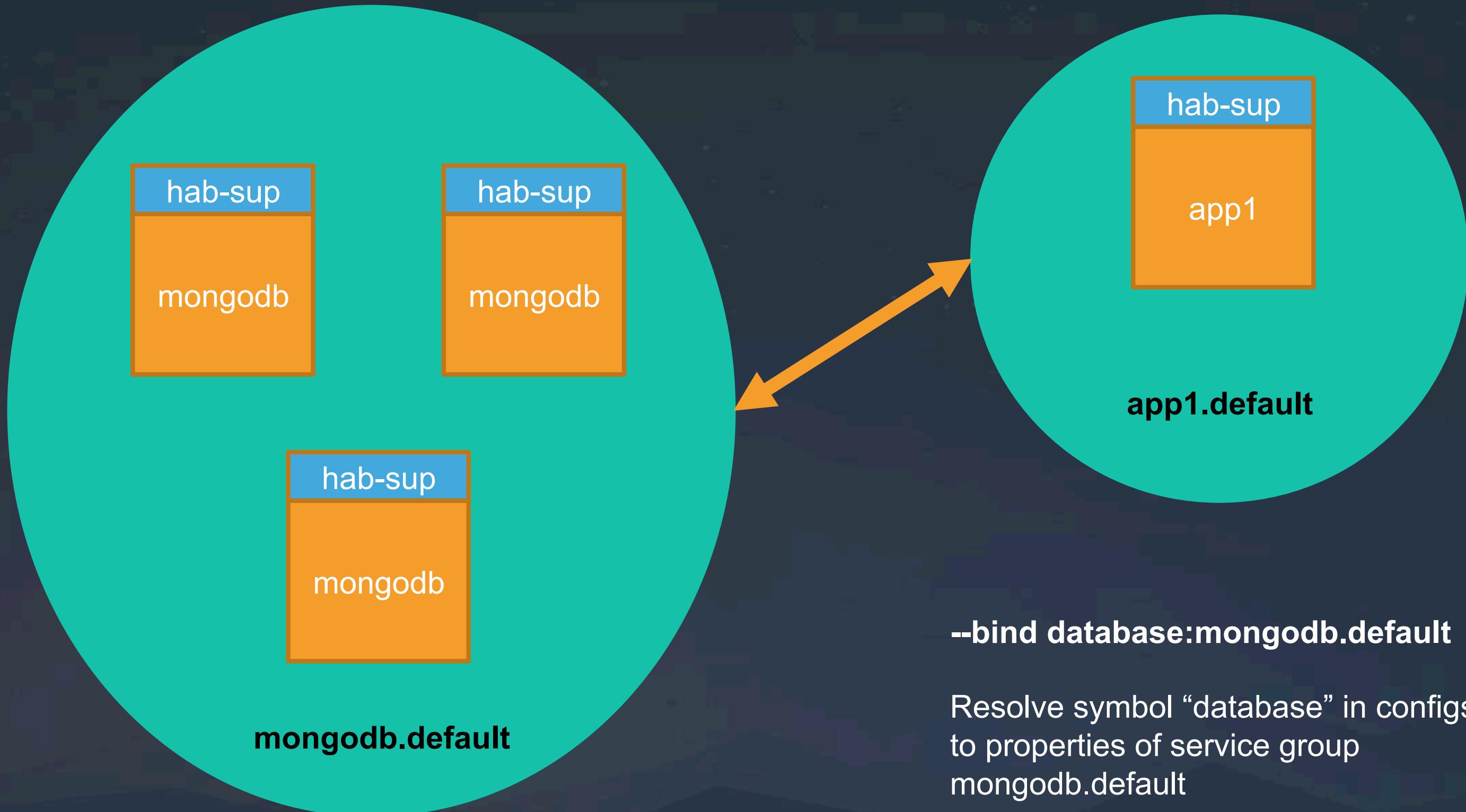


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supervisor in a nutshell

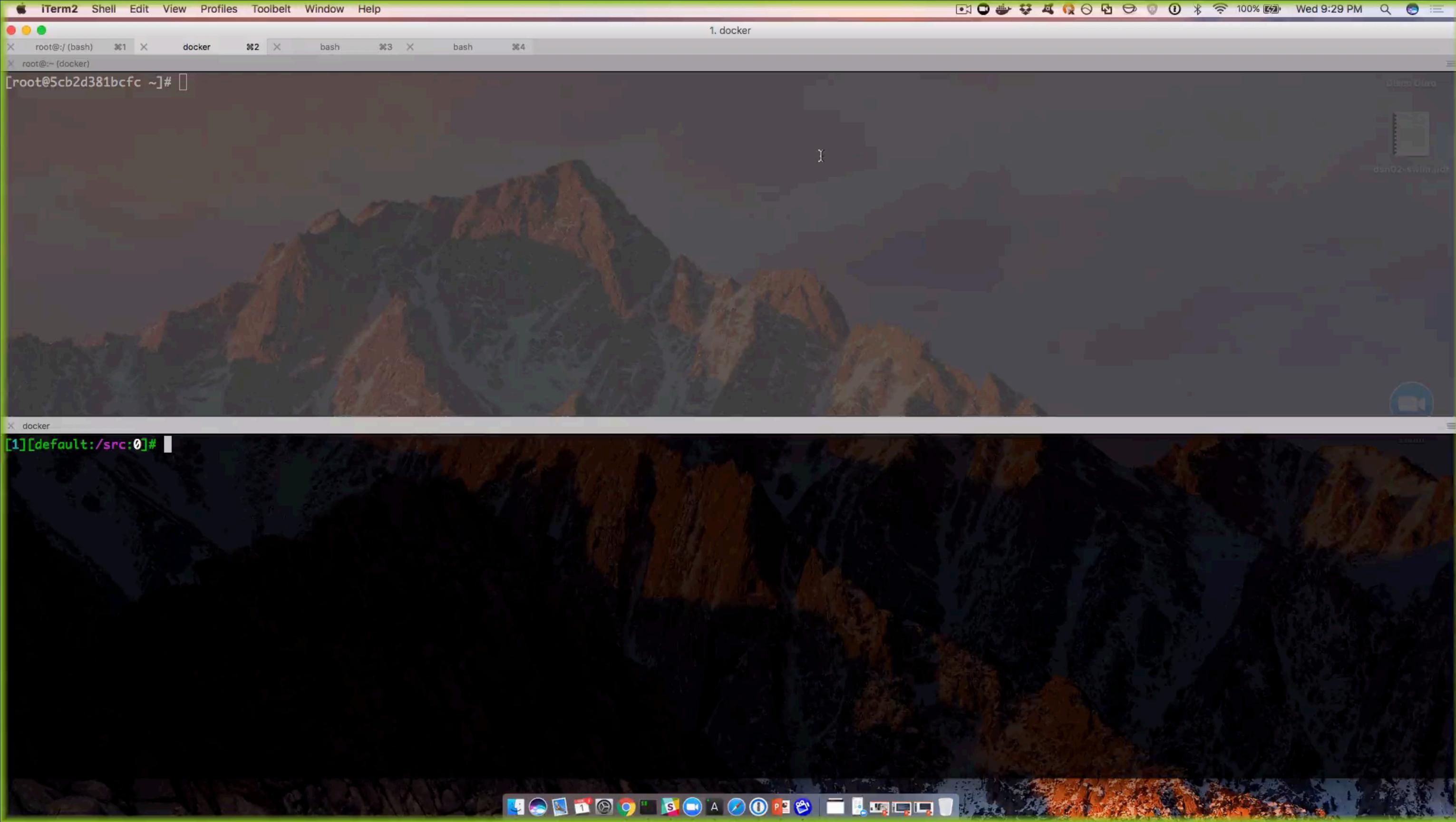
- Network-connected supervision system
- Like systemd+consul/etcd
- Provides a global state for realtime configuration management
- Standard management interface for new and legacy apps



Habitat Supervisor Examples

```
$ hab start jdunn/mongodb
$ hab start jdunn/mongodb --peer 192.168.5.2
$ hab start jdunn/mongodb --topology leader
$ hab start jdunn/mongodb --strategy rolling

# Docker (image=Habitat pkg+sup as
entrypoint)
$ docker run jdunn/mongodb --peer 192.168.5.2
```

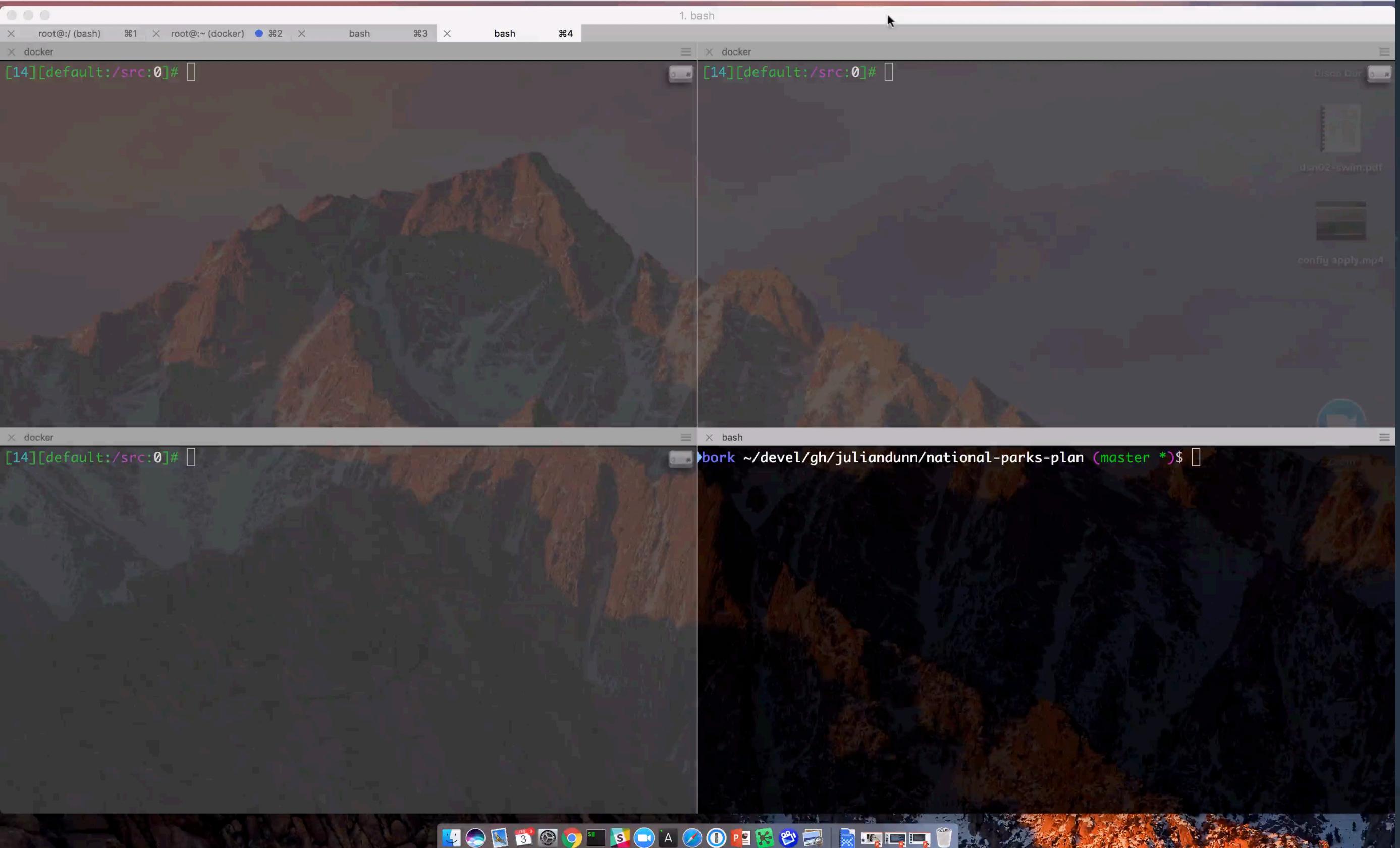


config apply

- Write TOML to override default config values at runtime
- Send new TOML into REST interface of supervisor network
- New config is gossipped around and is persistent for the lifetime of that service group
- Completely masterless

rolling updates

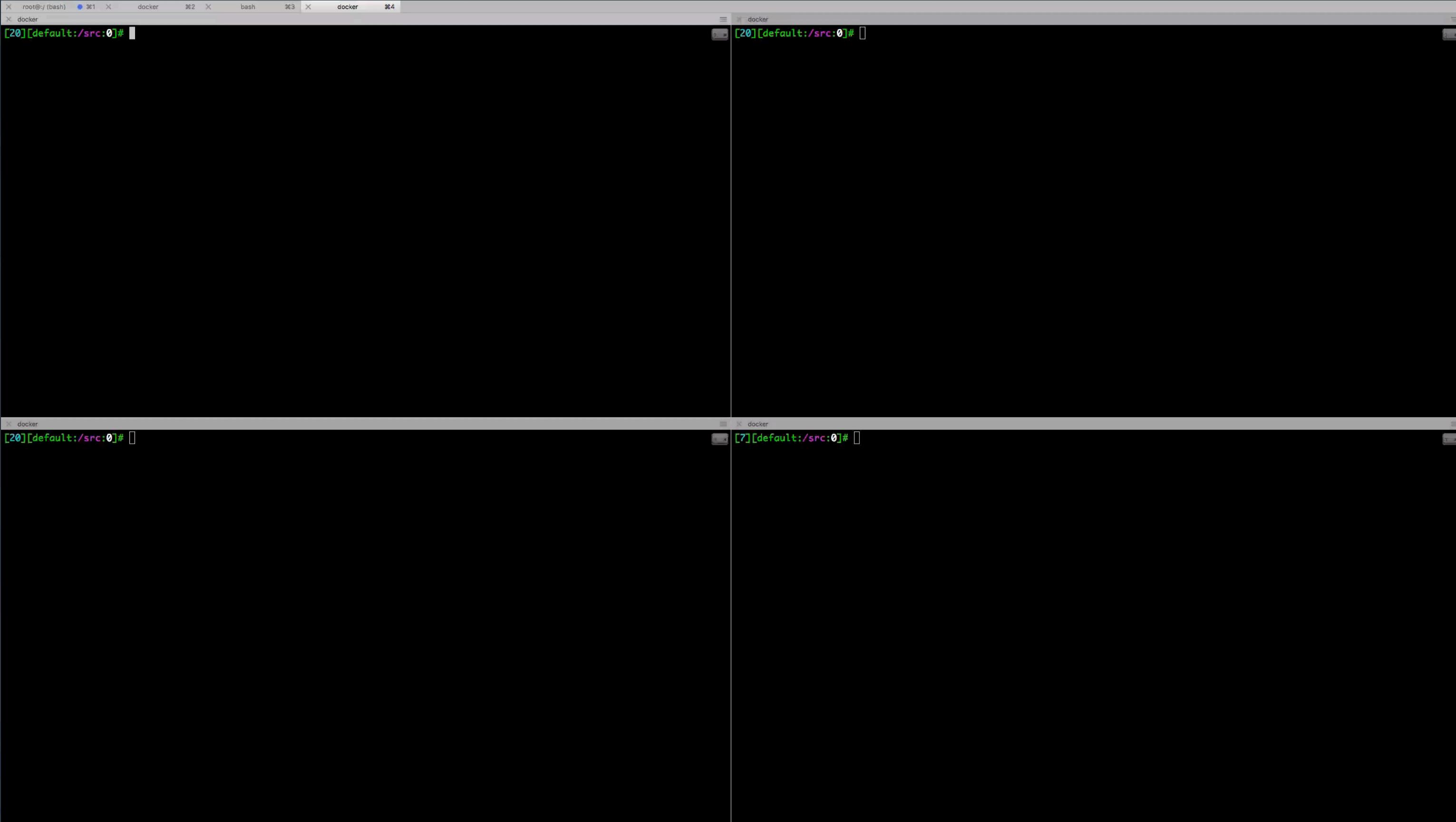
- Service group has --strategy rolling
- Self-election of update leader
- One-at-a-time, starting with leader
- Self-coordinating, no master
- Deployment/reconfig stops if health check fails



leader election

- Leader/follower = application-level leader
- Not a Raft leader. Not needed for Habitat operations, only to support application semantics
- Run the same immutable payload as leader or follower
- Masterless. Supervisor network self-elects leader, rewrites config, re-elects leader if it dies

```
{ { ~#if  svc.me.follower } }
{ { ~#with  svc.leader } }
slaveof  {{ip}}  {{port}}
{ { ~/with } }
{ { ~/if } }
```



leader election + update strategy

- Yes, we can do it!
- We make sure topology leader never wins an update leader election (i.e. update topology leader last)

Wrap Up

- The future is distributed – orchestration is not
- Assert a global state and let members sort it out on their own
- Habitat makes building and running distributed systems easy

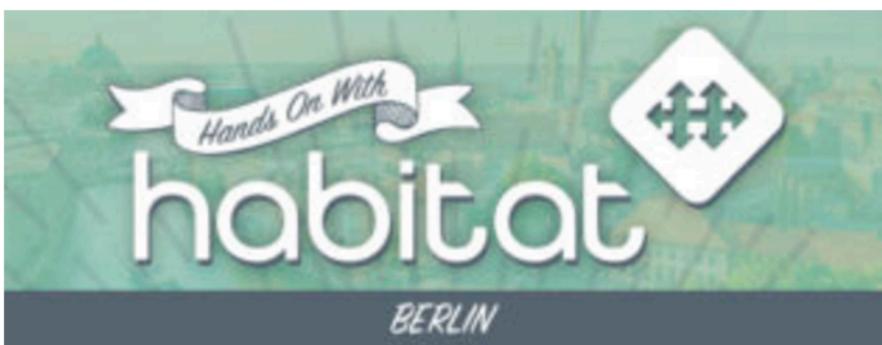


Hands on with Habitat - Gent

February 8th



SchoonMeersen Campus of the
University College Gent
Gent



Hands on with Habitat – Berlin

February 9th



Endocode AG
Berlin



Hands on with Habitat – Amsterdam

February 9th



Container Solutions
Amsterdam

<https://events.chef.io/events/categories/habitat/>



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