



# The Distributed System Toolkit

## Composite Containers for Modular Architectures

Brendan Burns - Google Cloud Platform  
@brendandburns



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JUNE 22-23

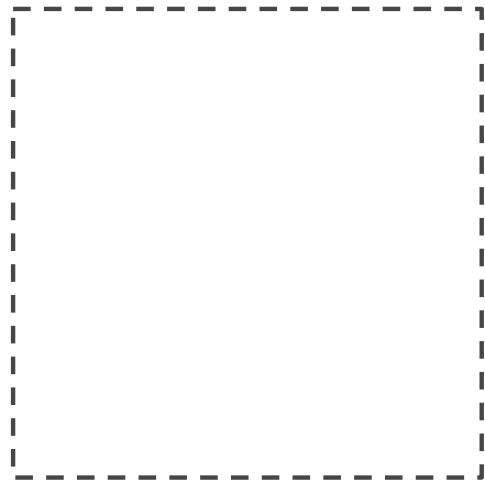


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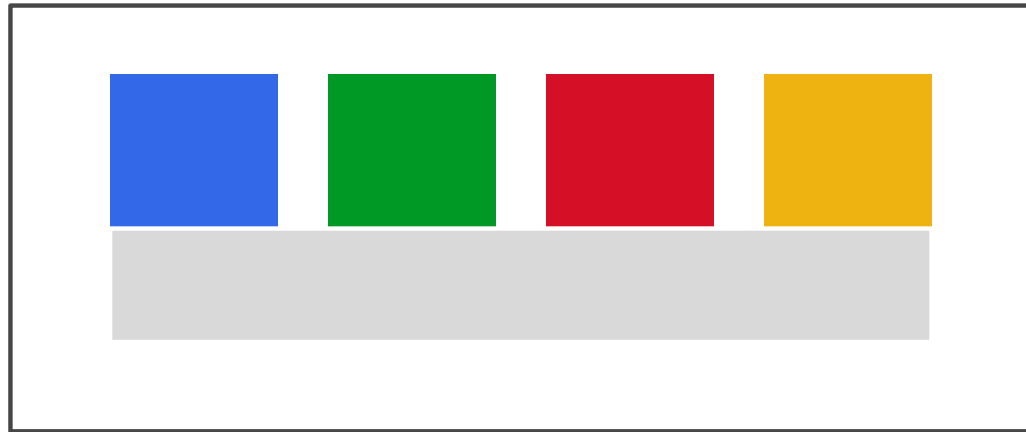
# Modular Container Design



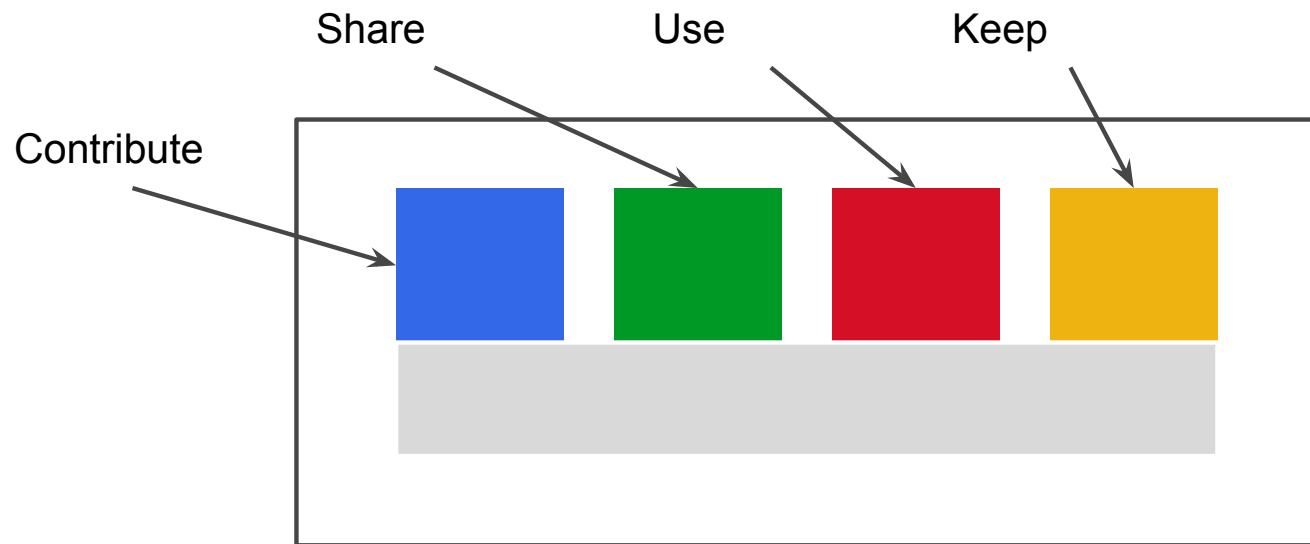
“Good fences make good neighbors” - Robert Frost



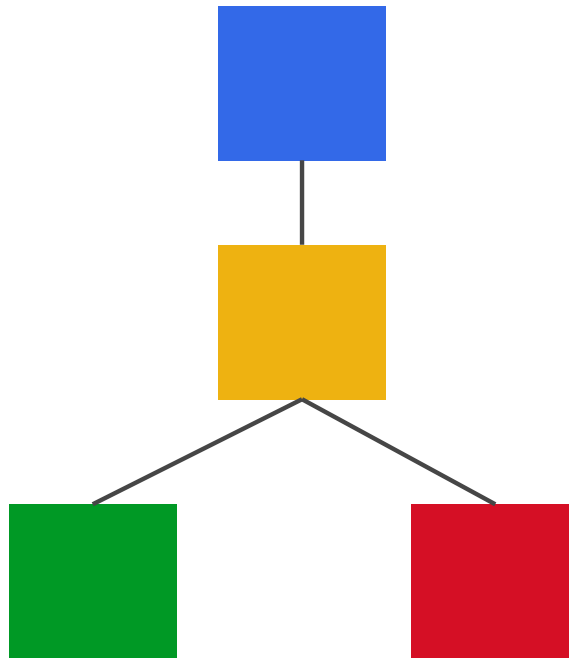
# A Quick Look @ Your Code



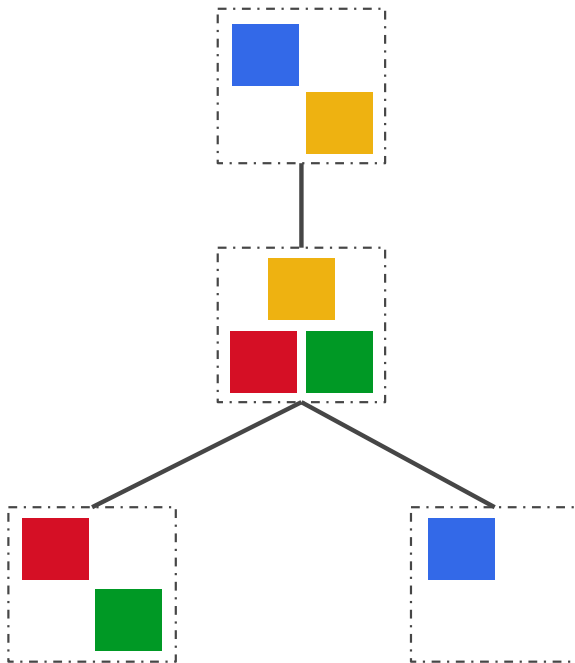
# & Your Code Community



# Quick Look @ Your Cluster



# Your Next App. Design



Don't think of a container as the boundary of your application

A container is more like a class in an object oriented language.

# Benefits...



Build applications more quickly

- Re-use existing containers in more places
- Build things that are easy to use
- Container boundaries are natural boundaries for teams





# Benefits...



Build applications more reliably

- Leverage expert knowledge everywhere
- Only make mistakes once
- Only update the bits that need updating



# Modular Container Design



- Separate concerns (e.g. “webserver”, “git syncher”)
- Build consistent experiences
- Avoid NIH

# Requirements...



Sharing between containers

- Share namespaces (esp. PID, Network and IPC)
- Share filesystems



# Requirements...



Co-scheduling of containers

- Composition requires co-location

# Requirements...



## Parameterization of containers

- Configurable at runtime
- Documented and discoverable

# Patterns...

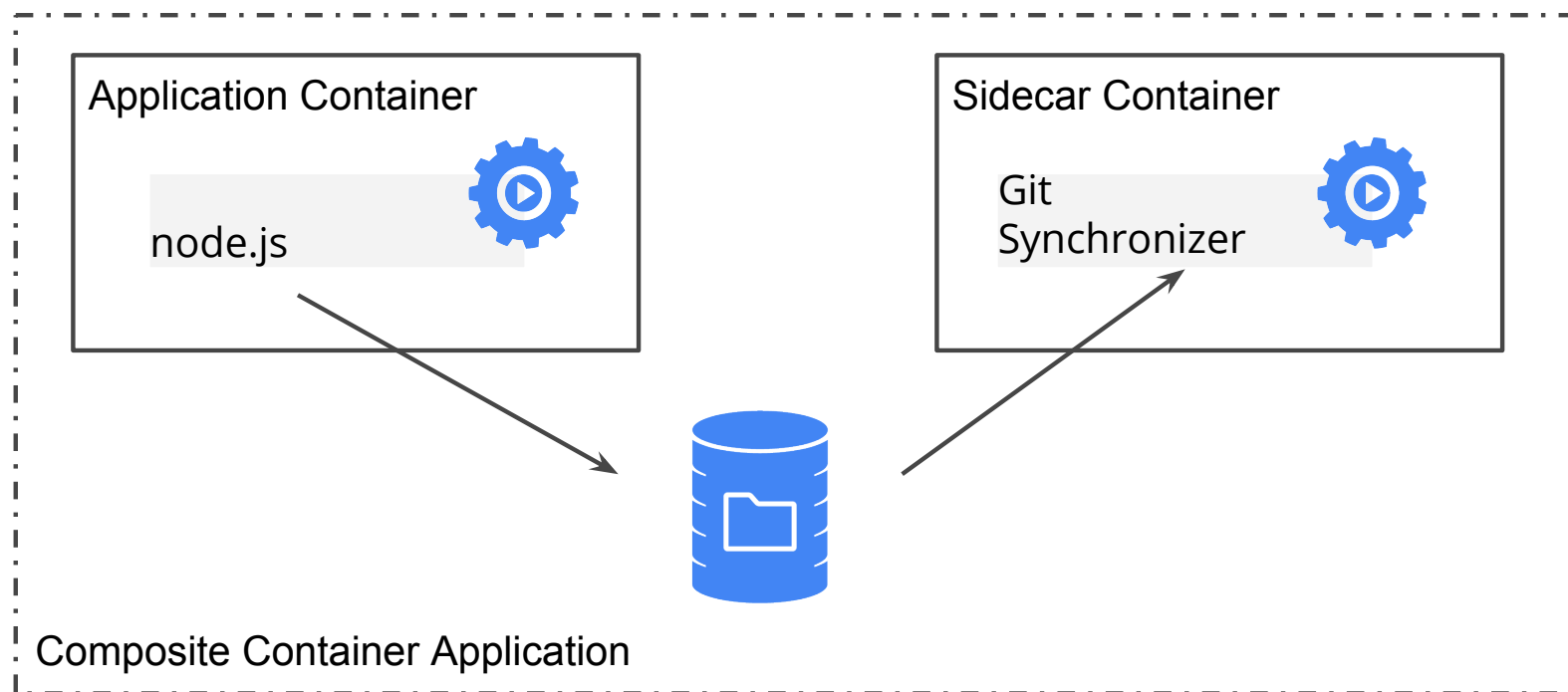


- Don't design in a vacuum!
- Don't think that you are special!
- Do share best practices and ideas!



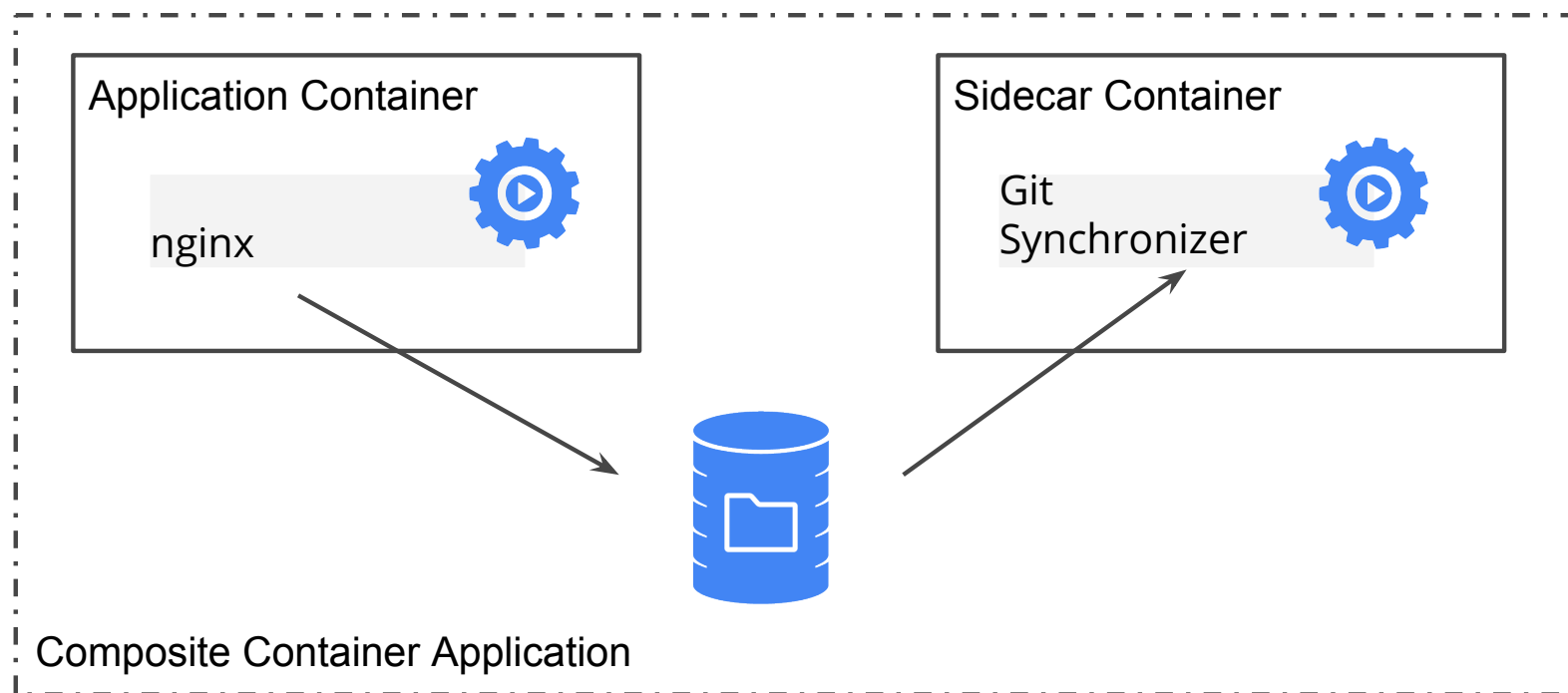
# Sidecars

**Sidecars extend and enhance**



# Sidecar Pattern

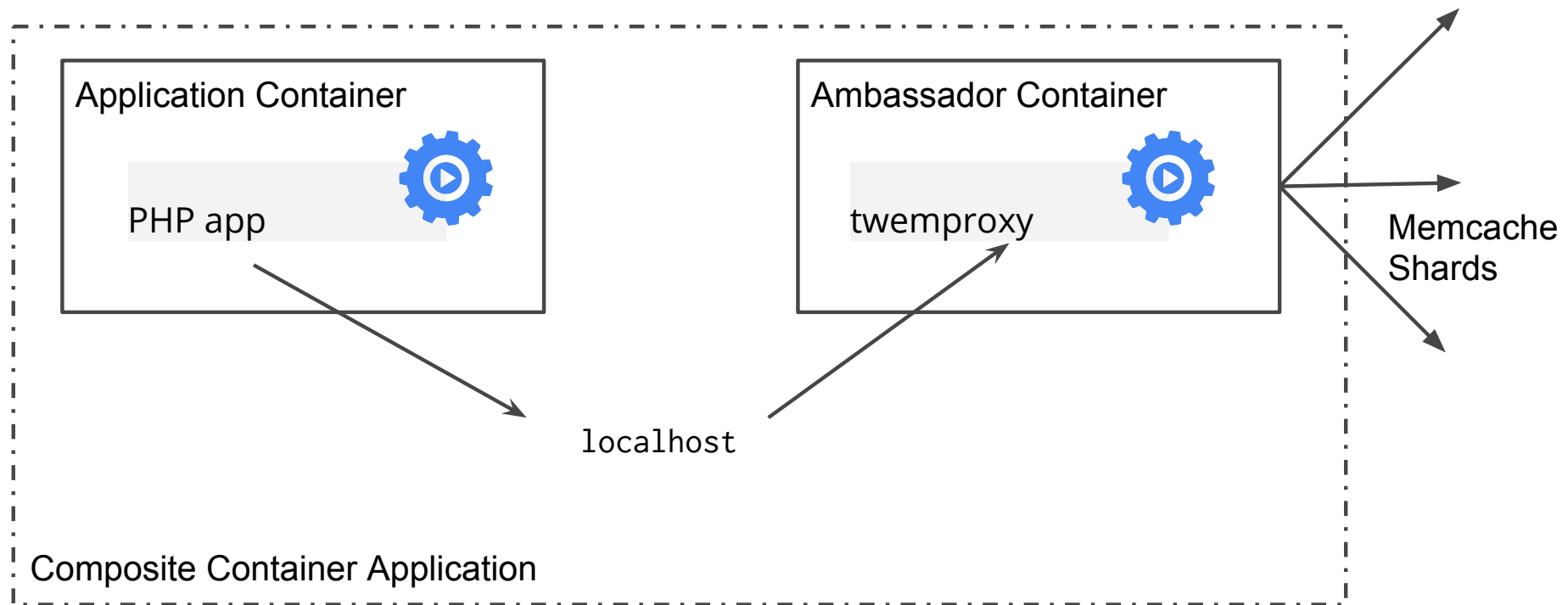
**Sidecars extend and enhance**





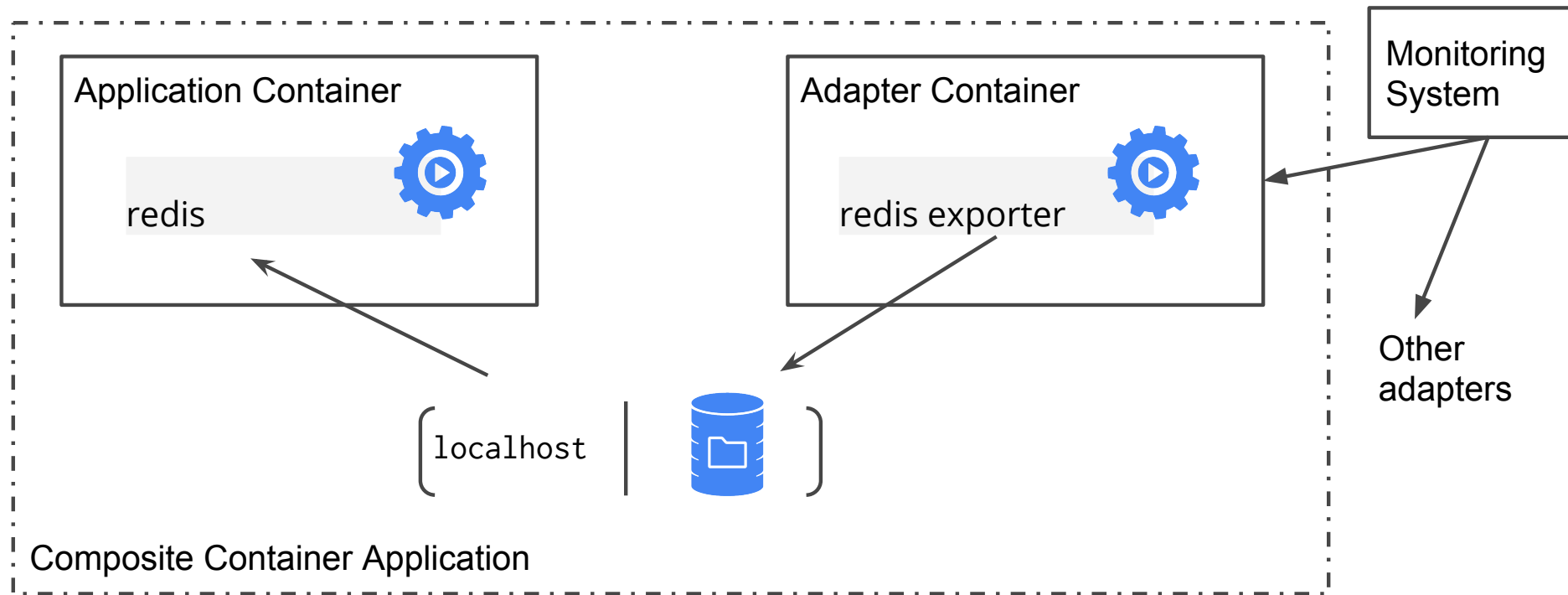
# Ambassador Pattern

Ambassadors represent and present



# Adapter Pattern

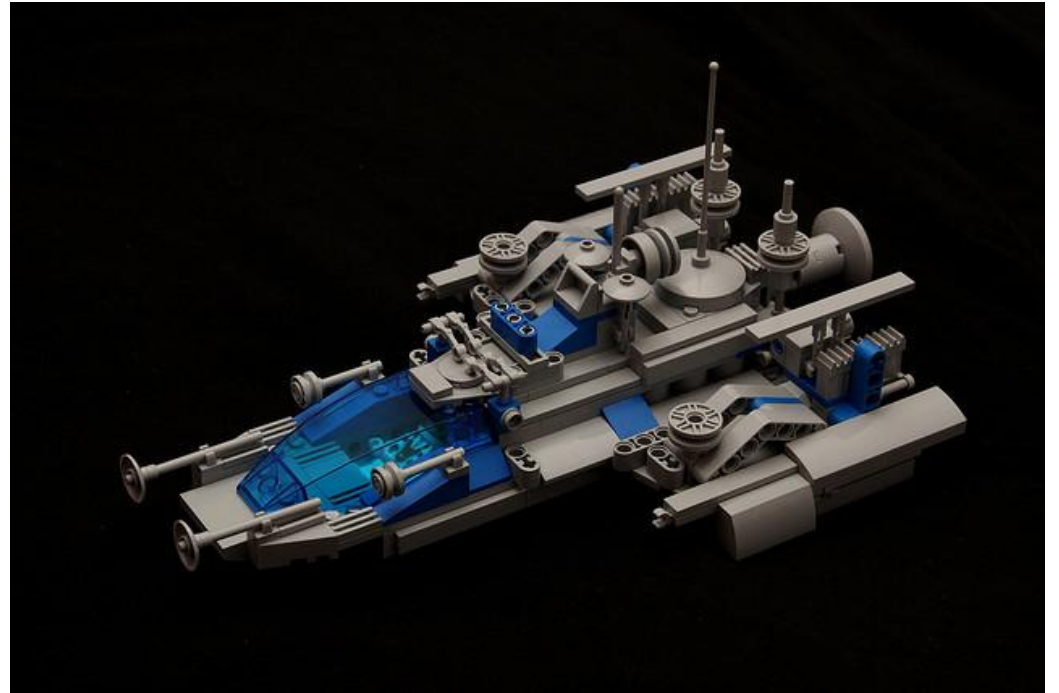
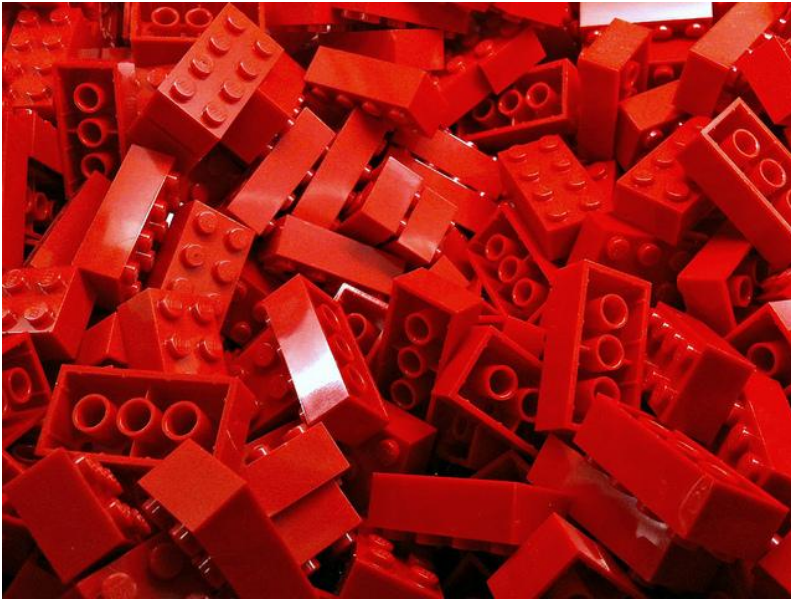
## Adapters normalize and abstract



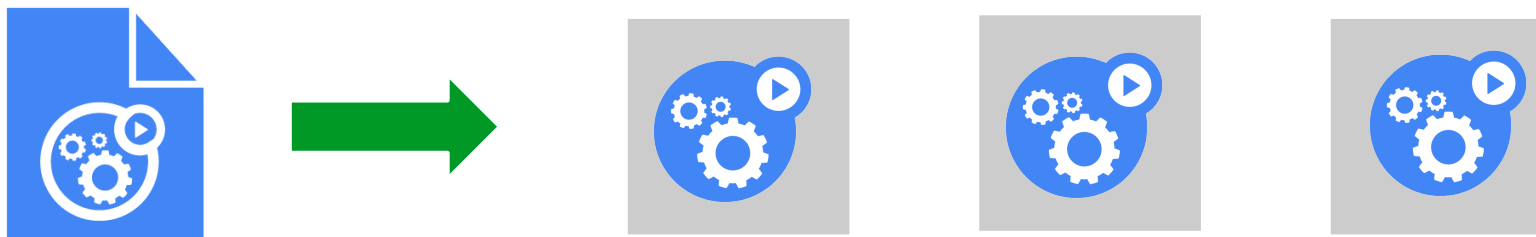
# Demo



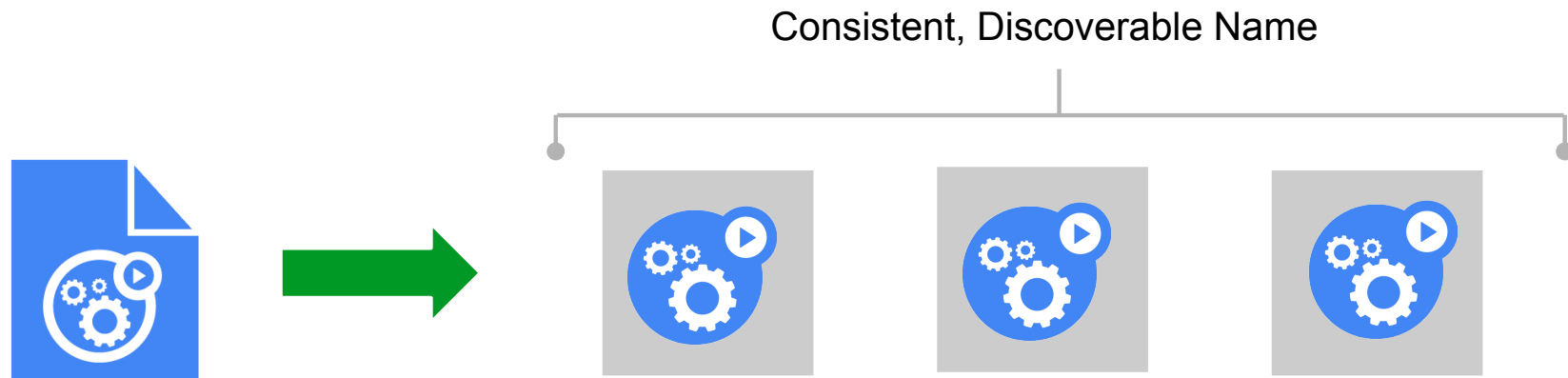
# From Legos to Starships



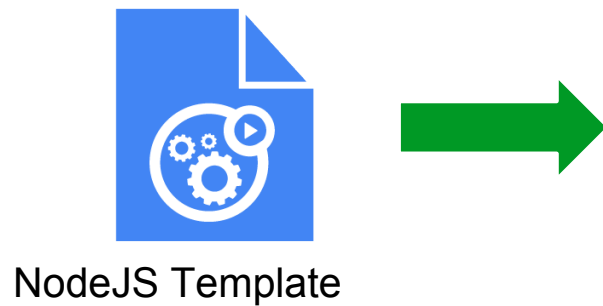
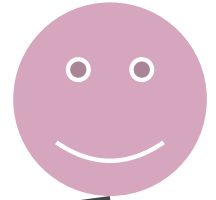
# Replication



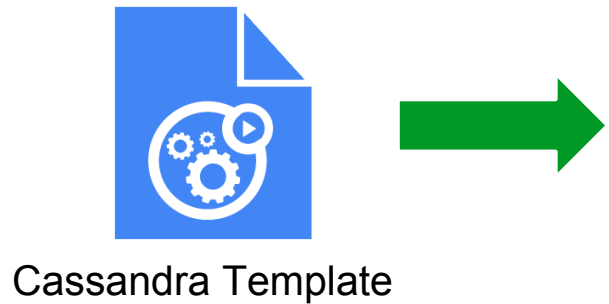
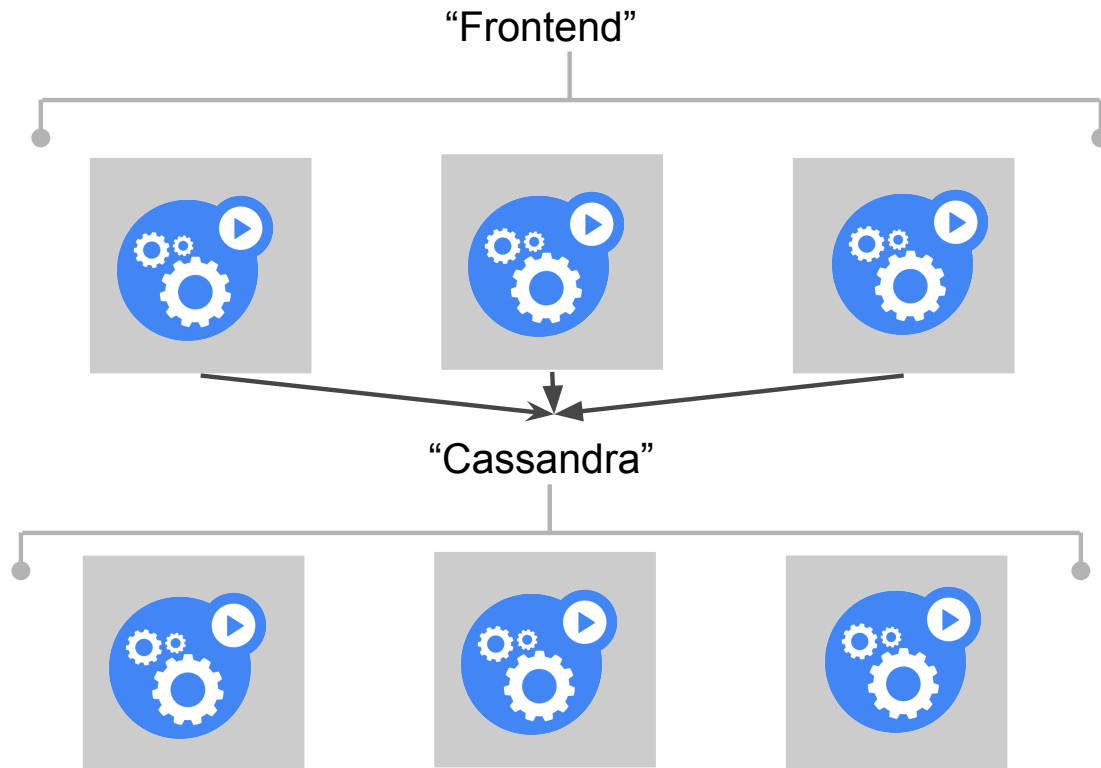
# Micro-Service Load Balancer



# Complete Application



NodeJS Template



Cassandra Template



# Thank you

Brendan Burns

#google-containers - @brendandburns - bburns [at] google.com  
[github.com/GoogleCloudPlatform/kubernetes](https://github.com/GoogleCloudPlatform/kubernetes)



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