Juju - Google Go in a scalable Environment

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Frank Müller

Born 1965 in Oldenburg

Software Development since 1984

Author since 1999

Book about Go in 2011

Introduction

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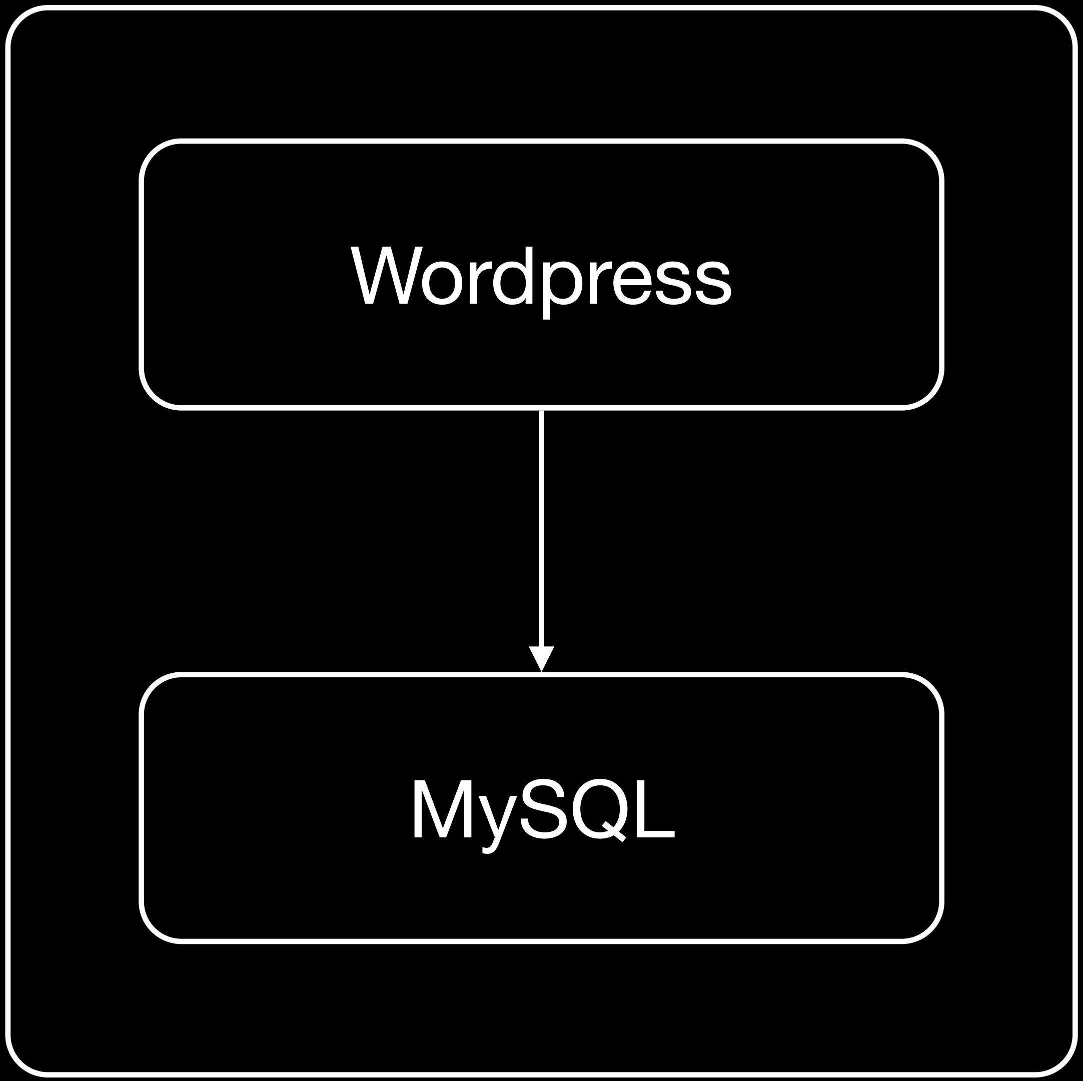

Well known scenario

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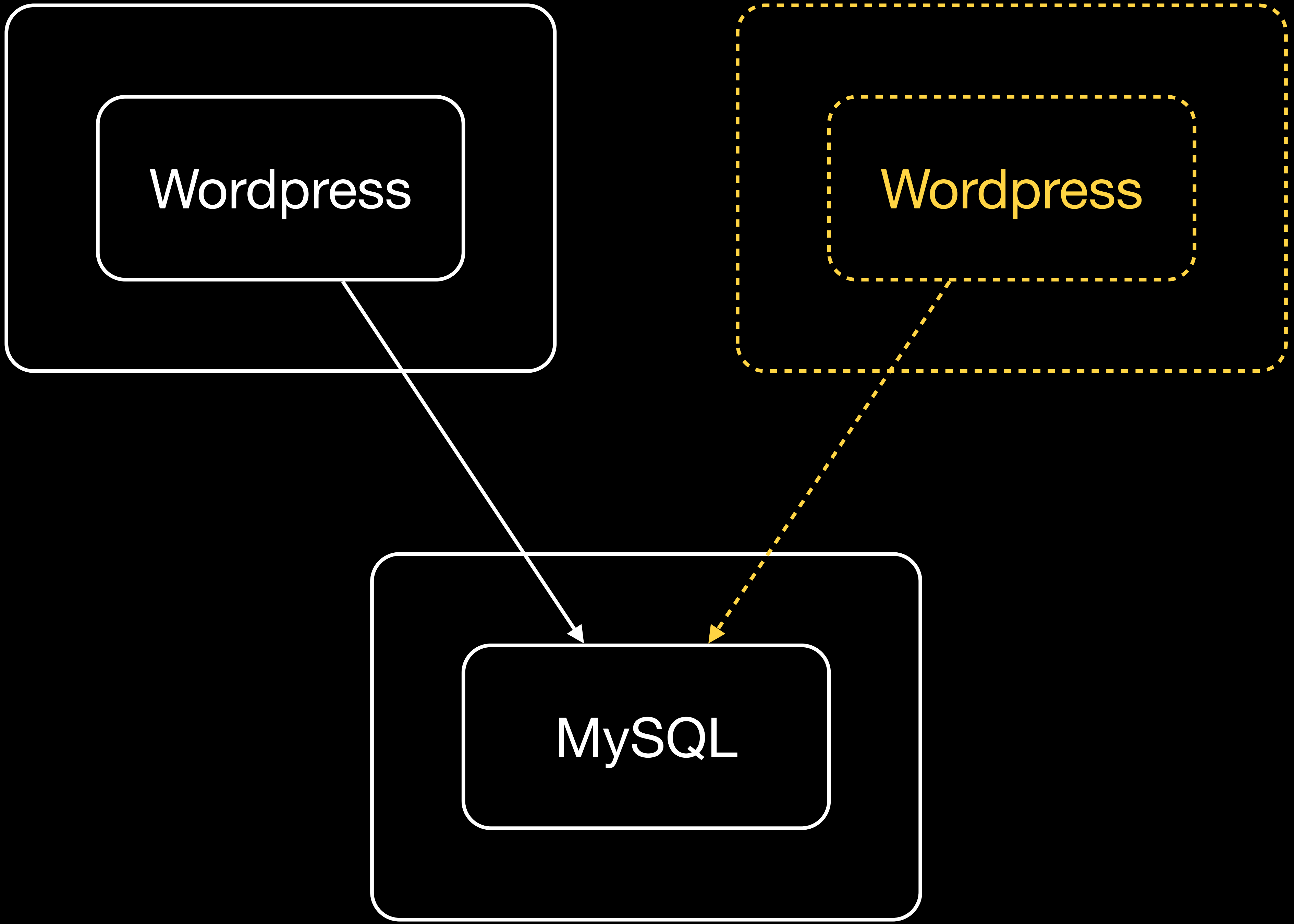

Different in clouds

Scaling means effort

Amazon Web Services

MAAS

Local

OpenStack

Microsoft Azure

Juju for provisioning

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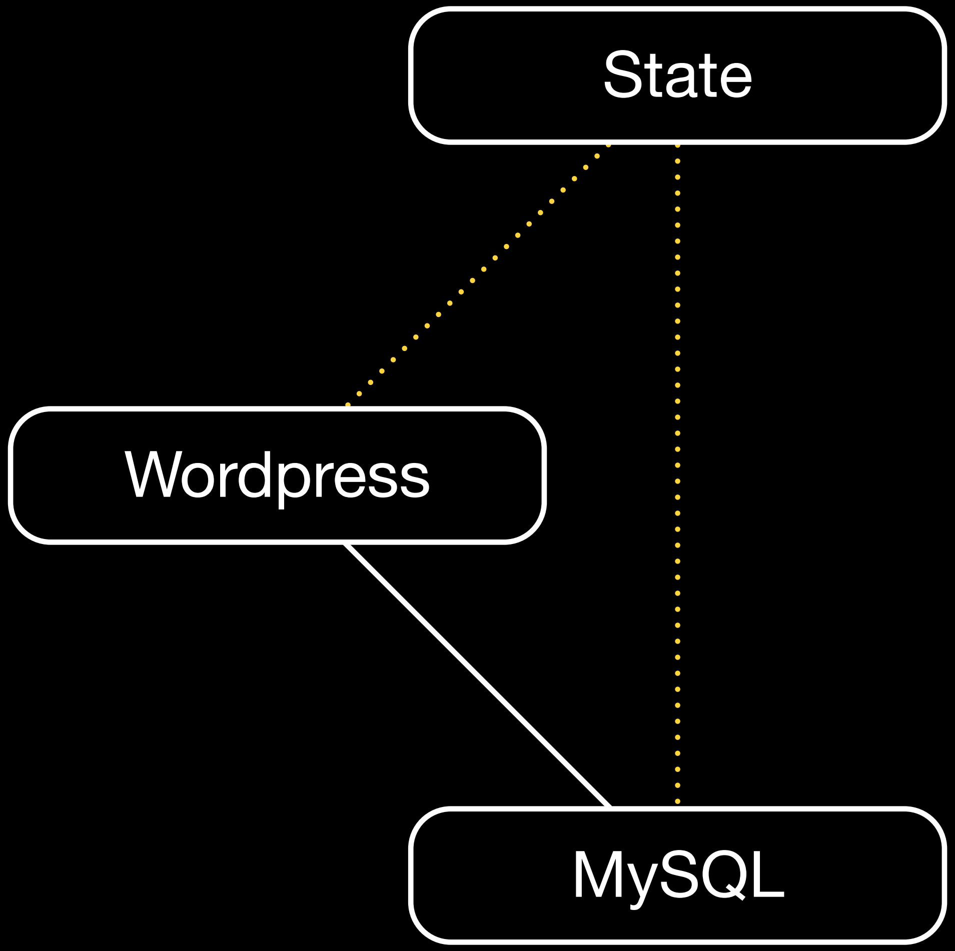
```
juju init -w
juju bootstrap
```

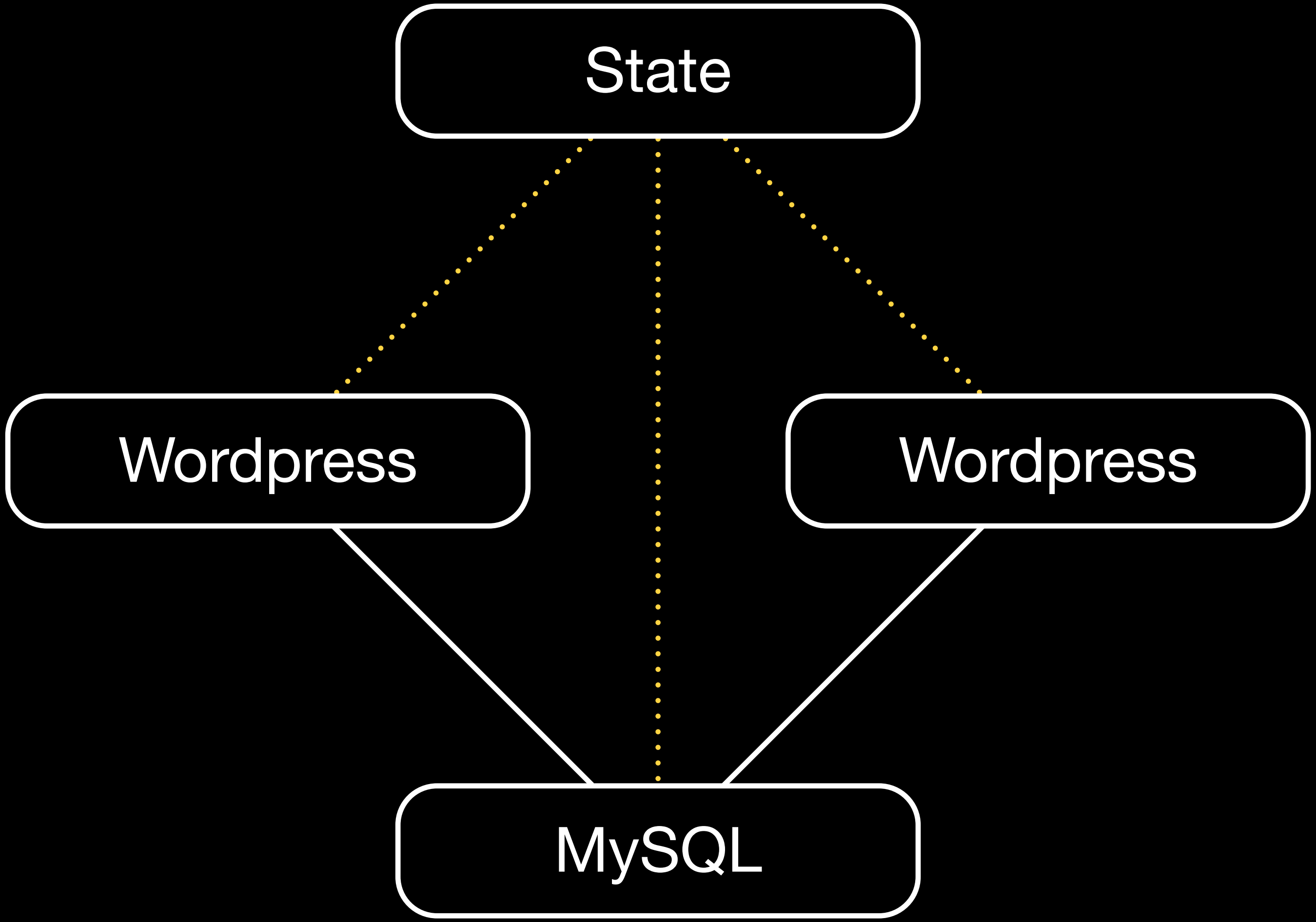
Create your environment

```
juju deploy cs:precise/wordpress
juju deploy cs:precise/mysql
juju add-relation wordpress mysql
```



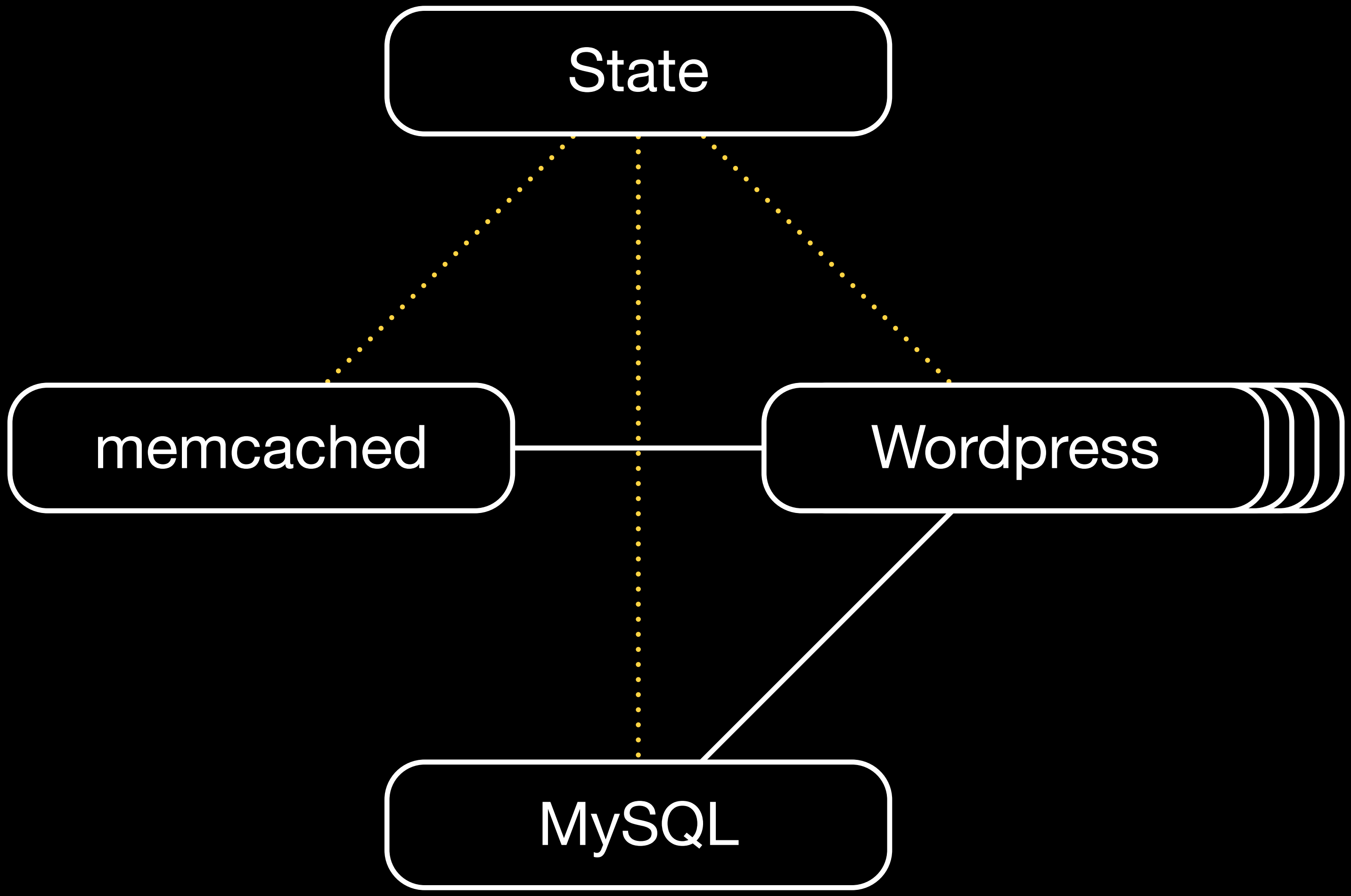
Add and relate services

```
juju add-unit wordpress
```



Add another unit

```
juju add-unit -n2 wordpress
juju deploy memcached
juju add-relation wordpress memcached
```



Scale!

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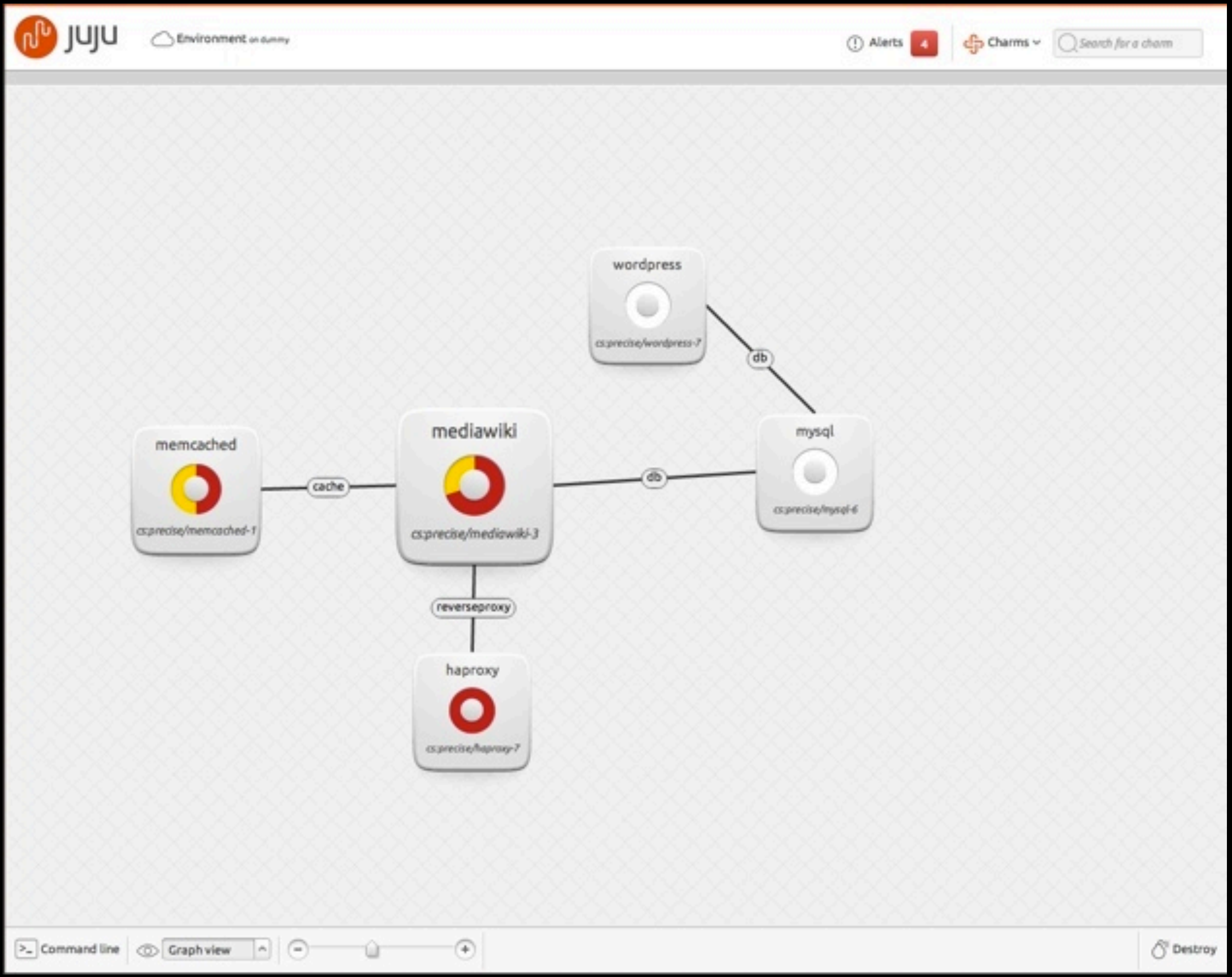

Also web UI available

Why Google Go?

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Architectural insights

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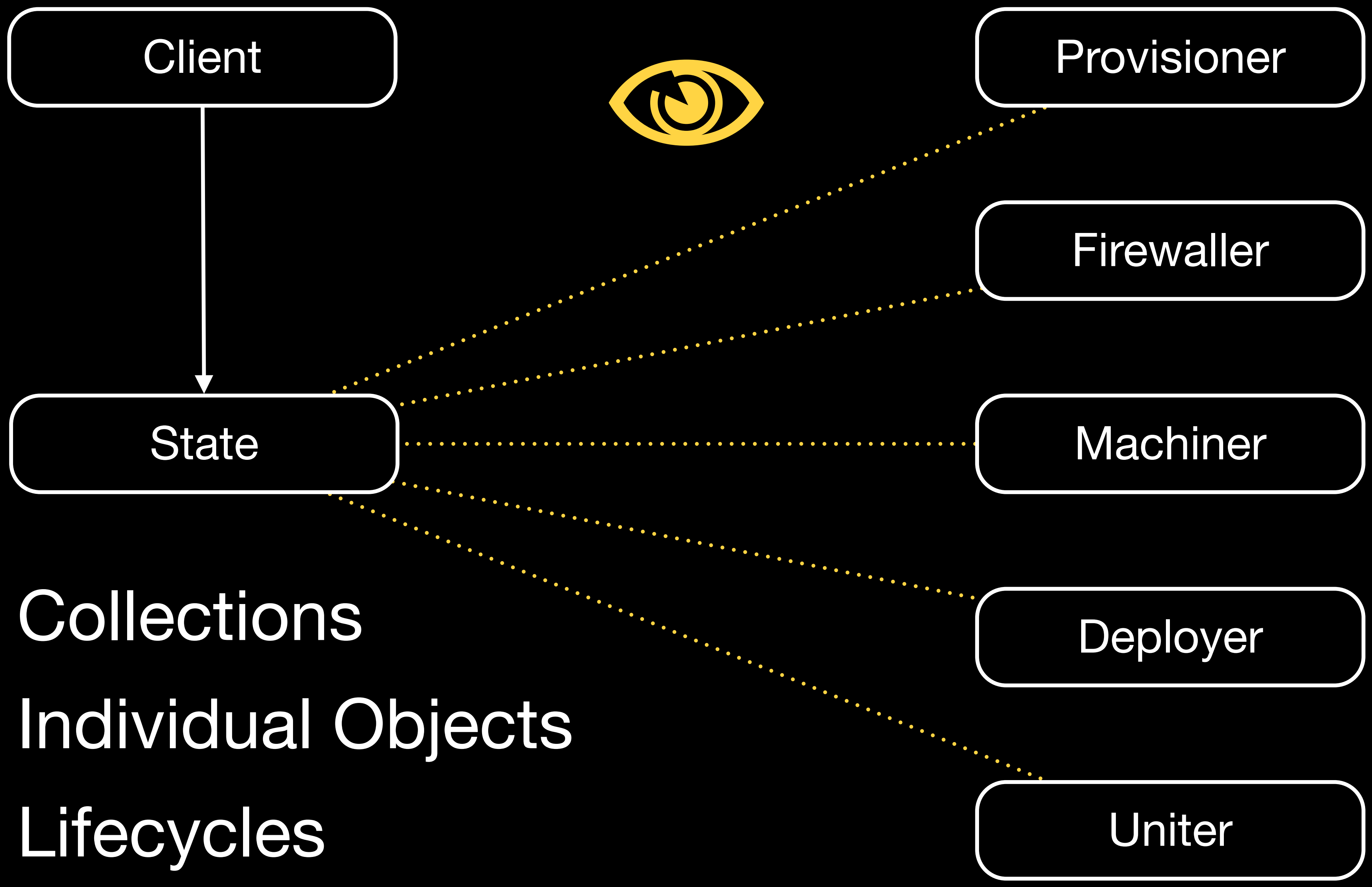

Collections

Individual Objects

Lifecycles

State - Watcher - Worker

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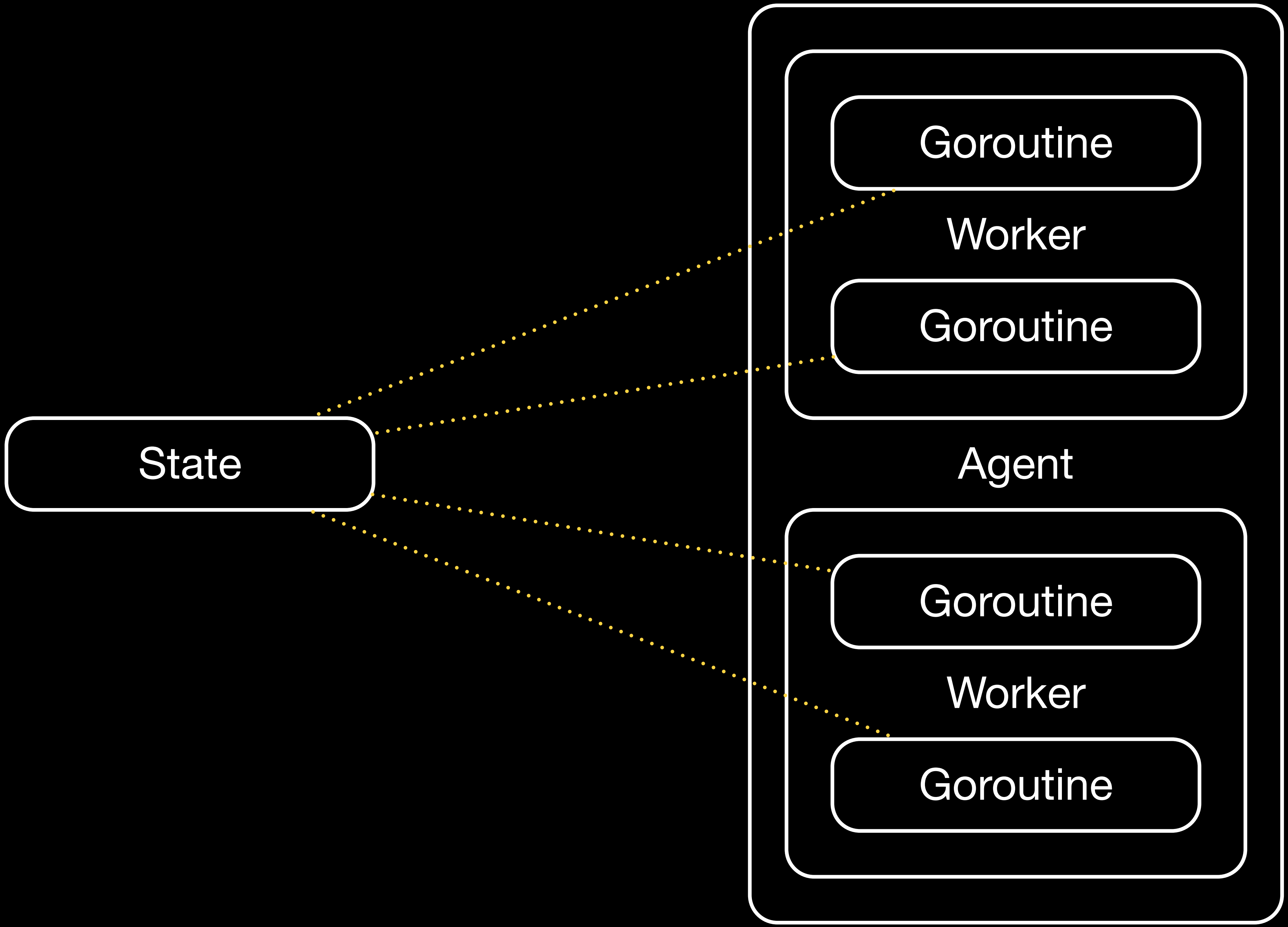
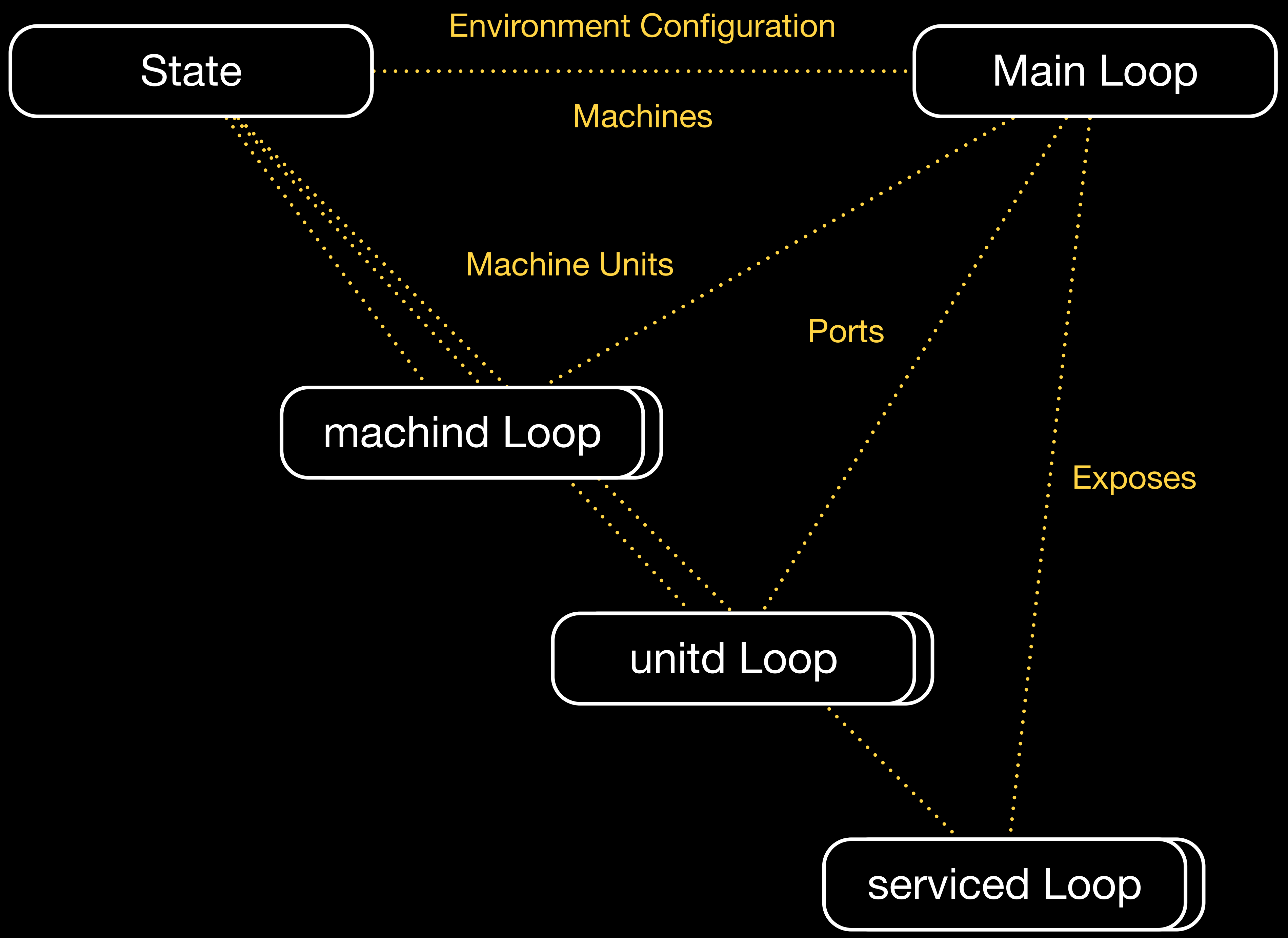


Lots of concurrent work


State
Environment Configuration
Main Loop
Machines
Machine Units
Ports
machind Loop
Exposes
unitd Loop
serviced Loop

Firewaller

Goroutine control

- not part of the language spec
- launchpad.net/tomb
- signals to leave loops
- wait until goroutine stopped
- leave in case of an error
- remember and retrieve that error

Monitoring and stopping

```
// loop processes ...
func (t *T) loop() {
	defer t.tomb.Done()
	for {
		select {
		case <-t.tomb.Dying:
			// Cleanup ...
			return
		case f := <-t.fooChan:
			if err := t.foo(f); err != nil {
				t.tomb.Kill(err)
			}
		case b := <-t.barChan:
			// ...
		}
	}
}
```

Loops with tomb

```
// Stop ends the main loop.
func (t *T) Stop() error {
	t.tomb.Kill(nil)
	return t.tomb.Wait()
}

// Err retrieves the error in case the backend loop died.
func (t *T) Err() error {
	return t.tomb.Err()
}
```

Stop and error handling

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Interfaces

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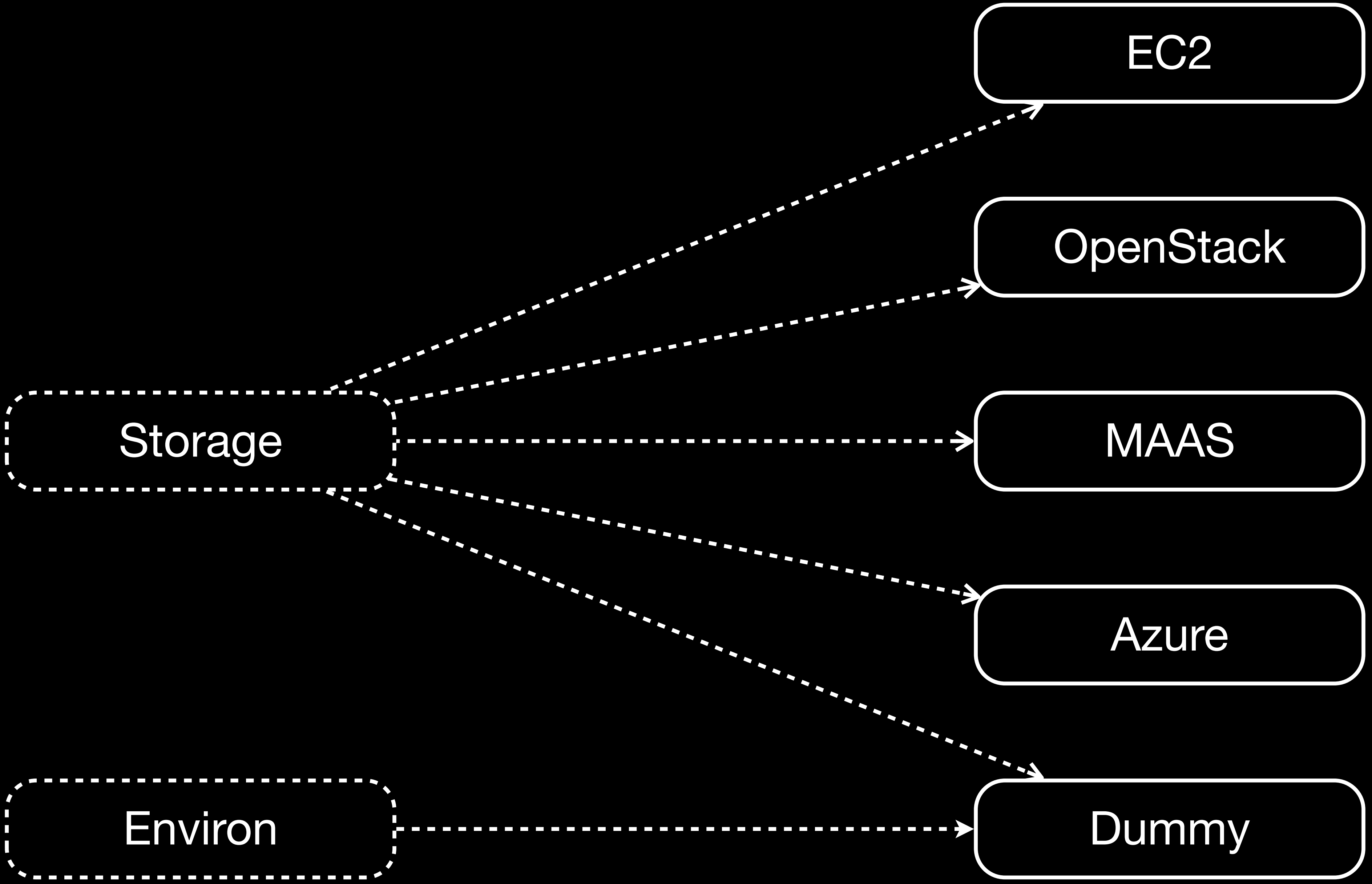
```
type StorageReader interface {
	Get(name string) (io.ReadCloser, error)
	List(prefix string) ([]string, error)
	URL(name) (string, error)
}

type StorageWriter interface {
	Put(name string, r io.Reader, length int64) error
	Remove(name string) error
}

type Storage interface {
	StorageReader
	StorageWriter
}
```

Define behaviors



Like a toolbox

```
type Foo interface {
	DoThis(with That) error
}

type MyFoo struct { … }

func (m *MyFoo) DoThis(with That) error { … }

type MockFoo struct { … }

func (m *MockFoo) DoThis(with That) error { … }

func Bar(f Foo, t That) error {
	return f.DoThis(t)
}
```

Also help in tests

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- extreme fast builds
- cross-compilation
- binaries are simple to deploy
- table-driven tests
- benchmarks and race detection
- go get always takes tip!

What else?

Questions?

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