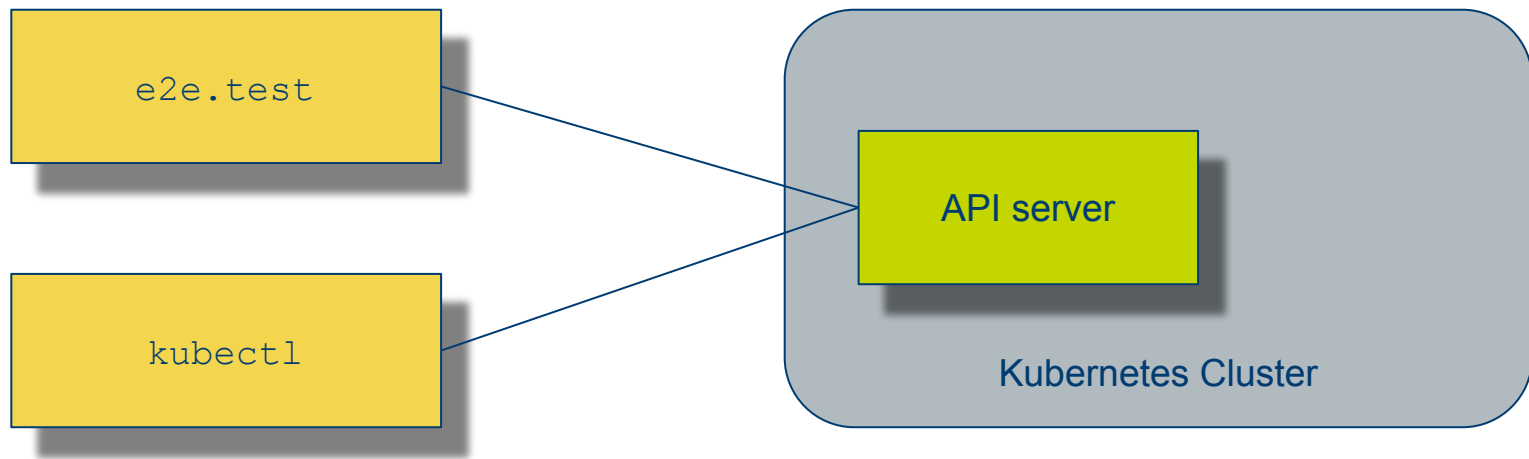


Real Developers Don't Test - But They Should

Patrick Ohly, Intel

End-to-End Testing (E2E)



Anatomy of an E2E Test Suite

Test suite setup:

- parameter parsing
- configuration handling
- connecting and checking cluster
- cleanup

```
var _ = Describe("foobar", func() {  
    f := framework.NewDefaultFramework(  
        "foo-test")  
    It("should do foo", func() {  
        // do foo in f.Namespace  
        cs := f.ClientSet  
    })  
})
```

...

...

Normal command in NFS driver

// <https://github.com/kubernetes-csi/csi-driver-nfs/blob/master/cmd/tests/nfs-e2e.go>

```
package main
import (
    _ "github.com/kubernetes-csi/csi-driver-nfs/test"
    "github.com/onsi/ginkgo"
    "github.com/onsi/gomega"
    "k8s.io/kubernetes/test/e2e/framework"
    "testing"
)
func main() {
    framework.HandleFlags()
    framework.AfterReadingAllFlags(&framework.TestContext)
    gomega.RegisterFailHandler(ginkgo.Fail)
    ginkgo.RunSpecs(&testing.T{}, "CSI Suite")
}
```

“go test” style in PMEM-CSI driver

```
// https://github.com/intel/pmem-csi/tree/devel/test/e2e
package e2e
var _ = ginkgo.SynchronizedBeforeSuite(func() ...)
var _ = ginkgo.SynchronizedAfterSuite(func() ...)
func init() {
    klog.SetOutput(GinkgoWriter)
    framework.HandleFlags()
    framework.AfterReadingAllFlags(&framework.TestContext)
}
func TestE2E(t *testing.T) { ... }
```

Enhancements in Kubernetes

1.13

Splitting out cloud provider code

- SDKs for AWS, Azure, GCE, etc.
pulled in by `e2e/framework`
- Now in optional packages:
`e2e/framework/providers`
- To be removed from `k8s.io/kubernetes`
- Simplified vendoring,
but still fairly large dependency chain



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Parameters

- Decentralized,
no need to modify E2E context
- Defined with `flag` package
- Value available *only* inside `It` callback
- [e2e/framework/config](#) for complete structs

```
import "flag"
```

```
var instances = flag.IntVar(  
    "my.test.instances", 5,  
    "number of foo instances")
```

```
It("works", func() {  
    for i := 1; i <= *instances; i++ {  
        }  
    })
```


Viper configuration file

- Optional, enabled in boilerplate code
- Sets all parameters defined via flag
- Can handle full file path
- To be replaced?
- .yaml example:

```
my:
  test:
    instances: 5
    cluster: "somewhere"
```

```
import "../e2e/framework/viperconfig"

var viperConfig =
flag.String("viper-config",
            "", "name of a viper config
file")

func init() {
    framework.HandleFlags()

    if err := viperconfig.ViperizeFlags(
        *viperConfig, "e2e"); err != nil {
        fmt.Fprintln(os.Stderr, err)
        os.Exit(1)
    }
    ...
}
```

Load data files

- Unified API for tests
- Load from
 - files
 - bindata (optional)

```
import ".../e2e/framework/testfiles"

It("works", func() {
    str := string(testfiles.ReadOrDie(
        "my/test/file.txt",
        ginkgo.Fail))

    ...
})
```

Create items from .yaml or .json

- Like “`kubectl create`”
- Renames global items or sets namespace -> avoids conflicts between parallel tests
- Custom modifications possible

[.../e2e/framework/create.go:](https://github.com/kubernetes/kubernetes/blob/master/pkg/kubectl/cmd/create.go#L200)

```
func myPatchFunction(item interface{}) error {  
    ....  
}  
  
cleanup, err := f.CreateFromManifests(  
    myPatchFunction,  
    “my-items.yaml”,  
    “more-items.json”)  
  
cleanup()
```

Enhancements in Kubernetes 1.14

Test external CSI drivers

- Reusable “storage” testsuites:

<https://github.com/kubernetes/kubernetes/tree/v1.14.0/test/e2e/storage/testsuites>

https://github.com/intel/pmem-CSI/blob/56d9f7dc5/test/e2e/storage/csi_volumes.go

- Test installed storage driver:

<https://github.com/kubernetes/kubernetes/tree/master/test/e2e/storage/external>

- Apply csi-sanity testing against installed driver:

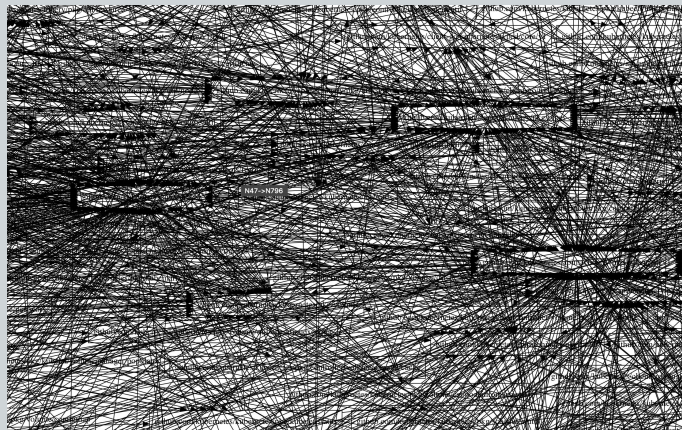
<https://github.com/intel/pmem-CSI/pull/228/commits/56d9f7dc5132d9f38dd125823c5e01c9a891d66c>

Enhancements in the future

Code cleanup and enhancements

- Simplify package dependencies
- Reduce `golint` errors
- Better API and API documentation
- Move into its own k8s.io repo

1.13 dependency graph for e2e/framework,
by John Schnake



Build and test something

- Blog about the topic:

<https://kubernetes.io/blog/2019/03/22/kubernetes-end-to-end-testing-for-everyone/>

- Join the testing-commons subproject of SIG-testing

<https://github.com/kubernetes/community/tree/master/sig-testing#subprojects>



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