

## Help Wanted!



- minikubes first principle is inclusive and community-driven, and we take this to heart.
- We know minikube could be better. That's why we're here.
- We could use your help!
- We are happy to hold your hand and turn you into a Kubernetes contributor

Who are y'all?



Medya Ghazizadeh



Sharif El-Gamal



Thomas Strömberg

Shout-out to @RA489, who's Visa was denied :(

# Principles

Simple local Kubernetes, for day-to-day development & learning.

- Inclusive and community-driven
- User-friendly
- Support all Kubernetes features
- Cross-platform
- Reliable
- High Performance
- Developer Focused

## Help Wanted!



- minikubes first principle is inclusive and community-driven, and we take this to heart.
- We know minikube could be better. That's why we're here.
- We could use your help!
- We are happy to hold your hand and turn you into a Kubernetes contributor

## The Origin Story



“ The most powerful magic is in the knowledge of the origin word. To know the birth and breeding of a thing or person, to reveal it, to recite it, and name it is to have power over it. ”

*Eino Friberg, The Kalevala: Epic of the Finnish People*

## Chesterton's Fence

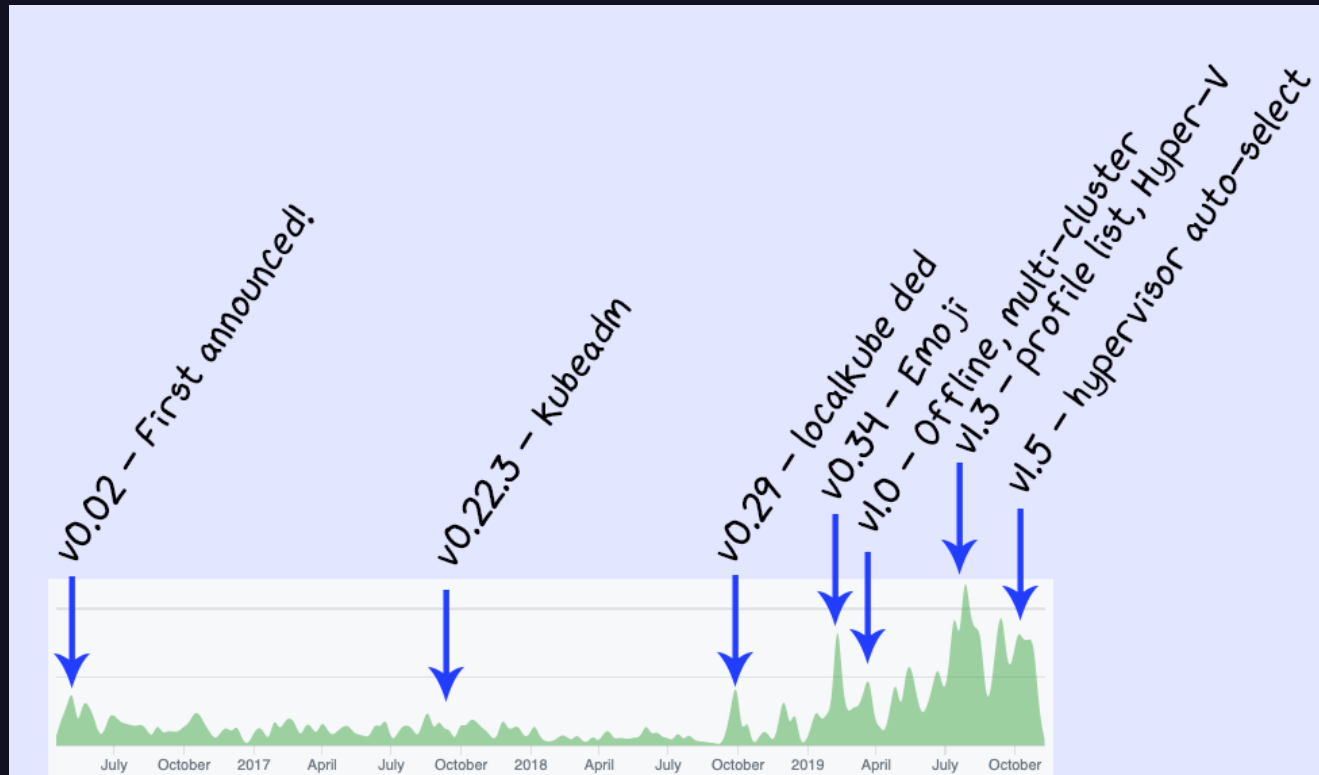


“ The more modern type of reformer goes gaily up to it and says, "I don't see the use of this; let us clear it away". To which the more intelligent type of reformer will do well to answer: "If you don't see the use of it, I certainly won't let you clear it away. Go away and think. Then, when you can come back and tell me that you do see the use of it, I may allow you to destroy

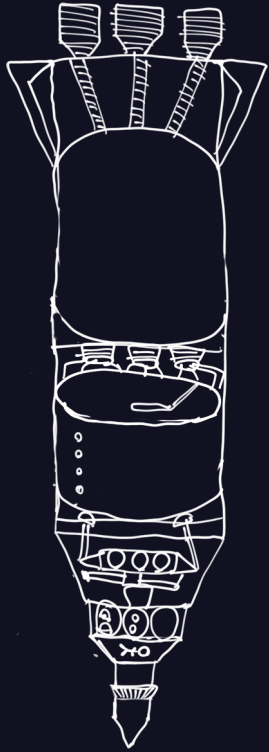
”

*G. K. Chesterton, The Thing*

# minikube: the origin story



# minikube architecture



T-85: start -> libmachine -> hyperkit VM  
T-62: cluster -> ssh, sync time, CRI  
T-60: cache -> load images into CRI  
T-41: bootstrapper -> install kubeadm  
T-40: kubeadm -> pull  
T-28: kubeadm -> init  
T-8: bootstrapper -> wait for apiserver  
T-0: kubeconfig -> set context



# Support Matrix

	Continuously Tested	Supported	May require work	Planned			
k8s	1.17	1.16	1.15	1.14	1.13	1.12	1.11
runtime	Docker	CRI-O	containerd	gvisor	kata		
bootstrapper	kubeadm		kic				
Drivers	VirtualBox	KVM2	HyperKit	HyperV	none		
	Parallels	VMware	Docker	Podman	Firecracker		
OS	Linux	MacOS	Windows	FreeBSD			
Architecture	amd64	arm64	s390x				

## minikube vs prod

- The master allows jobs to be scheduled
- Node won't resolve Kubernetes DNS records (pods can though!)
- More likely to OOM due to 2GB default memory size (`--memory`)
- Defaults to Docker runtime, allows direct image pushes

## minikube vs others

“ minikube is what we recommend when you're willing to pay some overhead for a more high-fidelity cluster ”

*Tilt's guide to cluster selection*

- The most full-featured local Kubernetes
- Easily run different Kubernetes versions, container runtimes, and controllers
- Build images in-cluster with minikube docker-env
- Developer-focused: LoadBalancer, addons, dashboard.

## minikube vs others, Cont.

### Cons

- High overhead – you'll want to shut minikube down when not in use
- Running within a VM makes Kubernetes performance slower
- Hypervisors can be difficult to configure

## Start Latency

On macOS (hyperkit): 1 minute 40 seconds. About 30 seconds of that is spent on VM.

- 
- T-100: Start Countdown
- T-70: VM is created
- T-50: Images, binaries loaded
- T-50: Images, binaries loaded
- T-0: Pod.List API with results

## Since KubeCon North America 2019

- Defaults to best available local hypervisor
- Automatic driver download and installation
- Available in 6 languages: de, es, en-US, fr, ja, pl, zh-CN
- Stable multi-cluster support (`profiles`)
- More command line options: `delete --all`, `--addon`, `-f json`
- Detection of network faults
- Improved proxy support
- Support for image mirrors
- kubectl version incompatibility detection

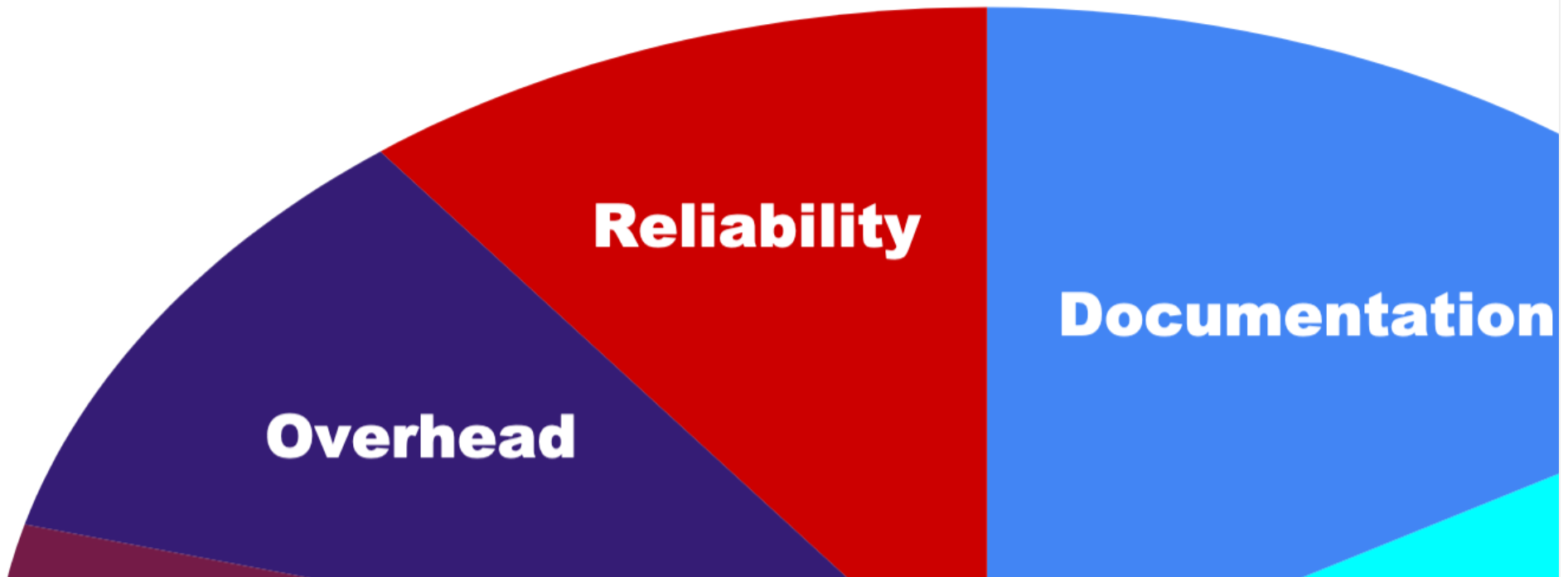
# minikube today

```
bash ~.
Darwin tstromberg-macbookpro.roam.corp.google.com 18.7.0 x86_64
14:02 up 2 days, 7:49, 2 users, load averages: 17.05 14.18 7.
~ /s/demoit *... minikube-deep Sat Nov 16 14:02:
~ /s/demoit *... minikube-deep
```

```
code ~ src
cmd/start.go x pkg/hyperkit.go pkg/docker.go pkg/kubeadm.go
1 /*
2 Copyright 2016 The Kubernetes Authors All rights reserved.
3
4 Licensed under the Apache License, Version 2.0 (the "License"
5 you may not use this file except in compliance with the License.
6 You may obtain a copy of the License at
7
8     http://www.apache.org/licenses/LICENSE-2.0
9
10 Unless required by applicable law or agreed to in writing, software
11 distributed under the License is distributed on an "AS IS" BASIS,
12 WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either expressed or
13 implied. See the License for the specific language governing permissions
14 and limitations under the License.
15 */
16
17 package cmd
18
19 import (
20     "encoding/json"
21     "fmt"
22     "math"
23     "net"
24     "net/url"
```

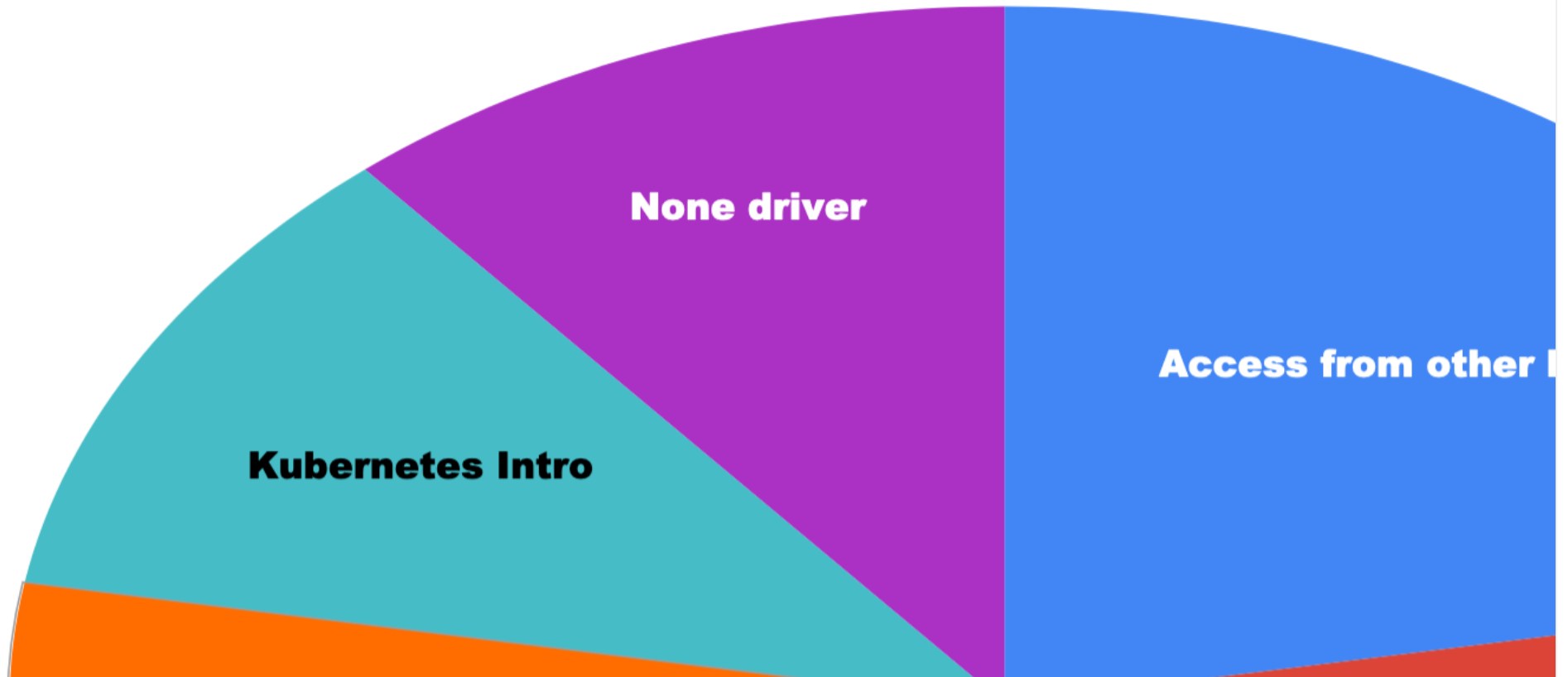
## What users want to see changed

Surveys are critical for user understanding.





# Documentation



# Features

**Multi-node**

A diagram consisting of a semi-circle with a flat bottom edge. The semi-circle is divided into two equal halves by a vertical line. The left half is filled with a solid yellow color, and the right half is filled with a solid blue color. The text 'Multi-node' is written in bold black font within the yellow region.

## Y U FAIL?

- #1: None driver compatibility (6x)
- #2: Great Firewall of China (3x)
- #3: Nested virtualization(2x)
- #4: None driver - incomplete cleanup (2x)
- #5: VirtualBox/Hyper-V conflict (2x)
- #6: Services confusion (2x)
- #7: KVM/libvirt networking (2x)
- #8: VPN or firewall issue (2x)
- #9: Obsolete Kubernetes flags (2x)

## Debugging

- Hypervisor failure → `--also-logs-to-stderr`. Install latest hypervisor update.
- kubelet failed to appear: `kubelet` section of `minikube logs`, `kubectl describe node`
- pod failed to schedule: `kubectl describe node`
- apiserver crashed: `minikube logs`, look for OOM in `dmesg`
- apiserver failed to appear: `kubelet` & `apiserver` in `minikube logs`
- connectivity failure: check for VPN or firewall, reboot

There is also `minikube logs --problems`, but it isn't great.

## Our confusing configuration model

- start flags are not persistent across restarts
- For persistence, use `minikube config`
- In v1.6, will become `--kubernetes-version` sticky across restarts
- Addons enable/disable is still global and persistent

# Multi-node: Prototype

```
bash ~.  
Darwin tstromberg-macbookpro.roam.corp.google.com 18.7.0 x86_64  
14:02 up 2 days, 7:49, 2 users, load averages: 17.05 14.18 7.  
~ /s/demoit *... minikube-deep Sat Nov 16 14:02:  
~ /s/demoit *... minikube-deep
```

```
code ~ src  
cmd/start.go x pkg/hyperkit.go pkg/docker.go pkg/kubeadm.go ...  
1 /*  
2 Copyright 2016 The Kubernetes Authors All rights reserved.  
3  
4 Licensed under the Apache License, Version 2.0 (the "License"  
5 you may not use this file except in compliance with the Lice  
6 You may obtain a copy of the License at  
7  
8 http://www.apache.org/licenses/LICENSE-2.0  
9  
10 Unless required by applicable law or agreed to in writing, s  
11 distributed under the License is distributed on an "AS IS" B  
12 WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express  
13 See the License for the specific language governing permissi  
14 limitations under the License.  
15 */  
16  
17 package cmd  
18  
19 import (  
20     "encoding/json"  
21     "fmt"  
22     "math"  
23     "net"  
24     "net/url"
```

# Docker deployment: Prototype

```
bash ~.  
Darwin tstromberg-macbookpro.roam.corp.google.com 18.7.0 x86_64  
14:02 up 2 days, 7:49, 2 users, load averages: 17.05 14.18 7.  
~ /s/demoit *... minikube-deep Sat Nov 16 14:02:  
~ /s/demoit *... minikube-deep
```

```
code ~ src  
cmd/start.go x pkg/hyperkit.go pkg/docker.go pkg/kubeadm.go ...  
1 /*  
2 Copyright 2016 The Kubernetes Authors All rights reserved.  
3  
4 Licensed under the Apache License, Version 2.0 (the "License"  
5 you may not use this file except in compliance with the Lice  
6 You may obtain a copy of the License at  
7  
8 http://www.apache.org/licenses/LICENSE-2.0  
9  
10 Unless required by applicable law or agreed to in writing, s  
11 distributed under the License is distributed on an "AS IS" B  
12 WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express  
13 See the License for the specific language governing permissi  
14 limitations under the License.  
15 */  
16  
17 package cmd  
18  
19 import (  
20     "encoding/json"  
21     "fmt"  
22     "math"  
23     "net"  
24     "net/url"
```

## Menu Bar UI Prototype

- Persistent process allows us to signal alerts
- Resource starvation
- Deployment failures
- Switch between Kubernetes contexts
- Stop/start (and eventually suspend)
- hyperkit time sync



## minikube 2020

- Multi-node
- VM-free by default
- Hypervisor installation
- Improved CNI integration
- Revamp of addons
- >25% CPU overhead
- Startup latency under 45s
- Kernel-assisted mounts
- Suspend and Resume
- Optional toolbar UI
- post-libmachine exploration
- Newbie-friendly documentation
- Separation of create vs start

## HELP WANTED!

A very friendly and patient group of contributors who want to help people learn Kubernetes. Many Kubernetes org members got their start by contributing to minikube.

- #minikube on Slack
- mailing list
- bi-weekly office-hours
- <https://minikube.sigs.k8s.io/>