

A photograph of a modern, curved architectural interior. The space features a series of dark, curved structural elements that create a sense of depth and movement. The floor is made of light-colored tiles, and the walls are composed of large glass panels. The lighting is soft and ambient, highlighting the sleek design of the space.

# Container Camp UK 2018 - Workshop

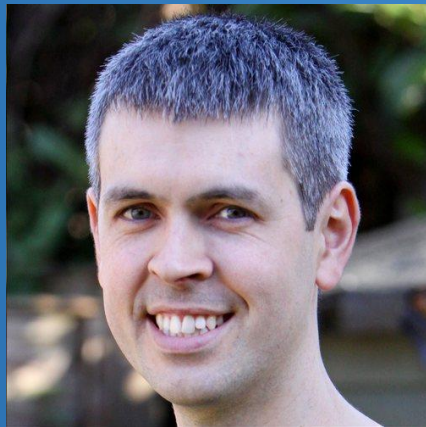
Introduction to the Virtual Kubelet



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 @pbouwer



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the virtual kubelet masquerades as a kubelet for the purposes of connecting kubernetes to other APIs.

# AGENDA

virtual kubelet

kubelet

The kubelet is the primary node agent that runs on each node.

The kubelet works in terms of a PodSpec. A PodSpec is a YAML or JSON object that describes a pod. The kubelet takes a set of PodSpecs that are provided through various mechanisms (primarily through the apiserver) and ensures that the containers described in those PodSpecs are running and healthy.

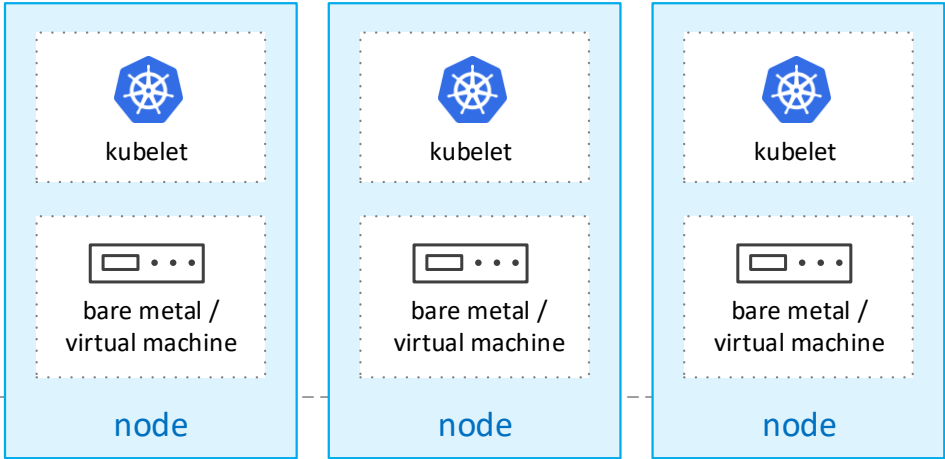
The kubelet doesn't manage containers which were not created by Kubernetes.

<https://kubernetes.io/docs/reference/command-line-tools-reference/kubelet/>

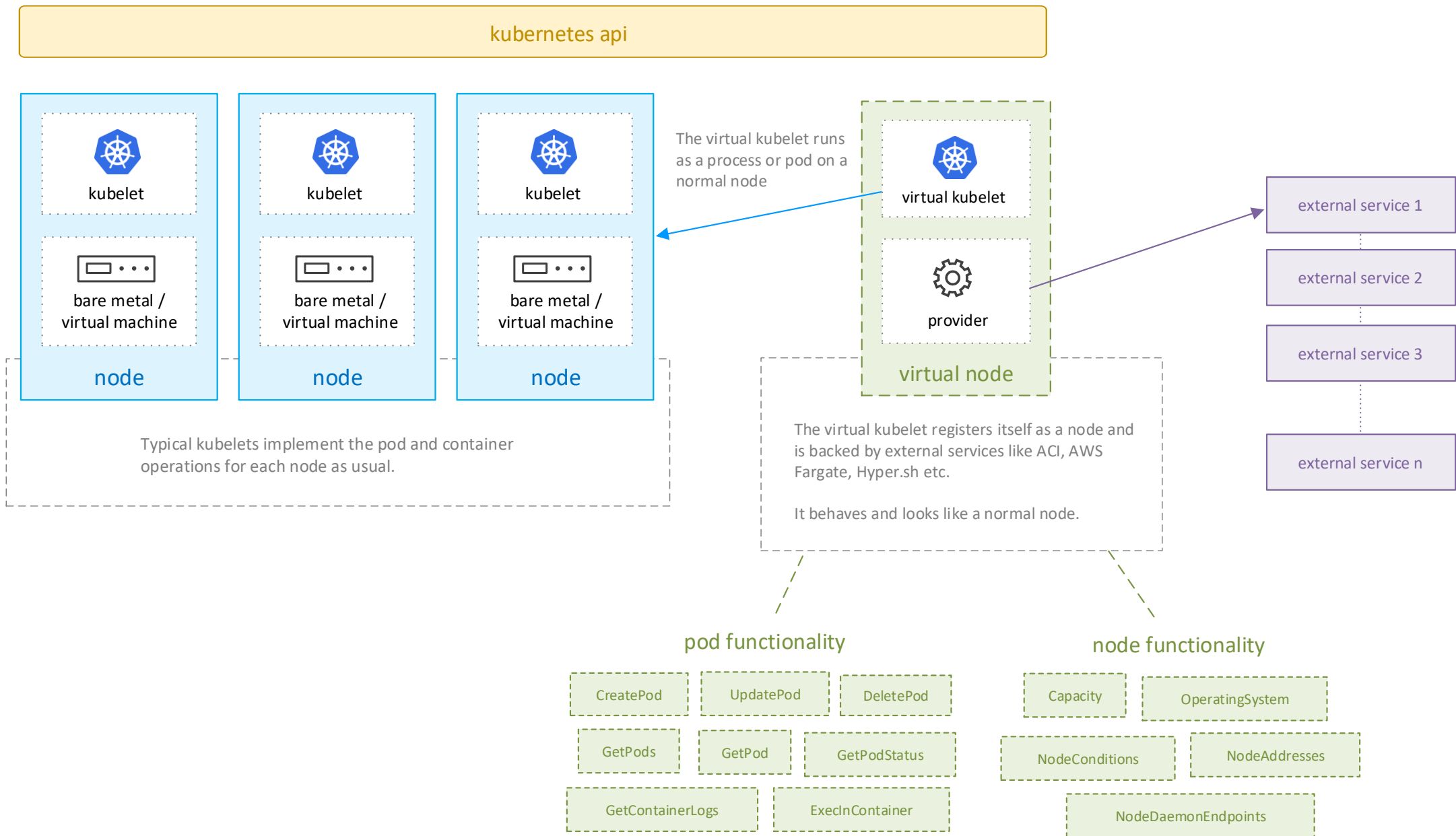
virtual kubelet



kubernetes api



Typical kubelets implement the pod and container operations for each node as usual.



capabilities

# Pod

create pod	deploy a kubernetes pod within the provider
update pod	update a kubernetes pod within the provider
delete pod	delete a kubernetes pod from the provider
get pod	retrieve a pod by name from the provider (can be cached)
get pod status	retrieve the status of a pod by name from the provider
get pods	retrieve a list of all pods running on the provider (can be cached)
get container logs	retrieve the logs of a container by name from the provider
exec in container	execute a command in a container in the pod, copying data between in/out/err and the container's stdin/stdout/stderr


# Node

capacity	return a resource list with the capacity constraints of the provider
node conditions	return a list of conditions (Ready, OutOfDisk, etc), which is polled periodically to update the node status within kubernetes
node addresses	return a list of addresses for the node status within kubernetes
node daemon endpoints	return NodeDaemonEndpoints for the node status within kubernetes
operating system	return the operating system the provider is for

get it



virtual-kubelet/virtual-kubelet

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virtual-kubelet / virtual-kubelet

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Projects0

Wiki

Insights

Branch: mastervirtual-kubelet / README.md

Find fileCopy path

yaron2 spaces fix

ebdb925 26 days ago

16 contributors

238 lines (158 sloc)9.83 KB

RawBlameHistory

## Virtual Kubelet

Virtual Kubelet is an open source [Kubernetes kubelet](#) implementation that masquerades as a kubelet for the purposes of connecting Kubernetes to other APIs. This allows the nodes to be backed by other services like ACI, AWS Fargate, Hyper.sh, [IoT Edge](#) etc. The primary scenario for VK is enabling the extension of the Kubernetes API into serverless container platforms like ACI, Fargate, and Hyper.sh, though we are open to others. However, it should be noted that VK is explicitly not intended to be an alternative to Kubernetes federation.

Virtual Kubelet features a pluggable architecture and direct use of Kubernetes primitives, making it much easier to build on.

We invite the Kubernetes ecosystem to join us in empowering developers to build upon our base. Join our slack channel named, virtual-kubelet, within the [Kubernetes slack group](#).


Please note this software is experimental and should not be used for anything resembling a production workload.

The best description is "Kubernetes API on top, programmable back."

### Table of Contents

- [How It Works](#)
- [Usage](#)
- [Providers](#)
  - [Azure Container Instances Provider](#)
  - [Azure Batch GPU Provider](#)
  - [AWS Fargate Provider](#)
  - [Hyper.sh Provider](#)
  - [Service Fabric Mesh Provider](#)
  - [Adding a New Provider via the Provider Interface](#)
- [Testing](#)
  - [Testing the Azure Provider Client](#)



 <input type="text" value="Search"/>			<a href="#">Explore</a>	<a href="#">Help</a>	<a href="#">Sign up</a>	<a href="#">Sign in</a>
PUBLIC REPOSITORY						
microsoft/virtual-kubelet ☆						
Last pushed: 5 hours ago						
<a href="#">Repo Info</a> <a href="#">Tags</a>						
Tag Name	Compressed Size	Last Updated				
0.5.2	24 MB	5 hours ago				
latest	18 MB	12 days ago				
0.5.1	18 MB	12 days ago				
0.5.0	18 MB	12 days ago				
0.4.1	18 MB	a month ago				
0.4	17 MB	2 months ago				
0.3.3	17 MB	2 months ago				
0.3.2	17 MB	3 months ago				
0.3.1	17 MB	3 months ago				
0.3	12 MB	3 months ago				
0.2-rc-2	11 MB	4 months ago				
0.2-rc-1	11 MB	4 months ago				
0.2-beta-12	10 MB	4 months ago				
0.2-beta-11	10 MB	4 months ago				
0.2-beta-10	10 MB	5 months ago				
0.2-beta-9	10 MB	6 months ago				
0.2-beta-8	10 MB	6 months ago				



get (grok) it



kubernetes.slack.com  
# virtual-kubelet

Kubernetes

| 204 | 0 | Add a topic

Jump to...

All Unreads

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Channels

# announcements

# ark-dr

# cert-manager

# charts

# draft-dev

# draft-users

# events

# helm-dev

# helm-users

# k8s-conformance

# kubernetes-users

# sig-apps

# sig-auth

# sig-autoscaling

# sig-azure

# sig-cli

# sig-windows

# virtual-kubelet

Direct Messages

slackbot

paul-bouwer (you)

Apps

#virtual-kubelet

| 204 | 0 | Add a topic

Wednesday, August 15th

**jlegrone** 9:41 AM

I did add back the `taint` flag for now

**junjiez** 9:41 AM

thanks

**jlegrone** 9:41 AM

and filed an issue to remove it in the future: <https://github.com/virtual-kubelet/virtual-kubelet/issues/316>

**jlegrone**

**#316 Remove deprecated `taint` flag**

This flag should be removed after external virtual-kubelet integrations have had time to update to the new taint key configuration method.

virtual-kubelet/virtual-kubelet | Aug 15th | Added by GitHub

**junjiez** 9:46 AM

Approved. appreciate the contribution again!

3 3

**jerickar** 9:57 AM

Thanks [@jlegrone](#) !

**mtsuka** 11:16 AM

joined #virtual-kubelet along with 5 others.

Saturday, August 18th

**Shawn Junell** 3:11 AM

[@Ria](#) Hello, I am looking for a bit of clarity. I saw open issue #13 'Cluster Networking' and noted within that a Virtual Pod deployed to ACI is currently unable to reach a Cluster Service/IP. Can you confirm? Thanks.

2 replies Last reply 13 days ago

**Venkatachitturi** 3:20 AM

joined #virtual-kubelet.

**Jedi** 4:07 AM

[@Ria](#) we have a question regarding the networking for the virtual kubelet (ACI-Connector) when you get a chance.

1

1 reply 13 days ago

**hpedrorodrigues** 5:59 AM

joined #virtual-kubelet along with 7 others.

Message #virtual-kubelet

configure

# USAGE

## Usage:

```
virtual-kubelet [flags]  
virtual-kubelet [command]
```

## Available Commands:

```
help          Help about any command  
version       Show the version of the program
```

## Flags:

```
-h, --help                help for virtual-kubelet  
--kubeconfig string       config file (default "$HOME/.kube/config")  
--namespace string        kubernetes namespace (default "all")  
--nodename string         kubernetes node name (default "virtual-kubelet")  
--os string               operating system (Linux/Windows) (default "Linux")  
--provider string         cloud provider  
--provider-config string  cloud provider configuration file  
--taint string            apply taint to node, making scheduling explicit
```

Use "virtual-kubelet [command] --help" for more information about a command.

# NODE TAINTS

Defaults:

```
taint: virtual-kubelet.io/provider  
value: <providername>  
effect: NoSchedule
```

Customise:

```
taint: <taint flag value> # --taint flag on virtual kubelet binary  
effect: NoSchedule
```

or

```
taint: $VKUBELET_TAINT_KEY  
value: $VKUBELET_TAINT_VALUE  
effect: $VKUBELET_TAINT_EFFECT # NoSchedule, NoExecute, PreferNoSchedule
```

# NODE LABELS

```
type: virtual-kubelet
kubernetes.io/role: agent
beta.kubernetes.io/os: <configured node os>
kubernetes.io/hostname: <configured node name>
alpha.service-controller.kubernetes.io/exclude-balancer: true
```

providers

# Platform Providers

aws	AWS Fargate
azure	Azure Container Instances (ACI)
azurebatch	Azure Batch
huawei	Huawei Cloud Container Instance (CCI)
hypersh	Hyper.sh Serverless Container Platform
sfmesh	Azure Service Fabric Mesh
vic	vSphere Integrated Containers
web	Http bridge



# Testing and Prototyping Providers

cri	CRI-based container runtime
mock	Mock virtual kubelet provider for tests

A close-up photograph of a person's face wearing a white VR headset. A black smartphone is mounted on top of the headset, secured with black straps. The entire scene is bathed in a warm, monochromatic red light. The person's eyes are closed, and their mouth is slightly open, suggesting they are immersed in the virtual experience.

# Demo

## Explore the Virtual Kubelet

requirements

kubernetes cluster

# RBAC

Enabled, with ClusterAdminRole

deployment yml

# TOLERATIONS

```
tolerations:  
- key: virtual-kubelet.io/provider  
  value: azure  
  effect: NoSchedule
```

```
tolerations:  
- key: virtual-kubelet.io/provider  
  value: aws  
  effect: NoSchedule
```

```
tolerations:  
- key: azure.com/aci  
  effect: NoSchedule
```

# NODE SELECTOR

```
nodeSelector:  
  kubernetes.io/hostname: virtual-kubelet-linux-aci
```

```
nodeName: virtual-kubelet-linux-web
```



# RESOURCE LIMITS

```
containers:  
  - name: hello-kubernetes  
    image: paulbouwer/hello-kubernetes:1.5  
    resources:  
      requests:  
        memory: 1G  
        cpu: 1
```

installation

helm chart

# HELM INSTALL

```
helm install "charts/virtual-kubelet" --name "mine" \  
  --namespace "virtual-kubelet" \  
  --set provider=<provider> \  
  --set nodeName=virtual-kubelet-mine
```

# HELM INSTALL

```
helm install "charts/virtual-kubelet" --name "linux-aci" \  
  --namespace "virtual-kubelet" \  
  --set provider=azure \  
  --set nodeName=virtual-kubelet-linux-aci \  
  --set nodeOsType=Linux \  
  --set rbac.install=true \  
  --set providers.azure.targetAKS=false \  
  --set providers.azure.tenantId=$AZURE_TENANT_ID \  
  --set providers.azure.subscriptionId=$AZURE_SUBSCRIPTION_ID \  
  --set providers.azure.clientId=$AZURE_CLIENT_ID \  
  --set providers.azure.clientKey=$AZURE_CLIENT_SECRET \  
  --set providers.azure.aciResourceGroup=$AZURE_RG \  
  --set providers.azure.aciRegion=$ACI_REGION \  
  --set apiserverCert=$cert \  
  --set apiserverKey=$key
```

components

# RBAC

Service Account (virtual-kubelet)

Cluster Role Binding (cluster-admin)

# Config

Secret (api-server certs, provider secrets)

# Virtual Kubelet

Deployment (virtual kubelet)

A close-up photograph of a person wearing a white VR headset. A black smartphone is mounted on the front of the headset. The person's face is partially visible, showing their nose and mouth. The background is a solid, vibrant red color. A semi-transparent dark red horizontal band is overlaid across the middle of the image, containing white text.

# Demo

## Install the Virtual Kubelet



A top-down photograph of various vintage tools and objects arranged on a dark, vertically-grained wooden surface. The tools include two axes with wooden handles and metal heads, a claw hammer, a mallet with a metal head and handle, a hand saw with a curved blade, a pair of work gloves, a metal mug, a folding knife, a pair of pliers, and a circular object with a logo that reads "CRAFTSMAN" and "NICKEL PLATED". The lighting is warm and directional, coming from the top left, creating strong highlights and shadows.

# Lab 1

Install Virtual Kubelet in a local Kubernetes cluster



# GitHub

<https://github.com/paulbouwer/virtual-kubelet-workshop>

scenarios

# Adhoc

Jobs and tasks that are run on irregular schedules

# Burst

Require additional temporary capacity

# Specialist

Require temporary or adhoc access to specialist resources like GPU clusters for Machine Learning

# Architecture Considerations

Service Discovery

Networking

Capabilities

A close-up photograph of a person wearing a white VR headset. A black smartphone is mounted on top of the headset, connected by a cable. The person's face is partially visible through the headset's opening. The entire scene is bathed in a warm, reddish-orange light, creating a monochromatic effect. The background is a soft, out-of-focus red.

# Demo

Burst workload with the Virtual Kubelet



A top-down photograph of various vintage tools and objects arranged on a dark, vertically-grained wooden surface. The tools include two axes with wooden handles and metal heads, a claw hammer, a mallet with a metal head and handle, a hand saw with a curved blade, a pair of work gloves, a metal mug, a folding knife, a small circular object with a logo, and a pair of pliers. The lighting is dramatic, with a strong light source from the left creating a bright, out-of-focus area on the far left edge of the frame.

# Lab 2

Explore burst scenario with the Virtual Kubelet



A top-down photograph of various vintage tools laid out on a dark, vertically-grained wooden surface. The tools include two axes with wooden handles and metal heads, a claw hammer with a wooden handle, a mallet with a metal handle, a curved saw, a pair of worn leather gloves, a pair of pliers, a folding knife, a circular metal object with a logo, and a metal cup. The lighting is dramatic, with a strong light source from the left creating a bright highlight on the wooden surface and casting long, dark shadows across the tools.

# Lab 3 (Bonus)

Explore other Virtual Kubelet providers



wrap up

resources

# References

GitHub repo

<https://github.com/virtual-kubelet/virtual-kubelet>

Azure AKS / Virtual Kubelet docs

<https://docs.microsoft.com/en-us/azure/aks/virtual-kubelet>

Ria's Demos

<https://github.com/rbitia/aci-demos>

## Releases

<https://github.com/virtual-kubelet/virtual-kubelet/releases>

## Docker Hub

<https://hub.docker.com/r/microsoft/virtual-kubelet/>

<https://hub.docker.com/r/microsoft/virtual-kubelet/tags/>

