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TiKV

What's New With SIG-Windows

What's New With SIG-Windows

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Europe 2023

18 - 21 APRIL 2023
RAI CONVENTION CENTRE
AMSTERDAM, THE NETHERLANDS

Agenda

- SIG-Windows Enhancement Update
- SIG-Windows Dev Tools (SWDT)
- Operational Readiness
- Containerd 1.7
- Windows Unit Tests Updates
- Additional Resources
- Q & A


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Enhancement Updates

Enhancements Updates

- **Specify root-fs volume size for Windows containers**
  - features.k8s.io/3746
  - Targeting alpha in v1.28
- **Node Log Query**
  - features.k8s.io/2258
  - Alpha in v1.27
- **cAdvisor-less, CRI-full Container and Pod Stats**
  - features.k8s.io/2371
  - Targeting Beta in v1.28 with Windows support
- **In-place Pod Vertical Autoscaling**
  - features.k8s.io/1287
  - Windows support coming in v1.28


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SIG-Windows
Dev Tools

SIG-Windows Dev-Tools (SWDT) Updates

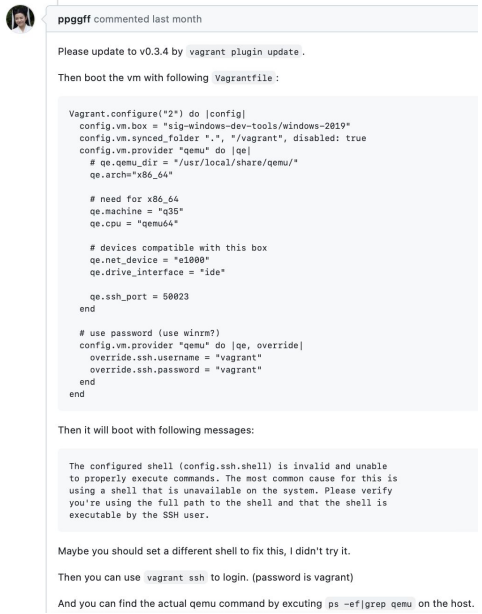
https://github.com/kubernetes-sigs/sig-windows-dev-tools

- **What's SIG-Windows Dev-Tools**
  - Make it so that anyone can contribute to sig-windows by building 2 node k8s cluster from **source**, on windows, and deploying locally.
  - Bootstrap your own cluster locally. No need of cloud to create the cluster, vagrant will create the cluster locally.

- **What's new**
  - QEMU support
  - Calico host-process containers

SIG-Windows Dev-Tools (SWDT) Updates

- **QEMU support (windows, os x m1/m2, linux)**
  - git clone sig-windows-dev-tools ; git checkout main-qemu
  - vagrant plugin install **vagrant-qemu**
  - make all
  - Big thanks to our vagrant-qemu friend ppggff: https://github.com/ppggff/vagrant-qemu
  - Need help testing it!
- Thanks also to ongoing r&d into windows laptop dev environments via WSL https://github.com/kubernetes-sigs/sig-windows-dev-tools/pull/245 **Mateusz Łoskot (@mloskot) !**
- **Note: VMWare fusion, Virtualbox, and so on do not support emulation, thus we've turned to QEMU! Emulation != Virtualization.**



ppggff commented last month

Please update to v0.3.4 by `vagrant plugin update`.

Then boot the vm with following `Vagrantfile`:

```
Vagrant.configure("2") do |config|
  config.vm.box = "sig-windows-dev-tools/windows-2019"
  config.vm.synced_folder ".", "/vagrant", disabled: true
  config.vm.provider "qemu" do |qe|
    # qe.qemu_dir = "/usr/local/share/qemu/"
    qe.arch="x86_64"

    # need for x86_64
    qe.machine = "q35"
    qe.cpu = "qemu64"

    # devices compatible with this box
    qe.net_device = "e1000"
    qe.drive_interface = "ide"

    qe.ssh_port = 50023
  end

  # use password (use winrm?)
  config.vm.provider "qemu" do |qe, override|
    override.ssh.username = "vagrant"
    override.ssh.password = "vagrant"
  end
end
```

Then it will boot with following messages:

```
The configured shell (config.ssh.shell) is invalid and unable
to properly execute commands. The most common cause for this is
using a shell that is unavailable on the system. Please verify
you're using the full path to the shell and that the shell is
executable by the SSH user.
```

Maybe you should set a different shell to fix this, I didn't try it.

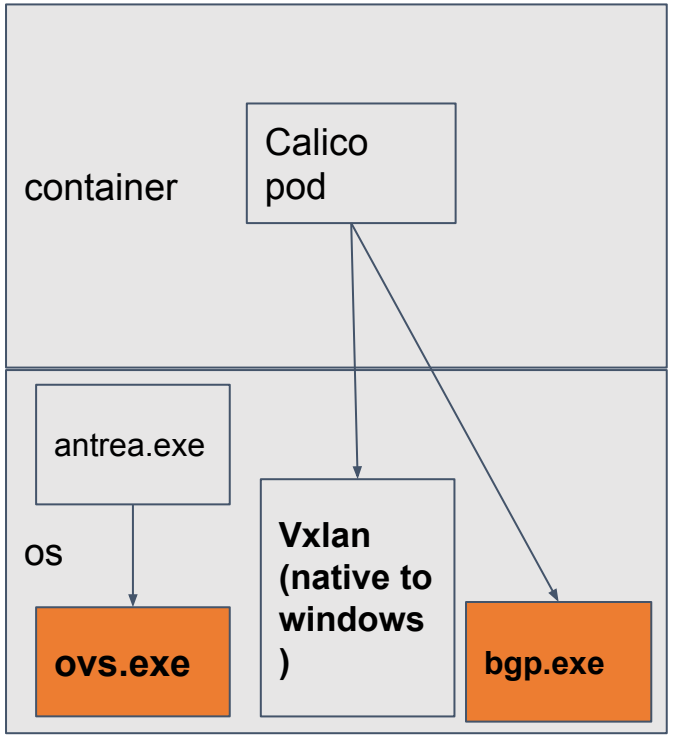
Then you can use `vagrant ssh` to login. (password is vagrant)

And you can find the actual qemu command by excuting `ps -ef|grep qemu` on the host.

OS	linux	windows	Mac os X m1	Mac os intel
VM creation	**SWDT or KVM manual VMs**	SWDT (see pr #245) or Hyper-V manual VMs	SWDT	**SWDT**
“Hypervisor”	**Vbox**	Vbox… Possibly QEMU in the future ?	QEMU	**Vbox**

SIG-Windows Dev-Tools (SWDT) Updates

- **Host process containers**
  - Supporting calico as host process container (only VXLAN though)
  - Antrea host process on the way (but still requires ovs.exe)

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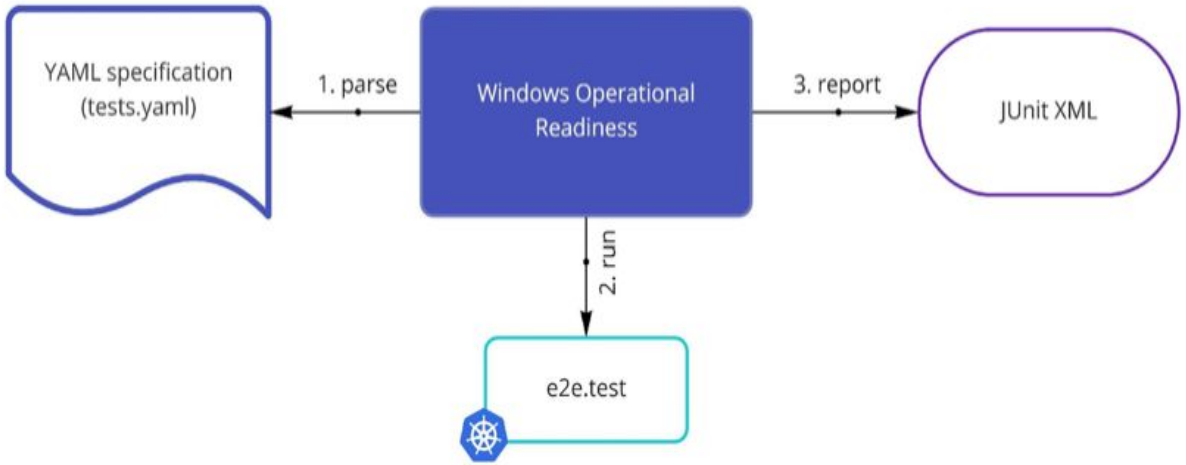
Operational
Readiness

Operational Readiness

Certifying Windows for enterprises (similar to https://github.com/cncf/k8s-conformance)

- Networking
- Storage
- GSMA
- NetworkPolicy

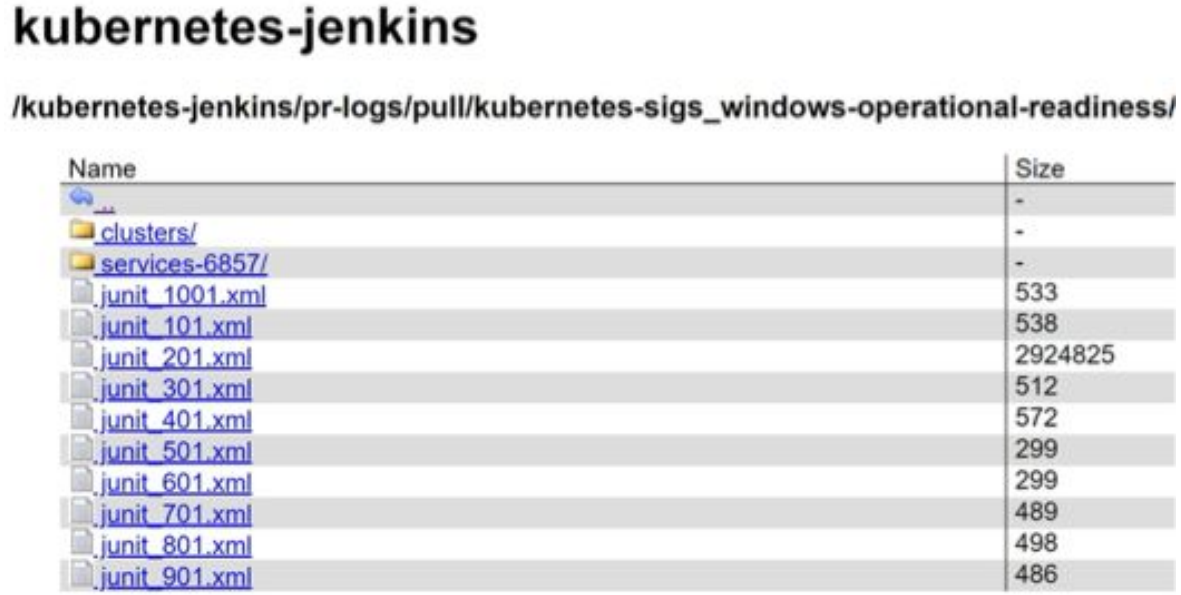



```yaml
kubernetesVersions:
- 1.25
- 1.24
- 1.23

testCases:
  # Network category
  - category: Core.Network
    description: Ability to access Windows container IP by pod IP
    focus:
    - 'should have stable networking for Linux and Windows pods'
    skip:
    - ''
  - category: Core.Network
    description: Ability to expose windows pods by creating the service ClusterIP
    focus:
    - 'should be able to up and down services'
    skip:
    - ''
  - category: Core.Network
    description: Ability to expose windows pods by creating the service NodePort
    focus:
    - 'should be able to create a functioning NodePort service for Windows'
    skip:
    - ''
  - category: Core.Network
```

```
Nov  8 16:14:32.072: INFO: >>> kubeConfig: /tmp/kubeconfig-235977939
Nov  8 16:14:32.074: INFO: Waiting up to 30m0s for all (but 0) nodes to be schedulable
Nov  8 16:14:32.084: INFO: Waiting up to 10m0s for all pods (need at least 0) in namespace 'kube-system' to be running and ready
Nov  8 16:14:32.113: INFO: 12 / 12 pods in namespace 'kube-system' are running and ready (0 seconds elapsed)
Nov  8 16:14:32.113: INFO: expected 2 pod replicas in namespace 'kube-system', 2 are Running and Ready.
Nov  8 16:14:32.113: INFO: Waiting up to 5m0s for all daemonsets in namespace 'kube-system' to start
Nov  8 16:14:32.119: INFO: 3 / 3 pods ready in namespace 'kube-system' in daemonset 'calico-node' (0 seconds elapsed)
Nov  8 16:14:32.119: INFO: 3 / 3 pods ready in namespace 'kube-system' in daemonset 'kube-proxy' (0 seconds elapsed)
Nov  8 16:14:32.119: INFO: e2e test version: v1.12.2-heptio.1
Nov  8 16:14:32.120: INFO: kube-apiserver version: v1.12.2-heptio.1
SSSSS
------------------------------
[k8s.io] Probing container
  with readiness probe should not be ready before initial delay and never restart [NodeConformance] [Conformance]
  /go/src/k8s.io/kubernetes/_output/dockerized/go/src/k8s.io/kubernetes/test/e2e/framework/framework.go:699
[BeforeEach] [k8s.io] Probing container
  /go/src/k8s.io/kubernetes/_output/dockerized/go/src/k8s.io/kubernetes/test/e2e/framework/framework.go:147
STEP: Creating a kubernetes client
Nov  8 16:14:32.120: INFO: >>> kubeConfig: /tmp/kubeconfig-235977939
STEP: Building a namespace api object, basename container-probe
Nov  8 16:14:32.175: INFO: No PodSecurityPolicies found; assuming PodSecurityPolicy is disabled.
STEP: Waiting for a default service account to be provisioned in namespace
[BeforeEach] [k8s.io] Probing container
  /go/src/k8s.io/kubernetes/_output/dockerized/go/src/k8s.io/kubernetes/test/e2e/common/container_probe.go:48
[It] with readiness probe should not be ready before initial delay and never restart [NodeConformance] [Conformance]
  /go/src/k8s.io/kubernetes/_output/dockerized/go/src/k8s.io/kubernetes/test/e2e/framework/framework.go:699
Nov  8 16:15:04.185: INFO: Container started at 2018-11-08 16:14:39 +0000 UTC, pod became ready at 2018-11-08 16:15:02 +0000 UTC
[AfterEach] [k8s.io] Probing container
  /go/src/k8s.io/kubernetes/_output/dockerized/go/src/k8s.io/kubernetes/test/e2e/framework/framework.go:148
Nov  8 16:15:04.185: INFO: Waiting up to 3m0s for all (but 0) nodes to be ready
STEP: Destroying namespace "e2e-tests-container-probe-8qmfq" for this suite.
Nov  8 16:15:26.193: INFO: Waiting up to 30s for server preferred namespaced resources to be successfully discovered
Nov  8 16:15:26.239: INFO: namespace: e2e-tests-container-probe-8qmfq, resource: bindings, ignored listing per whitelist
Nov  8 16:15:26.246: INFO: namespace e2e-tests-container-probe-8qmfq deletion completed in 22.05962315s

• [SLOW TEST:54.126 seconds]
[k8s.io] Probing container
/go/src/k8s.io/kubernetes/_output/dockerized/go/src/k8s.io/kubernetes/test/e2e/framework/framework.go:694
  with readiness probe should not be ready before initial delay and never restart [NodeConformance] [Conformance]
  /go/src/k8s.io/kubernetes/_output/dockerized/go/src/k8s.io/kubernetes/test/e2e/framework/framework.go:699
------------------------------
SSSSSSSSSSSSSS
```

Operational Readiness

- https://github.com/kubernetes-sigs/windows-operational-readiness
- KUBERNETES_VERSION=v1.25.0 make build
- ./op-readiness --provider=local --kubeconfig=<path-to-kubeconfig> --category=Core.Network



- If **–report-dir** or **ARTIFACTS** env var set.
- Junit reports will be saved and dumped.
- Can be parsed by dashboard.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Containerd
v1.7

Containerd v1.7 Windows Updates

- **Device assignment support**
  - containerd/containerd#6618
  - CRI-API / Kubernetes support
  - ctr.exe run –device idType://{id}
  - Nerdctl.exe run –device idType://{id}
  - GPU acceleration in Windows Containers

- **Graceful Pod / Container support for all Windows containers!**
  - Previously this only worked for nanoserver based Windows containers
  - https://github.com/microsoft/Windows-Containers/issues/164

Containerd v1.7 Windows Updates

- **Better volume mount support for HostProcess containers**
  - Volume mounts no longer rooted under $CONTAINER_SANDBOX_MOUNT_POINT
  - InClusterConfig() support!
  - K8s docs
- **CRI only stat / metrics reporting support**
  - Part of features.k8s.io/2371 - cAdvisor-less, CRI-full Container and Pod Stats
  - CRI-API and container updated to support this on Windows
  - Kubelet updates coming in v1.28

Containerd v1.7 Windows Updates

- **Hyper-V Isolated containers support**
  - Requires containerd v1.7
    - containerd/containerd#6862
  - Scheduled with **RuntimeClass**
    - runhcs-wcow-hypervisor runtime defined in default containerd config
  - Specify UVM resources with Pod annotations

```
apiVersion: v1
kind: Pod
metadata:
  name: wcow-test
  labels:
      app: wcow
  annotations:
       io.microsoft.virtualmachine.computetopology.memory.sizeinmb:
"4096"
       io.microsoft.virtualmachine.computetopology.processor.count: "4"
spec:
  replicas: 2
  selector:
    matchLabels:
      app: wcow
    spec:
      runtimeClassName: runhcs-wcow-hypervisor
      containers:
      - name: servercore
        image: mcr.microsoft.com/windows/servercore:ltsc2022
        ports:
        - containerPort: 80
          protocol: TCP
```

Unit Tests Updates

Windows Unit Tests Updates

- **Unit tests status**
  - 300+ failing unit tests failing initially.
  - ~10 failing unit tests left, for which there are unmerged PRs.
  - Improved test coverage for Windows, adding new unit tests for Windows modules and porting existing ones from Linux.
  - Goal is have all unit tests pass and have a release informing job.

- **Windows Unit tests dashboard**
  - https://testgrid.k8s.io/sig-windows-signal#windows-unit-master

- **PRs tracked here**
  - https://github.com/kubernetes/kubernetes/issues/51540

Windows Unit Tests Updates

- **Trigger Windows unit tests job on PRs**
  - /test pull-ci-kubernetes-unit-windows

- **Run unit tests on a local Windows machine**
  - https://github.com/kubernetes-sigs/windows-testing/blob/master/scripts/prepare_env_windows.ps1
    - installs dependencies: chocolatey, golang, git, make
  - https://github.com/kubernetes-sigs/windows-testing/blob/master/scripts/k8s_unit_windows.ps1
    - includes preparing, cloning, vendoring, and running tests.

Windows Unit Tests Updates

- **Manually run tests**
  - go test -v .\pkg\kubelet
- **Run all nested tests**
  - go test -v .\pkg\kubelet\...
- **Debug tests**
  - go install github.com/go-delve/delve/cmd/dlv@latest
  - dlv test .\pkg\kubelet\

Windows Unit Tests Updates

- **Found and solved issues:**
  - path.filepath functions must be used when joining file paths (not path functions): https://github.com/kubernetes/kubernetes/issues/110600
  - [kubeadm] filepath.IsAbs doesn’t consider / or \ prefixed paths as absolute. https://github.com/kubernetes/kubernetes/pull/111076
  - [kubeadm] cp does not exist on Windows, use xcopy instead. https://github.com/kubernetes/kubernetes/pull/111534
  - [kubelet] Cannot have "nodefs.inodesFree" EvictionHard config set on Windows. The default values had it set. https://github.com/kubernetes/kubernetes/pull/110263

Windows Unit Tests Updates

- **Found and solved issues:**
  - [kubelet] Pod DNS Policies did not include host's DNS configuration.
    - https://github.com/kubernetes/kubernetes/pull/110566
    - This can be configured by using the --resolv-conf=Host kubelet config option.
    - Alternatively, a path to a resolv.conf-like file can be used instead.
  - [kubelet] Windows CPU usage node stats now take into account multiple Processor Groups. https://github.com/kubernetes/kubernetes/pull/110864
  - [kubelet] Checking if a file is a Unix Socket on Windows is different than on Linux. Because of this, the kubelet Plugin Watcher was not working as intended. https://github.com/kubernetes/kubernetes/pull/111439

Windows Unit Tests Updates

- **Found and solved issues:**
  - [kubelet] symlinks were not evaluated properly if hidden folders were part of the path. https://github.com/kubernetes/kubernetes/pull/111534
  - [kubelet] log compression now works, the files were not closed before renaming. https://github.com/kubernetes/kubernetes/pull/111549
  - [kubelet] Volume nested mount points are now grouped correctly on Windows. https://github.com/kubernetes/kubernetes/pull/112571


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Additional Resources

How To Contribute

- Visit our SIG-Windows community page
- Follow our contributing guide
- Join our community meetings (12:30pm EST every tuesday)
- Join our SIG-Windows pairing sessions: https://github.com/kubernetes-sigs/sig-windows-samples/blob/master/PAIRING.md (right after the main meeting)
- Help us write additional documentation and user stories
- File bugs or review open PRs from our project boards - Issues - PRs

Additional Resources

Aravindh Puthiyaparambil
Co-Chair
Redhat
@Aravindh [Slack]
@aravindhp [GitHub]

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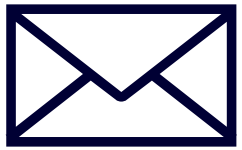
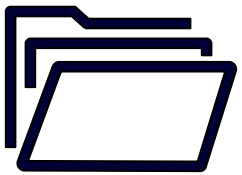
#sig-windows



https://groups.google.com/forum/#!forum/kubernetes-sig-windows



https://kubernetes.io/docs/setup/production-environment/windows/

https://github.com/kubernetes/community/tree/master/sig-windows

YouTube Playlist

https://zoom.us/j/94389601840
Every Tuesday @ 12.30pm EST

Contributors, thank you!

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- **Amim Knabben**
  - Windows Service Proxy
- **Fabian Fulga**
  - Windows Support for In-Place Pod Vertical Scaling
  - Calico Windows hostprocess
- **Pramita Gautam**
  - Windows Dev Tools contributions and Operational Readiness
- **June Rhodes**
  - Redpoint Kubernetes Manager on WSL2
- **Mateusz Łoskot**
  - Windows Dev Tools contributions


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Q & A

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