

vmtest

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Motivation

- ▶ Tests are good
- ▶ BPF is fast moving target
 - ▶ Feature gates and fallback code is necessary
 - ▶ New kfunc world
- ▶ BPF_PROG_RUN is powerful but depends on running kernel
- ▶ VM based testing is somewhat popular, but difficult to implement

Goals

1. Implement reusable infrastructure
2. Make it run in CI (GHA)
3. Make it simple and easy to use

Demo/examples

Two demos:

1. `vmtest` as development tool
2. `vmtest-action` in CI

Demo/examples (2)

vmtest.toml:

```
[[target]]
```

```
name = "check if kernel is 6.2"
```

```
kernel = "./bzImage-v6.2"
```

```
command = "/bin/bash -c 'uname -r | grep -e ^6.2.0$'"
```

```
[[target]]
```

```
name = "check if kernel is 6.1"
```

```
kernel = "./bzImage-v6.2"
```

```
command = "/bin/bash -c 'uname -r | grep -e ^6.1.0$'"
```

Demo/examples (3)

Link (click me)

```
[-/dev/dxuuu.xyz/examples/vmtest] git:(vmtest*) $
```

Demo/examples (4)

```
1    #include <sys/utsname.h>
2    #include <iostream>
3
4    #include "json/json.h"
5
6    int main() {
7        struct utsname data;
8        if (uname(&data))
9            return 1;
10
11        Json::Value root;
12        root["release"] = data.release;
13        std::cout << root << std::endl;
14    }
```

Demo/examples (5)

```
1  name: ci
2  on:
3    push:
4      branches: ["master"]
5    pull_request:
6      branches: ["master"]
7
8  jobs:
9    build:
10     runs-on: ubuntu-latest
11     steps:
12     - uses: actions/checkout@v3
13     - name: Install deps
14       run: |
15         sudo apt-get update
16         sudo apt-get install -y meson libjsoncpp-dev
17
18     - name: Build
19       run: |
20         meson build
21         ninja -C build
22
23     - name: Run
24       run: |
25         ./build/vmtest-action-demo
```


Demo/examples (6)

Showing 1 changed file with 15 additions and 2 deletions.

Split Unified

```

  7  7
  8  8   jobs:
  9  9     build:
      10 +       strategy:
      11 +         matrix:
      12 +           kernel:
      13 +             - name: v6.0
      14 +               url: https://github.com/danobi/vmtest/releases/download/test_assets/bzImage-v6.0
      15 +             - name: v6.1
      16 +               url: https://github.com/danobi/vmtest/releases/download/test_assets/bzImage-v6.1
      17 +             - name: v6.2
      18 +               url: https://github.com/danobi/vmtest/releases/download/test_assets/bzImage-v6.2
      19 +
  10 20     runs-on: ubuntu-latest
  11 21     steps:
  12 22     - uses: actions/checkout@v3
@@@ -21,5 +31,8 @@@ jobs:
  21 31         ninja -C build
  22 32
  23 33         - name: Run
  24 -         run: |
  25 -           ./build/vmtest-action-demo
      34 +         uses: danobi/vmtest-action@master
      35 +         with:
      36 +           name: ${ matrix.kernel.name }
      37 +           kernel_url: ${ matrix.kernel.url }
      38 +           command: ${ github.workspace }}/build/vmtest-action-demo

```

Demo/examples (7)

v6.2 job: Link (click me)

```
[..]
```

```
[ 4.569580] vmtest: Mounting tracefs at /sys/kernel/debug
```

```
[ 4.637126] vmtest: Mounting cgroup2 at /sys/fs/cgroup
```

```
[ 4.715317] vmtest: Mounting tmpfs at /mnt
```

```
[ 4.782600] vmtest: Init done
```

```
[ 4.885740] vmtest: Located qemu-guest-agent virtio port
```

```
[ 4.886275] vmtest: Spawning qemu-ga
```

```
==> Setting up VM
```

```
[ 5.511848] 9pnet: Limiting 'msize' to 512000 as this is
```

```
==> Running command
```

```
[ 5.955108] vmtest-action-d (76) used greatest stack dep
```

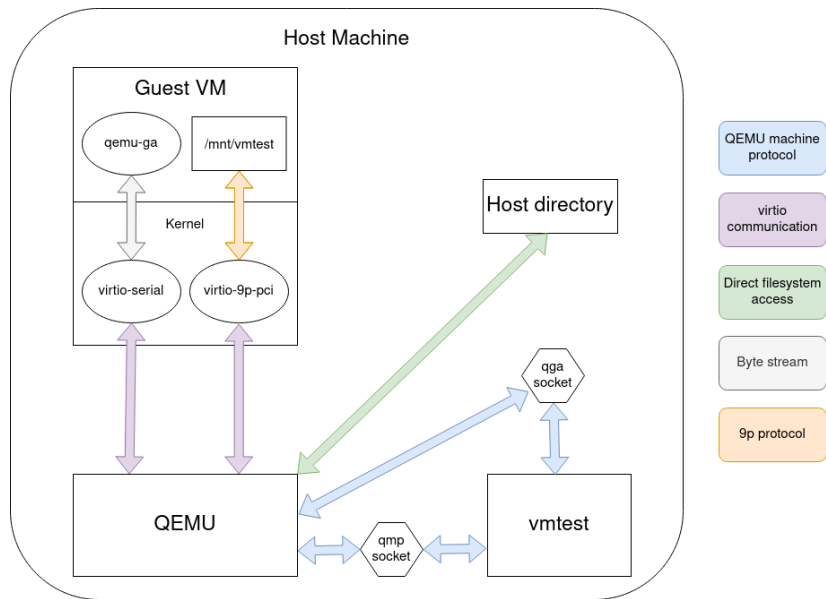
```
{
```

```
    "release" : "6.2.0"
```

```
}
```

```
PASS
```

Implementation



Future direction

- ▶ Core functionality there IMO
- ▶ GHA current builds vmtest from src; need binary distribution
- ▶ One-liner interface?
 - ▶ `vmtest -k ../linux/bzImage /cmd/on/host`
- ▶ Build a registry of distro-like kernels?
 - ▶ `vmtest -k ubuntu:22.04 /cmd/on/host`
 - ▶ `vmtest -k archlinux:latest /cmd/on/host`
- ▶ Need any features?

Links

- ▶ <https://github.com/danobi/vmtest>
- ▶ <https://github.com/danobi/vmtest-action>
- ▶ <https://github.com/danobi/vmtest-action-demo>