Enabling eBPF Super Powers on ARM64 with Cilium

eBPF Summit

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Preface

Arm ecosystem of CNI

Support Arm64

- Cilium enable on aarch64
  - https://github.com/cilium/cilium/issues/9898

  - Fix compiling and runtime issue on Arm64;
  - Multi-arch support for cilium-related images
  - CI/CD
    - Travis
  - Unit test

Travis CI

- Arm64 Full VM
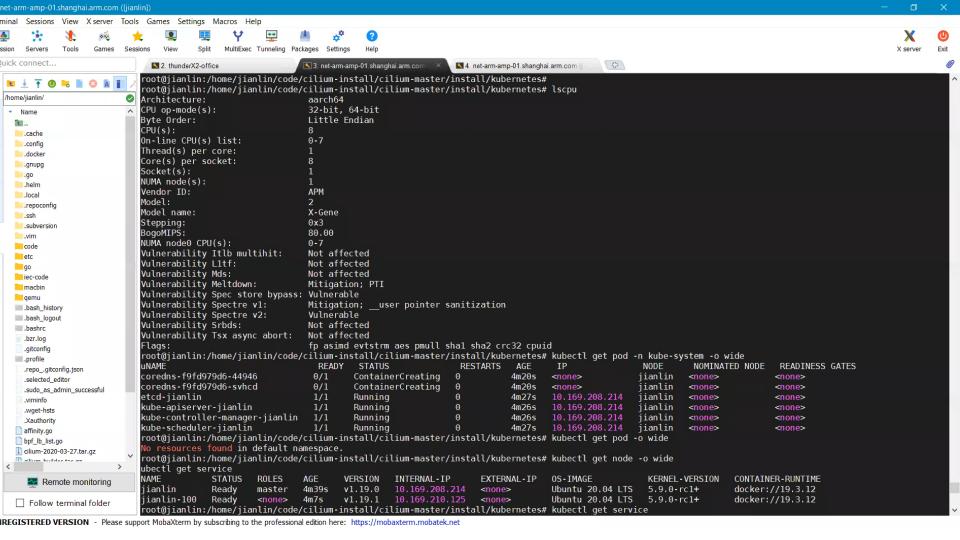 - arm64-graviton2

- Refer to:
  - https://docs.travis-ci.com/user/multi-cpu-architectures
  - https://github.com/cilium/cilium/pull/13033

Docker Images

- Github Action + Docker Buildx

- Issue
  - https://github.com/cilium/proxy/runs/1250471418

```
root@jianlin:/home/jianlin/code/cilium-install/cilium-master/install/kubernetes#
root@jianlin:/home/jianlin/code/cilium-install/cilium-master/install/kubernetes# lscpu
Architecture:                    aarch64
CPU op-mode(s):                  32-bit, 64-bit
Byte Order:                      Little Endian
CPU(s):                          8
On-line CPU(s) list:             0-7
Thread(s) per core:              1
Core(s) per socket:              8
Socket(s):                       1
NUMA node(s):                    1
Vendor ID:                       APM
Model:                           2
Model name:                      X-Gene
Stepping:                        0x3
BogoMIPS:                        80.00
NUMA node0 CPU(s):               0-7
Vulnerability Itlb multihit:     Not affected
Vulnerability L1tf:              Not affected
Vulnerability Mds:               Not affected
Vulnerability Meltdown:          Mitigation; PTI
Vulnerability Spec store bypass: Vulnerable
Vulnerability Spectre v1:        Mitigation; __user pointer sanitization
Vulnerability Spectre v2:        Vulnerable
Vulnerability Srbds:             Not affected
Vulnerability Tsx async abort:   Not affected
Flags:                           fp asimd evtstrm aes pmull sha1 sha2 crc32 cpuid
root@jianlin:/home/jianlin/code/cilium-install/cilium-master/install/kubernetes# kubectl get pod -n kube-system -o wide
uNAME                            READY    STATUS             RESTARTS   AGE      IP               NODE        NOMINATED NODE    READINESS GATES
coredns-f9fd979d6-44946          0/1      ContainerCreating  0          4m20s    <none>           jianlin     <none>            <none>
coredns-f9fd979d6-svhcd          0/1      ContainerCreating  0          4m20s    <none>           jianlin     <none>            <none>
etcd-jianlin                     1/1      Running            0          4m27s    10.169.208.214   jianlin     <none>            <none>
kube-apiserver-jianlin           1/1      Running            0          4m26s    10.169.208.214   jianlin     <none>            <none>
kube-controller-manager-jianlin  1/1      Running            0          4m26s    10.169.208.214   jianlin     <none>            <none>
kube-scheduler-jianlin           1/1      Running            0          4m27s    10.169.208.214   jianlin     <none>            <none>
root@jianlin:/home/jianlin/code/cilium-install/cilium-master/install/kubernetes# kubectl get pod -o wide
No resources found in default namespace.
root@jianlin:/home/jianlin/code/cilium-install/cilium-master/install/kubernetes# kubectl get node -o wide
ubectl get service
NAME           STATUS   ROLES    AGE     VERSION   INTERNAL-IP      EXTERNAL-IP   OS-IMAGE         KERNEL-VERSION   CONTAINER-RUNTIME
jianlin        Ready    master   4m39s   v1.19.0   10.169.208.214   <none>        Ubuntu 20.04 LTS  5.9.0-rc1+       docker://19.3.12
jianlin-100    Ready    <none>   4m7s    v1.19.1   10.169.210.125   <none>        Ubuntu 20.04 LTS  5.9.0-rc1+       docker://19.3.12
root@jianlin:/home/jianlin/code/cilium-install/cilium-master/install/kubernetes# kubectl get service
```

Future Work

- Cilium benchmark on Arm64

- Enable End-To-End Testing

Cilium Channel for Arm64

- https://cilium.slack.com/archives/C0125S9TQD8

arm

Thank You
Danke
Merci
谢谢
ありがとう
Gracias
Kiitos
감사합니다
धन्यवाद
شكرًا
ধন্যবাদ
תודה