
A Hackers Guide
To Kubernetes and the cloud

ABOUT ME

- 18 Years in IT/Information Security
- Managing Consultant at NCC Group PLC
- Contributor at Security Stack Exchange
- Contributing author to the CIS Docker and Kubernetes Standards

TOPICS

- Threat Models
- Attack Surface
- External Attackers
- Compromised Containers
- Top 10 Things to do

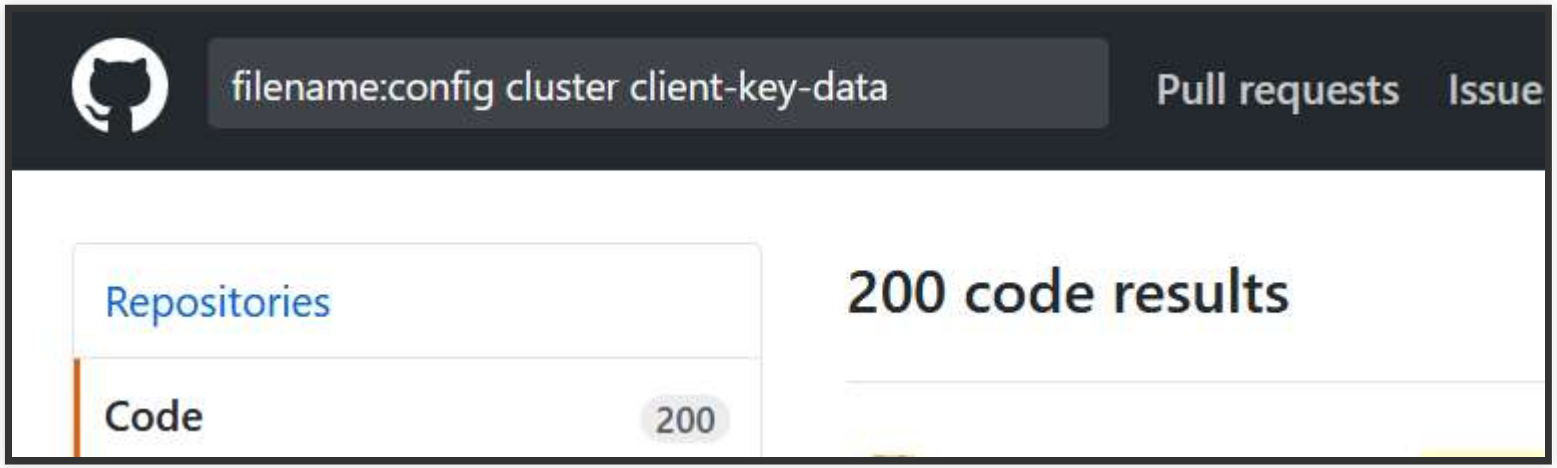

Threat Model


36


Attack
Surface

CLOUDY CLUSTERS

OTHER MEANS OF ACQUIRING ACCESS - GITHUB!




External
Attackers

EXTERNAL NETWORK VISIBILITY

- 2379/tcp open etcd
- 4194/tcp open cAdvisor
- (6|8)443/tcp open API Server
- 8080/tcp open Insecure API Server
- 10250/tcp open kubelet
- 10255/tcp open kubelet (Read Only)
- [various] open [Network plugins]

ATTACKING ETCD

SHODAN & FRIENDS

SHODAN port:2379 Explore Downloads Reports Enterprise Acc

Exploits Maps Share Search Download Results Create Report

TOTAL RESULTS

1,874

TOP COUNTRIES

United States	680
China	471
France	137
Germany	136
Ireland	57

TOP ORGANIZATIONS

Amazon.com	286
Hangzhou Alibaba Advertising Co.,Ltd.	160
Digital Ocean	154
Psychz Networks	62
OVH SAS	31

TOP OPERATING SYSTEMS

Linux 3.x	13

TOP PRODUCTS

etcd	1,830

104.254.244.82

1&1 Internet AG

Added on 2018-02-23 21:35:54 GMT

United States, Wayne

Details

```
etcd
Name: kube-etcd-0000
Version: 3.1.0
Uptime: 7441h27m17.554682808s
Peers: http://104.254.244.82:23
```

54.194.20.187

ec2-54-194-20-187.eu-west-1.compute.amazonaws.com

Amazon.com

Added on 2018-02-23 21:25:44 GMT

Ireland, Dublin

Details

cloud

```
etcd
Name: 8e19c8ff13c34a82bbf0c5c5e
Version: 2.3.1
Uptime: 5246h57m20.810080435s
Peers: http://10.0.30.75:2380
```

13.84.129.237

Microsoft Azure

Added on 2018-02-23 21:24:48 GMT

United States, San Antonio

Details

cloud

```
etcd
Name: etcd02
Version: 2.2.5
Uptime: 4h8m34.56225026s
Peers: http://10.3.0.8:2380
```

119.23.79.186

Hangzhou Alibaba Advertising Co.,Ltd.

Added on 2018-02-23 21:20:37 GMT

China, Hangzhou

Details

```
etcd
Name: x1
Version: 3.2.0+git
Uptime: 583h4m22.51149815s
Peers: http://0.0.0.0:2380
```

ATTACKING THE KUBELET

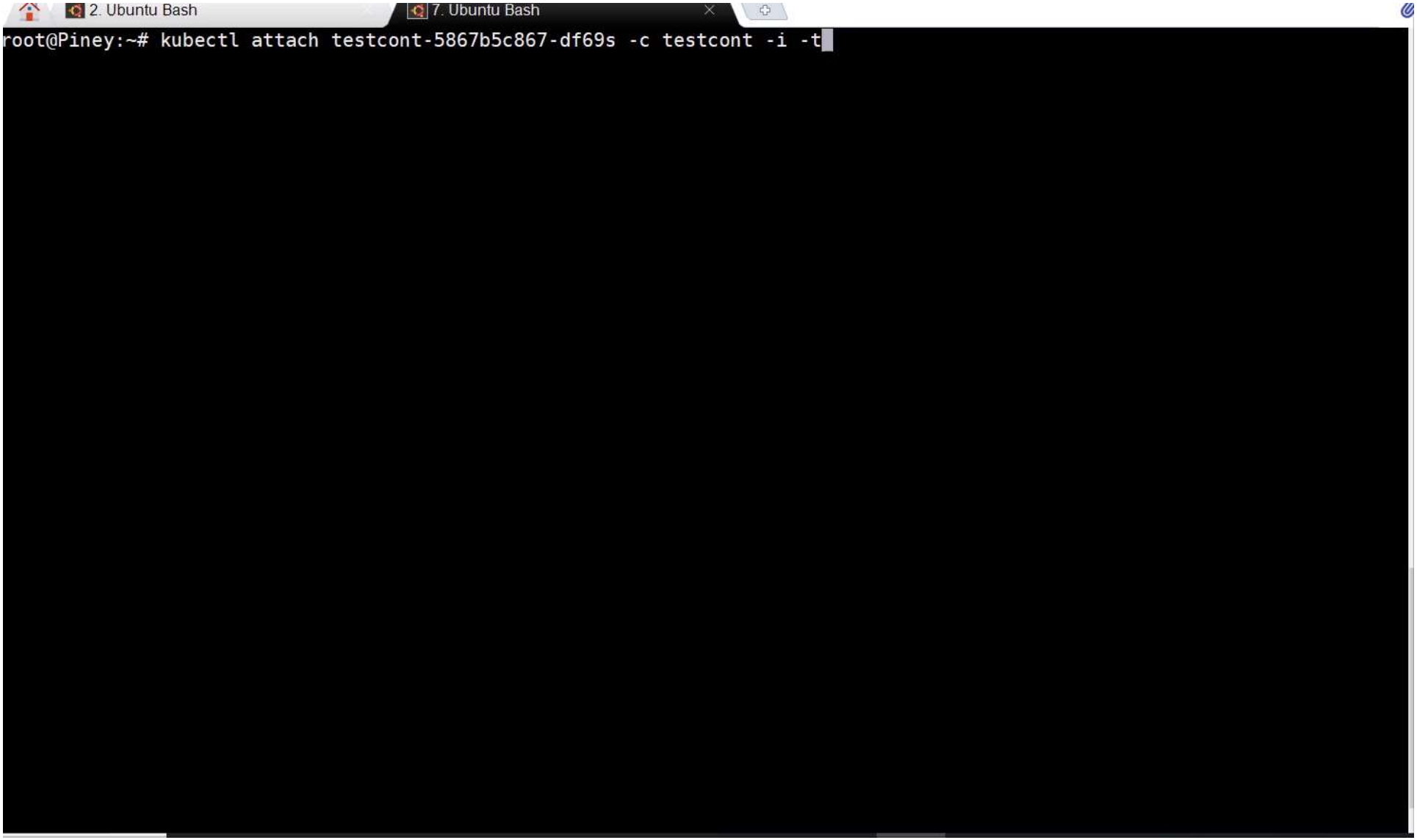

Malicious
Container

INCREASED ATTACK SURFACE

- Container Filesystem Access
- "Internal" Network Position
- Kernel Attacks

ATTACKING SERVICE ACCOUNT TOKENS

LEVERAGING ACCESS IN THE CLOUD


2. Ubuntu Bash
7. Ubuntu Bash
root@Piney:~# kubectl attach testcont-5867b5c867-df69s -c testcont -i -t

THE IMPORTANCE OF SECURE DEFAULTS!


Key Security Considerations

1. INSECURE PORT

```
--insecure-port=0
--insecure-bind-address - Not Set
```

2. CONTROL ACCESS TO THE KUBELET

```
--anonymous-auth=false
--authorization-mode - Not set to "AlwaysAllow"
--read-only-port=0
--cadvisor-port=0
```

3. CONTROL ACCESS TO ETCD

```
--client-cert-auth=true
--auto-tls=false
--peer-client-cert-auth=true
--peer-auto-tls=false
```

4. RESTRICT SERVICE TOKEN USE

5. RESTRICT PRIVILEGED CONTAINERS

6. API SERVER AUTHENTICATION

```
--anonymous-auth=false
--basic-auth-file - Not Set
--token-auth-file - Not Set
```

7. API SERVER AUTHORISATION

```
--authorization-mode=RBAC
```

8. PODSECURITYPOLICY

9. NETWORKPOLICY

10. REGULAR UPGRADES!

HONOURABLE MENTION - CLOUD RIGHTS

RESOURCES

- CIS Security Guide for Kubernetes - https://learn.cisecurity.org/benchmarks

CONCLUSION

- Default Security Options very important.
- Always think about your threat model and attack surface :)
- Get the basics right

QUESTIONS

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