



Singularity Runtime - 5 min

20 June 2019

Michael Bauer - HPC Container Workshop ISC19

Singularity is the open source container runtime of choice for



Artificial Intelligence, Compute Driven Analytics, Data Science...

- Millions of container runs per day
- With more than 40,000 users
- On millions of cores
- Across x86, ARM and POWER architectures

- Singularity voluntary registry, March 2019

HPC Wire Editors Choice Awards:

- 2016: Top products to watch
- 2017: Top products to watch
- 2017: Best HPC Programming Tool/Tech
- 2018: Best HPC Programming Tool/Tech
- 2018: Top Product to Watch

SINGULARITY USERS



BLOCKING ESCALATION

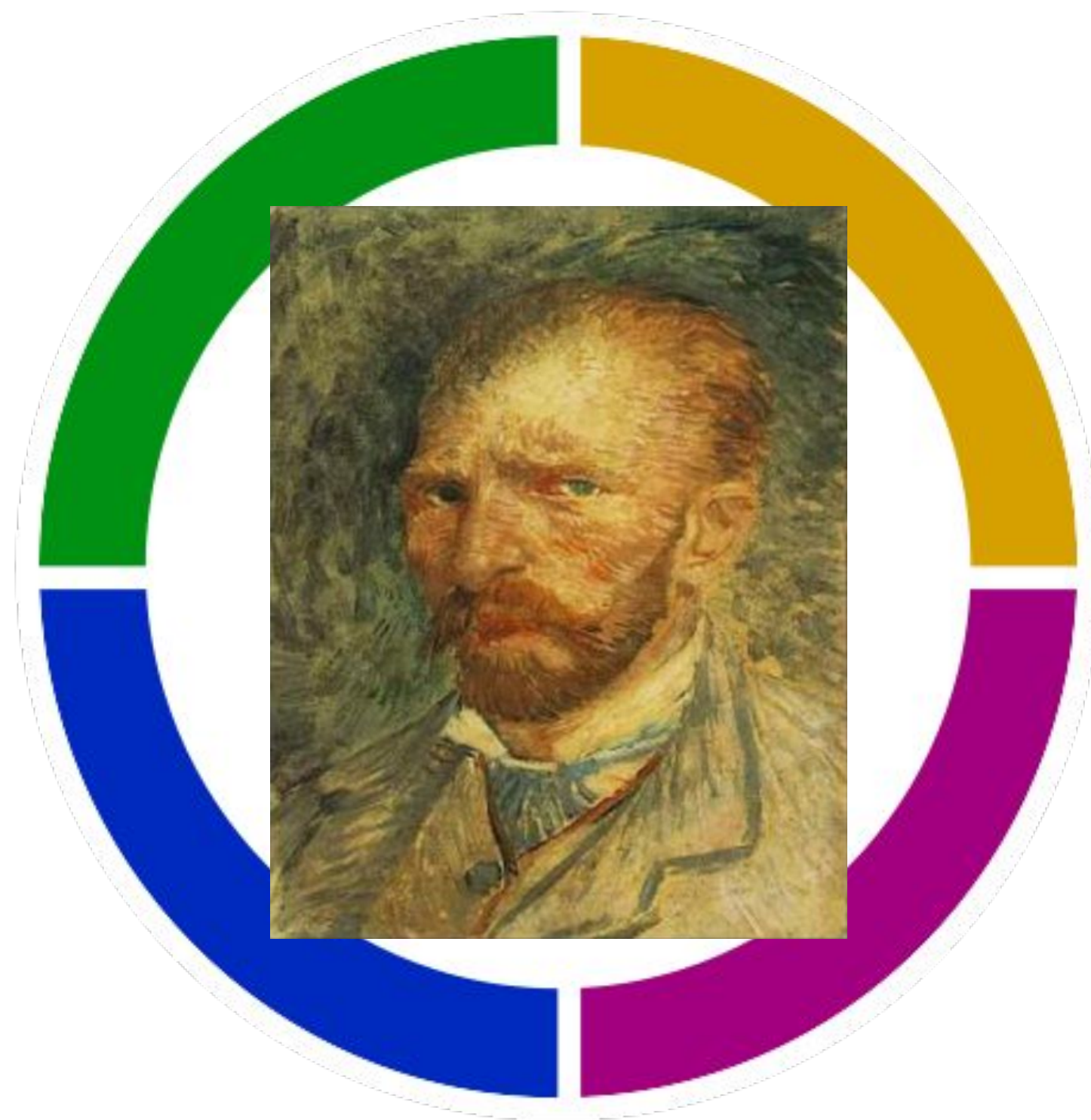
```
$ singularity exec ubuntu.sif whoami  
gmk
```

```
$ singularity exec ubuntu.sif su -c whoami  
Password:  
su: Authentication failure
```

```
$ singularity exec ubuntu.sif sudo whoami  
sudo: effective uid is not 0, is /usr/bin/sudo on a file system with the  
'nosuid' option set or an NFS file system without root privileges?
```

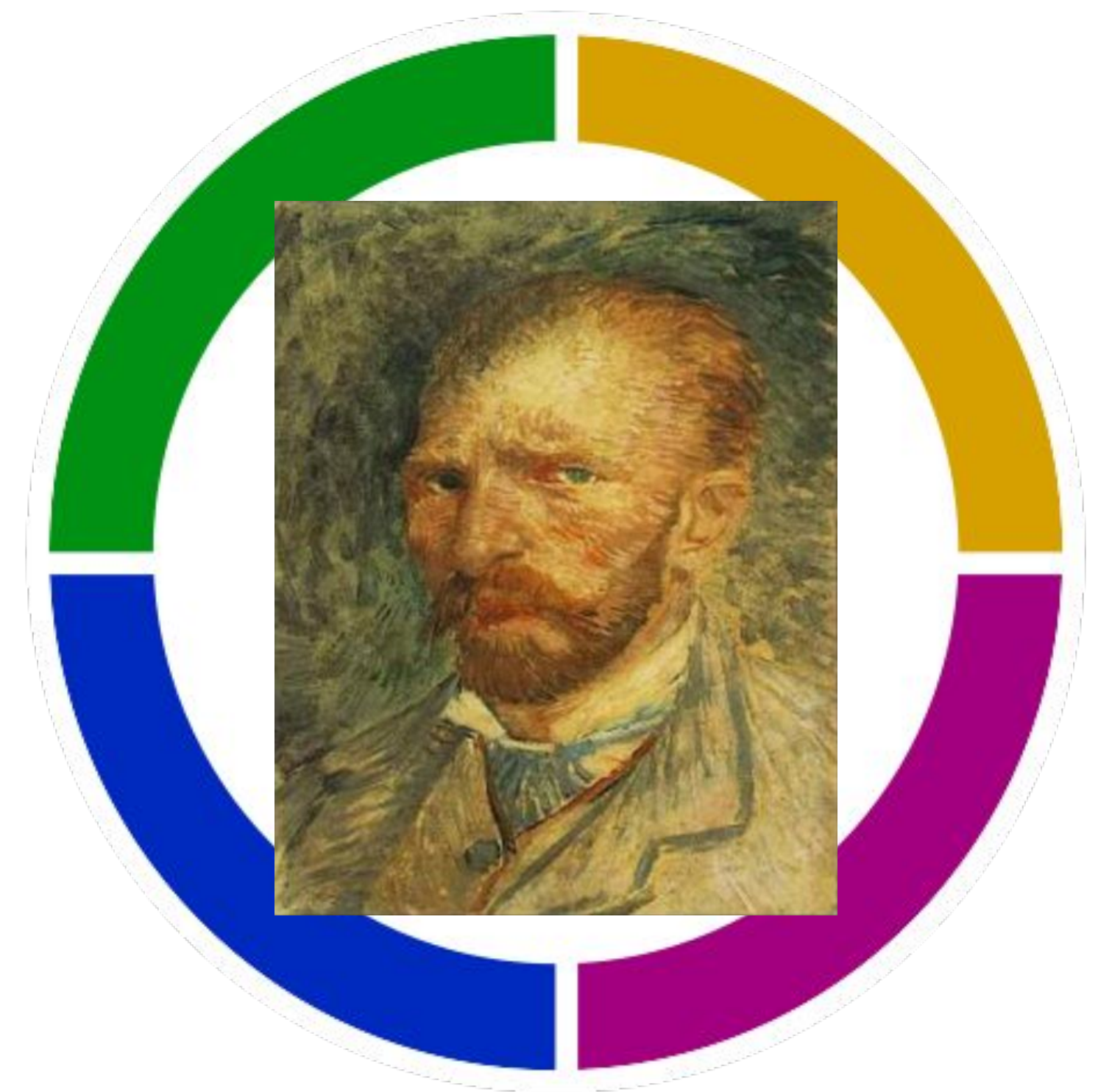
Singularity blocks privilege escalation; once inside the container the user is always themselves

With Singularity, you get verifiable reproducibility



SHA:
5f09a35a642a68c467bf230f5e5ea3218e4177a0

=



SHA:
5f09a35a642a68c467bf230f5e5ea3218e4177a0

```
$ singularity exec --gpu=$(platform) docker://tensorflow/tensorflow python
Python 2.7.12 (default, Dec 4 2017, 14:50:18)
[GCC 5.4.0 20160609] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import tensorflow as tf
>>> x1 = tf.constant([1,2,3,4])
>>> x2 = tf.constant([5,6,7,8])
>>> result = tf.multiply(x1, x2)
>>> print(result)
Tensor("Mul:0", shape=(4,), dtype=int32)
>>> exit()
$
```

Singularity Desktop

Singularity on MacOS

Singularity Desktop
Alpha released at #SUG19

```
gmk — xhyve • singularity shell ubuntu_latest.sif — 80x24
[Gregorys-MBP:~ gmk$ singularity shell ubuntu_latest.sif
WARNING: Could not set container working directory /Users/gmk: chdir /Users/gmk:
no such file or directory
[Singularity sda:~> pwd
/Users/gmk
[Singularity sda:~> ls
Applications  Documents  Library  Pictures          ubuntu_latest.sif
Code          Downloads  Movies   Public
Desktop       Dropbox   Music    busybox_1.28.sif
[Singularity sda:~> cat /etc/os-release
NAME="Ubuntu"
VERSION="18.04.1 LTS (Bionic Beaver)"
ID=ubuntu
ID_LIKE=debian
PRETTY_NAME="Ubuntu 18.04.1 LTS"
VERSION_ID="18.04"
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
VERSION_CODENAME=bionic
UBUNTU_CODENAME=bionic
Singularity sda:~>
```

