

Singularity

Past, Present, Future

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Introduction



Adam Hughes
Software Architect

A Brief History of Singularity

- Invented by Greg Kurtzer at LBNL to address problems specific to HPC
- Development started in October 2015 with initial release in April 2016
- User feedback, major changes and help from the community leads to 2.0 in June 2016
- 2.4 is released in October 2017

Singularity Users - Then



HARVARD
UNIVERSITY

RStor



GHENT
UNIVERSITY

Lenovo



Dartmouth

GSII



ONTOPOS



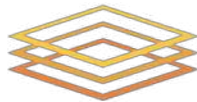
National Institutes of Health



INDIANA UNIVERSITY



Stanford
University



Open Science Grid



Institut Pasteur



TACC

TEXAS ADVANCED
COMPUTING CENTER



NVIDIA

nextflow



SDSC
SAN DIEGO SUPERCOMPUTER CENTER

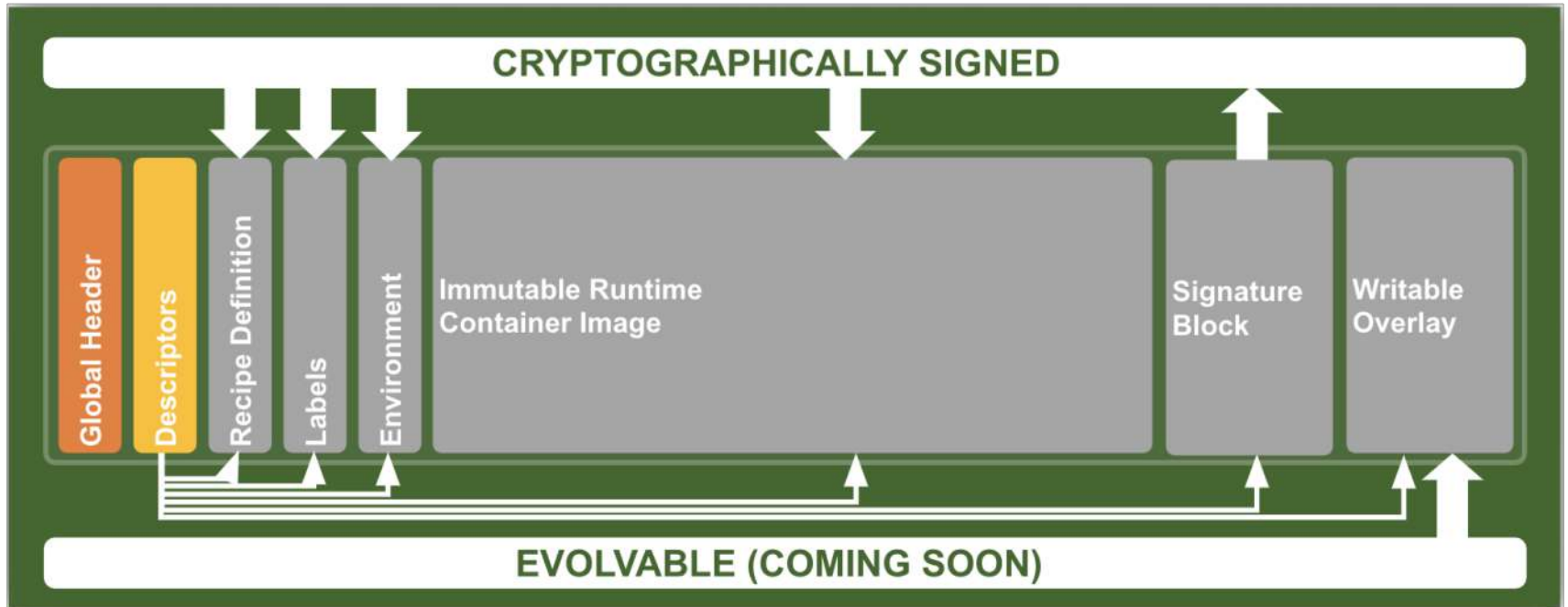


Singularity Users - Now



- Released October, 2018
- Rewrite in Golang
- Network virtualization via CNI plugins
- Fine-grained control over security context
 - SELinux, AppArmor and SecComp
- Native support for cgroups
- Easier to work with Docker and OCI containers
- Native integration with Singularity Container Services (SCS)
- New image format...

Singularity Image Format (SIF)



- Released February, 2019
- Adds OCI runtime compatibility
 - create delete exec kill mount pause resume run start state umount update
- Singularity CRI released



kubernetes



- Singularity-CRI now in v1.0.0-alpha.3 release
 - Please try and provide feedback!
 - <https://github.com/sylabs/singularity-cri/>
- Run all workloads (K8s microservices, HPC, EPC, etc...) with one unifying runtime
- Native support for GPUs and other HPC-oriented hardware via Container Device Plugins



**CLOUD NATIVE
COMPUTING FOUNDATION**

- Plugin framework, allowing third parties to develop plugins for use with Singularity.
- Multi-stage builds
- Enhanced integration with SCS

- Plugin ecosystem
- SIF encryption
- Unprivileged fakeroot from a sandbox
- True rootless (non-SUID) support for SIF
- Multi-arch support (- - arch)

Singularity Desktop



Alpha available for Mac now!

<https://www.sylabs.io/singularity-desktop-macos/>

Questions?

THANK YOU!

@SylabsIO

@SingularityApp

<https://www.sylabs.io>