Container Science – Intelligence Anywhere

COMPARISON BRIEF

Matching the right container platform for your IT workloads

Features	Singularity Community	SingularityPRO
SIF: Single File Container Format	■	■
Cryptographically Verifiable	■	■
No Persistent Global Daemon Process	■	■
Support for Non-root Users	■	■
Running Containers	■	■
Blocking Privilege Escalation within a Container	■	■
"Bring Your Own Environment" Usage Model	■	■
Support for AI/HPC Workflows and Architectures	■	■
Support for GPUs Natively	■	■
Code Curation		■
Streamlined Security Updates		■
Sylabs Cloud Features		■
Signed Packages and Repositories		■
Additional Self-Service Help		■
Container Build Services		■
Cryptographic Key Service		■
Container Library		■

Singularity Community vs SingularityPRO

Initially available as an open source container platform for high-performance computing (HPC) environments, Singularity Community is now offered in a PRO version designed to support HPC and Enterprise Performance Computing (EPC) workloads, including artificial intelligence (AI), machine learning (ML), deep learning (DL), IoT, and predictive analytics.

First Open Source...

Released in 2016, Singularity Community is an open source-based container platform that made what was previously impossible, possible.

Within six months of its initial release, Singularity Community was running on the largest HPC system in the world. Today, Singularity Community is:

- Used by over 25,000 top academic, government, and enterprise users
- Installed on over 3 million cores
- Trusted to run over a million jobs per day

Due to its unique architecture, functionality, and solution—coupled with overwhelming acceptance by the HPC community—Singularity Community was the recipient of the 2016 and 2017 HPCwire Editor and Readers' Choice Awards.

With Singularity and its single file image format, the container starts with a base Linux distribution. Then applications, libraries, data, scripts, and necessary parts of the containerized application's workflow are added. Next, all components are compressed into the Singularity Image Format (SIF). And if desired, the file can be cryptographically signed to ensure authenticity and security (i.e., a trusted containerized application).

Singularity's unique design meets users' needs for a container solution that not only offers high performance, but also supports mobility, reproducibility, and seamless integration within the existing environments. Singularity enables a Bring Your Own Environment (BYOE) capability where entire environments can be transported between computational resources with reproducibility.

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…Now the Enterprise

SingularityPRO builds on the success of Singularity Community and leverages its open source heritage to enable HPC and Enterprise Performance Computing workloads, including deep learning, IoT, and predictive analytics.

SingularityPRO includes all of the functionality of the open source version, plus enterprise-grade enhancements that make the platform stronger, highly secure, and more feature-rich, such as:

- Long-term support, where security patches and bug-fixes are backported into SingularityPRO versions. This way, administrators are released from the burden of continually updating the Singularity code base to the latest open-source version.
- Early releases of security patches, delivered to SingularityPRO customers before propagation into the source community release.
- Stability, by providing long-term support, along with bug and security fixes.
- Customized service/support options, enabling SingularityPRO users to choose the tiered service/support option that best meets their needs.
- Sylabs is building a value-added ecosystem to support the Singularity container platform with access to resources such as:

  o Remote Builder—For streamlining container creation. Building a container on most platforms requires root/administrator access. This method can be unnecessarily cumbersome, forcing a user to build a container on a system where they have root access and move it to a production system where they do not. Singularity over comes this problem with Remote Builder—a service that enables users to build containers in sandboxed/isolated virtual machines (VMs).

  o Library—For hosting Singularity containers. The full-featured Library can be hosted on-premises in your data center or the Sylabs cloud. Upload, download, search and browse for containers in public and private areas, share private containers with other users or via generated link. Security and privacy in the library are based around a user-owner of library objects, and the concept of public or private collections.

  o Key-Signing Services—Every container created with Singularity adheres to a single-file format (Singularity Image Format) that includes various data regions. For example, there are regions for the container file system itself, the metadata, and for the security keys to create self-signing mechanism. Rather than run the risk of downloading malicious containers from an untrusted source, containers created with Singularity are trusted because included container signatures can be validated with security keys.

Where Singularity Community is subject to rolling code changes, SingularityPRO is a stable and supported version provided by Sylabs. The PRO version will be released at specified intervals to benefit large organizations that manage pre-determined maintenance cycles.

Make the right choice

Discover which platform is best-suited for your environment—choosing open source-based Singularity Community, or SingularityPRO with commercial support for workloads such as AI, deep learning, machine learning, and intelligent analytics. Either way, you will receive a unique container platform that meets your needs for flexibility, mobility, reproducibility, security, and control.

For more information, you can visit **www.sylabs.io**

Sylabs—standing at the forefront of innovation

Founded in 2017 and emerged from stealth in early 2018, Sylabs is a U.S.-based company that stands on the forefront of innovation, design, development, support for HPC, open source, Linux, and containerization. Sylabs' team offers deep industry expertise in the intelligence community, neuroscience, bioinformatics, security, networking, and government/research entities including National Institutes of Health, University of Michigan, and U.S Department of Energy National Labs.

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