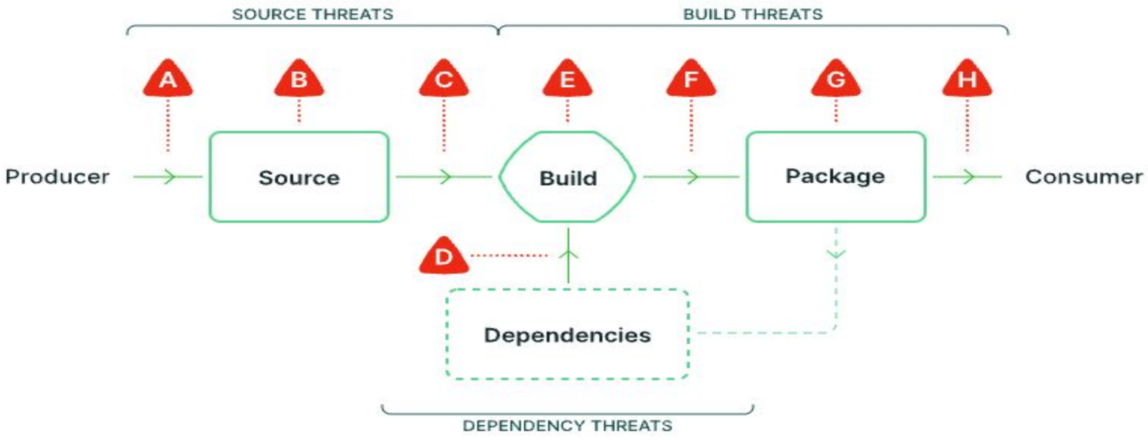
Scorecard and Sigstore

Overview

OpenSSF

OPEN SOURCE SECURITY FOUNDATION

Software Supply Chain Threats



SOURCE THREATS

- A Submit unauthorized change
- B Compromise source repo
- C Build from modified source

DEPENDENCY THREATS

- D Use compromised dependency

BUILD THREATS

- E Compromise build process
- F Upload modified package
- G Compromise package registry
- H Use compromised package

Reference: [SLSA Framework - Supply Chain Threats]

What is Scorecard?

*“an **automated tool** that assesses a number of important heuristics ("**checks**") associated with software security and assigns each check a score of 0-10. “ - Scorecard*

A great example of OpenSSF Scorecard report

What is Scorecard?

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A great example of OpenSSF Scorecard report

Scorecard - Shift Security to the Left

Measures and reports the security posture of software projects, mainly open source

- Analysing the potential threats

Improves the security posture of a software projects, close source and open source

- Provides recommendations

Help software producers to produce more secure software

Help software consumers to manage dependencies more effectively

- Software producers are consumers

Scorecard Adoption - By Maintainers

Make your open source software more secure

Showcase your security achievements using Scorecard Badge

Increase project adoption

How to?

- Use Scorecard GitHub Action to enable Scorecard on GitHub public repositories you own
- Focus on the most important findings first to improve security posture in the shortest time
- Refer to OpenSSF GUAC Scorecard Configuration as an example

Scorecard Adoption - By Consumers

Make fact-driven decisions on software dependencies

- Scorecard scans 1 million most critical open source projects weekly and publish the results publicly

Make your products/services more secure

Increase products/services market share

How to?

- Use BigQuery Explorer to check an OSS project security scoring history.
- Use the REST API
- Incorporate Scorecard measurements into your SDLC process to reduce dependency threats

Scorecard Resources

Website

https://securityscorecards.dev/

GitHub repository

https://github.com/ossf/scorecard

Scorecard training:

https://openssf.org/training/securing-projects-with-openssf-scorecard-course/

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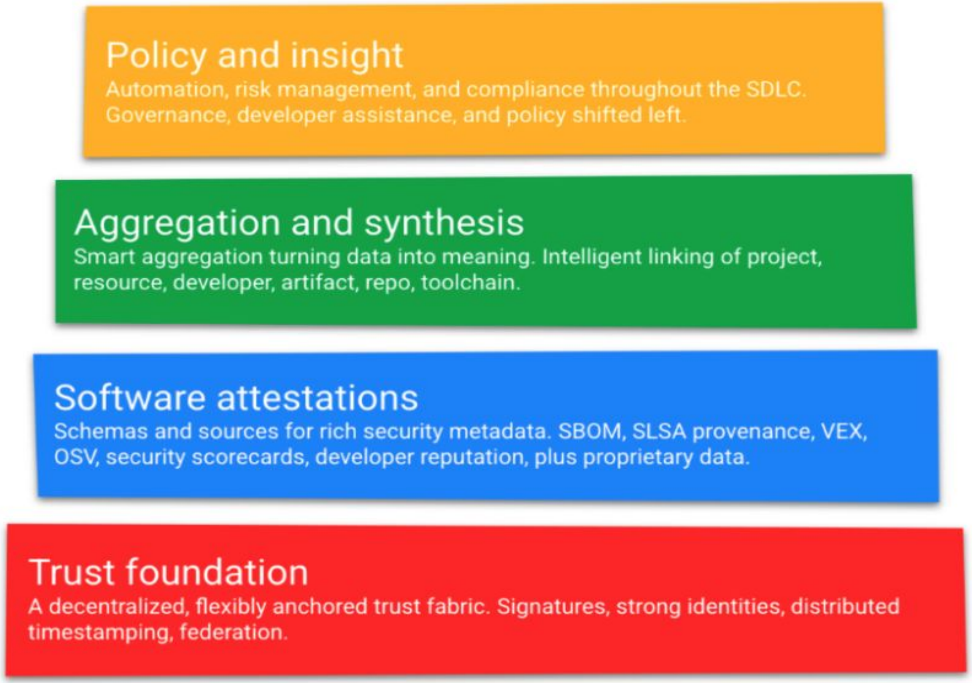
What is Sigstore?

An open source internet service that creates and verifies digital signatures using ephemeral certificates



Policy and insight
Automation, risk management, and compliance throughout the SDLC. Governance, developer assistance, and policy shifted left.

Embed security into SDLC process

Aggregation and synthesis
Smart aggregation turning data into meaning. Intelligent linking of project, resource, developer, artifact, repo, toolchain.

Automation capabilities for data-driven security decisions

Software attestations
Schemas and sources for rich security metadata. SBOM, SLSA provenance, VEX, OSV, security scorecards, developer reputation, plus proprietary data.

sigstore

Verifiable evidence of artifacts authenticity and integrity

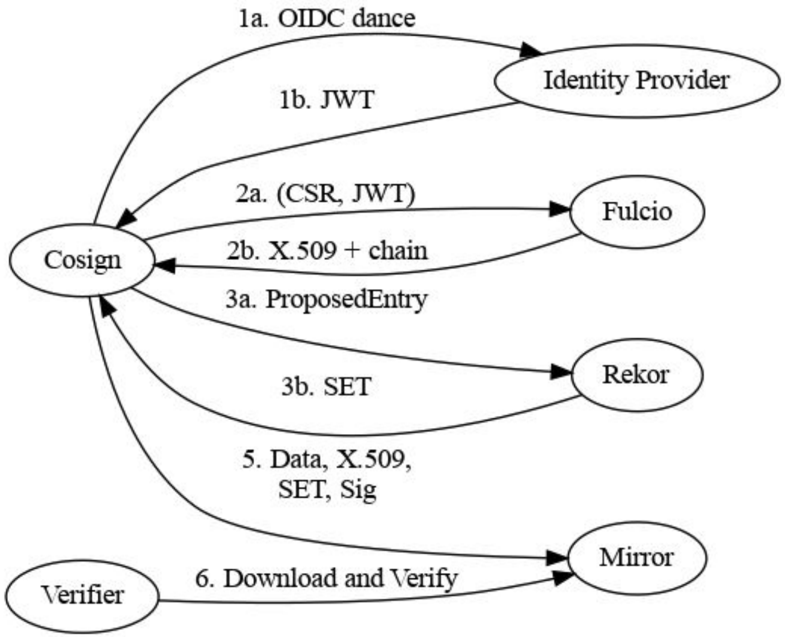
Trust foundation
A decentralized, flexibly anchored trust fabric. Signatures, strong identities, distributed timestamping, federation.

sigstore

Foundational layer of trust

Reference: Sigstore: Simplifying Code Signing for Open Source Ecosystems

Sigstore Architecture



IdP - Verifies the signer’s identity via OIDC

Fulcio - the CA that issues ephemeral x.509 certificates

Rekor - Timestamping authority, transparency log of software artifacts metadata and their signature

Reference: Life of a Sigstore Signature, What is Sigstore

Sigstore - Software Artifact Signing

sigstore- python to sign and verify Python package distributions.

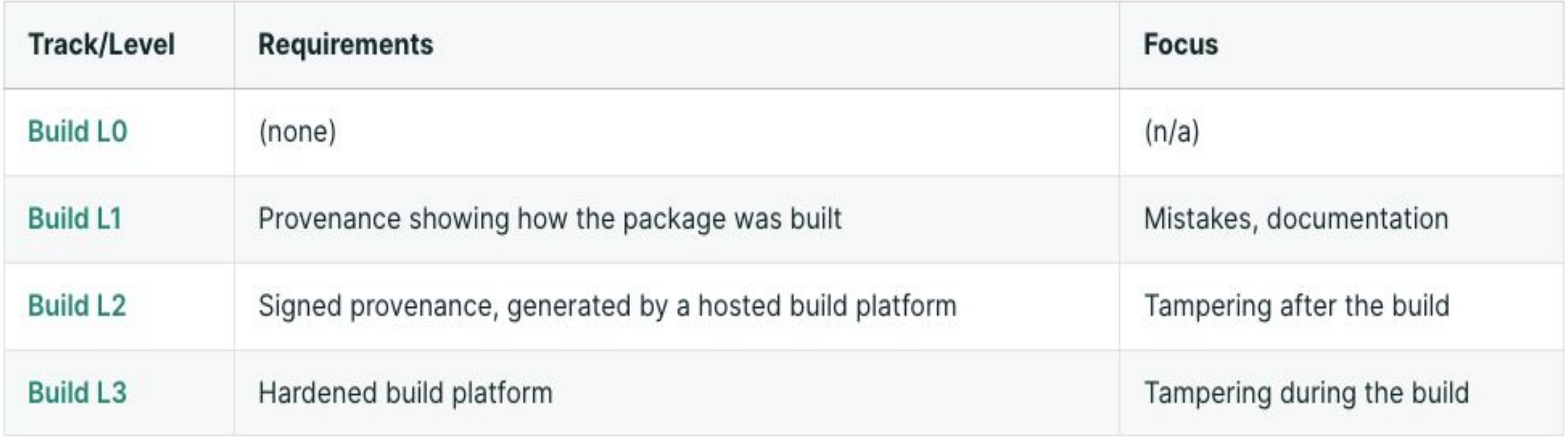
Scorecard scanning result signed and verifiable

- Rekor evidence
- Scorecard analysis workflow log
- Scorecard code base for signing artifacts

Sigstore - SLSA Build Provenance

SLSA - Supply chain Levels for Software Artifacts

SLSA is a specification for describing and incrementally improving supply chain security, established by industry consensus. It is organized into a series of levels that describe increasing security guarantees.



Track/Level	Requirements	Focus
Build L0	(none)	(n/a)
Build L1	Provenance showing how the package was built	Mistakes, documentation
Build L2	Signed provenance, generated by a hosted build platform	Tampering after the build
Build L3	Hardened build platform	Tampering during the build

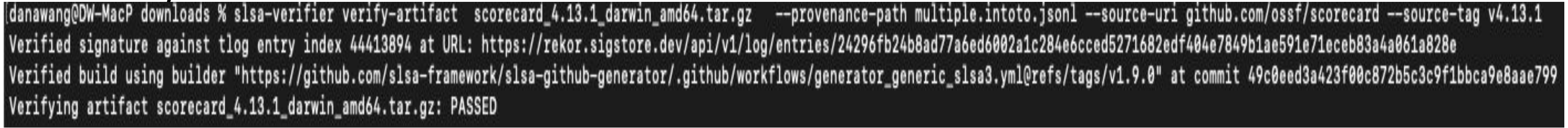
Sigstore - SLSA Build Provenance

Build provenance provides traceability of software artifacts back to its origin

- Where the source code is
- When, where, and how the artifacts are build
- Who triggers the build and why

Scorecard again!

- Release v4.13.1 build provenance
- Uses GitHub action to produce SLSA build Level 3 provenance
- Verify a tar ball



```
[danawang@DW-MacP downloads % slsa-verifier verify-artifact  scorecard_4.13.1_darwin_amd64.tar.gz   --provenance-path multiple.intoto.jsonl --source-uri github.com/ossf/scorecard --source-tag v4.13.1
Verified signature against tlog entry index 44413894 at URL: https://rekor.sigstore.dev/api/v1/log/entries/24296fb24b8ad77a6ed6002a1c284e6cced5271682edf404e7849b1ae591e71eceb83a4a061a828e
Verified build using builder "https://github.com/slsa-framework/slsa-github-generator/.github/workflows/generator_generic_slsa3.yml@refs/tags/v1.9.0" at commit 49c0eed3a423f00c872b5c3c9f1bbca9e8aae799
Verifying artifact scorecard_4.13.1_darwin_amd64.tar.gz: PASSED
```

Sigstore Resources

Website

https://www.sigstore.dev/

GitHub repository

https://github.com/sigstore

Training

https://openssf.org/training/securing-your-software-supply-chain-with-sigstore-course/

SLSA Resources

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Website

https://slsa.dev/

GitHub repository

https://github.com/slsa-framework

Ways to Participate

- Join a Working Group/Project
- Come to a Meeting (see Public Calendar)
- Collaborate on Slack
- Contribute on GitHub
- Become an Organizational Member
- Keep up to date by subscribing to the OpenSSF Mailing List

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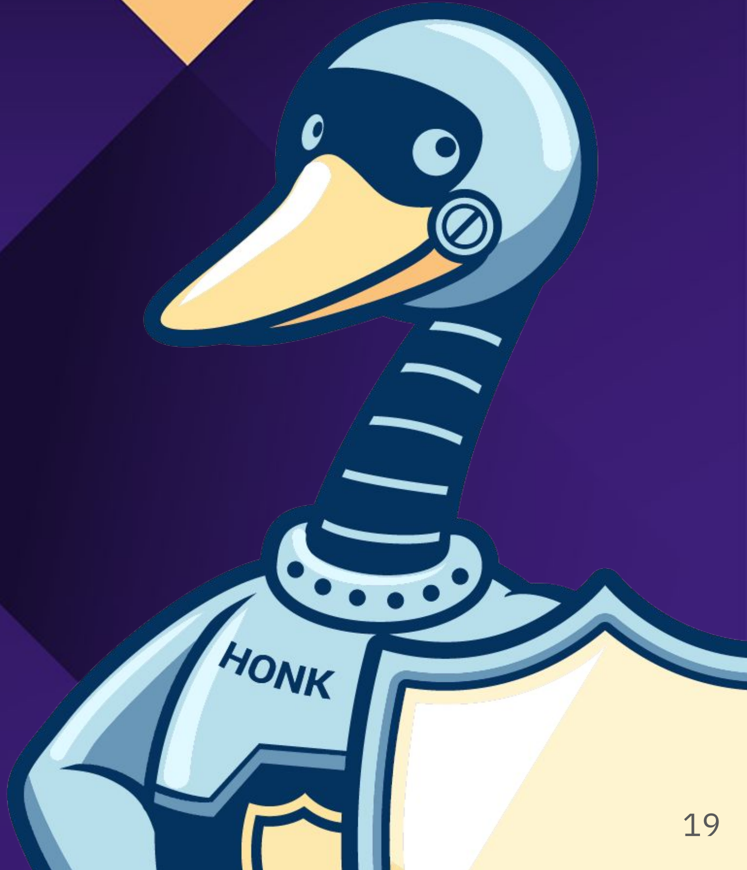

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Appendix

Elements

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