Sovereign Cloud Stack
An OSB ALLIANCE project

https://scs.community

Supported by:
Federal Ministry for Economic Affairs and Climate Action
on the basis of a decision by the German Bundestag

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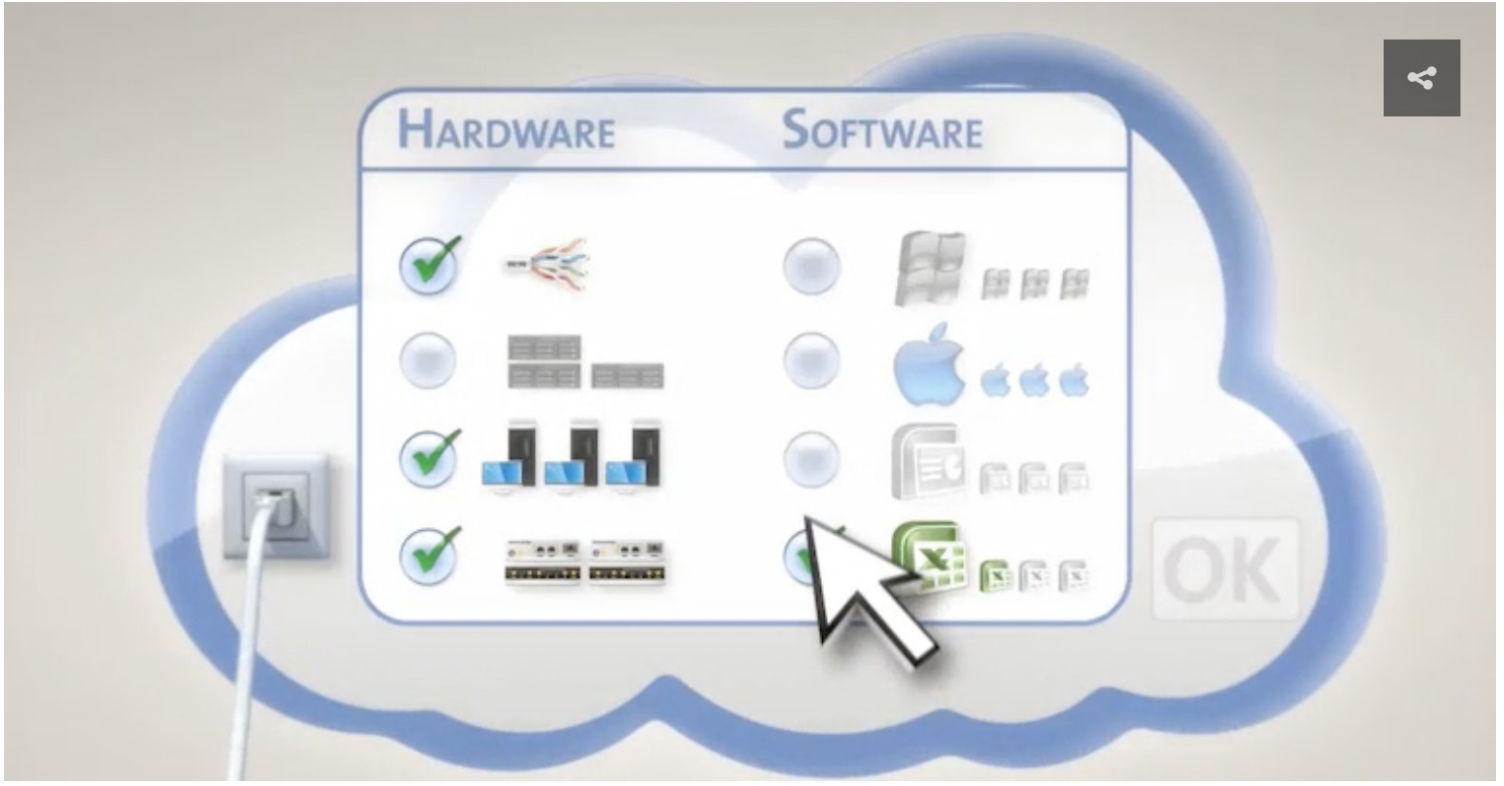
FOSSGIS 2024 Hamburg
20. März 2024

Manuela Urban

Sovereign Cloud Stack: Offene, föderierbare Cloud-Technologie für jeden Sektor

Der Traum von der Wolke...



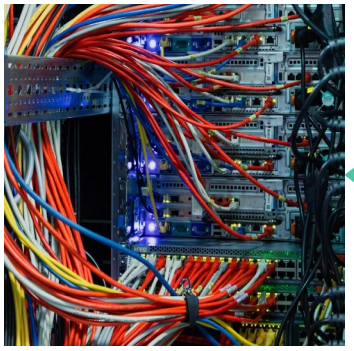
Quelle: Bundesministerium für Wirtschaft und Technologie 2010

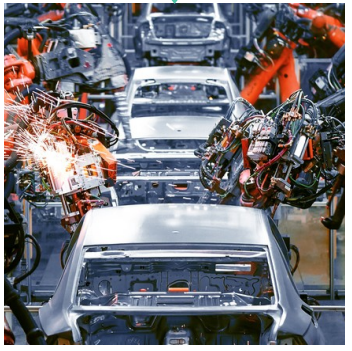
…und die Realität

- Über 80 % der Unternehmen in Europa fühlen sich technologisch abhängig.[1]
- Amazon, Microsoft, Alphabet (Google) beherrschen den Markt.[2]
- Vendor lock-in[3]
- Inkompabilität bei Infrastrukturen, Plattformen und Applikationen
- US Foreign Intelligence Surveillance Act (FISA) EU DSGVO
- Dynamische, verteilte Plattformen sind hochkomplex im Betrieb.
- Fachkräftemangel

1 ZEW – Leibniz-Zentrum für Europäische Wirtschaftsforschung:„Schwerpunktstudie Digitale Souveränität 2021“ Hrsg.: Bundesministerium für Wirtschaft und Energie (Oktober 2021)
2 https://www.srgresearch.com/articles/huge-cloud-market-is-still-growing-at-34-per-year-amazon-microsoft-and-google-now-account-for-65-of-all-cloud-revenues
3 https://www.cio.bund.de/SharedDocs/downloads/Webs/CIO/DE/digitale-loesungen/marktanalyse-reduzierung-abhaengigkeit-software-anbieter.pdf?__blob=publicationFile&v=1

Sovereign Cloud Stack: Ein Ökosystem für offene Infrastruktur





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SCS Leistungen

Zertifizierbare Standards

Modulare OS-Referenz-Implementierung

Open Knowledge

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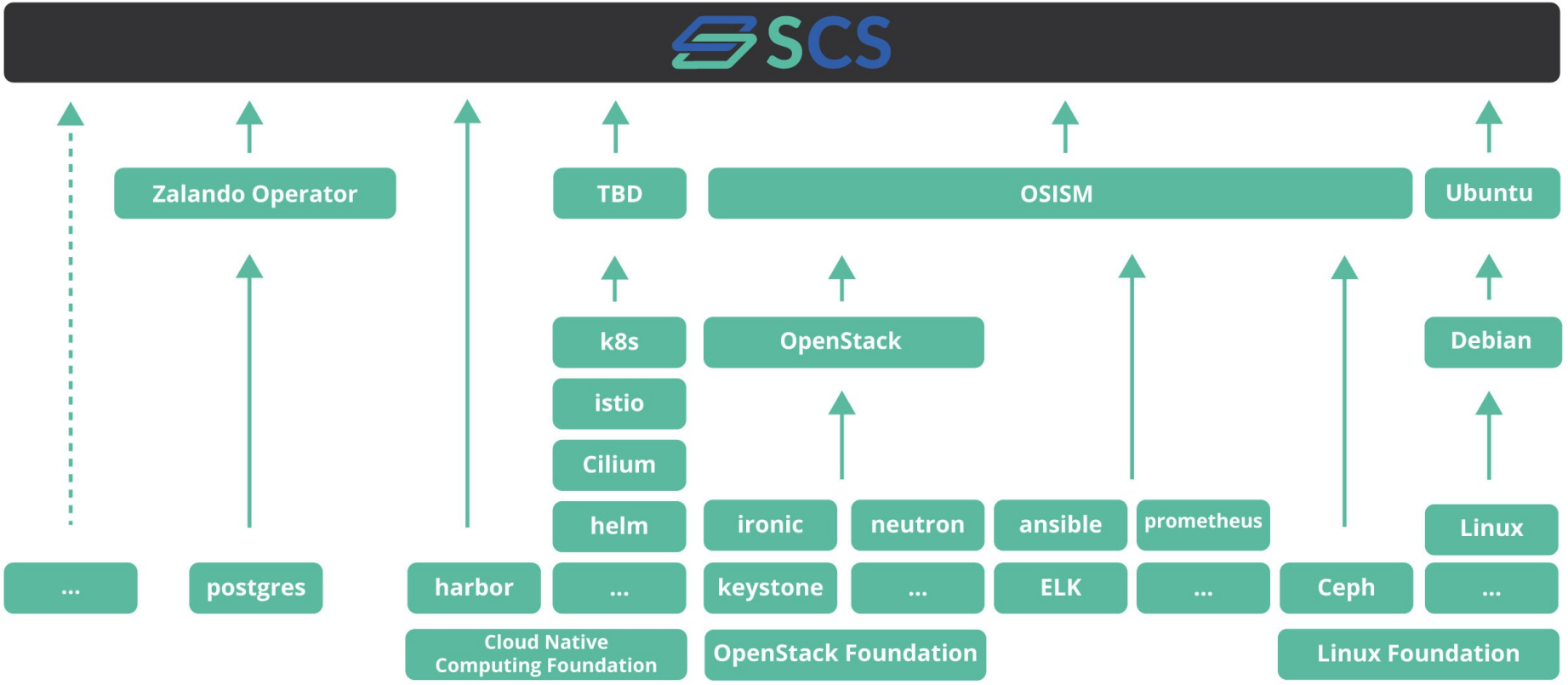
SCS integriert und ergänzt bewährt Open-Source-Bausteine



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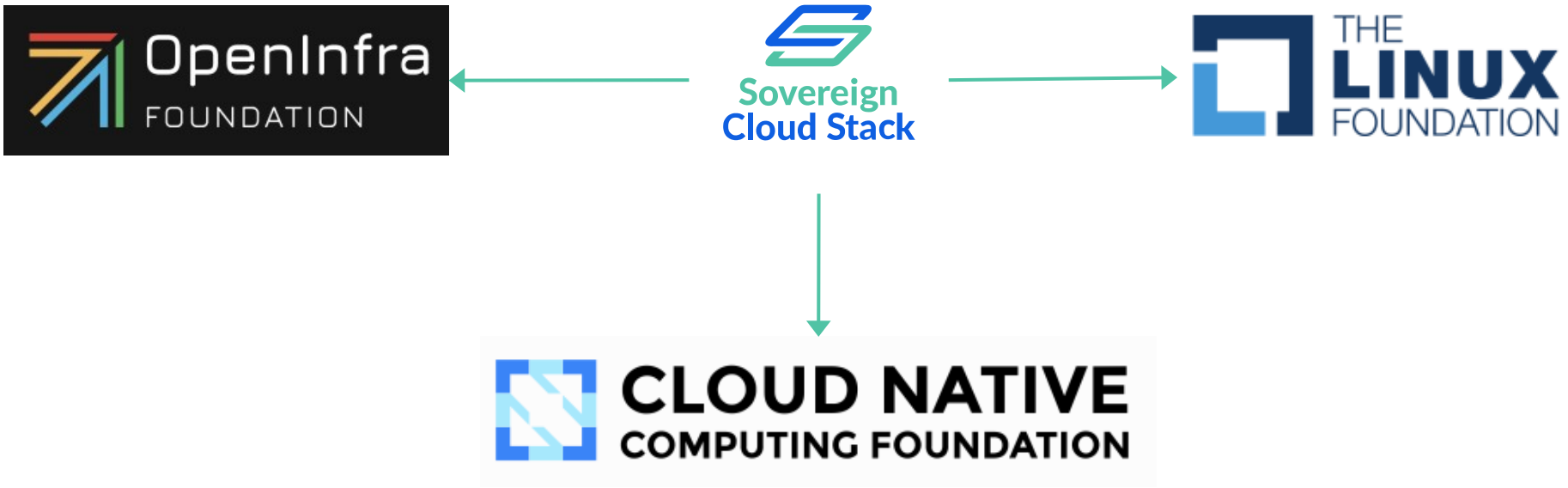
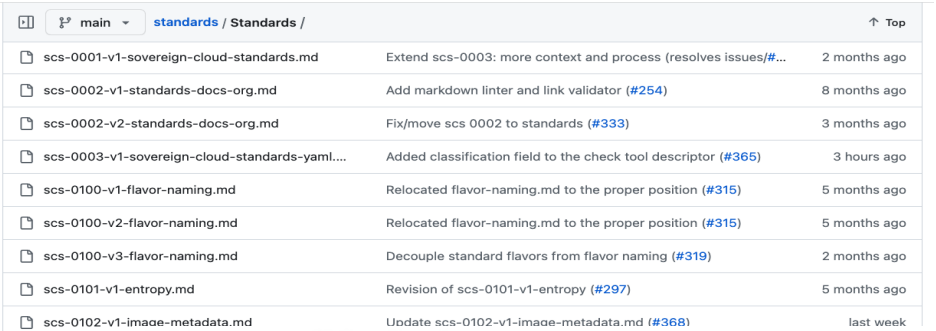
Upstream first!



Offene, zertifizierbare Standards

- ✔ Interoperabilität
- ✔ Portabilität
- ✔ Skalierung
- ✔ einfachere Zusammenarbeit von CSPs, Technology Providers, Service Companies, Software Vendors
- ✔ SaaS-Anbieter können plattformunabhängige Dienste entwickeln und anbieten



main standards / Standards / Top

scs-0001-v1-sovereign-cloud-standards.md	Extend scs-0003: more context and process (resolves issues/#...	2 months ago
scs-0002-v1-standards-docs-org.md	Add markdown linter and link validator (#254)	8 months ago
scs-0002-v2-standards-docs-org.md	Fix/move scs 0002 to standards (#333)	3 months ago
scs-0003-v1-sovereign-cloud-standards-yaml....	Added classification field to the check tool descriptor (#365)	3 hours ago
scs-0100-v1-flavor-naming.md	Relocated flavor-naming.md to the proper position (#315)	5 months ago
scs-0100-v2-flavor-naming.md	Relocated flavor-naming.md to the proper position (#315)	5 months ago
scs-0100-v3-flavor-naming.md	Decouple standard flavors from flavor naming (#319)	2 months ago
scs-0101-v1-entropy.md	Revision of scs-0101-v1-entropy (#297)	5 months ago
scs-0102-v1-image-metadata.md	Update scs-0102-v1-image-metadata.md (#368)	last week
scs-0103-v1-s		
scs-0104-v1-s		
scs-0110-v1-s		
scs-0111-v1-v		
scs-0210-v1-k		
scs-0211-v1-k		

SCS compatible clouds

This is a list of clouds that we test on a nightly basis against our `scs-compatible` certification level.

Name	Description	Operator	IaaS Compliance Check	HealthMon
gx-scs	Dev environment provided for SCS & GAIA-X context	plusserver GmbH	compliant passing	HM
pluscloud open - prod1	Public cloud for customers	plusserver GmbH	compliant passing	HM
pluscloud open - prod2	Public cloud for customers	plusserver GmbH	compliant passing	HM
Wavestack	Public cloud for customers	noris network AG/Wavecon GmbH	compliant passing	HM
REGIO.cloud	Public cloud for customers	OSISM GmbH	compliant passing	Dashboard

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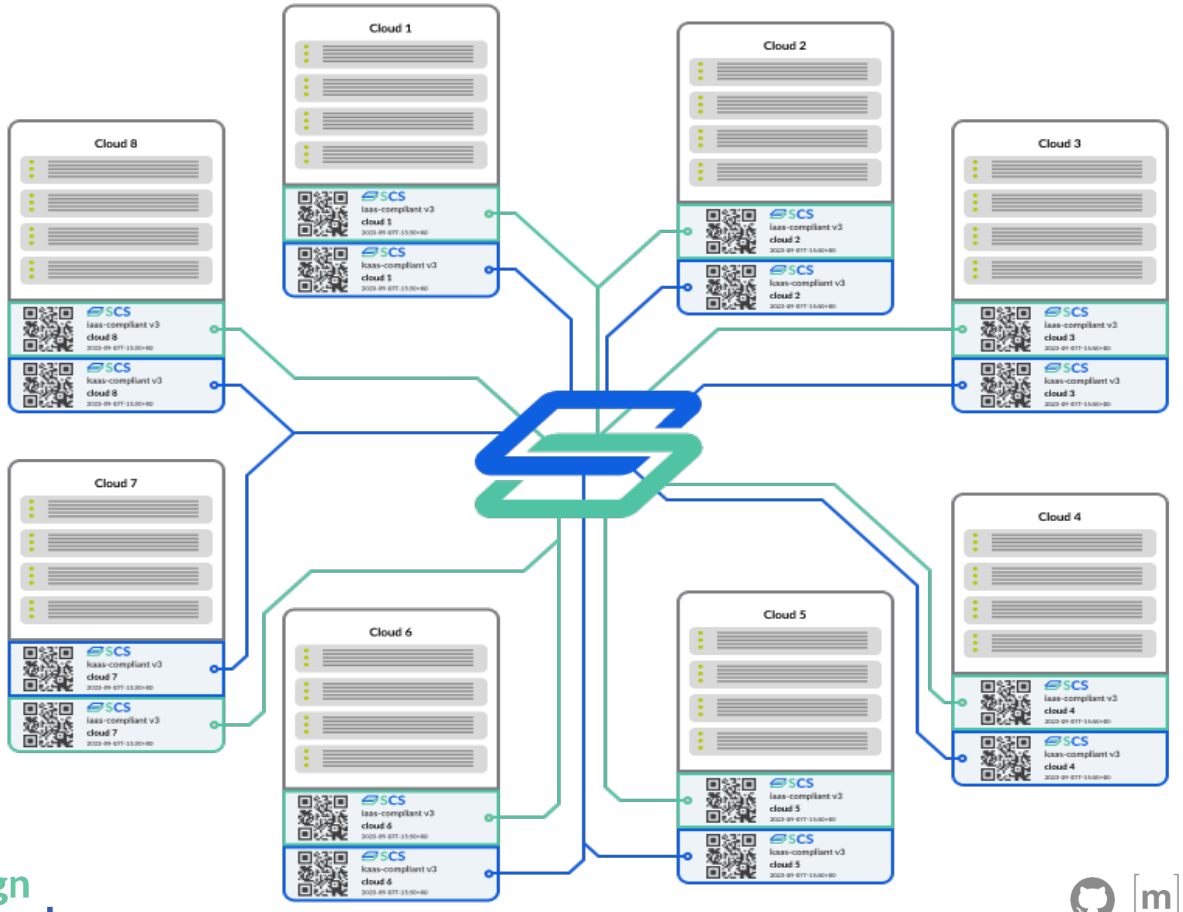
Sovereign Cloud Grid: Build a virtual hyperscaler!



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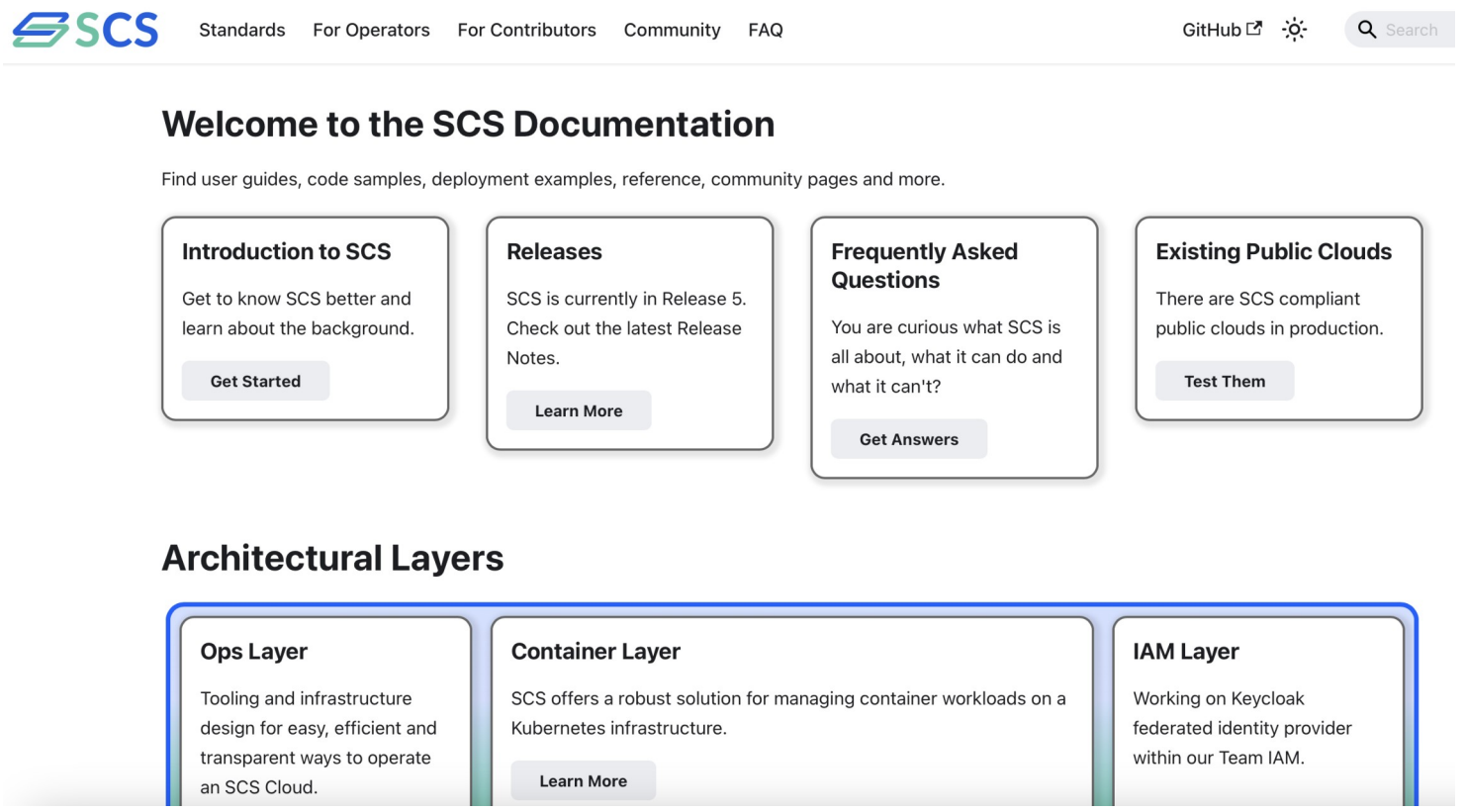
Open Knowledge



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OPEN OPERATIONS MANIFESTO

Building a community of practice and transparency for operations

https://openoperations.org

We build a community of practice

Open Operations builds a community of practice to keep the barrier to entry low and create a thriving environment for comfortable exchange.

We share knowledge

The availability of knowledge and skilled engineers is the limiting factor for many organizations to adopt, leverage, and successfully operate complex technology.

We're transparent about our incidents

We firmly believe that failures make us experts. The way we handle mistakes is how we become better.

We're transparent about our operational processes

We share our internal processes for the sake of transparency. We firmly believe that transparency leads to better and more reliable processes.

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Cloud-Angebote auf Basis von SCS

BayernCloud Schule

Die Plattform für eine moderne digitale Bildung

→ Informationen für Schulleitungen zur Freischaltung

...läuft auf SCS-Infrastruktur.

powered by plusserver

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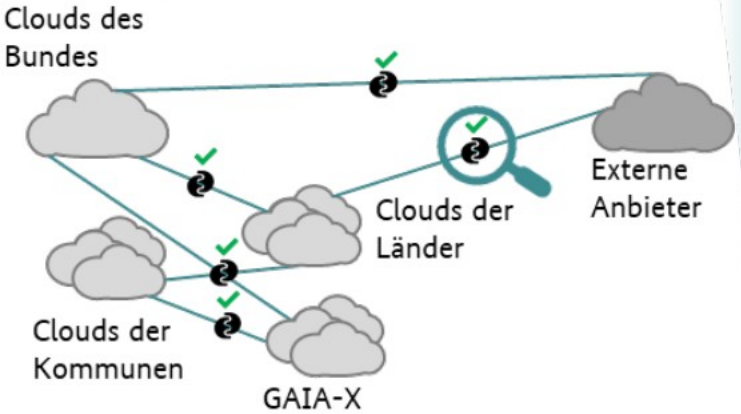
SCS ist an der Entwicklung der Deutschen Verwaltungscloud (DVC) beteiligt.

IT-Planungsrat

Deutsche Verwaltungscloud-Strategie
Übergreifende Etablierung und Nutzung von Standards für bestehende föderale Cloud-Lösungen der Öffentlichen Verwaltung



Bereiche zur Standardisierung föderaler Cloud-Lösungen

1 Entwicklung und Entwicklungsplattform
Plattformen, Prozesse und Architekturvorgaben zur Entwicklung von Anwendungen

2 Anwendungsbereitstellung und -management
Bereitstellung und Betreuung von Anwendungen über gesamten Lebenszyklus

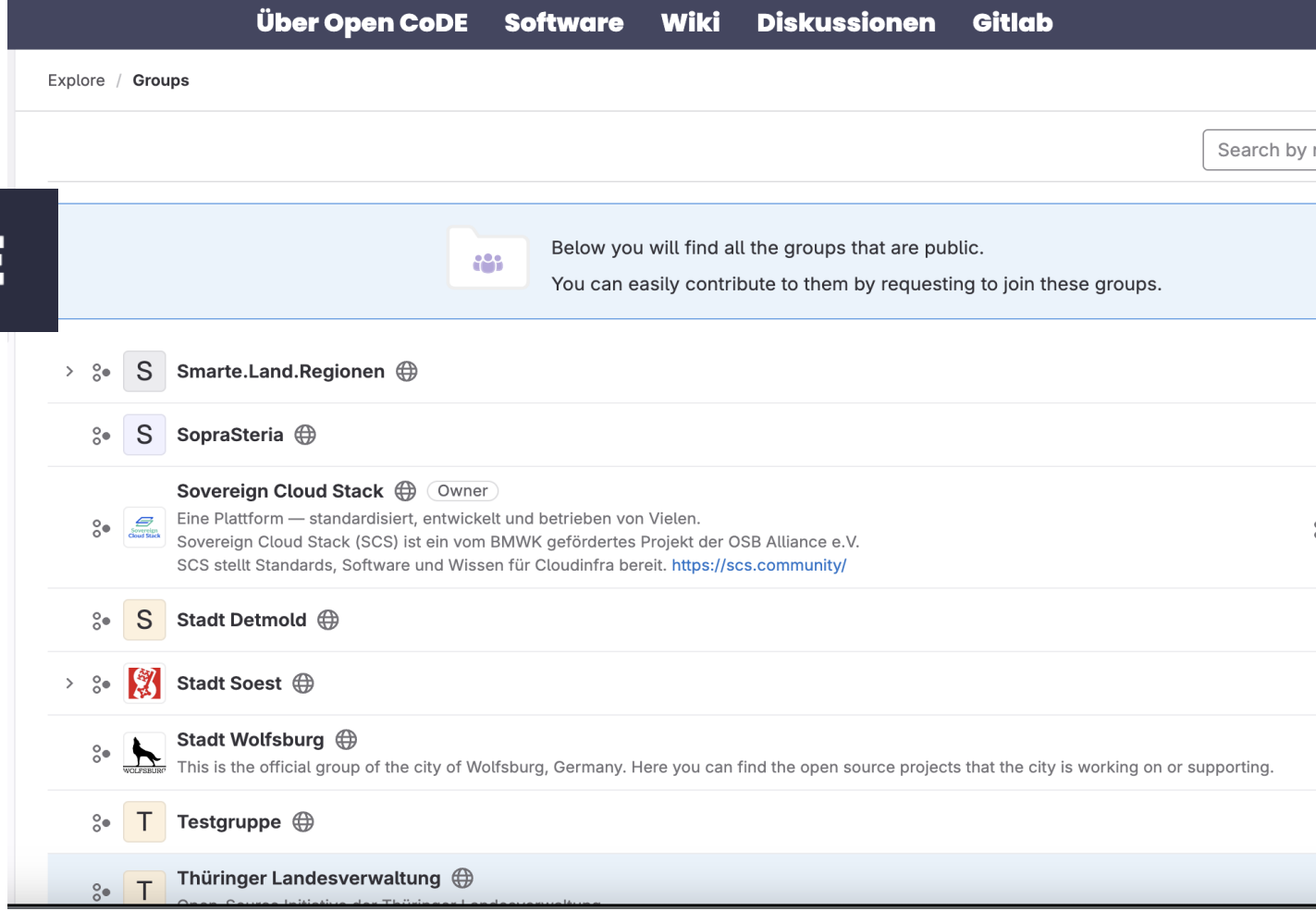
3 Code Repository
Verwaltungsumgebung zur Versionierung von Anwendungs-Code

4 Infrastruktur-Service und technologischer Stack
Hard- und Software zur Erbringung von IT-Leistungen

5 Betriebsstandards und Betriebsmodell
Zusammenarbeit IT-Dienstleister/Service-Bereitstellung

SCS in

Open CoDE



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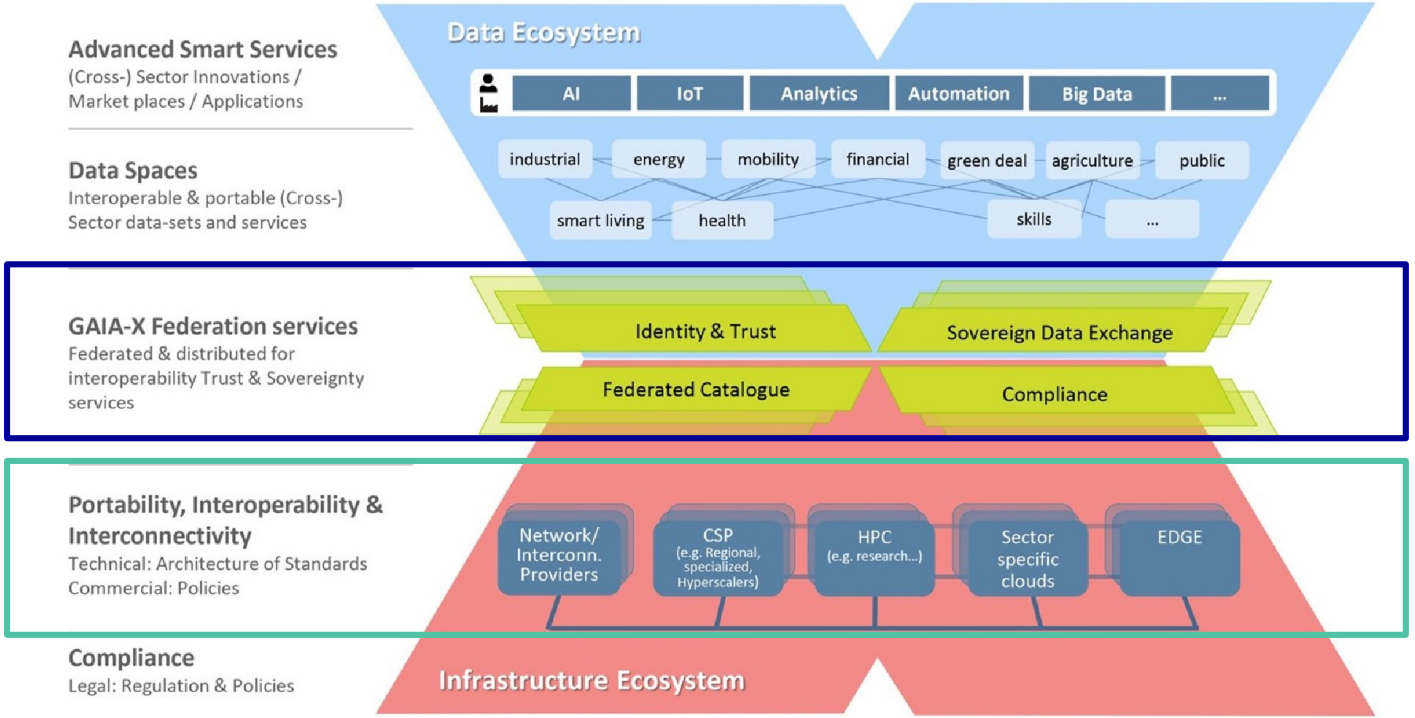
SCS liefert Infrastrukturschicht für Gaia-X Federation Services



Gaia-X FEDERATION SERVICES GXFS

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SCS beteiligt sich an GovStack

GovStack harnesses the power of a global network and is led by:

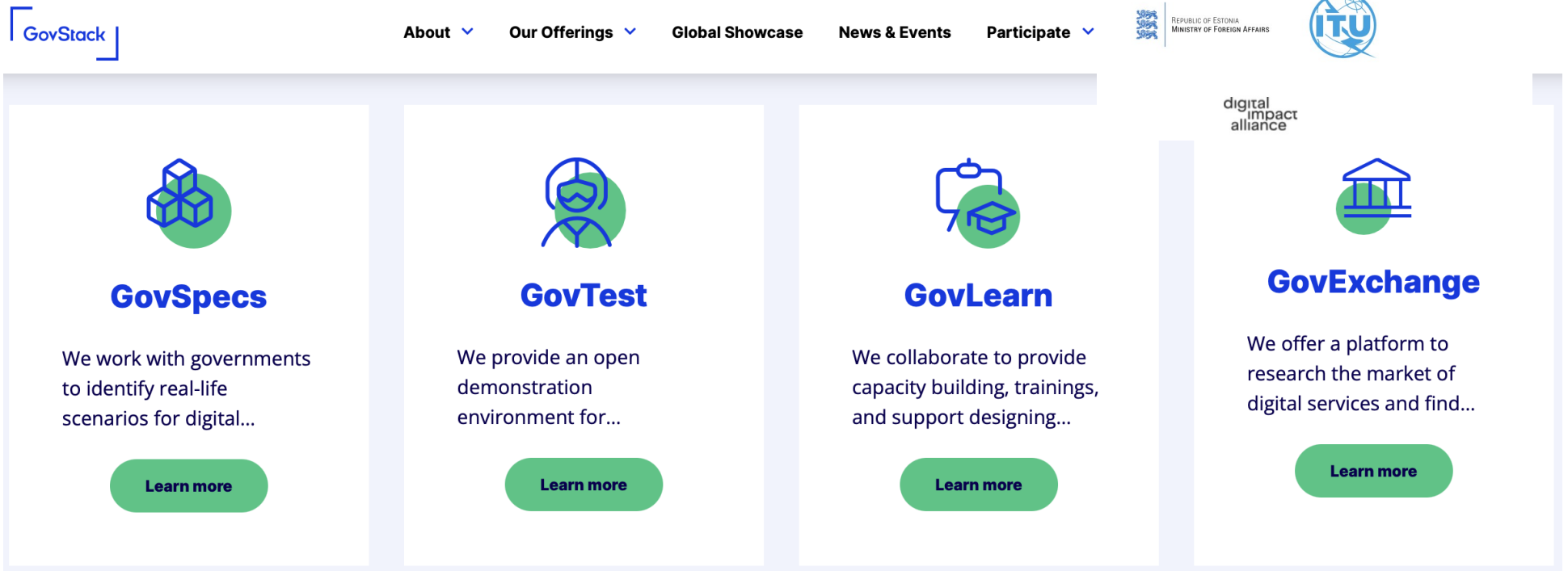
Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Republic of Estonia Ministry of Foreign Affairs

ITU

digital impact alliance



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SCS unterstützende Organisationen

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https://scs.community/de/summit2024/

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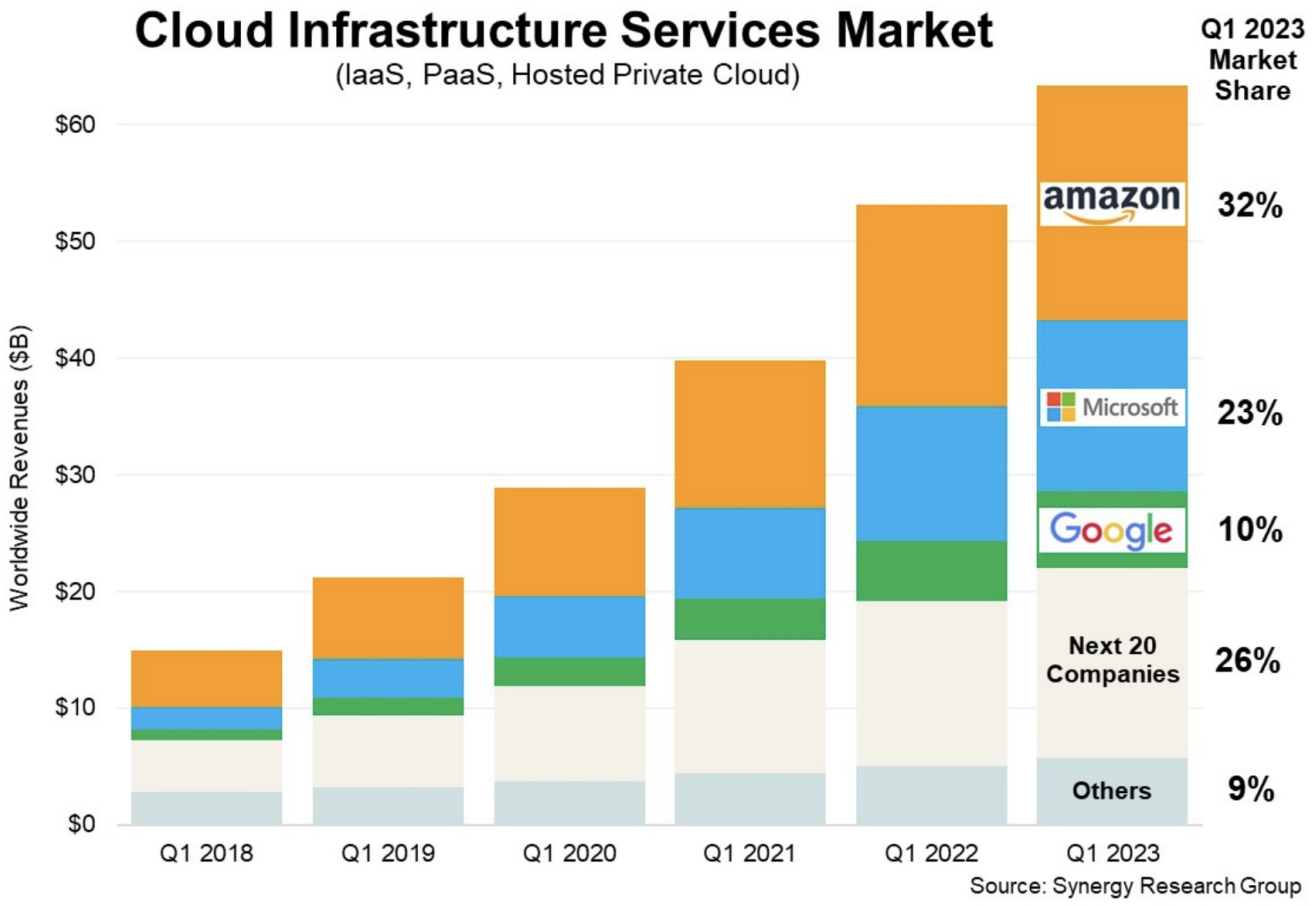
https://scs.community
https://github.com/SovereignCloudStack
https://gitlab.opencode.de/sovereigncloudstack
#scs-community:matrix.org
scs@osb-alliance.com

One platform – standardised, built and operated by many.

Supplement

https://www.srgresearch.com/articles/q1-cloud-spending-grows-by-over-10-billion-from-2022-the-big-three-account-for-65-of-the-total



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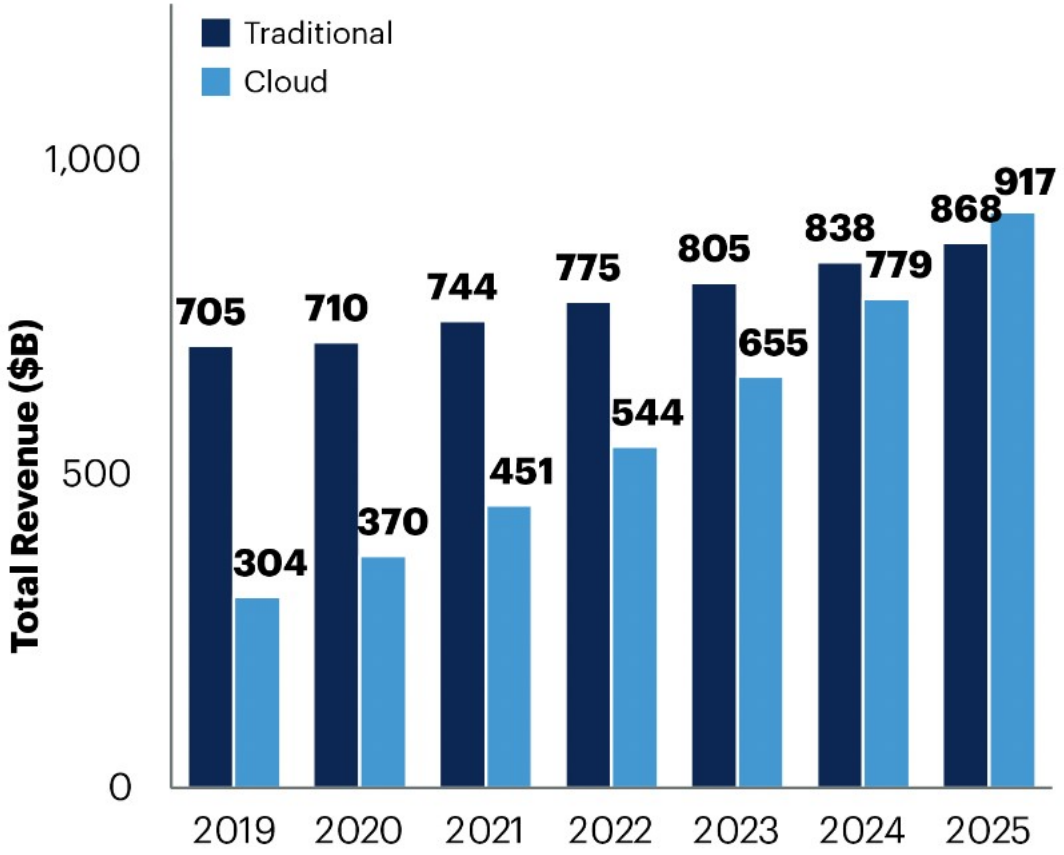
"Cloud-Shift": Enterprise IT Spending Worldwide



Source: Gartner 2022

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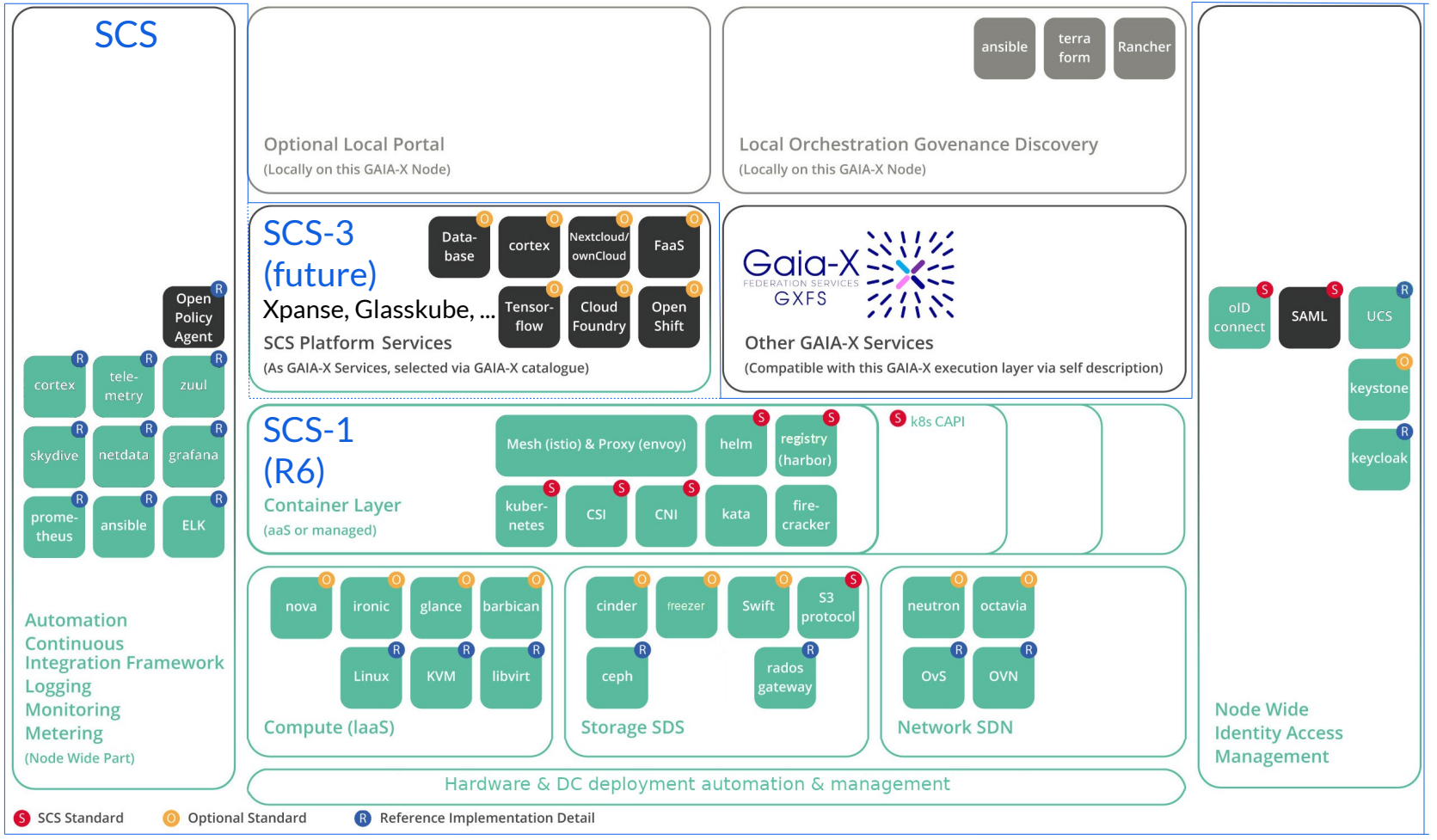
SCS Reference Architecture (current status)



Dark squares: future

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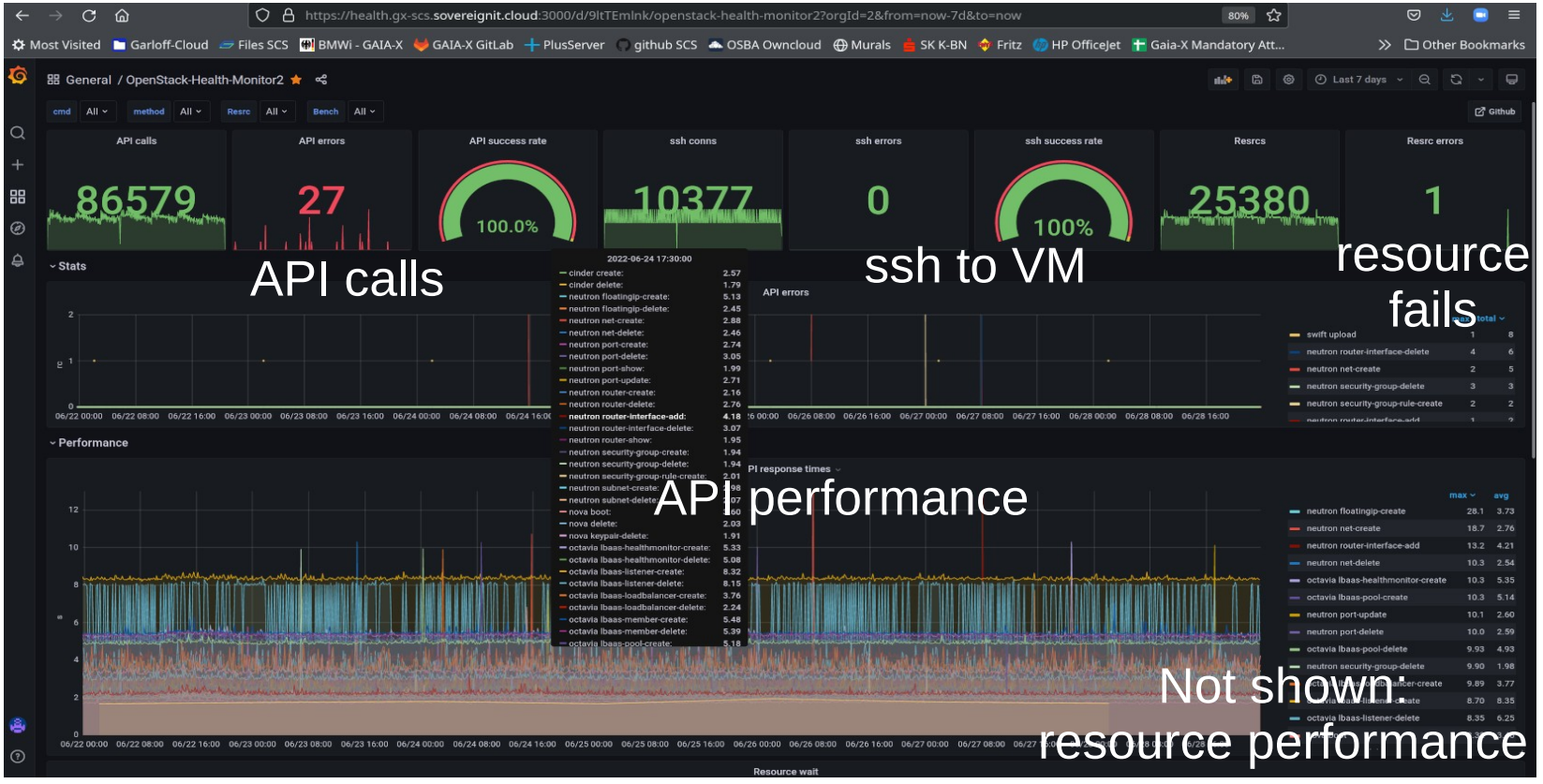
SCS Operations: Measure what you want to manage.



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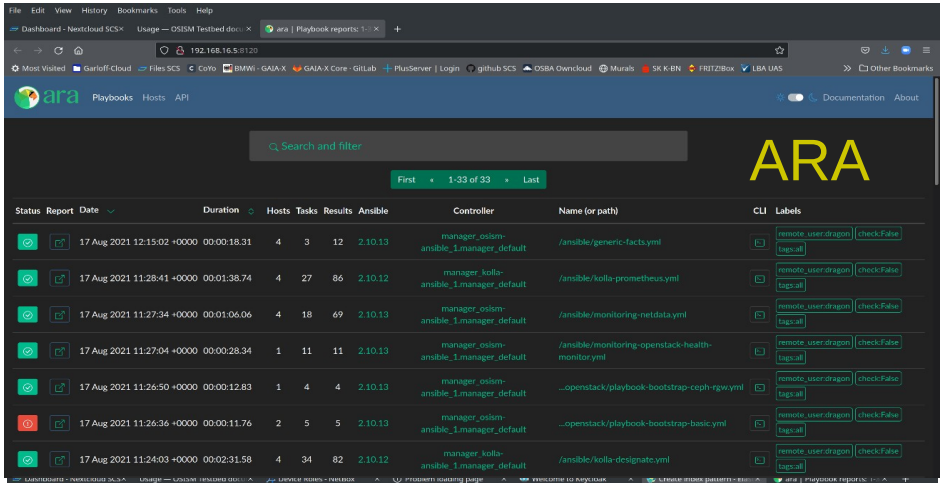
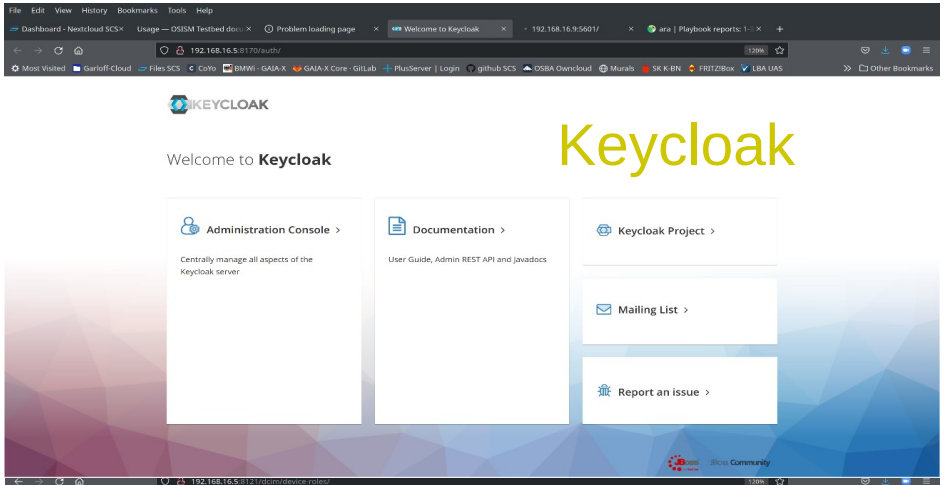
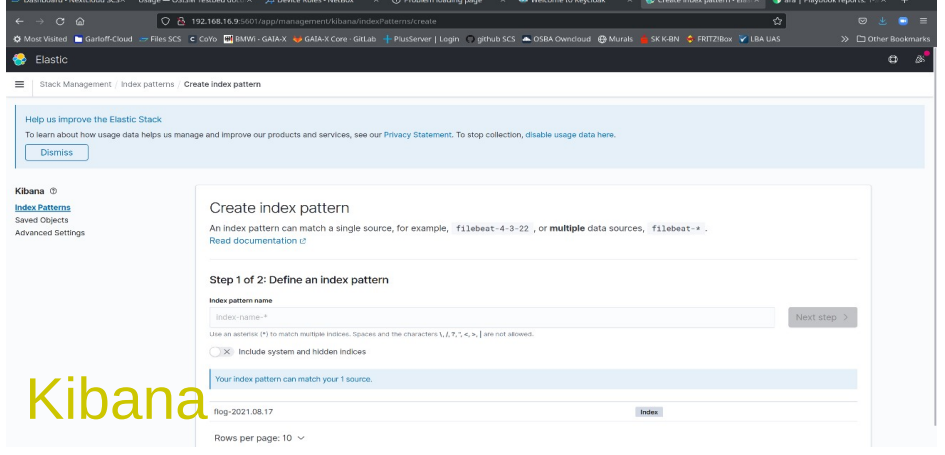
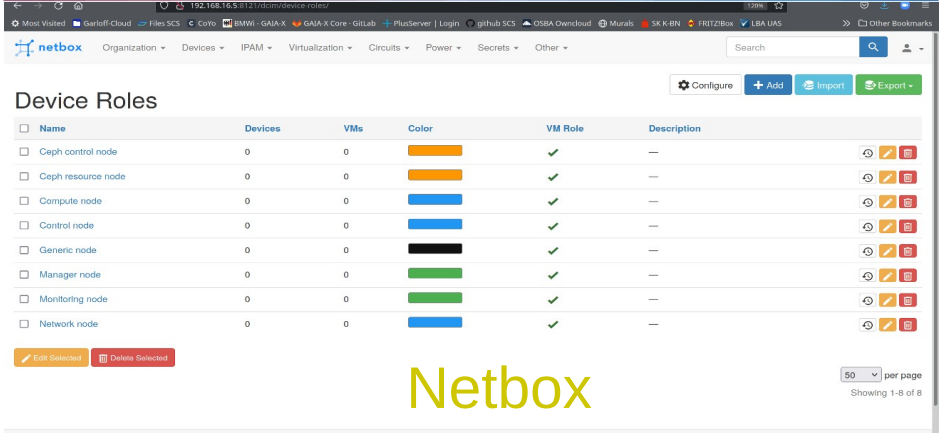
Operations: SCS Tooling

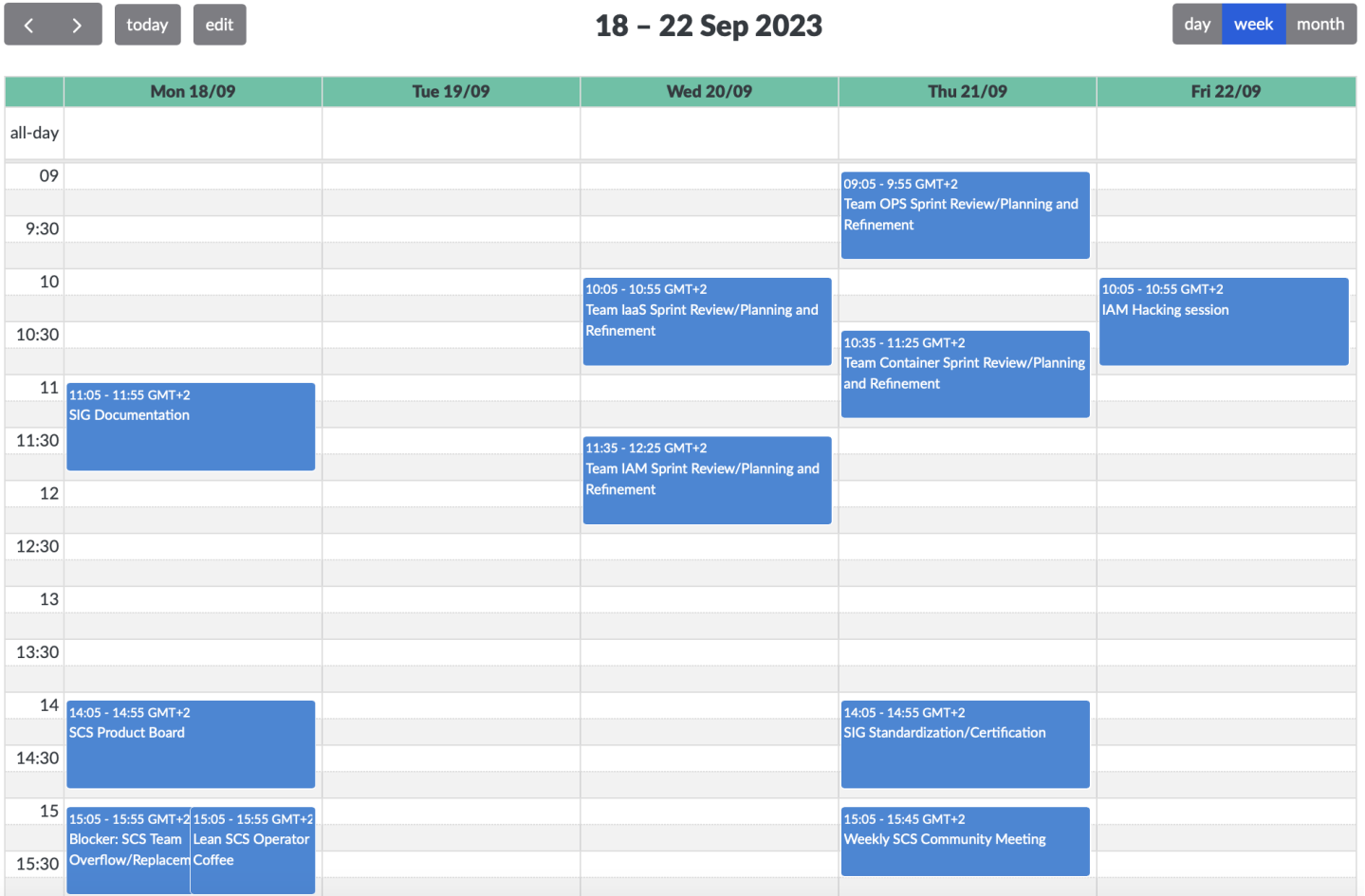








SCS Open Development in Practice



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SCS: Realize Digital Sovereignty

Competence (esp. Operations)

Ability to shape technology

Choice / Switching / Interoperability

Legal Compliance (GDPR ...)

https://rdcu.be/cWdBJ

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SCS Certification

Levels of digital sovereignty

4: Operational transparency and knowledge and skills available

3: Transparent technology and capability to contribute & shape

2: Freedom of choice (many providers as well as on-prem) , Interoperability, Portability

1: Legal compliance

SCS certification levels

3: **“SCS-Sovereign”** – Ops/IAM Stacks “open” as well, transparency on monitoring, incidents, contributing to “Open Operations”
(5x Open)

2: **“SCS-Open”** – SBOM for functional stack available, fully “open”
(4x Open according OpenInfra Foundation)

1: **“SCS-Compatible”** – Technical compatibility, interoperabel (Conformance tests pass: CNCF, OIF, SCS)

0: ENISA / Gaia-X labels / GDPR (no SCS certificate)

Security by Design

Using strong isolation for container clusters

- Different tenants receive their own Kubernetes clusters; by default, no cluster sharing happens
- Underlying VMs, network, storage are separated by strong virtualization barriers

Private registry for users

- Make it easy for DevOps teams to enforce their own security vetting processes and control their supply chain
- Vulnerability scanning included in registry solution

Daily patching supported

- The architecture is built for daily patching (or redeployment) without noticable customer impact
- This creates a practice of keeping the systems up to date especially with respect to security patches

Secure Operational practices

- Document updating, patching, security response, … processes to help with secure operations

Air gap mode supported

- Deploying and updating without internet connection possible
- Leveraging an internal registry and patch distribution mechanism (includes vulnerability scanning)

Certification

- Budget for security certifications (BSI) with partners – SCS based PlusCloud Open achieved BSI C5 in Nov 2021
- Pen testing planned (and budget allocated)

Supply chain security

- Work with community on further improving supply chain security (reproducible builds, scanning, …)

Confidential computing

- Work with intel (and AMD) on TDX / SVE enablement for additional protection

SCS Open Source Health Check

https://github.com/SovereignCloudStack/Docs/blob/main/Design-Docs/OSS-Health.md

1. Really Open: Four Opens (Code, Development, Design, Community)
2. Maturity: Quality, Reviews, CI, Maintenance, Standards
3. Security: Supply Chain, Sec Response, SecTesting / PenTest
4. Activity: Adoption, Community, Ecosystem
5. Risk Assessment: Likelihood to fail? Replace? Fork?

SCS: How to start

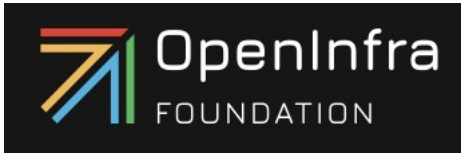
1. Use existing SCS public cloud IaaS offerings:
   OSISM's betacloud, PlusServer's pluscloudopen, Wavecon/Noris' wavestack, regio.digital
   a) Running SCS ref.impl. for k8s aaS (KaaS) on top of it
   b) Using managed SCS ref.impl. for KaaS (using e.g. syself, see GXFS)
   c) Using Gardener based managed k8s (PSKE, …)
2. Use Cloud-in-a-Box (128GB RAM box for 3.5k€)
3. Deploy SCS testbed on top of pre-existing OpenStack IaaS.
   (*Deploy SCS on a notebook in a camper van as Robert Holling @ HS Osnabrück did.*)
4. Build small PoC env (min. 5 hardware nodes: 4*HCI+1*Manager)
5. Production env. ~12 -- 300 nodes

The Four Opens

1. Open Source
2. Open Design
3. Open Development
4. Open Community

A fifth Open?

5. Open Operations



Zur Bedeutung von Open Source

EU-Studie: Open Source stärkt die Wirtschaft und die technologische Unabhängigkeit

FEATURED | VERBANDS-NEWS | 13. DEZEMBER 2021

https://digital-strategy.ec.europa.eu/en/library/study-about-impact-open-source-software-and-hardware-technological-independence-competitiveness-and

https://www.acatech.de/publikation/open-source-i40-innovationstreiber/

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SCS: Why thoroughly Open?

- Highly innovative
- Best possible quality
- Efficiency and reduced complexity
- Trust through transparency
- Digital sovereignty
- We believe that basic cloud technology and know-how should be common property.