



<https://scs.community>

Supported by:



Federal Ministry
for Economic Affairs
and Climate Action

on the basis of a decision
by the German Bundestag

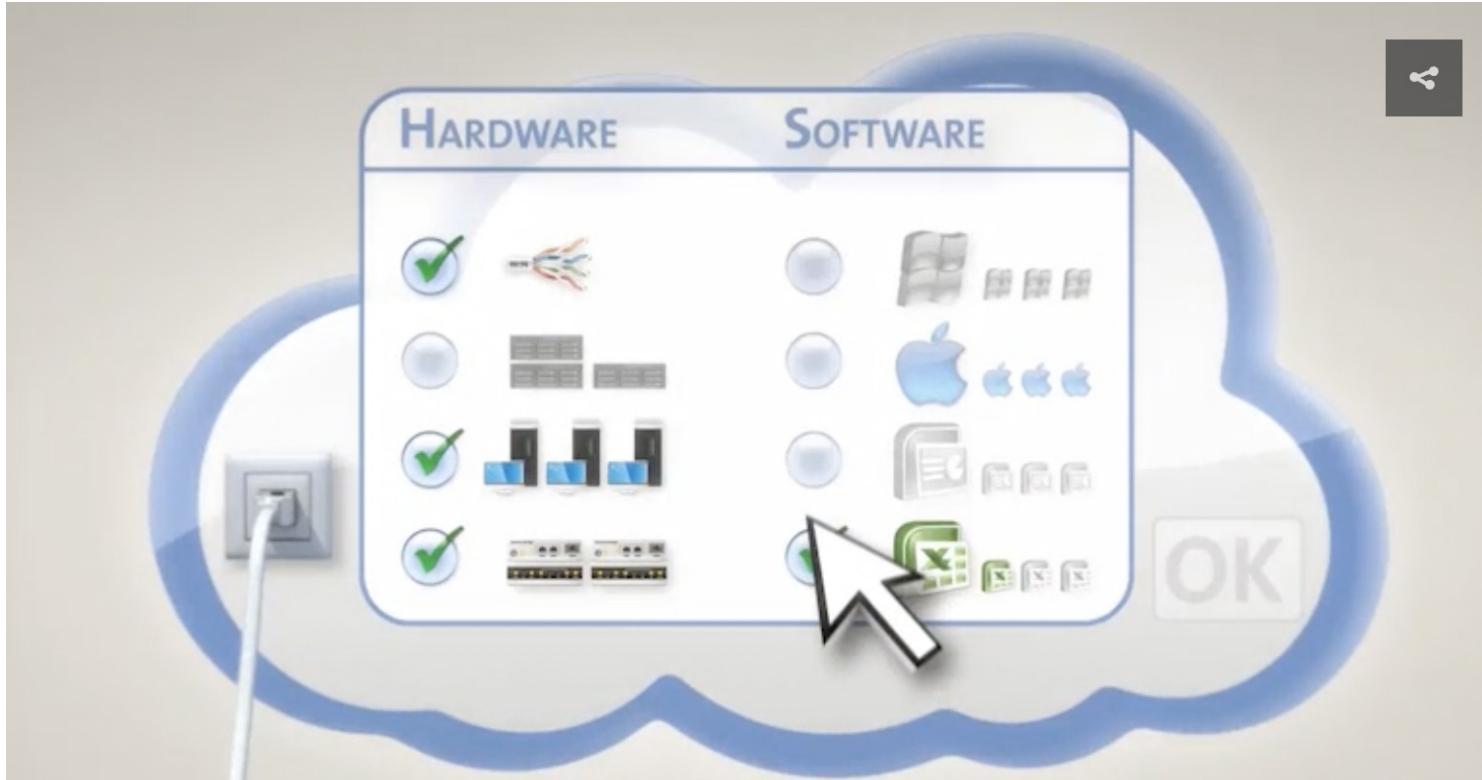


bitkom Forum Open Source 2024
12. September 2024

Dr. Manuela Urban

Sovereign Cloud Stack: Offene, standardisierte Cloud-Technologie für mehr digitale Souveränität

Der Traum von der Wolke...



Quelle: Bundesministerium für Wirtschaft und Technologie 2010

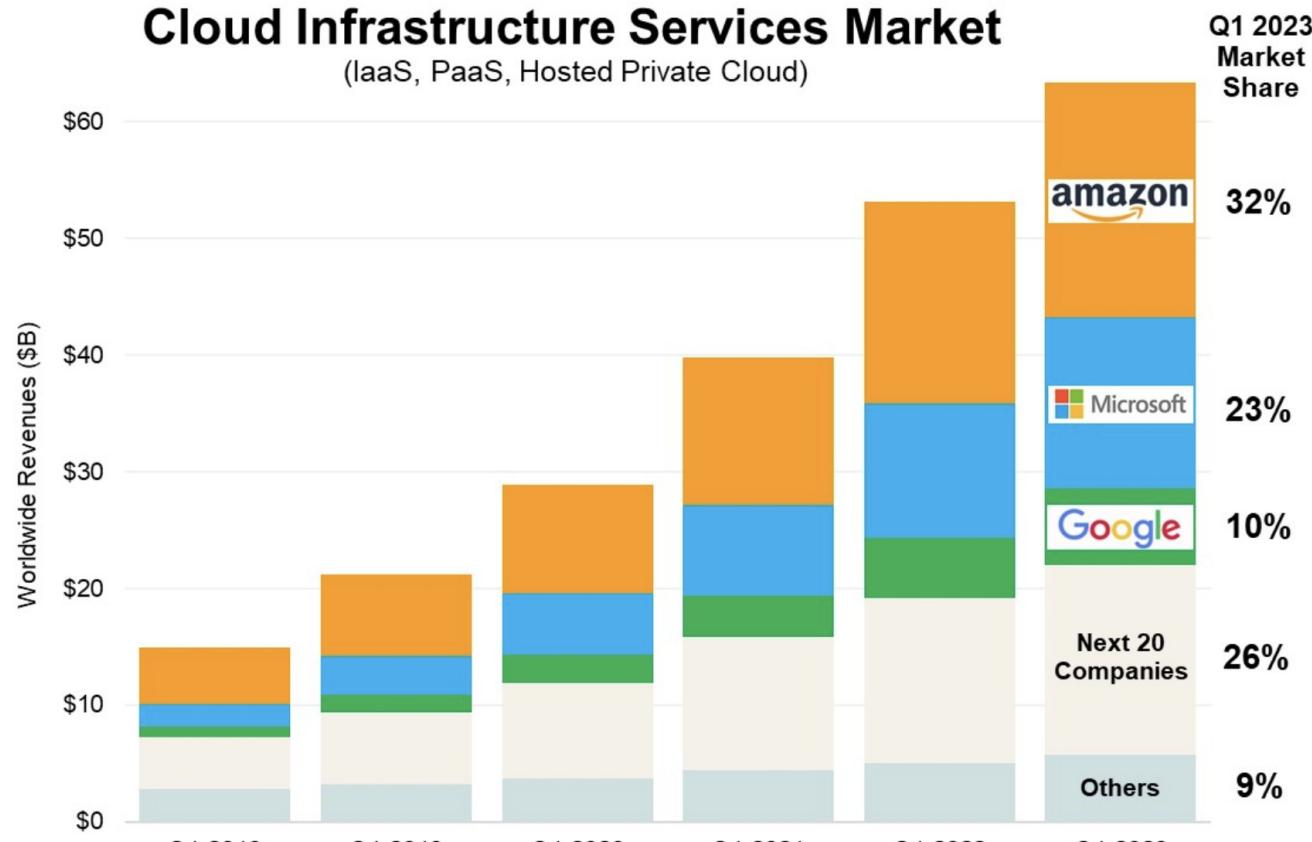
...und die Realität

- Über 80 % der Unternehmen in Europa fühlen sich technologisch abhängig.¹
- Amazon, Microsoft, Alphabet (Google) beherrschen den Markt.²
- Vendor lock-in³
- Inkompatibilität bei Infrastrukturen, Plattformen und Applikationen
- US Foreign Intelligence Surveillance Act (FISA)  EU DSGVO
- hohe Komplexität dynamischer, verteilter Plattformen 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



Source: Synergy Research Group

Digitale Wertschöpfung & Marktmacht

Die Top100 größten börsennotierten Unternehmen der Welt

Nach Marktkapitalisierung

Zum Vergleich (Market Cap):
GER 2,2 Bio. EUR (2023)

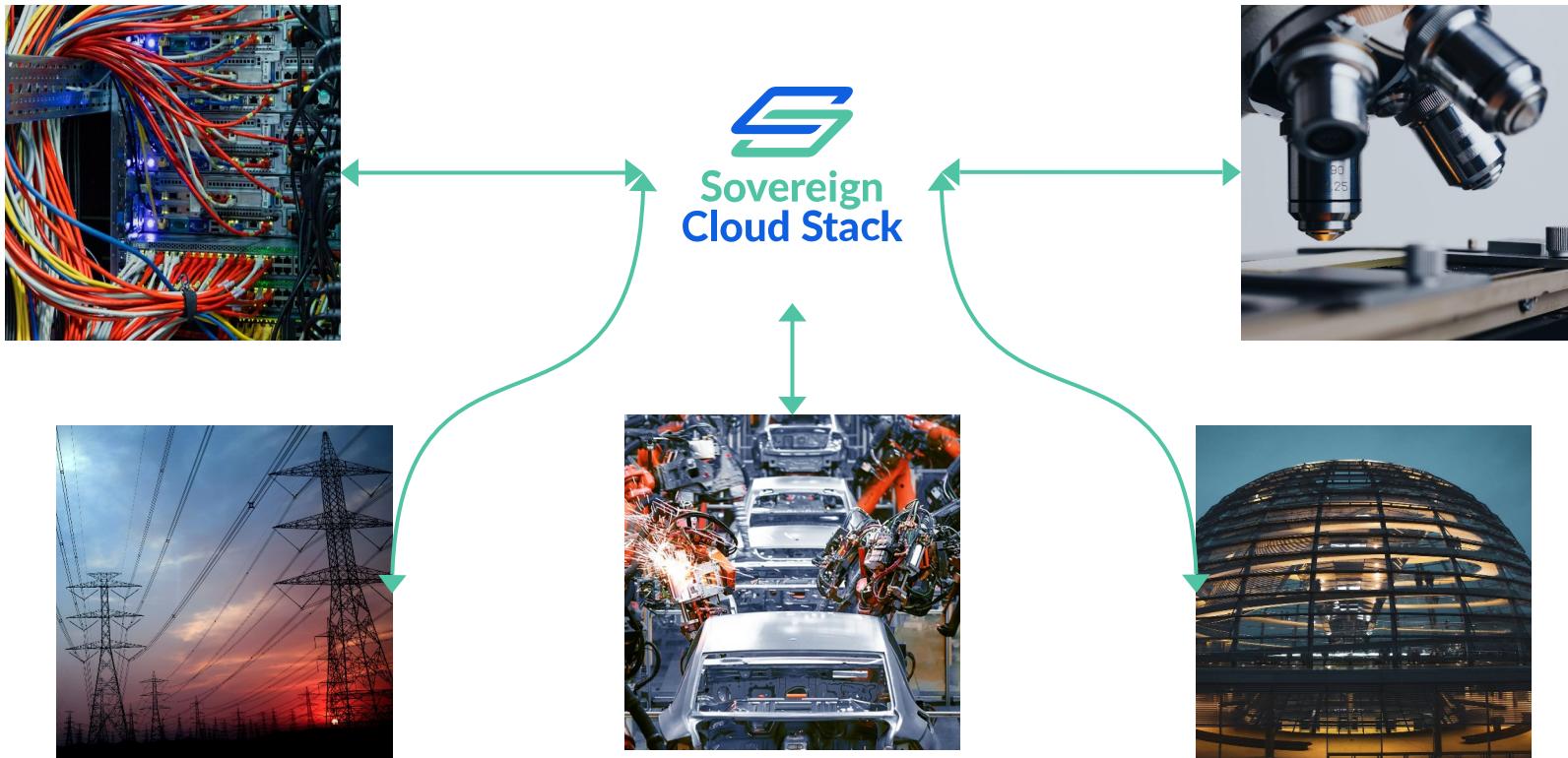
	Name	Land 	Umsatz (EUR)	Gewinn (EUR)	↓ Market Cap (EUR)
# 1	 Microsoft Corp. Registered Shares DL-,00000625		192,4 Mrd.	65,7 Mrd.	3,0 Bio.
# 2	 Apple		355,6 Mrd.	90,0 Mrd.	2,7 Bio.
# 3	 Alphabet Inc. Reg. Shs Cl. A DL-,001		282,5 Mrd.	67,9 Mrd.	1,9 Bio.
# 4	 Amazon.com		533,2 Mrd.	28,2 Mrd.	1,8 Bio.
# 5	 Meta Platforms Inc. Reg.Shares Cl.A DL-,000006		125,1 Mrd.	36,3 Mrd.	1,0 Bio.

Source: Finanzen 100, June 2024

imagine a Cloud Platform...

... where users can easily switch between
different cloud service providers without being
locked in.

Sovereign Cloud Stack bringt Entwickler und Anwender sektorübergreifend zusammen, um Cloud-Technologie gemeinsam zu standardisieren und zu entwickeln.



SCS Leistungen



1
Zertifizierbare Standards

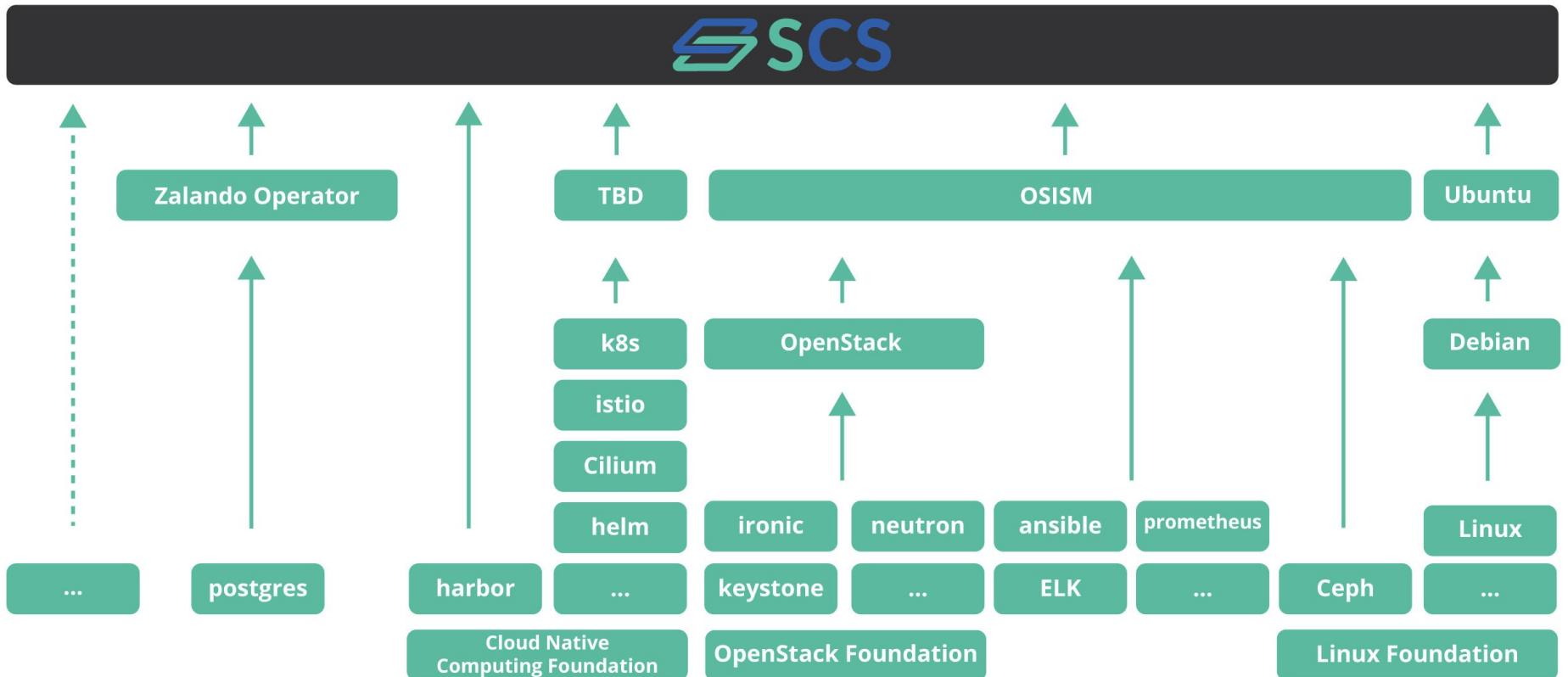


2
Modulare Open-Source-Referenz-Implementierung



3
Open Knowledge

SCS integriert, standardisiert und ergänzt bewährte Open-Source-Bausteine



Offene, zertifizierbare Standards

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

standards / Standards / ↑ Top

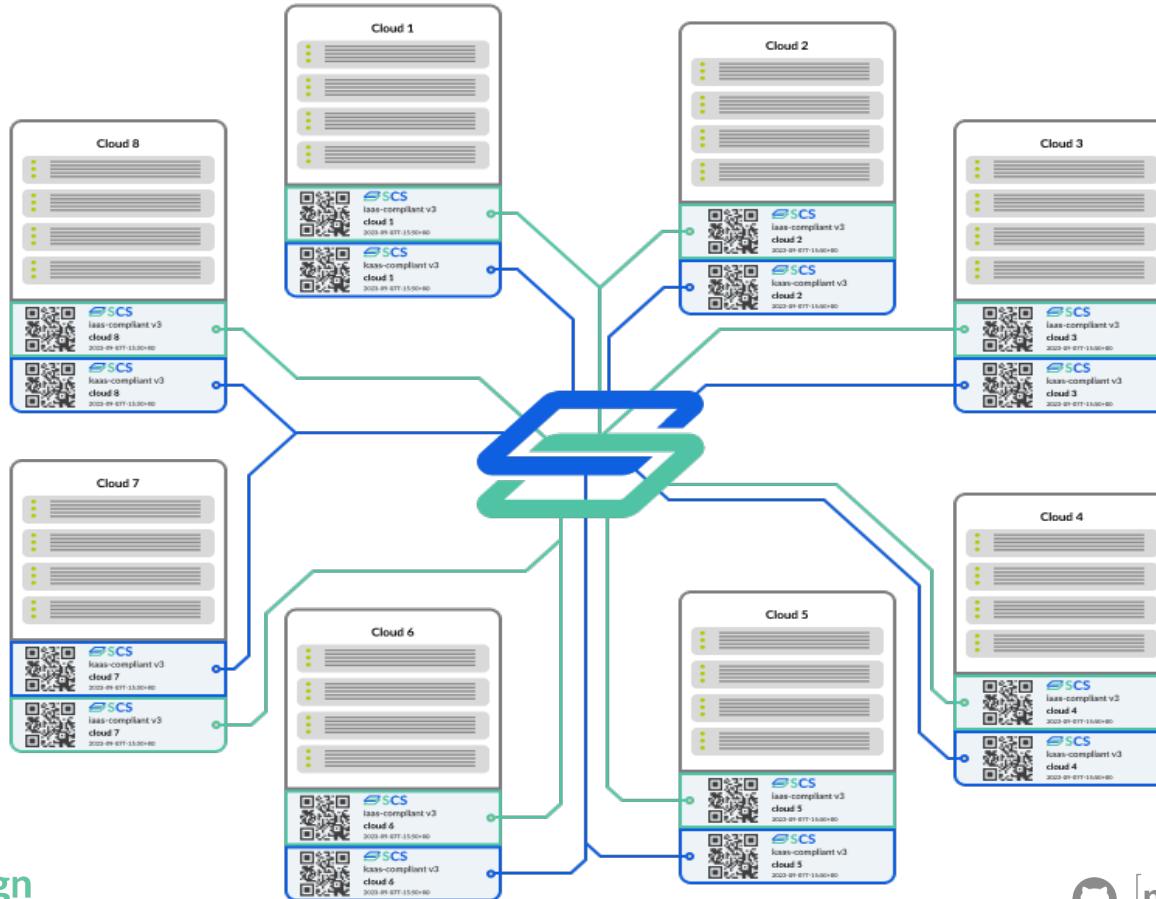
scs-0001-v1-sovereign-cloud-standards.md	Extend scs-0003: more context and process (resolves issues/#...)	2 months ago
scs-0002-v1-standards-docs-org.md	Add markdown linter and link validator (#254)	8 months ago
scs-0002-v2-standards-docs-org.md	Fix/move scs 0002 to standards (#333)	3 months ago
scs-0003-v1-sovereign-cloud-standards-yaml....	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 compatible clouds	
scs-0104-v1-s	This is a list of clouds that we test on a nightly basis against our <code>scs-compatible</code> certification level.	
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

Sovereign Cloud Grid: Build a virtual hyperscaler!



Open Knowledge



Standards For Operators For Contributors Community FAQ

[GitHub](#)

Search

Welcome to the SCS Documentation

Find user guides, code samples, deployment examples, reference, community pages and more.

Introduction to SCS

Get to know SCS better and learn about the background.

[Get Started](#)

Releases

SCS is currently in Release 5. Check out the latest Release Notes.

[Learn More](#)

Frequently Asked Questions

You are curious what SCS is all about, what it can do and what it can't?

[Get Answers](#)

Existing Public Clouds

There are SCS compliant public clouds in production.

[Test Them](#)

Architectural Layers

Ops Layer

Tooling and infrastructure design for easy, efficient and transparent ways to operate an SCS Cloud.

Container Layer

SCS offers a robust solution for managing container workloads on a Kubernetes infrastructure.

[Learn More](#)

IAM Layer

Working on Keycloak federated identity provider within our Team IAM.

SCS Mehrwert

- für Kunden
 - Wechselfähigkeit, Wettbewerb, Wahlmöglichkeiten durch standardisierte Technologie
 - Transparenz durch Offenheit im Code, im Design, im Betrieb
 - Gestaltungsfähigkeit durch Kontaktmöglichkeiten zu Service Providern und Community
- für Cloud Service Provider (public or private)
 - „Turnkey Solution“: betriebsfähiger, produktionsreifer vollständiger Stack, modular, inkl. Betriebstools
 - Föderierung: Skalierbarkeit („Virtual Hyperscaler“)
 - „Open Knowledge“: frei zugängliches Knowhow durch umfassende Dokumentation und Community
- für Applikationsentwickler
 - Plattformunabhängigkeit durch Standardisierung

Serviceangebote auf der Basis von SCS



secunet

REGIO
Digital für Deutschland



wavestack

aov
IT.Services GmbH



 **Sovereign
Cloud Stack**
— An **OSB ALLIANCE** project —

 **ScaleUp**
Technologies

B1
SYSTEMS

 **SysEleven**


<https://scs.community>

Gefördert durch:

Bundesministerium
für Wirtschaft
und Klimaschutz

aufgrund eines Beschlusses
des Deutschen Bundestages

 **gaia-x**

BayernCloud Schule

Die Plattform für eine moderne digitale Bildung

→ Informationen für Schulleitungen zur Freischaltung



...läuft auf SCS-Infrastruktur.

powered by **plusserver**

SH setzt auf SCS im Cloud-Computing

leswig-Holstein. Der echte Norden.

19

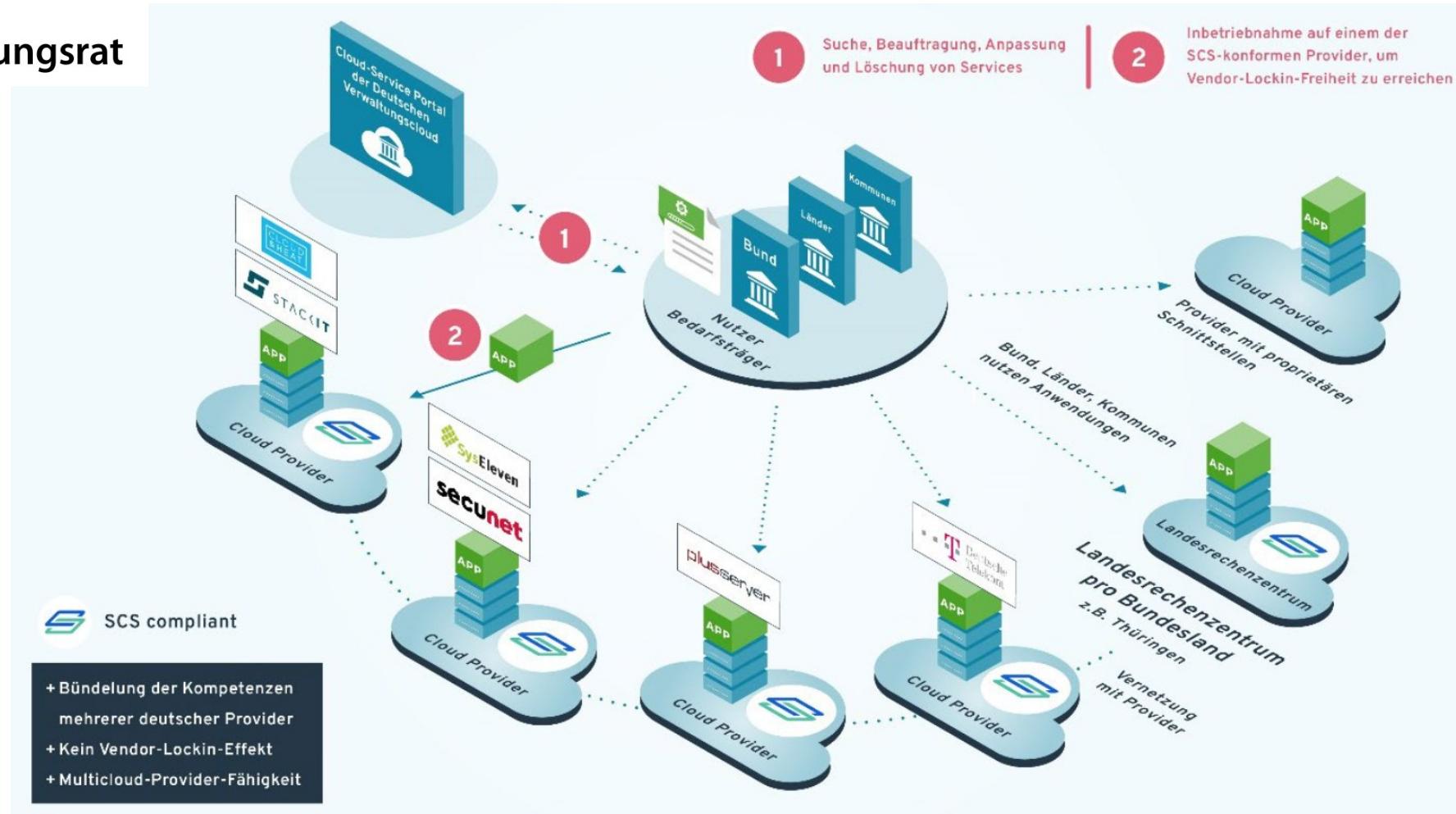


SCS Summit
14.5.2024
Berlin

SCS Proof of Concept: Skalierung + Wechselfähigkeit für die DVC



IT-Planungsrat





> ● S Smarte.Land.Regionen

S SopraSteria

Sovereign Cloud Stack

 Eine Plattform — standardisiert, entwickelt und betrieben von Vielen.
Sovereign Cloud Stack (SCS) ist ein vom BMWK gefördertes Projekt der OSB Alliance e.V.
SCS stellt Standards, Software und Wissen für Cloudinfra bereit. <https://scs.community/>

• S Stadt Detmold

>  Stadt Soest 

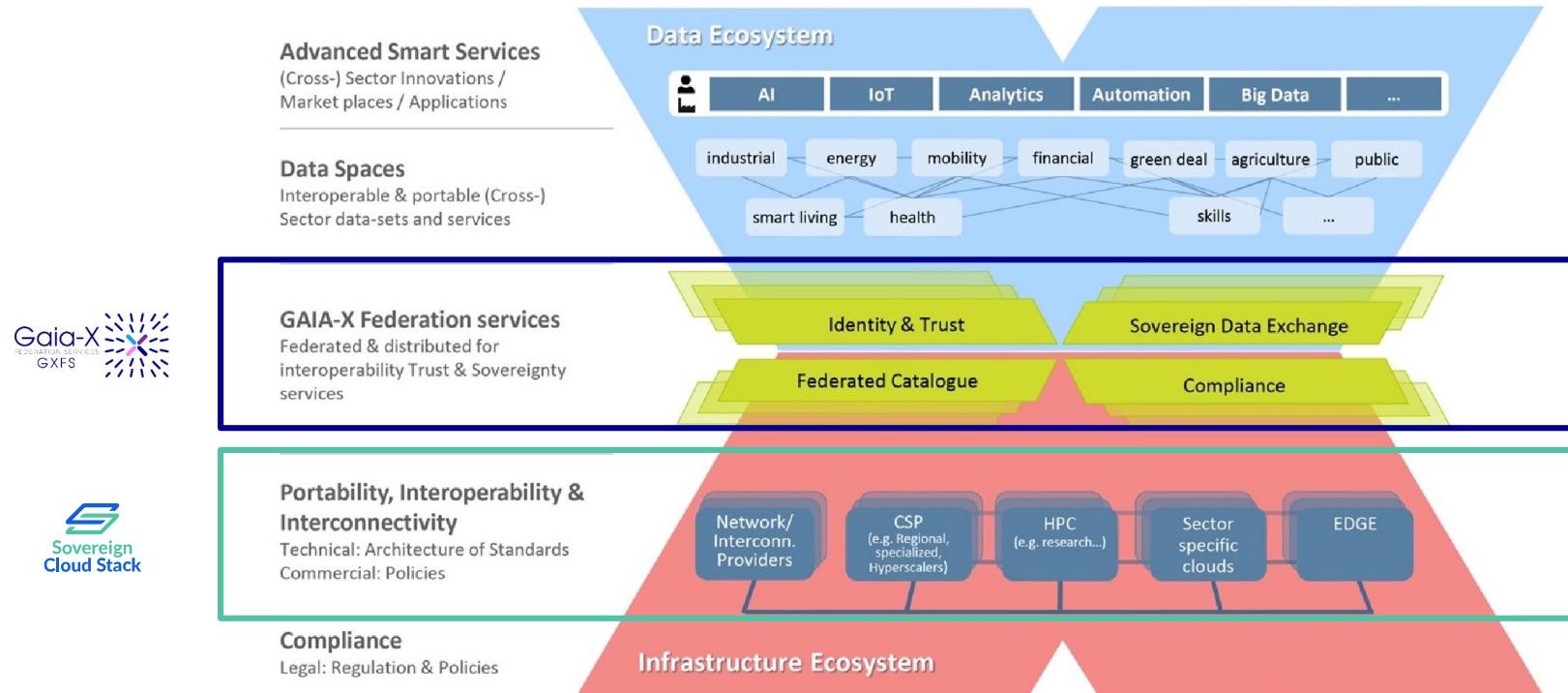
Stadt Wolfsburg

This is the official group of the city of Wolfsburg, Germany. Here you can find the open source projects that the city is working on or supporting.

Testgruppe

Thüringer Landesverwaltung

SCS liefert Infrastrukturschicht für Gaia-X Federation Services



GovStack setzt auf SCS

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



About ▾ Our Offerings ▾ Global Showcase News & Events Participate ▾



digital impact alliance



GovExchange

We offer a platform to research the market of digital services and find...

[Learn more](#)



GovSpecs

We work with governments to identify real-life scenarios for digital...

[Learn more](#)



GovTest

We provide an open demonstration environment for...

[Learn more](#)



GovLearn

We collaborate to provide capacity building, trainings, and support designing...

[Learn more](#)



— 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



gaia-x

Save the date:
SCS Summit #3
8. Mai 2025
Berlin

One platform – standardised, built and operated by many.

<https://scs.community>

Supplement

Why do we think that Open Source makes a difference?



Competence (esp. Operations)

Ability to shape technology

Choice / Switching / Interoperability

Legal Compliance (GDPR ...)



<https://rdcu.be/cWdBJ>
(in German)

https://the-report.cloud/wp-content/uploads/2022/03/CloudReport_2022_01-1.pdf
(in English)

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, interoperable (Conformance tests pass: CNCF, OIF, SCS)
- 0: ENISA / Gaia-X labels / GDPR (no SCS certificate)



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/>



Geordert durch:



<https://scs.community>

aufgrund eines Beschlusses
des Deutschen Bundestages



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.



<https://openinfra.dev/four-opens/>

The Four Opens

Our Philosophy on Open Source

The Four Opens are a set of principles guidelines that were created by the OpenStack community as a way to guarantee that the users get all the benefits associated with open source software, including the ability to engage with the community and influence future evolution of the software.

Under these guidelines, the OpenStack community grew from tens of contributors to thousands, creating one of the top three most active open source projects in the world behind the Linux Kernel and Chromium. The Four Opens were instrumental not only in this success but also in building a thriving, global community.

We at OpenInfra Foundation consider The Four Opens our guiding principles in everything we do.

- [Open Source](#)
- [Open Design](#)
- [Open Development](#)
- [Open Community](#)

The Four Opens

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



A fifth Open?

5. Open Operations



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.



The Open Source Definition

Page created on July 7, 2006 | Last modified on February 16, 2024

Introduction

Open source doesn't just mean access to the source code. The distribution terms of open source software must comply with the following criteria:

1. Free Redistribution

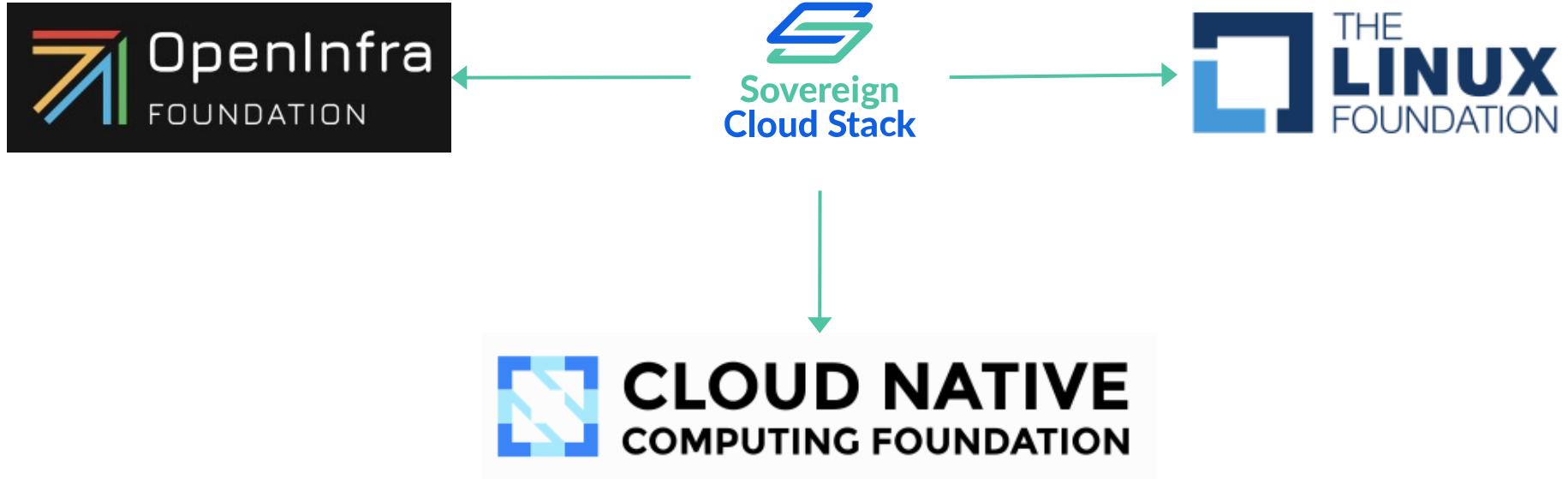
The license shall not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fee for such sale.

2. Source Code

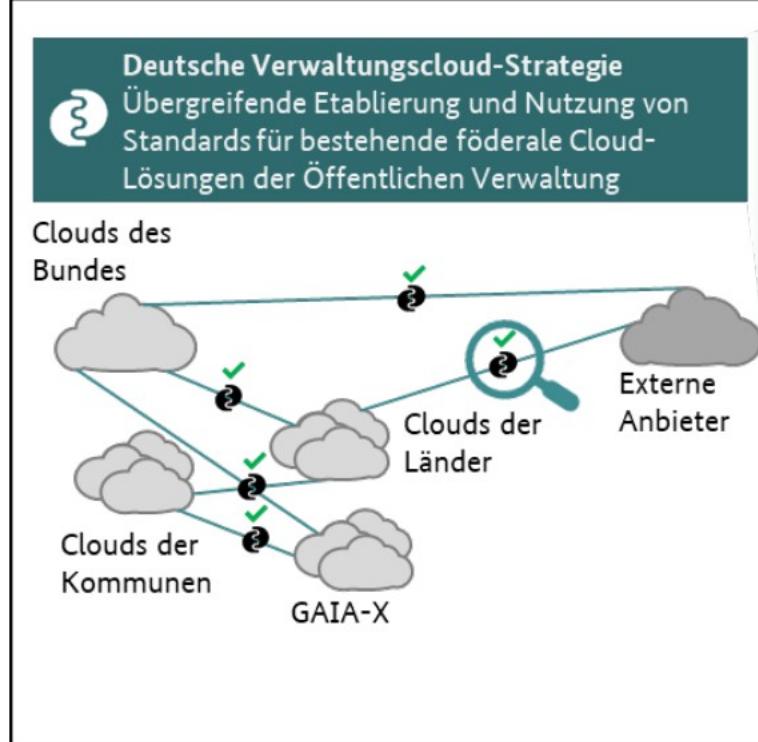
The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed



Upstream first!



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



🔍 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

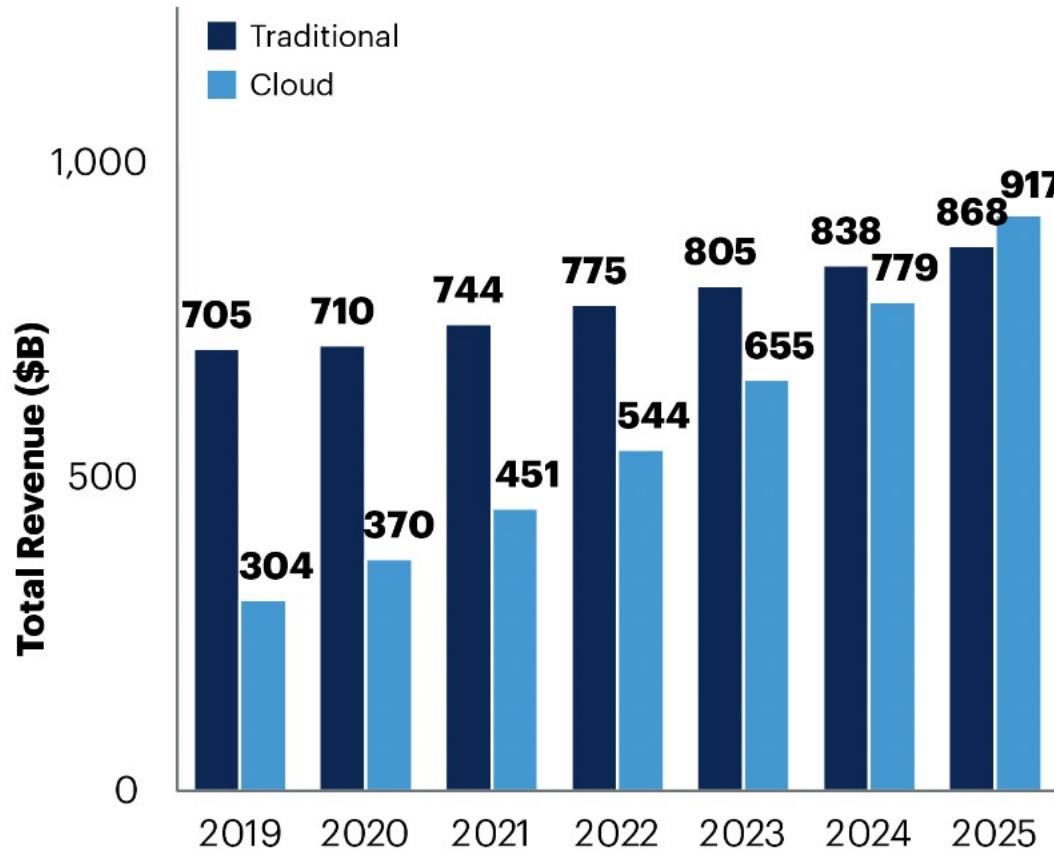
4 Infrastruktur-Service und technologischer Stack

Hard- und Software zur Erbringung von IT-Leistungen

5 Betriebsstandards und Betriebsmodell

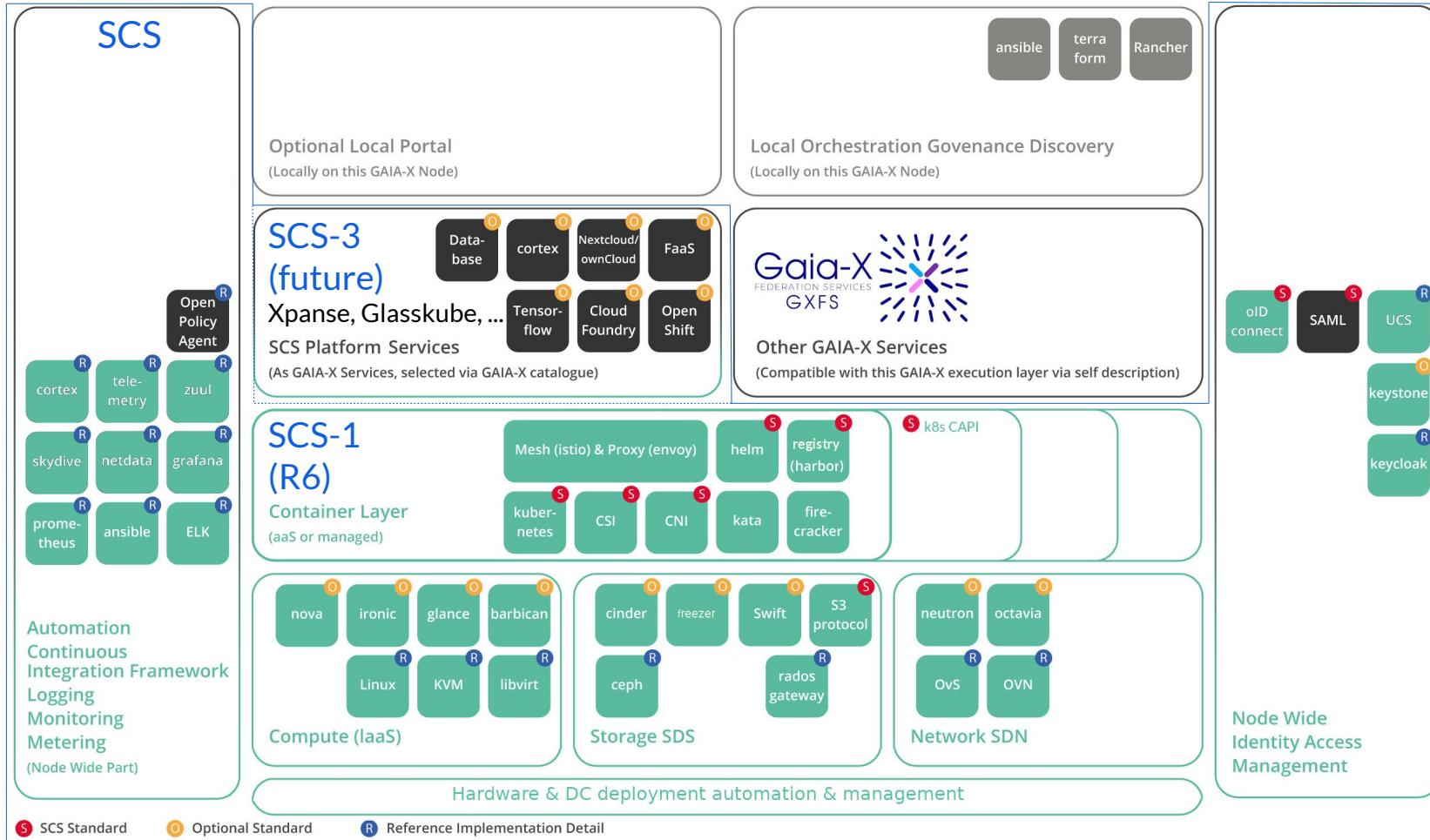
Zusammenarbeit IT-Dienstleister/Service-Bereitstellung

"Cloud-Shift": Enterprise IT Spending Worldwide

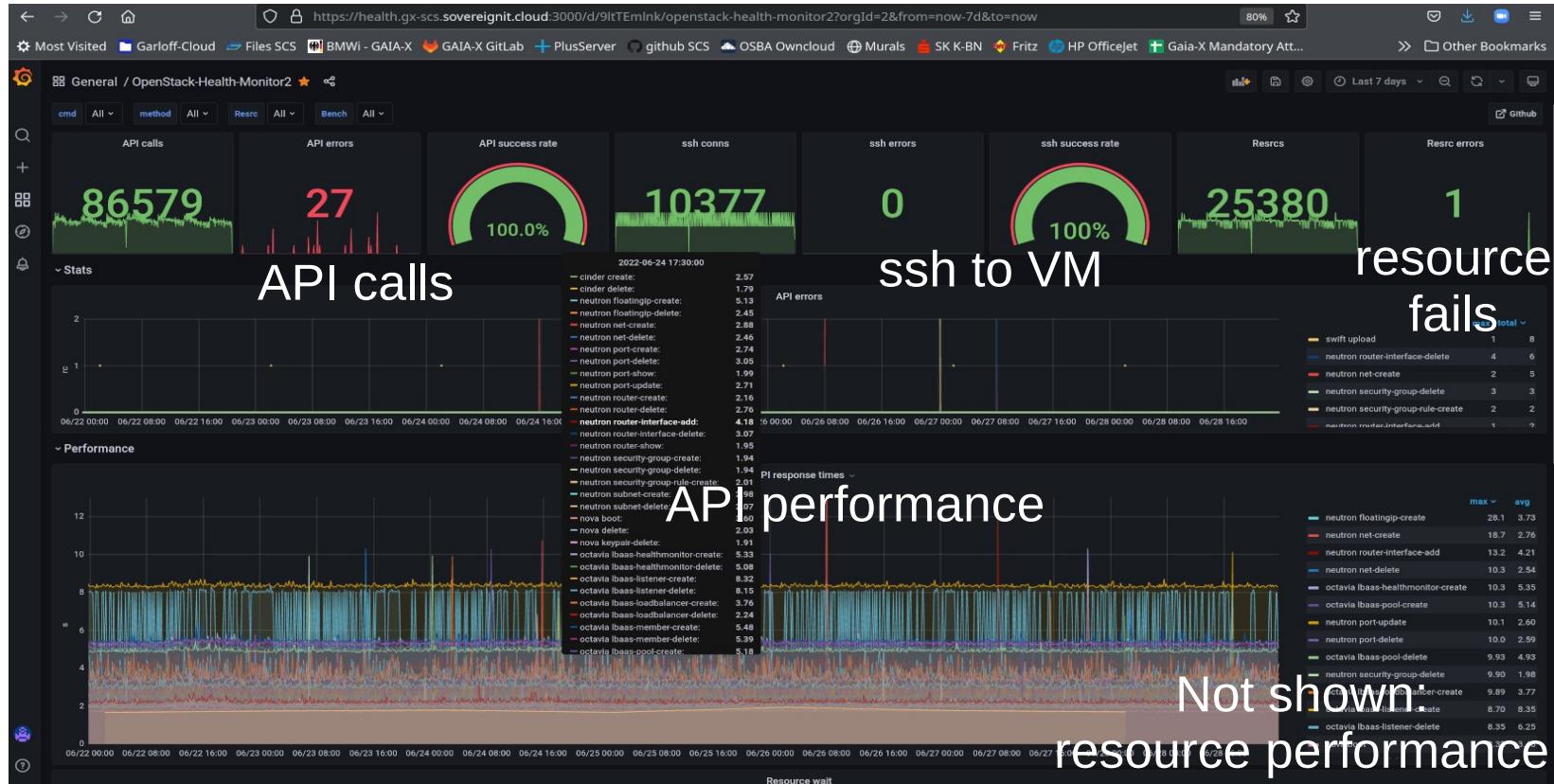


Source: Gartner 2022

SCS Reference Architecture (current status)



SCS Operations: Measure what you want to manage.



Operations: SCS Tooling

The screenshot shows the ARA dashboard with a table of playbook runs. The columns include Status, Report, Date, Duration, Hosts, Tasks, Results, Ansible, Controller, Name (or path), CLI, and Labels. One row is highlighted in yellow, showing a run from 17 Aug 2021 at 12:15:02 with 4 hosts, 3 tasks, and 12 results.

Status	Report	Date	Duration	Hosts	Tasks	Results	Ansible	Controller	Name (or path)	CLI	Labels
Success		17 Aug 2021 12:15:02 +0000	00:00:18.31	4	3	12	2.10.13	manager_ostim-ansible_1_manager_default	/ansible/generic-facts.yml		remote_user:dragon check=False tags:all
Success		17 Aug 2021 11:28:41 +0000	00:01:38.74	4	27	86	2.10.12	manager_ostim-ansible_1_manager_default	/ansible/kolla-prometheus.yml		remote_user:dragon check=False tags:all
Success		17 Aug 2021 11:27:34 +0000	00:01:06.06	4	18	69	2.10.13	manager_ostim-ansible_1_manager_default	/ansible/monitoring-netdata.yml		remote_user:dragon check=False tags:all
Success		17 Aug 2021 11:27:04 +0000	00:00:28.34	1	11	11	2.10.13	manager_ostim-ansible_1_manager_default	/ansible/monitoring-openstack-health-monitor.yml		remote_user:dragon check=False tags:all
Success		17 Aug 2021 11:26:50 +0000	00:00:12.83	1	4	4	2.10.13	manager_ostim-ansible_1_manager_default	...openstack/playbook-bootstrap-ceph-rgw.yml		remote_user:dragon check=False tags:all
Failure		17 Aug 2021 11:26:36 +0000	00:00:11.76	2	5	5	2.10.13	manager_ostim-ansible_1_manager_default	...openstack/playbook-bootstrap-basic.yml		remote_user:dragon check=False tags:all
Success		17 Aug 2021 11:24:03 +0000	00:02:31.58	4	34	82	2.10.12	manager_kolla-ansible_1_manager_default	/ansible/kolla-delegate.yml		remote_user:dragon check=False tags:all

The screenshot shows the Kibana "Create index pattern" step. It includes fields for "Index pattern name" (index-name-*), "Include system and hidden indices" (unchecked), and a note that the index pattern can match multiple sources. Below the form is a preview section showing a log entry from "log-2021.08.17".

Help us improve the Elastic Stack
To learn about how usage data helps us manage and improve our products and services, see our [Privacy Statement](#). To stop collection, disable usage data here.
[Dismiss](#)

Kibana
Index Patterns
Saved Objects
Advanced Settings

Create index pattern
An index pattern can match a single source, for example, `filebeat-4-3-22`, or **multiple** data sources, `filebeat-*`.
[Read documentation ↗](#)

Step 1 of 2: Define an index pattern
Index pattern name
Index name-*
Use an asterisk (*) to match multiple indices. Spaces and the characters 1, 2, 3, <, >, | are not allowed.
 Include system and hidden indices
Your index pattern can match your 1 source.
log-2021.08.17
Rows per page: 10

The screenshot shows the Keycloak "Welcome to Keycloak" page. It features three main sections: "Administration Console" (Centrally manage all aspects of the Keycloak server), "Documentation" (User Guide, Admin REST API and javadocs), and "Keycloak Project" (Mailing List and Report an issue). There is also a "Community" section at the bottom.

The screenshot shows the Netbox "Device Roles" table. The columns are Name, Devices, VMs, Color, VM Role, and Description. Eight rows are listed, each with a checkbox and edit/delete icons. The rows represent different node types: Ceph control node, Ceph resource node, Compute node, Control node, Generic node, Manager node, Monitoring node, and Network node. Most nodes have a green color bar and a checkmark in the VM Role column.

Name	Devices	VMs	Color	VM Role	Description
Ceph control node	0	0		✓	—
Ceph resource node	0	0		✓	—
Compute node	0	0		✓	—
Control node	0	0		✓	—
Generic node	0	0		✓	—
Manager node	0	0		✓	—
Monitoring node	0	0		✓	—
Network node	0	0		✓	—

Netbox
50 per page
Showing 1-8 of 8

SCS Open Development in Practice

< > today edit

18 – 22 Sep 2023

day week month

	Mon 18/09	Tue 19/09	Wed 20/09	Thu 21/09	Fri 22/09
all-day					
09					
9:30					
10					
10:30			10:05 - 10:55 GMT+2 Team IaaS Sprint Review/Planning and Refinement		
11	11:05 - 11:55 GMT+2 SIG Documentation			10:35 - 11:25 GMT+2 Team Container Sprint Review/Planning and Refinement	
11:30			11:35 - 12:25 GMT+2 Team IAM Sprint Review/Planning and Refinement		
12					
12:30					
13					
13:30					
14	14:05 - 14:55 GMT+2 SCS Product Board			14:05 - 14:55 GMT+2 SIG Standardization/Certification	
14:30					
15	15:05 - 15:55 GMT+2 Blocker: SCS Team Overflow/Replace 15:05 - 15:55 GMT+2 Lean SCS Operator Overflow/Replace			15:05 - 15:45 GMT+2 Weekly SCS Community Meeting	
15:30		Coffee			

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 noticeable 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. sysself, 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