

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.<sup>1</sup>
- Amazon, Microsoft, Alphabet (Google) beherrschen den Markt.<sup>2</sup>
- Vendor lock-in<sup>3</sup>
- Inkompabilität bei Infrastrukturen, Plattformen und Applikationen
- US Foreign Intelligence Surveillance Act (FISA)  EU DSGVO
- hohe Komplexität dynamischer, verteilter Plattformen im Betrieb
- Fachkräftemangel

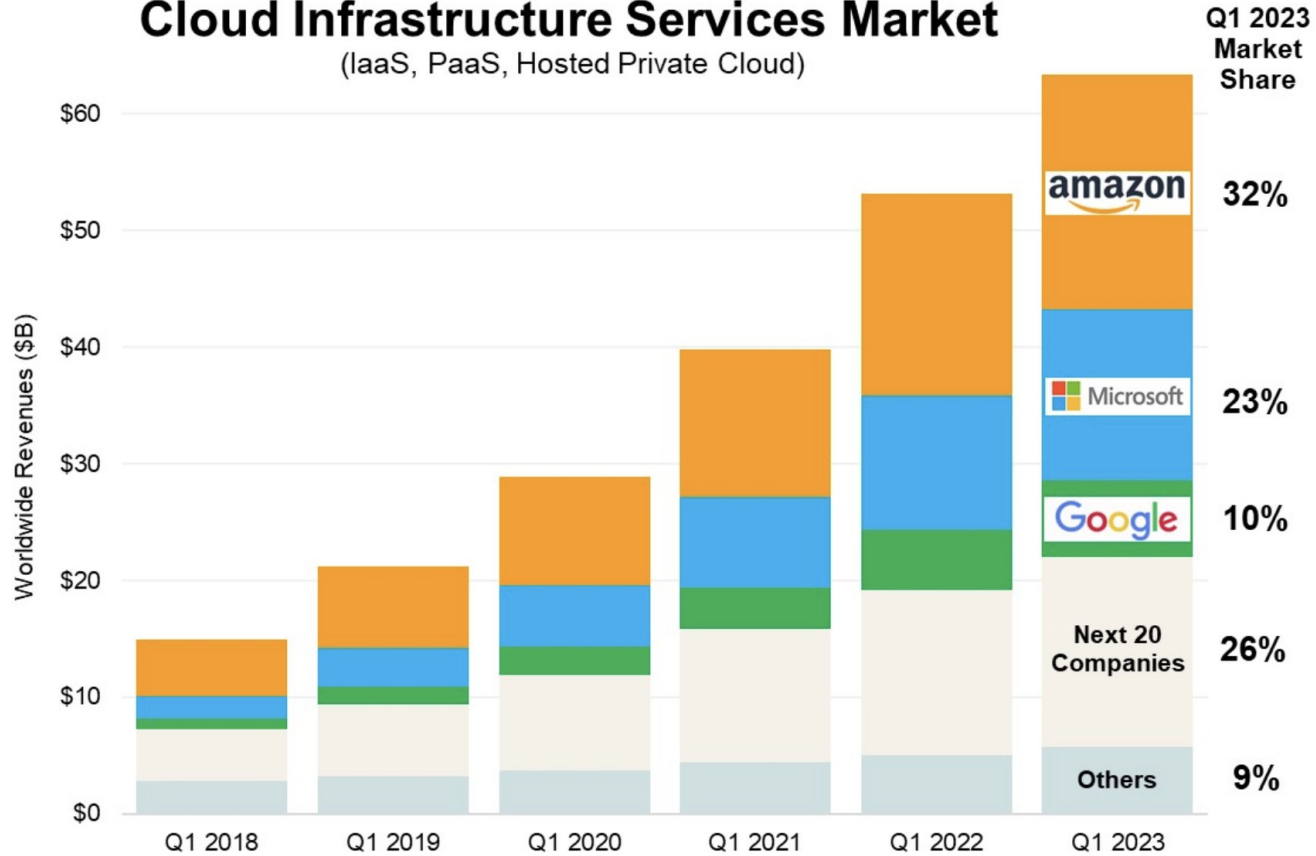
1 ZEW – Leibniz-Zentrum für Europäische Wirtschaftsforschung: „Schwerpunktstudie Digitale Souveränität 2021“ Hrsg.: Bundesministerium für Wirtschaft und Energie (Oktober 2021)

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](https://www.cio.bund.de/SharedDocs/downloads/Webs/CIO/DE/digitale-loesungen/marktanalyse-reduzierung-abhaengigkeit-software-anbieter.pdf?__blob=publicationFile&v=1)

# Cloud Infrastructure Services Market

(IaaS, PaaS, Hosted Private Cloud)













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)

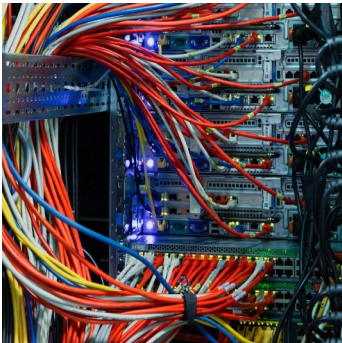
	Name	Land ⚙️	Umsatz (EUR)	Gewinn (EUR)	↓ Market Cap (EUR)
# 1	 Microsoft Corp. Registered Shares DL-,00000625		192,4 Mrd.	65,7 Mrd.	3,0 Bio.
# 2	 Apple		355,6 Mrd.	90,0 Mrd.	2,7 Bio.
# 3	 Alphabet Inc. Reg. Shs Cl. A DL-,001		282,5 Mrd.	67,9 Mrd.	1,9 Bio.
# 4	 Amazon.com		533,2 Mrd.	28,2 Mrd.	1,8 Bio.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

Source: Finanzen 100, June 2024

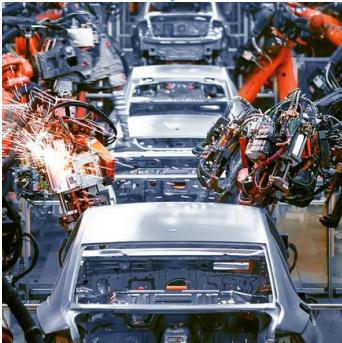
# imagine a Cloud Platform...

... 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.



  
**Sovereign  
Cloud Stack**



# SCS Leistungen



Zertifizierbare Standards



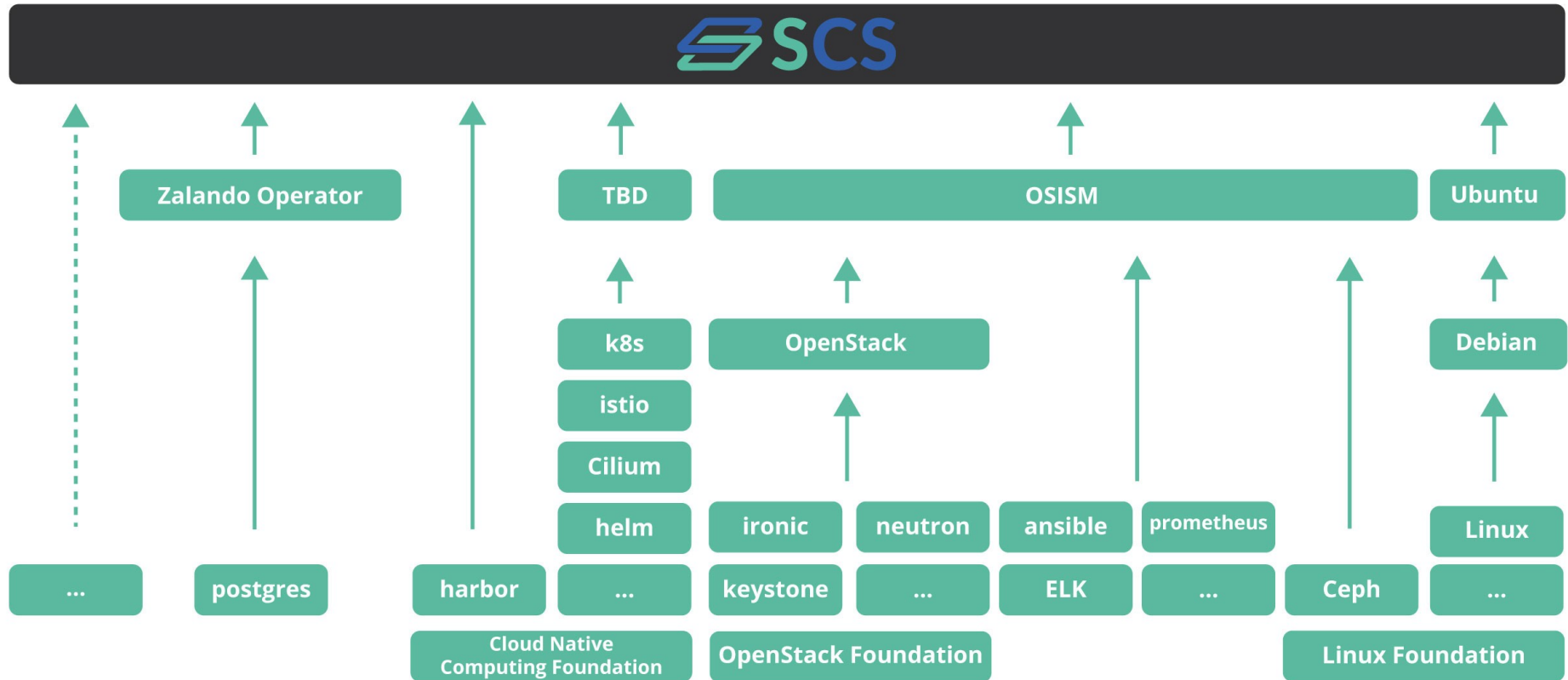
Modulare Open-Source-Referenz-Implementierung



Open Knowledge

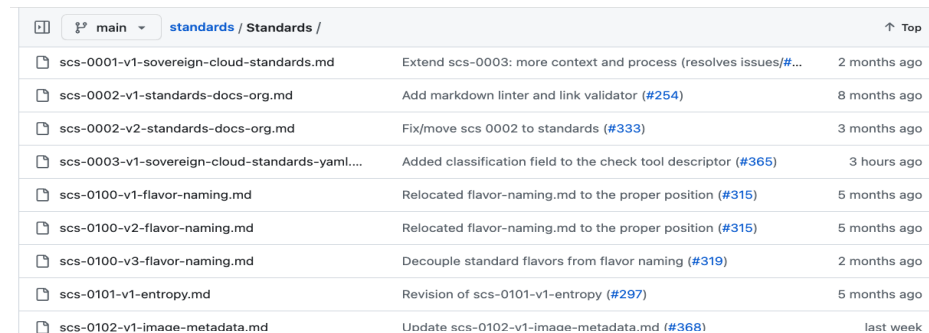


# SCS integriert, standardisiert und ergänzt bewährt Open-Source-Bausteine



# Offene, zertifizierbare Standards

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



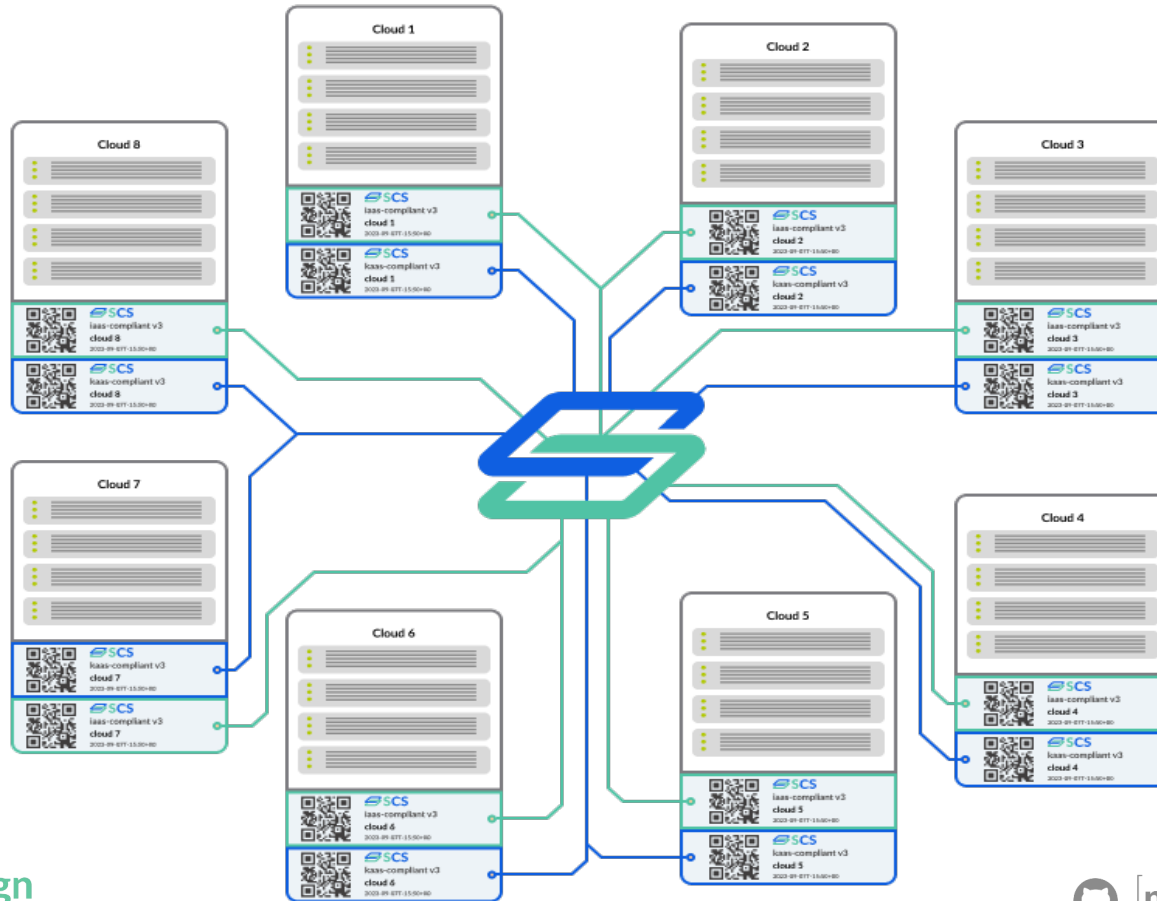
File Name	Description	Time
scs-0001-v1-sovereign-cloud-standards.md	Extend scs-0003: more context and process (resolves issues/#...	2 months ago
scs-0002-v1-standards-docs-org.md	Add markdown linter and link validator (#254)	8 months ago
scs-0002-v2-standards-docs-org.md	Fix/move scs 0002 to standards (#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-imaae-metadata.md	Update scs-0102-v1-imaae-metadata.md (#368)	last week

## 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



## 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
  - **Förderierung**: 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**





# 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

Schleswig-Holstein. Der echte Norden.

19



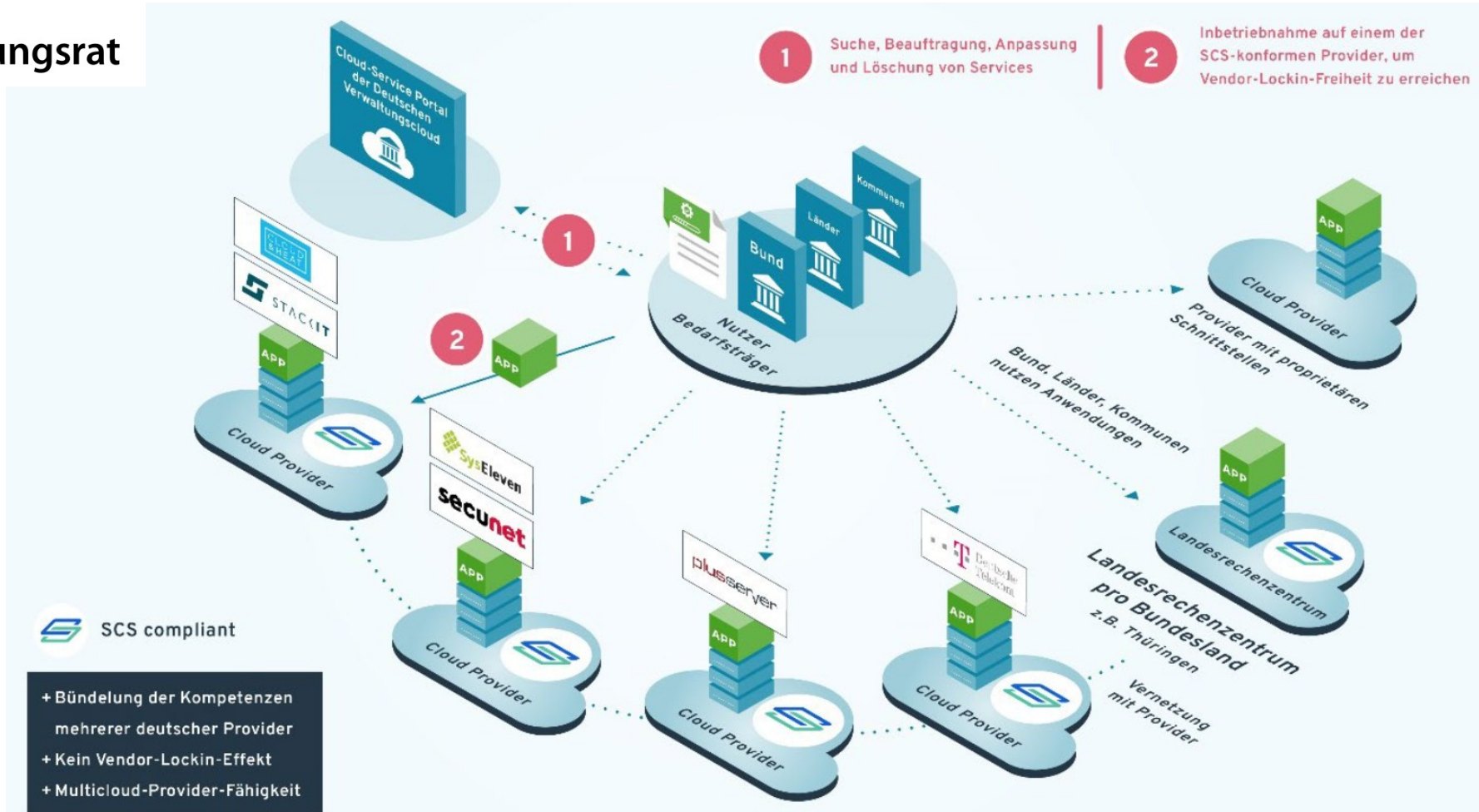
SCS Summit  
14.5.2024  
Berlin



# SCS Proof of Concept: Skalierung + Wechselfähigkeit für die DVC



IT-Planungsrat



SCS in



Zen  
DiS



Below you will find all the groups that are public.  
You can easily contribute to them by requesting to join these groups.

> S **Smarte.Land.Regionen**

S **SopraSteria**

**Sovereign Cloud Stack** Owner  
 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**

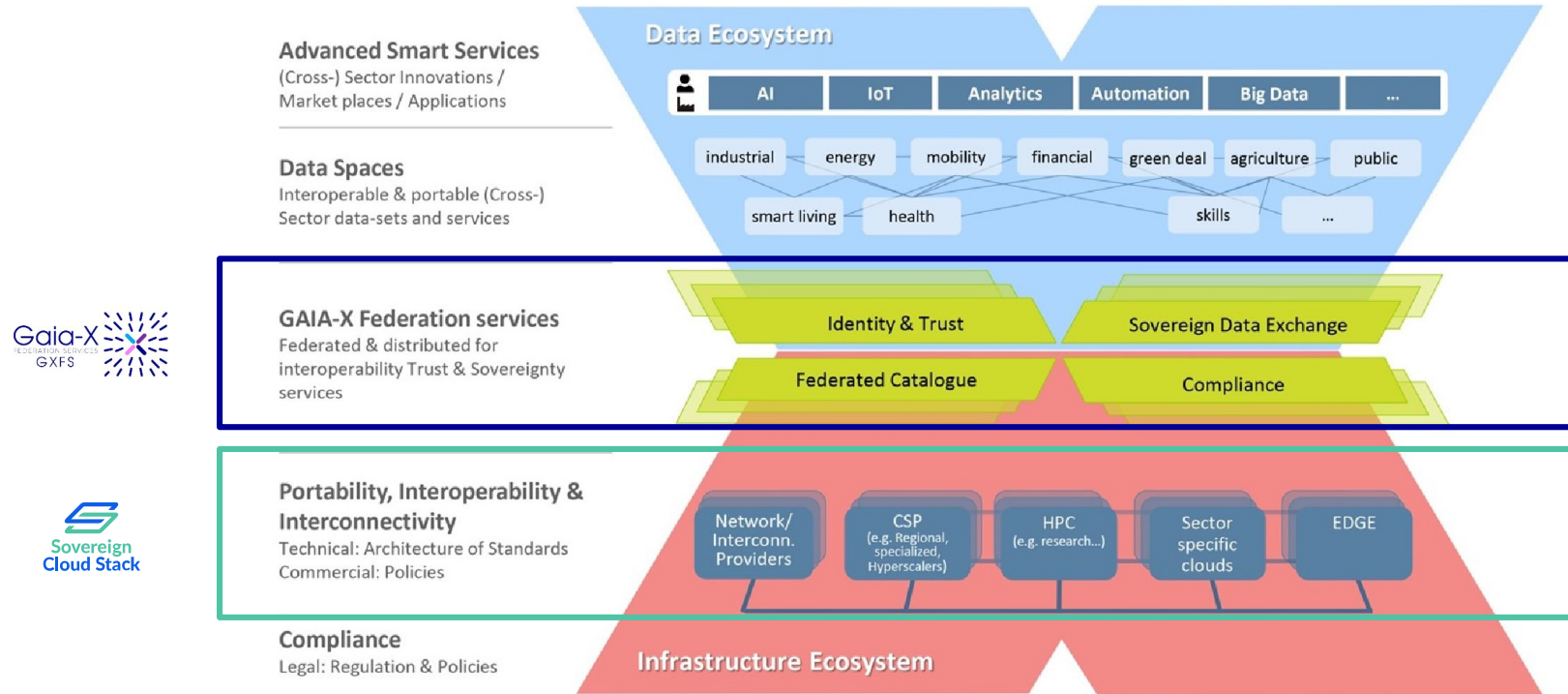
> **Stadt Soest**

**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.

T **Testgruppe**

T **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 ▾



## 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](#)



## GovExchange

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

[Learn more](#)

digital  
impact  
alliance



— An OSB ALLIANCE project —



<https://scs.community>

Supported by:



on the basis of a decision  
by the German Bundestag



*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](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, interoperabel (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/>



<https://scs.community>

Generiert durch:



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.

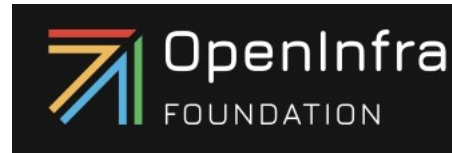
- [Open Source](#)
- [Open Design](#)
- [Open Development](#)
- [Open Community](#)

# 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:

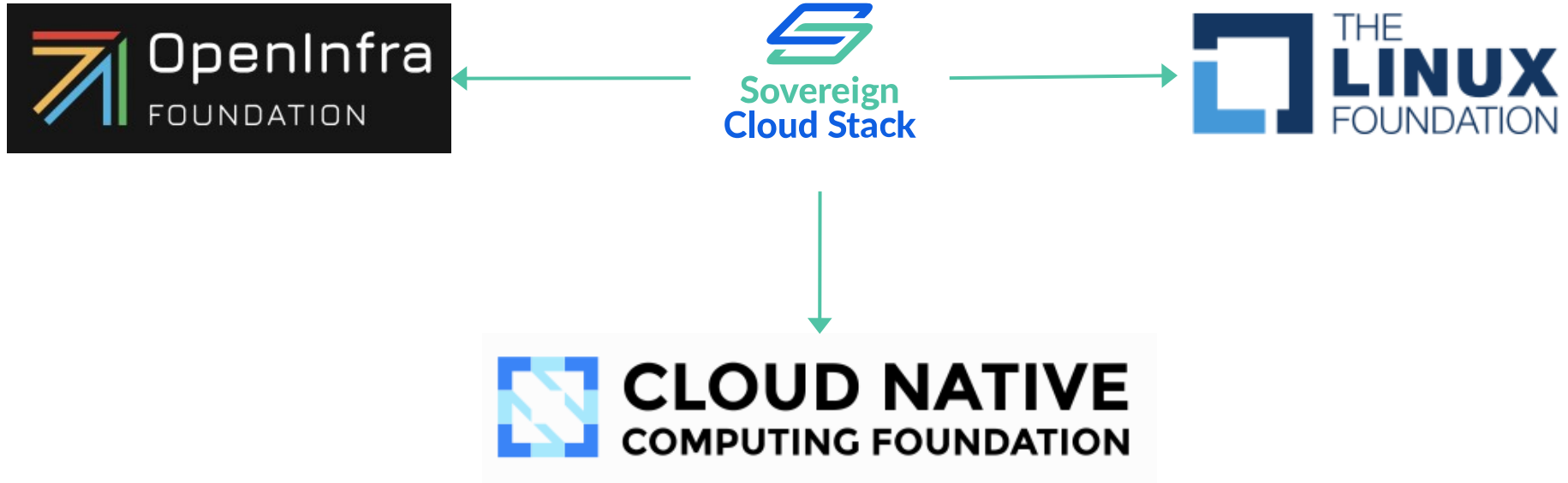
### 1. Free Redistribution

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.

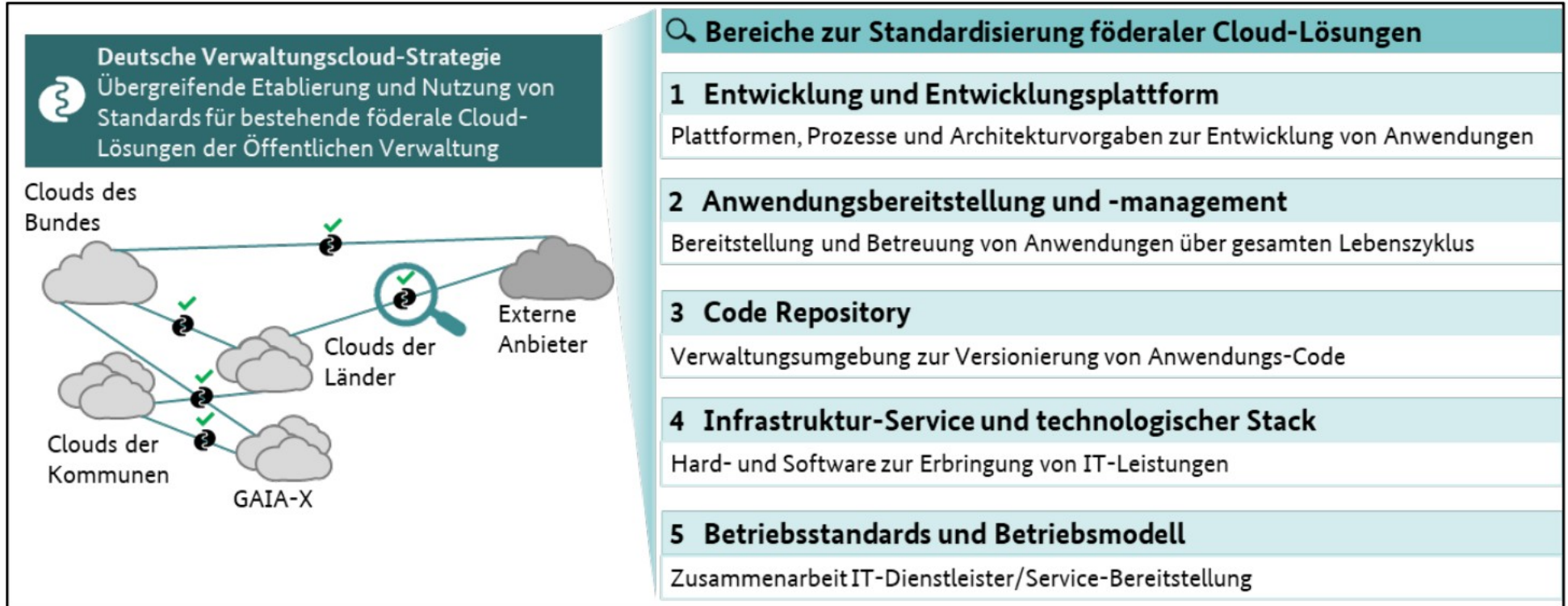
### 2. Source Code

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!

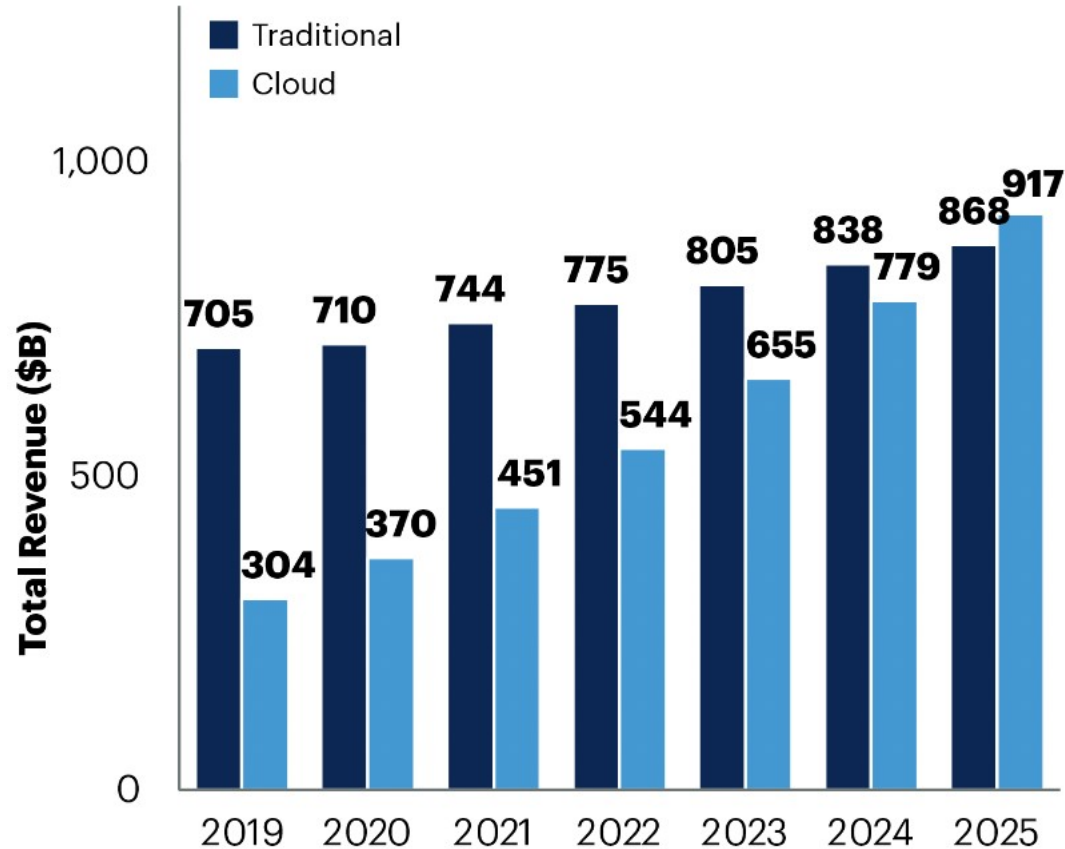


# SCS ist an der Entwicklung der Deutschen Verwaltungscloud (DVC) beteiligt.



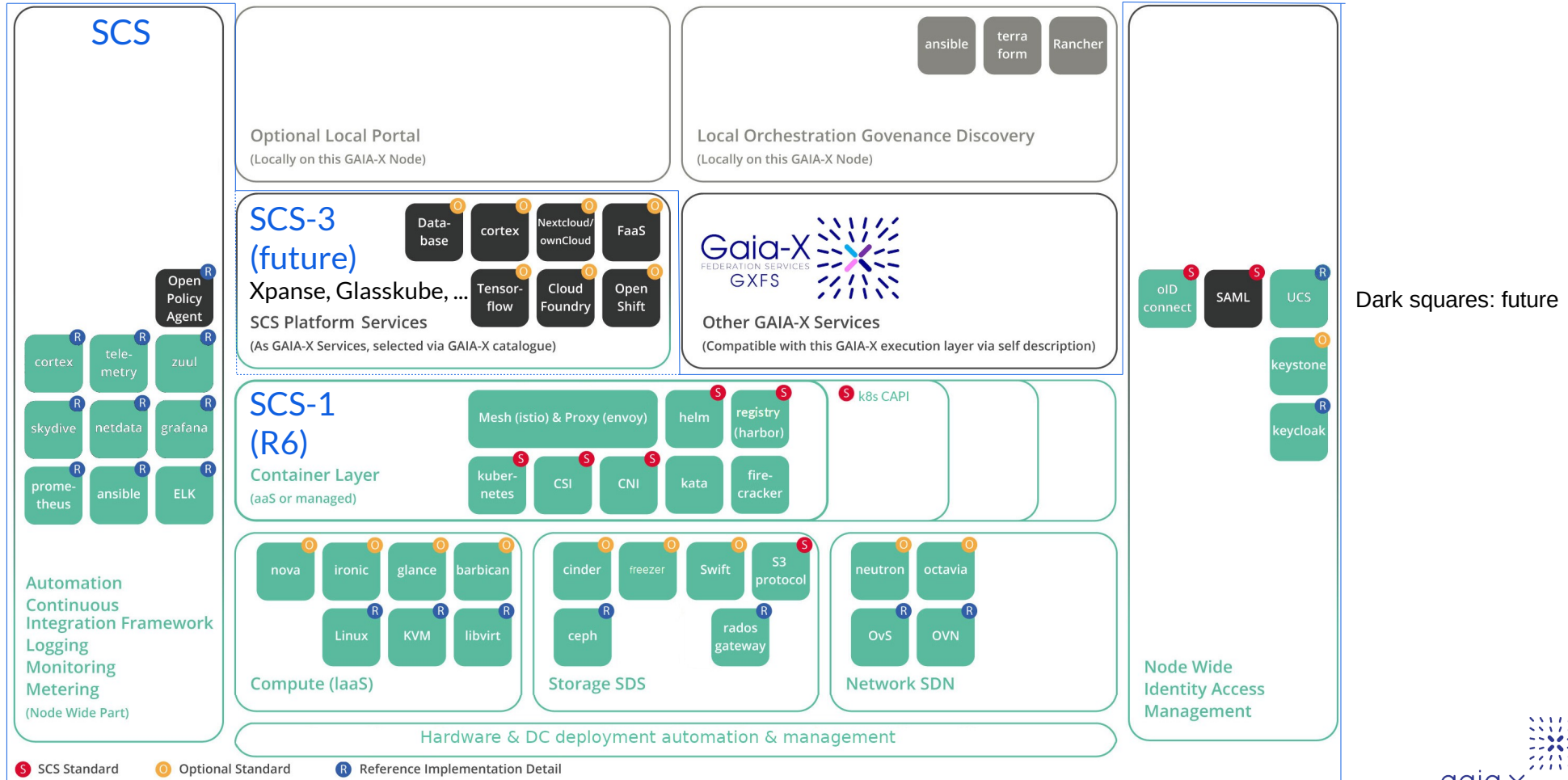


# "Cloud-Shift": Enterprise IT Spending Worldwide

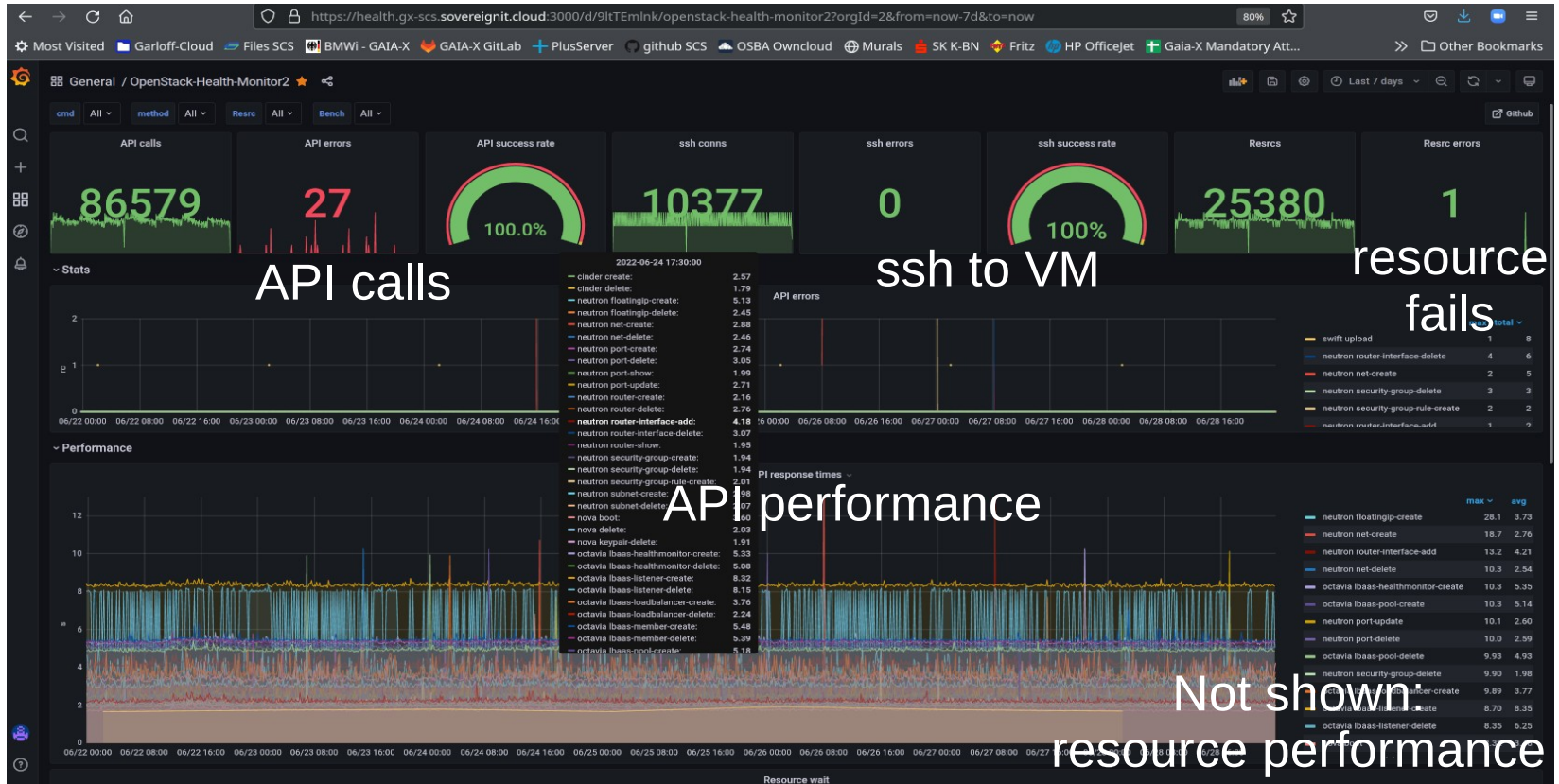


Source: [Gartner 2022](#)

# SCS Reference Architecture (current status)



# SCS Operations: Measure what you want to manage.



# Operations: SCS Tooling

The screenshot shows the ARA web interface with a table of job execution results. The table has columns for Status, Report, Date, Duration, Hosts, Tasks, Results, Ansible, Controller, Name (or path), and CLI. The jobs listed include tasks like 'manager\_osism\_...', 'manager\_kolla\_...', and 'manager\_osism\_...'.

The screenshot shows the Keycloak Administration Console landing page. It features a 'Welcome to Keycloak' message and several navigation links: 'Administration Console', 'Documentation', 'Keycloak Project', 'Mailing List', and 'Report an issue'.

The screenshot shows the Kibana 'Create index pattern' configuration page. It includes a 'Help us improve the Elastic Stack' message, a 'Create index pattern' heading, and a form for defining an index pattern. The form contains an 'Index pattern name' field with the value 'index-\*' and a 'Next step >' button.

The screenshot shows the Netbox 'Device Roles' configuration page. It features a table with columns for Name, Devices, VMs, Color, VM Role, and Description. The roles listed include 'Ceph control node', 'Ceph resource node', 'Compute node', 'Control node', 'Generic node', 'Manager node', 'Monitoring node', and 'Network node'. There are also buttons for 'Configure', '+ Add', 'Import', and 'Export'.

Kibana

Netbox

# 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				09:05 - 9:55 GMT+2 Team OPS Sprint Review/Planning and Refinement	
9:30					
10			10:05 - 10:55 GMT+2 Team IaaS Sprint Review/Planning and Refinement		10:05 - 10:55 GMT+2 IAM Hacking session
10:30				10:35 - 11:25 GMT+2 Team Container Sprint Review/Planning and Refinement	
11	11:05 - 11:55 GMT+2 SIG Documentation				
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/Replacement	15:05 - 15:55 GMT+2 Lean SCS Operator Coffee		15:05 - 15:45 GMT+2 Weekly SCS Community Meeting	
15:30					

# 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, Sec Testing / Pen Test
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