



# Sovereign Cloud Stack: Open Source Cloud & Container Stack for GAIA-X

## Sovereign Cloud Stack

Kurt Garloff – SCS Project  
(KGarloff IT Consulting / OSB Alliance e.V.)

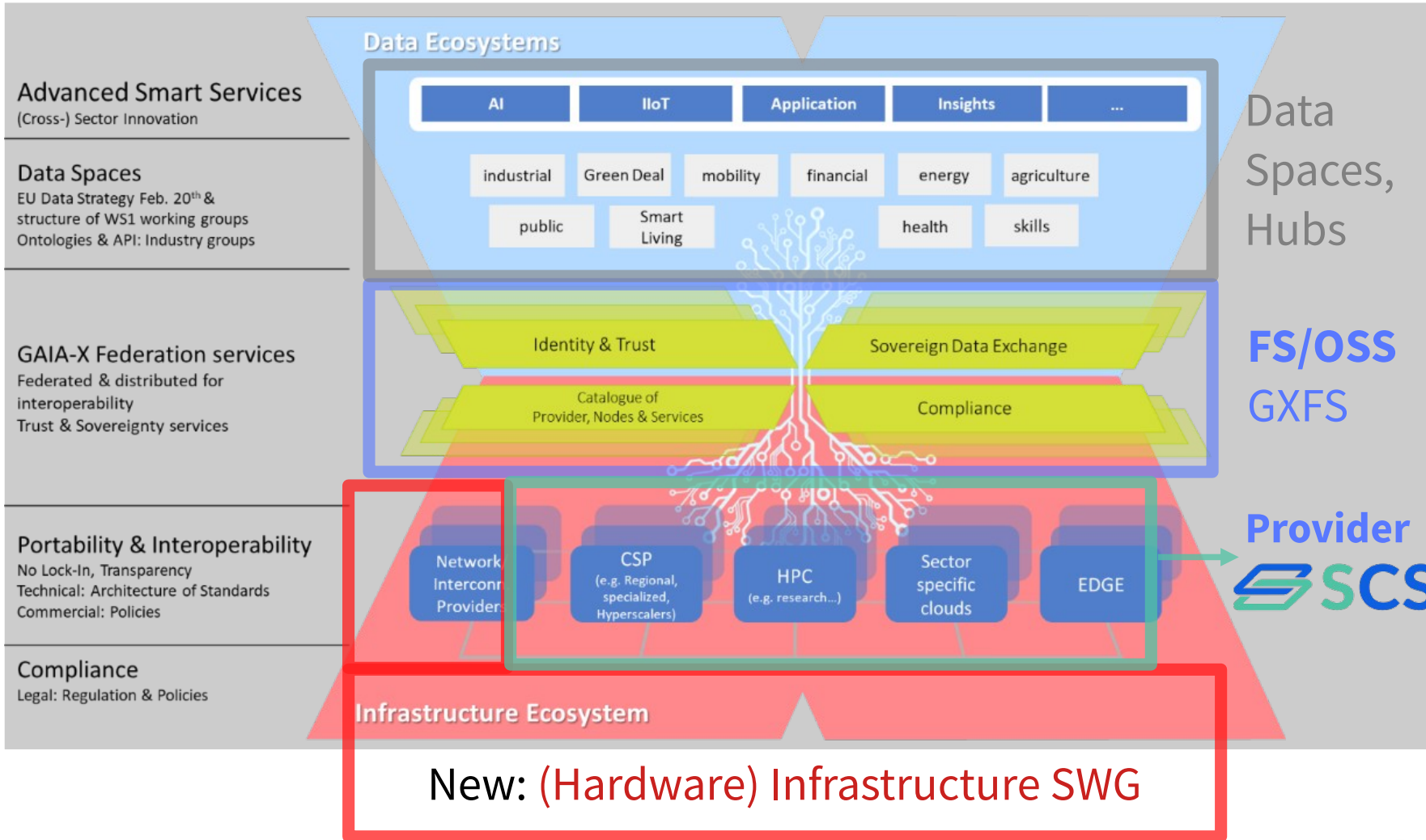
[scs@garloff.de](mailto:scs@garloff.de)



NL Cloud Infra Coalition

2021-03-17

# GAIA-X Map



GAIA-X's mission is to strengthen digital sovereignty for business, science, government and society by empowering the development of innovation ecosystems. Digital sovereignty means that these individuals, organizations and communities stay in complete control over stored and processed data and are enabled to decide independently who is permitted to have access to it.

Source: (w/o frames)

[https://www.data-infrastructure.eu/GAIA-X/Redaktion/EN/Publications/gaia-x-the-european-project-kicks-of-the-next-phase.pdf?\\_\\_blob=publicationFile&v=7](https://www.data-infrastructure.eu/GAIA-X/Redaktion/EN/Publications/gaia-x-the-european-project-kicks-of-the-next-phase.pdf?__blob=publicationFile&v=7)



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# Status Quo & Sovereign Cloud Stack vision

## Hyperscalers dominate the cloud market

- Dependencies (economic, strategic, legal challenges) → digitization barrier
- Centralized control over platforms and data access
- Control and Value creation outside Europe

## Open Source Building blocks available for alternatives

- Many disconnected efforts in many companies and some CSPs to build & run their own stacks
- Operating such a dynamic distributed platform well is hard
- Every team solves curation, integration, testing, automation, certification, operations on their own (duplicated efforts)
- Many somewhat incompatible disconnected offerings, don't sum up to a viable alternative

## Sovereign Cloud Stack creates a network of many of these teams

- Define and implement the stack together as open source (in an open community process) and also tackle operational topics together (“Open Operations”)
- Certifiable standardized interfaces
- Make it easy for users to federate clouds



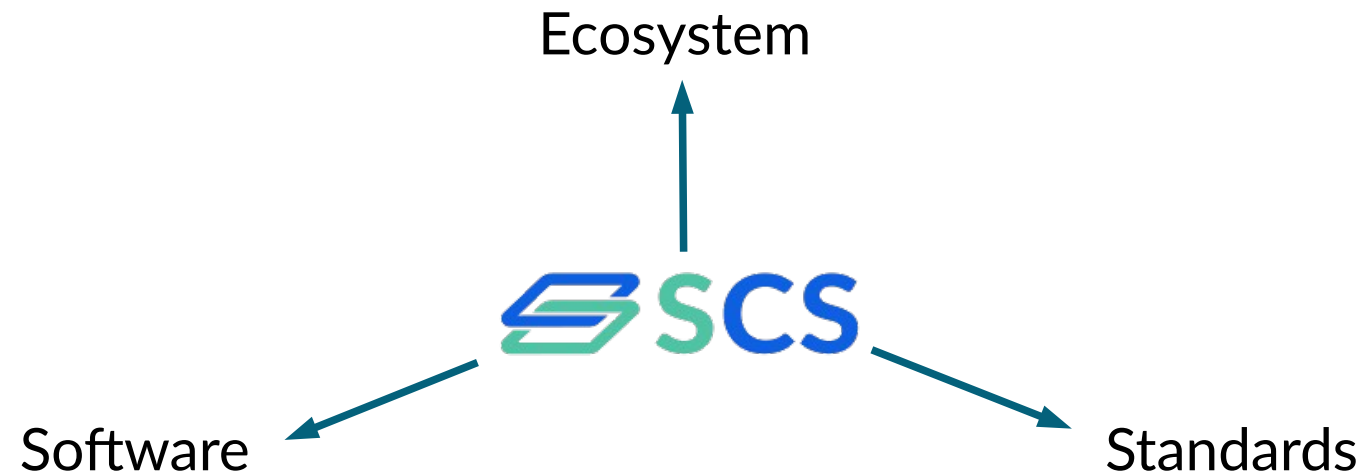
# SCS Deliverables



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- CSPs: Share Ops Best Practices
- Transparency on Quality, RCAs
- “Open Ops”
- One set of interfaces for ISVs, Operators, Consultants, ...
- **Stretch goal: Cross-reselling**

- Complete Stack: IaaS, KaaS, (PaaS)
- As Open Source (4 Opens)
- Modular
- Including Ops: Lifecycle Mgmt, Infra, CI, Moni
- Including Federatable IAM



- Strict standards: IaaS, k8s, k8s cluster mgmt Behavior (e.g. AZ definition), roles
- Ops standards (e.g. updating!)
- SLAs
- GAIA-X Self-Desc

# SCS project status



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## Organization

- Project team started in early 2020 with SPRIN-D funding
- Part of GAIA-X (WS2/SWG 1.4 → GAIA-X Community Project under iTC Provider WG)
- BMWi funding WIP (real SCS start planned for Mar 2021, team @ OSB Alliance e.V. coordinating partners)
- Homepage (<https://scs.community/>), source code on [github/SovereignCloudStack](#)
- Lined up ~15 engineers (growing) from partners regularly contributing code/artifacts, weekly sprints

## Standardization & Ecosystem

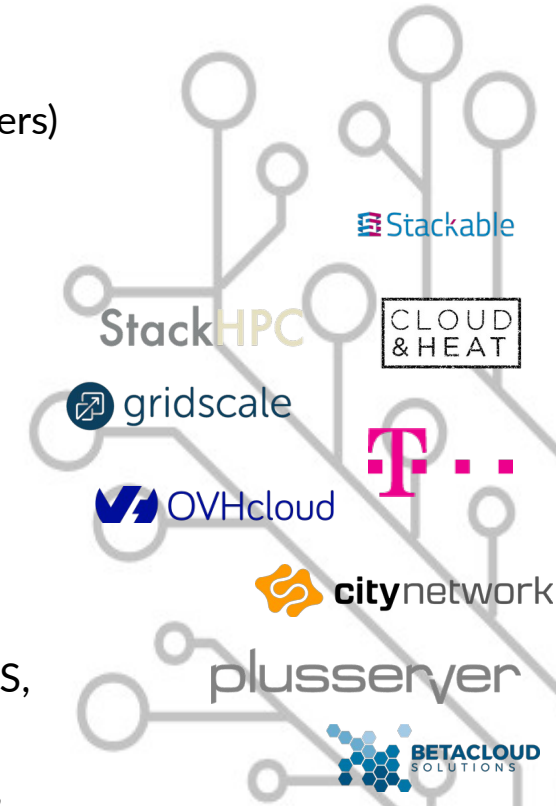
- Working with existing providers: Betacloud Solutions, PlusServer, CityNetwork, T-Systems, OVH, Cloud&Heat, gridscale, StackHPC, IONOS, ...
- Working with industry (private clouds @ e.g. automotive, HPC)
- Working with public sector IT providers (Germany)

## Implementation

- Automated deployment of federatable IAM, Ops Tooling (LCM, Monitoring, CI, Security, telemetry), SDS, SDN, IaaS (OpenStack) – [daily deployments \(CI/CD\) on virtual environments \(city, plus, ...\)](#)
- KaaS is WIP (k8s cluster API + Gardener), CNI+CSI, Container tooling (helm, mesh, registry, monitoring, tracing)
- **PaaS => ecosystem, develop standardized base in 2022**
- Release Plan: R0: 4/2021, R1: 9/2021, R2: 3/2022, ...

## Transparency & Certification

- GAIA-X self descriptions exist (rudimentary)
- TBD: Convert chosen standards (all open source!) into automated standards compliance tests



# Webpage

<https://scs.community/>

&

# github

[github/SovereignCloudStack](https://github.com/SovereignCloudStack)



The screenshot shows the homepage of the Sovereign Cloud Stack community website. At the top left is the logo for Sovereign Cloud Stack. Below it are navigation icons for home, mail, phone, refresh, document, and code. A list of roles and locations is provided, including Product Owner for Container Technologies, Knowledge Management Engineer, Product Owner for IaaS and Operations, Community Manager, and Staff/Project Management/Documentation. A contact note for Kurt Garloff is included. The bottom section, titled "Supporting companies", features logos for 23 Technologies, B1 Systems, BetaCloud Solutions, CityNetwork, Cloud & Heat, Dilossacon, Gonicus, Gridscale, OSB Alliance, OSF, OVHcloud, Plusserver, SPRIN-D, Stackable, StackHPC, and univention.

The screenshot shows the GitHub repository page for SovereignCloudStack. The repository is titled "testbed-gx-scs" and is described as a "GAIA-X Sovereign Cloud Stack (SCS) testbed". It has 0 forks, 0 stars, 0 issues, and 0 pull requests, and was updated 9 days ago. Below this are three other repositories: "website" (Base content for scs.community, 1 fork, 0 stars, 2 issues, 0 pull requests, updated 9 days ago), "testbed" (Forked from osism/testbed, Hyperconverged infrastructure (HCI) testbed based on OpenStack and Ceph, 5 forks, 2 stars, 0 issues, 0 pull requests, updated 10 days ago), and "poc-gardener" (Automatically set up SAP Gardener on SCS compliant IaaS, 0 forks, 0 stars, 0 issues, 0 pull requests, updated 12 days ago). At the bottom, "Design-Docs" (Design Documents, Architecture etc. for SCS and related technology, 0 forks, 1 star, 2 issues, 1 pull request, updated 13 days ago) and "k8s-gatekeeper" are also listed.



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# IP management in SCS

**Only accept OSI accepted open source licenses in implementation**

**Open Source health check**

- 4 opens (open license, community, development, design)
- active&diverse communities
- maintenance, maturity

**Use OSI licenses (ASL2, GPL, ...) of upstream projects**

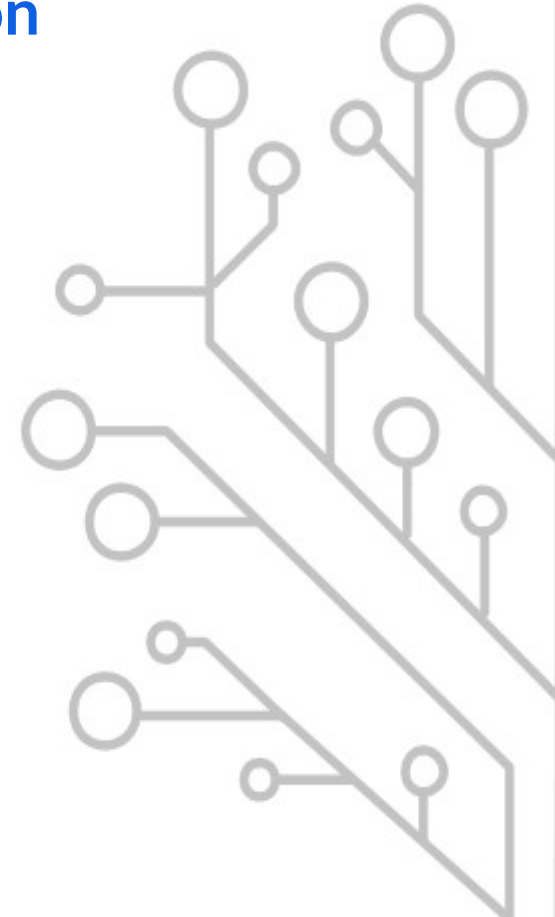
- contribute back as much as possible
- prefer copyleft for own independent code (weak for interface code)

**Distributed copyright (like the Linux kernel)**

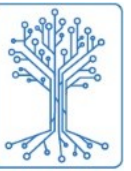
- Intentionally prevents dual licensing, license changes

**Use Digital Certificate of Origin (DCO, „signed-off-by“)**

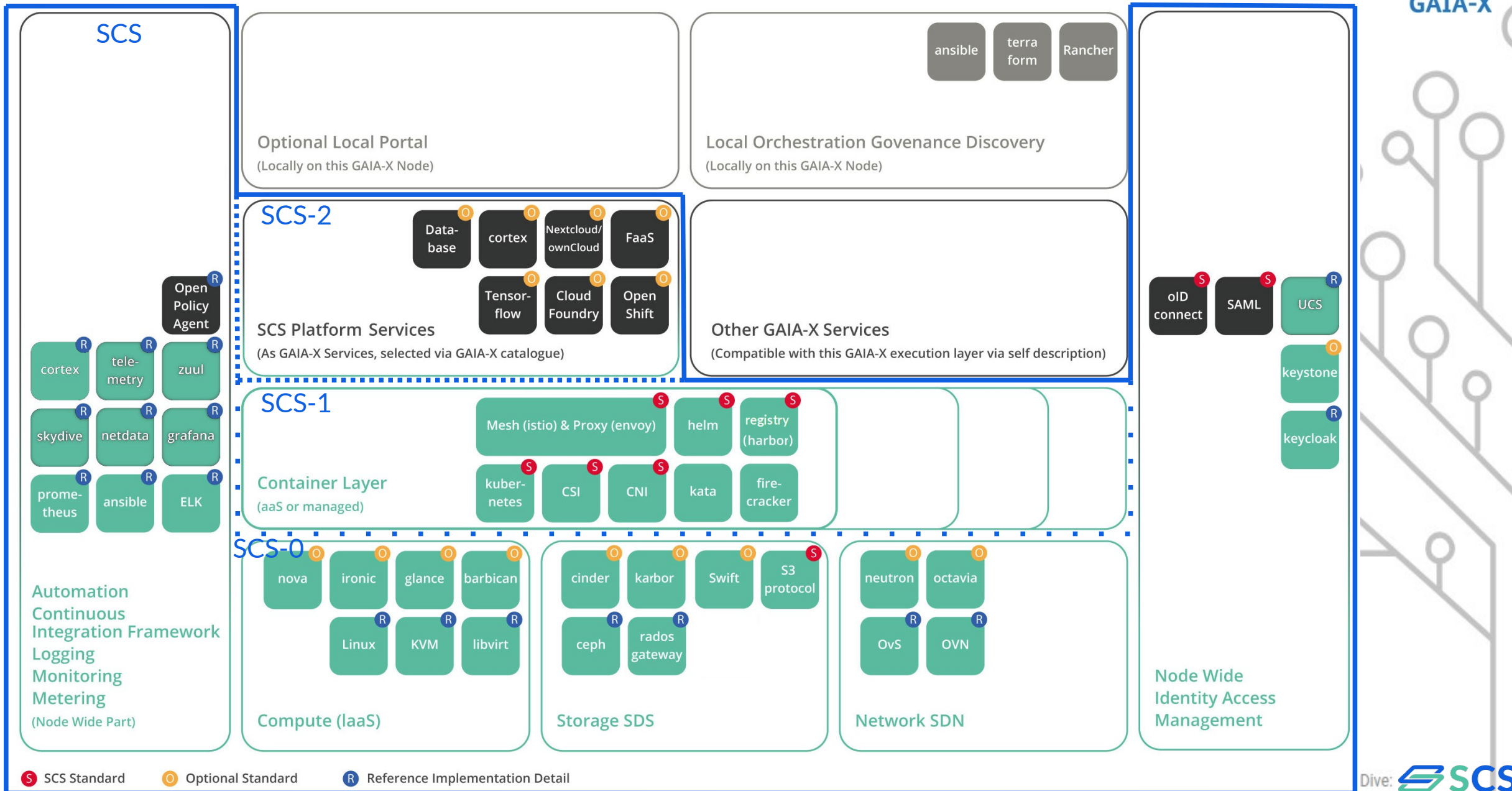
- documenting willful contributions under accepted license terms
- enforced by pre-merge checks



# SCS Architecture (current status)



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S SCS Standard   
 O Optional Standard   
 R Reference Implementation Detail



# Flow of automated deployment

(currently covering: Infra, IaaS, Ops, KaaS is WIP)

Physical SCS can of course host virtual SCS  
Nested virtualization support recommended



## Physical deployment

Production („Live“)

Server buying, racking, cabling

MaaS  
Netbox  
zabbix

Ansible: Setup Mgr, Nodes:  
- Infra: Database, MemCache, rabbitMQ  
- Infra: ceph+radosgw, OvS/OVN  
- OpsTooling: ARA, ELK, netdata, prometheus, patchman  
- IaaS: OpenStack Core (nova, keystone, ...)  
- Validation (WIP): Smoke tests, confest, RefStack, OPA

## Virtual (testbed) deployment

Dev, Testing / CI („Ref/Test“)  
Demo, Explore, Debug, ...

Bootstrap:  
terraform  
(on IaaS)

Ansible: Setup Mgr, Nodes:  
- Infra: Database, MemCache, rabbitMQ  
- Infra: ceph+radosgw, OvS/OVN  
- OpsTooling: ARA, ELK, netdata, prometheus, patchman  
- IaaS: OpenStack Core (nova, keystone, ...)  
- Validation (WIP): Smoke tests, confest, RefStack, OPA



<https://github.com/OSISM>

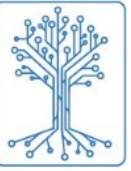
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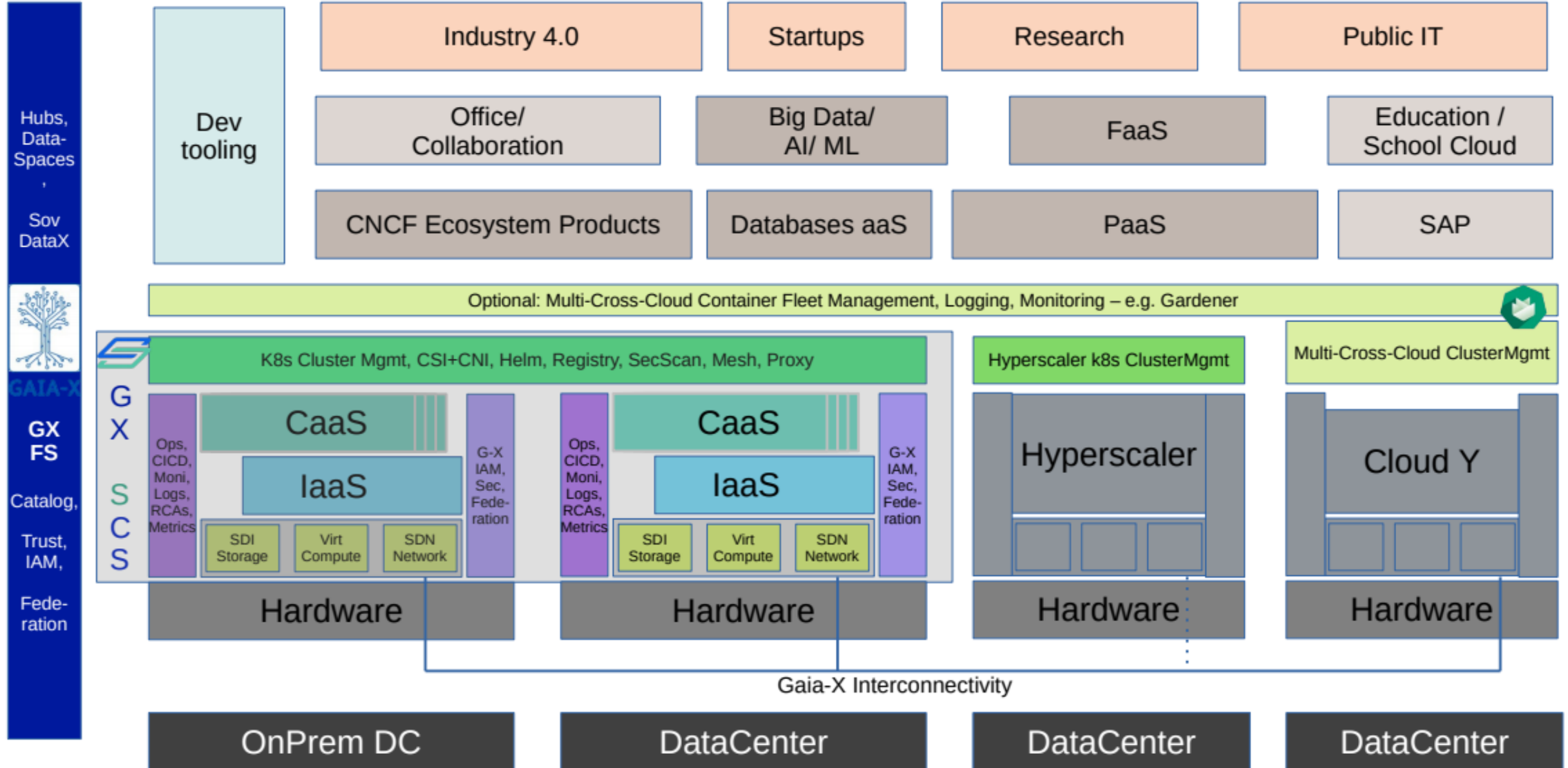
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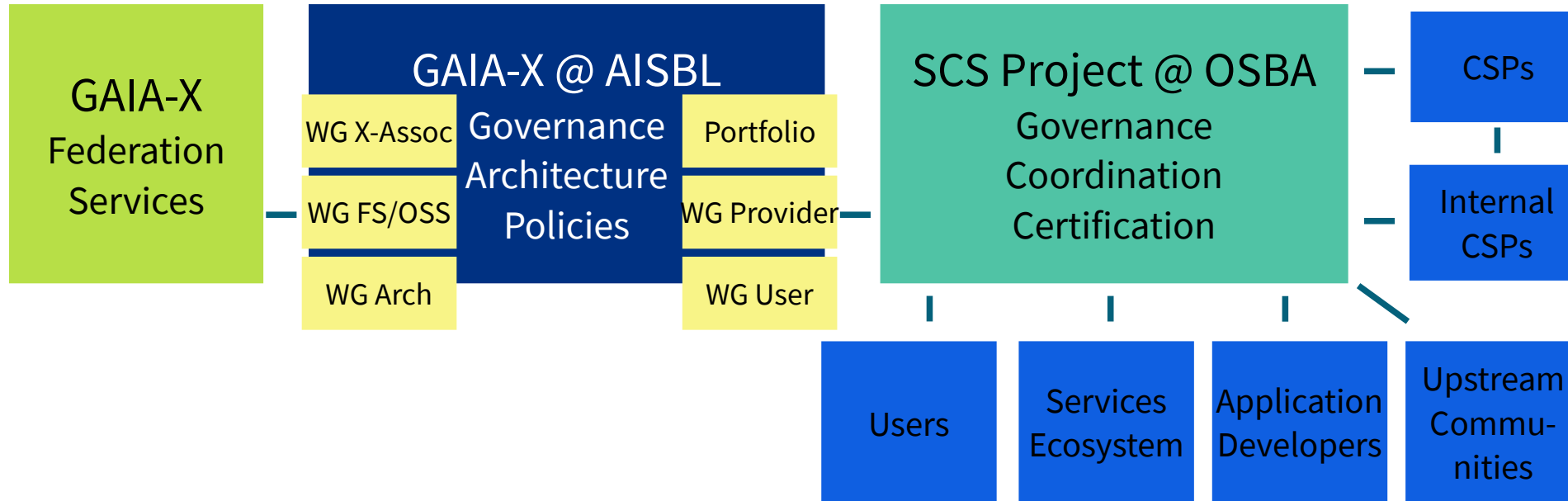
# IT Ecosystem with GAIA-X



# How SCS works



SPRIN-D



## Open Software Development

- All Open Source (OSI, mostly ASL2, DCO), distributed copyright, code on github, Open Design, Open Development by Open & Diverse Community
- Contributors from all groups → Join us!

## Open Operations – „Open Source for Ops“

- We collaborate on operations, building and sharing automation & knowledge



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# CIC and SCS / GAIA-X ideas

**Join GAIA-X: AISBL membership, participation in TC working groups**

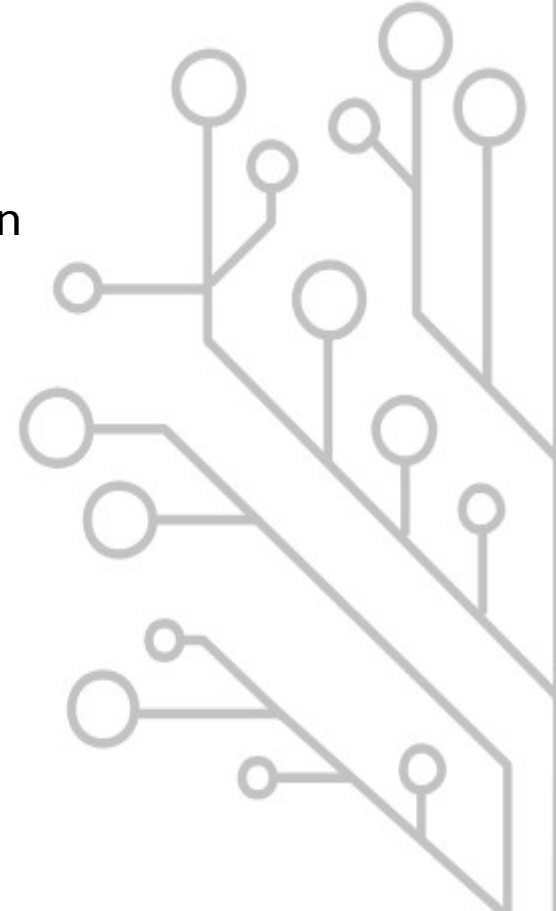
**GXFS: Work on Federation Services, tenders out RSN**

**Join SCS:**

- Test virtual deployment (you need access to existing OpenStack IaaS or work with us on porting terraform description to libvirt/AWS/VMware/...)
- Feedback, input, patches, issues, requirements ... → github (or mail)
- Formal SCS onboarding: Talk to me :-)
  - Nextcloud for internal material
  - Weekly SCS team meeting (Thu afternoon)
  - Weekly per-Subteam Sprint review/planning/Backlog refinement (Mon afternoon)
  - Subteams: 1 (Infra+IaaS), 2 (Container platform/tooling), 3 (Ops tooling, CI, IAM), 4 (Platform services – FUTURE, SCS-2)
- Tenders from SCS, jobs

**Ecosystem partners**

- Services around SCS (Training, Support, Implementation, Consulting, ...)
- Platform & Software Services on top of well-standardized CaaS platform
  - Will work with partners to standardize some as part of SCS-2



# Discussion



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# QUESTIONS?

GAIA-X: <https://www.data-infrastructure.eu/>

SCS Project: <https://scs.community/>

EMail: [project@scs.sovereignit.de](mailto:project@scs.sovereignit.de), [scs@garloff.de](mailto:scs@garloff.de)