GAIA-X Technical Deep Dive 2021-02-17

Sovereign Cloud Stack

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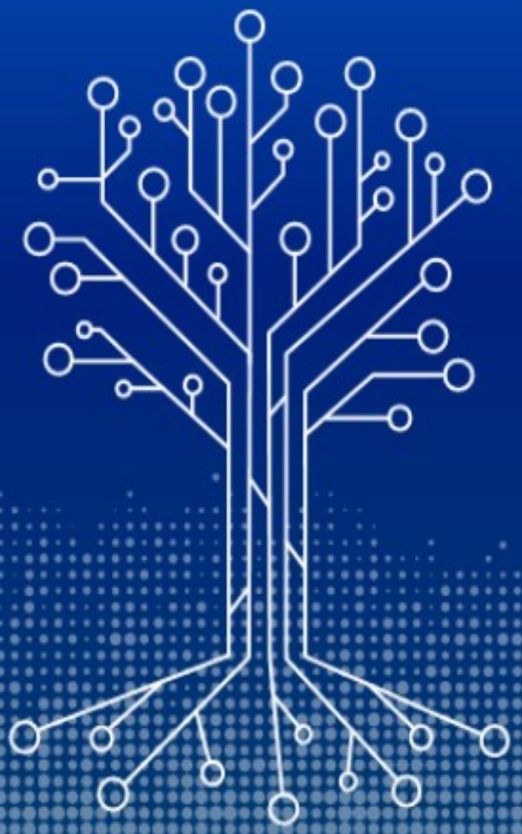
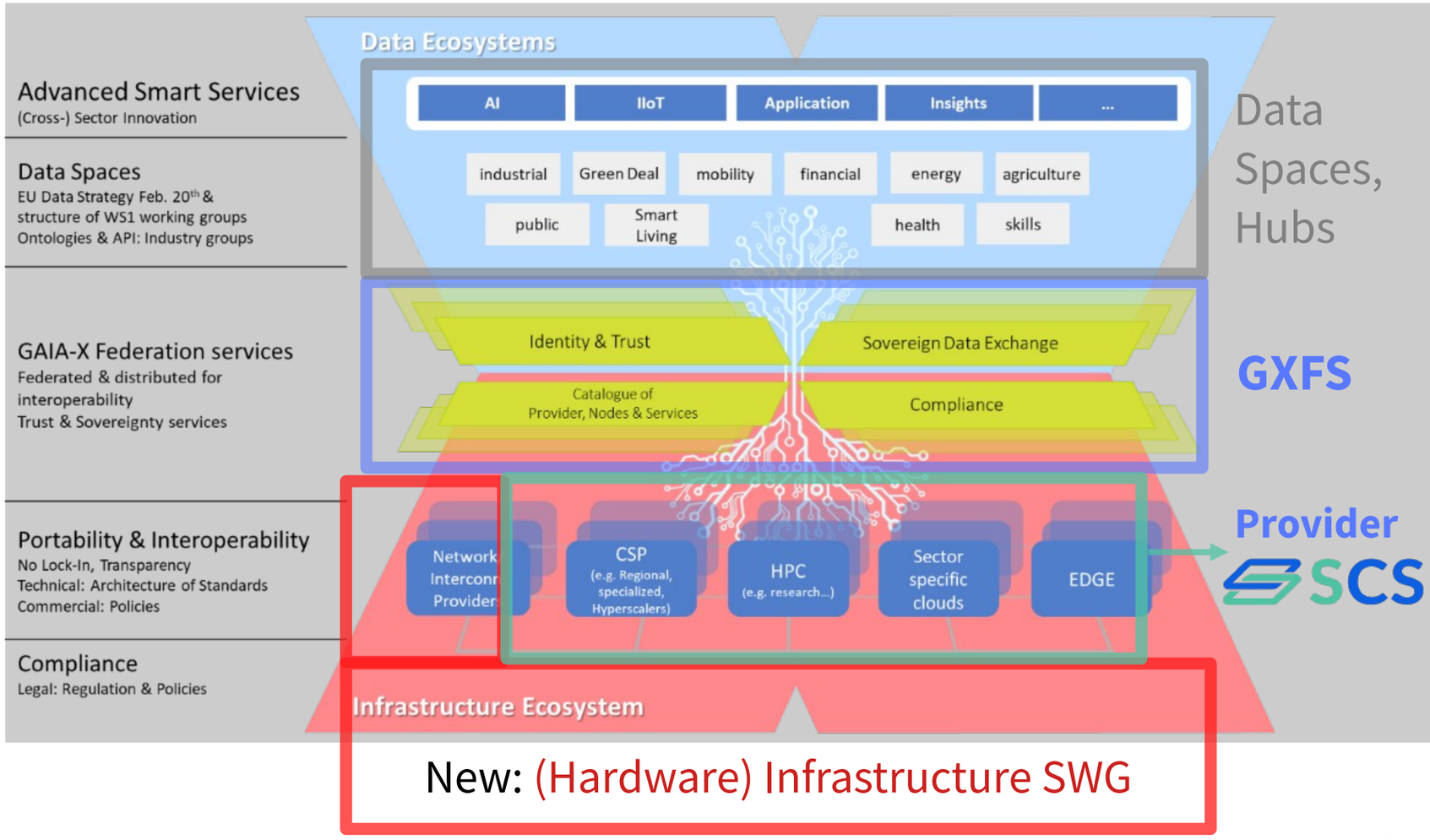


GAIA-X Map



New: (Hardware) Infrastructure SWG

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/GAIAX/Redaktion/EN/Publications/gaia-x-the-european-project-kicks-of-the-next-phase.pdf?__blob=publicationFile&v=7

Sovereign Cloud Stack vision & mission

We imagine the desired IT landscape to be under the control of the developers and users, supported by a broad set of providers that deliver modern IT infrastructure and data services in certifiable interoperable and federated ways respecting their users' rights, data protection and security requirements. The easy availability of such compliant services enables digital innovation across the industry, research and public sector.

Sovereign Cloud Stack empowers IT developers and users to innovate on modern, self-service automated IT infrastructure that is sovereign, i.e. under their own control or under control of federatable providers that they can chose according to their technical, strategic and regulatory needs from a broad set of choices.

SCS Goals & Vision

Standardization

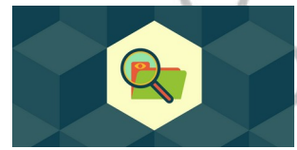
- Of the offered interfaces (compatibility for users)
- Operator – Focus: Configuration, Operations Tooling, Continuous Ops Processes
- Create scale advantages for all

Certification

- Verifiable Compatibility/Interoperability, Quality, Security

Transparency

- Completely Open Source Software, Open Community, Open Design and Development
- Open Ops: Configuration, Operational Processes and Operations Knowledge (new!)
- GAIA-X Self-Descriptions



Sustainability

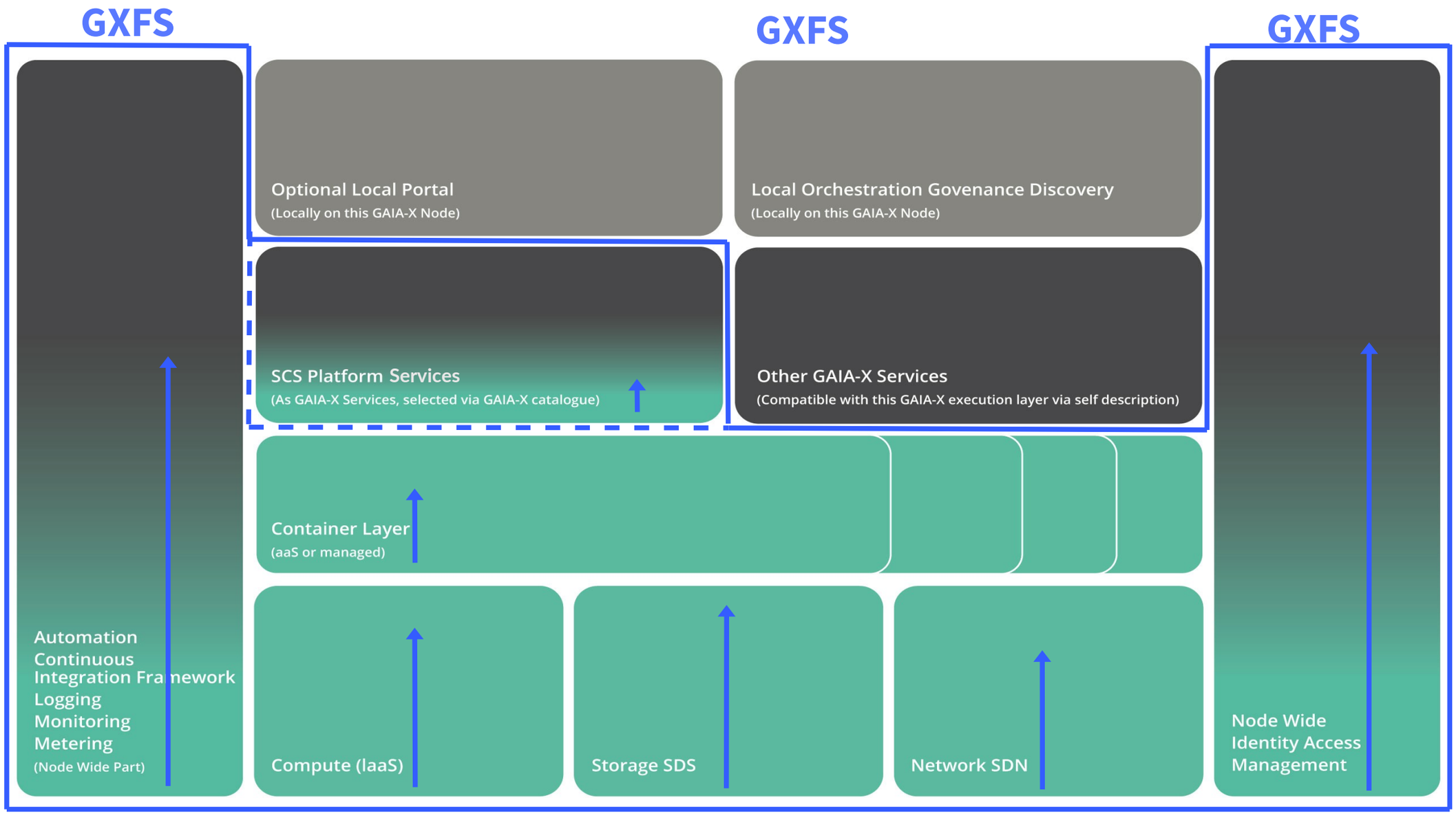
- Long-term existence of SCS
- Contribute back to existing upstream projects
- Efficient usage of resources

Federation

- Network of federated, compatible providers is better than monolithic structure
- Allows for specialization and differentiation

=> Relevance as <u>one</u> federated platform

Building the SCS architecture bottom up



SCS project status

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 requested (tentative start Mar 1, 2021, team @ OSB Alliance e.V. coordinating partners)
- Homepage (https://scs.community/), source code on github/SovereignCloudStack
- ~15 engineers 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. automobile, HPC)
- Working with public sector (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, standardized base in 2022
- Release Plan: R0: End of 3/2021, 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

SCS in GAIA-X

PlusServer hosts first open SCS development platform

- open for GAIA-X developers that interface infra
- more to come (OSBA, possibly virtual @OTC, OVH, CityNetwork, ...)

Test & validate GXFS concepts/pilots on SCS

- ideally, using SCS to test that concepts can be implemented (PoC)
- iterative refinement
- implement IAM (both SP and IdP sides)

Ensure license compatibility

Develop Self-Descriptions together

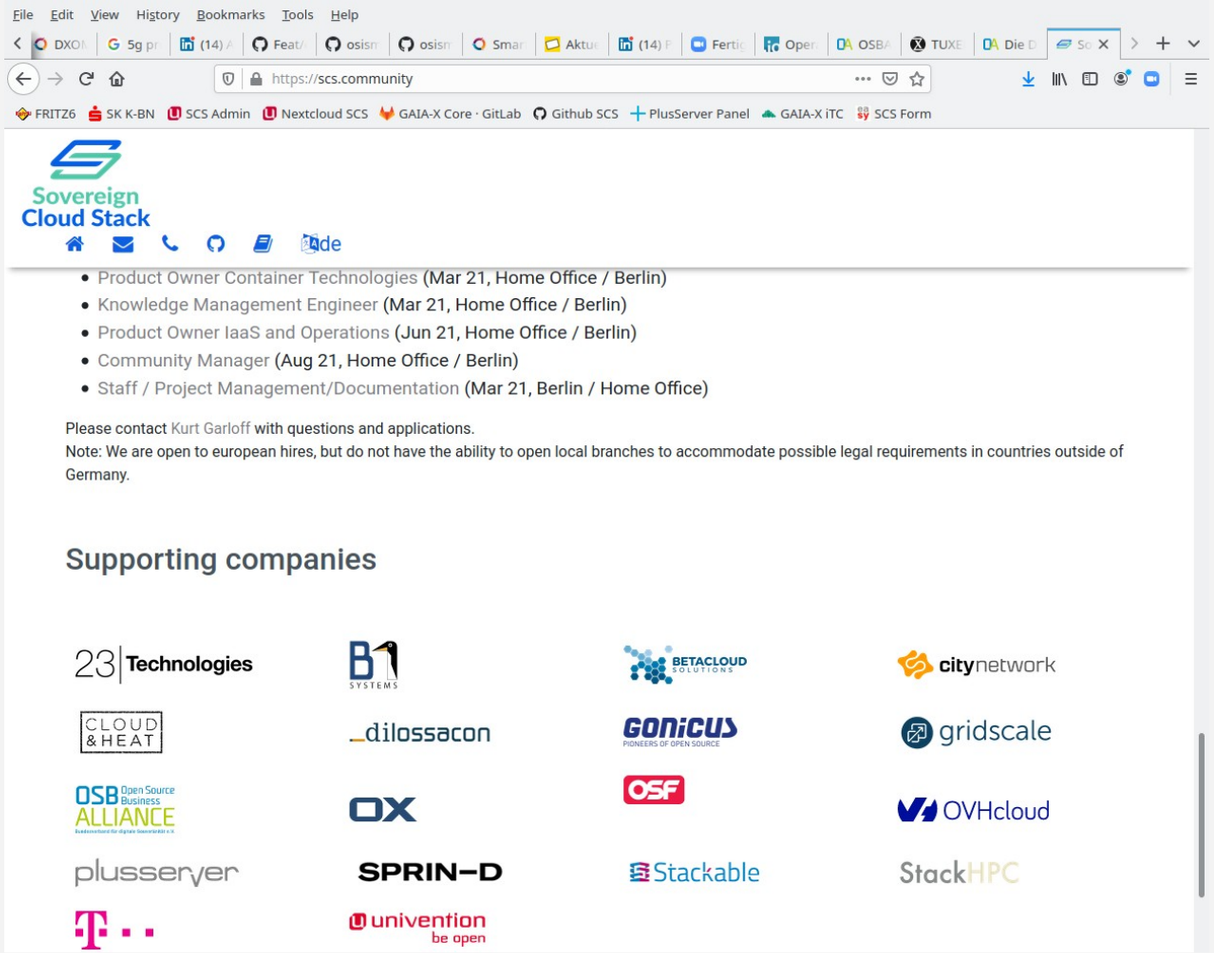
- Need to develop standard vocabulary to achieve service orchestration and composition (TOSCA?)
- SCS fully transparent – which properties do we want to expose?
  - Functional (Features, API, ...)
  - Non-functional (SLA, quality, security, data protection, control, monitoring, legislation, ...)
- Develop (automated) conformance tests → CI

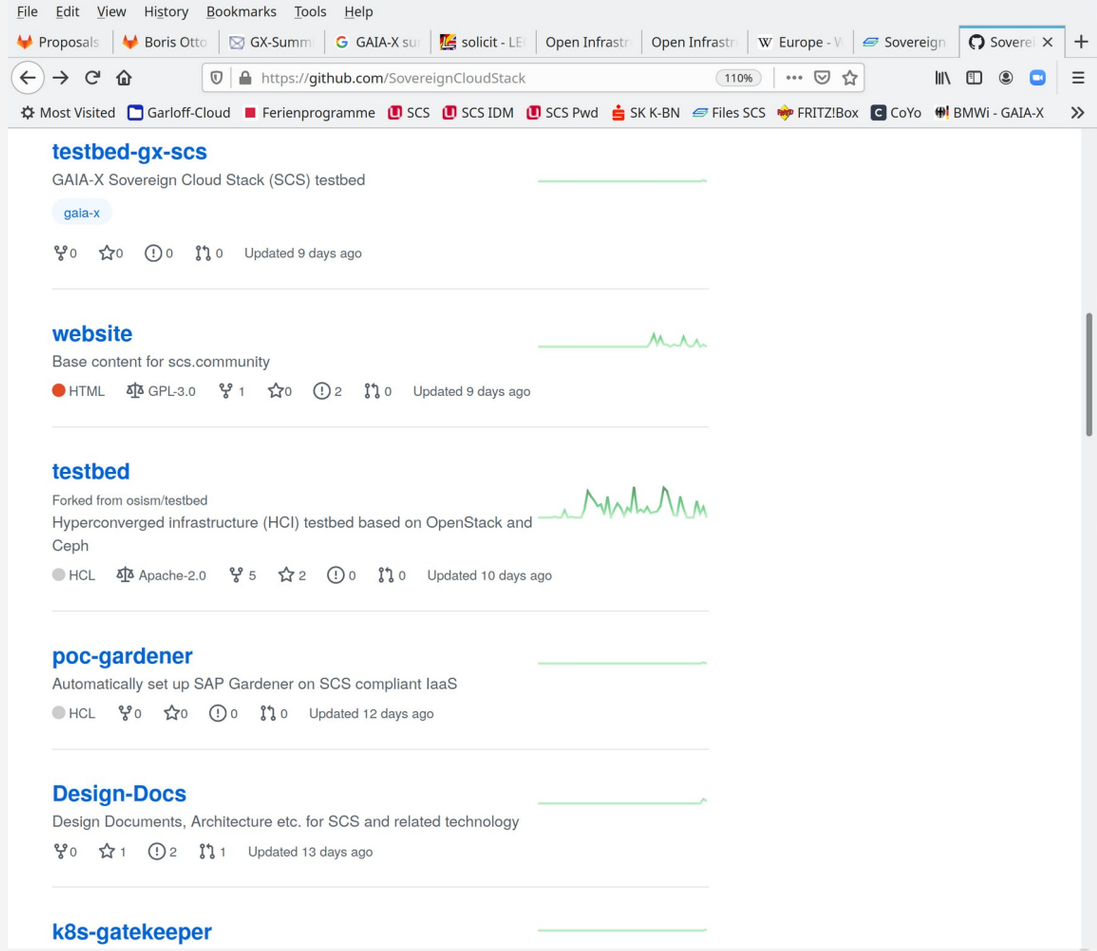
Future: Standard SCS platform services definition

Webpage & github

https://scs.community/ github/SovereignCloudStack

GAIA-X





Discussion & Call to Action

GAIA-X

Join us! Help us to define and implement an open source federated sovereign cloud stack together!

We're looking for hands-on architects, developers, quality engineers, … (Jobs @ OSBA and with partners)

We're looking for requirements and for growing the set of SCS providers.

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

SCS Project: https://scs.community/

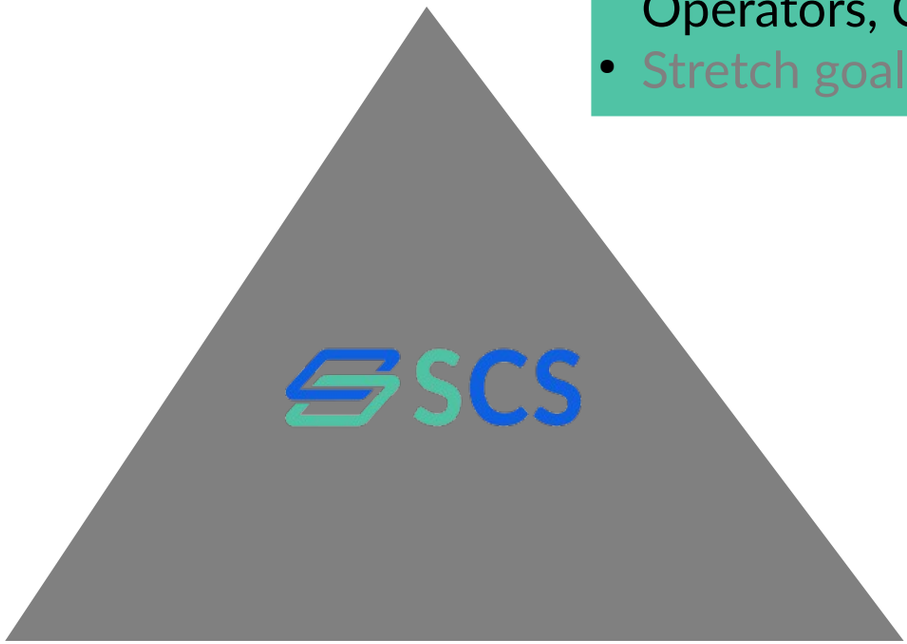
EMail: project@scs.sovereignit.de

Backup

SCS Deliverables

GAIA-X

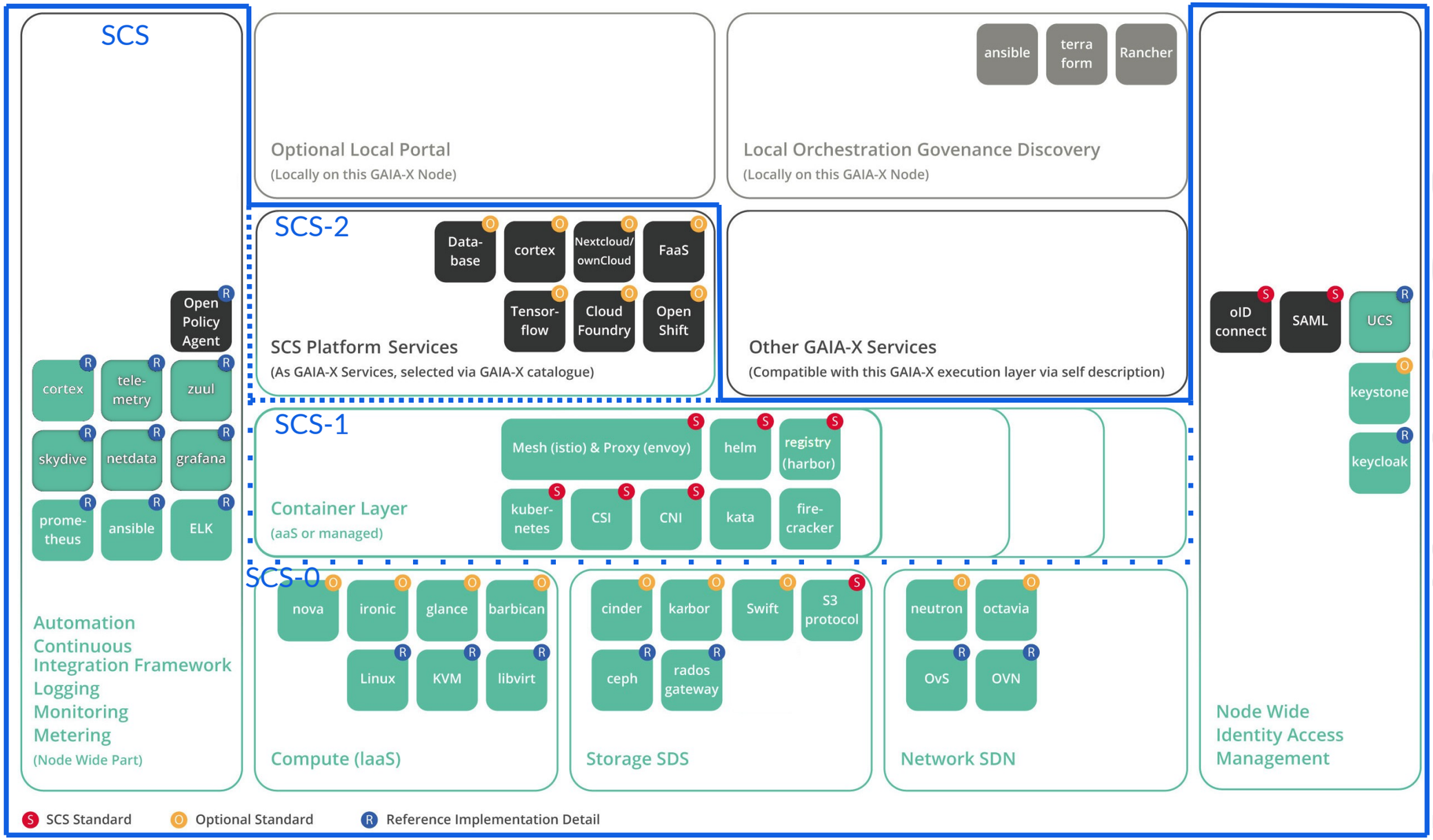
- CSPs: Share Ops Best Practices
- Transparency on Quality, RCAs
- Open Ops
- One set of interfaces for ISVs, Operators, Consultants, ...
- Stretch goal: Cross-reselling



- Complete Stack: IaaS, KaaS, (PaaS)
- Including Ops: Lifecycle Mgmt, Infra, CI, Moni
- Including Feder-atable IAM
- Modular
- Open (4x)

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

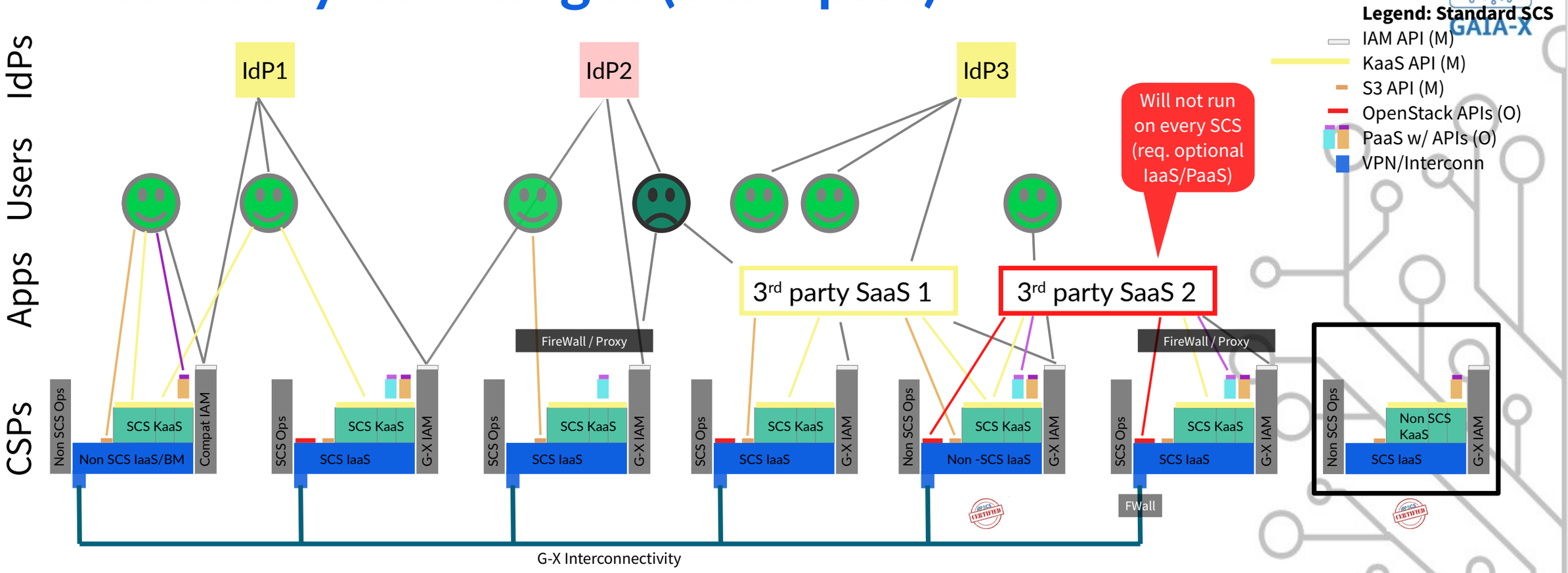
SCS Architecture (current status)



GAIA-X

Dive: SCS

CSP ecosystem target (examples)



Prov1: (public)	Prov2: (public)	Prov3: (priv/comm)	Prov4: (public)	Prov5: (public)	Prov6: (priv/corp)	Prov7: (gov/mil)
Using preex IaaS or BM, not exposing IaaS, Non-Std Ops, Compat IAM Standard SCS KaaS, S3, PaaS 2	Standard SCS Ops, IaaS (exposed), IAM, KaaS, S3, PaaS 1+2	Extra protection (limit users/IdPs) Standard SCS Ops, IaaS (not exposed), IAM, KaaS, S3, PaaS 1	Standard SCS Ops, IaaS (exposed), IAM, KaaS, S3	Non-Standard Ops, IaaS (but certified & exposed as std) Standard SCS IAM, KaaS, S3, PaaS 1+2	Extra protection for Interconnect, limited federation Standard SCS Ops, IaaS (exp), IAM, KaaS, S3, PaaS 1+2	Air-Gap protected Own KaaS, but compatible (cert) Still using std SCS Ops, IaaS (not exp), IAM, S3, PaaS 2

Flow of automated deployment
(currently covering: Infra, IaaS, Ops)

GAIA-X

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

BETACLOUD SOLUTIONS plusserver

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, conftest, RefStack, OPA

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

citynetwork T . . OVHcloud

Bootstrap: terraform (on IaaS)

Ansible: Setup Mgr, Nodes:
- Infra: Database, MemCache, rabbitMQ
- Infra: ceph+radosgw, OvS/OVN
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~90min

https://github.com/OSISM https://docs.osism.de/ https://docs.osism.de/testbed/
https://github.com/OSISM/testbed https://github.com/SovereignCloudStack/testbed