

**Sovereign  
Cloud Stack**

# SCS: Large federated infrastructure for sovereignty

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# Quo vadis, Europe?

## Digitalization Dilemma



### Classical development & production:

- + Well-protected in-house
- + Close to developer / in-house support
  - o Bare-Metal, Enterprise Virtualization
  - o Proprietary tooling, niche solutions
- Slow, manual deployment processes
- Even slower approval processes (CapEx)



### Own Infra-as-Code platform:

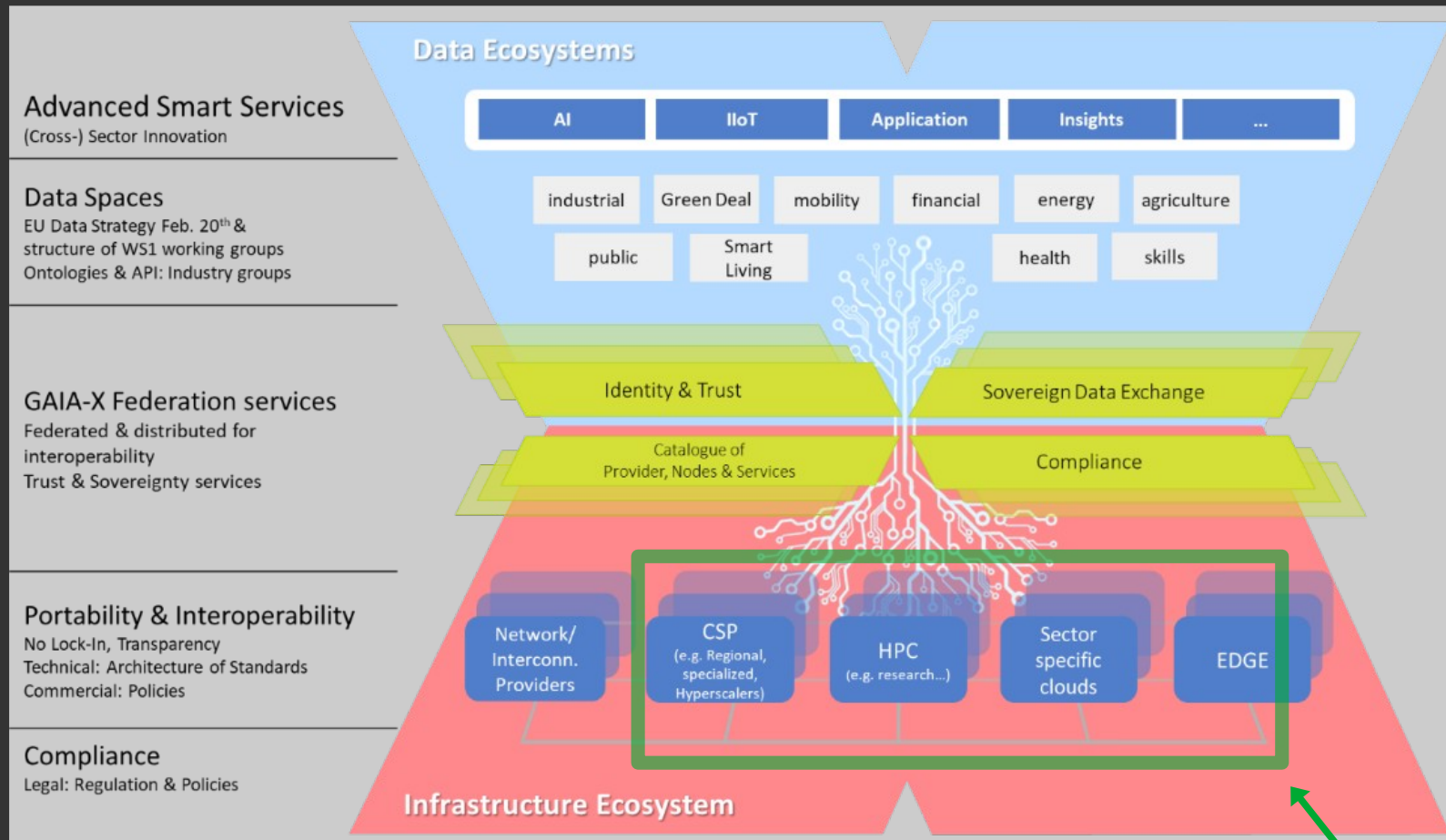
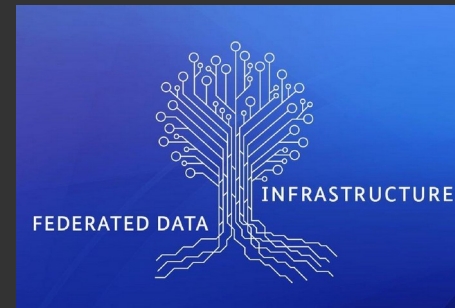
- + API driven automation
- + Flexible
  - Non-standardized, niche solutions
  - Not enhancable by federation with others
  - Expensive/scarce skills needed to operate

### Infra-as-Code on Hyperscalers:

- + Full automation of infrastructure (API driven) allowing efficient Dev(Sec)Ops
- + Ready to use building blocks
- + o A lot of Open Source tooling but sometimes not really (Open Core)
  - Dependencies and lock-in
  - Data protection challenges, no sovereignty
  - Cloud Act; Privacy Shield & SCC dead



# Enter GAIA-X



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 SCS frame)

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



# Sovereign Cloud Stack vision & mission

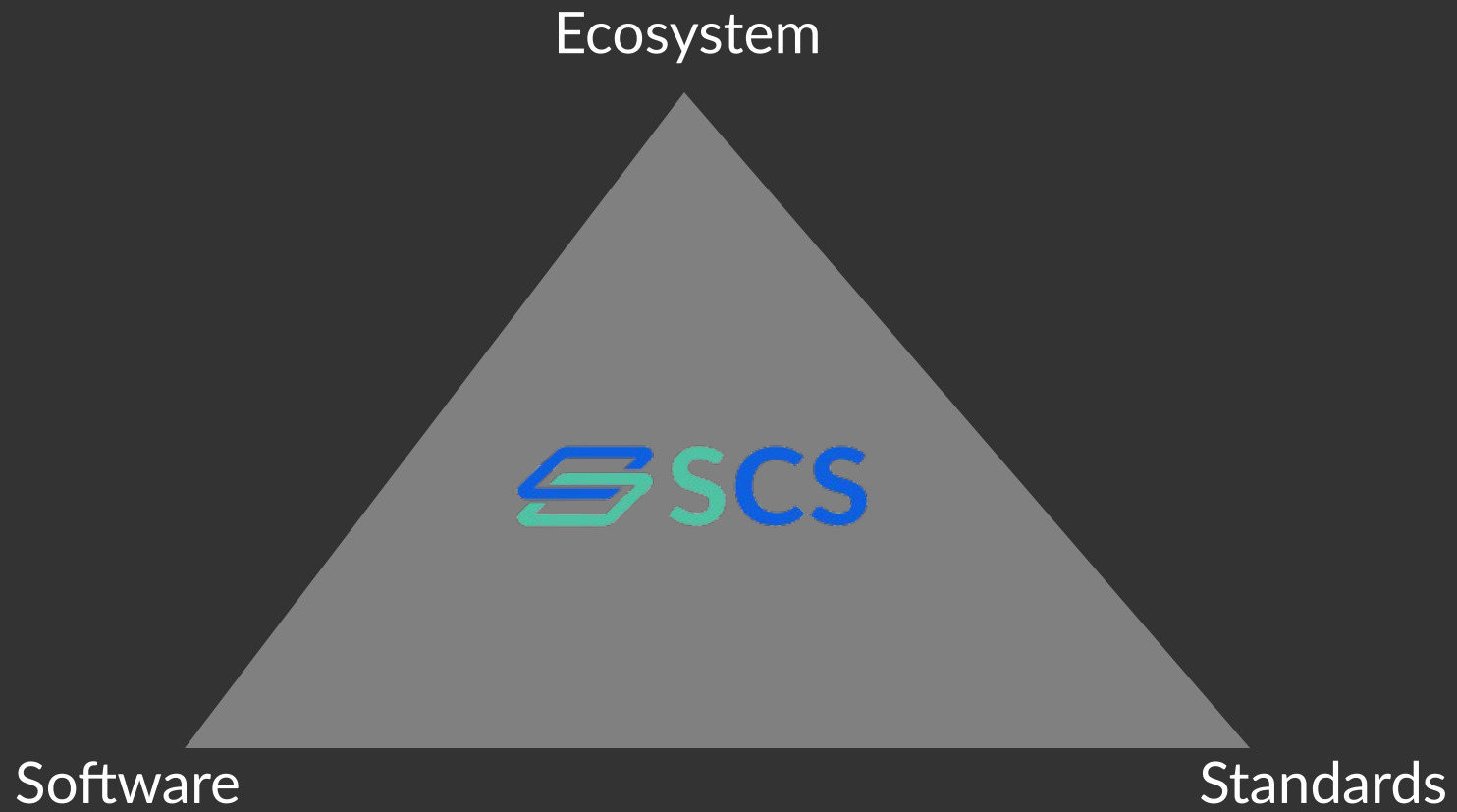
We imagine the desired IT landscape to be under the control of the developers and users, supported by a broad set of providers that deliver modern agile IT infrastructure and data services in certifiable interoperable and federated ways respecting their users' rights, data protection and security requirements.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



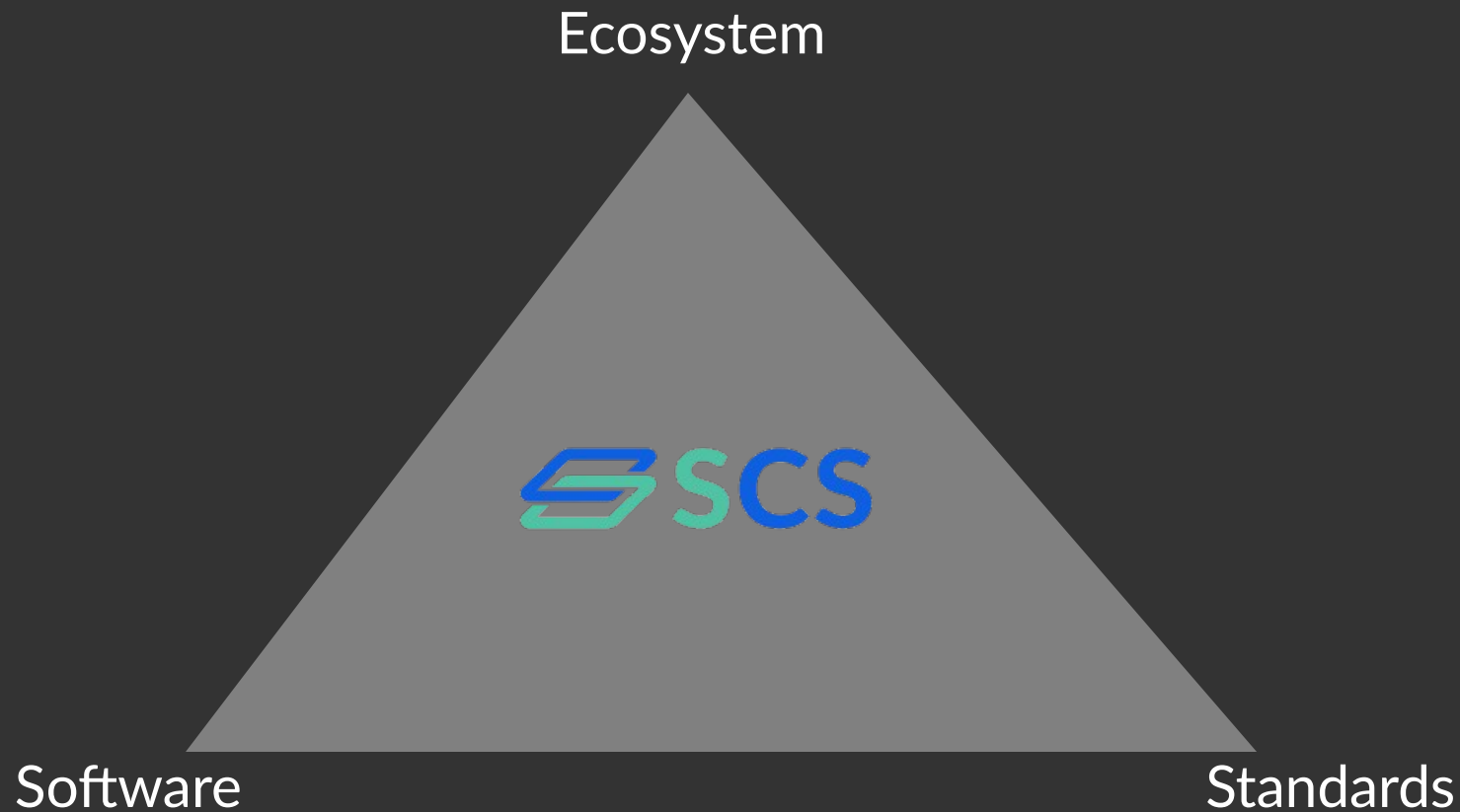
Sovereign Cloud Stack empowers IT developers and users to innovate on modern, self-service automated IT infrastructure that is sovereign, i.e. under their own control or under control of federatable providers that they can choose according to their technical, strategic and regulatory needs from a broad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



# SCS Deliverables



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

# SCS Deliverables



Ecosystem



Software

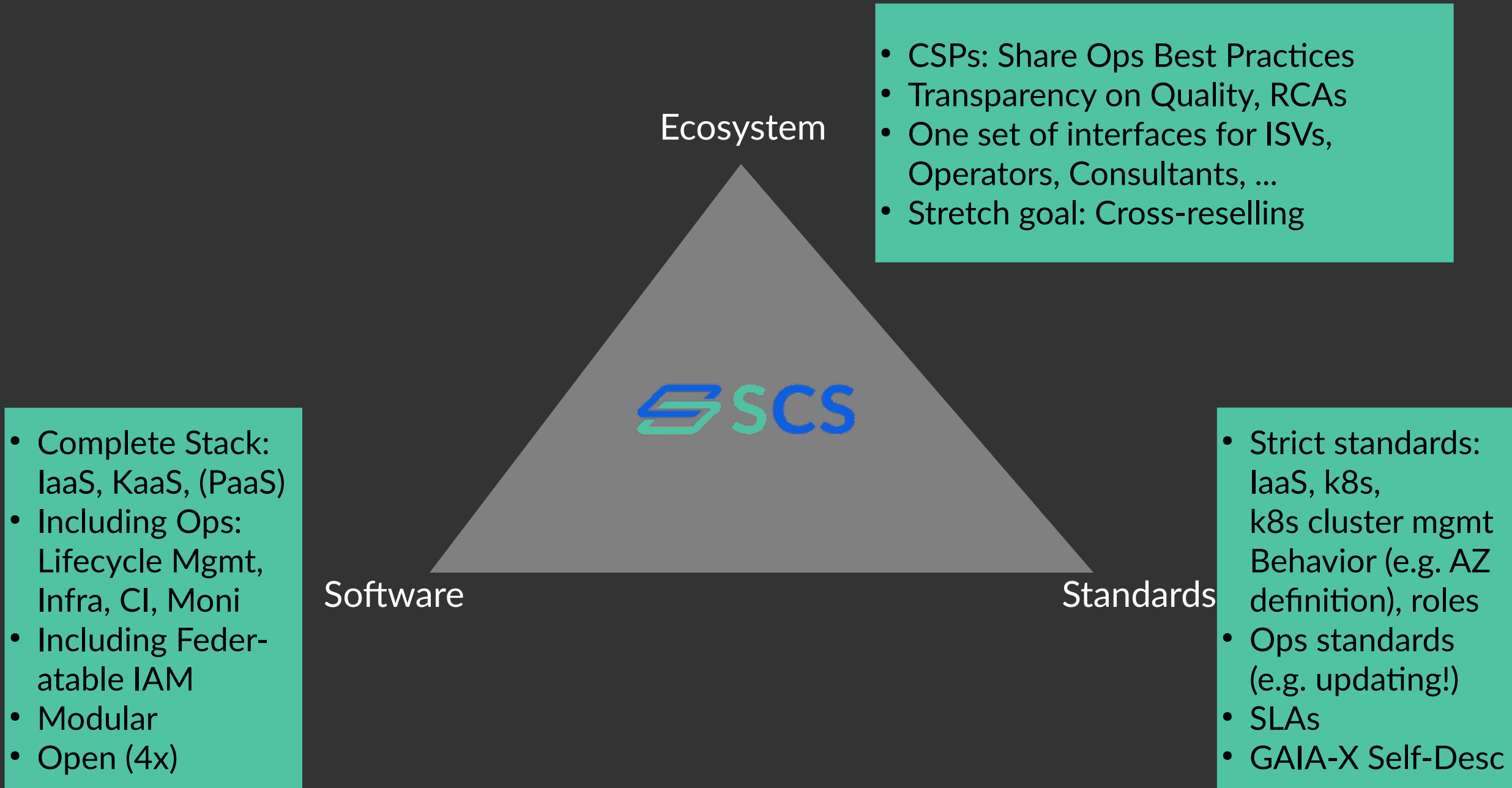
Standards

- Complete Stack: IaaS, KaaS, (PaaS)
- Including Ops: Lifecycle Mgmt, Infra, CI, Moni
- Including Federatable 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 Deliverables





# Design Criteria (Vision)

## Standardization

- Of the offered interfaces (compatibility for users) – combining existing standards w/ precision
- 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
- But also Configuration, Operational Processes and Operation Knowledge (new!)

## 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

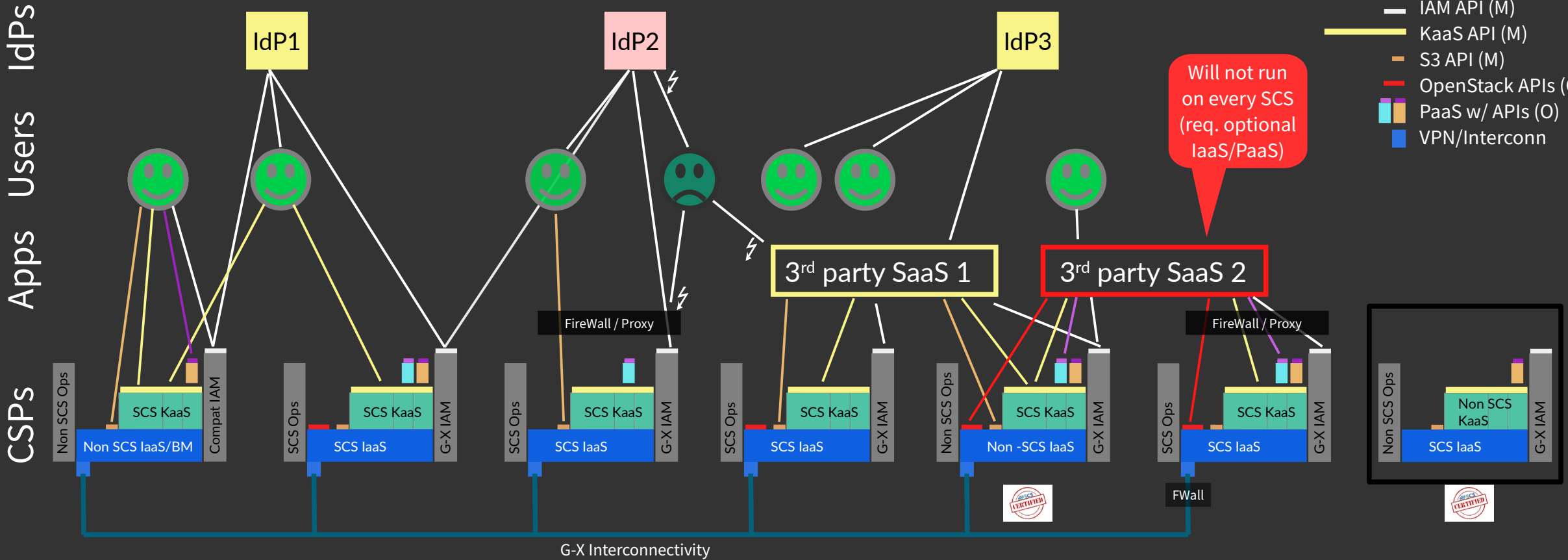
=> Relevance as one federated platform consisting of many providers



# CSP ecosystem target (examples)

## Legend: Standard SCS

- IAM API (M)
- KaaS API (M)
- S3 API (M)
- OpenStack APIs (O)
- PaaS w/ APIs (O)
- VPN/Interconn



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



## Small Project team operational

- Young project, current group came together first in Nov 2019
- Coordinating & orchestrating larger community, bringing IT departments and existing and new providers together
- Funded by SPRIN-D for 2020; funding proposal from OSBA for BMWi in finalization to fund central coordination work; allows contributing companies to build up business models; transfer central work to association/foundation later

## Ecosystem

- Growing number of supporting & contributing partners (OSBA members plus companies from Sweden and France); Continuous SCS installations at 2 (physical) + 7 (virtual) providers
- Trademark, Logo, Web page, github SovereignCloudStack and OSISM
- Part of GAIA-X – SCS is Work Package of GAIA-X. Intense collaboration e.g. w/ IAM  
→ Join the GAIA-X summit, Nov 19/20 (virtual event)
- Amazing feedback from many discussions, both industry and public sector
- Public coverage (SPRIN-D, c't, WDR, ... see web page)
- Open for more contributions!

# Webpage

<https://scs.community/>

# & github

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



The screenshot shows the homepage of the Sovereign Cloud Stack website. At the top, there is a navigation bar with the SCS logo and several utility icons (home, mail, phone, refresh, document, code). Below the navigation bar, the main heading reads "(OpenStack), we are building on top of Open Source Infrastructure Manager." Underneath, there are three main sections: "Job openings" with a list item "Container Infrastructure Architect", "Supporting companies" which features a grid of logos for various partners including B1 Systems, BetaCloud Solutions, CityNetwork, Cloud & Heat, Dilosacon, Gonicus, OpenCore, OSB Alliance, OX, OSF, OVHcloud, Plusseryer, and SPRIN-D, and Univention. At the bottom left, there is a footer with the URL <https://citynetwork.eu> and contact information.

The screenshot shows the GitHub repository page for Sovereign Cloud Stack. The repository name is "testbed-gx-scs" and it is described as "GAIA-X Sovereign Cloud Stack (SCS) testbed". The repository is categorized under "gaia-x" and has 0 forks, 0 stars, 0 issues, and 0 pull requests, with the last update being 9 days ago. Below this, there are several other repositories listed with their respective descriptions and statistics:

- website**: Base content for scs.community. 0 forks, 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. 0 forks, 5 stars, 2 issues, 0 pull requests. Updated 10 days ago.
- poc-gardener**: Automatically set up SAP Gardener on SCS compliant IaaS. 0 forks, 0 stars, 0 issues, 0 pull requests. Updated 12 days ago.
- Design-Docs**: Design Documents, Architecture etc. for SCS and related technology. 0 forks, 1 star, 2 issues, 1 pull request. Updated 13 days ago.
- k8s-gatekeeper**: (No description or statistics visible)

# SCS technical status (2020-10)

## Infra + IaaS + Ops reference implementation pieces operational

- Includes Bare Metal install (MaaS), inventory (Netbox), zabbix, automated containerized install (using ansible) of Manager with Management tooling (ELK, Netdata, ARI, prometheus, skydive, patchman, DB, MsgQ, ...) and Hyperconverged Nodes (with KVM, encrypted ceph, OvS/OVN, core OpenStack plus octavia, barbican – vanilla kolla-ansible)
- Virtual deployment (“testbed”) can be done on top of another IaaS using terraform – self-hosting (SCS testbed on SCS physical) works of course – ~60 – 90min deployment time.
- Virtual deployment useful for demos, CI testing (smoke-tests, refstack, API monitoring, more TBD ...), validating upgrades, exploration, ...
- Physical deployments on Bare Metal at two providers (Betacloud (prod), PlusServer)
- Virtual deployment tested on half a dozen providers (Betacloud, PlusServer, CityNetwork, OVH, teuto, OTC – with patches)
- Testbed for GAIA-X ID-Federation using keycloak as ID-Proxy
- Strong SCS standard definitions at IaaS layer (images, flavors, AZ meaning etc.) is WIP

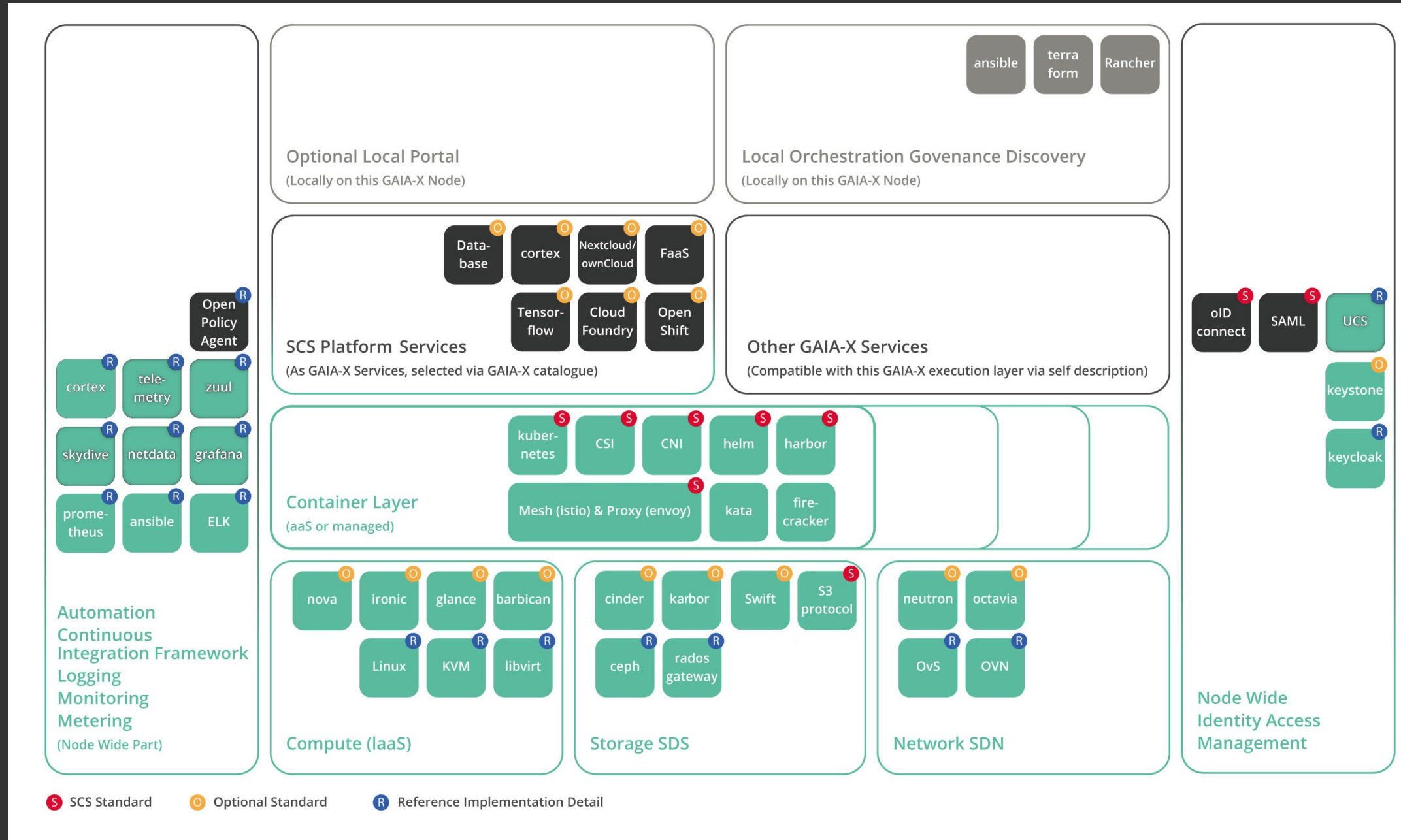
## Container layer in development:

- Working with SAP Gardener, kubermatic, Giantswarm, rancher (rke) – challenge is missing standardization for k8s cluster management – MVP planned for Q1/21, OpenStack k8s cluster API provider?

## Using testbed framework also for automating other GAIA-X infra, e.g. IAM

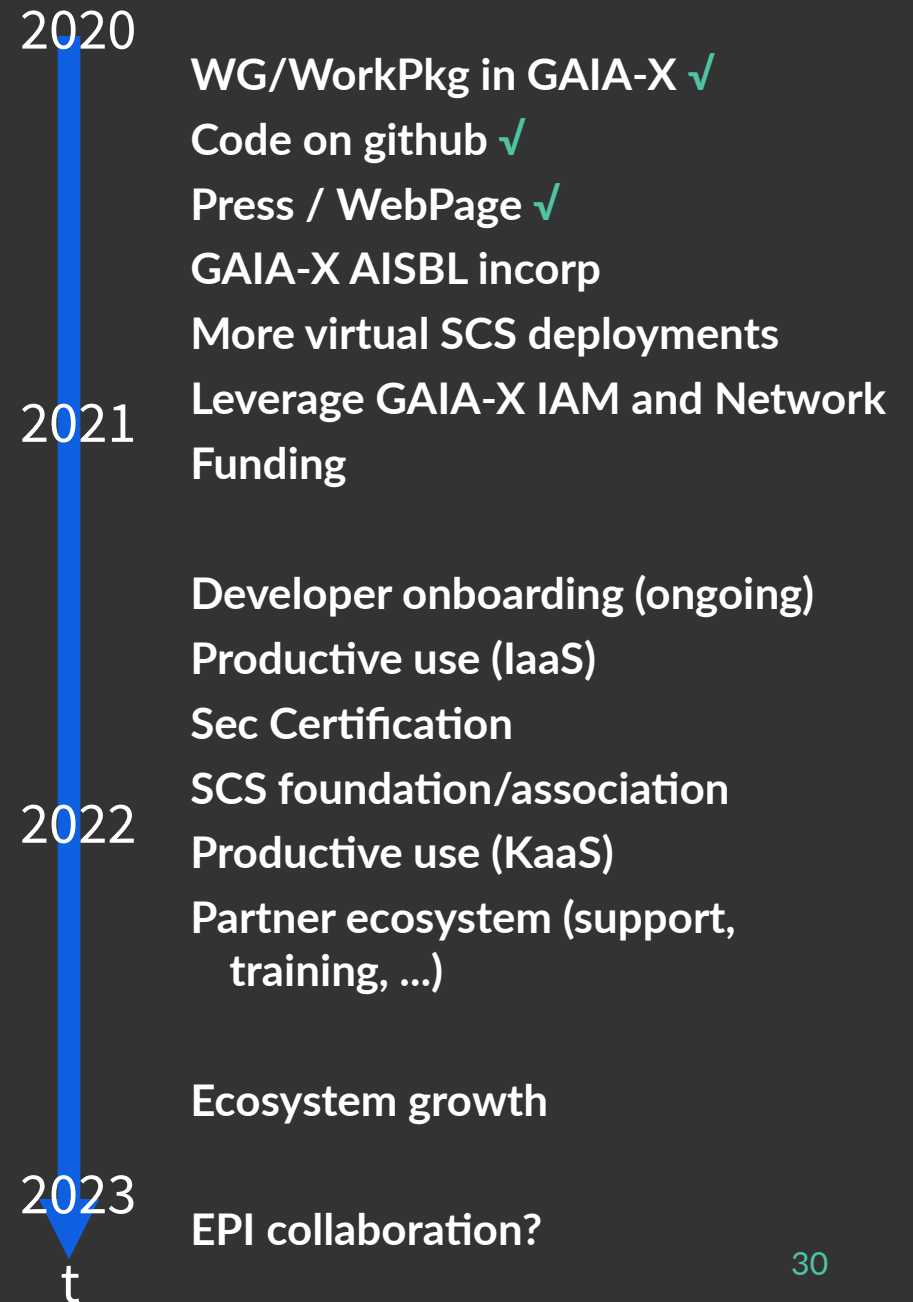
# Optional Testbed Demo

# Architecture (current status)



# Roadmap

- Automate deployment for Infra, IaaS, OpsTools ✓
- Resolve k8saaS automation std challenge (v1 until end of 2020)
- Strengthen CI (ongoing)
- Implement daily updates for production (v1 in 2020)
- Implement OPA policies (v1 in 2020)
- Document SCS certification requirements (1H 2021)
- Create plan for Security Certifications (BSI, TC, ISO, ...)
- Start implementing first PaaS services (DB, Big Data, ...) (1H2021)
- Cloud federation use cases (1H2021)
- Automation for SCS certification (2H2022)
- Monitoring driven mitigation – remediation workflows (v1 in 2H2021)
- Access to acceleration technologies (2H2021)
- SDN scalability work (1H2022)
- Cross-cloud orchestration & monitoring (1H2022)
- Utilization optimizations (2022)
- Developer toolchain (starting in 2021)
- Simplified stacks for special use cases (2022)
- AI supported operations (2023)





# SCS Summary

For data sovereignty, infrastructure and control over infrastructure matters.

Our response in GAIA-X and SCS is to build a network of providers of interoperable, federated services (not: one European hyperscaler).

SCS helps GAIA-X node providers to easily deliver modern interoperable, federated infrastructure.

SCS believes in certifiable standards, in (4x) openness and transparency, sustainability and federation.

It does so by defining certifiable standards, delivering a modular open source implementation and building a provider ecosystem in which we share the tools and best practices for operating it.

SCS status: Automated deployment for Infra, Ops Tools, IaaS in daily use (CI) and in production (Betacloud). K8s aaS not yet standardizable, automation available for Gardener, Kubermatic, Rancher.

**Technical deep dive: Wed, Oct 21, 9:15** [Back to the original mission: an open cloud operating system](#)



Join us!

Questions?

<https://scs.community/>  
Contact: [project@scs.sovereignit.de](mailto:project@scs.sovereignit.de)  
[scs@garloff.de](mailto:scs@garloff.de)





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