Infrastrukturplattformen für ÖV mit dem Sovereign Cloud Stack

Übersicht & Roadmap

Stefan Grote & Kurt Garloff

FrOSCon 2021

21. August 2021

Kurzvorstellung

Stefan Grote

>15 Jahre OSS

OSI Layer 8

Country & Western

Kurt Garloff

Plasma Physicist

Dortmund, Eindhoven

GONICUS
PIONEERS OF OPEN SOURCE

OSB Open Source Business ALLIANCE
Bundesverband für digitale Souveränität e.V.

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Kurt Garloff

Linux Kernel 1996

SUSE Labs 2003

OpenStack 2012

OTC 2016

SCS 2020

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Übersicht & Definition

Infrastrukturplattformen...

...im Kontext der Digitalen Souveränität

Digital Souveräne Infrastrukturplattformen

- Politischer Begriff, ca. Frühjahr/Sommer 2019
  - „Strategische Marktanalyse zur Reduzierung von Abhängigkeiten von einzelnen Software-Anbietern“

- „Risiko einer wachsenden Technologieabhängigkeit der Öffentlichen Verwaltung“

- „Daraus resultiert dringender Handlungsbedarf hinsichtlich einer grundlegenden Veränderung in der IT“

Abrufbar unter:
https://www.cio.bund.de/SharedDocs/Publikationen/DE/Aktuelles/20190919_strategische_marktanalyse.html;jsessionid=3D38A49B8010695832F43605C510E41B.2_cid322?nn=4623908

Digital Souveräne Infrastrukturplattformen

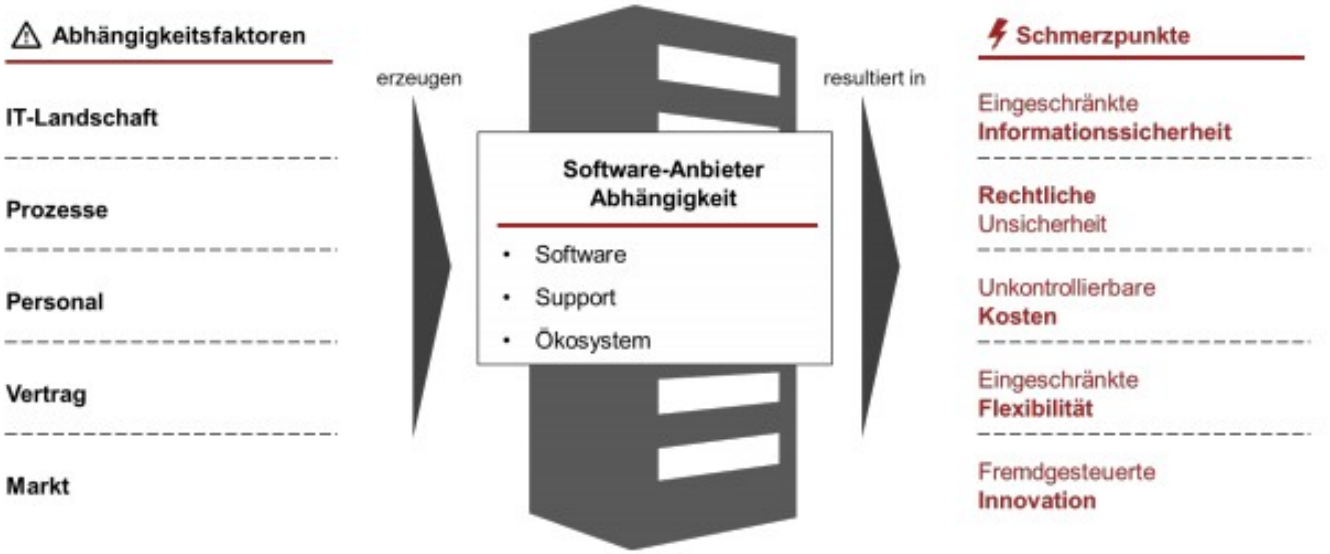

Abbildung 2: Rahmenwerk zur Bewertung der Abhängigkeitsfaktoren und Schmerzpunkte

Abrufbar unter:
https://www.cio.bund.de/SharedDocs/Publikationen/DE/Aktuelles/20190919_strategische_marktanalyse.html;jsessionid=3D38A49B8010695832F43605C510E41B.2_cid322?nn=4623908

Souveränität – die Abhängigkeit der Unabhängigkeit

- Es gibt viele, sehr unterschiedliche Definitionen...
- ...alle haben ihre Berechtigung!

Souveränes Handeln

Gesellschaft

Bürger

Parlament, Regierung

Öffentlicher Verwaltung

Unternehmen

Souveränität – die Abhängigkeit der Unabhängigkeit

- Digitale Souveränität != Digitale Autarkie (Digitaler Nationalismus)

Digitale Souveränität bedeutet die Wahlfreiheit zu haben

- Möglichkeit zwischen verfügbaren Optionen
- „Ein Lösungsansatz zur Reduktion von Abhängigkeiten ist der Einsatz alternativer (insb. Open-Source-basierter) IT-Lösungen“

Abrufbar unter:
https://www.de.digital/DIGITAL/Redaktion/DE/Digital-Gipfel/Download/2019/digitale-souveraenitaet.pdf?__blob=publicationFile&v=3

Digitale Souveränität bedeutet Wahlfreiheit

Ein offenes Ökosystem (Framework) als Fundament für Digital Souveräne Lösungen

Vorstellung weiterer Schritte: Mai 2020

Corona-Pandemie als Katalysator

- Ganz gut: Homeoffice & New Work
- Mäßig: Bildung & Gesundheitswesen

- Deutschland ist beim Einsatz und Ausbau zurückgefallen
- ~~Marktversagen, Organisationsversagen, Bürokratie~~

Wahrnehmung & Handlungsbedarf

Warum SCS? - Überleitung

- Offene & Föderierte Plattformen
- Standard für ein lebendiges Ökosystem
- Container Monitoring, IaC, CI Installationsautomatisierung
- Mitglied der ersten Stunde

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Sovereign Cloud Stack

OSS cloud stacks have not been successful …

So let’s build a new one!

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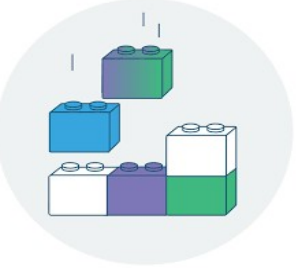
Sovereign Cloud Stack

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

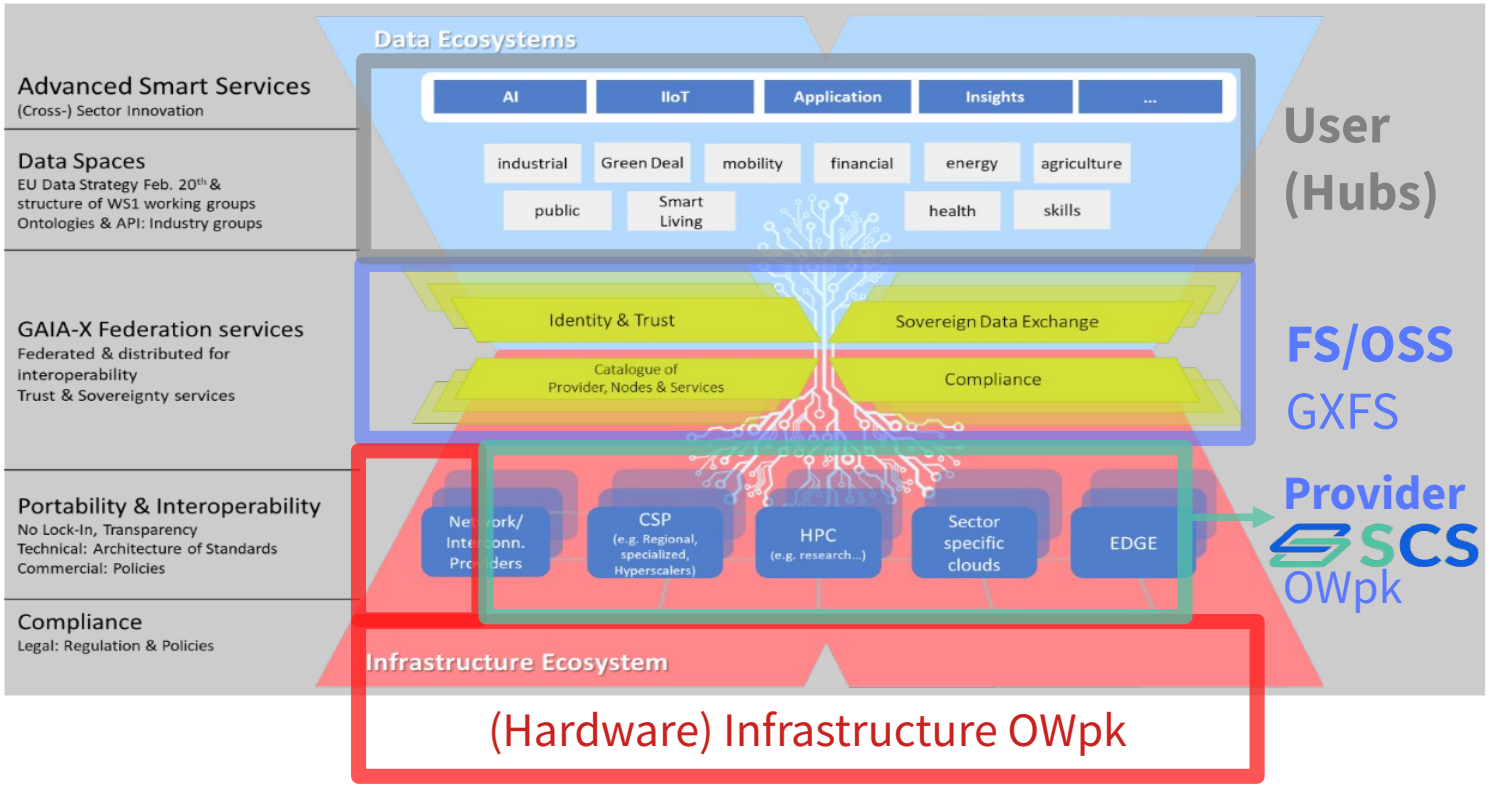


- Many mostly disconnected efforts in many companies, research institutes and some CSPs to build & run their own stacks
- Operating such a dynamic distributed platform well is very hard
- Every team solves curation, integration, testing, automation, certification, operations on their own (duplicated 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

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

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 one federated platform

SCS project status

Organization

- Project team started in early 2020 with SPRIN-D funding
- Part of GAIA-X (WS2/SWG 1.4 → GAIA-X (Open) Work Package SCS under TC Provider WG)
- BMWi funding (14.9M€ granted on 2021-06-30 to OSB Alliance e.V., hosting the team to coordinate partners)
- Homepage (https://scs.community/), source code on github/SovereignCloudStack
- Lined up ~25 engineers (growing) from partners regularly contributing code/artifacts, weekly sprints

Standardization & Ecosystem

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

Implementation

- See releases (next slide)

Transparency & Certification

- GAIA-X self descriptions created 11/2020 (rudimentary) – working with SD group on improving
- TBD: Convert chosen standards (all open source!) into automated standards compliance tests

SCS Roadmap

Releases

- Release 0: (2021-07-14)
  - Fully automated Infra, IaaS, Ops automation (CI/CD, Monitoring, Patching), local IAM
  - Technical Preview for Container Stack (k8s cluster API, incl. CNI/CSI, helm)
- Release 1: (9/21)
  - Container Stack in production quality, container registry
  - Federation (OIDC, SAML)
- Half-yearly releases (3/22, 9/22, 3/23, 9/23, 3/24, 9/24):
  - Multi-region setups, Security scanning, Security Certifications, CI coverage (for daily updates!), Compliance test coverage (automated certification), SSI/DID federation, X-Cloud Orchestration, Service Mesh, ...

Adoption

- Public Clouds: Betacloud Solutions (2020), PlusCloud Open (12/2020), ...
- Industry Partners: (Automotive, Commerce, ...)
- Public Sector: DVS – looking for pilot / PoC partners

Ecosystem

- Building skilled support, implementation, training partners
- Platform services on top of well-defined SCS standards

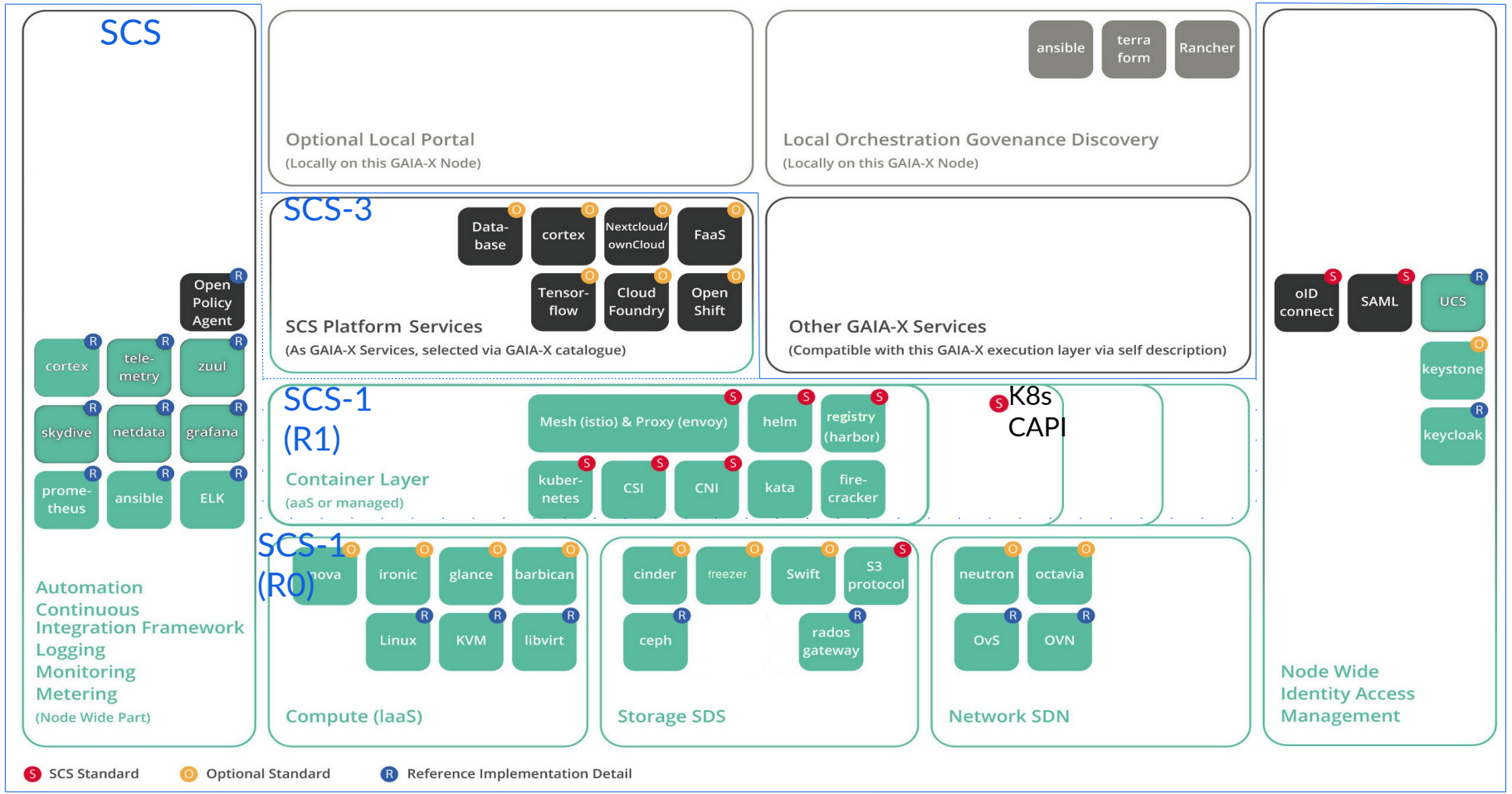
SCS-2: Edge (project proposal WIP)

- Even smaller simplified stacks (limited multitenancy), but w/ special acceleration / realtime requirements

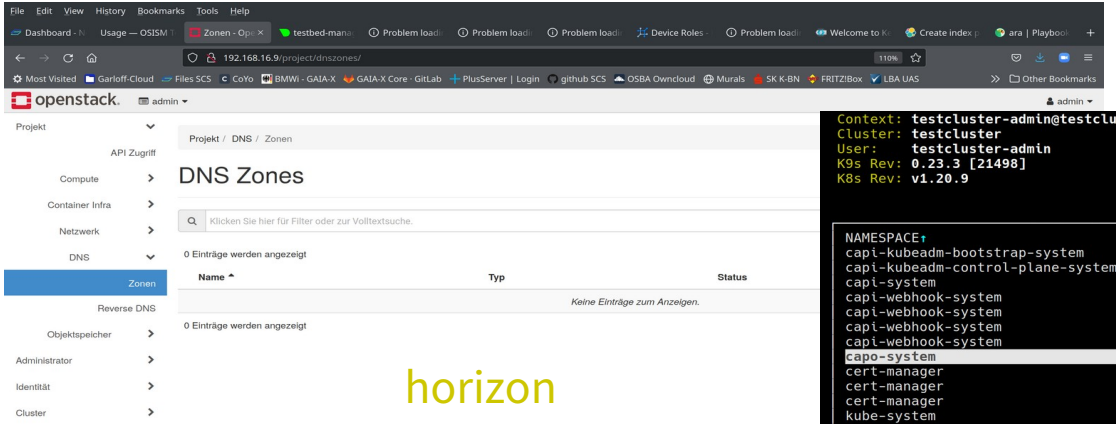
SCS-3: PaaS&Dev (project proposal WIP)

- Integrate set of Platform services and Dev Tooling into standard SCS base

SCS Architecture (current status)



How does it look? (Customer perspective)



horizon

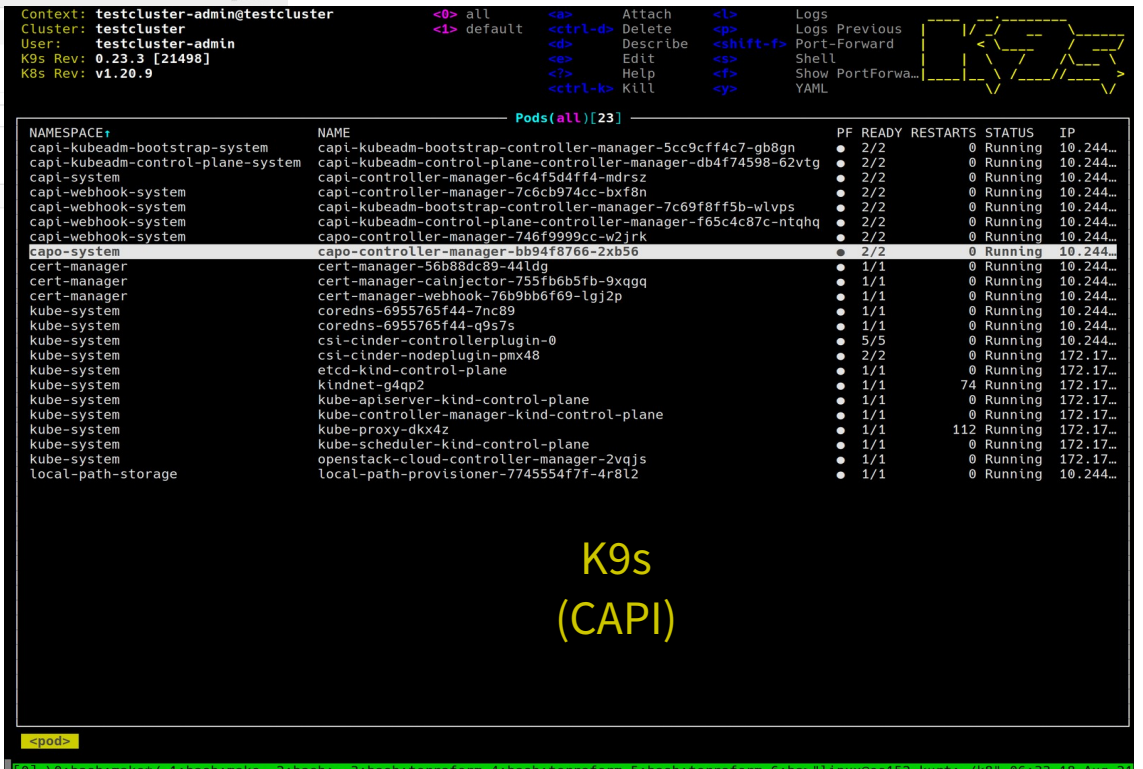
```
os152-kurt 0:0:bash - "linux@os152-
---
apiVersion: v1
kind: ServiceAccount
metadata:
  name: csi-cinder-controller-sa
  namespace: kube-system

---
# external attacher
kind: ClusterRole
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  name: csi-attacher-role
rules:
  - apiGroups: [""]
    resources: ["persistentvolumes"]
    verbs: ["get", "list", "watch", "update", "patch"]
  - apiGroups: [""]
    resources: ["nodes"]
    verbs: ["get", "list", "watch"]
  - apiGroups: ["storage.k8s.io"]
    resources: ["volumeattachments"]
    verbs: ["get", "list", "watch", "update", "patch"]
  - apiGroups: ["storage.k8s.io"]
    resources: ["csinodes"]
    verbs: ["get", "list", "watch"]


---
kind: ClusterRoleBinding
apiVersion: rbac.authorization.k8s.io/v1
metadata:
  name: csi-attacher-binding
subjects:
  - kind: ServiceAccount
    name: csi-cinder-controller-sa
    namespace: kube-system
roleRef:
  kind: ClusterRole
  name: csi-attacher-role
  apiGroup: rbac.authorization.k8s.io
```

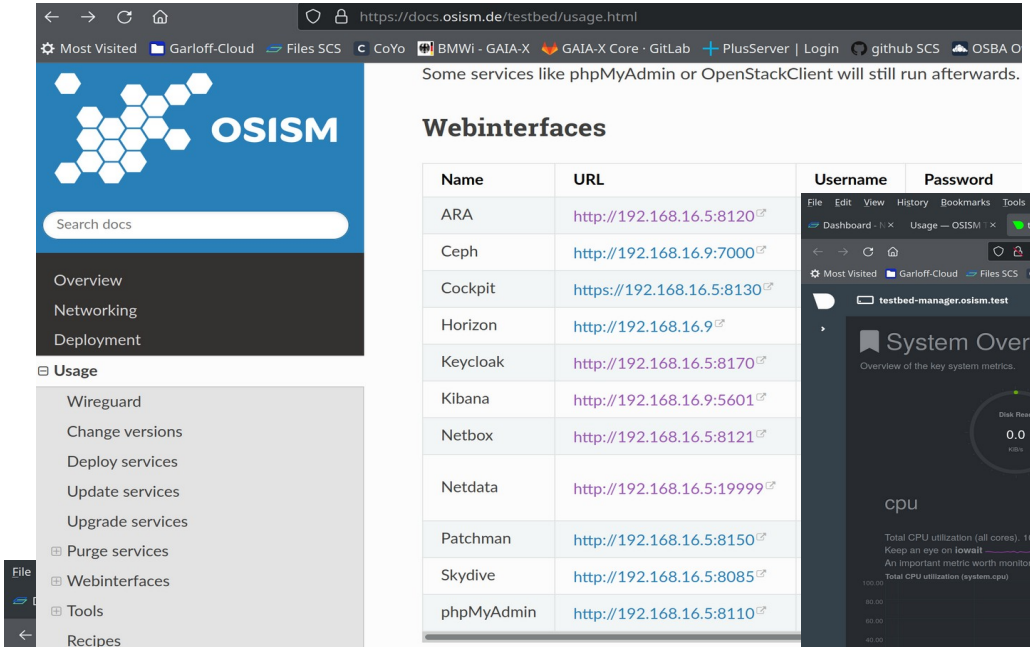
API

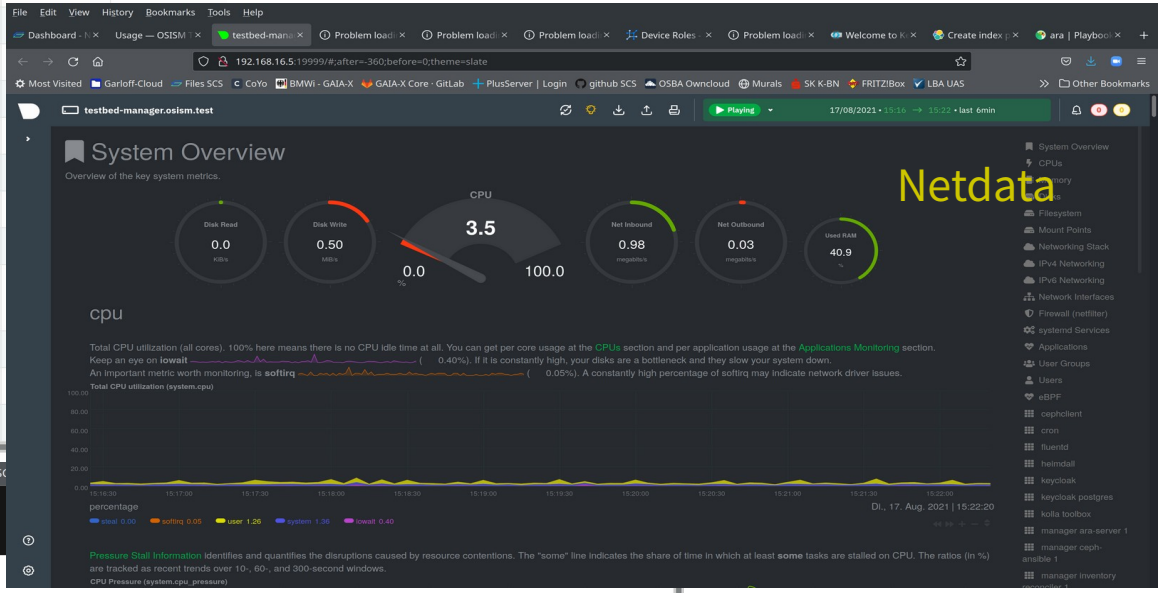
REST APIs for
DevOps teams
(Infra-as-Code)

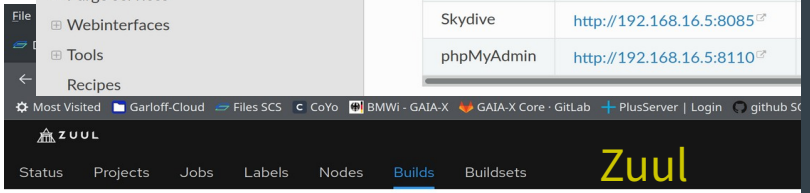


K9s
(CAPI)

How does it look? (Operator perspective)



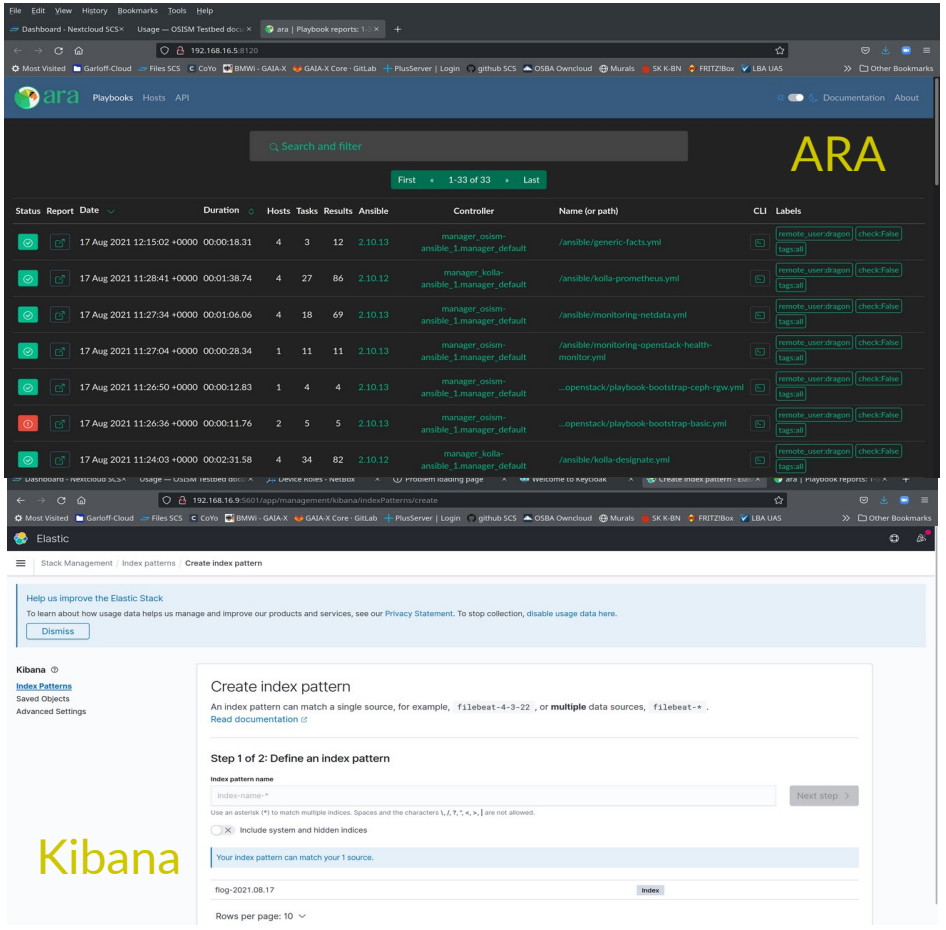


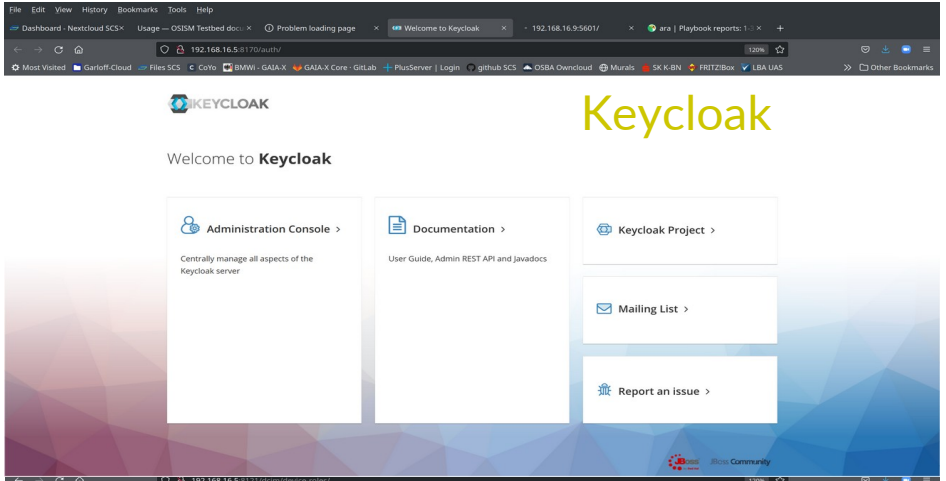


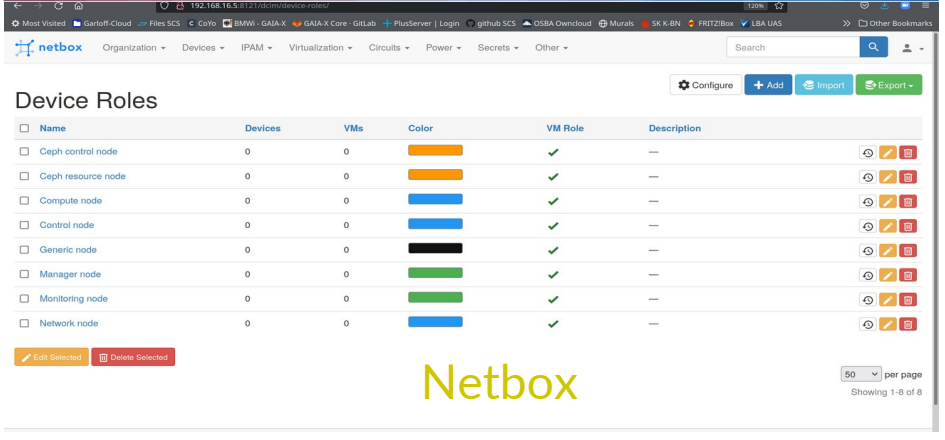
Job | Filter by Job...

Job	Project	Branch	Pipeli...	Change	Dur...	Start time	Result
markdownlint	SovereignCloudStack/zuul-sandbox	main	gh_post	a6fe9d6	20 secs	2021-08-17 12:45:29	RETRY_LIMIT
markdownlint	SovereignCloudStack/zuul-sandbox	main	gh_post	a6fe9d6	19 secs	2021-08-17 12:45:09	RETRY
markdownlint	SovereignCloudStack/zuul-sandbox	main	gh_post	a6fe9d6	20 secs	2021-08-17 12:44:39	RETRY
demo-job	SovereignCloudStack/zuul-sandbox	main	gh_post	a6fe9d6	15 secs	2021-08-17 12:44:39	SUCCESS

How does it look? (Operator perspective)







How is it developed?

Upstream communities

- OIF: OpenStack, kolla-ansible, kayobe, zuul, ...
- CNCF: kubernetes, helm, harbor, openstack-capi-provider
- LF: Linux, KVM, ceph, ...
- OSISM: Integration, Ops tooling (https://github.com/OSISM/)

SCS community

- https://github.com/SovereignCloudStack/Docs
  https://scs.community/docs/contributor/
- Contributions from providers, users, volunteers
- IP policy (Various FOSS licenses, Four Opens, DCO)
- Paid development via public tenders (BMWi funded): https://scs.community/Tender/
- Development performed in agile teams coordinated by POs (@OSBA)
- Align with upstream and contribute back

Collaboration

- Weekly sprints: Sprint reviews, backlog refinement, sprint planning via weekly VC (Jitsi)
- Weekly team call (Thu afternoon, SCS Jitsi)
- Taskboard (nextcloud deck, trello-like)
- Github: Reviews, PRs, Issues
- Mailing list

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Sovereign Cloud Stack

How to get started? How to join?

Test testbed ...

- Virtual deployment of SCS for testing, exploring, demos, CI, ...
  - You need access to a reasonably vanilla OpenStack
  - OR: You can helps us port the terraform recipes to VMware, AWS, ...
- Ask questions, raise issues, submit PRs (with DCO)

Contribute upstream

Join the SCS community

- Become a regular contributor ...
- Onboarding call to understand interests, needs, skills, contribution areas ...
- Participate in team call (Thu 15:00 CEST) and sprint reviews (Mon afternoon)
- Onboarding to nextcloud and mailing lists
- Participate in tenders

Use SCS

- Create production setups for internal usage or as public clouds
  - Support available via partners (e.g. osism.tech)
  - Certification conformance tests in development
- Develop apps/services for SCS container/cloud platform (preferably with k8s operators)
- Become skilled to offer services around SCS (partner certification program in preparation)

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Discussion

QUESTIONS?

Test it!

Pilot project / Proof-of-concept

Join us!

GAIA-X: https://gaia-x.eu/

SCS Project: https://scs.community/

Gonicus: https://gonicus.de/

EMail: project@scs.sovereignit.de, garloff@osb-alliance.com