GP4L: Resource management and reservation orchestration

GP4L Infoshare

10 Feb 2025

GN5-2

GÉANT Global Platform for Labs

The GÉANT Global Platform for Labs (GP4L) is the GÉANT initiative to provide users with an environment where they can run programmable network experiments and design, implement and validate new network management implementations.

Testbed

Labs

Community

GÉANT Global Platform for Labs

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Testbed   Labs   Community

GP4L automated network operations

- Moving from manual approach to orchestration and automation
  - Definition and implementation of workflows
  - Use of nmaas to run network management tools
  - Only open source software with APIs
  - Implementations not only for GP4L
- Implementations
  - Automated resource management
  - Automated resource reservation for experiments
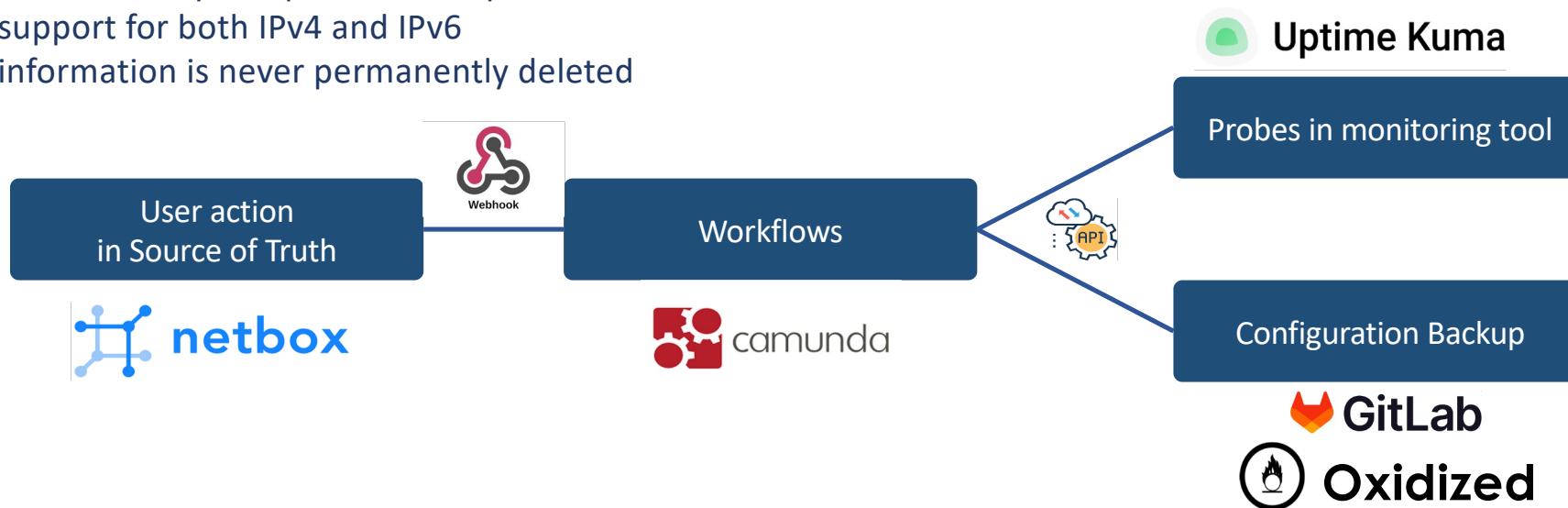 - Service provisioning
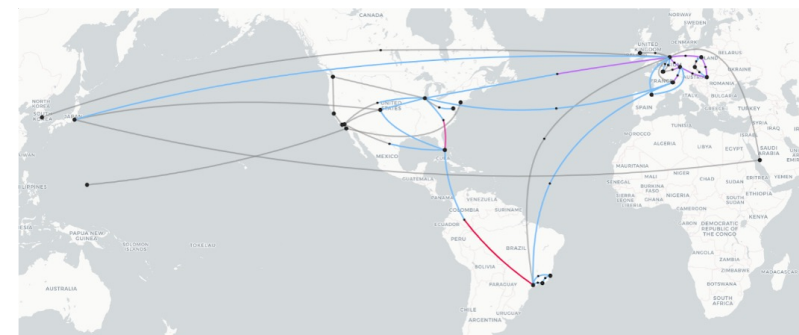
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1	ams0001	GEANT	NL	23	bna0021	Tennessee Tech	US
2	fra0001	GEANT	DE	24	CJJ0001	KISTI	KR
3	bud0001	GEANT	HU	25	jed0101	KAUST	UAE
4	poz0001	GEANT	PL	26	hnd0001	KDDI	JP
5	bud0002	MC36	HU	27	gva0061	GEANT	CH
6	par0001	RENATER	FR	28	gva0062	GEANT	CH
7	gva0001	SWITCH	CH	29	gva0081	GEANT	CH
8	chi0041	STARLIGHT	US	30	gva0082	GEANT	CH
9	tcd0021	Trinity College of Dublin	IR	31	umu0001	University of Murcia	ES
10	par0101	GEANT	FR	32	bio0001	University of Pays Basques	ES
11	rio0021	RNP	BR	33	bio0071	University of Pays Basques	ES
12	pra0101	GEANT	CZ	34	hnd0101	KDDI	JP
13	e513-e-yecwh-1	CERN	CH	35	ams0002	University of Amsterdam	NL
14	bur0051	CALTECH	US	36	san0111	San Diego Supercomputer Center	US
15	mia0001	AM-Light	US	37	gum0111	University of GUAM	US
16	sao0021	RNP	BR	38	nyc0111	NYSERNet	US
17	vit0071	UFES	BR	39	chi0111	Pacific Wave	US
18	dub0021	HEANET	IR	40	mia0101	Florida International University	US
19	bwi0001	University of Maryland	US	41	cph0021	Technical University of Denmark	DK
20	bur0001	CALTECH	US	42	lax0111	CENIC - Los Angeles	US
21	bur0002	CALTECH	US	43	sjc0111	CENIC - Sunnyvale -	US
22	bur0061	CALTECH	US	44	sea0111	CENIC - Seattle	US

Automated resource management

The goal is to automate the manual activities necessary for the maintenance and synchronisation of the components used to document and manage the resources of the GP4L experimental testbed.

Requirements:
- device history is kept whenever possible
- support for both IPv4 and IPv6
- information is never permanently deleted

Uptime Kuma

Probes in monitoring tool

User action
in Source of Truth

Webhook

Workflows

Configuration Backup

netbox

camunda

GitLab

Oxidized

https://geant-netdev.gitlab-pages.pcss.pl/gp4ldocs/guides/playground/arm/idea/
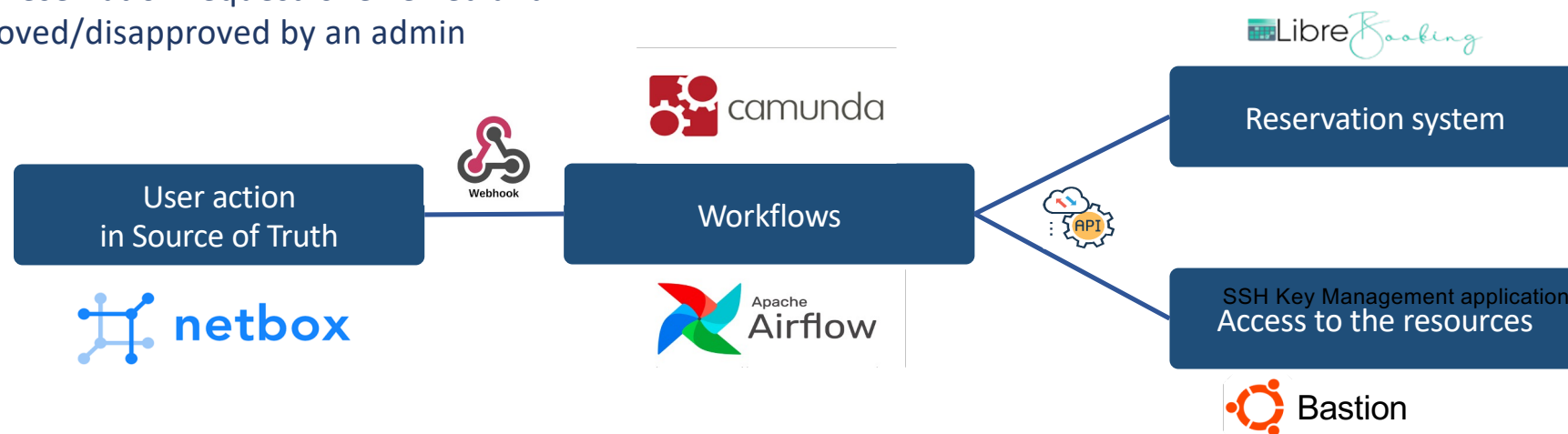
https://www.youtube.com/watch?v=KYqpLPBDR3k

Automated resource reservation for experiments

The goal is to give R&E community efficient access to the GP4L experimental testbed.
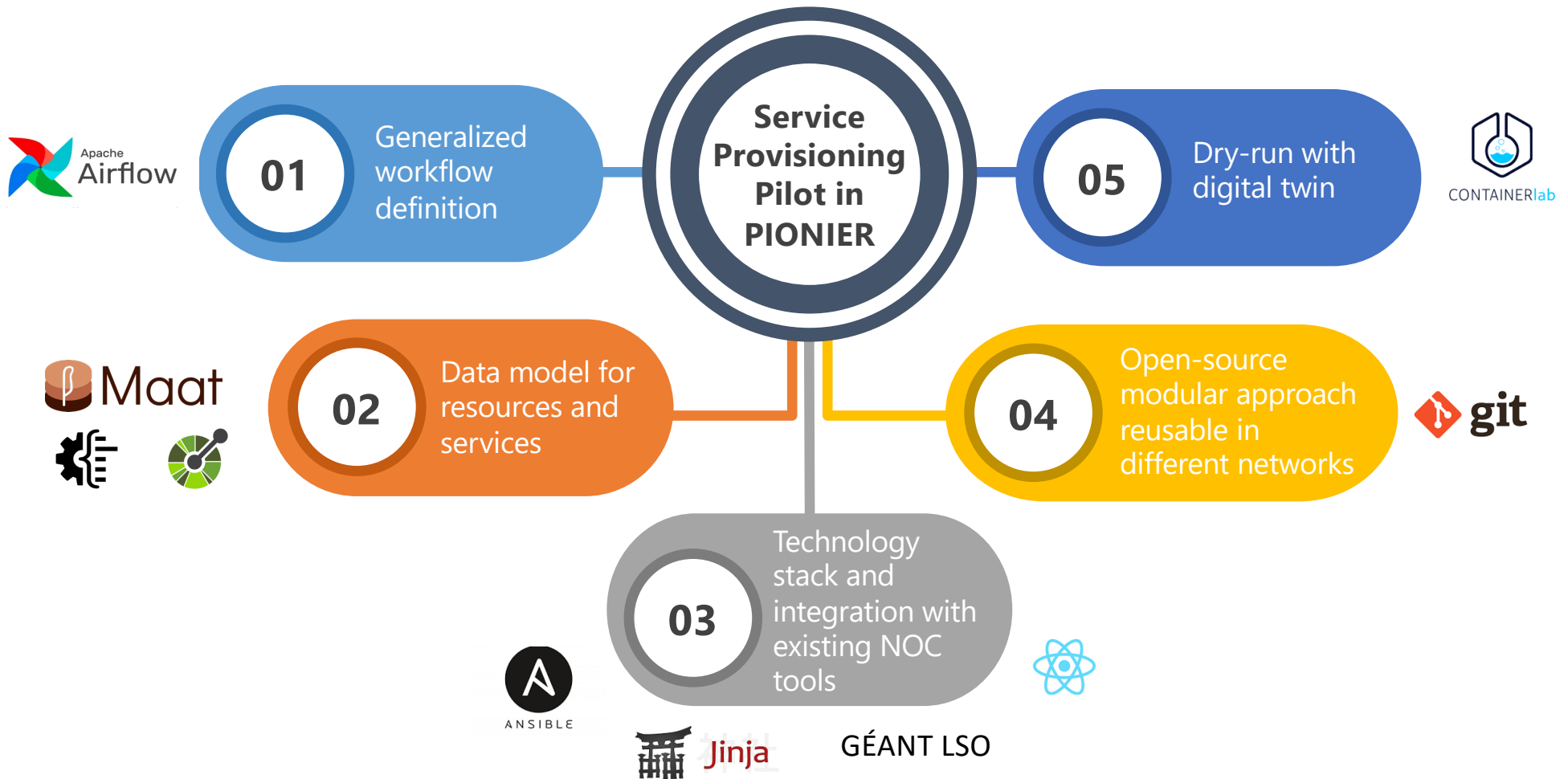
Requirements:
- users should self-register to a self-service portal
- the self-service portal will provide up-to-date information on available resources at all times
- the self-service portal will be used to create a reservation request
- each reservation request is reviewed and approved/disapproved by an admin

- once a reservation is approved, the ssh keys necessary for access are automatically handled
- the solution should be seen as an extension of the automated resource management implementation

https://geant-netdev.gitlab-pages.pcss.pl/gp4ldocs/guides/playground/reservation/idea/
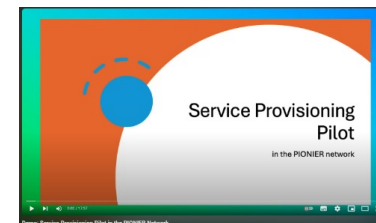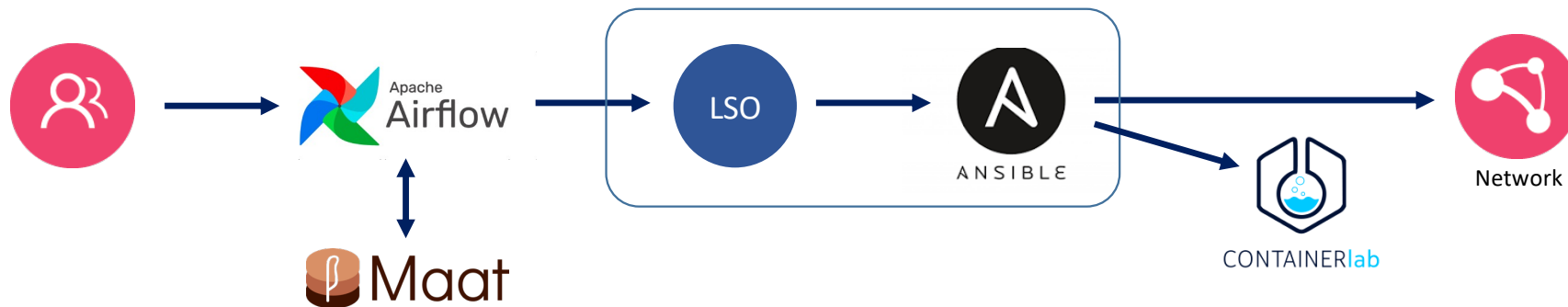
Orchestrated service provisioning

L2 service provisioning pilot in PIONIER

https://www.youtube.com/watch?v=HmBRHUSWYe8
https://geant-netdev.gitlab-ages.pcss.pl/gp4ldocs/guides/playground/provision/idea/

Lesson learned

Constant Headaches

- Incomplete documentation
- Libraries status
- Bugs

Workflow Flexibility

- Adding functionality
- Changing components

Data Integrity

- Matching data across components

Compatibility

- The impact of upgrades

Thank You

Contact: gp4l-admin@lists.geant.org

GP4L: https://geant-netdev.gitlab-pages.pcss.pl/gp4ldocs/guides/testbed/info/
Maat: https://geant-netdev.gitlab-pages.pcss.pl/MaatDocs/

www.geant.org

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