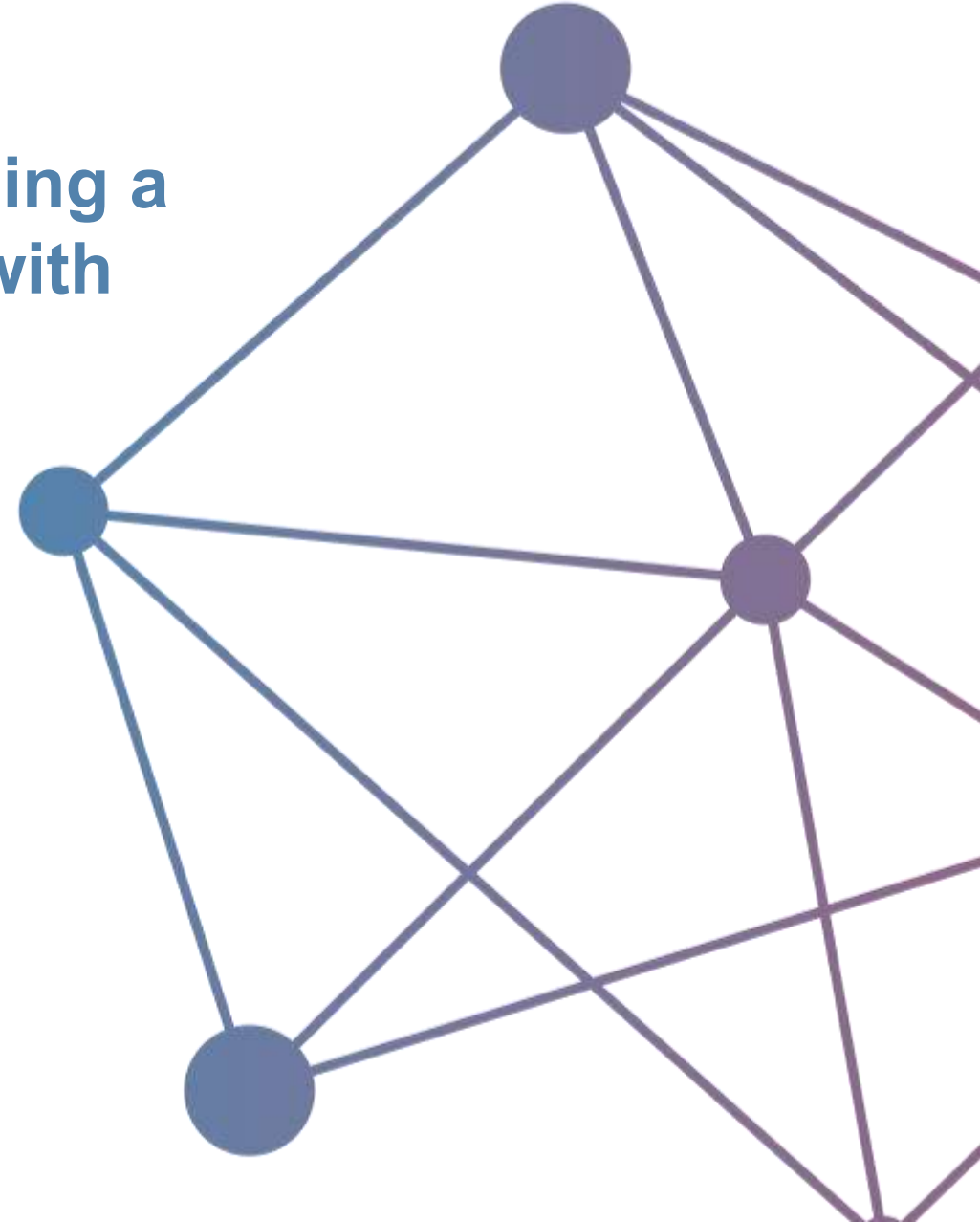


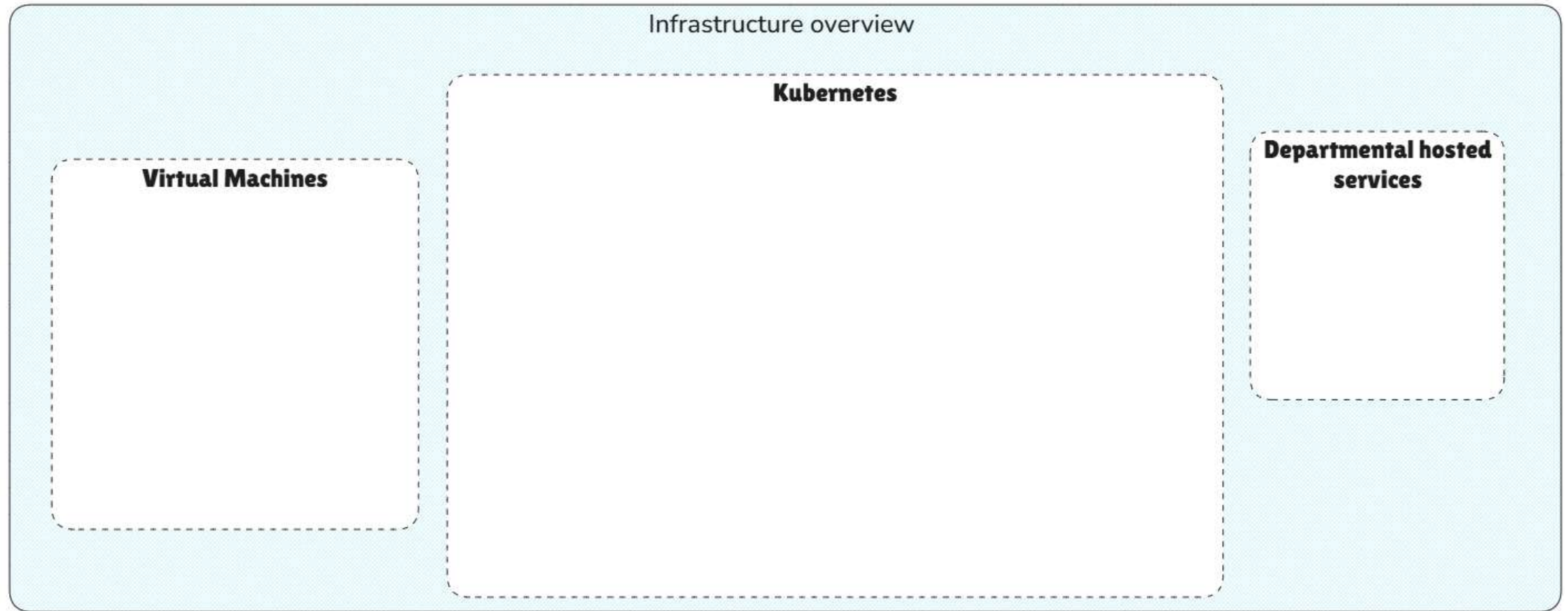
Through the lens of the DAFNI: maintaining a digital research infrastructure platform with industry standard tooling

RSE Southwest meetup, 31st July 2026
University of Bath, Claverton Downs Campus

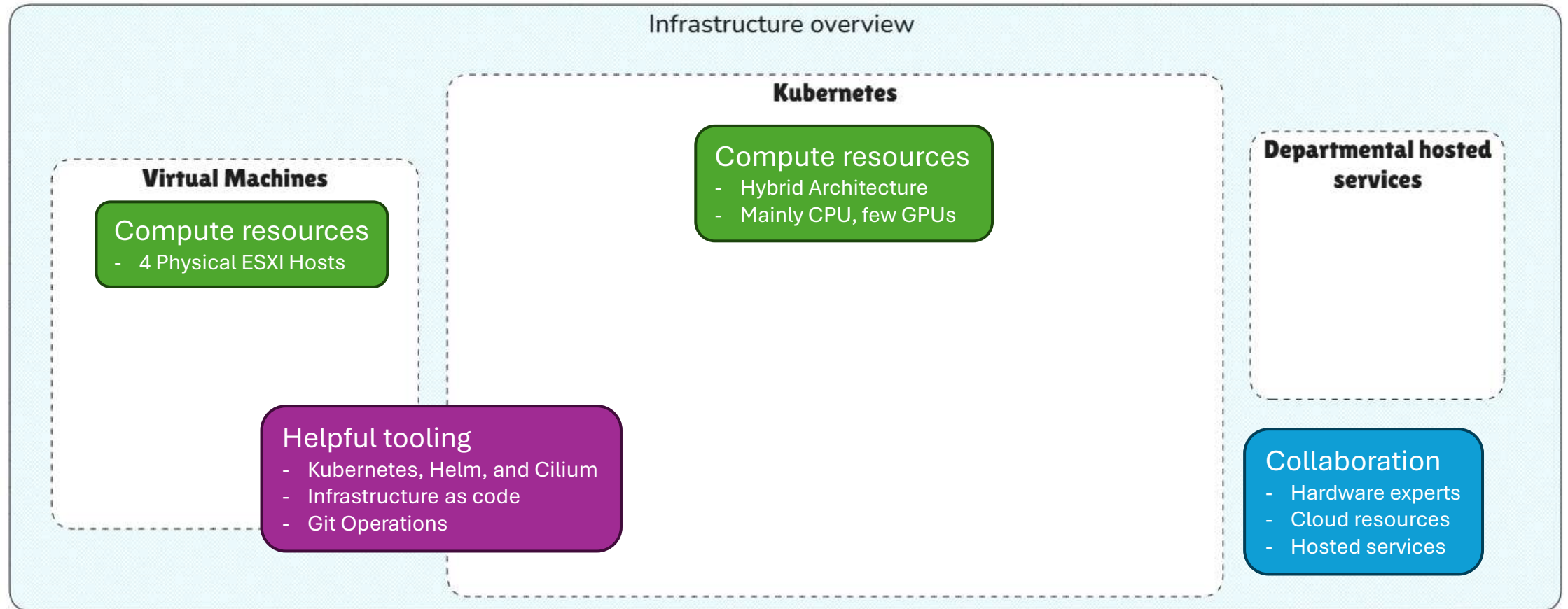
Lewis Sampson, DAFNI, RSE/RIE
UKRI STFC



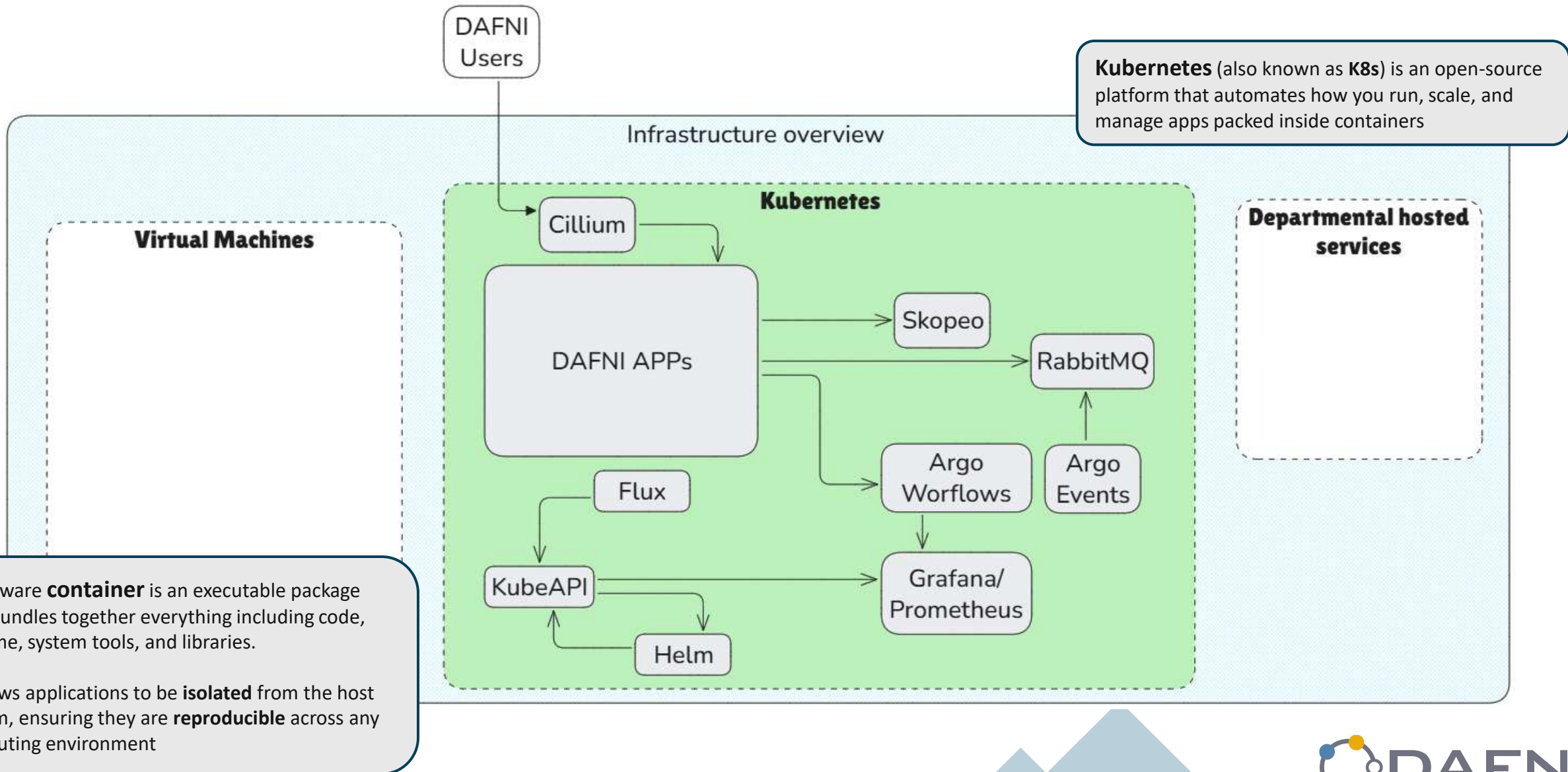
DAFNI infrastructure



DAFNI infrastructure



Kubernetes Cluster



Kubernetes

Benefits

- Declarative Configuration with Git Ops (more on this later)
- General resource management for networking and security
- Scaling cluster to include additional cloud resources.
- Offer High Availability (HA) with Self-Healing for production

Simplicity vs. Complexity:

Docker Compose is ideal for small projects due to its lightweight setup.

Kubernetes is more complex and better suited for production environments using advanced features.

Kubernetes

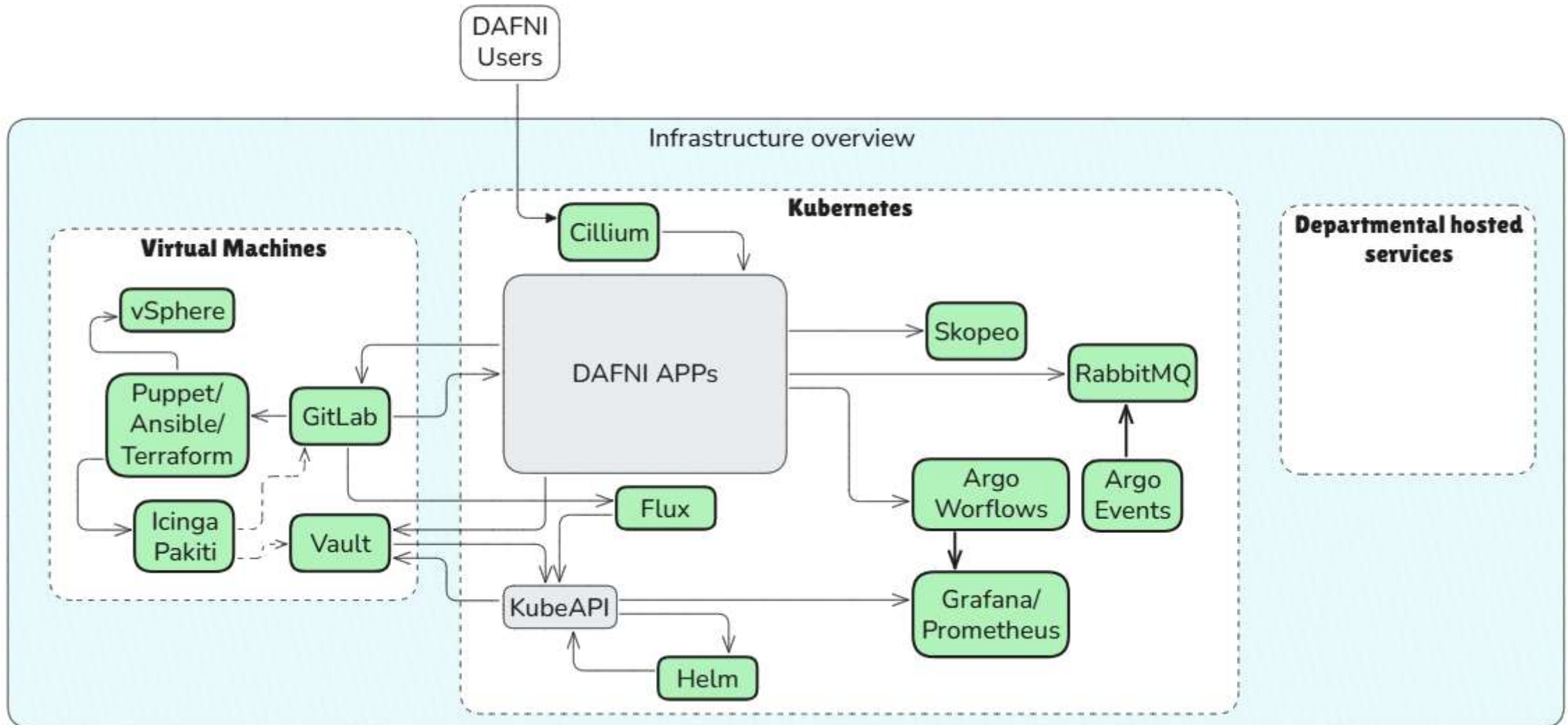
Difficulties

- Investing in an entirely new infrastructure
- Fast paced update cycle and dependency chains

Unsuitable use cases

- HPC batch job management (use SLURM)
- Large-scale parallel filesystems (use dedicated solutions, e.g., Lustre)
- If you are receiving services offered by a cloud provider or technology already.

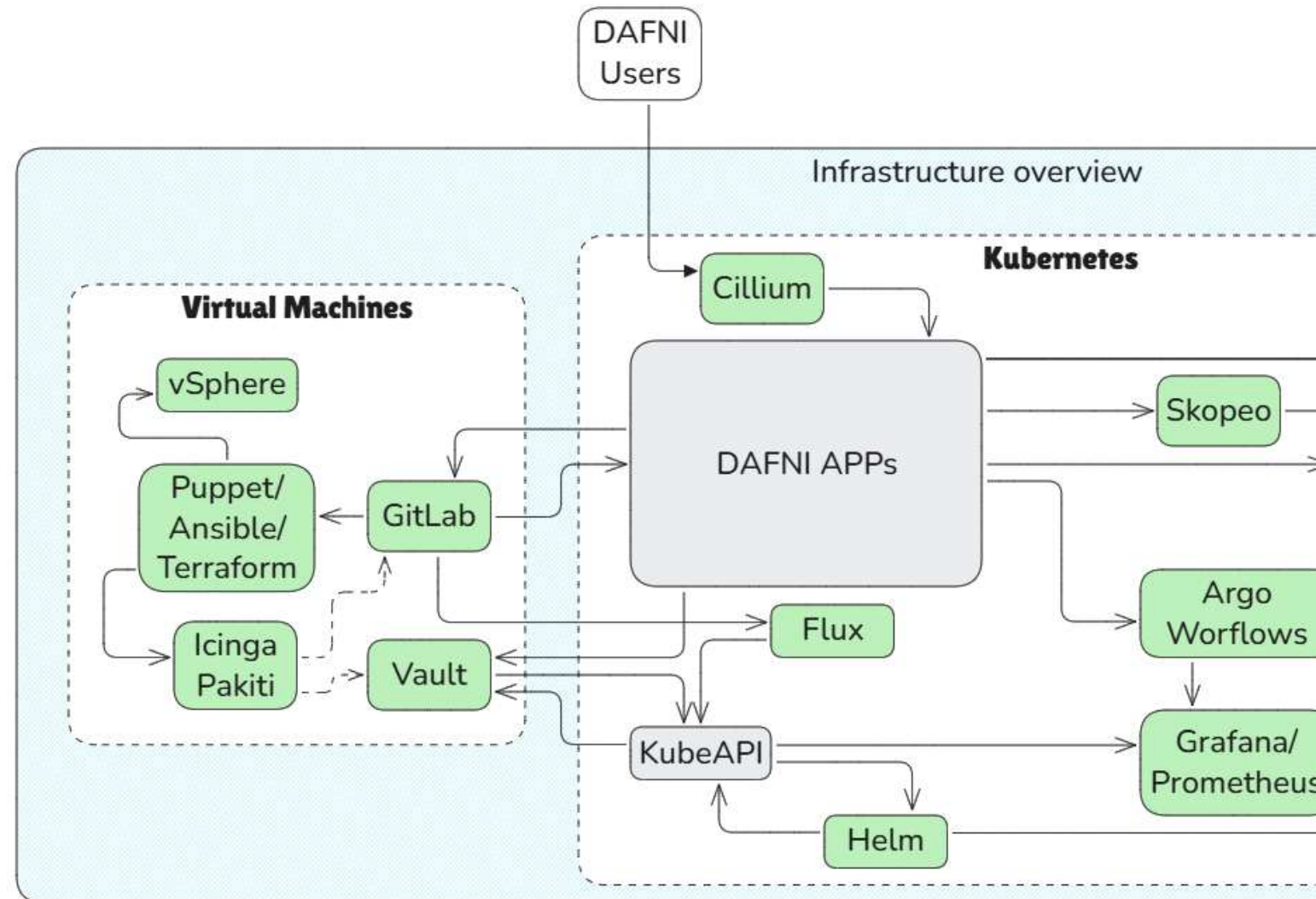
Third-party tools



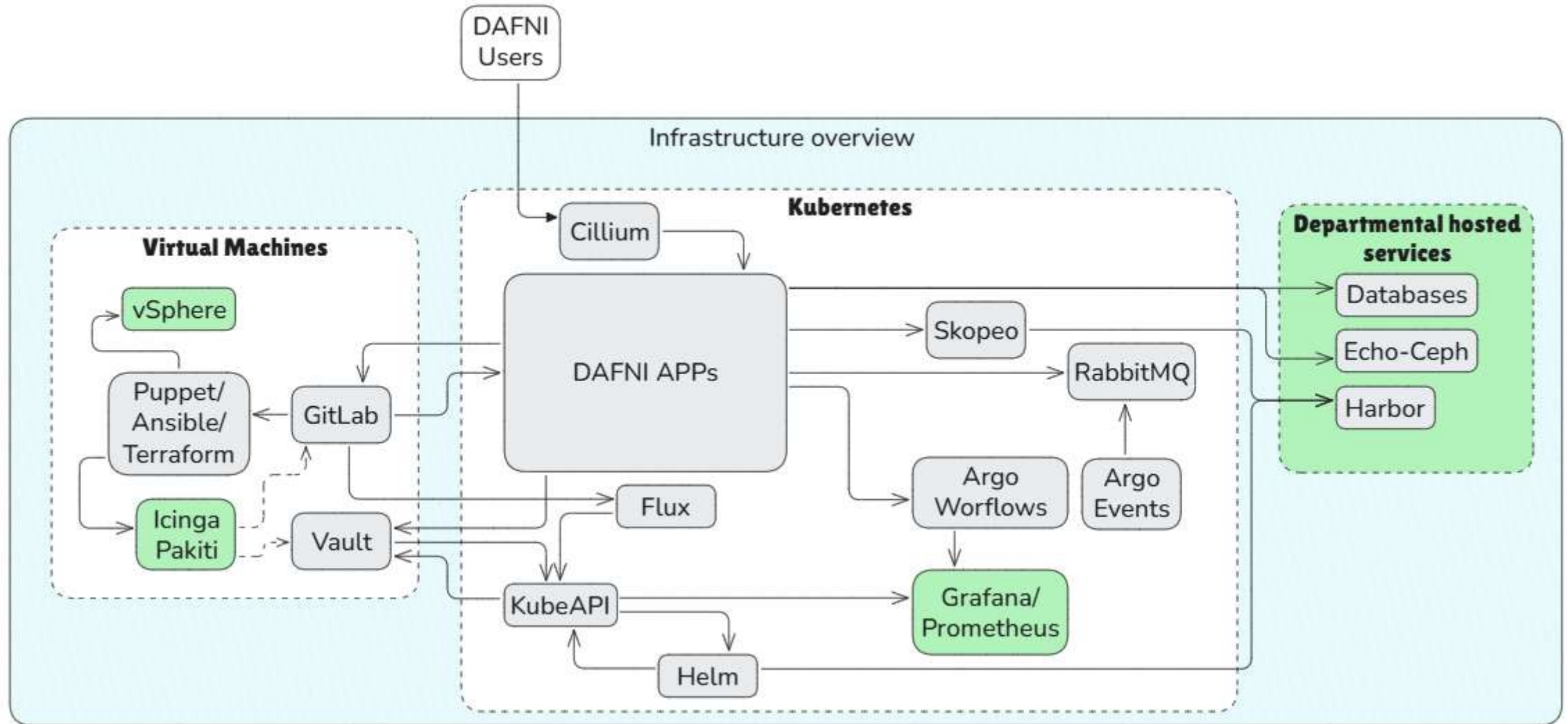
Third-Party Tools

What do we use them for?

- **Git Operations** – Git, Flux and Helm
- **Kubernetes** – RKE2 and Cilium
- **Infrastructure as Code** – Terraform/Ansible/Puppet
- **Monitoring** – Grafana/Prometheus, ELK, Icinga.
- **Security** – Vault, Pakiti



Departmental hosted tools and services



General lessons

How has industry tooling and practices helped us?

1. Hybrid architecture is pragmatic for a lot of modern DRI
2. The value of being organized. Think documentation, Agile practices, IaC and GitOps.
3. Off-the-shelf tooling can be a quick and professional solution
 - a) “*There is no such thing as a free lunch*” – Open Source & Cloud-Native tools require ongoing maintenance
 - b) Don't get stuck evaluating every new tool. Use the recommendations from the Cloud Native Computing Foundation (CNCf) landscape

App Definition and Development

Application Definition & Image Build

Buildpacks.io	dapr	HELM	Artifact HUB	Backstage	KubeVela	KubeVirt	MICROCKS	OPERATOR FRAMEWORK	spring.io
CNCF GRADUATED	CNCF GRADUATED	CNCF GRADUATED	CNCF INCUBATING	CNCF INCUBATING	CNCF INCUBATING	CNCF INCUBATING	CNCF INCUBATING	CNCF INCUBATING	
CARVEL	CHEF HABITAT	KubePlus	istio	Coder	code zero	Cyclaps	Datoc	Daytona	DeployHub
depot	Devfile.io	DevSpace	Eclipse Che	fabric8	Gefyra	Gitpod	distr.sh		
Gradle	itopia	Kaniko	Kapeta	ko	kubefed	KONVEYOR	kots	KubeOrbit	KubeOrchestrator
Kui_	lagoon	Platform	mirrord	ModePack	Nocalhost	okteto	Open Application Model	OPENAPI	OpenRun
ORAS	Packer	podman	Porter	QUARKUS	radius	rafft	score	sealio	
ServiceComb	SHIPWRIGHT	SKAFFOLD	squash	Tanka	TILT	vmware	Yolo		

Continuous Integration & Delivery

argo	flux	OpenKruise	TEKTON	agola	Akuiy	AppVeyor
CNCF GRADUATED	CNCF GRADUATED	CNCF INCUBATING	CNCF INCUBATING			
circleci	Skycap	CloudBees	codefresh	Concourse	devtron	flagger
go	harness	HELM/ARWE	hysscale	Jenkins	JED/ARWE	k6
Northflank	Octopus Deploy	OpenGitOps	OpsMx	ozone	PipeCD	Razee
TeamCity	terramate	TESTIM	Travis CI	werf	kube-burner	ZUUL

Database

TIKV	Vitess	CarbonData	Ignite	ArangoDB	BIGCHAIN	cassandra	Clickhouse	Cockroach Labs	Couchbase	CRATE.io	crunchydata	XTDB	Databend	Dgraph	DORIS
CNCF GRADUATED	CNCF GRADUATED														
SQL Server	MogDB	mongodb	MySQL	NebulaGraph	neo4j	nuodb	OCEANBASE	OpenEuler	openGemini	ORACLE	OrientDB	PERCONA	PostgreSQL	presto	drant
RethinkDB	SAP	SCALARDB	SCHEMA	SCYLLA	SEATA	ShardingSphere	SingleStore	spicedb	StarRocks	STOLON	supabase	Twingly	TDengine	TIDB	Timescale
Valkey	VERTICA	VOLTRON	Weaviate	YDB	YugabyteDB	PolarDB									

Streaming & Messaging

cloudevents	NATS	STRIMZI	nifi	Apache Kudu	Apache Beam	Apache Flink
CNCF GRADUATED	CNCF INCUBATING	CNCF INCUBATING				
cd events	drasi	Flink	Fluvio	GlassFlow	Google Cloud Dataflow	Google Cloud Datastream
akka	memphis	Quarkus	Pachyderm	PULSAR	RabbitMQ	Redpanda
talend	Tremor	userver	AutoMQ			

Orchestration & Management

Scheduling & Orchestration

Crossplane	KEDA	Knative	Kubeflow	kubernetes	Fluid	HAMI	KARMADA	VOLCANO	wasmcloud
CNCF GRADUATED	CNCF GRADUATED	CNCF GRADUATED	CNCF GRADUATED	CNCF GRADUATED	CNCF INCUBATING	CNCF INCUBATING	CNCF INCUBATING	CNCF INCUBATING	CNCF INCUBATING

Service Proxy

envoy	CONTOUR	AVI network	BFE	DUNKE	CoreDNS
CNCF GRADUATED	CNCF INCUBATING				
Caddy	citrix	f5			

Coordination & Service D

CoreDNS
CNCF GRADUATED

Opportunities for collaboration



Science and
Technology
Facilities Council



Engineering and
Physical Sciences
Research Council



UKCRIC™

UK COLLABORATORIUM
FOR RESEARCH ON
INFRASTRUCTURE & CITIES



DAFNI

Data & Analytics Facility
for National Infrastructure

Opportunities for collaboration

- [DAFNI](#) – Explore the DAFNI pages and use the links to express interest in the platform.
- [Cloud Native SIG](#) – If you are interested contact us or follow the [GitHub tutorials](#).
- [CAKE Fellowship](#) - *Basic introductions for the DRI community to the benefits and processes of Kubernetes.*
- [ACIT Hub Webinar](#), CNSIG - *Kubernetes for Research Infrastructure - Core Concepts and Practical Use Cases. 2:00-3:00pm, 20th August 2026, Online*

Any Questions?

Key takeaways

- Industry-Standard tooling (GitOps & IaC) can help solve research infrastructure debt
- Kubernetes is powerful, but it is NOT a universal replacement for HPC
- *There is no such thing as a free lunch* – Tools take research and maintenance
- Pragmatism beats analysis paralysis

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