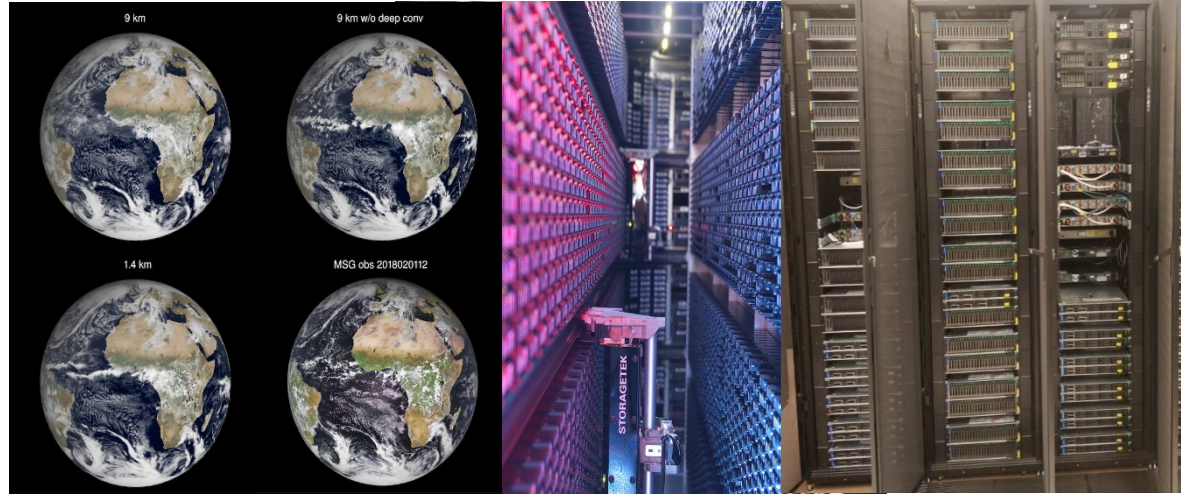


European Weather Cloud

Status and path to operations

Roope Tervo, Xavier Abellan



*“The European Weather Cloud aims to be **the cloud-based collaboration platform for meteorological application development and operations** in Europe and enables the digital transformation of the European Meteorological Infrastructure. The European Weather Cloud is dedicated to support the National Hydro-meteorological Services of the Member States of both ECMWF and EUMETSAT in fulfilling their official duties to protect life and property from impending meteorological hazards.”*

“a community cloud”

Who is it for?

Member and Cooperating States

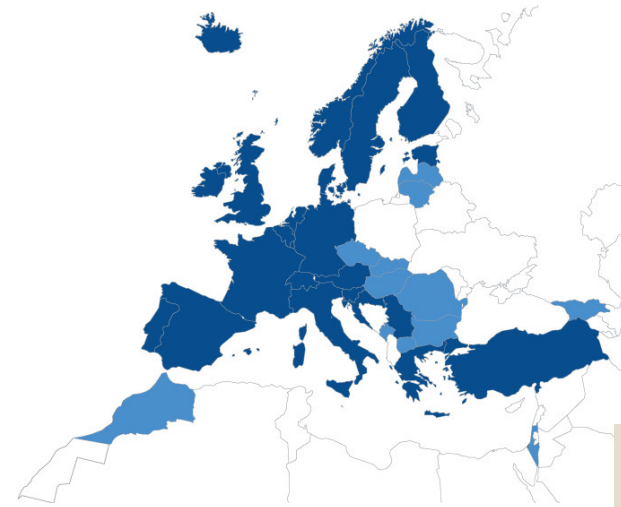
Research & Development

ECMWF Special projects
EUMETSAT thematic annual R&D calls

EMI Partners (e.g. EUMETNET)

Internal use

Support training, hackathons
Partners
Contractor interaction / projects



ECMWF

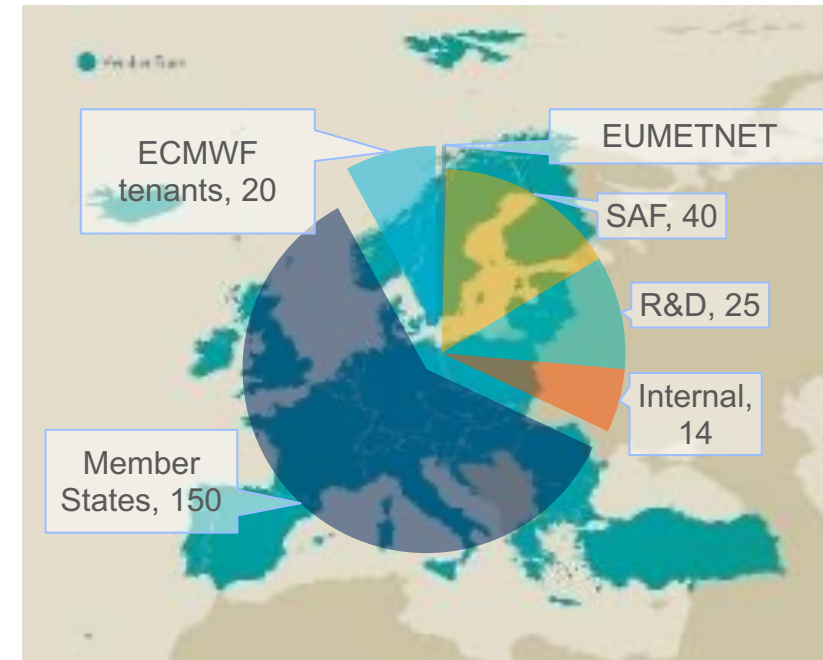


EUMETSAT

EUMETSAT starts operations with 225 CRUs

1 CRU = 16 cores; 128GB RAM; 1 GPU; storage: 4TB block, 8TB object, 4TB filestore

Allocation	CRUs identified in initial sizing	2021	Start of operations
Member States basic allocation	75	22	75
Member States pro-rata allocation	75	0	75
Support to ECMWF EWC users/tenants	44	4	20
SAFs	64	34	40
Research (indicative, 25-100 CRUs)	25	0	0
Other EUM internal usage	45	14	14
Optional EUMETNET usage/ additional community relevant data and services	2 expected	0	1
Totals	328	74	225



CPU	3600
RAM	28.8 TB
Block Storage	900 TB
S3	1.8 PB
SFS	900 TB
vGPU*	225

The actual sizing will be based on the actual usage within the limits of Member States allocation and sizing of different usage categories

The operational phase is to be started with 10Gbps dedicated network link based on the experiences gained from WEkEO

- Link capacity is to be evaluated each year and increased if necessary. Remarkable evolution is envisaged in 2025 due to both increased amount of usage and data.

What will be allocated to Member States

EUMETSAT

Each Member State will receive a share of the infrastructure:

- Equal basic allocation for all MS + additional allocation pro-rata to contribution. EUMETSAT example agreed at a 50/50% split between basic and pro-rata;
- Cloud Resource Unit (CRU) is used for planning purposes, while the real resource provisioning for tenants will be based on the actual resource needs expressed in number of cores, storage amount etc.

In operational phase, Member State shares will be managed by the Computing Representatives

Member state	Base allocation (CRUs)	Pro-rata allocation (CRUs)	Total (CRUs)
Austria	2.50	1.63	4
Belgium	2.50	1.94	4
Bulgaria	2.50	0.25	3
Croatia	2.50	0.19	3
Czech Republic	2.50	0.81	3
Denmark	2.50	1.31	4
Estonia	2.50	0.13	3
Finland	2.50	1.00	4
France	2.50	10.25	13
Germany	2.50	14.56	17
Greece	2.50	0.81	3
Hungary	2.50	0.50	3
Iceland	2.50	0.06	3
Ireland	2.50	1.06	4
Italy	2.50	7.63	10
Latvia	2.50	0.13	3
Lithuania	2.50	0.19	3
Luxembourg	2.50	0.19	3
Netherlands	2.50	3.25	6
Norway	2.50	1.63	4
Poland	2.50	1.94	4
Portugal	2.50	0.81	3
Romania	2.50	0.81	3
Slovakia	2.50	0.38	3
Slovenia	2.50	0.19	3
Spain	2.50	5.06	8
Sweden	2.50	2.13	5
Switzerland	2.50	2.63	5
Turkey	2.50	3.25	6
United Kingdom	2.50	10.38	13

Indicative proposal in EUM/C/97/21/DOC/06 to be finalised this Autumn
1 CRU = 16 cores; 128GB RAM; 1 GPU; storage: 4TB block, 8TB object, 4TB filestore

What will be allocated to Member States

ECMWF

- Each Member and Cooperating State will receive a share of the infrastructure
- Similar model to the existing HPCF service
 - Proportional and fair share of resources based on contributions
 - Bigger Member and Cooperating States get more resources
 - Baseline guaranteed for smaller Member and Cooperating States
- Exact figures to be published soon

ECMWF Operational infrastructure

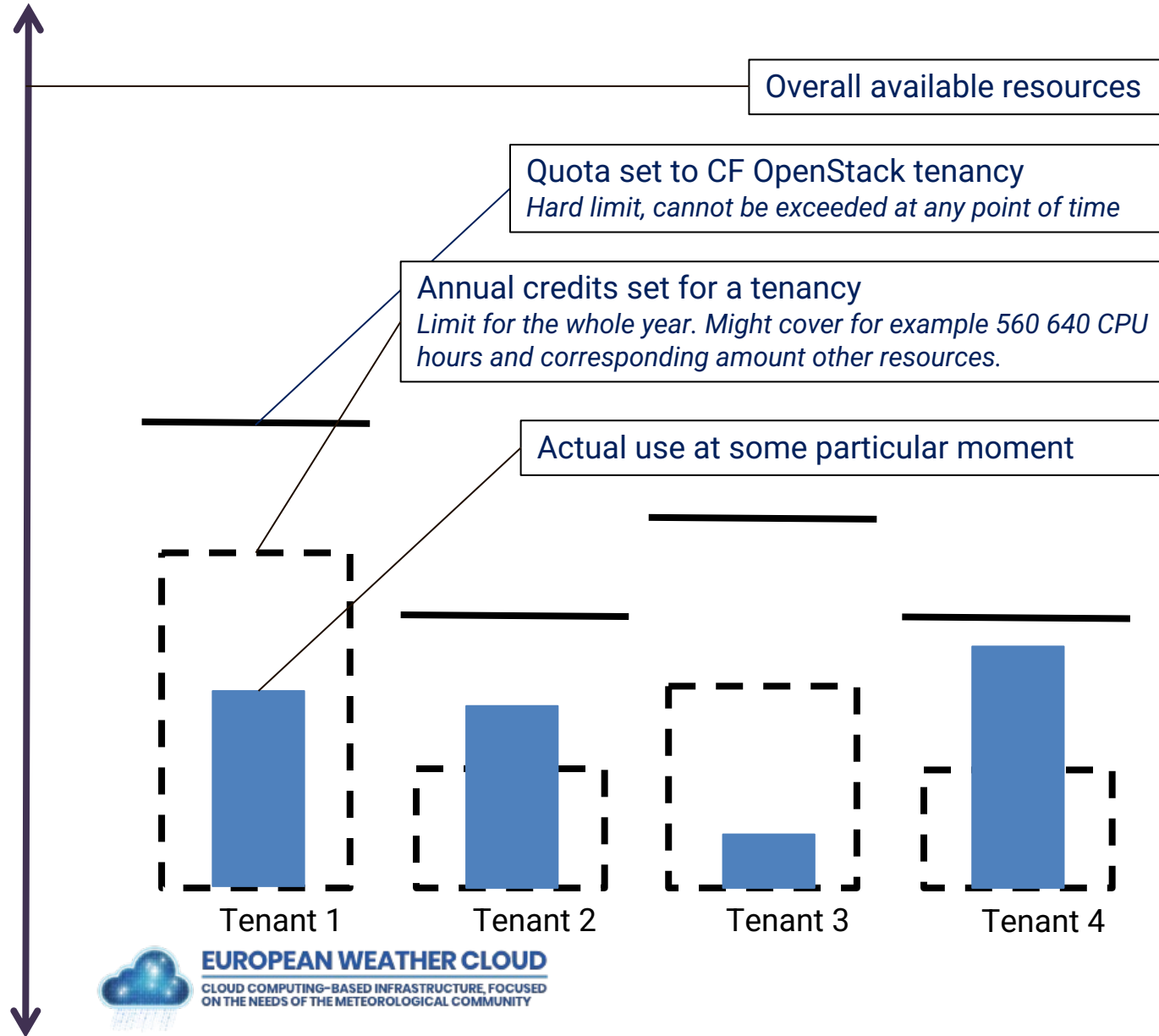
- New Cloud Infrastructure being procured as we speak
- To be installed in ECMWF's Bologna Home
 - Collocated with other key ECMWF Computing and Data Services
- Ready by end of Q1 2023
 - Pilot infrastructure in Reading will continue until it is ready
 - Migration of existing tenants planned between Q1 and Q2 2023
- 2 Production clouds - one on each computer hall
 - Based on Openstack and Ceph

Coming soon!

Cores	5632
Memory	53 TB
Storage	4 PB
GPUs	32 x A100 80 GB



Tenants can use their yearly allocation flexibly



- Tenants will have **yearly budgets of credits** and resource quota based on their allocation:
 - Allocating any type of resources will consume credits
- **This will allow tenants to use their yearly allocation in shorter period**
- Member States can share their credits to several tenants and combine them with other Member States
- EWC support team will monitor and control the usage so that overall limit is not exceeded
 - In case of many tenants will use burst capacity at the same time, action might be needed.

Accounting

Computing Representatives get access to accounting dashboard

The dashboard displays the following information:

- Announcement:** The data visualized in the Accounting Tool for this demo is generated from the "Pilot Infrastructure" of the European Weather Cloud and might not reflect the real usage of the "Operational Infrastructure".
- Menu Bar:** Includes dropdowns for "Select..." and "Tenant", with buttons for "Apply changes", "Cancel changes", and "Clear form".
- Usage Metrics:**
 - vCPU Usage:** 50 Total vCPUs Usage
 - Memory Usage:** 260.2GB Total Memory (RAM) Usage
 - Block Storage Usage:** 1.4TB Total Block Storage Usage
 - Object Storage (Buckets) Usage:** 6.6GB Total Object Storage (Buckets) Usage
- Federee Allocation (# of Instances):** A donut chart showing 90% for eumetsat and 10% for ecmwf.
- Total Budget:** No results found.
- Total Price (EWCU):** 0 Total Price (EWCU).
- Tenant Quota Table:**

Tenant Quotas	vCPU	vCPU used	RAM
it-cnr-ifac	20	10	25GB
it-itaf-nwp-postprocessing	128	39	1TB
it-itaf-nwpmllp	50	1	200GB
- vGPU Flavour Usage by Instance:**

Instance Name	vGPU Flavor
frogger	vm.a6000.8
pacman	vm.a6000.8
- Object Storage Usage:**

Bucket Name	Tenant Name	Size
it-itaf-nwpmllp-rapids	it-itaf-nwp-postprocessing	6.6GB
it-itaf-nwpmllp-eda	it-itaf-nwp-postprocessing	10KB
test	it-itaf-nwp-postprocessing	4B

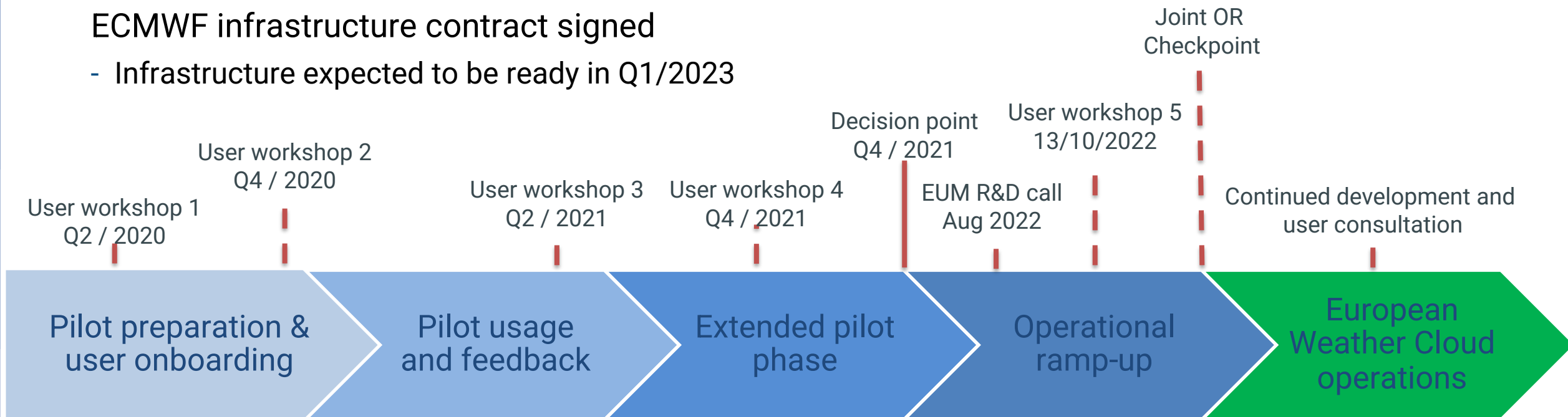
Target to be operational in Spring 2023

EUMETSAT infrastructure almost operational

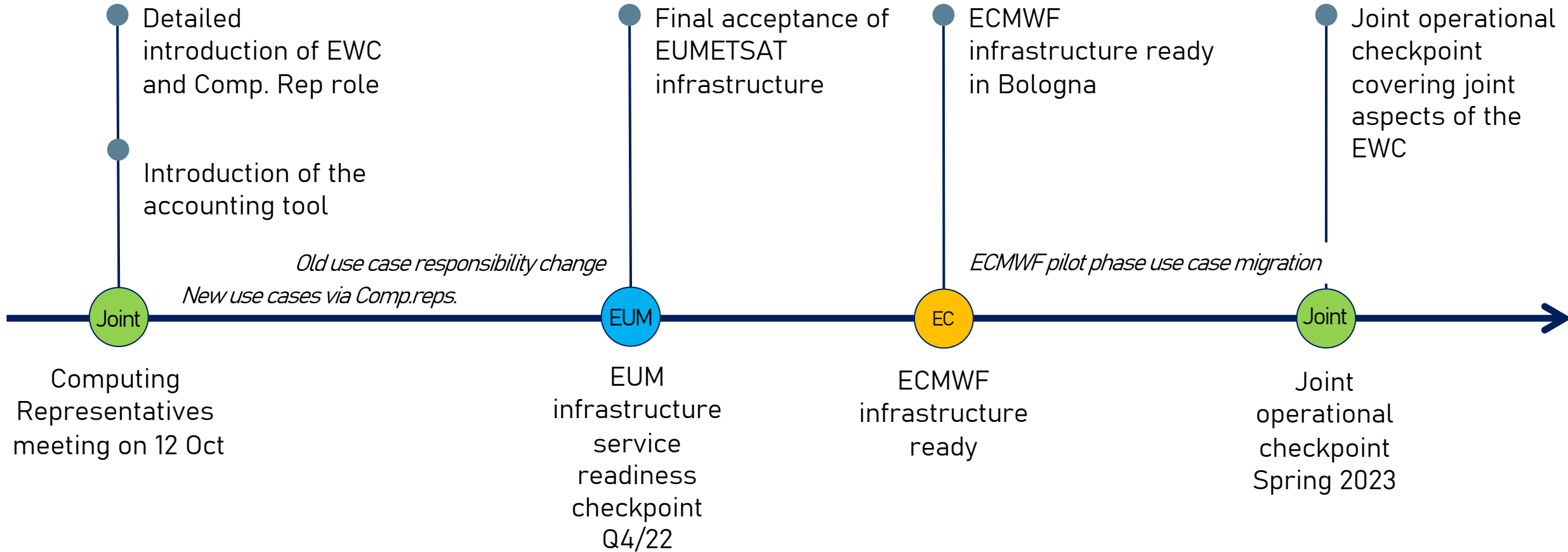
- Service readiness checkpoint successful August 2022 with an exclusion of direct link and Flash+ storage tier
- Final acceptance in 2022

ECMWF infrastructure contract signed

- Infrastructure expected to be ready in Q1/2023



Roadmap to operations



Tasks to conduct before operational checkpoint

Color coding based on current status

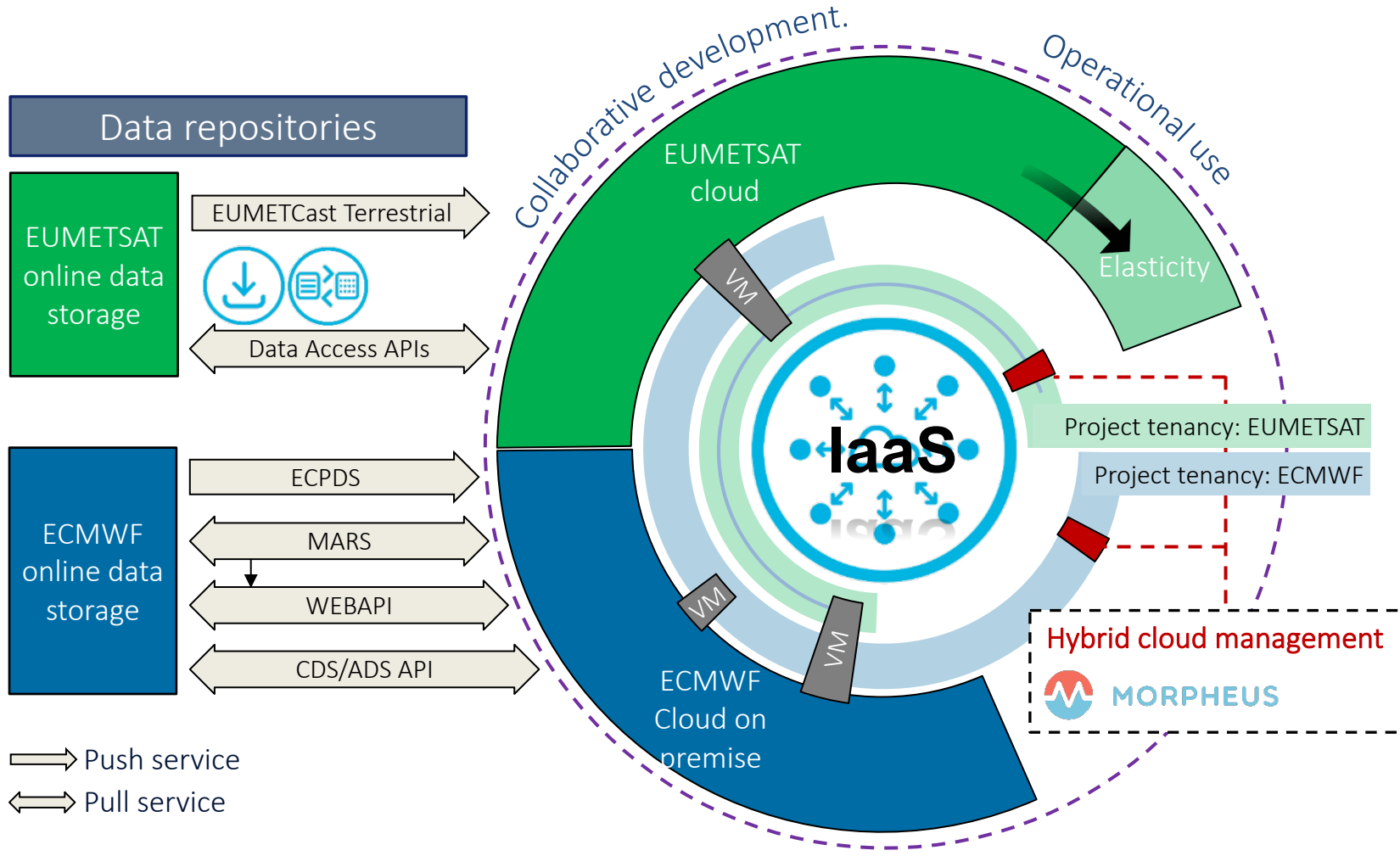


Governance	Joint management model				T&C		
Operations	Processes and responsibilities		User support & knowledge base		Accounting		
Security	Baseline recommendations for providers		Security processes			3 rd party evaluation of Cross-cloud security compliance	
Training and outreach	User support		Discussion platform(s)		User workshops	Training	
Use case migration	EUMETSAT				ECMWF (BO)		
Infrastructure	Operational infrastructure (EUMETSAT)	Test and validation (EUMETSAT)			Operational infrastructure (ECMWF)		Test and validation (ECMWF)

Pilot

Full operations

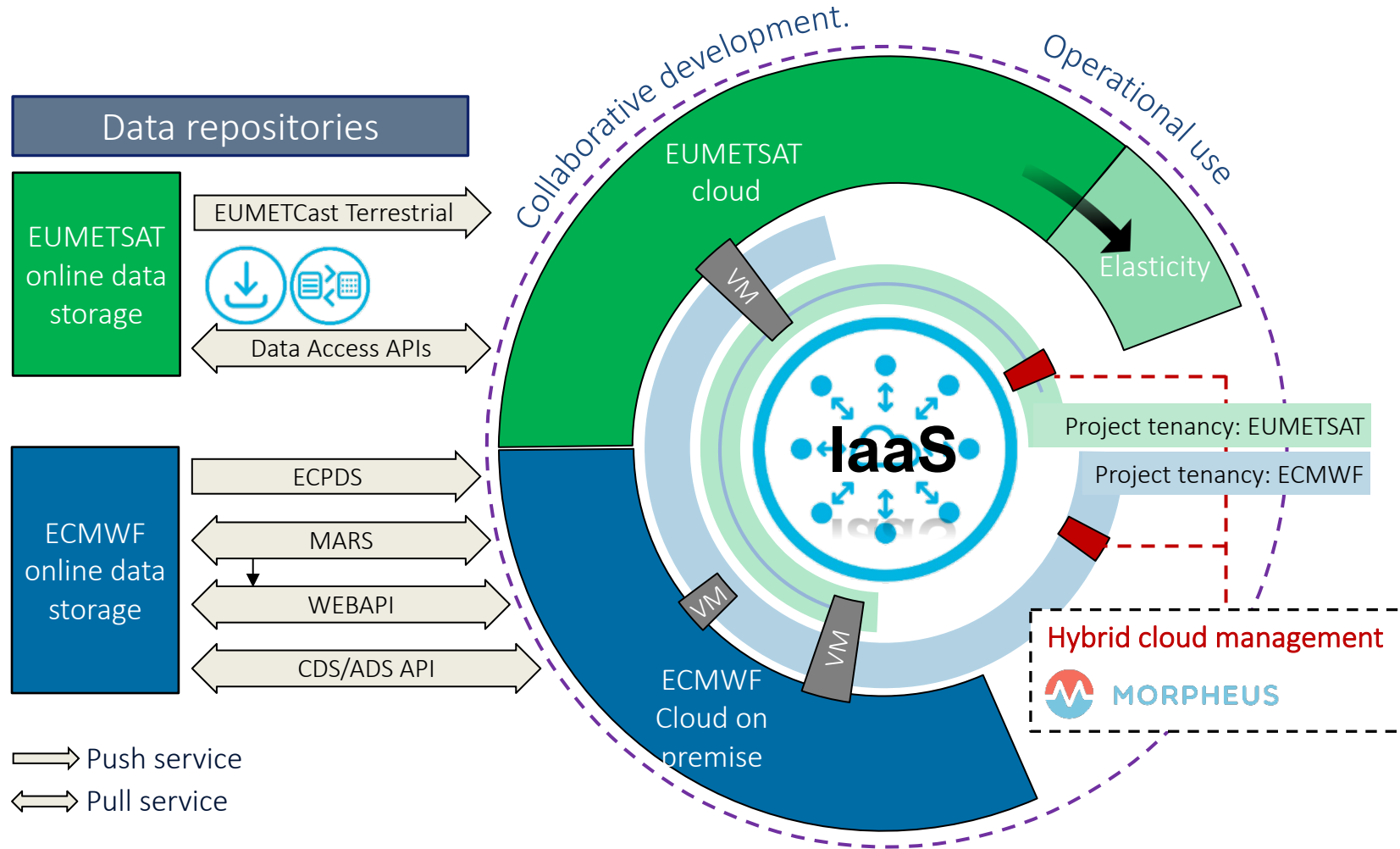
What being operational means?



Tenants can provision VMs and host their own applications

- Also basic level service, such as user management, maintained by the tenants

What being operational means?



- EUMETSAT infrastructure contract contains 99.5% SLA
 - (allowing ~3,5h downtime per month)
- EUMETSAT Morpheus and Big Data Services are not in 24/7 maintenance
- ECMWF Infrastructure with 99.9% guaranteed availability and 24/7 operational monitoring

Roles and definitions

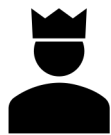
Authorizing Officer



The designated representative of ECMWF, EUMETSAT and Member and Co-operating States of EUMETSAT and ECMWF who authorizes access to the EWC Services.

Authorizing officer may act as tenant admin or delegate the task.

Tenancy Owner



A user who administers one or several tenancies available on the EWC in accordance with an agreement with the Authorizing Officer.

Tenancy User



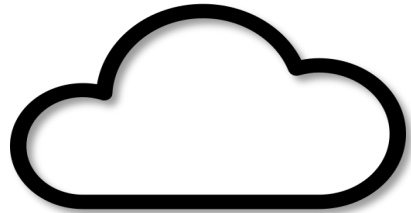
A user authorized by a Tenancy Owner or another existing Tenancy User to use one or more identified Tenancies on the EWC. A Tenancy User may generate Tenancy -based Services for End-Users

Tenancy



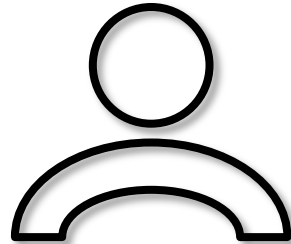
An isolated environment offering services on the EWC and administered by a Tenancy Owner authorized by the Authorizing Officer.

Shared responsibility model



Cloud provider

- Infrastructure
- Provides secure by default initial setup
- Provide support
- Can interrupt the service if legally required to
- *May monitor traffic*
- **NO access to VMs**



Tenant

- Application security
- OS level updates
- Access control to VMs
- Network security
- Data protection
- ...



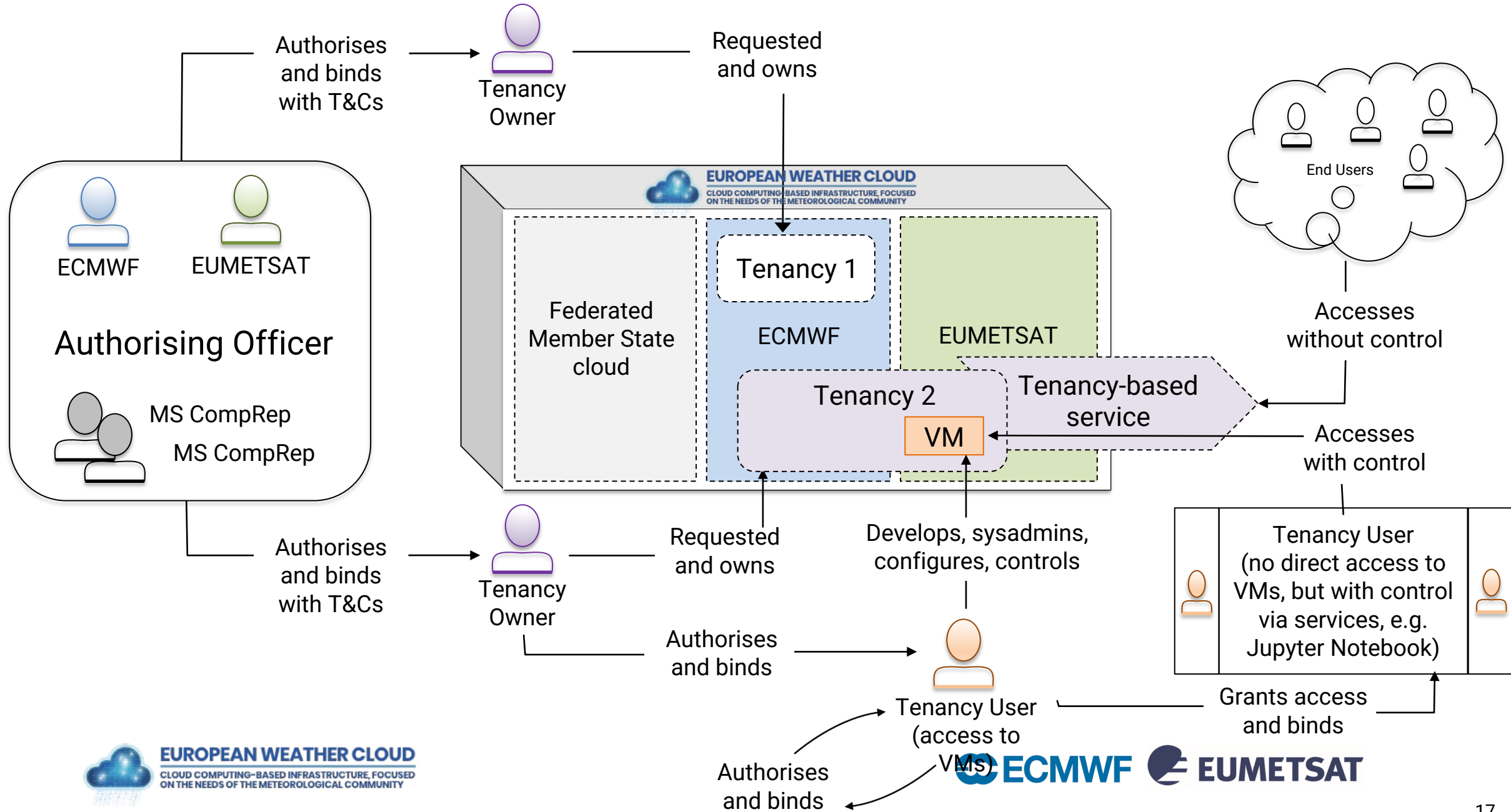
Authorizing officer will authorize users

Authorizing officer may act as tenant admin or delegate the task.

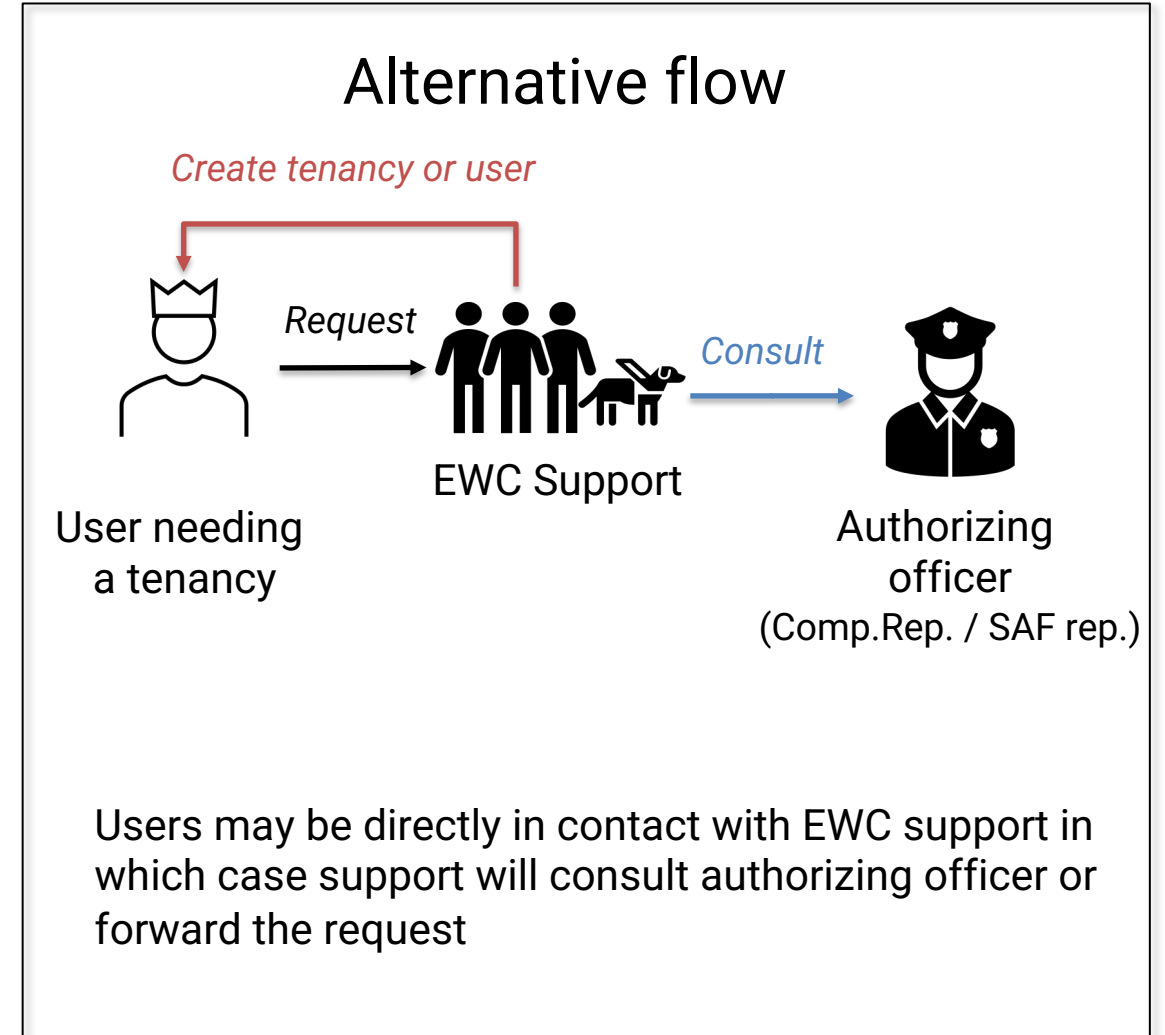
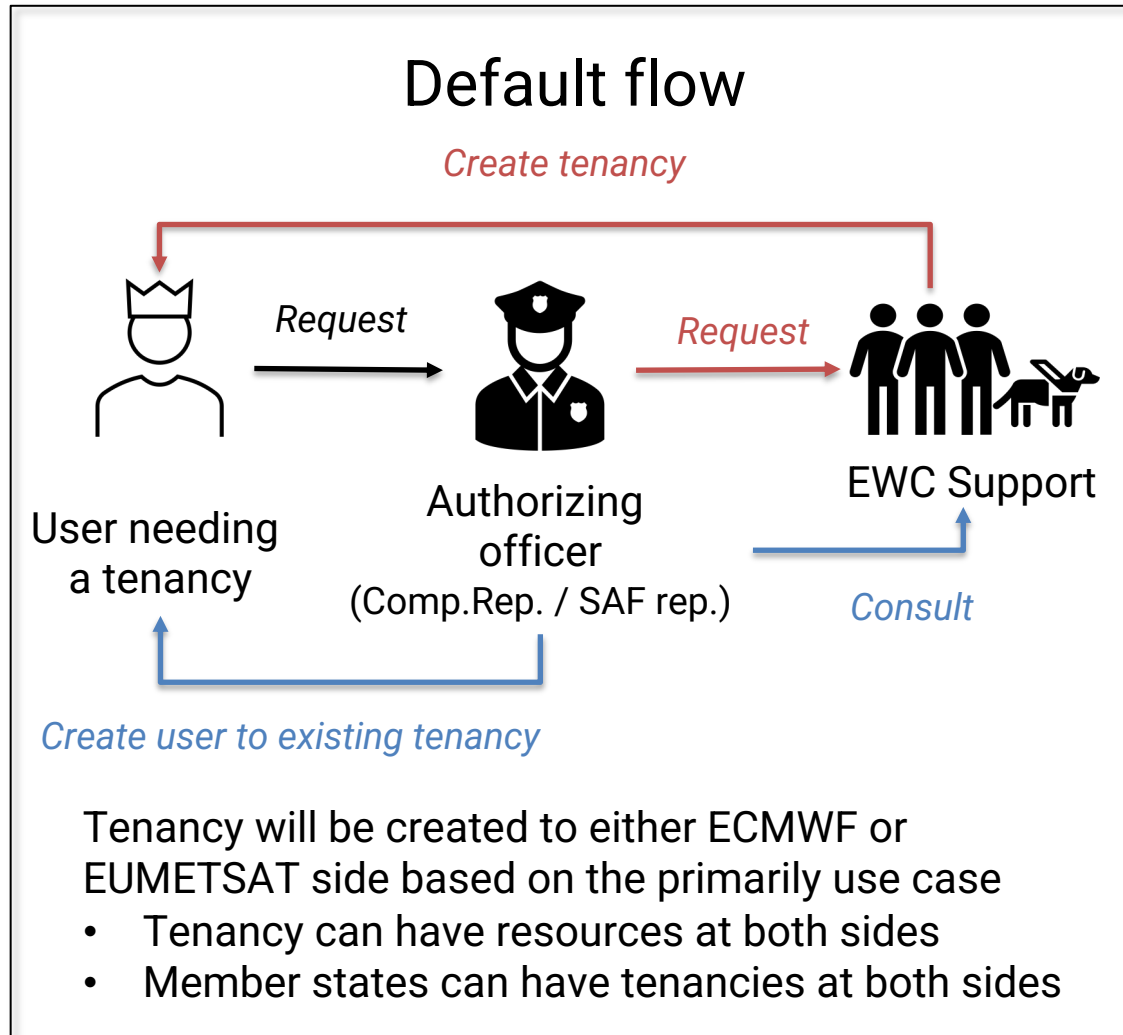


Using EWC implies the acceptance of Terms and Conditions

EWC resources administration and use



Getting a tenancy workflow



External data in EWC

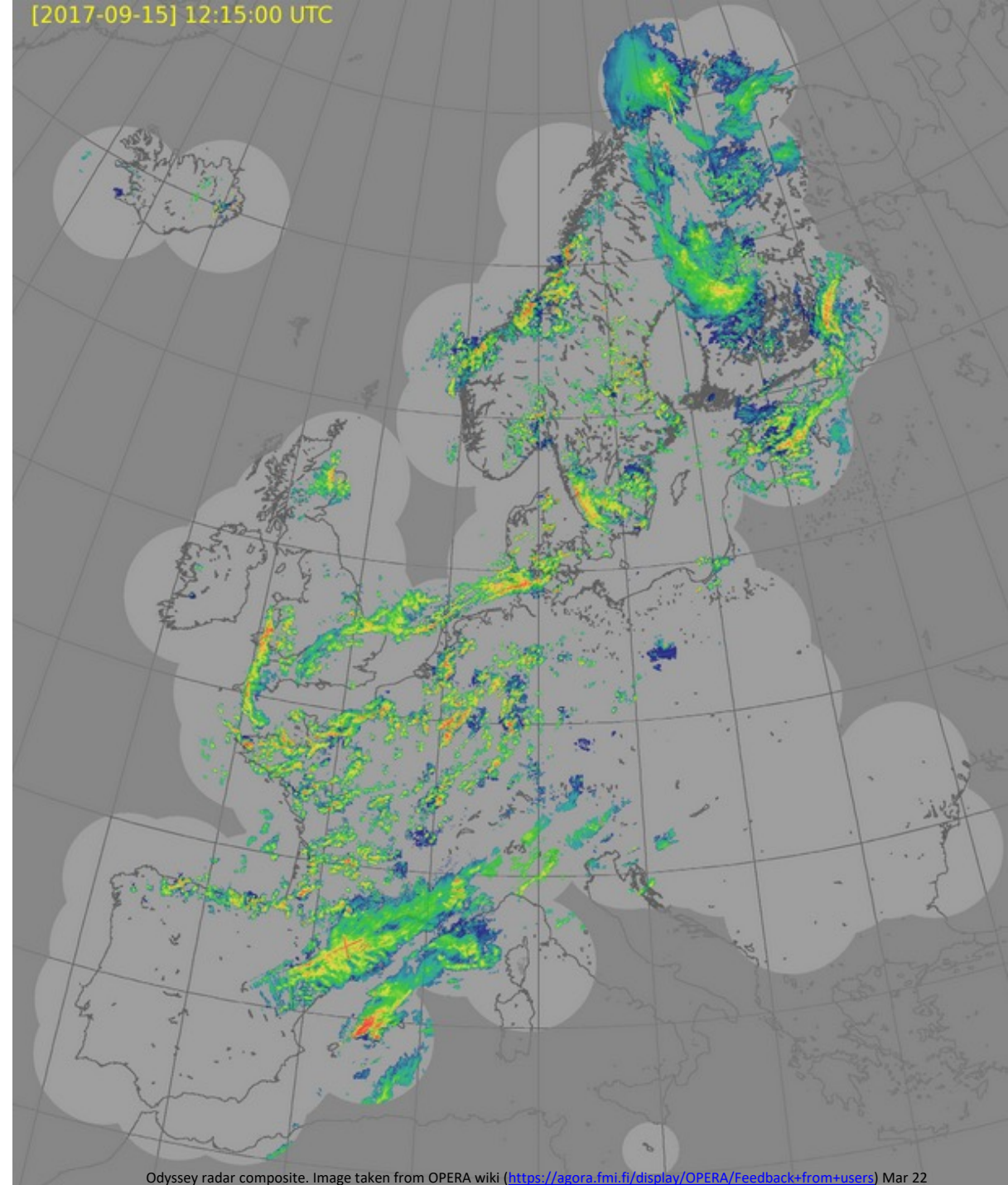
ECMWF and EUMETSAT are in negotiations to host OPERA composites for EWC users in EWC

- OPERA data contains **volume data from radars** and **composites** covering Europe created by EUMETNET OPERA program
- Most probably provided via S3 buckets (feedback welcome!)

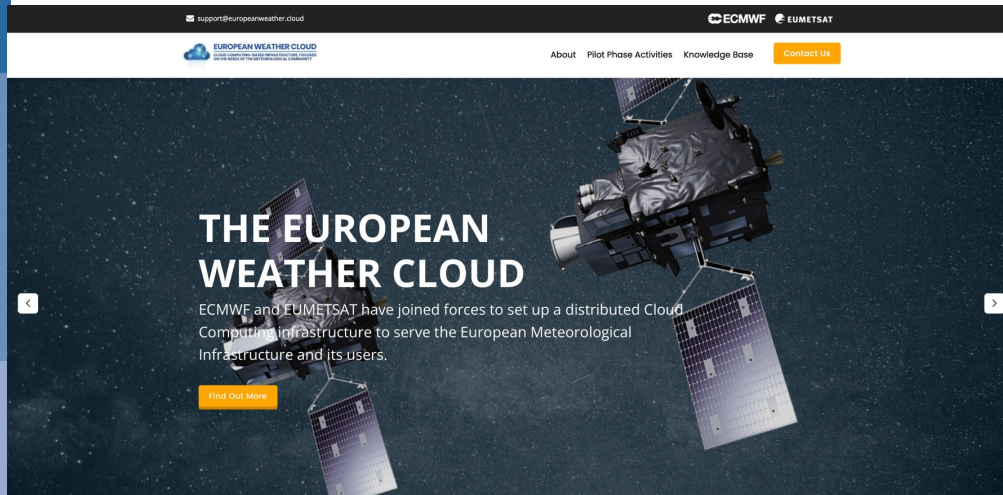
Users can easily establish data sharing buckets in the EWC for collaboration. Examples:

- EUMETSAT is currently coordinating SAF CDOP4 data needs to collaborate in external data access

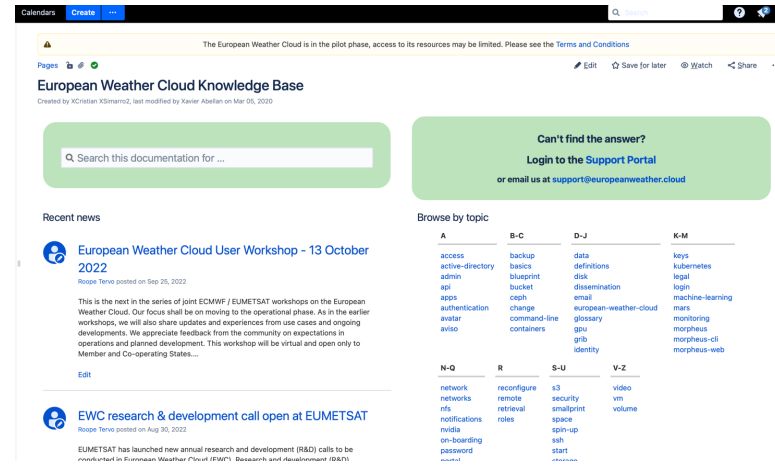
As part of the [MAELSTROM EuroHPC](#) project that ECMWF is coordinating, six benchmark datasets for machine learning applications from five partners are stored and made available online via S3 buckets



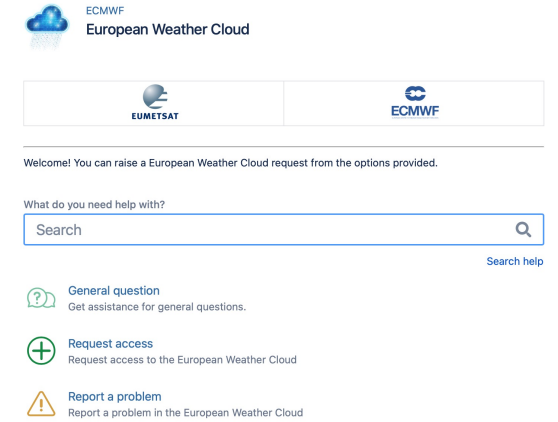
More information



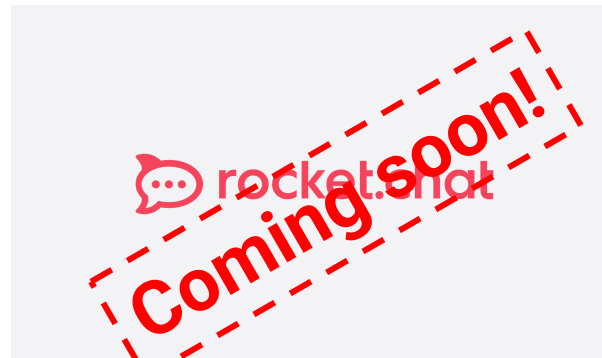
<https://www.europeanweather.cloud>



[Knowledge Base](#)



[User Support](#)



<https://chat.europeanweather.cloud>

EUMESTAT R&D calls and ECMWF Special projects

- ECMWF Special projects experiments or investigations of a scientific or technical nature, undertaken by one or more Member States, likely to be of interest to the general scientific community
 - Traditionally for HPCF resources
 - They can now include EWC resources in their request
 - <https://www.ecmwf.int/en/research/special-projects/special-project-application>
- Researchers from member states' public institutions can now apply annually for resources for research and development (R&D) projects to be conducted on EWC at EUMETSAT.
 - Also possible to apply for the fast-track project which can have more limited resources and in maximum duration of maximum of one year
 - <https://www.eumetsat.int/european-weather-cloud-research-development-call>

	EUMETSAT	ECWMF
Application Deadline	End of November	End of June
Start - implementation	May	First of January

Questions?