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European Cloud services in an Open FEDerated ecosystem

Coming to an open cloud ecosystem based on federation

What will the ECOFED project do?

- Develop a technical basis for a more open cloud usage model, facilitating interoperability, federation and switching between providers.

- Vertical decomposition: disentangling cloud infrastructure and applications

- Enable cloud service providers to build more flexible, scalable and federated cloud

- Lower risk of lock-in effects due to easier cloud switching and more flexible capacity scaling

From Mono-cloud to Multi-Cloud

Keep: freedom of choice and unbundling

	Pre-Cloud	Cloud (Native) *Current cloud market*	Federated Cloud
Data & Management			**1+1=3** **Combine advantages of Pre-cloud and Cloud Native**
Application	Atos ilionx CGI centric		
Platform	Red Hat LAMP IBM django		
Hosting	leaseweb transip bit internet technology EQUINIX		
Virtualisation	vmware CITRIX XenServer Xen Project PROXMOX Red Hat		
Hardware	IBM Hewlett Packard Enterprise intel DELL SUPERMICRO AMD		
Interconnectivity	eurofiber amsix kpn ndix NL-ix		

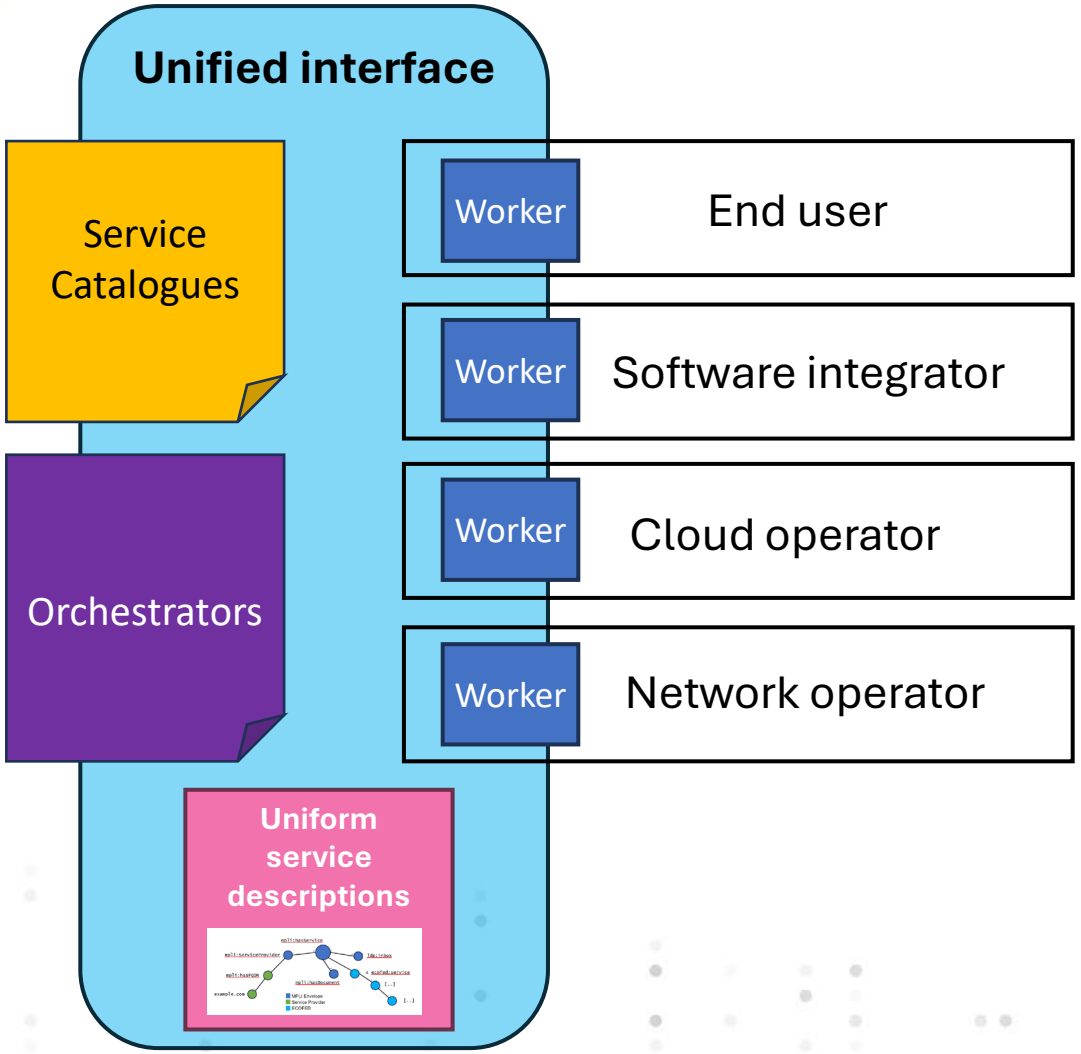
Keep: ease of deployment, integration and management

How?

" change is the only constant"
Heraclitus 500 B.C.

- Many ways, many technologies…
- One certainty we have: technologies will change and evolve
- We need to have something that is future proof
- We aspire to be technology agnostic like the HTTP protocol for web communication (1991)
- "*HTTP*" for cloud services!

ECOFED - High level architecture



- Building a **unified interface** as abstraction layer on top of heterogeneous CSP technology stacks **using a common protocol**
- The protocol consists of
  - **Ontology based uniform service descriptions** (based on RDF-SHACL)
  - **API-specifications** for the different federation capabilities
- Create ease of use for developers, as ease of use is hyperscalers biggest selling point
- No assumptions on providers business model

ECOFED Design principles

- ECOFED architecture contains at least the following components: **Unified Interface (Specification), Ontology, Service Catalogue, Orchestrator**

- ECOFED offers the following **Service capabilities**: **Discover, Move, Switch, Expand, Stacking, Transparency, Compatibility, Compliance**
  - The **orchestrators** enables these capabilities with specific flows

- ECOFED strives for **automatic resolution of legal and administrative checks and balances** as a gateway for participating in the federation

ECOFED Design principles

Principles **Unified interface**

1. There is one unified interface defined in an open specification
2. All parties/roles involved connect via a unified interface
3. Parties can have a subset of the unified interface, with only functions necessary for the role
4. The unified interface is extensible
5. We prefer a declarative description over an imperative description to allow parties as much freedom as possible in the implementation

Principles **Service catalogue**

1. There can be one or more service catalogues
2. All parties can publish their service offerings to a service catalogue
3. All parties involved can use a third-party service catalogue to offer services
4. All parties involved can use a private service catalogue to offer services
5. Providers can use service catalogues to offer their services

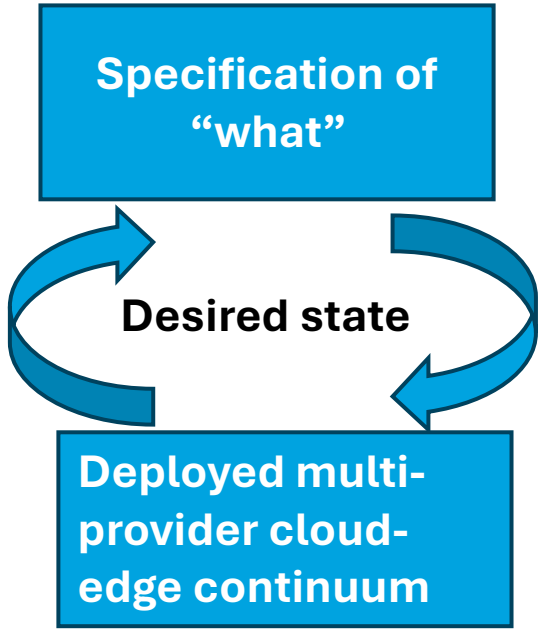
Principles **Orchestrator**

1. There can be one or more orchestrators
2. The orchestrator offers and uses the unified interface
3. The orchestrator is decentral in nature
4. The orchestrator can be run by any party
5. The orchestrator organizes service deployments and changes

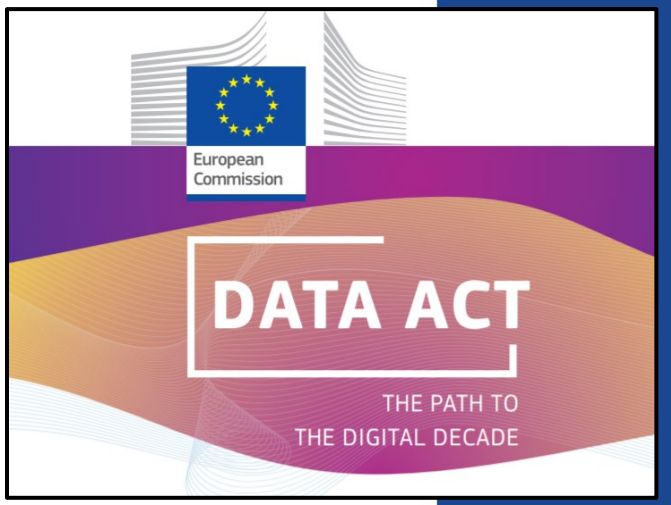
In short:
*Our core value to be **open** and **technology agnostic** have had their impact on the system design.*

Declarative approach for cloud federation

- API-Specs for the unified interface supporting declarative approach for users
- **Specify what** the multi-provider cloud-edge continuum needs to look like
- Let the machinery figure out how to come to the **desired state**
- Want to change cloud configuration? Change desired state



Compliance towards cloud switching in EU Data Act



CHAPTER VI
SWITCHING BETWEEN DATA PROCESSING SERVICES

Article 23: Removing obstacles to effective switching between providers of data processing services

Article 24: Contractual terms concerning [illegible] between providers of data processing services

Article 25: Gradual withdrawal of switching charges

Article 26: Technical aspects of switching

Article 29: Interoperability for data processing services

Article 34: Interoperability for the purposes of in-parallel use of data processing services

Several articles related to cloud switching

From the Data Act a **Central Union standards repository will come** containing:

- open specifications
- harmonized standards

Highly relevant for IPCEI-CIS !

Source: legal Data Act text: https://eur-lex.europa.eu/eli/reg/2023/2854

Interested to contribute?

- Contribute to HTTP for Cloud Services
- Contribute to APIs and Service ontologies
- Building orchestrators
- Building CSP Reference implementations
- …

Interested to collaborate? Let us know!

www.ecofed.eu

Contact

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