




Kennisavond: Eén Europese cloud

Eén Europese cloud





Agenda

- Europese ontwikkelingen
 - Het ECOFED-project op hoofdlijnen
 - Centre of Excellence Data Sharing & Cloud
 - Demo
 - Paneldiscussie
- 

Europese ontwikkelingen

Björn Håkansson



ECOFEED

Content

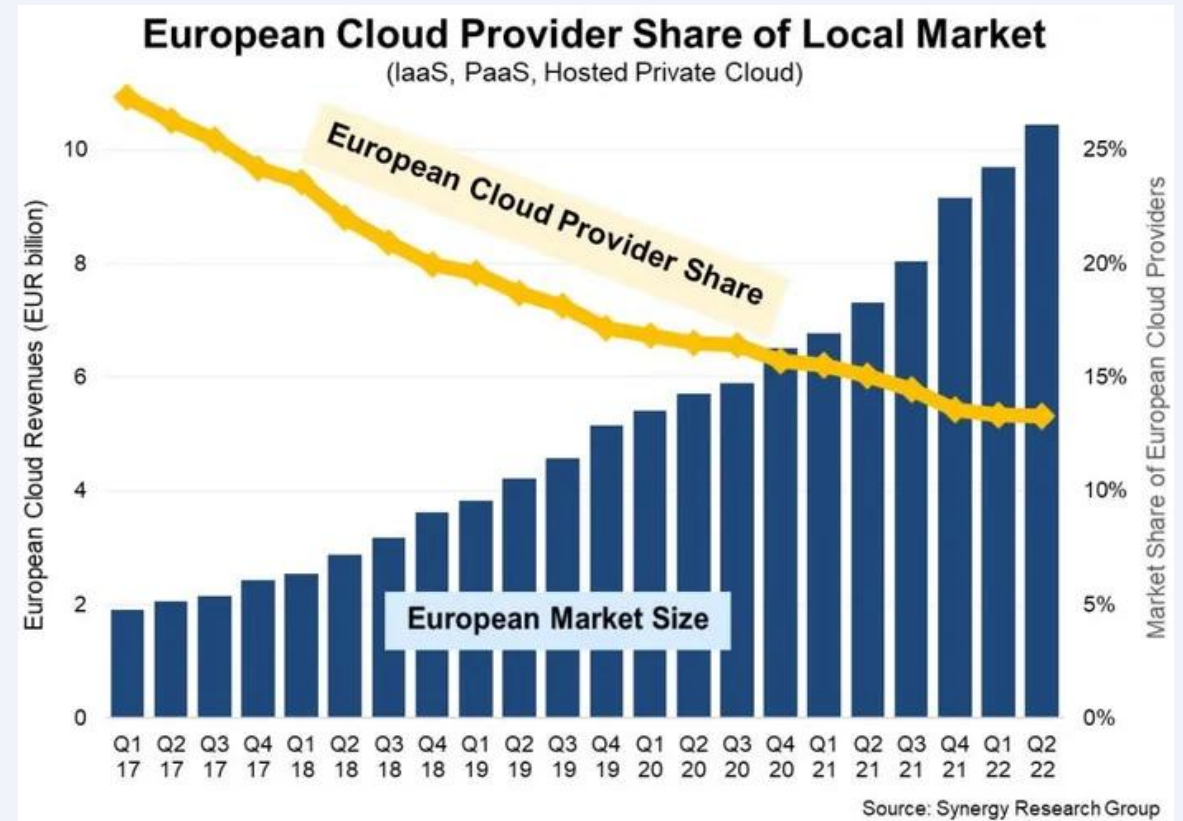
- General Market developments
- European cloud developments and initiatives
 - Overview
 - European Commission, incl. IPCEI-CIS
 - European Alliance for Industrial Data Sharing, Edge and Cloud
 - Gaia-X / Structura-X
 - Outlook for 2025 and beyond
 - Putting the pieces together



Bjorn Hakansson
Business Developer, TNO
Co-chair of the European
Alliance for Industrial Data,
Edge and Cloud

The boom in Data & Cloud, and the European debate

- The developments in the data and cloud markets have triggered many different initiatives; including the industry initiative Gaia-X, new legislation from the European Commission and research projects like the IPCEI-CIS.
- A common factor has often been the worry over the ever-increasing dominance of non-EU players in the cloud service provider market in the EU in combination with increasing use of data and AI, and with concerns over the legal protection for data stored with non-EU cloud service providers.
- In the meanwhile, the topic of data sovereignty and digital sovereignty is a much wider debate.



So what are the challenges in the cloud market? And what are the initiatives in Europe dealing with this?

What are some of the hot topics in Data & Cloud?

Data Privacy

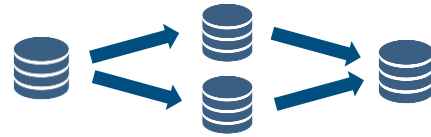
1



I want to be compliant with all Data Privacy legislation and keep my users aware of this.

Data Security

2



I want to share data with others, but I want to control that my data is shared in a secure way.

Data Interoperability

3



I want use / combine data with data from other parties across Europe in so called Data Spaces.

Data Sovereignty

4



I want to control how my data is stored e.g. in a cloud that is 100% based on EU legislation.

5

Transparency & Trust

Cloud Security

6



I want my cloud environment to be secure and compliant with all European security regulations.

Cloud Portability

7



I want my applications to be able to run in any type of cloud environment to avoid lock-ins.

Cloud Switching

8



I want to be able to switch all my data and applications from one cloud provider to another.

Cloud Scalability

9



I have needs for computing on demand for my workloads and need to scale up temporarily.

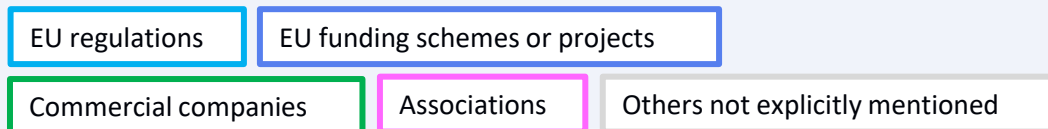
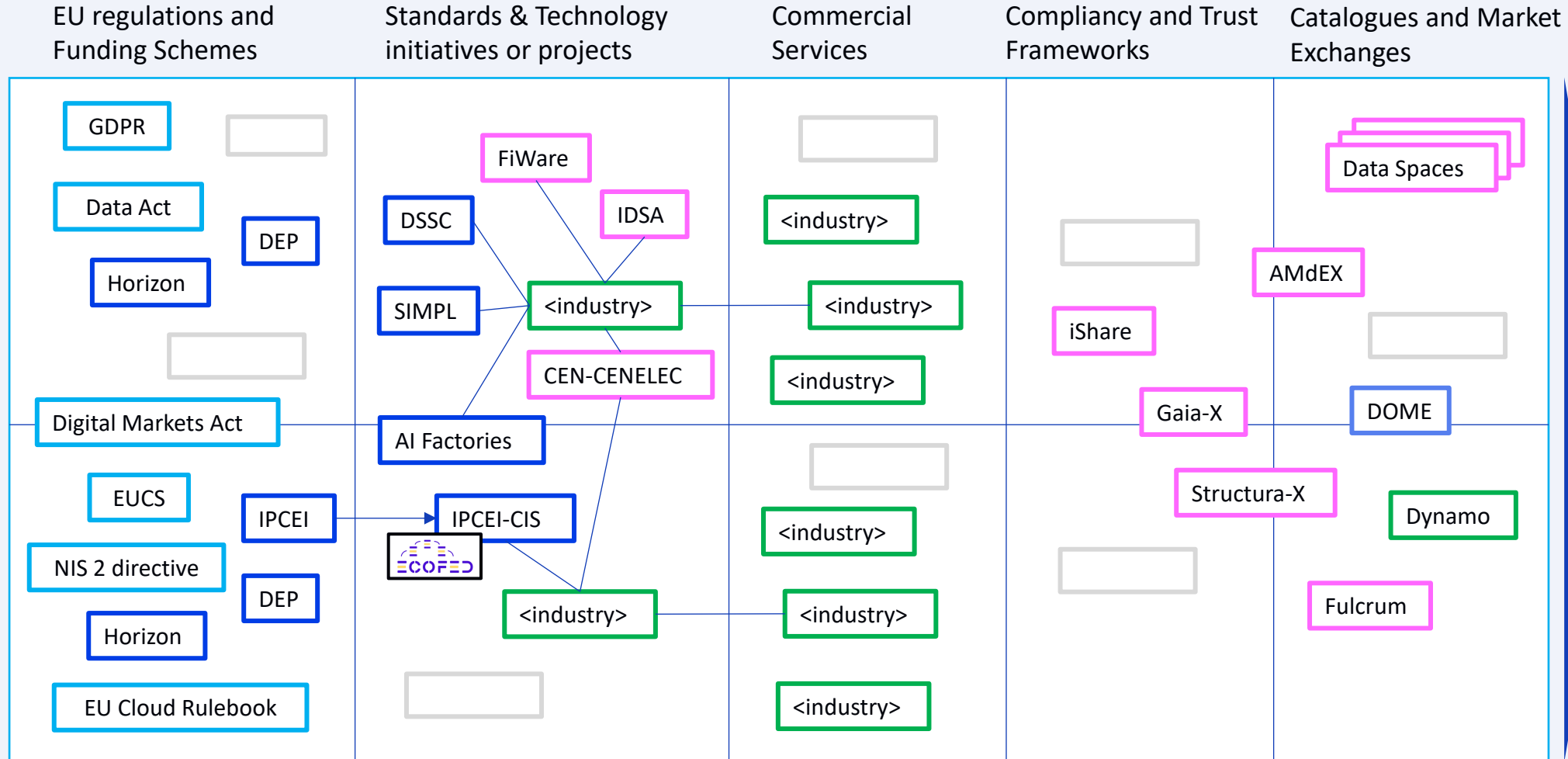
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Interoperability & Autonomy

Understanding the developments on Data & Cloud

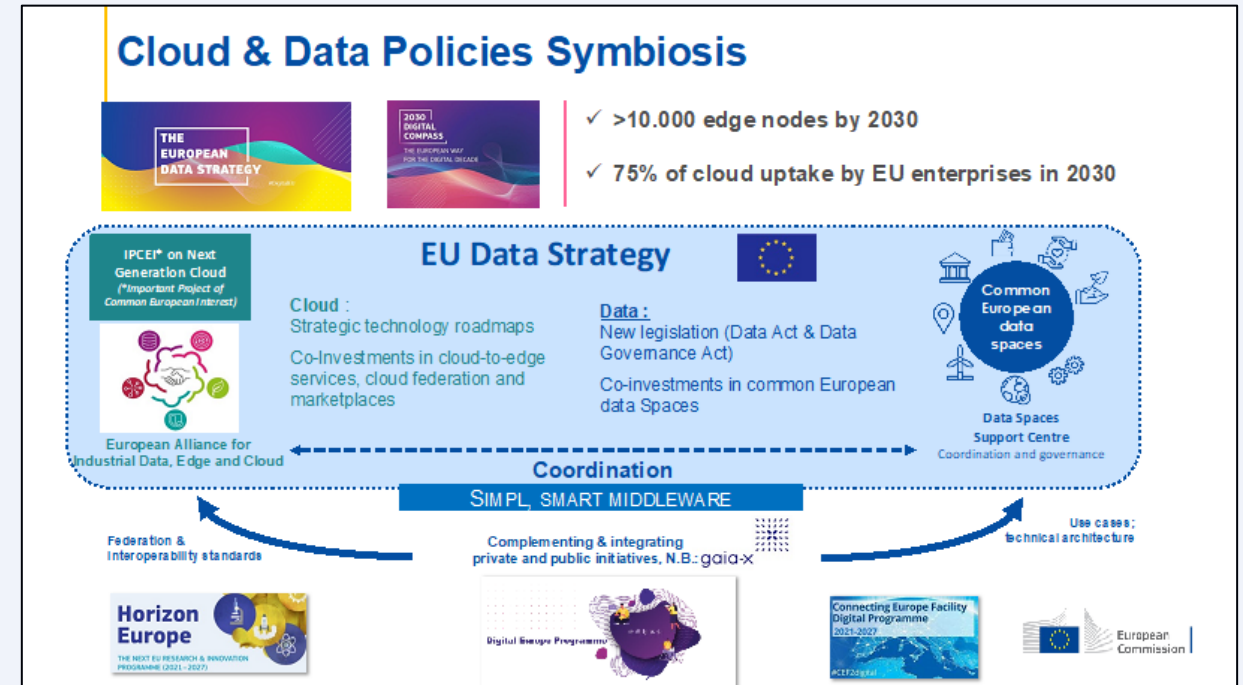
Addressing the Data Ecosystem

Addressing the Cloud Ecosystem



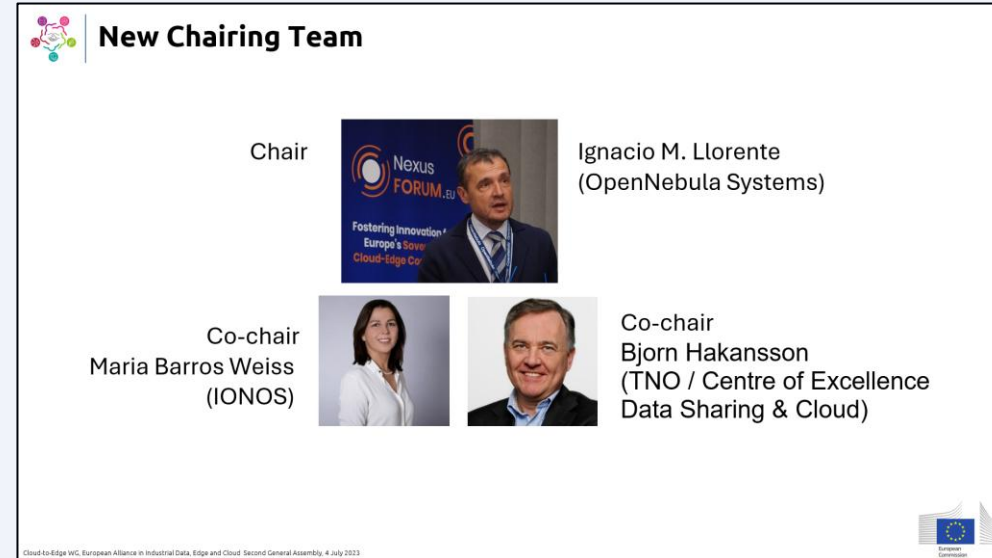
European Commission initiatives on Cloud & Data

- Overall EU Data Strategy, supported by a number of initiatives or projects, a.o.:
- European Alliance for Industrial Data, Edge and Cloud
- IPCEI-CIS and Horizon Europe projects
- SIMPL (SIMPL is the EU-funded open-source secure middleware that will support data access and interoperability among European data spaces and other cloud-to-edge federations)
- DOME (DOME is an EU-funded project that develops open-source components for a European marketplace catalogue of Data and Cloud services)



European Alliance for Industrial Data, Edge & Cloud

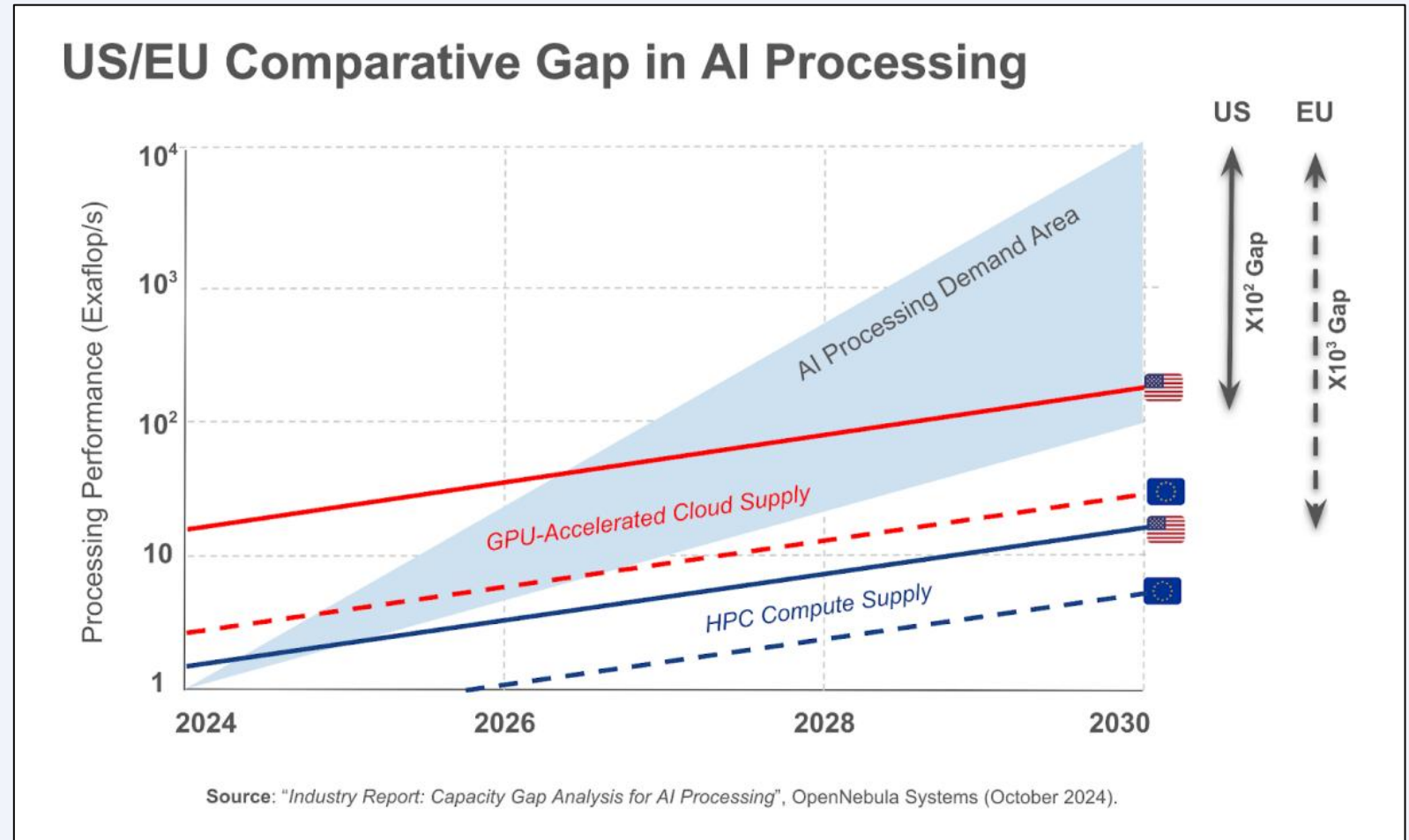
- TNO / CoE DSC is active in this Alliance to develop roadmaps for the European Commission.



- Currently working on roadmaps for Telco-Edge and for role of AI in digital infrastructures.
- We also get early updates on future plans from the European Commission, like new IPCEI programmes;
 - IPCEI on Large-scale Federated Edge Computing Infrastructure
 - IPCEI on Federated and Distributed Artificial Intelligence Services

European developments on AI computing vs USA

- Within the domain of Cloud-Edge the need for computing infrastructure for Artificial Intelligence is a hot topic.
- Some of the challenges include dependencies on non-EU players and energy use in AI computing.
- To tackle these challenges several European plans and initiatives are currently being developed, such as new IPCEI projects.



An industry report from OpenNebula highlights the developments in AI processing.

EU and the Draghi report

- The recent report from former ECB president Mario Draghi on The future of European competitiveness has received a lot of attention in media.
- Some of the key points in this report concern digital innovations:
 - “Europe largely missed out on the digital revolution led by the internet and the productivity gains it brought: in fact, the **productivity gap** between the EU and the US is largely explained by the tech sector. The EU is weak in the emerging technologies that will drive future growth.”
 - “With the world on the cusp of an AI revolution, Europe cannot afford to remain stuck in the “middle technologies and industries” of the previous century. **We must unlock our innovative potential.**”



“Important Projects of Common Interest (IPCEIs) should be expanded to all forms of innovation that could effectively push Europe to the frontier in strategically important sectors and benefit from EU financing.”

The new European Commission 2024 - 2029

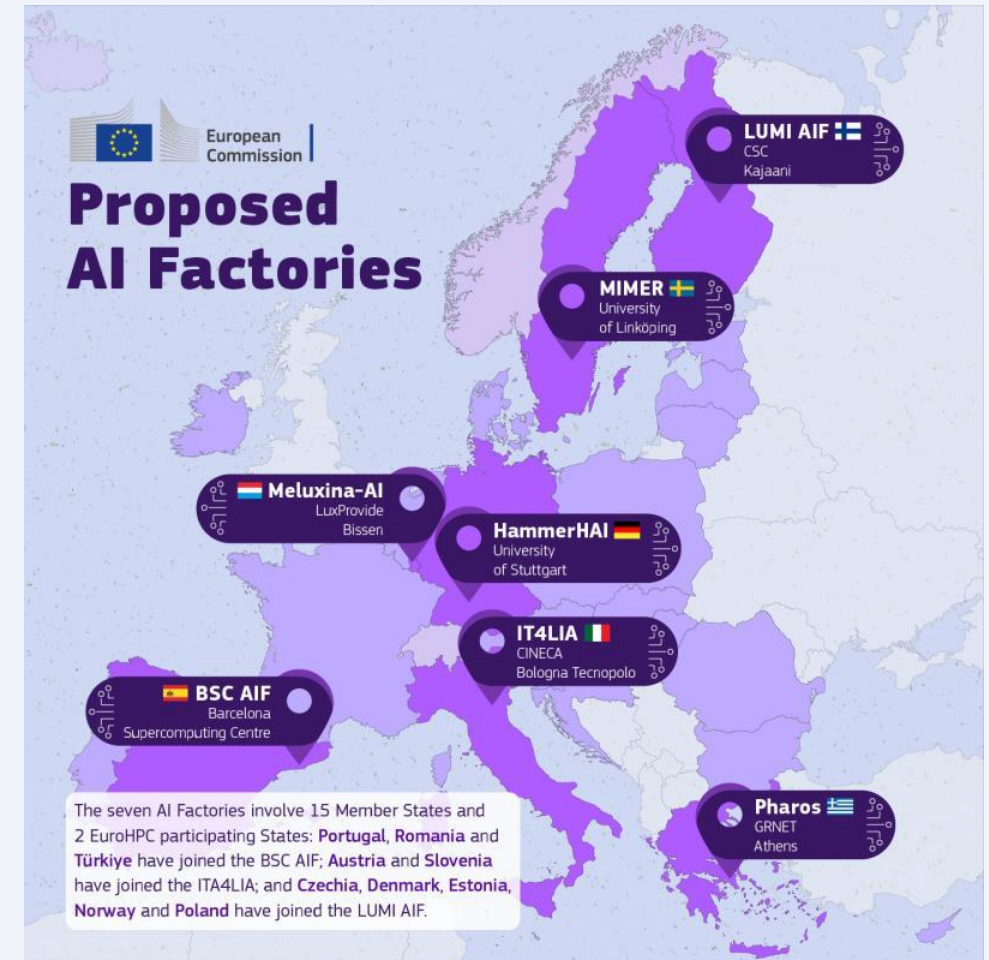
- EVP Henna Virkkunen was assigned Tech Sovereignty, Security and Democracy with a.o. these tasks in her mission letter:
 - Boost **Artificial Intelligence innovation**, ensure access to the **AI Factories**. Develop an AI strategy and set up European AI Research Council.
 - Intensify efforts and investments concerning the next wave of frontier technologies.
 - Develop and **EU Cloud and AI Development Act** to increase computational capacity and develop a single **EU-wide cloud policy** for public administrations and public procurement.
 - Present a **European Data Union Strategy** to ensure a simplified, clear and coherent legal framework for business and administrations to share data seamlessly and at scale.
 - Etc.

We must exploit our strengths in order to maintain or attain leadership in strategic technologies, to establish essential assets for technological sovereignty and resilience, and to foster commercialisation of deep tech innovation.



The AI Factories already announced

- In total 7 AI Factories have already been announced.
- With an investment of around €1.5 billion from the EU and Member States, these sites will deploy new AI-optimised supercomputers and upgrade existing EuroHPC systems, significantly enhancing Europe's AI capabilities, creating supercomputing services in AI, and developing AI-oriented microprocessors and skills support.
- Additional AI Factories are welcome, and eventually this will create an ecosystem of AI Factories across EU with the purpose to give access to AI capabilities, especially in support of AI startups and innovation.



What about Gaia-X and Structura-X then?

- Gaia-X has another role than many people think.
 - The mission of Gaia-X is to create the de facto standard aligned with EU values by developing a set of policies, rules, specifications and a **verification framework**.
 - Gaia-X is not developing a “European Cloud”.
 - Gaia-X has also joined forces with FIWARE, BDVA and IDSA in the Data Spaces Business Alliance (DSBA).
- Structura-X is a lighthouse project within Gaia-X and the only lighthouse project targeting cloud with this vision:
 - Structura-X provides **Gaia-X compliant** infrastructure services by an **ecosystem** of federated (cloud) providers realizing a choice of interoperability, portability and sovereign services as a foundation for Data Spaces and other Gaia-X Lighthouse projects.

4TH GAIA-X SUMMIT - EUROPEAN DATA STRATEGY IS BEING IMPLEMENTED

21.11.2023

Gaia-X presented a clear implementation strategy by building a European ecosystem



(c) Gaia-X AISBL: Helmut Leopold [Chairman Gaia-X Hub Austria], Gerald Steiner [Gaia-X Hub Austria], Claudia Schickling [CEO Pilotfabrik], Roland Fadrany [COO AISBL], SC Maria Ulmer Ulrich Ahle [CEO AISBL], Stefan Dumss [EuProGigant] Tobias Höllwarth [Gaia-X Hub Austria] [vlnr.]

Cloud Federation made available in different shapes

- Cloud Federation is a term being used in many places, but we often see different interpretations on what a federation means in this context. These are some of the federation models you can come across:

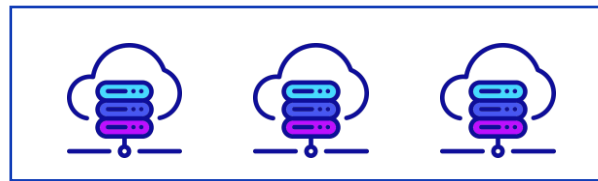
Commercial Federation

Cloud Service Providers federated in a common catalogue e.g. with federated billing in a one-stop shop.



Compliance Federation

Cloud Service Providers federated based on a common compliance, without need for interoperability.



Trust Federation

Cloud Service Providers federated based on a labelled trust framework where certain compliance is verified.



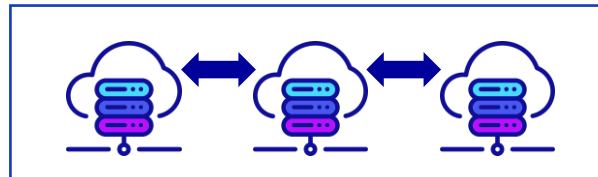
Service Federation

Cloud Service Providers federated in a 'provider mesh', a shopping mall model offering service compositions.



Resource Federation

Federated Cloud Service Providers offering resource expansion and/or cloud roaming across a continuum.



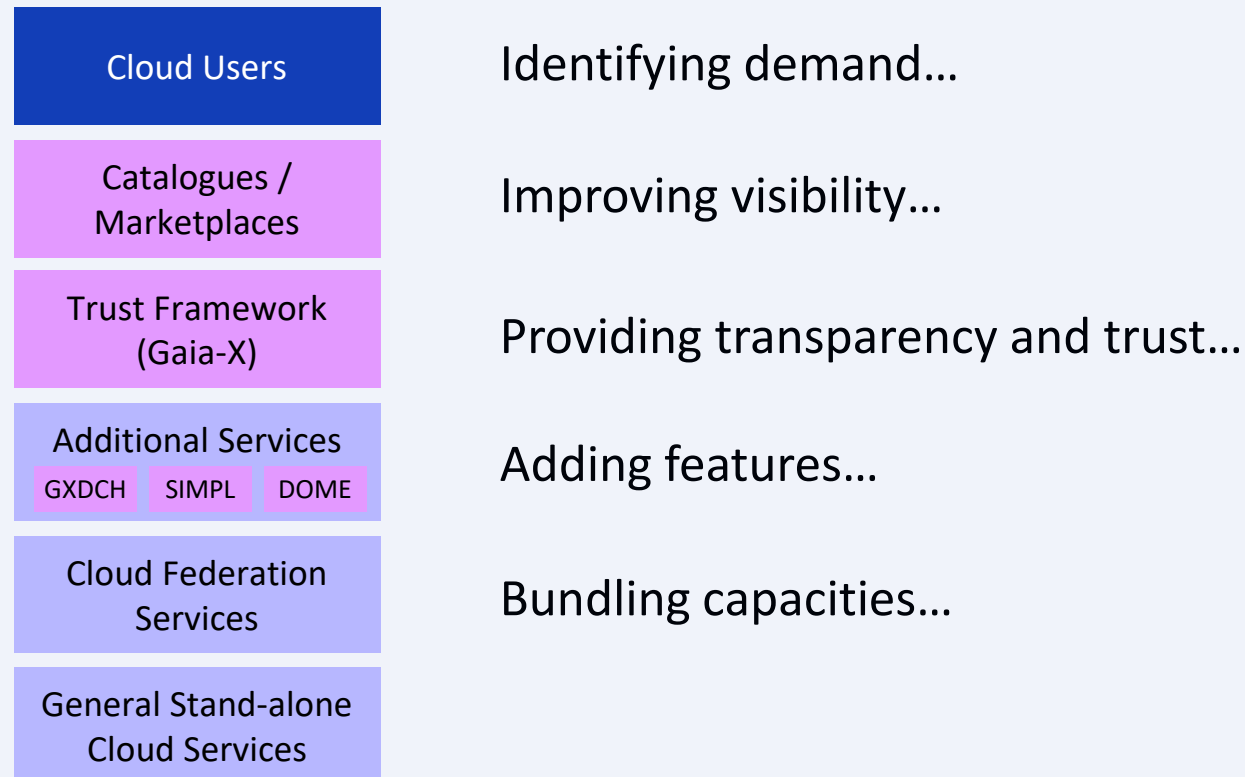
Trusted Resource Federation

Federated Cloud Service Providers offering resource expansion and/or cloud roaming across a continuum.



Bringing all the parts together

- Many of the European developments in the cloud landscape are targeting different parts of the value chain, with different purposes. Eventually all these parts should be brought together:



Bringing all the parts together

- Cloud Federation is just one component in this new emerging more open cloud landscape, where cloud providers are developing complementary and interoperable services, based on open standards :

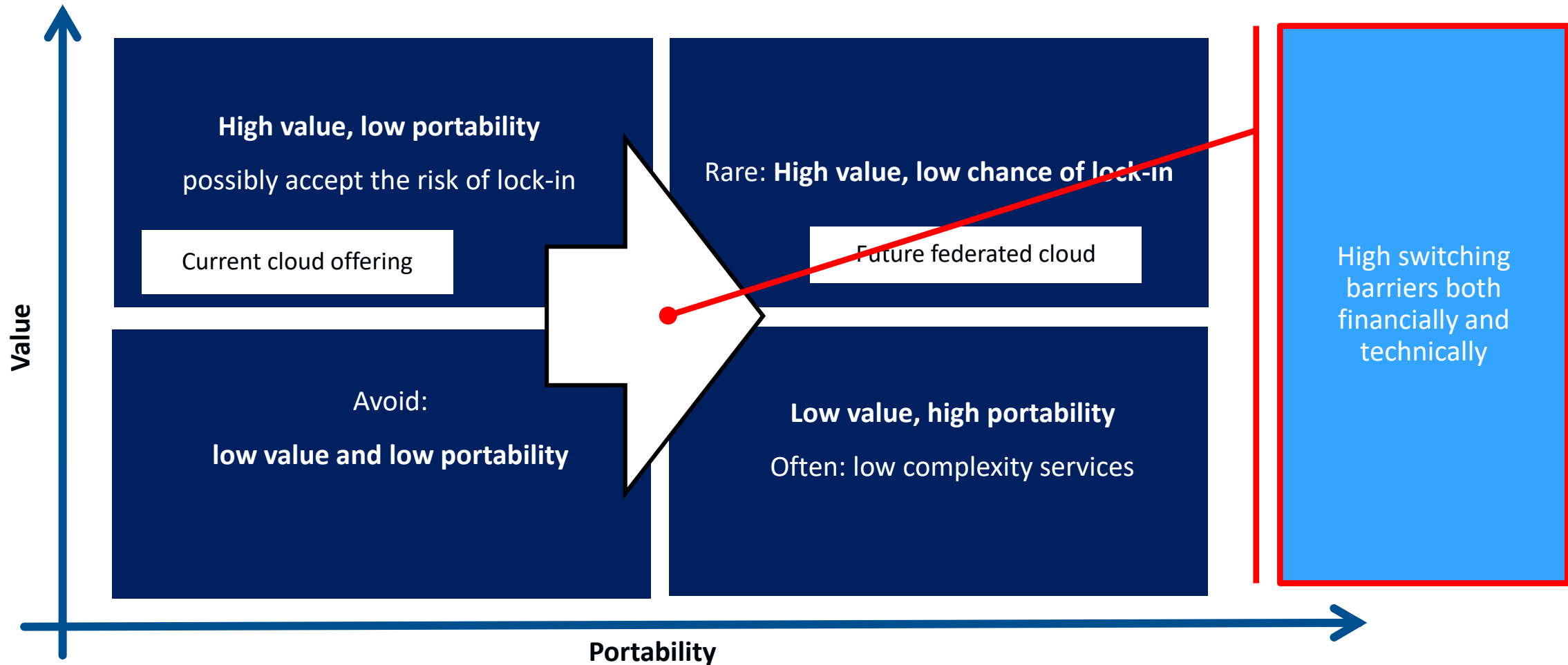




European Cloud services in an Open FEDerated ecosystem *part of EU IPCEI CIS*

Erik Langius

What needs to be solved for an open cloud ecosystem?



IPCEI-CIS: Technology development for cloud federation

IPCEI Next Generation Cloud Infrastructure and Services

Europe on the path to the cloud infrastructure of the future



- IPCEI = Important Project of Common European Interest
- CIS = Cloud Infrastructures and Services
- 100 organizations from 12 member states contribute with projects in this integrated project.
- Government funding of > 1,2 billion euro. Private funding comes in addition to this for a total of 2,6 billion euro.
- The Netherlands is funding 70 million euro in three projects:
 - **MISD**: Modular Integrated Sustainable Datacenter.

TNO innovation for life

euofiber

Deerns

UNIVERSITY OF TWENTE.

NBP nationale beheersorganisatie internet providers

BetterxBe

Asperitas IMMERSED COMPUTING

- **ECOFED**: European Cloud services in an Open FEDerated ecosystem.

TNO innovation for life

InfoSupport Solid Innovator

i3D.NET

obit internet technology

amsix amsterdam internet exchange

- **European Cloud Campus**: Development of European Cloud Infrastructure and Services.

leaseweb reliable hosting

ECOFED in EU Context

ECOFED consortium



TNO innovation for life

i3D.net

amsix

bit internet technology

infoSupport Solid Innovator

Collaborations with IPCEI Direct Partners within Workstream 2 (Cloud-Edge Capabilities)

leaseweb

SAP **ENGINEERING**
THE DIGITAL TRANSFORMATION COMPANY

Open Nebula **arsys**

National Reference Groups National Reference group to validate results

CoE DSC **Dutch Cloud Community** **interested?**

ECOFED liaises with adjacent EU-projects

gaia-x **Simpl**
Streamlining cloud-to-edge federations for major EU data spaces

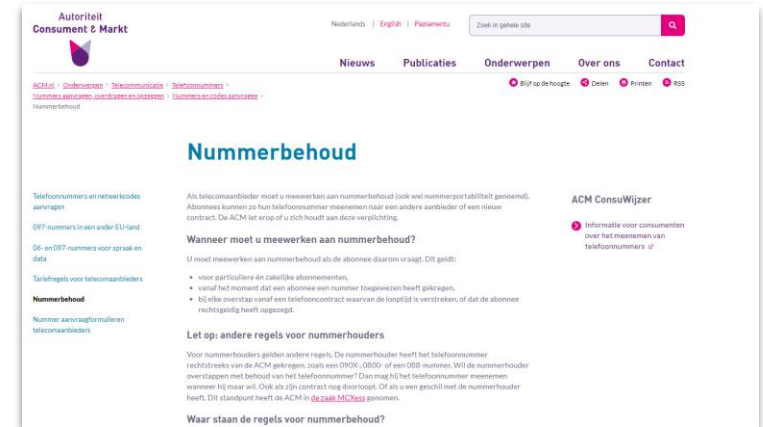
DOME
A Distributed Open Marketplace for Europe Cloud and Edge Services

DATA ACT
THE PATH TO THE DIGITAL DECADE

Is Cloud Federation feasible?

A parallel with the transformation of telecom market

- Separation on infrastructure and services on top of this infrastructure:
 - Telecom market: by separating telecom infra and telecom services it is possible to be a telecom provider without owning a network (Mobile Virtual Operators, MVO).
 - In NL: 3 telecom networks (KPN, Odido and Vodafone) and over 50 MVOs active (telco services on top of infra of the 3 networks).
 - Infrastructure sharing and infrastructure mixing to reach international coverage.
 - Number portability and roaming: switching doesn't end the service quality.
- Similar transformations have been made in the energy market and for public transport.



Cloud switching in upcoming 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 switching 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

Open interoperability specifications and European standards for the interoperability of data processing services shall address:

- (a) the cloud interoperability aspects of transport interoperability, syntactic interoperability, semantic data interoperability, behavioural interoperability and policy interoperability;
- (b) the cloud data portability aspects of data syntactic portability, data semantic portability and data policy portability;
- (c) the cloud application aspects of application syntactic portability, application instruction portability, application metadata portability, application behaviour portability and application policy portability.

From Mono-cloud to Federated Cloud

New: Cloud Federation

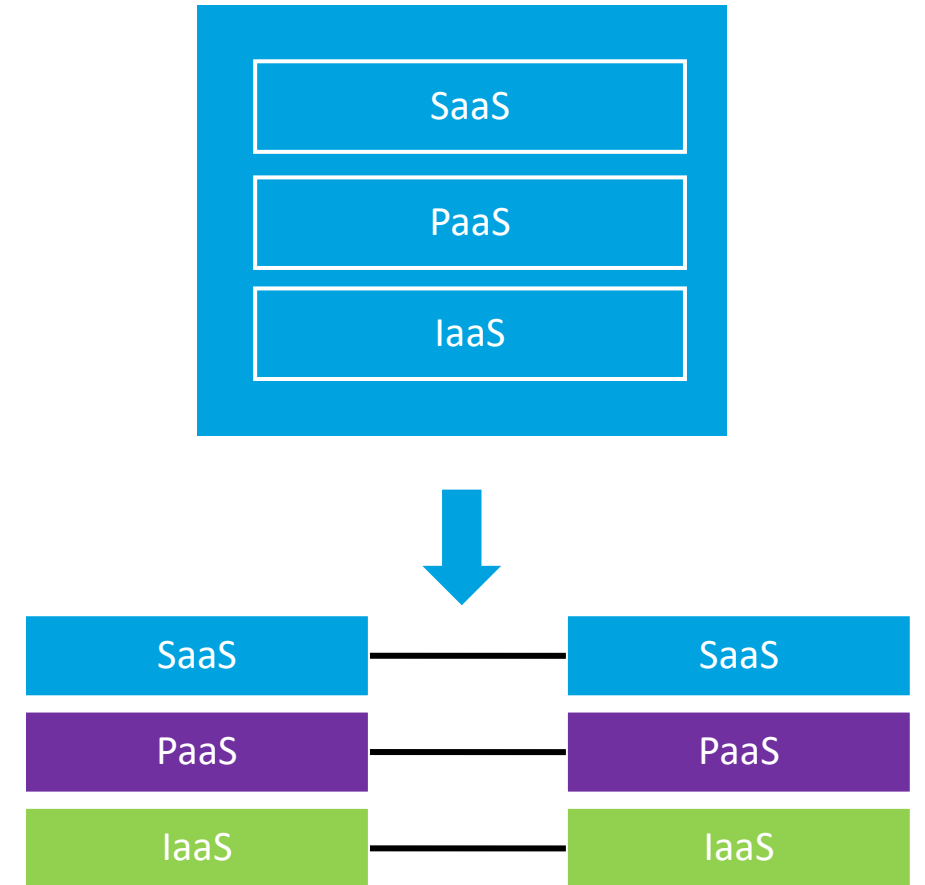
Keep: freedom of choice and unbundling

	Pre-Cloud	Cloud (Native) <i>Current cloud market</i>	Federated Cloud
<i>Data & Management</i>			<div style="background-color: #004a7c; color: white; padding: 20px; text-align: center;"> <p>1+1=3</p> <p>Combine advantages of Pre-cloud and Cloud Native</p> </div>
<i>Application</i>	Atos, ilionx, CGI, centric	Google, Microsoft, AWS	
<i>Platform</i>	Red Hat, LAMP, IBM, django	Google, Microsoft, AWS	
<i>Hosting</i>	leaseweb, transip, obit, EQUINIX	Google, Microsoft, AWS	
<i>Virtualisation</i>	vmware, Citrix, Xen, PROXMOX, XeriServer, Red Hat	Google, Microsoft, AWS	
<i>Hardware</i>	IBM, Hewlett Packard Enterprise, intel, DELL, SUPERMICRO, AMD	Google, Microsoft, AWS	
<i>Interconnectivity</i>	euromfiber, amsix, kpn, ndix, NLIX	Google, Microsoft, AWS	

Keep: simplicity of deployment, integration and management

How? ECOFED's approach

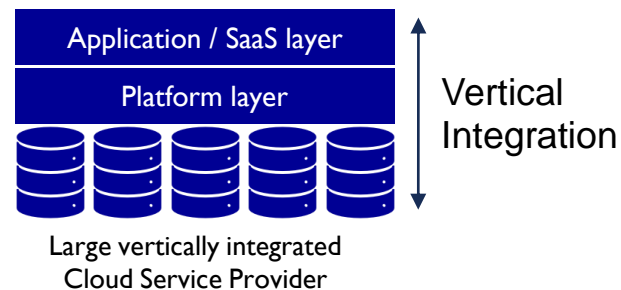
- From mono-cloud to federated cloud
- “Vertical decomposition” of the cloud stack by disentangling technology stacks
- Make SaaS, IaaS, PaaS and SaaS layers interchangeable to make mix-and-match applications and infrastructure
- Technology stack agnostic: a diverse technological landscape
- Technology should not enforce a specific business model



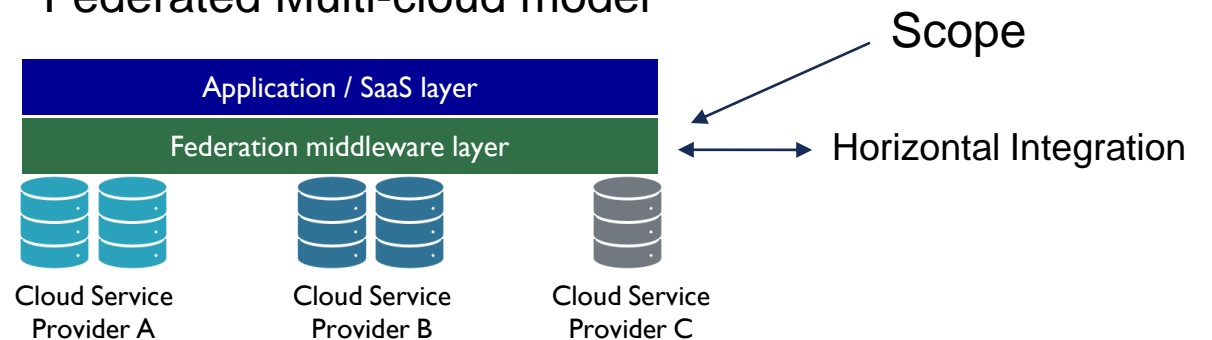
What will the ECOFED project do?

- The objective of the ECOFED project is to develop a technical basis for a more open cloud usage model, facilitating interoperability, federation and switching between providers.

Current model



Federated Multi-cloud model



- The open source software deliverables will enable cloud service providers to build more flexible, scalable and federated cloud infrastructure services.
- Benefits; lower risk of lock-in effects due to easier cloud switching and more flexible capacity scaling through cloud federation without the intervention of one central provider.

To conclude

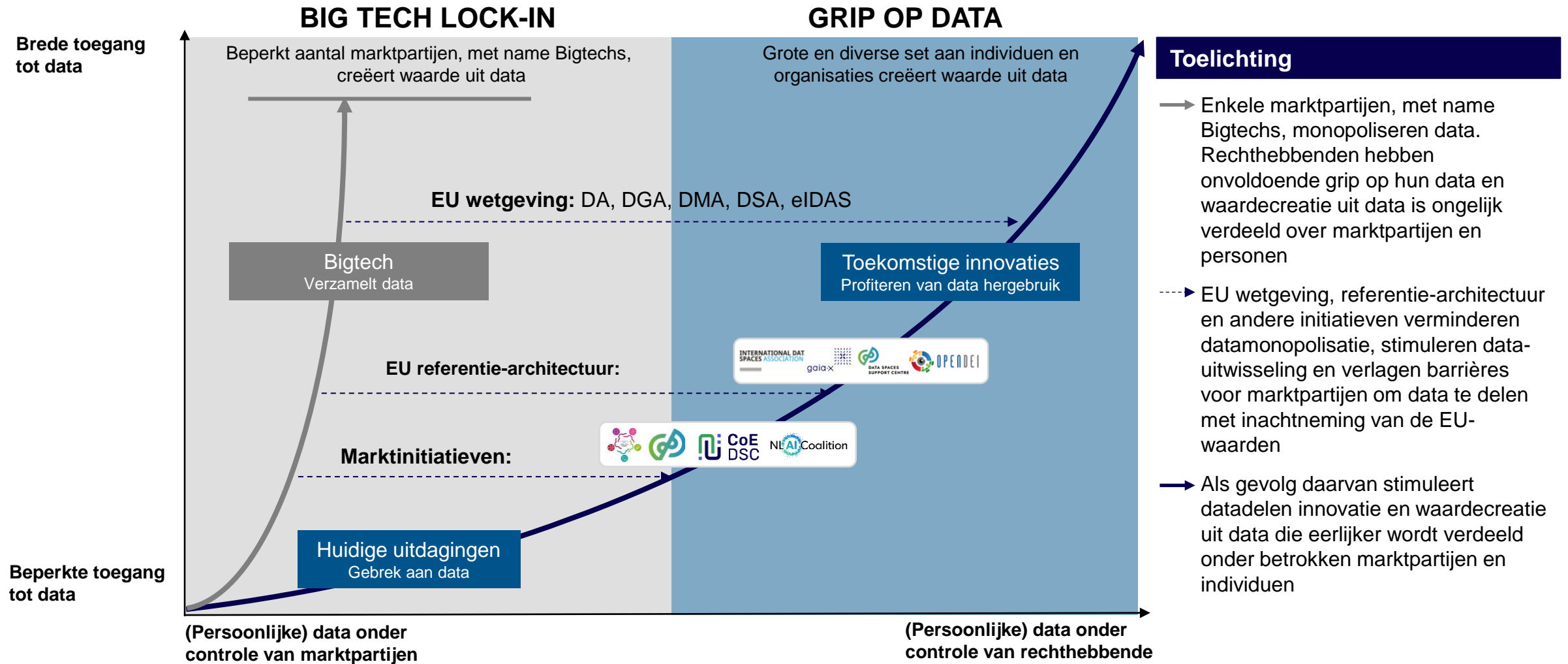
- Are you interested and want to closely follow ECOFED's development?
 - Sign up for interest in the sounding board group (klankbordgroep)
 - Provide input towards EU
- Want to test your application on a federated cloud?
 - Let us know!
- contact: Erik Langius - erik.langius@tno.nl



Centre of Excellence for Data Sharing & Cloud

Peter.Verkoulen@CoE-DSC.nl

Het CoE-DSC ondersteunt de ontwikkeling van soeverein datadelen om economische en maatschappelijke waarde te creëren uit data



In NL bestaan/ontstaan steeds meer sectorale datadeel-initiatieven en aanbieders van datadeel-diensten, die vooral praktijkgedreven zijn

Data deel initiatieven

Niet-uitputtend



Enkele kentallen

Niet-uitputtend

- Er bestaan inmiddels **±50 grote data deel initiatieven in NL**, en nog vele kleinere, regionale of in opstart.
- De ontwikkeltijd van een nieuwe, grootschalige dataspace is zeker 5 jaar.
- **Ruim meer dan 20.000 NL organisaties – veelal MKB** - zijn momenteel verbonden met een live datadeel initiatief. Enkele voorbeelden:
 - [HDN](#) verbindt 60 hypotheekverstrekkers met alle financieel adviseurs
 - In de toeleverketen voor high-tech metaalproducten aan o.a. ASML zijn >400 leveranciers verbonden via [SCSN](#), via 10+ intermediars.
 - 7800 melkveehouders delen data met 260 agri- en inspectiepartijen via [JoinData](#)
- Naast Ministerie van EZK zijn met name ook **BZK, I&W en VWS** actief
- Andere projecten met een sterke datadeel component zorgen voor een impuls. Verder draagt AiNed specifiek bij aan AI investeringen en mogelijk dus ook aan data delen als randvoorwaarde daarvoor.
- Er zijn enige tientallen Nederlandse **cloud service providers**; sommigen zijn ook aangesloten bij Gaia-X (b.v. via het Structura-X project).

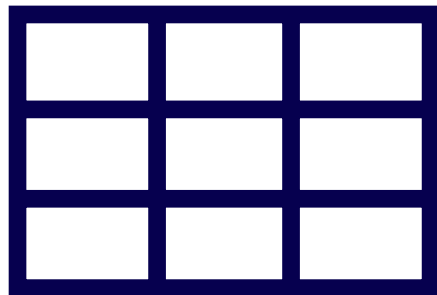
Data space dienstenaanbieders (van connectors-as-a-service tot cloud tot PET tot ...)

Niet-uitputtend

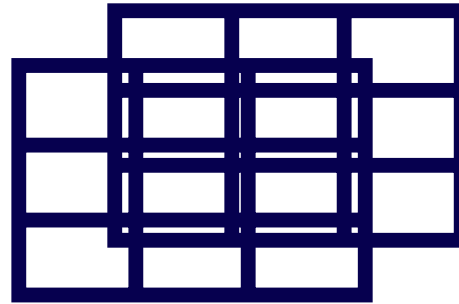


Het CoE-DSC meerjarenprogramma 2024 – 2027 richt zich op 3 hoofddoelen

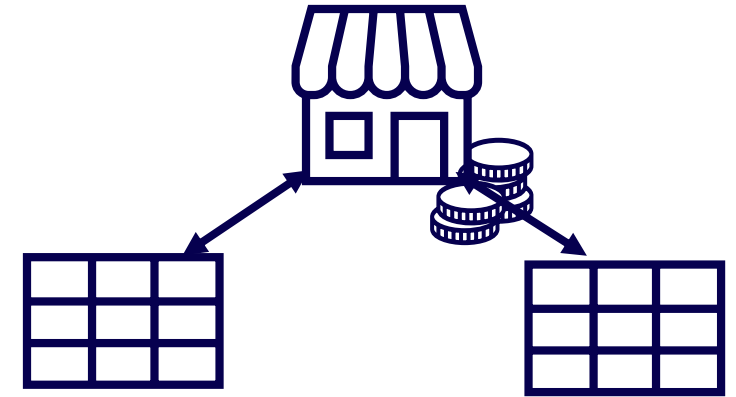
Naar volwassen
data spaces



Naar interoperabiliteit: cross-dataspace data
delen en federatieve cloud

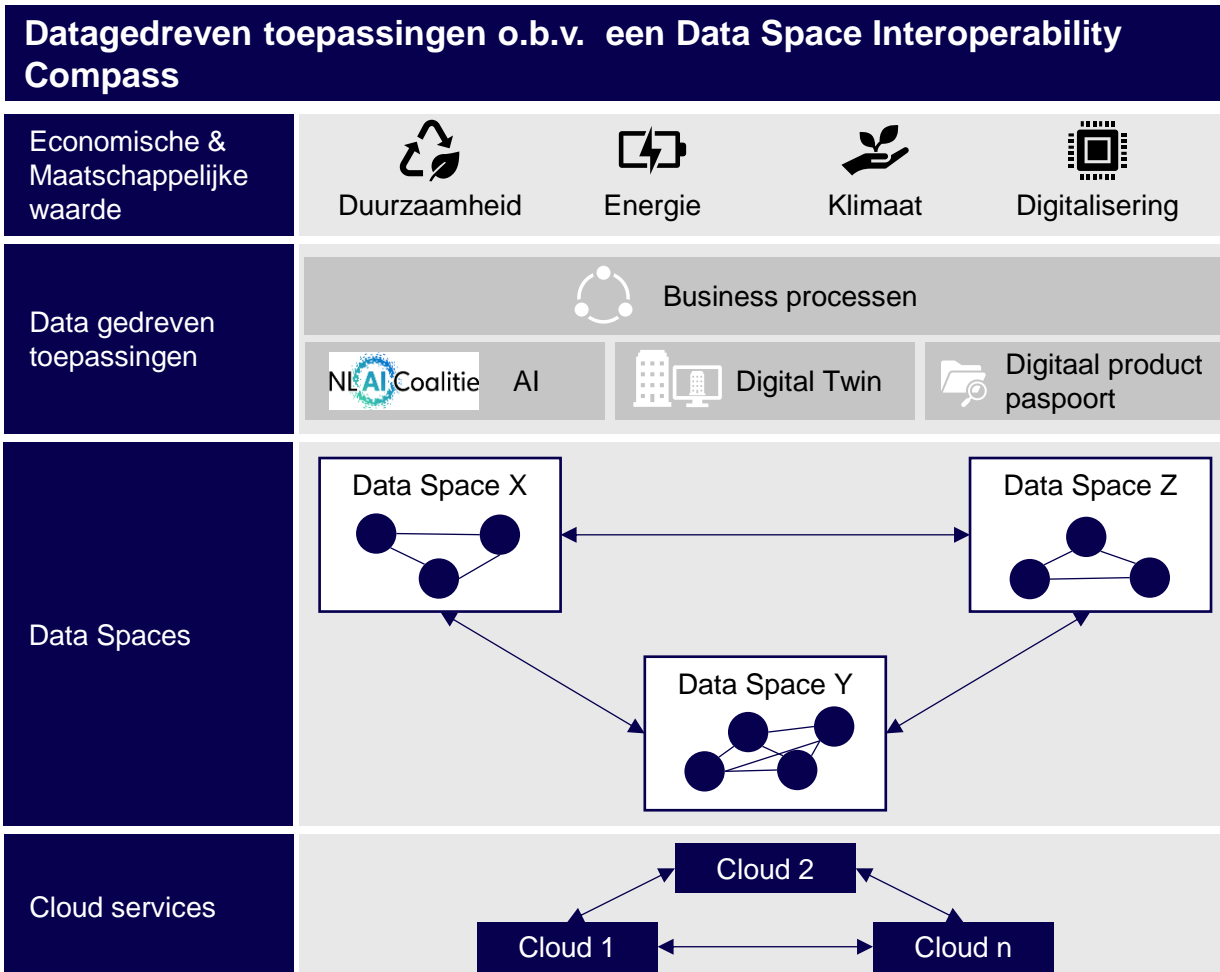


Naar volwassen vraag, diensten en
aanbieders data delen èn (federatieve) cloud



- In verbinding met **Europese wet- en regelgeving en initiatieven**
- In **co-creatie** met grote en kleine bedrijven en andere belanghebbenden
- Pro-actief **praktijkgericht onderzoek** voor gezamenlijk relevante onderwerpen
- **Open, transparant** en van algemeen nut voor Nederlandse bedrijven en organisaties
- Federatieve oplossingen vergroten de **digitale soevereiniteit** doordat ze het combineren van verschillende oplossingen (interoperabiliteit) en het overstappen naar andere oplossingen (portabiliteit) vergemakkelijken

Visie 2028: data gedreven toepassingen zijn mogelijk door een Data Space Interoperability Compass - met brede adoptie in Nederland, en internationaal goed ingebed.



Hard infrastructure provider ● Organisation

Toelichting

Maatschappelijke transitie zijn in gang rondom grote uitdagingen van de huidige tijd, dit levert **Economische en Maatschappelijke waarde** op.

Dit gebeurt mede op basis van **data gedreven toepassingen** zoals Digital Twins en Digitale product paspoorten. AI toepassingen spelen hier een steeds belangrijkere rol – het CoE-DSC vervult ook de rol van data delen werkgroep van de NLAIC.

Hiervoor benodigde data is **beschikbaar in én tussen sectorale Data Spaces**, onder andere o.b.v. van **generieke afspraken** op basis waarvan **data vrij stroomt onder controle van de rechthebbende**.

Afhankelijkheid van een enkele cloud service provider (**lock-in**) is **beperkt** doordat een **federatieve cloud infrastructuur** wordt gebruikt voor data delen – zonder deze onderliggende (federatieve) cloud infrastructuur, is soeverein data delen niet mogelijk.

CoE-DSC mobiliseert en verbindt het Nederlandse Cloud Ecosysteem en vult waar mogelijk lacunes.



Data Sharing Festival

February 4 to 5, 2025
The Hague

• Adopt, Scale-up, Roll-out

www.Data-Sharing-Festival.net



Ministerie van Infrastructuur
en Waterstaat





Centre of Excellence for Data Sharing & Cloud

Peter.Verkoulen@CoE-DSC.nl



Eerste stap in digitale autonomie

Bas Meerman, CTO

Van brede wet-, regelgeving naar technologie en toepassing

Digitale autonomie is een grote ambitie, de eerste stappen

Met ECOFED maken we dit tastbaar

We creëren en gebruiken:

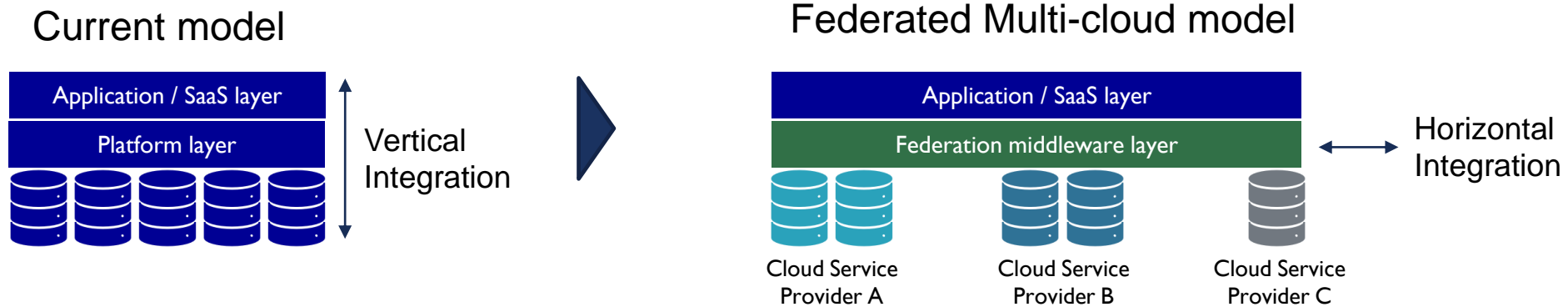
- Open technologie & standaarden
- Open source
- Open speelveld

Think BIG

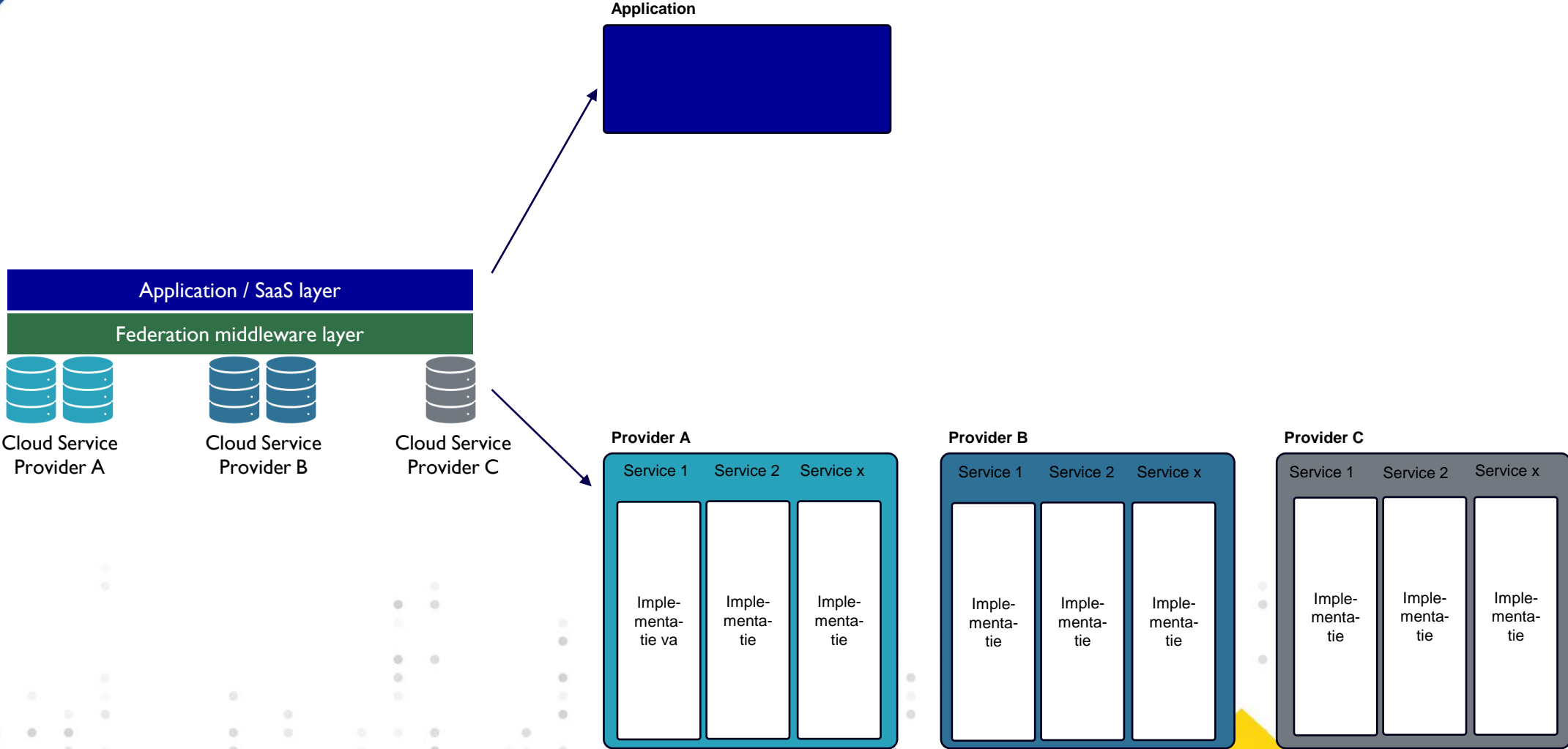
Act small

Realize fast

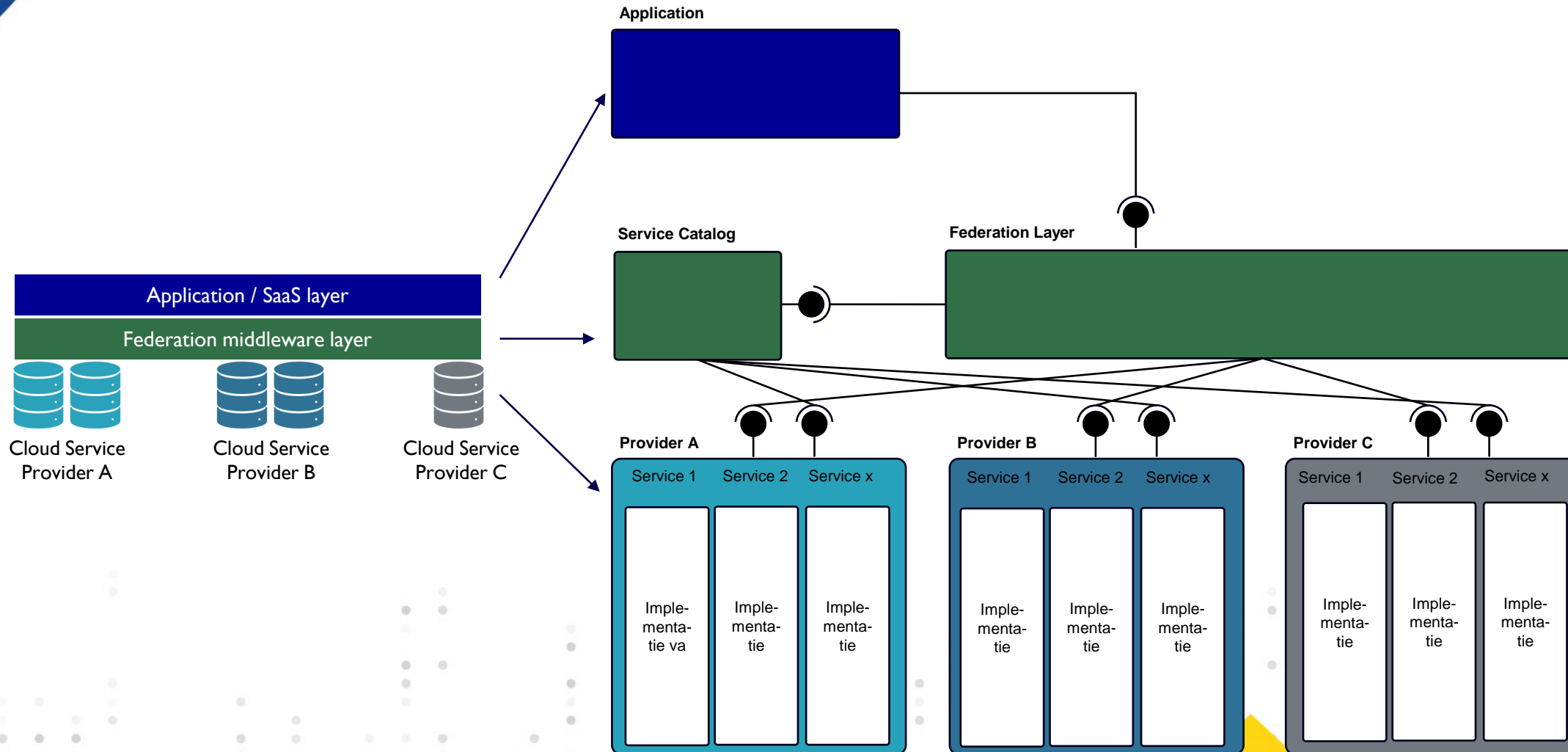
Eerste stap in digitale soevereiniteit



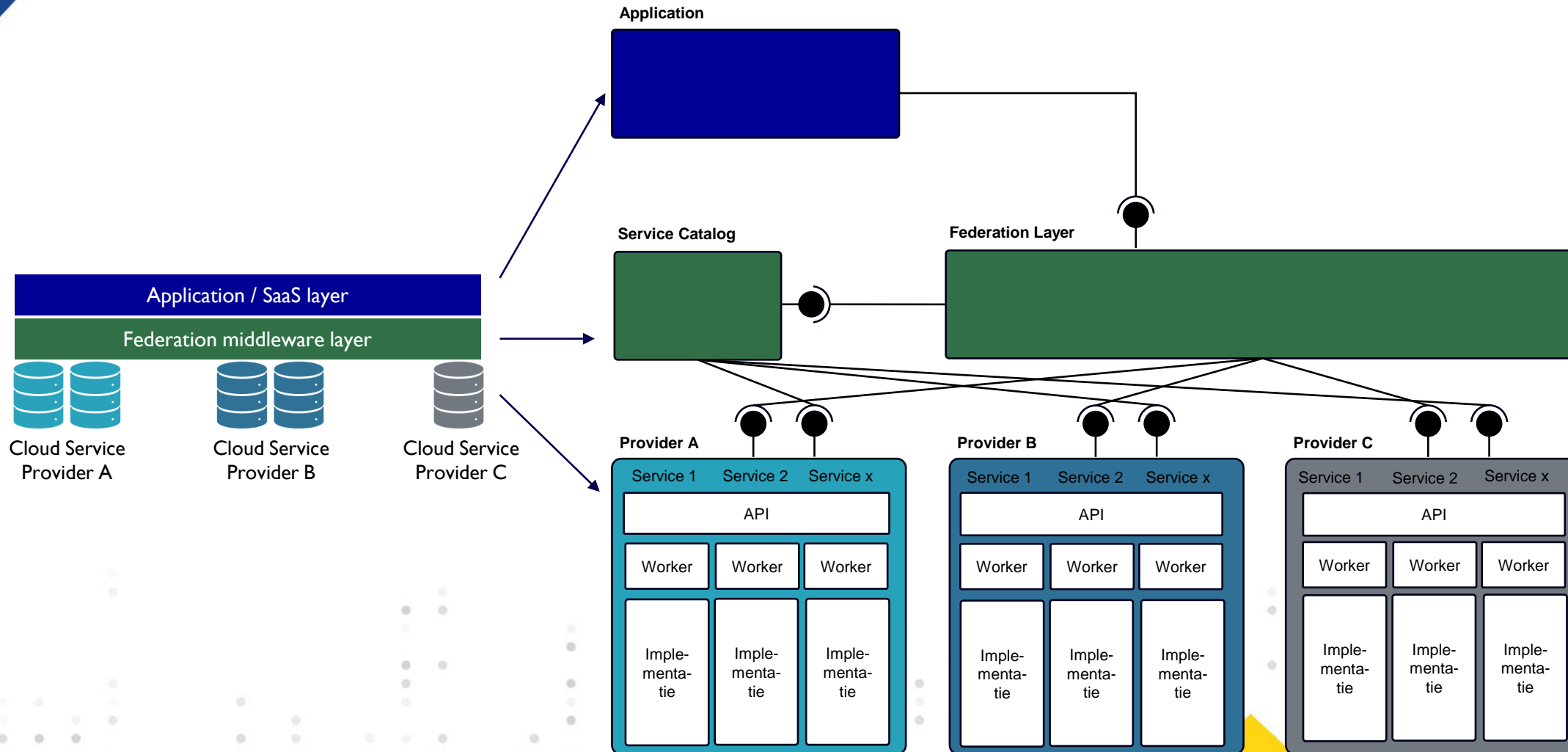
Federated multi cloud in detail



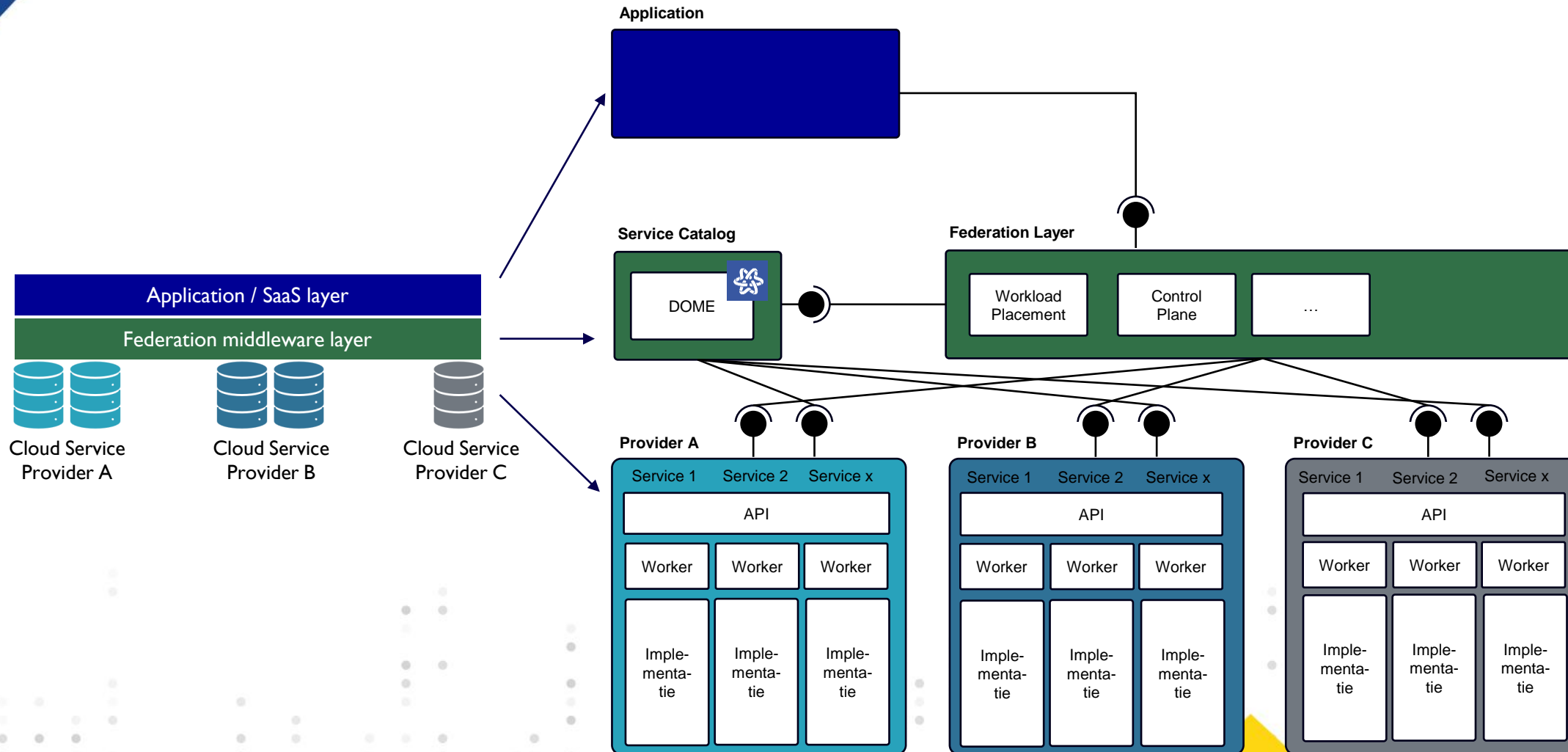
Federated multi cloud in detail



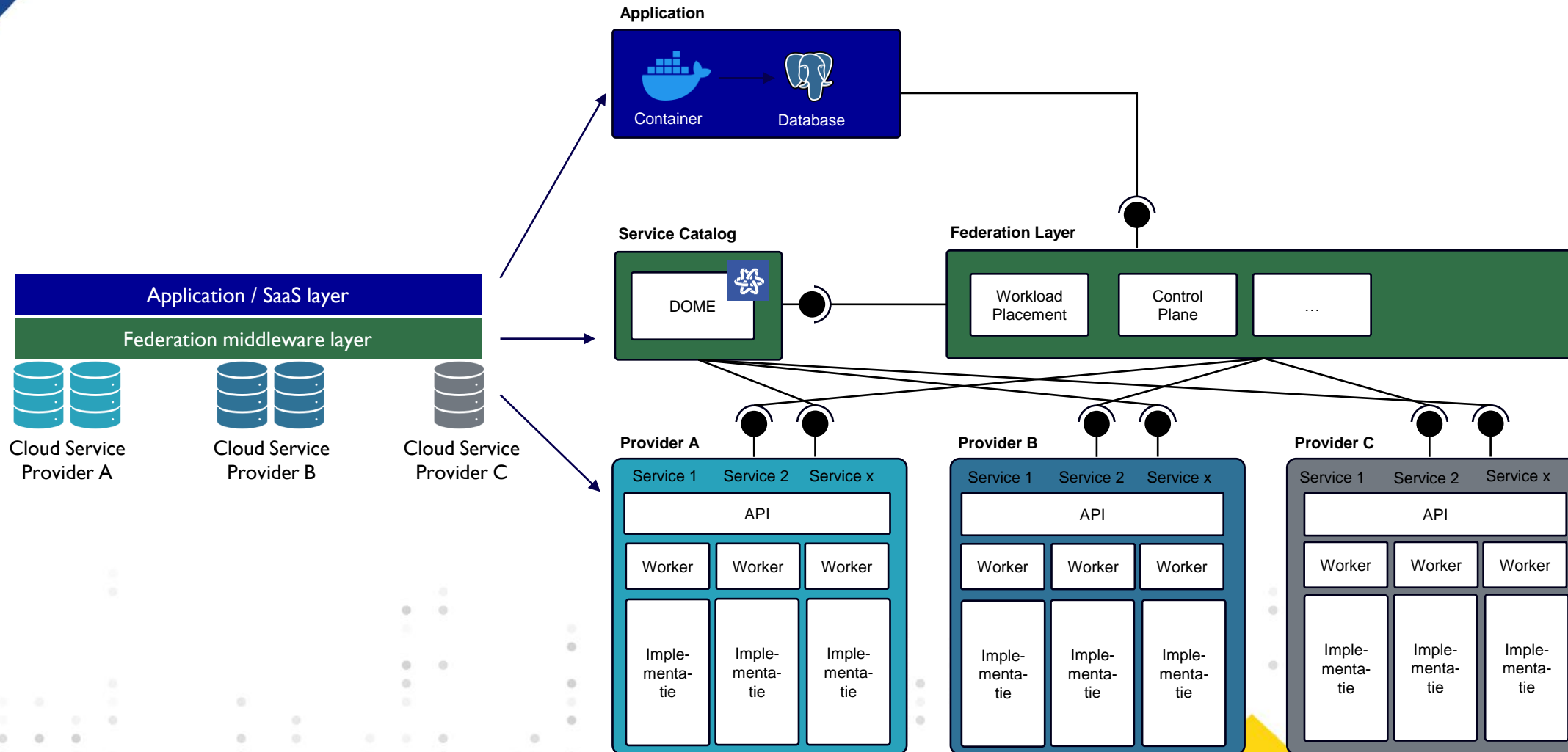
Federated multi cloud in detail



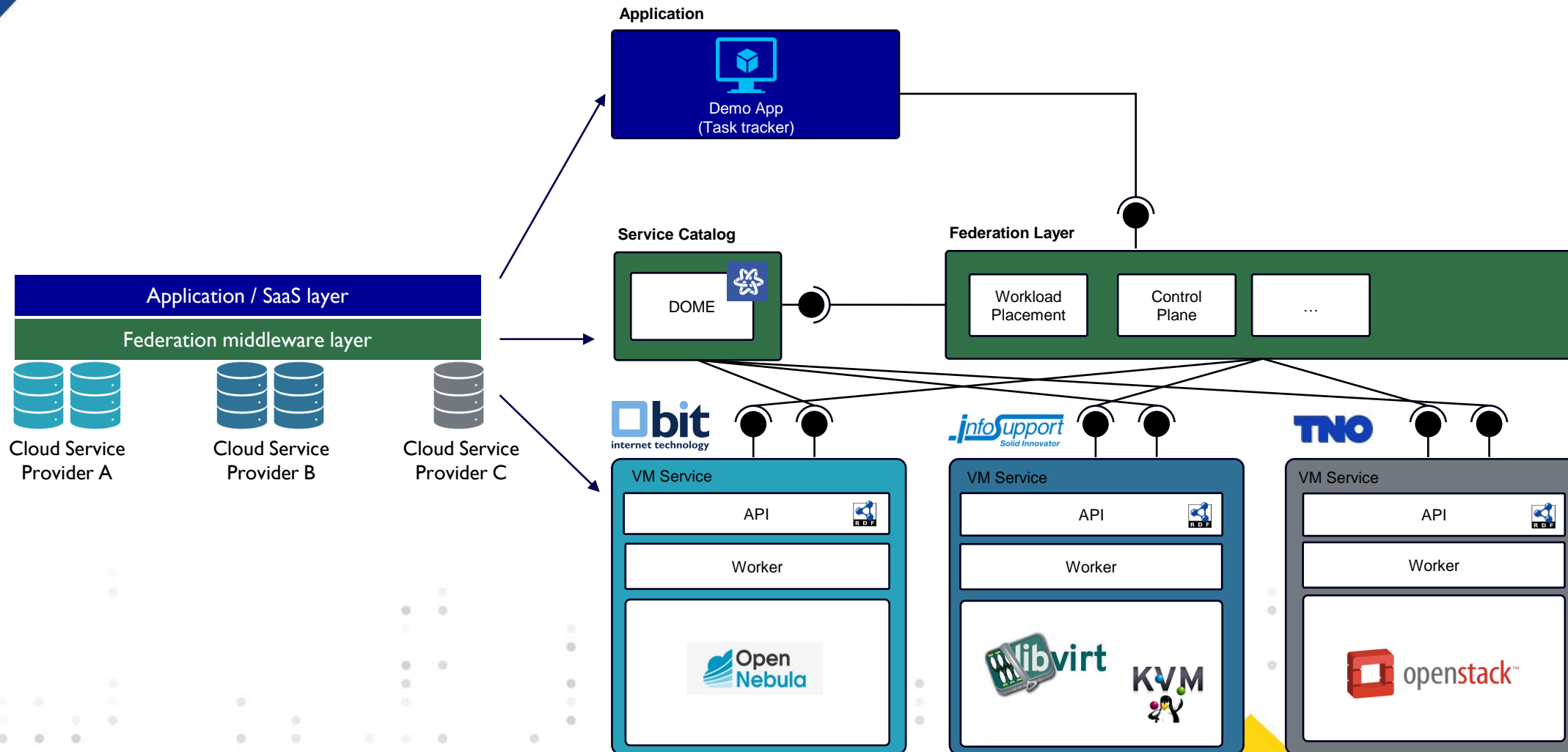
Federated multi cloud in detail



Federated multi cloud in detail



Demo landschap



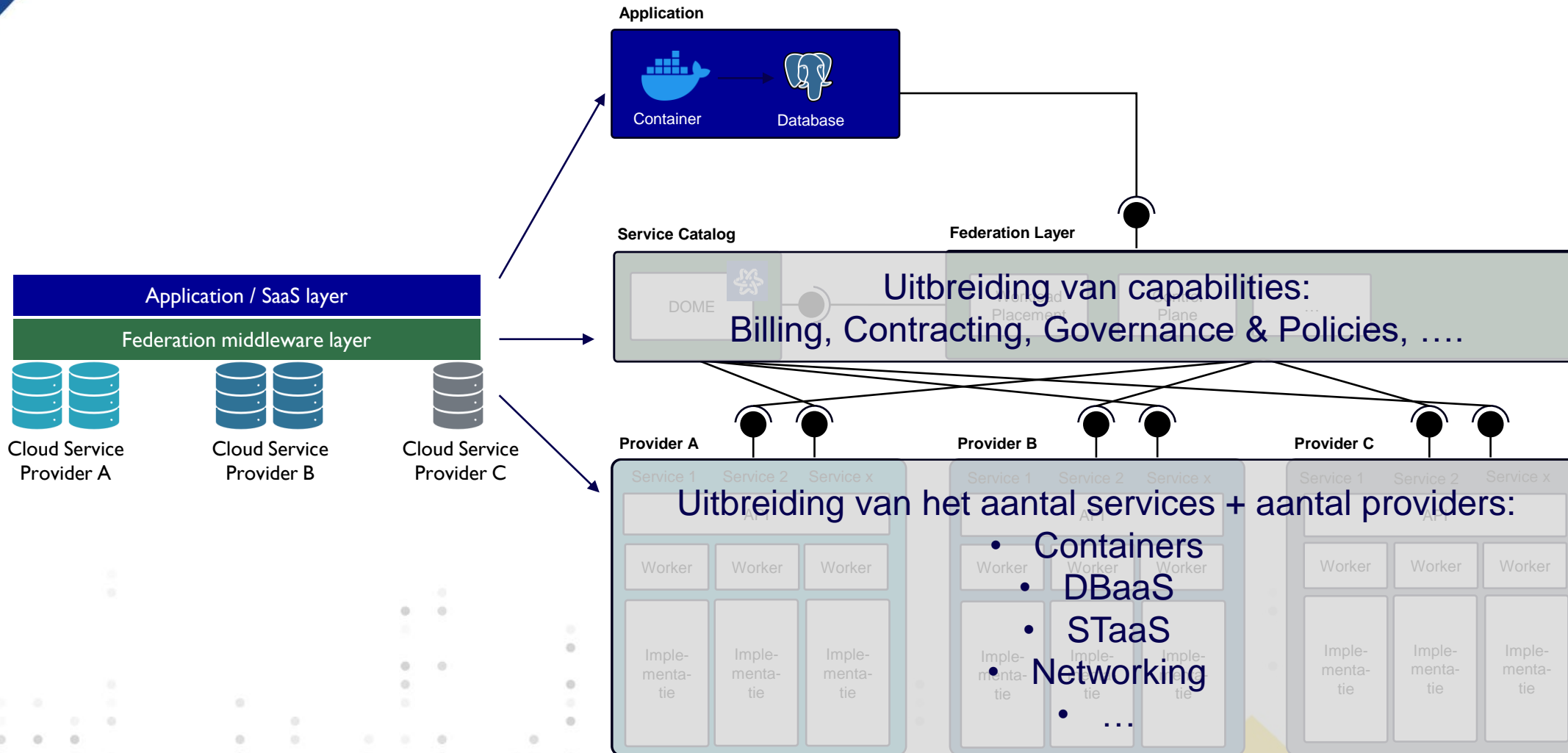
DEMO

The logo for EcoFeed features the word "EcoFeed" in a white, stylized, sans-serif font. Above the letters "E", "C", "F", and "E" are three horizontal bars each, with curved lines above them, resembling a stylized sun or a signal. The logo is set against a background of a blue network of nodes and lines with several gold stars scattered throughout.

EcoFeed

Lucas Dresscher

Federated multi cloud – ontwikkelingen



Afronding

- Voor SaaS leveranciers / eindgebruikers:
 - Soevereiniteit, controle, portabiliteit.
- Voor CSP's / Service Providers:
 - Grotere markt, eigen diensten gestandaardiseerd aanbieden.
- Oproep: Neem contact op! basm@infosupport.com



Paneldiscussie

Rogier de Boer, Ruud Alaerds, Wido Potters, en Erik Langius



Eén Europese cloud





Scan en deel jouw vraag
met het panel



Bedankt