



The transformation of the cloud market in the EU

Centre of Excellence - Data Sharing and Cloud

TNO innovation
for life

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 - Overview
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 - Centre of Excellence Data Sharing and Cloud
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- What's next...?



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

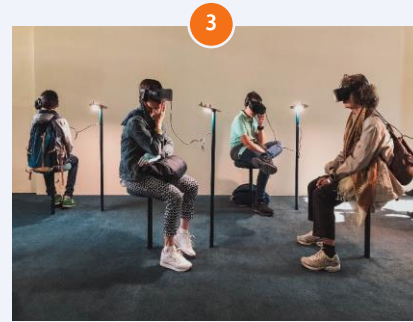
All major societal innovation challenges require some form of data sharing



Smart Energy



Smart Cities



Smart Society



Smart Climate Solutions



Smart Agriculture



Smart Production



Smart Resources



Smart Health



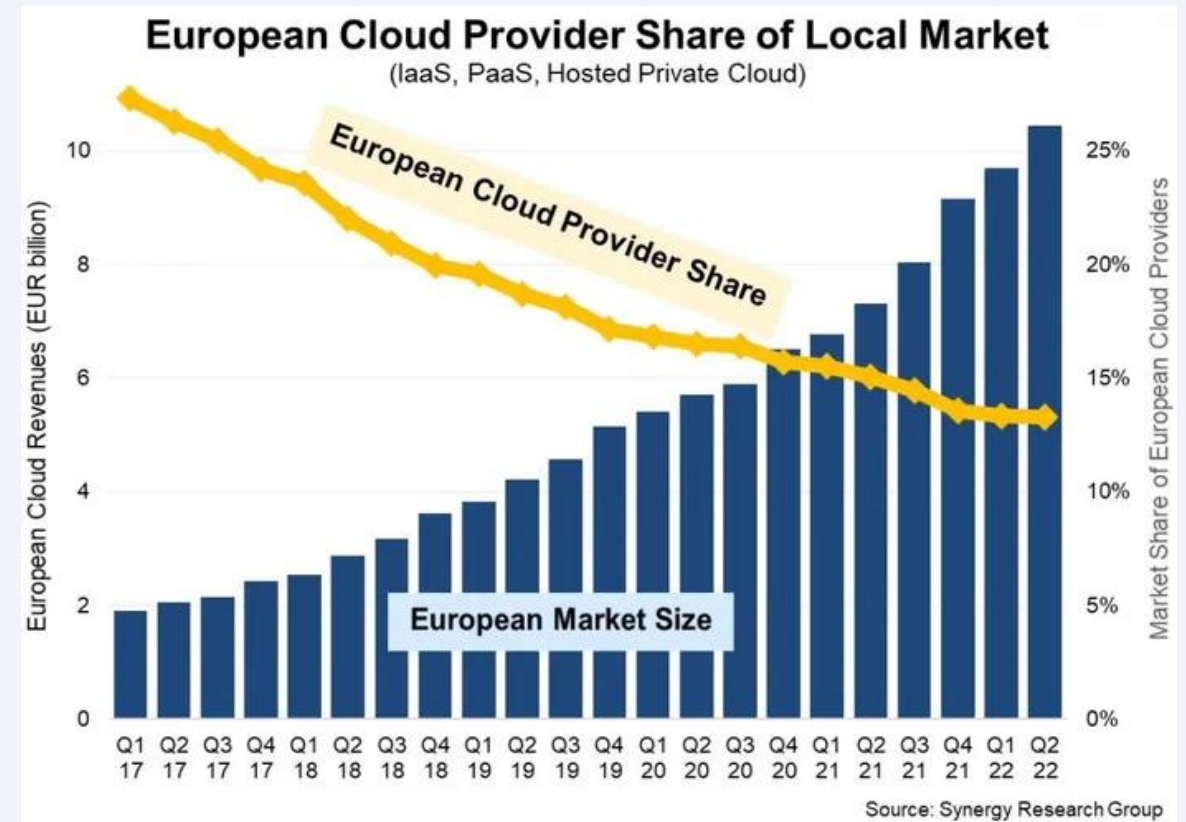
Smart Security



Smart Mobility

The boom in Data & Cloud, and the European debate

- One reason Gaia-X was established as an initiative from the industry in France and Germany was 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, and it's not all about Gaia-X anymore.

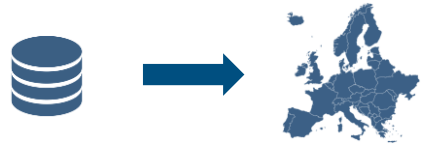


So what are the challenges in the cloud market? And what are the initiatives in Europe dealing with this?

What is the background for EU-interest & Gaia-X?

European Data Spaces

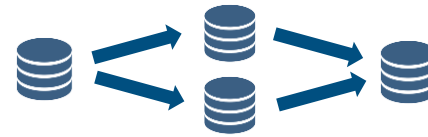
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I want share data with parties in other European countries and I want to make sure that I can use data and combine data in an interoperable way.

Trusted data sharing

2



I want to share my data for applications which will combine data from several sources, but I want to control that my data is shared in a secure way.

Data sovereignty

3



I want to know that my data is stored in a cloud under European legislation and where non-EU entities have no access to my data.

Application portability & Service composition

4



I want my applications to be able to run in any type of cloud so that I can easily switch to other cloud providers and avoid any lock-in effects.

Cloud Switching or Cloud Roaming

5



I want to move all my data from one cloud provider to another cloud provider with some kind of automatic migration service or in a cloud roaming model.

Computing On Demand or Resource Expansion

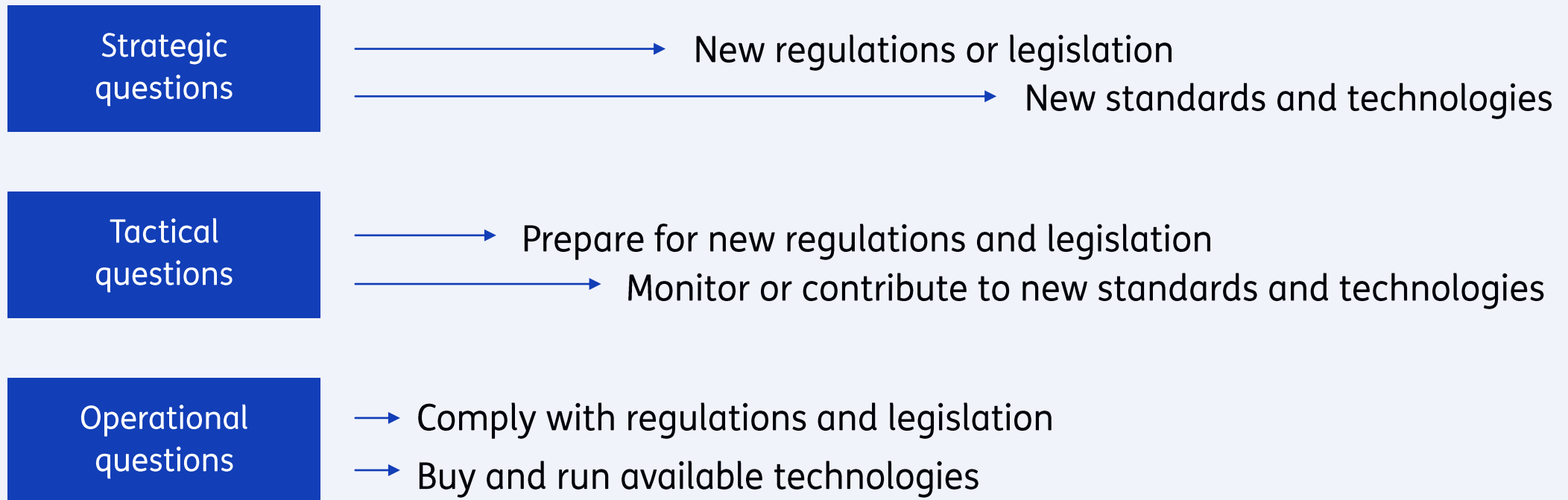
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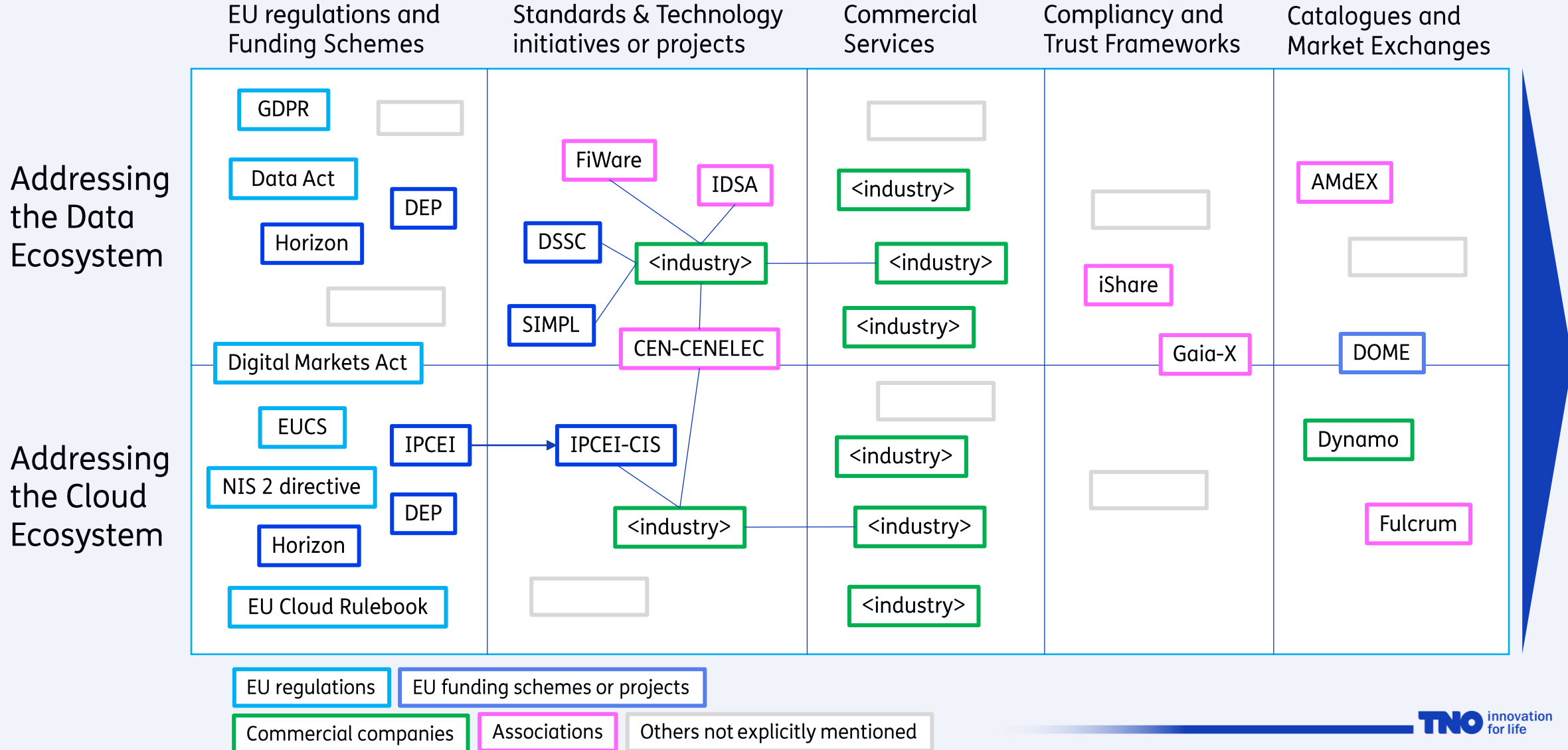
I have a large data set or compute demand, and I want to be able to find the (federated) cloud services tailored for my specific compute challenge.

The European developments have a strategic focus

- The focus from the larger European initiatives are more on the strategic level and is thus not giving answers to operational day-to-day questions in the short term. Some European developments will become relevant soon and some will take a bit longer to make a difference.

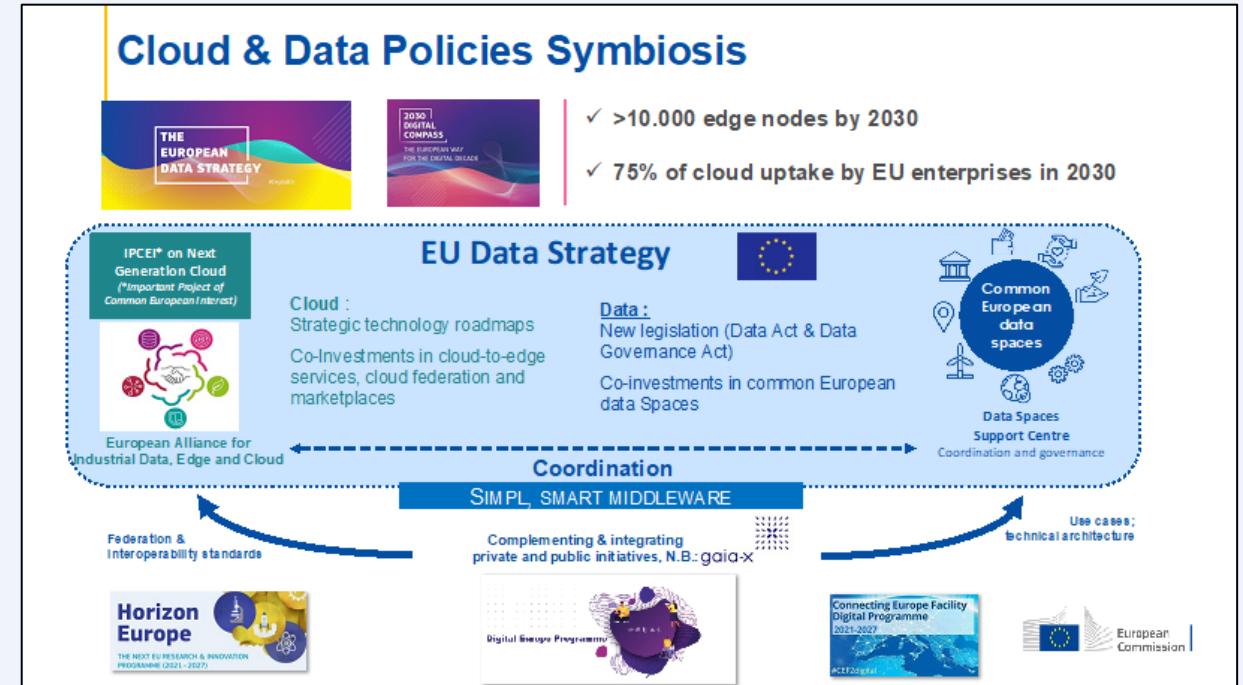


Understanding the developments on Data & Cloud



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 a EU-funded project that develops open-source components for a European marketplace catalogue of Data and Cloud services)



Important Project of Common European Interest

PRESS RELEASE | 5 December 2023 | Brussels

Commission approves up to €1.2 billion of State aid by seven Member States for an Important Project of Common European Interest in cloud and edge computing technologies



€2.6bn for IPCEI projects on European cloud technologies

Technology News | December 5, 2023

By Nick Flaherty

Goedkeuring voor €70 miljoen kabinetssteun aan Nederlandse cloudinnovaties

Nieuwsbericht | 05-12-2023 | 20:00

Meer dan honderd ondernemingen en kennisinstellingen uit twaalf EU-landen gaan samenwerken aan het opzetten van nieuwe en innovatieve cloudoplossingen voor (industriële) bedrijven. Dat moet leiden tot minder technologische afhankelijkheden en minder marktverstoring. Maar ook tot een betere toepasbaarheid en onderlinge deelbaarheid van data waardoor ook de concurrentiepositie van Nederlandse bedrijven verbetert. De Europese Commissie heeft vandaag ook verschillende initiatieven vanuit 13 Nederlandse bedrijven en kennisinstellingen goedgekeurd. Het kabinet draagt zelf 70 miljoen euro bij aan het ontwikkelen van deze cloudinnovaties in dit zogenoemde Important Project of Common European Interest (IPCEI).

Technology

EU clears up to 1.2 bln euros of aid for cloud computing

Reuters

December 5, 2023 11:41 AM GMT+1 · Updated 2 months ago



Dutch iT Channel

Info Support, i3D.net, BIT, AMS-IX en TNO bouwen federatieve Europese cloud

Een Nederlands consortium, bestaande uit Info Support, i3D.net, BIT, AMS-IX en TNO, start met het bouwen van een federatieve Europese cloud. Het project "European cloud services in an open federated ecosystem" (ECOFED) wordt mede gefinancierd door de Nederlandse overheid, na goedkeuring van de Europese Commissie.

Cloud Infrastructuur

Nederlands project van start om keuzevrijheid cloudgebruikers te bevorderen



10 januari 2024 – Een Nederlands consortium, bestaande uit Info Support, i3D.net, BIT, AMS-IX en TNO, start met het bouwen van een federatieve Europese cloud. Het project "European cloud services in an open federated ecosystem" (ECOFED) wordt mede gefinancierd door de Nederlandse overheid, na goedkeuring van de Europese Commissie.



What is IPCEI-CIS?

IPCEI Next generation Cloud Infrastructures and Services

Europe on the path to the cloud infrastructure of the future



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- IPCEI = Important Project of Common European Interest
- CIS = Cloud Infrastructures and Services
- In EU more than 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.



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

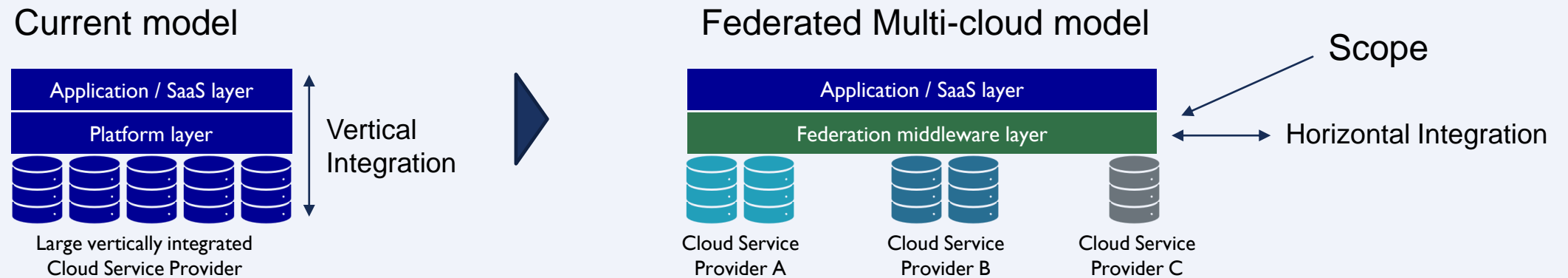


- European Cloud Campus: Development of European Cloud Infrastructure and Services.



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.



- 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.

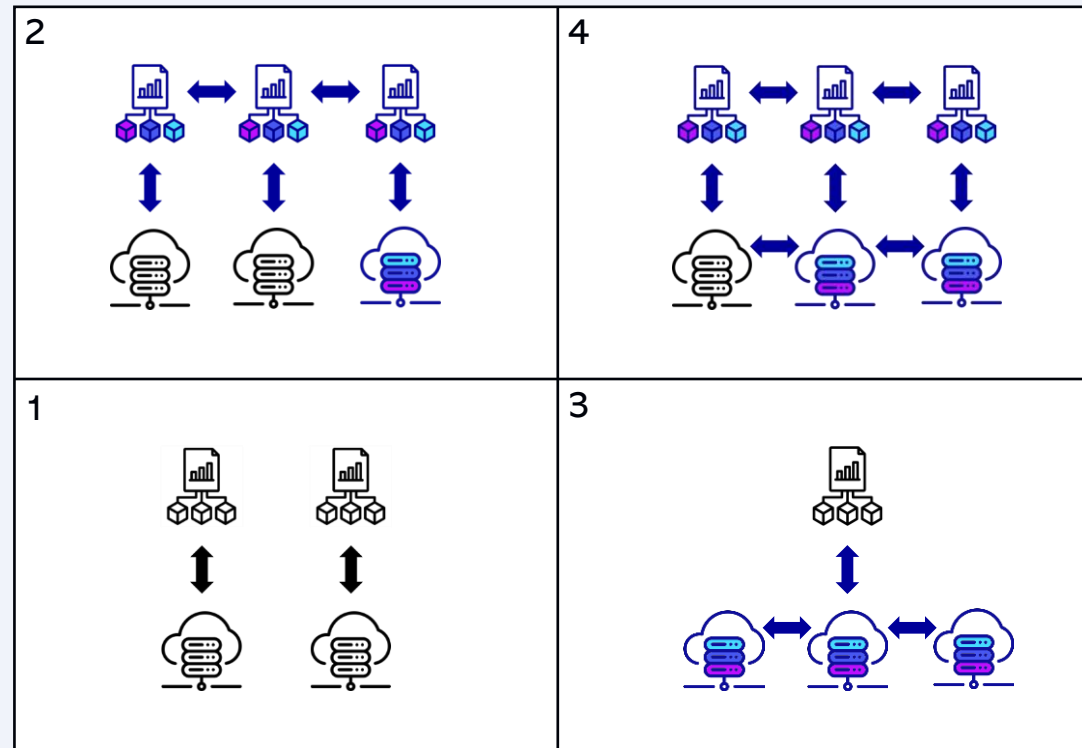
ECOFED is nominated for the Computable Awards 2024 in the category Partner project.



Cloud Federation and Data Sharing

Data Sharing

No Data Sharing



Four scenarios for the developments of interoperability; in the data ecosystem and in the cloud infrastructure ecosystem.

No Cloud Federation

Cloud Federation

The IPCEI-CIS projects' next generation deliverables

- From the 12 member states and more than 100 involved companies in the IPCEI-CIS a wide range of new deliverables are now being developed and these will be launched as new products and services in the coming years:
 - Deployment of Edge nodes across Europe for the cloud-edge continuum
 - Open Source platforms and tools for integration and orchestration of multi-provider cloud federation based on common open standards and a common open reference architecture.
 - Etc. Etc.
- The package of all these deliverables from the IPCEI-CIS project will be marketed towards users under the umbrella of a new unique brand name:
 - 8ra.com (to be read as 'ora' which means edge in latin. The use of an 8 in the name refers to ∞ as an illustration of the continuum.

8ra.com

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.]

Structura-X has a focus on Gaia-X cloud compliance

- Structura-X gathers a range of companies that support the mission of Structura-X.
- Not all companies are members of Gaia-X
- The Netherlands is well represented on the European level
- Structura-X on European level does not have any funding for e.g. innovation and services & technology development.
- Other projects are needed to provide services & technology development



Zooming in on cloud activities in the Netherlands

- Zooming in on the Dutch cloud ecosystem
- Zooming in on some Dutch cloud projects

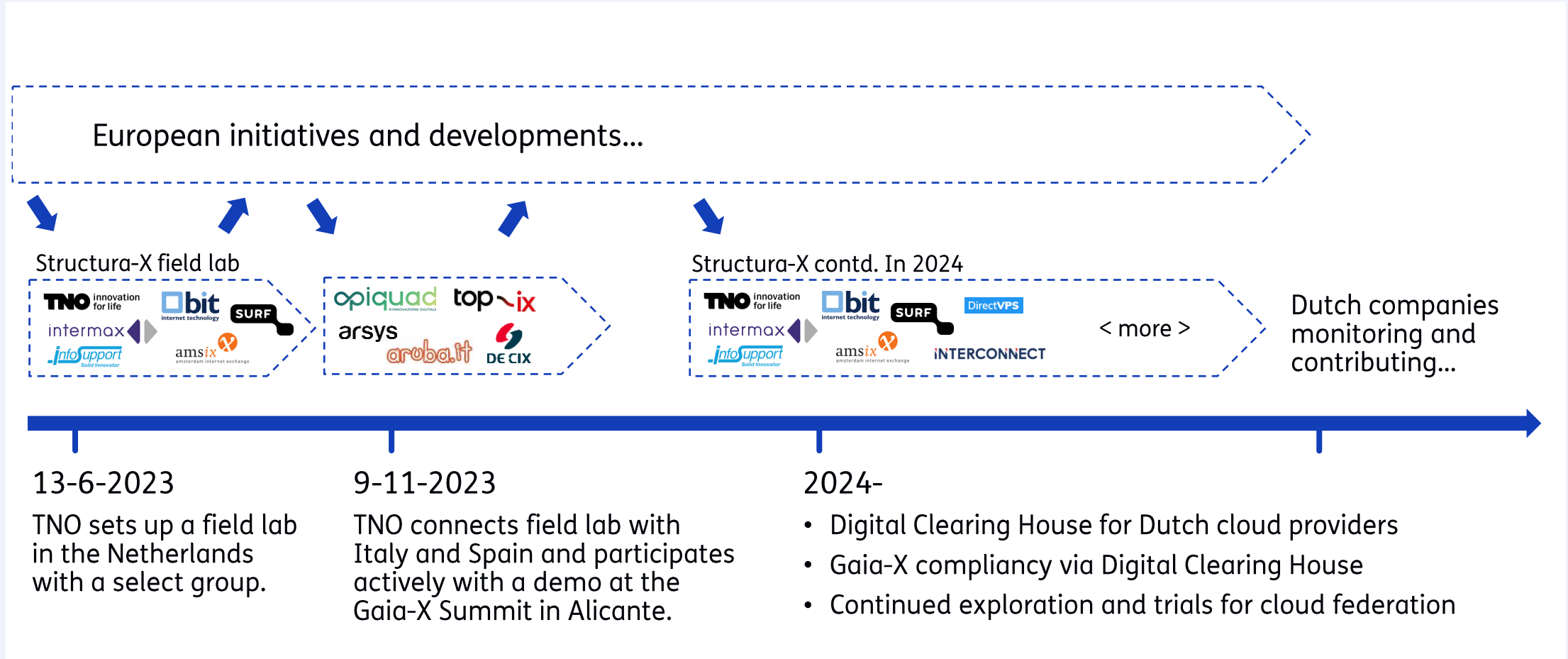
Some developments in the Dutch cloud ecosystem

- TNO has been initiating a number of activities with the Dutch cloud ecosystem since 2020.



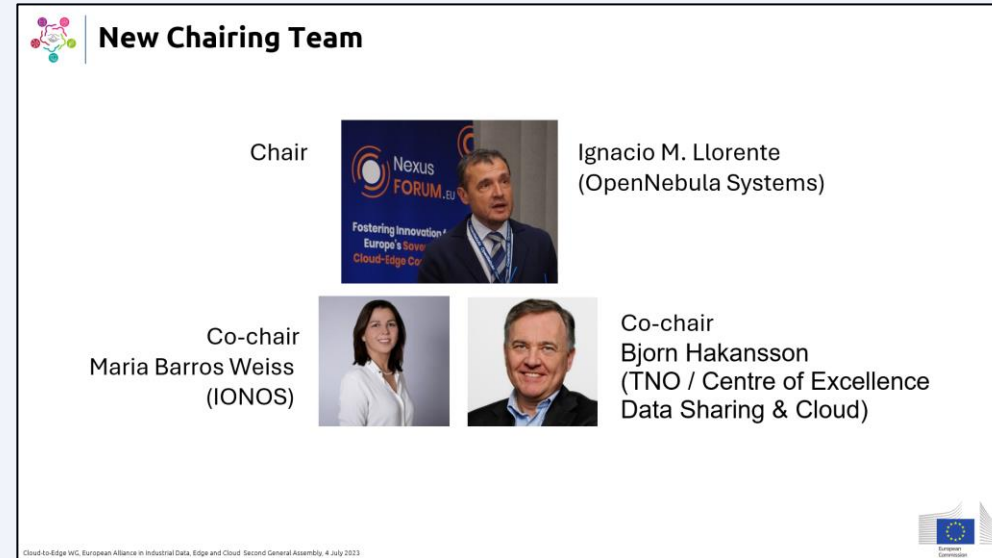
Structura-X and IPCEI-CIS in The Netherlands

- TNO and CoE DSC work on translating EU initiatives and developments into Dutch activities.



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 inside information on future plans from the European Commission, like new IPCEI programmes;
 - IPCEI on Telco-Edge? (strengthening the role of national telco's?)
 - IPCEI on AI? (decreasing dependencies on a few technology providers?)

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.



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