

A path to future-compatibility to navigate the complexity of integrating AI-powered Virtual Sensing in Digital Twin

Digital Twin technology isn't a single monolithic software solution. It is a complex system that must adapt to varying and potentially unpredictable user needs. This adaptability is crucial in environments where data, models, and objectives are shared across different domains, sectors, organisations, and expertise groups and roles across the organisations. Striving to ensure Digital Twin applications and models are future-compatible and can cater to diverse requirements, a holistic approach to design and management is essential. We outline a strategy using a Platform-as-a-Service model for Digital Twinning Infrastructure Components. This approach enables AI-powered virtual sensing to support multiple Digital Twin applications and models, illustrated through a case study where groundwater level measurements are integrated into a digital twin of The Netherlands. We share the insights gained from developing this operational platform service and their implications for future services.

Paolo Pileggi | EGI2024, Lecce - Italy

September 30 – October 4, 2024

TNO.NL – Dutch Applied Science Organisation

The image shows a screenshot of the TNO website homepage. The top navigation bar is dark blue with the TNO logo and tagline 'innovation for life' on the left, and menu items 'Sustainable', 'Healthy', 'Safe', 'Digital', 'Sectors', 'Careers', 'More', a search icon, and 'EN' on the right. The main hero section features a background image of solar panels at sunset with a person walking. The text '#thisisourtime' is centered above the main headline 'This is the time for innovative solutions'. Below the headline is an orange 'Join us' button. On the right side, there is a profile card for Paolo Pileggi, showing a circular profile picture, his name with a verified badge, and his title: 'Responsible Advanced Digitalisation and Transformation (Digital Twinning & AI lifecycle) - Technology absorption'. The TNO logo is also present in the bottom right corner of the profile card area.

TNO innovation for life


Sustainable ▾ Healthy ▾ Safe ▾ Digital ▾

Sectors Careers ▾ More ▾ 🔍 EN ▾

#thisisourtime

This is the time for innovative solutions

Join us



Paolo Pileggi ✓
Responsible Advanced Digitalisation and Transformation (Digital Twinning & AI lifecycle) - Technology absorption

TNO TNO

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By Paolo Pileggi | For EGI, Lecce – Italy | 1 October 2024



Findable. Accessible. Interoperable. Reusable.

FAIR Digital Twin technologies enables self-determination.



Digital twin (model)

Digital replica



Digital Twin Application

With purpose



Digital Twinning

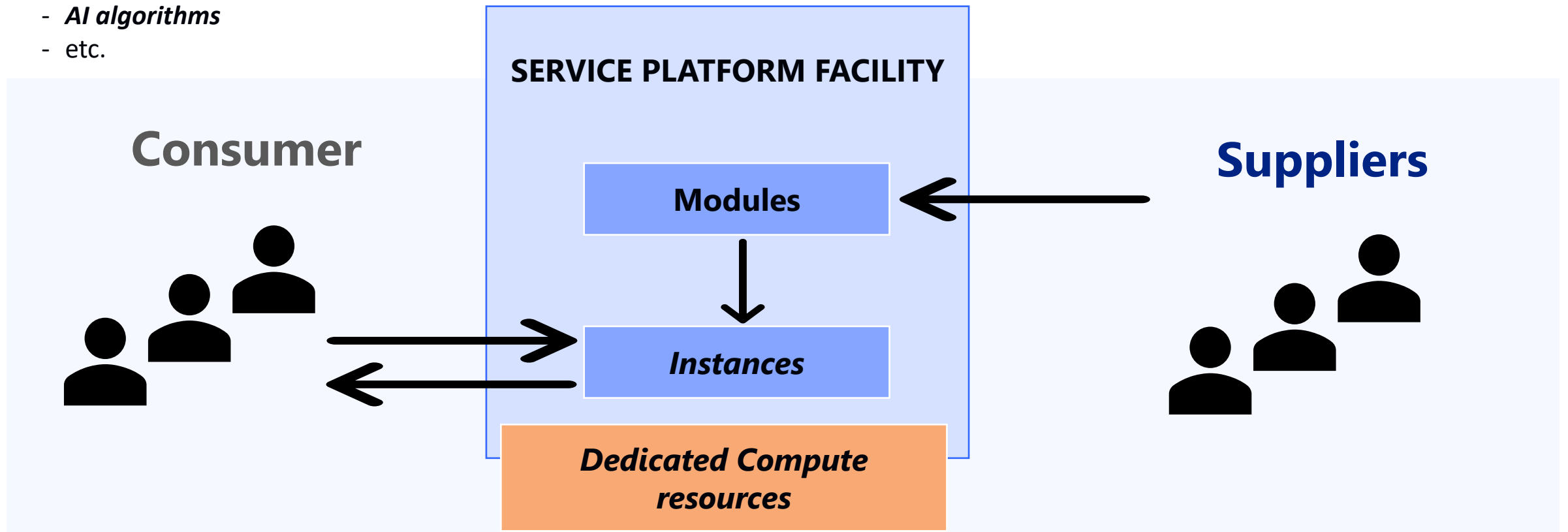
That keeps bringing value

Platform-as-a-Service for Digital Twinning Infrastructure Components

RADiance (*Responsible Advanced Digitalisation alliance*) SPF (*Service Platform Facility*)

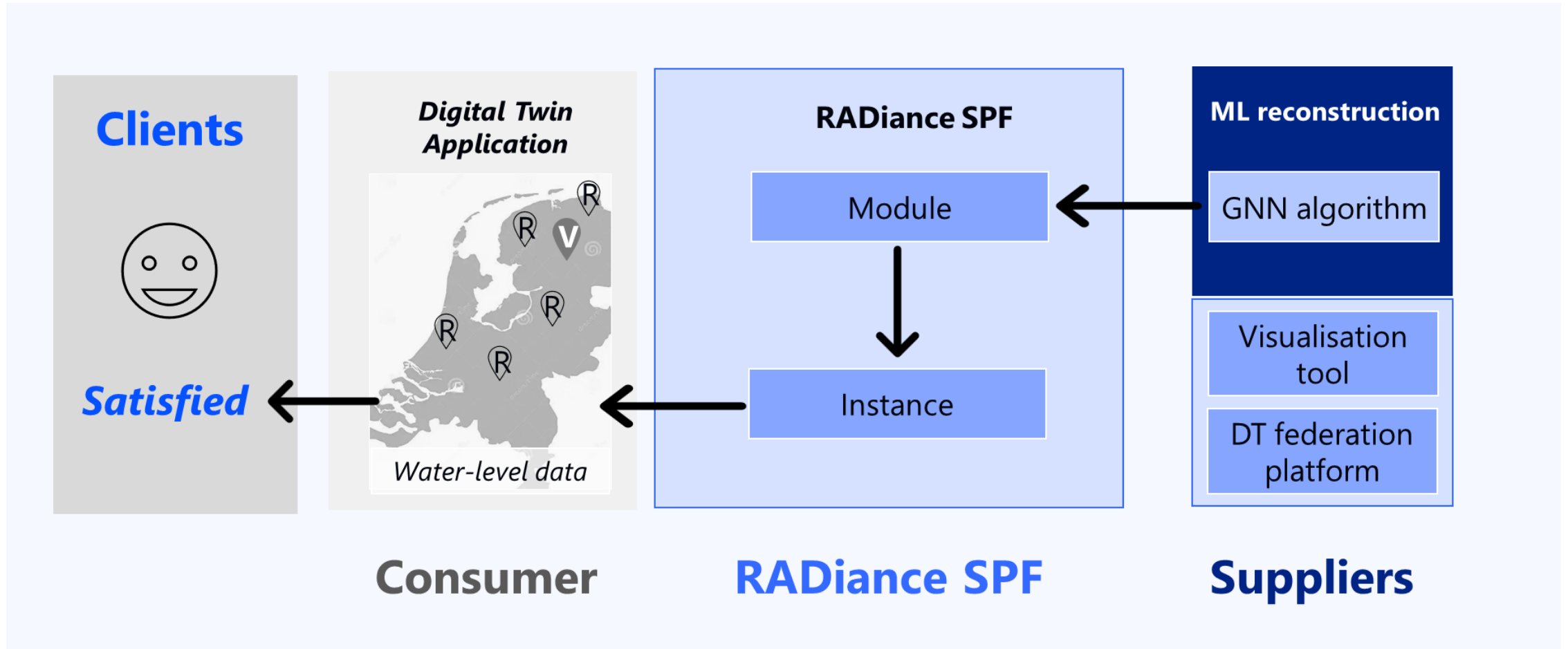
Digital Twinning Infrastructures Components (DTIC) can be

- Model scripts
- Visualisation applications
- Digital Twin platforms
- *AI algorithms*
- etc.



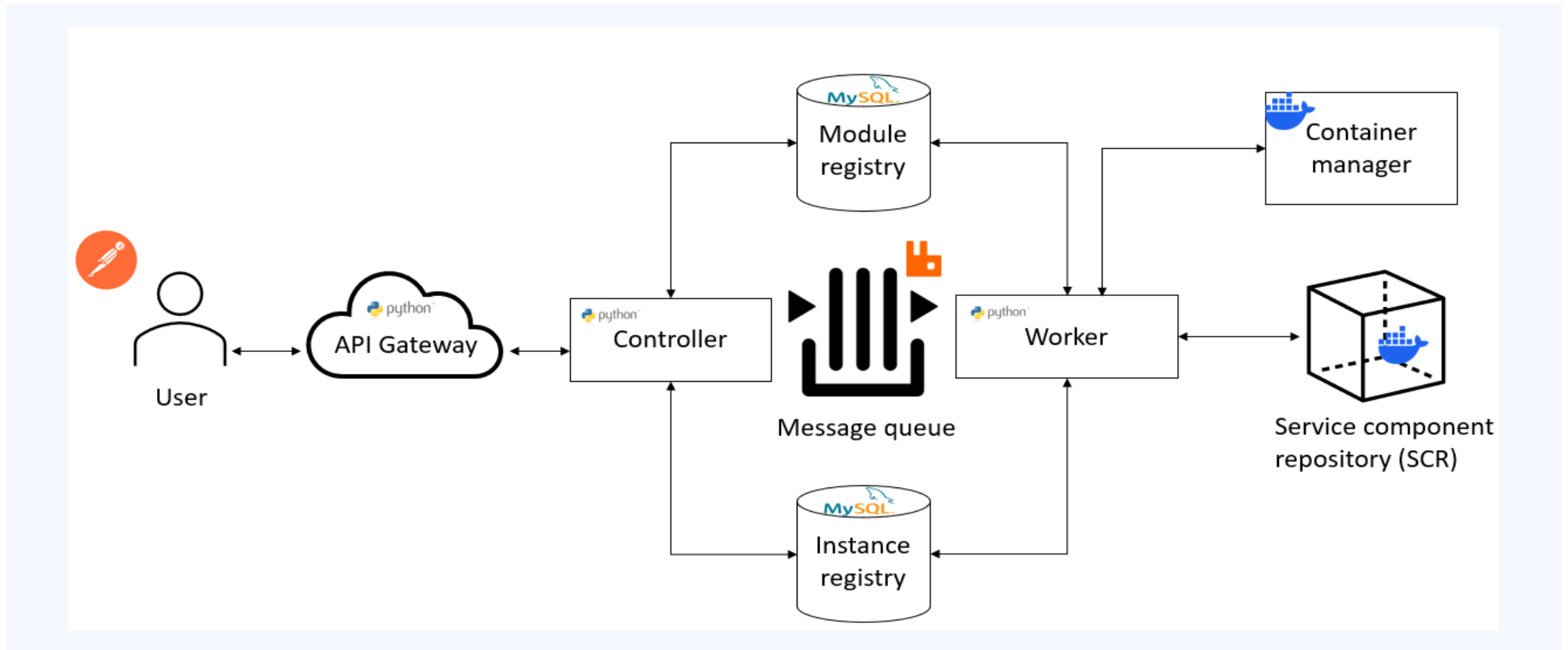
MVP prototype to Demonstrate an ML-powered Virtual Sensor

Servitising ML functionalities for groundwater level monitoring in The Netherlands



Design and tech used

Our prototype runs using simple tools for now



Ongoing projects ... *and more* ...

TNO is involved in many projects where project results are components that we could servitise

Biodiversity and life sciences



<https://biodt.eu/>



<https://dto-bioflow.eu/>

Power and Energy



<https://enershare.eu/>

Transportation and mobility



<https://zefes.eu/>

Smart Industry



<https://www.change2twin.eu/>

Wanna join us?

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