Destination Earth (DestinE) Core Service Platform

Living Planet Symposium

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→ THE EUROPEAN SPACE AGENCY

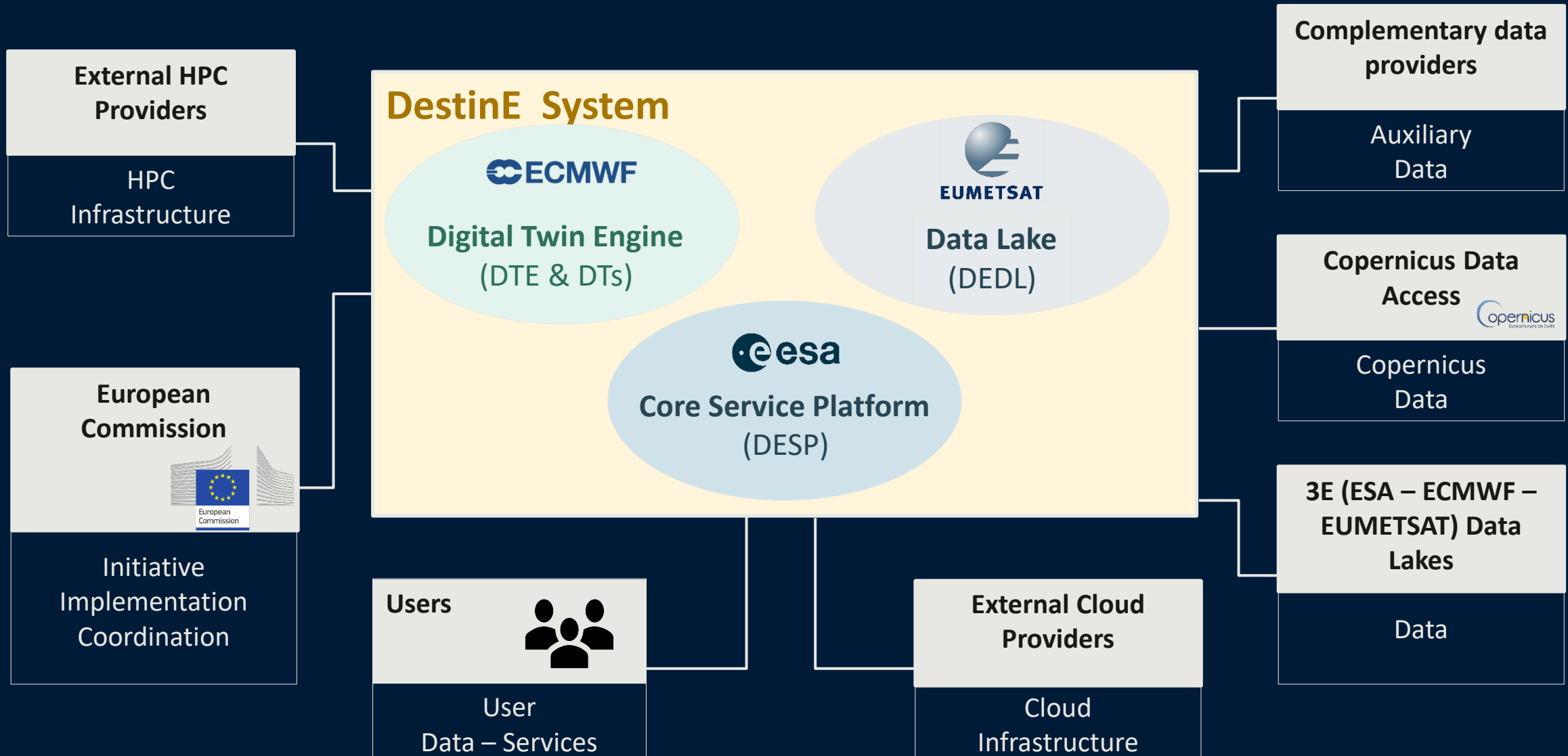# Best way to interact with the DestinE provided services and interfaces?

The Interaction depends on the respective goals and abilities

Some of the DestinE platform goals for the users are :

- Support local exploitation of the DestinE data

- Support development, integration and operations of complementary services for end users on the platform - so called : third-party services

- Favor user or third-party service <u>autonomy</u>

- Support open collaboration between DestinE platform users

Abilities will be verified with implementation – First services : 2023 – Maximum quality of service is expected

DestinE System Context

DestinE System

- Digital Twin Engine (DTE & DTs) — ECMWF
- Data Lake (DEDL) — EUMETSAT
- Core Service Platform (DESP) — esa

External HPC Providers
- HPC Infrastructure

European Commission
- Initiative Implementation Coordination

Users
- User Data – Services

External Cloud Providers
- Cloud Infrastructure

Complementary data providers
- Auxiliary Data

Copernicus Data Access
- Copernicus Data

3E (ESA – ECMWF – EUMETSAT) Data Lakes
- Data

The DestinE Core Service Platform is the place

to explore and analyse DestinE Data

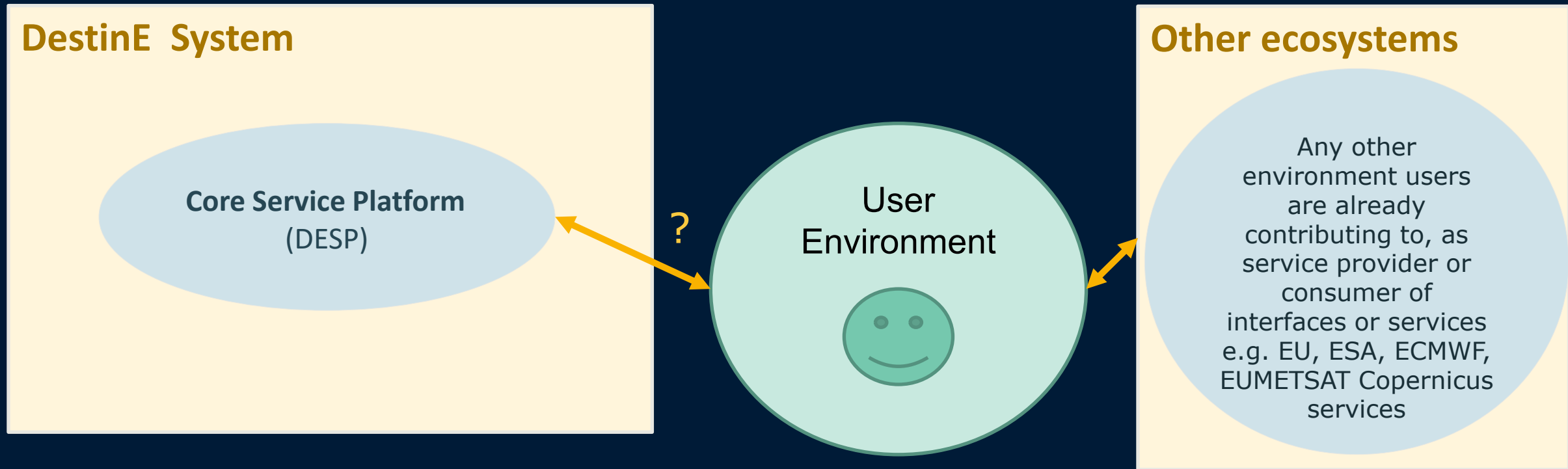to develop and exercise models and simulations based on DestinE Data

to build, deploy and operate new services

to publish and share results of applications and services

Interaction model

DestinE System

Core Service Platform
(DESP)

?

User Environment
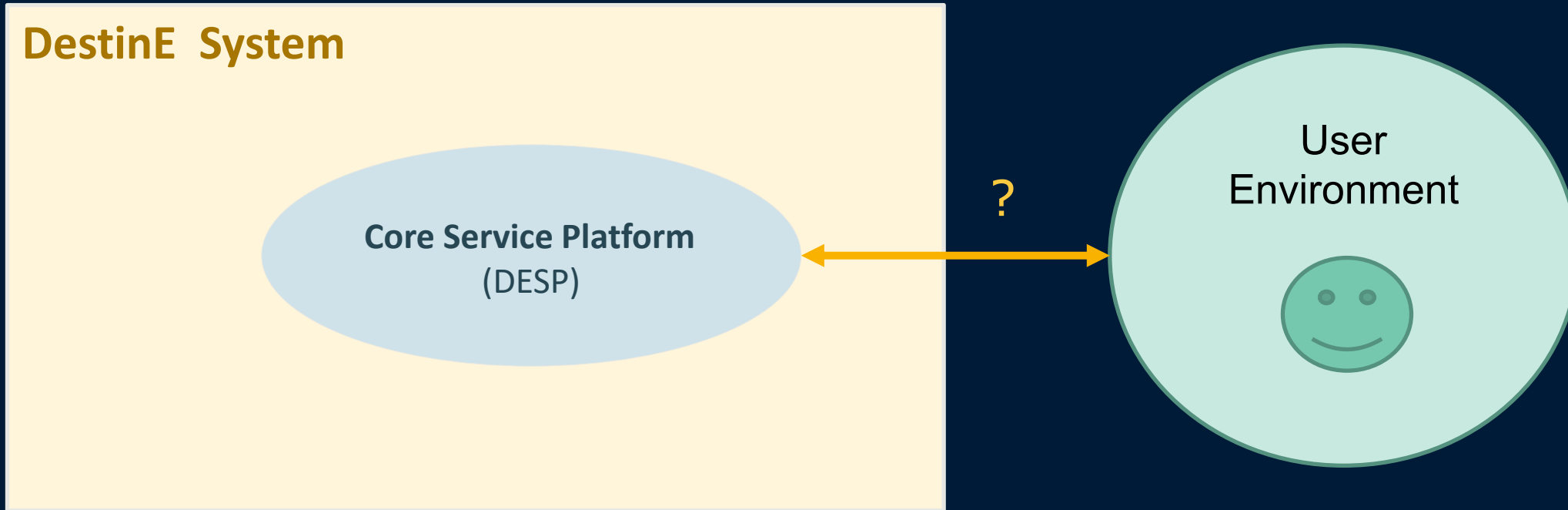
What is the relationship between the user and the DestinE platform?

Interaction model - highlights

DestinE System

Core Service Platform
(DESP)

?

User
Environment

Other ecosystems

Any other environment users are already contributing to, as service provider or consumer of interfaces or services e.g. EU, ESA, ECMWF, EUMETSAT Copernicus services

Users : Service provider / Service consumer terminology to describe platform operational interactions*

*A user may take the 2 different roles, even for the same interface

How to make sure that users will benefit from DestinE?

- How many users?: ESA Copernicus data access ½ million!

- The DestinE platform is planned for large user community, with gradual opening (ESA, ECMWF, EUMETSAT & DG-CNECT on-going activity for definition and design)

- DESP is developed, and operated implementing EU regulations and will benefit from DG-CNECT work on the design and implementation of the overarching Cloud and Data Spaces federation.

DESP model has to be attractive and competitive
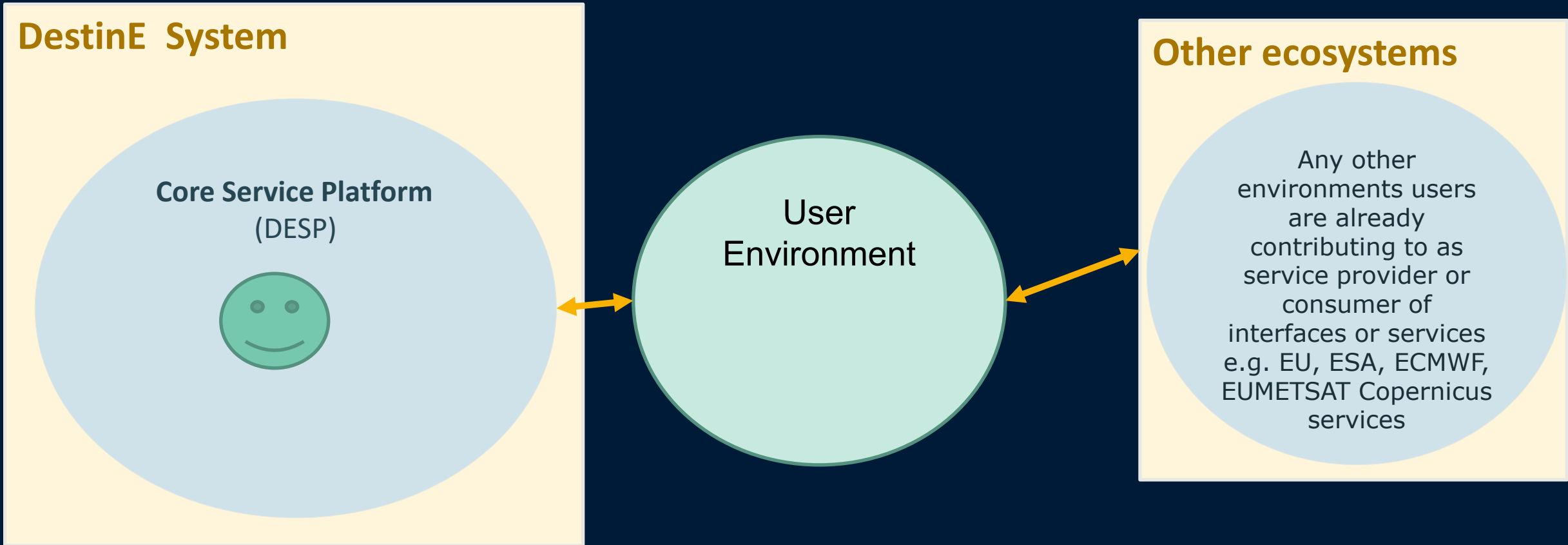
Necessary: Projects with already established infrastructure and workflows will need to test the DestinE data and services prior to any kind of on-boarding

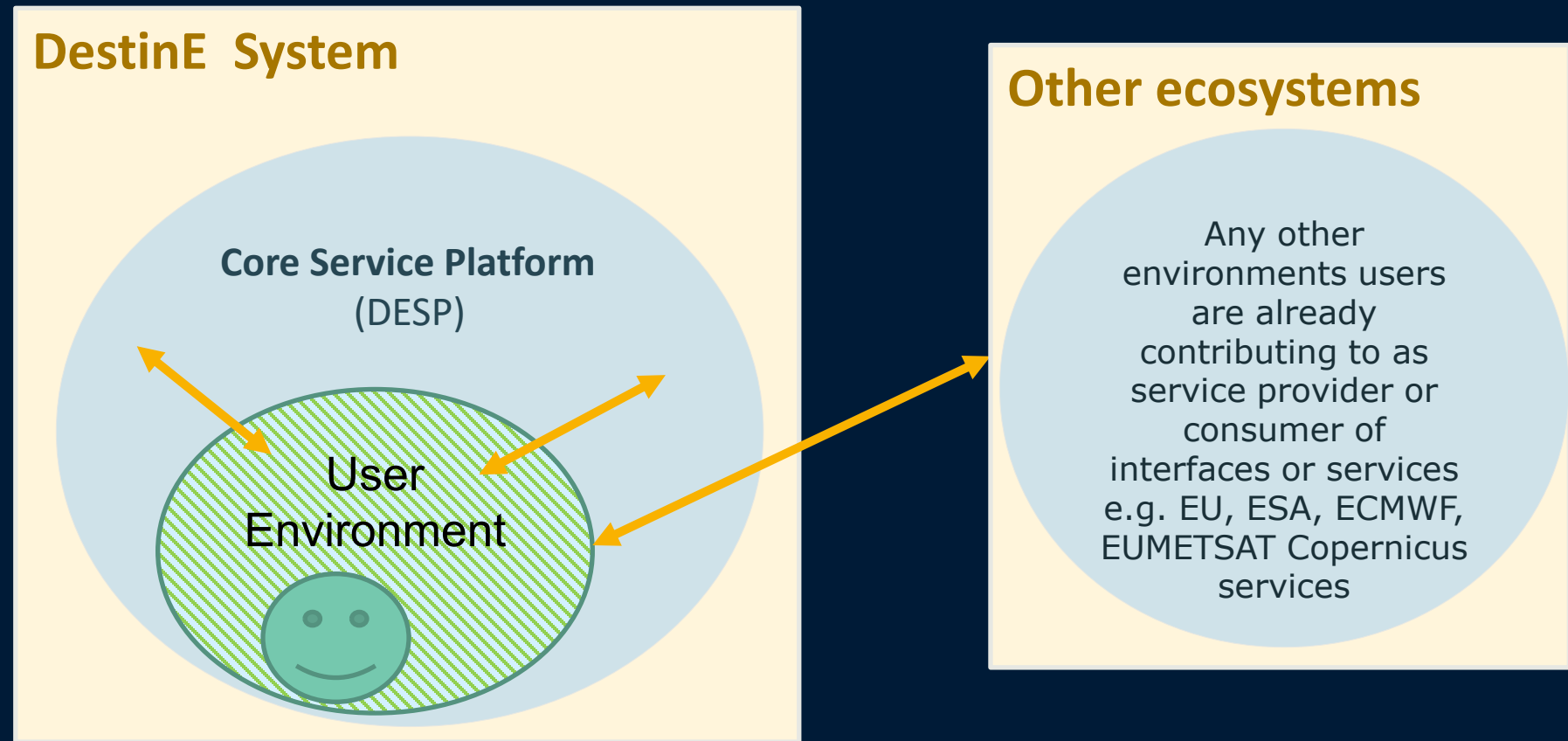Service Challenge: Global access bandwidth is the shared resources for DestinE service consumers

=> due to high volume : download is not adapted to DestinE volume

=> extraction, compression : Global compute resources will soon be also shared resources for DestinE service consumers

Service Management: DestinE service provision will be based on a fixed global allocation and quotas management between users

=> performances may depend on user operations profile

Drawbacks: DestinE platform is not used to foster user activities – Users are duplicating efforts

Type of Interaction – Infrastructure proxy

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(DESP)

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Example : IaaS: Users registered to get access to necessary Infrastructure for their workflow
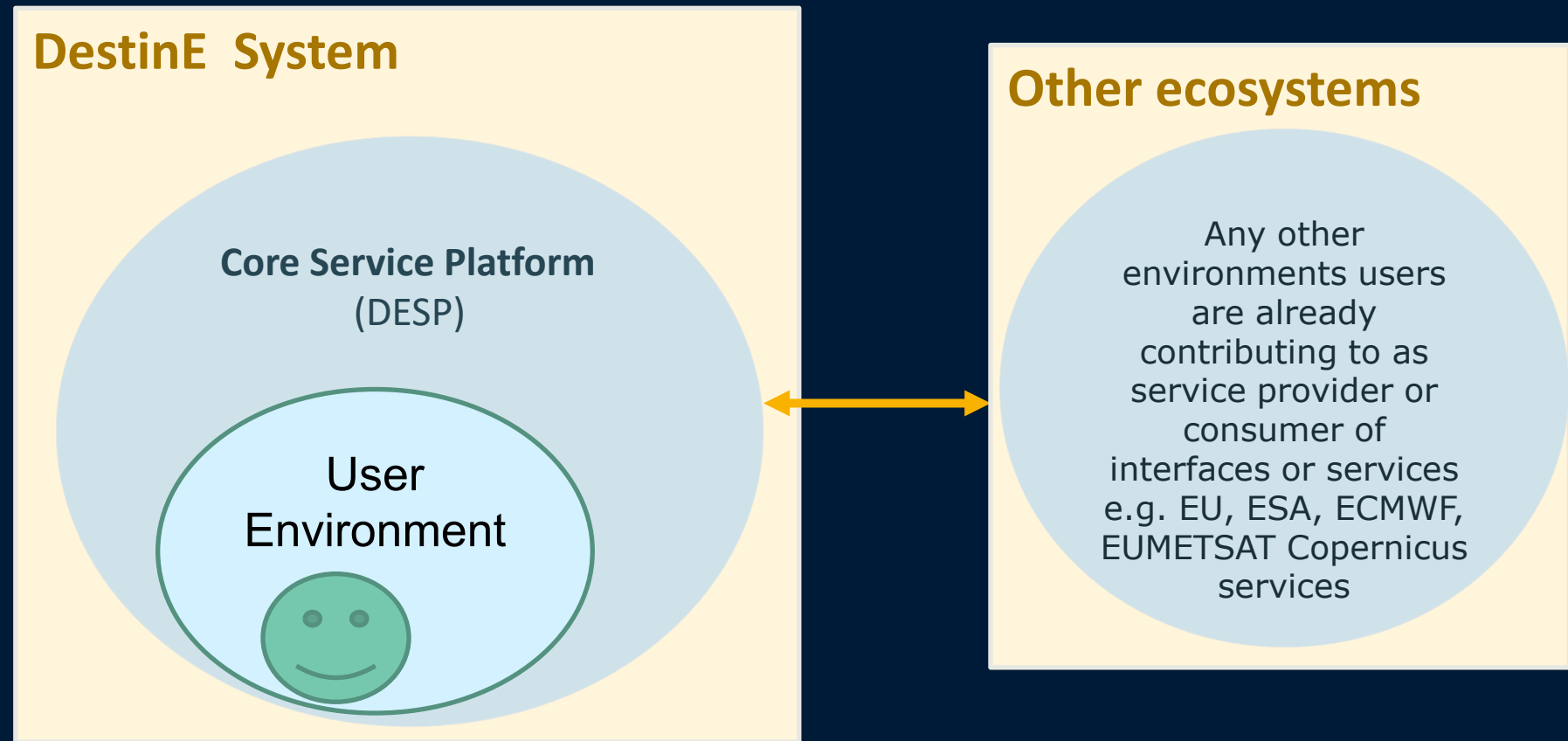
DestinE platform cannot be a success just by brokering infrastructure…

<u>Service:</u> Provide IaaS to enable the deployment of user workflows

<u>Service Challenge</u>: Finite resources – Demand can easily over exceed available resources – make sure the service is not abused

<u>Management</u>: Provision of <u>open</u> IaaS cannot be committed but DESP development will make sure that IaaS providers offer scalability to extend DestinE services

    => some provision of shared storage capacity will be consolidated to support exchange of data and some data persistence within the platform

Type of Interaction - PaaS

DestinE System

Core Service Platform
(DESP)

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Example : Notebooks: Users registered to get access to an environment that covers all needs for development and operations

Simple simulation model

Data input

Full featured environment (the platform)

Data & information

(simulation results, analysis, support to decision,…)

Services

(Visusalisation, user supports,…)

Interaction model

Data input

Infrastructure

Web framework

Plotting Tools

Modeling Environment

Data processing

Network

Database connection

…

Data & information

(simulation results, analysis, support to decision,…)

Services

(Visusalisation, user supports,…)
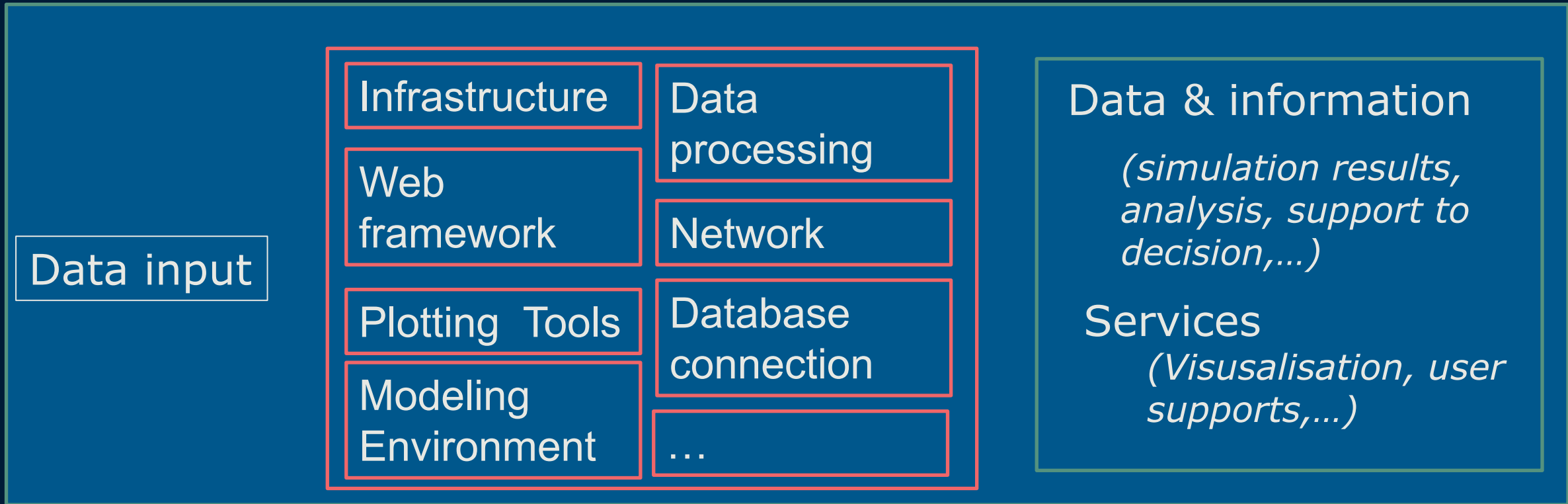
A single framework covering all user needs is not credible!

Highlights

Many other interactions to be assessed : license, collaborative,…

Key take away at this stage:

- DESP cannot be a monolithic platform, DESP will support many forms of interaction to consume interfaces and resources

- DESP is designed with scalability in mind – Services are not conceived for a reduced set of users

- DESP will support the development of a large variety of services based on standard interfaces and resources management approach

- Third party services can be autonomously deployed and operated between them based on DESP APIs, core services and DestinE capabilities from DTE, DTs product generation to Data Lake operations