



Climate Change

Climate Change Service **Python** in the ECMWF **Copernicus** landscape

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ECMWF, Reading , 28th of November 2017

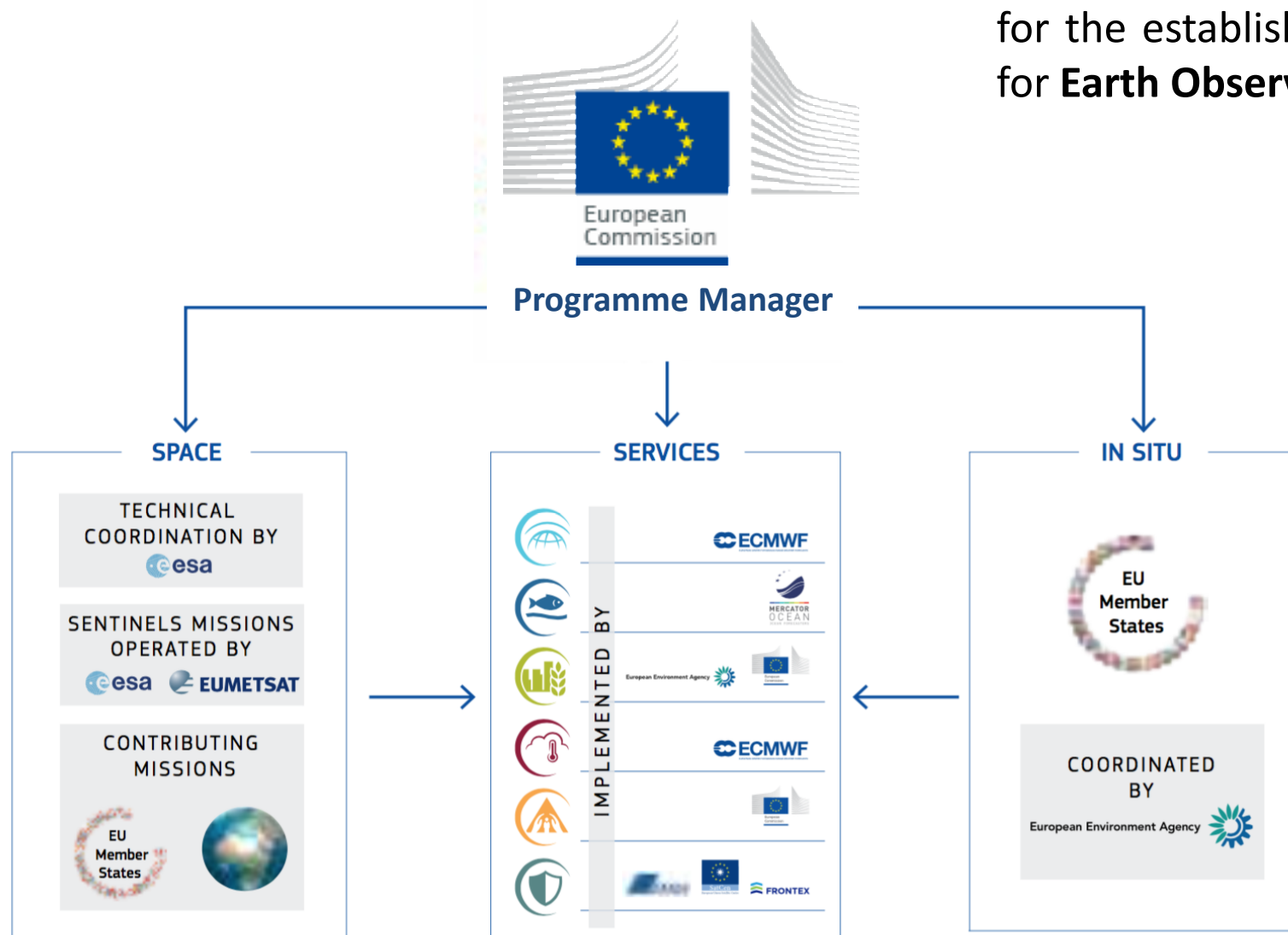




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C O P E R N I C U S

Copernicus is the **European Programme** for the establishment of a European capacity for **Earth Observation**





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C O P E R N I C U S Climate Change service - C 3 S

- The European Commission has **entrusted** ECMWF with the implementation of the **Copernicus Climate Change Service – C3S**
- The Copernicus Climate Change service will provide **information** to increase the **knowledge** base to support **adaptation** and **mitigation** policies.





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C3S in a nutshell

International
expert panel

from European Commission
e.g., FP7 Space call, H2020

from EU Member States, ESA,
EUMETSAT, EEA, WMO..

Evaluation & Qc Function

Quality assurance
Integrity of Service
User requirements

CLIMATE DATA STORE
Toolbox

SECTORAL INFORMATION SYSTEM



ENERGY



WATER
MANAGEMENT



INSURANCE



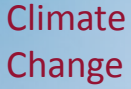
AGRICULTURE
& FORESTRY



INFRASTRUCTURE

Stakeholders & Users

Outreach & Dissemination



- The **Climate Data Store** is at the heart of the C3S infrastructure and provides information about **past, present** and **future** climate in terms of **Essential Climate Variables** and **derived climate indicators**
- The CDS is designed as a **distributed system**, providing improved access to **existing datasets** through a **unified web interface**
- The CDS contains **observations**, global and regional **climate reanalyses**, global and regional **climate projections** and **seasonal forecasts**
- The CDS provides an **authoritative set of software (toolbox)** that will allow the users to **develop applications** that will make use of the content of the CDS





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CDS - content



Scientific basis:

- Essential Climate Variables as defined by GCOS
- GCOS Status Report and Implementation Plan
- IPCC, CMIP

Observations

Global estimates
of ECVs from
satellite and in-
situ observations

Reprocessed
CDRs, reference
observations

Support for data rescue,
climate data collections

Climate reanalysis

Global atmosphere,
ocean, land

Regional
reanalysis for
Europe

Coupled climate
reanalysis for
100 years

Model output

Multi-model seasonal
forecast products

Access to CMIP
data and
products (global
and regional)

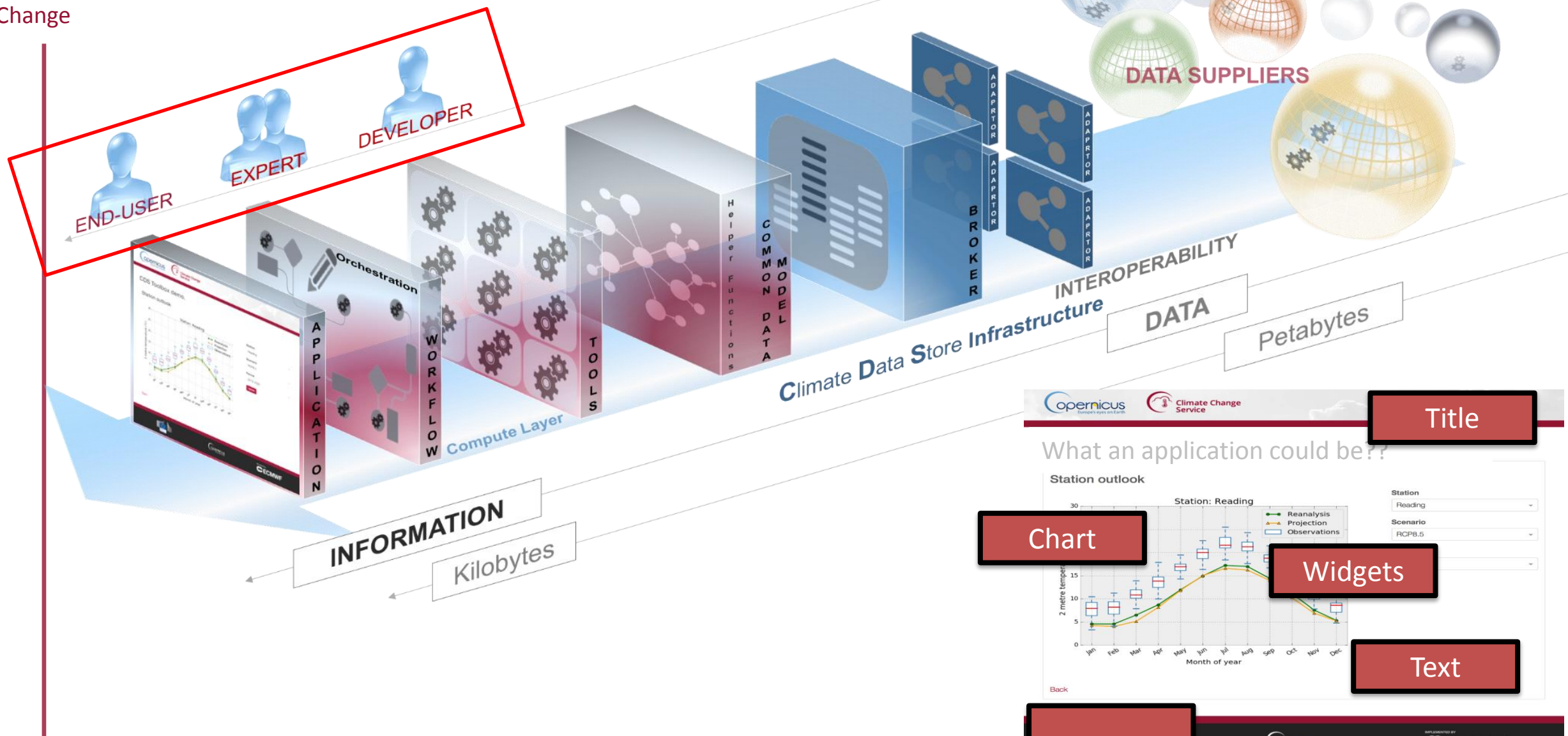
Reference set of
climate projections
for Europe

Climate Indicators



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CDS Toolbox - concept



Title

What an application could be??

Chart

Widgets

Text

...

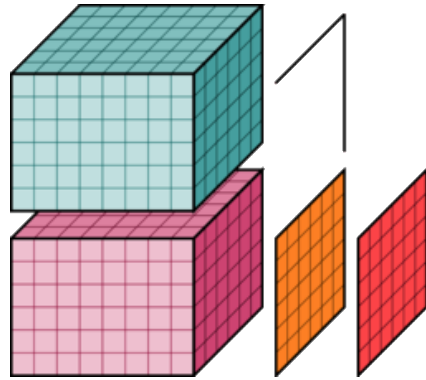
copernicus

ECMWF

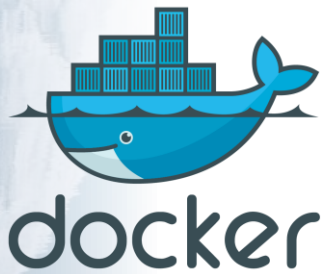


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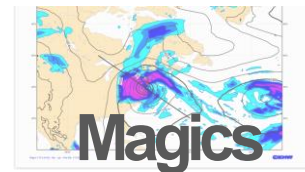
CDS Toolbox - Open-Source TECHNOLOGIES



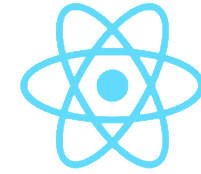
xarray



docker



Magics



React



jupyter

matplotlib