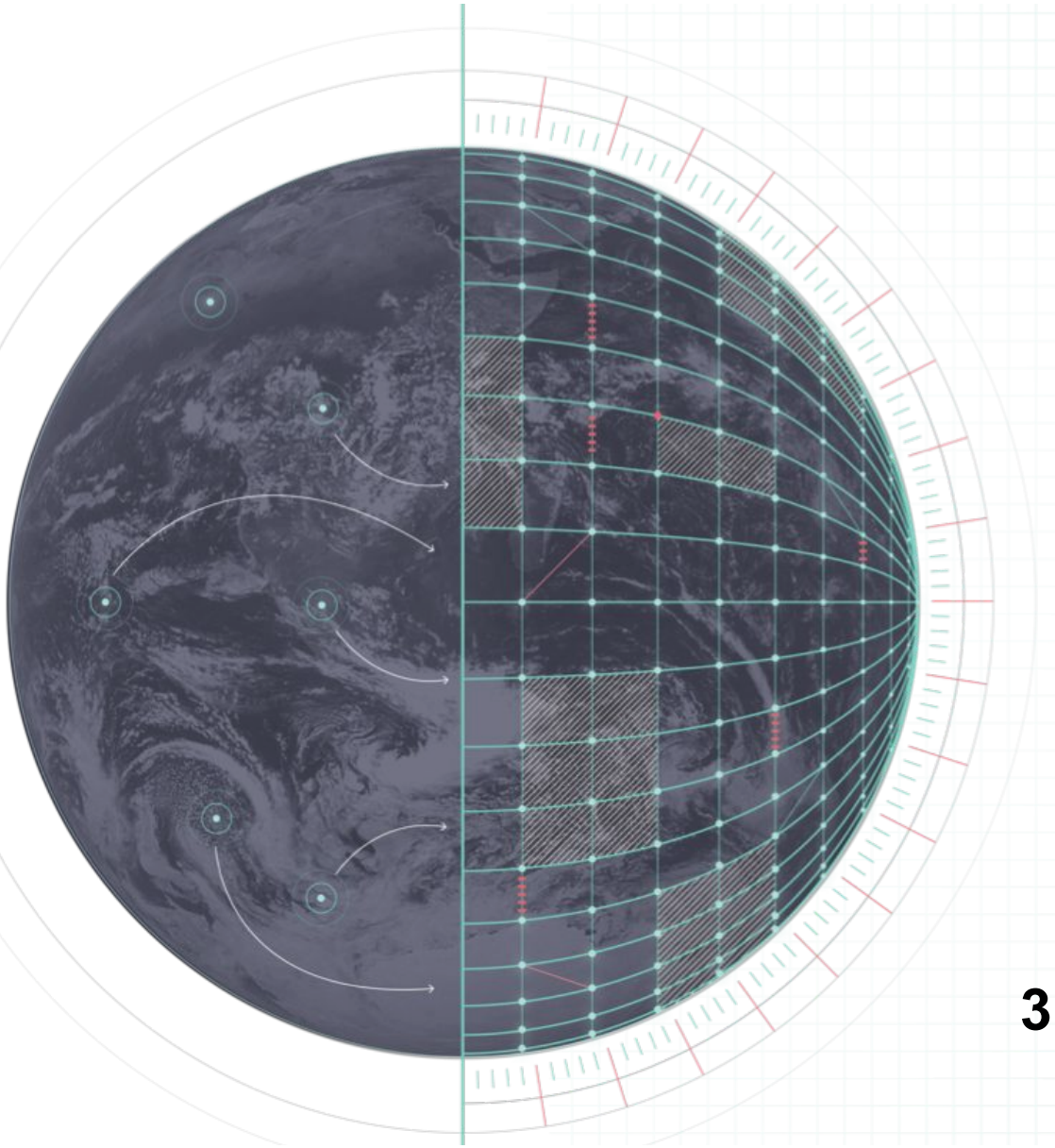

DESTINATION EARTH

GSV interface: a new python access to the Climate Digital Twin data

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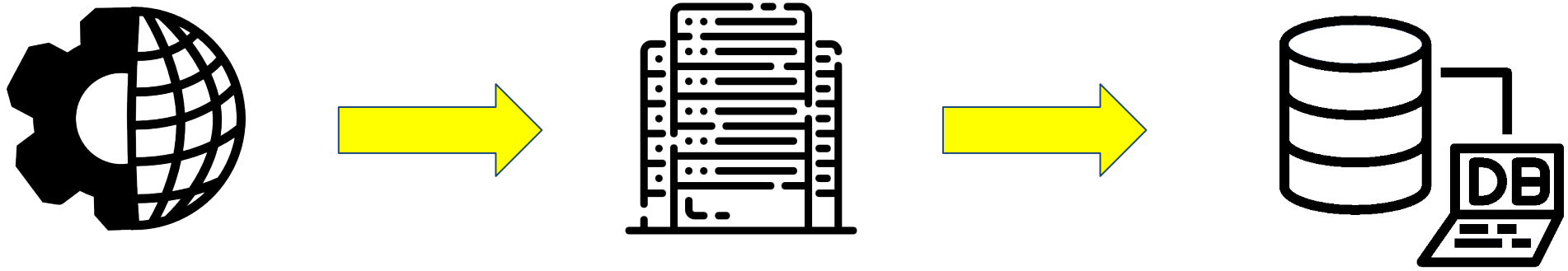
3rd Destination Earth User eXchange

15/10/2024

Funded by the European Union

Destination Earth implemented by ECMWF esa EUMETSAT

ClimateDT Data Flow



Climate Models

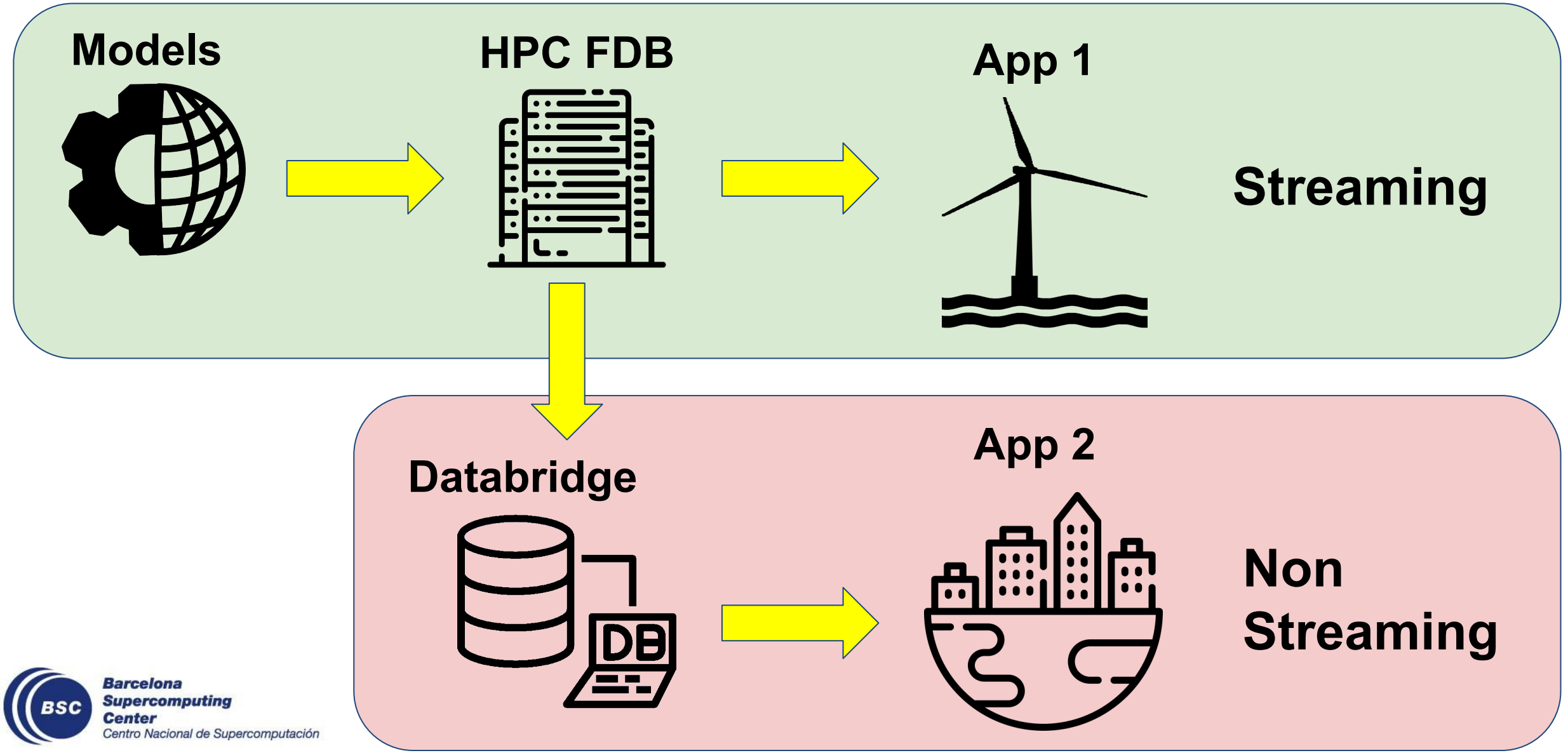
HPC FDB:

- Short-time storage
- Highest resolution
- Full output

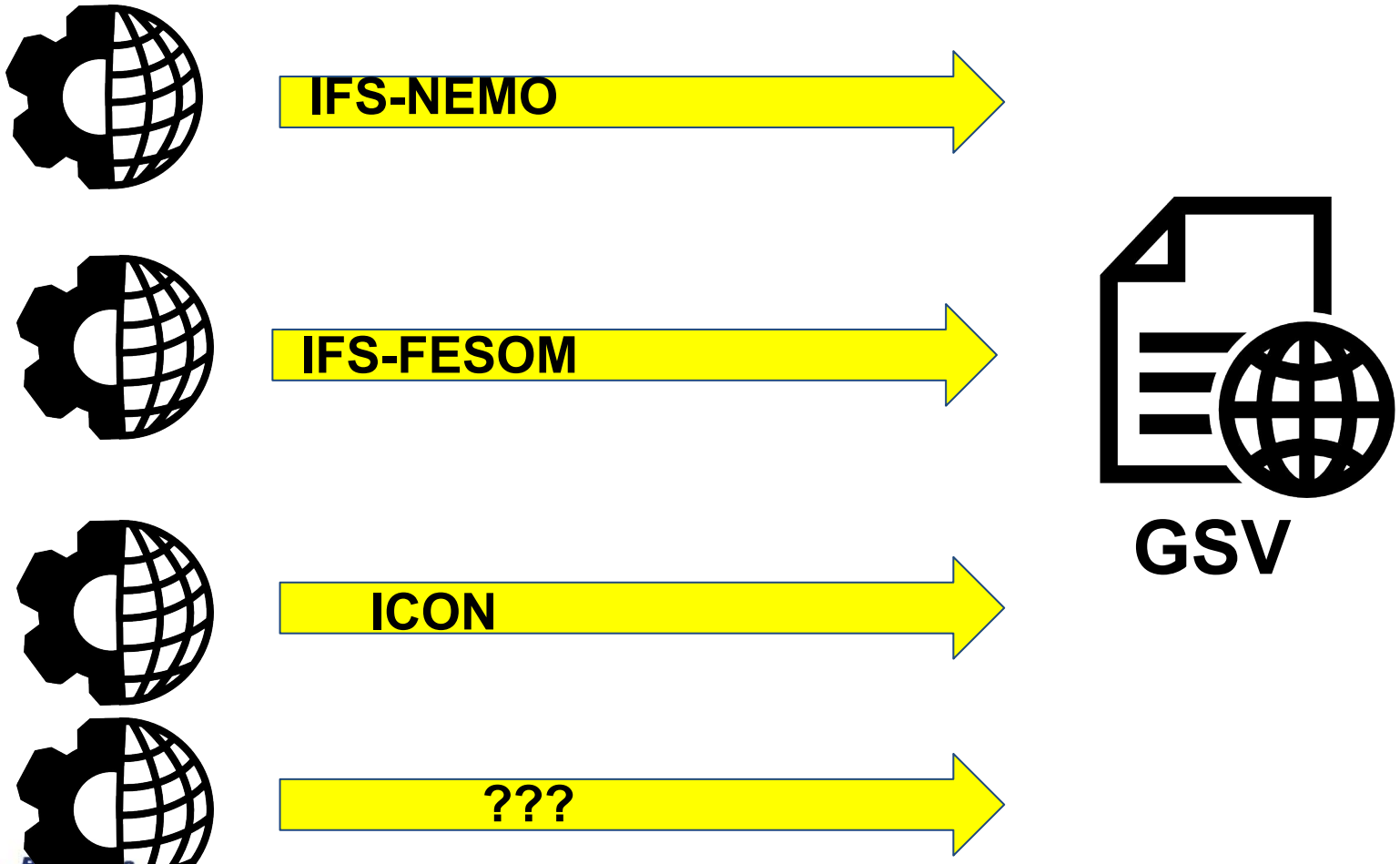
Databridge FDB:

- Long-time storage
- Lower resolution
- Reduced output

Data Streaming for internal applications



GSV - Generic State Vector



GSV

Standardized output

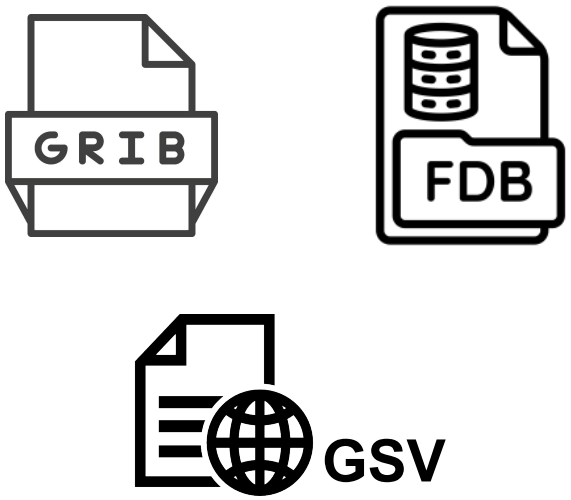
- Variable list
- Horizontal grids
- Time frequencies
- Pressure levels

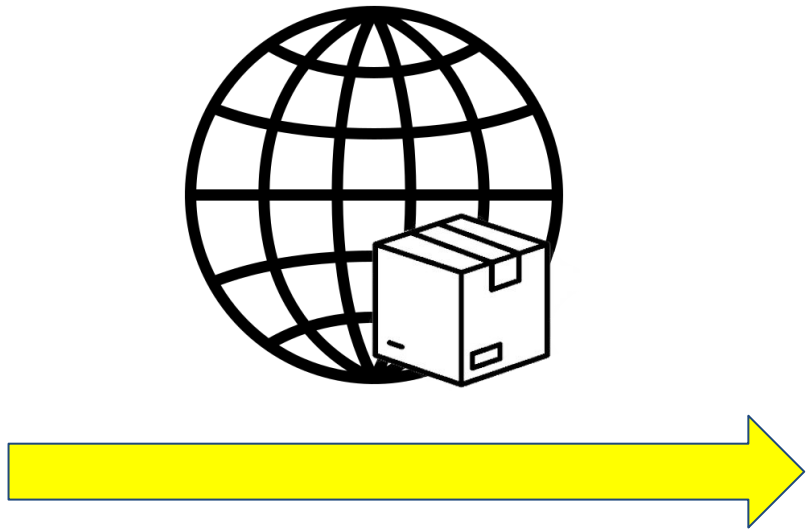
Context for the GSV interface

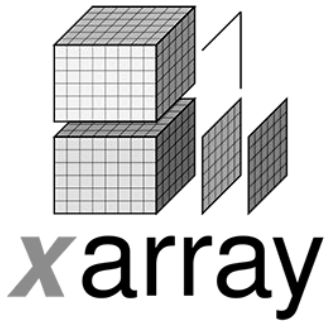
MODELS

Applications

GSV Interface







GSV API example

```
>>> from gsv import GSVRetriever
>>> gsv = GSVRetriever()
>>> gsv.request_data("request.yaml")

<xarray.Dataset> Size: 8GB
Dimensions:     (ncells: 12582912, cell_corners: 4, time: 24)
Coordinates:
    lon         (ncells) float64 101MB 45.0 45.04 44.96 ... 315.0 315.0 315.0
    lat         (ncells) float64 101MB 0.0373 0.0746 0.0746 ... -0.0746 -0.0373
    lon_bounds  (ncells, cell_corners) float64 403MB 45.0 44.96 ... 315.0 315.0
    lat_bounds  (ncells, cell_corners) float64 403MB 0.0746 0.0373 ... -0.0373
  * time        (time) datetime64[ns] 192B 2024-01-01 ... 2024-01-01T23:00:00
Dimensions without coordinates: ncells, cell_corners
Data variables:
    2t          (time, ncells) float64 2GB 299.7 299.7 299.7 ... 301.3 301.2
    10u         (time, ncells) float64 2GB -8.524 -8.626 -8.62 ... -6.977 -7.114
    10v         (time, ncells) float64 2GB -4.557 -4.59 -4.528 ... -1.14 -1.355
```

GSV Request schema

Keys to identify experiment

class: d1
dataset: climate-dt
type: fc
experiment: “cont” / “hist” / “ssp3-7.0”
activity: “HighResMIP” / “CMIP6” / “ScenarioMIP”
model: “ifs-nemo” / “ifs-fesom” / “icon”
expver: “0001” for production data
generation: 1/2/3… generation of Destine products
stream: “clte” for production climate data

GSV Request schema

Keys to identify data within experiment

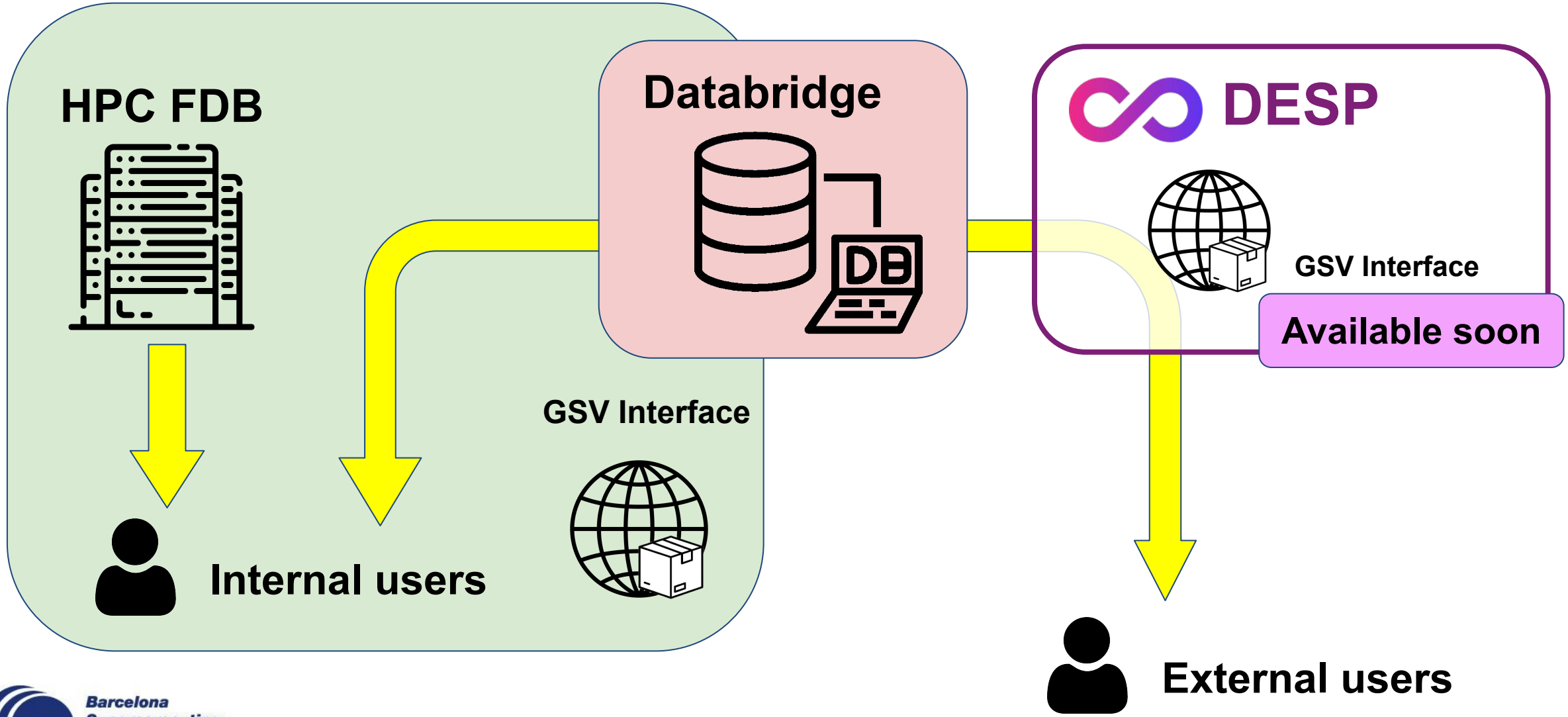
param: e.g. [“2t”, “10u”, “10v”]
date: e.g. “20240101/to/20240131”
time: e.g. “0000/to/2300/by/0100”
levtype: “sfc” / “pl” / “o2d” / “o3d” / “hl” / “sol”
Levelist: (only for 3d variables). Pressure levels or model levels
realization: 1/2/3… Ensemble member
resolution: “high” / “standard”

GSV Request schema

Post-processing keys (optional)

grid: 1.0/1.0 for interpolation to 1º x 1º regular_ll
method: “nn” / “con”
area: [72.5, x ,x, x] coordinates of rectangular box in NWSE order

Data access to internal and external users



Thank you for your attention!