

# The I-GUIDE Platform

## Filling the HDR Ecosystem's "Missing Middle"

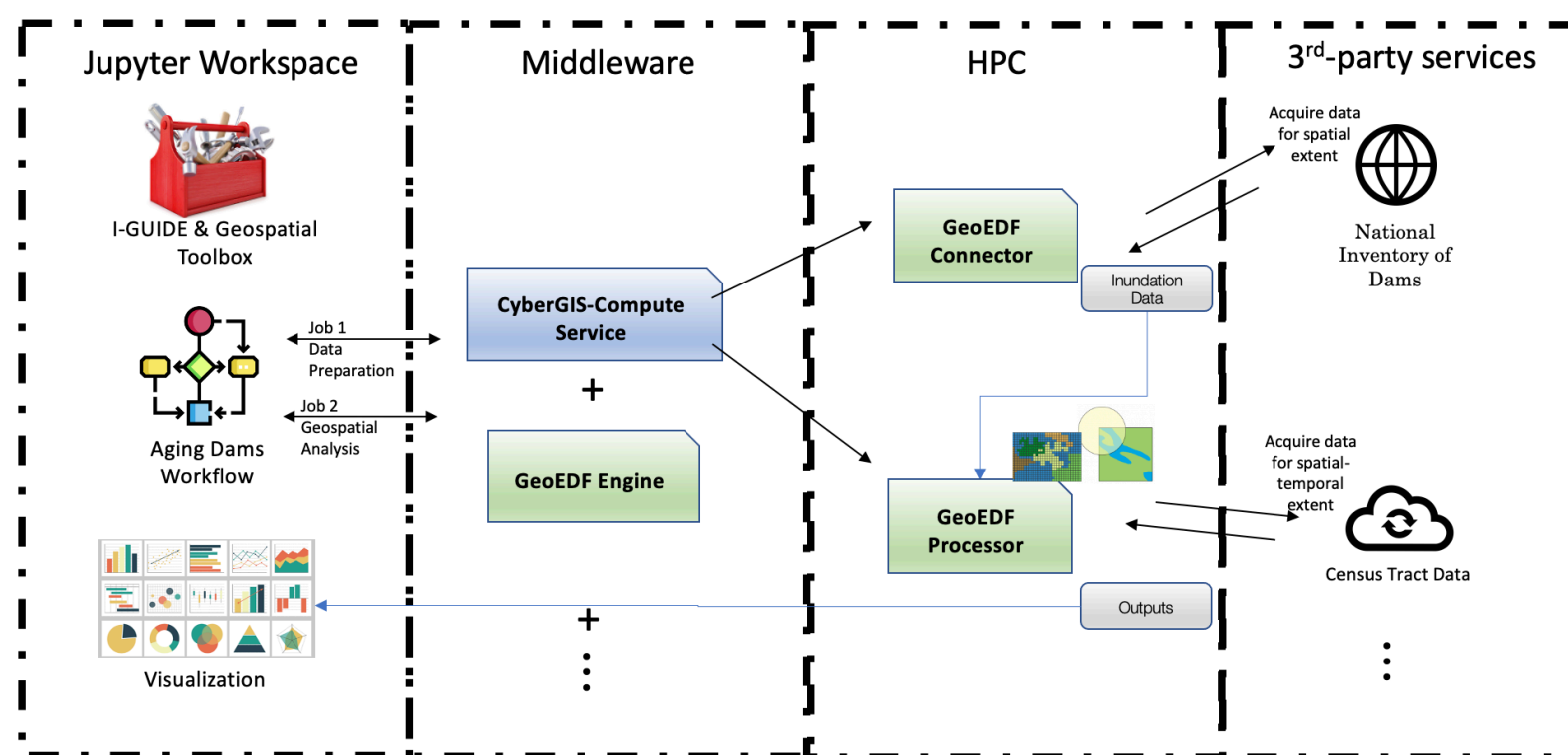
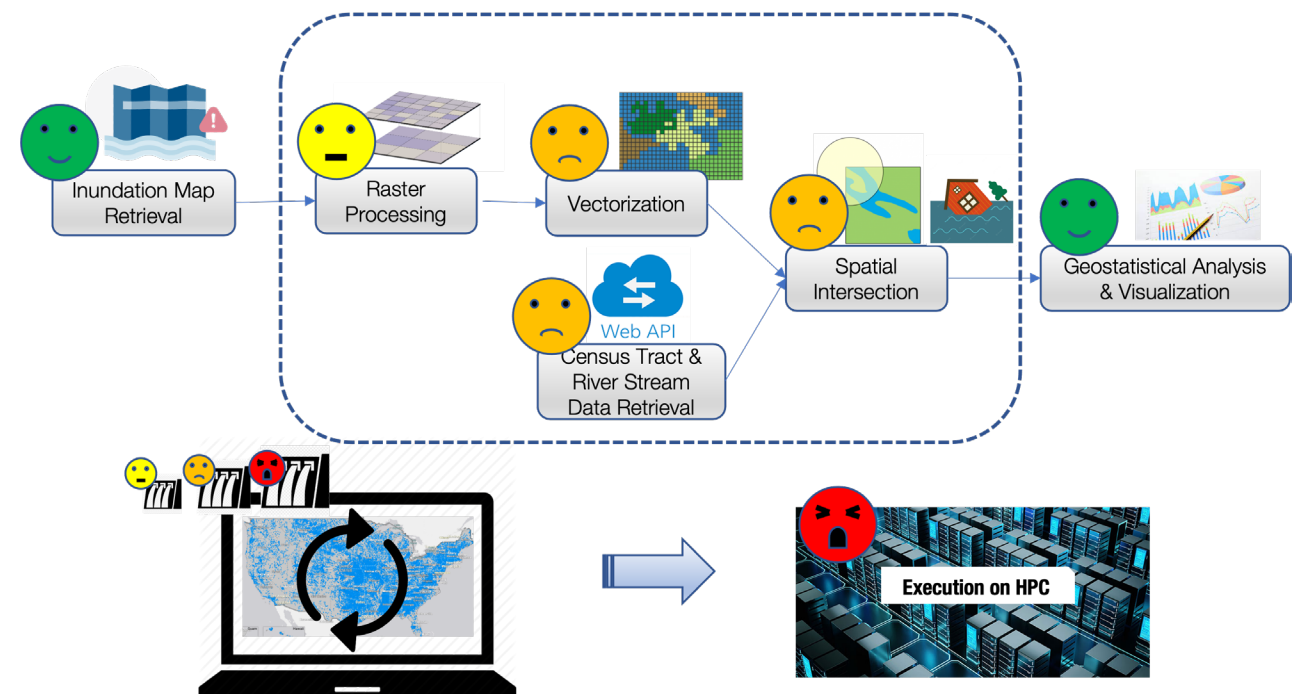
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### Vision

Integrate distributed geospatial data capabilities and advanced CI to form a composable and open I-GUIDE platform to accelerate scientific workflows and support education and workforce development as well as broader community engagement.

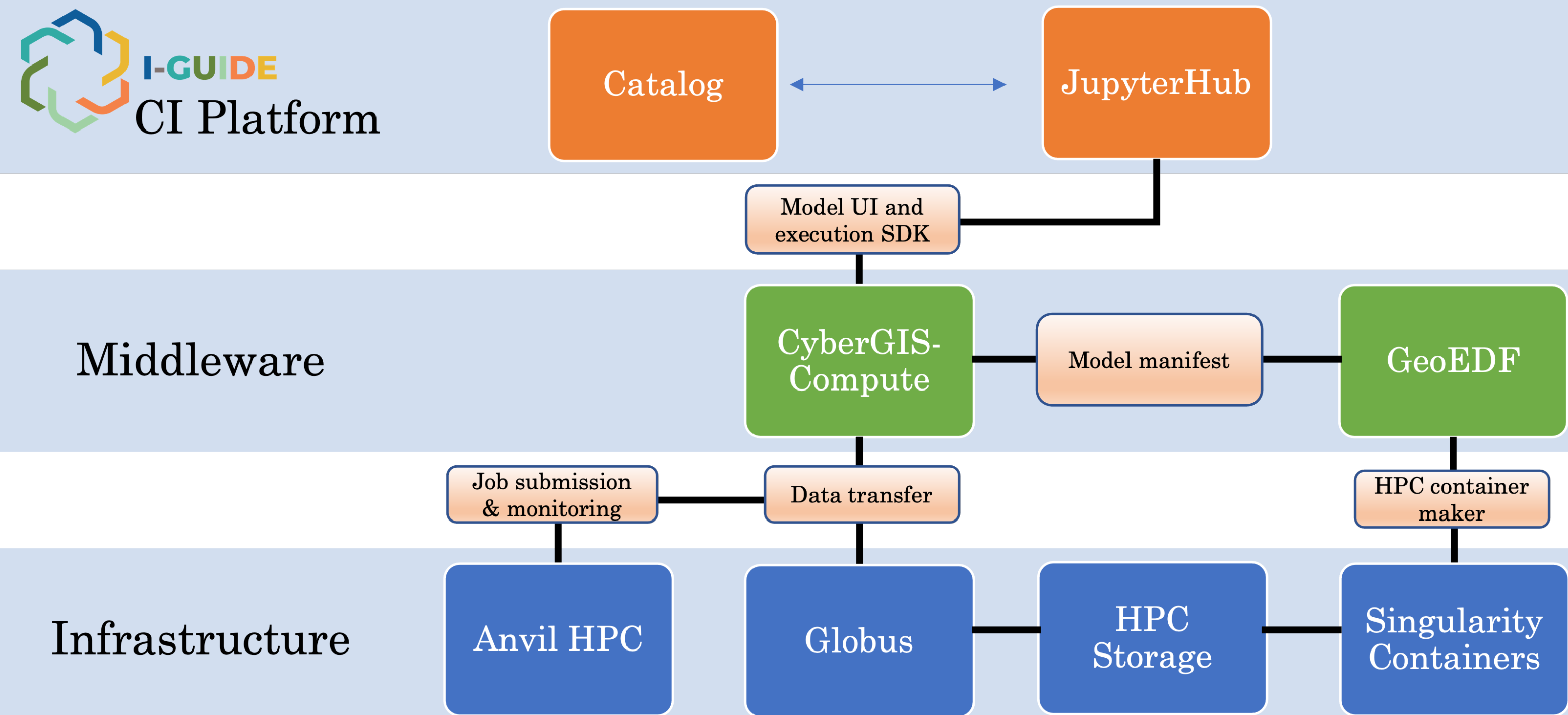
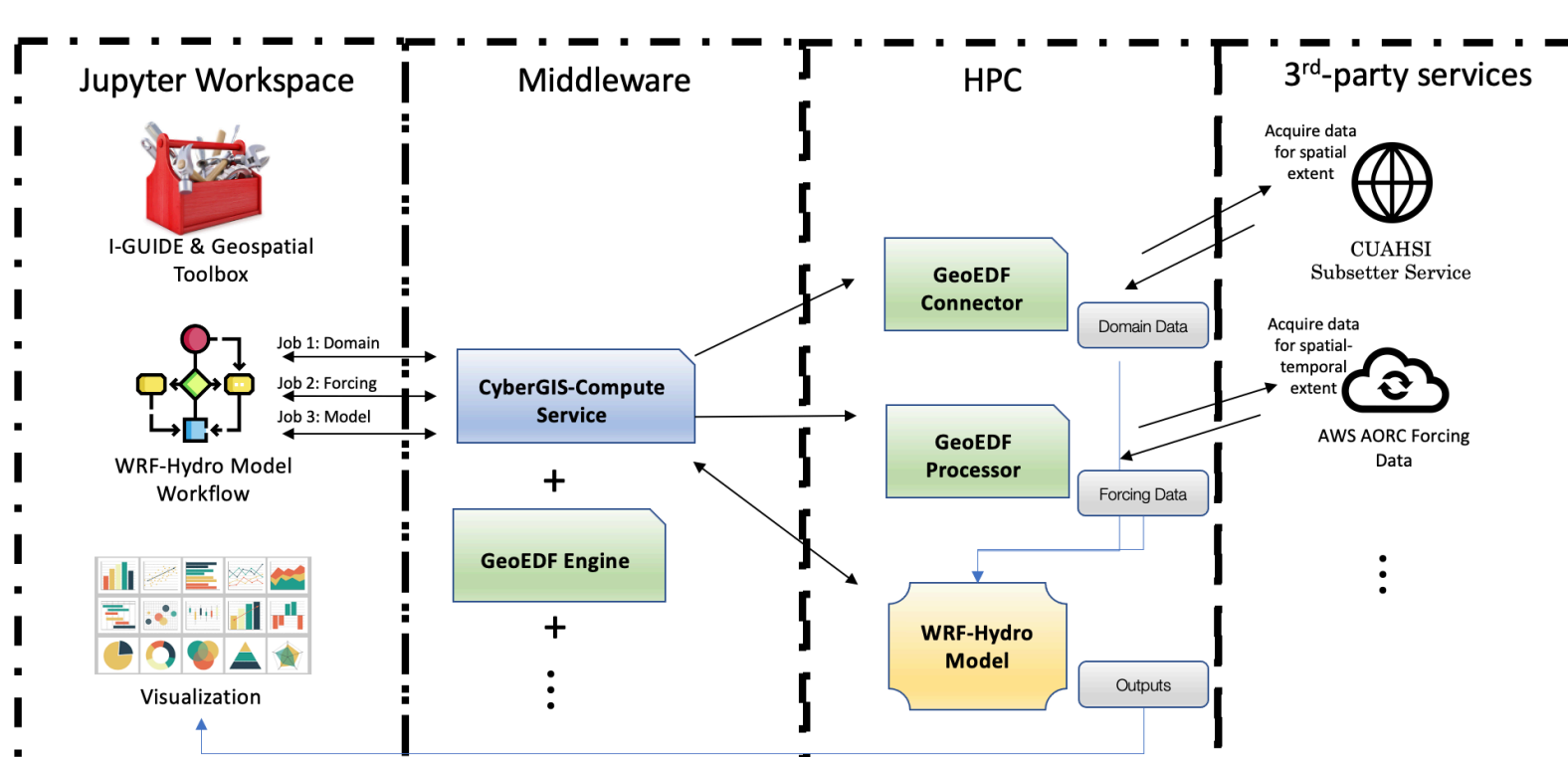
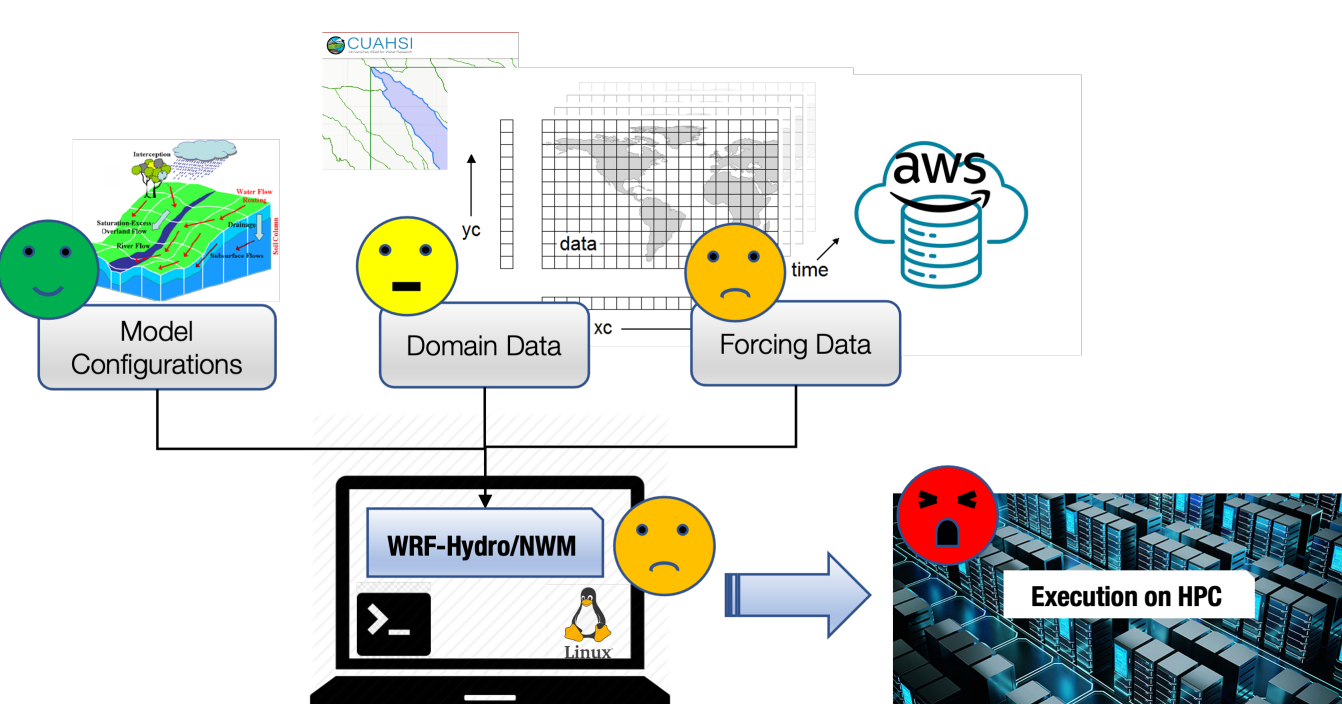
### Aging Dam Use Case

Address the questions of whether and where socioeconomically disadvantaged populations are vulnerable to disasters caused by potential aging dam failures.



### WRF-Hydro Use Case

Model hydrological processes in a watershed using the WRF-Hydro model to reproduce the National Water Model (NWM) results.

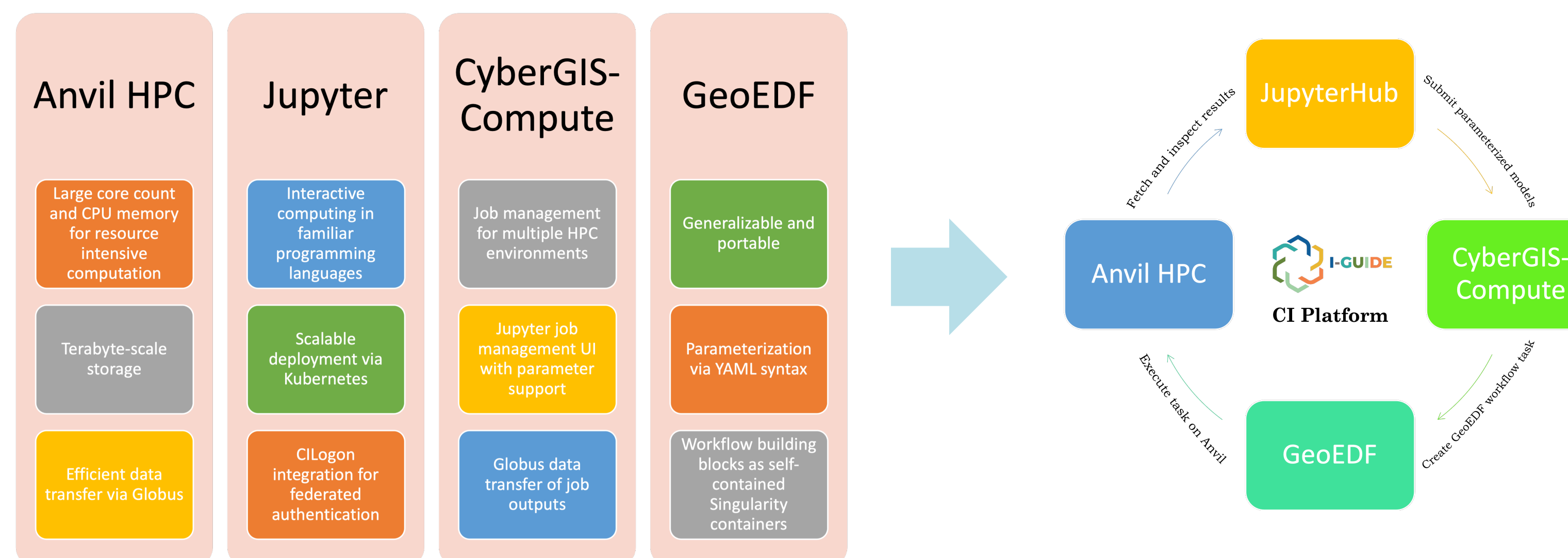


IGUIDE (beta) platform design overview

### System Design

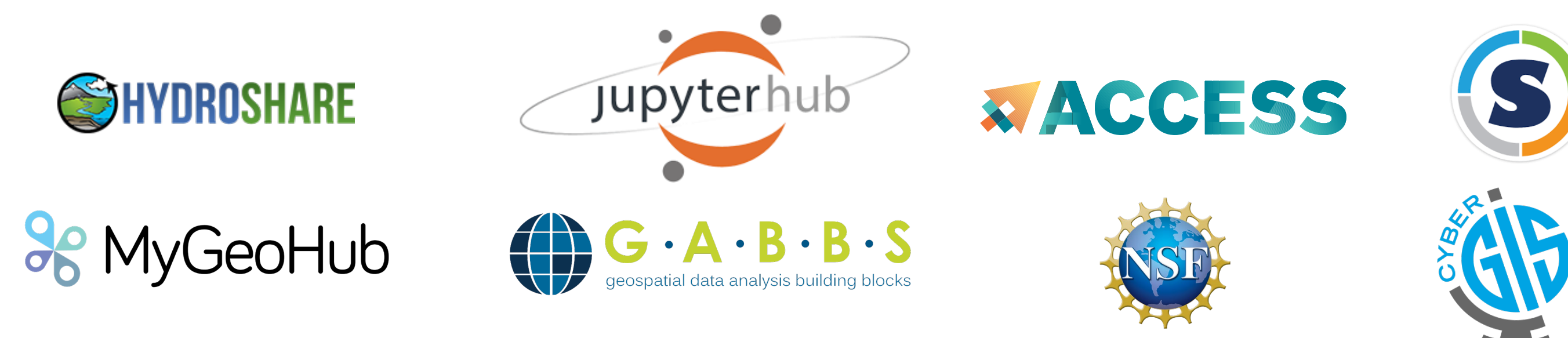
- Bring together disparate tools and leverage past investments in tools
- Lower the barrier by using a familiar interactive computing platform like Jupyter as the entry point
- Hide details via the CyberGIS-Compute that can seamlessly execute diverse models and workflow building blocks
- Efficiently leverage existing tools and national CI capabilities such as GeoEDF, JupyterHub, Globus, Singularity containers, and Anvil HPC
- Future resource catalog integration will simplify resource discovery and utilization

### An Integrated Approach (beta)



Existing CIs and capabilities

Integration of existing CIs



### Aging Dam Notebook

```

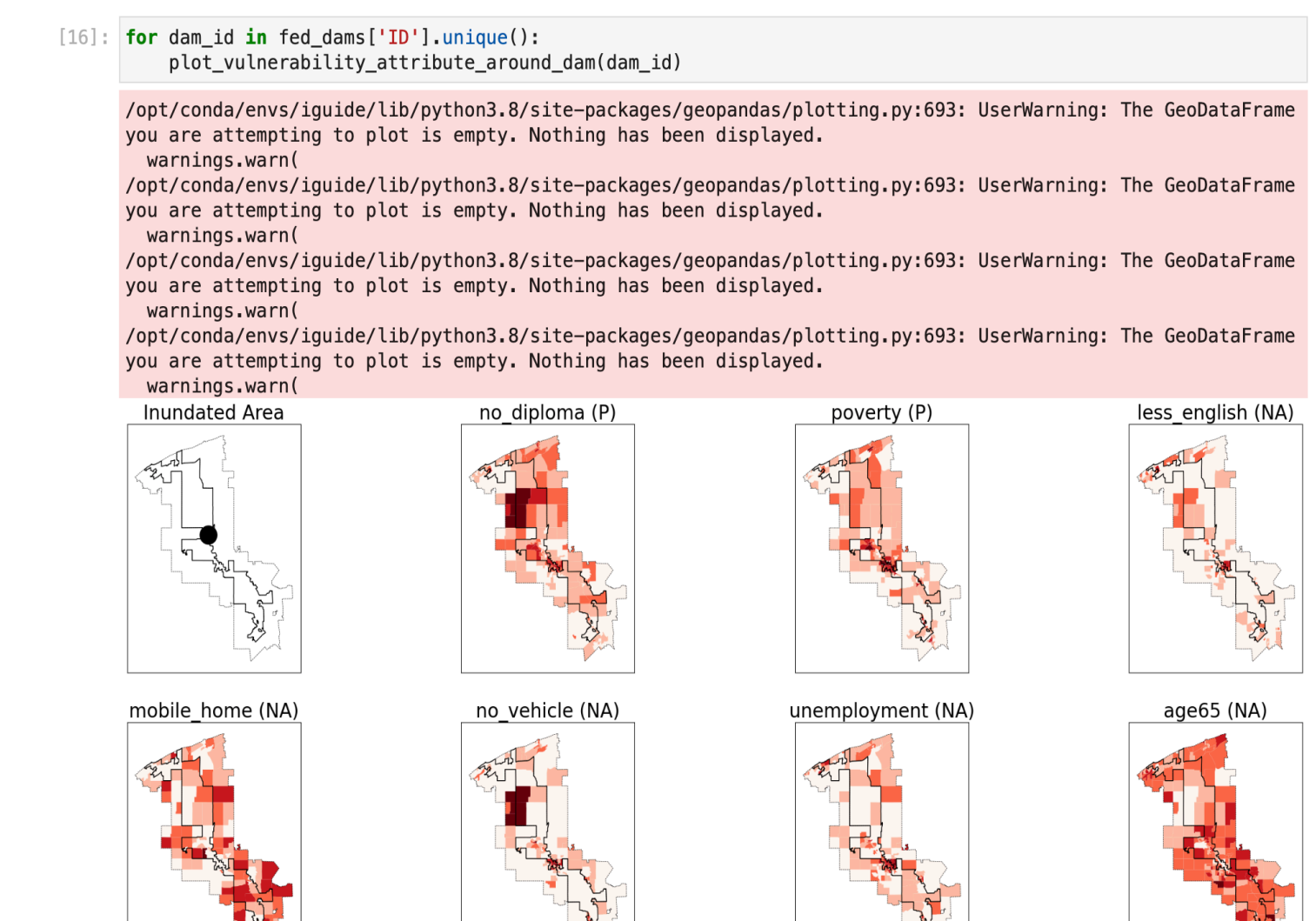
iguide_wrfhydro.ipynb | iguide_agingdams.ipynb | Python [conda env:iguide]
Code
benchmark_area = dam_area.loc[dam_area['Class'] == 0]
inund_area = dam_area.loc[dam_area['Class'] > 0]
benchmark_area_union = benchmark_area.dissolve(by='Dam_ID')
inund_area_union = inund_area.dissolve(by='Dam_ID')

fed_dams_focus = fed_dams.loc[fed_dams['ID'] == dam_id].reset_index()

# Plot maps
var_list = ['no_diploma', 'poverty', 'less_english', 'mobile_home', 'no_vehicle', 'unemployment', 'age65']
for n in range(8):
    if n == 0:
        fed_dams_focus.plot(ax=ax[n], markersize=500, color='black')
        ax[n].set_title(label='Inundated Area', fontsize=24)
    else:
        dam_area.loc[dam_area['var_list'] == -66666666].plot(var_list[n-1], ax=ax[n], scheme='Fisher')
        dam_area.loc[dam_area['var_list'] == -66666666].plot(ax=ax[n], color='Grey')
        ax[n].set_title(label=f'{var_list[n-1]} ({fed_dams_focus["C_"] + var_list[n-1].values[0]}', font
        benchmark_area_union.boundary.plot(ax=ax[n], color='black', lw=0.5, linestyle='dashed')
        inund_area_union.boundary.plot(ax=ax[n], color='black', lw=1)
        ax[n].get_xaxis().set_visible(False)
        ax[n].get_yaxis().set_visible(False)

plt.show()
    
```

#### Data Visualization



### WRFHydro Notebook

```

iguide_wrfhydro.ipynb | Markdown
Map Layout
This map layout represents the Logan River Watershed. For this example, we have selected the upstream watershed (the highlighted one)
[Map showing Logan River Watershed]
[53]: params_subset_domain = {"huc12_id": huc12,
                             "start_date": start_datetime.strftime("%m/%d/%Y"),
                             "end_date": end_datetime.strftime("%m/%d/%Y")}
params_subset_domain

[53]: {"huc12_id": "160102030302",
      "start_date": "01/01/2016",
      "end_date": "01/01/2016"}

Subset DOMAIN Files with GeoEDF Data Connector on CyberGIS Compute
The source of WRFHydro DOMAIN files is CUAHSI Domain Subsetter service. I-GUIDE provides a reusable GeoEDF Data Connector (CUAHSISubsetter
CUAHSI Domain Subsetter REST APIs and retrieves the domain files ready for model use. The GeoEDF Data Connector has been integrated into Cybe
by users from Jupyter environment and executed on supported HPC resources. The subset domain files staged remotely in ready for use by WRFHyd
download the files from HPC back to Jupyter for local manipulation.

[54]: import cybergis_compute_client
from cybergis_compute_client import CyberGISCompute

cybergis = CyberGISCompute(url='cogjobsup.cigi.illinois.edu', isJupyter=True, protocol='HTTPS', port=443, suffix='v
cybergis.show_ui(defaultJob='CUAHSI_Subsetter_Connector', input_params=params_subset_domain)

Tab(children=(Output(), Output(), Output(), Output()), selected_index=0, titles=('Job Configuration', 'Your Jo...
Make sure to download the output and then continueRetain Domain Subsetter JobID for later reference

[55]: jobid_cuahsi_subset_domain = cybergis.job_id
    
```

### Reference

IGUIDE platform:  
<https://iguide.illinois.edu/platform/>

This project is funded by the National Science Foundation award no 2118329.  
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