

User experience and co-creation

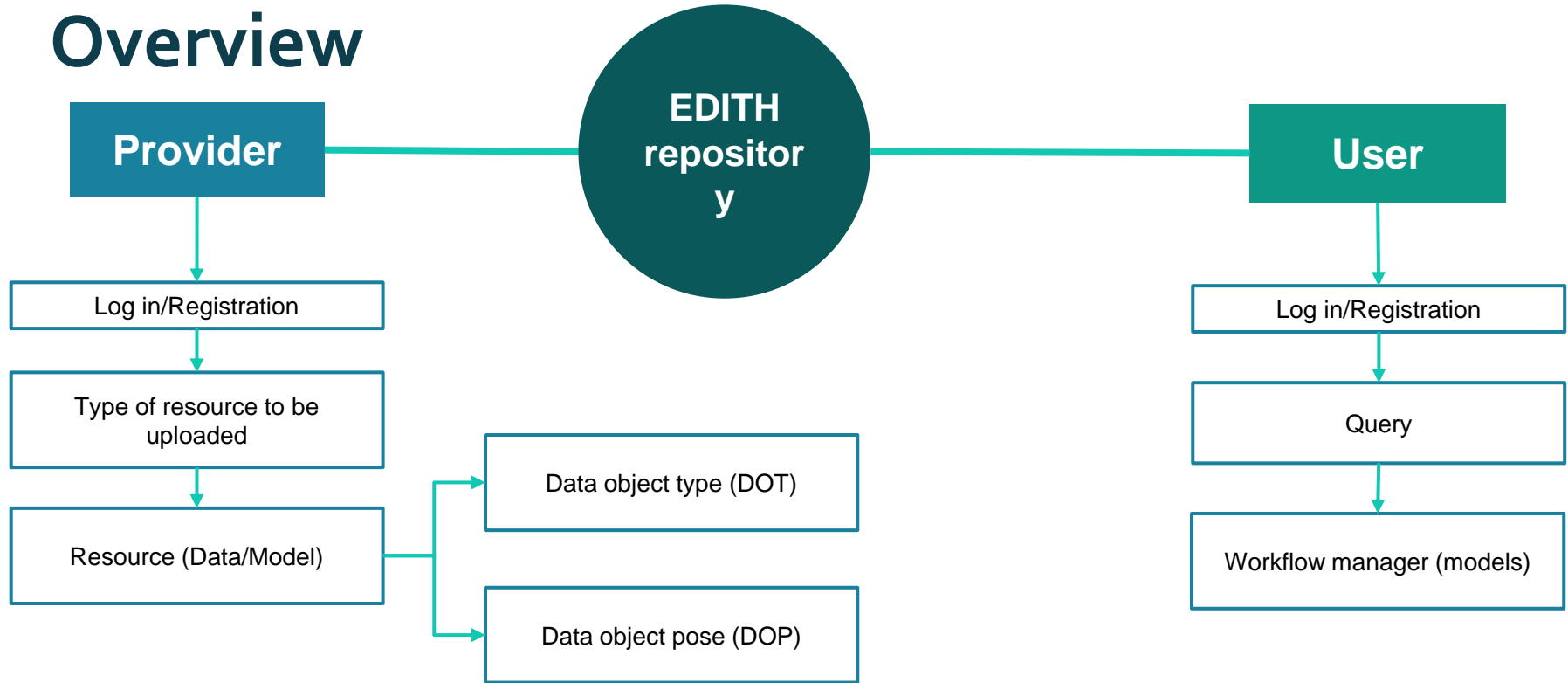
Deep Thinkers Meeting
Rome, 16th-17th of May



EDITH is a coordination and support action funded by the Digital Europe program of the European Commission under grant agreement n° 101083771.



Overview



EDITH

Ecosystem for Digital Twins in Healthcare



Welcome to EDITH catalogue
Are you already registered on EDITH?

Yes

No



Create an account

Two-step authentication

Username

Password

Telephone

Field 2

Field 3

Field 4

Field 5

Field 6

Field 7

Field 8



Log in

Username

Password

Send OTP



Log in

Insert the OTP received on your email

Log in

User experience

PROVIDER



EDITH is a coordination and support action funded by the Digital Europe program of the European Commission under grant agreement n° 101083771.



Which action do you want to do?

Upload a resource

Use a resource

What do you want to upload into the EDITH repository?

Dataset

Model

Algorithm

Good practice



Data Object Type



Data Object Pose



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Semantics

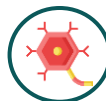
Select the scale of the dataset



Molecular



Cell



Tissue



Organ

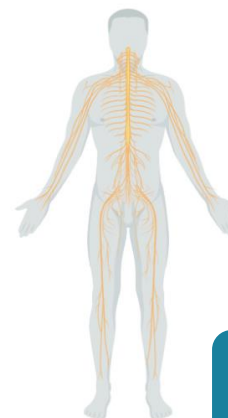
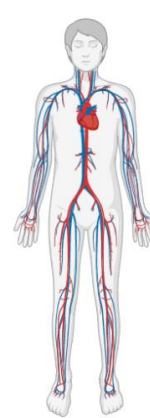
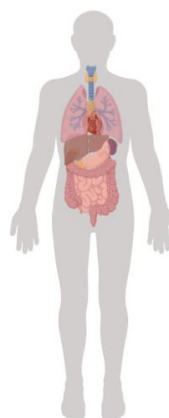


System



Body

Select to which part of the body the dataset is referred to





▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Semantics

Are dataset variables coded based on an ontology?

Yes

No





▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Semantics

Are dataset variables coded based on an ontology?

Yes

No

Select an ontology ▼

Cancer research and management ontology

Foundational Model of Anatomy

Vital Sign Ontology

Cardiovascular Disease Ontology

Neuron Phenotype Ontology

...

The ontology you used is
not listed here?





▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Semantics

Are dataset variables coded based on an ontology?

Yes

No

Select an ontology ▼

Cancer research and management ontology

Foundational Model of Anatomy

Vital Sign Ontology

Cardiovascular Disease Ontology

Neuron Phenotype Ontology

...

The ontology you used is
not listed here?





▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Semantics

Are dataset variables coded based on an ontology?

Yes

No

Select an ontology ▼

Cancer research and management ontology

Foundational Model of Anatomy

Vital Sign Ontology

Cardiovascular Disease Ontology

Neuron Phenotype Ontology

...

The ontology you used is
not listed here?



What to do if:

- The ontology is not present within EDITH
- The dataset does not follow an ontology?





▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No





1st
scenario



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Select the standard

Select a standard ▼
HL7
OMOP
CDISC
openEHR
other



1st
scenario



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Select the standard

Select a standard ▼
HL7
OMOP
CDISC
openEHR
other

Version ▼
v2
v3
FHIR





**1st
scenario**



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Select the standard

HL7 FHIR





**2nd
scenario**



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Select the standard

Select a standard ▼
HL7
OMOP
CDISC
openEHR
other



2nd scenario

▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Select the standard

Select a standard ▼

HL7

OMOP

CDISC

openEHR

other

Version ▼

CDM v3.0

CDM v5.3

CDM v5.4

CDM v6.0





2nd scenario



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Standard selected

OMOP CDM v5.4

An automatic mapping procedure will be adopted for the conversion from the current standard to HL7 FHIR (aka *metadata crosswalk*)





**3rd
scenario**



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Select the standard

Select a standard ▼
HL7
OMOP
CDISC
openEHR
other





3rd scenario



▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Syntax

Is the dataset standardized?

Yes

No

Select the standard

Select a standard ▼
HL7
OMOP
CDISC
openEHR
other

Guided procedure
for standard
mapping



3rd scenario

Guided procedure for standard mapping

Domain

Variable granularity

Other info



Any thoughts about these
procedures for different
scenarios?





▼ Data Object Type

- ▶ Semantics
- ▶ Syntax
- ▶ Accessibility
- ▶ Data Object Pose

Is the dataset released under a license?

Yes

No





▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Is the dataset released under a license?

Yes

No

Select the license

Select a license ▼

Open Access

Specific conditions





▼ Data Object Type

▶ Semantics

▶ Syntax

▶ Accessibility

▶ Data Object Pose

Is the dataset released under a license?

Yes

No

Select the license

Select a license ▼

Open Access

Specific conditions

Specific conditions ▼

Accept/Decline conditions

Signature on the document

Warranties

Other documentation needed



What about the adoption of this strategy?





▶ Data Object Type

▼ Data Object Pose

▶ Body

▶ Time

▶ Credibility

▶ Clustering





▶ Data Object Type

▼ Data Object Pose

▶ Body

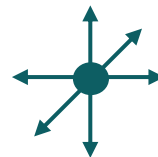
▶ Time

▶ Credibility

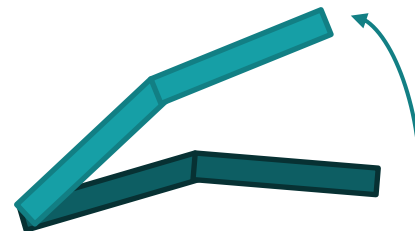
▶ Clustering

Body

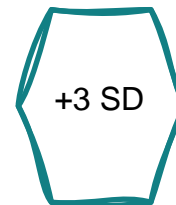
Rigid transformation



Multi-body rigid transformation



Elastic transformation



How to represent a dataset with different variables?





▶ Data Object Type

▼ Data Object Pose

▶ Body

▶ Time

▶ Credibility

▶ Clustering

Time (Age)

It represents the age of the subject when the data were collected



How to represent a dataset with different subjects?





▶ Data Object Type

▼ Data Object Pose

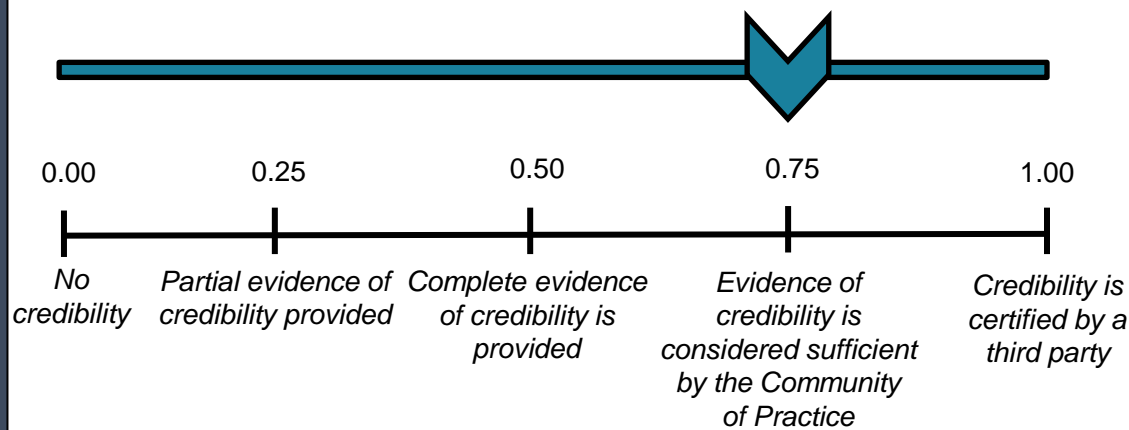
▶ Body

▶ Time

▶ Credibility

▶ Clustering

Credibility



Options for a reliable credibility rating

- Insert a third-party process for evaluating the credibility rating inserted by the provider
- Present a standardized procedure to reach a certain credibility rating
- The provider does not set a credibility rating, instead a third-party process assign a credibility ratings directly





▶ Data Object Type

▼ Data Object Pose

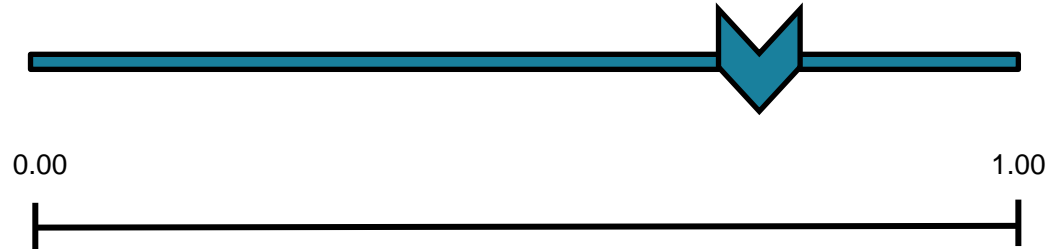
▶ Body

▶ Time

▶ Credibility

▶ Clustering

Clustering



How to generalize this concept?



User experience

USER



EDITH

EDITH is a coordination and support action funded by the Digital Europe program of the European Commission under grant agreement n° 101083771.



Which action do you want to do?

Upload a resource

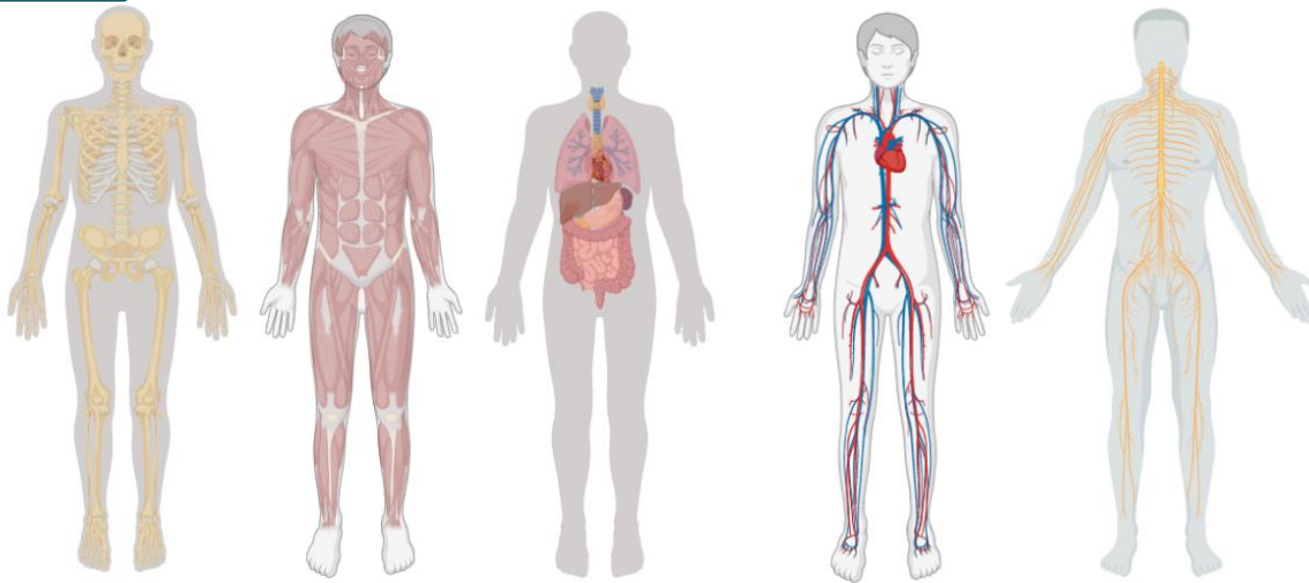
Use a resource

Example: Cardiac
output in presence
of atrial fibrillation

Use a resource

Select the part of the body to explore

1st
strategy



Example: Cardiac
output in presence
of atrial fibrillation

1st
strategy

Use a resource

Select the part of the body to explore



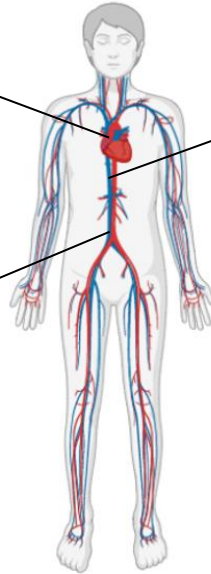
Heart



Venous
system



Artery
system



Cardiovascular system



1st
strategy

Example: Cardiac
output in presence
of atrial fibrillation

Use a resource

Select the part of the body to explore



Heart

Model #1

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #2

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #3

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Cardiovascular system

- Pre-select the type of resource (aka dataset, model, etc.)?
- Give the possibility to select the scale?



2nd strategy

Use a resource

Insert a query

Example: Cardiac output
in presence of atrial
fibrillation

Model of atrial fibrillation

Model #1

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #2

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #3

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Categories

Dataset

Model

Algorithm

Good practice

Accessibility

Free Access

Controlled Access

Restricted access

Taken from
ebrains.eu
Other «metadata»
info to be shown
here to facilitate
the search?



2nd strategy

Use a resource

Insert a query

Example: Cardiac output
in presence of atrial
fibrillation

Model of atrial fibrillation

Model #1
[Abstract]
INPUT: ...
OUTPUT: ...

Ontology: ...
Accessibility:
...
Body: ...
Time (Age): ...

Credibility: ...
Clustering: ...

Model #2
[Abstract]
INPUT: ...
OUTPUT: ...

Ontology: ...
Accessibility: ...
Body: ...
Time (Age): ...

Credibility: ...
Clustering: ...

Model #3
[Abstract]
INPUT: ...
OUTPUT: ...

Ontology: ...
Accessibility: ...
Body: ...
Time (Age): ...

Credibility: ...
Clustering: ...



Categories

- ▶ Dataset
- ▶ Model
- ▶ Algorithm
- ▶ Good practice

Accessibility

- ▶ Free Access
- ▶ Controlled Access
- ▶ Restricted access

Taken from
ebrains.eu
Other «metadata»
info to be shown
here to facilitate
the search?

2nd strategy

Use a resource

Insert a query

Example: Cardiac output
in presence of atrial
fibrillation

Model of cardiac output

Model #1

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #2

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #3

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Categories

Dataset

Model

Algorithm

Good practice

Accessibility

Free Access

Controlled Access

Restricted access

Taken from
ebrains.eu
Other «metadata»
info to be shown
here to facilitate
the search?



2nd strategy

Use a resource

Insert a query

Example: Cardiac output
in presence of atrial
fibrillation

Model of cardiac output

Model #1

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #2

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility: ...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Model #3

[Abstract]

INPUT: ...

OUTPUT: ...

Ontology: ...

Accessibility:

...

Body: ...

Time (Age): ...

Credibility: ...

Clustering: ...

Categories

Dataset

Model

Algorithm

Good practice

Accessibility

Free Access

Controlled Access

Restricted access

Taken from
ebrains.eu
Other «metadata»
info to be shown
here to facilitate
the search?

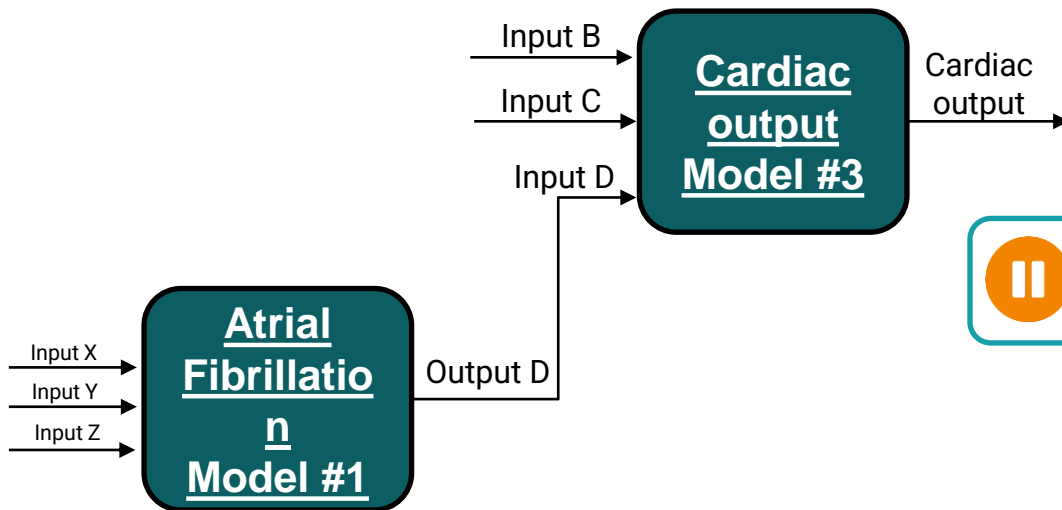


Example: Cardiac output
in presence of atrial
fibrillation

Use a resource

Build the workflow

- ✓ All resources are actionable
- ✓ All resources are HPC-actionable
- ✓ Models input-output are compatible
- ✗ Some inputs are missing



 Play
simulation

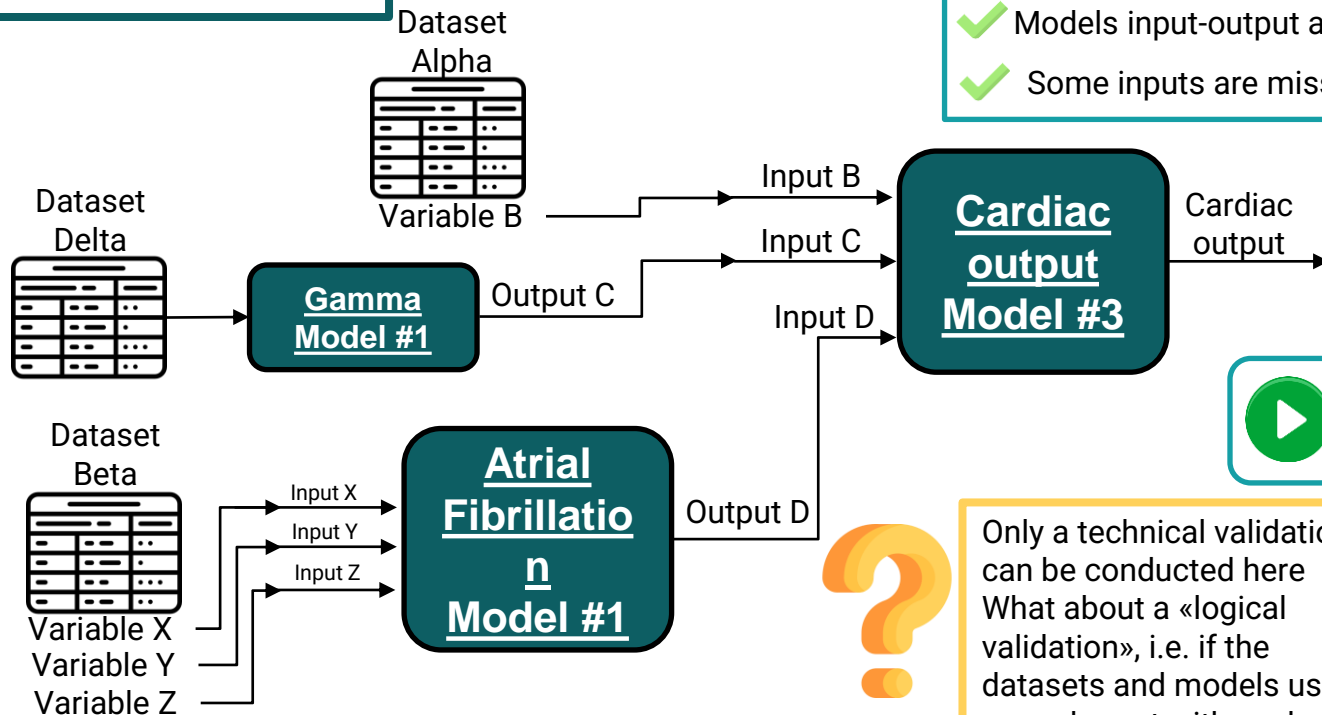


Example: Cardiac output
in presence of atrial
fibrillation

Use a resource

Build the workflow

- ✓ All resources are actionable
- ✓ All resources are HPC-actionable
- ✓ Models input-output are compatible
- ✓ Some inputs are missing



 Play
simulation



Only a technical validation
can be conducted here
What about a «logical
validation», i.e. if the
datasets and models used
are coherent with each
other?

