COMETE FRAMEWORK : G.U.I. CONNECTED TO MULTIPLE DATA SOURCES

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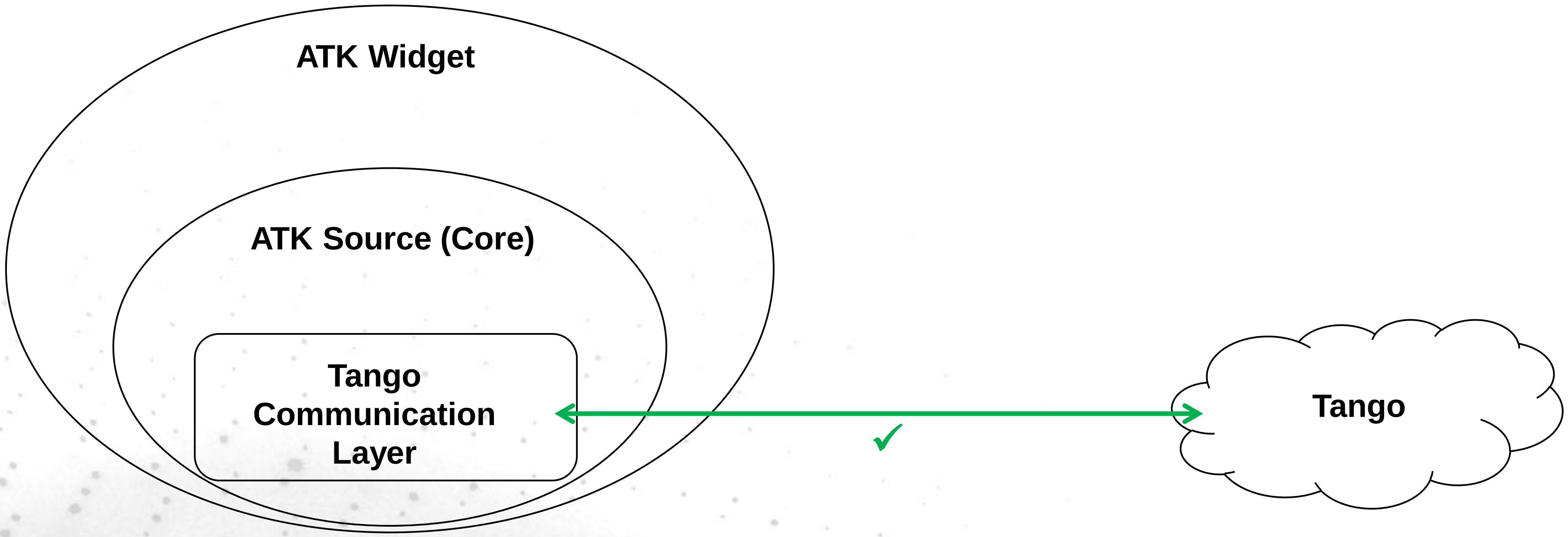
Motivations of the project

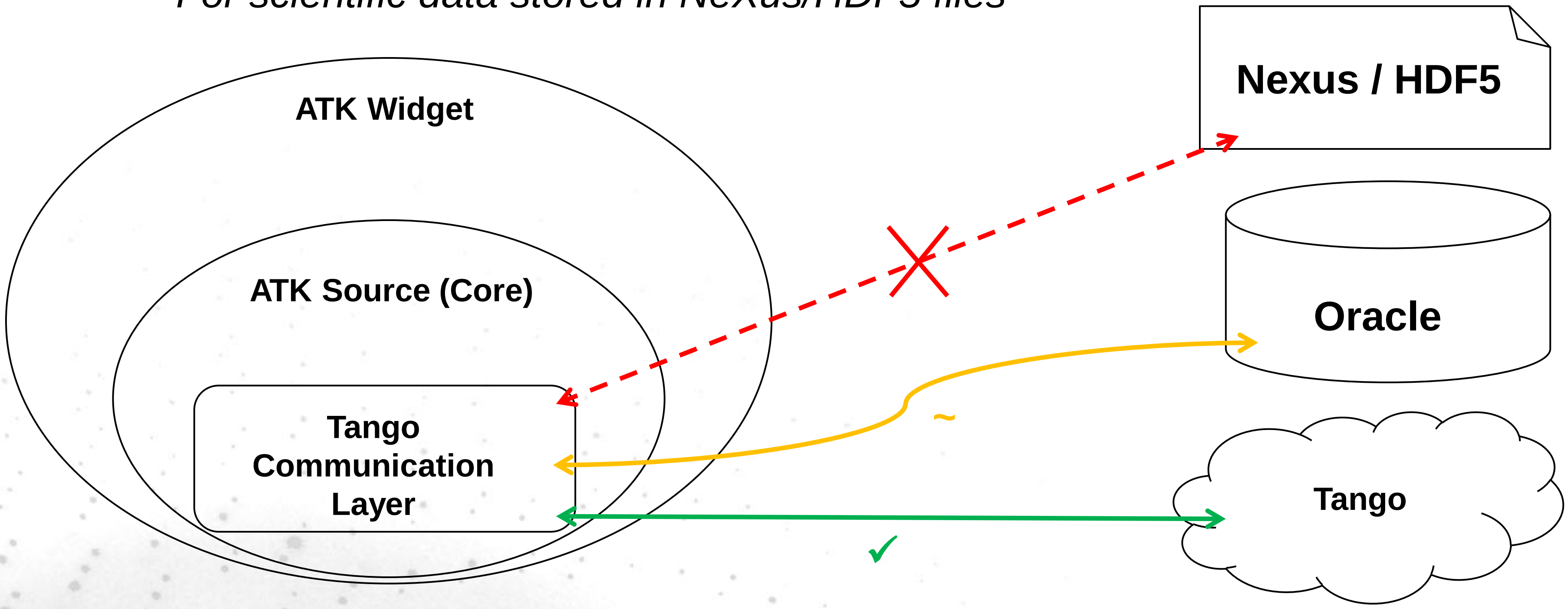
Motivations of the COMETE framework

- During the first years of SOLEIL construction, ICA team was focused on developing GUI applications on top of TANGO devices for the Control systems
- For this purpose, it was decided to use an existing framework: ATK



Motivations of the COMETE framework

- Then the focus was set on providing data storage and management applications for technical and scientific data.
  - *For the technical data the Tango Archiving service storing Tango attributes in MYSQL or Oracle database*
  - *For scientific data stored in NeXus/HDF5 files*



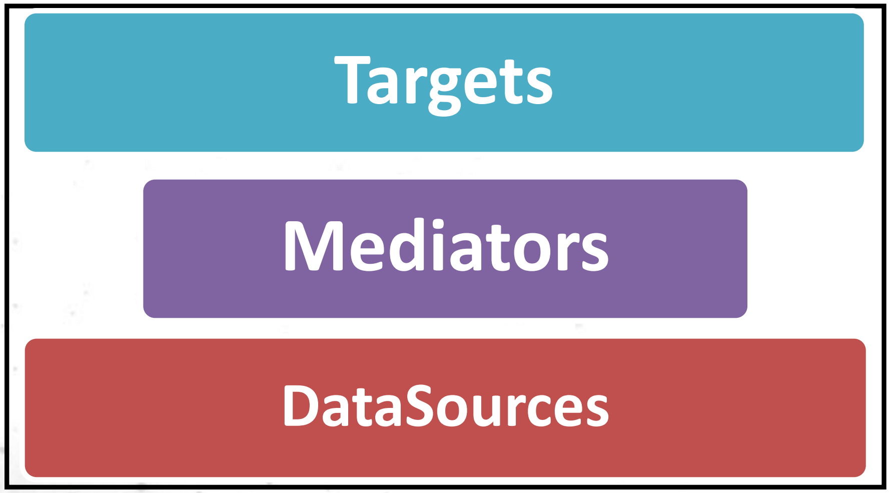
COMETE project started in 2009

Comete Architecture

COMETE Architecture : DataConnection Management

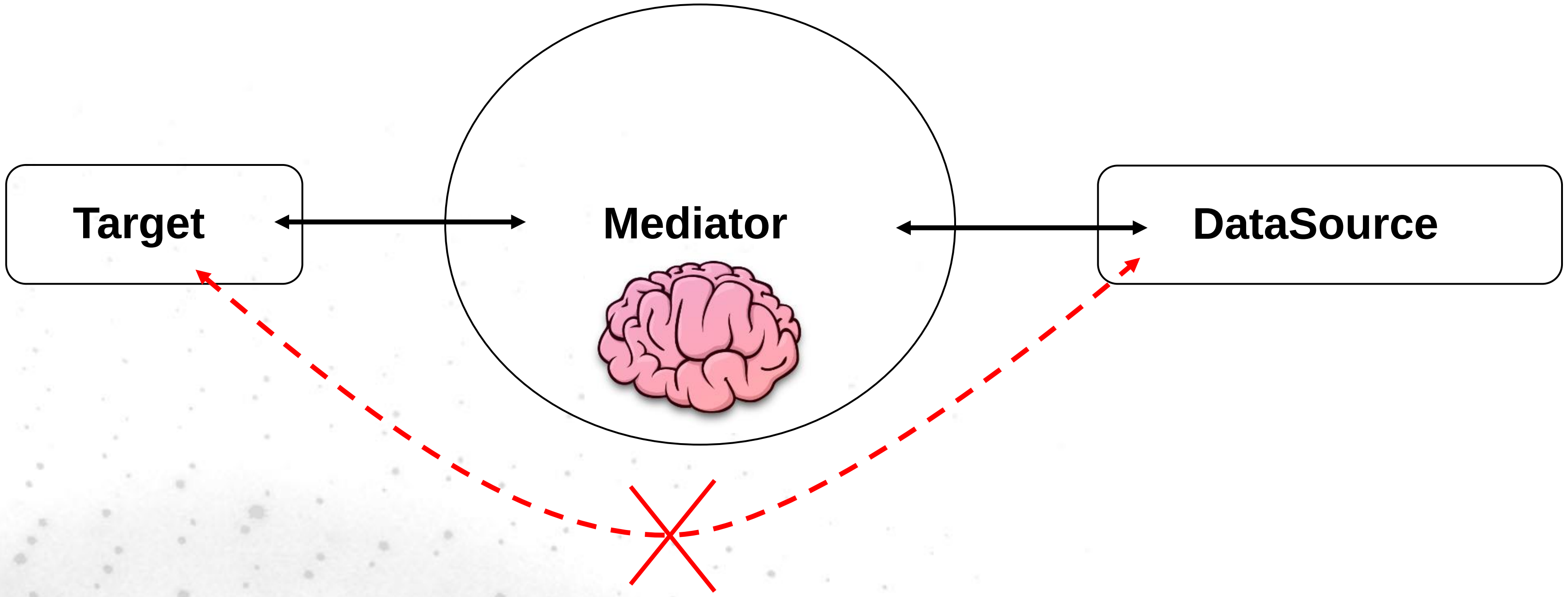
- The DataConnectionManagement module is a layer that allows connection between two abstract entities, called “Targets” and “Data Sources”

- DataConnectionManagement implements a Mediator pattern , as well as various other patterns such as Strategy, Observer



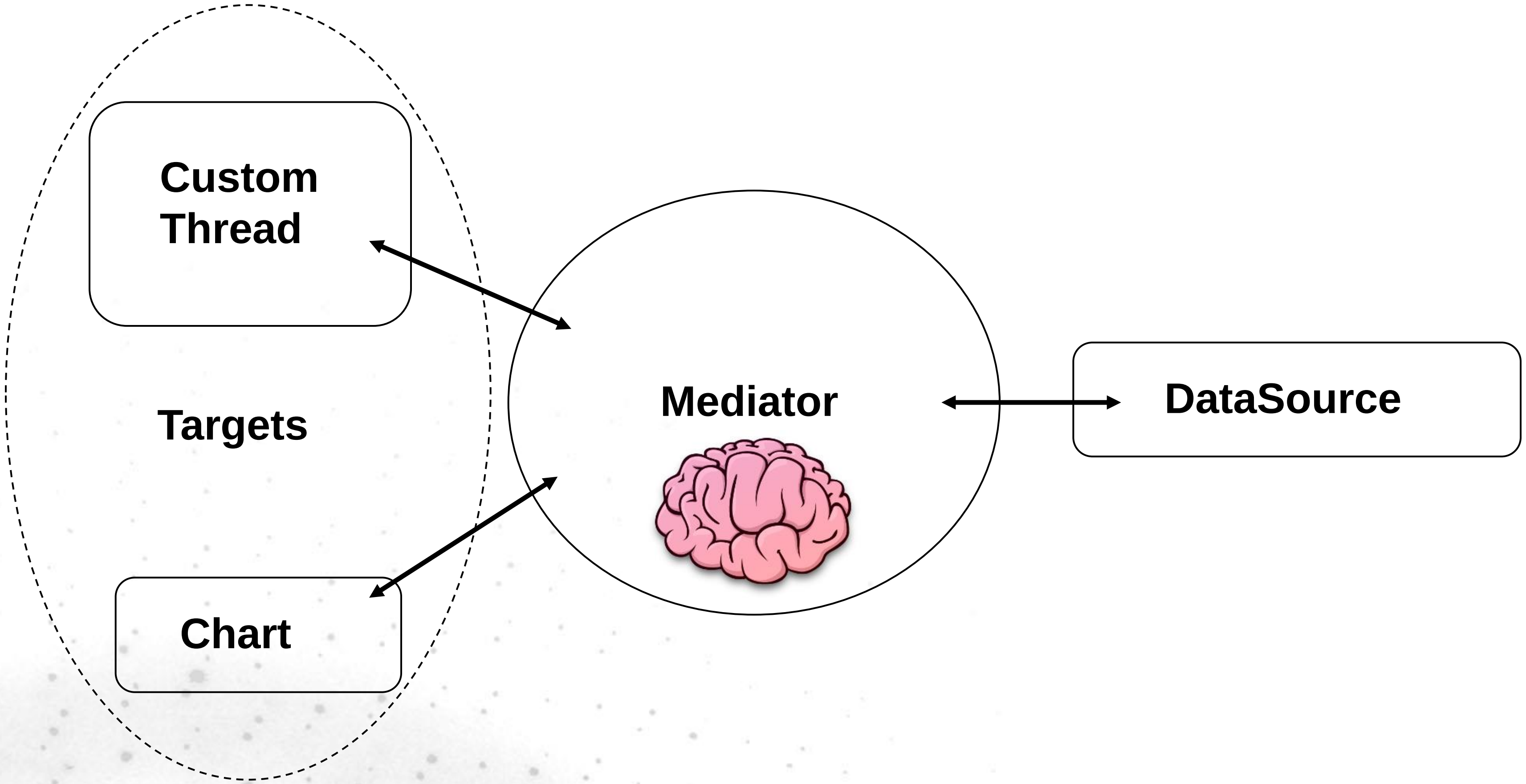
COMETE Architecture : DataConnection Management

- Mediator was chosen instead of MVC pattern because our two entities had to be completely independent from each other, to allow easily adding new widgets and sources



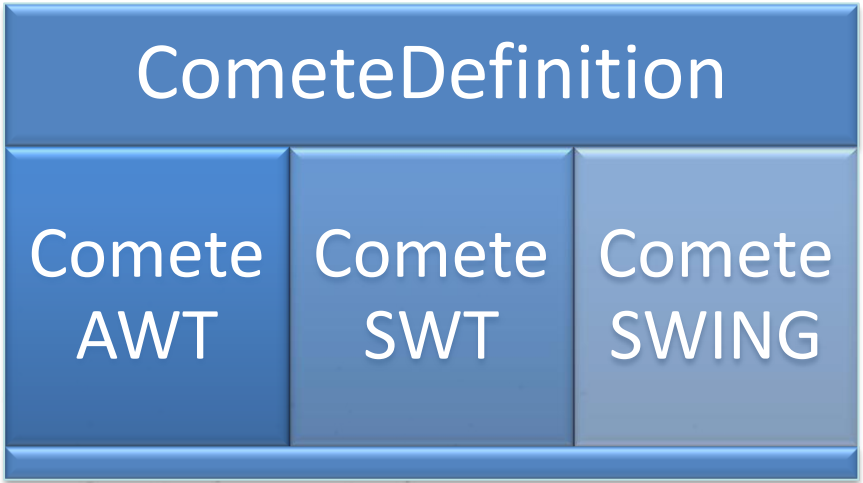
COMETE Architecture : DataConnection Management

- We decided to use Targets instead of Widgets, because we also needed to connect sources to non graphical targets (example: to custom processes)



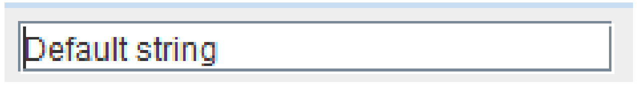
COMETE Architecture : Widgets

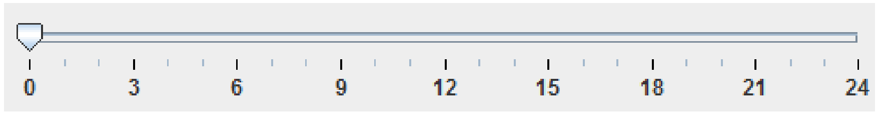
- COMETE **Widgets** are “**Targets**” specialization
- They musts comply with the interfaces described in CometeDefinition that makes them connectable to any data source
- Comete Widgets are available in three implementations (Swing, SWT & AWT)

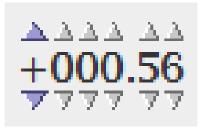


COMETE Architecture : Widgets

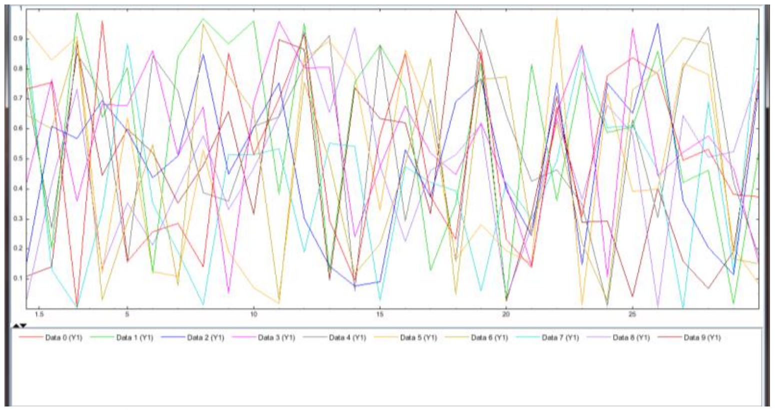
- Of course the COMETE framework allows adding easily new widgets.
- The **current library of widgets** can display:
  - ➢ *Scalar data (textfield, spinner, wheelswitch, slider, etc.)*



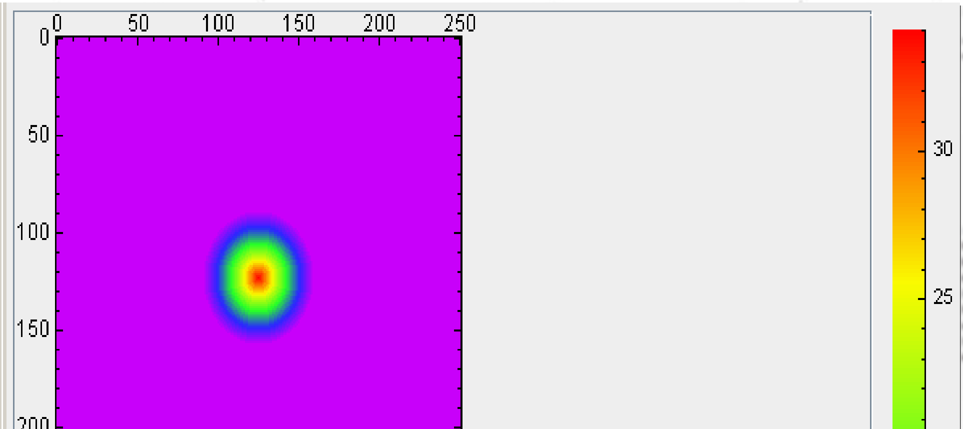


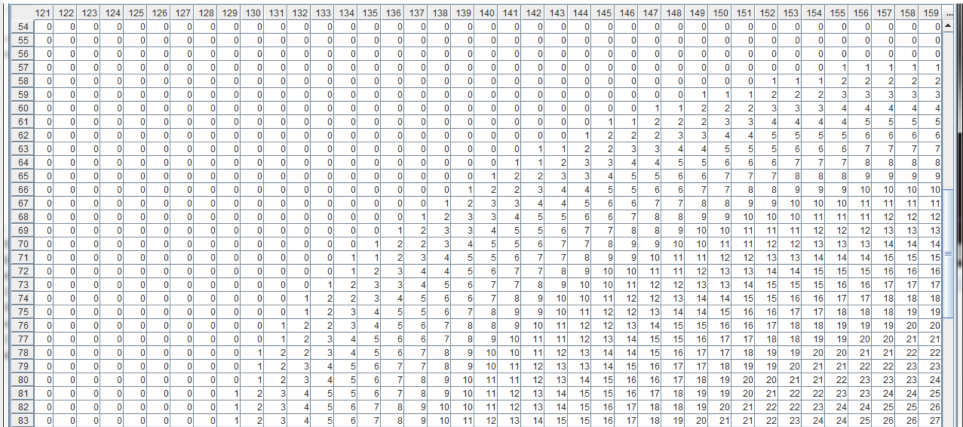


  - ➢ *Spectrum data (chart viewer)*



  - ➢ *Images (image viewer, tables)*





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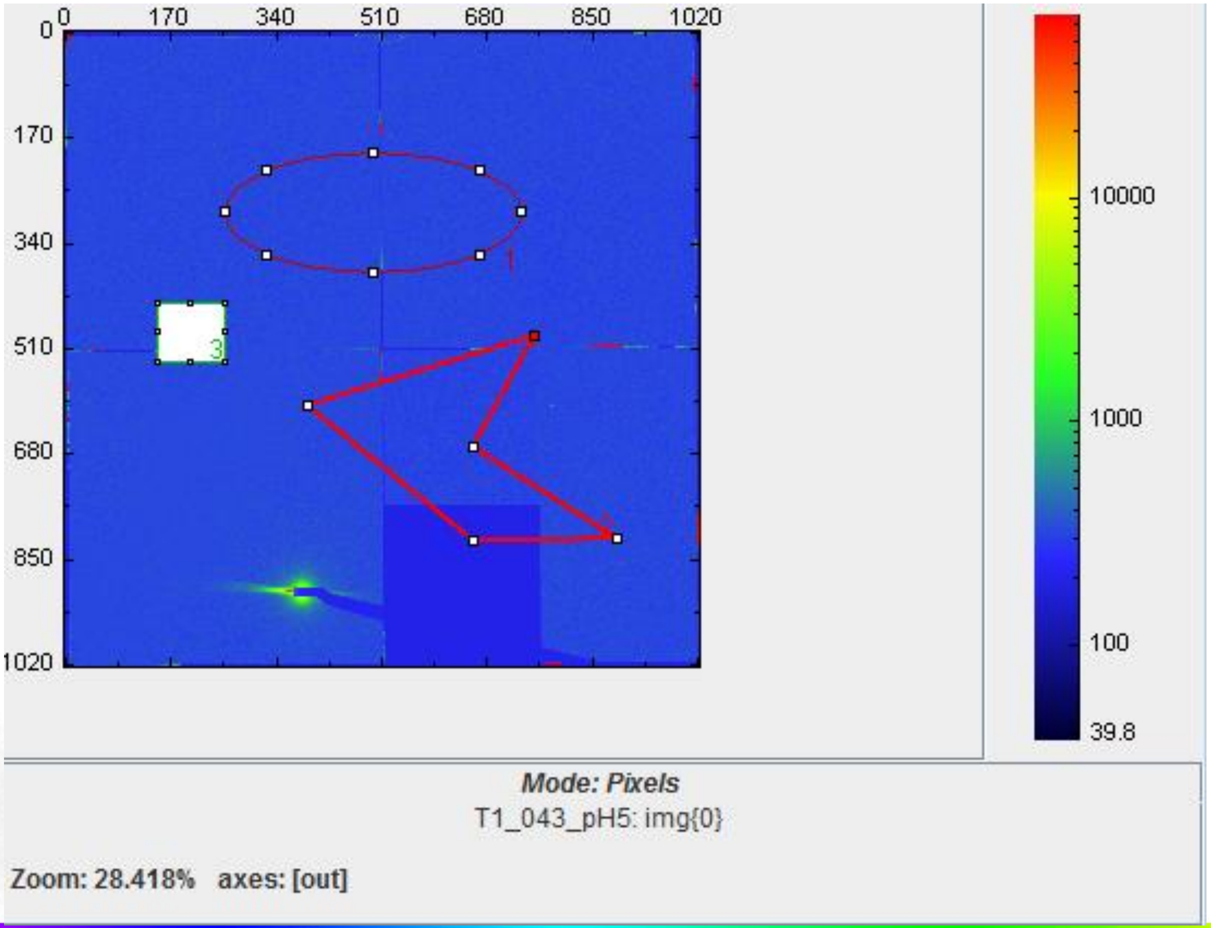
COMETE Architecture : Widgets

- CometeSwing image viewer is based on **ImageJ** which allows using ImageJ macros and ROI definitions within the component



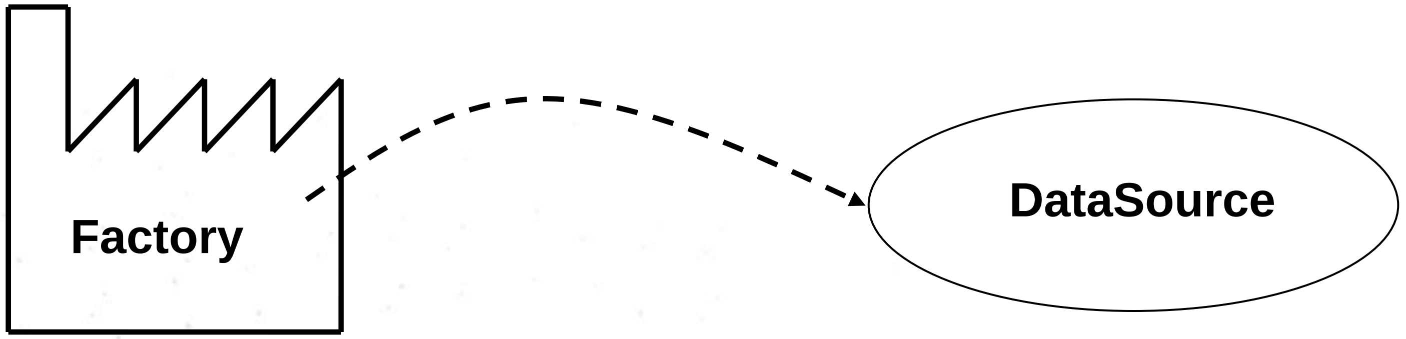
Mode: Pixels

T1_043_pH5: img{0}

Zoom: 28.418%   axes: [out]

COMETE Architecture : DataSources

- For better development separation, and in order to manage extra services around sources (like polling), DataSources creation follow the factory design pattern



COMETE Architecture : DataSources

- When someone wants to add a new data source to Comete, this person will implement a class that extends AbstractDataSource
- This guarantees that the COMETE mediator will be able to send data to the widget and vice-versa
- The developer will also make the factory (IDataSourceFactory) that handles sources production and data refreshment (if any)

- Today the **following data sources are available** within the COMETE framework:
    - *A TANGO implementation to access Control System data*
    - *A NeXus implementation to access scientific data from data reduction applications.*
    - *A first SQL implementation to access technical data produced by the Tango Archiving system*

COMETE Architecture : CometeBox

- The CometeBox module aims to simplify the use of COMETE for developers who intend to use the IDataSourceFactory
- When you want **to connect a target to some source** produced by an IDataSourceFactory, you have to do following steps:

  - *Instantiate your target*
  - *Instantiate your mediator*
  - *Instantiate your IDataSourceFactory*
  - *Instantiate a key*
  - *Ask your IDataSourceFactory to produce your source from this key*
  - *Ask your mediator to connect your source to your target*

- And of course, this allows accessing only 1 data.

COMETE Architecture : CometeBox

- CometeBox simplifies this access.
- It also offers the possibility to automatically connect your target to some meta-data around your source (for example, a state or quality concerning your source)

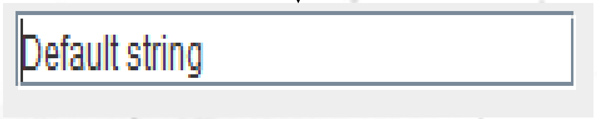
- To connect your target to a source and all its meta-data, you have to do following steps:
  - *Instantiate your target*
  - *Instantiate your CometeBox*
  - *Instantiate a key*
  - *Ask your CometeBox to connect your target to your key*

Use cases

Use cases : Connexion to a tango attribute

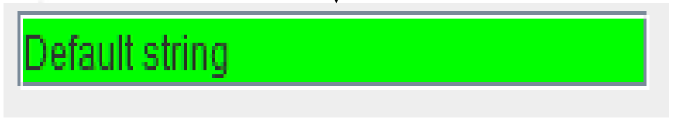
Case 1: Without CometeBox

```
TextField field = new TextField();
StringMediator mediator = new StringMediator();
TangoDataSourceFactory factory = new
TangoDataSourceFactory();
TangoKey key = new TangoKey();
TangoKeyTool.registerAttribute(«tango/tangotest/1
/string_scalar», key);
mediator.addLink(field,
factory.createDataSouce(key));
[...]
```


Default string

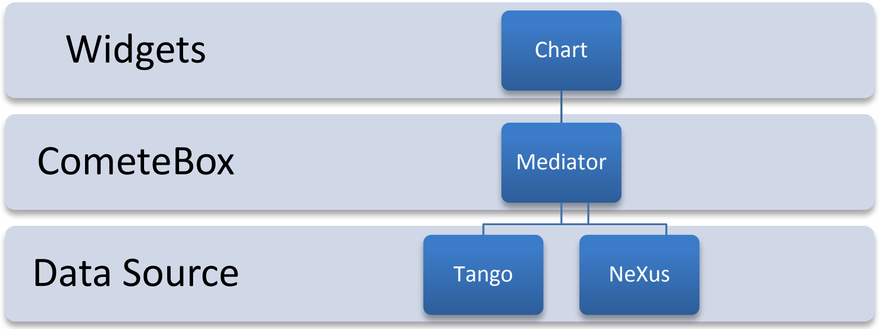
Case 2: With CometeBox

```
TextField field = new TextField();
StringScalarBox box = new StringScalarBox();
TangoKey key = new TangoKey();
TangoKeyTool.registerAttribute(«tango/tangot
est/1/string_scalar», key);
box.connectWidget(field,key);
[...]
```


Default string

Use cases : Connexion to multiple sources

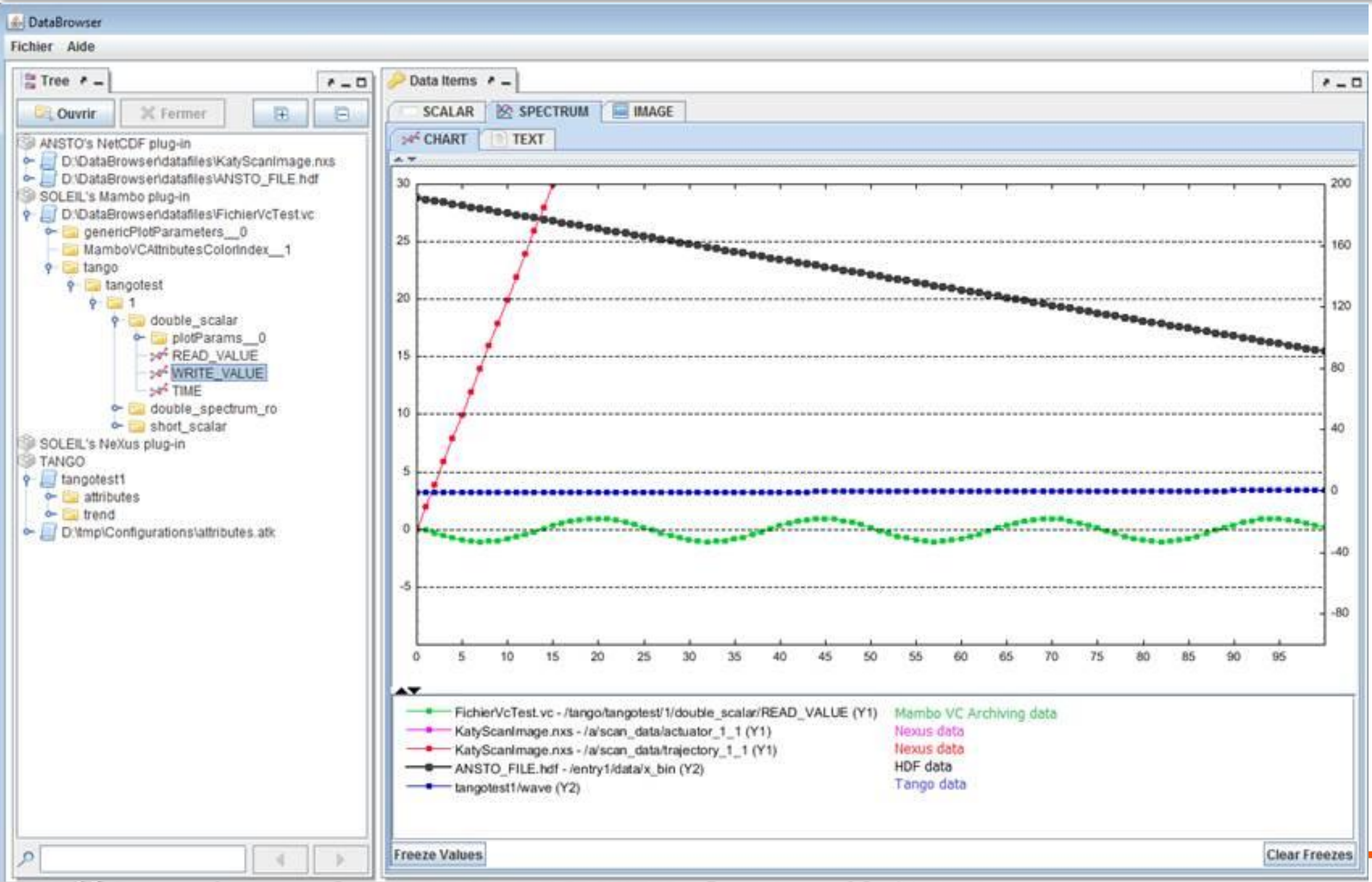
- A typical use case is to connect the same chart to both a tango and a NeXus source, in order to superpose spectrums from both sources



- This use case can be illustrated by following code:

```
Chart chart = new Chart();
ChartBox box = new ChartBox();
TangoKey tKey = new TangoKey();
TangoKeyTool.registerAttribute(«my/tango/device/myAttribute», tKey);
box.connectWidget(chart, tKey);
NexusKey nxKey = new NexusKey();
NexusKeyTool.registerDataSet(nxKey, filePath, datasetPath);
box.connectWidget(chart, nxKey);
[...]
```

Use cases : Chart connected to multiple sources



- FichierVcTest.vc - /tango/tangotest/1/double_scalar/READ_VALUE (Y1) — Mambo VC Archiving data
- KatyScanImage.nxs - /a/scan_data/actuator_1_1 (Y1) — Nexus data
- KatyScanImage.nxs - /a/scan_data/trajectory_1_1 (Y1) — Nexus data
- ANSTO_FILE.hdf - /entry1/data/x_bin (Y2) — HDF data
- tangotest1/wave (Y2) — Tango data

Conclusion

COMETE Framework : Summary

COMETE is the result of about 10 years of experience on GUI applications at SOLEIL.
It is now a **mature** and powerful framework **widely and daily used** by our developers

- The library of available **GUI** components is very **rich**
- Its architecture is **adaptable** in many contexts and other GUI frameworks

SOLEIL is open to collaborations on the project:

- With contributors (new widgets, new data sources, data services, etc…)
- With users, making feedback on their use and needs.

Questions ?

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