



LAVOISIER
DATA AGGREGATION FRAMEWORK

Journées Informatiques 2018
Port-Bail



- **Contribution to European Projects : Operations Portal ~ 2004**
 - **Data retrieved from services developed in various countries**
 - > Technologies were heterogeneous
 - > Technologies were potentially replaced with newer ones
 - **Data retrieved from many distributed sources**
 - > Memory overload issues
 - > Data source availability and latency issues
- **Many other applications need to aggregate data ~ Now**
 - Multiplicity of technologies, protocols, formats
 - We need to factorize the development efforts for supporting :
 - > New technologies
 - > Common features (robustness, monitoring, security)



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DATA AGGREGATION FRAMEWORK

What does Lavoisier ?





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What does Lavoisier ?



Heterogeneous

- protocols
- data formats



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Heterogeneous

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- data formats



Standard

- data format (XML)
- query language (XPath)
- query API (REST)



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What does Lavoisier ?



Heterogeneous

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Standard

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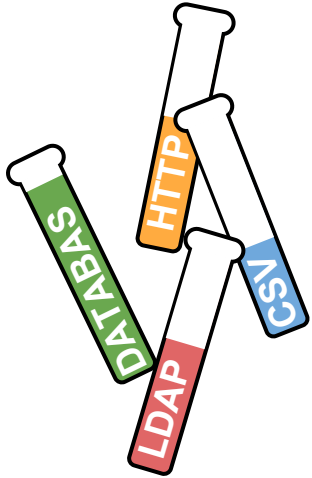
Rendering format chosen by user



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Lavoisier architecture

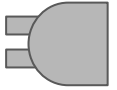


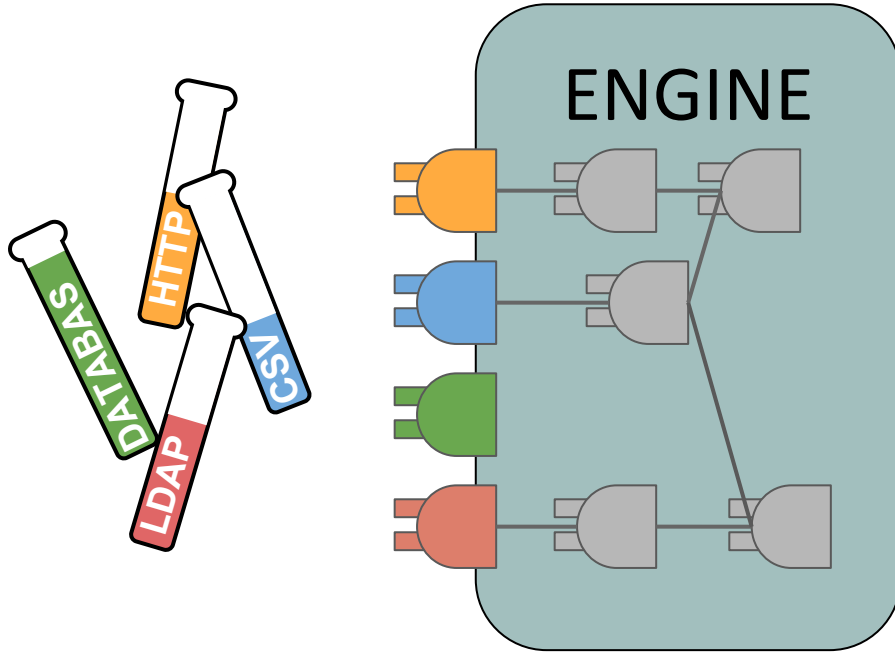


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Lavoisier architecture

plug-in 

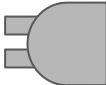


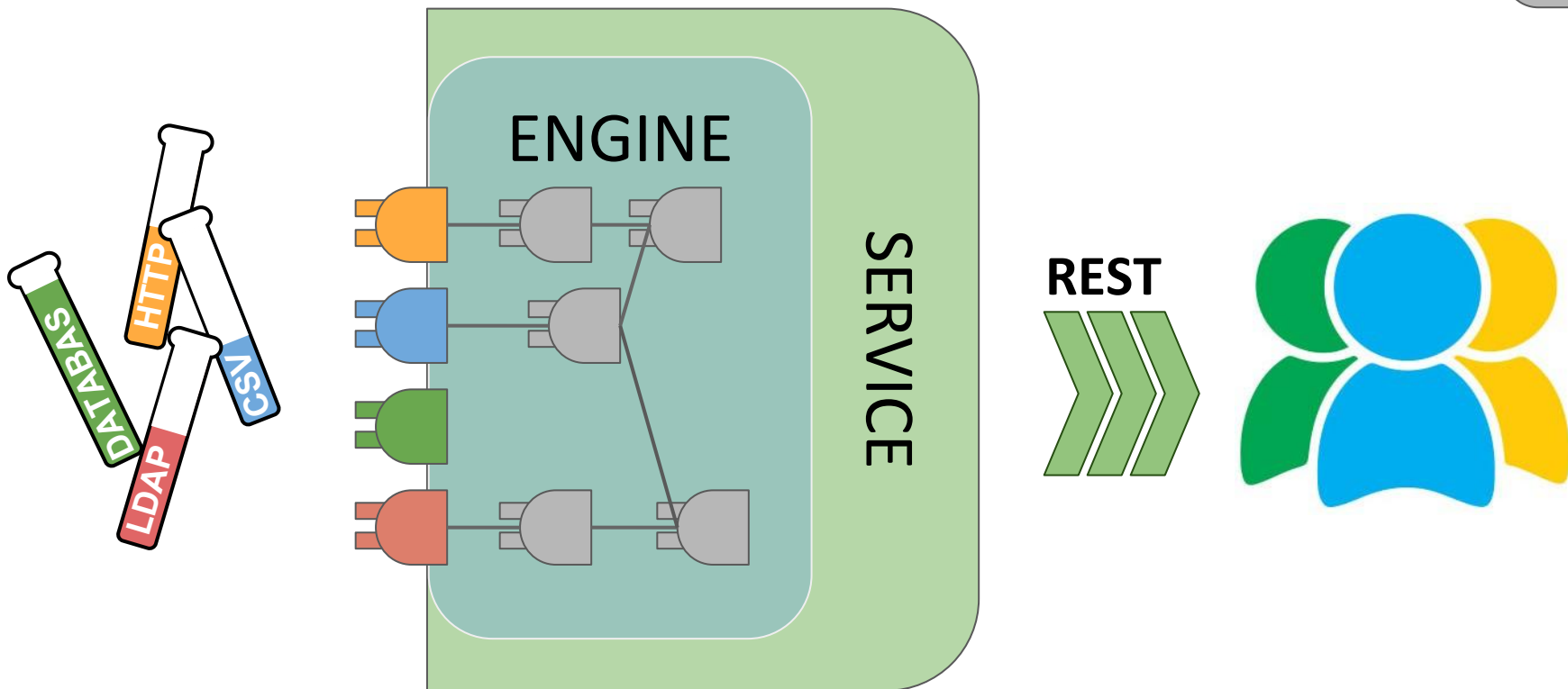


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Lavoisier architecture

plug-in 





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DATA AGGREGATION FRAMEWORK

A chain of plug-ins

EXAMPLE

- Retrieve a distant CSV File
- Extract columns
- Provides a html output .





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Retrieve a distant
CSV File

HTTP Connector

CSV Serializer





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A chain of plug-ins

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Retrieve a distant
CSV File

HTTP Connector

CSV Serializer

Extract
columns

XML Template



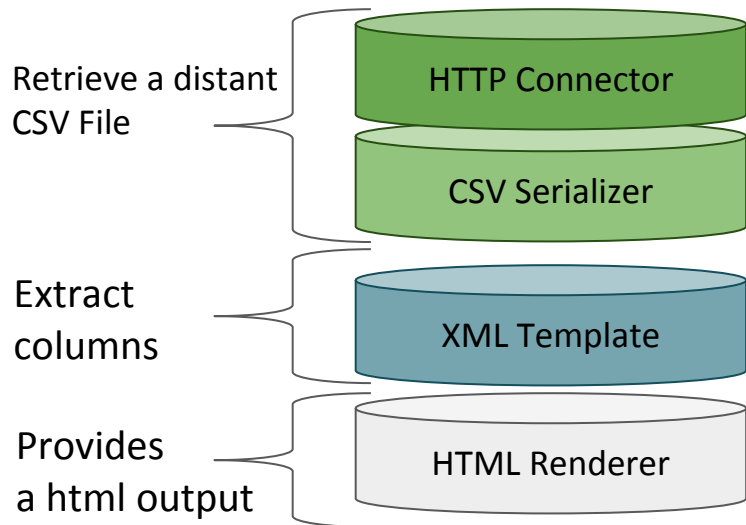
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A chain of plug-ins

EXAMPLE

- Retrieve a distant CSV File
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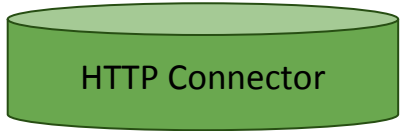




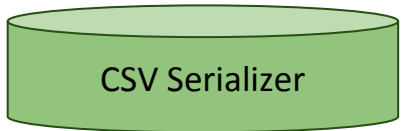
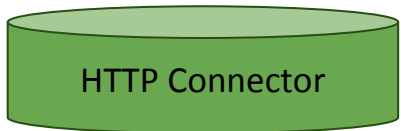
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Into the “views” file



```
<views xmlns="http://software.in2p3.fr/lavoisier/application.xsd">
  <view name="my_example_view">
    <connector type="HTTPConnector">
      <parameter name="url"> http://software.in2p3.fr/lavoisier/input.csv</parameter>
    </connector>
  </view>
</views>
```



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    </serializer>

  </view>
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HTTP Connector

CSV Serializer

XML Templates

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    <processors> [XML TEMPLATES ] </processors>

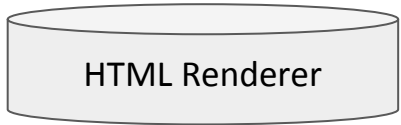
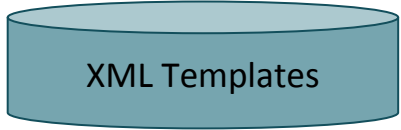
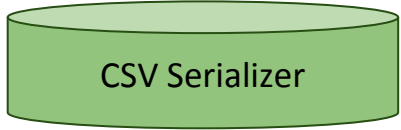
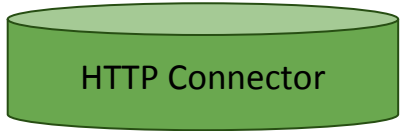
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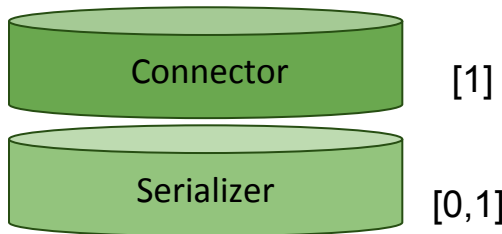


http://myserver:8080/lavoisier/my_example_view?accept=html



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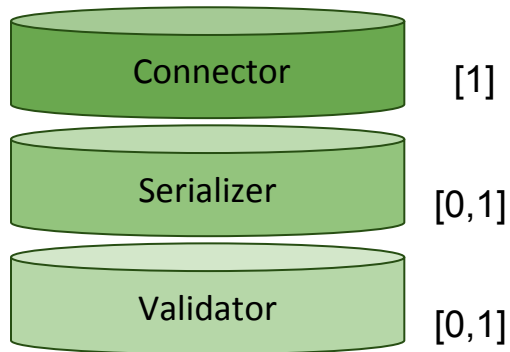
Structure of a view

```
<view name="my_structure">  
  
  <!-- the connector is adapted to the technology, protocol or format of the data source -->  
  <connector type=""> [...] </connector>  
  
  <!-- optional if the connector output is already in xml format -->  
  <!-- in case select the serializer corresponding to the connector output format -->  
  <serializer type=""> [...] </serializer>  
  
</view>
```



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DATA AGGREGATION FRAMEWORK



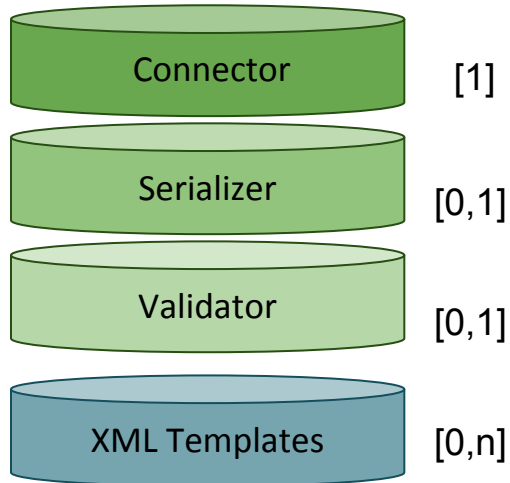
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  <!-- validates the structure or the content of the output -->  
  <validator></validator>  
  
</view>
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DATA AGGREGATION FRAMEWORK



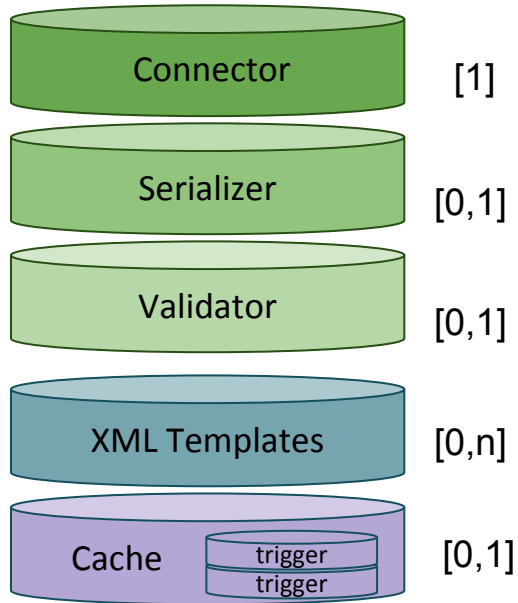
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  <!-- describe the rules to transform the xml structure-->  
  <processors> [ XML Templates ] </processors>  
  
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DATA AGGREGATION FRAMEWORK



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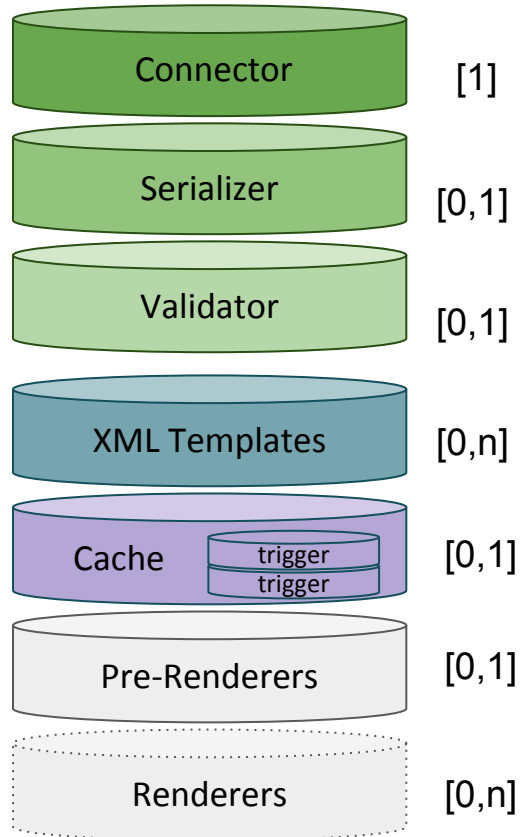
  <!-- describe how to cache data and the associated refresh triggering rules -->
  <cache>
    <trigger type=""></trigger>
  </cache>

</view>
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DATA AGGREGATION FRAMEWORK



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  <!-- organise data around 2D formats : table, chart -->
  <pre-renderers> [...] <pre-renderers>

  <!-- overwrite default values for the renderers, including html templates
  <renderers>
    <renderer type=""> [...] </renderer>
  </renderers>

</view>
```

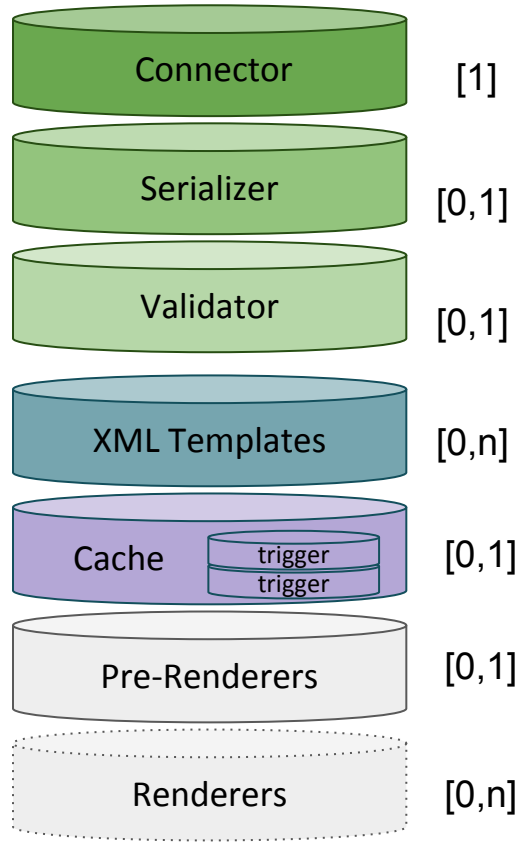


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Structure of a view

PLUG-INS CHAIN



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<view name="my_structure">

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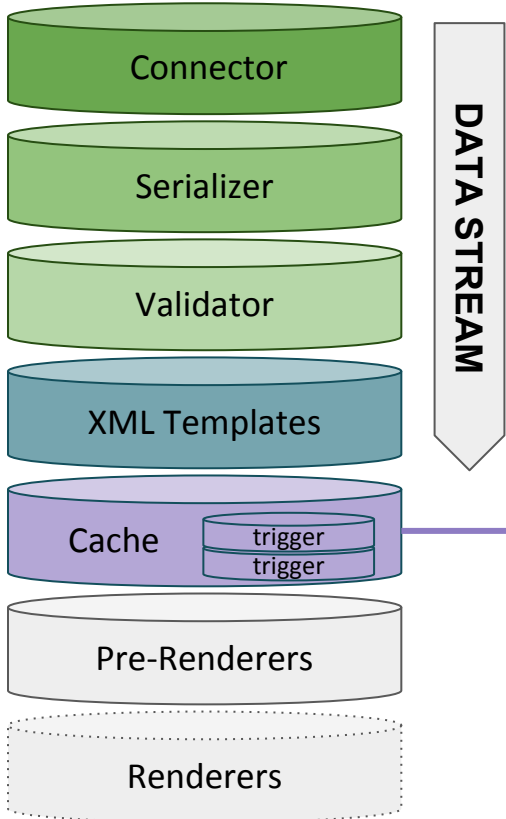
</view>
```




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Benefits



PERFORMANCE

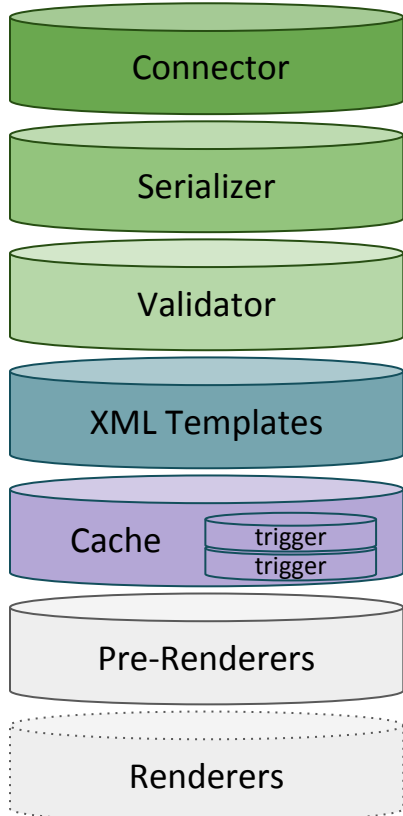
- Low memory usage thanks to on-the-fly processing of **data streams** (rather than in-memory data structures).
 - Each data stream can be **cached**.



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DATA AGGREGATION FRAMEWORK

Benefits



PERFORMANCE

- Low memory usage thanks to on-the-fly processing of **data streams** (rather than in-memory data structures).
- Each data stream can be **cached**.

ROBUSTNESS

- **Validation** of the data
- Tolerance to disruptions of the data sources (**cache**)
- Management of errors : fallback



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Integrated Tools



Lavoisier Data Processing Service



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DATA AGGREGATION FRAMEWORK



LavoisierEditorPlugin
1 plug-in for IDEA IDE

Integrated Tools



Lavoisier Data Processing Service



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DATA AGGREGATION FRAMEWORK



LavoisierEditorPlugin
1 plug-in for IDEA IDE

 Administrator

Follow the link to monitor data views

[Web Console](#)

LavoisierConsole
1 Web console for
administration and monitoring

Integrated Tools



Lavoisier Data Processing Service



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LavoisierEditorPlugin
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LavoisierConsole

1 Web console for
administration and monitoring

 Dashboard

Créer votre propre dashboard

[GO](#)

LavoisierDashboard

1 graphically customizable
dashboard for users

Integrated Tools



Lavoisier Data Processing Service

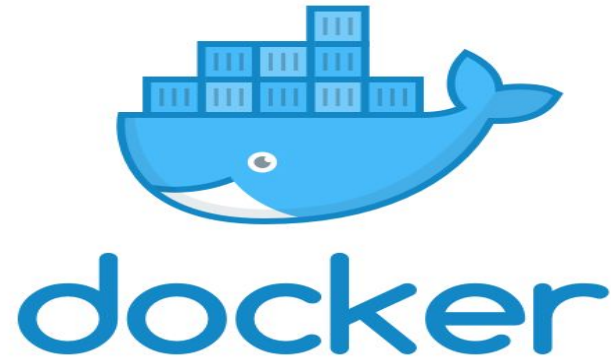


- Automatically deploy one Lavoisier application



... on a puppetized machine@CC

... in Docker / Kubernetes

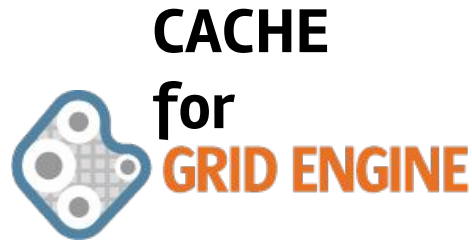




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Use cases





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Use cases



OPERATIONS PORTAL

~ 15 data sources

- HTTP, SQL, LDAP
- JSON, CSV, XML, HTML



~ 5 data sources

- HTTP, SQL, LDAP, Shell
- JSON, XML, HTML
- 20 ldap queries ~ average output per query 200 MB



~ 12 data sources

- HTTP, SQL, LDAP, Telnet, OpenStack, Shell
- JSON, CSV, XML, HTML



- **Facilitate / accelerate developments and maintenance**
 - Normalized configuration of plug-ins
 - Normalized languages, homogeneous process
 - Numerous reusable plug-ins
 - View modularity
 - Ecosystem : IDE integration, deployment tools
 - Automatic features : monitoring, security
 - Roles separation: Lavoisier developer, application developer, administrator, user
- **Robustness / Performances**
 - Caches
 - Streaming process

An original idea from **Sylvain Reynaud** ...



Director : Sylvain Reynaud

Assistant Director / Press Officer : Cyril L'Orphelin

Technical Staff : Bernard Chambon, Cyril Flieller, Olivier Lequeux, Jonathan Moutarde, Lionel Schwarz, Alexandre Zicaro

Set Decorator : Philippe Correia

Distributor : Justin Bussery, Christelle Eloto, Rémi Ferrand, Benjamin Guillon



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Prêt à l'utiliser ??

Rdv au tutorial