



Integrating ParaView in a numerical simulation framework

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CHANGER L'ÉNERGIE ENSEMBLE



Agenda

- 1. Stand-alone ParaView evolutions**
- 2. Integration of ParaView in the SALOME framework**
- 3. Perspectives : Coll@viz projet**



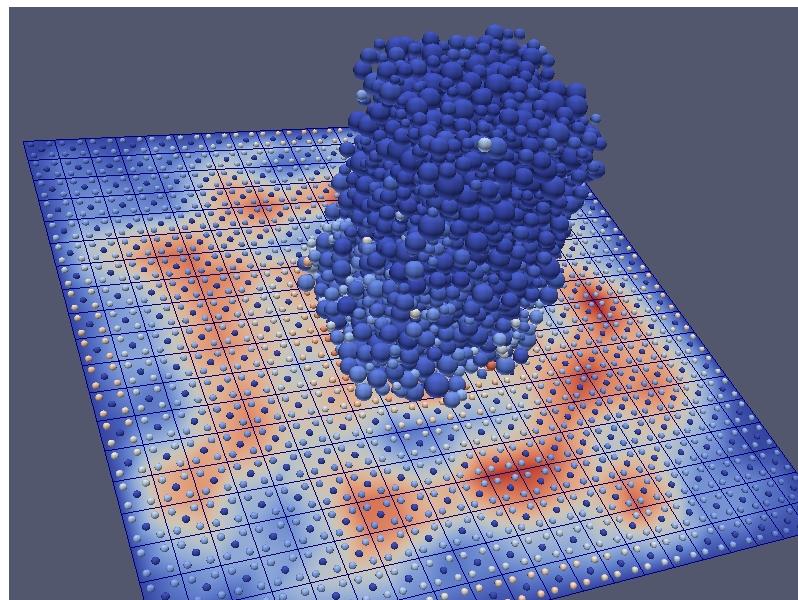
Stand-alone ParaView evolutions

Quadrature Points

► Goal : visualise integration points in cells

► Necessary steps

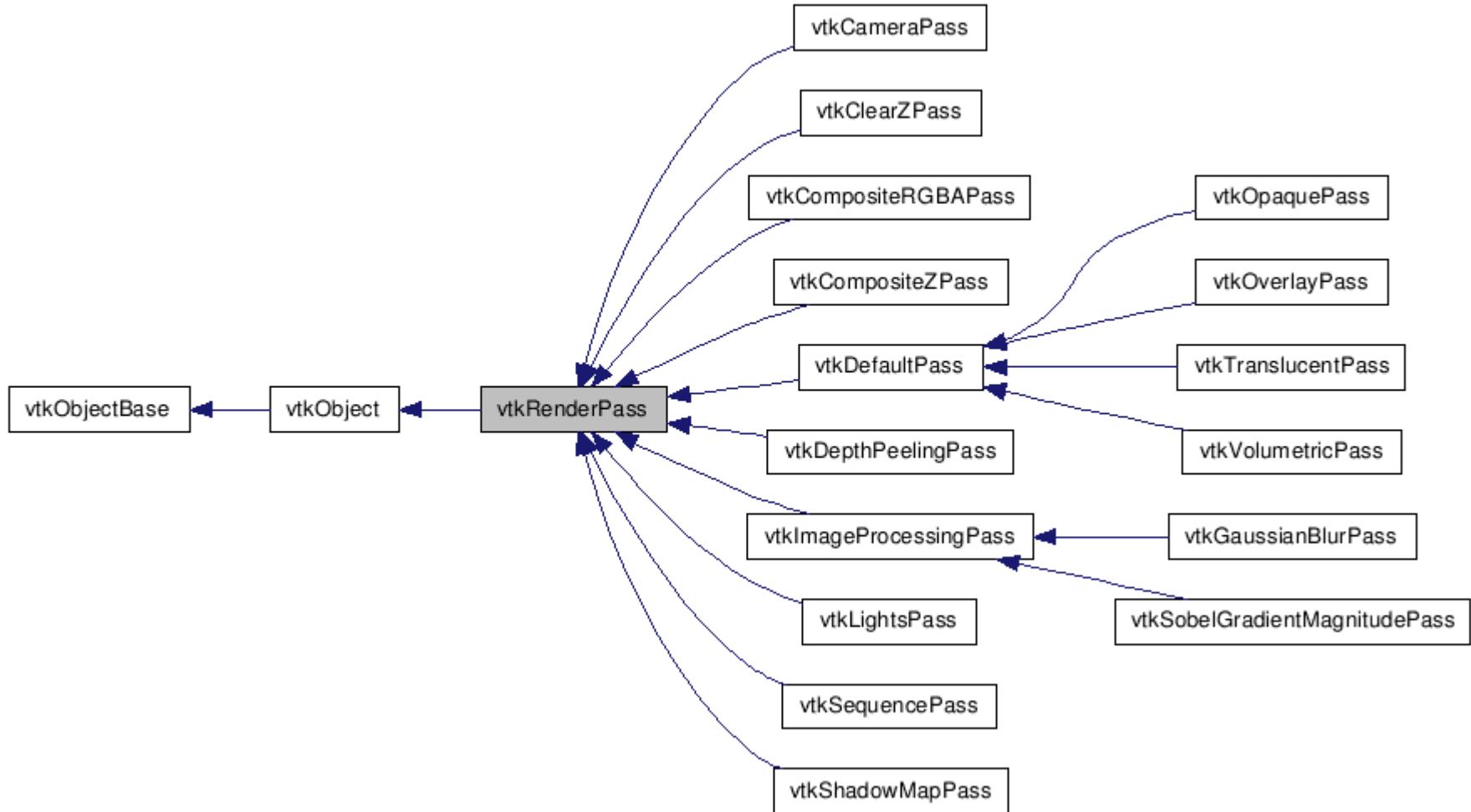
- Add the needed data structures in VTK
 - See vtkQuadratureSchemeDefinition and others
- Add a new kind of plugins : Representation
 - http://paraview.org/Wiki/Plugin_HowTo
- Integrate the Point Sprite rendering from the CSCS as a plugin
 - Plugins/PointSprite



Multi-pass rendering pipeline

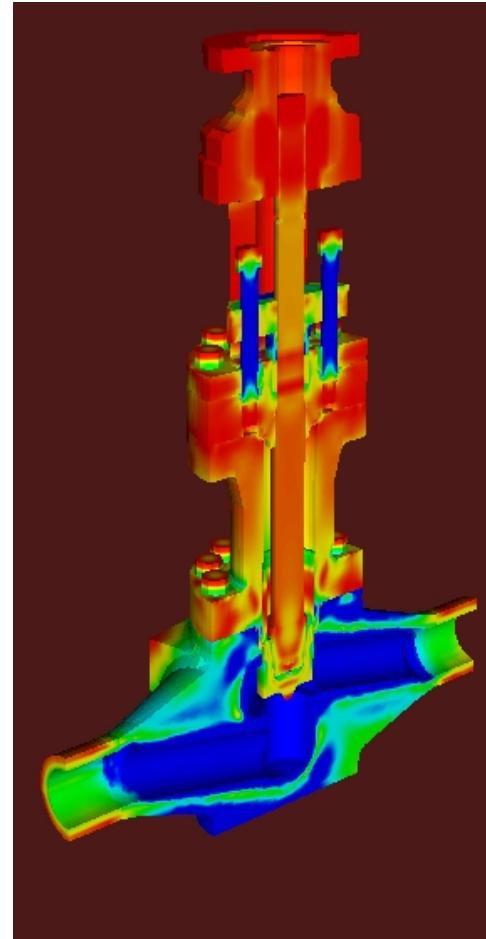
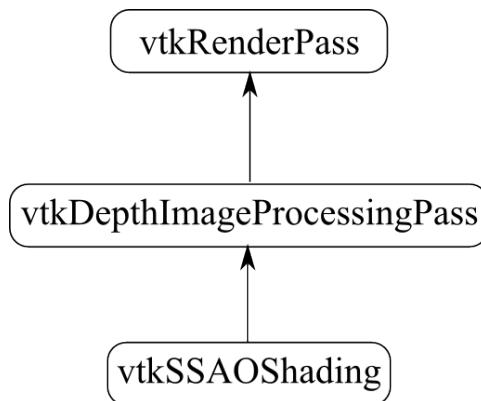
- ▶ Goal : add the possibility to implement advanced visualization algorithms using multiple passes
 - Shadow Maps
 - Post-processing algorithms :
 - Screen Space Ambient Occlusion
 - Edge Enhancement (Sobel Filter)
 - ...
- ▶ Current development state :
 - Available in VTK CVS
 - Can chain several passes
 - But only if there is no shader program clash
 - Ex : point sprite + shadow maps
 - Only partially parallel

Render Pass Hierarchy

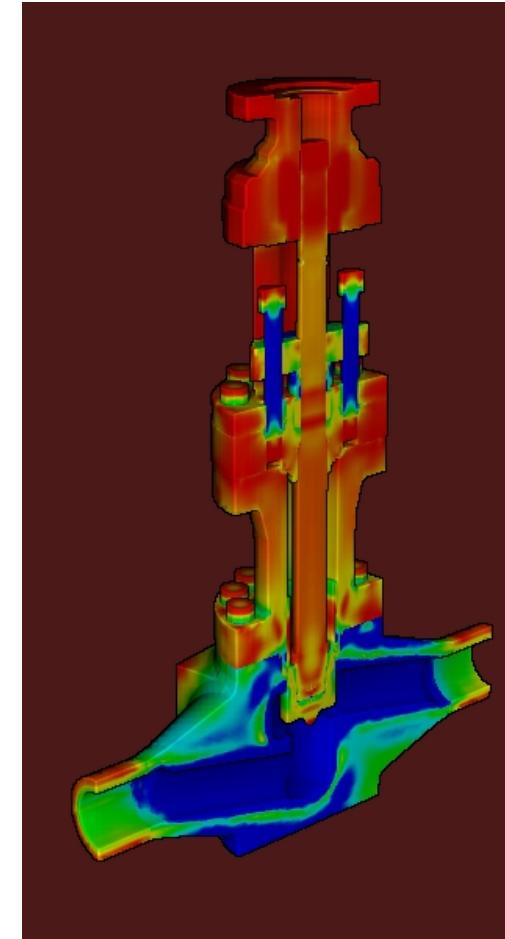


Example : Screen Space Ambient Occlusion

```
vtkRenderer *renderer = vtkRenderer::New();  
  
vtkRenderPassCollection*passes  
    =vtkRenderPassCollection::New();  
passes->AddItem(lights_pass);  
passes->AddItem(opaque_pass);  
seq->SetPasses(passes);  
cameraP->SetDelegatePass(seq _pass);  
  
vtkSSAOShading  
*ssaoShadingP=vtkSSAOShading::New();  
ssaoShadingP->SetDelegatePass(cameraP);  
  
renderer->SetPass(ssaoShadingP);
```



Phong



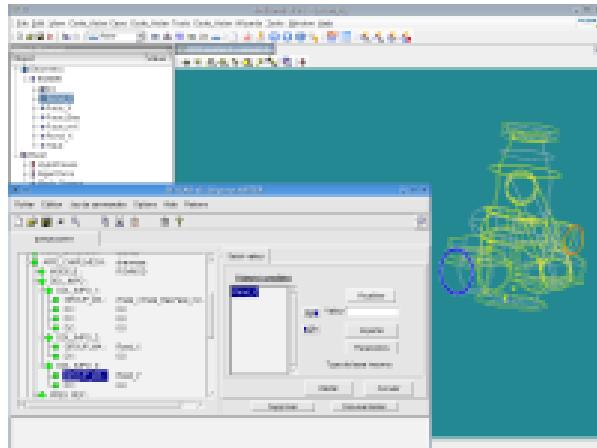
SSAO



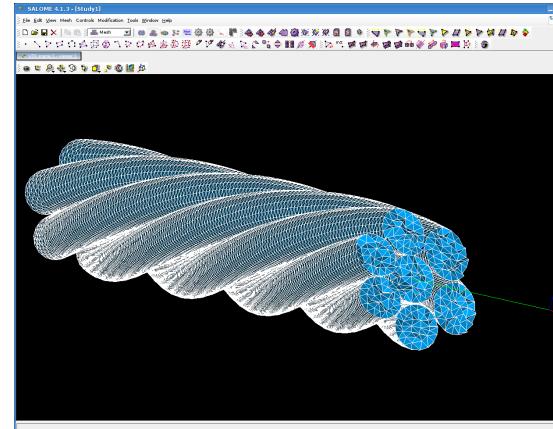
Integration of ParaView in the SALOME Framework

Overview of the SALOME framework

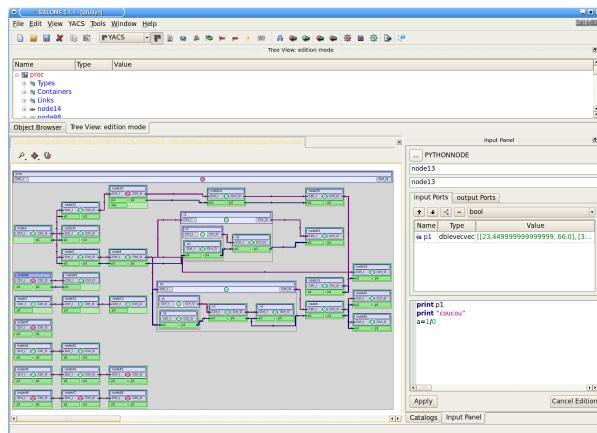
► Goal : an integrated environment



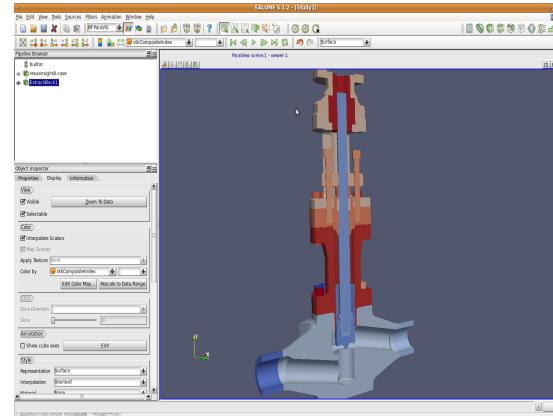
CAD



Meshering

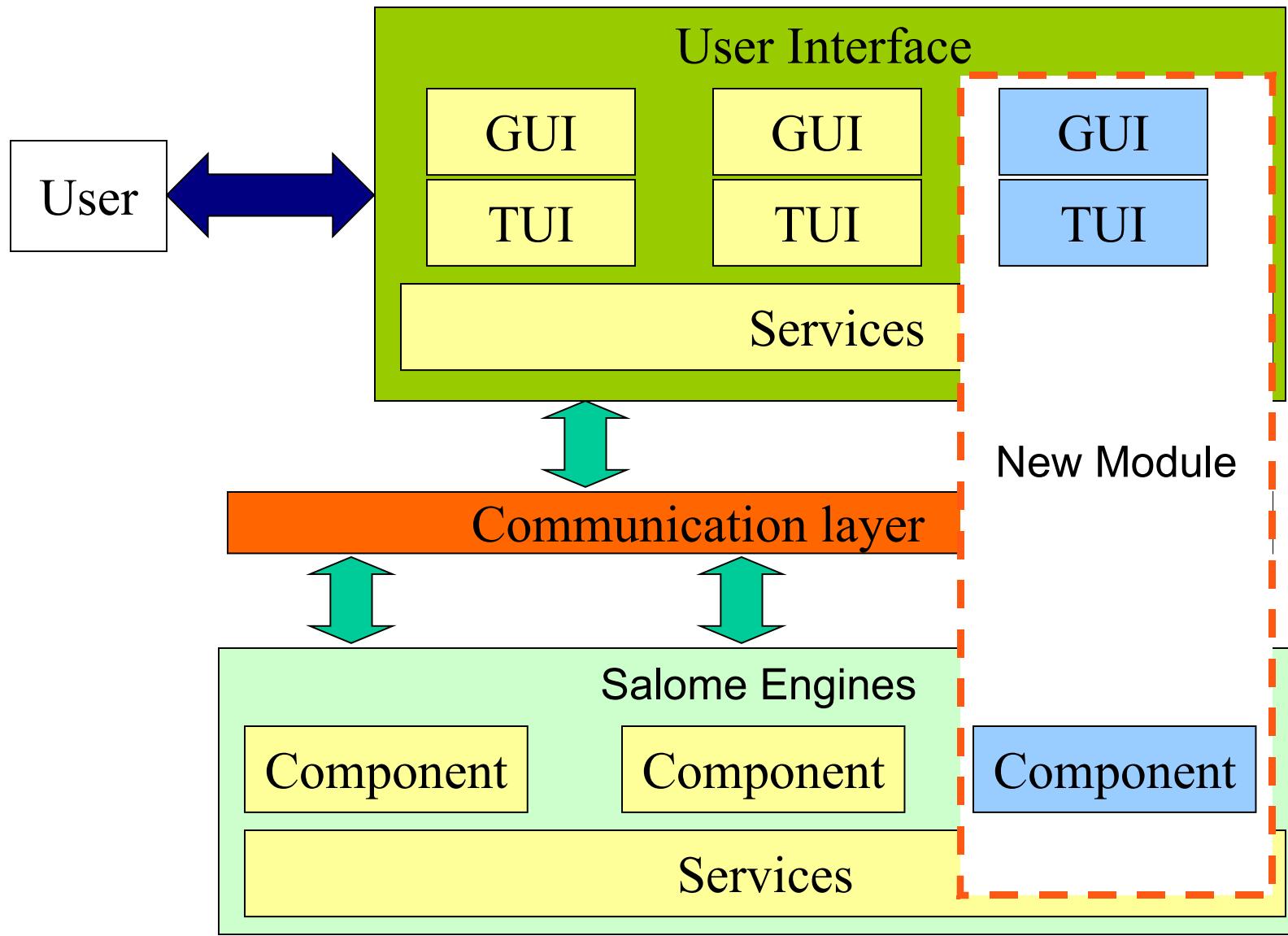


Code chaining
Code coupling



Post-
processing

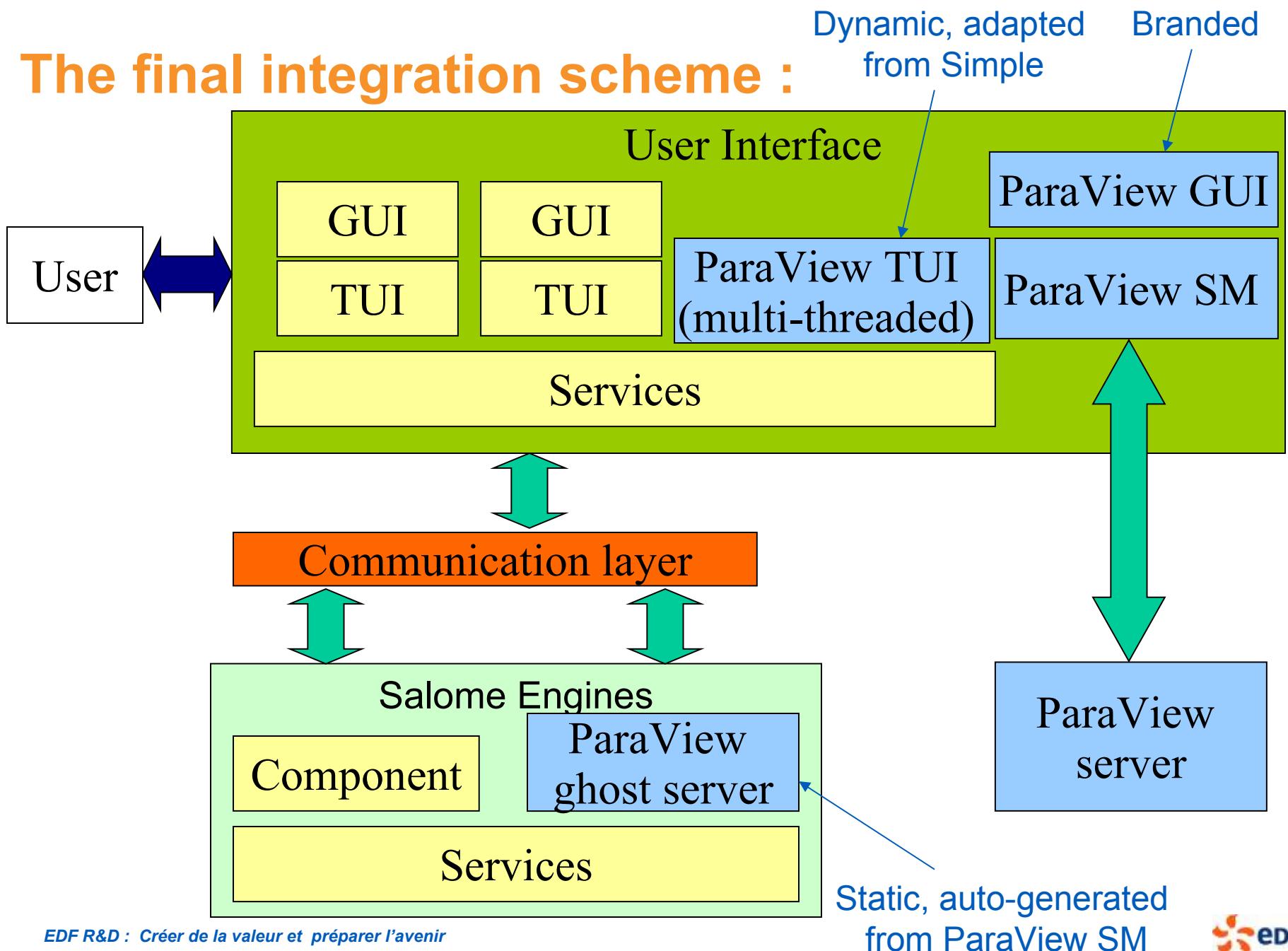
Adding a new module in SALOME

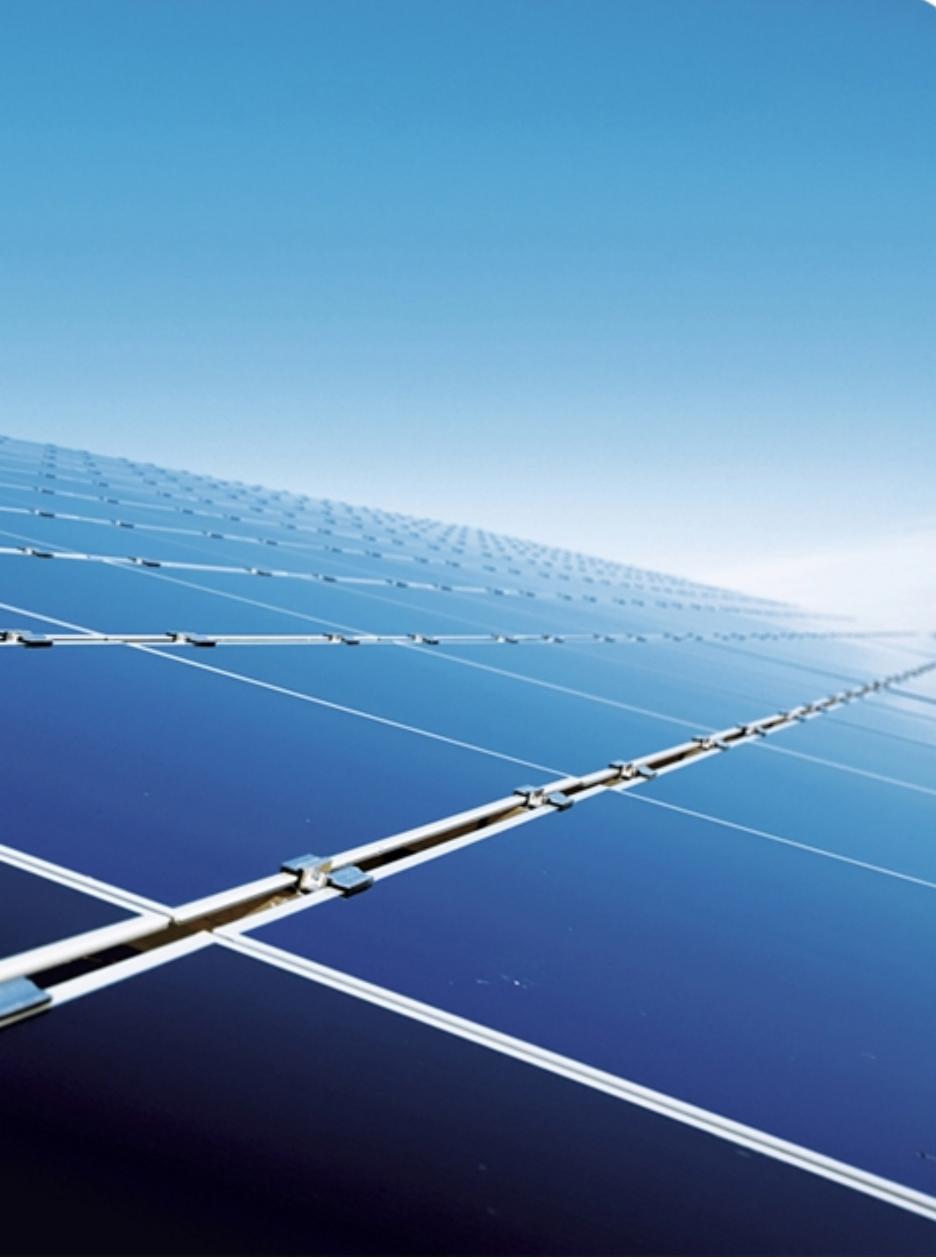


It seems to fit with ParaView, but...

- ▶ The ParaView client is not multi-threaded
 - And SALOME python console runs in a separate thread
- ▶ ParaView is not multi-client
 - Each server should be able to access services in other servers
- ▶ ParaView uses a specific client-server language
 - SALOME has adopted CORBA for the client-server layer
- ▶ ParaView extensively uses plugins
 - The interface must be dynamic

The final integration scheme :





Perspectives : Coll@viz project