gPTM3D : Grid-Enabling Interactive Medical Analysis

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CERN
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www.eu-egee.org

Information Society

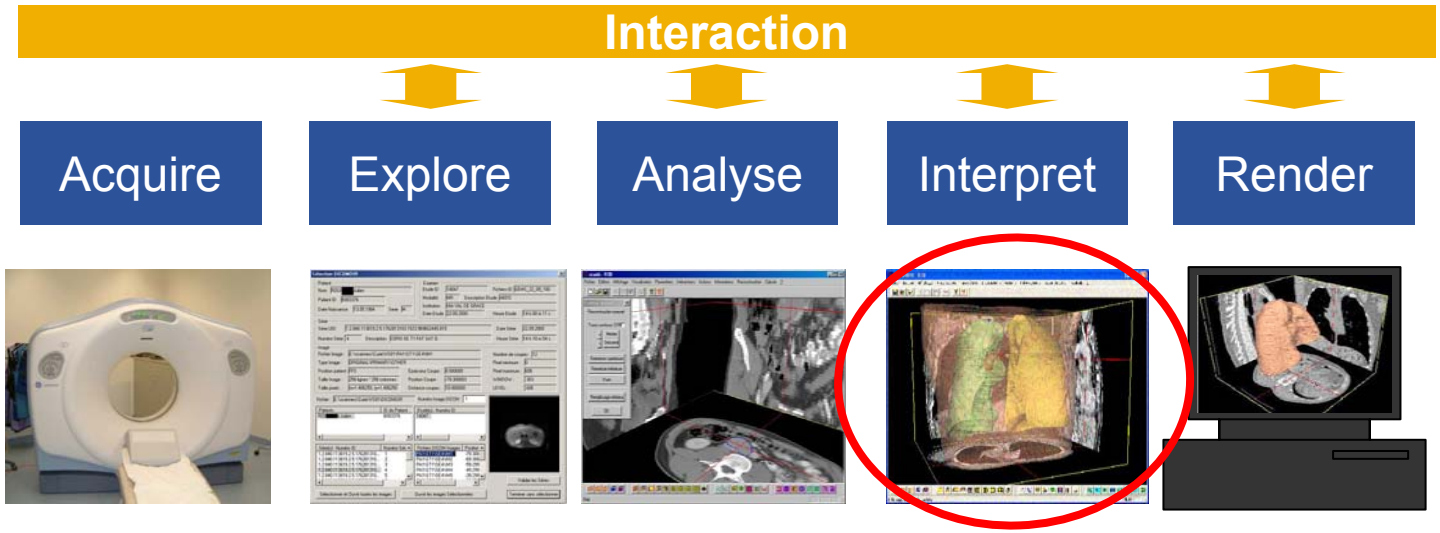
Application Summary

- **Goal: Grid-enable PTM3D**
  - PTM3D (Poste de Travail Médical 3D) is
    - A medical images analysis software developed at LIMSI (CNRS)
    - With clinical usage: CHU Tenon, Sainte Anne, FMP,…, InfoRad RSNA *Certificates of Merit* (2002, 2003, 2004)
  - Step1 (this demo): interactive response time for CPU-intensive volume reconstruction
  - Next steps: interactive response time for all components
- **Contexts**
  - Computational steering
  - Medical research and clinical requirements: IMAGE'04 report
- **EGEE status**
  - NA4 internal application
  - On a production grid
  - Collaborations: CNRS STIC labs, French research programmes

PTM3D

- **One data set is**
  - DICOM files: 100MB – 1GB
  - One radiological image: 20MB – 500MB
- **Complex interface: optimized graphics and medically-oriented interactions**
- **Physician interaction is required at and inside all steps**

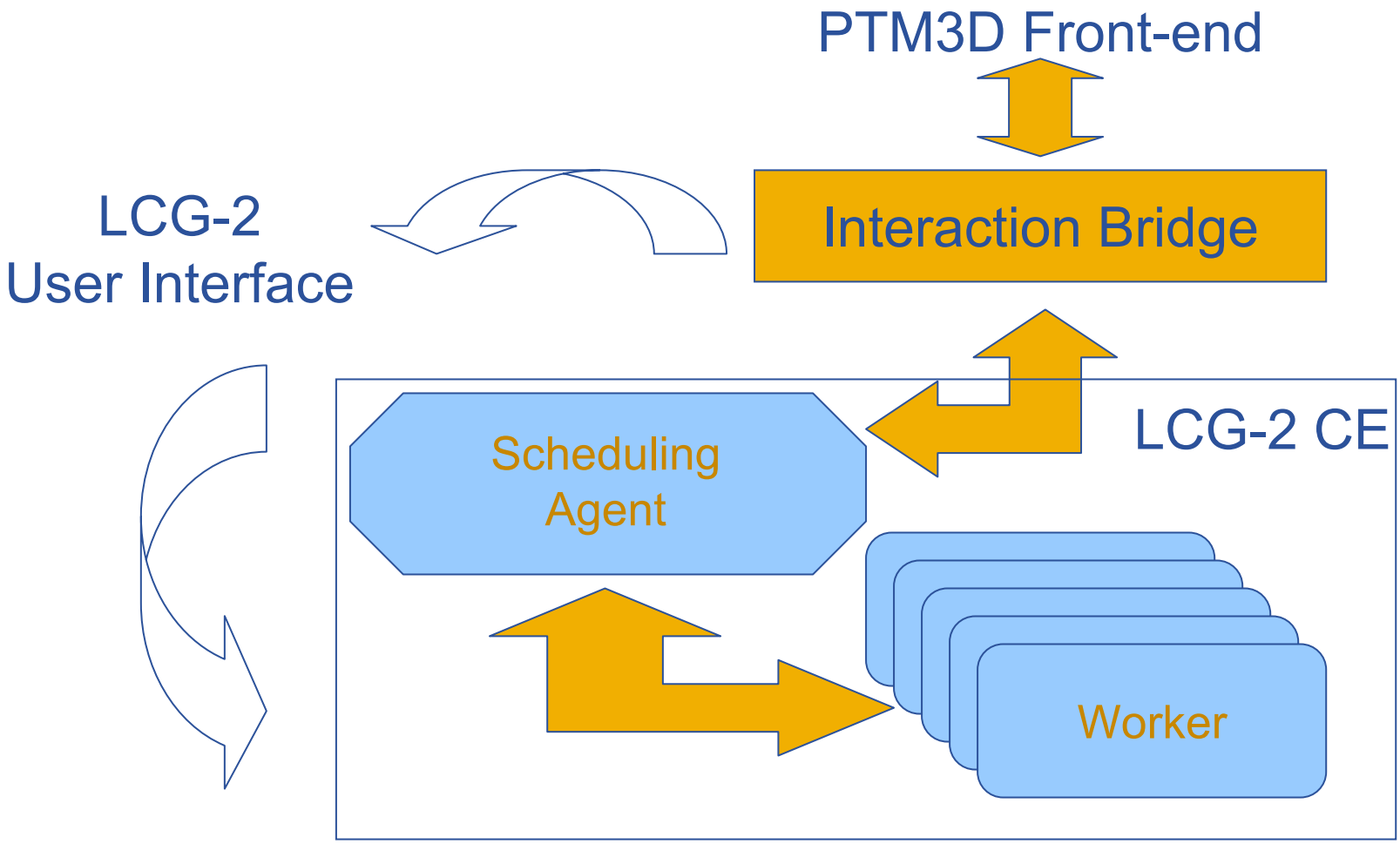
  Poorly discriminant data, pathologies, medical windowing



Figures

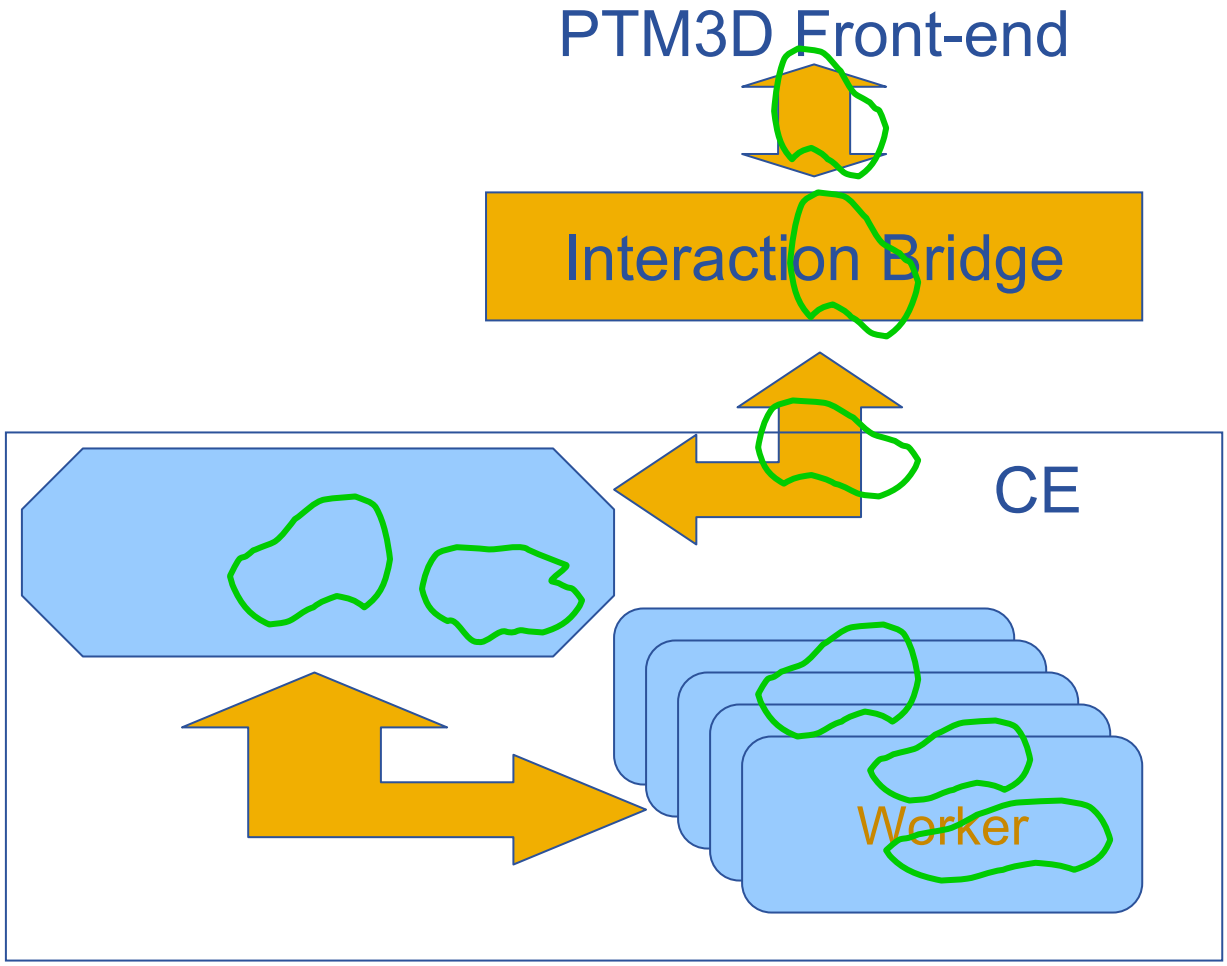
	Dataset	Input data	Output data	Tasks	Standalone Execution	EGEE Execution 14 procs.
Small body	87MB	3MB 18KB/slice	6MB 106KB/slice	169	5min15s *1min54s*	37s *18s*
Medium body	210MB	9.6 MB 25KB/slice	57MB 151KB/slice	378	33min *11min5s*	2min30s *1min15s*
Lungs	87MB	410KB 4KB/slice	2.3MB 24KB/slice	95	36s	24s

Opening a session



Application-level scheduling

- Stage data
- Pull model: workers pull contours at their own pace



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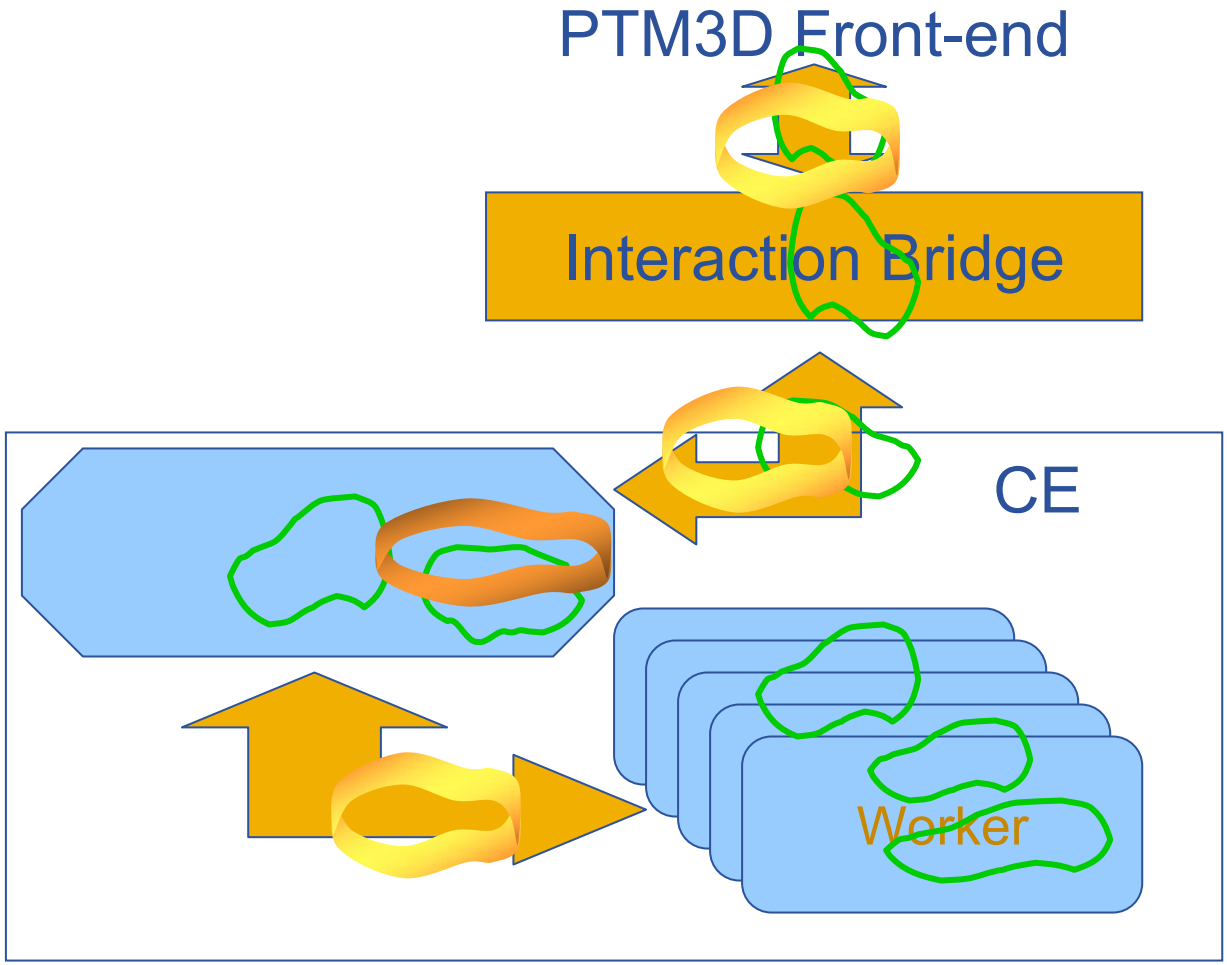

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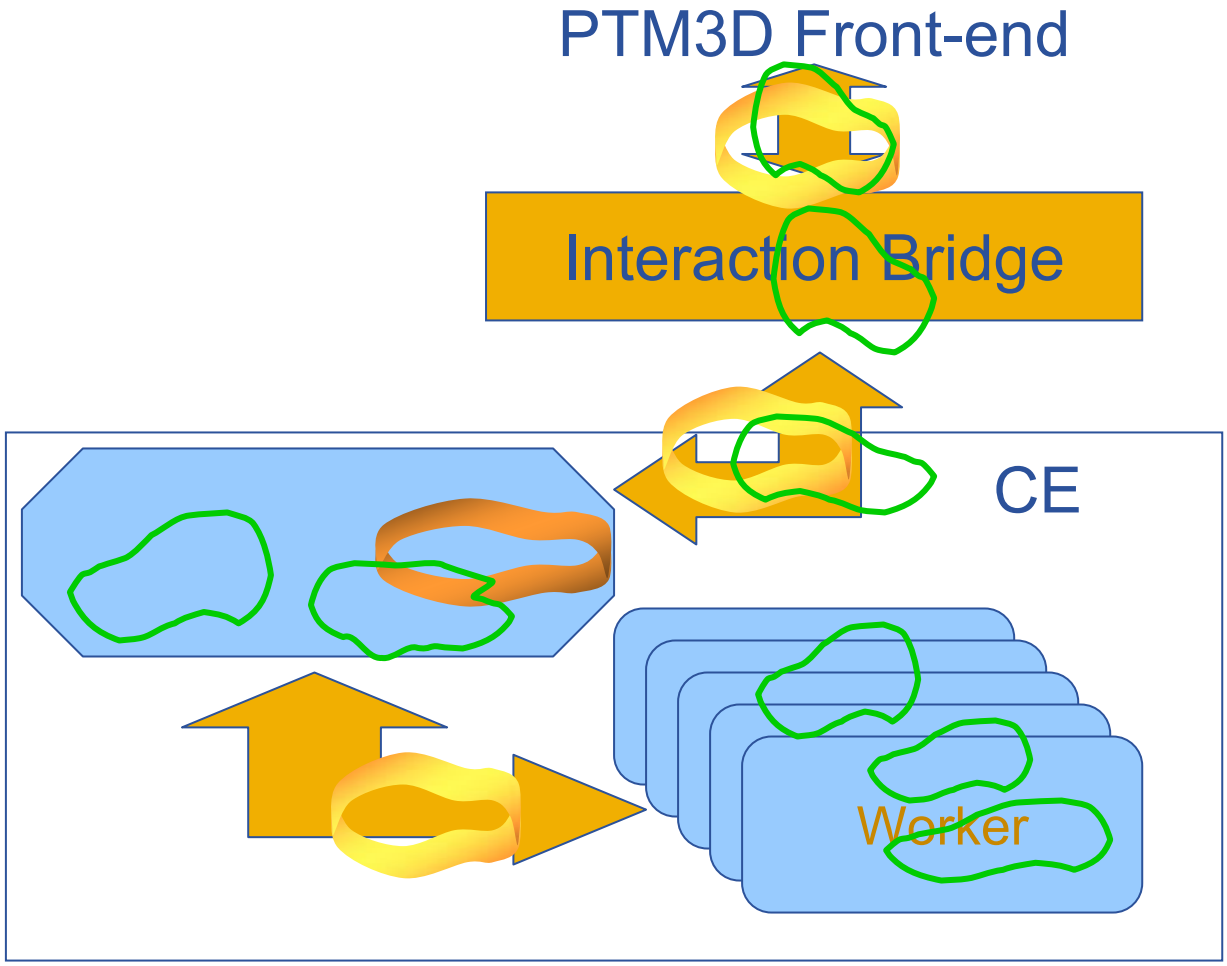

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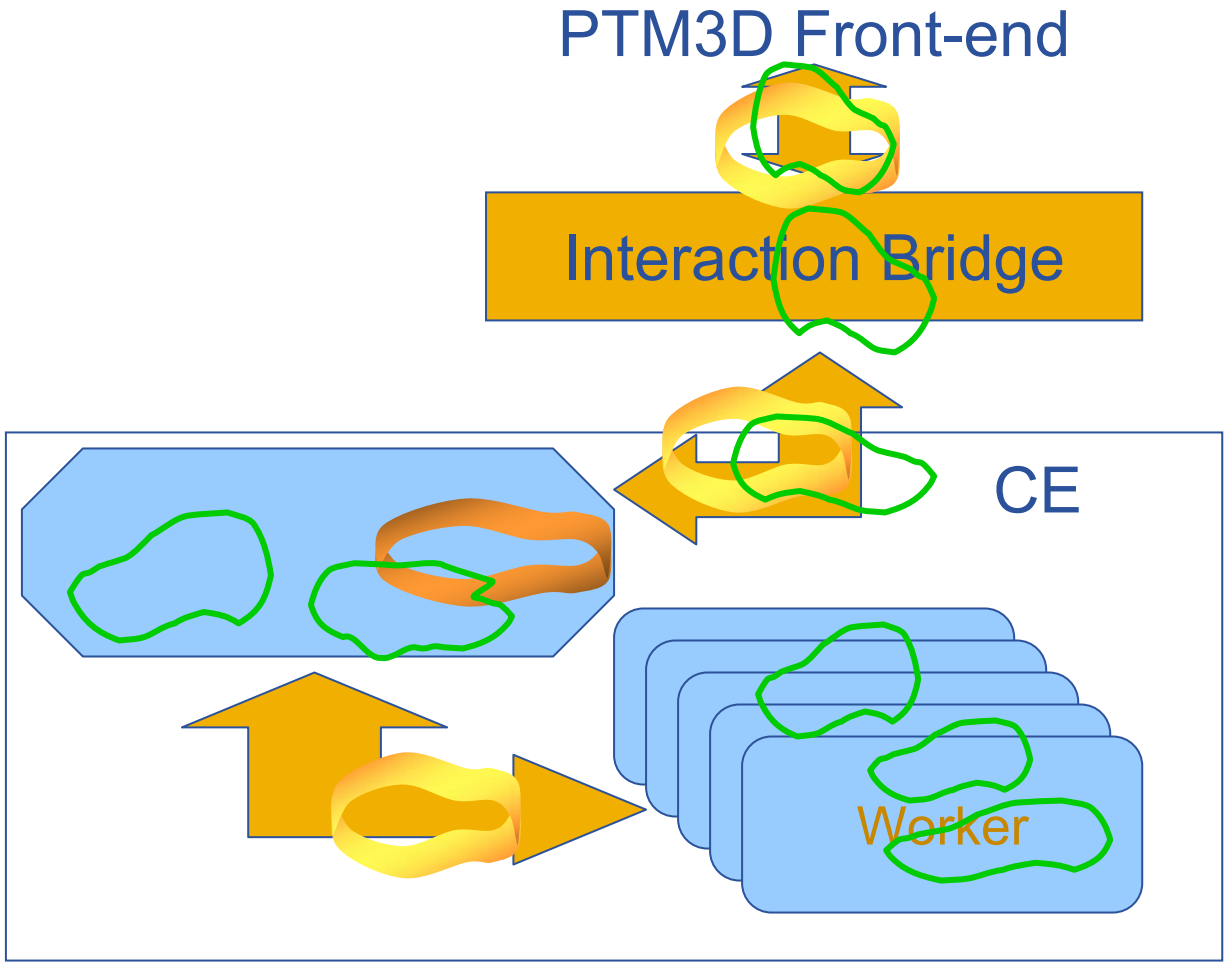

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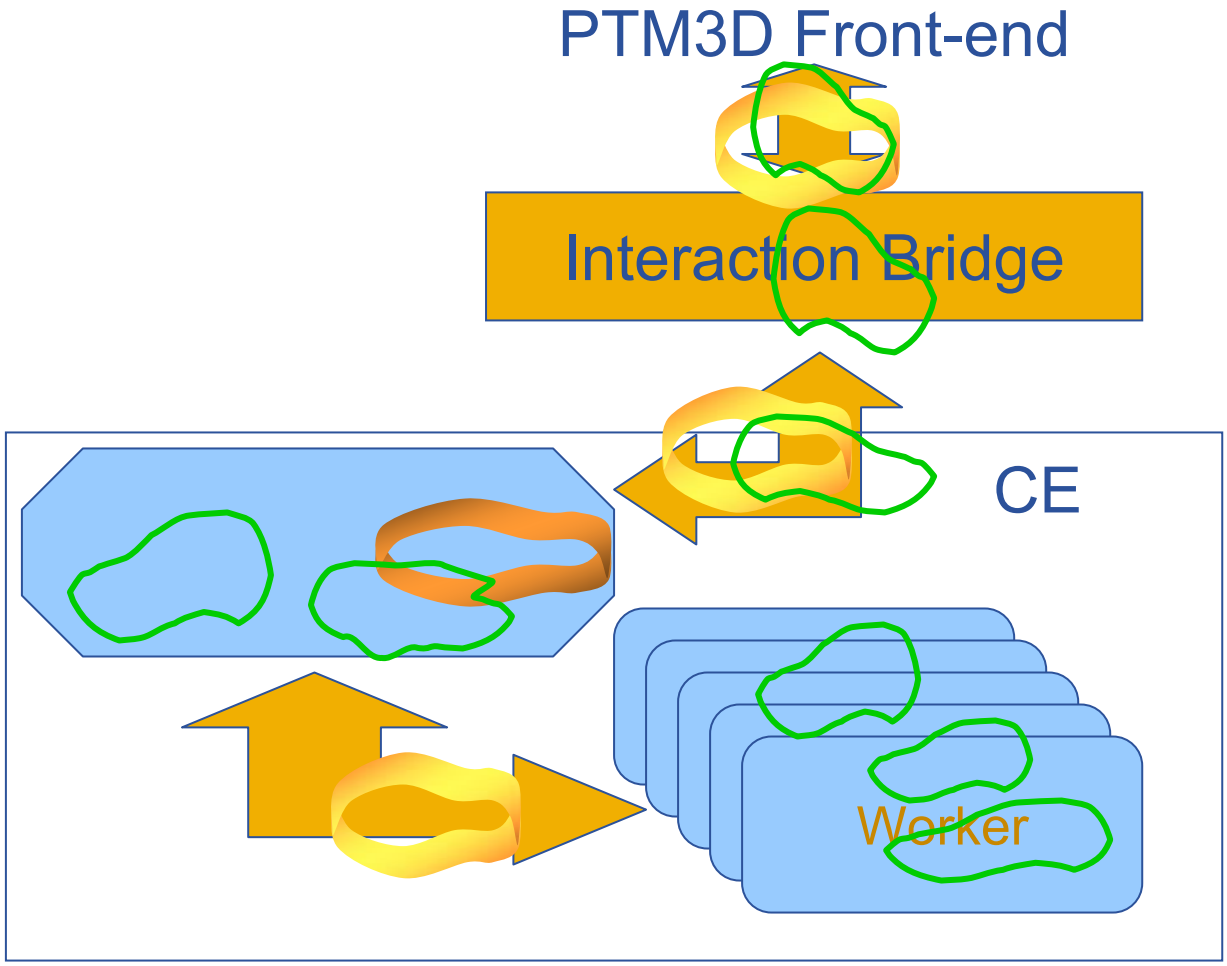
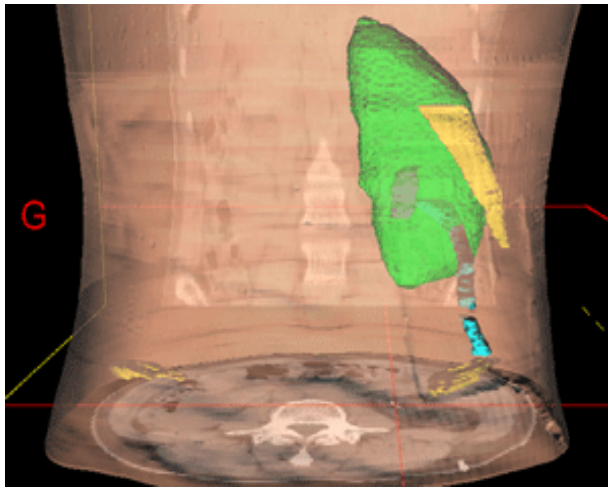


Workplan

- **Technical**
  - Convergence with other EGEE applications : AliEn, DiRac
  - Port to gLite
  - Scheduling policy: Time-sharing and QoS across the scheduling stack
    - GGF GRAAP and GSA
    - Admission control from sensors
  - Interact with *remote* data
    - Clinical research: evaluate registration algorithms on large existing databases – ACI AGIR
- **Dissemination: demonstrations at**
  - HealthGrid 2005
  - Journées de la Société Française de Radiologie 2005
  - InfoRad-RSNA 2005

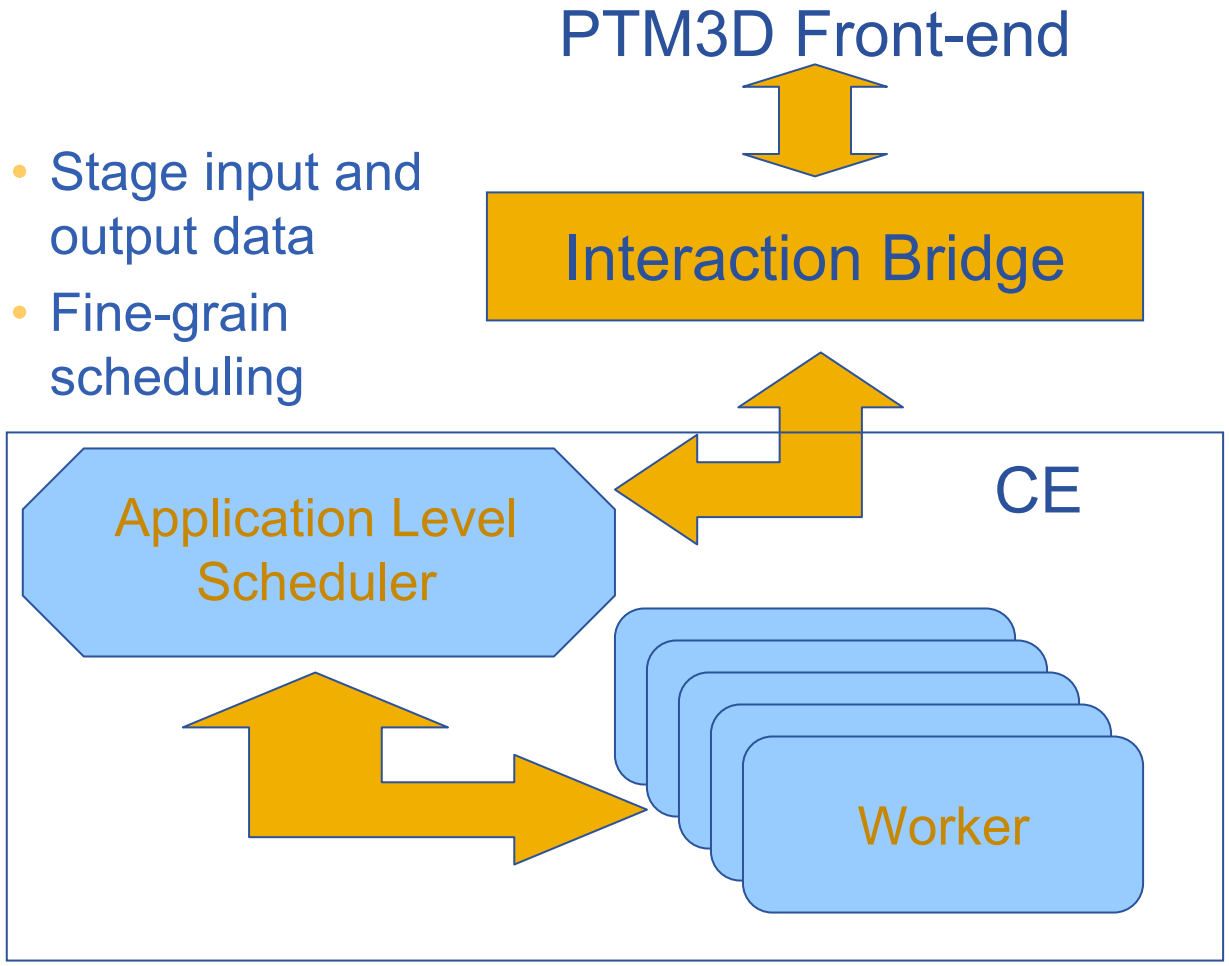
Use case

Planning percutaneous nephrolithotomy



Next step: scheduling

- Stage input and output data
- Fine-grain scheduling



- Stage input and output data
- Negotiate for interactive vs batch
- Admission control
- Schedule interactive jobs
  - No reservation
  - Soft real-time scheduling