

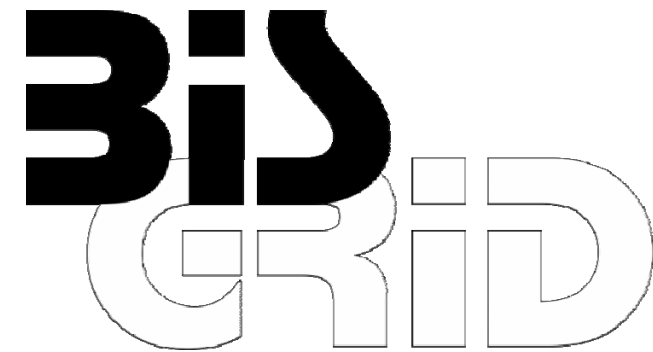
# Workflow Service Extensions for UNICORE 6

Utilising a Standard WS-BPEL Engine for  
Grid Service Orchestration

*S. Gudenkauf, W. Hasselbring, **A. Höing**, G. Scherp,  
O. Kao*

Unicore Summit - Euro-Par 2008

26.08.2008



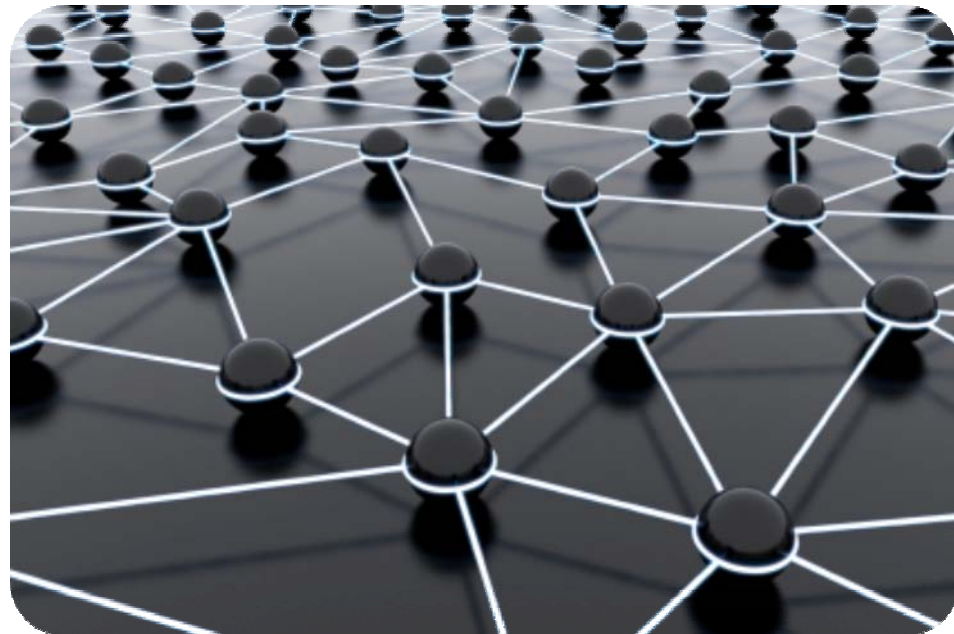
SPONSORED BY THE



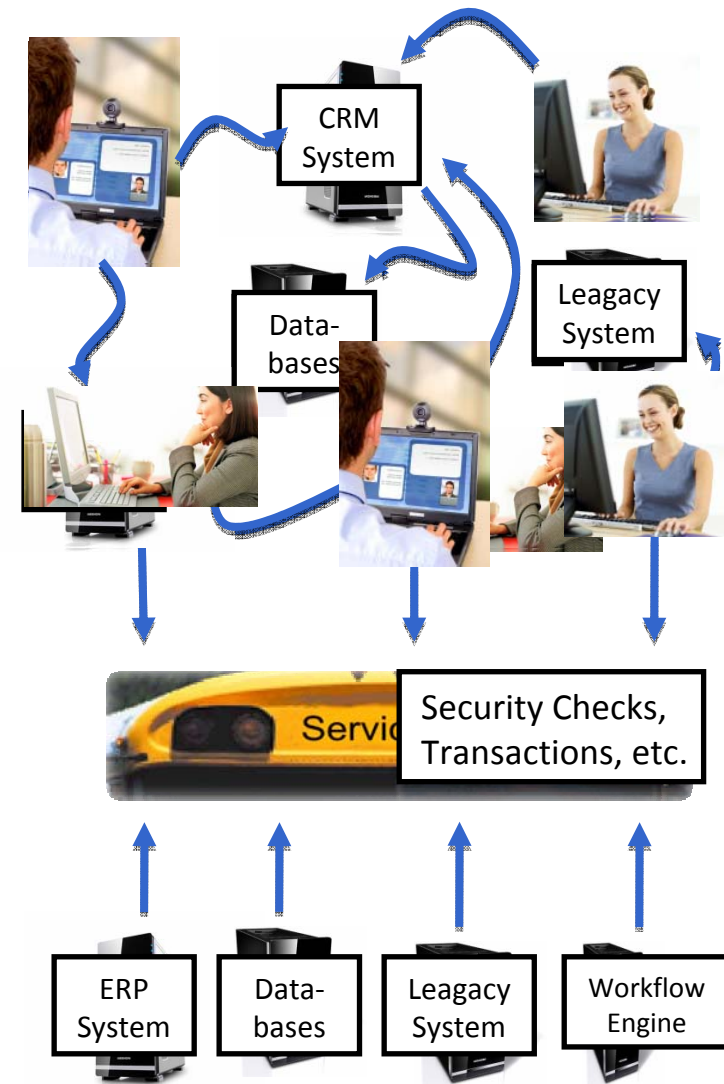
**Federal Ministry  
of Education  
and Research**

André Höing – [andre.hoeing@tu-berlin.de](mailto:andre.hoeing@tu-berlin.de)  
Technische Universität Berlin

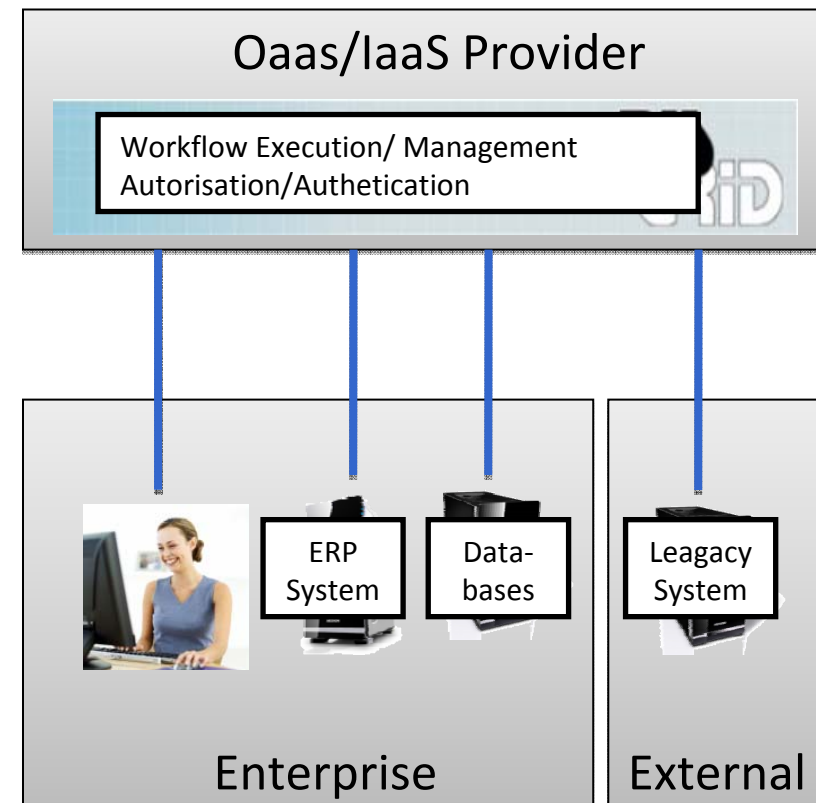
- Motivation
- BIS-Grid as UNICORE 6 Services
- The BIS-Grid Services
- Implementation Status
- Conclusion



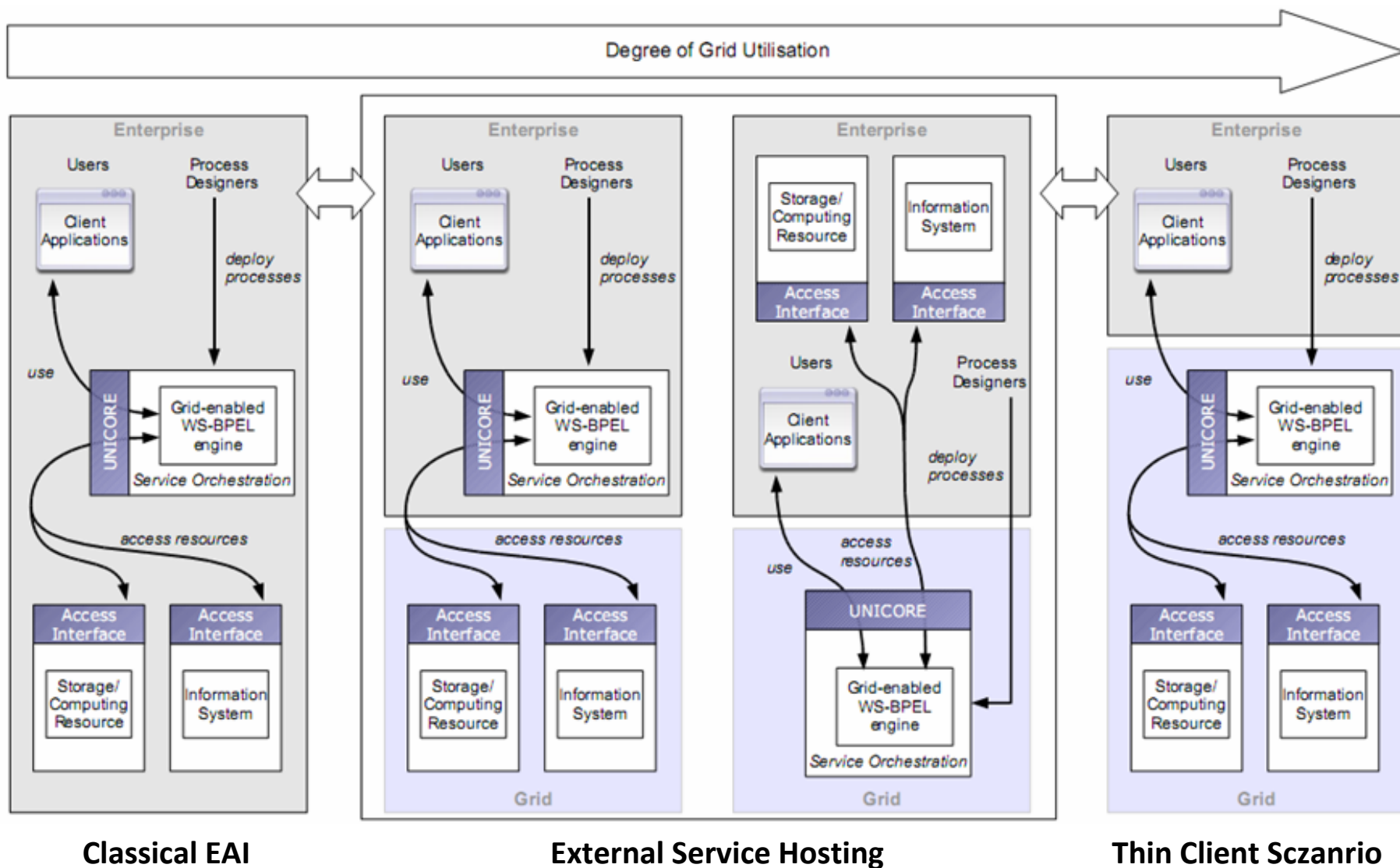
- Enterprises often have a lot of **heterogeneous information systems**
- Unstructured application landscape
- **System Integration**
  - Enterprise Application Integration as solution to consolidate the IT
  - First choice for inter-systems communication: Web Services and WS-\* specifications
  - Workflow Engines for Orchestration
- **Challenges**
  - Operational and maintenance costs
  - Quality of Service



- **Case Study:** Feasibility of EAI with Grid Technologies
- **Door Opener:** Grid utilisation and D-Grid participants for SMEs
- **Enabler:** generic Grid-compatible integration solution (Grid Service orchestration)
- **Goals**
  - **Trustworthy collaboration** and business models for Grid providing
  - **Orchestration/Integration-as-a-Service**
  - Focussing **SME**
  - Utilisation of industrial **standards** to orchestrate Web and Grid Services
  - Integration with **well-accepted technologies**



# How to integrate the BIS-Grid Engine



# Some Use Cases



deploy workflow

undeploy workflow

redeploy workflow

retrieve workflow

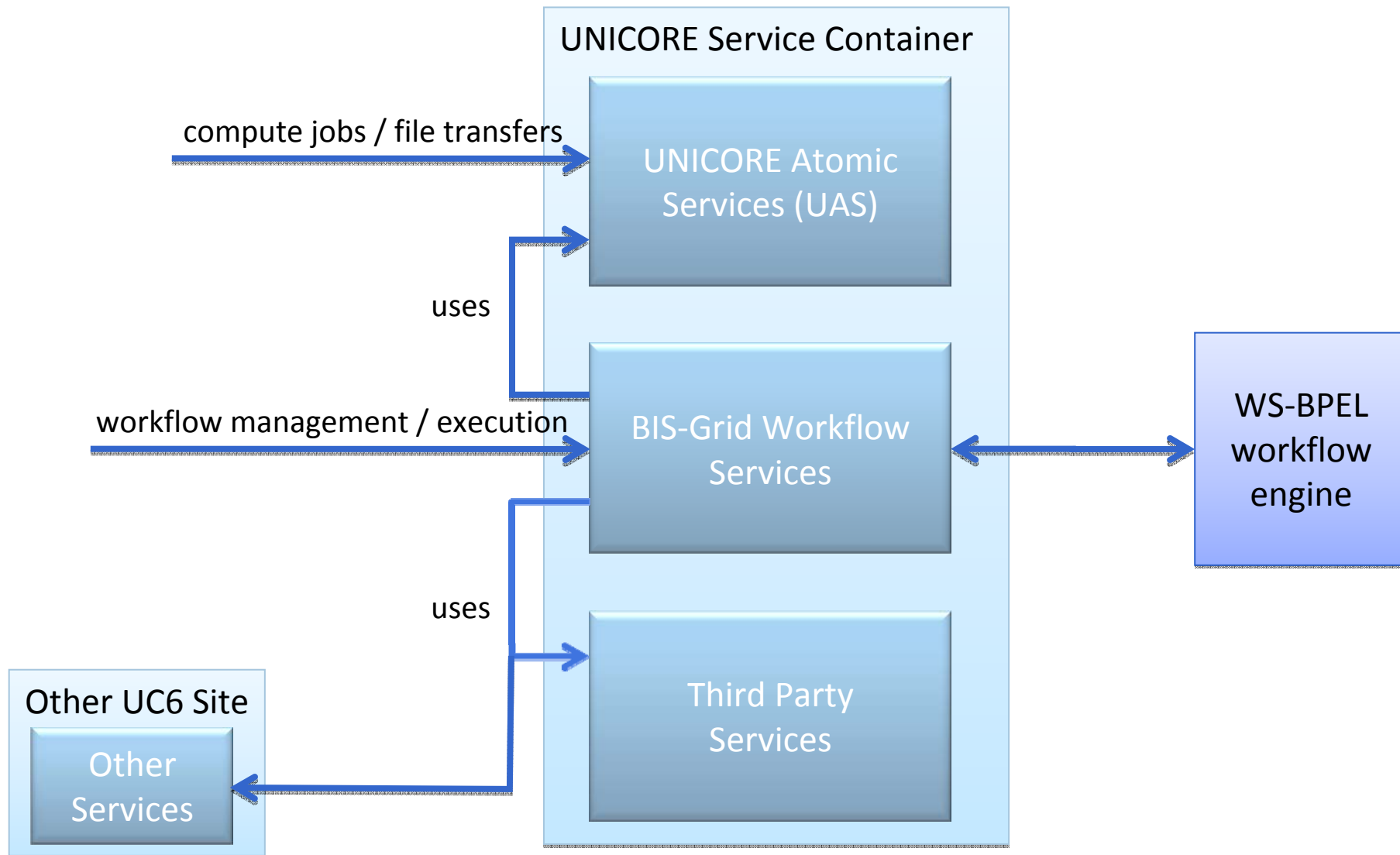
create workflow instance

execute workflow

get current status

change workflow configuration





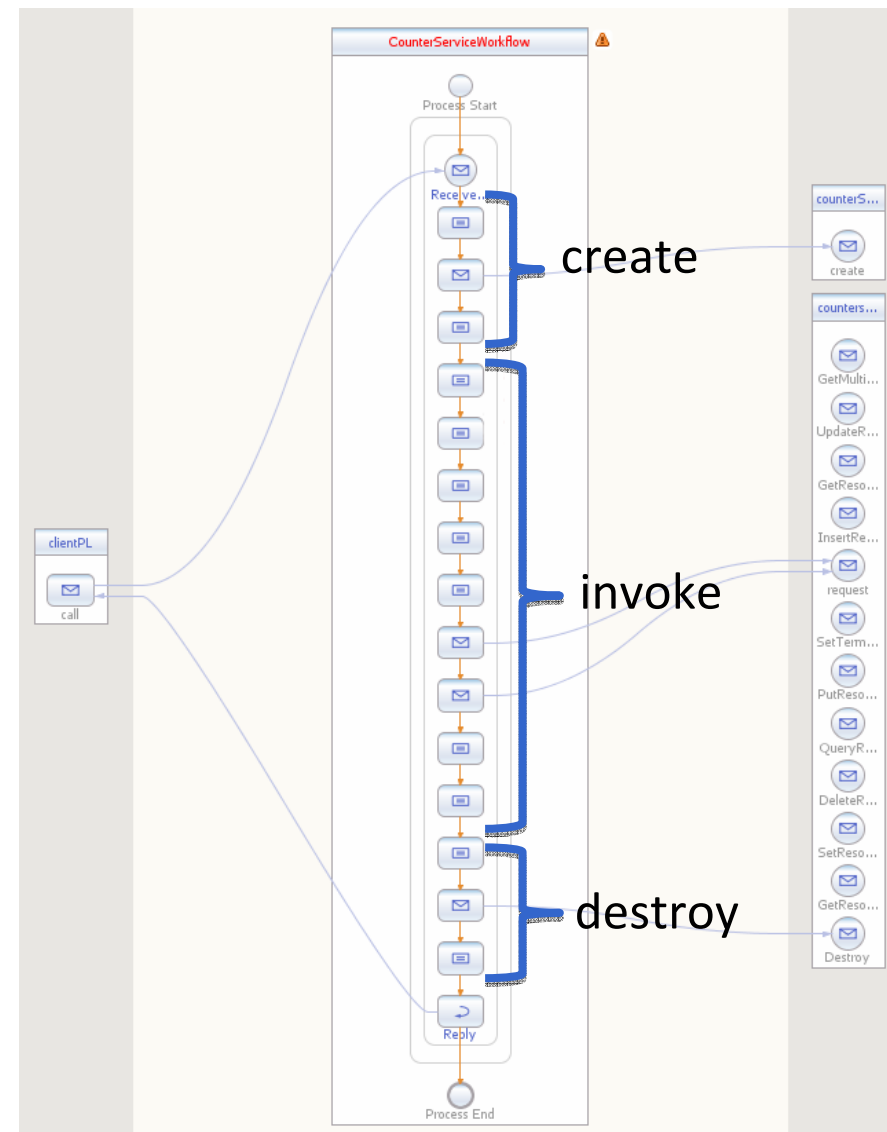


## ■ Pros

- Possibility to easily evolve with future BPEL developments
- Load Balancing /Security by using several WS-BPEL engines

## ■ Cons

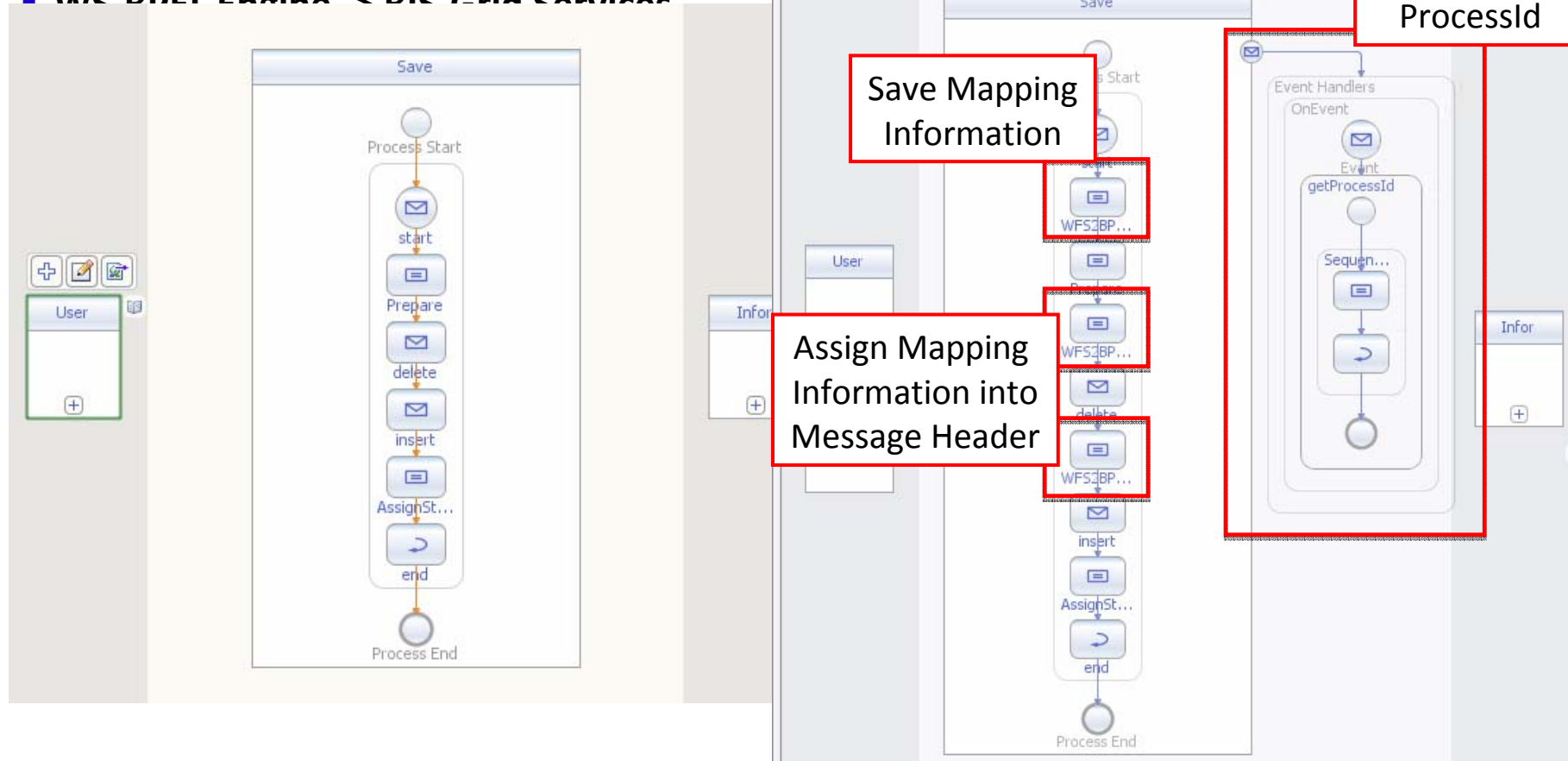
- Modeling Grid Invokes by using WS-Calls is very complex
  - Create
  - Invoke
  - Destroy
- 2 existing Workflow Instances (UNICORE and WS-BPEL Engine)
  - Mapping Problems

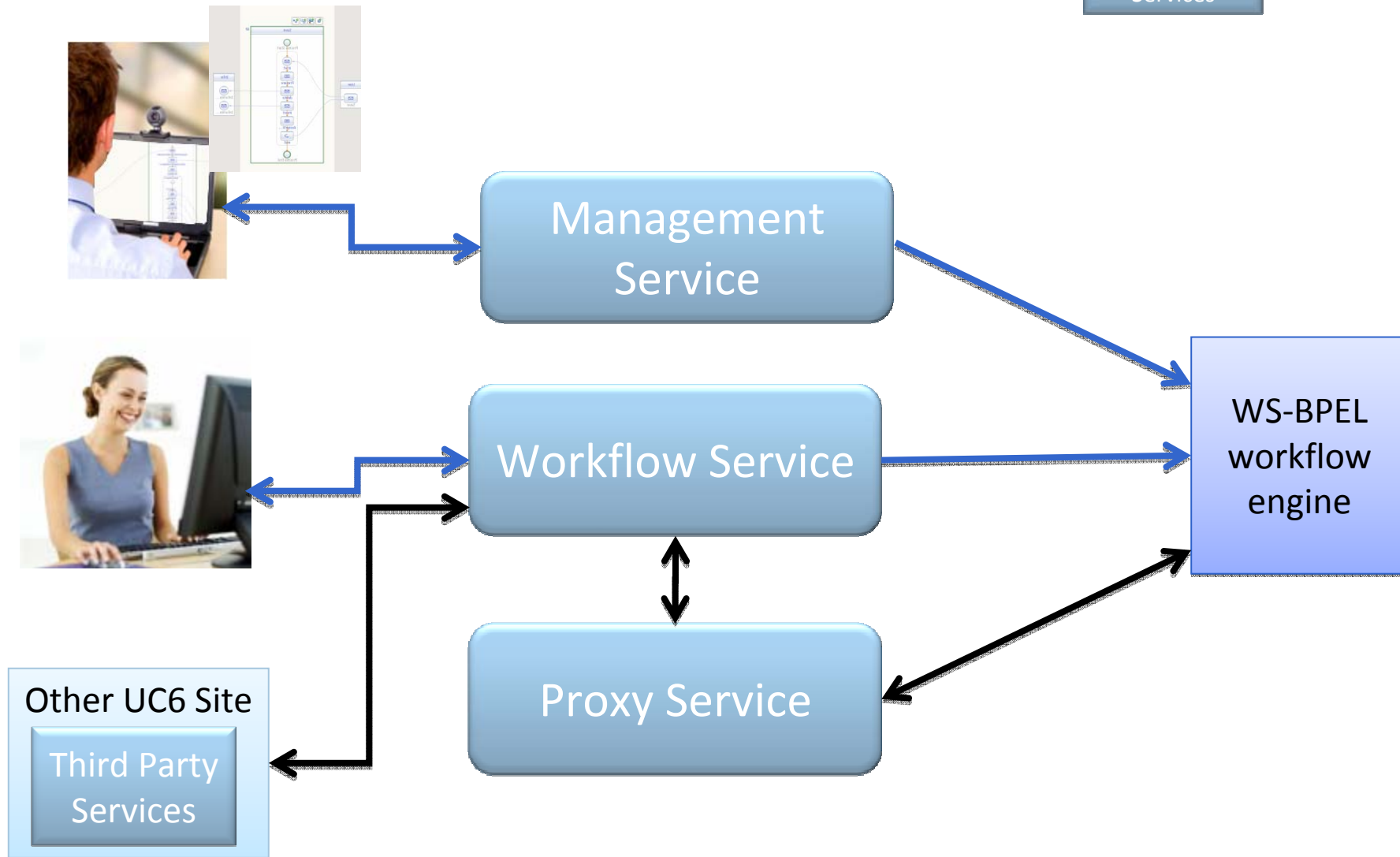




- Realized through changes in the BPEL Code

## WS-BPEL Engine > BIS-Grid Services





- **WSRF Service**

- Factory
  - Create
  - Search
- Service
  - Deploy
  - Undeploy
  - Redeploy
  - Retrieve

## Deploy:

1. Store deployment package to file space
  2. Check correctness
  3. Modify WS-BPEL Description with implementation specific pattern
  4. Deploy workflow to WS-BPEL Workflow Engine
  5. Create and register new Workflow Service
- 
5. Remove all files concerning this workflow from file space

- **WSRF Service**
  - Factory
    - Create
  - Service
    - Start
    - Stop
- Opens a port for connections from WS-BPEL Engine
- Extracts Mapping Information from SOAP Message Header
- Forwards the Message to the correct Workflow Service Instance

```
<soap:Header>
  <map:mapping-information
    xmlns:map="http://bisgrid.dgrid.de/mapping">
    <map:ID>
      CallCenterWorkflowService:c5517ab3-8ea7-4b01-b350-fca6173d4dab
    </map:ID>
    </map:mapping-information>
  ...
</soap:Header>
```

- **WSRF Service**

- Factory

- Create

- Service

- GetCurrentStatus

- AddSecurityCredentials

- ConfigureExternalCalls

- ...

- + Workflow specific operations

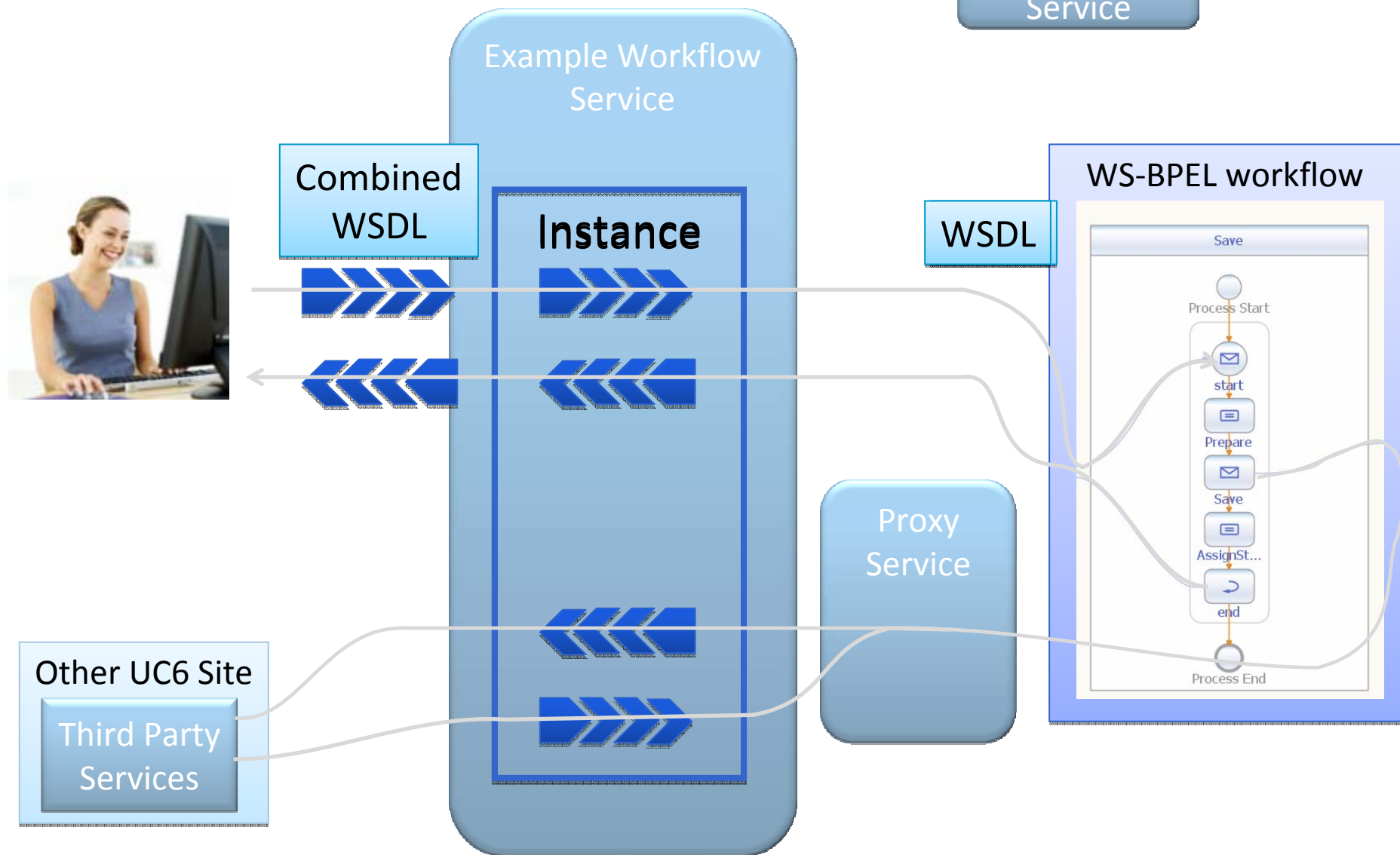
- Responsible for Workflow Execution

- Make the WS-BPEL Engine to a GS-BPEL Engine

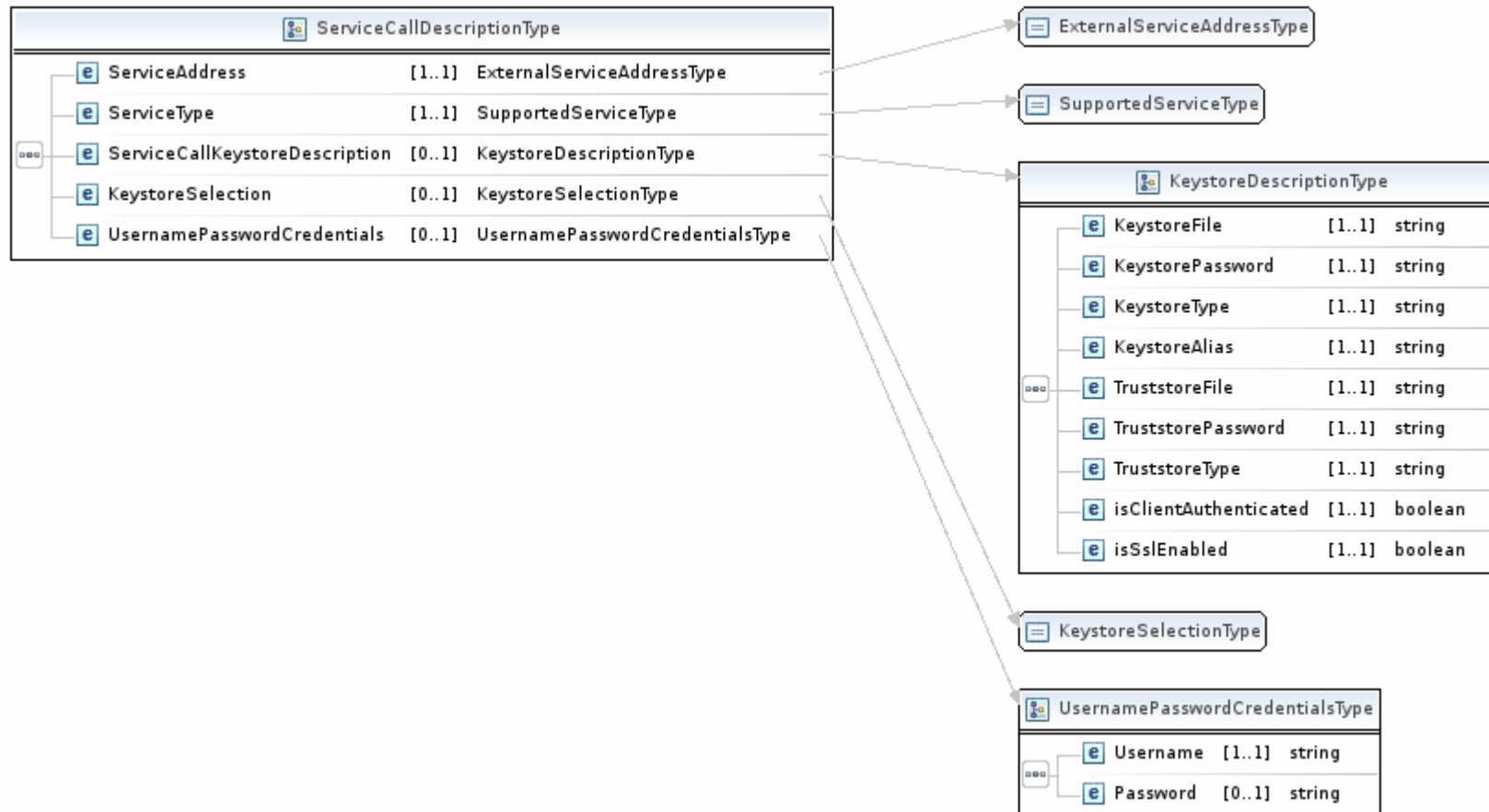
- Security

- Hide Grid-Specific stuff

Workflow  
Service



# Service Call Configuration (current status)





- **WORK IN PROGRESS**
- **First prototype in test phase**
  - Management Service as prototype
  - Proxy nearly ready
  - Workflow Service as prototype
- **Not all features already implemented**
- **Configurable external Service calls**
- **SSL Security**



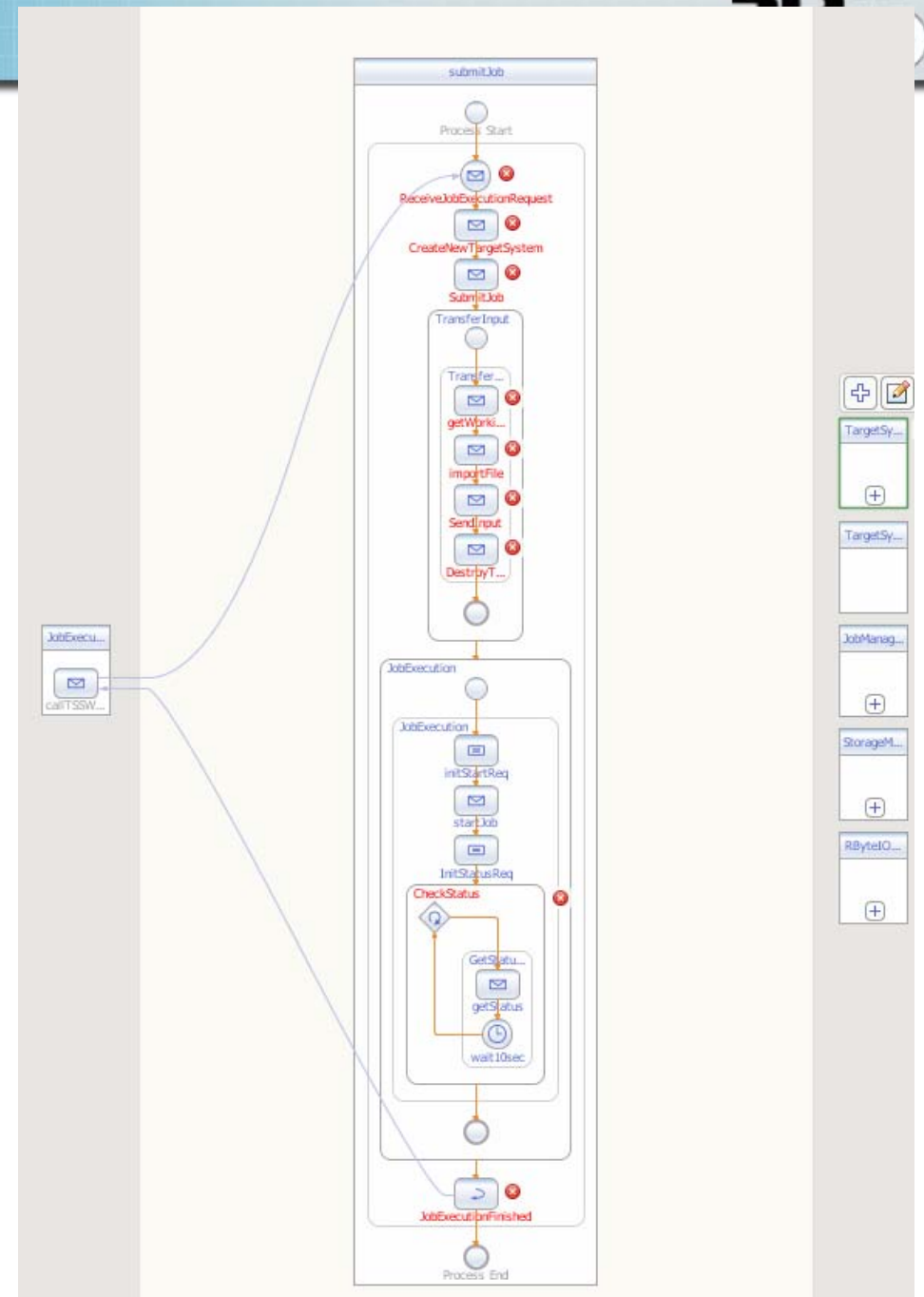
- Tests, tests, tests ...
- More input from the business domain
- Security Policies, PDP, PEP
- Editor that hides a lot of the complexity
  - Should address Business Domain
  - Simple to Use
  - Not Engine specific
  - Whp. we will extend the NetBeans BPEL Plugin (from OpenESB Project)
- Human Interaction in Workflows
  - Simple human interaction pattern should be introduced
- Extensions to call GT4 Services ?!
- Integration into the UNICORE Stack?



# BIS-Grid for Compute Jobs?

## ■ Job Submission Workflow

- Job Submission Grid Bean acts like a workflow and makes over 10 UNICORE ATOMIC Services Calls (without stage out)
- BIS-Grid can be used to model and execute such a workflow
- Can be used in other workflows
- Flexible and Modifiable for different Use Cases



- **BIS-Grid as Case Study to use Grid Technologies for EAI**
- **Flexibale Workflow Management and Execution**
- **Addresses Business Domain but also Scientific Workflows are possible**
- **Prototype implementation already available**

If we find an Internet Connection  
I can give a DEMO in a break.

