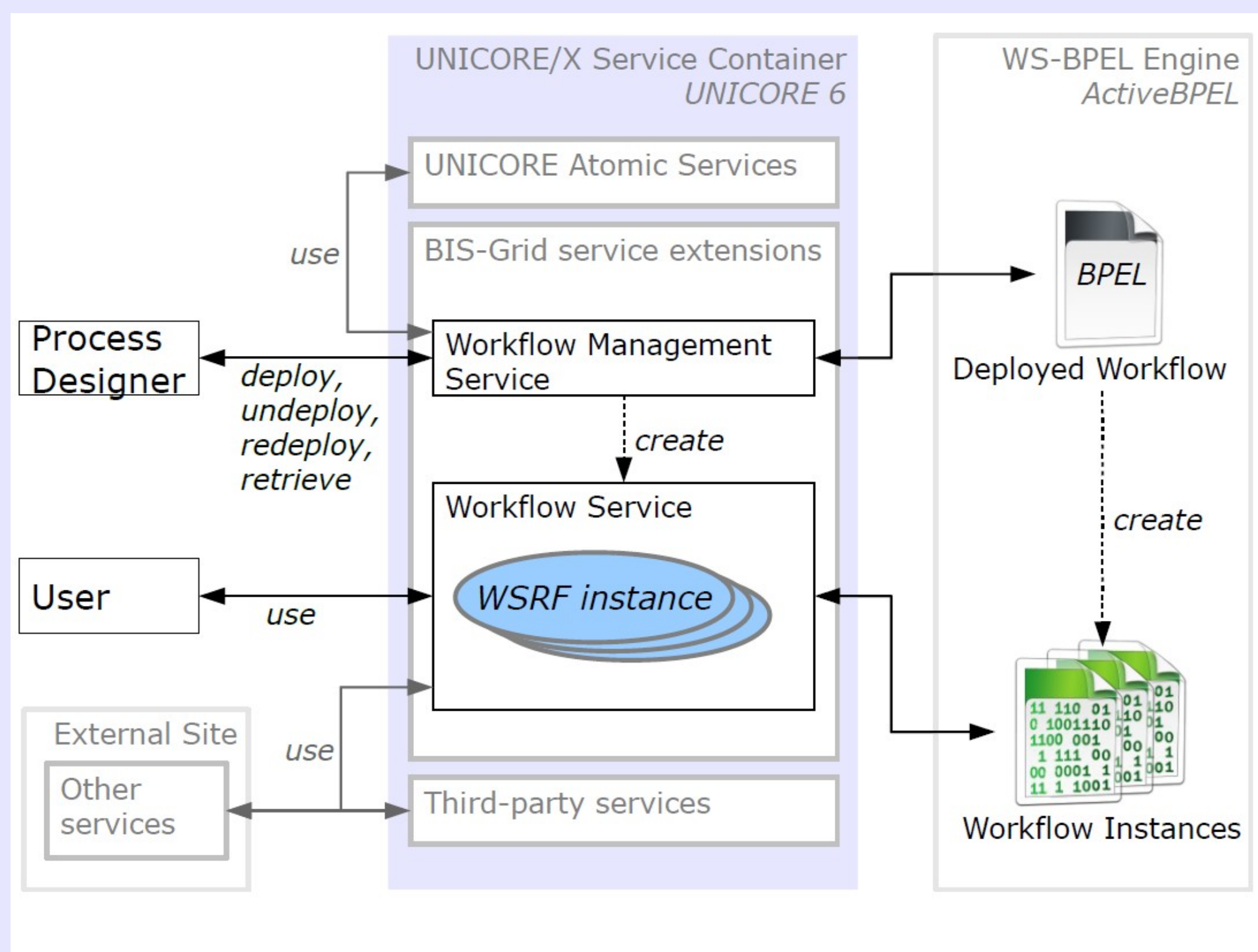


BIS-Grid OaaS Middleware



BIS-Grid Workflow Engine architecture overview

Orchestration as a Service

- ▶ A service orchestration engine is maintained by an OaaS provider to be provided itself as a service
- ▶ Platform as a Service (PaaS) from the developer's viewpoint
- ▶ Software as a Service (SaaS) from the end user's viewpoint

BIS-Grid Workflow Engine

- ▶ Open source service extensions to the UNICORE 6 Grid middleware that act as a WSRF*-Wrapper for WS-BPEL** workflows
- ▶ Uses an arbitrary WS-BPEL engine and provides WS-BPEL workflows as WSRF Grid services

* WSRF is the Grid standard for stateful web services
 ** WS-BPEL is the *de facto* standard for web service orchestration

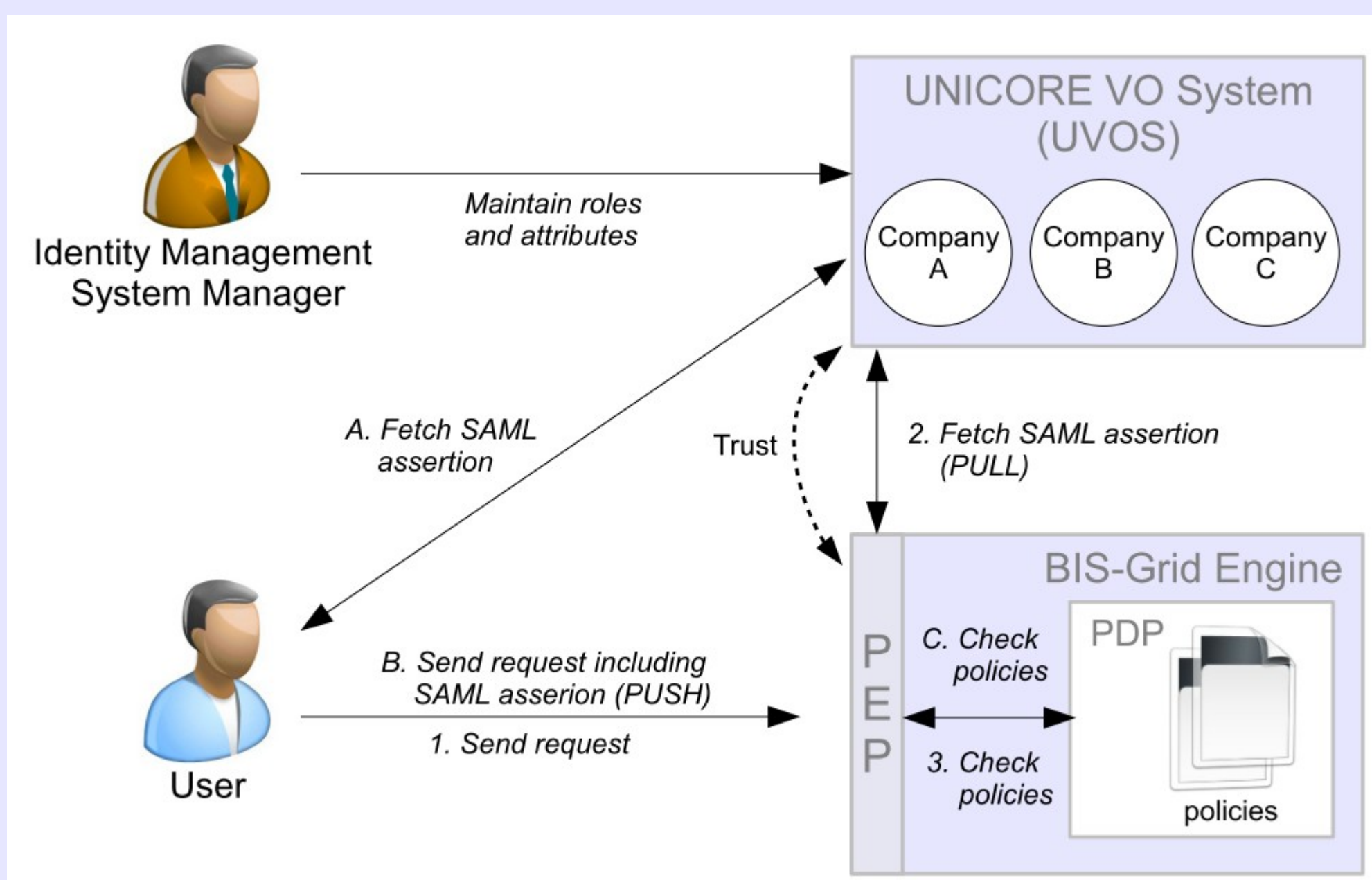
Security

- ▶ UNICORE Virtual Organization System (UVOS) for the administration of user identities
- ▶ SAML assertions for identity-specific attributes and fine-grained credential delegation
- ▶ XACML policies for rights description
- ▶ BIS-Grid Workflow Engine supports hot deployment of security policies

Scientific Workflows

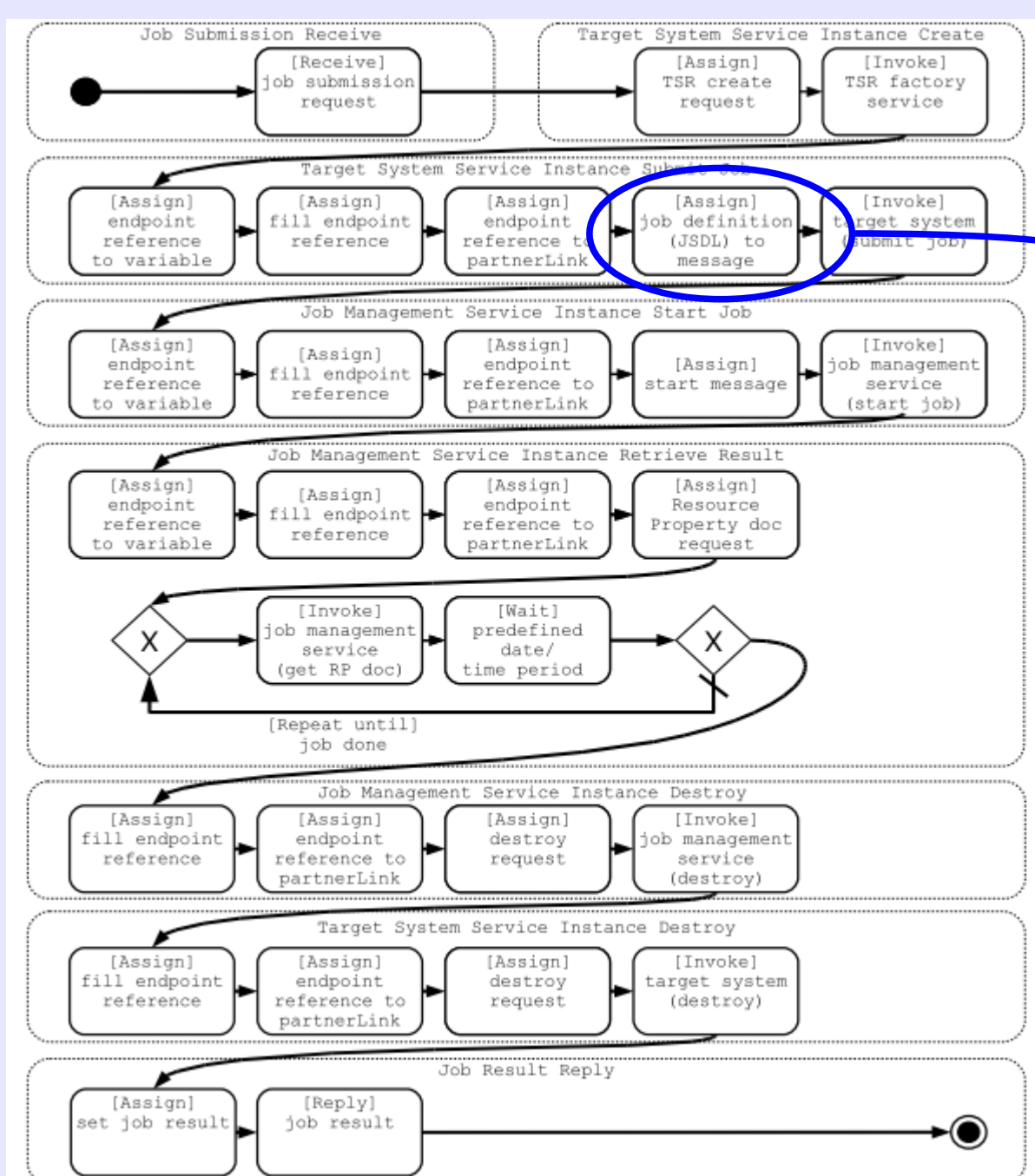
- ▶ Stateful Grid services can be orchestrated by standard WS-BPEL, resulting in a service to be reused in higher-level orchestrations
- ▶ Job Submission Workflow forms the basis for higher-level workflows

OaaS Security Infrastructure



UVOS-based authentication and authorization (PUSH and PULL)

Job Submission Workflow



Job Submission Workflow realized with JSDL and standard WS-BPEL

```
<bpel:assign name="InitInput">
  <bpel:copy>
    <bpel:from>
      <bpel:literal>

      <tss:Submit xmlns:ns="http://docs.oasis-open.org/wsrfl/1-2"
        xmlns:ns1="http://unigrids.org/2006/04/services/jms">

        <jSDL:JobDefinition>
          <jSDL:JobDescription>
            <jSDL:JobIdentification>
              <jSDL:JobName>...
            </jSDL:JobName>
            <jSDL:Description>...
            </jSDL:Description>
            ...
          </jSDL:Application>
        </tss:Submit>
      </bpel:literal>
    </bpel:from>
  </bpel:copy>
</bpel:assign>
```

Job Submission Description Language (JSDL)

Partners: CEWE, KIESELSTEIN, SIEMENS, IDSYS, OFFIS, UNIVERSITÄT PADERBORN, JÜLICH.
 Sponsors: Bundesministerium für Bildung und Forschung, GEFÖRDERT VOM.