

AssessGrid: Implementation Experiences with WS-AG

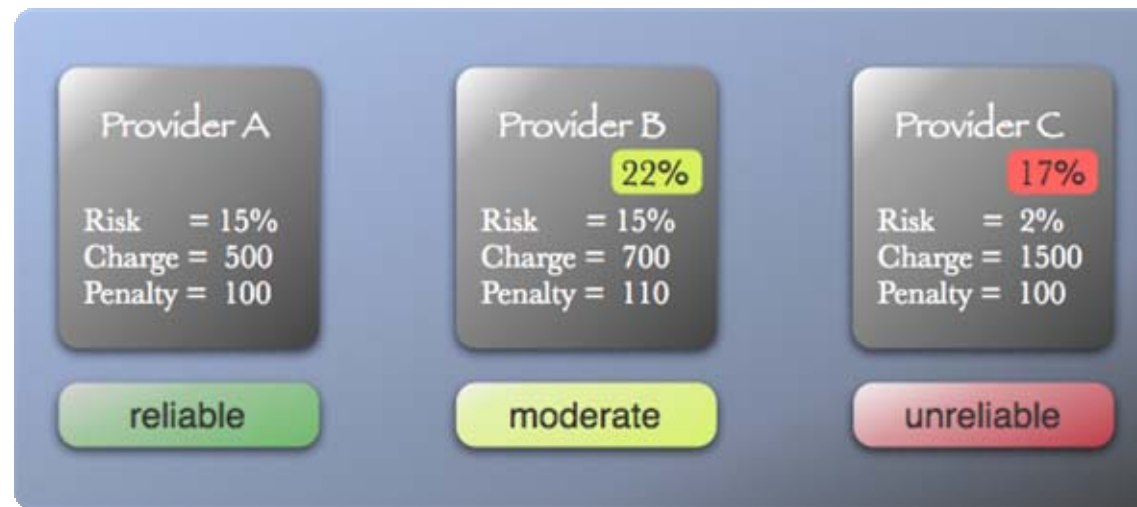
Dominic Battré





- AssessGrid
- Experience with Globus Toolkit 4
- Use of Service Level Agreements

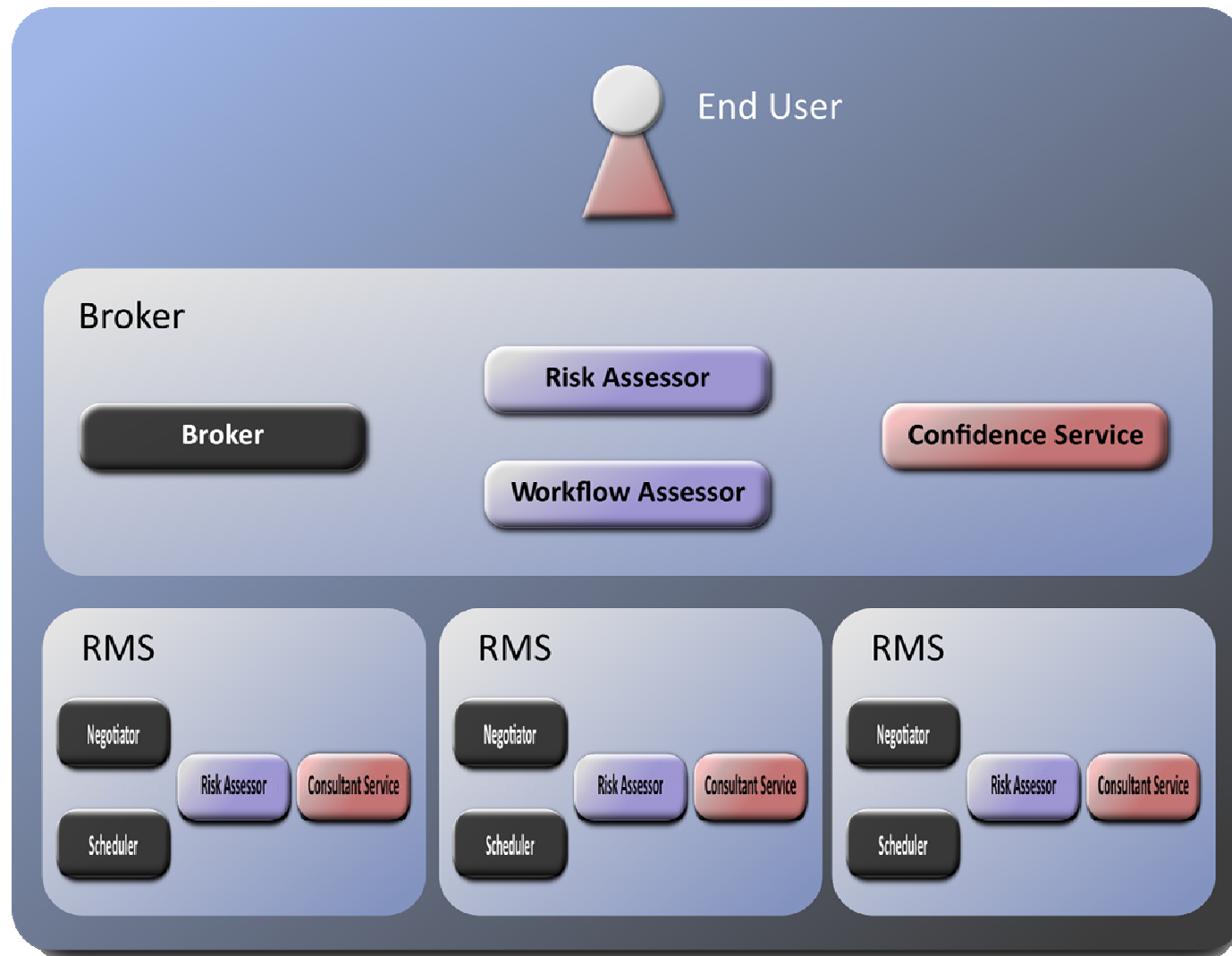
- Introducing Risk Management into the Grid
- From a user's perspective:



Components



assessGRID





- Why Globus?
 - Utility: Authentication, Authorization, Delegation, RFT, MDS, WS-Notification
 - Impact
- Problem 1: GRAM (Grid Resource Allocation and Management)
 - State machine, incl. File-Staging, Delegation of Credentials, RSL
 - Cannot use it: written for batch schedulers, nor for planning schedulers
- Problem 2: Deviations from WS-AG spec.
 - Different Namespaces WS-A, WS-RF



- Technical Challenges
 - **xs:anyType**
 - Wrote custom serializers/deserializers
 - **Substitution groups**
 - Used in ItemConstraint (Creation Constraints)
 - Cannot be mapped to Java by Axis
 - Replaced by xs:anyType – use as DOM tree
 - **CreationConstraints**
 - Namespace prefixes in XPaths meaningless
 - Need for WSDL and interpretation for xs:all, xs:choice, and friends

```
<wsag:Context>
```

```
...
```

```
<wsag:AgreementInitiator>
```

```
<AG:DistinguishedName>
```

```
/C=DE/O=...
```

```
</AG:DistinguishedName>
```

```
</wsag:AgreementInitiator>
```

```
<wsag:AgreementResponder>EPR</...>
```

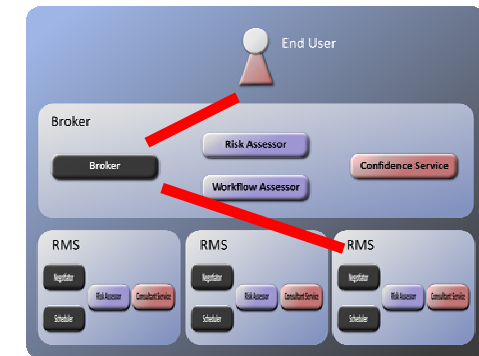
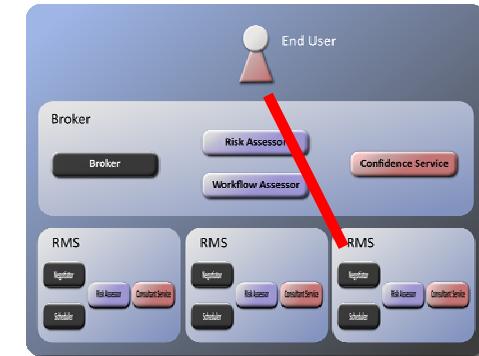
```
<AG:ServiceUsers>
```

```
<AG:ServiceUser>DN</...>
```

```
</AG:ServiceUsers>
```

```
...
```

```
</wsag:Context>
```



Context

Terms

Creation Constraints

- Conjunction of terms
 - Common structure of templates
 - WS-AG too powerful/difficult to fully support
- Service Description Term (one)
 - `assessgrid:ServiceDescription` (extension of abstract `ServiceTermType`)
 - `jsdl:POSIXExecutable` (executable, arguments, environment)
 - `jsdl:Application` (mis-)used for libraries
 - `jsdl:Resources`
 - `jsdl:DataStaging` *
 - `assessgrid:PoF` (upper bound)

Context

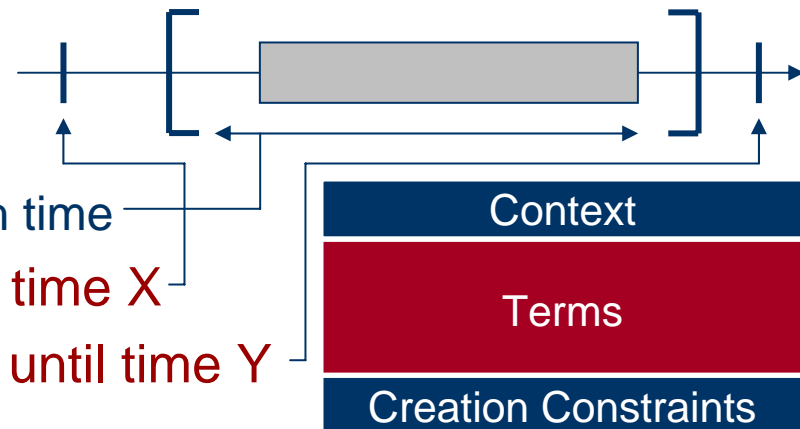
Terms

Creation Constraints

- No hierarchy but two meta guarantees
 - **ProviderFulfillsAllObligations**
 - e.g. Reward: 1000 EUR, Penalty 1000 EUR
 - **ConsumerFulfillsAllObligations**
 - e.g. Reward: 0 EUR, Penalty 1000 EUR
- First violation is responsible for failure
- No hardware problem, then User fault
- Other Guarantees
 - **Execution Time**
 - Any start time (best effort)
 - Exact start time
 - Earliest start time, latest finish time
 - User provides StageIn files by time X
 - Provider keeps StageOut files until time Y

No timely execution

No stage-out





- SLA does **not** contain requirements of **fault tolerance** mechanisms
 - Covered by asserted PoF, penalty and loss of reputation
- Compulsory Assessment Intervals not really useful for us
 - How often do you assess that job was allocated for asserted time?
- Preferences too complicated

Context

Terms

Creation Constraints



- Difficult to support Namespaces:
 - `//wsag:.../assessgrid:...` - prefixes are just strings
- Very difficult to support structural information
 - `xs:group`, `xs:all`, `xs:choice`, `xs:sequence`
- Possible but difficult to support `xs:restriction`
- `xs:simple`
 - Check for enumeration (`xs:restriction` of `xs:string`)
 - Check for valid dates (`xs:restriction` of `xs:date`)
 - Everything else close to impossible
- `{min,max}{In,Ex}clusive`
- `totalDigits`, `fractionDigits`, `length`,
... probably useless

Context
Terms
Creation Constraints



- AssessGrid
- Experience with Globus Toolkit 4
 - Challenges, deviation from standard
- Use of Service Level Agreements
 - Elements used in AssessGrid
- Questions?