



Integrating WS-Agreement with a Framework for Service- Oriented Infrastructures

Run WS-Agreement services within
the SLA@SOI Framework

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Outline



What offers SLA@SOI?

Why syntax conversion?

Methodological approach: The SLA* model

Technical approach: A generic SLA manager

Conversion example

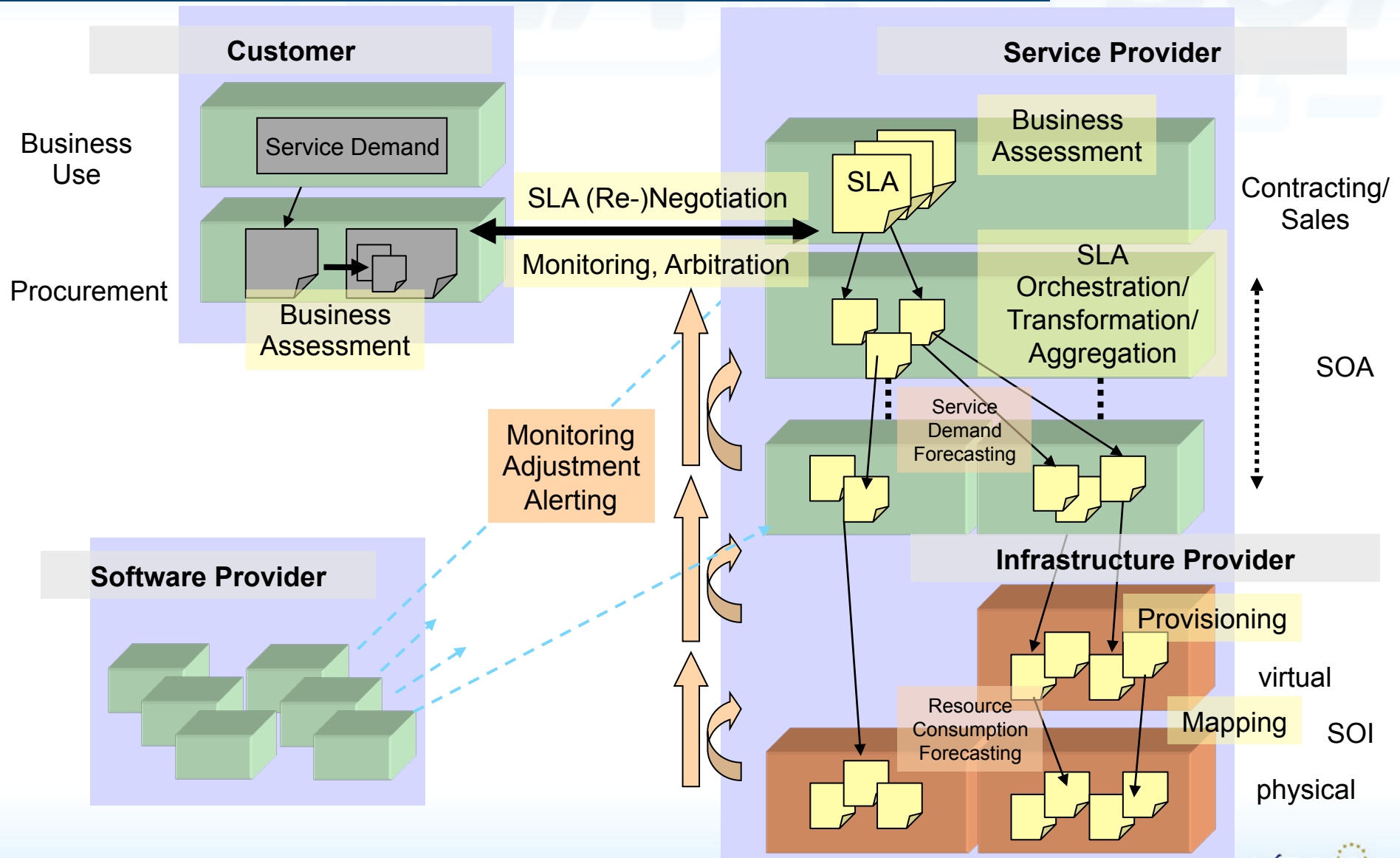
Open issues

Project Objectives & Solutions

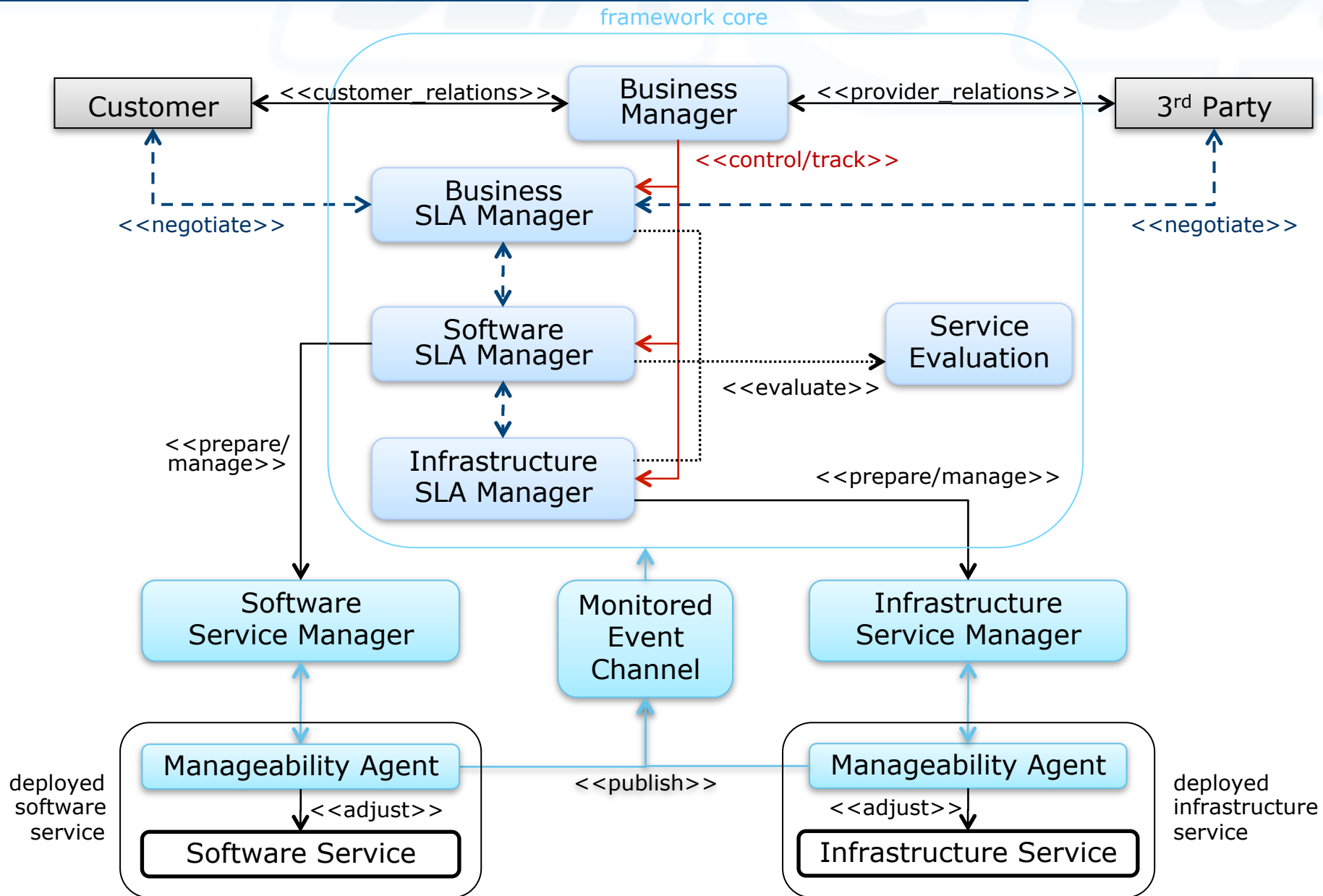


- **SLA management framework**
 - ◇ Harmonizing perspectives of relevant stakeholders (software/service/infrastructure provider and customer)
 - ◇ General methods for SLA specification and negotiation & systematic multi-layer SLA management (planning, optimization, and provisioning), monitoring and accounting
- **Adaptive SLA-aware infrastructures**
 - ◇ Well defined interfaces for adaptive infrastructures with harmonized access to different virtualization technologies.
 - ◇ Advanced technologies for SLA enforcement on infrastructure level
- **Engineering methods for predictable service-oriented systems**
 - ◇ Modelling techniques and prediction tools for SOA and SOI components
- **Business management suite for e-contracting**
 - ◇ Covers complete business lifecycle of a service provisioning and delivery

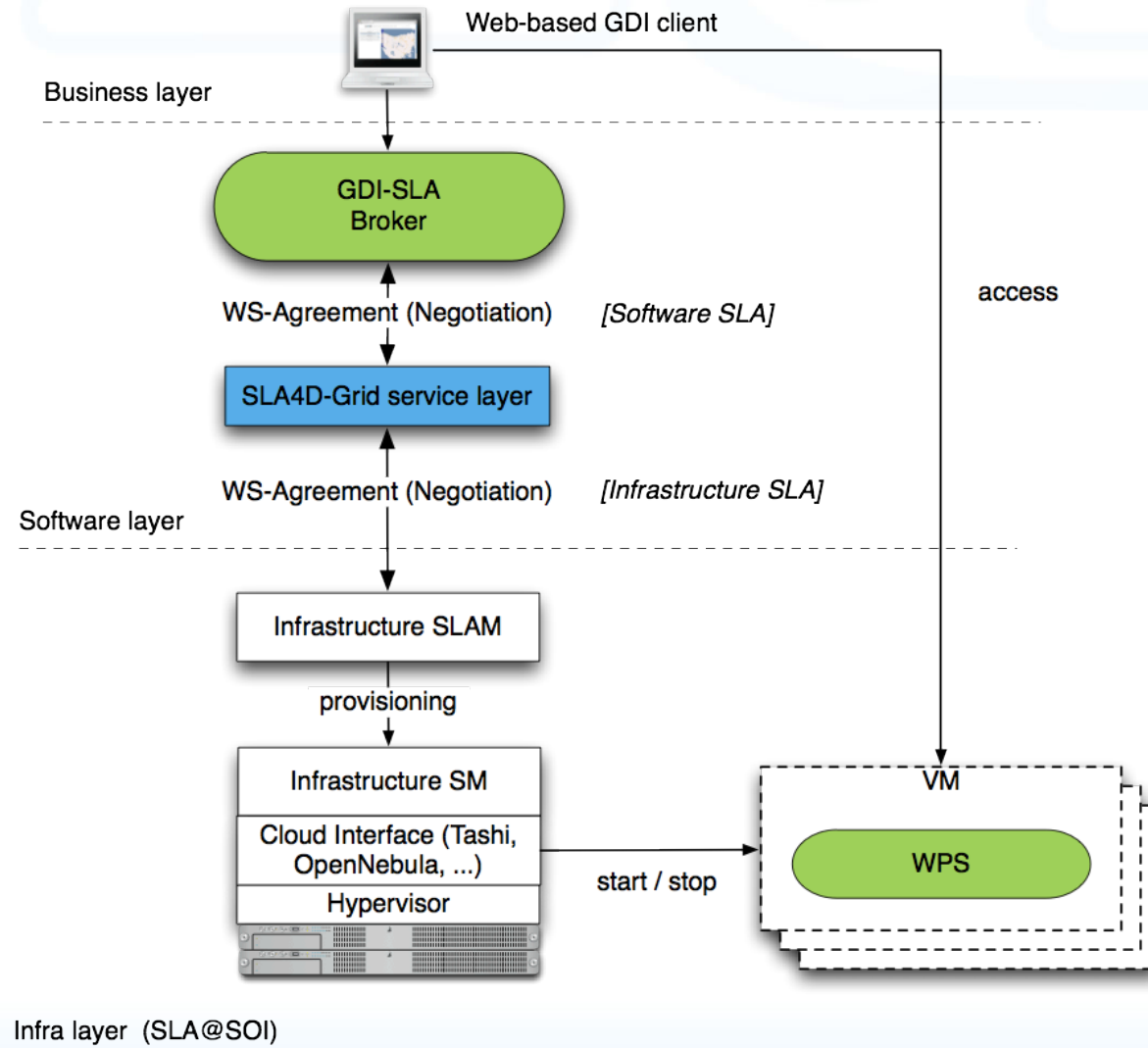
The SLA@SOI Framework



Reference Architecture



An Application Scenario



Various types of renderings

- SLA@SOI's SLA model allows various types of renderings
 - ◇ XML
 - ◇ RDF/OWL
 - ◇ JSON
 - ◇ ...
- Framework internal representation is Java
- Essential: Conversion between string-based representations and Java-based representations

Various types of SLA models

- SLA@SOI supports various types of SLAs
 - ◇ Its own SLA model
 - ◇ WS-Agreement with embedded content
 - ◇ Potentially further models
- Framework internal model is SLA*
- required: Conversion between different SLA models

The Basis: SLA@SOI's SLA Model



Provides various representations

- XML, JSON, Java
- ...

Uses vocabularies as extensions to the core model

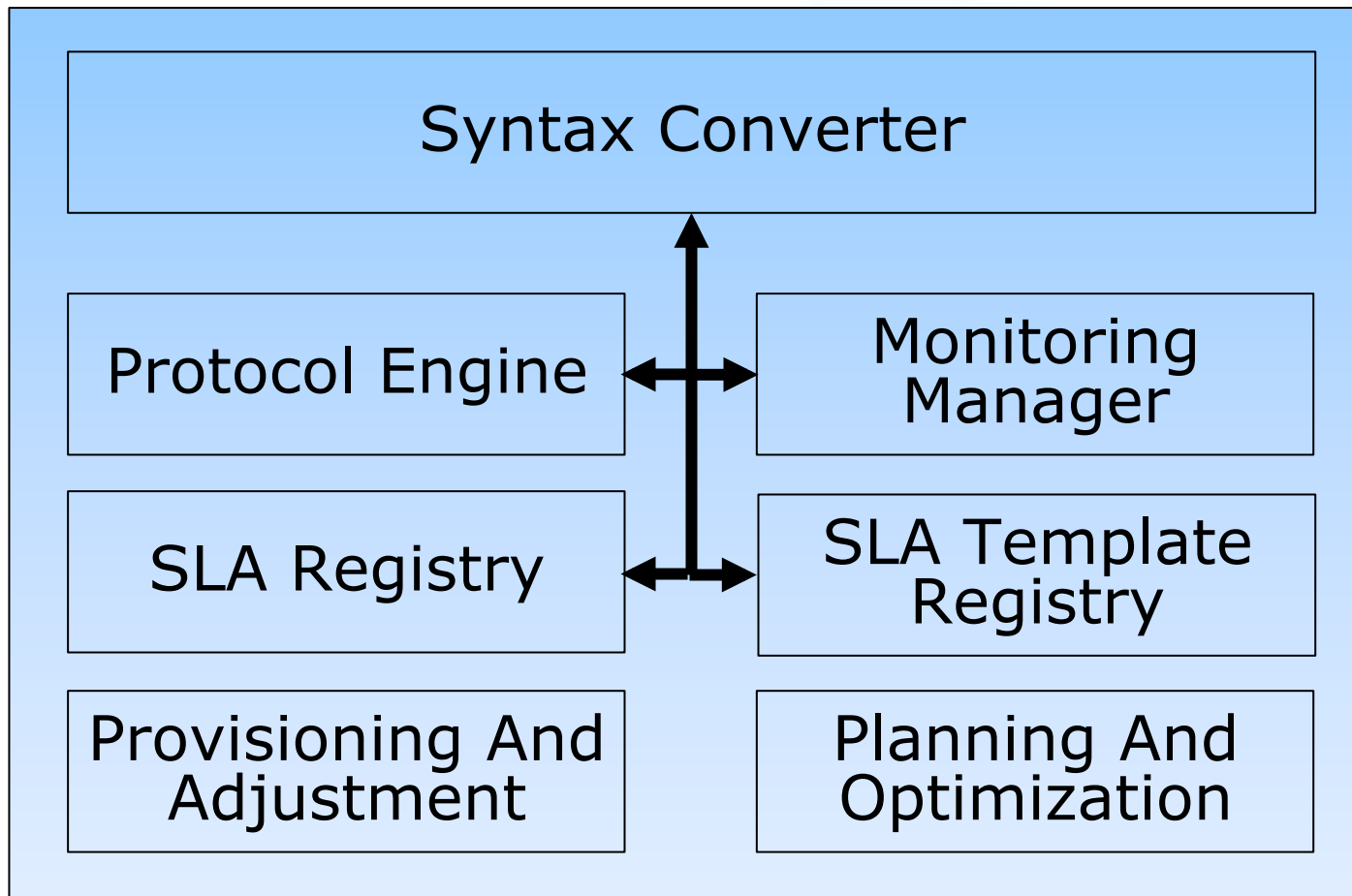
- Business Terms
- Infrastructure Terms
- QoS Terms

Validates content automatically

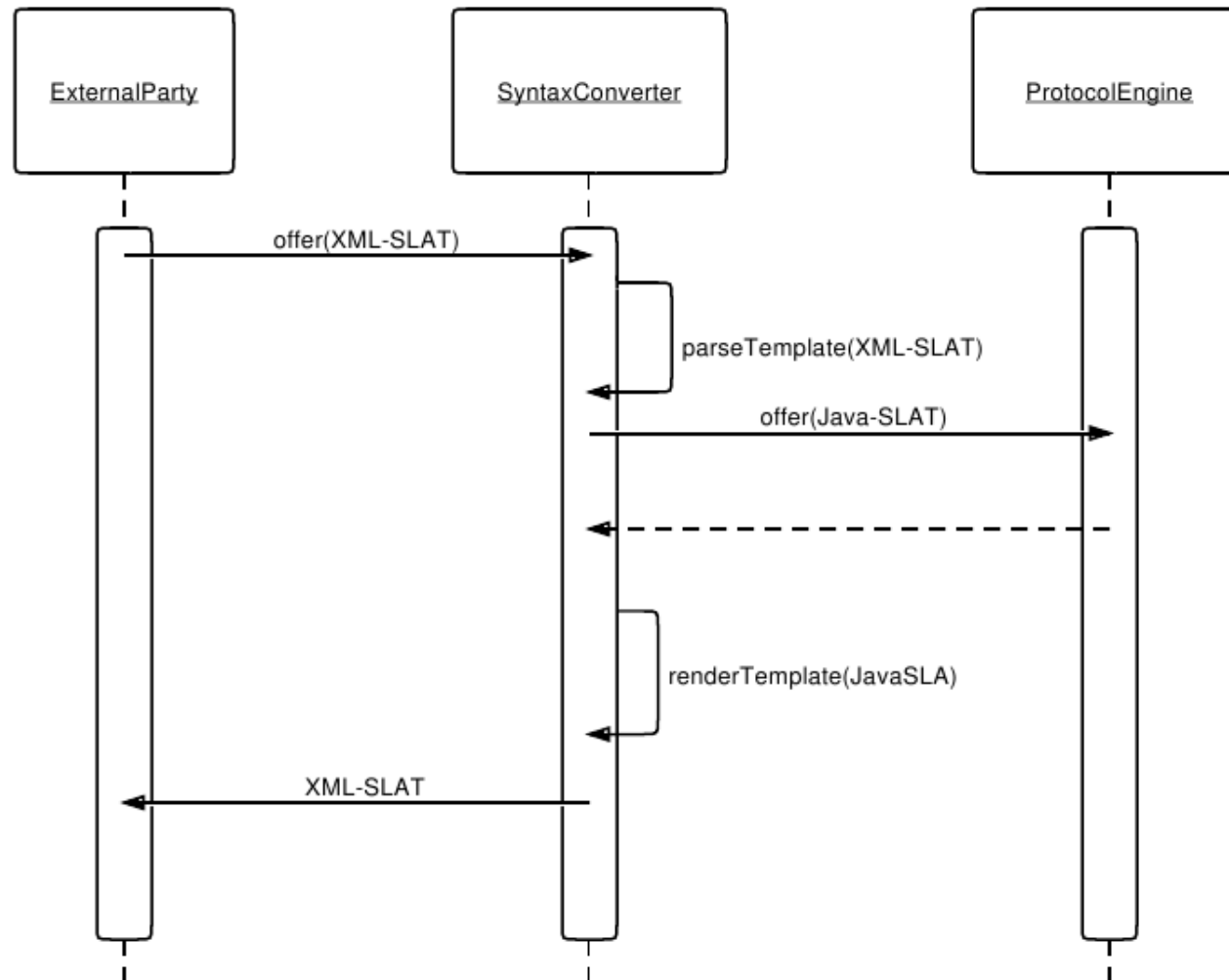
- Makes use of external vocabulary
- Validation included e.g. is the data-type right? Is the value in the predefined range?

Has been developed based on WS-Agreement extensions

- Domain-specific extensions for certain domains targeting e.g. the infrastructure layer



Syntax-Conversion in Action



Ideal versus pragmatic

- Pragmatic approach has been chosen to ease the implementation
- Potential problems
 - ◇ Semantics of mapping may not be clear directly
 - ◇ Documentation essential for programmers/adopters

Bi-lateral mapping necessary

- Realise domain-specific WS-Agreement extensions as SLA* elements

SLA* provides in general simple solutions

- E.g. XPath for XML-based systems versus SLA* PATH

Example Mapping



WS-Agreement \leftrightarrow SLA*

- Top-level
 - ◇ Name \leftrightarrow SLA identifier
- wsag:GuaranteeTerm to slaso:Guaranteed
 - ◇ Obligated \leftrightarrow Precondition of a guaranteed state or action
 - ◇ QualifyingCondition \leftrightarrow Also goes into the precondition of state/action
 - ◇ ServiceLevelObjective \leftrightarrow Guaranteed state
 - ◇ BusinessValueList \leftrightarrow No explicit support in SLA@SOI
- BusinessValueList to SLA*
 - ◇ Penaltys/Rewards \leftrightarrow E.g. custom guaranteed action with AssessmentInterval and Count as precondition

Constraint expressions

- WS-Agreement uses XML-Schema-based constraints
- SLA@SOI's model has its own constraint concept
- WS-Agreement constraints cannot be mapped to SLA* constraints in all cases
- Using SLA@SOI as free-formed constraints in WS-Agreement is one solution (but then standard validation does not work)

Business terms

- Only supported by SLA@SOI via an external vocabulary
- Not included in core model


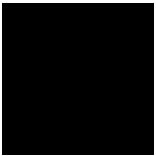






Many minor issues

- Missing elements and attributes in SLA@SOI need to be supported by complementary vocabularies
- Such extensions are foreseen in SLA@SOI

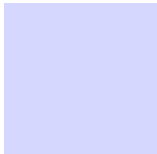
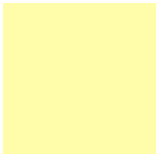


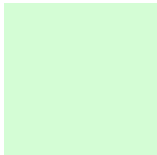
**Thank
you!**

Colour Scheme

Main colours (according to branding scheme)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
|  | R(255) G(255) B(255) |  | R(0) G(0) B(0) |  | R(150) G(150) B(150) |  | R(0) G(153) B(255) |
|  | R(0) G(51) B(102) |  | R(103) G(204) B(255) |  | R(221) G(221) B(221) |  | R(77) G(77) B(77) |

Additional colours (to be used for fancy diagrams)

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|---|---|--|---|--|---|--|---|
|  | R(204) G(204) B(255) |  | R(255) G(255) B(153) |  | R(255) G(204) B(153) |  | R(255) G(153) B(102) |
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