

SLA Negotiation

SLA@SOI Negotiation Platform

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Motivation

State of the art - quick recap

Architecture

Design

Novelty and achievements

Ongoing work and future extensions

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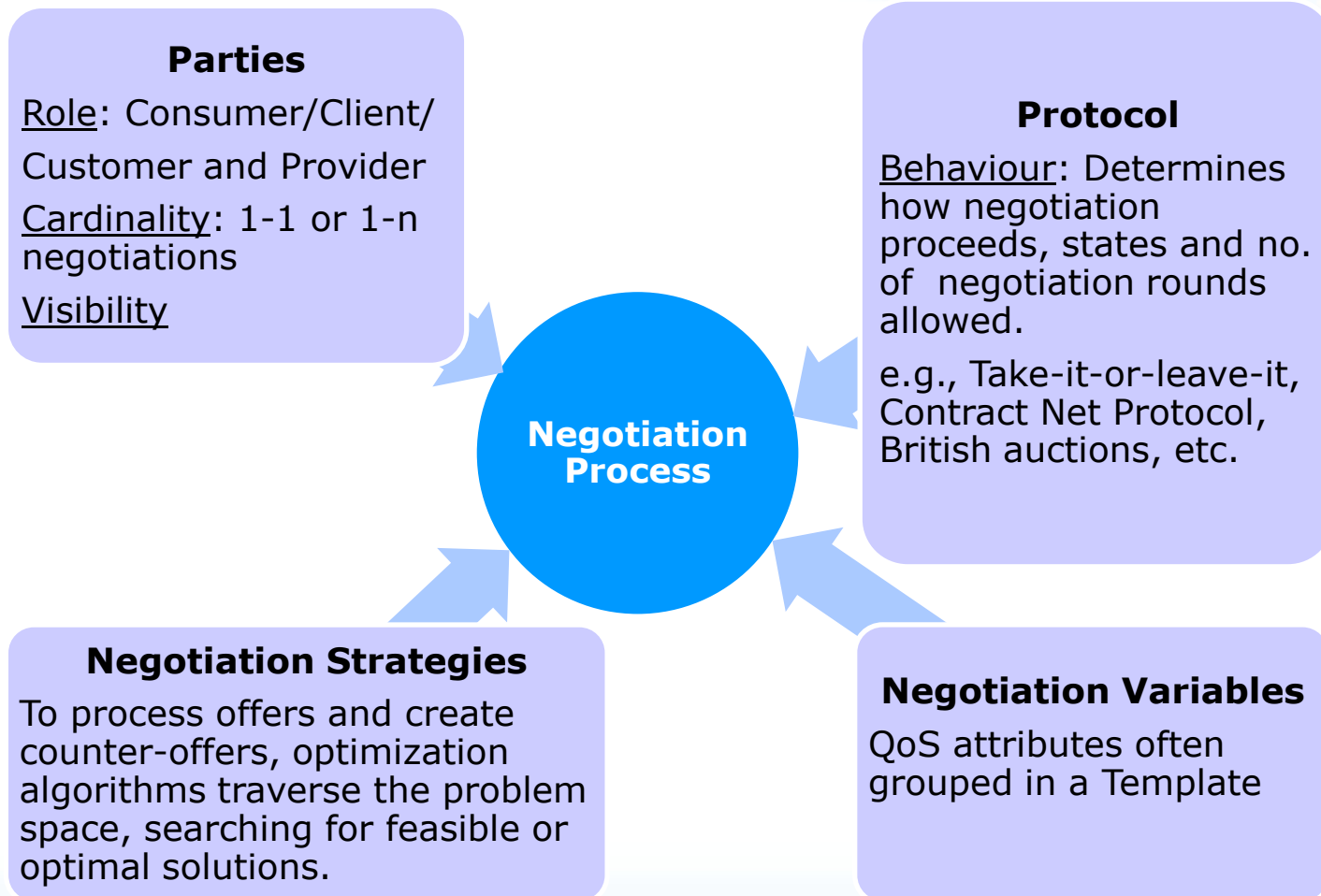
Why negotiate?

- Usage aspects like quality of service cannot be prefixed.
 - ◇ Customers have varying needs.
 - ◇ Demand and supply situation is constantly changing.

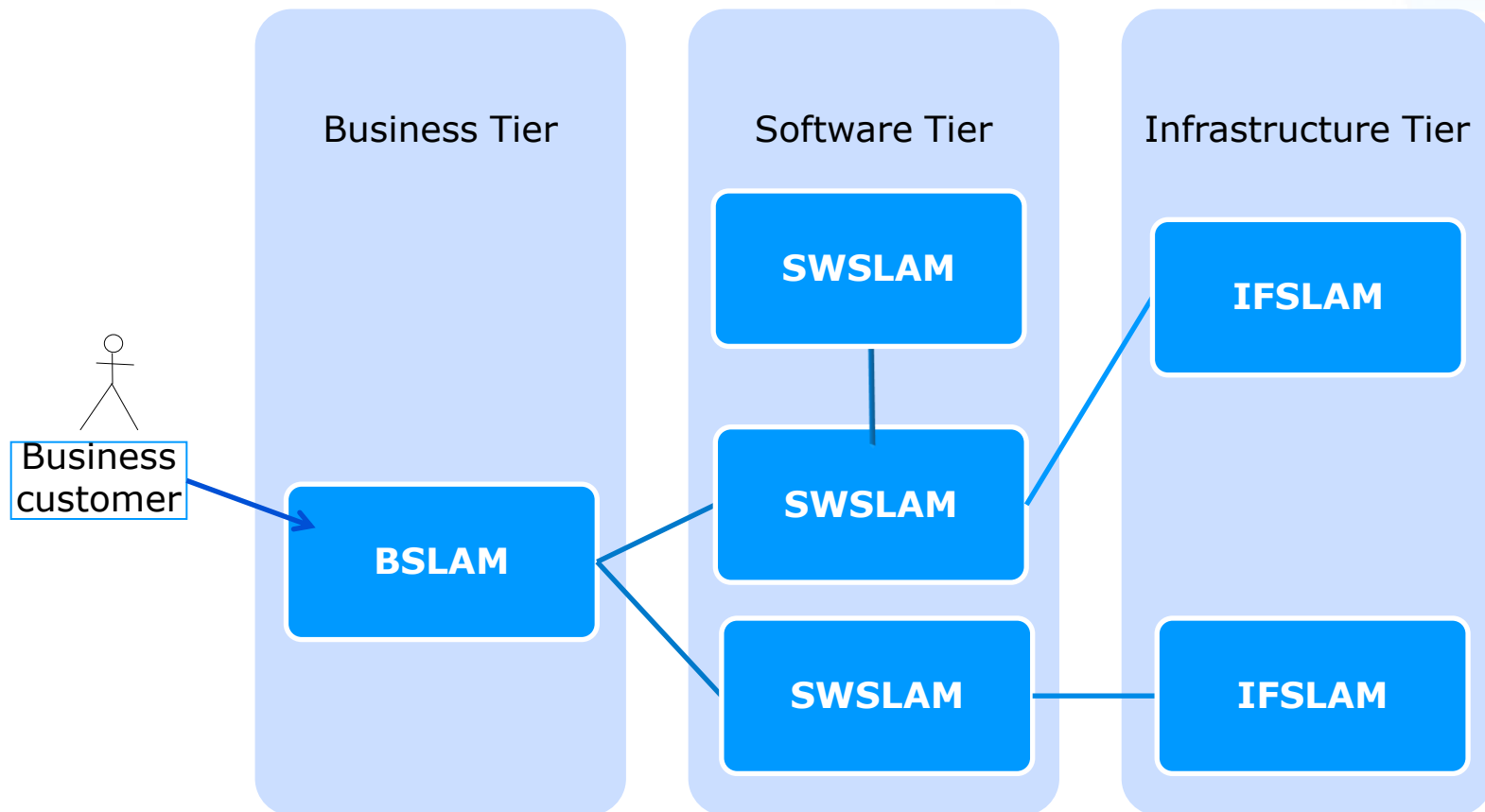
Objective

- Provide negotiation mechanisms for exchanging offers and counter offers between customers and providers.
 - ◇ Target: Obtain service level agreements for guarantees on QoS.

Negotiation as a process having multiple aspects



Negotiations to be realized across multiple tiers



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Other projects addressing SLA negotiations

- WS-Agreement (WSAG)
 - ◇ Implements "Take-it-or-leave-it".
 - ◇ Tight coupling of negotiation states with provided interface imposes strict restrictions.
 - ◇ Custom interactions cannot be developed.
- BREIN
 - ◇ Implements FIPA Contract Net Protocol.
 - ◇ Considers multi-tier negotiations.
 - ◇ Custom interactions cannot be developed.
- SeCSe
 - ◇ Bi/Multi-lateral negotiations.
 - ◇ Marketplace architecture.
 - ◇ Custom interactions possible.
- WSLA, ASAPM, CAAT, ...

Motivation in SLA@SOI

- Allowing users to implement custom interaction behaviours in negotiation protocol.
- 1-1 and 1-n negotiations.
- Supporting multiple rounds of negotiation in order to reach agreement.
- Usability of the approach.
- Flexible design that can be adopted in agent like as well as marketplace or broker based architectures.

Motivation

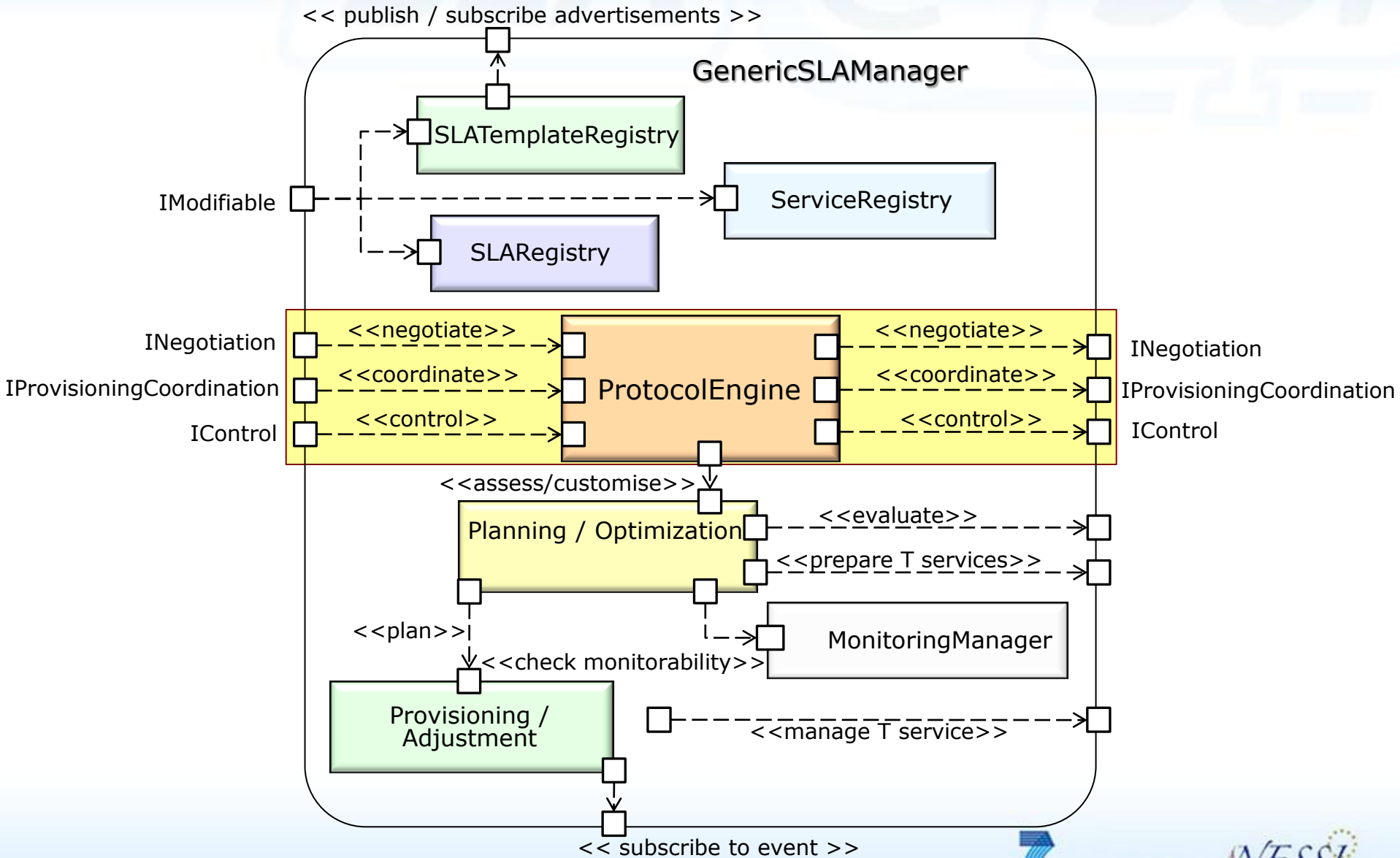
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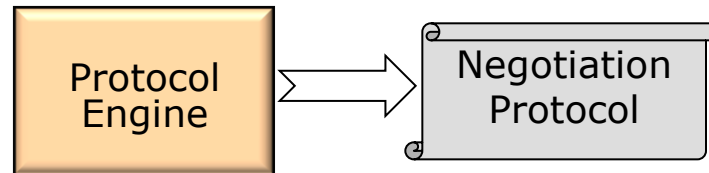
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Conclusion

Protocol Engine and the Negotiation Protocol

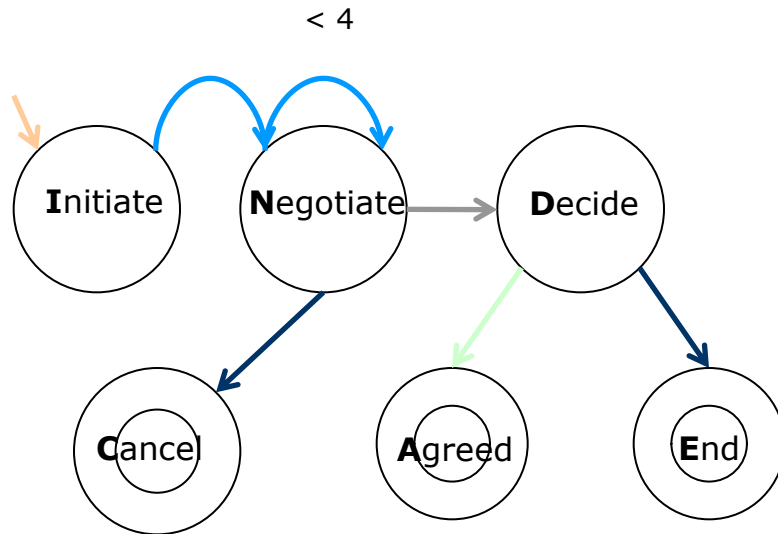
- Provides automated (stateful) interaction b/w a customer and provider.
- Executes the negotiation protocol.
- Is domain agnostic.
- Exposes its features as webservice + Java.



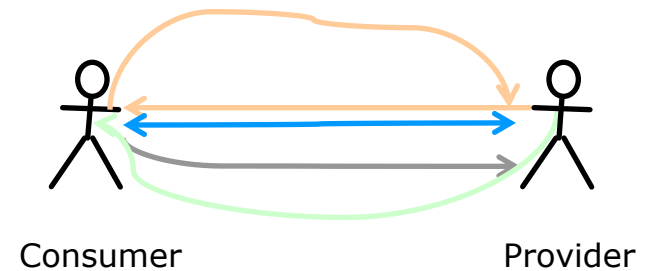
- Allows to implement custom interaction behaviours.
- May have domain specific content.
- Encoded as declarative styled rules making it:
 - Maintainable
 - Human readable
 - Machine interpretable

Models interaction behaviour as Finite State Machine

- A bilateral multi-round negotiation protocol is developed.

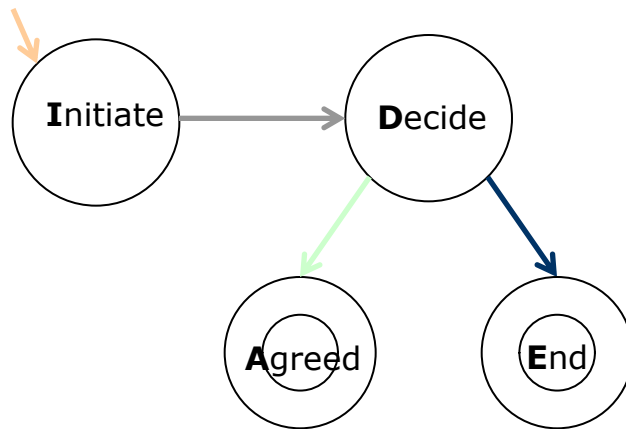


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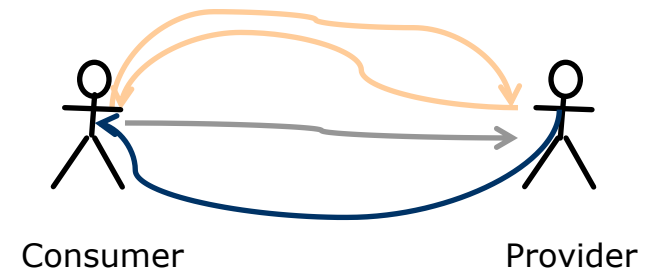


Models interaction behaviour as Finite State Machine

- Take-it-or-leave-it

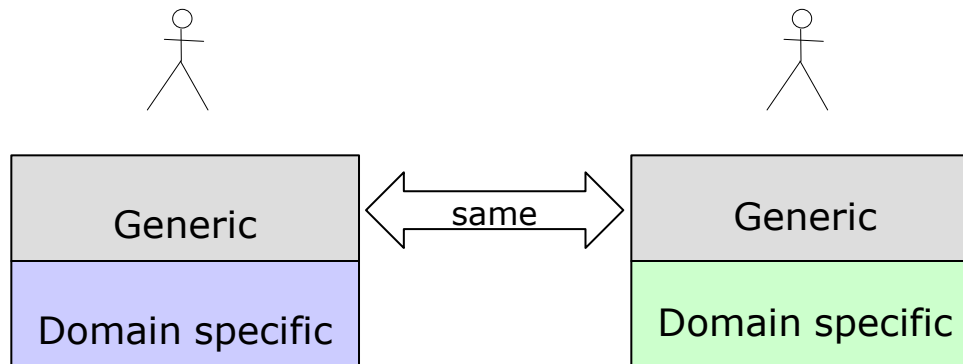


I.D.(A+E)

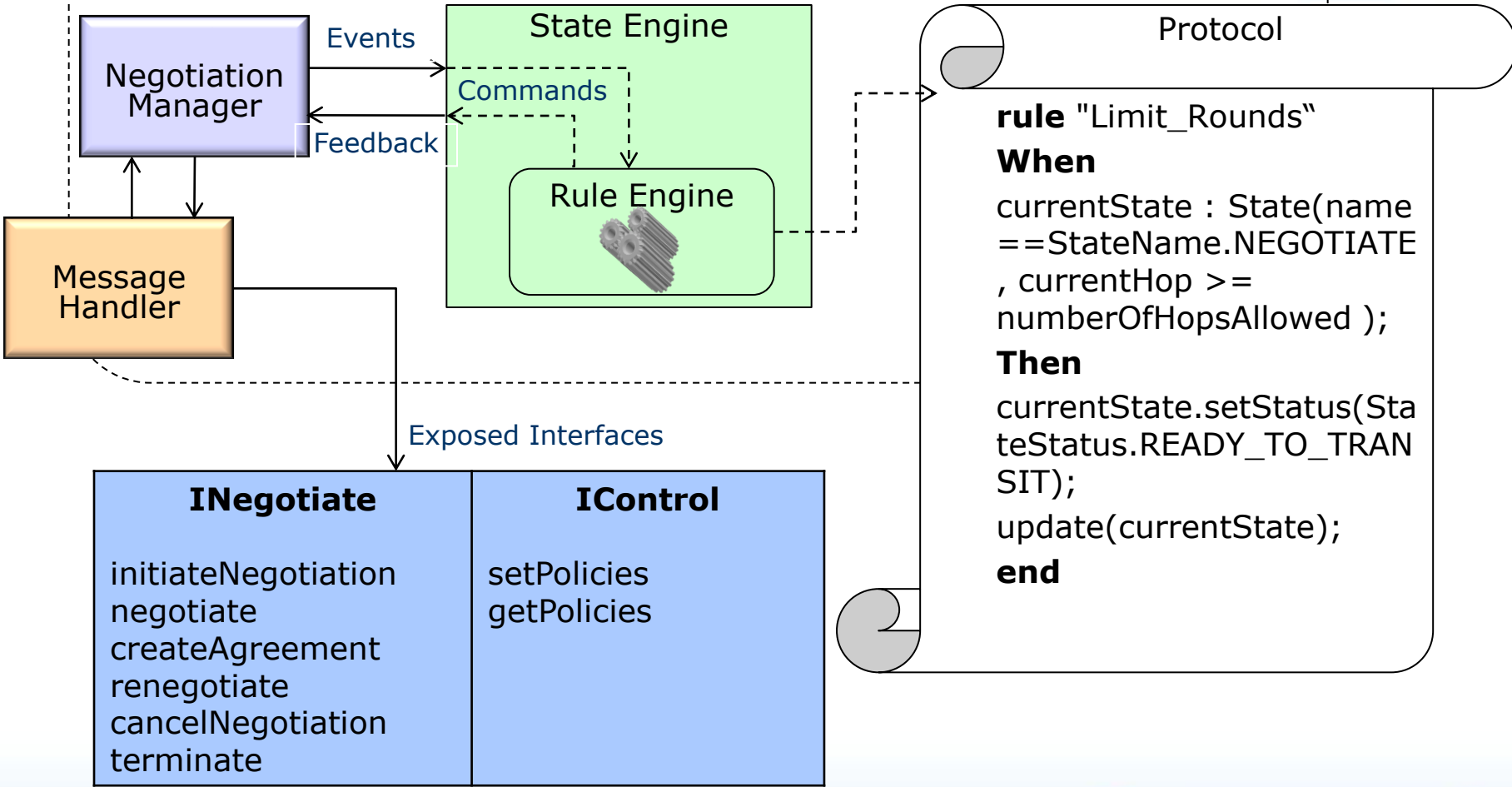


Structure

- Generic section
 - ◇ Implements interaction behaviour as FSM.
 - Check input against current state, implement transition logic, max. rounds allowed on a state, process timeout, etc.
- Domain specific section
 - ◇ Validation rules. Business specific (e.g., admissibility criteria, ranking, cardinality of participants, business filtering on QoS, etc.)



Protocol Engine



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Following innovations are made

- A flexible approach to develop custom interaction behaviours.
- Support for domain specific content.
- A bilateral multi-round negotiation protocol.
- A Protocol Engine that is fully integrated with SLA management agent (SLAM)
 - ◇ Loosely coupled with the protocol.
 - ◇ Able to process heterogeneous protocols in a generic manner.
 - ◇ Allows administrators to configure protocol policies at runtime.

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Ongoing work

- Generalizing protocol description approach.
- Domain specific content is being explored.
- Competitive negotiation strategies (inside Planning/Optimization).

Future extensions

- 1-n (1 customer, n providers) negotiations.
- Profiling customer and provider.
- Cooperative negotiation strategies (inside Planning/Optimization).

**Thank
you!**