



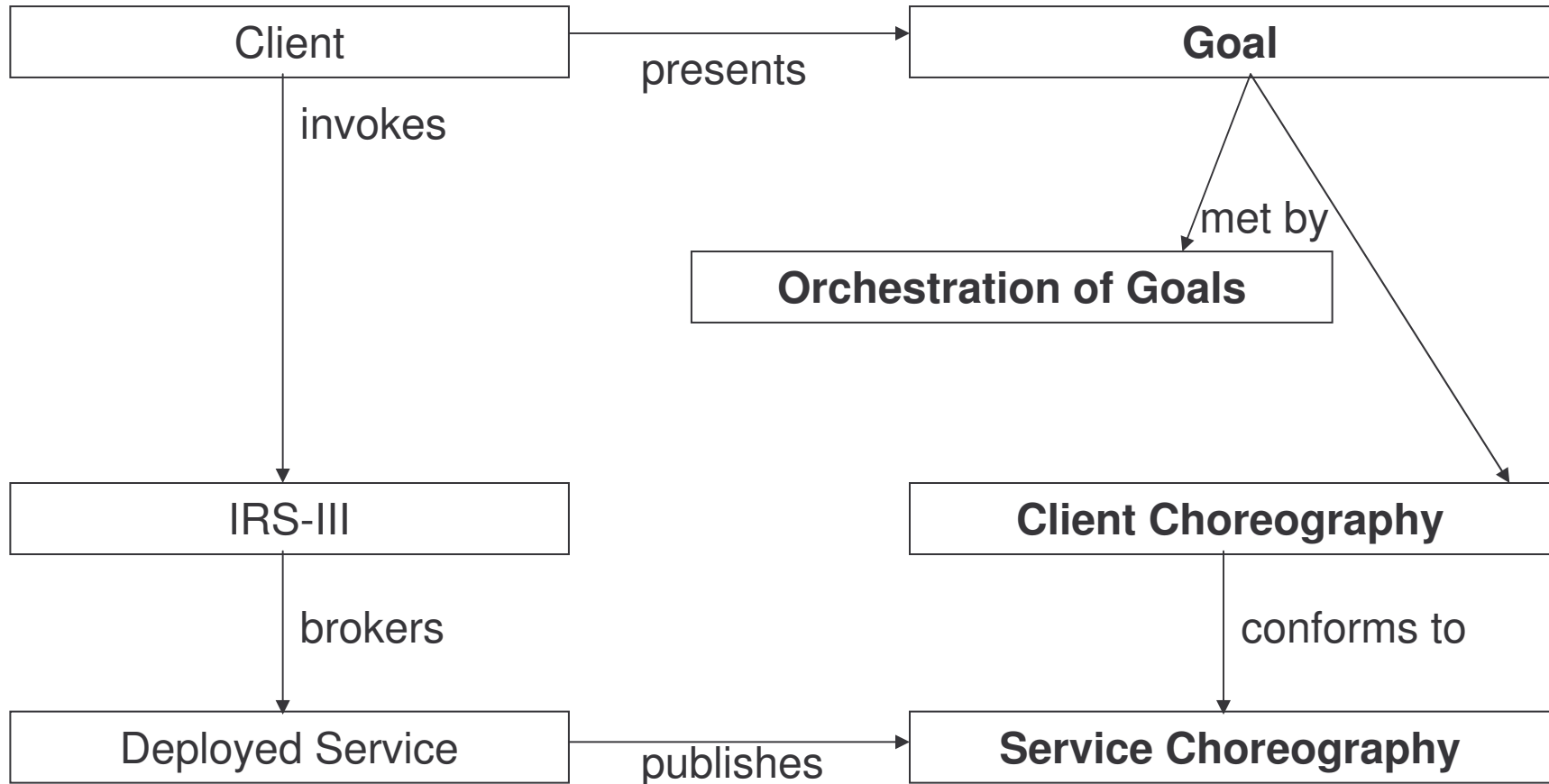
Towards a reconciliation of
ChOrch in
IRS, Configurator and WSMO

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Input

- Considers following work:
 - **IRS**
 - Choreography engine based on ASMs
 - Orchestration engine based on partial OWL-S
 - **Configurator**
 - Partial UML2AD workflow as choreography
 - UML2AD composes these to make orchestrations
 - **Cashew**
 - IO automata as choreographies
 - OWL-S as orchestration (visualised in UML2AD), composes these, engine in Haskell via process algebraic semantics...
 - **WSMO**
 - ASMs are everything (somehow...)

IRS View of ChOrch



Views on IRS

- Client choreography (currently an ASM) can be viewed as partial workflow
- Composition by orchestration of goals can be compared to workflow composition
- Answers Cashew criticism that
 - OWL-S
 - tackles only ‘operation composition’
(since it combines operations to make ‘scripts’ over a service that are atomic workflow tasks)
 - ignores challenges of (service) choreography
(since it encapsulates dependencies between operations)
 - Configurator
 - considers only one (client’s intention) interaction
(**claim:** partial workflows can be viewed as client choreographies)

Requirements

- Need to achieve:
 - Reconciliation of viewpoints (IRS reference implementation, Configurator work, WSMO) on paper;
 - Demonstrator that convincingly executes an example illustrating this, i.e.
 - import from Configurator to IRS-III
 - orchestration engine in IRS-III (and interface with choreography engine)
 - export as ASMs
 - orchestration engine in WSMX

Proposal

- Build an ontology fragment:
 - representing workflow patterns;
 - structured as per OWL-S (process model);
 - adapted to capture UML idioms.
- Represent in this language:
 - orchestration of goals (goals as tasks);
 - client choreographies (operations of deployed service as tasks - restricted fragment?).
- Translate via Cashew to (control state) ASMs via process algebra...

Cashew Process Algebra

Syntax and Semantics

$$\mathcal{E} ::= \mathbf{0} \mid \Delta \mid \alpha.\mathcal{E} \mid \mathcal{E} + \mathcal{E} \mid \mathcal{E}|\mathcal{E} \mid [\mathcal{E}]\sigma(\mathcal{E}) \mid \mu X.\mathcal{E} \mid X$$

$$\begin{aligned} a, \bar{a}, b, \bar{b}, \dots &\in \Lambda \cup \bar{\Lambda} \\ \alpha, \beta, \dots &\in \Lambda \cup \bar{\Lambda} \cup \{\tau\} \\ \rho, \sigma, \dots &\in \mathcal{T} \\ \gamma, \delta, \dots &\in \Lambda \cup \bar{\Lambda} \cup \{\tau\} \cup \mathcal{T} \end{aligned}$$

Act	$\frac{-}{\alpha.P \xrightarrow{\alpha} P}$	TO1	$\frac{-}{[P]\sigma(Q) \xrightarrow{\sigma} Q} P \xrightarrow{\tau} P$	TO2'	$\frac{P \xrightarrow{\gamma} P'}{[P]\sigma(Q) \xrightarrow{\gamma} P'} \gamma \neq \sigma$
Sum1	$\frac{P \xrightarrow{\alpha} P'}{P + Q \xrightarrow{\alpha} P'}$	Sum2	$\frac{Q \xrightarrow{\alpha} Q'}{P + Q \xrightarrow{\alpha} Q'}$	Sum3	$\frac{P \xrightarrow{\sigma} P' \quad Q \xrightarrow{\sigma} Q'}{P + Q \xrightarrow{\sigma} P' + Q'}$
Com1	$\frac{P \xrightarrow{\alpha} P'}{P Q \xrightarrow{\alpha} P' Q}$	Com2	$\frac{Q \xrightarrow{\alpha} Q'}{P Q \xrightarrow{\alpha} P Q'}$	Com3	$\frac{P \xrightarrow{\alpha} P' \quad Q \xrightarrow{\alpha} Q'}{P Q \xrightarrow{\tau} P' Q'}$
Com4	$\frac{P \xrightarrow{\sigma} P' \quad Q \xrightarrow{\sigma} Q'}{P Q \xrightarrow{\sigma} P' Q'} P Q \xrightarrow{\tau} P Q$	Patient	$\frac{-}{a.P \xrightarrow{\sigma} P}$	Idle	$\frac{-}{\mathbf{0} \xrightarrow{\sigma} \mathbf{0}}$
Hid1	$\frac{P \xrightarrow{\gamma} P'}{P/\sigma \xrightarrow{\gamma} P'/\sigma} \gamma \neq \sigma$	Hid2	$\frac{P \xrightarrow{\sigma} P'}{P/\sigma \xrightarrow{\tau} P'/\sigma}$	Rec''	$\frac{E \xrightarrow{\gamma} E'}{\mu X.E \xrightarrow{\gamma} E'\{\mu X.E/X\}}$