Basic Process Modeling
for Semantic Web Services

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Process Modeling Requirements

1. Sequential composition
2. Parallel composition
3. Alternative executions
4. Transition pre-conditions/post-condition
   —— Supported by many formalisms with more or less same semantics ——
5. Subroutine mechanism (process definition)
   ———— Required minimum ————
6. Constraints – probably also required
7. Exceptions
8. Planning
9. Constraint solving
10. Non-cooperative actors
Process Modeling Requirements (contd.)

1. Executable?
2. Specification only?
3. Both?
Bid Evaluation Example

Control Flow Graph:

- **Receive Bid**
- **Contractor Evaluation**
  - **O. Eval = {Low, High}**
- **Financial Analysis**
- **C. Cost < Budget**
- **Cost Update**
- **Budget Update**
- **Store Bid**
- **Final Decision**
  - **D. Final = Accept**
  - **D. Final = Reject**
- **Technical Evaluation**
- **Risk Analysis**
- **External Consultant**
- **Consultant Billing**
- **Update Cost Budget**

Global Coordination Dependencies:

1. IF o.eval = low THEN not e
2. IF occurs (e) THEN o before e
3. IF occurs (t) AND occurs (e) THEN e before i
4. c before f
Capturing Bid Evaluation Example

- **Control-flow graphs** translates straightforwardly into logic programming style rules (in Concurrent Transaction Logic). Here $\otimes$ - sequential composition, $|$ - parallel composition, $\lor$ - alternatives, $\ominus$ - isolated (non-interleaved) execution.

\[
\begin{align*}
bid\_eval & \leftarrow r \otimes (financial \mid db\_updates \mid technical) \otimes rest \\
financial & \leftarrow o \otimes ([o.eval = "high"] \otimes f) \lor (low \otimes f) \\
db\_updates & \leftarrow o(c \otimes [c.cost < budget] \otimes b) \otimes s \\
technical & \leftarrow (t \otimes i) \lor (e \otimes m) \lor (t \otimes i \mid e \otimes m) \\
\ldots
\end{align*}
\]

- **Global Coordination Dependencies** can be specified as well.