The Workflow State Machine

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1. Syntax

A workflow description is called a **workflow schema**. It is a guarded automaton:

W = (**S, T, E, C, A, V, s0**)

with

- **S** is a set of states
- **E** is a set of events
- **C** is a set of conditions
- **A** is a set of actions
- **V** is a set of boolean variables
- **Ass** is a set of assignments: **Ass** subseteq **V** x {true, false}
- **T** is a set of transitions: **T** subseteq **E** x **S** --> **S** x **CS** x **AS**
  - with
  - **CS** subseteq **C**
  - **AS** = {(A1, ..., An)} for Ai in **A** union **Ass** and n in N0
- **s0** in **S** is the initial state

2. Semantics

A **workflow instance** is defined as follows:

I = (**W, s, i**)

with

- a workflow schema **W** = (**S, T, E, C, A, V, s0**)
- a current state **s** in **S**
- a variable instantiation **i**: **V** --> {true, false}

Be **I** = (**W, s, i**) a workflow instance. The successor of **I** for the event **e** is

(a) the workflow instance **I'** = (**W, s', i'**) with

- there is a t in **T** with
  - t = (**e, s, s', cs, as**)
  - all c in **cs** are complied
- **i'**(v) = b for all v with (v, b) in **as**
- **i'**(v) = **i**(v) for all other v

(b) **I**, if such a t does not exist.

3. Invoking a Transition

When an event *e* is invoked on a workflow instance *I*, the following algorithm is executed:

- The current state *scurrent* is determined.
- The transition *t* from *scurrent* to *snext* which has the event *e* is determined.
- If *t* is not exactly defined, an exception is thrown.
- All conditions of *t* are validated.
- If all conditions are complied, the transition *t* fires:
  - All assignments of *t* are executed.
  - The workflow instance *I* is advanced to the state *snext*.