Deriving Behavior of Multi-User Processes From Interactive Requirements Validation

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Introduction

- Before building a system supporting a business process, **requirements** need to be elicited
- Requirements are by nature **inconsistent, incorrect, or incomplete**
- Specifying requirements in **formal models** provides advantages such as, e.g., test case generation or automatic consistency checks
- Usually, **stakeholders are experts in their domain**, not in software engineering
- Thus, they could **judge the correctness of requirements** if they could **understand the captured intention**
- Valuable feedback can only be gathered through expensive explanation sessions

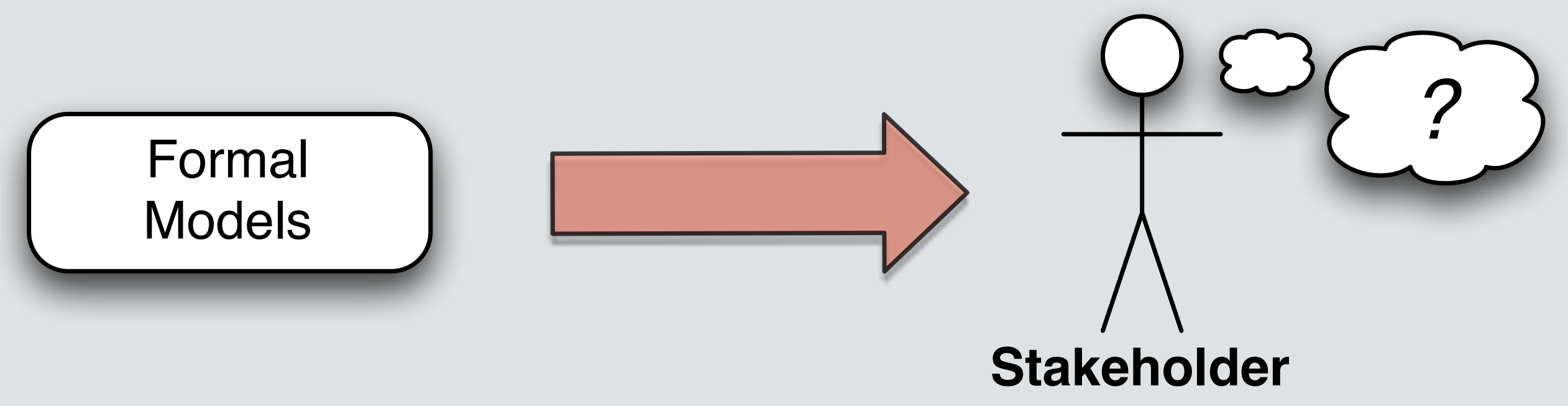


Figure 1: Stakeholders can validate only what they understand

Approach

- Stakeholders should **experience intuitively what is specified** so far, to be able to validate it
- Execution of the behavioral specifications captured so far (**Play-Out**) and **animation of the results** within domain of expertise of stakeholders to gather their feedback
- Allowing stakeholders to add new behavior through their interactions along the way during the simulation of the process in order to fill-in the blanks (**Play-In**)

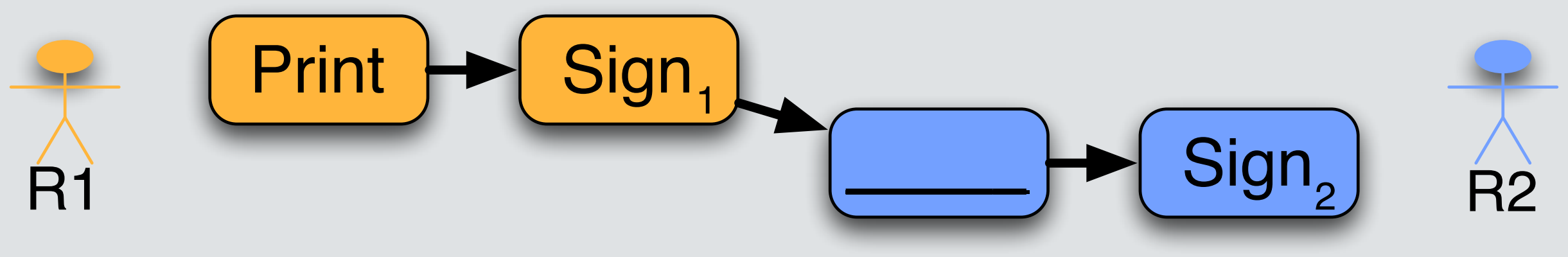


Figure 2: Participants can seamlessly fill-in the blanks by interacting with the simulation or each other

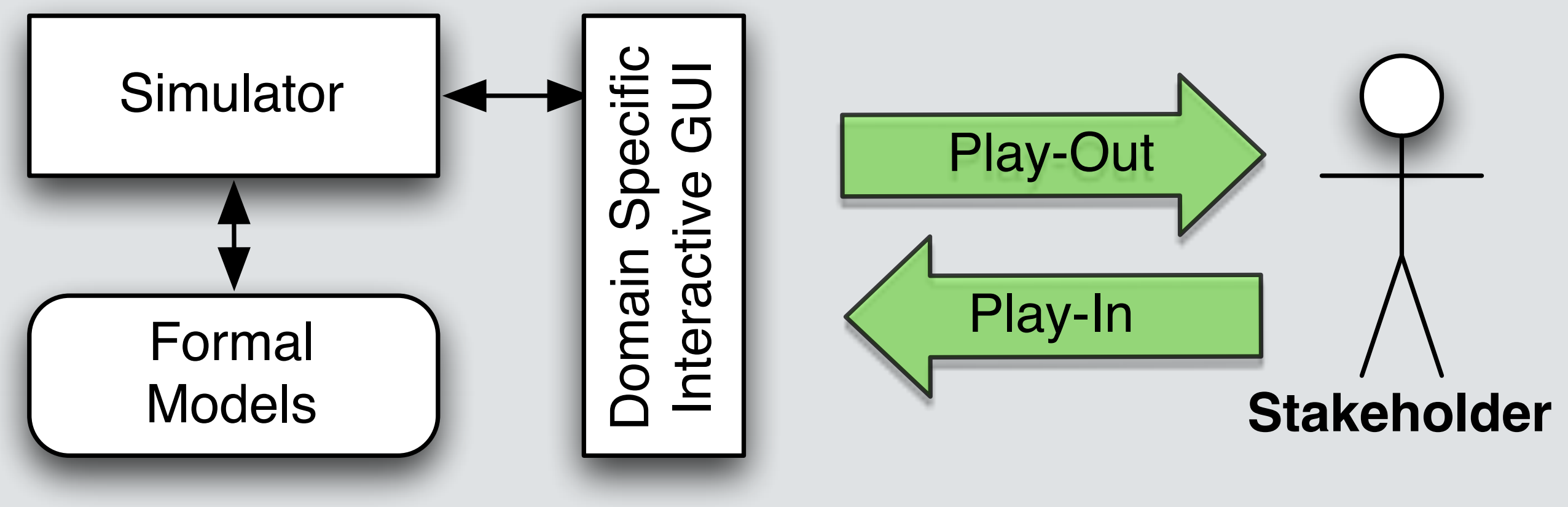


Figure 3: Stakeholders experience the content of formal models via simulation and animation

Play-Out

- The **simulation** of multi-user business process always starts from an initial process state (e.g., Fig. **??**, left side)
- Executing and replaying the behavior captured so far to **provoke feedback** about wrong models
- Behavioral specifications (**Story Patterns**) are used to simulate process participants who are not enacted by a stakeholder

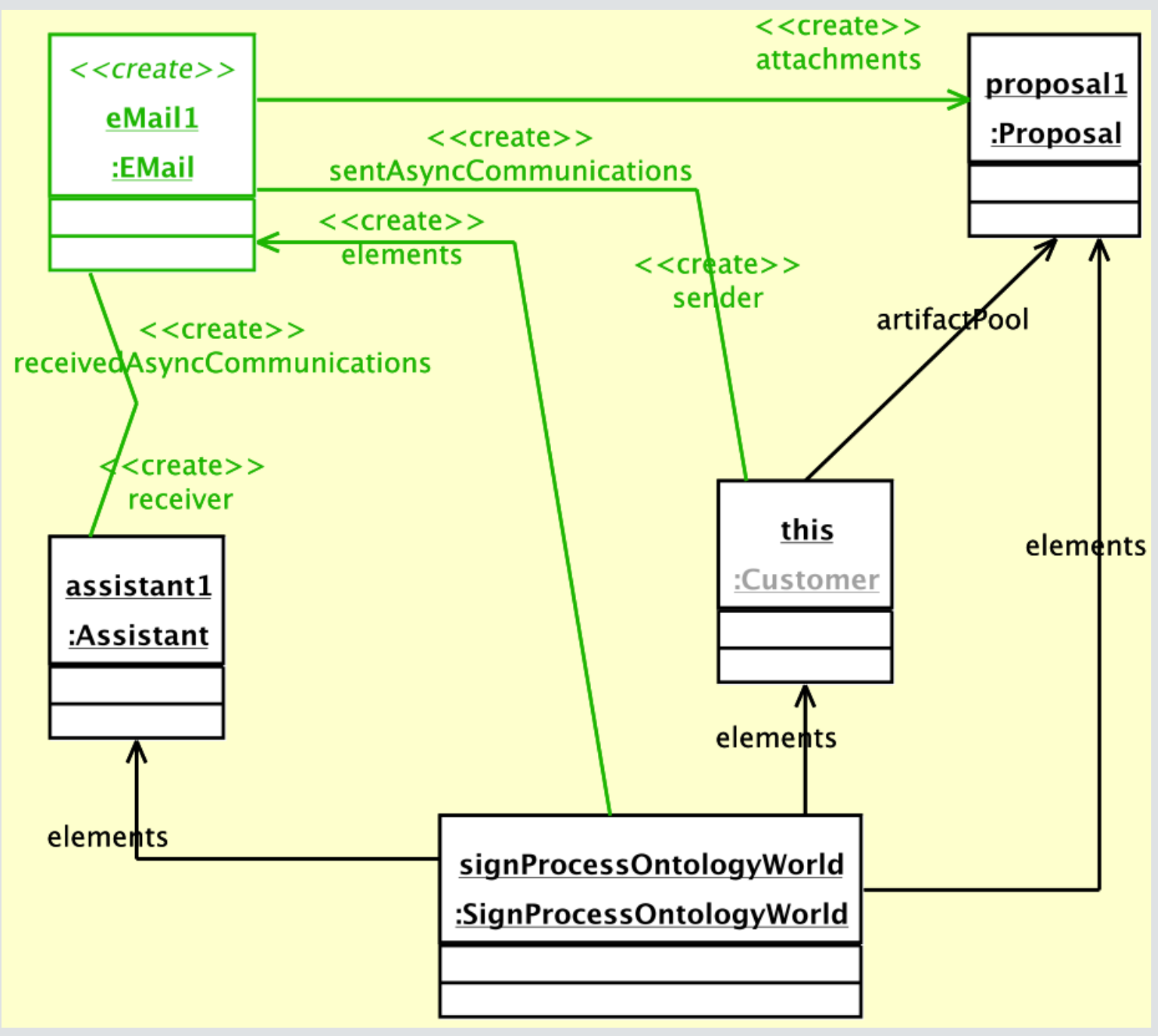


Figure 4: Formal behavior specification of sending an email derived from Fig. **??**

Play-In

- Elicitation of **valid system behavior** based on stakeholder **GUI interaction**
- During the process simulation, all state changes are observed & recorded
- Behavioral models (Fig. **??**) are derived automatically from state transitions (Fig. **??**)

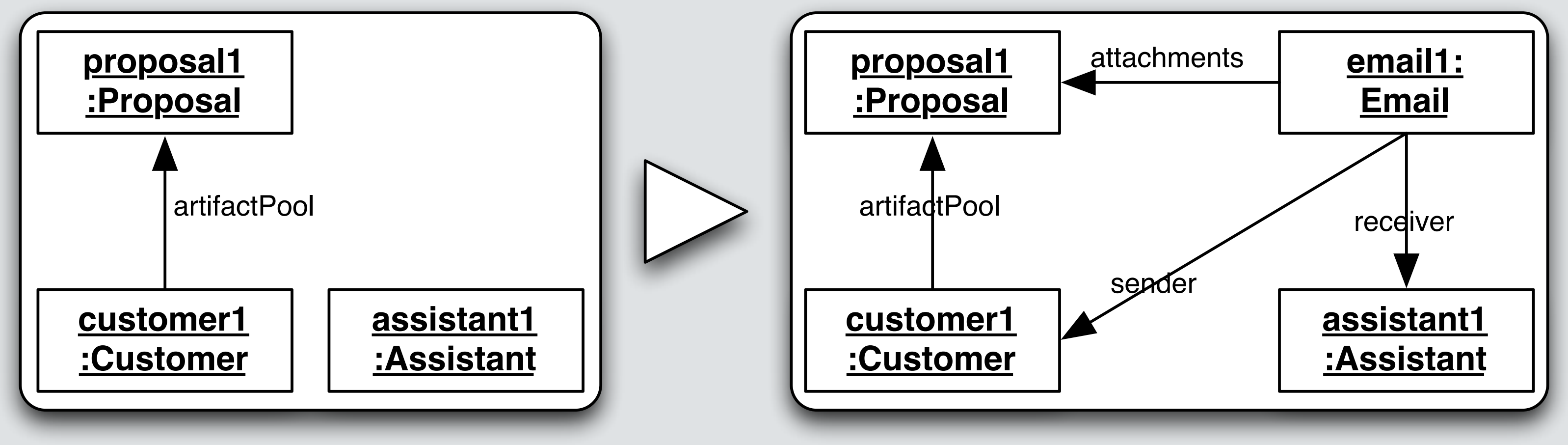
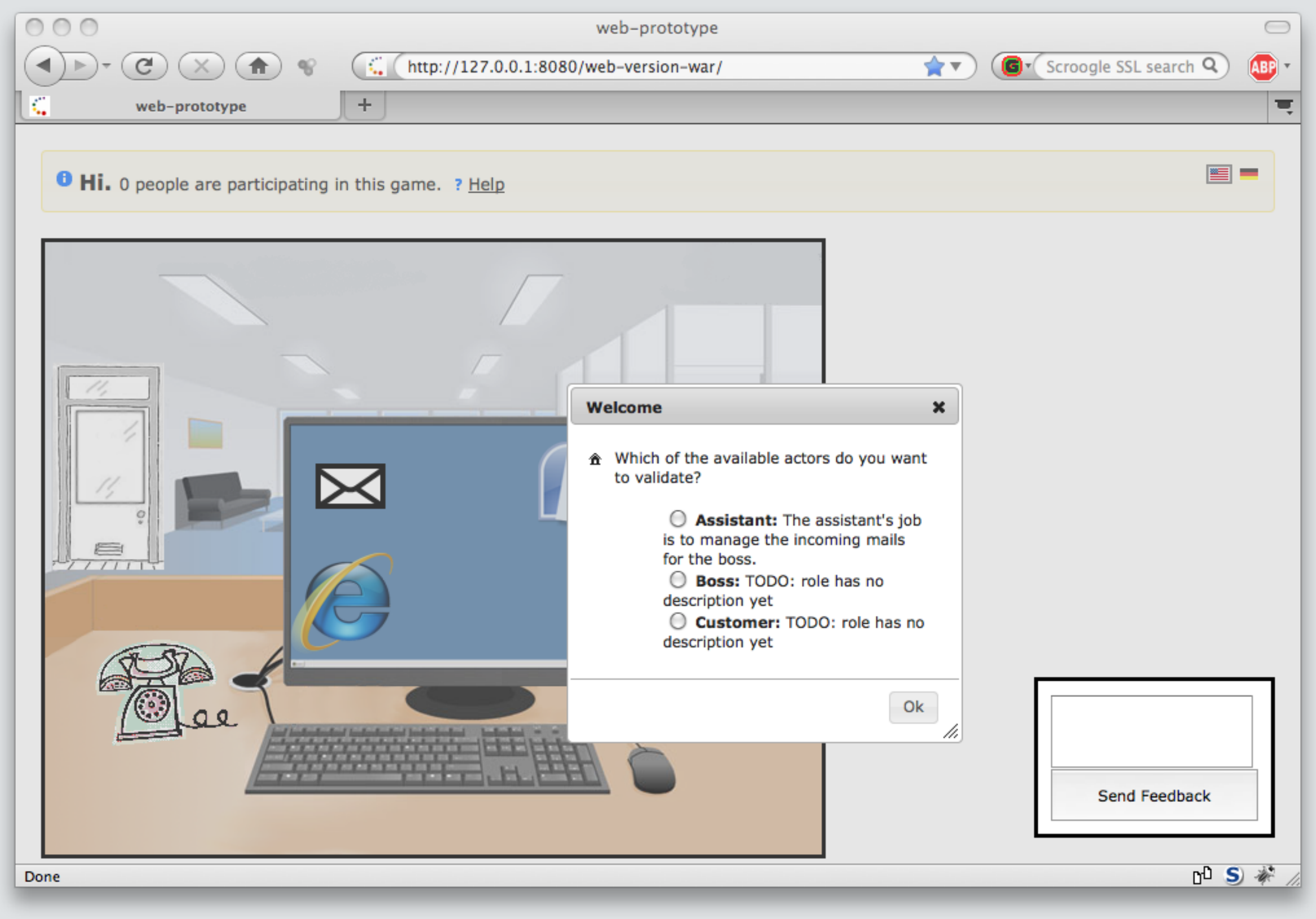


Figure 5: State s_{left} is followed by s_{right} after a stakeholder enacting the *Customer* sends an email

Interactive Visualization

- Domain concepts are mapped into GUI & animated using familiar **metaphors**
- Web-based GUI for **remote validation sessions**
- Stakeholders can experience & re-enact their role within the business process
- Enables the stakeholders to **provide feedback within their domain**



web-prototype
http://127.0.0.1:8080/web-version-war/

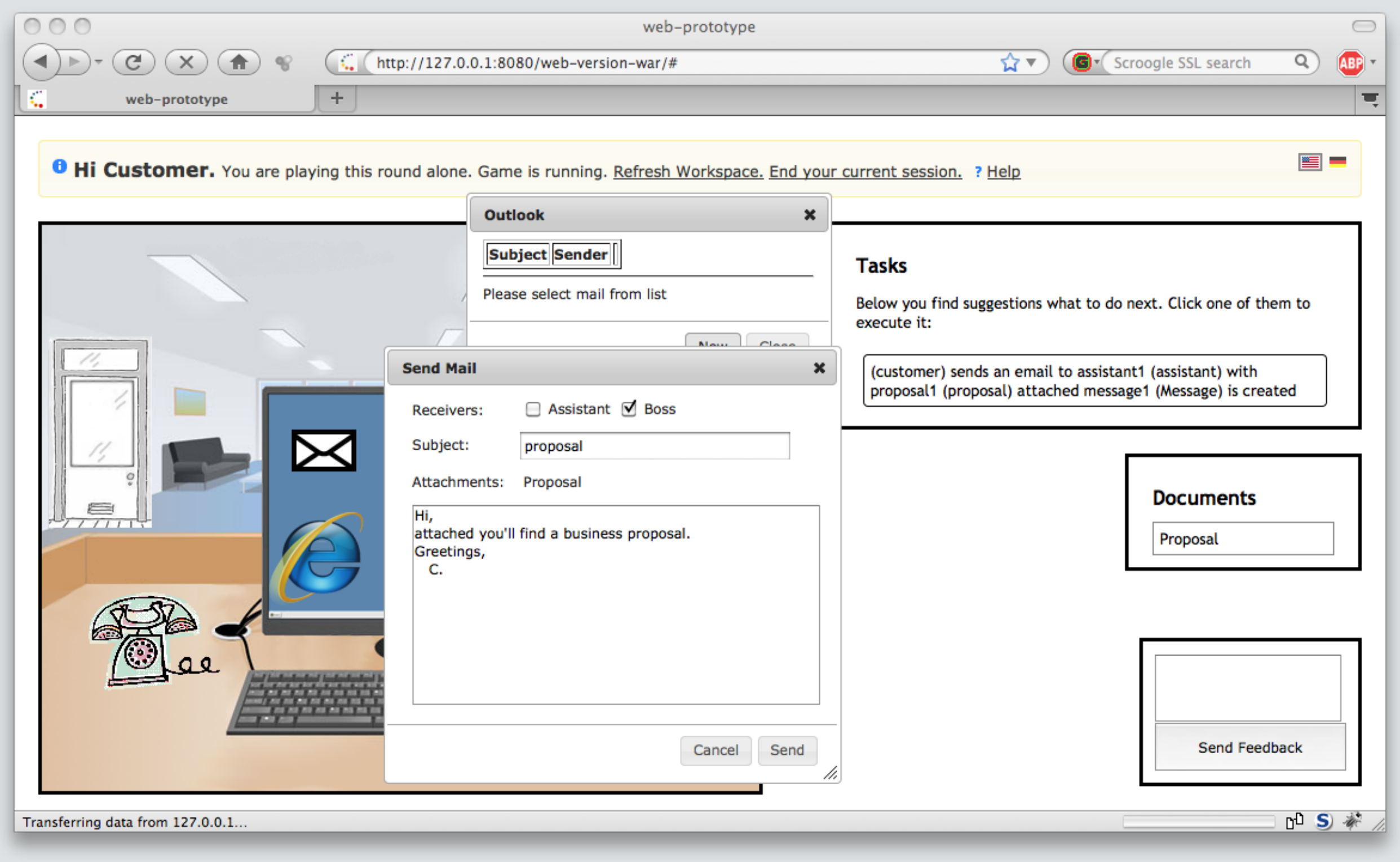
Hi. 0 people are participating in this game. ? Help

Welcome

Which of the available actors do you want to validate?

○ **Assistant:** The assistant's job is to manage the incoming mails for the boss.
○ **Boss:** TODO: role has no description yet
○ **Customer:** TODO: role has no description yet

Figure 6: Connecting to a simulation session and choosing a role



web-prototype
http://127.0.0.1:8080/web-version-war/#

Hi Customer. You are playing this round alone. Game is running. Refresh Workspace. End your current session. ? Help

Outlook

Subject | Sender

Please select mail from list

Send Mail

Receivers: □ Assistant ☑ Boss

Subject: proposal

Attachments: Proposal

Hi,
attached you'll find a business proposal.
Greetings,
C.

Tasks

Below you find suggestions what to do next. Click one of them to execute it:

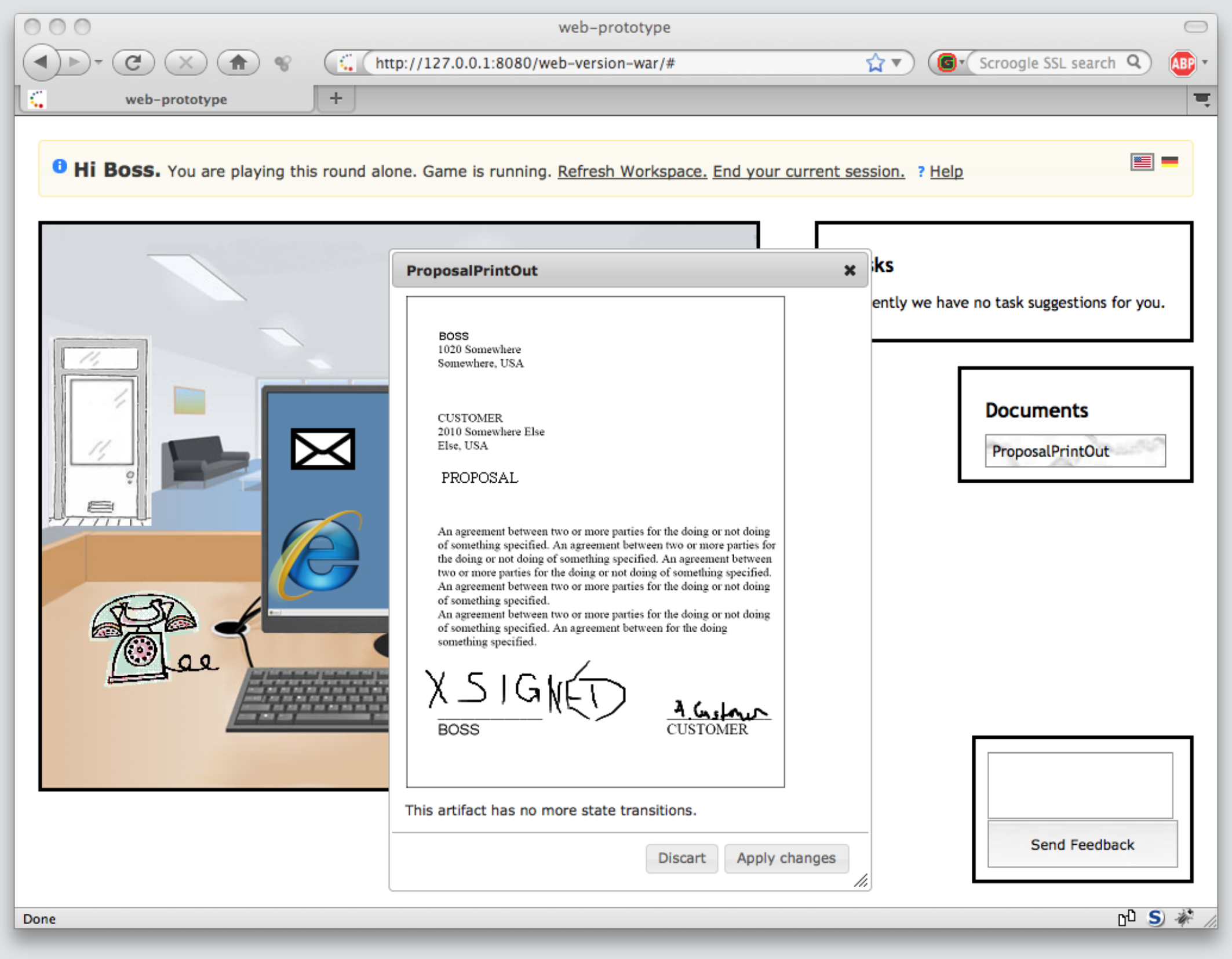
(customer) sends an email to assistant1 (assistant) with proposal1 (proposal) attached message1 (Message) is created

Documents

Proposal

Transferring data from 127.0.0.1...

Figure 7: Actions which were observed in earlier sessions are proposed



web-prototype
http://127.0.0.1:8080/web-version-war/#

Hi Boss. You are playing this round alone. Game is running. Refresh Workspace. End your current session. ? Help

ProposalPrintOut

BOSS
1020 Somewhere
Somewhere, USA

CUSTOMER
2010 Somewhere Else
Else, USA

PROPOSAL

An agreement between two or more parties for the doing or not doing of something specified. An agreement between two or more parties for the doing or not doing of something specified. An agreement between two or more parties for the doing or not doing of something specified. An agreement between two or more parties for the doing or not doing of something specified.
An agreement between two or more parties for the doing or not doing of something specified. An agreement between for the doing something specified.

X SIGNED
BOSS

A. Customer
CUSTOMER

This artifact has no more state transitions.

...ks

...ently we have no task suggestions for you.

Documents

ProposalPrintOut

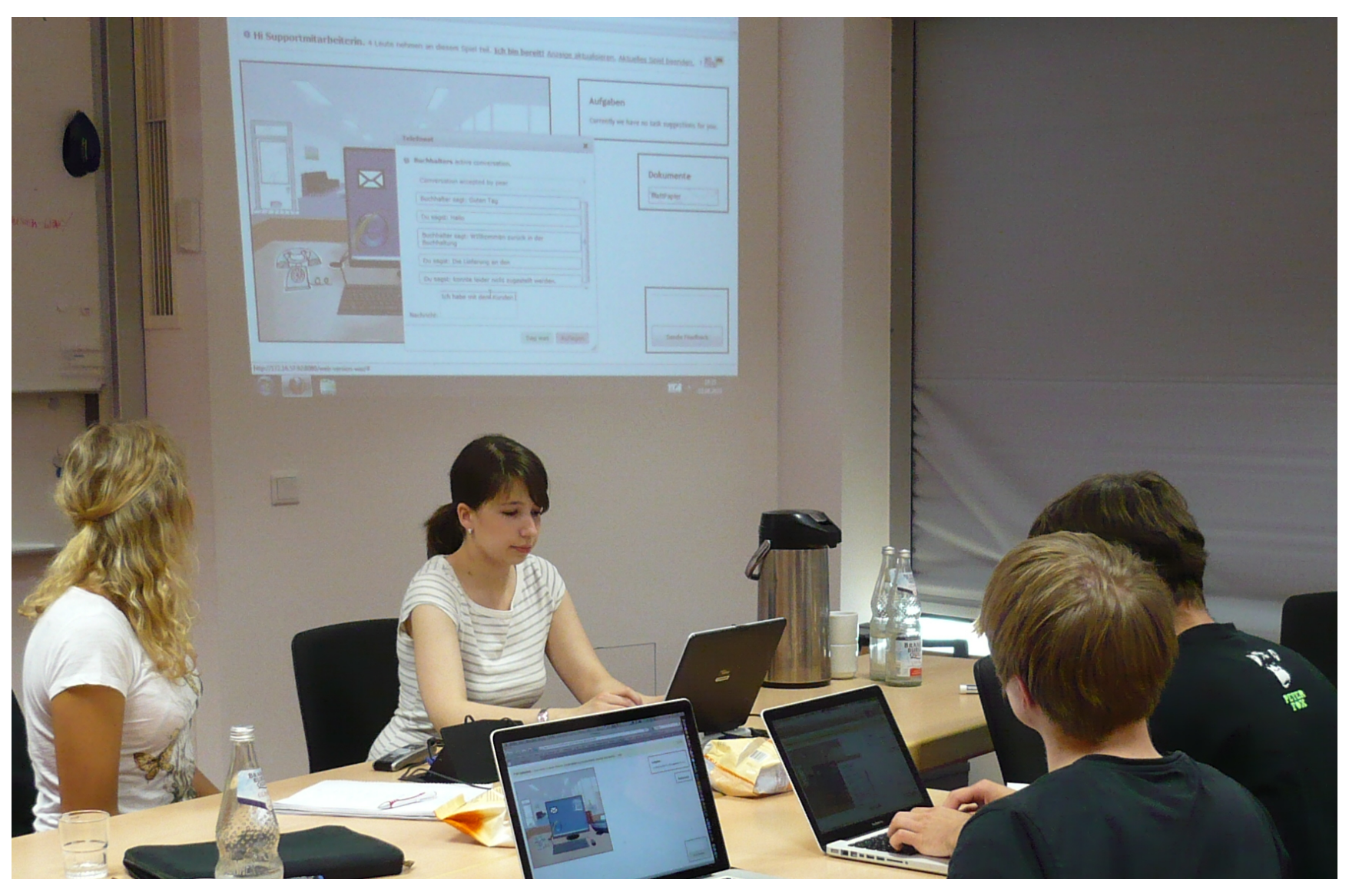
Done

Figure 8: Stakeholders interact with documents & each other

Implementation

- Engine & models based on **E**clipse **M**odeling **F**ramework
- Simulation through a **Graph Transformation System**
- Web-GUI based on **E**nterprise **J**ava **B**eans 3.0 on **JBoss**
- Dynamic meta model to cope with new, changed, or removed domain concepts

- Current and future work:
  - **GMF** Editors suitable for stakeholders
  - Play-Out strategies (e.g., lead users to inconsistencies)
  - Creation of state space based on behavioral models to explore alternatives



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