SCXML and Voice Interfaces

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Outline

• DFP & SCXML
  • Based on VoiceXML 3.0 Preview
• Example: SCXML Stopwatch
  • Based on Apache Jakarta SCXML
• Demo
  • Stopwatch 1: SCXML + GUI
  • Stopwatch 2: SCXML + GUI + TTS
  • Stopwatch 3: SCXML + GUI + TTS + ASR
DFP: Data Flow Presentation 1

- W3C framework for voice applications
- Data: canonical data representation
- Flow: controls application flow
- Presentation: interaction with user
Separating Flow & Presentation

- Simplifies Code Reuse
  - Presentation not tangled with `<goto>` logic
- Improves Intelligibility
  - Flow description separate from presentation details
- Natural Extension to Multiple Modes
  - Same flow layer, multiple presentation layers
DFP: Data Flow Presentation 2

- W3C framework for *multimodal* applications
- Data: canonical data representation
- Flow: controls application flow and coordinates presentation
- Presentation: *multiple* interactions with user
Flow Layer

- Flow Represents Application Logic
  - Does Not Interact with User
- Flow Layer Removes Control from Presentation Layer
- Various Flow Languages Possible
  - CCXML (Call Control XML)
  - SCXML (State Chart XML)
SCXML (State Chart XML)

- Designed as Dialog Flow Language
- A State Machine Language
  - Based on Harel State Charts
  - A few dialog-specific extensions
- Powerful, Compact Control Abstractions
States, Events & Transitions

- **States**
  - Represent Status of System

- **Events**
  - What Happens

- **Transitions**
  - Move between States
  - Triggered by Events
Example: Stopwatch

```xml
<scxml xmlns="http://www.w3.org/2005/07/scxml" version="1.0" initialstate="reset">
  <state id="reset">
    <transition event="watch.start" target="running" />
  </state>
  <state id="running">
    <transition event="watch.split" target="paused" />
    <transition event="watch.stop" target="stopped" />
  </state>
  <state id="paused">
    <transition event="watch.unsplit" target="running" />
    <transition event="watch.stop" target="stopped" />
  </state>
  <state id="stopped">
    <transition event="watch.reset" target="reset" />
  </state>
</scxml>
```
Example: Stopwatch
Example: Stopwatch

![Stopwatch Image]
Example: Stopwatch
Demo (1)

- GUI Stopwatch
  - Flow Layer: SCXML
  - Presentation Layer 1: GUI
  - Demo from Apache Jakarta SCXML
Demo (2 and 3)

- Voice Stopwatch
  - Flow Layer: SCXML (same)
  - Presentation Layer 2:
    added speech output (GUI + TTS)
  - Presentation Layer 3:
    added speech input (GUI + TTS + ASR)
Summary

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  • Stopwatch 3: SCXML + GUI + TTS + ASR