



# SCXML and Voice Interfaces

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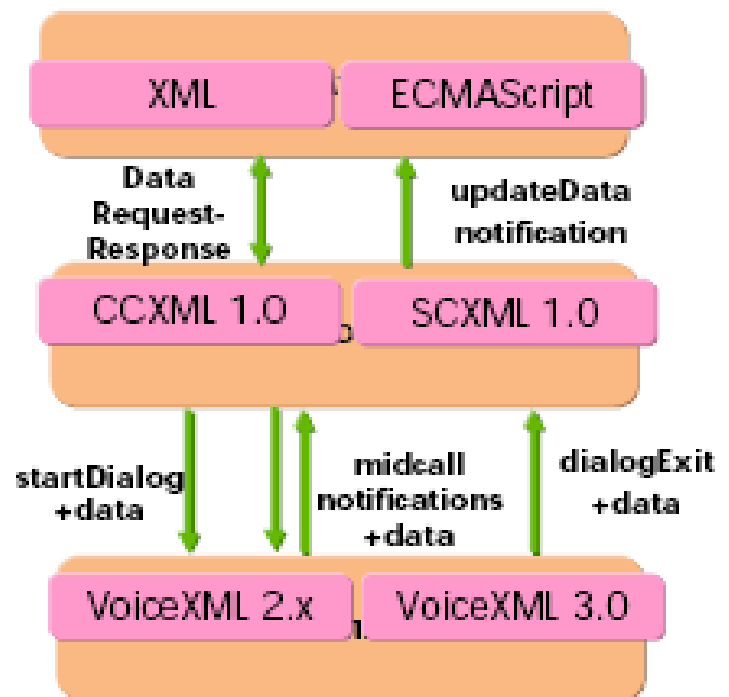
# Outline

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- 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





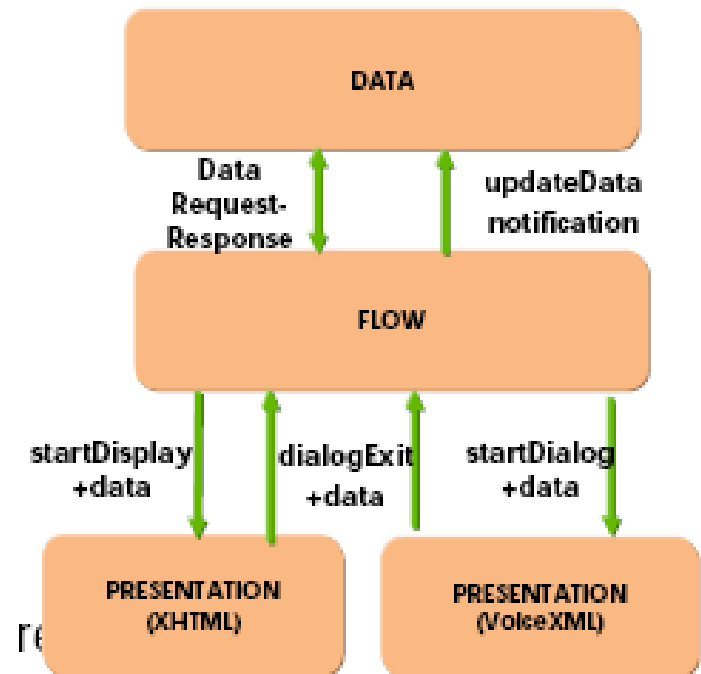
# Separating Flow & Presentation

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- 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

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- 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)

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- 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

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- States
  - Represent Status of System
- Events
  - What Happens
- Transitions
  - Move between States
  - Triggered by Events





# Example: Stopwatch

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```
<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>
```

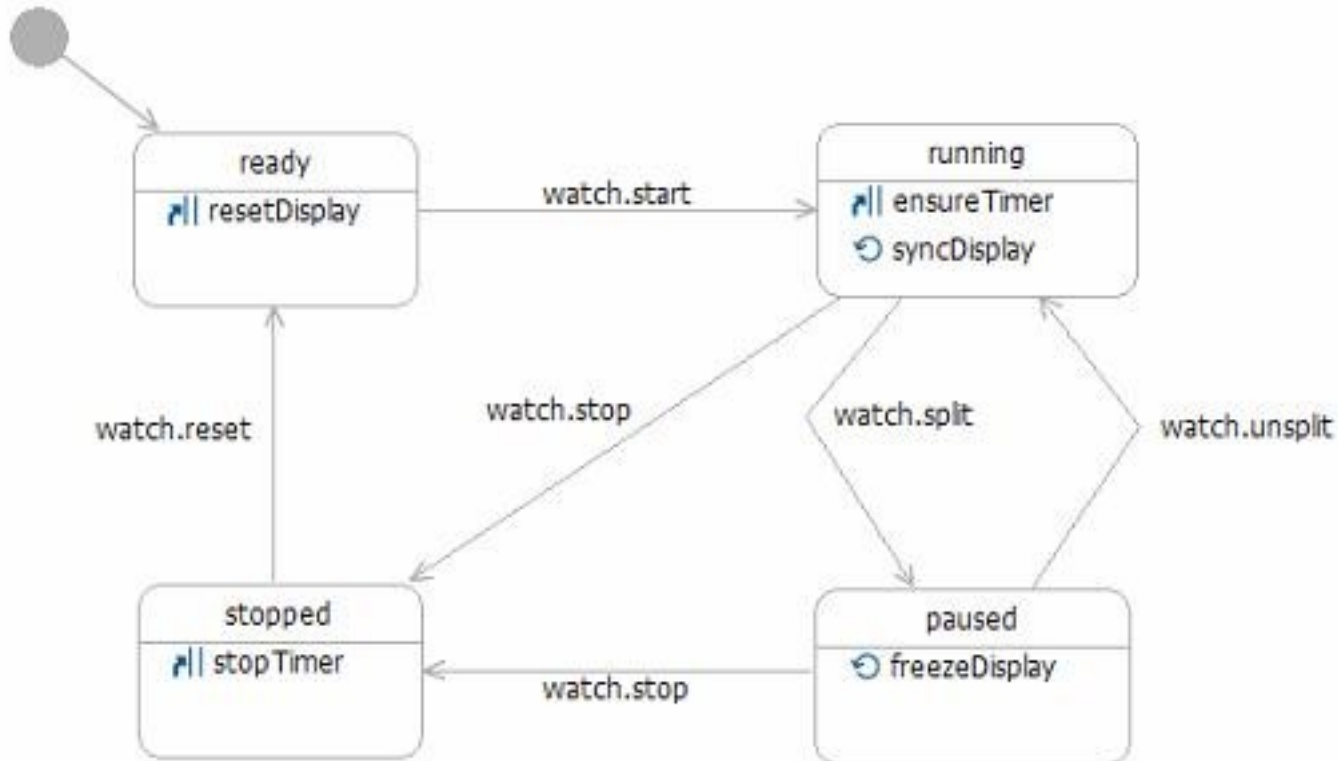
# Example: Stopwatch



# Example: Stopwatch



# Example: Stopwatch





# Demo (1)

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- GUI Stopwatch
  - Flow Layer: SCXML
  - Presentation Layer 1: GUI
  - Demo from Apache Jakarta SCXML



# Demo (2 and 3)

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- 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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- DFP & SCXML
  - Based on VoiceXML 3.0 Preview
- Example: SCXML Stopwatch
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- Demo
  - Stopwatch 1: SCXML + GUI
  - Stopwatch 2: SCXML + GUI + TTS
  - Stopwatch 3: SCXML + GUI + TTS + ASR