The Search for a Dialog Metalanguage that Makes Everybody Happy

David Thomson
Chair, VoiceXML Tools Committee, SpeechPhone CTO
Automated Attendant Service

What would you like to do?

- Check my voicemail.
- Change my greeting.
- Change my virtual extension.
- Dial a number.
- Call Michael Metcalf.
- Check my e-mail.
- Enable call screening.

SpeechPhone Mandi™
VoiceXML Tools Committee

• Sponsored by the VoiceXML Forum

• Objective: Make VoiceXML easier to deploy
VoiceXML Service

Metalanguage

Development Tools

Application Server

VoiceXML Browser

Developer

User

SpeechPhone

David Thomson
Two Working Groups

Data Logging Working Group

- Format for service observation, etc.
- Used to track and improve user interface.

Metalanguage Working Group

- Format for a complete speech application
- Includes database, system interface, platform, …
Metalanguage Motivation

Problem
Applications written with Vendor X’s tools will not run on Application Server from Vendor Y.

Solution
Define a uniform format for representing a complete application
Current Active Participants

AT&T  Intervoice
Chrysalis  Lumenvox
Empirix  Nuance
France Telecom  Oracle
Genesys  SpeechPhone
IBM  Unisys
IEEE-ISTO  West
Intel
Metalanguage Requirements

• Completely defines the application

• Platform independent

• XML

• Compatible with and uses existing standards
  (CCXML, SCXML, V3, etc.)

• Supports advanced dialogs

• Not generated dynamically (usually)
Service Provider

I don’t want to be tied to a single vendor.
The metalanguage should be efficient and expressive.
Developers (2)

I don’t want to give up my old languages and tools.
User Interface Researchers

The metalanguage should be able to support advanced dialogs -- once we figure how to implement them.
Development Managers

Writing applications should not require a PhD.
Product Manager

I want the service running ASAP.
Computer Scientists

The language should be elegant and incorporate the latest software methods.
Development Tool Vendor

The metalanguage should work with my special sauce.
Standards Organizations

The metalanguage shouldn’t try to replace V3 capabilities.

What’s in V3?

It’s a secret.
We want the metalanguage available royalty-free.

We need to protect our intellectual property.
Application Server (not Browser) Functions

- Call control
- Database access
- Business logic
- Billing
- Back-end systems/transaction servers
- Complex ASR/semantic analysis (dialog analysis, checksums, context processing, …)
- Advanced dialogs
- OAM&P
- Platform-specific functions
Use Case – Benchmark for Proposals

What is your departure city?

Boston

What date?

(baby crying)

Please say the date.

What?

You usually fly to Boston on Tuesdays. Do you want to fly this Tuesday?
Current Design Under Study

- Modular with optional elements
- State based
- Incorporates existing standards
- SCXML for control
- Extension tags inside VoiceXML
- Tags are not limited to VoiceXML capabilities
- Tags may be rendered in Java or other language
Extension Tags

Application Server

VoiceXML (possibly with SCXML)

Tag Library

VXML Code

VXML + SCXML

VoiceXML Browser

Metacode

Tag Interpretation Engine

Complex Computation

Advanced Dialog Processing

Semantic Analysis

Business Logic

Billing

Database

Transaction servers, web pages, humans, etc.

<scxml>
  <vxml>
    <tagX>
    </tagX>
  </vxml>
  ...
  </scxml>

<scxml>
  <vxml>
    ...
  </vxml>
</scxml>
Meta-language Processing Flow

1. Offline Application Development Tools
2. Online higher-level dialog managers (e.g. rule- or plan-based) Optional
3. Metalanguage Documents
   - SCXML tags (for control)
   - Extension tags
   - XML tags (for data)
   - Other resources
4. Metalanguage Interpreter
8. VXML and Related Documents
   - SCXML, SRGS, CCXML, etc.
   - Extension Tags
   - Dynamic? Static?
9. Extension Tag Expansion Optional
10. VXML and Related Documents
    - SCXML, SRGS, CCXML, etc.
    - No Extension Tags
11. Voice Browser
14. Results and Feedback
13. Results and Feedback
15. Extension Tag Library
5. Database
6. Transaction servers, web pages, business logic, CSRs, etc.

Extension tag expansion may be sensitive to context so this is not necessarily the same thing as “macro expansion”.

IDL = Interface Definition Language
For More Information

Copy of slides:
David@SpeechPhone.com
(or business card)
Join committee / see notes:
Cindy Tiritilli
c.tiritilli@ieee.org
Architecture – Draft 6b

Offline Tools

- Alternate Toolset
- Interchange Code
- Interchange Export/Import
- GUI
- Grammar Builder

Call Flow Designer

Analyze & Test

High-Level Scripting Objects

Runtime Tools

- Billing
- OA&M
- Logging
- Application Server
- VoiceXML Generator

Data Bus

Conversations Manager

Transaction Server

System Interface

E-mail IM HTML

Agent

Data

To Speech Server

Grammar Builder
VoiceXML Complications

• Applications rarely written natively in VoiceXML → Leads to metalanguages

• Applications are not portable

  (Vendor-neutral applies only to speech server)

• Vendor tools/servers not interchangeable
Interchange/Metalanguage Candidates

1. Proprietary XML + style sheets
2. W3C’s Xforms
3. XHTML
4. Java
5. “VoiceXML 9.0”
6. Extension tags
7. SCXML

“X+X"