NetVoice 3.0 Specification

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1 Overview

NetVoice is a carrier-grade VoiceXML gateway that enables developers to quickly develop and deploy voice-enabled business solutions by taking advantage of the powerful VoiceXML script language. NetVoice combines the leading technologies from the Internet and telephony worlds, using an open architecture with high scalability to deliver a finely architecture solution.

NetVoice comprises six modules:

Resource Manager – A centralized resource management of the NetVoice system.

VoiceXML engine – Support VoiceXML 2.0 script language – a W3C protocol for creating telephony applications.

Speech recognition engine – Support multiple ASR vendors, including Philips, Nuance, and Speechwork. It supports multiple ASR vendors for different applications in the same architecture.

Text to speech engine – Support multiple TTS vendors, including Toshiba, Scansoft, Speechwork, iFly, and JTTS. It supports multiple TTS vendors for different language in the same architecture.

Telephony platform – Supports multiple connection protocols to PSTN or PBX, including analog, T1, ISDN/PRI, E1 and VoIP.

OA&M system – Allow administrator to monitor and change the system status remotely through web interface via SNMP.

1.1 System Requirement:

Industry PC with Dialogic or NMS voice card (depend on the telecom interface).

Pentium 4, 2.8 GHz or above

512 MB RAM

80 GB hard disk

1.2 Operating system:

Windows XP

Windows 2003

Redhat Enterprise Linux 3 Update 4

Redhat Enterprise Linux 4 Update 2.

2 Features

- N+1 redundancy, no single failure point.
- Distribute service for VoiceXML server, ASR server and TTS server. All servers can support multiple telephony platforms via TCP/IP in N-to-N architecture or can co-exist in the same hardware box with telephony platform.
- Resource manager to allow dynamically add/ delete resource into service, including ASR, TTS and telephony platforms.
- Support VXML 2.0.
    - Access VXML files and resources, e.g., medias and grammars, with standard HTTP and HTTPS protocols. Local resources can be accessed with file URI.
    - Support SSL-enabled HTTP transaction for better security concern.

- Extended features for VXML 2.0:
- Support external modules for fax and conference controller.
  - Features are easy to add with controllers.
- Provide proprietary shadow variables.
  - session.telecom.addr.
  - session.vxml.addr.
  - url for record tag.
- Additional events for resource errors.
- Support versatile and mixed charsets in VXML file:
  - Including UTF-8, Big5, GB2312, EUC, etc.
- Flexible ASR resource allocation. ASR resource can be allocated and released freely by applications.
- Improved user experience:
  - Reject calls if there is no VXML resource or no start page.
  - Answer a call after the VXML start page is ready.
  - Generated TTS audio files are cached for better performance.
  - TTS audio can be streamed to provide better interaction.
  - Heuristic intelligent sentences wrap for better TTS performance.
- Dynamic resource allocation:
  - Centralized resource manager provides easy management.
  - Dynamically VXML resource allocation when call established.
  - Flexible routing rules, e.g., by ANI and DNIS.
  - Dynamic ASR/TTS resource allocation for each call by language/charset.
  - Dynamic telecom resource allocation for outbound/bridge functions.
- Enhanced ASR functions:
  - Support multiple programming interfaces for ASR, including native APIs for Nuance 8.5 and 9.0, network interfaces for MRCP 1.0 (MRCP 2.0 in the roadmap).
  - Support versatile ASR grammar formats, including ABNF, SRGS and XML. Nuance proprietary GSL is also supported.
  - Mixed DTMF and voice grammars are allowed for easy development.
  - Prompt can be interrupted (barge-in) by utterance.
  - Support N-best confirmation of the recognition result.
  - Support multiple keywords spotting and single keyword spotting.
- Enhanced TTS functions:
  - Support versatile venders and languages of TTS, including Nuance Vocalizer 4.0 and iFly 3.5/4.0. Korean Core TTS in on the roadmap.
  - Processing queue and asynchronized speech generation provide better resource utilization.
  - Support bilingual speech generation with different TTS engines.
- Support multimodal interaction (Data/Voice synchronization):

- Support out band DTMF.

- Flexible interface for outbound services:
  - Allocate telecom resources by ANI/DNIS.
  - User friendly interface to make call and show the result.
  - High density outbound call
  - Mission queue for high utilization.
  - Support dial plan (on the roadmap).
- Provide conference services:
  - The capacity of conference services depends on CPU power, on a Pentium4 2.8G PC, we get the test result
    - ✓ Maximum 32 attendees in a single conference.
    - ✓ Maximum 16 conferences, each conference has 4 attendees.

3 Telephony Interface

- Supported mixed multi interface in a single server.
  - For example: SIP + NMS + JTAPI.
- Flexible line set configuration.

3.1 SIP Interface

- Support SIP trunk mode and agent mode.
- Support authentication when register.
- Support multiple accounts.
  - Maximum calls number control for each account.
- Support Dialogic HMP T.38 fax.
  - Dynamic fax resource allocation.
- Support G.711a/u and G.729 audio codec.
- Provide a built-in voice activity detector with configurable barge-in parameters.
- Support Cisco CallManager 4.x, 5.x, 6.x.
- Support Cisco CallManager Express 3.2 and later.
- Support Avaya Communication Manager 3.x and later

3.2 JTAPI External Call Control

- Support Cisco Call Manager 4.x, 5.x and 6.x.

3.3 NMS Interface

- Support signaling protocol:
  - Loop-start, ISDN, NOCC, MFC.
- Support AG-2000, AG-4000, AG-4040, CG-6000, CG-6060, CG-6100 and CG-6565 serials.
- Support voice and fax.

3.4 Dialogic GlobalCall SS7 External Call Control

- Based on Dialogic Global Call API.

- Support Dialogic SS7 board or Dialogic SIU.
- Support SS7 signaling:
  - TUP, ISUP User Part.

4 ASR/TTS Features

4.1 ASR Features

4.1.1 Nuance 8.5

- Integrated with Nuance 8.5 RCEngine interface.
  - Integrated with Nuance 8.5 Voice-Activity-Detecting locally.
- Compiled with grammar objects are cached for better performance.
- Support versatile language acoustic modules:
  - Cantonese, English America, Korean, Mandarin China, Mandarin Taiwan.
  - English America with Mandarin China, English America with Mandarin Taiwan.
- Support both file system database and ODBC database required by ASR engine.
- Support complete nuance parameters:
  - Configurable Nuance configuration file.
  - Voice-Activity-Detecting parameters.
- Support nuance log:
  - Turn on/off Nuance call log for performance tuning.
  - Turn on/off Nuance RCEngine log for debugging.
  - Configurable Nuance server logs for debugging.
- Support Nuance distributed architecture.

4.1.2 MRCP 1.0

- Support MRCP 1.0 protocol over RTSP protocol.
- Support Nuance MRCP server.
  - Configurable Nuance server logs for debugging.
- Versatile languages are available:
  - Cantonese, English America, Korean, Mandarin China, Mandarin Taiwan.
  - English America with Mandarin China, English America with Mandarin Taiwan.
- Turn on/off RTSP log for debugging.

4.2 TTS Features

4.2.1 Nuance Vocalizer 4.0

- Nuance Vocalizer 4.0 is fully integrated.
- Configurable Nuance server logs for debugging.
- Support Nuance distributed architecture.
- Support audio streaming for TTS result.

4.2.2 iFly 3.5/4.0

- iFly 3.5/4.0 is fully integrated.
- Support distributed iFly architecture.

- Completely support iFly parameters.
- Versatile voice package provided by iFly:
  - Xiao-yan, Xiao-jing, Xiao-yu, Xiao-mei.
- Support audio streaming for TTS result.

5 Resources and Dispatching

5.1 Resource Management

- Manage resources of six modules of NetVoice:
  - VXML, Telecom, ASR, TTS, Conference Mixer, External Modules (Plug-in).
- Resource group with group name for easy management.
- Resource is ready after the registration.

5.2 Resources Dispatching

- Flexible dispatching rules for each resource type
- Only the first matched rule is taken.
- Multiple keyword expression.
- Compare operators:
  - "**==**"/"**!=**"/"**like**" for string operands.
  - "**==**"/"**!=**"/"**>**"/"**>=**"/"**<**"/"**<=**" for numeric operands.
- Logical operators:
  - "**or**"/"**||**"/"**|**" as logical OR.
  - "**and**"/"**&&**"/"**&**" as logical AND.
- Resource group name is the evaluation result of the matched rule.
- The defined rules are reloaded automatically when the file is modified.

6 Configuration and Management

6.1 System Configuration

- Web-based user interface for system configuration.
- Common settings can be grouped as a configuration set for simplicity and flexibility.
- A configuration set can be applied to many system modules.

6.2 System Management

- Flexible logging system.
- Centralized NVMS server and web-based user interface for management.
- SNMP protocol is supported.
- Managed targets are categorized into three levels, server, worker and engine.
- NVMS server probes managed servers in the LAN automatically.
- System alarms can be set by user defined rules and can be delivered via many channels.
- The NVMS user interface can:

- Start/Stop worker.
- Open/Close engine.
- Start/Stop engine.
- Terminate current session.
- Reset/Restart server (on the roadmap).

- Support configures whole system in future.
- Just-in-time status of servers, workers, and engines.
- Log viewer:
  - View/Query by log levels.
  - View/Query by server/worker/engine.
  - View/Query by sessions.
- Versatile statistical reports.