Audio Conference

Don’t forget to join the telephone audio portion of today’s event

- 1 888 425 4170 inside the U.S. or Canada
- +1 706 634 6387 International
- Conf. Code: 2866451

We’ll be starting at 11:00 am EST

Technical Support:
  888-865-7469 U.S. or Canada
  +1-706-643-3559 International
  *0 on the teleconference

Reminder:
Please give the telephone operator the same name that you’ve used to log into the computer portion of today’s event
How to Participate

- To submit a text question, please type a message in to the window in your toolbar. If this window is not open, press the “Message” button.

- Please be sure to select “Leaders” from the “Send To” pull down menu. When complete, click “Send.”
Using Natural Access to Add New Speech Services

January 11, 2005

NMS Communications
NMS at a Glance

- Founded in 1983, publicly traded since 1994
- Technology and solutions
- Designed into products deployed in 90 countries
- Major telecom operators, equipment and solution providers rely on NMS
20+ Years of Telecom Innovation

- Open Communications
  - Deploy in any network — TDM to IP
  - Blade to system versatility; superior scalability

- Innovative, future-proof solutions
  - Rapid ROI

- Blue chip partnerships
  - Applications, content, integration, support
Using Natural Access To Add New Speech Services

January 11, 2005

Jack Chase, Director Product Marketing
Jerry Gavin, Director Sales Engineering
NMS Communications
Agenda

- NMS Natural Access 2005-1
  - Basic components
- Migrating for the AG 4000 to the CG 6000
  - IVR application; DTMF control
  - Adding VoIP interface
- Migrating from the CG 6000 to HMP
  - PacketMedia HMP 1.0
- Adding speech to an IVR application
  - MRCP speech servers
  - Universal Speech Access 1.0
Natural Access Provides...

- Hardware-independent C APIs
  - Asynchronous; single-threaded, multi-threaded programming models
- Support for all NMS boards; PacketMedia HMP
- Run-time software, complete documentation, sample programs with source
- Operating system independence
  - Windows, Linux, Solaris (SPARC and Intel)
## Natural Access Evolution

<table>
<thead>
<tr>
<th>NA release</th>
<th>NA 2003-1</th>
<th>NA 2004-1</th>
<th>NA 2005-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS Support</td>
<td>Win 2000 AS Win Svr 2000 Std; Ent. Svr (SP2)</td>
<td>Win 2000 Prof; Svr. (SP4)</td>
<td>Win 2000 Prof; Svr. (SP4)</td>
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<tr>
<td></td>
<td>Windows 2003 Enterprise, Std</td>
<td>Windows 2003 Enterprise, Std</td>
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<tr>
<td></td>
<td>SPARC Solaris 8: 32-bit, 64-bit, mixed mode</td>
<td>SPARC Solaris 9: 32-bit, 64-bit, mixed mode</td>
<td>SPARC Solaris 9: 32-bit, 64-bit, mixed mode</td>
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<td>Intel Solaris 8</td>
<td>Intel Solaris 8</td>
<td>Intel Solaris 8</td>
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<tr>
<td></td>
<td>Red Hat Linux 7.2</td>
<td>Red Hat Linux 9</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>Red Hat Enterprise Linux 3.0 ES</td>
<td>Red Hat Enterprise Linux 3.0 ES (update 2)</td>
</tr>
<tr>
<td>New Features</td>
<td>IPV6/ IPSEC, Quad SMP support, DPNSS</td>
<td>AG 4040, PacketMedia HMP 1.0, Universal Speech Access 1.0</td>
<td>SIP, native play/record, Fusion 4.5</td>
</tr>
</tbody>
</table>
The Software Component
Call Control & Media

Natural Access

- NCC & ADI Service API
- Voice Message Service API
- Fax Service API
- IP Media Stream Processing API
- Universal Speech Access API
- Conference Service API

- VCE Manager
- NFX Manager
- FAX Manager
- MSP Manager
- CNF Manager
- SAI Manager

- ADI Manager
- DTM
- NCC
- ADI
- FXM

- AG Hardware
- CG Hardware

Note:
The OAM and SWI Service API Connects to all NMS boards
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CG 6000/ CG 6500 Series

- 120-480 universal ports
  - IVR
  - Fax
  - Conferencing
  - VoIP gateway (reduced ports)
  - IP media server (reduced ports)
  - Universal Speech Access 1.0

- Software-switchable T1/E1 trunks
  - PCI: 0, 2, or 4
  - cPCI: 2 or 4, 8, 16

- Dual Ethernet ports

- CG 6565 coming in 2005
AG 4xxx: IVR Application

Server App
- Natural Access
  - NCC
  - ADI/VCE

Data Storage

PSTN

IVR DSP Port
- VCE/ADI Play
- ADI Record
- Signaling
  - Echo

HMIC
- Long Buffers
- Short Buffers

T1/E1 Framer
- RJ-48T Connection

HDLC
- PRI ISDN

Nat Acc Svc Msgs

PCM Streams

www.nmscommunications.com
CG 6000: IVR Application

Server App

- Natural Access
- MSPP
- ADI/VCE
- NCC SIP

IVR DSP Port

- VCE/ADI Play
- ADI Record
- Echo

IP

Data Storage

- RTP Endpoint
- Channel
- DS0 Endpoint

MSPP Connection

- NatAcc Svc Msgs
- PCM Streams
Agenda

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PacketMedia HMP 1.0: Host-based IP Media Processing

- Install on Natural Access & Fusion environment
  - G.711 native play & record
    - A-law, μ-law
    - 10, 20, 30 ms packets
    - DTMF detection and clamping/ tone generation
    - Gain control
  - SIP Call Call control
  - MRCP interface to speech recognition engines (option)
- 1.0 released mid 2004
- 128 media sessions on dual 3 GHz P4 at 50% load
PacketMedia HMP: IVR Application

Server App
- Natural Access
  - MSPP
  - ADI/VCE
  - NCC SIP

Data Storage

IP

RTP Endpoint

Channel

MSPP Connection

IVR DSP Port
- VCE/ADI Play
- ADI Record

PacketMedia

PCM Streams

NatAcc Svc Msgs

Short Buffers

Long Buffers
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Scalable Speech Resources

- IVR and speech servers are pooled separately
- Easy to reconfigure system as needs change
- Easy to implement N+1 or 2N redundancy
CG 6000: IVR Application with MRCP

- **Server App**
  - Natural Access
  - NCC SIP
  - SAI
  - MSPP
  - NCC

- **MRCP Client**
  - Control
  - RTCP

- **Echo DSP Port**
  - DSP
  - Echo

- **MSPP Connection**
  - MSPP

- **RTP Endpoint**
  - VAD enabled

- **Channel**
  - MSPP Connection

- **NatAcc Svc Msgs**
  - PCM Streams

- **PSTN**
  - T1/E1 Framer
  - HDLC

- **Speech Server**
  - MRCP Server
  - Speech Server
PacketMedia HMP: IVR Application with MRCP

Server App
- Natural Access
  - NCC SIP
  - SAI
  - MSPP

Speech Server
MRCP Server
Speech Server

Control
RTCP

MRCP Client

RTP Endpoint
VAD enabled

Channel
MSPP Connection

IP

RTP Forking

NatAcc Svc Msgs
PCM Streams
Thank You!

Note:
- PDF will be posted today
- Recorded version posted in a few days
Q & A Session

Please use the text messaging feature to send your questions
For more information...

- **Contact**
  - Jack Chase, Director, Product Marketing
    - +1 508 271 1109 – jack_chase@nmss.com
  - Jerry Gavin, Director, Sales Engineering
    - +1 508 271 1443 – jerry_gavin@nmss.com

- **Upcoming NMS web seminars**
  - February 8: Developing VoIP Applications Using SIP
  - March 5: Developing Enhanced Applications Using Media Servers

- **Upcoming Events**
  - Spring VON: March 7–10, San Jose, CA; Booth # 815