

# *Natural Language Applications and the iPhone.*

A105 - Advanced applications and technology

Monday, March 10<sup>th</sup>., 2008.

4:00 PM – 5:15 PM



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# "Just Say It"





## Gartner Research

- The Economics of Service Levels
  - On average, every 1 percent increase in **first contact resolution** results in a 0.64 % **increase in customer satisfaction**.
  - On average, with every 1 second decrease in the average speed of answer, customer satisfaction improves only 0.03 %
  - Focusing on things that **drive first contact resolution** generally creates **greater customer satisfaction** and is **often less costly** than focusing on things that improve the average speed of answers
- User Interface Requirements
  - A **multimodal user interface** will be required, as users will expect to use a **blend of speech and graphical interface** in every kind of device or channel





## Challenges with Open Ended Dialogs & User Interfaces

- Conversations and human responses can be **unpredictable**
  - In many cases, it is impossible to design a dialog flow that anticipates all user's responses.
  - Case statements, if-then-else and mix-initiative will not do the trick.
- Phrases must be well understood
  - Just picking up keywords doesn't do the trick, the **context and meaning** of the phrase must be captured.
- Find the **single best response** to the question
- Must **keep track of the context** of the conversation.
  - What were we talking about, and is the user now talking about something different?
- **User Interface not intuitive** and user/customer friendly
  - Limitation of technology capabilities (telephone)



## How Do We Address the Challenges

- Conversations and human responses can be unpredictable
  - Use AI techniques to build the **dialog on the fly**, rather than attempting to script the dialog.
- Phrases must be well understood
  - Use a combination of **semantics and syntax with computational linguistics**.
- Find the single best response to a question
  - Perform **computational linguistics** for matching the semantics of the question with the semantics of the knowledge base repository.
  - Perform **AI search techniques with heuristics** for sorting through possible answers.
- New capabilities with the introduction of the “smart phone”
  - iPhone, Nokia N95, Blackberry and series of others.
- Introduction of the combination of natural language understanding in text and voice recognition with the graphical capabilities of smart phones, web chat sessions etc.
  - **Interactive Digital Assistant** (IDA)





# "Just Say It"



## Natural Language Understanding

- **Traditional approaches for Natural Language Understanding (NLU)**
  - **Statistical Language Modeling (SLM)**
  - **Statistical Semantic Modeling (SSM)**
    - *"Say Anything", "Speak Freely"*
  - **Transcription of 20 - 30,000 utterances**
  - **Procedural developments**
- **GyrusLogic Platica approach for Natural Language Understanding**
  - **Robust Linguistic** approach coupled with Artificial Intelligence (no SLM)
  - **Full conversational capabilities** (no transcriptions)
  - **Easy industry standard** solution (no proprietary scripting)
  - **Interfacing existing "Voice" environments** (IVR, ASR, TTS, VoiceXML)
  - **Declarative developments**
  - **Significant less effort, with additional operational savings and more application functionality**



# Our Language Processing

## Speech Input



GYRUSLogic

Acoustic  
Language  
Models  
Word Lists



Speech  
Recognition

What does the speaker  
**say?**

Grammar  
Lexical  
Meaning



Speech  
Analysis

What does the speaker  
**mean?**

Discourse  
Context  
Knowledge  
about Domain  
of Discourse



Speech  
Under-  
standing

What does the speaker  
**want?**

Unambiguous  
Understanding in the  
Dialog Context

The Right Answer

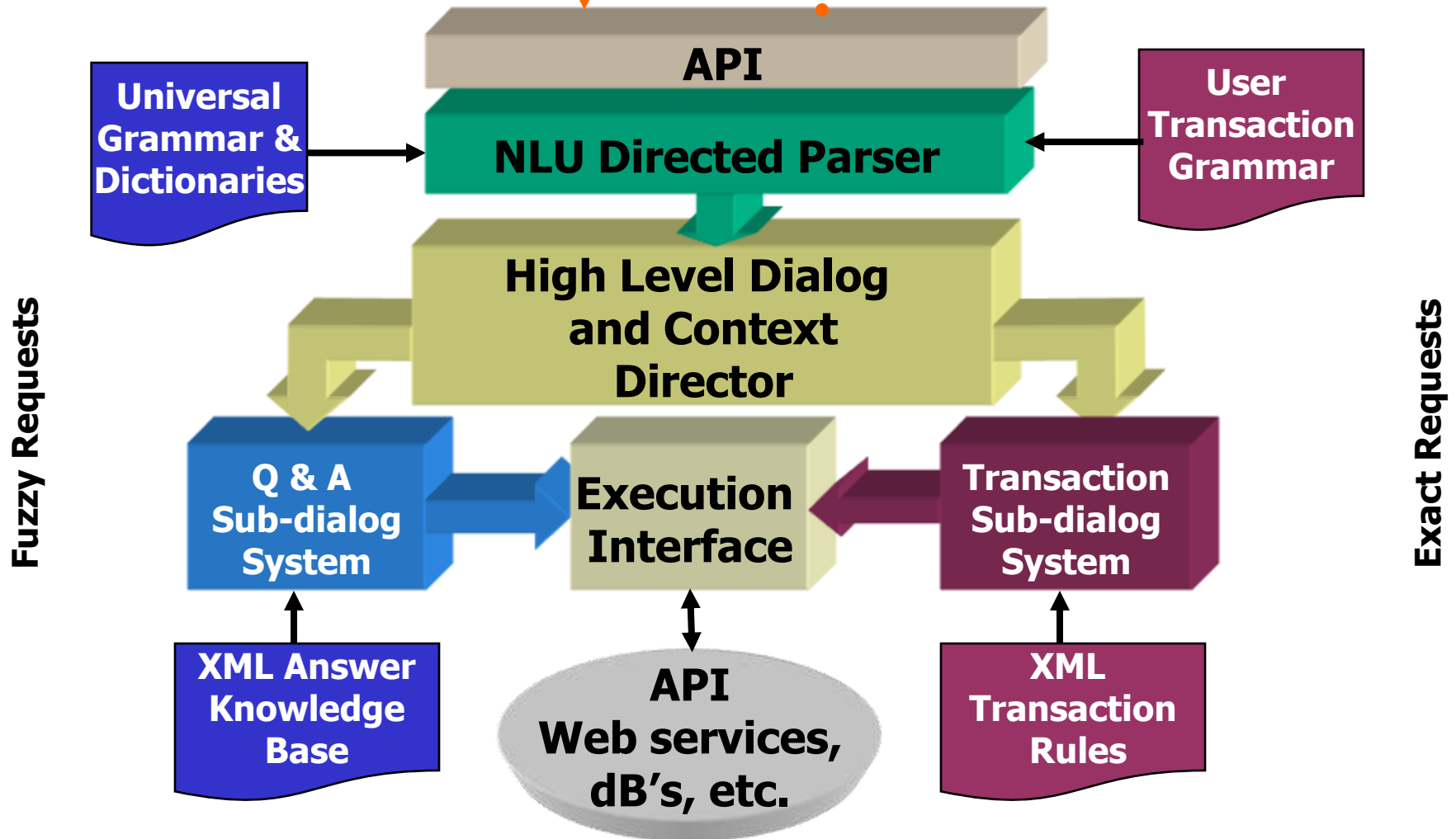
Reduction of Uncertainty



# Platica Server Architecture



N-best input  Prompts to play (TTS and/or Audio) 





## The Application Developed

- The user application does not need a specification for how the logic of the dialog should look like. (natural language processing)
  - GyrusLogic's inference engines mimic human's reasoning and **build the dialog on the fly**, thereby delivering a natural conversation.
  - It is a **true conversational** AI system and a true AI **declarative paradigm**.
  - It allows the user to be **spontaneous** and to **interrupt** a dialog with questions outside the ongoing dialog.
- Interfaced with the Interactive Digital Assistance (IDA) as a new option
  - **Emotional expressions and facial gestures** based upon human anatomic models
  - Technology aligned to TTS and Audio prompts outputs





# Operational savings with Conversational Natural Language Systems

- Directed Dialog
  - 1:48 avg. call
- Conversational Dialog
  - 0:57 avg. call
- Savings
  - **51 seconds per call saved**
  - Avg. 50,000 calls / day
  - Initial 20% use of conversational dialog
  - **Over 3.1 million minutes saved in initial year**





**Integrated multimodal natural language solution**

**GyrusLogic Platica,**

**Partner ADI, ASR & TTS, VoiceXML/IVR**



## Examples

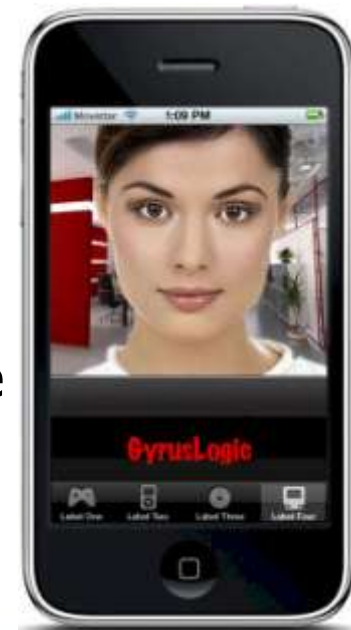




## In Summary



- **Full conversational dialog or natural language understanding application** based upon industry standards
- **First contact customer resolution** for improved customer satisfaction
- **Improved “recognition rates”** by resolving false positives
- **ASR & IVR independent, VoiceXML 2.0 support**
- New language developments can be completed in days
- **Significant savings** in development and total cost of ownership
- Creation of a **multimodal user interface** to accommodate the user expectation independent of their device or channel





**“Just say it”**

**Thank You!**

**questions, trial or demo,**

**connect with us @**

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