

Improve customer satisfaction with natural language call routing and application navigation.

April 23rd. 2010 - Call routing and flexible navigation in customer service

Peter Trompetter
VP Global Development
GyrusLogic, Inc.



Mobile Voice
Conference 2010





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





Language Processing

Speech Input

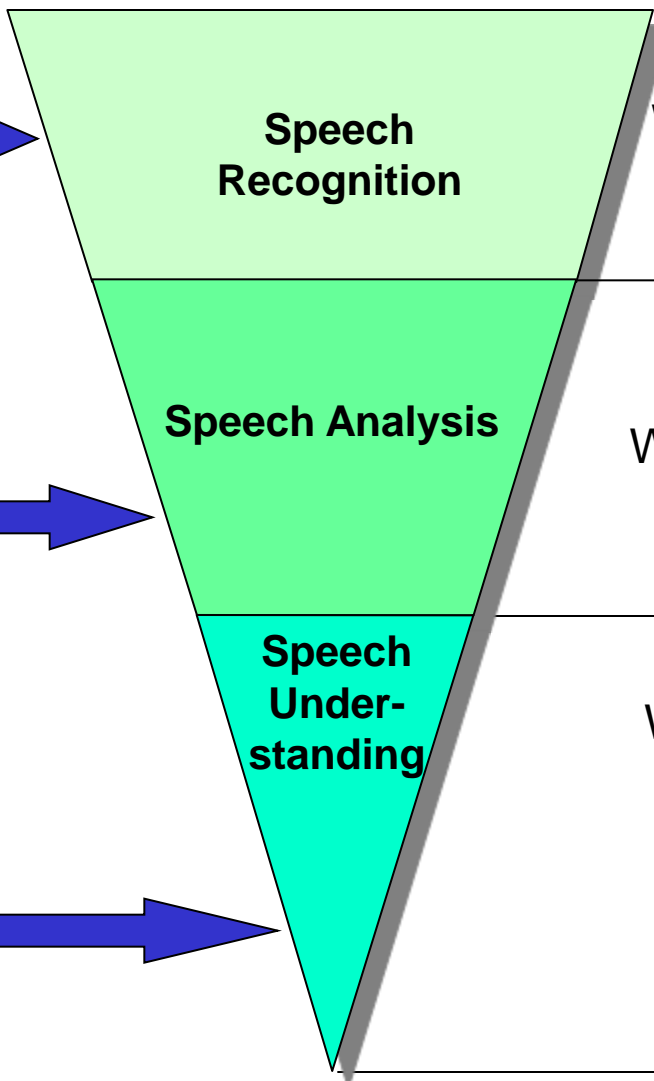
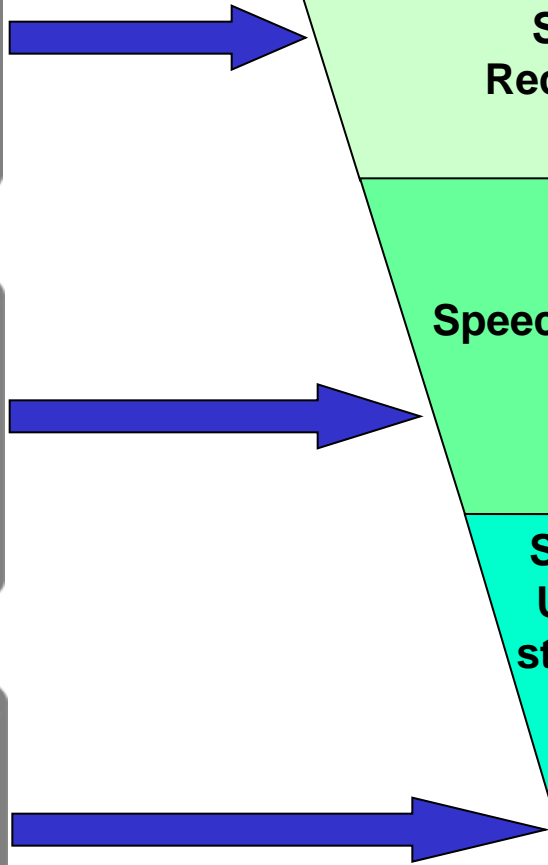


GYRUSLogic

Acoustic Language Models
Word Lists

Grammar
Lexical Meaning

Discourse Context
Knowledge about Domain of Discourse



What does the speaker **say?**

What does the speaker **mean?**

What does the speaker **want?**

Unambiguous Understanding in the Dialog Context

The Right Answer

Reduction of Uncertainty



Challenges with Open Ended Dialogs & User Interfaces

- Conversations and human responses can be **unpredictable**
 - It is virtually impossible to design a dialog flow that anticipates all user's requests.
 - *Unknown "if-then-else" statements.*
- 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 are we talking about, and is the user now requesting 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 unknown 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.
- **Distinguish between a question and a response**
- Understand exact requests vs. vague questions
- **Multimodal** support with the combination of natural language understanding in text and voice recognition with graphical capabilities (avatar) of smart phones, web chat or URL's, etc.





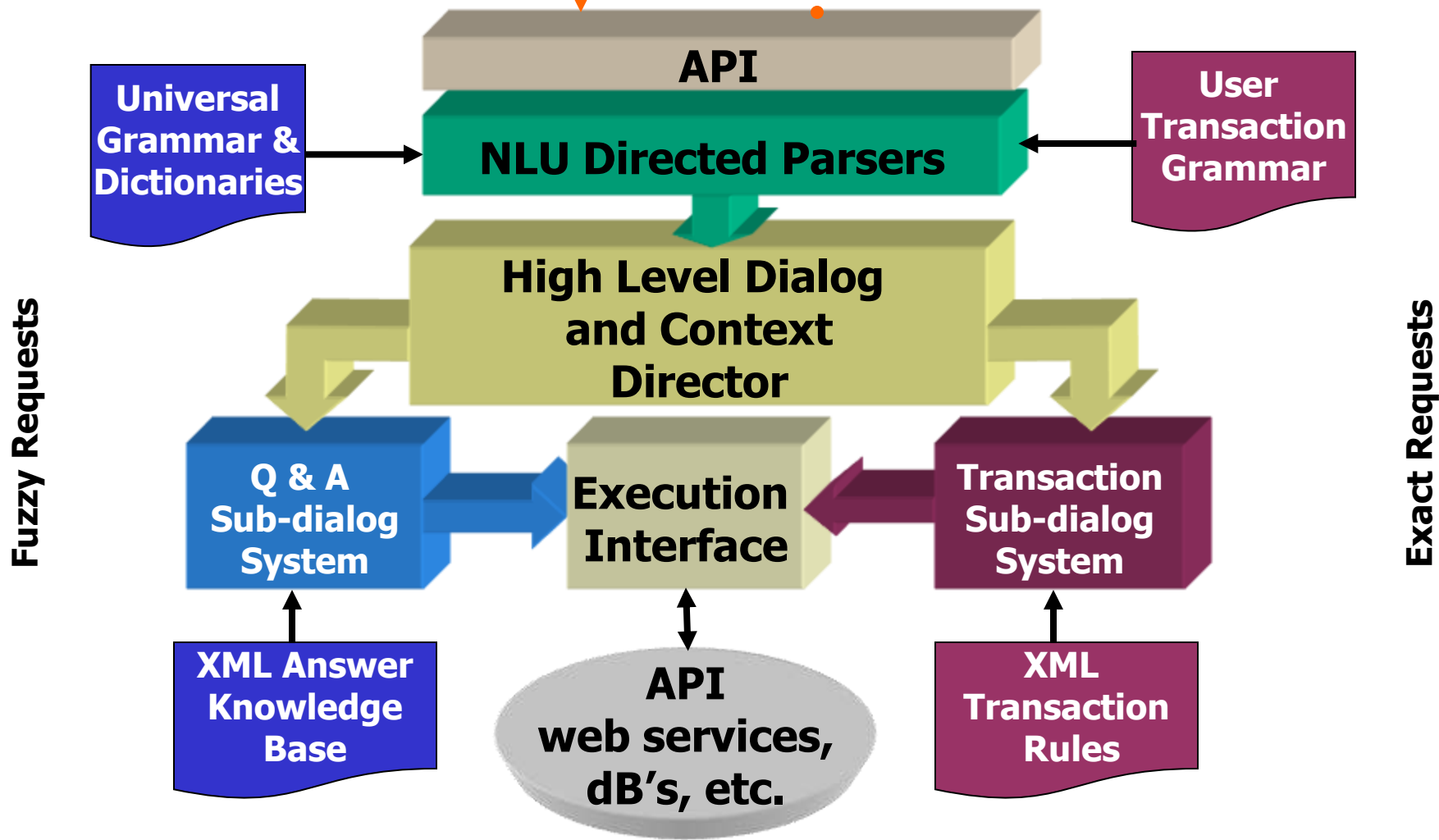


Platica Server Architecture



GYRUSLogic

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

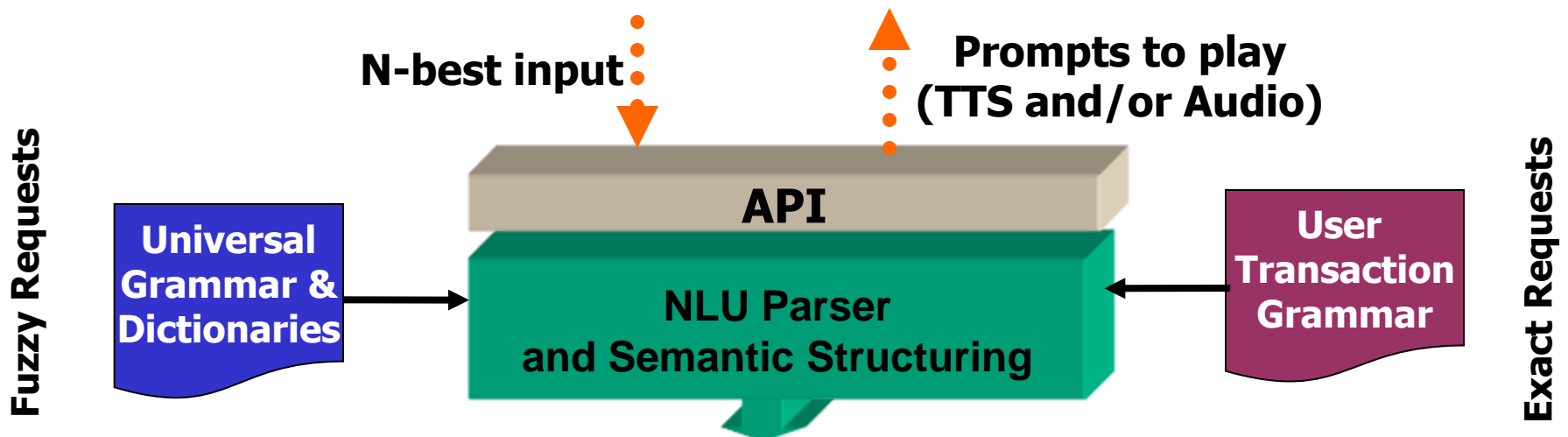




Life Cycle of Natural Language Request



- An utterance is converted into multiple recognition (n-best) results or captured from a web chat session and sent to the GyrusLogic API.
- The GyrusLogic API takes the (n-best) phrase and sends it to the **Platica Server**.
- Platica processes it through its Natural Language Understanding (NLU) Parser, the Parser checks first the **User Grammar**. If the parsing is not successful, then it checks the **Universal Language Grammar**.
- The phrase is then broken apart **Syntactically** by the Parser using the Platica Grammars.
- As the phrase is being broken apart syntactically, the **Conceptual Structure** is being assembled through the process of **Semantic Structuring**. From this point on, the system no longer deals with phrases, but rather with conceptual structures





Life Cycle of Natural Language Request (2)



- The **Context Director** is responsible for keeping track of the conversation and building the dialog flow on the fly.
- If the parsing with the user grammar is successful, then the Context Director determines that this is an “**exact request**”. (transaction type)
- If the parsing with the Universal Language Grammar is successful, then Platica determines that this is an “**fuzzy request**” (ad-hoc query).
- If the request is an ad-hoc query or question, then the **Context Director** determines whether the request is interrupting a sub-dialog and it keeps the current dialog context.
 - If the request interrupts the dialog for any other reasons, then the Context Director determines whether to interrupt the current sub with the new request.
 - The context director also keeps track of where the dialog is at any given point in time, whether this is a correction, or whether the dialog is at a confirmation, etc.

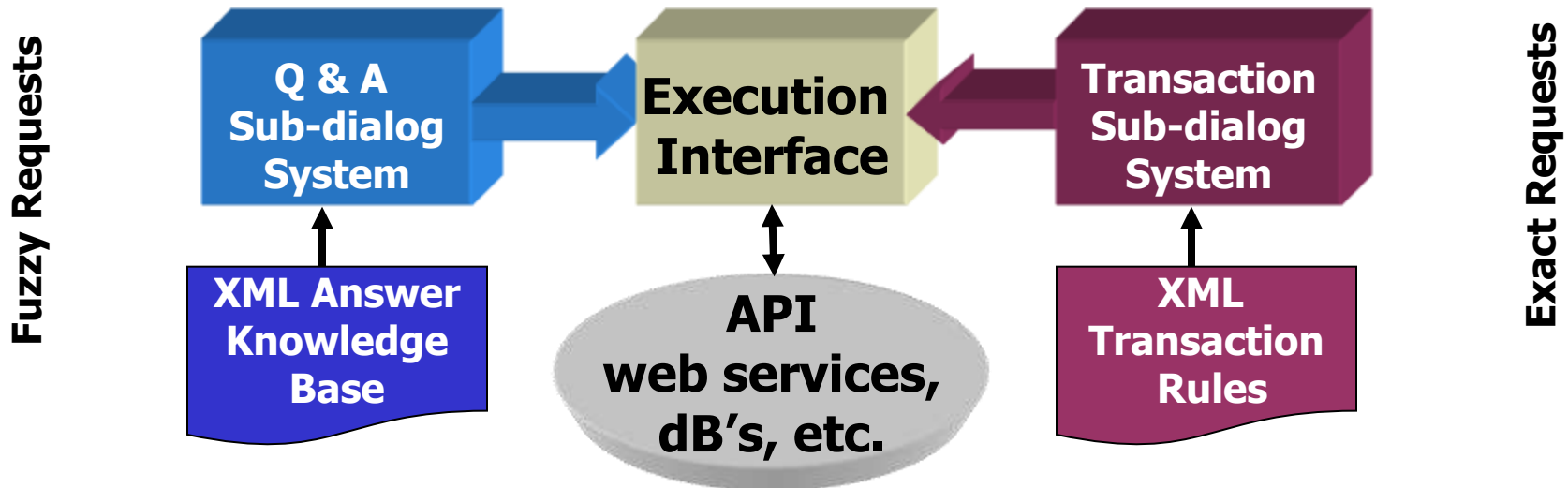




Life Cycle of Natural Language Request (3)



- Once the Context Director determines how the request must be processed, a conceptual structure is sent to either the **Heuristic Q&A Answer Engine** or to the **Transaction Sub-dialog System**.
- The Heuristic Answer Engine retrieves a correct answer from the question (in the form of a conceptual structure). It may require to go through the **Execution Interface** in order to retrieve information from a database or some proprietary system in order to complete the variable data in the answer.
- The repository of possible answers are stored in a **XML Knowledge Base**. These answers are also converted into *conceptual networks* and are compared heuristically with the *conceptual structure*. A successful comparison yields a correct answer.
- The **Transaction Sub-Dialog System** is a rule based system that fires the next prompt for the user. It may require to go through the Execution Interface and then access a database or proprietary API, for either execute a transaction or retrieve information that is necessary in order to follow up on the dialog.





"Just Say It"



GYRUSLogic Languages Support

- Language Support options



Since the input phrase/grammar does not need to be perfect **GyrusLogic can interface real-time with a translation engine of choice**, translating the input phrase and respective output answer to the language of choice while managing your application in English.

- Learning capabilities to **improve language grammar strength and answer opportunities**
- Language dictionaries and Platica grammar are kept outside the GyrusLogic engine, allowing users to easily update language related files.

- For Fuzzy requests we do provide a **universal language grammar** of English, no user development needed.

- Language limitations outside Platica are bound by

- Languages supported by ASR and/or translation engine used.





"Just Say It"



GyrusLogic Bilingual and Translation Support

USER: Cual es el saldo en mi cuenta de ahorros

Platica: El saldo actual de su cuenta de ahorros es 10.100 dólares. ¿En qué le puedo servir?

USER: What's the balance in my savings account

Platica: The current balance in your savings account is 10100 dollars. Anything else i can assist you with?

USER: Cual es el saldo en mi cuenta corriente

Platica: El saldo actual de su cuenta de cheques es 6900 dólares. ¿En qué le puedo servir?

USER: What's the balance in my checking

Platica: The current balance in your checking account is 6900 dollars.

USER: Transfiera fondos

Platica: ¿A cual cuenta quiere hacer la transferencia?

USER: From my checking to my savings

Platica: How much would you like to transfer?

USER: Cuanto dinero tengo en mi cuenta

Platica: Usted tiene en su cuenta corriente 6900 dólares y tiene 10.100 dólares en la cuenta de ahorros. Ahora bien, si no te importa que le vuelvo a preguntar, ¿Cuánto le gustaría estar en la transferencia?

USER: How much

Platica: You have in your checking account 6800 dollars and you have 10200 dollars in the savings account



Bilingual and other translation capabilities managed from one English application and knowledge base.



The Advantages of Patented GyrusLogic Platica

- **No dialog flow or menu design or maintenance based upon a Natural Language approach**
- Identifying “out of grammar” and resolving false positives automatically
- Declarative application development paradigm, with a first contact resolution result.
- ASR, IVR and TTS independent.
- Same application can be deployed for consistency with **Voice, Web chat & SMS (Text Messaging)**
- **Virtually no language dependency, managed from a single interactive business application.**



ConversationAssist.com

Thank You!

Questions, trial or demo connect with us @

<http://GyrusLogic.com> - (+1) 602 - 432 1995 - contact@GyrusLogic.com