

AN INFORMATION STATE-BASED VOICE WEB

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LIMITATIONS OF VOICEXML, THE VOICE STANDARD FOR ACCESSING THE WEB

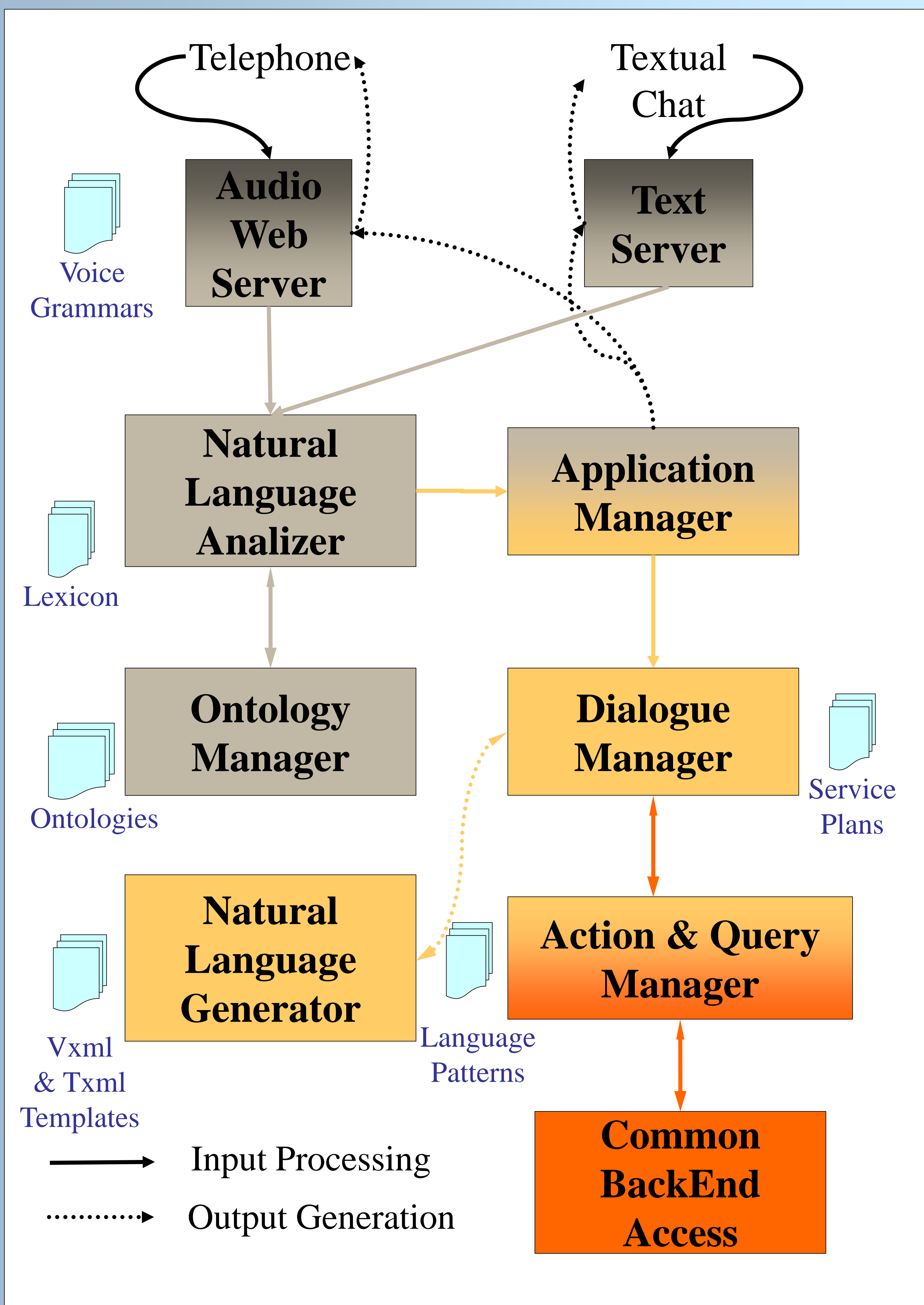
- VoiceXML only supports simple dialogues
 - ✓ Where user initiative is very limited
 - ✓ It does not support complex dialogue phenomena, such as clarification
- For each service, all possible sequences of interaction have to be defined
- VoiceXML systems only support voice mode

In order to solve these problems we propose:

The integration of VoiceXML with language and dialogue technologies



A DIALOGUE SYSTEM FOR ACCESSING THE WEB



THE DIALOGUE MANAGER

- The dialogue manager controls the dialogue flow.
- The dialogue manager uses a dialogue model.
- The dialogue model defines general dialogue mechanisms.
- Confirmation and disambiguation strategies.
- The dialogue model follows the **state-based theory**, based on a rich representation of the dialogue state (the context).
- The **information state** consists of two parts:
 1. The information shared with the user. It includes:
 - ✓ Unresolved questions (raised but not resolved yet)
 - ✓ Answers to previous questions
 - ✓ The past dialogue movements
 2. The information private to the system. It includes:
 - ✓ The actions to do
 - ✓ The results obtained previously from the web services

THE USE OF COMMUNICATION PLANS

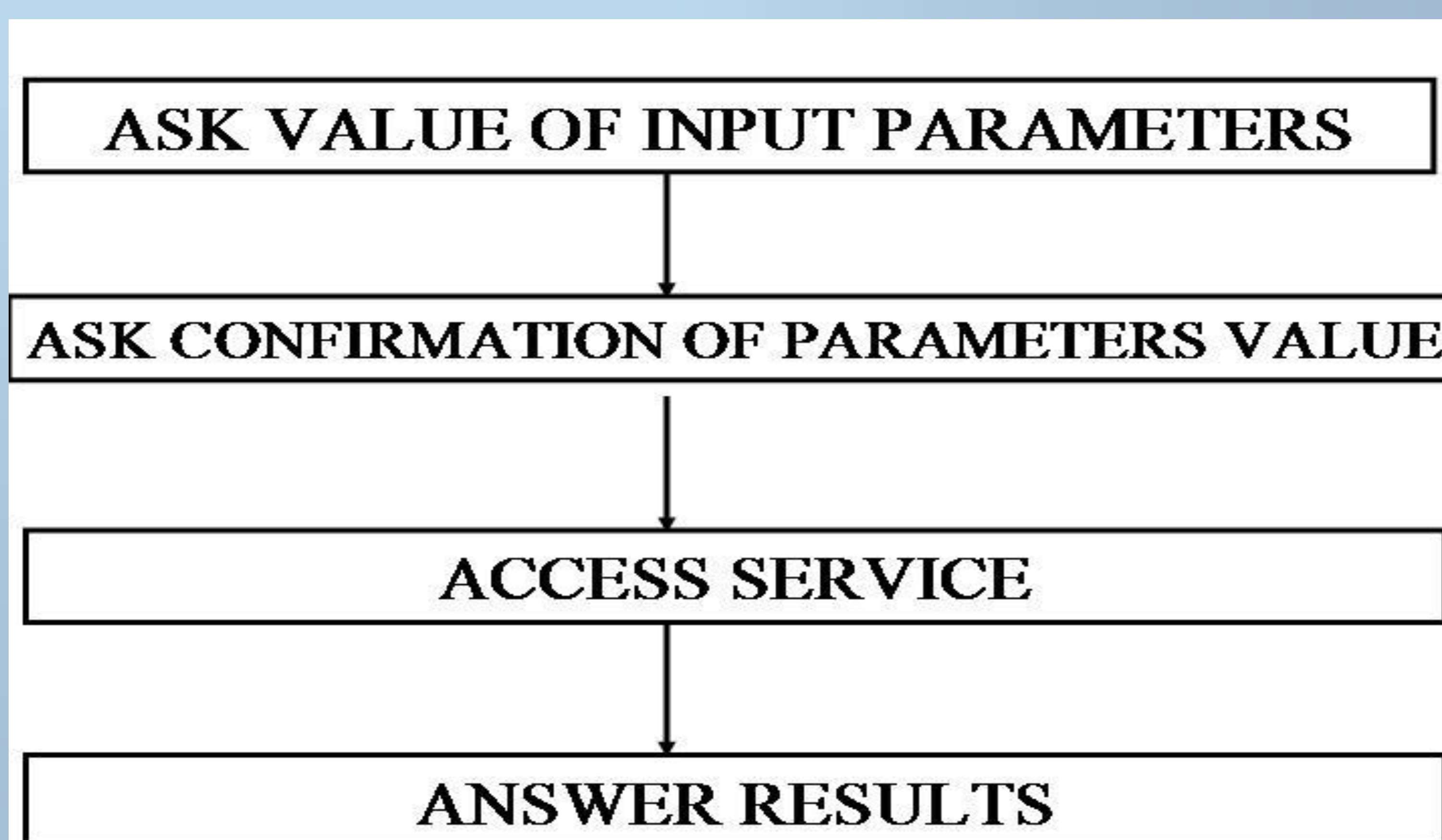
- The dialogue manager uses communication plans
- ✓ To recognize the specific web service the user wants to access
 - ✓ To obtain the next actions the system has to follow
 - ✓ For guiding the user to access the particular web service

The plans are generated statically

- ✓ when a new service is incorporated

We have defined general plans for two different types of web services: transactional and informational.

1. PLANS FOR TRANSACTIONAL SERVICES



General communication plan for transactional services

DIALOGUE MANAGER FOR MAKING SMARTER

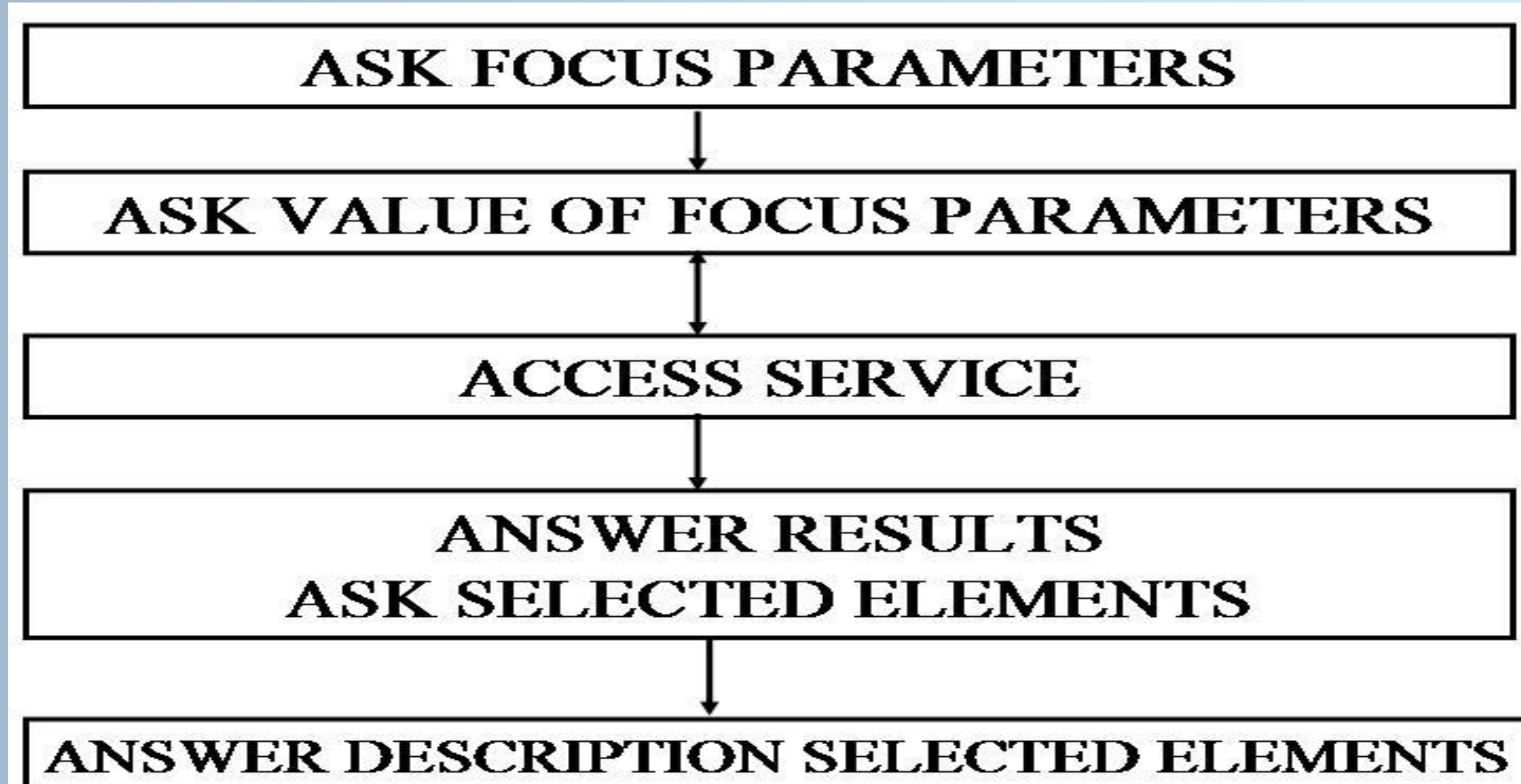


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An example of **transactional service** supported by our dialogue system:

- The service states a date for collection of large objects
- The user has to fill a form
- The system returns the collection date

2. PLANS FOR INFORMATIONAL SERVICES



General communication plan for transactional services

An example of **informational service** supported by our system

- It gives information about the cultural events in the city
- The user has to give information about the searched event(s)

THE LANGUAGE COMPONENTS

The Speech Recognition component

- ✓ The voice component of the Loquendo VoiceXML platform
- ✓ It uses voice grammars

The Natural Language Analyzer

- ✓ It is used for voice and text input
- ✓ It performs deep syntactic and semantic analysis
- ✓ It uses domain restricted lexicon and ontologies

The Natural Language Generator

- ✓ It generates automatically the system's prompts for each service in several languages: English, Spanish, Catalan and Italian
- ✓ The specific lexical entries needed for each service are classified according to a syntactic-semantic taxonomy

CONCLUSIONS

- The informal evaluation of the performance of the dialogue manager component indicates that:
 - ✓ Simple dialogues in which the system asks the user for specific information are appropriate for transactional services
 - ✓ Flexible dialogues are required for informational services
- Other types of web information have also to be supported

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