

Should Intelligent Agents Listen and Speak to Us?

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Expectations for Human Agents

- Use multiple means of communication
- Recognize me
- Learn my preferences and choices
- Understand my requests
- Resolve ambiguous requests
- Identify required resources
- Perform my requests

Expectations for ~~Human~~ Agents Automated

- Use multiple means of communication
- Recognize me
- Learn my preferences and choices
- Understand my requests
- Resolve ambiguous requests
- Identify required resources
- Perform my requests

Use Multiple Means of Communication

- Speak and listen
- Text
- Illustrations and pictures

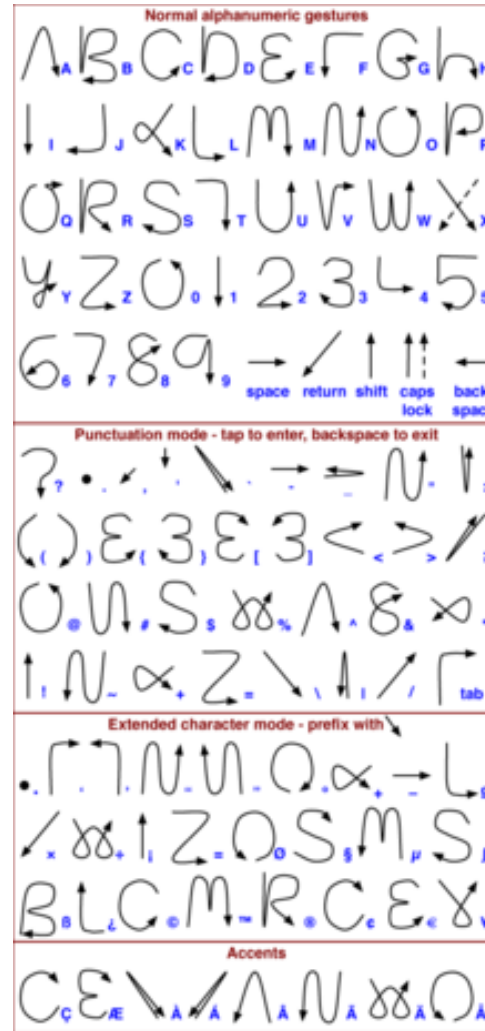
Text Capture



Speech Recognition



Keyboarding



Hand Writing Recognition

Pickers and Pallets

Depart 06/15/2012 Anytime Return 06/21/2012 Anytime

June 2012							July 2012						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
					1	2	1	2	3	4	5	6	7
3	4	5	6	7	8	9	8	9	10	11	12	13	14
10	11	12	13	14	15	16	15	16	17	18	19	20	21
17	18	19	20	21	22	23	22	23	24	25	26	27	28
24	25	26	27	28	29	30	29	30	31				

Depart 06/15/2012 Anytime Return 06/21/2012 Anytime

1 traveler

Find Hotels (in ne...)

Choose Sites to C...

Travelocity C...


Compare hundreds

- Anytime
- Early (4a-8a)
- Morning (8a-12p)**
- Afternoon (12p-5p)
- Evening (5p-9p)
- Night (9p-12a)
- 1:00 am
- 2:00 am
- 3:00 am
- 4:00 am
- 5:00 am
- 6:00 am
- 7:00 am
- 8:00 am
- 9:00 am
- 10:00 am
- 11:00 am
- Noon
- 1:00 pm
- 2:00 pm
- 3:00 pm
- 4:00 pm
- 5:00 pm

Colors

Standard Custom

Colors:

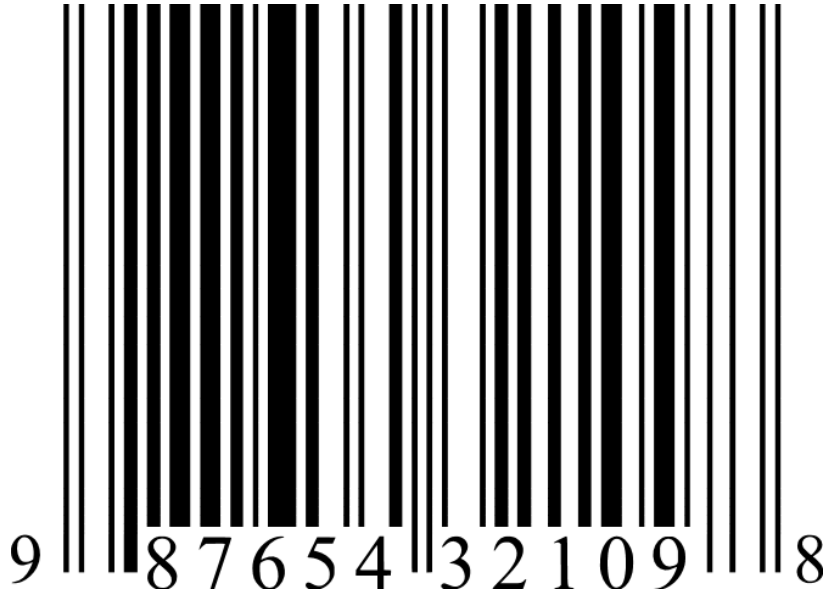


New

Current

OK Cancel

Pattern Recognition



UPC Code

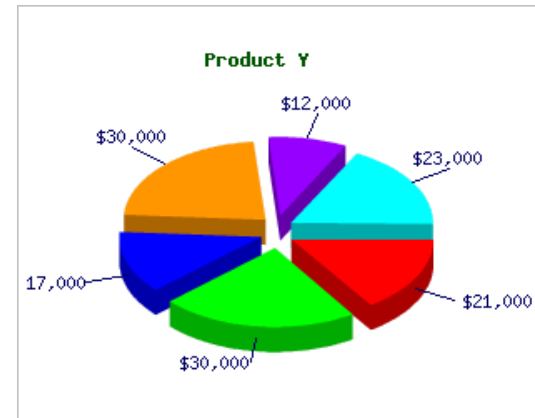


QR Code

Multiple Ways to Present Information



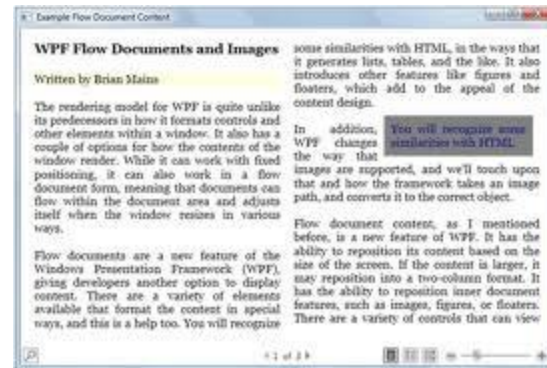
Maps



Charts



Video



Text Documents

Use Multiple Means of Communication

- Speak and listen
- Text
- Illustrations and pictures

Use the appropriate mode (modes) of communication

Recognize Me

- User identification devices
 - Something the user has
 - Something the user knows
 - Something about the user
- Combination increases security

Recognize Me: Something the User Has



Recognize Me: Something the User Knows

- Account names and passwords
 - Complex strings of digits and characters
 - Must be changed frequently
 - Difficult for user to remember
- Challenge dialog:
 - System: what is your mother's maiden name?
 - User: Lewis
 - System: What is the name of your first pet?
 - User: Fido
 - System: Apply your secret function to the number 7
 - User: 4
 - System: Approved to access

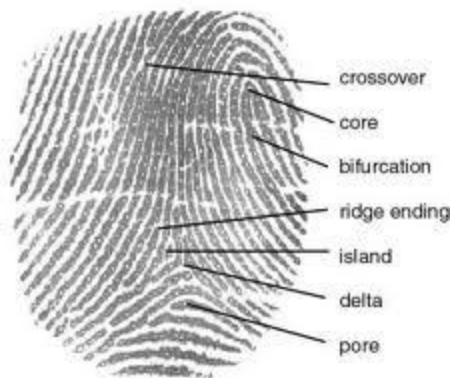
Recognize Me: Something About the User



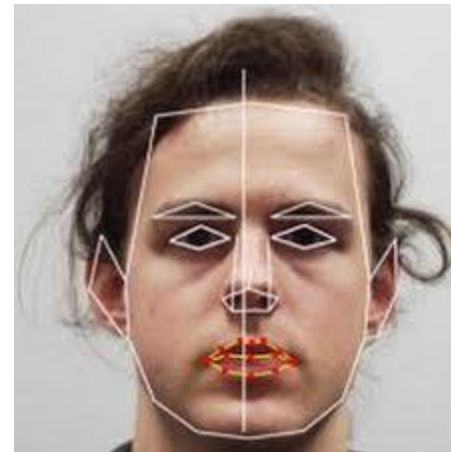
Signature Recognition



Speaker Recognition



Fingerprint Recognition



Face Recognition

Learn My Preferences and Choices

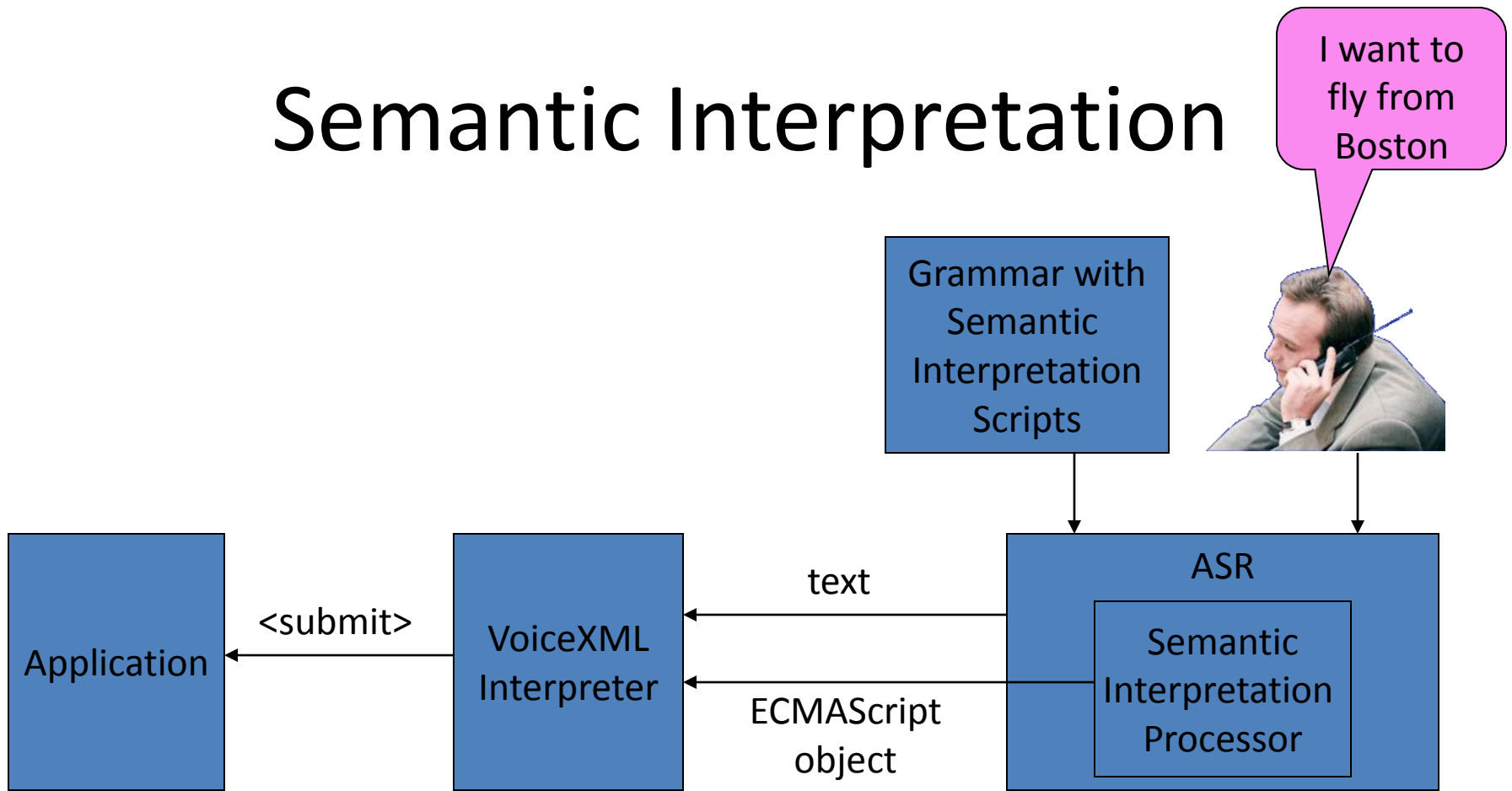
- User Profile
- History

Understand My Requests: Semantic Interpretation

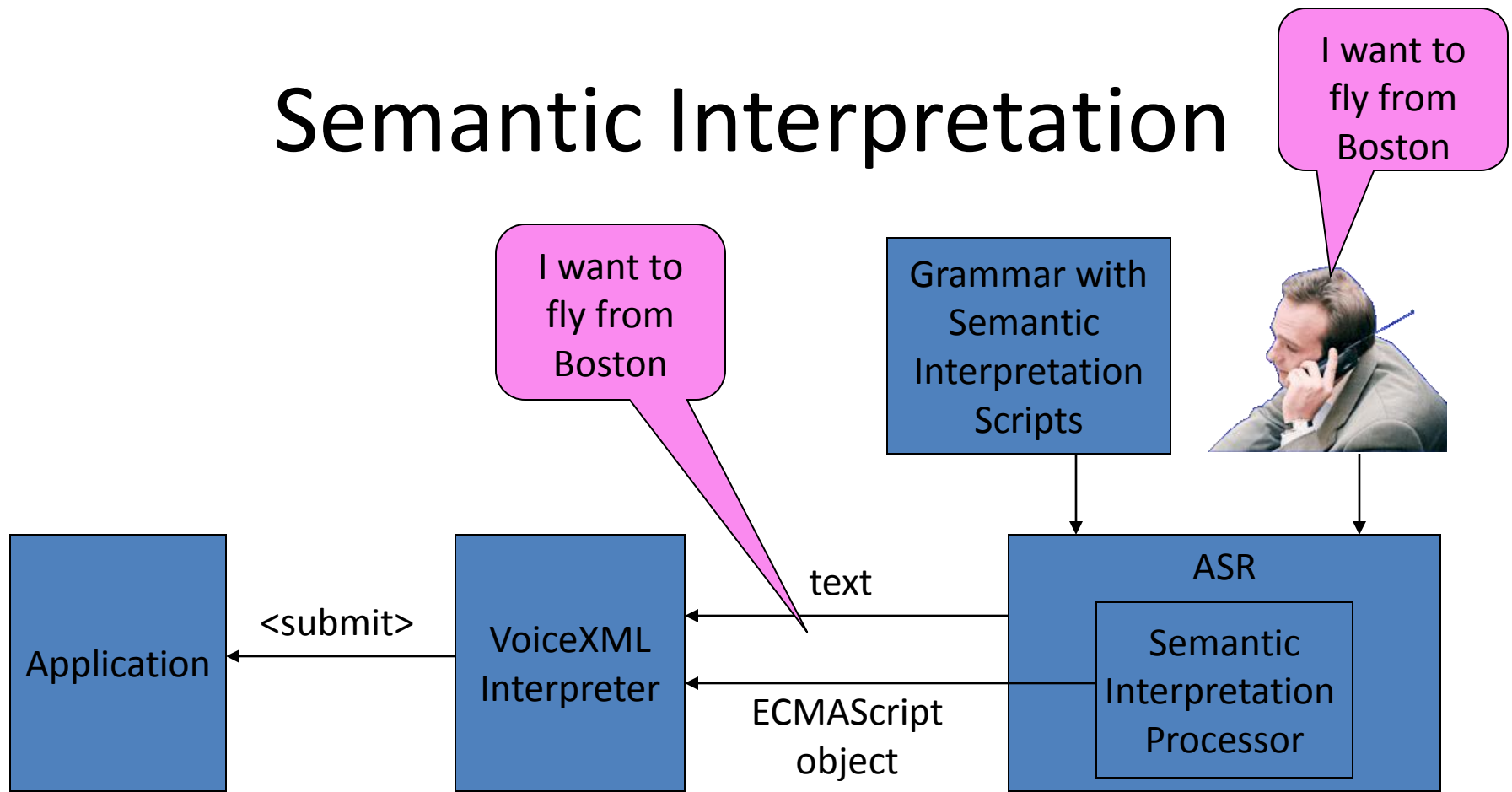
- To create smart voice user interfaces, we need to extract the semantic information from speech utterances
- Example:
 - Utterance: “I want to fly from **Boston** to **Chicago**”
 - Semantic Interpretation:

```
{  
  origin: "BOS"  
  destination: "OHR"  
}
```

Semantic Interpretation



Semantic Interpretation

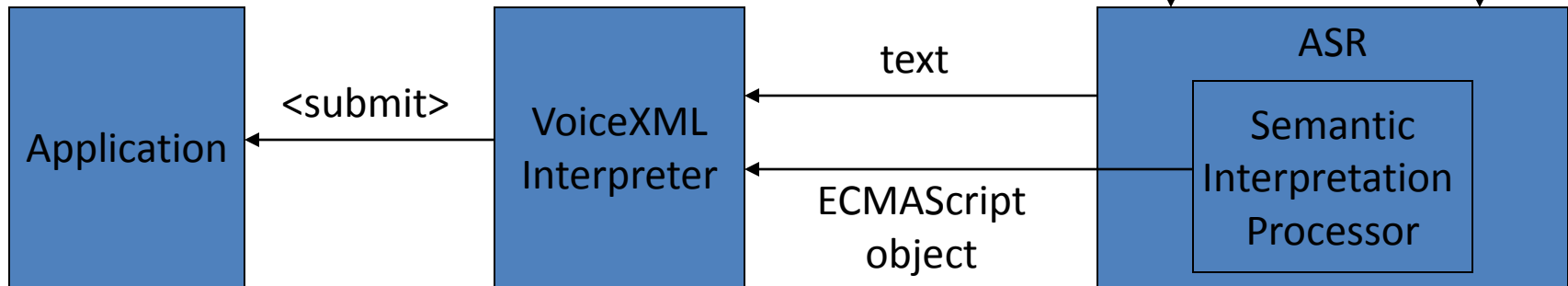


Semantic Interpretation

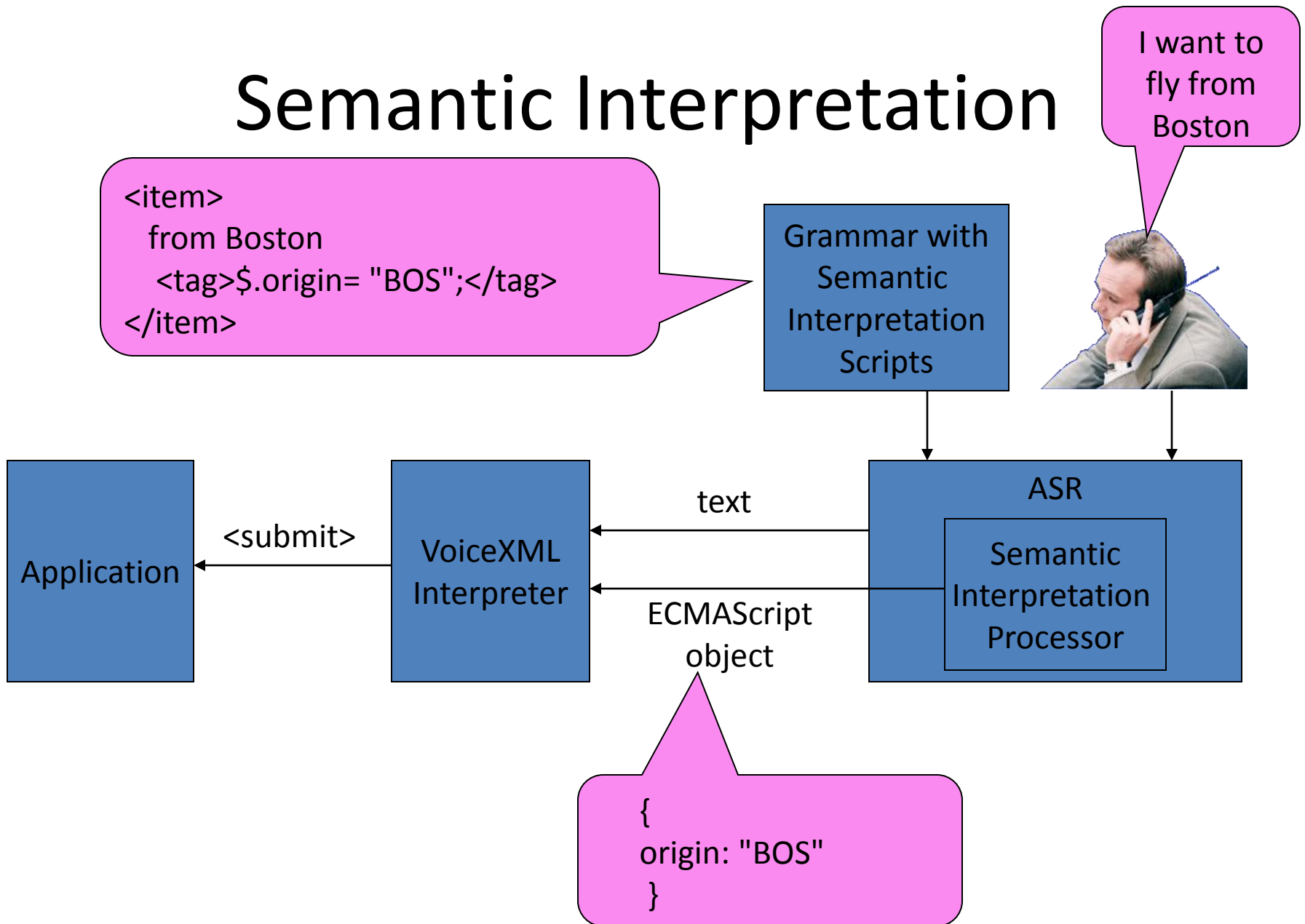
`<item>`
from Boston
`<tag>$.origin= "BOS";</tag>`
`</item>`

Grammar with
Semantic
Interpretation
Scripts

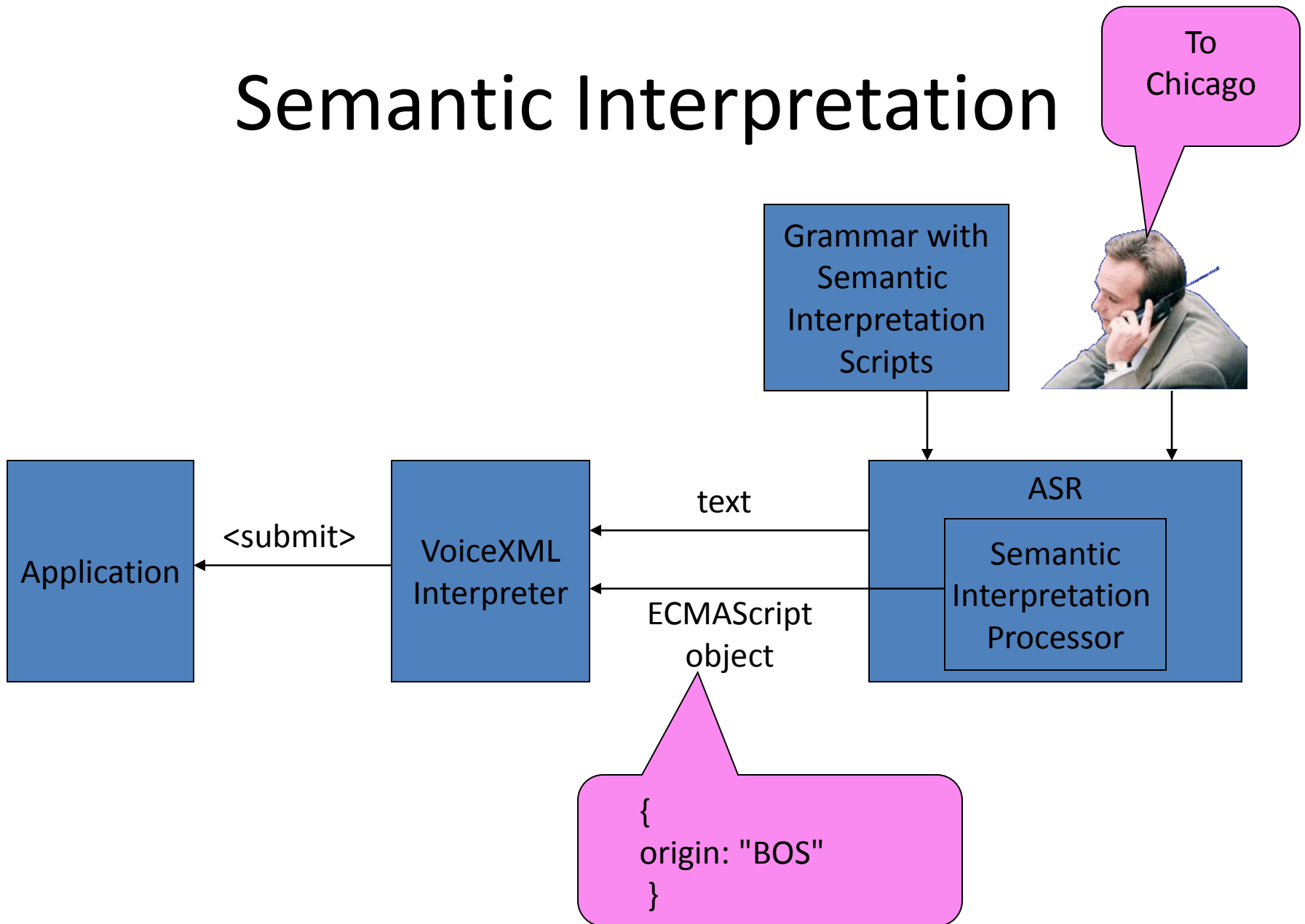
I want to
fly from
Boston



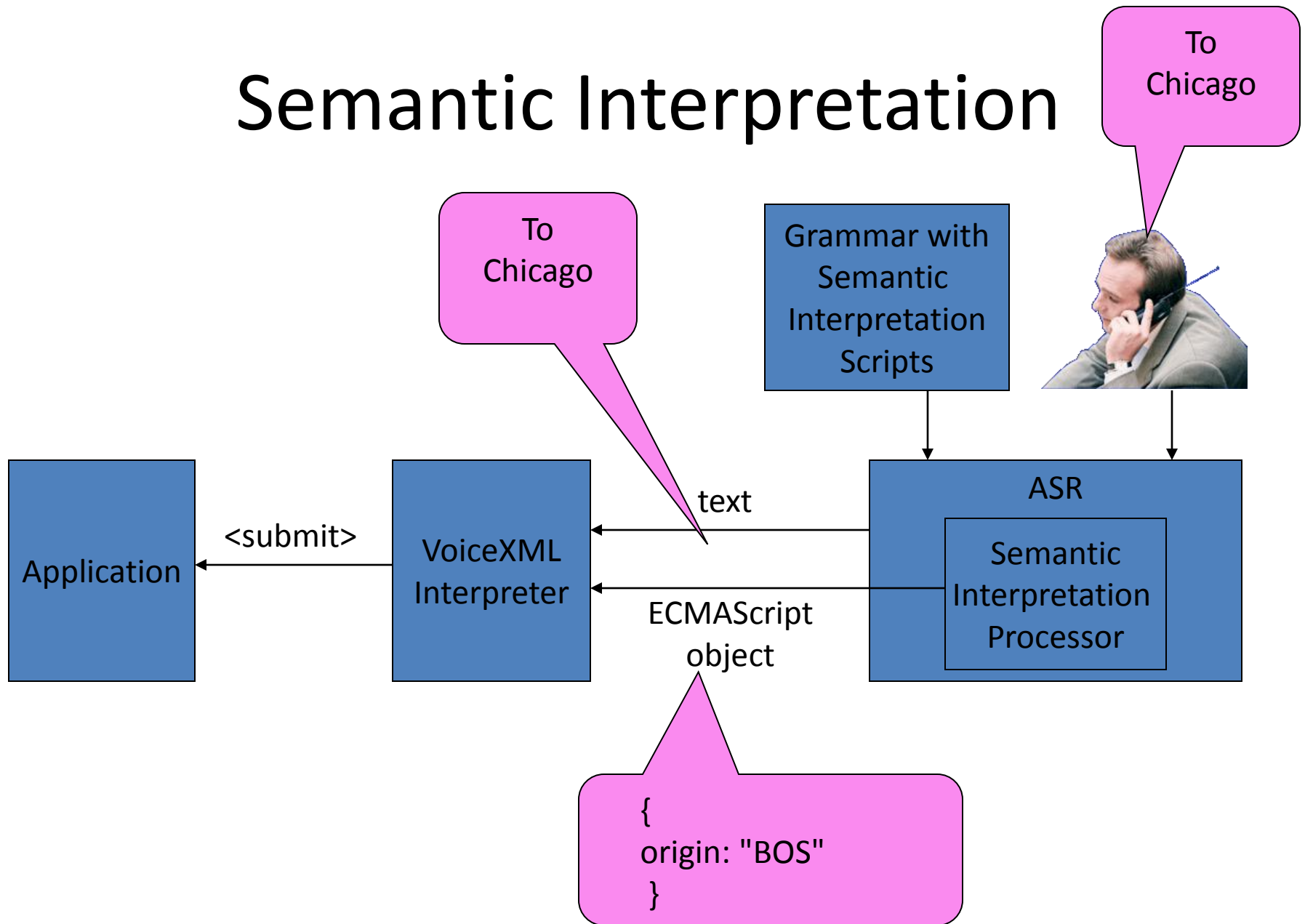
Semantic Interpretation



Semantic Interpretation



Semantic Interpretation

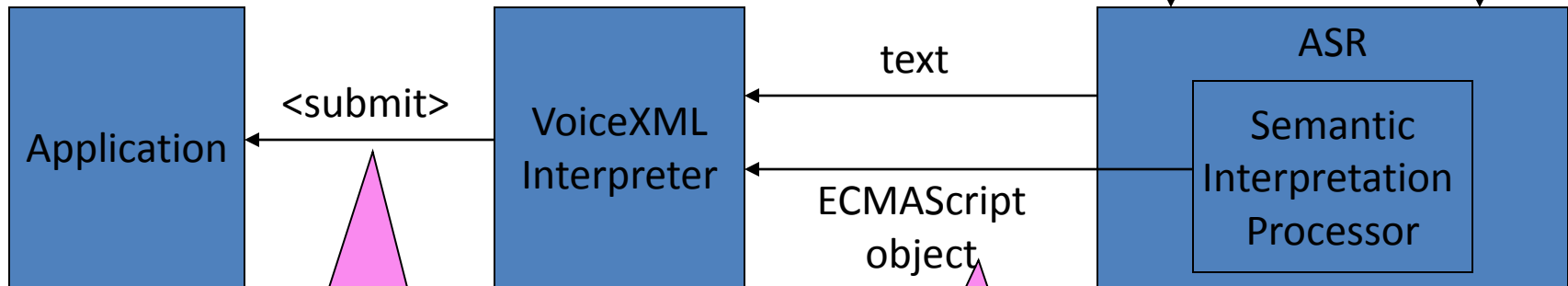


Semantic Interpretation

```
<item>
  from Boston
  <tag>$.from="OHR" tag>
</item>
```

Grammar with
Semantic
Interpretation
Scripts

To
Chicago



```
{
  origin: "BOS"
  destination: "OHR"
}
```

```
{
  origin: "BOS"
  destination: "OHR"
}
```

Resolve Ambiguous Requests

- Consult my user profile and histories
- Ask me if you are uncertain

Resolve Ambiguous Requests: Consult My User Profile and History

User Profile

Preferred airline: United

Travel History

From Chicago to Portland, Maine

From Chicago to Portland, Oregon

I want to fly from
Chicago to Portland



Do you want to fly to
Portland, Maine or
Portland, Oregon?

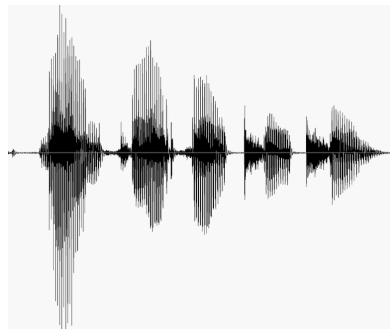
Resolve Ambiguous Requests: Ask Me if You Are Not Certain

I want to fly to Austin



Do you want to fly to
Austin or Boston?

Identify Required Resources

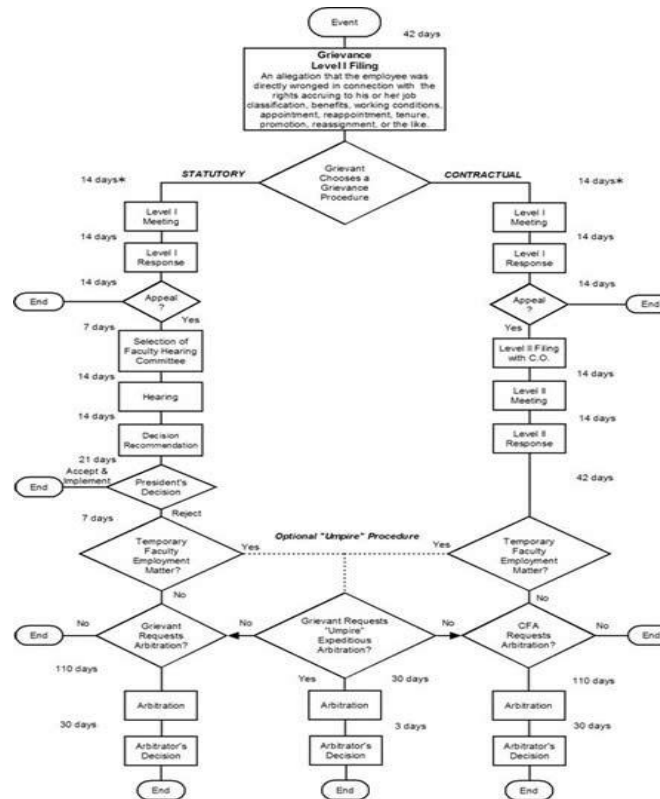


Local Resources

Remote Resources

Perform Required Tasks

- Carry out instructions accurately and efficiently



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Should intelligent agents Listen
and speak to us?

Yes!

And a whole lot more.