

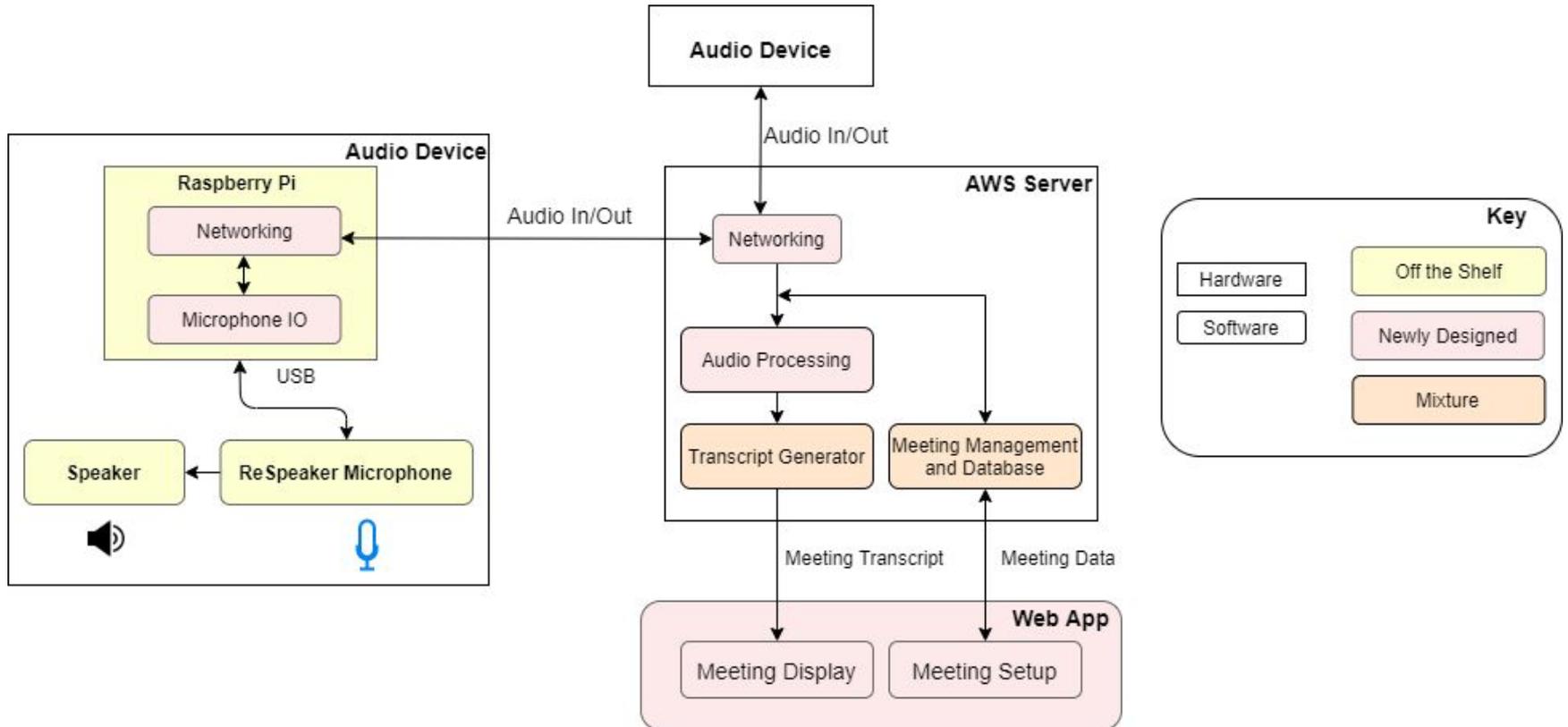
# D6: StenoPhone

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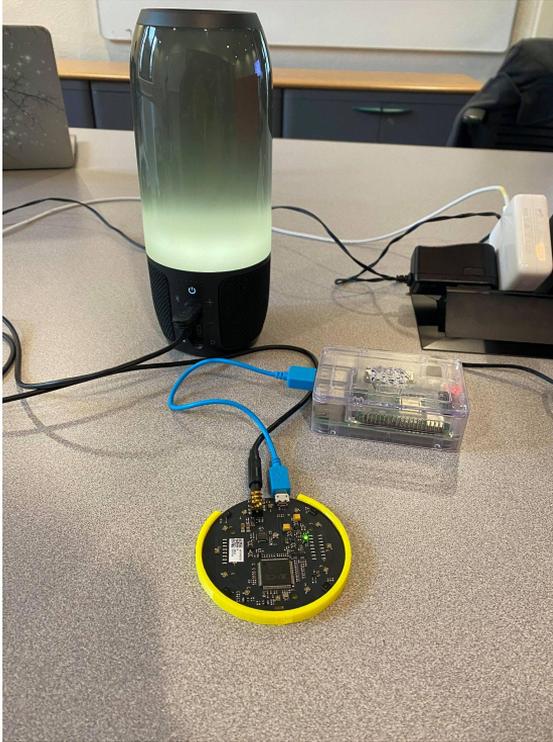
# Application Area

- Application area: distributed team meetings
  - Previous solution: third party transcription plugged into meeting software, transcription capabilities without speaker identification
  - New solution: transcription with speaker identification integrated in meeting hardware and software
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# Solution Approach



# Complete Solution



StenoPhone: Meeting x +

← → ↻ ⚠ Not secure | ec2-18-221-2-198.us-east-2.compute.amazonaws.com:8000/meetings/57/

Apps 📅 Calendar 🔄 CMU SIO 📄 Canvas 📄 Piazza 🔄 ECE Capstone Proje... 📊 Gradescope 🔄 18-335 / 18-732 🔄 18330 🔄 15-4

## Meeting 57

Leave Meeting End Meeting Add Microphone Download

### Transcript:

[p2] okay so now we have a lot of data and I

[p2] I need to fix the speaker okay why don't you explain it

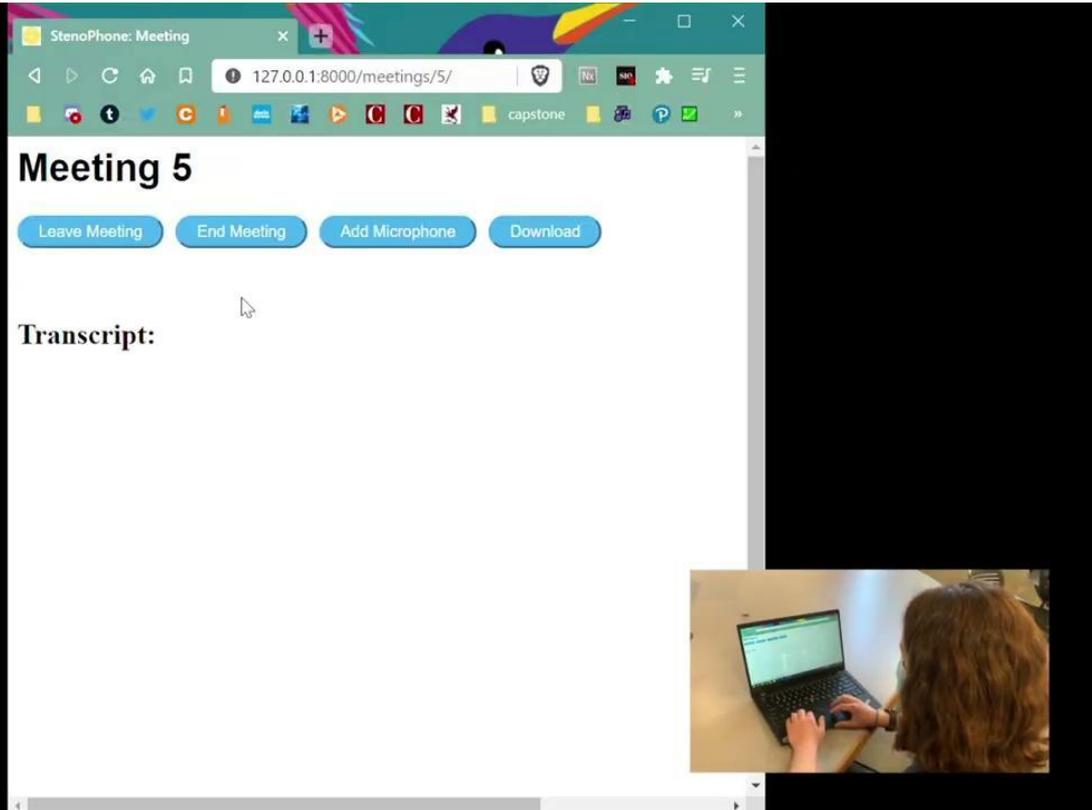
[p2] like it's supposed to

[p2] for every time the audio coming through but it seems to be like only

[p2] Google yeah I think so too

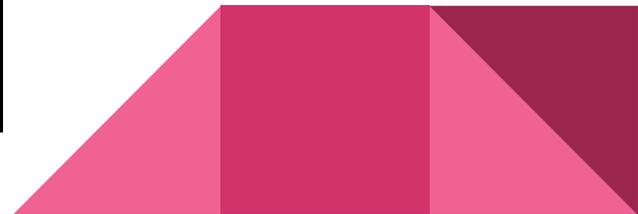
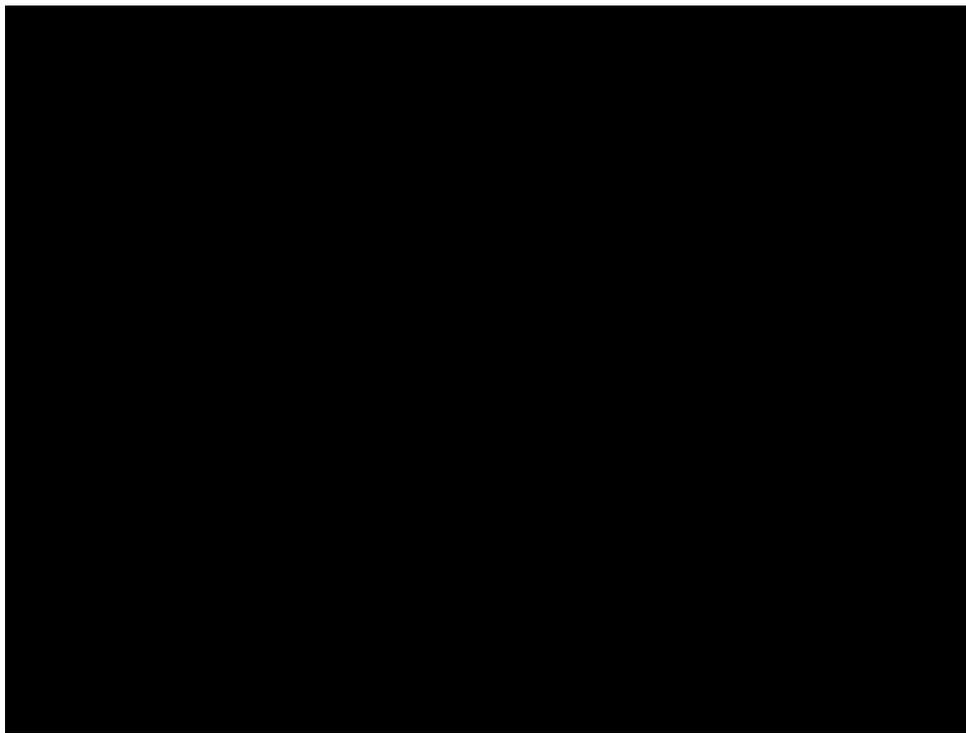


# Setup Demo



The screenshot displays a web browser window titled "StenoPhone: Meeting". The address bar shows the URL "127.0.0.1:8000/meetings/5/". The page content includes the heading "Meeting 5" and four blue buttons: "Leave Meeting", "End Meeting", "Add Microphone", and "Download". Below these buttons is a section labeled "Transcript:" with a mouse cursor hovering over it. An inset video in the bottom right corner shows a person with long brown hair sitting at a desk, working on a laptop.

# Meeting Demo



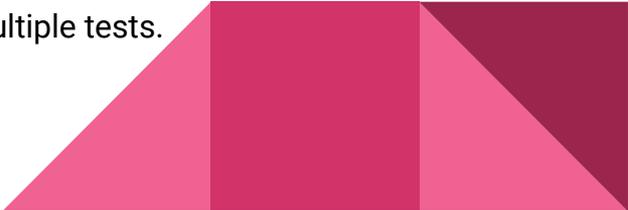
# Requirements and Testing

Requirement	Metric	Test	Results and Tradeoffs
Audio Transmission Latency	Mouth-to-Ear Latency (ms) < 150 ms	Route audio packets through server, to and from same microphone to find RTT	Processing vs inter packet delay <u>Latency &lt;= 30 ms</u>
Audio Quality	Dropped packets (%) < 5%	Count original and final number of packets after transmitting an audio stream	<u>Dropped packets &lt;= .3%</u>

# Requirements and Testing

Requirement	Metric	Test	Results and Tradeoffs
Transcript Latency	Average Word Delay (s) < 3s	Capture timestamp of audio captured by mic and timestamp of packet arrival in browser. 80 samples taken.	<u>Average word delay &lt;= 1.8s</u>
Transcript Accuracy	Word Error Rate (%) < 25%	Check transcript for word error (substitution, deletion, and insertion) after speaking a known text.* 543 samples taken from 4 trials.	Paid services vs open source packages <u>Average WER: 18%</u>

\*100+ words. Well-formed sentences featuring common English words. Constant over multiple tests.



# Requirements and Testing

Speaker Identification Accuracy	Speaker Identification Error (%) < 25%	Check transcript for identification error after conducting a conversation with known contents and speaker switches. 437 samples taken from 3 trials.	Paid services vs open source packages DOA assumptions vs relying on ML <u>Speaker ID Error 12%</u>
Formatting Accuracy (chronology and speaker ID tags)	Formatting Error Rate (%) < 5%	Check transcript for formatting error instances after conducting a conversation with known contents and microphone switches. 400 samples taken from 5 trials.	<u>Formatting error = 0%</u>

# Requirements and Testing

## StenoPhone Result

[P2] oh

[P1] did you manage to get a response from her

[sp 3] yes ↓ did she said she would ↓ be

[sp 3] willing to make ~~other~~ a delivery

[sp 3] in the City to bring us the parts we ~~were~~ want

[P2] great did she indicate a price for the delivery

[sp 3] she is going to charge 50 dollars

[P2] all right I'll speak ~~the~~ with the department to ask for \$50 for the delivery fee

Sample Script (P1, P2 in one room; sp 3 in another room)

[P1] Oh, did you manage to get a response from her?

[sp 3] Yes, I did. She said she would be willing to make a delivery in the city to bring us the parts we want.

[P2] That's great. Did she indicate a price for the delivery?

[sp 3] She is going to charge fifty dollars.

[P2] All right. I'll speak with the department to ask for fifty dollars for the delivery fee.



# Takeaways / Conclusion

- Tradeoffs of python development
  - Challenges of audio streaming
  - Software as a service vs. open source software packages
  - Rewards of project design
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