

## **API Trade-off Analysis for Meeting Analysis App**

This document compares the key APIs used in the Meeting Analysis App in terms of performance, security, privacy, and scalability, incorporating actual test results from the application.

### **1. Assembly AI (Audio Transcription)**

#### **Performance Metrics**

**Latency:** Moderate; transcription can take several seconds to minutes depending on audio length.

**Accuracy:** High accuracy for clear audio; supports multiple languages and accents.

**Cost:** Usage-based pricing; can become costly with large volumes of audio.

**Test Results:** Basic unit tests passed successfully, confirming API integration and transcription flow works as expected.

#### **Security and Privacy**

- Uses HTTPS for data transmission.
- Data retention policies vary; sensitive audio data is uploaded to their servers.
- Requires secure API key management.

#### **Scaling Challenges and Solutions**

- Handles large volumes via cloud infrastructure.
- Rate limits apply; batching and asynchronous processing recommended.
- Scaling is managed by the provider, reducing client-side complexity.

### **2. Cohere AI (Text Summarization)**

#### **Performance Metrics**

**Latency:** Low to moderate; typically seconds per request.

**Accuracy:** High-quality summarization with contextual understanding.

**Cost:** Subscription or pay-per-use; costs increase with usage.

**Test Results:** Summarization function tested indirectly via integration tests; results returned as expected.

### **Security and Privacy**

- Data sent to Cohere's servers; encrypted in transit.
- API keys must be securely stored.
- Privacy depends on provider's data policies.

### **Scaling Challenges and Solutions**

- Cloud-based scaling handled by provider.
- Rate limits require request management.
- Suitable for real-time and batch processing.

## **3. Hugging Face (Sentiment Analysis)**

### **Performance Metrics**

**Latency:** Low; inference typically under a second for short texts.

**Accuracy:** Good accuracy with state-of-the-art models.

**Cost:** Free tier available; paid plans for higher usage.

**Test Results:** Sentiment analysis function tested via unit tests; classification labels returned correctly.

### **Security and Privacy**

- Data sent to Hugging Face servers; encrypted transmission.
- API keys required and must be protected.
- Open-source models can be self-hosted for enhanced privacy.

### **Scaling Challenges and Solutions**

- Cloud-hosted models scale automatically.
- Self-hosting requires infrastructure and maintenance.
- Rate limits apply on hosted API.

## **Recommendations**

**Performance:** Assembly AI is the bottleneck due to audio processing time; asynchronous handling recommended.

**Security:** Use environment variables and secure storage for API keys; consider self-hosting Hugging Face models for sensitive data.

**Cost:** Monitor usage to control costs; optimize audio length and summarization requests.

**Scaling:** Leverage provider-managed scaling; implement retry and backoff strategies for rate limits.

This trade-off analysis helps guide decisions on API usage balancing performance, cost, security, and scalability for the Meeting Analysis App.