Technical Disclosure Commons

May 06, 2019

AUDIBLE EMBEDDED SIDEBAND IN PRINT CONTENT

HP INC

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Title

Audible embedded sideband in print content

Abstract

Accessibility options in printers providing speech processing and text-to-speech conversions, has opened possibilities of adding active voice content to printed media. Users can embed or attach an audible categorized message through options when sending or generating a printout.
This information can be saved with the scan using options or embedded as a machine readable code on the actual printed media.
When printing, this embedded audible content can be used to attract attention to insecure activities by sounding an alarm when copying restricted content or to play an informational message when print data is send to a remote printer.

Description

Introduction of devices like Accessibility Assistant make printers playback capable. These devices are already available in the market. Printed media is considered passive content. The proposed system is to add active data in the form of audible information embedded in print and scan content to be played by the printer/copy device. This solution also enables adding audio security tags that attract attention by playing alerts or alarms.

When print content is created or scanned (see Figure1), the user is provided with options to set the audible side band by the following options:

- selecting from a list of system error/warnings settings or
- recording a message, which would be stored in an **Audio message storage server** or
- type a custom text to be played back

Unique Audio tags are created with respect to the audible message and embedded in the printed media or send with the print job. Method to send the message info with print content can be as a print property information as in a PJL header or a new control message in any print ready language.

The audio tag will be in the following format:

<Tag Header><Sound Tag Type><Payload>

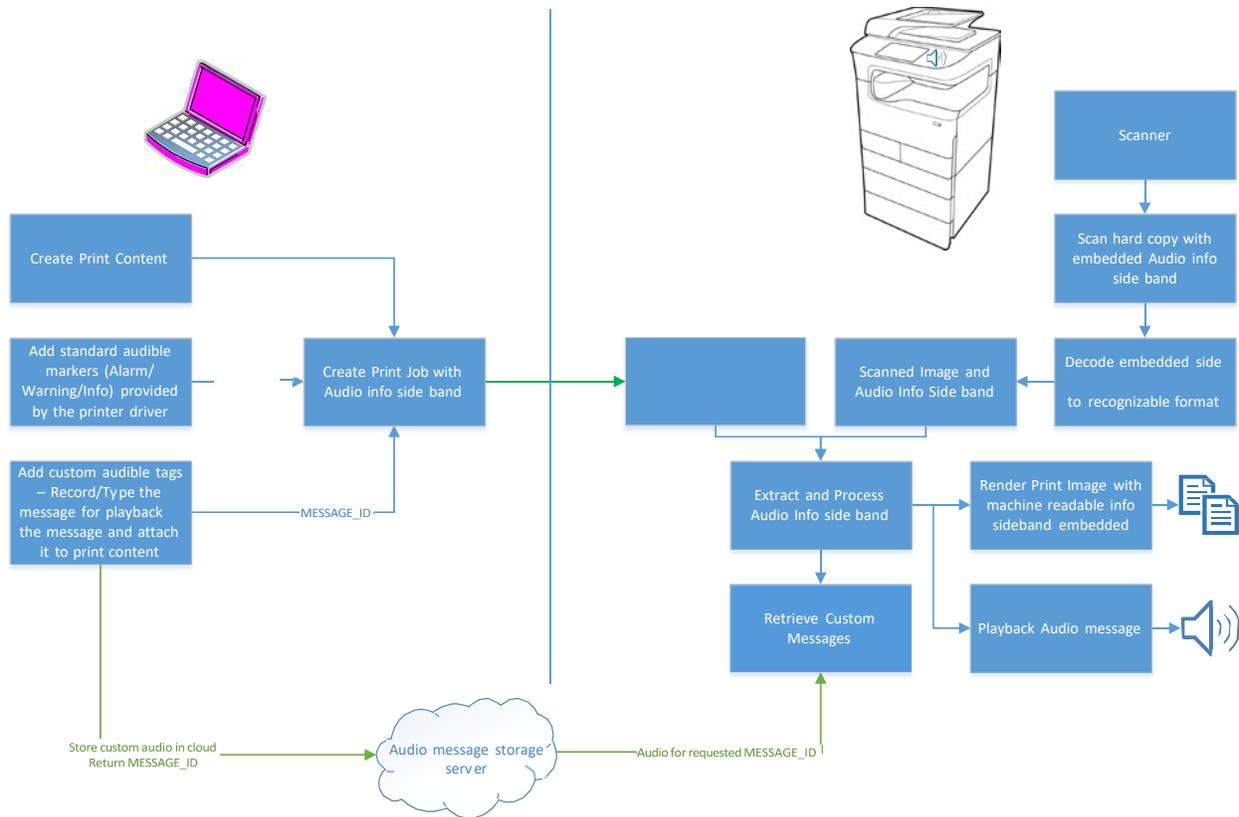| Tag Header	Identification of Tag. This can be extended to other formats other than sound.
Sound Tag Type	System Sound | Text | Custom Audio
Payload	The payload can be different based on the type of tag as follows, • System Sound Id Number OR • Text to be converted to sound OR • Unique Identifier (UID) that could be used to retrieve the custom recorded audio clip from cloud.

Figure 1

Two methods are proposed to embed the Audio tag on a printed content

1. **QR code**

   The tag info outlined above will be transformed into a QR code and can be printed on the margin at a predefined offset of the print content. Upon copy/scan of such a content, the scanned image will be processed. The QR code from the image will be extracted and decoded to obtain the Audio tag info. This info will be handed off to the audio tag handler of the system.

2. **Encoded dots**

   The tag info will encoded into image dots that will be embedded into print content. This method has enhanced security implications. Upon copy/scan of such a content, audio tag info will be extracted and send to the audio tag handler.

When the print job is received or when a copy job is started for such enhanced print content, the audio tag is extracted. The side band information is then decoded.
For embedded critical security messages, a prompt playback of a system set alarm is played back.
The recorded audible messages can be downloaded from the message server for playback when printing content.

Audio Sideband Handler

The audio tag extracted from print content (digital or via image processing of scanned image) will be analyzed.

- If the audio tag is "system sound", then the audio library inside the printer will be indexed to retrieve the audio clip. Play Sound interface of the audio device on board (Accessibility assistant) will be called to play the retrieved audio clip.
- If the audio tag is "text", then the TTS (text to Speech) interface of the audio device on board (Accessibility assistant) will be called to convert Text to audio and playback.
- If the audio tag is "custom audio", then the cloud audio library queried with the UID in the payload to retrieve the audio clip. Play Sound interface of the audio device on board (Accessibility assistant) will be called to play the retrieved audio clip.

Example of use cases are:

1. In banks and other high risk offices, an audible feedback like sounding an alarm when copying sensitive documents can attract prompt attention.
2. Sending photos to loved ones on remote printers with recorded messages that talks about the context of that photo will add value to the printout.

Advantages:
1. Enhances accessibility.
2. Can be used for better security of print content.
3. Enhances user experience with audible feedback that is specific for the print content.
4. Customization capable making this relevant to both home and enterprise printer ecosystem.

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