**3GPP2 CORRESPONDENCE**

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Mr. Sungoh Hwang
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**Re: ALC Protocol for Service Guide Metadata Delivery**

Dear Sungoh,

Thank you for your quick and detailed response to our request for information. Following below are our responses to your requested actions:

**Clarification to Your Three Questions**

1. You mentioned "for its mobile broadcast distribution technology, BCMCS, 3GPP2 made the decision in December 2005 that ALC should be mandatory and FLUTE optional for file delivery, regardless of the file type.", Our question is how ALC is used in BCMCS for file delivery? Do you specify any mechanism for file metadata signaling? May we kindly ask you to provide us with the part of your specification that deals with ALC for file delivery?

Following is the working agreement in the 3GPP2 TSG-C "C.P0070-0 BCMCS Codecs and Transport Protocols" draft specification regarding the use of ALC and FLUTE for file delivery:

"BCMCS terminals shall support Asynchronous Layered Control (ALC) protocol with the following mechanisms to work synergistically with the ESG delivery mechanisms. If any metadata of a BCMCS file download session is available in advance, this should be included as part of the Electronic Service Guide (ESG). If the metadata needs to be updated during the session, then it shall be sent using the ESG delivery/update mechanisms.

BCMCS terminals should support File Delivery over Unidirectional Transport (FLUTE) protocol with the following modifications to work synergistically with the ESG delivery mechanisms. If any metadata of a BCMCS file download session is available in advance, this should be included as part of the ESG. Then in-band delivery of this metadata in FDT is not critical for the consumption of the downloaded content. If FLUTE is supported and metadata needs to be updated during the session, then the metadata shall be signaled in-band of FLUTE session in the form of a new FDT instance.

BCMCS terminals shall support OMA BCAST ESG."

At this time, 3GPP2 has not specified the detailed mechanisms for including the metadata in the ESG.

2. You mentioned “Our preference for ALC was predicated by the belief that in most scenarios, it is more efficient than FLUTE”. Could you please give us clarification on what the term “efficiency” and what “scenarios” refers to in this context?

3GPP2 had determined the following during our investigation of ALC and FLUTE:

- Delivering metadata over the broadcast channel at the time of content delivery can not achieve the same reliability as advanced delivery of the metadata. To improve the reliability of delivering metadata during file delivery requires more overhead.
- The use cases where the system would need to deliver metadata at the time of file delivery are not common.
- The ESG can be used to deliver the file metadata before or during file delivery. If FLUTE is constrained such that it can only deliver the file metadata during file delivery it would always incur the additional resource overhead required for reliable delivery.

Therefore, FLUTE could require the system to always consume more resources to deliver the metadata reliably during file delivery. The system would not be able to take advantage of use cases where the metadata can be delivered in advance which we believe is the most common usage case for file download/delivery over a broadcast system.

Following below is more background on our reasoning:

**Use Cases for Dynamic Metadata Changes**

Downloaded files are generally data that have been taken out of permanent storage and are being placed into another permanent storage. They are static in nature compared to their usage lifetime and it is rare that their metadata needs to be changed between the announcement of the distribution time and the actual download.

**Cost of Sending Metadata During Content Delivery**

It is costly to the system and terminal battery to dynamically update metadata at the time of file download.

Updating metadata at the time of file delivery places a very tight time constraint on when the metadata has to be received error-free at the terminal. When a terminal misses an FDT or receives it in error the terminal has to consume more battery power decoding the broadcast channel, waiting to finally receive another FDT error-free.

The solutions to mitigate this problem such as frequently repeating the FDT to compensate for missed or improperly decoded FDTs increases bandwidth usage. The FDTs would have to be repeated frequently to reduce the time the terminal actively decodes the broadcast channel to receive an error-free FDT. The frequent repetitions of the FDT consume more bandwidth. Furthermore, closely spaced FDT transmissions lose the benefit of time-diversity across the wireless channel. A terminal in poor geometry (edge of the cell, temporary shadowing) may not be able to receive any of these rapidly repeated FDT’s error-free because they are all sent so close together.

**Sending Metadata in Advance of File Delivery**

Sending metadata in advance of the actual file delivery allows the system to take advantage of a longer delivery window to send the metadata to the terminal. The system does not have to quickly repeat transmission of the FDTs and can make better use of time diversity to space out transmissions. Thus, the number of times the FDT needs to be repeated for such a case can be significantly less than when updating the metadata during the file download, and therefore use much less bandwidth.

For example, an advanced FDT could be sent 10 times over a span of 2 hours before the file is downloaded. On the other hand, sending the FDT every 4 seconds during a file download that takes 2 minutes and is repeated 5 times would require that the FDT be sent 75 times during the 10 minute download window.

3. You mentioned “to allow only FLUTE for SGDD delivery, will negatively impact BCMCS”. In the context of broadcast delivery of Service Guide we would like to ask your clarifications on what the negative impact of using FLUTE is, i.e. adding the FDT to an ALC session which carries Service Guide Announcement information?

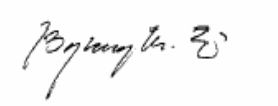
The negative impact discussed for file delivery above extends to the Service Guide delivery.

**Snapshot, Timeline and Schedule of Specification**

A snapshot of the relevant section of C.P0070-0 dealing with ALC and FLUTE was identified in the answer to question #1 above. The planned publication date for this specification is November, 2007.

Please let us know if you have more questions regarding this issue.

Regards,



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