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| *Title:* | **On profiling** | | |
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# Abstract

This document proposes to generate a profile with no specific parallel processing tools, preferably by removing the inclusion of tiles from the current Main profile.

# Introduction

It is generally agreeably that single-core decoders in the near future would be able to decode large bitstreams of spatial resolutions, hence parallel decoding is not in a great need. An HEVC profile with no specific parallel processing tools would allow for lower-cost and lower-complexity decoder implementations, which are particular important for mobile terminals.

Currently, the Main profile includes both tiles and wavefront parallel processing (WPP). For decoder implementations, WPP doubles the pstate/valmps table, and adds control logic to save/restore the table. There would also be some additional development cost and verification cost. Tiles adds much more implementation complexities and costs, including the introduction of the need of column line buffer when vertical tiles are in use, control logic (especially in in-loop filters) becoming complicated, requirement of additional fetching and storing couple of coding tree blocks worth of local data. The verification and development costs for tiles would also be considerably high.

It is possible to avoid to avoid column line buffer if the decoder is implemented in a way to process tiles in coding tree block (CTB) raster scan order of the picture, but then the bit stream processing becomes complex because either

1. Decoder have to save/restore the bit stream pointers at the beginning of every tile when there are vertical tile boundaries, and decoders have to switch between many bit stream pointers when there is at least one non-picture-boundary vertical tile boundary and there are many tiles.
2. Decoders have to parse the bitstream in bitstream order much ahead of decoding and store the parsing results in memory, adding to bandwidth and latency penalty for single-core decoders.

Another point also to be made is that, for those applications where the parallel decoding is not needed, unless the use of tiles is mandated, a decoder has to support the bit streams created by with only one tile in each picture. Therefore, the inclusion of tiles in a profile does \*not\* help the decoders and only increases the complexity with no benefit for the decoders. Their inclusion then becomes mainly an encoder side option (as decoder has to decode the bit streams that do not use them, anyway). Encoder can use one of the many (including tiles and others) parallel processing approaches without requiring decoder to also support them.

On the other hand, if the use of tiles is mandated then that will force everyone to fit in a certain architecture of design (on both encoder and decoder sides). Plus, it will also impact the visual quality and coding efficiency. Therefore, if some applications must have tiles then separate profiles should be created, one that mandates tiles and other that does not. In this case, the scenarios where the interoperability between those two profiles is required, the products will implement both the profiles - as it is done today to support multiple codecs (and profiles).

Therefore, we would prefer to use a profile in our products without having to support tiles and WPP. Note that without tiles and WPP, parallel encoding and/or decoding, if needed, is still possible, e.g., by using slices.

On the other hand, we acknowledge the following:

1. In general it is always better to have fewer profiles for better interoperability and less fragmentation among different domains.
2. Improved parallel encoding is sometimes desirable.
3. The additional implementation complexity and cost are relatively minor for WPP.

# Proposal

Based all reasons expressed above, we propose to drop the inclusion of tiles from the Main profile.

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