Tessellation Run Length Encoding (TRLE) Technology

NXP®'s software for tesssellation run length encoding (TRLE) technology provides an efficient, lossless image compression that leverages the high-performance i.MX 3D GPU while minimizing memory and bus bandwidth requirements.

TRLE technology enables the highest quality graphics without overtaxing system resources. This software product is offered through NXP Professional Services.

WHY CHOOSE TRLE?

TRLE image compression is ideal for applications requiring detailed high-quality 2D graphics in a 3D scene.

▸ Perfect for graphics intensive interfaces such as automotive instrument clusters

▸ Pixel-accurate 2D compression perfect for computer-generated graphics

▸ Advantage over standard RLE due to parallelism and much higher decoding performance

▸ Leverages 3D GPU hardware for faster, on-the-fly decoding and rendering

▸ Reduces graphics memory and bus bandwidth requirements

FEATURES

▸ Patent-pending compression technology

▸ Utilizes tessellation of geometry from input image for lossless compression

▸ Leverages 3D graphic engines for decompression

▸ Smaller overall RAM size and memory bus bandwidth requirements

▸ Supports animations and atlas generation
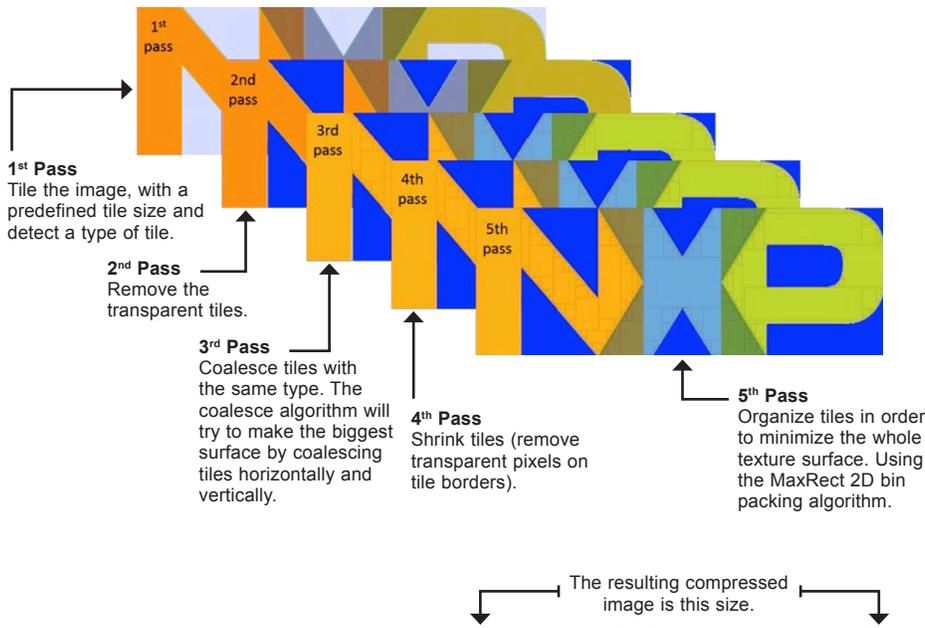
▸ Up to 9x compression of textures for lower storage costs

Example with the NXP® logo representing the original image

This image is passed through the encoder 5 times:

1st Pass
Tile the image, with a predefined tile size and detect a type of tile.

2nd Pass
Remove the transparent tiles.

3rd Pass
Coalesce tiles with the same type. The coalesce algorithm will try to make the biggest surface by coalescing tiles horizontally and vertically.

4th Pass
Shrink tiles (remove transparent pixels on tile borders).

5th Pass
Organize tiles in order to minimize the whole texture surface. Using the MaxRect 2D bin packing algorithm.

The resulting compressed image is this size.

Rendering a 1920 x 695 image using the compression algorithm on the i.MX 6Quad applications processor:
• Average frame rate: 193 fps
• Average bandwidth used: 2,500 MB/s

Rendering a 1920 x 965 image WITHOUT compression on the i.MX 6Quad applications processor:
• Average frame rate: 123 fps
• Average bandwidth used: 3,000 MB/s

Savings gained by using NXP's TRLE software:
• ~500 MB/s of bandwidth and 70 fps
• Up to 750 MB/s if using a full HD image

Business Model

NXP's TRLE software follows a simple business engagement model. A development license which includes a block of support hours is required to get your development started, followed by a production license when you are ready to go to market. In addition, NXP offers professional support and engineering services to assist with the integration of TRLE in end products and application, as well as customizations and optimizations specific to the targeted system.

For more information or to obtain your TRLE development kit, please visit **www.nxp.com/TRLE**.