

RL compression for volume data

Master thesis overview

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Outline

- Goals
- Algorithms
- Application

Goals

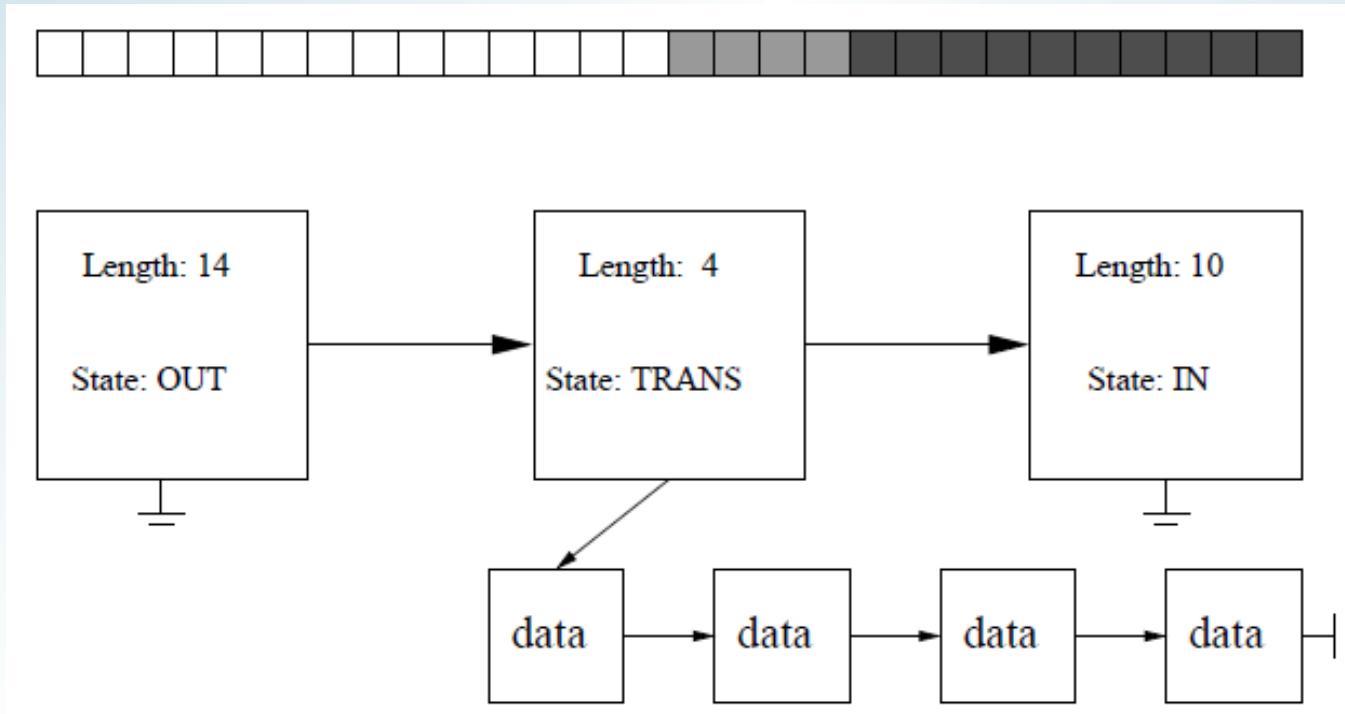
- Run-length compression algorithm for volume data
- Rendering algorithm for RL compressed data
- Implementation into Visualization engine
- Platform independent (source)

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Algorithms – Compression

- Volume data compression
 - Run-length encoding
 - 1D example

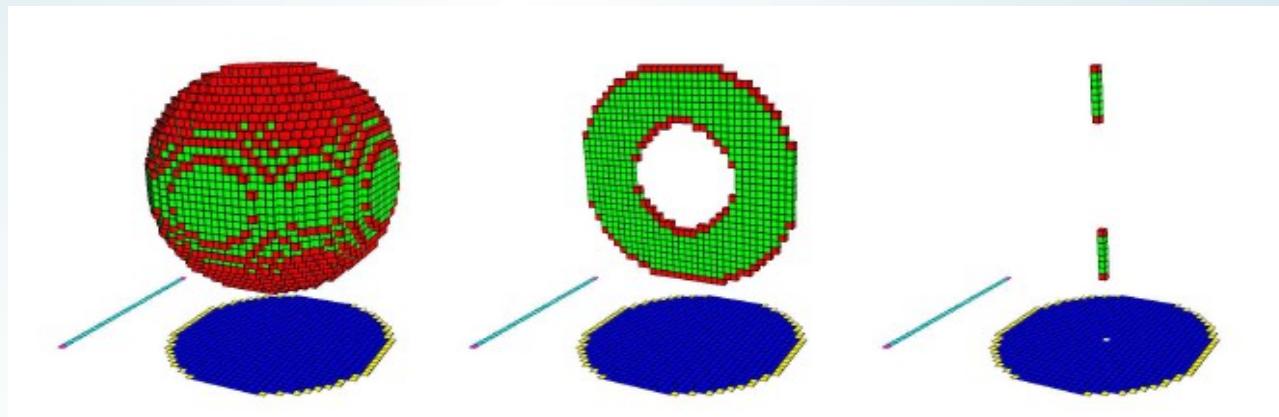


Algorithms – Compression II

- Data structure representation
 - Static
 - Dynamic
 - Editable trans. voxels
 - Editable all voxels
 - Voxel editing
 - Row editing

Algorithms – Compression III

- Volume data compression
 - 2D & 3D run-length encoding
 - Recursively defined using 1D RLE
 - DT-Grid, H-RLE level set
- Not efficient for every volume



Algorithms III – Rendering

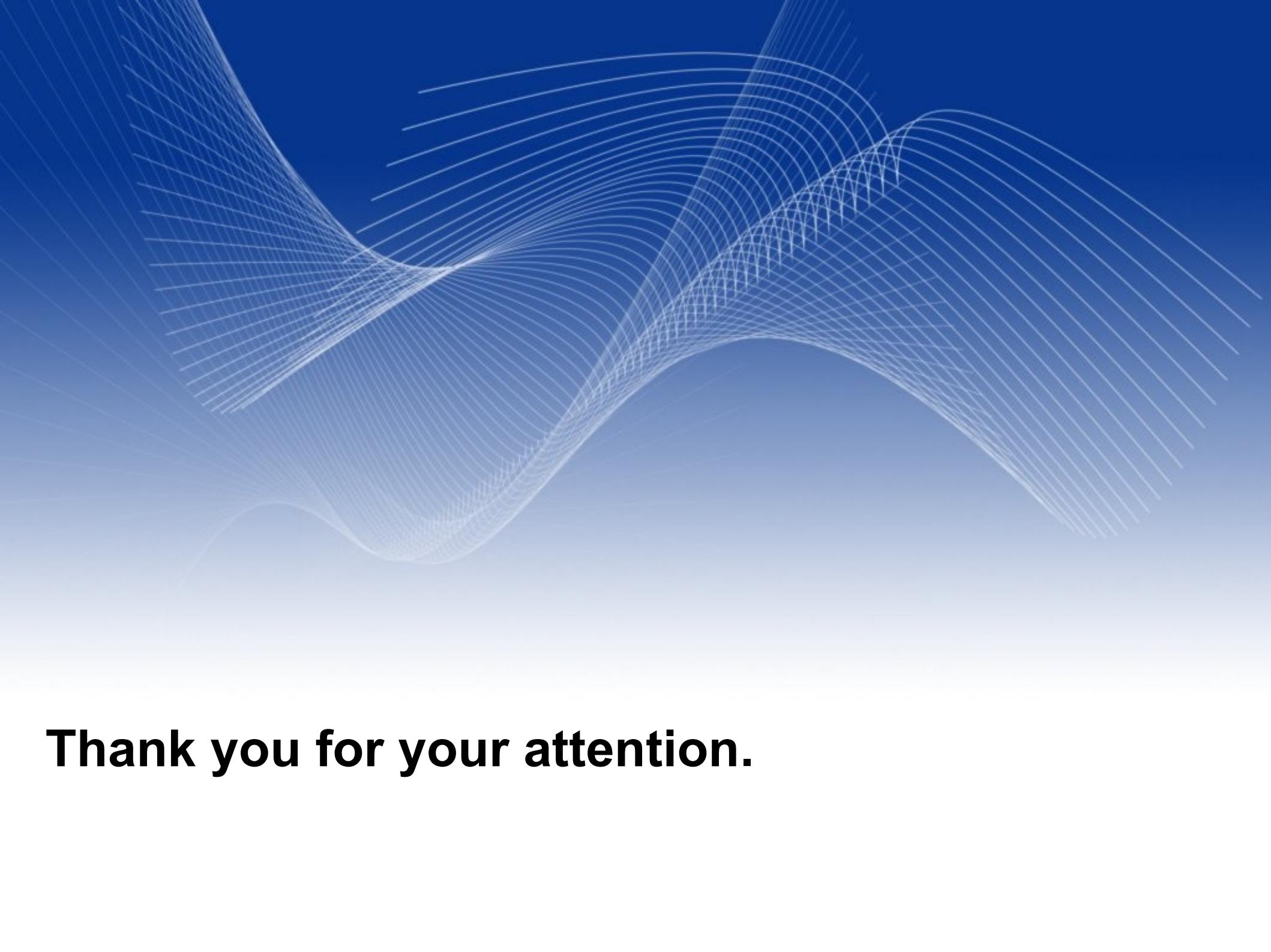
- Rendering based on ray-tracing
 - Adapted on RL compressed data
 - Different types of volumes
 - Acceleration technique (distance transform)
- Possible implementation on graphics cards GPU (GLSL, Cg, CUDA)

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Application

- **Visualization engine**
 - Loader, builder, renderer
 - RL compression algorithm as builder module
 - Ray-tracing renderer as renderer module
 - Loading from raw file, f3d file (flag)

The background of the slide features a minimalist design with a blue gradient. Overlaid on this are several thin, white, wavy lines that create a sense of motion and depth. These lines are more concentrated in the upper half of the slide, forming a dynamic pattern that tapers towards the bottom.

Thank you for your attention.