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**
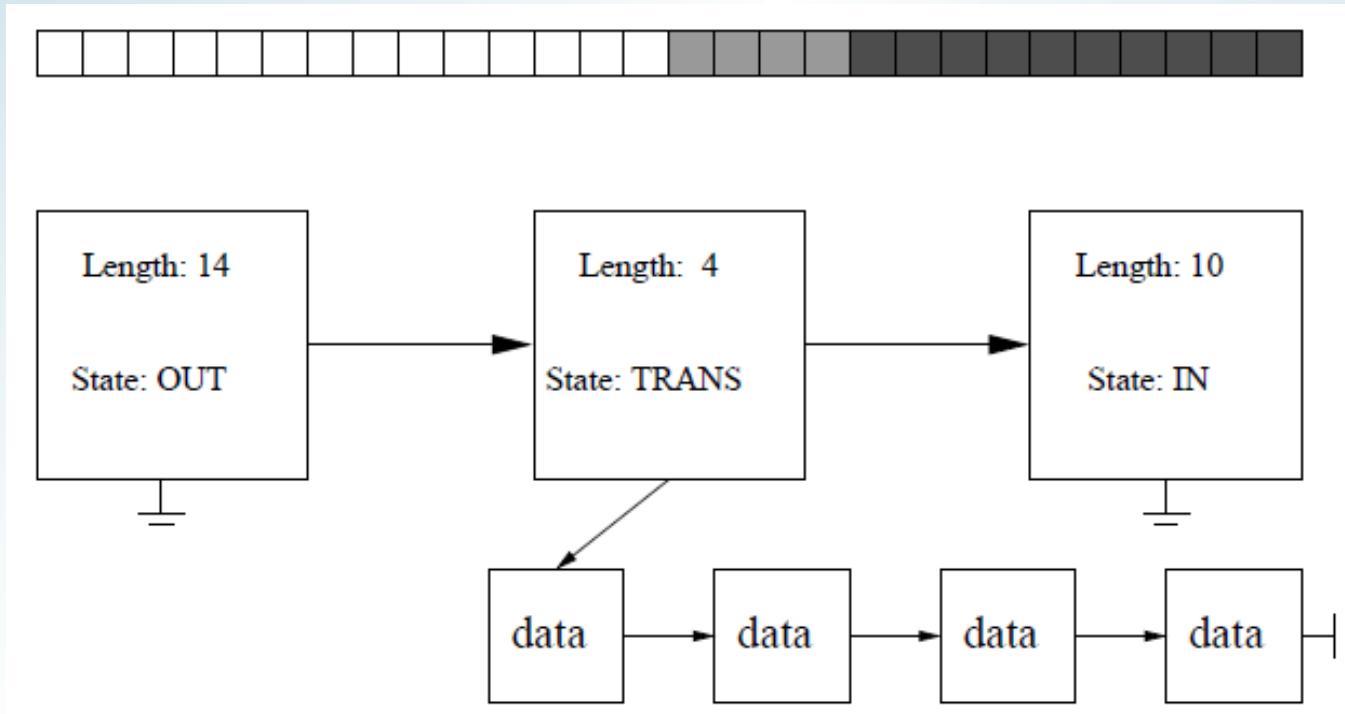
Algorithms – Compression II

- **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**
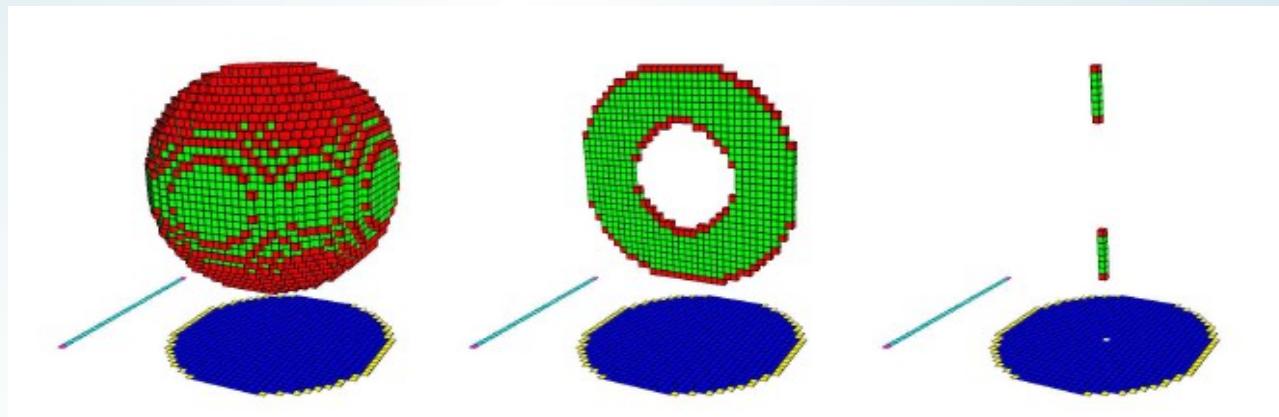
Algorithms III – Rendering

- **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)**
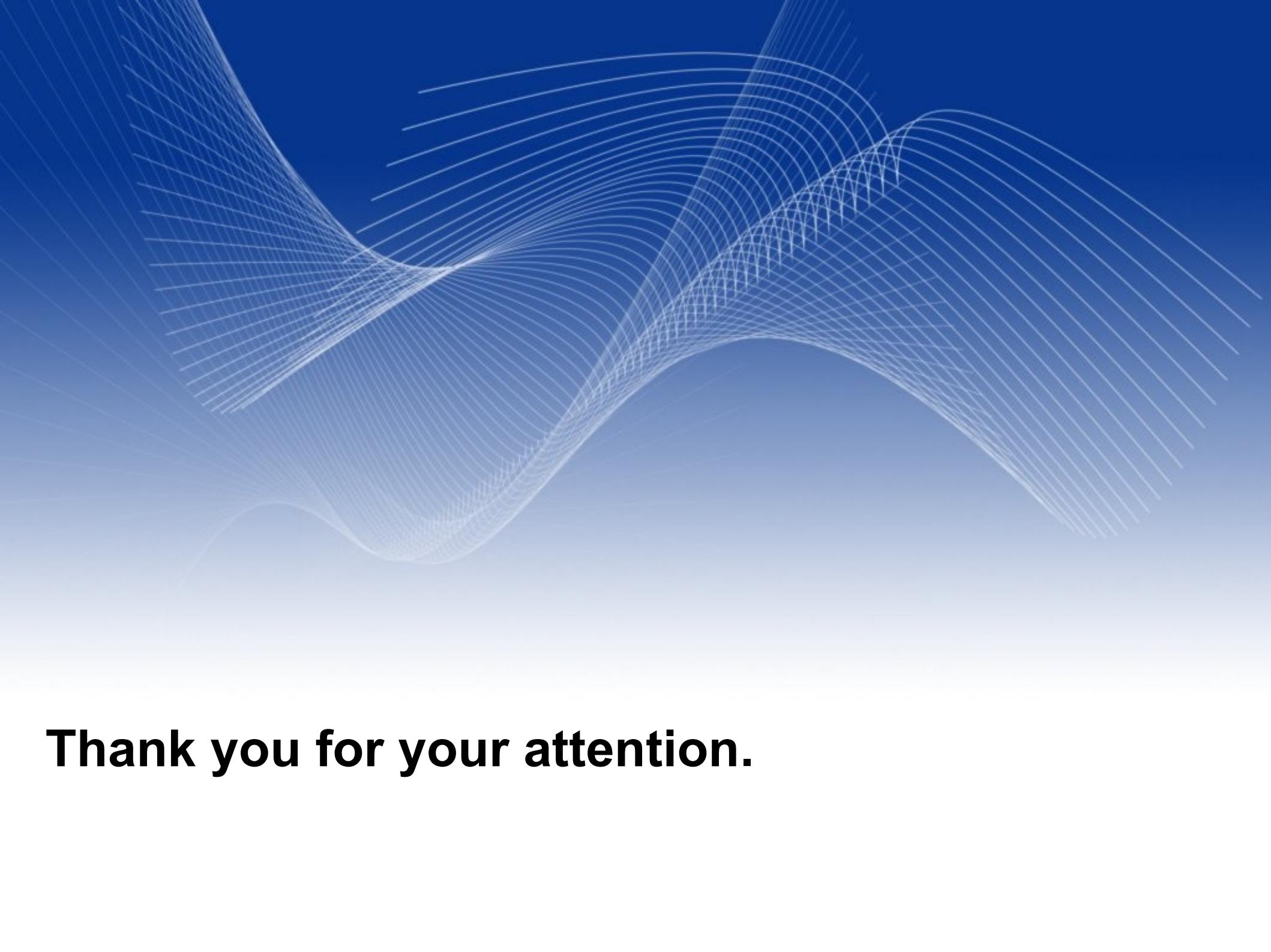
Thank you for your attention.