

# Data-Parallel Transcoding for 3D-Internet

Master's Thesis Kickoff Presentation

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- Administrative Setup
- Business Vision of 3D Web Based Lifecycle Collaboration Platform
- Problem Definition
- Approach
- Challenge's and Research Questions
- Thesis Workplan

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# Business Vision of 3D Web Based Lifecycle Collaboration Platform

- Use the Digital Mockup (DMU) as key entry point and reference to support communication, collaboration and data exchange
- Develop A web-based collaborative engineering environment that :
  - Integrates different engineering domains.
  - Allows engineers to have different views for the same 3D model



## 3D Conversion

- Convert 3D models from different tools to a browser readable format (X3D)

## 3DWeb Resource Generation

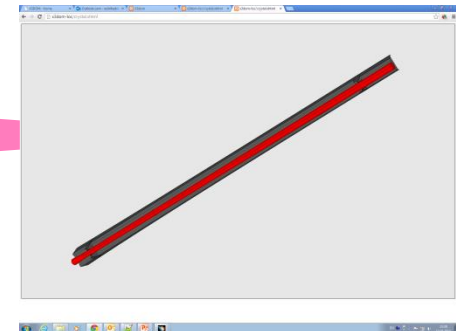
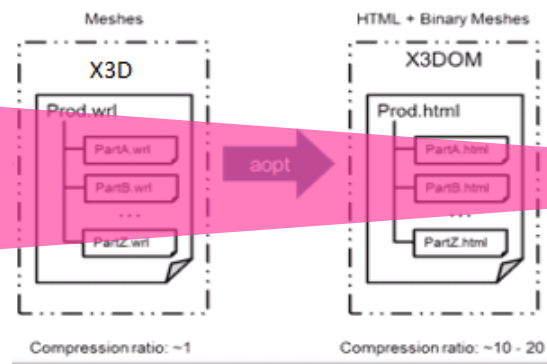
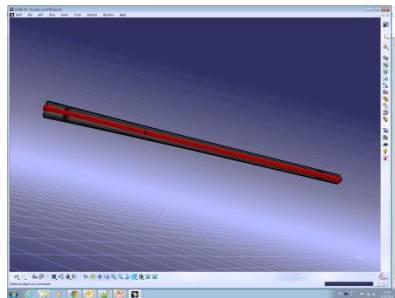
- Process the X3D file and generate a web resource for each shape in model

## Build Graph

- Build A hyper linked graph of Web3D resources

## Publish

- Publish and share the graph over the internet



- There are many Digital Content Creation (DCC) tools in the market.
- These tools are:
  - very expensive.
  - Proprietary formats
  - Limited availability in organization
- Each department use its preferred tool for Building 3D models.



AUTODESK  
MAYA

This leads to :

- Inefficient communication between engineers
- Limited access
- Inconsistencies of data sets! >> Inconsistencies of results



Since our interest is to reduce the processing time of a single model, .... a data-parallel approach seems to be a good choice.

## Approach Steps

1. Prepare the X3D file for processing.
2. Partition the file into small chunks.
3. Build MapReduce environment
  - Create a binary representation for each 3D part.
  - Create a web resource for each part.
4. Generate hyperlinked graph of Web3D resources.
5. Integrate the generated graph into X3DOM.

## Technology Used



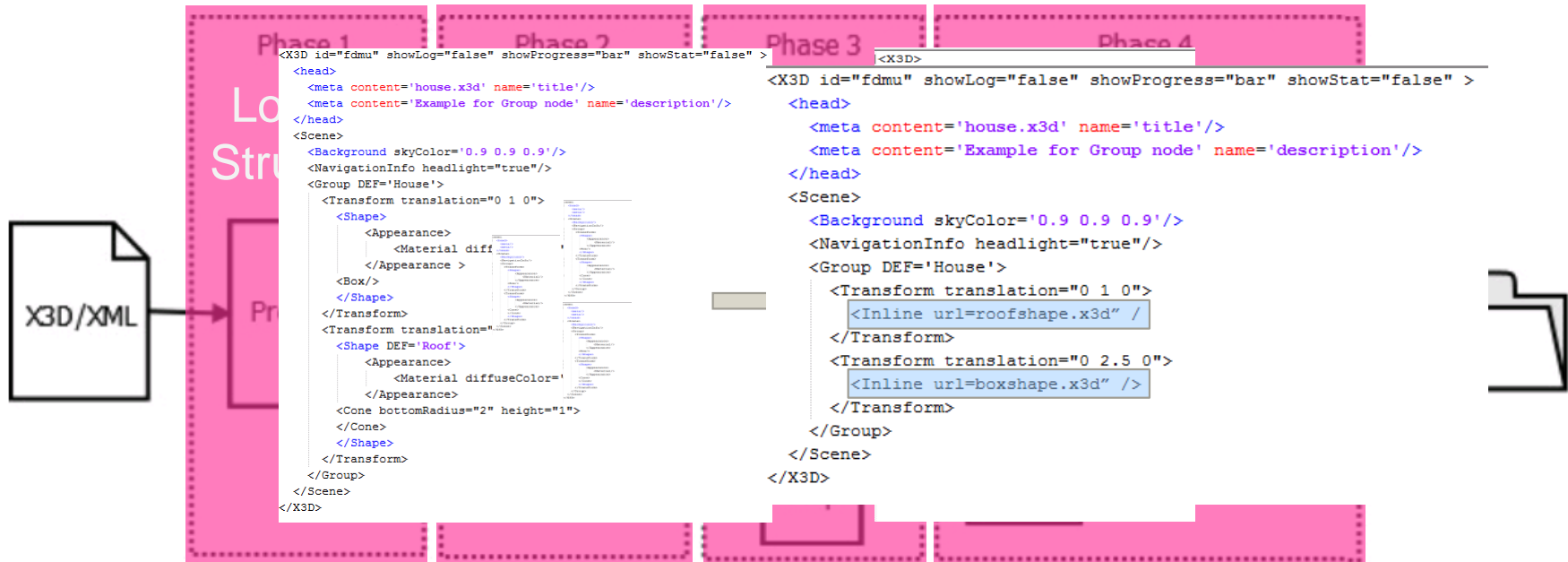


Figure 1: Data-parallel Transcoding Architecture



1

- Usually 3D model files are very large 1+ GB

2

- Processing and optimizing the 3D model will be slow.

3

- loading the 3D model into the browser will be very slow

4

- Low Performance of 3D interaction in web-browser

5

- What are the best data-parallel approach to transcode X3D/XML ?

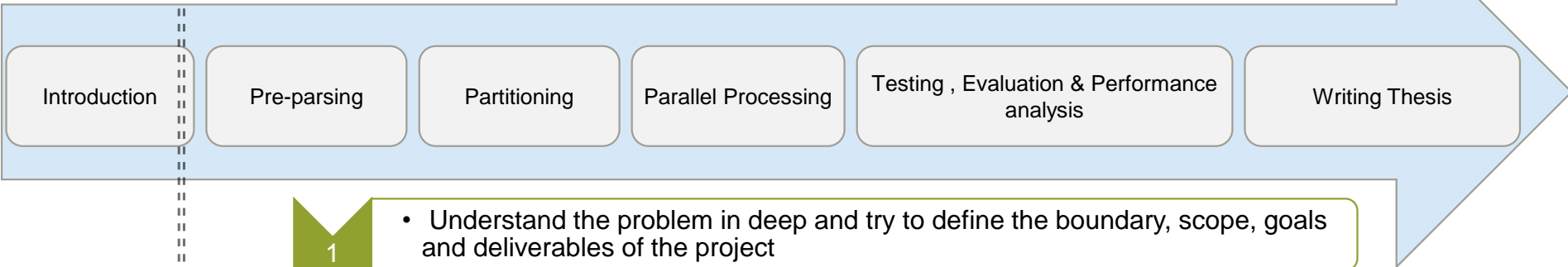
6

- How to partition X3D files ?

7

- How to Parse X3D files in parallel ?

## Activities



- 1 • Understand the problem in deep and try to define the boundary, scope, goals and deliverables of the project
- 2 • Prepare a logical structure (**skeleton**) of the 3D model
- 3 • Partition X3D file according to its skeleton
- 4 • Use Map-Reduce model to process XML files in parallel  
• Create web-resource for each part in the 3D model.
- 5 • Run the system with different configuration (number of cores, clusters , model size ) and report the performance and efficiency of the system .
- 6 • Start writing the thesis report and prepare for the final presentation .



# Questions?



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