WGLRAD - A windows opengl - raytrace viewer for Radiance
8th International RADIANCE Workshop

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Former work

- Simulation commercial packages
- Architectural images
- Using photometric data
- Not special equipment to measure materials
- Recent work at university and later
modelo

- Terminales fibra óptica VFG 1605-1615
- Dañadores de pared QDR600 20x20
- techo palcos
- soffits palcos
- antepechos
- Barra de cristal-luz RSL130 techo
- Proyectores PAR56 techo
- Fluorescencia lineal de relleno conchas RENNES 996
- Downlights MBN 210 75/150W
Goals
More control & flexibility in software
More accurate software
Light & Material simulation
Similar performance

Inconvenients
Amateur programming
Modifying code
Very complete packages in market
Radiance command line oriented

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Several utilities

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ies2dxf
Several utilities

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event-driven

**Rview** recursive function that check events

**WgIrad** event-driven message based

External process calculation to avoid gui collapse

Messages $\rightarrow$ ray packets through sockets

Allow remote and cluster calculation
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1. OpenGL converted by glrad routines
2. OpenGL Sended progressively as mesh
   - Ordered by area
   - Limit geometry by graphics hardware
   - Light mapped
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Process

1. Client connects and ask for a project
2. Server returns opengl model
3. Server divides total calculation projects between display clients
4. Clients sends a view
5. Server sends packets to calculation nodes to raytrace
6. Server sends back the calculated rays to display clients compressing information
Integrate glrad
Achieve interaction
OpenGL transmitted at the beginning | through streaming

Keyboard controls
F1: Show/hide help message
Z: Zoom Extension
I: Modo acercar/alejar
O: Modo Orbital

Mouse controls
Dragged: Mover o Orbitar
Recursive vs Ordered

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Redistribute calculation

recalculate each add/remove client

<table>
<thead>
<tr>
<th>6 calculation nodes</th>
<th>10</th>
<th>5</th>
<th>4</th>
<th>2</th>
<th>8</th>
<th>4</th>
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<td>3 display clients</td>
<td></td>
<td>11 per cl</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1st client</td>
<td>10</td>
<td></td>
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<tr>
<td>2nd client</td>
<td>11</td>
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<tr>
<td>3rd client</td>
<td>13</td>
<td></td>
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</tr>
</tbody>
</table>

Divides available calculation power between current display clients

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Data format

1. **OpenGL** information
   - mesh as **file**
   - mesh **streaming**
     - *wglrad* send the three vertex for each triangle doesn’t use vertex indexes
     - triangles (uv coordinates, vertex, normal) ordered by area

2. **Raytraced** information
   - packets of rays containing each packet the view number and the rays
   - rays **not calculated** → node an integer to define the node and the origin and direction as 6 doubles
   - rays **calculated** → radiance color (4 bytes) and an integer for the node
Message types

- **Display nodes messages**
  - Project
  - View
  - Parameters change
  - OpenGL messages
  - Ray packets

- **Calculation nodes messages**
  - Project identification
  - Ray packets
  - Kill calculation (new view or new project)
  - Flushing
  - Parameters
WgIrad in action 2

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Load model with name

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Control Files

1 Server
- one line per project
- name of the project and route to the geometry mesh file

2 Calculation Nodes
- one line per project
- name of the project, number of processors, radiance rtrace parameters, route to the oct file

3 Applet
- parameters: project name, ip server, gamma, exposition, interior | exterior, english | spanish
Available Interactive tools

Cylindrical – Spherical panoramas
Opengl mapping (Lightmapping with Radiance )
Rholo – rview
wglrad
Panoramic
Opengl mapped video
Interactive viewer

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Thank you

Any Questions?