What’s new in the virtual world?

XDC 2018

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Collabora
Summary

• What is virgl?
• Evolution of virgl through the year.
• The infrastructure, GitLab and CI.
• Plan for the future.
• Q&A and discussion.
What is virgl?

History

- Dave Airlie side project.
- Virtual 3D GPU for QEMU.
- Security in mind.
- Base on Gallium architecture.
- https://www.youtube.com/watch?v=rPeMrmeLTig

- Reach production level.
What is virgl?

Stack

Guest

- Kernel
  - virtio-gpu

Host

- QEMU
  - virtio-gpu
  - virglrenderer

- Application
  - virgl

- OpenGL
What is virgl?

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What is virgl?

Resource allocation (part 1/2)

- Guest virtio-gpu driver allocates resource.
- Guest driver creates resources (RESOURCE_CREATE_*).
- QEMU or virglrenderer creates host resource.
- Guest sets up backing storage (RESOURCE_ATTACH_BACKING).
- QEMU creates a iovec for the guest resource.
What is virgl?

Resource allocation (part 2/2)

- Guest writes data to resource.
- Guest requests a transfer (TRANSFER_TO_HOST_*).
- QEMU or virglrenderer copy data from guest resource to host resource
- Guest can use the resource. \o/
Project status at last XDC

• OpenGL 3.0 support.

• OpenGL backend only.
Current status

- OpenGL 4.3 support.
- OpenGL ES 3.2 support.
- OpenGL and OpenGL ES backend.
  - Require SDL to create the GLES context.
Current status

- GLES 2 on GL and GLES: 0 failure.
- GLES 3 on GLES: 3 failures.
- GLES 3.2 on GL and GLES: 0 failure, 3397 not supported.

- State leaks when we randomized the CTS.
Current status
How did we achieve these results?

• Heavy use of host GPU features inside the guest.
  – Caps initialized at launch.
• Workarounds for OpenGL ES.
  – Modify shader header.
  – GLES doesn’t support glDrawBuffer...
• Add formats support.
Debugging

• Where the f*%&% is my issue?
# Performance on Kabylake

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Host</th>
<th>QEMU guest</th>
<th>Vtest guest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unigine Valley (1024x768, Q:High, AA:2x)</td>
<td>31.4 fps (17.9, 47.9)</td>
<td>1.0 fps (1.0, 1.5)</td>
<td>12.3 fps (8.4, 17.5)</td>
</tr>
<tr>
<td>Unigine Heaven (1024x768, Q:High, Tess: Normal, AA:2x)</td>
<td>37.3 fps (8.3, 64.1)</td>
<td>2.1 fps (1.5, 3.9)</td>
<td>13.4 fps (5.8, 24.9)</td>
</tr>
<tr>
<td>Gputest Pixmark Piano Windowed: 1024x640</td>
<td>7 fps</td>
<td>6 fps</td>
<td>6 fps</td>
</tr>
</tbody>
</table>

The infrastructure

- Easy use of Freedesktop GitLab.
  - Pull request.
  - Bug report.
- Still have some discussions over the ML.
The infrastructure

• CI in progress
  - https://gitlab.freedesktop.org/virgl/virglrenderer/merge_requests/13
Plans for the future

- Release and improve the CI.
- Fix the remaining Piglit/CTS failures.
- Improve security of the project.
- Add coherent memory.
Plans for the future

• Vulkan support.
  – Started by Nathan Gauër, GSoC student.
  – https://github.com/Keenuts/vulkan-virgl
Demo

- What is a talk without a demo?
Join the party

- [https://gitlab.freedesktop.org/virgl/virglrenderer](https://gitlab.freedesktop.org/virgl/virglrenderer)
- [#virgil3d](https://gitlab.freedesktop.org/virgl/virglrenderer)
- [virglrenderer-devel@lists.freedesktop.org](mailto:virglrenderer-devel@lists.freedesktop.org)
UMMM, YES I HAVE A QUESTION...

WTF?
Thank you!