

Updates on UltraGrid Platform

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Talk Overview

Development Status

Rendering

Compression

MacOS X

Latency

2K Support



Development Status

- Production release
 - released Feb 20, 2008
 - MacOS X sender support
 - extended display support
 - DXT compression support
- Development branch
 - assumed release – mid-May 2008
 - improved support for MacOS X as receiver
 - support for 2K video
 - working on compatibility with iHDTV





Development Team

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Rendering Options

- through capture/playback card
 - can provide greater color depth (10b)
- software displays
 - X11 – useful for debugging
 - Xv – currently not maintained
 - SDL and OpenGL
 - preferred ways
 - support for down-scaling

Rendering Options

- SAGE display
 - modes
 - enlarging one window
 - rendering more windows
 - UltraGrid can use OpenGL to do rendering (e.g., GLSL-based transforms)
 - UltraGrid passes data to libSAIL library
 - libSAIL sends data to SAGE receivers based on windows position (controlled by fsManager)
 - SAGE receiver renders textures (supported transforms: scaling, rotation)



Rendering Options

- SAGE display (cont'd)
 - SAGE 3.0 support
 - SAGE `video_display` for UltraGrid
 - linking using g++ (due to libSAIL being implemented in C++)
 - 1 PC implementation:
 - 2× dual-core Opteron, 2× NVidia 8800 GTX, Myrinet 10GE
 - 4× 24" display 1920×1200



Compression Support

- DXT compression
 - color-indexing-based compression
 - fixed compression ratio:
 - 8:1 or 4:1 data reduction in RGBA
 - 6:1 or 3:1 data reduction in RGB
 - decompression implemented in vast majority of current graphics cards
 - http://en.wikipedia.org/wiki/S3_Texture_Compression
 - <http://developer.nvidia.com/object/real-time-ycocg-dxt-compression.html>
 - posterization (banding) of long “slow” gradients



Compression Support

- DXT compression in UltraGrid
 - plan to do compression on GPU failed:
 - too slow read-back times from older GPUs
 - compression on CPU
 - utilizes FastDXT, 4 cores to do it in real-time
 - but almost one core is eaten by traffic shaping of UltraGrid
 - decompression on GPU
 - GL rendering back-end
 - GLSL to do color conversions
 - receiver can be totally affordable machine with common graphics card and GbE network interface
 - data rate 250 Mbps (i.e., 6:1 practical reduction ratio)
- FastDXT
 - SSE2 optimized implementation
 - <http://www.ev1.uic.edu/cavern/fastdxt/>



MacOS X Support

- UltraGrid for MacOS X raison d'être: affordable capture cards
 - BlackMagic Design Intesity (Pro) – \approx 300 USD
 - BlackMagic DeckLink HD – \approx 1000 USD
 - BlackMagic MultiBridge (incl. 2K) – \approx 1600 USD
 - AJA Kona3 (incl. 2K) – \approx 3000 USD
 - c.f. Linux :-(:
 - Centaurus II LT – \approx 5000 USD
 - Centaurus II – \approx 7000 USD
- Support for capture is in the released version
- Support for DXT compression
- Current development branch can do
 - software playback at full rate
 - hardware playback with AJA Kona3



MacOS X Support

- Tested HW:
 - MacPro
 - 2× Intel Xeon Quad Core 3 GHz
 - 4GB RAM
 - Myrinet 10GbE network interface cards
 - support for both Tiger (MacOS X 10.4) and Leopard (MacOS X 10.5)
 - tested with all capture cards mentioned on the previous slide

End-to-End Latency Measurements

- Development branch of UltraGrid
- Measured with software-based display
- Entirely end-to-end: from camera all the way to the screen

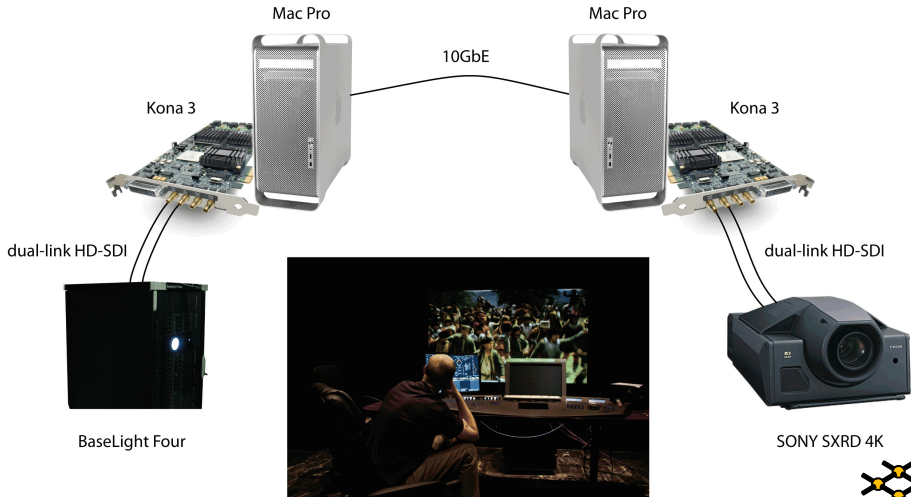
Configuration	No comp.	DXT comp.
Linux, Centaurus PCI-X	90 ± 8 ms	130 ± 8 ms
Linux, Centaurus II PCIe	85 ± 8 ms	95 ± 8 ms
MacOS X 10.4, DeckLink Pro HD PCIe	148 ± 8 ms	178 ± 8 ms

2K Support

- Support for 2K video in development branch
 - implemented standards
 - 2048×1080 @ 24 psf, 24 p
 - 4:2:2 YUV / 10 b per color channel \implies 1,2 Gbps
 - 4:4:4 RGB / 10 b per color channel \implies 1,8 Gbps
 - hardware playback – 10 b colors required
- Collaboration with postproduction industry: CinePost



2K Support



2K Support



2K Support



Thank you for your attention!

Q?/A!

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<https://www.sitola.cz/igrid/index.php/UltraGrid>

