X Acceleration that Finally Works

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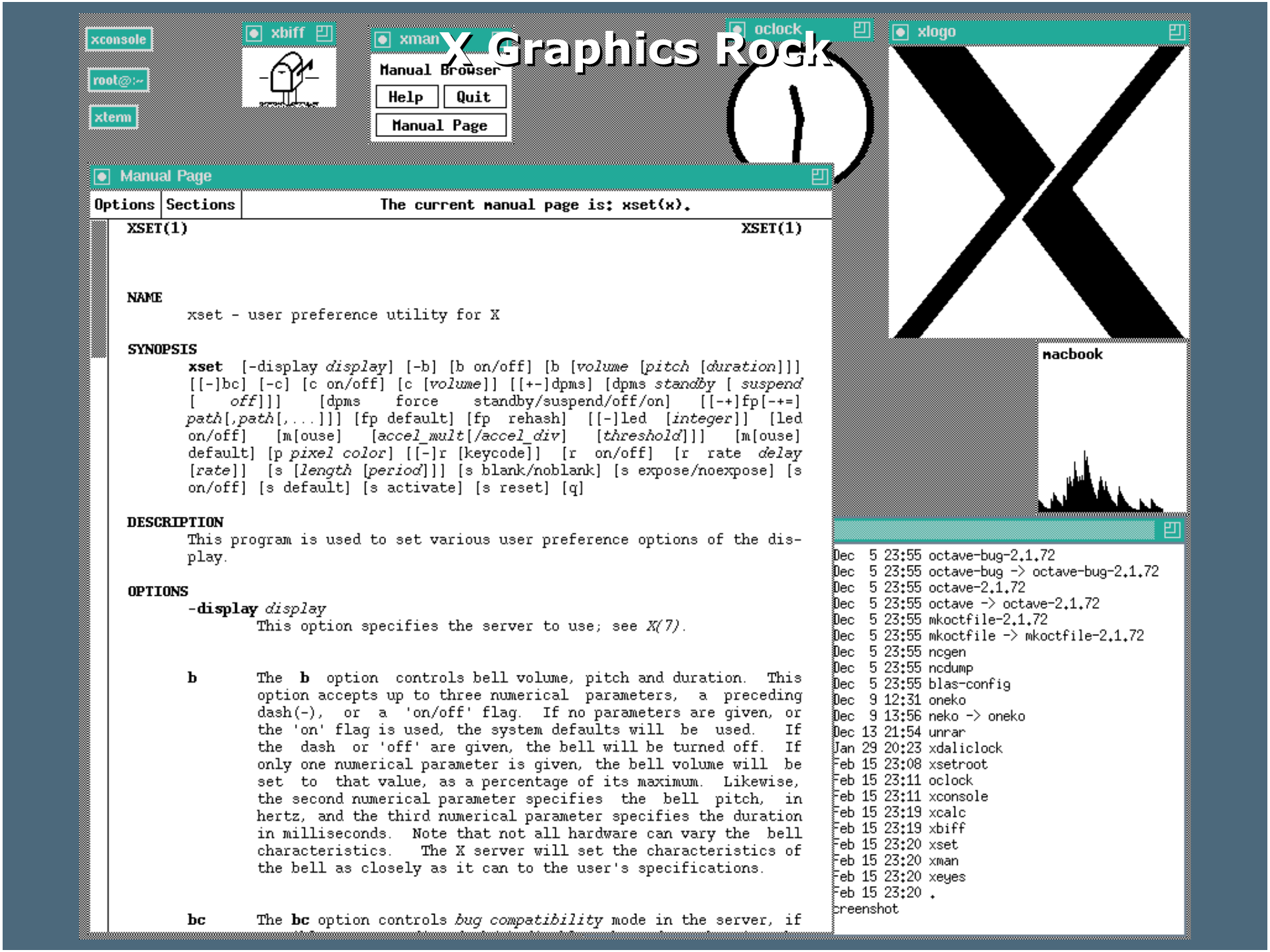
X Graphics


xconsole
root@:~
xterm
xbiff
xman
Manual Browser
Help
Quit
Manual Page
X Graphics Rock
oclock
xlogo
macbook
Manual Page
Options
Sections
The current manual page is: xset(x).
XSET(1) XSET(1)
NAME
xset - user preference utility for X
SYNOPSIS
xset [-display display] [-b] [b on/off] [b [volume [pitch [duration]]] [[-]bc] [-c] [c on/off] [c [volume]] [[+-]dpms] [dpms standby [suspend [off]]] [dpms force standby/suspend/off/on] [[-+]fp[-+=] path[,path[,...]]] [fp default] [fp rehash] [[-]led [integer]] [led on/off] [m[ouse] [accel_mult[/accel_div] [threshold]]] [m[ouse] default] [p pixel color] [[-]r [keycode]] [r on/off] [r rate delay [rate]] [s [length [period]]] [s blank/noblank] [s expose/noexpose] [s on/off] [s default] [s activate] [s reset] [q]
DESCRIPTION
This program is used to set various user preference options of the display.
OPTIONS
-display display
This option specifies the server to use; see X(7).
b
The b option controls bell volume, pitch and duration. This option accepts up to three numerical parameters, a preceding dash(-), or a 'on/off' flag. If no parameters are given, or the 'on' flag is used, the system defaults will be used. If the dash or 'off' are given, the bell will be turned off. If only one numerical parameter is given, the bell volume will be set to that value, as a percentage of its maximum. Likewise, the second numerical parameter specifies the bell pitch, in hertz, and the third numerical parameter specifies the duration in milliseconds. Note that not all hardware can vary the bell characteristics. The X server will set the characteristics of the bell as closely as it can to the user's specifications.
bc
The bc option controls bug compatibility mode in the server, if
Dec 5 23:55 octave-bug-2.1.72
Dec 5 23:55 octave-bug -> octave-bug-2.1.72
Dec 5 23:55 octave-2.1.72
Dec 5 23:55 octave -> octave-2.1.72
Dec 5 23:55 mkoctfile-2.1.72
Dec 5 23:55 mkoctfile -> mkoctfile-2.1.72
Dec 5 23:55 ncgen
Dec 5 23:55 ncdump
Dec 5 23:55 blas-config
Dec 9 12:31 oneko
Dec 9 13:56 neko -> oneko
Dec 13 21:54 unrar
Jan 29 20:23 xdaliclock
Feb 15 23:08 xsetroot
Feb 15 23:11 oclock
Feb 15 23:11 xconsole
Feb 15 23:19 xcalc
Feb 15 23:19 xbiff
Feb 15 23:20 xset
Feb 15 23:20 xman
Feb 15 23:20 xeyes
Feb 15 23:20 .
creenshot

Problem Space

Core Xlib drawing primitives

- Solid fills
- Bitwise raster operations
- Non-antiliased lines/arcs
- Server-side fonts

Render extension primitives

- Image compositing
- Client-side font support
- Trapezoid rasterization
- Gradients

Past attempts

XAA

- fills, copies, stipple fills, bresenham lines
- 2D rectangular memory manager
- almost no pixmap caching

KAA

- fills, copies
- linear memory manager
- caches all pixmaps

EXA

- fills, copies, textured blending
- linear memory manager
- caches all pixmaps, migration heuristics

Hardware

Graphics device support

- Provides fills, copies, textured blending
- Has no local memory
- Aperture reads still expensive
- GART binding is cheap

Recent Work

TTM

- kernel graphics memory manager
- buffer objects
- fences

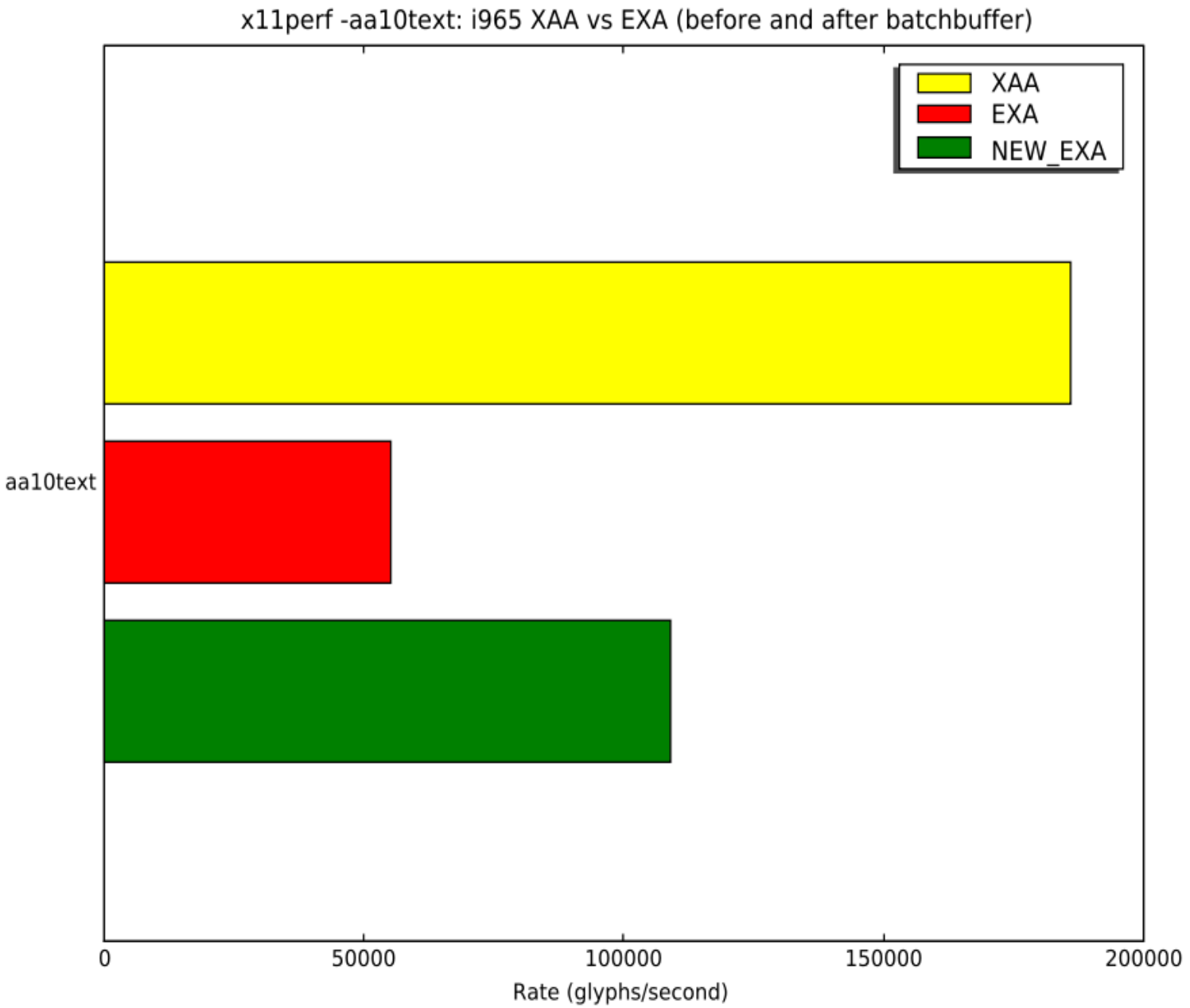
EXA with TTM

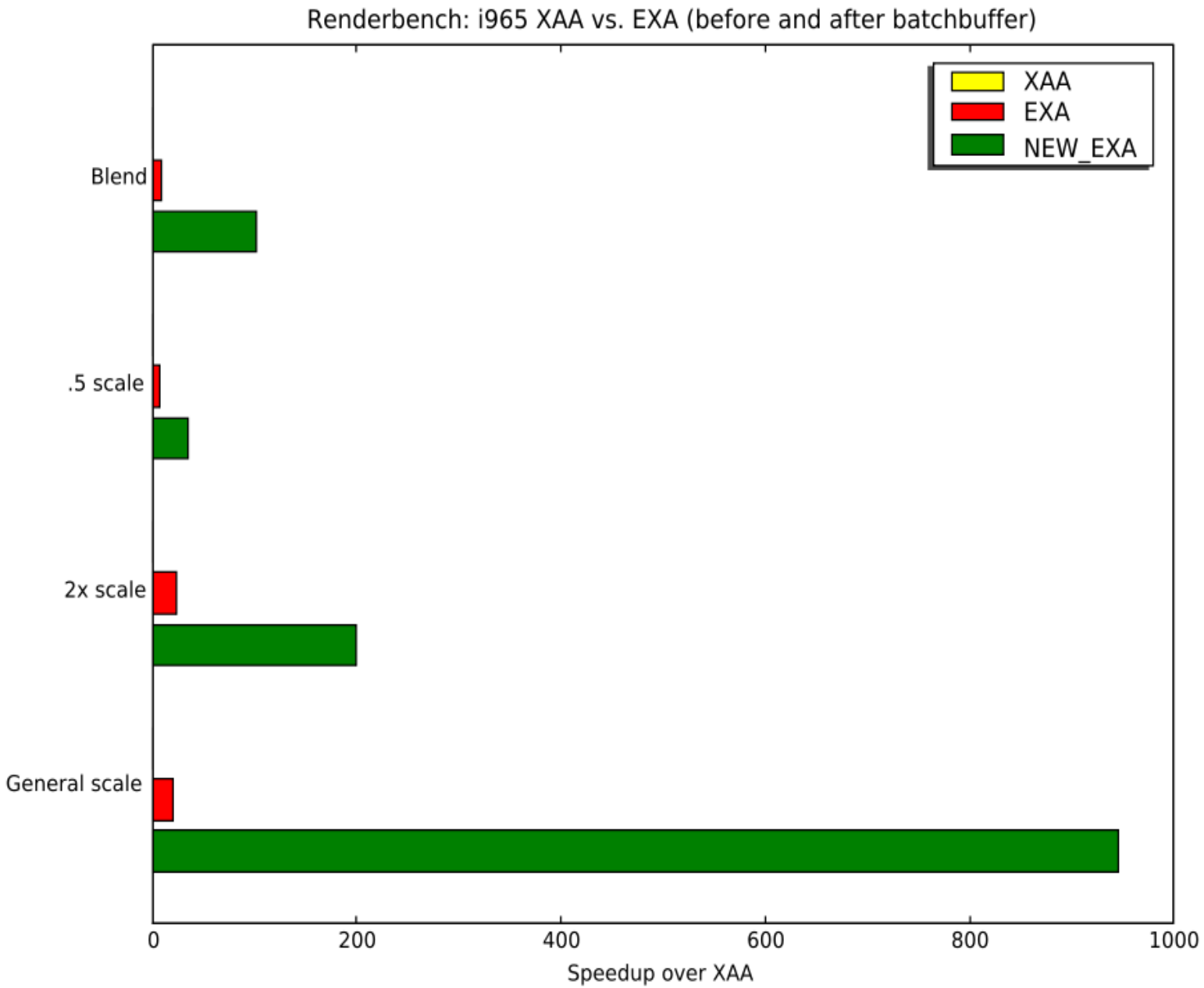
- fills copies, textured blending
- all pixmaps in buffer objects
- migration by GART binding

965 Render acceleration

- Accumulates operations in batchbuffer
- Enumerate all programs and state

Status


x11perf -aa10text: i965 XAA vs EXA (before and after batchbuffer)
XAA
EXA
NEW_EXA
aa10text
0
50000
100000
150000
200000
Rate (glyphs/second)


Renderbench: i965 XAA vs. EXA (before and after batchbuffer)
XAA
EXA
NEW_EXA
Blend
.5 scale
2x scale
General scale
0
200
400
600
800
1000
Speedup over XAA

Demo

Future work

- Cache flushing reduction
- Surface state caching
- Gradients acceleration