NAME

x11perf – X11 server performance test program

SYNTAX

x11perf [–option ...]

DESCRIPTION

The *x11perf* program runs one or more performance tests and reports how fast an X server can execute the tests.

Many graphics benchmarks assume that the graphics device is used to display the output of a single fancy graphics application, and that the user gets his work done on some other device, like a terminal. Such benchmarks usually measure drawing speed for lines, polygons, text, etc.

Since workstations are not used as standalone graphics engines, but as super-terminals, *x11perf* measures window management performance as well as traditional graphics performance. *x11perf* includes benchmarks for the time it takes to create and map windows (as when you start up an application); to map a preexisting set of windows onto the screen (as when you deiconify an application or pop up a menu); and to rearrange windows (as when you slosh windows to and fro trying to find the one you want).

x11perf also measures graphics performance for operations not normally used in standalone graphics displays, but are nonetheless used frequently by X applications. Such operations include CopyPlane (used to map bitmaps into pixels), scrolling (used in text windows), and various stipples and tiles (used for CAD and color half-toning, respectively).

x11perf should be used to analyze particular strengths and weaknesses of servers, and is most useful to a server writer who wants to analyze and improve a server. *x11perf* is meant to comprehensively exercise just about every X11 operation you can perform; it does not purport to be a representative sample of the operations that X11 applications actually use. While it can be used as a benchmark, it was written and is intended as a performance testing tool.

As such, *x11perf* DOES NOT whittle down measurements to a single ‘‘HeXStones’’ or ‘‘MeXops’’ number. We consider such numbers to be uninformative at best and misleading at worst. Some servers which are very fast for certain applications can be very slow for others. No single number or small set of numbers are sufficient to characterize how an X implementation will perform on all applications. However, by knowledge of your favorite application, you may be able to use the numbers *x11perf* reports to predict its performance on a given X implementation.

That said, you might also want to look at *x11perfcomp(1),* a program to compare the outputs of different *x11perf* runs. You provide a list of files containing results from *x11perf,* and it lays them out in a nice tabular format.

For repeatable results, *x11perf* should be run using a local connection on a freshly-started server. The default configuration runs each test 5 times, in order to see if each trial takes approximately the same amount of time. Strange glitches should be examined; if non-repeatable one might chalk them up to daemons and network traffic. Each trial is run for 5 seconds, in order to reduce random time differences. The number of objects processed per second is displayed to 3 significant digits, but you’ll be lucky on most UNIX system if the numbers are actually consistent to 2 digits. *x11perf* moves the cursor out of the test window; you should be careful not to bump the mouse and move it back into the window. (A prize to people who correctly explain why!!).

Before running a test, *x11perf* determines what the round trip time to the server is, and factors this out of the final timing reported. It ensures that the server has actually performed the work requested by fetching a pixel back from the test window, which means that servers talking to graphics accelerators can’t claim that they are done, while in the meantime the accelerator is painting madly.

By default *x11perf* automatically calibrates the number of repetitions of each test, so that each should take approximately the same length of time to run across servers of widely differing speeds. However, since each test must be run to completion at least once, some slow servers may take a very long time, particularly on the window moving and resizing tests, and on the arc drawing tests.

All timing reports are for the smallest object involved. For example, the line tests use a PolyLine request to

paint several lines at once, but report how many lines per second the server can paint, not how many PolyLine requests per second. Text tests paint a line of characters, but report on the number of characters per second. Some window tests map, unmap, or move a single parent window, but report on how many children windows per second the server can map, unmap, or move.

The current program is mostly the responsibility of Joel McCormack. It is based upon the x11perf developed by Phil Karlton, Susan Angebranndt, Chris Kent, Mary Walker, and Todd Newman, who wanted to assess performance differences between various servers. Several tests were added in order to write and tune the PMAX (DECStation 3100) servers. For a general release to the world, *x11perf* was rewritten to ease making comparisons between widely varying machines, to cover most important (and unimportant) X functionality, and to exercise graphics operations in as many different orientations and alignments as possible.

OPTIONS

x11perf is solely Xlib based, and accepts the options listed below:

–display host:dpy
Specifies which display to use.

–sync Runs the tests in synchronous mode. Normally only useful for debugging *x11perf*.

–pack Runs rectangle tests so that they pack rectangles right next to each other. This makes it easy to debug server code for stipples and tiles...if the pattern looks ugly, you've got alignment problems.

–repeat *<n>* Repeats each test *n* times (by default each test is run 5 times).

–time *<s>* Specifies how long in seconds each test should be run (default 5 seconds).

–pause *<s>* Specifies how long, in seconds, to pause for between each run.

–all Runs all tests. This may take a while.

–range *<test1>***[,***<test2>***]**
Runs all the tests starting from the specified name *test1* until the name *test2*, including both the specified tests. The testnames should be one of the options starting from -dot. (eg) -range line100 will perform the tests from the 100 pixel line test, and go on till the last test, -range line100,dline10 will do the tests from line100 to dline10.

–labels Generates just the descriptive labels for each test specified. See *x11perfcomp* for more details.

–fg *color-or-pixel*
Specifies the foreground color or pixel value to use.

–bg *color-or-pixel*
Specifies the background color or pixel value to use.

–clips *default* Default number of clip windows.

–ddbg *color-or-pixel*
Specifies the color or pixel value to use for drawing the odd segments of a DoubleDashed line or arc. This will default to the bg color.

–rop <rop0 rop1 ...>
Use specified raster ops (default is GXcopy). This option only affects graphics benchmarks in which the graphics function is actually used.

–pm <pm0 pm1 ...>
Use specified planemasks (default is ~0). This option only affects graphics benchmarks in which the planemask is actually used.

–depth <depth>
Use a visual with <depth> planes per pixel (default is the default visual).

−vclass <vclass>
Use a visual with of class <vclass>. <vclass> can be StaticGray, GrayScale, StaticColor, PseudoColor, TrueColor, or DirectColor. (default is the default visual).

−reps <n> Specify the repetition count (Default is number that takes approx. 5 seconds)

−subs <s0 s1 ...>
Specify the number of sub windows to use in the Window tests. Default is 4, 16, 25, 50, 75, 100 and 200.

−v1.2 Perform only x11perf Version 1.2 tests using Version 1.2 semantics.

−v1.3 Perform only x11perf Version 1.3 tests using Version 1.3 semantics.

−su Set the save_under window attribute to True on all windows created by x11perf. Default is False.

−bs <backing_store_hint>
Set the backing_store window attribute to the given value on all windows created by x11perf. <backing_store_hint> can be WhenMapped or Always. Default is NotUseful.

−dot Dot.

−rect1 1x1 solid-filled rectangle.

−rect10 10x10 solid-filled rectangle.

−rect100 100x100 solid-filled rectangle.

−rect500 500x500 solid-filled rectangle.

−srect1 1x1 transparent stippled rectangle, 8x8 stipple pattern.

−srect10 10x10 transparent stippled rectangle, 8x8 stipple pattern.

−srect100 100x100 transparent stippled rectangle, 8x8 stipple pattern.

−srect500 500x500 transparent stippled rectangle, 8x8 stipple pattern.

−osrect1 1x1 opaque stippled rectangle, 8x8 stipple pattern.

−osrect10 10x10 opaque stippled rectangle, 8x8 stipple pattern.

−osrect100 100x100 opaque stippled rectangle, 8x8 stipple pattern.

−osrect500 500x500 opaque stippled rectangle, 8x8 stipple pattern.

−tilerect1 1x1 tiled rectangle, 4x4 tile pattern.

−tilerect10 10x10 tiled rectangle, 4x4 tile pattern.

−tilerect100 100x100 tiled rectangle, 4x4 tile pattern.

−tilerect500 500x500 tiled rectangle, 4x4 tile pattern.

−oddsrect1 1x1 transparent stippled rectangle, 17x15 stipple pattern.

−oddsrect10 10x10 transparent stippled rectangle, 17x15 stipple pattern.

−oddsrect100 100x100 transparent stippled rectangle, 17x15 stipple pattern.

−oddsrect500 500x500 transparent stippled rectangle, 17x15 stipple pattern.

−oddosrect1 1x1 opaque stippled rectangle, 17x15 stipple pattern.

−oddosrect10 10x10 opaque stippled rectangle, 17x15 stipple pattern.

−oddosrect100 100x100 opaque stippled rectangle, 17x15 stipple pattern.

−oddosrect500 500x500 opaque stippled rectangle, 17x15 stipple pattern.

−oddtilerect1 1x1 tiled rectangle, 17x15 tile pattern.

−oddtilerect10 10x10 tiled rectangle, 17x15 tile pattern.

−oddtilerect100
100x100 tiled rectangle, 17x15 tile pattern.

−oddtilerect500
500x500 tiled rectangle, 17x15 tile pattern.

−bigsrect1 1x1 stippled rectangle, 161x145 stipple pattern.

−bigsrect10 10x10 stippled rectangle, 161x145 stipple pattern.

−bigsrect100 100x100 stippled rectangle, 161x145 stipple pattern.

−bigsrect500 500x500 stippled rectangle, 161x145 stipple pattern.

−bigosrect1 1x1 opaque stippled rectangle, 161x145 stipple pattern.

−bigosrect10 10x10 opaque stippled rectangle, 161x145 stipple pattern.

−bigosrect100 100x100 opaque stippled rectangle, 161x145 stipple pattern.

−bigosrect500 500x500 opaque stippled rectangle, 161x145 stipple pattern.

−bigtilerect1 1x1 tiled rectangle, 161x145 tile pattern.

−bigtilerect10 10x10 tiled rectangle, 161x145 tile pattern.

−bigtilerect100 100x100 tiled rectangle, 161x145 tile pattern.

−bigtilerect500 500x500 tiled rectangle, 161x145 tile pattern.

−eschertilerect1
1x1 tiled rectangle, 215x208 tile pattern.

−eschertilerect10
10x10 tiled rectangle, 215x208 tile pattern.

−eschertilerect100
100x100 tiled rectangle, 215x208 tile pattern.

−eschertilerect500
500x500 tiled rectangle, 215x208 tile pattern.

−seg1 1-pixel thin line segment.

−seg10 10-pixel thin line segment.

−seg100 100-pixel thin line segment.

−seg500 500-pixel thin line segment.

−seg100c1 100-pixel thin line segment (1 obscuring rectangle).

−seg100c2 100-pixel thin line segment (2 obscuring rectangles).

−seg100c3 100-pixel thin line segment (3 obscuring rectangles).

−dseg10 10-pixel thin dashed segment (3 on, 2 off).

−dseg100 100-pixel thin dashed segment (3 on, 2 off).

−ddseg100 100-pixel thin double-dashed segment (3 fg, 2 bg).

−hseg10 10-pixel thin horizontal line segment.

−hseg100 100-pixel thin horizontal line segment.

−hseg500 500-pixel thin horizontal line segment.

−vseg10 10-pixel thin vertical line segment.

−vseg100 100-pixel thin vertical line segment.

−vseg500 500-pixel thin vertical line segment.
−whseg10 10-pixel wide horizontal line segment.
−whseg100 100-pixel wide horizontal line segment.
−whseg500 500-pixel wide horizontal line segment.
−wvseg10 10-pixel wide vertical line segment.
−wvseg100 100-pixel wide vertical line segment.
−wvseg500 500-pixel wide vertical line segment.
−line1 1-pixel thin (width 0) line.
−line10 10-pixel thin line.
−line100 100-pixel thin line.
−line500 500-pixel thin line.
−dline10 10-pixel thin dashed line (3 on, 2 off).
−dline100 100-pixel thin dashed line (3 on, 2 off).
−ddline100 100-pixel thin double-dashed line (3 fg, 2 bg).
−wline10 10-pixel line, line width 1.
−wline100 100-pixel line, line width 10.
−wline500 500-pixel line, line width 50.
−wdline100 100-pixel dashed line, line width 10 (30 on, 20 off).
−wddline100 100-pixel double-dashed line, line width 10 (30 fg, 20 bg).
−orect10 10x10 thin rectangle outline.
−orect100 100-pixel thin vertical line segment.
−orect500 500-pixel thin vertical line segment.
−worect10 10x10 wide rectangle outline.
−worect100 100-pixel wide vertical line segment.
−worect500 500-pixel wide vertical line segment.
−circle1 1-pixel diameter thin (line width 0) circle.
−circle10 10-pixel diameter thin circle.
−circle100 100-pixel diameter thin circle.
−circle500 500-pixel diameter thin circle.
−dcircle100 100-pixel diameter thin dashed circle (3 on, 2 off).
−ddcircle100 100-pixel diameter thin double-dashed circle (3 fg, 2 bg).
−wcircle10 10-pixel diameter circle, line width 1.
−wcircle100 100-pixel diameter circle, line width 10.
−wcircle500 500-pixel diameter circle, line width 50.
−wdcircle100 100-pixel diameter dashed circle, line width 10 (30 on, 20 off).
−wddcircle100 100-pixel diameter double-dashed circle, line width 10 (30 fg, 20 bg).
−pcircle10 10-pixel diameter thin partial circle, orientation and arc angle evenly distributed.
−pcircle100 100-pixel diameter thin partial circle.

−wpcircle10 10-pixel diameter wide partial circle.

−wpcircle100 100-pixel diameter wide partial circle.

−fcircle1 1-pixel diameter filled circle.

−fcircle10 10-pixel diameter filled circle.

−fcircle100 100-pixel diameter filled circle.

−fcircle500 500-pixel diameter filled circle.

−fcpcircle10 10-pixel diameter partial filled circle, chord fill, orientation and arc angle evenly distributed.

−fcpcircle100 100-pixel diameter partial filled circle, chord fill.

−fspcircle10 10-pixel diameter partial filled circle, pie slice fill, orientation and arc angle evenly distributed.

−fspcircle100 100-pixel diameter partial filled circle, pie slice fill.

−ellipse10 10-pixel diameter thin (line width 0) ellipse, major and minor axis sizes evenly distributed.

−ellipse100 100-pixel diameter thin ellipse.

−ellipse500 500-pixel diameter thin ellipse.

−dellipse100 100-pixel diameter thin dashed ellipse (3 on, 2 off).

−ddellipse100 100-pixel diameter thin double-dashed ellipse (3 fg, 2 bg).

−wellipse10 10-pixel diameter ellipse, line width 1.

−wellipse100 100-pixel diameter ellipse, line width 10.

−wellipse500 500-pixel diameter ellipse, line width 50.

−wdellipse100 100-pixel diameter dashed ellipse, line width 10 (30 on, 20 off).

−wddellipse100
100-pixel diameter double-dashed ellipse, line width 10 (30 fg, 20 bg).

−pellipse10 10-pixel diameter thin partial ellipse.

−pellipse100 100-pixel diameter thin partial ellipse.

−wpellipse10 10-pixel diameter wide partial ellipse.

−wpellipse100 100-pixel diameter wide partial ellipse.

−fellipse10 10-pixel diameter filled ellipse.

−fellipse100 100-pixel diameter filled ellipse.

−fellipse500 500-pixel diameter filled ellipse.

−fcpellipse10 10-pixel diameter partial filled ellipse, chord fill.

−fcpellipse100 100-pixel diameter partial filled ellipse, chord fill.

−fspellipse10 10-pixel diameter partial filled ellipse, pie slice fill.

−fspellipse100 100-pixel diameter partial filled ellipse, pie slice fill.

−triangle1 Fill 1-pixel/side triangle.

−triangle10 Fill 10-pixel/side triangle.

−triangle100 Fill 100-pixel/side triangle.

−trap1 Fill 1x1 trapezoid.

–trap10 Fill 10x10 trapezoid.

–trap100 Fill 100x100 trapezoid.

–trap300 Fill 300x300 trapezoid.

–strap1 Fill 1x1 transparent stippled trapezoid, 8x8 stipple pattern.

–strap10 Fill 10x10 transparent stippled trapezoid, 8x8 stipple pattern.

–strap100 Fill 100x100 transparent stippled trapezoid, 8x8 stipple pattern.

–strap300 Fill 300x300 transparent stippled trapezoid, 8x8 stipple pattern.

–ostrap1 Fill 10x10 opaque stippled trapezoid, 8x8 stipple pattern.

–ostrap10 Fill 10x10 opaque stippled trapezoid, 8x8 stipple pattern.

–ostrap100 Fill 100x100 opaque stippled trapezoid, 8x8 stipple pattern.

–ostrap300 Fill 300x300 opaque stippled trapezoid, 8x8 stipple pattern.

–tiletrap1 Fill 10x10 tiled trapezoid, 4x4 tile pattern.

–tiletrap10 Fill 10x10 tiled trapezoid, 4x4 tile pattern.

–tiletrap100 Fill 100x100 tiled trapezoid, 4x4 tile pattern.

–tiletrap300 Fill 300x300 tiled trapezoid, 4x4 tile pattern.

–oddstrap1 Fill 1x1 transparent stippled trapezoid, 17x15 stipple pattern.

–oddstrap10 Fill 10x10 transparent stippled trapezoid, 17x15 stipple pattern.

–oddstrap100 Fill 100x100 transparent stippled trapezoid, 17x15 stipple pattern.

–oddstrap300 Fill 300x300 transparent stippled trapezoid, 17x15 stipple pattern.

–oddostrap1 Fill 10x10 opaque stippled trapezoid, 17x15 stipple pattern.

–oddostrap10 Fill 10x10 opaque stippled trapezoid, 17x15 stipple pattern.

–oddostrap100 Fill 100x100 opaque stippled trapezoid, 17x15 stipple pattern.

–oddostrap300 Fill 300x300 opaque stippled trapezoid, 17x15 stipple pattern.

–oddtiletrap1 Fill 10x10 tiled trapezoid, 17x15 tile pattern.

–oddtiletrap10 Fill 10x10 tiled trapezoid, 17x15 tile pattern.

–oddtiletrap100
Fill 100x100 tiled trapezoid, 17x15 tile pattern.

–oddtiletrap300
Fill 300x300 tiled trapezoid, 17x15 tile pattern.

–bigstrap1 Fill 1x1 transparent stippled trapezoid, 161x145 stipple pattern.

–bigstrap10 Fill 10x10 transparent stippled trapezoid, 161x145 stipple pattern.

–bigstrap100 Fill 100x100 transparent stippled trapezoid, 161x145 stipple pattern.

–bigstrap300 Fill 300x300 transparent stippled trapezoid, 161x145 stipple pattern.

–bigostrap1 Fill 10x10 opaque stippled trapezoid, 161x145 stipple pattern.

–bigostrap10 Fill 10x10 opaque stippled trapezoid, 161x145 stipple pattern.

–bigostrap100 Fill 100x100 opaque stippled trapezoid, 161x145 stipple pattern.

–bigostrap300 Fill 300x300 opaque stippled trapezoid, 161x145 stipple pattern.

–bigtiletrap1 Fill 10x10 tiled trapezoid, 161x145 tile pattern.

–bigtiletrap10 Fill 10x10 tiled trapezoid, 161x145 tile pattern.

−bigtiletrap100
Fill 100x100 tiled trapezoid, 161x145 tile pattern.

−bigtiletrap300
Fill 300x300 tiled trapezoid, 161x145 tile pattern.

−eschertiletrap1
Fill 1x1 tiled trapezoid, 216x208 tile pattern.

−eschertiletrap10
Fill 10x10 tiled trapezoid, 216x208 tile pattern.

−eschertiletrap100
Fill 100x100 tiled trapezoid, 216x208 tile pattern.

−eschertiletrap300
Fill 300x300 tiled trapezoid, 216x208 tile pattern.

−complex10 Fill 10-pixel/side complex polygon.

−complex100 Fill 100-pixel/side complex polygon.

−64poly10convex
Fill 10x10 convex 64-gon.

−64poly100convex
Fill 100x100 convex 64-gon.

−64poly10complex
Fill 10x10 complex 64-gon.

−64poly100complex
Fill 100x100 complex 64-gon.

−ftext Character in 80-char line (6x13).

−f8text Character in 70-char line (8x13).

−f9text Character in 60-char line (9x15).

−f14text16 2-byte character in 40-char line (k14).

−tr10text Character in 80-char line (Times-Roman 10).

−tr24text Character in 30-char line (Times-Roman 24).

−polytext Character in 20/40/20 line (6x13, Times-Roman 10, 6x13).

−polytext16 2-byte character in 7/14/7 line (k14, k24).

−fitext Character in 80-char image line (6x13).

−f8itext Character in 70-char image line (8x13).

−f9itext Character in 60-char image line (9x15).

−f14itext16 2-byte character in 40-char image line (k14).

−f24itext16 2-byte character in 23-char image line (k24).

−tr10itext Character in 80-char image line (Times-Roman 10).

−tr24itext Character in 30-char image line (Times-Roman 24).

−scroll10 Scroll 10x10 pixels vertically.

−scroll100 Scroll 100x100 pixels vertically.

−scroll500 Scroll 500x500 pixels vertically.

−copywinwin10
Copy 10x10 square from window to window.

−copywinwin100
Copy 100x100 square from window to window.

−copywinwin500
Copy 500x500 square from window to window.

−copypixwin10 Copy 10x10 square from pixmap to window.

−copypixwin100
Copy 100x100 square from pixmap to window.

−copypixwin500
Copy 500x500 square from pixmap to window.

−copywinpix10 Copy 10x10 square from window to pixmap.

−copywinpix100
Copy 100x100 square from window to pixmap.

−copywinpix500
Copy 500x500 square from window to pixmap.

−copypixpix10 Copy 10x10 square from pixmap to pixmap.

−copypixpix100
Copy 100x100 square from pixmap to pixmap.

−copypixpix500
Copy 500x500 square from pixmap to pixmap.

−copyplane10 Copy 10x10 1-bit deep plane.

−copyplane100 Copy 100x100 1-bit deep plane.

−copyplane500 Copy 500x500 1-bit deep plane.

−putimage10 PutImage 10x10 square.

−putimage100 PutImage 100x100 square.

−putimage500 PutImage 500x500 square.

−putimagexy10
PutImage XY format 10x10 square.

−putimagexy100
PutImage XY format 100x100 square.

−putimagexy500
PutImage XY format 500x500 square.

−shmput10 PutImage 10x10 square, MIT shared memory extension.

−shmput100 PutImage 100x100 square, MIT shared memory extension.

−shmput500 PutImage 500x500 square, MIT shared memory extension.

−shmputxy10 PutImage XY format 10x10 square, MIT shared memory extension.

−shmputxy100 PutImage XY format 100x100 square, MIT shared memory extension.

−shmputxy500 PutImage XY format 500x500 square, MIT shared memory extension.

−getimage10 GetImage 10x10 square.

−getimage100 GetImage 100x100 square.

−getimage500 GetImage 500x500 square.

−getimagexy10 GetImage XY format 10x10 square.

−getimagexy100
GetImage XY format 100x100 square.

−getimagexy500
GetImage XY format 500x500 square.

−compwinwin10
Composite 10x10 from window to window.

−compwinwin100
Composite 100x100 from window to window.

−compwinwin500
Composite 500x500 from window to window.

−comppixwin10
Composite 10x10 from pixmap to window.

−comppixwin100
Composite 100x100 from pixmap to window.

−comppixwin500
Composite 500x500 from pixmap to window.

−magpixwin10 Scale 5x5 from pixmap to 10x10 window.

−magpixwin100
Scale 50x50 from pixmap to 100x100 window.

−magpixwin500
Scale 250x250 from pixmap to 500x500 window.

−minpixwin10 Scale 10x10 from pixmap to 5x5 window.

−minpixwin100
Scale 100x100 from pixmap to 50x50 window.

−minpixwin500
Scale 500x500 from pixmap to 250x250 window.

−noop X protocol NoOperation.

−atom GetAtomName.

−pointer QueryPointer.

−prop GetProperty.

−gc Change graphics context.

−create Create child window and map using MapSubwindows.

−ucreate Create unmapped window.

−map Map child window via MapWindow on parent.

−unmap Unmap child window via UnmapWindow on parent.

−destroy Destroy child window via DestroyWindow parent.

−popup Hide/expose window via Map/Unmap popup window.

−move Move window.

−umove Moved unmapped window.

−movetree Move window via MoveWindow on parent.

−resize Resize window.

−uresize Resize unmapped window.

−circulate Circulate lowest window to top.

−ucirculate Circulate unmapped window to top.

X DEFAULTS

There are no X defaults used by this program.

SEE ALSO

X(7), x11perfcomp(1)

AUTHORS

Joel McCormack
Phil Karlton
Susan Angebranndt
Chris Kent
Keith Packard
Graeme Gill