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X Server 1.16 SNA UXA 2D Benchmarks

A Display Server comparison with SNA and UXA Intel 2D acceleration architectures. benchmarks by Michael Larabel for a future article on Phoronix.com.

Automated Executive Summary

X Server 1.16.0: SNA had the most wins, coming in first place for 59% of the tests.

Based on the geometric mean of all complete results, the fastest (X Server 1.16.0: SNA) was 2.17x the speed of the slowest (X Server 1.15.1: UXA). X Server 1.15.1: UXA was 0.467x the speed of X Server 1.15.1: SNA, X Server 1.16.0: UXA was 1.046x the speed of X Server 1.15.1: UXA, X Server 1.16.0: SNA was 2.074x the speed of X Server 1.16.0: UXA.

The results with the greatest spread from best to worst included:

x11perf (Test: PutImage XY 500x500 Square) at 149x
x11perf (Test: Fill 300 x 300px AA Trapezoid) at 116.38x
GtkPerf (GTK Widget: GtkDrawingArea - Pixbufs) at 9.366x
x11perf (Test: Char in 80-char aa line) at 4.48x
GtkPerf (GTK Widget: GtkDrawingArea - Circles) at 2.343x
x11perf (Test: 500px Compositing From Window To Window) at 2.239x
GtkPerf (GTK Widget: GtkToggleButton) at 1.628x

GtkPerf (GTK Widget: GtkRadioButton) at 1.307x
QGears2 (Rendering: XRender Extension - Test: Image Scaling) at 1.28x
GtkPerf (GTK Widget: GtkComboBoxEntry) at 1.136x.

Test Systems:

X Server 1.15.1: SNA

X Server 1.15.1: UXA

Processor: Intel Core i7-4600U @ 3.30GHz (4 Cores), Motherboard: CompuLab Intense-PC2 (IPC2), Chipset: Intel Haswell-ULT DRAM, Memory: 8192MB, Disk: 120GB Micron_M500_MTFD, Graphics: Intel Haswell-ULT IGP (1100MHz), Audio: Intel Haswell-ULT HD Audio, Monitor: MX279, Network: Intel Connection I218-LM + Intel Wireless 7260

OS: Ubuntu 14.10, Kernel: 3.16.0-14-generic (x86_64), Desktop: Unity 7.3.1, Display Server: X Server 1.15.1, Display Driver: intel 2.99.914, OpenGL: 3.3 Mesa 10.2.6, Compiler: GCC 4.9.1, File-System: ext4, Screen Resolution: 1920x1080

Compiler Notes: --build=x86_64-linux-gnu --disable-browser-plugin --disable-vtable-verify --disable-werror --enable-checking=release --enable-clocale=gnu --enable-gnu-unique-object --enable-gtk-cairo --enable-java-awt=gtk --enable-java-home --enable-languages=c,c++,java,go,d,fortran,objc,obj-c++ --enable-libstdcxx-debug --enable-libstdcxx-time=yes --enable-multiarch --enable-multilib --enable-nls --enable-objc-gc --enable-plugin --enable-shared --enable-threads=posix --host=x86_64-linux-gnu --target=x86_64-linux-gnu --with-abi=m64 --with-arch-32=i686 --with-arch-directory=amd64 --with-multilib-list=m32,m64,mx32 --with-tune=generic -v
Processor Notes: Scaling Governor: intel_pstate powersave
Graphics Notes: UXA

X Server 1.16.0: UXA

X Server 1.16.0: SNA

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Processor Notes: Scaling Governor: intel_pstate powersave
Graphics Notes: SNA

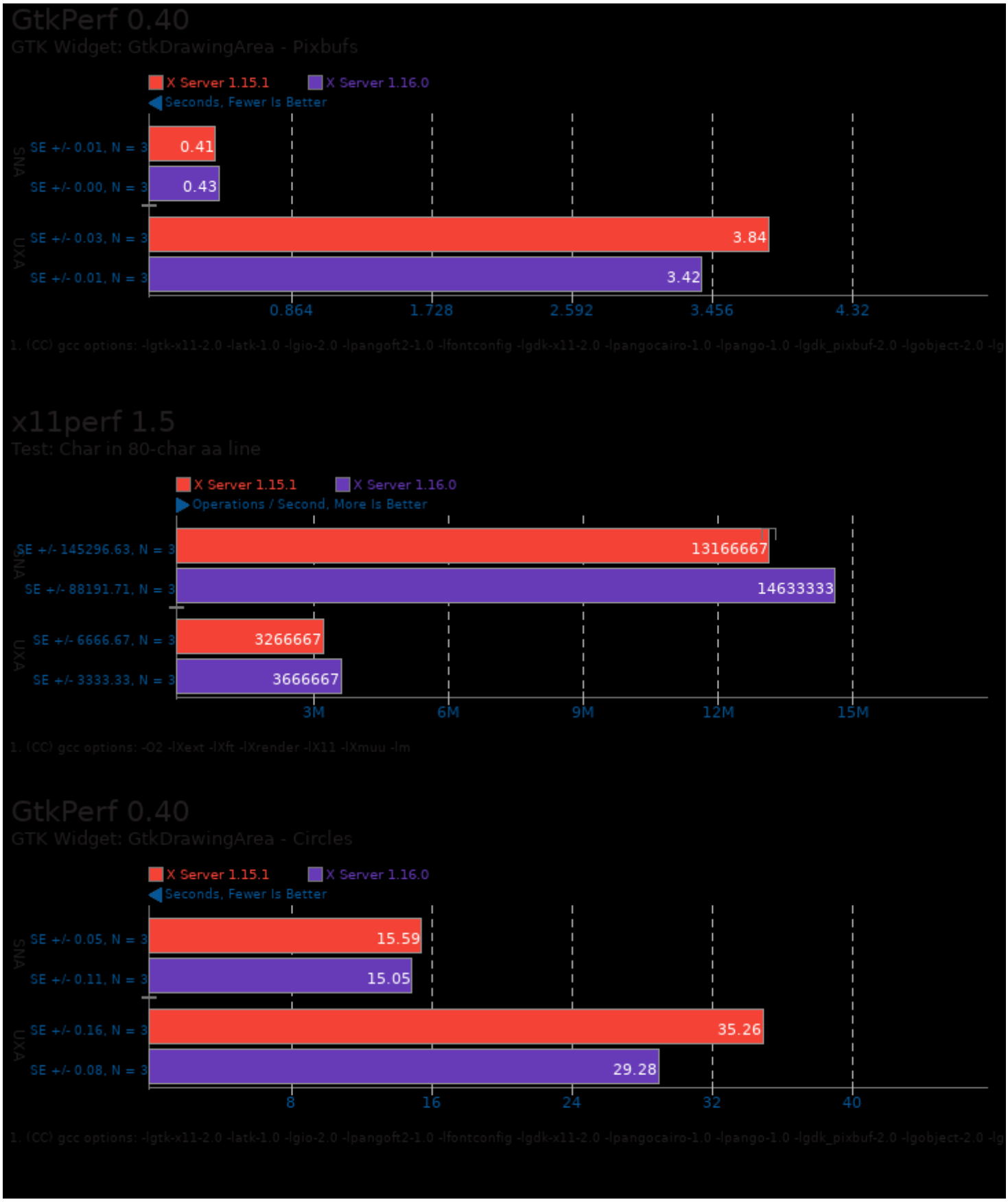
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	X Server 1.15.1: SNA	X Server 1.15.1: UXA	X Server 1.16.0: UXA	X Server 1.16.0: SNA
GtkPerf - GtkDrawingArea - Pixbufs (sec)	**0.41**	**3.84**	3.42	0.43
Normalized	100%	10.68%	11.99%	95.35%
Standard Deviation	2.4%	1.3%	0.7%	1.3%
x11perf - C.i.8.c.a.l (Operations / Second)	13166667	**3266667**	3666667	**14633333**
Normalized	89.98%	22.32%	25.06%	100%
Standard Deviation	1.9%	0.4%	0.2%	1%
GtkPerf - GtkDrawingArea - Circles	15.59	**35.26**	29.28	**15.05**
Normalized	96.54%	42.68%	51.4%	100%
Standard Deviation	0.5%	0.8%	0.5%	1.3%
x11perf - 5.C.F.W.T.W (Operations / Second)	15533	**7177**	7197	**16067**
Normalized	96.68%	44.67%	44.79%	100%
Standard Deviation	2.7%	0.3%	0.3%	0.7%
x11perf - P.X.5.S (Operations /	147	**1**	**1**	**149**
Normalized	98.66%	0.67%	0.67%	100%
Standard Deviation	0%	0%	0%	0%
x11perf - F.3.x.3.A.T (Operations / Second)	321333	**2910**	**2910**	**338667**
Normalized	94.88%	0.86%	0.86%	100%
Standard Deviation	0.4%	0%	0%	0.2%
GtkPerf - GtkToggleButton (sec)	**5.45**	**8.87**	8.13	5.52
Normalized	100%	61.44%	67.04%	98.73%
Standard Deviation	0.1%	0.7%	2.6%	1.1%
GtkPerf - GtkRadioButton (sec)	3.53	**4.56**	4.11	**3.49**
Normalized	98.87%	76.54%	84.91%	100%
Standard Deviation	1%	0.3%	2.9%	0.3%
QGears2 - XRender Extension - Image Scaling (FPS)	1977	**1591**	1710	**2037**
Normalized	97.04%	78.11%	83.93%	100%
Standard Deviation	0.5%	1.6%	1.7%	0.8%
GtkPerf - GtkComboBoxEntry (sec)	7.31	6.81	**6.68**	**7.59**
Normalized	91.38%	98.09%	100%	88.01%
Standard Deviation	1.4%	4%	1.8%	0.9%
GtkPerf - GtkCheckButton (sec)	1.92	**2.12**	2.09	**1.87**
Normalized	97.4%	88.21%	89.47%	100%
Standard Deviation	0.8%	2.4%	5.8%	1.9%
QGears2 - XRender Extension - Text (FPS)	267.90	**241.14**	266.13	**269.57**
Normalized	99.38%	89.45%	98.72%	100%
Standard Deviation	0.2%	0.7%	1.1%	0.2%
GtkPerf - GtkComboBox (sec)	**12.67**	**14.07**	13.90	13.14
Normalized	100%	90.05%	91.15%	96.42%
Standard Deviation	0.3%	0.1%	0.2%	0.4%
QGears2 - XRender Extension - Gears (FPS)	282.33	**262.91**	278.07	**284.48**
Normalized	99.24%	92.42%	97.75%	100%
Standard Deviation	0.4%	1.2%	0.4%	0.9%
x11perf - 5.P.S (Operations / Second)	4677	**4467**	**4810**	4747
Normalized	97.23%	92.87%	100%	98.69%
Standard Deviation	0.8%	1.2%	1.7%	2.9%

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Render Bench - P.T.S.v.4.0 (sec)	16.42	17.43	**17.48**	**16.25**
Normalized	98.96%	93.23%	92.96%	100%
Standard Deviation	0.3%	0.5%	1.2%	0.6%
x11perf - S.5.x.5.p (Operations /	7333	**7170**	7260	**7380**
Normalized	99.36%	97.15%	98.37%	100%
Standard Deviation	1.8%	1%	0.6%	0.5%
x11perf - 5.C.F.W.T.W (Operations / Second)	**7240**	**7087**	7180	7237
Normalized	100%	97.89%	99.17%	99.96%
Standard Deviation	0.5%	0.6%	0.8%	0.5%
x11perf - C.5.F.P.T.P (Operations / Second)	**7260**	7360	**7370**	7273
Normalized	98.51%	99.86%	100%	98.68%
Standard Deviation	1%	0.5%	0.7%	0.6%
GtkPerf - GtkTextView - Add Text	**367.65**	**371.15**	369.38	370.14
Normalized	100%	99.06%	99.53%	99.33%
Standard Deviation	0.6%	0.2%	0.2%	0.9%
GtkPerf - GtkTextView - Scroll (sec)	**0.04**	**0.04**	**0.04**	**0.05**
Normalized	100%	100%	100%	80%
Standard Deviation	14.1%	0%	0%	37.5%
x11perf - 5.C.F.P.T.W (Operations / Second)	10197	**6667**	6720	**13683**
Normalized	74.52%	48.72%	49.11%	100%
Standard Deviation	38.2%	0.1%	0.8%	8.1%

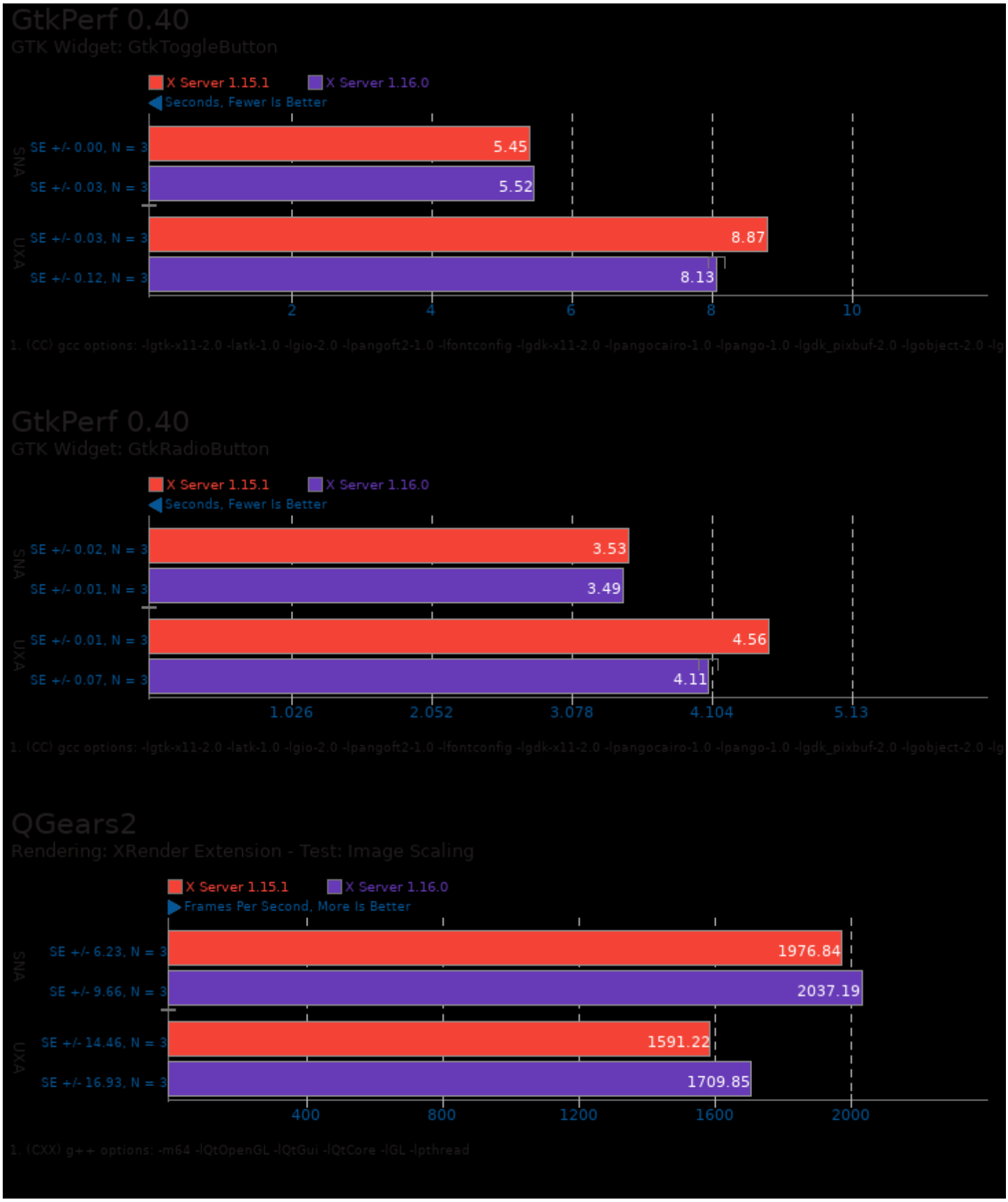
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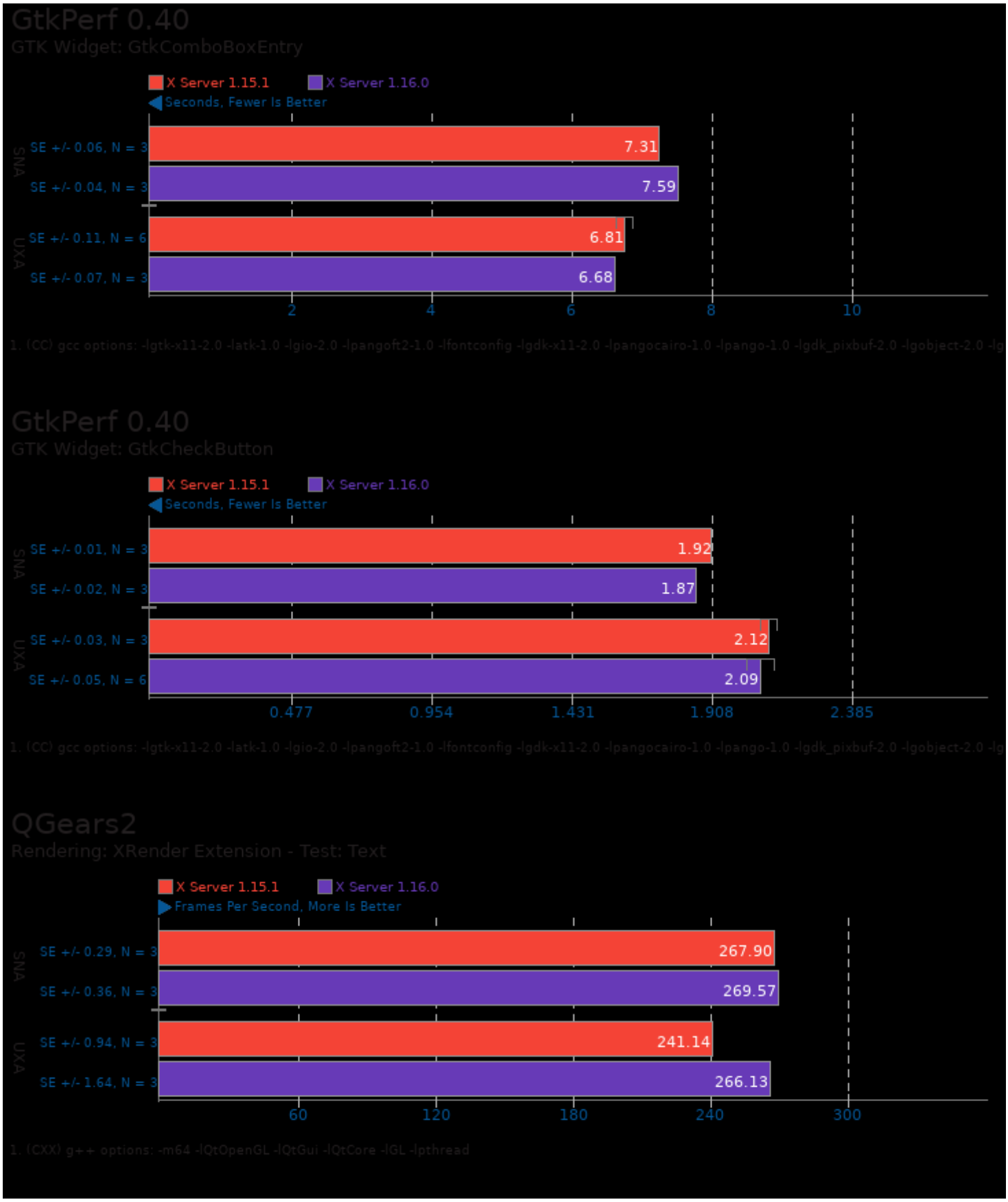
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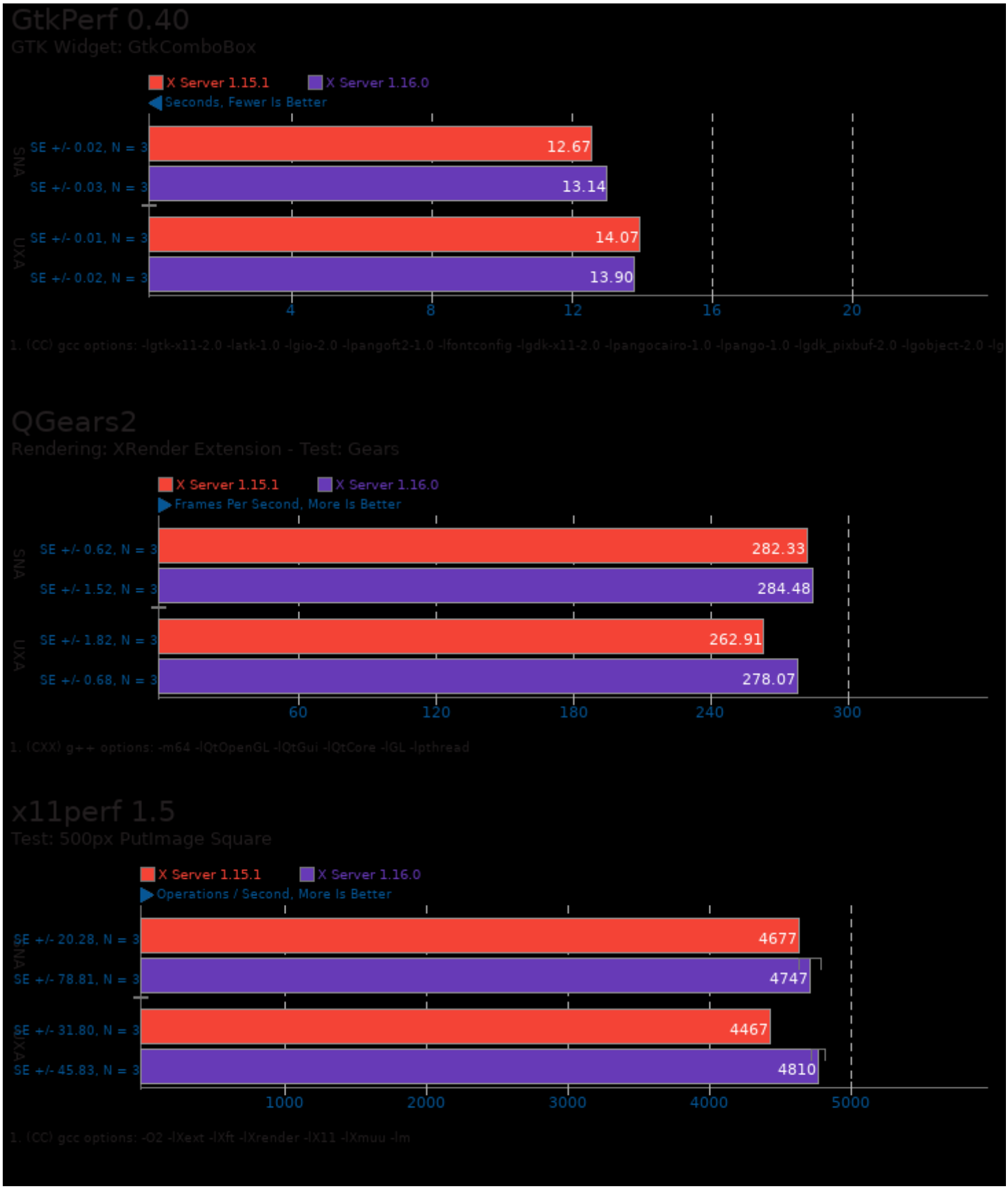
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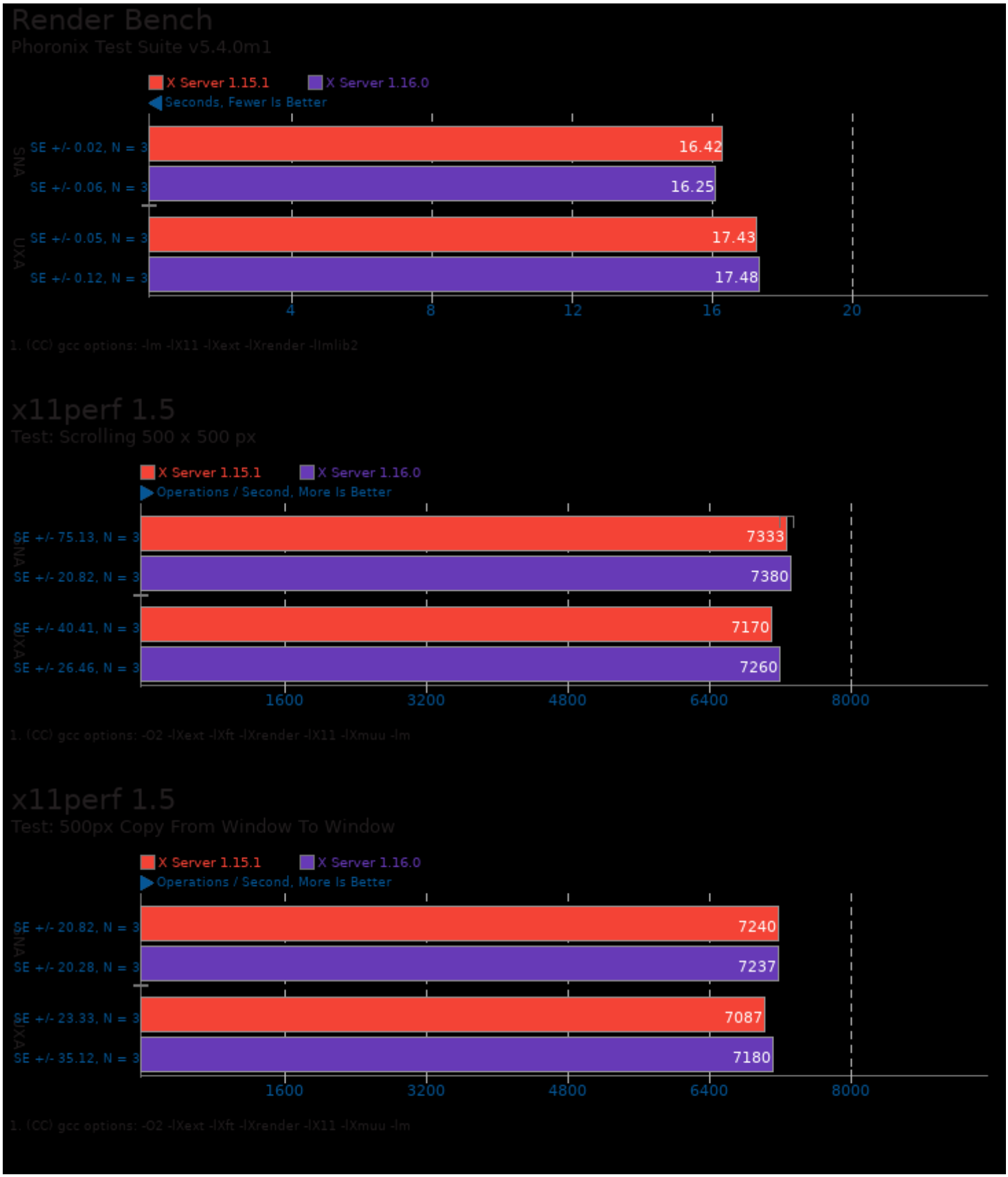
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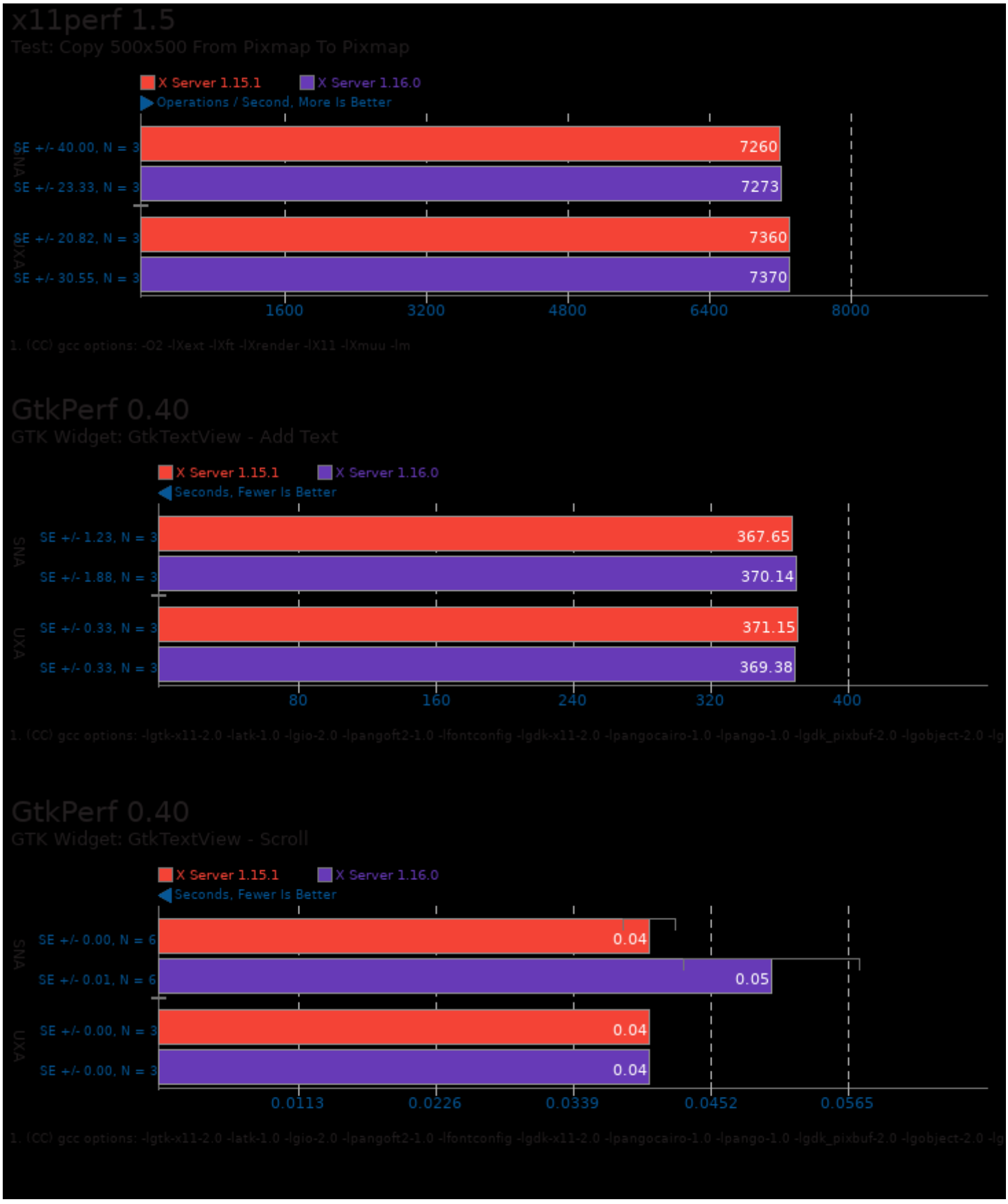
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