

Making More Informed Linux Hardware Choices

With Phoronix Test Suite 3.0 and
OpenBenchmarking.org

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Evolution Of Linux Hardware Support

- Linux hardware support has improved a lot over the years.
- Most hardware now works "out of the box" with new distributions.
- There's still troublesome areas (mainly graphics processors, select motherboard, peripherals).
- With the maturity of Linux has also come new problems: multiple drivers covering the same hardware and offering different features/performance, different tuning options, and optimizations/completeness of the driver.
- There will always be the challenges that face even Windows users: what component to upgrade, finding the hardware that's the best value

The Phoronix Ecosystem

- Phoronix.com was founded in 2004.
- Phoronix Test Suite 1.0 was publicly released in 2008.

Our Software Ecosystem:

- Phoronix Test Suite
- OpenBenchmarking
- Phoromatic



The Ecosystem

Phoronix Test Suite

Testing & Benchmarking Platform

- Cross Platform PHP based solution
- Local and cloud based results aggregation
- Runs on Linux, Mac OS X, Solaris, BSD, Windows
- Available natively on almost all distributions

Since Inception in 2008

- More than 38,000 results shared on Phoronix Global
- Used near universally by Tier-1 IHVs, ISVs, other organizations
- More than 72,000 individual systems activated on PTS

The Ecosystem

OpenBenchmarking.org

Collaborative benchmarking platform (launching today!)

Allowing users to compare their platform against thousands of other users.

Allowing projects and companies to crowd source performance and functional testing over hundreds or thousands of users

All driven by Phoronix Test Suite 3.0.

The Ecosystem

Phoromatic

Coordinated, remote test execution across a number of systems.

Automatically directs clients to switch between configuration states to allow ongoing automated testing.

Can be configured to automatically detect regressing behaviors across suites.

So you are looking for new hardware...

So many choices.



Lots of Questions

Does it work?

How fast is it?

How do I make my system faster?

Does it work?

Google, Google, Google

We've all done it.

1. Google for hardware
2. Read, read, read
3. Download, compile
4. Cross fingers
5. Hope for a good return policy.

You are really relying on the success of other users documenting what they did

Over time, the distributions make it easy, but new hardware means a lot of research.

Does it work?

Hardware Compatibility Lists

Distribution Vendors such as SuSE, Red Hat and Canonical maintain large lists of products that are "certified"

Certification usual means

- it kind of works (?)
- the manufacturer has requested the certification.

Unfortunately, there are no standardized tests

- It "works" for graphics may mean just pixels on the screen with the VESA driver.

HCL's provide some value, but don't guarantee experience

Does it work?

OpenBenchmarking searches

Existent proof that the system with that hardware works and an indication of the configurations that showed the hardware working.

RADEON HD 4870

Radeon HD 4870 is a **graphics processor**. This product is part of the **Radeon** series and is available from **ASUS, Gigabyte, MSI, Sapphire, AMD, ATI, XFX, HIS, Power Color, Palit, Diamond, and GeCube**. The Radeon HD 4870 has been tested via the Phoronix Test Suite in the configurations listed below.

The Radeon HD 4870 product can be found for approximately **\$215 USD** with an average price of **\$250 USD**. [Shop for it on Amazon.com](#).

Operating Systems	Kernels	Display Drivers	OpenGL Drivers
Ubuntu 10.10	2.6.28-13-generic	radeon	2.1.8673
Ubuntu 9.04	2.6.35-22-generic	fglrx 8.62.4	2.1.8494
Ubuntu 10.04	2.6.28-11-generic	radeon 6.13.1	2.0 Mesa 7.8.2
Fedora 13	2.6.27-11-generic	radeon 6.13.0	2.1.8575
Arch	2.6.34.7-63.fc13.x86_64	fglrx 8.58.2	
Ubuntu 8.10		fglrx 8.60.40	

Display Servers

X Server 1.9.0
X.Org Server 1.7.6
X.Org Server 1.9.0
X.Org Server 1.8.2
X Server 1.8.2

Does it work?

OpenBenchmarking searches

Lots of tests to explore

OPENBENCHMARKING.ORG RESULTS

Sandy Bridge Compiler Tests			Featured Compiler Comparison
GCC 4.5.2	GCC 4.6.0	GCC 4.4.5	Clang 4.2.1
Scaling			Featured Processor Comparison
Intel Core i7 970	Intel Core i7 970	Intel Core i7 970	
Intel Core i7 970	Intel Core i7 970	Intel Core i7 970	
Sandy Bridge Compiler Tests			Featured Compiler Comparison
GCC 4.3.5	GCC 4.5.2	GCC 4.6.0	
GCC 4.4.5	GCC 4.6.0		

Does it work?

OpenBenchmarking searches

News articles to read, both Linux oriented

PHORONIX INFORMATION

When It Works, Intel Core i5 2500K Graphics On Linux Are Fast!: After a month of headaches for Intel and myself, there are now Sandy Bridge graphics benchmark results from the Intel Core i5 2500K under Linux to finally publish. Sandy Bridge was a tough launch for Intel in terms of the Linux coverage with the media having problems building a working driver stack and then when I finally got my hands on a CPU, I ran into an entirely different set of show-stopping problems.

Intel Core i5 2500K Linux Performance: Earlier this month Intel released their first "Sandy Bridge" processors to much excitement. However, for Linux users seeking to utilize the next-generation Intel HD graphics found on these new CPUs, it meant problems. Up to this point we have largely been looking at the graphics side of Sandy Bridge, and while we have yet to publish any results there due to some isolated issues, on the CPU side its Linux experience and performance has been nothing short of incredible.

and general

INDUSTRY REVIEWS

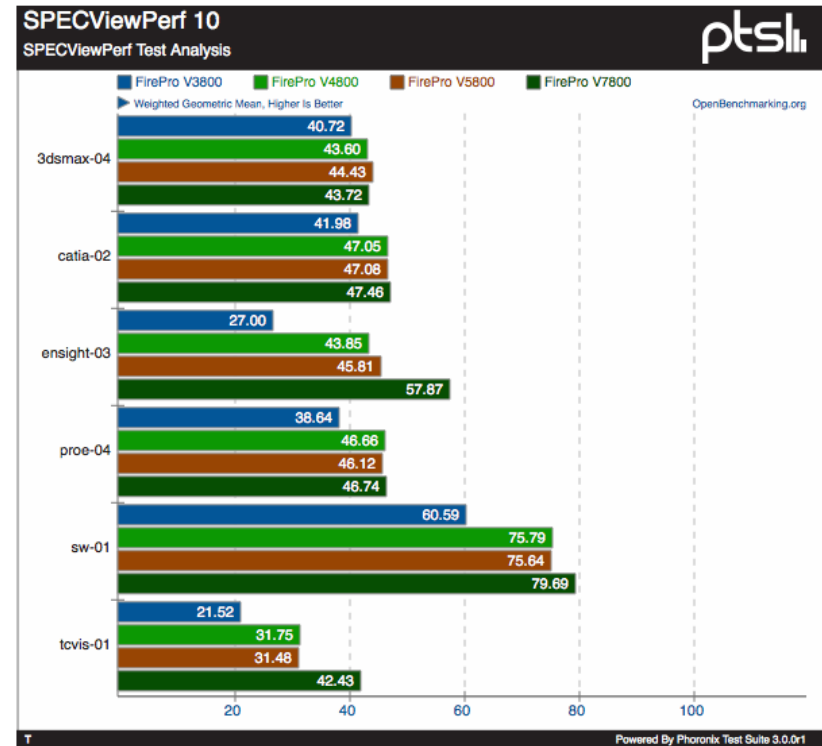
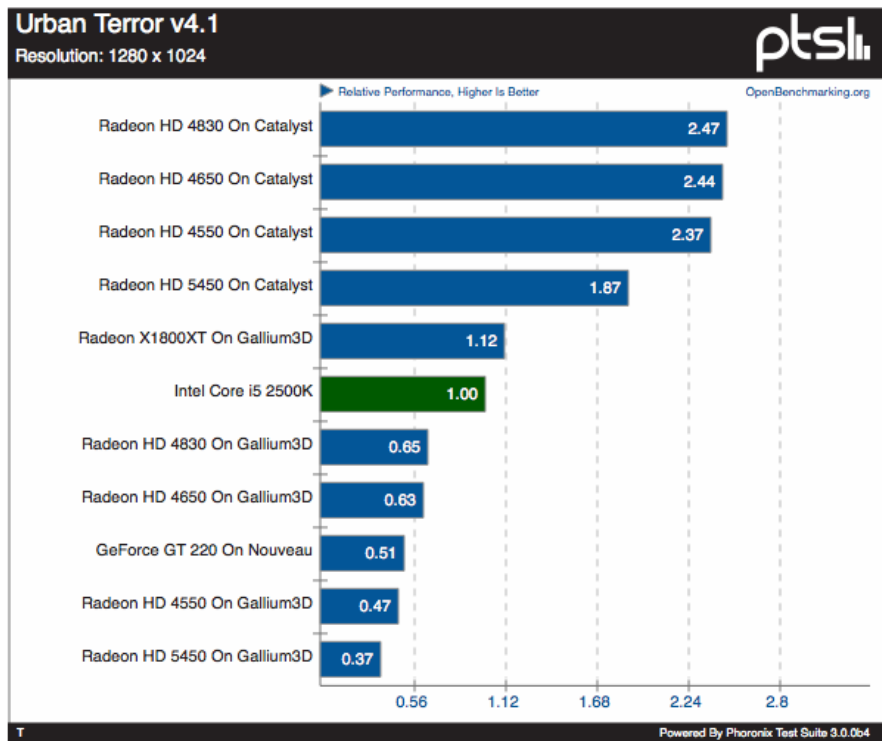
INTEL CORE I5-2500K LGA 1155

thinkcomputers.org: The word Sandy Bridge is what we have been hearing for the past 3 months. In forums, on different websites and even on the news. Sandy Bridge is the codename for Intel's new 32nm processor architecture. This new architecture brings on-die graphics to a whole new level and still has all of the same features we saw on the Nehalem architecture.

How fast is it?

OpenBenchmarking.org Performance

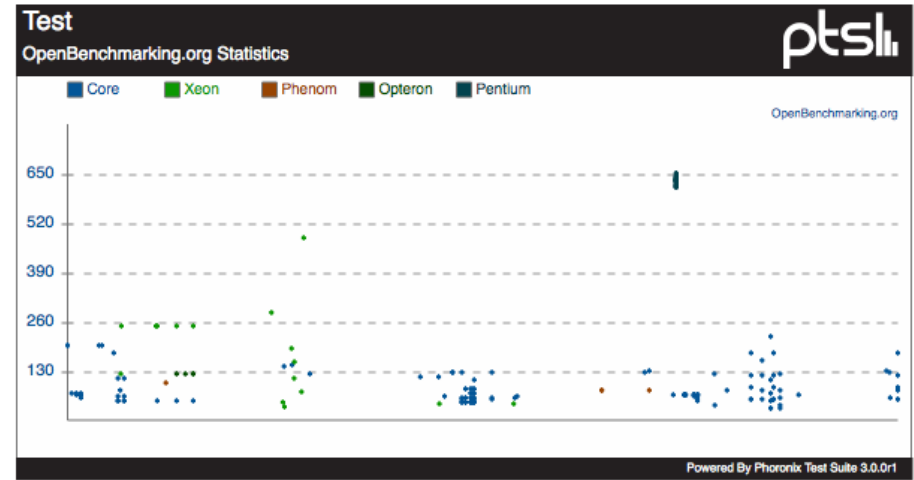
Search for Hardware, get some benchmarks.



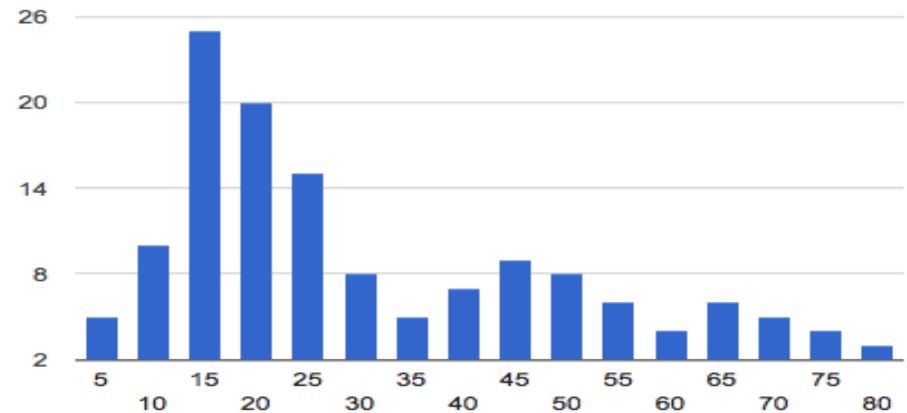
How fast is it?

OpenBenchmarking.org Heatmaps

For a given test... There are a lot of results.



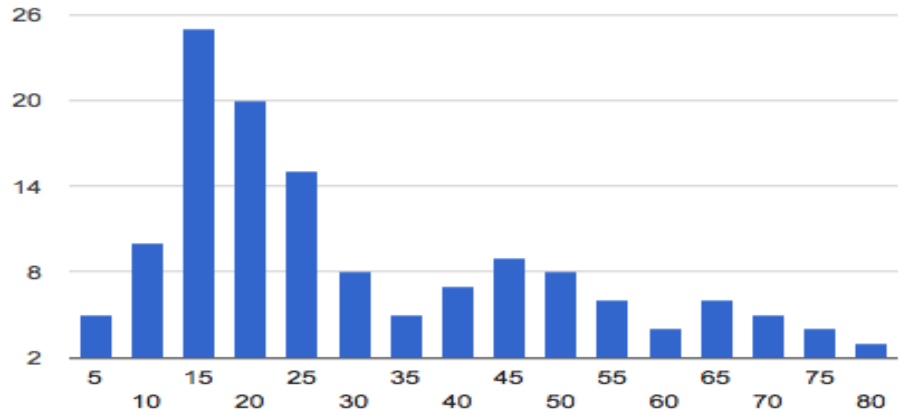
Collapse these against time, and you get a histogram with a particular distribution.



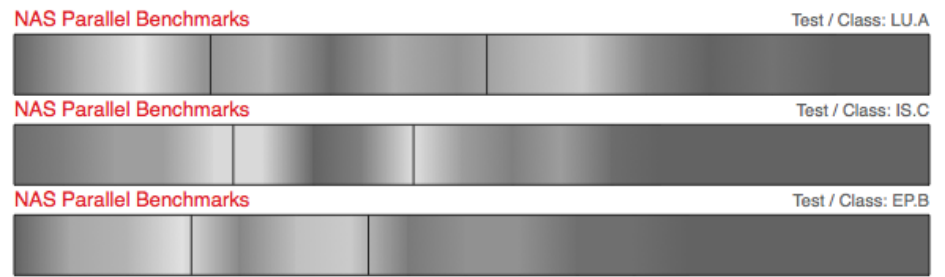
How fast is it?

OpenBenchmarking.org Heatmaps

Histograms provide sparse information and are kind of boring if we had lots of them.



We've created an alternate view of the histogram - the OPC Heatmap

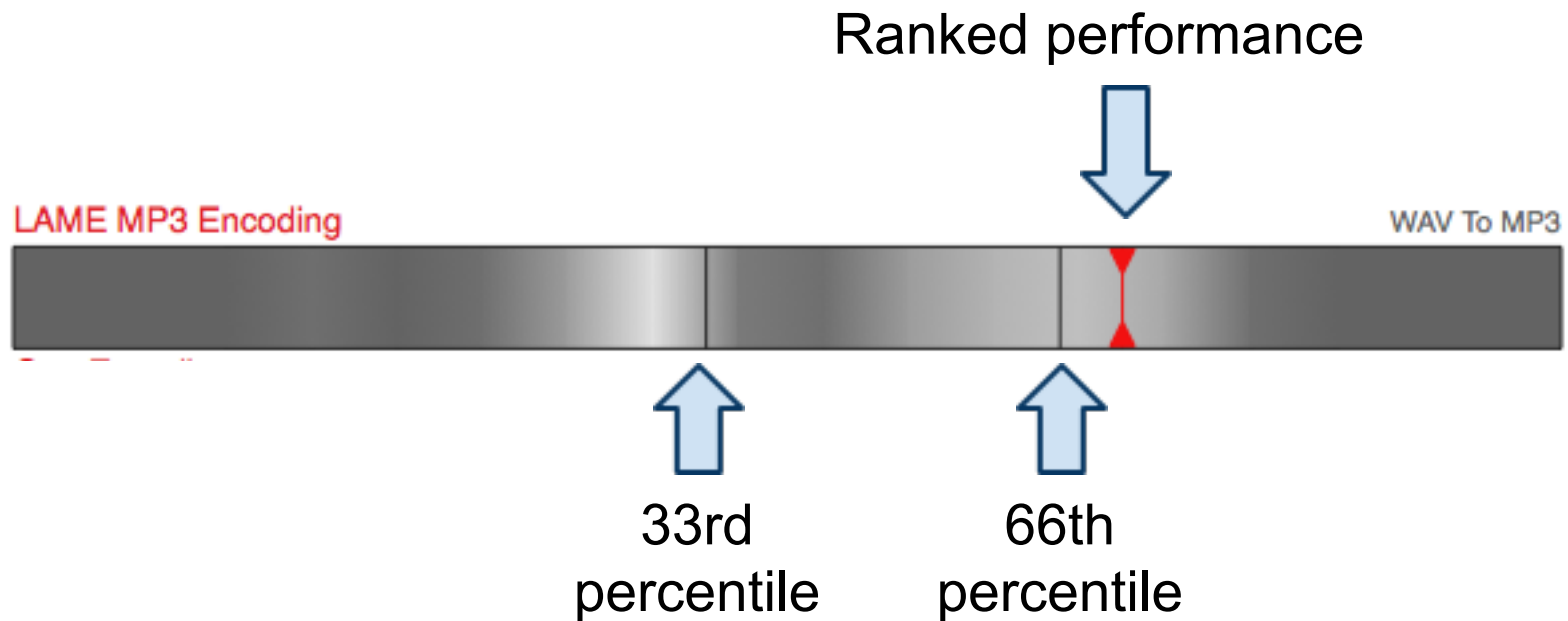


How fast is it?

OpenBenchmarking Performance Classification

OPC allows you in a snapshot understand where your results sit against other systems in the OpenBenchmarking database.

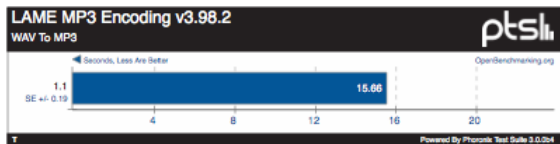
This system is a "High" performer in encoding.



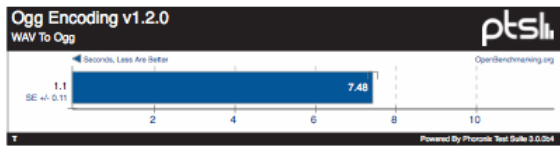
How fast is it?

Understand your hardware's performance

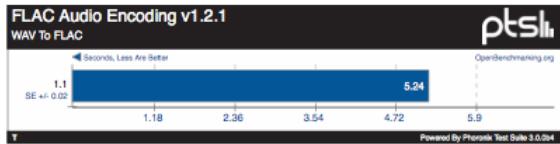
LAME MP3 ENCODING



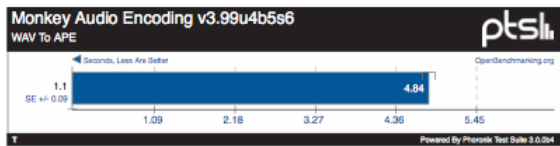
OGG ENCODING



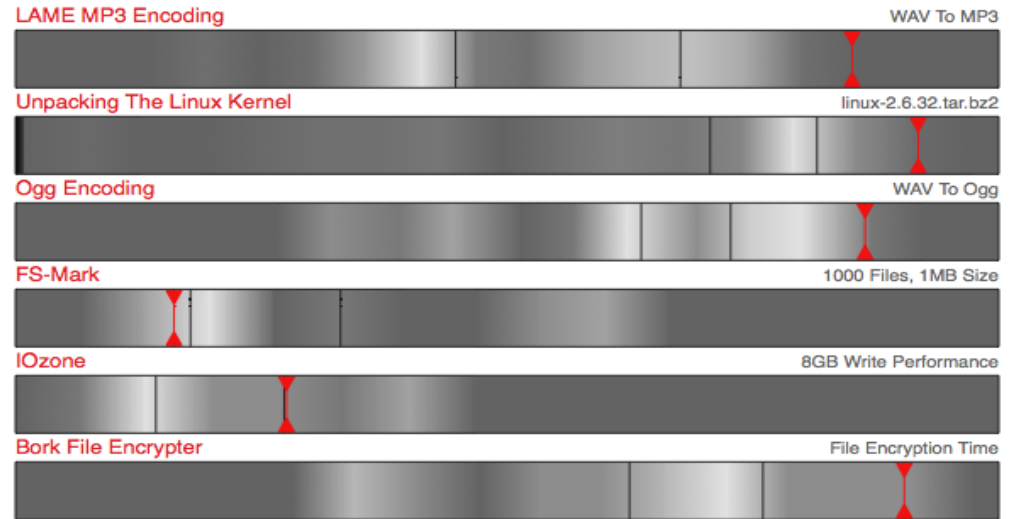
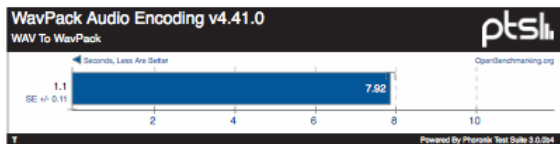
FLAC AUDIO ENCODING



MONKEY AUDIO ENCODING



WAVPACK AUDIO ENCODING

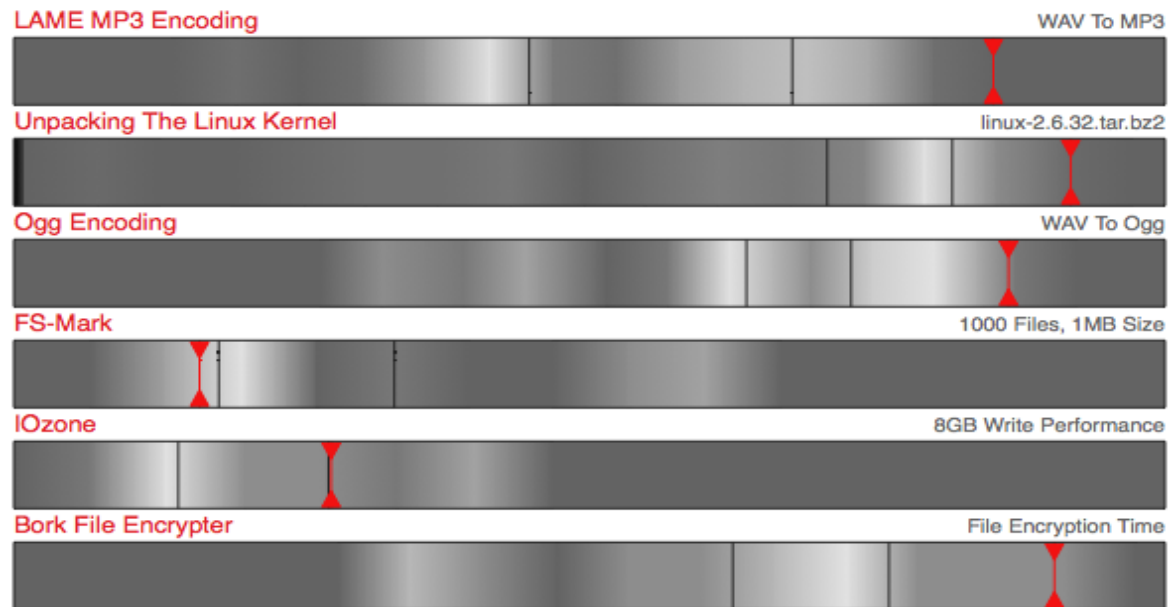


How fast is it?

Understand your hardware's performance

At a glance, you can see that this system is a "High" performing system, always above the 66th percentile.

But... The filesystem performance is "Low"... Maybe a bad filesystem?



How fast is it?

How does it compare?

Find your hardware



1102136-IV-AMDRADEON60: Radeon HD 6870 Linux benchmarking using the proprietary Catalyst driver.

Filter for your test

OPC **Compare Performance** **Filter** **Testing Notes** **Export** **Logs**

If you wish to limit the tests that are shown, check mark the tests you wish to see displayed.

<input type="checkbox"/> Nexuiz	<input type="checkbox"/> Xonotic	<input type="checkbox"/> OpenArena
<input type="checkbox"/> World of Padman	<input type="checkbox"/> Unigine Sanctuary	<input type="checkbox"/> Unigine Tropics
<input checked="" type="checkbox"/> Unigine Heaven	<input type="checkbox"/> Urban Terror	<input type="checkbox"/> VDrift
<input type="checkbox"/> Warsow		

[Refresh Results](#)

How fast is it?

How does it compare?

Find how you stack up



Find some comparative tests

COMPARE TEST RESULTS
GeForce 9800GTX Core i5
Native Linux
Ubuntu 10.10
Wine 1.3.9
Wine 1.2.1

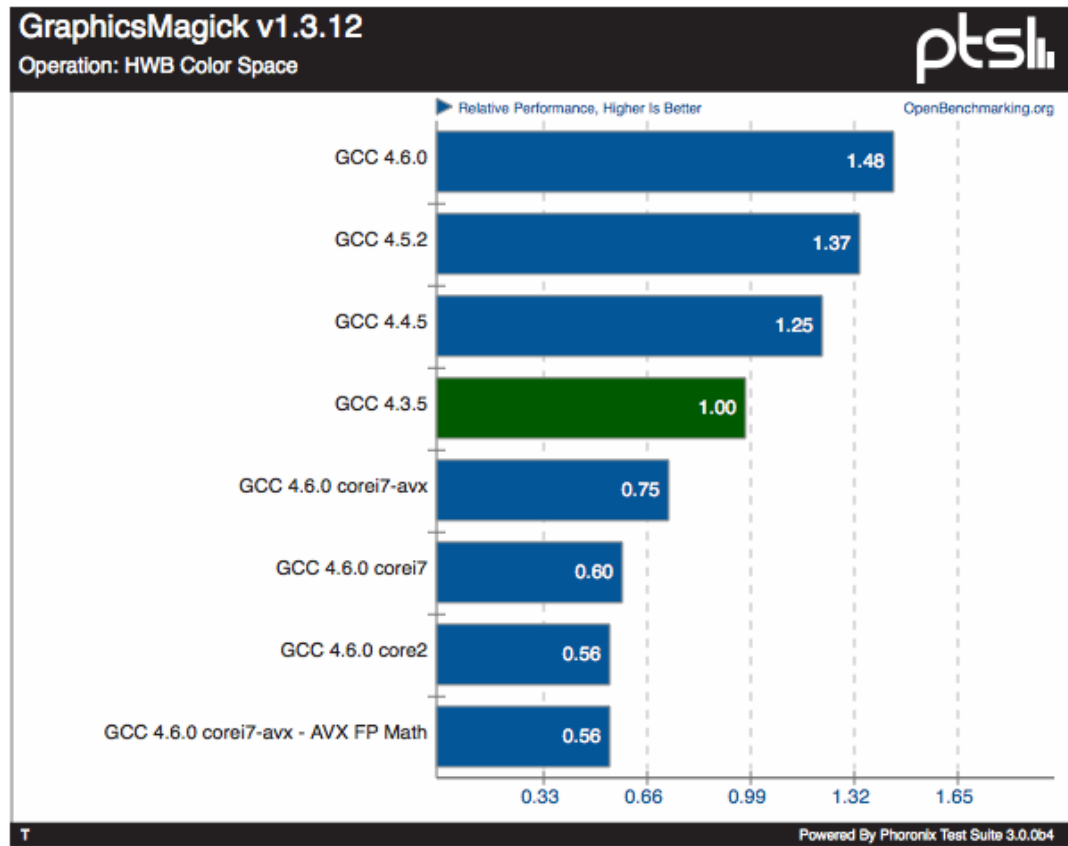
See how



What else can I do?

Compilers

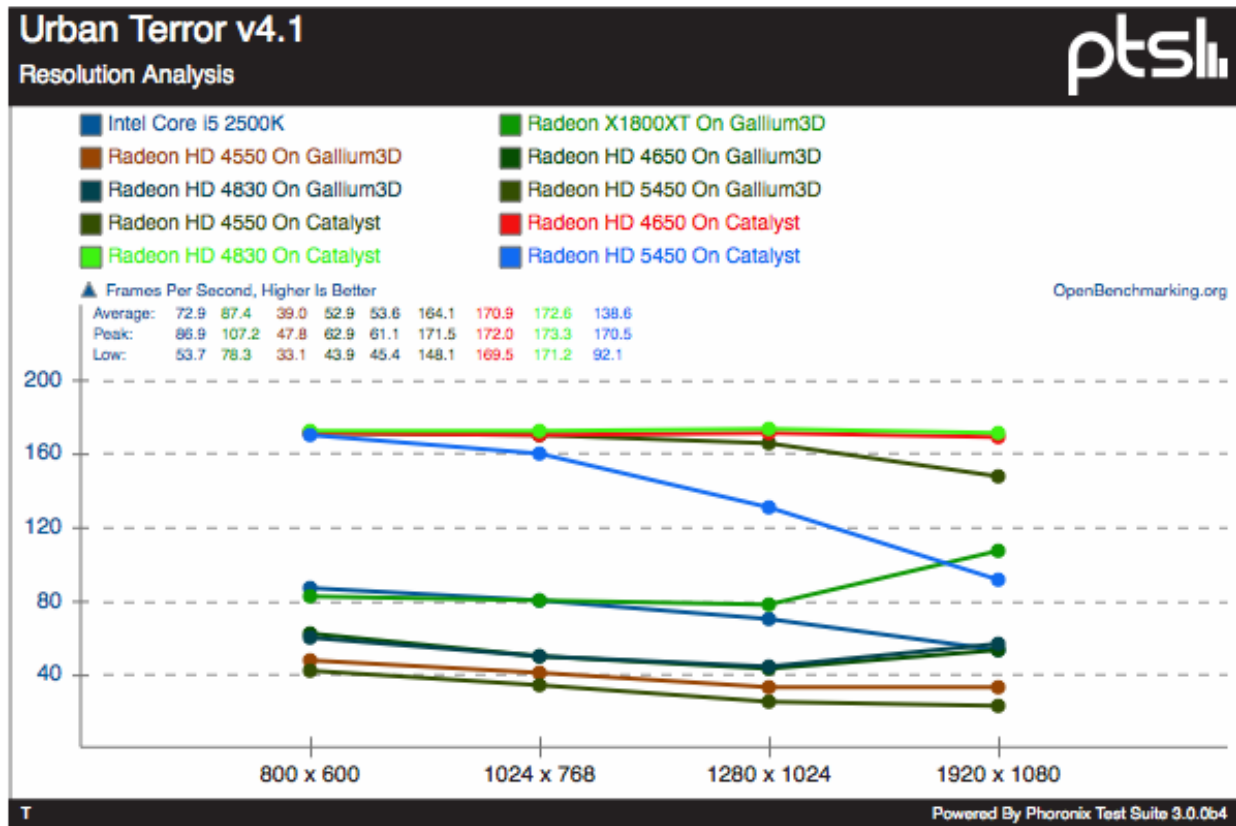
Maybe the Gentoo crowd is onto something after all



What else can I do?

New Hardware

Upgrade the GPU or switch drivers?



Future Standardization

OPC Suite

Standard suite that exercises the primary attributes of a system.

Trivially executable by any user.

Provides a standard performance benchmark that fits into the OPC groupings.

Future Standardization

PCQS Suite

Phoronix Certification and Qualification Suite (PCQS)

Formal validation of a system across a number of functional and system performance areas.

Provides a very high confidence that a system will work.

Future Work

Virtual Build-a-system

Given a particular set of components, explore other systems that contain similar hardware.

Burrow down to a particular set of components that maximize performance.

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Future Work

Crowd Sourced Validation & Benchmarks

Open Source projects can trivially define a suite to be executed by their users.

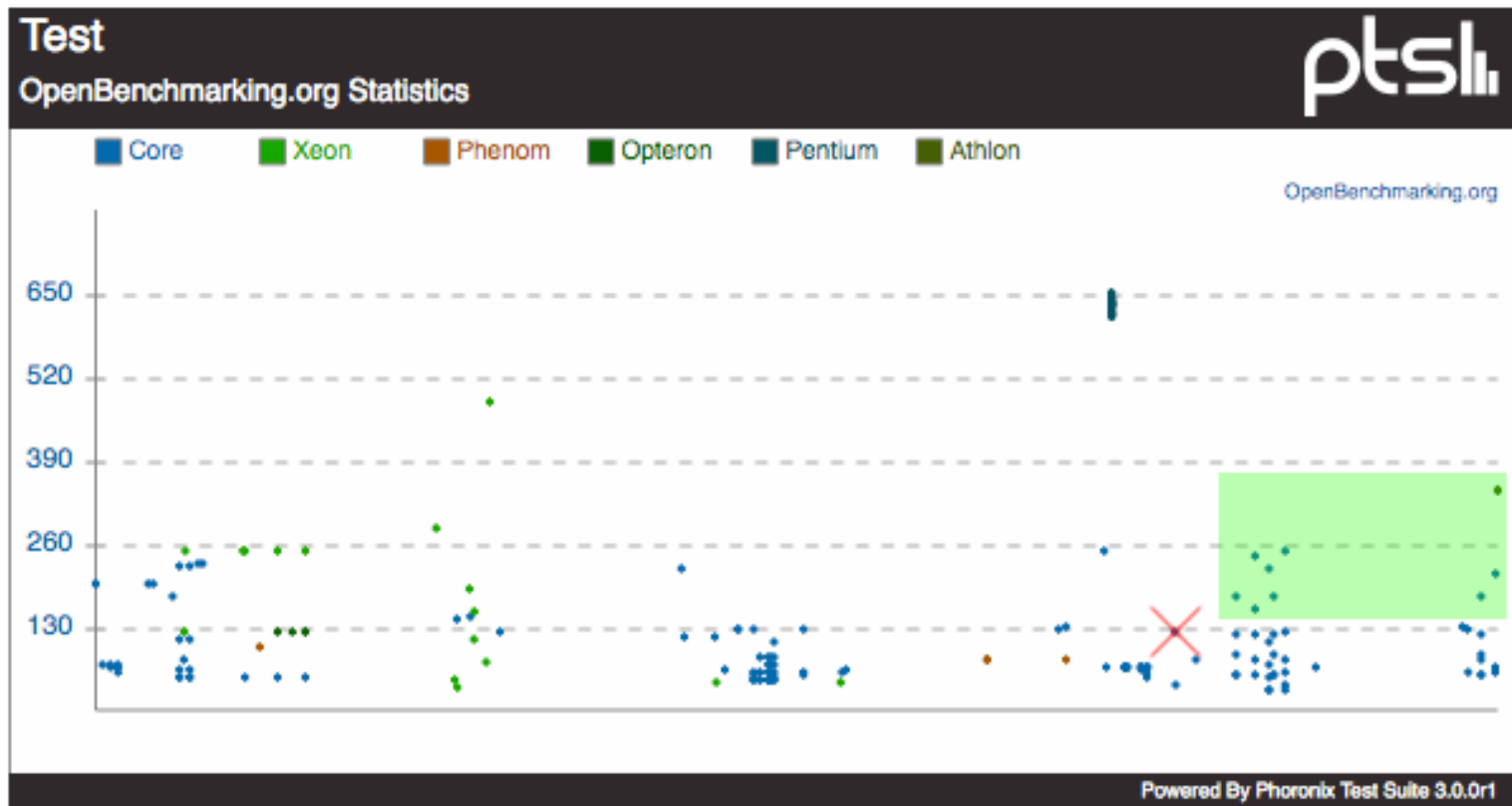
Email the users to run a benchmark command, PTS takes care of the hard work, OpenBenchmarking gives a view of the relative behavior of a large portion of the user base.

No longer do developers need to be tied to their own PCs.

Future Work

Highly interactive comparisons

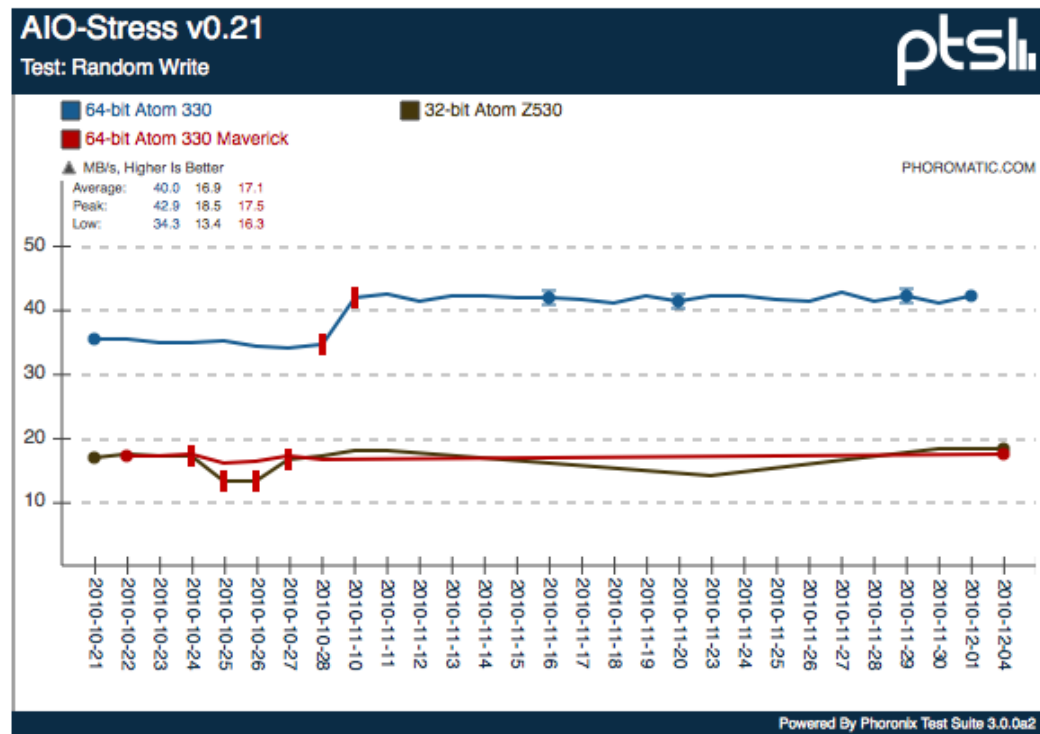
Taking the scenario described above and making it fully interactive across the entire discovery process.



Future Work

Automated Regression Identification System

Similar to git-bisect, PTS can run a collection of automated tests across a set of builds and determine a break point.



Questions?

Phoronix Test Suite - <http://www.phoronix-test-suite.com/>

OpenBenchmarking - <http://www.openbenchmarking.org/>

Phoromatic - <http://www.phoromatic.com/>

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