COMPUTER BUYING ASSIGNMENT

Shelby Elise Simmons

Computer Buying Assignment

1 SCENARIO

Mira Smith is a young professional with several devices for accessing the internet and accessing social media including a Kindle Fire tablet, a MP3 Player, and an IPad and Windows 7 laptop provided by her office. Ms. Smith has acquired a second position recording and editing video and a hobby of playing computer games.

Ms. Smith has been having difficulty running her video editing and game software on her laptop and is noticing greatly reduced multitasking capabilities. According to the software she purchased she needs a video card that includes at least 256MB RAM and at least a Intel Core 2 Duo 1.8 GHz or AMD Athlon X2 64 2.0 GHz or their equivalent for optimal performance, she does not have the appropriate video card, but her laptop does meet the processor requirement. Because Ms. Smith has regular access to high speed wired and wireless connections to the internet via her home network, she has invested in digital music, videos, streaming video and television, and a cloud printer, however she also has DVDs, CDs, flash drives and external hard drives that she uses on a regular basis. Ms. Smith has a large high definition television that she would like to use as a monitor at least some of the time. It has an HDMI and VGA connection. Because Ms. Smith has a wide variety of portable devices, she would like a desktop computer for her new home office that has a large amount of storage for her data as all of her current devices have less than 160 GB of storage. Her devices are all compatible with an Apple computer and she would like to upgrade.

Ms. Smith wishes to purchase a desktop personal computer running IOS6 or newer operating system that exceeds the minimum requirements for her games and video editing software and is designed to run multiple programs at once. She would like to be able to access all of her media via USB 2 or 3 ports and read and write DVDs of her movies. Although she does see this new computer as an investment, she would like to spend less than $3000 for the computer, monitor, and any peripherals, Ms. Smith does not have a preference for any color or size of device. Ms. Smith has a keyboard, mouse, and speakers that are compatible with MAC devices.

2   SELECTED DEVICE – iMAC 27 INCH 3.2GHZ

Ms. Smith Selected the iMac 27 inch 3.2 GHz all-in-one device over the 3.4 GHz version of the same device, the Mac Pro desktop, the Mac Mini, and the MacBook laptop devices. First of all, Ms. Smith would like to have a stable desktop computer instead of a laptop (excluding the MacBook and Air devices, a large viewing screen, significant RAM and a video card with discrete memory. Because Ms. Smith needs to attach other devices, especially external drives with video and music, she needs USB 3.0 ports and a CD/DVD drive. The iMac has all of these features in an attractive package at a price the beats the Mac Pro desktop with a monitor and design factor that exceeds the Mac Mini. Ms. Smith make significant upgrades to the iMac as a part of the purchase of the device including the addition of the fusion drive that adds solid state drive capabilities and external accessories like the smart drive that enables her to use her CDs and DVDs. She did not purchase additional software.

Ms. Smith's evaluation of Apple devices began with Westover and Regaza's (2013) top ten list for desktop computers which included the device she eventually purchased. Westover's comment, "With its beautiful design and quality fabrication, the iMac 27-inch (Late 2012) is the best all-in-one desktop we've ever seen, with a look and feel that manufacturers will be trying to replicate for years. It's not without a few frustrations, like the lack of height adjustment and a price that will give some shoppers a stroke, but there's no denying that the iMac we reviewed—the top spec'ed model of Apple's best configuration—is worth every penny" echos her feelings about the device (2012, p.5).

The devices Ms. Smith decided against had several flaws, including (to varying degrees) negative reviews that highlighted older technology including a lack USB 3 ports, lack of upgradability, lower value for the money, or the lack of a monitor or the ability to connect her existing television (Galbraith, 2012a, 2012b). The upgraded specifications and purchase price of the selected device are included in the chart below and attached documentation (Apple, 2013a, 2013b).

3 APPLE/MAC – SPECIFICATIONS – IMAC 27 INCH

Manufacturer & Model	Apple iMac 27 inch
CPU - Model & Speed	Intel 3.2GHz Core i5
RAM - Amount & Type	16 GB DDR3 SDRAM
Cache - Amount & Type	
Graphics - Amount & Type	NVIDIA GeForce GT, 755M graphics processor with 1GB of GDDR5 memory

Sound	Stereo speakers Dual microphones Headphone port Headphone/optical digital audio output (minijack) Support for Apple iPhone headset with microphone
Speakers	Stereo speakers Headphone port Headphone/optical digital audio output (minijack) Support for Apple iPhone headset with microphone
Network Access - Wired (Ethernet)	10/100/1000BASE-T Gigabit Ethernet (RJ-45 connector)
Network Access - Wireless (WiFi)	Wi-Fi 802.11ac Wi-Fi wireless networking;3 IEEE 802.11a/b/g/n compatible
Other Wireless Capabilities	Bluetooth Bluetooth 4.0 wireless technology
Hard Drive - Size, Type, Speed	1TB (7200-rpm) hard drive (FUSION DRIVE W/ 128GB Solid State drive selected)
Solid State Drive - Size &Type	128MB Solid State
Optical Drive - Type, Speeds	Apple USB SuperDrive play and burn both CDs and DVDs with the Apple USB SuperDrive. It's perfect when you want to watch a DVD movie, install software, create backup discs, and more. http://store.apple.com/us/product/MD564ZM/A/apple-usb-superdrive
Other Drives	N/A
Bays (For Desktops Quantity & Types)	N/A
Expansion Slots (Quantity & Types) **Not common on laptops**	N/A
Media/Memory Card Readers (for things like cards from digital cameras)	SDXC card slot
Ports (Quantity & Types)	Four USB 3 ports (compatible with USB 2) Two Thunderbolt ports

	Mini Display Port output with support for DVI, VGA and dual-link DVI (adapters sold separately) Kensington lock slot Headphone port Headphone/optical digital audio output (minijack) Support for Apple iPhone headset with microphone
Monitor / Screen - type, size, features	Simultaneously supports full native resolution on the built-in display and up to a 30-inch display (2560 by 1600 pixels) on an external display Support for extended desktop and video mirroring modes
Webcam	FaceTime HD camera
Microphone	Dual microphones
Operating System	OS X Mountain Lion Includes Mail, Messages, Contacts, Calendar, Safari, Reminders, Notification Center, Notes, Dictation, iCloud, Time Machine, FaceTime, Photo Booth, AirPlay, Game Center, the Mac App Store, iTunes, Gatekeeper, Twitter and Facebook integration, and more.
Bundled Software	OS X Mountain Lion Includes Mail, Messages, Contacts, Calendar, Safari, Reminders, Notification Center, Notes, Dictation, iCloud, Time Machine, FaceTime, Photo Booth, AirPlay, Game Center, the Mac App Store, iTunes, Gatekeeper, Twitter and Facebook integration, and more.
Optional Software	N/A
Purchase Place	Apple Store
Cost: **Base Computer** **Upgrades & Add-ons** **Software** **TOTAL**	1799.00 786.00 Included 2585.00

Works Cited

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Intel HD Graphics 2500

Apple Store

Items in Your Cart

27-inch iMac		$2,199.00	1	**$2,199.00**

Available to ship: 3-5 business days

Part number: Z0PF

Hardware
- 16GB 1600MHz DDR3 SDRAM - 2X8GB
- 1TB Fusion Drive
- Apple Magic Mouse
- Apple Keyboard with Numeric Keypad (English) & User's Guide
- Accessory Kit
- 3.2GHz Quad-core Intel Core i5, Turbo Boost up to 3.6GHz
- NVIDIA GeForce GT 755M 1 GB GDDR5

Software
- OS X
- iLife '11

☐ This is a gift

Services and Support

AppleCare Protection Plan for iMac - Auto-enroll $169.00
Automatically registered with your Apple Hardware.

Apple USB SuperDrive		$79.00	1	**$79.00**

Available to ship: Within 24 hours

Part number: MD564ZM/A

☐ This is a gift

Apple Thunderbolt cable (2.0 m)		$39.00	1	**$39.00**

Available to ship: Within 24 hours

Part number: MD861ZM/A

☐ This is a gift

Apple TV		$99.00	1	**$99.00**

Available to ship: Within 24 hours

Part number: MD199LL/A

☐ This is a gift

6, 12, or 18 month special financing

Cart subtotal	$2,585.00
Free Shipping	$0.00
? Estimated Tax	Calculate

Total $2,585.00

Save Cart   Chat Now   Check Out

Recommended for You

Smart Baby Monitor by Withings

$249.95

Add To Cart

hipKey Proximity and Movement Alarm

$89.95

Add To Cart

Philips SoundShooter Wireless Bluetooth Speaker

$49.95

Add To Cart

UP by Jawbone

$129.95

Add To Cart

Questions

When will I get my items?

We need your shipping address before we can give you an accurate delivery estimate. We'll provide delivery dates when you enter your shipping information during checkout. Learn more about Shipping & Pickup.

Can I pick up my items at an Apple Store?

Yes. With Personal Pickup, you can order online and pick up your items at your local Apple Store. You'll see more options during the checkout process. Learn more about Personal Pickup.

What payment methods can I use?

You can pay in a variety of ways, including credit/debit cards, Apple Gift Cards, and two financing options. You can also pay with a cashier's check, money order, or wire transfer— just call an Apple Representative at 1-800-MY-APPLE for more information. Learn more about Payment & Pricing.

How is sales tax determined for my order?

The tax listed on the Cart and Checkout pages is an estimate. Your invoice will reflect the final total tax, which includes state taxes, local taxes, and any applicable fees. Learn more about Payment & Pricing.

Does Apple offer an education discount?

Apple offers special pricing for students, teachers, administrators, staff members, and homeschooling programs. If you think you qualify, visit the Apple Store for Education to place your order. Learn more about Payment & Pricing.

What financing options are available?

You can choose between two financing options. Either buy now and pay later with Bill Me Later, or get special financing with the Barclaycard Financing Visa card.

Shop Mac

| MacBook Air | MacBook Pro | Mac mini | iMac | Mac Pro | Mac Accessories | Compare |

Select your iMac

| 21.5-inch iMac | 27-inch iMac |

21.5-inch: 2.7GHz

2.7GHz quad-core Intel Core i5
Turbo Boost up to 3.2GHz
8GB (two 4GB) memory
1TB hard drive[1]
Intel Iris Pro graphics

$1,299.00

Free Shipping
6, 12, or 18 month
special financing

Select

Available to ship:
Within 24 hours

Available for pickup:
Check availability

21.5-inch: 2.9GHz

2.9GHz quad-core Intel Core i5
Turbo Boost up to 3.6GHz
8GB (two 4GB) memory
1TB hard drive[1]
NVIDIA GeForce GT 750M with 1GB
video memory

$1,499.00

Free Shipping
6, 12, or 18 month
special financing

Select

Available to ship:
Within 24 hours

Available for pickup:
Check availability

27-inch: 3.2GHz

3.2GHz quad-core Intel Core i5
Turbo Boost up to 3.6GHz
8GB (two 4GB) memory
1TB hard drive[1]
NVIDIA GeForce GT 755M with 1GB
video memory

$1,799.00

Free Shipping
6, 12, or 18 month
special financing

Select

Available to ship:
Within 24 hours

Available for pickup:
Check availability

27-inch: 3.4GHz

3.4GHz quad-core Intel Core i5
Turbo Boost up to 3.8GHz
8GB (two 4GB) memory
1TB hard drive[1]
NVIDIA GeForce GTX 775M with 2GB
video memory

$1,999.00

Free Shipping
6, 12, or 18 month
special financing

Select

Available to ship:
Within 24 hours

Available for pickup:
Check availability

Looking for an iMac with a Built-in VESA Mount Adapter?

Free shipping. Free returns.   Get education pricing.   6-, 12-, or 18-month special financing.
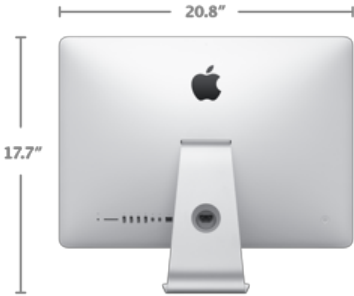
Overview   Tech Specs   Gallery   Compare Desktops

21.5-inch iMac   27-inch iMac

Price	**$1,299.00**	**$1,499.00**	**$1,799.00**	**$1,999.00**
In the Box		• iMac • Apple Wireless Keyboard • Apple Magic Mouse • Power cord		
Processor	2.7GHz quad-core Intel Core i5 processor (Turbo Boost up to 3.2GHz) with 4MB L3 cache	2.9GHz quad-core Intel Core i5 processor (Turbo Boost up to 3.6GHz) with 6MB L3 cache Configurable to 3.1GHz quad-core Intel Core i7 (Turbo Boost up to 3.9GHz).	3.2GHz quad-core Intel Core i5 processor (Turbo Boost up to 3.6GHz) with 6MB L3 cache	3.4GHz quad-core Intel Core i5 processor (Turbo Boost up to 3.8GHz) with 6MB L3 cache Configurable to 3.5GHz quad-core Intel Core i7 (Turbo Boost up to 3.9GHz).
Memory	8GB (two 4GB) of 1600MHz DDR3 memory Configurable to 16GB.		8GB (two 4GB) of 1600MHz DDR3 memory; four user-accessible SO-DIMM slots Configurable to 16GB or 32GB.	
Display	21.5-inch (diagonal) LED-backlit display with IPS technology; 1920-by-1080 resolution with support for millions of colors		27-inch (diagonal) LED-backlit display with IPS technology; 2560-by-1440 resolution with support for millions of colors	
Storage[1]	1TB 1TB (5400-rpm) hard drive Configurable to 1TB Fusion Drive or 256GB or 512GB of flash storage.		1TB 1TB (7200-rpm) hard drive Configurable to 3TB hard drive, 1TB or 3TB Fusion Drive, or 256GB, 512GB, or 1TB of flash storage.	
Size and Weight	Height: 17.7 inches (45.0 cm) Width: 20.8 inches (52.8 cm) Stand depth: 6.9 inches (17.5 cm) Weight: 12.5 pounds (5.68 kg)[2]		Height: 20.3 inches (51.6 cm) Width: 25.6 inches (65.0 cm) Stand depth: 8 inches (20.3 cm) Weight: 21 pounds (9.54 kg)[2]	
Graphics	Intel Iris Pro graphics	NVIDIA GeForce GT	NVIDIA GeForce GT	NVIDIA GeForce GTX

	750M graphics processor with 1GB of GDDR5 memory	755M graphics processor with 1GB of GDDR5 memory	775M graphics processor with 2GB of GDDR5 memory
			Configurable to NVIDIA GeForce GTX 780M with 4GB of GDDR5 memory

| Video Support and Camera	FaceTime HD camera Simultaneously supports full native resolution on the built-in display and up to a 30-inch display (2560 by 1600 pixels) on an external display Support for extended desktop and video mirroring modes Support for Target Display Mode via the Thunderbolt port using a Thunderbolt to Thunderbolt cable (sold separately)

Connections and Expansion	

Headphone   USB 3   Thunderbolt

SDXC card slot   Gigabit Ethernet
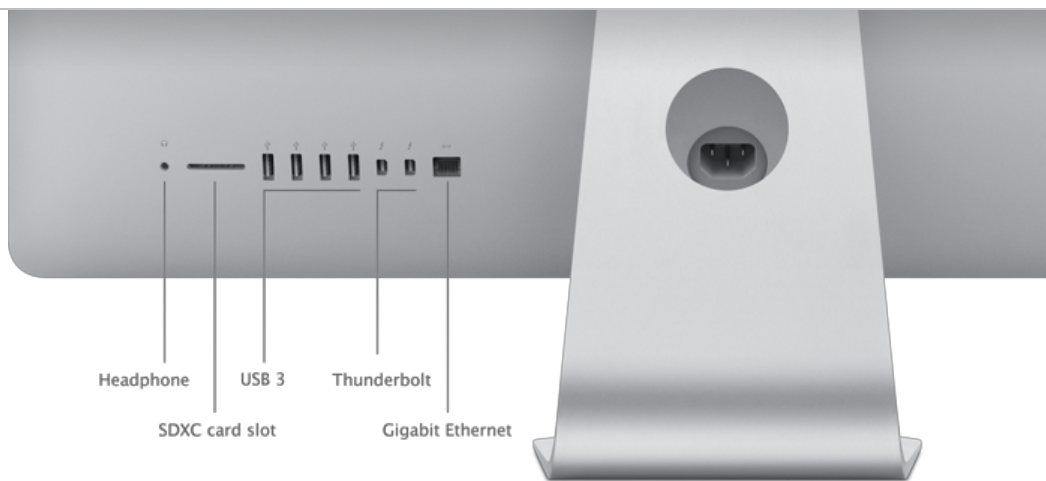
- SDXC card slot
- Four USB 3 ports (compatible with USB 2)
- Two Thunderbolt ports
- Mini DisplayPort output with support for DVI, VGA and dual-link DVI (adapters sold separately)
- 10/100/1000BASE-T Gigabit Ethernet (RJ-45 connector)
- Kensington lock slot

Input	**Apple Wireless Keyboard** Full-size keyboard with 78 (U.S.) or 79 (ISO) keys, including 12 function keys and 4 arrow keys (inverted "T" arrangement) **Magic Mouse** Smooth, seamless Multi-Touch surface with support for simple gestures (scrolling and swiping). Click and double-click anywhere. Ambidextrous construction accommodates left- and right-handed users.

Magic Trackpad

Glass Multi-Touch trackpad for precise cursor control; supports inertial scrolling, pinch and expand, swipe, three-finger swipe, four-finger swipe, tap, double-tap, rotate, screen zoom, scroll, click and drag, click drag and lock, secondary click A and B.

Wireless	**Wi-Fi** 802.11ac Wi-Fi wireless networking;[3] IEEE 802.11a/b/g/n compatible **Bluetooth** Bluetooth 4.0 wireless technology

Audio	• Stereo speakers
	• Dual microphones
	• Headphone port
	    ○ Headphone/optical digital audio output (minijack)
	    ○ Support for Apple iPhone headset with microphone

Electrical and Operating Requirements	• Line voltage: 100-240V AC • Frequency: 50Hz to 60Hz, single phase • Operating temperature: 50° to 95° F (10° to 35° C) • Relative humidity: 5% to 95% noncondensing • Maximum operating altitude: 10,000 feet
Included Software	**OS X Mountain Lion** Includes Mail, Messages, Contacts, Calendar, Safari, Reminders, Notification Center, Notes, Dictation, iCloud, Time Machine, FaceTime, Photo Booth, AirPlay, Game Center, the Mac App Store, iTunes, Gatekeeper, Twitter and Facebook integration, and more. Learn more about OS X Mountain Lion **iLife** Includes iPhoto, iMovie, and GarageBand. Learn more about iLife

Configure to Order

Configure your iMac with these options, only at the Apple Online Store.

Intel HD Graphics 2500

you can mount on a wall or adjustable arm? Choose an iMac with a Built-in VESA Mount Adapter.

21.5-inch iMac 2.7GHz

- Magic Trackpad
- 16GB memory upgrade (two 8GB)
- 1TB Fusion Drive
- 256GB or 512GB of flash storage

21.5-inch iMac 2.9GHz

- Magic Trackpad
- 16GB memory upgrade (two 8GB)
- 1TB Fusion Drive
- 256GB or 512GB of flash storage

:el Core i7 (Turbo Boost up to 3.9GHz) with 8MB L3 cache

27-inch iMac 3.2GHz

- Magic Trackpad
- 16GB memory upgrade (two 8GB)
- 32GB memory upgrade (four 8GB)
- 3TB hard drive
- 1TB or 3TB Fusion Drive
- 256GB, 512GB, or 1TB of flash storage

27-inch iMac 3.4GHz

- Magic Trackpad
- 16GB memory upgrade (two 8GB)
- 32GB memory upgrade (four 8GB)
- 3TB hard drive
- 1TB or 3TB Fusion Drive
- 256GB, 512GB, or 1TB of flash storage
- 3.5GHz quad-core Intel Core i7 (Turbo Boost up to 3.9GHz) with 8MB L3 cache
- NVIDIA GeForce GTX 780M graphics processor with 4GB of GDDR5 memory

Accessories

Mac Software
iWork
Aperture
Logic Pro X
Final Cut Pro X

Displays and Graphics
Apple Mini DisplayPort to DVI Adapter
Apple Mini DisplayPort to VGA Adapter
Apple Mini DisplayPort to Dual-Link DVI Adapter

AirPort and Wireless
Time Capsule
AirPort Express Base Station
AirPort Extreme Base Station

Other Accessories
Magic Trackpad
Apple USB SuperDrive
Apple Battery Charger
AppleCare Protection Plan

Limited Warranty and Service

Your iMac comes with 90 days of free telephone support and a one-year limited warranty. Purchase the AppleCare Protection Plan to extend your service and support to three years from your computer's purchase date. Only the AppleCare Protection Plan provides you with direct telephone support from Apple technical experts and the assurance that repairs will be handled by Apple-authorized technicians using genuine Apple parts. For more information, visit Apple Support or call 1-800-275-2273.

Apple Store   Shop Mac   iMac

Apple Store	More Stores	Customer Help	Store Services	Apple Retail Store
Shop Mac	Refurbished & Clearance	Order Status	Customize Your Mac	Find a Store
Shop iPad	Education	Payment & Pricing	Free Engraving	Complete Store List
Shop iPhone	Business	Shipping & Pickup	Financing	Shop Your Way
Shop iPod	Government	Returns & Refunds	Reuse & Recycling	Workshops and Learning

iMac and the Environment

Apple takes a complete product life cycle approach to determining our environmental impact. Learn more

Apple Stor

iMac is designed with the following features to reduce its environmental impact:

Apple and the Environment

Learn more about Apple's dedication to reducing the

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Copyright

IY-APPLE.

1. 1GB = 1

- Arsenic-free display glass
- BFR-free
- PVC-free[4]
- Mercury-free LED–backlit display
- Highly recyclable aluminum and glass enclosures
- Meets ENERGY STAR Version 5.2 requirements
- Rated EPEAT Gold[5]

environmental impact of our products and process. Or read our Product Environmental Reports for detailed information on the environmental performance of every Apple product.

Recycling

Apple takes a holistic view of materials management and waste minimization. Learn more about how to recycle your Mac.

1. 1GB = 1 billion bytes and 1TB = 1 trillion bytes; actual formatted capacity less.

2. Weight varies by configuration and manufacturing process.

3. Based on an IEEE 802.11ac draft specification.

4. PVC-free AC power cord available in all regions except South Korea.

5. iMac achieved a Gold rating from EPEAT in the U.S. and Canada.

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The 10 Best Desktops

You're ready to replace your old desktop, but aren't sure what to get. We take some of the mystery out of finding your perfect desktop to give you the 10 best desktops on the market today.

41   0   293   22   36   35   Comments

	Apple iMac 27-Inch (Late 2012)	Dell Precision T1700 SFF	Apple iMac 27-inch (Intel Core i5-4670)	Dell Optiplex 9010 AIO	Gateway DX4870-UB2B	Gateway SX2380-UR318	Acer Aspire AZ3-605-UR23	Dell XPS 18	HP Z420	Samsung ATIV One 7 (DP700A3D-A01US)
Name										
Editor Rating										
Lowest Price	$1,749.99 B&H Photo-Video	$989.00 Dell Small Business	$1,794.00 Amazon	$1,155.30 Dell Small Business	$529.99 Amazon	$389.99 Amazon	$919.92 Amazon	$1,349.99 Dell	Best Price Amazon	$1,099.00 Microsoft Store $1099.99 MSRP
Type	Gaming, Mainstream, Multimedia, All-in-one	Workstation	All-in-one	Business, All-in-one	Mainstream, Value	Mainstream, Value	All-in-one, Digital Entertainment System, Touchscreen All-In-One	Mainstream, All-in-one, Touchscreen All-In-One	Workstation, Business, Small Business	All-in-one, Touchscreen All-In-One
Processor Name		Intel Xeon E3-1225 v3	Intel Core i5-4670		Intel Core i3-3240	AMD A6-5400K	Intel Core i5-3337U	Intel Core i5-3337U	Intel Xeon E5-1620	Intel Core i5-3470T
Processor Speed	3.4 GHz	3.2 GHz	3.4 GHz	3.1 GHz	3.4 GHz	3.6 GHz	1.8 GHz	1.8 GHz	3.6 GHz	2.9 GHz
RAM	8 GB	8 GB	8 GB	8 GB	6 GB	6 GB	8 GB	8 GB	16 GB	6 GB
Storage Capacity (as Tested)	1128 GB	500 GB	1128 GB	128 GB	1000 GB	1000 GB	1000 GB	500 + 32 GB	1250 GB	1000 GB
Graphics Card	Nvidia GeForce GTX 680X	Nvidia Quadro K600	Nvidia GeForce GTX 775M	Intel HD Graphics 4000	Intel HD Graphics 2500	AMD Radeon HD 7540D		Intel HD Graphics 4000		Intel HD Graphics 2500
Primary Optical Drive	External	DVD+R DL		DVD+/-RW (Plus Minus)	Dual-Layer DVD+/-RW	Dual-Layer DVD+/-RW			Dual-Layer DVD+/-RW	Dual-Layer DVD+/-RW
Monitor Type	LCD Widescreen		LED Widescreen	LCD Widescreen			LCD Widescreen	LCD Widescreen		LCD Widescreen
Touchscreen			No	Yes			Yes	Yes		Yes
Screen Size	27 inches		27 inches	23 inches			23 inches	18.4 inches		23.6 inches
	Read the Review	Read the Review	Read the Review	Read the Review	Read the Review	Read the Review	Read the Review	Read the Review	Read the Review	Read the Review

By Brian Westover, Laarni Almendrala Ragaza | October 9, 2013

Don't write off the desktop PC just yet—the workhorse of the PC world still has a place. The desktop continues to evolve with stunning new designs, extremely affordable prices, and a range of uses that extends far beyond the home office. Whether you're looking for a standard tower PC or a sleek All-in-One, we've got you covered. Whether you're looking for a crazy fast gaming rig or a computer for streaming movies and TV shows, you'll find something here.

The standard desktop tower still reigns as the basic

PC, ranging from smaller budget-priced systems to powerful towers that can double as workstations or gaming rigs. You'll get a lot of performance and plenty of features even at budget prices, but perhaps the biggest draw for desktop buyers is the fact that, unlike slim laptops that won't even let you swap the battery, the tower still allows the user to maintain and upgrade their system. Even the simple tasks of upgrading RAM or swapping out an old hard drive with a newer, faster solid-state drive will extend the life of a PC for months, or even years.

The PC is making headway in the living room, as well, with home theater PCs (HTPC) gaining ground. These PCs connect easily to an HDTV and tout smaller, sleeker designs that will fit into a home theater set-up without looking too out of place. Whether it's a tiny HTPC for streaming Netflix movies to your TV, or a heavy duty gaming PC that blends in next to stereo equipment, the desktop PC has moved from the office to the den, and the trend looks to continue in future months.

But the biggest shift in the desktop PC is the move from tower-based designs to all-in-one systems which pack the PC components into the chassis or base of the monitor. The result is less cluttered, with fewer cables and without the tower providing extra space stealing bulk on your desk. Since the release of Windows 8, the all-in-one shift has added touch to the mix, providing large screens that can be tapped, swiped, and poked for a more intuitive navigation experience.

But with so many different options, which should you choose? We've sifted through the dozens of desktops on the market and selected the ten choicest systems to pick from.

FEATURED IN THIS ROUNDUP

Apple iMac 27-Inch (Late 2012)
●●●●◐ EC
$2,668 list
$1,749.99 at B&H Photo-Video
The Apple iMac 27-inch (Late 2012) all-in-one PC is the pinnacle of desktop design and manufacturing. It's not perfect, or cheap, but it's worth every penny. Read the full review ››

Dell Precision T1700 SFF
●●●●◐ EC
$994 list
$989.00 at Dell Small Business
For under $1,000, you can get an ISV-compliant workstation that comes with an Intel Xeon CPU and Nvidia Quadro graphics. For the money, this is the single-processor workstation that you should be procuring for scientific/engineering management and your graphics arts folk. Read the full review ››

Apple iMac 27-inch (Intel Core i5-4670)
●●●●○ EC
$1,999 list
$1,794.00 at Amazon
Though it's mainly a speed bump, the inclusion of the latest 4th-generation Intel Core i5 quad-core processor and Nvidia GeForce GTX 775M Kepler graphics bump the Apple iMac 27-inch (Intel Core i5-4670) back to the top spot on our high-end all-in-one desktop list. Read the full review ››

Dell Optiplex 9010 AIO

●●●●○ EC

$2,592.00 list

$1,155.30 at Dell Small Business

The Dell Optiplex 9010 All-in-One desktop brings Windows 8 and touch capability to offices large and small. Read the full review ››

Gateway DX4870-UB2B

●●●●○ EC

$499.99 list

$529.99 at Amazon

The Gateway DX4870-UB2B gives its users what they expect: the latest technology and decent power in an inexpensive desktop PC. It's what we currently recommend for general-purpose computing. Read the full review ››

Gateway SX2380-UR318

●●●●○ EC

$489.99 list

$389.99 at Amazon

If you're looking to spend under $500, but still expect a laundry list of features in a new PC to replace that old clunker in your den, then the Gateway SX2380-UR318 will give you just about all you need in a new Windows 8 desktop. Read the full review ››

Acer Aspire AZ3-605-UR23

●●●●○

$999 list

$919.92 at Amazon

The Acer Aspire AZ3-605-UR23 has a lot of intelligent features we'd like to see on most if not all all-in-one desktop PCs in the future. Read the full review ››

Dell XPS 18

●●●●○

$1399.99 list

$1,349.99 at Dell

The Dell XPS 18 fulfills a niche somewhere between a large screen ultrabook and a dedicated all-in-one desktop PC. It mostly works, though the market for such a product is still in its beginning stages. Read the full review ››

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$1,099.00 at Microsoft Store

The Samsung Series 7 (DP700A3D-A01US) all-in-one desktop has a very good bang for the buck, and includes a lot of features we'd say are must-haves in a new midrange all-in-one desktop with Windows 8. Read the full review ››

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Apple iMac 27-Inch (Late 2012)

EDITOR RATING: **EXCELLENT**   52 COMMENTS

REVIEW   COMMENTS   SPECS   COMPARE

MSRP	LOWEST PRICE
$2668.00	**$1,749.99**

B&H Photo-Video   **$1,749.99**
                    +FREE SHIPPING

VIEW ALL **9** PHOTOS IN GALLERY

PROS
Stunningly thin design. Impressive low-glare display. Top-of-the-line processor and graphics card offer best-in-class performance. User serviceable memory slots. Ports include

Thunderbolt and USB 3.0.

CONS
Pricey. No upgradability beyond RAM. No height adjustment.

BOTTOM LINE
The Apple iMac 27-inch (Late 2012) all-in-one PC is the pinnacle of desktop design and manufacturing. It's not perfect, or cheap, but it's worth every penny.

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EDITORS' CHOICE

BY BRIAN WESTOVER Viewing Apple's iMac 27-inch (Late 2012) desktop (model MD096LL/A) from the front, it looks at first as if Apple is doing the same thing to the iMac that it did with the Mac mini (Late 2012) $759.99 at B&H Photo-Video-Pro Audio: updating the internal hardware but leaving the exterior unchanged. The edge-to-edge glass over the display, the wide brushed aluminum "chin" below the display, the single piece aluminum stand —it's clearly an iMac. If looking at it from the front, side by side, the new model would be indistinguishable from last year's iMac, the Apple iMac 27-inch (Thunderbolt). That illusion is broken as soon as you view the iMac from an angle. Suddenly the difference is dramatic—this thing is thin, dropping nearly a full inch at the edges. And the differences are more than skin deep. ==Thanks to upgraded hardware and a new internal design, the iMac is faster and more responsive, offering larger, smarter storage. It all adds up to be our new Editors' Choice for high-end all-in-one desktops.==

COMPARE SIMILAR PRODUCTS

COMPARE

Apple iMac 27-Inch (Late 2012)	Apple iMac 27-inch (Thunderbolt)	Dell XPS One 27	Asus ET2701INKI-B046C
$1,749.99		$1,649.99	
B&H Photo-Video		Dell Small Business	

Design and Features

From the front, the system looks almost identical to the previous iteration, the Apple iMac 27-inch (Thunderbolt), but you may notice that the display looks a little bit better. The 27-inch panel has the same 2,560-by-1,440 resolution, and a backlit panel with In-Plane Switching (IPS) technology offers clear viewing from 178 degrees, and glowing with up to 300 nits brightness. This isn't all about numbers, though—when compared side-by-side with the Acer Aspire 7600U (A7600U-UR308) $1,485.00 at Amazon, the higher resolution display on the iMac is far better to the naked eye.

VIEW ALL 9 PHOTOS IN GALLERY

It also features full lamination construction, removing the two-millimeter gap between the display panel and the glass covering it. Thanks to this lamination process, as well as specialized coatings on the glass, the display is much less reflective than the previous model—75-percent less reflective, according to Apple. Despite the changes, the color is still true-to-life and compatible with professional color calibration tools. Shoppers looking for a touch screen will need to look elsewhere, but it's just as well, because the glass picks up every possible smudge and fingerprint. You'll want to keep a soft cloth handy for wiping off dust and smudges if you tend to move the system around or adjust its angle often.

The chassis is also dramatically thinner. At the tapered edges of the display, the chassis is a mere 0.2 inch thick—thinner than the stand it sits on—and the overall thickness of the iMac has been reduced by almost half. The iMac has the same sturdy aluminum stand seen in past models, but there's still no good way to adjust the monitor height aside from setting it on something higher.

The back of the iMac is curved to accommodate its internal components, but even with this extra thickness, it's still jaw-droppingly thin. A healthy amount of the dropped width can be attributed to the now-absent optical drive. If you're still holding on to software and movies on disc, you'll need to pick up an Apple USB SuperDrive ($79 direct), and it still won't offer Blu-ray playback. For a system with integrated Blu-ray, look to Windows systems like the

Asus ET2701INKI-B046C or the former Editors' Choice Dell XPS One 27.

The bottom edge of the iMac is just as thin as the top and sides, but is slotted for ventilation and sound. Integrated speakers provide what Apple calls "higher-fidelity" sound, and by and large, it lives up to the name with vibrant sound and surprisingly rich bass. Apple has touted that the audio offers a larger soundstage, meaning that the area for optimal sound listening is deeper and wider. At the top of the chassis, above the screen, are an HD FaceTime webcam (for capturing video in 720p) and two integrated microphones, which offer clearer voice recording while filtering out ambient noises, like typing and noise in the surrounding room.

The iMac also comes bundled with Apple's Wireless Keyboard and your choice of either the Apple Magic Mouse or Apple Magic Trackpad. If you want both (like we did), you can pick one when you configure your system and add the other for an extra $69 (direct). Both pointing devices also offer support for gesture controls, giving you all of the multiple-finger-gesture controls found in OS X Mountain Lion.

On the back of the system, you'll find the ports and connectors—a stereo minijack, an SDXC card reader, four USB 3.0 ports, two Thunderbolt ports, and Gigabit Ethernet. You may not initially recognize them as USB 3.0 ports, however, because Apple eschews the traditional blue port color and Super-speed logo. Thankfully, with only USB 3.0 ports available, and because they are all USB 2.0 compatible, you won't need to remember which type of device you're using. The two Thunderbolt ports can be used for either blazingly fast data connections or monitor outputs, as they double as mini-DisplayPorts. You can also use the Thunderbolt ports in Target Display mode to view output from a Mac mini, another iMac, or a Thunderbolt-equipped MacBook Pro or Air. For those needing to connect to a monitor via DVI or VGA, adapters are available separately. Also, unlike the Asus ET2701INKI-B046C or the Dell XPS One 27, there is no input for using the iMac as an HDMI monitor, so there's no option of connecting your cable box or game console, so you're limited to what you can get on the Mac App Store, iTunes, or other online services.

The SDXC card reader, which was found alongside the optical drive on the side in previous models has moved. The new position isn't quite as convenient, but it's no more of a hassle than plugging in a USB flash drive. Noticeably absent is any FireWire port. Though it was included on the Mac mini (Late 2012), FireWire has been largely phased out by Apple, as it wasn't included on either the new iMac or the new Retina Display-equipped MacBooks.

Alongside the ports on the back of the iMac, you'll also find a small access panel, which lets you service and upgrade the system memory. To pop it open, all you need to do is remove the power cable and tap a button underneath. While our system came with the standard 8GB of RAM, a total of 4 SO-DIMM slots let you upgrade to a whopping 32GB of DDR3 memory. It's worth noting, however, that between the 27-inch and 21.5-inch models, only the 27-inch iMac is user serviceable in this way. Internally, the iMac is equipped with 802.11n Wi-Fi and Bluetooth 4.0.

Fusion Drive

Our review unit also came equipped with Apple's 1TB Fusion Drive, which pairs a 1TB hard drive with 128GB of flash storage, automatically shifting programs and files between the two to offer the best performance. This dynamic memory management is done automatically, with only one drive volume to manage, providing all of the performance of a dual-drive setup without the hassle of manually managing your files.

What makes this setup different from hybrid drives, however, is that the Flash storage is not acting as a cache, mirroring data from the drive. Also, the optimization process is ongoing, continuously evaluating each piece of data as it is accessed by the user, shifting it back and forth to maximize performance. Once your iMac gets into a routine and is optimized, this setup can save wear and tear on the spinning hard drive, since oft-used programs and files will eventually reside on Flash storage. All of this work happens in the background, with data evaluated in real time, and shifted to and from the Flash storage

during idle times so as not to slow down performance during data intensive actions. For more on the Fusion drive, see our article, 5 Things to Know about Apple's Fusion Drive.

In addition to the 1TB Fusion Drive found in our review unit, the iMac 27-inch can also be equipped with a larger 3TB Fusion Drive, as well as plain 1 or 3TB hard drives, or an all flash memory 768GB solid-state drive.

Mac OS X and Software

As with the Mac mini and the MacBook Pro, the iMac comes with OS X 10.8 Mountain Lion (OS X 10.8.2 on our review unit) preinstalled on the 128GB flash storage portion of the Fusion Drive for optimum performance. With either the Magic Mouse or Magic Trackpad, you'll be able to use a wide array of multi-touch gestures, along with a full roster of programs like iTunes, iPhoto, iMovie, and GarageBand. The programs themselves are top-rated, and Mountain Lion itself was picked as one of the best tech products of 2012.

In addition to the operating system and programs, Apple covers the iMac with 90 days of free telephone tech support and a one-year warranty. For extra protection and longer coverage, you can also purchase two more years of AppleCare coverage ($169).

Configuration Options

Our review unit is a slightly different configuration than the pre-configured model that Apple offers for $1,999. In addition to the aforementioned 1TB Fusion Drive (a $250 extra), and the second pointing device ($69 for either the Magic Mouse or Trackpad), our review

unit is configured with a 3.4GHz quad-core Intel Core i7 processor (which added an extra $200 to the price) instead of the standard 3.2GHz Core i5, and swaps out the standard Nvidia GeForce GTX 675MX with 1GB of dedicated memory for the GeForce GTX 680MX with 2GB ($150). These brought the total cost of our review unit to $2,668 when purchased directly from Apple. It should be noted, however, that unlike a desktop tower that allows upgrading over time, the only part of the iMac that can be changed after purchase is the amount of RAM.

Additionally, if you want to expand the amount of memory included with the iMac the standard 8GB can be bumped up to either 16GB ($200) or 32GB ($600), but the user accessible memory slots give you the option of expanding this yourself after purchase.

Performance

With the shift from older Intel Core processors to the faster Ivy Bridge chips—and the upgrade to the 3.4GHz Intel Core i7 quad-core processor found in our review unit—this iMac positively screams, offering the most powerful Mac this side of the workstation-grade Mac Pro. In Cinebench R11.5, our processor speed benchmark test, the iMac scored 7.36 points, rocketing past the under-powered Acer 7600U (2.88 points), easily surpassing the previous iMac (5.10), and leading both the Dell XPS One 27 and Asus ET2701INKI-B046C (7.04 and 7.08, respectively) by a healthy margin.

Performance Tests

	Processor	Graphics chipset	Handbrake ▼ min:sec	CineBench ▲ R11.5
Apple iMac 27-inch (Late 2012)	Intel Core i7 Quad-Core (3.4GHz)	2GB Nvidia GeForce GTX	0:32	7.36
Dell XPS One 27	Intel Core i7-3770S (3.1GHz)	1GB Nvidia GeForce GT 640M	N/A	7.04
Apple iMac 27-inch (Thunderbolt)	Intel Core i5-2400 (3.1GHz)	1GB AMD Radeon HD 6970	N/A	5.10
Acer Aspire 7600U (A7600U-UR308)	Intel Core i5-3210M (2.5GHz)	2GB Nvidia GeForce GT 640M	1:14	2.88
Asus ET2701INKI-B046C	Intel Core i7-3770S (3.1GHz)	1GB Nvidia GeForce GT 640M	N/A	7.08

RED denotes Editors' Choice.   N/A—Not applicable: The product could not complete the test, or the test was not compatible.

It also made short work of our current media tests, plowing through Handbrake in 32

seconds--the Acer Aspire 7600U took 1:16—and Photoshop CS6 in 3 minutes 16 seconds. To get a clearer comparison against the previous iMac, we dusted off our prior Photoshop test (CS5) as well. The new iMac finished in a speedy 3 minutes 8 seconds, while the iMac 27-

inch (Thunderbolt) finished the same test in 3:17. For the Mac-friendly designer or videographer, the iMac is still the machine you'll want on your desk.

With an Nvidia GeForce GTX 680MX graphics processor and 2GB of dedicated GDDR5 video memory, the iMac also has some serious gaming chops. In our gaming benchmark, Heaven, the iMac produced 104 frames per second (fps) at 1,366-by-768 resolution, but maintained a playable score of 34 fps even at its native 2,560-by-1,440 resolution and higher detail settings. For optimal performance, you'll want to find a resolution somewhere in between, but with performance like that, you should be able to enjoy any Mac-compatible game you throw at it.

With its beautiful design and quality fabrication, the iMac 27-inch (Late 2012) is the best all-in-one desktop we've ever seen, with a look and feel that manufacturers will be trying to replicate for years. It's not without a few frustrations, like the lack of height adjustment and a price that will give some shoppers a stroke, but there's no denying that the iMac we reviewed—the top spec'ed model of Apple's best configuration—is worth every penny. As a result, it replaces the Dell XPS One 27 as our high-end all-in-one desktop Editors' Choice.

BENCHMARK TEST RESULTS:
Check out the test scores for the Apple iMac 27-inch (Late 2012)

Compare the Apple iMac 27-inch (Late 2012) with several other desktops side by side.

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BY BRIAN WESTOVER

ANALYST, HARDWARE

Brian Westover is an Analyst for the Hardware Team, reviewing laptops, desktops, and storage devices. As a child, Brian was frequently asked "What do you want to be when you grow up?" His answer alternated between...

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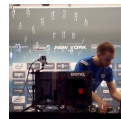
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Apple iMac (27-inch, September 2013) review:

New processors and faster Wi-Fi for Apple's slim desktop

CNET Editors' Rating

4.0

Stars
Excellent

$1,999.00 [http://www.cnet.com/desktops/apple-imac-2013/4014-3118_7-35827456.html?orderBy=totalPrice#onlineStores]

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The good: With the addition of Intel's Haswell chips, plus 802.11ac wireless, faster SSD hard drives, and new Nvidia GPUs, the latest **Apple iMac** is a thoroughly up-to-date desktop.

The bad: Other big-screen all-in-one systems have handy extras missing here, such as touch screens and HDMI inputs.

The bottom line: Anyone who bought last year's redesigned iMac doesn't need to upgrade, but for owners of older models or anyone looking to switch, the latest 27-inch Apple iMac offers a wide-ranging set of internal upgrades.

Editors' Top Picks

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Dell XPS One 27 (Windows 8) [http://www.cnet.com/desktops/dell-xps-one-27/4505-3118_7-35485706.html]

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Set price alert »

It's telling that the latest set of updates to Apple's iMac all-in-one desktop were not announced at one of the company's regular stage shows. Instead, the new iMac slipped quietly into Apple's Web site, the news announced via an understated press release

posted early in the morning.

That's because the updates are internal, putting new hardware inside an iMac body that received a major makeover in 2012. From the outside, this is the same slim screen sitting on top of an aluminum stand and minimalist base. The design was controversial last year, with the iMac's razor-thin edge and bulging center creating an optical illusion that the entire system was as slim as an iPad. We're not quite there yet, but even in its second year, the iMac's design still feels modern, and unlike anything else on the market.

Inside, you'll find exactly the kind of revisions one would expect from a quiet hardware update. Intel's latest fourth-generation Core i-series processors are here, also known by the code named Haswell. In our tests with other Haswell systems, we've found modestly improved performance and greatly improved battery life, although the latter won't matter here.

Our review sample has the faster of two base CPUs offered in the 27-inch size, plus a fusion hard drive that combines a 1TB HDD with a 128GB SSD, for a total of $2,199. The least-expensive 27-inch iMac is $1,799.

The built-in Wi-Fi has been updated to the new 802.11ac standard, which offers faster data speeds when connected to a compatible 802.11ac router. Both of these upgrades previously found their way into Apple's MacBook Air laptops back in June 2013.

The SSD internal storage options are now connected via PCIe, which the company says increases drive performance if you order an iMac with either SSD storage or a fusion drive with both SSD and HDD components.

Finally, the fall 2013 iMac gets GPUs from Nvidia's latest series, the GeForce 755M, 775M, or 780M in the 27-inch models, and the GeForce 750M in the higher of two 21.5-inch models.

Taken together, these updates don't radically change the iMac experience. But they do take an already excellent desktop and make it very up-to-date for the holiday season and beyond, and at this point, it's hard to suggest any midprice or higher computer that doesn't have Intel's Haswell processors.

That leaves us in the unusual situation of having MacBook Air laptops and iMac desktops with Intel's current generation of processors, but the high-end **MacBook Pro, including the models with the Retina Display [http://www.cnet.com/laptops/apple-macbook-pro-with/4505-3121_7-35331572.html]**, still using last year's third-generation Intel chips, to say nothing of the Mac Mini.

Some of the best Windows 8 all-in-ones, such as the **Dell XPS 27 [http://www.cnet.com/desktops/dell-xps-27-all/4505-3118_7-35792394.html]** , add additional features not found here, chief among them a touch screen and an HDMI input so these big, high-resolution screens can also be used with other devices. Neither is a deal breaker, nor expected anytime soon.

One final note for those about to invest in a new iMac: Apple's next operating system upgrade, named OS X Mavericks, is expected sometime in the next several weeks. That leaves early adopters wondering if the update will be free for everyone, if they'll get a free upgrade while other Mac owners have to pay for the update, or if they'll be stuck paying $20 or so for Mavericks so soon after buying their new iMacs.

	Apple iMac (27-inch, September 2013)	Dell XPS 27	MacBook Air 13-inch (June 2013)	Apple iMac (27-inch,November 2012)
Price	$2,199	$2,099	$1,099	$2,599
Display size/resolution	27-inch, 2560x1,440 screen	27-inch, 2,560x1,440 touch screen	13.3-inch, 1,440x900 screen	27-inch, 2560x1,440 screen
PC CPU	3.4GHz Intel Core i5 4670	3.1GHz Intel Core i7-4770S	1.3GHz Intel Core i5 4250U	3.4GHz Intel Core i7 3770
PC Memory	8GB DDR3 SDRAM 1600MHz	8GB 1,600MHZ DDR3 SDRAM	4GB DDR3 SDRAM 1600MHz	8GB DDR3 SDRAM 1600MHz
Graphics	2GB Nvidia GeForce GTX 775M	2GB Nvidia GeForce GT750M	1,024MB Intel HD Graphics5000	2GB Nvidia GeForce GTX 680M
Storage	128GB SSD 1TB hybrid hard drive	2TB, 7,200 rpm hard drive	128GB SSD hard drive	128GB SSD 1TB hybrid hard drive
Optical drive	None	Blu-Ray/DVD/DVD RW combo	None	None
Networking	802.11a/c wireless, Bluetooth 4.0	Gigabit Ethernet, 802.11b/g/n wireless, Bluetooth 4.0	802.11a/c wireless, Bluetooth 4.0	802.11n wireless, Bluetooth 4.0
Operating system	OSX Mountain Lion 10.8.5	Windows 8 (64-bit)	OSX Mountain Lion 10.8.4	OSX Mountain Lion 10.8

Design and features

The current iMac design blew a lot of minds when **first unveiled by Apple in October 2012 [http://www.cnet.com/imac/]** . The artful photography and clever angles made the system look completely flat, although once you got to see it in person, you could see that the rear panel curves out in the center. So, no, it's not as paper-thin as one might think at first glance, but there's still a notable lack of bulk for a high-powered 27-inch all-in-one. (Note, for example, the thick slablike design of the Dell XPS 27, probably this system's closest competitor.)

The bowl-like panel and curved one-piece stand make this among the most organic-feeling of Apple's products, which is fitting for an all-in-one. That desktop subgenre is most closely associated with family computer use, kitchen PCs, or creative/artistic work, in a way that a no-nonsense tower chassis or an on-the-go laptop is not.

The design is a year old now, so it doesn't grab the eye as it once did, but it's still a great example of what happens when aesthetic considerations come first, not as an afterthought.

We didn't notice any changes to the system exterior for this 2013 update. The iMac still has last year's less-reflective screen, hidden memory slots, and rear-panel-only ports. As with most all-in-one PCs, and nearly every Apple computer (except the Mac Pro), there's no easy user access to components -- except for the RAM, this is essentially a sealed system, unless you're willing to do some warranty-voiding surgery.

Apple's single-cable strategy is evident here. For most users, you'll simply need to connect a white power cable and that's it. The built-in Wi-Fi eliminates the need for an Ethernet cable, and the included keyboard and mouse are wireless and arrive ready to use.

The standard Apple wireless keyboard and Magic Mouse have been static for a few generations of hardware now. The keyboard is still top-notch -- compact, but with large, deep keys, and a logical layout. The mouse is certainly a widely used model, and has its fans, but it's never been one of my favorites, perhaps because my reflexes are so tied into the physical click of separate left and right mouse buttons and a physical scroll wheel. But I'm actually much more partial to touch pads these days, either Apple's Magic Trackpad for OS X systems or something like Logitech's T650 touch pad for PCs. Outside of gaming, an actual mouse rarely crosses my palm anymore.

I originally thought you were tied to the mouse as your input device, but was pleased to

discover that you can actually swap it out for Apple's Magic Trackpad in the configuration options, which makes sense as both cost the same $69 if purchased separately.

Any all-in-one PC lives or dies based on its display. The version here is identical to last year's and is an LED-backlit LCD with a 2,560x1,440-pixel native resolution. That better-than-HD resolution is common now in 27-inch systems, and is identical to our Windows-side favorite, the XPS 27 from Dell. Some computers are experimenting with even higher resolutions, including Apple's 15-inch Retina MacBook Pro, with a 2,880x1,800-pixel screen, or a handful of 3,200x1,800-pixel laptops, such as **Lenovo's 13-inch Yoga 2 Pro [http://www.cnet.com/laptops/lenovo-ideapad-yoga-2/4505-3121_7-35827161.html]** .

The screen on the 27-inch iMac, though not a matte display, is less reflective than most, a change that started with the 2012 version. Apple's displays are always bright, clear, and consistent, which makes me wish there was a way to use the display for other devices, a feature some Windows all-on-one PCs offer via an extra HDMI input port.

Apple iMac (27-inch, September 2013)	
Video	Mini DisplayPort (x2)
Audio	Stereo speakers, combo headphone/microphone jack
Data	4 USB 3.0, SD card reader
Networking	Ethernet, 802.11ac Wi-Fi, Bluetooth
Optical drive	None

Connections and performance

While some may knock Apple's MacBook Air laptops for not offering enough ports and connections, the same can't be said for the iMac. In a single row on the back of the display chassis, you'll find four USB 3.0 ports, two Thunderbolt/Mini DisplayPort connections, an SD card slot, Ethernet jack, and headphone plug. It's hard to imagine you'd need much more, especially as the Thunderbolt ports can connect to two external monitors.
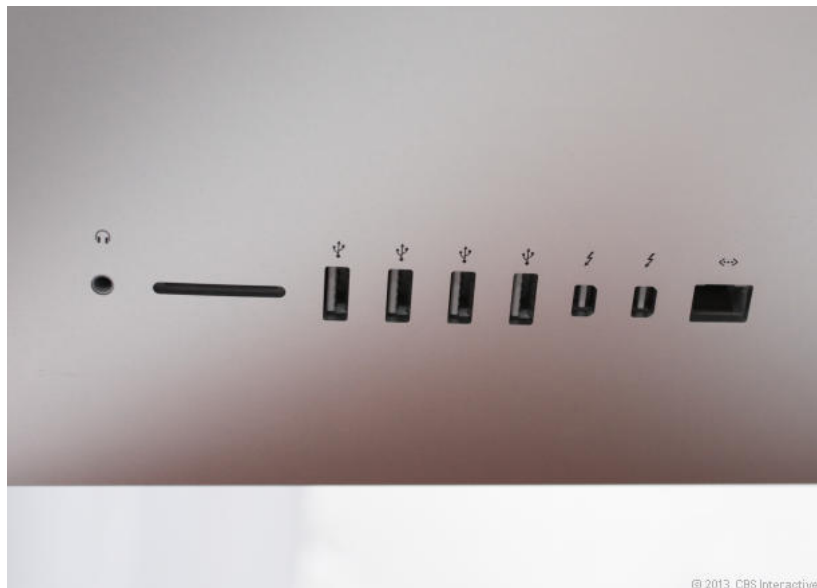
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1 2 [HTTP://WWW.CNET.COM/DESKTOPS/APPLE-IMAC-2013/4505-3118_7-35827456-2.HTML]

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Dell XPS One 27 (Windows 8) [http://www.cnet.com/desktops/dell-xps-one-27/4505-3118_7-35485706.html]

4.0 stars

[http://www.cnet.com/desktops/dell-xps-one-27/4505-3118_7-35485706.html]

[http://www.cnet.com/desktops/origin-chronos-february-2012/4505-3118_7-35160534.html]

Origin Chronos (February 2012) [http://www.cnet.com/desktops/origin-chronos-february-2012/4505-3118_7-35160534.html]

Starting at$1,199.00 [http://www.cnet.com/desktops/origin-chronos-february-2012/4014-3118_7-35160534.html]

4.0 stars
[http://www.cnet.com/desktops/origin-chronos-february-2012/4505-3118_7-35160534.html]

[http://www.cnet.com/mac-mini-fusion-drive/]

Apple Mac Mini [http://www.cnet.com/mac-mini-fusion-drive/]

4.0 stars
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DeeeNYC [http://www.cnet.com/profile/DeeeNYC] Oct 1, 2013

From what I understood Haswell really only benefits laptops since it's a weaker chip that just
uses less power and produces less heat.

/ **like [ ]reply [ ]**

gidgiddonihah [http://www.cnet.com/profile/gidgiddonihah] Oct 1,
2013

@DeeeNYC [http://www.cnet.com/profile/DeeeNYC]

It is actually just a bit more powerful, maybe 5%, with the loss of overclocking potential for those
people who do care (I would if I was building my own Intel system). The biggest concern is for
mobile setups. It uses much less power than previous "i" series so battery life is much, MUCH
better and the graphics chipset is 30-50% faster than Ivy Bridge.

The two major complaints about Intel right now is that they are not advancing performance (no
real boost in performance since Sandy Bridge) and that their last few releases have not done
well in the overclocking world.

/ 2**like [ ]reply [ ]**

CNET Reviews

Apple iMac (27-inch, September 2013) review:

New processors and faster Wi-Fi for Apple's slim desktop

Above the row of connections, a small trap door allows you to access the system's RAM to change the modules. To open the door, you must unplug the power cable and press a small release button. It's nice to have at least one user-accessible component, but I suspect many consumers would rather have access to the hard-drive bays.

Our 27-inch iMac is the higher-end of two 27-inch base models, with the addition of a Fusion Drive combining a 1TB HDD and 128GB of SSD storage. This configuration takes advantage of the new PCIe connection for faster flash modules, and the total comes out to $2,199. The base high-end model includes just the 1TB HDD for $1,999. In the less-expensive $1,799 iMac, the Intel Core i5 CPU gets clocked down from 3.4GHz to 3.2GHz, and the GPU goes from a GeForce 775 to a 755 with less onboard memory.

Also updated in this round is the 21.5-inch iMac, with slower Intel Haswell-generation Core i5 CPUs, and only Intel's integrated graphics in the lowest-end $1,299 version.

The 3.4GHz Intel Core i5 in our review sample is more than fast enough for just about any task, or series of tasks, and matches up well with other Haswell systems we've tested. One difference is that this is a Core i5 CPU, whereas other comparably expensive recent all-in-one systems give you a faster Core i7 CPU, as one might expect to find for such a sizable investment. You can upgrade to a Core i7 here for $200.

In our benchmark tests, the Core i5 iMac held its own against a couple of Core i7 all-in-one desktops, and was much faster than the Haswell-powered 13-inch MacBook Air that was released a few months ago. Last year's iMac was faster in our multitasking test, but that was a system with the expensive Core i7 upgrade.

It's great to have a high-powered GPU in a nongaming system, in this case the newish Nvidia GeForce 775M. Video and photo applications may benefit, and the system can drive two external displays, but it's also starting to be a lot easier to be a Mac gamer. Steam, GOG.com, and other game distributors have robust Mac sections now, and Windows games are finally being ported to OS X within months, not years.

Two excellent 2013 games, BioShock Infinite and Metro: Last Light, are both available on Macs now, although some would call them incomplete versions. While we use those games as PC benchmarks, on the OS X versions, most of the graphics options are unavailable, and the Mac version of BioShock Infinite even caps the resolution at 1,600x900, which is a real shame for a 2,560x1,440 monitor. Both games, however,

played well at the highest detail settings allowed, and hopefully they will be patched to allow higher resolutions and better graphics options.

Our old Mac standby, Call of Duty 4: Modern Warfare, ran at 89 frames per second at the highest detail settings and full 2,560x1,440 resolution. On a 2012 iMac, the same game ran at 78.3 frames per second. Both iMacs also ran Diablo III at the screen's native resolution at about 58 frames per second.

Conclusion

In you already own last year's slim iMac, there's no reason to upgrade. The new Haswell CPUs, Nvidia graphics cards, and faster Wi-Fi and flash storage are good to have, but don't radically alter the iMac experience. If you have an older model, then it's a more compelling case. And ==now that it has the latest parts, you don't need to worry about paying top dollar for out-of-date tech.==

Keep in mind that Apple's extra-cost AppleCare extended warranty is practically required, as these are much less user-serviceable than many other desktops. At least at $169 for a three-year term, it's a small add-on relative to the system's premium price.

Power users may be waiting for the radically redesigned new Mac Pro, coming later in 2013, but for everyone else who wants a big-screen Apple experience, this is the default.
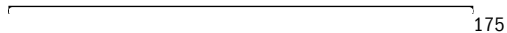
Adobe Photoshop CS5 image-processing test (in seconds)

(Shorter bars indicate better performance)

Apple iMac (27-inch, September 2013)
175

Asus ET2702
175

Dell XPS 27
[http://www.cnet.com/desktops/dell-xps-27-all/4505-3118_7-35792394.html]
180

Apple iMac (27-inch, November 2012)
[http://www.cnet.com/imac/]
199
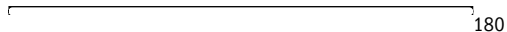
MacBook Air 13-inch (June 2013)
[http://www.cnet.com/apple-macbook-air-13-inch/]
333

Apple iTunes encoding test (in seconds)

(Shorter bars indicate better performance)

Apple iMac (27-inch, November 2012)
[http://www.cnet.com/imac/]
52

Apple iMac (27-inch, September 2013)
54

Asus ET2702
80

MacBook Air 13-inch (June 2013)
[http://www.cnet.com/apple-macbook-air-13-inch/]
82

Dell XPS 27
[http://www.cnet.com/desktops/dell-xps-27-all/4505-3118_7-35792394.html]
83

iTunes and Handbrake (in seconds)

(Shorter bars indicate better performance)

Apple iMac (27-inch, November 2012)
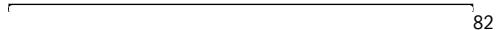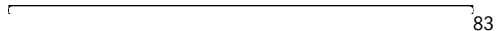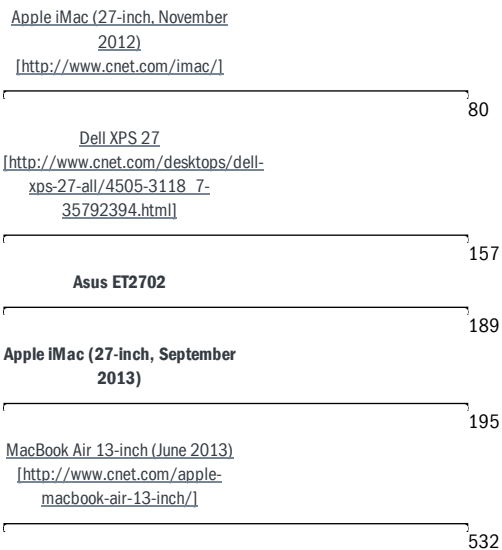[http://www.cnet.com/imac/]

80

Dell XPS 27
[http://www.cnet.com/desktops/dell-
xps-27-all/4505-3118_7-
35792394.html]

157

Asus ET2702

189

Apple iMac (27-inch, September 2013)

195

MacBook Air 13-inch (June 2013)
[http://www.cnet.com/apple-
macbook-air-13-inch/]

532

Cinebench 11.5

(Longer bars indicate better performance)

Rendering multiple CPUs Rendering single CPU

Asus ET2702

8.06
1.76

Apple iMac (27-inch, November 2012) [http://www.cnet.com/imac/]

7.49
1.58

Dell XPS 27 [http://www.cnet.com/desktops/dell-xps-27-all/4505-3118_7-35792394.html]

7.23
1.66

Apple iMac (27-inch, September 2013)

6.15
1.64
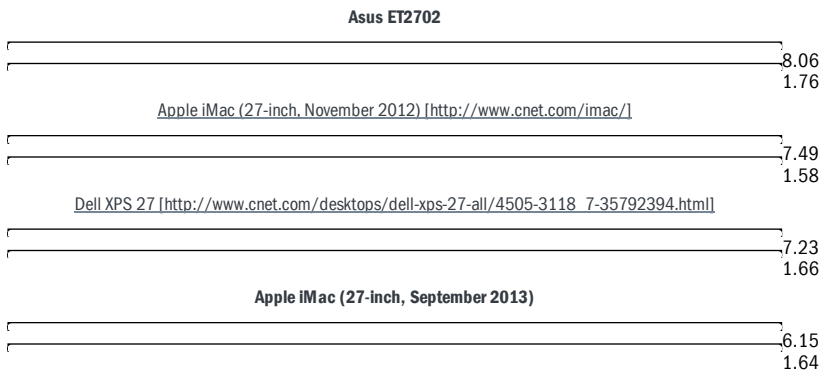
System configurations

Apple iMac (27-inch, September 2013)
Apple OS X Mountain Lion 10.8.5; 3.4GHz Intel Core i5-4670; 8GB 1,600MHz DDR3 SDRAM; 2GB Nvidia GeForce GTX 775M graphics card; 1TB 7,200rpm hard drive, 128GB solid-state hard drive

Apple iMac (27-inch, November 2012)
Apple OS X Mountain Lion 10.8; 3.4GHz Intel Core i7-3770; 8GB 1,600MHz DDR3 SDRAM; 2GB Nvidia GeForce GTX 680M graphics card; 1TB 7,200rpm hard drive, 128GB solid-state hard drive

Dell XPS 27
Windows 8 (64-bit) 3.1GHz Intel Core i7 4770S; 8GB 1,600MHz DDR3 SDRAM; 2GB Nvidia GeForce GT750M graphics card; 2TB 7,200rpm hard drive

MacBook Air 13-inch (June 2013)
OSX 10.8.4 Mountain Lion; 1.3GHz Intel Core i5 4240U; 4GB DDR3 SDRAM 1,600MHz; 1024MB (Shared) Intel HD Graphics 4000; 128GB Apple SSD

Asus ET2702
Windows 8 (64-bit); 3.4GHz Intel Core i7 4770; 8GB DDR3 SDRAM 1600MHz; 2048MB (Dedicated) AMD Radeon HD 8800M; 2TB 7,200rpm Toshiba hard drive

What You'll Pay

MSRP:
$2,199.00
[http://www.cnet.com/desktops/apple-imac-2013/4014-3118_7-
35827456.html]

LOW PRICE:

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[http://offers.cnet.com/redir?edId=3&siteId=7&oId=4505-3118_7-

AVERAGE PRICE:

$1,999.00

8&lop=wtbChart&tag=lst&ltype=mlst&astId=2&pid=35827456&merId=272829&pg=2&prc=%241%2C999.00&channel

[http://www.cnet.com/desktops/apple-imac-2013/4014-3118_7-35827456.html]

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1 [HTTP://WWW.CNET.COM/DESKTOPS/APPLE-IMAC-2013/4505-3118_7-35827456.HTML] 2

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Dell XPS One 27 (Windows 8) [http://www.cnet.com/desktops/dell-xps-one-27/4505-3118_7-35485706.html]

4.0 stars

[http://www.cnet.com/desktops/dell-xps-one-27/4505-3118_7-35485706.html]

[http://www.cnet.com/desktops/origin-chronos-february-2012/4505-3118_7-35160534.html]

Origin Chronos (February 2012) [http://www.cnet.com/desktops/origin-chronos-february-2012/4505-3118_7-35160534.html]

Starting at $1,199.00 [http://www.cnet.com/desktops/origin-chronos-february-2012/4014-3118_7-35160534.html]

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[http://www.cnet.com/mac-mini-fusion-drive/]

Apple Mac Mini [http://www.cnet.com/mac-mini-fusion-drive/]

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[http://www.cnet.com/mac-mini-fusion-drive/]

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Meet the new Mac Pro, about the same as the old Mac Pro

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PRODUCTS REVIEWED   (2 items) ⌃

Apple Mac Pro 12-Core/2.4GHz Intel Xeon (Mid 2012)
4a14705c73fcb86c5687eae&ret=1381840800&k=ad975a28fb8b06a9abe303bfc44e7911)
2012-.html)
4a14705c73fcb86c5687eae&ret=1381840800&k=ad975a28fb8b06a9abe303bfc44e7911)
(/article/1167386/meet_the_new_mac_pro_about_the_same_as_the_old_mac_pro.html)

Apple Mac Pro Quad-Core/3.2GHz Intel Xeon (Mid 2012)
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mid-2012-.html)
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(/article/1167386/meet_the_new_mac_pro_about_the_same_as_the_old_mac_pro.html)

By James Galbraith (/author/James-Galbraith/), Macworld   Jun 22, 2012 4:30 AM |

If you were looking for a bright side to Apple's underwhelming updates (http://www.macworld.com/article/1167178/mac_pro_quietly_gets_first_update_since_2010.html) to its **Mac Pro (http://www.apple.com/macpro/)** line of tower computers, it would have to be that Apple hasn't forgotten that it makes such a product.

In the nearly two years since the last update (http://www.macworld.com/product/712254/apple_mac_pro_mid_2010_family.html) to the Mac Pro, you may have let your imagination go and allowed yourself to dream of a Mac Pro with an updated case design and the latest in peripheral connection ports. However, this is not that update. In an email response to a concerned Mac Pro user, Apple CEO Tim Cook promised (http://www.macworld.com/article/1167247/cook_apple_planning_professional_mac_for_2013.html) that the company was working "on something really great for later next year."

The new Mac Pros released at WWDC 2012 (http://www.macworld.com/article/1167184/apple_unveils_next_generation_macbook_pro_with_retina_display.html) represent a speed bump, plain and simple. The new Mac Pros use the same, highly-upgradable case design, the same graphics cards, and even the same version of USB as the last iteration. And while the Macworld Lab's test results show the new Mac Pros to be considerably faster than those systems the new Mac Pros replace, it is hard to swallow new "pro" systems that lack Apple's fastest connection, Thunderbolt (http://www.macworld.com/article/1158145/thunderbolt_what_you_need_to_know.html), released on MacBook Pros 16 months ago, and USB 3.0 support that arrived on the new MacBook Air and MacBook Pro.

The Mac Pros aren't cheap. The new low-end Mac Pro costs $2499 and comes with a 3.2GHz quad-core Xeon W3565 processor and 6GB of 1066 DDR3 RAM. The $3799 Mac Pro has a pair of 6-core 2.4GHz Xeon E5645 processors, and 12GB of 1333 DDR3 RAM. Both systems have 7200-rpm 1TB hard drives and ATI Radeon HD 5770 PCI Express graphics cards with 1GB of video memory.
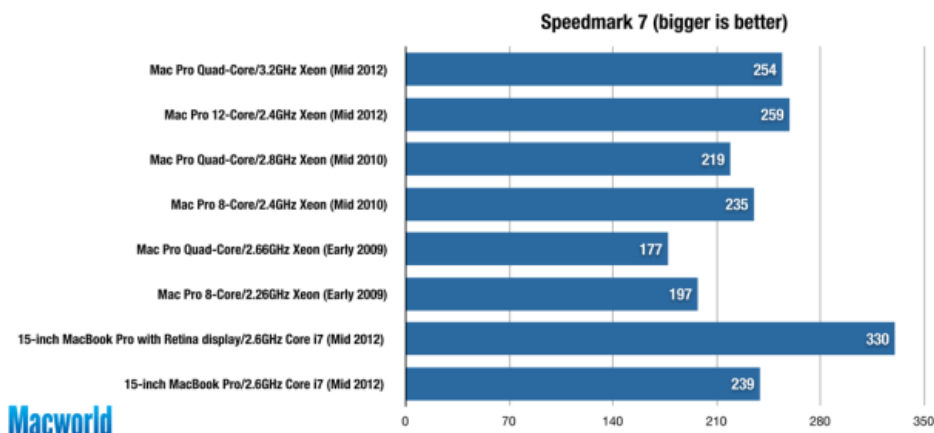
The Mac Pro is still Apple's most customizable Mac. In an era where the company has begun using proprietary screws to keep casual DIYers from tampering with their own Macs, the Mac Pro has an easy-to-access case with three free hard drive slots, three empty PCI express card slots, and an extra optical bay. It has two gigabit ethernet ports, built-in Wi-Fi, five USB ports, four FireWire 800 ports, two Mini DisplayPort connectors, and a dual-link DVI connector.

What the new Mac Pros lack are Thunderbolt, USB 3.0, and new processor technology. Even if new case and motherboard designs weren't ready for release, it sure would've been nice if Apple included Thunderbolt and USB 3.0 connectivity via a PCI express card. Who wants to spend $3800 on a system that begins its working life a year and half behind current technology?

Performance

(http://images.macworld.com/images/article/2012/06/2012macpro_speedmark-285063.png)

Speedmark 7 (bigger is better)

| Model	Score
Mac Pro Quad-Core/3.2GHz Xeon (Mid 2012)	254
Mac Pro 12-Core/2.4GHz Xeon (Mid 2012)	259
Mac Pro Quad-Core/2.8GHz Xeon (Mid 2010)	219
Mac Pro 8-Core/2.4GHz Xeon (Mid 2010)	235
Mac Pro Quad-Core/2.66GHz Xeon (Early 2009)	177
Mac Pro 8-Core/2.26GHz Xeon (Early 2009)	197
15-inch MacBook Pro with Retina display/2.6GHz Core i7 (Mid 2012)	330
15-inch MacBook Pro/2.6GHz Core i7 (Mid 2012)	239

Macworld

Macworld Lab testing by James Galbraith, Mauricio Grijalva, William Wang, and Kean Bartelman (http://images.macworld.com/images/article/2012/06/2012macpro_speedmark-285063.png)

The new quad-core 3.2GHz Mac Pro is <mark>16 percent faster overall than the 2010 quad-core 2.8GHz Xeon Mac Pro,</mark> which is certainly nothing to sneeze at. The new system is 8 percent faster than the 2010 eight-core 2.4GHz Xeon Mac Pro. Going back further, the new system is 44 percent faster than the 2009 low-end quad-core 2.66GHz Xeon Mac Pro. While the file duplication test results are pretty much identical between the new low-end and the 2010 low-end Mac Pro, some tests were considerably faster on the new system, helped by a 14 percent faster processor and twice the RAM. Photoshop, for example, is 31 percent faster than the 2010 quad core model.

The new 12-core 2.4GHz Mac Pro is 10 percent faster overall than the 2010 eight-core 2.4GHz Xeon Mac Pro, and 31 percent faster from the 2009 eight-core 2.26GHz Xeon Mac Pro.

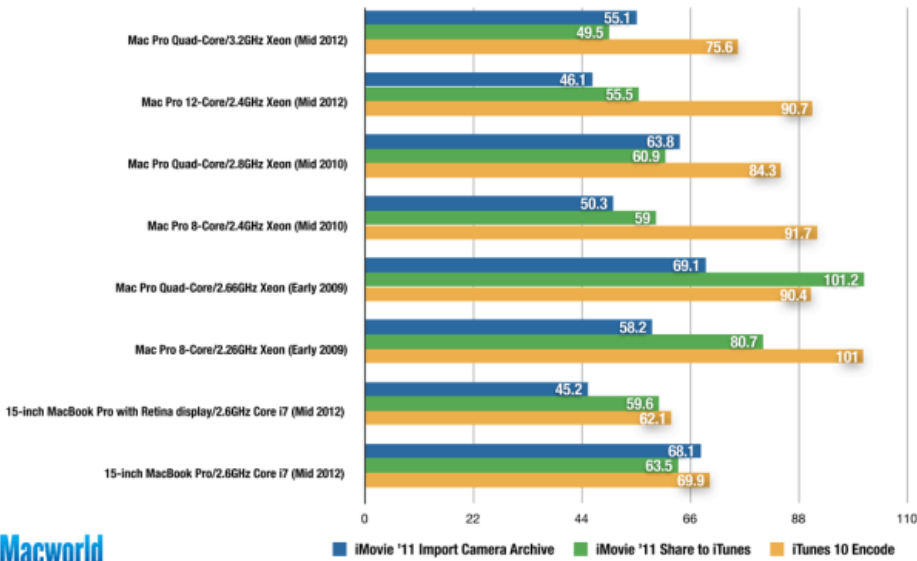(http://images.macworld.com/images/article/2012/06/2012macpro_chart1-285027.png)

Duplicate, Zip, Unzip, Pages Tests (in seconds, smaller is better)
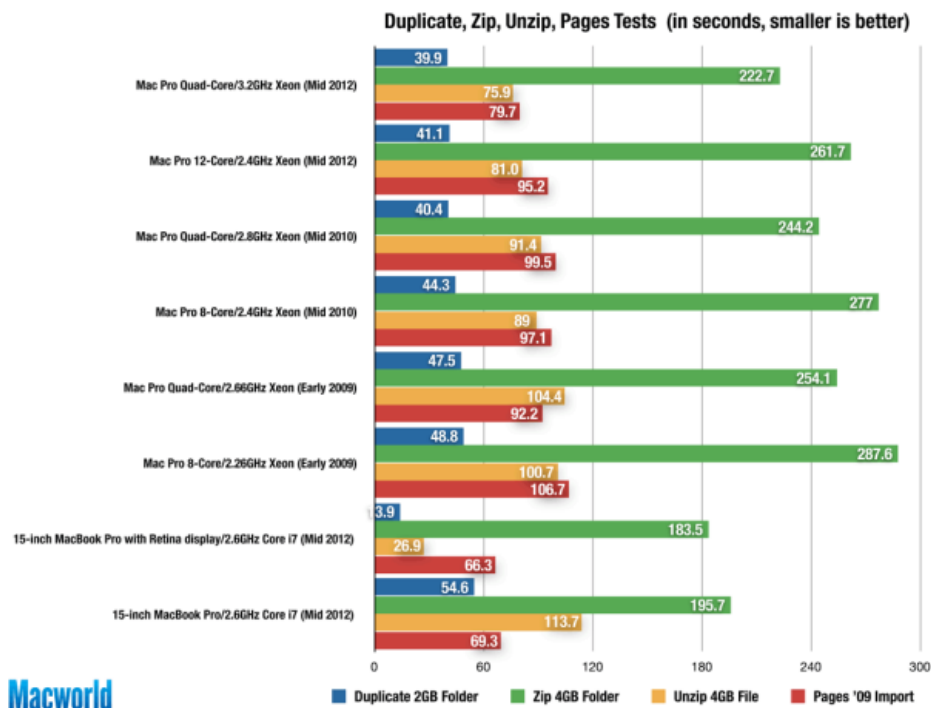
How We Tested: We duplicated a 2GB file, created a Zip archive in the Finder from the two 2GB files, and then unzipped it. In Pages '09 we converted and opened a 500-page Microsoft Word document.

(http://images.macworld.com/images/article/2012/06/2012macpro_chart1-285027.png)

(http://images.macworld.com/images/article/2012/06/2012macpro_chart2-285028.png)

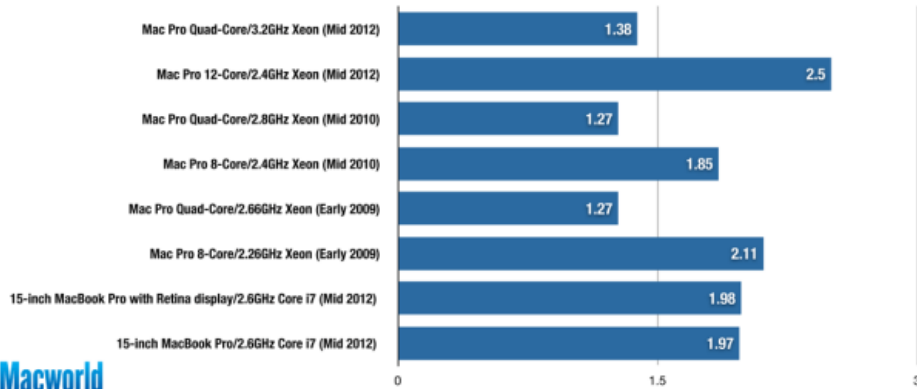**iMovie, iTunes Tests (in seconds, smaller is better)**

System	iMovie '11 Import Camera Archive	iMovie '11 Share to iTunes	iTunes 10 Encode
Mac Pro Quad-Core/3.2GHz Xeon (Mid 2012)	55.1	49.5	75.6
Mac Pro 12-Core/2.4GHz Xeon (Mid 2012)	46.1	55.5	90.7
Mac Pro Quad-Core/2.8GHz Xeon (Mid 2010)	63.8	60.9	84.3
Mac Pro 8-Core/2.4GHz Xeon (Mid 2010)	50.3	59	91.7
Mac Pro Quad-Core/2.66GHz Xeon (Early 2009)	69.1	101.2	90.4
Mac Pro 8-Core/2.26GHz Xeon (Early 2009)	58.2	80.7	101
15-inch MacBook Pro with Retina display/2.6GHz Core i7 (Mid 2012)	45.2	59.6	62.1
15-inch MacBook Pro/2.6GHz Core i7 (Mid 2012)	68.1	63.5	69.9

Macworld

■ iMovie '11 Import Camera Archive   ■ iMovie '11 Share to iTunes   ■ iTunes 10 Encode

How We Tested: In iMovie '11, we imported a two-minute clip from a camera archive, and performed a Share Movie to iTunes for Mobile Devices function. In iTunes, we converted 135 minutes of AAC audio files to MP3 using the High Quality setting.

(http://images.macworld.com/images/article/2012/06/2012macpro_chart2-285028.png)

(http://images.macworld.com/images/article/2012/06/2012macpro_mathematica-285047.png)

MathematicaMark 8 (bigger is better)

System	Score
Mac Pro Quad-Core/3.2GHz Xeon (Mid 2012)	1.38
Mac Pro 12-Core/2.4GHz Xeon (Mid 2012)	2.5
Mac Pro Quad-Core/2.8GHz Xeon (Mid 2010)	1.27
Mac Pro 8-Core/2.4GHz Xeon (Mid 2010)	1.85
Mac Pro Quad-Core/2.66GHz Xeon (Early 2009)	1.27
Mac Pro 8-Core/2.26GHz Xeon (Early 2009)	2.11
15-inch MacBook Pro with Retina display/2.6GHz Core i7 (Mid 2012)	1.98
15-inch MacBook Pro/2.6GHz Core i7 (Mid 2012)	1.97

Macworld

How We Tested: We ran Mathematica 8's Evaluate Notebook Test.

(http://images.macworld.com/images/article/2012/06/2012macpro_mathematica-285047.png)

As we've seen many times in the past, a system having fewer but faster processing cores will outperform (in all but a few of our tests) a system with more cores that run at a slower speed. That holds true with these machines. The new quad-core 3.2GHz Mac Pro is faster than the new 12-core 2.4GHz Mac Pro in 11 of our 16 individual tests, including our iTunes encode test (17 percent faster), Pages import (16 percent faster), iMovie import test (16 percent faster), and our file compression test (15 percent faster). And even though they use the same graphics cards with the same 1GB of video memory, the 3.2GHz quad core Mac Pro is 21 percent faster in our Cinebench OpenGL test and 22 percent faster in our Portal 2 tests.

Not surprsingly, the 12-core Mac Pro excels with software that's designed to take advantage of multiple cores. With 12 cores—and the ability to address 24 virtual cores—the 12-core 2.4GHz Mac Pro is 28 percent faster than the new quad-core

This isn't the first 12-core system that Apple has ever shipped. A 2010 12-core 2.66GHz Mac Pro was considered a configure-to-order option in some Apple documents, but showed up as one of three standard configurations on the Apple Store's Mac Pro page. While that system cost $4999, it outperforms the new $3799 12-core Mac Pro. The 2010 12-core Mac Pro is 7 percent faster in overall performance, 4 percent faster in MathematicaMark, 12 percent faster in our Handbrake encode test, 8 percent faster in the Cinebench CPU test and 13 percent faster in Cinebench's OpenGL test.

(http://images.macworld.com/images/article/2012/06/2012macpro_chart3-285029.png)

Handbrake, Parallels/WorldBench, Cinebench Tests (in seconds, smaller is better)
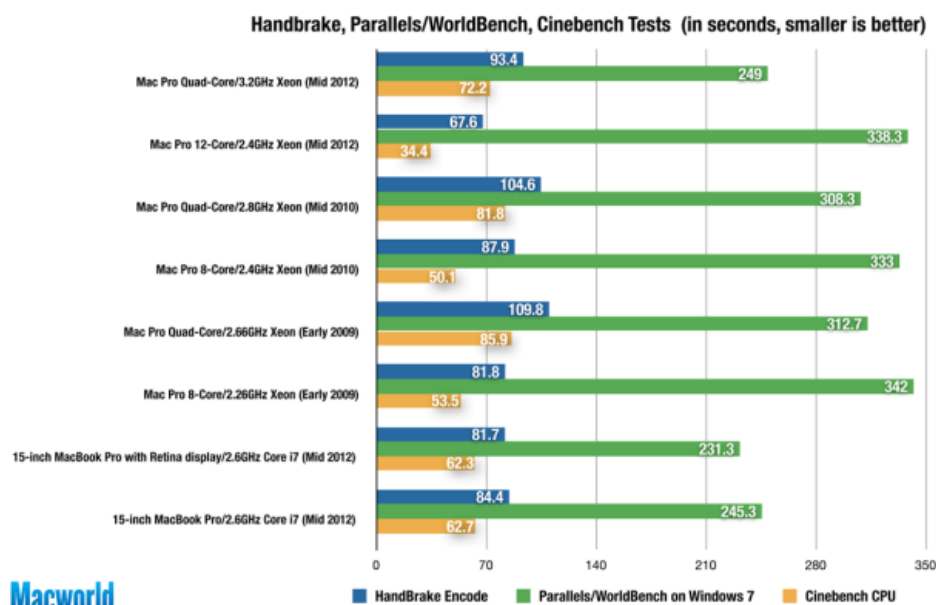
How We Tested: In Handbrake 0.9.5, we encoded a single chapter (to H.264 using the application's Normal settings) from a DVD that was previously ripped to the hard drive. We installed Parallels 6 and ran WorldBench 6's Multitask test. In Cinebench, we recorded how long it took to render a scene with multiprocessors.

(http://images.macworld.com/images/article/2012/06/2012macpro_chart3-285029.png)

(http://images.macworld.com/images/article/2012/06/2012macpro_chart4-285044.png)
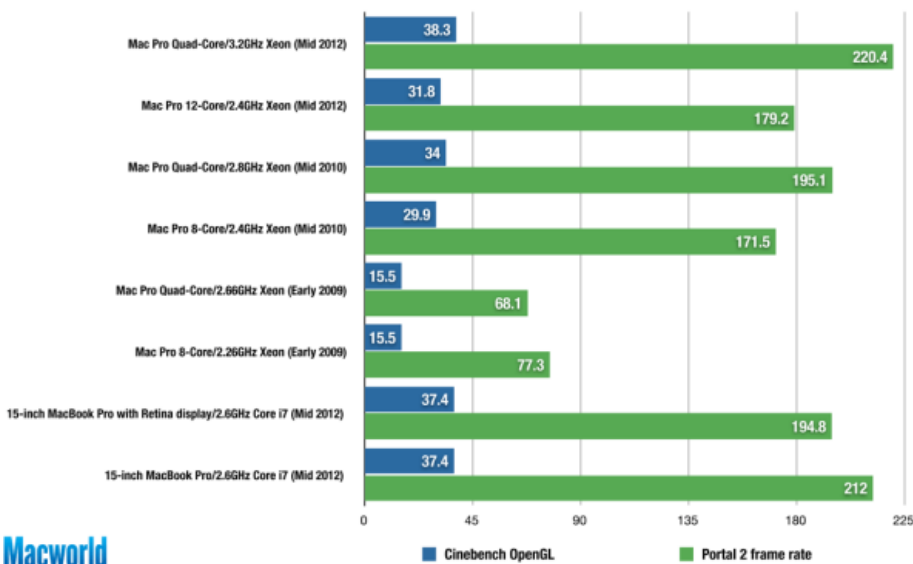
Photoshop, Aperture, iPhoto Tests (in seconds, smaller is better)

	Photoshop CS5 Action Script	Aperture 3 Import	iPhoto '11 Import
Mac Pro Quad-Core/3.2GHz Xeon (Mid 2012)	86.8	78.2	83.3
Mac Pro 12-Core/2.4GHz Xeon (Mid 2012)	89.4	83.5	79.4
Mac Pro Quad-Core/2.8GHz Xeon (Mid 2010)	125.3	88.8	93.2
Mac Pro 8-Core/2.4GHz Xeon (Mid 2010)	94.2	85	86.8
Mac Pro Quad-Core/2.66GHz Xeon (Early 2009)	166.7	99	109.4
Mac Pro 8-Core/2.26GHz Xeon (Early 2009)	110.5	104	107.9
15-inch MacBook Pro with Retina display/2.6GHz Core i7 (Mid 2012)	80.9	54.8	48.8
15-inch MacBook Pro/2.6GHz Core i7 (Mid 2012)	83.1	97.8	135.9

Macworld

How We Tested: In Photoshop CS5, we ran an action script on a 100MB image file. In Aperture 3 we performed an Import and Process on 207 photos. In iPhoto '11, we imported 500 photos. (http://images.macworld.com/images/article/2012/06/2012macpro_chart4-285044.png)

(http://images.macworld.com/images/article/2012/06/2012macpro_graphics-285046.png)

Cinebench, Portal 2 Tests (bigger is better)

	Cinebench OpenGL	Portal 2 frame rate
Mac Pro Quad-Core/3.2GHz Xeon (Mid 2012)	38.3	220.4
Mac Pro 12-Core/2.4GHz Xeon (Mid 2012)	31.8	179.2
Mac Pro Quad-Core/2.8GHz Xeon (Mid 2010)	34	195.1
Mac Pro 8-Core/2.4GHz Xeon (Mid 2010)	29.9	171.5
Mac Pro Quad-Core/2.66GHz Xeon (Early 2009)	15.5	68.1
Mac Pro 8-Core/2.26GHz Xeon (Early 2009)	15.5	77.3
15-inch MacBook Pro with Retina display/2.6GHz Core i7 (Mid 2012)	37.4	194.8
15-inch MacBook Pro/2.6GHz Core i7 (Mid 2012)	37.4	212

Macworld

How We Tested: In Cinebench, we ran that application's OpenGL frames-per-second test. Using Steam and Steam for Mac, we created a self-running demo for Portal and recorded the frames-per-second rating. (http://images.macworld.com/images/article/2012/06/2012macpro_graphics-285046.png)

Neither Mac Pro models are able to surpass the overall score of the new 2.6GHz Core i7 MacBook Pro with Retina display (http://www.macworld.com/article/1167286/macbook_pro_with_retina_display_redefines_the_concept_of_a_pro_laptop.html) (   ). The Retina MacBook Pro is 30 percent faster overall than the new quad-core Mac Pro. The performance from the Retina MacBook Pro's flash memory crushes the internal hard drive of the Mac Pro; the Retina MacBook Pro completed the file duplication and file unzip test 65 percent faster than the new low-end Mac Pro. The quad core Mac Pro was faster in just three of our tests: iMovie export (16.9 percent), Portal 2 (11.6 percent), and Cinebench's OpenGL tests (2.5 percent).

The Retina MacBook Pro is also faster overall than the new 12-core Mac Pro, with a 27 percent higher Speedmark 7 score. Again, faster flash memory and faster (though fewer) processing cores helps the Retina laptop best the 12-core Mac Pro in all but our three most processor-intensive tasks: Cinebench CPU, MathematicaMark 8, and Handbrake.

The Retina MacBook Pro is light on expandability and connectors, so if you want a fast system with FireWire 800, Thunderbolt, USB 3.0, an optical drive and built-in gigabit ethernet, the new non-retina MacBook Pro (http://www.macworld.com/article/1167330/macbook_pro_15_inch_and_13_inch_non_retina_models_occupy_the_consumer_space.html) might be a better bet. The new quad-core and 12-core Mac Pros were 6 and 8 percent faster, respectively, than the $2199 non-Retina 2.6GHz Core i7 15-inch MacBook Pro—the quad core Mac Pro bests the MacBook Pro in eight of the 16 individual tests, and the 12-core tops the laptop in nine of the 16 tests. The 7200 rpm hard drives in the Mac Pros are about 25 percent faster than the 5400 rpm drive in the 15-inch MacBook Pro.

Macworld's buying advice

If you need to have multiple internal hard drives or PCI-Express cards for your video or audio workstation, the Mac Pro is without a doubt the most configurable Mac available. If your workflow includes one of the few applications that can take full advantage of 12 cores, then the speed increase may warrant spending the extra cash for a Mac Pro. But even for most power users, a new non-retina display MacBook Pro with its full complement of up-to-date connection types, may offer a better mix of upgradability, connection flexibility and processing power.

[*James Galbraith is Macworld's lab director.*]

Apple Mac Pro 12-Core/2.4GHz Intel Xeon (Mid 2012) (/product/1223930/mac-pro-12-core-2-4ghz-intel-xeon-mid-2012-.html)

(/article/1167386/

Apple Mac Pro Quad-Core/3.2GHz Intel Xeon (Mid 2012) (/product/1223929/mac-pro-quad-core-3-2ghz-intel-xeon-mid-2012-.html)

(/article/1167386/

WE RECOMMEND

(http://www.techrepublic.com/blog/apple-in-the-enterprise/lesser-known-features-in-ios-7/)

(http://www.macworld.com/article/2048906/how-to-use-activation-lock-in-ios-7.html)
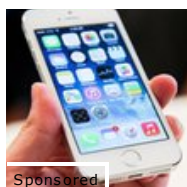
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Lesser-known features in iOS 7 (TechRepublic)

How to use Activation Lock in iOS 7

Ten apps every

Review: New Mac mini offers an attractive bang for the buck

PRODUCTS REVIEWED   (2 items) ⌃

Apple Mac mini/2.3GHz Core i7 (late 2012) (/product/1250222/mac-mini-2-3ghz-core-i7-late-2012-.html) $799.00 (/product/1250222/mac-mini-2-3ghz-core-i7-late-2012-.html)

(/article/2013385/review-

Apple Mac mini/2.5GHz Core i5 (late 2012) (/product/1250221/mac-mini-2-5ghz-core-i5-late-2012-.html) $599.00 (/product/1250221/mac-mini-2-5ghz-core-i5-late-2012-.html)

(/article/2013385/review-

James Galbraith
@jimgalbraith   Nov 2, 2012 3:30 AM |

Last year's Mac mini

APPLE

(http://www.macworld.com/article/1161414/mac_mini_mid_2011_review.html)
brought a number of drastic changes to the compact desktop computer: Core i5
processors that replaced the aging Core 2 Duo CPUs, Thunderbolt ports, and the
discontinuation of a built-in SuperDrive. The new Mac mini
(http://www.apple.com/mac-mini/) may not be quite as revolutionary as the 2011
models, but its updates are still significant.

The 2012 Mac mini introduces USB 3, which replaces the tired, old USB 2.0 ports
found in the previous model. The new Mac mini also has faster integrated graphics,
and, for the first time, quad-core processors.

You look familiar

This Mac mini update maintains many physical aspects that were introduced with the
mid-2010 Mac mini
(http://www.macworld.com/article/152228/2010/06/macminimid2010.html), including
a low-profile (1.4 inches high, 7.7 inches deep and wide) aluminum unibody design.
The front has a pin-hole sized activity light and IR port. The back of the new model
has a power button, power cord input, and ports for gigabit ethernet, FireWire 800,
HDMI, Thunderbolt, and USB 3. An SDXC card slot and audio-out and audio-in ports
round out the physical connection types, while 802.11a/b/g/n Wi-Fi, Bluetooth 4.0,
and an IR port deliver wireless connectivity.

As always, Apple invites you to bring
your own keyboard, mouse, and
display to the Mac mini party—they're
not included. The box includes an
HDMI to DVI cable, but you may need
additional adapters—such as one for
DVI—that will cost extra money.

(http://images.techhive.com/images/article/2...
100011294-orig.jpg)

2012 Mac mini: Rear ports

The Mac mini's body sits on a round,
quarter-inch high black plastic disc
that, when rotated half an inch, can be removed to expose the two RAM slots. Both
the $599 and $799 standard Mac minis come with two 2GB 1600MHz DDR3
SDRAM modules (for a total of 4GB), but they can be upgraded to use up to 16GB
of RAM.

Drive issues

The entry-level $599 Mac mini comes with a relatively pokey 5400-rpm 500GB hard drive. Aside from RAM, it has no optional upgrades available from the Apple Store. The high-end $799 Mac mini also comes standard with a 5400 rpm drive, though at 1TB it has twice the capacity. And this high-end model has options: For an additional $300, you can upgrade to 256GB of flash storage, or for $250 you can opt for a new 1TB Fusion Drive (http://www.macworld.com/article/2012884/apple-unveils-fusion-drive-for-new-imac-and-mac-mini.html).

A Fusion Drive brings together a 1TB hard drive and 128GB of flash storage. The operating system and applications are installed on the flash storage at the factory. Over time, the Fusion Drive is supposed to learn your work habits and move apps and data around between the hard drive and flash storage to provide the best performance. For example, if you use Aperture all the time and infrequently use iPhoto, the Fusion Drive and OS X might move the iPhoto library and application to the slower portion of the hard drive, and move Aperture to the faster flash storage.

I haven't gotten my hands on a Fusion Drive yet, but I'm anxious to see how it differs from hybrid drives, such as the Seagate Momentus XT, which combines a fast but pricey solid-state memory with an affordable but slow rotational hard drive.

Processor boost

The $599 Mac mini has a 2.5GHz dual-core Core i5 Ivy Bridge processor; last year's high-end model also had a 2.5GHz dual-core Core i5 processor, but it was from the Sandy Bridge family. The $799 Mac mini has a 2.3GHz quad-core Core i7 Ivy Bridge processor. Both the Core i5 and i7 support Intel's Hyper Threading

Macworld
(http://images.techhive.com/images/article/2
100011293-orig.jpg)
2012 Mac mini, with the bottom removed

(http://www.intel.com/content/www/us/en/architecture-and-technology/hyper-threading/hyper-threading-technology.html) technology, which allows applications to address four virtual processing cores on the Core i5, and eight virtual cores on the Core i7. Both processors also support Turbo Boost (http://www.intel.com/support/processors/sb/CS-029908.htm?wapkw=turbo+boost), which lets processors run faster than their rated speed when necessary. Using Turbo Boost, the 2.5GHz Core i5 can reach speeds up to 3.1GHz, and the 2.3GHz Core i7 can top out at 3.3GHz.

As you'd expect, in processor-intensive tasks that use all of a system's processing cores, the $799 2.3GHz quad-core Core i7 Mac mini was much faster than the $599 2.5GHz dual-core Core i5 Mac mini. MathematicaMark was 72 percent faster on the quad-core system, and Cinebench CPU tests took 51 percent less time to complete than the dual-core model.

The high-end Mac mini can also be customized to use a quad-core 2.6GHz Intel Core i7 processor (a $100 option) that can get as fast as 3.6GHz using Turbo Boost.

Grappling with graphics

The new Mac mini uses Intel's much improved HD Graphics 4000 graphics processor. It's an *integrated* processor—the graphics processing is built into the main CPU and shares the computer's main memory. *Discrete* graphics, on the other hand, are graphics processors that are completely separate and use dedicated video memory. Generally, discrete graphics are preferred over integrated graphics for applications that demand the highest performance.

The HD Graphics 4000 is much better at delivering high frame rates in games than the HD Graphics 3000 processor used previously, but it falls far short of the performance of the discrete AMD Radeon HD 6630M graphic processor. In our Portal 2 test, the new entry-level Mac mini was 27 percent faster than the previous low-end model. However, the previous high-end model with its AMD Radeon discrete graphics was 24 percent faster than the new high-end Mac mini with the integrated Intel HD 4000 graphics.

Benchmarks: Speedmark 8 scores
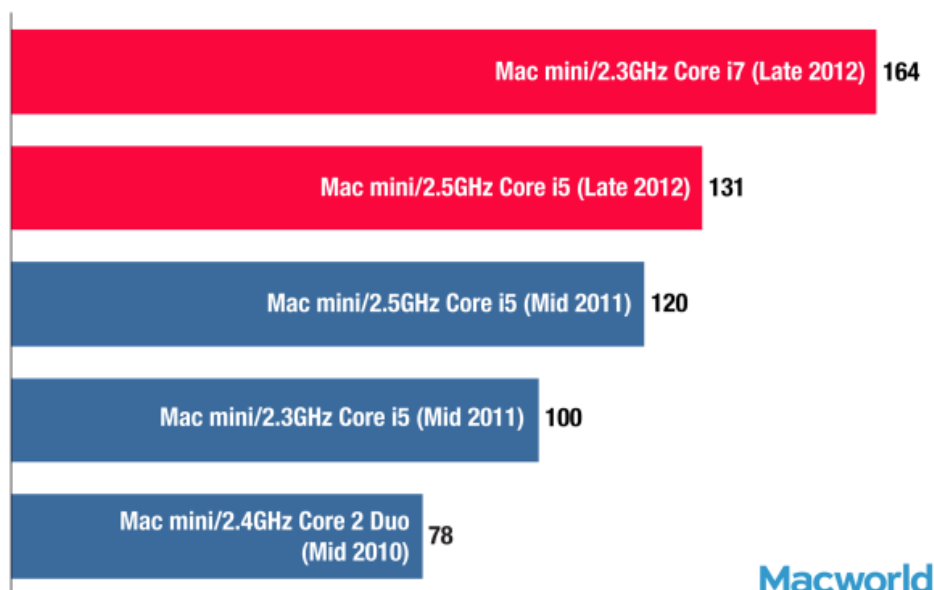
(http://images.techhive.com/images/article/2012/11/2012macmini_speedmark8_bar 100011164-orig.png)

All results are scores. Higher scores/longer bars are better. Reference models in blue. Macworld Lab testing by James Galbraith, Albert Filice, Kean Bartelman, and William Wong.

The new $599 Mac mini was 31 percent faster in our Speedmark 8 (http://www.macworld.com/article/2010644/measure-mac-performance-with-speedmark-8.html) tests than its 2011 predecessor. The new system was faster in all of our tests, but its processor-intensive test results were only slightly higher. Interestingly, the hard drive test results were much faster on the new systems, though the drives are still just 5400-rpm models.

We also looked at the performance differences between the new low-end machine and a mid-2010 entry-level Mac mini with a 2.4GHz Core 2 Duo processor. The new Mac mini was 68 percent faster and finished the Cinebench CPU test in half the time of the 2010 model. The old system took nearly three times as long to complete our Photoshop action script.

The new $799 2.3GHz quad-core Core i7 Mac mini is 37 percent faster than its 2011 predecessor. Keep in mind that the previous high-end Mac mini had a 2.5GHz dual-core Core i5 processor of the older Sandy Bridge family.

Macworld Lab has a complete look at the performance of the new Mac mini (http://www.macworld.com/article/2013250/lab-tested-2012-mac-mini-gets-a-nice-speed-boost.html), including a deep dive into the individual application results from Speedmark 8.

Bottom line

The new Mac mini continues to build on the solid foundation set by the 2011 model. If you prefer a Mac desktop computer to a laptop, and/or you don't want to be confined to the glossy 21.5- or 27-inch displays that come with the iMac, the Mac mini is a capable system for most tasks.

The quad-core Core i7 processor and the larger storage capacity make the $799 Mac mini more attractive—plus you can configure this system with Apple's new Fusion Drive for an additional $250. The least expensive Mac available today, the $599 Mac mini, has made its own performance strides and continues to be an affordable option for anyone wanting the Mac experience without paying a high premium.

Updated 1/2/12 11:45 AM PST to correct price of SSD drive upgrade and to clarify info about the processor familes.

Apple Mac mini/2.3GHz Core i7 (Late 2012) (/product/1250222/mac-mini-2-3ghz-core-i7-late-2012-.html)

(/article/2013385/new-mac-mini-offers-an-attractive-bang-for-the-buck.html)

Apple Mac mini/2.5GHz Core i5 (Late 2012) (/product/1250221/mac-mini-2-5ghz-core-i5-late-2012-.html)

(/article/2013385/new-mac-mini-offers-an-

iMac review: Modest gains for the new entry-level Haswell iMac

★ **Review (/article/2050353/imac-review-modest-gains-for-the-new-entry-level-haswell-imac.html)**

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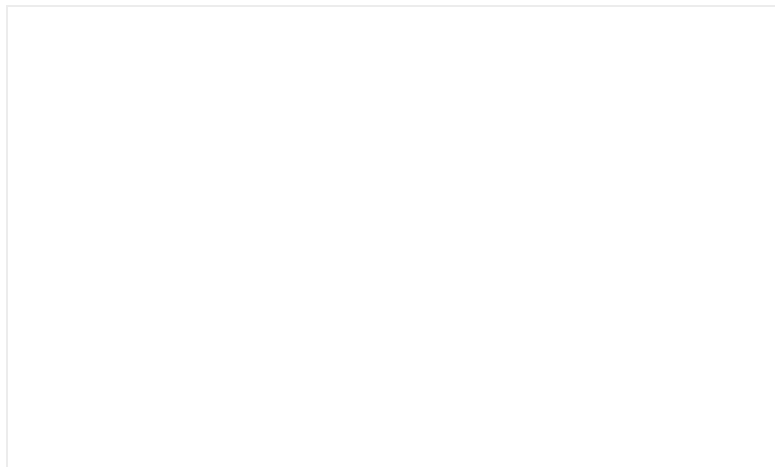
AT A GLANCE   (1 items) ⌃

Apple 21.5- (/product/1253891/21-5-inch-imac-2-7ghz-late-2013-.html)
inch

iMac/2.7GHz (Late 2013) (/product/1253891/21-5-inch-imac-2-7ghz-late-2013-.html)

$1,299.00 (/product/1253891/21-5-inch-imac-2-7ghz-late-2013-.html)
(/article/2050353/imac-

James Galbraith
@jimgalbraith

Oct 3, 2013 3:30 AM | SINGLE PAGE (?PAGE=0)

There's no denying that the 21.5-inch iMac (http://www.apple.com/imac/) is a beautifully designed all-in-one computer. Its gleaming aluminum body, seamless ultra-thin edges, and bright, LED-backlit IPS screen make the iMac a drool-worthy desktop. This design isn't new, however—in fact, ==the 2013 iMacs are externally identical to the late 2012 iMacs.== The updates to this iteration of iMacs are all internal.

The $1299 entry-level iMac features a 1TB hard drive, 8GB of RAM, a 21.5-inch screen with a 1920 by 1080 resolution, and a 2.7GHz quad-core Intel Core i5 processor. Sound familiar? That's because they're the same as the 2012 entry-level iMac (http://www.macworld.com/article/2018522/review-thin-is-in-with-new-21-5-inch-imacs-but-user-upgrades-superdrive-are-out.html).

But where the 2012 iMacs used Intel's Ivy Bridge Core i5 processors, the 2013 models incorporate Intel's fourth-generation Core processors, code-named Haswell. Haswell made its Mac debut with the MacBook Air released in June (http://www.macworld.com/article/2041698/review-latest-intel-chip-boosts-speed-

and-endurance-in-new-macbook-air.html), and as our lab testing bears out, the Haswell processor is more efficient and higher-performing than its Ivy Bridge counterpart.

Haswell also brings a new integrated graphics option. All 2012 iMacs used discreet Nvidia GeForce GTX 600 series graphics. The 2013 iMacs were updated with Nvidia GTX 700 series graphics, except for the new low-end iMac in this review; it now uses Intel's Iris Pro integrated graphics, which Intel claims should perform similarly to a discrete GPUs and be as much as twice as fast as the integrated graphics that shipped with Ivy Bridge. Integrated graphics share memory with the CPU, while discrete have their own designated RAM (from 500MB to 4GB in the new iMacs). Iris Pro still shares memory, but has access to a small amount (128MB) of dedicated on-chip memory. The 2013 MacBook Air uses Haswell processors and integrated graphics, but in these systems, Apple opted to use the Intel HD Graphics 5000.

While the 2013 21.5-inch iMac retains the striking design of the 2012 models, it also shares the limitations introduced with those systems—namely, a lack of upgradability and features set aside in the name of slimming down the design. The RAM slots are not user-accessible on the 21.5-inch iMac. All 2013 iMacs ship with a generous 8GB of 1600MHz DDR3 SDRAM and can be ordered with 16GB for an extra $200, but if you order with 8GB and decide later that you'd like more, you'll be stuck. The iMacs also use adhesive to attach the screen to the bezel, not magnets as used in the past, which makes getting to the internals and reassembling the system much more difficult. The super-slim edge of the iMac makes it impossible to include a slot-loading optical drive and the SDXC card slot was moved to the less-convenient location near the ports. On the back of the iMac you'll find two Thunderbolt ports, four USB 3.0 ports, headphone jack, and one Gigabit Ethernet port.

100016346-large.jpg)

The back of the iMac has a headphone jack, SDXC card slot, four USB 3 ports, two Thunderbolt ports, and a gigabit ethernet jack.

Apple also continues the year-long tradition of using 5400-rpm hard drives in the smaller iMacs. The 27-inch models use speedier 7200-rpm drives. These 5400-rpm drives have a larger cache and perform better than most 2.5-inch drives, but still aren't as fast as a 7200-rpm drive.

The new iMac has an internal PCIe connection for use with optional flash storage upgrades. As seen with the new MacBook Air, PCIe-connected flash storage is considerably faster than SATA-connected flash. None of the four standard configuration iMacs come with flash storage, but all can upgraded at the time of purchase. The 21.5-inch iMac can be configured with 256GB of flash storage in place of the 1TB hard drive for an additional $200. 512GB of flash storage is a $500 upgrade. Also available is a 1TB Fusion Drive (http://www.macworld.com/article/2013805/fusion-drive-an-overview.html) (a $200 option), which marries a 1TB hard drive with a 128GB flash storage to make one logical volume that performs similarly to flash storage, but with the capacity of standard hard drives.

21.5-inch iMac/2.7GHz (Late 2013): Speedmark 8 benchmarks

21.5" iMac/2.7GHz (Late 2013)	212.0
21.5" iMac/2.7GHz (Late 2012)	194.0
21.5" iMac/2.9GHz (Late 2012)	204.0

21.5" iMac/2.7GHz (Mid 2011)	183.0	
27" iMac/2.9GHz (Late 2012)		238.0

Higher results/longer bars are better.—Macworld Lab testing by James Galbraith and Albert Filice

To see how the processor and graphics updates affect the performance of the new $1299 iMac, we ran our Speedmark 8 (http://www.macworld.com/article/2013458/measure-mac-performance-with-speedmark-8.html) suite of tests on the system and compared the results to recent models. <mark>The new iMac was 9 percent faster,</mark> overall, than the entry-level iMac it replaces, and 4 percent faster than last year's step-up model, the 21.5-inch iMac with a 2.9GHz Core i5 Ivy Bridge processor.

In terms of CPU performance, the new iMac was 12 percent faster in MathematicaMark and 14 percent faster in the Cinebench CPU test than last year's iMac with its quad-core 2.7GHz Ivy Bridge processor. Looking at the results of a 2.7GHz Sandy Bridge-powered 2011 iMac, the new Haswell was 17 percent faster in MathematicaMark and 19 percent faster in the Cinebench CPU test.

The Iris Pro integrated graphics was impressive in some tests and disappointing in others. The new iMac posted a 9 percent higher frame rate in Portal 2 tests over last year's entry-level iMac with discreet Nvidia GeForce GT 640M graphics. The Iris Pro mopped the floor with the 640M in Cinebench r11.5's OpenGL test, with 52 frames per second on the new model versus 35.6 frames per second on last year's iMac. The new iMac also beat out last year's 2.9GHz 27-inch model, with a 30 percent faster OpenGL frame rate in the same Cinebench test. Cranking up the resolution and settings in Portal 2, we saw the new iMac's frame rate drop to a very playable 33.4 frames per second. However, the same high resolution Portal 2 test on a 2012 2.9GHz 21.5-inch iMac produced frame rates of 62.9 frames per second.

In the course of our testing, Maxon updated their Cinebench to version r15. The tests are more taxing, and while r15's results can't be compared with r11.5's, comparing the new benchmark's scores across systems shows a dramatic shift in the performance balance with last year's 2.9GHz iMac posting 47 percent higher frame rates than the new iMac.

Hard drive tests also showed improvement over last year's iMac too, though both use 1TB 5400 rpm drives. Our 6GB file copy test was 9 percent faster on the new iMac than on the 2012 2.7GHz 21.5-inch iMac. Comparing the speed of the new 21.5-inch model's drive to the 7200 rpm drive from the 2.9GHz 27-inch iMac from last year, the 27-inch iMac's drive was 30 percent faster in our file copy tests.

Bottom line

The new $1299 entry-level iMac may not be nearly as groundbreaking as its predecessor, but the updated internals offers welcome, if subtle, performance enhancements.

Next page: Complete Speedmark 8 application test results

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(/article/2050353/review-modest-gains-for-the-

View full product specs »
(/product/1253891/21-5-inch-imac-2-
7ghz-late-2013-.html)

Price when rated: $1299

Pros
‣ Faster, more efficient processor
‣ Available PCIe-connected Flash
   storage
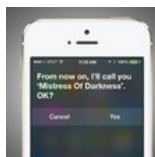‣ Faster 802.11AC WiFi networking

Cons
‣ Integrated graphics
‣ 5400 rpm hard drive
‣ No optical drive

+ COMPARE

WE RECOMMEND

(http://www.macworld.com/article/2053310/teach-siri-nicknames.html)
(http://www.macworld.com/article/2048197/is-applecare-
worth-it-.html)

Teach Siri
nicknames

Is AppleCare worth
it?

Get your Mac
ready for
Mavericks (OS X

Recommended by