# ISO vs. IMG and NRG formats

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When it comes to downloading copies of software from the Internet, it is common practice for the software to be distributed in an archived form. This not only means that every part of the software is downloaded, and therefore there is no need to go hunting for missing files, but it also ensures that the files will not have been tampered with unless special archive-editing software is used. However, the different file formats can be confusing, so it is important to know the differences between ISO and IMG files if they are to be handled correctly once downloaded.

ISO and IMG files make burning a duplicate CD easier

The Facts

ISO and IMG are both archival formats. Each file contains a copy of the contents of the original disc the archive was made from, plus information about the file structure of the disc. They are designed to make archiving the disc easier and make creating an exact duplicate copy easier. However, while there is only one version of the ISO format, IMG comes in two versions: compressed and uncompressed.

ISO File Format
The ISO file format is an international standard file format designed to contain a disc image, including its file system, in a single file. The ISO format was created as a means of archiving discs and as such it has become a standard method of distributing software, such as Linux installation CDs, for users to download and burn their own CDs. ISO is used to create CD and DVD images.

IMG File Format
The IMG file format was designed to create a backup copy of a floppy disk in a single file. It works by creating a bitmap of each sector of the disk that has been written to. As these sectors are 512 bytes in size, IMG files are always sized in multiples of 512 bytes. Since the demise of floppy disks, the IMG format has been used for the creation of hard disk image files.

Considerations
There is no difference in the structure of ISO and IMG formats if the IMG file is uncompressed. It is possible for an IMG format file to be renamed with the ISO file extension and then opened in software that only recognizes the ISO file format. This is an effective way of accessing disc information in programs that do not handle the IMG format.

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An NRG file is a proprietary optical disc image file format originally created by Nero AG for the Nero Burning ROM utility. It is used to store disc images. Other than Nero Burning ROM, however, a variety of software titles can use these image files. For example, Alcohol 120%, or Daemon Tools can mount NRG files onto ... NRG files are not ISO images with a .nrg extension and a header attached.

NRG vs ISO

When it comes to saving images of discs, there are a few formats to choose from. Two of these formats are ISO and NRG. The main difference between NRG and ISO is their source. ISO is a global standard created by ISO, a body that governs over world standards. In comparison, NRG is actually a proprietary format that was developed by Nero, a very popular disc imaging and burning software.

As a consequence of the primary difference between NRG and ISO, there is also a difference when it comes to what they are compatible with. ISO, as a global standard, is used quite widely and it is a given for any burning software to have support for it. Because Nero was very popular, it gave programmers an incentive to support the file format so that they programs will be able to open disc images that were created in Nero. Still, not everyone has added compatibility with NRG so it is still better to use ISO if you want to achieve the highest level of portability.

Another advantage that ISO has over NRG is the support incorporated into most modern operating systems. Since it is incorporated into the operating system, you do not really need to install any other software just to burn ISO images to disc. You can pretty much do this via the operating systems native file browser application. You just need to pop a blank disc into your optical drive and you'd get options on disc burning.

NRG is not without its advantages though because ISO has a primary limitation. ISO is not able to record discs that have multiple tracks. A prime example of this is the audio disc where each song is placed on its own track. There are other formats that are able to do this like BIN/CUE, as well as NRG.

Most people believe that NRG is just an ISO file with an added header, but this is not so. You cannot simply mount an NRG disc into a system that only recognizes ISO discs. If you want maximum compatibility for you data discs, you should use ISO.

Summary:

1.ISO is a worldwide standard while NRG isn't
2.ISO is recognized by virtually all software but not NRG
3.ISO recording is native in most modern operating systems but not NRG recording
4.ISO cannot record audio tracks while NRG can

Read more: Difference Between NRG and ISO | Difference Between
http://www.differencebetween.net/technology/difference-between-nrg-and-iso/#ixzz4sskqgwRX

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ISO Image Mode vs DD Image Mode
Issue description
For an Arch Linux ISO, could you please explain the overall difference, when creating a USB Flash Drive, between Rufus' ISO Image mode and it's DD Image (disk image) mode? I am trying to understand what steps Rufus goes through, depending on which mode is selected, and how that affects the outcom

Answer

DD is an exact clone of the image onto the USB. Basically, this flat copies the image byte by byte onto the USB, so if you look at the image in hex and see it starts with something like 33 ED 90 90 ... then what Rufus or any other DD application will do is copy 33 ED 90 90 ... onto the USB, starting at the first byte of the first sector, and continue to copy bytes until the data from the image is exhausted. That's all DD does, and it usually ensures that you get an exact clone of the image or device the maintainer of the distro created.

One advantage is that it doesn't require partitioning or formatting, and it can create USB drives with file systems that Windows is unable to handle on its own (such as ext# or anything *BSD). But this can also be one of the drawbacks, as it means you will usually find that you cannot access the content of your USB any longer after it has been created. So if you want to modify some settings, or want to access the doc, or, say, copy the firmware for your Wifi card onto the USB, you may not be able to do so. Also, even if you are able to access the content, you will find that the available size

you have is a lot less than the total size of your USB. For instance, if you DD copy a 4GB image onto a 16GB USB, then even if you can access your drive from Windows, you will only ever be able to access 4GB of your drive, and not 16.

Finally, the choice between DD and ISO only applies to ISOHybrid images (not all ISOs are ISOHybrid!), which is a somewhat brittle hack that tries to make optical disc filesystems (ISO9660 or UDF) something that they were never designed to do (which essentially boils down to making it look like a completely different file system, along with constructs, such as a partition table, that are not meant to apply to optical media), so it takes A LOT of trial and error to get something that kind of works, but has some limits.

On the other hand what ISO mode does is partition and format the USB in a way that Windows can always understand (and using the whole capacity of the drive), and then copy each individual file and directory from the ISO image onto the newly created file system.

One of the drawback this has is that the boot loading and later process of the media has to be able to handle a Windows file system (usually FAT32, but it could be NTFS or exFAT), which may come with some limitations, but this is usually not an issue for something like an installation media.
Also, if you have a lot of small files the copy process in ISO mode can be a lot slower than the DD mode copy process. But as I pointed above, ISO mode also ensures that you can always access the full content of your USB.

If you want a quick analogy, you can consider that DD mode is similar to cloning a whole bookshelf, full of books, into your living room. For some cases, cloning the bookshelf in one go may be the best option, but in others, you may find that this bookshelf is locked with a key that you don't have, and it has to sit right in the middle of your living room, which prevents you from installing a couch, or something else.

On the other hand, ISO mode is akin to first providing you with a bookshelf, which is tailored to the space you have against a wall of your choosing, and then cloning books one by one into it. It's a bit more tedious and slow, but if you have a large wall, if will leave you with a similarly large bookshelf, that you can later use to put other book. Also, it isn't locked, so you can always access both the books that were copied over, as well as any new book you put in it.

Hope that explains it, and also the reason why Rufus usually recommends to try using ISO mode first, and only use DD mode if you have an issue with ISO mode.

As far as Arch is concerned, ISO mode should work very well (because the Arch maintainers tend to be very good at what they are doing), but in the end it's really up to you to pick the mode you want.

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.ISO vs .IMG files for DVD images?

There seem to be multiple standards for image files representing the contents of a DVD. For example, iDVD creates .img files if told to burn a file rather than a DVD directly. However, Linux install disks (for example) that are too big to fit on one CD (over 740 Mb or so) usually come in the form of .iso files meant to be converted to a physical DVD using dd, Toast, Disk Utility, or a comparable program. Disk Utility can also mount an .iso image on the desktop so that it looks like a drive, much as with .dmg files. So, several related questions:

What exactly differentiates a DVD-size .iso from a DVD .img?
Is there a simple conversion path from .img to .iso?
Is .img an Apple-specific file format?
If .img is Apple-specific, should I be worried about archiving DVD images that I want to keep permanently as .imgs (i.e., is it possible that future software won't be able to read them)?

The last question speaks to the specific issue that brought this question to mind--I have a number of DVDs of home movies, painstakingly produced with iMovie and iDVD, that I would like to archive both as actual burnt video DVDs (i.e. for a DVD player) and as image files from which I can burn more copies if necessary. But is .img the best format to do this, or are those likely to become obsolete? Would .iso be better? I'm interested in the general question of .iso vs .img (vs any other relevant formats) too, as the title of the question indicates.

Single-track (.iso) vs. multiple-track (.img)

Any single-track CD-ROM, DVD or Blu-ray disc can be archived in ISO format as a true digital copy of the original.

But ISO files have limitations. For example, a CD can have multiple tracks, which can contain computer data, audio, or video. File systems such as ISO 9660 are stored inside one of these tracks. Since ISO images are expected to contain a binary copy of the file system and its contents, there is no concept of a "track" inside an ISO image, since a track is a container for the contents of an ISO image. This means that CDs with multiple tracks can't be stored inside a single ISO image; at most, an ISO image will contain the data inside one of those multiple tracks, and only if it is stored inside a standard file system.

Formats such as CUE/BIN, CCD/IMG and MDS/MDF formats can be used to store multi-track disc images, including CD-Audio discs. These formats store a raw disc image of the complete disc, including information from all tracks, along with a companion file describing the multiple tracks and the characteristics of each of those tracks. This would allow an optical media burning tool to have all the information required to correctly burn the image on a new disc

Answer

Interesting. Good find. This seems to disagree with your comment above, though. If an .img is a metaformat of sorts that can contain .isos and "a companion file describing the multiple tracks..." then how can you just change the extension on an .img and make a valid .iso out of it? I would think that the metadata would come across as noise.
– dodgethesteamroller Oct 28 '15 at 18:08

Because I only encountered single track IMG files so far;) – CousinCocaine Oct 28 '15 at 18:09

Aha, ok, so perhaps all valid .isos are valid .imgs (just single-track .imgs) but not vice versa. – dodgethesteamroller Oct 28 '15 at 18:11

That is correct – CousinCocaine Oct 28 '15 at 18:14

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ISO is like international standard (as the name itself suggests) for storing disc images and supported by most image burning/extracting software. This format is typically good for data files/video content. This format isn't good with Audio CD's, and is not even supported by image burning software's.

BIN/CUE format was specifically developed to overcome the Audio CD's archiving problem with ISO. In general, this format can be used for the same content that ISO supports and has no drawbacks.

MDS is typically used for copy protected DVD's. ISO or BIN/CUE does not have the feature of storing copy protection information within the image file. This MDS file type usually contains information about the position of layer break bits that helps in re-creating exact same copy of any copy protected DVD.

To summarize, ISO is good for storing files/data/video that isn't copy protected and is supported by almost every imaging software. BIN/CUE is good for copying Audio CD's. And, MDS is good for making copies of copy protected DVD's.

Hope this helps.

shareimprove this answer

answered Oct 26 '10 at 12:53

humanfly
481510

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add a comment

up vote 7 down vote

Uh, a few corrections to the above answer.

First of all, "this format (BIN/CUE) can be used for the same content that ISO supports and has no drawbacks."

This is not entirely true. ISO is a rather simple disc image format, while BIN/CUE is a raw copy of a disc, sector by sector, including copy protection, error correction, track list, multi track, and any system specific information on the disc. It is for this reason that many "old-timers" rightly consider BIN/CUE to be the most pure copy of a disc. On the other hand ISO only keeps the files and folders on the disc and loses much of the other information.

Hope that helps.

shareimprove this answer

answered Sep 25 '14 at 16:04

trix
7111

add a comment

up vote 4 down vote

ISO keeps more than just files and folders. A bootable CD is still bootable if it has been copied to a ISO file and then burned again on CD (or used to install Operating System in VMware etc.) If you just copy files and folders from a bootable CD to another CD, the new CD will not boot.