Linux Kernel Developers Discuss Dropping x32 Support (phoronix.com)

Posted by msmash on Wednesday December 12, 2018 @09:00AM from the direction-of-the-wind dept.

An anonymous reader shared a report: *It was just several years ago that the open-source ecosystem began supporting the x32 ABI, but already kernel developers are talking of potentially deprecating the support and for it to be ultimately removed,.*

[...] While the x32 support was plumbed through the Linux landscape, it really hasn't been used much. Kernel developers are now discussing the future of the x32 ABI due to the maintenance cost involved in still supporting this code but with minimal users. Linus Torvalds is in favor of sunsetting x32 and many other upstream contributors in favor of seeing it deprecated and removed.

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0

No! (Score:1)
by Anonymous Coward on Wednesday December 12, 2018 @09:17AM (#57792018)
There is still a lot of product in the wild using some x32 architecture, be them 486+ or whatever, with kernel 2.6, please keep it the hell

4 hidden comments

Re:No! (Score:4, Informative)
by Desler (1608317) on Wednesday December 12, 2018 @09:21AM (#57792018)
It allows access to the extended registers of x86_64 but with 32-bit pointers. It requires an x86_64 processor to be used.

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Re: (Score:2)
by lgw (121541)
Perhaps you could not be retarded and just know this?
X32 is a stupid version of 64 bit that uses 32-bit pointers.
Never understood who thought this was a good idea.
People who care about memory footprint? Linux is used in some pretty small systems, still. If you have far, far less than 4GB you not only don't need 64-bit addressing, you need to not waste 4 bytes on every pointer.
Why not just use x86? More registers (and x64 has a lot more registers) can make a real performance impact.

2 hidden comments

Re: (Score:2)
by willaien (2494962)
Not to mention that x32 still lets you use 64-bit native words, etc. for faster computation with the smaller memory footprint.

Re: (Score:2)
by _merlin (160982)
Also PC-relative addressing works in x32 mode, and that's a huge gain over i386 for position-independent code (think shared libraries and ASLR). It's supposed to help reduce the size of the working set so you don't thrash the cache as much as you would with 64-bit pointer, size_t etc. Cache miss latency is horrible on modern systems. The trouble is, there are very few libraries built for it, so you pretty much have to build your own userland before you can do anything.

1 hidden comment

Re: (Score:2)
by lgw (121541)
An x64 processor is expensive, large, and power-hungry for modern "pretty small systems." If you have far, far less than 4GB, you've probably moved to 32-bit ARM.
I admire your ideal world where management chooses components rationally.

Re: (Score:2)
by lgw (121541)
Interesting thread/article here on /. today - refreshing & back to "old-school slashdot" imo (better than POLITICAL or "SJW" articles that have been hitting this place the past year or so now)... apk
Yeah, fewer and fewer real articles between the clickbait, but those few are still interesting.

Re: (Score:2)
by Chris Mattern (191822)
Never understood who thought this was a good idea.
People under severe memory constraints who need to use pointers that take up only half the space? People under severe performance constraints who can't spare the cycles to copy 64-bit pointers or do 64-bit lookups?

1 hidden comment

Re:No! (Score:5, Informative)
by Misagon (1135) on Wednesday December 12, 2018 @09:11AM (#57791946)
That's not what x32 is. 32-bit x86 will still be supported.
"x32" is an ABI for x86-64 that uses 32-bit pointers with the x86-64 instruction set for better performance when a large address space is not needed.
It's in the second paragraph in the TFA ;)

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Re: (Score:2)
by aitikin (909209)
It's in the second paragraph in the TFA ;)
I'd say you must be new here if you expect people to RTFA, but your UID is a respectable 4 digits...

Re: (Score:3)
by thegarbz (1787294)
I'd say you must be new here if you expect people to RTFA, but your UID is a respectable 4 digits...
Or another way of putting it, his UID can be expressed in 11bits and is therefore obsolete and we should consider dropping support.

Re:No! (Score:4, Informative)
by mrdoni (228377) on Wednesday December 12, 2018 @09:11AM (#57791948)
Wrong CPU, nothing to do with 4/586s. From TFA itself:
The Linux x32 ABI as a reminder requires x86_64 processors and is engineered to support the modern x86_64 features but with using 32-bit pointers rather than 64-bit pointers. The x32 ABI allows for making use of the additional registers and other features of x86_64 but with just 32-bit pointers in order to provide faster performance when 64-bit pointers are unnecessary.
While the x32 support was plumbed through the Linux landscape, it really hasn't been used much. Kernel developers are now discussing the future of the x32 ABI due to the maintenance cost involved in still supporting this code but with minimal users.

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musl libc has supported it for years. (Score:1)
by Anonymous Coward
As far as I know their support is feature complete, outside of bugs in the toolchain/kernel.
Personally all these 'lets delete xxx feature' discussions and removals is just making the linux kernel LESS interesting, while the major fuckups and bugs in the kernel are mostly in new, stupid, overengineered code that wasn't well thought out to begin with.
x32 from everything I hear has some shortcomings, but at the same time has been the proof of concept for all the other 32 on 64 bit ABI attempts made. Furthermor

x32 does not mean what you think it means (Score:1)
by Anonymous Coward
Wikipedia (wikipedia.org):
The x32 ABI is an application binary interface (ABI) and one of the interfaces of the Linux kernel. It allows programs to take advantage of the benefits of x86-64 instruction set (larger number of CPU registers, better floating-point performance, faster position-independent code, shared libraries, function parameters passed via registers, faster syscall instruction) while using 32-bit pointers and thus avoiding the overhead of 64-bit pointers. It's a 64-bit CPU thing, not a 32-bit CPU thing.

- **Re: (Score:1)**
by Anonymous Coward
This isn't about removing x86 32 bit support as far as I can see, it's about removing 32 bit support for 64-bit processors using the x86_64 branch, it's niche and only started appearing in 2012:
details [phoronix.com]

- **Re: (Score:1)**
by Anonymous Coward
You mean "x86" architecture, and that's not what this is about. "x32" is a feature of the Linux kernel where an application can run in a 4GB address space with all pointers being only 32 bit wide while still being in x86-64 mode and having access to all of the new instructions.

- **Re: (Score:1)**
by Desler (1608317)
A 486 does not support x32.

- **Re: (Score:3)**
by Frederic54 (3788)
Ah damn ok it isn't x86, I was confused...

- **What is x32? (Score:3)**
by Megane (129182) on Wednesday December 12, 2018 @09:10AM (#57791936) Homepage
Would it have hurt to include this?
The Linux x32 ABI as a reminder requires x86_64 processors and is engineered to support the modern x86_64 features but with using 32-bit pointers rather than 64-bit pointers. The x32 ABI allows for making use of the additional registers and other features of x86_64 but with just 32-bit pointers in order to provide faster performance when 64-bit pointers are unnecessary.
...except for the fact that this explanation is 25% of the four-paragraph article, and another 25% of it was already in TFS. Oops.
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- **Re: (Score:2)**
by dunkelfalke (91624)
Generally it would not hurt, but this is, after all, Slashdot so contributors assume a certain amount of "general knowledge".
1 hidden comment
- **Re: (Score:1)**
by Anonymous Coward

Generally it would not hurt, but this is, after all, Slashdot so contributors assume a certain amount of "general knowledge".

The article is about how this technology is obscure, and barely used. By definition that means that even among tech people it's not particularly well known. I actually _did_ happen to know about it, but that's only because years ago I did a little research into the 2038 problem, which on Linux is connected to running a 32 bit OS. the x32 ABI came up in passing.
That was several year

- **Re: (Score:2)**
by thegarbz (1787294)
Generally it would not hurt, but this is, after all, Slashdot so contributors assume a certain amount of "general knowledge".
An esoteric ABI so barely used that dropping its support is being considered by Linux most definitely does not qualify as general knowledge. Hell being general knowledge alone would likely be grounds for it to remain supported.

- **Re: (Score:2)**
by squiggleslash (241428)
I guarantee that 90% of the responses to this article will think they're dropping ia32/x86 support (or whatever you call the architecture that began on the 80386)...
To give an on-topic response, I think it's a shame, but predictable. Most people are either interested in full 64 bit or in backward compatibility, the benefits of X32 were obvious but marginal, a slight performance improvement in return for the need to recompile everything and be limited to 32 bit addressing in the future at a time when 4G n

- **Re: (Score:2)**
by xvan (2935999)
I can't think of a system that needs no more than 4GB, but needs the extra performance of 32bit addressing space.

- **Re: (Score:2)**
by pak9rabid (1011935)
I can't think of a system that needs no more than 4GB, but needs the extra performance of 32bit addressing space. It would be nice to have on x86_64 embedded systems with limited memory such as these [pcengines.ch], which are commonly used for networking gear.

- **Re: (Score:2)**
by xvan (2935999)
I thought of those at first, but in such case, the issue is memory space and not memory access time which would be improved. Found these benchmarks(end of post) [askubuntu.com]

Seems x32 would reduce the memory footprint up to 25%, might be to somebody doing a tight design.

- **Re: (Score:2)**
by squiggleslash (241428)
The extra performance you get out of X32 is the use of AMD's more optimal 64 bit instruction set. It's not about the address space, it's about the fact you have faster instructions, you have more registers, and you can process 64 bit values (integers, bit masks, etc) in almost the same amount of time it takes to process a 32 bit value. Remember that the 80386 was never considered an optimal CPU, it was the best Intel could do at the time with the conflicting needs of not having Motorola eat their lunch, wh

- **Re: (Score:2)**
by sconeu (64226)
386 is 'i386'. ia32 is Itanium.

- **Re: (Score:2)**
by squiggleslash (241428)
ia64 is Itanium [wikipedia.org]. ia32 [wikipedia.org] is the architecture introduced in the 80386.
Yeah, I know, it got confusing when the AMD 64 bit thing happened.

- **Re: (Score:2)**
by Immerman (2627577)
Why so verbose? Less is usually more:
>...began supporting the x32 ABI**(which allows 64-bit code to use 32-bit pointers to reduce overhead)**, but already kernel developers...

- **Re: (Score:1)**
by shoor (33382)
If I'd been writing the summary, I wouldn't have necessarily included the full techno description of what x32 ABI is, which might just be techo-babble for a lot of people, but I would have added "this has nothing to do with the old 32 bit architecture intel CPUs." somewhere early on.

- **Re: (Score:1)**
by Desler (1608317)
No, not at all. The two have nothing to do with each other. x32 is not the same as x86.

- **Re: (Score:2)**
by doconnor (134648)
One reason Linux has supported so many processors is that most of it has always been in written in C.

- **Anyone have statistics? (Score:2)**
by Maury Markowitz (452832)
Does anyone have comments on how many apps made use of this? I know that's kind of nebulous, and a nebulous answer is fine.
2 hidden comments
- **Re: (Score:1)**
by 110010001000 (697113)
Two.
1 hidden comment

- **Re: (Score:2)**
by crow (16139)
No, but...
Well, in reading that, it occurred to me that it might be interesting to see if I could compile a Gentoo system in x32, but I have a few programs that really need 64-bit pointers (based on their memory footprint): X, web browsers, libreoffice, and a few others. I suppose that means I would need a multilib support for this, and that gets ugly.

- **Re: (Score:2)**
by quintus_horatius (1119995)
IIRC 32-bit pointers chop something like 20% off the Firefox binary vs it's 64-bit version. That's not an inconsiderate savings.
Of course, you wouldn't want to run Firefox, Chrome, LibreOffice, or X with a 4-gig memory limit, hence the utility just isn't there for the times you would really like it.

- **Re: (Score:2)**
by Junta (36770)
The intent was to provide for a memory-efficient architecture that availed itself of the richer register space of x86_64. In practice, that's not a widespread interest (limiting to 4GB of ram support on architectures that can fundamentally support a lot more). General distributions wouldn't bother touching it (a lot of work to maintain a distro for users that have *almost* as good experience with an i686 distro), embedded applications may be more interested, but even they are outgrowing 4GB and honestly d

- **Re: (Score:2)**
by LordNimon (85072)
Isn't it technically less than 4GB of RAM because you still need address space for PCI devices?

- **Re: (Score:2)**
by Immerman (2627577)
I would think it would be fairly limited. The benefit would really only be felt by programs where a large percentage of the total used memory was pointers... so perhaps large graph-analysis applications? Perhaps neural networks, where it could reduce the size of an individual "synapse" from 96 bits (64 bit pointer + 32 bit weight) to 64 bits (32bit pointer+32 bit weight), saving roughly 1/3rd of the total program memory without resorting to index-based access and the associated overhead of pointer additio

- **Re: (Score:2)**
by pahles (701275)
http://bfy.tw/IIU [bfy.tw]
1 hidden comment

- **Re: (Score:2)**
by jfdavis668 (1414919)
Several refers to a small count of some group of items. "Few" is a similar word. "Several years" could refer to anything from 2-10 years in conversation. It does not imply less or more than something else. You could say "it took several years more than expected" if you are referring to something taking a longer time. But, it is still referring to a small quantity of years. You could also say it took several years less than expected" if it happened faster than the estimated amount of time.
1 hidden comment

- **Re: (Score:2)**
by BringsApples (3418089)
"One" is 1
"A couple" is 2
"A few" is 3 or 4 (in some cases, 5)
"Several" is 5 6 7 8 or 9
"A bunch" is the normal amount of something plus an additional .25% - .50%

"A lot" is the normal amount of something x2
"A shitload" is the normal amount of something x10
"A fuckload" is the normal amount of something x10 and you're drunk.

- **Re: (Score:2)**
by BringsApples (3418089)
Woops, "A bunch" is the normal amount of something plus an additional 25% - 50%
1 hidden comment

- **Re: How to use "several"? (Score:2)**
by UnknowingFool (672806)
Can you relate that in the standard slashdot unit of measure, the Library of Congress (LOC)? :)

- **Re: (Score:2)**
by aitikin (909209)
Obligatory xkcd [xkcd.com]

- **Re: (Score:2)**
by bigdavex (155746)
"It was just several years ago" or "Only several days left".
As a native English speaker, those examples both make my ears bleed, so I think I agree with your point. Several doesn't just mean a specific range of numbers, but also that the speaker wants to convey that, in this context, that number is many or greater than expectation.

- **Re: (Score:2)**
by jdschulteis (689834)
As others have answered, "several" in this context means a vague small number.
I'd like to point out that when writing up a news article, the author should have taken several minutes to look up exactly how long ago the X32 ABI was introduced.
"It was just six [kernel.org] years [kernelnewbies.org] ago..."

- **Re: (Score:2)**
by XanC (644172)
You're right that this usage is weird. The other posters are correct about what number range the word "several" might represent, but they're ignoring its connotation. You're exactly correct that it has the sense of "more than expected".
"There are still several years left", or "This established feature has been there for several years" all make sense. "It was just several years ago" does not make sense.

- **Missed a verb there (Score:3, Funny)**
by GreyWanderingRogue (598058) on Wednesday December 12, 2018 @09:46AM (#57792146)
Linus Torvalds is in favor of sunsetting x32 and many other upstream contributors in favor of seeing it deprecated and removed
It looks like you missed a verb there. Either that, or Slashdot has finally come across something everyone on Slashdot can agree is "News for Nerds." One nerd attempting to assassinate a group of nerds certainly meets every possible meaning of "News for Nerds."

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- **Re: (Score:2)**
by Zocalo (252965)
On the plus side, "sunsetting" is clearly a lot of progress compared to some of Linus' previous LKML putdowns so clearly that timeout has had the intended effect in getting *"some assistance on how to understand people's emotions and respond appropriately."* "Sunsetting" almost sounds like it would be pleasant experience, maybe with cocktails or something...

- **Re: Missed a verb there (Score:2)**
by jd (1658)
Worked for Reiser. Ish.

- **Just do it (Score:1)**
by Artem S. Tashkinov (764309)
How many people use it? 50? 500? I see no reason for it to exist. It's not like Open Source has too much manpower to afford supporting a queer architecture barely used by anyone.
1 hidden comment
- **Re: Just do it (Score:2)**
by UnknowingFool (672806)
Yeah I'm not sure of what the justification was to create it. The only scenario I can see is that for a short while some systems like ARM had to use it while transitioning to full 64-bit and needed a stopgap where the hardware could handle 64-bit but not all the systems were ready for it.

- **Re: (Score:2)**
by Artem S. Tashkinov (764309)
Now I see who's downvoting me.
x32 has never been deployed by any known company in any measurable quantities. And yes, Linux kernel architecture do require maintenance. In short your entire comment is invalid. Perhaps, you've mistaken x32 for something else (most ./ readers don't understand the difference between x86 and x32 - the latter is a completely different beast).
Also, no commercial/proprietary software exists for x32.

- **Re: (Score:2)**
by Artem S. Tashkinov (764309)
I also have to not that x32 was created as a sort of experiment. It has gained almost no traction anywhere and it's not really used by anyone aside from Gentoo/LFS lovers.

- **Damnit, Linus! (Score:2)**
by DontBeAMoran (4843879)
How else will I run Linux on my SEGA Genesis?
Oh wait, x32, not 32X.
Carry on.
2 hidden comments

- **The correct approach (Score:2)**
by jd (1658)
Is surely to provide a better abstraction layer.
I should not have to care if x32, DEC or the Prime Radiant are supported by the kernel admins. Patches should largely just work with minimal hacking.
In turn, it should not be such hard work to maintain code. Different systems have different ways to achieve the same thing with different optimizations possible.
All of that can be stuck in helper code, well almost all, which means there is far less maintenance.
This is not esoteric wisdom, its the basis behind all

- **Clearing Space for Next-Gen Linux Features ... (Score:1)**
by Seven Spirals (4924941)
Hey, sounds like something Linux would do. Here are some other ideas for the new-school Linux children. 1. Drop support for any text configuration file. Go full binary registry. Hell, make it an SQL database that has to start before the system can boot. 2. Convert all log files to encrypted binary files. Just making them binary wasn't good enough. 3. Disable all support for shell scripting. Only Python scripting is allowed now so that you can get the joy of tracebacks for everything you do. 4. Disable pipes

- **Weird syscalls, but surely still workable (Score:2)**
by Etcetera (14711)
Here's the LKML post that kicked it off, if you don't want to click through: https://lkml.org/lkml/2018/12/10/1145 [lkml.org]
I think his point #2 is probably the most "nutty", but that really does seem like an implementation detail:
*2. The way that system calls work is very strange. Most syscalls on x32 enter through their *native* (i.e. not COMPAT_SYSCALL_DEFINE) entry point, and this is intentional. For example, adjtimex() uses the native entry, not the compat entry, because x32's struct timex matches the x86-64 layou*
3 hidden comments

- **x32 (Score:2)**
by ledow (319597)
I tend to find that oddball intermediate layers like this die off rather quickly. In terms of "when I'd heard of it" to "when its death is proposed", this one is really quite quick.
I'm surprised that x86 is still supported, let alone an oddball "64-bit processor with 32-bit pointers" hybrid setup. Surely even x86 is only more for legacy and embedded chipsets, nowadays, where I can't imagine that x32 would help at all.
Either your chip is 64-bit capable, or not. If it is, even if there are minor advantages

- **Nooo! (Score:2)**
by ReneR (1057034)
Don't take the 10% advance away from me! :-/ https://t2sde.org/ [t2sde.org]

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