Is there any difference between a GUID and a UUID?

Asked 16 years, 1 month ago Modified 1 year, 2 months ago

Viewed 374k times

1195

I see these two acronyms being thrown around and I was wondering if there are any differences between a GUID and a UUID?

guid uuid

Share

Improve this question

Follow

edited Nov 2, 2021 at 10:29

malana

5,220 ● 3 ● 29 ● 43

asked Oct 29, 2008 at 14:09

Jon Tackabury

49.2k ● 52 ● 131 ● 170

286 I can say "GUID", I can't say "UUID". – Hardwareguy Jul 5, 2012 at 18:31

67 I pronounce UUID as "you-wid" – Matt Greer Jul 5, 2012 at 23:26

189 I say "you-you-I-dee", but I'm not a native speaker... – Wilt Aug 25, 2014 at 7:16

37 UUID specification (RFC-4122) says in the abstract: *This specification defines a Uniform Resource Name namespace for UUIDs (Universally Unique IDentifier), also known as GUIDs (Globally Unique IDentifier)* – Tom Nov 19, 2014 at 16:01

69 GUID is unique across Globe and UUID is unique across Universe. Choose wisely! – Nilesh May 14, 2021 at 8:03

5 Answers

Sorted by: Highest score (default)

1142

The **simple answer** is: **no difference**, they are the same thing.

For most practical purposes, treat them as 16 byte (128 bits) values that are used as a unique identifier. In Microsoft-speak they are called GUIDs, but call them UUIDs when not using Microsoft-speak.

Even the authors of the UUID specification and Microsoft claim they are synonyms:

- From the introduction to IETF RFC 4122 "*A Universally Unique IDentifier (UUID) URN Namespace*": "a Uniform Resource Name namespace for UUIDs (Universally Unique IDentifier), also known as GUIDs (Globally Unique IDentifier)."
- From the ITU-T Recommendation X.667, ISO/IEC 9834-8:2004 International Standard: "UUIDs are also

known as Globally Unique Identifiers (GUIDs), but this term is not used in this Recommendation."

- And Microsoft even claims a GUID is specified by the UUID RFC: "In Microsoft Windows programming and in Windows operating systems, a globally unique identifier (GUID), as specified in [RFC4122], is ... The term universally unique identifier (UUID) is sometimes used in Windows protocol specifications as a synonym for GUID."

Detailed answer

But the **correct answer** is "it depends". It depends on what the question means when it says "UUID"...

The first part depends on what the asker is thinking when they are saying "UUID".

Microsoft's claim implies that all UUIDs are GUIDs. But are all GUIDs real UUIDs? That is, is the set of all UUIDs just a proper subset of the set of all GUIDs, or is it the exact same set?

Looking at the details of the RFC 4122, there are four different "variants" of UUIDs. This is mostly because such 16 byte identifiers were in use before those specifications were brought together in the creation of a UUID specification. From section 4.1.1 of RFC 4122, the four *variants* of UUID are:

1. Reserved, Network Computing System backward compatibility

2. The *variant* specified in RFC 4122 (of which there are five sub-variants, which are called "versions")
3. Reserved, Microsoft Corporation backward compatibility
4. Reserved for future definition.

According to RFC 4122, all UUID *variants* are "real UUIDs", then all GUIDs are real UUIDs. To the literal question "is there any difference between GUID and UUID" the answer is definitely no for RFC 4122 UUIDs: **no difference** (but subject to the second part below).

But not all GUIDs are *variant* 2 UUIDs (e.g. Microsoft COM has GUIDs which are variant 3 UUIDs). If the question was "is there any difference between GUID and variant 2 UUIDs", then the answer would be yes -- they can be different. Someone asking the question probably doesn't know about *variants* and they might be only thinking of *variant* 2 UUIDs when they say the word "UUID" (e.g. they vaguely know of the MAC address+time and the random number algorithms forms of UUID, which are both *versions* of *variant* 2). In which case, the answer is **yes different**.

So the answer, in part, depends on what the person asking is thinking when they say the word "UUID". Do they mean variant 2 UUID (because that is the only variant they are aware of) or all UUIDs?

The second part depends on which specification being used as the definition of UUID.

If you think that was confusing, read the ITU-T X.667 ISO/IEC 9834-8:2004 which is supposed to be aligned and fully technically compatible with RFC 4122. It has an extra sentence in Clause 11.2 that says, "All UUIDs conforming to this Recommendation | International Standard shall have variant bits with bit 7 of octet 7 set to 1 and bit 6 of octet 7 set to 0". Which means that only *variant* 2 UUID conform to that Standard (those two bit values mean *variant* 2). If that is true, then not all GUIDs are conforming ITU-T/ISO/IEC UUIDs, because conformant ITU-T/ISO/IEC UUIDs can only be *variant* 2 values.

Therefore, the real answer also depends on which specification of UUID the question is asking about. Assuming we are clearly talking about all UUIDs and not just variant 2 UUIDs: there is **no difference** between GUID and IETF's UUIDs, but **yes difference** between GUID and *conforming* ITU-T/ISO/IEC's UUIDs!

Practical notes

The information above does not go into the details of the UUID/GUID values, or how you get/generate them. But there are two misconceptions about the values that should be cleared up.

1. Representation of UUID/GUIDs

Firstly, the same UUID/GUID is a 16 bytes (128 bits) value that can be represented in different ways.

In memory or storage, it can be represented compactly as binary data. For example, it can be represented as an array of sixteen bytes, eight 16-bit words, or four 32-bit integers; signed or unsigned. The endian is significant when using words or integers.

In text or strings, it is commonly represented in hexadecimal with hyphens:

```
hhhhhhhh-hhhh-Yhhh-Xhhh-hhhhhhhhhhhh
```

where h, X and Y are hexadecimal characters.

Some programs might only accept uppercase characters, or only lowercase characters---even though the case is not significant to the value of the UUID/GUID. Some programs might require the hyphens to be omitted or to be present only in those positions---even though the hyphens are not significant to the value of the UUID/GUID.

The positions of the hyphens reflect the time-based version of UUIDs: separating the various time, clock and MAC address fields. Obviously, those fields don't have meaning when it comes to the other version of UUIDs. But, by convention, those positions of the hyphens are still used.

2. Interpretation of the bytes

Secondly, always use a library to generate a UUID/GUID. Generating 16 random bytes does not guarantee a valid

UUID/GUID. Even when using a version 4 UUID, some of the bytes must have specific values.

In the above hexadecimal string template, three bits of the hexadecimal character in position X encodes the UUID's *variant*. For the variant defined in RFC 4122, X will be either 8, 9, A or B.

If the UUID is an RFC 4122 *variant*, the bits represented by the hexadecimal character in position Y encode its *version*. For example, 4 indicates a version 4.

Randomly generating 16 bytes would not guarantee the bytes would have the correct values in those two fields.

For the full details, see RFC 4122. But normally you don't need to know their internal structure. If you are just using values you have been given, just treat them as 16 byte (128 bits) values that are used as a unique identifier.

Share Improve this answer Follow

edited Oct 2, 2023 at 2:00

answered Aug 5, 2011 at 8:01

Hoylen

16.9k ● 6 ● 32 ● 16

53 More informative than chosen answer. I think the chosen answer is the absolute simplest answer to the question, though. – New Alexandria Jul 5, 2012 at 16:46

3 The binary encoding table embedded in the answer is very useful. Tnx – Luciano Mar 3, 2016 at 18:37

4 The 'endianness' is very important. If you store the id as bytes you will get different results from GUID and UUID. – Calabacin Dec 21, 2016 at 16:43

2 And imagine, beings stuck at a mere 665 upvotes! How could I not upvote this? – Haakon Løtveit Sep 19, 2018 at 12:15

5 Excellent write up, I would have upvoted, but it's currently at precisely 1024. – SleepyCal Oct 24, 2022 at 13:12

733

GUID is Microsoft's implementation of the UUID standard.

Per Wikipedia:

> The term GUID usually refers to Microsoft's implementation of the Universally Unique Identifier (UUID) standard.

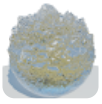
An updated quote from that same Wikipedia article:

> RFC 4122 itself states that UUIDs "are also known as GUIDs". All this suggests that "GUID", while originally referring to a variant of UUID used by Microsoft, has become simply an alternative name for UUID…

Share Improve this answer

Follow

edited Mar 4, 2022 at 14:57



polypoyo

9 ● 1 ● 5

answered Oct 29, 2008 at 14:10

bdukes

156k ● 25 ● 150 ● 176

47 (The G stands for Globally) – ted.strauss Sep 20, 2012 at 14:14

39 Note that if you want to convert from Microsoft's GUID binary representation to a standard UUID you'll have to flip endianness of the first three (of four) data fields as detailed in the "Binary encoding" section here: en.wikipedia.org/wiki/Globally_unique_identifier – Form Jun 14, 2013 at 4:41

123 This is why astronauts are not allowed to install Windows on the ISS. – intuited Jul 28, 2015 at 22:02

12 @bdukes Seems Wikipedia has changed what you referred to as their statement. It now reads `The term "GUID" typically refers to various implementations of the universally unique identifier (UUID) standard.` – Khadim Ali Oct 10, 2015 at 11:23

17 Except that isn't what happened, the standard wasn't created until after Microsoft started using GUIDs. – andynormancx May 4, 2017 at 12:36

20

Not really. GUID is more Microsoft-centric whereas UUID is used more widely (e.g., as in the *urn:uuid:* URN scheme, and in CORBA).

Share Improve this answer

Follow

answered Oct 29, 2008 at 14:10

Mark Cidade

99.8k ● 33 ● 229 ● 237

12 What is the definition and effect of Microsoft-centricity?
– Kalle Richter Oct 26, 2019 at 7:14

9

GUID has longstanding usage in areas where it isn't necessarily a 128-bit value in the same way as a UUID. For example, the RSS specification defines GUIDs to be any string of your choosing, as long as it's unique, with an "isPermalink" attribute to specify that the value you're using is just a permalink back to the item being syndicated.

Share Improve this answer

Follow

answered Jul 5, 2012 at 16:26

Tony Arcieri
165 ● 1 ● 4

lol. Perhaps not the best example given the infamous history of the RSS specification. And it certainly wouldn't be the only thing that the RSS specification got absurdly wrong.
– Robin Davies Apr 21, 2022 at 6:50

1

One difference between GUID in SQL Server and UUID in PostgreSQL is letter case; SQL Server outputs upper while PostgreSQL outputs lower.

The hexadecimal values "a" through "f" are output as lower case characters and are case insensitive on input. - rfc4122#section-3

Share Improve this answer

Follow

edited Oct 7, 2021 at 11:32

Community Bot

1 • 1

answered Apr 26, 2019 at 23:39

eezing

83 • 2

That is not a difference between UUID and GUID but between the default text-formatting of 2 different Database-engines. – ABaumstumpf Sep 10 at 15:25

Highly active question. Earn 10 reputation (not counting the association bonus) in order to answer this question. The reputation requirement helps protect this question from spam and non-answer activity.