The case of the UuidCreateSequential that didn't use the MAC address

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A customer reported that the `UuidCreateSequential` function was generating UUIDs that did not place the network card's MAC address in the final bytes of the UUID.

Sequentially-generated UUIDs are so-called Version 1 UUIDs: A combination of a timestamp and a MAC address. The timestamp is incremented to produce sequential UUIDs.

So why wasn't the MAC address being used in the UUID? Instead, the high bit of the first byte of the MAC address was set, indicating that this was a pseudo-random MAC address rather than a real one. (In real MAC addresses, the first bit is zero, indicating a unicast destination.)

It took a lot of investigation, but the team finally got to the root of the problem.

Their systems had a virtual network card, and the driver for the virtual network card generated a MAC address where the Organizationally Unique Identifier (OUI) was `FFFFFF`.

Uh, oh.

Remember I said that in real MAC addresses, the first bit is zero, indicating a unicast destination. But their MAC address had the first bit (indeed the first 24 bits) all set!

When the system gets the MAC address for the purpose of creating sequential UUIDs, it ignores network adapters who report a OUI of `FFFFFF`, on the assumption that they are fake network adapters and therefore do not carry a unique MAC address.

And if *all* of the network adapters are fake, then the UUID generation algorithm falls back to the case where there is no network adapter at all and generates a pseudo-random one. And sets the bit that says "This is a fake MAC address."

When told that their virtual network card driver was setting the OUI to `FFFFFF`, they answered, "Is that a problem? Should we be using something else?"

It's actually a good thing that they accidentally chose a blatantly invalid OUI for their fake MAC address, because it makes things as clear as possible (within the expressive range of 48-bit MAC addresses) that the MAC address is fake and should not be relied upon for global uniqueness. The `UuidCreateSequential` function is correct to ignore that artificial MAC address and fall back on a pseudo-randomly-generated one.

The problem was not in the `UuidCreateSequential` function, nor was it in their virtual network card. It was in their expectations! If you have a fake network card, then its MAC cannot be used to generate sequential GUIDs.

Bonus chatter: The kdnet feature also sets up a virtual network card with a vendor ID of all F's. So if you enabled kdnet, and you don't have a real network card, then you may encounter this problem, too.

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