WWN to EUI-64 Mapping

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Problem statement: To permit the interoperable implementation of bridges between Fibre Channel and other technologies which use EUI-64 as addressing format, there is the need of a standard method to map EUI-64 addresses in FC WWNs and viceversa. Proposal 01-531 solves the problem of how to map EUI-64 addresses in FC WWNs, permitting to a FC bridge to give a unique FC name to non-FC devices. However, there is still the need of a standard method to map FC WWNs in EUI-64 addresses, to permit to a bridge to map FC devices over the non-FC network.

Another reason to define this mapping is the fact that vendors require a method to avoid the assignment of overlapping names on the EUI-64 address space and in the FC name space. Several tecniques can be used to rearrange a FC WWN in a EUI-64 address, and this can lead to several EUI-64 addresses derived from the same FC WWN. Standardizing a single method allows to map one FC WWN in a single EUI-64 address.

Proposed solution: This algorithm defines a mapping of the most widely used FC Name_Identifier formats to EUI-64 addresses. The considered formats are:

- IEEE 48 bit address (NAA = 1)
- IEEE Extended (NAA = 2)
- IEEE Registered (NAA = 5)

The first step is to rearrange the FC WWN in a EUI-64 address. In this manner each FC WWN is mapped in a single EUI-64 address as follows:

- IEEE 48 bit address WWN format:

63 ... 60	59 ... 48	47 ... 24	23 ... 0
NAA=1	0	OUI	VSID

- Mapped EUI-64 address:

63 ... 40	39 ... 36	35 ... 12	11 ... 0
OUI	NAA=1	VSID	0

- IEEE Extended WWN format:

63 ... 60	59 ... 48	47 ... 24	23 ... 0
NAA=2	local ass.	OUI	VSID

- Mapped EUI-64 address:

63 ... 40	39 ... 36	35 ... 12	11 ... 0
OUI	NAA=2	VSID	local ass.

- IEEE Registered WWN format:

63 ... 60	59 ... 36	35 ... 0
NAA=5	OUI	VSID

- Mapped EUI-64 address:

63 ... 40	39 ... 36	35 ... 0
OUI	NAA=5	VSID

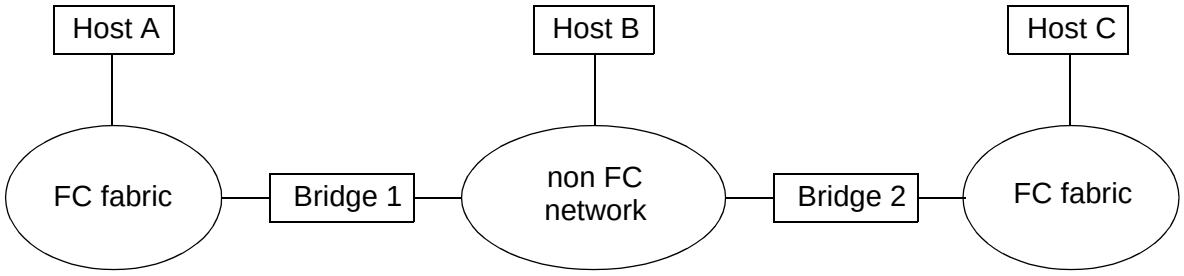
If this mapped EUI-64 address has to be used by a bridge, and the vendor who assigned the FC WWN did not assign consistently the EUI-64 addresses in other devices that he manufactured, then there is the possibility that the EUI-64 address derived from the FC WWN conflicts with a “native” EUI-64 address. To solve this collision, a possible solution is to set to 1 the Universal/Local bit in the OUI part of the WWN in the mapped EUI-64 address. This is permitted by IEEE, as per Std 802-1990:

“Though the Organizationally Unique Identifiers are 24 bits in length, their true address space is 22 bits. The first bit can be set to 1 or 0 depending on the application. The second bit for all assignment is 0.”

“The second bit of the Organizationally Unique Identifier being set to 0 indicates that the assignment is universal. Organizationally Unique Identifiers with the second bit set to 1 are locally assigned and have no relationship to the IEEE-assigned values.”

“If this bit is set to 1, the entire address has been locally administered.”

Case study: how the algorithm works in the following scenario:



in which the three hosts have globally unique names WWN(A), WWN(C) and EUI-64(B).

Bridge 1 maps, in the non FC network, WWN(A) in a “local” EUI-64(A), with the local bit set, and Bridge 2 does the same for WWN(C), obtaining a “local” EUI-64(C) address. Being the WWNs globally unique, as the EUI-64 addresses connected to the non-FC network, there are no address conflicts on this network.

Bridge 1 maps, in the FC fabric, EUI-64(B) in a WWN(B) using the rules defined in document 01-531, and, recognizing the local bit set to 1, the “local” EUI-64(C) in WWN(C). So, there are no name conflicts in the first FC fabric.

Bridge 2 performs the corresponding functions for the second FC fabric, and also in this case there are no name conflicts.