

## How to understand an IEEE 802.1d Ethernet Bridge

The integrated Ethernet bridging tool of your Linux Security Gateway IGW/100 default embedded Linux configuration – called “Embedded Gateway Linux” – implements the IEEE 802.1d (MAC Bridge) concepts. Please see also the Linux Security Gateway IGW/100 microHOWTOs “*How to setup an Ethernet Bridge*” and “*How to setup a Multiport Ethernet Bridge (IEEE 802.1d 3-Port Switch)*” for more details about bridging.

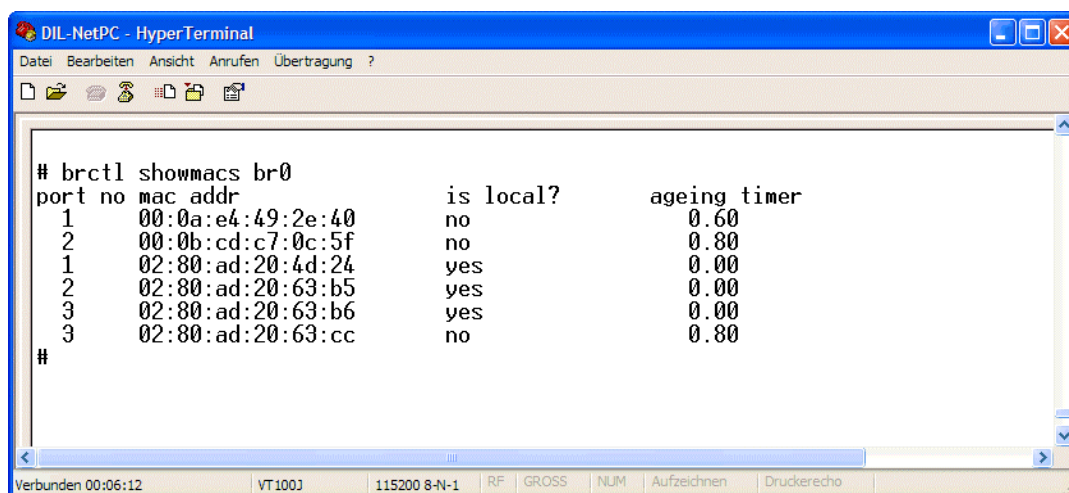
A bridge is a device used to interconnect network segments and pass packets between those network segments. They operate at the layer 1 (Physical) and layer 2 (Data Link) of the OSI Model and their operation depends on the method they use to process the packets between the adjoining network segments.

The IGW/100 bridge software works as **Transparent** or **Learning Bridge**. Most of today's transparent bridges are more commonly called "Learning Bridges" because, in addition to buffering the packets at the port, they also examine information the source address field of a data packet. When a packet arrives at a port on a learning bridge, the bridge looks for its source address in its **Source Address Table (SAT)**, an internal database.

If the source address is not in the SAT, it simply adds that source address and the bridge port number on which it arrived to the SAT. Then the bridge looks for the packet's destination in the SAT: 1. *If the destination exists in the SAT*, the packet is sent to the bridge port associated with the destination address. 2. *If the destination does NOT exist in the SAT*, the packet is sent out all of the bridge ports except for the port on which it arrived. A Learning Bridge learns from a packets source address and forwards it on the packets destination address.

- **1. Step:** Enter the following command within an IGW/100 Linux Security Gateway RS232-based serial console session:

```
brctl showmacs br0
```



```
# brctl showmacs br0
port no mac addr is local? ageing timer
1 00:0a:e4:49:2e:40 no 0.60
2 00:0b:cd:c7:0c:5f no 0.80
1 02:80:ad:20:4d:24 yes 0.00
2 02:80:ad:20:63:b5 yes 0.00
3 02:80:ad:20:63:b6 yes 0.00
3 02:80:ad:20:63:cc no 0.80
#
```

The command `brctl showmacs <bridge>` displays the items of the internal IGW/100 SAT, `br0` is the name of the bridge. The picture above shows a SAT for three ports.

MAC Addresses	Port Number
00:0a:e4:49:2e:40	1
00:0b:cd:c7:0c:5f	2
02:80:ad:20:63:cc	3
<empty>	-
<empty>	-
<empty>	-

**Table 1:** Sample for a SAT content

Table 1 is a sample for a Source Address Table (SAT) structure. The total item count depends on the bridge configuration.

That's all.