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# 13 VLAN Translation

In version 9.4, the ability to translate VLAN has been added: the incoming VLAN of the packet is replaced with the specified outgoing VLAN. VLAN translation is specified in `/etc/dpi/vlan_translation.txt` text file, which has the following structure:

```
# subs VLAN      inet VLAN
123              1123
124              1124
125              1125
# and so on.
```

Each line defines the correspondence of the incoming and outgoing VLAN. A line starting with # is a comment. Leading spaces/tabs on the line are ignored.

The translation text file must be converted to a binary file `/etc/dpi/vlan_translation.bin` using the `vlan2bin` utility from `dpiutils`:

```
cat vlan_translation.txt|vlan2bin /etc/dpi/vlan_translation.bin
```

The reverse conversion from binary to text is performed by the `bin2vlan` utility:

```
bin2vlan /etc/dpi/vlan_translation.bin >vlan_translation.txt
```

VLAN translation mode is enabled simply by the presence of the file `/etc/dpi/vlan_translation.bin`: if this file does exist, than translation mode is enabled. The absence of the file is an indication that the VLAN translation mode is disabled. The content of the translation file can be changed on-the-fly: DPI platform periodically checks the file; if it was changed, DPI re-reads the translation table. You can turn off translation mode on-the-fly by simply deleting or renaming the translation file `/etc/dpi/vlan_translation.bin`.

When VLAN translation is enabled, it applies to any mode of DPI operation, not just BRAS mode.

When VLAN translation is enabled, DPI works as follows:

- packet from the Subscriber to the Internet (subs → inet): searches the translation table for the incoming VLAN of the packet (subs VLAN); if VLAN is found, replaces it with outgoing inet VLAN. In the example above, subs VLAN=123 will be replaced with inet VLAN=1123.
- packet inet → subs: searches the translation table for the incoming VLAN of the packet (inet VLAN); if VLAN is found, replaces it with outgoing subs VLAN. In the example above, inet VLAN=1124 will be replaced with subs VLAN=124.
- If the incoming VLAN is not found in the translation table, it is not changed (this situation is not an error). Thus, the translation table does not have to be complete and list all VLANs.
- For a passthrough packet (for example, if the AS flag is set to pass), VLAN translation is not applied.

VLAN translation is applied only to the packets with one VLAN-tag. For Q-in-Q, translation is not applied. If the packet does not have a VLAN tag, translation is also not applied - the packet is sent "as it is", unchanged.

The correspondence must be one-to-one; the following settings are not valid:

```
# subs VLAN      inet VLAN
  # Error: two subs VLAN (64 and 65) are translated into one VLAN=200
64                200
65                200

  # Similar error: inet VLAN 202 and 203 are translated into one subs
VLAN=2067
2067              202
2067              203
# ...
```

At the end of the file, you can add default translation recordings:

```
# subs VLAN      inet VLAN
123              1123
124              1124
125              1125
# then list all the other translations ...

# Statement "translate all other subs VLANs on subs->inet to inet VLAN 4012"
# There can be only one such statement in a file!
*                4012

# Statement "translate all other inet VLAN on inet->subs to subs VLAN 2089"
# There can be only one such statement in a file!
2089             *

# End of translation file
```

## Compatibility with L2 BRAS/BNG mode

VLAN translation is also used in the L2 BRAS/BNG mode; taking into account the fact that L2 BRAS/BNG VLAN is already able to perform [VLAN tag replacement](#), the rules are slightly different.

The VLAN translation table is used in L2 BRAS/BNG when terminating sub→inet traffic in the following cases:

1. if the subscriber is not an L2 subscriber (subscriber's [L2-parameters](#) are unknown);
2. if VLAN termination is disabled (`bras_vlan_terminate=0`);
3. in the [replacement mode](#) `bras_vlan_terminate=2`: if the subscriber does not have the [outVLAN](#) property and there is a translation record for the VLAN-tag of the packet
4. in the [VLAN transformation mode](#) `bras_vlan_terminate=3`: if the subscriber does not have the [outVLAN](#) property and there is a translation record for the VLAN-tag of the packet.

In other words, in `bras_vlan_terminate=2` or `3` modes, the subscriber's [outVLAN](#) property has the highest priority when terminating traffic subs→inet. The next (if the subscriber does not have the [outVLAN](#) property and if the packet has only one VLAN-tag) is the search in the VLAN termination table. Then, if there are no translations found, configuration parameters are applied as described in

the modes `bras_vlan_terminate` (see links above).

When the `inet→subs` traffic is originated, VLAN translation table in L2 BRAS/BNG mode is used only for unknown subscribers, that is, when DPI system does not find L2-properties of the subscriber.

## CLI-commands

There are several [CLI-commands](#) for working with the VLAN translation table.

```
fdpi_cli vlan translation
```

Lists the current translation tables `subs→inet` and `inet→subs`. В выводе этой команды записи "по умолчанию" вида `* N` and `N *` развернуты. If there are no translations, the command will report it.

```
fdpi_cli vlan translation reload
```

Немедленная загрузка файла `/etc/dpi/vlan_translation.bin`. Если файла нет - режим трансляции VLAN выключается. СКАТ периодически (раз в минуту) проверяет наличие и изменение файла `/etc/dpi/vlan_translation.bin`, но этой командой можно принудительно заставить СКАТ пересчитать этот файл немедленно.

```
fdpi_cli vlan translation test [subs|inet] <vlan>
```

Проверка трансляции VLAN на указанном пути:

- `subs` - трансляция `subs-VLAN <vlan>`
- `inet` - трансляция `inet-VLAN <vlan>`

Примеры:

```
# в какой VLAN транслируется VLAN=123 на пути subs->inet
fdpi_cli vlan translation test subs 123
# выхлоп команды:
VLAN=123 translation subs->inet: 123 -> 1123
```

```
# в какой VLAN транслируется VLAN=1124 на пути inet->subs
fdpi_cli vlan translation test inet 1124
# выхлоп команды:
VLAN=1124 translation inet->subs: 1124 -> 124
```

```
# Если трансляции для указанного VLAN нет, команда ответи ошибкой вида:
No translation for VLAN=666 for subs->inet
```