

\_\_\_\_\_  
##  
Front  
mat-  
ter  
ti-  
tle:  
“

№5”  
sub-  
ti-  
tle:  
“  
VLAN”  
au-  
thor:  
“

”

##  
Generic  
options  
lang:  
ru-  
RU  
toc-  
title:  
“ ”

—  
##  
Bib-  
li-  
og-  
ra-  
phy  
bib-  
li-  
og-  
ra-  
phy:  
bib/cite.bib  
csl:  
pan-  
doc/csl/gost-  
r-7-  
0-  
5-  
2008-  
numeric.csl

---

```
##  
Pdf  
out-  
put  
for-  
mat  
toc:  
true  
#  
Ta-  
ble  
of  
con-  
tents  
toc-  
depth:  
2  
lof:  
true  
#  
List  
of  
fig-  
ures  
lot:  
true  
#  
List  
of  
ta-  
bles  
font-  
size:  
12pt  
linestretch:  
1.5  
pa-  
per-  
size:  
a4  
doc-  
u-  
ment-  
class:  
scr-  
reprt  
##  
Iñn  
poly-  
glos-  
sia  
polyglossia-  
lang:  
name:  
rus-
```

# 1

VLAN

# 2

1. Trunk- .
2. msk-donskaya-sw-1 VTP- VLAN.
3. msk-donskaya-sw-2 — msk-donskaya-sw-4, msk-pavlovskaya-sw-1 VTP- VLAN.
4. IP- .
5. IP- , ip- .
6. VLAN, , VLAN, , VLAN.
7. .(netadmin?)

# 3

LAB04.  
 Trunk- g0/1 msk-donskaya-  
 sw-1 (msk-donskaya-vnkhrustalev-sw-1), Trunk-  
 ( . 1).  
 VTP,  
 msk-donskaya-vnkhrustalev-sw-1( . 7) VTP-  
 VLAN. msk-donskaya-vnkhrustalev-sw-2( . 8) — msk-donskaya-  
 vnkhrustalev-sw-4( . 10), msk-pavlovskaya-vnkhrustalev-sw-1( . 11) VTP-

VLAN.

Table 2:

	Access VLAN	Trunk VLAN
msk-donskaya- vnkhrustalev-gw-1	f0/1	UpLink

		Access VLAN	Trunk VLAN
msk-donskaya-vnkhrustalev-sw-1	f0/0	msk-donskaya-sw-1	2, 3, 101, 102, 103, 104
	f0/24	msk-donskaya-gw-1	2, 3, 101, 102, 103, 104
	g0/1	msk-donskaya-sw-2	2, 3
	g0/2	msk-donskaya-sw-4	2, 101, 102, 103, 104
	g0/1	msk-pavlovskaya-sw-1	2, 101, 104
	g0/1	msk-donskaya-sw-1	2, 3
	g0/2	msk-donskaya-sw-3	2, 3
	f0/1	Web-server	3
	f0/2	File-server	3
	g0/1	msk-donskaya-sw-2	2, 3
msk-donskaya-vnkhrustalev-sw-3	f0/1	Mail-server	3
	f0/2	Dns-server	3
	g0/1	msk-donskaya-sw-1	2, 101, 102, 103, 104
	f0/1-f0/5	dk	101
	f0/6-f0/10	departments	102
msk-donskaya-vnkhrustalev-sw-4	f0/11-f0/15	adm	103
	f0/16-f0/24	ther	104
	f0/24	msk-donskaya-sw-1	2, 101, 104
	f0/1-f0/15	dk	101
	f0/20	other	104

IP-

msk-donskaya-vnkhrustalev-sw-1

Physical    Config    **CLI**    Attributes

**IOS Command Line Interface**

```
%LINKPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
%LINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%LINKPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

User Access Verification
Password: Password:
Password:
* Bad password

Press RETURN to get started!

User Access Verification
Password:
Password:
msk-donskaya-vnkhrustalev>en<1>enable
Password:
msk-donskaya-vnkhrustalev>en<1>configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vnkhrustalev>en<1>(config)#interface g0/1
msk-donskaya-vnkhrustalev>en<1>(config-if)#switchport mode trunk
msk-donskaya-vnkhrustalev>en<1>(config-if)#
%LINKPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down
%LINKPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up
interface g0/2
msk-donskaya-vnkhrustalev>en<1>(config-if)#
%LINKPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to down
%LINKPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up
```

Top

Figure 1: Trunk- msk-donskaya-vnkhrustalev-sw-1

Figure 2: Trunk- msk-donskaya-vnkhrustalev-sw-2

msk-donskaya-vnkhrustalev-sw-3

Physical Config **CLI** Attributes

iOS Command Line Interface

```
[base ethernet MAC Address: 0001.6347.2819]
Memory size available: 1024M/1024M (781)
Power supply part number: 3A-2945-00
Motherboard serial number: POC05104042
Processor part number: A8000000000000000000000000000000
Model revision number: CD
Motherboard revision number: A0
Model number: MS-C2500T-24
System serial number: FHM05102C00

Cisco Internetwork Operating System Software
IOS (tm) Software Image for C2500-48t-S, Version 12.1(2)EAA, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2003 by cisco Systems, Inc.
Compiled Wed 18-May-03 21:31 by kshariba

Please RETURN for get started

*11/05/03 15:45:20: [UNLINED]: Interface GigabitEthernet0/1, changed state to up
*11/05/03 15:45:20: [UNLINED]: Line protocol on Interface GigabitEthernet0/1, changed state to up
*11/05/03 15:45:20: [UNLINED]: Interface FastEthernet0/1, changed state to up
*11/05/03 15:45:20: [UNLINED]: Line protocol on Interface FastEthernet0/1, changed state to up
*SPANPANEE-2-SRCV_PVID_E8E: Received 802.1Q 8800 on non trunk GigabitEthernet0/1 VLAN1.
*SPANPANEE-2-BLOCK_PVID_LOCAL: Blocking GigabitEthernet0/1 on VLAN0001. Inconsistent port type.

*11/05/03 15:45:20: [UNLINED]: Line protocol on Interface GigabitEthernet0/5, changed state to down
*11/05/03 15:45:20: [UNLINED]: Line protocol on Interface GigabitEthernet0/5, changed state to up

User Access Verification

Password: 1234567890

msk-donskaya-vnkhrustalev-sw-3>en
msk-donskaya-vnkhrustalev-sw-3#en
msk-donskaya-vnkhrustalev-sw-3#conf t
^C
! Invalid input detected at '^' marker!

msk-donskaya-vnkhrustalev-sw-3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vnkhrustalev-sw-3#conf t
msk-donskaya-vnkhrustalev-sw-3(config)#interface gigabitethernet0/1
msk-donskaya-vnkhrustalev-sw-3(config-if)#port mode trunk
msk-donskaya-vnkhrustalev-sw-3(config-if)#
```

Figure 3: Trunk- msk-donskaya-vnkhrustalev-sw-3

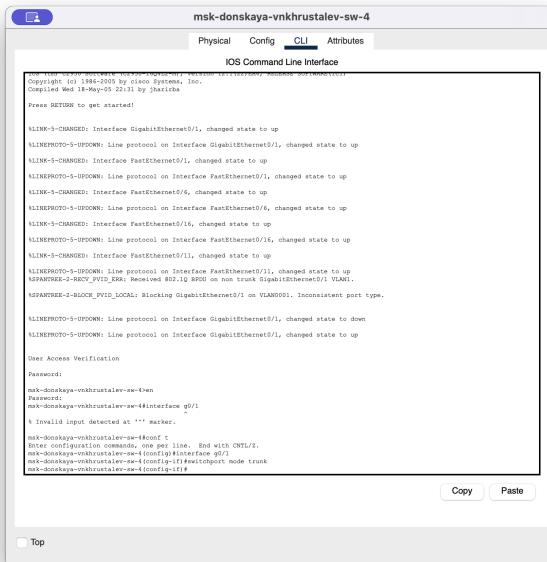


Figure 4: Trunk- msk-donskaya-vnkhruystalev-sw-4

```

msk-donskaya-vnkhruystalev-sw-1(config)#interface f0/1
msk-donskaya-vnkhruystalev-sw-1(config-if)#switchport mode trunk
msk-donskaya-vnkhruystalev-sw-1(config-if)#exit

```

Figure 5: Trunk- msk-donskaya-vnkhruystalev-sw-1

```

msk-pavlovskaya-vnkhruystalev-sw-1(config)#interface f0/24
msk-pavlovskaya-vnkhruystalev-sw-1(config-if)#switchport mode trunk
msk-pavlovskaya-vnkhruystalev-sw-1(config-if)#

```

Figure 6: Trunk- msk-pavlovskaya-vnkhruystalev-sw-1

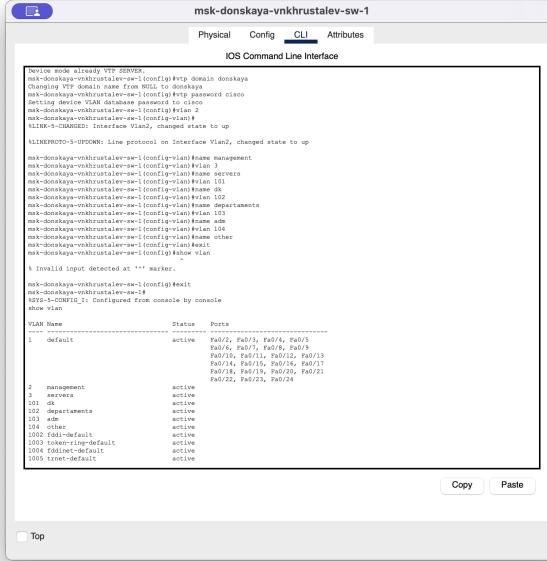


Figure 7: msk-donskaya-vnkhruystalev-sw-1 VTP-, VLAN

```
msk-donskaya-vnkhruystalev-sw-2>en
Password:
msk-donskaya-vnkhruystalev-sw-2#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vnkhruystalev-sw-2(config)#vtp mode client
Setting device to VTP CLIENT mode.
msk-donskaya-vnkhruystalev-sw-2(config)#interface range f0/1 - 2
msk-donskaya-vnkhruystalev-sw-2(config-if-range)#switchport mode access
msk-donskaya-vnkhruystalev-sw-2(config-if-range)#switchport access vlan 101
msk-donskaya-vnkhruystalev-sw-2(config-if-range)#switchport access vlan 3
msk-donskaya-vnkhruystalev-sw-2(config-if-range)#exit
msk-donskaya-vnkhruystalev-sw-2#
%SYS-5-CONFIG_I: Configured from console by console
msk-donskaya-vnkhruystalev-sw-2#
```

Figure 8: msk-donskaya-vnkhruystalev-sw-2 VTP-, VLAN

```
msk-donskaya-vnkhruystalev-sw-3>en
Password:
msk-donskaya-vnkhruystalev-sw-3#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-donskaya-vnkhruystalev-sw-3(config)#vtp mode client
Setting device to VTP CLIENT mode.
msk-donskaya-vnkhruystalev-sw-3(config)#interface f0/1
msk-donskaya-vnkhruystalev-sw-3(config-if)#switchport access vlan 3
msk-donskaya-vnkhruystalev-sw-3(config-if)#exit
msk-donskaya-vnkhruystalev-sw-3(config)#
```

Figure 9: msk-donskaya-vnkhruystalev-sw-3 VTP-, VLAN

```

msk-donskaya-vnkhrustalev-sw-4#conf t
Press RETURN to get started.

User Access Verification
Password:
msk-donskaya-vnkhrustalev-sw-4>en
Password:
msk-donskaya-vnkhrustalev-sw-4#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Setting device to VTP CLIENT mode.
(msk-donskaya-vnkhrustalev-sw-4(config)#interface range F0/1 - 2
1 invalid input detected in input line 1
(msk-donskaya-vnkhrustalev-sw-4(config-if-range)#switchport mode access
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport access vlan 101
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport mode access
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport access vlan 102
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport mode access
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport access vlan 103
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#interface range F0/11 - 15
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport mode access
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport access vlan 103
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#interface range F0/11 - 15
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport mode access
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#switchport access vlan 104
msk-donskaya-vnkhrustalev-sw-4#(config-if-range)#exit
(msk-donskaya-vnkhrustalev-sw-4(config)

```

Figure 10: msk-donskaya-vnkhrustalev-sw-4 VTP-VLAN

```

msk-pavlovkaya-vnkhrustalev-sw-1>en
Password:
msk-pavlovkaya-vnkhrustalev-sw-1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
msk-pavlovkaya-vnkhrustalev-sw-1(config)#vtp mode client
Setting device to VTP CLIENT mode.
(msk-pavlovkaya-vnkhrustalev-sw-1(config)#interface f0/1
msk-pavlovkaya-vnkhrustalev-sw-1(config)#interface range f0/1 - 15
msk-pavlovkaya-vnkhrustalev-sw-1(config-if-range)#switchport mode access
msk-pavlovkaya-vnkhrustalev-sw-1(config-if-range)#switchport access vlan 101
msk-pavlovkaya-vnkhrustalev-sw-1(config-if-range)#interface F0/20
msk-pavlovkaya-vnkhrustalev-sw-1(config-if)#switchport mode access
msk-pavlovkaya-vnkhrustalev-sw-1(config-if)#switchport access vlan 104
msk-pavlovkaya-vnkhrustalev-sw-1(config-if)#exit
msk-pavlovkaya-vnkhrustalev-sw-1(config)#

```

Figure 11: msk-pavlovskaya-vnkhrustalev-sw-1 VTP-VLAN

IP-

:

Table 3: IP. 10.128.0.0/16

IP-	VLAN
10.128.0.0/16	
10.128.0.0/24	3
10.128.0.1	
10.128.0.2	Web
10.128.0.3	File
10.128.0.4	Mail
10.128.0.5	Dns
10.128.0.6-10.128.0.254	
10.128.1.0/24	2
10.128.1.1	
10.128.1.2	msk-donskaya-sw-1
10.128.1.3	msk-donskaya-sw-2
10.128.1.4	msk-donskaya-sw-3
10.128.1.5	Msk-donskaya-sw-4
10.128.1.6	msk-pavlovskaya-sw-1
10.128.1.7-10.128.1.254	
10.128.2.0/24	Point-to-Point
10.128.2.1	
10.128.2.2-10.128.2.254	
10.128.3.0/24	(DK) 101
10.128.3.1	
10.128.3.2-10.128.3.254	
10.128.4.0/24	(DEP) 102
10.128.4.1	
10.128.4.2-10.128.4.254	
10.128.5.0/24	(ADM) 103
10.128.5.1	
10.128.5.2-10.128.5.254	
10.128.6.0/24	(OTHER) 104
10.128.6.1	
10.128.6.2-10.128.6.254	

IP- ( . 12) web( . 13):

IP- IP-

msk-pavlovskaya-vnkhruostalev-sw-1 c  
msk-donskaya-vnkhruostalev-sw-1 ( . 14)

Packet Tracer,

ICMP

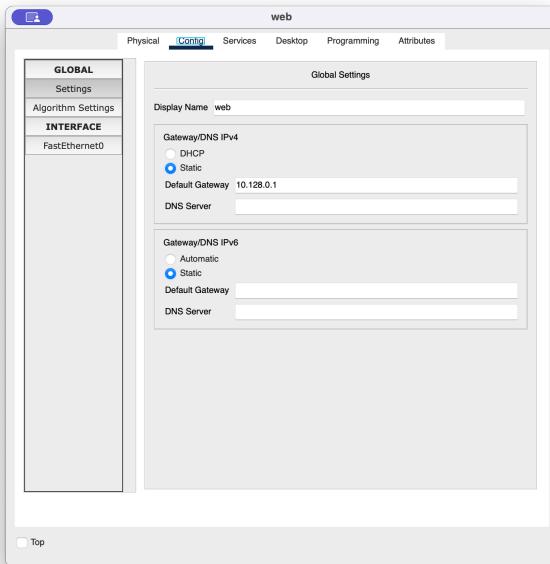


Figure 12: IP-

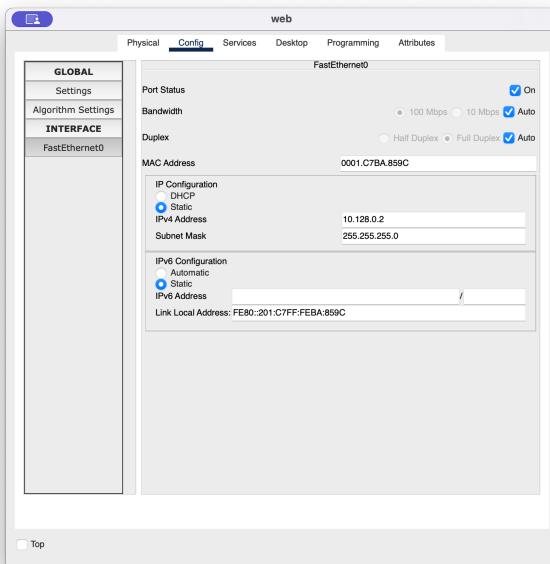


Figure 13: IP-

dk-donskaya-vnkhruštalev-1

Physical Config Desktop Programming Attributes

Command Prompt

```

IPv4 Address.....: 10.128.3.201
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 10.128.3.1

Bluetooth Connection:
Connection-specific DNS Suffix.:
Link-local IPv6 Address.....::1
IPv4 Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: 0.0.0.0

C:\>ping 10.128.3.202
Pinging 10.128.3.202 with 32 bytes of data:
Reply from 10.128.3.202: bytes=32 time<1ms TTL=128

Ping statistics for 10.128.3.202:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.128.4.201
Pinging 10.128.4.201 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 10.128.4.201:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>

```

Top

Figure 14: , VLAN, , VLAN.

• ( . 15)

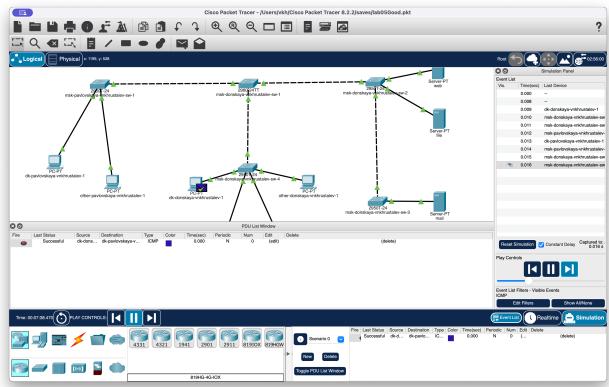


Figure 15: ( )

, IP, IP-, ICMP .( . 16) :(. 17) Ethernet, mac- ,

3.1

1. VLAN ?\*\*

show vlan brief

- VLAN , (ID),

show vlan

- VLAN,

show vtp status

- VLAN Trunking Protocol (VTP),  
VLAN .

2. VLAN Trunking Protocol (VTP).  
VLAN.\*\*

**VTP (VLAN Trunking Protocol) –** Cisco, VLAN . , VLAN

- Server ( ) - , VLAN

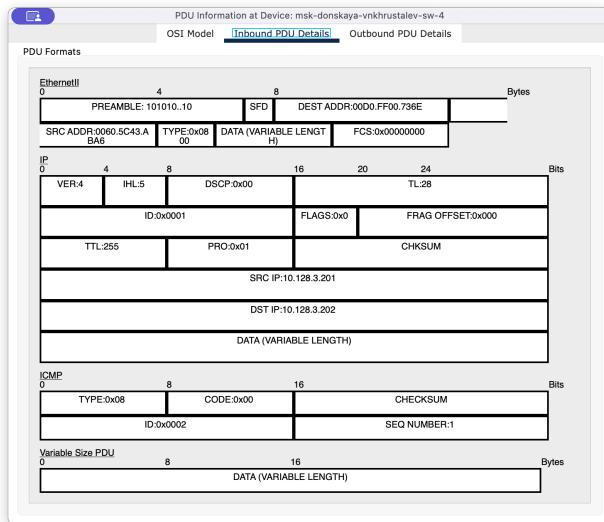


Figure 16: PDU

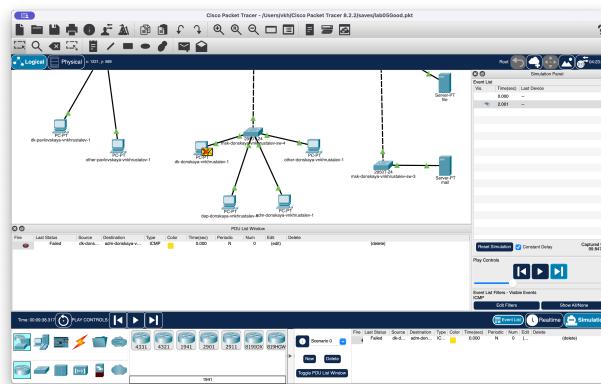


Figure 17: ( )

- Client ( ) – VLAN ,
- Transparent ( ) – VLAN, VTP-

**VTP:**

```
configure terminal
vtp mode server           !
vtp domain mydomain       !          VTP-
vtp password mypass        !
vtp version 2              !          VTP (      2)
```

## VLAN:

```
vlan 10  
name Sales  
exit
```

## VLAN:

show vlan brief	!	VLAN
show vtp status	!	VTP
show vtp counters	!	VTP-

3. Internet Control Message Protocol (ICMP).

ICMP.\*\*

ICMP (Internet Control Message Protocol) –  
IP- .

## **ICMP:**

- (ping)
  - (Destination Unreachable)
  - (Source Quench)
  - (Redirect)

ICMP- :

$$\begin{array}{c} (\quad) \\ \hline 8 & & & & & & ( \quad ) \\ & 0 - & - & , & 8 - & - & ) \\ 8 & & & & & & ( \quad , 0 - \\ & & & & & & ) \end{array}$$

**ICMP:**

```
ping 192.168.1.1
```

4. Address Resolution Protocol (ARP). ARP.

ARP (Address Resolution Protocol) – , IP-  
MAC- .

**ARP:**

1. ARP- (Who has 192.168.1.1? Tell 192.168.1.2).

2. IP- 192.168.1.1 , MAC- .

3. MAC- ARP- .

**ARP- :**

( )		
	16	(Ethernet = 1)
	16	IPv4 = 0x0800
MAC-	8	6
IP-	8	4
	16	1 = ARP- , 2 = ARP-
MAC-	48	MAC- ,
IP-	32	IP-
MAC-	48	
IP-	32	IP-

ARP- :

```
show arp
```

5. MAC- ?

MAC- (Media Access Control address) –

,

MAC- (48 / 6 ):

: XX:XX:XX:YY:YY:YY, :

- XX:XX:XX - 3 (OUI)

- YY:YY:YY - 3

MAC- :

00:1A:2B:3C:4D:5E

MAC- , :

```
show mac address-table
```

**4**

VLAN