实验任务 4：动态路由设计与实施

一、实验目的

分析网络需求，设计网络动态路由，配置路由进行网络测试，比较两种动态路由算法生成的路由表。

二、实验任务

1）设计动态路由
2）路由测试
3）应用数据协议分析

三、实验内容：

3.1 动态路由设计

网络拓扑就是用实验 3 中的网络拓扑。

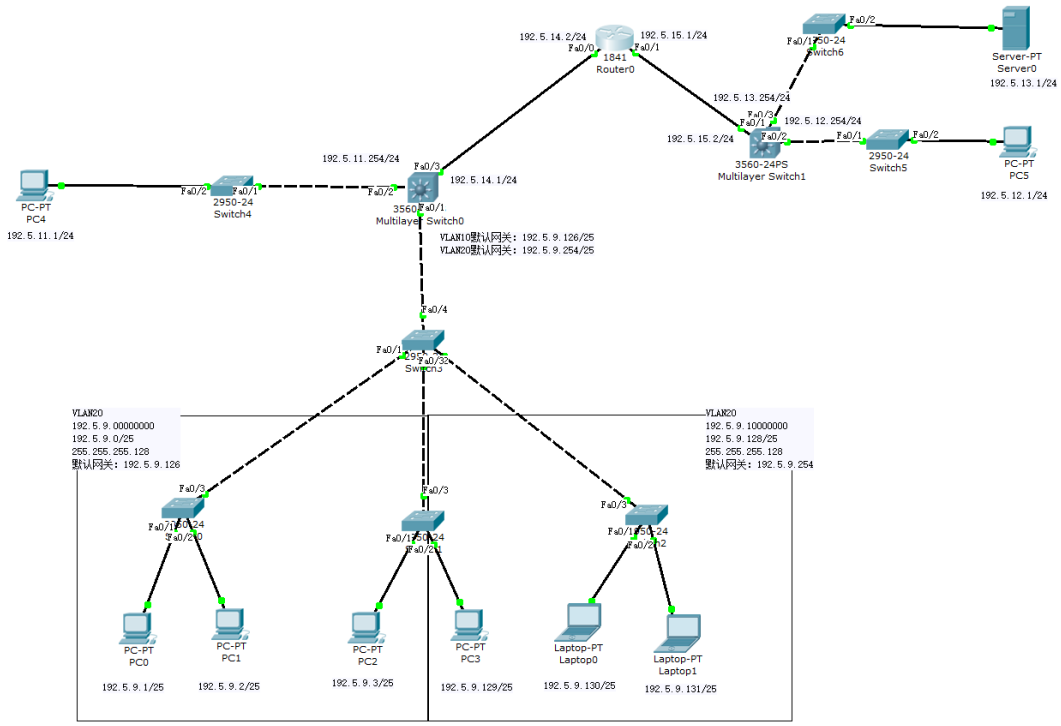


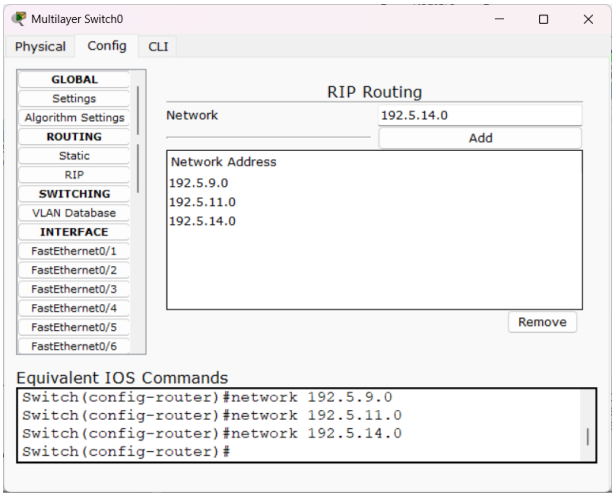
图 4.1 企业网拓扑示意图

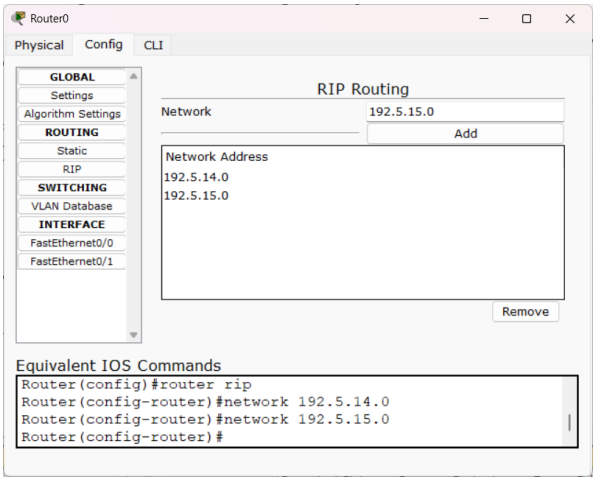
网络设备分别将自身端口连接的网络地址加入到自身的 RIP 列表中，路由器通过

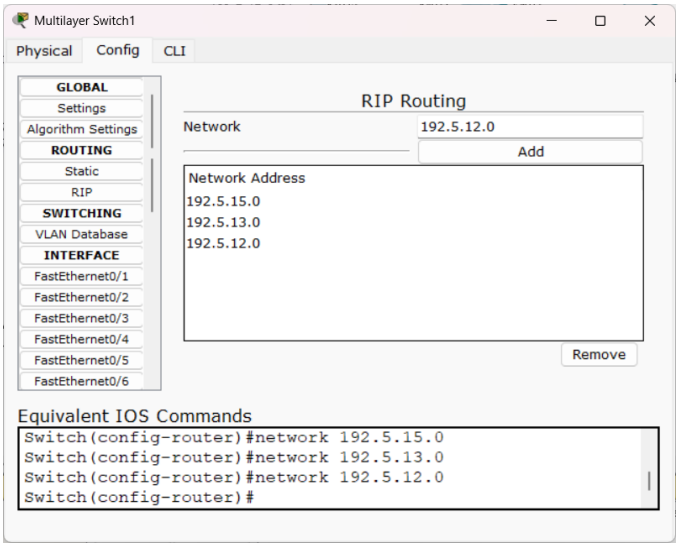
RIP 协议与相邻路由器交换路由表，自动学习路由，直到全网同步所有路由信息。

3.2 配置过程

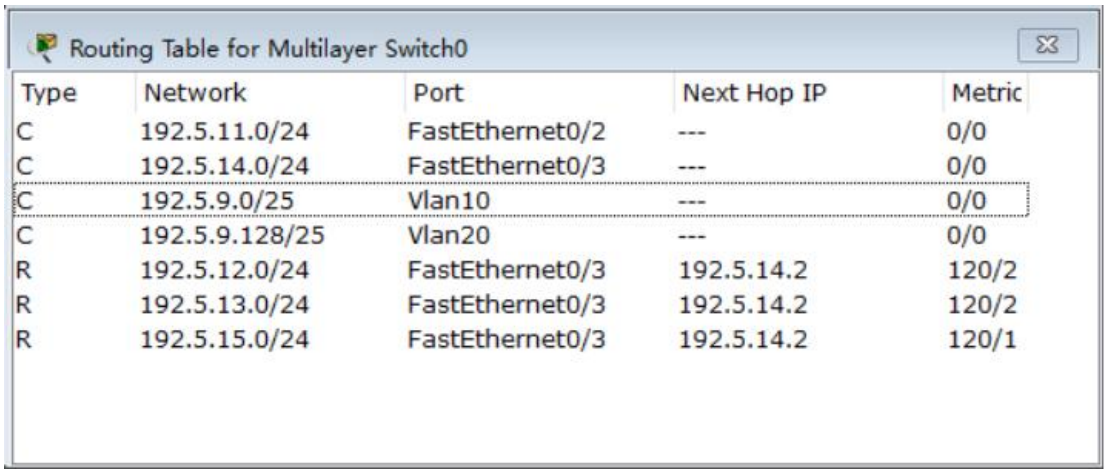
首先删除路由器和三层交换机中的静态路由表：
用图形界面的方式配置 rip 协议动态路由：







我切换成仿真环境，进行了 rip 协议报文的转发（路由器之间周期性的转发 rip 报文），然后查看各个路由器和三层交换机的路由表：



Type	Network	Port	Next Hop IP	Metric
C	192.5.11.0/24	FastEthernet0/2	---	0/0
C	192.5.14.0/24	FastEthernet0/3	---	0/0
C	192.5.9.0/25	Vlan10	---	0/0
C	192.5.9.128/25	Vlan20	---	0/0
R	192.5.12.0/24	FastEthernet0/3	192.5.14.2	120/2
R	192.5.13.0/24	FastEthernet0/3	192.5.14.2	120/2
R	192.5.15.0/24	FastEthernet0/3	192.5.14.2	120/1

Routing Table for Router0

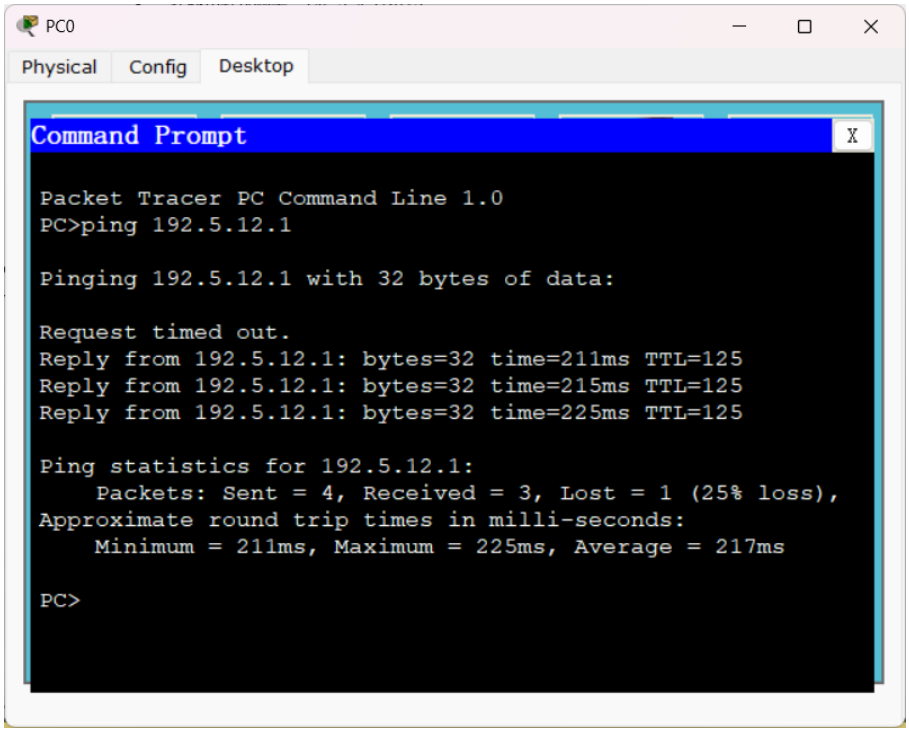
Type	Network	Port	Next Hop IP	Metric
C	192.5.15.0/24	FastEthernet0/1	---	0/0
C	192.5.14.0/24	FastEthernet0/0	---	0/0
R	192.5.11.0/24	FastEthernet0/0	192.5.14.1	120/1
R	192.5.12.0/24	FastEthernet0/1	192.5.15.2	120/1
R	192.5.13.0/24	FastEthernet0/1	192.5.15.2	120/1
R	192.5.9.0/24	FastEthernet0/0	192.5.14.1	120/1

Routing Table for Multilayer Switch1

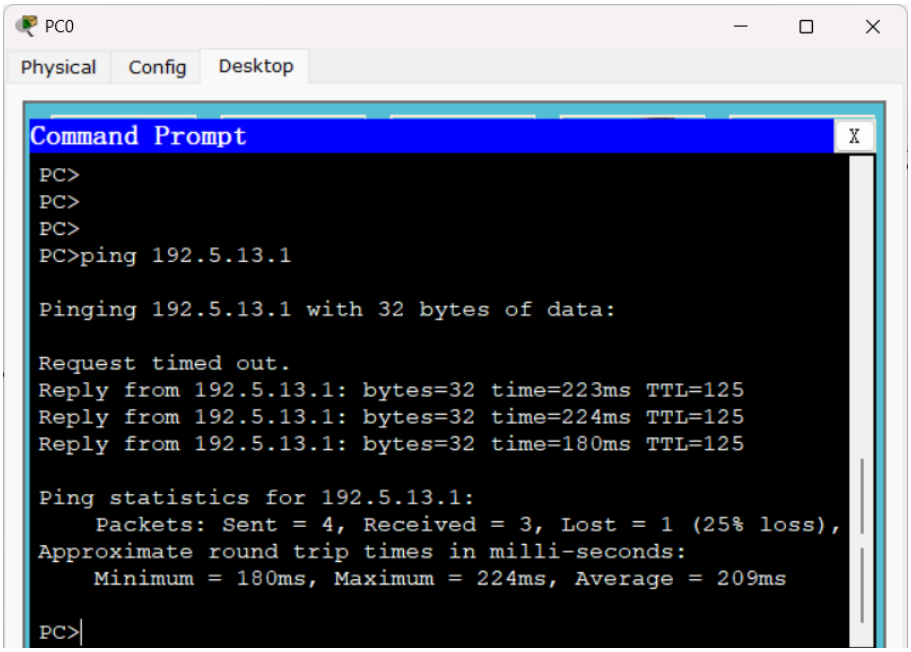
Type	Network	Port	Next Hop IP	Metric
C	192.5.12.0/24	FastEthernet0/2	---	0/0
C	192.5.13.0/24	FastEthernet0/3	---	0/0
C	192.5.15.0/24	FastEthernet0/1	---	0/0
R	192.5.11.0/24	FastEthernet0/1	192.5.15.1	120/2
R	192.5.14.0/24	FastEthernet0/1	192.5.15.1	120/1
R	192.5.9.0/24	FastEthernet0/1	192.5.15.1	120/2

3.3 连通性测试

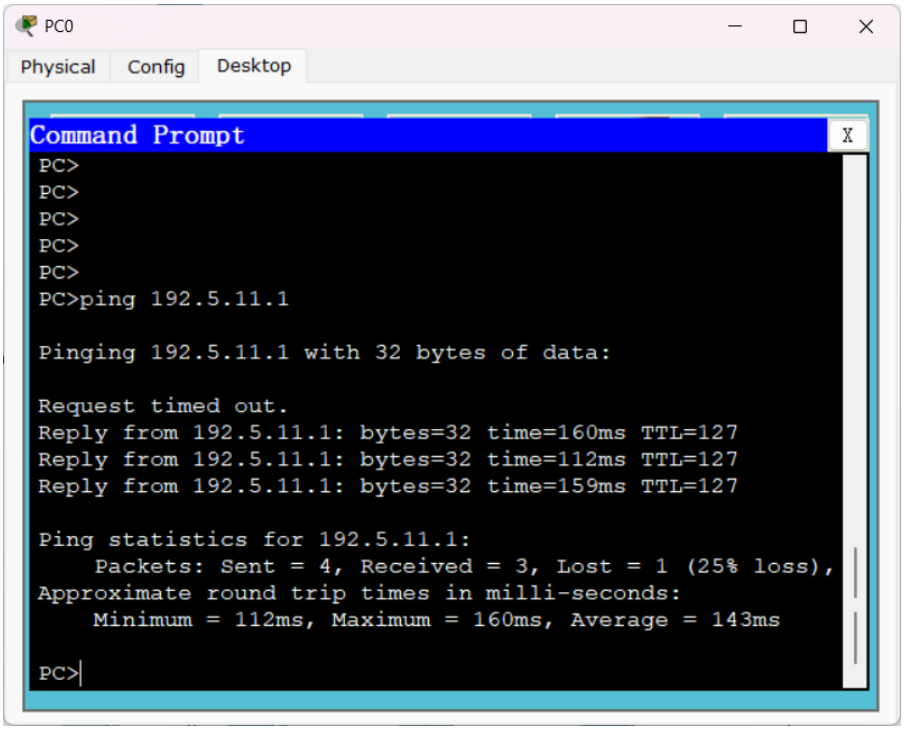
Pc0（192.5.9.1/25）ping pc5（192.5.12.1/24）：



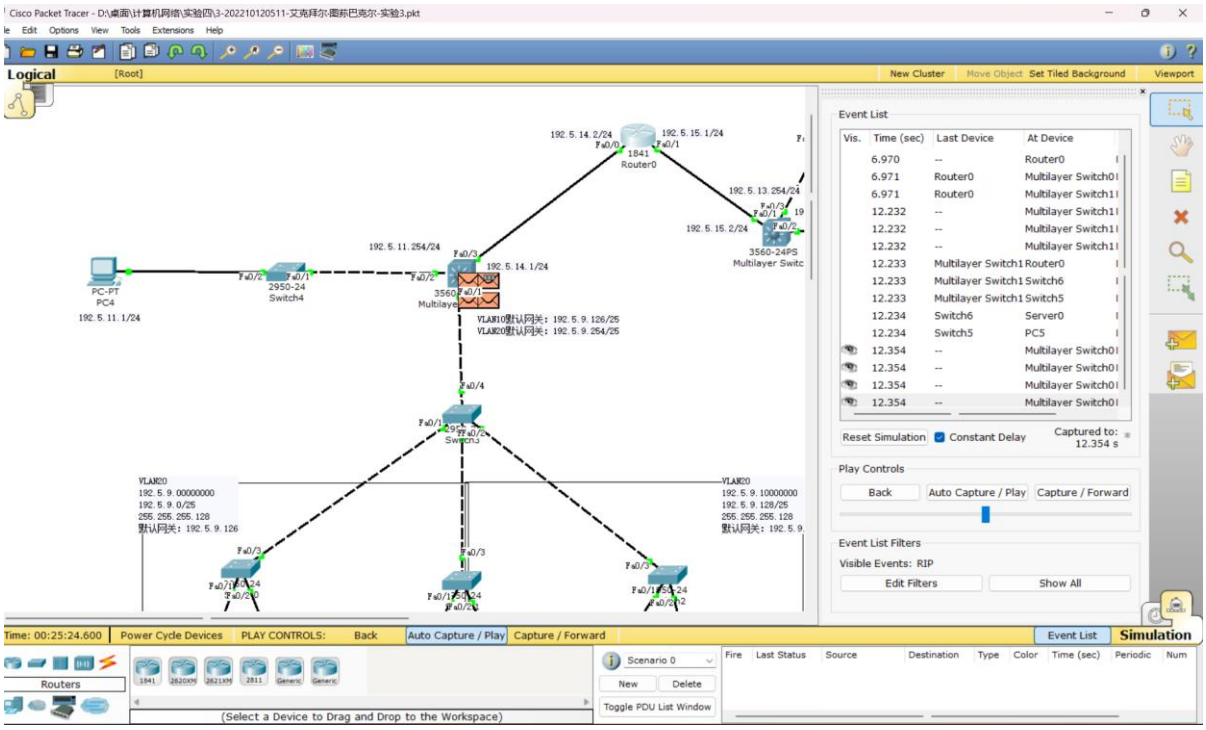
Pc0（192.5.9.1/25） ping 服务器 server0（192.5.13.1/24）：



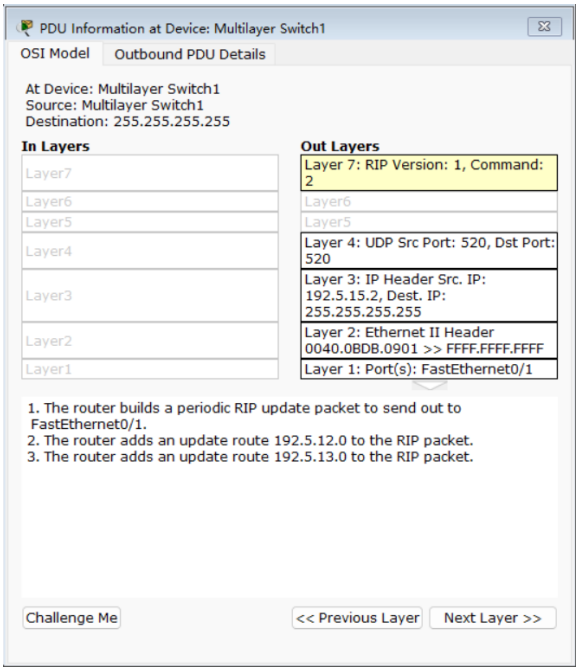
Pc0（192.5.9.1/25）ping pc4（192.5.11.1/24）：

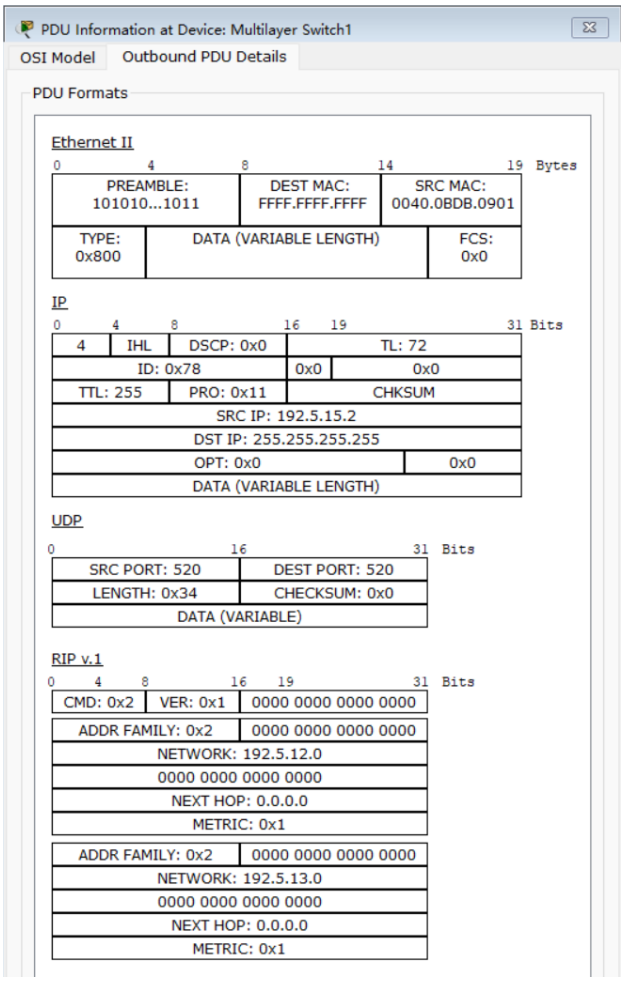


3.4RIP 协议抓包



分析 pdu 在 Multilayer Switch1 中的 rip 协议：


PDU Information at Device: Multilayer Switch1
OSI Model
Outbound PDU Details
At Device: Multilayer Switch1
Source: Multilayer Switch1
Destination: 255.255.255.255
In Layers
Out Layers
Layer7
Layer 7: RIP Version: 1, Command: 2
Layer6
Layer6
Layer5
Layer5
Layer4
Layer 4: UDP Src Port: 520, Dst Port: 520
Layer3
Layer 3: IP Header Src. IP: 192.5.15.2, Dest. IP: 255.255.255.255
Layer2
Layer 2: Ethernet II Header 0040.0BDB.0901 >> FFFF.FFFF.FFFF
Layer1
Layer 1: Port(s): FastEthernet0/1
1. The router builds a periodic RIP update packet to send out to FastEthernet0/1.
2. The router adds an update route 192.5.12.0 to the RIP packet.
3. The router adds an update route 192.5.13.0 to the RIP packet.
Challenge Me
<< Previous Layer
Next Layer >>


PDU Information at Device: Multilayer Switch1
OSI Model
Outbound PDU Details
PDU Formats
Ethernet II
0 4 8 14 19 Bytes
PREAMBLE: 101010...1011
DEST MAC: FFFF.FFFF.FFFF
SRC MAC: 0040.0BDB.0901
TYPE: 0x800
DATA (VARIABLE LENGTH)
FCS: 0x0
IP
0 4 8 16 19 31 Bits
4
IHL
DSCP: 0x0
TL: 72
ID: 0x78
0x0
0x0
TTL: 255
PRO: 0x11
CHKSUM
SRC IP: 192.5.15.2
DST IP: 255.255.255.255
OPT: 0x0
0x0
DATA (VARIABLE LENGTH)
UDP
0 16 31 Bits
SRC PORT: 520
DEST PORT: 520
LENGTH: 0x34
CHECKSUM: 0x0
DATA (VARIABLE)
RIP v.1
0 4 8 16 19 31 Bits
CMD: 0x2
VER: 0x1
0000 0000 0000 0000
ADDR FAMILY: 0x2
0000 0000 0000 0000
NETWORK: 192.5.12.0
0000 0000 0000 0000
NEXT HOP: 0.0.0.0
METRIC: 0x1
ADDR FAMILY: 0x2
0000 0000 0000 0000
NETWORK: 192.5.13.0
0000 0000 0000 0000
NEXT HOP: 0.0.0.0
METRIC: 0x1