IPV6'DA MULTICAST KRİTİĞİ

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Muğla Üniversitesi / Bilgisayar Müh. Bölümü

AKADEMİK BİLİŞİM 2011 / İNÖNÜ ÜNİVERSİTESİ

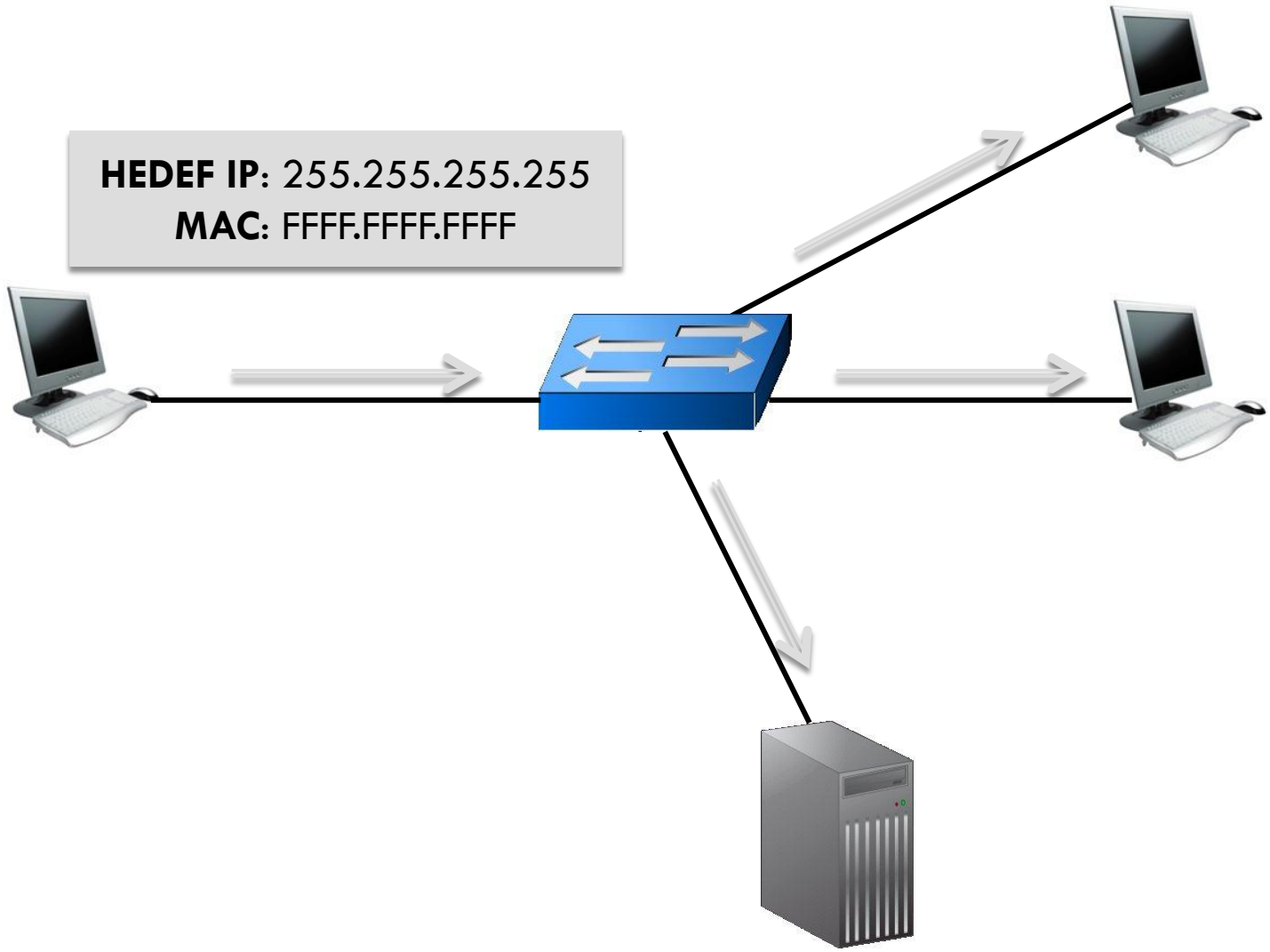
IPV4 HABERLEŞME

Unicast (Tekil Gönderim)

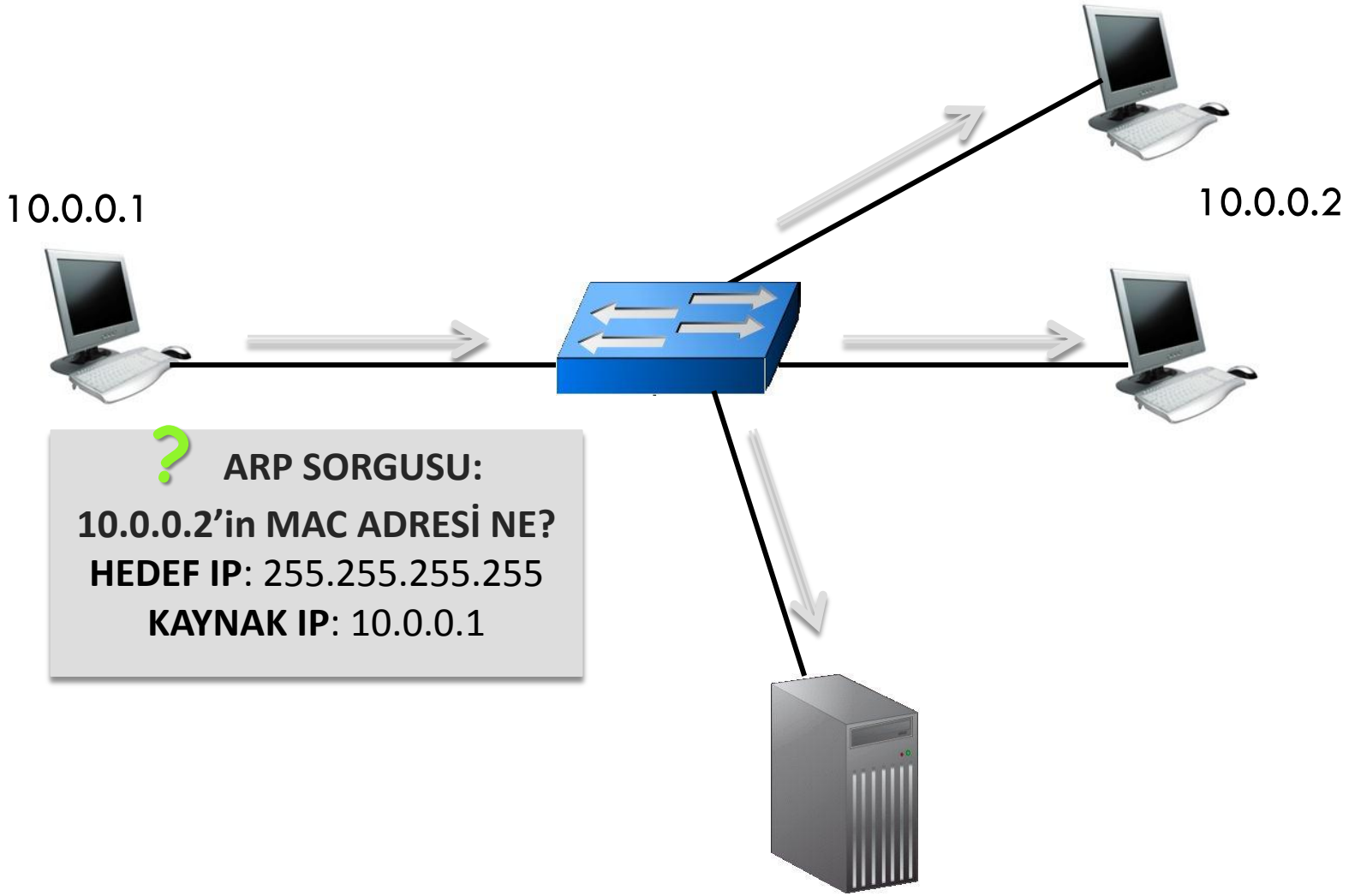
Multicast (Çoklu Gönderim)

Broadcast (Tüme Gönderim)

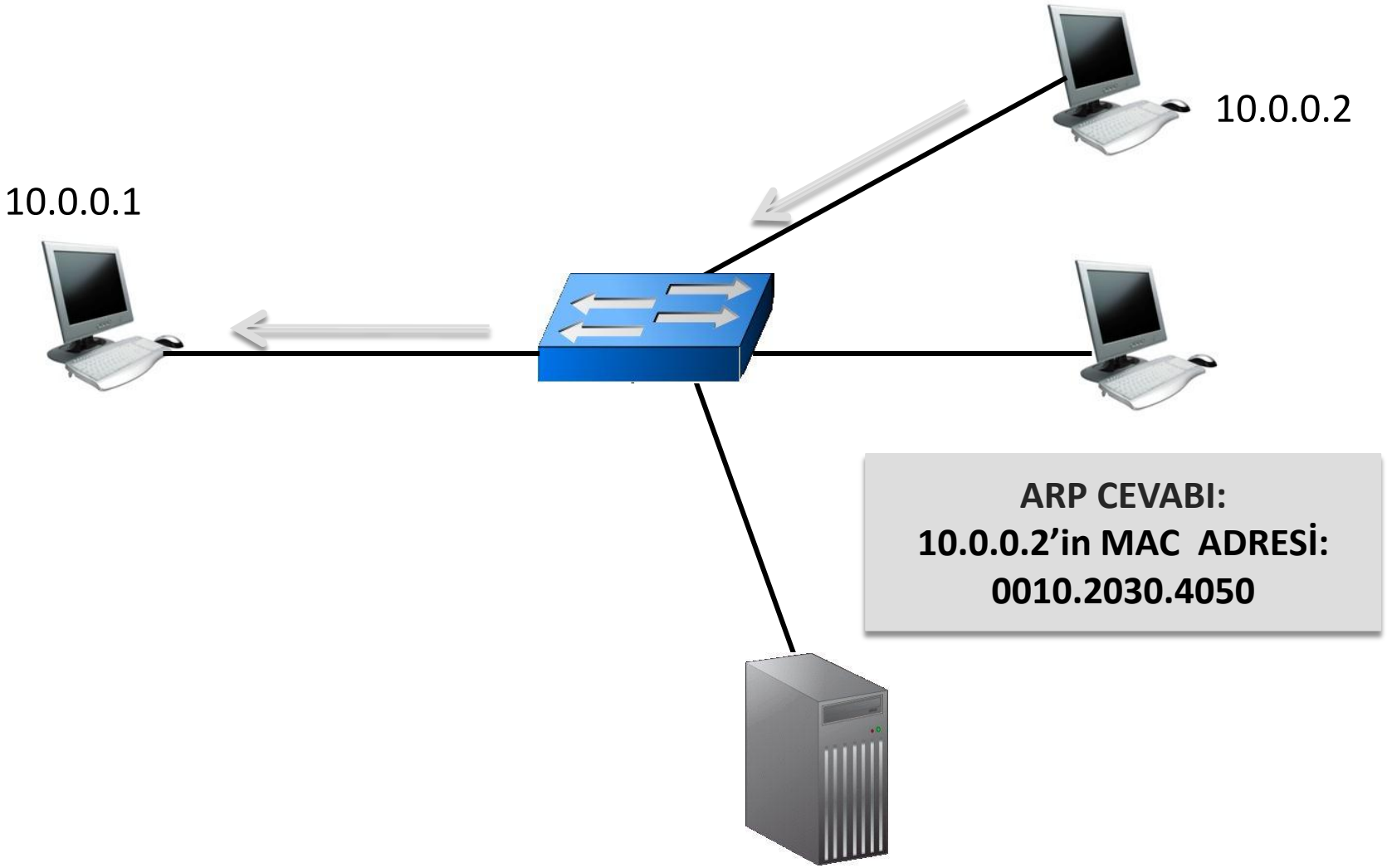
IPV4 BROADCAST



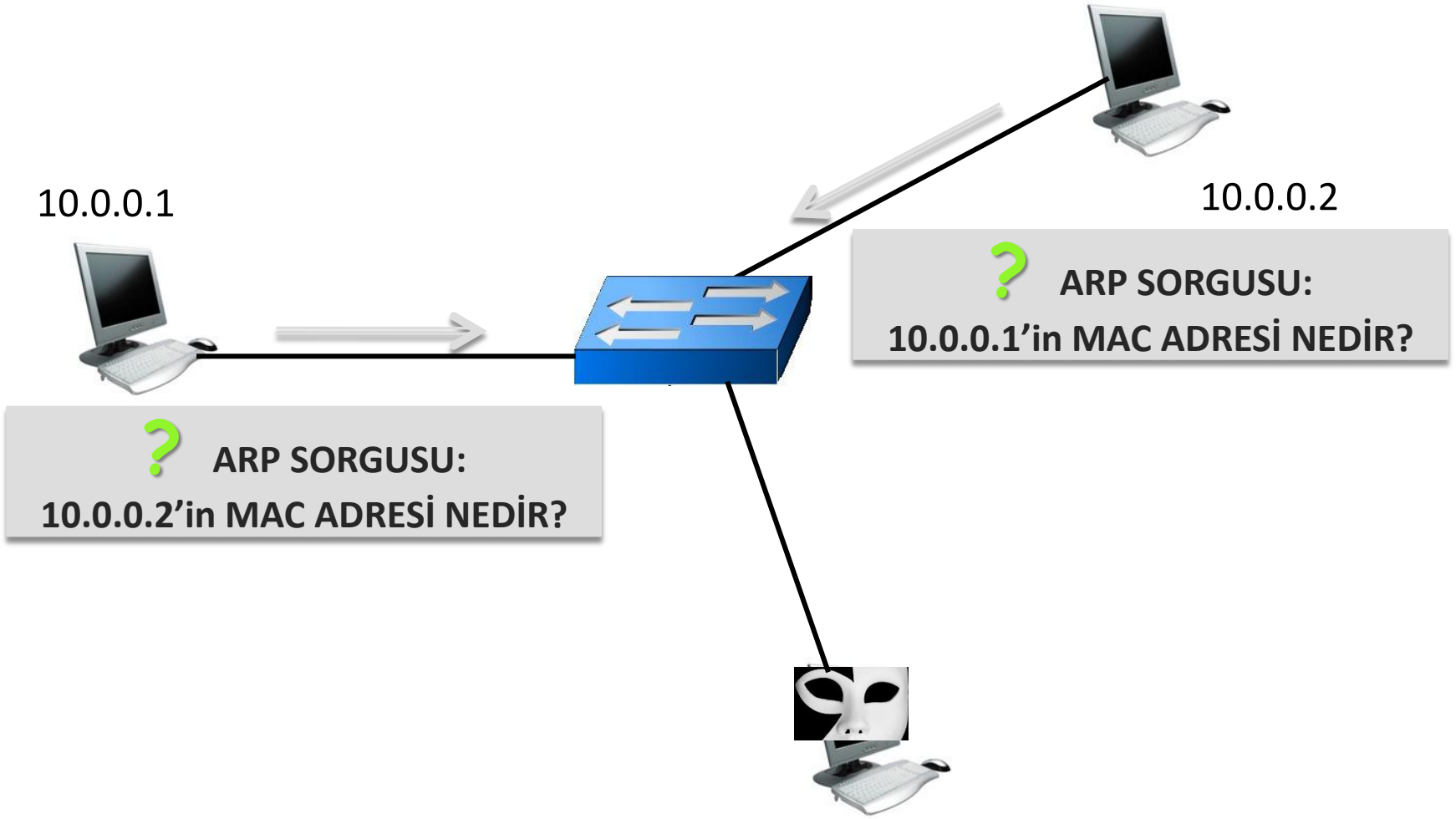
IPV4 ARP-1


10.0.0.1
10.0.0.2
?
ARP SORGUSU:
10.0.0.2'in MAC ADRESİ NE?
HEDEF IP: 255.255.255.255
KAYNAK IP: 10.0.0.1

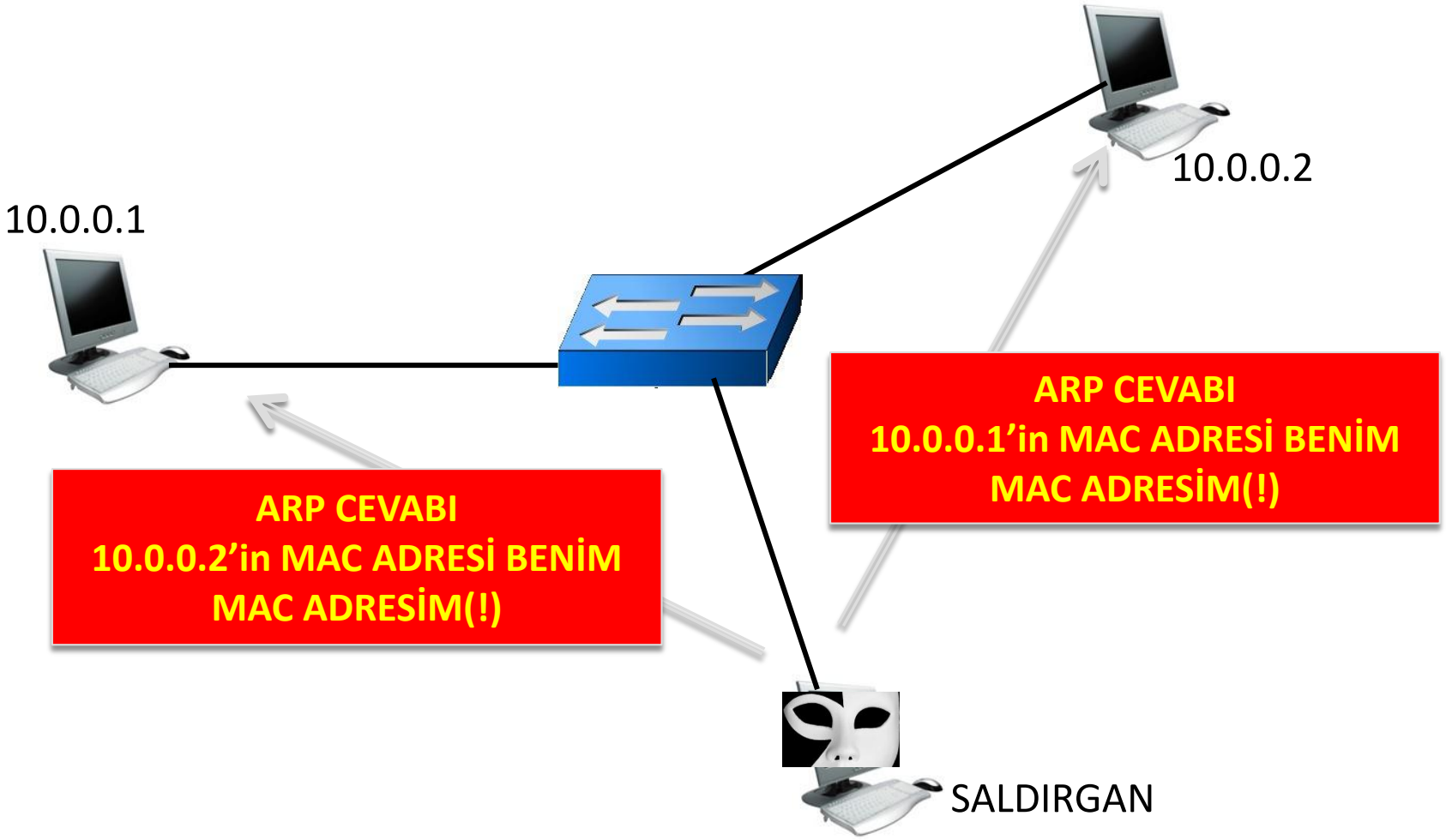
IPV4 ARP-2



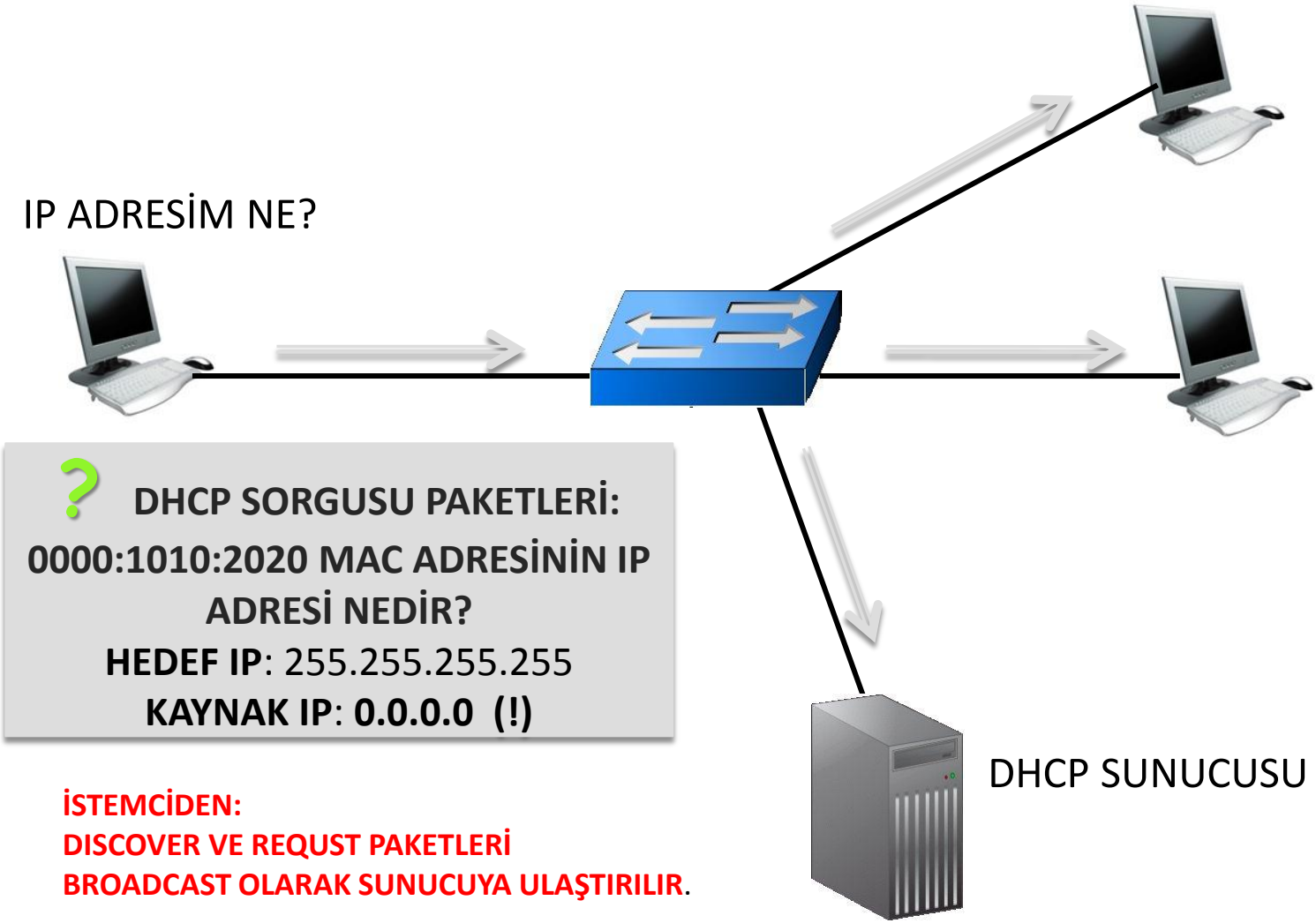
IPV4 ARP ZEHİRLEMESİ-1



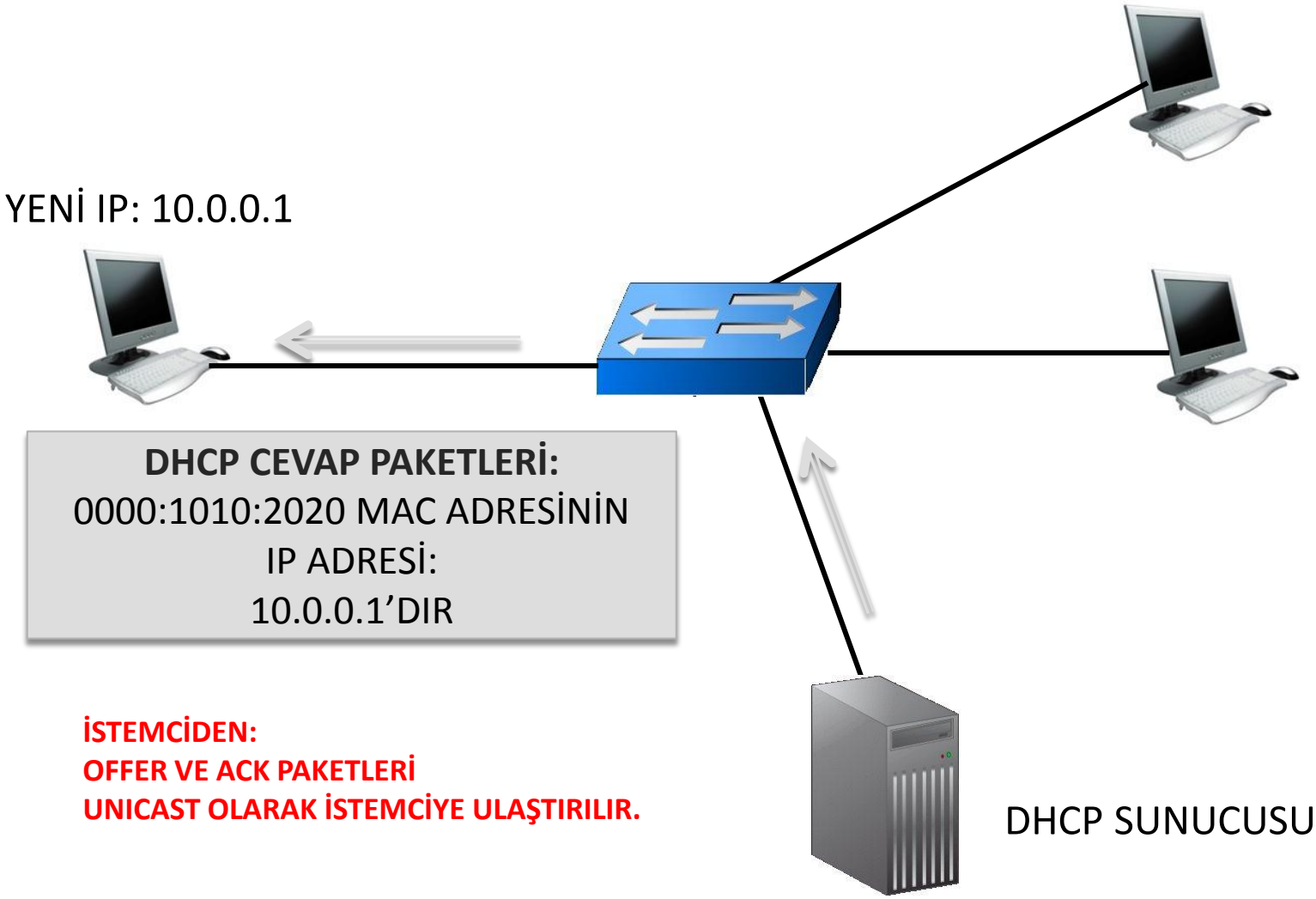
IPV4 ARP ZEHİRLEMESİ-2



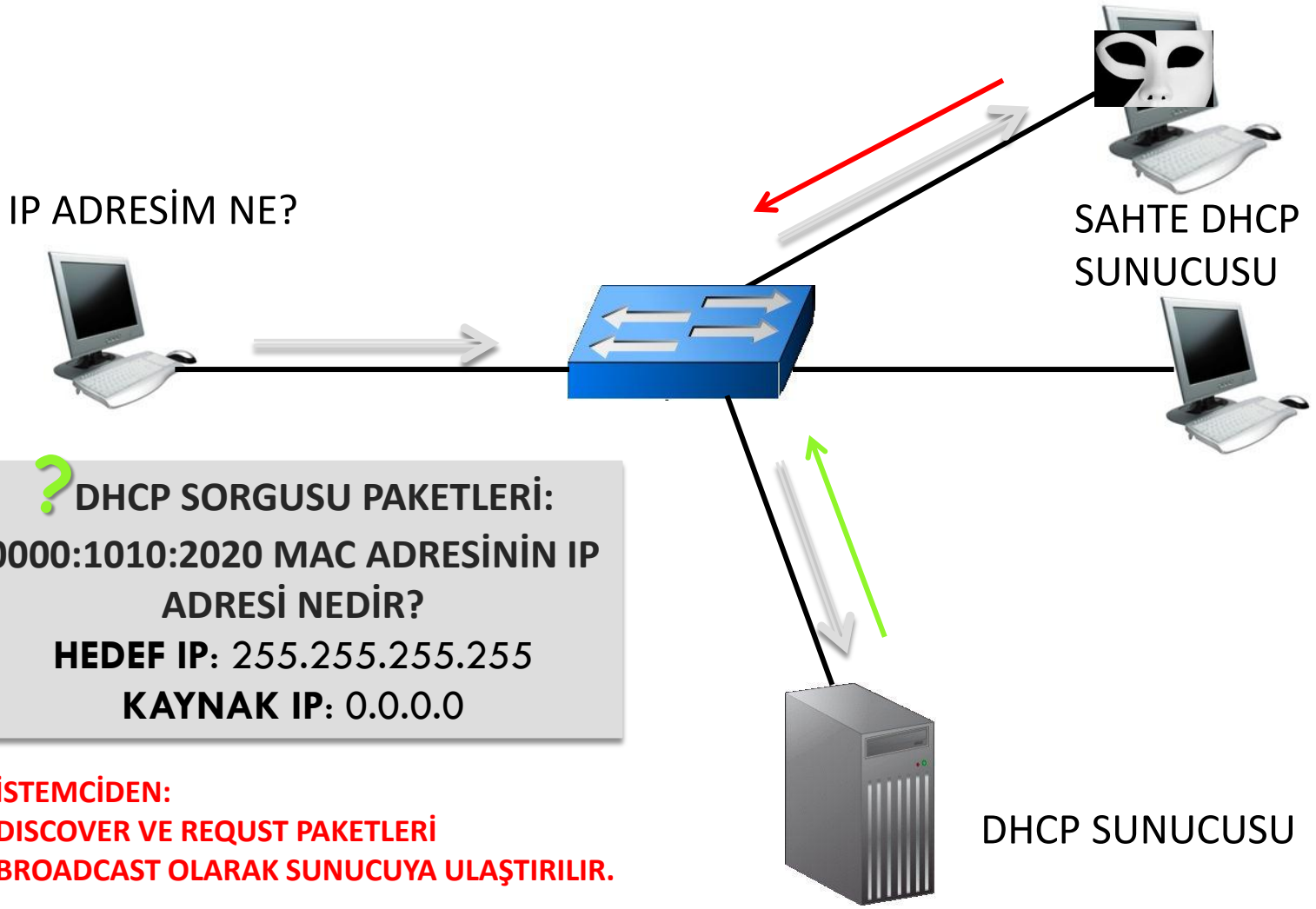
IPV4 DHCP-1


IP ADRESİM NE?
DHCP SORGUSU PAKETLERİ:
0000:1010:2020 MAC ADRESİNİN IP ADRESİ NEDİR?
HEDEF IP: 255.255.255.255
KAYNAK IP: 0.0.0.0 (!)
İSTEMCİDEN:
DISCOVER VE REQUST PAKETLERİ
BROADCAST OLARAK SUNUCUYA ULAŞTIRILIR.
DHCP SUNUCUSU

IPV4 DHCP-2


YENİ IP: 10.0.0.1
DHCP CEVAP PAKETLERİ:
0000:1010:2020 MAC ADRESİNİN
IP ADRESİ:
10.0.0.1'DIR
İSTEMCİDEN:
OFFER VE ACK PAKETLERİ
UNICAST OLARAK İSTEMCİYE ULAŞTIRILIR.
DHCP SUNUCUSU

IPV4 SAHTE DHCP SUNUCUSU



?DHCP SORGUSU PAKETLERİ:

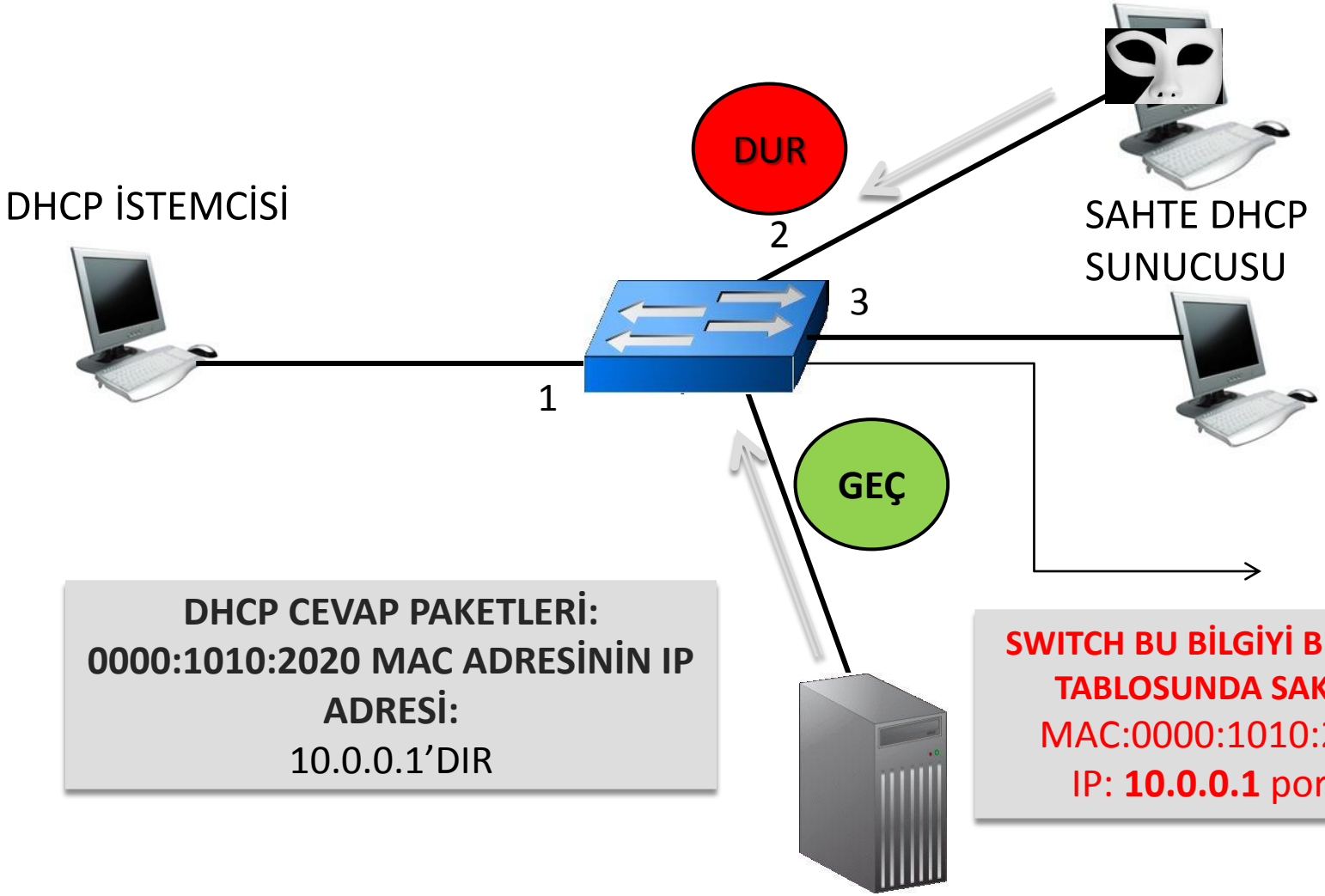
0000:1010:2020 MAC ADRESİNİN IP ADRESİ NEDİR?

HEDEF IP: *255.255.255.255*

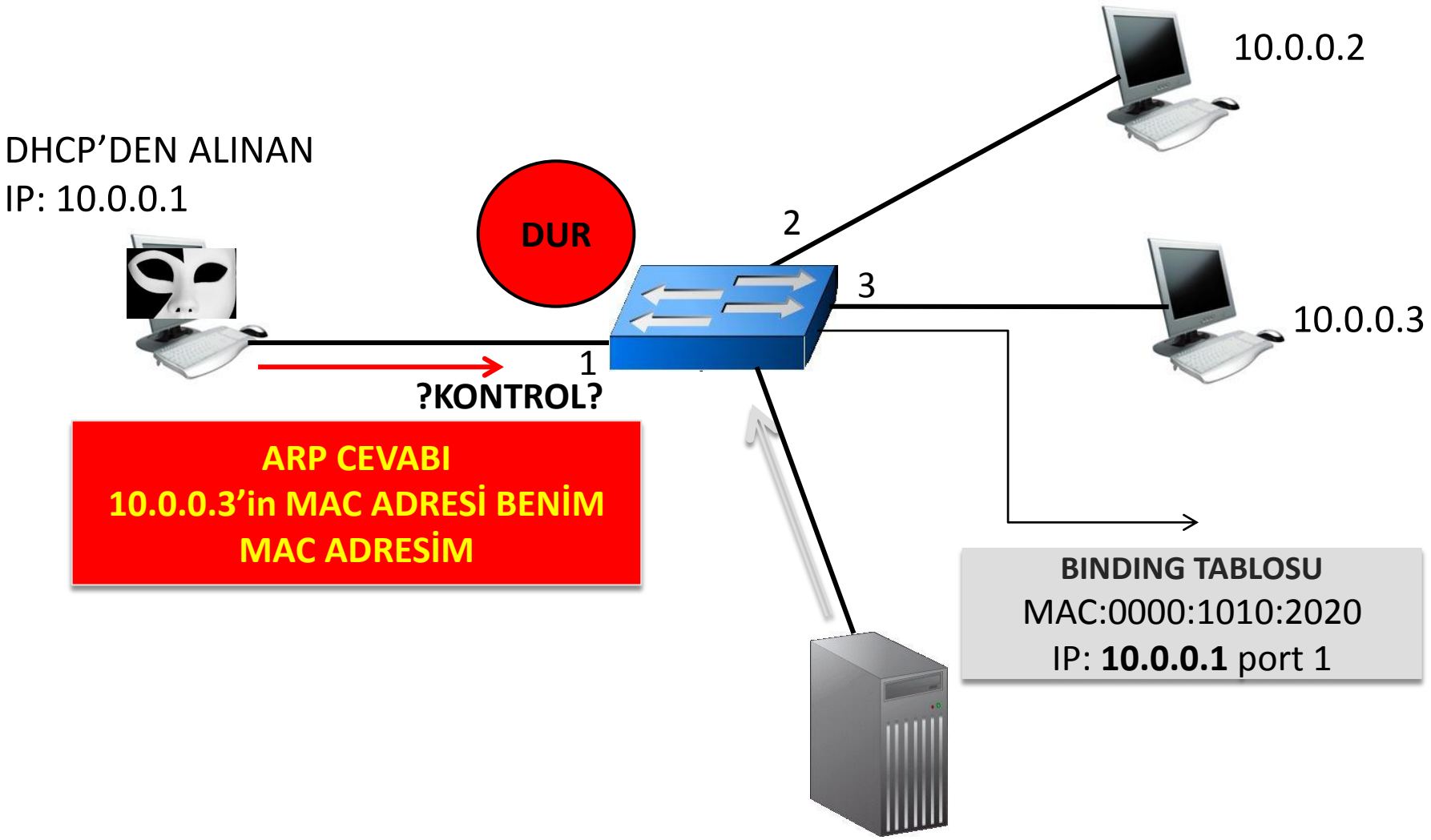
KAYNAK IP: 0.0.0.0

İSTEMCİDEN:
DISCOVER VE REQUST PAKETLERİ
BROADCAST OLARAK SUNUCUYA ULAŞTIRILIR.

SALDIRI ÇÖZÜMLERİ: DHCP SNOOPING



SALDIRI ÇÖZÜMLERİ 2: DYNAMIC ARP INSPECTION

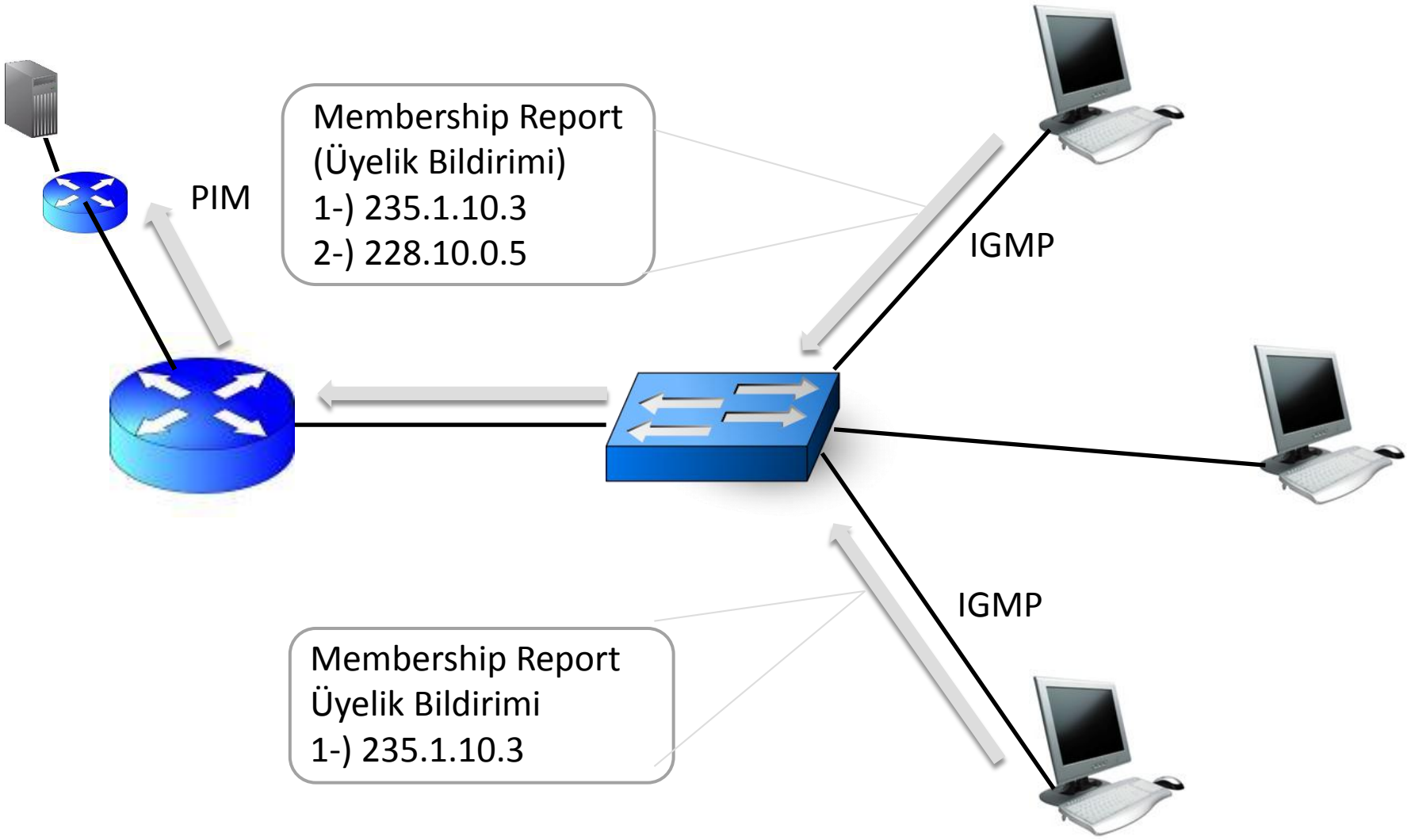


IPV4 MULTICAST

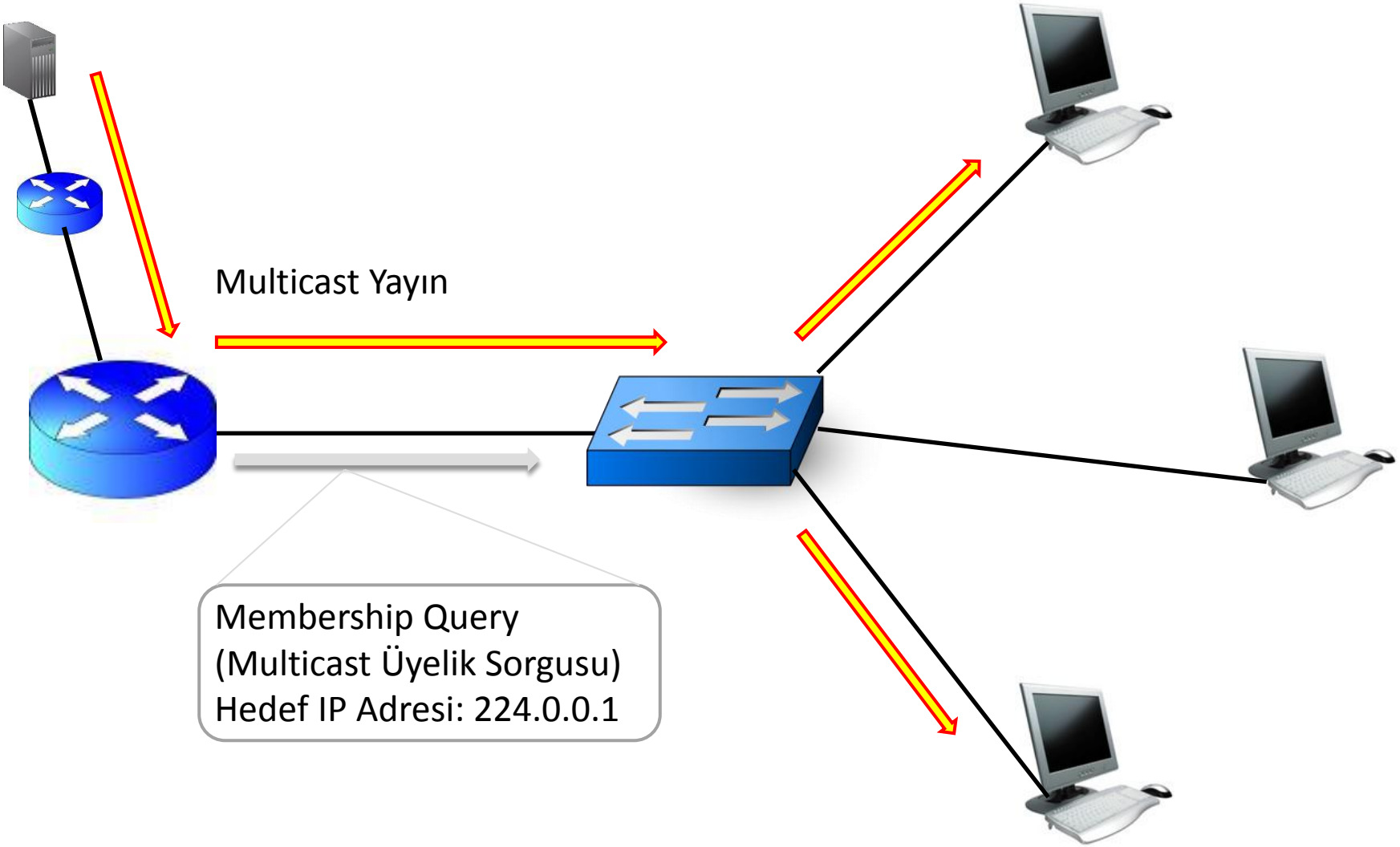
- Multicast Adres Aralığı
  224.0.0.0 – 239.255.255.255
- 224.0.0.0/24 – Link Local Multicast Adresler
- 224.0.1.0 – 239.255.255.255 Genel Kapsam

ADRES	KAPSAMI
224.0.0.1	Yerel Ağdaki Bütün Uçlar
224.0.0.2	Yerel Ağdaki Bütün Yönlendiriciler
224.0.0.5	Yerel Ağdaki Bütün OSPF Yönlendiriciler
224.0.0.9	Yerel Ağdaki Bütün RIP Yönlendiriciler

IPV4 IGMP-1


Membership Report
(Üyelik Bildirimi)
1-) 235.1.10.3
2-) 228.10.0.5
PIM
IGMP
IGMP
Membership Report
Üyelik Bildirimi
1-) 235.1.10.3

IPV4 IGMP-2


Multicast Yayın
Membership Query
(Multicast Üyelik Sorgusu)
Hedef IP Adresi: 224.0.0.1

IPV6 HABERLEŞME

Unicast (Tekil Gönderim)

Multicast (Çoklu Gönderim)

Anycast (Herhangi Gönderim)

- **IPV6 BROADCAST?**

YOK!

ARP,DHCP vb servisler ne olacak??

IPV6 ANYCAST?

- Anycast IPv6’ya özel bir hizmet değildir.
- IPv4’de de bir süredir kullanılan bir tekniktir.
- Yük paylaşımlı bir mimari elde edebilmek için aynı IP adresi ile birden fazla sunucunun hizmet vermesi durumudur.

IPV6 ve ARP

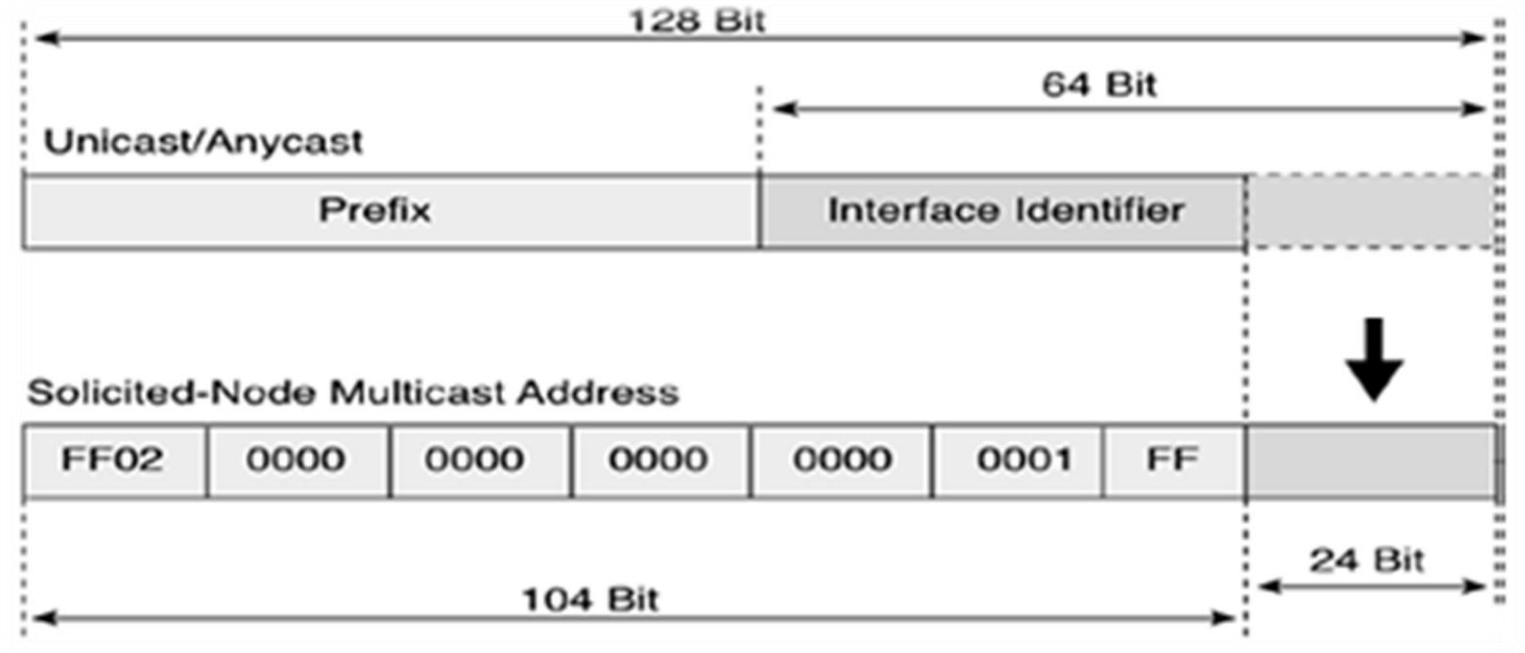
- IPv6'da ARP Protokolü bulunmamaktadır.
- Yerine ICMPv6 «Neighbor Discovery(ND)» paketleri kullanılmaktadır.

- ND Paketlerinin Hedef Adresi Ne Olacak Peki?

IPV6 MULTICAST?

FF02::1	**Tüm istemciler**	FF02::A	Tüm EIGRP router'lar
FF02::2	Tüm router'lar	FF02::1:2	Tüm DHCP sunucuları ve DHCP relay agent'lar
FF02::5	Tüm OSPF router'lar	FF02::1:FFXX:X	NDP NS destination address
FF02::6	Tüm OSPF router'lar	FF05::101	Tüm NTP sunucuları (site local)
FF02::9	Tüm RIP router'lar	FF05::1:3	Tüm DHCP sunucuları (site local)

SOLICITED-NODE MULTICAST IPv6 ADRESİ

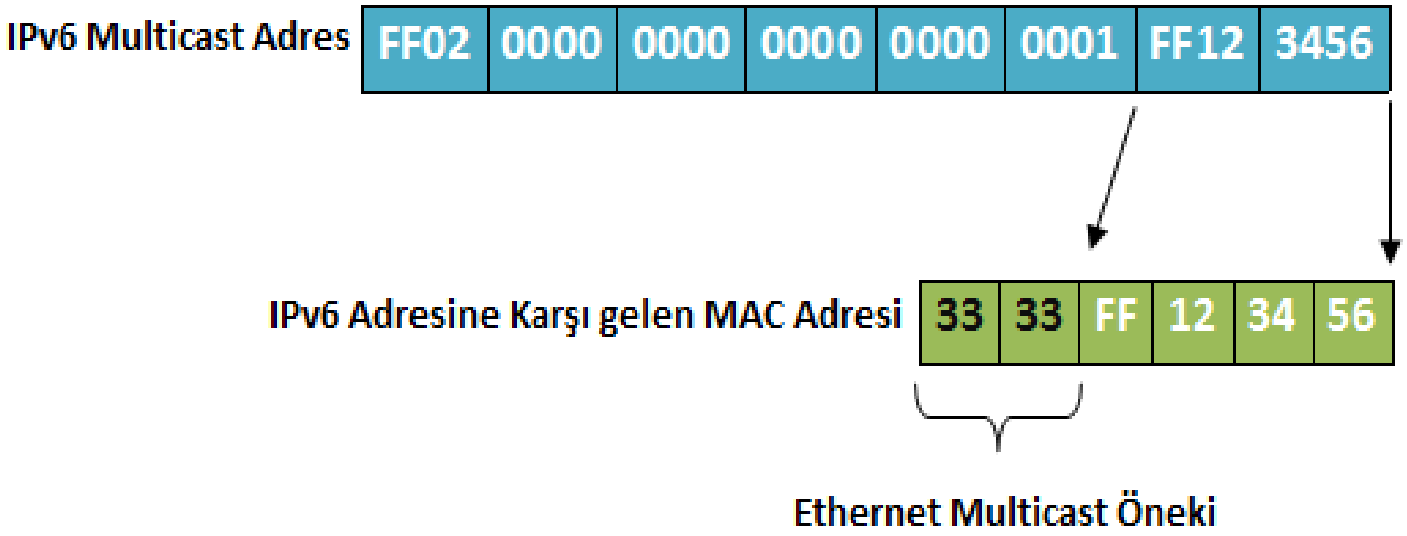


Örnek:

2001:A98:8000:5::5512:3456

FF02::1:FF12:3456

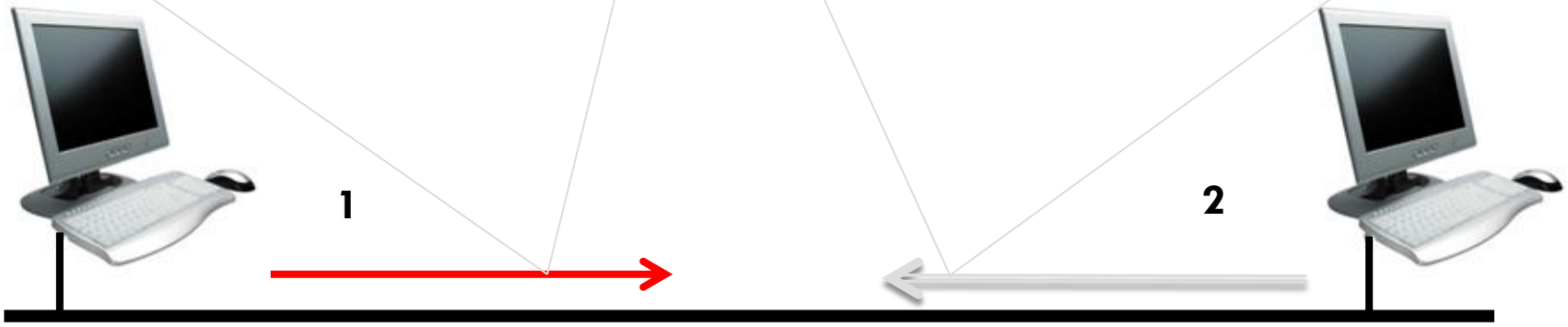
SOLICITED-NODE MULTICAST MAC ADRESİ



ARP YERİNE: NEIGHBOR DISCOVERY

ICMPv6 Type 135 (Neighbor Solicitation)
Kaynak IPv6 Adres: 2001::1:0:0:1:A
Hedef IPv6 Adres: **FF02::1:FF01:B**
Kaynak MAC Adres: 01:23:45:67:89:AB
Hedef MAC Adres: 33:33:FF:01:00:0B

ICMPv6 Type 136 (Neighbor Advertisement)
Kaynak IPv6 Adres: **2001::1:0:0:1:B**
Hedef IPv6 Adres: FF02::1:FF01:A
Kaynak MAC Adres: 00:09:87:65:43:21
Hedef MAC Adres: 01:23:45:67:89:AB



Kaynak İstemci
MAC:01:23:45:67:89:AB
IP:2001::1:0:0:1:A

Hedef İstemci
MAC:00:09:87:65:43:21
IP:2001::1:0:0:1:B

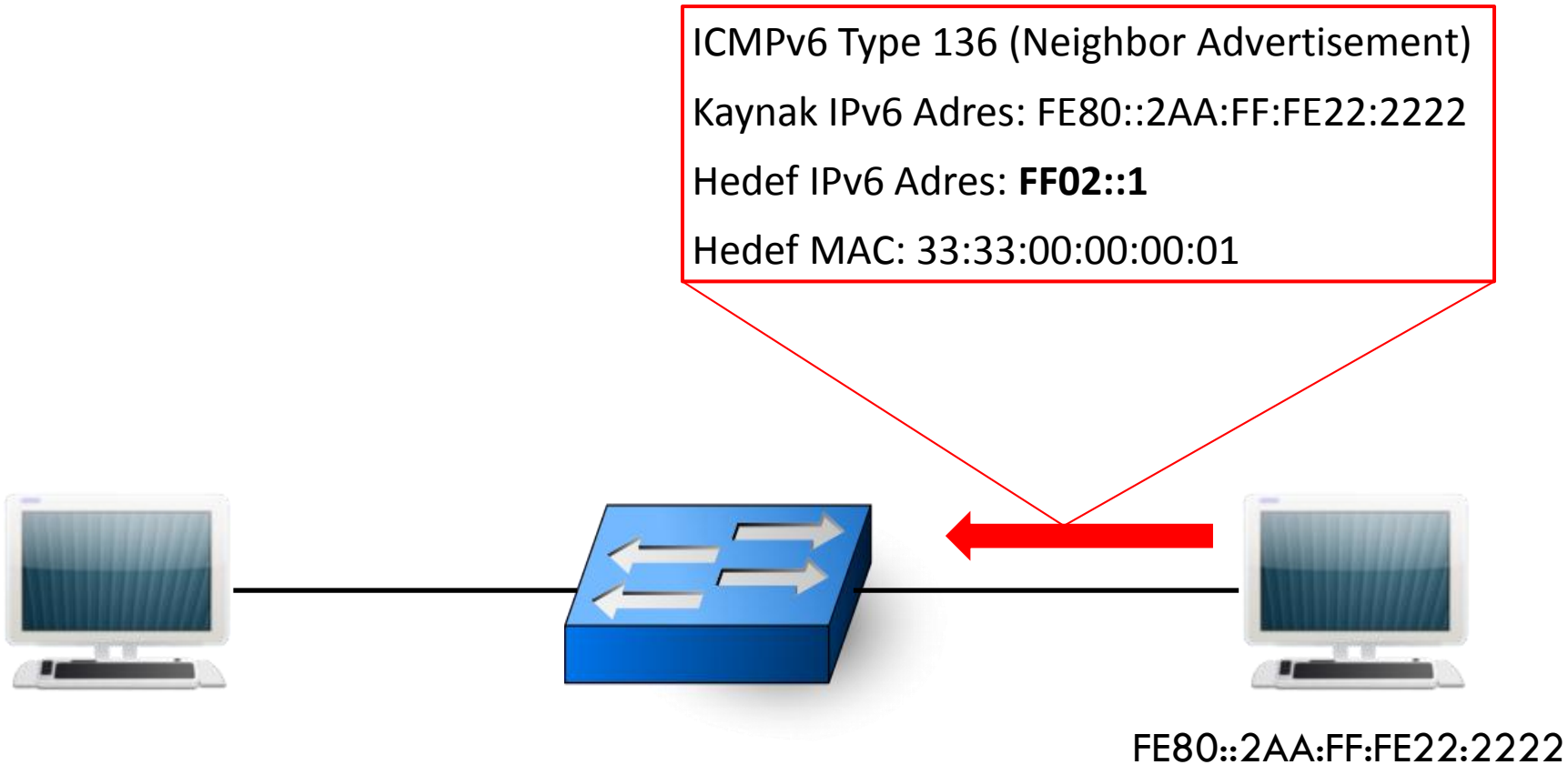
DUPLICATE ADDRESS DETECTION-1 (IP ÇAKIŞMASI TESPİTİ-1)

ICMPv6 Type 135 (Neighbor Solicitation)
Kaynak IPv6 Adres: **::** **(!)**
Hedef IPv6 Adres: FF02::2AA:FF:FE22:2222
Hedef MAC: 33:33:FF:22:22:22

FE80::2AA:FF:FE22:2222 ???

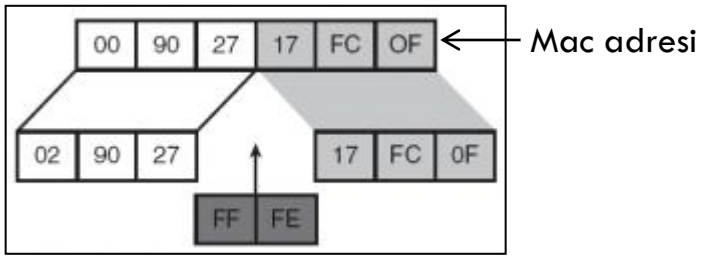
FE80::2AA:FF:FE22:2222

DUPLICATE ADDRESS DETECTION-2 (IP ÇAKIŞMASI TESPİTİ-2)



IPv6 ADRESİ ATANMASI

- STATİK : İstemcilerde IP adresinin atanması
- DİNAMİK :
  - STATELESS : İstemcinin yönlendiriciden ağ adresini öğrenip kalan adresini kendisinin atamasıdır.
  - STATEFULL: İstemcinin DHCP sunucusunda IP adresini aldığı metotdur.

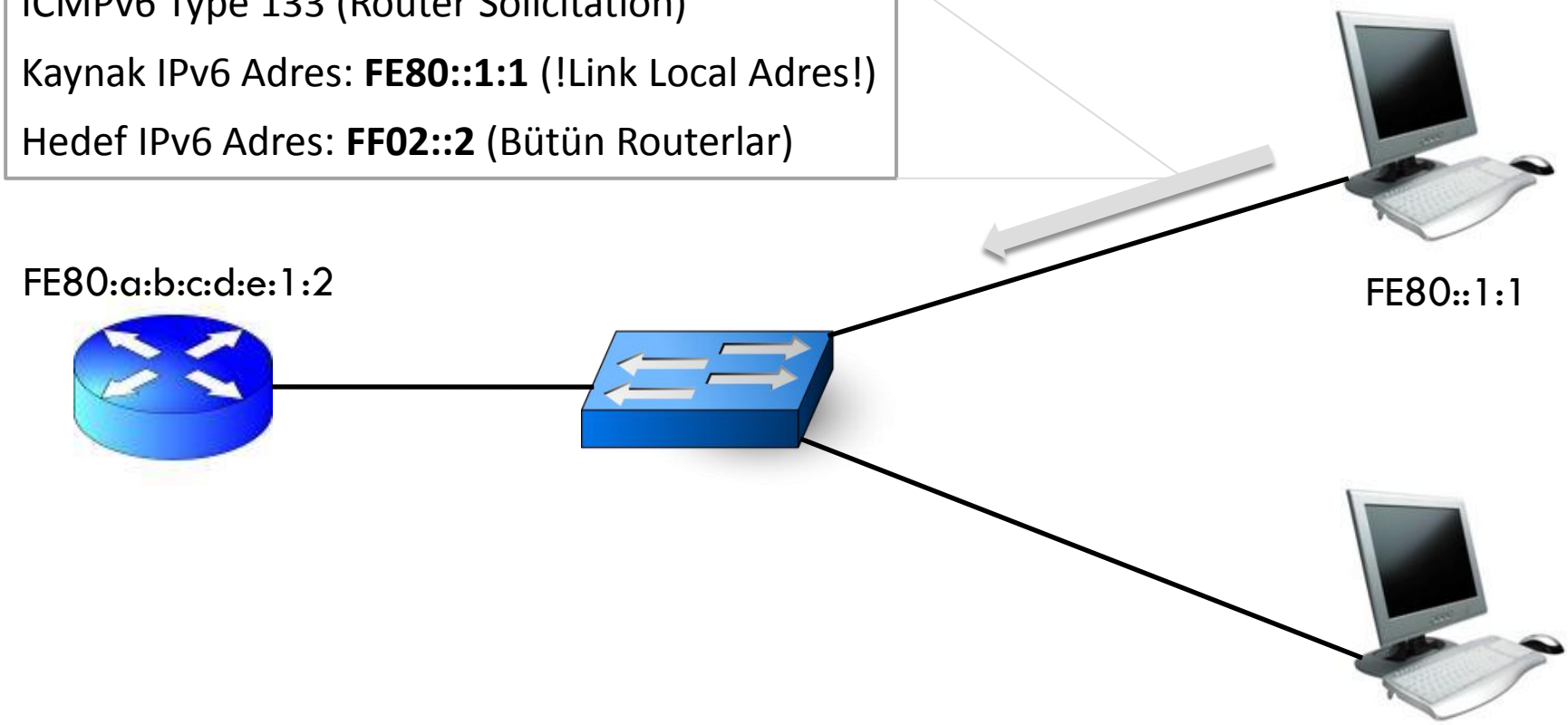


STATELESS IP ADRESİ ATANMASI -1 ROUTER SOLICITATION

ICMPv6 Type 133 (Router Solicitation)

Kaynak IPv6 Adres: **FE80::1:1** (!Link Local Adres!)

Hedef IPv6 Adres: **FF02::2** (Bütün Routerlar)



NOT: LINK LOCAL ADRESLER : fe80::/10 adres aralığında yöneticin belirlediği veya istemcinin kendisinin belirlediği adres aralıklarıdır.

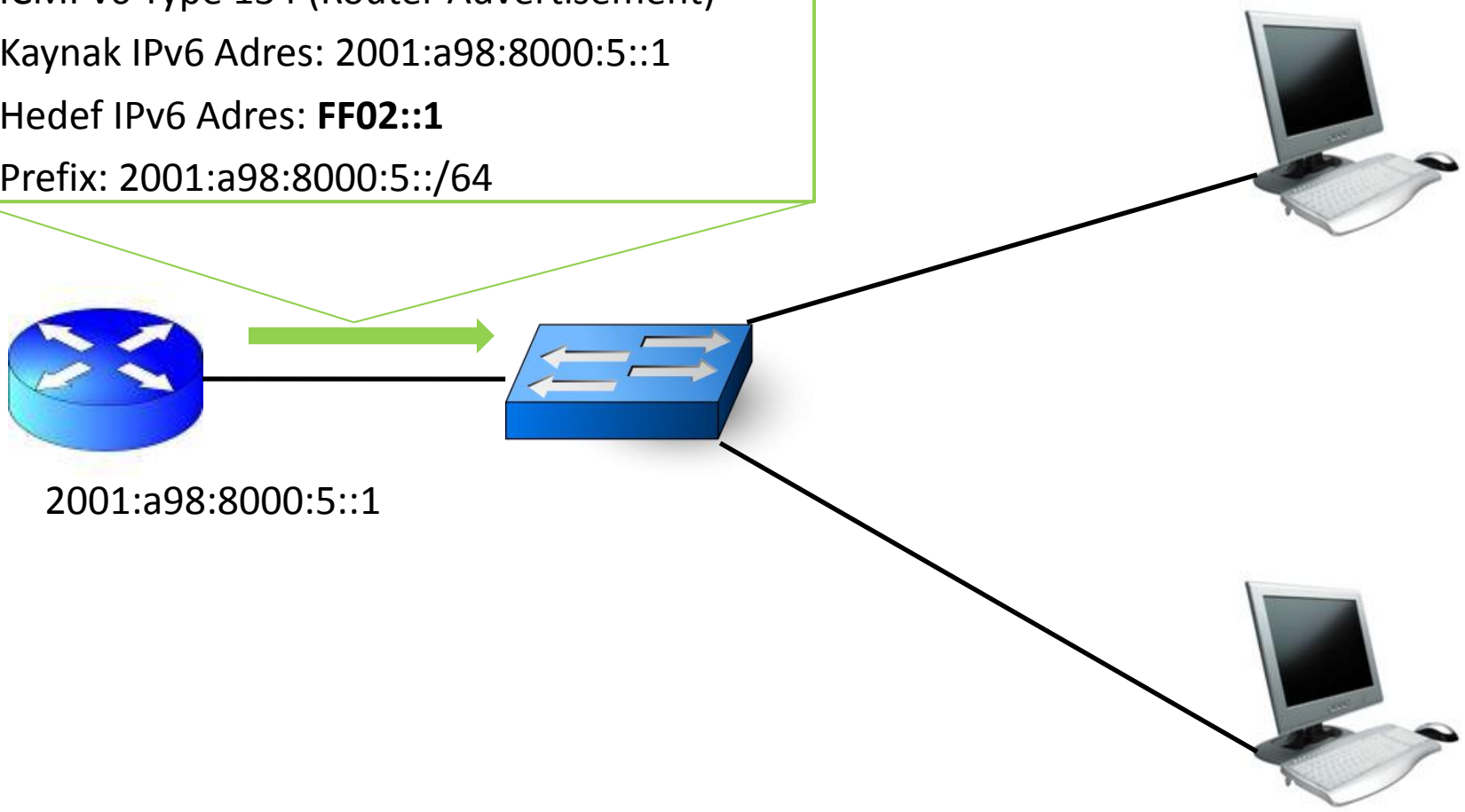
STATELESS IP ADRESİ ATANMASI - 2 ROUTER ADVERTISEMENT (Herkese)

ICMPv6 Type 134 (Router Advertisement)

Kaynak IPv6 Adres: 2001:a98:8000:5::1

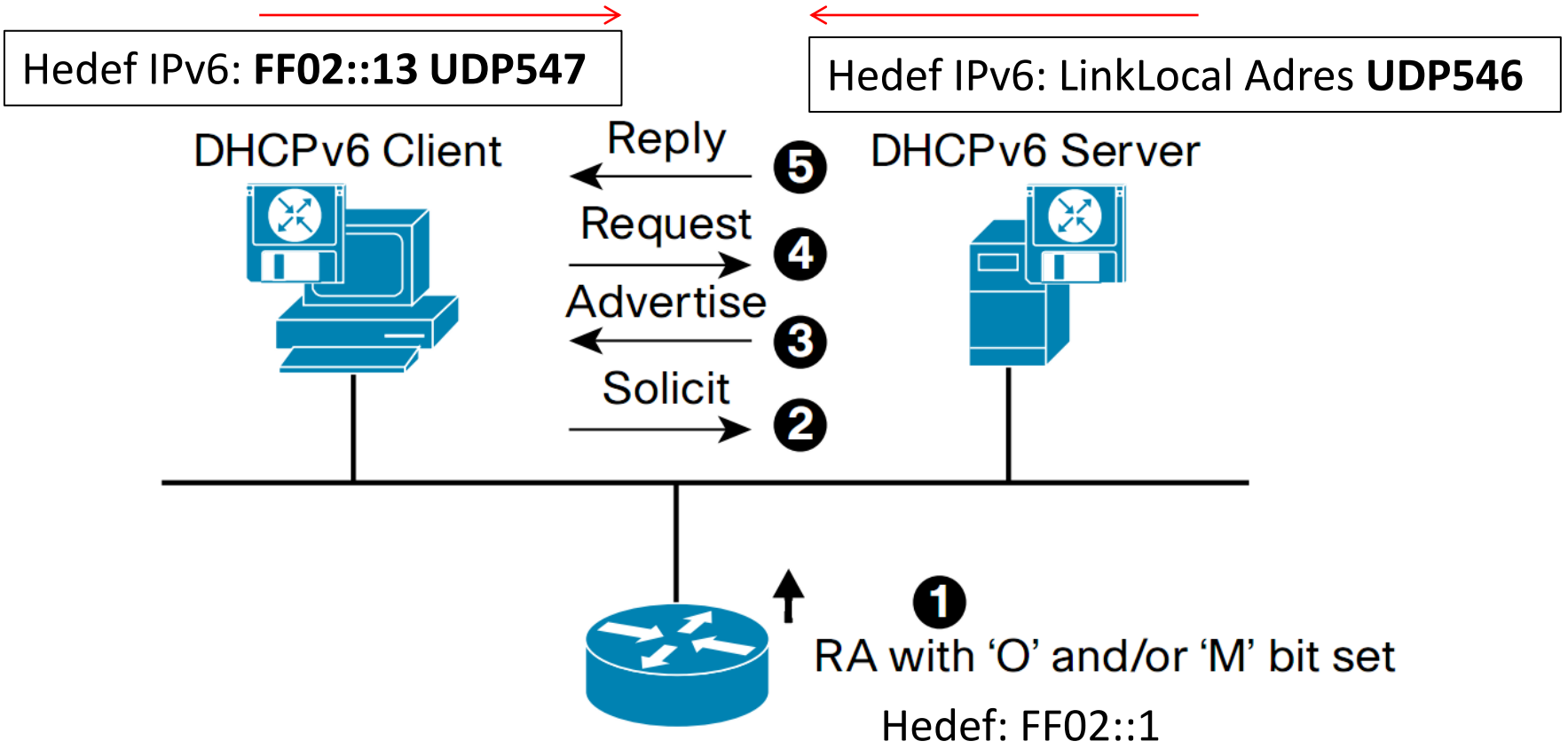
Hedef IPv6 Adres: **FF02::1**

Prefix: 2001:a98:8000:5::/64



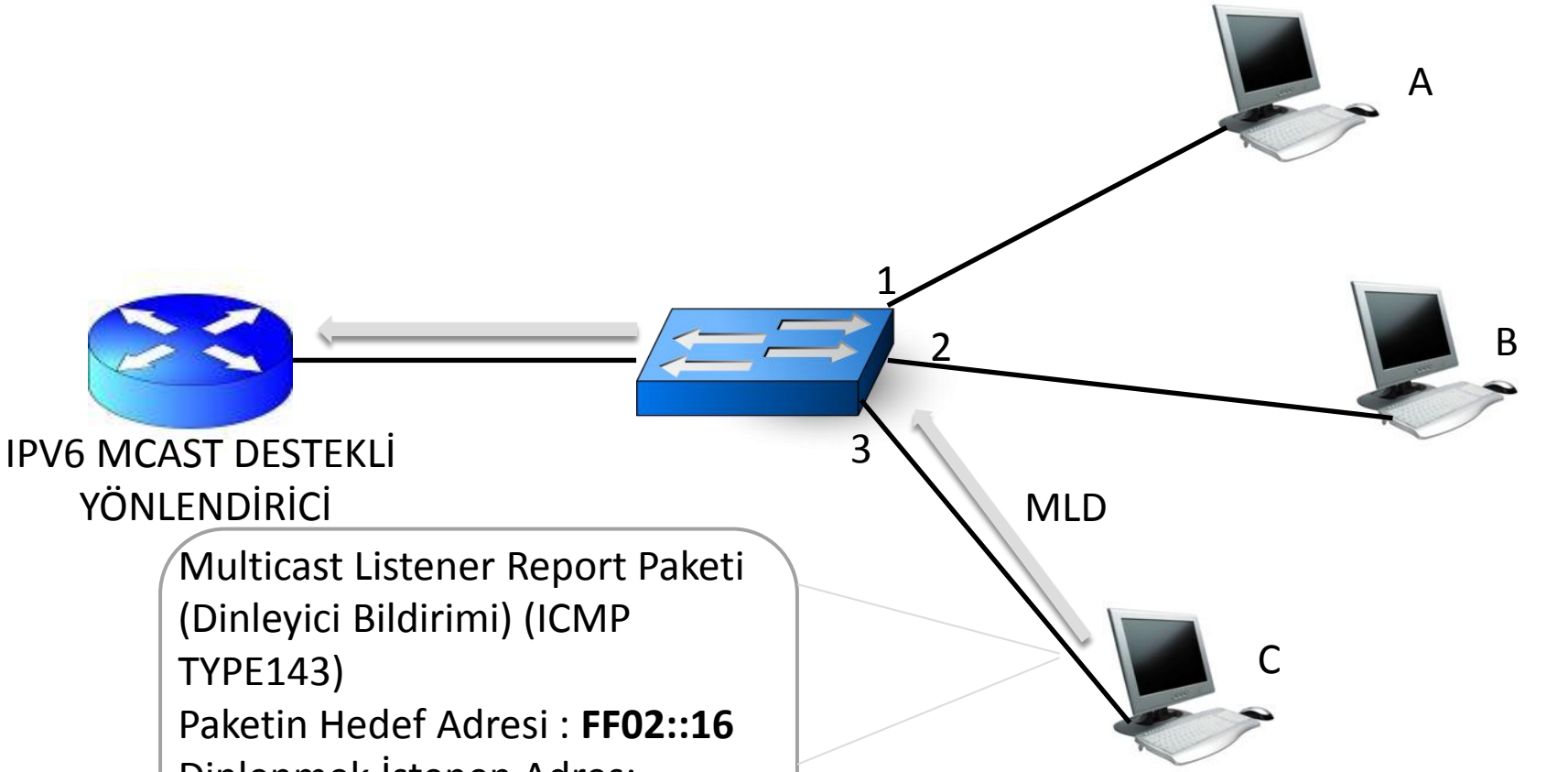
2001:a98:8000:5::1

IPV6 DHCP

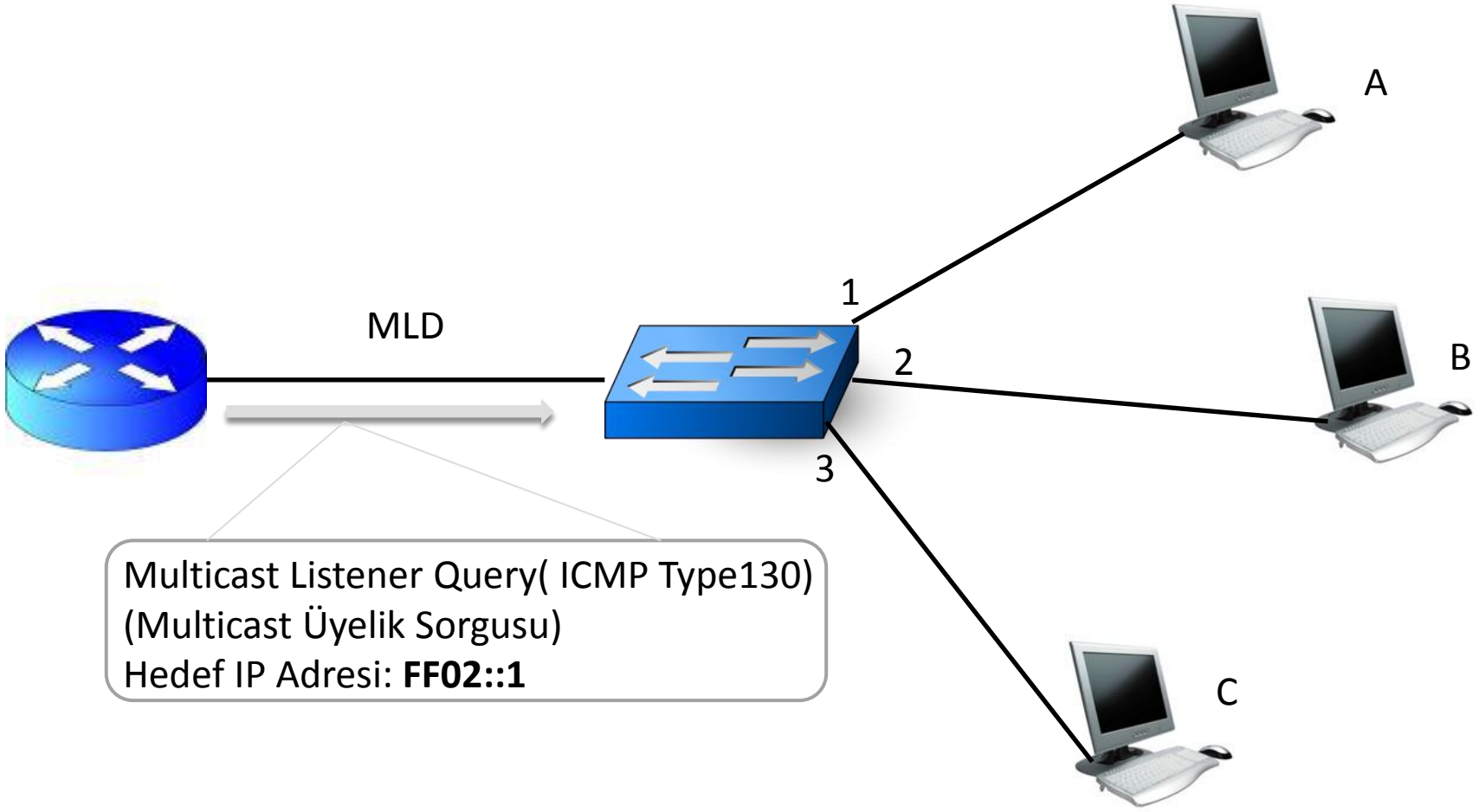


Neden FF02::13'e soruyor da FF02::1'de sormuyor?

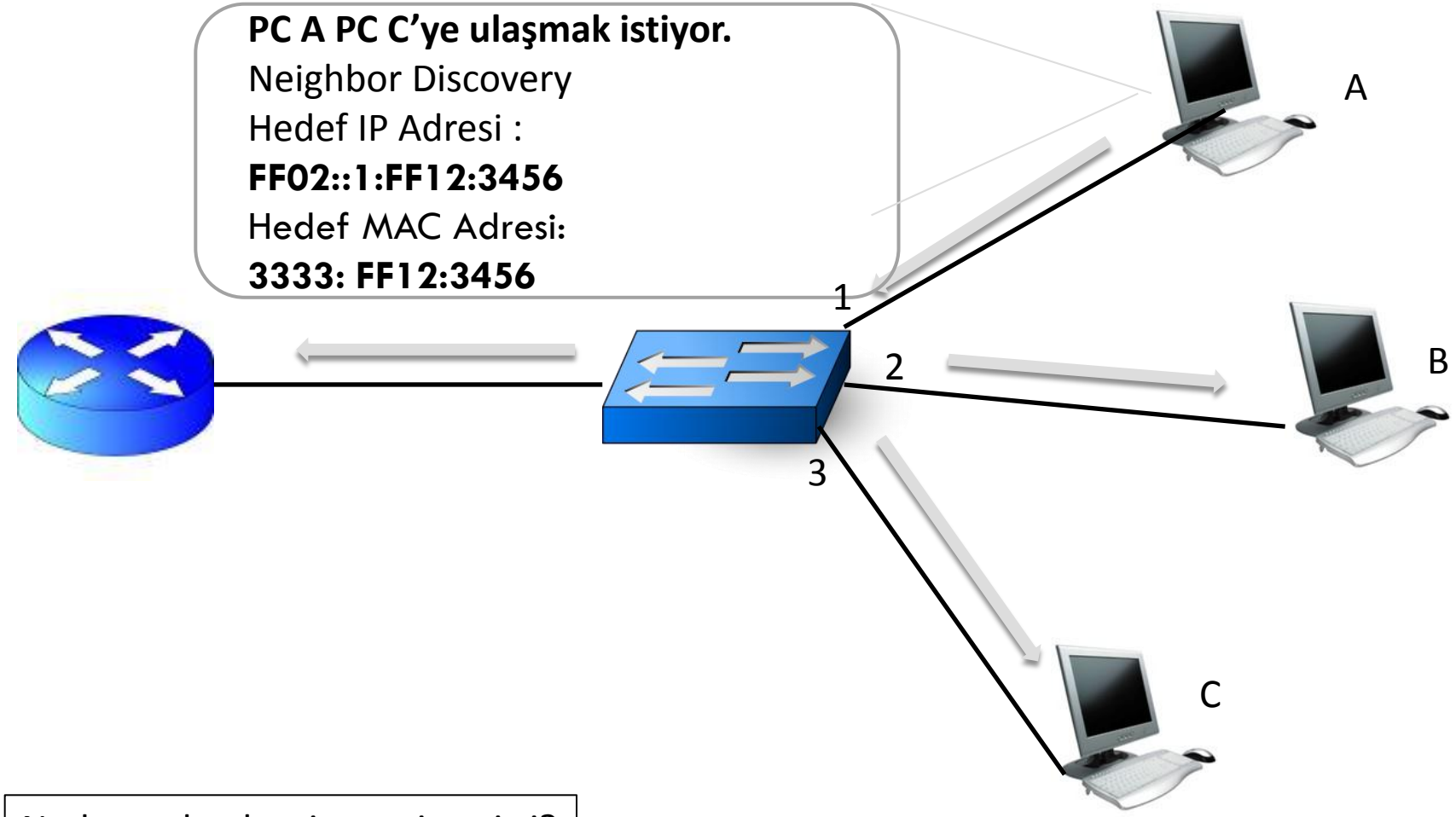
IPv6 MLD - 1 (Multicast Listener Discovery)



IPv6 MLD - 2 (Multicast Listener Discovery)

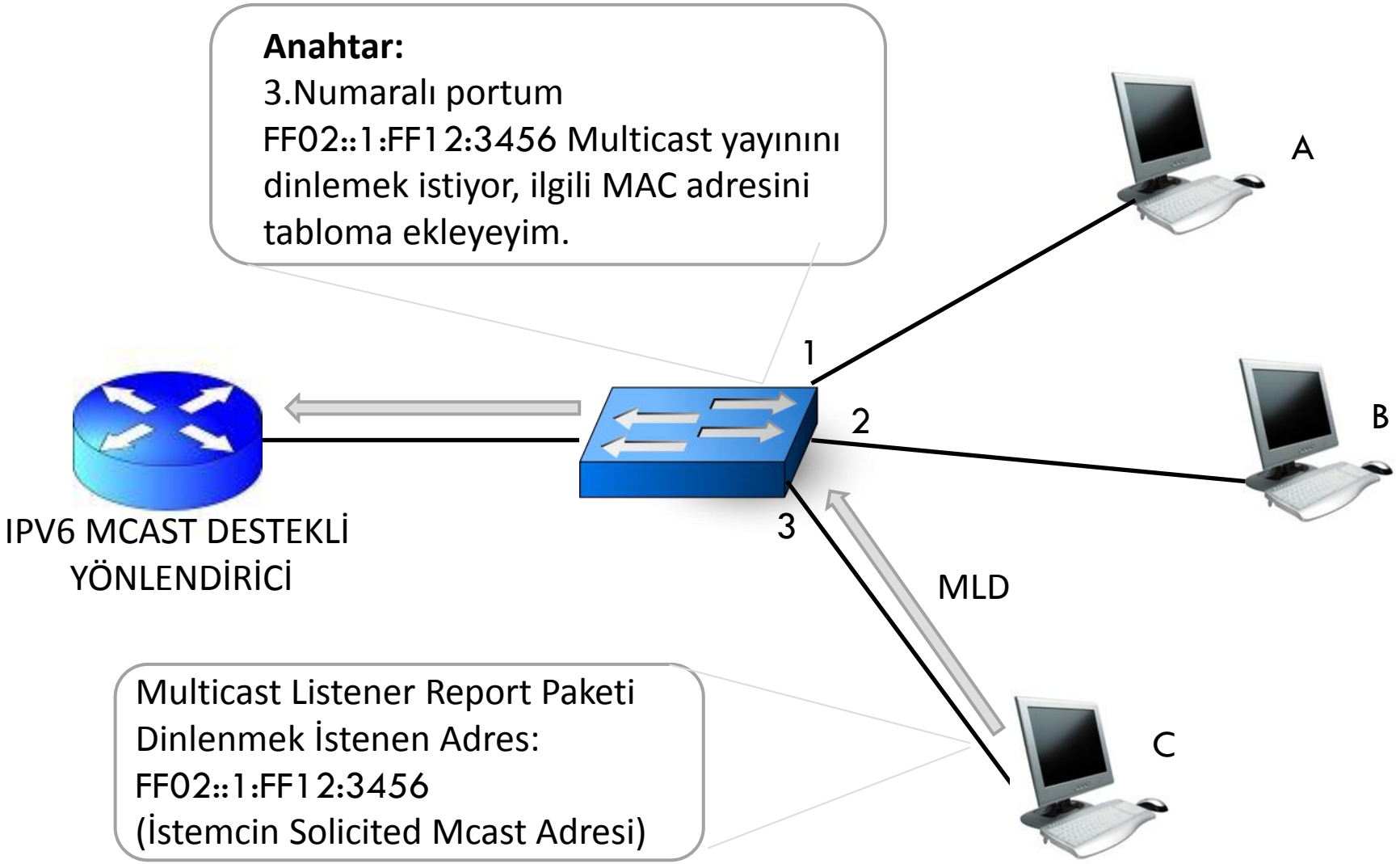


IPv6 MLD - 3 (Multicast Listener Discovery)



Neden paket her istemciye gitti?

IPV6 MLD SNOOPING FAYDASI- 1



IPV6 MLD SNOOPING FAYDASI- 2

IPV6 ATAKLARINDAN KORUNMA

- Sahte Router Advertisement Anonusu
- Sahte IPv6 DHCP Sunucusu
  - Çözümleri : Erişim Kural Listesi Yazabilmek (ACL)

```
Switch(config)#ipv6 access-list koruma
Switch(config-ipv6-acl)#deny icmp any any router-advertisement
Switch(config-ipv6-acl)# deny udp any any eq 546
```

- NEIGHBOR DISCOVERY Zehirleme
  - Çözüm: Secure Neighbor Discovery (SeND) Kullanmak

TEŞEKKÜRLER

- Sunuma ulaşılabilecek adresler:
  -- http://web.itu.edu.tr/akingok
  -- http://www.gokhanakin.net

- Bizim mail adreslerimiz:
  -- akingok@itu.edu.tr
  -- uysalmeh@itu.edu.tr

- **Sorular ??**