ARP
(Camada Inter-rede)

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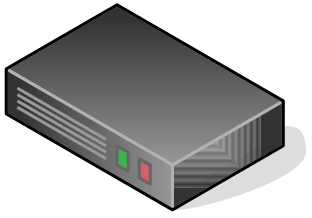
https://luizsantos.github.io/

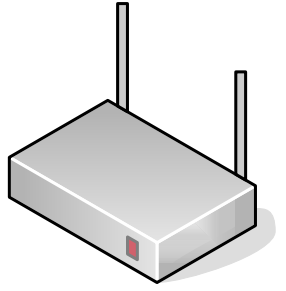
ARP

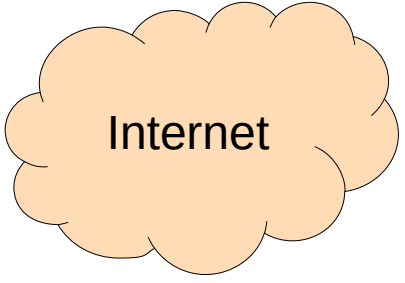
Modelo TCP/IP

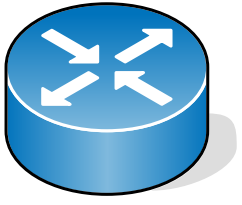
5	Aplicação
4	Transporte
3	Inter-rede
2	Enlace
1	Física

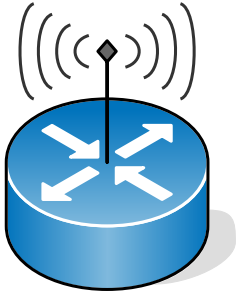
- Endereçamento e roteamento.











Camada de Inter-rede

A tecnologia TCP/IP é foi criada para ser roteável e interligar vários *hosts* em uma rede tal como a Internet:

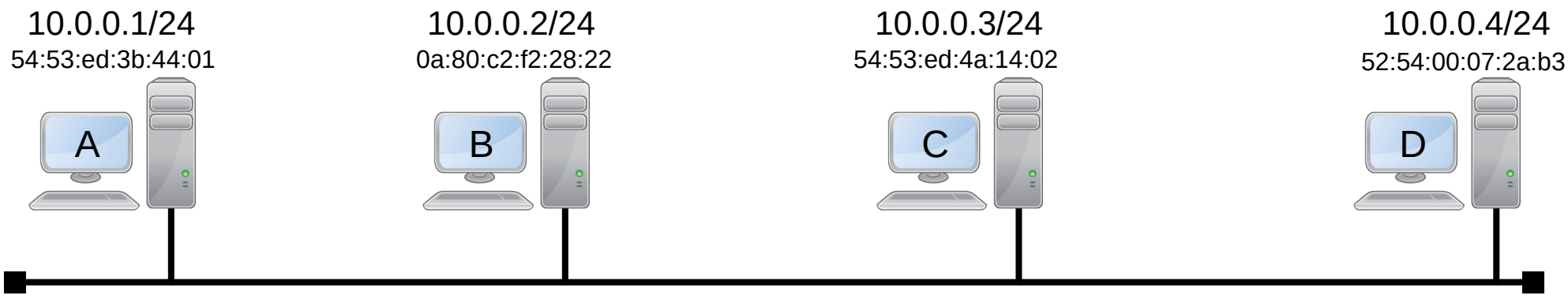
- IP (*Internet Protocol*);
  - Endereçamento IP (IPv4 e IPv6);
  - *Datagrama* IP.

- **ARP (*Address Resolution Protocol*);**
  - **RARP** (*Reverse Address Resolution Protocol).*

- ICMP (*Internet Control Message Protocol*).

ARP

O ARP converte endereços lógicos em endereços físicos.



ARP

Qual é o motivo disso?
Por que ter endereço lógico e físico?

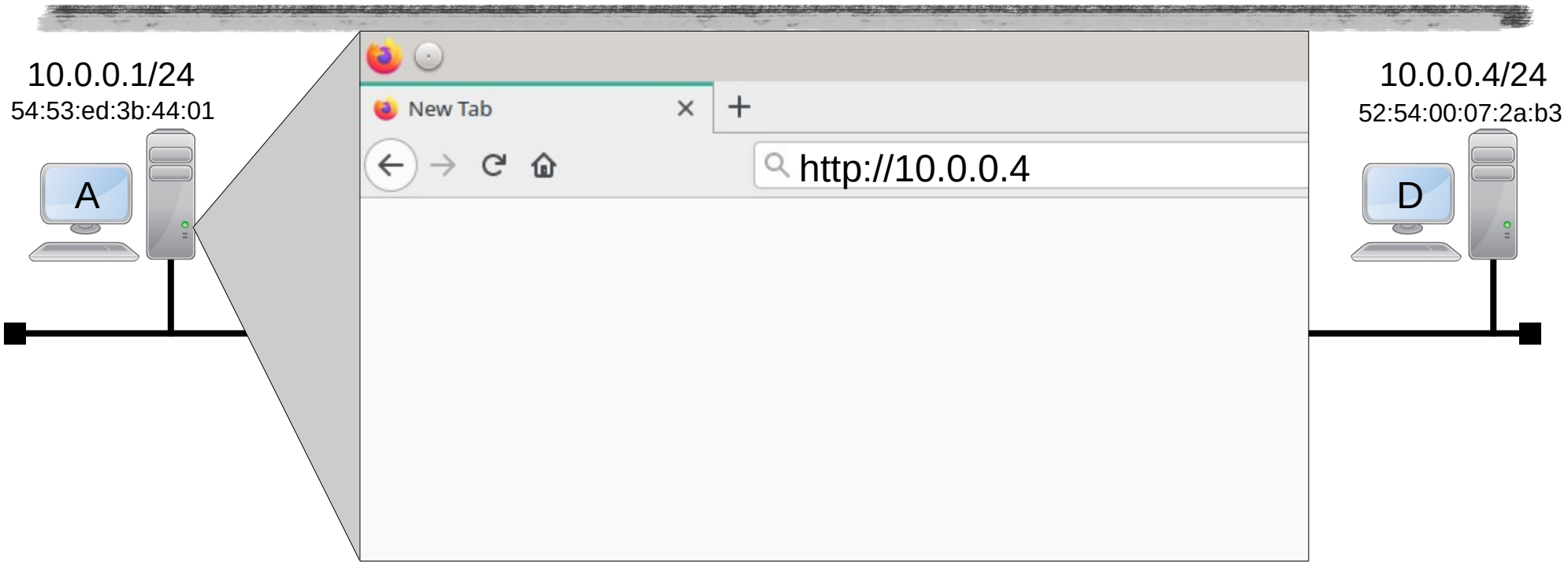
ARP

Qual é o motivo disso?
Por que ter endereço lógico e físico?

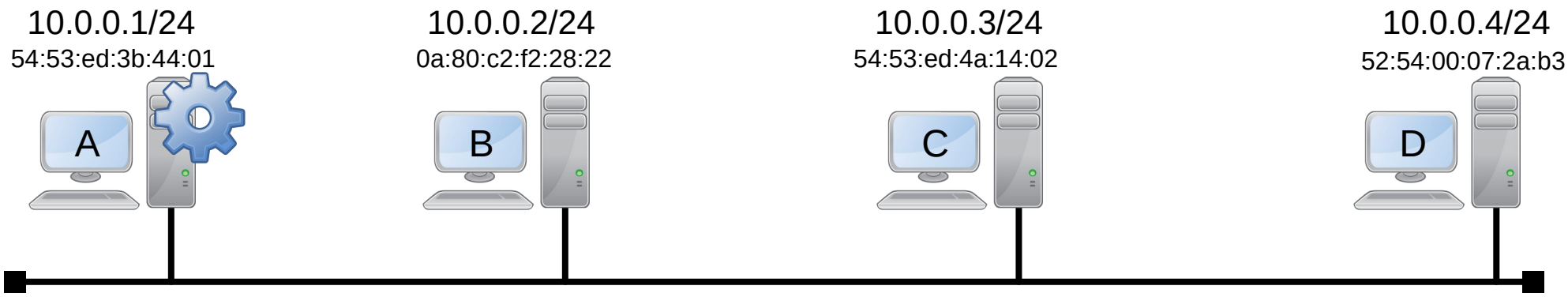
O endereçamento lógico
é mais fácil de gerenciar…

O processamento do
endereço físico
é mais rápido!

ARP

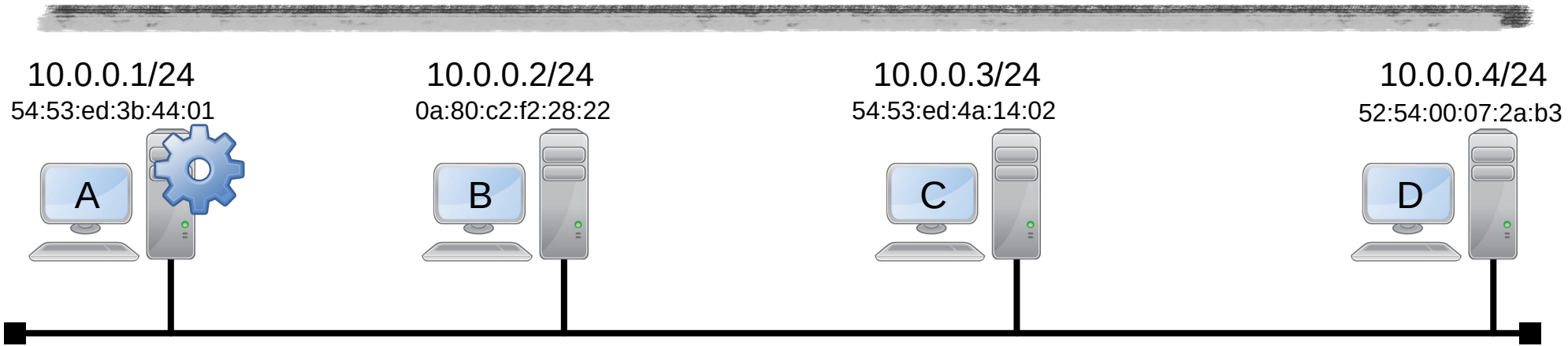

10.0.0.1/24
54:53:ed:3b:44:01
A
New Tab
http://10.0.0.4
10.0.0.4/24
52:54:00:07:2a:b3
D

ARP



Version	IHL	Type of Service	Total Length
Identification		Flags	Fragment Offset
Time to Live	Protocol - **TCP**	Header Checksum	
Source Address – **10.0.0.1**			
Destination Address – **10.0.0.4**			
Data - **GET**			

ARP



Version	IHL	Type of Service	Total Length
Identification		Flags	Fragment Offset
Time to Live	Protocol - **TCP**	Header Checksum	
Source Address – **10.0.0.1**			
Destination Address – **10.0.0.4**			
Data - **GET**			

Preamble+SFD	*Destination Address* ?	*Source Address* ***54:53:ed:3b:44:01***	*Type* **IP**	*Data*	*Checksum*

ARP

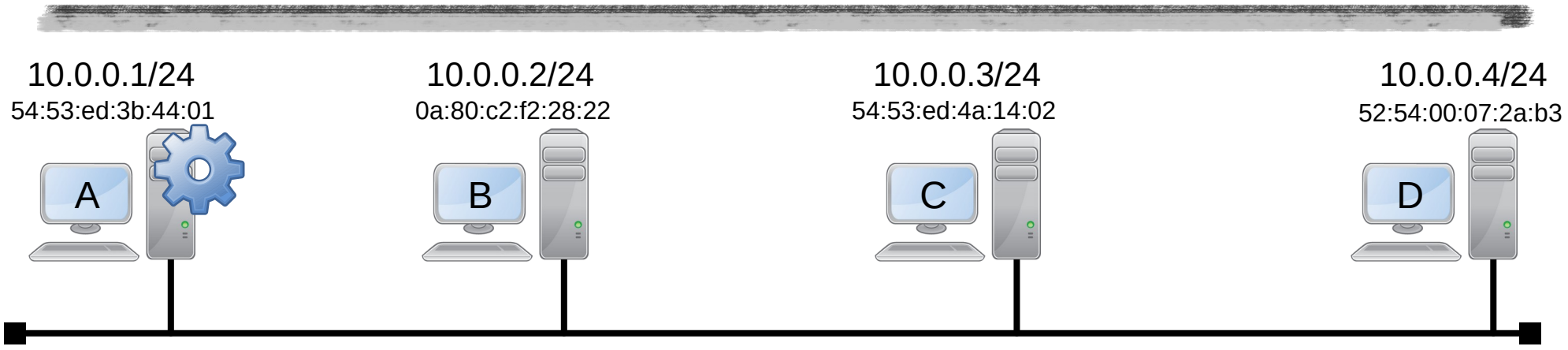
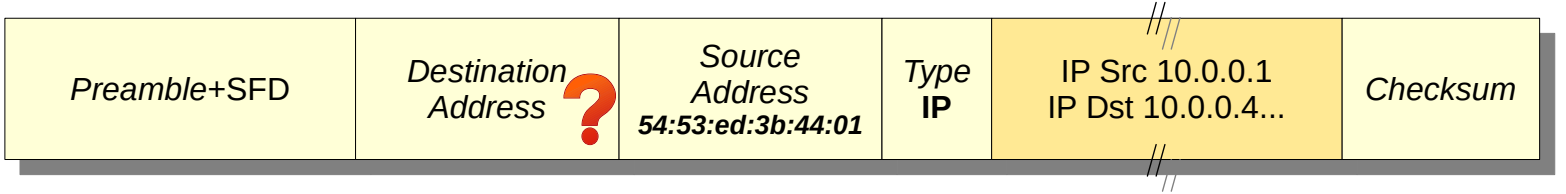


Tabela ARP – host A



ARP

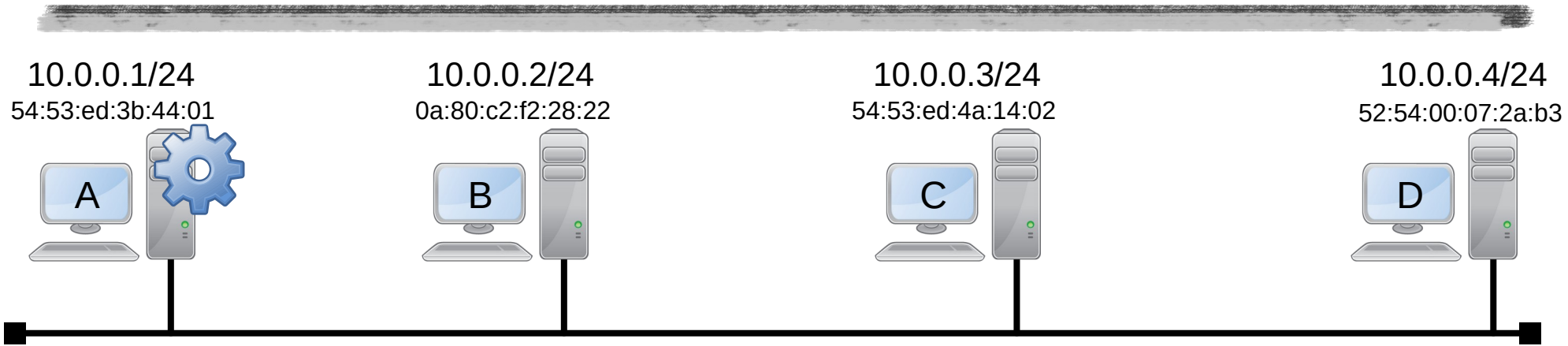


Tabela ARP – host A

?

Preamble+SFD	*Destination Address* ?	*Source Address* ***54:53:ed:3b:44:01***	*Type* **IP**	IP Src 10.0.0.1 IP Dst 10.0.0.4...	*Checksum*

O ARP deve descobrir o endereço físico, antes de prosseguir...

ARP

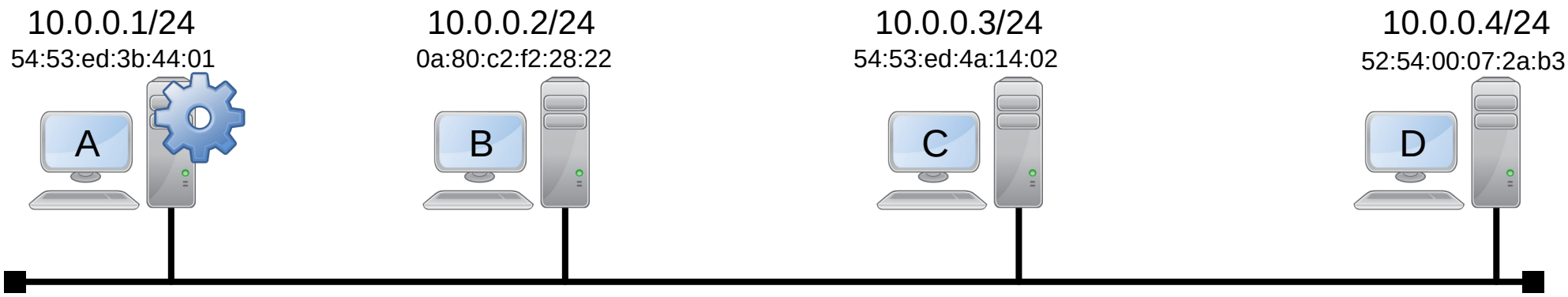


Tabela ARP – host A

ARP – **Pergunta**:
Sou 10.0.0.1 → 54:53:ed:3b:44:01
Quem é 10.0.0.4 → ?

ARP

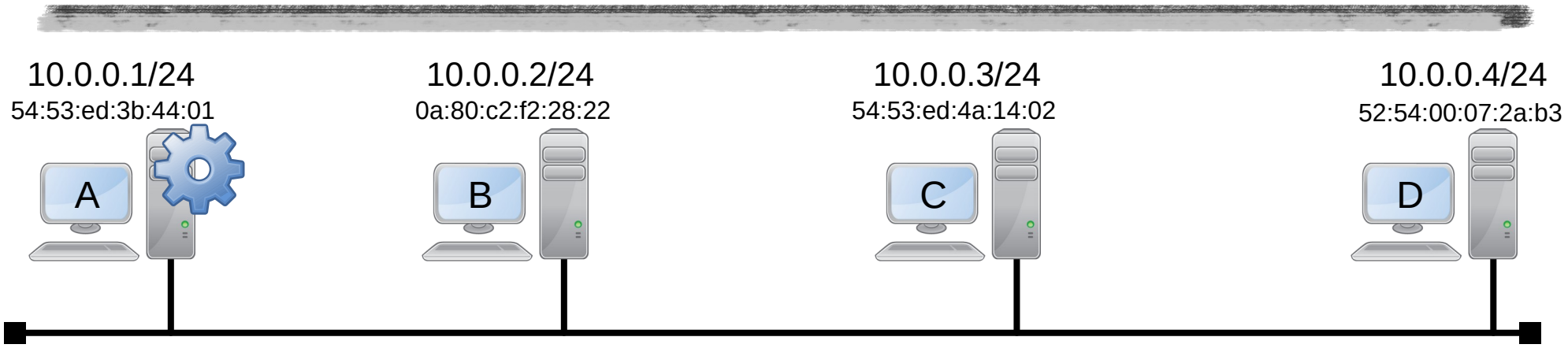
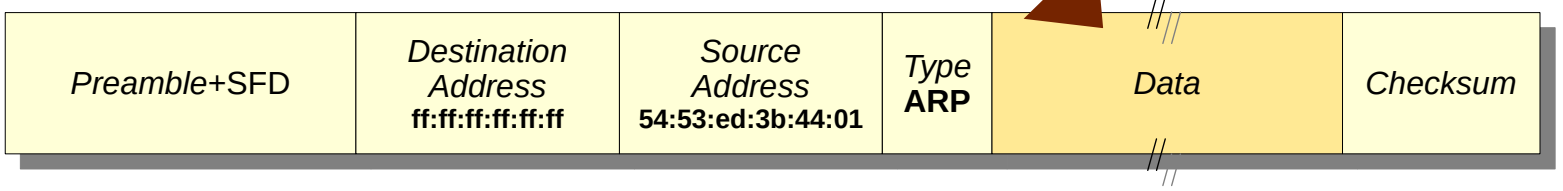
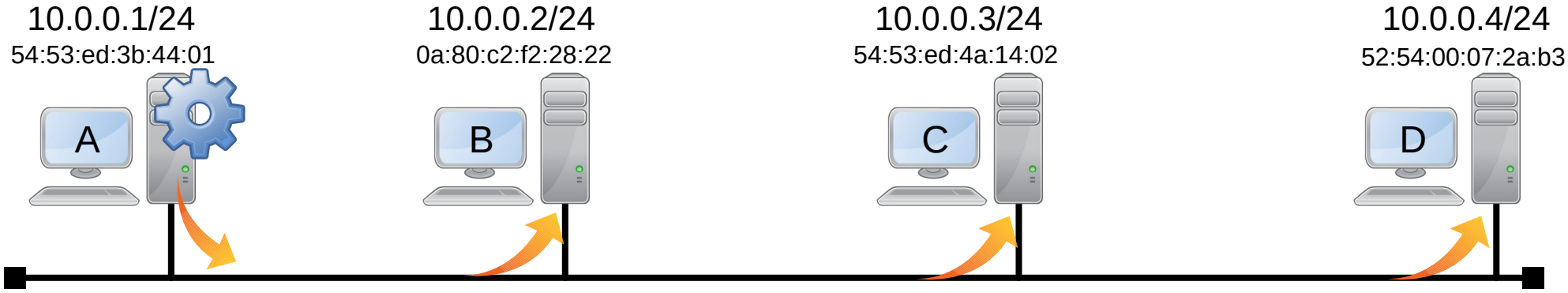


Tabela ARP – host A

ARP – **Pergunta**:
Sou 10.0.0.1 → 54:53:ed:3b:44:01
Quem é 10.0.0.4 → ?

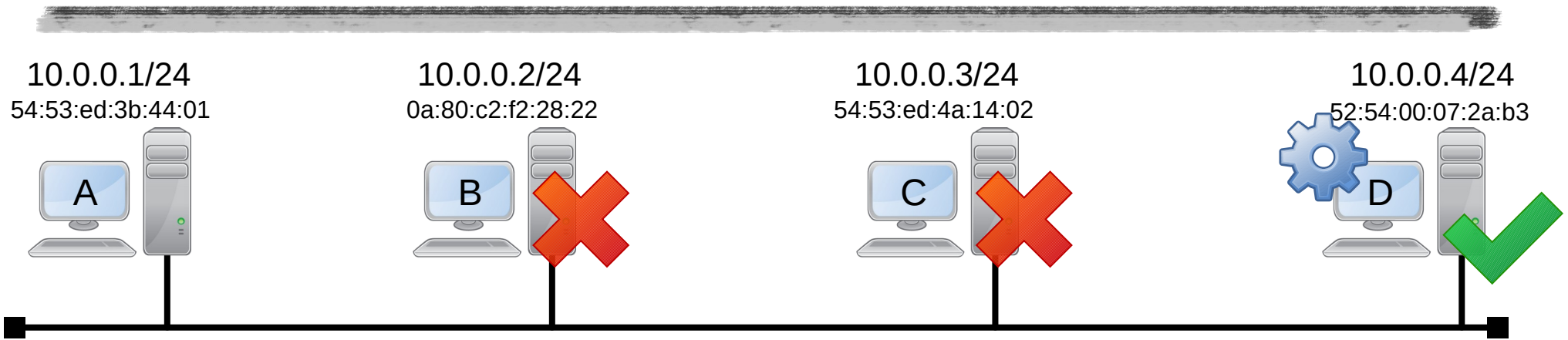


ARP



Preamble+SFD	*Destination Address* **ff:ff:ff:ff:ff:ff**	*Source Address* **54:53:ed:3b:44:01**	*Type* **ARP**	ARP Quem é 10.0.0.4?	*Checksum*

ARP



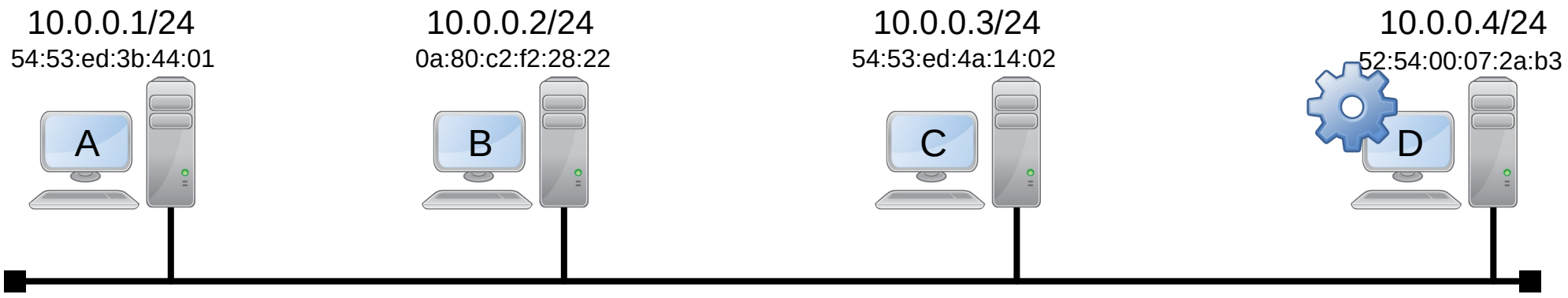
ARP – **Pergunta**:
Sou 10.0.0.1 → 54:53:ed:3b:44:01
Quem é 10.0.0.4 → ?

Preamble+SFD	*Destination Address* **ff:ff:ff:ff:ff:ff**	*Source Address* **54:53:ed:3b:44:01**	*Type* **ARP**	ARP Quem é 10.0.0.4?	*Checksum*

Tabela ARP – host D

10.0.0.1 → 54:53:ed:3b:44:01

ARP

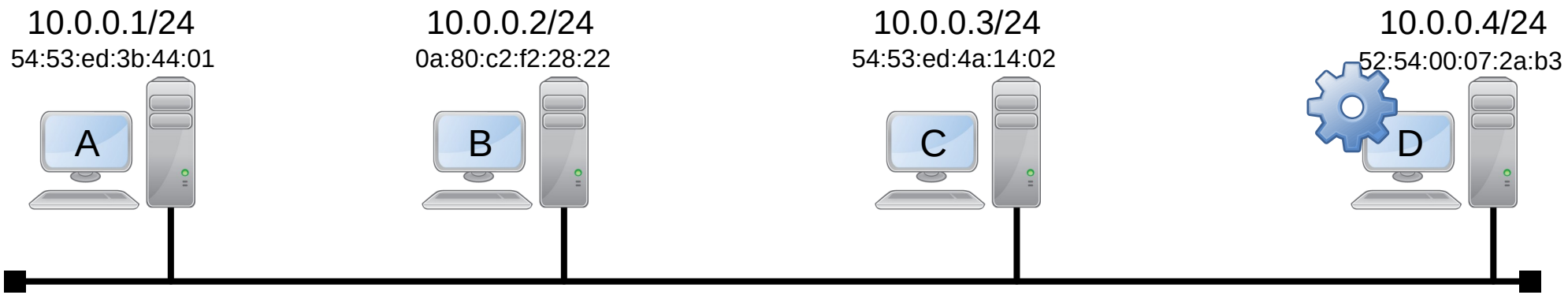


ARP – **Resposta**:
Sou 10.0.0.4 → 52:54:00:07:2a:b3
Para 10.0.0.1 → 54:53:ed:3b:44:01

Tabela ARP – host D

10.0.0.1 → 54:53:ed:3b:44:01

ARP



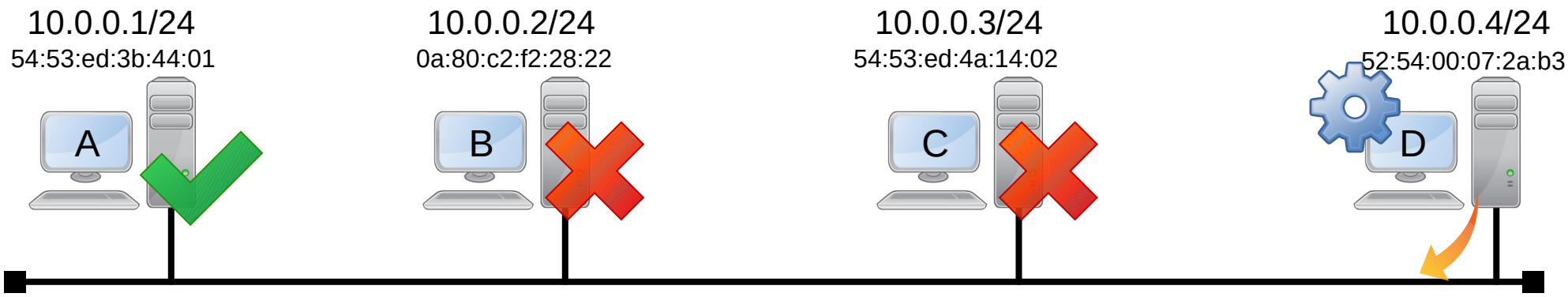
ARP – **Resposta**:
Sou 10.0.0.4 → 52:54:00:07:2a:b3
Para 10.0.0.1 → 54:53:ed:3b:44:01

Preamble+SFD	*Destination Address* **54:53:ed:3b:44:01**	*Source Address* **52:54:00:07:2a:b3**	*Type* **ARP**	ARP Resposta...	*Checksum*

Tabela ARP – host D

10.0.0.1 → 54:53:ed:3b:44:01

ARP



Preamble+SFD	*Destination Address* **54:53:ed:3b:44:01**	*Source Address* **52:54:00:07:2a:b3**	*Type* **ARP**	ARP Resposta...	*Checksum*

ARP

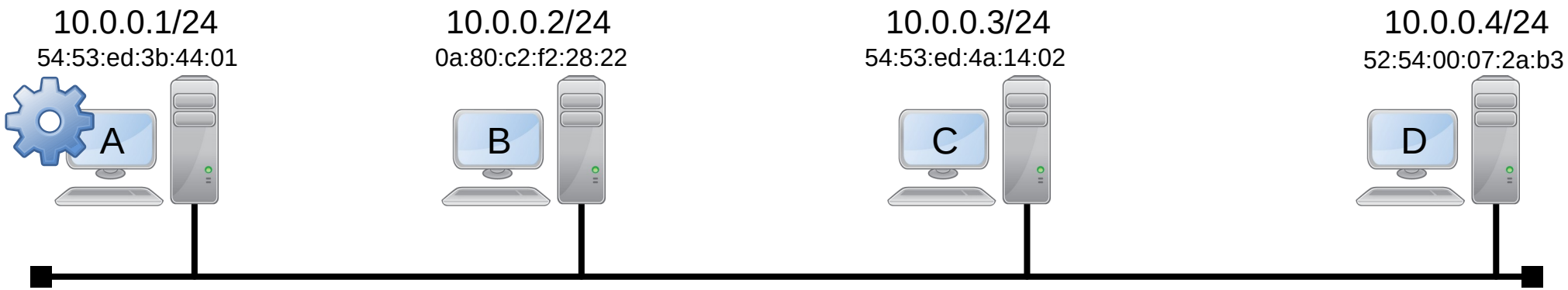


Tabela ARP – host A

10.0.0.4 → 52:54:00:07:2a:b3

ARP – **Resposta**:
Sou 10.0.0.4 → 52:54:00:07:2a:b3
Para 10.0.0.1 → 54:53:ed:3b:44:01

Preamble+SFD	*Destination Address* **54:53:ed:3b:44:01**	*Source Address* **52:54:00:07:2a:b3**	*Type* **ARP**	ARP Resposta...	*Checksum*

ARP

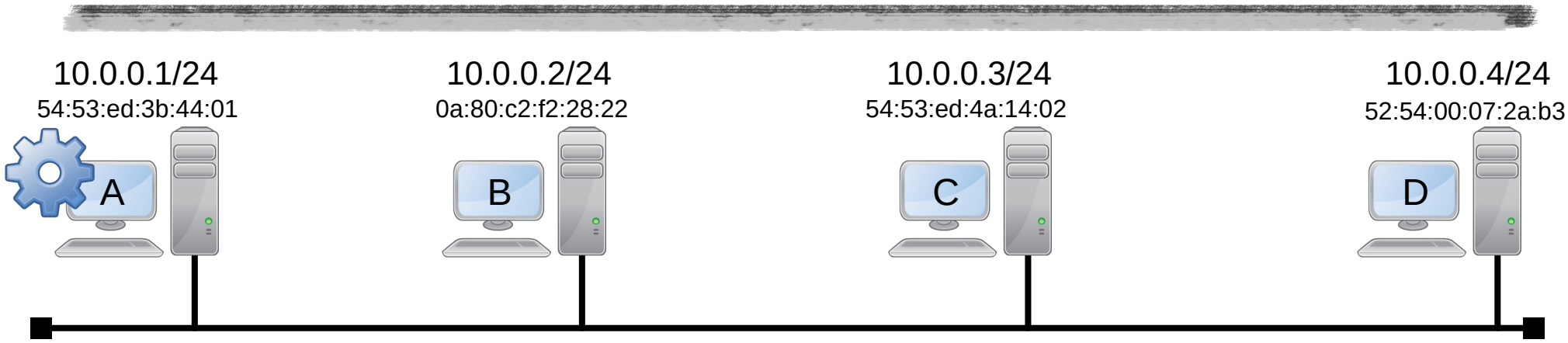


Tabela ARP – host A

10.0.0.4 → 52:54:00:07:2a:b3

Agora podemos voltar ao processo que estava esperando!

ARP – **Resposta**:
Sou 10.0.0.4 → 52:54:00:07:2a:b3
Para 10.0.0.1 → 54:53:ed:3b:44:01

ARP

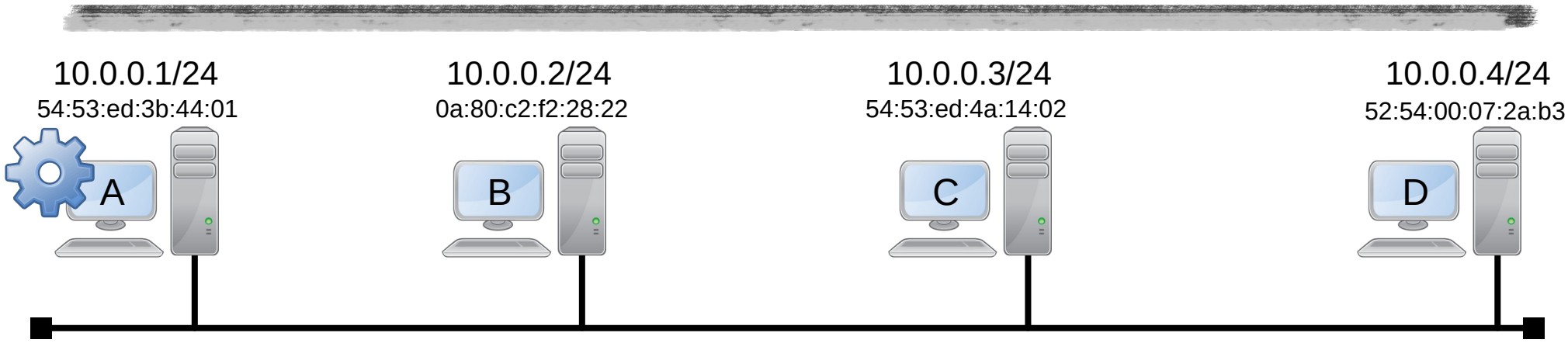


Tabela ARP – host A

10.0.0.4 → 52:54:00:07:2a:b3

Preamble+SFD	*Destination Address* ?	*Source Address* ***54:53:ed:3b:44:01***	*Type* **IP**	IP Src 10.0.0.1 IP Dst 10.0.0.4...	*Checksum*

Voltando...

ARP

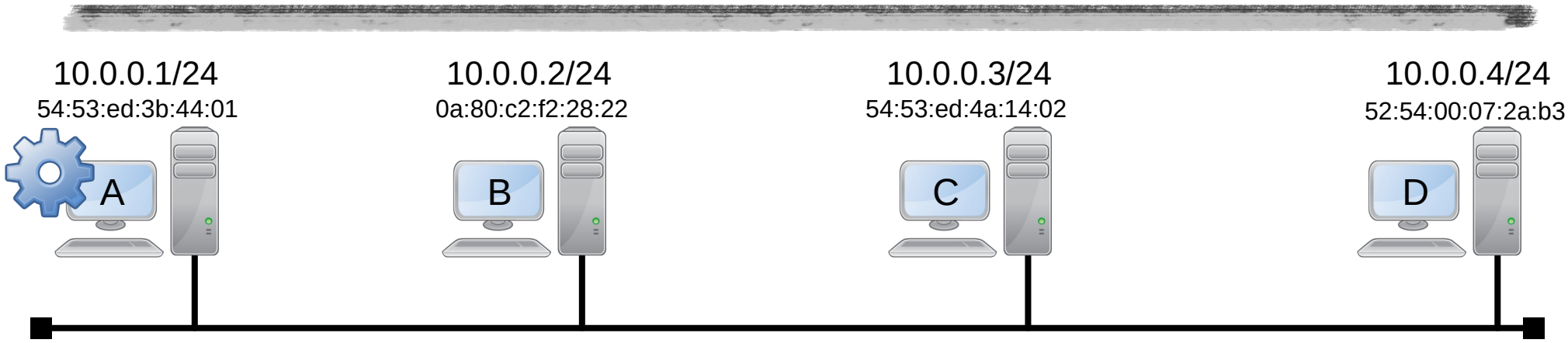


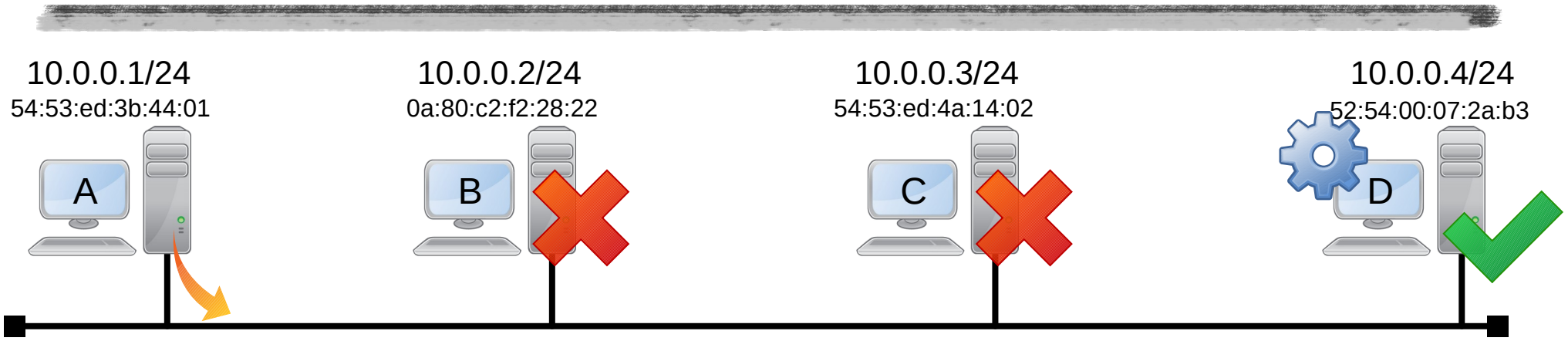
Tabela ARP – host A

10.0.0.4 → 52:54:00:07:2a:b3

Preamble+SFD	*Destination Address* **52:54:00:07:2a:b3**	*Source Address* ***54:53:ed:3b:44:01***	*Type* **IP**	IP Src 10.0.0.1 IP Dst 10.0.0.4...	*Checksum*

Voltando...

ARP



Preamble+SFD	*Destination Address* **52:54:00:07:2a:b3**	*Source Address* ***54:53:ed:3b:44:01***	*Type* **IP**	IP Src 10.0.0.1 IP Dst 10.0.0.4...	*Checksum*

ARP

Nossa, mas toda vez que eu for me comunicar com alguma máquina o ARP faz isso?

ARP

Nossa, mas toda vez que eu for me comunicar com alguma máquina o ARP faz isso?

Não… a referência fica lá enquanto houver comunicação!

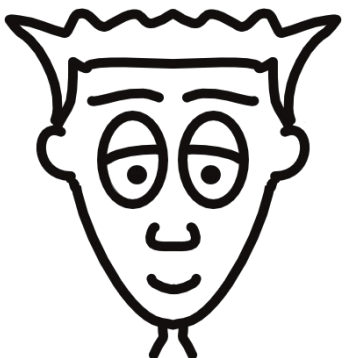
Você pode usar o comando `arp` para ver sua tabela ARP...

ARP

Legal, já sei…

Vou utilizar o ARP para saber qual é o endereço físico do **Google**!

Qual hardware será que eles usam?



ARP

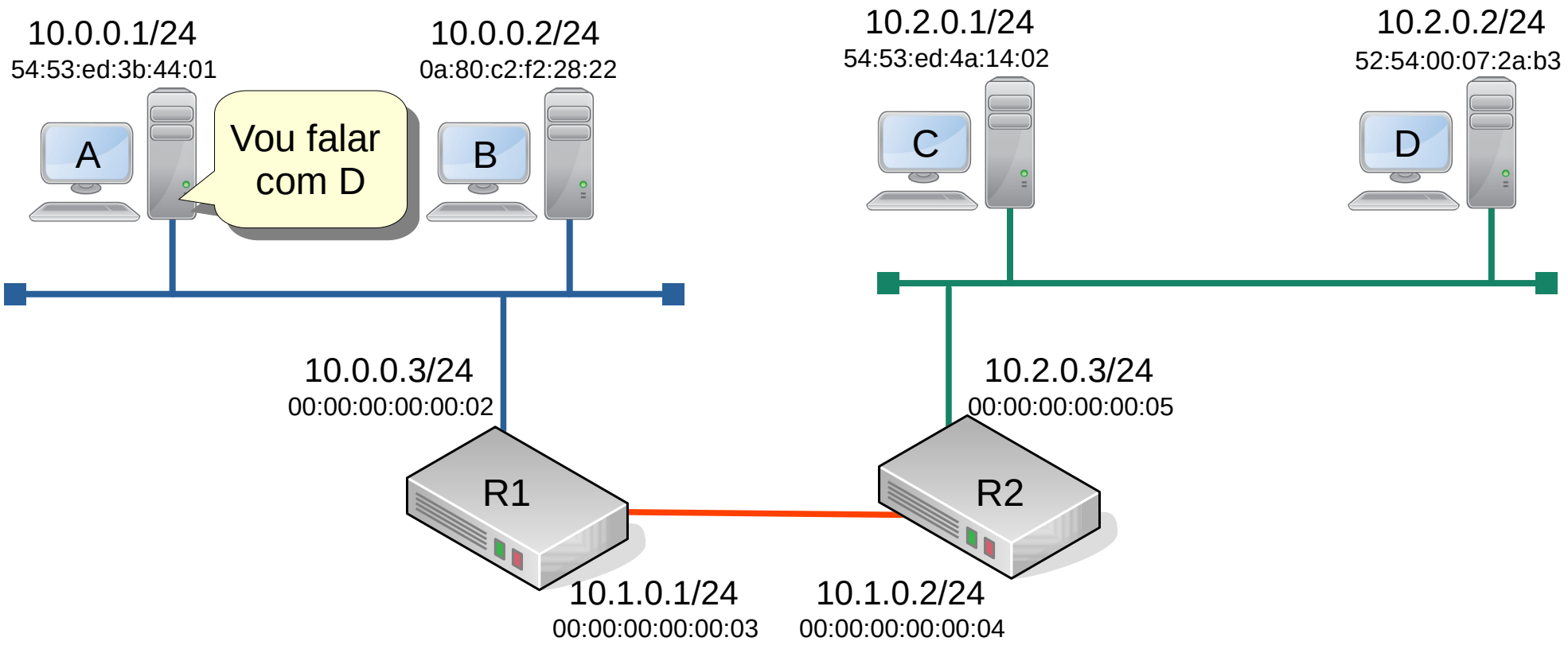
Legal, já sei…

Vou utilizar o ARP para saber qual é o endereço físico do **Google**!

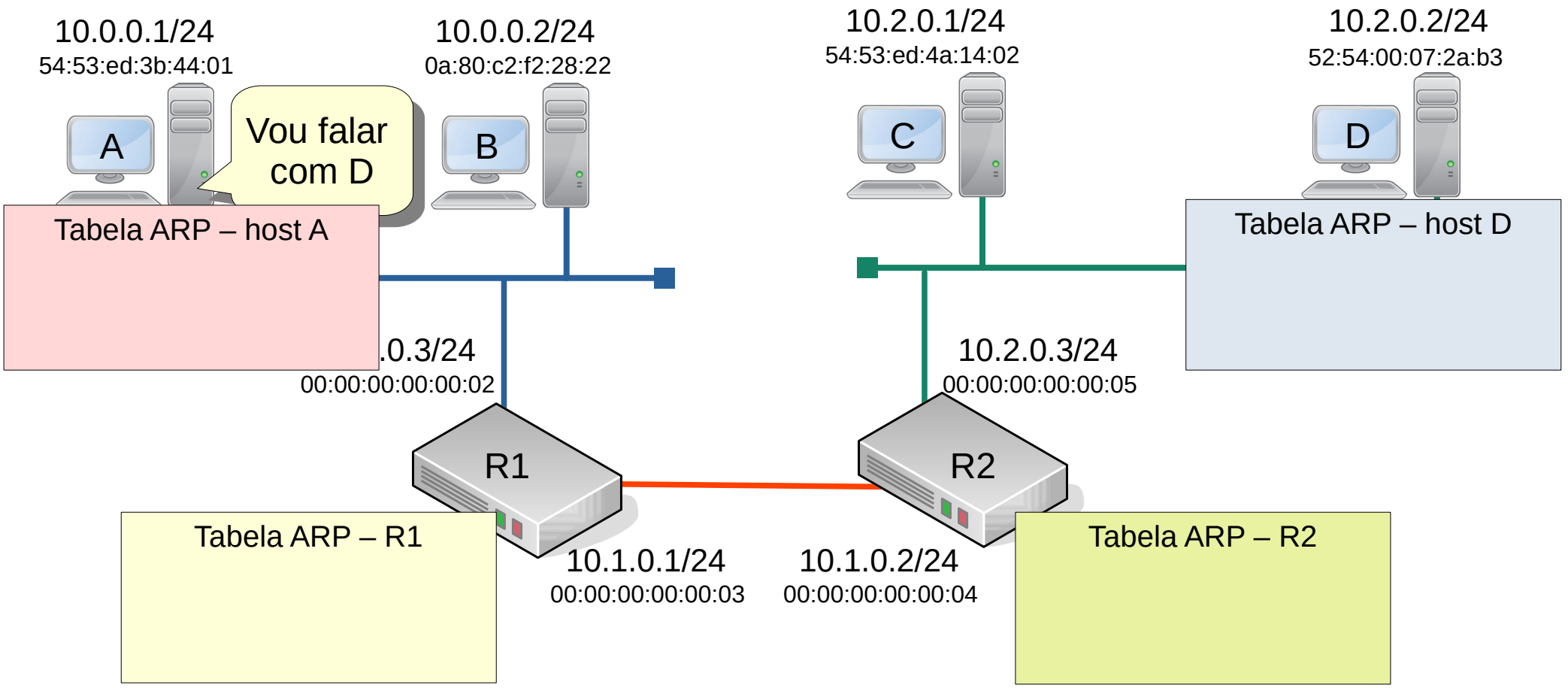
Qual hardware será que eles usam?

Não dá…
O ARP não passa de uma rede para outra!

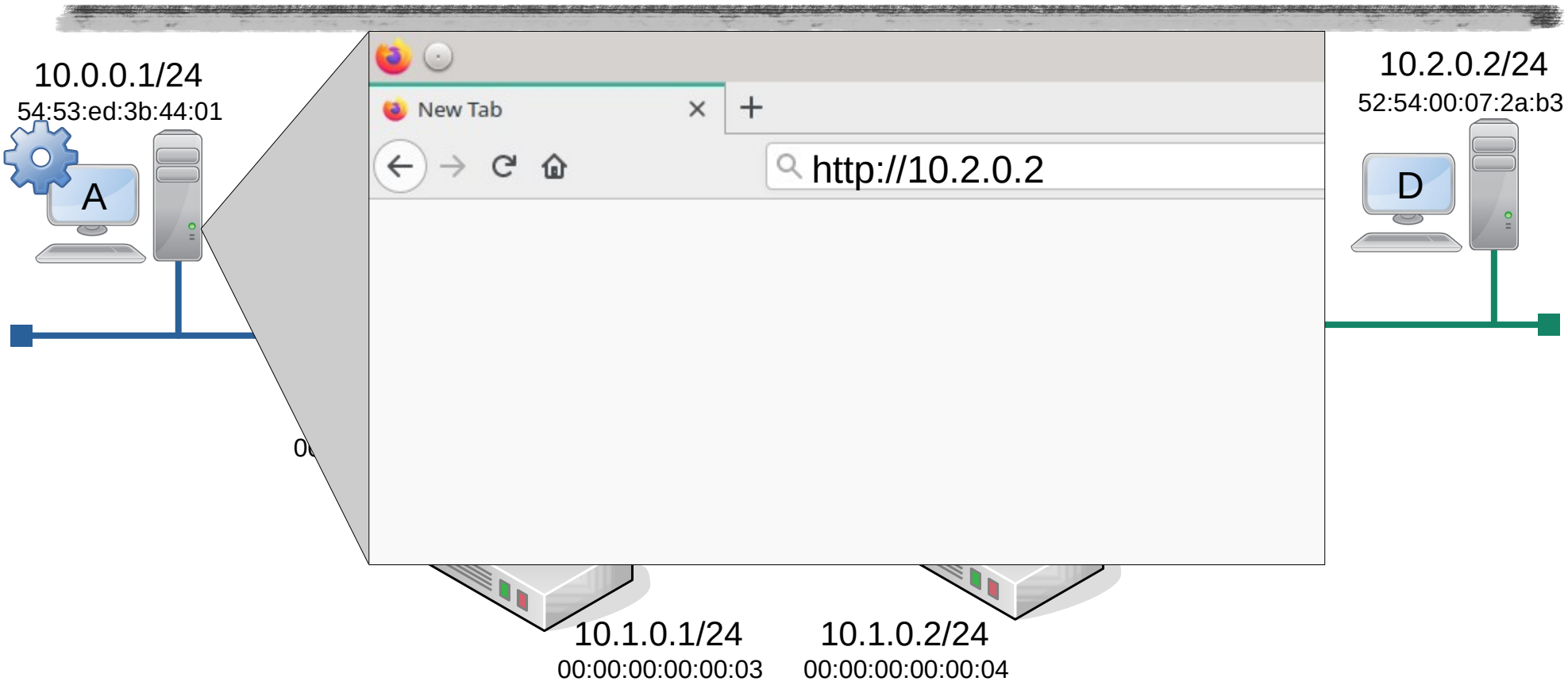
ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
Vou falar com D
B
C
D
10.0.0.3/24
00:00:00:00:00:02
10.2.0.3/24
00:00:00:00:00:05
R1
R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

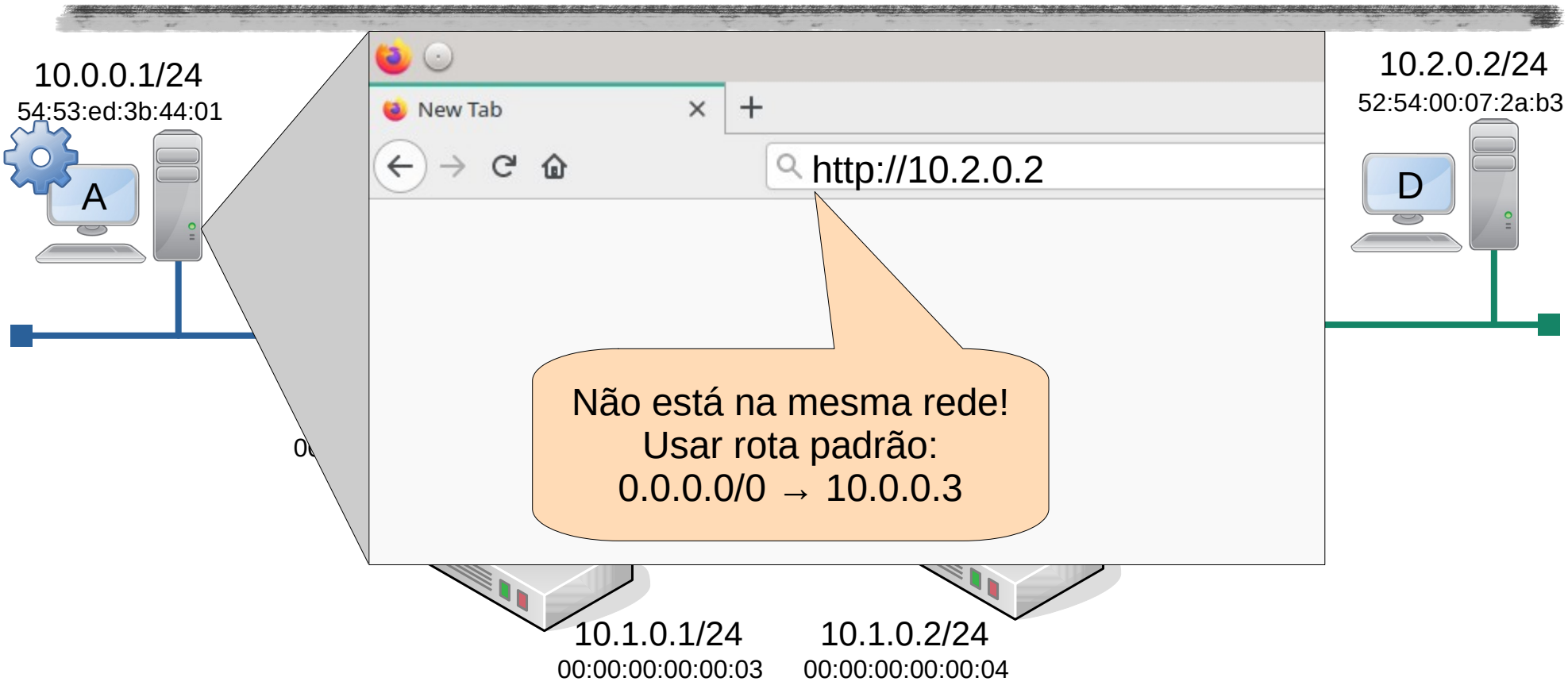
ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
Vou falar com D
B
C
D
Tabela ARP – host A
Tabela ARP – host D
.0.3/24
00:00:00:00:00:02
10.2.0.3/24
00:00:00:00:00:05
R1
R2
Tabela ARP – R1
Tabela ARP – R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

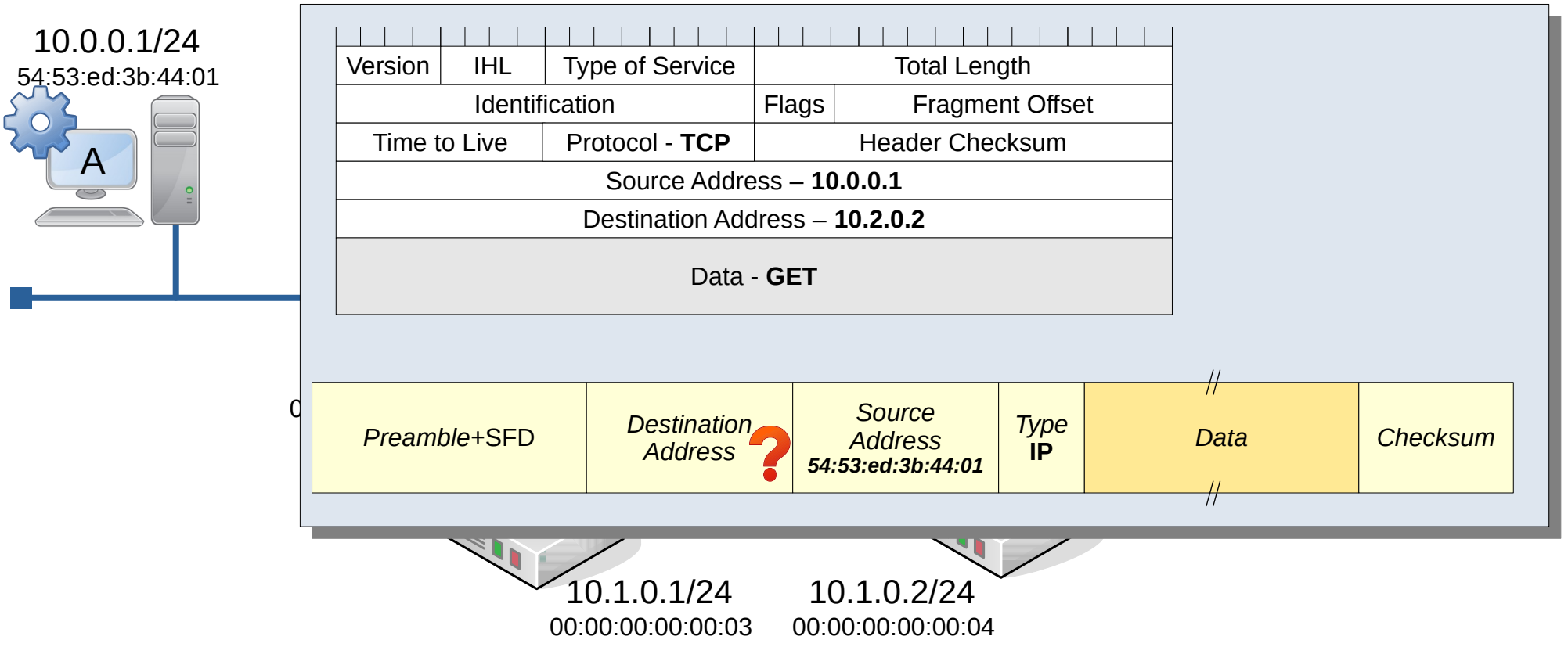
ARP


10.0.0.1/24
54:53:ed:3b:44:01
A
New Tab
http://10.2.0.2
10.2.0.2/24
52:54:00:07:2a:b3
D
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

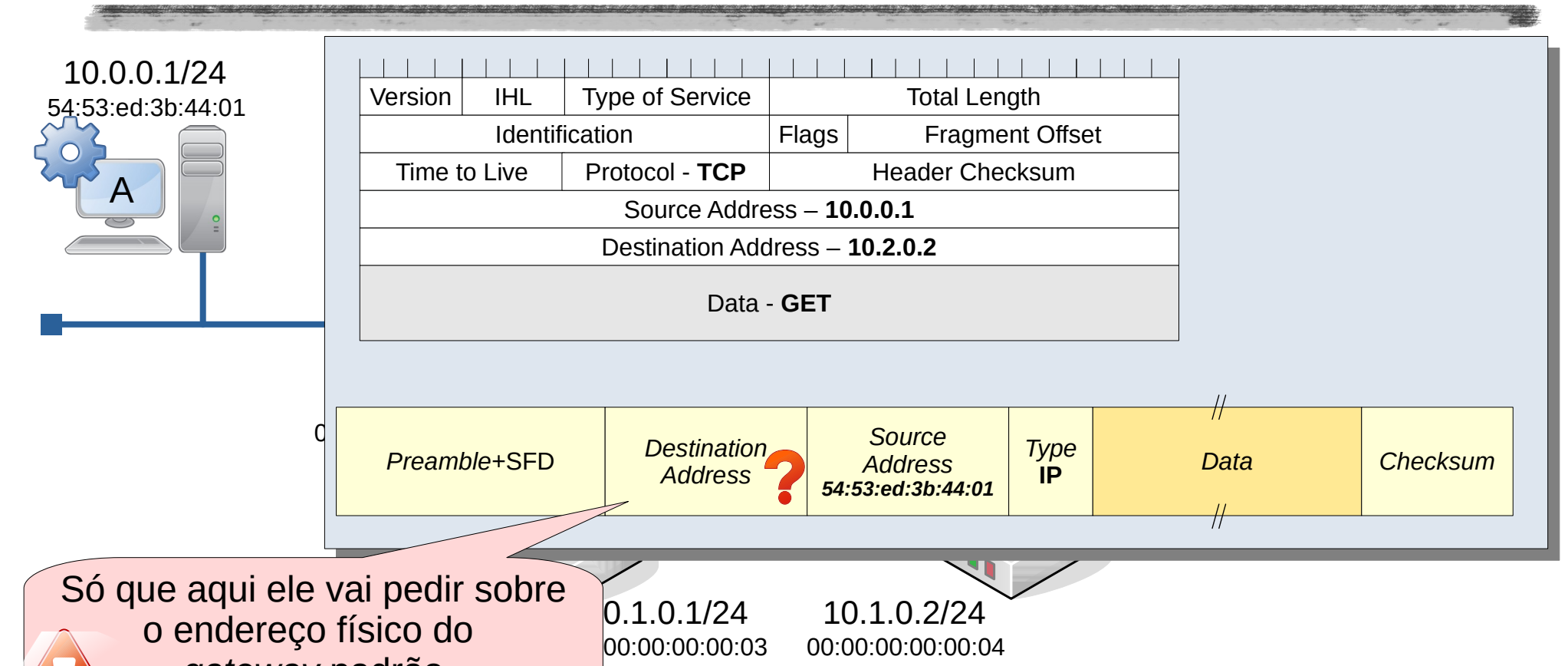
ARP


10.0.0.1/24
54:53:ed:3b:44:01
A
New Tab
http://10.2.0.2
10.2.0.2/24
52:54:00:07:2a:b3
D
Não está na mesma rede!
Usar rota padrão:
0.0.0.0/0 → 10.0.0.3
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

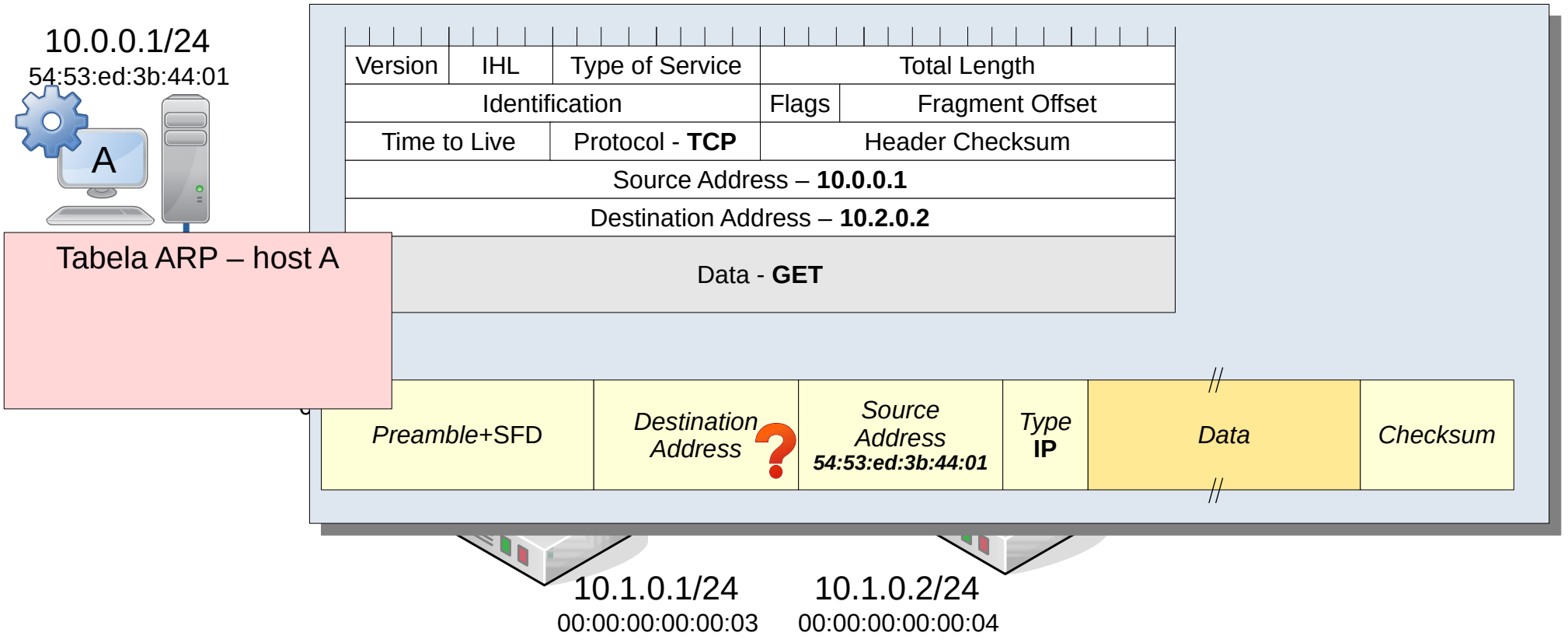
ARP


10.0.0.1/24
54:53:ed:3b:44:01
A
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - TCP
Header Checksum
Source Address – 10.0.0.1
Destination Address – 10.2.0.2
Data - GET
Preamble+SFD
Destination Address
Source Address
54:53:ed:3b:44:01
Type
IP
Data
Checksum
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

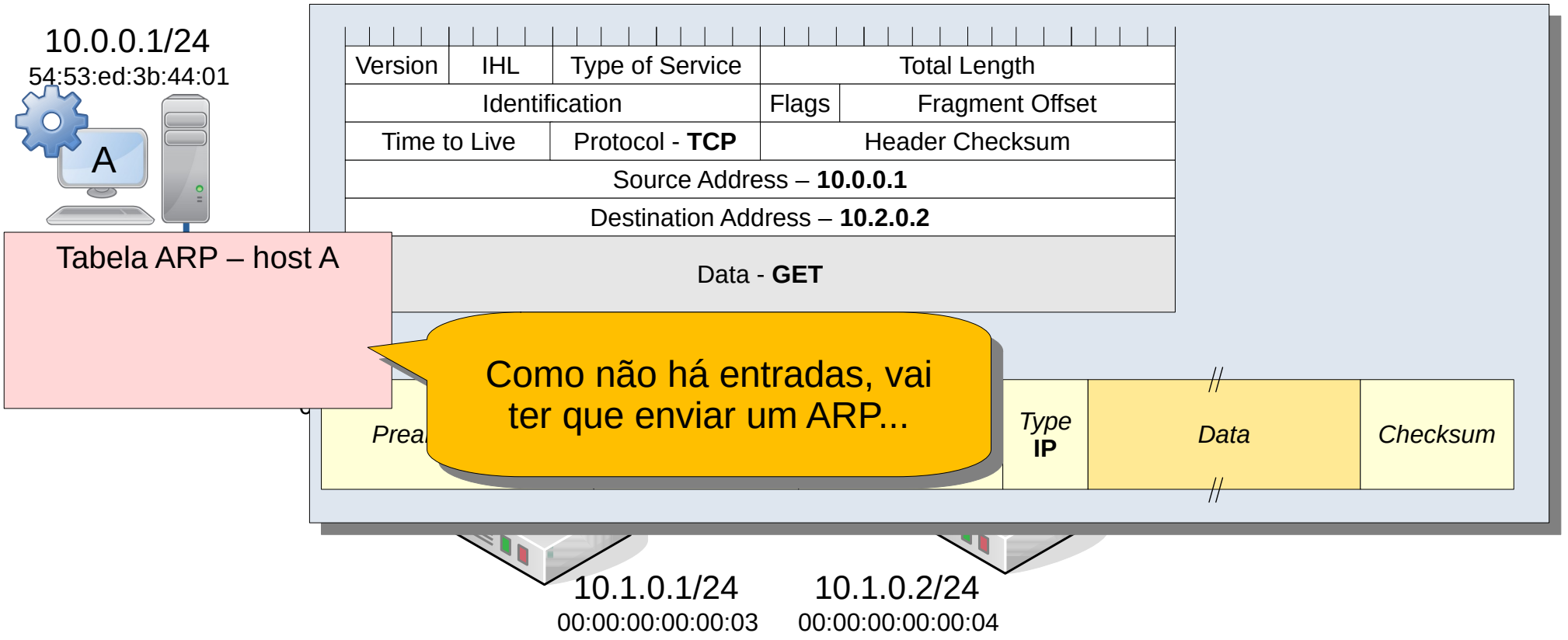
ARP


10.0.0.1/24
54:53:ed:3b:44:01
A
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - TCP
Header Checksum
Source Address – 10.0.0.1
Destination Address – 10.2.0.2
Data - GET
Preamble+SFD
Destination Address
Source Address
54:53:ed:3b:44:01
Type
IP
Data
Checksum
0.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04
Só que aqui ele vai pedir sobre o endereço físico do gateway padrão (0.0.0.0/0 → 10.0.0.3)

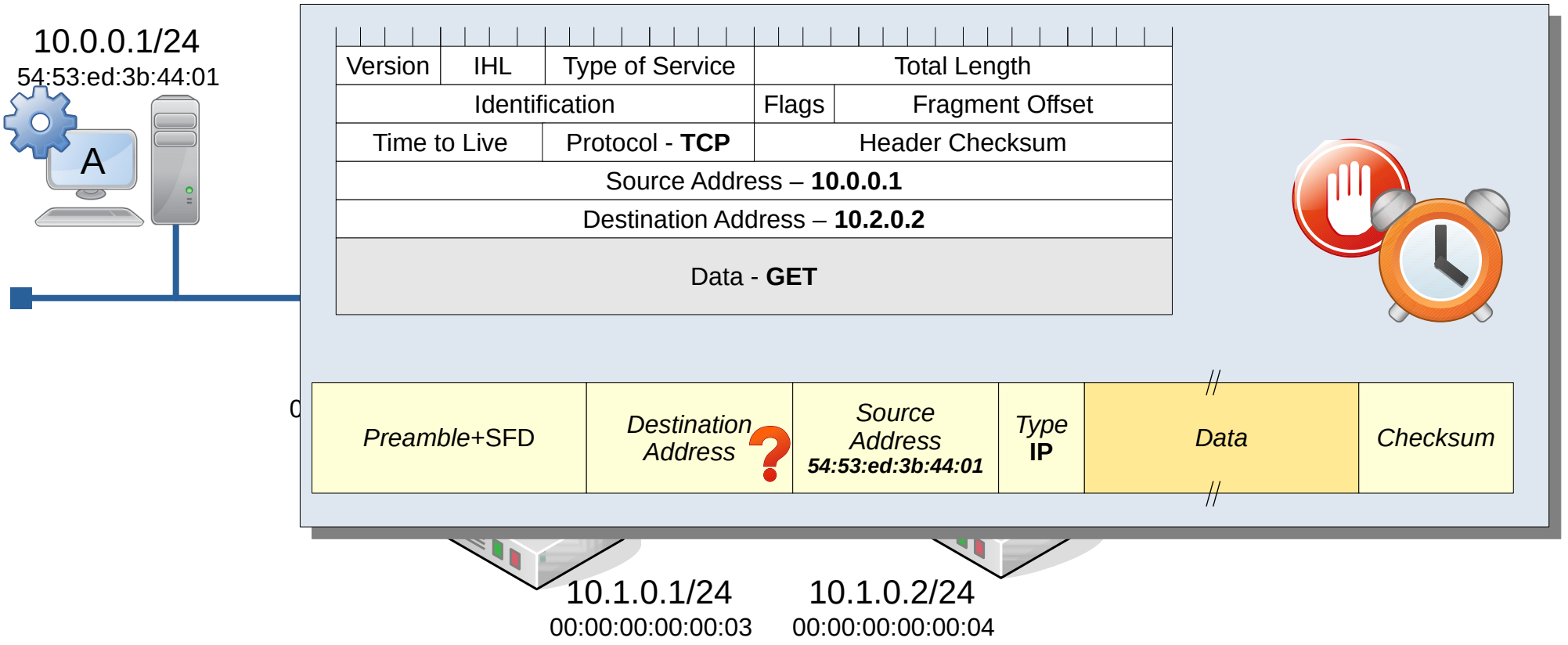
ARP


10.0.0.1/24
54:53:ed:3b:44:01
A
Tabela ARP – host A
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - TCP
Header Checksum
Source Address – 10.0.0.1
Destination Address – 10.2.0.2
Data - GET
Preamble+SFD
Destination Address
Source Address
54:53:ed:3b:44:01
Type
IP
Data
Checksum
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

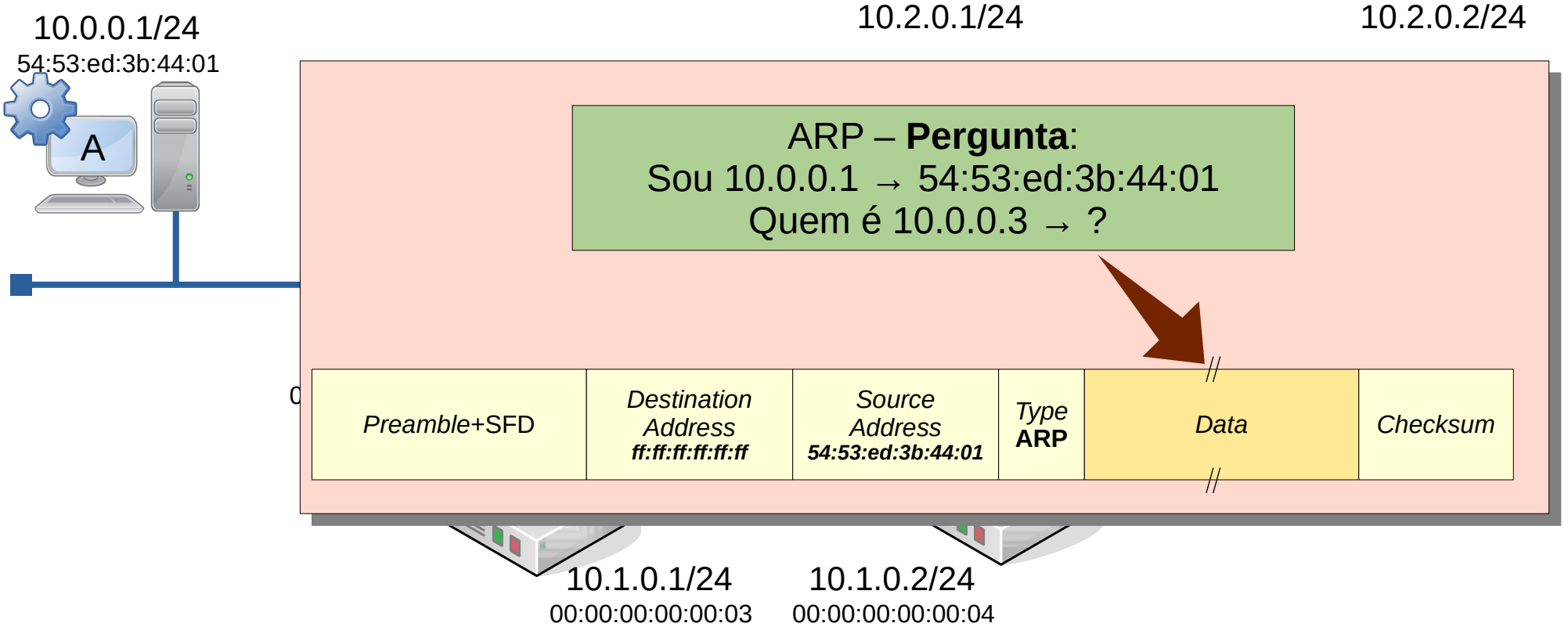
ARP


10.0.0.1/24
54:53:ed:3b:44:01
A
Tabela ARP – host A
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - TCP
Header Checksum
Source Address – 10.0.0.1
Destination Address – 10.2.0.2
Data - GET
Como não há entradas, vai ter que enviar um ARP...
Type
IP
Data
Checksum
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

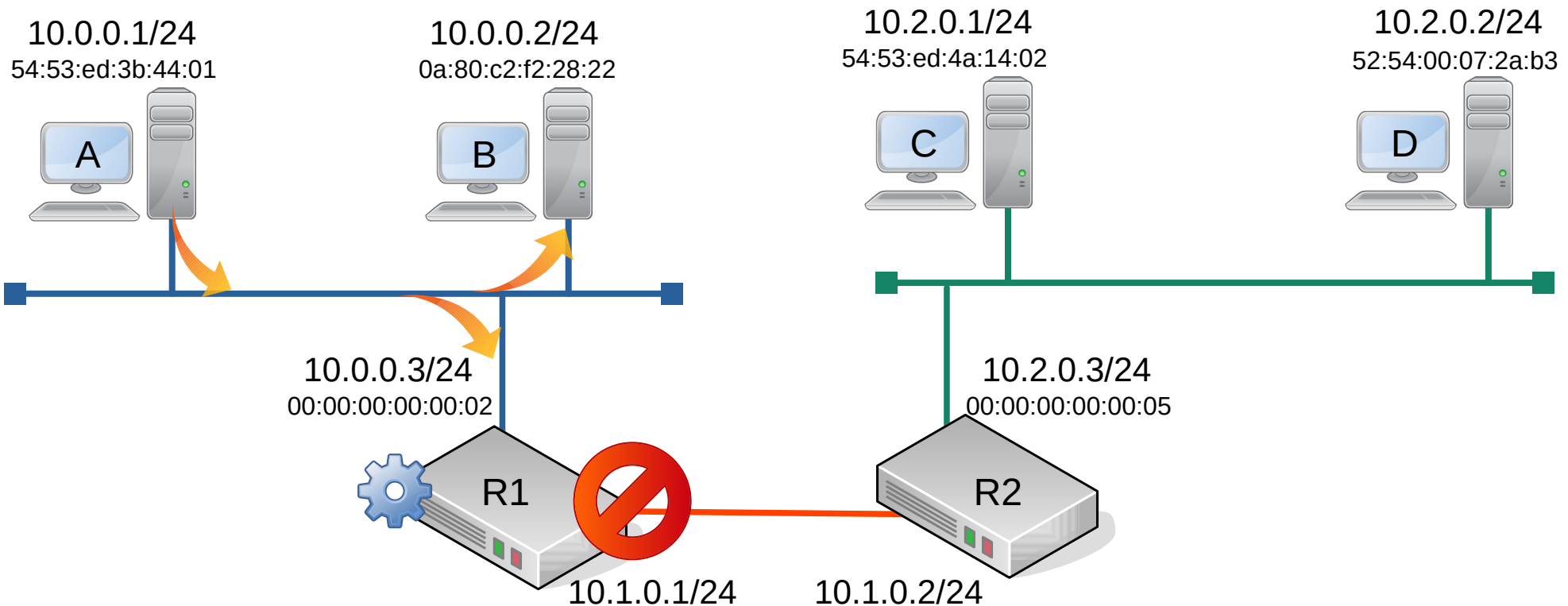
ARP


10.0.0.1/24
54:53:ed:3b:44:01
A
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - TCP
Header Checksum
Source Address – 10.0.0.1
Destination Address – 10.2.0.2
Data - GET
Preamble+SFD
Destination Address
Source Address
54:53:ed:3b:44:01
Type
IP
Data
Checksum
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

ARP

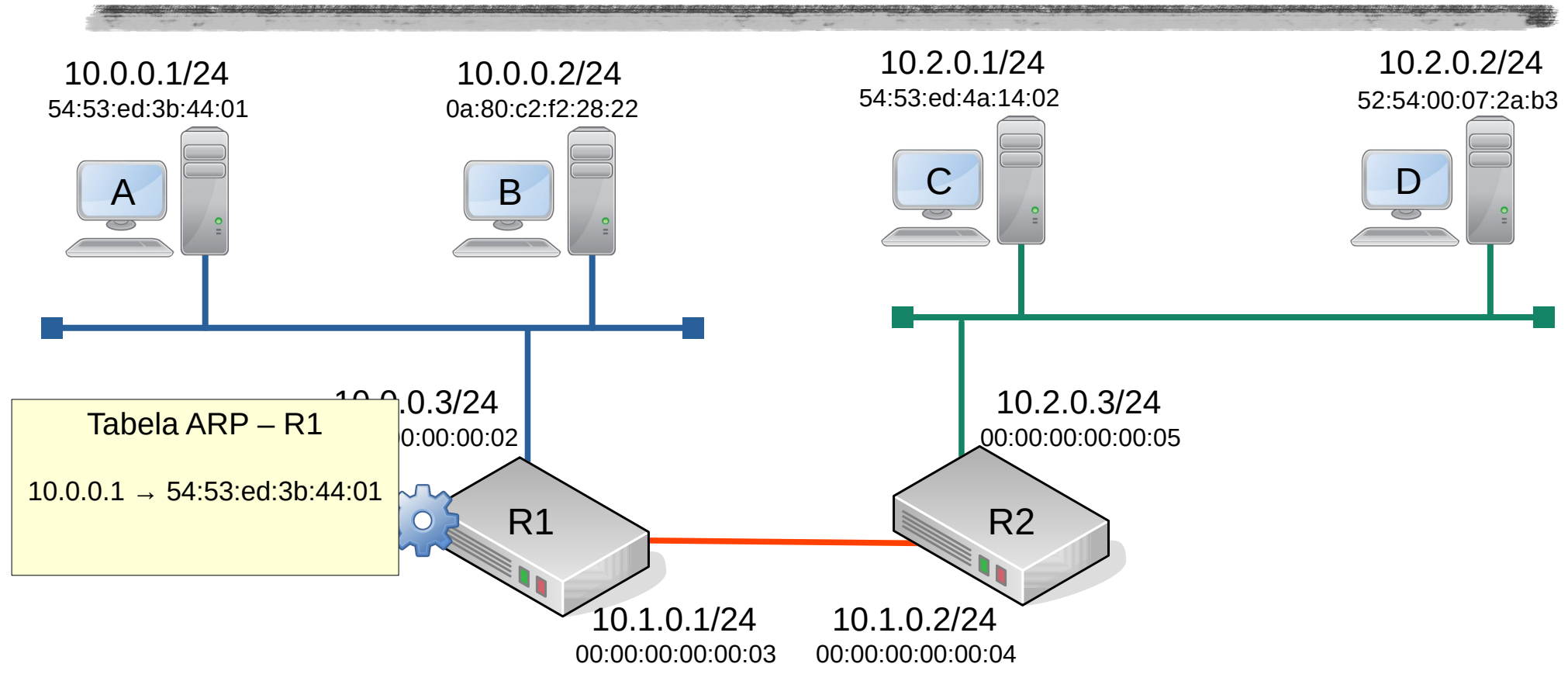

10.0.0.1/24
54:53:ed:3b:44:01
A
10.2.0.1/24
10.2.0.2/24
ARP – **Pergunta**:
Sou 10.0.0.1 → 54:53:ed:3b:44:01
Quem é 10.0.0.3 → ?
Preamble+SFD
Destination Address
ff:ff:ff:ff:ff:ff
Source Address
54:53:ed:3b:44:01
Type
ARP
Data
Checksum
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

ARP

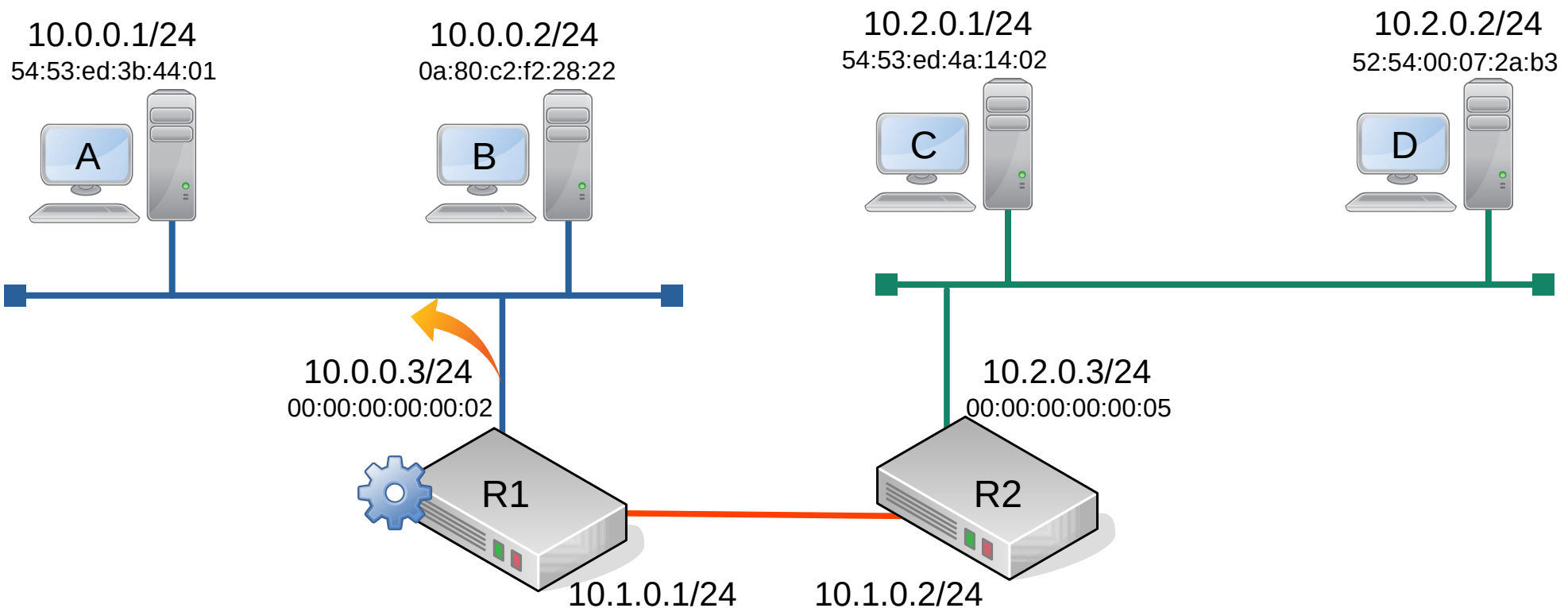


Preamble+SFD	*Destination Address* ***ff:ff:ff:ff:ff:ff***	*Source Address* ***54:53:ed:3b:44:01***	*Type* **ARP**	*Quem é 10.0.0.3?*	*Checksum*

ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
10.2.0.3/24
00:00:00:00:00:05
Tabela ARP – R1
10.0.0.1 → 54:53:ed:3b:44:01
R1
R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

ARP



Preamble+SFD	*Destination Address* ***54:53:ed:3b:44:01***	*Source Address* ***00:00:00:00:00:02***	*Type* **ARP**	*Resposta: 10.0.0.3 é 00:00:00:00:00:02*	*Checksum*

ARP

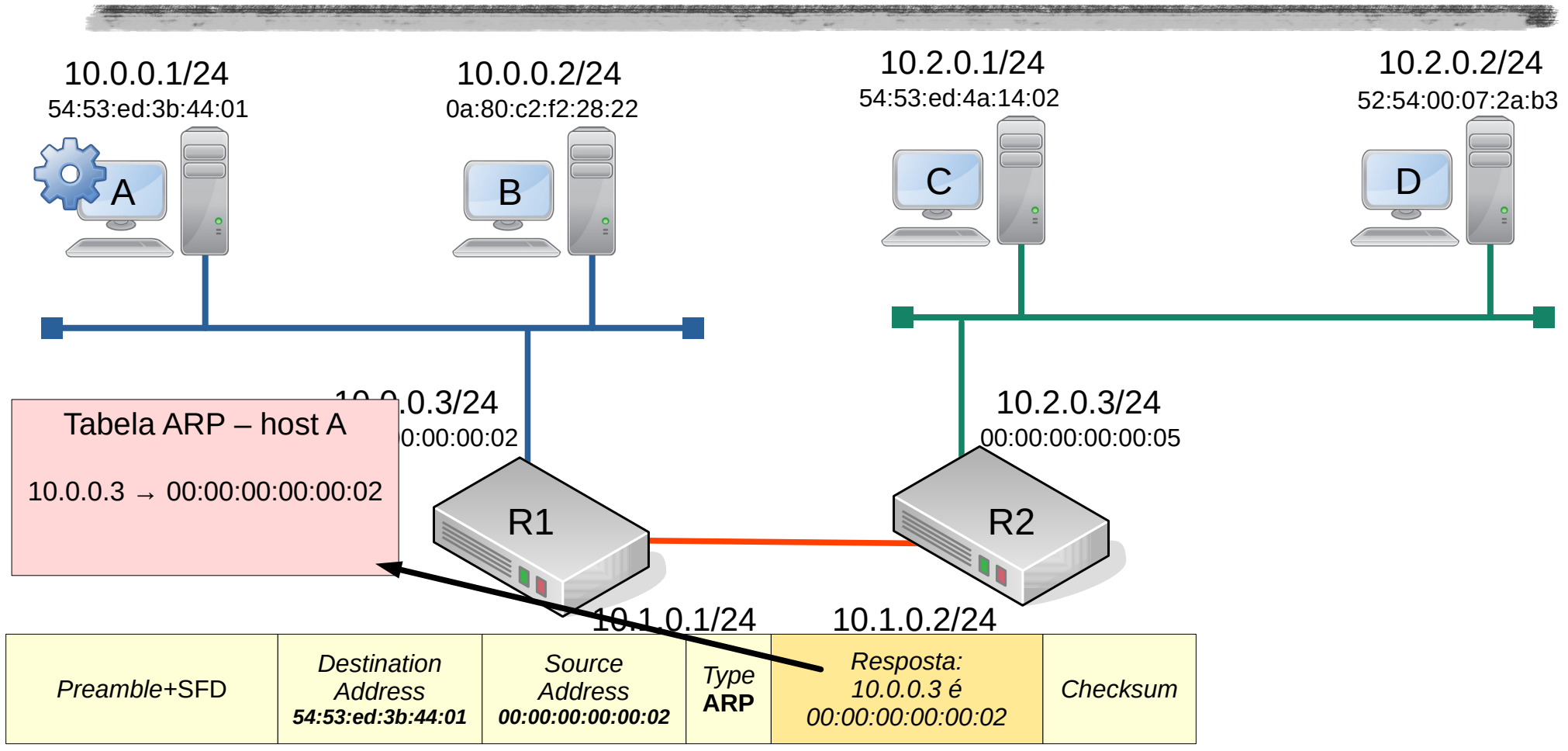
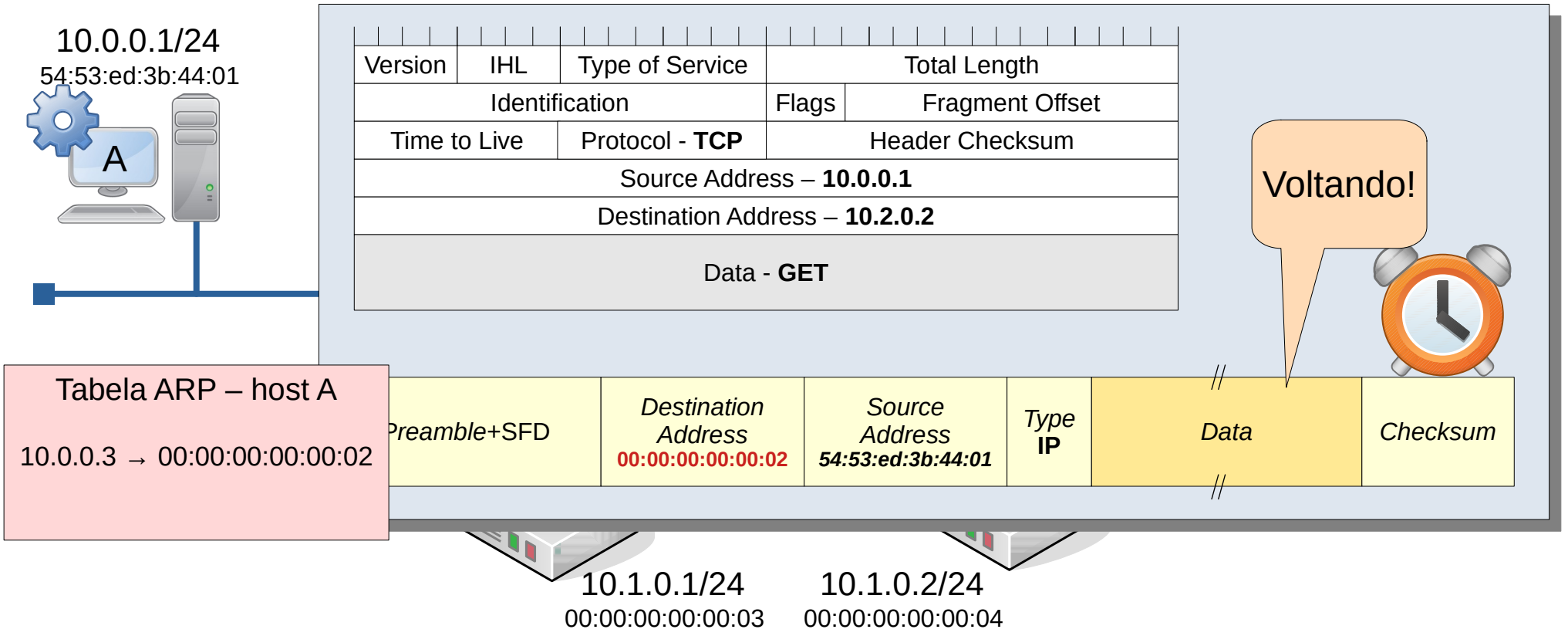


Tabela ARP – host A

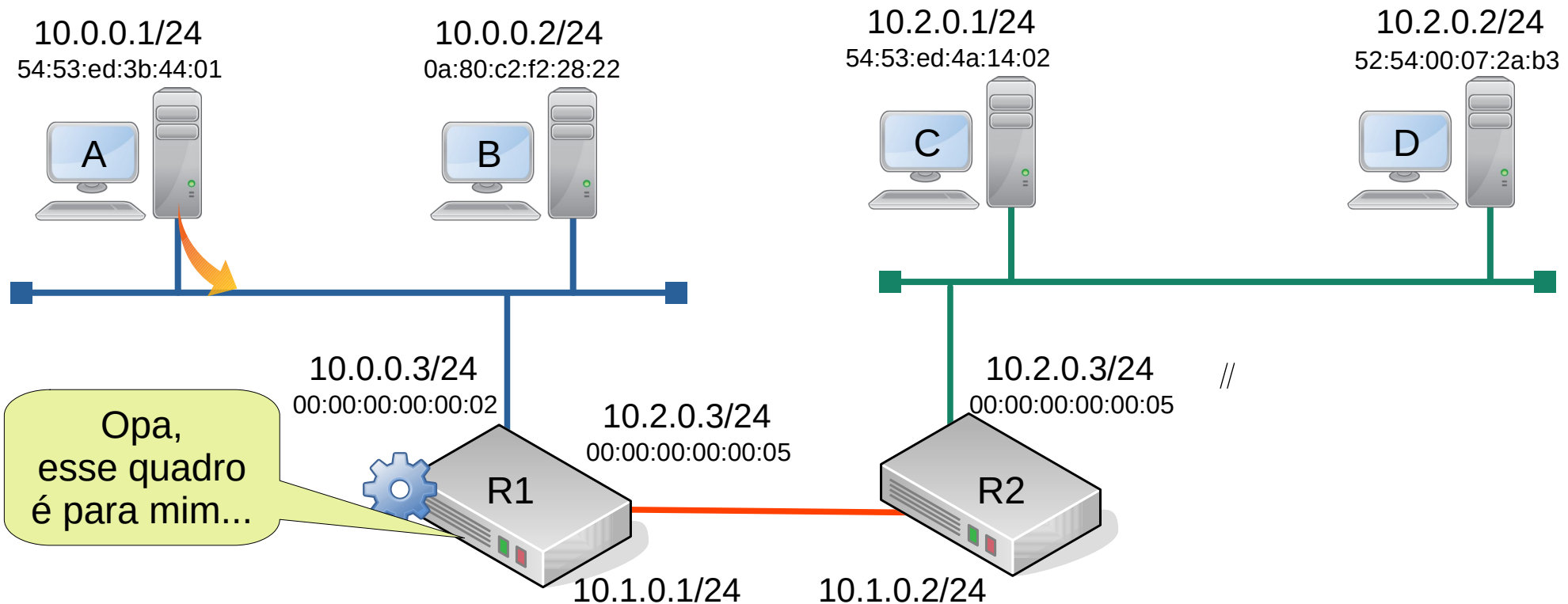
10.0.0.3 → 00:00:00:00:00:02

Preamble+SFD	*Destination Address* ***54:53:ed:3b:44:01***	*Source Address* ***00:00:00:00:00:02***	*Type* **ARP**	*Resposta: 10.0.0.3 é 00:00:00:00:00:02*	*Checksum*

ARP

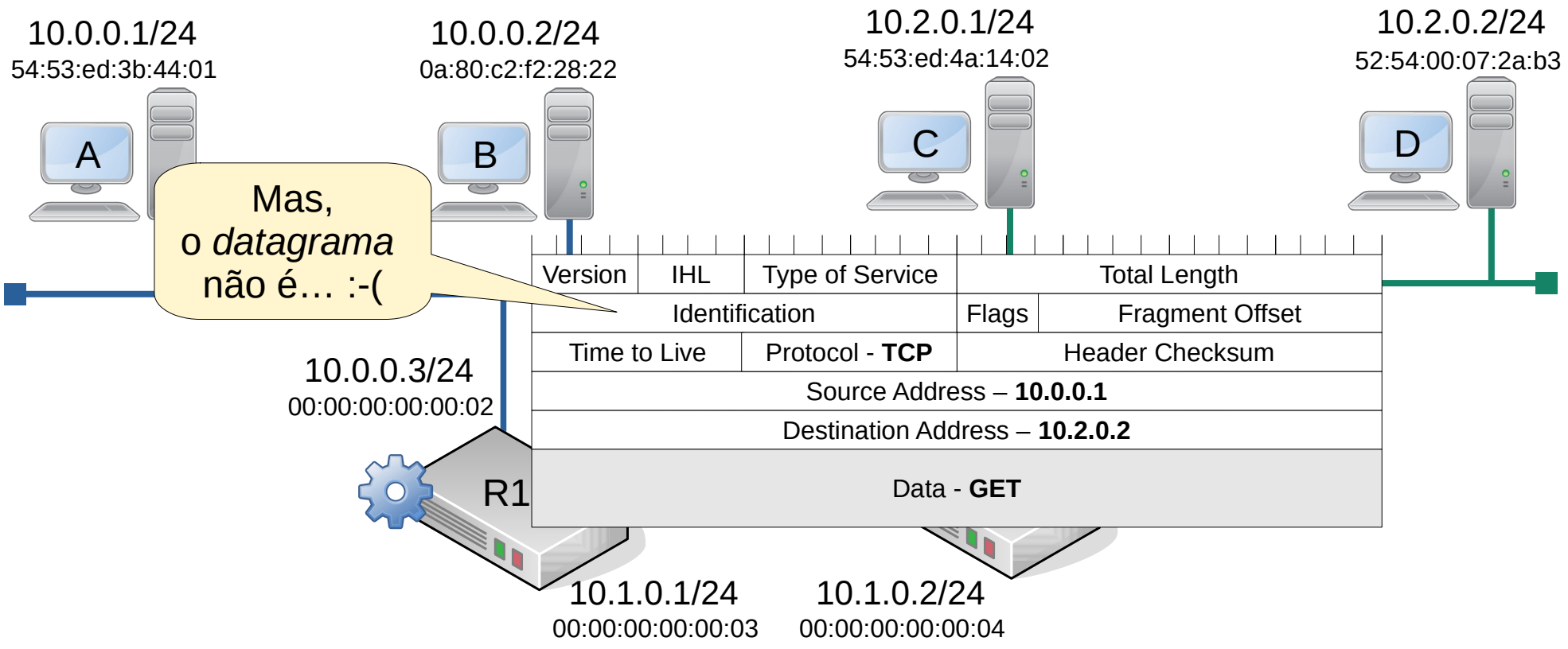

10.0.0.1/24
54:53:ed:3b:44:01
A
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - TCP
Header Checksum
Source Address – 10.0.0.1
Destination Address – 10.2.0.2
Data - GET
Voltando!
Tabela ARP – host A
10.0.0.3 → 00:00:00:00:00:02
Preamble+SFD
Destination Address
00:00:00:00:00:02
Source Address
54:53:ed:3b:44:01
Type
IP
Data
Checksum
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

ARP

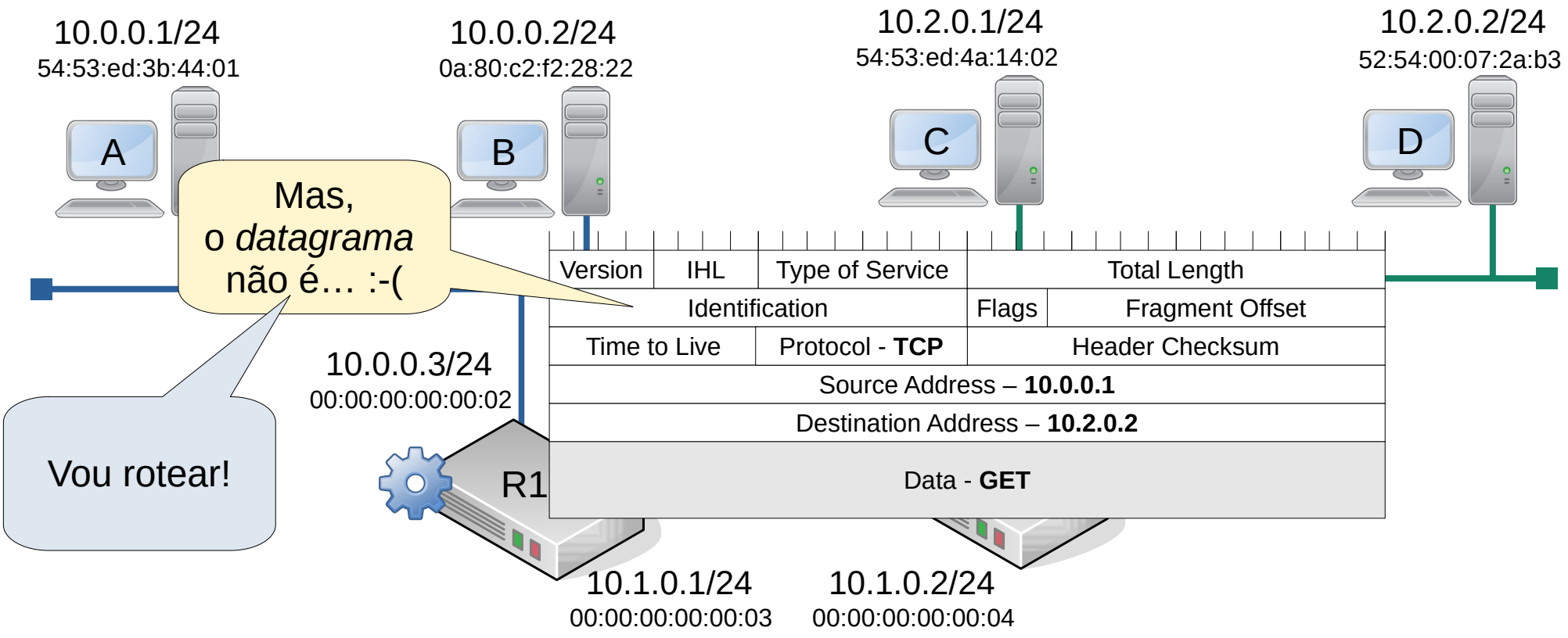


Preamble+SFD	*Destination Address* **00:00:00:00:00:02**	*Source Address* ***54:53:ed:3b:44:01***	*Type* **IP**	*Data*	*Checksum*

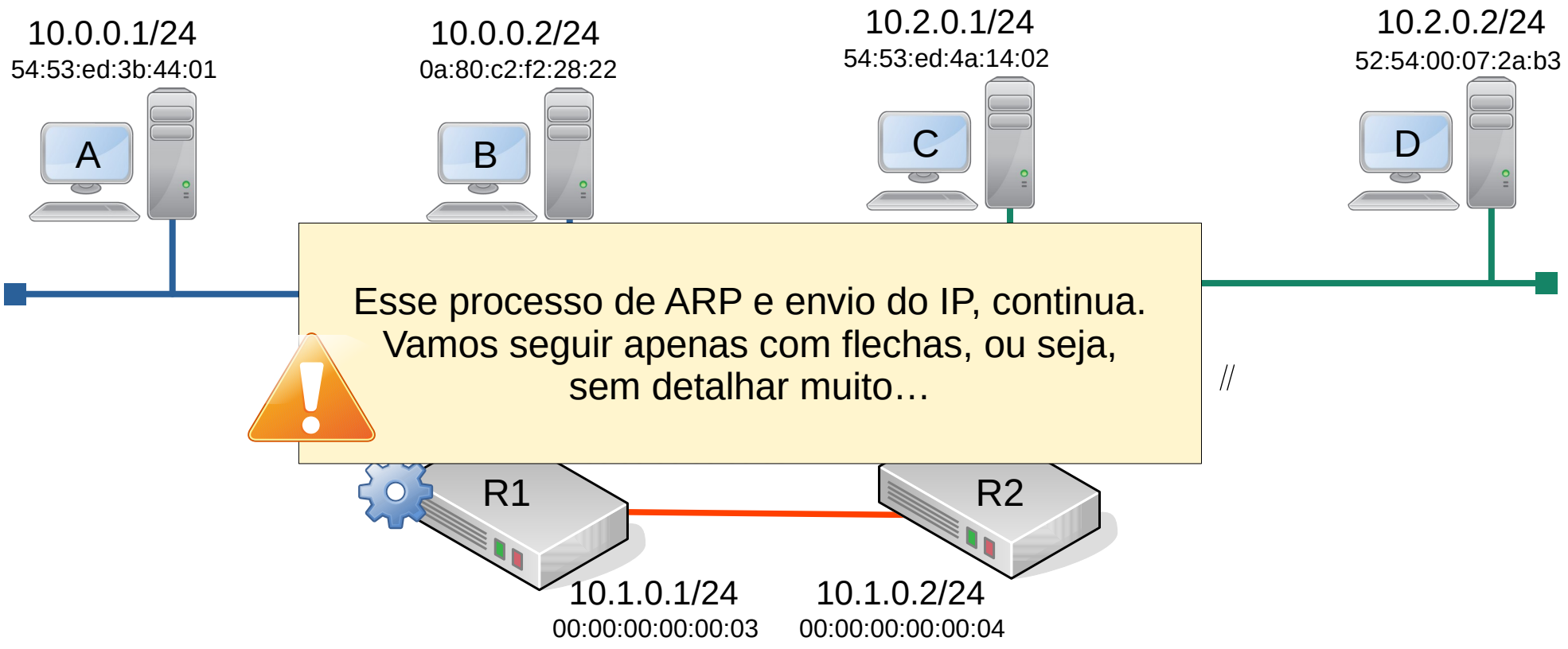
ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
Mas,
o *datagrama*
não é… :-(
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - **TCP**
Header Checksum
Source Address – **10.0.0.1**
Destination Address – **10.2.0.2**
Data - **GET**
10.0.0.3/24
00:00:00:00:00:02
R1
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

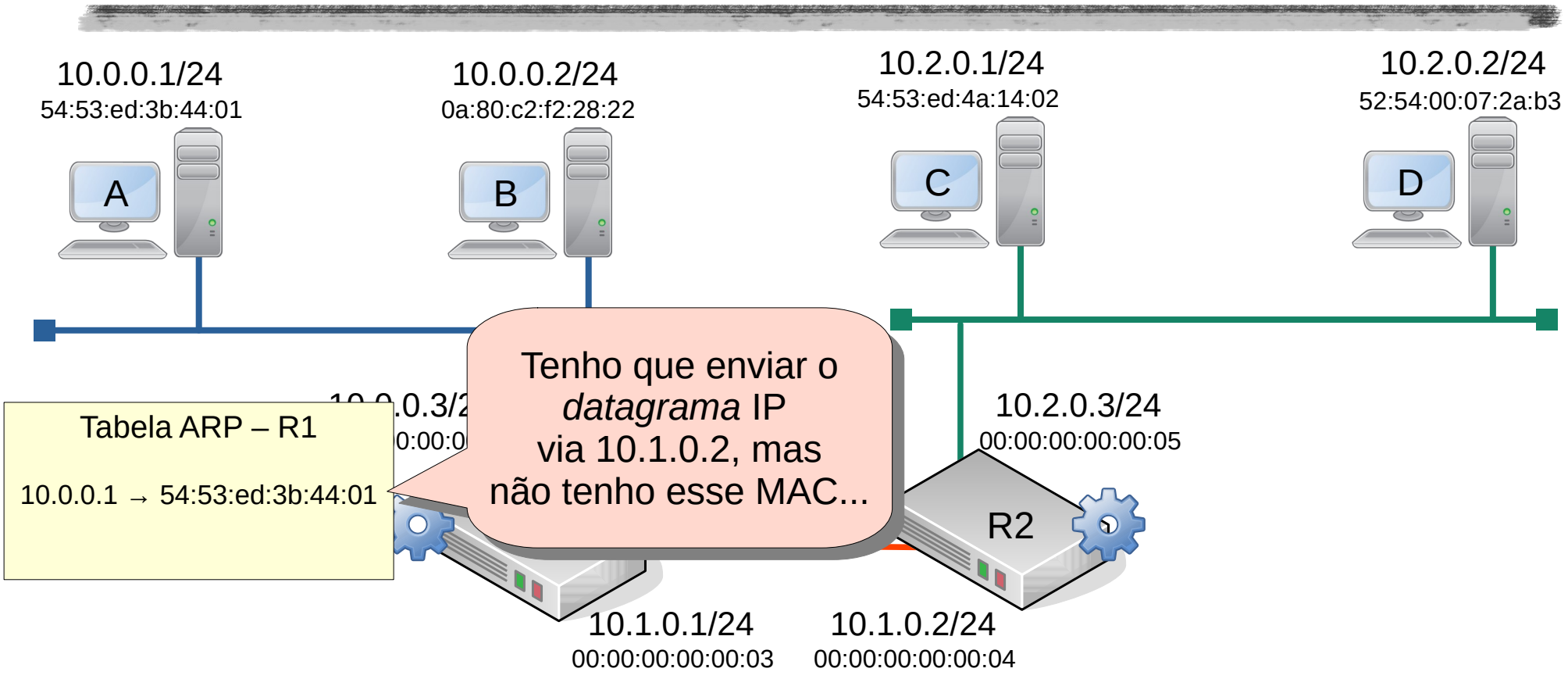
ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
Mas,
o *datagrama*
não é… :-(
Vou rotear!
10.0.0.3/24
00:00:00:00:00:02
R1
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol - **TCP**
Header Checksum
Source Address – **10.0.0.1**
Destination Address – **10.2.0.2**
Data - **GET**

ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
Esse processo de ARP e envio do IP, continua.
Vamos seguir apenas com flechas, ou seja,
sem detalhar muito…
//
R1
R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
Tenho que enviar o
datagrama IP
via 10.1.0.2, mas
não tenho esse MAC...
Tabela ARP – R1
10.0.0.1 → 54:53:ed:3b:44:01
10.2.0.3/24
00:00:00:00:00:05
R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

ARP

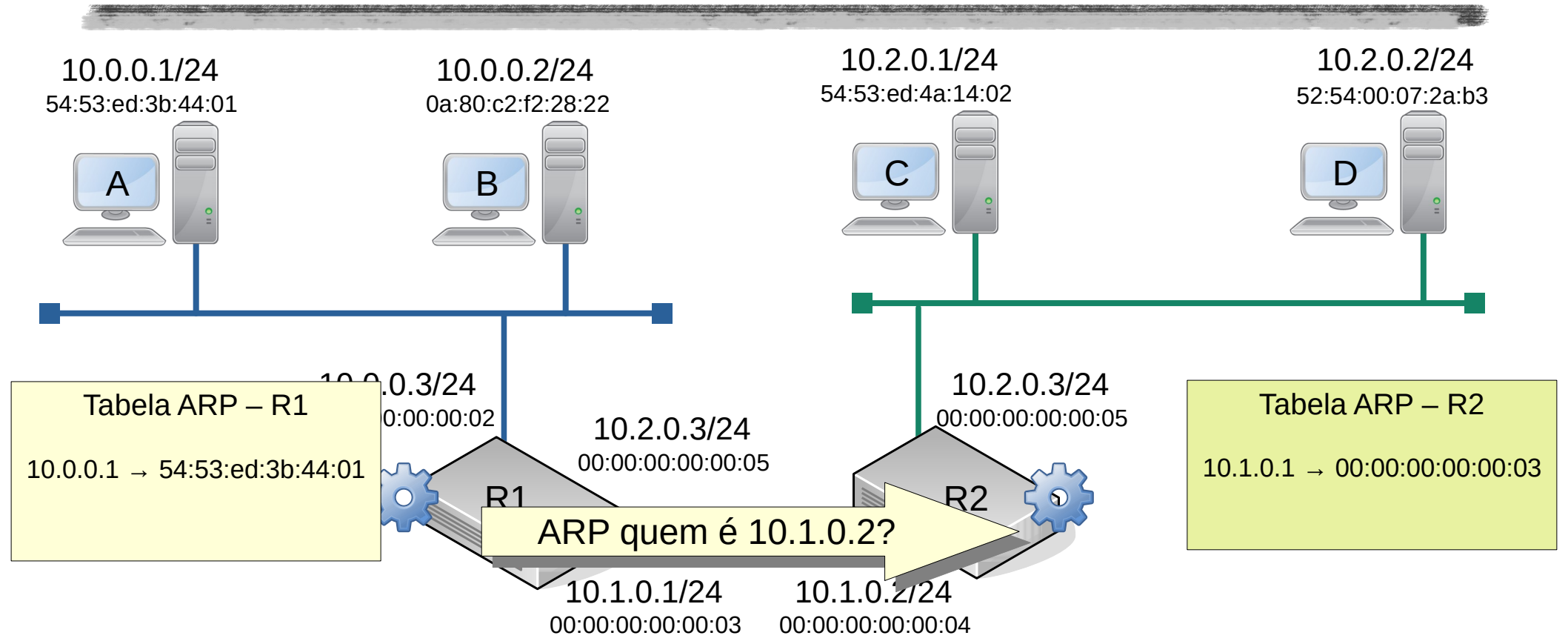


Tabela ARP – R1

10.0.0.1 → 54:53:ed:3b:44:01

Tabela ARP – R2

10.1.0.1 → 00:00:00:00:00:03

ARP

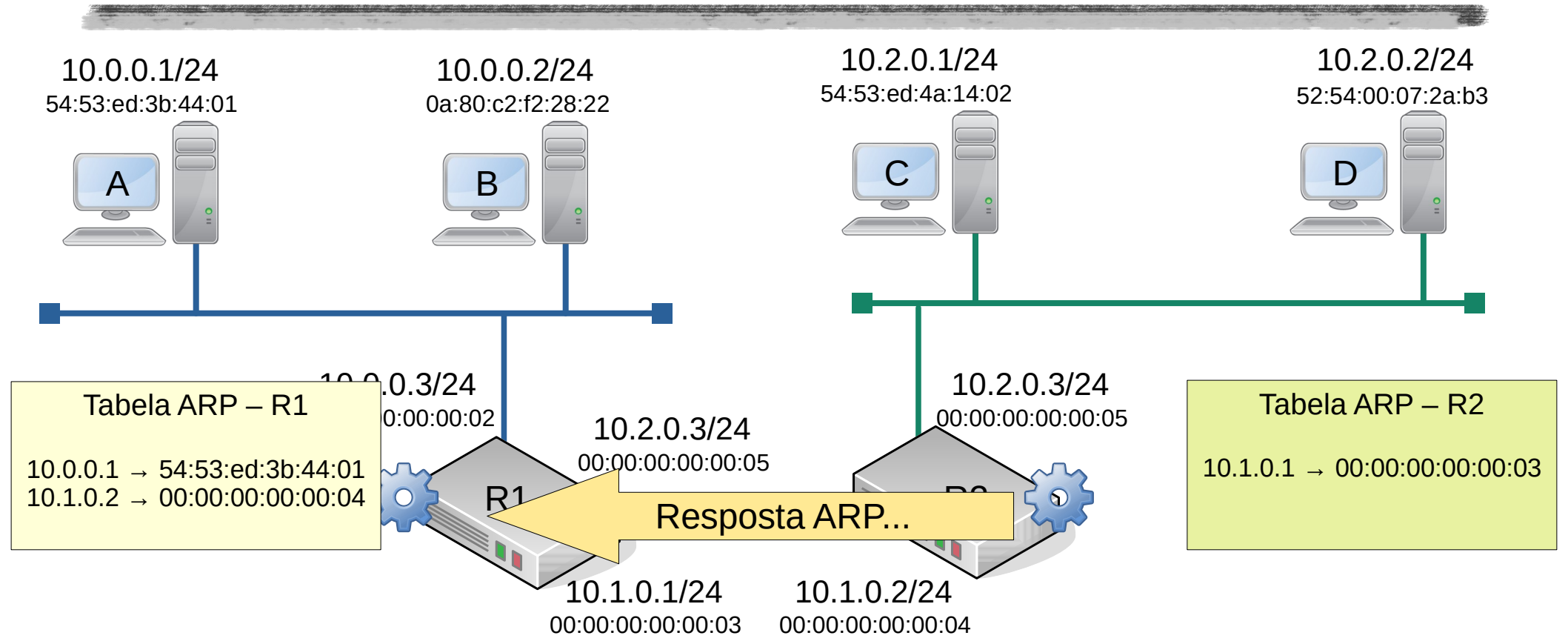


Tabela ARP – R1

10.0.0.1 → 54:53:ed:3b:44:01
10.1.0.2 → 00:00:00:00:00:04

Tabela ARP – R2

10.1.0.1 → 00:00:00:00:00:03

ARP

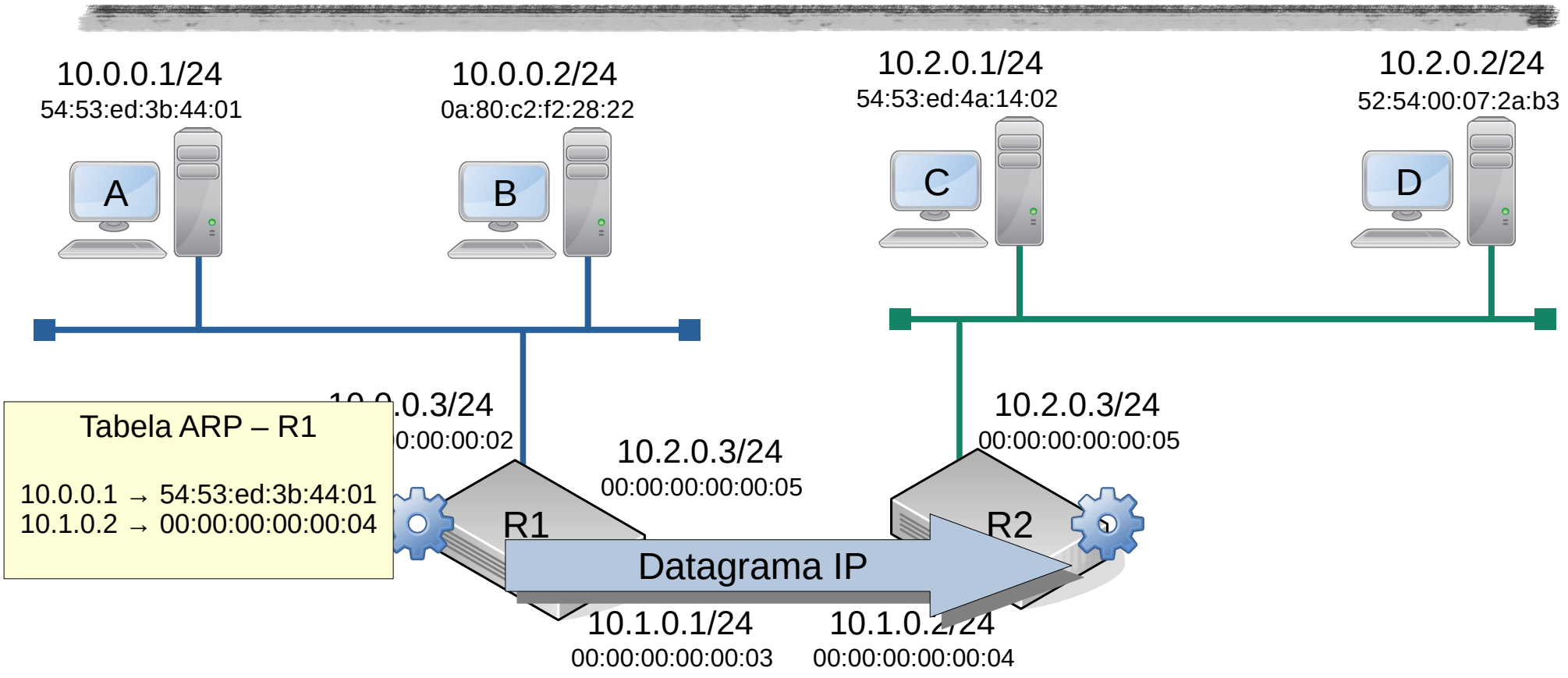
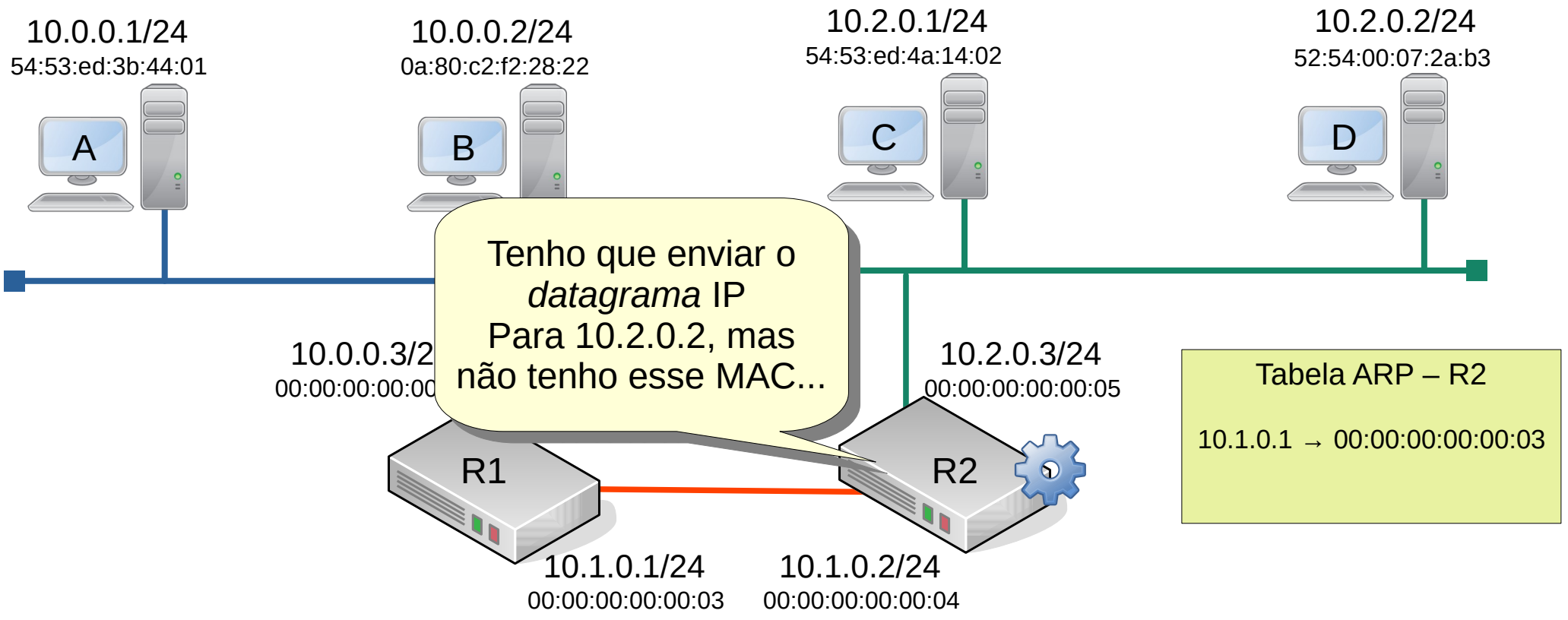


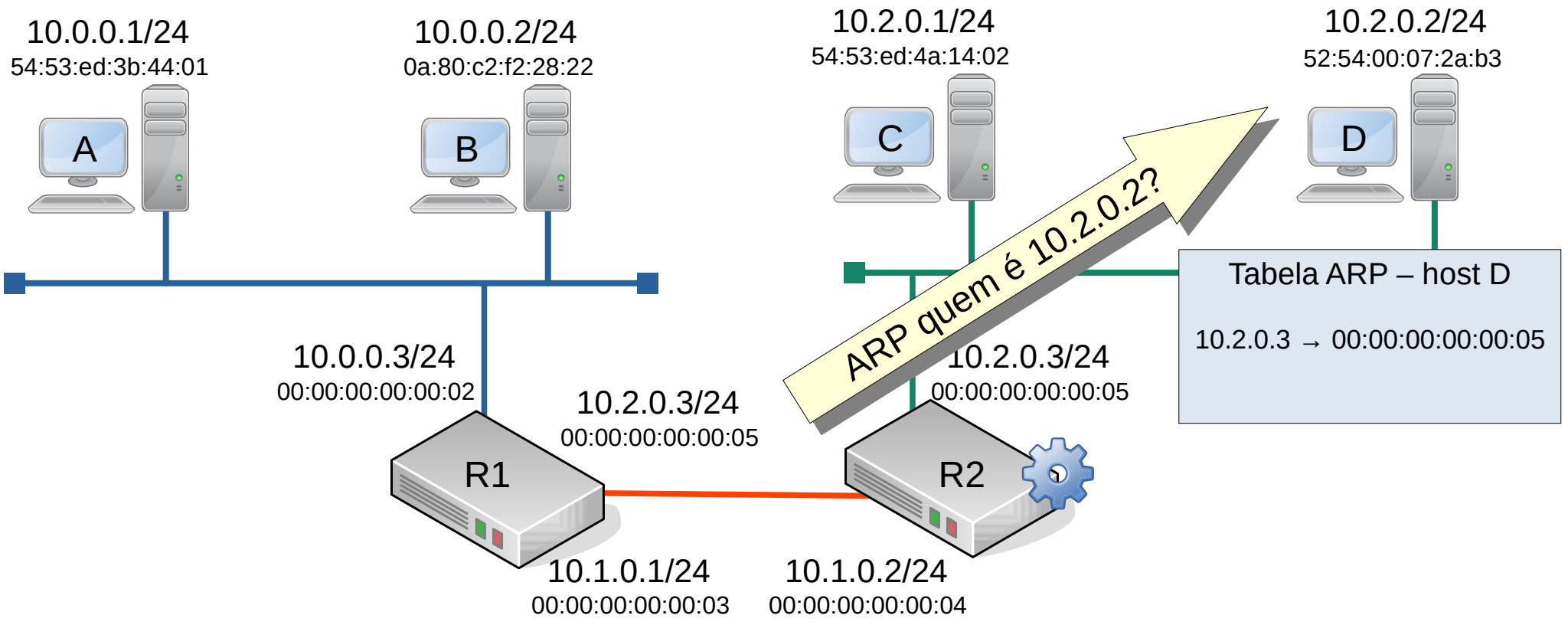
Tabela ARP – R1

10.0.0.1 → 54:53:ed:3b:44:01
10.1.0.2 → 00:00:00:00:00:04

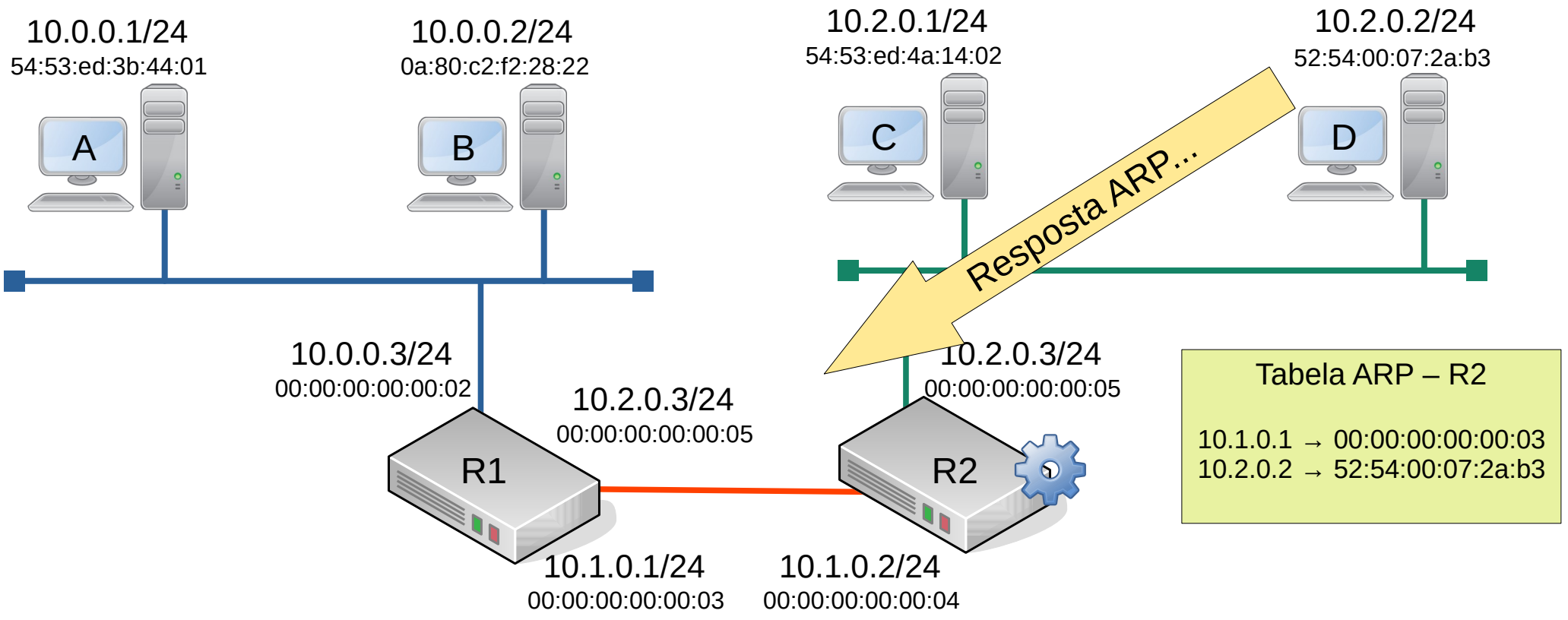
ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
Tenho que enviar o *datagrama* IP Para 10.2.0.2, mas não tenho esse MAC...
10.0.0.3/2
00:00:00:00:00
10.2.0.3/24
00:00:00:00:00:05
R1
R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04
Tabela ARP – R2
10.1.0.1 → 00:00:00:00:00:03

ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
ARP quem é 10.2.0.2?
Tabela ARP – host D
10.2.0.3 → 00:00:00:00:00:05
10.0.0.3/24
00:00:00:00:00:02
10.2.0.3/24
00:00:00:00:00:05
10.2.0.3/24
00:00:00:00:00:05
R1
R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04

ARP


10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:22
10.2.0.1/24
54:53:ed:4a:14:02
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
Resposta ARP...
10.0.0.3/24
00:00:00:00:00:02
10.2.0.3/24
00:00:00:00:00:05
10.2.0.3/24
00:00:00:00:00:05
R1
R2
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04
Tabela ARP – R2
10.1.0.1 → 00:00:00:00:00:03
10.2.0.2 → 52:54:00:07:2a:b3

ARP

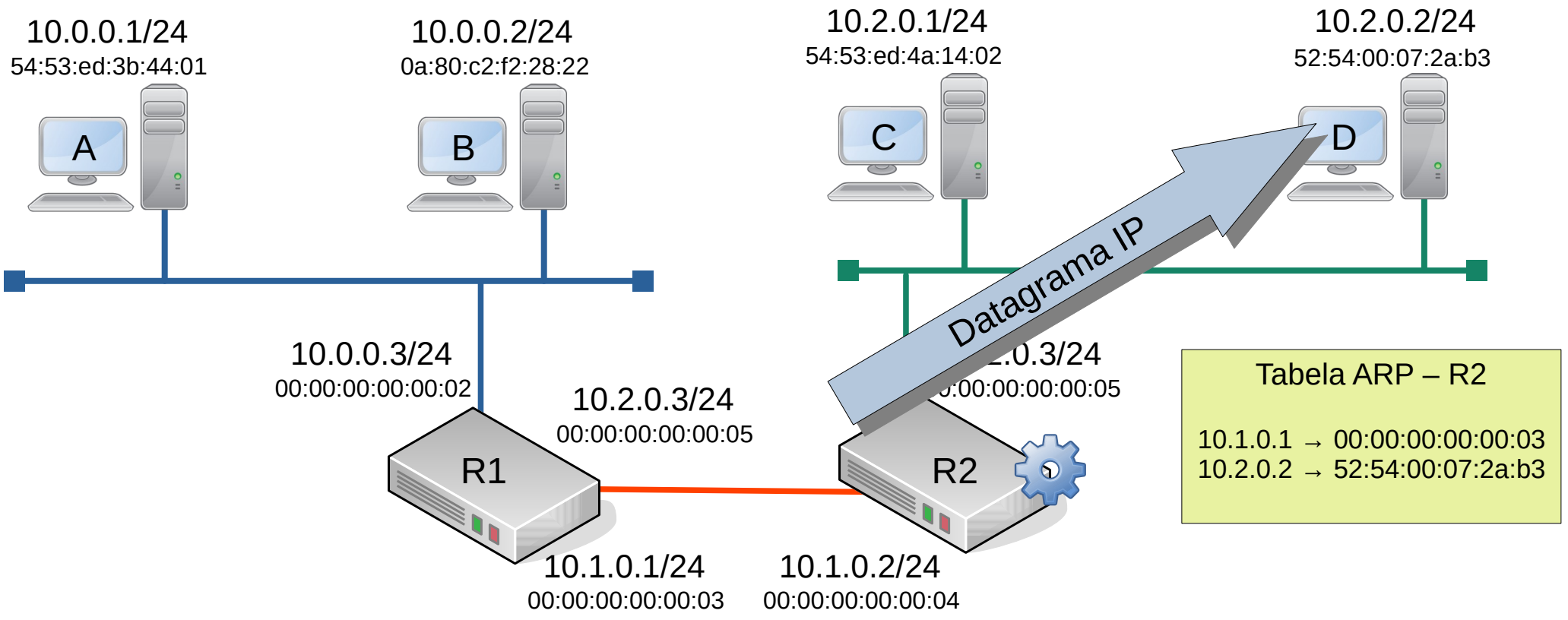
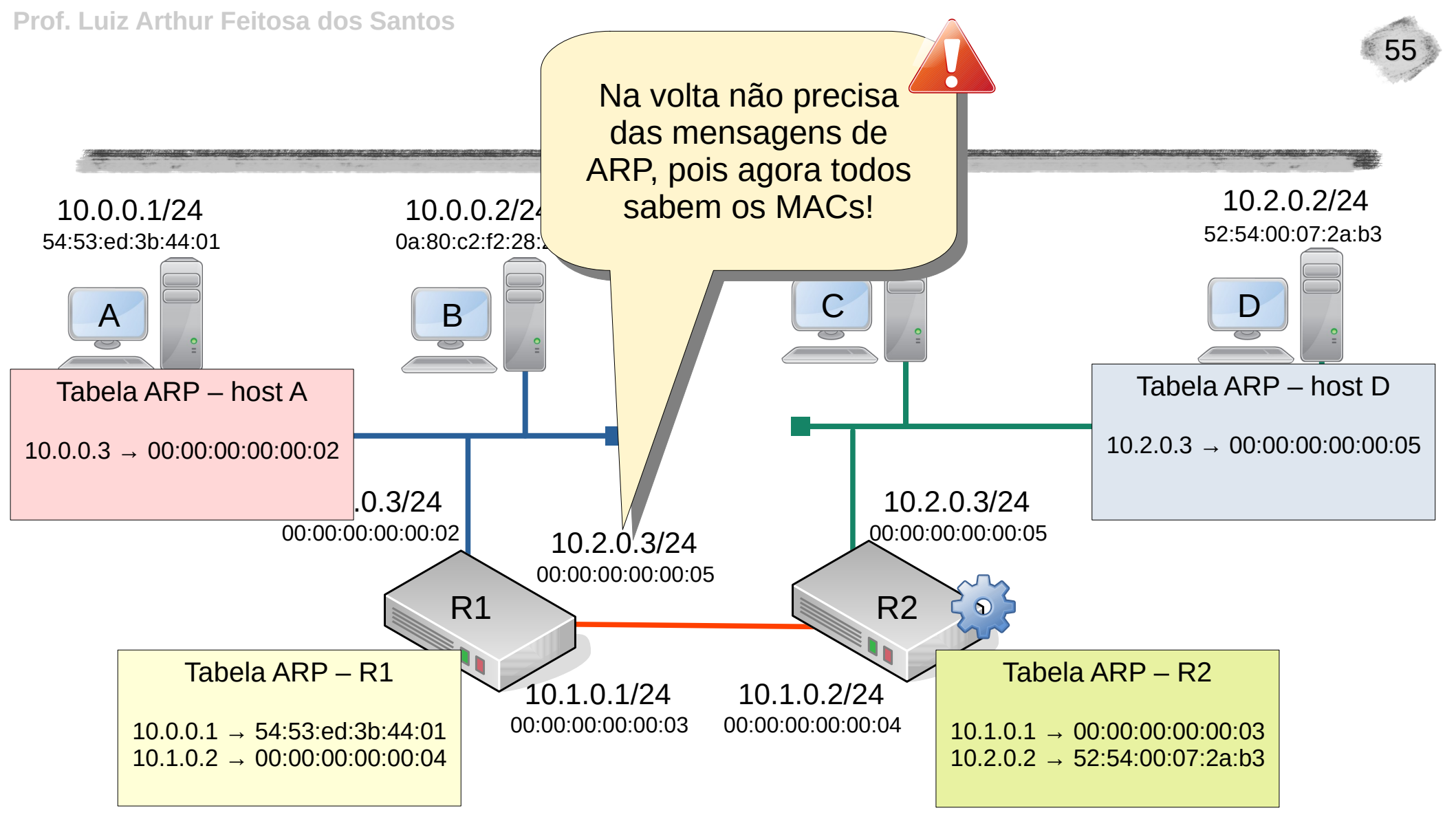


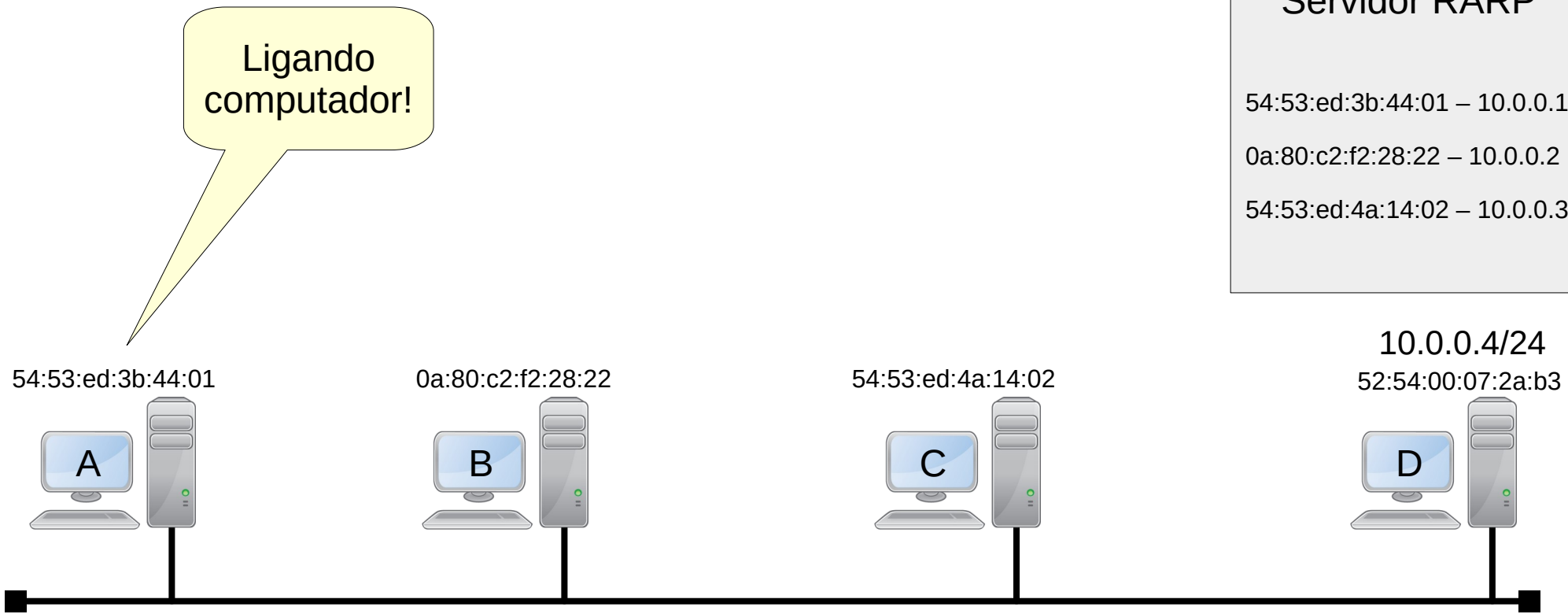
Tabela ARP – R2

10.1.0.1 → 00:00:00:00:00:03
10.2.0.2 → 52:54:00:07:2a:b3


Na volta não precisa das mensagens de ARP, pois agora todos sabem os MACs!
10.0.0.1/24
54:53:ed:3b:44:01
10.0.0.2/24
0a:80:c2:f2:28:
10.2.0.2/24
52:54:00:07:2a:b3
A
B
C
D
Tabela ARP – host A
10.0.0.3 → 00:00:00:00:00:02
Tabela ARP – host D
10.2.0.3 → 00:00:00:00:00:05
.0.3/24
00:00:00:00:00:02
10.2.0.3/24
00:00:00:00:00:05
10.2.0.3/24
00:00:00:00:00:05
R1
R2
Tabela ARP – R1
10.0.0.1 → 54:53:ed:3b:44:01
10.1.0.2 → 00:00:00:00:00:04
10.1.0.1/24
00:00:00:00:00:03
10.1.0.2/24
00:00:00:00:00:04
Tabela ARP – R2
10.1.0.1 → 00:00:00:00:00:03
10.2.0.2 → 52:54:00:07:2a:b3

ARP

RARP


Ligando computador!
Servidor RARP
54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
10.0.0.4/24
52:54:00:07:2a:b3
54:53:ed:3b:44:01
0a:80:c2:f2:28:22
54:53:ed:4a:14:02
A
B
C
D

ARP

RARP

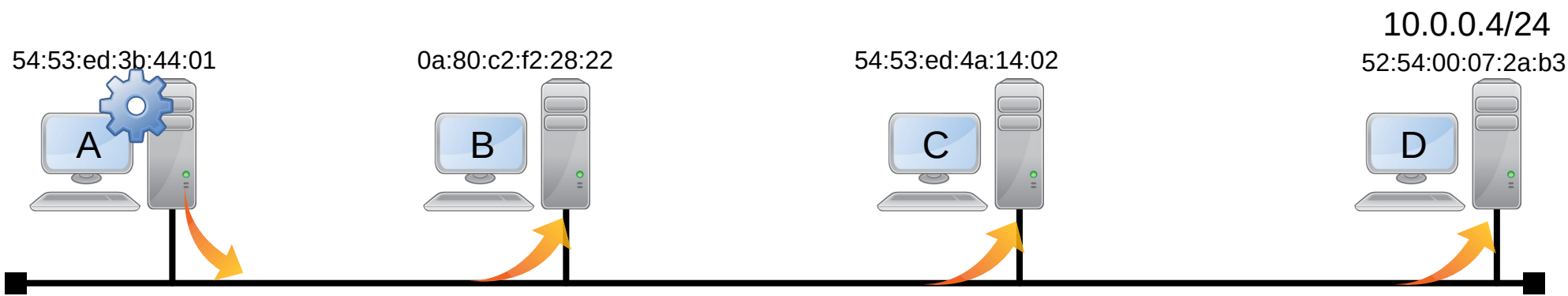
Servidor RARP

54:53:ed:3b:44:01 – 10.0.0.1

0a:80:c2:f2:28:22 – 10.0.0.2

54:53:ed:4a:14:02 – 10.0.0.3

Pergunta RARP
Sou 54:53:ed:3b:44:01,
Alguém tem meu IP?



ARP

RARP

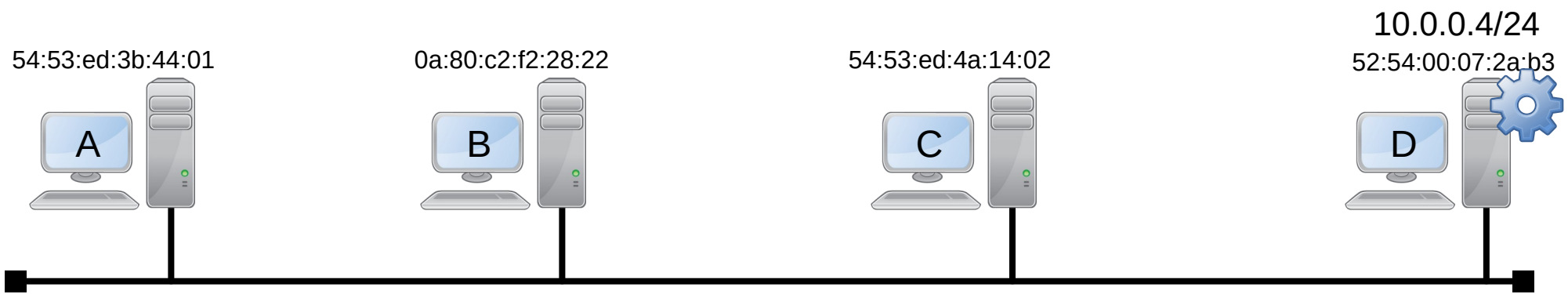
Pergunta RARP
Sou 54:53:ed:3b:44:01,
Alguém tem meu IP?

Servidor RARP

54:53:ed:3b:44:01 – 10.0.0.1

0a:80:c2:f2:28:22 – 10.0.0.2

54:53:ed:4a:14:02 – 10.0.0.3



ARP

RARP

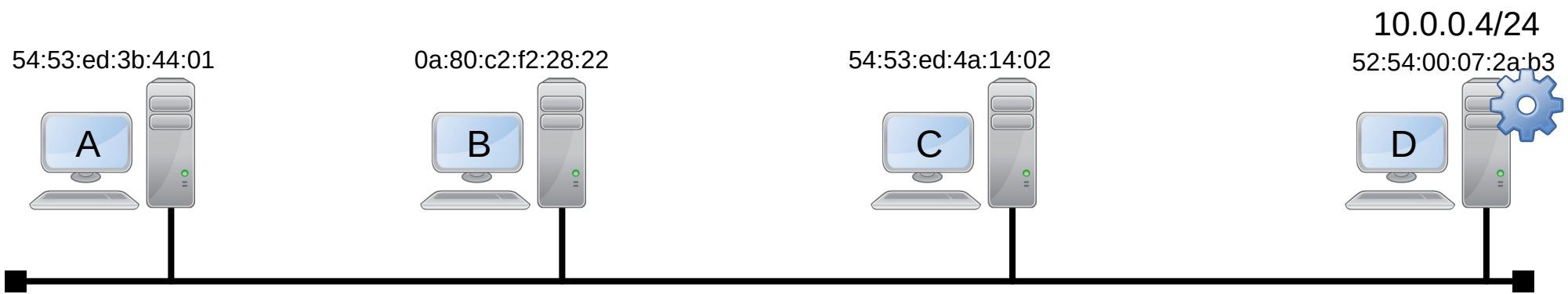
Resposta RARP
54:53:ed:3b:44:01,
Seu IP é 10.0.0.1

Servidor RARP

54:53:ed:3b:44:01 – 10.0.0.1

0a:80:c2:f2:28:22 – 10.0.0.2

54:53:ed:4a:14:02 – 10.0.0.3



ARP

RARP

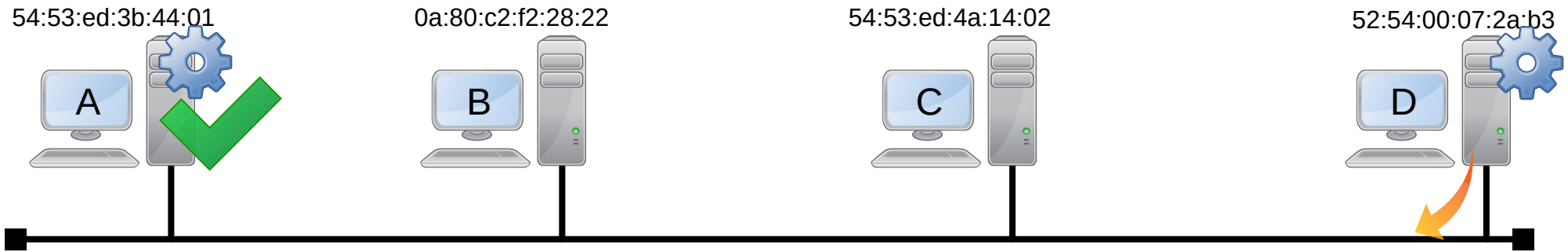
Servidor RARP

54:53:ed:3b:44:01 – 10.0.0.1

0a:80:c2:f2:28:22 – 10.0.0.2

54:53:ed:4a:14:02 – 10.0.0.3

Resposta RARP
54:53:ed:3b:44:01,
Seu IP é 10.0.0.1



ARP

RARP

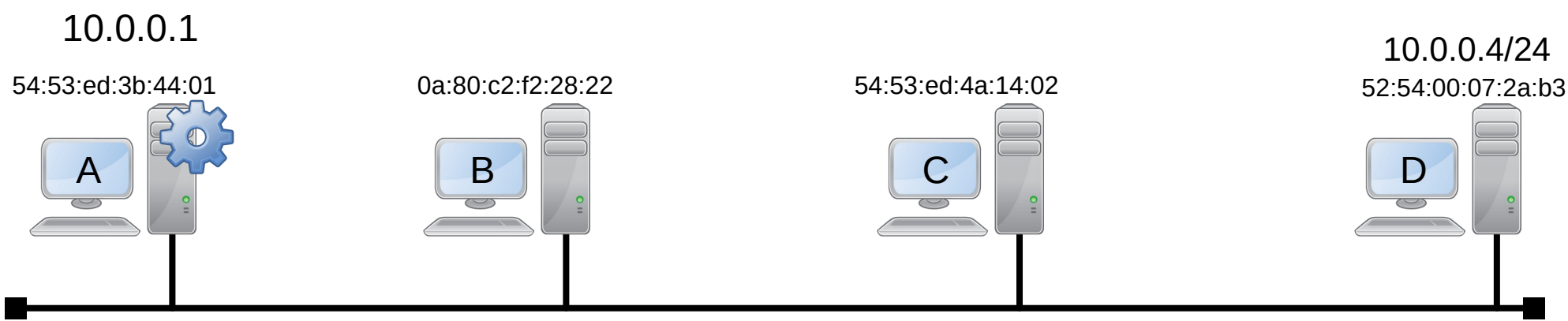
Servidor RARP

54:53:ed:3b:44:01 – 10.0.0.1

0a:80:c2:f2:28:22 – 10.0.0.2

54:53:ed:4a:14:02 – 10.0.0.3

Resposta RARP
54:53:ed:3b:44:01,
Seu IP é 10.0.0.1



ARP

RARP

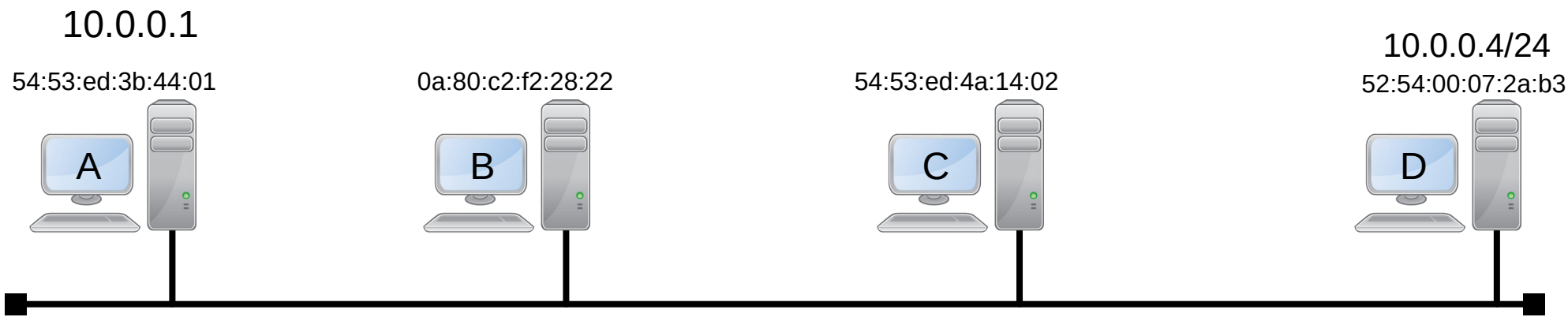
O RARP tem dois problemas:
1. não passa de uma rede para outra;
2. só atribui IPs para *hosts* cadastrados;

Servidor RARP

54:53:ed:3b:44:01 – 10.0.0.1

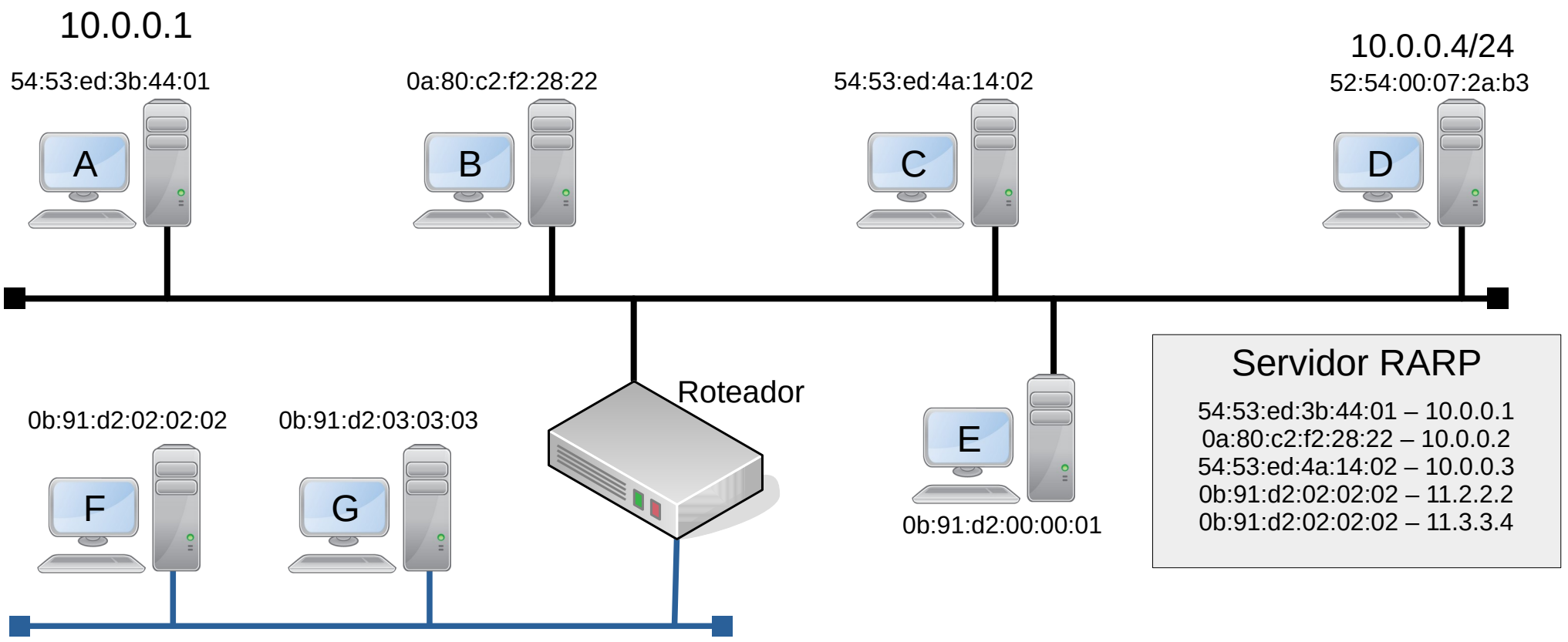
0a:80:c2:f2:28:22 – 10.0.0.2

54:53:ed:4a:14:02 – 10.0.0.3



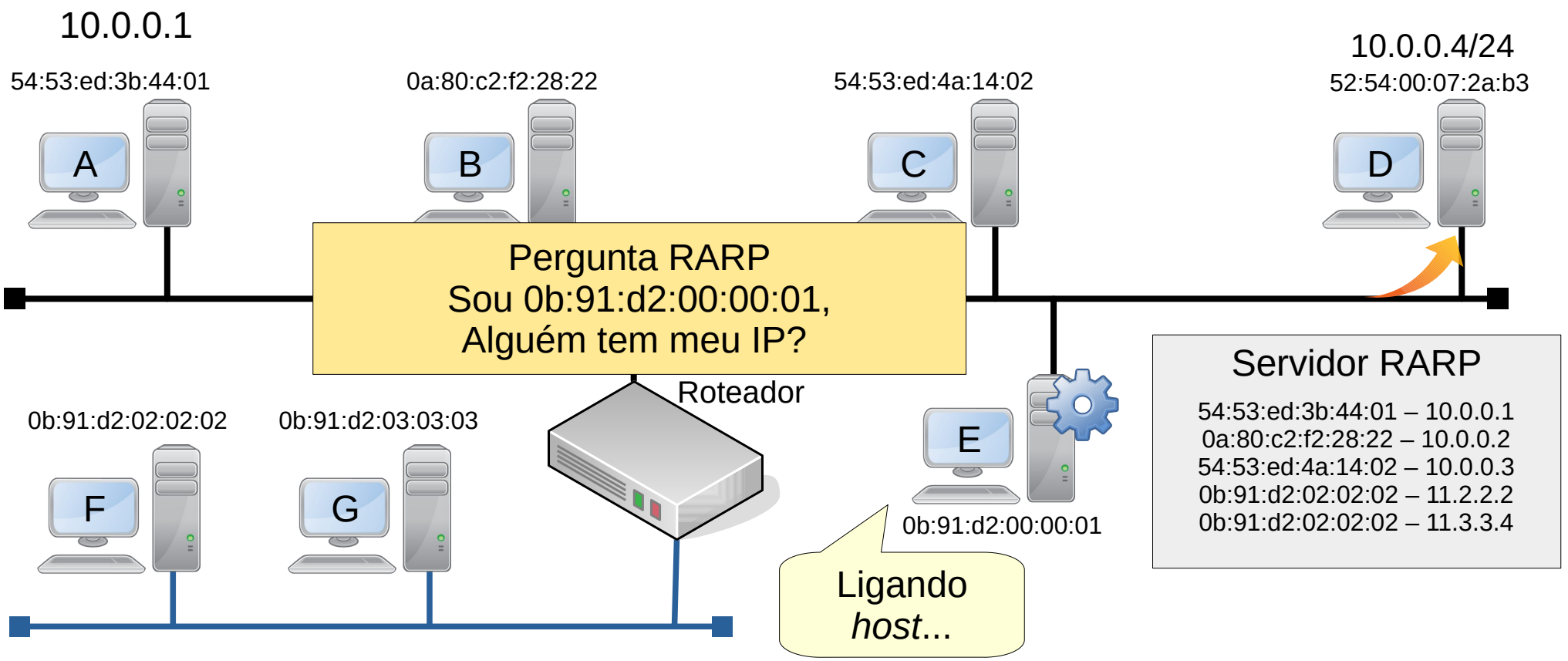
ARP

RARP


10.0.0.1
54:53:ed:3b:44:01
0a:80:c2:f2:28:22
54:53:ed:4a:14:02
10.0.0.4/24
52:54:00:07:2a:b3
A
B
C
D
Roteador
0b:91:d2:02:02:02
0b:91:d2:03:03:03
F
G
E
0b:91:d2:00:00:01
Servidor RARP
54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
0b:91:d2:02:02:02 – 11.2.2.2
0b:91:d2:02:02:02 – 11.3.3.4

ARP

RARP


10.0.0.1
54:53:ed:3b:44:01
0a:80:c2:f2:28:22
54:53:ed:4a:14:02
10.0.0.4/24
52:54:00:07:2a:b3
A
B
C
D
Pergunta RARP
Sou 0b:91:d2:00:00:01,
Alguém tem meu IP?
Roteador
0b:91:d2:02:02:02
0b:91:d2:03:03:03
F
G
E
0b:91:d2:00:00:01
Ligando
host...
Servidor RARP
54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
0b:91:d2:02:02:02 – 11.2.2.2
0b:91:d2:02:02:02 – 11.3.3.4

ARP

Não sei o IP de
0b:91:d2:00:00:01

RARP

10.0.0.1

54:53:ed:3b:44:01

A

0a:80:c2:f2:28:22

B

54:53:ed:4a:14:02

C

10.0.0.4/24

52:54:00:07:2a:b3

D

0b:91:d2:02:02:02

F

0b:91:d2:03:03:03

G

Roteador

E

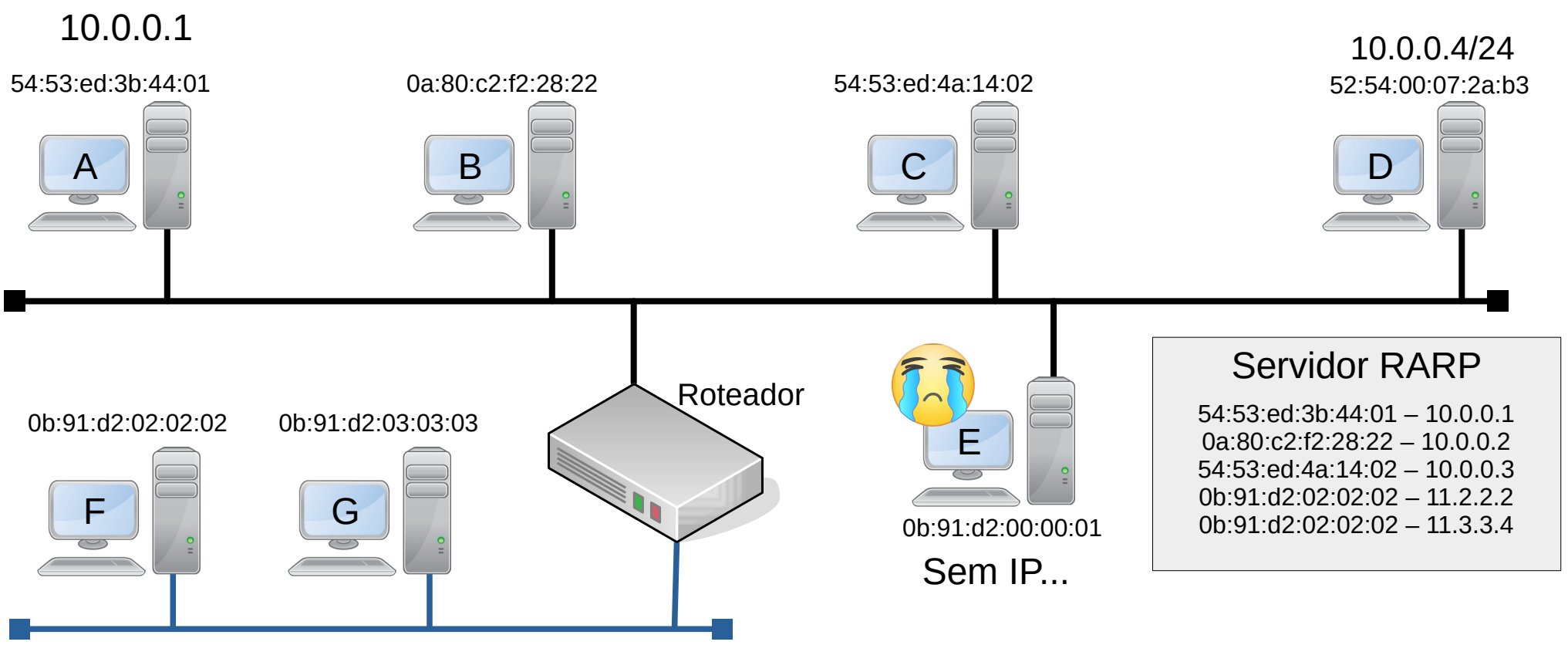
0b:91:d2:00:00:01

Servidor RARP

54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
0b:91:d2:02:02:02 – 11.2.2.2
0b:91:d2:02:02:02 – 11.3.3.4

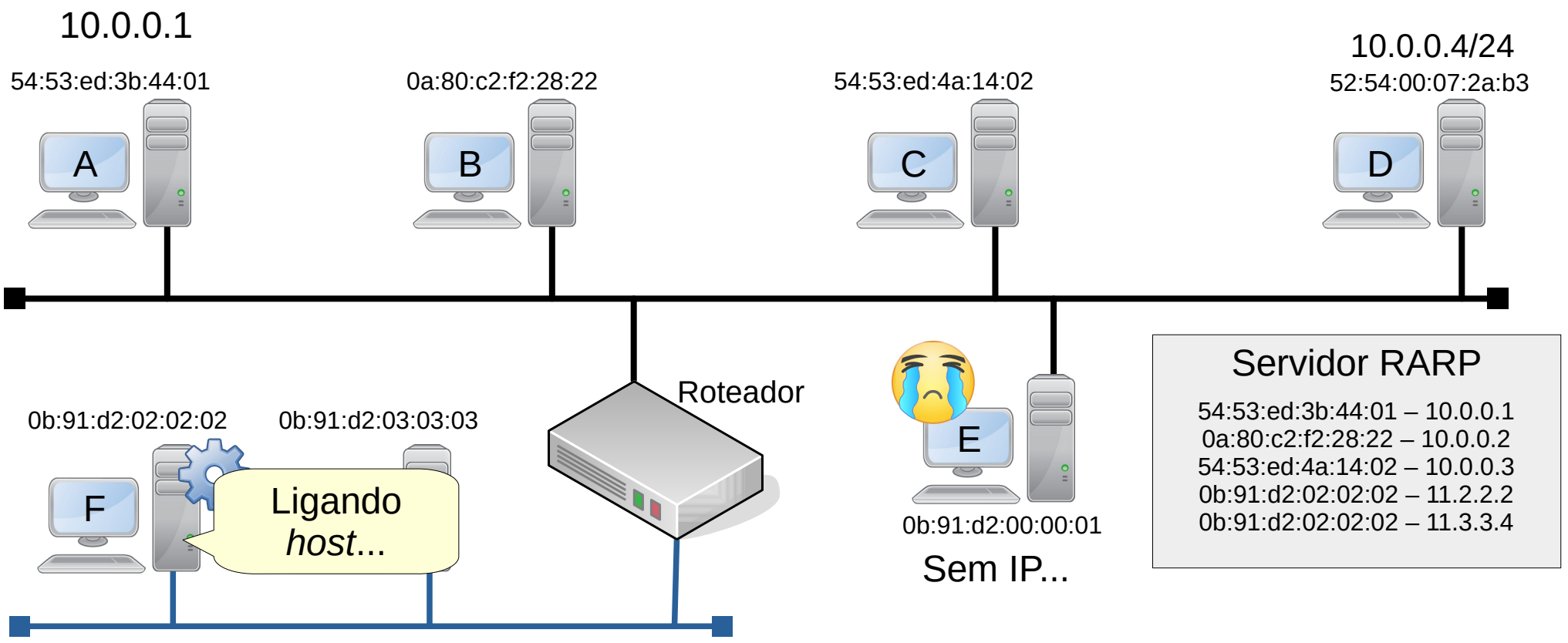
ARP

RARP


10.0.0.1
54:53:ed:3b:44:01
0a:80:c2:f2:28:22
54:53:ed:4a:14:02
10.0.0.4/24
52:54:00:07:2a:b3
A
B
C
D
Roteador
0b:91:d2:02:02:02
0b:91:d2:03:03:03
F
G
E
0b:91:d2:00:00:01
Sem IP...
Servidor RARP
54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
0b:91:d2:02:02:02 – 11.2.2.2
0b:91:d2:02:02:02 – 11.3.3.4

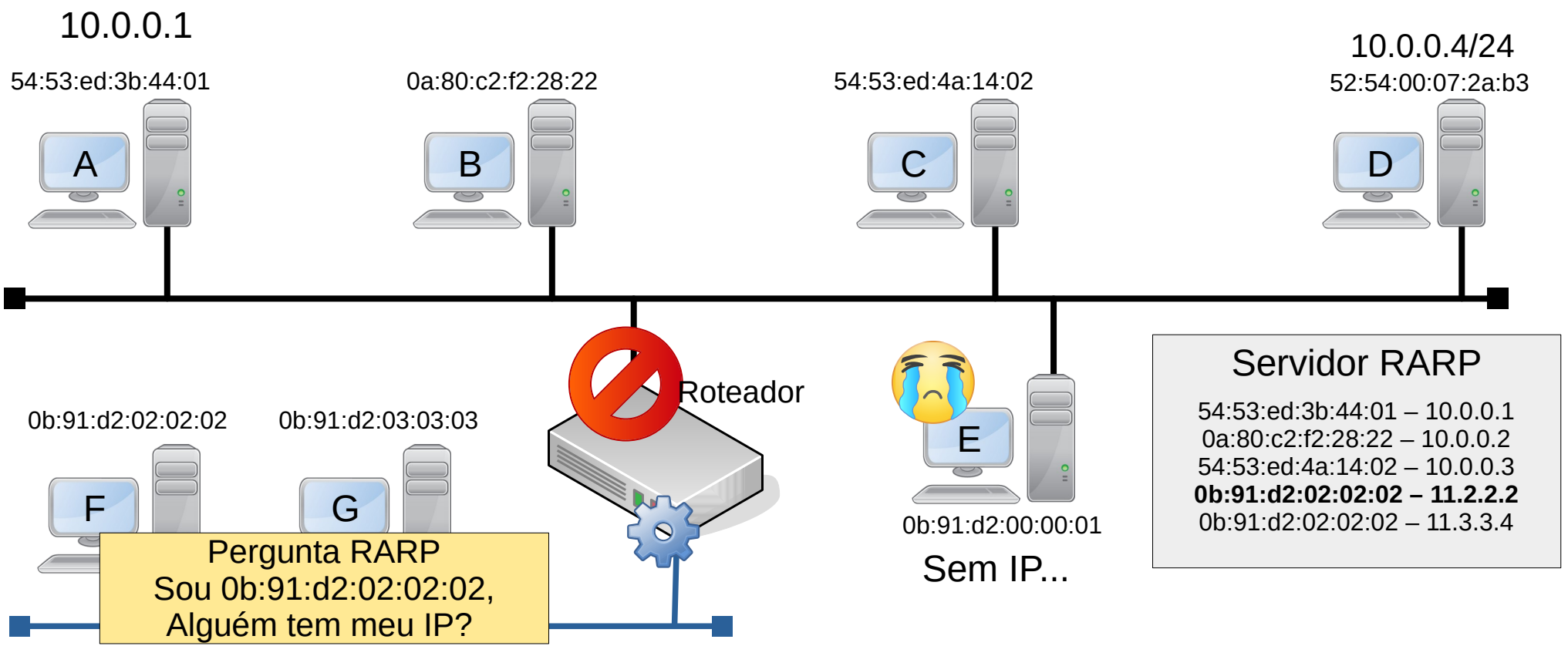
ARP

RARP


10.0.0.1
54:53:ed:3b:44:01
0a:80:c2:f2:28:22
54:53:ed:4a:14:02
10.0.0.4/24
52:54:00:07:2a:b3
A
B
C
D
Roteador
0b:91:d2:02:02:02
0b:91:d2:03:03:03
F
Ligando
host...
E
0b:91:d2:00:00:01
Sem IP...
Servidor RARP
54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
0b:91:d2:02:02:02 – 11.2.2.2
0b:91:d2:02:02:02 – 11.3.3.4

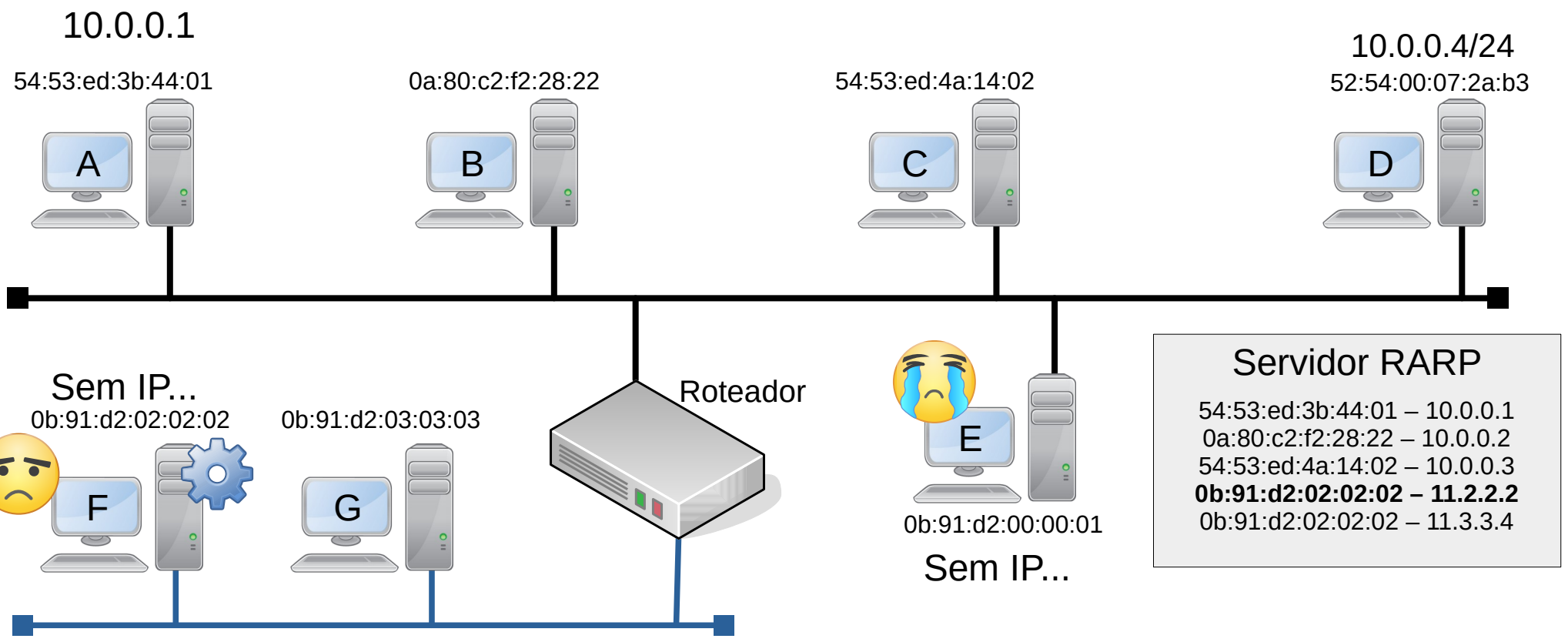
ARP

RARP


10.0.0.1
54:53:ed:3b:44:01
0a:80:c2:f2:28:22
54:53:ed:4a:14:02
10.0.0.4/24
52:54:00:07:2a:b3
A
B
C
D
Roteador
0b:91:d2:02:02:02
0b:91:d2:03:03:03
F
G
E
0b:91:d2:00:00:01
Sem IP...
Pergunta RARP
Sou 0b:91:d2:02:02:02,
Alguém tem meu IP?
Servidor RARP
54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
0b:91:d2:02:02:02 – 11.2.2.2
0b:91:d2:02:02:02 – 11.3.3.4

ARP

RARP


10.0.0.1
54:53:ed:3b:44:01
0a:80:c2:f2:28:22
54:53:ed:4a:14:02
10.0.0.4/24
52:54:00:07:2a:b3
A
B
C
D
Sem IP...
0b:91:d2:02:02:02
0b:91:d2:03:03:03
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Sem IP...
Servidor RARP
54:53:ed:3b:44:01 – 10.0.0.1
0a:80:c2:f2:28:22 – 10.0.0.2
54:53:ed:4a:14:02 – 10.0.0.3
0b:91:d2:02:02:02 – 11.2.2.2
0b:91:d2:02:02:02 – 11.3.3.4

ARP

Mas neste último caso o endereço físico do *host* F está cadastrado no servidor RARP!

ARP

Mas neste último caso o endereço físico do *host* F está cadastrado no servidor RARP!

Lembre, o ARP/RARP não passam de uma rede para outra!

Nem atribuem IP para *hosts* não cadastrados...

ARP

Mas neste último caso o endereço físico do *host* F está cadastrado no servidor RARP!

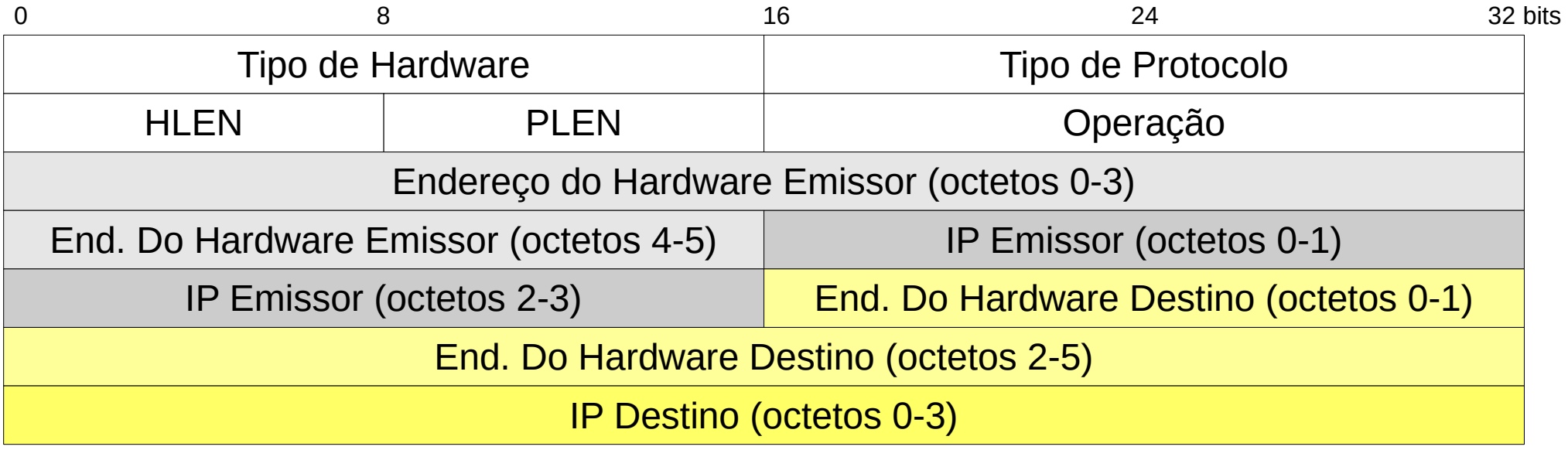
O DHCP resolve tudo isso!

Lembre, o ARP/RARP não passam de uma rede para outra!

Nem atribuem IP para *hosts* não cadastrados...

ARP

Datagrama ARP

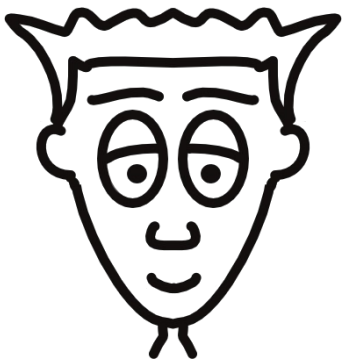


ARP

Conclusão:

O ARP é fundamental em redes TCP/IP, pois quadros de rede (Camada de Enlace) navegam na rede local através de endereços físicos, todavia redes TCP/IP utilizam endereços lógicos (IPs – Camada de Inter-Rede), então o ARP converte IPs em endereços físicos…

O RARP foi substituído pelo DHCP, que fica na camada de aplicação.



Obrigado!!!

Prof. Dr. Luiz Arthur Feitosa dos Santos

luiz.arthur.feitosa.santos@gmail.com

https://luizsantos.github.io/

Links e referencias na descrição do vídeo