

Capítulo 4

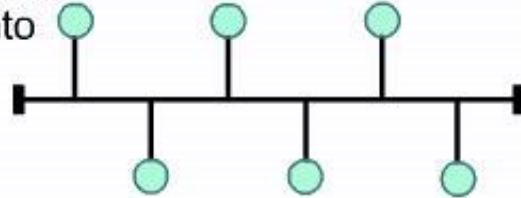
Subcamada de controle de acesso ao meio (Enlace)



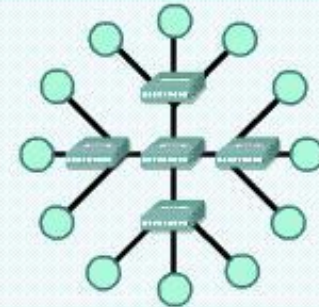
Topologias de Redes

Topologias Físicas

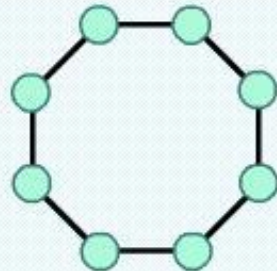
Topologia de Barramento



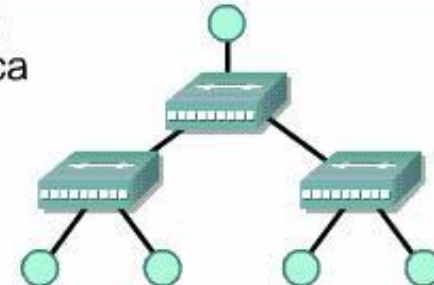
Topologia em Estrela Estendida



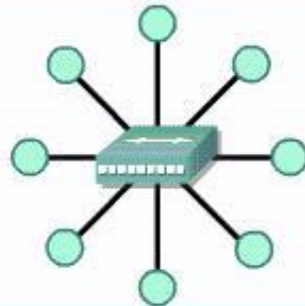
Topologia em Anel



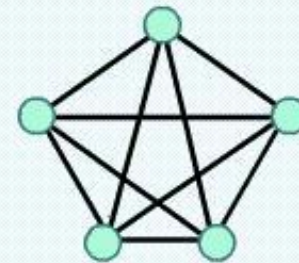
Topologia Hierárquica



Topologia em Estrela

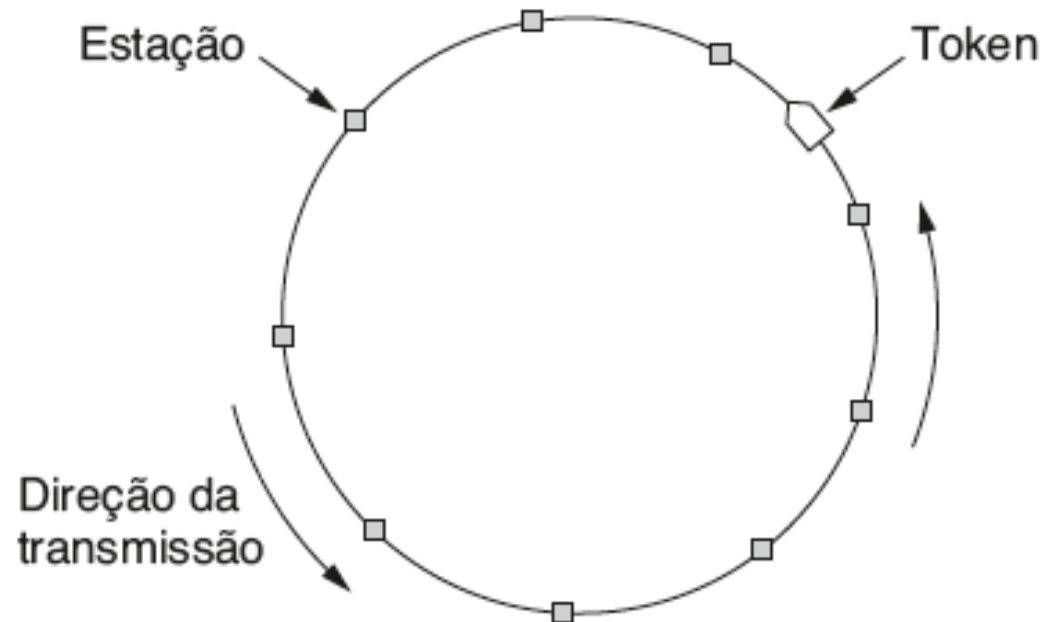


Topologia em Malha

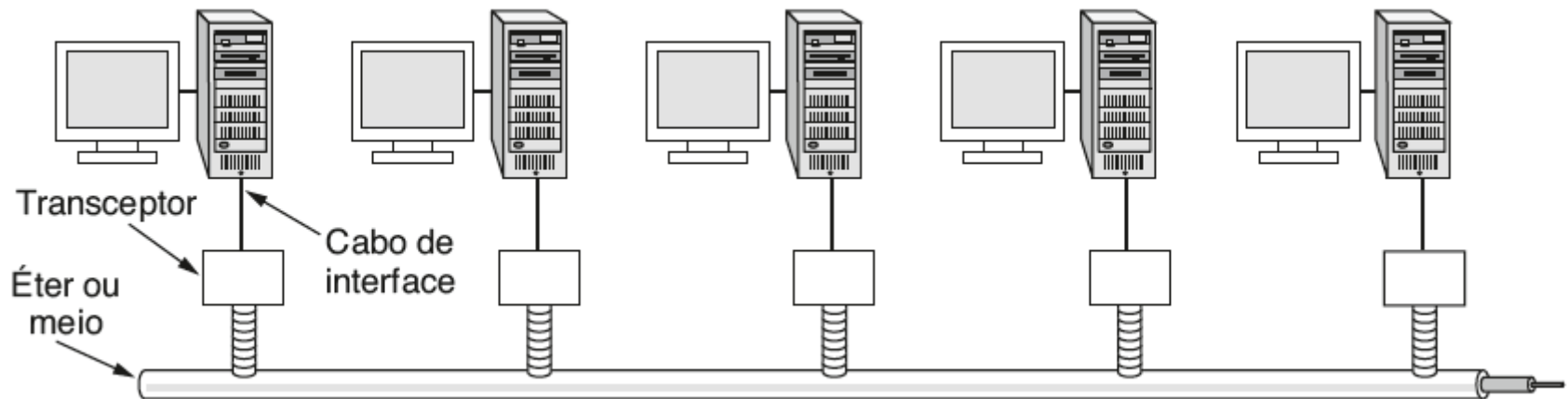


Protocolos sem ocorrência de colisões – topologia em anel

Topologia em anel: token ring.

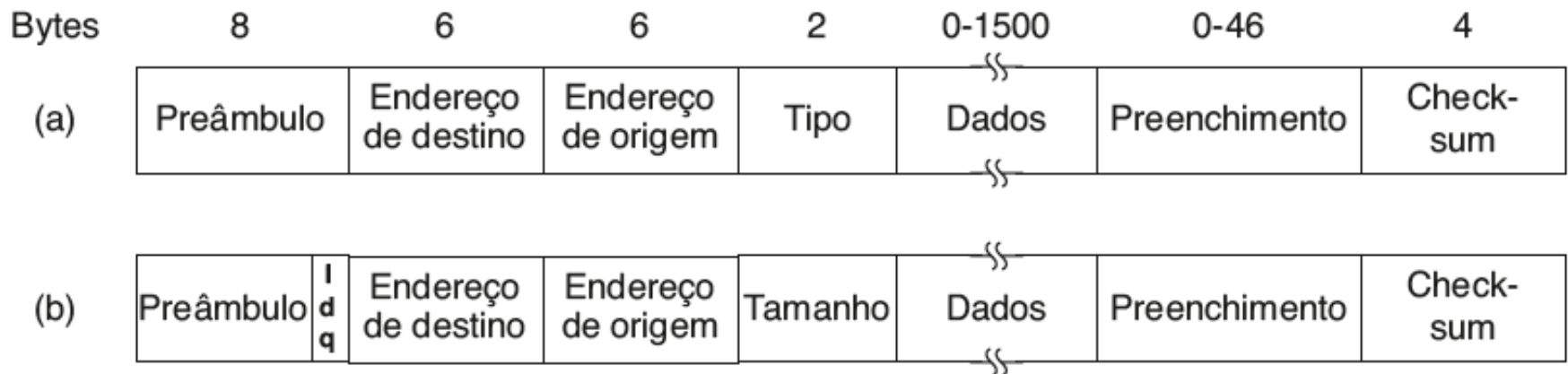


- ➡ Camada física
- ➡ Protocolo da subcamada MAC
- ➡ Desempenho da Ethernet
- ➡ Ethernet comutada
- ➡ Fast Ethernet
- ➡ Gigabit Ethernet
- ➡ 10 Gigabit Ethernet



Arquitetura da Ethernet clássica.

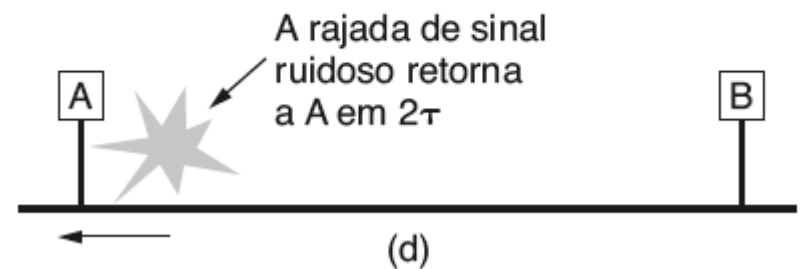
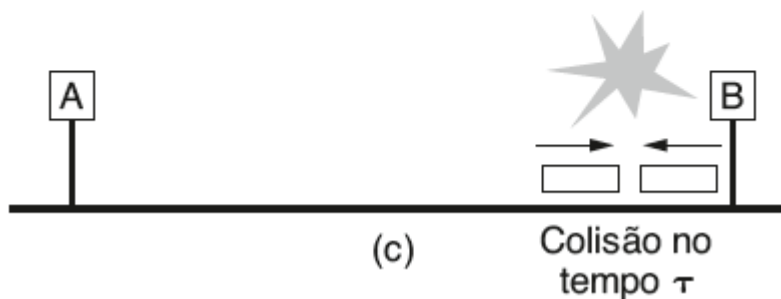
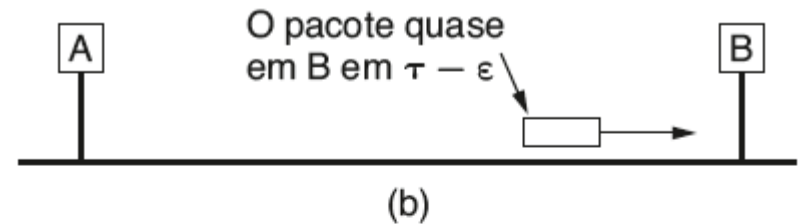
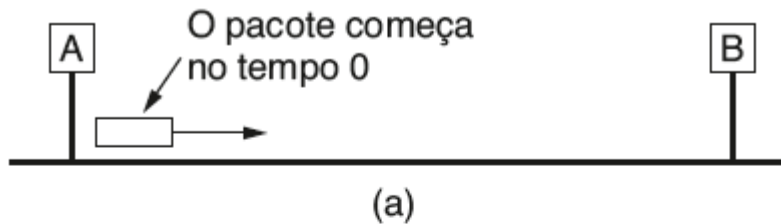
Protocolo da subcamada MAC



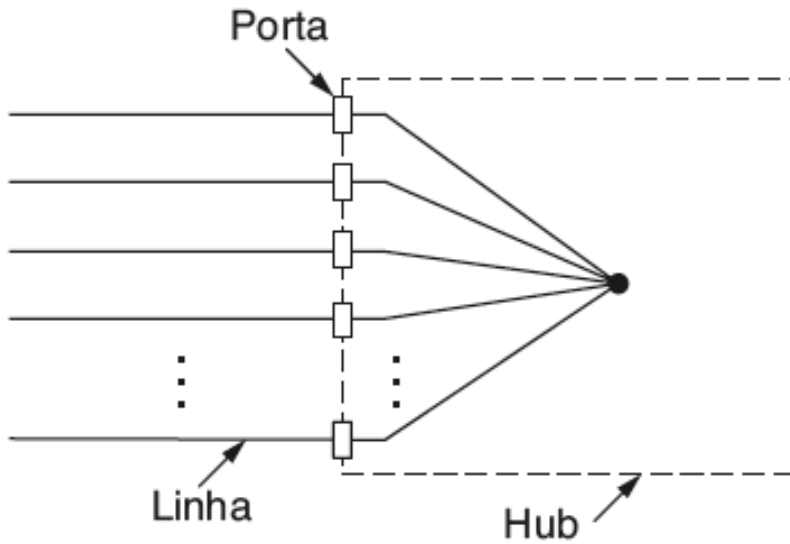
Formato dos quadros. (a) Ethernet (DIX). (b) IEEE 802.3.

Protocolo da subcamada MAC

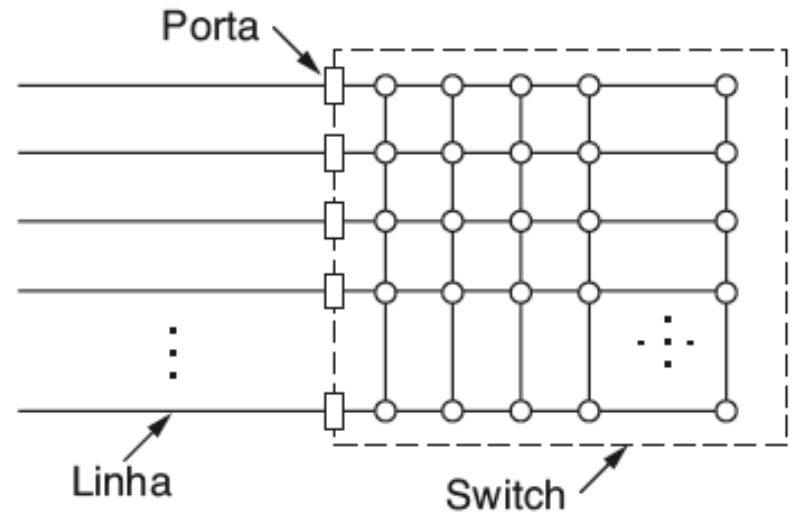
A detecção de colisão pode chegar a 2τ .



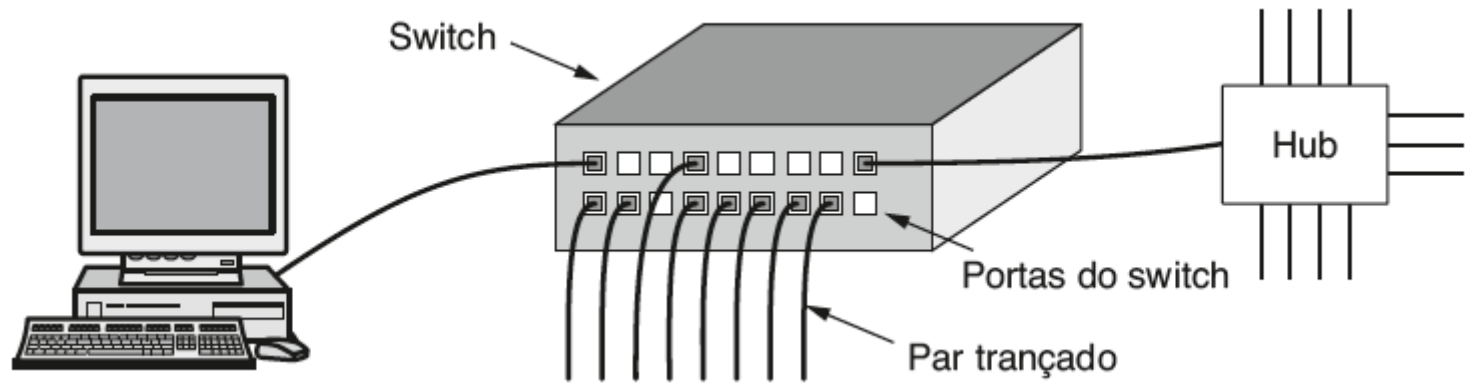
(a) Hub. (b) Switch.



(a)



(b)



Um switch Ethernet.

Fast Ethernet

Nome	Cabo	Tam. máx. de segmento	Vantagens
100Base-T4	Par trançado	100 m	Utiliza UTP da Categoria 3
100Base-TX	Par trançado	100 m	Full-duplex a 100 Mbps (UTP da Categoria 5)
100Base-FX	Fibra óptica	2.000 m	Full-duplex a 100 Mbps; grandes distâncias

Cabeamento para a fast Ethernet.

Gigabit Ethernet

Nome	Cabo	Distância máxima do segmento	Vantagens
1000Base-SX	Fibra óptica	550 m	Fibra multimodo (50, 62,5 micra)
1000Base-LX	Fibra óptica	5.000 m	Modo único (10 micra) ou multimodo (50, 62,5 micra)
1000Base-CX	2 pares de STP	25 m	Par trançado blindado
1000Base-T	4 pares de UTP	100 m	UTP padrão da Categoria 5

Cabeamento usado na gigabit Ethernet.

Obs.: O CAT 5 foi extinto, dando origem ao CAT 5e (enhanced)

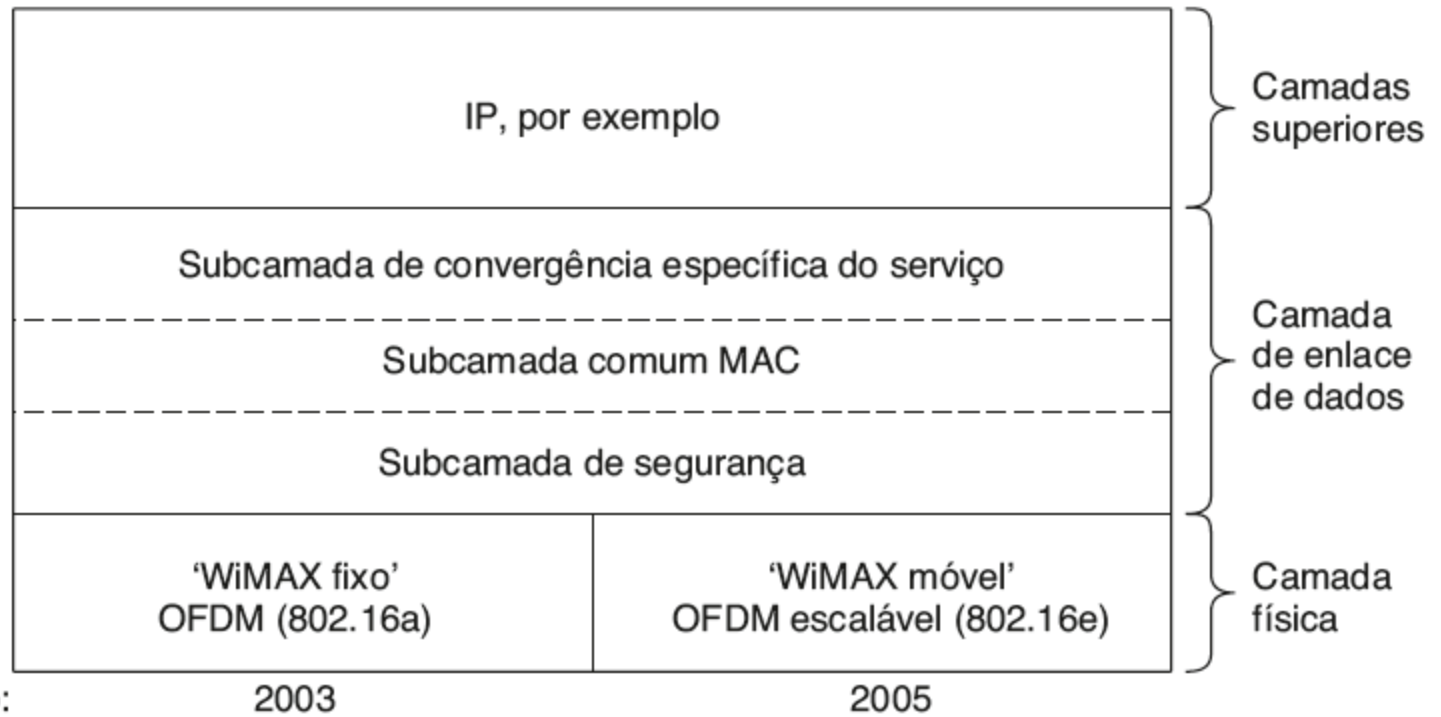
10 gigabit Ethernet

Nome	Cabo	Distância máxima do segmento	Vantagens
10GBase-SR	Fibra óptica	Até 300 m	Fibra multimodo (0,85 μ)
10GBase-LR	Fibra óptica	10 Km	Fibra monomodo (1,3 μ)
10GBase-ER	Fibra óptica	40 Km	Fibra monomodo (1,5 μ)
10GBase-CX4	4 pares de twinax	15 m	Cobre twinaxial
10GBase-T	4 pares de UTP	100 m	UTP padrão da Categoria 6a

Cabeamento usado na 10 gigabit Ethernet.

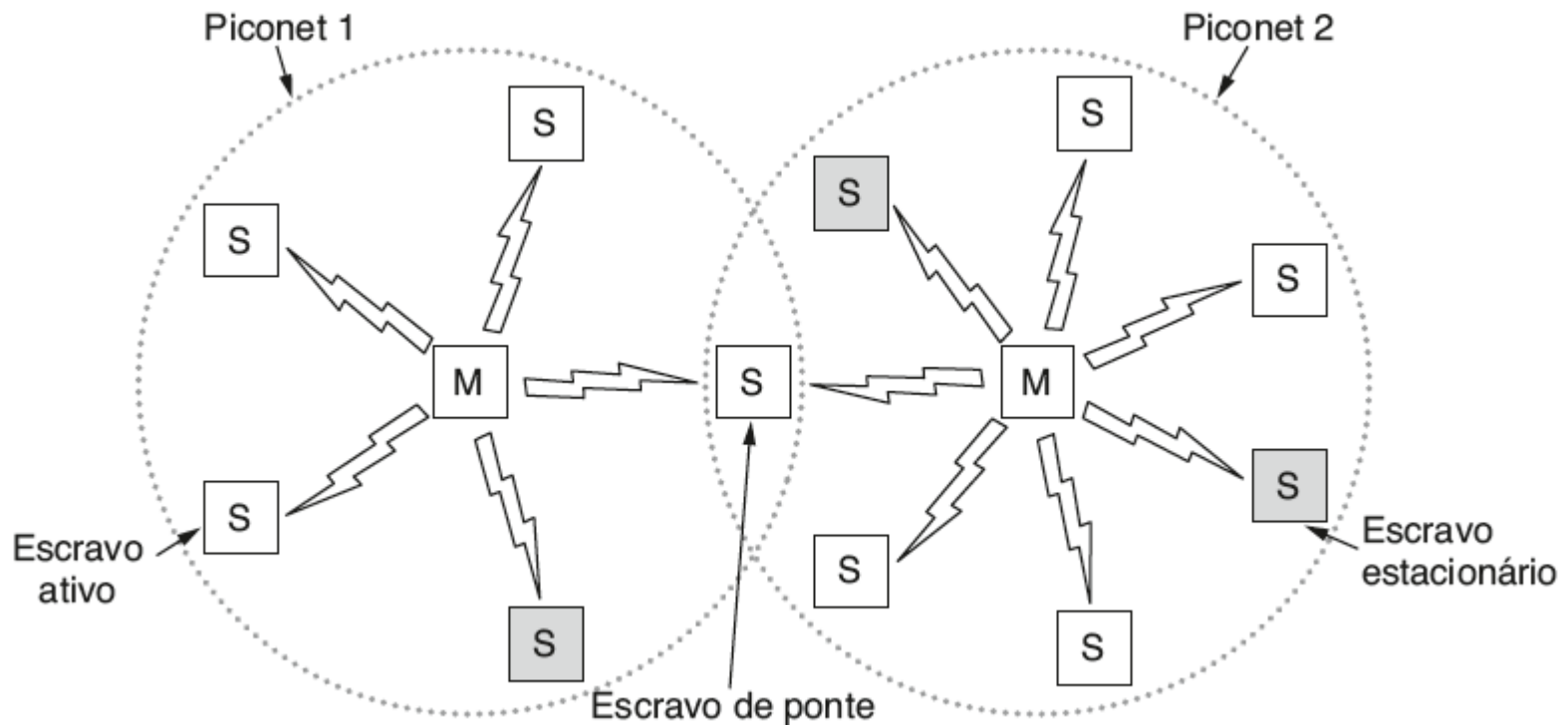
Topologias e pilha de protocolos 802.16 (WiMax)

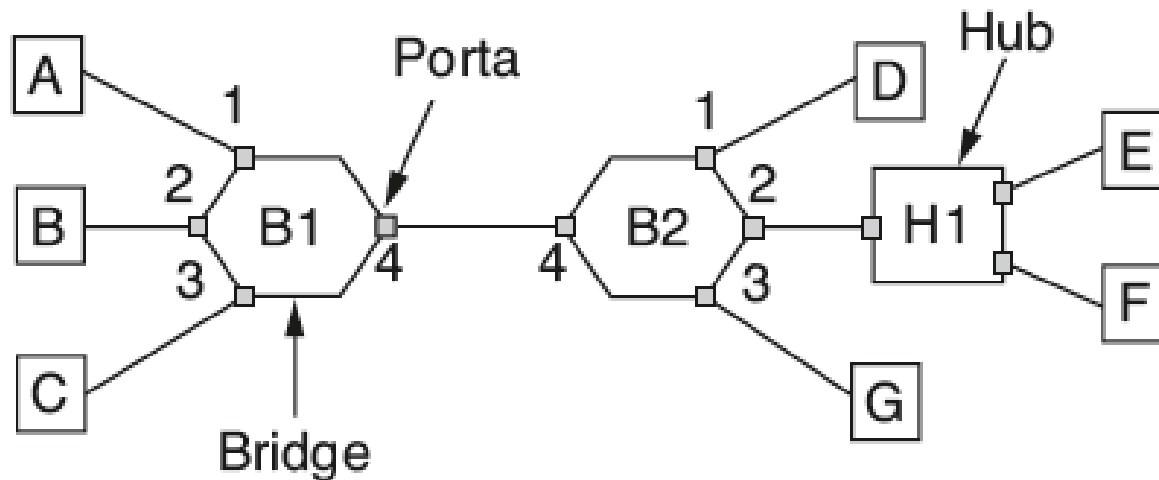
Pilha de protocolos 802.16.



Topologia Bluetooth

Duas piconets formando uma scatternet.

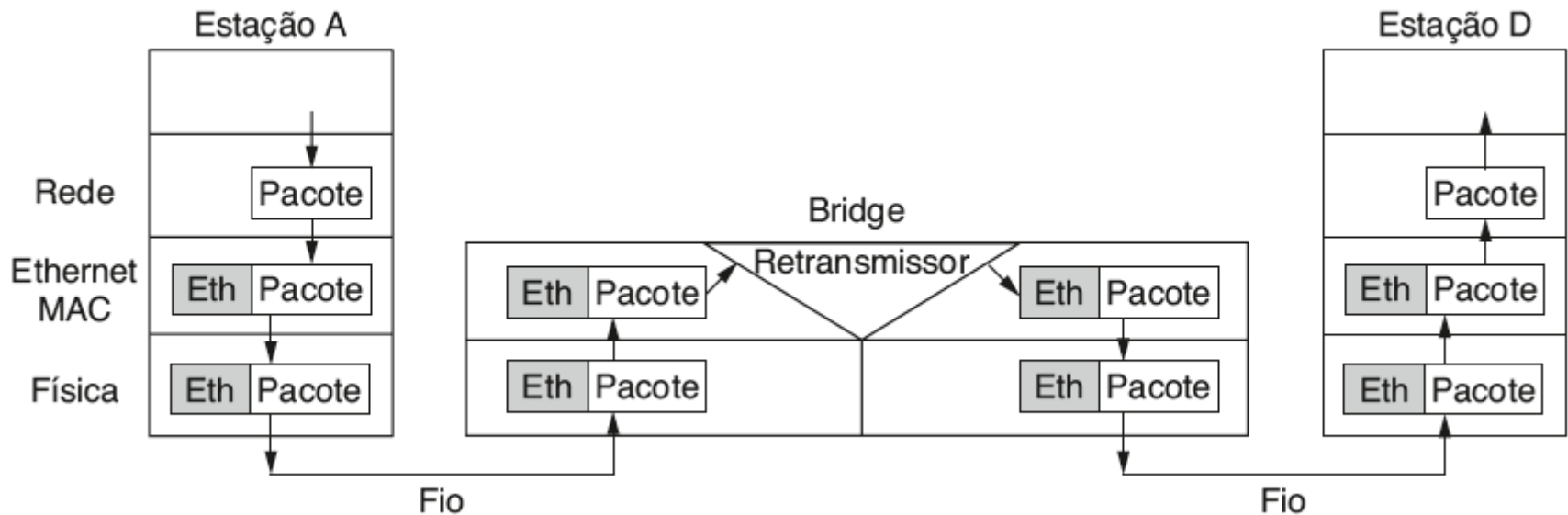




Bridges (e um hub) conectando sete estações ponto a ponto.

Learning bridges

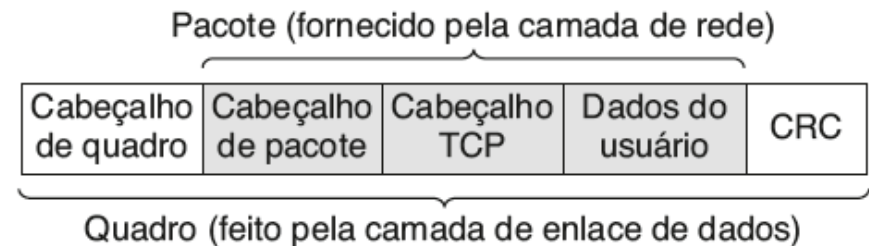
Encaminhamento através de uma bridge.



Repetidores, hubs, bridges, switches, roteadores e gateways

Camada de aplicação	Gateway de aplicação
Camada de transporte	Gateway de transporte
Camada de rede	Roteador
Camada de enlace de dados	Bridge, switch
Camada física	Repetidor, hub

(a)



(b)

(a) Qual dispositivo para qual camada.

(b) Quadros, pacotes e cabeçalhos.