Transport protocols

2017/18 Q2

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DAC - UPC

Contents

- UDP (User Datagram Protocol)
- ARQ (Automatic Repeat reQuest)
- TCP (Transmission Control Protocol)

UDP Header

0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1
+	 	+	- - +	 	 	 	+ – +	⊢ – ⊣	 	+ – +	-	+ – +	 	+ – +	- -	- -	+ – +	⊢ – ⊣	⊢ – -	+	- -	⊢ — ⊣	- - +	+ – +	- -	⊢ – ⊣	 	- - +	- - +	 	
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						Ι	Ŀer	ıgt	th													Cł	iec	cks	sur	n					
+	+ - +	- – +	+	+	 	 	⊢ – +	⊦ – ⊣	- -	⊢ – ⊣		⊦ – +	- -	⊢ – +	-	- -	 	⊢ – ⊣	- -	+	-	+	⊢	⊢ – +	-	⊦ – +	+	-	-	⊢	⊢ – +

- Mecanismo básico:
 - EMISOR: Transmitir y esperar confirmación.
 Si no llega (esperar un tiempo), retransmitir.
 - RECEPTOR: Transmitir confirmación.
 (Confirmación / Reconocimiento / Acknowledgement / ACK)
- Transmisión de datos
- ... Propagación
- Transmisión de ACK
 - … Propagación
- T_C (tiempo de ciclo) o RTT (Round Trip Time)

- Mecanismo básico:
 - EMISOR: Transmitir y esperar ACK.
 Si no llega (esperar un tiempo), retransmitir.
 - RECEPTOR: Transmitir ACK.
- Mejoras:
 - "Arriesgarse" a seguir transmitiendo antes de recibir ACKs.
- Soluciones a problemas:
 - Retransmitir ACKs si no llegan datos.

- Tiempo de proceso → 0
- Tiempo de propagación: tp
 (depende de la velocidad del medio y la distancia)
- Tiempo de transmisión de datos: t_t

 (depende de la cantidad de datos)
- Tiempo de transmisión de ACKs: t_a

 (normalmente ACK << datos)
- Tiempo de espera (temporizador): T_{out}
 (RTO: Retransmission TimeOut)

- Protocolos:
 - Stop & Wait (S&W)
 - Transferencia continua:
 - Go back N (GbN)
 - Retransmisión Selectiva (RS)

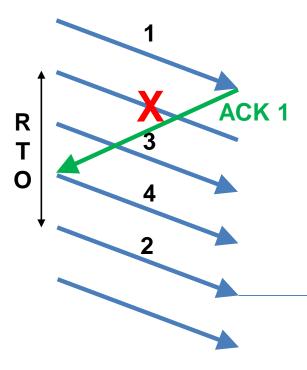
Protocolos:

- Stop & Wait (S&W)
- Transferencia continua:
 - Go back N (GbN): Descarta desordenados.
 - Retransmisión Selectiva (RS): "Reordena".

(ACKs siempre "acumulados" ("han llegado todos los anteriores")) (Siempre se descartan duplicados)

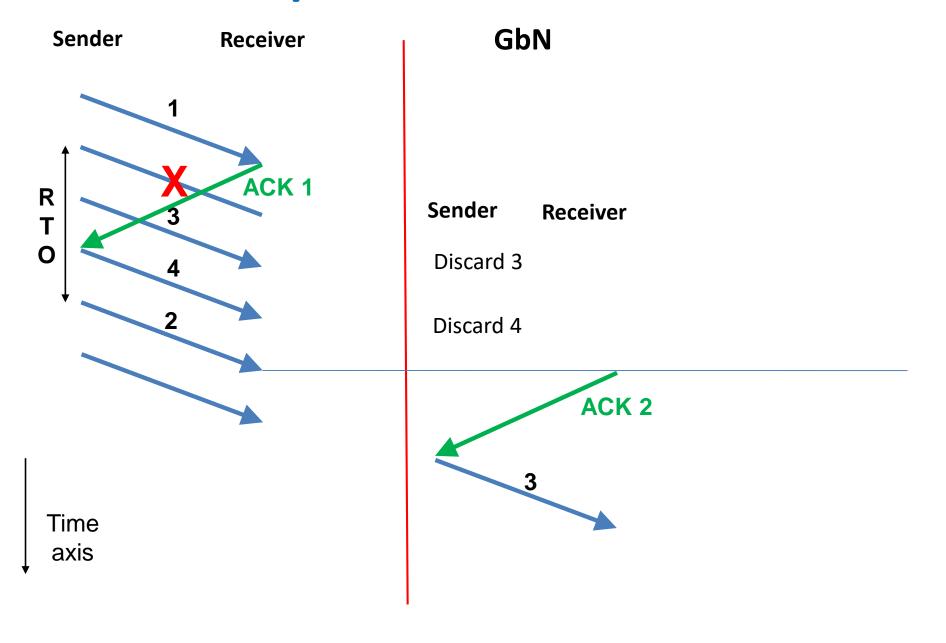
Go back N / Selective Retransmission



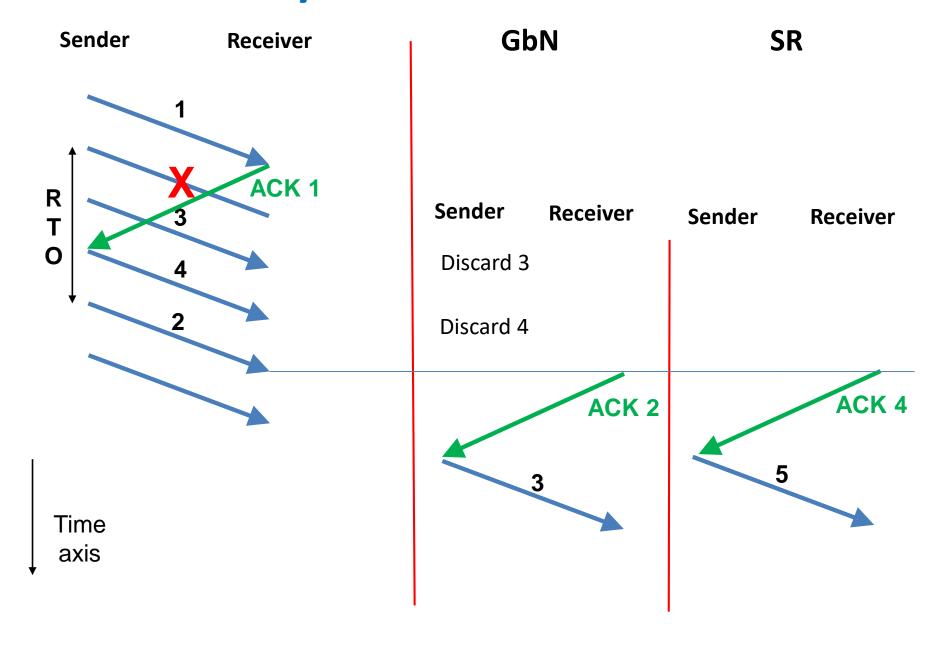


Time axis

Go back N / Selective Retransmission



Go back N / Selective Retransmission



Datos

- Subíndices
 - t: transmisión de datos; p: propagación; C: ciclo
- **t**_t, **t**_p (tiempo); **L**_t (longitud); **v**_t, **v**_p (velocidad)
- **D** (distancia), **T** (tiempo o periodo), **E** (eficiencia)
- T_C : Tiempo mínimo para transmitir una PDU (Protocol Data Unit)

- $\mathbf{t_t} = \mathbf{L_t} / \mathbf{v_t}$ L_t en bits, $\mathbf{v_t}$ en bps
- $t_p = D/v_p$ D en m, v_p en m/s

Eficiencia sin errores

- Stop & Wait (S&W):
 - $E_{s&w} = t_t / T_c = t_t / (t_t + t_a + 2 t_p)$ (tiende a 1 si t_a y $t_p <<< t_t$)
- Go back N (GbN):
 - $\mathbf{E}_{GbN} = \mathbf{t}_t / \mathbf{T}_c \approx \mathbf{1}$, ya que $Tc \approx t_t$ (si se envían n PDUs, $T_c(n) = (n * t_t) + (t_a + 2 t_p)$ Si $n >> , T_c \approx 1$)
- Retransmisión Selectiva (RS):
 - $E_{RS} = t_t / T_c \approx 1$, por las mismas razones que GbN

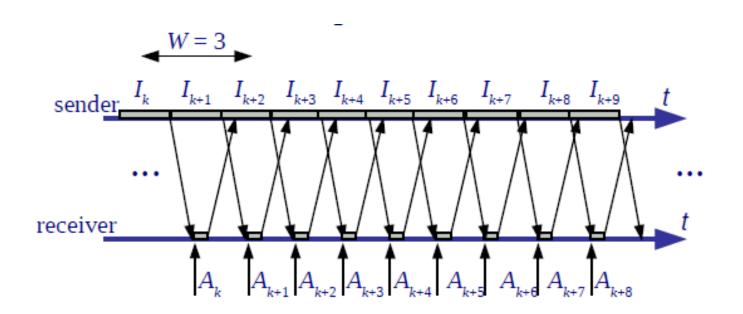
Eficiencia con errores

- T_T : Tiempo total real para transmitir una PDU (Protocol Data Unit)
- $T_T = (N_t 1) * T_{out} + T_C$ $T_{out} > T_C$
- N_t: Número total de transmisiones;
 (Nt 1): Número de transmisiones fallidas.
- Stop & Wait (S&W):
 - $E_{S\&W-errores} = t_t / T_T = t_t / ((N_t 1) * T_{out} + T_c)$
- Go back N (GbN):
 - $E_{GbN-errores} = t_t / T_T = t_t / ((N_t 1) * T_{out} + t_t)$
- Retransmisión Selectiva (RS):
 - $E_{RS-errores} = t_t / T_T = t_t / (N_t * t_t) = 1 / N_t$

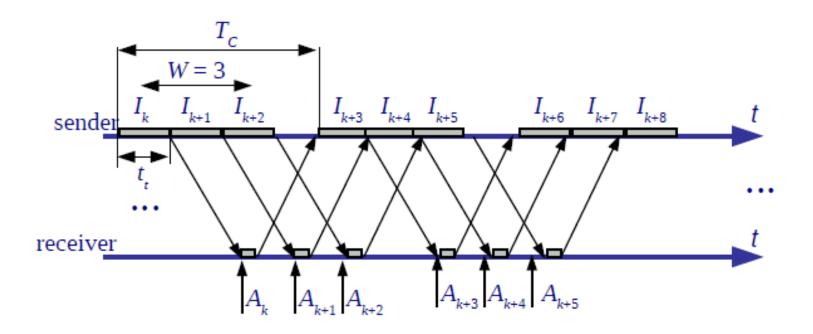
Control de flujo

- Control de flujo vs. Recuperación de errores:
 - ARQ = CF + RE
- Protocolos de ventana:
 - Ventana de transmisión: "Cantidad de datos que se pueden enviar sin esperar su ACK"
 - Ventana óptima:

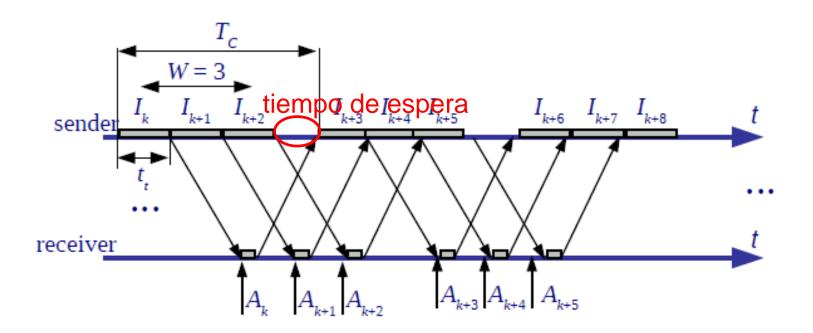
mínima en tamaño, máxima en velocidad.

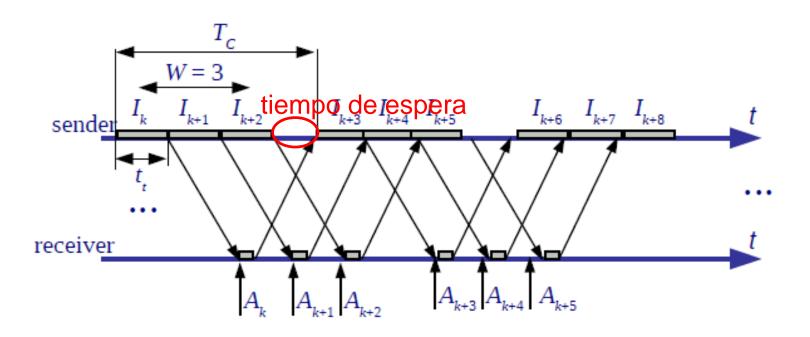


No hay "esperas"



$$T_c = t_t + t_a + 2 t_p$$





Cálculo Wopt:
$$W_{opt} = \left| \frac{T_C}{t_t} \right|$$

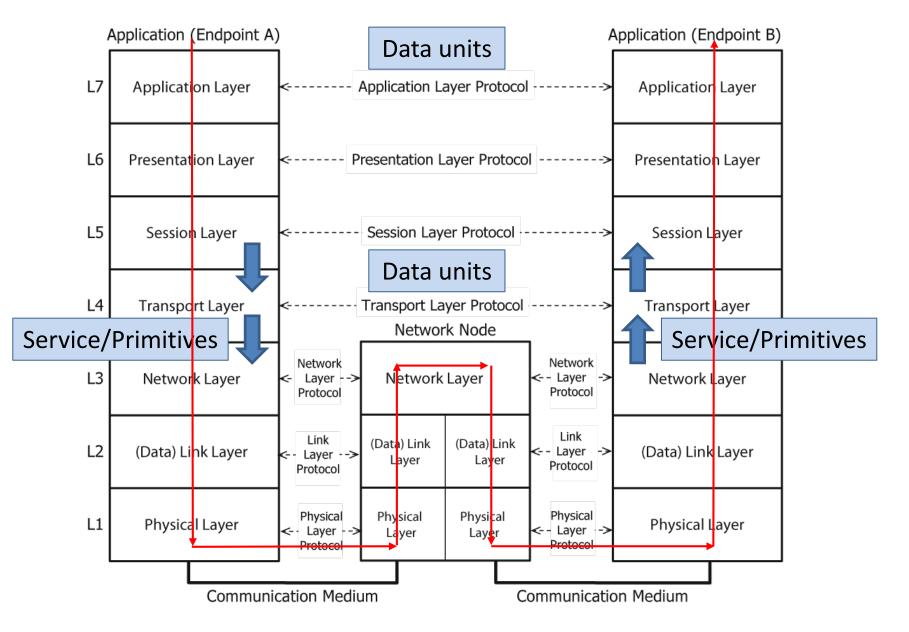
Contents

- UDP (User Datagram Protocol)
- ARQ (Automatic Repeat reQuest)
- TCP (Transmission Control Protocol)

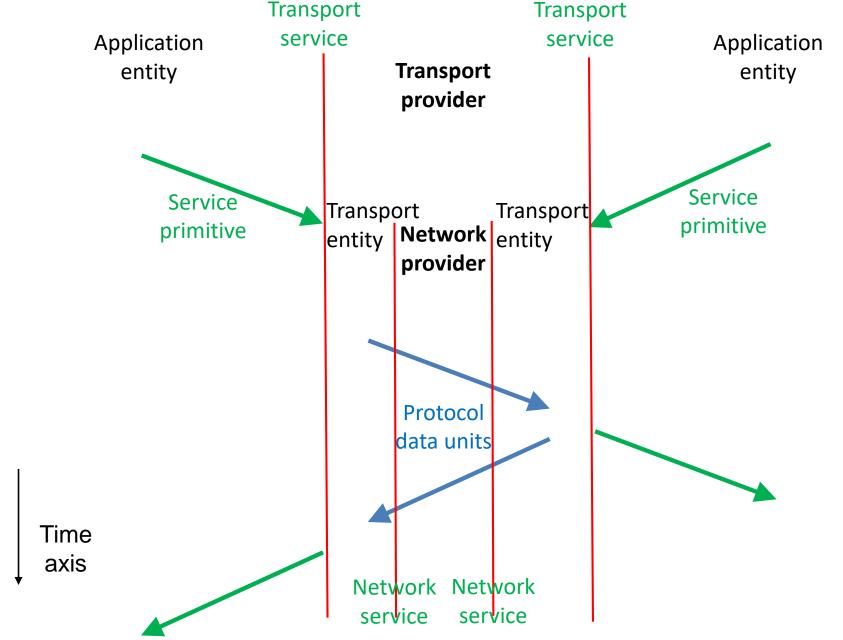
TCP - fases

- Establecimiento de la conexión
- Transferencia de datos
- Liberación de la conexión

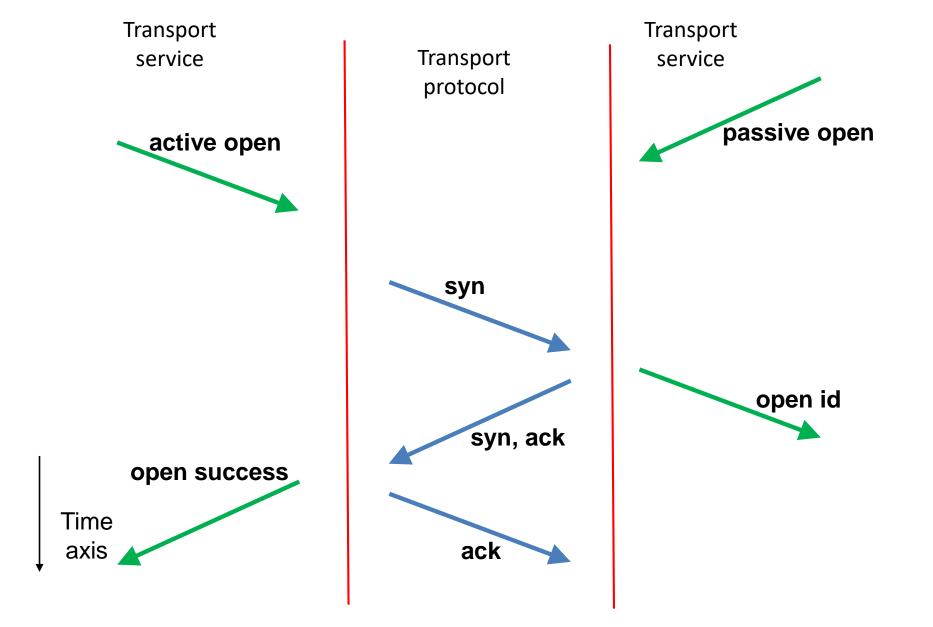
Communication



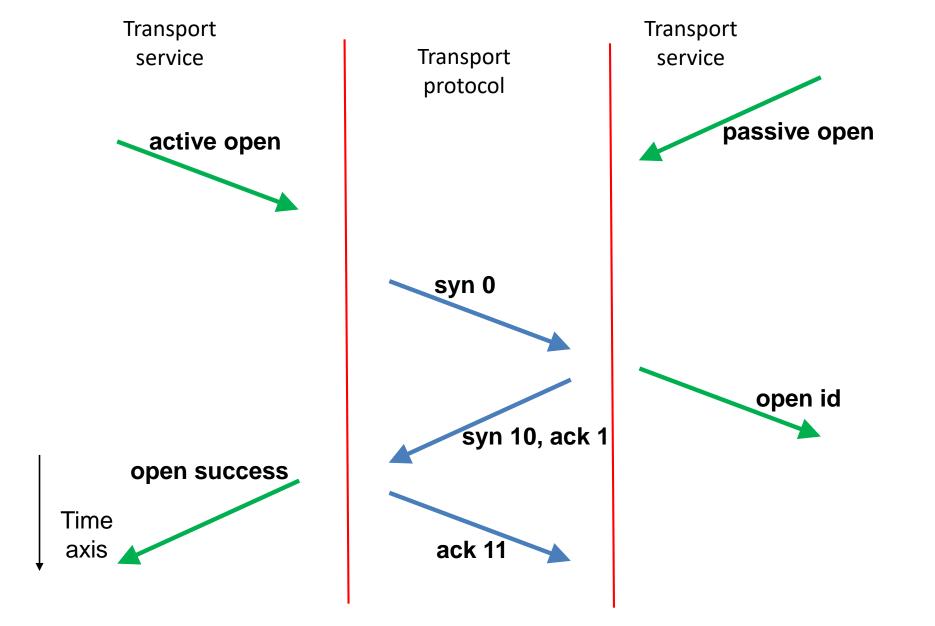
Service & Protocol



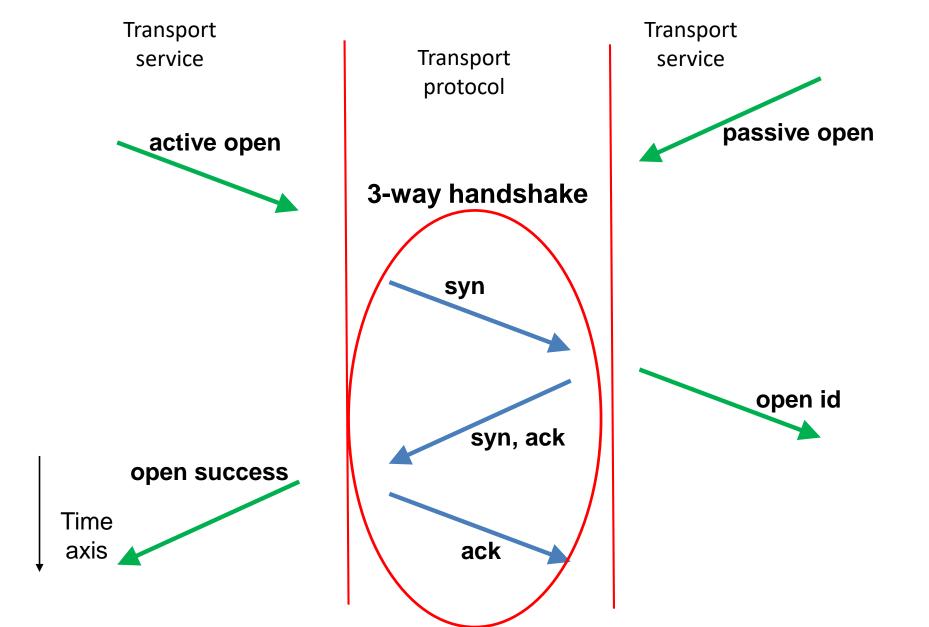
Connect



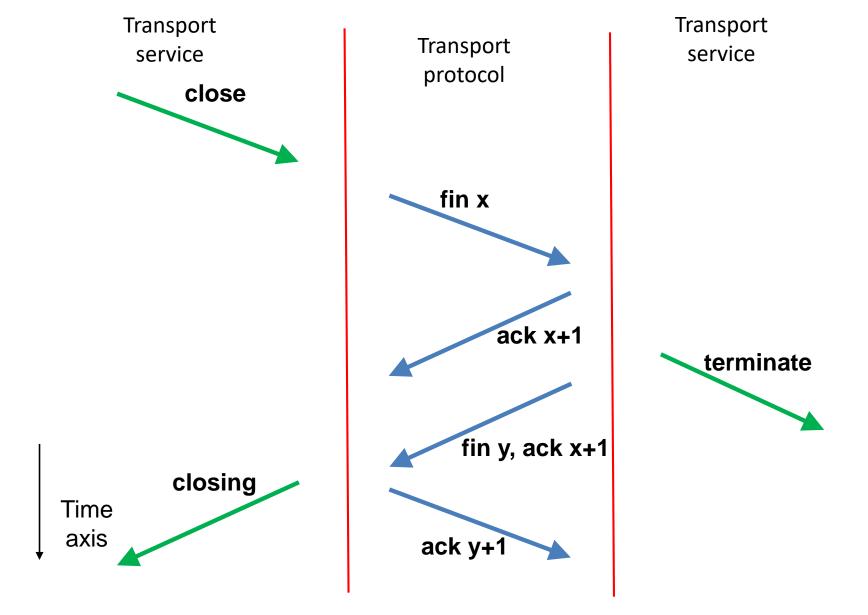
Connect



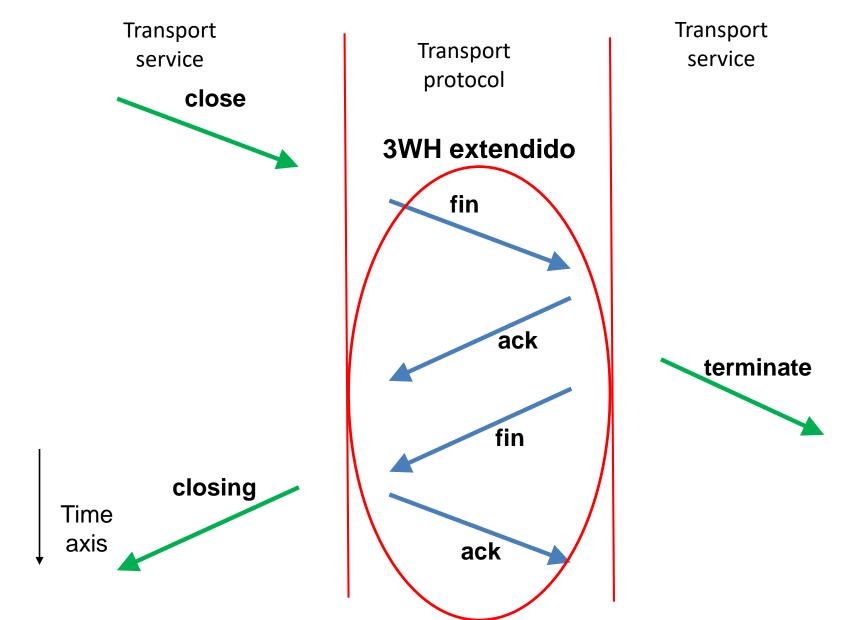
Connect



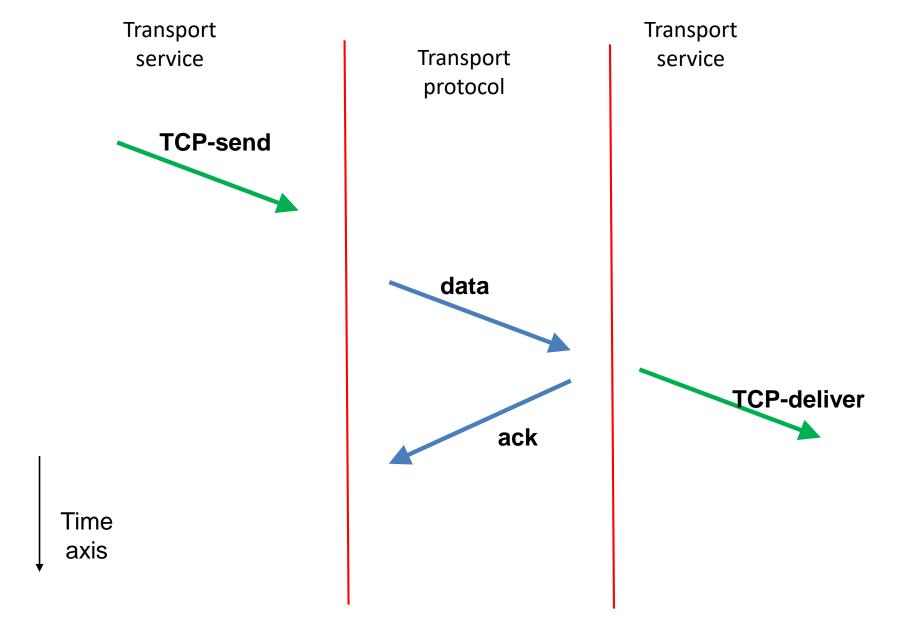
Disconnect / Release



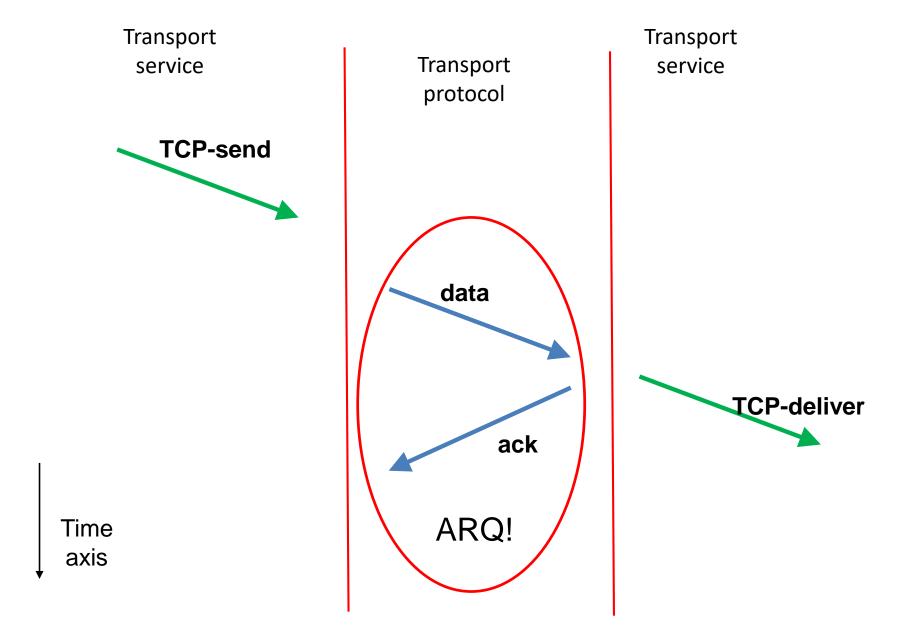
Disconnect / Release



Data transfer



Data transfer



TCP - conceptos

- Ports: "Well-known" (<1024) vs. Efímeros
- "Stream" de datos Cabeceras
- Flags: SYN, ACK, FIN, ...
- Opciones en establecimiento de conexión ...
- ISN (Initial Sequence Number)
- Números de secuencia. SYN, FIN

Cabecera TCP

20 octetos: 5 palabras de 32 bits

```
1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
```

Ports (direcciones TCP)

0 1 2 3 4	5 6 7 8 9 0 1 2 3 4 5	6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1	
1	Source Port	+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+	
I		+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	
1		+-	
 +-+-+-	+-+-+-+-+-	 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	-
 +-+-+-	+-+-+-+-+-	+-	-

Números de secuencia y de ACK

0 1 2 3 4 5 6 7 8 9 0 1 2 3	4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-	+-
Source Port	Destination Port
+-+-+-+-+-+-+-+-+-+-	+-
Seq	uence Number
+-+-+-+-+-+-+-+-+-+-+-+-	+-
Ackno	wledgment Number
+-+-+-+-+-	+-
· +-+-+-+-+-+-	· +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
' +-+-+-+-+-+-	' +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

Ventana anunciada

	2 3 4 5 6 7 8 9 <mark>0</mark> 1 2 3 4 5 6 7 8 9 <mark>0</mark> 1
Source Port	Destination Port
	+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
Ac	t-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
	+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-
	+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

Puntero urgente

+-+-+-+-	+-+-+-+-+-	-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
 +-+-+-	Source Port	Destination Port
I		ce Number
+-+-+-+- 		dgment Number
+-+-+-+-	+-+-+-+-+-	-+-+-+-+-+-+-+-+-+-+-+-+-+
 		Advertised window (awnd)
1		-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

Longitud cabecera

	4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
Source Port	
	ence Number
	+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
length	Advertised window (awnd)
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	 +-+-+-+-+-+-+
 +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	Urgent Pointer

Flags

0 1 2 3	4 5 6 7 8 9	9 0 1 2 3	4 5 6	7 8 9 0 1 2	3 4 5 6 7 8 9	9 0 1
	Source Po	ort			-+-+-+-+- ation Port	-+-+ -+-+
		Seq	uence N	umber		
		Ackno	wledgme	nt Number	-+-+-+-	
Header length 	Reserved			Advertised	window (awnd))
				Urgen	-+-+-+-+- t Pointer	

Flags: ACK, SYN, FIN

0 1 2 3 4 5 6	5 7 8 9 0 1 2 3	4 5 6 7	8 9 0 1 2 3 4 5	5 6 7 8 9 0 1
Sou	-+-+-+-+-+-+- urce Port -+-+-+-+-+-	1	Destination	n Port
1		uence Num	ber	
	Acknow	wledgment		
	A erved C K	s F Y I A N N 	dvertised windo	ow (awnd)
	-+-+-+-+-+-+-		Urgent Poi	inter

Flags: URG, PSH

0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	Destination Port
Sequence	e Number
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+	+-+-+-+-+-+-+-+-+-+-+-+-+ gment Number
+-	
Header $ \mathbf{U} \mathbf{A} \mathbf{P} $ $ \mathbf{S} \mathbf{F} $ length Reserved $ \mathbf{R} \mathbf{C} \mathbf{S} $ $ \mathbf{Y} \mathbf{I} $ $ \mathbf{G} \mathbf{K} \mathbf{H} $ $ \mathbf{N} \mathbf{N} $	
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	Urgent Pointer

Flags: RST

		7 8 9 0 1 2 3 4 5 6 7 8	_
Source Po	ort	Destination Port	
	Sequence N		
	Acknowledgme		
Header length Reserved 	U A P R S F R C S S Y I G K H T N N	Advertised window (awr	 nd)
		Urgent Pointer	

Cabecera TCP

		6 7 8 9 0 1 2 3 4 5 6 7 8 9 0	1
Source	Port	Destination Port	
	Sequence	-+-+-+-+-+-+-+-+-+-+-+	
	Acknowledg	ment Number	
Header length Reserved 	U A P R S F R C S S Y I G K H T N N	-+-+-+-+-+-+-+-+-+-+-+-+	
		-+-+-+-+-+-+-+-+-+-+-+-+	+-+

Checksum

0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	
Source Port	Destination Port
Sequence	Number
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	ment Number
Header	Advertised window (awnd)
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	Urgent Pointer

Parte opcional

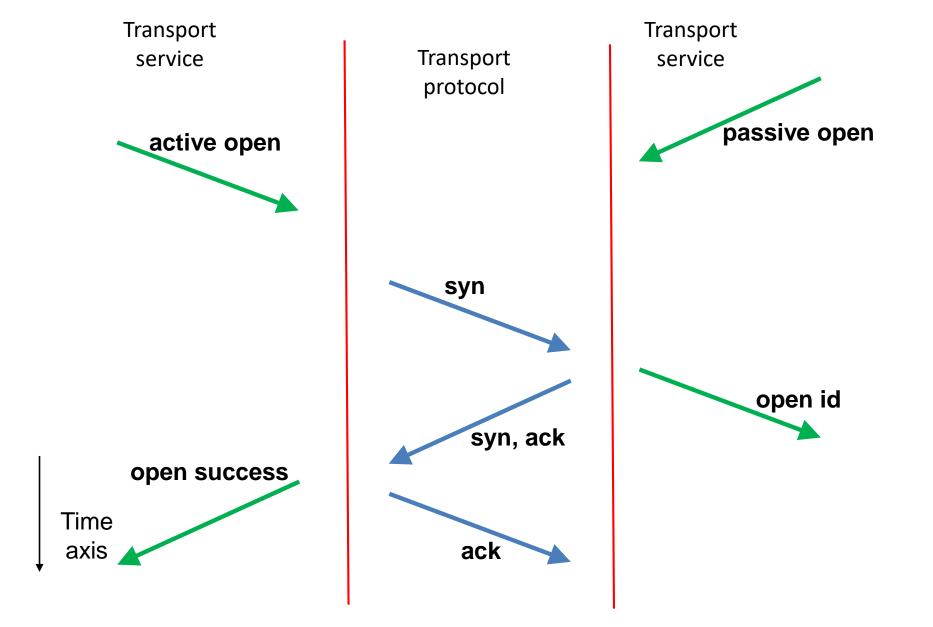
0 1 2 3 4 5 6 7 8	9 0 1 2 3 4 5 6	7 8 9 0 1 2 3 4 5	678901
+-+-+-+-+-+-+-+-+	+-+-+-+-+-+		+-+-+-+-+
Source I	Port	Destination	Port
+-+-+-+-+-+-+-+-+	+-+-+-+-+-		+-+-+-+-+-
	Sequence 1	Jumber	J
+-+-+-+-+-+-+-+-+	+-+-+-+-+-+	+-+-+-+-	+-+-+-+-+
	Acknowledgme		
	U A P R S F R C S S Y I G K H T N N	Advertised windo	w (awnd)
+-+-+-+-+-+-+-+-+			
Checks	sum	Urgent Poi	nter
+-+-+-+-+-+-+	+-+-+-+-+-+	+-+-+-+-+-+-	+-+-+-+-+
	Options	P	adding
+-+-+-+-+-+-+-+	+-+-+-+-+-+-+	+-+-+-+-+-+-	+-+-+-+-+

TCP Header

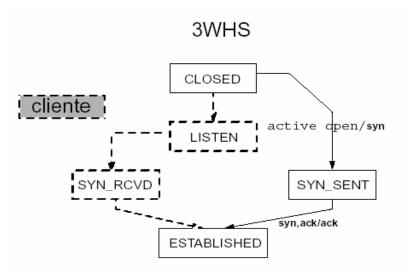
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5	
Source Port	Destination Port
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	Number
	ment Number
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	Advertised window (awnd)
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-	Urgent Pointer
	Padding

State diagrams

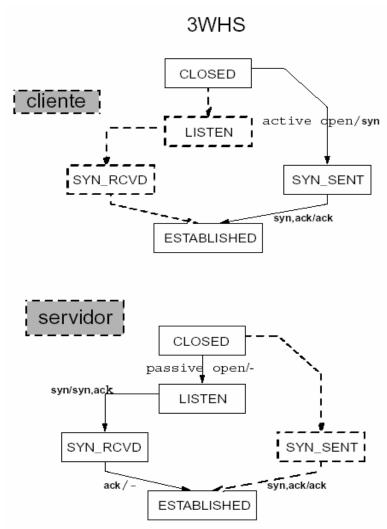
Connect



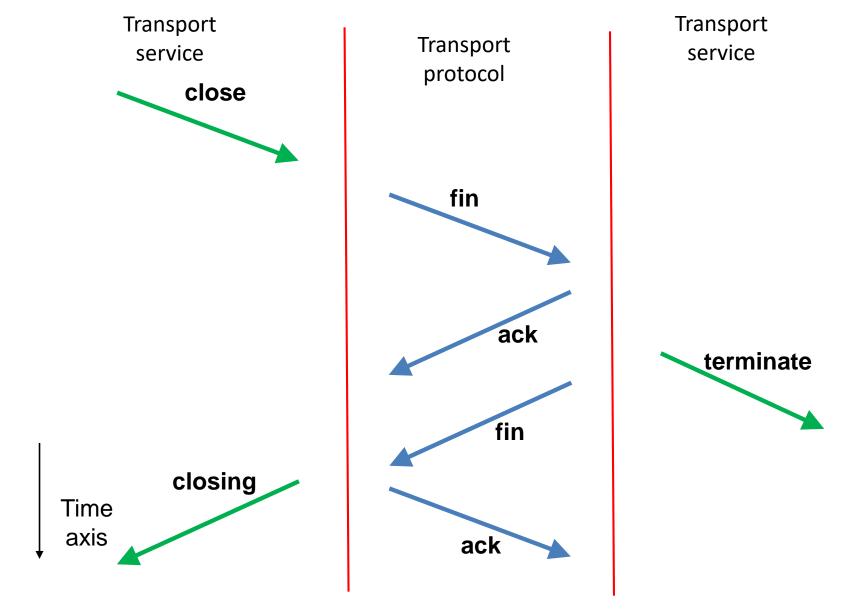
Connect - Client



Connect - Client/Server

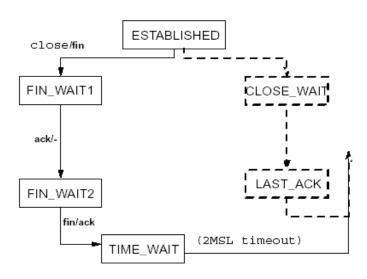


Disconnect / Release



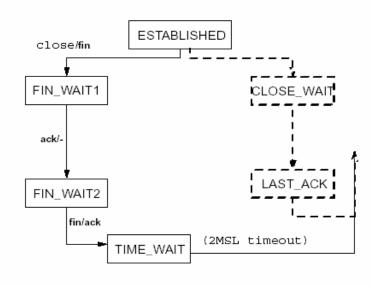
Disconnect - Client

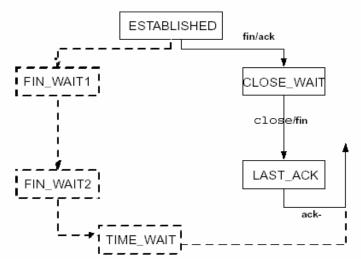
Desconexión



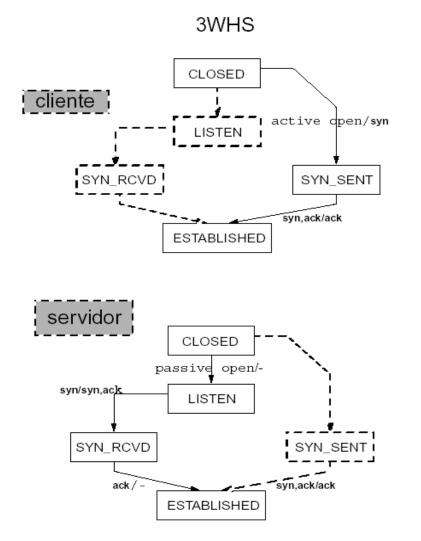
Disconnect – Client/Server

Desconexión

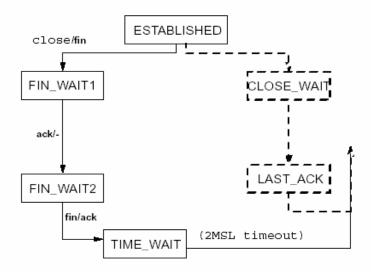


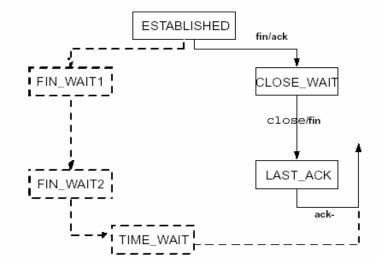


Connect/Disconnect - Client/Server



Desconexión





ENVÍO:

Retransmisión: Segmento no confirmado

- Retransmisión: Segmento no confirmado
- Persistencia: Abortar conexión cuando no hay ACKs

- Retransmisión: Segmento no confirmado
- Persistencia: Abortar conexión cuando no hay ACKs
 RECEPCIÓN:
- Ventana: Tiempo máximo entre envíos ACK/Crédito

- Retransmisión: Segmento no confirmado
- Persistencia: Abortar conexión cuando no hay ACKs
 RECEPCIÓN:
- Ventana: Tiempo máximo entre envíos ACK/Crédito
- Inactividad: Abortar conexión cuando no hay datos

- Retransmisión: Segmento no confirmado
- Persistencia: Abortar conexión cuando no hay ACKs
 RECEPCIÓN:
- Ventana: Tiempo máximo entre envíos ACK/Crédito
- Inactividad: Abortar conexión cuando no hay datos ESPECIALES CONEXIÓN/DESCONEXIÓN:
- Reconexión: Tiempo mínimo entre conexiones "correctas" (con la misma dirección destino)
- Retransmisión de conexión: Tiempo mínimo entre intentos de establ. de conexión (retransmisión de SYNs)

Control de Congestión

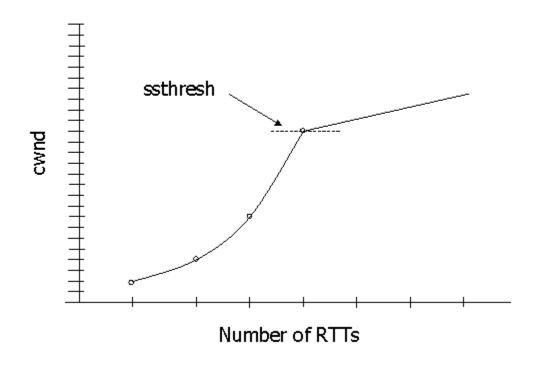
SLOW START / CONGESTION AVOIDANCE (SS/CA)

SS inicial - Si Tout, paso a SS reinicio - Cuando Vc = umbral, paso a CA

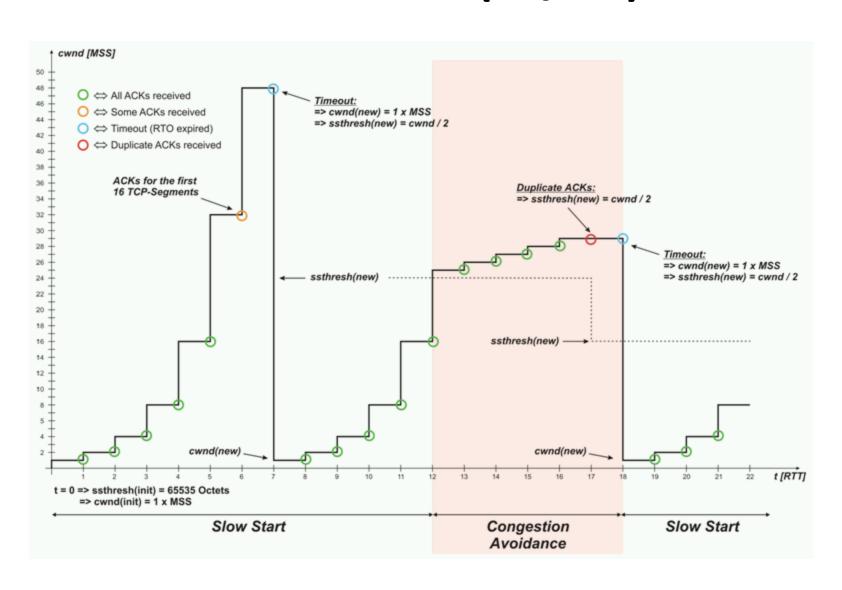
```
Vc := 1 MSS;
                          [V: ventana; c: congestión, a: anunciada, r: real]
umbral := infinito;
para cada ACK nuevo
   si Vc < umbral entonces
                                          [Fase SS] [MSS: Maximum Segment Size]
        Vc := Vc + MSS
   sino
        Vc := Vc + MSS * MSS/Vc;
                                          [Fase CA] [En MSSs: Vc:=Vc+(1/Vc)]
fpara;
                                        (Vc incrementa en 1 cuando recibe Vc octetos)
cuando hay Tout
   (se retransmite el segmento que no ha recibido ACK)
   umbral := max (min (Va, Vc)/2, 2 MSS);
                         [La mitad de la Vr en el momento de la pérdida]
   Vc := 1 MSS;
fcuando;
```

SLOW START / CONGESTION AVOIDANCE (SS/CA)

TCP Slow-Start & Congestion Avoidance



SLOW START / CONGESTION AVOIDANCE (SS/CA)



Capturas WireShark

TCP IP

🚄 captura 1 portátil.pcapno File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help 🔀 🖺 | 9 👄 👄 堅 🕜 🎚 📃 🖳 9 9 9 🕸 🎹 tcp.stream eq 3 No. Time Destination Protocol 192.168.1.63 TCP 66 49420 → 443 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=256 SACK_PERM=1 56 26.556748 216.58.201.142 216.58.201.142 57 26.570621 192.168.1.63 TCP 66 443 → 49420 [SYN, ACK] Seq=0 Ack=1 Win=42900 Len=0 MSS=1430 SACK_PERM=1 WS=128 58 26.570683 192.168.1.63 216.58.201.142 TCP 54 49420 → 443 [ACK] Seq=1 Ack=1 Win=65536 Len=0 59 26.571868 192.168.1.63 216.58.201.142 TLSv1 174 Client Hello 60 26.585374 216.58.201.142 192.168.1.63 TCP 54 443 → 49420 [ACK] Seq=1 Ack=121 Win=43008 Len=0 61 26.585833 216.58.201.142 192.168.1.63 TLSv1 1484 Server Hello 62 26.586249 216.58.201.142 192.168.1.63 TCP 1484 [TCP segment of a reassembled PDU] 63 26.586249 216.58.201.142 192.168.1.63 TLSv1 1213 CertificateServer Key Exchange, Server Hello Done 64 26.586311 192.168.1.63 TCP 54 49420 → 443 [ACK] Seq=121 Ack=4020 Win=65536 Len=0 216.58.201.142 65 26.593698 192.168.1.63 216.58.201.142 TLSv1 188 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message 66 26.607963 216.58.201.142 113 Change Cipher Spec, Encrypted Handshake Message 192.168.1.63 TLSv1 67 26.629750 192.168.1.63 TLSv1 715 Application Data 216.58.201.142 1484 [TCP segment of a reassembled PDU] 68 26.629876 192.168.1.63 216.58.201.142 TCP 69 26.629889 192.168.1.63 216.58.201.142 TLSv1 293 Application Data 70 26.648245 216.58.201.142 192.168.1.63 TCP 54 443 → 49420 [ACK] Seq=4079 Ack=2585 Win=48640 Len=0 71 26.677677 216.58.201.142 192.168.1.63 TLSv1 971 Application Data 72 26.678069 216.58.201.142 192.168.1.63 TLSv1 859 Application Data 73 26.678109 192.168.1.63 216.58.201.142 TCP 54 49420 → 443 [ACK] Seq=2585 Ack=5801 Win=65536 Len=0 74 26.718766 192.168.1.63 216.58.201.142 TCP 54 49420 → 443 [RST, ACK] Seq=2585 Ack=5801 Win=0 Len=0 Frame 56: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0 Ethernet II, Src: IntelCor 3a:04:3a (5c:e0:c5:3a:04:3a), Dst: Mitrasta 3d:35:90 (e0:41:36:3d:35:90) Internet Protocol Version 4, Src: 192.168.1.63, Dst: 216.58.201.142 0100 = Version: 4 0101 = Header Length: 20 bytes (5) > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT) Total Length: 52 Identification: 0x0477 (1143) > Flags: 0x02 (Don't Fragment) Fragment offset: 0 Time to live: 128 Protocol: TCP (6) Header checksum: 0x929c [validation disabled]

0010 0020 0030

Transmission Control Protocol, Src Port: 49420, Dst Port: 443, Seq: 0, Len: 0

Frame (frame), 66 bytes

Source: 192.168.1.63 Destination: 216.58.201.142 [Source GeoIP: Unknown] [Destination GeoIP: Unknown]

[Header checksum status: Unverified]

captura	1 portátil.pcapng	l					
: Edit	View Go C	Capture Analyze Statist	tics Telephony Wireless	Tools Hel	р		
_	am eq 3						
^	Time	Source	Destination	Protocol	Length Info		
56	26.556748	192.168.1.63	216.58.201.142	TCP	66 49420 → 443 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=256 SACK_PERM=1		
57	26.570621	216.58.201.142	192.168.1.63	TCP	66 443 → 49420 [SYN, ACK] Seq=0 Ack=1 Win=42900 Len=0 MSS=1430 SACK_PERM=1 WS=128		
58	26.570683	192.168.1.63	216.58.201.142	TCP	54 49420 → 443 [ACK] Seq=1 Ack=1 Win=65536 Len=0		
59	26.571868	192.168.1.63	216.58.201.142	TLSv1	174 Client Hello		
60	26.585374	216.58.201.142	192.168.1.63	TCP	54 443 → 49420 [ACK] Seq=1 Ack=121 Win=43008 Len=0		
61	26.585833	216.58.201.142	192.168.1.63	TLSv1	1484 Server Hello		
62	26.586249	216.58.201.142	192.168.1.63	TCP	1484 [TCP segment of a reassembled PDU]		
63	26.586249	216.58.201.142	192.168.1.63	TLSv1	1213 CertificateServer Key Exchange, Server Hello Done		
64	26.586311	192.168.1.63	216.58.201.142	TCP	54 49420 → 443 [ACK] Seq=121 Ack=4020 Win=65536 Len=0		
65	26.593698	192.168.1.63	216.58.201.142	TLSv1	188 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message		
66	26.607963	216.58.201.142	192.168.1.63	TLSv1	113 Change Cipher Spec, Encrypted Handshake Message		
67	26.629750	192.168.1.63	216.58.201.142	TLSv1	715 Application Data		
68	26.629876	192.168.1.63	216.58.201.142	TCP	1484 [TCP segment of a reassembled PDU]		
69	26.629889	192.168.1.63	216.58.201.142	TLSv1	293 Application Data		
70	26.648245	216.58.201.142	192.168.1.63	TCP	54 443 → 49420 [ACK] Seq=4079 Ack=2585 Win=48640 Len=0		
71	26.677677	216.58.201.142	192.168.1.63	TLSv1	971 Application Data		
72	26.678069	216.58.201.142	192.168.1.63	TLSv1	859 Application Data		
73	26.678109	192.168.1.63	216.58.201.142	TCP	54 49420 → 443 [ACK] Seq=2585 Ack=5801 Win=65536 Len=0		
74	26.718766	192.168.1.63	216.58.201.142	TCP	54 49420 → 443 [RST, ACK] Seq=2585 Ack=5801 Win=0 Len=0		
Enamo	56. 66 hyt	es on wine (528 hi	ts) 66 bytas canti	upad (528	bits) on interface 0		
	_	·			Mitrasta_3d:35:90 (e0:41:36:3d:35:90)		
	Internet Protocol Version 4, Src: 192.168.1.63, Dst: 216.58.201.142 0100 = Version: 4						
		eader Length: 20 by	tos (5)				
			ox00 (DSCP: CS0, EC	N. Nat EC	r\		
	remendraced cal Length:		0X00 (D3CF. C30, EC	NV. NOC-LC			
	_						
	Identification: 0x0477 (1143)						
	> Flags: 0x02 (Don't Fragment)						
Fragment offset: 0							
Time to live: 128 Protected: TCP (6)							
Protocol: TCP (6)							
	Header checksum: 0x929c [validation disabled] [Header checksum status: Unverified]						
_	unce: 192.16		real				
		216.58.201.142					
	ounce GeoIP:						
_		-					
_	[Destination GeoIP: Unknown] 'ransmission Control Protocol, Src Port: 49420, Dst Port: 443, Seq: 0, Len: 0						

TCP

🚄 captura 1 portátil.pcapno File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help 🔀 🖺 | 9 👄 👄 堅 🕜 🎚 📃 🖳 9 9 9 🕸 🎹 tcp.stream eq 3 Time Destination Protocol 66 49420 → 443 [SYN] Seg=0 Win=8192 Len=0 MSS=1460 WS=256 SACK PERM=1 56 26.556748 192.168.1.63 216.58.201.142 TCP 57 26.570621 216.58.201.142 192.168.1.63 TCP 66 443 → 49420 [SYN, ACK] Seq=0 Ack=1 Win=42900 Len=0 MSS=1430 SACK_PERM=1 WS=128 58 26.570683 192.168.1.63 216.58.201.142 TCP 54 49420 → 443 [ACK] Seq=1 Ack=1 Win=65536 Len=0 59 26.571868 192.168.1.63 216.58.201.142 TLSv1 174 Client Hello 60 26.585374 216.58.201.142 192.168.1.63 TCP 54 443 → 49420 [ACK] Seq=1 Ack=121 Win=43008 Len=0 216.58.201.142 192.168.1.63 TLSv1 61 26.585833 1484 Server Hello 216.58.201.142 192.168.1.63 TCP 1484 [TCP segment of a reassembled PDU] 62 26.586249 216.58.201.142 192.168.1.63 TLSv1 1213 CertificateServer Key Exchange, Server Hello Done 63 26.586249 TCP 54 49420 → 443 [ACK] Seq=121 Ack=4020 Win=65536 Len=0 64 26.586311 192.168.1.63 216.58.201.142 65 26.593698 192.168.1.63 216.58.201.142 TLSv1 188 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message 66 26.607963 216.58.201.142 192.168.1.63 TLSv1 113 Change Cipher Spec, Encrypted Handshake Message 192.168.1.63 TLSv1 715 Application Data 67 26.629750 216.58.201.142 1484 [TCP segment of a reassembled PDU] 68 26.629876 192.168.1.63 216.58.201.142 TCP 69 26.629889 192.168.1.63 216.58.201.142 TLSv1 293 Application Data 216.58.201.142 192.168.1.63 TCP 54 443 → 49420 [ACK] Seq=4079 Ack=2585 Win=48640 Len=0 70 26.648245 71 26.677677 216.58.201.142 192.168.1.63 TLSv1 971 Application Data 72 26.678069 216.58.201.142 192.168.1.63 TLSv1 859 Application Data 73 26.678109 192.168.1.63 216.58.201.142 TCP 54 49420 → 443 [ACK] Seq=2585 Ack=5801 Win=65536 Len=0 74 26.718766 192.168.1.63 TCP 54 49420 → 443 [RST, ACK] Seq=2585 Ack=5801 Win=0 Len=0 216.58.201.142 Frame 56: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0 Ethernet II, Src: IntelCor 3a:04:3a (5c:e0:c5:3a:04:3a), Dst: Mitrasta 3d:35:90 (e0:41:36:3d:35:90) Internet Protocol Version 4, Src: 192.168.1.63, Dst: 216.58.201.142 Transmission Control Protocol, Src Port: 49420, Dst Port: 443, Seq: 0, Len: 0 Source Port: 49420 Destination Port: 443 [Stream index: 3] [TCP Segment Len: 0] Sequence number: 0 (relative sequence number) Acknowledgment number: 0 Header Length: 32 bytes Flags: 0x002 (SYN) Window size value: 8192 [Calculated window size: 8192] Checksum: 0x3369 [unverified] [Checksum Status: Unverified] Urgent pointer: 0 > Options: (12 bytes), Maximum segment size, No-Operation (NOP), Window scale, No-Operation (NOP), No-Operation (NOP), SACK permitted 0000 10 34 04 77 40 00 80 06 92 9c c0 a8 01 3f d8 : 0010

Frame (frame), 66 bytes

0020 0030

```
🚄 captura 1 portátil.pcapng
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
■ Ø Ø □ Ø □ □ □ X □ Q ⇔ ⇒ 望 T ₺ 등 □ □ Q Q 및 耶
tcp.stream eq 3
                                                                      Length Info
No.
       Time
                    Source
                                       Destination
                                                          Protocol
                    192.168.1.63
     56 26.556748
                                       216.58.201.142
                                                          TCP
                                                                         66 49420 → 443 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS=256 SACK PERM=1
                                                                         66 443 → 49420 [SYN, ACK] Seq=0 Ack=1 Win=42900 Len=0 MSS=1430 SACK_PERM=1 WS=
                                                          TCP
     57 26.570621
                    216.58.201.142
                                       192.168.1.63
     58 26.570683
                    192.168.1.63
                                       216.58.201.142
                                                          TCP
                                                                         54 49420 → 443 [ACK] Seq=1 Ack=1 Win=65536 Len=0
     59 26.571868
                    192.168.1.63
                                       216.58.201.142
                                                          TLSv1
                                                                        174 Client Hello
     60 26.585374
                    216.58.201.142
                                       192.168.1.63
                                                          TCP
                                                                         54 443 → 49420 [ACK] Seq=1 Ack=121 Win=43008 Len=0
                                                                       1484 Server Hello
     61 26.585833
                    216.58.201.142
                                       192.168.1.63
                                                          TLSv1
                                                          TCP
                                                                       1484 [TCP segment of a reassembled PDU]
     62 26.586249
                    216.58.201.142
                                       192.168.1.63
                                                                       1213 CertificateServer Key Exchange, Server Hello Done
     63 26.586249
                    216.58.201.142
                                       192.168.1.63
                                                          TLSv1
     64 26.586311
                    192.168.1.63
                                       216.58.201.142
                                                          TCP
                                                                         54 49420 → 443 [ACK] Seq=121 Ack=4020 Win=65536 Len=0
     65 26.593698
                    192.168.1.63
                                       216.58.201.142
                                                          TLSv1
                                                                        188 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
     66 26.607963
                    216.58.201.142
                                       192.168.1.63
                                                          TLSv1
                                                                        113 Change Cipher Spec, Encrypted Handshake Message
     67 26.629750
                    192.168.1.63
                                       216.58.201.142
                                                          TLSv1
                                                                        715 Application Data
                                       216.58.201.142
     68 26.629876
                    192.168.1.63
                                                          TCP
                                                                       1484 [TCP segment of a reassembled PDU]
     69 26.629889
                    192.168.1.63
                                       216.58.201.142
                                                         TLSv1
                                                                        293 Application Data
     70 26.648245
                    216.58.201.142
                                       192.168.1.63
                                                          TCP
                                                                         54 443 → 49420 [ACK] Seq=4079 Ack=2585 Win=48640 Len=0
     71 26.677677
                    216.58.201.142
                                       192.168.1.63
                                                          TLSv1
                                                                        971 Application Data
     72 26.678069
                    216.58.201.142
                                       192.168.1.63
                                                          TLSv1
                                                                        859 Application Data
     73 26.678109
                    192.168.1.63
                                       216.58.201.142
                                                          TCP
                                                                         54 49420 → 443 [ACK] Seg=2585 Ack=5801 Win=65536 Len=0
     74 26.718766
                    192.168.1.63
                                       216.58.201.142
                                                          TCP.
                                                                         54 49420 → 443 [RST, ACK] Seq=2585 Ack=5801 Win=0 Len=0
 Frame 56: 66 bytes on wire (528 bits), 66 bytes captured (528 bits) on interface 0
  Ethernet II, Src: IntelCor 3a:04:3a (5c:e0:c5:3a:04:3a), Dst: Mitrasta 3d:35:90 (e0:41:36:3d:35:90)
  Internet Protocol Version 4, Src: 192.168.1.63, Dst: 216.58.201.142
Transmission Control Protocol, Src Port: 49420, Dst Port: 443, Seq: 0, Len: 0
     Source Port: 49420
     Destination Port: 443
     [Stream index: 3]
     [TCP Segment Len: 0]
     Sequence number: 0
                           (relative sequence number)
     Acknowledgment number: 0
     Header Length: 32 bytes
  > Flags: 0x002 (SYN)
    Window size value: 8192
     [Calculated window size: 8192]
     Checksum: 0x3369 [unverified]
     [Checksum Status: Unverified]
     Urgent pointer: 0
  > Options: (12 bytes), Maximum segment size, No-Operation (NOP), Window scale, No-Operation (NOP), No-Operation (NOP), SACK permitted
```

HTTP

🚄 http_gzip.cap

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		<ctrl-></ctrl->

No.	Time	Source	Destination	Protocol	Length Info
	1 0.000000	192.168.69.2	192.168.69.1	TCP	74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK_PERM=1 TSval=2011387883 TSecr=0 WS=128
	2 0.000059	192.168.69.1	192.168.69.2	TCP	74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK_PERM=1 TSval=432614628 TSecr=2011387883 WS=1
	3 0.000153	192.168.69.2	192.168.69.1	TCP	66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387883 TSecr=432614628
	4 0.000282	192.168.69.2	192.168.69.1	HTTP	511 GET /test/ethereal.html HTTP/1.1
	5 0.000330	192.168.69.1	192.168.69.2	TCP	66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=432614628 TSecr=2011387883
-	6 0.021452	192.168.69.1	192.168.69.2	HTTP	468 HTTP/1.1 200 OK (text/html)
	7 0.021629	192.168.69.2	192.168.69.1	TCP	66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912 Len=0 TSval=2011387905 TSecr=432614630
	8 0.021755	192.168.69.1	192.168.69.2	TCP	66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=6432 Len=0 TSval=432614630 TSecr=2011387905
	9 0.022677	192.168.69.2	192.168.69.1	TCP	66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSval=2011387906 TSecr=432614630
L	10 0.022715	192.168.69.1	192.168.69.2	TCP	66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432614630 TSecr=2011387906

- Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
- > Ethernet II, Src: Kingston_2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple_67:49:3c (00:0a:95:67:49:3c)
- Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2
- Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402
- Hypertext Transfer Protocol

```
00 0a 95 67 49 3c 00 c0 f0 2d 4a a3 08 00 45 00
                                                        ...gI<...-J...E.
     01 c6 bf c4 40 00 40 06 6e 19 c0 a8 45 01 c0 a8
                                                       ....@.@. n...E...
0020 45 02 00 50 85 0b 96 18 93 27 8f f5 a3 f0 80 18
                                                       19 20 2e ef 00 00 01 01 08 0a 19 c9 2c e6 77 e3
                                                        . ..... ....,.W.
     57 eb 48 54 54 50 2f 31 2e 31 20 32 30 30 20 4f
                                                       W.HTTP/1 .1 200 O
     4b 0d 0a 44 61 74 65 3a 20 46 72 69 2c 20 32 39
                                                       K..Date: Fri, 29
     20 4f 63 74 20 32 30 30 34 20 30 35 3a 32 31 3a
                                                        Oct 200 4 05:21:
                                                       00 GMT.. Server:
     30 30 20 47 4d 54 0d 0a 53 65 72 76 65 72 3a 20
     41 70 61 63 68 65 2f 32 2e 30 2e 35 30 20 28 46
                                                       Apache/2 .0.50 (F
     65 64 6f 72 61 29 0d 0a 4c 61 73 74 2d 4d 6f 64
                                                        edora).. Last-Mod
     69 66 69 65 64 3a 20 46 72 69 2c 20 32 39 20 4f
                                                       ified: Fri, 29 O
                                                        ct 2004 05:20:21
     63 74 20 32 30 30 34 20 30 35 3a 32 30 3a 32 31
     20 47 4d 54 0d 0a 45 54 61 67 3a 20 22 31 32 36
                                                        GMT..ET ag: "126
                                                        e1f-6d-3 71b2f40"
00d0 65 31 66 2d 36 64 2d 33 37 31 62 32 66 34 30 22
     0d 0a 41 63 63 65 70 74 2d 52 61 6e 67 65 73 3a
                                                        ..Accept -Ranges:
     20 62 79 74 65 73 0d 0a 56 61 72 79 3a 20 41 63
                                                        bytes.. Vary: Ac
     63 65 70 74 2d 45 6e 63 6f 64 69 6e 67 0d 0a 43
                                                       cept-Enc oding..C
     6f 6e 74 65 6e 74 2d 45 6e 63 6f 64 69 6e 67 3a
                                                        ontent-E ncoding:
     20 67 7a 69 70 0d 0a 43 6f 6e 74 65 6e 74 2d 4c
                                                        gzip..C ontent-L
     65 6e 67 74 68 3a 20 39 32 0d 0a 43 6f 6e 6e 65
                                                       ength: 9 2..Conne
     63 74 69 6f 6e 3a 20 63 6c 6f 73 65 0d 0a 43 6f
                                                        ction: c lose..Co
     6e 74 65 6e 74 2d 54 79 70 65 3a 20 74 65 78 74
                                                       ntent-Ty pe: text
     2f 68 74 6d 6c 3b 20 63 68 61 72 73 65 74 3d 55
                                                        /html; c harset=U
     54 46 2d 38 0d 0a 0d 0a 1f 8b 08 00 00 00 00 00
                                                       TF-8....
     00 03 b3 c9 28 c9 cd b1 e3 b2 c9 48 4d 4c b1 e3
                                                        ....(... ...HML..
     e2 b4 29 c9 2c c9 49 b5 73 2d c9 48 2d 4a 4d cc
                                                        ..).,.I. s-.H-JM.
01a0 51 70 ad 48 cc 2d c8 49 55 08 48 4c 4f b5 d1 87
                                                       Qp.H.-.I U.HLO...
01b0 48 72 d9 e8 43 54 db 24 e5 a7 54 02 35 71 62 55
                                                       Hr..CT.$ ..T.5qbU
```

01d0 6d 00 00 00

.4L.... 1....n.C

m...



http_gzip.cap Go Capture Analyze Statistics Telephony Wireless Tools Help ile Edit View □ X □ Q ⊕ ⇒ ≅ T U □ Q Q Q Ⅲ Apply a display filter .. <Ctrl-/> Source Destination Protocol Length Info Time 192.168.69.2 192.168.69.1 TCP 74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK PERM=1 TSval=2011387883 TSecr=0 1 0.000000 192.168.69.1 TCP 74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK PERM=1 TSval=43261462 2 0.000059 192.168.69.2 192.168.69.2 TCP 66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387883 TSecr=432614628 3 0.000153 192.168.69.1 4 0.000282 192.168.69.2 192.168.69.1 HTTP 511 GET /test/ethereal.html HTTP/1.1 5 0.000330 192.168.69.1 192.168.69.2 TCP 66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=432614628 TSecr=2011387883 6 0.021452 192.168.69.1 192.168.69.2 HTTP 468 HTTP/1.1 200 OK (text/html) 7 0.021629 192.168.69.2 TCP 66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912 Len=0 TSval=2011387905 TSecr=432614630 192.168.69.1 8 0.021755 192.168.69.1 192.168.69.2 TCP 66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=6432 Len=0 TSval=432614630 TSecr=201138790 9 0.022677 192.168.69.2 192.168.69.1 TCP 66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSval=2011387906 TSecr=43261463 10 0.022715 192.168.69.1 192.168.69.2 TCP 66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432614630 TSecr=2011387906 Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits) Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c) Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2 Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402

gzip..C ontent-L

Нуре	erte	xt	Tra	nsf	en	Pro	toc	ol									
900	00	0a	95	67	49	3с	00	c0	f0	2d	4a	аЗ	98	00	45	00	gI <je.< th=""></je.<>
910	01	с6	bf	<4	40	00	40	96	6e	19	c0	а8	45	01	c0	а8	@.@. nE
920	45	02	00	50	85	0b	96	18	93	27	8f	f5	аЗ	f0	80	18	EP'
23 <i>0</i>	19	20	26	ρf	aa	aa	Й 1	9 1	98	Ωа	19	~9	20	eĥ	77	63	lol

1090 | 65 64 6f 72 61 29 0d 0a 4c 61 73 74 2d 4d 6f 64 edora).. Last-Mod 10a0 | 69 66 69 65 64 3a 20 46 | 72 69 2c 20 32 39 20 4f ified: Fri, 29 O 10b0 | 63 **74** 20 32 30 30 34 20 30 35 3a 32 30 3a 32 31 ct 2004 05:20:21 10c0 20 47 4d 54 0d 0a 45 54 61 67 3a 20 22 31 32 36 GMT..ET ag: "126 10d0 65 31 66 2d 36 64 2d 33 37 31 62 32 66 34 30 22 e1f-6d-3 71b2f40" ..Accept -Ranges: 10e0 | 0d 0a 41 63 63 65 70 74 | 2d 52 61 6e 67 65 73 3a 10f0 20 62 79 74 65 73 0d 0a 56 61 72 79 3a 20 41 63 bytes.. Vary: Ac 100 63 65 70 74 2d 45 6e 63 6f 64 69 6e 67 0d 0a 43 cept-Enc oding..C 110 | 6f 6e 74 65 6e 74 2d 45 | 6e 63 6f 64 69 6e 67 3a ontent-E ncoding:

0130 65 6e 67 74 68 3a 20 39 32 0d 0a 43 6f 6e 6e 65 ength: 9 2..Conne 0140 63 74 69 6f 6e 3a 20 63 6c 6f 73 65 0d 0a 43 6f ction: c lose..Co 0150 6e 74 65 6e 74 2d 54 79 70 65 3a 20 74 65 78 74 ntent-Ty pe: text

120 | 20 67 7a 69 70 0d 0a 43 | 6f 6e 74 65 6e 74 2d 4c

HTTP Request

```
http_gzip.cap
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
◢ ■ ∅ ⑧ │ 📙 🔚 🔀 🚨 │ 약 ⇔ ⇔ 堅 😿 🕭 🕎 🚞 │ 역 역 역 🏨
Apply a display filter ... <Ctrl-/>
                                 Destination
                                                Protocol
                                                          Length Info
       1 0.000000 192.168.69.2
                                 192.168.69.1 TCP
                                                            74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK PERM=1 TSval=2011387883 TSecr=0 WS=128
       2 0.000059 192.168.69.1 192.168.69.2 TCP
                                                            74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK PERM=1 TSval=432614628 TSecr=2011387883 WS=1
       3 0.000153 192.168.69.2 192.168.69.1 TCP
                                                            66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387883 TSecr=432614628
       4 0.000282 192.168.69.2 192.168.69.1 HTTP
                                                           511 GET /test/ethereal.html HTTP/1.1
       5 0.000330 192.168.69.1 192.168.69.2 TCP
                                                            66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=432614628 TSecr=2011387883
       6 0.021452 192.168.69.1 192.168.69.2 HTTP
                                                           468 HTTP/1.1 200 OK (text/html)
       7 0.021629 192.168.69.2 192.168.69.1 TCP
                                                            66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912 Len=0 TSval=2011387905 TSecr=432614630
       8 0.021755 192.168.69.1 192.168.69.2 TCP
                                                            66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=6432 Len=0 TSval=432614630 TSecr=2011387905
       9 0.022677 192.168.69.2 192.168.69.1 TCP
                                                            66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSval=2011387906 TSecr=432614630
      10 0.022715 192.168.69.1 192.168.69.2 TCP
                                                            66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432614630 TSecr=2011387906
 Frame 4: 511 bytes on wire (4088 bits), 511 bytes captured (4088 bits)
 Ethernet II, Src: Apple 67:49:3c (00:0a:95:67:49:3c), Dst: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3)
 Internet Protocol Version 4, Src: 192.168.69.2, Dst: 192.168.69.1
 Transmission Control Protocol, Src Port: 34059, Dst Port: 80, Seq: 1, Ack: 1, Len: 445
 Hypertext Transfer Protocol
  > GET /test/ethereal.html HTTP/1.1\r\n
   Host: cerberus\r\n
   User-Agent: Mozilla/5.0 (X11; U; Linux ppc; rv:1.7.3) Gecko/20041004 Firefox/0.10.1\r\n
   Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,image/png,*/*;q=0.5\r\n
```

Keep-Alive: 300\r\n
Connection: keep-alive\r\n

[HTTP request 1/1]
[Response in frame: 6]

 $\r\n$

Accept-Language: en-us,en;q=0.5\r\n Accept-Encoding: gzip,deflate\r\n

Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7\r\n

[Full request URI: http://cerberus/test/ethereal.html]

> Cookie: FGNCLIID=05c04axp1yaqynldtcdiwis0ag1\r\n

```
http_gzip.cap.
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
Apply a display filter ... <Ctrl-/>
No.
                                                          Length Info
        Time
                  Source
                                 Destination
                                                Protocol
                 192.168.69.2
                                 192.168.69.1
                                                TCP
                                                           74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK PERM=
       1 0.000000
                                                TCP
                                                            74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460
       2 0.000059 192.168.69.1
                                192.168.69.2
       3 0.000153 192.168.69.2
                                192.168.69.1
                                                TCP
                                                            66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387
                                                           511 GET /test/ethereal.html HTTP/1.1
       4 0.000282 192.168.69.2
                                 192.168.69.1
                                                HTTP
                                                            66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=43261
       5 0.000330 192.168.69.1
                                192.168.69.2
                                                TCP
       6 0.021452 192.168.69.1
                                192.168.69.2
                                                HTTP
                                                           468 HTTP/1.1 200 OK (text/html)
       7 0.021629 192.168.69.2
                                                TCP
                                                            66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912 Len=0 TSval=201
                                192.168.69.1
                                                TCP
                                                            66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=6432 Len=0 TSva
       8 0.021755 192.168.69.1
                                192.168.69.2
       9 0.022677 192.168.69.2
                                192.168.69.1
                                                TCP
                                                            66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSva
      10 0.022715 192.168.69.1
                                192.168.69.2
                                                TCP
                                                            66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432
> Frame 4: 511 bytes on wire (4088 bits), 511 bytes captured (4088 bits)
 Ethernet II, Src: Apple 67:49:3c (00:0a:95:67:49:3c), Dst: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3)
 Internet Protocol Version 4, Src: 192.168.69.2, Dst: 192.168.69.1
 Transmission Control Protocol, Src Port: 34059, Dst Port: 80, Seq: 1, Ack: 1, Len: 445
Hypertext Transfer Protocol
   GET /test/ethereal.html HTTP/1.1\r\n
    Host: cerberus\r\n
   User-Agent: Mozilla/5.0 (X11; U; Linux ppc; rv:1.7.3) Gecko/20041004 Firefox/0.10.1\r\n
    Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,image/png,*/*;q=0.5\r\n
    Accept-Language: en-us,en;q=0.5\r\n
    Accept-Encoding: gzip,deflate\r\n
    Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7\r\n
    Keep-Alive: 300\r\n
    Connection: keep-alive\r\n
  > Cookie: FGNCLIID=05c04axp1yaqynldtcdiwis0ag1\r\n
    \r\n
    [Full request URI: http://cerberus/test/ethereal.html]
    [HTTP request 1/1]
    [Response in frame: 6]
```

HTTP Response TCP

http_qzip.cap File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help 📙 🖺 🔀 🖺 🤇 👄 👄 堅 🕜 🌡 🚆 📵 Q Q 🗨 🎹 Apply a display filter ... <Ctrl-/> Protocol 1 0.000000 192.168.69.2 192.168.69.1 TCP 74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK PERM=1 TSval=2011387883 TSecr=0 WS=128 192.168.69.1 192.168.69.2 TCP 74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK PERM=1 TSval=432614628 TSecr=2011387883 WS=1 2 0.000059 192.168.69.2 192.168.69.1 TCP 66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387883 TSecr=432614628 3 0.000153 4 0.000282 192.168.69.2 192.168.69.1 HTTP 511 GET /test/ethereal.html HTTP/1.1 5 0.000330 192.168.69.1 192.168.69.2 TCP 66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=432614628 TSecr=2011387883 6 0.021452 192.168.69.1 192.168.69.2 HTTP 468 HTTP/1.1 200 OK (text/html) 192.168.69.2 192.168.69.1 66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912 Len=0 TSval=2011387905 TSecr=432614630 7 0.021629 TCP 8 0.021755 192.168.69.1 192.168.69.2 TCP 66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=6432 Len=0 TSval=432614630 TSecr=2011387905 192.168.69.1 TCP 66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSval=2011387906 TSecr=432614630 9 0.022677 192.168.69.2 10 0.022715 192.168.69.1 192.168.69.2 TCP 66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432614630 TSecr=2011387906 Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits) Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c) Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2 Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402 Source Port: 80 Destination Port: 34059 [Stream index: 0] [TCP Segment Len: 402] Sequence number: 1 (relative sequence number) [Next sequence number: 403 (relative sequence number)] Acknowledgment number: 446 (relative ack number) Header Length: 32 bytes > Flags: 0x018 (PSH, ACK) Window size value: 6432 [Calculated window size: 6432] [Window size scaling factor: 1] Checksum: 0x2eef [unverified] [Checksum Status: Unverified] Urgent pointer: 0 > Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps > [SEQ/ACK analysis] Hypertext Transfer Protocol Line-based text data: text/html

00 0a 95 67 49 3c 00 c0 f0 2d 4a a3 08 00 45 00 ...gI<...-J...E. 0010 01 c6 bf c4 40 00 40 06 6e 19 c0 a8 45 01 c0 a8@.@. n...E... 0020 45 02 00 50 85 0b 96 18 93 27 8f f5 a3 f0 80 18 E..P.... .'..... 0030 19 20 2e ef 00 00 01 01 08 0a 19 c9 2c e6 77 e3 0040 57 eb 48 54 54 50 2f 31 2e 31 20 32 30 30 20 4f W.HTTP/1 .1 200 O 0050 4b 0d 0a 44 61 74 65 3a 20 46 72 69 2c 20 32 39 K..Date: Fri. 29

Frame (468 bytes) Uncompressed entity body (109 bytes)

http gzip

```
Length Info
No.
           Time
                       Source
                                          Destination
                                                            Protocol
                                                            TCP
                                                                           74 34059 → 80 [SYN] Seg=0 Win=5840 Len=0 MSS=
         1 0.000000
                       192.168.69.2
                                          192.168.69.1
                                                                           74 80 → 34059 [SYN, ACK] Seg=0 Ack=1 Win=5792
         2 0.000059
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                                                                           66 34059 → 80 [ACK] Seg=1 Ack=1 Win=5888 Len=
         3 0.000153
                      192.168.69.2
                                          192.168.69.1
                                                            TCP
         4 0.000282
                       192.168.69.2
                                          192.168.69.1
                                                            HTTP
                                                                           511 GET /test/ethereal.html HTTP/1.1
         5 0.000330
                       192.168.69.1
                                          192.168.69.2
                                                                           66 80 → 34059 [ACK] Seg=1 Ack=446 Win=6432 Le
                                                            TCP
         6 0.021452
                       192.168.69.1
                                          192.168.69.2
                                                            HTTP
                                                                          468 HTTP/1.1 200 OK (text/html)
                                                                           66 34059 → 80 [ACK] Seg=446 Ack=403 Win=6912
         7 0.021629
                       192.168.69.2
                                          192.168.69.1
                                                            TCP
                                                                           66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=
         8 0.021755
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                       192.168.69.2
                                                                           66 34059 → 80 [FIN, ACK] Seg=446 Ack=404 Win=
         9 0.022677
                                          192.168.69.1
                                                            TCP
                       192.168.69.1
                                          192.168.69.2
                                                                           66 80 → 34059 [ACK] Seg=404 Ack=447 Win=6432
        10 0.022715
                                                            TCP
> Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c)
> Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2

    Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402

     Source Port: 80
     Destination Port: 34059
     [Stream index: 0]
     [TCP Segment Len: 402]
     Sequence number: 1
                         (relative sequence number)
     [Next sequence number: 403 (relative sequence number)]
     Acknowledgment number: 446
                                  (relative ack number)
     Header Length: 32 bytes
  > Flags: 0x018 (PSH, ACK)
    Window size value: 6432
     [Calculated window size: 6432]
     [Window size scaling factor: 1]
     Checksum: 0x2eef [unverified]
     [Checksum Status: Unverified]
     Urgent pointer: 0
  > Options: (12 bytes), No-Operation (NOP), No-Operation (NOP), Timestamps
  > [SEQ/ACK analysis]
  Hypertext Transfer Protocol
> Line-based text data: text/html
```

HTTP Response TCP Flags

```
http_gzip.cap
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
           📙 🔚 🔀 🖺 | ९ 👄 👄 ≊ ዥ 🌡 🚍 📃 🗨 ६ ६ 🕮
Apply a display filter ... <Ctrl-/>
                                         Destination
                                                                       Length Info
         1 0.000000
                      192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                          74 34059 → 80 [SYN] Seg=0 Win=5840 Len=0 MSS=1460 SACK PERM=1 TSval=2011387883 TSecr=0 WS=128
         2 0.000059
                      192.168.69.1
                                         192.168.69.2
                                                           TCP
                                                                         74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK PERM=1 TSval=432614628 TSecr=2011387883 WS=1
         3 0.000153
                      192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                         66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387883 TSecr=432614628
         4 0.000282
                      192.168.69.2
                                         192.168.69.1
                                                           HTTP
                                                                        511 GET /test/ethereal.html HTTP/1.1
         5 0.000330
                      192.168.69.1
                                         192,168,69,2
                                                           TCP
                                                                         66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=432614628 TSecr=2011387883
         6 0.021452
                      192.168.69.1
                                         192,168,69,2
                                                                        468 HTTP/1.1 200 OK (text/html)
         7 0.021629
                      192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                         66 34059 → 80 [ACK] Seg=446 Ack=403 Win=6912 Len=0 TSval=2011387905 TSecr=432614630
         8 0.021755
                      192.168.69.1
                                         192.168.69.2
                                                           TCP
                                                                         66 80 → 34059 [FIN, ACK] Seg=403 Ack=446 Win=6432 Len=0 TSval=432614630 TSecr=2011387905
         9 0.022677
                      192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                         66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSval=2011387906 TSecr=432614630
        10 0.022715
                      192.168.69.1
                                         192.168.69.2
                                                                          66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432614630 TSecr=2011387906
  Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
  Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c)
  Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2

▼ Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402

    Source Port: 80
    Destination Port: 34059
    [Stream index: 0]
    [TCP Segment Len: 402]
    Sequence number: 1
                          (relative sequence number)
                                  (relative sequence number)]
    [Next sequence number: 403
    Acknowledgment number: 446
                                  (relative ack number)
    Header Length: 32 bytes

▼ Flags: 0x018 (PSH, ACK)

       000. .... = Reserved: Not set
       ...0 .... = Nonce: Not set
       .... 0... = Congestion Window Reduced (CWR): Not set
       .... .0.. .... = ECN-Echo: Not set
       .... ..0. .... = Urgent: Not set
       .... = Acknowledgment: Set
       .... 1... = Push: Set
       .... .... .0.. = Reset: Not set
       .... .... ..0. = Syn: Not set
       .... .... 0 = Fin: Not set
       [TCP Flags: .....AP...]
    Window size value: 6432
    [Calculated window size: 6432]
    [Window size scaling factor: 1]
      00 0a 95 67 49 3c 00 c0 f0 2d 4a a3 08 00 45 00
                                                         ...gI<...-J...E.
0010 01 c6 bf c4 40 00 40 06 6e 19 c0 a8 45 01 c0 a8
                                                         ....@.@. n...E...
0020 45 02 00 50 85 0b 96 18 93 27 8f f5 a3 f0 80 18
                                                        E..P.... .'.....
0030 19 20 2e ef 00 00 01 01 08 0a 19 c9 2c e6 77 e3
                                                         0040 57 eb 48 54 54 50 2f 31 2e 31 20 32 30 30 20 4f
                                                         W.HTTP/1 .1 200 O
0050 4b 0d 0a 44 61 74 65 3a 20 46 72 69 2c 20 32 39
                                                         K..Date: Fri, 29
```

Frame (468 bytes) Uncompressed entity body (109 bytes)

http gzip

```
30.000153
                       192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                          66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=
         4 0.000282
                       192.168.69.2
                                         192.168.69.1
                                                           HTTP
                                                                         511 GET /test/ethereal.html HTTP/1.1
         5 0.000330
                       192.168.69.1
                                         192.168.69.2
                                                           TCP
                                                                          66 80 → 34059 [ACK] Seg=1 Ack=446 Win=6432 Le
                                                                         468 HTTP/1.1 200 OK (text/html)
         6 0.021452
                       192.168.69.1
                                         192.168.69.2
                                                           HTTP
                       192.168.69.2
                                                           TCP
                                                                          66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912
         7 0.021629
                                         192.168.69.1
         8 0.021755
                       192.168.69.1
                                         192.168.69.2
                                                           TCP
                                                                          66 80 → 34059 [FIN, ACK] Seg=403 Ack=446 Win=
                       192.168.69.2
                                         192.168.69.1
                                                                          66 34059 → 80 [FIN, ACK] Seg=446 Ack=404 Win=
         9 0.022677
                                                           TCP
                       192.168.69.1
                                                                          66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432
        10 0.022715
                                         192.168.69.2
                                                           TCP
> Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c)
Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2

    Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402

     Source Port: 80
     Destination Port: 34059
     [Stream index: 0]
     [TCP Segment Len: 402]
     Sequence number: 1
                         (relative sequence number)
     [Next sequence number: 403
                                 (relative sequence number)]
     Acknowledgment number: 446
                                 (relative ack number)
     Header Length: 32 bytes

▼ Flags: 0x018 (PSH, ACK)

       000. .... = Reserved: Not set
       ...0 .... = Nonce: Not set
       .... 0... = Congestion Window Reduced (CWR): Not set
       .... .0.. .... = ECN-Echo: Not set
       .... ..0. .... = Urgent: Not set
       .... = Acknowledgment: Set
       .... 1... = Push: Set
       .... .... .0.. = Reset: Not set
       .... .... ..0. = Syn: Not set
       .... .... 0 = Fin: Not set
       [TCP Flags: ······AP····]
     Window size value: 6432
     [Calculated window size: 6432]
     [Window size scaling factor: 1]
0000 00 00 00 07 40 30 00 00 40 04 40 03 09 00 45 00
```

HTTP Response

```
🚄 http_gzip.cap
File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help
             📙 🔚 🔀 🖒 | ସ୍ର 👄 👄 堅 🕜 🌡 🚃 📗 🗨 ସ୍ର୍ର୍ୟ
Apply a display filter ... <Ctrl-/>
                                                            Protocol
         1 0.000000
                       192.168.69.2
                                          192.168.69.1
                                                            TCP
                                                                           74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK PERM=1 TSval=2011387883 TSecr=0 WS=128
         2 0.000059
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                                                                           74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK_PERM=1 TSval=432614628 TSecr=2011387883 WS=1
                       192.168.69.2
                                          192.168.69.1
                                                            TCP
                                                                           66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387883 TSecr=432614628
         3 0.000153
         4 0.000282
                       192.168.69.2
                                          192.168.69.1
                                                            HTTP
                                                                          511 GET /test/ethereal.html HTTP/1.1
         5 0.000330
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                                                                           66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=432614628 TSecr=2011387883
                       192.168.69.1
                                          192.168.69.2
                                                            HTTP
                                                                          468 HTTP/1.1 200 OK (text/html)
         6 0.021452
                       192.168.69.2
                                                            TCP
                                                                           66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912 Len=0 TSval=2011387905 TSecr=432614630
         7 0.021629
                                          192.168.69.1
         8 0.021755
                       192.168.69.1
                                                            TCP
                                                                           66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=6432 Len=0 TSval=432614630 TSecr=2011387905
                                          192.168.69.2
                       192.168.69.2
                                                            TCP
                                                                           66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSval=2011387906 TSecr=432614630
         9 0.022677
                                          192.168.69.1
        10 0.022715
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                                                                           66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432614630 TSecr=2011387906
  Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
  Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c)
  Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2
  Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402
 Hypertext Transfer Protocol
  > HTTP/1.1 200 OK\r\n
    Date: Fri, 29 Oct 2004 05:21:00 GMT\r\n
    Server: Apache/2.0.50 (Fedora)\r\n
    Last-Modified: Fri, 29 Oct 2004 05:20:21 GMT\r\n
    ETag: "126e1f-6d-371b2f40"\r\n
    Accept-Ranges: bytes\r\n
    Vary: Accept-Encoding\r\n
    Content-Encoding: gzip\r\n
  > Content-Length: 92\r\n
    Connection: close\r\n
    Content-Type: text/html; charset=UTF-8\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.021170000 seconds]
    [Request in frame: 4]
    Content-encoded entity body (gzip): 92 bytes -> 109 bytes
```

```
0000 00 0a 95 67 49 3c 00 c0 f0 2d 4a a3 08 00 45 00 ...gI<...-J...E.
0010 01 c6 bf c4 40 00 40 06 6e 19 c0 a8 45 01 c0 a8 ...@.@. n...E...
0020 45 02 00 50 85 0b 96 18 93 27 8f f5 a3 f0 80 18 E.P....'....
0030 19 20 2e ef 00 00 01 01 08 0a 19 c9 2c e6 77 e3 ......w.
0040 57 eb 48 54 54 50 2f 31 2e 31 20 32 30 30 20 4f W.HTTP/1 .1 200 0
0050 4b 0d 0a 44 61 74 65 3a 20 46 72 69 2c 20 32 39 K..Date: Fri, 29
```

Frame (468 bytes) Uncompressed entity body (109 bytes)

File Data: 109 bytes Line-based text data: text/html

O Maria http_gzip

```
Length Info
No.
           Time
                       Source
                                          Destination
                                                            Protocol
                                                            TCP
                                                                           74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=
         1 0.000000
                       192.168.69.2
                                          192.168.69.1
                                                                           74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792
         2 0.000059
                      192.168.69.1
                                         192.168.69.2
                                                            TCP
                                                            TCP
                                                                           66 34059 → 80 [ACK] Seg=1 Ack=1 Win=5888 Len=
         3 0.000153
                      192.168.69.2
                                         192.168.69.1
                      192.168.69.2
                                         192.168.69.1
         4 0.000282
                                                            HTTP
                                                                          511 GET /test/ethereal.html HTTP/1.1
         5 0.000330
                      192.168.69.1
                                          192.168.69.2
                                                                           66 80 → 34059 [ACK] Seg=1 Ack=446 Win=6432 Le
                                                            TCP
         6 0.021452
                       192.168.69.1
                                          192.168.69.2
                                                            HTTP
                                                                          468 HTTP/1.1 200 OK (text/html)
                                                                           66 34059 → 80 [ACK] Seg=446 Ack=403 Win=6912
         7 0.021629
                      192.168.69.2
                                          192.168.69.1
                                                            TCP
         8 0.021755
                      192.168.69.1
                                                                           66 80 → 34059 [FIN, ACK] Seg=403 Ack=446 Win=
                                         192.168.69.2
                                                            TCP
                      192.168.69.2
                                                            TCP
                                                                           66 34059 → 80 [FIN, ACK] Seg=446 Ack=404 Win=
         9 0.022677
                                         192.168.69.1
                                                                           66 80 → 34059 [ACK] Seg=404 Ack=447 Win=6432
        10 0.022715
                      192.168.69.1
                                         192.168.69.2
                                                            TCP
> Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c)
> Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2
> Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402

    Hypertext Transfer Protocol

  > HTTP/1.1 200 OK\r\n
     Date: Fri, 29 Oct 2004 05:21:00 GMT\r\n
     Server: Apache/2.0.50 (Fedora)\r\n
     Last-Modified: Fri, 29 Oct 2004 05:20:21 GMT\r\n
    ETag: "126e1f-6d-371b2f40"\r\n
     Accept-Ranges: bytes\r\n
     Vary: Accept-Encoding\r\n
     Content-Encoding: gzip\r\n
  > Content-Length: 92\r\n
     Connection: close\r\n
     Content-Type: text/html; charset=UTF-8\r\n
     \r\n
     [HTTP response 1/1]
     [Time since request: 0.021170000 seconds]
     [Request in frame: 4]
     Content-encoded entity body (gzip): 92 bytes -> 109 bytes
     File Data: 109 bytes
> Line-based text data: text/html
```

HTTP Response HTML

```
🚄 http_gzip.cap
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                  🔀 🖺 | Q 👄 👄 堅 🕜 🌡 🕎 | 📃 | Q Q Q 🗓 🖽
Apply a display filter ... <Ctrl-/>
                                                            Protocol
         1 0.000000
                       192.168.69.2
                                          192.168.69.1
                                                            TCP
                                                                            74 34059 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK PERM=1 TSval=2011387883 TSecr=0 WS=128
         2 0.000059
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                                                                           74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK_PERM=1 TSval=432614628 TSecr=2011387883 WS=1
                       192.168.69.2
                                          192.168.69.1
                                                            TCP
                                                                           66 34059 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=2011387883 TSecr=432614628
         3 0.000153
         4 0.000282
                       192.168.69.2
                                          192.168.69.1
                                                            HTTP
                                                                          511 GET /test/ethereal.html HTTP/1.1
         5 0.000330
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                                                                           66 80 → 34059 [ACK] Seq=1 Ack=446 Win=6432 Len=0 TSval=432614628 TSecr=2011387883
                       192.168.69.1
                                          192.168.69.2
                                                            HTTP
                                                                          468 HTTP/1.1 200 OK (text/html)
         6 0.021452
                       192.168.69.2
                                                            TCP
                                                                           66 34059 → 80 [ACK] Seq=446 Ack=403 Win=6912 Len=0 TSval=2011387905 TSecr=432614630
         7 0.021629
                                          192.168.69.1
         8 0.021755
                       192.168.69.1
                                                            TCP
                                                                           66 80 → 34059 [FIN, ACK] Seq=403 Ack=446 Win=6432 Len=0 TSval=432614630 TSecr=2011387905
                                          192.168.69.2
                       192.168.69.2
                                                            TCP
                                                                           66 34059 → 80 [FIN, ACK] Seq=446 Ack=404 Win=6912 Len=0 TSval=2011387906 TSecr=432614630
         9 0.022677
                                          192.168.69.1
        10 0.022715
                       192.168.69.1
                                          192.168.69.2
                                                            TCP
                                                                            66 80 → 34059 [ACK] Seq=404 Ack=447 Win=6432 Len=0 TSval=432614630 TSecr=2011387906
 Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
  Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c)
  Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2
  Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402
  Hypertext Transfer Protocol
Line-based text data: text/html
    <html>\n
    <head>\n
    \t<title>Ethereal Example Page</title>\n
    </head>\n
    <body>\n
    \t\tEthereal Example Page\n
    \t</body>\n
    </html>\n
    λn
```

Frame (468 bytes) Uncompressed entity body (109 bytes)

http_gzip

```
Apply a display filter ... <Ctrl-/>
                                                                        Length Info
No.
           Time
                       Source
                                         Destination
                                                           Protocol
                                                                          74 34059 → 80 [SYN] Seg=0 Win=5840 Len=0 MSS=
         1 0.000000
                       192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                          74 80 → 34059 [SYN, ACK] Seq=0 Ack=1 Win=5792
         2 0.000059
                      192.168.69.1
                                         192.168.69.2
                                                           TCP
                                                                          66 34059 → 80 [ACK] Seg=1 Ack=1 Win=5888 Len=
         3 0.000153
                      192.168.69.2
                                         192.168.69.1
                                                           TCP
         4 0.000282
                      192.168.69.2
                                         192.168.69.1
                                                           HTTP
                                                                         511 GET /test/ethereal.html HTTP/1.1
         5 0.000330
                      192.168.69.1
                                         192.168.69.2
                                                           TCP
                                                                          66 80 → 34059 [ACK] Seg=1 Ack=446 Win=6432 Le
         6 0.021452
                      192.168.69.1
                                         192.168.69.2
                                                           HTTP
                                                                         468 HTTP/1.1 200 OK (text/html)
         7 0.021629
                      192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                          66 34059 → 80 [ACK] Seg=446 Ack=403 Win=6912
         8 0.021755
                      192.168.69.1
                                         192.168.69.2
                                                           TCP
                                                                          66 80 → 34059 [FIN, ACK] Seg=403 Ack=446 Win=
                                                                          66 34059 → 80 [FIN, ACK] Seg=446 Ack=404 Win=
         9 0.022677
                      192.168.69.2
                                         192.168.69.1
                                                           TCP
                                                                          66 80 → 34059 [ACK] Seg=404 Ack=447 Win=6432
        10 0.022715
                       192.168.69.1
                                         192.168.69.2
                                                           TCP
> Frame 6: 468 bytes on wire (3744 bits), 468 bytes captured (3744 bits)
> Ethernet II, Src: Kingston 2d:4a:a3 (00:c0:f0:2d:4a:a3), Dst: Apple 67:49:3c (00:0a:95:67:49:3c)
> Internet Protocol Version 4, Src: 192.168.69.1, Dst: 192.168.69.2
> Transmission Control Protocol, Src Port: 80, Dst Port: 34059, Seq: 1, Ack: 446, Len: 402
 Hypertext Transfer Protocol
Line-based text data: text/html
     <html>\n
     <head>\n
     \t<title>Ethereal Example Page</title>\n
     </head>\n
     <body>\n
     \t\tEthereal Example Page\n
     \t</body>\n
     </html>\n
     ١n
```

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