Comprensión del flujo de paquetes en un dispositivo web seguro

Contenido

Introducción

Este documento describe el flujo de red en la red configurada con proxy, centrada específicamente en Secure Web Appliance (SWA).

Prerequisites

Requirements

Cisco recomienda que tenga conocimiento sobre estos temas:

- Conceptos básicos de TCP/IP.
- Conocimientos básicos sobre la configuración de Proxy.
- Conocimiento básico del mecanismo de autenticación utilizado en el entorno con proxy.

Las abreviaturas utilizadas en este artículo son:

TCP: protocolo de control de transmisión

UDP: protocolo de datagramas de usuario

IP: protocolo de Internet

GRE: encapsulación de routing genérico

HTTP: protocolo de transferencia de hipertexto.

HTTPS: protocolo de transferencia de hipertexto seguro.

URL: Localizador uniforme de recursos

TLS: Seguridad de la capa de transporte

Componentes Utilizados

Este documento no tiene restricciones específicas en cuanto a versiones de software y de hardware.

La información que contiene este documento se creó a partir de los dispositivos en un ambiente de laboratorio específico. Todos los dispositivos que se utilizan en este documento se pusieron en funcionamiento con una configuración verificada (predeterminada). Si tiene una red en vivo, asegúrese de entender el posible impacto de cualquier comando.

Tipos de implementación de proxy diferentes

Protocolo de enlace TLS

Un intercambio de señales TLS en HTTPS se produce cuando un cliente y un servidor se comunican a través de Internet, proporcionando una conexión segura. El proceso mantiene la privacidad y la integridad de los datos entre dos aplicaciones que se comunican. Funciona mediante una serie de pasos en los que el cliente y el servidor acuerdan los estándares y códigos de encriptación para todas las transmisiones posteriores. El protocolo de enlace tiene por objeto impedir el acceso no autorizado o la manipulación por parte de terceros. También autentica las identidades de las partes que se comunican para eliminar la suplantación. Este proceso es crucial en HTTPS, ya que garantiza que los datos permanezcan seguros durante el tránsito.

Estos son los pasos de un intercambio de señales TLS:

1. Saludo del cliente: el cliente inicia el proceso de intercambio de señales con un mensaje de saludo. Este mensaje contiene la versión de TLS del cliente, los conjuntos de cifrado admitidos y una cadena de bytes aleatoria conocida como "cliente aleatorio".
2. Saludo del servidor: el servidor responde con un mensaje de saludo. Este mensaje incluye la versión de TLS elegida por el servidor, el conjunto de cifrado seleccionado, una cadena de bytes aleatoria conocida como "servidor aleatorio" y el certificado digital del servidor. Si es necesario, el servidor también solicita el certificado digital del cliente para la autenticación mutua.
3. El cliente comprueba el certificado de servidor: el cliente comprueba el certificado digital de servidor con la autoridad de certificados que lo emitió. Esto garantiza al cliente que se está comunicando con el servidor legítimo.
4. Pre-master Secret: El cliente envía una cadena de bytes aleatoria, conocida como "pre-master secret", que contribuye a la creación de las claves de sesión. El cliente cifra este secreto anterior al maestro con la clave pública del servidor, de modo que sólo el servidor puede descifrarlo con su clave privada.
5. Secreto principal: tanto el cliente como el servidor utilizan el secreto anterior al maestro y las cadenas de bytes aleatorias de los mensajes hello para calcular independientemente el mismo "secreto principal". Este secreto compartido es la base para generar las claves de sesión.
6. Cliente finalizado: el cliente envía un mensaje "Finalizado", cifrado con la clave de sesión, para indicar que el cliente ha completado la parte del protocolo de enlace.
7. Servidor finalizado: el servidor envía un mensaje de "Finalizado", también cifrado con la clave de sesión, para indicar que el servidor ha completado la parte del protocolo de enlace.

Código de respuesta HTTP

1xx: Información

Code	Detalles
100 Continuar	Normalmente se observa en relación con el protocolo ICAP. Se trata de una respuesta informativa que permite al cliente saber que puede continuar enviando datos. En lo que respecta a los servicios ICAP (como el análisis de virus), el servidor sólo puede desear ver la primera x cantidad de bytes. Cuando se termina de escanear el primer conjunto de bytes y no se detectó un virus, envía un 100 Continue para que el cliente sepa que debe enviar el resto del objeto.

2xx: Satisfactorio

Code	Detalles
200 OK	El código de respuesta más común. Esto significa que la solicitud es exitosa sin ningún problema.

3xx: Redirección

Code	Detalles
301 Redirección permanente	Esta es una redirección permanente, puede ver este código cuando redirige al subdominio www.
302 Redirección temporal	Esta es una redirección temporal. Se indica al cliente que realice una nueva solicitud para el objeto especificado en el encabezado Location:.
304 No modificado	Esto es en respuesta a un GIMS (GET If-modified-since). Esto es literalmente un HTTP GET estándar que incluye el encabezado If-modified-since: <date>. Este encabezado indica al servidor que el cliente tiene una copia del objeto solicitado en su caché local y que se incluye la fecha en la que se obtuvo el objeto. Si el objeto se ha modificado desde esa fecha, el servidor responde con una copia 200 OK y una copia nueva del objeto. Si el objeto no ha cambiado desde la fecha de obtención, el servidor devuelve una respuesta 304 No modificado.
Redirección de autenticación 307	Esto se observa principalmente en la implementación de proxy transparente, cuando el servidor proxy está configurado para autenticar la solicitud y redirige la solicitud a otra URL para autenticar al usuario,

Códigos 4xx: Error del cliente

Code	Detalles
400 Solicitud incorrecta	Esto sugiere un problema con la solicitud HTTP, ya que no cumple con la sintaxis correcta. Entre los posibles motivos se incluyen varios encabezados en una sola línea, espacios dentro de un encabezado o la falta de HTTP/1.1 en el URI, entre otros. Para obtener la sintaxis correcta, consulte RFC 2616.

401 No autorizado Se requiere autenticación de servidor web	El acceso al objeto solicitado requiere autenticación. El código 401 se utiliza para la autenticación con un servidor web de destino. Cuando el SWA funciona en modo transparente y la autenticación está habilitada en el proxy, devuelve un 401 al cliente, ya que el dispositivo se presenta como si fuera el OCS (servidor de contenido de origen). Los métodos de autenticación que se pueden utilizar se detallan en un encabezado de respuesta HTTP 'www-authenticate:'. Esto informa al cliente si el servidor está solicitando NTLM, basic u otras formas de autenticación.
403 denegado	El cliente no puede acceder al objeto solicitado. Una serie de razones podrían llevar a un servidor a denegar el acceso a objetos. El servidor normalmente proporciona una descripción de la causa dentro de los datos HTTP o la respuesta HTML.
404 No encontrado	El objeto solicitado no existe en el servidor.
407 Autenticación de proxy necesaria	Esto es lo mismo que un 401, excepto que es específicamente para la autenticación a un proxy y no al OCS. Esto se envía sólo si la solicitud se envió explícitamente al proxy. No se puede enviar un 407 a un cliente mientras SWA esté configurado como proxy transparente, ya que el cliente no sabe que el proxy existe. Si este es el caso, el cliente probablemente FIN o RST usará el socket TCP.

5xx: Error de servidor

Code	Detalles
501 Error interno del servidor	Error del servidor Web genérico.
502 Puerta de enlace incorrecta	Se produce cuando un servidor que actúa como puerta de enlace o proxy recibe una respuesta no válida de un servidor entrante. Indica que la puerta de enlace ha recibido una respuesta inadecuada del servidor de origen o ascendente.
503 Servicio no disponible	Indica que el servidor no puede procesar la solicitud debido a una sobrecarga temporal o a un mantenimiento programado. Esto implica que el servidor está temporalmente fuera de servicio, pero

	puede estar disponible de nuevo después de un tiempo.
504 Tiempo de espera del gateway	Indica que un cliente o proxy no recibió una respuesta oportuna del servidor Web al que intentó acceder para cargar la página Web o atender otra solicitud del explorador. Esto a menudo implica que el servidor ascendente está inactivo.

Implementación explícita

Aquí ....

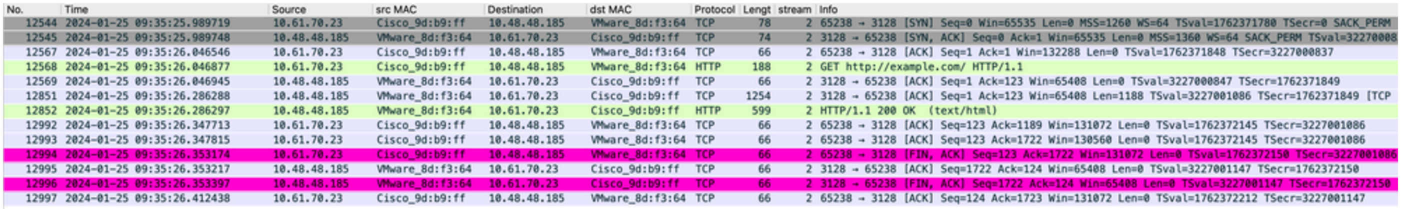
Tráfico HTTP en implementación explícita sin autenticación

Cliente y SWA

El tráfico de red transpira entre la dirección IP del cliente y la dirección IP de la interfaz de proxy SWA (normalmente es la interfaz P1, pero puede ser la interfaz P2 o la interfaz de administración, según la configuración del proxy).

El tráfico del cliente está destinado al puerto TCP 80 o 3128 al SWA (los puertos proxy SWA predeterminados son TCP 80 y 3128; en este ejemplo, utilizamos el puerto 3128)

- Protocolo de enlace TCP.
- HTTP Get from Client (IP de destino = IP SWA , Puerto de destino = 3128)
- Respuesta HTTP del proxy (IP de origen = SWA)
- Transferencia de datos
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
12544	2024-01-25 09:35:25.989719	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	78	2	65238 → 3128 [SYN] Seq=0 Win=65535 Len=0 MSS=1260 WS=64 TSval=1762371780 TSecr=0 SACK_PERM
12545	2024-01-25 09:35:25.989748	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	74	2	3128 → 65238 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1360 WS=64 SACK_PERM TSval=32270008
12567	2024-01-25 09:35:26.046546	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=1 Ack=1 Win=132288 Len=0 TSval=1762371848 TSecr=3227000837
12568	2024-01-25 09:35:26.046877	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	HTTP	188	2	GET http://example.com/ HTTP/1.1
12569	2024-01-25 09:35:26.046945	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 65238 [ACK] Seq=1 Ack=123 Win=65408 Len=0 TSval=3227000847 TSecr=1762371849
12851	2024-01-25 09:35:26.286288	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	1254	2	3128 → 65238 [ACK] Seq=1 Ack=123 Win=65408 Len=1188 TSval=3227001086 TSecr=1762371849 [TCP
12852	2024-01-25 09:35:26.286297	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	HTTP	599	2	HTTP/1.1 200 OK (text/html)
12992	2024-01-25 09:35:26.347713	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=123 Ack=1189 Win=131072 Len=0 TSval=1762372145 TSecr=3227001086
12993	2024-01-25 09:35:26.347815	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=123 Ack=1722 Win=130560 Len=0 TSval=1762372145 TSecr=3227001086
12994	2024-01-25 09:35:26.353174	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [FIN, ACK] Seq=123 Ack=1722 Win=131072 Len=0 TSval=1762372150 TSecr=3227001086
12995	2024-01-25 09:35:26.353217	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 65238 [ACK] Seq=1722 Ack=124 Win=65408 Len=0 TSval=3227001147 TSecr=1762372150
12996	2024-01-25 09:35:26.353397	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 65238 [FIN, ACK] Seq=1722 Ack=124 Win=65408 Len=0 TSval=3227001147 TSecr=1762372150
12997	2024-01-25 09:35:26.412438	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=124 Ack=1723 Win=131072 Len=0 TSval=1762372212 TSecr=3227001147

Image-Client a SWA, modo HTTP explícito

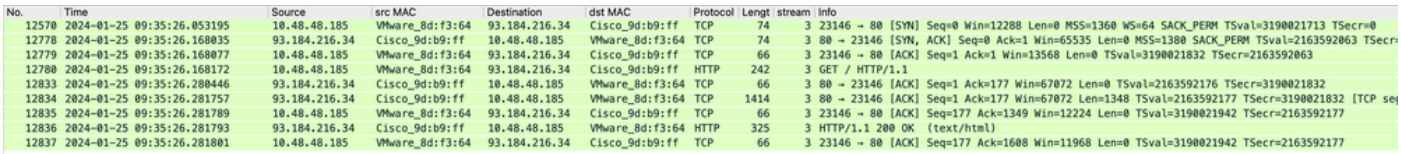
SWA y servidor web

El tráfico de red se produce entre la dirección IP del proxy y la dirección IP del servidor Web.

El tráfico de SWA se dirige al puerto TCP 80 y se origina con un puerto aleatorio (no el puerto de proxy)

- Protocolo de enlace TCP.
- HTTP Get from Proxy (IP de destino = servidor web, puerto de destino = 80)
- Respuesta HTTP del servidor Web (IP de origen = servidor proxy)
- Transferencia de datos

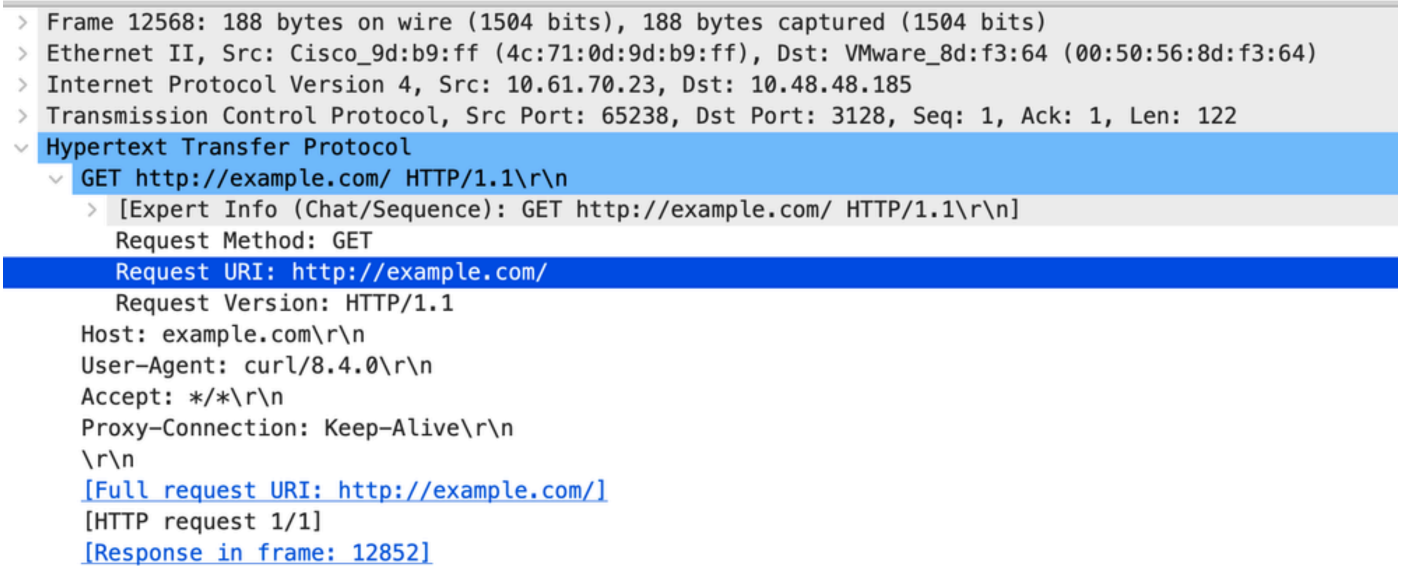
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
12570	2024-01-25 09:35:26.053195	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	74	3	23146 → 80 [SYN] Seq=0 Win=12288 Len=0 MSS=1360 WS=64 SACK_PERM TSval=3190021713 TSecr=0
12778	2024-01-25 09:35:26.168035	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	74	3	80 → 23146 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1380 SACK_PERM TSval=2163592063 TSecr=
12779	2024-01-25 09:35:26.168077	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	23146 → 80 [ACK] Seq=1 Ack=1 Win=13568 Len=0 TSval=3190021832 TSecr=2163592063
12780	2024-01-25 09:35:26.168172	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	HTTP	242	3	GET / HTTP/1.1
12833	2024-01-25 09:35:26.280446	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	3	80 → 23146 [ACK] Seq=1 Ack=177 Win=67072 Len=0 TSval=2163592176 TSecr=3190021832
12834	2024-01-25 09:35:26.281757	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	1414	3	80 → 23146 [ACK] Seq=1 Ack=177 Win=67072 Len=1348 TSval=2163592177 TSecr=3190021832 [TCP seg
12835	2024-01-25 09:35:26.281789	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	23146 → 80 [ACK] Seq=177 Ack=1349 Win=12224 Len=0 TSval=3190021942 TSecr=2163592177
12836	2024-01-25 09:35:26.281793	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	HTTP	325	3	HTTP/1.1 200 OK (text/html)
12837	2024-01-25 09:35:26.281801	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	23146 → 80 [ACK] Seq=177 Ack=1608 Win=11968 Len=0 TSval=3190021942 TSecr=2163592177

Imagen- HTTP-SWA a servidor web-Explicit-no cache

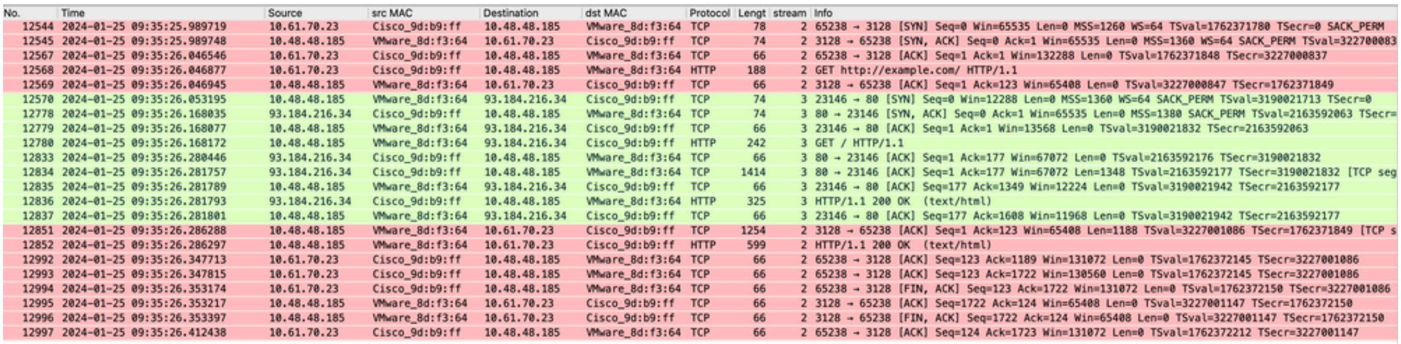
Este es un ejemplo de HTTP Get from Client



```
› Frame 12568: 188 bytes on wire (1504 bits), 188 bytes captured (1504 bits)
› Ethernet II, Src: Cisco_9d:b9:ff (4c:71:0d:9d:b9:ff), Dst: VMware_8d:f3:64 (00:50:56:8d:f3:64)
› Internet Protocol Version 4, Src: 10.61.70.23, Dst: 10.48.48.185
› Transmission Control Protocol, Src Port: 65238, Dst Port: 3128, Seq: 1, Ack: 1, Len: 122
⌄ Hypertext Transfer Protocol
  ⌄ GET http://example.com/ HTTP/1.1\r\n
    › [Expert Info (Chat/Sequence): GET http://example.com/ HTTP/1.1\r\n]
      Request Method: GET
      Request URI: http://example.com/
      Request Version: HTTP/1.1
    Host: example.com\r\n
    User-Agent: curl/8.4.0\r\n
    Accept: */*\r\n
    Proxy-Connection: Keep-Alive\r\n
    \r\n
    [Full request URI: http://example.com/]
    [HTTP request 1/1]
    [Response in frame: 12852]
```

Imagen- Cliente a SWA HTTP GET- Explícito

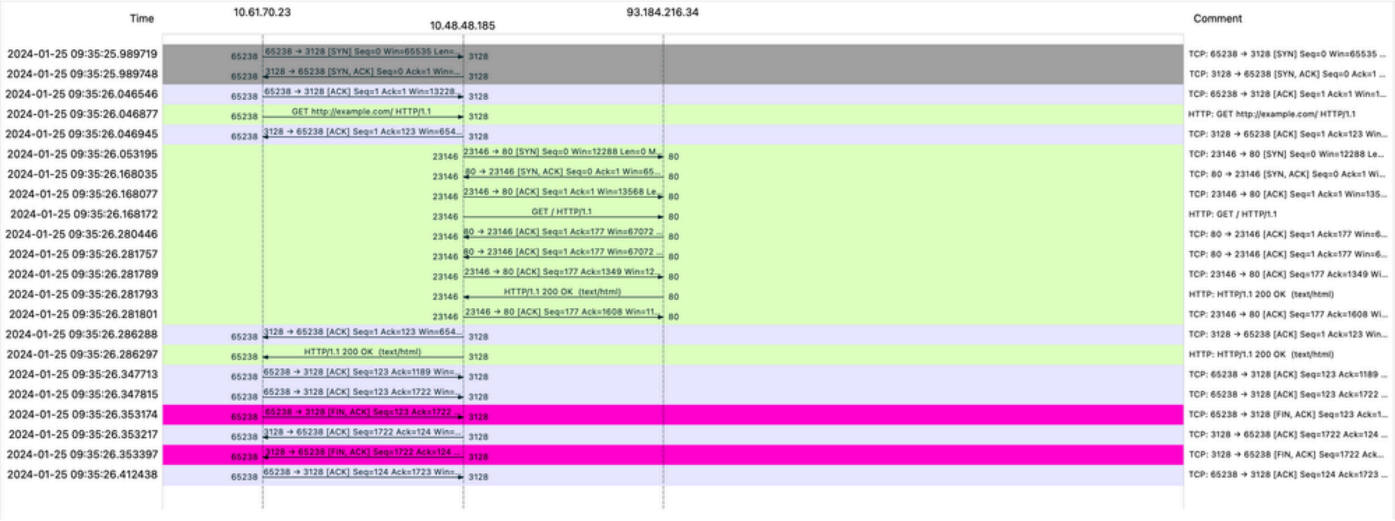
Esto representa el flujo completo de tráfico desde el cliente al SWA, luego al servidor web y, finalmente, de vuelta al cliente.



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
12544	2024-01-25 09:35:25.989719	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	78	2	65238 → 3128 [SYN] Seq=0 Win=65535 Len=0 MSS=1260 WS=64 TSval=1762371780 TSecr=0 SACK_PERM
12545	2024-01-25 09:35:25.989748	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	74	2	3128 → 65238 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1360 WS=64 SACK_PERM TSval=322700083
12567	2024-01-25 09:35:26.046546	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=1 Ack=1 Win=132288 Len=0 TSval=1762371848 TSecr=3227000837
12568	2024-01-25 09:35:26.046877	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	HTTP	188	2	GET http://example.com/ HTTP/1.1
12569	2024-01-25 09:35:26.046945	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 65238 [ACK] Seq=1 Ack=123 Win=65408 Len=0 TSval=3227000847 TSecr=1762371849
12570	2024-01-25 09:35:26.053195	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	74	3	23146 → 80 [SYN] Seq=0 Win=12288 Len=0 MSS=1360 WS=64 SACK_PERM TSval=3190021713 TSecr=0
12778	2024-01-25 09:35:26.168035	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	74	3	80 → 23146 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1380 SACK_PERM TSval=2163592063 TSecr=
12779	2024-01-25 09:35:26.168077	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	23146 → 80 [ACK] Seq=1 Ack=1 Win=13568 Len=0 TSval=3190021832 TSecr=2163592063
12780	2024-01-25 09:35:26.168172	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	HTTP	242	3	GET / HTTP/1.1
12833	2024-01-25 09:35:26.280446	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	3	80 → 23146 [ACK] Seq=1 Ack=177 Win=67072 Len=0 TSval=2163592176 TSecr=3190021832
12834	2024-01-25 09:35:26.281757	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	1414	3	80 → 23146 [ACK] Seq=1 Ack=177 Win=67072 Len=1348 TSval=2163592177 TSecr=3190021832 [TCP seg
12835	2024-01-25 09:35:26.281789	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	23146 → 80 [ACK] Seq=177 Ack=1349 Win=12224 Len=0 TSval=3190021942 TSecr=2163592177
12836	2024-01-25 09:35:26.281793	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	HTTP	325	3	HTTP/1.1 200 OK (text/html)
12837	2024-01-25 09:35:26.281801	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	23146 → 80 [ACK] Seq=177 Ack=1608 Win=11968 Len=0 TSval=3190021942 TSecr=2163592177
12851	2024-01-25 09:35:26.286288	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	1254	2	3128 → 65238 [ACK] Seq=1 Ack=123 Win=65408 Len=1188 TSval=3227001086 TSecr=1762371849 [TCP s
12852	2024-01-25 09:35:26.286297	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	HTTP	599	2	HTTP/1.1 200 OK (text/html)
12992	2024-01-25 09:35:26.347713	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=123 Ack=1189 Win=131072 Len=0 TSval=1762372145 TSecr=3227001086
12993	2024-01-25 09:35:26.347815	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=123 Ack=1722 Win=130560 Len=0 TSval=1762372145 TSecr=3227001086
12994	2024-01-25 09:35:26.353174	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [FIN, ACK] Seq=123 Ack=1722 Win=131072 Len=0 TSval=1762372150 TSecr=3227001086
12995	2024-01-25 09:35:26.353217	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 65238 [ACK] Seq=1722 Ack=124 Win=65408 Len=0 TSval=3227001147 TSecr=1762372150
12996	2024-01-25 09:35:26.353397	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 65238 [FIN, ACK] Seq=1722 Ack=124 Win=65408 Len=0 TSval=3227001147 TSecr=1762372150
12997	2024-01-25 09:35:26.412438	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	65238 → 3128 [ACK] Seq=124 Ack=1723 Win=131072 Len=0 TSval=1762372212 TSecr=3227001147

Imagen: todo el tráfico HTTP explícito sin caché

Nota: Cada flujo de tráfico se distingue por un color diferente; el flujo del cliente al SWA es de un color y el flujo del SWA al servidor web es de otro.



```
Time                        10.61.70.23                                              93.184.216.34                  Comment
                                             10.48.48.185
2024-01-25 09:35:25.989719  65238  65238 → 3128 [SYN] Seq=0 Win=65535 Len=...    3128                               TCP: 65238 → 3128 [SYN] Seq=0 Win=65535 ...
2024-01-25 09:35:25.989748  65238  3128 → 65238 [SYN, ACK] Seq=0 Ack=1 Win=...   3128                               TCP: 3128 → 65238 [SYN, ACK] Seq=0 Ack=1 ...
2024-01-25 09:35:26.046546  65238  65238 → 3128 [ACK] Seq=1 Ack=1 Win=13228...   3128                               TCP: 65238 → 3128 [ACK] Seq=1 Ack=1 Win=1...
2024-01-25 09:35:26.046877  65238  GET http://example.com/ HTTP/1.1              3128                               HTTP: GET http://example.com/ HTTP/1.1
2024-01-25 09:35:26.046945  65238  3128 → 65238 [ACK] Seq=1 Ack=123 Win=654...   3128                               TCP: 3128 → 65238 [ACK] Seq=1 Ack=123 Win...
2024-01-25 09:35:26.053195                                                  23146  23146 → 80 [SYN] Seq=0 Win=12288 Len=0 M...  80   TCP: 23146 → 80 [SYN] Seq=0 Win=12288 Le...
2024-01-25 09:35:26.168035                                                  23146  80 → 23146 [SYN, ACK] Seq=0 Ack=1 Win=65...   80   TCP: 80 → 23146 [SYN, ACK] Seq=0 Ack=1 Wi...
2024-01-25 09:35:26.168077                                                  23146  23146 → 80 [ACK] Seq=1 Ack=1 Win=13568 Le...  80   TCP: 23146 → 80 [ACK] Seq=1 Ack=1 Win=135...
2024-01-25 09:35:26.168172                                                  23146  GET / HTTP/1.1                                80   HTTP: GET / HTTP/1.1
2024-01-25 09:35:26.280446                                                  23146  80 → 23146 [ACK] Seq=1 Ack=177 Win=67072 ...  80   TCP: 80 → 23146 [ACK] Seq=1 Ack=177 Win=6...
2024-01-25 09:35:26.281757                                                  23146  80 → 23146 [ACK] Seq=1 Ack=177 Win=67072 ...  80   TCP: 80 → 23146 [ACK] Seq=1 Ack=177 Win=6...
2024-01-25 09:35:26.281789                                                  23146  23146 → 80 [ACK] Seq=177 Ack=1349 Win=12...   80   TCP: 23146 → 80 [ACK] Seq=177 Ack=1349 Wi...
2024-01-25 09:35:26.281793                                                  23146  HTTP/1.1 200 OK  (text/html)                  80   HTTP: HTTP/1.1 200 OK  (text/html)
2024-01-25 09:35:26.281801                                                  23146  23146 → 80 [ACK] Seq=177 Ack=1608 Win=11...   80   TCP: 23146 → 80 [ACK] Seq=177 Ack=1608 Wi...
2024-01-25 09:35:26.286288  65238  3128 → 65238 [ACK] Seq=1 Ack=123 Win=654...   3128                               TCP: 3128 → 65238 [ACK] Seq=1 Ack=123 Win...
2024-01-25 09:35:26.286297  65238  HTTP/1.1 200 OK  (text/html)                  3128                               HTTP: HTTP/1.1 200 OK  (text/html)
2024-01-25 09:35:26.347713  65238  65238 → 3128 [ACK] Seq=123 Ack=1189 Win=...   3128                               TCP: 65238 → 3128 [ACK] Seq=123 Ack=1189 ...
2024-01-25 09:35:26.347815  65238  65238 → 3128 [ACK] Seq=123 Ack=1722 Win=...   3128                               TCP: 65238 → 3128 [ACK] Seq=123 Ack=1722 ...
2024-01-25 09:35:26.353174  65238  65238 → 3128 [FIN, ACK] Seq=123 Ack=1722 ...  3128                               TCP: 65238 → 3128 [FIN, ACK] Seq=123 Ack=1...
2024-01-25 09:35:26.353217  65238  3128 → 65238 [ACK] Seq=1722 Ack=124 Win=...   3128                               TCP: 3128 → 65238 [ACK] Seq=1722 Ack=124 ...
2024-01-25 09:35:26.353397  65238  3128 → 65238 [FIN, ACK] Seq=1722 Ack=124 ...  3128                               TCP: 3128 → 65238 [FIN, ACK] Seq=1722 Ack...
2024-01-25 09:35:26.412438  65238  65238 → 3128 [ACK] Seq=124 Ack=1723 Win=...   3128                               TCP: 65238 → 3128 [ACK] Seq=124 Ack=1723 ...
```

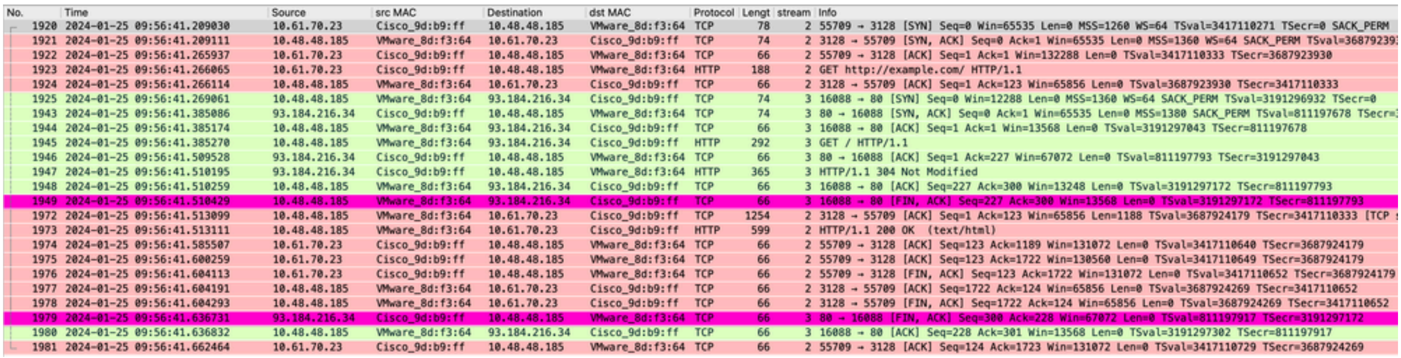
Imagen- Flujo de tráfico HTTP explícito - sin caché

A continuación se muestra un ejemplo de Registros de accesorios:

```
1706172876.686 224 10.61.70.23 TCP_MISS/200 1721 GET http://www.example.com/ - DIRECT/www.example.com t
```

Tráfico Con Datos Almacenados En Caché

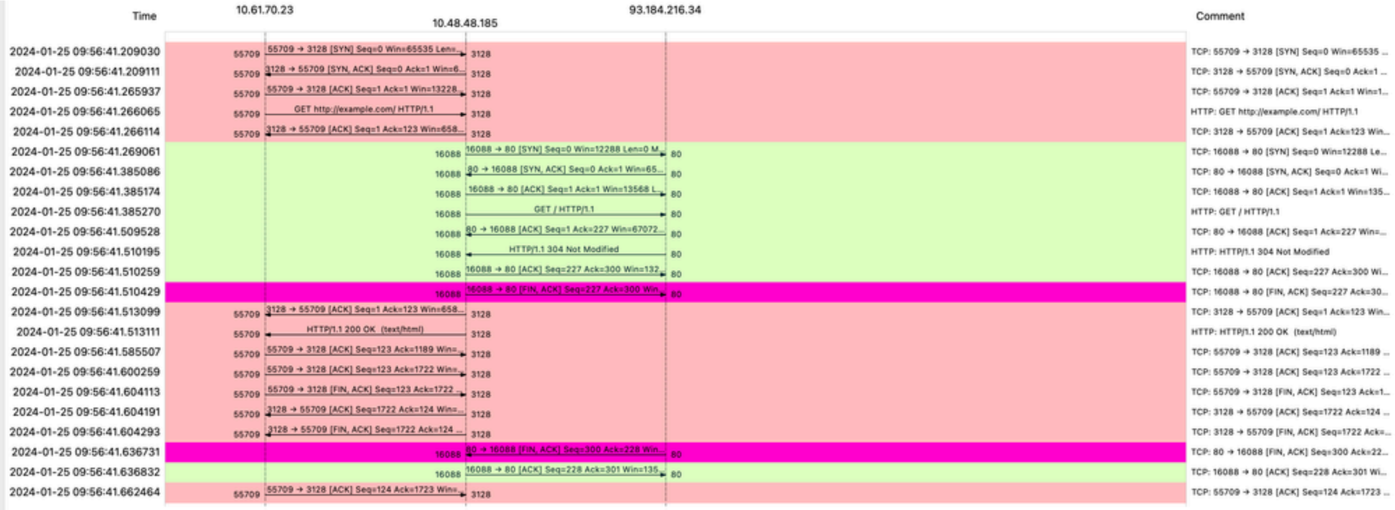
Esto representa el flujo completo de tráfico del cliente al SWA, cuando los datos están en la caché SWA.



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
1920	2024-01-25 09:56:41.209030	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	78	2	55709 → 3128 [SYN] Seq=0 Win=65535 Len=0 MSS=1260 WS=64 TSval=3417110271 TSecr=0 SACK_PERM
1921	2024-01-25 09:56:41.209111	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	74	2	3128 → 55709 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1360 WS=64 SACK_PERM TSval=36879239
1922	2024-01-25 09:56:41.265937	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	55709 → 3128 [ACK] Seq=1 Ack=1 Win=132288 Len=0 TSval=3417110333 TSecr=3687923930
1923	2024-01-25 09:56:41.266065	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	HTTP	188	2	GET http://example.com/ HTTP/1.1
1924	2024-01-25 09:56:41.266114	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 55709 [ACK] Seq=1 Ack=123 Win=65856 Len=0 TSval=3687923930 TSecr=3417110333
1925	2024-01-25 09:56:41.269061	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	74	3	16088 → 80 [SYN] Seq=0 Win=12288 Len=0 MSS=1360 WS=64 SACK_PERM TSval=3191296932 TSecr=0
1943	2024-01-25 09:56:41.385086	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	74	3	80 → 16088 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1380 SACK_PERM TSval=811197678 TSecr=
1944	2024-01-25 09:56:41.385174	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	16088 → 80 [ACK] Seq=1 Ack=1 Win=13568 Len=0 TSval=3191297043 TSecr=811197678
1945	2024-01-25 09:56:41.385270	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	HTTP	292	3	GET / HTTP/1.1
1946	2024-01-25 09:56:41.509528	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	3	80 → 16088 [ACK] Seq=1 Ack=227 Win=67072 Len=0 TSval=811197793 TSecr=3191297043
1947	2024-01-25 09:56:41.510195	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	HTTP	365	3	HTTP/1.1 304 Not Modified
1948	2024-01-25 09:56:41.510259	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	16088 → 80 [ACK] Seq=227 Ack=300 Win=13248 Len=0 TSval=3191297172 TSecr=811197793
1949	2024-01-25 09:56:41.510429	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	16088 → 80 [FIN, ACK] Seq=227 Ack=300 Win=13568 Len=0 TSval=3191297172 TSecr=811197793
1972	2024-01-25 09:56:41.513099	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	1254	2	3128 → 55709 [ACK] Seq=1 Ack=123 Win=65856 Len=1188 TSval=3687924179 TSecr=3417110333 [TCP
1973	2024-01-25 09:56:41.513111	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	HTTP	599	2	HTTP/1.1 200 OK (text/html)
1974	2024-01-25 09:56:41.585507	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	55709 → 3128 [ACK] Seq=123 Ack=1189 Win=131072 Len=0 TSval=3417110640 TSecr=3687924179
1975	2024-01-25 09:56:41.600259	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	55709 → 3128 [ACK] Seq=123 Ack=1722 Win=130560 Len=0 TSval=3417110649 TSecr=3687924179
1976	2024-01-25 09:56:41.604113	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	55709 → 3128 [FIN, ACK] Seq=123 Ack=1722 Win=131072 Len=0 TSval=3417110652 TSecr=3687924179
1977	2024-01-25 09:56:41.604191	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 55709 [ACK] Seq=1722 Ack=124 Win=65856 Len=0 TSval=3687924269 TSecr=3417110652
1978	2024-01-25 09:56:41.604293	10.48.48.185	VMware_8d:f3:64	10.61.70.23	Cisco_9d:b9:ff	TCP	66	2	3128 → 55709 [FIN, ACK] Seq=1722 Ack=124 Win=65856 Len=0 TSval=3687924269 TSecr=3417110652
1979	2024-01-25 09:56:41.636731	93.184.216.34	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	3	80 → 16088 [FIN, ACK] Seq=300 Ack=228 Win=67072 Len=0 TSval=811197917 TSecr=3191297172
1980	2024-01-25 09:56:41.636832	10.48.48.185	VMware_8d:f3:64	93.184.216.34	Cisco_9d:b9:ff	TCP	66	3	16088 → 80 [ACK] Seq=228 Ack=301 Win=13568 Len=0 TSval=3191297302 TSecr=811197917
1981	2024-01-25 09:56:41.662464	10.61.70.23	Cisco_9d:b9:ff	10.48.48.185	VMware_8d:f3:64	TCP	66	2	55709 → 3128 [ACK] Seq=124 Ack=1723 Win=131072 Len=0 TSval=3417110729 TSecr=3687924269

Imagen: datos en caché explícitos de HTTP

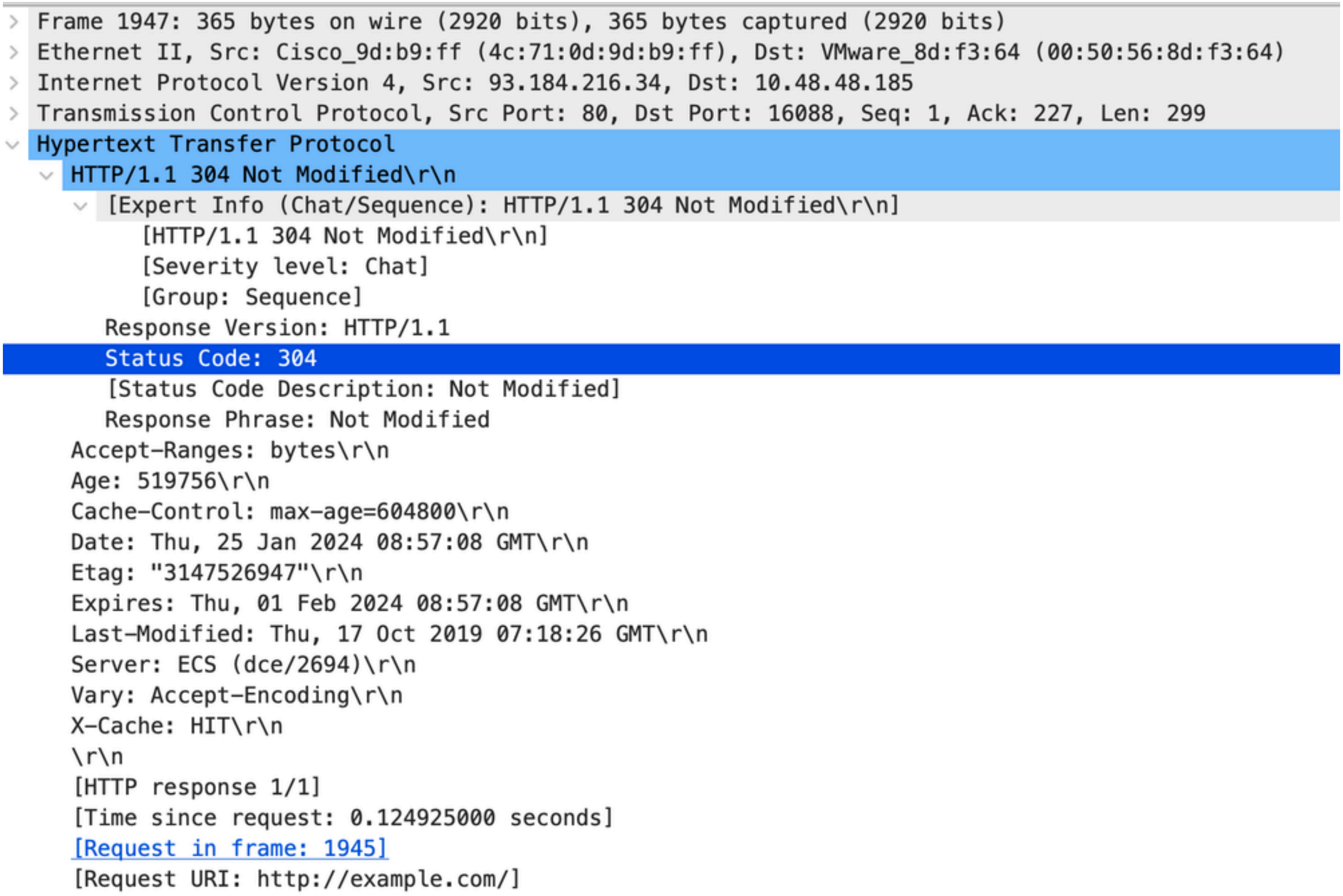
Nota: Como puede ver, el servidor Web devuelve la respuesta HTTP 304: Cache not Modified (Caché no modificada). (en este ejemplo, Paquete número 1947)



```
                   Time    10.61.70.23                                      93.184.216.34                         Comment
                                           10.48.48.185
2024-01-25 09:56:41.209030  55709  55709 → 3128 [SYN] Seq=0 Win=65535 Len=...  3128                                                TCP: 55709 → 3128 [SYN] Seq=0 Win=65535 ...
2024-01-25 09:56:41.209111  55709  3128 → 55709 [SYN, ACK] Seq=0 Ack=1 Win=6...  3128                                               TCP: 3128 → 55709 [SYN, ACK] Seq=0 Ack=1 ...
2024-01-25 09:56:41.265937  55709  55709 → 3128 [ACK] Seq=1 Ack=1 Win=13228...  3128                                                TCP: 55709 → 3128 [ACK] Seq=1 Ack=1 Win=1...
2024-01-25 09:56:41.266065  55709  GET http://example.com/ HTTP/1.1  3128                                                            HTTP: GET http://example.com/ HTTP/1.1
2024-01-25 09:56:41.266114  55709  3128 → 55709 [ACK] Seq=1 Ack=123 Win=658...  3128                                                TCP: 3128 → 55709 [ACK] Seq=1 Ack=123 Win...
2024-01-25 09:56:41.269061                      16088  16088 → 80 [SYN] Seq=0 Win=12288 Len=0 M...  80                       TCP: 16088 → 80 [SYN] Seq=0 Win=12288 Le...
2024-01-25 09:56:41.385086                      16088  80 → 16088 [SYN, ACK] Seq=0 Ack=1 Win=65...  80                       TCP: 80 → 16088 [SYN, ACK] Seq=0 Ack=1 Wi...
2024-01-25 09:56:41.385174                      16088  16088 → 80 [ACK] Seq=1 Ack=1 Win=13568 L...  80                       TCP: 16088 → 80 [ACK] Seq=1 Ack=1 Win=135...
2024-01-25 09:56:41.385270                      16088  GET / HTTP/1.1  80                                                    HTTP: GET / HTTP/1.1
2024-01-25 09:56:41.509528                      16088  80 → 16088 [ACK] Seq=1 Ack=227 Win=67072...  80                       TCP: 80 → 16088 [ACK] Seq=1 Ack=227 Win=...
2024-01-25 09:56:41.510195                      16088  HTTP/1.1 304 Not Modified  80                                         HTTP: HTTP/1.1 304 Not Modified
2024-01-25 09:56:41.510259                      16088  16088 → 80 [ACK] Seq=227 Ack=300 Win=132...  80                       TCP: 16088 → 80 [ACK] Seq=227 Ack=300 Wi...
2024-01-25 09:56:41.510429                      16088  16088 → 80 [FIN, ACK] Seq=227 Ack=300 Win...  80                      TCP: 16088 → 80 [FIN, ACK] Seq=227 Ack=30...
2024-01-25 09:56:41.513099  55709  3128 → 55709 [ACK] Seq=1 Ack=123 Win=658...  3128                                                TCP: 3128 → 55709 [ACK] Seq=1 Ack=123 Win...
2024-01-25 09:56:41.513111  55709  HTTP/1.1 200 OK  (text/html)  3128                                                                HTTP: HTTP/1.1 200 OK  (text/html)
2024-01-25 09:56:41.585507  55709  55709 → 3128 [ACK] Seq=123 Ack=1189 Win=...  3128                                                TCP: 55709 → 3128 [ACK] Seq=123 Ack=1189 ...
2024-01-25 09:56:41.600259  55709  55709 → 3128 [ACK] Seq=123 Ack=1722 Win=...  3128                                                TCP: 55709 → 3128 [ACK] Seq=123 Ack=1722 ...
2024-01-25 09:56:41.604113  55709  55709 → 3128 [FIN, ACK] Seq=123 Ack=1722 ...  3128                                               TCP: 55709 → 3128 [FIN, ACK] Seq=123 Ack=1...
2024-01-25 09:56:41.604191  55709  3128 → 55709 [ACK] Seq=1722 Ack=124 Win=...  3128                                                TCP: 3128 → 55709 [ACK] Seq=1722 Ack=124 ...
2024-01-25 09:56:41.604293  55709  3128 → 55709 [FIN, ACK] Seq=1722 Ack=124 ...  3128                                               TCP: 3128 → 55709 [FIN, ACK] Seq=1722 Ack=...
2024-01-25 09:56:41.636731                      16088  80 → 16088 [FIN, ACK] Seq=300 Ack=228 Win...  80                      TCP: 80 → 16088 [FIN, ACK] Seq=300 Ack=22...
2024-01-25 09:56:41.636832                      16088  16088 → 80 [ACK] Seq=228 Ack=301 Win=135...  80                       TCP: 16088 → 80 [ACK] Seq=228 Ack=301 Wi...
2024-01-25 09:56:41.662464  55709  55709 → 3128 [ACK] Seq=124 Ack=1723 Win=...  3128                                                TCP: 55709 → 3128 [ACK] Seq=124 Ack=1723 ...
```

Imagen- Flujo HTTP explícito con caché

A continuación se muestra un ejemplo de la respuesta HTTP 304



```
> Frame 1947: 365 bytes on wire (2920 bits), 365 bytes captured (2920 bits)
> Ethernet II, Src: Cisco_9d:b9:ff (4c:71:0d:9d:b9:ff), Dst: VMware_8d:f3:64 (00:50:56:8d:f3:64)
> Internet Protocol Version 4, Src: 93.184.216.34, Dst: 10.48.48.185
> Transmission Control Protocol, Src Port: 80, Dst Port: 16088, Seq: 1, Ack: 227, Len: 299
v Hypertext Transfer Protocol
  v HTTP/1.1 304 Not Modified\r\n
    v [Expert Info (Chat/Sequence): HTTP/1.1 304 Not Modified\r\n]
        [HTTP/1.1 304 Not Modified\r\n]
        [Severity level: Chat]
        [Group: Sequence]
      Response Version: HTTP/1.1
      Status Code: 304
      [Status Code Description: Not Modified]
      Response Phrase: Not Modified
    Accept-Ranges: bytes\r\n
    Age: 519756\r\n
    Cache-Control: max-age=604800\r\n
    Date: Thu, 25 Jan 2024 08:57:08 GMT\r\n
    Etag: "3147526947"\r\n
    Expires: Thu, 01 Feb 2024 08:57:08 GMT\r\n
    Last-Modified: Thu, 17 Oct 2019 07:18:26 GMT\r\n
    Server: ECS (dce/2694)\r\n
    Vary: Accept-Encoding\r\n
    X-Cache: HIT\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.124925000 seconds]
    [Request in frame: 1945]
    [Request URI: http://example.com/]
```

Imagen: respuesta HTTP Explícita 304

A continuación se muestra un ejemplo de Registros de accesorios:

```
1706173001.489 235 10.61.70.23 TCP_REFRESH_HIT/200 1721 GET http://www.example.com/ - DIRECT/www.exampl
```

Tráfico de HTTP en implementación explícita sin autenticación

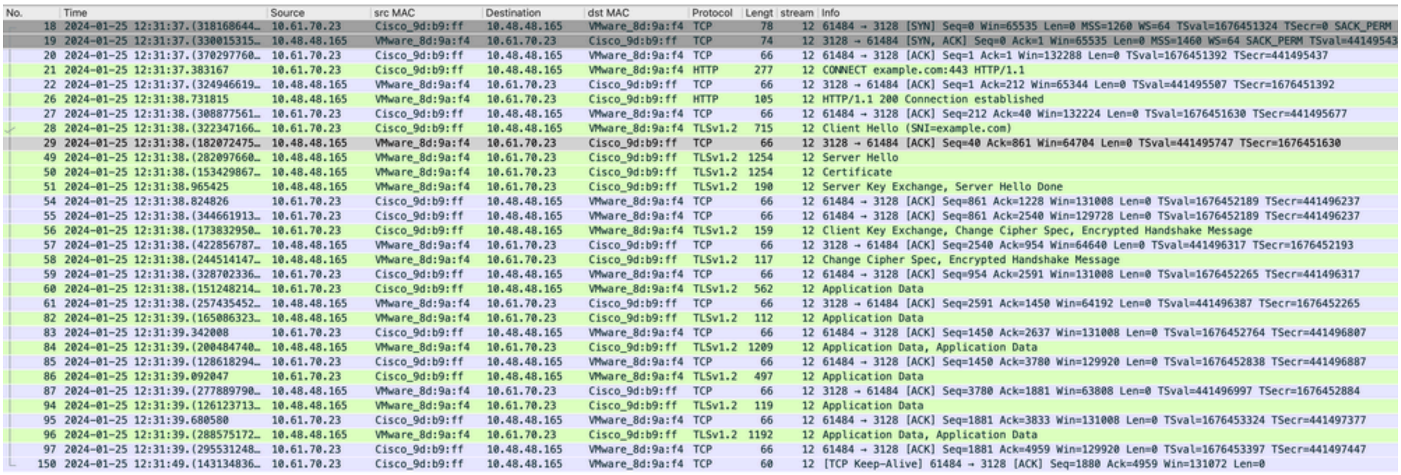
Cliente y SWA

El tráfico de red transpira entre la dirección IP del cliente y la dirección IP de la interfaz de proxy SWA (normalmente es la interfaz P1, pero puede ser la interfaz P2 o la interfaz de administración, según la configuración del proxy).

El tráfico del cliente está destinado al puerto TCP 80 o 3128 al SWA (los puertos proxy SWA predeterminados son TCP 80 y 3128; en este ejemplo, utilizamos el puerto 3128)

- Protocolo de enlace TCP.

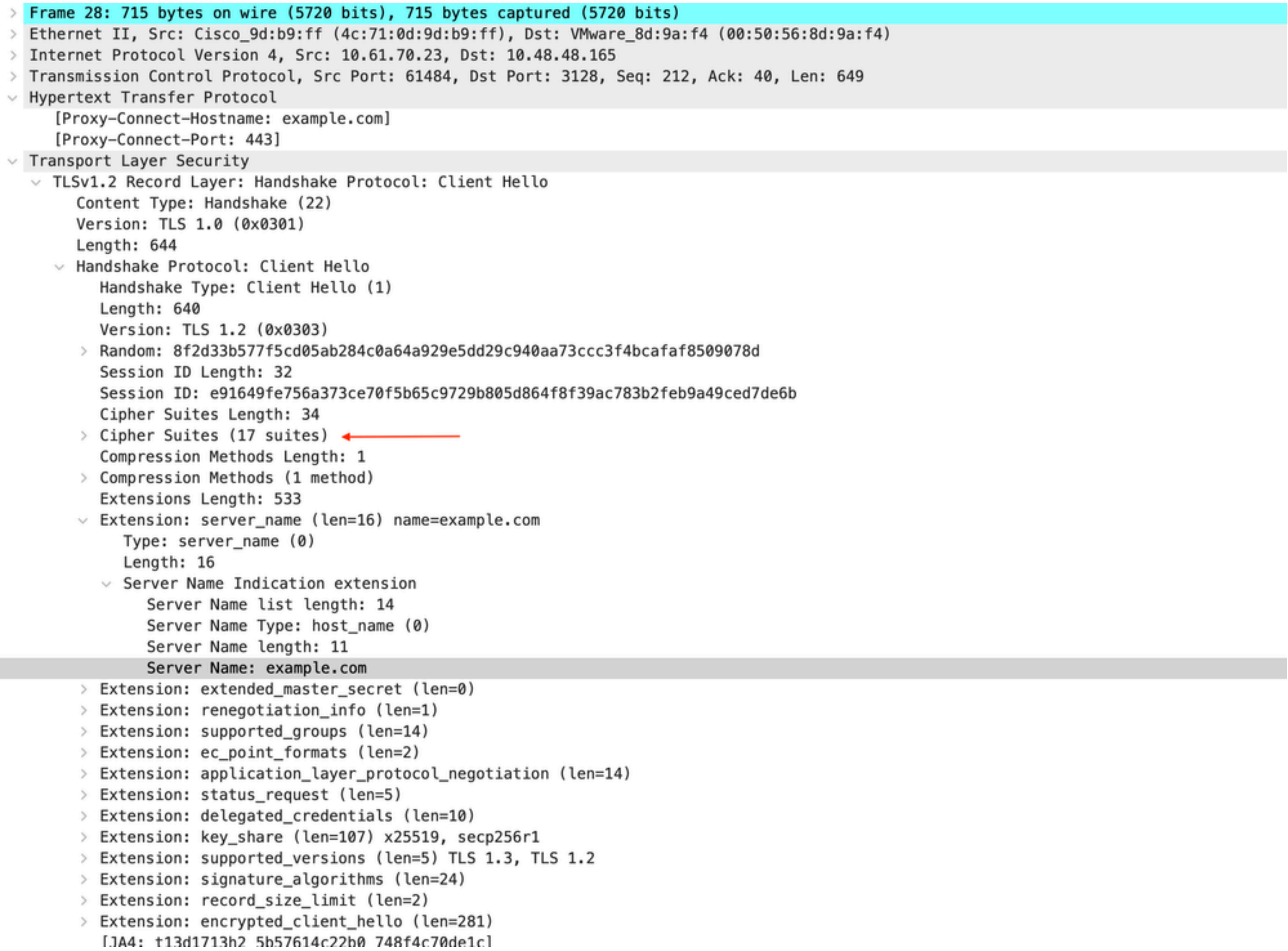
- HTTP CONNECT desde el cliente (IP de destino = SWA , Puerto de destino = 3128)
- Respuesta HTTP del proxy (IP de origen = SWA)
- Hello del cliente con SNI de la URL (IP de origen = Cliente)
- Hello del servidor (IP de origen = SWA)
- Intercambio de claves de servidor (IP de origen = SWA)
- Intercambio de claves de cliente (IP de origen = Cliente)
- Transferencia de datos
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
18	2024-01-25 12:31:37.(318168644…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	78	12	61484 → 3128 [SYN] Seq=0 Win=65535 Len=0 MSS=1260 WS=64 TSval=1676451324 TSecr=0 SACK_PERM
19	2024-01-25 12:31:37.(330015315…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	74	12	3128 → 61484 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM TSval=44149543
20	2024-01-25 12:31:37.(370297760…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1 Ack=1 Win=132288 Len=0 TSval=1676451392 TSecr=441495437
21	2024-01-25 12:31:37.383167	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	HTTP	277	12	CONNECT example.com:443 HTTP/1.1
22	2024-01-25 12:31:37.(324946619…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=1 Ack=212 Win=65344 Len=0 TSval=441495507 TSecr=1676451392
26	2024-01-25 12:31:38.731815	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	HTTP	105	12	HTTP/1.1 200 Connection established
27	2024-01-25 12:31:38.(308877561…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=212 Ack=40 Win=132224 Len=0 TSval=1676451630 TSecr=441495677
28	2024-01-25 12:31:38.(322347166…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	715	12	Client Hello (SNI=example.com)
29	2024-01-25 12:31:38.(182072475…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=40 Ack=861 Win=64704 Len=0 TSval=441495747 TSecr=1676451630
49	2024-01-25 12:31:38.(282097660…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	1254	12	Server Hello
50	2024-01-25 12:31:38.(153429867…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	1254	12	Certificate
51	2024-01-25 12:31:38.965425	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	190	12	Server Key Exchange, Server Hello Done
54	2024-01-25 12:31:38.824826	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=861 Ack=1228 Win=131008 Len=0 TSval=1676452189 TSecr=441496237
55	2024-01-25 12:31:38.(344661913…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=861 Ack=2540 Win=129728 Len=0 TSval=1676452189 TSecr=441496237
56	2024-01-25 12:31:38.(173832950…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	159	12	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
57	2024-01-25 12:31:38.(422856787…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=2540 Ack=954 Win=64640 Len=0 TSval=441496317 TSecr=1676452193
58	2024-01-25 12:31:38.(244514147…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	117	12	Change Cipher Spec, Encrypted Handshake Message
59	2024-01-25 12:31:38.(328702336…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=954 Ack=2591 Win=131008 Len=0 TSval=1676452265 TSecr=441496317
60	2024-01-25 12:31:38.(151248214…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	562	12	Application Data
61	2024-01-25 12:31:38.(257435452…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=2591 Ack=1450 Win=64192 Len=0 TSval=441496387 TSecr=1676452265
82	2024-01-25 12:31:39.(165086323…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	112	12	Application Data
83	2024-01-25 12:31:39.342008	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1450 Ack=2637 Win=131008 Len=0 TSval=1676452764 TSecr=441496807
84	2024-01-25 12:31:39.(200484740…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	1209	12	Application Data, Application Data
85	2024-01-25 12:31:39.(128618294…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1450 Ack=3780 Win=129920 Len=0 TSval=1676452838 TSecr=441496887
86	2024-01-25 12:31:39.092047	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	497	12	Application Data
87	2024-01-25 12:31:39.(277889790…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=3780 Ack=1881 Win=63808 Len=0 TSval=441496997 TSecr=1676452884
94	2024-01-25 12:31:39.(126123713…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	119	12	Application Data
95	2024-01-25 12:31:39.680580	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1881 Ack=3833 Win=131008 Len=0 TSval=1676453324 TSecr=441497377
96	2024-01-25 12:31:39.(288575172…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	1192	12	Application Data, Application Data
97	2024-01-25 12:31:39.(295531248…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1881 Ack=4959 Win=129920 Len=0 TSval=1676453397 TSecr=441497447
150	2024-01-25 12:31:49.(143134836…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	60	12	[TCP Keep-Alive] 61484 → 3128 [ACK] Seq=1880 Ack=4959 Win=131072 Len=0

Imagen- Cliente HTTPS a SWA-Explicit- Sin caché

A continuación se detallan los saludos del cliente desde el cliente al SWA, como puede ver en la Indicación de nombre de servidor (SNI), se puede ver la URL del servidor web que en este ejemplo es www.example.com y el cliente anunció 17 paquetes Cipher:

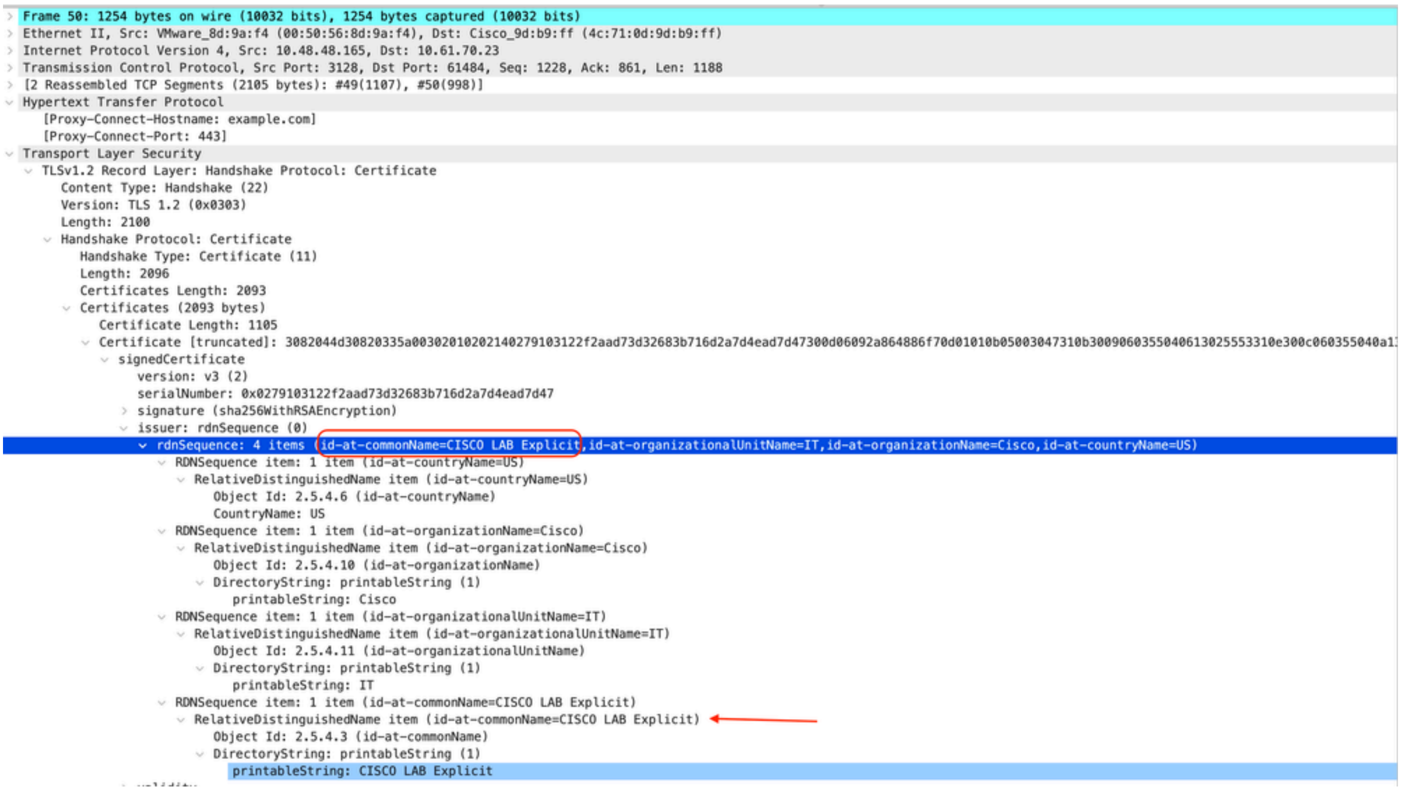


```
> Frame 28: 715 bytes on wire (5720 bits), 715 bytes captured (5720 bits)
> Ethernet II, Src: Cisco_9d:b9:ff (4c:71:0d:9d:b9:ff), Dst: VMware_8d:9a:f4 (00:50:56:8d:9a:f4)
> Internet Protocol Version 4, Src: 10.61.70.23, Dst: 10.48.48.165
> Transmission Control Protocol, Src Port: 61484, Dst Port: 3128, Seq: 212, Ack: 40, Len: 649
v Hypertext Transfer Protocol
    [Proxy-Connect-Hostname: example.com]
    [Proxy-Connect-Port: 443]
v Transport Layer Security
  v TLSv1.2 Record Layer: Handshake Protocol: Client Hello
      Content Type: Handshake (22)
      Version: TLS 1.0 (0x0301)
      Length: 644
    v Handshake Protocol: Client Hello
        Handshake Type: Client Hello (1)
        Length: 640
        Version: TLS 1.2 (0x0303)
      > Random: 8f2d33b577f5cd05ab284c0a64a929e5dd29c940aa73ccc3f4bcafaf8509078d
        Session ID Length: 32
        Session ID: e91649fe756a373ce70f5b65c9729b805d864f8f39ac783b2feb9a49ced7de6b
        Cipher Suites Length: 34
      > Cipher Suites (17 suites)  <-----
        Compression Methods Length: 1
      > Compression Methods (1 method)
        Extensions Length: 533
      v Extension: server_name (len=16) name=example.com
          Type: server_name (0)
          Length: 16
        v Server Name Indication extension
            Server Name list length: 14
            Server Name Type: host_name (0)
            Server Name length: 11
            Server Name: example.com
      > Extension: extended_master_secret (len=0)
      > Extension: renegotiation_info (len=1)
      > Extension: supported_groups (len=14)
      > Extension: ec_point_formats (len=2)
      > Extension: application_layer_protocol_negotiation (len=14)
      > Extension: status_request (len=5)
      > Extension: delegated_credentials (len=10)
      > Extension: key_share (len=107) x25519, secp256r1
      > Extension: supported_versions (len=5) TLS 1.3, TLS 1.2
      > Extension: signature_algorithms (len=24)
      > Extension: record_size_limit (len=2)
      > Extension: encrypted_client_hello (len=281)
        [JA4: t13d1713h2_5b57614c22b0_748f4c70de1c]
```

Imagen- saludo del cliente HTTPS - Explícito - Cliente a SWA

Consejo: Puede utilizar este filtro en Wireshark para buscar URL/SNI: tls.handshake.extensions_server_name == "www.example.com"

Este es un ejemplo de certificado que SWA envió al cliente



```
Frame 50: 1254 bytes on wire (10032 bits), 1254 bytes captured (10032 bits)
Ethernet II, Src: VMware_8d:9a:f4 (00:50:56:8d:9a:f4), Dst: Cisco_9d:b9:ff (4c:71:0d:9d:b9:ff)
Internet Protocol Version 4, Src: 10.48.48.165, Dst: 10.61.70.23
Transmission Control Protocol, Src Port: 3128, Dst Port: 61484, Seq: 1228, Ack: 861, Len: 1188
[2 Reassembled TCP Segments (2105 bytes): #49(1107), #50(998)]
Hypertext Transfer Protocol
    [Proxy-Connect-Hostname: example.com]
    [Proxy-Connect-Port: 443]
Transport Layer Security
  TLSv1.2 Record Layer: Handshake Protocol: Certificate
      Content Type: Handshake (22)
      Version: TLS 1.2 (0x0303)
      Length: 2100
    Handshake Protocol: Certificate
        Handshake Type: Certificate (11)
        Length: 2096
        Certificates Length: 2093
      Certificates (2093 bytes)
          Certificate Length: 1105
        Certificate [truncated]: 3082044d30820335a00302010202140279103122f2aad73d32683b716d2a7d4ead7d47300d06092a864886f70d01010b05003047310b3009060355040613025553310e300c060355040a1
          signedCertificate
              version: v3 (2)
              serialNumber: 0x0279103122f2aad73d32683b716d2a7d4ead7d47
              signature (sha256WithRSAEncryption)
              issuer: rdnSequence (0)
                rdnSequence: 4 items (id-at-commonName=CISCO LAB Explicit,id-at-organizationalUnitName=IT,id-at-organizationName=Cisco,id-at-countryName=US)
                  RDNSequence item: 1 item (id-at-countryName=US)
                    RelativeDistinguishedName item (id-at-countryName=US)
                        Object Id: 2.5.4.6 (id-at-countryName)
                        CountryName: US
                  RDNSequence item: 1 item (id-at-organizationName=Cisco)
                    RelativeDistinguishedName item (id-at-organizationName=Cisco)
                        Object Id: 2.5.4.10 (id-at-organizationName)
                      DirectoryString: printableString (1)
                          printableString: Cisco
                  RDNSequence item: 1 item (id-at-organizationalUnitName=IT)
                    RelativeDistinguishedName item (id-at-organizationalUnitName=IT)
                        Object Id: 2.5.4.11 (id-at-organizationalUnitName)
                      DirectoryString: printableString (1)
                          printableString: IT
                  RDNSequence item: 1 item (id-at-commonName=CISCO LAB Explicit)
                    RelativeDistinguishedName item (id-at-commonName=CISCO LAB Explicit)
                        Object Id: 2.5.4.3 (id-at-commonName)
                      DirectoryString: printableString (1)
                          printableString: CISCO LAB Explicit
```

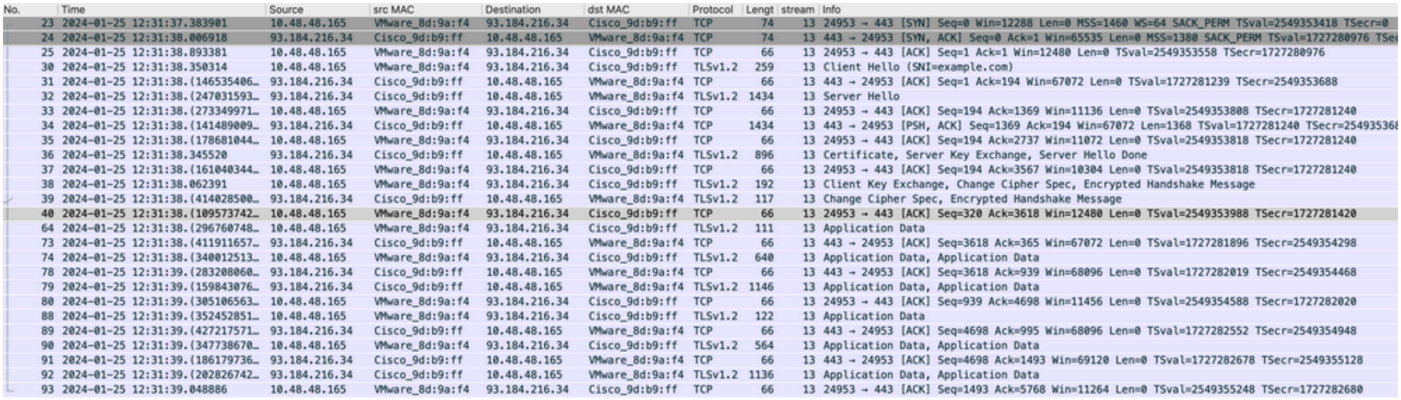
Imagen- certificado HTTPS - Explícito - SWA al cliente

SWA y servidor web

El tráfico de red se produce entre la dirección IP del proxy y la dirección IP del servidor Web.

El tráfico de SWA está destinado al puerto TCP 443 (no al puerto de proxy)

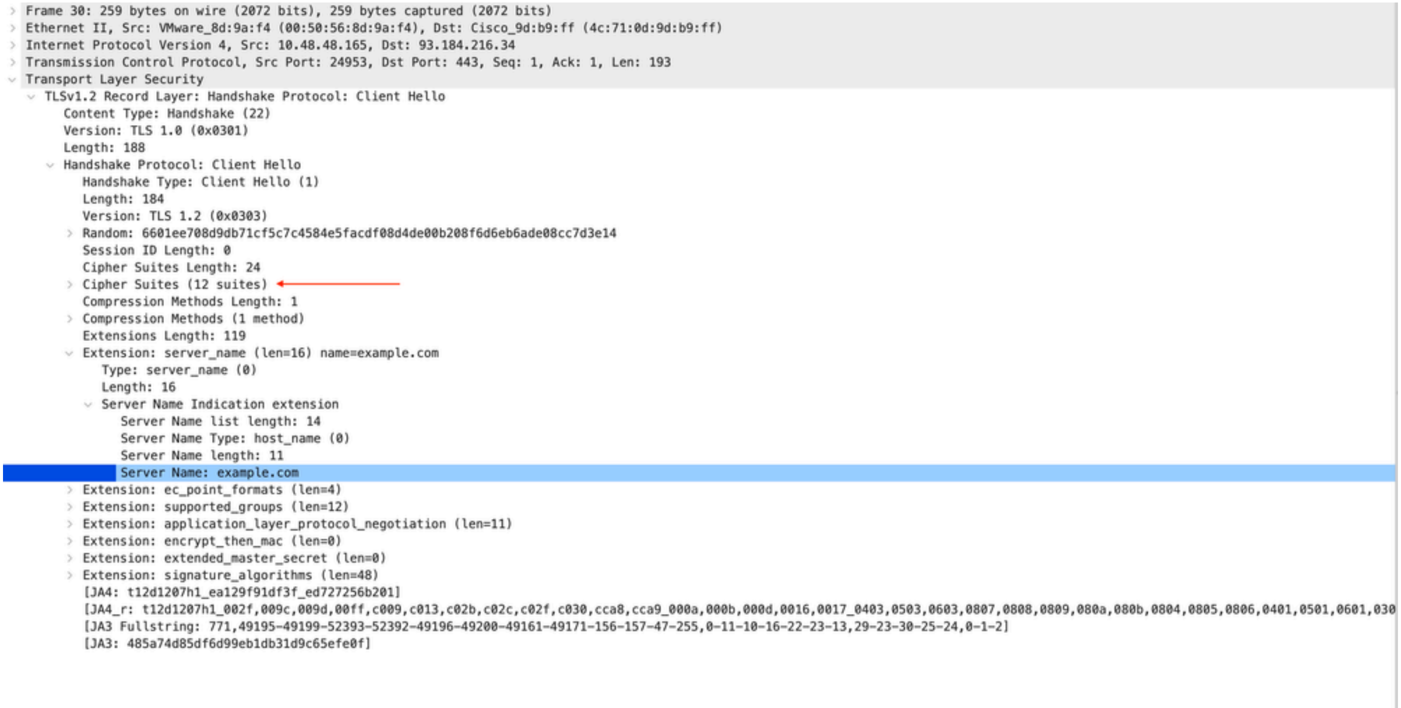
- Protocolo de enlace TCP.
- Hello del cliente (IP de destino = servidor web , Puerto de destino = 443)
- Hello de servidor (IP de origen = servidor Web)
- Transferencia de datos
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



```
No. Time                         Source         src MAC          Destination    dst MAC          Protocol Lengt stream Info
 23 2024-01-25 12:31:37.383901   10.48.48.165   VMware_8d:9a:f4  93.184.216.34  Cisco_9d:b9:ff   TCP        74   13 24953 → 443 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSval=2549353418 TSecr=0
 24 2024-01-25 12:31:38.006918   93.184.216.34  Cisco_9d:b9:ff   10.48.48.165   VMware_8d:9a:f4  TCP        74   13 443 → 24953 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1380 SACK_PERM TSval=1727280976 TSe
 25 2024-01-25 12:31:38.893381   10.48.48.165   VMware_8d:9a:f4  93.184.216.34  Cisco_9d:b9:ff   TCP        66   13 24953 → 443 [ACK] Seq=1 Ack=1 Win=12480 Len=0 TSval=2549353558 TSecr=1727280976
 30 2024-01-25 12:31:38.350314   10.48.48.165   VMware_8d:9a:f4  93.184.216.34  Cisco_9d:b9:ff   TLSv1.2   259   13 Client Hello (SNI=example.com)
 31 2024-01-25 12:31:38.(146535406… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TCP        66   13 443 → 24953 [ACK] Seq=1 Ack=194 Win=67072 Len=0 TSval=1727281239 TSecr=2549353688
 32 2024-01-25 12:31:38.(247031593… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TLSv1.2  1434   13 Server Hello
 33 2024-01-25 12:31:38.(273349971… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TCP        66   13 24953 → 443 [ACK] Seq=194 Ack=1369 Win=11136 Len=0 TSval=2549353808 TSecr=1727281240
 34 2024-01-25 12:31:38.(141489009… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TCP      1434   13 443 → 24953 [PSH, ACK] Seq=1369 Ack=194 Win=67072 Len=1368 TSval=1727281240 TSecr=254935368
 35 2024-01-25 12:31:38.(178681044… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TCP        66   13 24953 → 443 [ACK] Seq=194 Ack=2737 Win=11072 Len=0 TSval=2549353818 TSecr=1727281240
 36 2024-01-25 12:31:38.345520   93.184.216.34  Cisco_9d:b9:ff   10.48.48.165   VMware_8d:9a:f4  TLSv1.2   896   13 Certificate, Server Key Exchange, Server Hello Done
 37 2024-01-25 12:31:38.(161040344… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TCP        66   13 24953 → 443 [ACK] Seq=194 Ack=3567 Win=10304 Len=0 TSval=2549353818 TSecr=1727281240
 38 2024-01-25 12:31:38.062391   10.48.48.165   VMware_8d:9a:f4  93.184.216.34  Cisco_9d:b9:ff   TLSv1.2   192   13 Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
 39 2024-01-25 12:31:38.(414028500… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TLSv1.2   117   13 Change Cipher Spec, Encrypted Handshake Message
 40 2024-01-25 12:31:38.(109573742… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TCP        66   13 24953 → 443 [ACK] Seq=320 Ack=3618 Win=12480 Len=0 TSval=2549353988 TSecr=1727281420
 64 2024-01-25 12:31:38.(296760748… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TLSv1.2   111   13 Application Data
 73 2024-01-25 12:31:38.(411911657… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TCP        66   13 443 → 24953 [ACK] Seq=3618 Ack=365 Win=67072 Len=0 TSval=1727281896 TSecr=2549354298
 74 2024-01-25 12:31:38.(340012513… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TLSv1.2   640   13 Application Data, Application Data
 78 2024-01-25 12:31:39.(283208060… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TCP        66   13 443 → 24953 [ACK] Seq=3618 Ack=939 Win=68096 Len=0 TSval=1727282019 TSecr=2549354468
 79 2024-01-25 12:31:39.(159843076… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TLSv1.2  1146   13 Application Data, Application Data
 80 2024-01-25 12:31:39.(305106563… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TCP        66   13 24953 → 443 [ACK] Seq=939 Ack=4698 Win=11456 Len=0 TSval=2549354588 TSecr=1727282020
 88 2024-01-25 12:31:39.(352452851… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TLSv1.2   122   13 Application Data
 89 2024-01-25 12:31:39.(427217571… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TCP        66   13 443 → 24953 [ACK] Seq=4698 Ack=995 Win=68096 Len=0 TSval=1727282552 TSecr=2549354948
 90 2024-01-25 12:31:39.(347738670… 10.48.48.165  VMware_8d:9a:f4 93.184.216.34 Cisco_9d:b9:ff   TLSv1.2   564   13 Application Data, Application Data
 91 2024-01-25 12:31:39.(186179736… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TCP        66   13 443 → 24953 [ACK] Seq=4698 Ack=1493 Win=69120 Len=0 TSval=1727282678 TSecr=2549355128
 92 2024-01-25 12:31:39.(202826742… 93.184.216.34 Cisco_9d:b9:ff 10.48.48.165   VMware_8d:9a:f4  TLSv1.2  1136   13 Application Data, Application Data
 93 2024-01-25 12:31:39.048886   10.48.48.165   VMware_8d:9a:f4  93.184.216.34  Cisco_9d:b9:ff   TCP        66   13 24953 → 443 [ACK] Seq=1493 Ack=5768 Win=11264 Len=0 TSval=2549355248 TSecr=1727282680
```

Imagen- HTTPS - Explícito - SWA a webserver

Aquí están los detalles de Cliente Hello de SWA a servidor web, como se puede ver SWA anunciado 12 Cipher Suites:



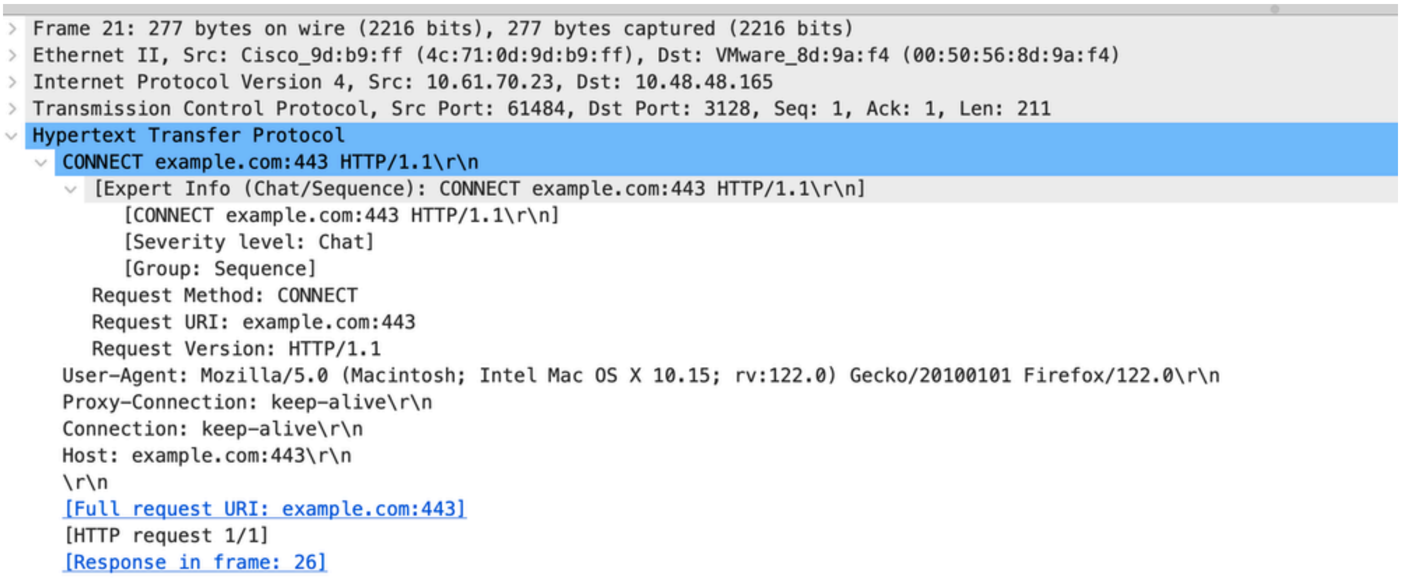
```
> Frame 30: 259 bytes on wire (2072 bits), 259 bytes captured (2072 bits)
> Ethernet II, Src: VMware_8d:9a:f4 (00:50:56:8d:9a:f4), Dst: Cisco_9d:b9:ff (4c:71:0d:9d:b9:ff)
> Internet Protocol Version 4, Src: 10.48.48.165, Dst: 93.184.216.34
> Transmission Control Protocol, Src Port: 24953, Dst Port: 443, Seq: 1, Ack: 1, Len: 193
v Transport Layer Security
  v TLSv1.2 Record Layer: Handshake Protocol: Client Hello
      Content Type: Handshake (22)
      Version: TLS 1.0 (0x0301)
      Length: 188
    v Handshake Protocol: Client Hello
        Handshake Type: Client Hello (1)
        Length: 184
        Version: TLS 1.2 (0x0303)
      > Random: 6601ee708d9db71cf5c7c4584e5facdf08d4de00b208f6d6eb6ade08cc7d3e14
        Session ID Length: 0
        Cipher Suites Length: 24
      > Cipher Suites (12 suites)
        Compression Methods Length: 1
      > Compression Methods (1 method)
        Extensions Length: 119
      v Extension: server_name (len=16) name=example.com
          Type: server_name (0)
          Length: 16
        v Server Name Indication extension
            Server Name list length: 14
            Server Name Type: host_name (0)
            Server Name length: 11
            Server Name: example.com
      > Extension: ec_point_formats (len=4)
      > Extension: supported_groups (len=12)
      > Extension: application_layer_protocol_negotiation (len=11)
      > Extension: encrypt_then_mac (len=0)
      > Extension: extended_master_secret (len=0)
      > Extension: signature_algorithms (len=48)
        [JA4: t12d1207h1_ea129f91df3f_ed727256b201]
        [JA4_r: t12d1207h1_002f,009c,009d,00ff,c009,c013,c02b,c02c,c02f,c030,cca8,cca9_000a,000b,000d,0016,0017_0403,0503,0603,0807,0808,0809,080a,080b,0804,0805,0806,0401,0501,0601,030
        [JA3 Fullstring: 771,49195-49199-52393-52392-49196-49200-49161-49171-156-157-47-255,0-11-10-16-22-23-13,29-23-30-25-24,0-1-2]
        [JA3: 485a74d85df6d99eb1db31d9c65efe0f]
```

Imagen- Hello de cliente HTTPS - SWA a servidor Web- Sin Chache

Nota: Las series Cipher observadas aquí difieren de las series Cipher en el saludo del cliente del cliente al SWA, ya que el SWA, configurado para descifrar este tráfico, utiliza sus propios cifrados.

Sugerencia: en el intercambio de claves de servidor de SWA a servidor web, aparece el certificado de servidor web. Sin embargo, si un proxy upstream encuentra la configuración para su SWA, su certificado aparece en lugar del certificado del servidor web.

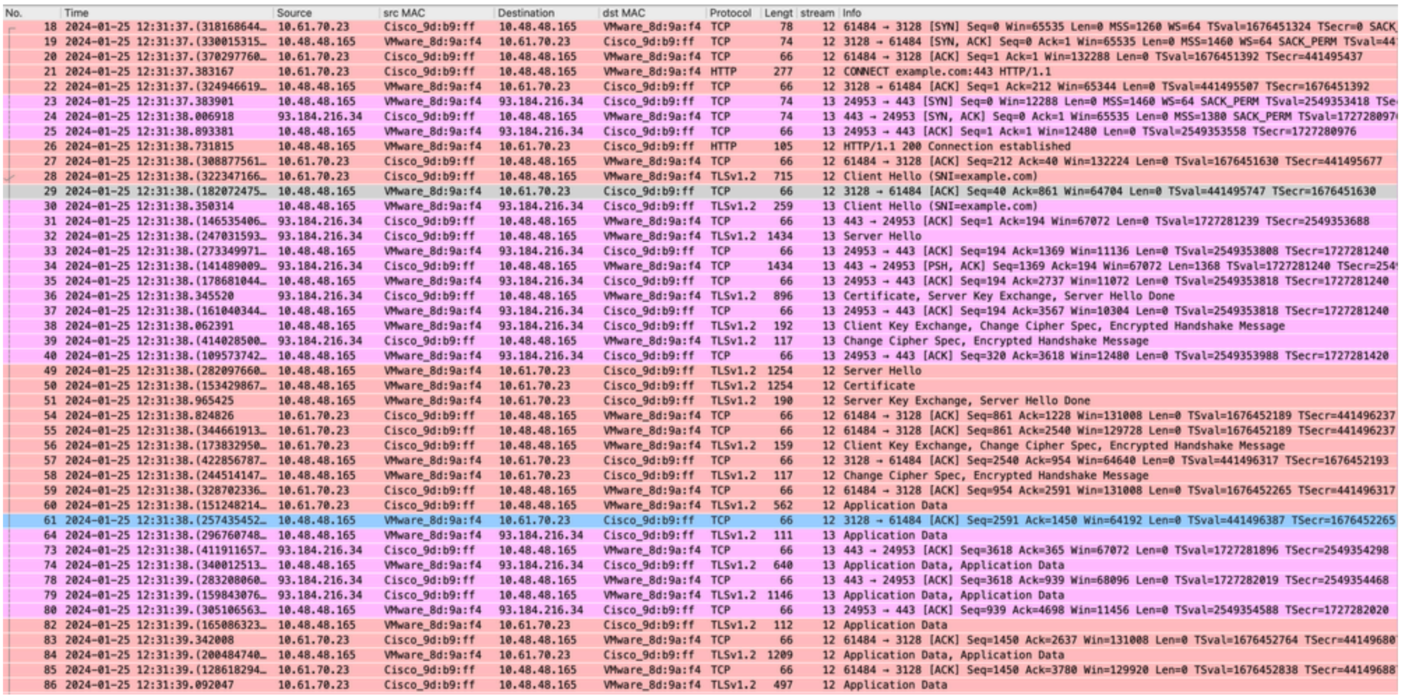
Este es un ejemplo de HTTP CONNECT desde el cliente



```
> Frame 21: 277 bytes on wire (2216 bits), 277 bytes captured (2216 bits)
> Ethernet II, Src: Cisco_9d:b9:ff (4c:71:0d:9d:b9:ff), Dst: VMware_8d:9a:f4 (00:50:56:8d:9a:f4)
> Internet Protocol Version 4, Src: 10.61.70.23, Dst: 10.48.48.165
> Transmission Control Protocol, Src Port: 61484, Dst Port: 3128, Seq: 1, Ack: 1, Len: 211
v Hypertext Transfer Protocol
  v CONNECT example.com:443 HTTP/1.1\r\n
    v [Expert Info (Chat/Sequence): CONNECT example.com:443 HTTP/1.1\r\n]
        [CONNECT example.com:443 HTTP/1.1\r\n]
        [Severity level: Chat]
        [Group: Sequence]
      Request Method: CONNECT
      Request URI: example.com:443
      Request Version: HTTP/1.1
  User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.15; rv:122.0) Gecko/20100101 Firefox/122.0\r\n
  Proxy-Connection: keep-alive\r\n
  Connection: keep-alive\r\n
  Host: example.com:443\r\n
  \r\n
  [Full request URI: example.com:443]
  [HTTP request 1/1]
  [Response in frame: 26]
```

Imagen- Cliente HTTP Connect

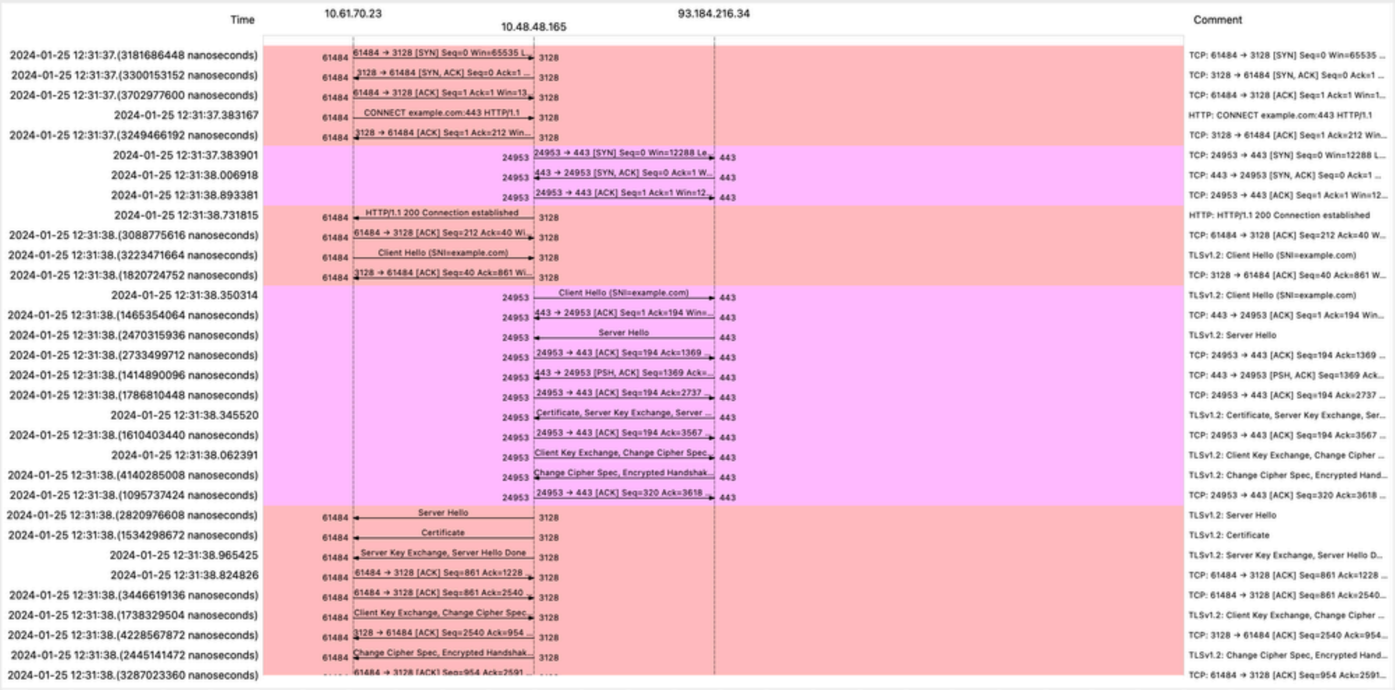
Esto representa el flujo completo de tráfico desde el cliente al SWA, luego al servidor web y, finalmente, de vuelta al cliente.



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
18	2024-01-25 12:31:37.(318168644…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	78	12	61484 → 3128 [SYN] Seq=0 Win=65535 Len=0 MSS=1260 WS=64 TSval=1676451324 TSecr=0 SACK_
19	2024-01-25 12:31:37.(330015315…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	74	12	3128 → 61484 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM TSval=44
20	2024-01-25 12:31:37.(370297760…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1 Ack=1 Win=132288 Len=0 TSval=1676451392 TSecr=441495437
21	2024-01-25 12:31:37.383167	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	HTTP	277	12	CONNECT example.com:443 HTTP/1.1
22	2024-01-25 12:31:37.(324946619…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=1 Ack=212 Win=65344 Len=0 TSval=441495507 TSecr=1676451392
23	2024-01-25 12:31:37.383901	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TCP	74	13	24953 → 443 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSval=2549353418 TSe
24	2024-01-25 12:31:38.006918	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	74	13	443 → 24953 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1380 SACK_PERM TSval=172728097
25	2024-01-25 12:31:38.893381	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TCP	66	13	24953 → 443 [ACK] Seq=1 Ack=1 Win=12480 Len=0 TSval=2549353558 TSecr=1727280976
26	2024-01-25 12:31:38.731815	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	HTTP	105	12	HTTP/1.1 200 Connection established
27	2024-01-25 12:31:38.(308877561…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=212 Ack=40 Win=132224 Len=0 TSval=1676451630 TSecr=441495677
28	2024-01-25 12:31:38.(322347166…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	715	12	Client Hello (SNI=example.com)
29	2024-01-25 12:31:38.(182072475…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=40 Ack=861 Win=64704 Len=0 TSval=441495747 TSecr=1676451630
30	2024-01-25 12:31:38.350314	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TLSv1.2	259	13	Client Hello (SNI=example.com)
31	2024-01-25 12:31:38.(146535406…	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	13	443 → 24953 [ACK] Seq=1 Ack=194 Win=67072 Len=0 TSval=1727281239 TSecr=2549353688
32	2024-01-25 12:31:38.(247031593…	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	1434	13	Server Hello
33	2024-01-25 12:31:38.(273349971…	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TCP	66	13	24953 → 443 [ACK] Seq=194 Ack=1369 Win=11136 Len=0 TSval=2549353808 TSecr=1727281240
34	2024-01-25 12:31:38.(141489009…	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	1434	13	443 → 24953 [PSH, ACK] Seq=1369 Ack=194 Win=67072 Len=1368 TSval=1727281240 TSecr=254
35	2024-01-25 12:31:38.(178681044…	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TCP	66	13	24953 → 443 [ACK] Seq=194 Ack=2737 Win=11072 Len=0 TSval=2549353818 TSecr=1727281240
36	2024-01-25 12:31:38.345520	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	896	13	Certificate, Server Key Exchange, Server Hello Done
37	2024-01-25 12:31:38.(161040344…	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TCP	66	13	24953 → 443 [ACK] Seq=194 Ack=3567 Win=10304 Len=0 TSval=2549353818 TSecr=1727281240
38	2024-01-25 12:31:38.062391	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TLSv1.2	192	13	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
39	2024-01-25 12:31:38.(414028500…	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	117	13	Change Cipher Spec, Encrypted Handshake Message
40	2024-01-25 12:31:38.(109573742…	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TCP	66	13	24953 → 443 [ACK] Seq=320 Ack=3618 Win=12480 Len=0 TSval=2549353988 TSecr=1727281420
49	2024-01-25 12:31:38.(282097660…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	1254	12	Server Hello
50	2024-01-25 12:31:38.(153429867…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	1254	12	Certificate
51	2024-01-25 12:31:38.965425	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	190	12	Server Key Exchange, Server Hello Done
54	2024-01-25 12:31:38.824826	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=861 Ack=1228 Win=131008 Len=0 TSval=1676452189 TSecr=441496237
55	2024-01-25 12:31:38.(344661913…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=861 Ack=2540 Win=129728 Len=0 TSval=1676452189 TSecr=441496237
56	2024-01-25 12:31:38.(173832950…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	159	12	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
57	2024-01-25 12:31:38.(422856787…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=2540 Ack=954 Win=64640 Len=0 TSval=441496317 TSecr=1676452193
58	2024-01-25 12:31:38.(244514147…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	117	12	Change Cipher Spec, Encrypted Handshake Message
59	2024-01-25 12:31:38.(328702336…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=954 Ack=2591 Win=131008 Len=0 TSval=1676452265 TSecr=441496317
60	2024-01-25 12:31:38.(151248214…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	562	12	Application Data
61	2024-01-25 12:31:38.(257435452…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TCP	66	12	3128 → 61484 [ACK] Seq=2591 Ack=1450 Win=64192 Len=0 TSval=441496387 TSecr=1676452265
64	2024-01-25 12:31:38.(296760748…	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TLSv1.2	111	13	Application Data
73	2024-01-25 12:31:38.(411911657…	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	13	443 → 24953 [ACK] Seq=3618 Ack=365 Win=67072 Len=0 TSval=1727281896 TSecr=2549354298
74	2024-01-25 12:31:38.(340012513…	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TLSv1.2	640	13	Application Data, Application Data
78	2024-01-25 12:31:39.(283208060…	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	13	443 → 24953 [ACK] Seq=3618 Ack=939 Win=68096 Len=0 TSval=1727282019 TSecr=2549354468
79	2024-01-25 12:31:39.(159843076…	93.184.216.34	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	1146	13	Application Data, Application Data
80	2024-01-25 12:31:39.(305106563…	10.48.48.165	VMware_8d:9a:f4	93.184.216.34	Cisco_9d:b9:ff	TCP	66	13	24953 → 443 [ACK] Seq=939 Ack=4698 Win=11456 Len=0 TSval=2549354588 TSecr=1727282020
82	2024-01-25 12:31:39.(165086323…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	112	12	Application Data
83	2024-01-25 12:31:39.342008	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1450 Ack=2637 Win=131008 Len=0 TSval=1676452764 TSecr=44149680
84	2024-01-25 12:31:39.(200484740…	10.48.48.165	VMware_8d:9a:f4	10.61.70.23	Cisco_9d:b9:ff	TLSv1.2	1209	12	Application Data, Application Data
85	2024-01-25 12:31:39.(128618294…	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TCP	66	12	61484 → 3128 [ACK] Seq=1450 Ack=3780 Win=129920 Len=0 TSval=1676452838 TSecr=44149688
86	2024-01-25 12:31:39.092047	10.61.70.23	Cisco_9d:b9:ff	10.48.48.165	VMware_8d:9a:f4	TLSv1.2	497	12	Application Data

Imagen- HTTPS explícito completo-Sin caché

Nota: Cada flujo de tráfico se distingue por un color diferente; el flujo del cliente al SWA es de un color y el flujo del SWA al servidor web es de otro.



Time	Comment
2024-01-25 12:31:37.(3181686448 nanoseconds)	TCP: 61484 → 3128 [SYN] Seq=0 Win=65535 ...
2024-01-25 12:31:37.(3300153152 nanoseconds)	TCP: 3128 → 61484 [SYN, ACK] Seq=0 Ack=1 ...
2024-01-25 12:31:37.(3702977600 nanoseconds)	TCP: 61484 → 3128 [ACK] Seq=1 Ack=1 Win=1...
2024-01-25 12:31:37.383167	HTTP: CONNECT example.com:443 HTTP/1.1
2024-01-25 12:31:37.(3249466192 nanoseconds)	TCP: 3128 → 61484 [ACK] Seq=1 Ack=212 Win...
2024-01-25 12:31:37.383901	TCP: 24953 → 443 [SYN] Seq=0 Win=12288 L...
2024-01-25 12:31:38.006918	TCP: 443 → 24953 [SYN, ACK] Seq=0 Ack=1 ...
2024-01-25 12:31:38.893381	TCP: 24953 → 443 [ACK] Seq=1 Ack=1 Win=12...
2024-01-25 12:31:38.731815	HTTP: HTTP/1.1 200 Connection established
2024-01-25 12:31:38.(3088775616 nanoseconds)	TCP: 61484 → 3128 [ACK] Seq=212 Ack=40 W...
2024-01-25 12:31:38.(3223471664 nanoseconds)	TLSv1.2: Client Hello (SNI=example.com)
2024-01-25 12:31:38.(1820724752 nanoseconds)	TCP: 3128 → 61484 [ACK] Seq=40 Ack=861 W...
2024-01-25 12:31:38.350314	TLSv1.2: Client Hello (SNI=example.com)
2024-01-25 12:31:38.(1465354064 nanoseconds)	TCP: 443 → 24953 [ACK] Seq=1 Ack=194 Win...
2024-01-25 12:31:38.(2470315936 nanoseconds)	TLSv1.2: Server Hello
2024-01-25 12:31:38.(2733499712 nanoseconds)	TCP: 24953 → 443 [ACK] Seq=194 Ack=1369 ...
2024-01-25 12:31:38.(1414890096 nanoseconds)	TCP: 443 → 24953 [PSH, ACK] Seq=1369 Ack...
2024-01-25 12:31:38.(1786810448 nanoseconds)	TCP: 24953 → 443 [ACK] Seq=194 Ack=2737 ...
2024-01-25 12:31:38.345520	TLSv1.2: Certificate, Server Key Exchange, Ser...
2024-01-25 12:31:38.(1610403440 nanoseconds)	TCP: 24953 → 443 [ACK] Seq=194 Ack=3567 ...
2024-01-25 12:31:38.062391	TLSv1.2: Client Key Exchange, Change Cipher ...
2024-01-25 12:31:38.(4140285008 nanoseconds)	TLSv1.2: Change Cipher Spec, Encrypted Hand...
2024-01-25 12:31:38.(1095737424 nanoseconds)	TCP: 24953 → 443 [ACK] Seq=320 Ack=3618 ...
2024-01-25 12:31:38.(2820976608 nanoseconds)	TLSv1.2: Server Hello
2024-01-25 12:31:38.(1534298672 nanoseconds)	TLSv1.2: Certificate
2024-01-25 12:31:38.965425	TLSv1.2: Server Key Exchange, Server Hello D...
2024-01-25 12:31:38.824826	TCP: 61484 → 3128 [ACK] Seq=861 Ack=1228 ...
2024-01-25 12:31:38.(3446619136 nanoseconds)	TCP: 61484 → 3128 [ACK] Seq=861 Ack=2540...
2024-01-25 12:31:38.(1738329504 nanoseconds)	TLSv1.2: Client Key Exchange, Change Cipher ...
2024-01-25 12:31:38.(4228567872 nanoseconds)	TCP: 3128 → 61484 [ACK] Seq=2540 Ack=954...
2024-01-25 12:31:38.(2445141472 nanoseconds)	TLSv1.2: Change Cipher Spec, Encrypted Hand...
2024-01-25 12:31:38.(3287023360 nanoseconds)	TCP: 61484 → 3128 [ACK] Seq=954 Ack=2591...

Imagen- Flujo HTTPS- Explícito - Sin caché

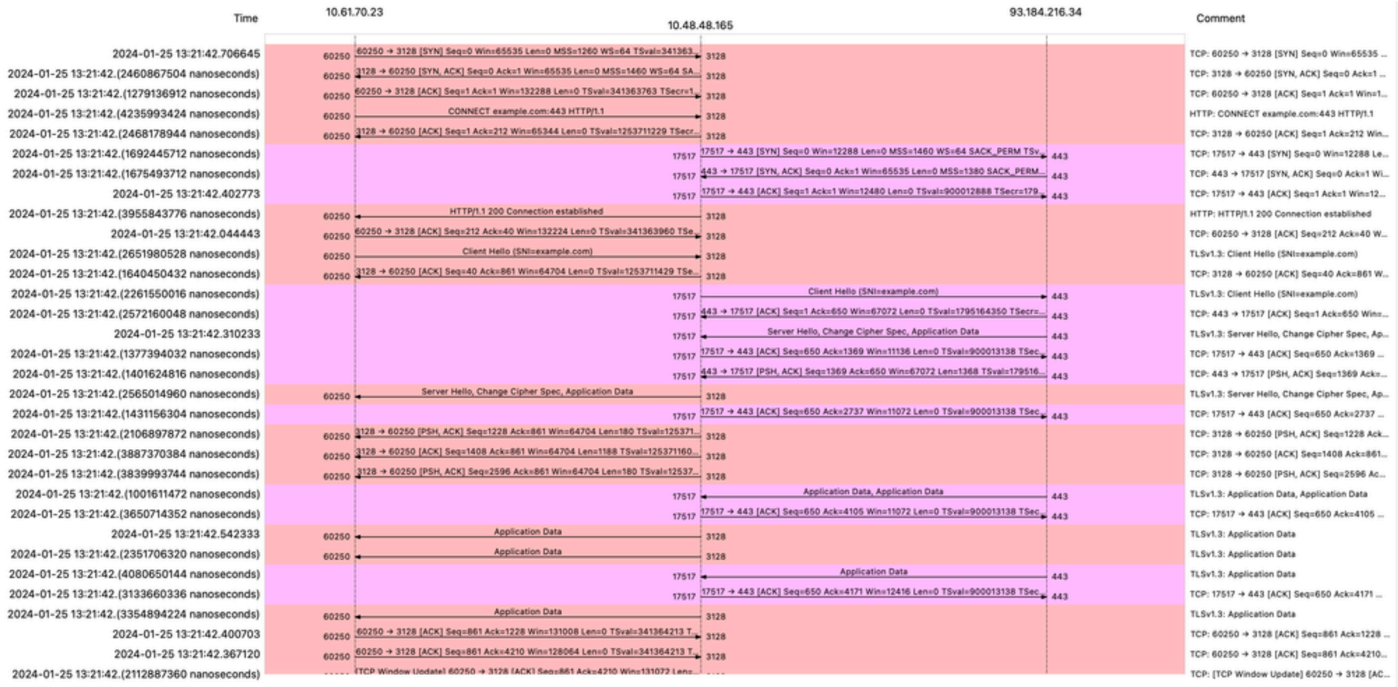
A continuación se muestra un ejemplo de Registros de accesorios:

```
1706174571.215 582 10.61.70.23 TCP_MISS_SSL/200 39 CONNECT tunnel://www.example.com:443/ - DIRECT/www.e
1706174571.486 270 10.61.70.23 TCP_MISS_SSL/200 1106 GET https://www.example.com:443/ - DIRECT/www.examp
```

Nota: Como puede ver en la implementación transparente para el tráfico HTTPS hay 2 líneas en los registros de acceso, la primera línea es cuando el tráfico está cifrado y puede ver CONNECT y la URL del servidor web comienza con tunnel://. Si el descifrado está habilitado en SWA, la segunda línea contiene GET y toda la URL comienza con HTTPS, lo que significa que el tráfico se ha descifrado.

Paso a través del tráfico HTTPS

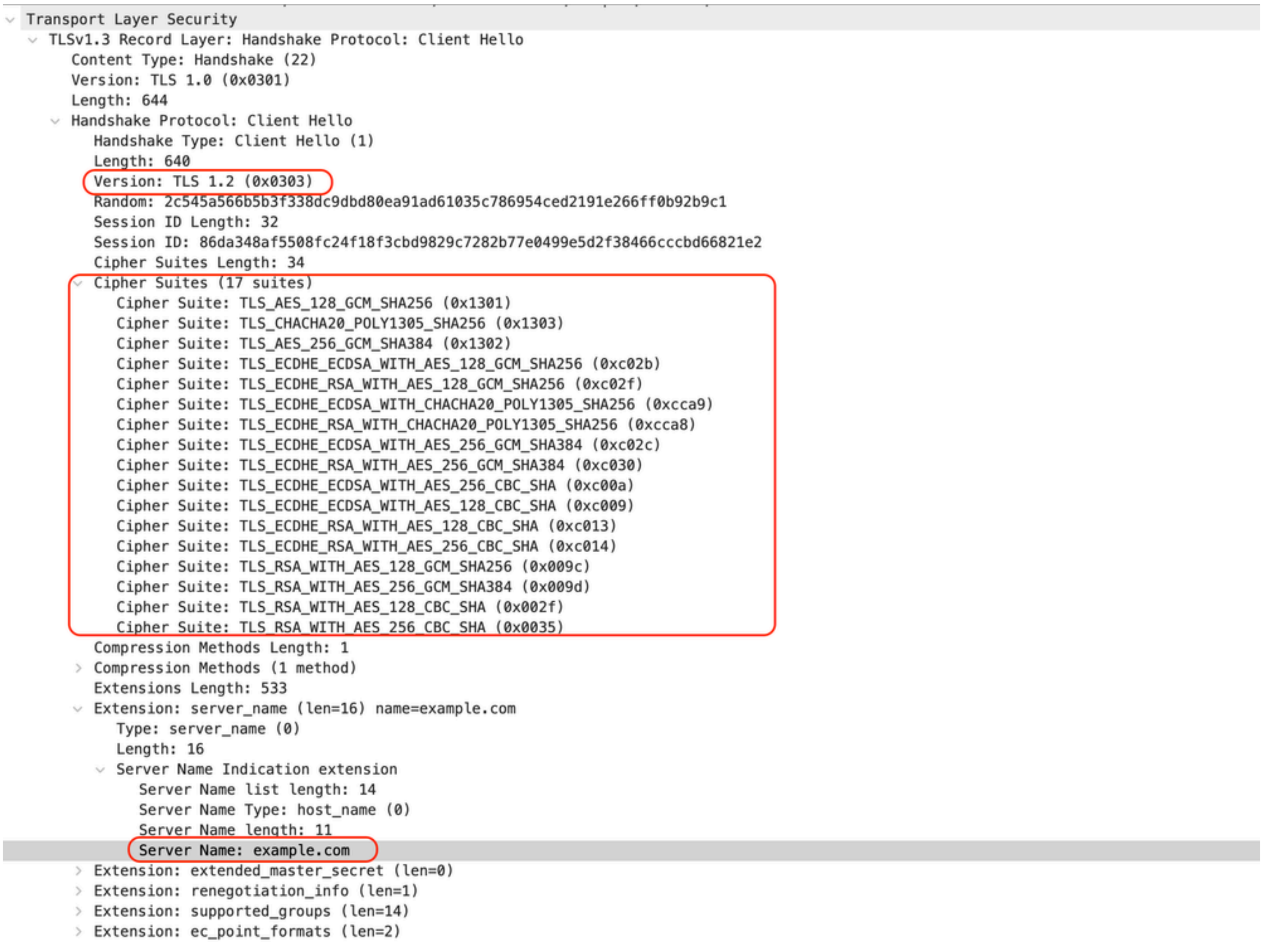
Si configuró su SWA para pasar a través del tráfico, aquí está el flujo general:



Time	10.61.70.23		10.48.48.165		93.184.216.34	Comment
2024-01-25 13:21:42.706645	60250	60250 → 3128 [SYN] Seq=0 Win=65535 Len=0 MSS=1260 WS=64 TSval=341363... →	3128			TCP: 60250 → 3128 [SYN] Seq=0 Win=65535 ...
2024-01-25 13:21:42.(2460867504 nanoseconds)	60250	← 3128 → 60250 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SA...	3128			TCP: 3128 → 60250 [SYN, ACK] Seq=0 Ack=1 ...
2024-01-25 13:21:42.(1279136912 nanoseconds)	60250	60250 → 3128 [ACK] Seq=1 Ack=1 Win=132288 Len=0 TSval=341363763 TSecr=1... →	3128			TCP: 60250 → 3128 [ACK] Seq=1 Ack=1 Win=1...
2024-01-25 13:21:42.(4235993424 nanoseconds)	60250	CONNECT example.com:443 HTTP/1.1 →	3128			HTTP: CONNECT example.com:443 HTTP/1.1
2024-01-25 13:21:42.(2468178944 nanoseconds)	60250	← 3128 → 60250 [ACK] Seq=1 Ack=212 Win=65344 Len=0 TSval=1253711229 TSecr...	3128			TCP: 3128 → 60250 [ACK] Seq=1 Ack=212 Win...
2024-01-25 13:21:42.(1692445712 nanoseconds)			17517	17517 → 443 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSv... →	443	TCP: 17517 → 443 [SYN] Seq=0 Win=12288 Le...
2024-01-25 13:21:42.(1675493712 nanoseconds)			17517	← 443 → 17517 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1380 SACK_PERM...	443	TCP: 443 → 17517 [SYN, ACK] Seq=0 Ack=1 Wi...
2024-01-25 13:21:42.402773			17517	17517 → 443 [ACK] Seq=1 Ack=1 Win=12480 Len=0 TSval=900012888 TSecr=179... →	443	TCP: 17517 → 443 [ACK] Seq=1 Ack=1 Win=12...
2024-01-25 13:21:42.(3955843776 nanoseconds)	60250	← HTTP/1.1 200 Connection established	3128			HTTP: HTTP/1.1 200 Connection established
2024-01-25 13:21:42.044443	60250	60250 → 3128 [ACK] Seq=212 Ack=40 Win=132224 Len=0 TSval=341363960 TSe... →	3128			TCP: 60250 → 3128 [ACK] Seq=212 Ack=40 W...
2024-01-25 13:21:42.(2651980528 nanoseconds)	60250	Client Hello (SNI=example.com) →	3128			TLSv1.3: Client Hello (SNI=example.com)
2024-01-25 13:21:42.(1640450432 nanoseconds)	60250	← 3128 → 60250 [ACK] Seq=40 Ack=861 Win=64704 Len=0 TSval=1253711429 TSe...	3128			TCP: 3128 → 60250 [ACK] Seq=40 Ack=861 W...
2024-01-25 13:21:42.(2261550016 nanoseconds)			17517	Client Hello (SNI=example.com) →	443	TLSv1.3: Client Hello (SNI=example.com)
2024-01-25 13:21:42.(2572160048 nanoseconds)			17517	← 443 → 17517 [ACK] Seq=1 Ack=650 Win=67072 Len=0 TSval=1795164350 TSecr=...	443	TCP: 443 → 17517 [ACK] Seq=1 Ack=650 Win=...
2024-01-25 13:21:42.310233			17517	← Server Hello, Change Cipher Spec, Application Data	443	TLSv1.3: Server Hello, Change Cipher Spec, Ap...
2024-01-25 13:21:42.(1377394032 nanoseconds)			17517	17517 → 443 [ACK] Seq=650 Ack=1369 Win=11136 Len=0 TSval=900013138 TSec... →	443	TCP: 17517 → 443 [ACK] Seq=650 Ack=1369 ...
2024-01-25 13:21:42.(1401624816 nanoseconds)			17517	← 443 → 17517 [PSH, ACK] Seq=1369 Ack=650 Win=67072 Len=1368 TSval=179516...	443	TCP: 443 → 17517 [PSH, ACK] Seq=1369 Ack=...
2024-01-25 13:21:42.(2565014960 nanoseconds)	60250	← Server Hello, Change Cipher Spec, Application Data	3128			TLSv1.3: Server Hello, Change Cipher Spec, Ap...
2024-01-25 13:21:42.(1431156304 nanoseconds)			17517	17517 → 443 [ACK] Seq=650 Ack=2737 Win=11072 Len=0 TSval=900013138 TSec... →	443	TCP: 17517 → 443 [ACK] Seq=650 Ack=2737 ...
2024-01-25 13:21:42.(2106897872 nanoseconds)	60250	← 3128 → 60250 [PSH, ACK] Seq=1228 Ack=861 Win=64704 Len=180 TSval=125371...	3128			TCP: 3128 → 60250 [PSH, ACK] Seq=1228 Ack...
2024-01-25 13:21:42.(3887370384 nanoseconds)	60250	← 3128 → 60250 [ACK] Seq=1408 Ack=861 Win=64704 Len=1188 TSval=125371160...	3128			TCP: 3128 → 60250 [ACK] Seq=1408 Ack=861...
2024-01-25 13:21:42.(3839993744 nanoseconds)	60250	← 3128 → 60250 [PSH, ACK] Seq=2596 Ack=861 Win=64704 Len=180 TSval=12537...	3128			TCP: 3128 → 60250 [PSH, ACK] Seq=2596 Ac...
2024-01-25 13:21:42.(1001611472 nanoseconds)			17517	← Application Data, Application Data	443	TLSv1.3: Application Data, Application Data
2024-01-25 13:21:42.(3650714352 nanoseconds)			17517	17517 → 443 [ACK] Seq=650 Ack=4105 Win=11072 Len=0 TSval=900013138 TSec... →	443	TCP: 17517 → 443 [ACK] Seq=650 Ack=4105 ...
2024-01-25 13:21:42.542333	60250	← Application Data	3128			TLSv1.3: Application Data
2024-01-25 13:21:42.(2351706320 nanoseconds)	60250	← Application Data	3128			TLSv1.3: Application Data
2024-01-25 13:21:42.(4080650144 nanoseconds)			17517	← Application Data	443	TLSv1.3: Application Data
2024-01-25 13:21:42.(3133660336 nanoseconds)			17517	17517 → 443 [ACK] Seq=650 Ack=4171 Win=12416 Len=0 TSval=900013138 TSec... →	443	TCP: 17517 → 443 [ACK] Seq=650 Ack=4171 ...
2024-01-25 13:21:42.(3354894224 nanoseconds)	60250	← Application Data	3128			TLSv1.3: Application Data
2024-01-25 13:21:42.400703	60250	60250 → 3128 [ACK] Seq=861 Ack=1228 Win=131008 Len=0 TSval=341364213 T... →	3128			TCP: 60250 → 3128 [ACK] Seq=861 Ack=1228 ...
2024-01-25 13:21:42.367120	60250	60250 → 3128 [ACK] Seq=861 Ack=4210 Win=128064 Len=0 TSval=341364213 T... →	3128			TCP: 60250 → 3128 [ACK] Seq=861 Ack=4210...
2024-01-25 13:21:42.(2112887360 nanoseconds)		[TCP Window Update] 60250 → 3128 [ACK] Seq=861 Ack=4210 Win=131072 Len=...				TCP: [TCP Window Update] 60250 → 3128 [AC...

Imagen- Paso a través de HTTPS - Explícito - Flujo

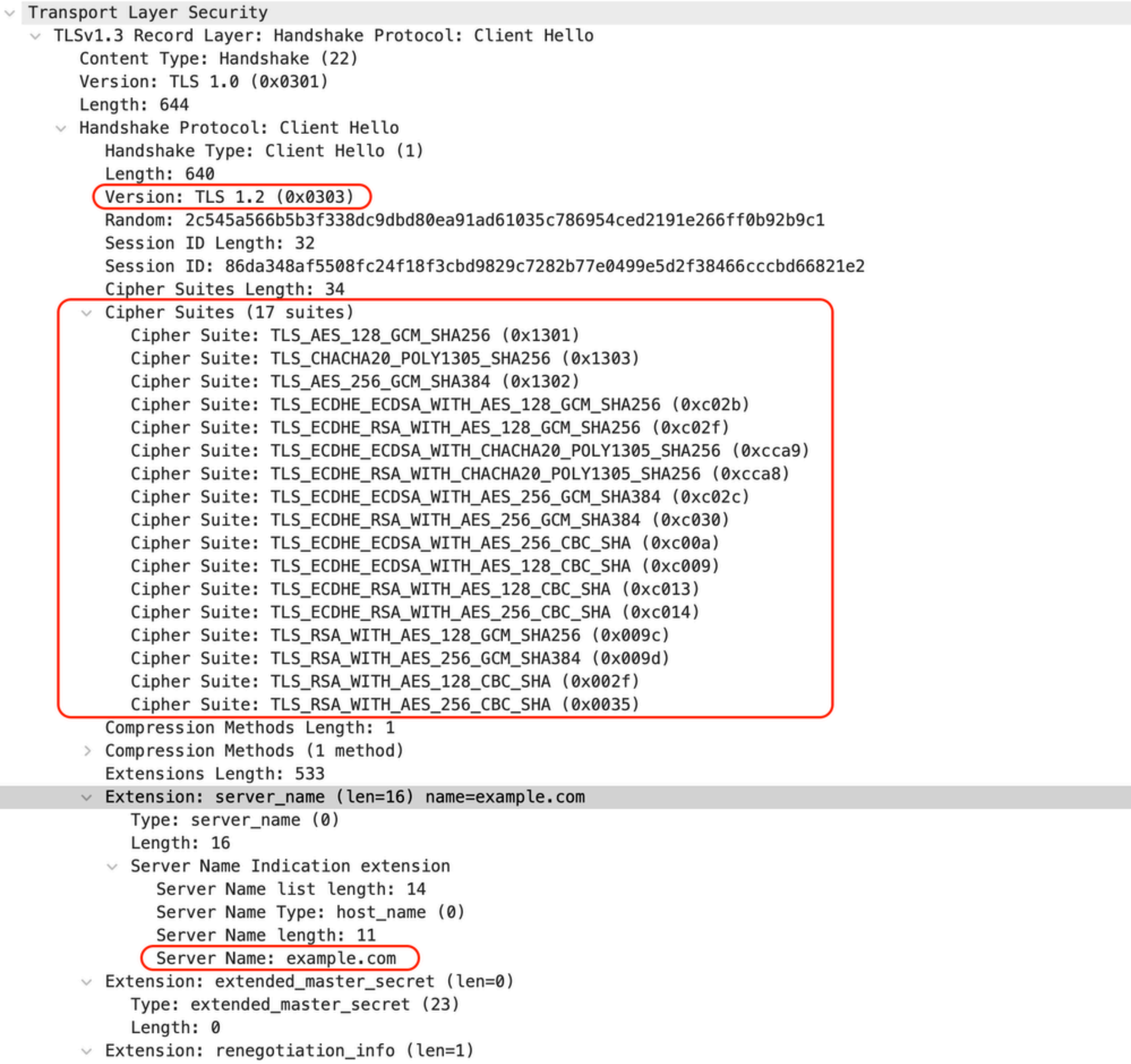
Este es el ejemplo de saludo del cliente desde SWA al servidor web:



```
∨ Transport Layer Security
  ∨ TLSv1.3 Record Layer: Handshake Protocol: Client Hello
      Content Type: Handshake (22)
      Version: TLS 1.0 (0x0301)
      Length: 644
    ∨ Handshake Protocol: Client Hello
        Handshake Type: Client Hello (1)
        Length: 640
        Version: TLS 1.2 (0x0303)
        Random: 2c545a566b5b3f338dc9dbd80ea91ad61035c786954ced2191e266ff0b92b9c1
        Session ID Length: 32
        Session ID: 86da348af5508fc24f18f3cbd9829c7282b77e0499e5d2f38466cccbd66821e2
        Cipher Suites Length: 34
      ∨ Cipher Suites (17 suites)
          Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
          Cipher Suite: TLS_CHACHA20_POLY1305_SHA256 (0x1303)
          Cipher Suite: TLS_AES_256_GCM_SHA384 (0x1302)
          Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
          Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
          Cipher Suite: TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 (0xcca9)
          Cipher Suite: TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (0xcca8)
          Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 (0xc02c)
          Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xc030)
          Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA (0xc00a)
          Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA (0xc009)
          Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA (0xc013)
          Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA (0xc014)
          Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
          Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
          Cipher Suite: TLS_RSA_WITH_AES_128_CBC_SHA (0x002f)
          Cipher Suite: TLS_RSA_WITH_AES_256_CBC_SHA (0x0035)
        Compression Methods Length: 1
      > Compression Methods (1 method)
        Extensions Length: 533
      ∨ Extension: server_name (len=16) name=example.com
          Type: server_name (0)
          Length: 16
        ∨ Server Name Indication extension
            Server Name list length: 14
            Server Name Type: host_name (0)
            Server Name length: 11
            Server Name: example.com
      > Extension: extended_master_secret (len=0)
      > Extension: renegotiation_info (len=1)
      > Extension: supported_groups (len=14)
      > Extension: ec_point_formats (len=2)
```

Imagen- Paso a través de HTTPS - Explícito - SWA a Webserver - Saludo del cliente

Lo que es lo mismo que el saludo del cliente del cliente al SWA:



```
Transport Layer Security
  TLSv1.3 Record Layer: Handshake Protocol: Client Hello
    Content Type: Handshake (22)
    Version: TLS 1.0 (0x0301)
    Length: 644
    Handshake Protocol: Client Hello
      Handshake Type: Client Hello (1)
      Length: 640
      Version: TLS 1.2 (0x0303)
      Random: 2c545a566b5b3f338dc9dbd80ea91ad61035c786954ced2191e266ff0b92b9c1
      Session ID Length: 32
      Session ID: 86da348af5508fc24f18f3cbd9829c7282b77e0499e5d2f38466cccbd66821e2
      Cipher Suites Length: 34
      Cipher Suites (17 suites)
        Cipher Suite: TLS_AES_128_GCM_SHA256 (0x1301)
        Cipher Suite: TLS_CHACHA20_POLY1305_SHA256 (0x1303)
        Cipher Suite: TLS_AES_256_GCM_SHA384 (0x1302)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 (0xcca9)
        Cipher Suite: TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 (0xcca8)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 (0xc02c)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xc030)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA (0xc00a)
        Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA (0xc009)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA (0xc013)
        Cipher Suite: TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA (0xc014)
        Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
        Cipher Suite: TLS_RSA_WITH_AES_256_GCM_SHA384 (0x009d)
        Cipher Suite: TLS_RSA_WITH_AES_128_CBC_SHA (0x002f)
        Cipher Suite: TLS_RSA_WITH_AES_256_CBC_SHA (0x0035)
      Compression Methods Length: 1
      Compression Methods (1 method)
      Extensions Length: 533
      Extension: server_name (len=16) name=example.com
        Type: server_name (0)
        Length: 16
        Server Name Indication extension
          Server Name list length: 14
          Server Name Type: host_name (0)
          Server Name length: 11
          Server Name: example.com
      Extension: extended_master_secret (len=0)
        Type: extended_master_secret (23)
        Length: 0
      Extension: renegotiation_info (len=1)
```

Imagen- Paso a través de HTTPS - Explícito - Cliente a SWA - Saludo del cliente

A continuación se muestra un ejemplo de AccessLog:

```
1706185288.920 53395 10.61.70.23 TCP_MISS/200 6549 CONNECT tunnel://www.example.com:443/ - DIRECT/www.e
```

Nota: Como puede ver, es solo una línea y la acción es PASSTHRU.

Implementación transparente

Tráfico HTTP en implementación transparente sin autenticación

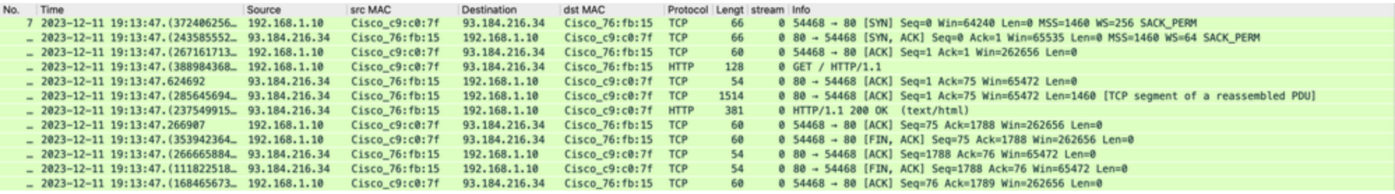
Cliente y SWA

El tráfico de red transpira entre la dirección IP del cliente y la dirección IP del servidor web.

El tráfico del cliente está destinado al puerto TCP 80 (no al puerto Proxy)

- Protocolo de enlace TCP.
- HTTP Get from Client (IP de destino = servidor web , Puerto de destino = 80)
- Respuesta HTTP del proxy (IP de origen = servidor Web)
- Transferencia de datos

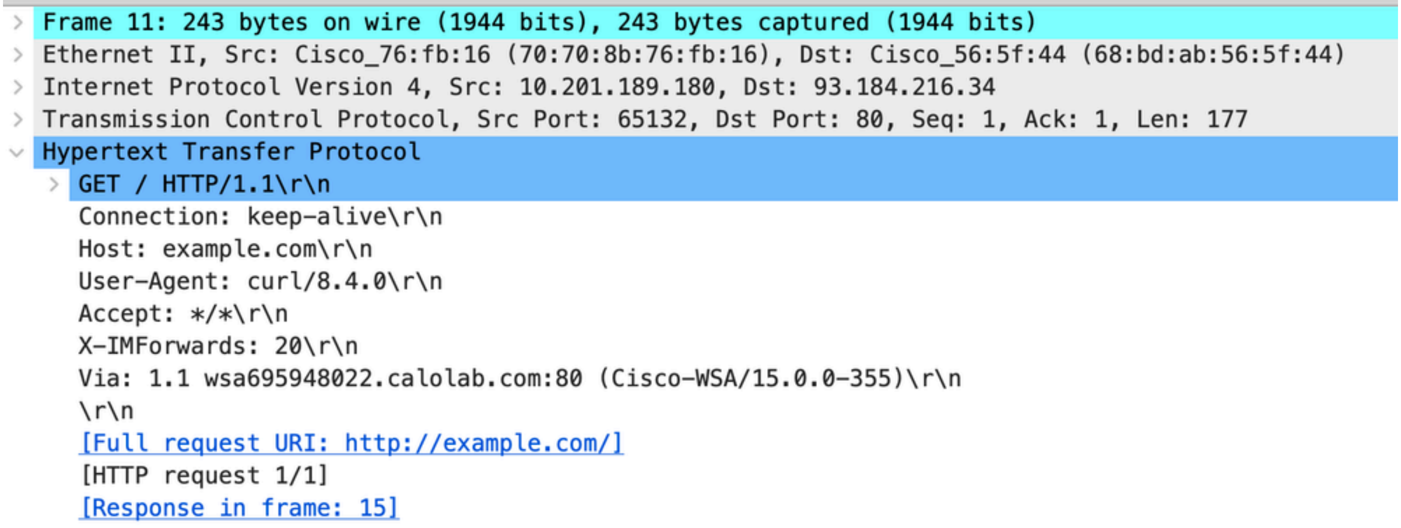
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



```
No.  Time                            Source         src MAC           Destination    dst MAC           Protocol Lengt stream Info
   7 2023-12-11 19:13:47.(372406256… 192.168.1.10   Cisco_c9:c0:7f    93.184.216.34  Cisco_76:fb:15    TCP        66      0 54468 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
   … 2023-12-11 19:13:47.(243585552… 93.184.216.34  Cisco_76:fb:15    192.168.1.10   Cisco_c9:c0:7f    TCP        66      0 80 → 54468 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM
   … 2023-12-11 19:13:47.(267161713… 192.168.1.10   Cisco_c9:c0:7f    93.184.216.34  Cisco_76:fb:15    TCP        60      0 54468 → 80 [ACK] Seq=1 Ack=1 Win=262656 Len=0
   … 2023-12-11 19:13:47.(388984368… 192.168.1.10   Cisco_c9:c0:7f    93.184.216.34  Cisco_76:fb:15    HTTP      128      0 GET / HTTP/1.1
   … 2023-12-11 19:13:47.624692      93.184.216.34  Cisco_76:fb:15    192.168.1.10   Cisco_c9:c0:7f    TCP        54      0 80 → 54468 [ACK] Seq=1 Ack=75 Win=65472 Len=0
   … 2023-12-11 19:13:47.(285645694… 93.184.216.34  Cisco_76:fb:15    192.168.1.10   Cisco_c9:c0:7f    TCP      1514      0 80 → 54468 [ACK] Seq=1 Ack=75 Win=65472 Len=1460 [TCP segment of a reassembled PDU]
   … 2023-12-11 19:13:47.(237549915… 93.184.216.34  Cisco_76:fb:15    192.168.1.10   Cisco_c9:c0:7f    HTTP      381      0 HTTP/1.1 200 OK  (text/html)
   … 2023-12-11 19:13:47.266907      192.168.1.10   Cisco_c9:c0:7f    93.184.216.34  Cisco_76:fb:15    TCP        60      0 54468 → 80 [ACK] Seq=75 Ack=1788 Win=262656 Len=0
   … 2023-12-11 19:13:47.(353942364… 192.168.1.10   Cisco_c9:c0:7f    93.184.216.34  Cisco_76:fb:15    TCP        60      0 54468 → 80 [FIN, ACK] Seq=75 Ack=1788 Win=262656 Len=0
   … 2023-12-11 19:13:47.(266665884… 93.184.216.34  Cisco_76:fb:15    192.168.1.10   Cisco_c9:c0:7f    TCP        54      0 80 → 54468 [ACK] Seq=1788 Ack=76 Win=65472 Len=0
   … 2023-12-11 19:13:47.(111822518… 93.184.216.34  Cisco_76:fb:15    192.168.1.10   Cisco_c9:c0:7f    TCP        54      0 80 → 54468 [FIN, ACK] Seq=1788 Ack=76 Win=65472 Len=0
   … 2023-12-11 19:13:47.(168465673… 192.168.1.10   Cisco_c9:c0:7f    93.184.216.34  Cisco_76:fb:15    TCP        60      0 54468 → 80 [ACK] Seq=76 Ack=1789 Win=262656 Len=0
```

Imagen- Cliente a Proxy - HTTP - Transparente - Sin autenticación

Este es un ejemplo de HTTP Get from Client



```
> Frame 11: 243 bytes on wire (1944 bits), 243 bytes captured (1944 bits)
> Ethernet II, Src: Cisco_76:fb:16 (70:70:8b:76:fb:16), Dst: Cisco_56:5f:44 (68:bd:ab:56:5f:44)
> Internet Protocol Version 4, Src: 10.201.189.180, Dst: 93.184.216.34
> Transmission Control Protocol, Src Port: 65132, Dst Port: 80, Seq: 1, Ack: 1, Len: 177
v Hypertext Transfer Protocol
  > GET / HTTP/1.1\r\n
    Connection: keep-alive\r\n
    Host: example.com\r\n
    User-Agent: curl/8.4.0\r\n
    Accept: */*\r\n
    X-IMForwards: 20\r\n
    Via: 1.1 wsa695948022.calolab.com:80 (Cisco-WSA/15.0.0-355)\r\n
    \r\n
    [Full request URI: http://example.com/]
    [HTTP request 1/1]
    [Response in frame: 15]
```

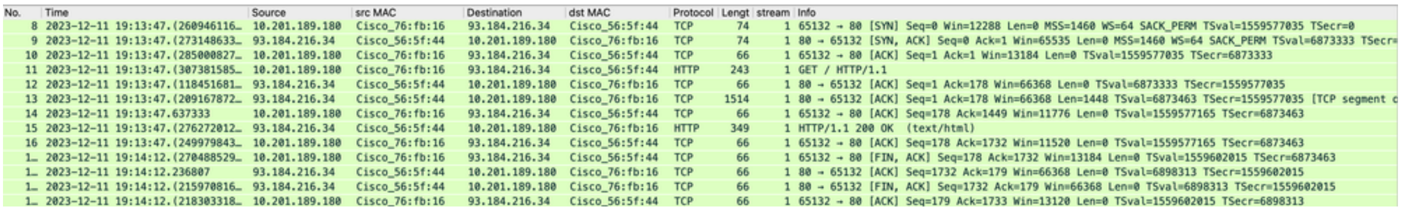
Imagen- Cliente a Proxy - HTTP - Transparente - Sin autenticación - Cliente HTTP Get

SWA y servidor web

El tráfico de red se produce entre la dirección IP del proxy y la dirección IP del servidor Web.

El tráfico de SWA está destinado al puerto TCP 80 (no al puerto de proxy)

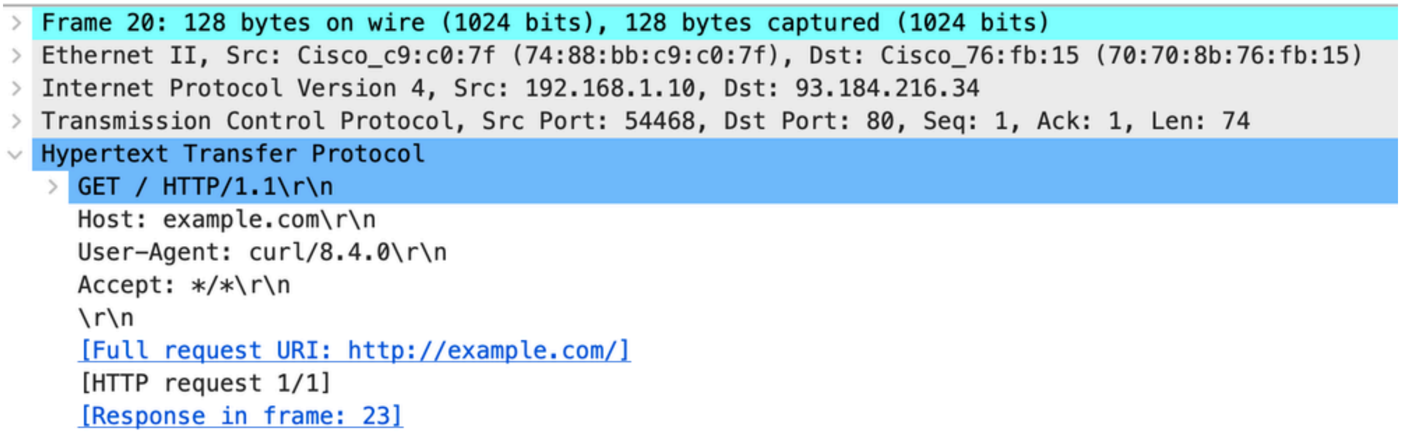
- Protocolo de enlace TCP.
- HTTP Get from Proxy (IP de destino = servidor web, puerto de destino = 80)
- Respuesta HTTP del servidor Web (IP de origen = servidor proxy)
- Transferencia de datos
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



```
No.  Time                            Source          src MAC           Destination     dst MAC           Protocol Lengt stream Info
   8 2023-12-11 19:13:47.(260946116… 10.201.189.180  Cisco_76:fb:16    93.184.216.34   Cisco_56:5f:44    TCP        74      1 65132 → 80 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSval=1559577035 TSecr=0
   9 2023-12-11 19:13:47.(273148633… 93.184.216.34   Cisco_56:5f:44    10.201.189.180  Cisco_76:fb:16    TCP        74      1 80 → 65132 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM TSval=6873333 TSecr=
  10 2023-12-11 19:13:47.(285000827… 10.201.189.180  Cisco_76:fb:16    93.184.216.34   Cisco_56:5f:44    TCP        66      1 65132 → 80 [ACK] Seq=1 Ack=1 Win=13184 Len=0 TSval=1559577035 TSecr=6873333
  11 2023-12-11 19:13:47.(307381585… 10.201.189.180  Cisco_76:fb:16    93.184.216.34   Cisco_56:5f:44    HTTP      243      1 GET / HTTP/1.1
  12 2023-12-11 19:13:47.(118451681… 93.184.216.34   Cisco_56:5f:44    10.201.189.180  Cisco_76:fb:16    TCP        66      1 80 → 65132 [ACK] Seq=1 Ack=178 Win=66368 Len=0 TSval=6873333 TSecr=1559577035
  13 2023-12-11 19:13:47.(209167872… 93.184.216.34   Cisco_56:5f:44    10.201.189.180  Cisco_76:fb:16    TCP      1514      1 80 → 65132 [ACK] Seq=1 Ack=178 Win=66368 Len=1448 TSval=6873463 TSecr=1559577035 [TCP segment o
  14 2023-12-11 19:13:47.637333      10.201.189.180  Cisco_76:fb:16    93.184.216.34   Cisco_56:5f:44    TCP        66      1 65132 → 80 [ACK] Seq=178 Ack=1449 Win=11776 Len=0 TSval=1559577165 TSecr=6873463
  15 2023-12-11 19:13:47.(276272012… 93.184.216.34   Cisco_56:5f:44    10.201.189.180  Cisco_76:fb:16    HTTP      349      1 HTTP/1.1 200 OK  (text/html)
  16 2023-12-11 19:13:47.(249979843… 10.201.189.180  Cisco_76:fb:16    93.184.216.34   Cisco_56:5f:44    TCP        66      1 65132 → 80 [ACK] Seq=178 Ack=1732 Win=11520 Len=0 TSval=1559577165 TSecr=6873463
  1… 2023-12-11 19:14:12.(270488529… 10.201.189.180  Cisco_76:fb:16    93.184.216.34   Cisco_56:5f:44    TCP        66      1 65132 → 80 [FIN, ACK] Seq=178 Ack=1732 Win=13184 Len=0 TSval=1559602015 TSecr=6873463
  1… 2023-12-11 19:14:12.236807      93.184.216.34   Cisco_56:5f:44    10.201.189.180  Cisco_76:fb:16    TCP        66      1 80 → 65132 [ACK] Seq=1732 Ack=179 Win=66368 Len=0 TSval=6898313 TSecr=1559602015
  1… 2023-12-11 19:14:12.(215970816… 93.184.216.34   Cisco_56:5f:44    10.201.189.180  Cisco_76:fb:16    TCP        66      1 80 → 65132 [FIN, ACK] Seq=1732 Ack=179 Win=66368 Len=0 TSval=6898313 TSecr=1559602015
  1… 2023-12-11 19:14:12.(218303318… 10.201.189.180  Cisco_76:fb:16    93.184.216.34   Cisco_56:5f:44    TCP        66      1 65132 → 80 [ACK] Seq=179 Ack=1733 Win=13120 Len=0 TSval=1559602015 TSecr=6898313
```

Imagen- Proxy y Servidor Web - HTTP - Transparente - Sin autenticación

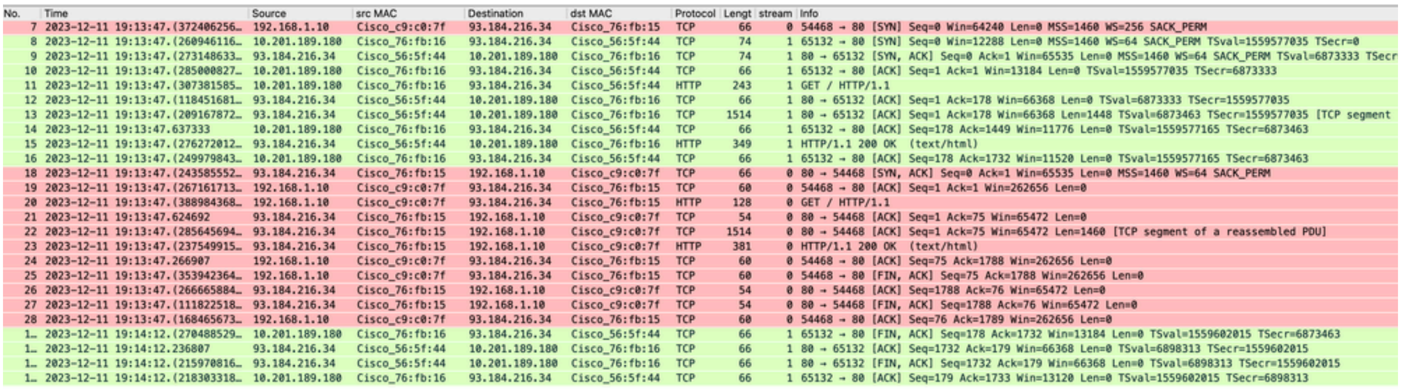
Este es un ejemplo de HTTP Get from Proxy



```
> Frame 20: 128 bytes on wire (1024 bits), 128 bytes captured (1024 bits)
> Ethernet II, Src: Cisco_c9:c0:7f (74:88:bb:c9:c0:7f), Dst: Cisco_76:fb:15 (70:70:8b:76:fb:15)
> Internet Protocol Version 4, Src: 192.168.1.10, Dst: 93.184.216.34
> Transmission Control Protocol, Src Port: 54468, Dst Port: 80, Seq: 1, Ack: 1, Len: 74
v Hypertext Transfer Protocol
  > GET / HTTP/1.1\r\n
    Host: example.com\r\n
    User-Agent: curl/8.4.0\r\n
    Accept: */*\r\n
    \r\n
    [Full request URI: http://example.com/]
    [HTTP request 1/1]
    [Response in frame: 23]
```

Imagen- Proxy a Servidor Web - HTTP - Transparente - Sin autenticación - Proxy HTTP Get

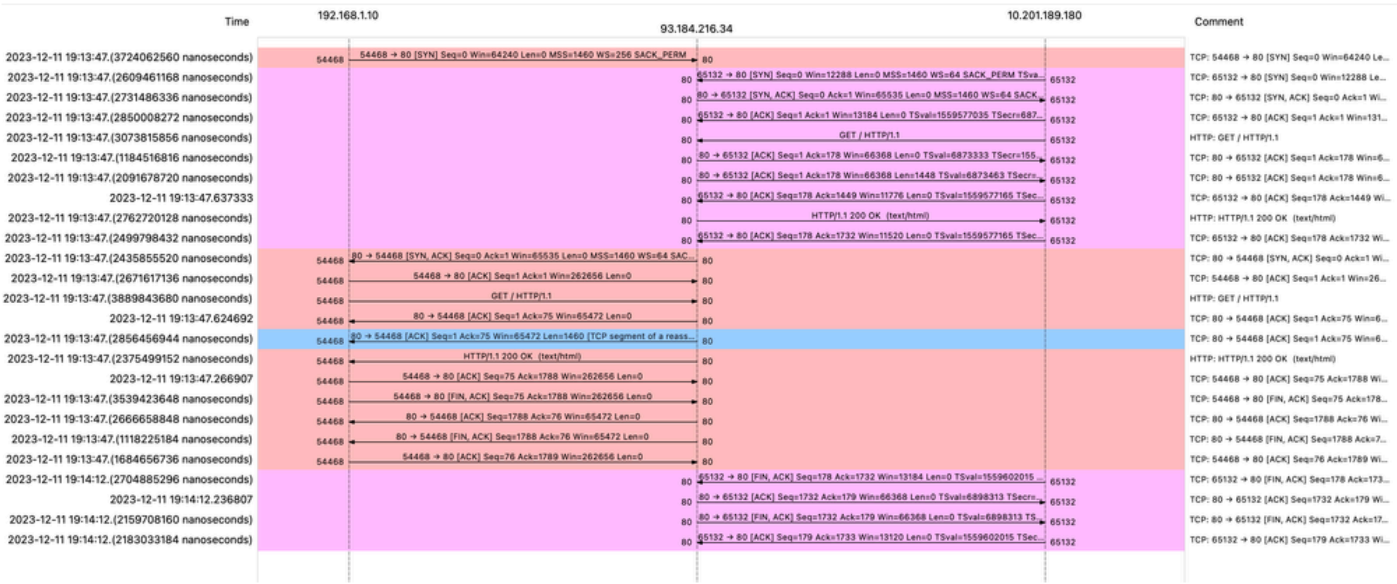
Esto representa el flujo completo de tráfico desde el cliente al SWA, luego al servidor web y, finalmente, de vuelta al cliente.



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
7	2023-12-11 19:13:47.(372406256…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	66	0	54468 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
8	2023-12-11 19:13:47.(260946116…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	74	1	65132 → 80 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSval=1559577035 TSecr=0
9	2023-12-11 19:13:47.(273148633…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	74	1	80 → 65132 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM TSval=6873333 TSecr
10	2023-12-11 19:13:47.(285000827…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	1	65132 → 80 [ACK] Seq=1 Ack=1 Win=13184 Len=0 TSval=1559577035 TSecr=6873333
11	2023-12-11 19:13:47.(307381585…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	HTTP	243	1	GET / HTTP/1.1
12	2023-12-11 19:13:47.(118451681…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	1	80 → 65132 [ACK] Seq=1 Ack=178 Win=66368 Len=0 TSval=6873333 TSecr=1559577035
13	2023-12-11 19:13:47.(209167872…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	1514	1	80 → 65132 [ACK] Seq=1 Ack=178 Win=66368 Len=1448 TSval=6873463 TSecr=1559577035 [TCP segment
14	2023-12-11 19:13:47.637333	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	1	65132 → 80 [ACK] Seq=178 Ack=1449 Win=11776 Len=0 TSval=1559577165 TSecr=6873463
15	2023-12-11 19:13:47.(276272012…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	HTTP	349	1	HTTP/1.1 200 OK (text/html)
16	2023-12-11 19:13:47.(249979843…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	1	65132 → 80 [ACK] Seq=178 Ack=1732 Win=11520 Len=0 TSval=1559577165 TSecr=6873463
18	2023-12-11 19:13:47.(243585552…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	66	0	80 → 54468 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM
19	2023-12-11 19:13:47.(267161713…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	0	54468 → 80 [ACK] Seq=1 Ack=1 Win=262656 Len=0
20	2023-12-11 19:13:47.(388984368…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	HTTP	128	0	GET / HTTP/1.1
21	2023-12-11 19:13:47.624692	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	0	80 → 54468 [ACK] Seq=1 Ack=75 Win=65472 Len=0
22	2023-12-11 19:13:47.(285645694…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	1514	0	80 → 54468 [ACK] Seq=1 Ack=75 Win=65472 Len=1460 [TCP segment of a reassembled PDU]
23	2023-12-11 19:13:47.(237549915…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	HTTP	381	0	HTTP/1.1 200 OK (text/html)
24	2023-12-11 19:13:47.266907	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	0	54468 → 80 [ACK] Seq=75 Ack=1788 Win=262656 Len=0
25	2023-12-11 19:13:47.(353942364…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	0	54468 → 80 [FIN, ACK] Seq=75 Ack=1788 Win=262656 Len=0
26	2023-12-11 19:13:47.(266665884…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	0	80 → 54468 [ACK] Seq=1788 Ack=76 Win=65472 Len=0
27	2023-12-11 19:13:47.(111822518…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	0	80 → 54468 [FIN, ACK] Seq=1788 Ack=76 Win=65472 Len=0
28	2023-12-11 19:13:47.(168465673…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	0	54468 → 80 [ACK] Seq=76 Ack=1789 Win=262656 Len=0
1…	2023-12-11 19:14:12.(270488529…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	1	65132 → 80 [FIN, ACK] Seq=178 Ack=1732 Win=13184 Len=0 TSval=1559602015 TSecr=6873463
1…	2023-12-11 19:14:12.236807	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	1	80 → 65132 [ACK] Seq=1732 Ack=179 Win=66368 Len=0 TSval=6898313 TSecr=1559602015
1…	2023-12-11 19:14:12.(215970816…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	1	80 → 65132 [FIN, ACK] Seq=1732 Ack=179 Win=66368 Len=0 TSval=6898313 TSecr=1559602015
1…	2023-12-11 19:14:12.(218303318…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	1	65132 → 80 [ACK] Seq=179 Ack=1733 Win=13120 Len=0 TSval=1559602015 TSecr=6898313

Imagen- Tráfico total - HTTP - Transparente - Sin autenticación

Nota: Cada flujo de tráfico se distingue por un color diferente; el flujo del cliente al SWA es de un color y el flujo del SWA al servidor web es de otro.



Time	192.168.1.10		93.184.216.34		10.201.189.180	Comment
2023-12-11 19:13:47.(3724062560 nanoseconds)	54468	54468 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM	80			TCP: 54468 → 80 [SYN] Seq=0 Win=64240 Le...
2023-12-11 19:13:47.(2609461168 nanoseconds)			80	65132 → 80 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSva...	65132	TCP: 65132 → 80 [SYN] Seq=0 Win=12288 Le...
2023-12-11 19:13:47.(2731486336 nanoseconds)			80	80 → 65132 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK...	65132	TCP: 80 → 65132 [SYN, ACK] Seq=0 Ack=1 Wi...
2023-12-11 19:13:47.(2850008272 nanoseconds)			80	65132 → 80 [ACK] Seq=1 Ack=1 Win=13184 Len=0 TSval=1559577035 TSecr=687...	65132	TCP: 65132 → 80 [ACK] Seq=1 Ack=1 Win=131...
2023-12-11 19:13:47.(3073815856 nanoseconds)			80	GET / HTTP/1.1	65132	HTTP: GET / HTTP/1.1
2023-12-11 19:13:47.(1184516816 nanoseconds)			80	80 → 65132 [ACK] Seq=1 Ack=178 Win=66368 Len=0 TSval=6873333 TSecr=155...	65132	TCP: 80 → 65132 [ACK] Seq=1 Ack=178 Win=6...
2023-12-11 19:13:47.(2091678720 nanoseconds)			80	80 → 65132 [ACK] Seq=1 Ack=178 Win=66368 Len=1448 TSval=6873463 TSecr=...	65132	TCP: 80 → 65132 [ACK] Seq=1 Ack=178 Win=6...
2023-12-11 19:13:47.637333			80	65132 → 80 [ACK] Seq=178 Ack=1449 Win=11776 Len=0 TSval=1559577165 TSec...	65132	TCP: 65132 → 80 [ACK] Seq=178 Ack=1449 Wi...
2023-12-11 19:13:47.(2762720128 nanoseconds)			80	HTTP/1.1 200 OK (text/html)	65132	HTTP: HTTP/1.1 200 OK (text/html)
2023-12-11 19:13:47.(2499798432 nanoseconds)			80	65132 → 80 [ACK] Seq=178 Ack=1732 Win=11520 Len=0 TSval=1559577165 TSec...	65132	TCP: 65132 → 80 [ACK] Seq=178 Ack=1732 Wi...
2023-12-11 19:13:47.(2435855520 nanoseconds)	54468	80 → 54468 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SAC...	80			TCP: 80 → 54468 [SYN, ACK] Seq=0 Ack=1 Wi...
2023-12-11 19:13:47.(2671617136 nanoseconds)	54468	54468 → 80 [ACK] Seq=1 Ack=1 Win=262656 Len=0	80			TCP: 54468 → 80 [ACK] Seq=1 Ack=1 Win=26...
2023-12-11 19:13:47.(3889843680 nanoseconds)	54468	GET / HTTP/1.1	80			HTTP: GET / HTTP/1.1
2023-12-11 19:13:47.624692	54468	80 → 54468 [ACK] Seq=1 Ack=75 Win=65472 Len=0	80			TCP: 80 → 54468 [ACK] Seq=1 Ack=75 Win=6...
2023-12-11 19:13:47.(2856456944 nanoseconds)	54468	80 → 54468 [ACK] Seq=1 Ack=75 Win=65472 Len=1460 [TCP segment of a reass...	80			TCP: 80 → 54468 [ACK] Seq=1 Ack=75 Win=6...
2023-12-11 19:13:47.(2375499152 nanoseconds)	54468	HTTP/1.1 200 OK (text/html)	80			HTTP: HTTP/1.1 200 OK (text/html)
2023-12-11 19:13:47.266907	54468	54468 → 80 [ACK] Seq=75 Ack=1788 Win=262656 Len=0	80			TCP: 54468 → 80 [ACK] Seq=75 Ack=1788 Wi...
2023-12-11 19:13:47.(3539423648 nanoseconds)	54468	54468 → 80 [FIN, ACK] Seq=75 Ack=1788 Win=262656 Len=0	80			TCP: 54468 → 80 [FIN, ACK] Seq=75 Ack=178...
2023-12-11 19:13:47.(2666658848 nanoseconds)	54468	80 → 54468 [ACK] Seq=1788 Ack=76 Win=65472 Len=0	80			TCP: 80 → 54468 [ACK] Seq=1788 Ack=76 Wi...
2023-12-11 19:13:47.(1118225184 nanoseconds)	54468	80 → 54468 [FIN, ACK] Seq=1788 Ack=76 Win=65472 Len=0	80			TCP: 80 → 54468 [FIN, ACK] Seq=1788 Ack=7...
2023-12-11 19:13:47.(1684656736 nanoseconds)	54468	54468 → 80 [ACK] Seq=76 Ack=1789 Win=262656 Len=0	80			TCP: 54468 → 80 [ACK] Seq=76 Ack=1789 Wi...
2023-12-11 19:14:12.(2704885296 nanoseconds)			80	65132 → 80 [FIN, ACK] Seq=178 Ack=1732 Win=13184 Len=0 TSval=1559602015 ...	65132	TCP: 65132 → 80 [FIN, ACK] Seq=178 Ack=173...
2023-12-11 19:14:12.236807			80	80 → 65132 [ACK] Seq=1732 Ack=179 Win=66368 Len=0 TSval=6898313 TSecr=...	65132	TCP: 80 → 65132 [ACK] Seq=1732 Ack=179 Wi...
2023-12-11 19:14:12.(2159708160 nanoseconds)			80	80 → 65132 [FIN, ACK] Seq=1732 Ack=179 Win=66368 Len=0 TSval=6898313 TS...	65132	TCP: 80 → 65132 [FIN, ACK] Seq=1732 Ack=17...
2023-12-11 19:14:12.(2183033184 nanoseconds)			80	65132 → 80 [ACK] Seq=179 Ack=1733 Win=13120 Len=0 TSval=1559602015 TSec...	65132	TCP: 65132 → 80 [ACK] Seq=179 Ack=1733 Wi...

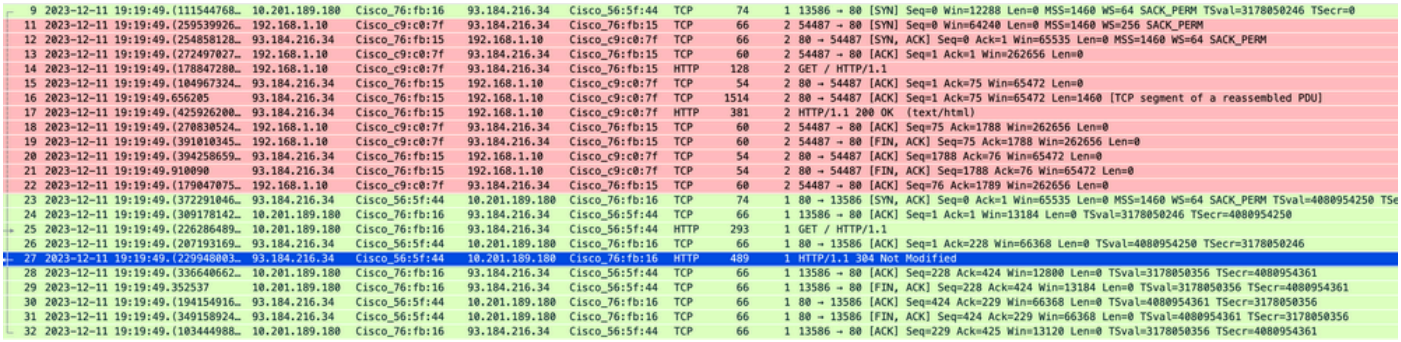
Imagen- Flujo HTTP WCCP

A continuación se muestra un ejemplo de Registros de accesorios:

```
1702318427.181 124 192.168.1.10 TCP_MISS/200 1787 GET http://www.example.com/ - DIRECT/www.example.com
```

Tráfico Con Datos Almacenados En Caché

Esto representa el flujo completo de tráfico del cliente al SWA, cuando los datos están en la caché SWA.

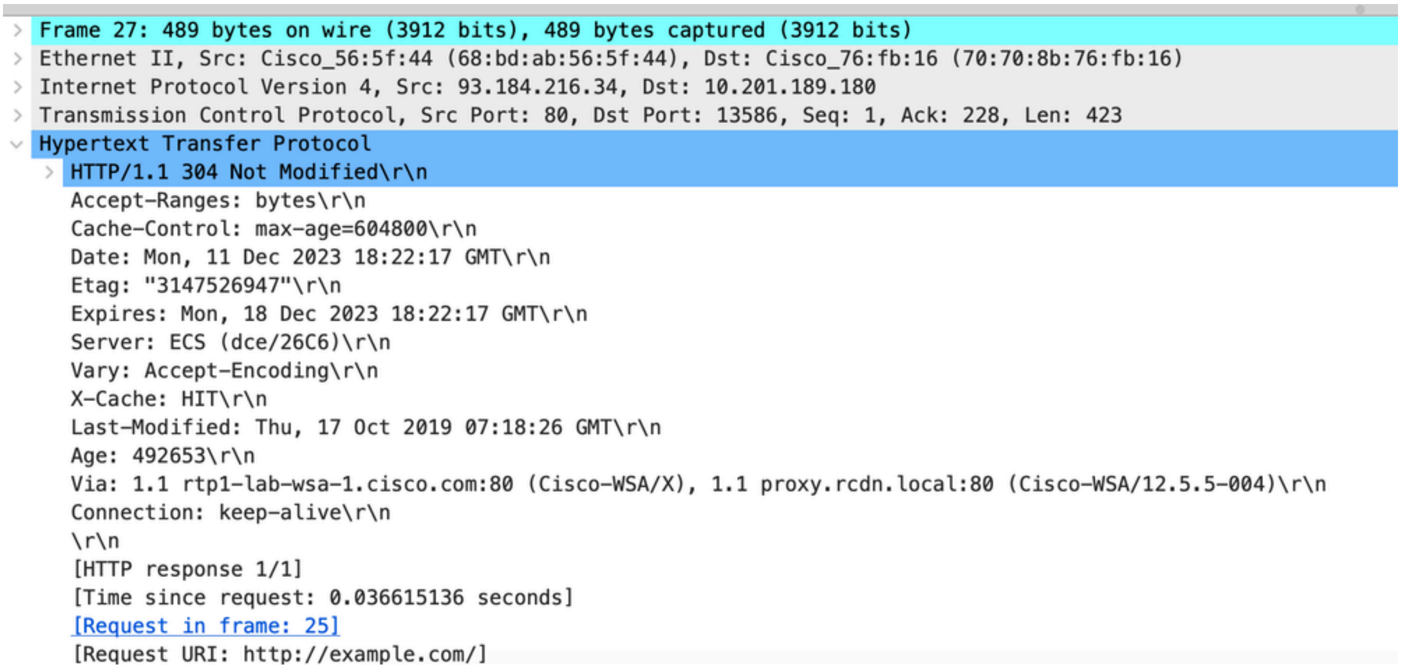


```
 9 2023-12-11 19:19:49.(111544768… 10.201.189.180 Cisco_76:fb:16 93.184.216.34  Cisco_56:5f:44 TCP    74  1 13586 → 80 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSval=3178050246 TSecr=0
11 2023-12-11 19:19:49.(259539926… 192.168.1.10   Cisco_c9:c0:7f 93.184.216.34  Cisco_76:fb:15 TCP    66  2 54487 → 80 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
12 2023-12-11 19:19:49.(254858128… 93.184.216.34  Cisco_76:fb:15 192.168.1.10   Cisco_c9:c0:7f TCP    66  2 80 → 54487 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM
13 2023-12-11 19:19:49.(272497027… 192.168.1.10   Cisco_c9:c0:7f 93.184.216.34  Cisco_76:fb:15 TCP    60  2 54487 → 80 [ACK] Seq=1 Ack=1 Win=262656 Len=0
14 2023-12-11 19:19:49.(178847280… 192.168.1.10   Cisco_c9:c0:7f 93.184.216.34  Cisco_76:fb:15 HTTP  128  2 GET / HTTP/1.1
15 2023-12-11 19:19:49.(104967324… 93.184.216.34  Cisco_76:fb:15 192.168.1.10   Cisco_c9:c0:7f TCP    54  2 80 → 54487 [ACK] Seq=1 Ack=75 Win=65472 Len=0
16 2023-12-11 19:19:49.656205      93.184.216.34  Cisco_76:fb:15 192.168.1.10   Cisco_c9:c0:7f TCP  1514  2 80 → 54487 [ACK] Seq=1 Ack=75 Win=65472 Len=1460 [TCP segment of a reassembled PDU]
17 2023-12-11 19:19:49.(425926200… 93.184.216.34  Cisco_76:fb:15 192.168.1.10   Cisco_c9:c0:7f HTTP  381  2 HTTP/1.1 200 OK  (text/html)
18 2023-12-11 19:19:49.(270830524… 192.168.1.10   Cisco_c9:c0:7f 93.184.216.34  Cisco_76:fb:15 TCP    60  2 54487 → 80 [ACK] Seq=75 Ack=1788 Win=262656 Len=0
19 2023-12-11 19:19:49.(391010345… 192.168.1.10   Cisco_c9:c0:7f 93.184.216.34  Cisco_76:fb:15 TCP    60  2 54487 → 80 [FIN, ACK] Seq=75 Ack=1788 Win=262656 Len=0
20 2023-12-11 19:19:49.(394258659… 93.184.216.34  Cisco_76:fb:15 192.168.1.10   Cisco_c9:c0:7f TCP    54  2 80 → 54487 [ACK] Seq=1788 Ack=76 Win=65472 Len=0
21 2023-12-11 19:19:49.910090      93.184.216.34  Cisco_76:fb:15 192.168.1.10   Cisco_c9:c0:7f TCP    54  2 80 → 54487 [FIN, ACK] Seq=1788 Ack=76 Win=65472 Len=0
22 2023-12-11 19:19:49.(179047075… 192.168.1.10   Cisco_c9:c0:7f 93.184.216.34  Cisco_76:fb:15 TCP    60  2 54487 → 80 [ACK] Seq=76 Ack=1789 Win=262656 Len=0
23 2023-12-11 19:19:49.(372291046… 93.184.216.34  Cisco_56:5f:44 10.201.189.180 Cisco_76:fb:16 TCP    74  1 80 → 13586 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM TSval=4080954250 TSe
24 2023-12-11 19:19:49.(309178142… 10.201.189.180 Cisco_76:fb:16 93.184.216.34  Cisco_56:5f:44 TCP    66  1 13586 → 80 [ACK] Seq=1 Ack=1 Win=13184 Len=0 TSval=3178050246 TSecr=4080954250
25 2023-12-11 19:19:49.(226286489… 10.201.189.180 Cisco_76:fb:16 93.184.216.34  Cisco_56:5f:44 HTTP  293  1 GET / HTTP/1.1
26 2023-12-11 19:19:49.(207193169… 93.184.216.34  Cisco_56:5f:44 10.201.189.180 Cisco_76:fb:16 TCP    66  1 80 → 13586 [ACK] Seq=1 Ack=228 Win=66368 Len=0 TSval=4080954250 TSecr=3178050246
27 2023-12-11 19:19:49.(229948003… 93.184.216.34  Cisco_56:5f:44 10.201.189.180 Cisco_76:fb:16 HTTP  489  1 HTTP/1.1 304 Not Modified
28 2023-12-11 19:19:49.(336640662… 10.201.189.180 Cisco_76:fb:16 93.184.216.34  Cisco_56:5f:44 TCP    66  1 13586 → 80 [ACK] Seq=228 Ack=424 Win=12800 Len=0 TSval=3178050356 TSecr=4080954361
29 2023-12-11 19:19:49.352537      10.201.189.180 Cisco_76:fb:16 93.184.216.34  Cisco_56:5f:44 TCP    66  1 13586 → 80 [FIN, ACK] Seq=228 Ack=424 Win=13184 Len=0 TSval=3178050356 TSecr=4080954361
30 2023-12-11 19:19:49.(194154916… 93.184.216.34  Cisco_56:5f:44 10.201.189.180 Cisco_76:fb:16 TCP    66  1 80 → 13586 [ACK] Seq=424 Ack=229 Win=66368 Len=0 TSval=4080954361 TSecr=3178050356
31 2023-12-11 19:19:49.(349158924… 93.184.216.34  Cisco_56:5f:44 10.201.189.180 Cisco_76:fb:16 TCP    66  1 80 → 13586 [FIN, ACK] Seq=424 Ack=229 Win=66368 Len=0 TSval=4080954361 TSecr=3178050356
32 2023-12-11 19:19:49.(103444988… 10.201.189.180 Cisco_76:fb:16 93.184.216.34  Cisco_56:5f:44 TCP    66  1 13586 → 80 [ACK] Seq=229 Ack=425 Win=13120 Len=0 TSval=3178050356 TSecr=4080954361
```

Imagen en caché - Tráfico total - HTTP - Transparente - Sin autenticación

Nota: Como puede ver, el servidor Web devuelve la respuesta HTTP 304: Cache not Modified (Caché no modificada). (en este ejemplo, Paquete número 27)

A continuación se muestra un ejemplo de la respuesta HTTP 304



```
> Frame 27: 489 bytes on wire (3912 bits), 489 bytes captured (3912 bits)
> Ethernet II, Src: Cisco_56:5f:44 (68:bd:ab:56:5f:44), Dst: Cisco_76:fb:16 (70:70:8b:76:fb:16)
> Internet Protocol Version 4, Src: 93.184.216.34, Dst: 10.201.189.180
> Transmission Control Protocol, Src Port: 80, Dst Port: 13586, Seq: 1, Ack: 228, Len: 423
v Hypertext Transfer Protocol
  > HTTP/1.1 304 Not Modified\r\n
    Accept-Ranges: bytes\r\n
    Cache-Control: max-age=604800\r\n
    Date: Mon, 11 Dec 2023 18:22:17 GMT\r\n
    Etag: "3147526947"\r\n
    Expires: Mon, 18 Dec 2023 18:22:17 GMT\r\n
    Server: ECS (dce/26C6)\r\n
    Vary: Accept-Encoding\r\n
    X-Cache: HIT\r\n
    Last-Modified: Thu, 17 Oct 2019 07:18:26 GMT\r\n
    Age: 492653\r\n
    Via: 1.1 rtp1-lab-wsa-1.cisco.com:80 (Cisco-WSA/X), 1.1 proxy.rcdn.local:80 (Cisco-WSA/12.5.5-004)\r\n
    Connection: keep-alive\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.036615136 seconds]
    [Request in frame: 25]
    [Request URI: http://example.com/]
```

Imagen en caché - Respuesta HTTP 304 - HTTP - Transparente - Sin autenticación

A continuación se muestra un ejemplo de Registros de accesorios:

```
1702318789.560 105 192.168.1.10 TCP_REFRESH_HIT/200 1787 GET http://www.example.com/ - DIRECT/www.examp
```

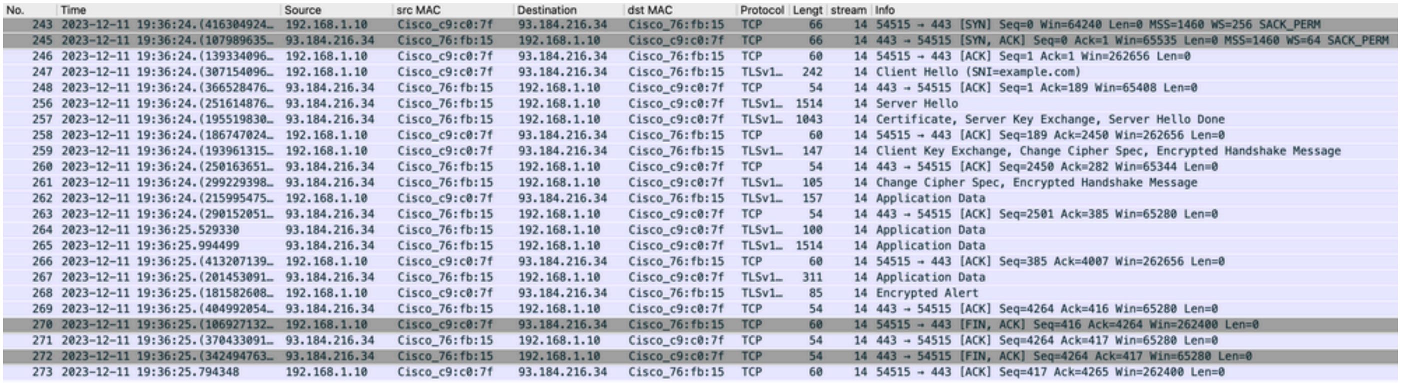
Tráfico de HTTP en implementación transparente sin autenticación

Cliente y SWA

El tráfico de red transpira entre la dirección IP del cliente y la dirección IP del servidor web.

El tráfico del cliente está destinado al puerto TCP 443 (no al puerto Proxy)

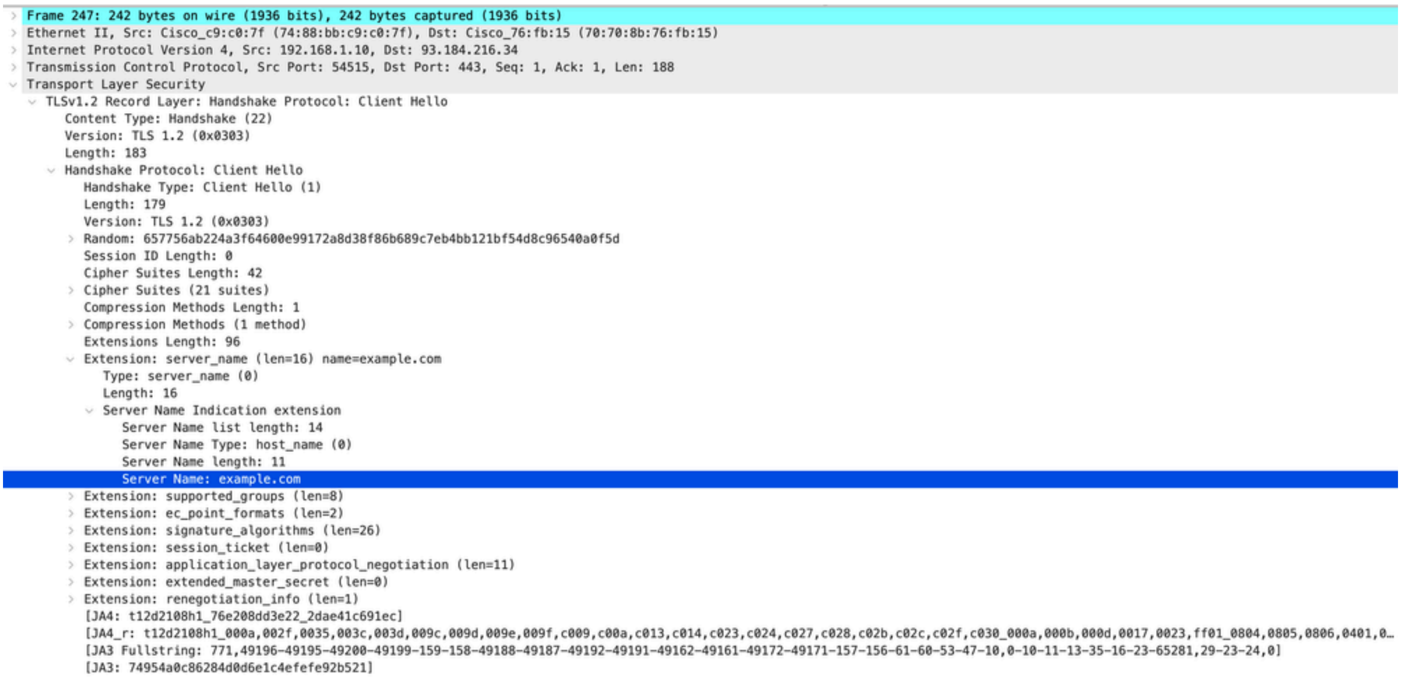
- Protocolo de enlace TCP.
- TLS Handshake Client Hello - Server Hello - Intercambio de claves de servidor - Intercambio de claves de cliente
- Transferencia de datos
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
243	2023-12-11 19:36:24.(416304924…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	66	14	54515 → 443 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 WS=256 SACK_PERM
245	2023-12-11 19:36:24.(107989635…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	66	14	443 → 54515 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM
246	2023-12-11 19:36:24.(139334096…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	14	54515 → 443 [ACK] Seq=1 Ack=1 Win=262656 Len=0
247	2023-12-11 19:36:24.(307154096…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TLSv1…	242	14	Client Hello (SNI=example.com)
248	2023-12-11 19:36:24.(366528476…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	14	443 → 54515 [ACK] Seq=1 Ack=189 Win=65408 Len=0
256	2023-12-11 19:36:24.(251614876…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TLSv1…	1514	14	Server Hello
257	2023-12-11 19:36:24.(195519830…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TLSv1…	1043	14	Certificate, Server Key Exchange, Server Hello Done
258	2023-12-11 19:36:24.(186747024…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	14	54515 → 443 [ACK] Seq=189 Ack=2450 Win=262656 Len=0
259	2023-12-11 19:36:24.(193961315…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TLSv1…	147	14	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
260	2023-12-11 19:36:24.(250163651…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	14	443 → 54515 [ACK] Seq=2450 Ack=282 Win=65344 Len=0
261	2023-12-11 19:36:24.(299229398…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TLSv1…	105	14	Change Cipher Spec, Encrypted Handshake Message
262	2023-12-11 19:36:24.(215995475…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TLSv1…	157	14	Application Data
263	2023-12-11 19:36:24.(290152051…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	14	443 → 54515 [ACK] Seq=2501 Ack=385 Win=65280 Len=0
264	2023-12-11 19:36:25.529330	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TLSv1…	100	14	Application Data
265	2023-12-11 19:36:25.994499	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TLSv1…	1514	14	Application Data
266	2023-12-11 19:36:25.(413207139…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	14	54515 → 443 [ACK] Seq=385 Ack=4007 Win=262656 Len=0
267	2023-12-11 19:36:25.(201453091…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TLSv1…	311	14	Application Data
268	2023-12-11 19:36:25.(181582608…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TLSv1…	85	14	Encrypted Alert
269	2023-12-11 19:36:25.(404992054…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	14	443 → 54515 [ACK] Seq=4264 Ack=416 Win=65280 Len=0
270	2023-12-11 19:36:25.(106927132…	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	14	54515 → 443 [FIN, ACK] Seq=416 Ack=4264 Win=262400 Len=0
271	2023-12-11 19:36:25.(370433091…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	14	443 → 54515 [ACK] Seq=4264 Ack=417 Win=65280 Len=0
272	2023-12-11 19:36:25.(342494763…	93.184.216.34	Cisco_76:fb:15	192.168.1.10	Cisco_c9:c0:7f	TCP	54	14	443 → 54515 [FIN, ACK] Seq=4264 Ack=417 Win=65280 Len=0
273	2023-12-11 19:36:25.794348	192.168.1.10	Cisco_c9:c0:7f	93.184.216.34	Cisco_76:fb:15	TCP	60	14	54515 → 443 [ACK] Seq=417 Ack=4265 Win=262400 Len=0

Imagen- Cliente a Proxy - HTTPs - Transparente - Sin autenticación

Aquí hay detalles del saludo del cliente del cliente al SWA, como puede ver en la indicación del nombre del servidor (SNI), se puede ver la URL del servidor web que en este ejemplo, es www.example.com .

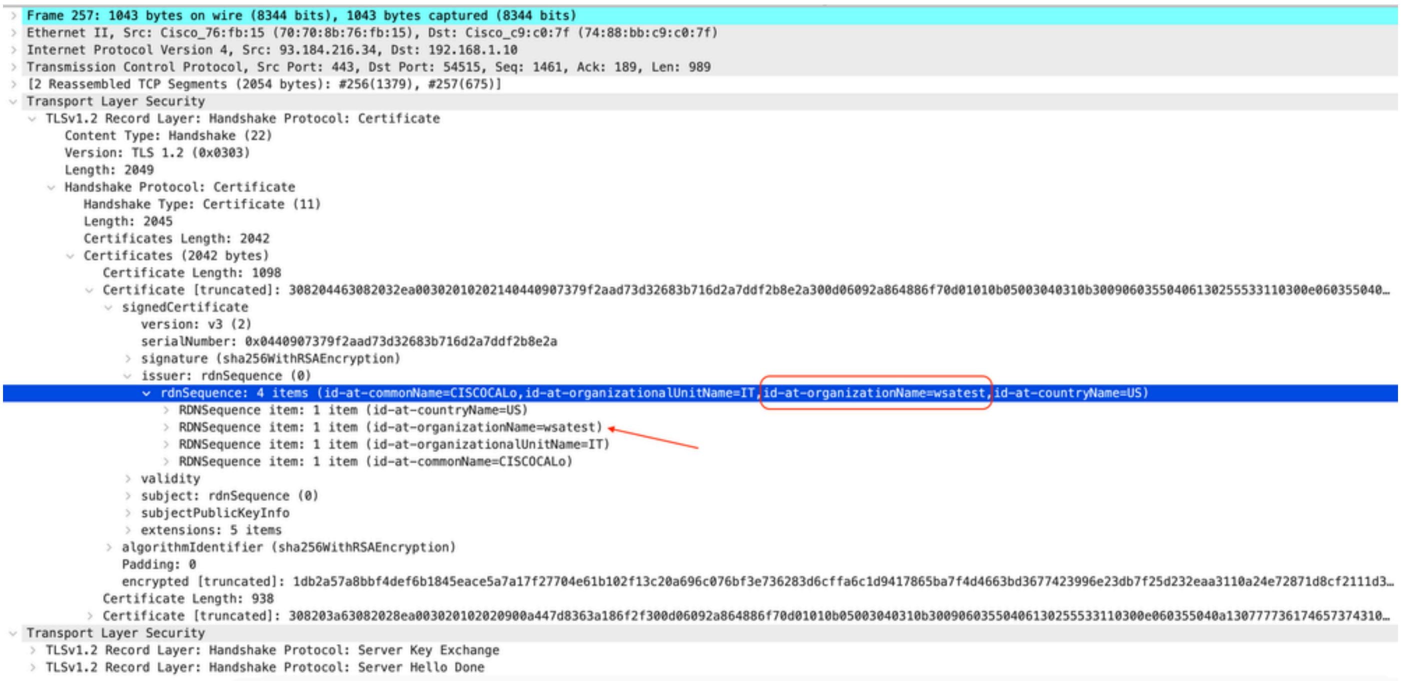


```
Frame 247: 242 bytes on wire (1936 bits), 242 bytes captured (1936 bits)
Ethernet II, Src: Cisco_c9:c0:7f (74:88:bb:c9:c0:7f), Dst: Cisco_76:fb:15 (70:70:8b:76:fb:15)
Internet Protocol Version 4, Src: 192.168.1.10, Dst: 93.184.216.34
Transmission Control Protocol, Src Port: 54515, Dst Port: 443, Seq: 1, Ack: 1, Len: 188
Transport Layer Security
  TLSv1.2 Record Layer: Handshake Protocol: Client Hello
    Content Type: Handshake (22)
    Version: TLS 1.2 (0x0303)
    Length: 183
    Handshake Protocol: Client Hello
      Handshake Type: Client Hello (1)
      Length: 179
      Version: TLS 1.2 (0x0303)
      Random: 657756ab224a3f64600e99172a8d38f86b689c7eb4bb121bf54d8c96540a0f5d
      Session ID Length: 0
      Cipher Suites Length: 42
      Cipher Suites (21 suites)
      Compression Methods Length: 1
      Compression Methods (1 method)
      Extensions Length: 96
      Extension: server_name (len=16) name=example.com
        Type: server_name (0)
        Length: 16
        Server Name Indication extension
          Server Name list length: 14
          Server Name Type: host_name (0)
          Server Name length: 11
          Server Name: example.com
      Extension: supported_groups (len=8)
      Extension: ec_point_formats (len=2)
      Extension: signature_algorithms (len=26)
      Extension: session_ticket (len=0)
      Extension: application_layer_protocol_negotiation (len=11)
      Extension: extended_master_secret (len=0)
      Extension: renegotiation_info (len=1)
      [JA4: t12d2108h1_76e208dd3e22_2dae41c691ec]
      [JA4_r: t12d2108h1_000a,002f,0035,003c,003d,009c,009d,009e,009f,c009,c00a,c013,c014,c023,c024,c027,c028,c02b,c02c,c02f,c030_000a,000b,000d,0017,0023,ff01_0804,0805,0806,0401,0…
      [JA3 Fullstring: 771,49196-49195-49200-49199-159-158-49188-49187-49192-49191-49162-49161-49172-49171-157-156-61-60-53-47-10,0-10-11-13-35-16-23-65281,29-23-24,0]
      [JA3: 74954a0c86284d0d6e1c4efefe92b521]
```

Imagen- Cliente Hello - Cliente a Proxy - Transparente - Sin autenticación

Consejo: Puede utilizar este filtro en Wireshark para buscar URL/SNI: tls.handshake.extensions_server_name == "www.example.com"

A continuación se muestra un ejemplo de Intercambio de claves de servidor



```
> Frame 257: 1043 bytes on wire (8344 bits), 1043 bytes captured (8344 bits)
> Ethernet II, Src: Cisco_76:fb:15 (70:70:8b:76:fb:15), Dst: Cisco_c9:c0:7f (74:88:bb:c9:c0:7f)
> Internet Protocol Version 4, Src: 93.184.216.34, Dst: 192.168.1.10
> Transmission Control Protocol, Src Port: 443, Dst Port: 54515, Seq: 1461, Ack: 189, Len: 989
> [2 Reassembled TCP Segments (2054 bytes): #256(1379), #257(675)]
v Transport Layer Security
  v TLSv1.2 Record Layer: Handshake Protocol: Certificate
      Content Type: Handshake (22)
      Version: TLS 1.2 (0x0303)
      Length: 2049
    v Handshake Protocol: Certificate
        Handshake Type: Certificate (11)
        Length: 2045
        Certificates Length: 2042
      v Certificates (2042 bytes)
          Certificate Length: 1098
        v Certificate [truncated]: 308204463082032ea003020102021404409073 79f2aad73d32683b716d2a7ddf2b8e2a300d06092a864886f70d01010b05003040310b3009060355040613025553311030 0e060355040…
          v signedCertificate
              version: v3 (2)
              serialNumber: 0x0440907379f2aad73d32683b716d2a7ddf2b8e2a
            > signature (sha256WithRSAEncryption)
            v issuer: rdnSequence (0)
              v rdnSequence: 4 items (id-at-commonName=CISCOCALo,id-at-organizationalUnitName=IT,id-at-organizationName=wsatest,id-at-countryName=US)
                > RDNSequence item: 1 item (id-at-countryName=US)
                > RDNSequence item: 1 item (id-at-organizationName=wsatest)
                > RDNSequence item: 1 item (id-at-organizationalUnitName=IT)
                > RDNSequence item: 1 item (id-at-commonName=CISCOCALo)
            > validity
            > subject: rdnSequence (0)
            > subjectPublicKeyInfo
            > extensions: 5 items
          > algorithmIdentifier (sha256WithRSAEncryption)
            Padding: 0
            encrypted [truncated]: 1db2a57a8bbf4def6b1845eace5a7a17f27704e61b102f13c20a696c076bf3e736283d6cffa6c1d9417865ba7f4d4663bd3677423996e23db7f25d232eaa3110a24e72871d8cf2111d3…
          Certificate Length: 938
        > Certificate [truncated]: 308203a63082028ea003020102020900a447d8363a186f2f300d06092a864886f70d01010b05003040310b3009060355040613025553311030 0e060355040a130777736174657374310…
v Transport Layer Security
  > TLSv1.2 Record Layer: Handshake Protocol: Server Key Exchange
  > TLSv1.2 Record Layer: Handshake Protocol: Server Hello Done
```

Imagen- Intercambio de claves de servidor - Cliente a proxy - Transparente - Sin autenticación

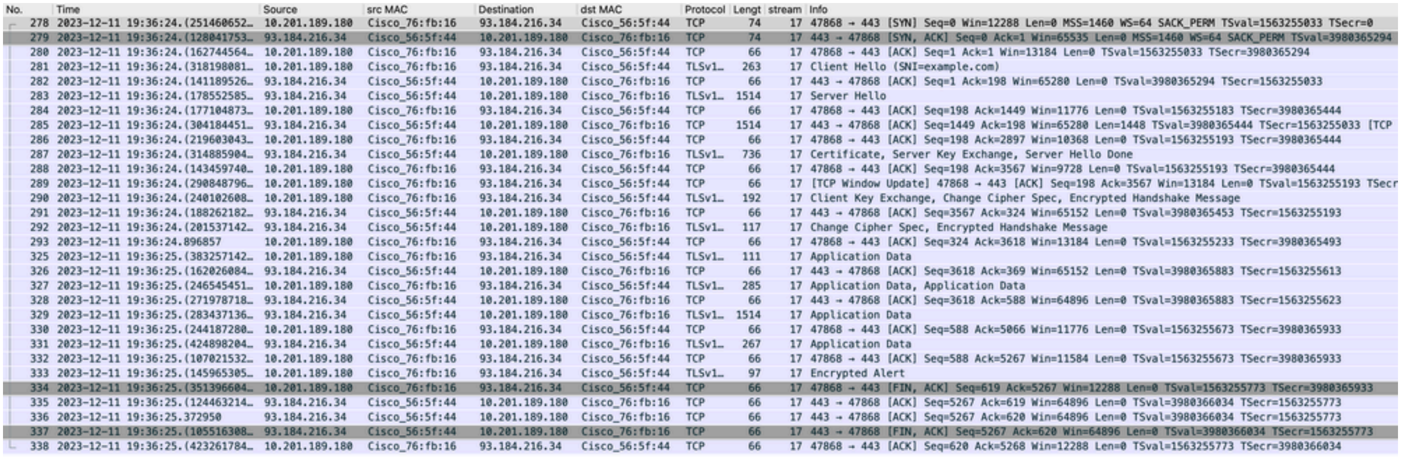
> Nota: Como puede ver, el certificado es el que se configuró en SWA como certificado de descifrado.

SWA y servidor web

El tráfico de red se produce entre la dirección IP del proxy y la dirección IP del servidor Web.

El tráfico de SWA está destinado al puerto TCP 443 (no al puerto de proxy)

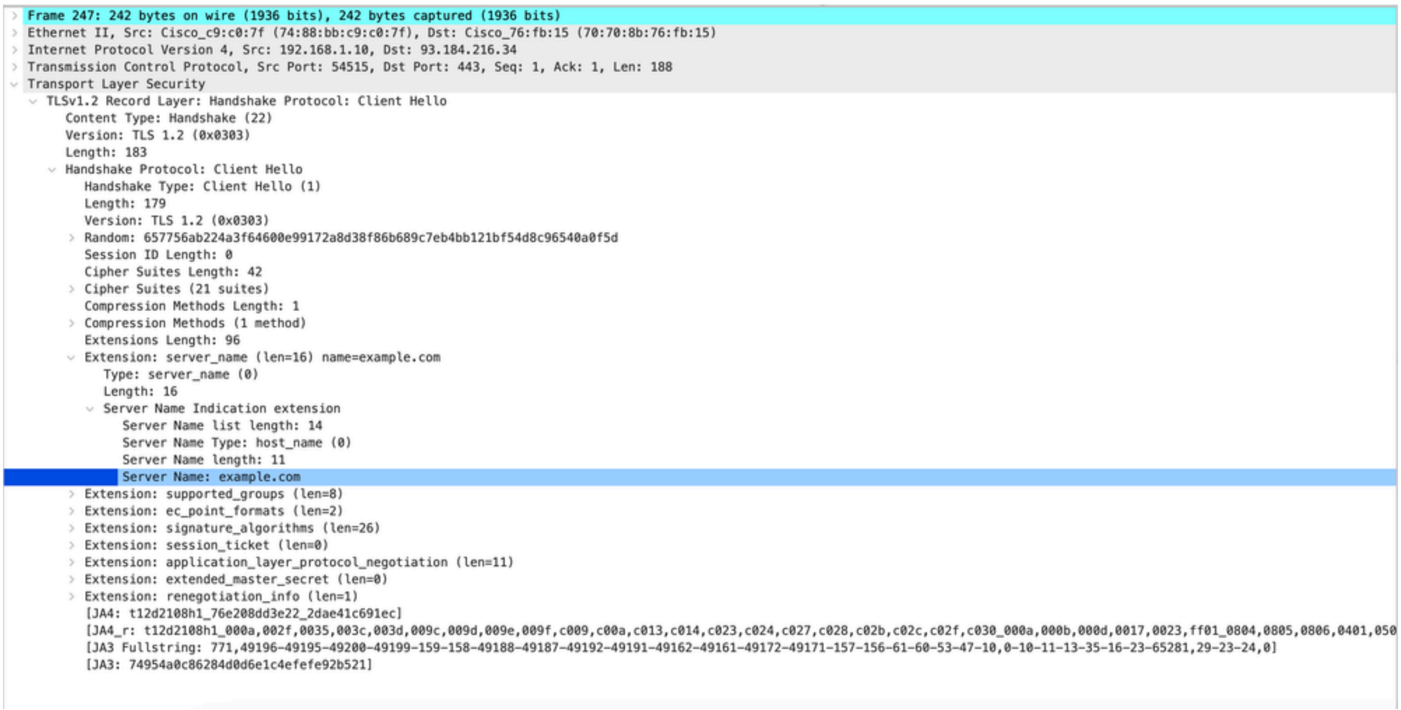
- Protocolo de enlace TCP.
- TLS Handshake Client Hello - Server Hello - Intercambio de claves de servidor - Intercambio de claves de cliente
- Transferencia de datos
- Terminación de la conexión TCP (protocolo de enlace de 4 vías)



No.	Time	Source	src MAC	Destination	dst MAC	Protocol	Lengt	stream	Info
278	2023-12-11 19:36:24.(251460652…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	74	17	47868 → 443 [SYN] Seq=0 Win=12288 Len=0 MSS=1460 WS=64 SACK_PERM TSval=1563255033 TSecr=0
279	2023-12-11 19:36:24.(128041753…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	74	17	443 → 47868 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=64 SACK_PERM TSval=3980365294
280	2023-12-11 19:36:24.(162744564…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=1 Ack=1 Win=13184 Len=0 TSval=1563255033 TSecr=3980365294
281	2023-12-11 19:36:24.(318198081…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TLSv1…	263	17	Client Hello (SNI=example.com)
282	2023-12-11 19:36:24.(141189526…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	17	443 → 47868 [ACK] Seq=1 Ack=198 Win=65280 Len=0 TSval=3980365294 TSecr=1563255033
283	2023-12-11 19:36:24.(178552585…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TLSv1…	1514	17	Server Hello
284	2023-12-11 19:36:24.(177104873…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=198 Ack=1449 Win=11776 Len=0 TSval=1563255183 TSecr=3980365444
285	2023-12-11 19:36:24.(304184451…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	1514	17	443 → 47868 [ACK] Seq=1449 Ack=198 Win=65280 Len=1448 TSval=3980365444 TSecr=1563255033 [TCP
286	2023-12-11 19:36:24.(219603043…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=198 Ack=2897 Win=10368 Len=0 TSval=1563255193 TSecr=3980365444
287	2023-12-11 19:36:24.(314885904…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TLSv1…	736	17	Certificate, Server Key Exchange, Server Hello Done
288	2023-12-11 19:36:24.(143459740…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=198 Ack=3567 Win=9728 Len=0 TSval=1563255193 TSecr=3980365444
289	2023-12-11 19:36:24.(290848796…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	[TCP Window Update] 47868 → 443 [ACK] Seq=198 Ack=3567 Win=13184 Len=0 TSval=1563255193 TSecr
290	2023-12-11 19:36:24.(240102608…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TLSv1…	192	17	Client Key Exchange, Change Cipher Spec, Encrypted Handshake Message
291	2023-12-11 19:36:24.(188262182…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	17	443 → 47868 [ACK] Seq=3567 Ack=324 Win=65152 Len=0 TSval=3980365453 TSecr=1563255193
292	2023-12-11 19:36:24.(201537142…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TLSv1…	117	17	Change Cipher Spec, Encrypted Handshake Message
293	2023-12-11 19:36:24.896857	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=324 Ack=3618 Win=13184 Len=0 TSval=1563255233 TSecr=3980365493
325	2023-12-11 19:36:25.(383257142…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TLSv1…	111	17	Application Data
326	2023-12-11 19:36:25.(162026084…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	17	443 → 47868 [ACK] Seq=3618 Ack=369 Win=65152 Len=0 TSval=3980365883 TSecr=1563255613
327	2023-12-11 19:36:25.(246545451…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TLSv1…	285	17	Application Data, Application Data
328	2023-12-11 19:36:25.(271978718…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	17	443 → 47868 [ACK] Seq=3618 Ack=588 Win=64896 Len=0 TSval=3980365883 TSecr=1563255623
329	2023-12-11 19:36:25.(283437136…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TLSv1…	1514	17	Application Data
330	2023-12-11 19:36:25.(244187280…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=588 Ack=5066 Win=11776 Len=0 TSval=1563255673 TSecr=3980365933
331	2023-12-11 19:36:25.(424898204…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TLSv1…	267	17	Application Data
332	2023-12-11 19:36:25.(107021532…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=588 Ack=5267 Win=11584 Len=0 TSval=1563255673 TSecr=3980365933
333	2023-12-11 19:36:25.(145965305…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TLSv1…	97	17	Encrypted Alert
334	2023-12-11 19:36:25.(351396604…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [FIN, ACK] Seq=619 Ack=5267 Win=12288 Len=0 TSval=1563255773 TSecr=3980365933
335	2023-12-11 19:36:25.(124463214…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	17	443 → 47868 [ACK] Seq=5267 Ack=619 Win=64896 Len=0 TSval=3980366034 TSecr=1563255773
336	2023-12-11 19:36:25.372950	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	17	443 → 47868 [ACK] Seq=5267 Ack=620 Win=64896 Len=0 TSval=3980366034 TSecr=1563255773
337	2023-12-11 19:36:25.(105516308…	93.184.216.34	Cisco_56:5f:44	10.201.189.180	Cisco_76:fb:16	TCP	66	17	443 → 47868 [FIN, ACK] Seq=5267 Ack=620 Win=64896 Len=0 TSval=3980366034 TSecr=1563255773
338	2023-12-11 19:36:25.(423261784…	10.201.189.180	Cisco_76:fb:16	93.184.216.34	Cisco_56:5f:44	TCP	66	17	47868 → 443 [ACK] Seq=620 Ack=5268 Win=12288 Len=0 TSval=1563255773 TSecr=3980366034

Imagen- Proxy a Servidor Web - HTTPs - Transparente - Sin autenticación

A continuación se muestra un ejemplo de saludo de cliente de SWA a servidor web



```
Frame 247: 242 bytes on wire (1936 bits), 242 bytes captured (1936 bits)
Ethernet II, Src: Cisco_c9:c0:7f (74:88:bb:c9:c0:7f), Dst: Cisco_76:fb:15 (70:70:8b:76:fb:15)
Internet Protocol Version 4, Src: 192.168.1.10, Dst: 93.184.216.34
Transmission Control Protocol, Src Port: 54515, Dst Port: 443, Seq: 1, Ack: 1, Len: 188
Transport Layer Security
  TLSv1.2 Record Layer: Handshake Protocol: Client Hello
    Content Type: Handshake (22)
    Version: TLS 1.2 (0x0303)
    Length: 183
    Handshake Protocol: Client Hello
      Handshake Type: Client Hello (1)
      Length: 179
      Version: TLS 1.2 (0x0303)
      Random: 657756ab224a3f64600e99172a8d38f86b689c7eb4bb121bf54d8c96540a0f5d
      Session ID Length: 0
      Cipher Suites Length: 42
      Cipher Suites (21 suites)
      Compression Methods Length: 1
      Compression Methods (1 method)
      Extensions Length: 96
      Extension: server_name (len=16) name=example.com
        Type: server_name (0)
        Length: 16
        Server Name Indication extension
          Server Name list length: 14
          Server Name Type: host_name (0)
          Server Name length: 11
          Server Name: example.com
      Extension: supported_groups (len=8)
      Extension: ec_point_formats (len=2)
      Extension: signature_algorithms (len=26)
      Extension: session_ticket (len=0)
      Extension: application_layer_protocol_negotiation (len=11)
      Extension: extended_master_secret (len=0)
      Extension: renegotiation_info (len=1)
      [JA4: t12d2108h1_76e208dd3e22_2dae41c691ec]
      [JA4_r: t12d2108h1_000a,002f,0035,003c,003d,009c,009d,009e,009f,c009,c00a,c013,c014,c023,c024,c027,c028,c02b,c02c,c02f,c030_000a,000b,000d,0017,0023,ff01_0804,0805,0806,0401,050
      [JA3 Fullstring: 771,49196-49195-49200-49199-159-158-49188-49187-49192-49191-49162-49161-49172-49171-157-156-61-60-53-47-10,0-10-11-13-35-16-23-65281,29-23-24,0]
      [JA3: 74954a0c86284d0d6e1c4efefe92b521]
```

Imagen- Cliente Hello - Proxy a servidor Web - Transparente - Sin autenticación

Nota: Las series Cipher observadas aquí difieren de las series Cipher en el saludo del cliente del cliente al SWA, ya que el SWA, configurado para descifrar este tráfico, utiliza sus propios cifrados.

Sugerencia: en el intercambio de claves de servidor de SWA a servidor web, aparece el certificado de servidor web. Sin embargo, si un proxy upstream encuentra la configuración para su SWA, su certificado aparece en lugar del certificado del servidor web.

A continuación se muestra un ejemplo de Registros de accesorios:

```
1702319784.943 558 192.168.1.10 TCP_MISS_SSL/200 0 TCP_CONNECT 10.184.216.34:443 - DIRECT/www.example.c
1702319785.190 247 192.168.1.10 TCP_MISS_SSL/200 1676 GET https://www.example.com:443/ - DIRECT/www.exa
```

Nota: Como puede ver en la implementación transparente para el tráfico HTTPS hay 2 líneas en los registros de acceso, la primera línea es cuando el tráfico está cifrado y puede ver TCP_CONNECT y la dirección IP del servidor web. Si el descifrado está habilitado en SWA, la segunda línea contiene GET y toda la URL comienza con HTTPS, lo que significa que el tráfico se ha descifrado y SWA conoce la URL.

Información Relacionada

- Soporte Técnico y Documentación - Cisco Systems
- Configuración del parámetro de rendimiento en registros de acceso: Cisco