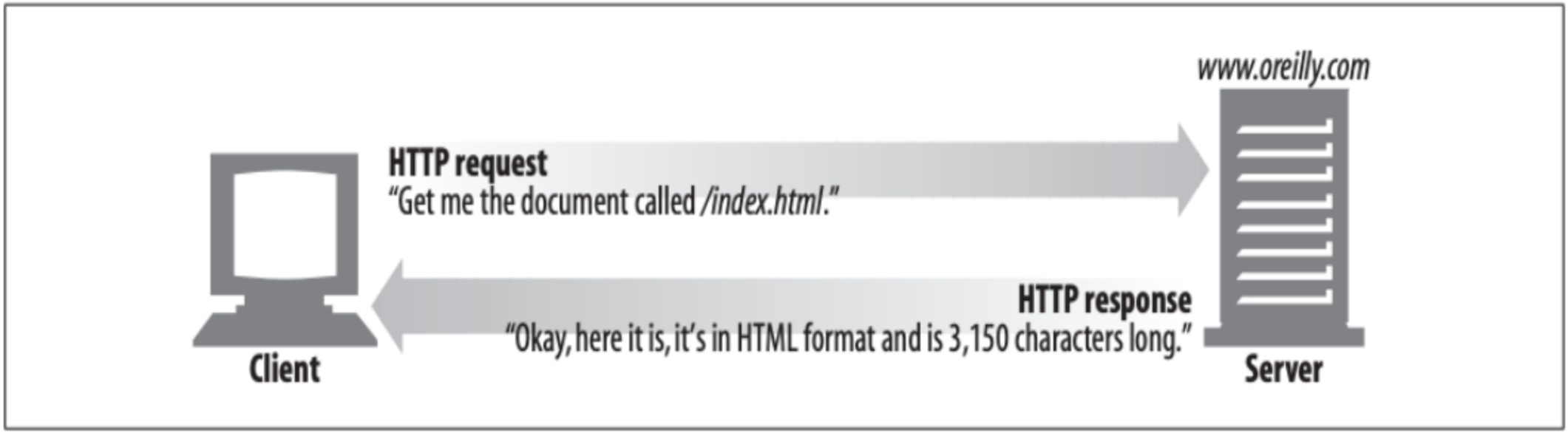
chapter1.
Overview of HTTP

Sunggon

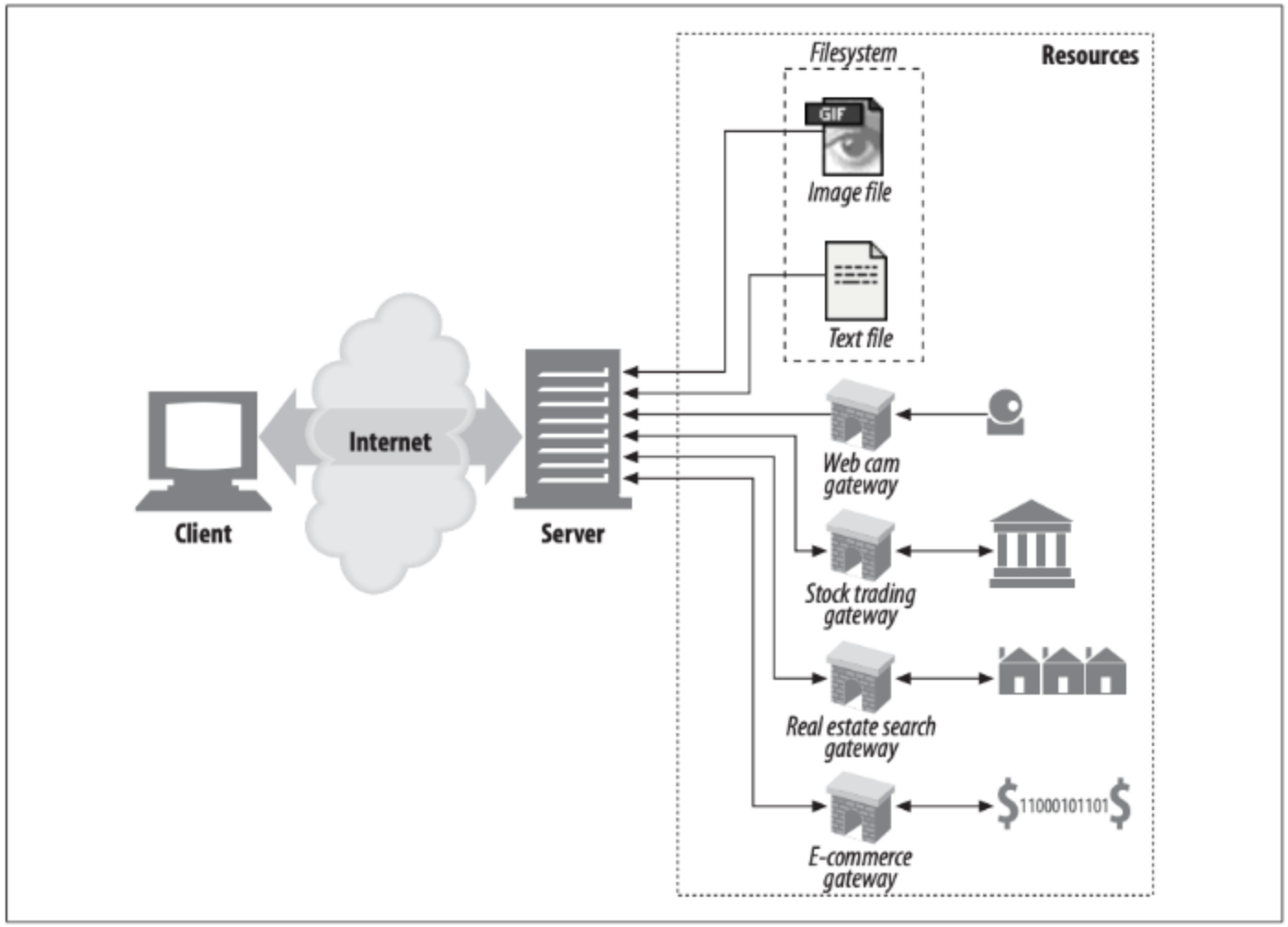
Contents

- How web clients and servers communicate
- Where resources (web content) come from
- How web transactions work
- The format of the messages used for HTTP communication
- The underlying TCP network transport
- The different variations of the HTTP protocol
- Some of the many HTTP architectural components installed around the Internet

Web Clients and Servers

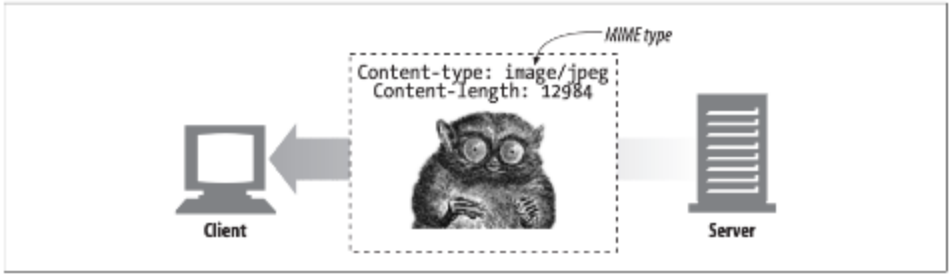


Resources


Filesystem
Resources
GIF
Image file
Text file
Internet
Client
Server
Web cam gateway
Stock trading gateway
Real estate search gateway
E-commerce gateway
11000101101

Media Types

MIME (Multipurpose Internet Mail Extensions)



primary object type/specific subtype

For example, text/html, text/plain

image/jpeg, image/gif, video/quicktime, ...

URIs (uniform resource identifier)

uniform resource locator

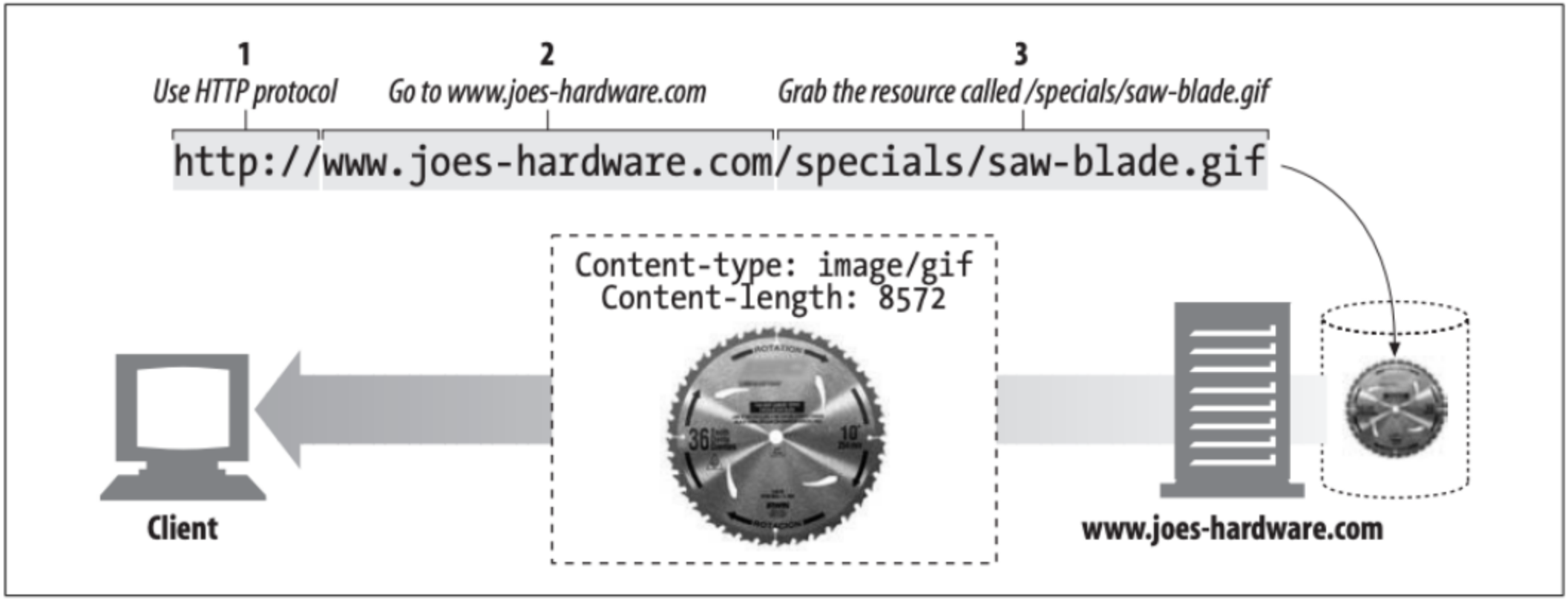
http://www.joes-hardware.com/specials/saw-blade.gif

URNs

uniform resource name

urn:ietf:rfc:2141

URLs



URL	Description
http://www.oreilly.com/index.html	The home URL for O'Reilly & Associates, Inc.
http://www.yahoo.com/images/logo.gif	The URL for the Yahoo! web site's logo
http://www.joes-hardware.com/inventory-check.cgi?item=12731	The URL for a program that checks if inventory item #12731 is in stock
ftp://joe:tools4u@ftp.joes-hardware.com/locking-pliers.gif	The URL for the *locking-pliers.gif* image file, using password-protected FTP as the access protocol

Transactions

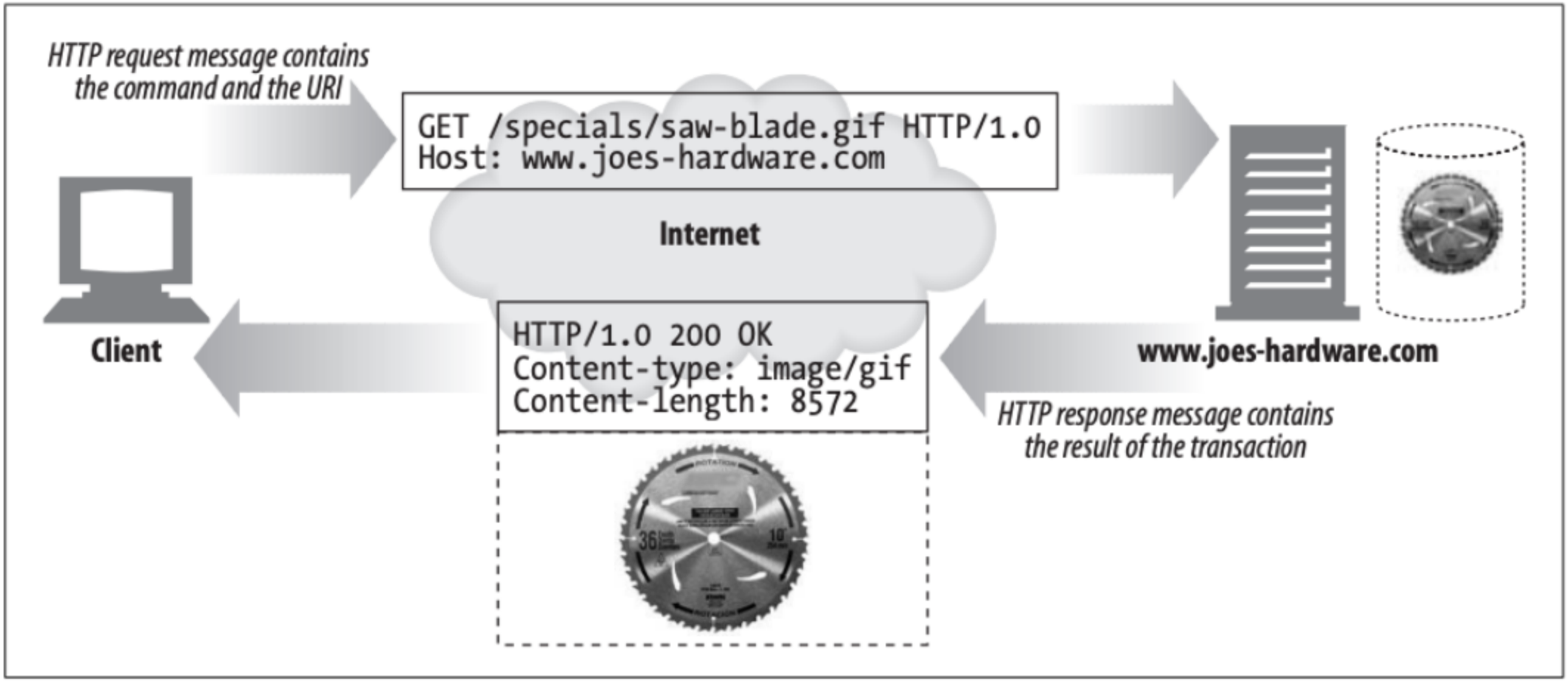


Figure 1-5. HTTP transactions consist of request and response messages

Methods

GET	POST	PUT	DELETE	PATCH	HEAD
retrieve data from server	add data to an existining file or resource	update(replace) an existing file or resource in server	delete data from server	update a resource partially (modify)	retrieve the resource's headers

Status Codes

1XX
INFORMATIONAL

2XX
SUCCESS

3XX
REDIRECTION

4XX
CLIENT ERROR

5XX
SERVER ERROR

Web Pages Can Consist of Multiple Objects

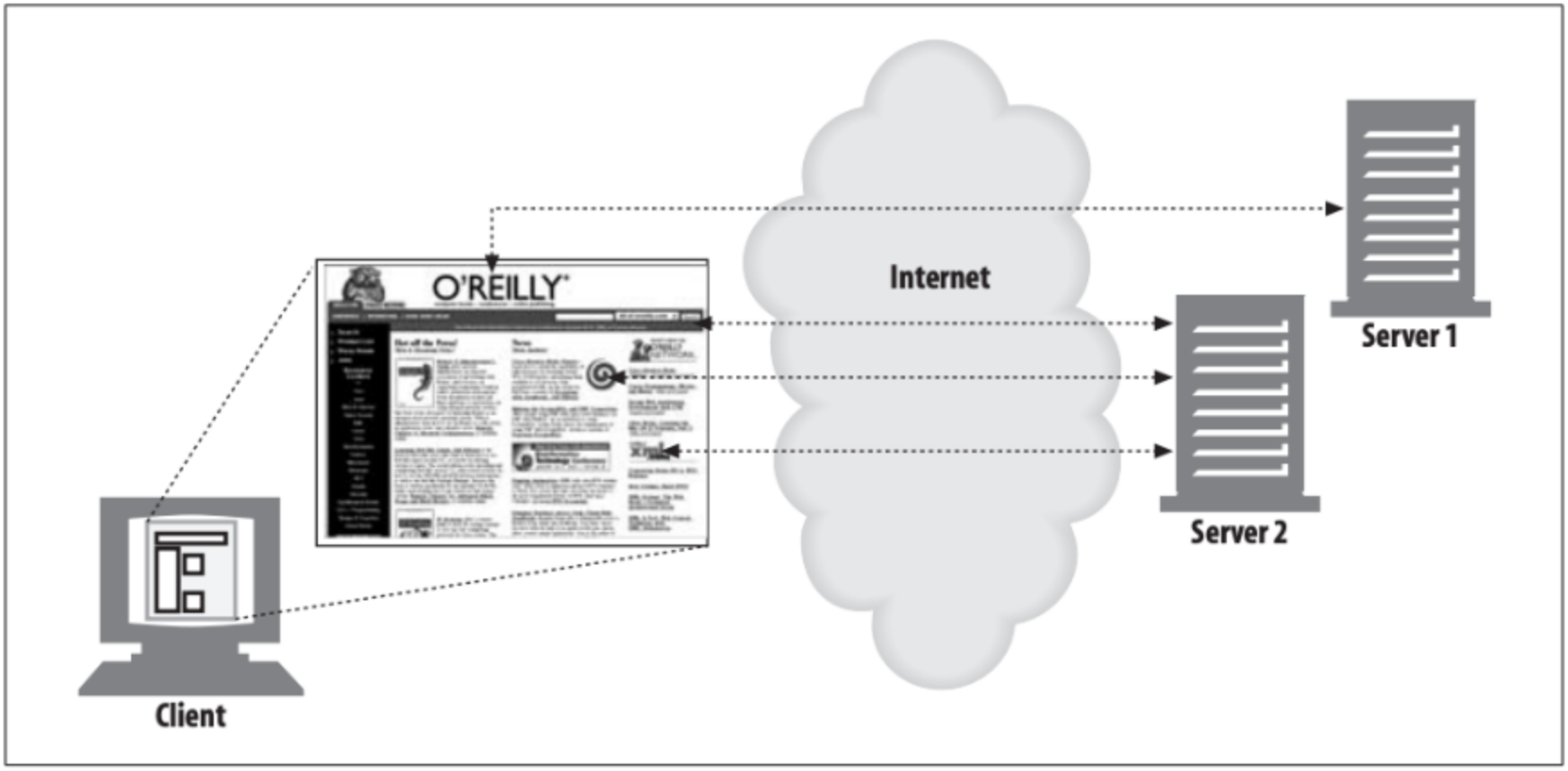


Figure 1-6. Composite web pages require separate HTTP transactions for each embedded resource

Messages

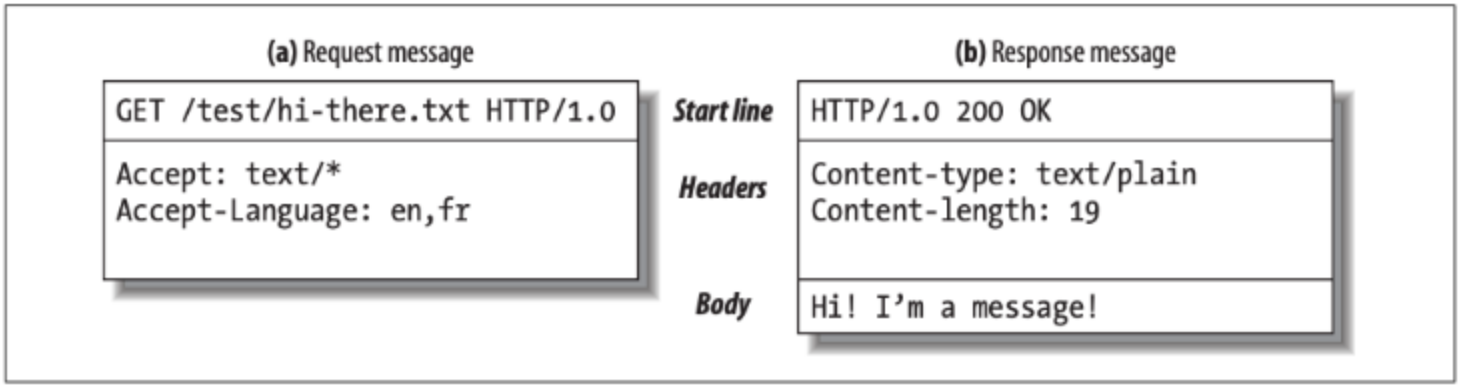
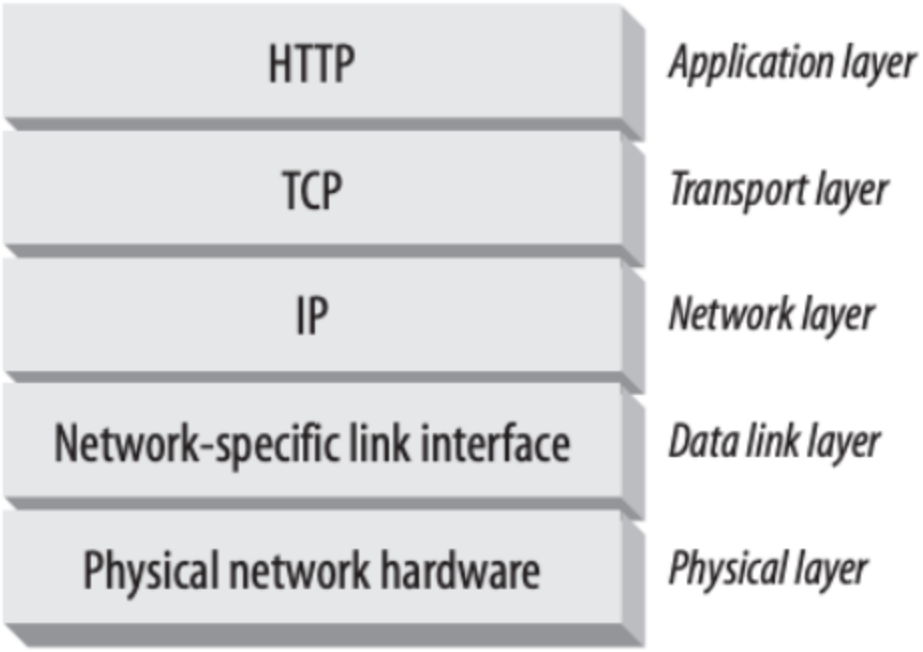
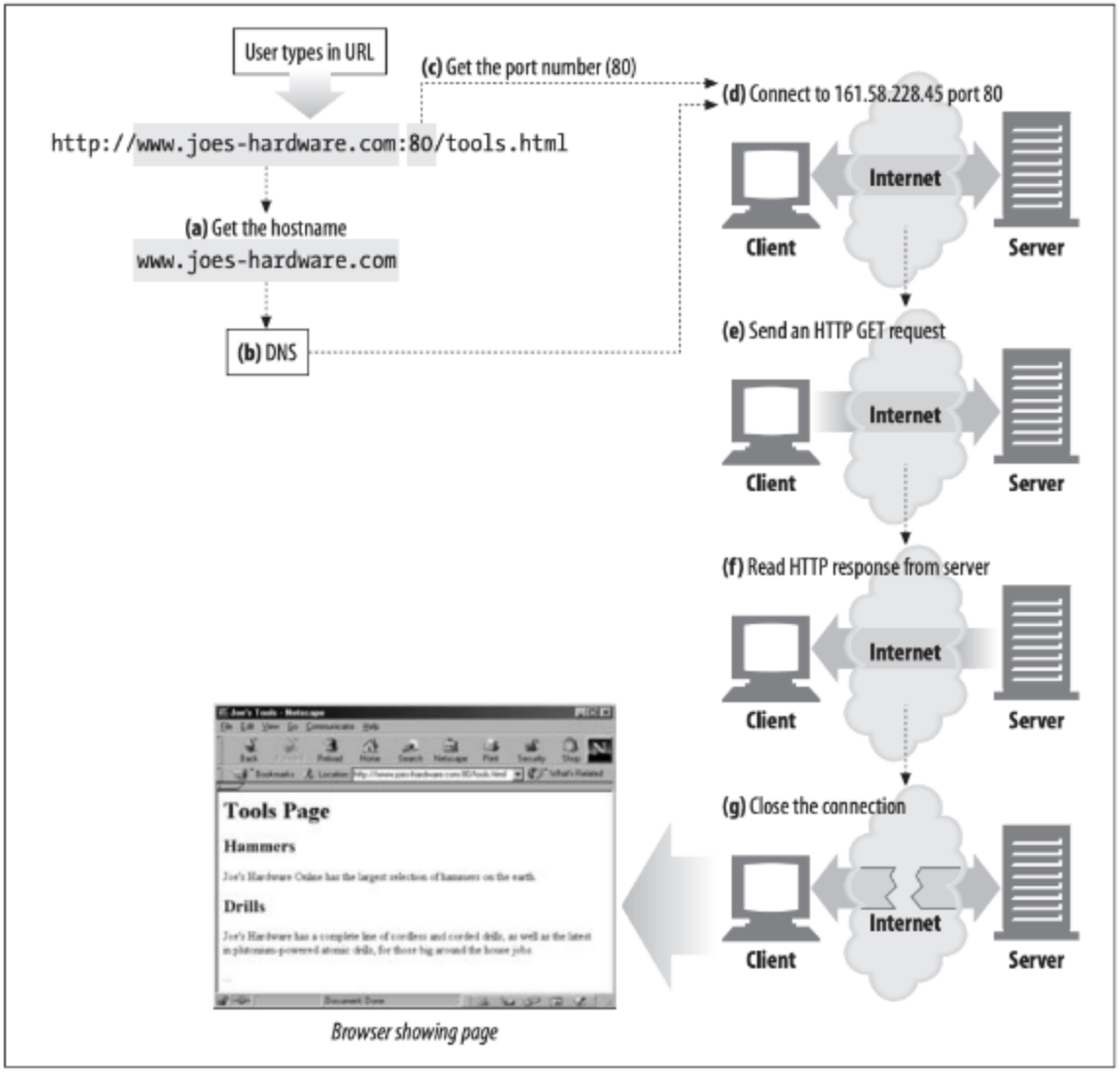


Figure 1-7. HTTP messages have a simple, line-oriented text structure

HTTP network protocol stack



Basic brawser connection process



Browser showing page

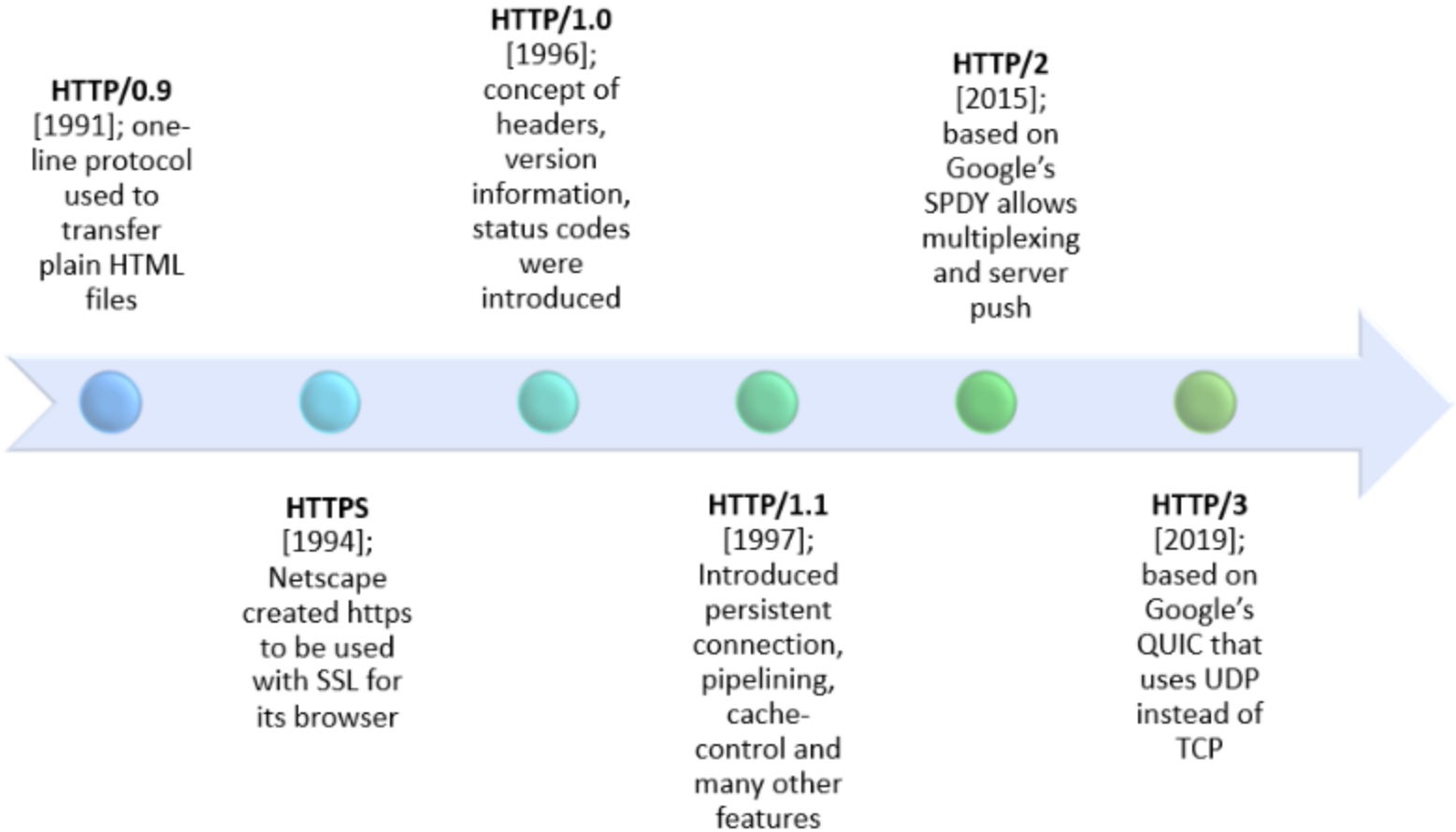
An HTTP transaction using telnet

```
% telnet www.joes-hardware.com 80
Trying 161.58.228.45...
Connected to joes-hardware.com.
Escape character is '^]'.
GET /tools.html HTTP/1.1
Host: www.joes-hardware.com

HTTP/1.1 200 OK
Date: Sun, 01 Oct 2000 23:25:17 GMT
Server: Apache/1.3.11 BSafe-SSL/1.38 (Unix) FrontPage/4.0.4.3
Last-Modified: Tue, 04 Jul 2000 09:46:21 GMT
ETag: "373979-193-3961b26d"
Accept-Ranges: bytes
Content-Length: 403
Connection: close
Content-Type: text/html

<HTML>
<HEAD><TITLE>Joe's Tools</TITLE></HEAD>
<BODY>
<H1>Tools Page</H1>
<H2>Hammers</H2>
<P>Joe's Hardware Online has the largest selection of hammers on the earth.</P>
<H2><A NAME=drills></A>Drills</H2>
<P>Joe's Hardware has a complete line of cordless and corded drills, as well as the latest
in plutonium-powered atomic drills, for those big around the house jobs.</P> ...
</BODY>
</HTML>
Connection closed by foreign host.
```

Protocol Versions



Proxies

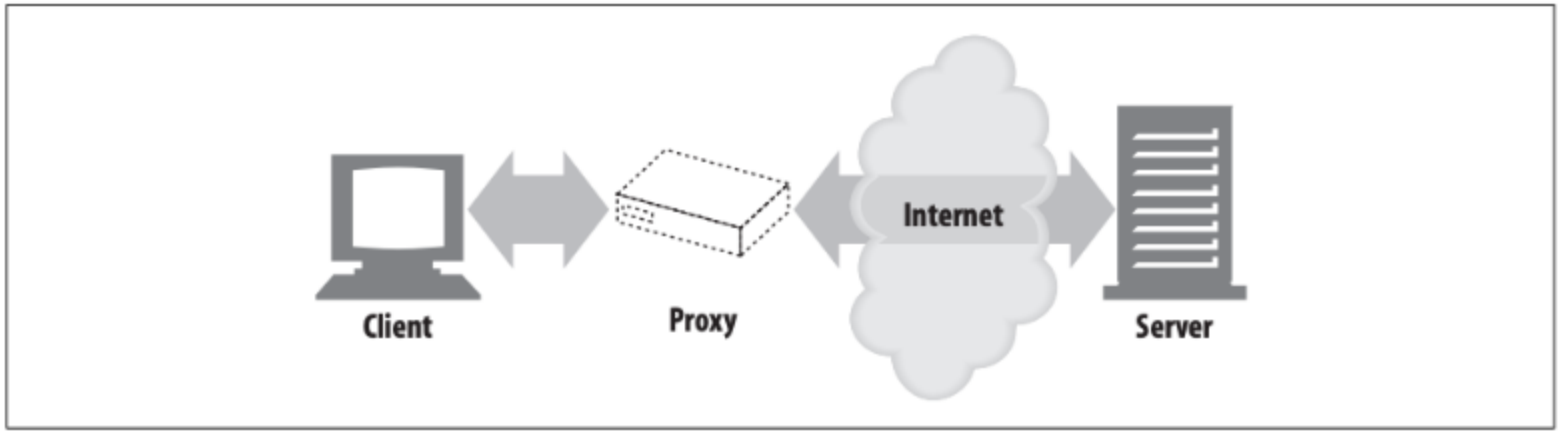


Figure 1-11. Proxies relay traffic between client and server

Caches

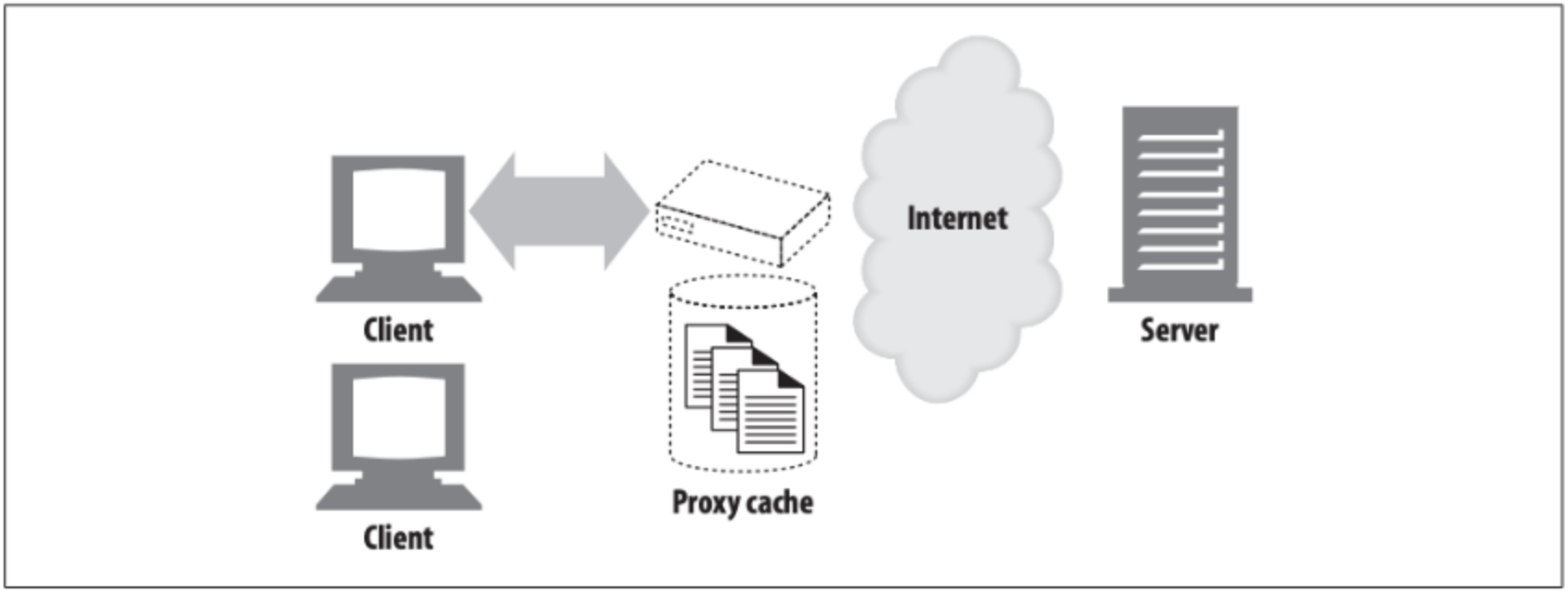


Figure 1-12. Caching proxies keep local copies of popular documents to improve performance

Gateways

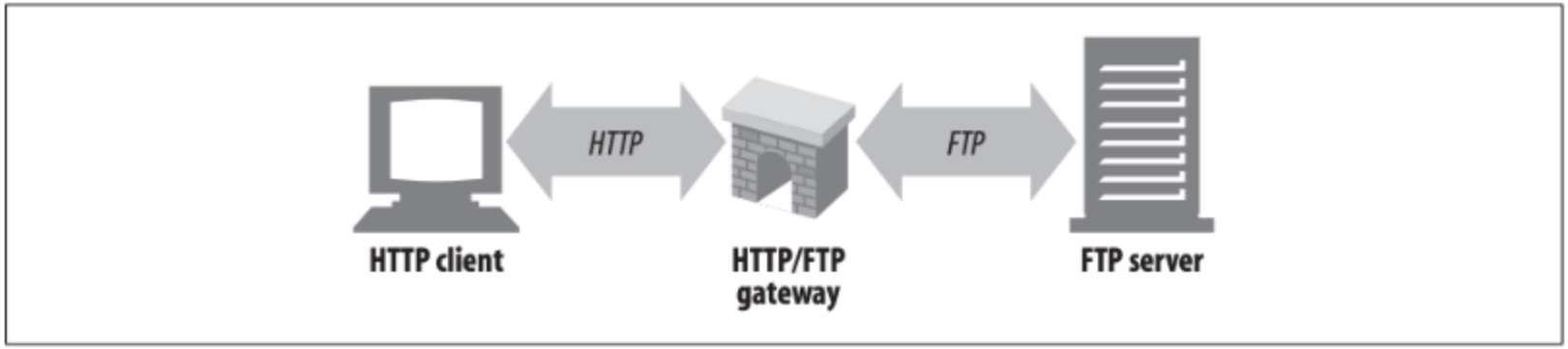


Figure 1-13. HTTP/FTP gateway

Tunnels

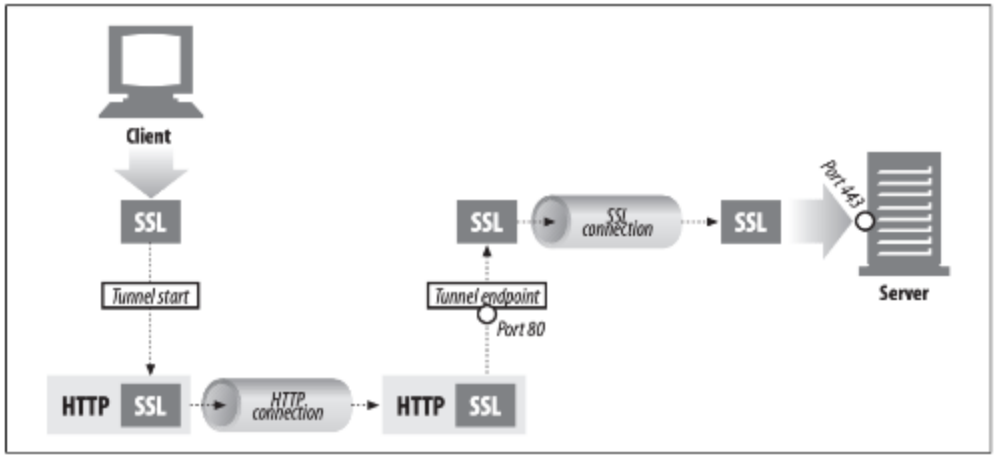


Figure 1-14. Tunnels forward data across non-HTTP networks (HTTP/SSL tunnel shown)

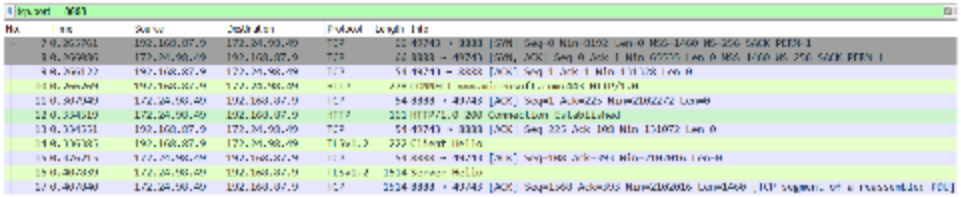
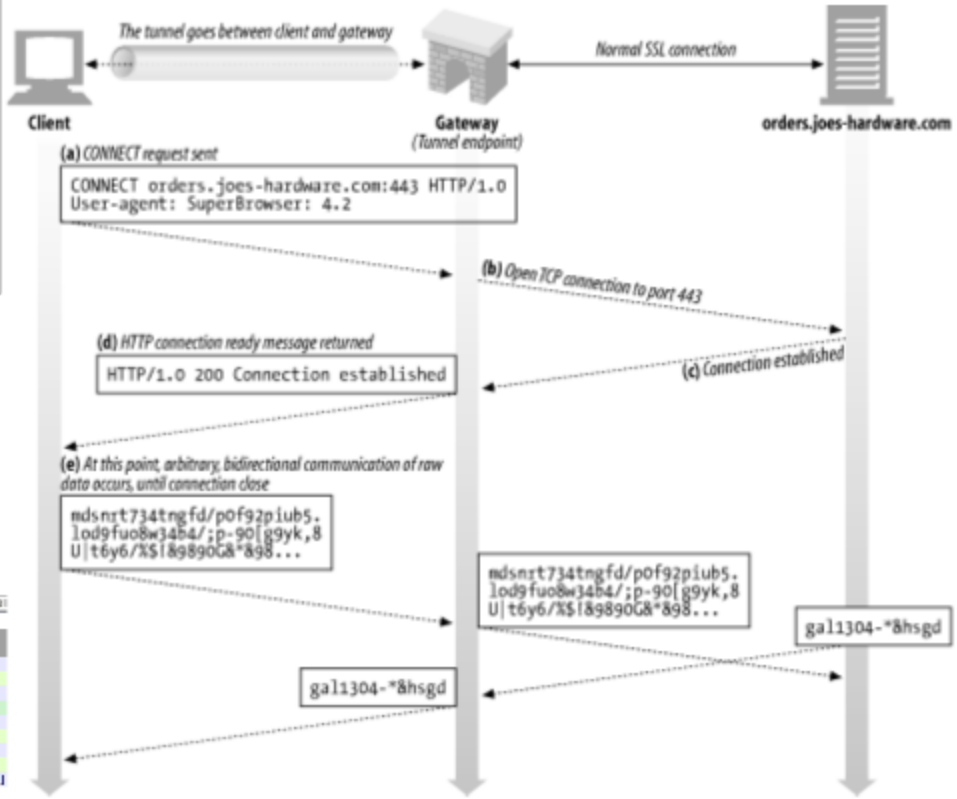


Figure 8-10. Using CONNECT to establish an SSL tunnel



Agents

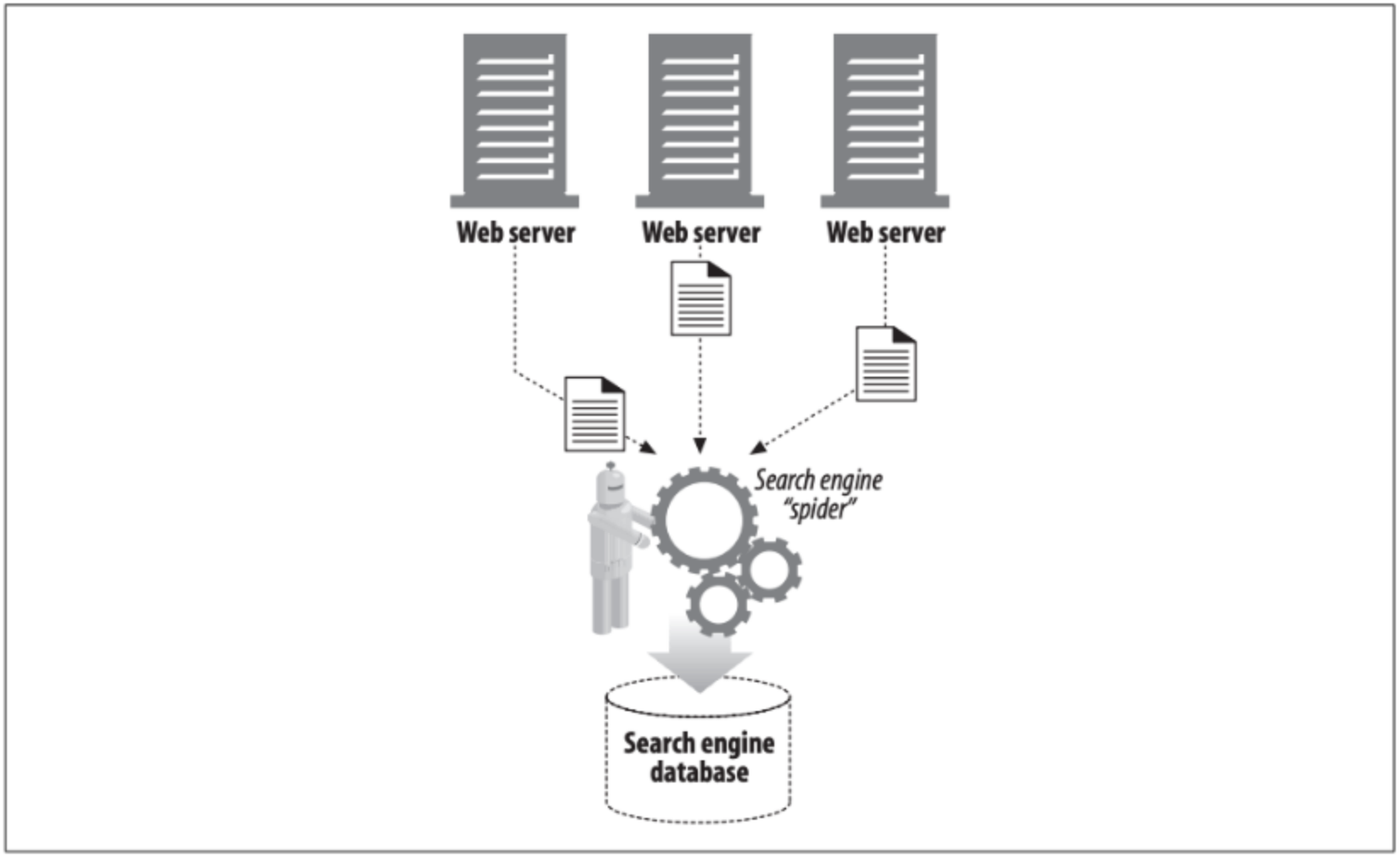


Figure 1-15. Automated search engine "spiders" are agents, fetching web pages around the world

For More Information

- https://datatracker.ietf.org/doc/html/rfc9114 - HTTP/3
- https://datatracker.ietf.org/doc/html/rfc9113 - HTTP/2
- http://www.ietf.org/rfc/rfc2616.txt - HTTP/1.1
- http://www.ietf.org/rfc/rfc1945.txt - HTTP/1.0
- https://developer.mozilla.org/en-US/docs/Web/HTTP/Resources_and_specifications - HTTP Resources and specifications