The Hyper-Text Transfer Protocol (HTTP)

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Outline

- HTTP message formats
- HTTP methods
- Status codes
- Headers
- Web caching

Anatomy of a Request

```
GET /carzaniga/index.html HTTP/1.1
Host:  www.inf.usi.ch
Connection:  close
User-agent:  Mozilla/4.0
Accept-Language:  it

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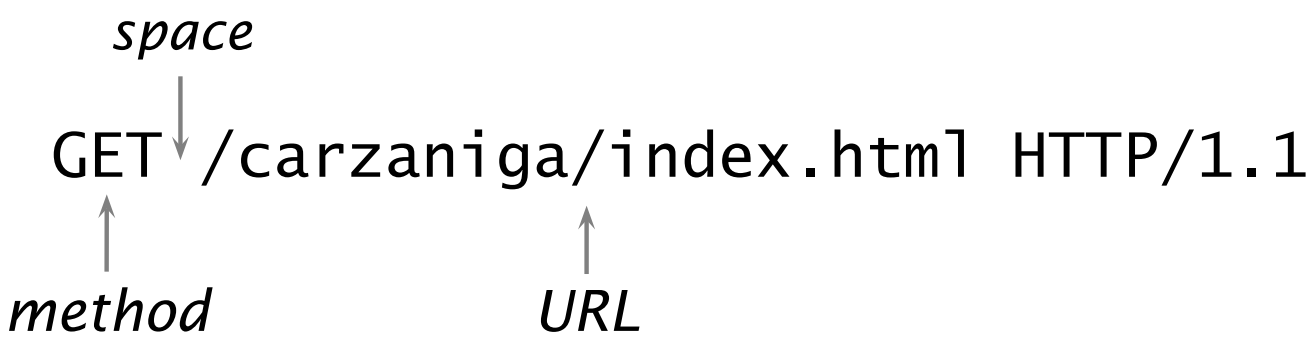

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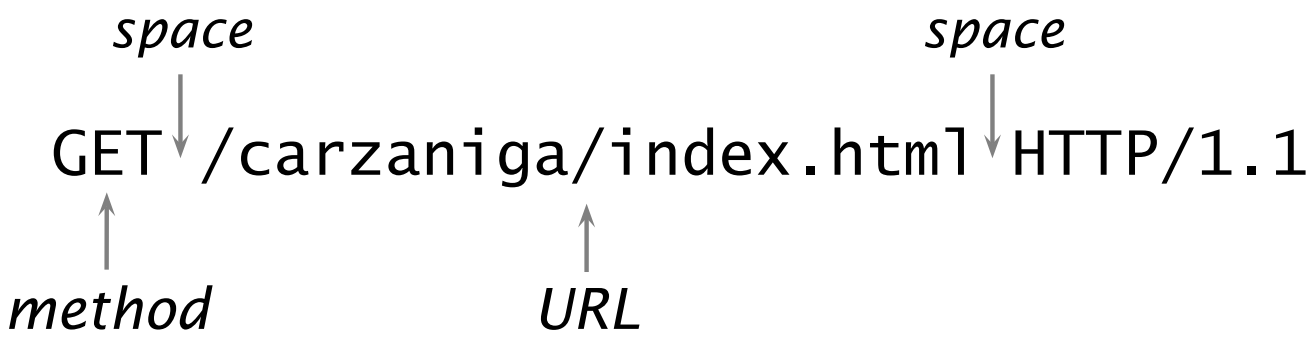

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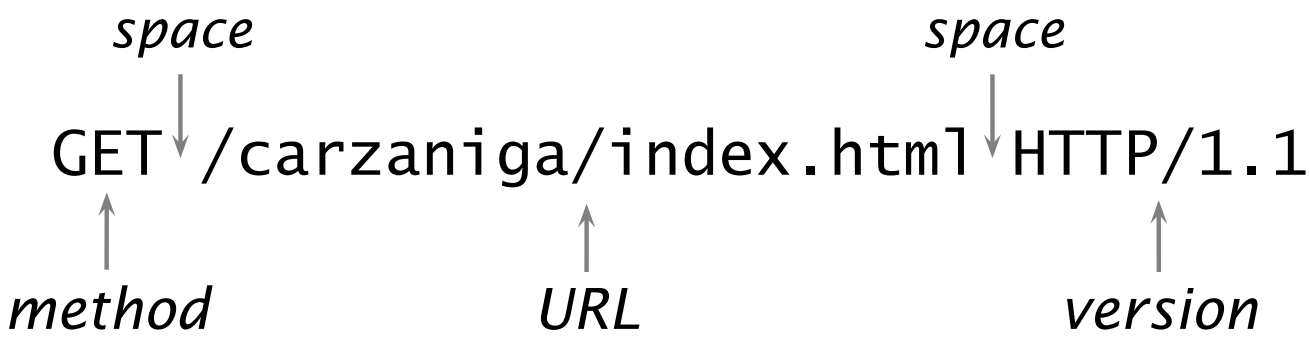

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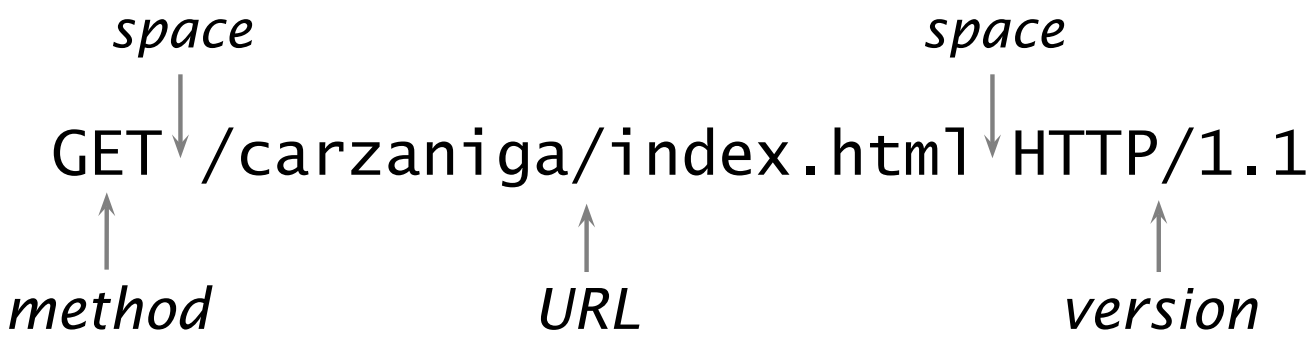

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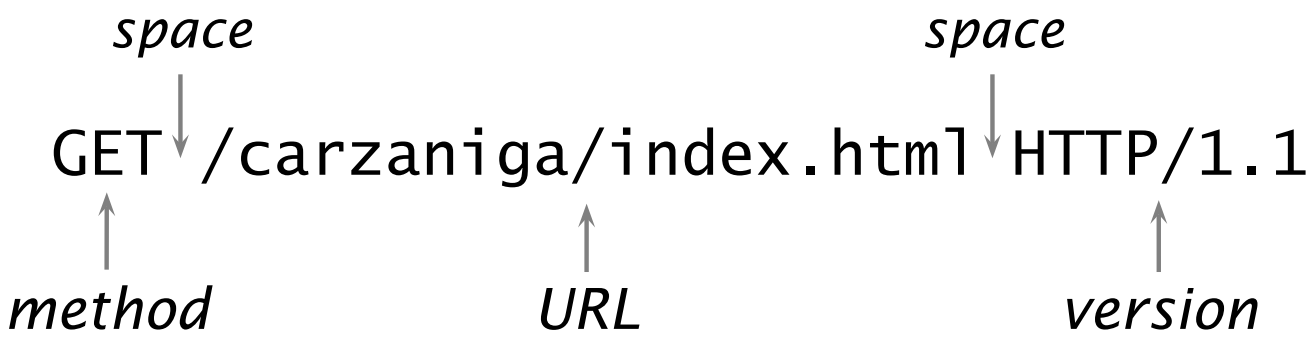

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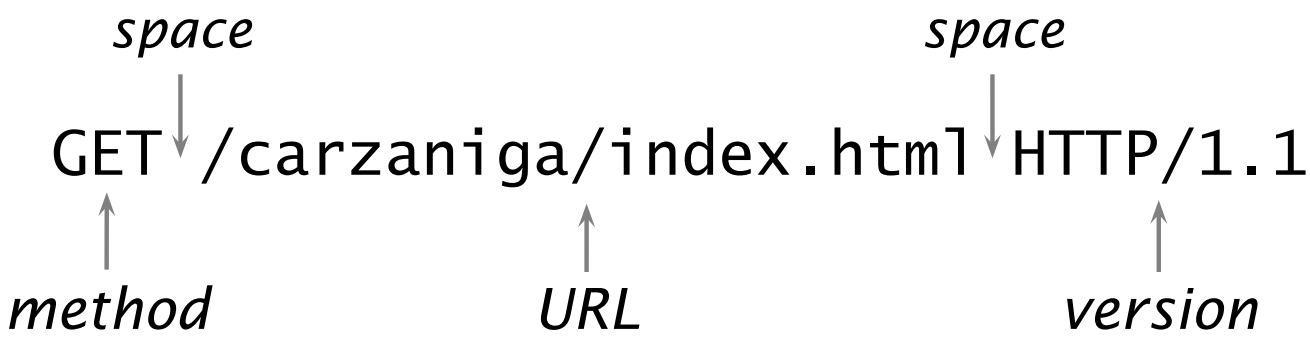

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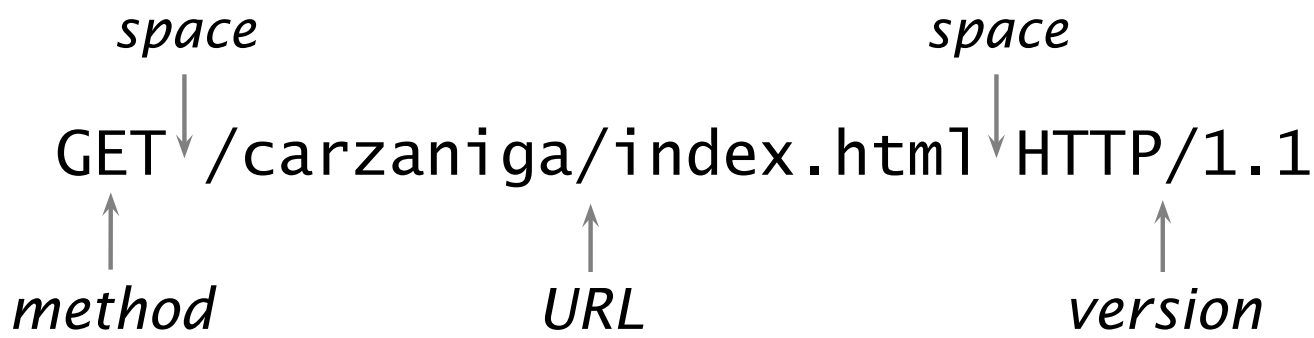

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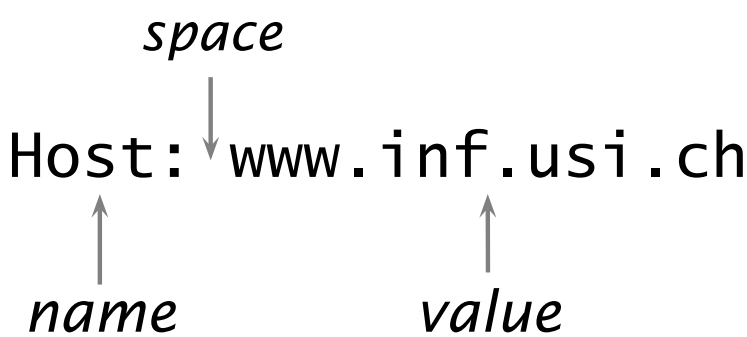

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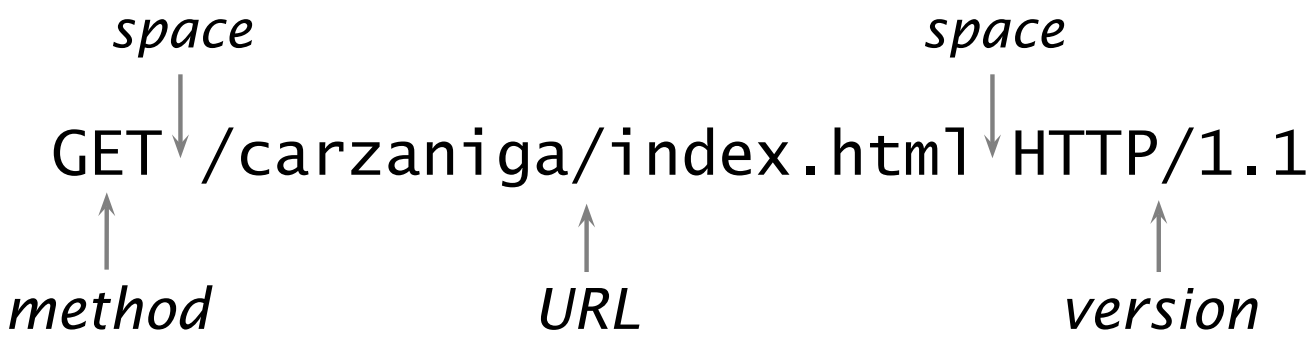

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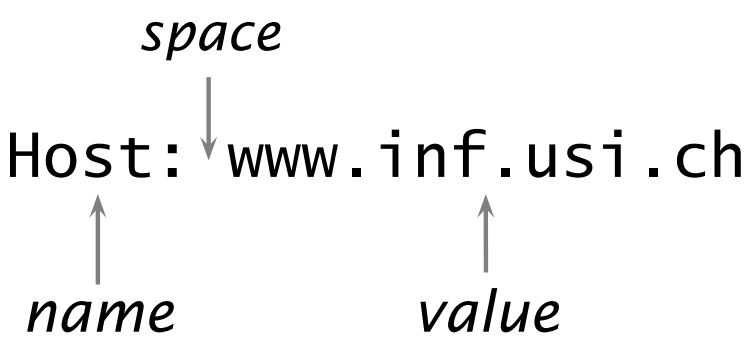

- Line terminator: *CRLF* ("carriage return" and "line feed")
  - two bytes: numeric values 13 and 10

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PUT	requests that the enclosed object be stored under the given URL
DELETE	deletes the given object
TRACE	see RFC 2616, Section 9.8
CONNECT	see RFC 2616, Section 9.8

Anatomy of a Response

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HTTP/1.1 405 Method Not Allowed
Date:  Fri, 18 Mar 2005 01:18:04 GMT
Server:  Apache/2.0.46 (Red Hat)
Allow:  GET,HEAD,POST,OPTIONS,TRACE
Content-Length:  329
Connection:  close
Content-Type:  text/html

<html><head>
<title>405 Method Not Allowed</title>
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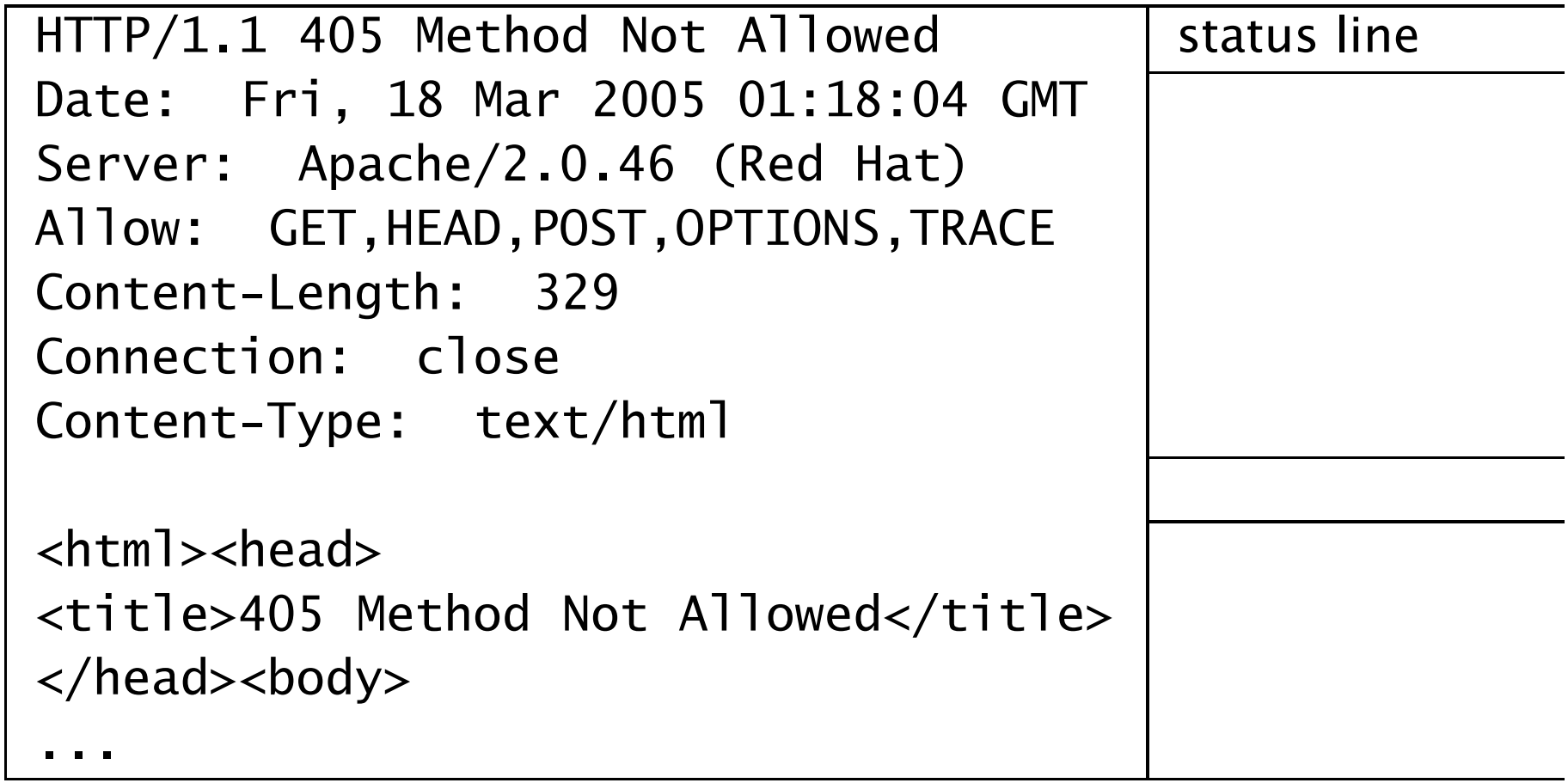

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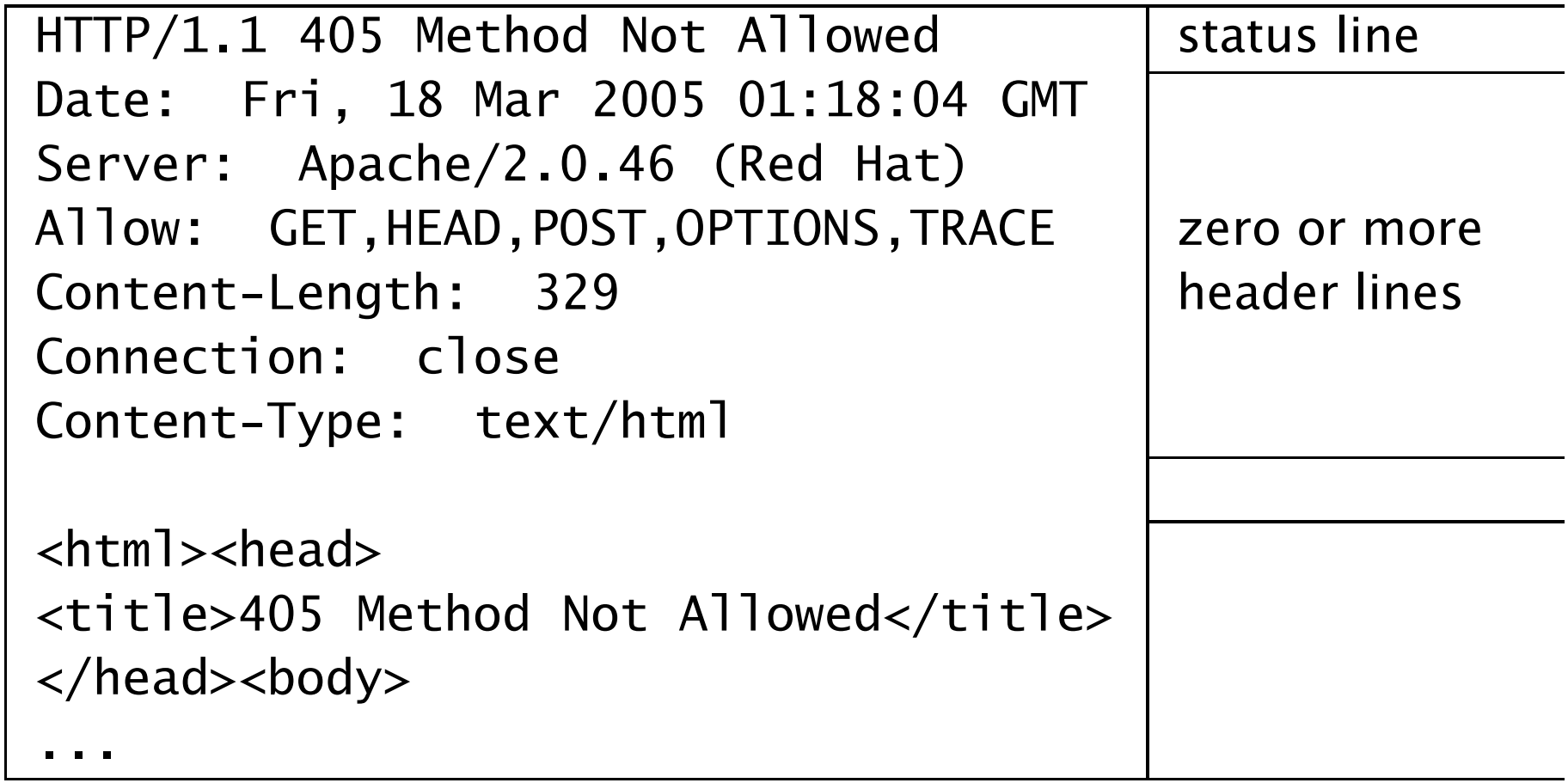

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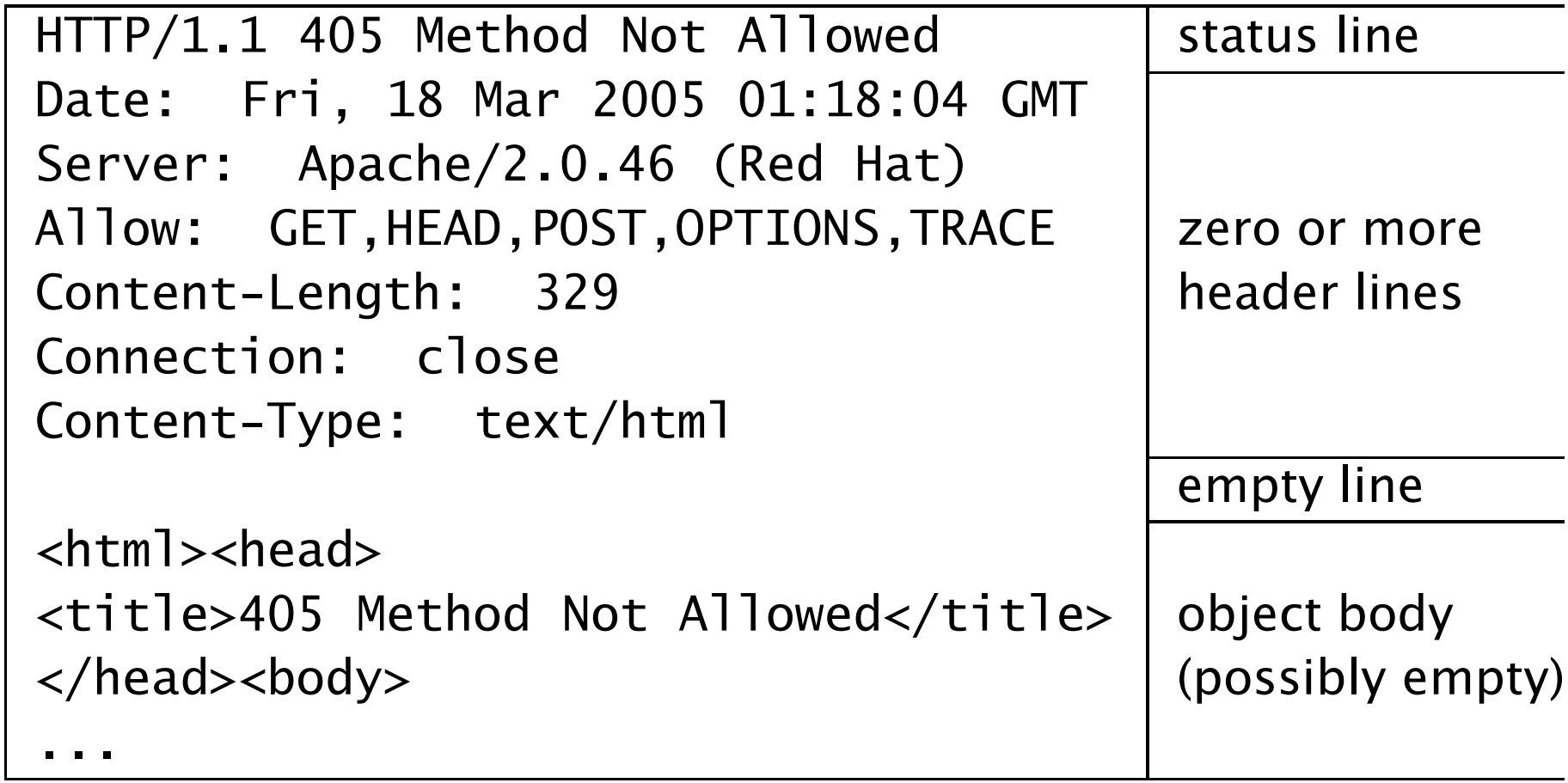

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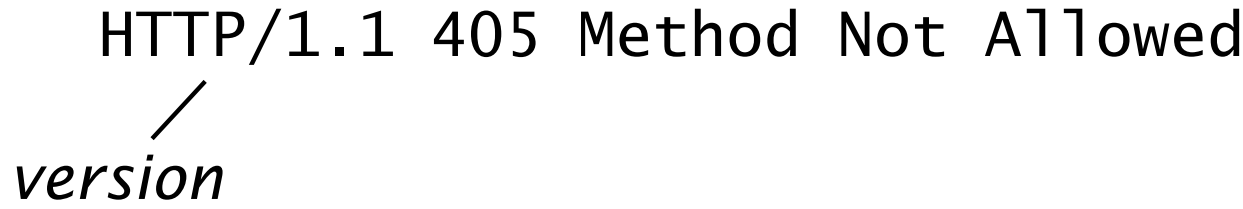

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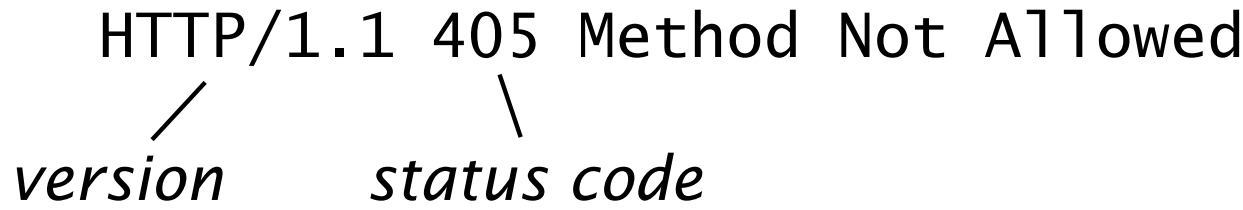

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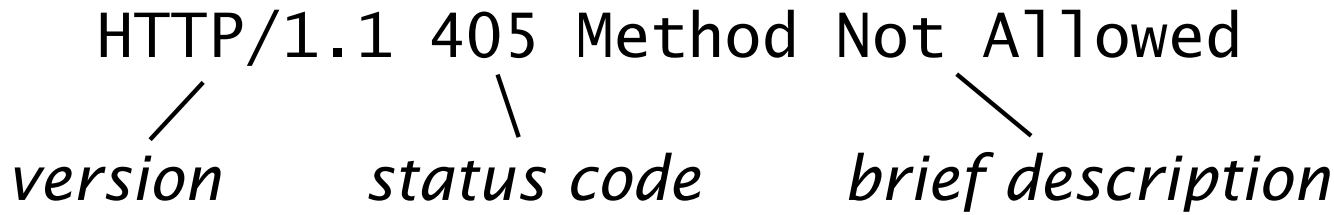

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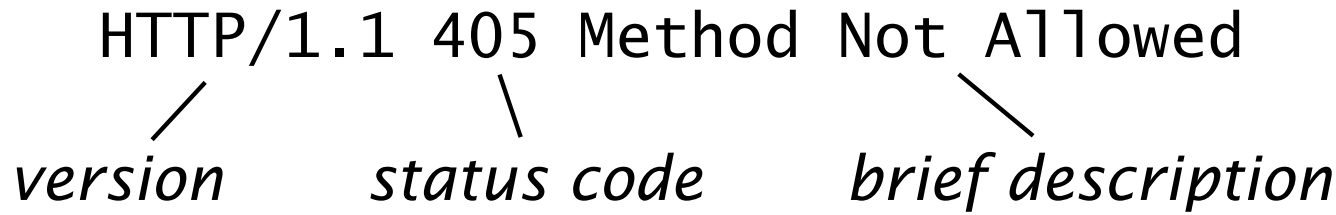

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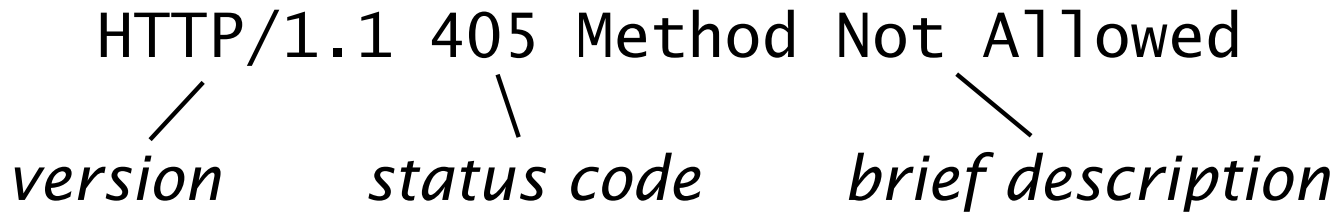

- The *status code* is a 3-digit value (e.g., 200 or 401)
- The rest has exactly the same structure as a request

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5*xx* server error. E.g., internal server error (500), service overloaded (503)

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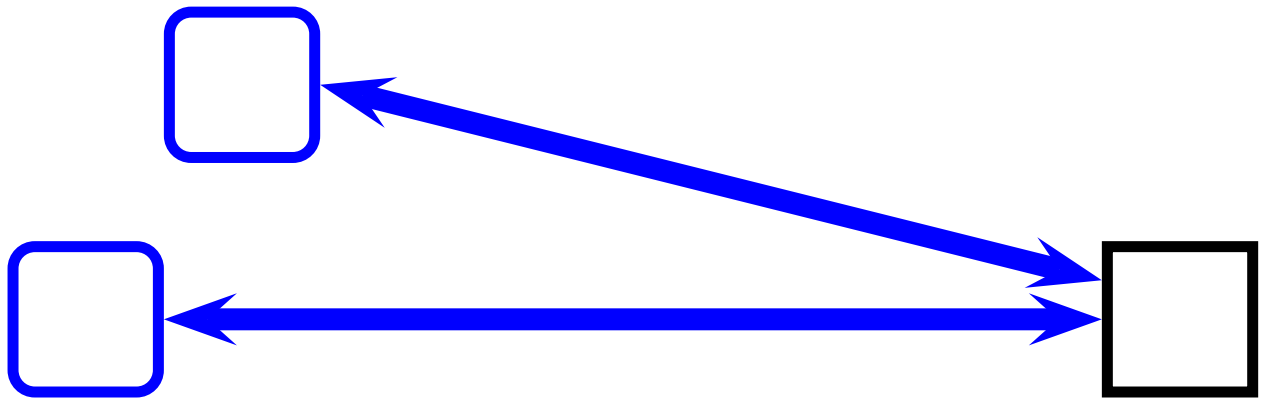

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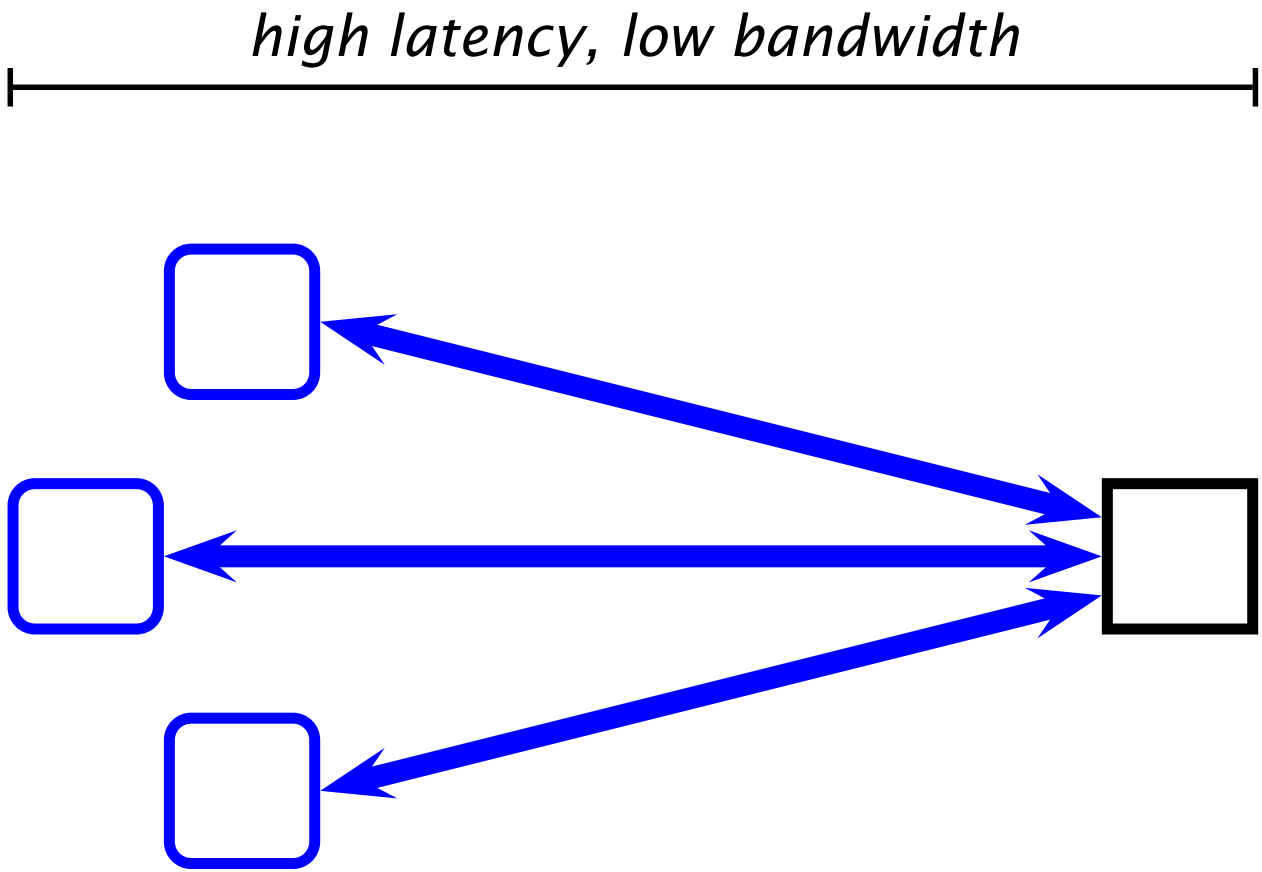

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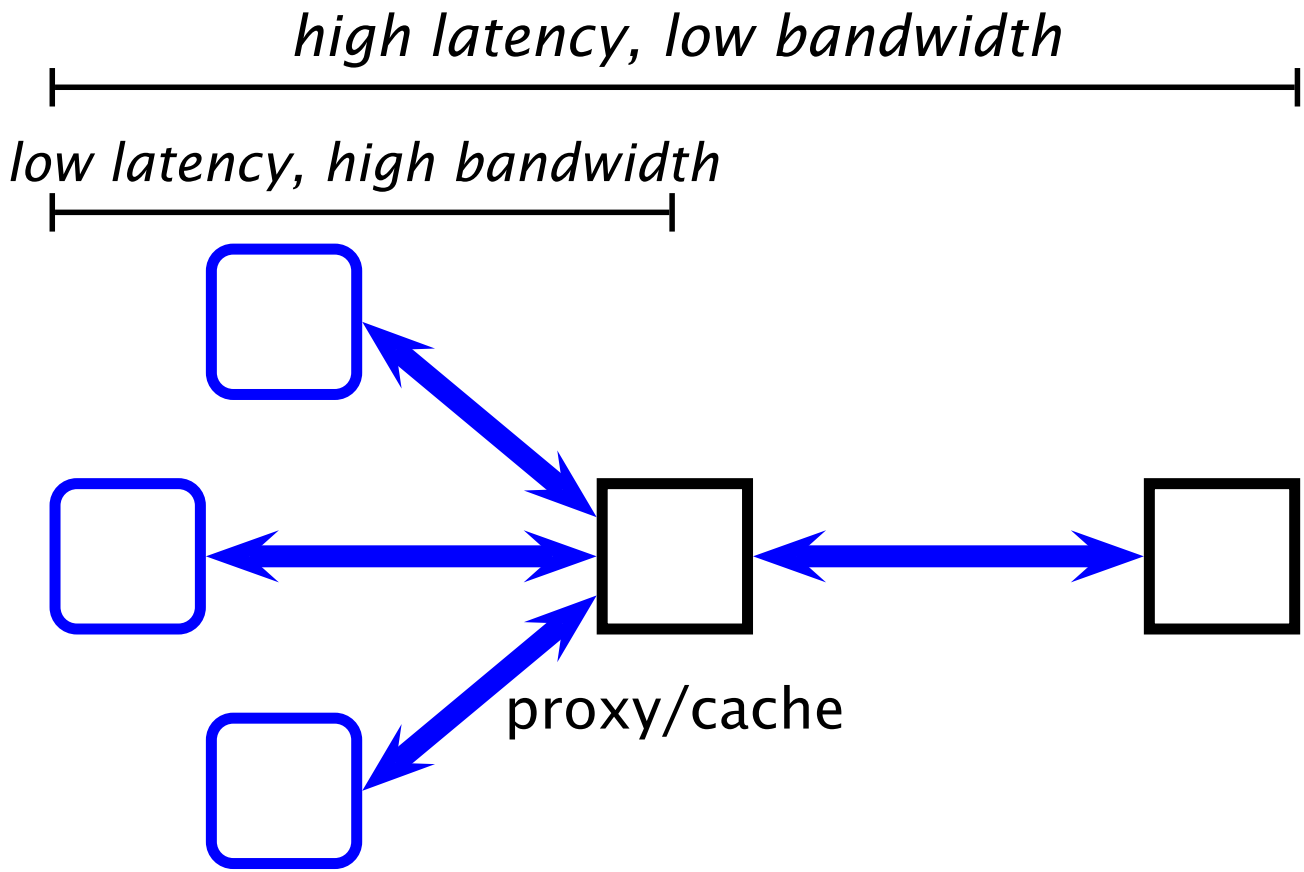

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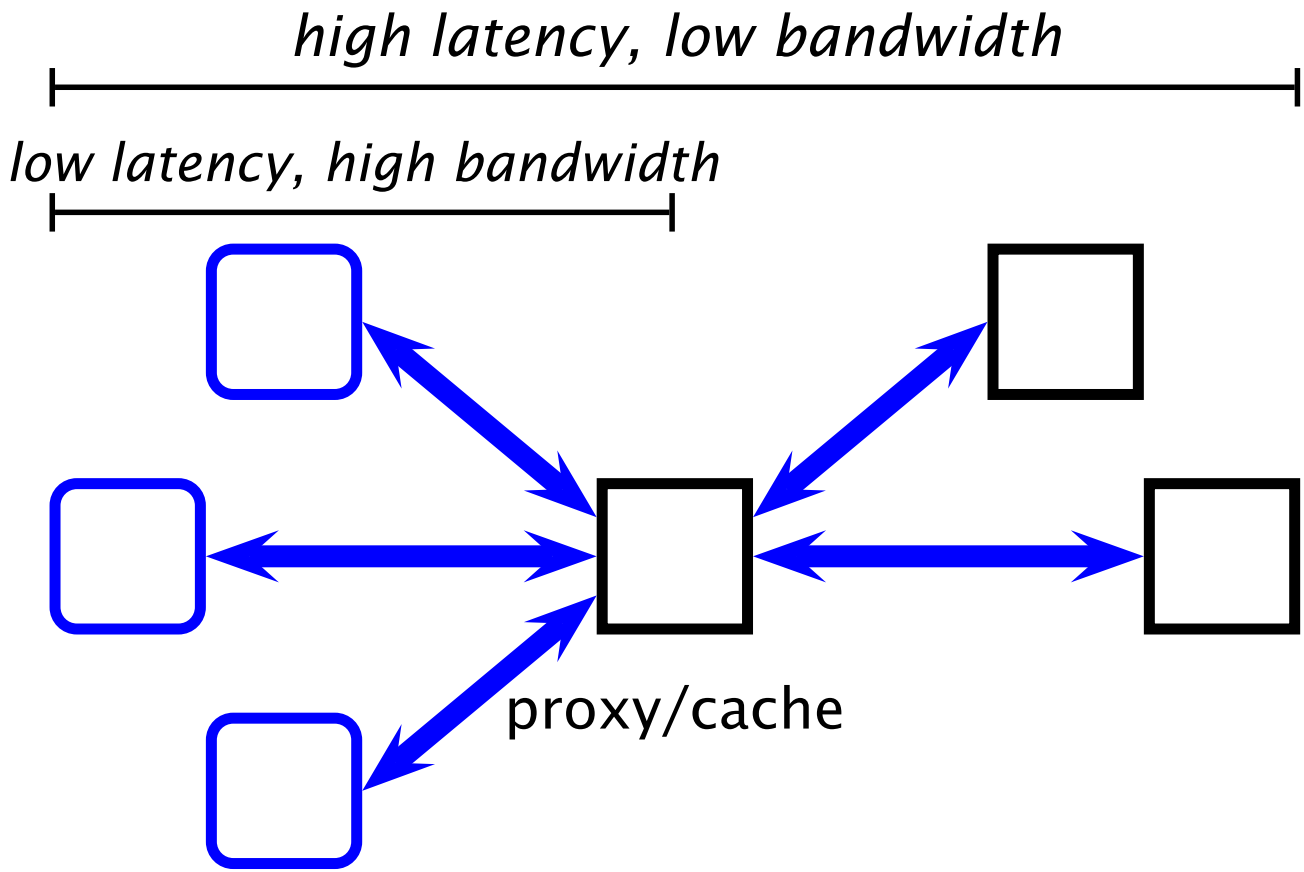

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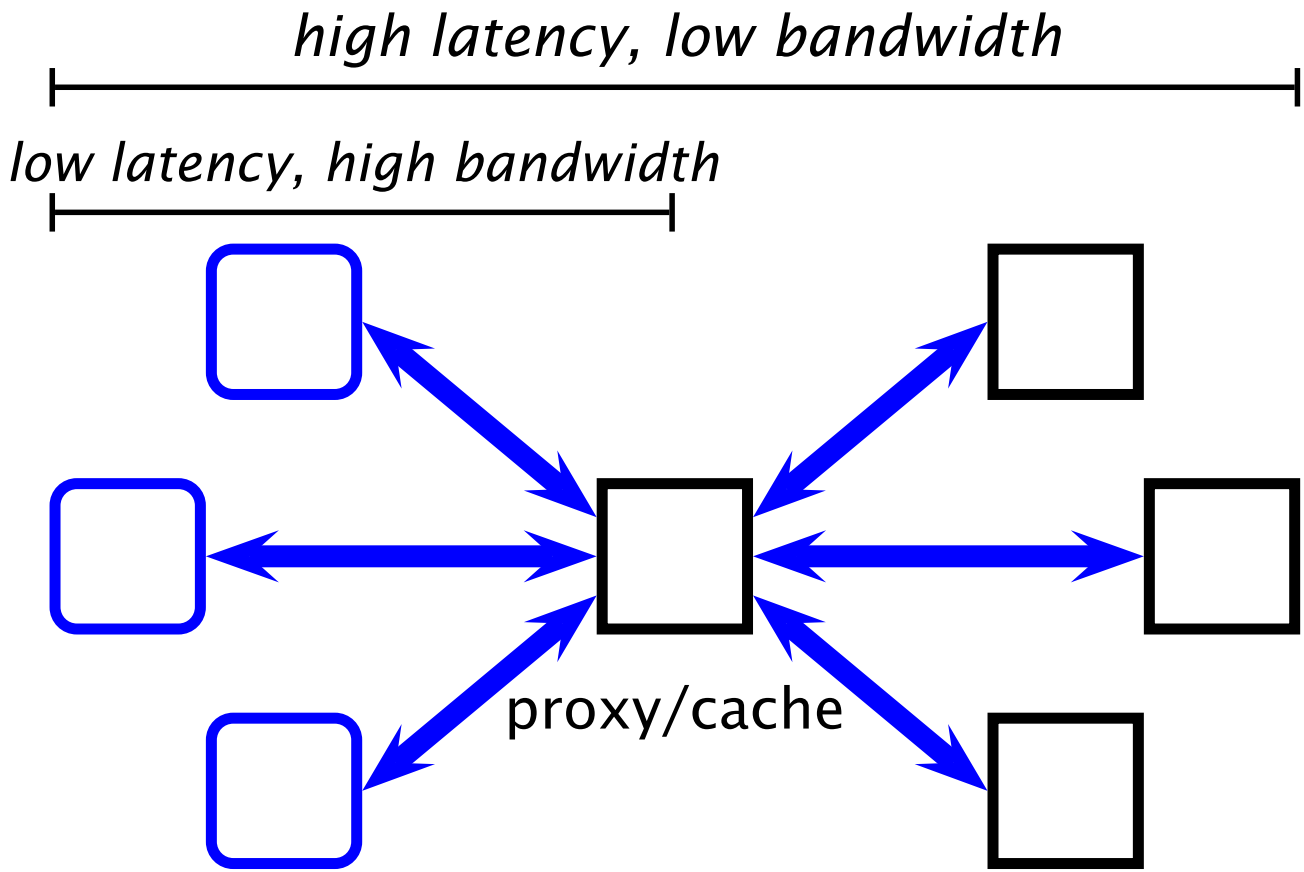

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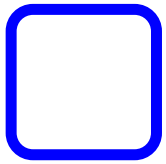

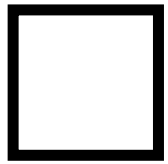

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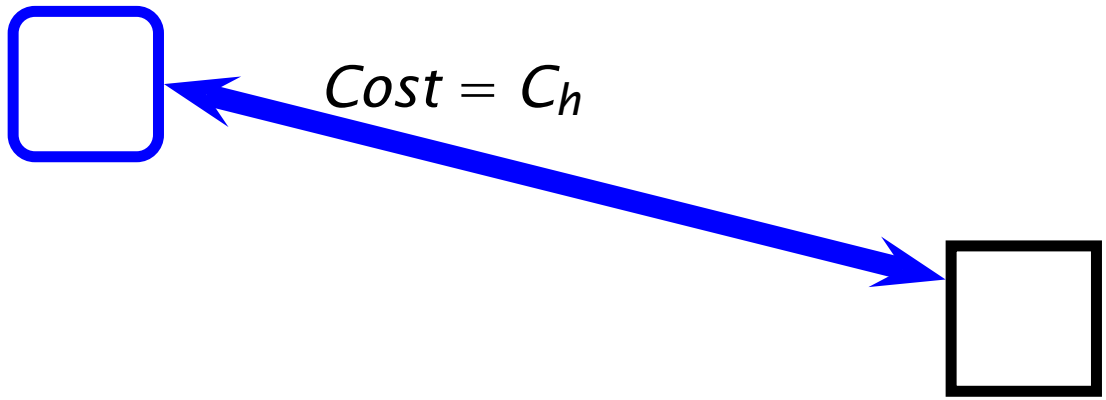

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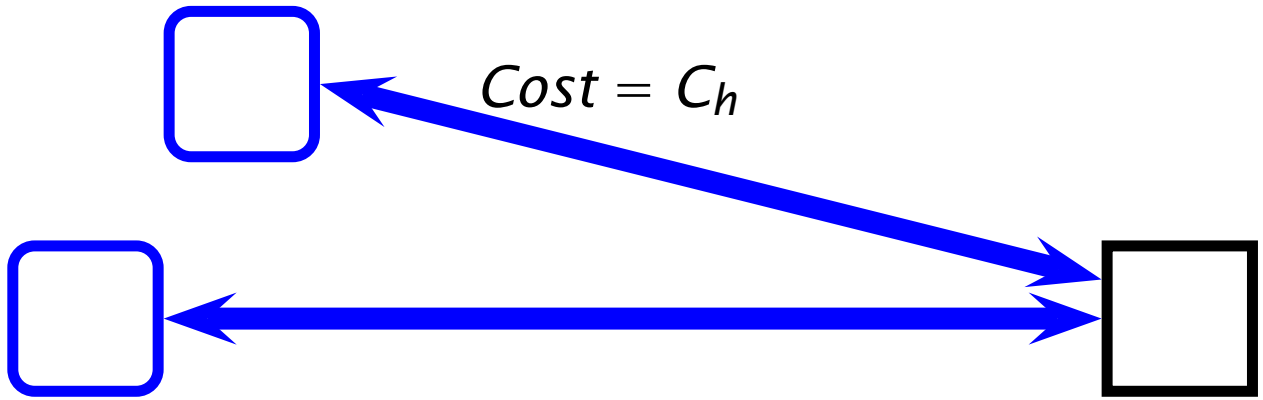

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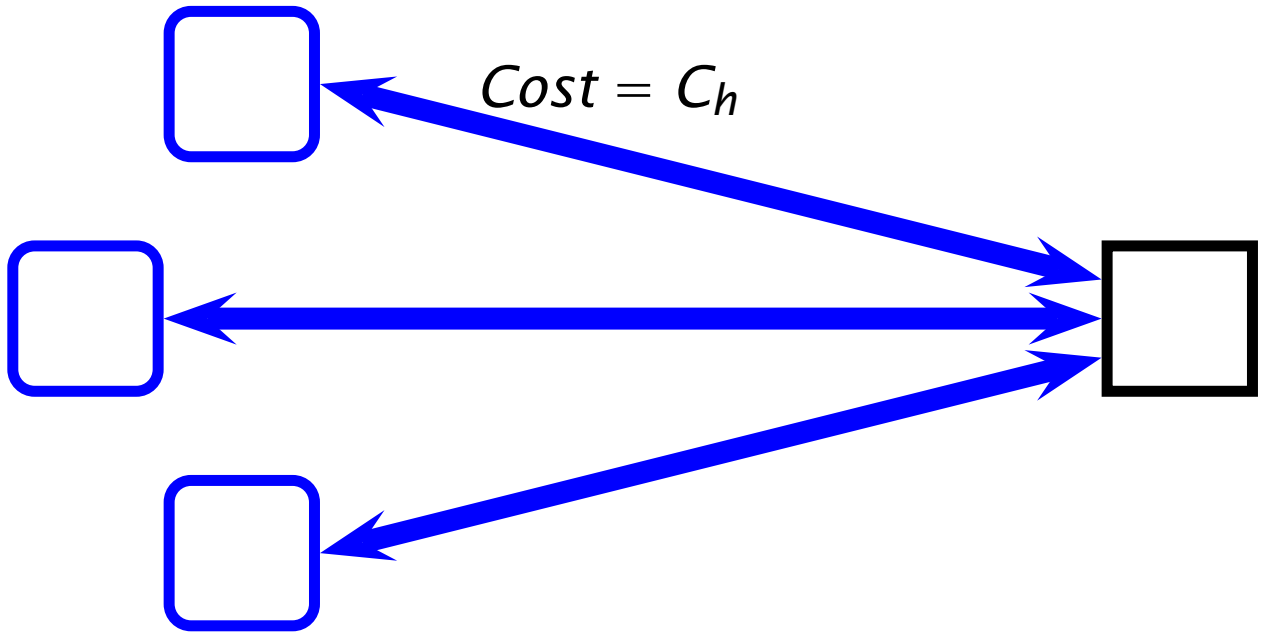

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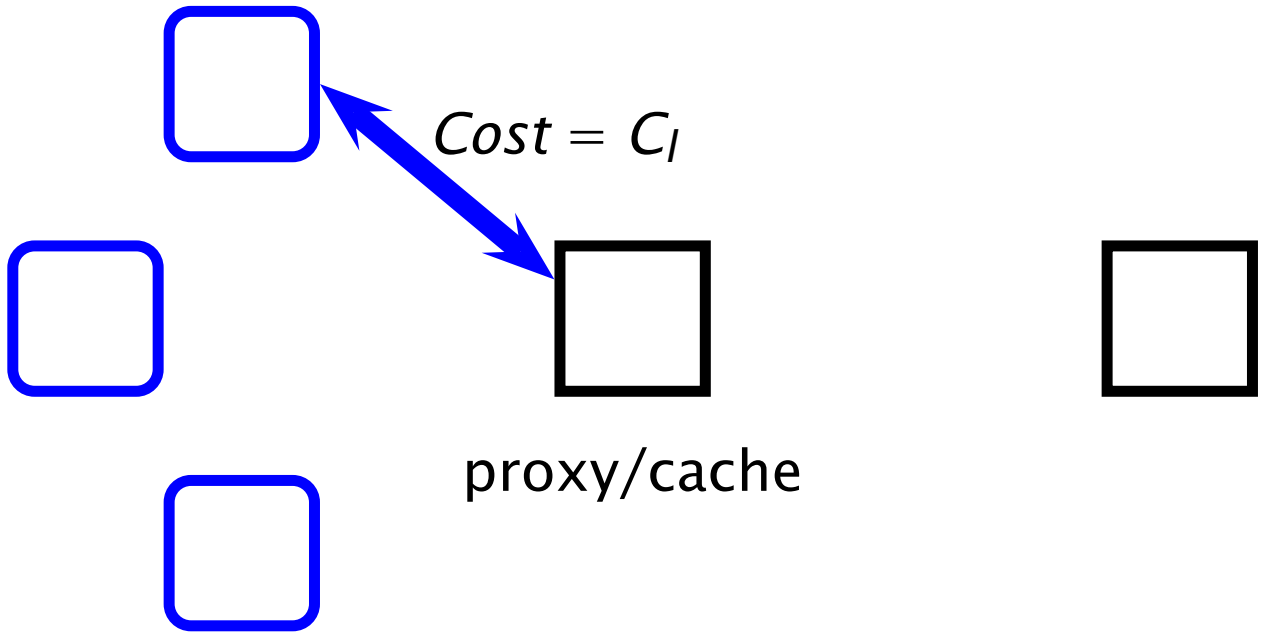

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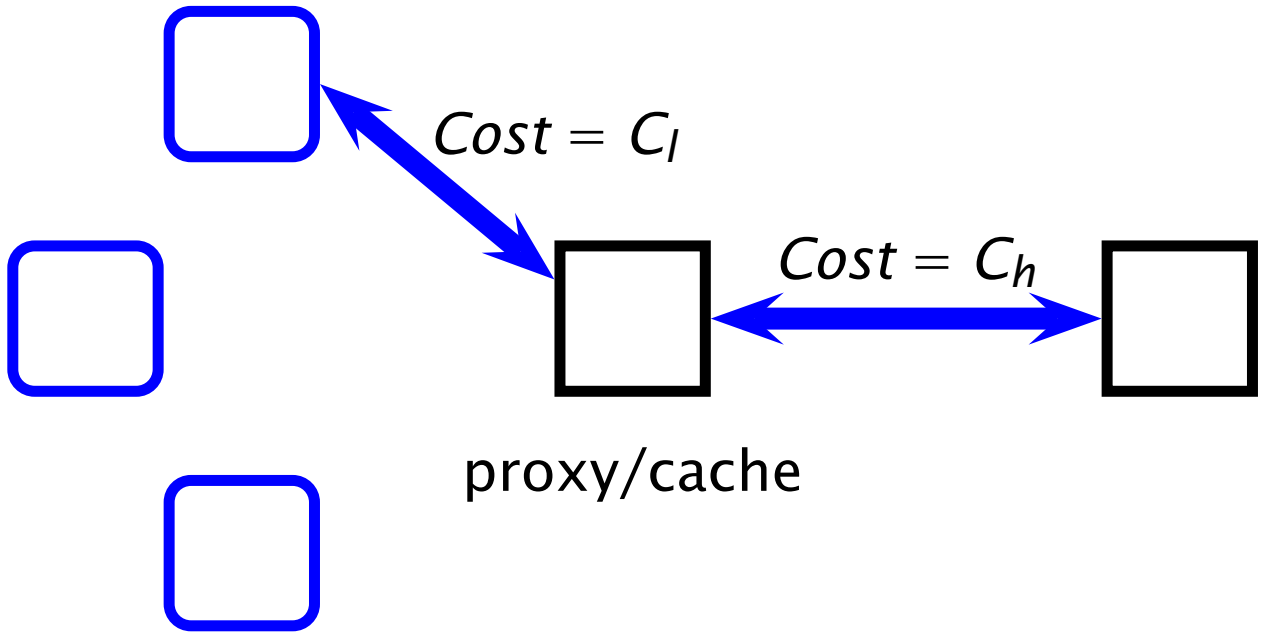

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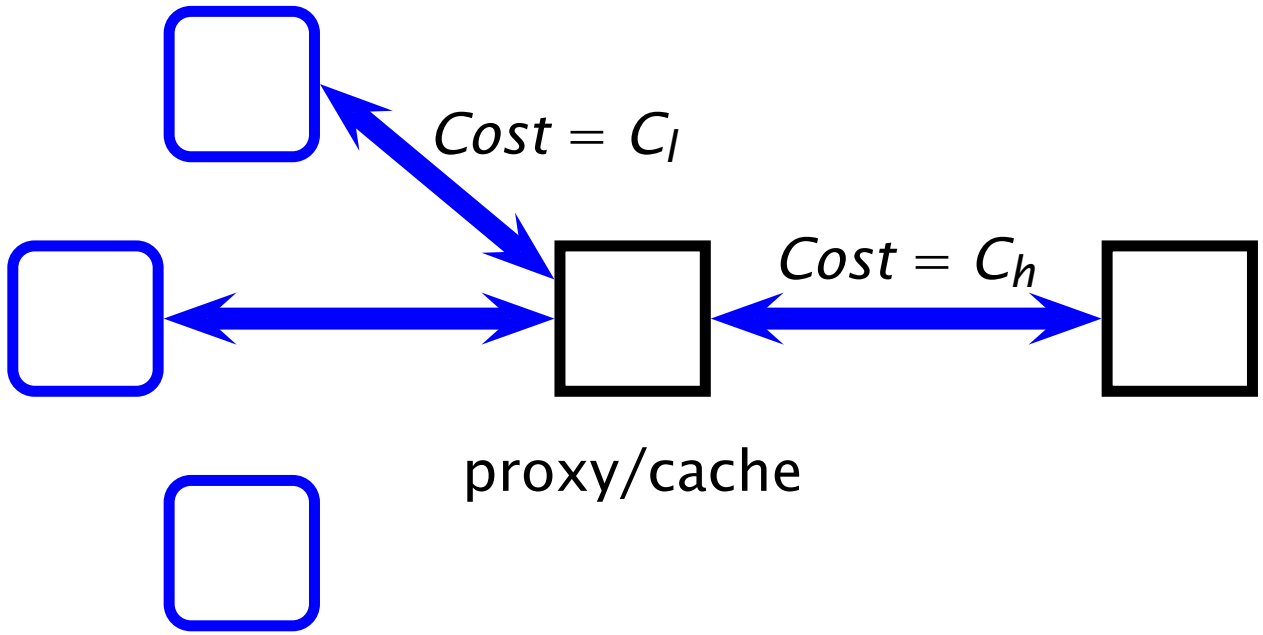

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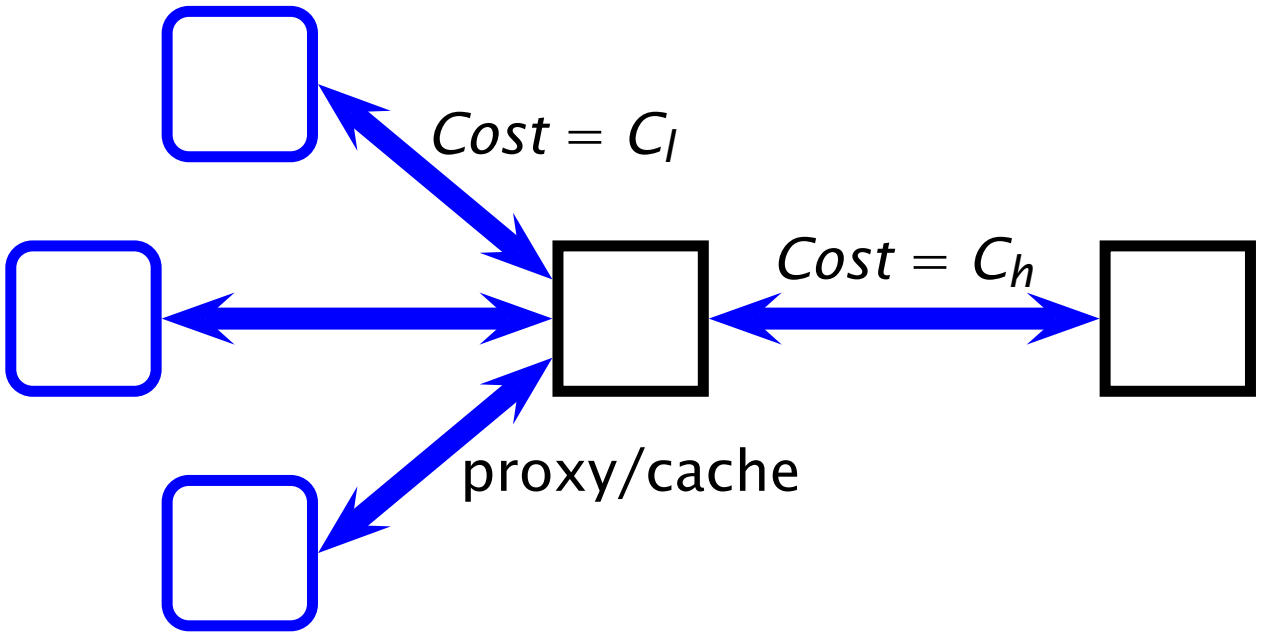

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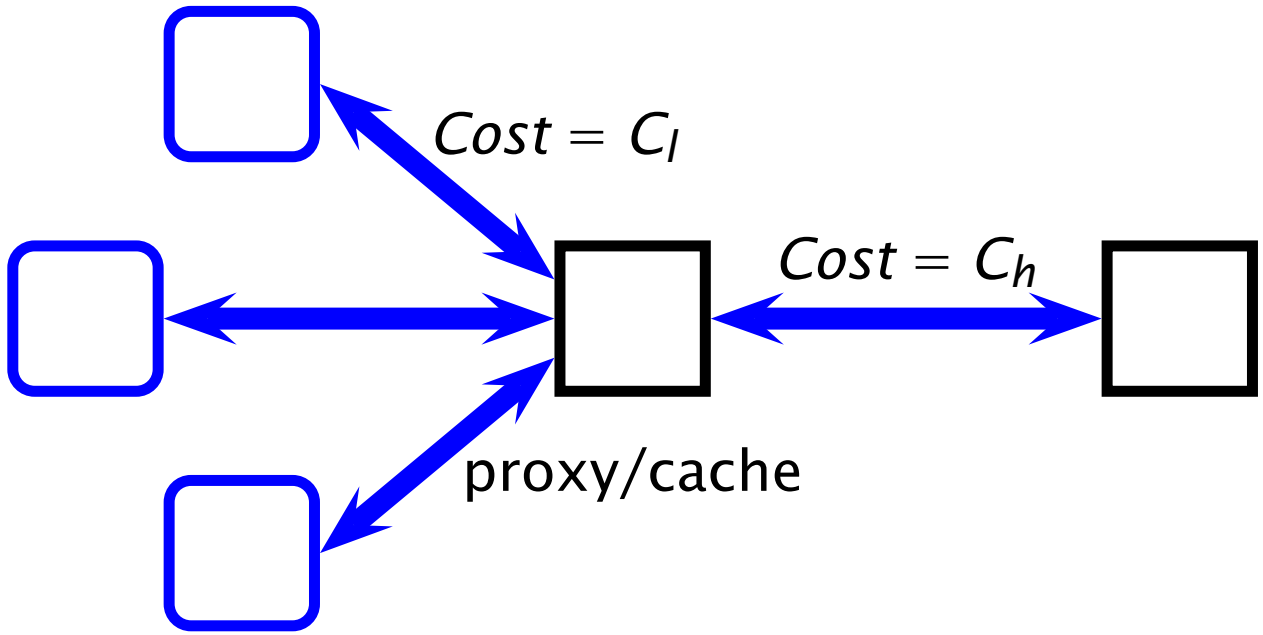

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  - latency (just like any other caching system)
  - complexity

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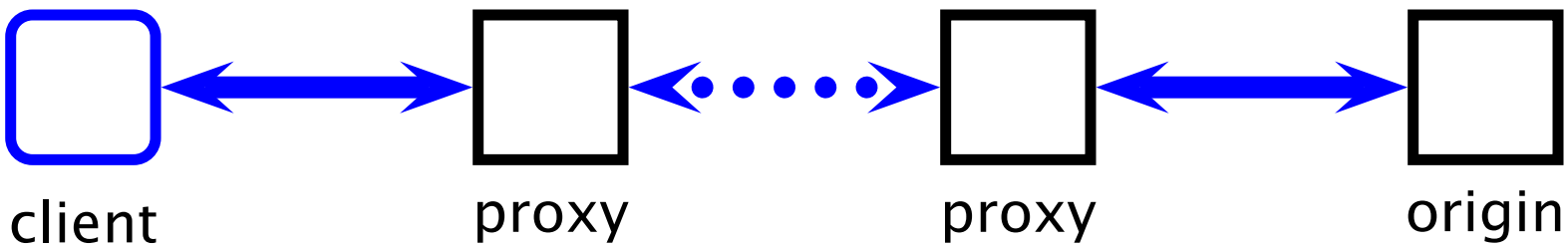

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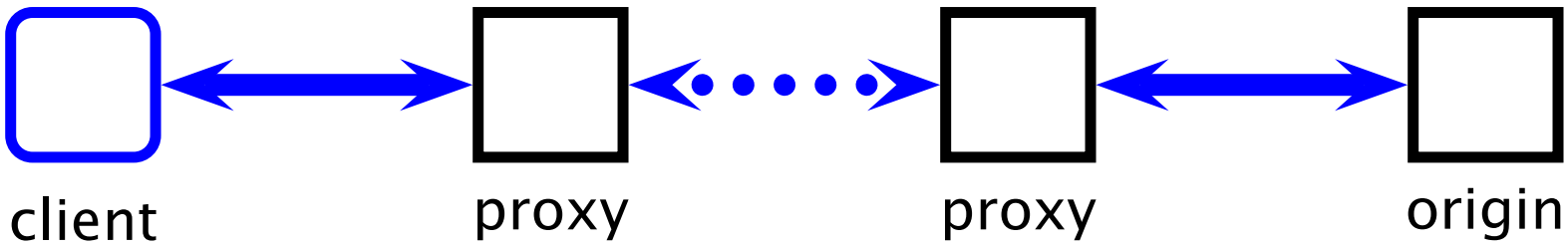

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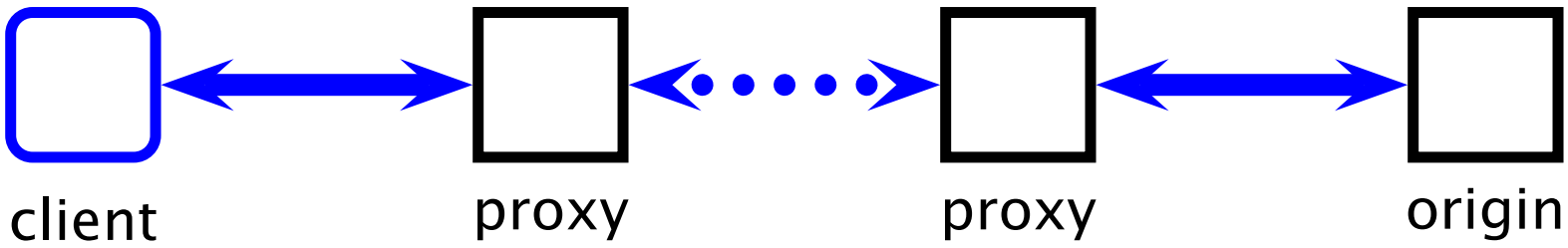

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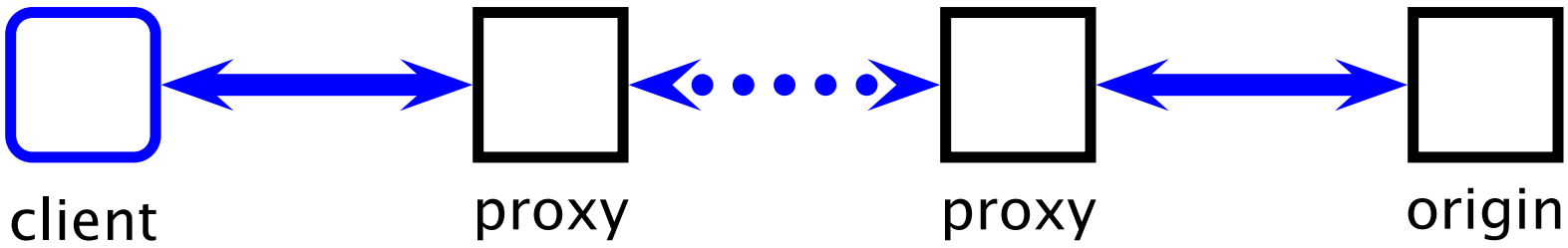

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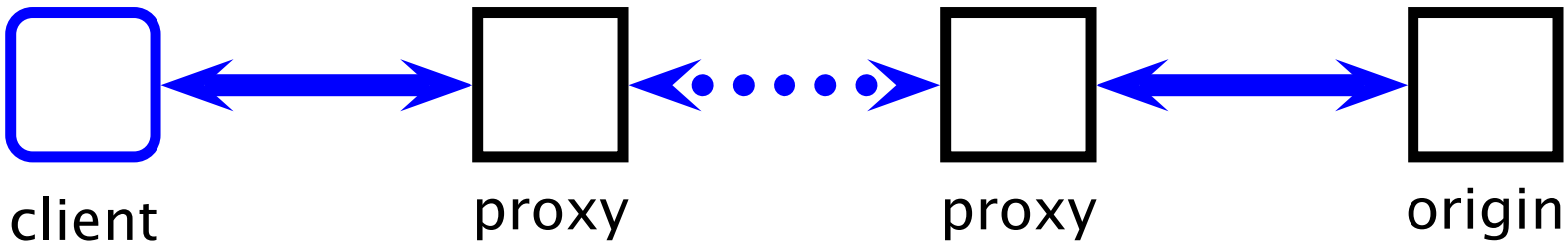

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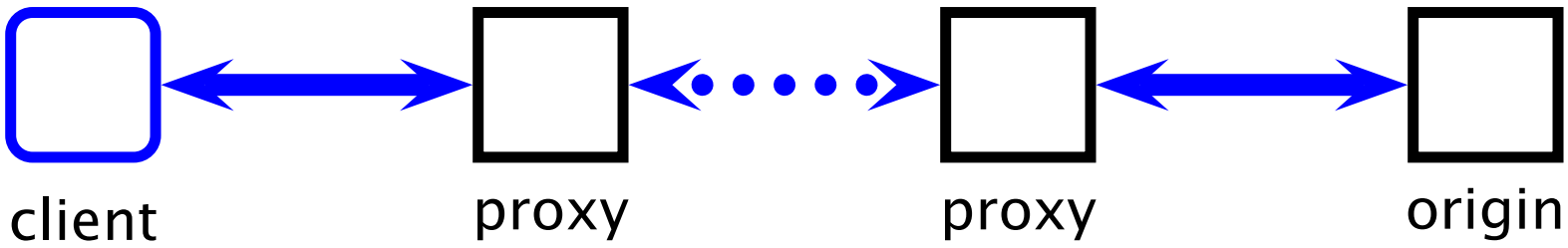

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  - a lot of headers to control caching along the request chain

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- A client or proxy can use a *conditional* `GET` by including a `If-Modified-Since` header

Cache-Control in Requests

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Host:  www.inf.usi.ch
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```
GET /carzaniga/index.html HTTP/1.1
Host:  www.inf.usi.ch
Cache-Control:  max-age=20
```

"Please, give me a cached object only if it is less than 20 seconds old"

Cache-Control in Replies

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HTTP/1.1 200 Ok
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...
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  ```

  "You *may* use this object up to 100 seconds from now. After that, you *must* revalidate the object."

  - without the `must-revalidate` directive, a client may use a stale object

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- `Cookie` header
  - sent within an HTTP request, from the client to the server
  - tells the server that the request belongs to the given session

Example

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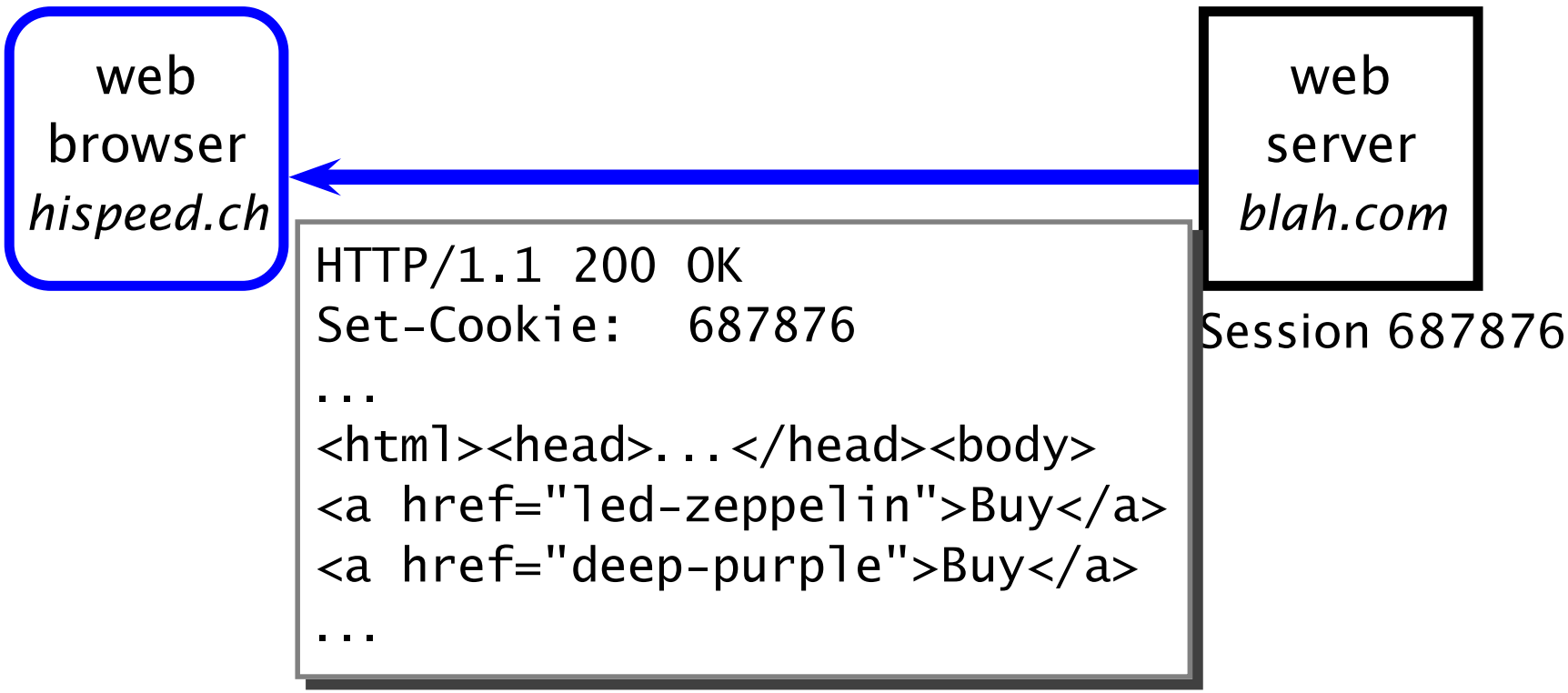

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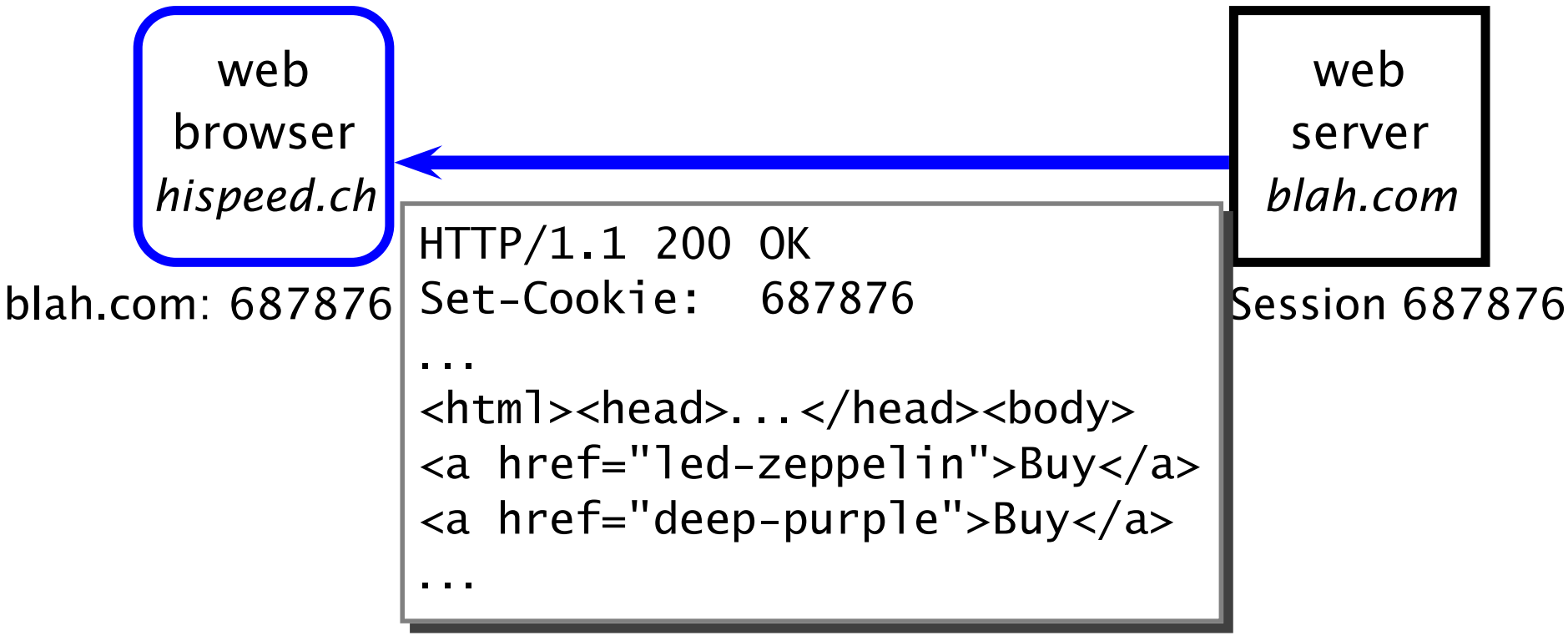

Example

blah.com: 687876

Session 687876

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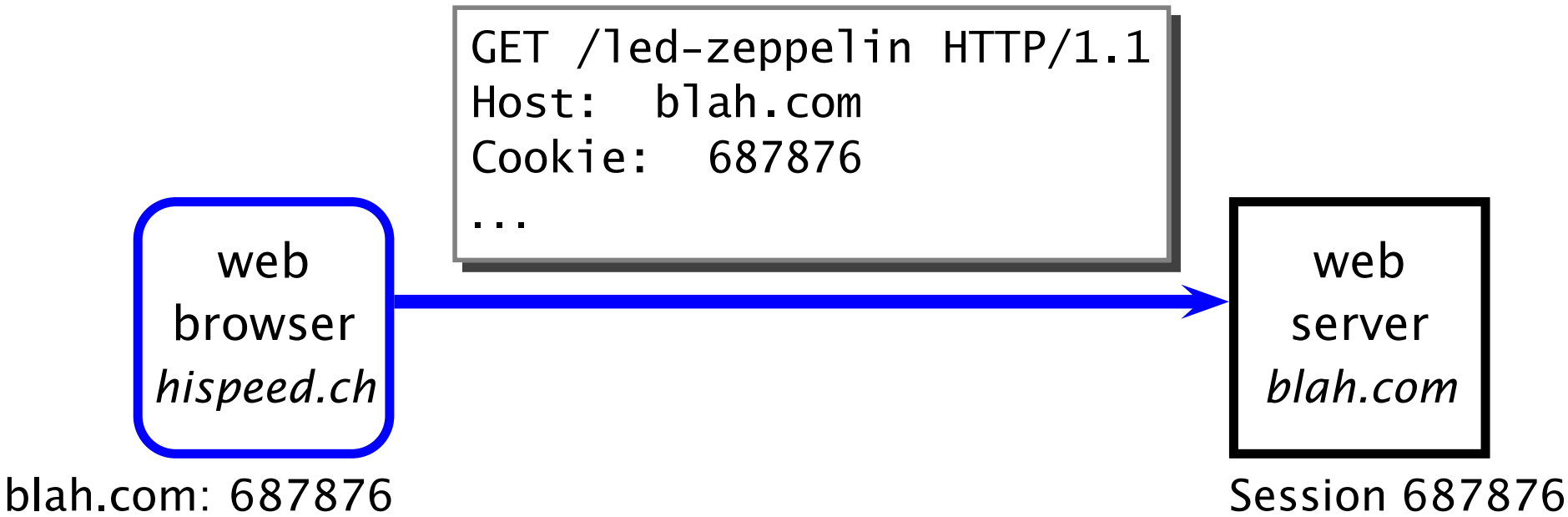

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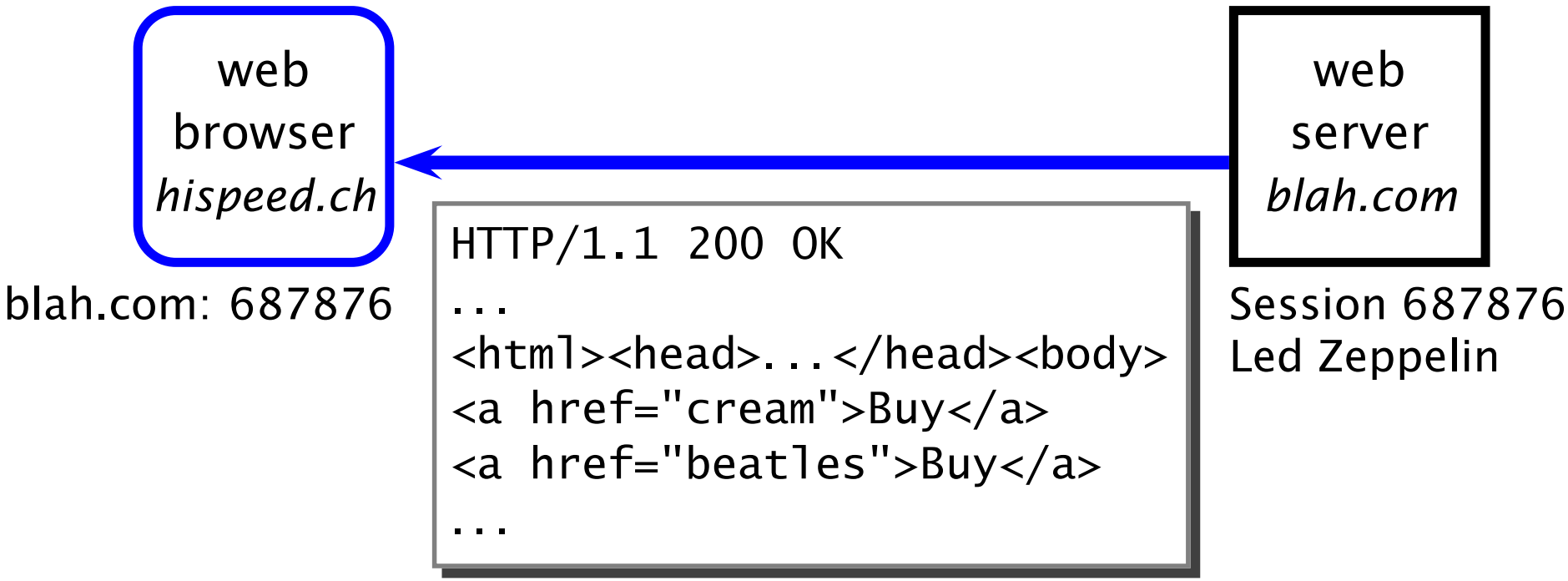

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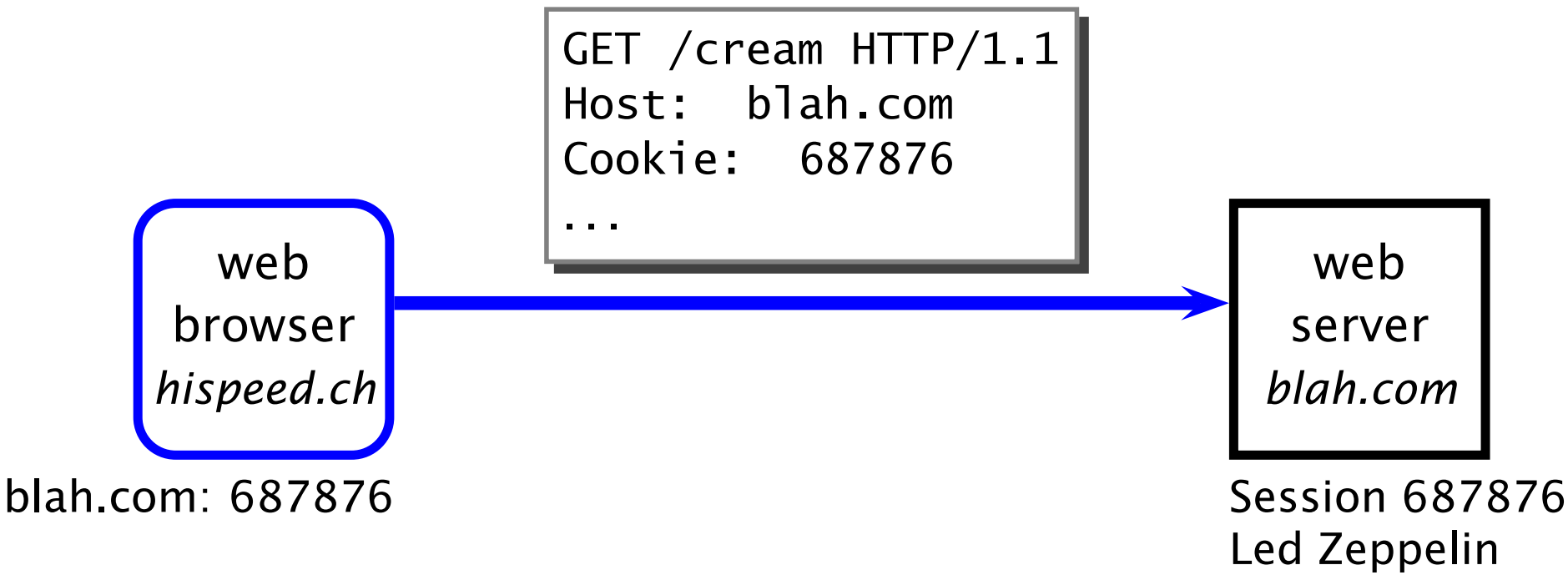

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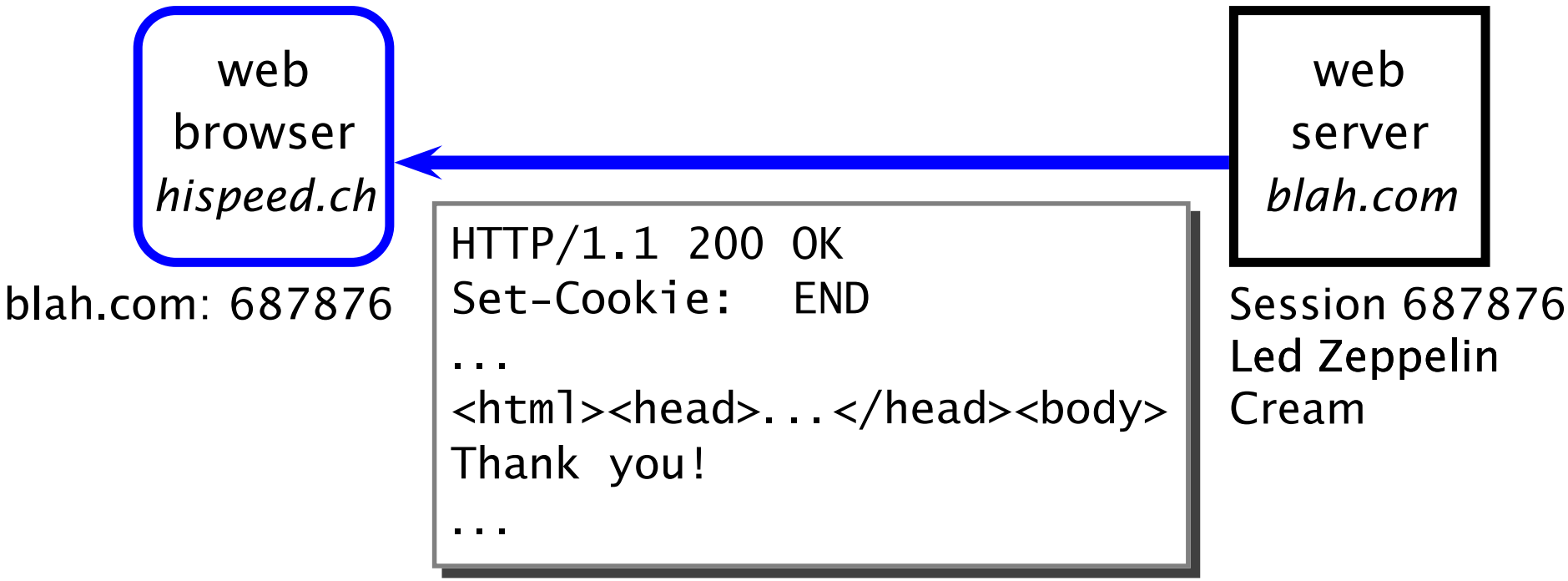

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- If user n. 687876 buys something on line with a credit card, then he or she would also be immediately indentified