



Web-based Transactions

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Evolution

The world wide web, if we analyze the involved technologies, evolved through 3 main phases:

1. Static and informative Web
2. Dynamic and interactive Web
3. Integrated and application-oriented Web

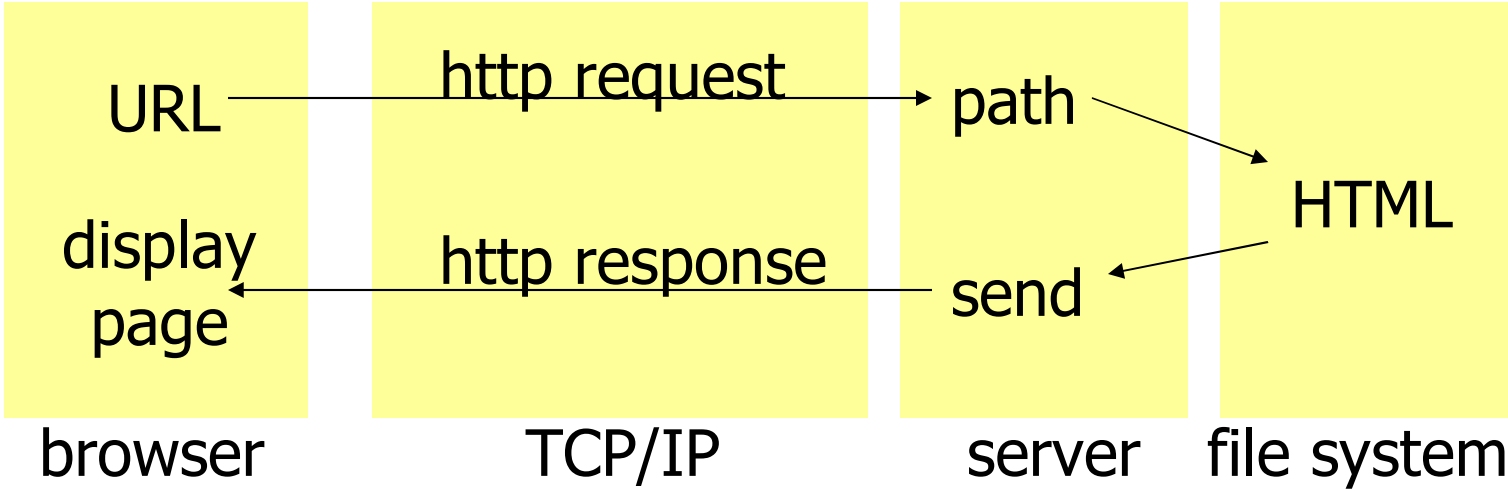
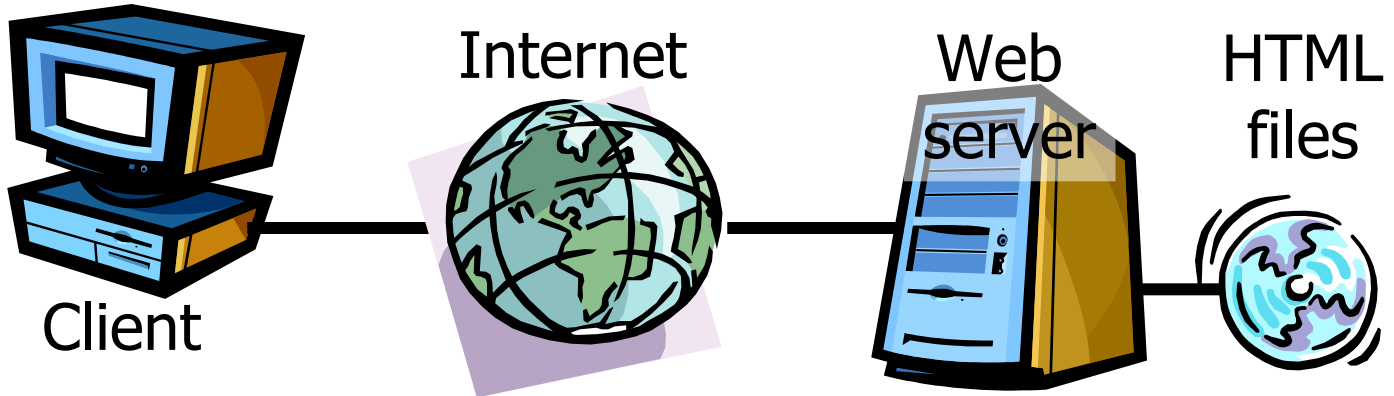
E-commerce and e-business are a particular application domain of Phase 3.



Summary

- Static Transactions
- Dynamic Transactions
- Database-driven Transactions
- Rich-Client Asynchronous Transactions

Static web transaction



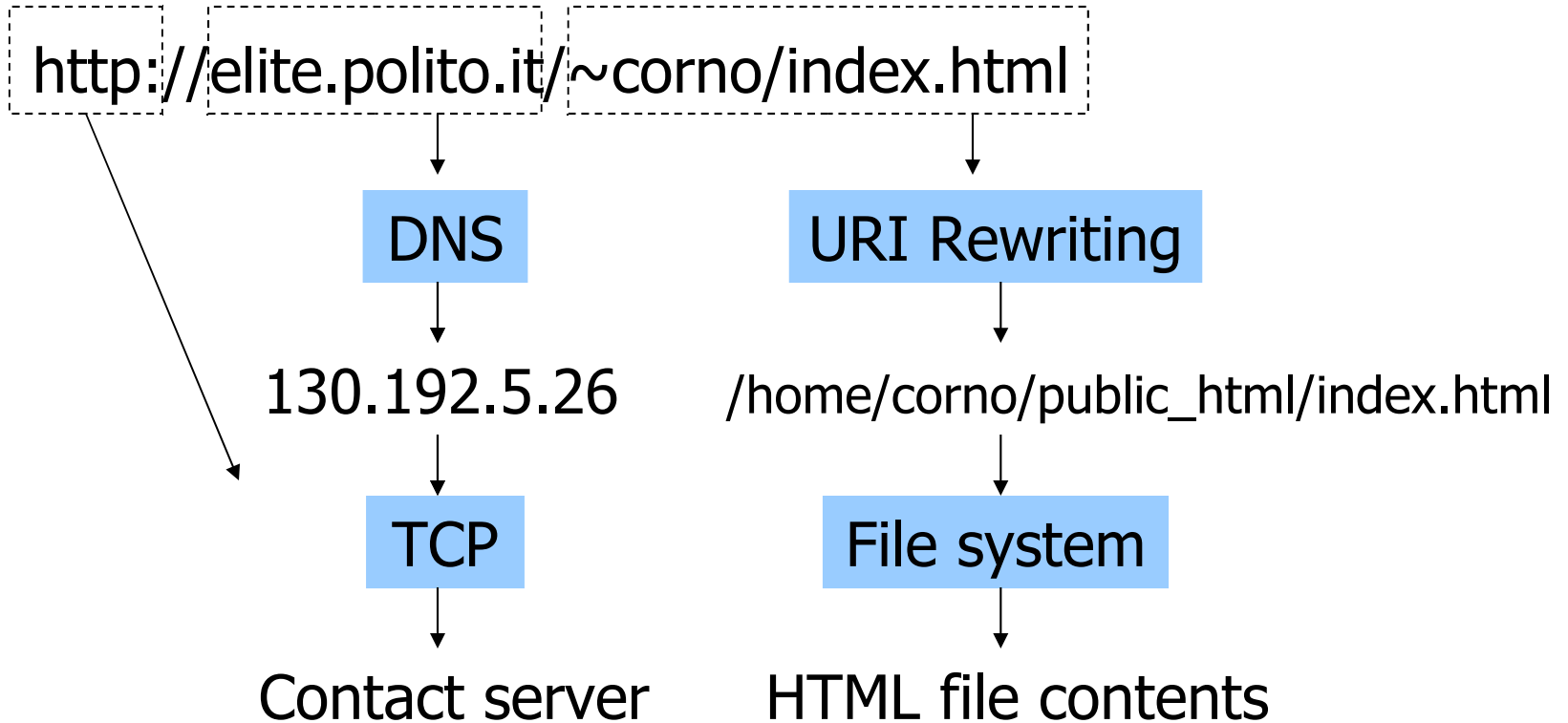


Adopted standards

- **URL** (uniform resource locator) for finding web pages
- **HTML** (hyper text markup language) for writing web pages
- **GIF** (graphics interchange format) for images
- **HTTP** (hyper text transfer protocol) for client-server interaction
- **TCP/IP** (transmission control protocol over internet protocol) for data transfer

URL

RFC 2396
<http://www.w3.org/Addressing/>



HTTP protocol

RFC 2616, RFC 2617

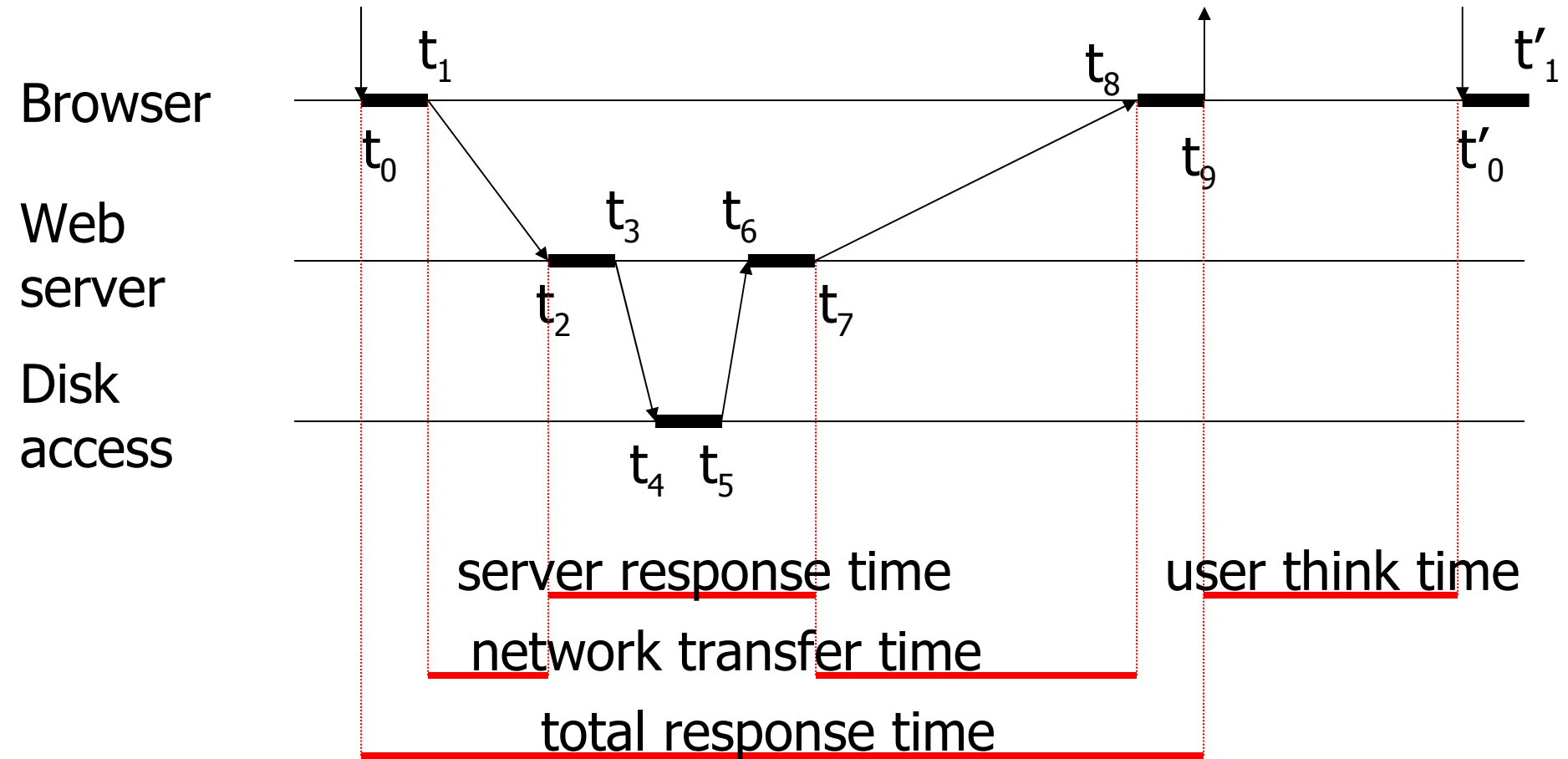
<http://www.w3.org/Protocols>

```
GET /~corno/index.html HTTP/1.0
Accept: text/html
Accept: image/gif
User-Agent: CornoSoft SuperBrowser 9.45
```

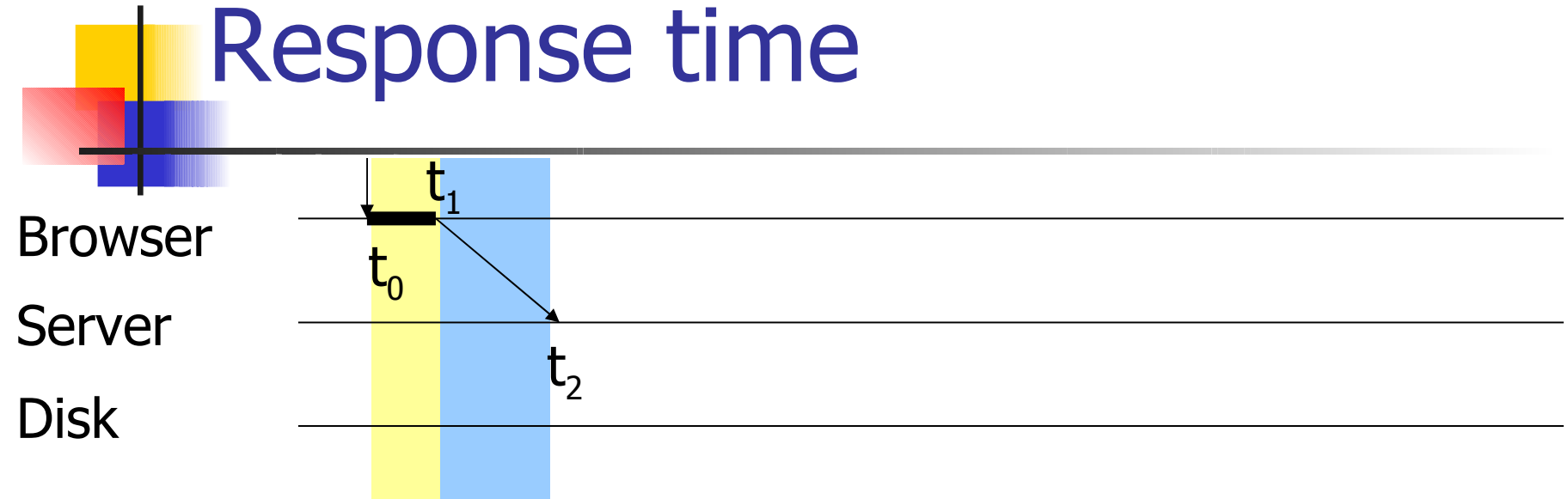
```
HTTP/1.0 200 OK
Date: Monday, 01-Jan-2001 00:00:00 GMT
Server: Apache 1.3.0
MIME-Version: 1.0
Last-Modified: 31-Dec-2000
Content-type: text/html
Content-length: 3021
```

```
<HTML> . . .
```

Static web transaction

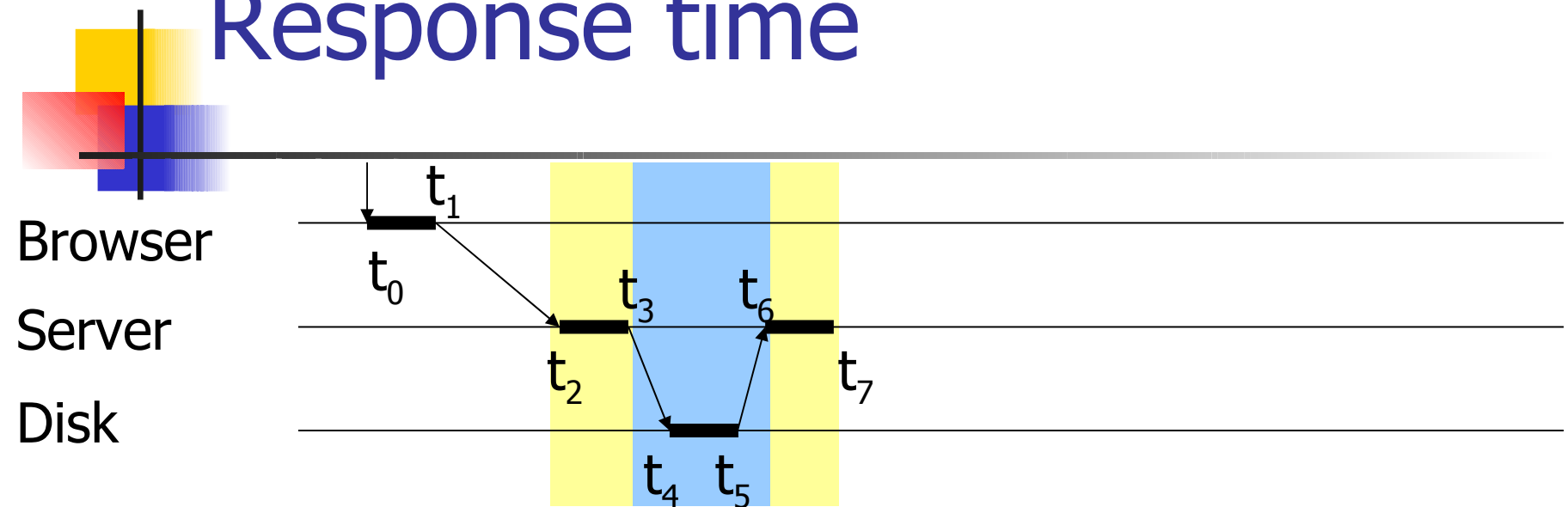


Response time



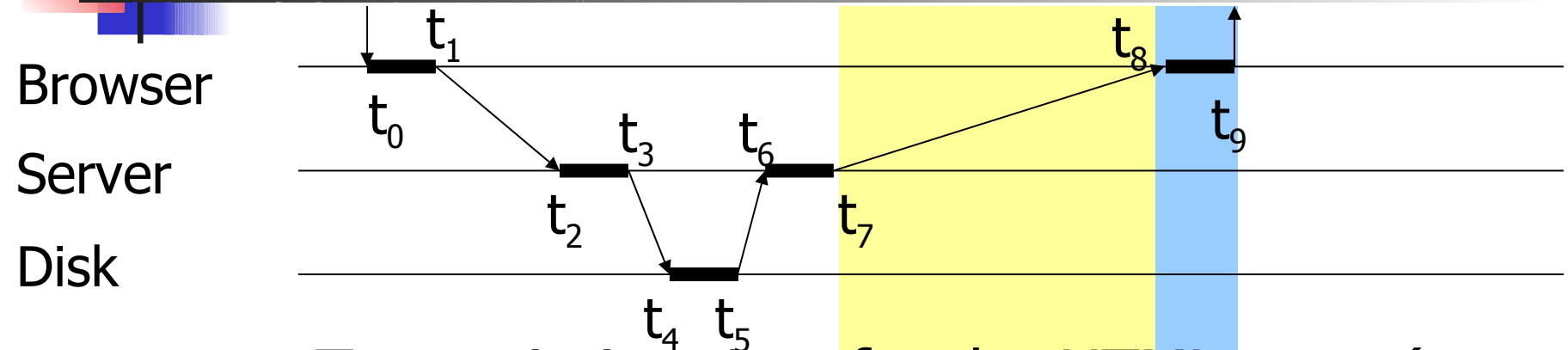
- Browser elaboration time (t_0-t_1): **power** of the users' computer
- Transmission time for http request (t_1-t_2): **latency** of Internet connection

Response time



- Server elaboration time (t_2-t_3, t_6-t_7): power of the server and number of simultaneous accesses
- Disk access time (t_3-t_6): I/O architecture del server and number of simultaneous accesses

Response time



- Transmission time for the HTML page (t_7 - t_8): **size** of the page and of the images, **latency**, available **bandwidth**
- Visualization time of the page (t_8 - t_9): **power** of the users' computer and **complexity** of the page



Examples

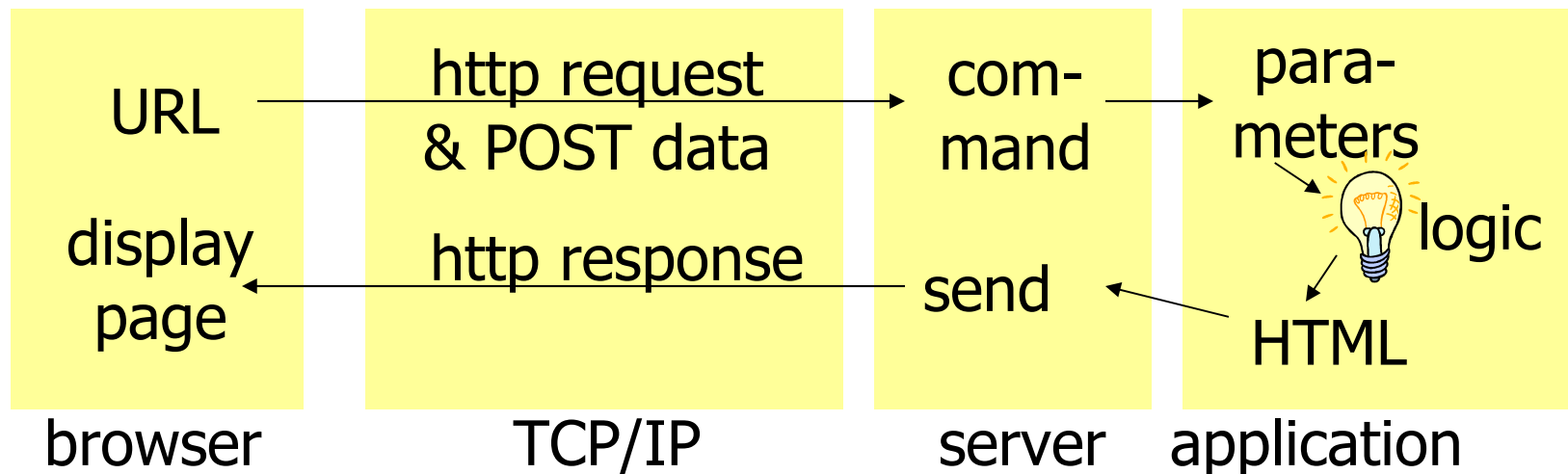
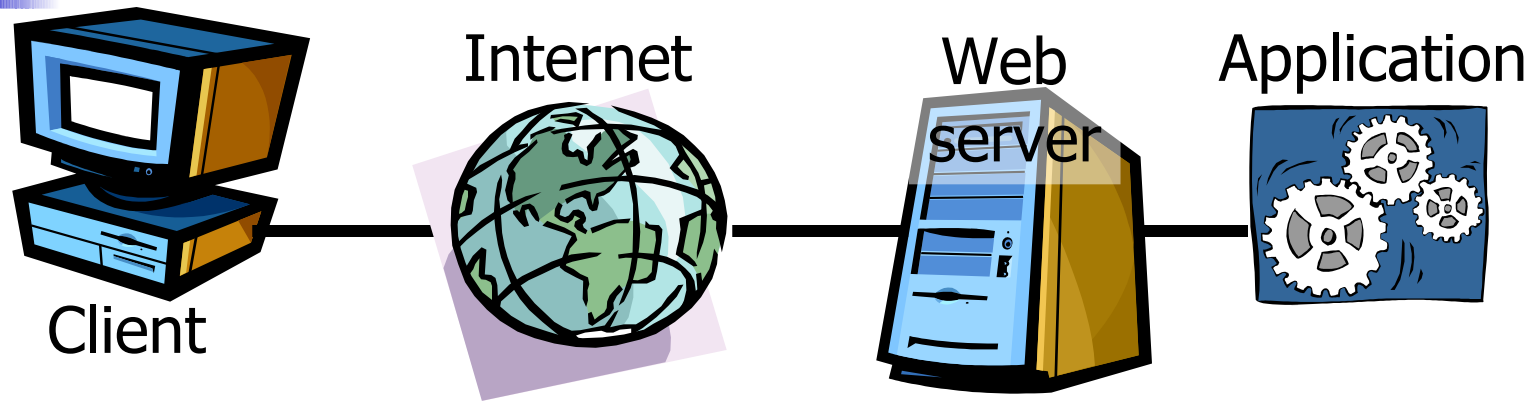
www.w3c.org



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Dynamic web transaction



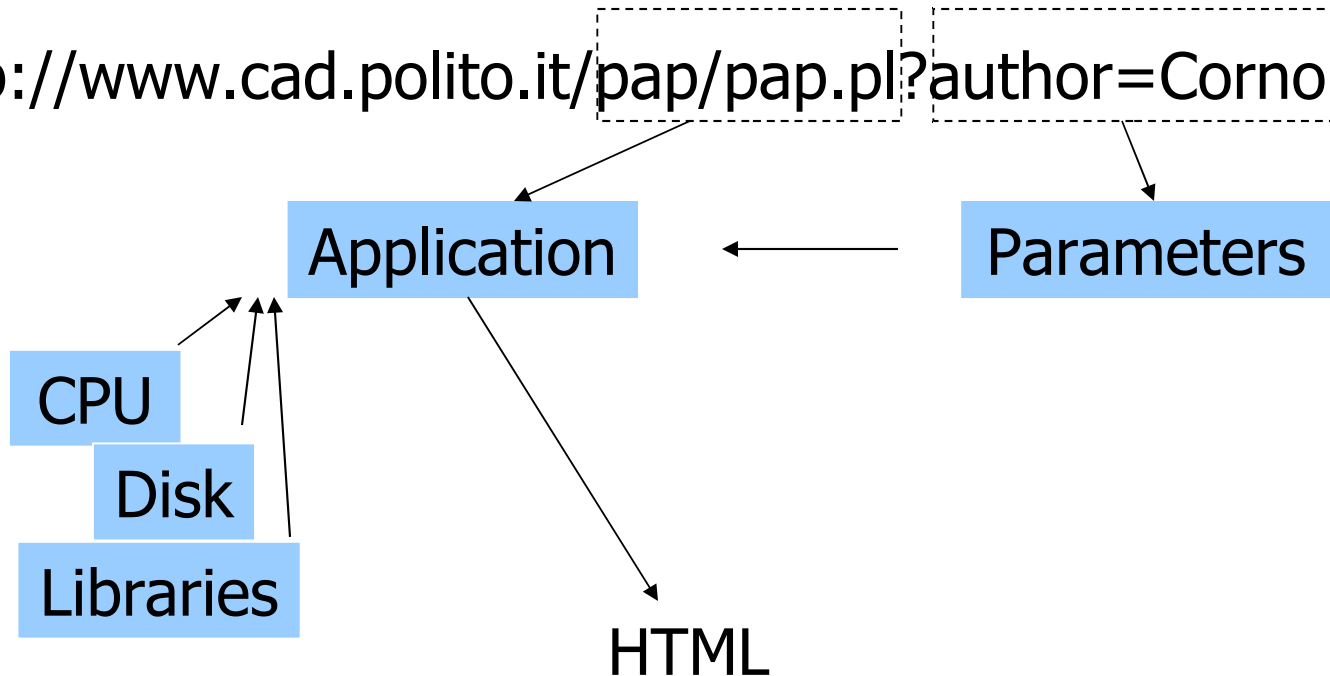


Adopted standards

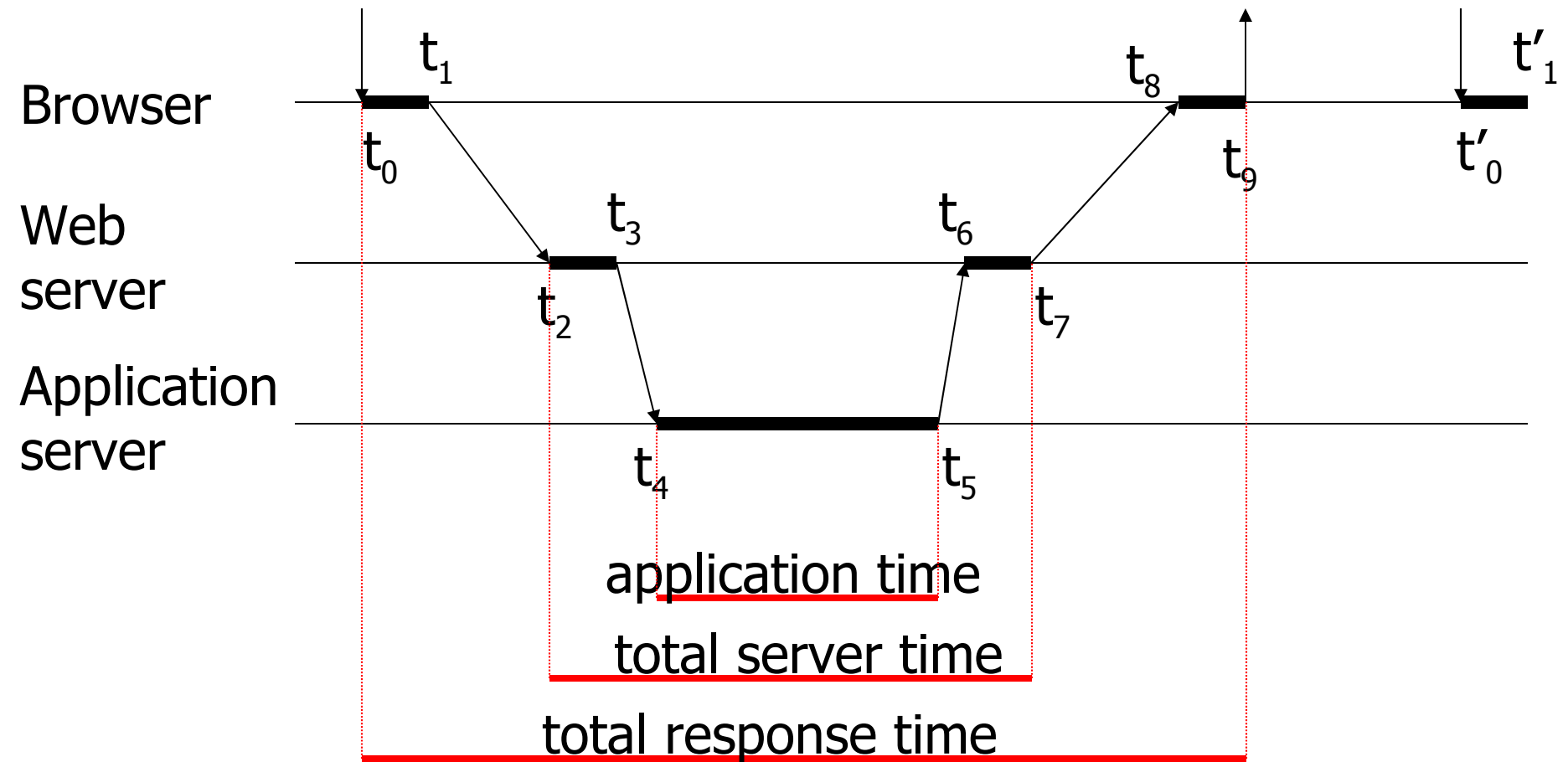
- **HTTP-POST** for sending user-specified data
- **CGI** (common gateway interface), **ISAPI** (internet information server application programming interface), **server-side script**, java **servlet** for integrating application logic into web servers
- **ASP** (active server pages), **PHP**, **PERL** as new languages for application development

URL (HTTP GET)

`http://www.cad.polito.it/pap/pap.pl?author=Corno`



Dynamic web transaction

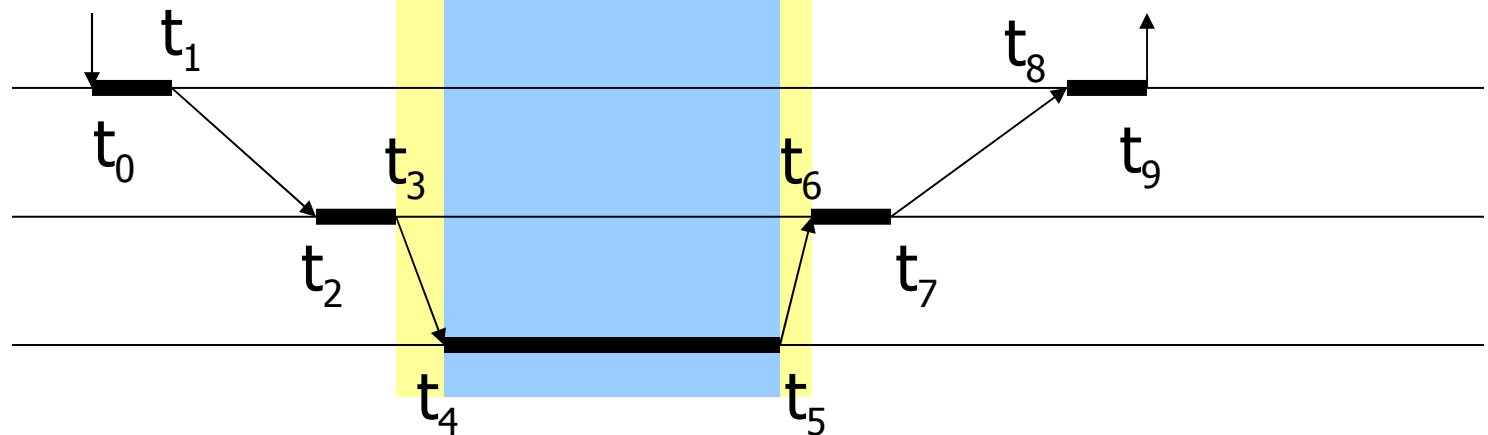


Response time

Browser

Web

Application



- Communication time between web server and application server (t_3-t_4, t_5-t_6): speed of the **local network**
- Execution time of the application (t_3-t_6): **server power**, number of **accesses**, **complexity** of the application



Examples

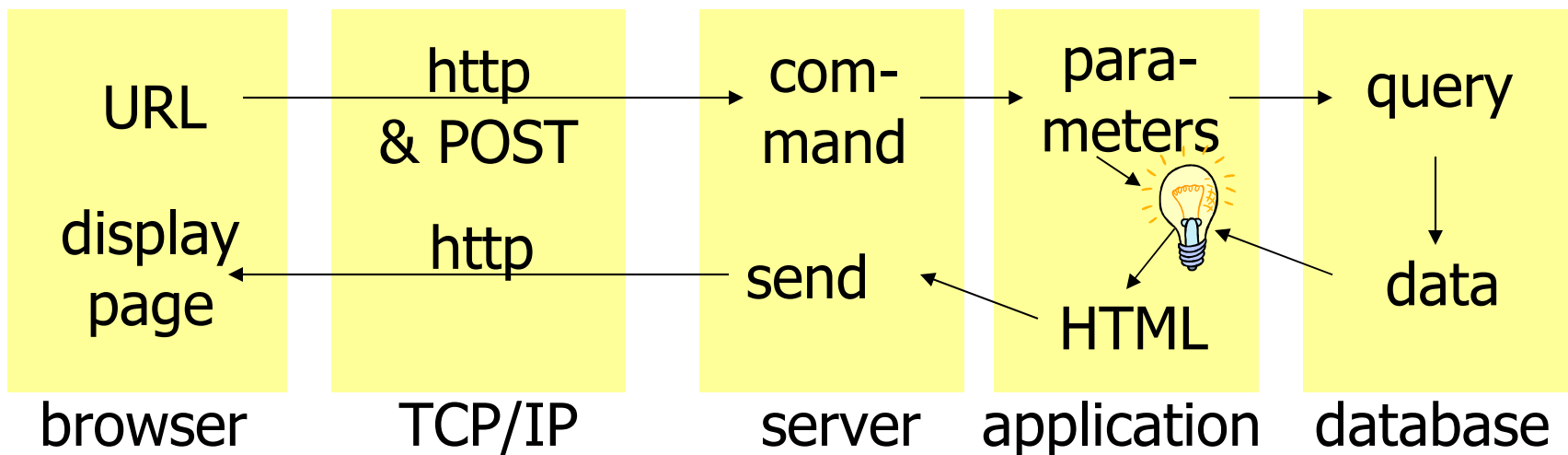
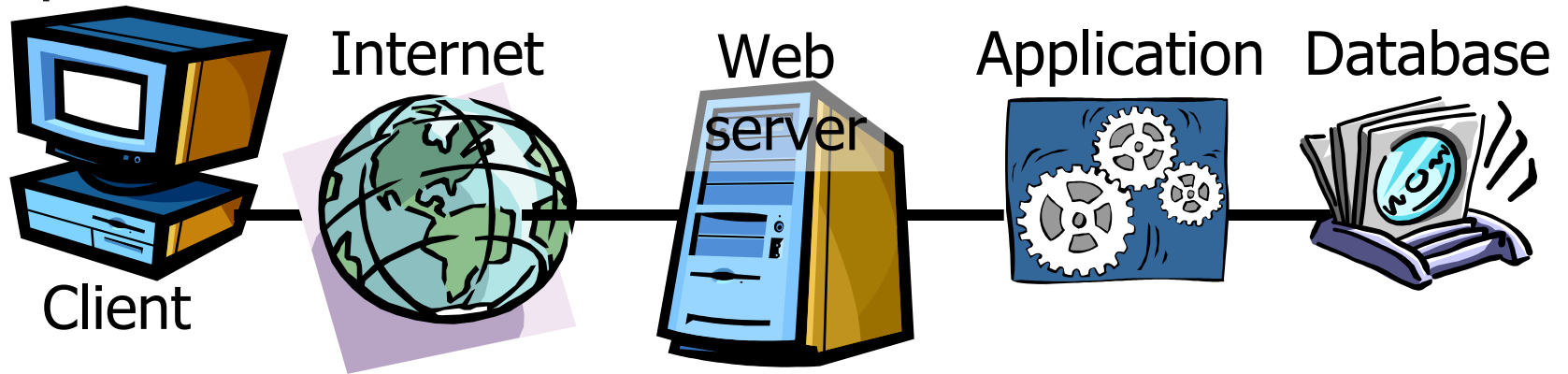
- www.sun.com
- www.lastampa.it
- www.altavista.com



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Database-driven transactions



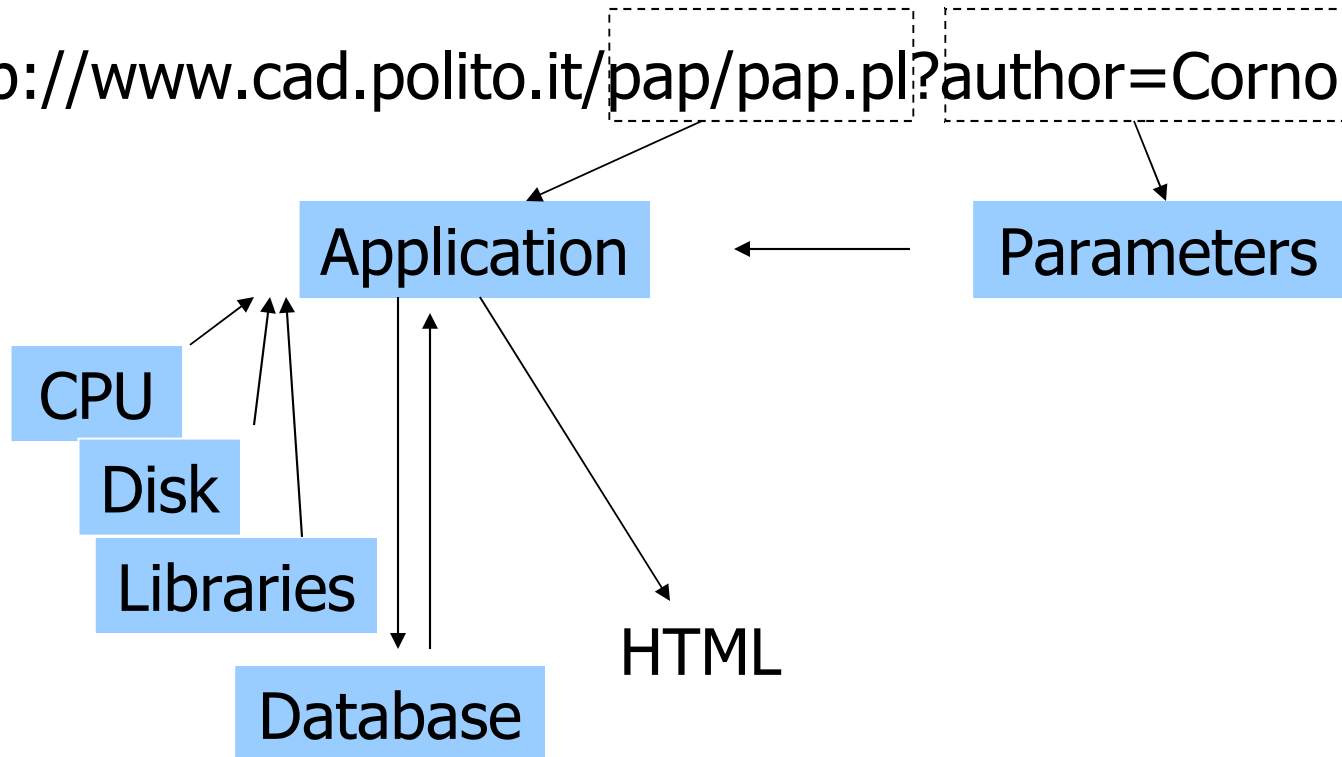


Adopted standards

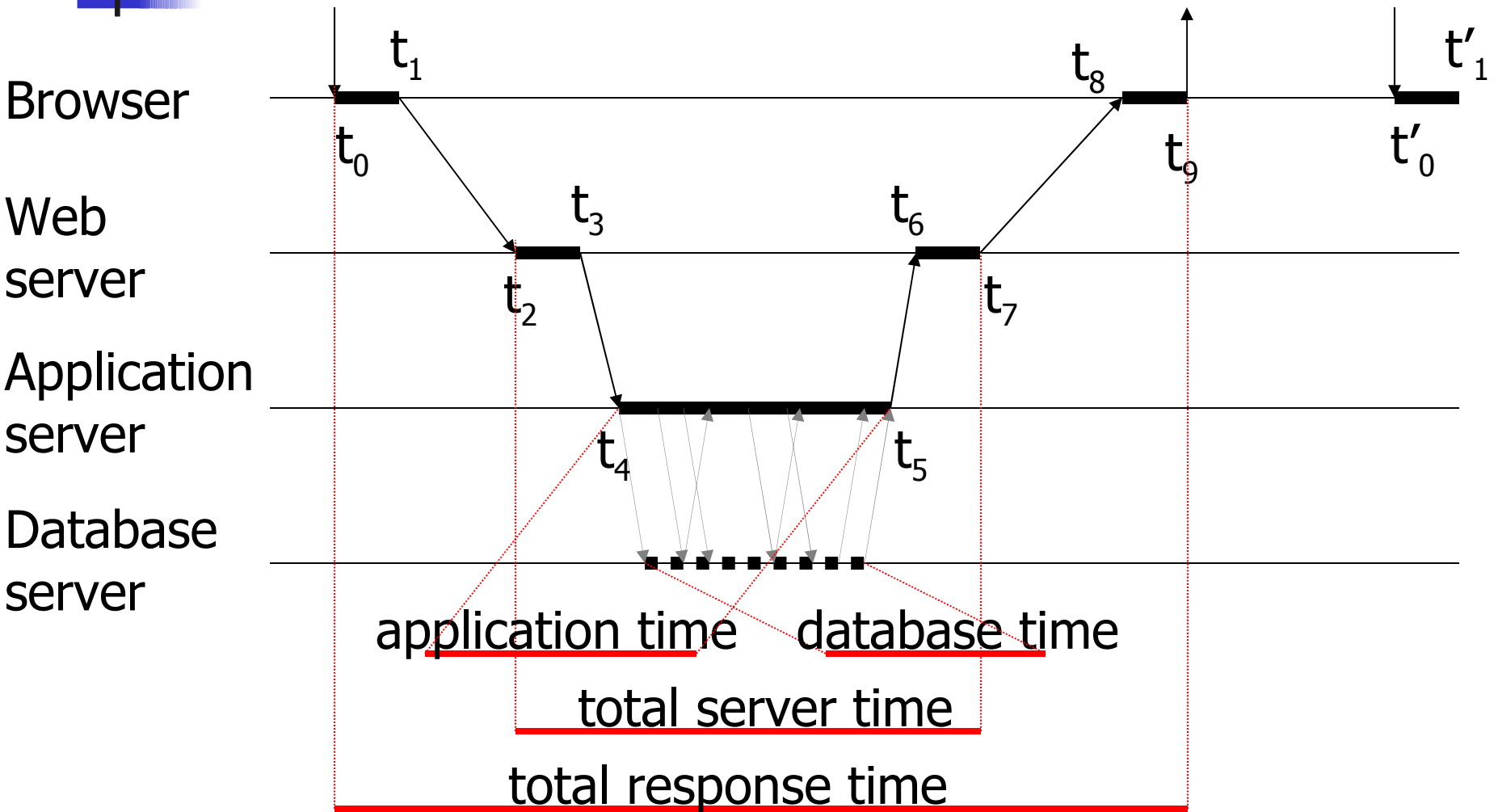
- **Cookies** for storing the state of a session
- **Java, JavaScript, ActiveX, Flash** to program the user interface on the browser
- **SQL** (structured query language), **ODBC** (open database connectivity) to access data bases

URL (HTTP GET)

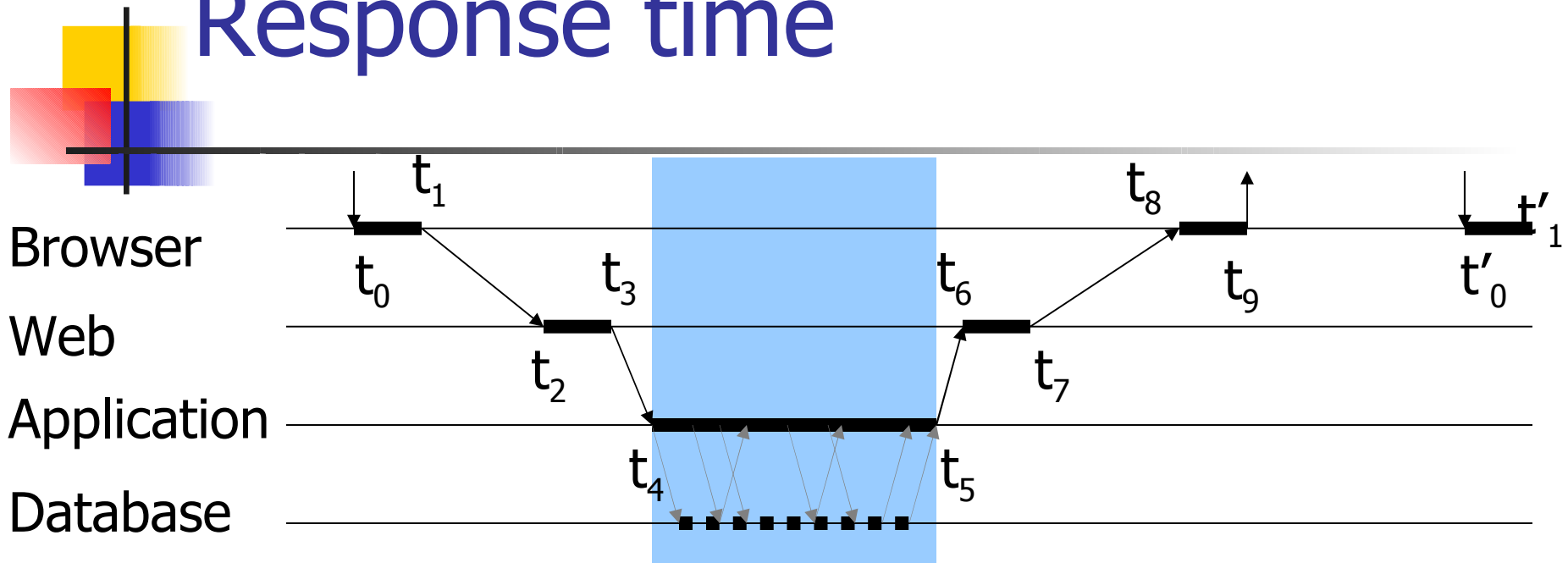
`http://www.cad.polito.it/pap/pap.pl?author=Corno`



Database-driven transaction



Response time



- Application: server power, number of accesses, complexity of application
- Database: number of queries, complexity of queries, size of the database
- Communications: local network



Examples

- www.amazon.com



Summary

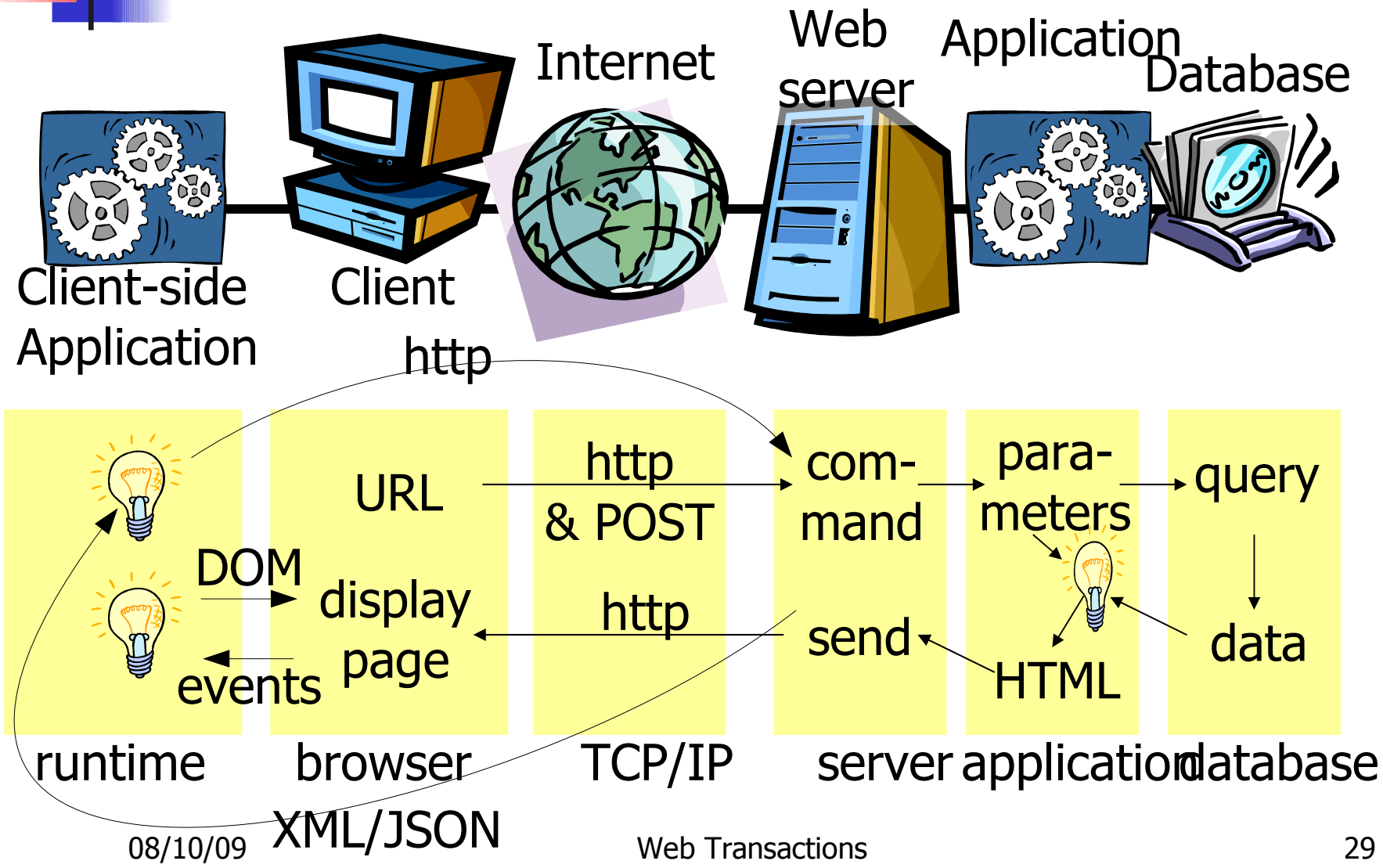
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Web 2.0

- Web applications support *social interaction* models
- Peer exchange and user-contributed content instead of rigid publisher/reader pattern
 - Online communities
- Rich, dynamic, interactive user interfaces
- Integration of contents across web sites (mashups)

Rich-Client Asynchronous Transactions





Adopted standards

- Dynamic HTML: **DOM, Javascript, CSS**
 - **JavaScript, Flash** to handle a runtime environment on the browser
 - **DOM** (XHTML Document Object Model) to allow on-the fly modification of the web page
 - **CSS 2.1** to modify attribute and handle objects
- **AJAX**: Asynchronous Javascript and XML
 - **XMLHttpRequest** for asynchronous communication to the server
 - Data transfer formats: **JSON, XML, RDF, RSS, Atom, FOAF, ...**

Rich-client transaction

