Taikomasis lygis

Taikomasis lygis

Taikomasis lygis	Taikomasis lygis
Transporto lygis	Transporto lygis
Tinklo lygis	Tinklo lygis
Kanalinis lygis	Kanalinis lygis
Fizinis lygis	Fizinis lygis

Taikomojo lygio paslaugos

- DNS
- Pašto paslaugos
- HTTP
- ir t.t.

DNS
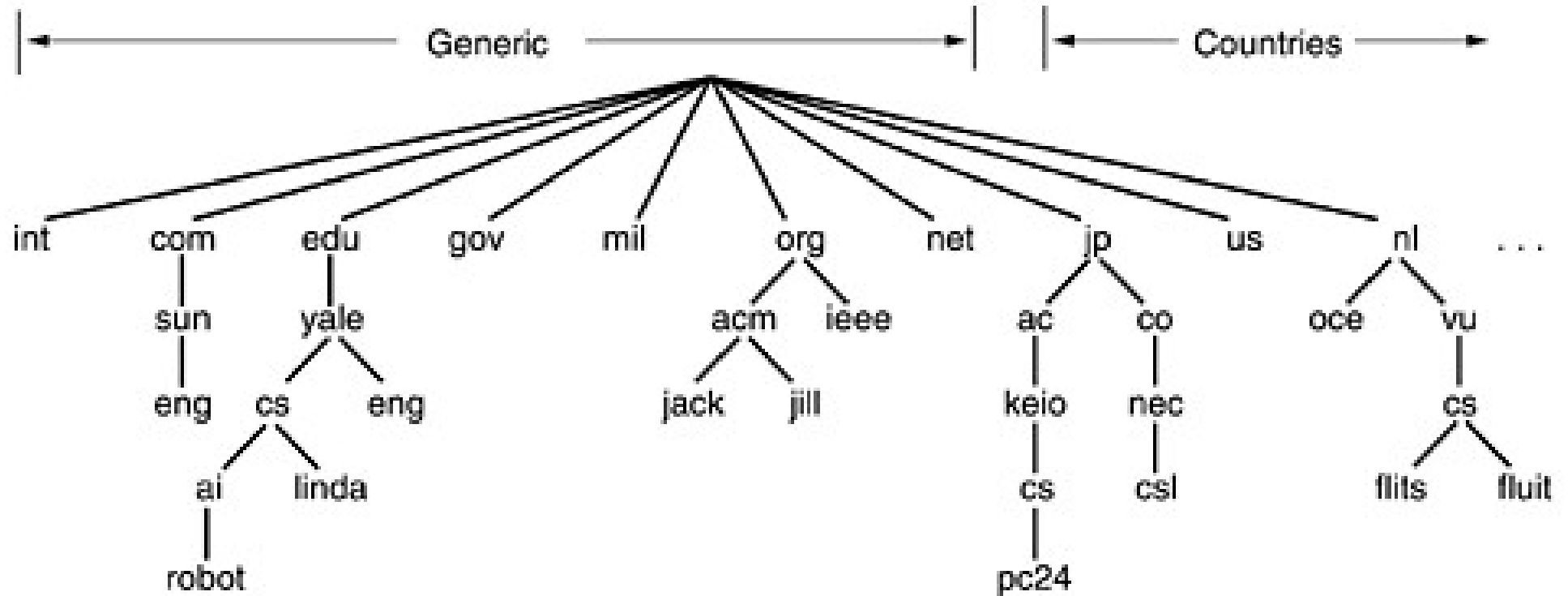
DNS

Tipas	Aprašymas	Parametrai
SOA	Aprėpties pradžia	Zonos parametrai
A	Hosto IP adresas	32 bitų sveikas skaičius
MX	Pašto serverio adresas	Prioritetas, serverio adresas
NS	Vardų serveris	Šios srities vardų serverio adresas
CNAME	Kanoninis vardas	Domeno vardas
PTR	Adreso rodyklė	IP adreso rodyklė į vardą
HINFO	Hosto aprašas	CPU ir OS aparšyta ASCII tekstu
TXT	Tekstas	Neinterpretuojamas informacinis tekstas

```
; Authoritative data for cs.vu.nl
cs.vu.nl.          86400    IN   SOA       star boss (9527,7200,7200,241920,86400)
cs.vu.nl.          86400    IN   TXT       "Divisie Wiskunde en Informatica."
cs.vu.nl.          86400    IN   TXT       "Vrije Universiteit Amsterdam."
cs.vu.nl.          86400    IN   MX        1 zephyr.cs.vu.nl.
cs.vu.nl.          86400    IN   MX        2 top.cs.vu.nl.

flits.cs.vu.nl.    86400    IN   HINFO     Sun Unix
flits.cs.vu.nl.    86400    IN   A         130.37.16.112
flits.cs.vu.nl.    86400    IN   A         192.31.231.165
flits.cs.vu.nl.    86400    IN   MX        1 flits.cs.vu.nl.
flits.cs.vu.nl.    86400    IN   MX        2 zephyr.cs.vu.nl.
flits.cs.vu.nl.    86400    IN   MX        3 top.cs.vu.nl.
www.cs.vu.nl.      86400    IN   CNAME     star.cs.vu.nl
ftp.cs.vu.nl.      86400    IN   CNAME     zephyr.cs.vu.nl

rowboat                     IN   A         130.37.56.201
                            IN   MX        1 rowboat
                            IN   MX        2 zephyr
                            IN   HINFO     Sun Unix

little-sister               IN   A         130.37.62.23
                            IN   HINFO     Mac MacOS

laserjet                    IN   A         192.31.231.216
                            IN   HINFO     "HP Laserjet IIISi" Proprietary
```
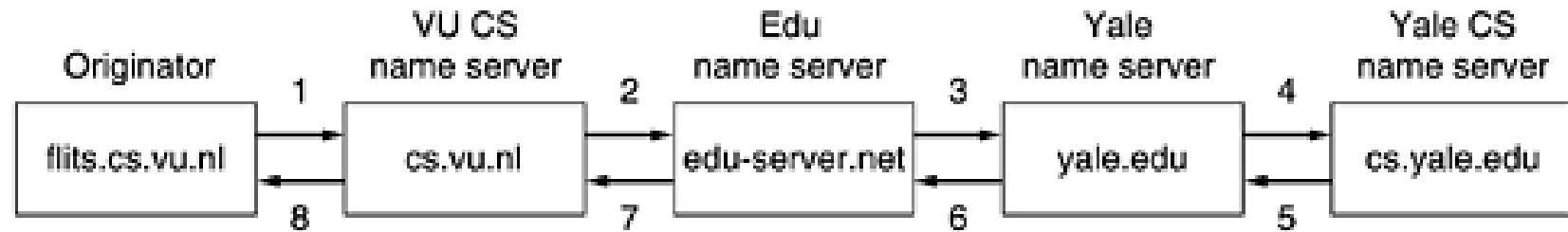
DNS

Pašto paslaugos

- SMTP
- UUPC
- POP3
- IMAP4

Pašto žinutės formatas RFC 822

Antraštė	Reikšmė
To:	Pirminių gavėjų sąrašas
Cc:	Antrinių gavėjų sąrašas
Bcc:	Paslėptas sąrašas gavėjų
From:	Siuntėjo identifikacija (gali būti keli)
Sender:	Siuntėjo identifikacija (konkretus)
Received:	Eilutė, nurodanti per kokius pašto mazgus ėjo žinutė
Return-Path:	Naudojama nurodyti keliui iki siuntėjo
Date:	Data ir laikas, kada pranešimas buvo išsiųstas
Reply-To:	Pašto adresas, kuriam atsakymai turės būti siunčiami
Message-Id:	Unikalus numeris apdorojant pranešimus
In-Reply-To:	Message-Id dokumento į kurį atsakinėjama
References:	Kiti pranešimai kurie susiję
Keywords:	Naudotojo pasirinkti raktiniai žodžiai susiję su žinute
Subject:	Pranešimo santrauka
MIME-Version:	Nurodo MIME versiją
Content-Description:	Naudotojui perskaitoma eilutė, apie tai kas yra pranešime
Content-Id:	Unikalus turinio identifikatorius
Content-Transfer-Encoding:	Kokiu būdu turinys buvo koduojamas siuntimo metu
Content-Type:	Turinio tipas

Kodavimas Base64

- Base64
- Kodavimas sudarytas iš 64 skirtingų, perskaitomų simbolių.
    - A – Z := 0 – 25
    - a – z := 26 – 51
    - 0 – 9 := 52 – 61
    - + := 62
    - / := 63
    - Rezervuotas simbolis '='

- Pavyzdys: "Kažkoks banalus tekstas" →
  S2HFvmtva3MgYmFuYWx1cyB0ZWtzdGFz

Pranešimo pavyzdys

```
From: elinor@abcd.com
To: carolyn@xyz.com
MIME-Version: 1.0
Message-Id: <0704760941.AA00747@abcd.com>
Content-Type: multipart/alternative; boundary=qwertyuiopasdfghjklzxcvbnm
Subject: Earth orbits sun integral number of times

This is the preamble. The user agent ignores it. Have a nice day.

--qwertyuiopasdfghjklzxcvbnm
Content-Type: text/enriched

Happy birthday to you
Happy birthday to you
Happy birthday dear <bold> Carolyn </bold>
Happy birthday to you

--qwertyuiopasdfghjklzxcvbnm
Content-Type: message/external-body;
        access-type="anon-ftp";
        site="bicycle.abcd.com";
        directory="pub";
        name="birthday.snd"

content-type: audio/basic
content-transfer-encoding: base64
--qwertyuiopasdfghjklzxcvbnm--
```

SMTP

```
              S: 220 xyz.com SMTP service ready
C: HELO abcd.com
              S: 250 xyz.com says hello to abcd.com
C: MAIL FROM: <elinor@abcd.com>
              S: 250 sender ok
C: RCPT TO: <carolyn@xyz.com>
              S: 250 recipient ok
C: DATA
              S: 354 Send mail; end with "." on a line by itself
C: From: elinor@abcd.com
C: To: carolyn@xyz.com
C: MIME-Version: 1.0
C: Message-Id: <0704760941.AA00747@abcd.com>
C: Content-Type: multipart/alternative; boundary=qwertyuiopasdfghjklzxcvbnm
C: Subject: Earth orbits sun integral number of times
C:
C: This is the preamble. The user agent ignores it. Have a nice day.
C:
C: --qwertyuiopasdfghjklzxcvbnm
C: Content-Type: text/enriched
C:
C: Happy birthday to you
C: Happy birthday to you
C: Happy birthday dear <bold> Carolyn </bold>
C: Happy birthday to you
C:
C: --qwertyuiopasdfghjklzxcvbnm
C: Content-Type: message/external-body;
C:        access-type="anon-ftp";
C:        site="bicycle.abcd.com";
C:        directory="pub";
C:        name="birthday.snd"
C:
C: content-type: audio/basic
C: content-transfer-encoding: base64
C: --qwertyuiopasdfghjklzxcvbnm
C: .
              S: 250 message accepted
C: QUIT
              S: 221 xyz.com closing connection
```

POP3

POP3 versus IMAP

| Feature	POP3	IMAP
Where is protocol defined	RFC 1939	RFC 2060
TCP port used	110	143
Where is e-mail stored	User's PC	Server
Where is e-mail read	Off-line	On-line
Connect time required	Little	Much
Use of server resources	Minimal	Extensive
Multiple mailboxes	No	Yes
Who backs up mailboxes	User	ISP
Good for mobile users	No	Yes
User control over downloading	Little	Great
Partial message downloads	No	Yes
Are disk quotas a problem	No	Could be in time
Simple to implement	Yes	No
Widespread support	Yes	Growing

HTTP

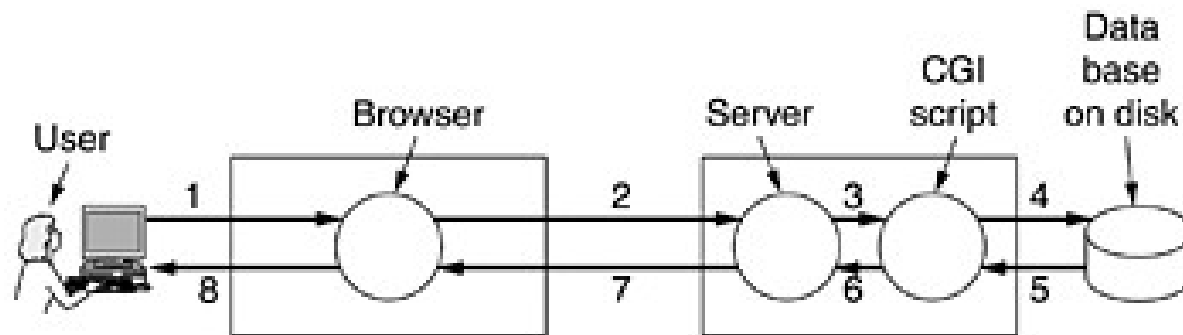- Hyper Text Transfer Protocol
- Sukurtas 1989 statinių duomenų apsikeitimui

HTTP modelis
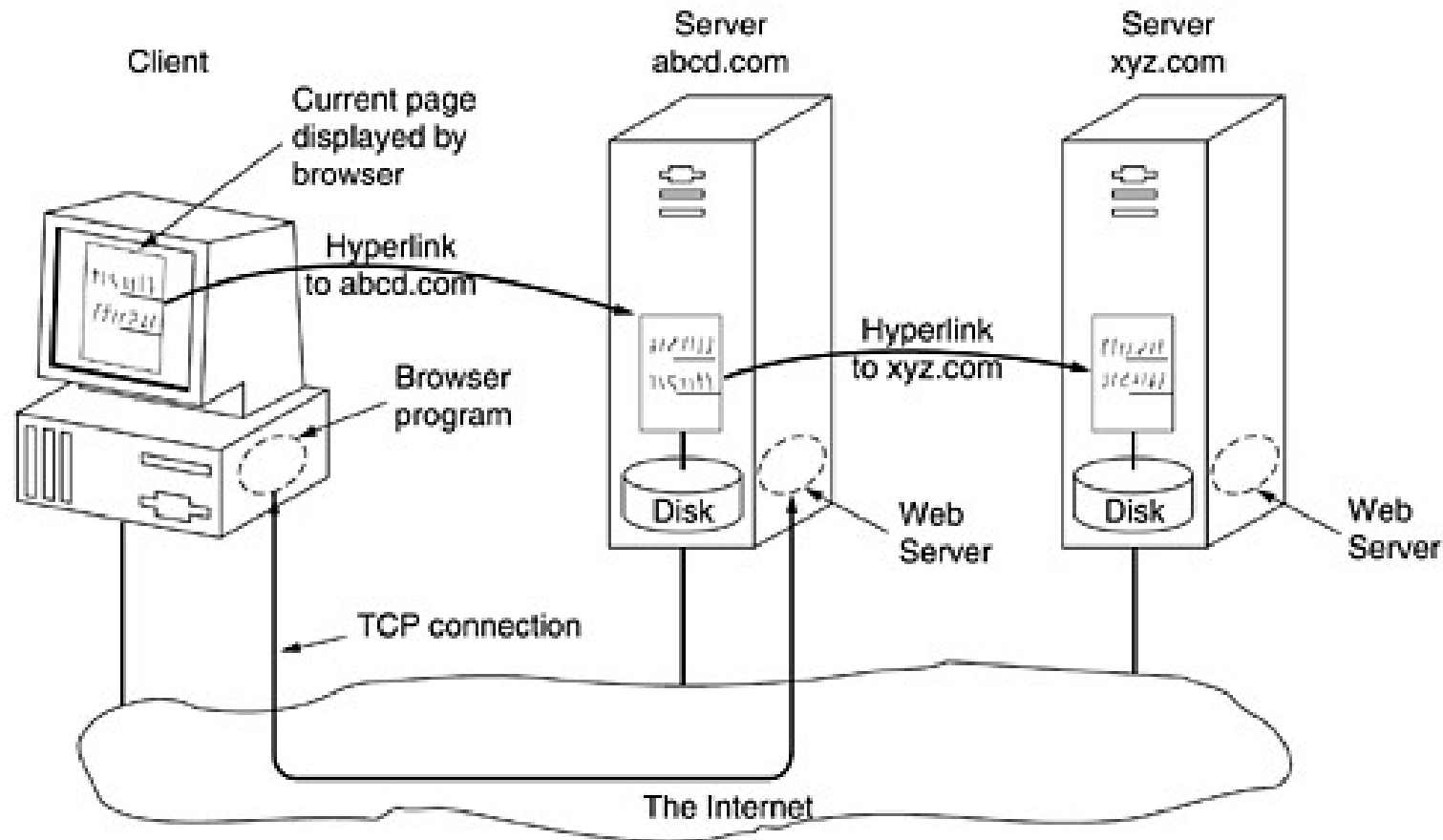
Daugiagijis HTTP modelis

Dinaminai puslapiai

Browser

Server

CGI script

Data base on disk
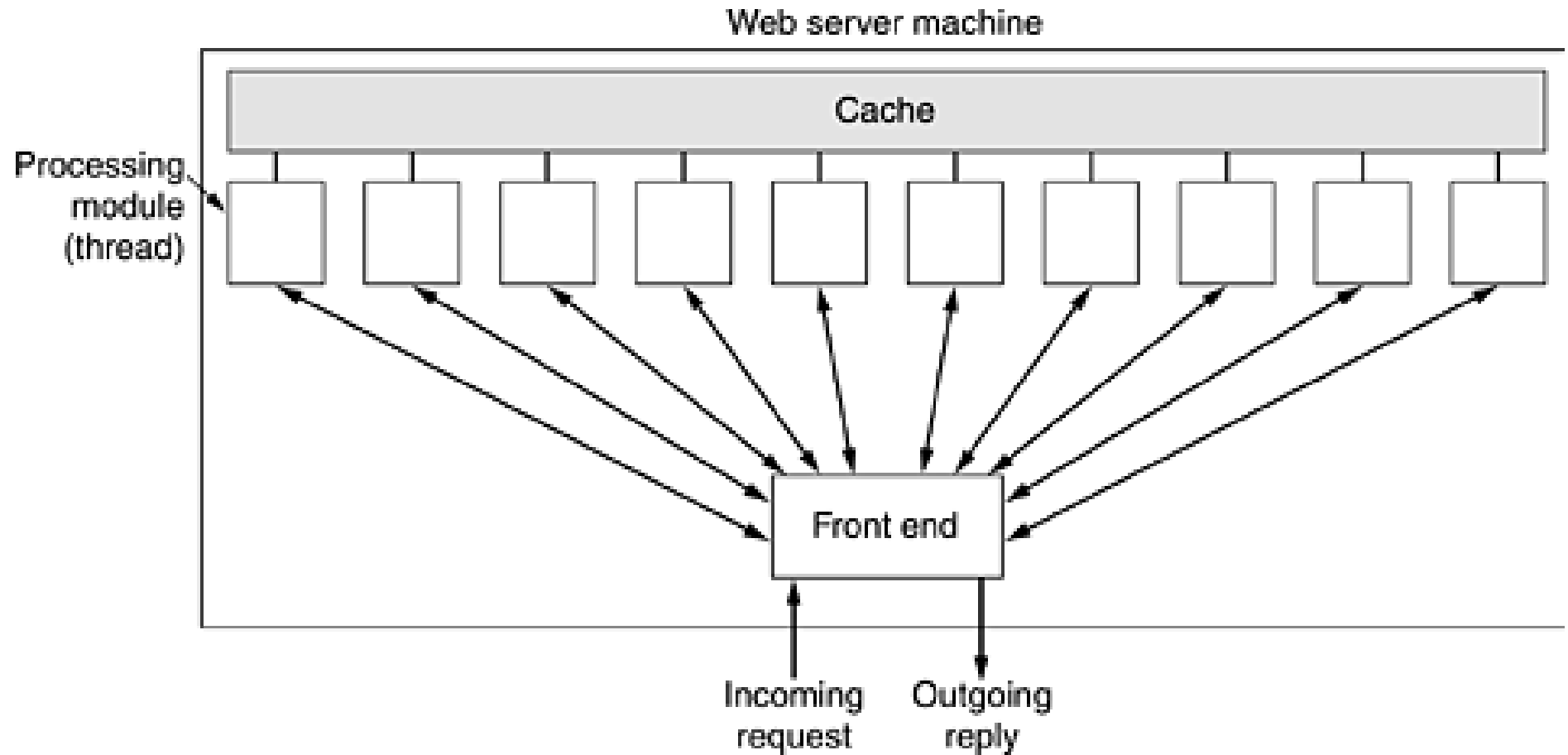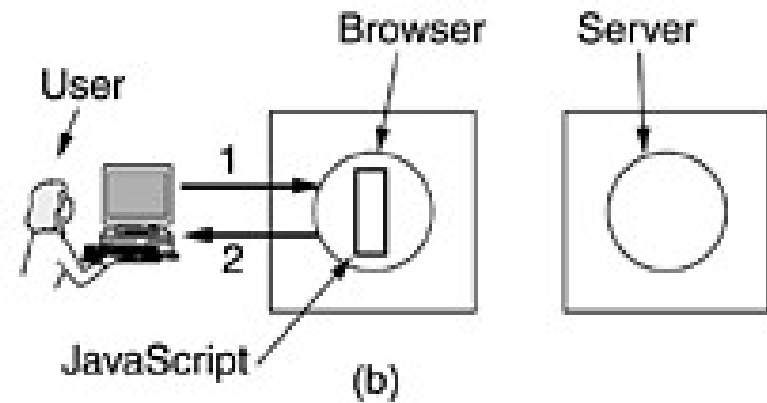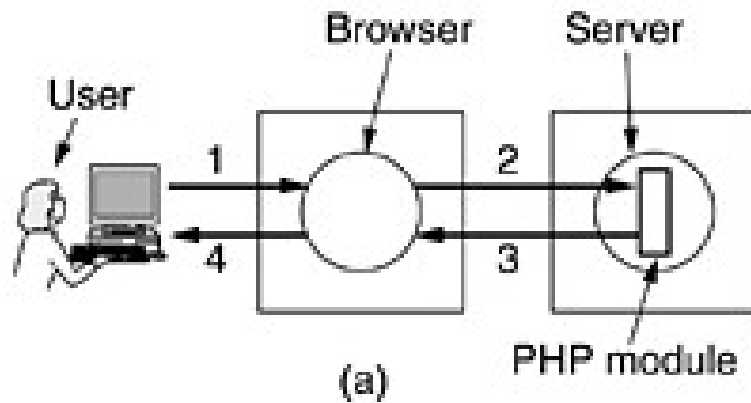
User

1. User fills in form
2. Form sent back
3. Handed to CGI
4. CGI queries DB
5. Record found
6. CGI builds page
7. Page returned
8. Page displayed

Dinaminiai puslapiai

HTTP Komandos

Method	Description
GET	Request to read a Web page
HEAD	Request to read a Web page's header
PUT	Request to store a Web page
POST	Append to a named resource (e.g., a Web page)
DELETE	Remove the Web page
TRACE	Echo the incoming request
CONNECT	Reserved for future use
OPTIONS	Query certain options

HTTP kodai

Kodas	Aprašymas	Pavyzdžiai
1xx	Informacija	100 – serveris sutinka apdoroti kliento užklausas
2xx	Sėkmingos užklausos	200 – užklausa įvykdyta, 204 – nėra turinio
3xx	Peradresavimas	301 – puslapis perkeltas, 304 – podelyje esantis puslapis vis dar validus
4xx	Kliento klaidos	403 – prieiga uždrausta, 404 – puslapis nerastas
5xx	Serverio klaidos	500 – vidinė serverio klaida, 503 – pabandykite vėliau

HTTP Antraštės

Header	Type	Contents
User-Agent	Request	Information about the browser and its platform
Accept	Request	The type of pages the client can handle
Accept-Charset	Request	The character sets that are acceptable to the client
Accept-Encoding	Request	The page encodings the client can handle
Accept-Language	Request	The natural languages the client can handle
Host	Request	The server's DNS name
Authorization	Request	A list of the client's credentials
Cookie	Request	Sends a previously set cookie back to the server
Date	Both	Date and time the message was sent
Upgrade	Both	The protocol the sender wants to switch to
Server	Response	Information about the server
Content-Encoding	Response	How the content is encoded (e.g., gzip)
Content-Language	Response	The natural language used in the page
Content-Length	Response	The page's length in bytes
Content-Type	Response	The page's MIME type
Last-Modified	Response	Time and date the page was last changed
Location	Response	A command to the client to send its request elsewhere
Accept-Ranges	Response	The server will accept byte range requests
Set-Cookie	Response	The server wants the client to save a cookie

HTTP Proxy

- Paskirtis:
    - Duomenų kešavimui
    - Saugumo užtikrinimui
    - Nukreipimams tinklo viduje