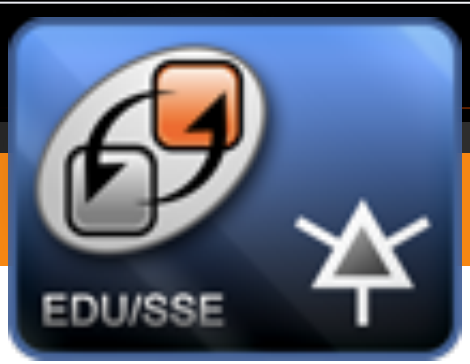

Software Service Engineering

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Section 2

CONTENT-TYPE

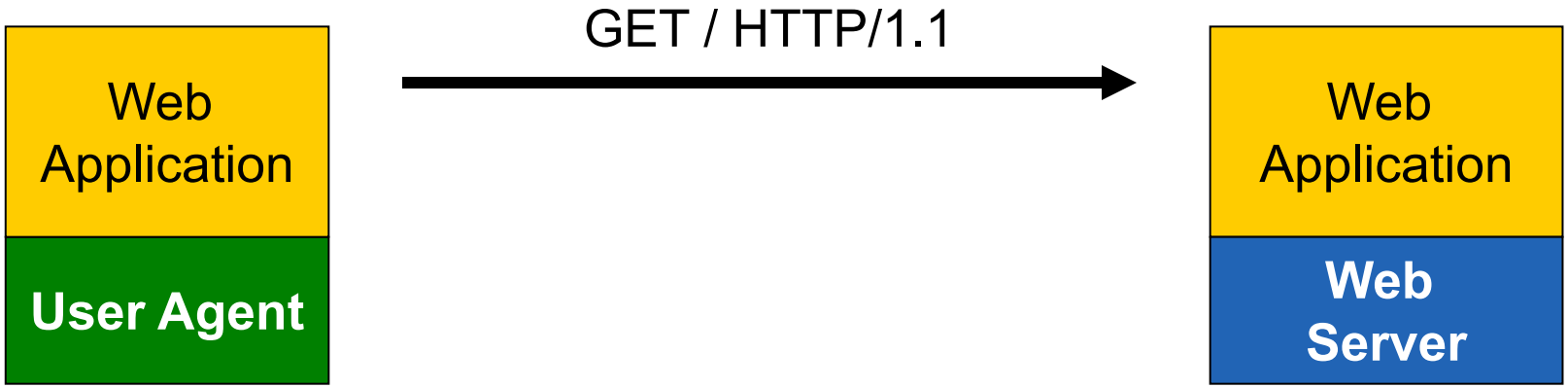
Introduction: Content

- **Content**
  - **Data** provided in a specific format
  - Format is defined as the content-type

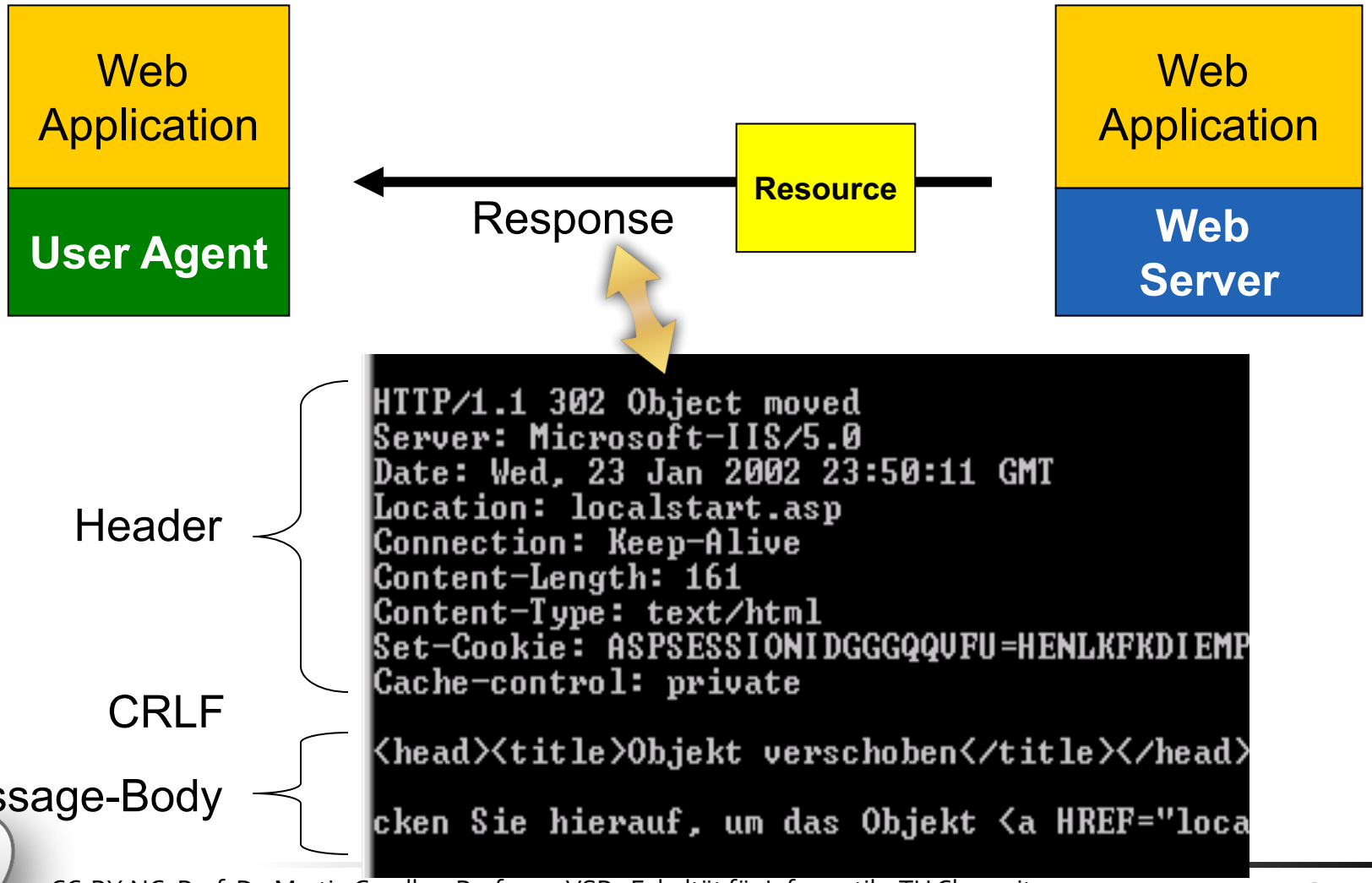
- **Content-Type** – Defines the format or type used for encoding data
  - Represents **Media Types**, i.e. HTML-documents, images, audio, video

- For further information regarding
  - Audio
  - Video
  - Cf. References at the end of this chapter

Resource Example

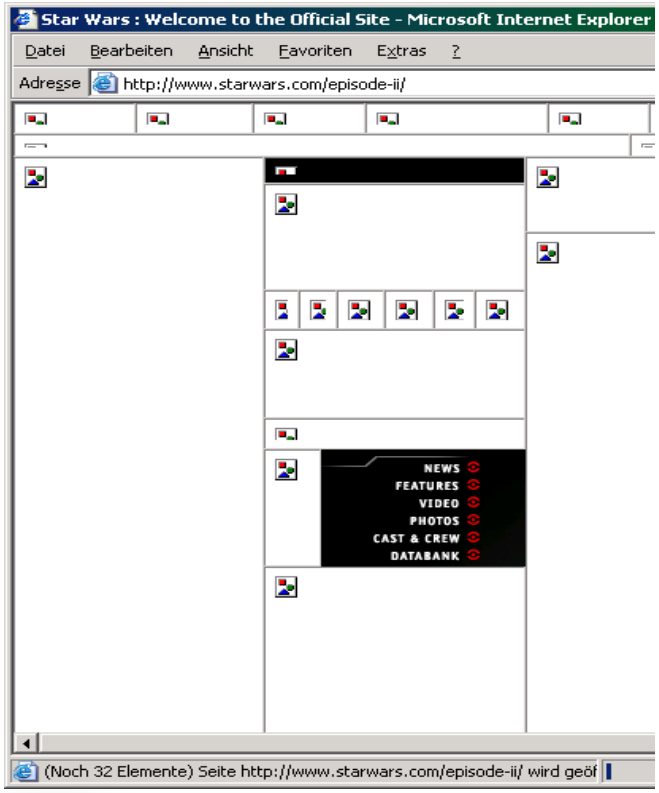


Resource Example



Resource Example

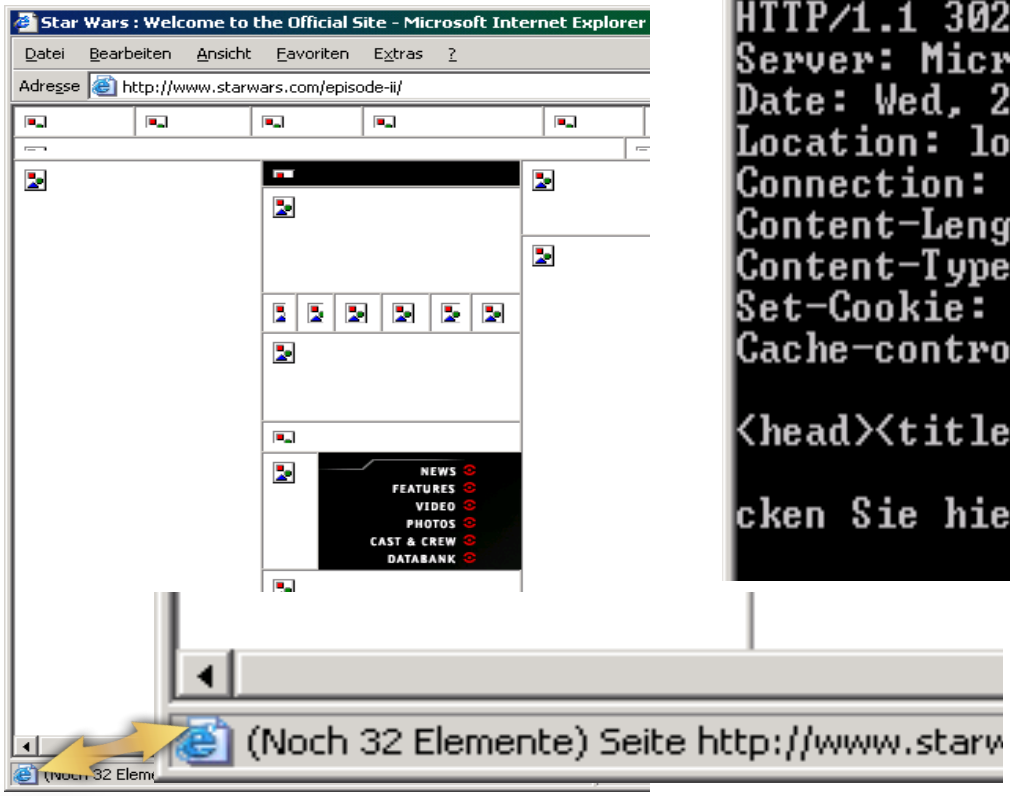
- (3) Handle Response




```
HTTP/1.1 302 Object moved
Server: Microsoft-IIS/5.0
Date: Wed, 23 Jan 2002 23:50:11 GMT
Location: localstart.asp
Connection: Keep-Alive
Content-Length: 161
Content-Type: text/html
Set-Cookie: ASPSESSIONIDGGGQQUFU=HENLKFKDIEMP
Cache-control: private

<head><title>Objekt verschoben</title></head>

cken Sie hierauf, um das Objekt <a HREF="loca
```

Resource Example

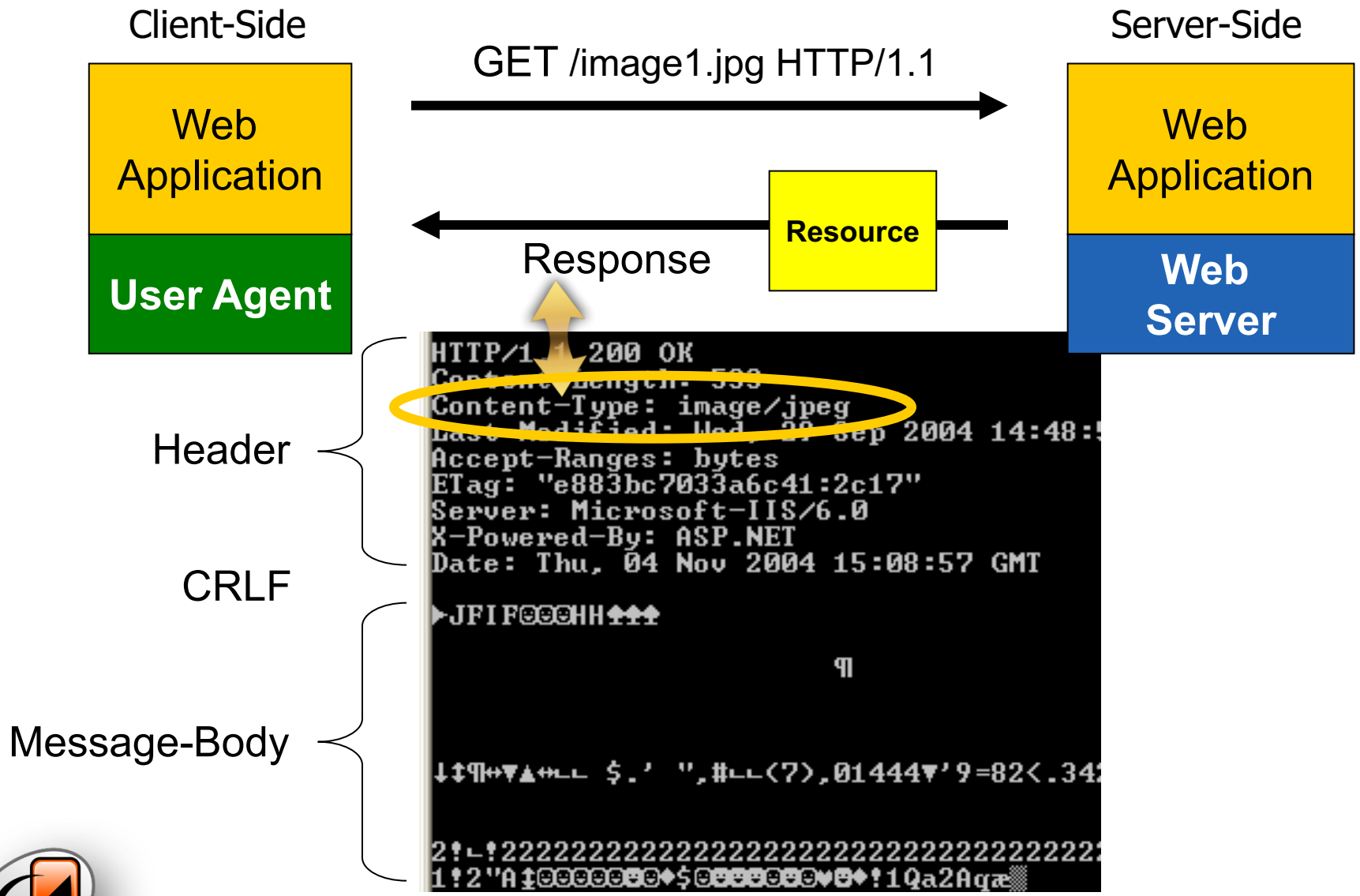
- (4) Process/Render Data of Resource




```
HTTP/1.1 302 Object moved
Server: Microsoft-IIS/5.0
Date: Wed, 23 Jan 2002 23:50:11 GMT
Location: localstart.asp
Connection: Keep-Alive
Content-Length: 161
Content-Type: text/html
Set-Cookie: ASPSESSIONIDGGGQQUFU=HENLKFKDIEMP
Cache-control: private

<head><title>Objekt verschoben</title></head>

cken Sie hierauf, um das Objekt <a HREF="loca
```

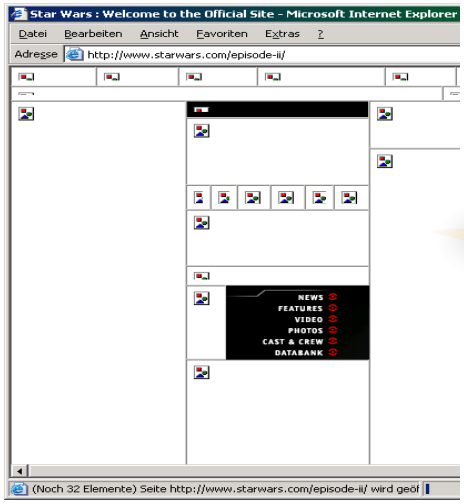
```
…
<img src="/image1.jpg">
…
```

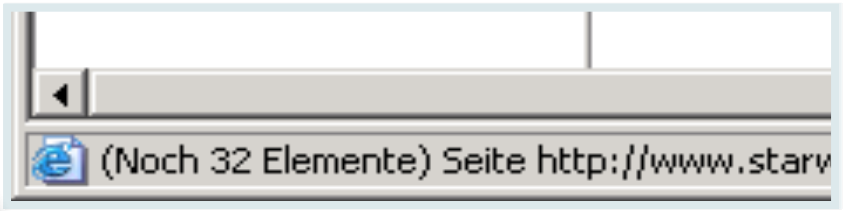
Resource Example



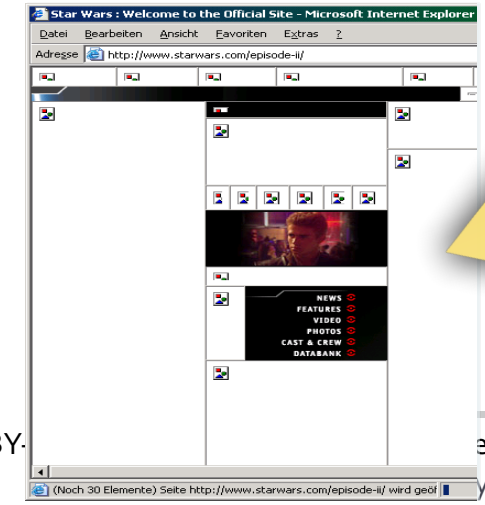
Resource Example

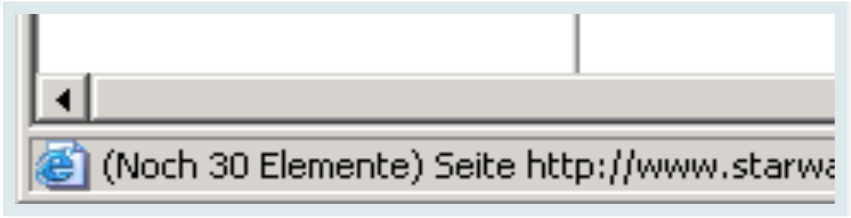
- (4) Process/Render Data of Resource





Further processing…



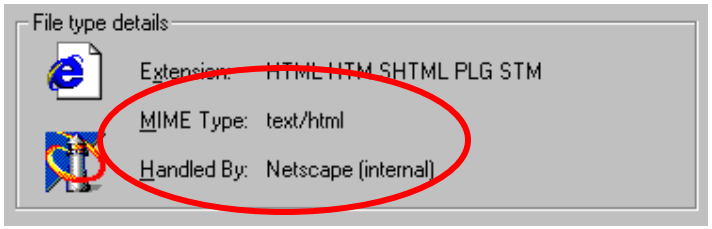


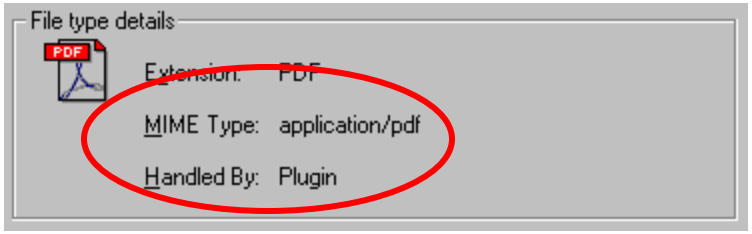
MIME

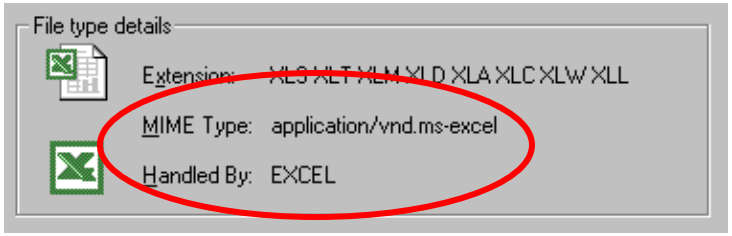
- MIME - Multipurpose Internet Mail Extension:
  RFC-Series 2045, 2046, 2047, 2048, 2049 (1996)
- Constraint
  - Backward compatibility with ASCII mail
- Concept
  - MIME-Messages can consist of many parts
    - Multi-part messages
  - Message parts can have different types of content
    - Content-Type
  - Each part of a message has its own headers to describe the content
    - Type, ID, Coding

Concept

- Open concept to integrate arbitrary media
  - Transmitted in the MIME format
- Interpretation of different media types in the WWW
  - Browser build-in for most basic types, e.g. text, HTML, GIF
  - Using browser Plug-Ins, e.g. for Acrobat PDF, Flash
  - Using external applications (helper applications)
    - E.g. Ghostscript for PostScript, other proprietary formats/applications
  - Save files
    - Download of arbitrary formats







MIME Content-Types

- Basic Types
  - text, audio, video, image
  - multipart (more than one body part)
  - message
  - model (multi dimensional Objects, e.g. für Virtual Reality)
  - application (application specific Content-Types)
  - x- for self defined types
- Subtypes
  - Basis Type and Subtype define together the Media Type
  - E.g. subtype of image: gif, jpeg
  - x- for self defined sub types
- Parameter
  - Dependent on the data type, e.g. name, boundary, ...

Content-Type – Examples

application/hylafax	fax
application/msword	doc
application/mspowerpoint	ppt
application/pdf	pdf
application/postscript	eps
	ps
application/x-dvi	dvi
application/x-latex	latex
application/msdownload	exe
	bat
	com
application/x-sh	sh
application/zip	zip

audio/basic	au snd
audio/x-aiff	aif aiff aifc
audio/x-wav	wav
image/gif	gif
image/jpeg	jpeg jpg jpe
multipart/mixed	
text/html	html htm
text/plain	txt
video/mpeg	mpeg mpg
video/quicktime	qt mov
video/x-msvideo	avi
x-world/x-vrml	wrl
...	

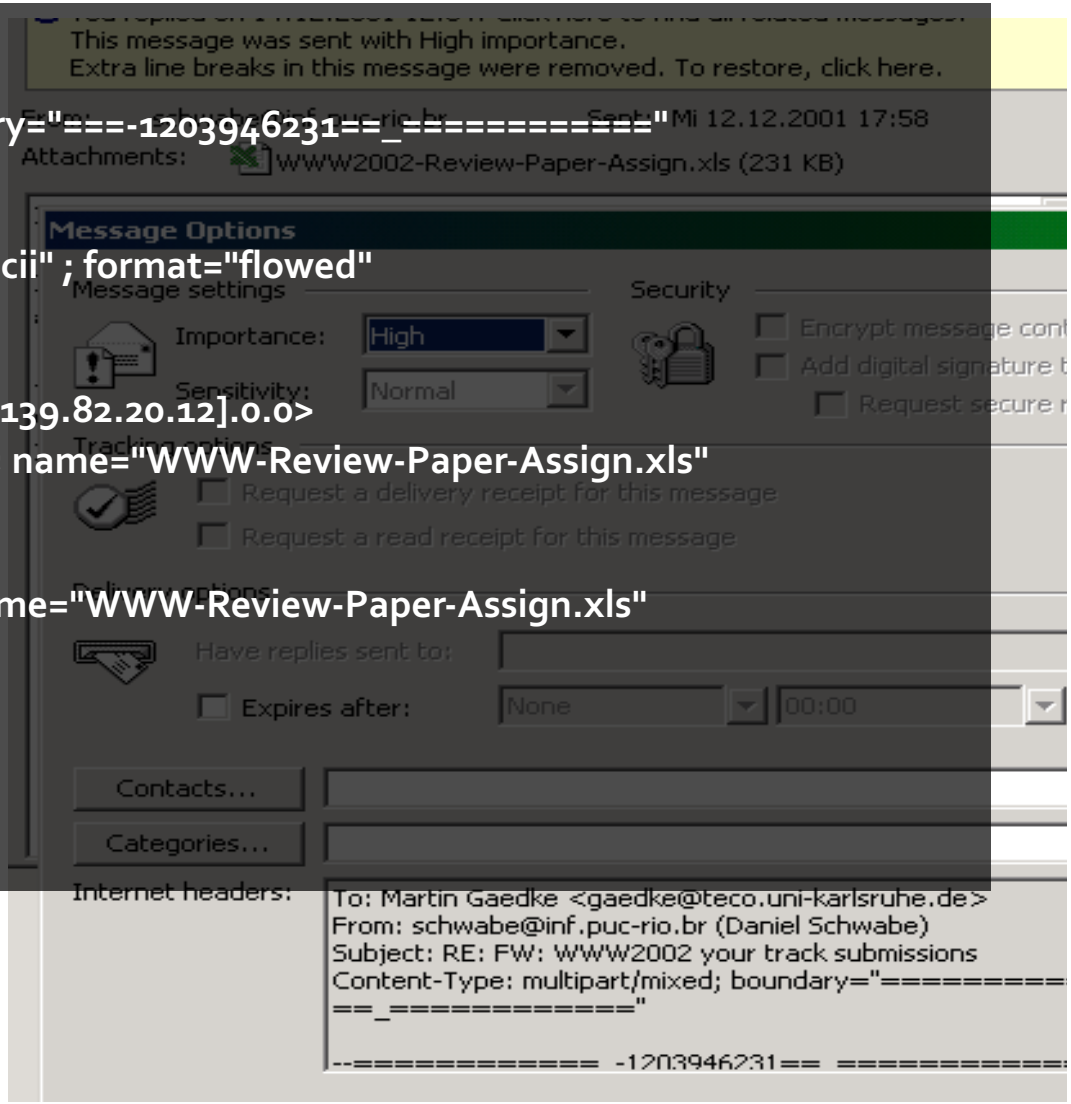
Content-Type Syntax

- content := "Content-Type" ":" type "/" subtype *(";" parameter) ;
- type := discrete-type / composite-type
- discrete-type := "text" / "image" / "audio" / "video" / "application" / extension-token
- composite-type := "message" / "multipart" / extension-token
- Matching of Media Type and Subtype is ALWAYS **Case-Insensitive**.
- Multipart Media Type
  - Mixed Subtype
  - Alternative Subtype
  - Parallel Subtype

MIME Example

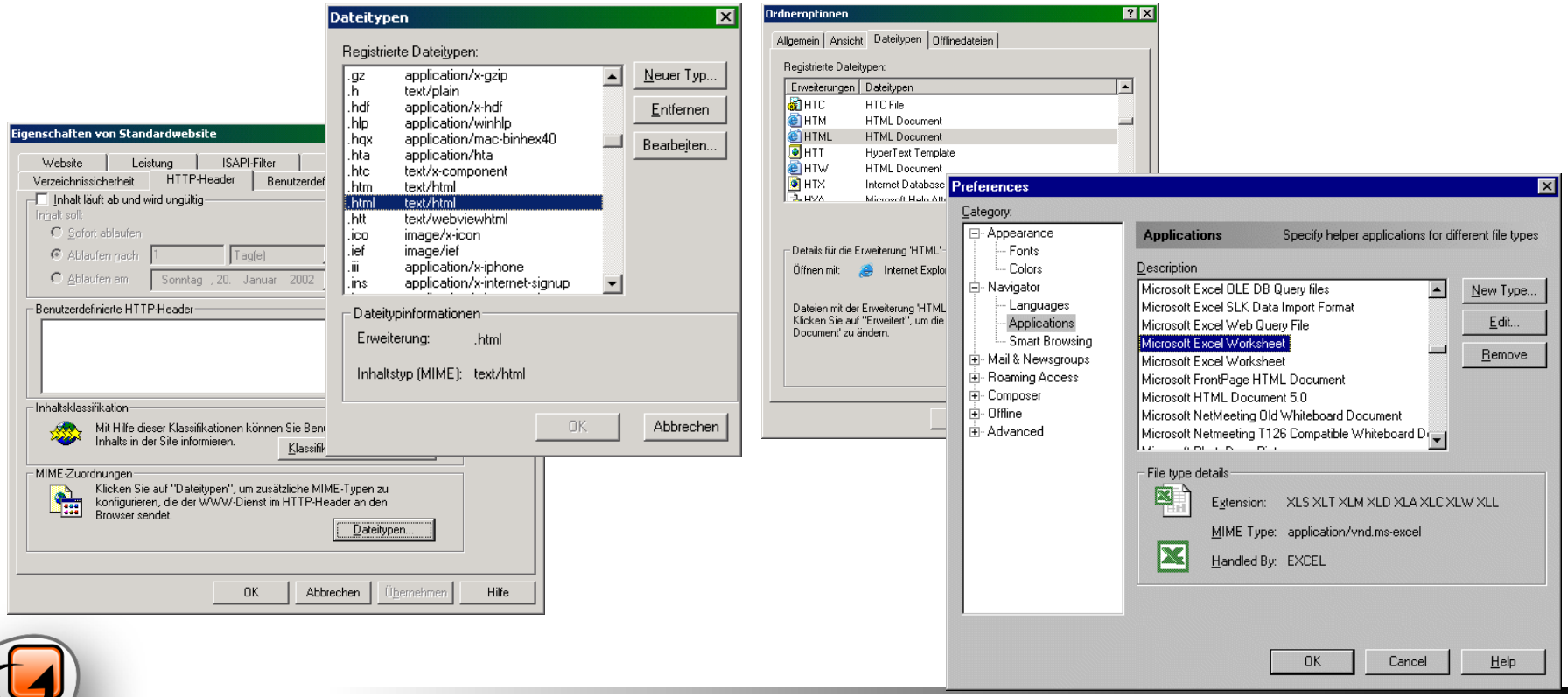
- Part of the Email Header: MIME
- Here: Text and Attachment

```
Content-Type: multipart/mixed; boundary="===-1203946231==_============"

===-1203946231==_============
Content-Type: text/plain; charset="us-ascii" ; format="flowed"

===-1203946231==_============
Content-Id: <p05100306b83d3caaff11@[139.82.20.12].0.0>
Content-Type: application/vnd.ms-excel; name="WWW-Review-Paper-Assign.xls"
 ; x-mac-type="584C5334"
 ; x-mac-creator="5843454C"
Content-Disposition: attachment; filename="WWW-Review-Paper-Assign.xls"
Content-Transfer-Encoding: base64

===-1203946231==_============
...
```



MIME Extension

- Mapping of file types (e.g. by file extension) to MIME types (server-side)
- Mapping of MIME types to applications (browser-side)



Section 3

HTTP EXTENSION: COOKIES

Introduction

- A mechanism to store a small amount of data (up to 4KB) at the client [RFC6265]
- A cookie is associated with a specific web site
- Cookie is sent in HTTP header
- Cookie is sent with each HTTP request
- Can last for only one session (until browser is closed) or can persist across sessions
- Can expire some time in the future

Overview

- Protocol Primitives
  - **Set-Cookie** – Request from server asking client to store a cookie, included in the response header
  - **Cookie** – If a Cookie is stored for the current domain and dedicated path of the request then the stored data this is sent to the server (as part of request header)
- Application areas:
  - Session management (usually supported by *Session* objects in programming languages)
  - Personalization
  - Tracking

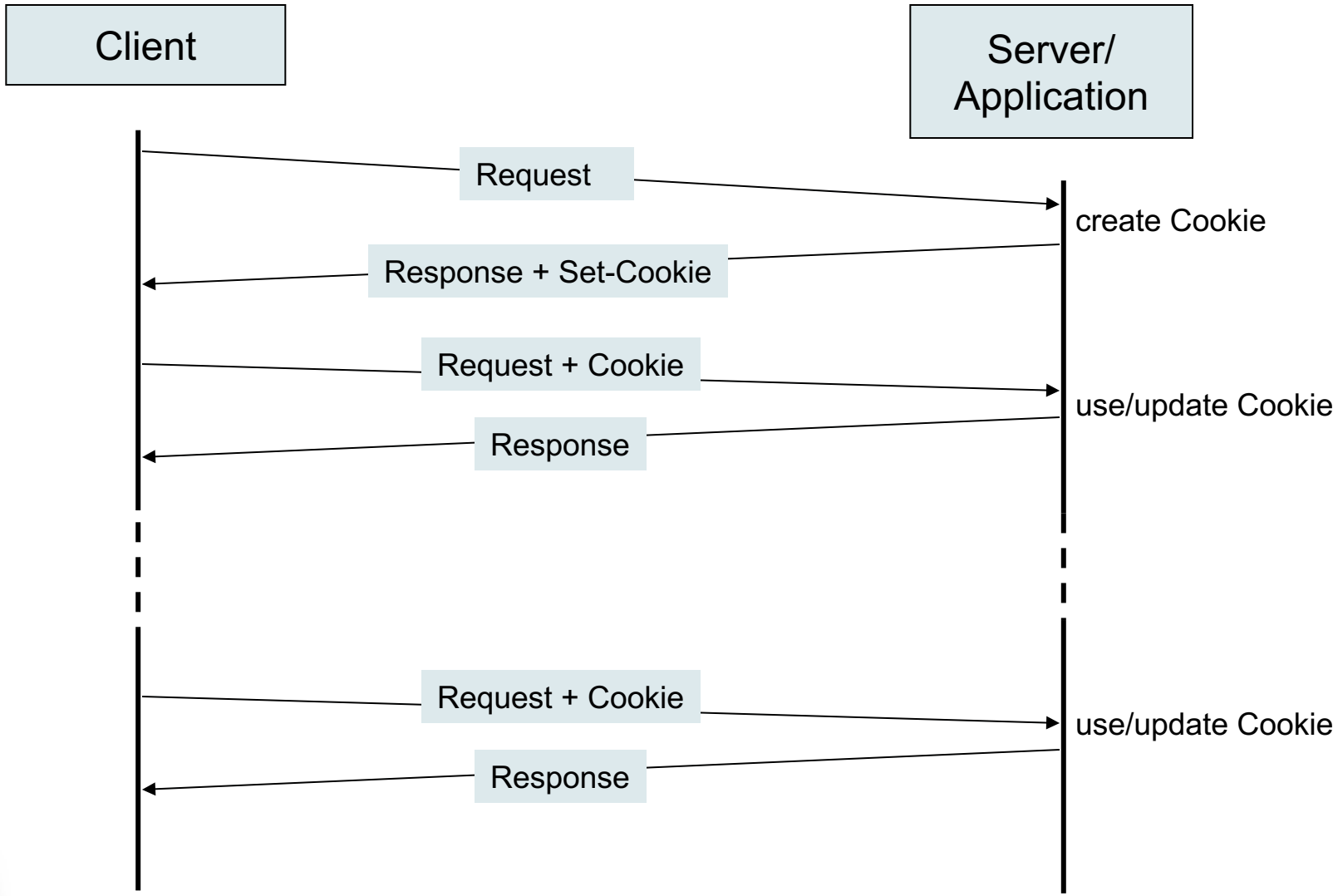
Set-Cookie

- set-cookie = "Set-Cookie:" cookie
- cookie = NAME "=" VALUE (";" cookie-av)*
- cookie-av =
  |"Comment" "=" value
  |"CommentURL" "=" <"> http_URL <">
  |"Discard"
  |"Domain" "=" value
  |"Max-Age" "=" value
  |"Path" "=" value
  |"Port" ["=" <"> portlist <">]
  |"Secure"
  |**"Version" "=" 1*DIGIT**

Cookie – Syntax

- cookie = "Cookie:" cookie-version 1*((";" | ",") cookie-value)
- cookie-value = NAME "=" VALUE [";" path] [";" domain]
- cookie-version = "$Version" "=" value

Preserving State



Cookies – Example I

```
GET / HTTP/1.1
Accept: */*
Host: www.example.com
```

```
HTTP/1.1 200 OK
Server: Microsoft-IIS/7.0
Date: Wed, 03 Nov 2012 02:57:09 GMT
Set-Cookie: p_uniqid=48BpFe5tJJwdL+7QaB;
            Max-Age=2592000;
            Domain=.example.com;
            Path=/;
            Version="1"
Connection: Keep-Alive
Content-Type: text/html
Content-Length: 15982

<html>
<head><title>...
```

Cookies – Example II

```
GET / HTTP/1.1
Accept: */*
Host: www.example.com
Cookie: p_uniqid=48BpFe5tJJwdL+7QaB
```

```
HTTP/1.1 200 OK
Server: Microsoft-IIS/4.0
Date: Wed, 03 Nov 1999 02:57:09 GMT
Connection: Keep-Alive
Content-Type: text/html
Content-Length: 15982

<html>
<head><title>...
```