MASTERING TCP/IP [INTRODUCTION]

APPLICATION PROTOCOL#2
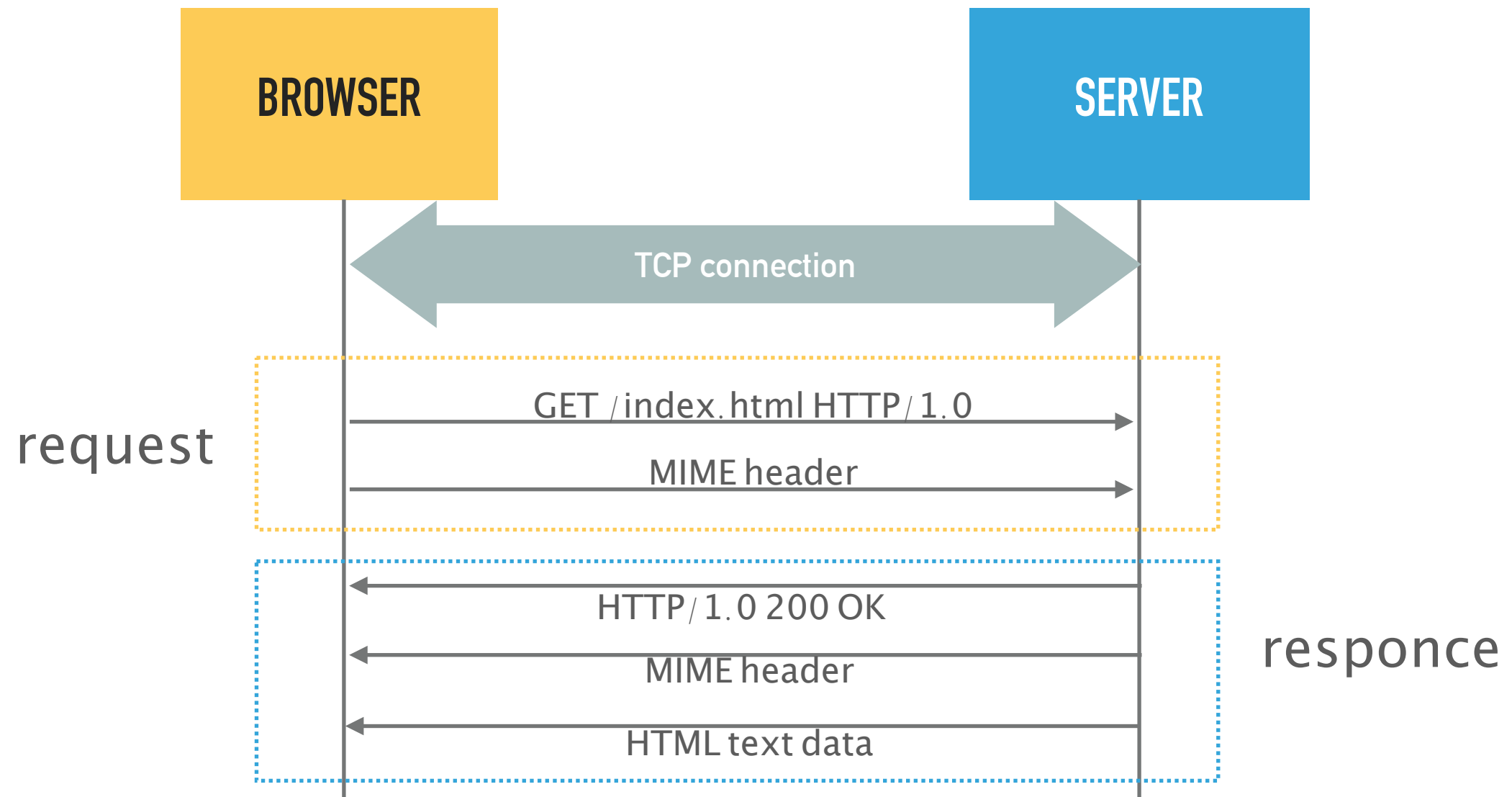
URI (UNIFORM RESOURCE IDENTIFIER)

▸ http://www.iana.org/assignments/uri-schemes.html

▸ URL ∈ URI

▸ http://hostname:portnumber/path?query#fragment

HTML (HYPERTEXT MARKUP LANGUAGE)

▸ Hyper text

▸ Implementations are slightly different on each browser

▸ XML & Java

HTTP (HYPERTEXT TRANSFER PROTOCOL)
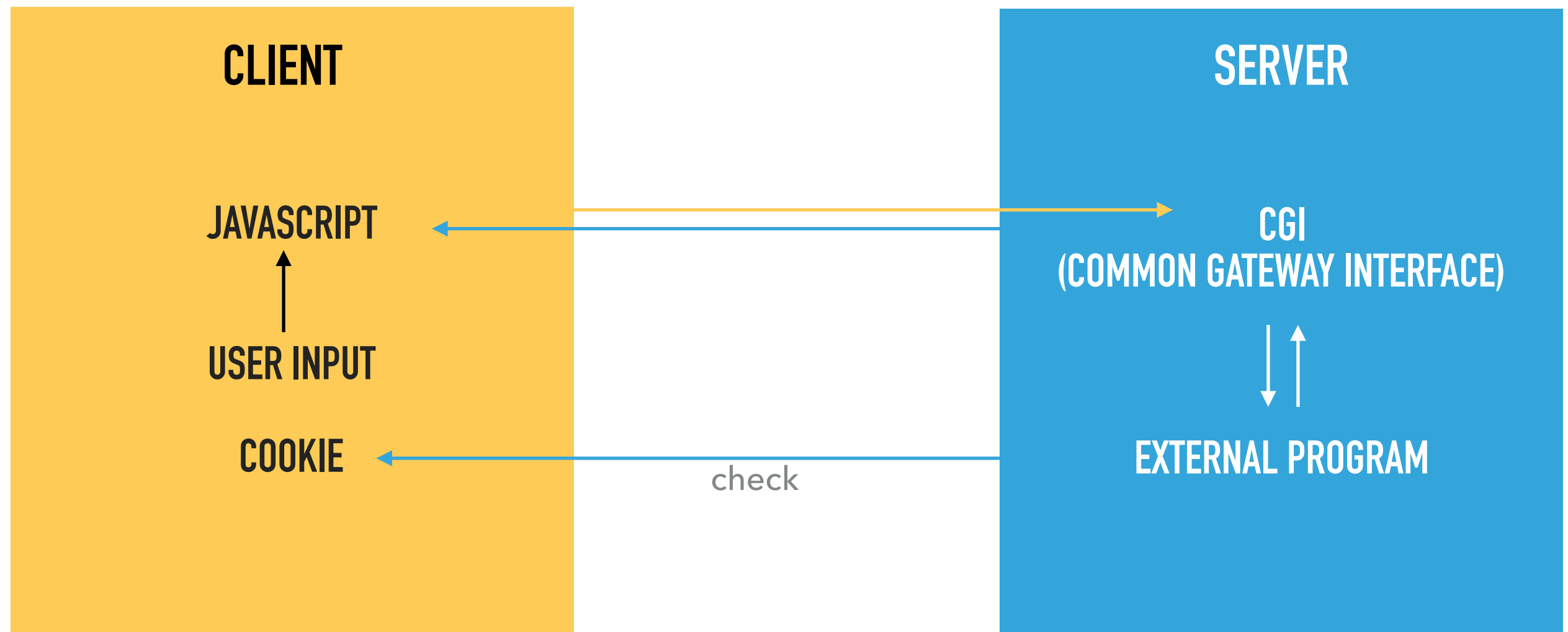
BROWSER

SERVER

TCP connection

request

GET /index.html HTTP/1.0

MIME header

HTTP/1.0 200 OK

MIME header

responce

HTML text data

HTTP status codes ref: https://developer.mozilla.org/en-US/docs/Web/HTTP/Status

JAVASCRIPT, CGI, COOKIE

▸ Dynamic web

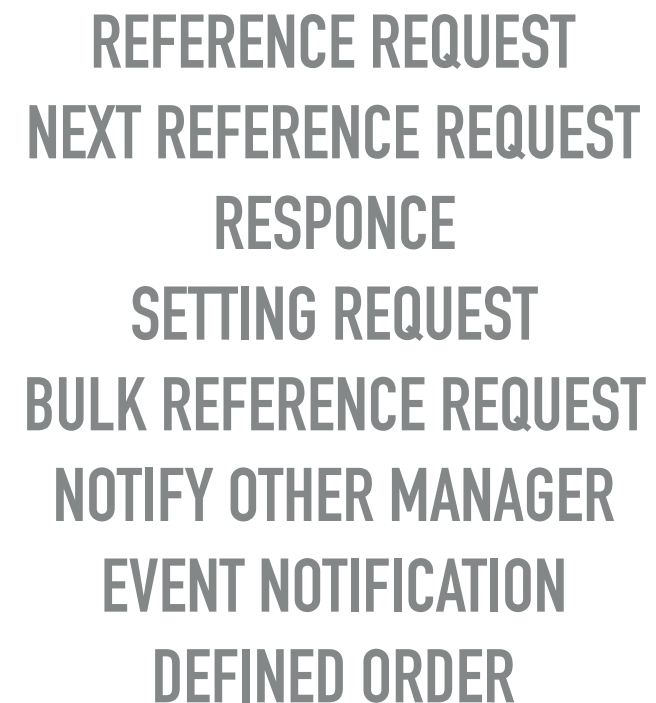| CLIENT	SERVER
JAVASCRIPT	CGI (COMMON GATEWAY INTERFACE)
USER INPUT	
COOKIE	EXTERNAL PROGRAM

check

SNMP (SIMPLE NETWORK MANAGEMENT PROTOCOL)

▸ SNMP v3: combination of versions

- message processing

- security

- access control

▸ Fetch/ store paradigm

REFERENCE REQUEST
NEXT REFERENCE REQUEST
RESPONCE
SETTING REQUEST
BULK REFERENCE REQUEST
NOTIFY OTHER MANAGER
EVENT NOTIFICATION
DEFINED ORDER

MANAGER

AGENT
(ROUTER, SWITCH…)
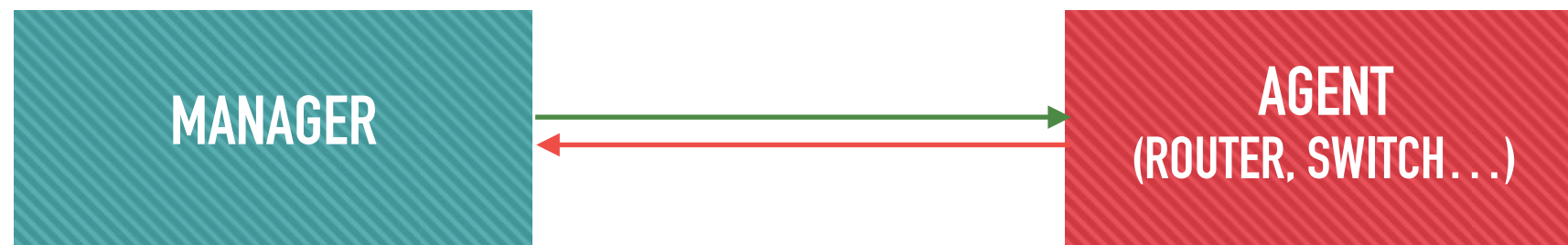
MIB (MANAGEMENT INFORMATION BASE)

▸ Presentation layer of SNMP

▸ Tree database

▸ Standard MIB, Extended MIB

▸ ISO ASN.1 SMI (Structure of Management Information)

RMON (REMOTE MONITORING MIB)

▸ Presentation layer of SNMP #2

▸ MIB → dot (Interface)

▸ RMON → line (Network line)

▸ From current transmission status to transmission direction

APPLICATION EXAMPLE

▸ MRTG (Multi Router Traffic GRAPHER)

▸ http://oss.oetiker.ch/mrtg/

TECHNOLOGIES FOR MULTI-MEDIA COMMUNICATIONS

▸ Using UDP & "call control", compression

▸ H.323, SIP

▸ RTP

▸ compression technologies
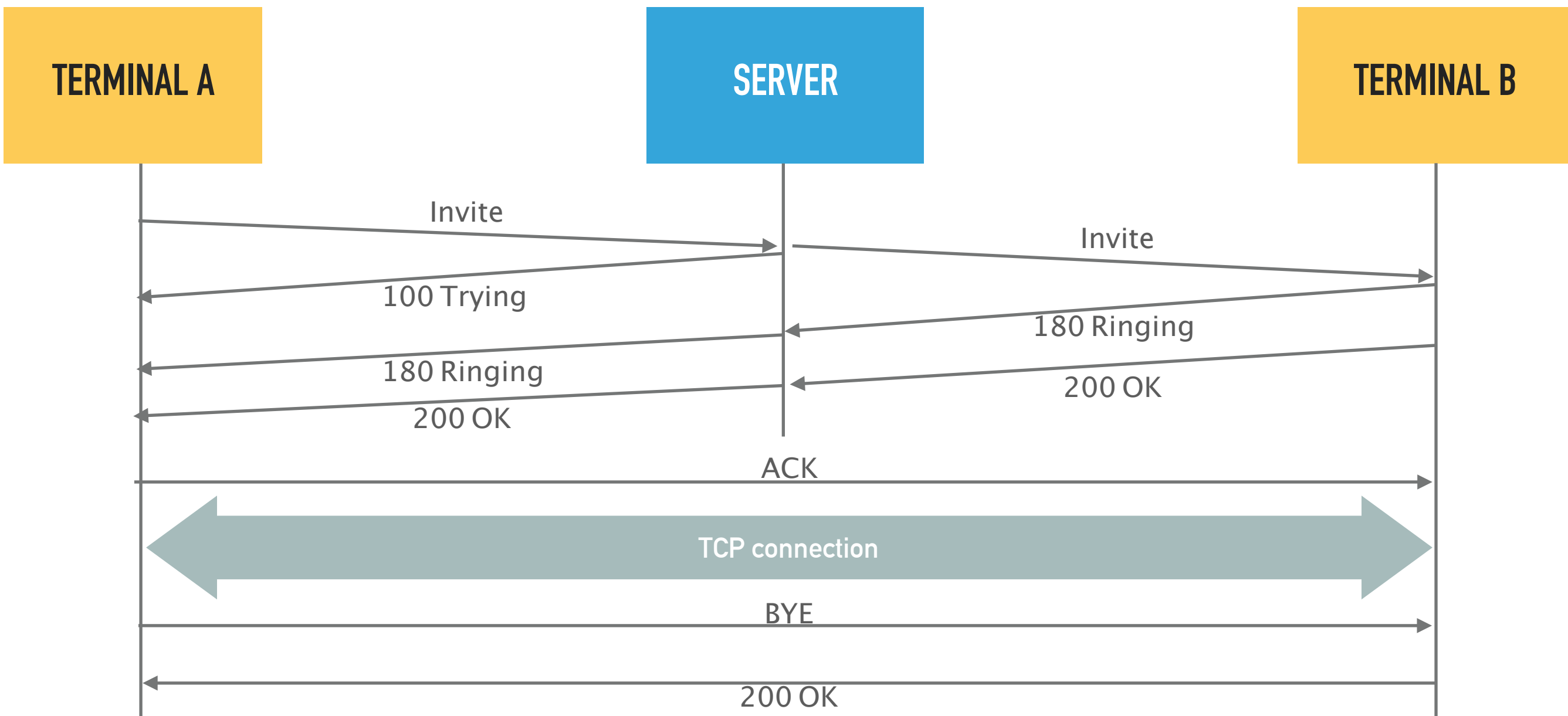
TECHNOLOGIES FOR MULTI-MEDIA COMMUNICATIONS

▸ H.323

Terminal, Gateway, Gatekeeper, Multi component unit

▸ SIP (Session Initiation Protocol)

TECHNOLOGIES FOR MULTI-MEDIA COMMUNICATIONS

▶ SIP call control process

TERMINAL A	SERVER	TERMINAL B

Invite

Invite

100 Trying

180 Ringing

180 Ringing

200 OK

200 OK

ACK

TCP connection

BYE

200 OK

TECHNOLOGIES FOR MULTI-MEDIA COMMUNICATIONS

▸ RTP (Real-Time Protocol)

  ● Packet management: sequence, time

  ● RCTP (RTP Control Protocol)

▸ compression technologies

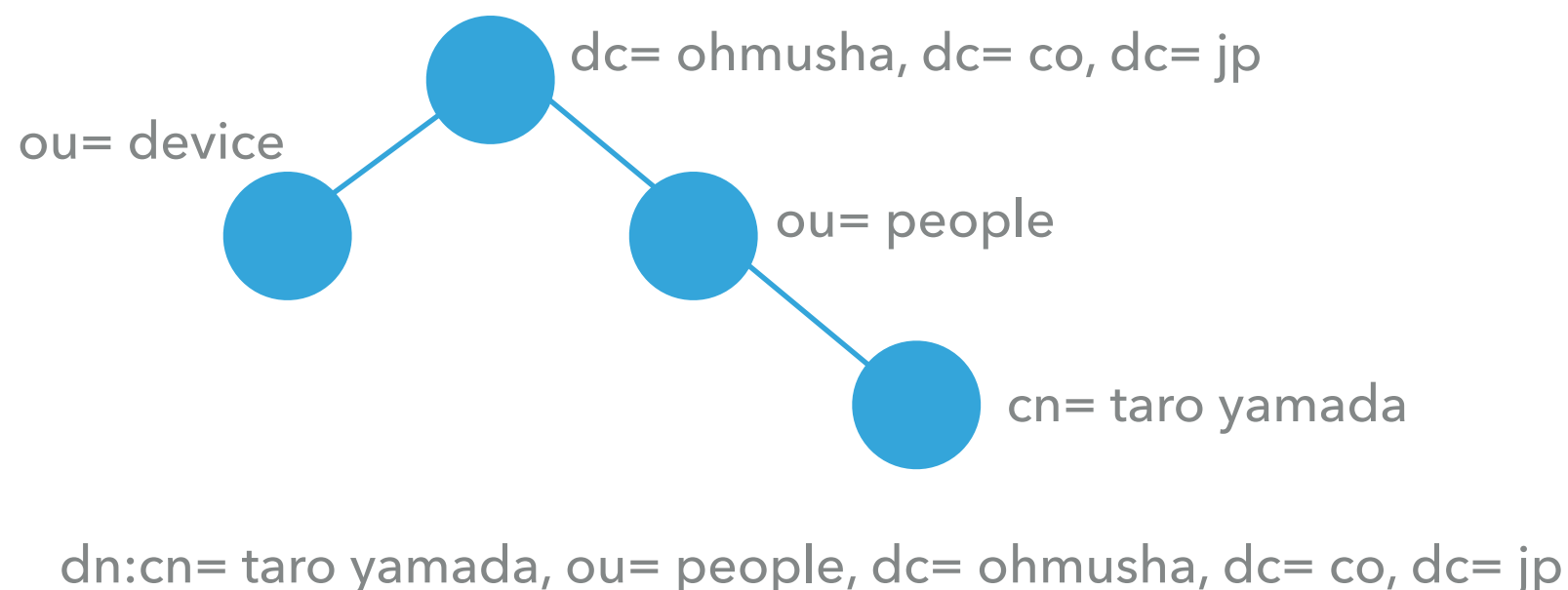 - MPEG (Moving Picture Experts Group)

  - MPEG1,2,4,7, H.264…

P2P (PEER TO PEER)
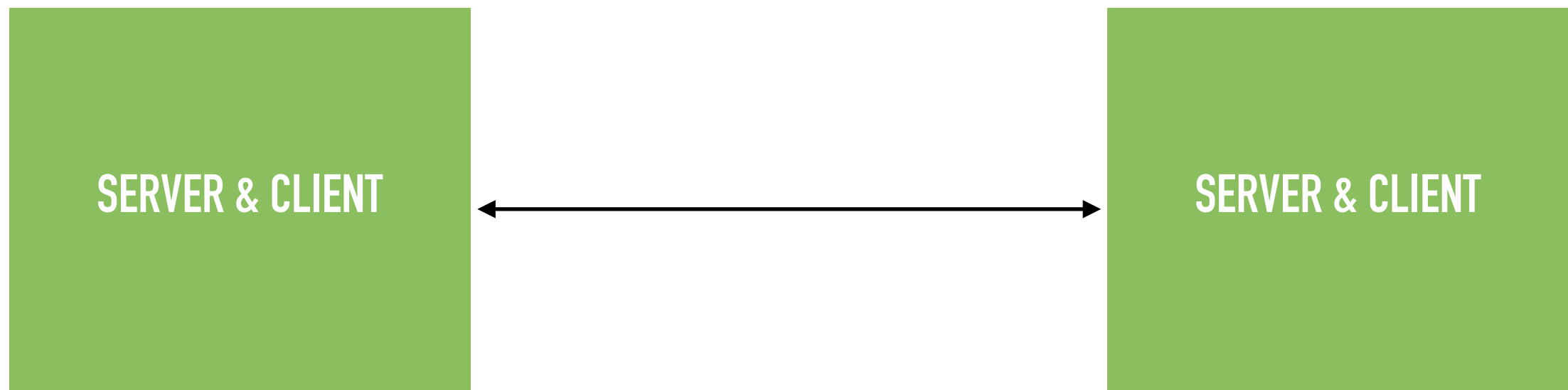
▸ e.g) Skype, BitTorrent

LDAP (LIGHTWEIGHT DIRECTORY ACCESS PROTOCOL)

▸ from X.500 in 1988

▸ Certification management

▸ Resource management

dc= ohmusha, dc= co, dc= jp

ou= device

ou= people

cn= taro yamada

dn:cn= taro yamada, ou= people, dc= ohmusha, dc= co, dc= jp

```
1    # comment
2    dn: <identifier>
3    <attribute>: <value>
4    <attribute>: <value>
5    <attribute>: <value>
6
7    # comment
8    dn: <identifier>
9    <attribute>: <value>
10   <attribute>: <value>
11   <attribute>: <value>
12
13   # comment
14   dn: <identifier>
15   <attribute>: <value>
16   <attribute>: <value>
17   <attribute>: <value>
18
19   :
20   :
21   :
```