Σημασιολογικός και Κοινωνικός Ιστός

Διάλεξη 02 – Εισαγωγή – Τεχνολογίες και Πρωτόκολλα

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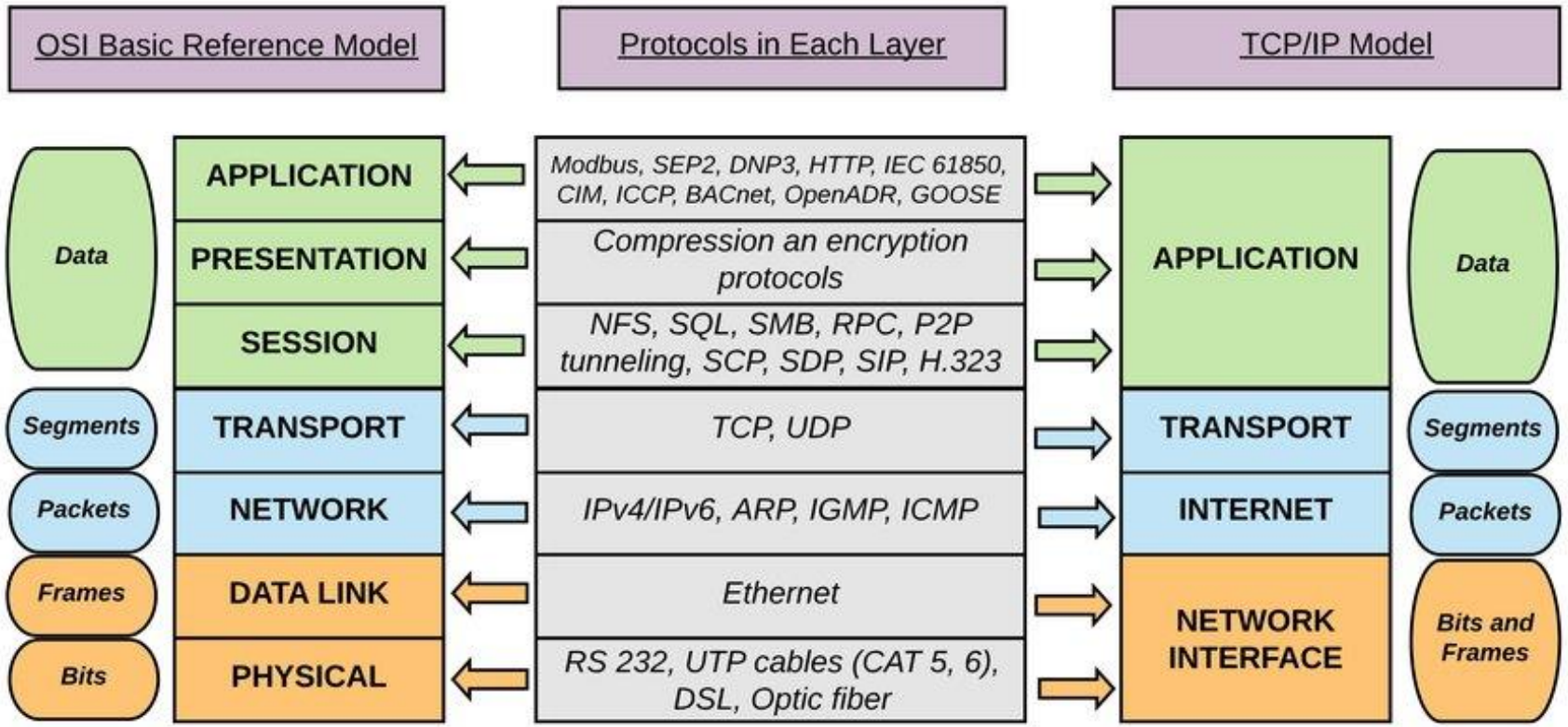
Τμήμα Πληροφορικής
Ιόνιο Πανεπιστήμιο

Διαδίκτυο


OSI Basic Reference Model
Protocols in Each Layer
TCP/IP Model
Data
APPLICATION
Modbus, SEP2, DNP3, HTTP, IEC 61850, CIM, ICCP, BACnet, OpenADR, GOOSE
PRESENTATION
Compression an encryption protocols
SESSION
NFS, SQL, SMB, RPC, P2P tunneling, SCP, SDP, SIP, H.323
APPLICATION
Data
Segments
TRANSPORT
TCP, UDP
TRANSPORT
Segments
Packets
NETWORK
IPv4/IPv6, ARP, IGMP, ICMP
INTERNET
Packets
Frames
DATA LINK
Ethernet
NETWORK INTERFACE
Bits and Frames
Bits
PHYSICAL
RS 232, UTP cables (CAT 5, 6), DSL, Optic fiber

IP

IPv4

Deployed 1981

32-bit IP address

4.3 billion addresses
Addresses must be reused and masked

Numeric dot-decimal notation
192.168.5.18

DHCP or manual configuration

IPv6

Deployed 1998

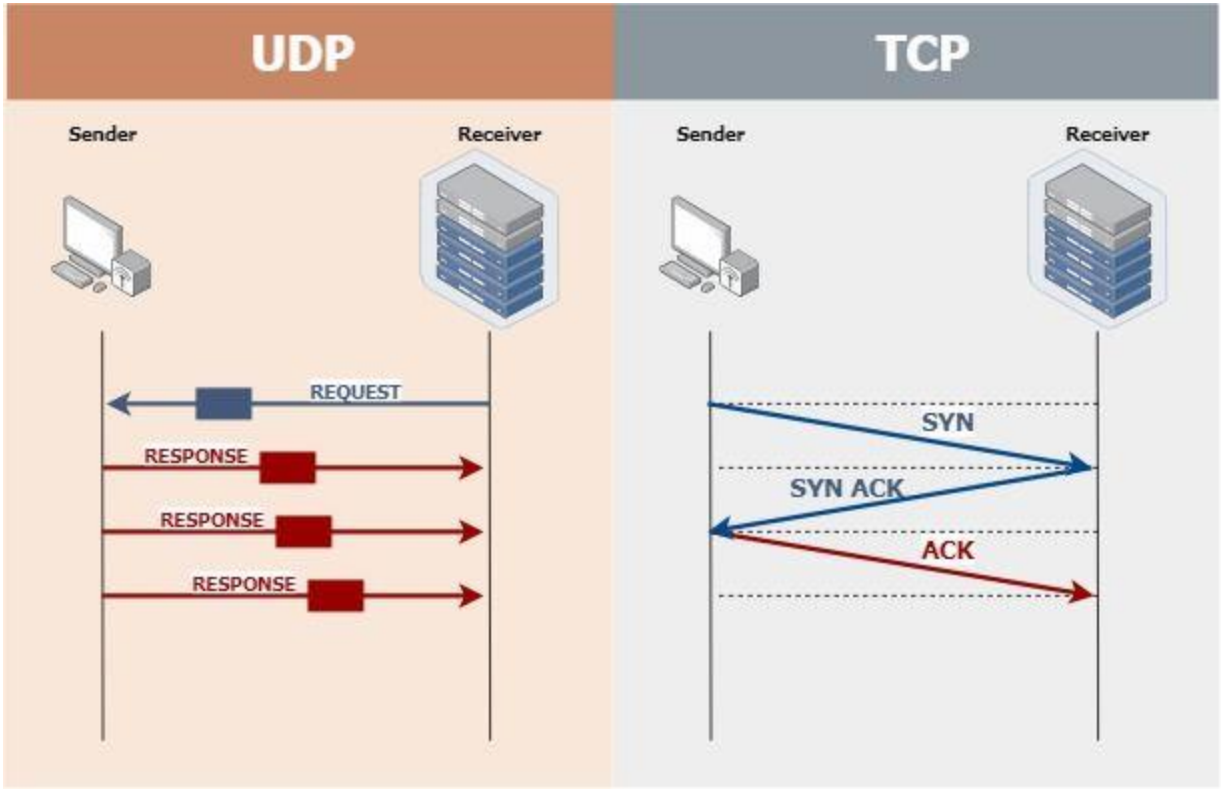
128-bit IP address

7.9×10^{28} addresses
Every device can have a unique address

Alphanumeric hexadecimal notation
50b2:6400:0000:0000:6c3a:b17d:0000:10a9
(Simplified - 50b2:6400::6c3a:b17d:0:10a9)

Supports autoconfiguration

TCP vs UDP


UDP
TCP
Sender
Receiver
Sender
Receiver
REQUEST
RESPONSE
RESPONSE
RESPONSE
SYN
SYN ACK
ACK

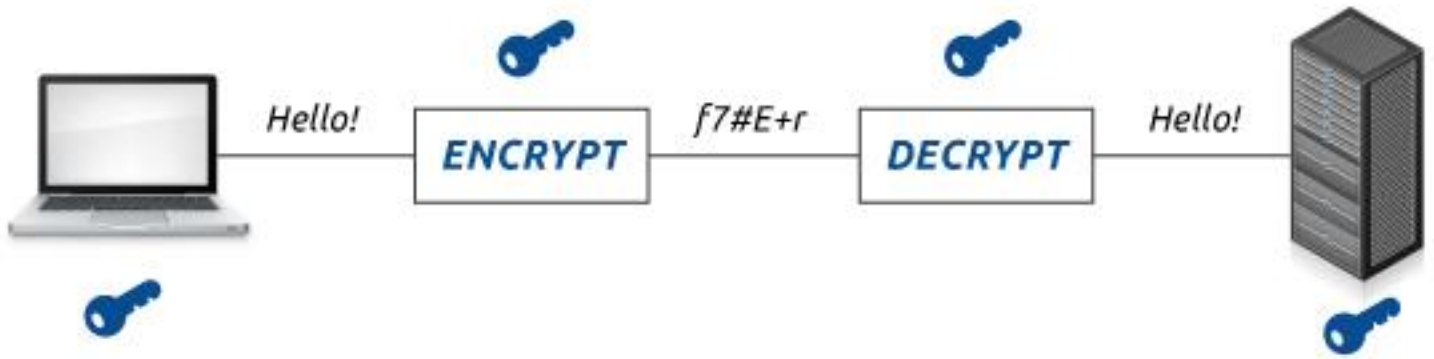
Application layer protocols

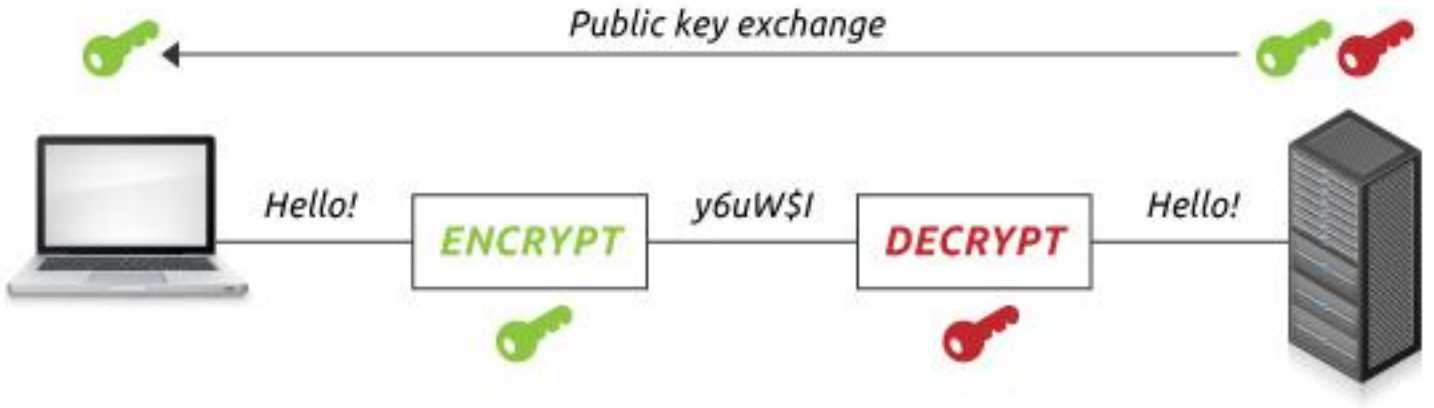
PORT NUMBER	TRANSPORT PROTOCOL	SERVICE NAME	RFC
20, 21	TCP	File Transfer Protocol (FTP)	RFC 959
22	TCP and UDP	Secure Shell (SSH)	RFC 4250-4256
23	TCP	Telnet	RFC 854
25	TCP	Simple Mail Transfer Protocol (SMTP)	RFC 5321
53	TCP and UDP	Domain Name Server (DNS)	RFC 1034-1035
67, 68	UDP	Dynamic Host Configuration Protocol (DHCP)	RFC 2131
69	UDP	Trivial File Transfer Protocol (TFTP)	RFC 1350
80	TCP	HyperText Transfer Protocol (HTTP)	RFC 2616
110	TCP	Post Office Protocol (POP3)	RFC 1939
119	TCP	Network News Transport Protocol (NNTP)	RFC 8977
123	UDP	Network Time Protocol (NTP)	RFC 5905
135-139	TCP and UDP	NetBIOS	RFC 1001-1002
143	TCP and UDP	Internet Message Access Protocol (IMAP4)	RFC 3501
161, 162	TCP and UDP	Simple Network Management Protocol (SNMP)	RFC 1901-1908, 3411-3418
179	TCP	Border Gateway Protocol (BGP)	RFC 4271
389	TCP and UDP	Lightweight Directory Access Protocol	RFC 4510
443	TCP and UDP	HTTP with Secure Sockets Layer (SSL)	RFC 2818
500	UDP	Internet Security Association and Key Management Protocol (ISAKMP) / Internet Key Exchange (IKE)	RFC 2408 - 2409
636	TCP and UDP	Lightweight Directory Access Protocol over TLS/SSL (LDAPS	RFC 4513
989/990	TCP	FTP over TLS/SSL	RFC 4217
			https://ipwithease.com

HTTP(s)

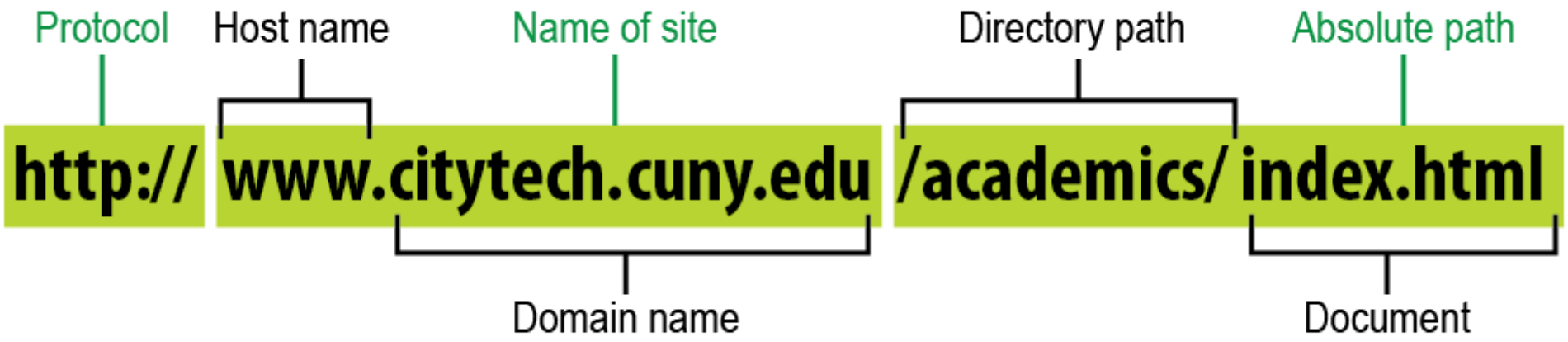
HTTP	HTTPS
• HTTP stands for 'HyperText Transfer Protocol'.	• HTTPS stands for 'HyperText Transfer Protocol Secure'.
• HTTP works at the application layer.	• HTTPS works at the transport layer.
• The default port number is 80, for communication.	• Here, the default port number is 443.
• No encryption is present in HTTP websites.	• Both encryption and decryption exist on HTTPS websites.

Encryption

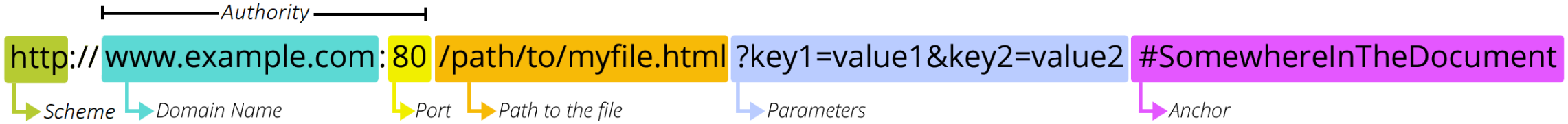

Hello!
ENCRYPT
f7#E+r
DECRYPT
Hello!


Public key exchange
Hello!
ENCRYPT
y6uW$I
DECRYPT
Hello!

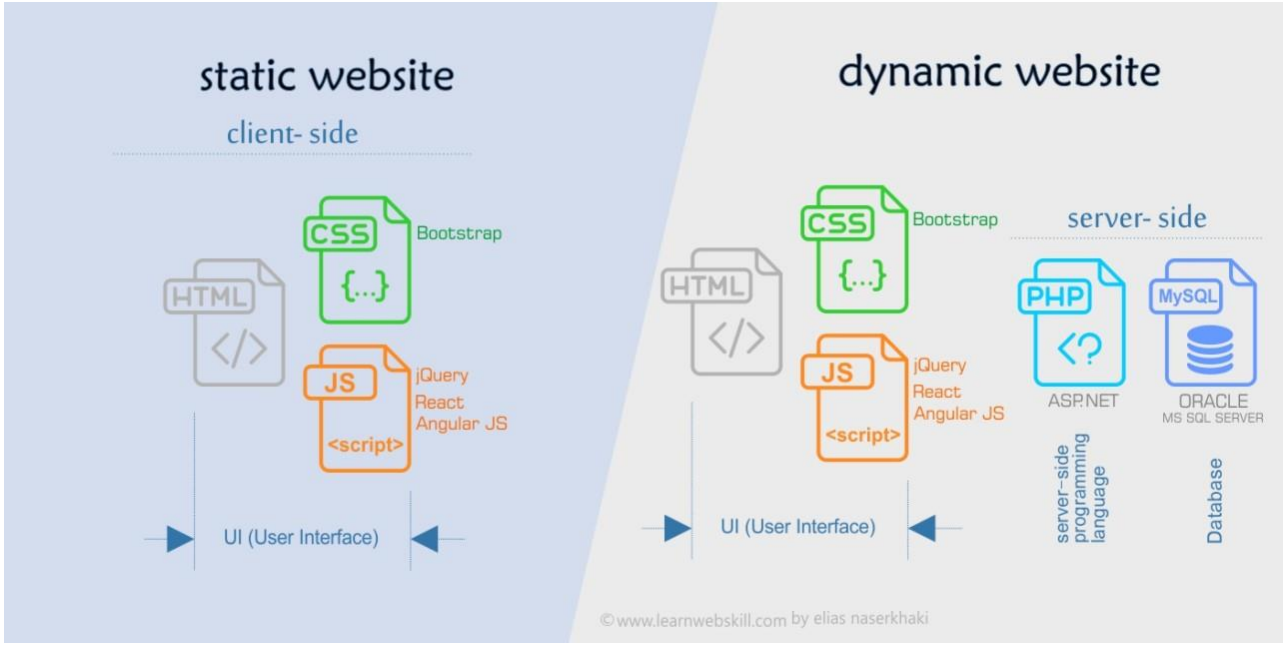
URL

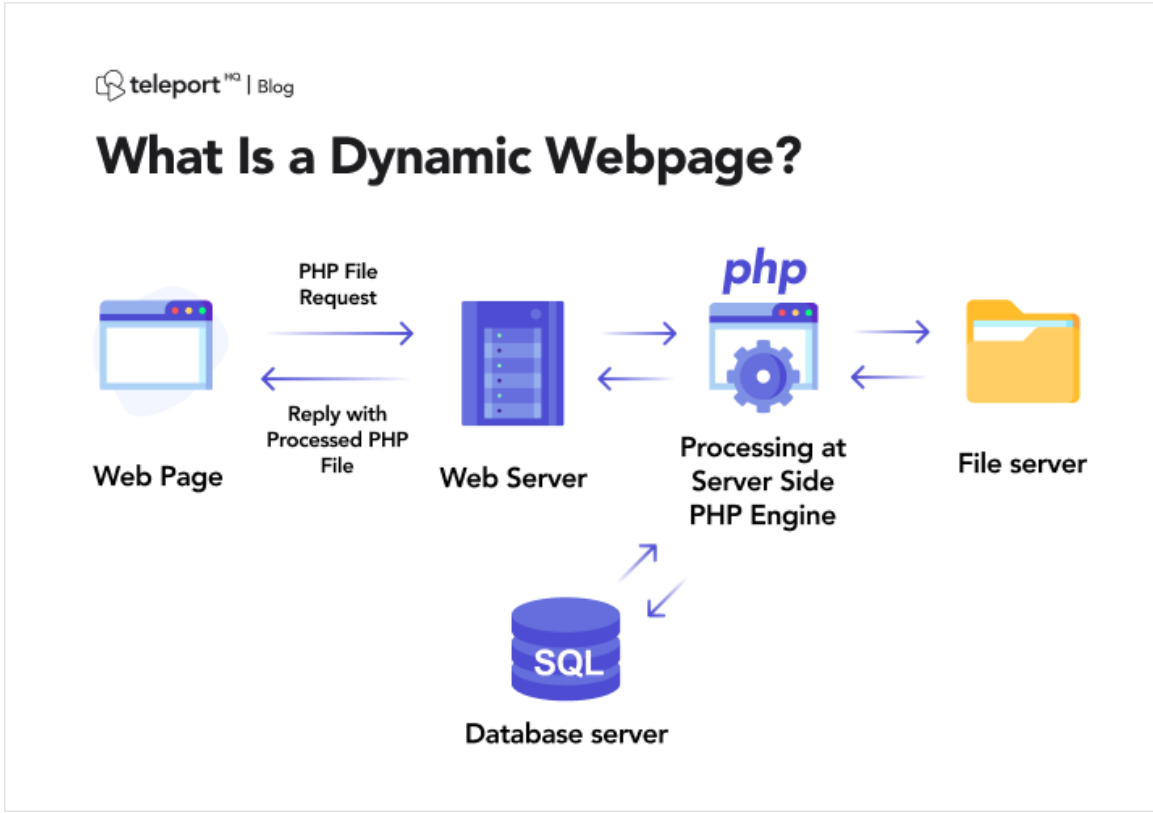

Protocol
Host name
Name of site
Directory path
Absolute path
http://
www.citytech.cuny.edu
/academics/
index.html
Domain name
Document

URL

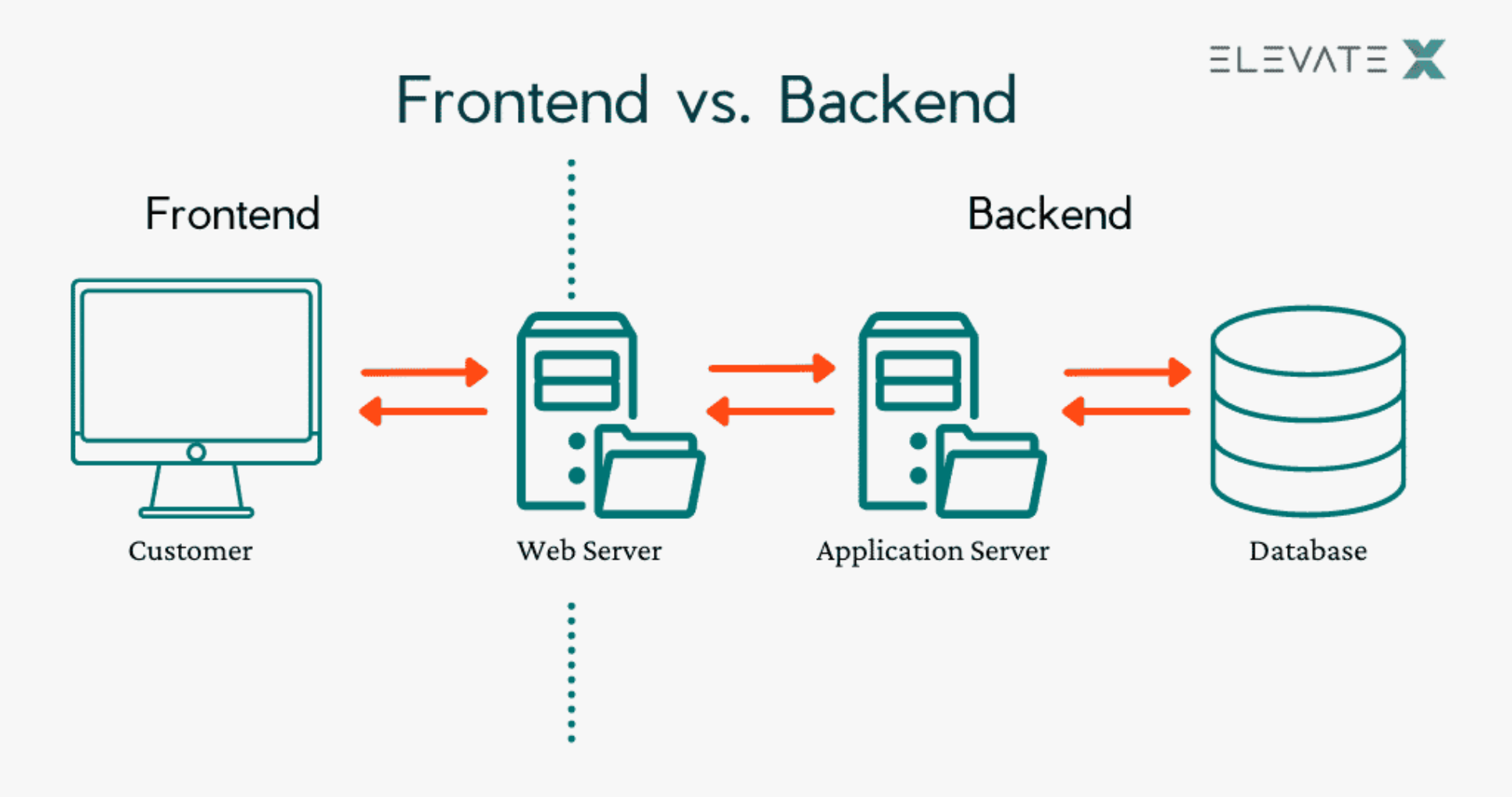

Authority
http://
www.example.com
:
80
/path/to/myfile.html
?key1=value1&key2=value2
#SomewhereInTheDocument
Scheme
Domain Name
Port
Path to the file
Parameters
Anchor

Client-Server

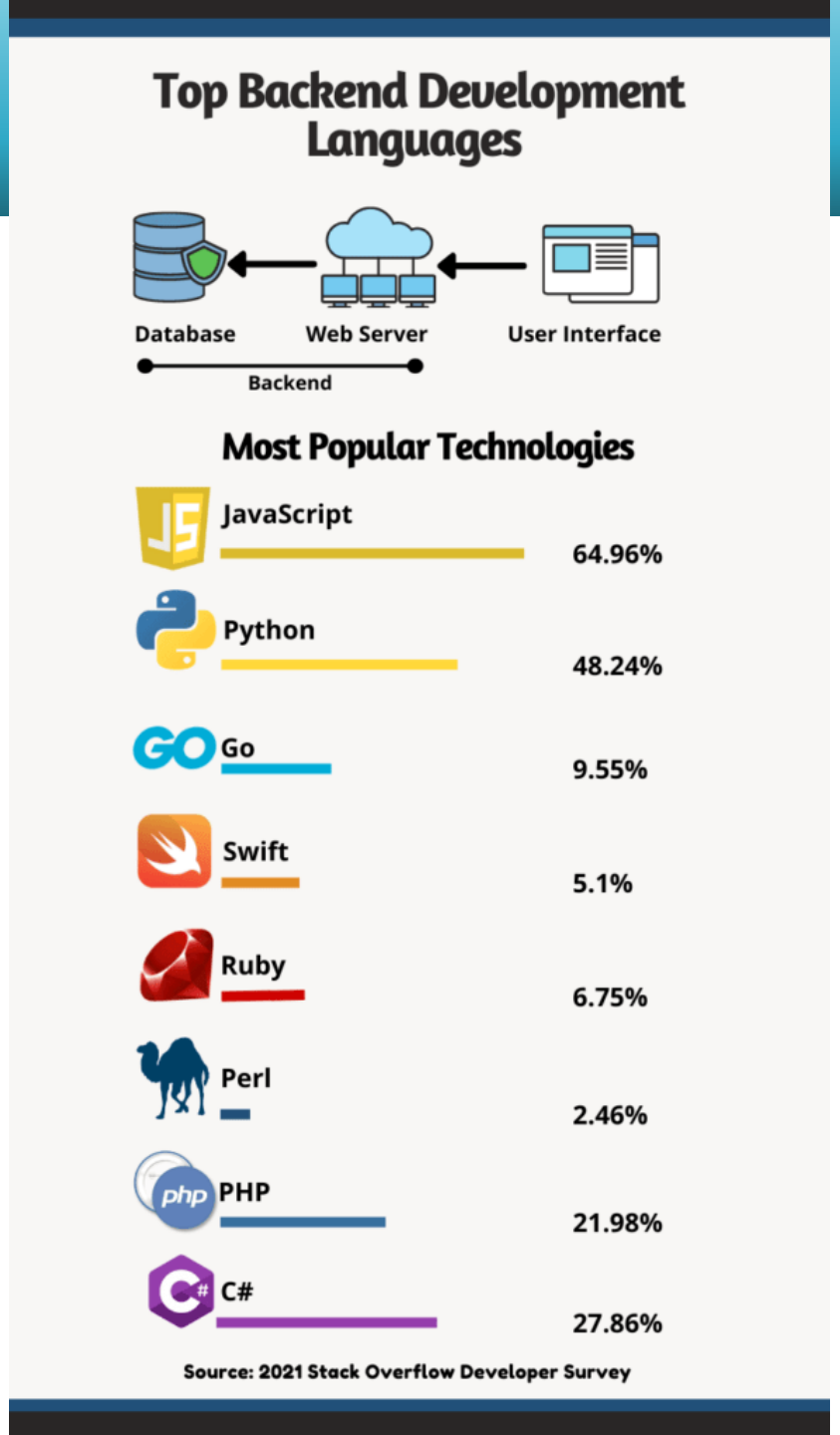




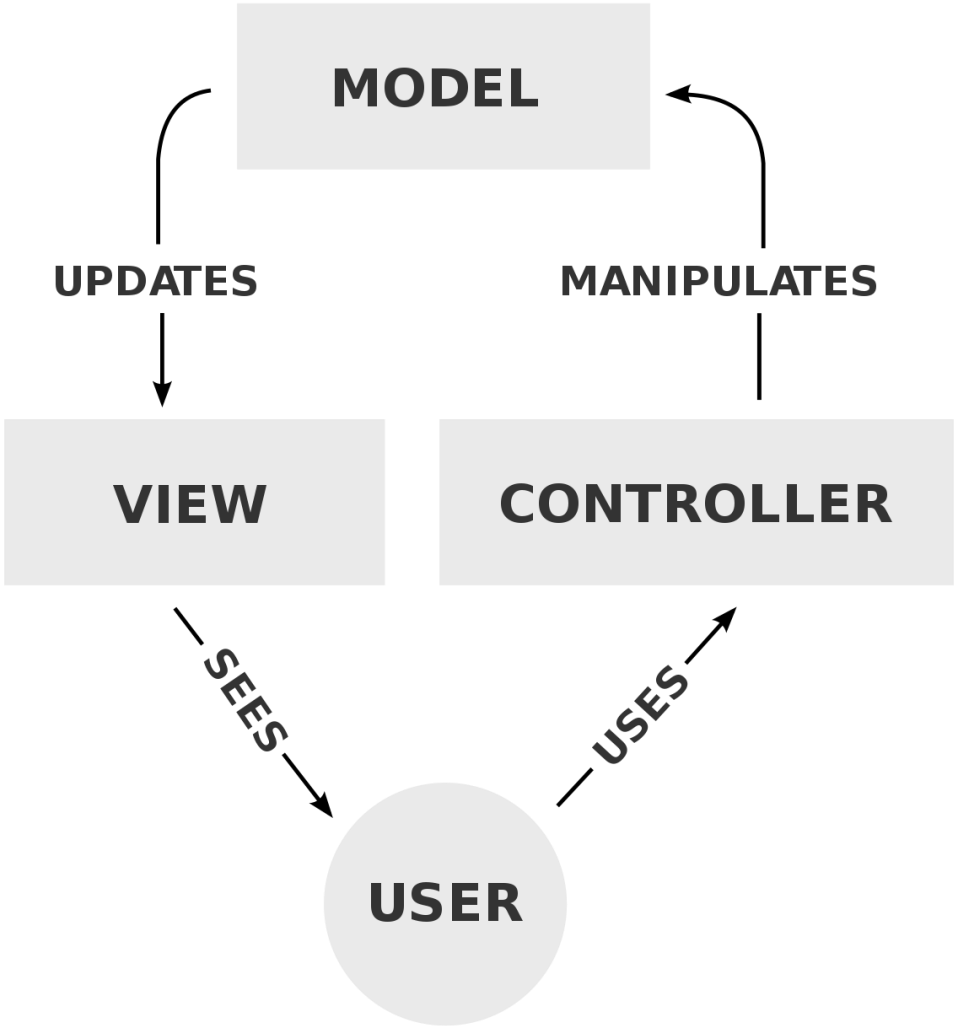
Front-end vs back-end



Backend programming languages



MVC model



Βάσεις Δεδομένων

Σχεσιακές βάσεις δεδομένων

- MySQL
- Microsoft SQL
- PostgreSQL
- SQLite

NoSQL:

- MongoDB

Front-End

- HTML
- https://www.w3schools.com/html/

- CSS for style

- Javascript for dynamic content