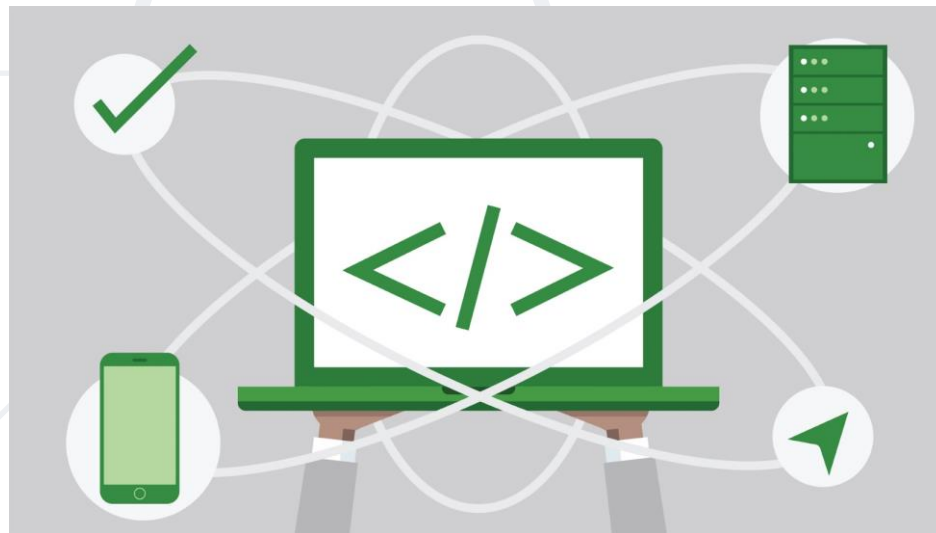


# State Management

## Cookies and Sessions



**SoftUni Team**  
**Technical Trainers**



**SoftUni**



**Software University**

<https://softuni.bg>

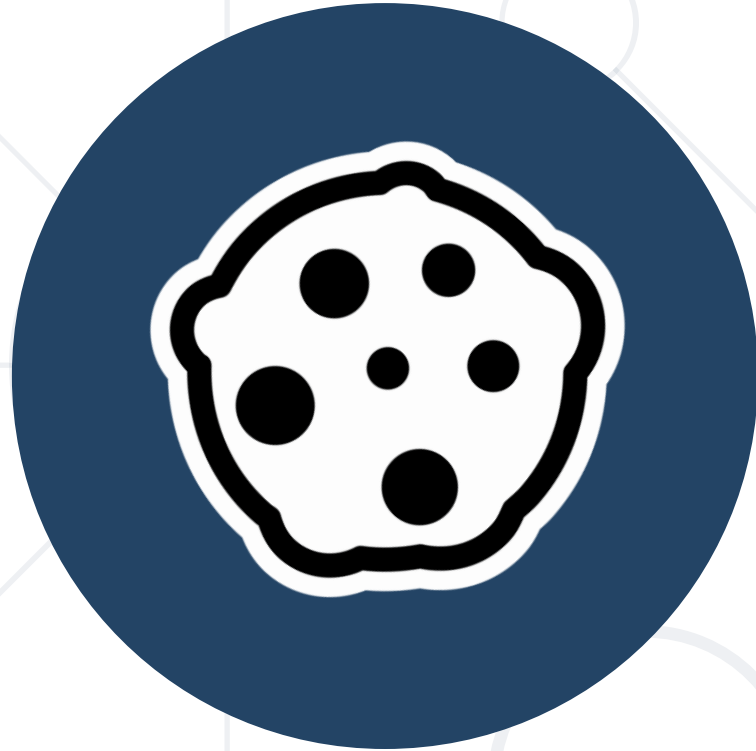
## 1. HTTP Cookies

- Usage and Control

## 2. HTTP Sessions

sli.do

**#java-web**



# HTTP Cookies

Usages and Control

# What Are Cookies?

- A **small file** of **plain text** with no executable code
  - Sent by the server to the client's browser
  - Stored by the browser on the client's device (computer, tablet, etc.)
  - Hold small piece of data for a particular client and a website



# What Are Cookies Used for?

- **Session management**

- Logins, shopping carts, game scores, or anything else the server should remember

- **Personalization**

- User preferences, themes, and other custom settings

- **Tracking**

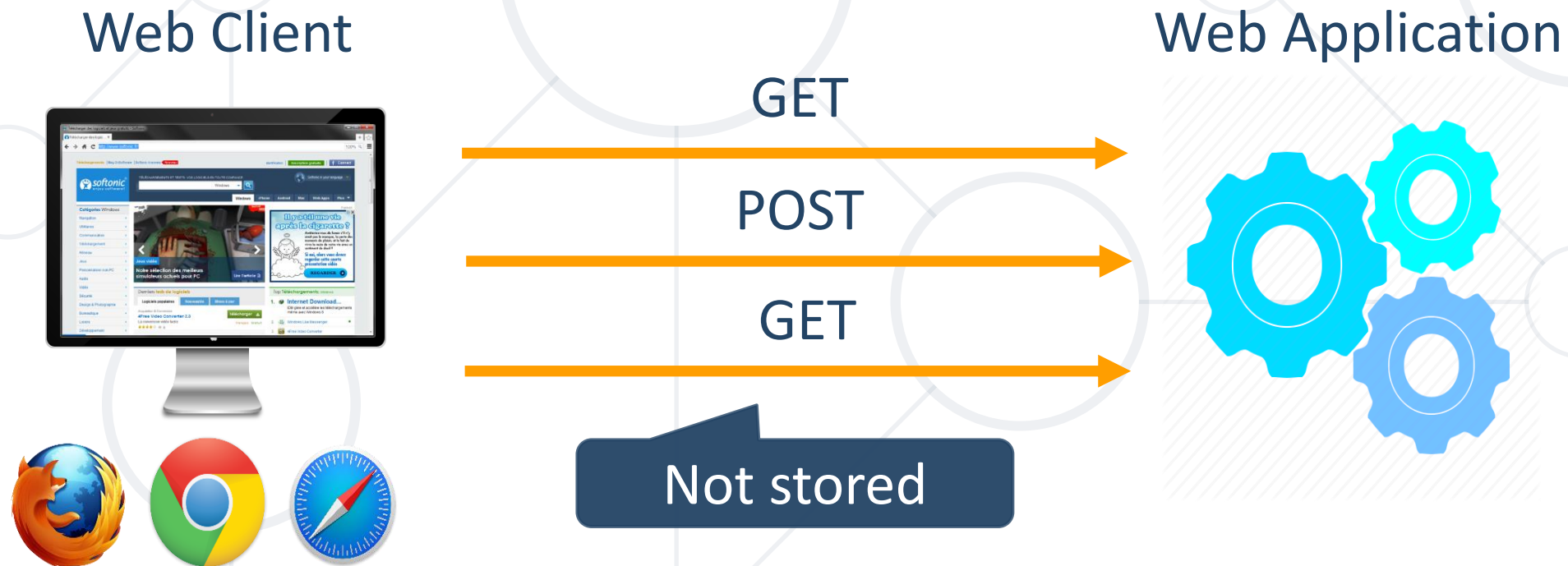
- Recording and analyzing user behavior

- **Breakfast**

- But that's not what we are currently talking about



- The HTTP object is **stateless**
  - It **doesn't store** information about the requests



- The **server does not know** if two requests come from the same client
- **State management** problems
  - Navigation through pages requires **authentication each time**
  - Information about the pages is lost **between the requests**
  - **Harder personalization** of page functionality



- A reliable **mechanism** for websites to **remember stateful information**
  - to know whether the user is **logged in or not**
  - to know **which account** the user is logged in with
  - to record the user's **browsing activity**
  - to remember pieces of information **previously entered** into form fields (usernames, passwords, etc.)

# How Are Cookies Used?

- The response holds the cookies to be saved within the **Set-Cookie** header

```
HTTP/1.1 200 OK  
Set-Cookie: lang=en
```

- The request holds the specific web site cookie within the **Cookie** header

```
GET /index HTTP/1.1  
Cookie: lang=en
```

# Server-Client Cookies Exchange



- The cookie consists of **Name**, **Value** and **Attributes** (optional)
- The attributes are **key-value pairs** with additional information
- Attributes are not included in the requests
- Attributes are used by the client to control the cookies

Name=Value

Attributes

Set-Cookie: **SSID=Ap4P...GTEq;** Domain=foo.com; Path=/  
Expires=Wed, 13 Jan 2021 22:23:01 GMT; Secure; HttpOnly

- Defined by the attributes **Domain** and **Path**
- **Domain** – defines the website that the cookie belongs to
- **Path** – Indicates a **URL** path that must exist in the requested resource before sending the **Cookie** header

```
Set-Cookie: SSID=Ap4P...GTEq; Domain=foo.com; Path=/;  
Expires=Wed, 13 Jan 2021 22:23:01 GMT; Secure; HttpOnly
```

- Defined by the attributes **Expires** and **Max-Age**
- **Expires** – defines the date that the browser should delete the cookie
- By default the cookies are deleted after the end of the session
- **Max-Age** – interval of seconds before the cookie is deleted

```
Set-Cookie: SSID=Ap4P...GTEq; Domain=foo.com; Path=/  
Expires=Wed, 13 Jan 2021 22:23:01 GMT; Secure; HttpOnly
```

- Security flags do not have associated values
- **Security** - tells the browser to use cookies only via **secure/encrypted** connections
- **HttpOnly** – defines that the cookie cannot be accessed via client-side scripting languages

```
Set-Cookie: SSID=Ap4P...GTEq; Domain=foo.com; Path=/  
Expires=Wed, 13 Jan 2021 22:23:01 GMT; Secure; HttpOnly
```

# What is in the Cookie?

- The cookie file contains a table with **key-value** pairs

Name:	ELOQUA
Content:	GUID=50B3A712CDAA4A208FE95CE1F2BA7063
Domain:	.oracle.com
Path:	/
Send for:	Any kind of connection
Accessible to script:	Yes
Created:	Monday, August 15, 2016 at 11:38:50 PM
Expires:	Wednesday, August 15, 2018 at 11:38:51 PM

Remove



# Examine Your Cookies (1)

- Most cookies are stored in a **RDBMS**, usually **SQLite**
- Download **SQLite browser** from [here](#)
- Location of Mozilla cookies

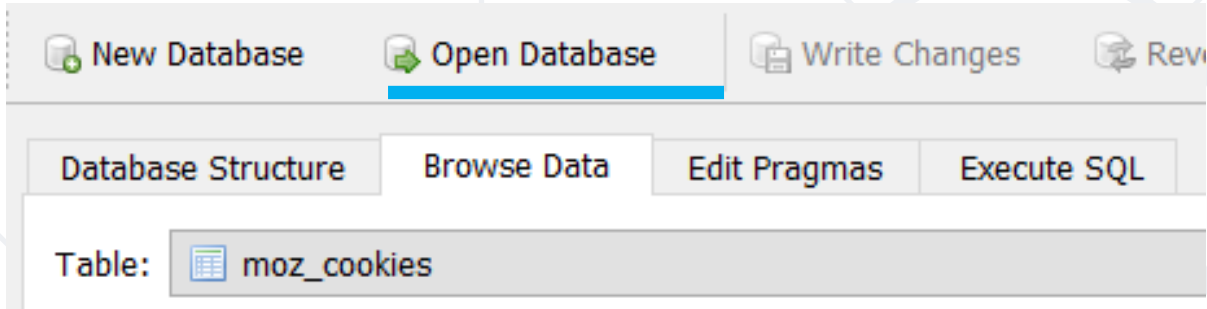
```
C:\Users\{username}\AppData\Roaming\Mozilla\Firefox\Profiles\{name}.default\cookies.sqlite
```

- Location of Chrome cookies

```
C:\Users\{username}\AppData\Local\Google\Chrome\User Data\Default\Cookies
```

# Examine Your Cookies (2)

- Open the file with the **SQLite browser**



- Browse the cookies table

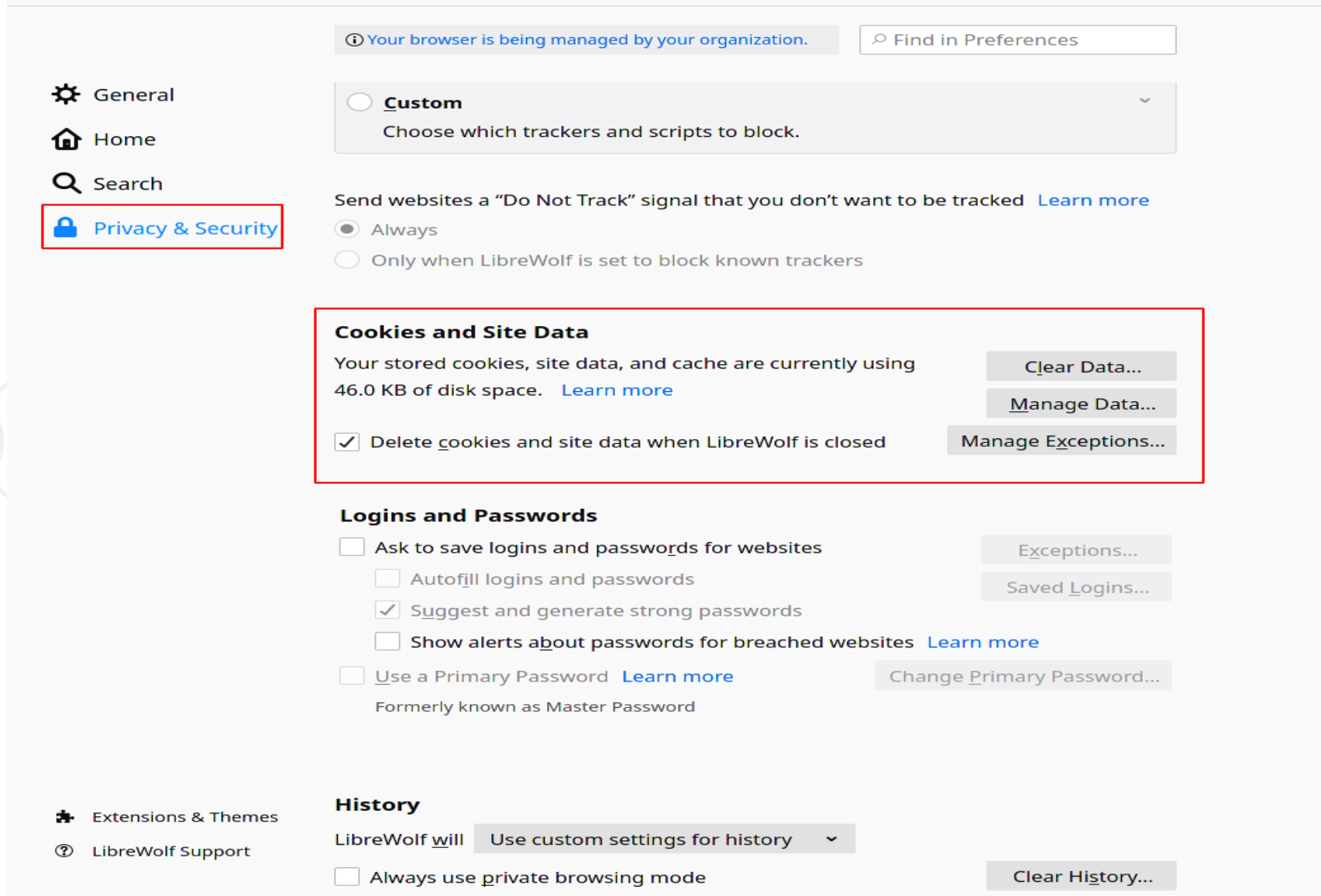
		Name		Host	Expiration date		Created on	
baseDomain	originAttributes	name	value	host	path	expiry	lastAccessed	creationTime
Filter	Filter	Filter	Filter	softuni	Filter	Filter	Filter	Filter
1	softuni.bg	_ga	GA1.2.14749...	.softuni.bg	/	1548331112	1485259173536000	1472458246652000
2	softuni.bg	cb-enabled	enabled	platform.soft...	/	1512124532	1485213524987000	1480588532898000
3	softuni.bg	cookies-notifi...	ok	judge.softuni....	/	1787818276	1485259172447000	1472458276862000
4	softuni.bg	cb-enabled	accepted	softuni.bg	/	1503994248	1485214353890000	1472458248921000

Value

Paths

Last accessed on

# Control Your Cookies – Firefox Browser (1)



The screenshot shows the Firefox Privacy & Security settings page. The left sidebar contains navigation links: General, Home, Search, Privacy & Security (highlighted with a red box), Extensions & Themes, and LibreWolf Support. The main content area has a top bar with a notification "Your browser is being managed by your organization." and a search box "Find in Preferences". Below this is a "Custom" settings section with a dropdown menu. The "Cookies and Site Data" section is highlighted with a red box and contains the following information: "Your stored cookies, site data, and cache are currently using 46.0 KB of disk space. [Learn more](#)", buttons for "Clear Data...", "Manage Data...", and "Manage Exceptions...", and a checked checkbox for "Delete cookies and site data when LibreWolf is closed". The "Logins and Passwords" section includes checkboxes for "Ask to save logins and passwords for websites", "Autofill logins and passwords", "Suggest and generate strong passwords" (checked), and "Show alerts about passwords for breached websites [Learn more](#)", as well as a "Use a Primary Password [Learn more](#)" option with a "Change Primary Password..." button. The "History" section shows "LibreWolf will Use custom settings for history" and a "Clear History..." button.

① Your browser is being managed by your organization. Find in Preferences

General  
Home  
Search  
**Privacy & Security**  
Extensions & Themes  
LibreWolf Support

☐ **Custom**  
Choose which trackers and scripts to block.

Send websites a "Do Not Track" signal that you don't want to be tracked [Learn more](#)

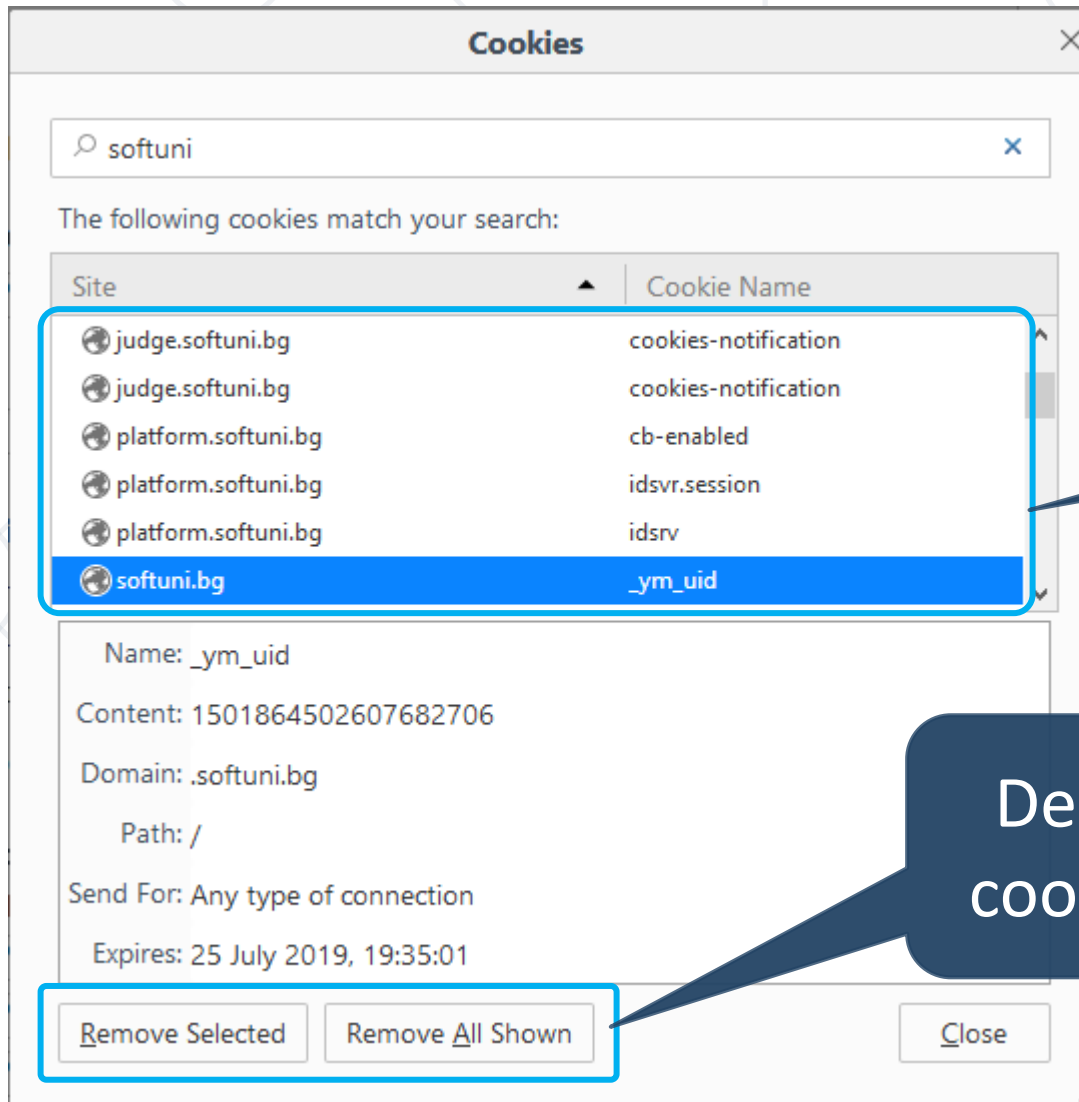
☒ Always  
☐ Only when LibreWolf is set to block known trackers

**Cookies and Site Data**  
Your stored cookies, site data, and cache are currently using 46.0 KB of disk space. [Learn more](#)  
☒ Delete cookies and site data when LibreWolf is closed  
Clear Data...  
Manage Data...  
Manage Exceptions...

**Logins and Passwords**  
☐ Ask to save logins and passwords for websites  
☐ Autofill logins and passwords  
☒ Suggest and generate strong passwords  
☐ Show alerts about passwords for breached websites [Learn more](#)  
☐ Use a Primary Password [Learn more](#)  
Formerly known as Master Password  
Exceptions...  
Saved Logins...  
Change Primary Password...

**History**  
LibreWolf will Use custom settings for history  
☐ Always use private browsing mode  
Clear History...

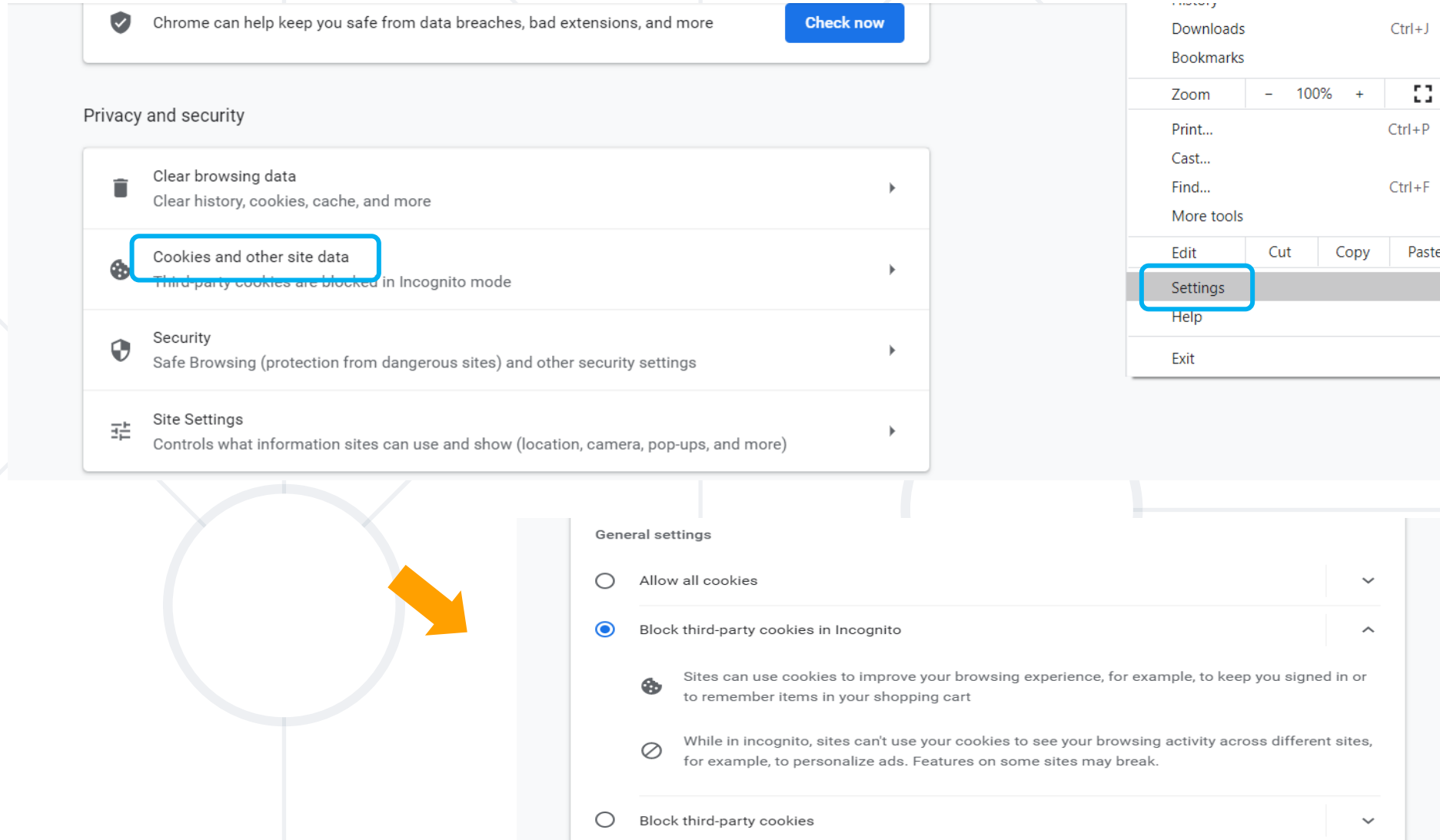
# Control Your Cookies – Firefox Browser (2)



Browse cookies from  
a selected website





Delete a particular  
cookie or all cookies

# Control Your Cookies – Chrome Browser





Chrome can help keep you safe from data breaches, bad extensions, and more [Check now](#)

### Privacy and security

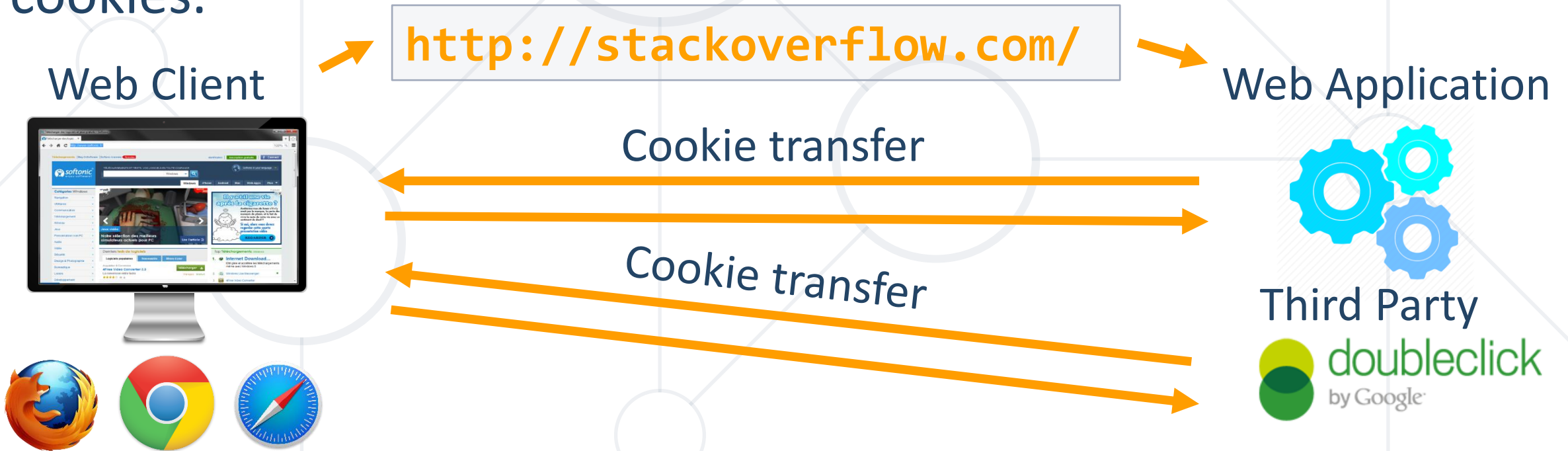
-  Clear browsing data  
Clear history, cookies, cache, and more
-  **Cookies and other site data**  
Third-party cookies are blocked in Incognito mode
-  Security  
Safe Browsing (protection from dangerous sites) and other security settings
-  Site Settings  
Controls what information sites can use and show (location, camera, pop-ups, and more)

### General settings

- ☐ Allow all cookies
- ☒ Block third-party cookies in Incognito
  -  Sites can use cookies to improve your browsing experience, for example, to keep you signed in or to remember items in your shopping cart
  -  While in incognito, sites can't use your cookies to see your browsing activity across different sites, for example, to personalize ads. Features on some sites may break.
- ☐ Block third-party cookies

# Third Party Cookies

- Cookies stored by an **external party** (different **domain**)
- Mainly used for advertising and tracking across the web
- By the end of 2023, Google will stop the use of third-party cookies.





# Cookies

## Live Demo

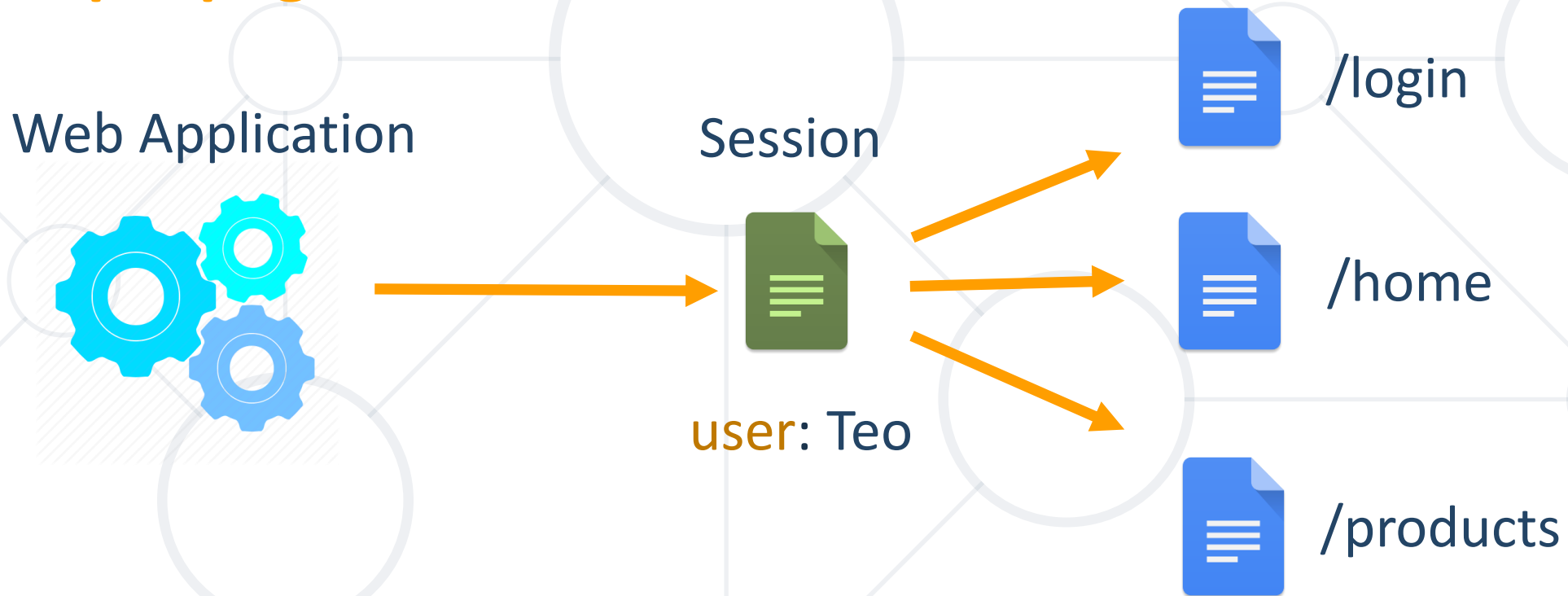


**HTTP Sessions**



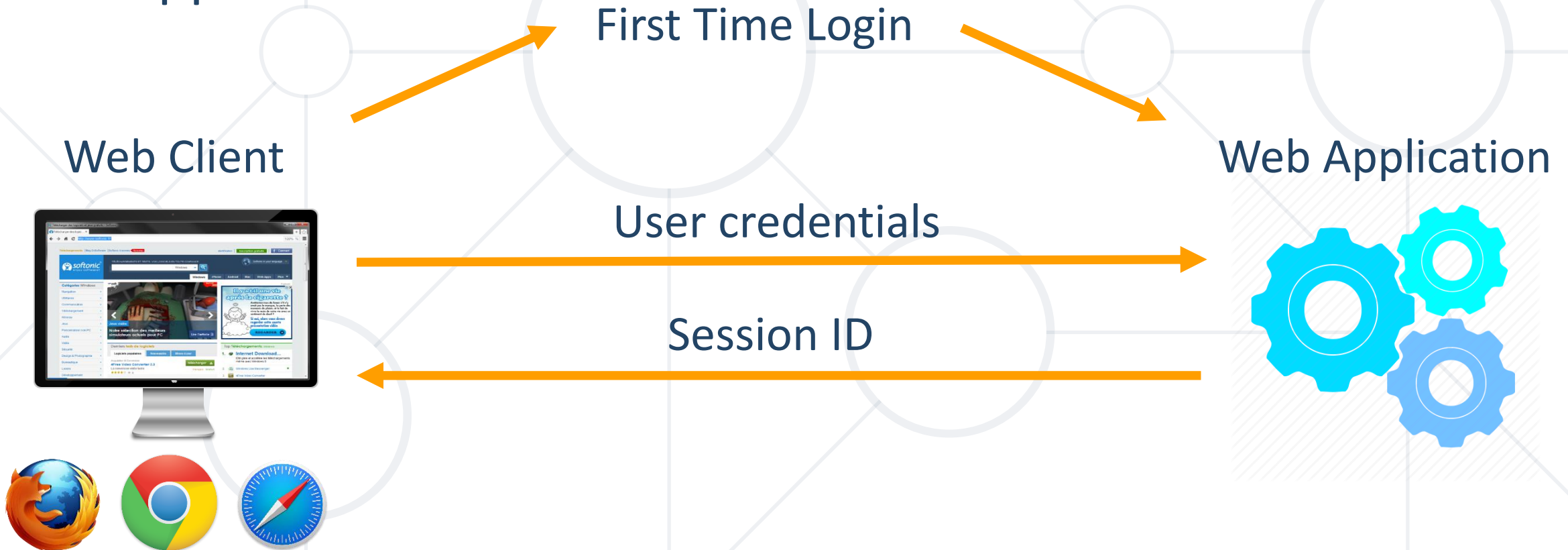
# What Are Sessions?

- A way to store information about a user to be used across **multiple pages**



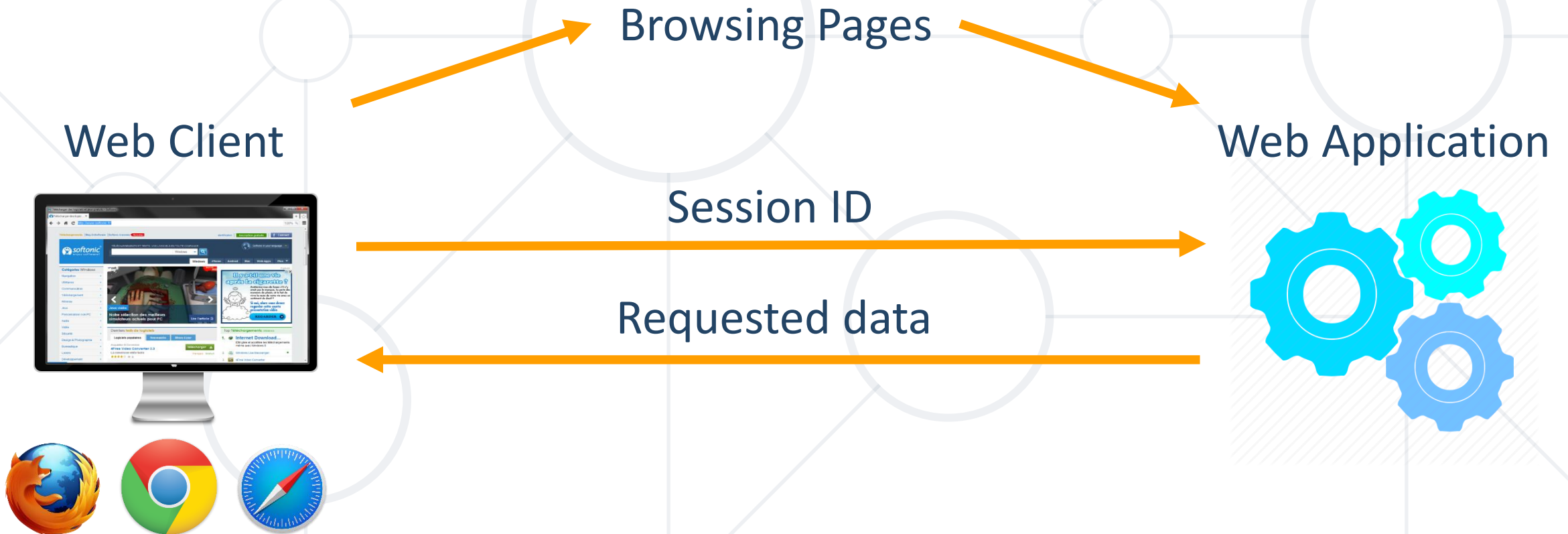
# Session Management (1)

- The exchange mechanism be used between the user and the web application



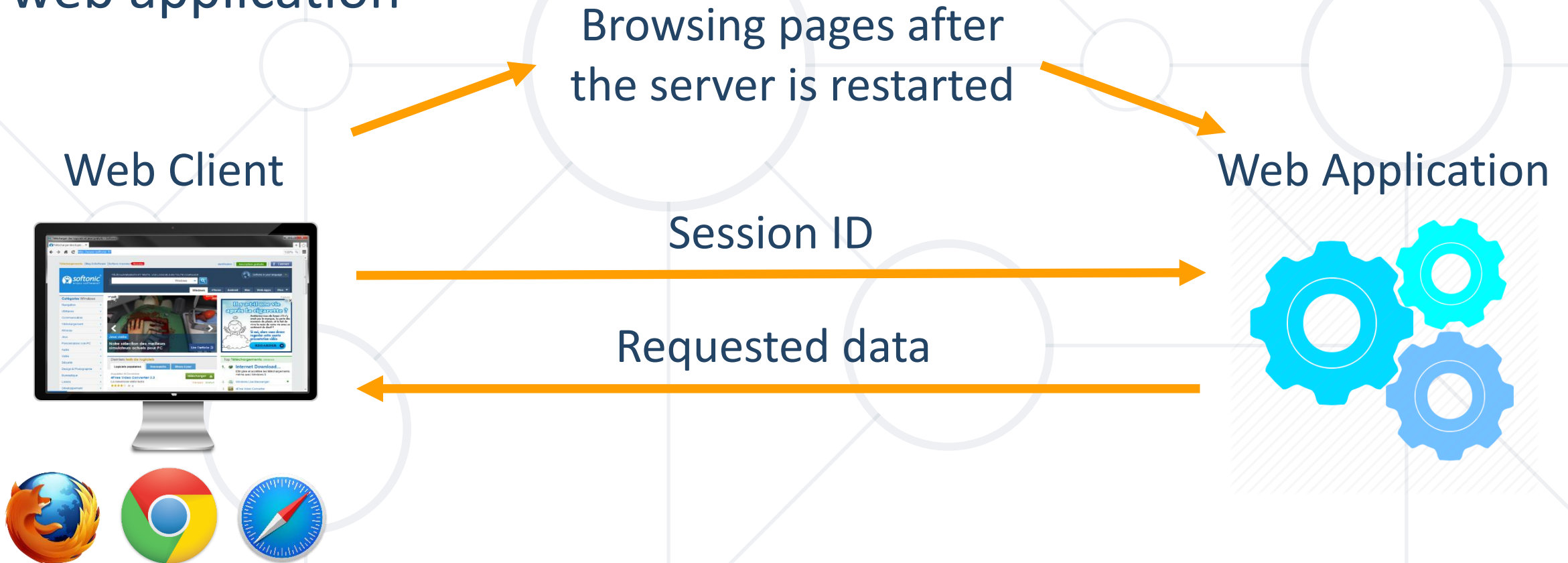
# Session Management (2)

- The exchange mechanism be used between the user and the web application

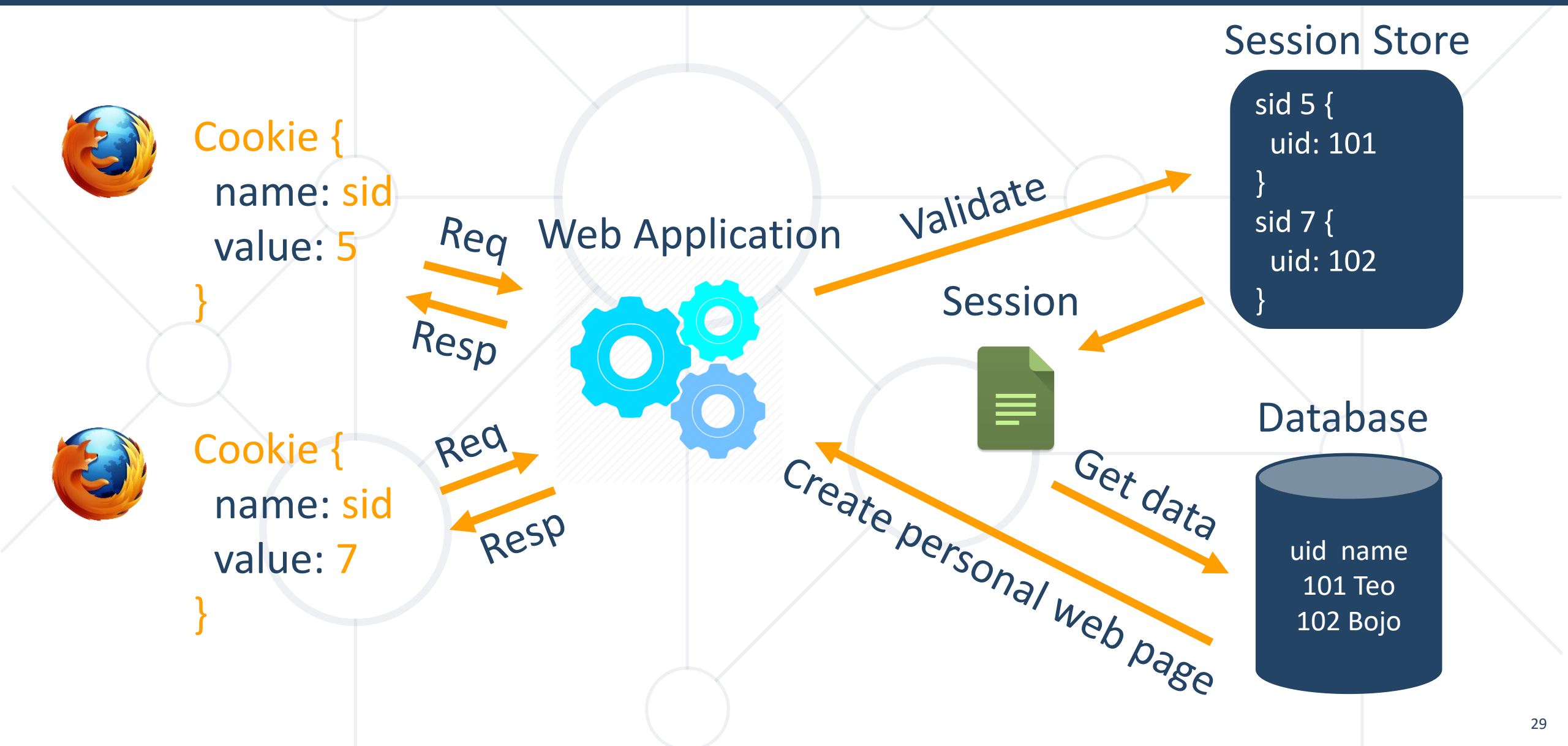


# Session Management (3)

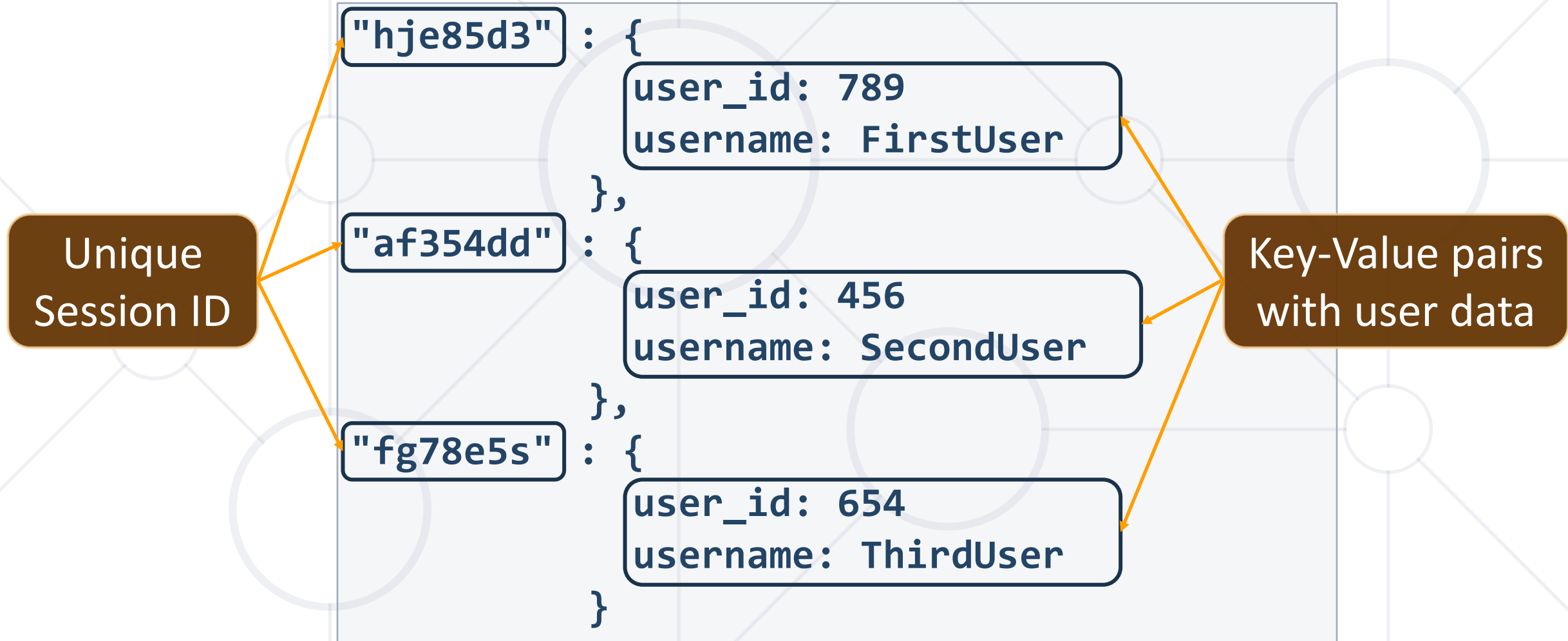
- The exchange mechanism be used between the user and the web application



# Relation with Cookies



# Session Structure





# Sessions

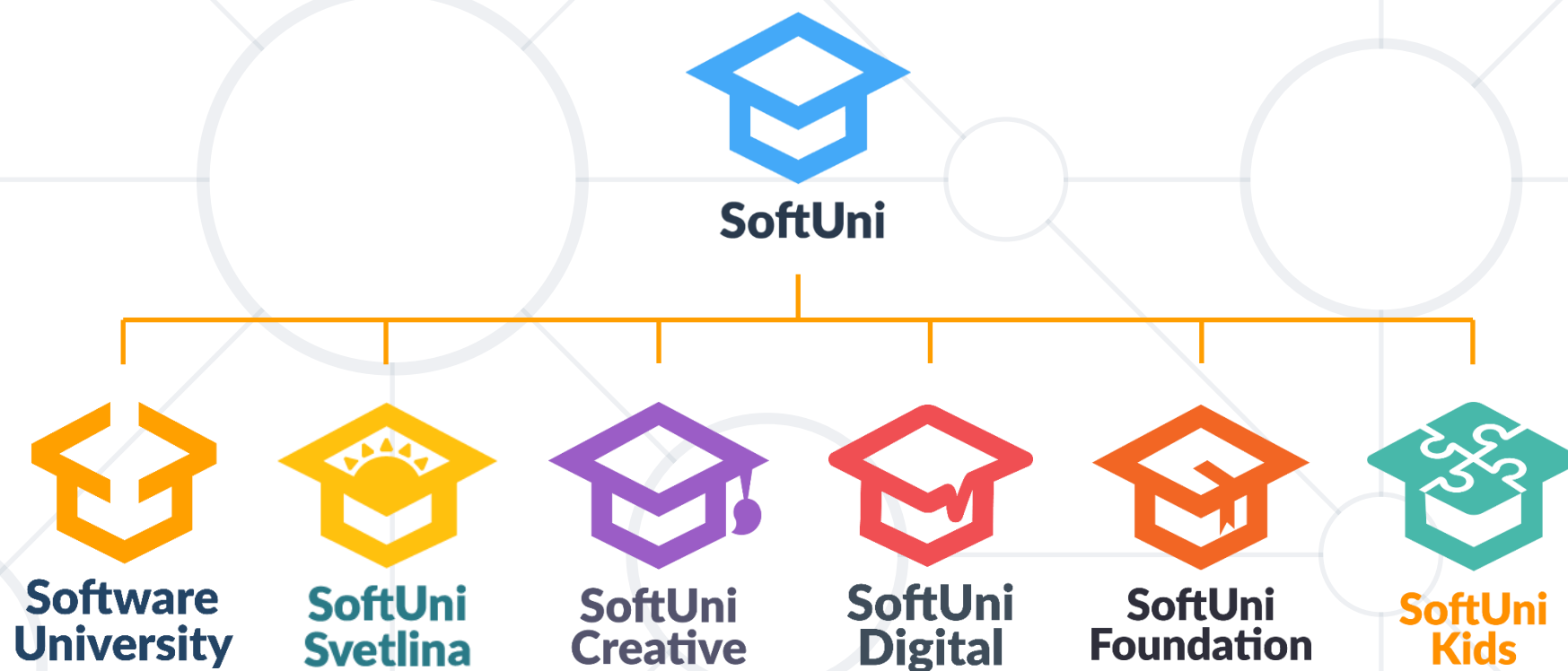
## Live Demo

- **Cookies** are client based stored information
  - They are created by web applications
  - Browser sends them back to the application
- **Sessions** are server based information
  - They are used across multiple pages
  - Stores important info about the client





# Questions?



# SoftUni Diamond Partners

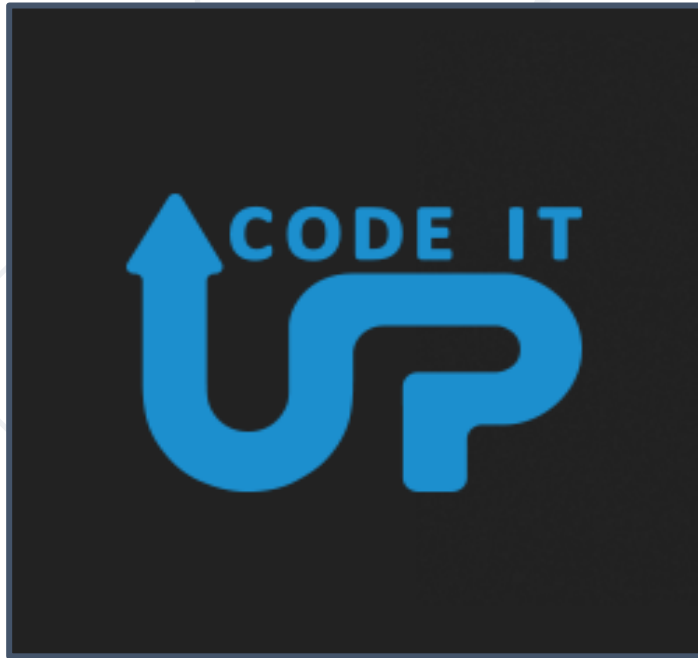


**SCHWARZ**



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**VIRTUAL RACING SCHOOL**



- Software University – High-Quality Education, Profession and Job for Software Developers

- [softuni.bg](http://softuni.bg), [about.softuni.bg](http://about.softuni.bg)

- Software University Foundation

- [softuni.foundation](http://softuni.foundation)

- Software University @ Facebook

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