

HTTP continued....

Claudia Hauff

TI1506: Web and Database Technology

ti1506-ewi@tudelft.nl

Authentication

Authentication: a system verifying the identity of a user who requests access.

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- C. **Fat URLs**
- D. **User login** (HTTP Basic Authentication)

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In later lectures: Cookies & Sessions

User-related HTTP header fields

From	Request	User's email address	mostly Web crawler
User-Agent	Request	User's browser	device customization
Referer	Request	Page the user came from	user interests
Client-IP	Request (Extension)	Client's IP address	
Authorization	Request	Username & password	

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 - D. HTTP **proxies** and **gateways** open new TCP connections (IP of the proxy/gateway is shown), **X-Forwarded-For** might help (it quickly gets complicated)

Fat URLs

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```
<a href="/browse/002-1145265-8016838">Gifts</a>
<a href="/wishlist/002-1145265-8016838">Wish List</a>
```

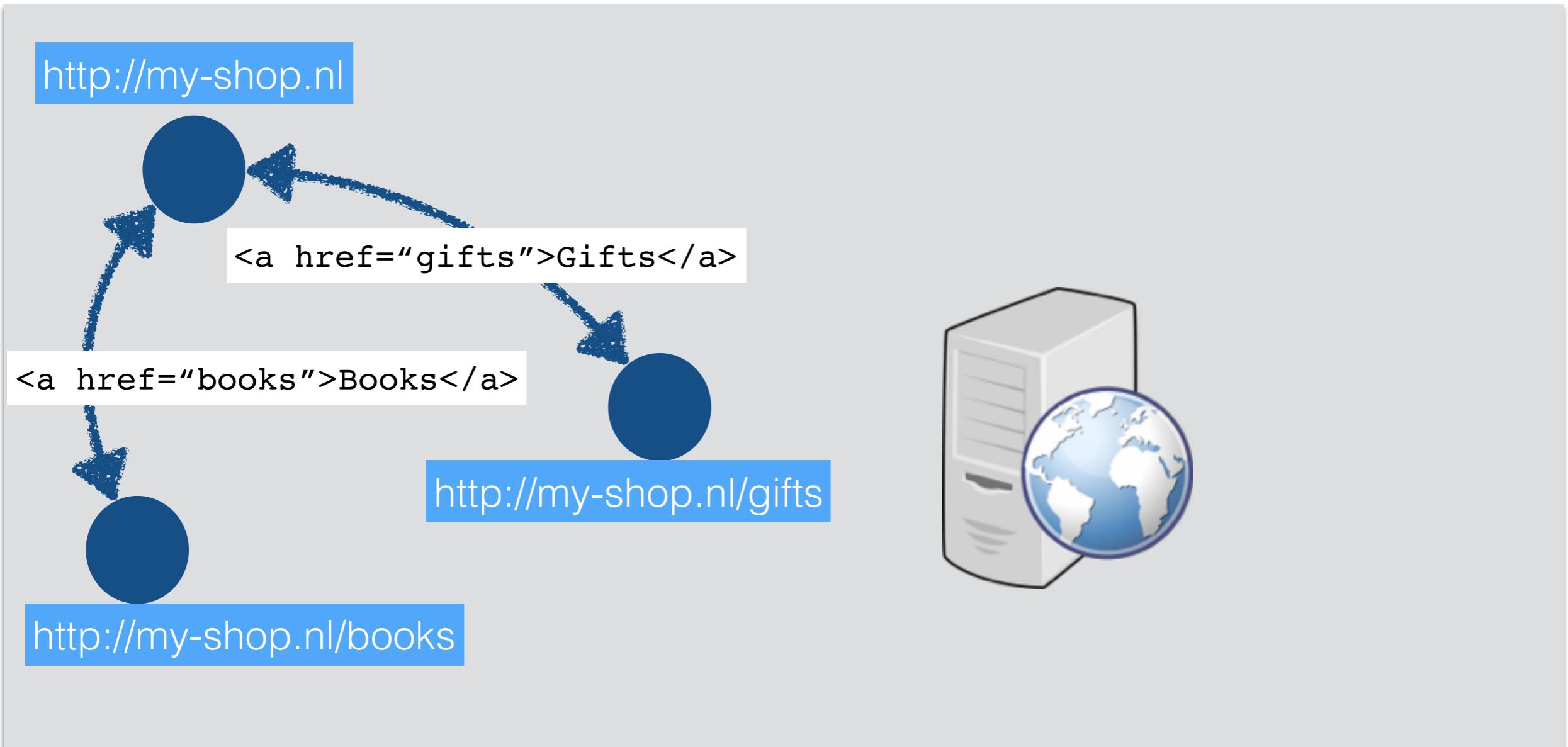
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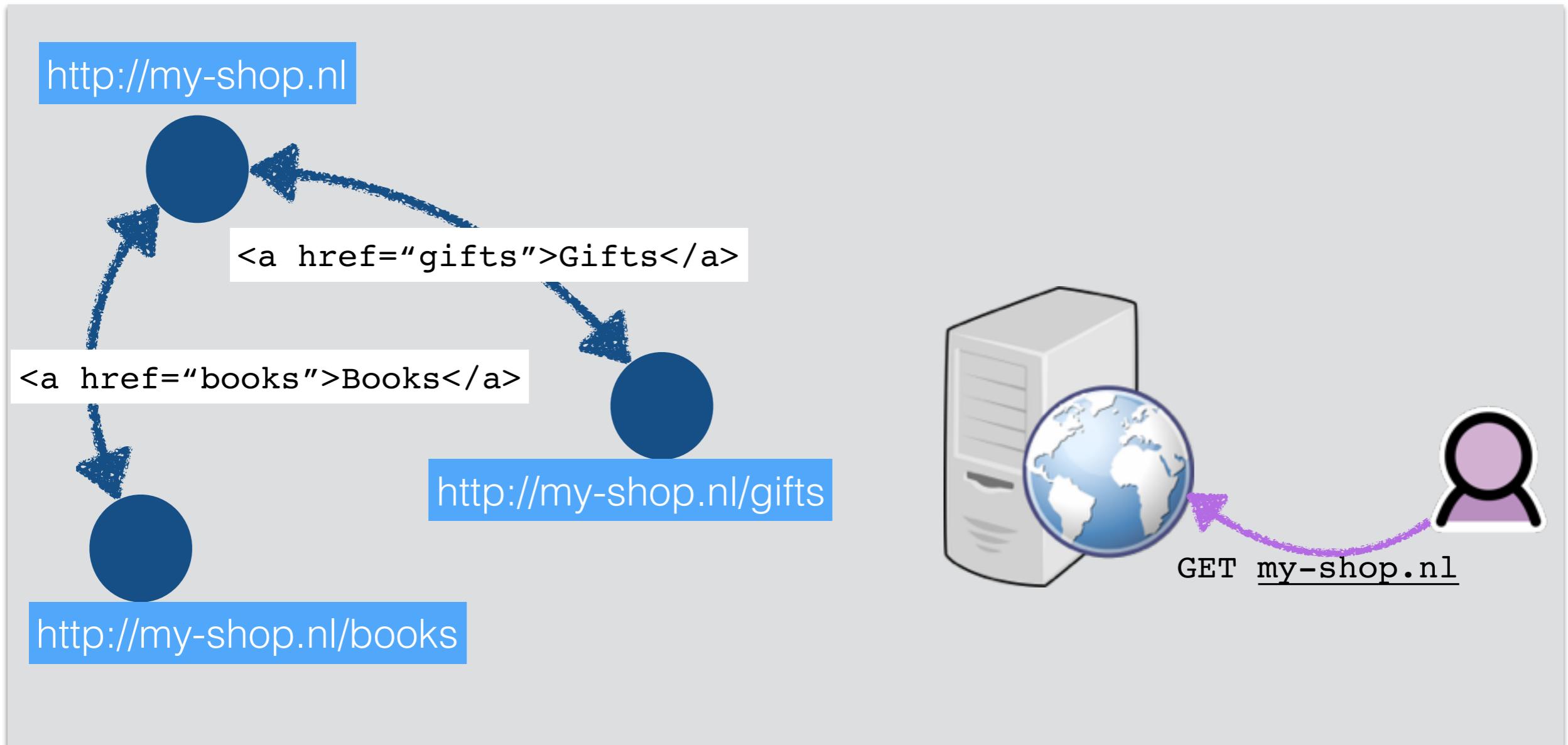
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- Independent HTTP transactions can be tied into a single “session”

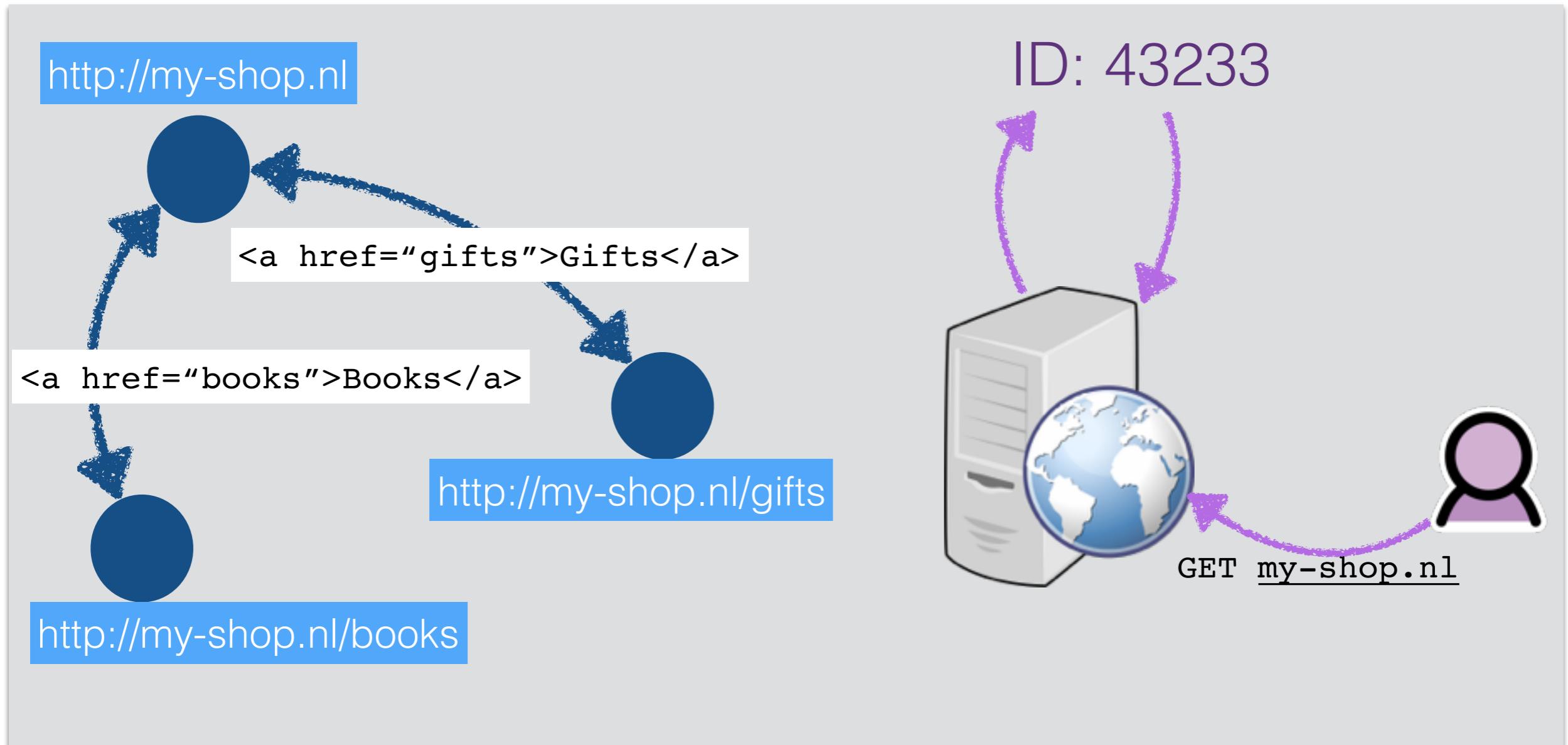
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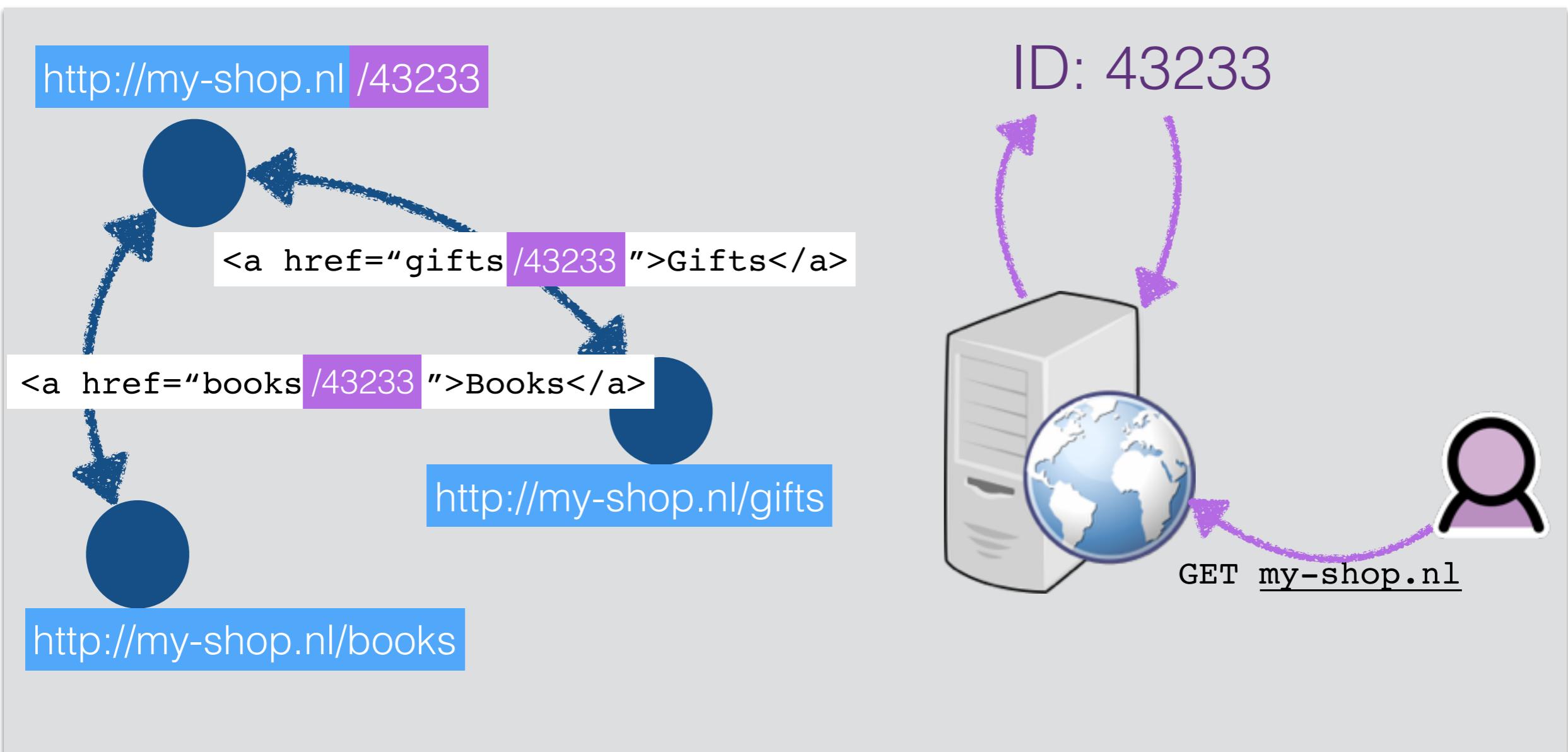
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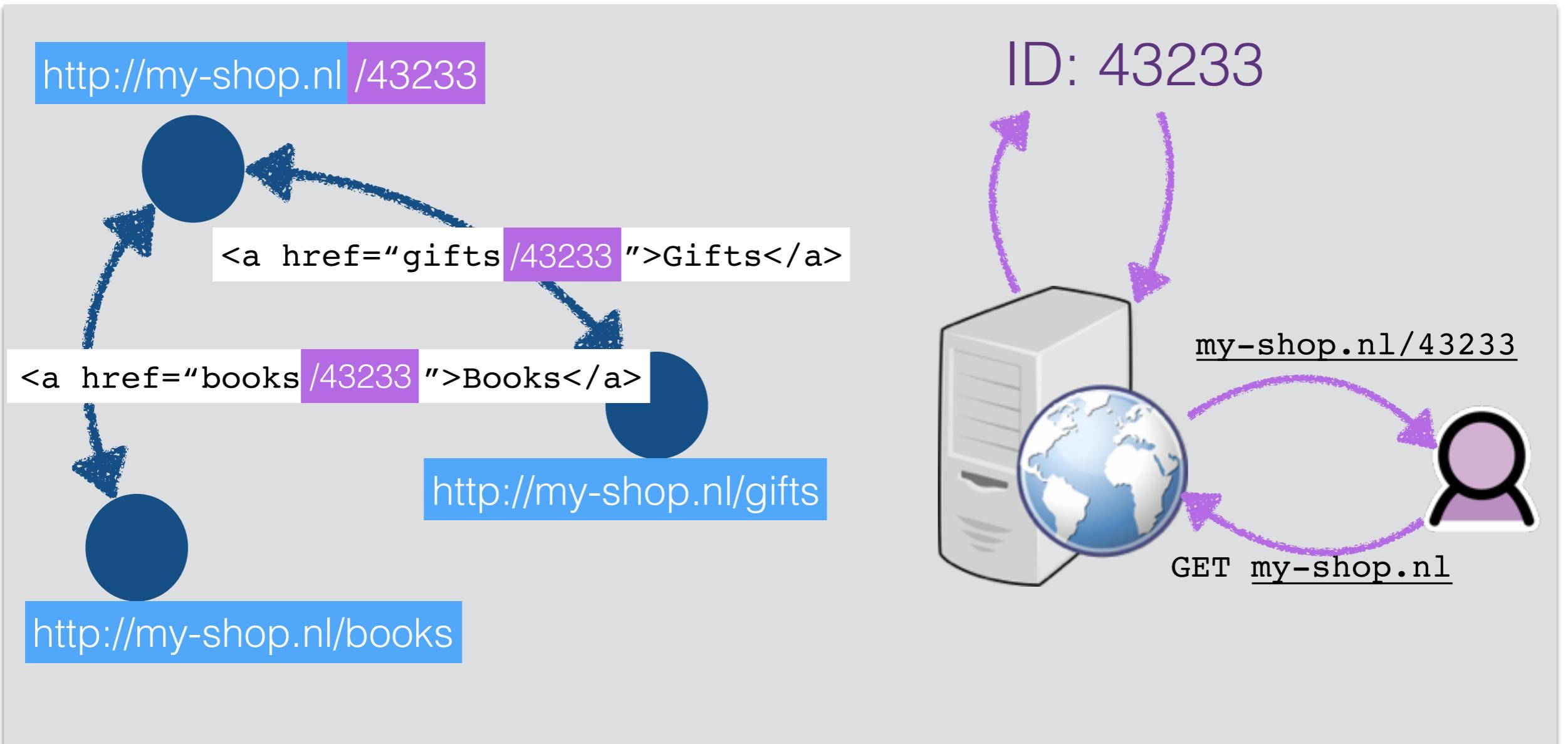
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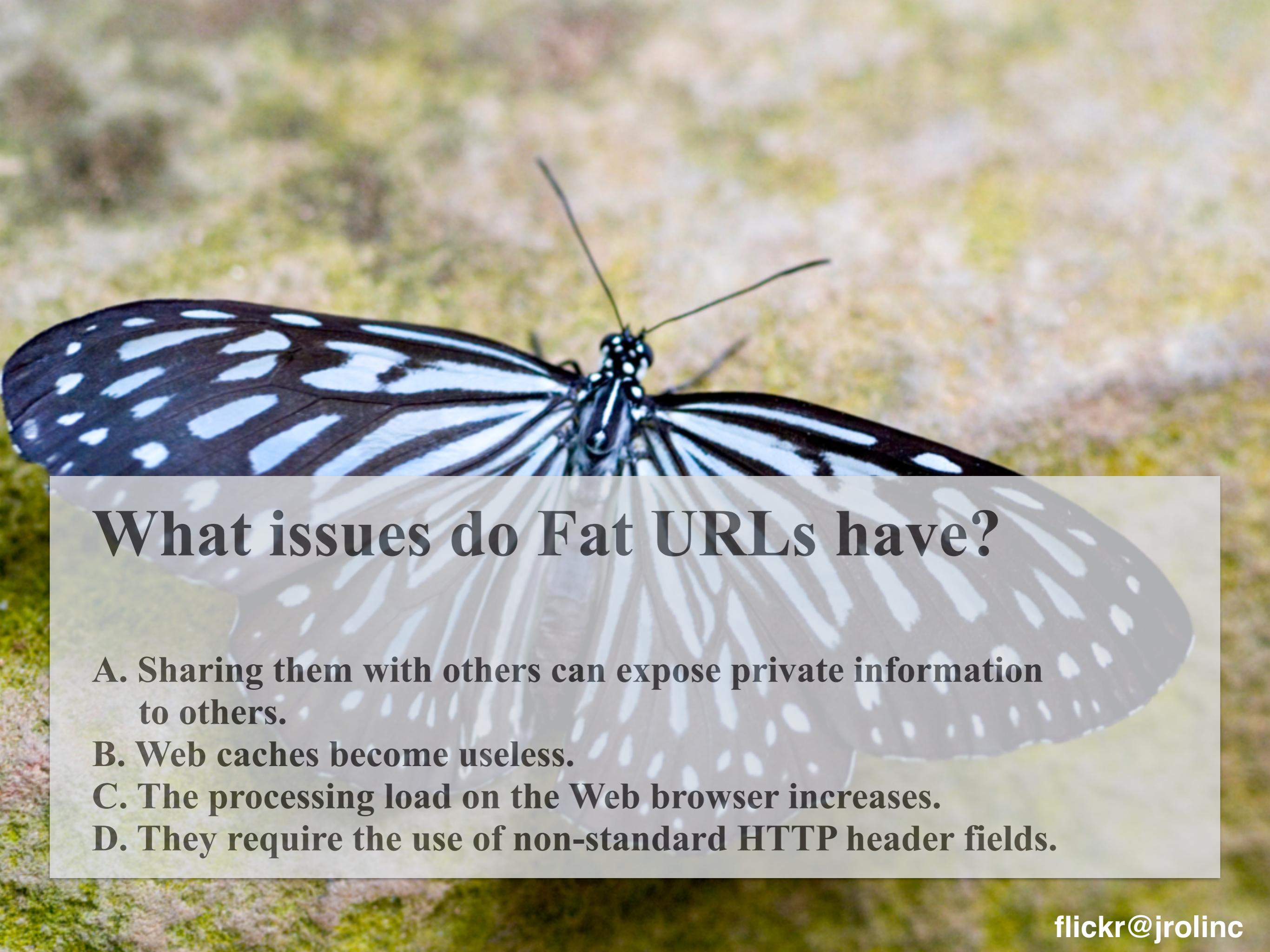


Fat URLs



Fat URLs





What issues do Fat URLs have?

- A. Sharing them with others can expose private information to others.**
- B. Web caches become useless.**
- C. The processing load on the Web browser increases.**
- D. They require the use of non-standard HTTP header fields.**

Fat URLs

- Fat URLs are **ugly**
- Fat URLs **cannot be shared** (URL may not exist later or user inadvertently shares private info)
- Fat URLs **break caching** mechanisms (one URL per user/page instead of one URL per page)
- **Extra server load** (HTML page rewrites necessary)
- Users can “**escape**” (ID is lost when user navigates outside the Web site)

HTTP basic authentication

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- Server explicitly asks the user for authentication
(username and password)

HTTP basic authentication

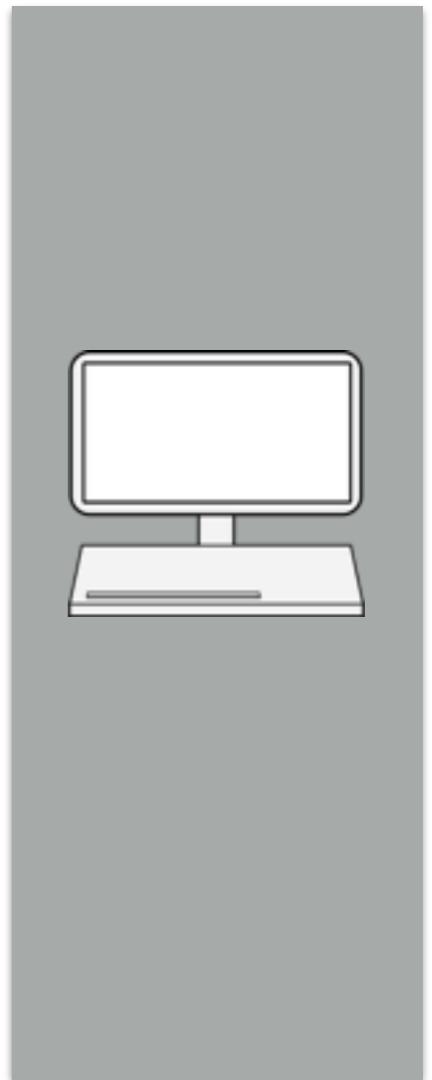
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- HTTP has a **built-in mechanism** to support username/password based authentication via `WWW-Authenticate` and `Authorization` headers
- HTTP is **stateless**: once logged in, the client sends the login information with each request

Put into practice
in Assignment 1

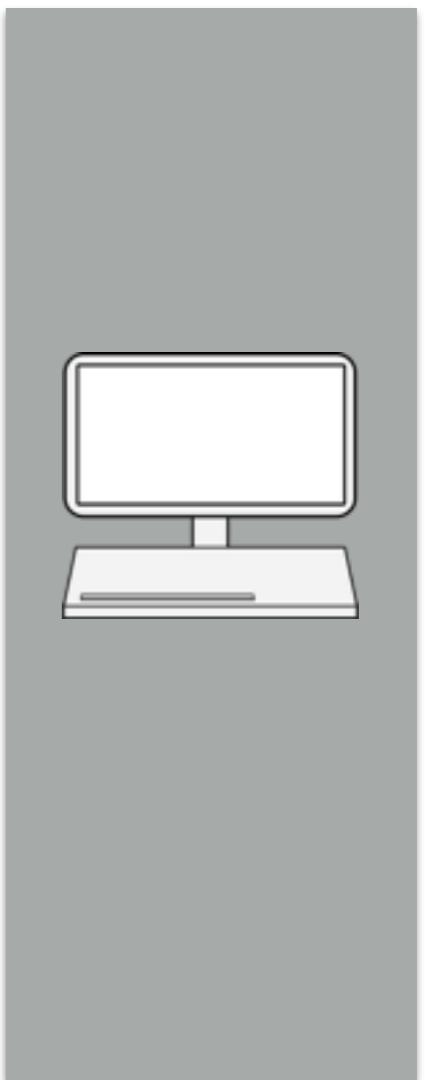
HTTP basic authentication



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1 GET /index.html HTTP/1.1
host: www.microsoft.com



HTTP basic authentication



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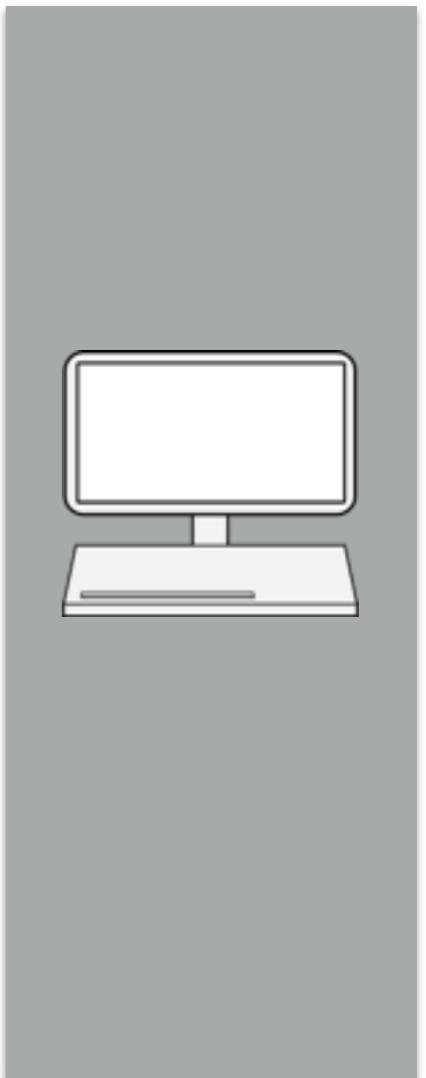


1
GET /index.html HTTP/1.1
host: www.microsoft.com

HTTP/1.1 401 Login Required

WWW-Authenticate: Basic realm="B&R"

2
security realm and authentication algorithm



HTTP basic authentication



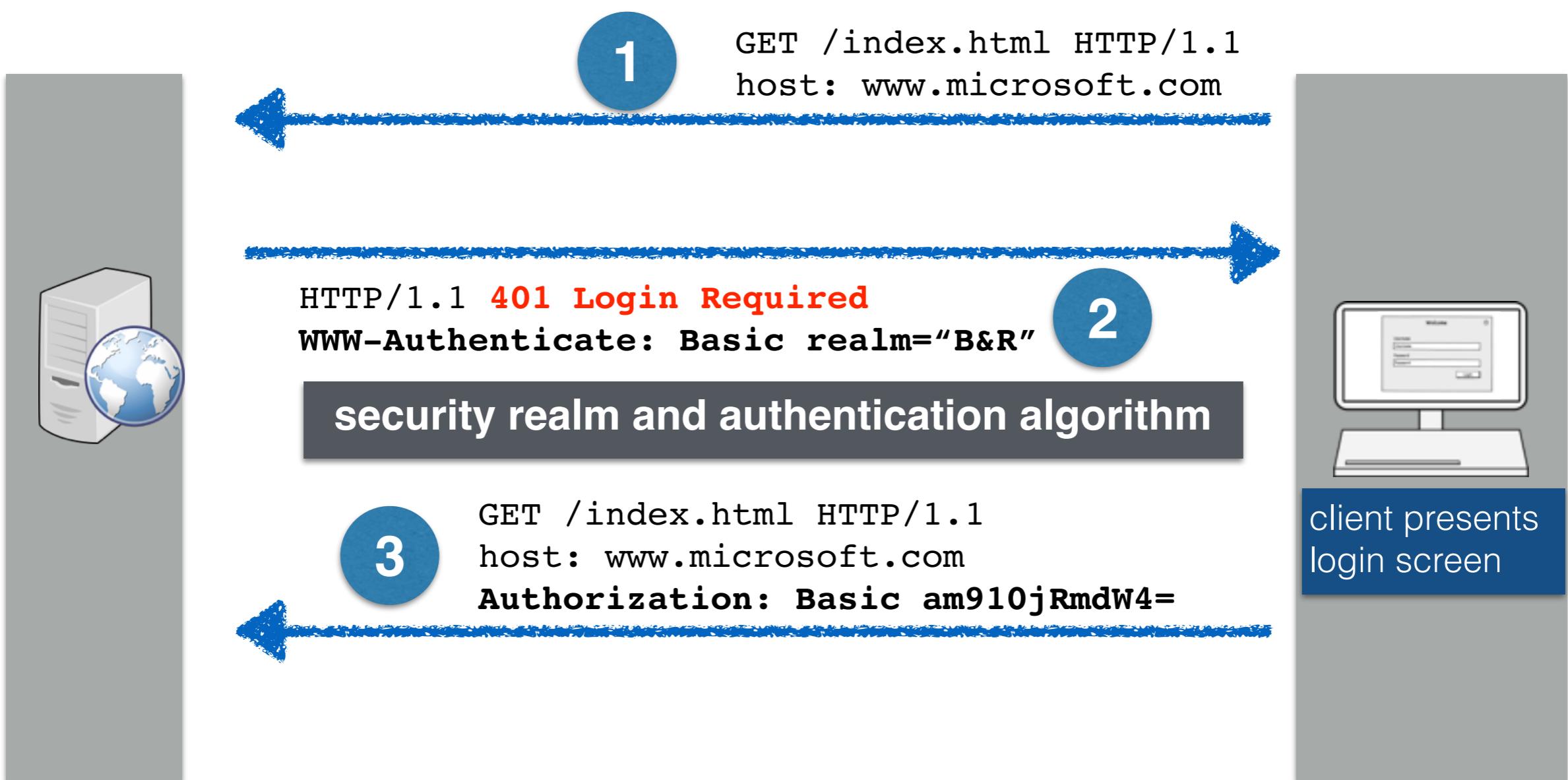
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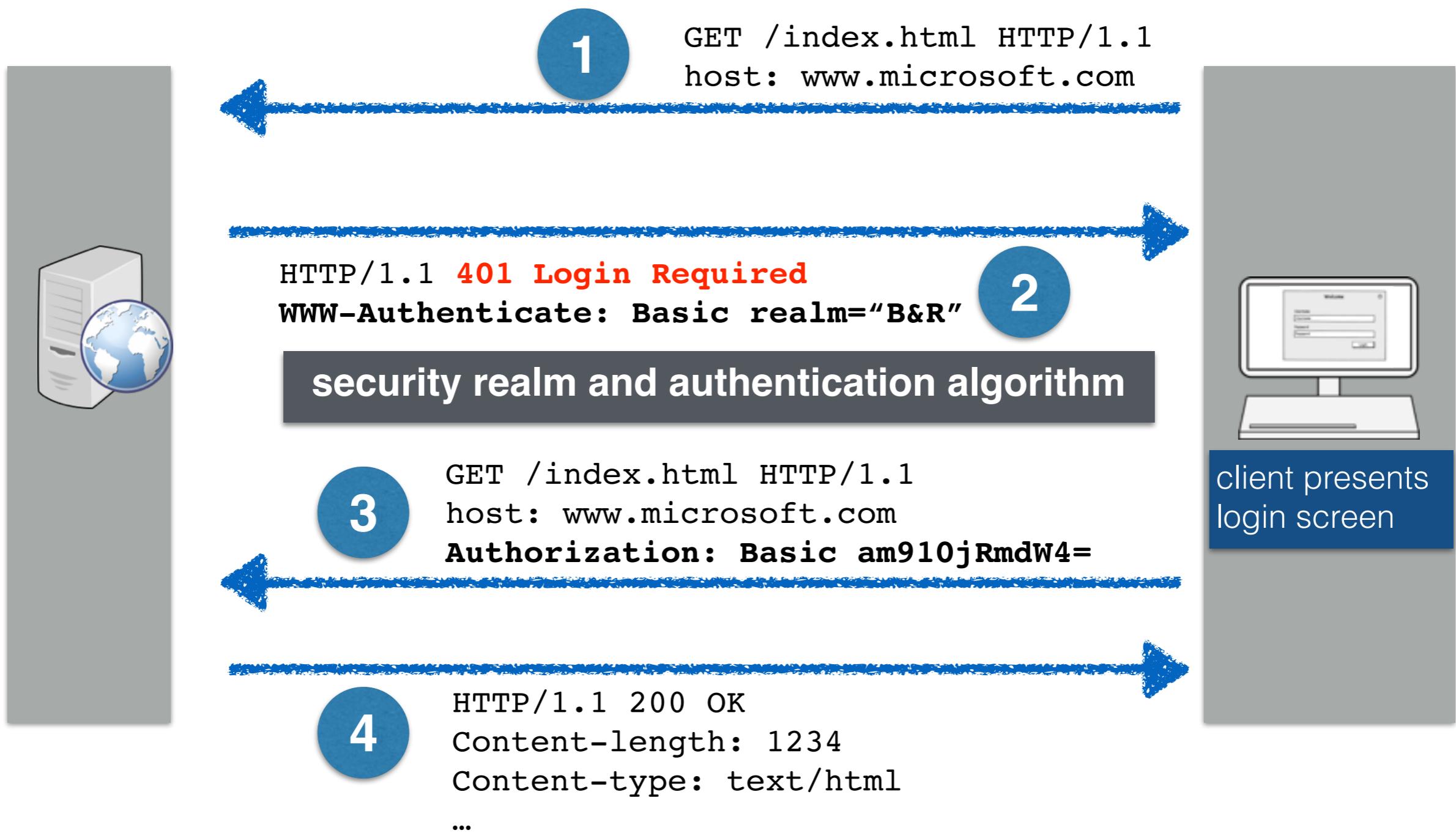
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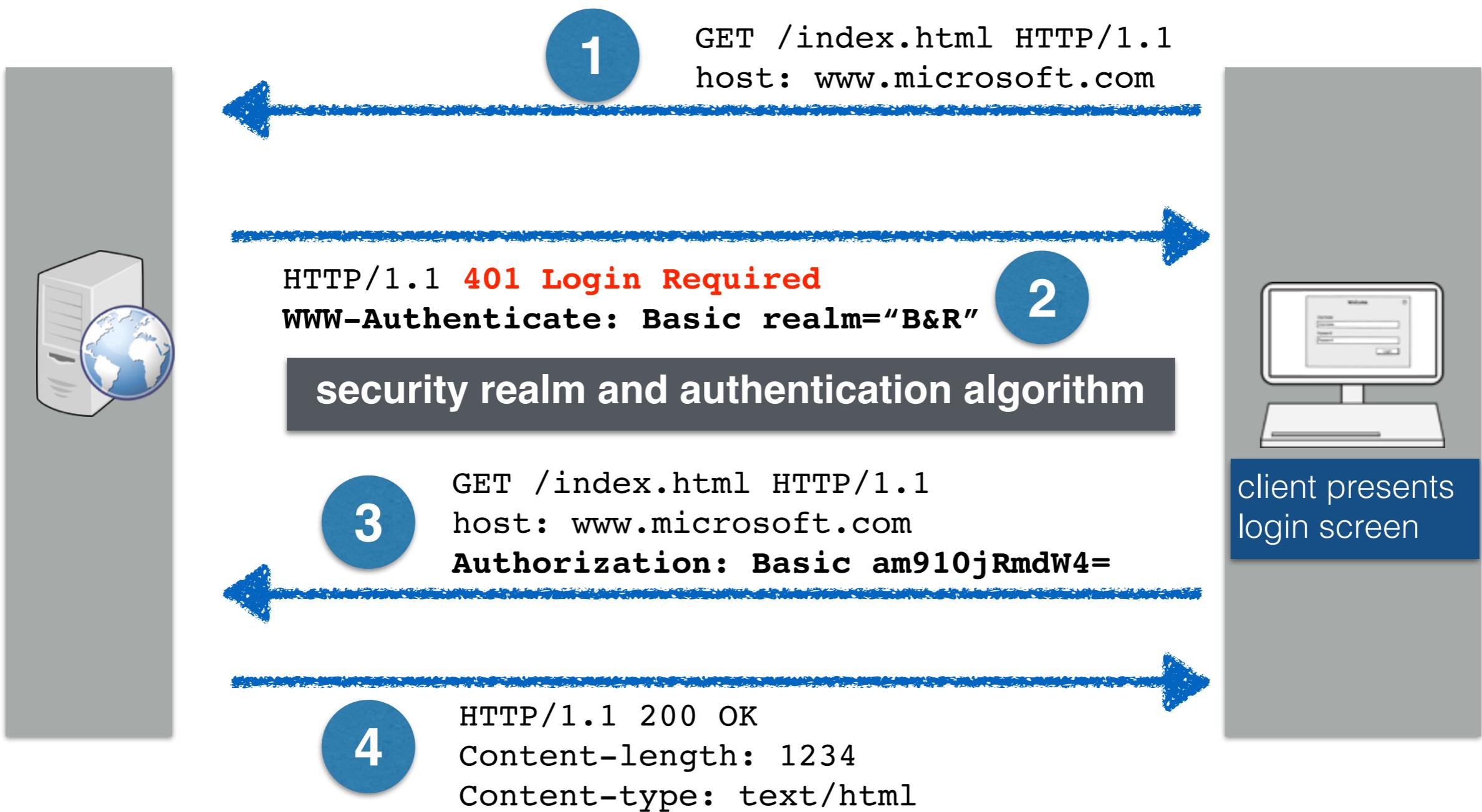
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In future HTTP requests to the site, the browser automatically issues the stored username/password.

HTTP basic authentication

Authorization: Basic

- Username and password are joined together by a colon and converted to **base-64 encoding** (binary-to-text encoding)
- Base-64 encoding ensures that **only HTTP compatible characters** are entered into the message (takes as input binary, text and international character data strings)

Normandië

Tm9ybWFuZGnDqw==

Delft

RGVsZnQ=

España

RXNwYcOxYQ==

Images can be encoded
this way too!

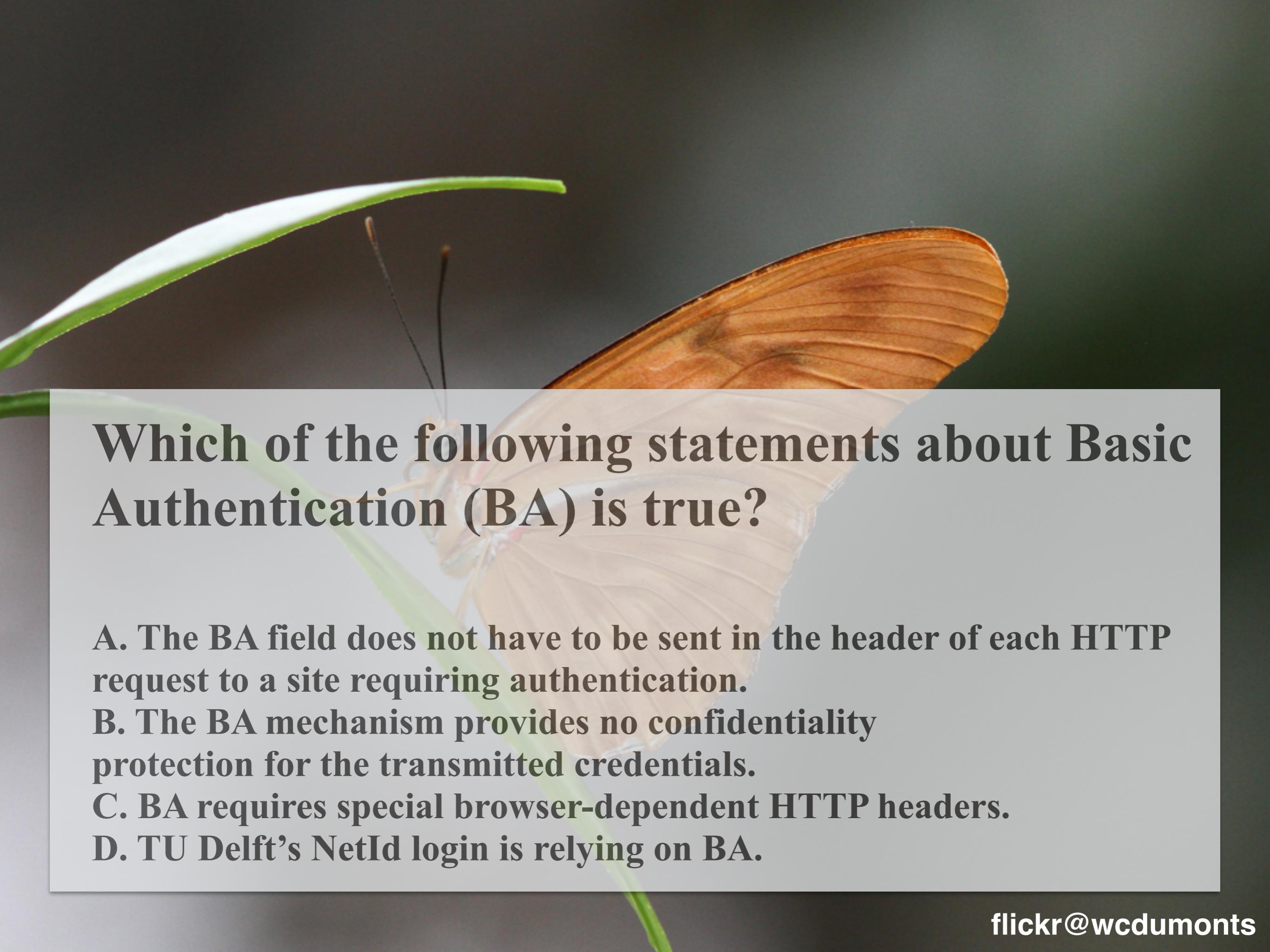
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HTTP basic authentication: secure?

- Username and password can be **decoded trivially** (sent over the network “in the clear”)
- Users tend to **reuse** login/password combinations; a non-critical web site may use basic authentication without SSL that an opponent can capture and try on critical sites



Which of the following statements about Basic Authentication (BA) is true?

- A. The BA field does not have to be sent in the header of each HTTP request to a site requiring authentication.
- B. The BA mechanism provides no confidentiality protection for the transmitted credentials.
- C. BA requires special browser-dependent HTTP headers.
- D. TU Delft's NetId login is relying on BA.

HTTP basic authentication: overall

Basic authentication prevents **accidental** or **casual access** by curious users (privacy is desired but not essential).

Basic authentication is useful for **personalisation** and access control within a “friendly” environment (intranet).

“In the wild”, basic authentication should always be used in combination with **secure HTTP (e.g. https)** — avoids sending username/password **in the clear** across the network.

Secure HTTP

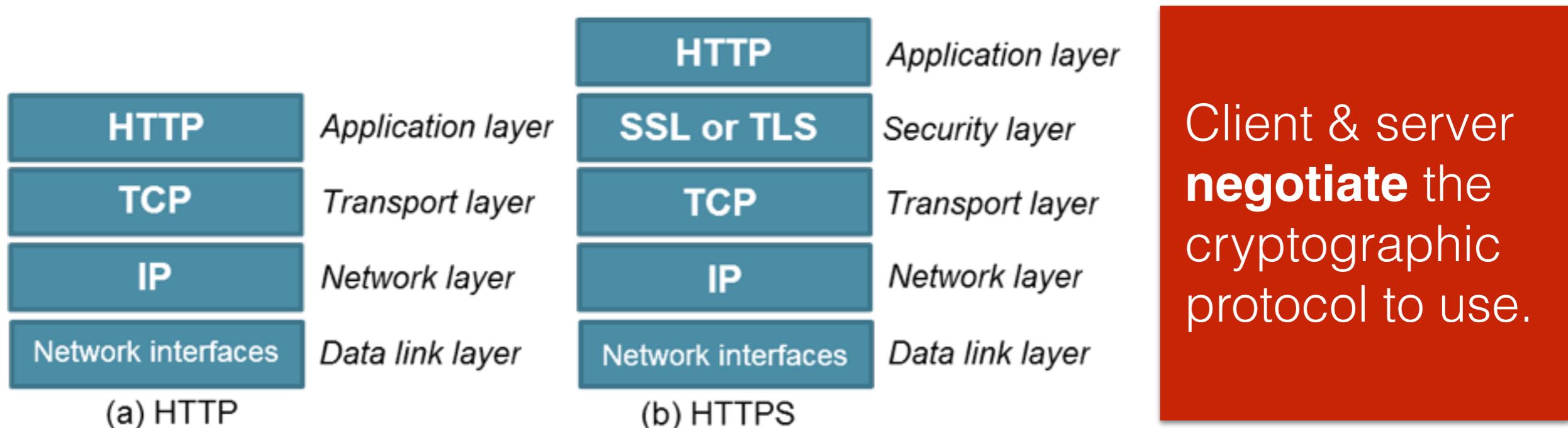
Secure HTTP

- So far: **lightweight** authentication
 - Not useful for purchasing, bank transactions or confidential data
- Secure HTTP should provide:

- A. **Server authentication** (client is sure to talk to the right server)
- B. **Client authentication** (server is sure to talk to the right client)
- C. **Integrity** (client and server are sure their data is intact)
- D. **Encryption**
- E. **Efficiency**

Secure HTTP: HTTPS

- HTTPS is the most popular secure form of HTTP
- URL scheme is `https://` instead of `http://`
- Request and response data are **encrypted** before being sent across the network (SSL: Secure Socket Layer)





HTML: the language of the Web

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Lectures vs. book chapters

- Each lecture **covers one main topic**
- Each book chapter **focuses** on one topic but also covers other topics
- All **required** readings are **relevant** for this course (**midterm/exam**)

O'REILLY®



Learning Web App Development

BUILD QUICKLY WITH PROVEN JAVASCRIPT TECHNIQUES

Semmy Purewal

At the end of this lecture, you should be able to ...

- **Apply** Web design principles during the design stage of a Web app
- **Explain** the ideas behind usability testing and **employ** it
- **Create** Web apps that can function offline

Create basic HTML documents containing forms

Self-study!

Web sites vs. Web applications

“As Web browsers and the Web engine components that power them become ubiquitous [...], developers are increasingly **using Web technologies** to build **applications** and are relying on Web engines as **application runtime environments**.

Examples of applications now commonly built using Web technologies include [...] **games**, **multimedia applications**, **maps** ...”

Not just for the Web: ELECTRON



Build cross platform desktop apps
with JavaScript, HTML, and CSS



Web design basics

Disclaimer

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Steve Krug



**DON'T
MAKE
ME
THINK**
revisited

and Mobile
A Common Sense Approach to Web Usability

Rule#1: Don't make me think

- The way a web site/app “works”, should be self-evident
- Users’ **cognitive effort** should be **minimal**

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The screenshot shows the eBay homepage. At the top, there's a navigation bar with the eBay logo, a search bar, and category links like 'All Categories', 'Search', and 'Advanced'. Below the navigation is a main menu with categories: My Feed, Collections (which is underlined), Motors, Fashion, Electronics, Collectibles & Art, Home & Garden, Sporting Goods, Toys & Hobbies, and Deals & Gifts. A promotional banner for 'Gear Up for School' features a yellow backpack and books, with a 'Shop now' button. Another banner for 'ebay deals' says 'IT IS A BIG DEAL' with a 'Shop now' button. The main content area has a large background image of a boat on water. On the left, there's a sidebar for 'Today's Top Collection' titled 'Style Your Summer' with descriptions of various fashion items like earrings, handbags, and sunglasses.

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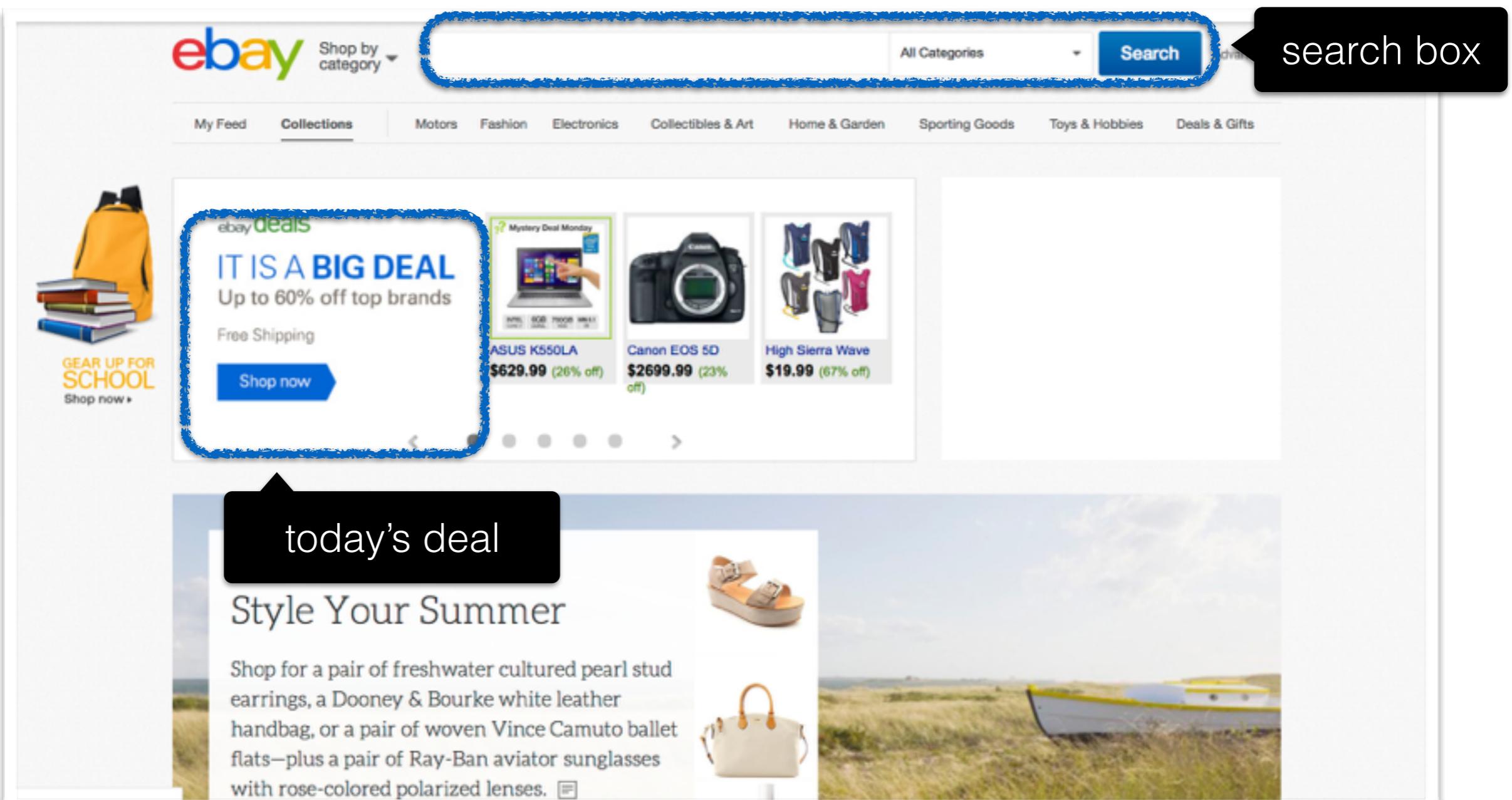
The screenshot shows the eBay homepage. At the top, there's a navigation bar with the eBay logo, a search bar, and category links like 'All Categories', 'Search', and 'Advanced'. Below the navigation is a horizontal menu with categories: My Feed, Collections (which is underlined), Motors, Fashion, Electronics, Collectibles & Art, Home & Garden, Sporting Goods, Toys & Hobbies, and Deals & Gifts.

On the left side, there's a promotional banner for 'GEAR UP FOR SCHOOL' featuring a yellow backpack and books. A blue rounded rectangle highlights a 'ebay deals' section with the text 'IT IS A BIG DEAL Up to 60% off top brands' and 'Free Shipping'. It includes a 'Shop now' button and a small image of a laptop. To the right of this are four product cards: an ASUS K550LA laptop for \$629.99 (26% off), a Canon EOS 5D camera for \$2699.99 (23% off), and two High Sierra Wave bags for \$19.99 (67% off).

Below these banners, a large black callout box contains the text 'today's deal' and 'Style Your Summer'. It describes items like freshwater cultured pearl stud earrings, a Dooney & Bourke white leather handbag, and Vince Camuto ballet flats. To the right of this text is a photograph of a boat on a grassy shore.

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The screenshot shows the eBay homepage with several UI elements highlighted by blue hand-drawn style circles:

- product categories**: Points to the horizontal navigation bar below the header.
- search box**: Points to the search input field in the top right corner.
- today's deal**: Points to a promotional banner for "IT IS A BIG DEAL".

Other visible elements include:

- ebay deals**: A section featuring discounted items like an ASUS K550LA laptop and Canon EOS 5D camera.
- GEAR UP FOR SCHOOL**: A promotional section with a yellow backpack icon.
- Style Your Summer**: A promotional banner for summer fashion items.
- Shop for a pair of freshwater cultured pearl stud earrings, a Dooney & Bourke white leather handbag, or a pair of woven Vince Camuto ballet flats—plus a pair of Ray-Ban aviator sunglasses with rose-colored polarized lenses.**: Text describing the summer deal items.

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The screenshot shows the homepage of Koopplein.nl. At the top left is the logo 'KOOPPLEIN.NL' with 'GRATIS & LOKAAL' below it, featuring a green recycling symbol. The main heading 'WELKOM!' and 'KIES HIER JE KOOPPLEIN' is displayed prominently, with the subtitle 'De gratis marktplaats in je eigen gem' underneath. A large green arrow graphic is visible in the background. A blue button labeled 'Nederland' is on the right. Below the header, there are input fields for 'Je postcode:' (1234 AB) and 'Of woonplaats:' (with a placeholder 'Typ hier je woonplaats...'). To the right of these fields is another 'Of' button. A green bar below contains the text 'Beginletter gemeente:' followed by a list of letters from A to Z. The bottom section is divided into two columns: 'Nieuws' on the left and 'Bekijk hieronder onze introductiefilm' on the right. Both columns contain descriptive text and a 'Lees verder »' link. A large green thumbs-up icon is at the bottom center.

WELKOM!
KIES HIER JE KOOPPLEIN
De gratis marktplaats in je eigen gem

Je postcode: 1234 AB Of woonplaats: Typ hier je woonplaats... Of

Beginletter gemeente:
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Nieuws
Blijf op de hoogte van alle gratis artikelen op Koopplein.nl en volg ons op Twitter! Om het gebruikers nog gemakkelijker te maken, zal Koopplein Nederland alle advertenties uit de rubriek 'Gratis aangeboden' van alle lokale Kooppleinen twitteren. Op die manier kunnen geïnteresseerden snel reageren en hoeven zij ook onderweg niets van Koopplein te missen. Gebruikers kunnen ook hun eigen advertenties eenvoudig delen met hun netwerk via social media als LinkedIn, Twitter en Facebook. Via de bek...

[Lees verder »](#)

Bekijk hieronder onze introductiefilm
Uitgever worden van onze snel groeiende formule Koopplein.nl? Wanneer in jouw gemeente nog geen licentie is afgegeven, maak jij kans je eigen Koopplein te vestigen. Slechts één ondernemer krijgt daarvoor het exclusieve recht in zijn gemeente. Reageer dus snel. Bekijk onze introductiefilm Koopplein.nl omvat een netwerk van lokale marktplaatsen op internet. Elke gemeente heeft een eigen Koopplein. Dat wordt geëxploiteerd door een ondernemer uit die gemeente/streek. Jij kent jouw...
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WELKOM!

How do I get to the offers?

JE KOOPPLEIN
plaats in je eigen gem

Nederland

Je postcode: 1234 AB Of woonplaats: Typ hier je woonplaats... Of

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WELKOM!

How do I get to the offers?

Je postcode: 1234 AB Of woonplaats: Typ hier je woonplaats... Of

Beginletter gemeente:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Nieuws

Blijf op de hoogte van ons werk. Volg ons op Facebook en Twitter. Maken, zal K... 'Gratis aangeboden' van alle lokale Kooppleinen twitteren. Op die manier kunnen geïnteresseerden snel reageren en hoeven zij ook onderweg niets van Koopplein te missen. Gebruikers kunnen ook hun eigen advertenties eenvoudig delen met hun netwerk via social media als LinkedIn, Twitter en Facebook. Via de bek...

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WELKOM!

How do I get to the offers?

JE KOOPPLEIN
plaats in je eigen gem

Nederland

Je postcode: 1234 AB Of woonplaats: Typ hier je woonplaats... Of

Beginletter gemeente:

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Nieuws

Blijf op de hoogte van ons werk. Volg ons op Twitter en Facebook. Maak een advertentie of maak een aanvraag om een licentie te maken, zal Koopplein.nl dat voor u doen. 'Gratis aangeboden' van alle lokale Kooppleinen kunnen gebruikers volgen. Op die manier kunnen geïnteresseerden snel reageren en hoeven zij ook onderweg niets van Koopplein te missen. Gebruikers kunnen ook hun eigen advertenties eenvoudig delen met hun netwerk via social media als LinkedIn, Twitter en Facebook. Via de bekende sociale media kan men de laatste ontwikkelingen volgen.

Lees verder »

What if I want to look at Delft **and** Rijswijk?

Bekijk hieronder onze introductiefilm

Uitgever worden van onze snel groeiende formule Koopplein.nl? Wanneer in jouw gemeente nog geen licentie is afgegeven, maak jij kans je eigen Koopplein te vestigen. Slechts één ondernemer krijgt daarvoor het exclusieve recht in zijn gemeente. Reageer dus snel. Bekijk onze introductiefilm Koopplein.nl omvat een netwerk van lokale marktplaatsen op internet. Elke gemeente heeft een eigen Koopplein. Dat wordt geëxploiteerd door een ondernemer uit die gemeente/streek. Jij kent jouw...

Lees verder »

A lot of text nobody will read ...



KOOPPLEIN.NL

De gratis marktplaats in je eigen gemeente



What do you think? Is this any better?

Zoek in je woonplaats

Meer dan 360.000 tweedehands producten in je eigen woonplaats of heel Nederland.

Zoeken

Plaats hier je gratis advertentie

Wil je snel iets verkopen? Plaats dan eenvoudig en **gratis** een advertentie op Koopplein.nl.

Plaats advertentie

Alle aanbiedingen in Nederland

Hieronder een greep uit ons aanbod uit heel Nederland. Kies je woonplaats om lokaal aanbod te kunnen zien.



Zuivere sinusomvormers mé...

Caravans, Campers en Kamperen >
Accessoires en Toebehoren

KENMERKEN:

- Co...

n.o.t.k.



Wit Luipaard boektype cov...

Telecommunicatie > Mobiele telefoons
en Smartphones > Hoesjes en
Frontjes...

€ 14,95

Minimising cognitive effort

Minimising cognitive effort

- Name links, buttons, sections, etc. **clearly, not cleverly**

Jobs

Vacancies

Join us!

Interested?

Minimising cognitive effort

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Jobs

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Join us!

Interested?

- **Adhere** to established style standards

this is a link in 1999

is this a link?

Minimising cognitive effort

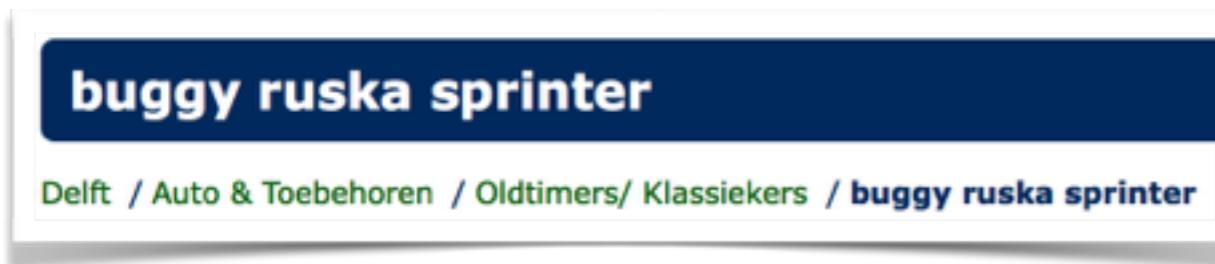
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- Avoid users getting lost within the web site; tell users where they are and how they arrived (leave “**breadcrumbs**”)



Minimising cognitive effort

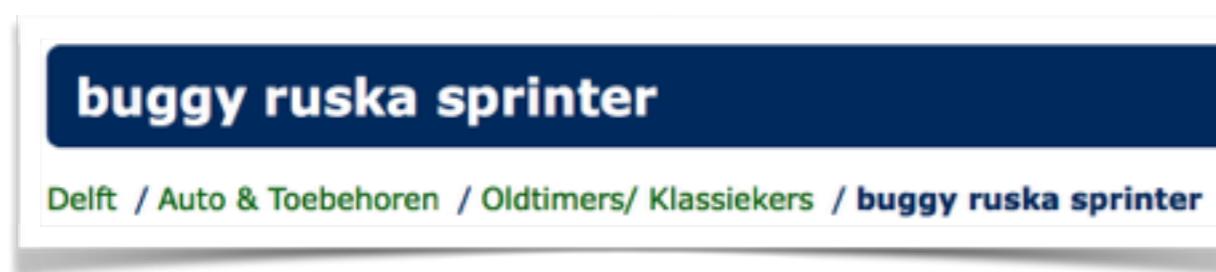
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this is a link in 1999 is this a link?

- Avoid users getting lost within the web site; tell users where they are and how they arrived (leave “**breadcrumbs**”)



- Clearly **divide** the different parts of a site (e.g. advertisements vs. content)

Rule#2: minimize noise & clutter

The screenshot shows the ZDNet homepage with a dark blue header bar containing links for Cameras, Reviews, Shop, Business, Help, News, Handhelds, Desktops, Notebooks, Downloads, and Developer. Below the header is a yellow banner with the ZDNet logo and the tagline "Where Technology Takes You". A large "Click Here!" button is positioned above the main content area. The main content area includes a "BREAKING NEWS" section with several headlines, a "HOT PRODUCTS" section listing hard drives, and various news and reviews categories like Reviews, Shopping, Business & Tech, Help & How-To, Tech News, Investing, GameSpot, Downloads, Electronics, and Developer. A "TODAY ON ZDNET" section at the bottom features an article about tax software bugs.

Cameras | Reviews | Shop | Business | Help | News | Handhelds | Desktops | Notebooks | Downloads | Developer

ZDNet
Where Technology Takes You

Click Here!

Free Downloads • Product Reviews • Buying Guides • Faster Downloads • Free Updates • Hi-Tech Jobs
Smart Shopping • Domain Names • Top Notebooks • IT Resources • PC Check-Up • ZDNet onebox

Search For: All ZDNet • Search Tips
• Power Search

BREAKING NEWS

Apr 13, 2001 5:16 PM PT

- Intel to chop Pentium 4 prices
- Double talk among Apple dealers
- New rules favor Bells, threaten ISPs
- BadTrans virus fails to spread
- Yahoo cuts off porn sales
- Computer junk: It's piling up
- AnchorDesk: How to find secret Easter eggs--in your computer programs
- [More news headlines...](#)

HOT PRODUCTS

[Hot hard drives here](#)

Looking for a hard drive? Meet ZDNet's five most popular picks and find a favorite of your own.

- Seagate Barracuda III
[Read review](#) | [Check prices](#)
- Maxtor DiamondMax 40
[Read review](#) | [Check prices](#)
- Western Digital 30GB
[Check prices](#)
- Maxtor DiamondMax 60
[Read review](#) | [Check prices](#)
- IBM Deskstar 75GB
[Read review](#) | [Check prices](#)

[More product reviews...](#)

DVD-RAM is a storage fanatic's dream
Toshiba's new DVD-RAM drive gives you an enormous amount of rewritable storage and a solid back-up solution, with no special drivers required.
[Check it out at ZDNet Reviews](#)

Reviews
PCs, Notebooks, Cameras, Handhelds, Digital Audio...

Shopping
Hardware, Software, Auctions, Computer Shopper, e-certives...

Business & Tech
IT Resources, Tech Jobs, E-Commerce, Small Biz...

Help & How-To
Viruses, Fix It, Experts, How-To, Free Updates, Online Classes...

Tech News
Page One, AnchorDesk, Alerts, Computing, Rumors...

Investing
Stock Quotes, Top Tech IPOs, Headline News, Portfolio...

GameSpot
Dreamcast, PC, PlayStation, N64, Previews, Hints...

Downloads
Free Software, Top 20, Games, Exclusives, Screensavers...

Electronics
Cameras, TVs, Digital Music, Tech Life, Theater, Phones...

Developer
HTML, Java, Free Scripts, Web Graphics, Usability...

MyZDNet
E-Mail, SiteBuilder, Calendar, Discussions, ZDNet Rewards...

TODAY ON ZDNET

Ten tax software bugs to watch out for
Tax software is supposed to save you time and stress when you do your taxes. We show you the bugs that stand in your way and how to fix them. [Get details at ZDNet Help & How-To](#)

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14.04.2001

Rule#2: minimize noise & clutter

[Cameras](#) | [Reviews](#) | [Shop](#) | [Business](#) | [Help](#) | [News](#) | [Handhelds](#) | [Desktops](#) | [Notebooks](#) | [Downloads](#) | [Developer](#)

ZDNet
Where Technology Takes You

Click Here!

[Free Downloads](#) • [Product Reviews](#) • [Buying Guides](#) • [Faster Downloads](#) • [Free Updates](#) • [Hi-Tech Jobs](#)
[Smart Shopping](#) • [Domain Names](#) • [Top Notebooks](#) • [IT Resources](#) • [PC Check-Up](#) • [ZDNet onebox](#)

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4. [Maxtor DiamondMax 60](#)
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More product reviews...

ZDNet

UK Edition | UK News | 3D Printing | Hybrid Cloud | Wearables | Enterprise Software | Security | Microservers | Tablets | [Hot Topics](#) | [Reviews](#) | [Downloads](#) | [Newsletters](#) | [White Papers](#) | [Log In](#) | [Join ZDNet](#)

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Get the best of ZDNet delivered straight to your inbox
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 ZDNet Must Read News Alerts - UK: Major news is breaking. Are you ready? This newsletter has only the most important tech news nothing else.

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 **Samsung seals SmartThings deal**
Cash-strapped universities' switch to Google Apps stokes post-Snowden privacy fears

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Can't find what you want or have a tip? Tell us about it and we will endeavour to cover this topic. Drop us a line.

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 The benefits are large and the privacy concerns are phony. Police should have cameras on them and the more cameras in public places, the better.
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 Google considers kids accounts, family-friendly YouTube and Google+



14.04.2001

14.10.2014

Rule#3: If you cannot make it self-evident, make it self-explanatory

- Self-explanatory sites require users to expend a **small** amount of cognitive effort
- A **small** amount of explanatory text can go a long way
- Keep the **mobile user** in mind (scrolling is expensive)
- **Avoid “happy talk”** - text without any content for the sake of adding text (e.g. welcome message)

Rule#3: If you cannot make it self-evident, make it self-explanatory

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Create Surveys. Get Answers.

Start Today

Pro Sign Up ▶

Unlimited Surveys & Responses

Sign Up FREE ▶

Just the Basics

Design
Build your own surveys or choose from our templates.

Collect
Choose how to distribute and start collecting responses.

Analyze
Use our powerful analytical tools for intelligent insights.

The interface shows a flow from design to collect to analyze, with corresponding icons (lightbulb, chain, pie chart) and descriptions for each step. There are also promotional buttons for different sign-up options.

EXPECTATIONS

VS.

REALITY

EXPECTATIONS

vs.

REALITY

Idea: Web users are **rational**, **attentive** with a **clear goal** in mind

EXPECTATIONS

VS.

REALITY

Idea: Web users are **rational, attentive** with a **clear goal** in mind

Reality: Web users ...

- quickly **scan** (not read!) a Web page
- decide **within seconds** whether or not a site is worth it
- click on the **first link** that looks reasonable
- depend a lot on the browser's **back button**
- do **not read instructions**



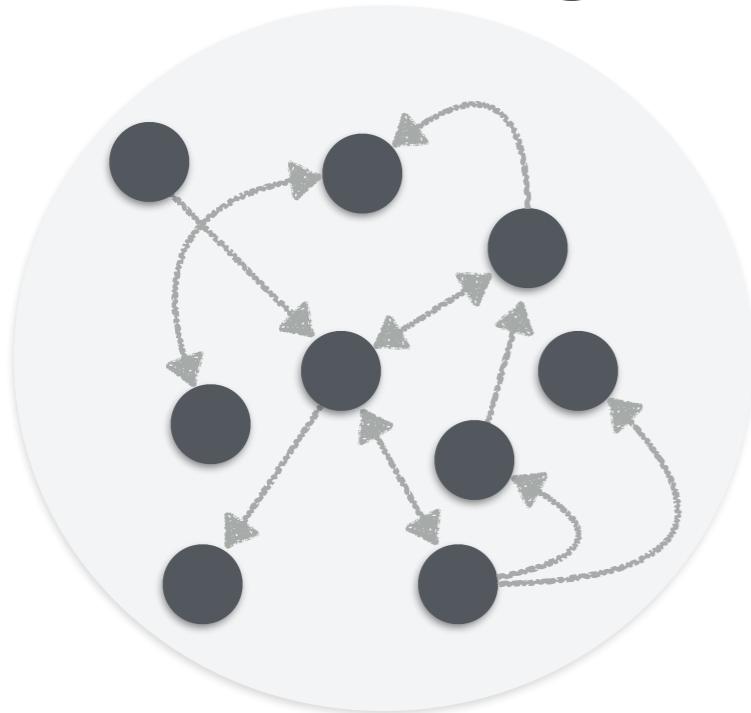
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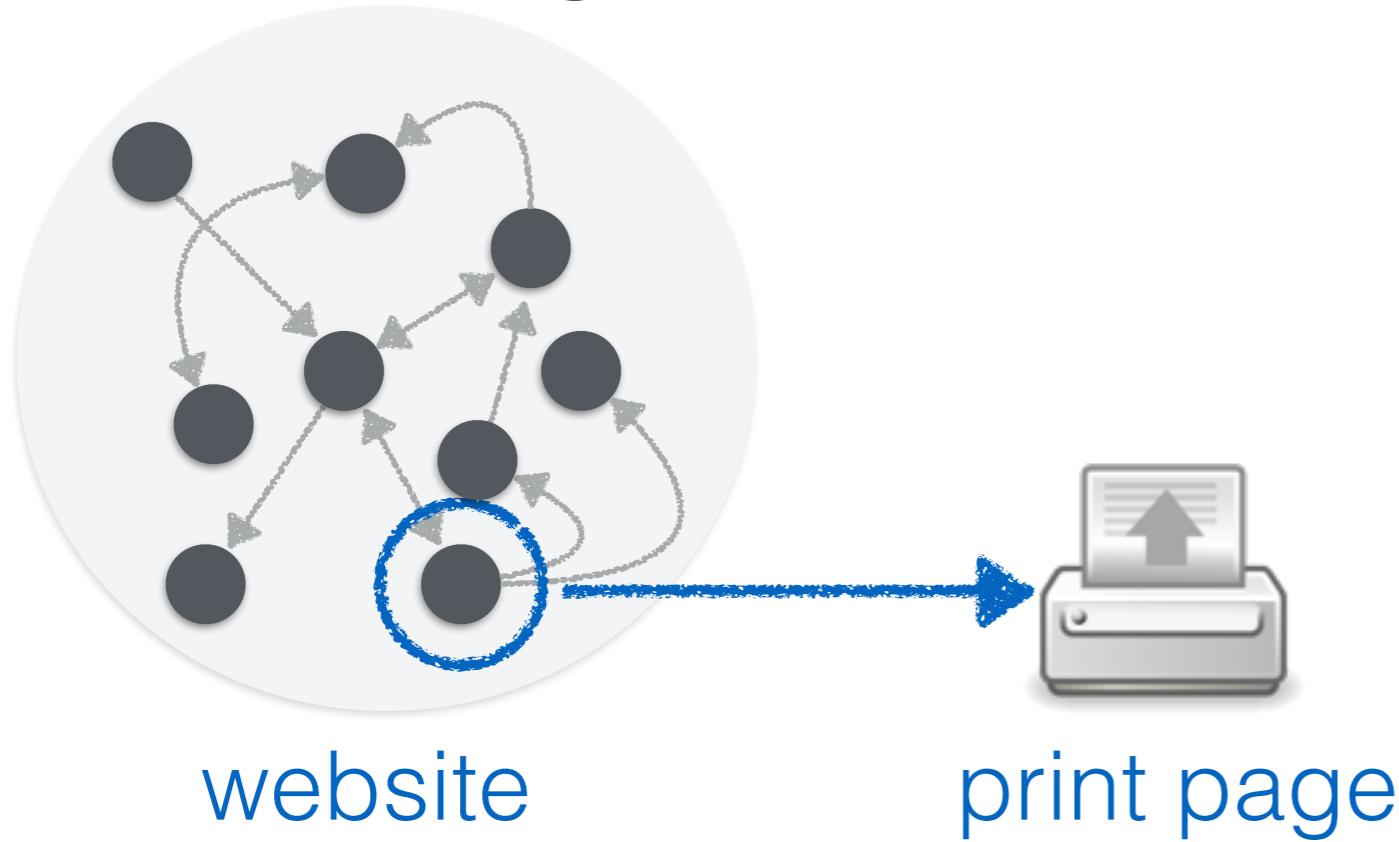
A Web site's design should be based on **user reality!**
Usability testing is important to make a site a success.

Site navigation: the “trunk test”

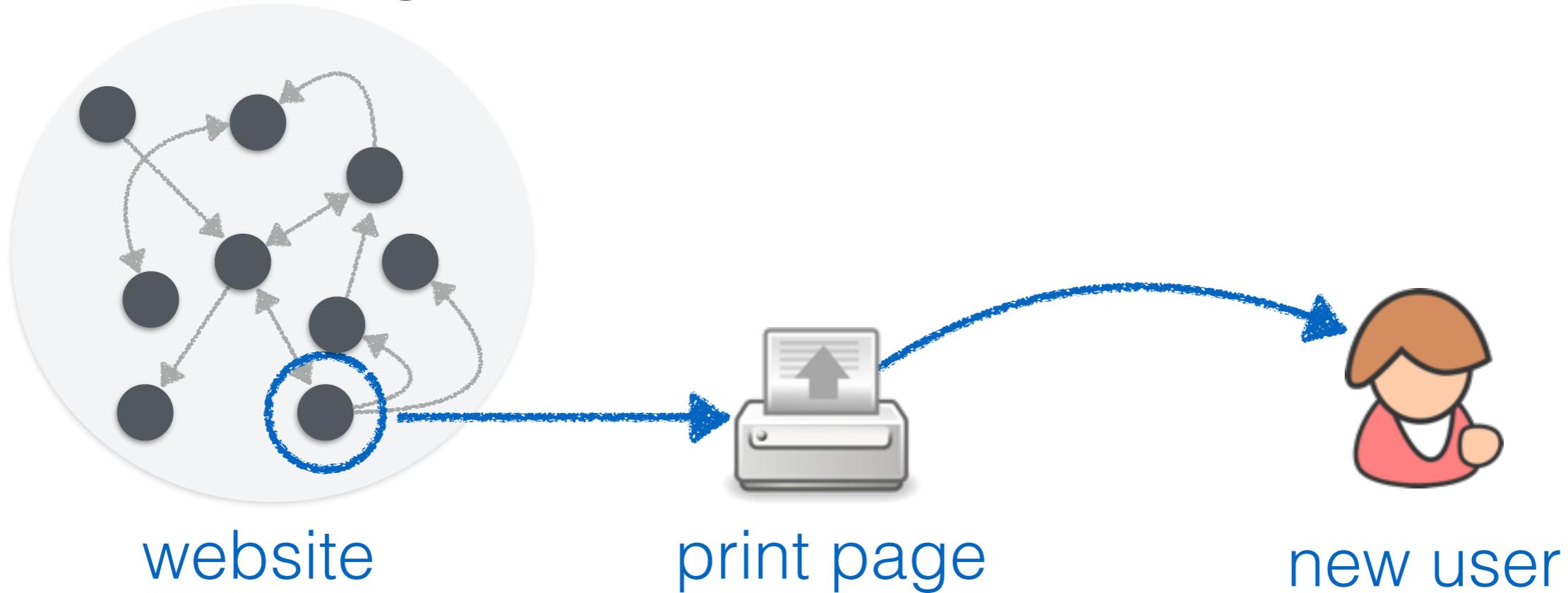


website

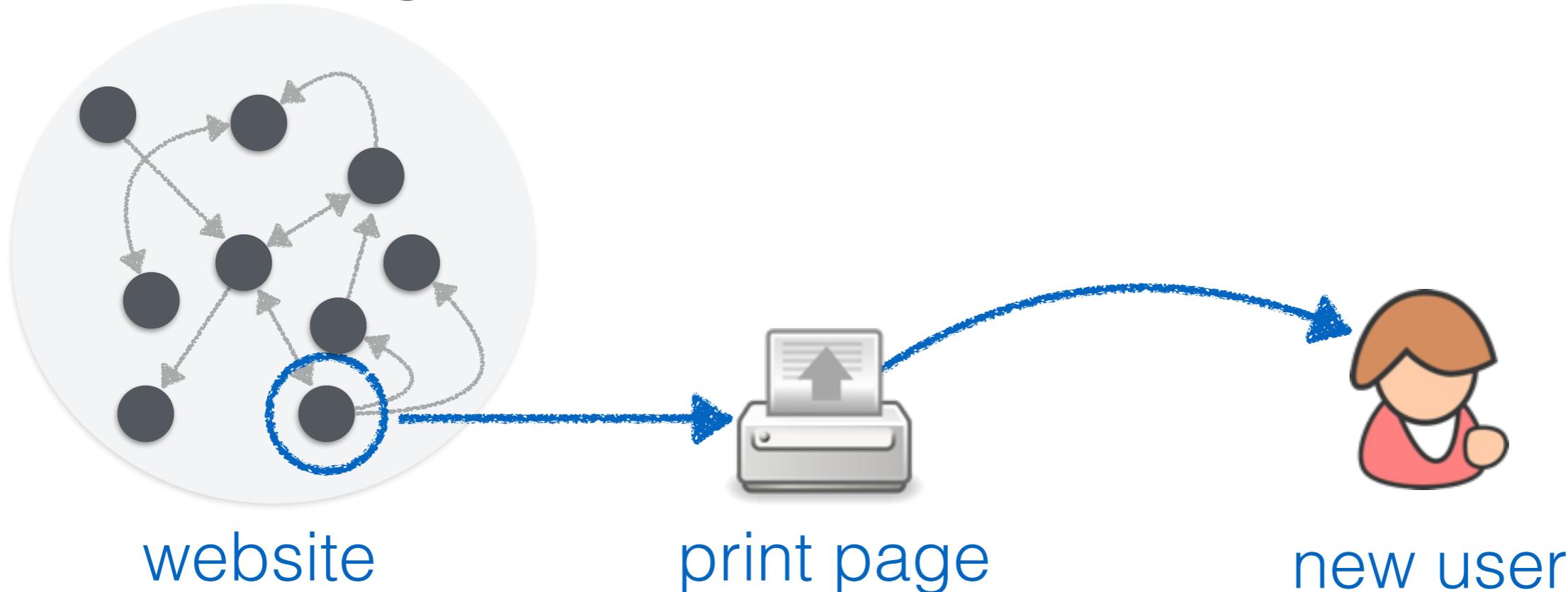
Site navigation: the “trunk test”



Site navigation: the “trunk test”



Site navigation: the “trunk test”



As quickly as possible the user should circle:

- **Name** of the Web site
- **Name** of the page he currently views
- **Major sections** of the page
- Possible **navigation options** at this point
- “**You are here**” indicators

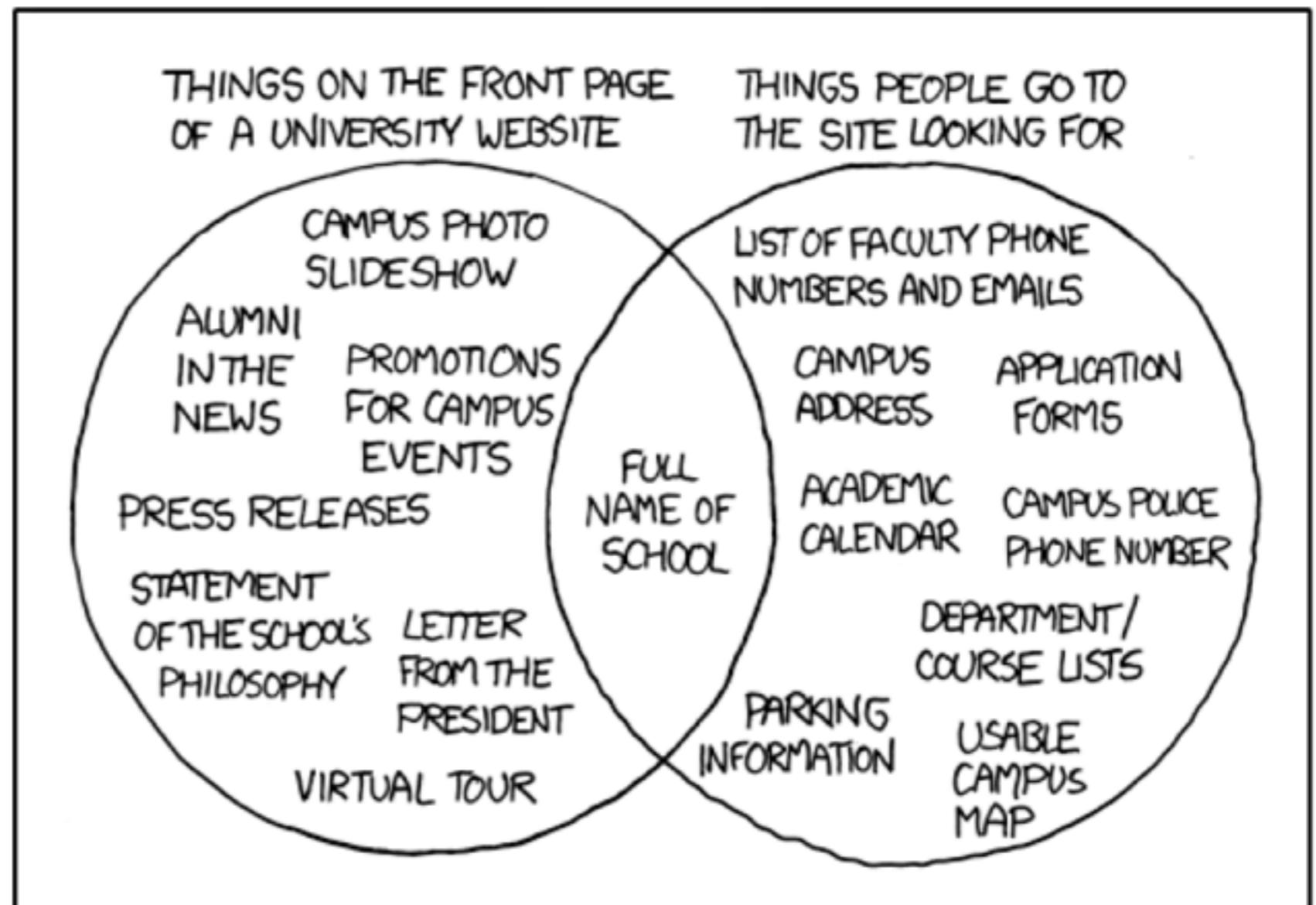
The home page: the point of entry for most users

1. What **is** this?
2. What can I **do** here?
3. Why **should** I be here?
4. What do they **have** here?

essential questions
to answer

The home page: the point of entry for most users

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essential questions
to answer

<http://xkcd.com/773/>

altijd verse koffie

Altijd verse koffie in huis?
Kies je favoriete koffie als
abonnement en je zit nooit
meer zonder.

[COFFEE SUBSCRIPTION](#)



Je favoriete koffie als abonnement, nu bij

Hoe maak jij je koffie?



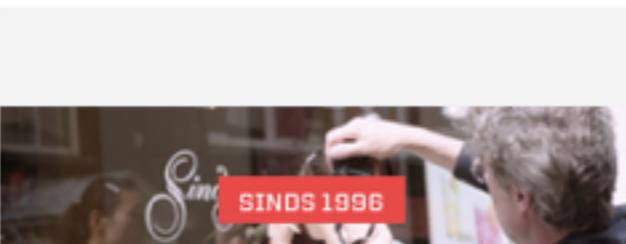
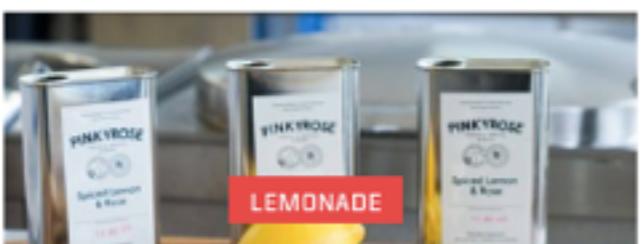
FILTER KOFFIE

Jij bent van de filter,
Aeropress, Chemex,
Cafeti re, dat werk.



ESPRESSO

Een mooie
Espressomachine thuis?
Toe maar! Dat verdient de
lekkerste verse bonen.



What does this business do?

Meet the Makers - Pinkyrose

A. It grows coffee.

Lem...

In de Meet the Makers serie geven we je een...

...kijkje achter de schermen van de makers die...

...de producten maken die je elke dag eet.

Doze kee...

20 jaar

!

"20 jaar, da's best lang" – Dat vinden wij ook!
Weet jij het nog, je eerste keer

B. It operates a chain of small coffee places (Starbucks-like)

C. It grows mushrooms

D. It operates a chain of stores selling coffee machines and coffee beans

Koffieparadijs in El Salvador

Op een uurtje rijden van San Salvador ligt de
paradijselijke plantage van Vickie Ann Dalton

e...

Rule#4: test often and early

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- **Usability test:** give a user a **typical task** and observe **how well** he is able to perform it

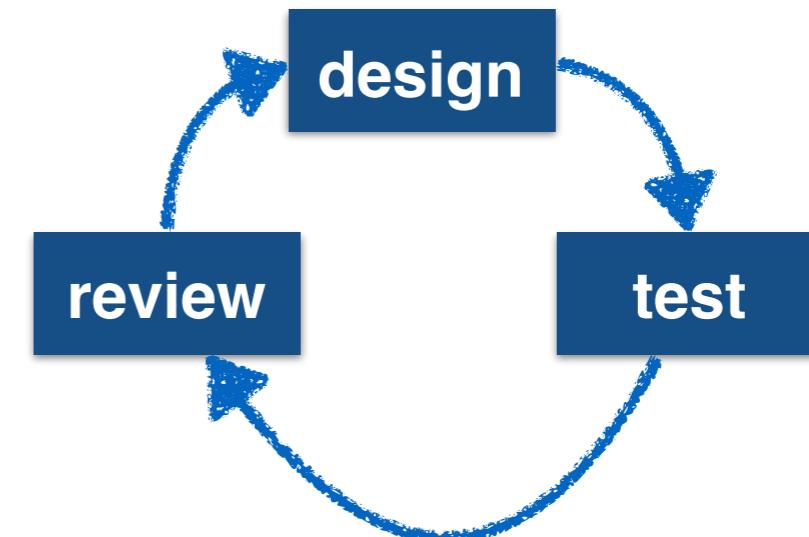
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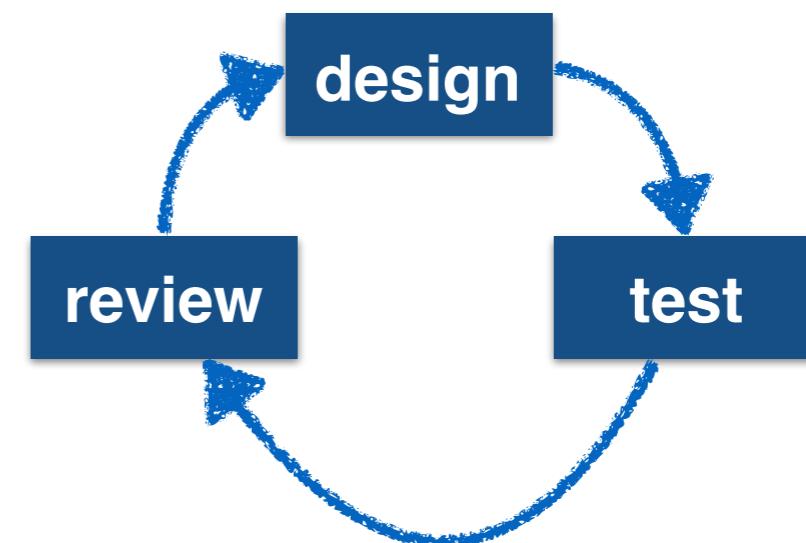
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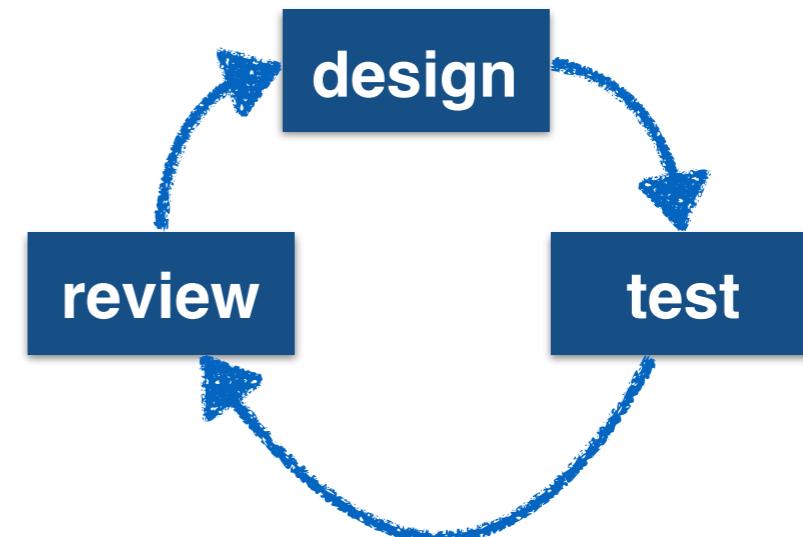
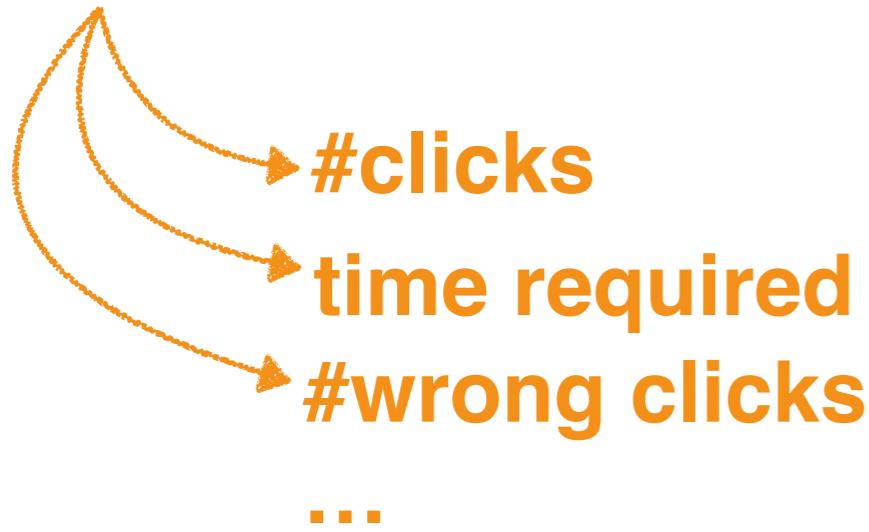
#clicks
time required
#wrong clicks
...
...



- Testers should be a mix of **target audience** and average Web users; **2-3 testers** per iteration are enough

Rule#4: test often and early

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Setup:

- + **Participant** (tester) sits in front of the laptop/smartphone/...
- + **Facilitator** sits next to him and guides him through the test
- + **Observers** (developers, managers, etc.) watch usability test



Participant & facilitator

<http://bit.ly/1jLXwUy>



Observer

What can you test?

- How to **create** a user account
- How to **retrieve** a lost password
- How to **change** the credit card information
- How to **delete** a user account
- How to **find** an article in the archive
- How to **edit** a posting made on the forum
-

Usability testing: the aftermath

- Assign each found problem to a **priority** (low, medium, high)
- Focus on the **high priority** problems
- Create an ordered list of high priority problems and **start fixing** the most severe one
- **Do not add** new problems to the list until you fixed everything

HTML5: lets take a closer look

Chapter 2 in one slide

```
<!doctype html>
<html>
  <head>
    <title>My First Web App</title>
  </head>

  <body>
    <h1>Hello World!</h1>
    <p>Nice to meet you.</p>
  </body>
</html>
```

Chapter 2 in one slide

informs the browser about the HTML version

```
<!doctype html>
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describes the document

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</body>
</html>
```

contains the document content

The **rendered** page does not show the tags, just the content.

Search Google

Fill in the blanks!

```
<!doctype html>
<html>
  <head>
    <title>My First Form</title>
  </head>

  <body>
    <form action="http://www.google.com/search"
          method="???" target="_blank">
      <input name="q" type="???" />
      <input type="submit" value="???" />
    </form>
  </body>
</html>
```

HTML5 overview

- A set of related technologies (core HTML5, CSS, JavaScript) that together enable **rich Web content**
- **Core HTML5**: mark up content
- **CSS**: control the appearance of marked-up content
- **JavaScript**: manipulate the contents of HTML documents & respond to user interactions
- **Modern Web (app) development** requires knowledge of all three technologies
- Before HTML5: XHTML and HTML 4.01

HTML5 overview

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html
    PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
    <head>
        <title>Virtual Library</title>
    </head>
    <body>
        <p>Moved to <a href="http://example.org/">example.org</a>.</p>
    </body>
</html>
```

- Before HTML5: **XHTML** and HTML 4.01

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Not all browsers support all features

<http://caniuse.com/>

The move towards HTML5

The move towards HTML5

- Initial list of HTML tags (**1991/92**) was **static**:

```
<title> <a> <isindex> <plaintext> <listing>  
<p> <h1> <address> <hp1> <dl> <dt> <ul>
```

The move towards HTML5



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HTML5: a drive to return rich content *directly* into the browser.
- **Semantic HTML** became a popular wish to enable large-scale automated processing of Web content

Who decides the HTML standard?

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- HTML is widely used, making standardisation a slow process
- Many different stakeholders are part of **W3C's HTML Working Group** (Microsoft, Apple, Google, Mozilla, Nokia, Adobe, Intel, Baidu, etc.)

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- HTML5.1: candidate recommendation in Q1-2015, **W3C recommendation in Q4-2016**

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In practice: W3C standardises what the browser vendors have chosen to implement (or will implement) and agree upon.

What does the standard look like?

2.4.4 Numbers

2.4.4.1 Signed integers

Add developer-view styles

A string is a **valid integer** if it consists of one or more [ASCII digits](#), optionally prefixed with a "-" (U+002D) character.

A [valid integer](#) without a "-" (U+002D) prefix represents the number that is represented in base ten by that string of digits. A [valid integer](#) with a "-" (U+002D) prefix represents the number represented in base ten by the string of digits that follows the U+002D HYPHEN-MINUS, subtracted from zero.

The **rules for parsing integers** are as given in the following algorithm. When invoked, the steps must be followed in the order given, aborting at the first step that returns a value. This algorithm will return either an integer or an error.

1. Let *input* be the string being parsed.
2. Let *position* be a pointer into *input*, initially pointing at the start of the string.
3. Let *sign* have the value "positive".
4. [Skip whitespace](#).
5. If *position* is past the end of *input*, return an error.
6. If the character indicated by *position* (the first character) is a "-" (U+002D) character:

1. Let *sign* be "negative".
2. Advance *position* to the next character.
3. If *position* is past the end of *input*, return an error.

Otherwise, if the character indicated by *position* (the first character) is a "+" (U+002B) character:

1. Advance *position* to the next character. (The "+" is ignored, but it is not conforming.)
2. If *position* is past the end of *input*, return an error.
7. If the character indicated by *position* is not an [ASCII digit](#), then return an error.
8. [Collect a sequence of characters](#) that are [ASCII digits](#), and interpret the resulting sequence as a base-ten integer. Let *value* be that integer.
9. If *sign* is "positive", return *value*, otherwise return the result of subtracting *value* from zero.

highly verbose

HTML5 is modular and complex

- **Web Workers**: Web applications can spawn background workers to run processes (scripts) running in parallel to their main page
- **WebSocket**: bidirectional communication with server-side processes (e.g. **Rumpetroll demo**)
- **WebRTC**: real-time communication between browsers (for videoconferencing, etc.)
- **HTML Media Capture**: enables user access to a device's media capture mechanism

Practical advice



Hello World!

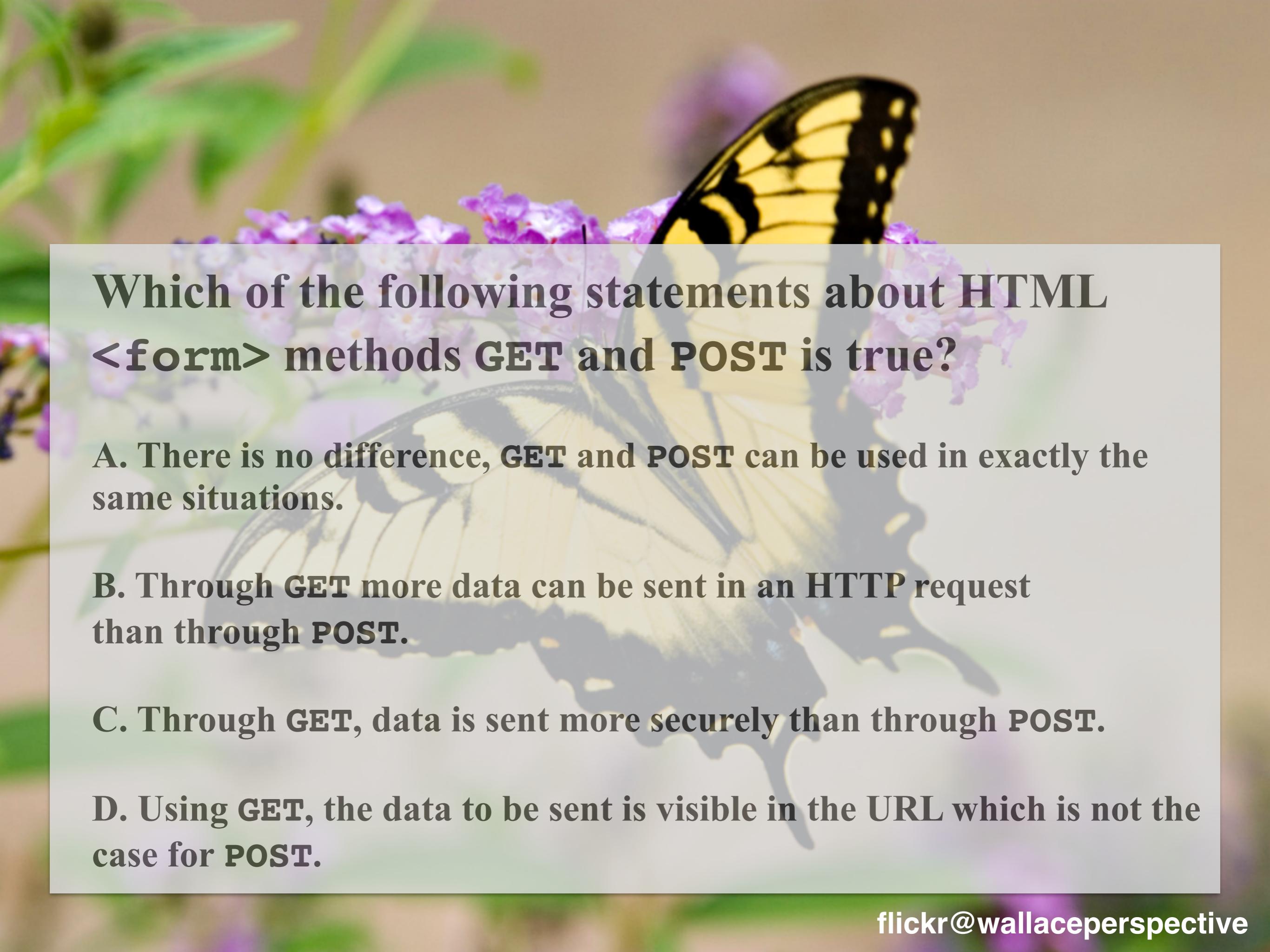
Nice to meet you.

Practical advice



Hello World!

Nice to meet you.

A close-up photograph of a butterfly with bright yellow wings featuring black veins and patterns. It is perched on a branch with several small, delicate purple flowers. The background is a soft-focus green and brown.

**Which of the following statements about HTML
<form> methods **GET** and **POST** is true?**

- A. There is no difference, **GET** and **POST** can be used in exactly the same situations.
- B. Through **GET** more data can be sent in an HTTP request than through **POST**.
- C. Through **GET**, data is sent more securely than through **POST**.
- D. Using **GET**, the data to be sent is visible in the URL which is not the case for **POST**.

HTML5: taking things offline with the AppCache



Long live the AppCache!

Offline web applications  - UNOFF

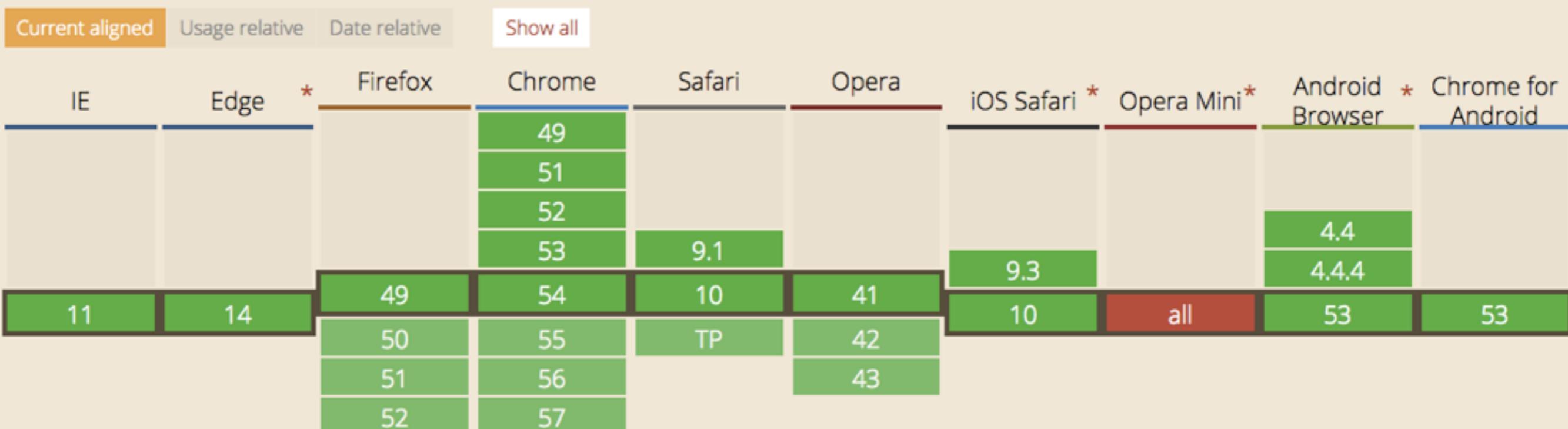
Global

92.94% + 0.04% = 92.99%

Netherlands

97.88% + 0.01% = 97.89%

Now deprecated method of defining web page files to be cached using a cache manifest file, allowing them to work offline on subsequent visits to the page.



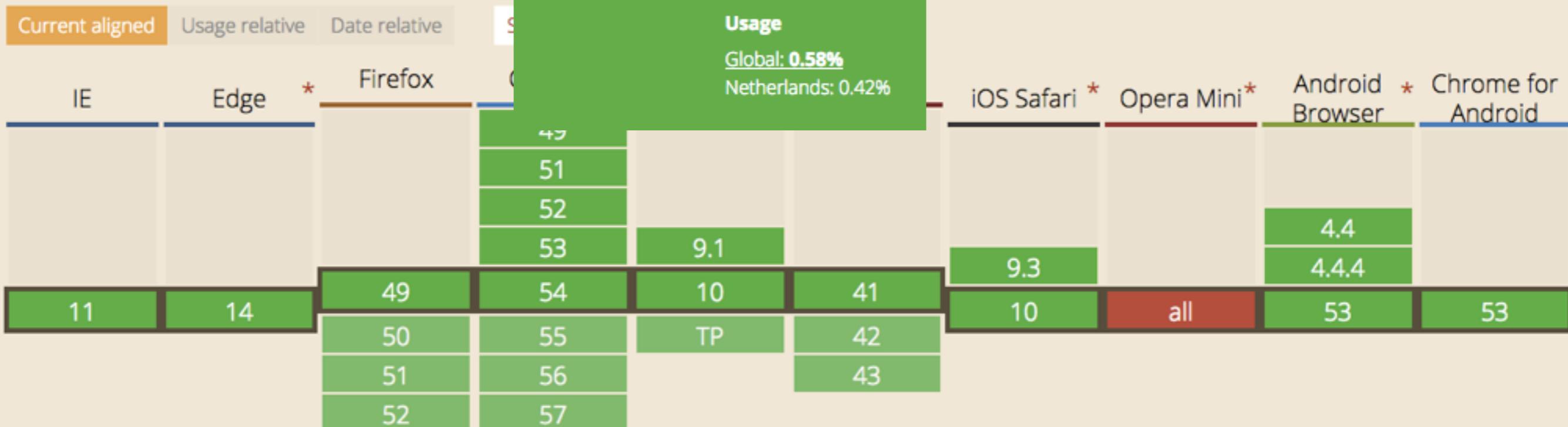
Notes Known issues (4) Resources (7) Feedback

This technology is being deprecated in favor of [Service Workers](#)

Long live the AppCache!

Offline web applications

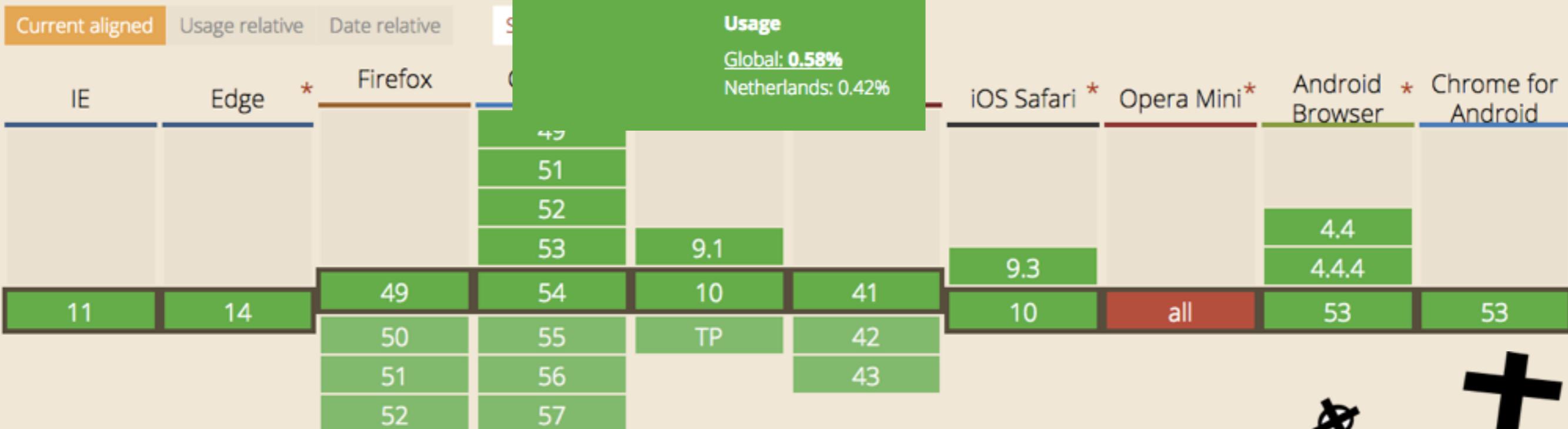
Now deprecated method of defining which page files to be cached using a cache manifest file, allowing them to be served from the browser's cache on subsequent visits to the page.



Long live the AppCache!

Offline web applications

Now deprecated method of defining which page files to be cached using a cache manifest file, allowing them to be served from the browser's cache on subsequent visits to the page.



Notes Known issues (4) Resources (7) Feedback

This technology is being deprecated in favor of [Service Workers](#)



Long live the AppCache!

Service Workers  - WD

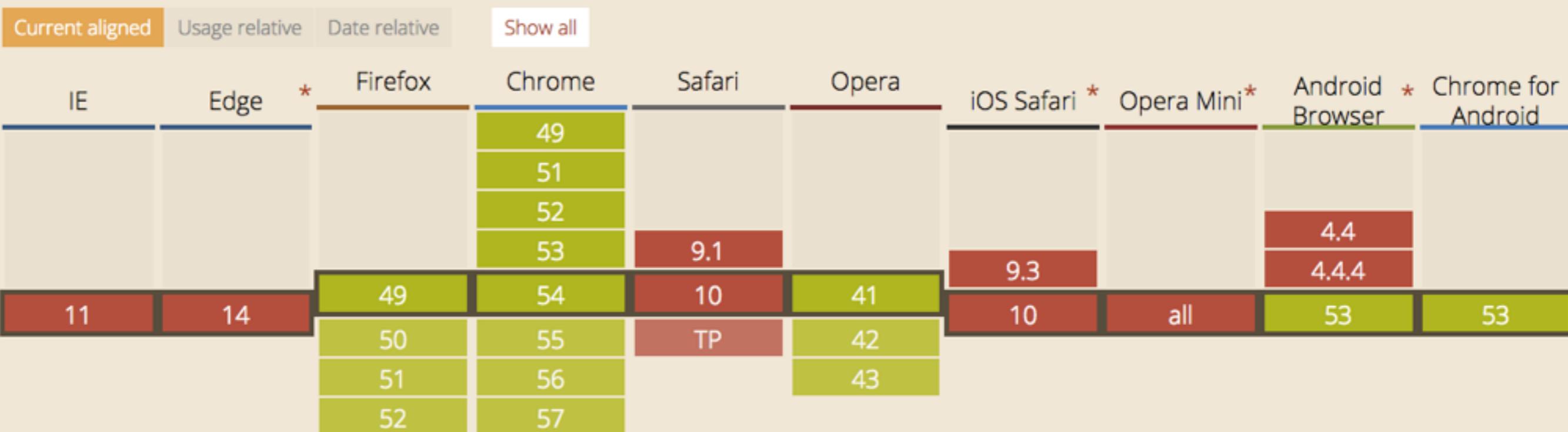
Global

0% + 60.92% = 60.92%

Netherlands

0% + 61.51% = 61.51%

Method that enables applications to take advantage of persistent background processing, including hooks to enable bootstrapping of web applications while offline.



Notes Known issues (0) Resources (8) Feedback

Details on partial support can be found on [is ServiceWorker Ready?](#)

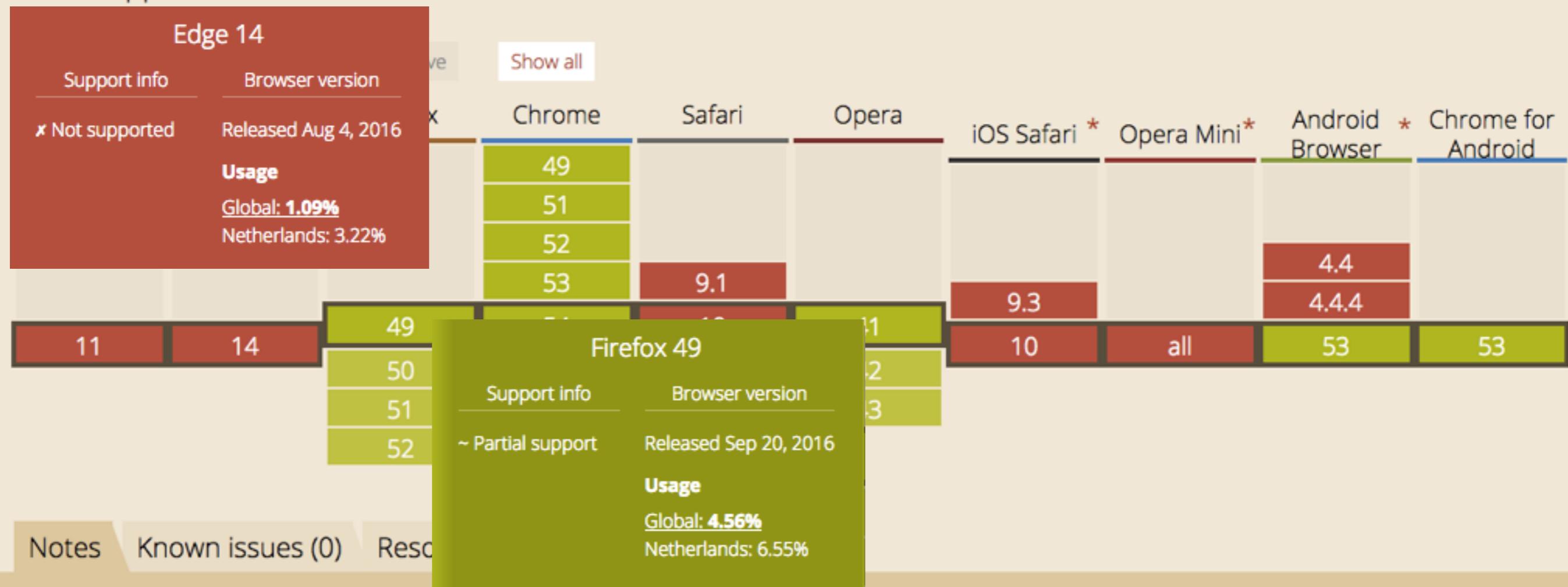
MS Edge status: In Development

WebKit status: Under Consideration

Long live the AppCache!

Service Workers  - WD Global 0% + 60.92% = 60.92%

Method that enables applications to take advantage of persistent background processing, including hooks to enable bootstrapping of web applications while offline.



Details on partial support can be found on [is ServiceWorker Ready?](#)

MS Edge status: In Development

WebKit status: Under Consideration

Long live the AppCache!

Service Workers  - WD

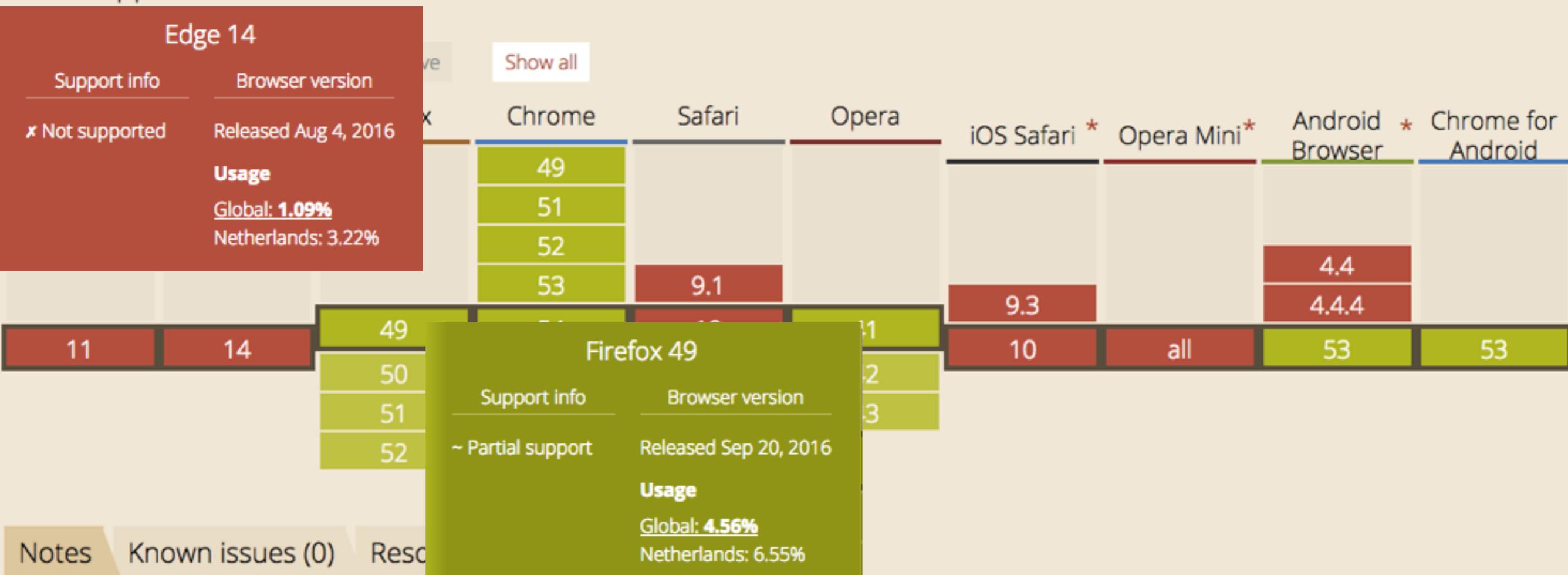
Global

0% + 60.92% = 60.92%

Netherlands

0% + 61.51% = 61.51%

Method that enables applications to take advantage of persistent background processing, including hooks to enable bootstrapping of web applications while offline.



Overall: for **simple** Web applications the AppCache is the **easiest** way to offer offline capabilities **over the next few years**.

Offline Web applications

Offline Web applications

- Until recently: Web applications were mostly available online; browser cache did not provide reliable storage (removed elements from the cache if memory limit reached)
- HTML5 introduced **application caches** that enable **reliable** offline browsing
- **Developers** specify the files the browser should (or should not) cache and make available offline

Offline Web applications

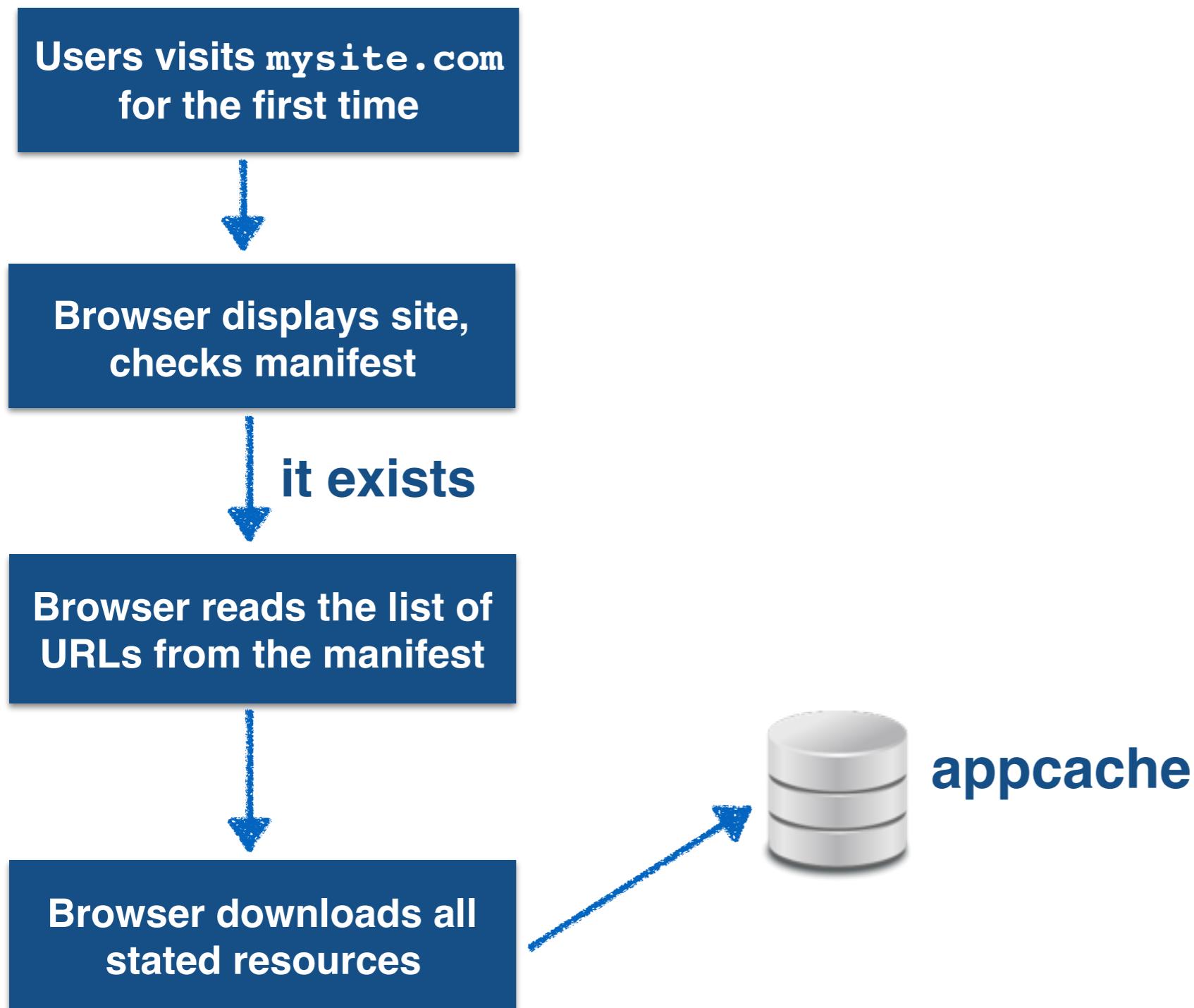
- Until recently: Web applications were mostly available online; browser cache did not provide reliable storage (removed elements from the cache if memory limit reached)
- HTML5 introduced **application caches** that enable **reliable** offline browsing
- **Developers** specify the files the browser should (or should not) cache and make available offline
- Main tool: **the manifest file** (referenced as attribute in the `html` tag)

Offline Web applications

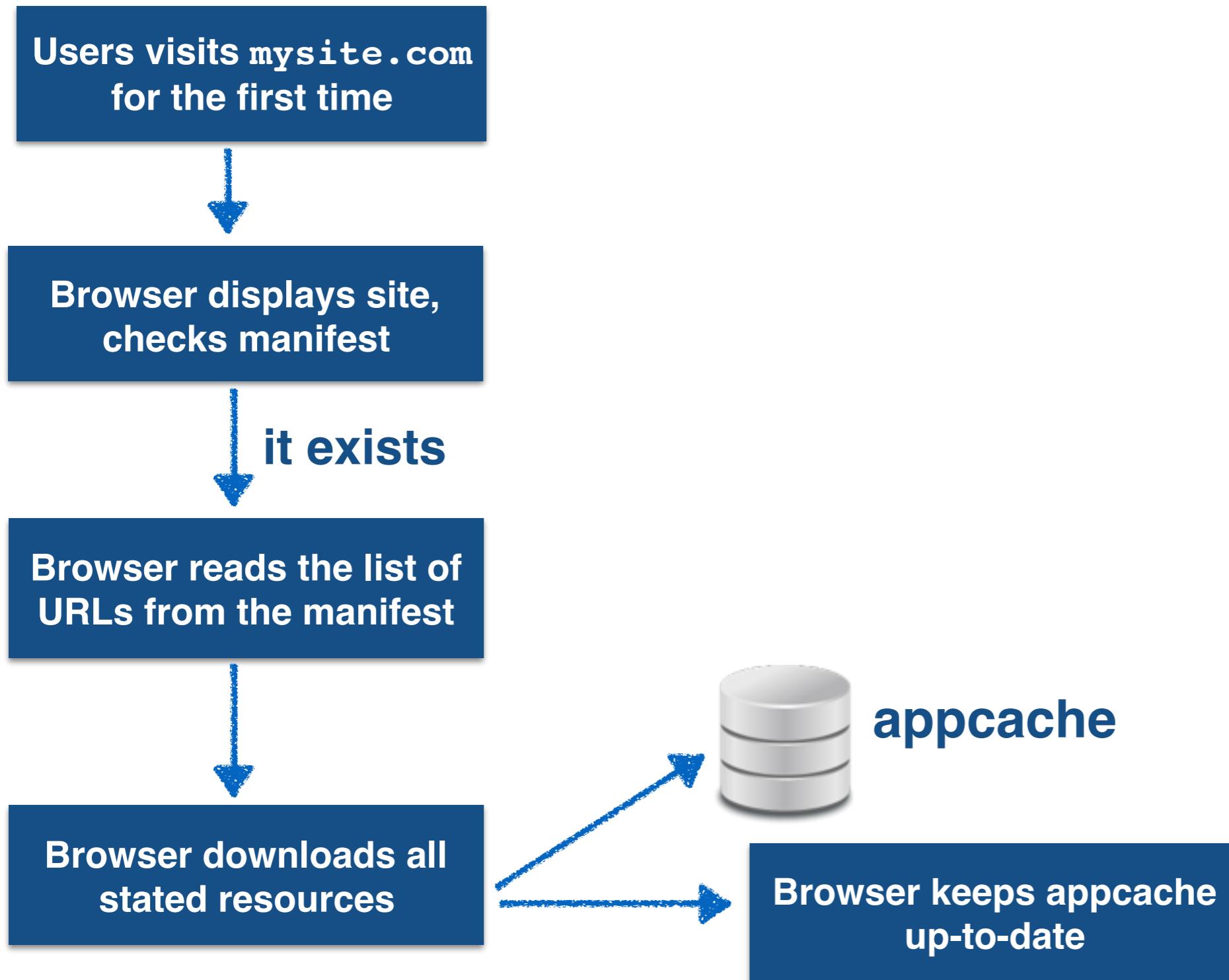
- Until recently: Web applications were mostly available online (remotely) → unreliable
 - HTML offline → reliable
 - Developers (not) caring → should
 - Main tool: **the manifest file** (referenced as attribute in the html tag)
- ```
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>My First Web App</title>
 </head>
 <body>
 <h1>Hello World!</h1>
 <p>Nice to meet you.</p>
 </body>
</html>
```

# Appcache “workflow”

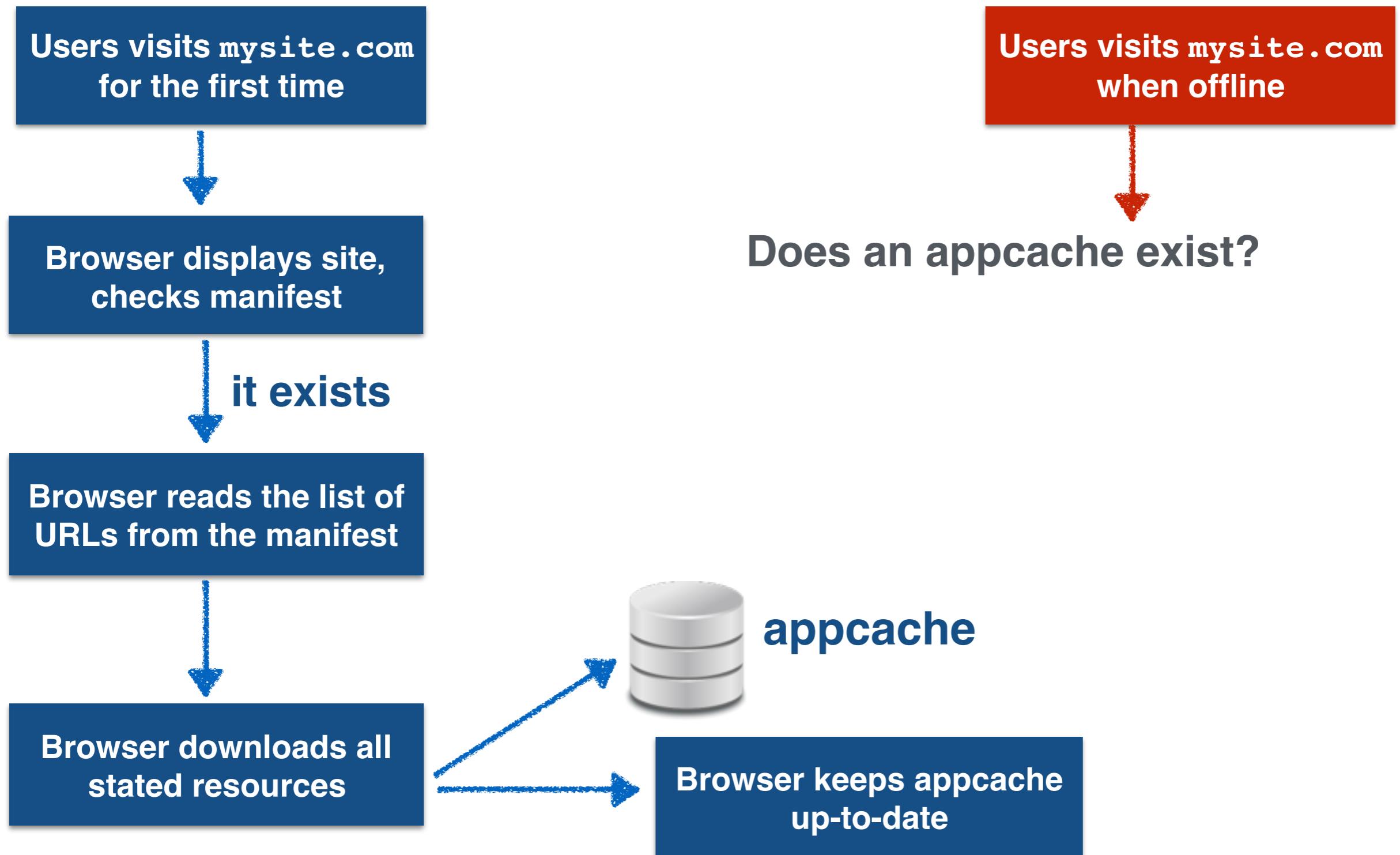
# Appcache “workflow”



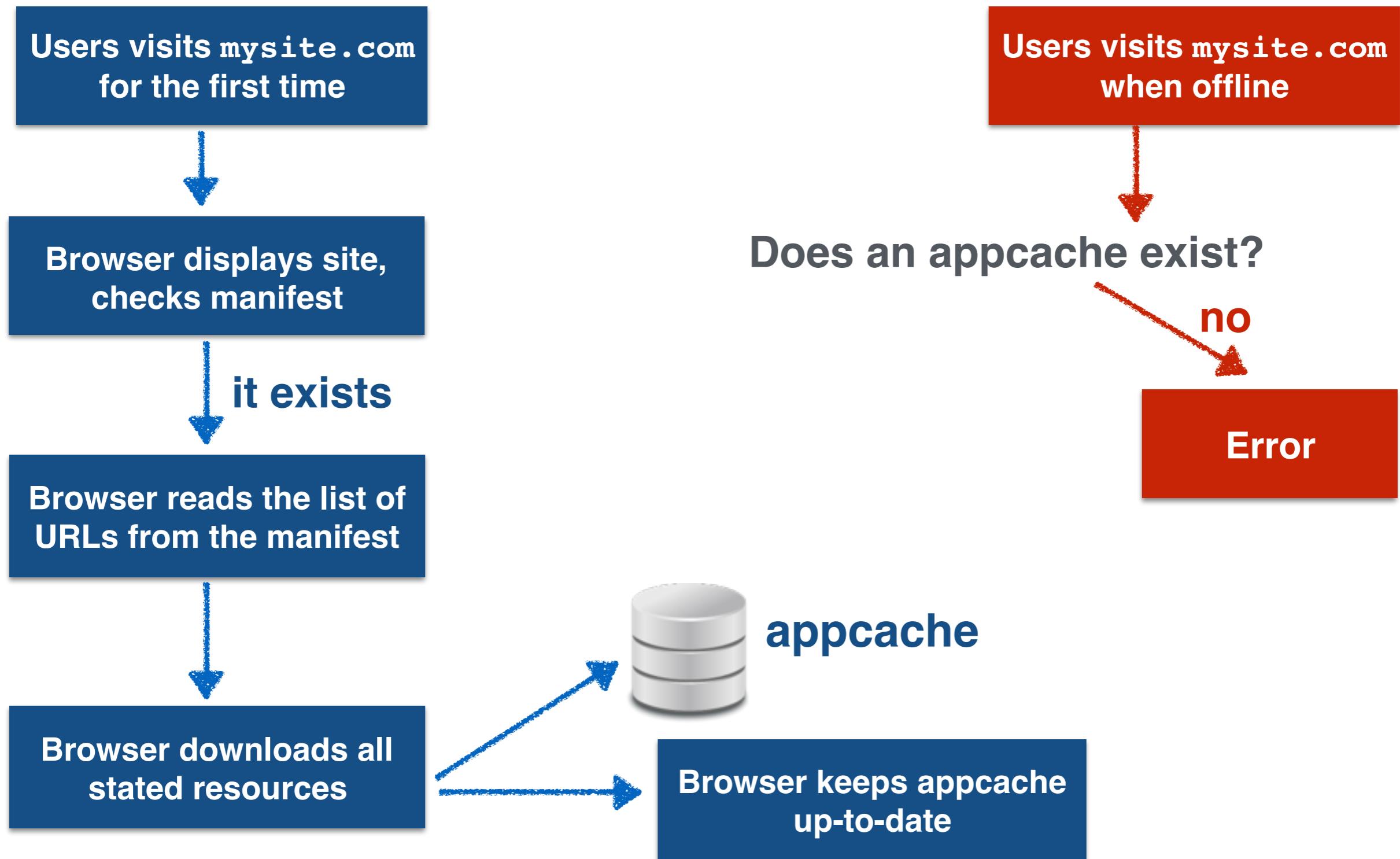
# Appcache “workflow”



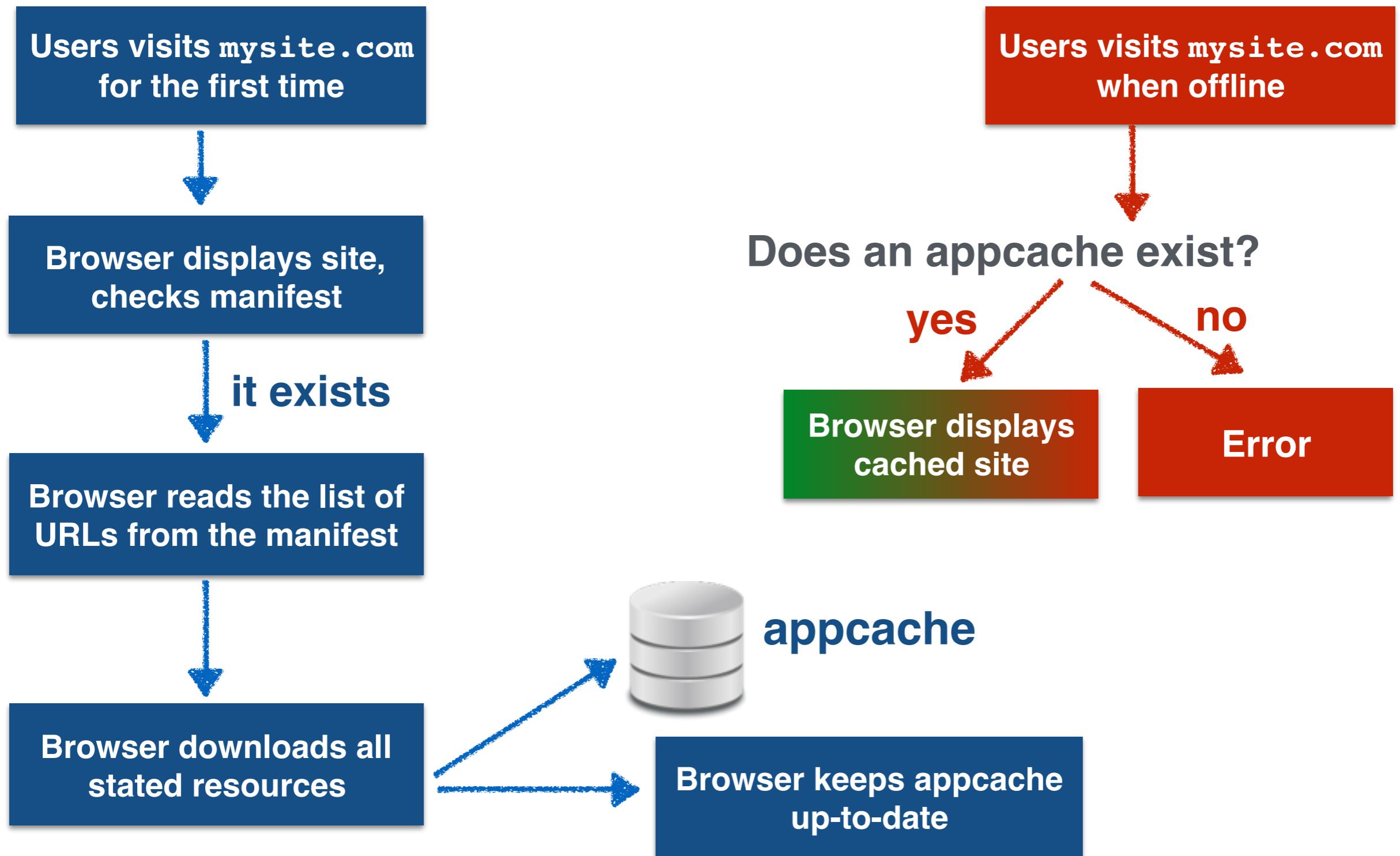
# Appcache “workflow”



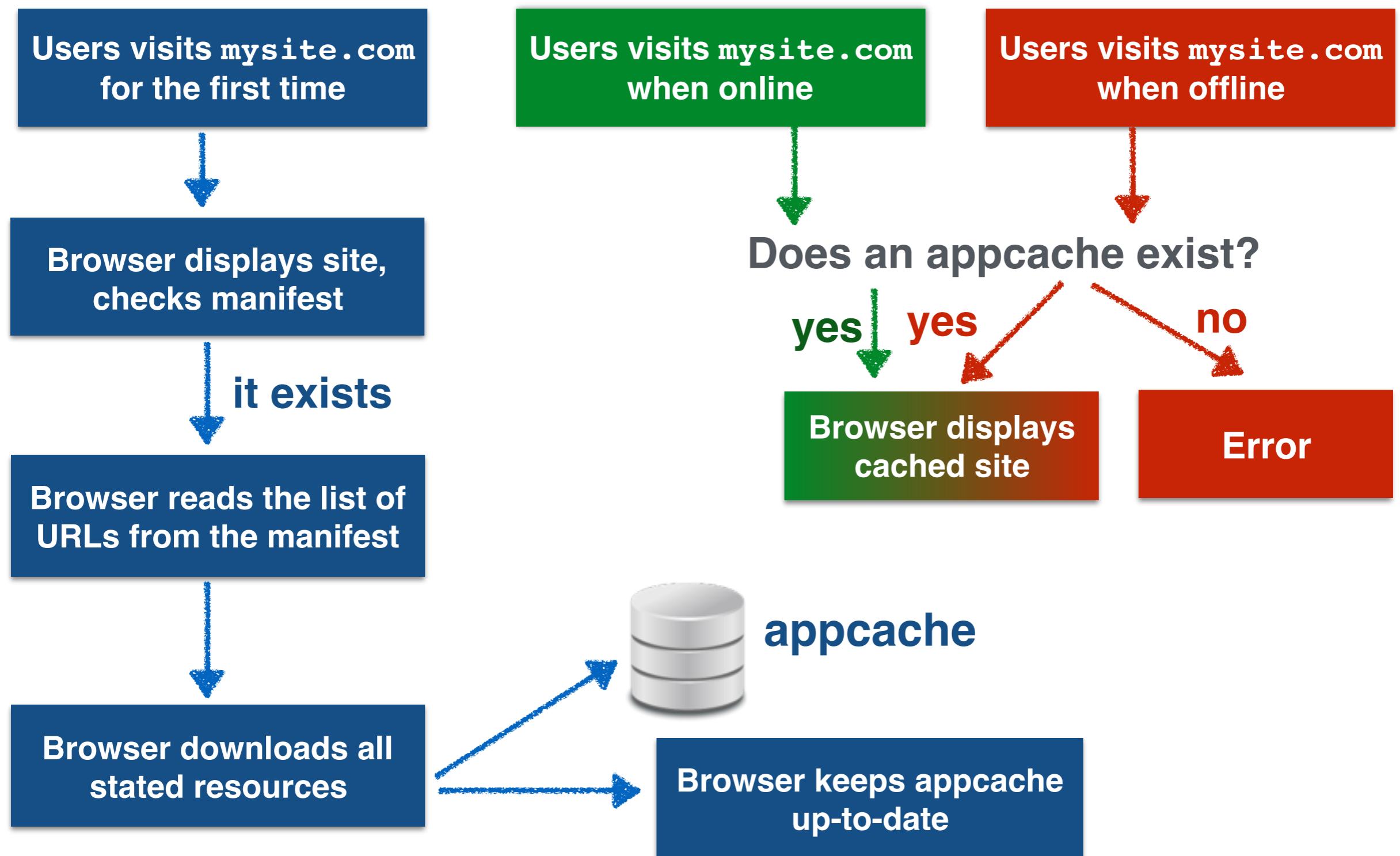
# Appcache “workflow”



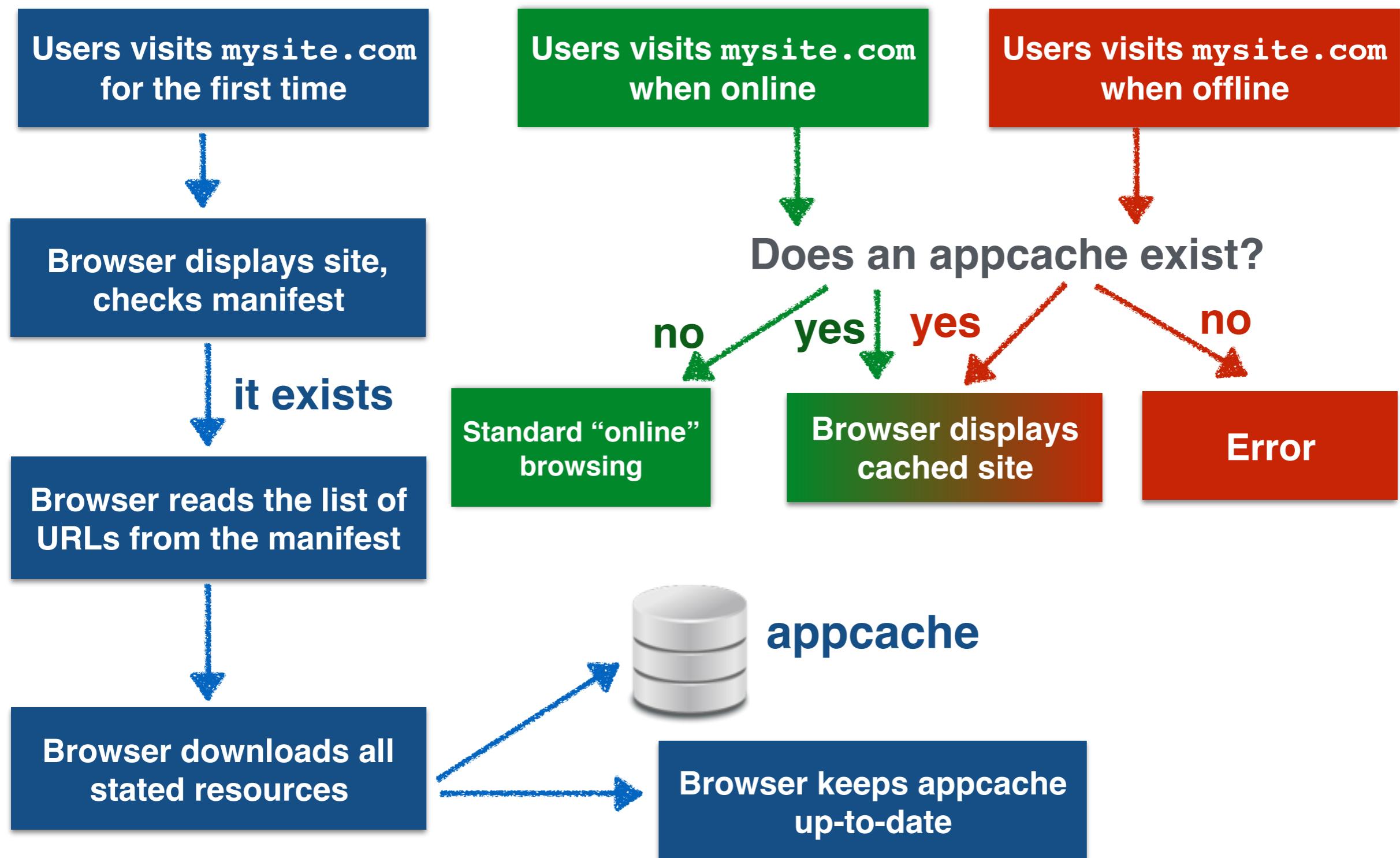
# Appcache “workflow”



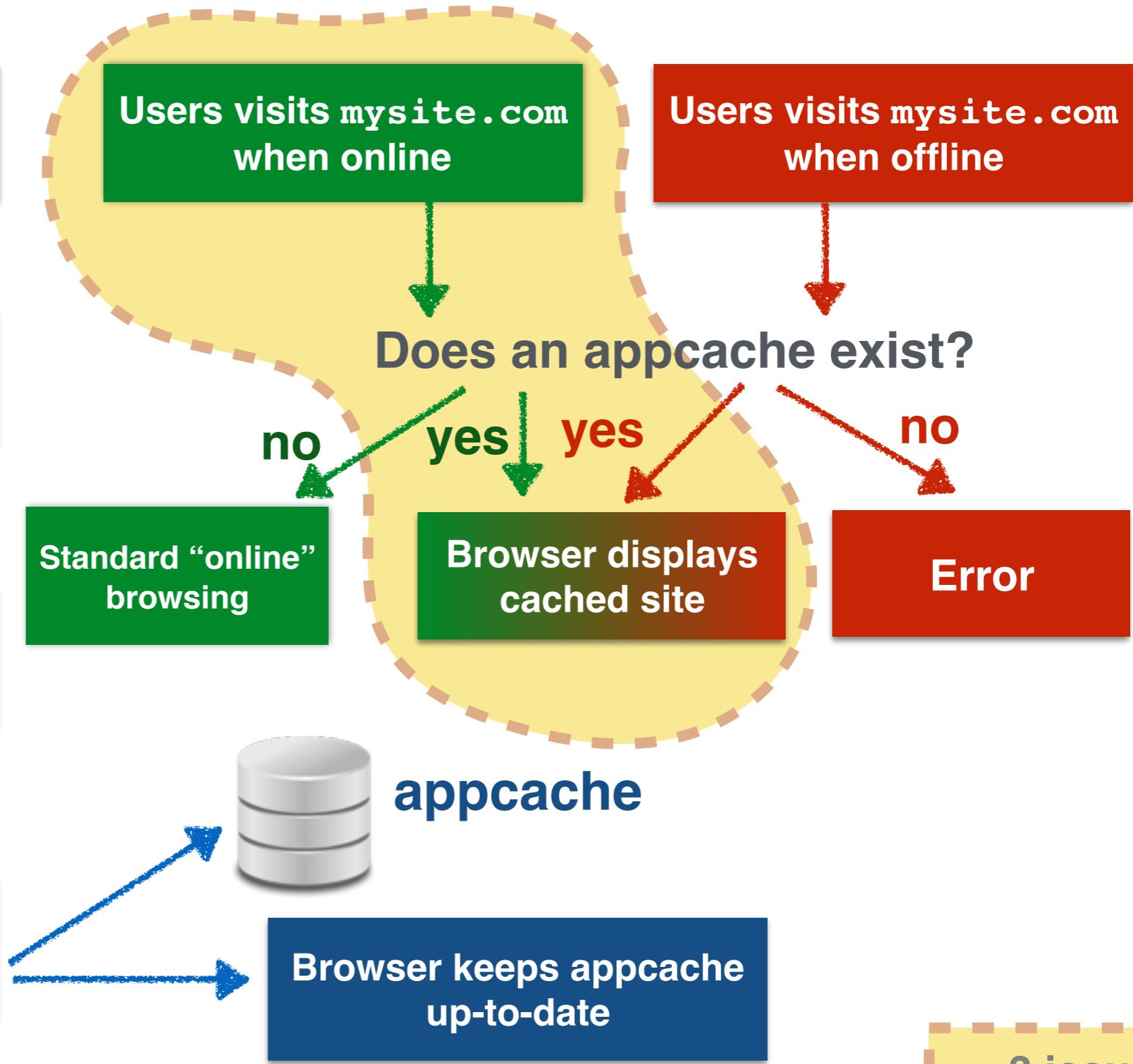
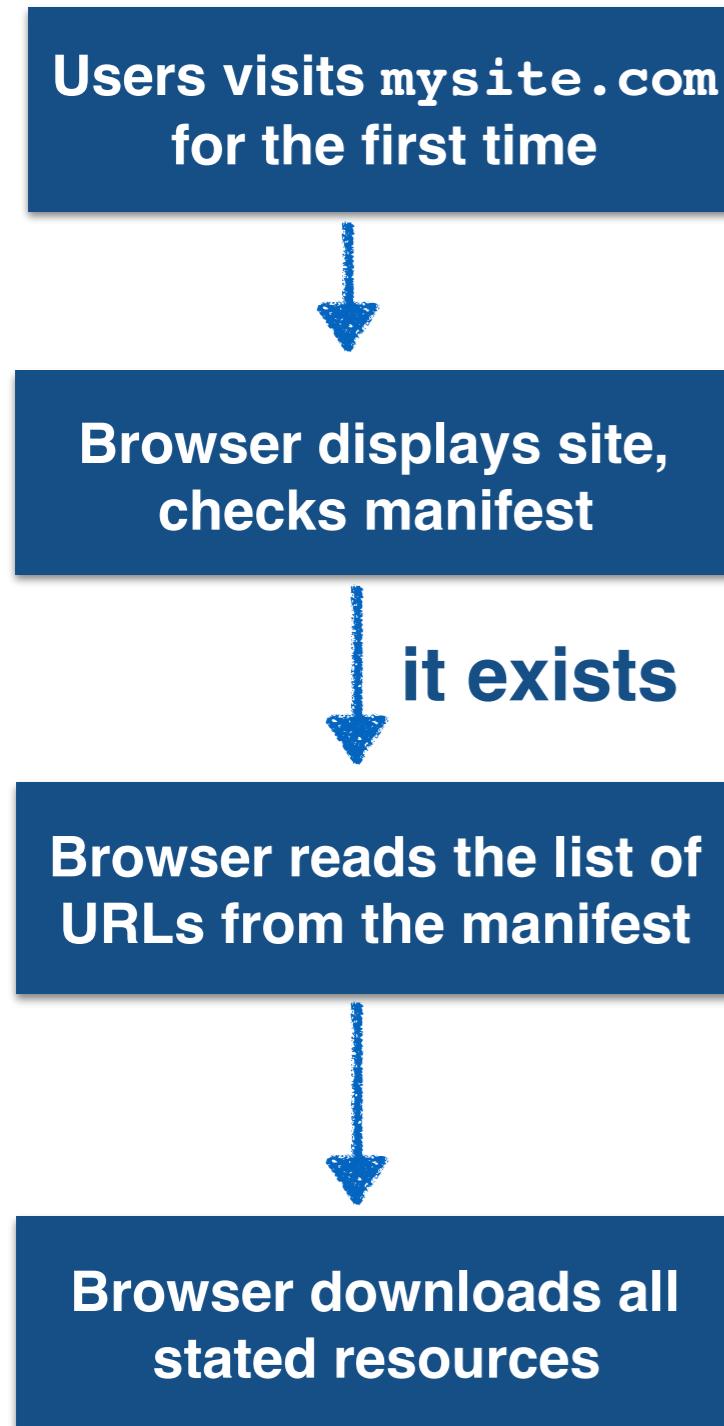
# Appcache “workflow”



# Appcache “workflow”

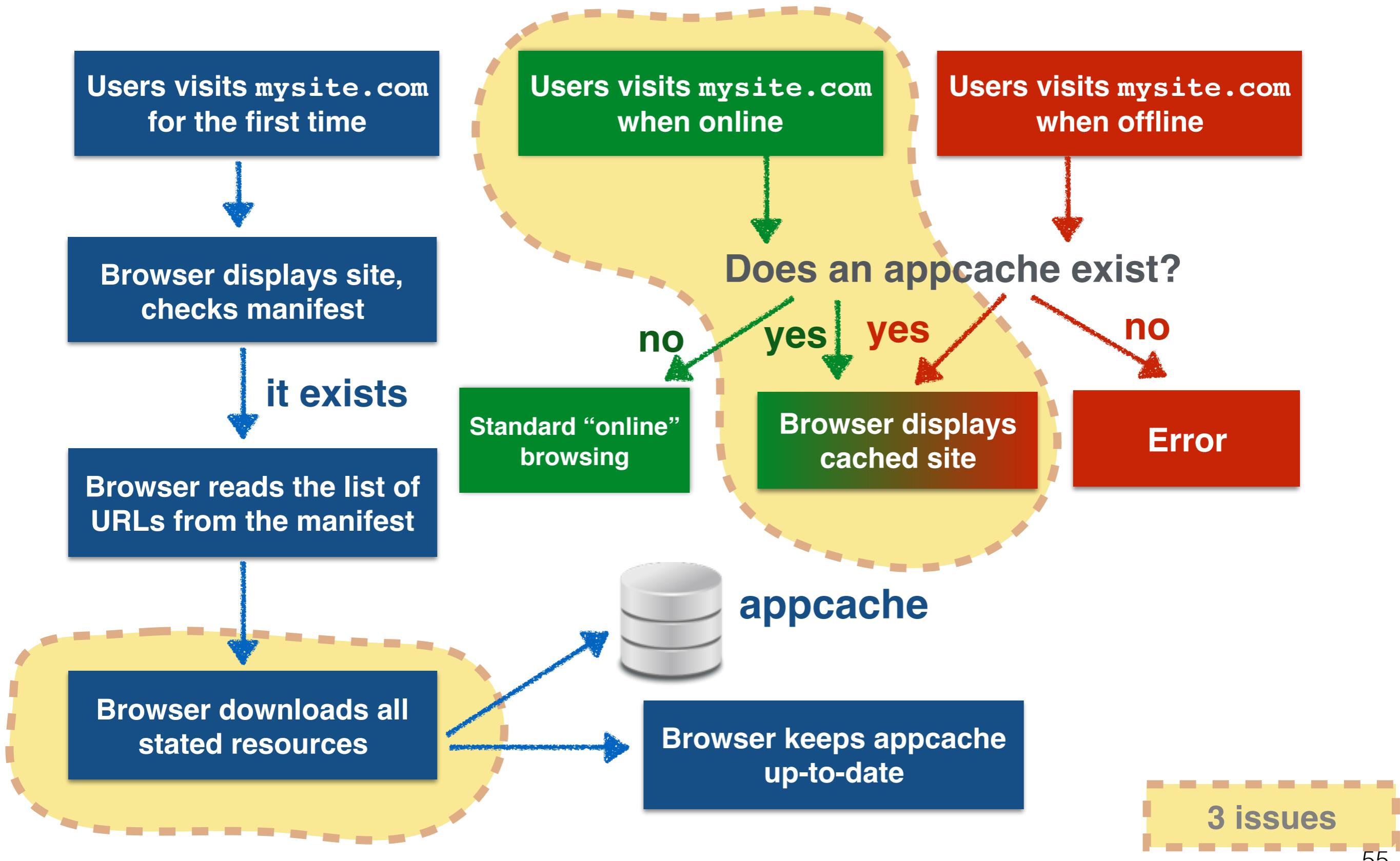


# Appcache “workflow”

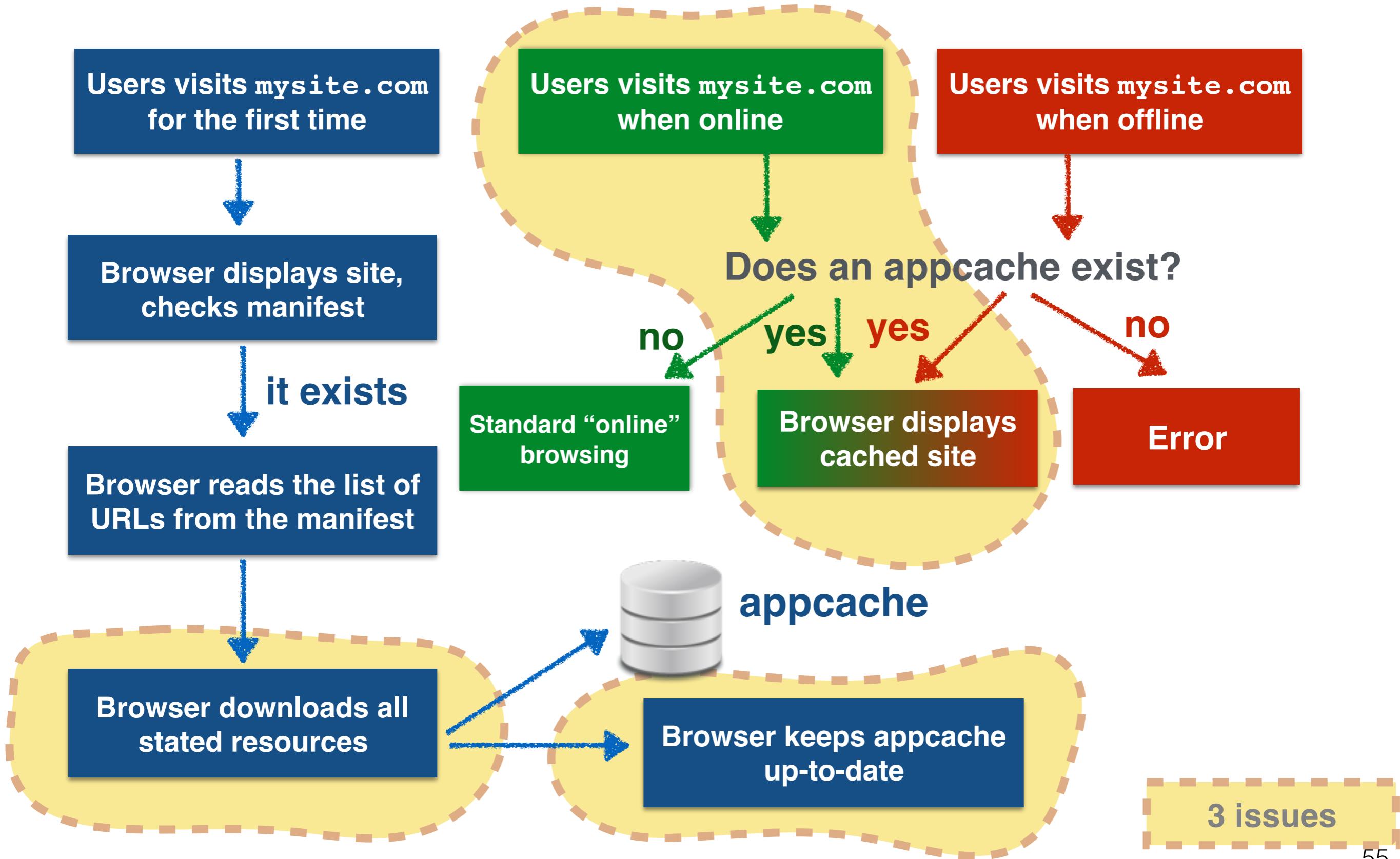


3 issues

# Appcache “workflow”



# Appcache “workflow”



# How to cache a resource

# How to cache a resource

- Web applications consist of numerous resources  
(\* .html, \*.css, \*.js, \*.mov, \*.wav, ....)

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- Web applications consist of numerous resources  
(\*.html, \*.css, \*.js, \*.mov, \*.wav, ....)
- To cache a **Web page**:

1. add the manifest attribute to the page to be cached
2. list the page in the manifest file itself

# How to cache a resource

- Web applications consist of numerous resources  
(\*.html, \*.css, \*.js, \*.mov, \*.wav, ....)

- To cache a **Web page**:

1. add the manifest attribute to the page to be cached
2. list the page in the manifest file itself

- To cache a resource of **any type**

**list the resource in the manifest file itself**

# A simple manifest file

myman.appcache

**CACHE MANIFEST**

**index.html**

**stylesheet.css**

**images/logo-small.png**

**images/logo.png**

**images/logo-large.png**

**scripts/myjs.js**

**scripts/jquery.js**

**http://myhp.nl/scripts/myjs2.js**

**required line**

**relative path**

**absolute path**

# A simple manifest file

myman.appcache

**CACHE MANIFEST**

**index.html**

**stylesheet.css**

**images/logo-small.png**

**images/logo.png**

**images/logo-large.png**

**scripts/myjs.js**

**scripts/jquery.js**

**http://myhp.nl/scripts/myjs2.js**

**required line**

**relative path**

**absolute path**

**Cached resources can come from any domain.**



# A complex manifest file

```
#required, 21.08.2014:0.1 #comments
CACHE MANIFEST
#must be cached, list first or add CACHE:
CACHE:
index.html
stylesheet.css
images/logo.png
```



# A complex manifest file

```
#required, 21.08.2014:0.1 #comments
CACHE MANIFEST
#must be cached, list first or add CACHE:
CACHE:
index.html
stylesheet.css
images/logo.png
#files that should never be cached
NETWORK:
my script.cgi
```



# A complex manifest file

```
#required, 21.08.2014:0.1 #comments
CACHE MANIFEST
#must be cached, list first or add CACHE:
CACHE:
index.html
stylesheet.css
images/logo.png
#files that should never be cached
NETWORK:
my_script.cgi
#determine what happens if not cached
FALLBACK:
/ offline.html
images/ offline.png
```



# Manifest resource types

- **CACHE**: is the explicit offline section
- **NETWORK**: indicates the “online whitelist” section, its resources are never cached
- **FALLBACK**: defines replacements for online resources that were not cached (fallback resources are automatically downloaded)
- Resource types can be combined for interesting effects

# Manifest resource types

- **CACHE**: is the explicit offline section
- **NETWORK**: indicates the “online whitelist” section, its resources are never cached
- **FALLBACK**: defines replacements for online resources that were not cached (fallback resources are automatically downloaded)
- Resource types can be combined for interesting effects
- URL pattern “\*” in **NETWORK**: online whitelist wildcard flag
- URL pattern “/” in **FALLBACK**: matches any resource on the Web site

**Assume for a moment that every page of nu.nl points to the manifest below. You are online and have just read articles A, B and C (one article/page).**

**You get disconnected from the Internet and try to access articles A and D. What happens?**

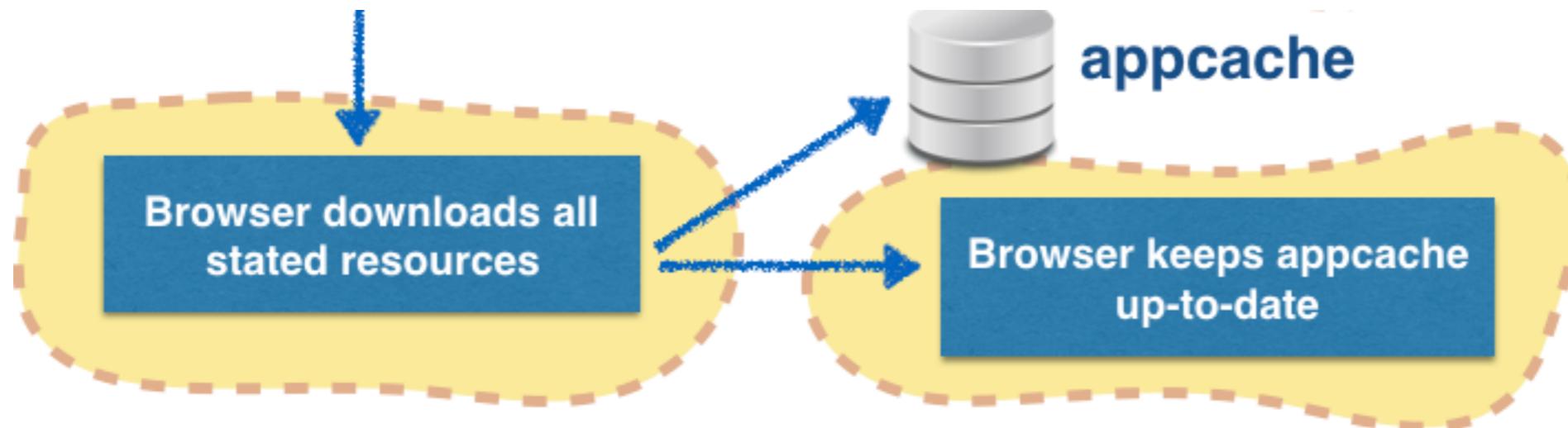
- A. Both A and D are available
- B. A is available, D is not
- C. D is available, A is not
- D. Neither A nor D is available

**CACHE MANIFEST  
Fallback:  
/ /offline.html**

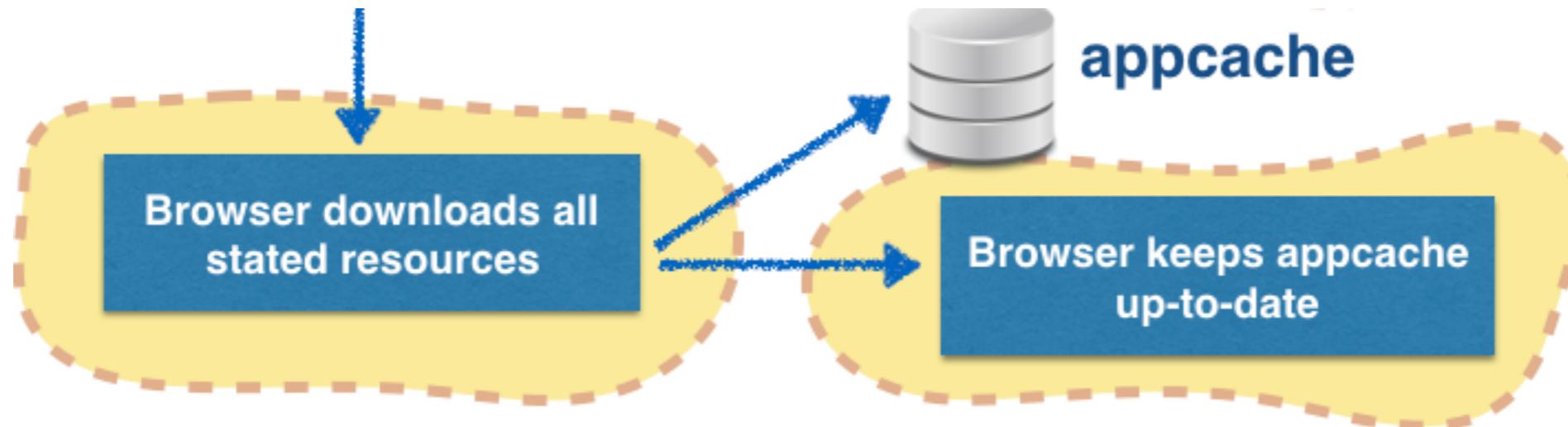
**NETWORK:**

\*

# Application cache pitfalls I



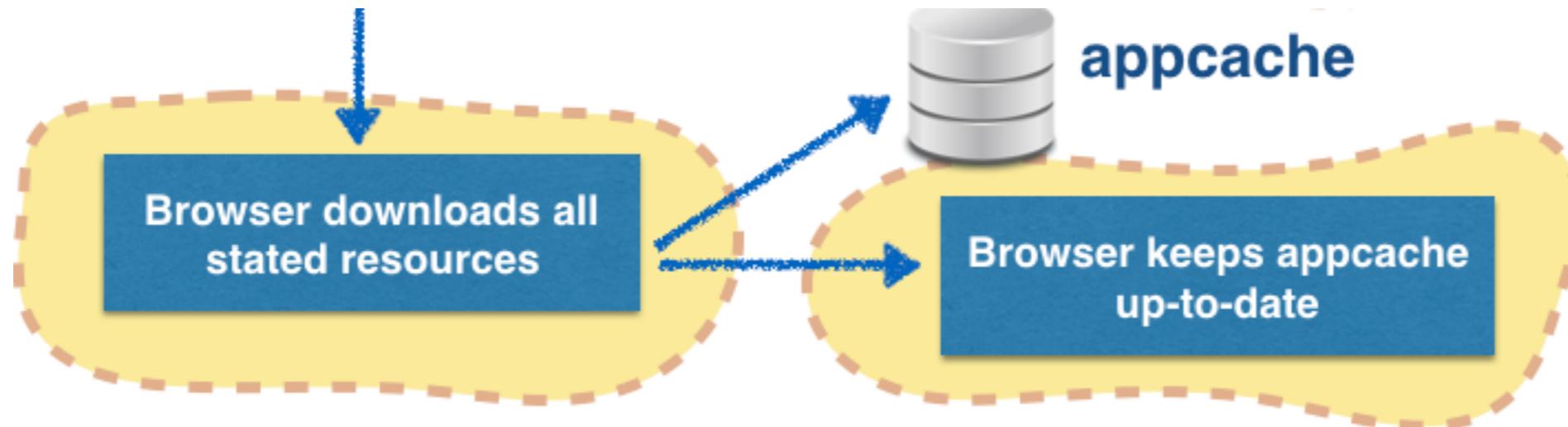
# Application cache pitfalls I



- Application caches are only **updated** by the browser when the manifest file changes

**Changing a comment within the manifest is sufficient!**

# Application cache pitfalls I

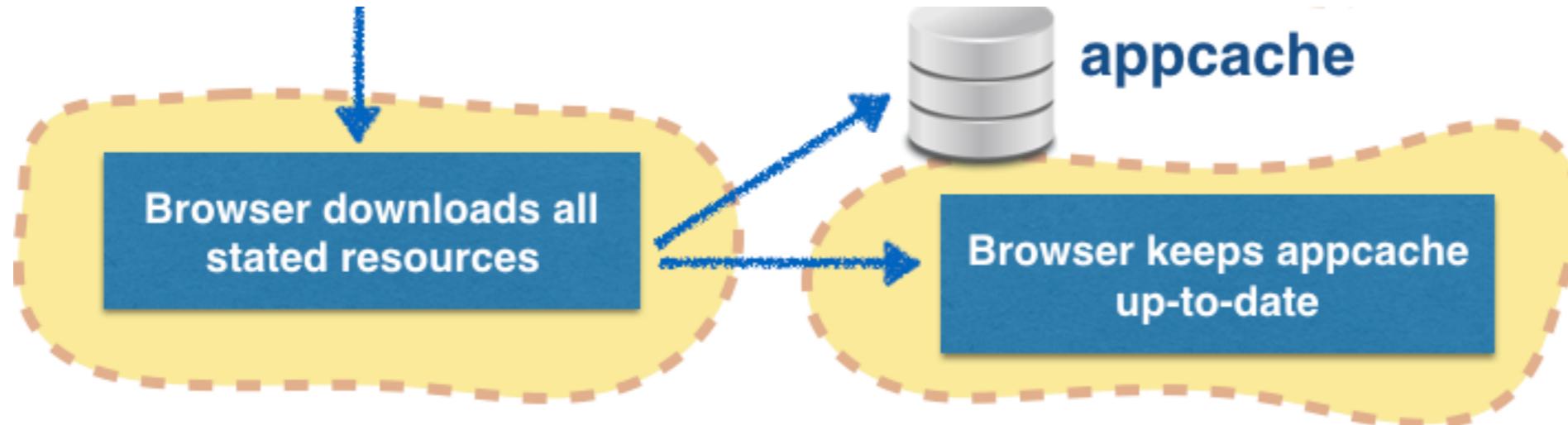


- Application caches are only **updated** by the browser when the manifest file changes

**Changing a comment within the manifest is sufficient!**

- If a single resource in the manifest **fails** to be downloaded, the appcache is not created

# Application cache pitfalls I



- Application caches are only **updated** by the browser when the manifest file changes

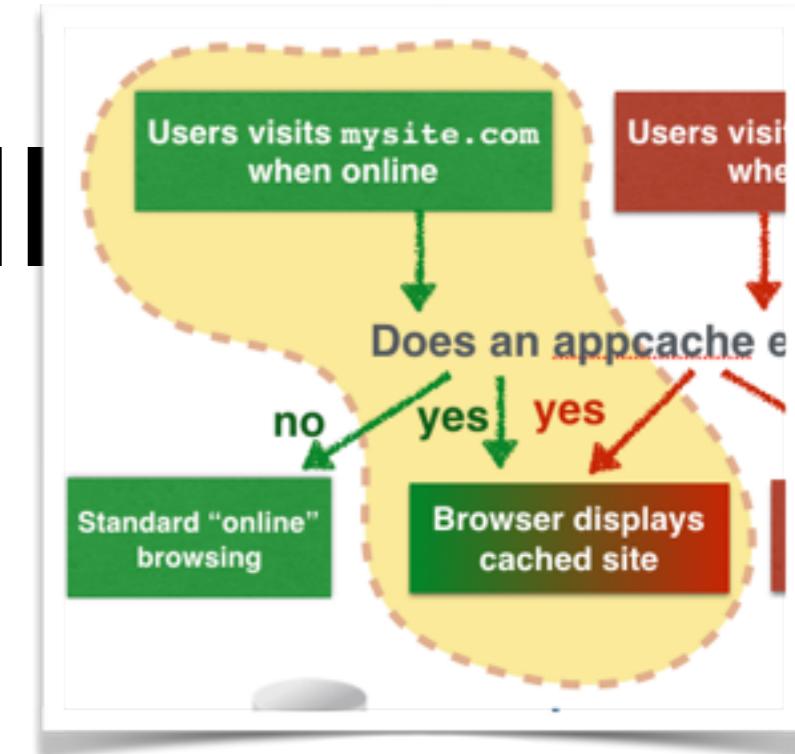
**Changing a comment within the manifest is sufficient!**

- If a single resource in the manifest **fails** to be downloaded, the appcache is not created

# Application cache pitfalls II

## When you are online

1. If an application cache exists for a site, all files are served from it
2. The browser looks for updates to the manifest
3. Once the cache is updated, the site is **not** automatically refreshed (could interfere with user actions)
4. The user needs to manually refresh the page



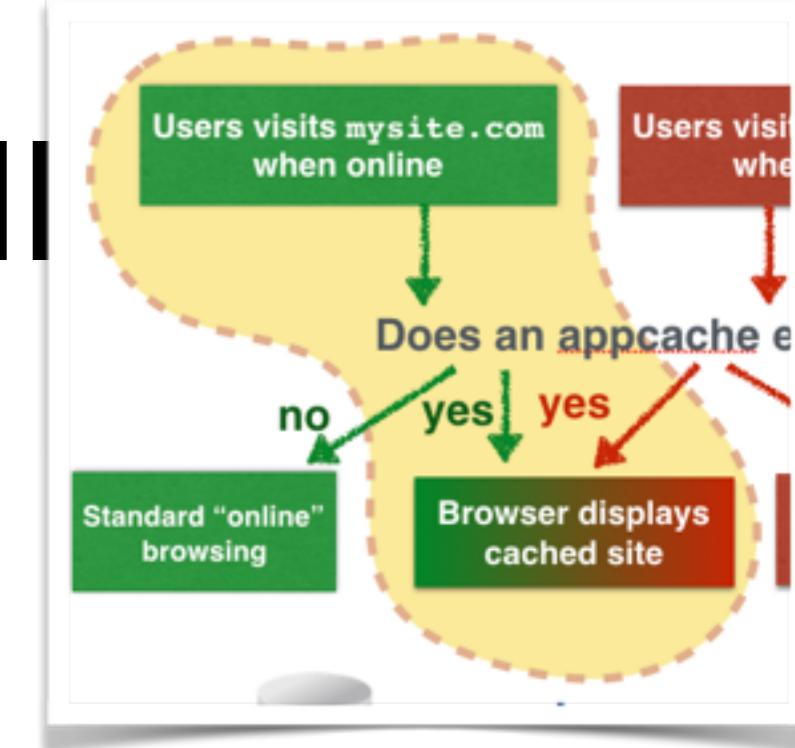
# Application cache pitfalls II

## When you are online

1. If an application cache exists for a site, all files are served from it
2. The browser looks for updates to the manifest
3. Once the cache is updated, the site is **not** automatically refreshed (could interfere with user actions)
4. The user needs to manually refresh the page

## For debugging purposes

The application cache is an additional cache, it obeys standard Web server-sent caching instructions.  
Remember HTTP's Expires and Cache-Control .



# Application cache pitfalls

A non-cached resource does not load on a cached resource.

```
<!-- index.html -->
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>My First Web App</title>
 </head>
 <body>
 <h1>Hello World!</h1>

 </body>
</html>
```

```
#required
#21.08.2014:0.1
CACHE MANIFEST

CACHE:
index.html
```

# Application cache pitfalls

A non-cached resource does not load on a cached resource.

```
<!-- index.html -->
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>My First Web App</title>
 </head>
 <body>
 <h1>Hello World!</h1>

 </body>
</html>
```

```
#required
#21.08.2014:0.1
CACHE MANIFEST

CACHE:
index.html
```

# Application cache pitfalls

A non-cached resource does not load on a cached resource.

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<!-- index.html -->
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>My First Web App</title>
 </head>
 <body>
 <h1>Hello World!</h1>

 </body>
</html>
```

```
#required
#21.08.2014:0.1
CACHE MANIFEST

CACHE:
index.html
```

Hello World!

A ghost

# Application cache pitfalls

A non-cached resource does not load on a cached resource.

```
<!-- index.html -->
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>My First Web App</title>
 </head>
 <body>
 <h1>Hello World!</h1>

 </body>
</html>
```

```
#required
#21.08.2014:0.2
CACHE MANIFEST
```

```
CACHE:
index.html
```

```
NETWORK:
*
```

# Application cache pitfalls

A non-cached resource does not load on a cached resource.

```
<!-- index.html -->
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>My First Web App</title>
 </head>
 <body>
 <h1>Hello World!

 </body>
</html>
```



```
#required
#21.08.2014:0.2
CACHE MANIFEST
```

```
CACHE:
index.html
```

```
NETWORK:
```

```
*
```

```
<!-- index.html -->
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>My First Web App</title>
 </head>
 <body>
 <h1>Hello World!</h2>
 <p>Go to the FAQ page for more infos.</p>
 </body>
</html>
```

```
<!-- faq.html -->
<!doctype html>
<html manifest="myman.appcache">
 <head>
 <title>FAQ</title>
 </head>
 <body>
 <h1>FAQ overview</h2>
 <p>Go back</p>
 </body>
</html>
```

#v1  
CACHE MANIFEST

#v2  
CACHE MANIFEST  
index.html

#v3  
CACHE MANIFEST  
index.html  
faq.html

A user visits `index.html`. Which version(s) of the manifest cache(s) the entire Web site?

- A. v1
- B. v2
- C. v3
- D. v1, v2 & v3
- E. v2 & v3

# That sounds easy

**That sounds easy ... it is not!**

# That sounds easy . . . it is not!

## Application Cache is a Douchebag

by Jake Archibald · May 08, 2012

Published in Application Development, HTML, JavaScript

“The applicationCache is like an onion: it has many layers and as you peel through them you’ll be reduced to tears.”

“The fine art of debugging, a.k.a. ‘Kill me! Kill me now!’”

## Common Pitfalls to Avoid when using HTML5 Application Cache



Tanay Pant



March 17, 2015



+1

## Ramblings of a madman

General ramblings about all things JavaScript and Firefox Developer Tools

The Application Cache is no longer a Douchebag

Getting Appcache’s Fallback to work, crossbrowser

“Offline webapps are... Lets be honest, a great idea marred by a particularly bizarre implementation, poor documentation and more gotchas than I can count.”

Read **Chapter 4** (introduction to JavaScript) of the Web development book **before** next week's Monday lecture.

**Ignore the parts related to CSS (or “style”) and git.**