ITDevCon
European Delphi Conference

6, 7 october 2016 - ROMA

Web Development with Delphi and React

Sviluppo Web con Delphi e React

bit Time professionals
consulenza | formazione | sviluppo

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Who am I?

About me

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ABLS team

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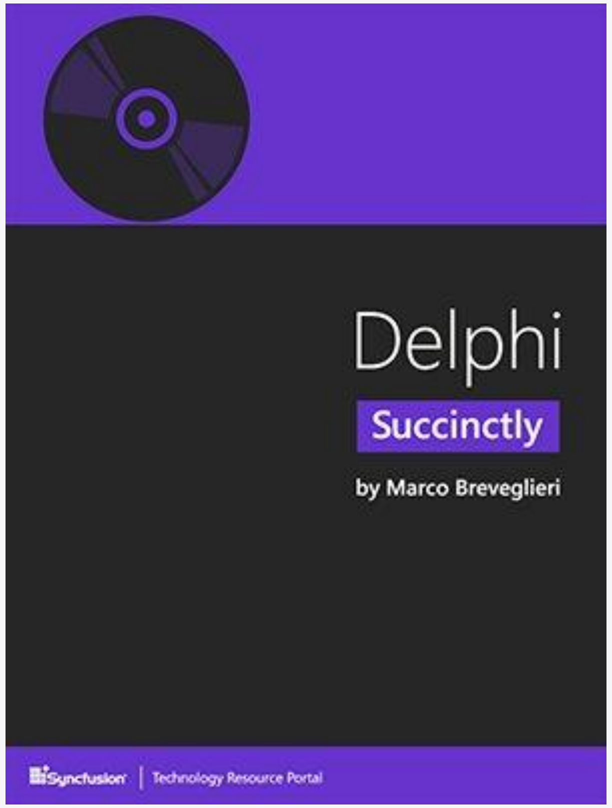
42019 Scandiano (RE)
ITALY

You might find interesting...

Delphi Succinctly

Learn the fundamentals of Delphi to build a variety of solutions for many devices and platforms in about 100 pages.

Find more here:
☞ http://bit.ly/delphi-succinctly



You might find interesting…

Delphi Podcast

The first Italian podcast about Delphi.

Listen here:
☞ http://www.delphipodcast.com
and also **take part in it**!

You might find interesting...

Component Tales

Find out what Delphi components do when you close the IDE...

Smile (if you can) here:

☞ https://twitter.com/ComponentTales

Form1
You really have a wrong concept of "native platform support".
Button
28/07/2016

MainForm
Hey, come on, play some music!
I am not that kind of *Radio* button.
Button1
RadioButton1

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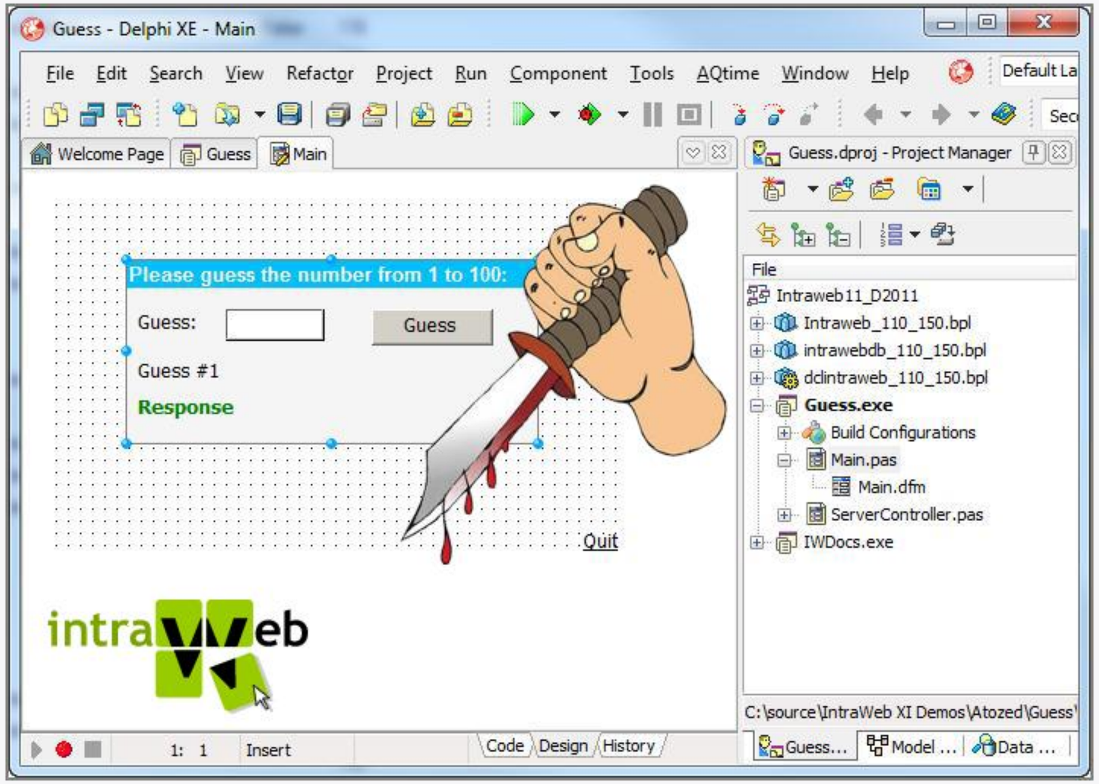
Modern Web Applications

Not these kind of app



Web Server Fat Applications

Based on

- IntraWeb
- ASP.NET Web Forms

are no more a good idea now. 😉

Web Server "Fat" Applications

Benefits

- Hide the details of HTTP
- Easy for developers with experience in desktop apps
- Leverage RAD tools support
- Are ideal for prototyping

Disadvantages

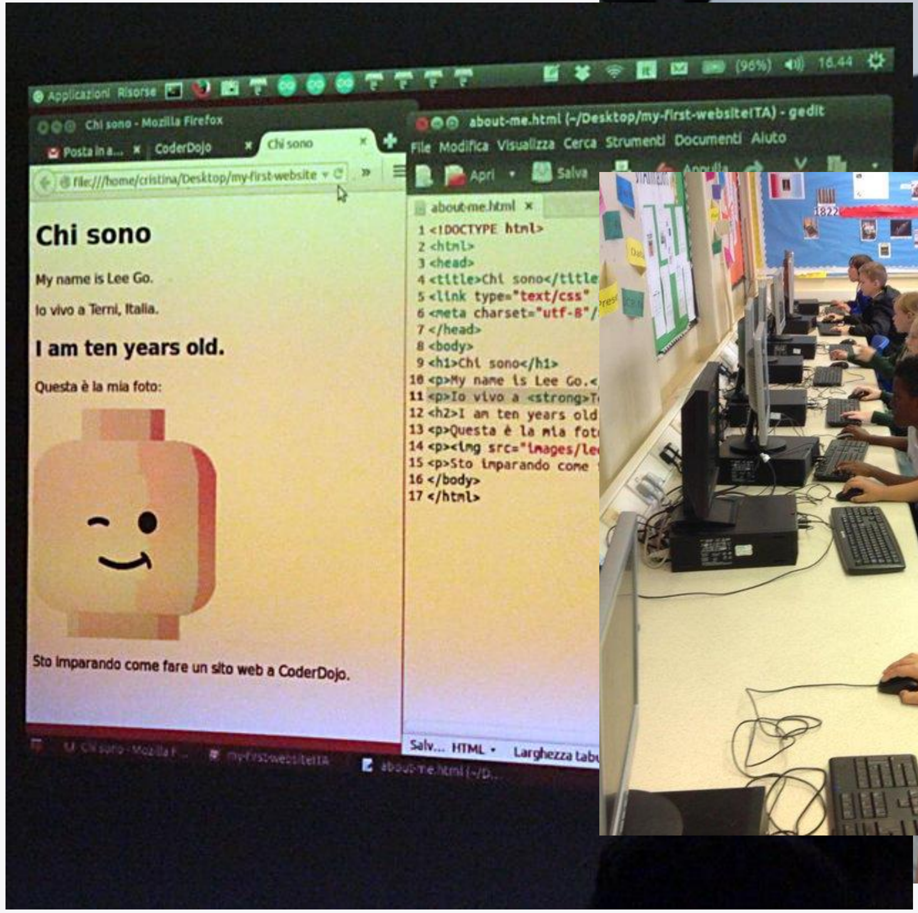
- Hide the details of HTTP
- Page/View state could become very large
- High bandwidth, memory and server CPU consumption
- Lower scalability
- Designer/Developer task separation is difficult
- Hard to Unit Test

Modern Web Applications

- Use standard Web technologies and languages

CSS HTML JS

Are they difficult to grasp?


Applicazioni Risorse
(96%) 16.44
Chi sono - Mozilla Firefox
Posta in a...
CoderDojo
Chi sono
file:///home/cristina/Desktop/my-first-website
about-me.html (~/Desktop/my-first-website(TA) - gedit
File Modifica Visualizza Cerca Strumenti Documenti Aiuto
Apri
Salva
Annulla
about-me.html
Salv... HTML
Larghezza tabu

Chi sono

My name is Lee Go.

Io vivo a Terni, Italia.

I am ten years old.

Questa è la mia foto:

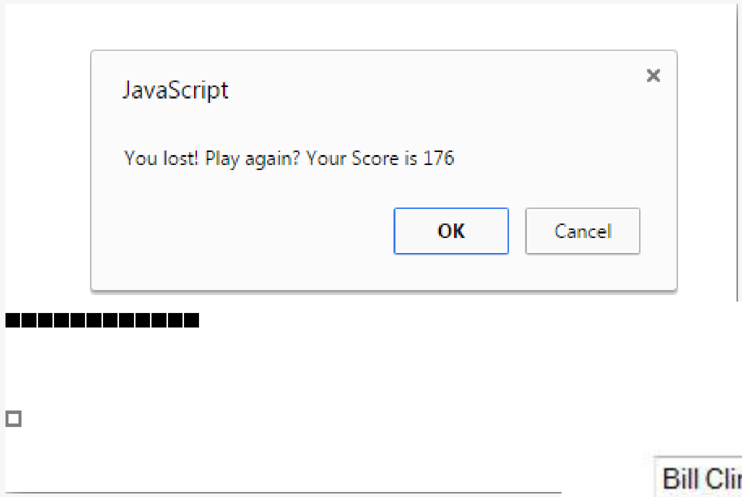
Sto imparando come fare un sito web a CoderDojo.

```
<!DOCTYPE html>
<html>
<head>
<title>Chi sono</title
<link type="text/css"
<meta charset="utf-8"/
</head>
<body>
<h1>Chi sono</h1>
<p>My name is Lee Go.<
<p>Io vivo a <strong>T
<h2>I am ten years old
<p>Questa è la mia fot
<p><img src="images/le
<p>Sto imparando come
</body>
</html>
```

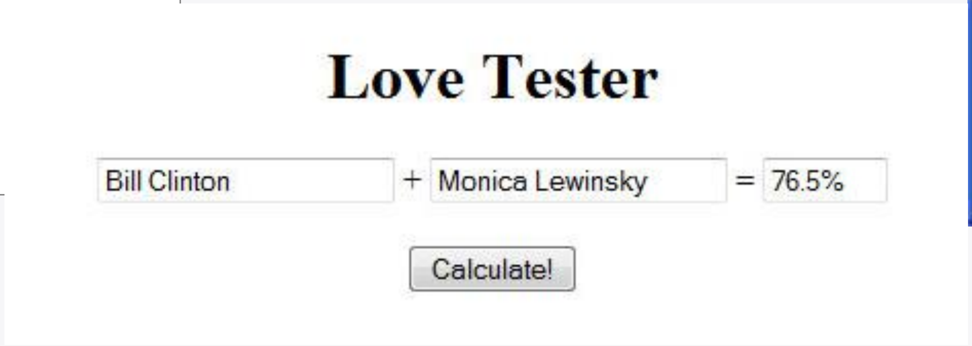
CoderDojo

JavaScript language

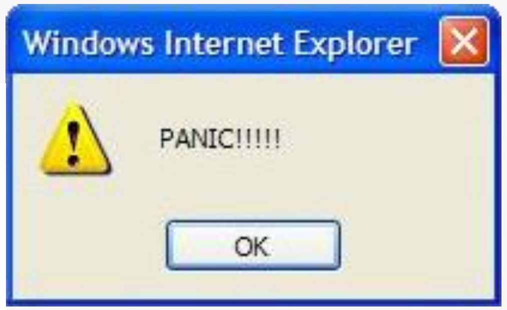
At the beginning...


JavaScript

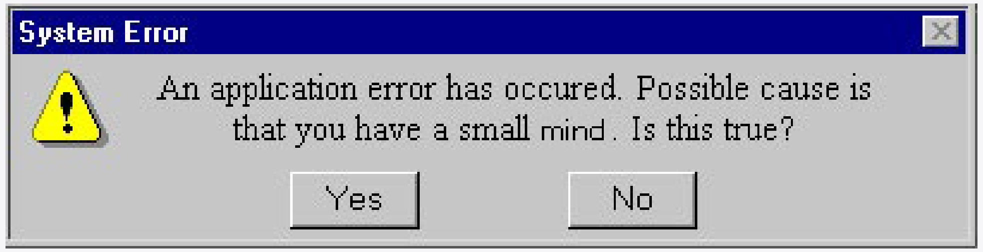
You lost! Play again? Your Score is 176


Love Tester

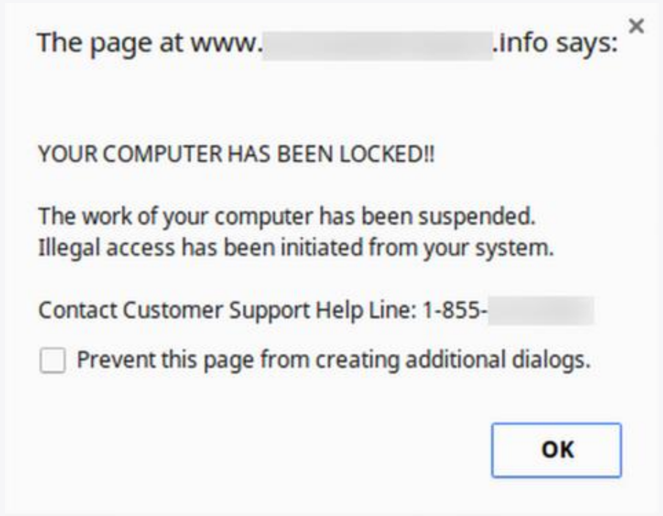
Bill Clinton + Monica Lewinsky = 76.5%


Windows Internet Explorer

PANIC!!!!!


System Error

An application error has occured. Possible cause is that you have a small mind. Is this true?


The page at www.[redacted].info says:

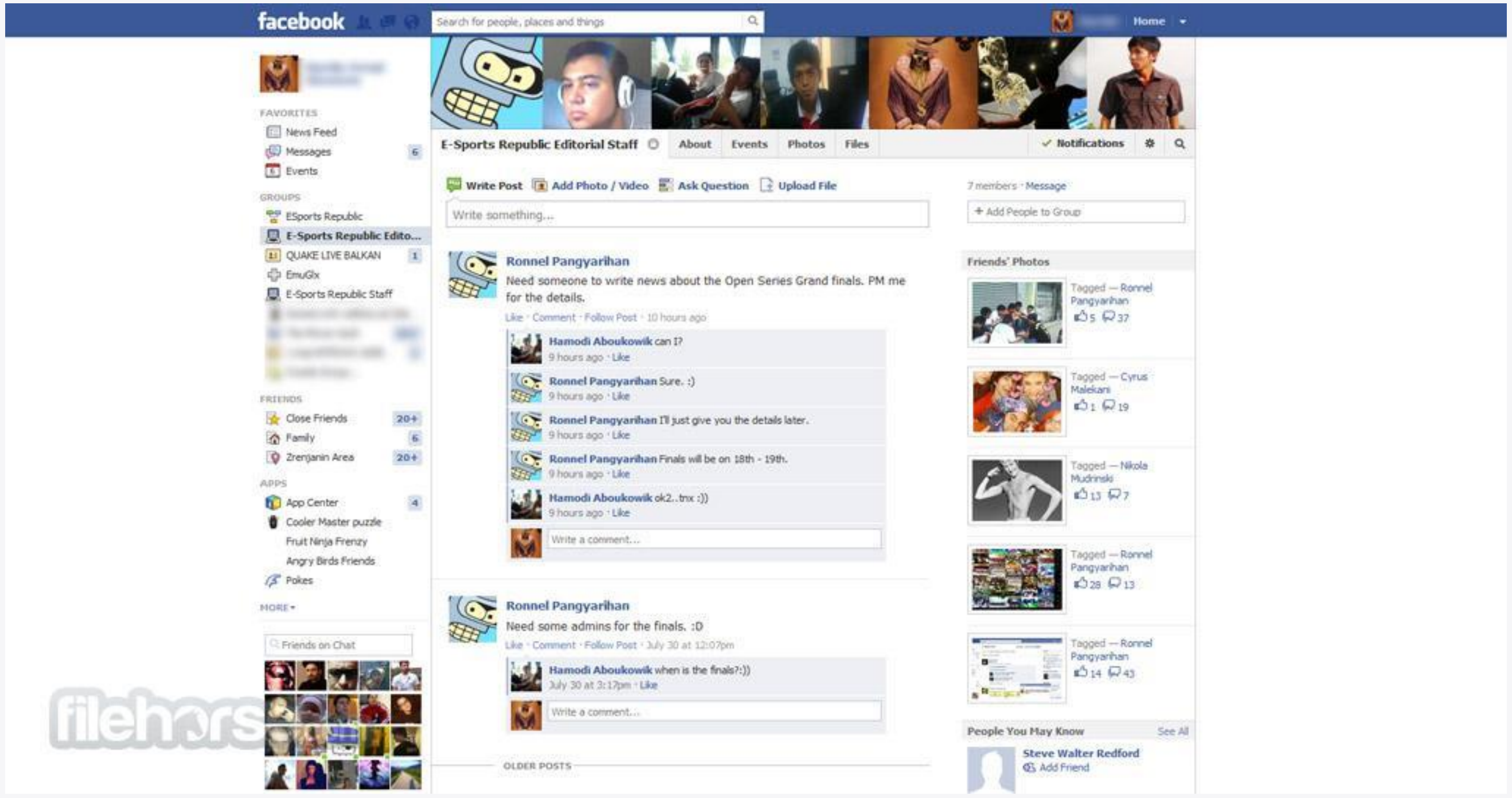
YOUR COMPUTER HAS BEEN LOCKED!!

The work of your computer has been suspended.
Illegal access has been initiated from your system.

Contact Customer Support Help Line: 1-855-[redacted]

Prevent this page from creating additional dialogs.

Today is…



Ronnel Pangyarihan
Need someone to write news about the Open Series Grand finals. PM me for the details.
Like · Comment · Follow Post · 10 hours ago

Hamodi Aboukowik can I?
9 hours ago · Like

Ronnel Pangyarihan Sure. :)
9 hours ago · Like

Ronnel Pangyarihan I'll just give you the details later.
9 hours ago · Like

Ronnel Pangyarihan Finals will be on 18th - 19th.
9 hours ago · Like

Hamodi Aboukowik ok2..tnx :))
9 hours ago · Like

Write a comment...

Ronnel Pangyarihan
Need some admins for the finals. :D
Like · Comment · Follow Post · July 30 at 12:07pm

Hamodi Aboukowik when is the finals?:))
July 30 at 3:17pm · Like

Write a comment...

Tagged — Ronnel Pangyarihan 5 37

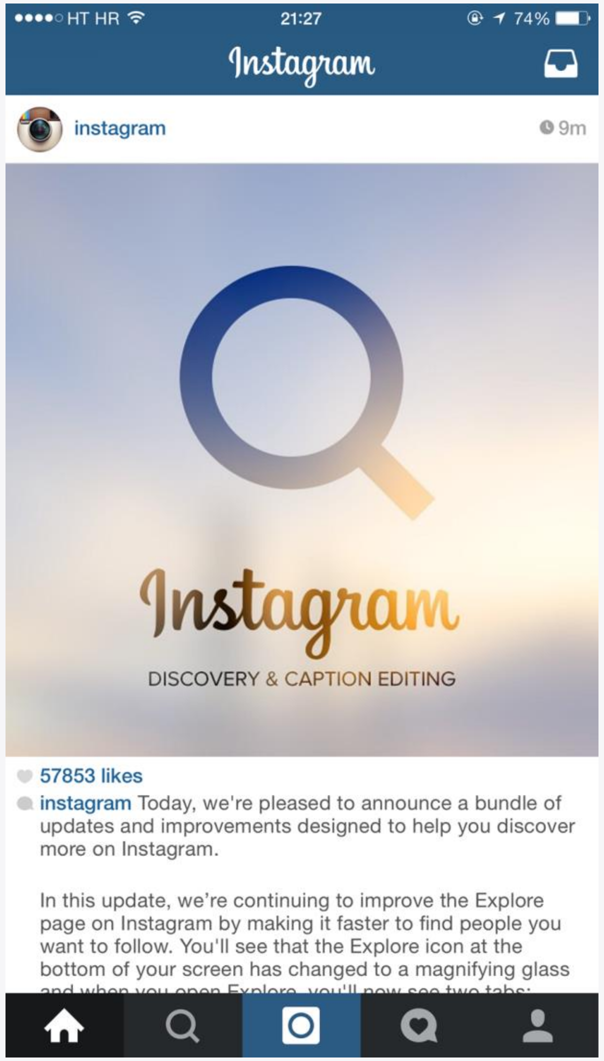
Tagged — Cyrus Malekani 1 19

Tagged — Nikola Mudrinski 13 7

Tagged — Ronnel Pangyarihan 28 13

Tagged — Ronnel Pangyarihan 14 43

Steve Walter Redford
Add Friend



57853 likes

instagram Today, we're pleased to announce a bundle of updates and improvements designed to help you discover more on Instagram.

In this update, we're continuing to improve the Explore page on Instagram by making it faster to find people you want to follow. You'll see that the Explore icon at the bottom of your screen has changed to a magnifying glass

Evolving Fast

JavaScript language is living a "second youth". 👶

- It has extended support by browsers
- New versions and standards are coming (ES6)
- There are supersets that make programmer life easier (TypeScript)

HTML5 new APIs

- Canvas / SVG
- WebGL
- File API
- Indexed DB
- Media API
- Offline support
- Web Sockets
- Web Workers
- Web Storage
- Geo-location API
- Fullscreen support

DOM (Document Object Model)

DOM (*Document Object Model*)

- It is an object model
- It is a hierarchical tree of nodes
- It represents the elements of a Web page
- It offers objects and members to add, delete, create elements in your page

Let's see some code

JQuery

JQuery is a JavaScript library that

- Simplifies access to the DOM
- Re-uses CSS syntax to select elements
- Provides additional features
- Manages the difference from browser to browser

but it is not enough to develop a large scale application. 😓

Let's see some code

Single Page Applications (SPA)

A **Single Page Application** (*SPA*)

- Consists of only a single (HTML) page
- Mimics the responsiveness of desktop apps
- Makes the user experience more fluid
- Does not reload the page in the browser but uses AJAX
- User Interface is update dynamically in response to an action
- Data and resource transfer is more efficient

To give you an idea...

```html
<!DOCTYPE html>
<html>
<head>
   <meta charset="UTF-8">
   <title>Single Page Application</title>
   <link rel="stylesheet" href="style.css" />
</head>
<body>
   <div id="container">
       <!-- Qui viene generata l’applicazione -->
   </div>
   <script src="framework.js"></script>
</body>
</html>
```

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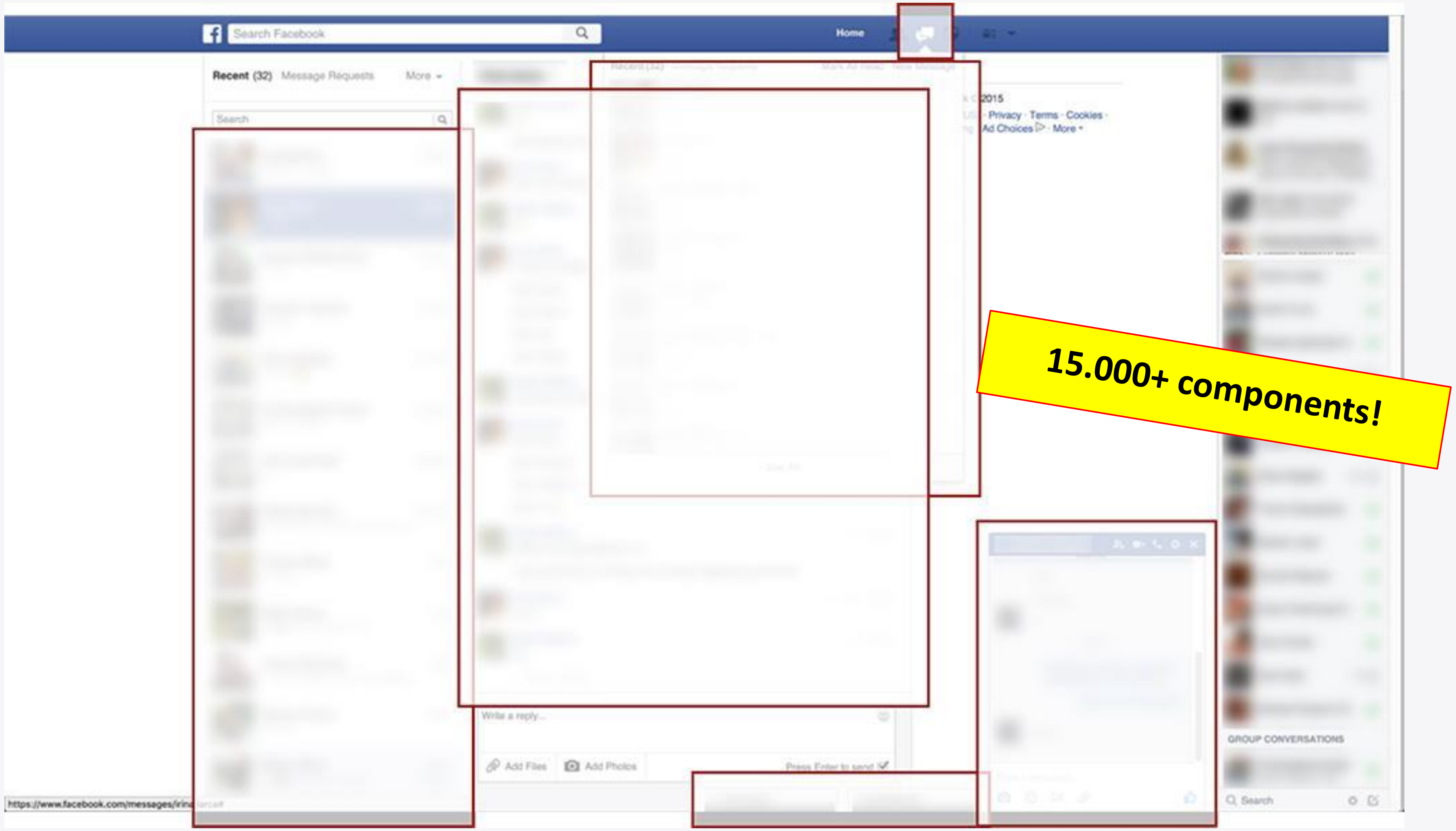
Let's React

What is React?

React is a JavaScript library
to manage UI in Web Applications.

- *Built by Facebook*
- *Used in Facebook and Instagram*
- *Thinking in MVC, React represents the "V"*
- *It is really fast (thanks to the Virtual DOM)*
- *It is based on components (a concept very clear to Delphi developers)*

Facebook Case Study



React Components

- Encapsulated
- Reusable
- Composable
- Easy to design and write

React vs...

JQuery

- Imperative Programming
- Need to assign IDs to elements
- Event-Driven approach
- Leads to "zuppa code"

AngularJS (ver. 1)

- Oscillating learning curve (but Angular is a full framework)
- Separation of Responsibility (instead of Separation of Concerns)
- Proliferation of directives and scopes

Let's see some code

JSX Syntax

JSX lets you mix JavaScript code and HTML.

- Makes it easy to write HTML templates
- Saves you from calling React functions
- Need to be "transpiled" (offline or live in the browser)
- Manages the elements of Virtual DOM *

(*) We will talk about that in a minute...

Component Properties/State

Properties

- Define immutable values inside the component
- They are useful for initialization
- You can read them with `this.props` in the code

State

- Define values that is subject to change
- When state change, React updates the UI
- You can read the state using `this.state` in the code

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Inside React

Limits of classical DOM

- It is a "black box" provided by the browser
- You cannot change its code
- You cannot optimize it and get better performances
- You cannot specialize it for specific scenarios
- It imposes an "imperative style" of coding
- The code based on DOM is less mantainable
- Sometimes it is a real bottleneck

React Virtual DOM

- It is a virtual representation of the page in memory
- It mirrors the real browser DOM
- When the page must be updated
  - React compares the VDOM with the real DOM to determine the differences between the two
  - React apply changes to the underlying DOM based on these differences
- Pages get updated in the fastest and most efficient way! ⚡⚡⚡

React Elements

- **ReactNode**
  represents a single "node" in VDOM
  - **ReactElement**: represents a HTML element
  - **ReactText**: represents a portion of text content

- **ReactFragment**
  - **ReactNode[ ]**: is an array of ReactNodes.

React Elements

To create new elements, call the **createElement()** function.

```
ReactElement createElement(
   string/ReactClass type,
   [object props],
   [children ...]
)
```

Let's see some code

Component Lifecycle

Each component can implement a set of functions to manage the main moments of its lifetime.

Most important functions are:

```
render()
getInitialState()
componentWillMount()
componentDidMount()
componentWillUnmount()
```

Put Everything Together

You must combine all the elements we have seen till now.

- Create the main page of your SPA
- Import libraries and stylesheets you need (including React!)
- Create scripts for your components
- Call the `ReactDOM.render()` function to render the UI

Let's see more demos! 👍

Let's see some code

Wire-up a (Delphi) backend

Delphi is a great tool for building backends! (soon also in Linux)

- There are nice libraries you can use
  - DataSnap / EMS
  - Delphi MVC Framework
  - MARS Curiosity
  - Indy Components
- Thanks to FireDAC, you can connect to any database you want
- Can be invoked through AJAX from any client application (*)

(*) Use the library/framework you prefer client-side for HTTP/REST communication

Questions?

Don't be afraid

of asking…

Thanks!
😇