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Cybersecurity PPP: Addressing Advanced Cyber Security Threats and  
Threat Actors



REactively Defending against Advanced  
Cybersecurity Threat

**D7.1: Website and Collaboration Tools<sup>†</sup>**

**Abstract:** This deliverable discusses the website and collaboration tools of the ReAct project. We focus on its content sections, the integration of social networking features, the content update mechanisms and the tools that will be used to foster the collaboration among the consortium. We also present a short overview of the platform and methods used for its development. Finally, we conclude the report.

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The *REACT* consortium consists of:

FORTH	Coordinator	Greece
STICHTING VU	Beneficiary	The Netherlands
UNIVERSITY OF CYPRUS	Beneficiary	Cyprus
EURECOM	Beneficiary	France
RUHR-UNIVERSITAET BOCHUM	Beneficiary	Germany
SYMANTEC	Beneficiary	France

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# 1 Introduction

This deliverable details the ReAct website which is one of the objectives of the seventh workpackage (WP7) of the project. The ReAct website is publicly available at <http://www.react-h2020.eu/> and it will be the main channel through which the general public will gain access to the project's outcomes. The website will link to public deliverables, reports, and will host a copy of all scientific publications. Furthermore, it will serve as a focal organization tool for announcing events, such as schools and workshops, organized by the project. In order to promote communication between the scientific community and the general public and in order to increase awareness of security issues, the project will organize further outreach activities.

For better dissemination of the information, we will also take advantage of social media such as Twitter, Facebook and LinkedIn, as a way to aggregate and reach out to our constituency. The website will be regularly updated with all recent information about the project but up-to-the-minute information will be posted on ReAct's social media accounts with links to the project's web site.

## 1.1 Deliverable Outline

In the following Chapters, we will describe the ReAct website as it was at the time of delivery of this deliverable. In Chapter 2 we initially present the content, features of the REACT website, how the website can be updated using a web browser, the tools used to create the website and why we chose them. We also briefly present the principles that the site is based on and the web standards that the REACT website adheres to. In Chapter 3 we present our presence on social media and in Chapter 4 we present our file hosting service. Finally, in Chapter 5 we summarize the website setup and outline possible future additions and enhancements. These are content and features that can be added at any time through the course of the project to help the website to better serve its purpose.

## 2 Website

In this chapter, we will present the content sections, the updating mechanisms and the design and hosting of the ReAct website.

### 2.1 Layout and Sections

In this section, we detail the current layout of the ReAct website. At this point of time, the main goal of the website is to provide information on the project and its goals and to enable interested parties to get in touch with the project. Certainly, the website will be a work-in-progress throughout the duration of the project.

#### 2.1.1 Home Section

The Home section provides an introduction and an overview to the project and its objectives (Figure 1). The current layout uses two columns. The larger left part provides the overview of the project while the right part of the layout will be used to show the latest news of the project. The displayed news will be obtained real-time from the ReAct Twitter feed.

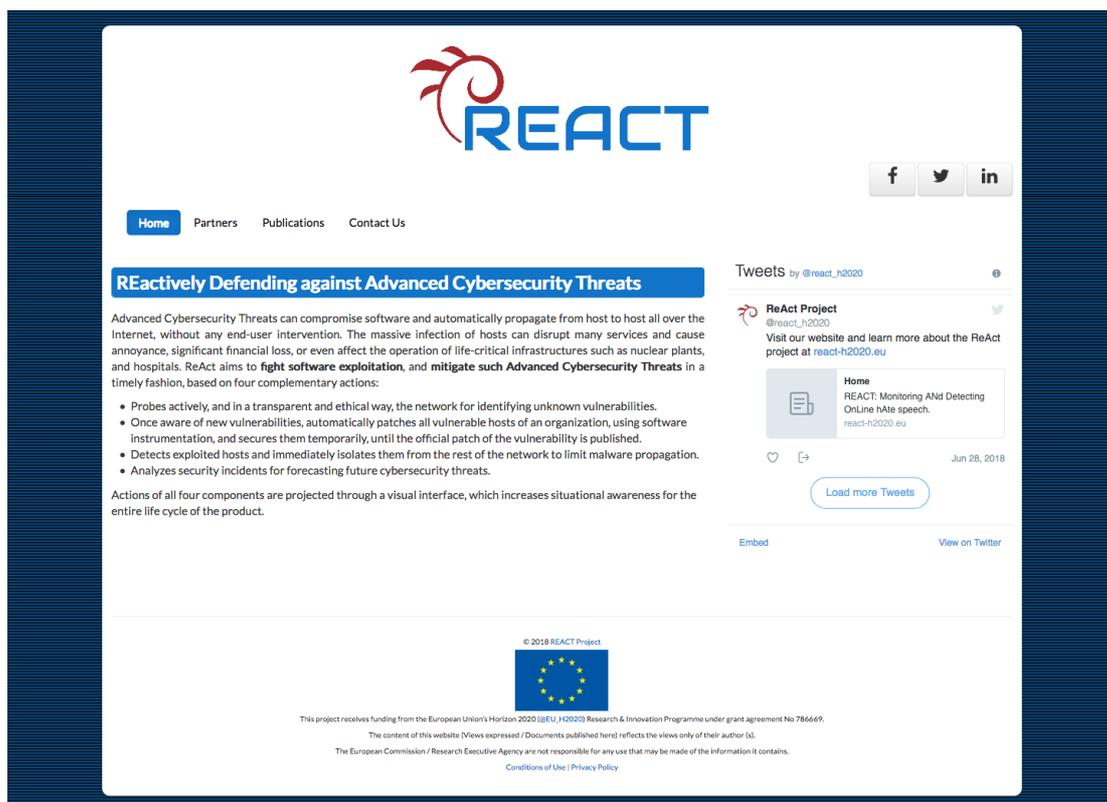


Figure 1 - Home section

#### 2.1.2 Partners Section

A short profile for each of the project partners is provided through the Partners section of the website (Figure 2). A general description and the official partners' logos have been

included in this page, for the visitor to have a clear view of the consortium and their roles in the project. The name of each partner contains a link to the webpage of the relative organization.

**REACT**

Home **Partners** Publications Contact Us

### The ReAct consortium

**FORTH**  
INSTITUTE OF COMPUTER SCIENCE

The **Foundation for Research and Technology - Hellas (FORTH)**, established in 1983, is the largest Greek State R&D Centre. FORTH hosts six major Research Institutes. The Institute of Computer Science (ICS) has established an internationally acknowledged excellence in conducting basic and applied research, developing applications and products, and providing services. FORTH, besides its pioneering contributions in the sector of Information and Telecommunications Technologies in Greece, cooperates, in the context of European and international collaborative R&D programmes, with universities, research centres and other organisations at national and international level, thus contributing to the exchange of scientific ideas and the creation and transfer of new technologies. The research directions at ICS take into consideration the state of the art, international trends, research and technological challenges worldwide, as well as the national needs of the public and private sectors. FORTH represents Greece in the European Research Consortium for Informatics and Mathematics (ERCIM), an organisation dedicated to the advancement of European research and development in the areas of information technology and applied mathematics.

**Vrije Universiteit Amsterdam (VUA)**

The **Vrije Universiteit Amsterdam (VUA)**, established in 1880, is a private University located in the southern part of Amsterdam, The Netherlands. It has over 15,000 students studying in 12 faculties. The Computer Science Department is in the Faculty of Sciences and its staff consists of about 60 researchers and counts more than 40 Ph.D. students. The department has participated in many EU projects in the past.

**University of Cyprus**

The **University of Cyprus (UCY)** is the largest University and main research organisation in Cyprus. UCY has a student population of 7,000 (2,000 graduate). The Department of Computer Science has 22 faculty members, and 100 postdoctoral researchers and PhD students. The Department publishes more than 100 journal papers per year and attracted a total funding of more than 30 MEuro in the last decade. UCY participates through SREC (Security Research group) and LINC, Laboratory for Internet Computing (linc.ucy.ac.cy), which has extensive experience in network-centric computing and software for large-scale distributed systems: Cloud, Grid, Peer-to-Peer and Vehicular Computing; Trustworthy Cloud Computing; Security; Content Distribution Networks; Semantic Web and Web 2.0 technologies. LINC has established and operates CyGrid, the Cypriot node of the European Grid Infrastructure EGEE, and the Cyprus Certification Authority (CyCA).

**EURECOM**

Eurecom is a non-profit research and teaching institute. It was founded in 1992 by EPFL and Telecom Paris. It specializes in communications and network engineering. Eurecom's academic and research activities are organized in three departments: Mobile Communications, Multimedia Communications and Corporate Communications. The Corporate Communications department consists of six professors and assistant professors, two research engineers, a dozen junior researchers and a number of master students. The security of mobile devices as well as the monitoring and modeling of Internet threats are among its main areas of research. The group has established an international reputation and its members are well involved in their respective scientific communities.

**Ruhr-Universität Bochum (RUB)**

The **Ruhr-University Bochum (RUB)**, located on the southern hills of central Ruhr area Bochum, was founded in 1962 as the first new public university in Germany after World War II. The Ruhr-University Bochum is one of the largest universities in Germany and part of the Deutsche Forschungsgemeinschaft, the most important German research funding organization. RUB with its 20 faculties (RUB's disciplinary institutional units) is home to 5,200 employees and over 42,000 students from 130 countries. All the great scientific disciplines are united on one compact campus. The Horst Gortz Institute for IT-Security (HGI) was founded 2001 at RUB to cope with the Europe-wide deficits in the field of public research on computer security. Thanks to its financial and staff facilities, as well as, its broad disciplinary range, the HGI is one of the world's leading institutions in the field of computer security research.

**Symantec**

Founded in 1982, **Symantec** has evolved to become the global leader in cyber security, with more than 11,000 employees in more than 35 countries. Operating one of the world's largest cyber intelligence networks, we see more threats, and protect more customers from the next generation of attacks. We help companies, governments and individuals secure their most important data wherever it lives. Thanks to large portfolio of cyber security products, since decades Symantec has been successfully protecting hundreds of millions of end-point and hundreds of thousands of enterprise customers against cyber attacks. The category of security products Symantec offers include endpoint & hybrid cloud security, information protection, web & cloud security, messaging security, cyber security services and website security.

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Figure 2 - Partners section

### 2.1.3 Publications Section

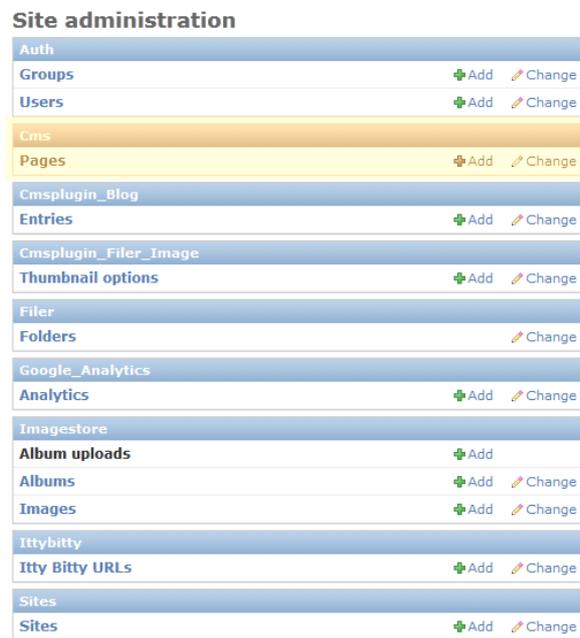
This section will make available to the public all the documents published by the project. As the list of published documents will expand both in length (i.e. more conference papers) and in diversity (i.e. inclusion of deliverables) it is expected that more frames will be added to this section. The title of each paper will be added to this page as soon as its acceptance notification is received. The full text of the paper or a link to the paper on the publisher website will be added at the same time or shortly after.

### 2.1.4 Contact Us Section

The Contact Us page contains a contact form allowing visitors to contact project consortium and submit comments, questions, or suggestions. The email address of the visitor is required in order to send feedback. We opted for a contact form, instead of publishing a contact email address, in order to avoid having our email address harvested and spammed through the course of the project.

## 2.2 Updating Mechanisms

The contents of the website can be easily updated using a web browser. This feature is provided by the CMS we use. After successful authentication, the website editor is presented with the *Site Administration Panel* shown in Figure 3. Through this panel all of the website's modules can be configured.



Site administration	
Auth	
Groups	<a href="#">+ Add</a> <a href="#">Change</a>
Users	<a href="#">+ Add</a> <a href="#">Change</a>
Cms	
Pages	<a href="#">+ Add</a> <a href="#">Change</a>
Cmsplugin_Blog	
Entries	<a href="#">+ Add</a> <a href="#">Change</a>
Cmsplugin_Filer_Image	
Thumbnail options	<a href="#">+ Add</a> <a href="#">Change</a>
Filer	
Folders	<a href="#">Change</a>
Google_Analytics	
Analytics	<a href="#">+ Add</a> <a href="#">Change</a>
Imagestore	
Album uploads	<a href="#">+ Add</a>
Albums	<a href="#">+ Add</a> <a href="#">Change</a>
Images	<a href="#">+ Add</a> <a href="#">Change</a>
Ittybitty	
Itty Bitty URLs	<a href="#">+ Add</a> <a href="#">Change</a>
Sites	
Sites	<a href="#">+ Add</a> <a href="#">Change</a>

Figure 3 - Site administration panel. Highlighted is the section of the CMS module, which is used to edit content.

The contents of the site are updated through the *CMS module* which appears highlighted. Following the Pages link, the *page hierarchy panel* (shown in Figure 4) is displayed. The panel allows the website editor to restructure the website layout by using *drag & drop* on the

items. Additionally, with a single-click the editor may hide a page from the navigation menu or take it offline.



Figure 4 - Page hierarchy panel. The pages can be rearranged by dragging them and dropping them on their new location in the hierarchy tree.

While it is possible to edit the content of a page through the admin interface we presented, it is usually more convenient to update it through the front-end editor of Django-CMS. The front-end editor feature is automatically enabled when visiting the website after having logged in the administrative interface. When it is enabled, a toolbar appears on the top of the page which enables the user to go into edit mode.

The actual content of the page is encapsulated in *Content Plugins*. Content Plugins produce HTML output which is placed in designated locations in the template called placeholders. Obviously, the most commonly used plugin is the *Text Plugin* which is used to edit and then display html formatted text. However more specialized plugins exist for interfacing with specific data sources (e.g. Twitter).

The built-in editor used for editing the page text offers many of the formatting options found in a full-blown word processor. The formatting options supported by default have been chosen to encourage semantic-based html formatting. I.e. the editor marks-up the contents according to their semantics on the page and their final appearance is determined by the CSS stylesheet used.

## 2.3 Design and Hosting

### 2.3.1 Grid-based Design

We wanted the ReAct website to have a visual layout which will be clean-cut while at the same time is easy to change in order to accommodate future needs. For this, we chose to have it designed and built using [Twitter Bootstrap](#). Twitter Bootstrap is a CSS framework that allows the rapid prototyping of *grid based website designs* while working equally well when integrated into a production system.



In grid based designs, the visual blocks that comprise the website (e.g., menus, text boxes, information boxes, ads etc.) are not placed on arbitrary positions. Instead they are laid out on predefined rigid positions on a grid. This may sound restrictive but in practice the resulting design is much more efficient in communicating its contents to the visitor. This is because placing the visual blocks of the website on a grid results in *clear visual paths* and *visual structure and balance* on the design. Additionally, a grid based design also ensures consistency between the website pages and are much easier to update in order to accommodate additional content.

### 2.3.2 Web Standards

The ReAct website pages have been tested to comply with the *HTML5* standard, using the [W3C Markup Validator](#). The situation is more complicated with regards to *CSS* compliance. We have chosen to use *CSS3* for the website because it greatly simplifies the implementation of aesthetic elements such as rounded element corners, element shadows etc. Without *CSS3*, these elements have to be pre-rendered as bitmap images and then included in the page, which degrades the semantic integrity of the produced HTML output.



While we have taken every care for our *CSS* code, it has been proved impossible to have *CSS3* code that both validates on the *W3C CSS Validator* and works on all popular browsers. This made us take a more pragmatic approach and instead strive to have our pages render correctly with the latest versions of all popular web browsers.

### 2.3.3 Software stack

For serving the REACT website we use a *LAMP software stack*:

- Linux as the operating system
- Apache as the web server
- MySQL as the database backend
- Python for dynamically compiling the web pages

The later components of the stack have been distributed between two servers. The first server is dedicated to running the *MySQL server*, while the second runs the *Apache web server* and generates the dynamic pages using the python-based [Django web framework](#).

Django itself is a generic web framework that provides an *Object-Relational-Mapper* (ORM) that allows accessing objects stored in a relational database (in our case *MySQL*) as Python objects. For serving and managing our pages we use [Django-cms](#) a Content Management System built on top of django.

The benefit of the Django/Django-cms combo is that they provide a clear, well documented Application Programming Interface. They are much more compact than other solutions which make tweaking and extending them much easier. This could prove useful in case we need to extend the functionality of the ReAct website beyond the basics. An additional benefit of this combo is the existing expertise of the consortium (specifically FORTH) on building and maintaining Django-cms sites. Finally, we should mention that all the software components are regularly updated in order to be immune to known (and patched) security vulnerabilities.

### 2.3.4 Hardware stack

The website is hosted by FORTH on their premises in Heraklion, Crete, Greece. The hosting server features two Intel Xeon dual-core CPUs running at 2.66GHz and a total memory of 4GB. It is connected to the Internet through FORTH's Gigabit connection to the GRNET backbone. The server has two high performance SAS disks (10k RPM) arranged as RAID-1 for fault-tolerance.

The server is protected by firewalls in order to minimize the risk from cyber-threats. As an additional security measure, the database server used by the REACT website is located on a separate host with even more restricted access rules. Both hosts are internally and externally monitored. Finally, remote backups are performed for both on a daily basis.

It is also important that the hosts reside in a protected physical environment. They are located in one of FORTH's data-centers. For ensuring optimal operating environment, it is fitted with industrial-strength air conditioning with more than 240.000BTUs efficiency. In power emergencies, it is supported by a UPS power supply and an external power generator which is engaged automatically on power failure. Additionally, the data-center features an automatic carbon dioxide fire-extinguishing system.

### 3 Social Networks

Currently, ReAct presence has been established in *Facebook, Twitter and LinkedIn*.

#### 3.1 Twitter

Twitter is the most popular news networking service where users interact with short posts known as “tweets”. Initially, tweets were restricted to 140 characters but in the last year this limit was doubled. The Twitter profile of ReAct can be seen on Figure 5. Twitter feed has been also integrated to the website in the form of the *news feed* in the right part of the front page.

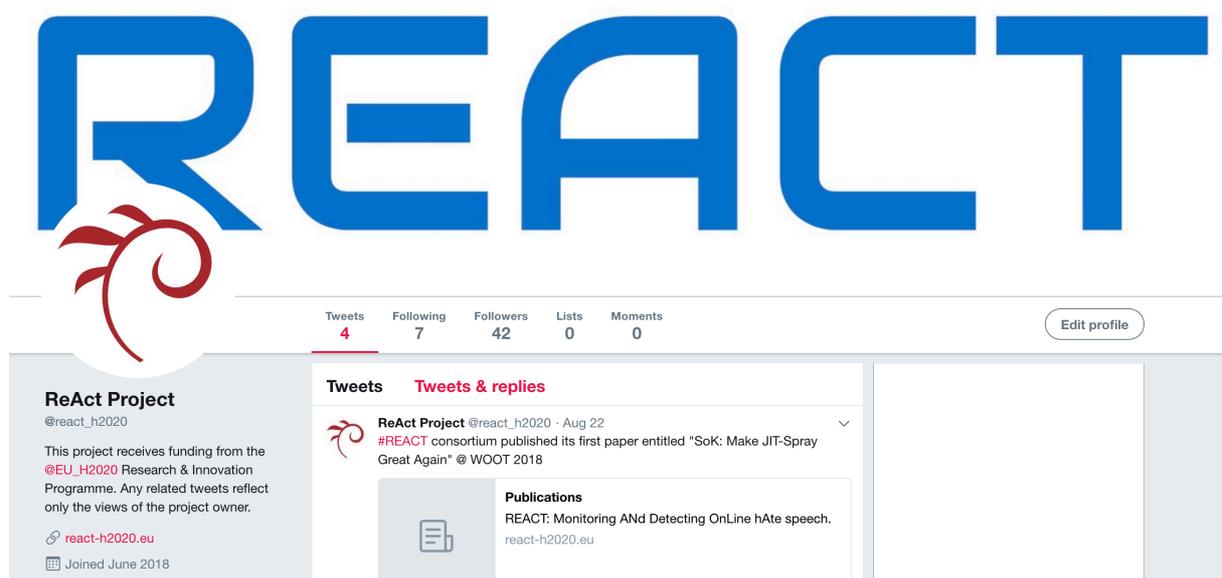


Figure 5 - Twitter profile of ReAct

#### 3.2 Facebook

Facebook, launched in February 2004, is a free and very popular networking platform that enables users and communities to maintain profiles, upload media files and stay in touch with the public. Facebook is much more complex than Twitter as it works as a social platform that allows many independently developed applications to run. A page was created for the ReAct project on Facebook which can be seen on Figure 6.

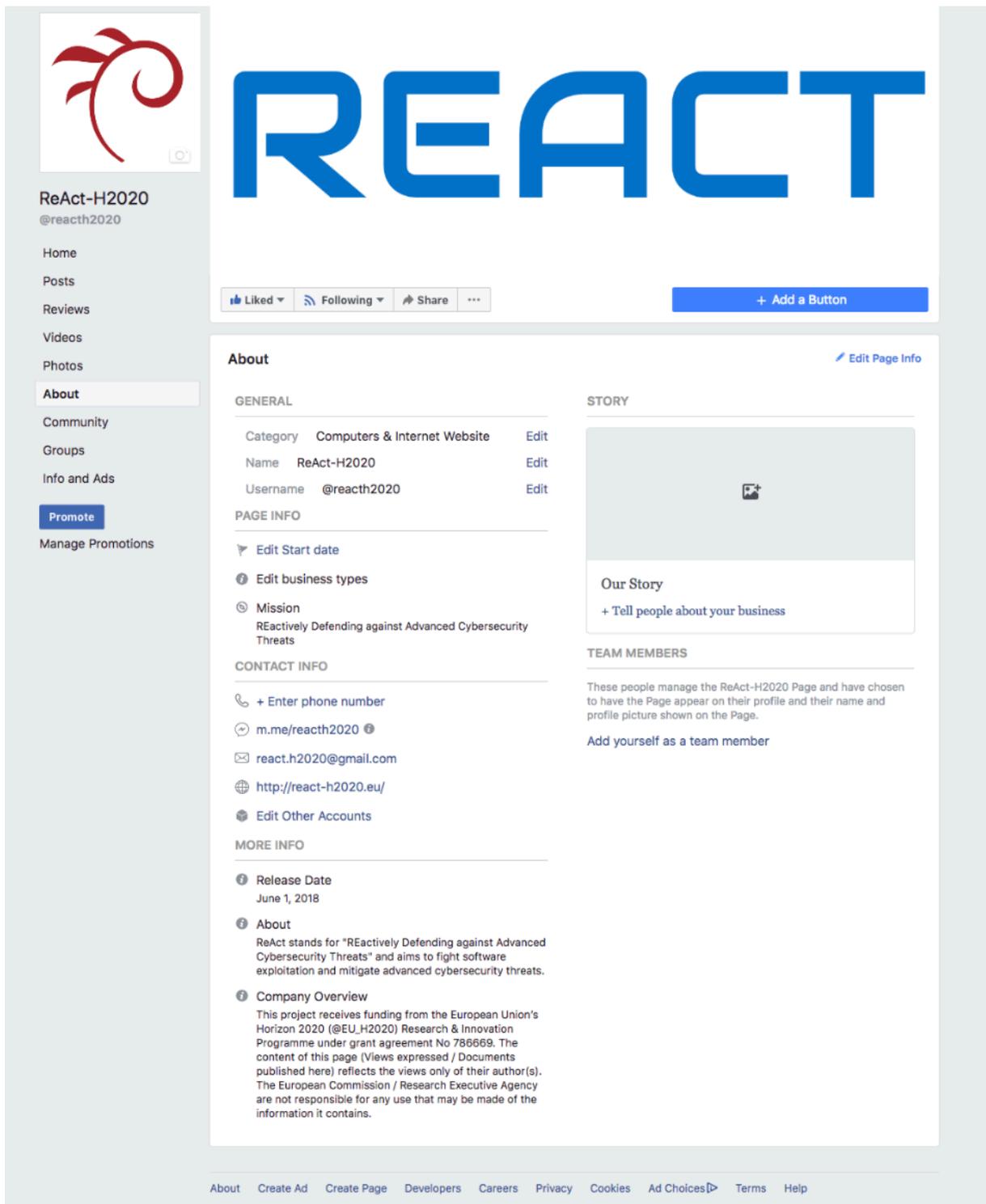


Figure 6 - Facebook profile of ReAct

### 3.3 LinkedIn

LinkedIn is another popular social networking platform specifically used for business. Its main goal is to connect registered users that they know each other professionally. The LinkedIn profile of ReAct can be seen on Figure 7.

# REACT



## ReAct Horizon

H2020 Project at Foundation for Research and Technology  
- Hellas (FORTH)

Greece

 Foundation for Research  
and Technology - Hellas ...

 See contact info

 See connections (6)

Add profile section ▼

More...

ReAct stands for "REactively Defending against Advanced Cybersecurity Threats" and aims to fight software exploitation and mitigate advanced cybersecurity threats.

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Figure 7 - LinkedIn profile of ReAct

## 4 File Hosting

REACT partners use the ownCloud platform for file hosting and sharing of consortium documents. ownCloud is a free open source software for data synchronization, file sharing, and remote storage of documents. It is written in the PHP and JavaScript scripting languages and supports several database management systems, including SQLite, MariaDB, MySQL, OracleDatabase, and PostgreSQL.

File access is provided through a web interface or from mobile devices via mobile applications for iOS and Android and from desktop clients available for PCs running Windows, Mac OS, or Linux.

In Figure 8 we can see the web interface of the REACT repository. The ownCloud user interface contains the following fields and functions:

- **Apps Selection Menu:** Located in the upper left corner and by clicking the arrow a dropdown menu opens to navigate to user's various available apps.
- **Apps Information Field:** Located in the left sidebar and provides filters and tasks associated with user's selected app. For example, when the Files apps is used, a special set of filters for quickly finding files is shown.
- **Application View:** The main central field in the ownCloud user interface. This field displays the contents or user features of the selected app.
- **Navigation Bar:** Located over the main viewing window (the Application View), this bar provides a type of breadcrumbs navigation that enables migration to higher levels of the folder hierarchy up to the root level (home).
- **New Button:** Located in the Navigation Bar, this button enables the user to create new files, new folders, or upload.
- **Search Field:** The user can click on the magnifier in the upper right hand corner to search for files.
- **Personal Settings Menu:** The user can click on her ownCloud username, located to the right of the Search field, to open the Personal Settings dropdown menu. Personal page provides settings and features such as:
  - Links to download desktop and mobile apps
  - Server usage and space availability
  - Password management
  - Name, email, and profile picture settings
  - Group memberships
  - Interface language settings
  - Manage notifications
  - Social media sharing buttons
  - ownCloud Version information



Figure 8 - ownCloud of ReAct

## 5 Conclusion

In this deliverable, we discussed the ReAct website and collaboration tools. We provided a description of the website sections and content and outlined the social networking features we have integrated. Moreover, we showed the process of updating the website through a user-friendly front-end editor.

Additionally, we provided an overview of the components and the methodology we used to build the website. We also detailed its software and hardware hosting environment.

Closing, we should cite that at the time of writing of this document the ReAct website was already capable to provide the functionality requirements that had been laid out in the project's description. However, in addition to the existing commitment to keep the website running and up to date, the consortium will continue looking throughout the course of the project for features that could be integrated with it in order to provide an enhanced experience to the visitors.