Condivisione User's Manual

VERSION 1.2

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Fermi Tech
Softworks

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Introduction to Condivisione

What's Condivisione?

Condivisione is a website created with the goal of providing peer-to-peer lessons between students, and it has been active in ITIS Enrico Fermi since 27/11/2017. Thanks to the platform, students form the 4th and 5th grade have been able to help students from the 1st and 2nd grade, two years in which the students encounter most of the difficulties due to the "gap" from middle school to high school.

Condivisione isn't just a software.

Condivisione is also composed, by the most part, by the volunteers that each week use two hours of their time to help younger students. Condivisione is alive, and well supported by the school that has fully absorbed in its structure, making it part of its teaching system.

Hierarchy and administration

On Condivisione, not all the users have the same powers or privileges. All the ones that use the service start as common **Users**, to then be promoted, using procedures followed by internal personnel of the school (such as the school office personnel), to the rank of **Peer**, **Teacher** or, in rare cases, **Administrator**. This guide contains instructions addressed to each category of user, whether they have standard privileges or high ones.

Information about the current version

Condivisione current version, 1.2, represents a meaningful step in a journey that started in July 2017, with the Pinnacle project that then became Condivisione.

Regarding the previous version, 1.1.17, the current version brings numerous improvements to the software's security, implementing ***Captcha*** technology

to prevent the creation of fake accounts by automatic programs, and improving the website's interface.

From a theoretical and ideal standpoint, this should be the last big update for Condivisione. All the following updates will be, at most, made to fix bugs or to increment software compatibility with as many platforms as possible.

A multiplatform software

With this update, Condivisione lands also on mobile devices without the need of using the website. Thanks to the introduction of a new kind of software, that being a bot, it is possible to interact with Condivisione using Telegram. This will allow the users to book new lessons and set reminders using the instant-messaging app. Given Condivisione nature of being a WebApp, the software works correctly on all the browsers, with guaranteed retro compatibility up to Microsoft Internet Explorer 6.

Used technologies

Python Language

Condivisione is written from the ground up in Python, an interpreted language born in 1991, oriented to object programming. Condivisione uses Python version 3.6, and is not compatible with releases prior to version 3.1.

Website: https://www.python.org/

Bootstrap 4 CSS and JavaScript engine

Bootstrap framework is the leader of the market when it comes to the creation of responsive website front-end, and Condivisione uses both Bootstrap's CSS and its JavaScript engine to work properly.

Website: https://v4-alpha.getbootstrap.com/

Flask

Flask is a Python module on which Condivisione is based on. Flask handles the website back-end and includes, among other features, Jinja2, a powerful templating language that allows Condivisione to create dynamic pages.

Website: http://flask.pocoo.org/

SQLAlchemy

SQLAlchemy is a Python module that handles the interaction between the server and the database.

Website: https://www.sqlalchemy.org/

Bcrypt

Bcrypt is a Python module that allows Condivisione to cypher sensitive data.

Website: https://pypi.python.org/pypi/bcrypt/3.1.0

Telepot

Telepot is a Python module that allows Condivisione to communicate with the users through Telegram.

Website: https://github.com/nickoala/telepot

reCaptcha

Condivisione uses reCaptcha technology using a complementary module of Flask, Flask-WTF.

Website: https://flask-wtf.readthedocs.io/en/stable/

Sentry

Sentry is an online service that allows to keep track of server errors, and it is integrated in Condivisione thanks to Raven, a python module

Website: https://github.com/getsentry/raven-python

Apache2

Apache2 is the web server used by Condivisione in order to work properly.

Website: https://httpd.apache.org/

HTTPS Connection

Condivisione uses a TLS protected HTTP connection to guarantee a safe connection. The certificate was created using OpenSSL, and further information can be found at the end of this manual.

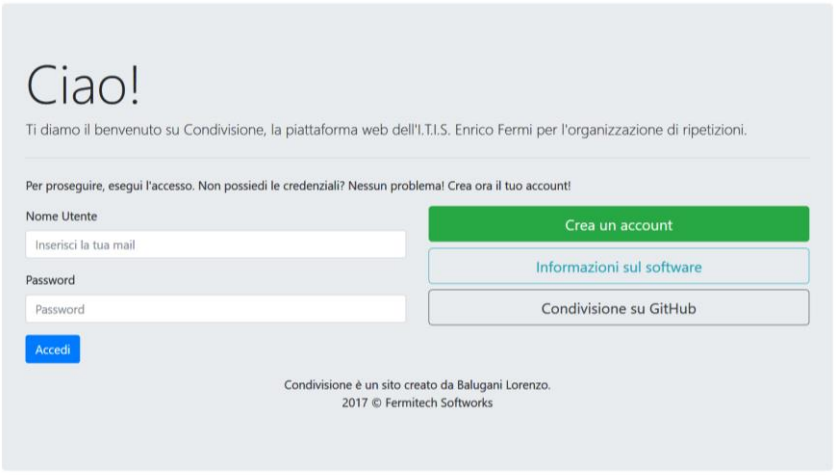
Standard user's guide

Who is this guide for?

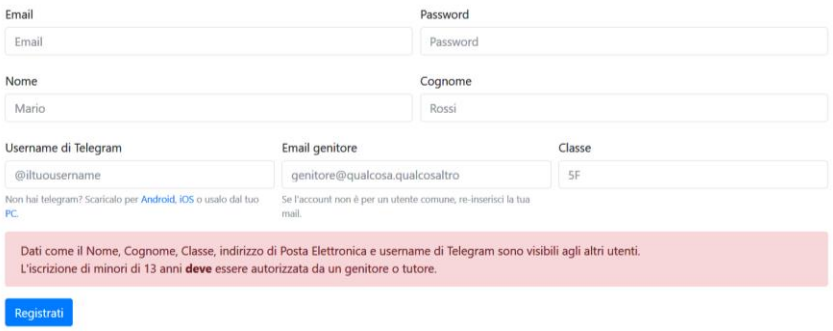
This section is aimed at the standard users of Condivisione, usually students from 1st and 2nd grade, and intends to guide them within the software to allow them to use it to the fullest.

Sign up on Condivisione

To sign in, the user has to visit the webpage condivisione.fermi-mo.gov.it. This following screen will appear:



To create an account, click on the button "Crea un account". The user will be redirected to the following webpage:



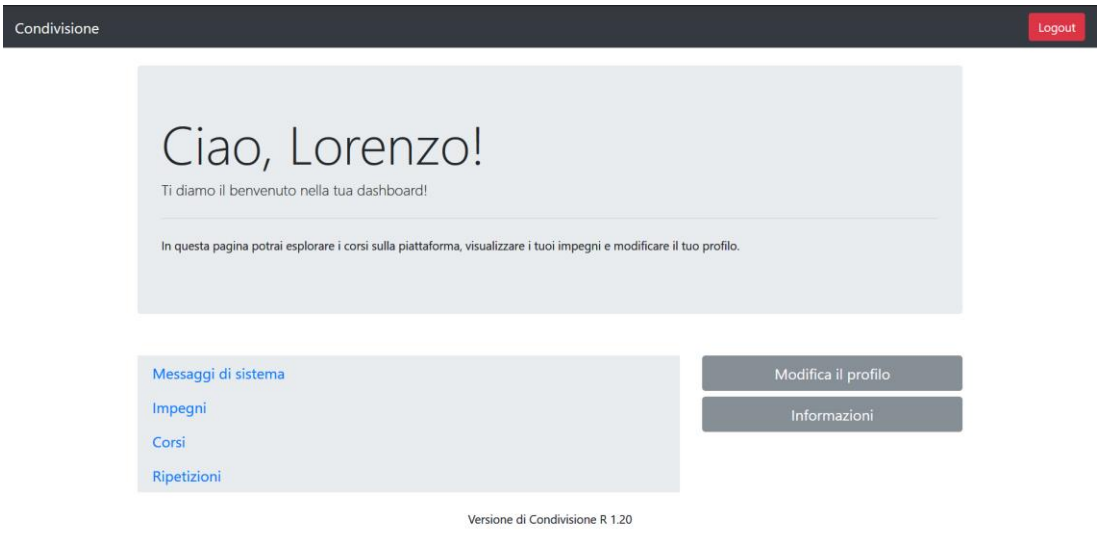
It is mandatory to fill all the required fields (ignoring this will show an error message).
The fields are the following:

1. The user's email;
2. The password;
3. Name and surname of the user;
4. Telegram username (not mandatory);
5. Father/Mother's email address, that will be used to notify the user's parents when the users books a lesson;
6. Class.

Once all the mandatory fields have been filled, it is possible to complete the sign-up procedure.

Dashboard Elements

Once the login procedure has been completed, this screen will then be presented to the user:



This screen is the User's dashboard, from which it is possible to access all the website functionalities. Let's inspect them one by one.

Updating the profile

In order to update the password and other personal information, the user has to click on "Modifica il Profilo". This will allow the user to change personal data.
Warning! It is mandatory to always fill the "Password" field!

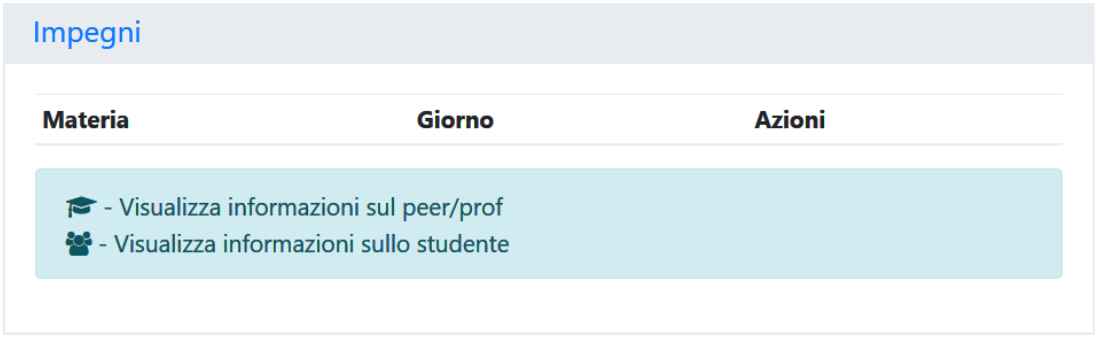
Information

To read website information and credits, click on "Informazioni".

"System messages" panel

Thanks to this panel, it is possible to visualize the messages created by the administrators of the website.

"Commitments" panel

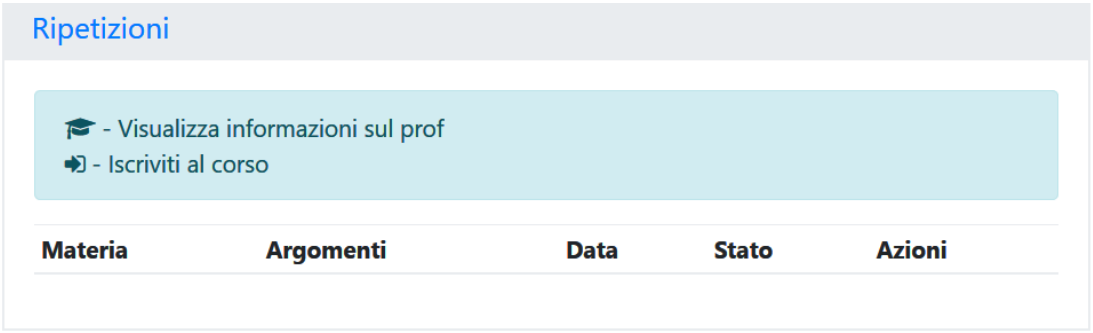


Thanks to this panel, it is possible to visualize the commitments that the student has taken with other users.

"Lessons" panel

Thanks to this panel, it is possible to visualize the lessons organized by the peers on the platform.

"Recovery Lessons" panel



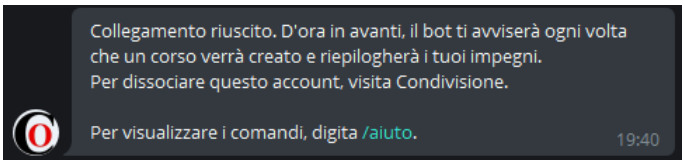
Thanks to this panel, it is possible to visualize the lessons organized by the teachers on the platform.

CondiBot: Telegram Condivisione Bot

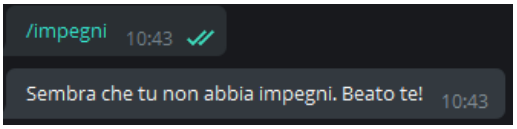
In order to provide a quick notification system, Condivisione also controls a Telegram Bot (further information on this topic can be found at the end of this manual).

Account union procedure

In order to receive notifications on Telegram, CondiBot has to know the user's chat_id, a unique value that enables the bot to recognize the user. To do so, the user has to properly set his Telegram username inside Condivisione and, once this has been done, it is mandatory to start a conversation with CondiBot. If the username has been set properly, this message will appear.



If an error message is received, the user should check his Telegram username.



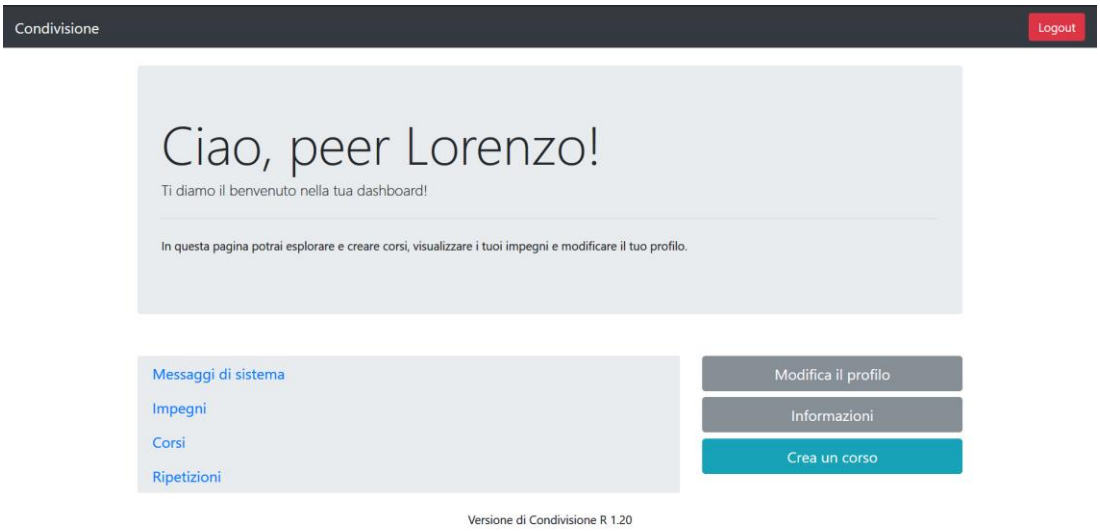
After the union, it will be possible for the user to interact with the bot and to receive notifications from it.

Peer Educator’s guide

Who is this guide for?

This section is aimed at the Peer Educator users of Condivisione, usually students from 4th and 5th grade, and aims to guide them within the software to allow them to use it to the fullest.

Peer’s Dashboard



As you can see, the Peer Dashboard differs from the standard user’s one for a button, the "Crea un corso" button and a series of extra features that we will examine below.

Lesson creation procedure

In order to create a lesson, click on the button “Crea un corso”. By doing so, the Peer will be carried to this screen:

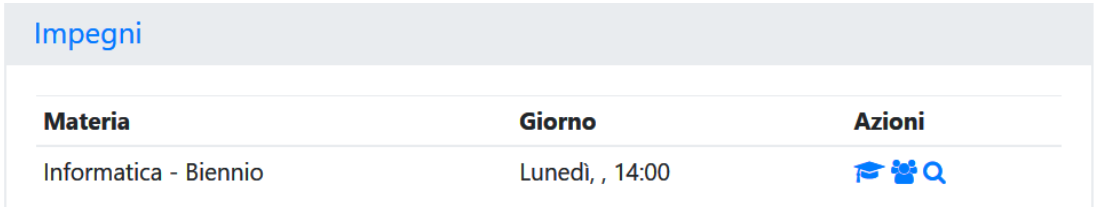
At this point all the Peer has to do is fill the fields and then click ”Invia”.

Lesson removal procedure

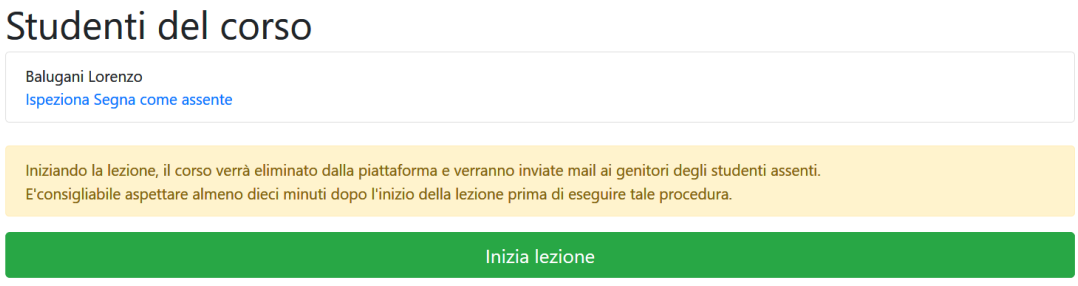
To delete a lesson, open the “Lesson” panel in the Dashboard and click on the X on the side of the corresponding lesson.

Lesson information and appeal procedure

To inspect the lessons information, open the dashboard panel “Tasks”.



To perform the appeal procedure, click on the magnifying glass. The peer will then be redirected to the following page:



Once the appeal is done, it is mandatory to click on the button “Inizia lezione” in order to start the lesson. On the same page, students can also be removed from the lesson.

Teacher's guide

Who is this guide for?

This section is aimed at the Teacher users of Condivisione and aims to guide them within the software to allow them to use it to the fullest.

Since most of the procedures are similar to the Peer's ones, only the functions that are slightly different will be described here.

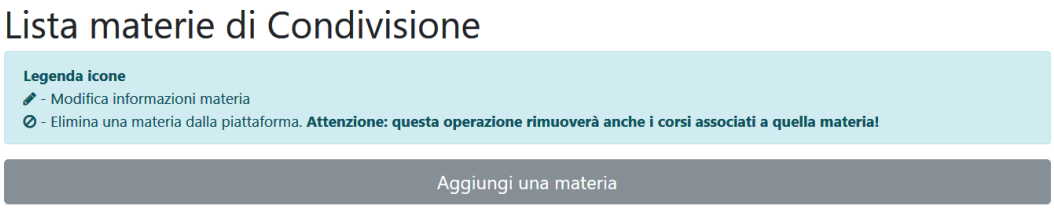
Creating a recovery lesson

To create a recovery lesson, click on the Dashboard button "Crea un Corso". By doing so, the teacher will be redirected to the following webpage:

Once all the fields have been filled, simply click on "Invia" to end the procedure.

Adding a subject

To add a subject, click on the Dashboard button "Gestisci materie". By doing so, the user will be redirected to the following webpage:



To add a subject, click on "Aggiungi una materia". Once the form has been compiled, click on "Invia".

Notes on the recovery lessons

The recovery lessons created by the Teachers will be visualized in the "Recovery Lessons" panel of the Dashboard. The appeal function is shared with the Peers.

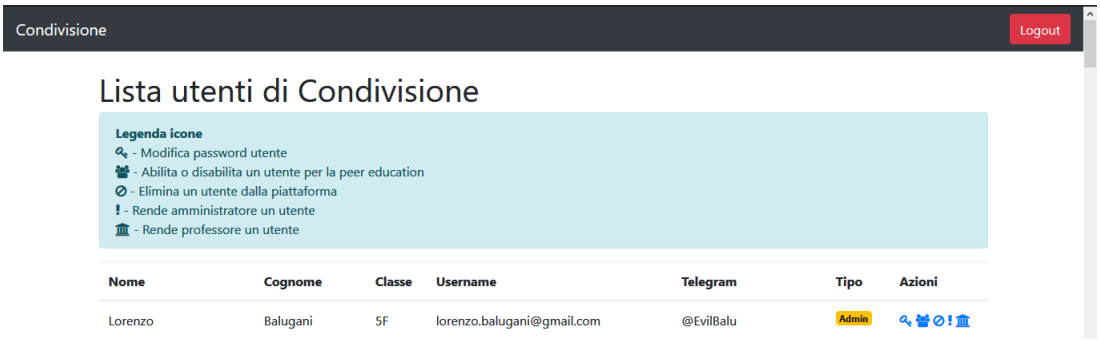
Administrator's guide

Who is this guide for?

This section is aimed at the Admin users of Condivisione and aims to guide them within the software to allow them to use it to the fullest. This section of the guide, however, is not about the installation or configuration procedure needed to make Condivisione work.

User management

To manage the users of the platform, click on the button "Gestione utenti" in the Condivisione Administrative Dashboard (CAD). The Admin will be redirected to this webpage:



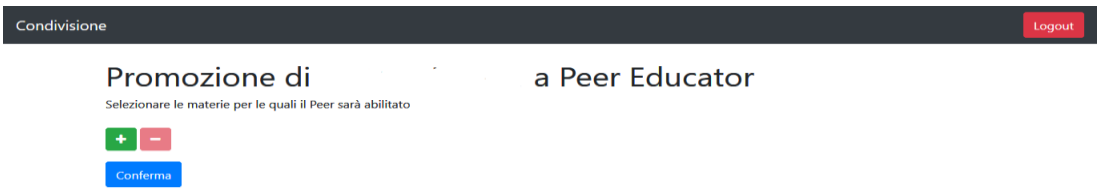
Forced password change procedure

To change a user's password, click on the key corresponding to the user. This will bring up a prompt that will allow the Admin to perform such action.

Peer education habilitation procedure

To promote a user to the rank of Peer, click on the corresponding symbol.

This will bring up this screen:



At this point, simply add the subjects in which the user will be enabled to teach and, to finish the operation, click on confirm.

User removal, promotion to Teacher or Administrator procedures

Click on the corresponding icons to perform the desired action.

Hidden functions

- /ricerca: opens a query page
- /botStart: starts the Telegram bot

System Administrator's guide

Who is this guide for?

This section is aimed at the administrator of the server on which Condivisione runs. The objective of this guide is to allow him, with not too many difficulties, to install Condivisione on any Linux machine.

Open letter to the administrator

To the attention of the System Administrator,

Thanks for choosing Condivisione as your peer-to-peer lessons manager and for your belief in Peer-to-Peer education, that is at the foundation of this ~~piece of~~ software. Given the fact that Condivisione is an open-source software released under LGPL-3 license, you can extend and customize it as you wish, without changing the core principle of the software: the inclusion of a payment system, for example, is not accepted since it would break the Peer education principles.

Best regards,
Balugani Lorenzo

Install procedure

Before starting the installing procedure, please control if all the modules used by Python and Apache2 are installed.

1. Install the WSGI Python 3 compatible module for Apache2, using the command
   `sudo apt install libapache2-mod-wsgi-py3`
   In order to activate this module, please restart the Apache2 server.
2. Move to /var/www/ using the cd command, and prompt
   `git clone https://github.com/LBindustries/Condivisione-Fermi`
3. Set the ownership of the newly created folder
   `chown [username] Condivisione-Fermi -R`

4. Access the Condivisione folder, and create a file named **condivisione.wsgi**, containing the following lines:
```
#/usr/bin/python3.6
import os
os.chdir('/var/www/Condivisione-Fermi')
from server import app as application
```
5. Create a file, named **configurazione.txt,** in which it is mandatory to put, divided by "|", the cookie key, Telegram token, email account, gmail username, the password and the Sentry API key
6. Move to /etc/apache2/sites-available/ and create a file named 001-condivisione.conf, which contains the following lines:

```
<VirtualHost *:80>
    WSGIDaemonProcess condivisione user=[USER]
group=[GROUP] threads=5 home="/var/www/Condivisione-Fermi"
    WSGIScriptAlias / /var/www/Condivisione-
Fermi/condivisione.wsgi

    <Directory /var/www/Condivisione-Fermi>
        WSGIProcessGroup condivisione
        WSGIApplicationGroup %{GLOBAL}
        Require all granted
    </Directory>
        ErrorLog ${APACHE_LOG_DIR}/error.log
        CustomLog ${APACHE_LOG_DIR}/access.log combined

</VirtualHost>
```

7. Disable the default website using the command a2dissite and enable the new one using a2ensite
8. Return to /var/www/Condivisione, and start the server to create the database using the command `python3 server.py`
9. Restart Apache2, and register on the platform in order to achieve Administrative rights.

Condivisione Documentation

Functions description

Function name	Type	Parameters	Description
login	Internal function	username, password	User's password check. Returns a BOOL.
find_user	Internal function	username	Executes a query inside the database to find a specific user. Returns the user.
sendemail	Internal function	to_addr_list, subject, message	Sends an email to a list of addresses. If the operation is successful, it returns True.
rendi_data_leggibile	Internal function	poccio	Starting from an unreadable piece of information, returns it in a readable format.
broadcast	Internal function	msg, utenti (lista)	Sends a Telegram message to several users
errorhandler	Error handler	codice_errore	Displays an error page, depending on

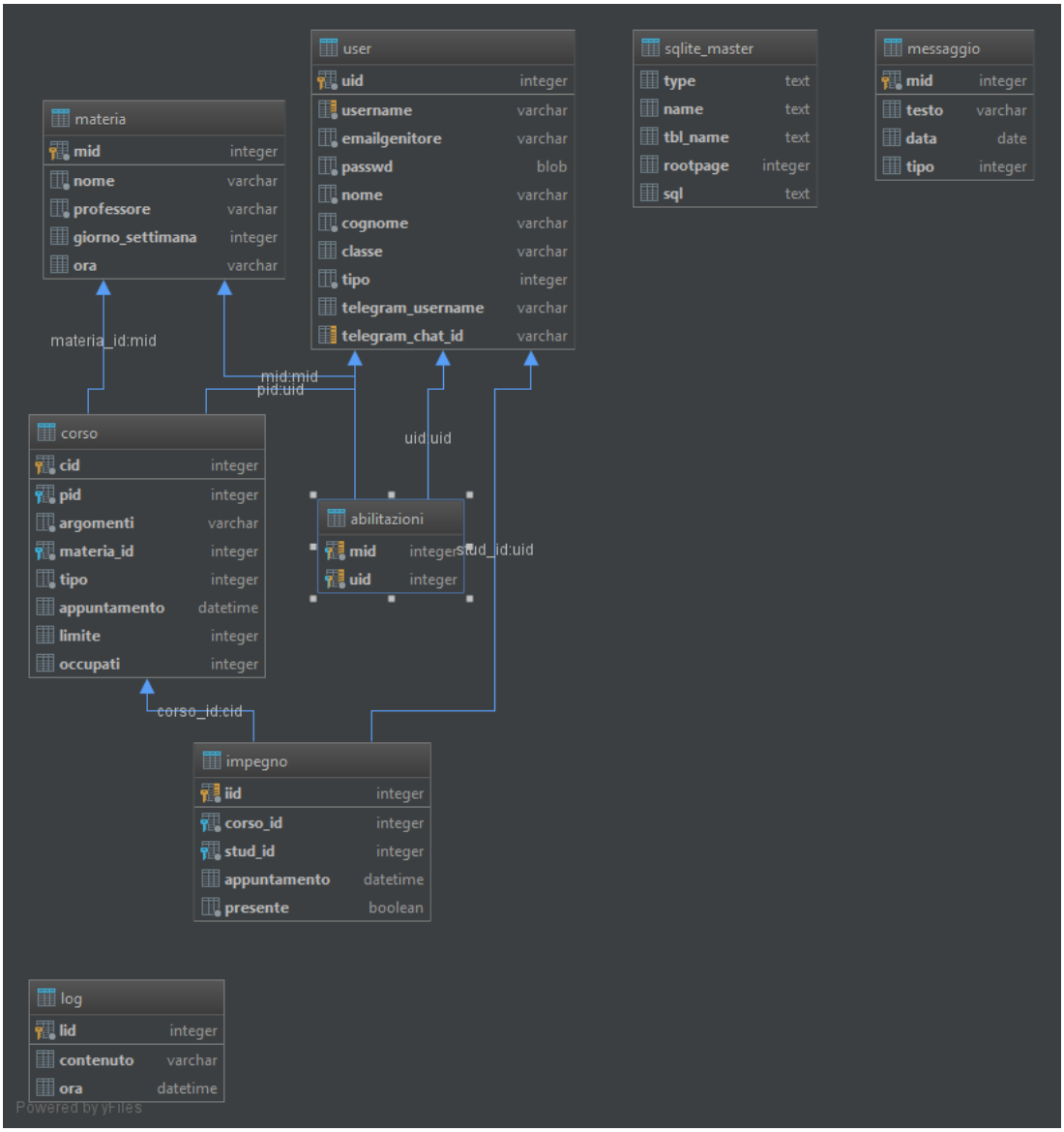
			the error number.
page_home	Webpage (“/”)		Allows logoff from the website.
page_login	Webpage (“/login”)	POST: username, password	Shows the login page and allows login.
page_register	Webpage (“/register”)	POST: username, nome, cognome, classe, usernameTelegram, mailGenitori	Shows the sign up webpage and allows new users creation.
page_dashboard	Webpage (“/dashboard”)		Shows the dashboard to the user.
page_informazioni	Webpage (“/informazioni”)		Shows the website information.
page_message_add	Webpage (“/message_add”)	POST: testo, scelta	Shows the page that allows adding messages to the website.
page_message_del	API function (“/message_del”)	GET: mid	Removes the selected message.
page_user_list	Webpage (“/user_list”)		Shows the webpage containing a list of the users.
page_user_changepw	Webpage (“/user_changepw”)	GET: uid POST: password	Shows the webpage that provides the administrators

			with the forced password change procedure for a specified user.
page_user_ascend	Webpage (“/user_ascend”)	GET:uid POST: materie	Shows the page that allows the promotion to peer educator.
page_user_godify	API function (“/user_godify”)	GET:uid	Turns a user into an admin.
page_user_teacher	API function (“/user_teacher”)	GET: uid	Turns a user into a teacher.
page_user_del	API function (“/user_del”)	GET: uid	Deletes a user with all the entities connected to it.
page_user_inspect	Webpage (“/user_inspect”)	GET: pid	Shows detailed information about the user.
page_user_edit	Webpage (“/user_edit”)	GET: uid POST: password, classe, usernameTelegram, mailGenitori	Shows the user’s profile update page.
page_materia_add	Webpage (“/materia_add”)	POST: nome, professore, giorno, ora	Shows the page that allows the creation of new subjects.

page_materia_list	Webpage (“/materia_list”)		Shows all the subjects inside the database.
page_materia_edit	Webpage (“/materia_edit”)	GET: mid POST: nome, professore, giorno, ora	Shows the page that allows the update of a given subject.
page_materia_del	API function (“/materia_del”)	GET: mid	Deletes a subject with all the entities connected to it.
page_corso_add	Webpage (“/corso_add”)	POST: argomenti, materia, data (solo per docenti)	Allows teachers and peers to create lessons.
page_corso_del	API function (“/corso_del”)	GET: cid	Deletes a subject with all the entities connected to it.
page_corso_join	API function (“/corso_join”)	GET: cid	Allows the students to join a lesson.
page_log_view	Webpage (“/server_log”)		Shows the server log.
corso_membri	Webpage (“/corso_membri”)	GET: cid	Shows the students that joined a specific lesson.
page_presenza	API function (“/presenza”)	GET: uid, cid	Sets a student as present or absent.

page_inizia	API function (“/inizialezione”)	GET: cid	Allows the peer or the teacher to start a lesson and also sends an email to the parents.
page_ricerca	Webpage (“/ricerca”)	POST: query	Created by Stefano Pigozzi. Executes a query.
thread	Internal function		Starts the bot.
page_bot	API function (“/botStart”)		Allows the bot to start.
handle	Internal function		Bot support function.
accedi	Internal function	chat_id, username	Checks Telegram usernames.

Database structure



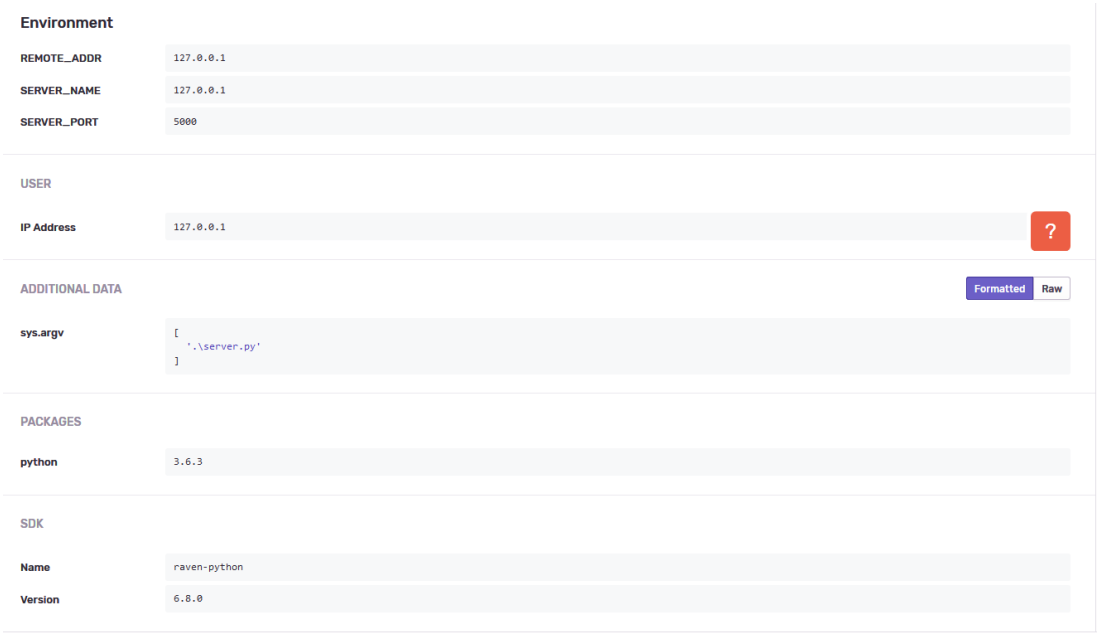
Comment on the database

This database was created during the summer of 2017, months before approaching this topic in TPS. With my end-year knowledge I re-executed the analysis of the requirements and I re-built the database, obtaining an extremely close structure to the one that I had created months earlier.

Since changing the database structure would not have created major benefits but just a small boost in performances, I preferred not to change the database at all.

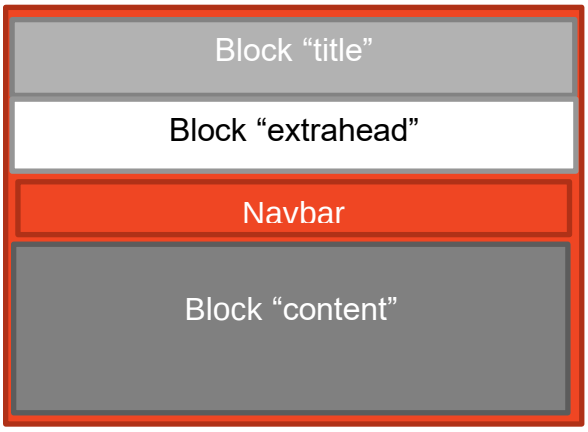
Sentry: automatic error alert service

Sentry is an online service that allows a programmer to keep his own software under control and to be alerted in case of errors during runtime. Condivisione uses this service to allow the administrators to act quickly on website issues and to offer a fast helpdesk to the website's users. To achieve this, it was mandatory to install Raven, a Python module, registering on sentry.io and obtaining in the end an access token. After this set-up phase, every time an error occurs, the admins are notified by the system with a detailed log, like the one located below.



Jinja2 template system

Condivisione uses, in an extensive way, one of Jinja2 main features: template extension.



Thanks to this feature, all the webpages of Condivisione are based on a standard page, **`stampo.htm`**, whose structure is represented on the left.

`Stampo.htm` accepts from pages blocks of texts that are then positioned inside the page.

A brief list of the blocks is the following:

- Block “title”: Block that contains the title of the webpage
- Block “extrahead”: Block that contains additional js script
- Block “content”: Block that contains the page content

`Stampo.htm` also incorporates the website navbar, contained in the separate file named **`nav.htm`**.

Telegram Bot

What’s a Telegram Bot?

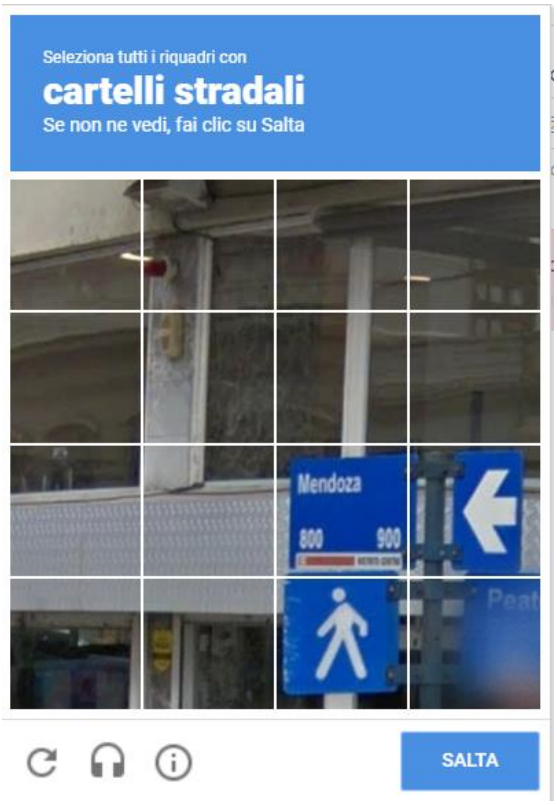
A Telegram Bot is a particular kind of program, capable of interfacing with the users using Telegram, an Instant Messaging application. A bot is capable to answer to simple commands, or interact with the users in more complex manners and it can be programmed in several programming languages.

Regarding Python, several options are available:

- pzGram, created by my classmate Casari Giovanni during this year, https://github.com/infopz/pzgram;
- Botogram, created by Pietro Albini, https://botogram.pietroalbini.org/
- Telepot, the solution that Condivisione has adopted to manage the bot, https://github.com/nickoala/telepot

reCaptcha

In order to prevent the creation of fake accounts using automatic applications, realized with the sole purpose of filling the database, Condivisione uses reCaptcha technology, thanks to a complementary module of Flask called Flask-WTFroms (WTF). In order to use Google Captcha, it is mandatory to subscribe to a free service that enables you to ask for an API key.



Apache2

Apache is the most used webserver worldwide, developed by the Apache Software Foundation and released under Apache license. The server has the duty of transporting information, managing connections and intranetworking.

Under the UNIX environment, Apache is composed of ~~by~~ a daemon that, based on what Apache configuration says, allows multiple virtual applications to be run, in this case a Python server. Its modular nature makes it really versatile, with each module being connected to the Core (Apache daemon), that does a polling cycle on them. This cycle is composed of different steps:

1. Client request translation
2. Access rights validation
3. Content identification
4. Response sent
5. Logging

HTTPS

The Hyper Text Transfer Protocol over TLS is a protocol that allows safe connection, and uses the virtual port 443. As the name suggests, HTTPS consists in a communication over HTTP protocol that gets encrypted by TLS, guaranteeing privacy protection, website authentication and exchanged data integrity. The usage of this protocol protects the communication in order to avoid the presence of a third user, the “Man in the middle”. TLS, the protocol that protects the communication, uses a public and a private key in order to create the sessions and to cipher the following communications between hosts. Although certificates can be manually created (self-signed certificate), it is always better to use the one provided by a certificate authority.

End User license

Condivisione is released under L-GPL3 license. This license allows a commercial use of the software, and also its modification, distribution and patent. The creator of the software is not responsible in case of modifications made by the end user, and does not include any form of warranty. The software always has to be presented and used with a copy of the license, and modifications have to be published and released under the same license.

The disrespect of these rules could cause legal actions.

A complete version of the license may be found inside Condivisione folder, or in the GitHub project page.

Sources

- Information on Bootstrap: https://v4-alpha.getbootstrap.com/
- Information on Python: https://www.python.org/
- Information on Flask: http://flask.pocoo.org/
- Information on SQL Alchemy: https://www.sqlalchemy.org/
- Information on Bcrypt: https://pypi.python.org/pypi/bcrypt/3.1.0
- Information on Telepot: https://github.com/nickoala/telepot
- Information on Flask-WTF: https://flask-wtf.readthedocs.io/en/stable/
- Information on Raven: https://github.com/getsentry/raven-python
- Information on Sentry: https://sentry.io
- Information on reCaptcha: https://en.wikipedia.org/wiki/ReCAPTCHA
- Information on Apache2: https://httpd.apache.org/
- Information on HTTPS: https://en.wikipedia.org/wiki/HTTPS

Condivisione is on GitHub, at the following address: https://github.com/LBindustries/Condivisione-Fermi.

Information on Fermi Tech Softworks

Fermi Tech Softworks is the name of Lorenzo Balugani's software house. Besides Condivisione, Fermi Tech Softworks has developed, in collaboration with the CNR-ISAC, Monitoraggio, a website that collects error messages created by CNR's instruments.

Fermi Tech Softworks uses the Gestione Framework in all the Web Apps. All the software is Open Source by principle.

Fermi Tech
Softworks