**Audacity**

Audacity is a popular sound recorder and audio editor. It is a capable program while still being easy to use. The majority of users are on Windows but the same Audacity source code compiles to run on Linux and Mac too.

Dominic Mazzoni wrote the original version of Audacity in 1999 while he was a research student at Carnegie Mellon University. Dominic wanted to create a platform on which to develop and debug audio processing algorithms. The software grew to become useful in its own right in many other ways. Once Audacity was released as open source software, it attracted other developers. A small, gradually-changing team of enthusiasts have modified, maintained, tested, updated, written documentation for, helped users with, and translated Audacity's interface into other languages over the years.

**Purpose :**

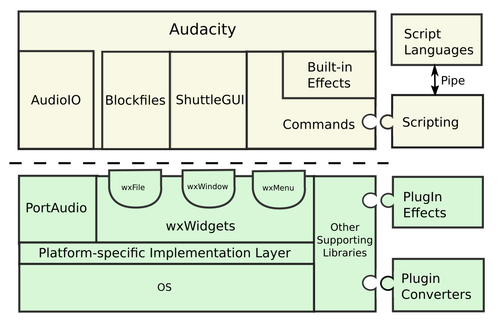
**Audacity** is [free software.](https://th.wikipedia.org/wiki/%E0%B8%8B%E0%B8%AD%E0%B8%9F%E0%B8%95%E0%B9%8C%E0%B9%81%E0%B8%A7%E0%B8%A3%E0%B9%8C%E0%B9%80%E0%B8%AA%E0%B8%A3%E0%B8%B5)used for audio editing Support [for Mac,](https://th.wikipedia.org/wiki/%E0%B9%81%E0%B8%A1%E0%B8%84%E0%B9%82%E0%B8%AD%E0%B9%80%E0%B8%AD%E0%B8%AA)[Windows](https://th.wikipedia.org/wiki/%E0%B8%A7%E0%B8%B4%E0%B8%99%E0%B9%82%E0%B8%94%E0%B8%A7%E0%B8%AA%E0%B9%8C) and [Linux](https://th.wikipedia.org/wiki/%E0%B8%A5%E0%B8%B4%E0%B8%99%E0%B8%B8%E0%B8%81%E0%B8%8B%E0%B9%8C) platforms. Can record audio . Import/Export Convert files back and forth Multi-format, edit, trim, analyse. File formats are supported including [WAV ,](https://th.wikipedia.org/w/index.php?title=WAV&action=edit&redlink=1)[MP3 ,](https://th.wikipedia.org/wiki/MP3)[Ogg Vorbis](https://th.wikipedia.org/wiki/Ogg_Vorbis) , and other file formats.

**Architectural patterns/styles :**

The diagram illustrates Audacity's layers and modules. Note the three important classes within wxWidgets, each of which has a reflection in Audacity.

Higher-level abstractions result from related lower-level ones. For example, the BlockFile system is a reflection of and is built on wxWidgets' wxFiles. Lower down in the diagram is a narrow strip for platform-specific implementation layers.

Both wxWidgets and [PortAudio](https://en.wikipedia.org/wiki/PortAudio" \o "PortAudio) are OS abstraction layers, containing conditional code that chooses different implementations depending on the target platform.



รูปที่ 1: https://upload.wikimedia.org/wikipedia/commons/thumb/3/34/Audacity\_Layers.png/750px-Audacity\_Layers.png

**Quality attribute scenarios :**

**- Modifiability**Source : Developer

Stimulus : Wishes to modify recording function

Artifact : Code

Environment : Development Time

Response : Modification is made with no side effects

Response measure : In Three hours

**- Portability**

Source : OS

Stimulus : Wishes to run on another OS

Artifact : Resource

Environment : Runtime

Response : Can run without error occurs

Response measure : In 30 minutes

**- Testability**

Source : Tester

Stimulus : Performs end to end test

Artifact : Complete application

Environment : At deployment time

Response : Perform a test sequence

Response measure : Path coverage of 85% is achieved within four hours

Reference :  
<https://en.wikipedia.org/wiki/Audacity_(audio_editor)>

<https://www.aosabook.org/en/audacity.html>

**Matplotlib**

Matplotlib is a Python-based plotting library with full support for 2D and limited support for 3D graphics, widely used in the Python scientific computing community. The library targets a broad range of use cases. It can embed graphics in the user interface toolkit of your choice, and currently supports interactive graphics on all major desktop operating systems using the GTK+, Qt, Tk, FLTK, wxWidgets and Cocoa toolkits. It can be called interactively from the interactive Python shell to produce graphics with simple, procedural commands, much like Mathematica, IDL or MATLAB. matplotlib can also be embedded in a headless webserver to provide hardcopy in both raster-based formats like Portable Network Graphics (PNG) and vector formats like PostScript, Portable Document Format (PDF) and Scalable Vector Graphics (SVG) that look great on paper.

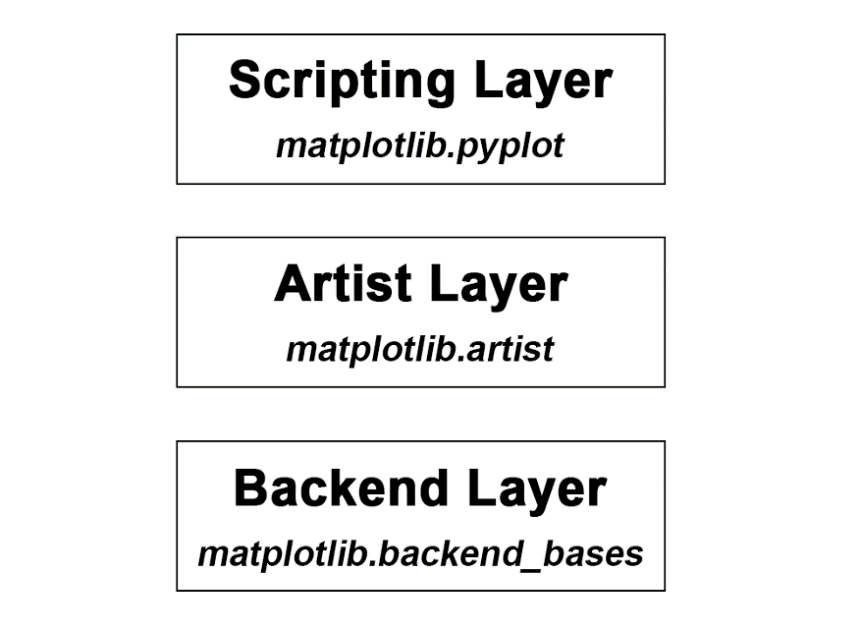
**Purpose :**

- To make plotting easier and faster

- To visualize graph with python

**Architectural patterns/styles :**

The Matplotlib architecture is composed of three main layers :



รูปที่ 1: https://miro.medium.com/max/875/1\*hi9AFzlV-nQyTmbaV3O1kg.png

* **Backend Layer**— Handles all the heavy works via communicating to the drawing toolkits in your machine. It is the most complex layer.
* **Artist Layer** — Allows full control and fine-tuning of the Matplotlib figure — the top-level container for all plot elements.
* **Scripting Layer** — The lightest scripting interface among the three layers, designed to make Matplotlib work like MATLAB script.

**Quality attribute scenarios :**

**- Modifiability**Source : Developer

Stimulus : Wishes to modify 2D plotting function

Artifact : Code

Environment : Development Time

Response : Modification is made with no side effects

Response measure : In Three hours

**- Portability**

Source : OS

Stimulus : Wishes to run on another OS

Artifact : Resource

Environment : Runtime

Response : Can run without error occurs

Response measure : In 30 minutes

**- Testability**

Source : Tester

Stimulus : Performs end to end test

Artifact : Complete application

Environment : At deployment time

Response : Perform a test sequence

Response measure : Path coverage of 80% is achieved within two hours

Reference :

<https://www.aosabook.org/en/matplotlib.html>

<https://medium.datadriveninvestor.com/data-visualization-with-python-matplotlib-architecture-6b05af533569>

**Jitsi**

Jitsi is an application that allows people to make video and voice calls, share their desktops, and exchange files and messages. More importantly it allows people to do this over a number of different protocols, ranging from the standardized XMPP (Extensible Messaging and Presence Protocol) and SIP (Session Initiation Protocol) to proprietary ones like Yahoo! and Windows Live Messenger (MSN). It runs on Microsoft Windows, Apple Mac OS X, Linux, and FreeBSD. It is written mostly in Java but it also contains parts written in native code. In this chapter, we'll look at Jitsi's OSGi-based architecture, see how it implements and manages protocols, and look back on what we've learned from building it.

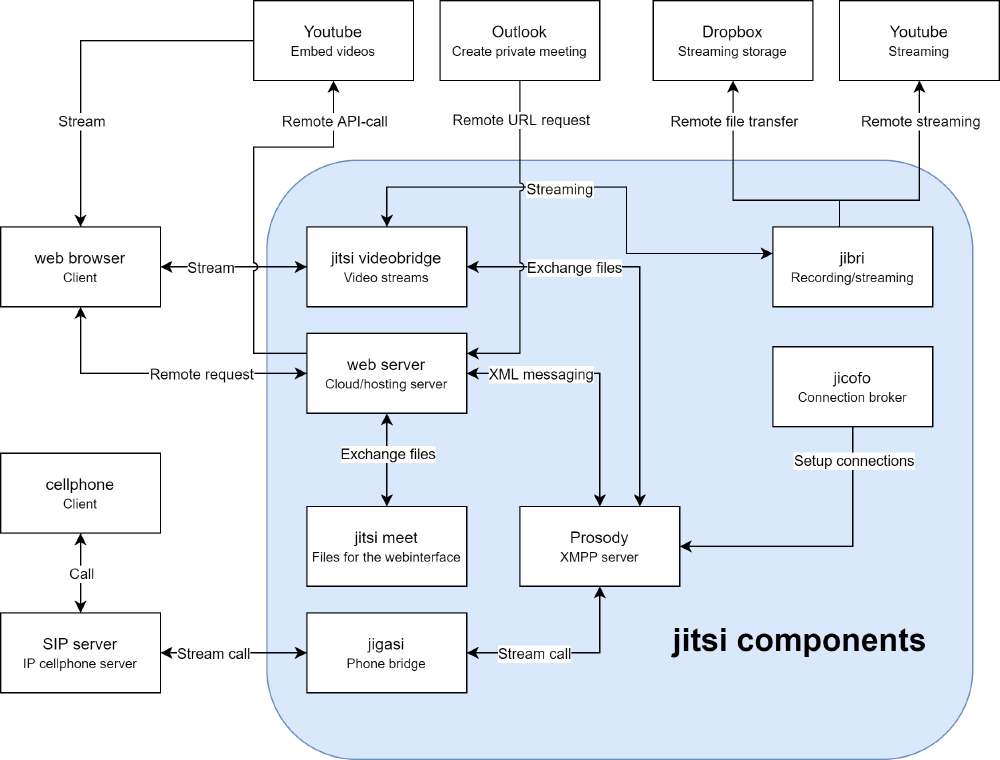
**Purpose :**

- To be able to use Video Conferencing, Text Chat, Sip Call.

- To be able tohandle multiple user at the same time and record the conversation.

**Architectural patterns/styles :**

Jitsi Meet consists of several components which are all developed inhouse. No third party component dependancies are present, except for the recommended web server. The following components are present in a standard configuration: Jitsi Meet, Jitsi videobridge (JVB), Jicofo, Jibri, SIP server, Jigasi and Prosody. We will list each of these components below.



รูปที่ 1: https://2021.desosa.nl/projects/jitsi/images/essay2\_connectoroverview\_hu9a09893c249307d8c39af57dc31a976a\_287654\_1000x0\_resize\_q75\_box\_3.png

**Jitsi Meet** : the files for the webinterface, accessed via files served by a webserver. The default webserver is Prosody.

**Jitsi videobridge (JVB)** : the video bridging service providing video streams to all participants, as well as the algorithm for video quaility distribution. JVB is an intelligent relay server that tests available bandwidth for clients to determine which streams to relay depending on that or what the client is watching, as well as whether or not to turn off certain streams due to bandwidth constraints.

**Jicofo** : the Jitsi conference focus determining who is speaking, JItsi COnference FOcus runs server side and is made for opening connections between users and the video bridge.

**Jibri** : a collection of tools for recording and / or streaming a Jitsi Meet conference that functions by launching a Chrome instance in a virtual framebuffer and capturing and encoding the output with ffmpeg.

**SIP server** : allows users with a slow internet connection to join over sound with their mobile / landline phone connection.

**Jigasi** : connection between videobridge and SIP server.

**Prosody** : an external free XMPP server serving as the base of the setup backend.

**Quality attribute scenarios :**

**- Usability**Source : Users

Stimulus : Use system efficiently

Artifact : System

Environment : Runtime

Response : Wishes to record conversation

Response measure : Recording start in less than a second

**- Modifiability**

Source : Developer

Stimulus : Wishes to add screen sharing function

Artifact : Code

Environment : Development time

Response : Modifications were made without side effects

Response measure : In 5 hours

**- Portability**

Source : Android

Stimulus : Wishes to run on Android

Artifact : Resource

Environment : Run time

Response : Can run on Android without error

Response measure : In 1 hour

Reference :

[**https://2021.desosa.nl/projects/jitsi/posts/essay\_2/**](https://2021.desosa.nl/projects/jitsi/posts/essay_2/)

[**https://www.aosabook.org/en/jitsi.html**](https://www.aosabook.org/en/jitsi.html)