

# CS 4287 Principles of Cloud Computing

# Cloud Technologies

## Virtual Machines

- The Discord bot server runs on Chameleon Virtual Machine with the Ubuntu 20.04 image.

## Docker

- Docker is used to set up configurations, install necessary packages and dependencies, and compartmentalize the application. Docker ensures that the server is always running, even if the virtual machine is not currently active. This is critical as the Discord bot needs to be available to users 24/7.

## Rest API

- Utilizes Stack exchange, Reddit, Bookrun, and Google Books APIs to retrieve data in json format, which is then used to aggregate best results to return to the user.

## Example of Stackoverflow search backend implementation

```
// Stackoverflow Search
// if the title may contain a keyword
if (title == "") {
  apicall += "&title=" + encodeURIComponent(title);
}

if (interaction.commandName === "stackoverflow") {
  const keyword = interaction.options.get("question").value;
  let title = "";
  accepted = "";
  if (interaction.options.get("title") === null) {
    title = interaction.options.get("title").value;
  }
  if (interaction.options.get("keyword") === null) {
    keyword = interaction.options.get("keyword").value;
  }
  if (interaction.options.get("accepted") === null) {
    accepted = interaction.options.get("accepted").value;
  }

  try {
    console.log(`Fetching question from stackoverflow...`);
    // default call with question
    let apicall =
      `https://api.stackexchange.com/2.3/search/advanced?order=desc&orderby=score&question=${keyword}`;

    // reduces search results to accepted answers if wanted
    if (accepted.toLowerCase() === "yes" || accepted.toLowerCase() == "acceptedtrue";
    ) {
      apicall += "&accepted=true";
    }

    // only threads with at least one answer
    apicall += "&answers=1";

    // if looking for a certain keyword in the body
    if (keyword === "") {
      apicall = "body=" + encodeURIComponent(keyword);
    }

    // if the title must contain a keyword
    if (title != "") {
      apicall += "&site=stackoverflow";

      const response = await fetch(apicall);
      const data = await response.json();
      console.log(`fetched response successfully`);
    }
    console.log(response);

    // interaction.reply(response);

    if (data.items.length > 0) {
      let reply = "your question: " + question + "\n";
      if (
        accepted.toLowerCase() === "yes" ||
        accepted.toLowerCase() === "yes"
      ) {
        reply += "Only searching for accepted answers.\n";
      }
      if (title != "") {
        reply += "title including: " + title + "\n";
      }
      if (keyword != "") {
        reply += "body including: " + keyword + "\n";
      }
      for (let i = 0; i < Math.min(data.items.length, 4); i++) {
        const myResult = data.items[i];
        const myTitle = myResult.title;
        const myLink = myResult.link;
        reply += `**title:** ${myTitle}\n**link:** ${myLink}\n\n`;
      }

      interaction.reply(reply);
    } else {
      await interaction.reply("No results found :(");
    }
  } catch (error) {
    console.log("There was an error: {error}");
    await interaction.reply("There was an error processing your request!");
  }
}
```

## Future Work

In the future, our goal for the Discord bot is to be an all-in-one resource for students to rely on.

We want to further add functionality to:

- create study groups
- act as a scheduler
- maintain a daily and weekly task list
- save class notes

There are endless possibilities to continue building on this project. We're excited about the potential for our Discord bot to evolve into an indispensable tool that streamlines students' academic journeys and fosters collaborative learning.

Computer Science students often face challenges in centralizing their academic tools and navigating the multitude of available options, particularly those who may be less familiar with them. Given Discord's popularity among most computer science students, our goal is to implement a solution on this platform to address these issues effectively.

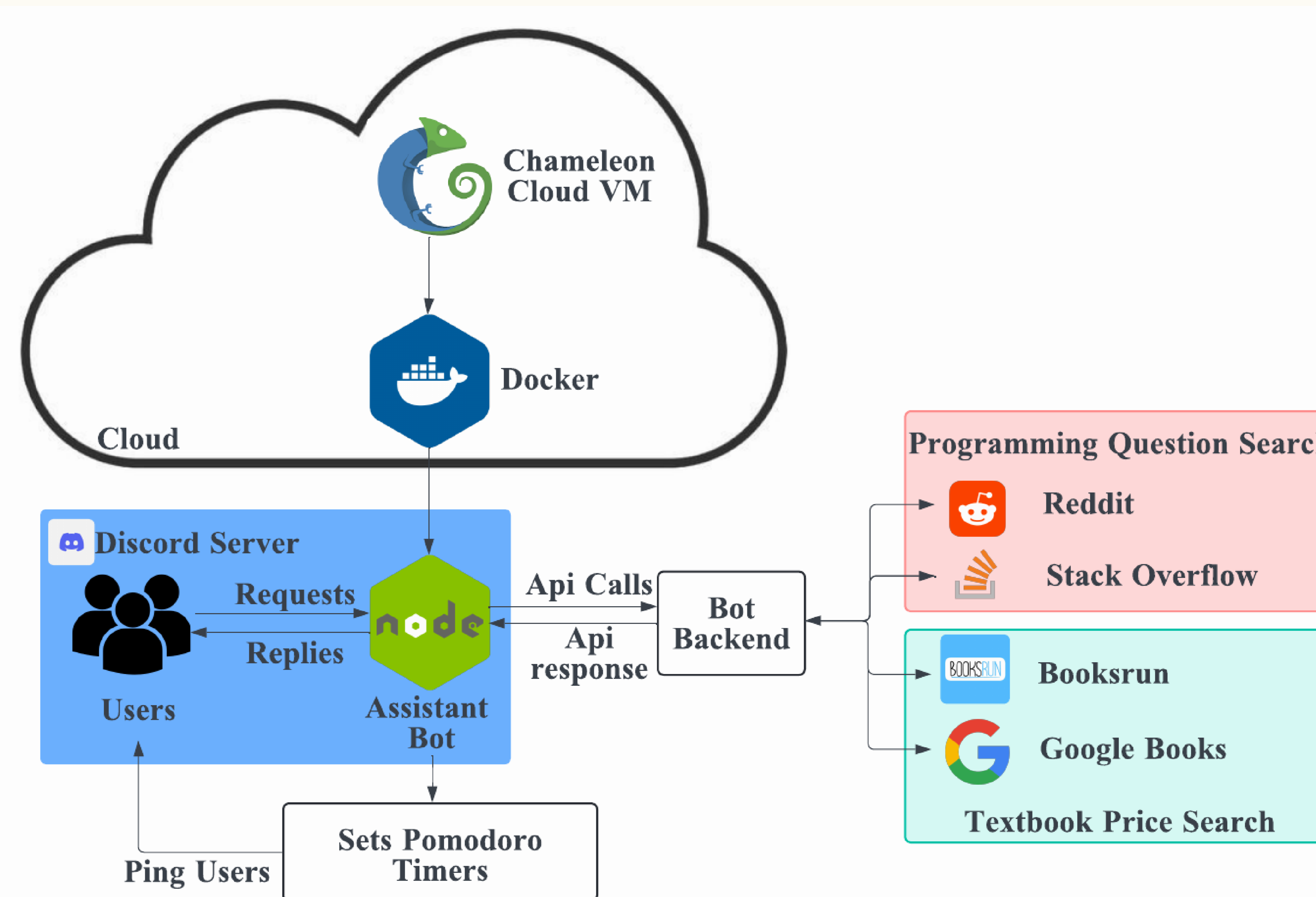
## Solution

This project aims to support Computer Science students by centralizing the best search results and providing various tools to assist them in their studies. The Discord bot can be seamlessly added to any server, aiding individuals or groups of students in their academic endeavors. Its strength lies in its versatility and accessibility.

Our Discord bot leverages Reddit and Stack Overflow APIs to aggregate programming-related search results and fetches textbook prices from Booksrun and Google Books to offer the best options for textbook price and rental. Additionally, students can use Pomodoro study timers to enhance their study sessions, with the bot providing timely notifications when necessary.



# Application



Our Discord bot is primarily designed to cater to the needs of computer science students; however, its versatile features make it suitable for users across various domains. As Discord becomes increasingly popular for academic and professional purposes, akin to platforms like Slack, our bot serves as a valuable assistant that can benefit any server. The bot provides users with a comprehensive toolkit to enhance productivity.











## Product





## Ping and Pomodoro functions





 brain used [plmg](#)  
**Assistant**  Today at 9:34 PM  
Client 207/ms

 brain used [jacobmoro](#)  
**Assistant**  Today at 9:35 PM  
Starting Pomodoro timer: 2 minutes of study, 1 minutes of break, for 2 cycles.

 **Assistant**  Starting Pomodoro timer: 2 minutes of study, 1 minutes of break, for 2 cycles.   
**Assistant**  Today at 9:37 PM  
Cycle 1: Time for a break! 1 minutes.

 **Assistant**  Starting Pomodoro timer: 2 minutes of study, 1 minutes of break, for 2 cycles.   
**Assistant**  Today at 9:39 PM  
Cycle 2: Time to study! 2 minutes.



 **Assistant**  Starting Pomodoro timer: 2 minutes of study, 1 minutes of break, for 2 cycles.   
**Assistant**  Today at 9:42 PM  
Cycle 2: Time for a break! 1 minutes.

 **Assistant**  Starting Pomodoro timer: 2 minutes of study, 1 minutes of break, for 2 cycles.   
**Assistant**  Today at 9:44 PM  
Pomodoro session complete!



## List of commands

- ASSISTANT
  - /bookprice**  
Searches for textbook costs given an ISBN number
  - /hello**  
Replies with hello
  - /ping**  
Returns the client ping
  - /pomodoro**  
Start a Pomodoro study session
  - /psearch**  
Searches for the best programming answers given the question
  - /reddit**  
Searches for related answers on Reddit given the question and subreddit
  - /stackoverflow**  
Searches for related answers on Stack Overflow given the question

Stackoverflow search with filters

 **Assistant**  **bot** [used /stackoverflow](#)  
Today at 9:48 PM  
**Your question:** no route to host port error  
Only searching for accepted answers...  
With title including: port  
**Title:** Node Js ssh: connect to host port error  
**Link:** <https://stackoverflow.com/questions/48444442/node-js-ssh-connect-to-host-port-error>  
**Title:** Failed to connect to bitbucket.org:22: Connection refused  
**Link:** <https://stackoverflow.com/questions/48444442/node-js-ssh-connect-to-host-port-error>  
**Title:** I/flutter (20418): Error: SocketException: Connection refused (OS Error: Connection refused), address = 192.168.1.100, port = 22  
**Link:** <https://stackoverflow.com/questions/48444442/node-js-ssh-connect-to-host-port-error>

## Programming question search function

 **beam used /psearch**  
 **Assistant** BOT Today at 9:44 PM

**Your question:** twosum in python  
Title: LeetCode Python TwoSums  
Link: <https://stackoverflow.com/questions/31763724/leetcode-python-twosums>

**Title:** How to understand this Python code for Twosum  
Link: <https://stackoverflow.com/questions/45874880/how-to-understand-this-python-code-for-twosum>

**Title:** what is the mechanism for `def twoSum(self, nums: List[int], target: int) -> List[int]:` in python 3:  
Link: <https://stackoverflow.com/questions/56635388/what-is-the-mechanism-for-def-twoSumself-nums-listint-target-int-l>

**Title:** What am I doing wrong: twoSum question in Python  
Link: [https://www.reddit.com/r/leetcode/comments/iq6l6v/what\\_am\\_i\\_doing\\_wrong\\_twosum\\_question\\_in\\_python/](https://www.reddit.com/r/leetcode/comments/iq6l6v/what_am_i_doing_wrong_twosum_question_in_python/)

**Title:** Looking for some insight on a simple problem  
Link: [https://www.reddit.com/r/learnpython/comments/131439t/looking\\_for\\_some\\_insight\\_on\\_a\\_simple\\_problem/](https://www.reddit.com/r/learnpython/comments/131439t/looking_for_some_insight_on_a_simple_problem/)

**Title:** What is the error in this code?  
Link: [https://www.reddit.com/r/learnprogramming/comments/y1rfgg/what\\_is\\_the\\_error\\_in\\_this\\_code/](https://www.reddit.com/r/learnprogramming/comments/y1rfgg/what_is_the_error_in_this_code/)

Textbook search with ISBN

• **Assistant BOT** Today at 9:45 PM

**Prices for ISBN 1464108730:**

**New:** Not available

**Used:** \$11.8 [Buy](#)

**Rent:** Not available

**Ebook:**

- 60 days: \$34.19 [Buy](#)
  - 90 days: \$36.89 [Buy](#)
  - 120 days: \$59.83 [Buy](#)
  - 180 days: \$67.99 [Buy](#)
  - 365 days: \$113.99 [Buy](#)
  - perpetual days: \$159.99 [Buy](#)