Telegram Bots

An introduction to python-telegram-bot

Azeem Vasanwala | Chaitanya Baranwal

Simple Ground Rules

- Question? Use the raise hand function on Zoom, or send your message in the chat
  - Don’t flood the chat with random banter, it will be hard to pick out questions
- Stuck? Join a breakout room. Someone will be with you shortly
- Ask as many questions as you want, but keep it on topic

What is a bot?

A software application that is programmed to do certain tasks

Source: Cloudflare

Why Bots?

Key Benefits

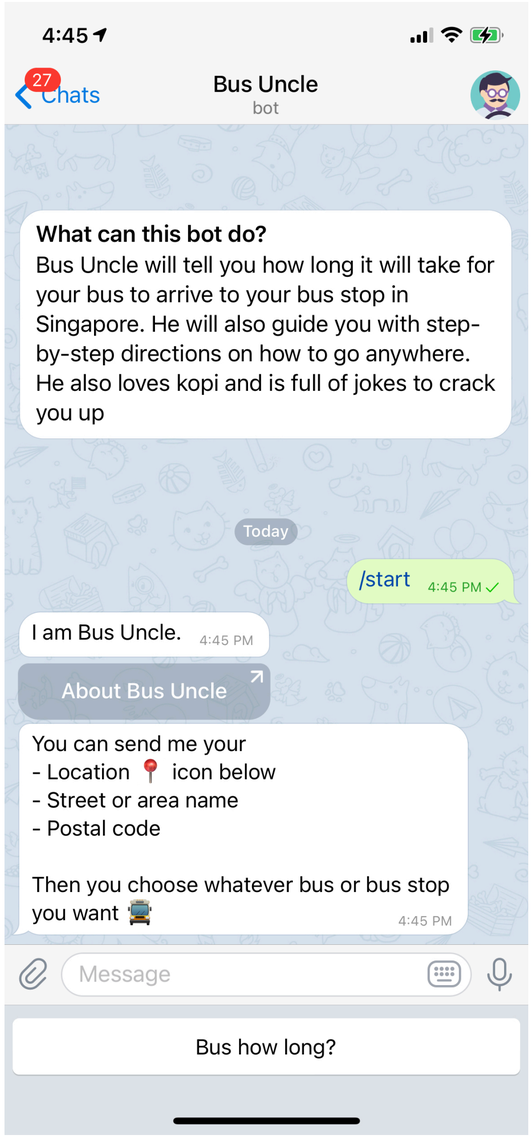
- (Mostly) Navigationless interface
  - No menu bars to dig around to find information
    - Try finding the curriculum for an older batch on the SOC website without googling 🙃
    - Try to find out what to do as an international student entering NUS now (SHN, student pass, etc) without googling

Key Benefits

- Easy Push alerts
  - Just like getting a notification for a text message
  - No complex integrations, device specific compatibility, etc
- Familiar UI
  - We all know how to use messaging apps
- Works on existing apps
  - Low bar of entry for new users
    - No need to download a new app, works with what you already have

Telegram Bots

- Chat messaging platform
  - Similar to WhatsApp, WeChat, etc
  - Cloud based, not P2P
- Bots are natively supported on the platform
- Texting a bot is similar to texting another person



- Chat messaging platform
  - Similar to WhatsApp, WeChat, etc
  - Cloud based, not P2P
- Bots are natively supported on the platform
- Texting a bot is similar to texting another person

Why build on Telegram?

- Telegram native support for bots:
  - Vast array of SDKs and libraries to build a bot: https://core.telegram.org/bots/samples
- No complex integrations, device specific compatibility, etc. as most of them has been abstracted away by Telegram app.

What can I do with a bot?

Common Interactions

How do people *usually* use bots?

- Perform manipulation of input from user
  - “Get me the bus timings”
  - “Add these numbers up”
  - Solve a quadratic equation **(fun, I know)**
    - Let’s build a bot to do this
- Pre-req: You have a telegram account and a gmail account
  - If you don’t, use let us know **now**

Some famous Telegram bots

- AirTrack
  - A bot that helps to keep track of the price of selected air routes
- Productivity Bots (e.g. Gmail Bots, Trello Bots, NV Bots, etc)
  - Made to complement the web applications
  - E.g. gmail bots: Get your emails in Telegram
- Werewolf Moderator Bot
  - Moderates a game of Werewolf

Our Environment

- Google CoLaboratory
  - Python development environment on Google's servers
    - No autocompletion, very sad ☹️
  - Go to https://colab.research.google.com/#create=true
    - Link in zoom chat
  - Create a notebook
    - Name it whatever you want, but this bot is a "request-response" example so maybe something along those lines

A quick introduction to CoLab

Creating a Bot

- Launch Telegram
- Search for the user @BotFather
- Create a Bot
  - Name it whatever you want
  - Give it whatever handle you want, but make sure it ends in `bot`

Back to CoLab

Getting started

- Pre-req: Your packages are installed.
  - Runtime crashed? Restart it once
- Go to https://tinyurl.com/TBOT01
- Copy the contents into a CODE block on CoLab
- Update the token with your own token
- Run the bot once
- Text the bot and say hello to it, it should echo “hello” back to you

What’s going on?

So now… Solve the quadratic equation

- Expected input: 3 numbers representing a, b and c from ax^2+bx+c
  - e.g: /quadratic 1 2 1
- Expected output: “`Your roots are {r1} and {r2}`”
- If you have no python experience, there will be a small hint to get you started
  - Googling the rest of the way will be enough
- Aim to finish in next 15 mins

Great! You can manipulate input 😄

Common Interactions

How do people *usually* use bots?

- Perform manipulation of input from user
  - “Get me the bus timings”
  - “Add these numbers up”
  - Solve a quadratic equation **(fun, I know)**
    - Let’s build a bot to do this
- Pre-req: You have a telegram account and a gmail account
  - If you don’t, use let us know **now**

Common Interactions

How do people *usually* use bots?

- Retrieve information from somewhere else
  - Get information from a database or API (e.g Bus bots)
- Lets create another command that can get a picture of a cat
  - https://cataas.com/cat
  - API you need: `update.message.reply_photo(photo=url)`
- Do you keep getting the same picture back?
  - Telegram is caching the url
    - Fix by appending a random number to the end as a query parameter

Common Interactions

How do people *usually* use bots?

- Alert user when something has happened
  - It started raining
  - Your semester results were released
- Lets make another bot that alerts the user when a webpage updates
  - How do we interact with a webpage programmatically?

Side track: HTTP Verbs

What? Verbs? This isn't English class…

- HTTP: HyperText Transfer Protocol
  - Basically how the internet communicates
- 4 Main Verbs
  - GET [Retrieve]
  - POST [Create]
  - PUT [Update]
  - DELETE [Delete]

Common Interactions

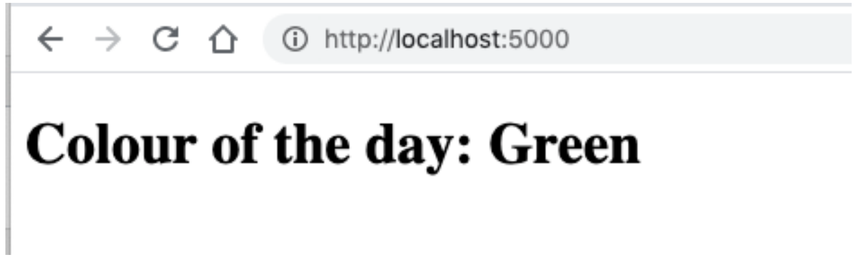
How do people *usually* use bots?

- Alert user when something has happened
  - It started raining
  - Your semester results were released
- Lets make another bot that alerts the user when a webpage updates
  - How do we interact with a webpage programmatically?
    - HTTP requests using the python `requests` library

Your second bot

- Create a new notebook on CoLab
  - Import the following packages:
    - `python-telegram-bot`
    - `requests`
- Go to https://tinyurl.com/TBOT02
- Copy the contents into a CODE block on CoLab
- Update the token with your own token

What your bot will do



- Query a webpage that looks like this →
- When the colour is “Blue”, send a message to yourself
  - How do you message yourself?
    - You need your `chat_id`. Send `/start` to `@userinfobot`
- Where is the website?
  - On my computer, I will give you a URL soon.
    - Don’t do anything funky, its just a simple webpage, if you DDOS it others can’t query it and I will be very sad

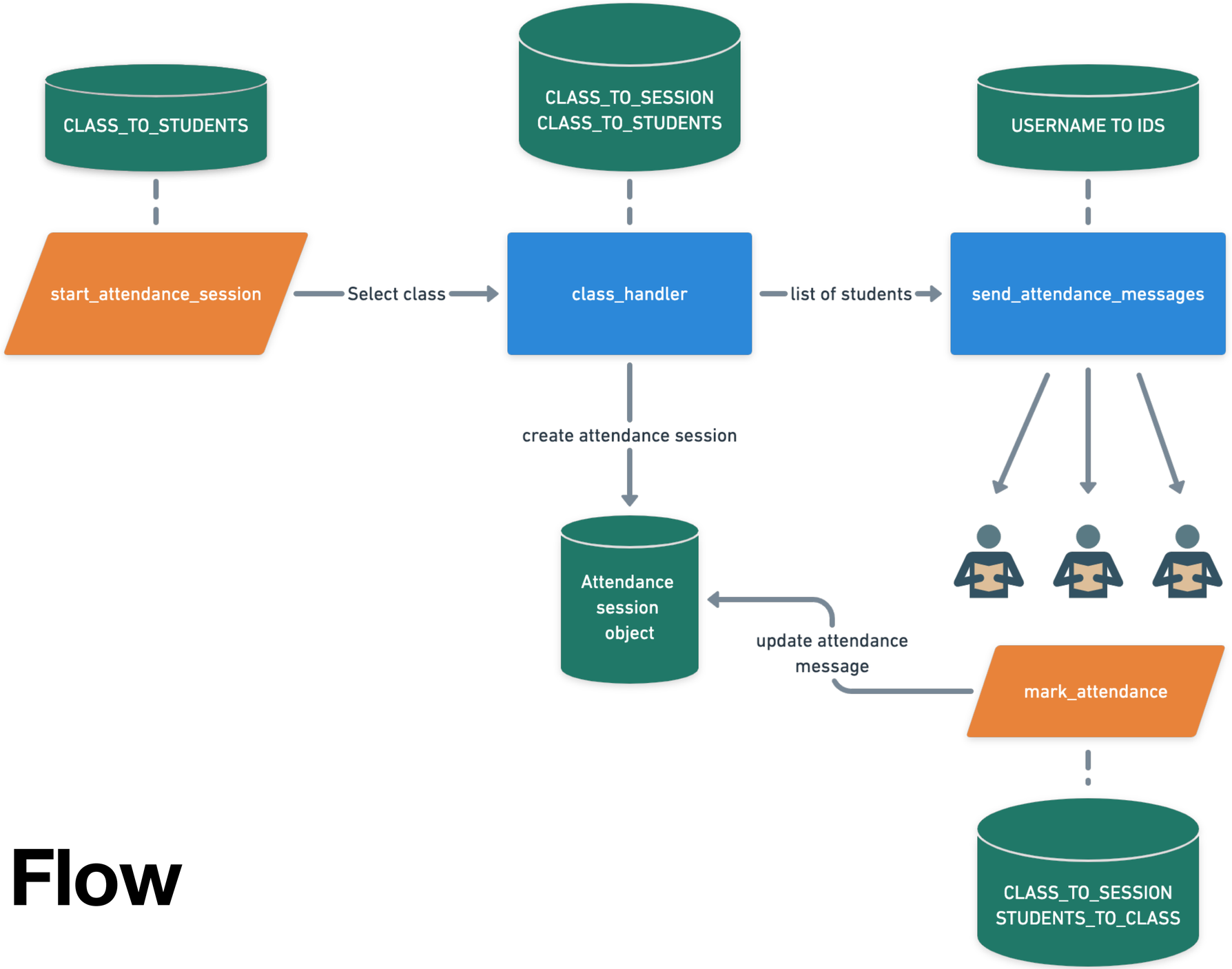
Great! You can monitor other services 😄

Common Interactions

How do people *usually* use bots?

- Group dynamics
  - Werewolf game
  - Quizarium game
- Lets do something simple: An attendance bot
  - Follow along to understand the implementation first, then try it yourself later
    - https://tinyurl.com/TBOT03
    - https://colab.research.google.com/drive/1TzvyALRF_z2buXLb7WOiWiM28nfw97rI

Let’s take a look

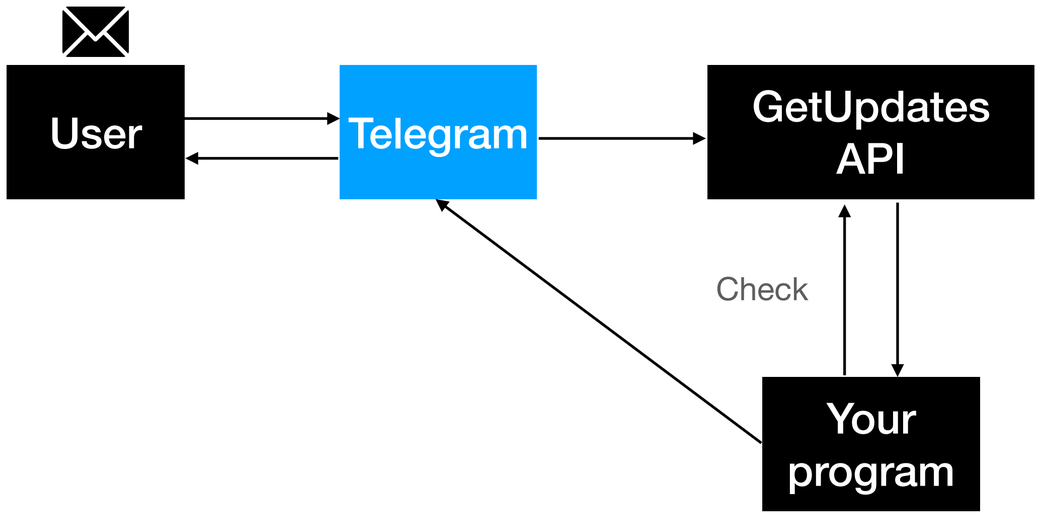

CLASS_TO_STUDENTS
CLASS_TO_SESSION
CLASS_TO_STUDENTS
USERNAME TO IDS
start_attendance_session
Select class
class_handler
list of students
send_attendance_messages
create attendance session
Attendance session object
update attendance message
mark_attendance
CLASS_TO_SESSION
STUDENTS_TO_CLASS

Data Flow

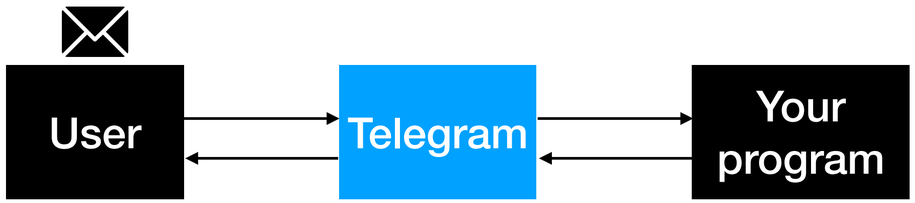
Extra: Webhook vs Polling

- Remember `updater.start_polling()`?
- What does that mean?

Polling



Webhook



Extra: Webhook vs Polling

- Sample implementation of a webhook: https://towardsdatascience.com/bring-your-telegram-chatbot-to-the-next-level-c771ec7d31e4

Further Reading & Resources

Telegram's Bot API

- Telegram
  - https://core.telegram.org/bots/api
- Other things you can do
  - Accept payments (https://core.telegram.org/bots/payments)
    - Talk to @ShopBot
  - Log In with Telegram (https://core.telegram.org/api/passport)
  - Create Games (https://core.telegram.org/bots/games)

Further Reading & Resources

SDKs

- https://github.com/python-telegram-bot/python-telegram-bot
  - Learning By Example
  - Documentation
- Want to use nodejs?
  - https://github.com/yagop/node-telegram-bot-api
- Other SDKs for other languages: https://core.telegram.org/bots/samples

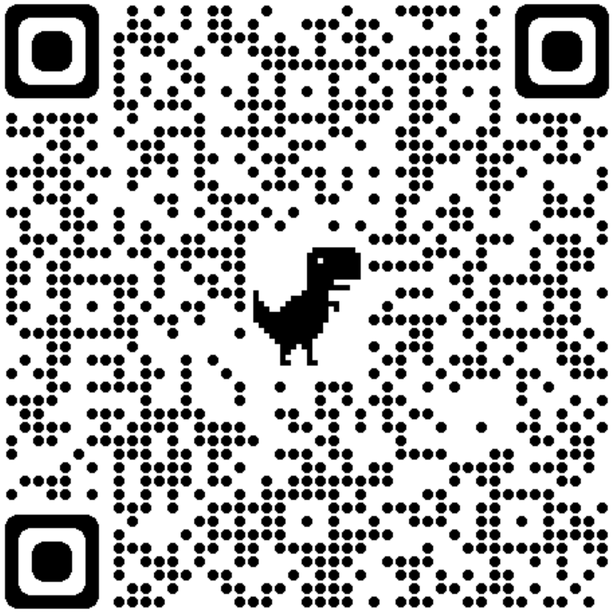
Good Practices

- Your token is precious
  - Don’t commit it to Git
    - People can do nasty things with it
  - Inject it into your code via an environment variable
- Your username and user_id is precious too
- Manage your packages properly
  - Use pip, npm, maven, whatever

What we did today

- Request-Reponse: https://colab.research.google.com/drive/17UflNtWWIxBraws5Vb1inK-JZ8GD0JCK?usp=sharing
- Server-Side Alerts: https://colab.research.google.com/drive/1Cx2IcBXJSNDEkbQEIPWIFG9tJrqnHGBh
- Group-based Interactions: https://colab.research.google.com/drive/1XNkDOtAkzRE0cQrqdNDZ-oNhZ8GQPYQu#scrollTo=ya5brDb1fFBW
- Git Repo with everything from today: https://github.com/DrWala/telegram-bot-workshop

Feedback



https://forms.gle/kwnjaLrf8WYXBxBXA

Up next

- In collaboration with Statistics and Data Science Society
  - Data Wrangling with Pandas - 10 Sept 2021
  - Introduction to Machine Learning with scikit-learn - 17 Sep 2021