

Analysis of the Use of Telegram Bot for Earthquake Information Dissemination Systems and Weather Forecasting

Muhammad Bayu Putra Primary¹, Nardi²

^{1,2}Undergraduate Program in Applied of Instrumentation Meteorology, Climatology Geophysics (STMKG)

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ABSTRACT

As one method deployment information forecast weather, BMKG has have mobile application based on Android and iOS with the name @infoBMKG since in 2016. Felt urgent for designing system with a deployment model information-based request to stay awake along with growth user application service message instant. Webhook method for Telegram Bot selected because especially effective _ for Bot creators in need guide for finish Settings base Telegram bot creation. Because of the server hosted and should use https then used Webhooks method. So, Telegram bots can respond message with fast. The success rate of Telegram Bot aimed at spreading information varies depending on the menu. A 100% success rate and an average response time of 2.54 seconds were recorded for the menu forecast weather, 100 % and an average response time of 2.76 seconds were recorded for the airport weather information menu, and 100 % and an average response time of 7.28 seconds were recorded for the image information menu satellite.

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Corresponden Author:

Muhammad Bayu Putra Pratama,
Undergraduate Program in Applied of Instrumentation Meteorology, Climatology Geophysics (STMKG),
South Tangerang City, Banten, Indonesia.
Email: bayu121@gmail.com

1. INTRODUCTION

The very high development of smartphone usage impacts the way communication is conducted by individuals [1]. This development can be utilized as best as possible, and the tasks within an organization can be resolved in a fast, accurate, and efficient manner [2]. According to the 2018 Digital Yearbook issued by <http://wearesocial.com>, it reveals that there are more than 4 billion people around the world using the internet, with the total number of internet users across continents increasing by more than 20 percent year to year. The majority of the growth in internet users over these years is driven by smartphones [3]. The use of instant messaging service applications has also continued to increase rapidly [4].

The Meteorology, Climatology, and Geophysics Agency (BMKG) is an official government institution responsible for providing public information related to weather [5]. In carrying out its duties, internet technology is very necessary for coordinating between departments or branches located throughout Indonesia [6]. This is what the BMKG is also aware of, with the use of social media rapidly growing, starting from Instagram, Twitter, Facebook, TikTok, to Telegram.

Telegram allows users to send text messages, voice messages, and communicate in groups. One of the advantages of the Telegram app compared to other similar applications is the existence of a feature in the form of an API (Application Programming Interface) available to the public [5]. As a real-time messaging application, Telegram provides convenient access for users because it is available on both mobile and desktop platforms. On the Telegram mobile platform, it can be used on iPhone, Android, and Windows Phone platforms, while on the Telegram desktop platform, it can be used on Windows, Linux, Mac OS, and also via a web browser. Telegram claims to be the fastest and safest bulk messaging application on the market. Besides that, Telegram also provides a container for developers who want to take advantage of the Open API and

Protocol, which is provided through the development of Telegram Bots, documented on the official website [1].

Weather is a very important natural phenomenon for the continuity of human life. However, weather can also cause various types of disasters, such as heavy rain, strong winds, or storms. Therefore, it is very important to have a system for disseminating weather forecasts to provide the latest information about weather conditions in a particular area. One technology that can be used to spread information about weather forecasts is chatbot applications, especially Telegram Bots. Telegram Bots allow chat application users to communicate with the system via text or voice commands. This study aims to develop a weather forecast dissemination system using Telegram Bots. This system will utilize weather forecast data available on the official BMKG website.

2. DATA AND METHOD

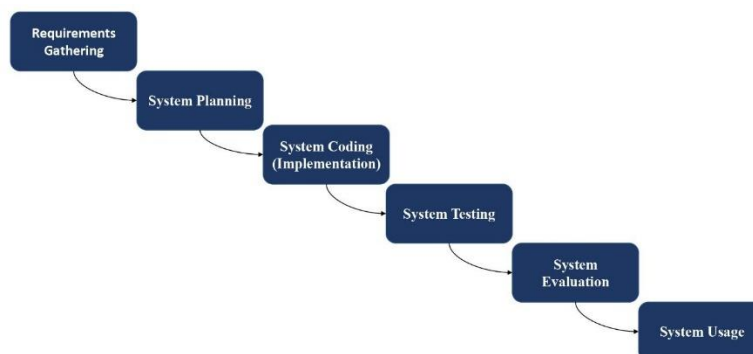


Fig 1. Prototype model

Device prototyping, or what is commonly called "soft device," is a method based on a working model with the purpose of showing the client what the system will do. This prototype is useful for understanding initial needs and determining the direction of development, as well as being a tool for designing interfaces that directly relate to user interaction. The stages of prototyping are as follows. From the prototype model image above, it can be explained as follows:

a. Collection of Needs

This stage is where customers and developers discuss the problems and needs that can be resolved by the computer system to be created.

b. Systems Planning

In this stage, system design is carried out by creating flowcharts. This stage provides details on how the system will interact with the user.

c. Coding System (Implementation)

In this step, the system that has been agreed upon by the customer and developer is translated into a programming language.

d. Testing System

In this stage, all the programs are combined into one and tested to determine whether there are any issues when the system is running. Testing can use either the white-box or black-box method.

e. Evaluation System

In this stage, the customer evaluates whether the system is running smoothly as expected, or if there are still parts that need to be repaired.

f. Use of System

In this stage, the system that has been tested is accepted by the customer and can be applied in its entirety.

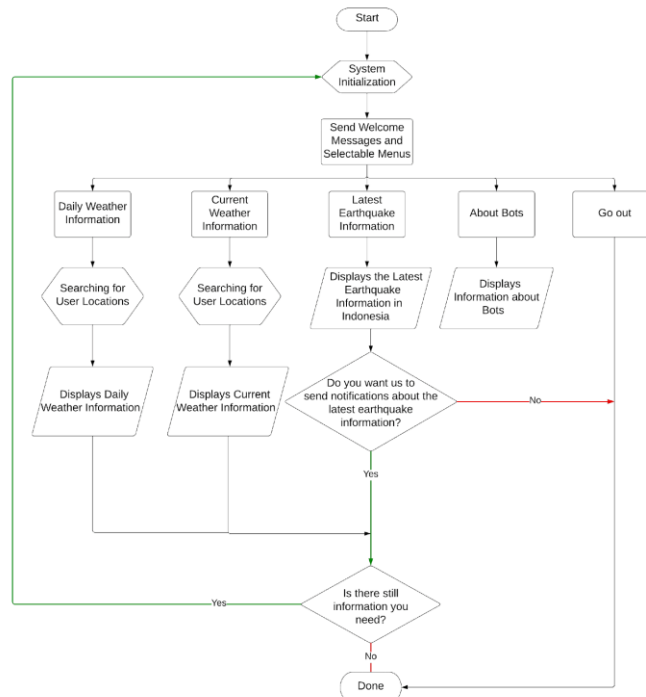


Fig 2. Diagram flow system Telegram Bots

From the flowchart, it can be understood that the process of running the Telegram bot system starts with “start,” followed by “initialize system.” After that, the bot will send an initial message containing the menu options provided by the bot, which includes daily weather information, current weather information, up-to-date earthquake information, and information about the bot itself. Users can choose the information they need. For example, if the user selects “latest earthquake information,” the Telegram bot will send the latest earthquake information to the user. Then, the bot will ask, “Would you like to receive earthquake notifications on your cellphone?” If the answer is “yes,” the bot will send earthquake notifications to the user’s cellphone whenever an earthquake occurs, based on the data updated on the BMKG’s open data website.

If the user selects “current weather information” or “daily weather information,” the bot will track the user’s location using the GPS on the user’s cellphone. Once the user’s location is found, the Telegram bot will send either current weather information or daily weather information, according to the user’s request.

Next, there is a menu about the bot itself. This menu provides information about what the bot can do. This information is the first message the bot sends when the user opens it for the first time.

The next stage occurs when the user has received the desired information—whether it is the up-to-date earthquake information, daily weather information, current weather information, or information about the bot. The bot will then ask the user, “Is there any other information you need?” If the user answers “yes,” the system will repeat the process from the beginning, providing the opening message with available menu options. However, if the user wants to end the conversation with the bot, they can choose the “exit” menu, and the process will be complete.

3. RESULT AND DISCUSSION

3.1. Bot Creation

Initial process from bot creation is register the bot to be we make it on the @Botfather account with Enter the data that will be Becomes attribute on the bot later.

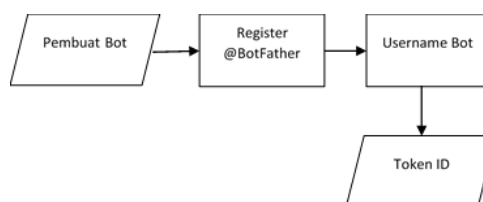


Fig. 3. Bot creation flow [5]

Then the @Botfather account will provide the IP Token which consists on code unique provided by the Telegram application. System application for Forecast Weather Info, Airport Weather and BMKG Satellite Imagery can connected with easy with using the API Token that has been provided by Telegram [5].



Fig. 4. Creating a BOT on the @Botfather account [5]

The registration process for the @BMKGbot bot account is shown in Figure 4. To start the process, enter the command /newbot in the BotFather account. After that, BotFather will respond with a request for the bot-name from the bot maker. The bot used in this investigation is called "BMKGbot". The bot-builder will respond to the message from BotFather, providing the bot's name. Once the naming procedure is done, the generated bot will be assigned a username, username@BMKGbot, as shown in the picture. After the username has been set, BotFather will send a reply message containing an embedded API Token for the bot.



Fig. 5. Appearance FIRE @BMKGbot tokens

The Telegram bot created by @BMKGbot has an API Token, which is the code that the Telegram app provides. The Telegram API token is used to connect the system application quickly for services such as Airport Weather, Weather Forecast Info, and BMKG Satellite Imagery. Each Telegram bot has a unique API Token, which can be accessed by the bot creators when needed. API tokens are also used as required based on specific needs.

3.2. Configure Webhooks

```
curl -H "Content-Type: application/json"
-X POST -d
'{"url": "https://www.[host@BMKGbot].com/hook.php"}'
https://api.telegram.org/bot[token@BMKGbot]/setWebhook
```

Fig. 6. Order Configuration Webhook @BMKGbot

Communication from servers Telegram to bot servers utilise Webhooks with protocol https. The command used for configuration Webhooks according Fig. 6 [4].

3.3. XML Data

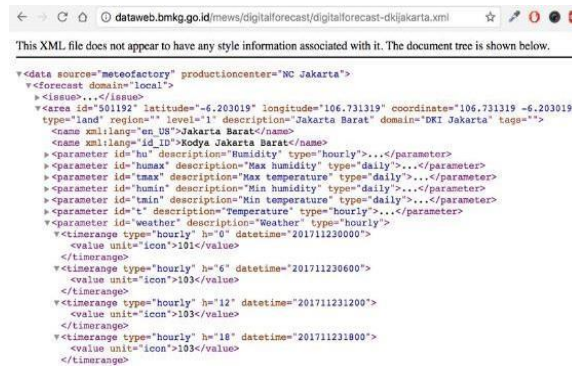


Fig. 7. Structure data XML for parameter

The information provided covers weather forecasts, temperature, air humidity, wind speed, and wind direction. The information is displayed for 3 days: today, tomorrow, and the day after tomorrow. Each day is divided into 4 times: morning, afternoon, evening, and early morning (the next day). The weather forecast information is taken from the XML file for each province [4].

The weather information for today is displayed using a PHP function. The parameter in the XML, as depicted in Figure 14 with ID="weather," will display the weather code for today [4].

The actual weather information from the airport that will be disseminated through the Telegram Bot application includes:

- Weather
- Temperature in Celsius
- Visibility distance in kilometers (km)
- Air pressure in hectopascals
- Wind speed in km/h
- Wind direction

To serve the actual weather information from the airport, the Telegram Bot uses PHP programming and API libraries to access BMKG Aviation XML data.

A new symbol will be added to the weather information provided at the airport to enhance the visual presentation [4].



Fig. 8. Appearance menu image satellite weather region Indonesia on application Telegram Bots

The satellite image information is collected from the Japan JMA Himawari-8 weather satellite. This Telegram Bot application presents satellite imagery based on weather conditions, categorized by region, according to Indonesian provinces. The satellite weather images are displayed as pictures with the .png extension. Telegram Bot users can request weather satellite images, which are then downloaded from the BMKG satellite server, and displayed along with weather data for the Indonesian territory covered by Himawari-8.

The results of the satellite image weather request for the Indonesian region from Himawari-8 in the Telegram Bot application are shown in Fig. 8. Users of smartphone devices have the option to zoom in and zoom out on the satellite weather images.

3.4. Application Result



Fig. 9. Appearance menu main Info BMKG weather

The current bot view system, as shown in Figure 8, initializes for the user. The bot will start the service by sending an opening message in response after the user types the command /start in the menu. The bot then replies by displaying the menu options for the user to choose from after the opening message. As mentioned before, the bot offers three menu options: Indonesian weather forecast, airport weather, and satellite imagery.

3.5. Analysis Application

Table 1. Summary Testing Bots (On Every Device)

Category	Amount Command	Amount Testing	Level Success	Response time	Flat Flat
Forecast Weather	576	576	100%	2,16 - 3 s	2.54 s
Weather Airport	104	104	100%	2,11 - 3.73 s	2.76 s
Image Satellite	35	35	100%	6 - 8 s	7,28 s

The table shows the data for the weather forecast menu, with a total of 576 comments and 576 tests, resulting in a success rate of 100%. The response time ranges from 2.16 to 3 seconds, with an average of 2.56 seconds. For the airport weather menu, the total number of comments is 104, with 104 tests, resulting in a success rate of 100%. The response time ranges from 2.11 to 3.73 seconds, with an average of 2.76 seconds. Finally, for the satellite image menu, the total number of comments is 35, with 35 tests, resulting in a success rate of 100%. The response time ranges from 6 to 8 seconds, with an average of 7.28 seconds.

4. CONCLUSION

The success rate of the Telegram Bot aimed at spreading information varies depending on its menu. In the forecast weather menu, the total comments are 576, the total tests are 576, resulting in a success rate of 100%. The response time ranges from 2.16 to 3 seconds, with an average of 2.56 seconds. In the airport weather menu, the total comments reached 104, the total tests are 104, with a success rate of 100%. The response time ranges from 2.11 to 3.73 seconds, with an average of 2.76 seconds. Finally, in the satellite image menu, the total comments reached 35, the total tests are 35, with a success rate of 100%. The response time ranges from 6 to 8 seconds, with an average of 7.28 seconds.

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