**WhatsApp Sequence Diagram Explained for Beginners**

A **sequence diagram** shows how different parts of a system communicate with each other step-by-step. Let’s break down the process of sending a message on **WhatsApp** in an easy-to-understand way:

**Step 1: User Sends a Message**

1. **You (the sender)** type a message in the chat window and hit the **"Send" button**.
2. As soon as you press send, your phone’s **WhatsApp app encrypts the message** to ensure it is secure and private.
3. The **encrypted message** is sent from your phone to **WhatsApp’s server**.

**Step 2: Message Queuing**

1. Once the message reaches the **WhatsApp server**, the server checks if the recipient (the person you’re sending the message to) is **online or offline**.
   * If the recipient is **online**, the server immediately forwards the message to their device.
   * If the recipient is **offline**, the server stores the message in a **queue** and waits until the recipient reconnects.

**Step 3: Recipient Receives the Message**

1. When the recipient’s phone connects to the internet, the **WhatsApp app on their device receives the message** from the server.
2. The message is then **decrypted** on their phone.
3. Once decrypted, the message is **displayed in their chat window**.

**Step 4: Message Delivery Confirmation**

1. WhatsApp uses **tick marks** to show the status of the message:
   * **One tick**: The message has been sent to the WhatsApp server.
   * **Two ticks**: The message has been delivered to the recipient’s device.
   * **Blue ticks**: The recipient has read the message.
2. As these statuses update, your WhatsApp app shows you the **latest delivery and read information**.

**Key Points to Remember**

* **Encryption**: Messages are encrypted for privacy, so only the sender and recipient can read them.
* **Server Role**: The WhatsApp server acts as a middleman, forwarding messages and storing them temporarily if needed.
* **Ticks**: The ticks (one, two, or blue) keep you informed about what’s happening with your message.

By understanding this sequence, you can see how WhatsApp efficiently handles billions of messages every day while keeping them private and secure.

sequenceDiagram

participant 🤳 Sender as Sender (You)

participant 📱 App as WhatsApp App (Sender)

participant ☁️ Server as WhatsApp Server

participant 📱 RecipientApp as WhatsApp App (Recipient)

participant 🧑‍💻 Recipient as Recipient (Your Friend)

%% Step 1: User Sends a Message

🤳 Sender->>📱 App: Type message and press "Send" 💬

📱 App->>📱 App: Encrypt message 🔒

📱 App->>☁️ Server: Send encrypted message 📤

%% Step 2: Message Queuing

☁️ Server->>☁️ Server: Check recipient status (Online/Offline) 🕵️‍♂️

alt Recipient Online

☁️ Server->>📱 RecipientApp: Forward encrypted message 📤

else Recipient Offline

☁️ Server->>☁️ Server: Store message in queue 🕒

end

%% Step 3: Recipient Receives the Message

📱 RecipientApp->>📱 RecipientApp: Connects to the Internet 🌐

☁️ Server->>📱 RecipientApp: Deliver encrypted message 📤

📱 RecipientApp->>📱 RecipientApp: Decrypt message 🔓

📱 RecipientApp->>🧑‍💻 Recipient: Display message in chat window 💬

%% Step 4: Message Delivery Confirmation

🧑‍💻 Recipient->>📱 RecipientApp: Reads the message 👀

📱 RecipientApp->>☁️ Server: Update read status ✔️

☁️ Server->>📱 App: Update delivery status ✔️✔️🔵

📱 App->>🤳 Sender: Show ticks (✔️, ✔✔️, ✔✔️🔵)