Question 3

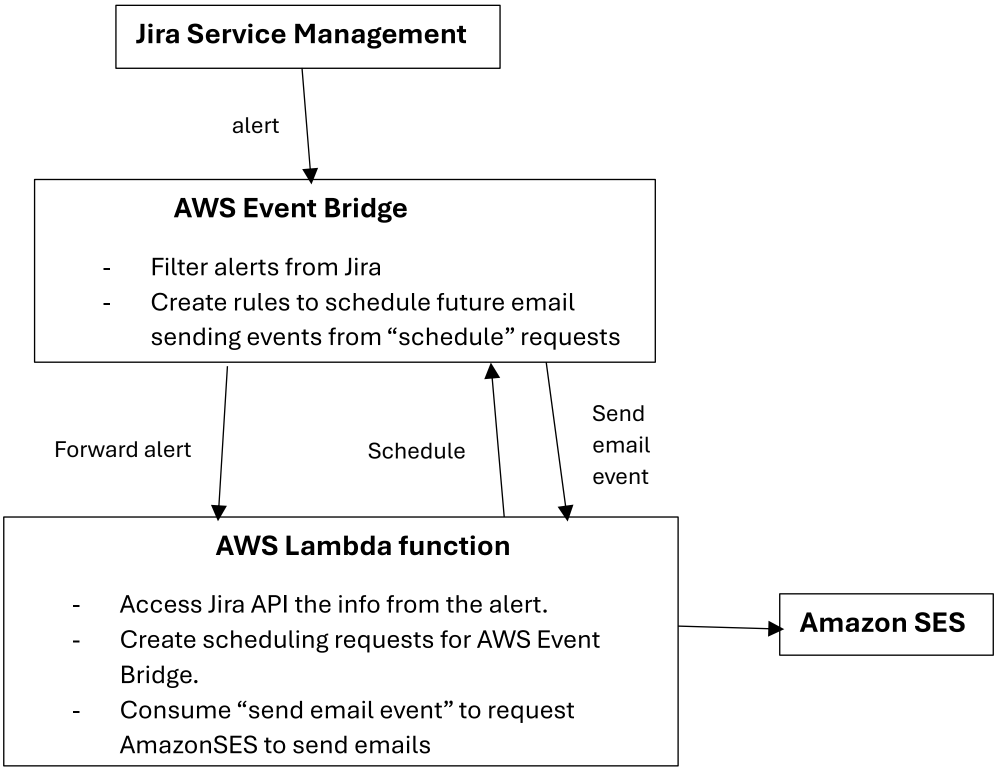
The architecture of the email-sending automation project is outlined below.

First, Jira Service Management is integrated with AWS Event Bridge, so that whenever an action is performed by the team on Jira, a request is sent to AWS Event Bridge.

AWS Event Bridge will keep only the alerts related to release creation and update and then forward them to an AWS Lambda Function which is created to handle the alerts, and get extra information from Jira API and databases that contain clients' information if needed.

Then our Lambda Function will compose and send the appropriate scheduling requests containing the project id, release id, the specific points in time that emails need to be sent out and the client's information to AWS Event Bridge.

The AWS Event Bridge will then create or update rules to schedule future requests which will be sent to the Lambda function to send the emails.


Jira Service Management
alert
AWS Event Bridge
- Filter alerts from Jira
- Create rules to schedule future email sending events from "schedule" requests
Forward alert
Schedule
Send email event
AWS Lambda function
- Access Jira API the info from the alert.
- Create scheduling requests for AWS Event Bridge.
- Consume "send email event" to request AmazonSES to send emails
Amazon SES

At the time of sending the emails, The AWS Event Bridge will send a request to our Lambda server with all the previous information to trigger the process. The Lambda server in turn will access the OpenAI API and Jira API to get the mail content, compose the email and send the emails to the clients using Amazon SES.

Technology Justification

- **Jira Service Management:** This technology is built into Jira cloud and creates an event for every action performed. It also supports integration with AWS Event Bridge which is the next tool in our ecosystem.

- **AWS Event Bridge:** Jira Service Management allows rule creation to handle its events; however, it lacks REST API support and does not support actions to create schedules or run scripts in response to events. This is where AWS Event Bridge becomes valuable. By leveraging AWS Event Bridge's REST API support, we can automatically schedule an email-sending event upon receiving a Jira event.
- **AWS Lambda Function:** Considering the number of release updates and creations, the server may remain idle for extended periods. Consequently, using a server that operates continuously and charges by the hour can be inefficient. A serverless model is ideal in this scenario, as it allows us to pay only for the resources consumed.

Email Sending:

- Amazon SES API is used to send emails. All communications are encrypted using TLS through the Amazon SES HTTPS endpoint, which supports TLS 1.2 and TLS 1.3.
- The information about the recipients of each release is taken from the database and stored in each request from AWS Event Bridge.
- For email authentication, Amazon SES supports DMARC together with SPF and DKIM to increase trust in the domain and delivery of the emails.
- The scheduling of emails is ensured by the AWS Event Bridge.

Error Handling:

- Since AWS and Jira handle the communication between Jira Service Management and AWS EventBridge, our focus will be on the interactions between AWS EventBridge and our Lambda server, as well as the communication between the Lambda server and Amazon SES.
- For our AWS Event Bridge and Lambda server integration, we will implement a robust error handling system. This system will ensure that failed requests are automatically retried at progressively increasing intervals. If a request continues to fail after multiple attempts, it will be rescheduled for future processing. In cases where a request fails after several rescheduling attempts, it will be permanently removed from the queue to maintain system efficiency.
- We can also deploy cross-region servers to improve the availability of the Lambda Function.

Testing and Monitoring:

- Most of our logic is in the Lambda Function so most of the testing will need to be done there. Unit testing is the most suitable in this case because we have clear-cut expectations for each functionality.
- Amazon SES provides a dashboard that helps monitor daily email usage and sending statistics. These numbers can be used to cross-check with our data to detect unusual behaviors.
- Observability can be further improved by implementing OpenTelemetry into our Lambda Function and collecting the exact traces and metrics needed to debug the application such as the time, content and number of the emails sent out for each project or release.

Scalability:

- The AWS Event Bridge has throttle limit of 2,250 transactions per second and that only counts the events after filtered by the rules. So only create and update release events are counted towards the limits. It is very unlikely that that number will be exceeded.
- Similarly, a Lambda can process many requests per second and is unlikely to be overwhelmed. However, if we need to scale it up to match the AWS Event Bridge we can add more servers behind a load balancer.