

Debbie Pao

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Location: San Francisco Bay Area, US Citizen

WORK EXPERIENCE

Twilio

Messaging Services Sender Team: Senior Software Engineer

9/2021-present

- Managed a team of 6 engineers to migrate a new microservice from MySQL to DynamoDB to address restrictions on scalability and efficiency problems and drive down monthly costs by \$30K, building a more resilient Twilio Messaging product that processes over 300+ million messages/day.
- Led 5 engineers to redesign and modularize the Messaging Services product architecture to prepare for next generation v2 large-scale features by separating complex business logic into 3 distinct microservices and 3 distinct database storage systems.
- Directed 8 engineers to redesign and conduct load testing on the complex number selection algorithm that minimized the queuing and delay time Twilio delivers messages to destination by 5 seconds, decreased database writes by 9K queries/second, and improved accuracy to 100% guaranteeing that no number is over-selected.
- Oversaw 4 engineers and designed a reconciliation initiative using a Kafka consumer to bridge the gap in data inconsistencies across two sources of truth where 1% of hosted phone numbers were already released, which greatly increased customer satisfaction.
- Created internal Zeppelin tool to query Spark clusters and provide a configurable impact analysis report of top impacted customers, total percentage of messages per customer that experienced queueing processing delays over 10 seconds, and average and maximum delay in milliseconds to give transparency and align with Messaging's defined SLA/SLO.
- Responsible for responding to oncall operational and customer escalations and running ops review meetings to identify points of failures and suggest betterments to prevent regressions.
- Mentored new hires on team, interviewed candidates, and initiated new hire onboarding process revamp.

Messaging Core Infrastructure Team: Software Engineer

7/2019-9/2021

- Led 6 teams in cross-functional initiative to re-architect existing distributed system to strengthen resiliency of message delivery receipt processing by migrating processing of OTT delivery receipts over to a generic Messaging Channel-agnostic processor. Eliminated risks to allow for removal of 40K messages/second scalability restriction by moving away from MySQL to AWS. Focused on 10 functional requirements, such as: new queue data model, processing order and retries, database storage schema updates, status callbacks, error code mappings, NACK processing, billing, OTT Read receipts, and failover/fallback handling strategies.
- Presented a solution for MySQL split brain incident at R&D company wide ops review that prevented losing 60K+ messages by decreasing the automatic failover time window from minutes to seconds and making sure the widely-used internal MHA tool cleanly shuts down connections to the old dead primary.
- Non-linearly scaled and defined the capacity model to ensure high availability and resiliency during high traffic holiday season for the most critical distributed system in Messaging by load testing the system expected to handle more than 40K+ requests/second and process a total of 960+ million message segments/day with different patterns based on peak production customer traffic.
- Designed internship project to enhance team's MySQL database sharding strategy to migrate storing shard configurations in DynamoDB for higher availability and scalability with 0 downtime and failure recovery.

Amazon

Amazon Web Services (AWS): Software Development Engineer Intern

5/2018-8/2018

- Implemented customer-facing features to improve the developer workflow experience in continuous deployment pipelines for Amazon's cloud version control system.
- Designed algorithms to calculate quality of source code files compared to existing code stored in the system.
- Engineered data models for AWS DynamoDB using operating systems and security principles to provide secure and scalable read-and-write operations for customers' data. Practiced test-driven development using Cucumber.io to validate.

NOTABLE PROJECTS

Esc Twilio

Python

12/2020-8/2021

Virtual escape room experience based in Twilio HQ that started as a company-wide internal hackathon project to showcase to new hires.

- Flask app that integrated Twilio's Programmable Messaging and Voice TwiML Call products with integrity checks and rate limiting.
- Launched successfully and was incorporated into the official onboarding process for all Twilio's Summer 2021 interns.
- Conducted extensive security threat model review with Twilio's internal Security team.

PintOS Operating System

C

2/2018-5/2018

Educational Operating System for x86 architecture that supports multithreading, loading and running user programs, and file systems.

- Implemented multi-threaded processes and process synchronization with locks, semaphores, and monitors.
- Constructed user programs to allow for user-prompted process control system calls and file operation system calls.
- Built filesystem using buffer cache and indexed inode data structure that uses multi-level pointers.

SKILLS

Coding Languages: Java, Python, Scala, MySQL, HTML, CSS, Javascript, Ruby, C

Technical Skills: Dropwizard, MySQL MHA, AWS EC2, AWS DynamoDB, AWS S3, Apache Kafka, Datadog, Rollbar, Pagerduty, Nagios, HAProxy, Jenkins, Kibana, Mockito, UNIX, Apache JMeter, Locust, OpenAPI Swagger, Redis, Apache Maven, Terraform, Zeppelin

EDUCATION

University of California, Berkeley

Graduated: 5/2019

B.S., Major in Bioengineering, Minor in Electrical Engineering and Computer Sciences

Relevant Coursework: Operating Systems and Systems Programming, Computer Security, Efficient Algorithms and Intractable Problems, Data Structures and Programming Methodology, Great Ideas in Computer Architecture (Machine Structures), Structure and Interpretation of Computer Programs, Discrete Mathematics and Probability Theory, Designing Information Devices and Systems