William McDonald

Software Engineer

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SUMMARY

Software engineer specializing in large scale infrastructure, distributed system design, performance optimization and video technology. Proven ability to lead and deliver complex cross-functional projects at scale.

EXPERIENCE

Discord — *Senior Software Engineer*

APRIL 2023 - JULY 2024 | REMOTE

MEDIA INFRASTRUCTURE

Established the technical strategy and roadmap for the team, defining metrics and goals to improve video playback and media uploads

Led a project across teams including security, design, legal and marketing to expire CDN URLs, reducing malware distribution by 90% and cutting CDN egress by 20%

Optimized GIF and video encoding, mitigating DDoS attacks and enhancing reliability

Meta — *Software Engineer*

OCTOBER 2016 - MAY 2022 | SEATTLE

VIDEO INFRASTRUCTURE TOOLING | JULY 2020 - MAY 2022

Created a persistent media index for videos, allowing videos to be repackaged and streamed via FUSE mount, saving 10% of network traffic and 20% latency

Unblocked the initial testing of Meta's video encoding ASICs (MSVP) by building an encoding validation toolset and deploying its FFmpeg integration

Prototyped distributed video encoding for the monolithic C++ livestreaming service

VIDEO PROCESSING INFRASTRUCTURE | JAN 2019 - JULY 2020

Invented a method of parallelizing video encoding, reducing encoding latency by up to 99% and enabling low-latency AV1 and VP9 video encoding at scale

Wrote a fast mp4 packaging library in C++, scaling usage to >10B calls per day across the Meta family of apps, for both live and on-demand video

Added DRM support in C++ for Live broadcasts

Created a proof-of-concept remote code execution attack to escalate a "low-severity" external report, leading to Meta's largest bug bounty payout ($80k) at the time (2020)

Reduced startup latency of video encoding by 98%, saving >1% of total encoding costs

ADS INFRASTRUCTURE | OCT 2016 - JAN 2019

Rearchitected the ingress flow of a C++ real-time analytics platform, increasing speed 10x to 10 GB/s and eliminating data inconsistencies

Redesigned the query engine to create a query plan, enabling distributed queries and streaming queries while simplifying the codebase

Profiled and optimized a C++ query service, resulting in -80% latency and -50% cost

EDUCATION

University of Waterloo — *Bachelor of Mathematics in Computer Science*

SKILLS

LANGUAGES

C++

Python

Rust

SYSTEMS

Distributed systems

Video (H.264, AV1, mp4)

Observability

Security

TOOLS

GCP

Cloudflare

Kubernetes

FFmpeg