Cloudflare Workers for Gaming

Product Management Report by Jack McClelland

Summary

Gaming, particularly web and mobile gaming, is a large and growing industry for Cloudflare Workers to address. Product suggestions include computation offloading via edge computing, websocket integration for Workers, and a gaming-specific code templates collection. Beta testing can first be rolled out to early adopters in exchange for discounts, and risks include technical challenges and product-market fit. Further research is recommended.

Market Analysis

Cloudflare Workers for Gaming will be servicing a large and rapidly-growing market. In 2019, around 2.5 billion gamers spent $150B on games in an industry seeing +9.6% year-over-year growth.[1] Mobile gaming grew +10.2% year-over-year to $70B as the largest segment of the global games market. This surge in mobile gaming is driving a demand for fast, low-latency connections, and edge computing is emerging as a better solution to meet this need than traditional data centers. As gaming requires immersive and real-time experiences, offloading some computation to data centers close to end users is becoming increasingly more necessary.

Additional research is recommended to ensure the technical validity of the product recommendations described below. For example, consulting with more game developers and backend engineers about technical specifics can address this project's feasibility. Further market research and need-finding interviews with gamers can help test some of the assumptions made in this report, including the following: will the future of gaming be in the browser or on the mobile device? Will game developers adopt Cloudflare Workers for Gaming?

The content in this report is informed by multiple sources. Two game development professionals were interviewed, including a game designer and a game developer. Three peers with extensive backend development experience were interviewed; they are set to work at Nvidia, Facebook, and Reddit this summer. Interview notes total nine pages. Cloudflare's [Workers](#) and [Gaming](#) pages and [Workers blog post](#) were also reviewed.

Product Recommendations

Computation for mobile + web games can be offloaded to edge computing nodes via Cloudflare Workers. Edge computing offers the opportunity to offload computation to small data centers close to end users at the edge of a network. For example, GPUs (Graphics Processing Units) are specifically designed to perform huge amounts of matrix multiplication calculations necessary to render gaming visuals.[2] The best-performing GPUs often require space, liquid cooling, and other measures that make it hard to pack this hardware into a laptop or mobile device. Cloudflare can offer the ability to offload computation like matrix calculations onto edge computing resources close to the gamer via Cloudflare Workers. This has the effect of reducing hardware costs for gamers and allowing game designers to deliver higher-quality games to their end users.

Multiplayer games can be coordinated by a socket-enabled worker spun up in an optimal location. This location would be geographically central to the group of players, and finding this optimal location close to gamers is absolutely vital. A websocket or traditional socket is a protocol used for real-time web/native applications (in

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[1] https://newzoo.com/insights/articles/the-global-games-market-will-generate-152-1-billion-in-2019-as-the-u-s-overtakes-china-as-the-biggest-market/

[2] https://graphics.stanford.edu/papers/gpumatrixmult/gpumatrixmult.pdf

particular, multiplayer gaming) that allows bidirectional, continuous communications.[3] Currently Cloudflare only supports websocket "pass through;" this suggestion would involve adding abilities for Cloudflare Workers to serve as endpoints for websockets and traditional sockets, though this may present challenges at the technical level and also require a restructuring of costs charged to customers.[4]

Create a section for gaming-specific code templates on the developers page for Cloudflare Workers.[5] The simple addition of a "Gaming" section in the code templates page for Workers would make it quick and easy for game developers to get started using Workers for specific features of their game. This section could include the Emscripten + Wasm Image Resizer template along with Authentication and dozens of other templates.[6]

Cloudflare is at a competitive advantage because of the strength of its edge computing network. Cloudflare Workers is already trusted by industry leaders, and rolling out Workers features to address the gaming vertical will come with the advantage of piggybacking on a reliable edge computing framework.

Pre-Release Testing

Alpha testing will help identify bugs before releasing product changes to the public. Extensive pre-release testing is recommended; this will be limited to internal employees and will ensure the general quality of the proposed product changes before advancing to public beta testing. This may involve a long execution cycle.

Beta testing will involve releasing the product to the public via a small group of initial testers. Cloudflare Workers itself was rolled out slowly via a Beta release.[7] Beta testing of the proposed product changes can help uncover reliability, security, and robustness issues, which can then be addressed before a full public release.

Beta testing can be rolled out first to key stakeholders. Cloudflare's Sales department can identify some game development firms that would be willing to try out these features in exchange for a discount.

Measuring Success

A close eye on certain metrics can help measure success. Examples of metrics that can be monitored for the proposed product changes are user adoption and churn, latency, and game consistency. Consulting developers for more specific technical metrics is recommended. Qualitative observations about game experience can also provide a quick initial measure of success. A/B testing can also be implemented; for example, different layouts for the Gaming Templates section of the Cloudflare Workers developers page can be deployed and their respective success measured. Finally, new revenue from the suggested product changes should be monitored.

Potential Risks

This report does not fully cover all of the technical details involved with the product recommendations. There may be technical barriers or misunderstandings that could prevent these product suggestions from being implemented. Also, despite growing demand for web and mobile games, without a crystal ball it's unclear whether mobile gaming will continue to outperform console gaming. Finally, Google Stadia provides market validation and its failure also indicates the importance of product-market fit. In a 2019 survey, 72% of gamers said they'd be more likely to spend money on console gaming than cloud gaming. Stadia rolled out a single solution to the mass-market. Cloudflare must target web and mobile gaming customers specifically.

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[3] https://www.cloudflare.com/website-optimization/web-sockets/
[4] https://community.cloudflare.com/t/streaming-a-request/14724/3
[5] https://developers.cloudflare.com/workers/templates
[6] https://www.cloudflare.com/press-releases/2018/cloudflare-workers-opens-edge-computing-to-everyone/
[7] https://blog.cloudflare.com/introducing-cloudflare-workers/