Workers For Gaming

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With more titles flooding the market day by day, the gaming industry is slowly becoming a saturated market. To combat this saturation, more studios are releasing ambitious games with innovative features and revolutionary multiplayer capabilities. Though these games strive to differentiate themselves from each other as much as possible however, there is one thing that makes them similar to one another, the use of servers.

Ever since multiplayer games came into the picture, servers have been an important part of their functionality. In order to obtain a better understanding of the state this market is in as well as of the problems that game developers have been running into, I scoured development forums like gamedev.net and TIG to read first person accounts from developers themselves and truly understand the problems they faced. I came to a consensus after going through numerous discussions that there was a common culprit, connectivity issues, which could be further linked to server space and storage. Another way to gain a more comprehensive understanding of the thought processes of game developers as well as the problems they face would be attending major gaming conferences and expos like E3, which focused equally on gameplay demonstration as well as discussion about development processes.

Now, the two primary servers used to support these games are dedicated servers and listen servers. Dedicated servers do not support direct input and output and instead require players to use third party client programs to play their games. This allows for a level playing field by allowing everyone to experience around the same latency. The problem with this server type is that dedicated servers can often be quite expensive to run and maintain, also requiring developers to offer server support. Listen servers on the other hand are essentially free and don't require any special infrastructure to be set up. However, what makes this possible is the fact that they are essentially in the same process as a "hosting player". This has two major disadvantages, the first being the latency advantage that is experienced by the host user and the second is the connection issues and lag that is experienced by remote players, ruining the experience for them and hurting gaming studio's customer bases. Another major problem that plagues the world of game development is security. With a network spanning across multiple countries in different corners of the world, it becomes easy for hackers to access sensitive data at certain points, allowing them to exploit it and then cheat.

Product Changes:

This is where Cloudflare's serverless function, Cloudflare Workers comes in. Cloudflare Worker will attempt to reduce server costs by a significant amount by using edge computing and thus removing the servers themselves while at the same time reducing network latency and for the players. Further, it will increase the security of the network as well, making it a win-win situation for everyone involved. This means that by moving the processing functions closer to the "edge" and thus closer to the end user, it will allow for much higher processing speeds. Edge computing would keep this processing local, on either the device itself or in data centers in the area, and as a result, sensitive data would not have to travel over longer distances, exposing it to less threats. However, in order to be a better product-market fit, a few important tweaks and changes would need to be made to Workers. The first, arguably most important thing that will be needed to be kept in mind is scaling. Better scaling capabilities would be extremely important in order to be able to handle the ever-increasing simultaneous server load. Scaling up would allow the establishment of a more robust platform. In order to enable this scaling, Cloudflare Workers could still maintain its FaaS model, but instead of charging $0.50 per million requests and a $5 monthly minimum, the price would be raised to $0.75 with the monthly minimum remaining the same. This rise in price would most likely not be enough to scare away current and potential users but would be enough to scale up the software. Though Workers has been described as scalable, it was previously equipped to run JavaScript. Handling millions of concurrent users streaming games in real time would require a much bigger load and thus establishing more data centers would become a necessity. Further, as Cloudflare does not have currently have

a distributed datastore that can receive data from the worker, establishing one would be beneficial. Game developers, whether it's an AAA studio or an Indie developer, include a variety of features in their products that allow the user to store information about their, profiles, characters, game progress, inventory systems, etc. Making arbitrary requests, which is the current system in place, would work in theory, but could also potentially slow down the response time, counteracting the purpose of going serverless in the first place.

Quality Adjustment Techniques and Ensuring Market Readiness:

Before the product is ready to hit the market, a few methods should be used while developing it in order to make sure it is successful. The first of these is ensuring to scale horizontally and not vertically. As mentioned earlier, though scaling is already a feature of Workers, taking precautionary measures to ensure the reduction of latency is important, and this can be done by adding more data centers to the network, thus scaling horizontally. Next, differentiating the services offered based on whether the execution of the game is synchronous or asynchronous would help streamline the flow of data. Games that are primarily asynchronous would have less server load than synchronous one's and thus could be on a separate edge computing architecture, allowing for faster processing speeds where it is needed and reducing costs in the process. In a similar vein of increasing efficiency, a load prediction model should be embedded into the system as well. Using machine learning, this would use historical load data in order to predict future load levels on the cloud and then redistribute server load based on what is concluded as optimal.

Goals to measure Success of Service:

Once these methods are implemented, it becomes necessary to weigh the system against previously established key performance indicators. These would include, average user latency, which can be measured using ping; average session length; retention rate and intrusion attempts. The ping would give us a direct measure of the latency of the server, and the lower the ping, the lower the latency and thus the more successful Cloudflare Workers for gaming would be in achieving its goal. In order to test this, stress tests could be used, with increasing number of users continuously joining servers until the maximum capacity is found. This would hypothetically be inversely proportional to the average session length and retention rate, as a faster, more stable network to play on would attract more users and make them want to play more. Lastly, the number of intrusion attempts would measure the prevalence of hackers and cheaters on the network and thus how secure the system truly is.

Risks Involved and Plan to Mitigate:

Developing this vertical would not be without risks. One major risk that could lead to failure is the already existing competition. The market of edge computing for gaming is not in the startup stage of the industry life cycle. Services like Azure Gaming by Microsoft and AWS Lambda have been around for the past 4-5 years offering similar features. However, due to how recent their introduction is, the barriers to entry into the market is still relatively low and thus Cloudflare Workers has a safe chance of breaking into this market. Another risk is having developers not seeing enough incentive in switching over from current server systems. In order to combat this, constant communication with developers is necessary to understand what exactly they would seek in a serverless model and to then create and release the relevant patches based on this feedback.

Cloudflare's Workers service for gaming will allow developers to focus what really matter when it comes to creating a game and will let them to create rich story lines, engaging environments and beautiful graphics while not having to worry about latency and security issues, leveraging edge computing to achieve maximum player engagement.