

Glossary of Key GPM Terms

Battery drain

User-perceived battery power as measured by the device OS. Corroborated with milliamp readings (where available).

Battery ratings

The average mA consumption of the whole system, measured during gameplay and combined with battery capacity (mAh) to rate the expected number of gameplay hours on a charge.

Frame rate (FPS)

The number of frames shown in a given second.

Frame times

Tied to frame rate, the number of milliseconds to draw a single given frame. For example, a frame every 16.6667ms reflects 60 frames per second.

Frame rate variability

The average jump between consecutive frame rate readings taken each second, reflecting the amount of variation in visual fluidity that a gamer experienced (Lower is better).

Frame rendering

What the user sees while playing a game. Measured using Median FPS, FPS Stability, and Variability Index.

Gameplay

The core, interactive component of a game, excluding loading screens, menu screens, and advertisements.

GPU latency

The demand that a game's software makes on the graphical processor.

Image consistency ratings

Algorithms are used to monitor key metrics of image consistency across a gameplay session.

Input latency

The measured time for a response to a user input, rated according to fixed benchmarks set by research. Example: Time between a player clicking the mouse button, and seeing the muzzle flash of an in-game gun.

Jank

An isolated, long pause between two frames, usually caused by dropped frames. ("Janky" is also used, less specifically, by gamers to denote poor game quality.)

Jitter

Negative impacts on video and audio quality, caused by delays in data packet arrival, due commonly to network congestion and/or route changes. (A key network metric, see also packet loss and latency.)

Launch Time

The time taken to launch an app after it has been removed from memory, but is not freshly installed (i.e., a "cold launch" but not a "first launch"). Measured from tapping the game icon on the home screen to seeing the first interactive screen.

Median frame rate

The middle-most frame rate during gameplay, representing the typical visual fluidity that the gamer experiences (Higher is better).

Network latency

Also known as lag, the time for a packet of data to be captured, transmitted and processed, then received and decoded. (See also packet loss and jitter.)

Packet loss

A key network metric (see also jitter and latency) when packets of data fail to reach their destination. Measured as a percentage of packets lost against number of packets sent.

Performance rating

Graphical performance rated by measuring multiple frame rate metrics during gameplay (median frame rate, minimum variability) and compared to established gaming benchmarks and user data analysis.

Pixel shader load

The operating load for running pixel (fragment) shaders, which update colours and textures on scene geometry.

Vertex shader load

The operating load for running vertex shaders which shape scene geometry.

Best Practices

Experience analytics

Data should reflect the experience of real gamers who are playing to win, i.e. no bots, scripts or device farms.

Testing methods

The testing elements of GPM should be accomplished using objective tools, with no reliance on traditional testers or subjective opinions.

Game-device pair

Every gaming experience relies on multiple hardware and software working in harmony, so valid testing is always done in game-device pairs.

Natural gameplay

Each gamer should follow a strict methodology that does not interfere with natural gameplay, but does ensure that certain parameters are matched across tests (e.g., game and device configuration, game scenarios covered). Minimum sessions of 15 minutes are essential.

Validated metrics

Metrics should be validated using multiple independent methods.

Real-world devices

Real-world, unrooted and non-jailbroken devices should be used, reflecting actual gamer experience as closely as possible.

Key Performance Management Benchmarks

Fluidity / When the FPS dips below the developer's target or becomes unstable, users immediately begin to notice stuttering images and lag in the game. The three key performance metrics here are Median FPS, Minimum FPS, and FPS Variability.

Median FPS

The middle-most frame rate during gameplay, representing the typical visual fluidity that the gamer experiences. (Higher is better.)



Minimum FPS

The worst frame rate experienced during gameplay, typically happens during a moment of heightened gamer activity or a computational bottleneck. (Higher is better.)



FPS Variability

The worst frame rate experienced during gameplay, typically happens during a moment of heightened gamer activity or a computational bottleneck. (Higher is better.)



Responsiveness / When a game is described as "laggy" or "slow", players' actions are not immediately acted upon, and the immersive experience is naturally compromised. This is a responsiveness issue, and the primary performance metric here is User Perceived Latency.

User Perceived Latency

The measured time for a response to a user input, rated according to fixed benchmarks set by research. Example: time between a player clicking the mouse button, and seeing the muzzle flash of an in-game gun.



Image Consistency / Disruptions in consistency of image presentation (for example, macroblocking, a common distortion that appears as large pixel blocks) directly undermine the enjoyment and quality of gameplay.

Our Jaggy Index

The GameBench Jaggy Index measures the degree to which low-res gameplay creates aliasing artefacts in geometrical elements containing straight lines. (Lower is better.)



Duration / This is the obvious cornerstone of mobile gamer experience, and while battery life continues to improve year-on-year, the need for carefully managed trade-offs between power and performance remains. Here the key performance metrics are Available Gameplay Hours and Loading Time.

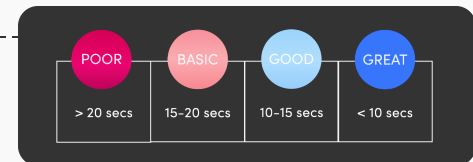
Available Gameplay Hours

The average mA consumption of the whole system, measured during gameplay and combined with battery capacity (mAh) to rate the expected number of gameplay hours on a charge.



Loading Time

The time taken to launch an app after it has been removed from memory, but is not freshly installed (i.e., a "cold launch" but not a "first launch"). Measured from tapping the game icon on the home screen to seeing the first interactive screen.



Scan to view comparison data of two top games using these benchmarks