

# Solution Brief



Cloud & Communication Service Providers  
Graphics

## Intel® Server GPUs for Cloud Gaming and Media Delivery

**Providers of cloud gaming and streaming media can realize the massive opportunity in their market segments with a high density of streams per server and cost efficiency using the Intel® Server GPU.**

### intel. SERVER GPU

The universe of digital content continues to grow dramatically, creating unprecedented opportunity for cloud service providers (CSPs) and communication service providers (CoSPs). This opportunity is nowhere more evident than for cloud gaming and streaming media.

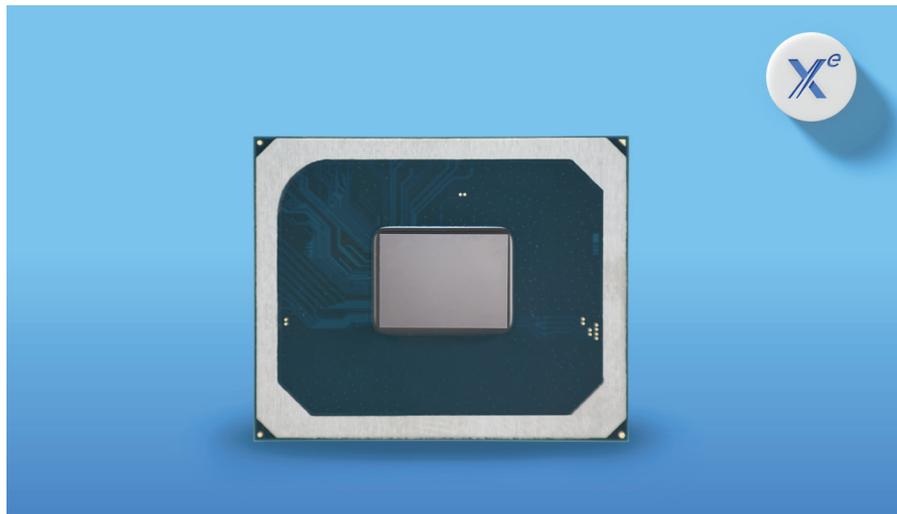
According to the Cisco VNI report, video will account for 82% of the global IP traffic by 2022 and live video will increase fifteen-fold from 2017 to 2022 to reach 17% of internet video traffic. Over the same time period, gaming traffic is expected to grow nine-fold.<sup>1</sup>

In response, new participants are coming to these market segments, with companies such as phone manufacturers and OEMs joining alongside CSPs and CoSPs to vie for consumer attention. Optimizing competitiveness means that CSPs and CoSPs must strive to lower total cost of ownership (TCO) while continuing to deliver high-quality, reliable services.

### Embracing Android Cloud Gaming

StatCounter reports that as of September 2020, Android has more than 74% of the global mobile market share.<sup>2</sup> The content catalog is growing, providing additional opportunities to CSPs and CoSPs. The throughput requirements in this usage area can be expected to grow dramatically as the 5G rollout makes greater bandwidth available to end users over the next several years. The combination of Intel Xeon Scalable Processors, open-sourced and licensed software ingredients, and the new Intel Server GPU provides a very cost-effective, optimized solution for service providers to address a growing market. The H3C XG310 PCIe card that integrates four Intel Server GPUs can support more than 100 simultaneous users in a typical two-card system and up to 160 simultaneous users, depending on the specific game title and server configuration.<sup>3</sup>

In addition to Intel Server GPUs, optimal Android cloud gaming service implementations require servers configured with optimal compute, storage, and networking performance. Intel's highly optimized cloud gaming reference software, licensed for use only on Intel-architecture-based solutions, can enable a two-socket server platform based on 2nd Gen Intel Xeon processors to support 120 to 160 instances of Android games, each in 720p resolution at 30 frames per second. A typical server might be equipped with two Intel Xeon Gold 6258R processors, 192 GB of 2933 MHz DDR4 memory, 2 TB of SSD storage, and two PCIe cards based on the Intel GPU, such as the H3C XG310.



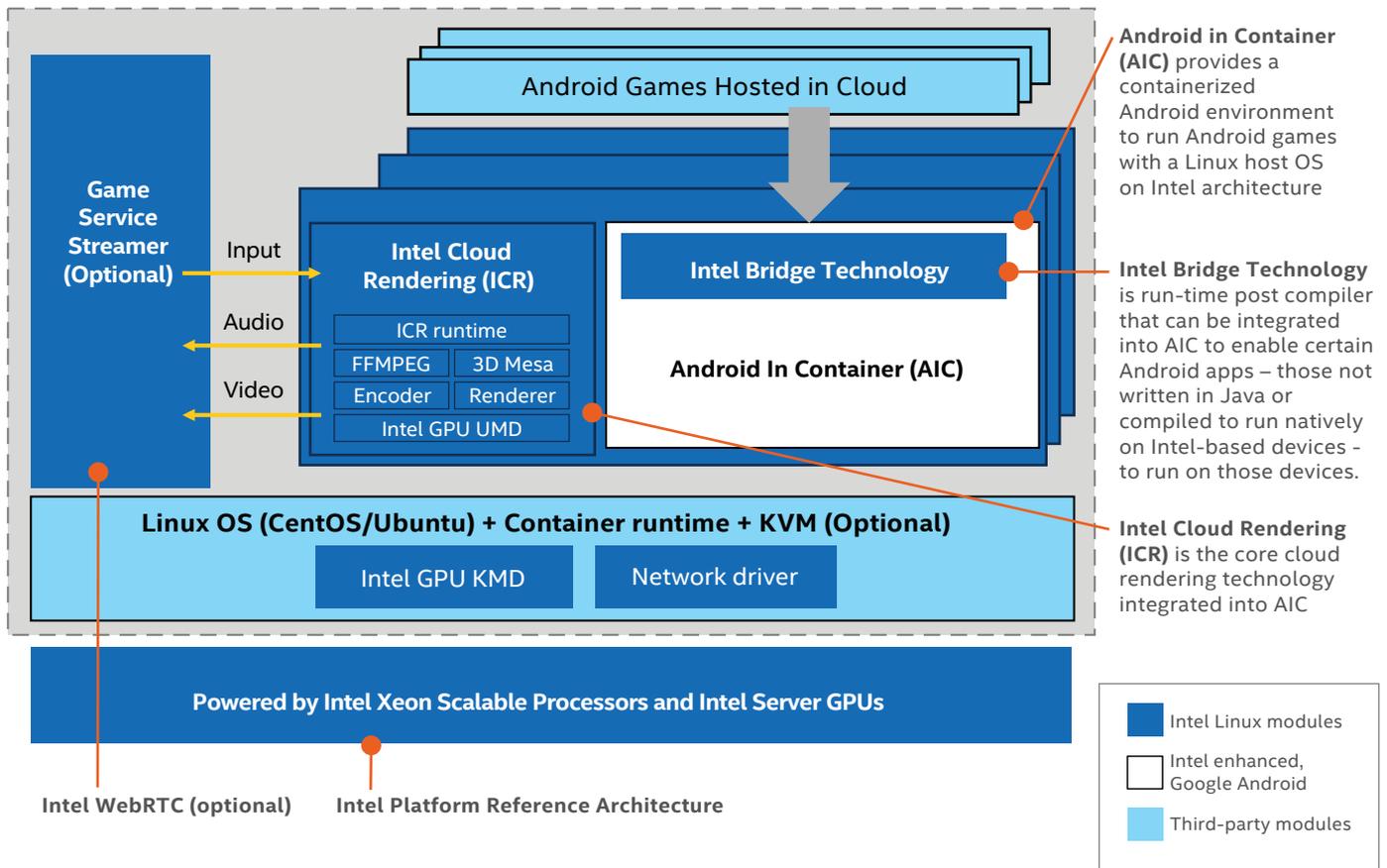
*“Intel is an important collaborator on our Android Cloud Gaming solution. Intel Xeon Scalable Processors and Intel Server GPUs offer a high-density, low-latency, low-power, low TCO solution. We are able to generate over 100 game instances per 2 card server for our most popular games, King of Glory and Arena of Valor.”*

– Allen Fang, Vice General Manager of Tencent XianYou Cloud Gaming Platform



Software is also a critical aspect of a successful Android cloud gaming service deployment. For a CSP or CoSP wanting to deploy a gaming service, gaming titles and a streaming service solution are mandatory. For Android cloud gaming, Intel licenses additional software components that work with the game streaming solution to support high server game stream density, game performance, and breadth of gaming title accessibility. These software components include an Android in Container (AIC) solution for games running on Intel-based platforms, helping enable high stream density. Intel Cloud Rendering (ICR) software provides the core cloud rendering technology and leverages the Intel-optimized Mesa 3D graphics library to optimize Intel Server GPU utilization. Finally, the cloud gaming software stack can take advantage of Intel Bridge Technology, which enables certain Android apps not written in Java or compiled to run natively on Intel-based devices to run on those devices. This software, combined with an optimal Intel-based server configuration, provides a strong foundation on which to deploy an Android gaming service.

### Edge/Cloud Server



## Optimizing Delivery of Streaming Media

The massive growth in media streaming continues, with Deloitte reporting that more respondents now have video streaming subscriptions than traditional pay-TV subscriptions.<sup>4</sup> At the same time, streaming services themselves are multiplying, with studios, networks, and various other entrants entering the market. This rapid state of change is accompanied by content owners creating a shifting landscape of distribution rights and alliances. The net effect is to cause consumers to subscribe to multiple services to access the full range of content they want. These circumstances create unprecedented opportunity for streaming providers to attract subscribers, while also making the market segment extremely competitive. While the content itself is the prime differentiator among services for consumers, the quality of the end-user experience remains critical. This competitive environment demands that providers operate their infrastructures as cost-effectively as possible so they can compete on price while optimizing profitability.

## Lower TCO

A recent [Amazon report](#) indicates that if a popular video service can lower its preparation costs (transcoding) by 50%, but doesn't lower its distribution costs (bandwidth, storage, and network optimization), the savings are almost non-existent. However, if a service company focuses on lowering distribution costs, the savings are instantaneous and dramatic. This can be achieved by delivering a channel at the same perceptual video quality at a lower bitrate. The Intel Server GPU gives service providers the flexibility to choose pre-sets that best meet their requirements. The pre-sets can scale from higher encoding efficiency at a lower density or higher density at a lower encoding efficiency for optimal TCO.

Supporting large numbers of streams per server enables a provider to serve its growing subscriber base with a smaller data center footprint, helping reduce CapEx associated with equipment and facilities costs. High performance per watt helps drive TCO down further by reducing OpEx. Standards-based hardware and software development environments provide further advantages by unifying a traditionally fractured graphics landscape across usages and performance levels. The Intel Server GPU is based on a low-power discrete system-on-chip (SoC) design, with a 128-bit wide pipeline and 8 GB of dedicated onboard low-power DDR4 memory. Four GPU SoCs are packaged together in a three-quarter-length, full height x16 PCIe Gen3 add-in card from H3C, with a target configuration of up to four cards per server. By using Intel Server GPUs alongside Intel Xeon Scalable processors, data center operators can scale graphics capacity separately from server count, supporting larger numbers of streams and subscribers per system.



Intel Server GPU provides a high density of streams per server for Android cloud gaming and streaming media, with low power consumption and high throughput.

[View the latest performance data.](#)

## Open Architecture

An optimized software stack supports the Intel Server GPU, drawing on a broad ecosystem and generations of innovation. Standards-based, open-source software ranges from drivers and APIs to developer tools such as the Intel Media SDK to streamline development while optimizing code quality, as well as the Mesa 3D Graphics Library, an open source implementation of OpenGL.

The Intel Server GPU supports accelerated AVC, HEVC, MPEG2, VP9 encode/decode, and AV1 decode. An optimized media plug-in for FFMPEG, the widely used industry standard open source framework for video streaming applications, enables application compatibility across Intel Xeon Scalable processors and the Intel Server GPU.

## Conclusion

The Intel Server GPU enables service providers that host Android cloud gaming and media streaming delivery to increase density and performance. As a result, customers can cost-effectively operate infrastructure that can serve a large subscriber base. This technology complements Intel's rich set of hardware and software offerings, as well as support for industry standard frameworks and a broad ecosystem that accelerates development of emerging cloud and edge workloads.

Find out more on the Intel Server GPU at [www.intel.com/servergpu](http://www.intel.com/servergpu)

**Explore how H3C is using the Intel Server GPU**

Learn more about Intel's Visual Cloud Solutions at [www.intel.com/visualcloud](http://www.intel.com/visualcloud)



<sup>1</sup> Cisco Systems, March 9 2020. "Cisco Annual Internet Report (2018-2023) White Paper."

<https://www.cisco.com/c/en/us/solutions/collateral/executive-perspectives/annual-internet-report/white-paper-c11-741490.html>.

<sup>2</sup> StatCounter. Mobile Operating System Market Share Worldwide, Sept. 2019 - Sept. 2020." Retrieved October 26, 2020. <https://gs.statcounter.com/os-market-share/mobile/worldwide>

<sup>3</sup> Performance may vary based on the specific game title and server configuration. To reference the full list of Intel Server GPU platform measurements, please refer to this [link](#) on [Intel.com](#).

<sup>4</sup> Deloitte. "2020 Media and Entertainment Industry Outlook."

<https://www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/media-and-entertainment-industry-outlook-trends.html>.

TCO analysis is based on internal Intel research. Pricing as of 10/01/2020. Analysis assumes standard server pricing, GPU list pricing, and software pricing based on estimated Nvidia software license costs of \$1 per year for 5 years.

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more complete information visit [www.intel.com/benchmarks](http://www.intel.com/benchmarks).

Performance results are based on testing as of dates shown in configurations and may not reflect all publicly available updates. See backup for configuration details. No product or component can be absolutely secure.

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