SUPERMICRO'S PURPOSE-BUILT, FLEXIBLE AND MASSIVELY-SCALABLE GPU EDGE INFRASTRUCTURE SOLUTION EMPOWERS GAMING AS A SERVICE (GAAS) AND CROSS-MEDIA ENTERTAINMENT

In partnership with Blacknut's GaaS (Gaming-as-a-Service) platform and Radian Arc GPU Edge IaaS (Infrastructure-as-a-Service) platform

Supermicro GPU Edge Infrastructure Solution

TABLE OF CONTENTS

Executive Summary

The advance of Cloud Gaming technology has removed all hardware barriers preventing video games from being played by the broadest audience. Dedicated video game consoles or PCs are no longer needed, and the on-screen experience (whether sports, movies, TV shows, or documentaries) can now be expanded upon with an interactive gaming experience at the simple push of a button.

In partnership with Supermicro and Radian Arc, Blacknut recently announced the launch of a cross-media entertainment offering bringing together a cloud Gaming-as-a-Service solution, bundled and fully managed game licensing, in-depth content metadata, and a global hybrid cloud solution, all within a comprehensive package:

- Turnkey cloud gaming service (integrable as an App or through an SDK);
- A catalog of 600+ premium games from major publishers and studios working with movie IPs;

As a global leader in high performance, high efficiency data center technology and innovation, we develop and provide end-to-end green computing solutions to the data center, cloud computing, enterprise IT, big data, HPC, and embedded markets. Our Building Block Solutions® approach allows us to provide a broad range of SKUs, and enables us to build and deliver application-optimized solutions based upon your requirements.

- Expansive Metadata and APIs to quickly cross-integrate with existing media catalogs;
- Hybrid cloud infrastructure with more than 23 local Points Of Presence (POP) across all five continents;

This turnkey solution allows media companies to easily integrate cloud gaming within over-the-top (OTT) and subscription video-on-demand (SVOD) platforms to deliver new cross-media experiences to their subscribers.

Cloud Gaming-as-a-Service and Cross-Media Integration

The impact of technology on cross-media content

Cross-media entertainment is not a recent phenomenon; for the past 150 years, technologies like the phonograph, radio broadcasting, cinema, televisions, and personal computers have contributed to the development and extension of original content from one medium to another.

Thanks to the democratization of video gaming and the increased sharing of original IPs across industries, playing video gaming is no longer perceived as a marginal form of entertainment, or reserved for a small sub-group of tech fans. In fact, with many gaming IPs having grown to become a ubiquitous part of pop culture, and the creative IPs from video games now seen in the same vein as original novels or movies, the boundaries between target user groups have all been removed.

Similar to how past technology breakthroughs shaped the way we collectively interact with content today, cloud gaming is the technological revolution within the cross-media entertainment landscape which will open up gaming content to all existing media platforms.

Cross-Media Cloud-Gaming Solution

1. **Benefits of adding cloud gaming to existing media platforms**

Interactive entertainment and Game streaming, in particular, have been identified as "the next big thing" in revenue growth, Newzoo forecasted that over 30 million paying users spent a combined $2.4 billion on cloud gaming services in 2022,[1] with expected revenues to grow to $8.2 billion by 2025.

SVOD (Subscription Video On Demand) platforms are investing in movies and TV shows based on gaming IPs in a bid to attract and retain new gaming centric users and, in some cases, even directly publishing games based on popular internal IPs.

Gen Z consumers spend an average of just over 12 hours per week on video games[2], surpassing TV by approximately half an hour. The only media platform that accounts for higher hours per week is social media. The difference between Gen Z and other consumers in terms of time spent with video games and virtual worlds is not so stark, suggesting that every generation is leaning toward the more immersive platform, especially as more types of entertainment are getting folded in.

---

[1] https://newzoo.com/resources/blog/the-games-market-in-2022-the-year-in-numbers

[2] https://newzoo.com/resources/blog/how-much-time-do-consumers-spend-on-media-platforms

Catering to gaming and IPs fans, old and new, is a proven strategy to increase time and attention from subscribers and help in justifying ever increasing costs and subscription fees.

For content distributors, like ISPs, device manufacturers, OTT services, and Media companies, Cloud Gaming is an opportunity to provide their subscribers with interactive features and access to a whole new media catalog previously locked away behind a hardware wall. By providing additional content verticals to a single content platform, users' fidelity and time spent within the platform will be increased.

For the Gaming Industry and game publishers, this is an opportunity to have a whole new population of gamers discover, or re-discover, games based around an IP or universe they might not have known existed or were unable to previously access because of the prerequisite hardware needed to run them.

2.   **Driving usage and user engagement with cross media experience.**

The expansive metadata dataset available through the Blacknut API enables the close integration of game IPs and universes with existing media ecosystems and recommendations algorithms.

Linking video games with media leverages the continuous growth in casual gamers with the universe or content they might be fond of.

For content distributors, like ISPs, device manufacturers, OTT services, and Media companies, an all-in-one media ecosystem encourages the cross-pollination of users between cloud gaming and traditional media catalogs of relevant shows and movies. Users can switch between forms of entertainment seamlessly without leaving their platform of choice.

As cross-media works both ways, video and gaming content can be advertised to subscribers, surfacing content they might be unaware of and incentivizing them to remain within the ecosystem.
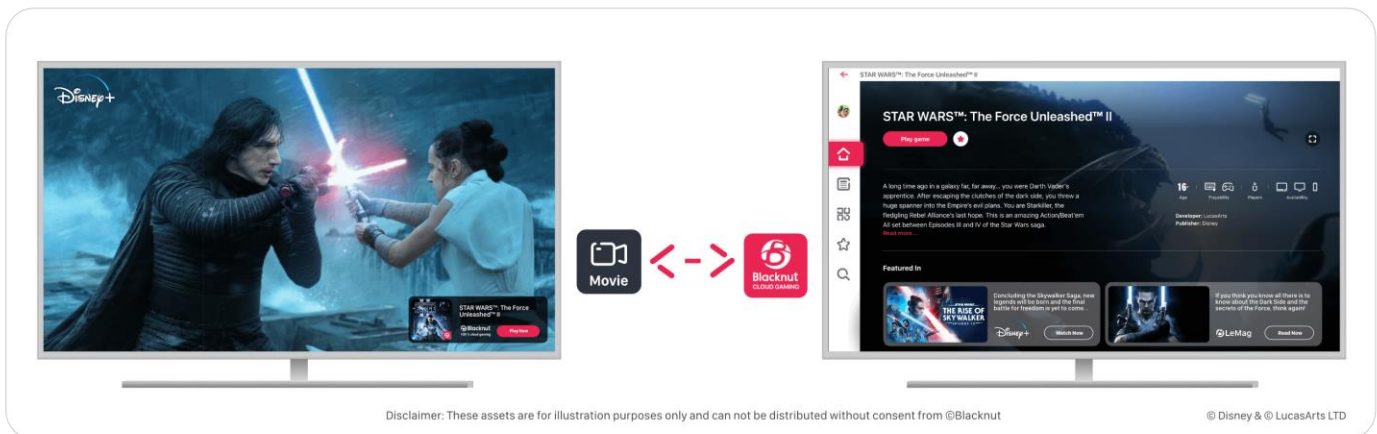

Figure 1: Illustration of cross-media integration and content suggestion between movies and video-games interface

Case Study: "Cliq – best of alles"

Cliq is the new flagship streaming service from CLIQ Digital for the German market.

About CLIQ Digital

Founded in 2005, CLIQ Digital specializes in online advertising and streaming services that are advertised towards specific consumer groups. Starting with the licensing and selling of single-category content services, CLIQ released its first all-in-one streaming service in 2019 and its flagship direct-to-consumer streaming service, with movies and series, music, audiobooks, sports, and cloud gaming in 2022. The company is headquartered in Germany and currently has around 1.8 million paid memberships on numerous streaming services across 30+ countries.

Product Vision

The ever increasing demand of the last few years has shown that streaming content is here to stay, but a scattered market quickly resulted in a streaming service overload, leaving consumers feeling overwhelmed by the ever-increasing number of content-specific platforms and rising costs.

CLIQ Digital believes that streaming content should be accessible to everyone and that simplicity means one service, one price and one login that goes beyond one content category and profiles. To offer an all-in-one cross-media service containing movies and series, music, audiobooks, sports, and games, CLIQ Digital chose Blacknut's turnkey solution to handle the cloud gaming portion.
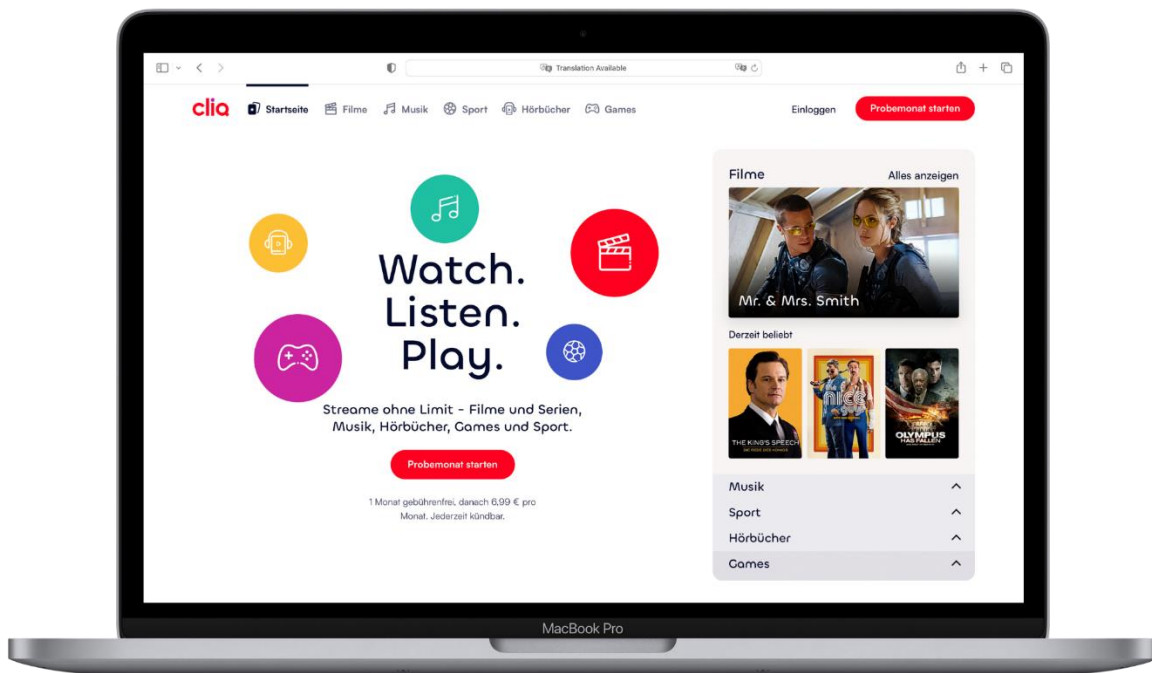

Figure 2: Cliq's best of alles offer

Technical Implementation

Using Blacknut's APIs, CLIQ Digital incorporates videogames metadata into its CLIQ Tech Hub™, where they store, bundle, and curate digital content. Proprietary data-driven marketing and business knowledge are then combined inside the digital content warehouse, which will ultimately drive the streaming service end-user experience through the Radian Arc GPU Edge IaaS platform powered by Supermicro GPU Edge Infrastructure solution.
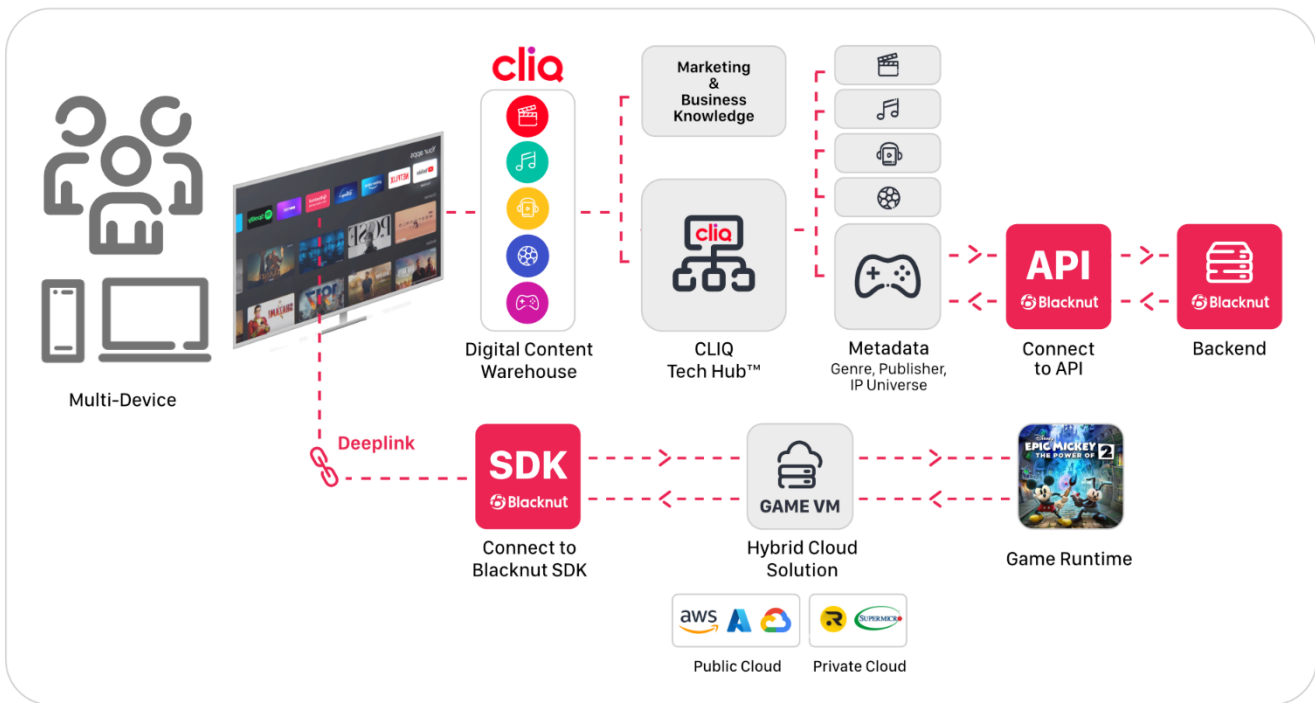

Figure 3: Implementation of Blacknut cloud Gaming-as-a-Service within Cliq – best of alles (Image Courtesy Blacknut)

The Cliq Streaming Service allows users to play on a large variety of devices, including Android Mobile and TV, Webapp for iOS, Windows, and MacOS computers, Web Browsers (Chrome, Safari, Firefox), FireOS, and Samsung Tizen.
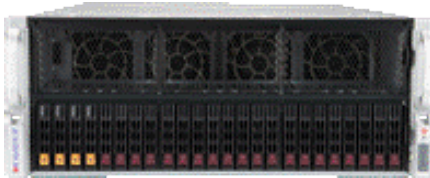
Project Key facts

At the end of 2022, CLIQ Digital launched its mass-market all-in-one streaming service for the German market: Cliq. The service offers unlimited access and bundles five different types of streaming content: movies and series, music, sports, audiobooks, and more than 600+ Console quality grade games. The subscription fee for the service is €6.99 per month with a free trial period of 30 days.

The work done in conjunction with Cliq's technical team positions Radian Arc IaaS and Blacknut GaaS platforms for cross-media integration immediately.

Radian Arc GPU Edge Infrastructure Solution Overview (powered by Supermicro)

SUPERMICRO BASED PURPOSE-BUILT, FLEXIBLE AND MASSIVELY-SCALABLE GPU EDGE INFRASTRUCTURE SOLUTION

Compelling 5G applications

No CAPEX investment to have the latest GPU technology and Supermicro servers

Marketing solutions to drive revenue from the 5G applications

AS-4124GS-TNR

Flexible GPU Server with directly attached 6-8 GPUs with dual-root balance architecture, and titanium-grade efficient redundant power supplies, supports double AMD EPYC™ 7003/7002 Series Processors, and 8TB Registered ECC DDR4 3200MHz SDRAM in 32 DIMMs

AS-1114CS-TNR

Cloud optimized and scalable Management Server with flexible advanced I/O and storage configuration, supports single AMD EPYC™ 7002/7003 Series Processor, and 16 DIMMs; up to 4TB 3DS ECC DDR4-3200MHz RDIMM/LRDIMM

SSE-x3548S

Industry leading feature-rich and cost optimized ToR Switch, 48x 10Gbps Ethernet ports, 6x 100Gbps Ethernet ports, Switching Capacity: 2.1 Tb

- Radian Arc is a provider of cloud gaming technology through proprietary GPU Edge infrastructure deployed to telecommunications, cable networks, and game publishers.

- Radian Arc offers an out-of-the-box white-label solution for telco and cable companies who want to offer cloud gaming services to their customers.

- Radian Arc can deliver cloud gaming in any region of the world when integrating their GPU Edge cloud gaming technology with your network.

- Radian Arc technology stack provides additional monetization and utilization of 5G and cable networks from an active and lucrative audience: gamers.

- Subscription-based cloud gaming services, powered by Radian Arc, can increase retention and revenue of your existing network.

- Radian Arc's new container based solution offers massive scalability and support for metaverse applications.

- Radian Arc sees cloud gaming as the tip of the spear, leading to more monetization opportunities with applications beyond gaming: AI, IoT, smart home, smart city, and more.

GPU EDGE BOM

BOM Item	Qty (Minimum)	Weight (KG per unit)	Height (MM per unit)	Width (MM per unit)	Depth (MM per unit)	Power* (KW max total)	RU (per unit)
Juniper SRX380 Router	1	12.3	150	630	500	0.31	1
Supermicro SSE-X3548S Switch	1	8.9	44	445	510	0.41	1
Supermicro AS -1114CS-TNR Mgmt Server	1	20.9	43	437	597	0.86	1
Supermicro AS-4124GS-TNR GPU Server AMD Radeon Pro V620	2	45.3	178	437	737	4.0	4
Install Kit	1	N/A					
Total		80.4				5.58	7

Cabling and install kits not listed (these are subject to deployment plan). Expansion space has been pre-allocated to enable a full rack to be deployed All items are AC power. Additional storage can be provided (as needed) using the 4x unused drive slots in the Supermicro server

April 2023

Why Supermicro

Supermicro offers the industry's broadest portfolio of cloud-optimized game servers to support the highest density of gaming CCU's (concurrent users), high I/O throughput, and open management. To manage mission-critical game servers in the cloud, the Supermicro CloudDC product line offers the industry's broadest portfolio of servers optimized for ultimate scalability and flexibility with advanced I/O features, innovative tool-less designs, and open architecture. Supermicro's cost optimized and feature rich line of ToR networking switches stitches everything together effortlessly at the GPU Edge.

Supermicro products are assembled and tested at production facilities in the USA. For EMEA and APAC companies, Supermicro builds products at production facilities in the Netherlands and Taiwan. Now, media and entertainment companies worldwide can depend on Total IT-Solution from Supermicro to accelerate their unique workloads and services.

"Supermicro's scalable servers offer the highest density of gaming CCUs, providing Radian Arc with the ideal platform to power our GPU edge technology solutions and deliver unparalleled gaming experiences to our customers," David Cook, CEO, of Radian Arc.

"We are thrilled to finally announce the general release of our GaaS cross-media solution, which was the fruit of more than two years of behind-the-scenes labour with our clients, content, and infrastructure partners." Said Olivier Avaro, CEO, Blacknut. "This is an important milestone for the company, not only for being live with CLIQ Digital, a major media industry player, but also because our partnership with Radian Arc and Supermicro enables us to immediately address a global market, with the ability to scale massively in line with our business requirements."

Conclusion

Blacknut's cloud Gaming-as-a-Service platform combined with Radian Arc's GPU Edge Infrastructure-as-a-Service platform powered by Supermicro GPU Edge Infrastructure solution offers a flexible turnkey solution to add gaming content easily and quickly to existing platforms. The solution enables common target groups to interact with all the available content they might be interested in without the need to leave the platform or subscribe to third party services.

Cloud Gaming Service: Service providers can launch cloud gaming services or activate gaming content with Blacknut and Radian Arc.

Games: In addition to a licensed catalog of 600+ AAA to Indie games, Blacknut also provides the following white glove services:

- Onboard games wish lists and help negotiate exclusive agreements with publishers
- Support "Bring Your Own Game" (BYOG) and Freemium Game models
- Assist in developing IP-licensed games in partnership with specialized studios like Gameloft, Outright, and others
- Specialized internal Marketing Agency team to support go-to-market plan and manage subscribers' engagement, as well as a complete assets library and editorialized content.

Infrastructure: Radian Arc's proprietary infrastructure is scalable and cost-efficient with the following:

- Integrated with Blacknut's Public and Private – Hybrid - Cloud Environment.
- Supermicro purpose-built, flexible, and massively scalable GPU Edge Infrastructure Solution
- Optimized with Netint high-density container-based solution
- Support for Windows, Linux, and Android games
- Optimized to support 5G slicing with Ericsson and Quality on Demand (QoD) APIs

The platform is live in 45 countries, with distribution partnerships signed with OTT providers such as CLIQ Digital, and carriers such as STC (Saudi Telecommunication Company) Group, Bridge Alliance, CKH Group, or M1. It is also pre-embedded in set-top boxes and TV ecosystems such as the Samsung Gaming Hub, the LG Gaming Shelf, and Amazon FireTV.

References

To learn more about Supermicro GPU Edge Infrastructure options, please visit:

- GPU Accelerated Servers for AI, ML, and HPC | Supermicro
- 4124GS-TNR | 4U | A+ Servers | Products | Super Micro Computer, Inc.
- CloudDC | Supermicro
- 1114CS-TNR | 1U | A+ Servers | Products | Super Micro Computer, Inc.
- Networking Products for Enterprise, Data Centers, HPC|Supermicro
- SSE-X3548S | Supermicro Layer 3 Ethernet Networking Switch

To learn more about Blacknut and Radian Arc's cloud gaming solution, visit www.blacknut.com and www.radianarc.io.

April 2023