# TENNIS IS NOW ON THE CLOUD AND POWERED BY APPLIED AI

### And This Is How Roland-Garros Did It

The 2021 Parisian Grand Slam, officially known as Roland-Garros after the French aviator, has enabled fans, players, coaches, broadcasters, journalists, and organizers of the tournament to experience the game with a new set of immersive and intelligent tools.

In partnership with the French Tennis Federation and Infosys, the duo leveraged applied artificial intelligence, 3D, and Infosys Cobalt cloud solutions for enhancing match viewing, tournament reporting, broadcast editing, and player training experiences.



*Source: ROLAND-GARROS*

## A DIGITAL STANDARD FOR SPORTING TOURNAMENTS?

The Roland-Garros Players Application for players and coaches offers AI-powered match analysis with cognitive capabilities such as natural language search. Players can analyze performance by querying the AI tool in English, which returns insights to better-informed training and match strategy decisions.

The tool can analyze the positive elements and areas of focus for a player in a selected match and generate instant summaries for players minutes after the game. The tool enables collaboration between the player and the coaching community located remotely, anywhere in the world, enhancing communication and analysis, ensuring better-informed training decisions and driving performance improvement.

As for fans, they can watch the game and analyze it at the same time. I believe Infosys Match Centre powers a compelling remote fan experience on the digital properties of the tournament bringing courtside to fans' homes in immersive ways. It brings fans closer to the action through engaging and interactive data visualizations around stats, rally length, strokes played and 3D CourtVision. Match insights, discovered through Infosys applied AI and generated using an NLG engine, provides fans a set summary of the key insights. AI-powered voice assistants bring global audiences close to the Roland-Garros through popular smart home devices, such as Amazon Alexa serving information to live radio broadcasts and event podcasts.

Journalists are included in the experience too. Those reporting on Roland-Garros matches hugely benefit from AI Assisted Journalism. The tool automates the extraction of elements from large data sets and develops intelligent narratives for inclusion in articles. Journalists authored over 900 editorials during the course of the tournament by accessing match analysis and auto generated infographics that could be easily embedded in media reports. Infosys' AI Highlights helped curate highlights automatically within minutes of the completion of a game. It applied AI to detect crowd noise, understand the match-context and statistical data to develop and deliver highlights across digital platforms. Broadcasters across the world featured different pieces of highlights using this tool and published it across various digital channels.

"Integrating an AI-first approach at Roland-Garros is a strategic decision for the tournament and it is already paying off. To be able to benefit from the expertise, passion and innovation brought by a partner like Infosys is clearly a huge advantage for the French Tennis Federation. From data processing to analysis to user interface, they have been mindful of our business priorities and of the priorities of our different groups

such as fans, players, broadcast partners. Thanks to the AI solutions from Infosys, we are able to continuously deliver new, relevant experiences to each group and we are confident each solution has been created to answer a business need and more importantly, to enhance the experience of and interaction with Roland-Garros." Michael Tonge, Director of Partnerships, Hospitality and Ticketing.

Interesting digital conveniences include innovations like Infosys' AI Shot of the Day – to dynamically resize videos to a specific aspect ratio using AI to produce ready-to-publish clips for various social platforms.

## DIGGING DEEPER INTO THE TOOLS AND TECHNIQUES THAT ARE REDEFINING THE WORLD OF TENNIS

Infosys developed six separate immersive products—five focused on fans, and one focused on players and coaches. There is MatchBeats to decode the quality of the play, helping fans follow the game through a point-by-point visualization. MatchBeats++, a special application offers a set-by-set view of the match.

CourtVision offers a bird's eye view of the court and shows where each point was won and lost. Slam Leaderboards rank the top 10 players based on points scored with shots that have a significant bearing on a match's outcome. Stats+ shows all the key statistics ranked according to their disproportionate influence on a match." Raghavan Subramanian, Associate Vice President, Infosys

Infosys Tennis Platform is available in two versions: Cloud Neutral and Serverless. The Cloud Neutral version is built using a wide range of open-source technologies, including Apache Spark, Kafka, Zookeeper, ELK, Kubernetes, Docker, Sunbird telemetry, OpenCV, PostgreSQL, Prometheus, Grafana etc. while the Serverless version leverages AWS-managed services like AWS Kinesis, AWS Lambda, Amazon Aurora, Amazon API Gateway, AWS CloudWatch etc.

For the 2021 edition of Roland-Garros, Infosys deployed the serverless version of the platform which includes a wide range of Amazon Web Services (AWS) utilities combined with proprietary Infosys applications. AWS Kinesis automatically provisions and elastically scales the Lambda functions needed to process the data from multiple sources, including scoring data, Hawkeye data which provides ball trajectory and player position. The processed data is stored in Amazon Aurora Serverless (PostgreSQL) and exposed as APIs through a combination of Amazon API Gateway and AWS Lambda.

The Tennis Platform also uses AWS Elemental MediaLive and AWS Elemental MediaConvert to encode and process live RTMP video streams from all the courts. The large-sized live video source is compressed into smaller versions and passed through a series of AI/ML models which powers features like AI Videos, AI Highlights, AI Shot of the day etc.

New age fans don't merely watch sports, they look for instant access to data and analytics to connect in real time with each game. Amazon Cloud Front, is used to speed up the distribution of static content, API responses, and videos. Cloud Front content delivery network (CDN) delivers content through a worldwide network of data centers called edge locations. When a user requests content, CloudFront routes the request to the edge location that provides the lowest latency ensuring the best possible performance.

All of the AI driven analysis is made accessible to end users through a rich interactive interface built using React.js, a javascript library. The virtual 3D art museum which that brings together over 40 years of iconic art posters for tennis fans to immerse themselves is powered by Babylon.js that enables the display of 3D graphics in the web browser via HTML5, hosted in Amazon S3 and accessed from Cloud Front CDN.

While the players deliver forehands and deft touches across 18 different courts, at any given time the Infosys Tennis Platform is in action match after match, using technologies such as AWS Cloud Watch and AWS X-Ray. These enable Roland-Garros to ensure uninterrupted digital service to players, coaches, journalists, broadcasters and to millions of fans across the world. These services provide data and actionable insights to monitor the application, respond to system-wide performance changes, optimize resource utilization, and get a unified view of operational health. CloudWatch is used to detect abnormal behavior, set alarms, visualize logs and metrics side by side, take automated actions, and troubleshoot issues.

## THE FUTURE OF SPORTS IS DECIDEDLY DIGITAL

The application of AI in sports has evolved to become more sophisticated in the last couple of years, significantly impacting how we consume sports content. From football to Formula 1, AI is being used to strategize, train, advertise and do so much more.

In many respects, it should come as no surprise that the sporting world is embracing AI. The industry has been using statistics and data analytics for many years, making it a fertile ground for the application of AI.

AI is helping coaches as well. In tennis, by understanding metrics such as spin, speed, placement, and the position of players, coaches can provide insight into improved decision-making. AI can deliver clips of every player's winning tactics or visual analysis to help coaches develop counter-strategies.

I believe AI will forever change sports journalism too. Automated journalism will produce summaries of the significant events of the day. Journalists can access match analysis, natural language generation (NLG)-based match synopsis, and integrations to allow easy embedding in media reports.

AI will increasingly be used to identify opportunities to present the most relevant ads according to the audience's demographics. Brands can improve advertising opportunities if fans can engage with these brands at exciting game moments, as determined by AI. With automated learning algorithms monitoring players' actions, spectators' emotions, and expressions to identify the game's most exciting moments – so much is possible!

Sports is about gaining a competitive edge over rivals, and AI can help players and coaches do exactly that. Improving algorithms will make AI more and more integral to this world of continuous contests. Beyond game strategies, that AI will affect advertisers, franchise owners, industry-watchers and fans, is a forgone conclusion. Follow me on Twitter or LinkedIn. Check out my website or some of my other work here.

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