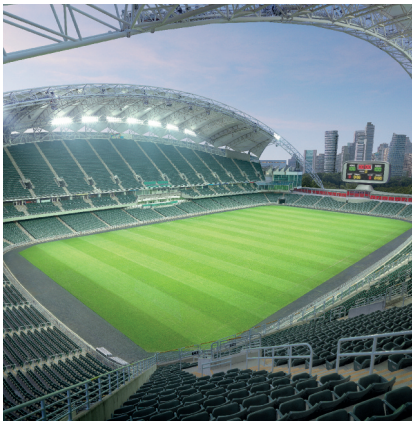
CASE STUDY
Intel® Xeon® Processor E3-1285 v3 Product Family
Big Data Analysis
Entertainment/Media

Scout7 Changing the Game

Football scouts and analysts take decision-making to the next level with big data, Scout7 and Intel® technology



"Football isn't just a game; it's big business. It's therefore increasingly looking towards big data analytics to facilitate decision-making. Our platform, powered by Intel® technology, is enabling clubs to meet their business, as well as their on-field, goals."

Lee Jamison, Managing Director, Scout7

Scout7 helps 138 clubs in 30 football leagues around the world organize and access data to allow them to do what they do best – focus on the football. In an environment increasingly reliant on video content and big data analytics, Scout7's platform uses Intel® technology to deliver the computing power and video transcoding speed that clubs need to mine and analyze more than 3 million minutes of footage per year, and holds 135,000 active player records.

Challenges

- **Decision-making pressure.** Football clubs need to make strategic decisions that can impact business performance as well as match success.
- **New data expectations.** Much data is available for objective decision-making thanks to the prevalence of video and the ability to easily access and search big data through the cloud.
- **Need for speed.** Clubs want to evaluate an opponent's performance as soon as possible after one match and before the next.

Solutions

- **Vast database.** Scout7's football database contains 135,000 active player records.
- **Video transcoding.** Using Intel® Quick Sync Video, Scout7 can transcode footage of each new match in 30 to 45 minutes, making it available to clubs for analysis just two hours after the final whistle.
- **Advanced graphics and analytics.** Scout7 offers advanced big data cloud analytics capabilities, with graphic capabilities powered by Intel® Xeon® processor E3-1285 v3 product family-based servers, and Intel® HD Graphics P4700 built into the chip.

Impact

- **Player performance.** Clubs and players can analyze past performance and how it relates to training schedules and match preparation. This insight can inform future decisions about who to put on the pitch.
- **Big events.** Clubs can manage the long-term evolution of their player roster by planning for future transfer windows and all recruitment activity 6-12 months in advance.
- **Future goals.** As data volume and computing power continue to grow, the platform has potential for use pitchside, in the commentator's box, and in other sports.

A game of the heart and the head

Despite the heartfelt passion and excitement that many feel when watching a football match, behind the scenes it's a numbers game. The elements that make up the perfect 90 minutes – the right players in their best positions, the strategy and tactics employed by the manager, the skills the coach focuses on in training – are all determined by careful and in-depth analysis of statistics. How often does the opponent's winger take on the full-back? Where is the other team most likely to have a weakness in today's lineup? Which players can make an immediate impact from the subs bench, and at which point? These, and a host of other decisions, are made based on insight gathered from previous team and player performance. In a business as big as football, it's essential that these decisions make sense.

Traditionally, even right up to the end of the twentieth century, the insight behind these decisions was gathered by teams of scouts. Come rain or shine, they would attend and monitor hundreds of matches, writing up and posting their reports to the chief scout, who would file them carefully away in the office filing cabinet. Stats would then be obtained from hard sources such as match day programs and annual yearbooks, which were only updated once at the end of each season and only included basic information such as appearances and goals. It wasn't the most efficient or thorough process.

> "Technology has made a difference in the way football is played and managed. The huge volume of video footage and other data available now means clubs have the tools to make more informed decisions than ever before."
>
> *Bradford Griffiths, Operations Director, Scout7*

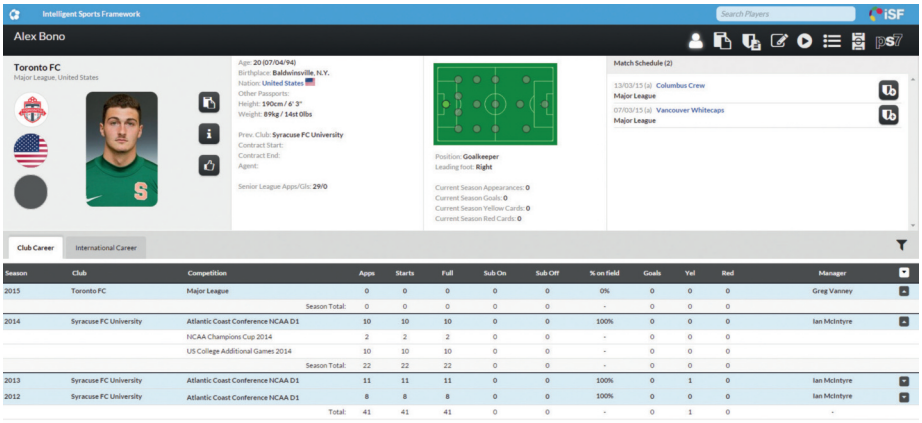
In the early 2000s, Scout7 began to change things with an online ColdFusion* database architecture into which users entered worldwide match lineup information that would then automatically update player and match statistics. Scout7's team of researchers, based all over the world, managed and maintained the input of match, player and transfer information on a daily basis. Within months, a massive live online football database was born. Scout7 used this to populate data into individually tailored private applications for clubs to manage their scouting data from anywhere in the world.

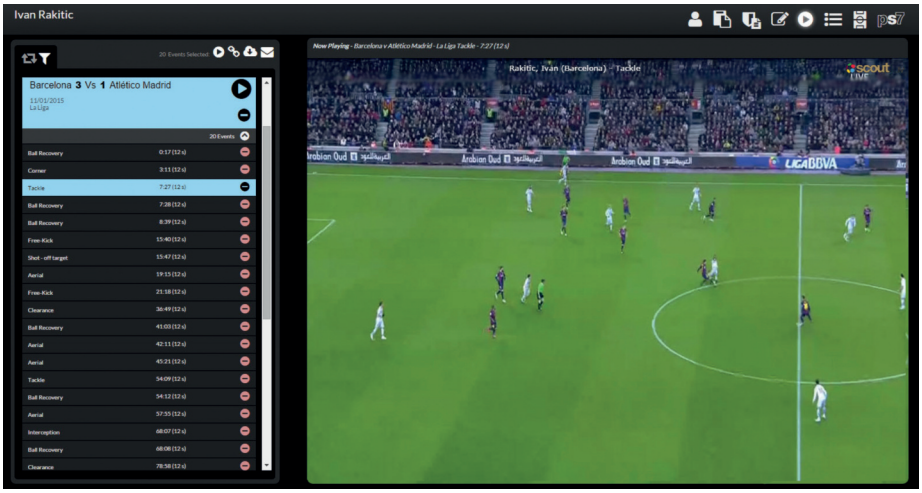
Today, football is big business. And as a business, it's becoming more and more reliant on data. For starters, there is biographical data – where a player has previously played, who he has played under and when, goals, and total minutes played. Then there is match data including all shots, passes, headers, tackles, take-ons, goals, and assists.

From scouting, recruitment and player development through to strategy and squad selection, hard data is supplementing scouts' subjective experience to give clubs the best chance of making the right decisions, both on and off the field. A lot of this data increasingly comes in unstructured formats, especially video.

With access to more sophisticated cloud storage solutions and video-sharing facilities, clubs now have as many as 100 new games available on video every day. They're no longer reliant on what they saw on TV or in the favorable footage a player's agent chooses to share with them. There's footage now of every shot, from every angle. As a result, it's not uncommon for clubs to utilize scouts as they would any other employee, getting them to evaluate players and teams from nine to five at a desk, to supplement the live games they watch in the stadium.

"Our customers are embracing this transition to data-driven business decision-making, breaking away from blind faith in the hunches of individuals and pulling insights from the raft of new information sources, including video, to extract value and insights from big data," explains Lee Jamison, managing director and founder, Scout7. "They are increasingly employing specialists in data analytics to inform scouting, recruitment, training, and player development activities. And as the volume and complexity of the data grows, they need increasingly sophisticated solutions. As a result, we've been doing a lot of work incorporating capabilities around video transcoding and data analytics into our offering."





The detail behind the drama

Following the explosion in video content, Scout7 now processes more than 3 million minutes of footage each year. Besides being full of moments of tension, elation and heartbreak, this footage holds thousands of little details that get clubs' scouts and analysts very excited – up to 2,000 individual actions (such as passes, goals, and corner kicks) per match, which are supplied by industry-leading event-data specialists. Scout7 uses Intel Xeon processor E3-1285 v3 product family-based servers and Intel Quick Sync Video to transcode the new footage, enabling it to process match recordings in 30 to 45 minutes and create a framework within which to mine insights from clubs' growing datasets. Within two hours, it can have the video ready for analysis by integrating match event data provided by the third party event-data specialists.

Scouts and analysts at a club can then access the platform through the cloud to analyze this data and extract the specific information they need. Footage can be stored as full games or made into playlists that have been edited by analysts in-house. This enables scouts to review a player's key match events which can be filtered using an exhaustive list of key criteria such as completed passes or assists. By running data analytics supported by powerful graphic capabilities delivered by the Intel Xeon processor E3-1285 v3 product family with built-in Intel® HD Graphics 4700, Scout7 provides a fast, sophisticated system that clubs can use to enhance its scouting and analysis operations.

The importance of being able to access this content as quickly as possible in a time-critical environment is highlighted by those instances when teams have to play back-to-back games

during the season and as a consequence, only have a short period of time to analyse new footage of their upcoming opponents. For example in the English Football League Championship, the average team has to play one-quarter of all its league games during midweek, just 72 hours after a game on a Saturday.

One Championship club currently using Scout7's technology to support its match preparation is Norwich City. The club's head of performance analysis, Donald Barron, explains how the club is using the company's latest platform, the Intelligent Sports Framework* (ISF*), alongside VideoHub*, an advanced video analysis solution developed jointly by Scout7 and OptaPro, to help ensure the club is fully prepared for every first-team game it plays throughout the season. "At Norwich City we have a number of scouts and two match analysts, who work on providing information to the manager and coaching staff on the opposition," explains Barron. "One of our analysts is always able to work a game in advance, so their preparation starts around two weeks prior to a game. This is the case when we have one game per week, but during the more hectic periods their preparation will start a week before the fixture. We will also have scouts watching the opposition live in the stadium a number of times before we play them, so their work will begin a number of weeks before we play each team."

The turnaround time for scouting reports and collating them into an overall assessment of the opposition, with video footage and data, is vital when Norwich City plays on a Saturday and then again on a Tuesday night. Managers and coaches need to have a detailed assessment of the most recent match as soon as possible. This means completing the scouting report and accessing footage of the match within a few hours of the game finishing to ensure staff have all the relevant information they need and can watch the game back for themselves the same night or the next morning.

"The Scout7 system has a number of major advantages that help support our requirements," says Barron. "We can create standard report templates for our scouts, so that the manager and coaching staff consistently receive the specific information they need each week. We can also securely store all of our reports online and access them easily through individual log-in details with varying levels of access. We have access to HD footage of all of our opponents within a couple of hours of their matches finishing, so that all users can access online or download to view offline."

He continues: "VideoHub allows us to identify very specific trends in a team's play by carrying out bespoke searches across a vast number of matches on the database. This tool has had a major impact on the quality of our work and the productivity of the department, as we can identify very specific details on a team's pattern of play within seconds. Previously, it would have taken a number of hours or even days to get the same level of detail during our preparation."

As well as preparing for midweek matches, professional clubs in England have to plan for other busy periods during the year, notably over Christmas and Easter. During these periods, the Scout7 technology has an important supporting role to play in ensuring a club's preparations are not compromised, a point stressed by Barron. "During the Christmas period, we can play three games in five days, with only 48 hours between matches and we also play two matches within 48 hours at Easter. This puts huge pressure on everyone involved. Our scouts and match analysts all want to maintain the high standard of work they provide every week, so the Scout7 system and all of its tools provide valuable support in making this possible, even in the most intense periods of the season."

Tracking player performance

So how exactly can a club translate all this data into value? One example is by applying predictive analytics. This is an established concept in corporate decision-making, where the anticipation of future trends is a lucrative practice. The same principles are now being explored in sport to maximize teams' chances of winning championships.

"We have already seen some early applications of predictive analytics in football," says Jamison. "For example, instances of player injury can be analyzed in conjunction with data about training regimes and game frequency to determine the likelihood of future injury. Individual clubs can also collect data about each player's coaching, fitness and exercise history over his career with the club to create an audit trail that can help establish a correlation between performance in training and on match day." This insight can then be used to develop optimal training and nutrition programs to manage the risk to fitness, especially if players are under additional strain when club and national competitions coincide.

Now, as technological innovation advances, the wealth of career-spanning player data is increasing—and with it, clubs' ability to improve future scouting processes. By building up a bank of data covering player milestones all through their journeys from youth leagues to the first squad, patterns can be established and used as benchmarks against future stars' development.

For example, FC Barcelona's Ivan Rakitic first appeared in the Scout7 database as long ago as 2003, when he made his debut for the Switzerland national under-16 team. His progress through the Swiss national youth ranks is chartered, before he switched allegiance to Croatia. His first senior club appearance is recorded, made in 2005 for FC Basel 1893 as a 17-year-old, as well as his first full 90 minutes, first senior goal and subsequently his first major career migration in 2007, when he was transferred to FC Schalke 04 in Germany.

Preparing for transfers

Now in its fourth season as an English Premier League club, Welsh team Swansea City has successfully established itself as an efficient operator in the player transfer market, both domestically and internationally. It has built a scouting operation that includes the head of technical player scouting and the European head scout, who work closely with the club's head of recruitment, David Leadbeater and chairman, Huw Jenkins. The scouting department has been responsible for recruiting players from several countries including Spain, France, the Netherlands, Mexico and Italy, as well as players recruited domestically from other Premier League and Football League clubs.

The club also employs 10 scouts who monitor all senior football in the UK, four scouts operating regionally in Europe and two office-based technical scouts, who analyze player targets using a combination of video and detailed statistics to compliment the traditional methodologies adopted by the scouts who attend games.

Fast Facts

- 104,000 full game video recordings are currently stored in the Scout7 database, with around 3,000 new matches added each month.
- 277,427 player records have been created since 2001, with an estimated 135,000 of these players currently playing in elite professional football.
- Between 1,600 and 2,000 individual actions (e.g., shots on target, completed passes, tackles, goals) are captured from every game, supplied by third parties.
- 138 clubs around the world use Scout7 technologies to assist with the management of their scouting operation.

For around 10 years the club has used Scout7 technology to assist with the management of its private recruitment data. Like Norwich City, it now uses the Intelligent Sports Framework (ISF) and VideoHub. Head of technical player scouting Tim Henderson explains how this technology has assisted the club's long-term planning as it prepares for each transfer window: "Planning is always ongoing," he says. "A lot of it is based on the contractual situation of the players at the club and how long each player has remaining on their contract, and obviously always being mindful of looking to improve the team throughout. But I would say that on average you are always looking at least six months ahead. The Scout7 systems we have are critical and it would not be an exaggeration to say that we all live by them every day, accessing them from first thing in the morning to last thing at night.

"All scouts use the system for submitting their reports," Henderson said. "Between them, they will get out to at least 30 different games a week and compile assessments on players being monitored."

According to Henderson, the technology has played a significant role in changing how all clubs monitor and identify prospects in each key recruitment market segment. It enables them to be more proactive in defining which players meet their specific requirements and who can then be monitored on a weekly basis in the build-up to transfer windows.

"In days gone by, an agent would have sent you a DVD of all of his player's best clips, making him look a world-beater," says Henderson. "But now, as we have access to all this footage and the tools for analysis, we have the means to make a rounded evaluation of a player. The data we receive from Scout7 and OptaPro helps us set up and define an effective filtering process. Depending on the positions we are looking at and the criteria we have set, we can look at all the different stats and footage to build a full picture of a player.

"We may have 10 criteria that we are looking at and if a player ticks most boxes we can, if it's appropriate, take our analysis to the next stage by sending our European head scout or one of our senior scouts out to look at the player and compile an eyeball assessment in the stadium.

"We will continue monitoring their performance week-to-week, both on video and through our scouts, and if the reports we get back continue to be positive, I will arrange to watch the player live myself alongside our head of recruitment.

Football clubs make critical strategic decisions about players, matches, and transfers using Intel® technology

Then, if everyone is in agreement that we want to recommend a player, I will prepare a full PowerPoint* presentation, incorporating all the research and data we have compiled, to present to the manager, chairman and the board."

Intelligent recruitment

In North America, Toronto FC is about to embark on its ninth season in Major League Soccer (MLS) and, as one of three Canadian franchises in the league, it has strict rules to adhere to when assembling its player roster. At the start of the year, the franchise had the opportunity to pick five players in the first two rounds of the annual MLS Superdraft. To assist the club ahead of the draft, it used an advanced search tool within Scout7's Intelligent Sports Framework to statistically analyze nearly 5,000 players involved in domestic college soccer during the preceding year, to narrow down a list of feasible targets that warranted further attention.

Besides domestic soccer, it also used other areas of the platform to assist with the execution of its plans across other recruitment strands, as Jack Dodd, director of scouting operations explains: "As is the case with clubs in Europe, we don't have the freedom to recruit players who are contracted to other clubs anytime we like. We can only recruit during two trade windows scheduled every year. We are also only allowed 30 players on our roster, with strict salary rules and a set number of places for international players, so our recruitment operations need to be run intelligently in tandem with our player budget and squad management."

Dodd and his team uses the Scout7 platform to archive any reports created about a given player and incorporate them into the club's specific assessment criteria. The team can also interrogate this archive of reports in order to find out how many players that it has watched have been given a specific ranting or rank, based on a specific attribute in a report. Scouts can retrieve a definitive list within seconds using the system's search engine.

"We also archive any other relevant documentation on a player, whether that be news articles or other information, and save it to their record. Over time, this enables us to compile huge dossiers of intelligence to support our decision-making," says Dodd.

As is the case at Swansea, the Toronto system also enables the club's recruitment staff to present their work to the board, highlighting the processes being followed and the reasons for identifying players deemed appropriate to the club's needs. "Our department manages our own player shortlists on the ISF for each different recruitment strand, which can be accessed by all our scouts, coaches and football operations staff," explains Dodd. "In terms of corporate governance, this is really valuable, as all the stakeholders in recruitment decisions can log into the platform and establish which players we are giving serious consideration to."

The records are maintained on a daily basis, so if the scouts and managers need to discuss anything they can arrange meetings, either in person or remotely, with the platform open to go through all the information available on the players. This ensures that all decisions and steps taken are sanity-checked internally at every stage of the player identification process, which helps the club make sound decisions with regards to the players it chooses to approach.

Goals for the future

"As the volume of data at a club's fingertips and computing power continue to grow, the role this information plays in a club's workflows and practices is also growing," Bradford Griffiths, Scout7 operations director, explains. "We expect to see increasing demand for real-time match data to assist in in-game decisions, as well as more advanced analysis to support player-based decisions such as training and transfers.

There is great potential outside of football too. The database, video, and analytic infrastructure that Scout7 has developed can be applied to other sports – team or individual – to support recruitment, training, strategic and tactical decisions. With new technological innovations, Scout7 expects to see an array of immersive and visual analysis environments develop, with the ability to control certain information or parameters. "Compared to today's largely observer-based models, we expect that improved processing power and analysis models will facilitate the analysis of unstructured or previously uncorrelated data in the same environment, identifying new trends and patterns that can be used to leverage more value from the data." says Griffiths.

Advances in video technology and data insights will go hand in hand. Scout7 anticipates a time when vast amounts of data can be automatically extracted from video, and correlated with a scout's subjective information of the same events. These can be combined to form a more holistic dataset for interrogation in an immersive environment. Speaking of video, "We've also been working with a major UK broadcaster, whose football commentators use our platform for pre-match research," Griffiths continues. "When you hear them talking about a player's stats, team shape or potential strategies being used, they've probably gleaned that information from Scout7. One thing that we may see in the future is that Scout7's platform becomes a tool for match analysis on TV as well."

Griffiths concludes: "There is huge potential for extracting more value from existing match data. We will start to see more predictive and probability analysis - how alternative team and player strategies could potentially influence the outcome of a match. There are many variables on the pitch so it will never be an exact science, but as the data grows and new trends materialize, we can certainly use the data better, we just need to ensure we are asking the right questions."

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