



# Prime Time: The NFL optimizes its playing schedule

success story: optimization



<b>Client</b>	The National Football League (NFL)
<b>Challenge</b>	Develop a game schedule that maximizes television ratings and accommodates the teams and their fans.
<b>Solution</b>	Fair Isaac's Xpress-MP optimization software
<b>Results</b>	The NFL can address stadium availability issues, minimize the competitive impact of travel, and deliver television schedules that allow the most fans to watch the biggest games.



*"We can solve problems now that we couldn't dream of solving five years ago. The NFL continues to ask for more and more complicated models, and with Fair Isaac optimization, we are able to deliver."*

— Rick Stone,  
President of Optimal  
Planning Solutions

## » CHALLENGE

A delicate balancing act takes place behind the scenes of every American football game broadcast at prime time. The NFL's 32 teams play 16 games over 17 weeks at different stadiums across the country. And for every game that's played, television exposure is the key to business success.

Countless factors must be taken into account to arrive at an optimal playing schedule: stadium availability, travel time, days between games, television placement and more. The challenge: How to balance the needs of network partners, the teams and their fans so that the competition is fair and the league turns a healthy profit?

"It's a mathematical problem that could run for a thousand years," says Rick Stone, President of Optimal Planning Solutions, a consultancy that helps professional sports leagues create playing schedules. "Only the most powerful optimization tool can generate a quality playing schedule for a sports league like the NFL."

A decade ago, the NFL began to replace its manual scheduling process with one that relies on computer software to determine the best combination of games for the season. Because of the time-intensive process, however, it created no more than a dozen schedules each year before selecting the official one. In 2004, the league wanted to improve its scheduling

process by creating and evaluating as many scenarios as possible, and now routinely completes and analyzes thousands of candidates before finalizing the schedule.

Speed and accuracy were deciding factors in the search for an optimization tool. In order to find the best schedule for the season's 256 games, the tool would have to consider 7,000 game options, while accounting for some 20,000 variables and 50,000 constraints. Above all, the schedule needed to maximize the value to the NFL's television partners while being fair to its teams and their fans.

"The NFL scheduling model involves countless constraints that must be satisfied to ensure that each team is being treated fairly, including the number of consecutive home or road games, travel schedules and the number of days off between games," says Stone.

A number of internationally known technology companies bid on the opportunity to help the NFL solve its scheduling challenge, but few were able to deliver a workable solution due to the complexity of the problem. Optimal Planning Solutions selected Fair Isaac from among leading providers of optimization software in part because of superior service and software performance.

"Scheduling the NFL season is an extremely difficult task and we need the most powerful optimization software that's available," says Stone. "Xpress-MP outperforms other optimization tools, including CPLEX, for our sports-scheduling challenges."

## » SOLUTION

To meet the rigorous scheduling demands, the NFL and Optimal Planning Solutions turned to Fair Isaac's Xpress-MP optimizing software for a new level of analytic precision and power. The tool's ability to solve mixed-integer linear and quadratic programming problems at industry-leading speeds, combined with the company's track record for top-notch service, persuaded the NFL to make the switch.

The NFL takes advantage of parallel implementations for even faster results. Working across eight CPUs simultaneously, Xpress-MP can produce an NFL schedule in 24 hours, which allows the league to choose the best among thousands of possible schedules over the course of a two-month planning effort.

"Xpress-MP allows us to evaluate infinitely more scheduling options than were possible with a manual process," says Michael North, Director of Broadcast Planning and Scheduling for the NFL. "And this capability has improved the quality of our schedules significantly."

Fair Isaac's optimization software not only meets the NFL's scheduling needs today, but it also has proven that it can keep up with the increasing complexity each new football season brings, as the league adds new variables and constraints. The advent of Thursday games, for example, added a new set of requirements to the schedule, as have changing travel and game-spacing requirements.

## » RESULTS

A decade ago, it took half a dozen people sitting in a room 14 hours a day for three months to come up with a satisfactory schedule—the quality of which could only be evaluated after the football season had come to a close. Today, the same process can be accomplished in much less time, with an outcome that accounts for many more variables and constraints than ever before.

Fair Isaac's optimization also has enabled the NFL to improve the way it creates television packages. In the past, some television placements were determined only after the schedule was set, but with Fair Isaac's software the NFL is able to create the schedule and corresponding television packages at the same time.

Faster, more thorough and accurate schedules have translated into higher revenues for the NFL, as the league's television, sponsorship and licensing revenue has grown substantially in the last five years.

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