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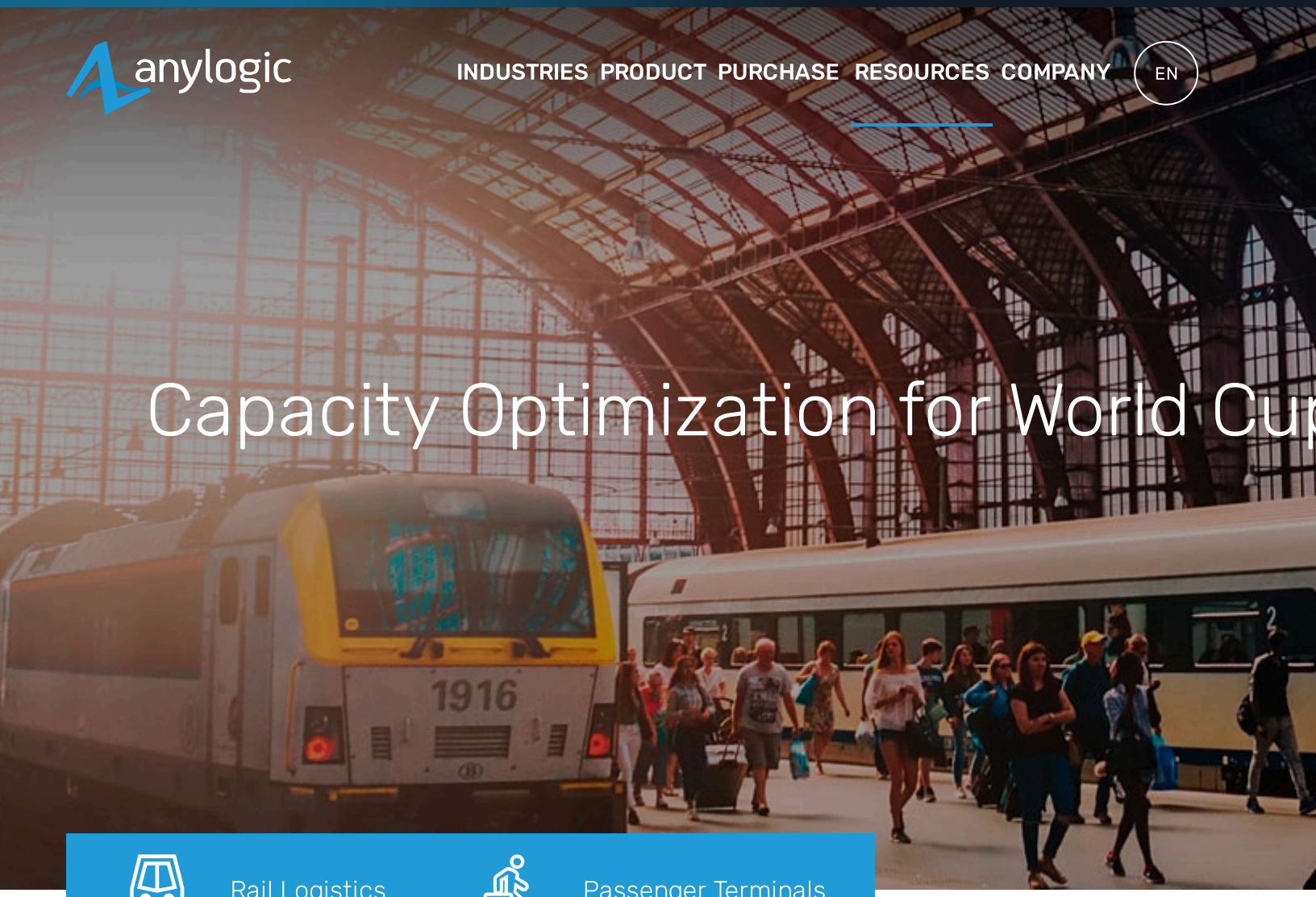


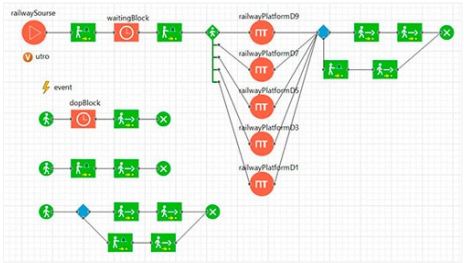
Capacity Optimization for World Cup

Rail Logistics

Passenger Terminals

Problem

The 2018 FIFA World Cup is in Russia, and in preparation for the event the extensive rail network of the enormous country had to prepare for increased traffic



Railway simulation software

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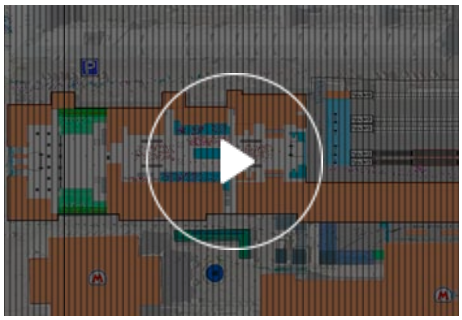
The project was contracted out to **IRTS**, a company specializing in the development of transport systems, and consisted of four tasks:

- Analyze the capacity of railway stations under normal and tournament conditions.
- Identify station bottlenecks during increased passenger traffic.
- Develop recommendations for optimizing passenger services at stations during the tournament.
- Optimize evacuation routes in railway station buildings.

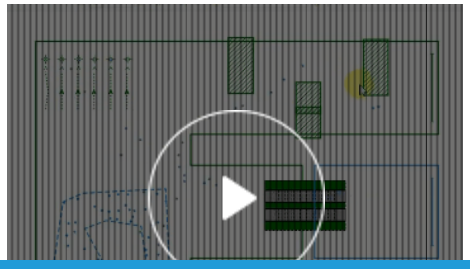


Railway simulation animation

Solution

To solve these problems, IRTS used AnyLogic simulation modeling. A decision that allowed them to develop a custom Station Modeling Library for modeling the stations and common station elements. This library reduces the time needed to create computer models of the network's assets by providing ready objects such as platforms, waiting areas, and services.

IRTS created models for stations in each host city and, in the first instance, simulated the normal operation of suburban



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and also the expected passenger numbers. With this data loaded, the bottlenecks at the stations were identified and, through testing, a set of measures was developed to enable the optimal operation of the facilities during special events.

Finally, with the detailed models and plans of operation, IRTS analyzed the evacuation plans for the station buildings. The pedestrian modeling considered different behavior characteristics, such as people with or without luggage, people in cafes, waiting rooms, and platforms, as well as varying congestion during the day. The peak load for the stations was taken as the base level for the evacuation scenarios and the time for evacuating the buildings was analyzed.

Part of the functionality of AnyLogic enabled stand-alone models to be created and downloaded. These are fully interactive, with a user interface, so the customer can conduct experiments without the need for AnyLogic itself.

Outcome

IRTS provided a successful solution that is both efficient and flexible. Operational planning for railway stations in use during the FIFA World Cup 2018 was completed by creating a system with a great number of variable parameters: timetable adjustments, train type changes, carriage numbers, passenger flows, and more. For special events to emergency planning, it is a system that will be used long after the FIFA World Cup has come to a close.

In the future, the station models will continue to be developed by the railway operator. The AnyLogic

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