Project Title: Business Intelligence for Gang Scheduling

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Abstract:
Railway tracks wear down and thus need to be constantly maintained. Groups of maintenance workers, called gangs, are responsible for such maintenance tasks. Throughout a year, a gang works for a few days in a particular track section and then reallocates to another section. Railways incur significant expenses related to gangs. They range from the direct costs such as salary and travel allowance to indirect costs consisting primarily of the impact to operational-disruptions. It is thus of vital importance to railways to schedule the gangs as efficiently as possible.

In conjunction with the Norfolk Southern Corporation (herein called NS), we have started developing a gang scheduling information system based on business intelligence and state-of-the-art analytics. At the core of the system there will be a sophisticated optimization algorithm considering the multi-objective nature of the problem and all of the underlying complexities. The algorithm will be composed of initially constructing a schedule and then iteratively refining the schedule based on state-of-the-art mathematical programming techniques combined with very large neighborhood local search strategies. After initially rolling out the system at NS, we plan to repackage the software around the Software-as-a-Service business model and offer it to other railways.