Unlocking Value Chain Optimisation with a Digital Mining System

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This paper focuses on a successful initiative run by the BHP Integrated Remote Operations Centre (BHP IROC) team to combine a commercially available optimisation tool, BOLT with a digital mining system, leveraging cloud for compute, interface, and data storage. This combination resulted in a modern, digitised, automated and optimised planning platform unlocking significant savings in vessel demurrage.

Every day the logistics planners at BHP Mitsubishi Alliance (BMA) plan the material movements across their complex multi-mine, rail, port, and sea-borne value chain. This operation plans to supply the best product, on time and to their customer's needs. Creating plans that deliver product on-specification and on time requires accurate data for both the current state of the system and for all planned future activities. Breakdowns in communication, data flow and data accuracy across the value chain, between planners, operations and marketing can result in defective plans, potentially impacting mine operations or incurring penalties and demurrage costs in the millions of dollars per year.

Armed with outdated decision support tools incapable of supporting the numerous and complex decisions required, BHP IROC identified value chain optimisation as the solution. To support the digitalisation and automation of the planning process, a digital mining system was designed as the data backbone. This system is responsible for collating the various data sources from disparate systems, each with their own file formats, naming conventions, data refresh rates and access rules.

The BHP IROC team used a commercially available Mixed Integer Linear Programming (MILP)-based mine-to-market optimisation tool, BOLT, to optimise the logistics and marketing plans for the entire BMA coal system. Using a MILP based optimisation technique presents an opportunity to not only streamline the planning process, but to add tremendous value vs the old manual planning method. Centralising and standardising how data is consumed by data-driven tools like BOLT was essential to enabling faster and optimised decision-making capability.