# MineRP GeoInventory

## Manage your mineral asset for all its worth

# Whitepaper

MineRP

MineRP GeoInventory Whitepaper 2015 v1.0
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# Executive Summary

## The Resources and Reserves Management Issue

It is clear from the requirements of international resources and reserves (R&R) reporting codes that a number of factors are to be considered in the classification of Mineral Inventories.

Time, infrastructure, accessibility and financial outcomes to name a few are all considered to a greater or lesser degree throughout the process of R&R classification. Accurately keeping track of such inventories and their classifications is a complex, time consuming and very expensive task.

The tediousness of resource and reserve analysis and management is mainly due to the time consuming nature of manually integrating and interpreting the underlying mineral resource management data describing the state and status of the mineral asset and extraction strategies.

Among other things, decisions regarding the design of asset portfolios and application of capital to the mineral assets are impeded by the lack of integration between the Financial and Mining Technical domains, as is the tracking and reporting against capital projects at a granular level.

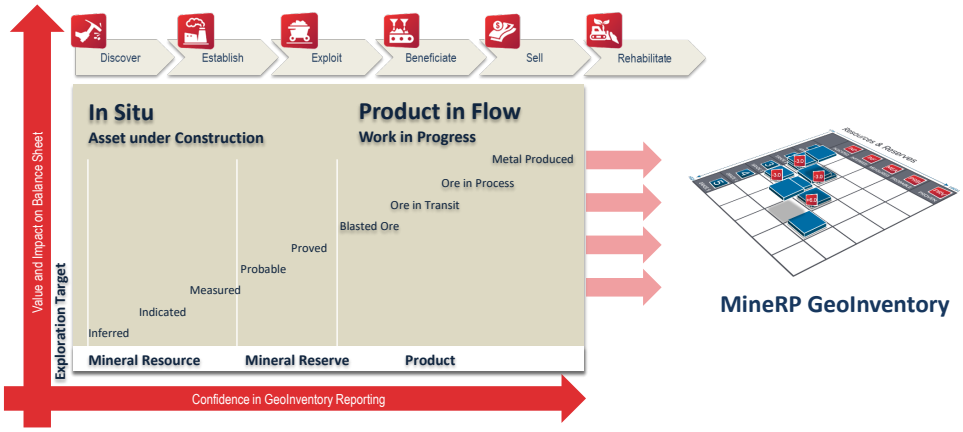
## MineRP's Solution to the Problem

MineRP has developed and has a patent pending for a system and method for mineral asset management, accounting and analysis through:

- Amalgamating and integrating big volumes of fragmented mining technical datasets into a spatially-referenced, standards-based mining technical database,
- Leveraging the ability to process big volumes of data in an efficient manner, employing current and future big data platforms, including but not limited to so-called in-memory databases, in order to
- Continuously translate the effect of changes in the state and status of the real mineral asset, as described in the integrated, spatially-referenced mining database, into standard stock management transactions for processing in standard inventory management systems.

The resulting Mineral Asset Inventory provides mining companies with a range of business-critical optimization opportunities, including:

- Real-time, reliable resource and reserve classification and analysis including reporting in compliance with regulatory codes, as and when required.
- Meaningful financial and other business input into production planning options through analysis of the mineral asset inventory at its lowest levels of granularity.
- Spatially integrated operational and commercial reporting
- Vastly improved speed and accuracy of reserve and resource audits through reliable access to datasets and transaction records in both the mineral asset inventory and the integrated, underlying mining technical datasets.





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# Business Benefits

> // MineRP's GeoInventory solution allows you to demonstrate the real value of your mineral asset at each stage of its development and lifecycle. //

## Strategic Benefits

The ability to leverage industry-leading solutions from MineRP, IBM and SAP provides innovative solutions to the mining industry not possible up to now. The involvement of recognized industry leaders in these solutions should give mining organisations the confidence that these solutions can be relied on to empower appointed competent persons to improve Resource and Reserve management.

MineRP GeoInventory's approach to dealing with the complexity of collaboration and inter-operability between multiple stakeholders and systems involved in resource and reserve management and reporting greatly reduces the effort required to classify and report on mineral assets. From the generation of resource reconciliation and conversion reports to accurately stating ore reserve positions at any moment in time, GeoInventory is the solution mines need to confidently interact with operations management, boards, analysts and investors alike.

MineRP GeoInventory represents a natural stepping-stone on the mining organisation's capability and maturity journey to leverage end-to-end information for strategic benefit. It enables leveraging of existing software investments, while also enhancing the organisation's capability to utilize advanced analytics to improve strategic decision-making with benefits including improved forecasting, advanced foresight and ultimately better decision making at all levels of the organization.

Bringing the management of mineral inventory into the world of the ERP solutions, mines are able to verify strategic plans via scenario planning and simulation, and effectively re-evaluate strategies in the face of ever changing external factors such as exchange rate and commodity price fluctuations.

## For the CEO and CFO

Mining stakeholders want consistent, predictable and reliable returns. They want mining companies to stick to the production and performance promises the CEO and CFO make.

Demonstrating how value is added with every cent of applied capital requires on-demand access to accurate resource and reserve reporting in compliance with global regulatory and audit codes.

Vastly reduce the cost and duration associated with reliable and auditable resource and reserve reporting, and meet the promises you make.

With MineRP GeoInventory, accurate data is available on all aspects of the mineral inventory to inform the best financial and strategic decisions at every level of the enterprise.

## For the COO

Planning, modelling and simulation is every COO's business. GeoInventory lets you optimize your operational efficiencies beyond anything possible to date.

To effectively manage a complex domain, the modern COO needs on-demand, visually integrated operational and commercial information.

Mining technical systems (geology, plannning, survey, safety, etc.) are extremely fragmented by nature. MineRP provides an end-to-end integration and collaboration platform.

This allows the COO continuous control of the mineral asset with real-time visualization, reporting and analytics capabilities on all technical and financial aspects.

## For the CIO

Tasked with governance and information management for both internal and external clients, CIOs must provide uninterrupted, accurate and auditable access to real mining data.

Modern economies require information to be available on-demand, to any destination, and on any device imaginable.

MineRP provides a platform for mining technical systems collaboration, translating the entire mining technical dataset into an integrated dataset that seamlessly relates to the ERP domain.

Simplify, standardize, collaborate, vizualise, analyse and optimise: All from one domain with no need to change source systems or retrain users.


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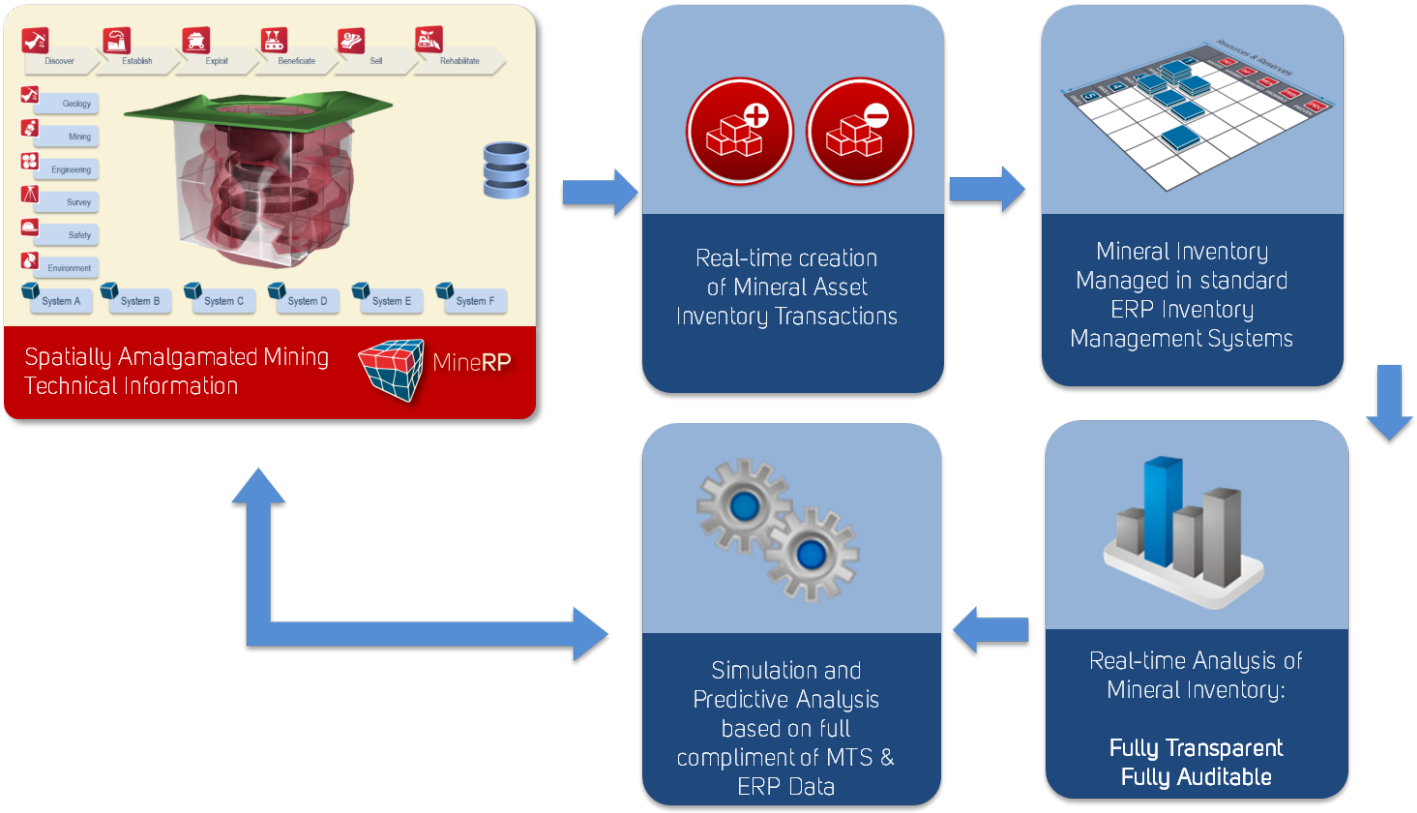
# How GeoInventory Works

## High Level Solution Concept




## Mining Activities Amalgamation and Translation

### Spatial Integration of the Mining Technical Solutions Landscape

Completely integrate all your mining technical solutions into a single, spatially integrated, standardised environment through the MineRP Enterprise Integration Platform.

### Translation of Mining Activities into Inventory Transactions

The GeoInventory system continuously monitors all mining activities, and creates inventory management transactions to update stock / inventory levels in your ERP.

## ERP-based Management, Accounting and Analysis

### Fully maintained Mineral Asset Inventory

By applying the inventory management transactions created in real-time by the GeoInventory solution to your ERP, you will have a fully auditable, 100% transparent and traceable inventory of mineral assets.

### Apply business intelligence and predictive analysis solutions to:

Utilise best practice in inventory management to predict and rapidly respond to business drivers located in both technical, commercial and economic domains.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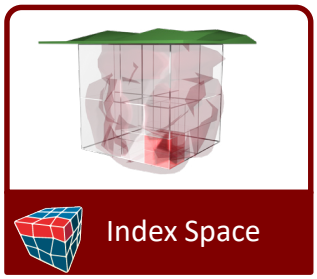
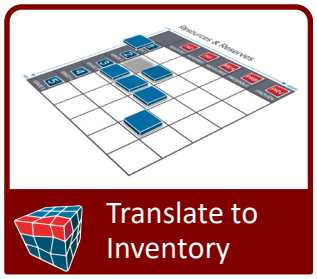
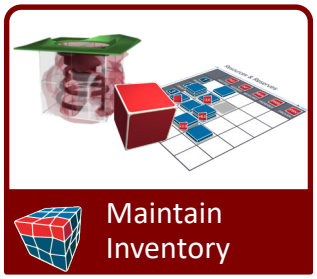
# The Process Step by Step






## Step 1: Spatially Index the relevant mining space

The first step required to spatially integrate all MTS solutions is to create and superimpose a logical reporting cube on the entire mineral asset volume.

This reporting cube becomes the spatial reporting constant against which all mining activities will be recorded and reported in future. The granularity of the reporting cube is determined by the relevant granularity of all mining technical activities within the mineral asset volume.

## Step 2: Amalgamate all MTS information against the Spatial Index

Once a standard spatial reporting index exists, the MineRP Enterprise Framework allows for the integration of any/all multi-disciplinary mining technical data sources without the need to replace these source systems.

This has several important benefits:

- Facilitate enterprise-wide mining technical system Interoperability
- Realise mining technical discipline collaboration
- Centrally govern all relevant Mining Attributes within managed space.

## Step 3: Analyse mineral asset and generate stock

Utilise the amalgamated, integrated information base to calculate initial stock take-on positions and values.

These values and positions, along with any relevant mining technical information attributes, are now used to populate appropriate stock levels in your Inventory Management System

## Step 4: Continuously translate mining activities into stock management transactions

The maintenance of the inventory entails the accurate processing of mining activities and other geological factors impacting on the real mineral asset, and continuously translating these into Inventory Management Transactions that can be executed against your geological inventory.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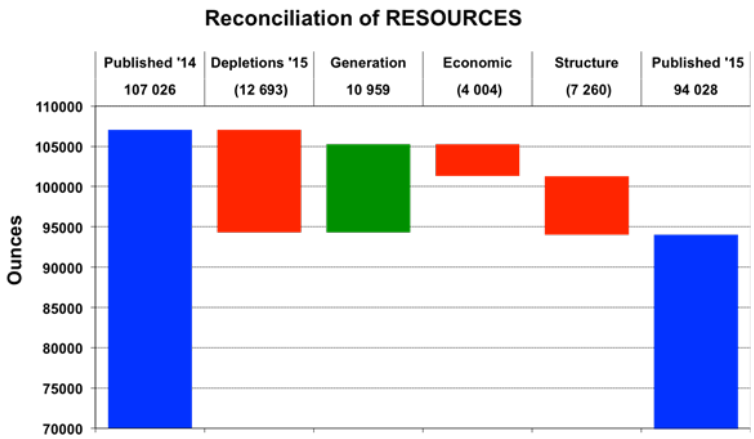
# GeoInventory Outcomes

## Reconciliation

It is an explicit requirement of SAMREC that a reconciliation of the current results to previous results be discussed.

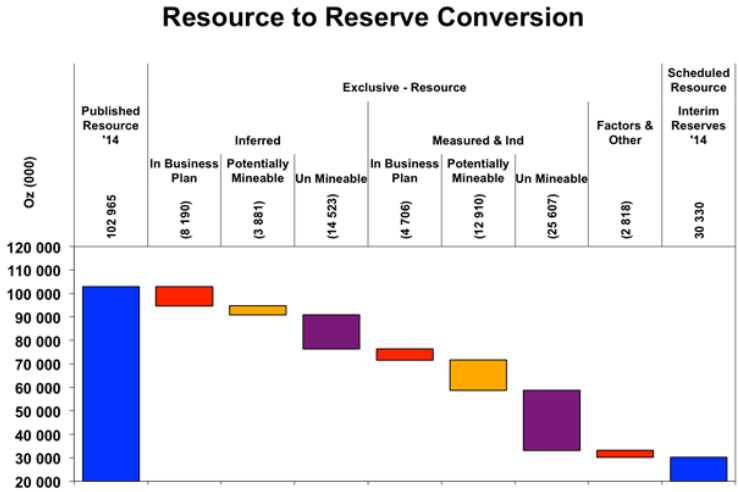
MineRP GeoInventory resource reconciliation reports implements each client's unique classification rules as a standard feature.




## Conversion

The conversion waterfall graph is a standard management tool assisting managers and analysts understand and explain the effectiveness of the mine plans with particular reference to the development program.

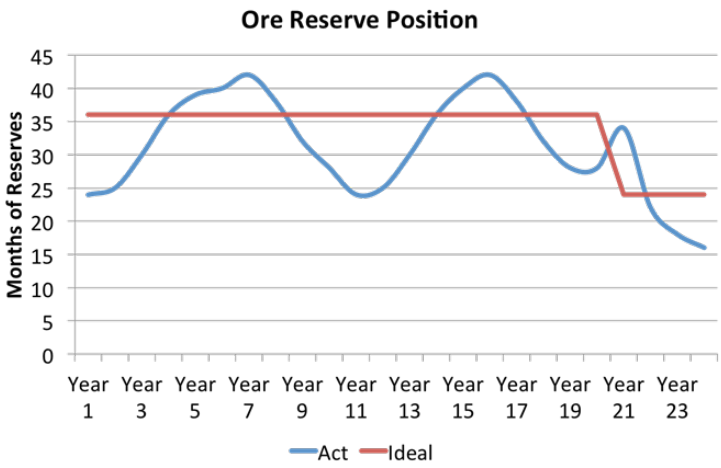
Its purpose is mainly to demonstrate the difference between resource and reserve over or during the life of the mine, as well as to show the reasons and sources of change over time.




## Ore Reserve Position (ORP)

The ORP is employed to test the temporal effectiveness of a mining plan's development programme.

Highly tuned to the organization's capital expenditure and other strategies, it compares the current and projected reserves with the company's stated objectives, and assists in decision making such as "just in case" or "just in time"development strategies.





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# Under the Hood

## Bringing mainstream information technology to bear on mining

Although a big consumer of technology, mining has not been a primary driver for the proprietors of mainstream information technologies. This is largely due to the lack of integrated data in the primary business of mining as it is created in disparate mine technical systems.

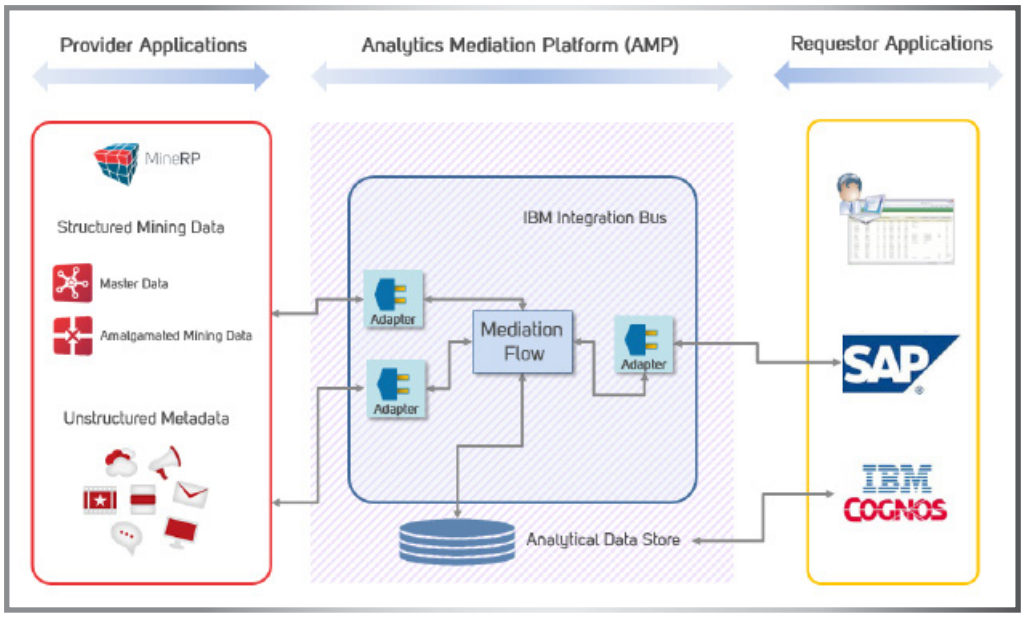
As such, MineRP has developed global relationships with technology companies such as IBM and SAP to complement the functionality available within our own applications with superior products, solutions and services proven across large, global industries and complex technical processes.

Information exchange between ERP systems and MTS platforms for purposes such as advanced analytics and simulation is now available for use in the development of mining scenarios to the benefit of mining companies.

> // MineRP and IBM have joined their significant capabilities in developing versions of GeoInventory and GeoFinance built on a combination of best in class technologies contributed by both companies. //

Specifically, MineRP and IBM have co-funded the development of mining-ready GeoInventory and GeoFinance solutions created on these two MineRP patened pending solutions and methodologies.

Bringing together specialist teams in MineRP MTS integration, SAP MM-IM, IBM AMP, Cognos, and a host of other technologies, both companies invested significantly in the development of minimum viable prototypes delivering ground breaking joint solutions in 2015.




## The MineRP / IBM Solution Architecture

Integrating the MTS and ERP domains was achieved in this instance through the IBM Analytics Mediation Platform (AMP).

Other options for direct integration with SAP MM/IM or other ERP solutions are also available.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