INCREDIBUILD

CASE STUDY

# Sarine Technologies

## Sarine Technologies Accelerates Performance with Incredibuild

Industry

| General

Process

| C++

Results

| Reduced Full Optimization Processes from 40 hours to 40 mins

Established in 1988, Sarine Technologies Ltd. is a worldwide leader in the development and manufacturing of advanced planning, evaluation and measurement systems for diamond and gemstone production. Sarine products include diamond cut, color and light performance grading tools, the Galaxy™ family of inclusion mapping systems, rough diamond optimization systems, laser cutting and shaping systems and laser-marking and inscription machines. Sarine systems have become an essential gemology tool in every properly equipped gem lab, diamond appraisal business and manufacturing plant, and are today considered essential items by both diamond dealers and retailers. For more information about Sarine and its products and services, visit http://www.sarine.com.

## About Incredibuild

Incredibuild is a leading solution provider of software acceleration technology. By harnessing unutilized processing power in private and public cloud environments, Incredibuild's technology accelerates Windows-based computational software with easy deployment and migration. Incredibuild is the de facto standard solution for code-build acceleration on the Windows platform. More than 100,000 users at over 2,000 companies and organizations depend on Incredibuild's technology for software and build acceleration, including 20 Fortune 100 companies.

Advisor TM is a powerful optimizer developed by Sarine Technologies used to maximize the profit extracted out of rough diamonds. Advisor is used to analyze rough diamonds to determine optimal cutting parameters in order to extract the most profit. Incredibuild was integrated with Advisor as a private cloud implementation in order to accelerate performance, expedite the optimization process, and improve results using wider search functions that were not possible prior to the integration.

# Background

A polished diamond's value is the result of several parameters including shape, weight (size), color, clarity and cut. Using both software and hardware components, Advisor provides detailed analysis and instructions to diamond manufacturers in order to maximize the value of each stone.

Advisor begins by scanning the exterior of the rough diamond. High-value stones are also scanned internally using a unique technology that reveals the interior features of the diamond without refractions. The diamond is then processed by the optimizer, which returns several possible cutting alternatives. Once an alternative is selected, the manufacturing instructions are marked on the diamond (using the laser marker), printed and executed in the factory.

The optimizer runs through dozens of shapes (3D meshes with predefined parameter ranges such as angles and heights) to identify the most valuable combination of shapes for the given rough stone. The value is defined by many parameters including shape, size, clarity (objects in the planned shape) and additional customer-defined parameters.

Adding complexity to the analysis (additional shapes, user parameters, and internal features) results in superior outcomes. However, complex analysis is time-consuming; simple analysis takes as few as 10 minutes per stone, while sophisticated configurations may require up to 40-60 hours.

# Challenge

In order to accelerate Advisor's processing time and improve outputs through enhanced search parameters, Sarine sought a parallel computing technology solution. The technology had to be flexible and scalable in order to support future optimizer versions and new engines.

Determining the optimal parameters to cut a rough diamond into one or several polished diamonds presents a multi-dimensional, highly non-linear optimization problem. Every rough stone is unique internally and externally; thus, the optimizer engine must navigate a six-dimensional price list in a highly dynamic and complex geometric setting.

The average diamond manufacturing lifecycle lasts between 20-25 days, from rough stone to polished finished product. The first stage includes planning the diamond cutting process and defining a specific goal for each stone, activities that contribute about 25% of the total cycle time.

Advisor generates profitable results for customers; however, the additional time required for intense analysis (3-5 days) can make the whole process impractical for the diamond manufacturing industry. Furthermore, as the optimization engine becomes more sophisticated, the amount of data increases exponentially, slowing optimization and limiting product attractiveness.

# Solution

Before selecting distributed computing via Incredibuild, Sarine examined several parallel computing alternatives:

Public clouds: Rejected due to the large data volume that must be sent and received to the cloud in every run, as well as customer reluctance to send out sensitive data to the public cloud.

Private clouds via dedicated clusters: Rejected due to prohibitively high costs to the client (both entry and maintenance costs).

Private clouds via distributed computing: Sarine chose this approach to enable maximal deployment flexibility. Sarine can offer customers several alternatives for grid computing: using existing client networks (i.e., zero added hardware/traffic costs), on dedicated private clouds at the customer site (i.e., zero interference with workstation usage), or on public clouds.

After exploring several distributed computing solutions, Incredibuild was chosen for the following reasons:

Trusted technology: Incredibuild is used extensively worldwide, with more than 100,000 client installations, and Sarine already had considerable mileage and excellent experience using Incredibuild for their code builds.

Simple to install and use: Incredibuild was the simplest and user-friendliest engine – both programming-wise and deployment-wise.

Minimal additional coding: Incredibuild's unique process virtualization approach enables grid adaptation using external XML and without the need to change and maintain dedicated source code.

Monitoring tools: Incredibuild includes extensive management tools for performance monitoring and optimization. The Incredibuild integration and optimization effort was negligible and took less than a month to complete. In order to integrate with Incredibuild, Advisor's core algorithmic code was modified to be divisible into independent tasks that can be executed in parallel. A typical optimization scenario includes a succession of 5-8 jobs, each depending on prior results and consisting of several hundred thousand tasks. Of the several integration options available in Incredibuild, Sarine selected Incredibuild's XML Interface (dynamically created on a per-job basis), input files for the various tasks, and an XML file encoding the input/output file paths.

Typically all tasks within a job share large input files that require significant time to load and pre-process. Sarine chose to batch the tasks together and present 'macro-tasks' to each grid agent, each consisting of dozens to hundreds of individual atomic tasks. A typical 'macro-task' can now be processed in a few minutes, so the common input pre-processing (<10 seconds) is now negligible.

Sarine tested the Incredibuild integration extensively, using various optimization scenarios and network sizes, and achieved accelerations ranging between 6x to 30x faster results. Workloads of several days were easily reduced to less than a single night, eliminating a process bottleneck and allowing customers to redesign their entire workflows.

# Benefits

Dramatically accelerated processing: Using the integrated solution, Sarine's customers have run full optimization processes in just 50 to 120 minutes, compared to 40-60 hours prior to the Incredibuild integration. Simple processes were reduced from 1-2 hours to just 10-15 minutes.

Expanded product functionality: Reduced processing time has enabled Sarine to add complexity and enhance optimizer analysis. Customers have experienced higher profitability by using wider search criteria. Not only were the results of better quality in comparison to the standalone process, but the processing time was still faster by a factor of 4-5.

Game-changing results: Incredibuild has enabled Sarine to capture additional market share by targeting time-sensitive customers previously out of reach. Furthermore, expanded product functionality increases Sarine's competitive advantage and opened new windows of opportunity for the existing optimizer as well as future developments.