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# SHYFTINC VALIDATES SMART MINING SOLUTION TO RESOLVE INDUSTRY INEFFICIENCIES

SHYFTinc has validated a supply chain management solution that can resolve inefficiencies in mines. During their CENGN project, the company leveraged CENGN's infrastructure to prove that a new IoT solution will meet clients' security, stability, and load demands.

SHYFTinc is a Sudbury-based company that develops and distributes solutions that advance the mining production process. The company delivers established and emerging automation and software products as well as services that make mining safer, more productive, and more profitable. Among other innovations, SHYFTinc has brought to market NRG1-ECO®, a mine-wide energy management and ventilation control solution, and AutoGen®, an automatic process control code-generating technology. SHYFTinc is maintaining its momentum with a new innovative end-to-end IoT solution, which includes a SmartCube®, SmartModule™ and the ADMMIT® platform.



Figure 1: SHYFTinc Staff Developing Their Solution

## TRANSFORMING THE MINING INDUSTRY

The mining industry is a hot sector for digital transformation. Other industries have made measurable gains in inventory management, coordination between workers, and material management through technology adoption. These changes are highlighting opportunities for improvement in mining. Miners are looking to optimize the use of equipment and labour, as well as address problems with storage space and the movement of materials. All these obstacles result in lower profit margins for mining companies. With the SmartCube<sup>®</sup>, SmartModules<sup>™</sup>, and ADMMIT<sup>®</sup> platform, mining companies can implement safe and efficient supply, usage, and storage practices. These combined solutions introduce real-time inventory tracking, effective storage monitoring, and safe transport of materials and equipment. Here is how each component works:

- SmartCube: A stackable box used to store materials and equipment. These cubes are connected to the Automated Delivery of Mine Material and Inventory Technology (ADMMIT) platform through SmartModules.
- SmartModules: IoT sensor packs connected to SmartCubes, which transmit information from the SmartCubes to the ADMMIT platform.
- ADMMIT: A platform accessed through a mobile app, providing the appropriate workers with real-time location tracking and status reporting (impact, leak, unauthorized access, temperature humidity) updates.



Figure 2: SHYFTinc SmartCube & Smart Module

In order to target clients that require large-scale deployments, SHYFTinc came to CENGN to validate that the IoT solution will meet the scaling, connectivity and security demands required.



### **BUILDING THE PROJECT SPACE**

CENGN provided SHYFTinc with access to an isolated and private test space made up of two bare metal servers and a cloud tenancy. The cloud tenancy resource was used exclusively for monitoring, using the open-source monitoring tool, Prometheus. This software collected data throughout the project in order to provide SHYFTinc with the required usage metrics.

The ADMMIT platform was deployed on the first bare metal server, while the second bare metal was a test script server. The test script server simulated an incremental increase in the number of connected SmartModules. SHYFTinc needed to verify that the solution can scale to 500 SmartModules during testing, reflecting the approximate number of modules used by their target market of medium-sized industrial clients.

### VALIDATING THE SOLUTION

SHYFTinc performed an incremental stress test, simulating more and more SmartModules to measure how the ADMMIT platform would respond. With ease, it reached the 500-module goal. The company continued to perform the stress test, increasing to 1,500 SmartModules on the platform. Being able to support 1,500 SmartModules proves the scalability and reliability of the platform. It also indicates that a single server can meet the requirements of large-scale industrial clients, or support multiple smaller clients.



Figure 3: SHYFTinc Project Space on CENGN Infrastructure

SHYFT inc

To validate the solution's stability and security, the SHYFTinc team introduced intermittent connectivity issues to the SmartModules. The team successfully validated the ADMMIT platform, demonstrating it could handle extreme cases of packet loss from 5% to 50%. This means that during times of poor or intermittent connectivity, the SmartModules store the lost packet data and will retransmit once connectivity becomes stable. This is a crucial feature in the mining industry, as connectivity can never be taken for granted. The test also confirmed the security of the solution, showing resiliency to DOS attacks.

During these tests, SHYFTinc was also able to identify ways to increase further scalability, which bodes well for the ADMMIT platform and its end-users.

### FROM VALIDATION TO MARKET GROWTH

This was a very successful project for SHYFTinc. By leveraging resources at CENGN, SHYFTinc was able to validate the solution, demonstrating that ADMMIT can support the demands of medium and large industrial clients. In addition, the team was also able to successfully validate that the ADMMIT platform could remain secure and stable, even after introducing connectivity issues to the modules that could arise within a mining environment.

CENGN staff provided expertise for load testing and monitoring throughout the project. CENGN's Customer Solution Engineering team is wellversed in both of these functions and provided helpful oversight throughout the project.

The monitoring gave SHYFTinc metrics and data that allowed the team to gain a better understanding of the resources required by the ADMMIT solution, which will lead to spec optimization, maximizing customer experience, and streamlining the deployment process.

With all of this new information and validation, SHYFTinc is in a position to service larger clients with confidence. The team is ready to capitalize on the market potential that comes with the robust solution. SHYFTinc is on the path towards new growth and opportunities, and we are eager to witness their future success.



rick.penwarden@cengn.ca cengn.ca/projects

Rick Penwarden, Marketing Manager Lynn Bulloch, Communications Manager lynn\_bulloch@bestech.com www.shyftinc.com