



Bringing Rugged Computer Systems Built for Arctic Conditions to the Tradeshow Floor

Alteeve's Niche! is a Toronto-based software and systems design developer that specializes in server uptime and operational continuity. The company started in 1997 with a goal of preventing servers from becoming unavailable. With roots in open source software, their fault-tolerant technology stack, the Anvil! Intelligent Availability™, has been developed from the ground up, enabling an impressive server historical uptime of over 99.9999 per cent across all company deployments. It not only eliminates a single point of failure by providing complete hardware redundancy, but also by utilizing autonomous decision-making capabilities and eliminating the need to involve IT personnel to maintain uptime. This technology

is particularly well suited for applications where, due to unreliable connectivity, security reasons or physical server inaccessibility, it makes more sense to host IT infrastructure on a physical, in-house server, rather than in the Cloud.

The problem the company was facing was that any software development, system testing, trade show attendance or customer demonstrations needed to be performed on a bulky and expensive Anvil! that weighed more than 100 kilograms and costed more than \$20,000.

“Bringing the Anvil! anywhere created significant logistic problems, and had a negative impact on costs related to



both system development and marketing activities,” said Dennis Mansillo, Alteeve’s Vice-President of Operations.

In order to find a better solution, Alteeve turned to Seneca’s Chris Tyler (NSERC Industrial Research Chair) and his team for help. This led to the development of SimEngine, an open-source, hardware simulation software that can reconstruct Alteeve’s system topology and simulate common hardware failure scenarios. The Anvil! is comprised of two management servers called Striker, two Uninterrupted Power Supplies, two Power Distribution Units, two Switches and two Nodes. Seneca research assistants Olga Belavina, Miguel Roncancio and Yanhao Lei were able to accurately recreate behaviour

of core hardware assets, simulate power connections as well as internal thermal and data storage behaviour. Hardware data produced by the simulation engine is exposed through IPMI and SNMP interfaces in the same way physical components present their state. In addition, SimEngine supports both web-based management dashboard as well as a set of command line tools aimed to automate continuous testing.

“The interactions between the Anvil! hardware components are complex – an electrical failure in part of the system will have cascading effects that reduce power or thermal stress in one part of the system but increase it in others. SimEngine models these complex relationships and presents accurate information to the systems inside the simulation, while presenting an easy-to-use dashboard and control system for the user, with the ability to create and replay scenarios to easily test and demonstrate Alteeve’s ScanCore software,” said Mr. Tyler.

This innovative platform greatly accelerates Alteeve’s development process by saving hardware resources and surpasses traditional ways of approaching quality assurance of infrastructure design. SimEngine was created with open-source community in mind and it is capable of modelling a broad range of high-availability setups. Future project phases include research and development of an adaptive decision engine capable of applying machine learning to the simulated hardware models.

The project was funded by Natural Sciences and Engineering Research Council of Canada (NSERC).

“

By working with Seneca to build SimEngine, Alteeve is able to simulate environments and test conditions that would have otherwise required a significant amount of test equipment, space and staff to develop our Intelligent Availability™ platform”

– **Madison Kelly, Alteeve’s Founder and CTO**