

## STUDIO 1 LABS DETERMINES PERFORMANCE OF INTELLIGENT BEDSHEET WHEN SCALED

Studio 1 Labs is a healthcare technology company that has developed an intelligent bedsheet to transform any bed into a patient vital sign monitoring system. The Canadian startup company collaborated on a project at CENG to test the scalability of their complete intelligent bedsheet solution.

### INTRODUCTION

The eruption of the Internet of Things (IoT) in the healthcare industry has created a large demand for devices to capture and monitor patient health information. The intelligent bedsheet created by Studio 1 Labs provides real-time health monitoring to improve both the patient and doctor experience by eliminating the need for wiring or electrodes to the body to obtain patient health data.

Studio 1 Labs completed several successful clinical trials across North America, but this project with CENG has allowed them to determine the resource requirements hospitals would need to run their solution. During the project, Studio 1 Labs completed scalability testing by measuring server requirements of data flow and tested the performance as the number of active simulated intelligent bedsheet sensors were increased on CENG's next generation commercial-grade infrastructure. The resulting information has enabled the company to create a benchmark of requirements based on the number of intelligent bedsheets being used.

### A COST EFFECTIVE ALTERNATIVE

The intelligent bedsheet offers a better alternative to collecting patient information than traditional techniques, like time intensive in-person checkups or expensive and entangling wired devices. The intelligent bedsheet offers the same accurate information to hospitals validated through clinical studies, but at a reduced price making it marketable to countries around the world where healthcare is expensive.

### THE INTELLIGENT BEDSHEET

The intelligent bedsheet is an IoT clinical grade solution that monitors heart rate, respiration rate and quality, location, and position of patients. The data provided by the intelligent bedsheet is all in real-time enabling doctors to make decisions based on current information and accurately predict medical problems in patients. The bedsheets can be either wirelessly connected or hard-wired to a local controller, which distributes the information in compliance with regulatory requirements through a private network for data collection in a server where the reporting application is hosted. The patient health information is then displayed through a graphical user interface from the server.

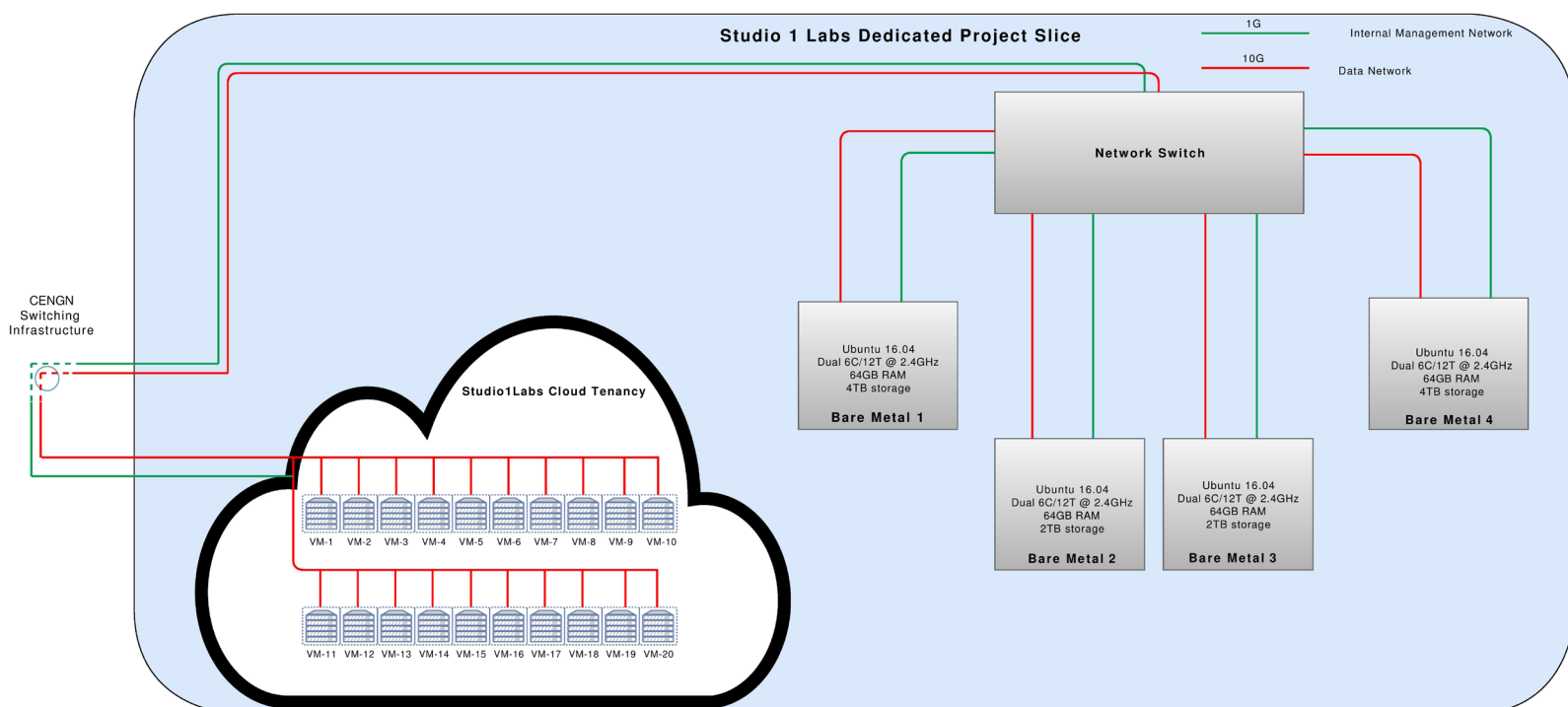


#### CENG MEMBERS



## BUILDING A PROJECT SLICE FOR STUDIO 1 LABS

Studio 1 Labs' CENGn project was comprised of four bare metal servers and a secured cloud tenancy. To replicate a real-world deployment, simulated bedsheets sensors were deployed in a cloud tenancy on the CENGn Testbed. The number of simulated sensors was then incrementally increased to determine the effect it had on performance metrics such as network and storage utilization.



## THE RESULTS

**Test 1:** This test depicted the network utilization rate as the number of simulators were increased. The utilization rate measured how much bandwidth is being consumed when devices are writing different amounts of data to the database.

**Test 2:** The second test focused on the server resource utilization as the number of sensor simulators were increased. It was initially presumed that the project would be resource intensive due to the amount of data the intelligent bedsheets collect. However, the server resource utilization was much less than expected, and as the number of bedsheets increased the amount of required resources grew proportionally smaller. Beyond this, Studio 1 Labs was able to significantly reduce the resources used by testing the solution with the SSH data compression protocol.

## SCALABILITY TESTING BENEFITS

By carrying out a scalability project at CENGn, Studio 1 Labs has gained information leading to numerous benefits and developments for their intelligent bedsheets solution. Having their own secured project slice on the CENGn Testbed offered Studio 1 Labs the opportunity to deploy their solution and test it in an environment with no consequences of affecting customers if any issues transpire. In the end, the scalability testing has provided Studio 1 Labs with a benchmark of the hardware and resource requirements needed to deploy their solution in large scale customer environments, like hospitals and long-term care institutions. This is an essential part of their commercialization journey as they now can confidently present their intelligent bedsheets to potential customers with knowledge behind their products capabilities and system requirements.