

Vertiv™ SmartRow™ Boosts the Uptime of Kenya's Motor Vehicle Registration System

A Vertiv Case Study



Background

The nation of Kenya, with the largest economy in East Africa, serves as a significant regional transportation and financial hub. According to the [Finance Ministry](#), the nation's economy is expected to expand by 6.3% in 2024. This growth is helping to support ongoing investments in Kenya's public infrastructure.

Kenya established the National Transport and Safety Authority (NTSA) in 2012 to manage the growth of vehicles and the safety of drivers and pedestrians. The NTSA supports Kenyan citizens in several ways, including vehicle registration, car inspection, driver's license applications, driver training, transfer of car ownership, online car search, reflective number plate application, and registration of physical or functional automobile modifications.

In June of 2021, the NTSA deployed a revamped Transport Integrated Management System (TIMS) to meet client security and technological advancement requirements as part of its digital transformation strategy. In part, the citizens of Kenya use their TIMS account to register vehicles, transfer vehicle ownership, and obtain license plates.



Challenge:

Maintain high levels of service and system availability in support of Kenya's country-wide vehicle registration system.

Solution:

Pre-engineered and tested Vertiv™ SmartRow™ data center.

Results:

- Estimated 10-month rollout timeline reduced to six months
- License renewal compliance nearly doubled
- License registration systems achieving increased uptime
- More than 80,000 licenses processed per month (versus only 10,000 prior to the new infrastructure)



Challenge

Modernization needed to accommodate growing citizenry expectations

NTSA leadership realized they needed to modernize IT systems to meet the population's growing demands. According to Nashon Kondiwa, Deputy Director, Information and Communications Technology and Innovation NTSA, modernization of systems was paramount to achieving the efficiencies required to fulfill vehicle owners' expectations. "We had to transform the way business is done and improve service delivery to our citizens," he said.

According to Kondiwa, antiquated systems resulted in service degradation and negative economic impacts. "Kenyan law mandates that new vehicles entering the country cannot leave our ports without registering. Therefore, if the TIMS registration system is unavailable, new vehicles coming in are stuck in port. Not only are the dealers who import these vehicles unhappy when systems are down, but the downtime also disrupts the entire logistics of our port systems," he said.

ICT department staff members also faced continuous challenges keeping the system up and running. "Our staff members lost lots of sleep and experienced high levels of stress because of persistent system downtime. Many had to spend extra time on weekends away from their families to maintain the availability of the system," Kondiwa said.

At NTSA, digital transformation of services meant deploying a modern data center capable of real-time road safety monitoring and reporting, enabling data-driven road transport and safety management.

Moreover, Kenyan citizens still possess paper driver's licenses and license plates. New laws are now mandating the creation of a digital licensing system, including number plates that are camera-readable and digitally recognizable. A new data center system was needed to store, track, and process the new incoming licensing, driver identification, and vehicle number data to account for every two-wheel, four-wheel, and truck vehicle on Kenyan roads.

To address this challenge, the NTSA ICT team required an upgrade to existing systems that fulfilled the following essential requirements:

- Modularity and scalability – An existing facility needed to be repurposed and redesigned to support the required capacity with room to grow and expand as more citizens registered their vehicles.
- High reliability – Online services would have to be available to the citizenry 24 x 7 x 365 with minimal downtime.
- Energy efficiency – Energy bills related to powering the data center IT and cooling equipment would have to be minimized to lower operational costs.
- Simple integration – The various components needed to operate the data center (power, cooling, environmental monitoring, fire suppression, and safety equipment) would have to be easily integrated to shorten project timelines and reduce installation, commissioning, and servicing costs.

Solution

Modular, scalable Vertiv™ SmartRow™ lowers downtime while making operations future-ready

As a first step to implementing a new data center solution, the NTSA issued a request for proposal (RFP), which outlined the agency's vehicle registration business and technical requirements.

After reviewing the proposal responses, the NTSA team chose a SmartRow™ solution submitted by Vertiv and its local partner Encapsulated East Africa Limited, a diamond elite partner and systems integrator. Besides submitting the most comprehensive proposal, a track record of solid products and sound project execution helped the Vertiv/Encapsulated team stand out among the competition.

The SmartRow is a self-contained data center that simplifies IT deployments in indoor spaces. With capacities of up to 10 racks and integrated cooling, uninterruptible power supply (UPS), power distribution, fire suppression, and backup ventilation, the Vertiv SmartRow is both modular and scalable. These self-contained units' high degree of factory integration maximizes installation speed while minimizing cost.

The SmartRow is also equipped with remote monitoring software for precise power and cooling management with built-in redundancies. For instance, if one of the precision cooling units fails, the other takes over the load with no impact on availability. In addition, these units operate variable-speed fans, which save significant energy by only providing the necessary fan circulation when needed.

Once the NTSA decided to proceed with Vertiv, consultations began regarding the necessary building blocks for implementing a viable, long-term solution. With higher uptime as a critical goal, the joint team proposed a timeline for migrating to the new SmartRow.

The new system offered the NTSA several essential advantages:

- **Easy integration** – The Vertiv™ SmartRow™ design allowed rapid integration of power, cooling, environmental monitoring, and fire safety components compared to the traditional “parts and pieces” approach.
- **Standardization** – The SmartRow™ enables standardized data center configuration across multiple locations. NTSA uses SmartRow to support vehicle registration systems in one location, while a six-rack SmartRow implementation populates the agency’s disaster recovery backup site. Such standardization makes the entire IT infrastructure easier to manage.
- **Scalability and growth path to accommodate future expansion** – The modular and scalable nature of the SmartRow solution means that pre-built modules of integrated power and cooling capacity can be rapidly added into the rack frames when expansion is needed. This helps extend the life of the systems and maximize return on investment.
- **High rack density ranges and capabilities** – The 70-kilowatt (kW) SmartRow operates at an average density of 7 kW per rack (with a low of 2 kW per rack and a high of 10 kW per rack). This enables NTSA to pack high levels of computing power in a small area, saving valuable floor space.
- **High reliability** – The system is designed to provide both power and cooling redundancy. On the power side, 2 x 80 kilovolt amps (kVA) Vertiv™ Liebert® EXS UPS units support each row of racks. Should any power glitches occur, the UPS units take over and continue providing a smooth, stable power supply for a predefined runtime. On the cooling side, a Vertiv™ Liebert® CRV 3 x 35 kW redundant in-row precision cooling system feeds cool air to the servers using digital scroll compressors and electronically commutated (EC) fans to adjust cooling safely and cost-effectively. If one of the units fails, the other two are ready to assume the extra heat load.
- **Environmental monitoring** – The Vertiv™ Environet™ Alert monitoring software that comes as part of the solution provides support technicians with greater operations visibility, allowing them to manage system alerts proactively and to maintain high availability. Coupled with Vertiv™ Liebert® rack data units (RDUs), administrators and facility engineers can monitor data center environmental conditions (such as temperature, humidity, liquid leaks, smoke, and vibrations) and quickly detect any developing issues. With a remote view into the racks, support teams are no longer required to physically enter the data center to check the enclosures for equipment status and alarms. By detecting issues early on, the team can apply fixes before any unanticipated downtime occurs.
- **Enhanced security** – The SmartRow solution drastically reduces the risk of unauthorized physical breaches by offering options that include steel doors, access control systems, Internet Protocol (IP) cameras, and door sensors. Administrators automatically receive alarms whenever any breach is detected. Sensors installed into the rack provide smoke detection, as well as temperature, humidity, and security data. The solution’s racks are also designed for simple and safe cable management to reduce the possibility of downtime caused by human error.
- **Superior maintenance and support** – Vertiv and Encapsulated East Africa Limited ensured that maintenance technicians are available anytime should an emergency occur. Service people can arrive on site in hours if needed and have access to local spare parts should a repair be required. The NTSA staff benefits from the equipment's higher reliability (fewer instances of required maintenance) and a consistent, quick response if the facilities staff need on-site technical assistance.

“The compactness of the whole solution made it unique. We didn’t have to deal with parts and pieces all over the place from multiple suppliers and all of the integration challenges that such a scenario usually presents. With access control, closed-circuit television, environmental monitoring, sensors, power, and cooling all pre-integrated into one architecture, it became much easier for us to install and manage the system. The added reliability also made the management of the system much more predictable,” Kondiwa said.

“The new Vertiv™ SmartRow™ simplifies processes, enhances system security, and broadens citizen access to our services.”

**Nashon Kondiwa, Deputy Director,
ICT and Innovation NTSA**

Results

Uptime stability and return on investment

The deployment of the Vertiv™ SmartRow™ solution has resulted in higher uptime and lower energy consumption for the NTSA. The modular/scalable nature of the Vertiv™ solution has allowed the agency's ICT department to right-size data center equipment for lower energy utilization, manage cooling and power distribution more efficiently, gain much higher visibility into their operations, and better serve the citizens of Kenya.

Elements of success in rolling out the NTSA data center modernization project include:

- **Rapid delivery** – Vertiv expedited system delivery by taking only eight weeks to manufacture the SmartRow™ to client specifications. That time included the civil engineering work involved in the data center and UPS room renovation (including installing a drop ceiling, fire-rated doors, and fire-rated wall paints). Thanks to the rapid configuration of the Vertiv solution, the project timeline for NTSA was reduced to approximately 6 months instead of the expected 10-month duration.
- **Improved customer service** – Kenyan citizens now receive a much faster and more accurate response to their inquiries for new vehicle licenses, driver's licenses, and vehicle registrations. Users can now track service application status online, 24 hours a day. Where the old system processed 10,000 new licenses per month, the new system has already successfully processed 80,000 licenses monthly. The TIMS system has gone from attempting to manage a queue of 60,000 drivers waiting for their applications to process to zero now waiting in the queue. Applications are now processed upon submission.
- **Improved licensing compliance** – The new system has helped the NTSA agency improve citizen license renewal compliance. Before the new data center was installed, license renewal compliance stood at 45-50%. Many citizens gave up because of difficulty in accessing a working online system. With the new system in place, compliance has exceeded 80%.
- **Enhanced system uptime** – Because of enhanced systems availability, faster speed, improved efficiency, and higher reliability, the overall uptime of the system has increased. The new system is more integrated, easier to use, optimized for high performance, more secure, and offers NTSA staff improved reporting capabilities.

- **Recognition** – National leaders have recognized the new NTSA data center and have nominated the site as the country's most digitized and reliable government service provider. It is also beginning to serve as an example of a successful model for data center deployment for other countries across the region.
- **Future scalability** – A forward-looking plan and the scalable SmartRow architecture now offer NTSA the flexibility of future system expansion when needed. The additional space within the existing racks leaves room for growth, and the data center server room can also easily accommodate an additional row of SmartRow racks.

As the NTSA and other Kenyan government agencies implement their modernization plans, they look to Vertiv as a trusted advisor, collaborating to accelerate data center infrastructure technology rollouts while revolutionizing how the connected world communicates. "The Vertiv and Encapsulated teams never try to shortcut quality," Kondiwa said. "They are knowledgeable professionals with high ethical standards."

To learn more about how SmartRow solutions can enhance your data center power, cooling, and environmental control system uptime, [download our brochure](#).

"Vertiv™ SmartRow™ reduces stress on our staff by providing them with a highly reliable and more predictable system."

**- Nashon Kondiwa, Deputy Director,
ICT and Innovation NTSA**