SUCCESS STORY

INDUSTRIAL SHIELDS

UPGRADING OF GATE ACCESS CONTROL AT DINOKENG GAME RESERVE

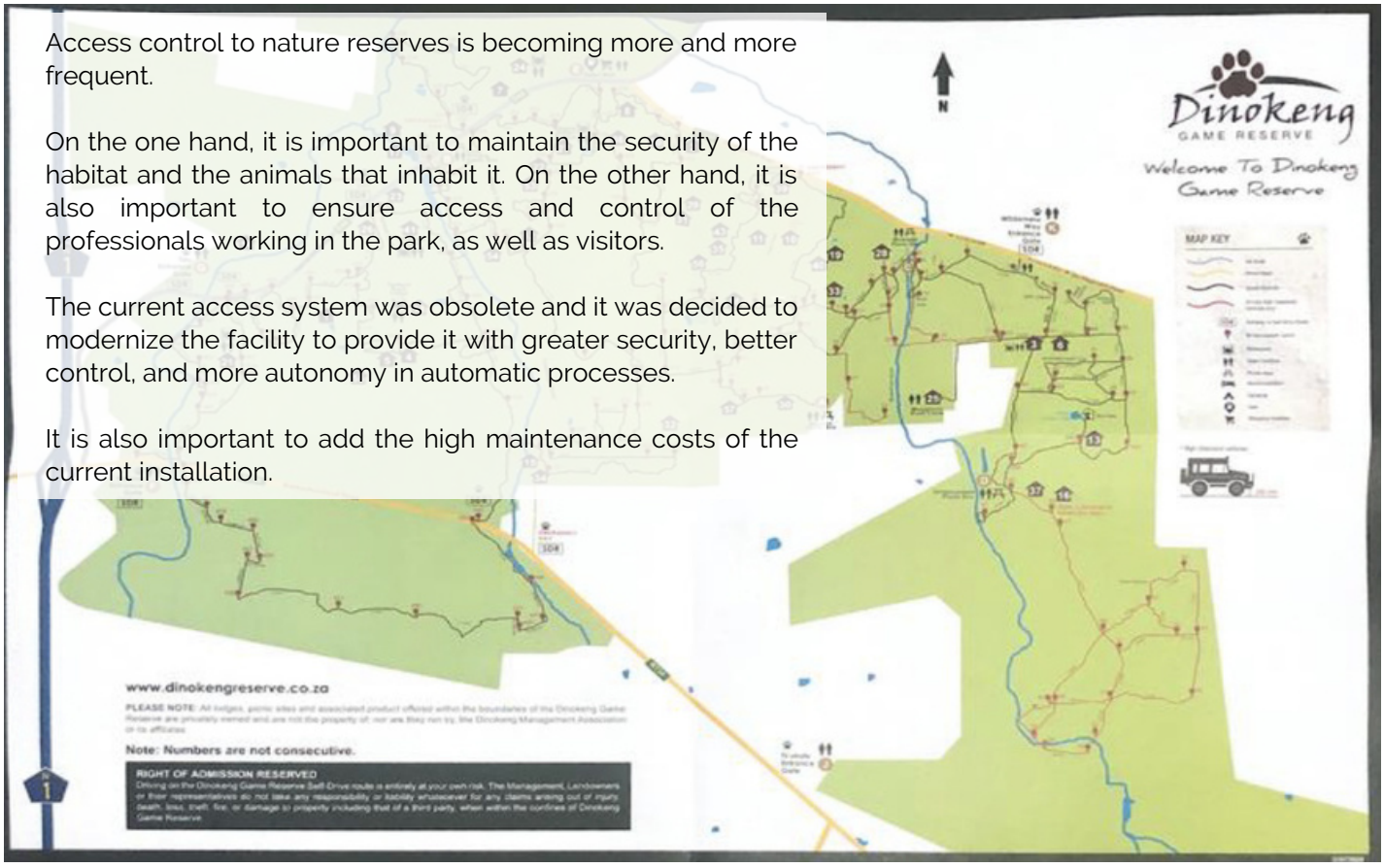
SITUATION

Access control to nature reserves is becoming more and more frequent.

On the one hand, it is important to maintain the security of the habitat and the animals that inhabit it. On the other hand, it is also important to ensure access and control of the professionals working in the park, as well as visitors.

The current access system was obsolete and it was decided to modernize the facility to provide it with greater security, better control, and more autonomy in automatic processes.

It is also important to add the high maintenance costs of the current installation.



Upgrading of current outdated wire based RS485 interface access control system at 5 entrance gates to the game reserve. Maintenance cost and parts availability on the existing system has become prohibitive.

CHALLENGE

- The upgrade should **entail** the use of **Wi-Fi based technology** with a central control system to allow gate access through the generation of **barcoded** and **QR Coded tickets** issued via a 'No Touch' sensor at gate entrances.
- Existing serial **TSP700II slip printers** had to be Wi-Fi enabled, with the use of Serial to Wi-Fi devices to enable reuse of existing working equipment.
- Upon a hand wave near the **'No Touch' sensor** at the entrance gate, a microcontroller should communicate with the gate controller software to enable a ticket to be printed and a barrier to be opened. There can be up to 2 'No Touch' sensors for normal and large vehicles.

SUCCESS STORY

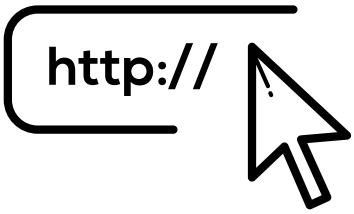
GAÑAR GROUP

The Gañar Group was requested for the upgrading of **Gate Access Control** at **Dinokeng Game Reserve**. The goal was to **control** the system with **open source** technology. So, by means of **PLC with Wi-Fi** and a **sensor,** Gañar Group succeeded in enabling the printing of the ticket and opening a barrier with quality technology and easy programming.

IMPLEMENTATION

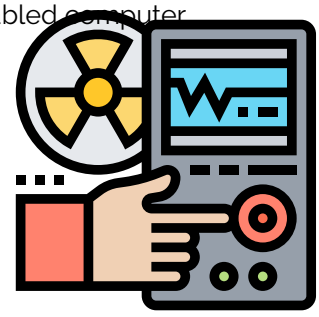
We started the project with off the shelf **ESP32 microchips** and got a basic system to work within a period of **3 months**.

The challenge lay in **securing a stable and reliable local area Wi-Fi network,** to which all the **Serial WiFi devices** for both the printers and barcode scanners had to connect. Then, to set up these devices to communicate via socket connections to the gate controller software computer's IP address on specific ports.



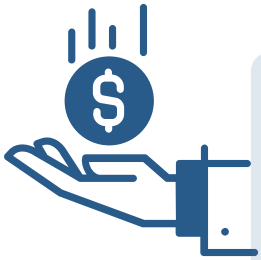
For the ESP32, we used **HTTP protocol utilizing port 80 locally**. The latter code had to be written under the **Arduino IDE** environment to set up a local web server to save parameter settings on the ESP's flash memory.

The microprocessor had to be written in **Access Point (AP) mode**, so it could be accessible for any Wi-Fi smartphone, tablet or Wi-Fi enabled computer.



We soon learned that **electromagnetic disturbances** were **interfering** with the **ESP32 microcontrollers**, causing hang-ups and disconnects.

At this stage, it was necessary to use the **Industrial Shield ESP32 19R IO+** devices on both the entrance and exit gates in the hope of eliminating electromagnetic interference.



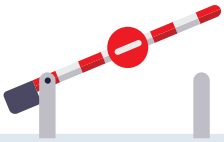
The client saved up to 80% on the slip printer type tickets, as well as the lower cost for of the shelve hardware components.

24/7

The project is currently running 24/7 with minimal maintenance.

SUCCESS STORY

IMPLEMENTATION



A '**Ticket Taken' sensor signal** is read by the **ESP32 19R microcontroller** which will then open a boom and request a form feed from the gate controller software.

At the entrance gates, **Wi-Fi enabled 1D/2D barcode readers** should allow prepaid permits to be scanned and open the boom upon verification of payment via a **cloud-based database**. The relevant database could also be a **third-party institution** that is allowed to **sell permits**. The barcode scanners send barcodes to the gate controller software from where the validity checks are executed.

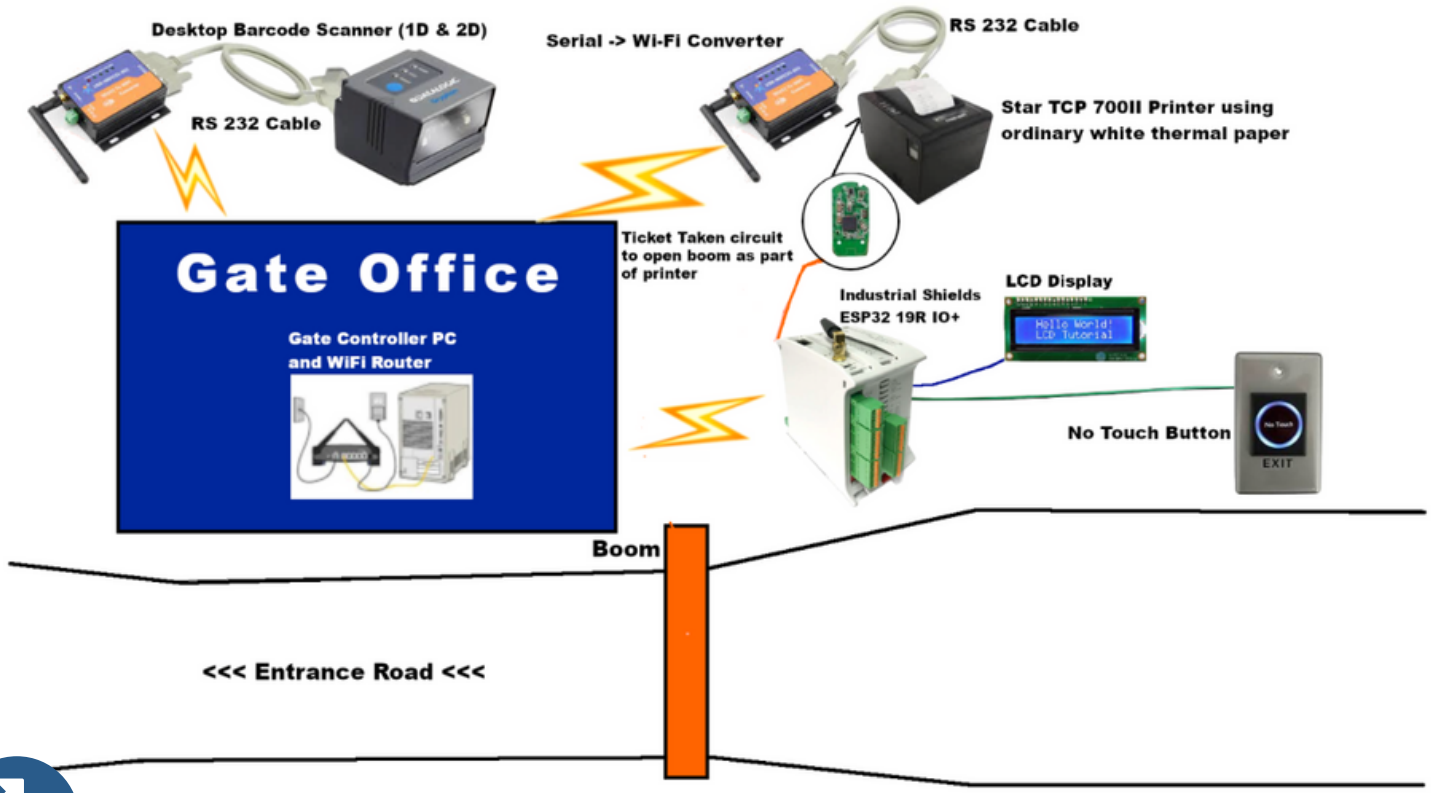
SUCCESS STORY

IMPLEMENTATION

Barcodes are linked to an **Entrance timestamp** that should also be able to operate **off-line** in case an internet connection is not available.
This timestamp will be used upon exit to determine the duration of the stay in the park.

Exit barcode scanners are needed on the exit gates to determine the **paid or free status** of a ticket and directly communicate via Wi-Fi to the gate controller software.

The software will then validate the barcode on the cloud database and **send messages** to the **microprocessor (ESP32 19R+)** which in turn should display it on a connected 2-line **LCD display** to inform the visitor. The message determines whether an open gate command is executed or not.



Both the entrance and exit gate ESP software was adapted to accommodate the new board types and model, all done within the **Arduino IDE**. Our expectations of the performance of these devices were exceeded. Especially, the shielding aspect was a vast improvement.
The **addition of an external antenna** typically improved the **Received Signal Strength Indicator (RSSI) from -80dB to- 50dB.**

SUCCESS STORY

ADVANTAGES

Less is More
With a single Wi-Fi PLC it is possible to remotely manage the entire solution and all the control system. Reducing the hardware of the Gate Access Control installation makes it easy, fast, and cheap.

Focus on customer
One of the most important demands of the solution was the need for automatic control. Thanks to the Wi-Fi PLC this can be done.

Easy programming
The ESP32 PLC can be programmed with the system that best suits the customer's needs. It is an open source based operating system, making it easy for the customer.

? WHY INDUSTRIAL SHIELDS?

Industrial Shields won this project and beat its major competitor thanks to the key points below:

Open solution
No licence fees.

24/7 technical support
Our team is available 24 hours a day, 7 days a week, by phone, mail or WhatsApp.

Modular solution
Product specifications can be extended in the future.

Equipment designed and manufactured for **industrial use** at a lower price than competing products.

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