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Asset identifier IT with NFC technology

Introduction

In this document, we will delve into the various technical and functional aspects of the application or solution focused on “IT Asset Identification.”

The mission of this application is to place an adhesive identifier on IT equipment such as servers, switches, storage cabinets, and others located in Data Center clean rooms.

Current use of the technology

In general terms, asset management is often carried out using Excel as a digital tool to store information about these devices. However, while the tool is powerful, its use is so open that it’s easy to make errors such as:

- Duplicating data, such as equipment names.
- The update date is not usually recorded, so entering one item one day and another item five days later, for the observer, it’s unclear when each entry occurred.
- If an item is being entered during an urgent phone call, the process may not be completed entirely, leaving fields incomplete, and the reason for the lack of information is unknown.
- Data can be easily modified by making a mistake in a row of the file, deleting a row, hiding it, etc.
- It’s also easy for several people to have different usage criteria, with names in uppercase, others in lowercase, others with spaces, others with hyphens or underscores, etc.

Job description with the application

This application aims to reduce such human errors by attempting to provide a more organized framework that eliminates the majority of human error, as certain parts of the process are enforced, making it nearly impossible to make mistakes.

The digitization of the equipment identification process can begin as soon as the equipment arrives at the goods reception warehouse, validating that the received material is correct and placing the NFC tag as the first step in the process.

This tag could already be pre-programmed with the brand, model, and serial number of the equipment and continue on its route to installation and commissioning.

Next, the infrastructure department could install the equipment in a rack; with their smartphone, they would read the NFC tag and verify that the installed equipment matches the one indicated in the received work ticket. Upon completion, they can fill out the remaining fields, such as the equipment name, responsible party, and number of power sources.

Subsequently, the server can be started, assigned to a project or service, and additional information can be added to complete the system's data loading process.

All of this is done with a free mobile application that will be available upon subscribing to the platform. The number of users is unlimited, allowing this process to be carried out simultaneously at multiple sites across a country.

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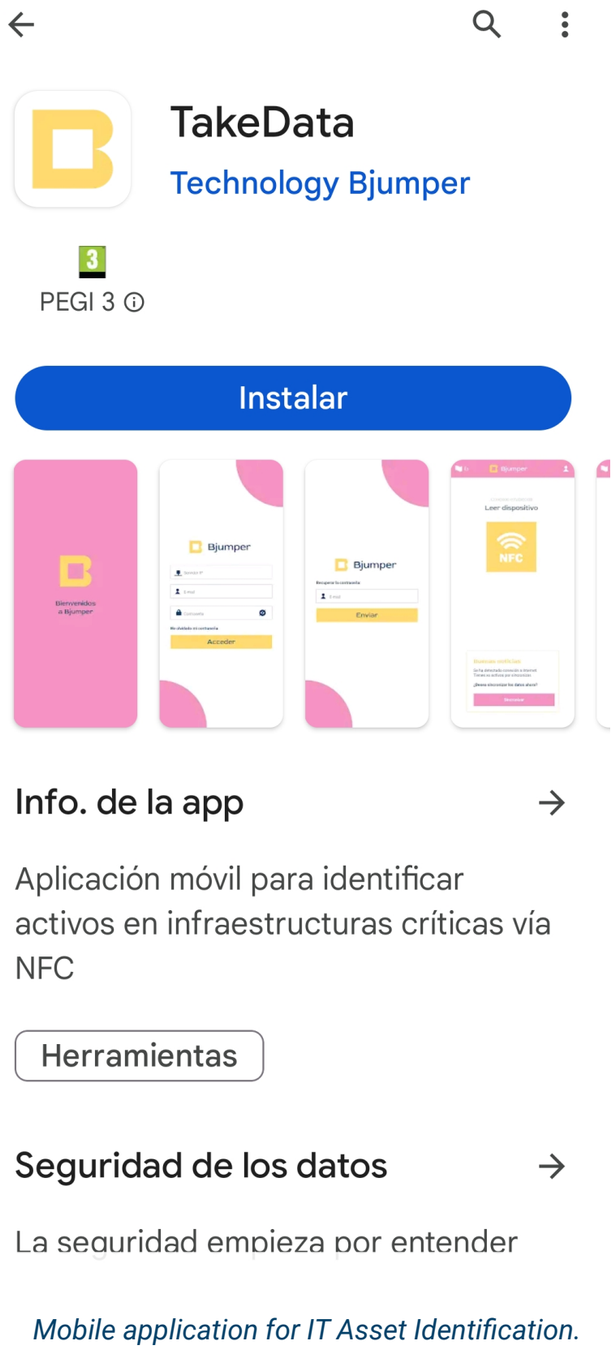


Mobile application for IT Asset Identification.

The data loading process is always focused on ensuring that the information entered by the person in front of the equipment takes precedence, as they have complete certainty about it.

Therefore, the system is designed for sending information from the mobile application to the web application and subsequently to other systems that need integration.

If information could be sent from the web application to the smartphone, there would be uncertainty about which information should take precedence. For this reason, the focus is on the integrity of the information, and the process from the smartphone to the web application ensures data integrity in the long term, regardless of the number of people working simultaneously on different smartphones and the web application.

After this initial loading, daily operations are straightforward. Sending a ticket to a technician to perform an operation on equipment would prompt the technician to locate the equipment in the web application, identify its row, rack, and height unit, move to the location, verify with the mobile application that the equipment for the intervention is correct by checking the equipment name or serial number. Thus, the technician has absolute certainty that their work will be accurate.

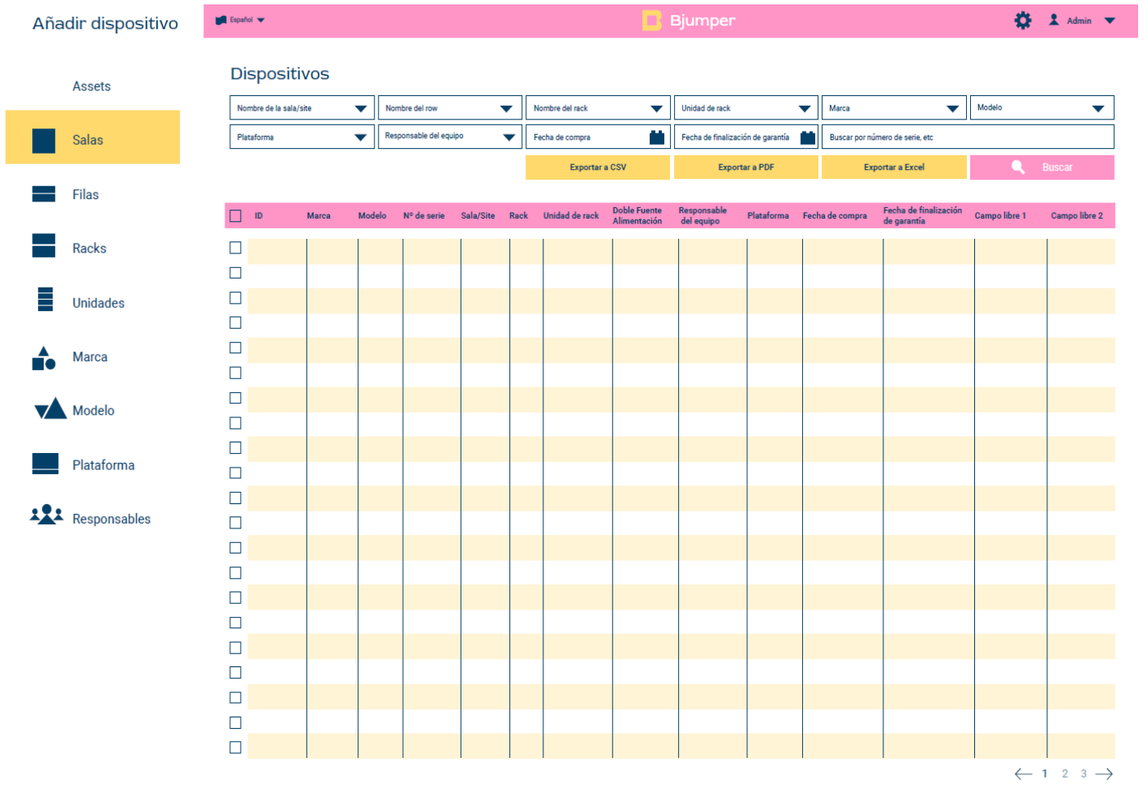
Once the job is finished, if any equipment data needs to be modified, it can be done directly on-site and in real-time, avoiding oversights or forgetting to update the information. The information is updated again within seconds, and the notification time for ticket completion is much faster and error-free.

Working with the web application for querying, exporting, or reviewing is straightforward, as it offers multiple filtering, searching, and exporting options. It is similar to working with Excel, which we are all accustomed to, but with the assurance that the displayed information is accurate and completely up-to-date. This adds significant value to the application.

In a real project, the first step is defining the architecture of the Data Center room or rooms, including rows, the number of racks, etc. This way, the mobile application has several fields preloaded in a dropdown list, preventing the introduction of information with errors in capitalization, spacing, etc.

This slight inflexibility, contrary to what it may seem, simplifies the task because it is executed much faster and without errors.

In summary, it can be considered as the Digitalization 4.0 version of a conventional Excel.



IT Asset Identifier Website.

Why NFC Technology?

The various labeling options have pros and cons that help us make a decision based on 100% objective criteria.

For example, QR code and barcode technologies share the same drawback—they cannot be rewritten, which is why they did not pass the selection process.

Regarding RFID technology, which is essentially the same as NFC, they differ in that RFID reading is possible at a much greater distance, several meters in fact, while NFC technology only works within a maximum range of 2 cm between the transmitter and receiver.

In our case, precision is crucial because one of the most important pieces of data is the height unit where the equipment is placed. One U (rack unit) measures 2.54 cm. To ensure that we are reading or writing to a specific server, it's essential to be clear about which one we are working with. Therefore, NFC is the technology that provides this level of precision.

In fact, NFC stands for Near Field Communication. Additionally, the tags it uses are passive, so there's no need to worry about battery replacement, dust, temperature issues, or other extreme environmental conditions, as there are tags designed for any situation.

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Features	NFC	QR	RFID
Low cost	✓	✓	✗
Unlimited overwriting	✓	✗	✓
Robustness	✓	✗	✓
Possibility of reusability	✓	✗	✓
Simplicity in configuration	✓	✓	✗

Comparison of Asset Identification Technologies.

Cybersecurity

Security is a vital aspect of software technology, and that's why we have placed special emphasis on a design that is simple, robust, and completely secure.

While the software technology used is state-of-the-art, the following aspects have been taken into account for validating the security of the platform:

1. SSL protocol testing was conducted to enhance data encryption.
2. Load testing was conducted to measure the system's behavior against potential denial-of-service attacks.
3. Vulnerability analysis tests were conducted..

In all cases, the results were satisfactory. We can confirm that the system operates with TLS 1.2 or higher encrypted connections, no significant vulnerabilities were detected, and during the tests, it demonstrated proper functioning even with 5000 simultaneous connections.

What does this application contribute?

* **This application allows usage even when the Wi-Fi or 4G/5G** signal is lost on the mobile device. The information will be stored on the device, and when the connection is restored, a synchronization of the temporarily stored information on the mobile device will be performed. This provides an additional level of efficiency and avoids the need for reprocessing.

* **NFC tags are passive, making them 100% compatible** with any manufacturer that ensures a minimum storage capacity of 500 bytes. This makes it an excellent option to avoid dependency on a specific manufacturer or supplier. Additionally, it allows for the use of different classes based on availability in different geographic areas..

* **The application was designed from the beginning for complete compatibility and integration capability with other systems.** It features a fully documented integration API in "Swagger," providing the technological foundation for potential integration with systems such as DCIM, CMDB, or others.

* **The architecture is highly versatile based on the requirements,** capable of operating in an on-premise version, the client's private cloud, or Bjumper's public or private cloud, depending on the expectations for each project.

* **The use of predefined fields simplifies what the mobile application is requesting from the technician,** as they only need to follow the steps. Additionally, there are two free-text fields that allow entering any desired information, but the guided process with predefined fields is very useful for streamlining the work.

* **As part of the strategy to reach the largest number of users,** the development has been focused on the Android operating system, which is the most widespread among corporate smartphones used by the majority of Data Center technicians. Therefore, with a mid-range NFC-enabled device, any technician can use the system.

Conclusion

The digitization of an asset management system, we believe, should not only be carried out with state-of-the-art technology but also tailored to each market and need.

Therefore, the use of a multi-user system, accessible via web and mobile application, with a process that ensures the accuracy of data in the long term, is scalable and integrable due to being 100% open, represents a good strategy for an “IT Asset Identifier” system for Data Centers