

# Implementing Intel® RFID Sensor Platform: A Real-Life Use Case

## Introduction

Intel has been working to meet the challenges industries face in streamlining and improving inventory management. A major tool in the solution is the Intel® RFID Sensor Platform (RSP). Solutions built on this platform enable companies to more effectively manage inventory, increasing productivity while significantly reducing costs

Let's take a look at a use case where Intel put its own technology to work in one of its own facilities to track and trace inventory—with resounding success. By implementing an RFID solution in the Guadalajara Data Center, Intel invested \$10,000 and generated a \$1 million ROI.



## The Location: The Intel Guadalajara Design Center, Zapopan, Mexico

The Guadalajara Design Center (GDC) focuses on technical development, with several hundred engineers involved with research in a variety of technology areas.

## The Challenge:

The GDC has several lab areas, each of which deals with a multitude of hardware components, from computers, gateways, routers, and antennas...to tools such as probes, logic and power analyzers, oscilloscopes, and generators... to miscellaneous materials such as cables, mounting hardware, nuts and bolts, and more. Inventory control—keeping track of those components as they move between inventory stock rooms, labs, and other areas—is difficult: around 5% of these components are “lost” (become unaccounted for) each year.

## The Solution:

Use the Intel® RFID Sensor Platform to drive an inventory Trace & Track system.

As shown here, the Intel® RSP consists of:

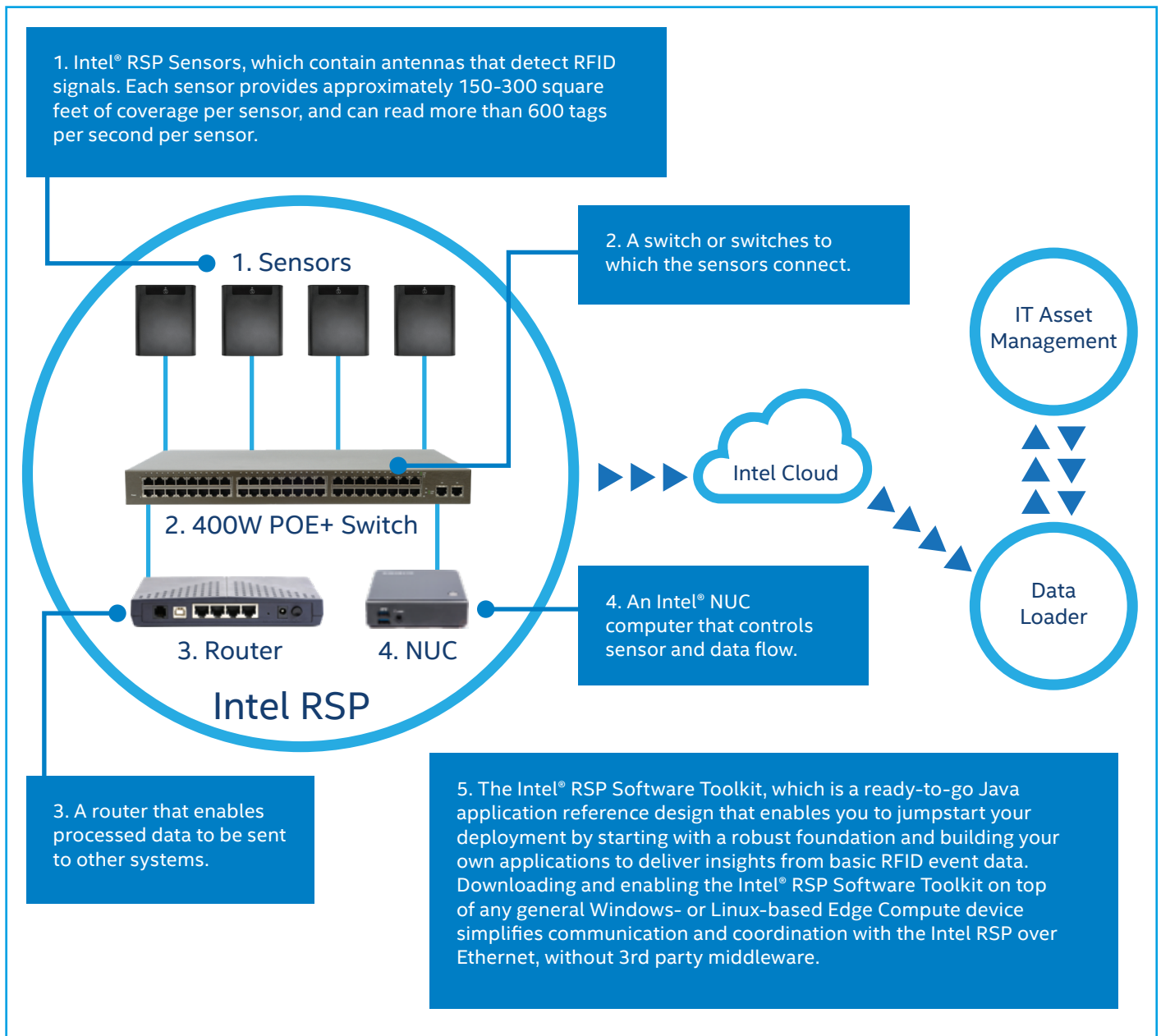


Figure 1. Intel RSP

The Intel RSP is designed to work either stand-alone or within a network of other smart sensors as part of an IOT system working at the edge.

In the GDC solution, the Intel RSP communicates with an Intel cloud, which passes data to the Data Loader, which itself communicates with IT Asset Management, as shown above.

## The GDC Layout

Let's look at the main areas of GDC where component tracking comes into play:

1) The Inventory Control Room is the main storage room for components. When materials arrive at GDC, they are checked into the Inventory Control Room, with an inventory ID assigned to each component.

2) The GDC site contains several laboratory areas, including Lab 1, Lab 2, and Lab 13, as shown here. It's in these lab areas that the work of the GDC is done. Intel scientists and technicians work in the labs on a wide variety of projects, and virtually all these projects require hardware.

3) Note that the areas mentioned above are not always contiguous; staff moving from one area to another may move through corridors or other work areas.

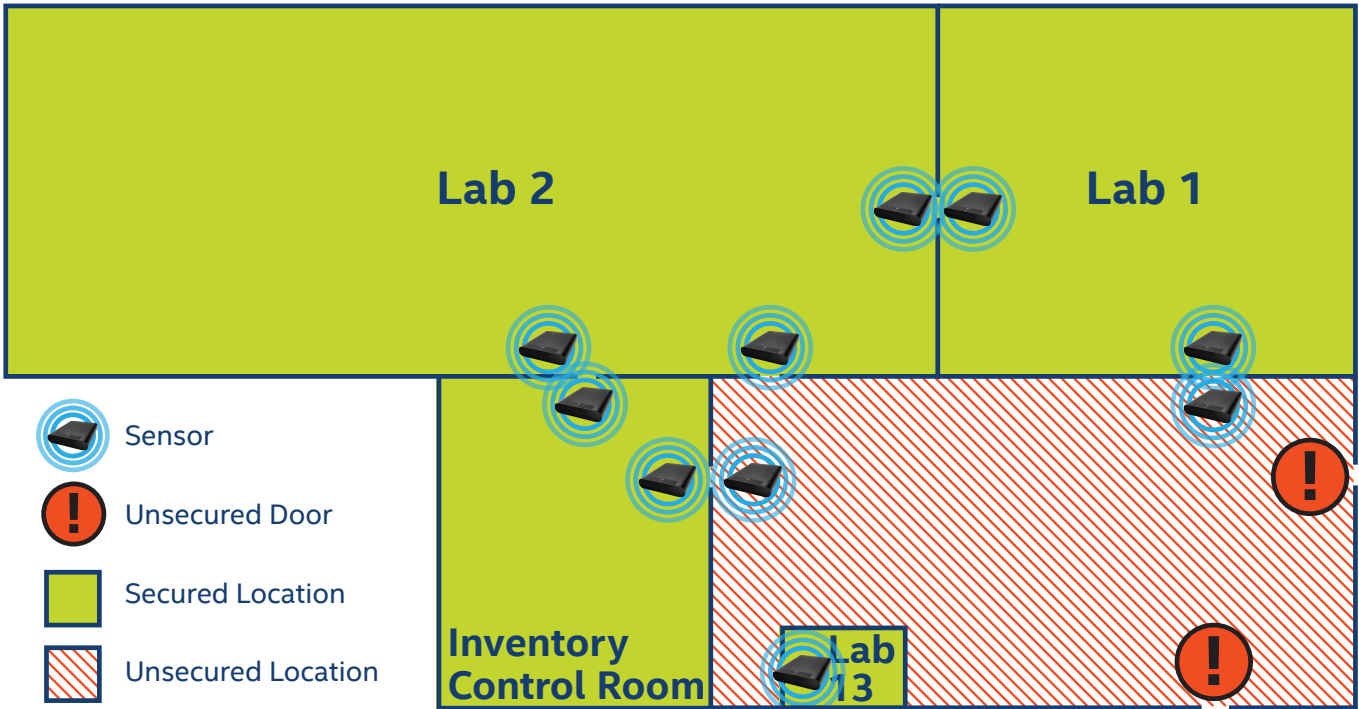


Figure 2. GDC Layout

## The Flow of Materials

When scientists in a lab need a particular hardware component, they requisition it from the Inventory Control Room; a staff member locates the component and transfers it from the Inventory Control Room to the scientist's area in the lab. Prior to the introduction of the Intel® RFID Sensor Platform, this is the point at which problems started: it was very easy for a part in the lab to be set aside, moved to another location, or otherwise lost to inventory control. When it came time for that component to be returned to inventory, or used elsewhere, all too often it was nowhere to be found, at a significant cost in time and materials.

To meet this challenge, GDC staff turned to the Intel® RSP Sensor Platform to enable a new inventory control process. In this new process, when a new component arrives at the GDC, it is checked into the Inventory Control room; a metal RFID tag is applied bearing the inventory ID tag, and the inventory ID number is entered into the IT Asset Management database. The tag is scanned and its location recorded as Inventory Control, where it remains until needed.

When a project in the lab is in need of that component, staff can check the database to find out where it is currently located. It's at this stage that the value of the Intel RSP becomes clear. Previously, when staff entered the Inventory Control Room,



Figure 3. Inventory ID tags



found the component, and left with it, there was no record of this activity. Today, though, when staff exit the Inventory Control Room with the component, Intel® RSP sensors mounted at area exits read the RFID tag on the component and record in the database that it has left the area. Reciprocally, RFID sensors inside the lab area also read the tag and record that the component has entered the lab.

When the component is no longer needed—whether that's minutes or months later—and staff returns it to the Inventory Control Room, the sensors read the tag again. The sensor in the lab records that the component has exited that area, and the sensor in the control room records its re-entry to the inventory area. The database is updated accordingly.

Note that if the component exits either the Inventory Control Room or the lab to an area that is not monitored, the database will have a record of its leaving, but the current location of the component won't be known until it re-enters a monitored area—for instance, lab 13, as shown in Figure 5.

### Benefits at the GDC

Implementing the GDC inventory control system provided Intel with a number of benefits, including:

**Cost savings:** As mentioned earlier, Intel's investment of \$10,000 in supply chain improvements resulted in an ROI of \$1 million. Intel accomplished this through fewer lost components, less time spent searching for lost items, and a positive impact on lab operations.

**Inventory accuracy:** No more reliance on error-prone, manual inventory procedures. The Intel RSP solution implemented at GDC uses metal RFID tags, as opposed to the much smaller paper tags used with some other systems. This helps improve the readability and success rate of the tracking. For example, testing after installation at GDC confirmed a 97% success rate for reading tags as they passed by sensors at entry and exit points, and a 98% success rate across the entire facility as a whole. Maintaining an accurate inventory means GDC can minimize inventory carrying costs because it's less likely that too many or too few of any one component will be ordered. It's easier than ever to maintain appropriate inventory levels.

Plus, thanks to timely event capture, staff not only knows where components are, but where they've been and how long they were there.

**Simplified installation and maintenance:** The Intel RSP works out of the box and requires no hardware development or software patches, so the solution was up and running in minimal time. RFID sensors can be easily affixed to any wall or ceiling, using a variety of compatible mounting mechanisms. All sensors run on power over Ethernet (PoE) to minimize cable installation requirements and eliminate signal loss across large areas. Plus, the Intel RSP provides a simpler and more organized method for dealing with hardware.

**Process automation:** Actionable insights from Intel RFID sensors decrease error and throughput times by eliminating manual registration and annotation throughout the process flow.



Figure 4. Sensor installed above a door

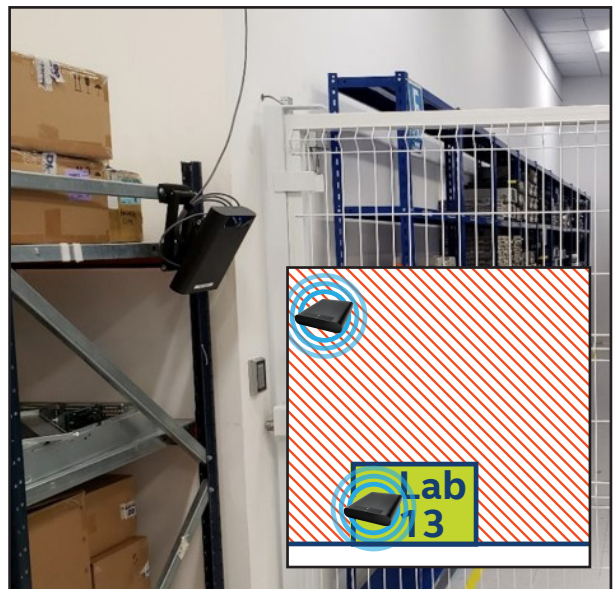


Figure 5. Sensor in Lab 13

**Improved operational efficiency:** Now projects are less likely to be delayed while a needed component is searched for. Schedules are less likely to push out because parts are available quickly when needed. Staff spends less time hunting for parts and more time on projects.

**Enhanced inventory security:** Tracking real-time events not only minimizes errors but also helps decrease inventory shrinkage.

## Set for the Future

GDC is prepared for the future, because the Intel® RFID Sensor Platform is expandable and scalable. Not only can more sensors be added easily and quickly, but advanced sensors also support video, PCI Express, BLE, and Wi-Fi. And the Intel® RSP Software Toolkit enables companies to customize the system to meet their specific needs as time goes on. The possibilities for data analysis are unlimited:

once collected, data generated by Intel RSP can be analyzed and combined in conjunction with other data to generate reports, forecasts, and more.

Regardless of industry, Intel RSP sensors can be used as part of an increasingly broad range of applications. This diagram, for example, shows how sensors in a retail environment can connect to form a complete edge-to-datacenter inventory solution.

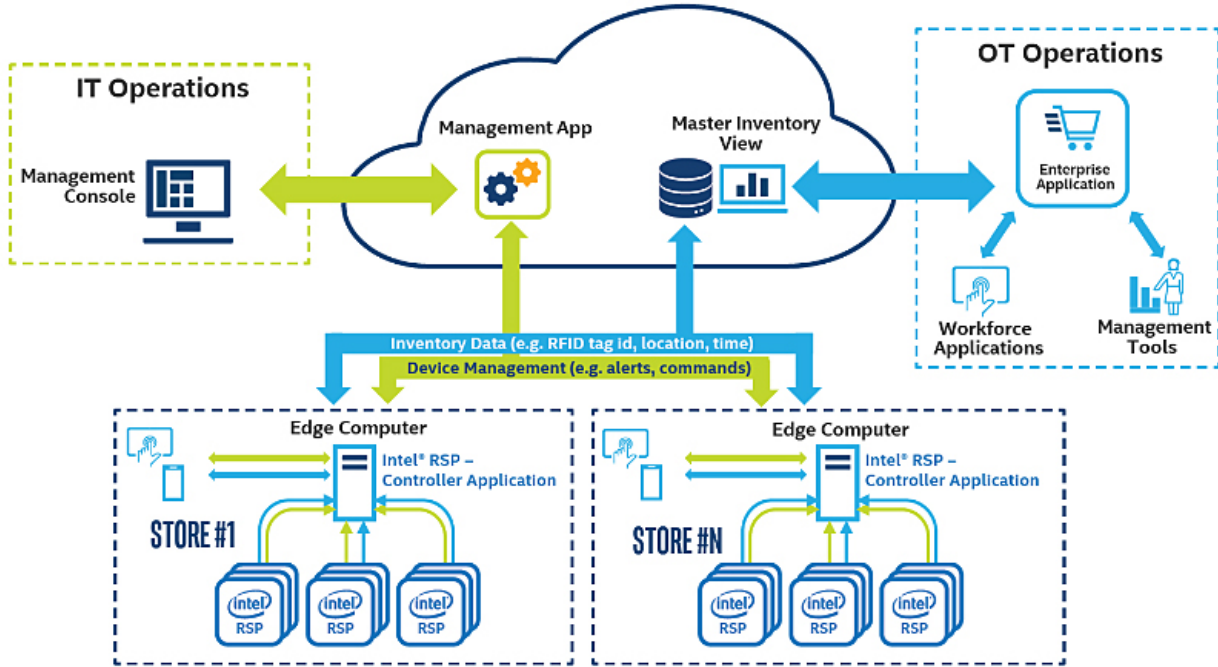


Figure 6. Intel® RSP Retail Configuration

## Summary

How can Intel RSP work in your facility? Now in its third generation, the solution enables you to:

- Transform raw sensor information into valuable inventory data.
- Deploy multiple sensors remotely using a single edge computer.
- Enable secure and scalable sensor deployments.

- Accelerate deployment with an Intel RSP developer kit.
- Customize open source software to build your own solution.
- Create affordable solutions. The Intel RFID Sensor Platform is available through distributors at a price point significantly less than many RFID technology solutions.

## Intel RFID Sensor Platform...

...An affordable, easy-to-install, fixed-overhead RFID system to collect accurate, always-on inventory information in near-real time to drive improvements to your business needs.

For more information, see your Intel representative, or visit <https://software.intel.com/en-us/retail/rfid-sensor-platform>

