

What is NOX?

Nox is a set of devices configured into a system that allows a customer to find immediate information about where an item is, where it has been in the past, and who moved it. It is a proprietary, configurable set of RFID readers, antennas, network server software, databases, Wi-Fi, video cameras, and RFID-tagged items that operate together to produce a tracking, traceability, and automatic surveillance system. If desired, it includes all the exportable file information necessary to integrate its output data with a customer's accounting, inventory, or security system.

Nox uses RFID (Radio Frequency ID) tags to monitor asset movement (people, equipment, computers, and other property) and links the asset movement to video. Using Nox, you can search for any asset and retrieve instant video and time of the entire asset movement through the facility. You can also locate the current location and watch items in real-time. You can find those items, even if they are in briefcases, inside boxes, packed on trucks, under tarps, under coats, behind furniture, or in file drawers.

Nox works via a standard web browser and on most iPads, iPhones, or Androids. It provides 24x7 unattended asset surveillance, alerts management to triggered security events, and maintains a complete history of your asset movement that can be accessed from anywhere in the world.

Concept of Operations

Items to be tracked are tagged with RFID chips. The chips come in a variety of sizes, depending on the item to be tagged. The first system decision is an assessment of what types of RFID tags to use. In most applications, this is a passive, self-adhesive label that is typically 4" X 0.62." They usually come standard on a roll of 1,000.

Labels are purchased blank from a label company, such as Avery-Denison. Blank passive RFID labels come with an inlay inside which serves as a receiving antenna. The labels are run through an RFID printer (such as a Zebra printer), and each label is programmed in the printer to associate the item with a specific, 24-digit hexadecimal code. To help out the humans, the printer will print the ID number on the label, but it generally isn't important for the humans to read it. Some customers will have a need for so many tags that they will want their system to include printers, so they can print tags for themselves. Most customers, however, will be happy to buy the tags pre-printed, from SimplyRFiD (or you, if this is your Special Agent account.)

RFID security concerns

The RFID tag product ID is unique to each customer. That is, it has no meaning unless a customer sets up a database and assigns the ID an associated meaning. The customer does this assignation in the initial setup of the system. In product planning for the quote, it is important to consider how much assistance you, as the Agent, will provide for this setup. Some customers will hire consulting staff to tag the items and set up the initial database. Others will assign the task to their own staff. In either case, the items are associated using the NOX Asset-Tracking-Appliance, which is a separate, secure network server running an MS-SQL database. This appliance (the NOX ATA), records the history of movement of every tagged item. Whenever a tagged item passes by an RFID reader, an event occurs and the event is recorded.

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The events can be transmitted to the customer's inventory management, accounting, or other management software, if the customer's need-application warrants integration. The data is output from the NOX ATA in a .csv file, which can be integrated if you, the Agent, choose to integrate it, and the customer wants it. A complete API set is also available.

Because no information is actually programmed into the RFID tag itself, other than the hexadecimal ID, there is no RFID security concern. That is, an RFID tag carries no meaningful information if it has no access to the customer's secure NOX ATA database. Even if the tag were read by an unauthorized person with a nefarious-purposed RFID reader, the information would be worthless unless they could also hack into the identifying NOX ATA database, which is not resident on the customer's network server. (Note: for additional security, it is possible to configure the NOX ATA server offsite.)

Tracking zones

Each area to be tracked by NOX is called an "interrogation zone." Typically, a zone can be a room up to 800 square feet, or a specific entrance point such as a doorway or loading dock. Tracking areas greater than 800 square feet require incremental sets of NOX Interrogator modules. Each interrogator zone requires an RFID reader (such as a ThingMagic reader.) Readers come in varying shapes and sizes, and are selected based on customer-needs criteria. Readers can also be handheld devices, such as the NOX Vault handheld reader. Readers can be installed covertly or overtly. That is, they can be hidden inside walls or ceilings, or they can be mounted where they can be seen. They have varying read ranges, and can be installed with "slave" modules to expand their coverage area. Full NOX technical training includes criteria for selecting and mounting readers.

The NOX ATA

Every time a tagged item passes a defined interrogation point, or is noted as present by a handheld reader, the RFID tag ID is stored in an MS SQL database on the NOX ATA. The time of this event is also stored, so a history of the item's movement is built. This history may optionally include a video still frame of the event, stored in the database with the item information. The customer chooses whether a specific event should or should not trigger an alarm. If the event is set to trigger an alarm, the alarm can be indicated by flashing lights, bells, or messages sent to cell phones or mobile devices. Further information on how to configure alarms is contained in the NOX technical training.

Video events are retained based on disk space provided, approximately 400GB per camera per month. This is highly variable based on the amount of movement in that camera zone, frame rate stored, and resolution selected. The key surveillance factor is that the tagged item does not have to be visible to be read by the sensors. It will be read inside briefcases or other containers. Video of the time frame that the item moved past the reader will capture the event.

Finding an item and querying the database

Any tagged item may be located by searching on the product ID. The search will bring up a video view of the item on a web browser. The video will show every location the asset has been seen passing a reader, a time it was seen, and a link to the all video events. Asset movement may also be accessed using an XML API, if the customer's application requires software development.

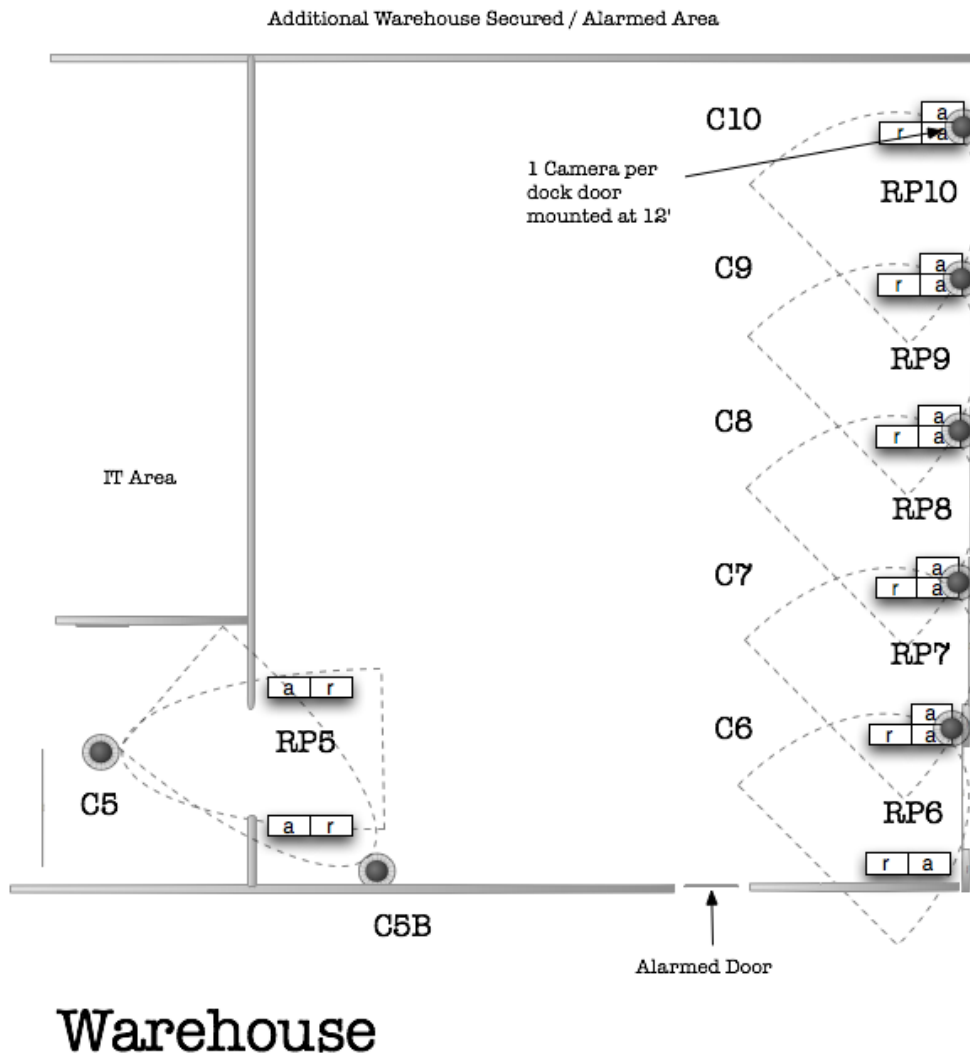
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Check-in-Check-out Procedures

Often, a customer's security concern will be based on the authority of the user. Some people are authorized to move certain items; some people are not. The NOX Check-in-Check-out module allows customers to identify who may move what items without triggering an alarm. It also records who had the item last, who removed it from a specific zone, and where it is now. This is particularly useful in tool rooms and evidence rooms.

Supply Chain Logistics

NOX also supports conveyors, palletization stretch wrap machines, handheld RFID inventory procedures, visual asset maps, and text message notifications on asset movement. The following blueprint of a warehouse shows a typical NOX configuration in a warehouse. RP represents an interrogation zone. R represents a reader, A represents a slave antenna, and C represents a camera in this configuration.



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For more detailed technical training in the NOX needs analysis, product configurations, support, installation, and training, please sign up for NOX Special Agent technical training. You can also request the NOX Product catalog from SimplyRFID.