WHITE PAPER

EVENT ATTENDEE LEAD MANAGEMENT
MOVING TO AN AI PLATFORM THRU RFID

Some History

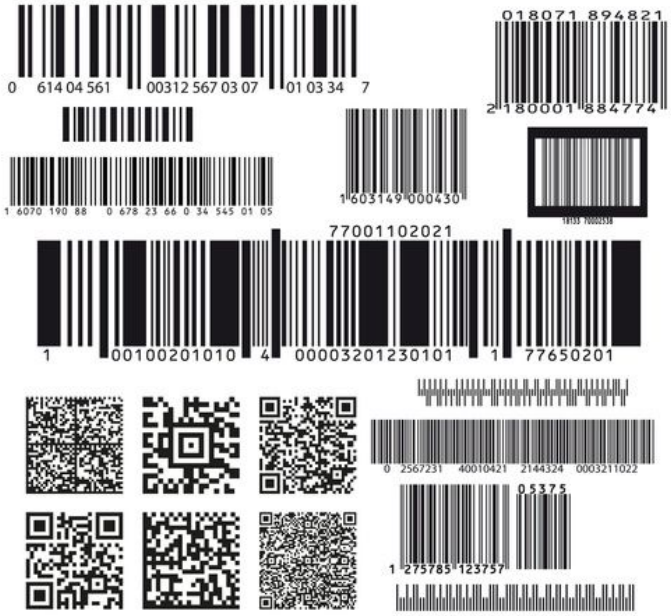
There are countless methods of tracking items in inventory, as they move from one point to another, even tracking them during the transfer process. The simplest form is to just count the items and write them on a piece of paper. You can place the paper into a central file until the next time you count. If you plan to move the items, you can send along a copy of the written inventory report and the recipient will know the quantity of what has (or should have) arrived.

When Barcode technology was created in 1974, it was done at the same time that George Laurer invented the Universal Product Code standard. The first item to have a barcode was a pack of Wrigley's gum and it was scanned with the first reader, the first time in a supermarket in

Ohio. The U.P.C. platform has become standard worldwide and virtually everything is registered with them and the barcode is included on every product.

The actual barcode scanner was created and patented by Norman Woodland and Bernard Silver in 1952. Uniquely, the original solution was loosely based on morse code extended out to become thin and thick lines.

The original language held a limited number of characters so different inventors came up with new variations of the barcode symbology. Code 11, Code 39, Code 93, Code 128, PDF 417, QR Code, Aztec Code, are just a few. The solution has developed into three types of platforms; numeric-only codes; alphanumeric codes; and 2D codes. The two-dimensional codes are QR and Aztec style codes, which have the ability to store up to 7,089 characters. This is substantially more than any inline barcode. Another version of this is the PDF 417 platform which was developed by Symbol Technologies. The potential capacity of a 417 label is up to one kilobyte of data. This is often referred to as 2 dimensional.



While there are volumes of information available about the technical specifications, and history of the different platforms, all barcode scanning methods are passive and one-way. Meaning once the code is printed, the data included is permanent and while it can be read unlimited times, the information remains the same.

Trade Show Relevance:

Before there were wireless connectivity platforms and the Internet, badge readers at North American trade shows would have the capacity to read an attendee's badge and print out the contact information on a sheet of paper. Show organizers understood that if they would contract with a registration company to print badges for all attendees and exhibitors, they could subsidize the cost of attendee identifiers in exchange for allowing the registration company to be the exclusive rental provider of the lead capture devices. The basic premise was that twenty thousand badges could be produced for pennies each if they could secure hundreds of dollars to rent the reader to a few hundred of the exhibitors providing the real revenue stream.

The push to adopt the PDF 417 platform allowed lead retrieval companies to create custom codes that couldn't be easily read by other applications, and at the same time, could deliver a greater amount of data about the attendee from the single scan.

With the advent of the Internet and wireless connectivity, the demand for a 2D barcode to hold massive amounts of data to be transferred locally through a proprietary reader, made by Symbol became less attractive. The idea of offering smaller readers that would capture the key identifier for each attendee, which would then link to a centralized database where for a fee, the attendee information would be transferred to the exhibiting company.

Through all of this, the common requirement was to have personal, individual interaction with each exhibitor in order to ask permission and gain access to the attendee's badge.

As the mobile phone platform has developed to where phones are equal to or greater in power than any of the original readers, applications have been developed that allow the user to use the built-in camera to become a barcode scanner and the cellular connectivity to link to the application servers to retrieve the attendee's information right onto the screen. Notes can be added and stored remotely for actions at the end of the show. This model cuts down on the capital expense of purchasing all of the readers that were then rented out to each exhibitor. Now the exhibitor simply pays for the rights to use the downloaded application to their phone. If they don't have a phone, the provider will rent them a limited use device.

Here are again, this process requires a person-to-person transaction, which limits the number of leads generated. It also requires that the cellular device has a strong battery or access close by to a charger.

Radio Frequency Identification

The idea of using radio frequency waves as a means to identify something has been going on since back in 1935 and was frequently used during World War II. Created by Sir Robert Alexander Watson-Watt, the system would warn of planes advancing from miles away. Under Watson-Watt, he developed a secret transmitter that would broadcast its identifier back only when a ground transmission was received to confirm they were friendly aircraft. This is actually the earliest version of the passive RFID tag.

Because RFID works on radio signals, it does not need to be in the line-of-sight, only within a select distance to receive the initial active signal. There are two types of RFID solutions. The first is the passive solution where the tag has a larger antenna and a small circuit that is

dormant until it is presented with a more powerful antenna signal. This “call to action” transfers enough energy to the tag to wake up and communicate with the antenna.

The second option is the active RFID solution to where the tag actually has a low power battery built in and is constantly sending out a signal to be found by an antenna and reader.

Notice I say communicate because unlike the barcode label that is printed, these tags have the ability to store and write data. A simple label can be a security tag on an item for sale. The 1-bit code is either on or off. On if the item has yet to be purchased, off if it has been paid for.

Readers are incorporated into a number of devices for security such as a door. The reader is linked to a database and can “read” a tag’s code and determine if it is allowed to enter. A hotel room key card is a good example. Not only can the reader validate that your key card is valid for access on a specific day, but it can also record the date and time you used it.

The antenna solutions for RFID tags can be small enough to read only a centimeter away or five to ten meters away. Larger and more powerful systems such as the toll systems on highways for express lanes use this technology to validate the driver's account and deduct a certain payment amount from their account as they pass by.

Active tags can be rewritten to include an exact GPS location. This means that you can use a handheld device in a warehouse scan to find something you are looking for in a particular aisle and have the tag broadcast its location until you find it.

RFID tags and antennas linked to readers are usually placed in areas where goods move from one place to another and unlike a barcode, may not be in a position to be stopped and scanned. Also, because the tag can receive updated information, it can retain codes and time and date stamps as to the most recent action it was involved with. This is especially true with production and assembly where actions at a particular station can be stored.

Combined RFID and NFC (Near Field Communication) functionality have been embedded into your debit and credit cards for a while now. The ability to tap a card on a device to make a secure payment is all due to the NFC capabilities based on radio frequencies.

There are a few challenges for radio frequency transmission. First, there are elements such as metal, water, and human skin that can interfere with the reading of a radio frequency. Even volumes of paper can absorb the signal. Also, because a radio frequency bounces off items, it is

hard to control the “read” zone so as not to collect random tags outside of the area of concentration.

Higher frequency tags have a greater chance to read at greater lengths and at a much higher rate of speed.

ASSESS Lead Intelligence has been working with the latest antenna manufacturers such as Harting Locfield, Times 7, Keonn, Turck, and some of our own developed reader/writer products. We also work with MWT Materials to develop the frequency focus control solutions to narrow the “read” zone. We work primarily in the UHF (Ultra High-Frequency Gen 2) platform.

Trade Show and Special Event Relevance:

There are a number of important physiological traits associated with human nature and attending trade shows and/or special events. These are often counterintuitive to a natural progression or flow. In theory, attendees go through the process of attending an event because they want to meet with companies, learn about their products or services, and if it meets their needs, they buy it. And if they don’t buy immediately, they have at least established contact and a path to the next step to complete the purchase.

But as we know, humans have strange traits that fight against this straightforward process. To start with, multiple studies have shown that the majority of people when entering a large space will automatically turn to their right. In terms of navigation, whether this is a large retail store or an exhibition hall, if they have been there before, they use specific large anchors as landmarks. This can be a major exhibitor that has staked a specific location that over the years has been known as their space.

Even though the attendee has traveled a great distance to get to the event and has a specific agenda, often when confronted by a salesperson or company representative in an exhibit, their immediate response is not to make eye contact and to claim they are “just looking”. The reality is that they are interested but initiating a conversation with someone in sales means they will ask for your business and that’s too much pressure to start the relationship with.

“For example, research conducted by noted industry expert Paco Underhill has suggested that, when given a choice, the vast majority of consumers will turn right after entering a store.”

Closely paralleling the trade show environment is the consumer retail sector, and in a recent report from HRC Retail Advisory “Ninety-five percent of consumers want to be left alone while shopping unless they need a store associate’s help, according to a new consumer survey.”

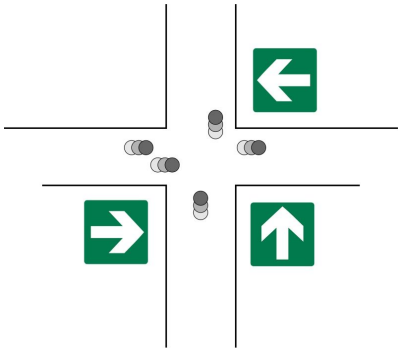
The Fear Of Spam

Whether it is a barcode solution or an RFID badge, asking for permission to scan is often met with resistance. Even if the attendee has just been through a product presentation, there is a hesitation to hand over their personal contact information. Furthermore, a single scanning station cannot fully capture all of the traffic coming through an exhibit space, so some individuals actually seek to collect collateral material that has contact details printed precisely when the scanner is working with other attendees. Strangely enough, the attendee believes they got away and will make the contact on their own terms later.

Conference Events

In a conference setting, if the registration system has collected reasonable demographics about the attendee and they have been assigned an RFID badge, knowing who is sitting in a particular educational track or session and for how long can offer organizers the ability to determine whether the content is important enough to retain someone's attention for the whole time, or based on the attendee's decision making position, maybe there is a certain point in the session where they lose interest and leave.

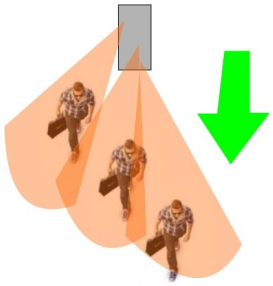
Venue and Exhibition Hall Entry



Another entry collection point is the main venue or hall entrance. Being able to collect badge details passively at an entrance without a staff member confronting them with a reader or clicker to count manually, is both more natural and potentially lower in cost due to less labor.

The challenge with RFID and a large venue entry is that the antennas are positioned to capture a wide "read" area and may inadvertently collect people passing by that don't actually enter. Additionally, organizers are not interested in creating one-way gauntlets so attendees will enter and exit through the same door. Filtering through the reader is an important way to validate movement. Remember, unlike goods on a conveyor system, humans move as they choose.

For the ASSESS Lead Intelligence system, we have developed a blended hardware and software solution that combines an array of antenna that feeds data to readers connected to AI



software systems that evaluate the direction a tag is moving as well as determines whether the read is valid or incomplete.

This means an entry with multiple antennae reads a tag in a particular sequence it is traveling in this direction. If not all of the antennae in a particular array is able to read the same tag, it is determined that the tag did not complete the pass and therefore is not to be counted.

Interactions With Products

At an event or trade show, if attendees wish to interact with a product, such as a test ride of a bicycle, try to fly a drone, or want to tour the inside of this motorhome, RFID tags that are linked to specific products can be temporarily attached to the interested attendee using AI software. The ASSESS Lead Intelligence system can create momentary pairs with a product and an attendee tag. This then records what an individual shows interest in and can be evaluated against all of the other items they look at from one or multiple companies.

Because of the human nature factors discussed earlier, allowing an attendee to explore and self-evaluate is critical. Forcing an attendee to go through the pre-planned presentation in a specific order where YOU highlight the products and services YOU want to concentrate on, may not be of interest to this attendee. More importantly, their desire to “just look” means they we come and find you when they have more questions or are ready to take the discussion to the next step.

Having the ability to understand what products they have interest in when no one is looking is important. Imagine finding out that the majority of the attendee interest was for a product not under the spotlight? This is where the Assess Lead solution blends in Artificial Intelligence. While the simple process of “reading” a tag generates both a code as well as a time and date stamp, it is the software that learns from these pieces of code and develops some decisions on what to do. Sequences scanned within seconds (or milliseconds) and in sequence can yield both validation as well as an action. Random selected “readings” of products can build a history of preferences that can be generalized or identified more specifically with a particular demographic profile. The system can remain passive and just build on the profile or actually make suggestions based on the volume of “reads” taken over a set number of days or the sum total of multiple events.

An example would be there are 15 models of shoes on display. The seemingly random selection of shoes selected by attendees actually builds a series of patterns. Those that start with shoe 4 seem to gravitate to shoe 7 as their second choice. Visitors that start with the 3 model seem to select model 10 more. Without the assistance of a booth staff person, we can learn a

tremendous amount about the preferences as well as what prospective customers see as natural pairs.

Another important aspect associated with the expense of events and trade shows is the right collateral materials and the ability to follow-up a request from a potential customer. Trade show follow-up is notorious for being bad. Industry studies in the US indicate companies participating in a trade show take an average of 35 days to follow-up a lead taken on the show floor. In Europe, it is even longer at 45 days. Attendees who have taken time from their businesses, traveled often a great distance to get to the event, paid a fair amount to enter, rightly expect that if they finally show interest in what you are selling that the company will get back to them in a reasonable timeframe.

Using RFID technology, ASSESS Lead Intelligence has created modular reader/collectors that can be easily incorporated into a product display. Attendees wearing an RFID badge can simply wave their badge over a small graphic dot and the system will send the exhibitor the lead request, while at the same time, deliver the product literature and technical specifications in PDF form to their email address. Now the lead response time has been reduced from 35 days to 60 seconds.

The devices comprise of a miniature touchscreen Android device linked to a RFID reader on a 36” cable. Operating off of an AC power source (or it can be powered by a rechargeable battery), an exhibit house can easily incorporate the reader into a product display an embed the reader under a graphic explaining the simple scan “Request For More Information” area.

The touchscreen allows for the simple activation of the application. The computing device can confirm the link to the secure wireless network for data transmission and the heavy lifting done in the data analysis is all done in the cloud.

Companies can place a dozen of these in their exhibit space and the requests are instantly uploaded through a 4G link to the cloud. The hardware/software application builds a mesh network to link the individual devices together and send the results through browser-based forms. The savings of not having to print volumes of collateral goods can be significant. Often the balance is tossed at the end of the event because the shipping expense associated with luggage weight to get them back to the office is too great.

Rental packages make it affordable for exhibitors to collect and evaluate data from multiple devices when compared to the cost of additional staff hovering around booth visitors.

Upselling and Transactions

Events and exhibitions often include some type of payment options. Attending an additional session, purchasing an item in the association's bookstore, buying drinks at the cash bar in a networking event are a few examples. The ability to program an RFID badge to become a secured payment device adds managed expense accounting for a company employee not outfitted with a company credit card. A preloaded attendee badge could provide them with enough additional funds to participate in the event fully without the fear of these funds being used outside of the event.

Predictive Analysis

For most event organizers, contracting a specialist to evaluate your collective data after the event is done is not predictive. Reviewing data collected during an event is "Post Data Analysis" and there is nothing predictive about it. The predictive analogy, in this case, requires the organizer to assuming that the economic environment, industry policies and the most important topics for your event will remain static until the next event. The ability to analyze your data in real-time is completely different. Here are some scenarios to look at:

Tracking attendees to the floor - When does each attendee come to the venue? When do they leave? Do they return, and if so, how many times? Are the times relevant to specific events happening on the floor? When do the decision makers come to the floor and how long do they stay? What show region draws the largest number of attendees based on how long they stay at the event?

Tracking The Main Aisle - By placing an array over the largest intersection you are able to track the traffic flow in each direction at every minute of the day. Place more than one array on a long aisle and you can determine who travels to the farthest end of the hall. Are they decision makers? Are there exhibitors with the products they indicated they were most interested in down at that end?

Product Testing - Because the products have been tagged in this area, you can evaluate which items they found most interesting. Was there a specific product category that the attendees were most interested in? Did they return to evaluate a particular product more than once? Who was actually doing the evaluating? What is their role in purchasing? Where certain products of more interest to attendees from a specific region?

Using External Data - Now imagine you can build a live map that pinpoints the address of every attendee. Now add a layer that blends in US Census data such as economic and education by zip code, household value, family size, gender, and ethnicity.

Think what you could do with that data during the event that could change the flow or within days following the event. What decisions could your organization make about the next event?

For Exhibitors To Use The Data About Their Products

If we assume that an exhibitor has positioned multiple reader/collector devices in their exhibit space, of the number of data collection devices set within the booth, what products generated the most interest when the attendee was not prompted by a staff member? What functions did that particular product deliver to this audience that maybe your lead product did not? If they looked a more than one item, what was the key differentiators between them? What are the demographics of the people who requested more information with their badges? Were they buyers or specifiers? Were they from company divisions that would be considered natural users for this product? What sales territory are they in?

When product testing is done that involves multiple brands with similar products, being able to look at the data provided by the attendees that interacted with your products as well as the competitors is invaluable. Do you understand the differences and/or similarities between the two products? What is the price point difference? Based on their address how close is a dealer or supplier to be able to service this attendee? Even something as simple as in what order did they test the products? All of these questions can build a deeper picture of how a company did at an event using this type of system.

Using the ASSESS Lead Intelligence System

Built as a cloud-based software service, and bundled with a hardware rental scheme. The solution can provide a complete advance registration system, as well as onsite registration with badge coding and distribution.

The system can also interface with an existing registration solution by cross scanning the existing badge into the system and either adding an adhesive RFID tag to the existing badge or attaching an additional plastic card to the lanyard with the built-in RFID chip and antenna.

The badge stock is credit card-sized plastic and can be printed in full color with custom event and sponsor graphics on one side with the attendee's name on the other. Labels are available in a variety of sizes to work with existing badge designs.

The partnership with Square allows for credit card payments and the Square cash register can accommodate all other types of payments.

The secure software system provides full administrative access from any web-enabled terminal. Individual exhibitors receive their own secure access with links to data entry tables, reports, and real-time infographic charts monitoring the event and individual exhibit activity.

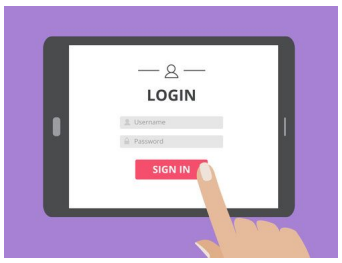
Onsite registration can be presented to both staff and attendees on simple Chromebook laptops and computer terminals. No expensive Windows or Apple hardware required. Badge printing combines thermal text on one side with the pre-printed organizer/sponsor graphics on the other. The printer is networked to all onsite registration stations and Fargo badge printers and encoders deliver a printed badge in 6 seconds.

Centralized product testing is accomplished with assigned RFID tags. These are linked to the products listed in the system, which are associated with each exhibitor for that particular event.

Organizers have the ability to formulate their own demographic questions to be presented on the registration form. There is also an option for a post-test evaluation survey that can be configured on a wireless tablet and completed randomly with attendee badge scans.

The Android-powered tablets include ASSESS Lead Intelligence newly developed miniature RFID reader that operates through the headphone jack, allowing the table to use an external power source to keep operating all day long. The new tag scanner has a read range of 1 to 5 cm to avoid random badge reads.

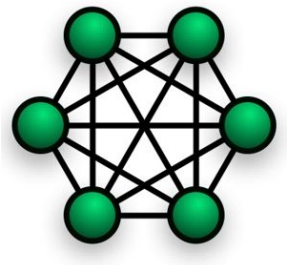
Individual product testing readers and/or information request units with miniature RFID antenna, include a compact computer wedge that links to the WiFi mesh and sends the data captured into a browser form to the cloud. The device can operate on standard AC power, or 12v portable power.



Monitoring your data in real-time is easy when there is a secure portal for each exhibitor to log into. Prior to the event, they can enter details about every product available for attendee testing or interaction. Once activated with RFID tags, they can follow along and monitor all activity that each product exchanges with each attendee. Exhibitors can also monitor overall traffic.

The entry scanner systems combine a series of antennae that are both suspended above as well as placed under flooring. There are available archways, and

truss frames to support the antennas and readers. All devices are connected securely via a wireless mesh network.



The system is inexpensive considering all of the built-in features and ease of setup. The mesh network technology allows for funneled connectivity back to regional high-speed broadband switches or through independent 4G high-speed cellular modems. There is limited wiring required and deployment does not require AV technicians or building engineers. Best of all, it is flexible and movable as needed.

ASSESS Lead Intelligence as a package can be contracted for everything from an outdoor experiential event in an open space, to a conference venue inside of a hotel. For larger applications such as trade shows and exhibitions, the system can be incorporated to work with an existing registration solution or provide a complete turnkey application that runs from advance online registration, through onsite physical registration, right through to full organizer and individual exhibitor data analysis.

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