Splunk Augmented Reality

Experience
Your Data

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Introduction to Splunk Augmented Reality (AR)

Splunk already provides great value in the office and at the desk, via beautiful visualizations and dashboards. What if that experience could be taken on the road? No longer a hypothetical, Splunk® AR ties Splunk data to real-world objects, so users can consume, interact and take action on data wherever it lives. Whether it's the factory floor or on location at a cell tower, users can now enjoy the benefits of Splunk via mobile, overlaid visualizations anchored on corresponding assets.

Available Scanning Methods

The Splunk AR app supports several ways of scanning for and displaying dashboards and AR workspaces using camera overlays combined with visualizations of live data from Splunk.

Quick Response (QR) Codes

Quick Response (QR) codes are a popular type of barcode that allows for the transfer of digital data from a physical object to a device using image processing. QR codes identify the entity they are attached to and function as an anchor for the app to use when positioning visualizations over an asset in augmented reality. Like other techniques that use image processing, reading QR codes requires environments with good lighting.

QR Codes and Splunk AR

The Splunk AR app associates QR codes with an AR workspace — a camera overlay of a collection of visualizations that contain live data from Splunk — as well as standard Splunk dashboards.

Near Field Communication (NFC)

Near field communication (NFC) tags store and transmit data over a contactless protocol that requires the device reading the tag to be within 4 centimeters. NFC tags are available in a variety of form factors in varying sizes and is a scanning method better-suited to environments with poor lighting conditions. Tags can also be affixed to equipment to be out of sight or, conversely, displayed prominently to readily show where the data can be accessed.

NFC Tags and Splunk AR

Similar to QR codes, NFC tags used with the Splunk AR app can be associated with AR workspaces or standard Splunk dashboards. When associated with AR workspaces, NFC tags do not provide the app with a physical anchor point in space to position the workspace. Due to this lack of a physical anchor point to pin the workspace, we provide users with an option to use an image of Buttercup to act as the visual queue for anchoring the AR workspace in the real-world. The user can also choose to not use Buttercup as an anchor and instead manually position the workspace using the device every time a tag is scanned.

Asset Tags

In the event that users have their equipment pre-tagged with asset tags, Splunk AR can scan these existing tags and associate them with Splunk dashboards to create an AR workspace or have them be linked to a standard Splunk dashboard. Beyond QR code and NFC tag compatibility, Splunk AR also supports the following barcode symbologies:

- Aztec
- Codabar
- Code 128
- Code 39
- Code 39 Checksum
- Code 39 Full ASCII
- Code 39 Full ASCII Checksum
- Code 93
- Code 93i
- Data Matrix
- EAN 13
- EAN 8
- Interleaved 2 of 5
- Interleaved 2 of 5 Checksum
- ITF 14
- PDF 417
- UPC-A
- UPC-E

Asset Tags and Splunk AR

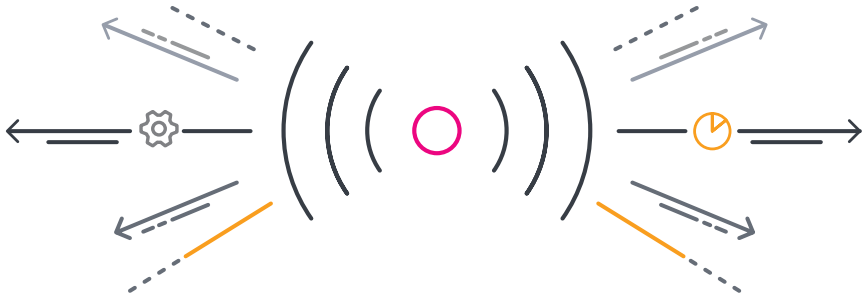
Using existing asset tags can be advantageous. Pre-existing tags remove the barrier to entry for using Splunk AR by removing the requirement to tag the equipment with Splunk-generated QR codes or NFC tags. Additionally, existing asset tags are likely to include identifiers that are already ingested into Splunk. Splunk AR supports these asset tag identifiers for inclusion in dashboards, which require the asset identifier as a form input.

Beacons

iBeacon is a protocol that uses Bluetooth Low Energy to transmit a signal with an identifier that can be detected by compatible devices and the signal strength can be used to determine proximity to the source of the signal.

Beacons and Splunk AR

The Splunk AR app is iBeacon-compatible and supports associating beacons with standard Splunk dashboards. This functionality allows users to associate dashboards with physical locations and present “nearby dashboards” to devices without any sort of action being required on the device itself. The primary advantage beacons provide is hyper-local proximity coverage from a range of over 10 meters to within a few centimeters. This sensitivity allows the Splunk AR app to accurately rank a list of dashboards in order of proximity from device in even the most beacon-dense areas.



Geofences

Geofences are virtual boundaries around geographic areas that allow a device to trigger an action when it enters or exits the perimeter defined by the boundary (using GPS-based location tracking).

Geofences and Splunk AR

The Splunk AR app allows users to create custom geofences on a map and associate them with standard Splunk dashboards. Similar to beacons, geofences offer the benefit of presenting Splunk data relative to a physical location when a user approaches the location. However, geofences differ in a couple of ways. Geofences are not as hyper-local as beacons simply due to the limitations of GPS technology — geofences work best when they are at least as large as a building. Geofences also differ from beacons in that they do not require any special hardware at the physical location to transmit a signal. Instead, geofences rely entirely on the device to track its own location and allow the Splunk AR app to present different information as the location of the device changes.

Which Scanning Method Is Best?

Concentric Rings of Information

The Splunk AR app is designed to provide the most relevant data to users at a specific time. There are layers of information stored in Splunk dashboards, each using a different method of scanning to answer different sets of questions. The layers of information can be broken down into the following three concentric rings:

Outer layer: Geofences

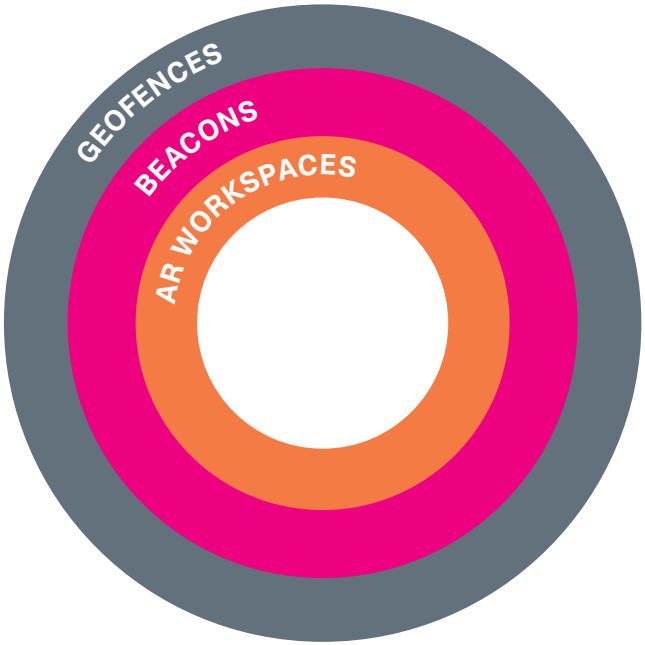
It is most useful to associate an entire geographic site (e.g. factory, data center, office, etc.) with dashboards that represent the health of the collection of data producers within that site. For example, a dashboard representing the overall health and vitals of a factory.

Middle layer: Beacons

Beacons are very useful when used to broadcast data from a single instance for passive consumption. A beacon could be attached to each machine in a factory and each one associated to a dashboard showing live data from the sensors on that machine. Then workers around the factory could consume data from machines near them.

Inner layer: AR workspaces

AR workspaces are incredibly powerful when a specific instance is being investigated and it is useful to have each data point tied to a physical object on the instance. If a worker in the factory is investigating a machine that is suffering from an outage, they can scan the AR workspace and see each sensor value overlaid on its respective sensor. This can be helpful in differentiating between multiple sensors in a complicated IoT environment.



Splunk AR in Action

We have compiled use cases covering a few different industries that use Splunk heavily. Consider these industries for uniquely valuable usage patterns of the Splunk AR app.

IoT (Industry 4.0) – Telecommunications

A telecommunications company dispatches field technicians to service cell tower sites periodically. The technician is tasked with driving to a cell tower site and running diagnostics on the on-site equipment to solve a problem. Often, the technician calls in to speak with IT to get a live relay of data running through the site to help debug the issue.

Consider the following application of the concentric rings method using the Splunk AR app:

Outer Layer: The field technician drives to a cell tower site. Upon arriving and parking the van, the Splunk AR app picks up that it is within a geofence corresponding to this location and brings up a dashboard containing high-level data the technician will be needing: last service date of the site, health checks of all systems and the manifest of all the equipment deployed on site. Equipped with this information, the technician can get a cursory understanding of failures on the site before digging deeper.

Middle Layer: Now, the technician gets out of the van and starts to approach the cell tower shelter. The Splunk AR app detects the proximity to the various beacons embedded in the site's equipment and brings up more specific dashboards for each of the machines. The technician can now view data on each system to get specifics about the failures that have occurred and have a view of a Splunk dashboard containing all the data they need to understand specifics on system issues — all without needing to contact an IT support team (or other remote experts) over the phone.

Inner Layer: Once the technician has determined the root cause, they realize they need to open up the generator because it looks like something has happened and some of the lines are disconnected from power. The engineer uses the Splunk AR app to scan the barcode on the generator housing to load an AR workspace overlaid on the cables. This workspace shows visualizations for each of the power lines on top of the physical connections inside the housing. The workspace also contains some notes placed on top of important systems that include labels so the technician doesn't need to look up a diagram to see which wires are for the power supply. The engineer can then easily fix the power supply issue without needing to consult a webpage on a laptop or an IT expert that provides Splunk data readings over the phone. As the power supply is fixed, the AR workspace immediately reflects the fix with updated data and visualization color changes.

Retail

A multi-national chain of electronics stores uses Splunk as a tool for analyzing their sales, IT and consumer data. Stores log all transactions from their point-of-sale (PoS) systems into Splunk so that they can track their sales. In each store, there are several demo units with sample equipment available for customers to use and play with as they browse and shop — these units track usage statistics for each demo that allow stores to optimize the shopping experience. And finally, these stores have advanced entertainment systems that require complex IT systems to create a positive shopping atmosphere and promote consumer engagement. Every employee in the store is equipped with a mobile device and the Splunk AR app empowers them to act on insights uncovered by Splunk.

This is how Splunk AR could look in a retail setting:

Managing Store Sales: Store management needs to track store sales and overall metrics on performance for various time frames (e.g daily, weekly, monthly, quarterly, etc). The chain's central finance team has provided a general Splunk dashboard for each store to use to track and manage their sales data. This dashboard takes a form input of store ID and each store has a geofence configured on it that links the store's ID to the sales dashboard. Now, store management can simply launch right into the correct sales dashboard with the correct form input without any knowledge of how Splunk works or how the dashboard is configured.

Managing Hardware Statuses: Daily, at closing time, the store staff does a walkthrough around the store to tabulate the usage data from each demo unit and also to check the health of each unit and fix any broken parts on the demo. Each demo unit is embedded with a beacon linked to a Splunk dashboard that contains all the consumer traffic data for the day. Data that is commonly useful about each demo can include things like battery status (does the device need to be charged?) or general hardware status (whether or not a pair of headphones is still functioning). At closing time the staff can simply walk through the store, without any interaction required, from unit to unit and get instant signals from color-coded dashboards about each demo unit's health and performance for the day.

Investigating and Debugging by Non-Technical Staff: The complexity of the entertainment system requires a large server rack in the back of the house to coordinate and power all the experiences. A team of technicians is sent onsite to install the IT infrastructure initially but it is extremely expensive and slow to maintain and debug the infrastructure without onsite IT teams. However, since each system is sending data into Splunk, when an entertainment experience breaks down, the non-technical staff members onsite can simply scan the server rack using the Splunk AR app and instantly see an overlay that sheds light on the vitals of the infrastructure. The staff member instantly sees notes on top of important aspects of the infrastructure that should not be touched (such as the network switch powering the entire store's network) as well as notes that contain instructions on which servers to restart when debugging certain experiences. The staff member can then attempt the basic debug steps on their own without needing to fumble with a video call with IT or requesting an onsite visit from IT.

Healthcare

SA hospital system that serves thousands of patients in large facilities heavily uses Splunk to collect data from all machines and devices used in patient care. These machines and devices require periodic servicing per set standards so that they continue to be accurate within a tolerance. Additionally, the data from these machines can provide a real-time data stream that clinicians can use to better inform their treatment plans. The hospital system owns thousands of devices that are deployed in the field for various staff to use, including machine technicians, doctors and nurses.

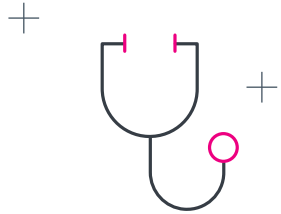
How would Splunk AR work in a hospital setting?

Making the Rounds: Periodically, doctors do rounds of their portion of the hospital wing. It is extremely important to the hospital to not disturb their inpatients unless absolutely necessary. Typically, to avoid disturbing patients, the nurses leave sheets on each door that include some details on the patient and latest instrument readings from the last meal service or nurse call. When the doctor does the next round, they read these vitals and decide whether to investigate further or move on to the next patient. However, the data on the sheet is often stale and the doctor is required to either disturb the patient to get the latest readings or make a decision based on stale data.

With a beacon placed in each room, doctors can do walkthroughs simply by walking from door to door and pausing only if the real-time feed of data coming from a patient invokes concern. Not only is this consumption of data providing the doctor with instant and real-time readings from the machines inside the room, but the doctor also isn't disturbing the patient unless absolutely necessary. Additionally, by eliminating the need for a patient file to be placed on the door, patient data is more secure and only accessible by the doctor that is authorized to view it.

Making the (Maintenance) Rounds: On a weekly basis, a maintenance person visits each hospital to perform maintenance and repairs on any equipment that may need it. However, this maintenance person does not know the specifics of the hospital. For instance, they do not know the different hours of operation for each department. Nor do they know the current staff working or who is on call for each department should an issue present itself. Equipped with the Splunk AR app however, the maintenance person can view a dashboard containing all this information for each hospital they visit by simply being present in a configured geofence around the site.

Sensory Illumination: When a technician is servicing a machine with several sensors, it can be very difficult to correlate which sensor is which data point on a dashboard. With Splunk AR, they can scan the machine's asset tag and a real-time feed of data coming from each sensor is overlaid on top of it. Now, the technician can confidently repair and adjust sensors without trial and error and see values update in real-time. When they are finished, they can leave a note in AR-space (on top of the newly serviced sensor) with some information about the work performed — such as the date of service, part number used, and their name and contact in case the next technician has any questions.



The Future of AR

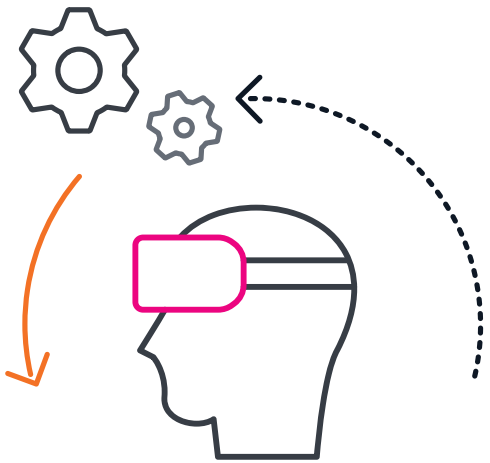
Digital Twins and 3D Content

We've already established that it's extremely useful to consume data in AR. Tying data to where it lives can be powerful in identifying an issue in the real-world. The next step once we discover an issue is to fix it. Currently, there are solutions available to conduct video calls between the technician in the field and the expert in a remote location. Over this video call, typically the AR camera view is shared and the expert on the line can draw on it, similar to a sports commentator using a telestrator to draw on a freeze frame or the weather anchor drawing arrows for the incoming cold front. However, there are drawbacks to this method, including the need to have an expert on demand to guide the technician at all times and dealing with challenges that come with low fidelity video feeds. The expert is also only able to provide 2D visual feedback with the telestrator-like drawings on the technician's screen.

A huge improvement in this scenario is to eliminate the need for an expert altogether by creating a 3D model of the repair the technician needs to perform and playing it alongside the actual object in real-world space. This concept of creating a digital representation of an actual object in 3D and mapping it to the real-world is often referred to as a "digital twin." The digital twin provides numerous advantages over a video call, such as being interactive and allowing the technician to use gestures to move it and inspect different components at every step of the repair process. Creating 3D content for every situation a technician might run into is currently very difficult. Typically, the use of digital twins is limited to larger, more generic static content such as replicas of buildings to show simulations and blueprints. But with the research and development happening in the 3D video space today, digital twins are poised to become much easier to create and our AR experiences will benefit greatly.

New Form Factors

Glasses are a better form factor for the AR experience because they allow for hands-free usage (great for manufacturing settings). However, currently the technology has not caught up and glasses are not quite feasible — mostly due to compatibility and performance issues. At Splunk, we are interested in exploring all form factors and possibilities for making Splunk AR a better experience. We hope to support some form of glasses in our AR experiences in the future and will continue to explore all avenues that enable this.



Conclusion

Splunk AR is just the latest in many steps Splunk is taking to create value wherever data lives. Interacting with data doesn't have to live on a screen. Create a whole new level of value by engaging in real-world situations integrated with Splunk.

Download the Splunk Cloud Gateway to get started on your Connected Experiences journey and incorporate this future-pushing technology into your organization.

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