

RFID

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DIRECTV Broadcast Systems: Asset Management Program

- In 2010 implemented a comprehensive program for management of all Physical/Hardware Assets.
 - Currently 200,000 line items in back end database, spread across nearly 200 locations.
 - Three (3) major broadcast centers (75K assets)
 - Remainder in Remote Uplink Facilities, Local Channel Collection Facilities and Telco Points of Presence (POP).
 - Acquisition Value of these Assets **> \$1 Billion**

DIRECTV Broadcast & RFID

- Major Gap Identified Early in Program Development:
 - Manual cycle counting/inventory turnover was determined to be approximately five years to complete full cycle.
 - Technology refresh averages 3-5 years; theoretically systems could be deployed and retired before ever being inventoried.
 - **Conclusion:** Solution required to significantly increase inventory turnover period, and drive much higher levels of accuracy. Require a **10X solution**, 60 months to 6 months!

DIRECTV & RFID Global

- After 3 years of research, discussion, proof of concept testing issued RFP to 5 vendors.
- Selected RFID Global for following reasons:
 - Most detailed and solution oriented response to RFP; Project Centric, Project Manager Accountability.
 - Industry Reputation & Leadership (RFID Journal Live)
 - Experience in similar implementation; Customer Recommendation (Cisco)
 - Ingenuity & Flexibility in Software Design
 - Mid Range Pricing
 - Willingness to provide solution requested, not solution being sold.
 - Willingness to experiment, push limits & customize/develop new approaches based on specific business requirements, and customer vision.

Software: Visi-Trac - for DIRECTV

- Visi-Trac off the shelf offered tools that quickly differentiated from other vendor products.
 - Heat Map showing real time status of both progress, and read results based on customized floor plan for each room.
 - Scheduling of inventories very flexible, available by various attributes. Location, room, site, rack or any asset attribute.
 - Graphical map interface with color coded status of asset inventories geo-coded on global scale.
- Customization to tailor for DIRECTV followed detailed Business Process Analysis (BPA) and allowed for customer review and input during each of several development “sprints”.

Data Center vs Broadcast Facility or Lab

- Similarities are obvious, but differences are noteworthy as all present varying degree of challenge related to RFID tag placement and “readability”.
 - Data Center (IT Assets): Tend to have higher incidence of recurring layout and form factors of equipment. Easier to implement, and maintain.
 - Broadcast Center/Lab: Less incidence of recurrence, more difficult to tag effectively.
- RFID Global approach involved analysis of all form factors to address special and difficult cases that has resulted in excellent tag reading/collection results!

Hardware: Tags & Readers

- Five different passive “on metal” RFID tag manufactures identified for solution based on extensive testing to meet unique requirements.
- Handheld Readers are Motorola/Zebra MC3190Z
- Audit Carts (see next slide) are RFID enabled, and configured with UPS & Laptop.



DIRECTV Special Requirements

- Audit Cart: Antennas mounted on both sides collecting information from both sides of equipment aisle or row simultaneously, and rapidly!



DIRECTV Special Requirements

- Ability to Separate Business Processes:
 - **Inventory collection** process: Lower Skill level
 - **Reconciliation/Remediation** process & approval of update to backend database (source of truth) performed & reviewed by Data Integrity Supervisor or Manager: Higher Skill level
- Willingness to collaborate with vendor of backend database.
 - VisiTrac information is passed through a web service to backend for update of master database.

DIRECTV Special Requirements

- Willingness to customize software and develop a more precise “location” method during rapid inventory collection process.
 - RFID Technology is limited in “resolution” accuracy by inherent properties of RF signal propagation.
 - Audit cart can detect tag in a “room”, but not capable of determining with high degree of certainty in a particular row, group of racks or a specific rack. Refer to as “**Advanced Audit Cart**”
- **Challenge Question:** What if we use “other” information that is available during collection process and couple with *business/logical rules* to generate higher resolution through location “Assumptions”. If so, how accurate can this be?

Advanced Audit Cart Logic

- Data gathered during collection includes the following information:
 - Signal Strength – indicator of tag proximity to reader
 - Antenna path – indicator of which antenna collected the tag signal
 - Signal Phase – indicator of tag direction from reader
 - Time Sequencing – indicator of “expected” tag read order
- By coupling this information with “expected” precise location information a *reasonable assumption* can be made that particular device is located in same position, or not - without relying on more precise handheld.
- How accurate will this be? Still testing, based on initial testing anticipate better ~ 90%.
 - Highly precise *handheld reader* collection will be performed once per year to guarantee overall target accuracy percentage of 97%.

DIRECTV Solution: End Result

- Broadcast center in LA required team of 4 individuals **three (3) months** to complete in 2014 using manual/barcode method.
- Anticipated schedule for team of two (2) to repeat Q1 this year, ten days.
 - 10X (+) requirement ***easily achieved.***
- Accuracy target is 97%; currently at ~75%.
 - Plan is to continuously, and simultaneously perform inventories at each major location until accuracy level is achieved, expected by mid 2015.
- 22% accuracy increase = High Confidence in equipment location for \$220 Million worth of equipment!

Thank You



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