

## Perspective



### RFID for Airline Baggage

---

Pankaj Narayan Pandit, Principal Consultant, Airlines Practice

#### Abstract

Nothing much has changed in airlines' baggage handling systems, except for few isolated RFID pilots. Fact is that airline industry can ill afford using RFID tags for all two billion passengers' baggage per year, at their present costs.

Current information sharing between airlines on baggage data, has gaps that the legacy departure control and baggage reconciliation systems cannot address. For example, all data pertaining to a baggage tag, such the logic to work backwards to passenger's name, FFP, or PNR record, is not retained in system when a bag is transferred to another airline in process of interline transfer. There is no data sharing of interlined tags. An integrated solution under RFID can address airline industry's pain points of interlining of baggage effectively. It will also mean airline industry need not waste money on technology led solution that proposes RFID tags for every bag.

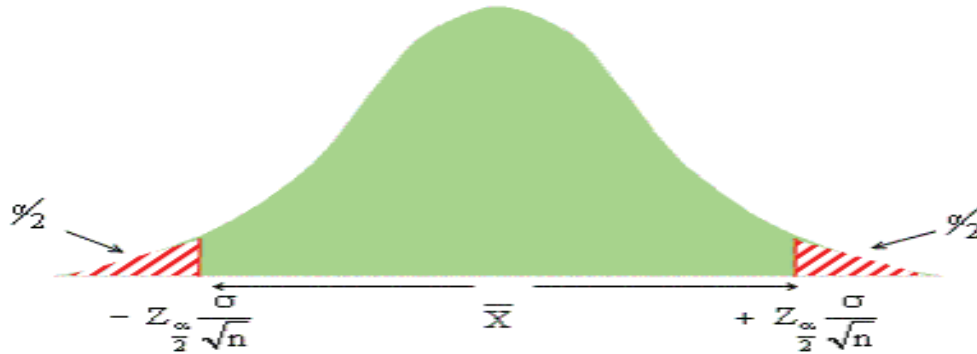
As per Infosys view airline groups/alliances need to undertake root cause analysis of baggage mishandling at major baggage transfer airports, prior to running RFID pilots.

Infosys has a vision to make airline baggage mishandling, a thing of past, due to our deep domain knowledge and a mature RFID practice. We also make sure that there is a clear business case for such investments.

## Introduction

The airline industry handles more than 2 billion passengers annually. As per airline industry statistics, average 5-7 bags per 1000 are mishandled, a four sigma limit. Can airlines improve the processes of handling passenger's baggage using RFID? RFID is touted as a panacea for airline baggage, by technology experts. Is this claim tenable on ROI parameters?

*As per a leading technology analyst, there is no business case yet for using RFID tags for airline baggage due to high costs, and questionable business benefits. Hence the analyst recommends giving a low priority to RFID for baggage, terming it “a major waste of resources”. They have advised airlines to focus on process improvements than making investments in reading technology such as RFID.*



**Six Sigma Approach:** Baggage mishandling can become a thing of past, currently at four sigma limit, if reduced to six sigma limit of 3.4 mishandlings per 1000000 (3.4 DPMO-Defects per million opportunities). This will be a substantial improvement over today's airline industry average of 5000-7000 mishandlings per million bags. To make this transition, Infosys recommends three step approach.

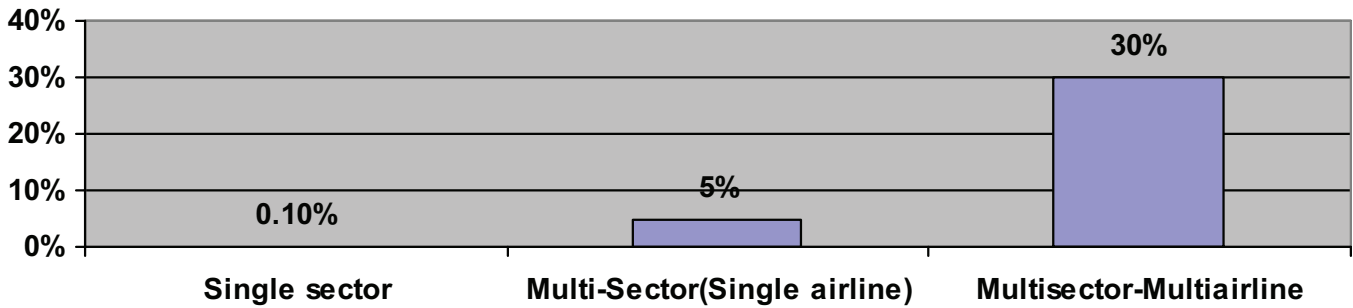
1. Process Design for RFID tags, location of readers, etc. Make ideal pilot strategy that airlines can reap maximize benefits from RFID.
2. Process Management
  - a. Improve network for baggage data sharing among participating airlines, by offering it as a web service to participating airlines.
  - b. Standardize baggage handling processes, particularly interline baggage transfer, end to end responsibility clearly assigned at each step.
  - c. Use RFID pilots with above process knowledge to assess performance in “real time” and take defined action to address problems
3. Process improvement
  - a. Identify the problem areas.
  - b. Define requirements with standards for baggage transfer such as MCT(Minimum Connection Time), clearly establishing standards of performance.
  - c. Measure performance to requirements or change standards of MCT to realistic levels.
  - d. Identify vital root causes for baggage mishandling by analyzing IATA codes for mishandling.
  - e. Establish standards between maximum baggage transfer activity at airport/airline pairs to maintain performance
  - f. Keep correcting the problem till we reach six sigma levels at selected airports ie 3.4 mishandlings per million bags.

**Can Airline industry make lost baggage a thing of past?** It will mean, Cutting down on the exorbitant labor and time spent dealing with lost bags, obviating need of filling up lengthy and cumbersome PIR (Property Irregularity Report) when bags are mishandled, cost of tracing systems, and settlement costs pertaining to claims of lost bag@ \$ 20 per Kg of checked baggage weight. According to a leading airline industry information technology organization, a baggage solution can potentially save airlines \$ 1 billion to \$650 million-plus, yet investments of an industry wide RFID solution, will be staggering, not only due tag costs but necessitating hardware, and replacement of baggage tag printers. [Infosys is proposing RFID integrated solution specifically for multisector-multi-airline baggage transfers with data sharing network with ability to track location and whereabouts of any interlined bag in real time.](#) It will improve customer loyalty by eliminating irate customers who suffer the

inconvenience of mishandled baggage, as the bag's location will be tracked at all points of its journey. In worst case scenario, when bag is left behind, its last location will be always available in system, proactive initiation to send the bag to its desired destination in case of mishandling..

Root cause of baggage mishandling seems to be interlining of baggage! (Source: An international airline based in South Asia)

### % of Baggage mishandling is much higher for multisector,multi-airline transfers



### Current Baggage Handling Process and Problem Areas

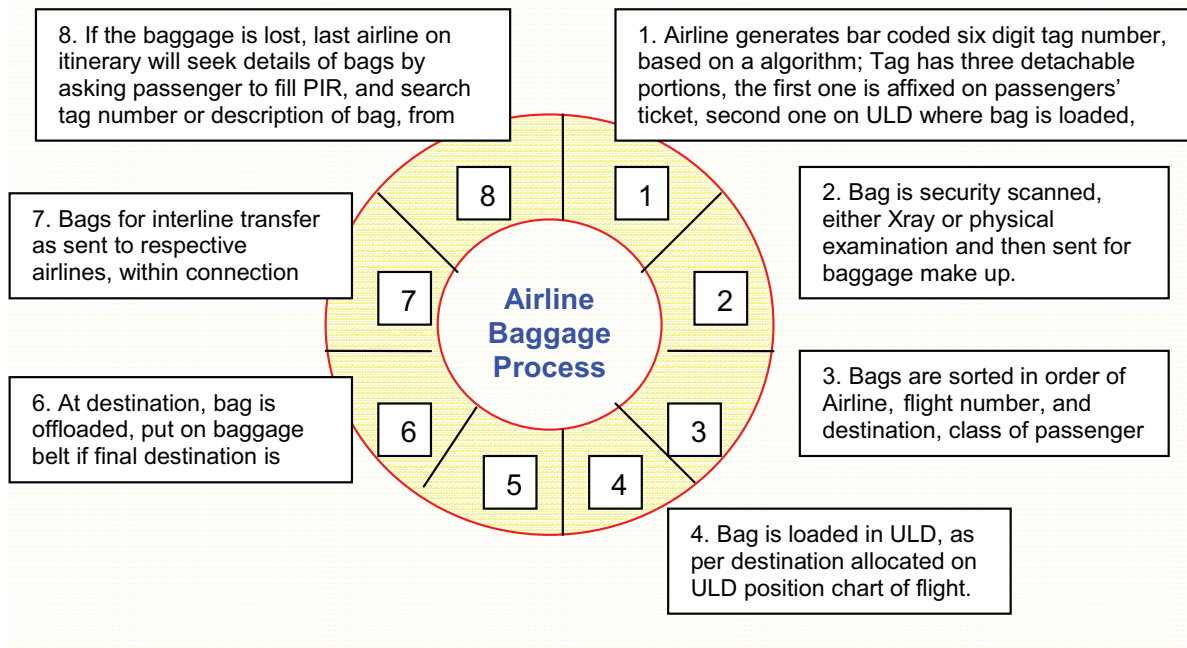
Airlines usually have separate dedicated airport terminals, airline specific bar coded baggage tag is affixed on the passenger's bag. Thus, unless airport has a common sortation area for all airlines, RFID for baggage sorting does not give much benefit to airlines. The bar coded baggage tag number is a six digit numeric, generated usually from a combination of (pseudo) flight number on which passenger is traveling , and the serial boarding number of passenger. Thus the first airline on itinerary, can work backwards from tag number and trace the name of passenger who has checked in the bag, in case the passenger is a "noshow" at the gate. The Baggage reconciliation system (BRS) is used to identify a bag, belonging to a passenger who does not board the flight. However, currently such a process can take as much as 15-25 minutes, thereby delaying the flight. Once a flight misses its departure slot, it gets pushed down the priority and can get delayed much more. It is well known fact that every minute of delay from scheduled departure causes tremendous losses for airline.

Current legacy systems for baggage reconciliation do not have capability to identify the bag interlined passenger who does not connect( called as Noshow) , as well as identify passenger whose baggage has not reached the aircraft baggage hold. After affixing the tag number, the bags are sorted, usually at the airline specific sortation center. Few airports do have common sortation areas for all airlines. After sorting, the bags are loaded onto ULD (Unit Load Devices), usually the containers. Airline keeps record of the tag number of bag loaded onto specific ULDs by means of BRS (Baggage Reconciliation System). After all the passengers are boarded, the airline will release the aircraft only after clearance from BRS, which ensures no piece of baggage is on aircraft without corresponding passenger on board.

### Interlining of baggage

In case of interlining, the airline on which passenger has arrived, has the responsibility to forward the bag to the next airline, before departure of the next flight. The time taken for baggage transfer at each airport, by each pair of airlines for doing such connections is called as MCT (Minimum Connection Time). MCT is a function of the efficiency of the airline, security procedures, policies of baggage handling at the particular airport. Can RFID-Data sharing system alert the airline on which passenger is being transferred, about status of baggage at arrival airlines' make up? How can airline groups agree on improving upon standard procedures, establish a new protocol for baggage transfer, reduce MCT, etc? Can airline groups concentrate their efforts at certain airports, to refine procedures

## Airline baggage handling; current processes



What are causes of baggage mishandling? Airlines categorize the reason for baggage mishandling with RL (reason for loss) IATA defined primary codes as follows.

### IATA defined codes for Reason for Loss

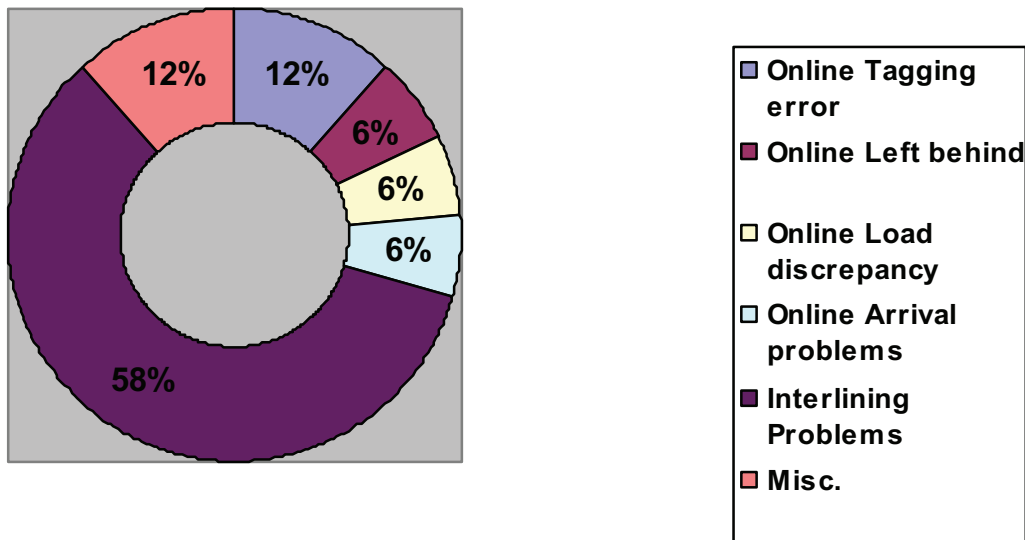
- 10 – ONLINE/TAGGING ERROR
- 20 – ONLINE/LEFT BEHIND-SHORT SHIPPED
- 30 – ONLINE/LOADING DISCREPANCY
- 40 – ONLINE/ARRIVAL PROBLEMS
- 50 – INTERLINE TRANSFER PROBLEMS
- 60 – AIRPORT CONGESTION
- 70 – MISCELLANEOUS
- 80 – DAMAGE GENERAL
- 90 – PILFERAGE/ITEMS MISSING FROM BAG

Infosys business consultants will analyze if there is anything common factor in Interline issues, analyze if certain geographical locations cause the problem, if certain days of the week, peak periods, times of shift changes, cause the problems? The baggage mishandling due interlining may also be due to the practice followed by airlines which imposes responsibility of delivering the bag on the arriving carrier but the accountability of settling the baggage claim on the next airline on itinerary? If the responsibility of connecting interlining bags remains with the connecting carrier, many problems can be solved. Hence there is case for a data sharing network between airlines interlining baggage.

## Analysis of Reasons for mishandling for 1300 cases from 24 airlines

Disembarking passengers, 1, 16, 000 per month at a station reveals that baggage Interlining is the weakest link in airline baggage process. Of 1300 cases of baggage mishandling, 58% were due to interlining of baggage. (Data Source: GHA of Air India )

### Reason for Baggage Mishandling



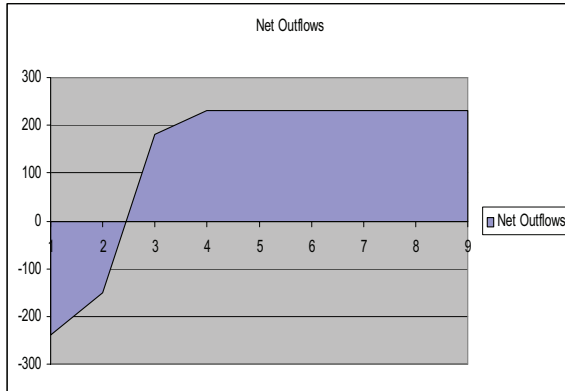
The process of baggage interlining, enables a passenger to travel on multiple airlines without necessity of tagging baggage along; However it is found to be the biggest contributor to mishandling, for the simple reason that baggage system lags behind the passenger in making connection to next flight connection, even at most efficient airports.

## How can Infosys make the interline baggage transfer smart through RFID and Data sharing?

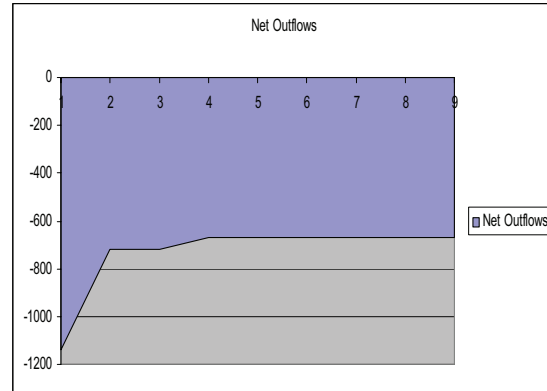
The logical cause analysis of the “interlining problems” needs to be done in following manner.

1. Find common factors between cases of baggage mishandling due to interlining? (The answers could be unrealistic MCT, lack of data sharing network of baggage data, no online visibility of bags that are to be connected, delayed arrival of connecting flight, apathy from arriving carrier to deliver baggage in time to departing carrier, etc)
2. Are there locations, pairs of airports/airlines where the problem is greater? The answers could be say, JFK airport, or airline pairs where the problem is perennial to be figured every week.
3. What are the times, days, weeks, or conditions, when problem is more prevalent? (such as peak times, pairs of flights which have critical MCT, airports which have terminals spaced wide apart such as La Guardia and JFK airport, or Gatwick and Heathrow airports in London, etc)
4. Infosys can use SAP's state-of-the-art auto-identification, integration and event management technologies, OER (Object Event Repository) to collect, monitor and analyze real-time RFID information on baggage-tags moving throughout globe. Hence Infosys can evolve global scalable solution based on SAP standards.
5. Find out the factors of interlining of baggage such as sharing of cost of baggage mishandling, MCT, baggage handover procedures which correlate with the problem of interlining.

## Business case for RFID for airline baggage



Graph A (Positive NPV)



Graph B (Negative ROI)

The net outflows for RFID solution for only interlined bags has a positive NPV (Net Present Value) for nine years time (Graph A). If RFID solution were to be implemented for all the bags, NPV is negative, with no positive outflows during entire nine years of life cycle as seen in Graph B. Results based on a hypothetical proposal for integrated RFID system, with our industry standard assumptions on costs of reader infrastructure, cost of RFID tag is assumed to \$1.0. The savings are calculated @ \$20 per Kg of baggage weight, \$ 460 per lost bag, assuming 23 KGs of “checked-in” baggage. It is assumed that the number of interlined bags are 1/10th of total bags.

## Conclusion

Infosys’ proposition to isolate only, interlined bags, or bags of premium passengers for RFID, along with process improvements under Six Sigma methodology, and finally conduct RFID pilots at key hub airports, will comprehensively test, and validate the approach. Infosys will revisit the assumptions regularly during such pilots. This will help airline industry, not only in deciding upon appropriate technology platform, but also lead to standardization of handling processes such as transfer protocol for handling of interlined baggage. It is likely that such implementation will reduce MCTs at airports, thereby giving enhanced revenues to airlines due to additional connecting traffic. Infosys is ideally placed in evolving RFID baggage tracking solution for airline industry due its deep domain knowledge of airline’s legacy system for baggage, backed by an established RFID practice that has delivered many solutions across a broad spectrum of industries, finally a partnership with SAP’s RFID auto ID group. Infosys RFID solution will avoid the pitfalls associated with a pure technological approach. It will give a snapshot of a point in time, of ROI being achieved, by changing the many variables with RFID technology. Reduction in tag costs, and improvements in technology will further enhance capability of the RFID solution. It is recommended that airline alliances take a lead in working together with business transformation partners like Infosys for evolving a global RFID baggage tracking solution. As the implementation moves forward, the airline industry will make savings from reduced baggage losses, paying back the investments made.

## About the Author

Pankaj Narayan Pandit is Principal Consultant with Infosys Limited, with over 16 years of experience in airline industry. His e-mail is [Pankaj\\_pandit@infosys.com](mailto:Pankaj_pandit@infosys.com)

## References

1. “The Six Sigma Way” by Peter S Pande, Robert P Neuman, Roland R Cavanagh.
2. Air India’s GHA baggage handling statistics
3. IATA document for “RFID for airline baggage system
4. RFID-View from Gartner



For more information, contact [askus@infosys.com](mailto:askus@infosys.com)

#### About Infosys

Many of the world's most successful organizations rely on Infosys to deliver measurable business value. Infosys provides business consulting, technology, engineering and outsourcing services to help clients in over 30 countries build tomorrow's enterprise.

For more information about Infosys (NASDAQ:INFY), visit [www.infosys.com](http://www.infosys.com).