Trips-R-You Flight Booking

Case Study

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Case Study Purpose

The purpose of the Trips-R-You Flight Booking Case Study is to provide an integrated, end-to-end set of requirement examples. In IIBA® BABOK® V3 terminology, end-to-end means from Business Requirements to Stakeholder Requirements to Solution and Transition Requirements. This case study, and associated artefacts, use the more traditional business terms Objectives, High-level Requirements (HLRs), and Detailed Requirements. Only functional requirements are addressed, and only within the context of a project chartered to deliver an IT-based solution.

The requirement examples included in this case study illustrate concepts presented in the *Requirements in Context* series of articles, originally published in BATimes.com in 2016, and the Well-defined Data series, also published in BATimes.com, in 2018. The 2016 series has been updated by the author, and re-published in ModernAnalyst.com.

The following are links to the updated Requirements in Context series:

- Part 1 - Just Know it!
- Part 2 - The Functional View from 10,000 feet
- Part 3 - Scope = High-Level Requirements
- Part 4 – Keeping High-Level Requirements High Level
- Part 5 – Managing Data-Specific Business Needs Using a Data Dictionary
- Part 6 – Detailed Requirements for User Interfaces and Reports
- Part 7 – Detailed Requirements for Data Importing and Exporting
- Part 8 – Detailed Requirements for Fully Automating a Business Activity
- Part 9 – Tool Support for Managing Requirements [in Context]

NOTE: The series would ideally be read in sequence, with subsequent articles building on concepts presented in prior articles. The last article includes a series summary and 'take-away' points.

About the Author

Dan Tasker began his IT career in 1970. He spent his first 10 years working as a developer (called 'programmer' back then) in the United States and Canada. This was followed by two years teaching computer programming, database design, and data modelling. The remainder of his career was spent as a business analyst, in Canada, Australia, and New Zealand. Engaged sometimes as an employee and others on contract, he has worked in a total of 11 industries and sectors, including utilities, transportation, clothing, shipping, government, financial services, and education. Some of the organizations he was involved with developed in-house software solutions, others were software solution vendors. Two organizations were going through the process of acquiring a software solution from vendors.

About the Case Study

The case study involves a fictitious organisation — the Trips-R-You Travel Agency. It deals with the requirements phase of an equally fictitious project, established to deliver a web-based customer self-service flight booking capability – often referred to as an Airline Reservation System.

The case study is divided into three sections. The first section introduces the organization and a problem it faces. An objective is set that is intended to eliminate the problem, and a business case is commissioned to examine potential solutions. A project is initiated to deliver the IT-based solution recommended by the business case.

The second section uses the project's charter, including its scope and assumptions, as a context for high-level requirements. The project and its objective are formalized to allow high-level requirements to be associated with them. High-level requirements are documented and signed off.

The third section takes selected HLRs to the detailed level – providing detailed requirement examples for each of the following business information system functional capability types:

- ▪ User Interface
- ▪ Report
- ▪ Data Import
- ▪ Data Export
- ▪ Automated Function

To support representing the detailed business requirements relevant to each of the above capability types, type-specific templates are used. These templates were developed by the author using MS Excel. Readers are welcome to adapt any of these for personal use. Links to all of the templates, containing detailed requirements from the case study, are available in Appendix B. These templates have been used as a model for extending existing Requirements Management (RM) tools and Application Lifecycle Management (ALM) tools. For examples of three commercially available tools that have had these extensions implemented see Tool Support for Managing Requirements [In Context].

Section 3 begins by presenting one additional template - a Data Dictionary (DD). It is used to capture data-specific business needs, independent of their use by the different functional capabilities. As the detail for a given example HLR is discussed, the data-specific detail requirements are captured in the DD template. These entries are then referenced from the capability-specific templates.

CASE STUDY NOTES:

- *Use of the terms 'High-level Requirement' (HLR) and 'Detailed Requirement' are intended to correspond to the IIBA® BABOK® V3 terms 'Stakeholder Requirement' and 'Solution Requirement'.*
- *Use of the term 'discussion' in relation to stakeholders or SMEs is intended to imply any requirement elicitation technique.*
- *Use of the terms 'Record' and 'Field' is intended to be equivalent to the logical data terms 'Entity', 'Attribute', and 'Relationship'.*

Contents

Section 1 – Trips-R-You Problems, Objectives, and Solutions

Section Objective

This section provides an introduction to the pseudo organization, the problem it has, and the objective it sets. A business case, chosen solution, and project charter are discussed. The outputs from these activities are seen to be inputs to the formal objective statement and high-level requirements covered in Section 2.

Case Study Scenario

The Trips-R-You Travel Agency has been in business for over 30 years. It currently has 500 offices in cities across the United States, with its head office in Chicago. The problem the organization is facing is that its net profit has been declining for the last several years – averaging a reduction of $25 million per year for the last three years.

Its customers continue to be satisfied with the service provided by its travel agents, but many of those customers have stopped booking 'simple' trips through the agency. This was attributed to the increased availability of self-service booking options, offered by other bricks and mortar travel agency chains, and internet-based start-ups. Trips-R-You has a web site, but only to advertise special fares available when booking through their travel agents.

While the organization remains profitable, it wanted to solve the problem of decreasing annual net profit. It set an objective of reversing this trend within three years of implementing a solution. That objective specified an additional net profit of $15 million in the first year, $25 million in the second year, and $50 million in the third year. Accomplishing this would require some combination of expense reduction and/or revenue increase. A business case was commissioned to investigate potential solutions. The options presented in the business case were:

1. Reduce travel agent staffing to reduce expenses, thus increasing overall net profit
2. Invest in additional travel agent training, to be able to offer new specialized travel advisory services not available through self-service, thus increasing net profit by more agent-based sales
3. Establish a competing self-service flight booking capability, thus increasing net profit with revenue from that market segment.

The third option was selected as the most cost-effective solution for achieving the business objective. A new Web Sales Manager position was established at head office, and a person with a successful track record of managing self-service booking systems recruited. The "Web-based Flight Booking" project was initiated. A contract project manager was engaged to work with the new manager, beginning with the establishment of a project charter.

The project charter restated the organizational objective from the business case, from the perspective of the selected solution:

> *"The objective of implementing and operating a web-based customer self-service flight booking capability is a net profit of $15 million in the first full year of operation, $25 million in the second year, and $50 million in year three."*

Because Trips-R-You has no formal place where objectives are managed, the above statement, at this point, only resides in the "Web-based Flight Booking" project charter. It will be formally

documented within the context of the project when high-level requirements (HLRs) begin to be captured for the purpose of associating those requirements to that objective.

Section 2 – Objectives and High-level Requirements

Section Objective

This section shows how the project charter, established for a project tasked with delivering an IT-based solution, acts as a context for the case study examples of both Objectives and High-level requirements.

Case Study Scenario

A business analyst resource was made available to the project for the purpose of preparing for, and carrying out, the requirements phase of the project (i.e. HLRs, and subsequent detailed requirements). The BA was advised that requirements were to be recorded using the standard Trips-R-You toolset. This consisted of Excel-based templates for documenting and managing:

- Requirements
- Data-specific business needs (i.e. a Data Dictionary)
- User Interfaces
- Reports
- Import Interfaces
- Export Interfaces
- Automated Functions

There were standard drawing tools as well, to be used for creating various UML diagram types, and process models.

NOTE: All diagrams seen in this case study were created using MS Powerpoint.

The BA referred to the project charter as a primary source of existing information about the project. Because end-to-end requirements include linking HLRs to Objectives, the BA formalized the project objective statement by recording it using the Requirements template:

Requirement Type	Label	Formal Statement
G - Objective	Additional Net Profit	The implementing and operation of a web-based customer self-service flight booking capability shall achieve an additional net profit of $15 million in the first full year of operation, $25 million in the second year, and $50 million in year three.

NOTE: As this is the only organization-level objective the project is based on, all HLRs are linked to it.

The BA gained further insights into the overall project from the following project charter sections:

Assumptions

- The existing Global Distribution Systems (GDS) vendor, supporting online terminals used by Trips-R-You travel agents, would be utilised by the web-based system.
- The existing business process, for settling with airlines for payment received for seats sold by agents, would support payments received from self-service seat bookings.

- The existing manual process, for receiving commission payments to Trips-R-You from airlines for seats booked by its travel agents, would support commission payments for self-service seat bookings made using the company's self-service capability.
- The existing Trips-R-You web site would be enhanced to provide access to self-service flight availability searching, and booking-related capabilities.

In Scope

- Flight availability searching by internet users
- Self-service customer setup and maintenance
- Self-service flight booking by customers
- Posting Payment / Refund transactions to the Financial System
- Printable trip itineraries
- Interactions with the GDS for seat inventories and associated fares
- Interactions with the GDS to make self-service bookings
- Interactions with GDS for maintaining flight reference data
- Cheapest fare determination functionality for available flights
- Foreign currencies

Out of Scope

- Changes to confirmed bookings (other than cancellation)
- Booking hotels or car rentals
- Booking of tourist attractions
- Foreign language support

Based on the scoping information provided, the BA drafted the following scope diagram. This diagram was used during discussions with the project owner, who, in this case, was also the subject matter expert (SME) on self-service flight booking systems.

The outcome of these discussions was a system context diagram that looked like this:

Trips-R-You Case Study
Context Diagram
Version 1.1
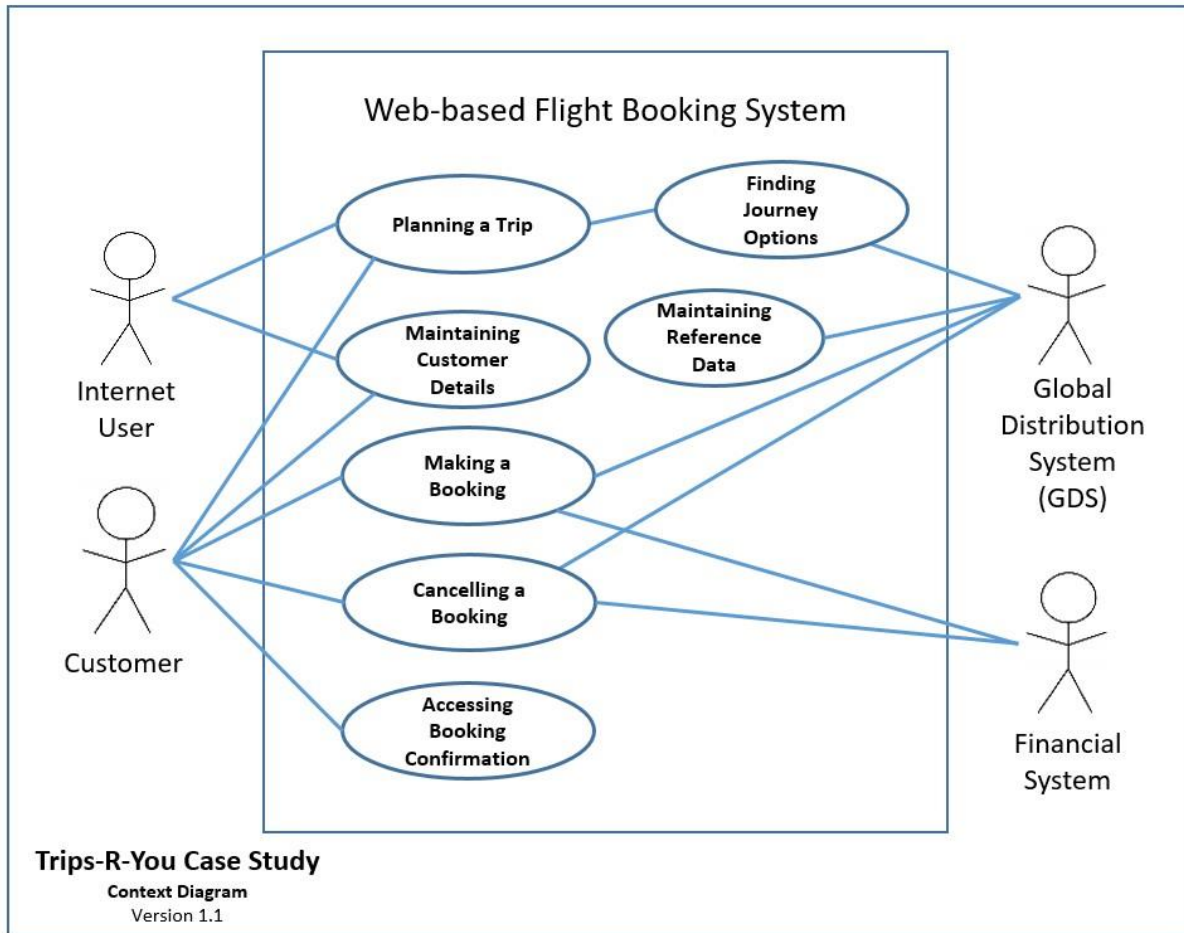
It was agreed that the above diagram represented the following high-level business needs related to a web-based flight booking system:

- The ability for an internet user to search for available flights for a trip.
- The ability to provide the GDS with sufficient details about a trip, for it to query airline reservation systems for available flight options for each journey (i.e. from/to city on a specified date) within the trip.
- The ability for the system to determine the cheapest total fare for each journey option, based on the traveller profiles specified as part of the trip search parameters.
- The ability for an internet user to self-register as a customer.
- The ability for a customer to make a booking based on selected journey options for the trip.
- The ability for a customer to cancel a booking within the allowed time period.
- The ability for a customer to print the booking confirmation, which includes the confirmed flight details and passenger E-Tickets.
- The ability for the system to maintain flight-related reference data sourced from the GDS.
- The ability for the system to report bookings and booking cancellations to the financial system.

Based on the above needs, the BA drafted the following HLRs using the requirements management tool:

Requirement Type	Req ID	Label	Formal Statement	Parent Requirement
HLR - User I/F	002	Search for Flights	An internet user or customer shall be able to search for flights for a trip.	Net Profit Increase
HLR - Data Import	003	Obtain Journey Options	The system shall be able to request journey options for a trip from the GDS.	Net Profit Increase
HLR - Automated Func	004	Determine Cheapest Fare	The system shall be able to determine the cheapest available total fare for each journey option for a trip.	Net Profit Increase
HLR - User I/F	005	Maintain Customer	An internet user or customer shall be able to maintain customer details.	Net Profit Increase
HLR - User I/F	006	Book Flights	A customer shall be able to book flights based on selected journey options.	Net Profit Increase
HLR - User I/F	007	Cancel Booking	A customer shall be able to cancel a booking within the allowed cancellation period for a full refund.	Net Profit Increase
HLR - Report	008	Print Booking Confirmation	A customer shall be able to access and print the booking confirmation details.	Net Profit Increase
HLR - Data Import	009	Maintain Reference Data	The system shall be able to request current values for reference data maintained by the GDS.	Net Profit Increase
HLR - Data Export	010	Request Flight Bookings	The system shall be able to request flight bookings be requested from airlines by the GDS, based on selected journey options for a trip.	Net Profit Increase
HLR - Data Export	011	Report Sales	The system shall be able to report self-service booking flight seat sales and sale cancellations to the financial system.	Net Profit Increase

NOTE: This case study uses the traditional "Shall" form for documenting the content of formally-managed requirements within a single sentence. The same content could be documented in User Story form. E.g. "As an internet user or customer I need to be able to search for flights for a trip."

The BA created the following artefacts for inclusion in the HLR documentation 'package':

- A system context diagram (shown above).
- A concept Model (shown below)
- A project Glossary (see Appendix A)
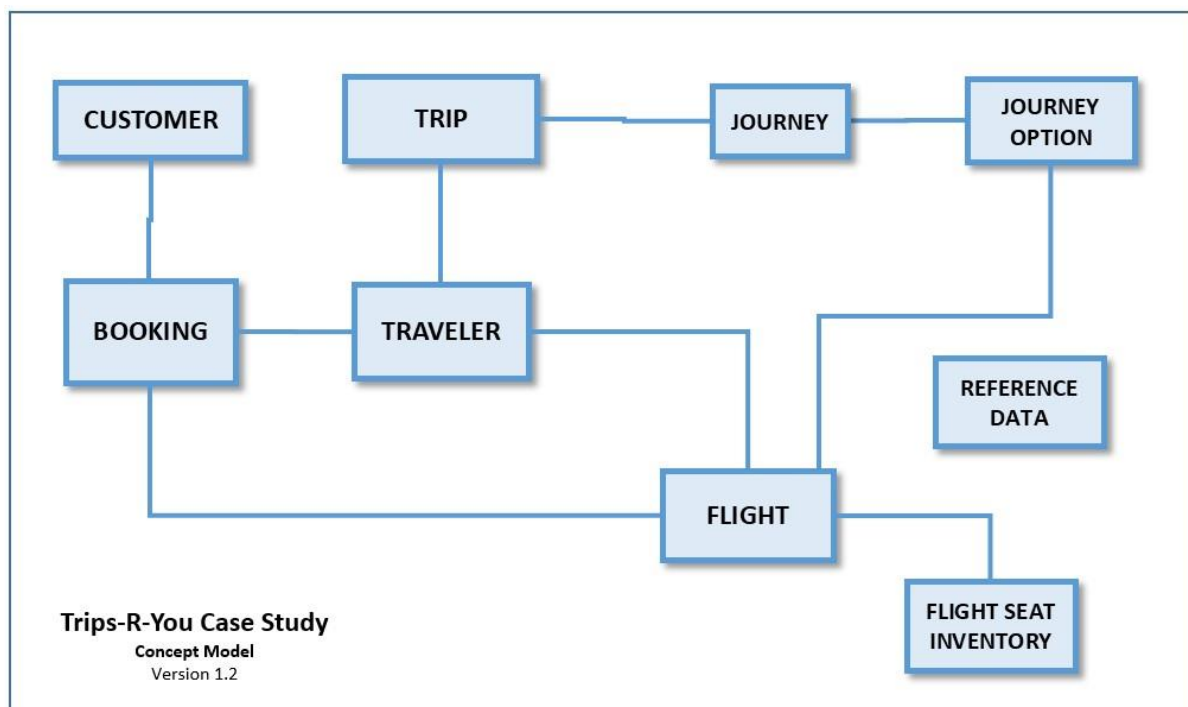
The HLRs went through a series of reviews by stakeholders and were signed-off by the project owner. Having a signed-off set of HLRs, the project manager and BA used them to plan detailed discussion sessions with stakeholders on each HLR (see Section 3).

For further reading about HLRs, see:

- *[Requirements In Context Part 3 - Scope = High-Level Requirements](#)*
- *[Requirements In Context Part 4 – Keeping High-Level Requirements High Level](#)*

Requirements Template Example Entries

The requirements template used in this case study contains the complete set of 'formal' goal, high-level and detailed requirement statements included in this case study. It includes additional requirement management-related columns not included in the examples above.

Example rows from the requirements tab in the spreadsheet can be seen in this screen shot:

Req ID	Requirement Type	Label	Formal Statement	Priority	Complexity	Parent Req	Parent Requirement	Pre-requisite	Co-requisite	User Role/ UR ID(s)	Source Stakeholder	Signatory Stakeholder	Risks	Entry Update Date	Last Update	Entry Update History
001	G - Objective	Additional Net Profit	The implementing and operation of a web-based customer self-service flight booking capability shall achieve an additional net											27 August 2019	DT	Entry Added
002	HLR - User I/F	Search for Flights	An internet user or customer shall be able to	Must Have	Medium	001	Additional Net			001,002	SW	SW		27 August 2019	DT	Entry Added
003	HLR - Data Import	Obtain Scheduled Options	The system shall be able to request scheduled options for a trip from the GDS.	Must Have (MVP)	Medium	001	Additional Net Profit			003	SW	SW		27 August 2019	DT	Entry Added
004	HLR - Automated Func	Determine Appropriated Journey Options	The system shall be able to identify viable journey options based on the search parameters for a trip.	Must Have (MVP)	High	001	Additional Net Profit			003	SW	SW		26 January 2020	DT	Updated the HLR to align with the functionality identified during detailed
005	HLR - User I/F	Maintain	An internet user or customer shall be able to	Must Have	Low	001	Additional Net			001,002	SW	SW		27 August 2019	DT	Entry Added
006	HLR - User I/F	Book Flights	A customer shall be able to book flights	Must Have	Medium	001	Additional Net			002	SW	SW		27 August 2019	DT	Entry Added
007	HLR - User I/F	Cancel Booking	A customer shall be able to cancel a booking within the allowed cancellation period for a	Must Have (MVP)	Low	001	Additional Net Profit			002	SW	SW		27 August 2019	DT	Entry Added
008	HLR - Report	Print Booking Confirmation	A customer shall be able to access and print the booking confirmation details.	Must Have (MVP)	Medium	001	Additional Net Profit			002	SW	SW		27 August 2019	DT	Entry Added
009	HLR - Data Import	Maintain Reference Data	The system shall be able to request current values for reference data maintained by the	Must Have	Medium	001	Additional Net Profit			003	FJ	FJ		27 August 2019	DT	Entry Added
010	HLR - Data Import	Booked Flights	The system shall be able to request flight bookings be requested from airlines by the	Must Have	Medium	001	Additional Net Profit			003	FJ	FJ		27 August 2019	DT	Entry Added
011	HLR - Data Export	Report Sales	The system shall be able to report self-service booking flight seat sale and sale	Must Have (MVP)	Medium	001	Additional Net Profit			003	AS	AS		27 August 2019	DT	Entry Added
012	TR - Transition	Database Schema	The system shall be able to store, update, and retrieve records, and the fields they	Must Have (MVP)	Medium	001	Additional Net Profit			003				27 August 2019	DT	Entry Added
013	DR - User I/F	Search for and Book Flights	An internet user or customer shall be able to search for, and book, flights for a trip - as	Must Have	High	002,006	(Multiple Parents)		014	001,002	SW	SW		3 November 2019	DT	Entry Added
014	TR - Transition	Links to Search for Flights	The Self-service booking capability shall be made accessable by web site menus and/or	Must Have	Low	002	Search for Flights		013		SW	SW		3 November 2019	DT	Entry Added
015	DR - Report	Booking Confirmation	The system shall be able to produce a Booking Confirmation report for a specific	Must Have (MVP)	Medium	008	Print Booking Confirmation		013	002	SW	SW		3 November 2019	DT	Entry Added
016	DR - Data Import	Scheduled Options	The system shall be able to obtain Scheduled Options for a Trip from the GDS - as	Must Have (MVP)	Medium	003	Obtain Scheduled Options			003	SW	SW		11 March 2020	DT	Changed from Journey Options to Scheduled
017	DR - Data Export	GL Export	The system shall be able to provide summarized booking sales in the form of	Must Have (MVP)	Low	011	Report Sales			003	AS	AS		9 December 2019	DT	Entry Added
018	DR - Automated Function	Finding Journey Options	The system shall be able to identify viable journey options based on the search parameters for a trip – as specified in DR18 –	Must Have (MVP)	High	004	Determine Appropriated Journey Options		016	na	SW	SW		25 February 2020	DT	Entry Added

See Appendix B for a link to download a copy of this file.

Section 3 - Detailed Requirements

A basic premise of this case study is that detailed business needs for a given capability (e.g. a specific UI or report), can be captured as a 'unit of delivery'. This unit of delivery can and should be represented (and managed within the project) by a single detailed requirement statement representing those details.

A familiar example of doing this are UML Use Cases. A 'fully dressed' use case is intended to address details of a specific user interface. Use Case templates or tools support capturing details including the purpose of the use case, the actors involved, pre and post conditions. The textual descriptions of the steps of a user interacting with the system during a main flow, alternate flows, and exception flows include field-level details. The use case is then considered to represent the detailed business needs for one unit of delivery.

This case study utilizes a tabular rather than a textual form of representing detailed business needs for a unit of delivery. MS Excel-based templates are used to support capturing business detail needs for each of the five basic business information system capability types:

- User Interfaces
- Reports
- Data Importing
- Data Exporting
- Automated Functions

The five templates are all similar in that they each have separate tabs for capturing needs that apply to the overall capability, needs related to individual field-level elements involved, and needs applicable to meaningful groups of elements, such as individual screens within a UI, or record types within a data import or export.

The case study presents one example of detail business needs being captured for each of the five capability types in tabular format, along with a single detail requirement referencing that detail. What is important is not the *form* the detail is documented in, but the detail *content*. The examples presented in this section of the case study are meant to illustrate the level of detail needed to support the design, development, testing, and delivery into production of a 'unit of delivery' of each of the five capability types.

Section 3.1 – Detailed Requirements for Data

Section Objective

The advantage of a business information system is that data can be captured and stored once, and used many times. There are detail business needs for data captured by a user interface or data import, independent of any particular capability type that captures it. Having identified data that needs to be sourced, those fields, within record types, are referenced or updated by user interfaces, appear in any number of reports, included in data exports, and/or used by automated functions.

This section presents an example of capturing details of business needs specific to records and fields irrespective of their use in user interfaces, reports, data imports, exports, or automated functions. As with the capability types, those details are captured in tabular form utilizing an MS Excel-based Data Dictionary template, and those needs referenced from a single detailed requirement for project management purposes.

For further reading about data dictionary concepts see Requirements In Context Part 5 – Managing Data-Specific Business Needs Using a Data Dictionary.

Case Study Scenario

The data dictionary template was a recent addition to the Trips-R-You toolkit, so this project would be starting with a clean slate. The BA took as a starter set of record types the following concepts that appeared in the concept model and in one or more HLRs:

- Customer
- Booking
- Flight
- Journey Option

The BA maintained a visual representation of the DD, similar to the concept model, but with attribute and relationship fields added (see below). It proved useful to have an up-to-date hard copy of the model available during discussions with stakeholders. This facilitated confirming record and field concepts that were already captured. Or to note where new entries needed to be added – as placeholders for further detailed discussions with SMEs regarding their data-specific properties.

The following is an example of such a model, representing the DD entries resulting from discussing the five capability type examples included in this case study:

Trips-R-You Case Study
Data Model / DD ID Mapping
Version 1.1
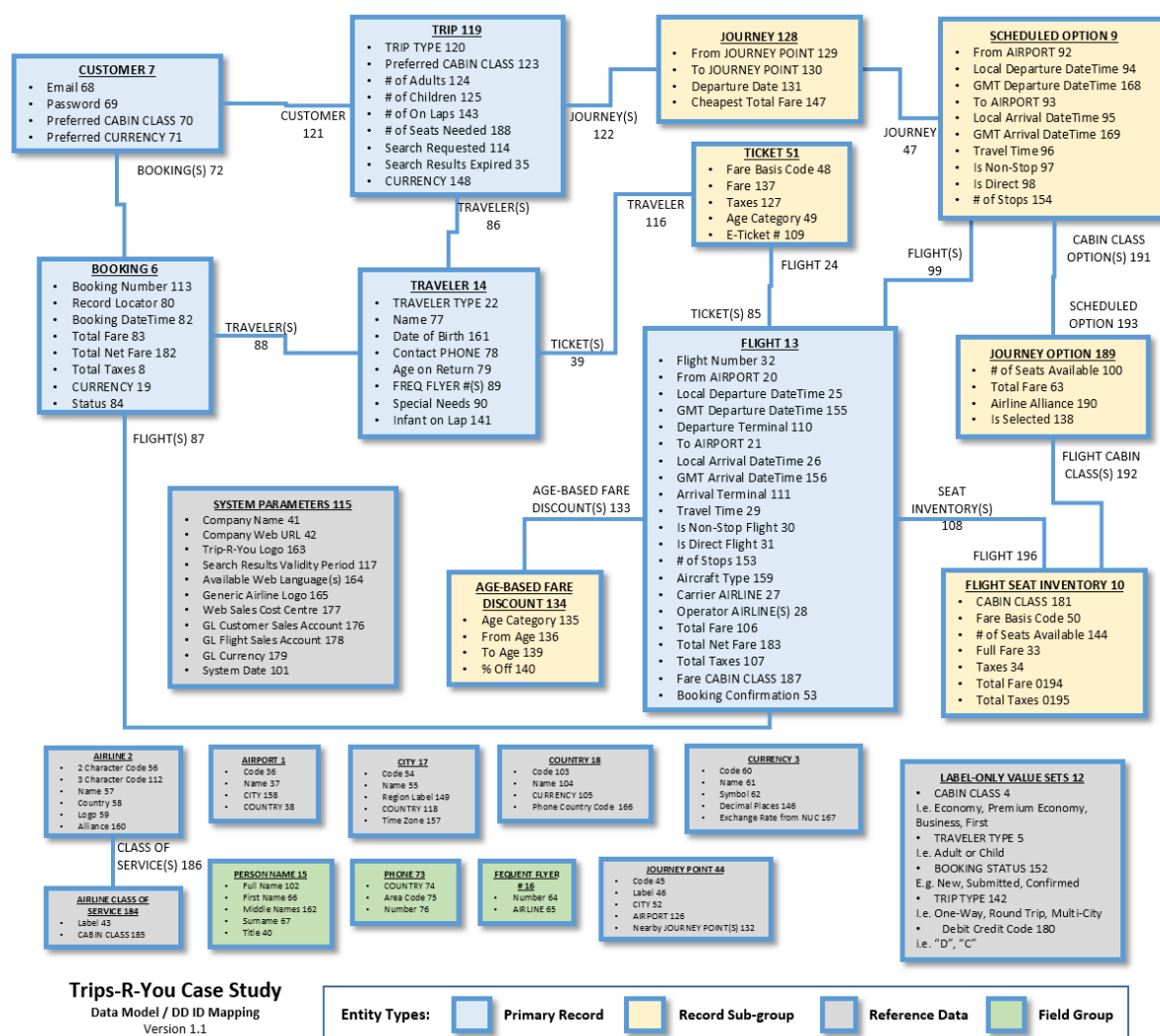
NOTEs:

- *The numbers shown in the model above are the unique DD ID# assigned to each entry.*
- *Lines representing relationships to Reference Data and Field Group Records are not shown in this model. This is to avoid unnecessary visual clutter. Those relationships are included in the model within the list of fields. E.g. Flight.From AIRPORT, Traveler.FREQ FLYER #(s).*

The Trips-R-You DD template is intended to be a 'business friendly' representation of data in that it manages records and their fields in a 'non-normalized' way. For example, a field within a record can be multi-valued (i.e. not in first normal form). Data relationships are treated like another type of field within a record – allowing that record to 'know' about a related record. E.g. The Trip record including the field Traveler(s) – thus given an instance of Trip, its related instances of Traveler are known.

When the detailed conversations for all of the HLRs were completed, the DD contained entries defining all of the business data needs, both sourced and derived, related to the project. The details captured are needed to design and implement the database schema providing tables and columns for all 'persistent' data to be managed by the system.

Given this detail contained in a DD tool, a single transition requirement was added to represent the need to produce the database schema. The following is an example of the formal requirement recorded in the case study requirements spreadsheet:

> *The system shall be able to store, update, and retrieve records, and the fields they contain, as identified in Data Dictionary version N.N dated dd mmm yyyy.*

"Data Dictionary version N.N dated dd mmm yyyy" is a reference to the MS Excel file based on the Data Dictionary template used to capture data-specific business needs. This file was managed as a project artefact and made available for reference by project stakeholders.

Data Dictionary Template Example Entries

The template-based spreadsheet used in this case study contains example entries for the 20 record types (entities) and over 100 fields (attributes and relationships) seen in the data model shown above. The file includes documentation explaining the purpose of each column, and the entry types each applies to. Properties not applicable to a given entry type are greyed out.

Example rows from the field-level tab in the spreadsheet can be seen in this screen shot:

See Appendix B for a link to download a copy of this file.

Section 3.2 – Detailed Requirements for a User Interface

Section Objective

This section presents an example of capturing details of business needs for a screen-based user interface. Details fall into three categories:

> **Operational Details** – Things that apply to the user interface as a whole. E.g. who uses the UI, when does it need to be available, what usage volumes are expected.

> **Area-level Details** – Things that can apply to a specific screen, tab, list, or group of fields. E.g. Sort criteria for a list of records, list length options for 'paged' lists.

> **Individual Element Details** – Each thing that's needed to appear in the UI. E.g. data, labels, headings.

For further reading about user interface concepts see Requirements in Context Part 6 – Detailed requirements for User Interfaces and Reports.

Case Study Scenario

Self-service booking of flights for a trip involves two separate but related activities – shopping (searching for flights) and purchasing (booking the selected flights). Any internet user is able to perform the first activity. If/when specific flights have been identified and the user is wanting to make a booking, the second activity is carried out, using the selected flights as inputs.

The high-level requirement discussed in Section 2 included one HLR representing the searching for flights:

> *DR013 - An internet user or customer shall be able to search for flights for a trip.*

At the start of the discussion, the SME sketched out the main steps in the flight search process:
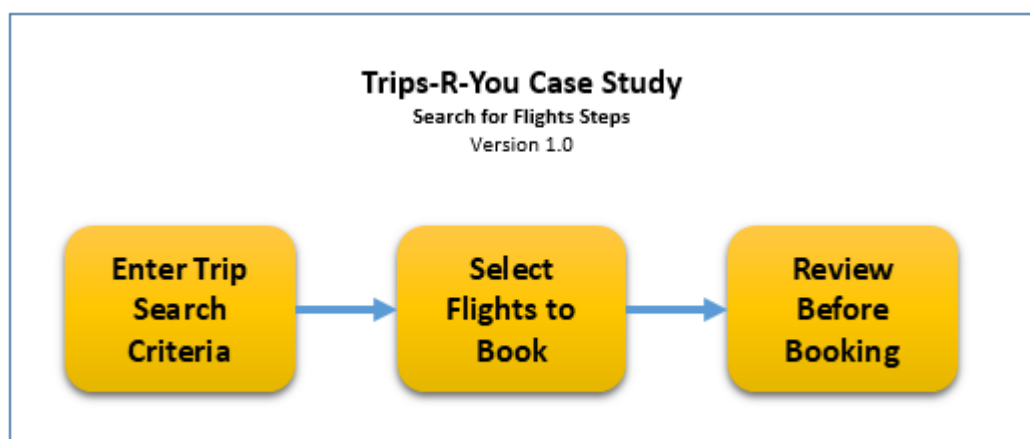
Detailed discussions about the UI supporting these steps were aided by hand-drawn screen mock-ups. There turned out to be a separate screen for each step shown above. In addition to the 'happy path' for the steps, alternate paths were identified. Alternative paths involved the user wanting to modify

search parameters that would mean the overall search would need to be redone and flight selection start over.

Possible exception conditions were also discussed. These typically involved something on a screen not being correct, such as a mandatory field not having a value. Instead of proceeding to the next screen, the current screen would remain, displaying an indication of what needed fixing.

NOTE: Dealing with the look and feel of error notification is an architectural issue, and outside the scope of this case study.

The final tool-drawn version of the screen flow for the search UI ended up looking like this:
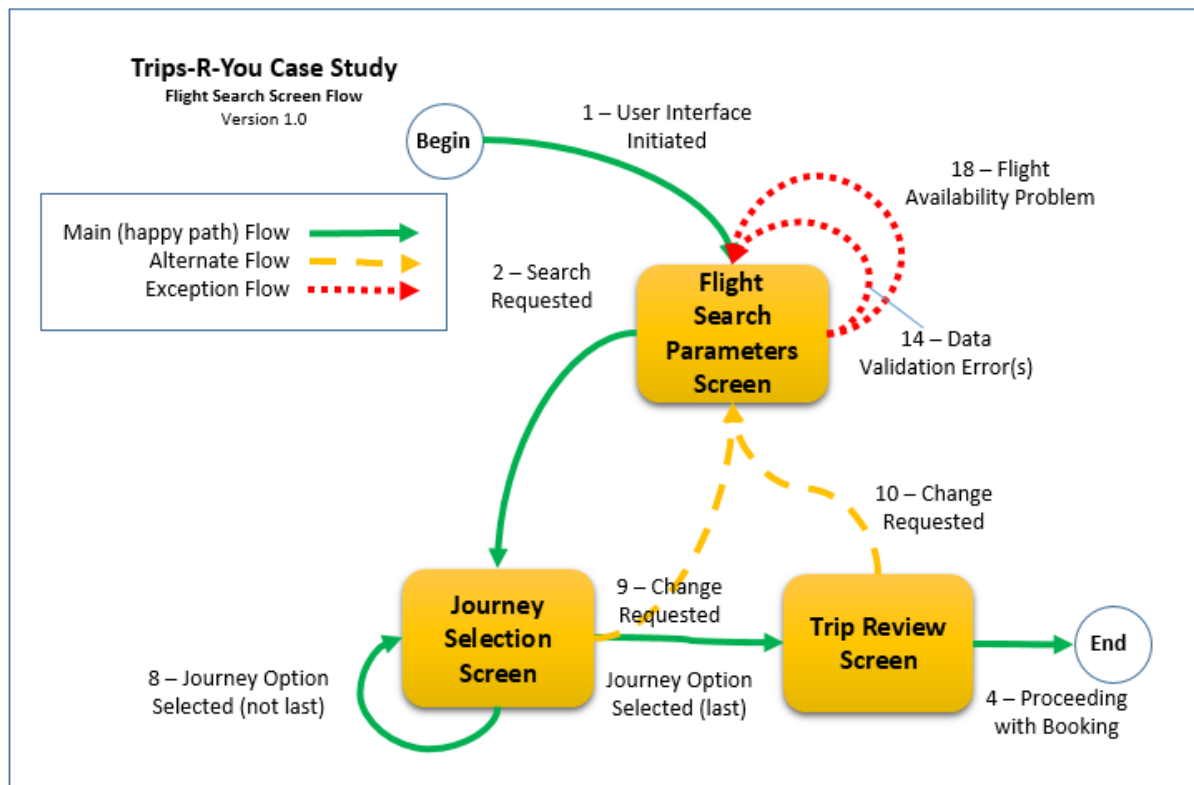
The BA also created tool-drawn versions of the hand-drawn screen mock-ups from the discussions, and recorded details of individual elements included on each UI area using the User Interface template.

The tool provided structured support for capturing the details, allowing a single formal detailed requirement referencing them to be sufficient:

> *An internet user or customer shall be able to search for, and book, flights for a trip - as specified in DR013 - Self-service Flight Booking User Interface v2.0.*

"DR013 – Self-service Flight Booking User Interface v2.0" is a reference to the MS Excel file based on the User Interface template used to capture details for this UI. This file was managed as a project artefact and made available for reference by project stakeholders.

A given UI is considered a 'unit of delivery', and as such its detailed requirement has a priority, including removing it from scope, or assigning it to a later project delivery phase. The template

includes element-level priority and release columns in the Elements tab, allowing specific elements within a given UI to be removed from scope or their delivery postponed.

A transition requirement was also added to address the task of modifying the existing web site's home page and menus:

> *The Self-service flight search capability shall be accessible from the web site home page.*

NOTE: Details of linking between a web site's pages is a look and feel / usability issue. Those types of details are out of scope of this case study.

User Interface Template Example Entries

The template-based spreadsheet used in this case study contains entries for 17 areas, three of which are screens. Those areas involve over 100 elements representing fields, textual labels, and action triggers.

Example rows from the element-level tab in the spreadsheet can be seen in this screen shot:

Field DD ID	DD Record and Field	Related Element #(s)	Displayed Label	Example / Format	Input Field Type	Justified	Other Details	Priority	Release	Entry Update Date	Last Updated By	Entry Update History
0163	SYSTEM.PARAMETERS.Trips-R-You		Logo			Right	Same as used by the existing web pages.	Must Have	1.0	12 October 2019	DT	Entry Added
0042	SYSTEM.PARAMETERS.Company		Web URL			Left	Same as used by the existing web pages.	Must Have	1.0	12 October 2019	DT	Entry Added
			Search For Flights			Left		Must Have	1.0	12 October 2019	DT	Entry Added
		5	Trip Type			Right		Must Have (MVP)	1.0	12 October 2019	DT	Entry Added
0120	TRIP.TRIP TYPE	4	Trip Type		Single Value Selection	Left	Presents available options. Default "Round Trip"	Must Have	1.0	12 October 2019	DT	Entry Added
		7	Class			Right		Must Have	1.0	12 October 2019	DT	Entry Added
0123	TRIP.Preferred CABIN CLASS	6	Preferred Cabin Class		Single Value Selection	Left	Presents available options. Default "Economy/Coach"	Must Have	1.0	12 October 2019	DT	Entry Added
		9	Adults			Right		Must Have	1.0	12 October 2019	DT	Entry Added
		8	# of Adults Selection		Single Value Selection	Left	Offers values 1-10, Default blank - On value change delete any existing Traveler records of type "Adult" create selected number of Traveler records of type "Adult" with default First Name of Adult 1, 2, etc.	Must Have (MVP)	1.0	12 October 2019	DT	Entry Added
		11	Children			Right		Must Have	1.0	12 October 2019	DT	Entry Added
		10	# of Children Selection		Single Value Selection	Left	Offers values 1-10, Default blank - On value change delete any existing Traveler records of type "Child" create selected number of Traveler records of type "Child" with default First Name of Child 1, 2, etc.	Must Have (MVP)	1.0	12 October 2019	DT	Entry Added
			[SEARCH]			Center	- Trip record and field validations and business rules are checked, and the user notified of any problems - Trip-related Journey record and field validations and business rules are checked, and the user notified of any problems - Trip-related Traveler record and field validations and business rules are checked and the user notified of any problems (including display of Area #9 - Children Details for Search to display fields(s) with errors. - If there are no problems then the Flight Search function is performed, obtaining Journey Options for each Journey. - The user is informed of any Journeys for which there are no Journey Options resulting from the search. - If the Search results include one or more Journey Options for each Journey then Area #2 - Journey Selection screen is displayed for the first Journey.	Must Have (MVP)	1.0	12 October 2019	DT	Entry Added
			[ADD FLIGHT]			Center	- Causes an additional input row to be displayed in Area #11 - Journeys for Search. - If "To City or Airport" field for previous row is not null then default "From City	Must Have (MVP)	1.0	12 October 2019	DT	Entry Added

See Appendix B for a link to download a copy of this file.

Section 3.3 – Detailed Requirements for Reports

Section Objective

This section presents an example of capturing details of business needs for a report. Details fall into three categories:

> **Operational Details** – Things that apply to the report as a whole. E.g. who is the report for, when does it need to be produced, where does it get delivered.

> **Area-level Details** – Things that apply to a specific section of the report. E.g. Sort criteria for a list of records, pagination rules for a grouping of records or set of fields.

> **Individual Element Details** – Each thing that's needed to appear in the report. E.g. data, labels, headings.

For further reading about report concepts see Requirements in Context Part 6 – Detailed requirements for User Interfaces and Reports.

Case Study Scenario

Preliminary planning was done for detailed discussions on the following HLR:

> *A customer shall be able to access and print their booking confirmation details.*

The SME, Sharon Wu, was asked to fill out the SME Questionaire about this report. The results of the questionnaire indicated that there was an existing report used by Trips-R-You travel agents, and that this report was exactly what was needed for the self-service system.

The following sample of the current report was provided to the BA:

Booking Conformation
Booking Number: 0000001
Booking Date: 09 Sep 2019

Trips-R-You
www.tripsryou.com

Flights and Passenger E-Tickets

	Departure	*Arrival*	
UA 916	Auckland Airport (AKL) International Terminal Mon 23 Sep 2019 1:30 p.m.	San Francisco International Airport (SFO) Terminal 6 Mon 23 Sep 2019 6:40 a.m.	Non-Stop Duration: 12h 10m Cabin: Economy

Passenger Name	Type	Frequent Flyer Number	E-Ticket Number	Special Needs
Jones, Fred	Adult	397882	85569325	
Jones, Martha	Adult		85569326	
Jones, Tiffany	Child		85569327	Vegetarian plus the following …

	Departure	*Arrival*	
NZ 7	San Francisco International Airport (SFO) Terminal 6 Fri 27 Sep 2019 8:50 p.m.	Auckland Airport (AKL) International Terminal Sun 29 Sep 2019 5:45 a.m.	Non-Stop Duration: 12h 55m Cabin: Economy

Passenger Name	Type	Frequent Flyer Number	E-Ticket Number	Special Needs
Jones, Fred	Adult	1024359	Y 103425	
Jones, Martha	Adult	1024553	Y 103426	
Jones, Tiffany	Youth		Y 103427	Vegetarian plus the following …

Booking Receipt

Per Person Fare	850.00 NZD
Per Person Tax	45.00 NZD
Total Person Fare	895.00 NZD
Number of Passengers	3
TOTAL FARE	2,685.00 NZD

Page 1 of 1

Because this report needed to be produced by a different system, it was left to the BA to document the detailed needs using the Trips-R-You report template.

The BA saw the report as involving a header, footer, plus the following four areas:

- Flights – in Departure DateTime sequence – earliest to latest
- Flight Details – individual fields for a given flight
- Ticket Details – a list of travellers in Date of Birth sequence – oldest to youngest
- Receipt – following the listed flights and not split across two pages

Because this report was discussed after details for the search and booking UI were discussed, all of the data elements except E-Ticket Number were defined in the data dictionary. The SME was able to provide detailed business needs for it and that element was added.

The report template supported stakeholder review of the details, allowing a single formal detailed requirement referencing them to be sufficient:

> *The system shall be able to produce a Booking Confirmation report for a specific Booking - as specified in DR015 - Self-service Booking Confirmation Report v1.0*

"DR015 – Self-service Booking Confirmation Report v1.0" is a reference to the MS Excel file based on the Report template used to capture details for this report. This file was managed as a project artefact and made available for reference by project stakeholders.

A given report is considered a 'unit of delivery', and as such its detailed requirement has a priority, including removing it from scope, or assigning it to a later project delivery phase. The Report template provides element-level priority and release columns within the Elements tab, allowing specific elements within a given report to be removed from scope or their delivery postponed.

Report Template Example Entries

The template-based spreadsheet used in this case study contains example entries for the six report areas. Those areas involve over 50 elements representing fields and textual labels.

Example rows from the element-level tab in the spreadsheet can be seen in this screen shot:

Element #	Area #	Seq #	Report Element Type	Field DD ID	DD Record and Field	Related Element #(s)	Example / Format	Justified	Other Details
1	1	1	Area Text					Left	
2	1	2	Field/Column Label			3		Left	
3	1	3	Output Field	0113	BOOKING.Booking Number	2		Left	
4	1	4	Field/Column Label			5		Left	
5	1	5	Output Field	0082	BOOKING.Booking DateTime	4	dd mmm yyyy	Left	
6	1	6	Output Field	0163	SYSTEM PARAMETERS.Trips-R-You Logo			Right	
7	1	7	Output Field	0042	SYSTEM PARAMETERS.Company Web URL			Right	
8	2	1	Field/Column Label					Center	Includes running page count with total "Page n of n".
9	3	1	Area Text					Left	
10	4	1	Data Navigation	0087	BOOKING.FLIGHT				Identifies the flights for this booking.
11	4	2	Data Navigation	0027	FLIGHT.Carrier AIRLINE	12			Points to Airline to get logo
12	4	3	Output Field	0059	AIRLINE.Logo	11		Center	Logo for Flight
13	4	4	Output Field	0032	FLIGHT.Flight Number			Center	
14	4	5	Area Text					Left	
15	4	6	Data Navigation	0020	FLIGHT.From Airport	66			Points to 'From' Airport to get name and code
16	4	7	Derivation/Merge Component	0037	AIRPORT.Name	66	Auckland Airport	Left	

See Appendix B for a link to download a copy of this file.

Section 3.4 – Detailed Requirements for Exporting Data

Section Objective

This section presents an example of capturing details of business needs for a data export. Detailed requirements fall into three categories:

Interface-level Details – Things that apply to the export as a whole. E.g. its purpose, how it's expected to operate, and its relationship to other system capabilities.

Record-level Details – Things that apply to a specific record type involved in the export. E.g. its place within a hierarchy of record types, selection criteria for that particular record type.

Individual Element Details – Each field that needs to be included in a record type, or participates in deriving a value for a field that needs to be included. E.g. contains values that need to be summarized into a total value to be exported.

For further reading about data export concepts see Requirements in Context Part 7 - Detailed Requirements for Data Importing or Exporting.

Case Study Scenario

Preliminary planning was done for detailed discussions on the following HLR:

The system shall be able to report self-service booking flight seat sales and sale cancellations to the financial system.

The SME, Anne Smith (CFO), was asked to fill out the SME Questionaire about this data export. The results of the questionnaire indicated that there was an export capability in the business information system that currently supports Trips-R-You travel agents. The new export capability needed for the self-service booking system would be expected to have similar operational-level aspects. These include running as a batch job at the same frequency and time of day as the travel agent sales export.

During subsequent detail discussions, Anne explained that the financial system only needed to know summarized amounts (separated into net and tax) for:

- Self-service Customer Bookings
- Self-service Booking Cancellations
- Carrier Airline Flights Booked
- Carrier Airline Flight Booking Cancellations

The amounts were to be reported against specific GL Account codes which she was able to provide. One code was applicable to Customer amounts and the other to Carrier Airline amounts. Customer booking amounts were to be credited and any cancellations debited. Carrier Airline flight booking amounts were to be debited and flight booking cancellations credited.

A Carrier Airline is considered a supplier by the financial system. That system uses the 3-character ISO-standard Airline code to uniquely identify a given airline as a supplier.

The self-service system represents a separate source of revenue (and expense) from the agent-based business unit. As such, it needs to be assigned its own cost centre code to be included in each exported record.

All records in the export file would represent new GL postings, and involve similar fields. But because the selection criteria is different for the four different total summarizations, the BA chose to document separate record types for each.

The export template supported stakeholder review of the details, allowing a single formal detailed requirement referencing them to be sufficient:

> *The system shall be able to provide summarized booking sales in the form of general ledger posting transactions - as specified in DR017 - Self-service GL I/F v1.0.*

"DR017 – Self-service GL I/F v1.0" is a reference to the MS Excel file based on the Trips-R-You Export template used to capture the business detailed requirements for this interface. This file was managed as a project artefact and made available for reference by project stakeholders.

Export Template Example Entries

The template-based spreadsheet used in this case study contains entries for four export record types. All four types have six elements in common. Two of the types involve an additional two elements.

Example rows from the element-level tab in the spreadsheet can be seen in this screen shot:

Elements

Element ID	Record ID	Record	Record Element Seq	Element Type	DD ID	DD Record and Field	Related Element ID(s)	Export Field Business Name	Comments	Entry Update Date	Last Updated By	Entry Update History
1	1	Customer Bookings	1	Stored	0101	SYSTEM PARAMETERS.System Date		Create Date	Date the record was created for posting to the GL	9 December 2019	DT	Entry Added
2	1	Customer Bookings	2	Fixed Value	0176	SYSTEM PARAMETERS.GL Customer Sales Account		GL Account Code	The GL account to post customer bookings to.	9 December 2019	DT	Entry Added
3	1	Customer Bookings	3	Fixed Value	0180	LABEL-ONLY VALUE SETS.Debit Credit Code		Debit or Credit	Customer booking amounts are credits in the GL	9 December 2019	DT	Entry Added
4	1	Customer Bookings	4	Fixed Value	0177	SYSTEM PARAMETERS.Web Sales Cost Centre		Cost Centre	The GL cost centre all postings from this system	9 December 2019	DT	Entry Added
5	1	Customer Bookings	5	Derived	0182	BOOKING.Total Net Fare		Summarized Net Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added
6	1	Customer Bookings	6	Derived	0008	BOOKING.Total Taxes		Summarized Tax Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added
7												
8												
9	2	Customer Booking Cancellations	1	Stored	0101	SYSTEM PARAMETERS.System Date		Create Date	Date the record was created for posting to the GL	9 December 2019	DT	Entry Added
10	2	Customer Booking Cancellations	2	Fixed Value	0176	SYSTEM PARAMETERS.GL Customer Sales Account		GL Account Code	The GL account to post customer bookings (and cancellations) to.	9 December 2019	DT	Entry Added
11	2	Customer Booking Cancellations	3	Fixed Value	0180	LABEL-ONLY VALUE SETS.Debit Credit Code		Debit or Credit	Customer booking cancellation amounts are debits in the GL	9 December 2019	DT	Entry Added
12	2	Customer Booking Cancellations	4	Fixed Value	0177	SYSTEM PARAMETERS.Web Sales Cost Centre		Cost Centre	The GL cost centre all postings from this system	9 December 2019	DT	Entry Added
13	2	Customer Booking Cancellations	5	Derived	0182	BOOKING.Total Net Fare		Summarized Net Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added
14	2	Customer Booking Cancellations	6	Derived	0008	BOOKING.Total Taxes		Summarized Tax Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added
15												
16												
17	3	Carrier Airline Flight Bookings	1	Stored	0101	SYSTEM PARAMETERS.System Date		Create Date	Date the record was created for posting to the GL	9 December 2019	DT	Entry Added
18	3	Carrier Airline Flight Bookings	2	Fixed Value	0178	SYSTEM PARAMETERS.GL Flight Sales Account		GL Account Code	The GL account to post carrier airline bookings to.	9 December 2019	DT	Entry Added
19	3	Carrier Airline Flight Bookings	3	Fixed Value	0180	LABEL-ONLY VALUE SETS.Debit Credit Code		Debit or Credit	Carrier airline booking amounts are debits in the GL	9 December 2019	DT	Entry Added
20	3	Carrier Airline Flight Bookings	4	Fixed Value	0177	SYSTEM PARAMETERS.Web Sales Cost Centre		Cost Centre	The GL cost centre all postings from this system	9 December 2019	DT	Entry Added
21	3	Carrier Airline Flight Bookings	5	Data Navigation	0027	FLIGHT.Carrier AIRLINE	22		When reporting flight summary – identifies the airline.	9 December 2019	DT	Entry Added
22	3	Carrier Airline Flight Bookings	6	Stored	0112	AIRLINE.3 Character Code	21	Supplier Code	Code used to match the GL supplier ID for the airline – accessed using navigation.	9 December 2019	DT	Entry Added
23	3	Carrier Airline Flight Bookings	7	Derived	0183	FLIGHT.Total Net Fare		Summarized Net Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added
24	3	Carrier Airline Flight Bookings	8	Derived	0107	FLIGHT.Total Taxes		Summarized Tax Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added
25												
26												
27	4	Carrier Airline Flight Booking Cancellations	1	Stored	0101	SYSTEM PARAMETERS.System Date		Create Date	Date the record was created for posting to the GL	9 December 2019	DT	Entry Added
28	4	Carrier Airline Flight Booking Cancellations	2	Fixed Value	0178	SYSTEM PARAMETERS.GL Flight Sales Account		GL Account Code	The GL account to post carrier airline bookings to.	9 December 2019	DT	Entry Added
29	4	Carrier Airline Flight Booking Cancellations	3	Fixed Value	0180	LABEL-ONLY VALUE SETS.Debit Credit Code		Debit or Credit	Carrier Airline booking cancellation amounts are credits in the GL	9 December 2019	DT	Entry Added
30	4	Carrier Airline Flight Booking Cancellations	4	Fixed Value	0177	SYSTEM PARAMETERS.Web Sales Cost Centre		Cost Centre	The GL cost centre of postings from this system	9 December 2019	DT	Entry Added
31	4	Carrier Airline Flight Booking Cancellations	5	Data Navigation	0027	FLIGHT.Carrier AIRLINE	32		When reporting flight summary – identifies the airline.	9 December 2019	DT	Entry Added
32	4	Carrier Airline Flight Booking Cancellations	6	Stored	0112	AIRLINE.3 Character Code	31	Supplier Code	Code used to match the GL supplier ID for the airline – accessed using navigation.	9 December 2019	DT	Entry Added
33	4	Carrier Airline Flight Booking Cancellations	7	Derived	0183	FLIGHT.Total Net Fare		Summarized Net Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added
34	4	Carrier Airline Flight Booking Cancellations	8	Derived	0107	FLIGHT.Total Taxes		Summarized Tax Amount	The sum of values for the selected records, and that value converted from NUC to the currency used by the GL.	9 December 2019	DT	Entry Added

See Appendix B for a link to download a copy of this file.

Section 3.5 – Detailed Requirements for Importing Data

Section Objective

This section presents an example of capturing details of business needs for a data import. As with exporting data covered in the previous section, detailed requirements fall into three categories:

> **Interface-level Details** – Things that apply to the import as a whole. E.g. its purpose, how it's expected to operate, and its relationship to other system capabilities.
>
> **Record-level Details** – Things that apply to a specific record type involved in the import. E.g. its place within a hierarchy of record types, selection criteria for that particular record type.
>
> **Individual Element Details** – Each field that needs to be included in a record type involved in the interface, and whether a value is mandatory or not. E.g. A field can be mandatory when adding a record by import, but optional when updates to records are being imported.

For further reading about data import concepts see Requirements in Context Part 7 - Detailed Requirements for Data Importing or Exporting.

Case Study Scenario

The need for an import interface to support the customer self-service booking process was identified as part of high-level requirements and represented by the following HLR:

> *The system shall be able to request scheduled options for a trip from the GDS.*

The business analyst was able to prepare for detail discussions by reviewing existing self-service flight booking web sites. The recognized SME, Sharon Wu, was asked to fill out the SME Questionaire to provide interface-level details.

With customer flight bookings taking place online, this interface would need to operate in real-time. The user interface would involve the person entering search criteria that include the From and To journey points for one or more Journeys, along with the intended departure date for each Journey. The interface would involve one record type containing those three fields.

Given these input parameters the interface to the GDS was responsible for finding and returning (i.e. importing) the Scheduled Options for each Journey found. A given scheduled option could involve one or more flights. The carrier airline for each flight involved would supply the GDS with the current seat inventory for the different cabin classes available on the flight (e.g. Economy, Business), and the full fare cost for one of those seats based on the Journey being part of a one-way trip, a round trip, or a multi-leg trip. Where the carrier airline offered age-based discounts off of the full fare, the discount percent per age group would be provided.

The above details were seen to involve four data import record types in the following hierarchical structure:

Trips-R-You Case Study
Scheduled Options from GDS Data Import
Imported Records Structure
Version 1.1
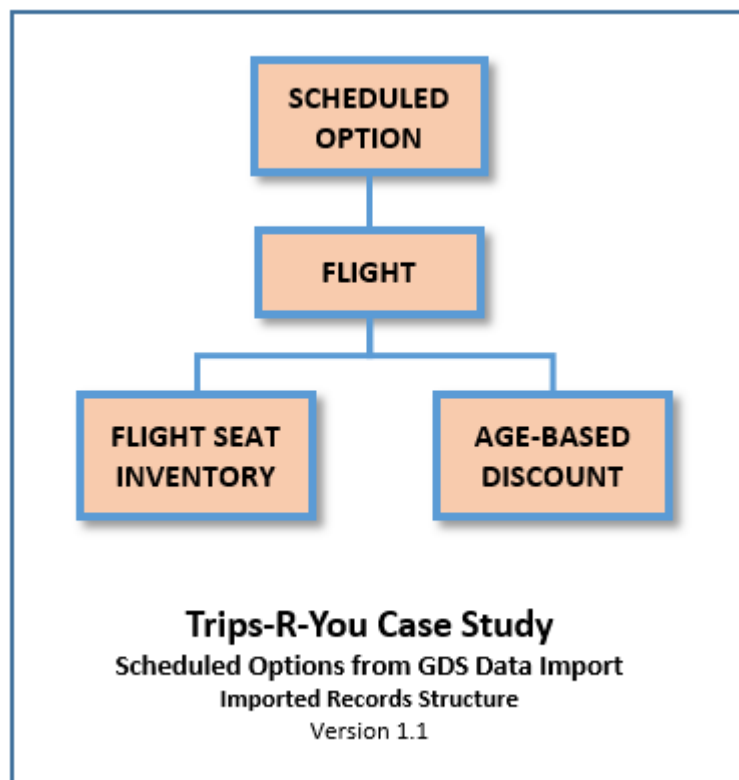
Record-level details for each of the above record types were recorded using the import-specific template, including details of the parent/child relationships. The above tool-drawn version of the hierarchy structure was created and included in the spreadsheet as a visual representation those details.

Discussions then proceeded to the fields needed to be included in the import of each record type. Those details were also captured using the template. Where a field involved in the import related to a field in a system record (e.g. imported values were to be stored), those fields not already documented in the data dictionary were added, and subsequently referenced in as part of field-level detail for the import capability.

Following a review and sign-off of the import capability detailed requirements documented in the spreadsheet, the following formal detailed requirement was added to the requirements management template:

> *The system shall be able to obtain Scheduled Options for a Trip from the GDS - as specified in DR016 - Scheduled Options from GDS v1.1.*

"DR016 – Scheduled Options from GDS v1.1" is a reference to the MS Excel file based on the Import template. This file was managed as a project artefact and made available for reference by project stakeholders.

Import Template Example Entries

The import template used in this case study contains entries for the one parameter record and four data import records. Those five records involve a total of 27 elements between them, each

identifying the business name for the field in the import file, and where appropriate, mapped to its parameter source or import target field within the data dictionary.

Example rows from the element-level tab in the spreadsheet can be seen in this screen shot:

Elements

Element ID	Record ID	Record	Record Element Seq #	Element Type	DD ID	DD Record and Field	Related Element ID(s)	Import Field Business Name	Mandatory	Comments	Entry Update Date	Last Updated By	Entry Update History
1	1	Journey		Sourced	0129	JOURNEY.From JOURNEY POINT		From Location	y	A city or specific airport	2 January 2020	DT	Entry Added
2	1	Journey		Sourced	0130	JOURNEY.To JOURNEY POINT		To Location	y	A city or specific airport	2 January 2020	DT	Entry Added
3	1	Journey		Sourced	0131	JOURNEY.Departure Date		Departs	y	Local From Location date	2 January 2020	DT	Entry Added
4	2	Journey Option		Sourced	0092	JOURNEY OPTION.From Airport		From Airport	y		2 January 2020	DT	Entry Added
5	2	Journey Option		Sourced	0094	JOURNEY OPTION.Local Departure DateTime		Local Departure Time	y		2 January 2020	DT	Entry Added
6	2	Journey Option		Sourced	0168	JOURNEY OPTION.GMT Departure DateTime		GMT Departure Time	y		2 January 2020	DT	Entry Added
7	2	Journey Option		Sourced	0093	JOURNEY OPTION.To Airport		To Airport	y		2 January 2020	DT	Entry Added
8	2	Journey Option		Sourced	0095	JOURNEY OPTION.Local Arrival DateTime		Local Arrival Time	y		2 January 2020	DT	Entry Added
9	2	Journey Option		Sourced	0169	JOURNEY OPTION.GMT Arrival DateTime		GMT Arrival Time	y		2 January 2020	DT	Entry Added
10	3	Flight		Sourced	0020	FLIGHT.From Airport		From Airport	y		2 January 2020	DT	Entry Added
11	3	Flight		Sourced	0025	FLIGHT.Local Departure DateTime		Local Departure Time	y		2 January 2020	DT	Entry Added
12	3	Flight		Sourced	0155	FLIGHT.GMT Departure DateTime		GMT Departure Time	y		2 January 2020	DT	Entry Added
13	3	Flight		Sourced	0032	FLIGHT.Flight Number		Flight #	y		2 January 2020	DT	Entry Added
14	3	Flight		Sourced	0021	FLIGHT.To Airport		To Airport	y		2 January 2020	DT	Entry Added
15	3	Flight		Sourced	0026	FLIGHT.Local Arrival DateTime		Local Arrival Time	y		2 January 2020	DT	Entry Added
16	3	Flight		Sourced	0156	FLIGHT.GMT Arrival DateTime		GMT Arrival Time	y		2 January 2020	DT	Entry Added
17	3	Flight		Sourced	0029	FLIGHT.Travel Time		Flight Time	y		2 January 2020	DT	Entry Added
66	3	Flight		Sourced	0159	FLIGHT.Aircraft Type		Aircraft Model	y		2 January 2020	DT	Entry Added
18	3	Flight		Sourced	0027	FLIGHT.Carrier AIRLINE		Carrier	y		2 January 2020	DT	Entry Added
19	3	Flight		Sourced	0028	FLIGHT.Operator AIRLINE		Operator	y		2 January 2020	DT	Entry Added
20	4	Flight Seat Inventory		Sourced	0181	FLIGHT SEAT INVENTORY.CABIN CLASS		Service Class	y		2 January 2020	DT	Entry Added
21	4	Flight Seat Inventory		Sourced	0050	FLIGHT SEAT INVENTORY.Fare Basis Code		Fare Basis	y		2 January 2020	DT	Entry Added
22	4	Flight Seat Inventory		Sourced	0144	FLIGHT SEAT INVENTORY.# of Seats Available		Quantity	y		2 January 2020	DT	Entry Added
23	4	Flight Seat Inventory		Sourced	0033	FLIGHT SEAT INVENTORY.Full Fare		Fare	y	Appropriate for one-way, round-trip, or multi-city trip based on Journey input parameters.	2 January 2020	DT	Entry Added
67	4	Flight Seat Inventory		Sourced	0034	FLIGHT SEAT INVENTORY.Taxes		Tax	y		2 January 2020	DT	Entry Added
24	5	Age-based Fare Discount		Sourced	0135	AGE-BASED FARE DISCOUNT.Age Category		Passenger Type	y	Airline's name for a given passenger type	2 January 2020	DT	Entry Added
25	5	Age-based Fare Discount		Sourced	0136	AGE-BASED FARE DISCOUNT.From Age		Minimum Age	y		2 January 2020	DT	Entry Added
26	5	Age-based Fare Discount		Sourced	0139	AGE-BASED FARE DISCOUNT.To Age		Maximum Age	y		2 January 2020	DT	Entry Added
27	5	Age-based Fare Discount		Sourced	0140	AGE-BASED FARE DISCOUNT.% Off		Discount	y		2 January 2020	DT	Entry Added

See Appendix B for a link to download a copy of this file.

Section 3.6 – Detailed Requirements for Fully Automating a Business Activity

Section Objective

This section presents an example of capturing detailed business needs to fully automate a business activity. 'Fully automated' means that the business information system (BIS) is expected to be capable of performing the activity from start to finish without user involvement. Within the context of this case study this capability type is referred to as an automated function (AF).

Detailed requirements for an AF involve categories similar to the ones applicable to the other four capability types:

> **Operational Details** – Things that apply to the AF as a whole. E.g. its purpose, and details relevant to it operating in batch or real-time mode.

> **Record-level Details** – An AF can involve records containing input parameters, output parameters, and system data it references or maintains (adding, updating, and/or deleting). Record-level details include selection criteria, sorting criteria, and parent/child (i.e. hierarchical) relationships between records.

> **Individual Element Details** – Identifying each field that needs to be included in a record involved in the AF, and whether its value is only referenced, or derived based on the values of other fields. E.g. Fields in a record being added, an existing record having one or more field values updated.

If the AF is complex – involving numerous steps and/or decisions - details of how the activity can be performed manually are captured in a fourth category:

> **Activity Element Details** – Steps and/or decisions that are part of the activity being automated. E.g. each 'shape' contained in a flow chart that represents the activity being performed.

For further reading about AF concepts see [Requirements in Context Part 8 - Detailed Requirements for Fully Automating a Business Activity](#).

Case Study Scenario

The need for an automated function to support the customer self-service booking process was identified as part of high-level requirements and represented by the following HLR:

> *The system shall be able to request journey options for a trip from the GDS.*

Detailed requirements discussions had already taken place involving the user interface capability that would source the input parameters and trigger this AF (see Section 3.2 above). Also discussed was the data import capability responsible for sourcing potential journey options from the GDS see Section 3.5 above). The detailed requirements documented during those discussions were therefore available to reference during the current discussions. In addition, Sharon Wu was asked to complete the SME Questionaire addressing operational-level details for this AF. Her response to the "Purpose" question was:

"This function produces a set of viable journey options for a given trip based on trip-related search parameters. Each journey option is expected to have sufficient seats available. The total fare for a given option is determined using the Full Fare for a seat in the preferred cabin class (or nearest available cabin class) on each flight involved in the option. The total full fare is reduced if there are children needing a seat that are eligible for an age-based discount on a flight."

Based on the UI mock-ups from previous discussions, the fields needed as input parameters for the AF were identified as:

- The preferred cabin class (e.g. Economy, Business).
- The number of adults taking the trip.
- The number of children taking the trip, their ages, and for any under the age of two, if they will need a seat or be sitting on a lap.
- For each journey within the trip, its 'from' and 'to' city or airport, and departure date.

The same UI screen containing the above fields included a "Search" action element (e.g. button). The description of the action(s) initiated included input field data validation and subsequent triggering of the automated activity. These UI elements can be seen in the UI screen mock-up included as part of the detail for that UI:


The input fields seen above were added to the data dictionary during UI detail discussions, an so were available to reference as Record Elements within the AF-specific detailed requirements template. The fields were defined within Trip, Traveler and Journey input parameter records. Record-

level details captured included these records being associated with each other in the following hierarchy:

Trips-R-You Case Study
Finding Journey Options AF
Input Parameter Record Structure
Version 1.0
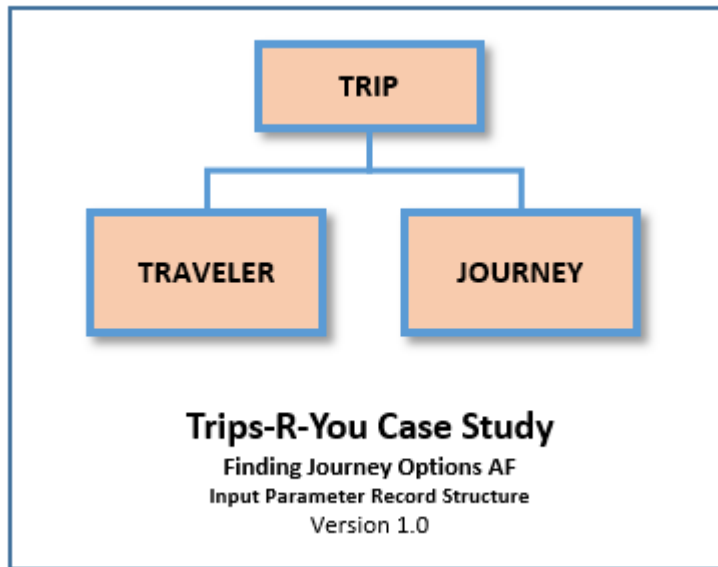
Records identified as being needed for reference by the AF were the same as those imported from the GDS. And the AF was found to produce new instances of a single Journey Option record.

NOTE: prior to discussions of this AF there was a record defined in the data dictionary called Journey Option. But based on detailed discussions for this AF it was agreed that that record actually represented something slightly different – the 'scheduled' options provided by the GDS. A given scheduled option, and its associated Flights, when processed by this AF, could result in more than one Journey Option. So that original record was renamed to "Scheduled Option" in the data dictionary, and a new record with the name Journey Option added. Existing documented details affected by this change not automatically propagated by the tool needed to be updated manually.

Detailed discussion of how the activity being automated would be performed manually initially identified four basic steps:

1. Get scheduled options from the GDS for each journey within the trip.
2. Identify journey options based on current seat availability on flights within each scheduled option.
3. Identify the best available cabin class per flight within each journey option
4. Determine the total fare for the travellers for each journey option in the designated cabin class of each flight.

The business analyst chose to address the steps within the activity from a UML use case perspective – identifying the 'happy path' steps taken when everything went as it should and involving the most common scenarios. This involved there being at least one viable journey option (i.e. sufficient seats available) for every journey. The most common scenarios included there being seats available in the preferred cabin class, and for all of the travellers on the trip being adults (i.e. no age-based discounts).

A fifth step was identified as being a necessary part of the main flow – dealing with trips involving more than one journey (i.e. not a one-way trip). In such cases 'airline alliances' needed to be

considered. The most common scenario for multi-journey trips was that there would be at least one viable journey option within each journey involving a given airline alliance. I.e. whichever journey option was selected for the first journey, the end-to-end trip could be booked involving the one alliance.

The end result of detailed discussions of the activity, from a use case perspective was:

- A main flow involving five steps.
- Three alternate flows to handle unusual situations.
- Three exception flows, where the activity would not be able to be completed successfully.

This was represented graphically by the following use case flow diagram:
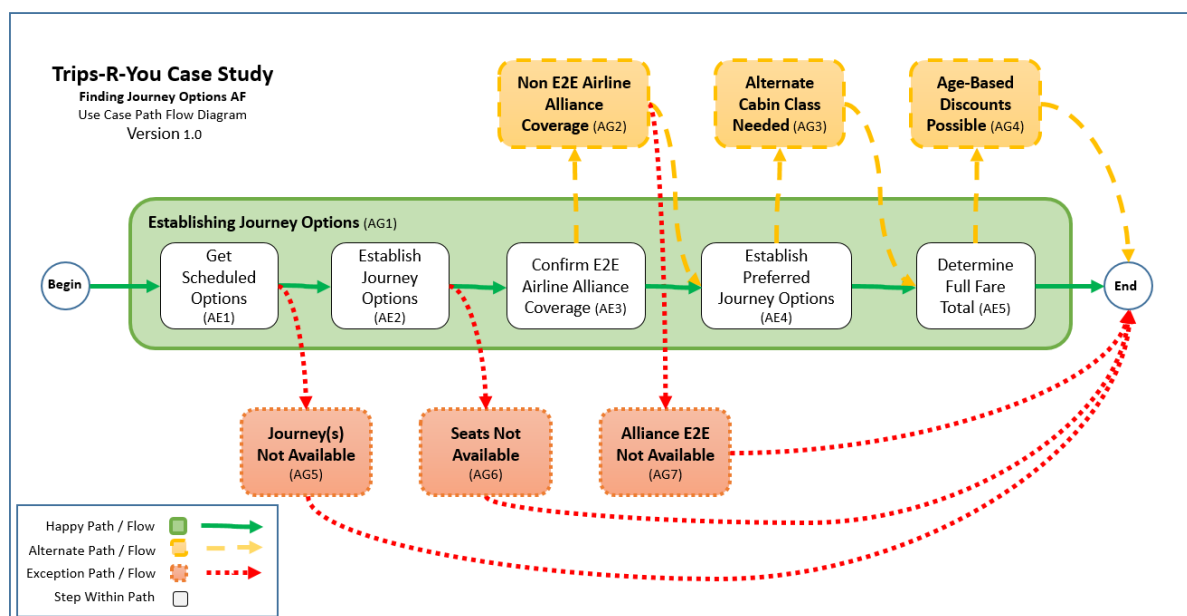
NOTE: Had the business analyst used flow charting to represent the steps and decisions to manually perform the activity, the end result would have looked as follows:

Trips-R-You Case Study
Finding Journey Options AF
Activity Flow Chart
Version 1.0
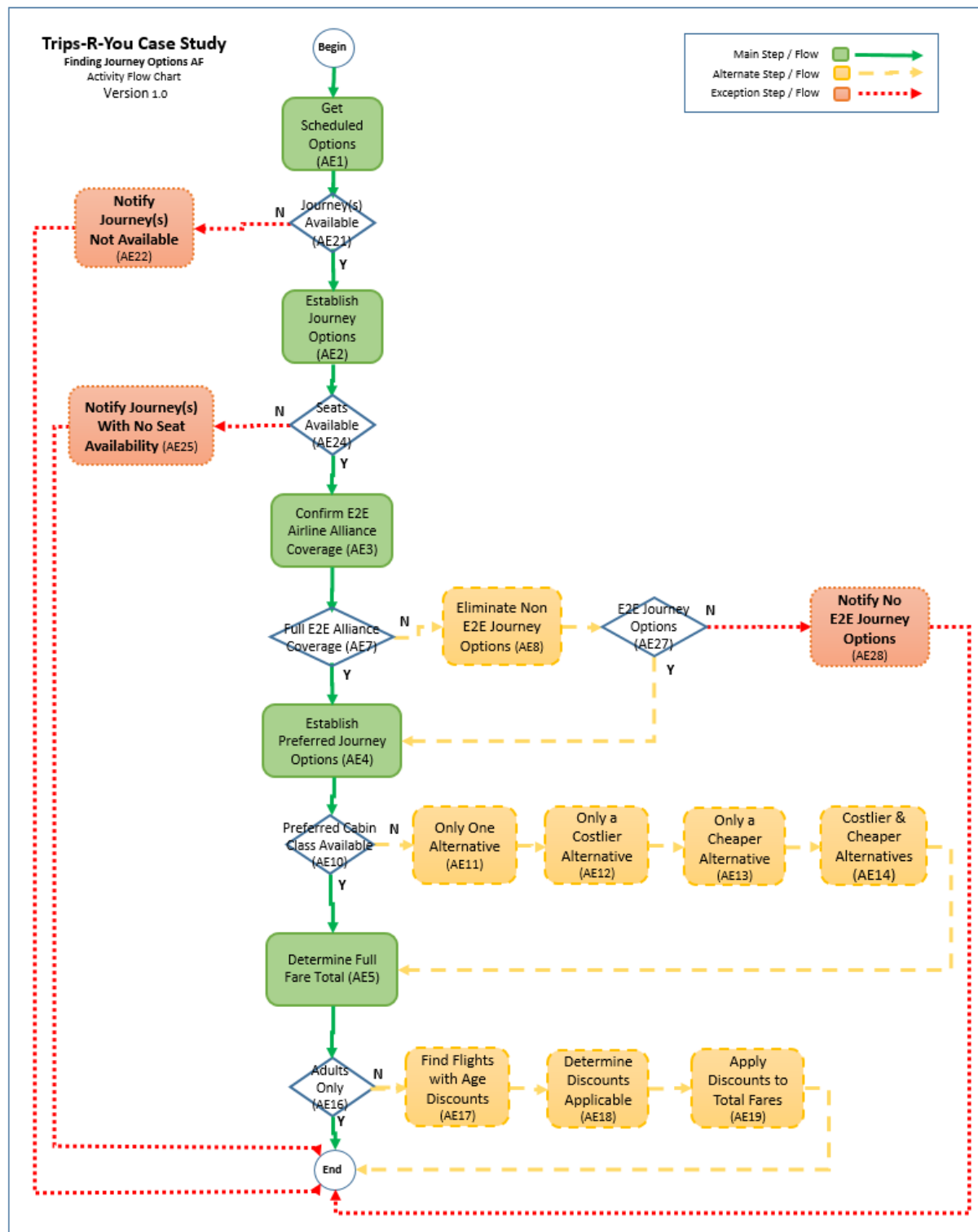
Both diagrams include unique identifiers for each 'shape'. The ID corresponds to a supplementary textual description captured using the AF-specific template. The spreadsheet includes one worksheet for defining *Activity Groupings* (i.e. Use case paths or flowchart sub-processes) and another for defining *Activity Elements* (i.e. steps or decisions within a given Activity Grouping).

The details behind each identified group and element for the above example can be seen documented in the Trips-R-You Automated Function Example. That same spreadsheet also includes

details of the operational, record and field detailed requirements for this AF. With all details captured together as a unit of delivery, a single formal detailed requirement statement can be used to represent the set of detailed requirements for the AF:

The system shall be able to identify viable journey options based on the search parameters for a trip – as specified in DR18 – Finding Journey Options AF v1.0."

"DR018 – Finding Journey Options AF v1.0" is a reference to the MS Excel file based on the AF template. This file was managed as a project artefact and made available for reference by project stakeholders.

Automated Function Template Example Entries

In addition to supporting capturing operational, record and field detailed requirements, the AF template includes two worksheets for capturing details of manually performing the activity. Had the above example been discussed in flow chart form, there would have been a single activity grouping (the one flow chart) and 22 activity elements (16 steps and 6 decisions).

Having used a (system only) UML use case to describe how the activity would be manually performed, there are seven activity groupings (a main flow, three alternate flows, and three exception flows). Those flows involve a total of 29 activity elements (the same 16 steps and six decisions, plus seven elements representing navigation at the end of each flow).

Example rows from the activity element tab in the spreadsheet can be seen in this screen shot:

Activity Element	Group	Group	Step Seq	Type	Label	Related Activity Element	Description	Entry Update Date	Last Updated By	Entry Update History
1	1	Establishing Journey Options	1	Step Element	Get Scheduled Options		The system imports from the GDS for each Journey for a given Trip, Scheduled Options, their related Flights, and for each Flight its Age-based Discounts and Flight Seat Inventory(s).	8 March 2020	DT	Entry Added
2	1	Establishing Journey Options	2	Step Element	Establish Journey Options		The system establishes a Journey Option for each Scheduled Option that has sufficient seats available in at least one Cabin Class for every Flight associated with the Scheduled Option.	8 March 2020	DT	Entry Added
3	1	Establishing Journey Options	3	Step Element	Confirm E2E Airline Alliance Coverage		If the trip involves more than one journey, and any airline alliances are involved in one or more journeys options, the system confirms that at least one airline alliance is involved in one or more journey options for each journey within the Trip. I.e. It will be possible for the end-to-end trip to be booked selecting journey options involving the same airline alliance.	8 March 2020	DT	Entry Added
4	1	Establishing Journey Options	4	Step Element	Establish Preferred Journey Options		The system finds all of the flights associated with journeys options that have sufficient flight seat inventory available in the preferred cabin class. That cabin class is associated with those flights for each Journey Option the flight is part of. I.e. any Journey Option the Flight is associated with the preferred Cabin Class can be booked.

NOTE: Sufficient flight seat inventory means that the # of seats available within a given flight seat inventory record is greater than or equal to the # of seats needed for the trip. Available in the preferred cabin class means that the cabin class for the flight seat inventory record is the same as the preferred cabin class for the trip. | 8 March 2020 | DT | Entry Added |
| 5 | 1 | Establishing Journey Options | 5 | Step Element | Determine Full Fare Total | | For every Flight Cabin Class for a Journey Option, the system calculates the Total Fare and Total Taxes by multiplying Full Fare and Taxes by the # of Seats Needed for the Trip.

E.g. A Trip that needs 3 seats, and a Journey Option Flight involving a Flight Seat Inventory record for Economy cabin class seats having a Full Fare value of $100 that includes Taxes of $10 - the Total Fare calculation on that flight is $300 and Total Taxes is $30. | 8 March 2020 | DT | Entry Added |
6	1	Establishing Journey Options	6	End Element	End		The use case ends.	8 March 2020	DT	Entry Added
7	2	Non E2E Airline Alliance Coverage	1	Alternate Condition	Full E2E Alliance Options	AE3	At the end of the step "Confirm E2E Airline Alliance Coverage" for a Trip involving two or more Journeys - every Airline Alliance that is involved in one or more Journey Options has at least one Journey Option for each Journey (i.e. E2E coverage for the trip) then all is good. Otherwise an alternate condition must be dealt with.	8 March 2020	DT	Entry Added
8	2	Non E2E Airline Alliance Coverage	2	Step Element	Eliminate Non E2E Journey Options		The system eliminates any Journey Option that involves a Flight associated with an Airline Alliance that does not offer E2E coverage for the trip. I.e. The only remaining Journey Options are ones that either involve no Airline Alliance or involve an Airline Alliance with at least one viable Journey Option for each Journey for the Trip.	8 March 2020	DT	Entry Added
9	2	Non E2E Airline Alliance	3	End Element	Path End	AE4	The use case resumes at the step Establish Preferred Journey Options	8 March 2020	DT	Entry Added
10	3	Alternate Cabin Class Needed	1	Alternate Condition	Preferred Cabin Class Available	AE4	At the end of the step "Establish Preferred Journey Options" - all Flights associated with Journey Options have sufficient seat inventory for the # of Seats Needed in the Preferred Cabin Class for the trip then all is good. Otherwise an alternate condition must be dealt with.	8 March 2020	DT	Entry Added
11	3	Alternate Cabin Class Needed	2	Step Element	Only One Alternative		For each Flight within a Journey Option that does not have a designated Cabin Class, and there is only one Flight Seat Inventory record for that flight with sufficient seats available for the trip, the system designates that cabin class for that flight and journey option.

E.g. Business Class was preferred, but for that Flight there are only sufficient seats available in Economy Class. | 8 March 2020 | DT | Entry Added |
| 12 | 3 | Alternate Cabin Class Needed | 3 | Step Element | Only a Costlier Alternative | | For each Flight within a Journey Option that does not have a designated Cabin Class, and there are only higher-priced Flight Seat Inventory records for that flight with sufficient seats available for the trip, the system designates closest to the preferred cabin class for that flight and journey option.

E.g. Economy Class was preferred, but for that Flight there are only sufficient seats available | 8 March 2020 | DT | Entry Added |
| 13 | 3 | Alternate Cabin Class Needed | 4 | Step Element | Only a Cheaper Alternative | | For each Flight within a Journey Option that does not have a designated Cabin Class, and there are only lower-priced Flight Seat Inventory records for that flight with sufficient seats available for the trip, the system designates closest to the preferred cabin class for that flight and journey option.

E.g. First Class was preferred, but for that Flight there are only sufficient seats available in | 8 March 2020 | DT | Entry Added |

See Appendix B for a link to download a copy of this file.

Appendix A - Glossary of Terms for "Web-based Flight Booking" Project

Term	Definition
Booking	A commitment by a commercial airline to fly a designated set of travellers on one or more journeys between specified cities, providing seats within a specific cabin class, with each journey having scheduled departure date and time. E.g. a family of four (individually named) flying Qantas economy class from Sydney to Los Angeles on 24 Dec, 2020 at 9:35 a.m., returning to Sydney on 5 January 2020 at 08:00 a.m.
Cabin Class	Economy/Coach, Premium Economy, Business, and First Class
Class of Service	An airline-specific code representing the four standard cabin classes.
Customer	A person that has successfully completed the Trips-R-You customer sign-up process using the web screens that support that process.
E2E	End to end.
Fare Basis Code	An airline-specific code (usually a single character) for describing the characteristics of a ticket sold as part of a booking. E.g. the first character of the code representing the class of service.
Flight	Transportation by air, offered to travellers, by a commercial airline, between two airports, departing at a specified date and time. E.g. Qantas flight QF11, flying from Sydney to Los Angeles on 29 August 2020, departing at 9:35 a.m.
Flight Seat Inventory	A number of seats available for booking on a given flight, in a specific cabin class, for a specified one-way or round trip fare. E.g. 10 economy class seats available for booking on Qantas flight QF11 departing Sydney 29 August 2020 at 9:35 a.m., with a one-way fare of $900.00 AUD.
Global Distribution System (GDS)	A computer-based service that provides travel industry service providers real-time access to flight seat inventories held in individual airline reservation systems, and subsequent booking of flights with those airlines. E.g. The Amadeus GDS providing travel agents the ability to book flights on behalf of their customers.
GMT	Greenwich Mean Time
International Air Transport Association (IATA)	A trade association involving 290 member airlines, providing code standards for airline-related things such as airports and airlines.
Internet User	Anyone with internet access able to view screens on the Trips-R-You web site.
Journey	Transportation by commercial airline between two cities on a designated date, either as a one-way trip, from or returning to the origin city of a round trip, or from one of the cities to another as part of a multi-city trip.
Journey Option	A single flight, or combination of flights, that has sufficient available seats in the designated cabin class to accommodate the number of travellers involved, on one of the journeys within a given trip. E.g. Qantas QF11 having a total of 25 economy seats available between Sydney and Los Angeles on 29 August 2020, departing at 9.35 a.m., arriving in Los Angeles at 6:20 a.m.
Neutral Unit of Currency (NUC)	A private currency operated by IATA, used as the standard by airlines for storing fares in their flight reservation systems. E.g. For a journey from Sydney to New York, involving a Qantas flight plus an American Airlines flight, the fares for both flights would be expressed in NUC, so could be summed to determine the total fare for the journey. That NUC sum would be converted to

	AUD or USD for display and payment purposes, depending on the booking involving an Australian or an American.
Reference Data	Standardized codes and other data for Airlines, Airports, Cities, Countries and Currencies needed for communicating between Service providers (e.g. travel agencies), and the GDS they connect to. E.g. a Journey from Sydney to Los Angeles involves a customer 'selecting' those two cities and the GDS understanding which cities to search for.
Ticket	Access to a specific flight for a Traveler. Used when checking in for a flight to confirm the right to receive a boarding pass.
Traveler	An individual (adult or child) intending to be making the trip, and therefore requiring a ticket for each flight involved in each of the selected journeys.
Trip	One or more journeys that a person is considering booking. E.g. a round trip from Sydney to Los Angeles departing on 29 August 2020 and returning on 15 September 2020.
Trip Itinerary	Details, of use or interest to the travellers involved in a booking, of each journey, and flight within journey. E.g. airports, departure and arrival dates and times, flight durations, journey durations, amount of time between connecting flights, and airline flight booking confirmation number for each flight booked.

Appendix B – Template-based Example Links

MS Excel-based Template	Trips-R-You Case Study Example Usage Link
Formal Requirements	Trips-R-You Case Study Requirements
Data Dictionary	Trips-R-You Data Dictionary
User Interface	DR013 – Self-service Flight Booking User Interface v2.0
Report	DR015 – Self-service Booking Confirmation Report v2.0
Data Export	DR017 – Self-service GL I/F v1.0
Data Import	DR016 – Scheduled Options from GDS v1.1
Automated Function	DR018 – Finding Journey Options v1.0