Adjusted Offers

Guidelines for Implementation

Version 1.0
June 2024

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Contents

Background

1. Overview of dynamic offers capabilities

The airline industry is developing new mechanisms for pricing, product, and revenue management to improve an airline's dynamic offers capabilities. ATPCO has worked with the industry to identify three dynamic offers capabilities:

Optimized offers

Dynamic offers that are created from predefined products and price points with dynamic availability.

Offers are created using traditional ATPCO data (e.g., fares, rules, services), airline availability, and Routehappy content. It includes static pricing, dual RBD validation, and quantum pricing mechanisms.

Adjusted offers

Dynamic offers created when a dynamic pricing/offer engine uses an airline's unique business logic to apply dynamic price or product adjustments to predefined prices and products (e.g., traditional fare and rule data).

Offers are created using traditional ATPCO data (e.g., fares, rules, services), price adjustment mechanisms, and/or bundle inclusions using Product Catalogue and Routehappy content.

Continuous offers

Dynamic offers created when a dynamic pricing/offer engine uses an airline's unique business logic that is not dependent on predefined prices and products. Products are chosen dynamically from a catalogue of potential offerings. Prices are determined dynamically and may be chosen from a predetermined range or by direct link to an airline's revenue management system.

Offers are created using big data (e.g., competitive, product performance, customer, economic, and environment insights), Product Catalogue, Routehappy content, and new science.

Note: Several airlines have implemented dynamic pricing and refer to it as "continuous pricing." However, in reality, they are dynamically adjusting traditional ATPCO fare data, which falls under the definition of "adjusted offers" for the purpose of this document.

Each mechanism offers improvements that aim to increase the number of price points available in any given market, increase the frequency and scale at which prices are changed from transaction to transaction, expand capabilities or introduce new proprietary rules for determining the optimal price and product offering, or implement complete flexibility when determining price and product offering in response to market conditions.

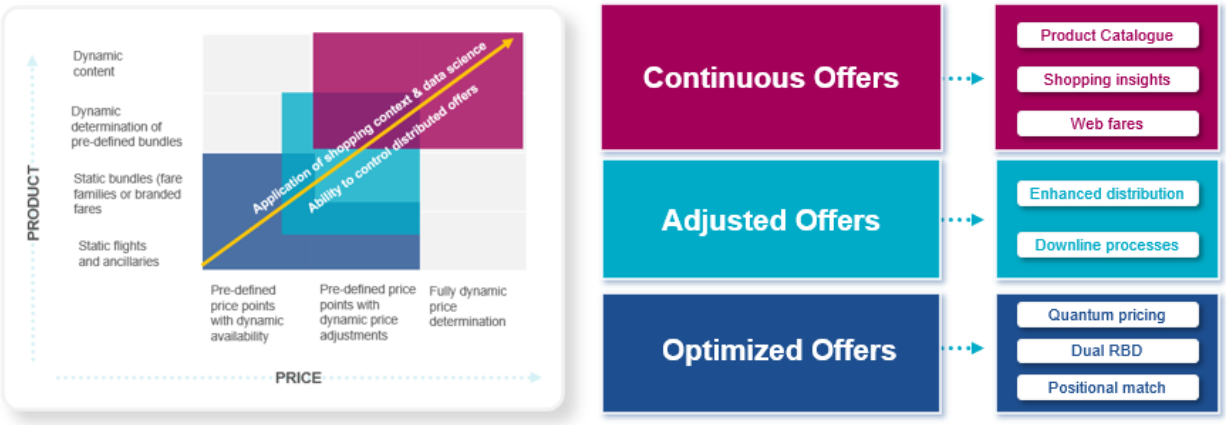
The dynamic offer capabilities may be used by an airline within an airline's direct (e.g., offer management system, airline website) or indirect (e.g., GDS) channels.

This document focuses on adjusted offers and provides an overview of items each airline needs to consider on the path to implementing adjusted offers.

Note: A *Dynamic Fare Adjustment via a DPE: Implementation Guide* was issued in September 2019 and detailed a rigid, well-defined process for implementing dynamic fare adjustments. However, as the industry requirements have evolved and dynamic price adjustment is a reality, ATPCO recognizes that a more flexible, less rigid approach is needed. Therefore, the previous guide will be archived and replaced by this new document, which provides broader guidelines for implementing adjusted offers based on industry capabilities to date.

1.1. Dynamic Offers Capability Matrix

The Dynamic Offers Capability Matrix (illustrated below) organizes the sets of tools that an airline will need to access to support its various strategies for optimized, adjusted, and continuous offers. To the right are supporting ATPCO solutions either in production or in progress.



Dynamic offers implementation mechanisms, strategy, and timeline will differ within and across airlines. The matrix is not a maturity matrix where an airline is moving from one box to another box. Instead, an airline may choose to employ strategies across multiple quadrants. Pricing and shopping strategies will require flexibility across all boxes in the matrix, and which strategy an airline chooses to use will depend upon market conditions and intended outcome. An airline may use one quadrant of the matrix for one pricing strategy and another quadrant for a different strategy. Interline partners may also use different quadrants. Data must be interoperable between the current method (calculating product and price together) and the end-state method (separation of product from price).

1.2. Which Dynamic Offers solution is right for you?

ATPCO, in conjunction with the industry, has or is in the process of defining solutions to support each dynamic offers capability.

1.2.1. Optimized offers

The following solutions are defined or under discussion to support optimized offers:

Solution	Explanation	Status
Dual RBD validation	Provides additional RBD capabilities. It increases the number of price points available by indicating that inventory availability is required in two booking classes for a fare to be valid. Refer to the Dual RBD Implementation Guide for further information. Note: BR 2099 (M2 stage) requests functionality to indicate that inventory availability is required in three booking classes for the fare to be valid.	In production
Positional match	Enables traditional fare-related data to be identified dependent upon the alphanumeric character in a specific position in the Fare Class Code. Many airlines have implemented a Fare Class Code taxonomy where values in each position are used to identify relevant product and brand criteria and may be used to align across partners. Using the positional match functionality allows an airline to better define rule and other conditions specific to a product or brand.	In production
Quantum pricing	Quantum pricing is when airlines make frequent updates using automated price determination and upload them via APIs, and then adjust the flight availability, linked to fare products, for specific customers or in specific situations.	In production for some airlines, but under discussion to address challenges

Optimized offers solutions can be used alone or in addition to other optimized offers or adjusted offers solutions.

Use optimized offers if you want to:

- Increase the number of price points (via Dual RBD validation)
- Resolve constraints on number of RBDs (via Dual RBD validation)
- Optimize yield and upsells (via Dual RBD validation)
- Better target rule and other conditions based on a product or brand (via positional match)
- Improve price and product management efficiencies (via positional match)
- Increase the frequency as which prices are changed (via quantum pricing)
- Improve optimal price determination for product and market conditions (via quantum pricing)
- Improve workflow efficiencies
- Increase accuracy
- Maintain existing infrastructure and processes
- Step into dynamic pricing

1.2.2. Adjusted offers

The following solutions are defined or under discussion to support adjusted offers:

Solution	Explanation	Status
Enhanced distribution	Allows an airline to *optionally* restrict the distribution of public fare and related data to specific selling channel subscribers. This enables an airline to differentiate content across direct and indirect channels and stimulate sales through designated channels (e.g., NDC). It ensures fares remain fully integrated into all airline internal systems and industry processes for public fares.	In production
Order posting for downline processes	Downline processes, such as revenue accounting, audit, settlement, changes/refunds, and revenue management, require knowledge of all possible fares in the marketplace to have a comprehensive database to compare to the sale/ticket information. Until an airline fully implements ONE Order (both online and in conjunction with interline partners), it is expected the dynamically adjusted fare must be integrated into the current ecosystem and supported through current ticketing, servicing, revenue accounting, and settlement processes. The general challenge with ticketing is the fact that the ticket will reflect the dynamically adjusted fare, but this fare amount is not contained in the filed fare data distributed by ATPCO. Refer to the white paper published by ATPCO in December 2022 that explored the consequences to downline processes when you have incomplete fare information due to dynamic offers.	Under discussion
Voluntary Changes enhancements	As the industry moves forward with dynamic offers, from optimized to adjusted to continuous offers, how can we separate product from price in voluntary change processing? Early airline adopters of adjusted pricing solutions have identified challenges when tickets containing an adjusted fare are presented for voluntary changes. These challenges can be summarized as: • Applying historical process tags (including keep the fare). Some airlines may require the ability to maintain (keep) historical products and conditions but not necessarily keep the historical price. The proposal is that when re-shopping, the product *conditions* that the customer purchased are relevant and need to be kept (e.g., an airline does not want to change the conditions midway through a customer's journey), but the airline may choose not to keep the historical dynamic price. • Retrieving historical change and refund conditions. When a ticket is presented for voluntary change, processing will resolve to (and apply) Voluntary Changes (Category 31) data applicable for each fare on the ticket. Airlines must ensure the system(s) that will be performing the voluntary change/refund transactions are in receipt of the ticketed fares and the associated rule conditions in order to enable the automated changes and refunds application (see above regarding Downline Processes).	Under discussion in the new Voluntary Changes Focus Team.

Adjusted offers solutions can be used alone or in addition to other adjusted offers or optimized offers solutions.

Use adjusted offers if you want to:

- Identify and create the optimal price and/or product bundle at shopping based on real-time data.
- Expand existing capabilities within a dynamic environment.
- Introduce new proprietary rules for determining the optimal price and product offering.
- Implement complete flexibility when determining price in response to market conditions.

- Maintain existing infrastructure and processes with minimal changes.

1.2.3. Continuous Offers

The following solutions are under discussion to support Continuous Offers:

Solution	Explanation	Status
Web fares	Airlines have agreements with third-party vendors to gather airline itinerary prices from various web sources including airline .com, OTAs, etc. This data is used for two primary purposes: • To identify what offers are available and selling to the consumer (where ATPCO data is only what is distributed data) • Identify offers that are not found in the ATPCO data, in the ATPCO market analysis subscriptions As the industry moves to dynamic offers, competitive data will become more opaque, as dynamic offers can only be seen via web scraped or API-collected data. Therefore, ATPCO is exploring the potential for a merged data source for ATPCO published + Web Fare data as part of the ultimate vision for a shared industry data source that provides a more comprehensive picture of the competitive landscape.	Under discussion
Shopping insights	Shopping data includes airline shopping request and response messages from the source where they're generated (e.g., NDC, GDS, etc.). As the industry moves to dynamic offers, competitive data will become more opaque. Therefore, ATPCO is exploring shopping insights as a new data source to augment the competitive data set, as well as for demand forecasting and consumer choice modeling as part of the ultimate vision for a shared industry data repository to enable dynamic offer creation.	Under discussion
Product Catalogue	The Product Catalogue is an electronic record of potential products and services that might be offered by an airline. It enables each airline the flexibility to define its products and then allow the price to be calculated using traditional pricing data or calculated or adjusted dynamically. Additionally, it will enable the product to be incorporated into Branded fares (pre-defined bundle), sold as a standalone product, or dynamically bundled (or unbundled) to create dynamic offers. Refer to the Supplier Catalogue and Airline Catalogue M3 documentation.	Under discussion

Refer to the Dynamic Offers Design Team page on MyATPCO for further information on the work being done to support Continuous Offers.

Adjusted offers

2. Adjusted offers overview

Airlines employ adjusted offers by using traditional ATPCO fare and related data as a baseline and dynamically adjusting price and product inclusions based on each airline's proprietary business logic. The decision to change the price and product inclusions is made individually by each airline, and the individual airline's logic used in determining the direction and magnitude of a dynamically adjusted fare remains proprietary.

Following is the general process:

Step 1: REVIEW	At time of shopping, review potential offers (solutions) and prices based on distributed fare data.
Step 2: OPTIMIZE	Determine the optimal price (e.g., determine a contextual pricing value) and optimal product inclusions. Note: This determination may be accomplished using a combination of rules-based and science-based applications. The optimal price may be between published price points.
Step 3: ADJUST	Change the price and/or product inclusions (as applicable) before returning a response to the customer.

Adjusted offers is intended to support both price and product adjustments, as described below:

- **Price adjustment** is an action performed by an individual airline during the shopping process that changes the price (e.g., fare amount) of a filed or created fare.

  Example: Airline XX adjusts its filed fare amount to be 5% less

- **Product adjustment** is an action performed by an individual airline during the shopping process that changes the product inclusions (e.g., features) of a pre-defined bundle.

  Example: Airline XX adds lounge access to a brand that does not already include a lounge

Most airlines are currently only capable of applying price adjustments. Therefore, this document will focus on **price adjustments**. ATPCO will update the document when product adjustment capabilities mature.

2.1. Dynamic Price Adjustment

Dynamic price determination and price adjustments are performed by an airline's proprietary dynamic pricing mechanism. For ease of explanation, this document refers to such mechanism as a Dynamic Pricing Engine (DPE). A DPE can be airline- or vendor-supplied; can be integrated into an airline's or vendor-supplied availability, shopping, and merchandising capabilities; and applies the unique business logic of each airline individually.

The DPE works by applying each airline's proprietary business rules and science-based data to determine the optimal price. Dynamic price adjustments may be applied to the pre-filed prices that would ordinarily be offered by the airline's revenue management system. Since the amount of the adjustment could vary from transaction to transaction, the DPE is a pricing mechanism that allows an airline to offer prices that are not necessarily pre-determined price points, thereby significantly enhancing pricing flexibility and better matching supply and demand, increasing output and competition overall.

Example: Pre-defined fares in a given market:

Fare Class Code	Amount
MHIGH	600.00
MLOW	550.00
HHIGH	500.00
HLOW	450.00
QHIGH	400.00
QLOW	350.00
~~VHIGH~~	~~300.00~~
~~VLOW~~	~~240.00~~

Assume V is closed.
DPE calculates the optimal price as 330.00.
Adjust QLOW fare: ~~350.00~~ **333.00**.

2.1.1. Base Fare Adjustment

Early industry discussions focused on interconnectivity standards and whether the price adjustment would occur to the base fare or the total price (which includes taxes, fees, and surcharges). Most industry participants generally agreed that for the initial solution, the DPE will adjust the base fare and the pricing system will continue to be responsible for calculating the total fare. This resolves some regulatory concerns regarding total fare disclosure responsibilities that currently reside with the pricing systems and allows dynamic adjustments to flow within the existing processes and infrastructure. However, end state requirements for some airlines are for the DPE to adjust the total price and then for shopping systems to back out taxes and fees as applicable.

2.2. Regulatory

ATPCO's preliminary legal analysis of applicable competition laws suggests that the dynamic fare adjustment capability should observe the following principles:

- All dynamically adjusted fares must be available for sale in at least one distribution channel before the fares can be observed by competitors.
- All business logic used to determine the direction and magnitude of a dynamic fare adjustment shall remain confidential to each airline. The system should look to publish the end amounts and not how they were calculated.
- Any values in the dynamic adjustment ranges must remain proprietary to the airline and not shared outside the airline's control.
- Every pricing decision by an airline continues to be made unilaterally.
- In addition, it is recommended that the dynamic pricing focus on generating "discounts".
- The use of dynamic fare adjustment markups could introduce some complications, including:
  - U.S. DOT-required customer service plans require airlines to disclose to customers that lower fares may be available through another channel; and
  - From a competition advocacy perspective, discounts are more customer friendly than markups.

2.3. Potential use case

One potential use case is an airline that wants the flexibility to react to market demands in real time. For example, the airline detects an uncompetitive product and decides to remedy it in the short term, before the next fare load, by using a DPE rule to reset pricing to be competitive.

3. Dynamic price adjustment approaches

ATPCO, in conjunction with industry working groups and design teams, has explored multiple approaches for implementing dynamic price adjustments.

Each solution requires some internal work for airlines and may require bilateral implementations with availability, shopping and/or downline systems. However, each does have the potential to remain interoperable with existing infrastructure and processes and eventually support interline solutions. Open items of consideration (open issues) exist and will be explored later in this document.

3.1. Possible approaches

Following are some possible dynamic price adjustment approaches that are currently in use. Ultimately, each airline wishing to implement dynamic price adjustments will need to evaluate the pros and cons of any approach for that airline's internal business requirements and capabilities.

3.1.1. Approach 1: Dynamic price adjustment after traditional offer construction

In this approach, potential pricing solutions (offers) will be constructed using traditional data (as today) and the price will then be dynamically adjusted by an airline's dynamic pricing mechanism. Following are key steps:

1. The shopping system creates potential pricing solutions (offers) using schedules, availability, and traditional fare and related data (as today).
2. The airline's dynamic pricing mechanism (using science and/or the individual airline's proprietary business rules) determines the optimal price and adjusts the base fare (as applicable).
3. Percentage-based taxes, fees, and charges are (re)calculated based on the adjusted amount.
4. The adjusted fare books into the base fare's RBD.
5. The ticket reflects the adjusted amount and the base fare's Fare Basis Code. Note, each airline and system may choose to implement a bilateral solution to include some type of data on the ticket to indicate it contains an adjusted price, such as a Ticket Designator and/or Fare Calculation Price Indicator (FCPI)

In this solution, the airline's Dynamic Pricing Engine (DPE) generates (creates) the price at time of shopping/pricing (price points are not predefined) and adjusts the potential offer (solution) accordingly before returning any offers to the customer (or the DPE passes a discount code to the shopping/pricing system to adjust the offer). This solution supports airlines who want to implement complete flexibility when determining DPE pricing in response to market conditions.

Note: When the price is generated, the new "fare" would not have been distributed and therefore would not flow through existing processes that are dependent upon distributed fare data (e.g., change/refund, settlement, fare management). See further discussion in this document regarding downline processes.

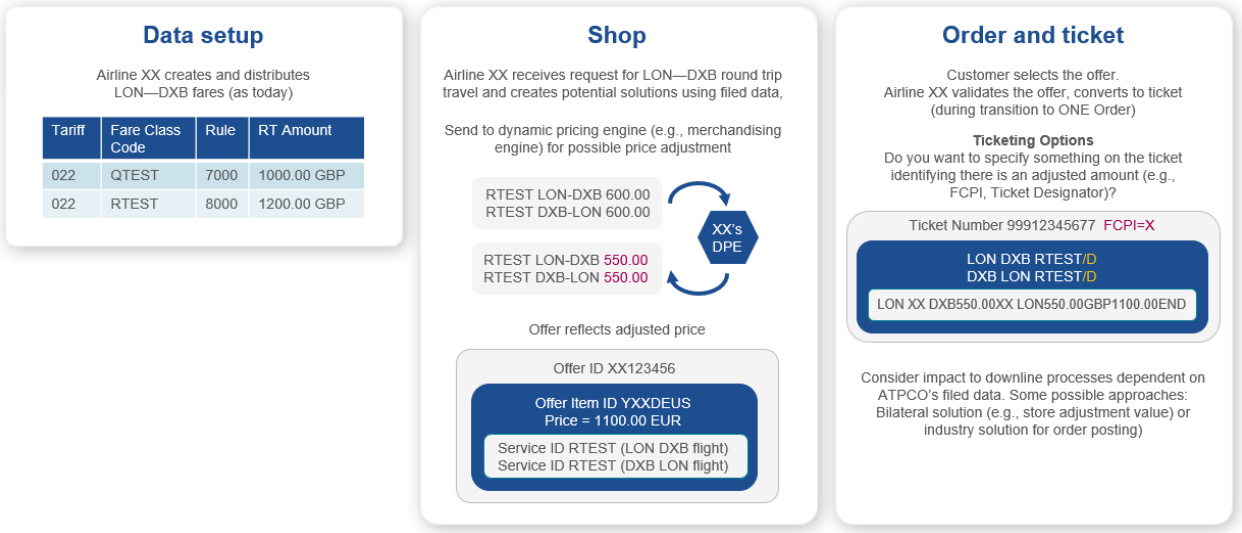
The concept is that upon receipt of a shopping/pricing request, the shopping/pricing system (airline internal system or third party such as GDS) will create potential offers (using existing schedules, fares, and related data, as is done today). The system will identify potential fares/offers eligible for adjustment (based on bilateral agreement with each airline) and send these to the airline's DPE for possible adjustment. The DPE will determine the optimal price and return the adjusted offer (solution) to the shopping/pricing system. The shopping/pricing system will recalculate the total price (including taxes, fees, and surcharges), and return a shopping/pricing response to the customer.

Systems continue to have the option to price with a traditionally distributed fare until they have implemented messaging to/from a DPE for potential dynamic fare adjustment.

The solution is defined so the shopping/pricing system may be an external system, such as a global distribution system (GDS) or an internal airline system, such as an airline's offer management system.

Note: This document primarily focuses on Approach 1.

3.1.1.1. EXAMPLE AND HIGH-LEVEL FLOW



3.1.1.2. SAMPLE USE CASE

Principal actors

- Airline: The airline that distributes the traditional ATPCO (baseline) fares and related data.
- DPE: The airline's DPE
- System: An external (GDS) or internal airline system performing shopping, pricing, and ticketing
- ATPCO
- Customer (traveler)

Pre-conditions and assumptions

- The airline distributes traditional fares and related data via ATPCO.
- The airline has implemented a DPE that can receive requests for potential adjustment, identify the optimal price, and respond with an adjusted price.
- The system can identify fares/scenarios eligible to be sent to a DPE for potential adjustment (e.g. via bilateral agreement with the airline)
- The airline and system have bilaterally agreed upon the minimum required elements to be sent to/from the DPE for dynamic price adjustment, such as full offer including total price (includes taxes, fees, and charges), total fare (includes fees and charges), base fare, surcharges, fare basis codes, all ticketed travel points, flight numbers, information included in the initial shopping request (that is, “who is asking”), etc.
- The airline is still dependent on existing ticketing, revenue accounting, audit and settlement processes.
- The airline and system have bilaterally agreed if and what to specify on the ticket to indicate it contains an adjusted price.
- The airline and system have bilaterally agreed on if and how to store adjusted price information for use in downline processes (e.g., change/refund).
- Customer has a travel plan, for example, to travel LON—DXB.

Description

In this use case an airline distributes (via ATPCO) fares and related data (as today). Upon receipt of a shopping request, the system will create potential solutions (offers), identify DPE-eligible solutions, and send a request to the airline’s DPE for dynamic pricing. The DPE will respond with an adjusted price. The system will return the solution with the adjusted price to the customer. The customer selects the solution with the adjusted price, and the system will execute the pricing, booking, and ticketing processes.

Processing steps

1. Airline creates baseline fares and related data (Footnotes, Rules, Routings) using existing ATPCO data standards.

   Airline XX’s fares in LON—DXB market

Fare Class Code	Tariff	Rule	Footnote	Routing	OW/RT	Amount
YABC	022	72AE	2	1234	1	1000.00 GBP

   Note: Assume these are Adult fares (Passenger Type Code is Blank for all fares).

2. Using Data Distribution Control (DDC) records (as today), the airline identifies subscribers (pricing systems, revenue accounting systems, etc.) who can receive the baseline fares and related data.

3. ATPCO distributes fares and related data (as today) to the system as directed by the airline.
4. System receives and loads fares and related data (as today).
5. System receives a shopping request from the customer for travel from LON to DXB.
6. System request/receives availability (as today).
7. System creates possible pricing solutions (as today), pulling in schedules, fares (baseline fares), rules, taxes, and fees.

    XX's YABC LON—DXB fare for 1000.00 GBP

8. System determines the YABC fare is eligible to be sent to the DPE for possible price adjustment.
9. System sends the potential solution to Airline XX's DPE for possible price adjustment.
10. The airline's DPE receives the request, determines price, and responds with an adjusted price.

    XX determines the optimal fare is YABC for 975.000 GBP.

11. System receives the response and recalculates the total price (taxes/fees/charges based on adjusted amount).
12. System responds to the Customer/Traveler with potential solutions (offers), including a solution with an adjusted price.

    One solution in the response is XX's YABC LON—DXB fare for 975.00 GBP

13. Customer selects a solution that includes an adjusted price

    Customer selects XX's YABC LON—DXB fare for 975.00 GBP

14. System sends a pricing request to the XX's DPE. (This second step is not necessary upon implementation of stateful processing, that is, with NDC).
15. The Airline's DPE receives the request and confirms the adjusted price.

    XX confirms the YABC fare for 975.000 GBP.

16. System receives the response and recalculates the total price (that is, taxes/fees/charges based on adjusted amount).
17. System collects payment information and issues a ticket (for traditional distribution). The airline and system may have a bilateral agreement to include some indication that the ticket includes and adjusted amount (e.g., ticket designator).

    Issue Ticket Number 9991234567 with LON DXB YDEP1 975.00 GBP

18. System optionally stores the adjusted price data for use in downline processes (e.g. change/refund).
19. System returns ticketing information to the customer.

Post conditions

The customer possesses an accountable document that includes an adjusted fare.

3.1.2. Approach 2: Dynamic price tied to seat availability: Discount Code/Rate

In this approach, the dynamic pricing mechanism is tied to the availability process. Availability will determine the optimal price and associated RBD and link this to a discount code or rate to be passed in the availability response to the shopping system. The shopping system will apply the discount code or rate when constructing the offer. Following are key steps:

1. Upfront (outside the shopping process), the airline pre-supplies the shopping system with proprietary discount rules associated to applicable discount code or rates.
2. At shopping, during the availability process, the availability engine calculates the optimal price and associates the applicable RBD and discount code/rate. This data is passed in the availability response to the shopping system.
3. The shopping system creates potential pricing solutions (offers) using schedules, availability, and traditional fare and related data (as today) *and* applies the discount code/rate to create or calculate the price (as applicable). The discount code/rate could be applied to any resulting base fare (e.g., specified, constructed, Fare by Rule).

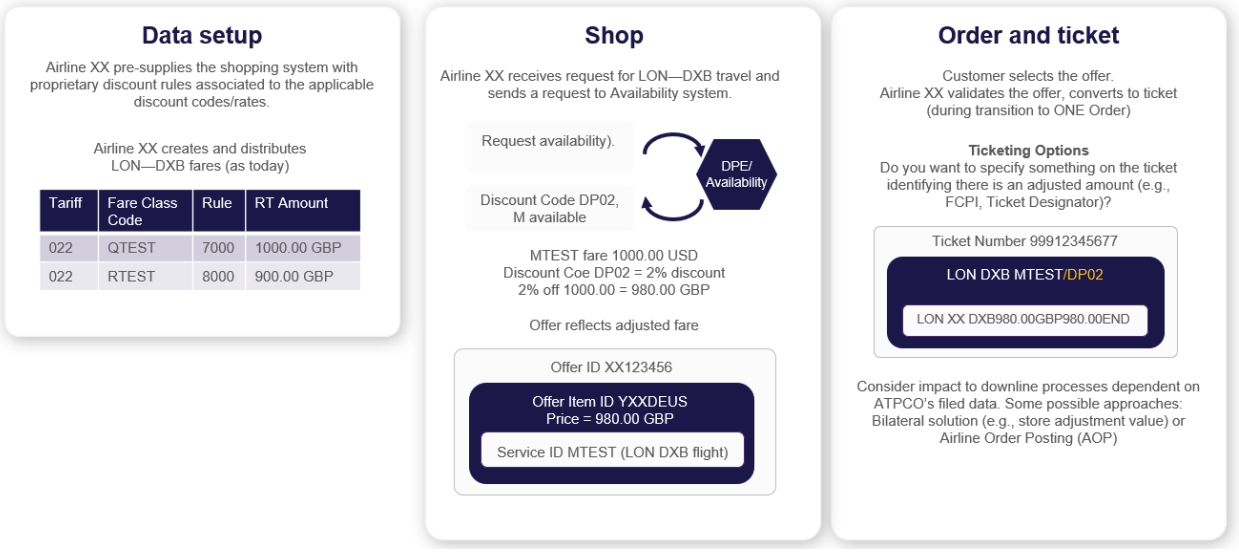
Note: This process is similar to the current process of applying Discount data found in Categories 19-22.

4. Percentage-based taxes, fees, and charges are calculated based on the discounted/calculated amount.
5. The discounted/calculated fare books into the base fare's RBD.
6. The ticket reflects the discounted/calculated amount and the base fare's Fare Basis Code. Each airline and system may choose to implement a bilateral solution to include some type of data on the ticket to indicate it contains an adjusted price, such as a Ticket Designator and/or Fare Calculation Price Indicator (FCPI).

In this solution, the airline's shopping system is pre-apprised (upfront, outside the shopping process) of discount codes/rates that are linked to the airline's proprietary price calculation (price adjustment) rules. The airline's availability engine will determine the optimal price and RBD and tie this to applicable discount codes/rates that will be passed to the shopping system.

At time of shopping, the airline's DPE/availability engine will determine the pricing and availability calculating an optimal price, associating that price with an RBD, and then associating the price and RBD to a discount code/rate that will result in the correct end price for the RBD when the rules/rate are applied by the shopping system.

3.1.2.1. EXAMPLE AND HIGH-LEVEL FLOW



3.1.2.2. SAMPLE USE CASE

Principal actors

- Airline: The airline that distributes the traditional ATPCO (baseline) fares and related data.
- Availability: The airline's availability engine. The DPE/Availability system are expected to be the same thing. Thus, a single request to the RM system is required to obtain both availability and DPE response.
- Shopping/pricing system: The airline's shopping/pricing system
- ATPCO
- Customer (traveler)

Pre-conditions and assumptions

- The airline distributes traditional fares and related data via ATPCO.
- The airline has implemented a DPE/availability engine that can determine availability, determine the optimal price and associated discount code/rate, and respond with the applicable code/rate and RBD.
- The shopping/pricing system can apply the discount code/rate received from availability to apply/calculate the price.
- The airline is still dependent on existing ticketing, revenue accounting, audit, and settlement processes.
- Customer has a travel plan, for example, to travel LON—DXB

Description

In this use case, an airline distributes (via ATPCO) fares and related data. Upon receipt of a shopping request, the shopping system will send a request to the availability system. The availability system will determine the optimal price and RBD and associated discount code/rate. The availability system will respond with the discount code/rate and RBD. The shopping system creates pricing solutions based on the availability and RBD (pulling in schedules and traditional fare and related data) and calculating price using the discount code/rate. The shopping system will return potential solutions to present to the customer. Solutions may include dynamically adjusted prices (priced using the discount code/rate) and traditional prices. The customer selects the solution with the adjusted price, and the system will execute the pricing, booking, and ticketing processes.

Processing steps

1. Airline creates baseline fares and related data (Footnotes, Rules, Routings) using existing ATPCO data standards.

   Airline XX's fares in LON—DXB market

Fare Class Code	Tariff	Rule	Footnote	Routing	OW/RT	Amount
MTEST	022	72AE	A	0000	1	1000.00 GBP
QTEST	022	72AE	1	0000	1	900.00 GBP

   Note: Assume these are adult fares (Passenger Type Code is Blank for all fares).

2. Using Data Distribution Control (DDC) records (as today), the airline identifies subscribers (pricing systems, revenue accounting systems, etc.) who can receive the baseline fares and related data.
3. ATPCO distributes fares and related data (as today) as directed by the airline.
4. Systems receive and loads fares and related data (as today).
5. Shopping system receives a shopping request from the customer for travel from LON to DXB.
6. Shopping system requests availability (as today)
7. Availability system determines availability, and whether an adjusted price is desired, and if so, that adjusted price (based on its independent business logic).
   a. The adjusted price may only apply in certain scenarios
   b. The availability system determines the associated RBD

      Q is closed. M is available.

   c. The availability system determines the associated discount code/rate.

      2% discount = Discount Code DP02

Note: The DPE/Availability system are expected to be the same thing. Thus, a single request to the RM system is required to obtain both availability and DPE response.

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8. The availability system responds to the shopping system. The response includes the discount code/rate and the RBD.

   Discount Code DP02, RBD M

9. The shopping system prices the itinerary (as today) based on provided availability and RBD and calculates the price based on the provided Discount Code (e.g., apply 2% discount).

   XX's MTEST LON—DXB fare for 1000.00 GBP

   2% discount off 1000.00 =980.00 GBP

   Note: Potential solutions may include adjusted fares (based on the discount code) and traditional fares (with no discount application).

10. The shopping system responds with potential solutions (offers) including a solution with the discounted price.

    One solution in the response is XX's MTEST LON—DXB fare for 980.00 GBP

11. Customer selects a solution that includes a discounted price

    Customer selects XX's MTEST LON—DXB fare for 980.00 GBP

    Once the customer selects the solution with the discounted price, there will be an availability check, as done today, but the adjusted price would not change because the discount code is assumed to remain valid. Booking and ticketing apply as done today.

Post conditions

The customer possesses an accountable document that includes a discounted fare.

3.1.3. Approach 3: Dynamic price tied to seat availability: Discount Code and Formula in Fare by Rule (FBR)

Similar to Approach 2, the dynamic pricing mechanism is tied to the availability process; however, in Approach 3, the discount rules are predefined in Fare By Rule (Category 25). Availability will determine the optimal price and associated RBD and link this to a discount code (account code) to be passed in the availability response to the shopping system. The shopping system will apply the discount code (account code) when constructing the offer. Following are key steps:

1. The airline leverages existing Fare By Rule (Category 25) functionality to predefine all possible discount rules and associated account codes. The data is distributed (via ATPCO and as directed by the airline) to systems authorized to view/apply the discount (airline's direct channel shopping system, downline systems, etc.)
2. At shopping, during the availability process, the availability engine calculates the optimal price and associates the applicable RBD and discount code (account code). This data is passed in the availability response to the shopping system.
3. The shopping system creates potential pricing solutions (offers) using schedules and availability and uses the discount code (account code) to create Fare By Rule resulting fares.

Note: The shopping system may also apply traditional fare and rule data, as today, to create potential solutions).

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4. Taxes, fees, and charges are calculated as today.
5. RBD data applies as today.
6. The ticket reflects the published/calculated amount and Fare Basis Code as today.

In this solution, the airline leverages the existing Fare By Rule (Category 25) functionality to predefine all discount levels and associated account codes (discount "trigger" codes) required to drive the discounts on the published fares. These account codes and discount levels will be known to the airline's DPE/availability engine (but will not be known to other airlines or systems)

At time of shopping, the airline's DPE/availability engine will determine the pricing and availability by calculating an optimal price, associating that price with an RBD, and then associating this optimal price and RBD with a discount (trigger) code (Account Code) that will result in the correct end price for the RBD when calculated by the shopping system.

3.1.3.1. FARE BY RULE CODING OPTIONS

In order for the DPE to return an account code that will determine the discount/markup to be applied to fares, the airline must file a structure of Fare By Rule that enables the DPE provider to determine the correct Account Code to be passed back to the requesting system. The granularity of the discount/mark-up levels is determined by the DPE provider who defines the structure and communicates requirements to the airline. The more granular the structure defined, the closer to Continuous Pricing the solution is. Other information such as Security (e.g., Category 15) can also be specified in the fare by rule if needed.

For filing the Category 25 Fare By Rule fares, the following two ways of structuring the Fare By Rules have been identified:

Option 1: One-rule Fare By Rule

The airline consolidates all data in one rule with a different account code for each discount. There would be a Record 8 for each account code pointing to the same rule. There is a coding limitation for this option in that the airline will be limited to specifying only 100 discounts per rule. The granularity of the discounts therefore impacts how high the discount can be set, although separate rules can be implemented to handle additional discount strategies.

Example: The airline wants to set up data to allow the DPE to discount in one percent increments up to 10% discount.

First, they assign unique account codes for each discount amount and create the related Fare By Rule Control data (Record 8).

Record 8: PTC, Account Code, Tariff, Carrier, Rule, (additional fields left out for simplicity)

R8	PTC	Account Code	Tariff	Carrier	Rule
	ADT	DP099	FBRINPV	XX	DPED
	ADT	DP098	FBRINPV	XX	DPED
	ADT	DP097	FBRINPV	XX	DPED
	ADT	DP096	FBRINPV	XX	DPED
	ADT	DP095	FBRINPV	XX	DPED
	ADT	DP094	FBRINPV	XX	DPED
	ADT	DP093	FBRINPV	XX	DPED
	ADT	DP092	FBRINPV	XX	DPED
	ADT	DP091	FBRINPV	XX	DPED
	ADT	DP090	FBRINPV	XX	DPED

Then they create the related Fare by Rule Category Control (Record 2) with the Fare by Rule discount percentage for each account code.

Record 2 Fare by Rule: Tariff, Carrier, Rule, Data/String

R2	Tariff	Carrier	Rule	CAT	Data							
	FBRINPV	XX	DPED	25	THEN	25	ADT	C	99%	989	IPREURP	ADT
					IF	1	DP099					
					THEN	25	ADT	C	98%	989	IPREURP	ADT
					IF	1	DP098					
					THEN	25	ADT	C	97%	989	IPREURP	ADT
					IF	1	DP097					
					THEN	25	ADT	C	96%	989	IPREURP	ADT

R2	Tariff	Carrier	Rule	CAT	Data						
					IF	1	DP096				
					THEN	25	ADT	C	95%	989	IPREURP ADT
					IF	1	DP095				
					THEN	25	ADT	C	94%	989	IPREURP ADT
					IF	1	DP094				
					THEN	25	ADT	C	93%	989	IPREURP ADT
					IF	1	DP093				
					THEN	25	ADT	C	92%	989	IPREURP ADT
					IF	1	DP092				
					THEN	25	ADT	C	91%	989	IPREURP ADT
					IF	1	DP091				
					THEN	25	ADT	C	90%	989	IPREURP ADT
					IF	1	DP090				

Note: The Fare Calculation is a percent OF the fare, not percent OFF the fare (e.g., calculate at 98% of the fare in order to achieve a 2% discount).

Refer to the Sample Processing and Use Case below for further illustration of this example.

Option 2: Individual rule per discount

The airline puts each discount into an individual rule and the Record 8 points to that rule. This would result in a different account code and a different rule for each discount.

Example: Using the example from Option 1 above, the airline wants the same discounts but breaks each discount into individual rules.

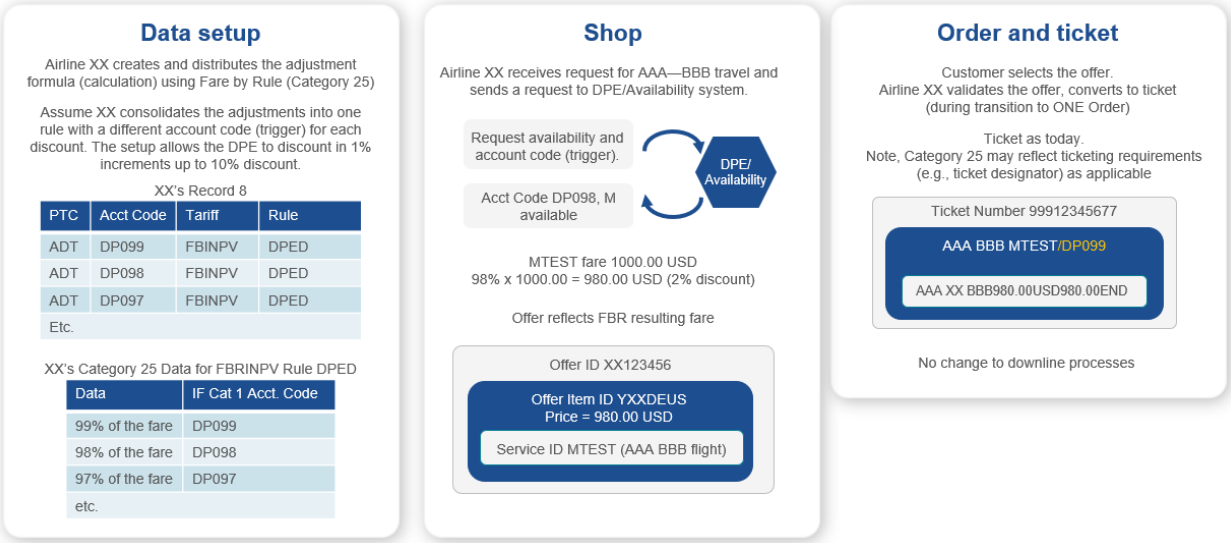
Record 8: PTC, Account Code, Tariff, Carrier, Rule, (additional fields left out for simplicity)

R8	PTC	Account Code	Tariff	Carrier	Rule
	ADT	DP099	FBRINPV	XX	DP99
	ADT	DP098	FBRINPV	XX	DP98
	ADT	DP097	FBRINPV	XX	DP97
	ADT	DP096	FBRINPV	XX	DP96
	ADT	DP095	FBRINPV	XX	DP95
	ADT	DP094	FBRINPV	XX	DP94
	ADT	DP093	FBRINPV	XX	DP93
	ADT	DP092	FBRINPV	XX	DP92
	ADT	DP091	FBRINPV	XX	DP91
	ADT	DP090	FBRINPV	XX	DP90

Record 2 Fare by Rule: Tariff, Carrier, Rule, Data/String

R2	Tariff	Carrier	Rule	CAT	Data							
	FBRINPV	XX	DP99	25	THEN	25	ADT	C	99%	989	IPREURP	ADT
					IF	1	DP099					
	FBRINPV	XX	DP98		THEN	25	ADT	C	98%	989	IPREURP	ADT
					IF	1	DP098					
	FBRINPV	XX	DP97		THEN	25	ADT	C	97%	989	IPREURP	ADT
					IF	1	DP097					
	FBRINPV	XX	DP96		THEN	25	ADT	C	96%	989	IPREURP	ADT
					IF	1	DP096					
	FBRINPV	XX	DP95		THEN	25	ADT	C	95%	989	IPREURP	ADT
					IF	1	DP095					
	FBRINPV	XX	DP94		THEN	25	ADT	C	94%	989	IPREURP	ADT
					IF	1	DP094					
	FBRINPV	XX	DP93		THEN	25	ADT	C	93%	989	IPREURP	ADT
					IF	1	DP093					
	FBRINPV	XX	DP92		THEN	25	ADT	C	92%	989	IPREURP	ADT
					IF	1	DP092					
	FBRINPV	XX	DP91		THEN	25	ADT	C	91%	989	IPREURP	ADT
					IF	1	DP091					
	FBRINPV	XX	DP90		THEN	25	ADT	C	90%	989	IPREURP	ADT
					IF	1	DP090					

3.1.3.2. EXAMPLE AND HIGH-LEVEL FLOW



3.1.3.3. SAMPLE USE CASE

Principal actors

- Airline: The airline that distributes the traditional ATPCO (baseline) fares and related data.
- Availability: The airline's availability engine. The DPE/availability system are expected to be the same thing. Thus, a single request to the RM system is required to obtain both availability and DPE response.
- Shopping/pricing system: The airline's shopping/pricing system
- ATPCO
- Customer (traveler)

Pre-conditions and assumptions

- The airline distributes traditional fares and related data as well as Fare By Rule data that includes discount formulas identified with a discount "trigger" code (Account Code) via ATPCO.
- The airline has implemented a DPE/availability engine that can determine availability, determine the optimal price and associated account code, and respond with the applicable account code and RBD.
- The airline is still dependent on existing ticketing, revenue accounting, audit, and settlement processes.
- Customer has a travel plan, for example, to travel LON—DXB

Description

In this use case, an airline distributes (via ATPCO) fares and related data. Airline chooses to leverage existing Fare By Rule functionality to specify all possible adjustments in 1% increments up to a maximum of 10%. (In other words, the airline will adjust a filed fare by a 1% discount, a 2% discount, a 3% discount and so on, up to a 10% discount.) Upon receipt of a shopping request, the shopping system will send a request to the availability system. The availability system will determine whether to apply a dynamic price and the associated account code. The availability system will respond with the account code and RBD. The shopping system creates pricing solution(s) based on the account code, availability, and RBD provided by the availability system. The shopping system will return potential solutions to the customer. Solutions may include dynamically adjusted prices (priced using the account code trigger) and traditional prices. The customer selects the solution with the adjusted price, and the system will execute the pricing, booking, and ticketing processes.

Processing steps

1. Airline creates baseline fares and related data (Footnotes, Rules, Routings) using existing ATPCO data standards. Airline leverages existing Fare By Rule functionality to specify all possible adjustments in 1% increments up to 10%. Airline chooses to consolidate into one rule (with a different account code for each discount), with a different Record 8 for each account code pointing to the same one rule.

Airline XX's fares in LON—DXB market

Fare Class Code	Tariff	Rule	Footnote	Routing	OW/RT	Amount
MTEST	022	72AE	A	0000	1	1000.00 GBP

Note: Assume these are adult fares (Passenger Type Code is Blank for all fares).

Airline XX's Record 8 (applicable for LON-DXB market)

Passenger Type	Account Code	Tariff	Rule
ADT	DP099	FBRINPV	DPED
ADT	DP098	FBRINPV	DPED
ADT	DP097	FBRINPV	DPED
Etc.			

Airline XX's Category 25 (applicable for LON-DXB market)

Data	IF Category 1 Account Code
Adjusted price = 99% of the published fare	DP099
Adjusted price = 98% of the published fare	DP098
Adjusted price = 97% of the published fare	DP097
Etc.	

Note: This is just one Fare by Rule data option. Other options are addressed in the data setup section later in this document.

2. Using Data Distribution Control (DDC) records (as today), the airline identifies subscribers (pricing systems, revenue accounting systems, etc.) who can receive the baseline fares and related data and subscribers who can receive the Fare By Rule data.
3. ATPCO distributes fares and related data (as today) as directed by the airline.
4. Systems receive and loads fares and related data (as today).
5. Shopping system receives a shopping request from the customer for travel from LON to DXB.
6. Shopping system requests availability (as today).
7. Availability system determines availability, and whether an adjusted price is desired, and if so, that adjusted price (based on its independent business logic).
   a. The adjusted price may only apply in certain scenarios.
   b. The availability system determines the associated RBD.

      M is available.

   c. The availability system determines the associated account code.

      2% discount = Account Code DP098

Note: The DPE/availability system are expected to be the same thing. Thus, a single request to the RM system is required to obtain both availability and DPE response.

8. The availability system responds to the shopping system. The response includes the account code and the (available) RBD to which the account code should be applied.

   Account Code DP098, RBD M

9. The shopping system prices the itinerary (as today) based on the provided account code, availability, and RBD.

   XX's MTEST LON—DXB fare for 1000.00 GBP

   Account Code DP098 matched to applicable Record 8 and Category 25 data

   98% X 1000.00 =980.00 GBP (2% discount)

Note: Potential solutions may include discounted fares (based on the account code) and traditional fares (with no account code requirement).

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10. The shopping system responds with potential solutions (offers), including a solution with the discounted price.

    One solution in the response is XX's MTEST LON—DXB fare for 980.00 GBP

11. Customer selects a solution that includes a discounted price

    Customer selects XX's MTEST LON—DXB fare for 980.00 GBP

    Once the customer selects the solution with the discounted price, there will be an availability check, as done today, but the adjusted price would not change because the account code is assumed to remain valid. Booking and ticketing apply as done today.

Post conditions

The customer possesses an accountable document that includes a discounted fare.

4. Definitions

Term	Definition
Dynamic Pricing Engine (DPE)	An airline or vendor-supplied mechanism to calculate dynamic fare adjustments based on the airline's independent business logic and data sets. Such mechanism may be a component of another system, e.g., a component of an availability, shopping, or merchandising system.
Dynamic Fare Adjustment	An action performed by a Dynamic Pricing Engine (DPE) during the shopping (and subsequent pricing) process that changes the base fare amount of a filed or created fare. The decision to change the base fare is made individually by each airline, and the individual airline's logic used in determining the direction and magnitude of a dynamically adjusted fare remains proprietary.
Shopping/pricing system	In this document, the shopping/pricing system refers to: • Internal airline system, direct system. For example, NDC offer/order management system, airline website, airline reservation center. • External or indirect system. For example, a global distribution system (GDS).

Implementation strategy and considerations

Each airline will ultimately need to determine if, how, and when it chooses to implement adjusted pricing. Additionally, the decision to change the price is made individually by each airline, and the individual airline's logic used in determining the direction and magnitude of a dynamically adjusted price remains proprietary.

Some changes may be required to existing infrastructure and processes in order to integrate dynamic price adjustments. The following sections describe items to consider, potential open issues, and possible solutions (where applicable) when implementing a solution and integrating it through the end-to-end process.

5. Strategy and planning

5.1. Building the solution

This section identifies strategic and planning decisions to be made by an airline in preparation for implementing dynamic price adjustments.

Following is a starting list of items/actions to be considered:

1. Which markets are in scope?
2. What fares and/or scenarios are eligible for potential adjustment?
3. What challenges/exposures are there to the current ecosystem, and how can they be resolved?
4. What criteria will be used to determine and differentiate price (outside existing fare and rule restrictions)? Examples: Frequent flyer status, customer segmentation criteria, network strength at point of origin, browsing history, purchasing history, geography, load factor.
5. Who is building and running your DPE, and what is your strategy? How sophisticated will the DPE be? Can it handle regularly changing proprietary business rules?
6. What are the impacts and expectations for partner airlines? Example: For ATI partners, will you be aligned in price calculation business rules?
7. Will you implement some type of "order posting" solution to distribute the dynamically adjusted price (e.g., at time of ticketing/order creation) to support downline processing)? If not, then what are the impacts on existing processes that depend upon distributed data (e.g., fare management, revenue accounting, settlement, and change/refund processes)?
8. How global will your implementation be (direct, all channels, etc.)?

5.2. DPE Capabilities

Each airline that wants to implement dynamic price adjustment needs to determine the required features of its DPE. What are the internal business rules and required capabilities of its DPE? Once this is determined, the airline can set up its data according to what the DPE will support.

Following are some requirements to be considered:

- Receive and respond to adjustment requests. If applicable to the airline's solution, the DPE must be able to receive a potential offer/solution from a shopping/pricing system and respond (as applicable) with an adjusted price.
- Optimal price determination. How will the DPE determine the optimal price and the corresponding adjusted price to return in its response (as applicable)? This determination can be based on any number of factors, such as frequent flyer status, customer segmentation criteria, network strength at point of origin, browsing history, purchasing history, geography, load factor, who is asking, and so on, but ultimately this will be based on internal, proprietary airline business rules.
- Voluntary change transactions. During a voluntary change transaction, will the DPE accept and respond to price adjustment requests when re-pricing with historical fares and/or current fares? (Refer to later sections regarding Changes/Refunds and Historical Fares).
- Receive and respond to adjustment requests. If applicable to the airline's solution, the DPE must be able to receive a potential offer/solution from a shopping/pricing system and respond (as applicable) with an adjusted price.

5.3. Shopping Flow

Each airline needs to determine at what stage in the shopping process the dynamic adjustment will occur and what pricing solution data is needed to feed the airlines proprietary price determination and adjustment logic.

Where in the shopping flow the potential dynamic adjustment occurs may differ depending on the airline's shopping/pricing system and DPE solution, as well as the data requirements for price adjustment (as detailed in the following section).

These are some possible shopping stage options:

Option 1: At time of availability check. This option applies for airlines implementing Approach 2 (Dynamic price tied to availability – discount code/rate) or Approach 3 (Dynamic price tied to availability – account code and formula in FBR).

Option 2: After traditional offer construction. This option applies for airlines implementing Approach 1 (Dynamic price adjustment after traditional offer construction). With this option, the shopping/pricing system will:

- Create potential solutions (including base fares and surcharges), and

- Prior to calculating taxes and fees, send (eligible) solutions (including base fares and surcharges) to the airline's DPE for potential adjustment.
- After adjustment, the shopping/pricing system will need to apply any percentage tax or fee calculation using the adjusted amount and (as applicable) recalculate percentage surcharges using the adjusted amount.

Option 3: After pricing solution and YQ/YR fee calculation. This option applies for airlines implementing Approach 1 (Dynamic price adjustment after traditional offer construction). With this option, the shopping/pricing system will:

- Create potential solutions (including base fares and surcharges),
- Calculate Carrier Imposed (YQ/YR) fees, and
- Prior to calculating taxes and other fees, send (eligible) solutions (including base fares, surcharges, and YQ/YR fees) to the airline's DPE for potential adjustment.
- After adjustment, the shopping/pricing system will need to apply any percentage tax or fee calculation using the adjusted amount and (as applicable) recalculate percentage Carrier Imposed (YQ/YR) fees and surcharges using the adjusted amount.

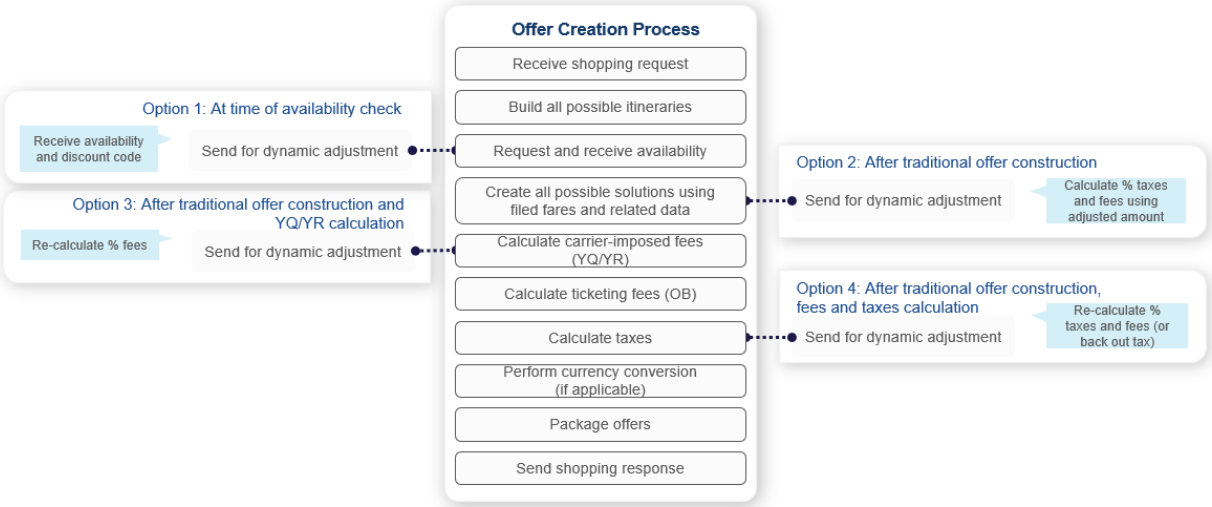
Option 4: After pricing solution, fee, and tax calculation. This option applies for airlines implementing Approach 1 (Dynamic price adjustment after traditional offer construction). With this option, the shopping/pricing system will:

- Create potential solutions (including base fares and surcharges),
- Calculate Carrier Imposed (YQ/YR) fees,
- Calculate Ticketing (OB) fees,
- Calculate taxes, and
- Send (eligible) solutions (including base fares. surcharges, fees, and taxes) to the airline's DPE for potential adjustment.
- After adjustment, the shopping/pricing system will need to recalculate (as applicable) any percentage tax, fee, or surcharge using the adjusted amount. (Alternatively, systems may choose to back out taxes in this situation.)

Note: These options simply represent potential approaches. Ultimately, it is each airline's (and/or system's) choice when to send for potential adjustment.

5.3.1. Sample High-level Shopping Flow with Options Inserted

The high-level shopping flow below illustrates insertion points for each of the above options.



5.4. Pricing Data

NOTE: This section applies for Approach 1 Dynamic price adjustment after traditional offer construction

What pricing solution data (values) are needed to feed the price determination process? In other words, what calculated amounts and values from the initial (pre-adjustment) pricing solution (to be sent to the DPE) are needed to make the optional price determination?

For example, will you need to know:

- Base fare, inclusive or exclusive of surcharges?
- Total fare, inclusive or exclusive of surcharges, fees, and taxes?

The answer to these questions will impact the decision regarding where to insert the price adjustment into the current shopping flow (refer to the section above).

Note: Early industry discussion suggested a need for an industry solution to distribute the Total Price, inclusive of surcharges and Carrier Imposed (YQ/YR) fees. If ATPCO were to provide a fully resolved price, then this may provide efficiency to implementers (depending on each airline's scope and intention). ATPCO can continue exploring a potential solution pending industry support and prioritization.

5.5. Price Adjustment

In addition to integrating the adjustment into the shopping flow and determining what pricing solution data is needed to help determine the adjustment, airlines also need to decide what amount is being adjusted and what type of adjustment they are applying. For example:

1. Do you adjust the base fare or the total price?

Note: ATPCO's understanding in the current environment is that most airlines are making adjustments to the base fare. Refer to the examples below.

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2. Are constructed fares in scope? If so, then are you adjusting the specified fare or the constructed fare (specified plus add-on fares)?
3. Are Fare By Rule (Category 25) created fares in scope? If so, then are you adjusting the Fare By Rule resulting fare or the base fare?
4. Are Discounts (Categories 19-22) created fares in scope? If so, then are you adjusting the Category 19-22 resulting fare or the base fare?
5. Are corporate fares in scope? If so, then how does this impact agreements (contracts)? What are the implications on agent mark-up fares ("C types")?
6. Are you only applying discount adjustments (mark down)? If not, then what are there any regulatory concerns (e.g., concerns that a published fare amount is being offered for higher than the published level)?
7. Do you store the discount amount for downline processes? If so, then how and where is it stored and later accessed (bilateral agreement)?
8. Which system identifies the optimal price and performs the price adjustment? Inventory system, merchandising system, other?
9. How are Brands impacted? When filling out your Brand matrix, do you adjust every possible solution for every brand, or do you only adjust one brand (or one fare in one brand) and propagate the discount across the matrix? For example, do you only adjust the lowest available fare (e.g., 2% discount) and propagate the discount across the matrix (e.g., 2% discount across all brands).
10. What is the validity period for the adjusted price (adjusted offer)? Is it only valid at the time of response? Valid for one hour? Valid for the remainder of the calendar day? The assumption is that the Ticket Time Limit (TTL) remains as defined in applicable fare rules and is not affected or changed by dynamic price adjustments. The TTL does not imply a price guarantee, and it only refers to the point in time when the ticket must be issued in order to avoid cancelation of the booking. The price guarantee for the adjusted offer is only valid if the ticket is issued as directed by the TTL. For example, this means the ticket must be issued by midnight local time to avoid a price jump to the standard fare of the respective booked RBD.
11. How is stateless processing between shopping and pricing handled so that pricing does not result in a higher price?

5.5.1. Adjustment Examples

While most airlines are adjusting the base fare, their business rules may differ in terms of what amount is being used to perform the discount calculation that arrives at the actual discount amount. For example, they may use the total price, total fare, or base fare to calculate the discount amount that will then be subtracted from the base fare. Refer to the following examples.

Example 1: Total Price (includes taxes, fees, and charges)

Calculate 10% discount off the Total Price (1390.00 × 10% = 139.00), then subtract from Base Fare (1200.00 – 139.00 = 1061.00)

	Base Fare	Q surcharge	YQ/YR	Total Fare	Tax *	Total Price
Original	1200.00	10.00	50.00	1260.00	130.00	1390.00
Adjusted	**1061.00**	10.00	50.00	1121.00	130.00	**1251.00**

Example 2: Total Fare (includes fees, and charges)

Calculate 10% discount off the Total Fare (1260.00 × 10% = 126.00), then subtract from Base Fare (1200.00 – 126.00 = 1074.00)

	Base Fare	Q surcharge	YQ/YR	Total Fare	Tax *	Total Price
Original	1200.00	10.00	50.00	1260.00	130.00	1390.00
Adjusted	**1074.00**	10.00	50.00	1134.00	130.00	**1264.00**

Example 3: Base Fare + Surcharge (calculated amount)

Calculate 10% discount off the Base Fare (inclusive of surcharge) (1210.00 x 10% = 121.00), then subtract from Base Fare (1200.00 – 121.00 = 1079.00)

	Base Fare	Q surcharge	YQ/YR	Total Fare	Tax *	Total Price
Original	1200.00	10.00	50.00	1260.00	130.00	1390.00
Adjusted	**1079.00**	10.00	50.00	1139.00	130.00	**1269.00**

Example 4: Base Fare + Surcharge (specified amount)

Specified discount amount of 105.00. Subtract from Base Fare (1200.00 – 105.00 = 1095.00)

	Base Fare	Q surcharge	YQ/YR	Total Fare	Tax *	Total Price
Original	1200.00	10.00	50.00	1260.00	130.00	1390.00
Adjusted	**1095.00**	10.00	50.00	1155.00	130.00	**1285.00**

5.6. Stakeholders

The following have been identified as general areas where the implementation of DPE pricing may have an impact. It is recommended these areas be contacted for impact analysis and then inclusion in the project planning and implementation.

- Fare Management/Decision Support (Revenue Management, Yield Management, Operational Research, Inventory, Pricing)
- Content Collection and Distribution
- Inventory and availability
- Pricing/Shopping/Order Management (direct and indirect)
- Revenue Accounting/Auditing
- Customer Service – Voluntary/Involuntary Changes
- Government Filing/Regulatory (in the event the DPE fares are public fares)
- Information Technology

Not all areas in all organizations will be affected, and additional research should be done to identify any other areas that may be affected.

5.7. Impact Analysis and Determination of Scope

A dynamic price adjustment solution can be implemented for target markets/segments to control the level of effort and impacts on or limitations of current systems. The following should be considered in any Impact Analysis and Scope Determination.

Area/Segments	Considerations	Possible Resolutions
Itinerary Types	Codeshare and interline itineraries may be limited by other carrier constraints.	Bilateral solution between airline and systems to identify itineraries eligible (or not eligible) for potential adjustment. Bilateral solution between airline partners (JV) to align adjustment formulas and business rules. Future: Industry solution to identify eligible fares, itineraries, and scenarios (e.g., Airline Profile).
Cabin Classes	Airlines may want to limit the scope of implementation to specific cabins (these may be traditional cabins such as first, business, premium economy, and/or economy) and/or a subset of a cabin (classes in the economy cabin).	Bilateral solution between airline and systems to identify RBDs/cabins eligible (or not eligible) for potential adjustment. Future: Industry solution to identify eligible fares, itineraries, and scenarios (e.g., Airline Profile).
Fare Types	Airlines can choose to implement based on types of baseline fare: public or private, specified or constructed, calculated via Fare by Rule or Discounts Categories 19-22	Bilateral solution between airline and systems to identify fares eligible (or not eligible) for potential adjustment. Future: Industry solution to identify eligible fares, itineraries, and scenarios (e.g., Airline Profile).
Channels	Channels can include Direct NDC	Fare rule provisions specifying the desired point of sale can be associated with the fares, for example, using Sales Restrictions (Category 15).

	Indirect	Private tariff distribution requirements will be specified (as today) to indicate subscribers authorized to receive the baseline fares. Enhanced Distribution allows airlines to optionally restrict the distribution of public fare and related data to specific selling channel subscribers. This enables an airline to differentiate content across direct and indirect channels (e.g., NDC) while ensuring the fares remain fully integrated into all airline internal systems and industry processes for public fares. Bilateral solution between airline and systems to identify points of sale eligible (or not eligible) for potential adjustment. Future: Industry solution to identify eligible fares, itineraries, and scenarios (e.g., Airline Profile).
Alliances	Determine whether implementation of dynamic price adjustment impacts alliance/JV fares. Do JV airlines need to align the adjustment formulas and business rules?	Future: Industry solution to allow JV partners to defer to a JV partner's DPE and/or align adjustment formulas and business rules.

6. Data Setup and Distribution

Once the airline identifies the DPE capabilities, features, and adjustment rules, it can use them as a guide to set up the data accordingly.

6.1. Schedules

No changes to schedule filing are necessary, and RBDs will be communicated to systems in the same way they are today.

6.2. Inventory and Availability

For Approach 1 (Dynamic price adjustment after traditional offer construction), no changes are proposed for availability messages.

For Approach 2 or 3 (Dynamic price tied to seat availability), the availability system will need to identify a discount code/rate/account code to associate with the optimal price and RBD and return this information in the availability response.

Note: If dual RBD is used, then revenue management will need to determine the forecasting impact of multiple price points and how to allocate inventory to the secondary RBD.

6.3. Fares and Rules

There is no change to the existing functionality and application of the fare and rule data.

Data setup for fares and rules may depend on DPE capabilities and features and distribution requirements. For example, for fares that are eligible for potential adjustment, airlines may want to target distribution and use of those fares to specific channels (such as NDC or direct channels). This can be done by:

- Using existing security functionality in Sales Restrictions (Category 15)
- Controlling private fare distribution (as today)
- Controlling public fare distribution to specific selling channel subscribers using Enhance Distribution (described in the following section)

Combinations (Category 10)

All baseline fares must each pass their applicable Combinations (Category 10) data. It is assumed if the baseline fare passed its category data (including Combinations), then the adjusted fare also passes the category data (including Combinations).

6.3.1. Enhanced Distribution

Enhanced Distribution allows an airline to *optionally* restrict the distribution of public fare data to specific subscribers that are identified as Pricing Subscribers in Data Distribution Control (DDC). Subscribers that are listed as Other Subscribers in DDC will continue to receive the data.

Public Tariff Data

Using Enhanced Distribution to restrict public tariff data distribution does **not** change public data to private.

- The data itself is still considered public tariff data and is still treated as public tariff data by ATPCO and by any subscriber that receives the data.
- The fares are still subject to all public tariff filing requirements.
- Public tariff data standards still apply.
- The public data can still be queried using FareManager tools
- Airlines should leverage existing functionality in Sales Restrictions (Category 15) to specify any point of sale (e.g., agency) restrictions.

Why use this solution

Airlines should use this solution if they want to:

- Differentiate content across their direct/indirect channels.
- Stimulate sales through designated channels (e.g., NDC)
- Support dynamic pricing and NDC.

- Continue to utilize ATPCO fare and rule structures.
- Ensure fares are fully integrated into all airline internal systems and industry processes for public fares.

Use of Enhanced Distribution is optional. If an airline chooses not to use it, then no changes to existing workflows are required.

Refer to the user manual for further information: Enhanced Distribution User Manual.

6.3.2. Eligibility for potential adjustment

Each airline needs to consider what fares and market segments are eligible for potential price adjustment. For example, is the eligibility limited to specific channels, points of sale, markets, fare products, itineraries, or other criteria? Are all pricing solutions (offers) eligible for potential adjustment?

Additionally, is eligibility limited to specific message types? For example, is it limited only to shopping requests, or are re-shopping requests eligible?

Once the eligibility is determined, the airline needs to determine how it will ensure only eligible scenarios are presented to the DPE for potential adjustment. The airline may not want to burden the DPE with every potential solution (offer), rather it may want to restrict to only eligible solutions (offers). This may be controlled via bilateral agreement with each vendor.

Note: Early industry discussion suggested a need for an industry solution to identify eligible scenarios. The initial suggestion was to incorporate the solution into an Airline Profile. ATPCO can continue exploring a potential solution pending industry support and prioritization.

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7. Shopping, Pricing, and Offer Management

7.1. Availability

For Approach 1 (Dynamic price adjustment after traditional offer construction), there are no changes to the current availability request-and-response processing in the shopping and sell processes.

For Approach 2 or 3 (Dynamic price tied to seat availability), the availability system will need to identify a discount code/rate/account code to associate with the optimal price and RBD and return this information in the availability response.

7.2. Shopping/Pricing

Until the system implements stateful processing, the system may need to request an adjusted price at the time of shopping and again at the time of pricing. Two calls are made because there is no current functionality to store/recall a shopping response and link it to pricing (the current situation is a stateless processing).

To minimize the possibility of the system receiving a different adjusted fare and amount at shopping versus pricing, the recommendation is that the that the same data sent to the DPE at time of shopping will also be sent at the time of pricing.

Many systems are working toward implementation of stateful processing to support NDC as well as traditional distribution. Once this is implemented, the stateless processing issue will be resolved.

8. Ticketing

Until an airline fully implements ONE Order (both online and in conjunction with interline partners), it is expected the dynamically adjusted fare will be reflected on a ticket using the existing ticketing standards.

For NDC, airlines rely on current ticketing standards until such time that they implement ONE Order. IATA Resolutions 722f and 725f were implemented as an interim solution to support NDC ticketing. Essentially the standards consist of new Fare Calculation Mode Indicator (FCMI) values reflecting “offer price” and the use of /OP in the fare calculation and/or FARE and TOTAL boxes. To date, ATPCO has not confirmed whether any airlines are using these new standards.

Airlines that have implemented adjusted pricing recognize the persistent challenge in identifying adjusted fares in post-ticket processes (Voluntary Changes and Refunds, Revenue Accounting, Audit) when working backwards from the ticket to the filed fare data. To resolve this issue, airlines may choose to put some type of indicator on the ticket (within existing ticketing standards) so that they are able to recognize tickets that contain an adjusted fare. These are some possible approaches:

- Fare Calculation Price Indicator (FCPI). The airline may use a bilaterally agreed FCPI value to identify tickets with at least one adjusted fare.
- Ticket Designator. The airline may choose to place a Ticket Designator at the end of the fare basis code for the adjusted price segment. If the fare basis consumes the maximum space, then the ticket designator cannot be used. In this case, the airline may choose to revert to the FCPI approach. If the baseline fare rule data contains a ticket designator, then the airline may need to invoke a bilateral solution to determine the hierarchical application of the Ticket Designators (e.g., does the fare rule data override the adjusted price designator, or vice versa).

9. Challenges for Downline Processes

In the current distribution landscape, shopping and pricing are not the only systems that depend on the existing ATPCO data structures. Many downline processes require knowledge of all possible fares in the marketplace to have a comprehensive database to compare to the sale/ticket information, and these systems rely on ATPCO fares and rules to perform reissues, exchanges, settlement calculation, and other processes. Additionally, some governments require that airlines meet tariff filing requirements. As an official filing agent, ATPCO files fares as applicable, using agreed-upon processes and fare data structures.

An airline may choose to implement a pricing strategy to be more dynamic when providing offers to consumers. They may require flexibility to make real-time adjustments to a fare product (e.g., dynamic price adjustment), creating a new fare level that is presented to the customer but does not exist in the ATPCO database. This creates challenges to any downline processes for the airline making the adjustment, as well as potentially any system or interline partner involved in the journey.

On the path to continuous pricing, airlines need to consider how they can enable dynamic pricing exploration and testing with minimal interruption to downline processes. Until an airline fully implements ONE Order (both online and in conjunction with interline partners), it is expected the dynamically adjusted fare must be integrated into the current ecosystem and supported through current ticketing, servicing, revenue accounting, and settlement processes. Is there a way to enable price adjustments at shopping time, and still support downline systems dependent on ATPCO fare data formats? Can each airline somehow supply its adjusted fare data to the downline processes so that they can continue to work with the least amount of disruption?

The following sections describe how downline processes utilize ATPCO's fare and rule data today, and as such, are impacted when the ticketed dynamic price is not distributed to support these processes.

Refer to ATPCO's white paper on the implications of incomplete fare information on airline downline processes in a world of dynamic offers: Airline Order Posting white paper.

9.1. Voluntary Changes (Category 31) and Voluntary Refunds (Category 33)

When a ticket is presented for voluntary change or refund, processing will resolve to (and apply) Voluntary Changes (Category 31) and/or Voluntary Refunds (Category 33) data applicable for each fare on the ticket. Airlines must ensure the systems that will be performing the voluntary change/refund transactions are in receipt of the ticketed fares and the associated rule conditions in order to enable the automated changes and refunds application.

Several **challenges** exist when tickets containing an adjusted fare are presented for voluntary change or refund, and these are described in the following sections.

Note: ATPCO is forming a new **Dynamic Offers Voluntary Changes Focus Group** to identify requirements and propose solutions to address the issues below, starting with historical fare and keep the fare repricing tags.

9.1.1. Resolving to the ticketed fare's Category 31/33 data

Current standards require processing to resolve to (and apply) Category 31 data applicable for each fare on the ticket. However, the ticketed DPE fare was created at shopping time and was not pre-distributed via ATPCO's current fare distribution products. Some repricing systems can invoke current methodologies to identify the baseline fare (pre-adjusted fare) and use its Category 31 data; however, this does not always produce accurate results. This may be further exacerbated if the ticket is issued as a result of an NDC Order and the amounts are specified as /OP or OP (e.g., FCMI 3 or 5). In this scenario, change/refund systems do not know the ticketed amount and did not receive the DPE fare.

9.1.2. Applying Category 31 Keep the Fare requirements

Airline fare rules can direct processing to reprice the itinerary by keeping the originally ticketed fare. For example, the airline may not want to reprice unflown portions to a higher fare when the revised itinerary qualifies for the ticketed adjusted fare (e.g., dynamically adjusted fare). In this case, processing needs to reprice using the same fare as originally ticketed. If an adjusted fare is ticketed, then processing will need to validate the fare rules for the adjusted fare. This results in the same challenges identified above for resolving the ticketed fare's Category 31 data. Further, while the airline may want to keep the original fare *product*, it is not clear whether an airline would also want to keep the original adjusted amount.

9.1.3. Historical Repricing

Airlines specify data elements in Category 31 indicating requirements for re-pricing flown and unflown portions of an itinerary (e.g., via the use Process Tags). Upon application and validation of Category 31 data, processing will determine whether each fare component must be re-priced by keeping the fare or using historical or current fares. When the data specifies repricing using historical fares, processing must use fares in effect on the date of original ticket issuance. This requires change/refund systems to maintain a historical fares database. For example, if there is no change to the first flight coupon (no change to the contract), the change policy may indicate the ticket must be repriced using fares in effect on the date of original ticket issuance.

Many airlines require historical repricing in their Contracts of Carriage, and most airlines specify some type of historical fare repricing requirements via use the Category 31 Process Tags.

How are historical repricing requirements applied in an adjusted pricing environment?

9.1.4. Application of Category 31/33 Fare Amount Requirements

Category 31 and 33 add-collect/refund elements and restrictions based on equal or higher fare or ticket amounts need to be defined as to whether they apply to the original baseline fare or the dynamically adjusted fare.

Proposal: Processing will use the adjusted fare amount (the amount the passenger actually paid or will pay) to validate fare amount data in Categories 31 and 33. This applies to add-collect/refund processing, equal or higher ticket requirements, and equal or higher fare requirements.

Note: The above is simply a *proposal* and is pending industry discussion, industry agreement, and (as applicable) M3 proposed changes to Category 31/33 data application.

9.2. Settlement

Settlement rules can be based on the published fares and rules in a market. Airlines use the published fares, in addition to industry methodology, to determine the value for a given market (that is, to determine how much their share is worth). Ticketing and baggage agreements require airlines to disclose their tariff location, which is typically in ATPCO fare and rule data. Both the IATA Multilateral Prorate Agreement and the Airline Clearing House (ACH) contain processes that potentially depend upon ATPCO fare and related data (either directly or indirectly).

An airline engaged in dynamic price adjustment for online travel does not face any direct settlement issues. However, there are still challenges with prorate factors (described below) that depend on filed fare data (if the filed fares are not actually reflective of the ticketed fares) and with future scenarios where the airline may want to engage in dynamic price adjustment on interline itineraries.

9.2.1. Applicable fare

Both the MPA and ACH have processes dependent upon determining the applicable fare. For example, under the MPA, settlement systems need to identify the Amount to Be Prorated (ATBP). This can be identified using the amount specified on the ticket, but in some scenarios, it may be determined by identifying the applicable fare. ACH calculation processes and Straight Rate Prorate (SRP) can use local fares (applicable fares) in intermediate markets, and systems need access to these fares. When the ticketed fare cannot be retrieved from historical ATPCO fare and rule data, both the MPA and the ACH systems will default to the applicable fare. Settlement processes may determine the applicable fare by estimating the price of the ticketed itinerary against historical ATPCO fare and rule data to determine what fare should have been applied.

Airline payables and receivables—interline billings—are largely based on bilateral agreements (joint ventures and Special Prorate Agreements) that may include the concept of billing the applicable fare level. The industry settlement rules are built on the concept of billing the appropriate portion of this applicable fare. The applicable fare is calculated based on the stored amount that was appropriate to the conditions of sale, not the actual sold amount. If even a small portion of interline billings are using an applicable fare value, having accurate filed fares and posted orders will ensure accurate prorated revenue calculation and a reduction in interline disputes.

9.2.2. Prorate factors (base amounts)

Base amounts underpin both Multilateral Prorate Agreement (IATA) and Special Prorate Agreement (all) proration. For the MPA, base amounts are calculated using ATPCO fares and related data. ATPCO supplies base amounts to IATA by deriving the amount from ATPCO data. For example, the base amount may be derived from the highest published unrestricted normal economy, business, or first-class fare in each market. If this published fare is dynamically adjusted, but the adjusted amount is not posted for use as a base amount, then the settlement calculation will still use the originally published fare, which may result in receiving a lower portion of an interline itinerary. Airlines face the risk of unexpected settlement values derived from filed fare data that is out of sync with the actual ticketed fare.

This is a zero-sum game for payables and receivables (some airlines will lose more based on geography or traffic flows), but inaccuracy in revenue declaration and collection leads to skewed cash flow, poor decision making (network planning and revenue management), cost of disputes, and ultimately badly targeted products for consumers.

9.2.3. Involuntary reroute

Involuntary reroute settlement—which can be broadly broken down into multilateral rules for billing and industry solutions for both Airlines Clearing House and IATA (Simplified Involuntary Reroute Settlement)—is calculated based on a random and neutral sample of actual tickets sold for the route and simple conditions of the journey. A lack of data to calculate the percentage to be used for settlement at the industry level means under- or over-billing due to a skewed sample underlying “trusted” industry calculation factors. An already costly event could now have hidden financial repercussions, like revenue losses, that cannot be recovered (there can be no dispute, because the data does not exist to enable a dispute). In addition, if the airline is adjusting the full normal cabin fare (economy, business, first) then the full fare used in involuntary settlement—to which the percentage is applied—will be incorrect.

9.2.4. Special Prorate Agreements

Special Prorate Agreements are commercially driven and bilateral, but they still use filed and sold data to calculate the right commercial agreement between partners, as well as referring to base amounts and involuntary rates. The above losses are compounded, and built into commercial agreements, in the event of no data.

For example, the SPA may depend on the fare type code for the ticketed fare. The fare type code or other fare elements are determined by retrieving the historical ATPCO fare and rule data (such as the Record 1) for the ticketed fare. If the ticketed fare cannot be matched to published ATPCO data, the incorrect fare type code could be assumed, and the settlement value could be calculated using the wrong percentage or rejected and disputed, resulting in manual costs.

9.3. Fare Management

Fare management systems receive and process ATPCO fare data. Airlines use this data for monitoring competitive activity based on airline, geography, and other criteria and to apply strategies to determine

whether to respond to changing activity. Most fare management systems allow airlines to make fare changes that are then uploaded to ATPCO for distribution. To ensure accurate analysis, fare management systems need a comprehensive set of fares that are available for sale.

Yield management forecasting/optimization O&D and real-time inventory management and optimization often ingests ATPCO pricing data in a summarized view (Price Elements) to identify the products and price points in the market to feed their forecasting models. These data derivatives provide a more granular view of prices or products in a given market and are typically manufactured from a system that consumes ATPCO data directly.

As more airlines implement dynamic adjustments, and the number of tickets sold with adjusted fares increases, the actual prices and products offered in a given market will become increasingly opaque. This lack of transparency will challenge fare management systems to understand the competitive landscape and determine an optimal price.

9.4. Possible solutions

Following are some potential solutions each airline may consider to ensure downline systems have a complete set of price data in the marketplace:

- Order posting. Order Posting (or an Order Store) is as a way for airlines to distribute order details for use in downline processes. One proposal is to enable airlines to take their product details that have not been previously filed with ATPCO, such as sold dynamically adjusted offers, transform them into ATPCO fare and rule structures and standardized formats, and distribute them to any downline (post-sales, such as servicing and revenue accounting) system that relies on ATPCO data to work effectively.
- Discount amount distribution. ATPCO could work with the industry to develop a data exchange solution where ATPCO would receive the discount amount linked to the ticket number (and other ticketing information as applicable) and distribute this data to downline systems as directed by each airline.
- Bilateral solution. Implement a bilateral solution between each airline and impacted vendor (e.g., store the discount data outside of ATPCO and make it available to the impacted downline systems, including each partner's system). This could be a work-around solution which could result in less accurate implementation. This may require customized development with each impacted vendor which could result in a higher development cost. A bilateral solution suits airlines that have their own dynamic price adjustment and downline systems or use the same vendor for these processes.
- ONE Order. Wait to implement adjusted or continuous offers until the end state vision is realized. However, this results in slower delivery of value.

10. Government Filing and Regulatory

The assumption is that all existing government filing and regulatory rules still apply. Any solution must adhere to these rules.

11. Launch and Assess

For a successful implementation, the following areas should be addressed. The impact on these areas will depend on current system and process capabilities.

11.1. Documentation and Training

Training and documentation needs for impacted airlines within and outside the airline should be assessed based on the impact.

11.2. Implementation Rollout

11.2.1. Staged rollout

Depending on the determined scope and impact assessment, plans may include rollout to specific fares, shopping/pricing systems, and points of sale. The following areas would require multiple implementation steps to accommodate a staged rollout:

- Data set-up and distribution: Fares and Rules (e.g., channel-specific distribution)
- Documentation and training

All other areas may require full implementation of processes and systems, regardless of whether it is rolled out in stages or as a single implementation.

11.2.2. Communications

In addition to areas directly involved in implementation, the following areas would require notification of implementation.

- Customer Service
- Distribution/Pricing partners

11.2.3. Assessment

All areas should be included in an assessment of impact as rollout happens. It is advisable to limit the scope of the initial implementation in order to be able to assess impact and effectiveness.

11.2.4. DPE Effectiveness

Airlines will need to assess the effectiveness of the DPE itself. Historical records of all DPE requests and responses should be maintained to develop core metrics of how well the DPE is doing:

- Identify how many fares have been adjusted, as well as the original baseline fare and adjusted amount.
- Total number of adjusted offers and how many were converted to orders.
- Markets, points of sale, and consumer information on adjusted fares offered and converted to orders or not converted to orders.

12. Implementation Checklist

Following is a list of implementation requirements with RACI (a responsibility assignment matrix).

Responsible: The area responsible for getting the job done
Accountable: The area can be accountable for each task (only one)
Consulted: The area who is consulted for expertise
Informed: The areas who are kept up-to-date on progress

PM = Project Management
RM = Revenue Management
DE = Distribution/Ecommerce
RA = Revenue Accounting and Audit
CS = Customer Service
IT = Information Technology

When	Accountable Organization	Description	Airline						System	
			PM	RM	DE	RA	CS	IT	PM	IT
Strategy and Planning	Executive Sponsorship	Secure executive sponsorship	A	A	A	A	A	A	A	A
	Project Management	Identify and engage stakeholders	R	C	C	C	C	C	C	C
	All Groups	Review current capabilities	R	R	R	R	R	R	R	R
		Analyze impact	R	R	R	R	R	R	R	R
		Determine structure and scope	R	R	R	R	R	R	R	R
Implementation	Fare Management/ Decision Support	Create intermediate fare levels between baseline fare price points and associate them to adjusted fares	I	R	I	I	I			
	Content Collection and Distribution	Enhanced distribution for baseline fares	I	R					I	I
	Shopping/Pricing/Order Management (Direct and Indirect)	Implement Dynamic Pricing Engine (DPE)	I	R		I	I	R	I	I
	Revenue Accounting/Auditing	Implement solution to recognize dynamically adjusted fares on a ticket and some type of order posting	I	I		R		I	R	R
	Customer Service – Voluntary Changes	Policies and procedures updates for refunds and re-issues. Implement solution to recognize dynamically adjusted fares on a ticket and some type of order posting	R	C/I	C/I	C/I	R/I	C		
	Government Filing/Regulatory	Future: Identify requirements and implement solution to support public order posting	I	R	I	I	I	I		
Launch/Rollout/ Assessment	All Groups	Documentation and training as required.	R	R	R	R	R	R	R	R
	All Groups	Communications	R	R	I	I	I	I	R	I
	All Groups	Assessment	R	R	R	R	R	R	R	R