



# Terminal Area Forecast – Modernized Platform (TAF-M)

Technical Documentation Set  
Section B – TAF-M Database Structure

Prepared by IT WORKS! Inc.  
for the Federal Aviation Administration  
Office of Aviation Policy & Plans

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# TAF-M: Database Structure

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# TAF-M: Database Structure

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# TAF-M: Database Structure

## 1. Introduction

### 1.1 Background

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The Terminal Area Forecast (TAF) is the official Federal Aviation Administration (FAA) forecast of aviation activity for U.S. airports. It is comprised of the Modernized TAF (TAF-M) and the Legacy TAF (TAF-L). The TAF is published by the Office of Aviation Policy and Plans.<sup>1</sup>

TAF-M factors in economic and demographic data to derive growth across metropolitan markets, which in turn helps the FAA to forecast growth in passenger traffic and airport operations. This is accomplished by initially forecasting origin and destination passenger flows. Currently, TAF-M provides coverage for over 500 airports, including 465 commercial airports located in 363 metropolitan statistical areas (MSAs) across the United States. There are between 36,000 and 40,000 origin and destination markets, a figure that varies based on seasonality and economic cycles.

Understanding the evolutionary nature of the airline network is key to making informed investment decisions for future development and adjustments. Refining the forecast capability regarding passenger flow and air traffic will have positive consequences for the future of the airline network.<sup>2</sup>

### 1.2 Purpose of This Document

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Developed by IT WORKS for the Federal Aviation Administration, Office of Aviation Policy and Plans, this document intends to provide a complete and comprehensive list of tables that are actively used in conducting analysis and generating forecasts under the Terminal Area Forecast – Modernized program (TAF-M). This document is targeted towards the programmers and analysts involved in the TAF-M program.

### 1.3 Scope of This Document

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This document clearly identifies and provides details on all primary data tables, lookup tables, system tables, forecast tables, and intermediate processing tables used by the TAF-M program.

The following areas are out of scope for this document:

- Tables, views, and stored procedures associated with exception analysis for current and prior forecasts.
- All tables, views, logs, and stored procedures associated with the Terminal Area Forecast – Legacy (TAF-L) program.
- All database assets associated with web reports or other specific reports.

The contents of this document may need to be revised in the future as TAF evolves and changes are made to the database assets.

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<sup>1</sup> Website – <http://aspm.faa.gov/main/TAf.asp>, Federal Aviation Administration, January 2015.

<sup>2</sup> “Determinants of Network: A Preliminary Analysis of US Air Transportation” (Dipasis Bhadra and Brendan Hogan), *Proceedings of the 5th Annual ATIO/AIAA Meeting*, September 2005.



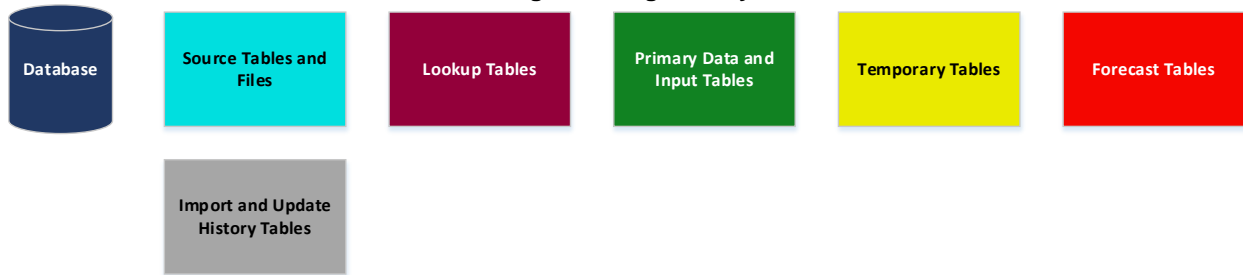
# TAF-M: Database Structure

## 2. Database Schematic

The database schematic below shows the database tables, views, and stored procedures that are leveraged to generate the Terminal Area Forecast under the TAF-M program. Also shown are the key relationships between tables and procedures that create and populate the tables.

The schematic follows the general Terminal Area Forecast process from economic data input through generating the O&D Forecasts, Routes, and Aircraft choices.

**Figure 1: Legend/Key**





# TAF-M: Database Structure

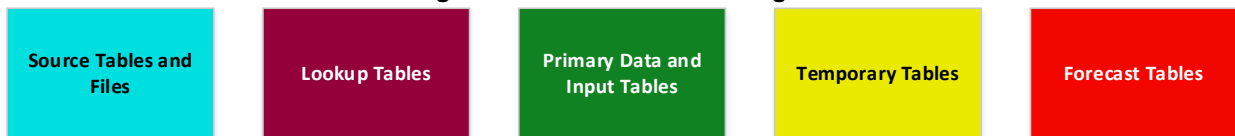
## 4. Stored Procedures

The following stored procedures are executed in TAF-M every time a forecast is run.

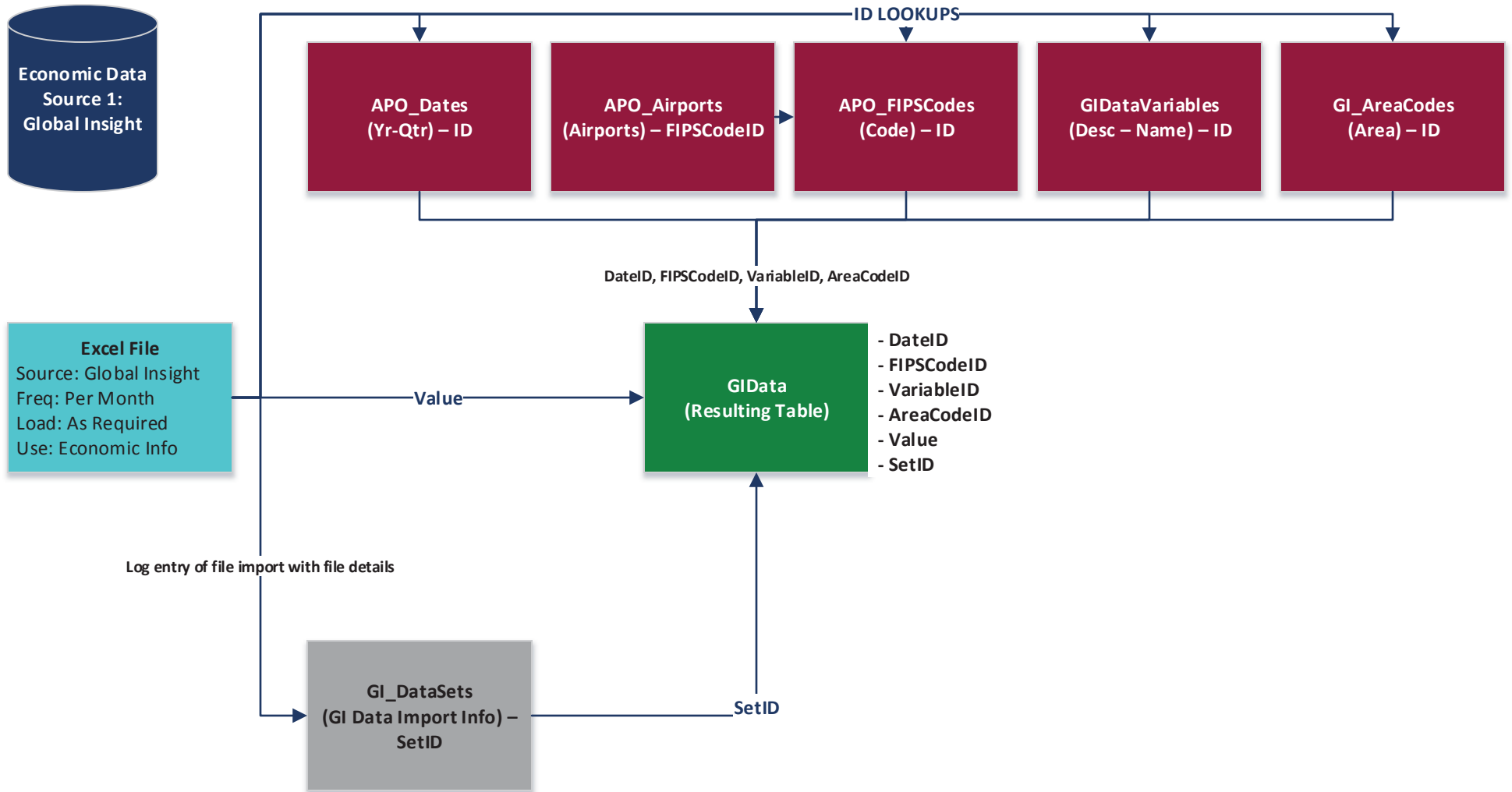
**Table 41: Stored Procedures**

Stored Procedure Name	Significance	Input Tables	Resulting Tables
spAPO_Recocile Airports	Consolidates airports by forecast	OAIP_DB1BMarket OAIP_DB1BCoupon OAIP_T100DSegmentUSCarrierOnly	APO_Airports_By Forecast
spAPO_Reconcile LocationPairs	Consolidates location pairs	OAIP_DB1BMarket OAIP_DB1BCoupon OAIP_T100DSegmentUSCarrierOnly	APO_Location Pairs
spAPO_TAF_LineUp	Updates market data based on scalar factors for OEP35 airports	APO_Scalar	APO_Market Summary_BD_ByOrigDest
spAPO_MarketSummary_GIData	Merges market summary and GI data to obtain GI variable values by origin and destination	GIData APO_Market_Summary_BD_ByOrig Dest Vw_APO_GIOrigin	APO_Market Summ_GIData
spAPO_MarketForecast	Calculates market forecast based on log-log-linear specification	APO_Forecast_WeightedAvg	APO_Market Forecast
spAPO_Segment_Forecast	Creates temporary tables required to calculate segment forecast. Calculates segment forecast	APO_Market_Details_tmp APO_Segment_Market_tmp APO_Segment_Cnts_tmp APO_Segment_Market_tmp1 APO_Segment_Market_Ratio_tmp OAIP_DB1BCoupon_tmp APO_M_tmp_1	APO_Segment Forecast
spAPO_T100Segment USCarrierOnly	Generates T-100 and cargo forecast	APO_T100SegmentUSCarrier_Forecast_tmp	APO_T100SegmentUSCarrier_Forecast

**Figure 2: Stored Procedures Legend**



Global Insights Data Import



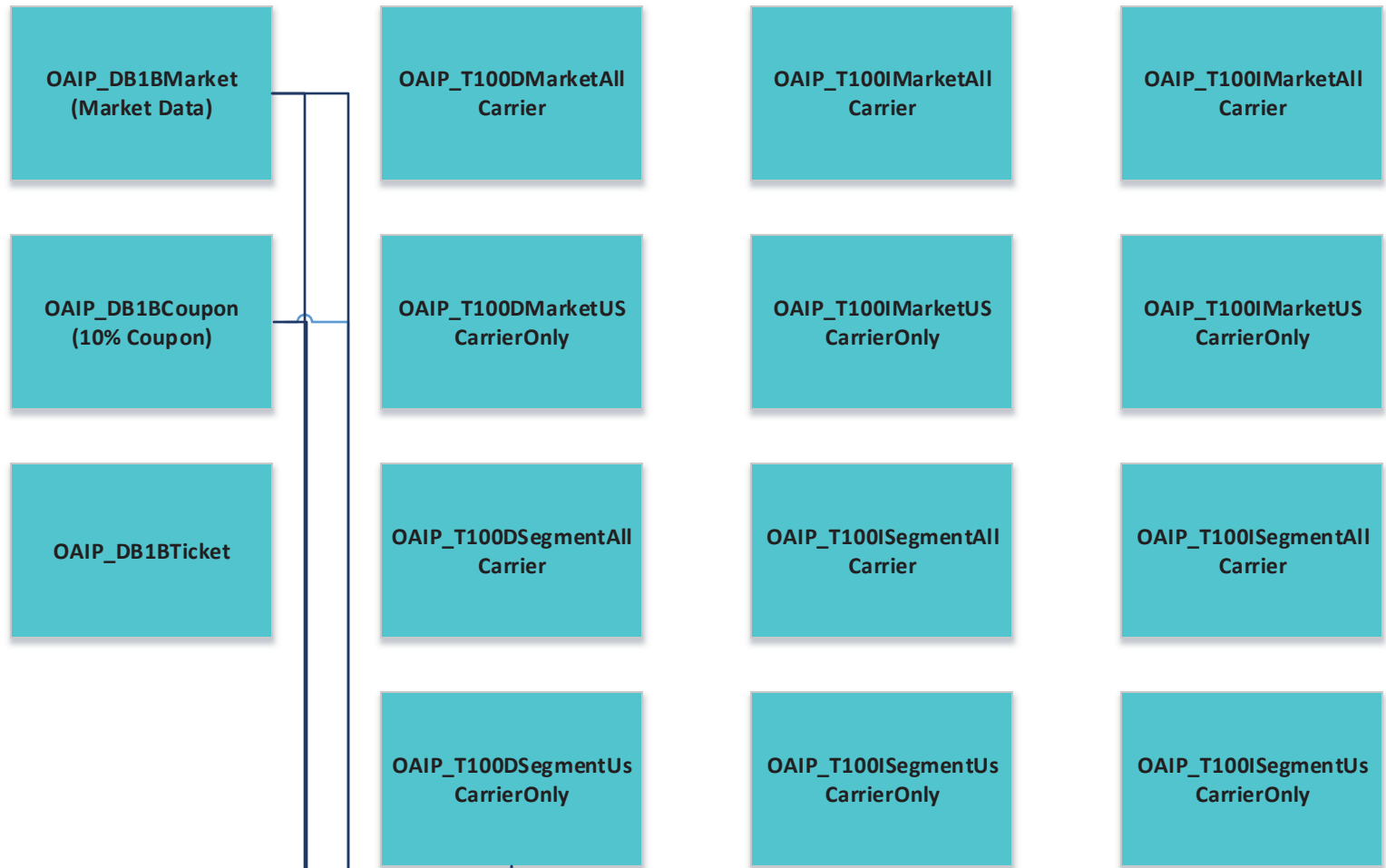
# TERMINAL AREA FORECAST – MODERNIZED PLATFORM (TAF-M) DATABASE SCHEMATIC

## BTS Data Import and Operations

Economic Data  
Source 2:  
DOT BTS Data

Sybase Database  
Source: DOT BTS  
Freq: Per Quarter  
Load: As Required  
Use: O&D Passenger  
Demand

BTS data is  
imported into the  
shown tables



Consolidate location pairs  
Stored proc: *spAPO\_ReconcileLocationPairs*

Consolidate airports by forecast  
(determine active airports)\*  
Stored proc: *spAPO\_ReconcileAirports*

**APO\_LocationPairs  
(Resulting Table)**

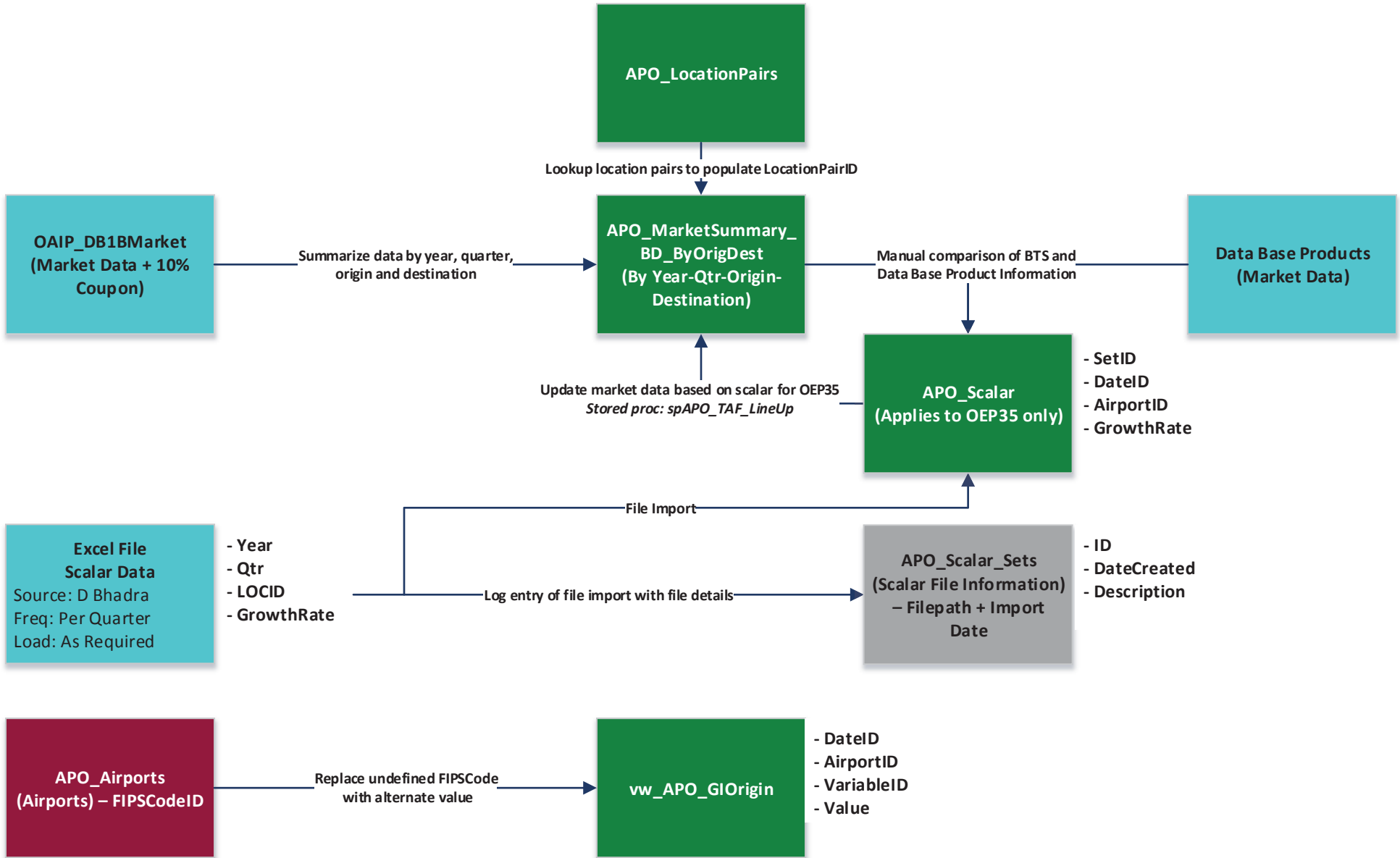
- ID
- OriginID
- DestID
- Distance

**APO\_Airports\_By  
Forecast  
(Resulting Table)**

\* For new airports a manual process is in place to add airport information to APO\_Airports table



**Creating Summary Tables for Forecast**





# TAF-M: Database Structure

## 3. Database Tables

### 3.1 Source Tables and Files

This section provides details and definitions of the fields in the source files used by TAF-M. Most of the source information is obtained in an Excel format and imported into the TAF database.

#### 3.1.1 Global Insight Excel File

The Global Insight economic data Excel file contains economic data FIPS Codes by year and quarter, for several economic indicators. For the TAF-M program, however, only the following economic indicators are used:

**Table 1: Global Insight Forecasting Variables**

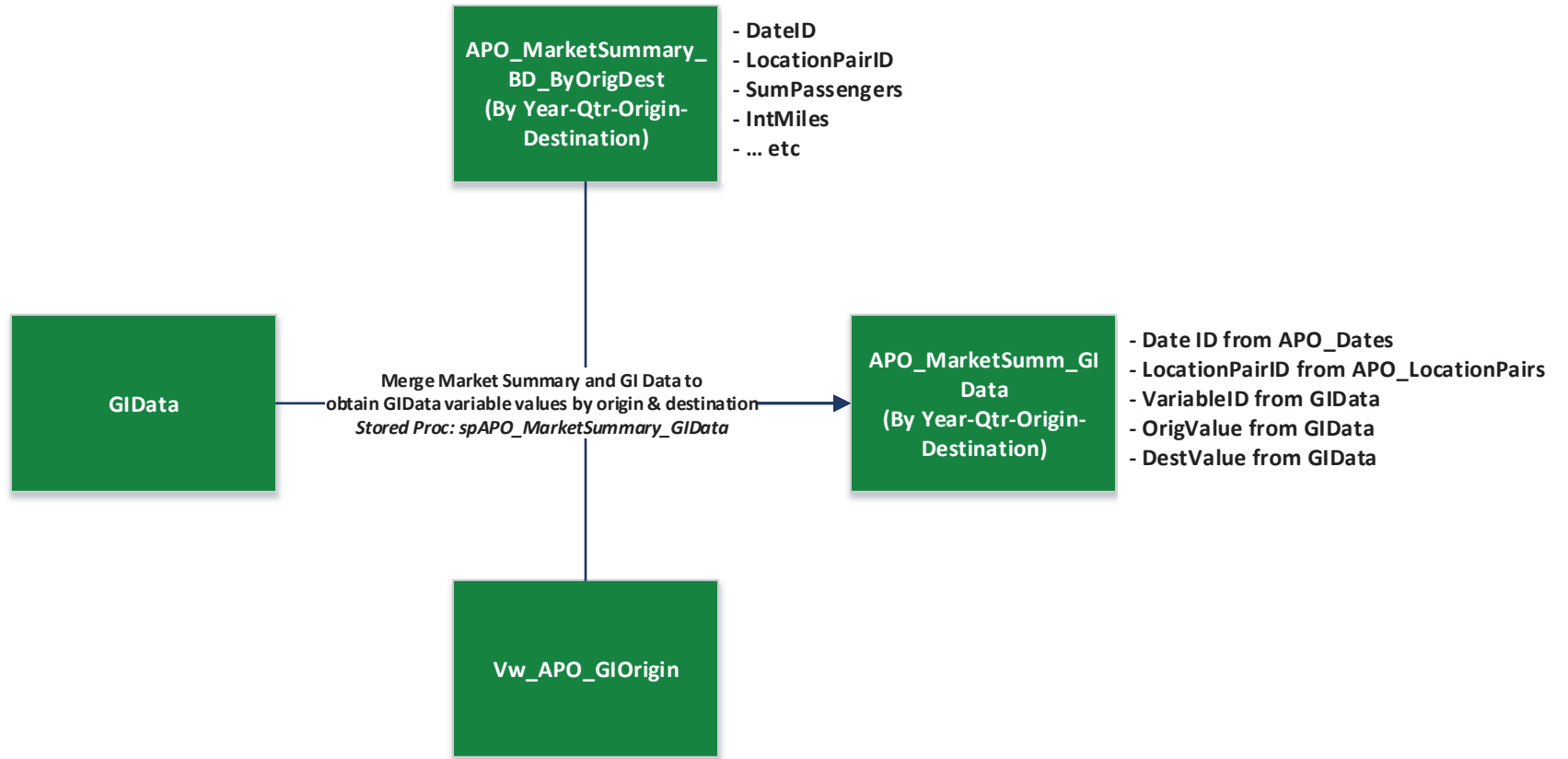
Global Insight Variable (Attribute) Name	Description
CYRPIC	Real Personal Income (Millions 2000\$, SAAR)
POP	Total Resident Population (Thousands)
EE	Employment, Total Nonfarm [Establishment Survey] (Thousands, SA)
QHALL	Households (Thousands)

**Table 2: CYRPIC Indicator Data**

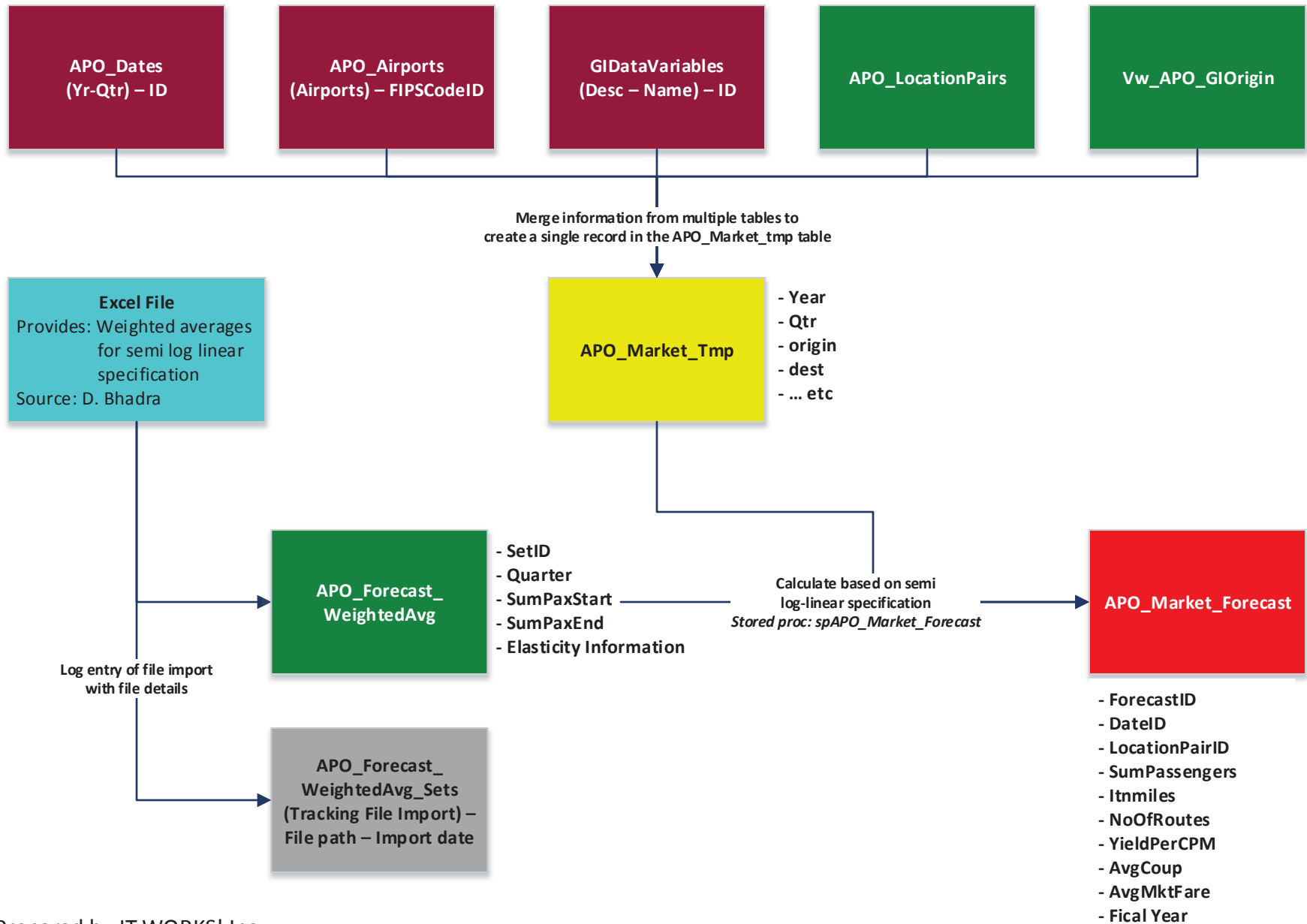
VARNAME	METABBREV	FIPS	1984Q1	1984Q2	1984Q3	1984Q4	1985Q1
CYRPIC	ABIL	10180	3212.576	3273.013	3334.488	3374.885	3377.871
CYRPIC	AKRO	10420	14643.91	14833.44	15036.74	15143.67	15196.7
CYRPIC	ALBU	10740	11130.44	11351.2	11625.98	11736.77	11964.9
CYRPIC	ALEX	10780	2579.215	2624.647	2675.656	2707.722	2683.619
CYRPIC	ALGA	10500	2503.858	2531.037	2567.692	2587.361	2586.923
CYRPIC	ALLE	10900	15119.58	15353.76	15578.29	15720.25	15869.31
CYRPIC	ALNY	10580	17810.89	18171.56	18501.31	18805.14	18862.85
CYRPIC	ALTO	11020	2319.982	2355.552	2391.235	2411.653	2436.302
CYRPIC	AMAR	11100	4490.946	4559.598	4626.369	4664.753	4595.059
CYRPIC	AMES	11180	1446.188	1467.83	1485.32	1502.883	1520.045

**Table 3: POP Indicator Data**

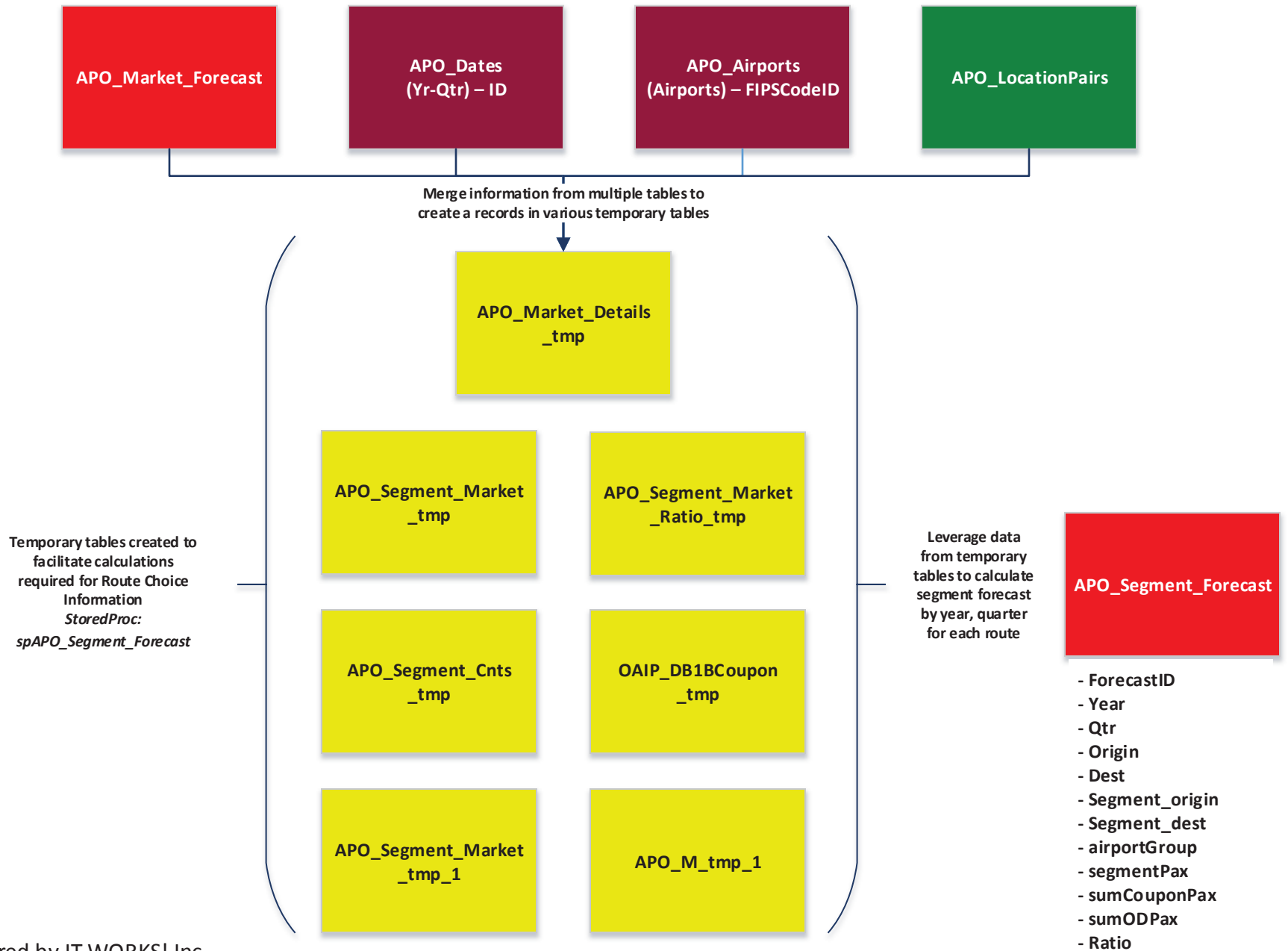
The Merge – Consolidating and Summarizing Source Data



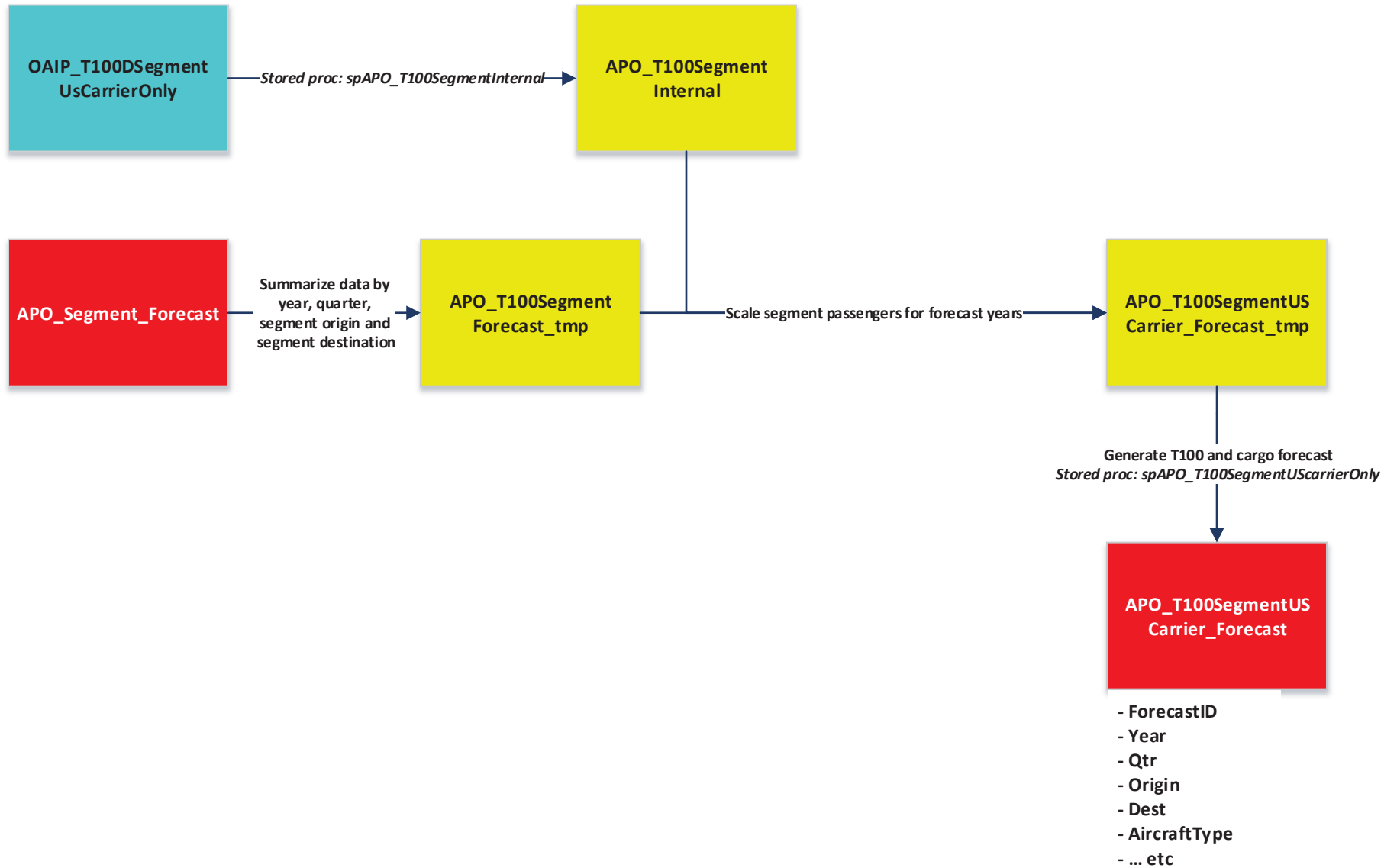
**Generating O&D Forecast**



**Determining Route Choice for Forecast**



Determining Aircraft Choice for Forecast





# TAF-M: Database Structure

VARNAME	METABBREV	FIPS	1984Q1	1984Q2	1984Q3	1984Q4	1985Q1
POP	ABIL	10180	153.4213	153.587	153.5538	153.5233	153.4954
POP	AKRO	10420	652.4297	651.917	651.052	650.187	649.322
POP	ALBU	10740	530.7344	533.544	536.2972	539.058	541.8266
POP	ALEX	10780	154.3905	154.515	154.3835	154.2519	154.1205
POP	ALGA	10500	150.159	150.313	150.4936	150.6787	150.8681
POP	ALLE	10900	644.041	644.843	645.6952	646.548	647.4017
POP	ALNY	10580	779.2644	779.804	780.7865	781.7693	782.7525
POP	ALTO	11020	133.293	132.925	132.7568	132.5888	132.4208
POP	AMAR	11100	195.6463	196.434	196.5562	196.6818	196.8108
POP	AMES	11180	73.38488	73.408	73.56779	73.72805	73.88878

**Table 4: EE Indicator Data**

VARNAME	METABBREV	FIPS	1990Q1	1990Q2	1990Q3	1990Q4	1991Q1
EE	ABIL	10180	53.83333	53.76667	53.33333	53.73333	54.3
EE	AKRO	10420	281.4667	283.2333	283.9	283.3333	280.9
EE	ALBU	10740	270.0333	273.3	271.7333	270.2333	270.2
EE	ALEX	10780	49.56667	49.23333	49.76667	50	49.93333
EE	ALGA	10500	56.5	56.5	56.3	56.16667	56.2
EE	ALLE	10900	287.4333	286.5667	286.6	286.1333	284.2667
EE	ALNY	10580	407.9	410.4	409.4333	406.4667	404.6
EE	ALTO	11020	54.4	54.23333	53.9	54.03333	53.36667
EE	AMAR	11100	81.36667	82.36667	83	83.06667	83.03333
EE	AMES	11180	37.63333	37.8	38.06667	38.13333	38.3
EE	ANCH	11260	116.1	118	118.7333	119.5333	119.1667



# TAF-M: Database Structure

**Table 5: QHALL Indicator Data**

VARNAME	METABBREV	FIPS	1984Q1	1984Q2	1984Q3	1984Q4	1985Q1
QHALL	ABIL	10180	54.83241	54.92748	54.93403	54.94025	54.83871
QHALL	AKRO	10420	236.7439	237.3268	237.7177	238.0263	238.2952
QHALL	ALBU	10740	190.7211	192.1391	193.5758	195.0314	196.3843
QHALL	ALEX	10780	52.43764	52.54494	52.54815	52.54891	52.54038
QHALL	ALGA	10500	50.48455	50.75111	50.96824	51.17244	51.45581
QHALL	ALLE	10900	236.824	237.5855	238.3337	239.0291	239.771
QHALL	ALNY	10580	287.4487	288.4862	289.6134	290.6586	291.9469
QHALL	ALTO	11020	49.26631	49.2676	49.33824	49.39802	49.49073
QHALL	AMAR	11100	73.65603	74.01916	74.10837	74.19722	74.23609
QHALL	AMES	11180	25.26054	25.32725	25.45532	25.56584	25.75587
QHALL	ANCH	11260	86.13643	87.25594	88.33643	89.38699	90.83452
QHALL	ANIN	11300	48.96866	49.04321	49.14062	49.21368	49.35831

### 3.1.2 BTS Data – Sybase Database

Both survey and actual data is downloaded from the Bureau of Transportation Statistics (BTS) on an annual basis to run the forecast. This data serves as input information for the model. Market, coupon, and ticket information is based on the O&D Survey and only accounts for 10% of the total. The stored procedures implemented as part of TAF-M extrapolate the 10% of data in order to arrive at a national representation.

The tables discussed in Sections 3.1.2.1 through 3.1.2.23 below constitute the BTS data download.

#### 3.1.2.1 OAIP\_DB1BMarket (10% Market Data)

This table provides coupon-specific information for each domestic itinerary of the O&D Survey, such as the operating carrier, origin and destination airports, number of passengers, fare class, coupon type, trip break indicator, and distance.

#### 3.1.2.2 OAIP\_DB1BCoupon (10% Coupon)

This table provides coupon-specific information for each domestic itinerary of the O&D Survey, such as the operating carrier, origin and destination airports, number of passengers, fare class, coupon type, trip break indicator, and distance.

#### 3.1.2.3 OAIP\_DB1BTicket (10% Ticket Data)

This table contains summary characteristics of each domestic itinerary on the O&D Survey, including the reporting carrier, itinerary fare, number of passengers, originating airport, roundtrip indicator, and miles flown.

#### 3.1.2.4 OAIP\_T100DMarketAllCarrier

This table contains domestic market data reported by both U.S. and foreign air carriers, including carrier, origin, destination, and service class for enplaned passengers. It also includes freight and mail when both origin and destination airports are located within the boundaries of the United States and its territories. For a uniform end date for the combined databases, the last 3 months of U.S. carrier domestic data released in the T-100 Domestic Market (U.S. Carriers Only) is not included.





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## **3.1.2.5 OAIP\_T100DMarketUSCarrierOnly**

This table contains domestic market data reported by U.S. air carriers, including carrier, origin, destination, and service class for enplaned passengers. It also includes freight and mail when both origin and destination airports are located within the boundaries of the United States and its territories.

## **3.1.2.6 OAIP\_T100DSegmentAllCarrier**

This table contains domestic non-stop segment data reported by both U.S. and foreign air carriers, including carrier, origin, destination, aircraft type, and service class for transported passengers. It also includes freight and mail, available capacity, scheduled departures, departures performed, aircraft hours, and load factor when both origin and destination airports are located within the boundaries of the United States and its territories. For a uniform end date for the combined databases, the last 3 months of U.S. carrier domestic data released in the T-100 Domestic Segment (U.S. Carriers Only) is not included.

## **3.1.2.7 OAIP\_T100DSegmentUSCarrierOnly**

This table contains domestic non-stop segment data reported by U.S. air carriers, including carrier, origin, destination, aircraft type, and service class for transported passengers. It also includes freight and mail, available capacity, scheduled departures, departures performed, aircraft hours, and load factor when both origin and destination airports are located within the boundaries of the United States and its territories.

## **3.1.2.8 OAIP\_T100IMarketAllCarrier**

This table contains international market data reported by both U.S. and foreign air carriers, including carrier, origin, and destination for enplaned passengers. It also includes freight and mail when at least one point of service is in the United States or one of its territories. International flight data is released 3 months after domestic data. Flights with both origin and destination in a foreign country are not included.

## **3.1.2.9 OAIP\_T100IMarketUSCarrierOnly**

This table contains international market data by U.S. air carriers, including carrier, origin, and destination for enplaned passengers. It also includes freight and mail when at least one point of service is in the United States or one of its territories. International flight data is released 3 months after domestic data. Flights with both origin and destination in a foreign country are not included.

## **3.1.2.10 OAIP\_T100ISegmentAllCarrier**

This table contains international non-stop segment data reported by both U.S. and foreign air carriers, including carrier, origin, destination, aircraft type, and service class for transported passengers. It also includes freight and mail, available capacity, scheduled departures, departures performed, aircraft hours, and load factor when at least one point of service is in the United States or one of its territories. International flight data is released 3 months after domestic data. Flights with both origin and destination in a foreign country are not included.

## **3.1.2.11 OAIP\_T100ISegmentUSCarrierOnly**

This table contains international non-stop segment data reported by U.S. carriers, including carrier, origin, destination, aircraft type, and service class for transported passengers. It also includes freight and mail, available capacity, scheduled departures, departures performed, aircraft hours, and load factor when at least one point of service is in the United States or one of its territories. International flight data is released 3 months after domestic data. Flights with both origin and destination in a foreign country are not included.



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### **3.1.2.12 OAIP\_T100MarketAllCarrier**

This table combines domestic and international market data reported by U.S. and foreign air carriers, including carrier, origin, destination, and service class for enplaned passengers. It also includes freight and mail. For a uniform end date for the combined databases, the last 3 months of U.S. carrier domestic data released in the T-100 Domestic Market (U.S. Carriers Only) is not included. Flights with both origin and destination in a foreign country are not included.

### **3.1.2.13 OAIP\_T100MarketUSCarrierOnly**

This table combines domestic and international market data reported by U.S. air carriers, including origin, destination, and service class for enplaned passengers. It also includes freight and mail. For a uniform end date for the combined databases, the last 3 months of U.S. carrier domestic data released in the T-100 Domestic Market (U.S. Carriers Only) is not included. Flights with both origin and destination in a foreign country are not included.

### **3.1.2.14 OAIP\_T100SegmentAllCarrier**

This table combines domestic and international T-100 segment data reported by U.S. and foreign air carriers, including non-stop segment data by aircraft type and service class for transported passengers. It also includes freight and mail, available capacity, scheduled departures, departures performed, aircraft hours, and load factor. For a uniform end date for the combined databases, the last 3 months of U.S. carrier domestic data released in the T-100 Domestic Segment (U.S. Carriers Only) is not included. Flights with both origin and destination in a foreign country are not included.

### **3.1.2.15 OAIP\_T100SegmentUSCarrierOnly**

This table combines domestic and international T-100 segment data reported by U.S. air carriers, including non-stop segment data by aircraft type and service class for transported passengers. It also includes freight and mail, available capacity, scheduled departures, departures performed, aircraft hours, and load factor. For a uniform end date for the combined databases, the last 3 months of U.S. carrier domestic data released in the T-100 Domestic Segment (U.S. Carriers Only) is not included. Flights with both origin and destination in a foreign country are not included.

### **3.1.2.16 OAIP\_ScheduleT1\_Summary**

This table summarizes the T-100 traffic data reported by U.S. air carriers. The monthly summary is compiled by carrier entities (geographical regions in which a carrier operates) and service classes, and includes available seat miles (ASMs), available ton miles (ATMs), revenue passengers enplaned (PAX), revenue passenger miles (RPMs), revenue ton miles (RTMs), revenue air hours (RAHs), revenue miles flown (MILES), and revenue departures performed (FLIGHTS). The T1 summary includes reported international flights and military service that may not be available in the T-100 segment and T-100 market data tables released in TranStats.

### **3.1.2.17 OAIP\_ScheduleT2\_Summary**

This table summarizes the T-100 traffic data reported by U.S. air carriers. The quarterly summary is compiled by aircraft types and configurations, carrier entities (geographical regions in which a carrier operates), and service classes, and includes available seat miles (ASMs), available ton miles (ATMs), revenue passenger miles (RPMs), revenue ton miles (RTMs), revenue air hours (RAHs), revenue miles flown (MILES), revenue departures performed (FLIGHTS), and aircraft fuels issued in gallons. The T2 summary includes reported international flights and military service that may not be available in the T-100 segment and T-100 market data tables released in TranStats. The T2 released after July 13, 2006 contains all service class summary data.



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### **3.1.2.18 OAIP\_F41\_ScheduleB1**

This table contains quarterly operating balance sheet statements for large certificated U.S. air carriers with annual operating revenues of \$20 million or more. The balance sheet includes items like cash, short-term investments, accounts receivable, long-term debt, accounts payable, and salaries and wages. Numbers in B1 now follow the format of common public financial documents, such as reports filed with the Securities and Exchange Commission (SEC) or company financial statements. This format reverses signs from the accounting format prior to October 18, 2006.

### **3.1.2.19 OAIR\_F41ScheduleP12A**

This table contains monthly reported fuel costs and gallons of fuel consumed organized by air carrier and category of fuel use, including scheduled and non-scheduled service for domestic and international traffic regions. Data since 2000 is available for major national and regional air carriers subject to reporting requirements.

### **3.1.2.20 OAIR\_AircraftTypes**

This table identifies the different types of aircraft reported to the DOT, organized by DOT-assigned aircraft type codes. The information includes the DOT-assigned aircraft code, aircraft manufacturer, and aircraft model name.

### **3.1.2.21 OAIR\_Cardecode**

This table provides a list of domestic and foreign air carrier codes, organized by T-100 and OAG designations, charter carrier codes, carrier descriptions, entity codes, service region, and beginning and ending dates of service.

### **3.1.2.22 OAIR\_MasterCoordinate**

This table contains a list of domestic and foreign airport codes and their associated city codes, world area codes, city or airport names, state or country names, and latitude and longitude coordinates.

### **3.1.2.23 OAIP\_APTDist**

This table contains on-time arrival data for non-stop domestic flights by major air carriers, and provides additional items such as departure and arrival delays, origin and destination airports, flight numbers, scheduled and actual departure and arrival times, cancelled or diverted flights, taxi-out and taxi-in times, air time, and non-stop flight distance.

### **3.1.3 Data Base Products (DBP)**

Data Base Products provides passenger counts by locations (LOC IDs), year, and quarter. This data was primarily used in running forecasts under TAF-L. Going forward, however, BTS will function as the primary data source. A scalar factor (adjustment factor) was used to align BTS data to the DBP data for the prior two years of OEP 35 forecasts (2013 and 2014). The scalar factor will be required as long as there is a need to align BTS data to DBP data.

Section 3.2 below provides a sample calculation of the scalar factor based on BTS and DBP data.

Table 6 below illustrates passenger data for the Hartsfield Jackson Atlanta International Airport (ATL) as obtained from a DBP download. Data is downloaded and converted into .xls format by Dipasis Bhadra prior to using it to run forecasts.



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**Table 6: ATL Passenger Data**

DBP		
LOC_ID	Year-Qtr	Passengers
ATL	2007-Q1	299842.00
ATL	2007-Q2	357462.00
ATL	2007-Q3	340445.00
ATL	2007-Q4	334921.00
ATL	2008-Q1	304764.00
ATL	2008-Q2	341413.00
ATL	2008-Q3	319717.00
ATL	2008-Q4	310523.00

### 3.1.4 Scalar Data Excel File

The Scalar Data Excel file contains adjustments by LOC ID for OEP35 airports by year and quarter. This file is provided by APO annually and the data from this file is used to make adjustments to the BTS O&D market data. The scalar calculations are illustrated in Section 3.2 below.

Table 7 below is an excerpt from the Scalar Data Excel file.

**Table 7: Scalar Data Excel File Excerpt**

Year	Qtr	LOCID	GrowthRate
2010	1	ATL	0.014484435
2010	2	ATL	-0.005773104
2010	3	ATL	0.001716529
2010	4	ATL	-0.015720838
2011	1	ATL	0.006576267
2011	2	ATL	-0.00678355
2011	3	ATL	0.000764991
2011	4	ATL	-0.010787281
2012	1	ATL	0
2012	2	ATL	-0.003819331
2012	3	ATL	0.005650112
2012	4	ATL	-0.013737248
2013	1	ATL	0
2013	2	ATL	-0.003819331
2013	3	ATL	0.005650112
2010	1	BOS	-0.017020326
2010	2	BOS	-0.021854223



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### 3.1.5 Weighted Averages Excel File

The Weighted Averages Excel file contains fare, distance, and income elasticity factors for origin and destination bucketed by passenger volume. These factors are entered in the log-log-linear specification used to obtain the APO Market Forecast.

Table 8 below is an excerpt from the Weighted Averages Excel file.

**Table 8: Weighted Averages Excel File Excerpt**

Quarter	SumPaxStart	SumPaxEnd	Intercept	FareElasticity	RouteFreqElasticity	DistanceElasticity	OriginIncomeElasticity	DestIncomeElasticity
1	0	500	NULL	-0.160808583	1.571025455	-0.53409239	0.235121714	0.238582643
1	501	999999999	NULL	-1.105044295	0.570903059	-0.394070255	0.338398214	0.3364585
2	0	500	NULL	-0.128441286	1.452652499	-0.589328241	0.260553808	0.264792462
2	501	999999999	NULL	-1.266881556	0.528978241	-0.382966648	0.389061923	0.382148923
3	0	500	NULL	-0.163348225	1.458993755	-0.583395772	0.258910808	0.261617346
3	501	999999999	NULL	-1.101510775	0.518757589	-0.409156166	0.3751465	0.370390385
4	0	500	NULL	-0.151750393	1.459647926	-0.59211903	0.266650077	0.272289692
4	501	999999999	NULL	-1.307467575	0.533772183	-0.380132522	0.384333231	0.378779462



# TAF-M: Database Structure

## 3.2 Scalar Factor Calculation Example

---

Inputs:

**Table 9: BTS Data**

MarkeForecast Original			
Year	Quarter	LOC ID	Passengers
2007	1	ATL	295010
2007	2	ATL	353400
2007	3	ATL	332442
2007	4	ATL	335141

**Table 10: DBP Data**

DBP		
LOC ID	Year-Qtr	Passengers
ATL	2007-Q1	299842.00
ATL	2007-Q2	357462.00
ATL	2007-Q3	340445.00
ATL	2007-Q4	334921.00

Calculations and Operations:

**Step 1:** Determine DBP ratio for each year-quarter:

DBP Passengers / BTS Passengers – 1

Example: ATL Q1 2007:  $(299,842/295,010) - 1 = 1.64\%$

**Step 2:** Use the calculated scalar factor in the stored procedure ‘spAPO\_TAFLineUp’



# TAF-M: Database Structure

## 3.3 Primary Data and Input Tables

This section provides details and definitions of the fields in the primary data tables used by TAF-M models.

### 3.3.1 GIData

This table contains economic data provided by Global Insight.

**Table 11: GIData**

SetID*/**	Integer	Primary key – Foreign key to GIData_Sets
DateId*/**	Integer	Primary key – Foreign key to APO_Dates
VariableID*/**	Integer	Primary key – Foreign key to GIDataVariables
AreaCodeID*/**	Integer	Primary key – Foreign key to GIAreaCodes
FIPSCoDeID*/**	Integer	Primary key – Foreign key to APO_FIPSCodes
Value	Numeric (18,4)	Value
ForecastID	Integer	Forecast ID

### 3.3.2 APO\_LocationPairs

This is a lookup/input table for origin and destination LOC ID. This table is populated using the BTS data tables (OAIP\_DB1BMarket, OAIP\_DB1BCoupon, and OAIP\_T100DsegmentUSCarrierOnly) by executing a stored procedure named 'spAPOReconcileLocationPairs'.

**Table 12: APO\_LocationPairs**

ID*	Integer	Primary key - Auto number
OriginID**	Integer	Foreign key – ID from APO_Airports
DestID**	Integer	Foreign key – ID from APO_Airports
Distance	Integer	Distance between origin and destination



# TAF-M: Database Structure

### 3.3.3 APO\_Airports\_ByForecast

This table contains new and unused LOC IDS for a particular forecast.

**Table 13: APO\_Airports\_ByForecast**

Forecastid	Integer	Forecast ID
Tablename	Varchar(20)	OAIP table name to keep track of the source airport
Locid	Varchar(3)	LOC ID
New	Small integer	'0' = not used airport '1' = new airport

### 3.3.4 APO\_MarketSummary\_BD\_ByOrigDest

This table contains summary data created from the OAIP\_DB1BMarket.

**Table 14: APO\_MarketSummary\_BD\_ByOrigDest**

DateID*/**	Integer	Primary key – Foreign key to APO_Dates
LocationPairID*/**	Integer	Primary key – Foreign key to APO_LocationPairs
SumPassengers	Integer	Number of passengers for O&D
ItnMiles	Float	O&D miles
NoOfRoutes	Integer	Number of routes between O&D
Revenue	Float	Revenue
YieldPerCPM	Float	$(O\&D\ Revenue / (pax * miles)) * 100$
AvgMktFare	Float	Average market fare
CoupMilesIn000	Float	Coupon miles in thousands
PaxPerDay	Float	Passengers per day
AvgCoup	Float	Average coupon
ZeroFarePax	Float	Sum of passengers where mktFare < 50
SumMktDistance	Integer	Total market distance
AvgMktDistance	Float	Average market distance
TotalMiles	Float	Pax * Distance
SumMilesFlown	Float	Total miles flown
CouponRevenue	Float	Coupon revenue
AvgYield	Float	mktFare/mktMilesFlown





# TAF-M: Database Structure

### 3.3.5 APO\_Scalar

This table contains ratios used to bridge the gap between Data Base Products and BTS data for the OEP 35 airports. This table is updated with every forecast run.

**Table 15: APO\_Scalar**

SetID*/**	Integer	Primary key – Foreign key to APO_Scalar_Sets
DateID*/**	Integer	Primary key – Foreign key to APO_Dates
AirportID*/**	Integer	Primary key – Foreign key to APO_Airport
GrowthRate	Float	Growth rate
ForecastID	Integer	Forecast ID

### 3.3.6 vw\_APO\_GIOrigin

This table is used to associate Global Insight economic data with APO\_Airports LOC IDs.

**Table 16: vw\_APO\_GIOrigin**

Dateid	Integer	Date ID – source APO_Dates
Airportid	Integer	Airport ID – source APO_Airports
Variableid	Integer	Variable ID – source GIDataVariables
Value	Numeric(38,4)	Economic data value

### 3.3.7 APO\_MarketSumm\_GIData

This table is used to associate Global Insight economic data with APO\_LocationPairs.

**Table 17: APO\_MarketSumm\_GIData**

DateID*/**	Integer	Primary key – Foreign key to APO_Dates
LocationPairID*/**	Integer	Primary key – Foreign key APO_LocationPairs
VariableID*/**	Integer	Primary key – Foreign key to GIDataVariables
OriginValue	Float	Origin value from Global Insight data
DestValue	Float	Destination value from Global Insight data



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## 3.3.8 APO\_Forecast\_WeightedAvg

This table contains coefficients for the log-log-linear specification.

**Table 18: APO\_Forecast\_WeightedAvg**

SetID*/**	Integer	Primary key – Foreign key to APO_Forecast_WeightedAvg_Sets
Quarter*	Integer	Primary key – quarter
SumPaxStart*	Integer	Lower limit for market size
SumPaxEnd	Integer	Upper limit for market size
Intercept	Float	Intercept
FareElasticity	Float	Fare elasticity
RouteFreqElasticity	Float	Route frequency elasticity
DistanceElasticity	Float	Distance elasticity
OriginIncomeElasticity	Float	Origin income elasticity
DestIncomeElasticity	Float	Destination income elasticity
ForecastID	Integer	Forecast ID



# TAF-M: Database Structure

## 3.4 Lookup Tables

### 3.4.1 APO\_Dates

This is a dynamic table that contains historical and forecast dates from 1984 through the dates provided by Global Insight data. Every Global Insight load adds another year (end date) to this table.

**Table 19: APO\_Dates**

ID*	Integer	Primary key (auto number)
Year	Integer	Year
Qtr	Integer	Quarter
NoDays	Integer	Number of days in quarter
FiscalYear	Integer	Fiscal year

### 3.4.2 APO\_FIPSCodes

This is a lookup table for FIPS codes provided by Global Insight. The table is updated with every forecast run.

**Table 20: APO\_FIPSCodes**

ID*	Integer	Primary key
Code	Varchar(6)	FIPS Codes
Imported From	Char(3)	Imported from

### 3.4.3 APO\_Airports

This is the airports master table and contains all NPIAS and T-100 airports.

**Table 21: APO\_Airports**

ID*	Integer	Primary key
LOCID	Character (3)	FAA LOCID
REGION	Varchar (4)	Region
APOINT_NAME	Varchar(100)	Airport name
CITY	Varchar(100)	Airport city
STATE	Varchar(2)	State
Longitude	Numeric (16,6)	Longitude
Latitude	Numeric (16,6)	Latitude
FIPSCoDeID**	Integer	Foreign key (FIPSCoDe from Global Insight)
FACILITY_TYPE	Integer	Facility type – indicator from



# TAF-M: Database Structure

		OPSNET
FACILITY_LEVEL	Integer	Facility level – indicator from OPSNET
OEP35	Small Integer	Indicator if the OEP35 classification
FIPSCoID_Orig	Integer	Origin FIPS Code ID
DisplayOrder	Integer	Field used for web reports
Corridor	Varchar(30)	Corridor
CountryID	Integer	Country
WAC	Integer	World Area Code Group
TAFL_Locid	Varchar(10)	TAF LOC ID equivalent

### 3.4.4 GIDataVariables

This is a lookup table for Global Insight economic variables.

**Table 22: GIDataVariables**

ID*	Integer	Primary key
Name	nChar(10)	Economic attribute name
Description	Varchar(50)	Attribute description

### 3.4.5 GI\_AreaCodes

This is a lookup table for area codes from Global Insight. The table is updated with every forecast run.

**Table 23: GI\_AreaCodes**

ID*	Integer	Primary key
Value	Varchar(5)	Area codes



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## 3.5 Import and Update History Tables

### 3.5.1 GI\_DataSets

This table contains historical information on GI Data file imports.

**Table 24: GI\_DataSets**

ID*	Integer	Primary key
ImportDate	DateTime	GI data file import date
Description	Varchar(256)	Description of the imported file
FileName	Varchar(256)	GI data file name
FilePath	Varchar(512)	GI data file path

### 3.5.2 APO\_Scalar\_Sets

This table contains historical information on Scalar data file imports. The scalar data file is an Excel file provided by Dipasis Bhadra for each forecast run.

**Table 25: APO\_Scalar\_Sets**

ID*	Integer	Primary key
ImportDate	DateTime	Scalar data file import date
Description	Varchar(256)	Description of the imported file
FileName	Varchar(256)	Scalar data file name
FilePath	Varchar(512)	Scalar data file path

### 3.5.3 APO\_Forecast\_WeightedAvg\_Sets

This table contains historical information on the Weighted Average file imports. The Weighted Average file is provided by Dipasis Bhadra based on the econometric modeling for each forecast run.

**Table 26: APO\_Forecast\_WeightedAvg\_Sets**

ID*	Integer	Primary key
ImportDate	DateTime	Scalar data file import date
Description	Varchar(256)	Description of the imported file
FileName	Varchar(256)	Scalar data file name
FilePath	Varchar(512)	Scalar data file path



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## 3.6 Temporary Tables

The tables listed in this section are temporary and intermediate tables created to facilitate summarizing data and calculating the forecast. All the tables listed are created and then dropped when the stored procedure execution is complete.

### 3.6.1 APO\_Market\_Tmp

This table is produced as a result of merging data from APO\_Dates, APO\_Airports, GIDataVariables, APO\_LocationPairs tables, and vw\_APO\_GIOrigin view. A single record is created per year, quarter, origin, and destination.

**Table 27: APO\_Market\_Tmp**

Year	Integer	Year
Qtr	Integer	Quarter
Origin	Varchar(4)	Origin
Dest	Varchar(4)	Destination
Dateid*	Integer	Primary key component
Locationpairid*	Integer	Primary key component
Variableid*	Integer	Primary key component
Name	Varchar(10)	Global Insight variable name
Origin_val	Numeric(18,3)	Global Insight origin value
Dest_val	Numeric(18,3)	Global Insight destination value
Distance	Integer	Distance between O&D
ItnMiles	Numeric(18,3)	Itinerary miles between O&D
YieldPerCPM	Numeric(18,3)	$(O\&D\ Revenue / (pax * miles)) * 100$
AvgCOUP	Numeric(18,3)	Average coupon O&D
AvgMktFare	Numeric(18,3)	Average market fare O&D
NoOfRoutes	Integer	Number of routes between O&D
SumPassengers	Integer	Historical and forecast passenger count



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### 3.6.2 APO\_Market\_Details\_Tmp

This table is a result of merging data from APO\_Dates, APO\_Airports, APO\_LocationPairs, and APO\_Market\_Forecast tables. A single record per year, quarter, origin, and destination is created.

**Table 28: APO\_Market\_Details\_Tmp**

Year	Integer	Year
Qtr	Integer	Quarter
Origin	Varchar(4)	Origin
Dest	Varchar(4)	Destination
sumODPax	Integer	Sum of historical and forecast passengers between O&D

### 3.6.3 APO\_Segment\_Market\_tmp

This table is a result of merging data from APO\_Dates, APO\_Airports, APO\_LocationPairs, and APO\_Market\_Forecast tables. A single record is created by Airport Group for coupon information.

**Table 29: OAIP\_DB1BCoupon.**

Itnid	Big integer	Itinerary ID
MktId	Big integer	Market ID
Year	Integer	Year
Qtr	Integer	Quarter
SeqNum	Integer	Sequence number – obtained from BTS
Origin	Varchar(4)	Origin
Dest	Varchar(4)	Destination
Segment_origin	Varchar(4)	Segment origin
Segment_dest	Varchar(4)	Segment destination
AirportGroup	Varchar(100)	Airport group
SegmentPax	Integer	Number of segment passengers
SumCouponPax	Integer	Number of coupon passengers



# TAF-M: Database Structure

### 3.6.4 APO\_Segment\_Cnts\_tmp

This table contains Segment Market data summarized at a market and itinerary ID level.

**Table 30: OAIP\_DB1BCoupon.**

ItinID	Big integer	Itinerary ID
MktId	Big integer	Market ID
mktCoupons	Integer	Coupons

### 3.6.5 APO\_Segment\_Market\_tmp\_1

This table contains additional market coupon count by itinerary and market ID.

**Table 31: OAIP\_DB1BCoupon\_tmp, APO\_M\_tmp\_1**

ItinID	Big integer	Itinerary ID
MktId	Big integer	Market ID
Year	Integer	Year
Quarter	Integer	Quarter
seqNum	Integer	Sequence number – obtained from BTS
Origin	Varchar(4)	Origin
Dest	Varchar(4)	Destination
Segment_origin	Varchar(4)	Segment origin
Segment_dest	Varchar(4)	Segment destination
airportGroup	Varchar(100)	Airport group
segmentPax	Integer	Number of segment passengers
sumCouponPax	Integer	Number of coupon passengers
mktCoupons	Integer	Number market coupons





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## 3.6.6 APO\_Segment\_Market\_Ratio\_tmp

This table contains market ratio information, obtained by dividing coupon Pax by O&D Pax.

**Table 32: APO\_Segment\_Market\_tmp\_1, APO\_Market\_Details\_tmp**

ItinID	Big integer	Itinerary ID
MktId	Big integer	Market ID
Year	Integer	Year
Quarter	Integer	Quarter
seqNum	Integer	Sequence number – obtained from BTS
Origin	Varchar(4)	Origin
Dest	Varchar(4)	Destination
Segment_origin	Varchar(4)	Segment origin
Segment_dest	Varchar(4)	Segment destination
airportGroup	Varchar(100)	Airport group
segmentPax	Integer	Number of segment passengers
sumCouponPax	Integer	Number of coupon passengers
sumODPax	Integer	Number of O&D passengers
mktCoupons	Integer	Number market coupons
ratio	Numeric(11,6)	Coupon Pax / O&D Pax



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## 3.6.7 OAIP\_DB1BCoupon\_tmp

This table contains a single record by itinerary, market, sequence number, year, quarter, origin, and destination from OAIP\_DB1BCoupon.

**Table 33: OAIP\_DB1BCoupon**

ItinID	Big integer	Itinerary ID
MktId	Big integer	Market ID
SeqNum	Integer	Sequence number
Coupons	Tiny integer	Coupons
Year	Small integer	Year
Quarter	Tiny integer	Quarter
Origin	Varchar(4)	Origin
OriginAptInd	Integer	Origin airport indicator
OriginCityNum	Integer	Origin city number
OriginCountry	Varchar(2)	Origin country
OriginStateFips	Varchar(2)	Origin state FIPS code
OriginState	Varchar(2)	Origin state
OriginStateName	Varchar(50)	Origin state name
OriginWac	Small integer	Origin world area code group
Dest	Varchar(4)	Destination
DestAptInd	Integer	Destination airport indicator
DestCityNum	Integer	Destination city number
DestCountry	Varchar(2)	Destination country
DestStateFips	Varchar(2)	Destination state FIPS code
DestState	Varchar(2)	Destination state
DestStateName	Varchar(50)	Destination state name
DestWac	Small integer	Destination world area code group
Break_	Varchar(1)	Trip break code
CouponType	Varchar(1)	Coupon type
TkCarrier	Varchar(3)	Ticketing carrier
OpCarrier	Varchar(3)	Operating carrier
RPCarrier	Varchar(3)	Reporting carrier
Passengers	Numeric(12,2)	Number passengers
FareClass	Varchar(1)	Fare class
Distance	Numeric(12,2)	Distance
DistanceGroup	Small integer	Distance group



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Gateway	Tiny integer	Gateway indicator
ItinGeoType	Tiny integer	Itinerary geography type
CouponGeoType	Tiny integer	Coupon geography type

### 3.6.8 APO\_M\_tmp\_1

Coupon (OAIP\_DB1BCoupon) and Market (OAIP\_DB1BMarket) data is merged by itinerary and airport group in this table.

**Table 34: OAIP\_DB1BCoupon and OAIP\_DB1BMarket**

Year	Integer	Year
Quarter	Integer	Quarter
Origin	Varchar(4)	Origin
Dest	Varchar(4)	Destination
airportGroup	Varchar(100)	Airport group
sumCouponPax	Integer	Total coupon passengers



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### 3.6.9 APO\_T100SegmentInternal

A single T-100 record is created using AEE Aircraft Class Assignment.

**Table 35: OAIP\_T100DSegmentUSCarrierOnly**

ForecastID	Integer	Forecast ID
Year	Integer	Year
Quarter	Integer	Quarter
Origin	Varchar(3)	Origin
Dest	Varchar(3)	Destination
AircraftType	Varchar(3)	Aircraft type
DepPerformed	Integer	Performed departure
Seats	Integer	Total seats
sumPassengers	Integer	Total passengers
RampTime	Decimal(12,2)	Ram time
airtime	Decimal(8,2)	Air time
avgSeatsPerDeps	Decimal(12,2)	Average seats per departure
avgLoadFactor	Decimal(12,2)	Average load factor
aeSeatClass	Integer	AEE seat class
sumODSeats	Integer	Total O&D seats
sumT100PaxByOD	Integer	Total T-100 passengers by O&D

### 3.6.10 APO\_T100SegmentForecast\_tmp

Coupon data is summarized by year, quarter, origin, and destination in this table.

**Table 36: APO\_Segment\_Forecast**

Year	Integer	Year
Qtr	Integer	Quarter
Segment_origin	Varchar(4)	Segment origin
Segment_dest	Varchar(4)	Segment destination
SegmentPax	Integer	Segment passenger



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## 3.6.11 APO\_T100SegmentUSCarrier\_Forecast\_tmp

This table contains both historical and forecast T100 data. Most calculations are run against the data in this table.

**Table 37: APO\_SegmentForecast\_tmp, APO\_T100SegmentInternal\_tmp**

Year	Integer	Year
Quarter	Integer	Quarter
Origin	Varchar(3)	Origin
Dest	Varchar(3)	Destination
AircraftType	Varchar(3)	Aircraft type
DepPerformed	Numeric(13,3)	Performed departure
Seats	Numeric(13,3)	Total seats
sumPassengers	Numeric(13,3)	Total passengers
RampTime	Numeric(13,3)	Ramp time
airtime	Numeric(13,3)	Air time
avgSeatsPerDeps	Numeric(13,3)	Average seats per departure
avgLoadFactor	Numeric(13,3)	Average load factor
aeSeatClass	Numeric(13,3)	AEE seat class
sumODSeats	Numeric(13,3)	Total O&D seats
sumT100PaxByOD	Numeric(13,3)	Total T100 passengers by O&D
seatsRatio	Numeric(13,3)	
segmentPax	Numeric(13,3)	Total segment passengers
scalarFactor	Numeric(13,3)	Scalar factor
scaledSegmentPax	Numeric(13,3)	Scaled segment passengers
avgLoadFactor_totalT100PaxSeats	Numeric(13,3)	Average load factor T100
extraPax	Numeric(13,3)	Extra passengers
extraSeats	Numeric(13,3)	Extra seats



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## 3.7 Forecast Tables

### 3.7.1 APO\_Market\_Forecast

This table contains historical O&D summary data and O&D forecast data. The actual and forecasted values of historical passenger count are used for the O&D forecast.

**Table 38: APO\_Market\_Forecast**

ForecastID*	Integer	Primary key component
DateID*	Integer	Primary key component
LocationPairID*	Integer	Primary key component
SumPassengers	Integer	Historical and forecast passenger count
ItnMiles	Float	Miles between origin and destination
NoOfRoutes	Integer	Number of routes between origin and destination
YieldPerCPM	Float	$(\text{O\&D Revenue}/(\text{pax}*\text{miles}))*100$
AvgCOUP	Float	Average coupon O&D
AvgMktFare	Float	Average market fare O&D
FicalYear	Integer	Fiscal year

### 3.7.2 APO\_Segment\_Forecast

This table contains historical and forecast data for route choice.

**Table 39: APO\_Segment\_Forecast**

Forecastid	Integer	Forecast ID
Year	Integer	Year
Qtr	Integer	Quarter
Origin	Varchar(4)	Origin
Dest	Varchar(4)	Destination
Segment_origin	Varchar(4)	Segment Origin
Segment_dest	Varchar(4)	Segment Destination
airportGroup	Varchar(100)	Airport Group
segmentPax	Integer	Number segment passengers
sumCouponPax	Integer	Number coupon passengers
sumODPax	Integer	Sum of passenger by O&D
Ratio	Numeric(11,6)	Coupon passengers / O&D passengers



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## 3.7.3 APO\_T100SegmentUSCarrier\_Forecast

This table contains historical and forecast data for aircraft choice.

**Table 40: APO\_T100SegmentUSCarrier\_Forecast**

ForecastID*	Integer	Forecast ID
Year	Integer	Year
Quarter	Integer	Quarter
Origin	Varchar (3)	Origin
Dest	Varchar (3)	Destination
AircraftType	Varchar (3)	Aircraft type
DepPerformed	Numeric (13,3)	Departure performed
Seats	Numeric (13,3)	Number of seats
forecastT100Pax	Numeric (13,3)	Number of passengers (historical or forecast – based on the year)
RampTime	Numeric (13,3)	Aircraft ramp time
airtime	Numeric (13,3)	Aircraft air time
avgSeatsPerDep	Numeric (13,3)	Average seats per departure performed
avgLoadFactor	Numeric (13,3)	Average load factor
aeeSeatClass	Numeric (13,3)	AEE seat classification
sumODSeats	Numeric (13,3)	Total O&D seats
seatsRatio	Numeric (13,3)	Seats / O&D seats
segmentPax	Numeric (13,3)	Segment passengers
sumODDeps	Numeric (13,3)	Total O&D departures
scaledSegmentPax	Numeric (13,3)	Scaled segment passengers