



# Digital TMI

Creation, Storage, Retrieval, and Transmission of TMI  
Data

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ATCSCC Visitors  
June 27, 2012

- Traffic demo

# Project Overview

- *The goal of Digital TMI is to offer specific and reasonable suggestions for improvements to the creation, storage, retrieval, and transmission of Traffic Management Initiative data, which may facilitate day-of-operations decisions and historical analysis.*
- *The TMI Cube will offer a unified view of TMIs for all stakeholders. This will include historical, current, and near-future TMIs. The TMI Cube will be accessed through the FAA's NAS Common Reference.*
- Started August 2011, currently funded through August 2013 by Rich Jehlen's group

# Traffic Management Data

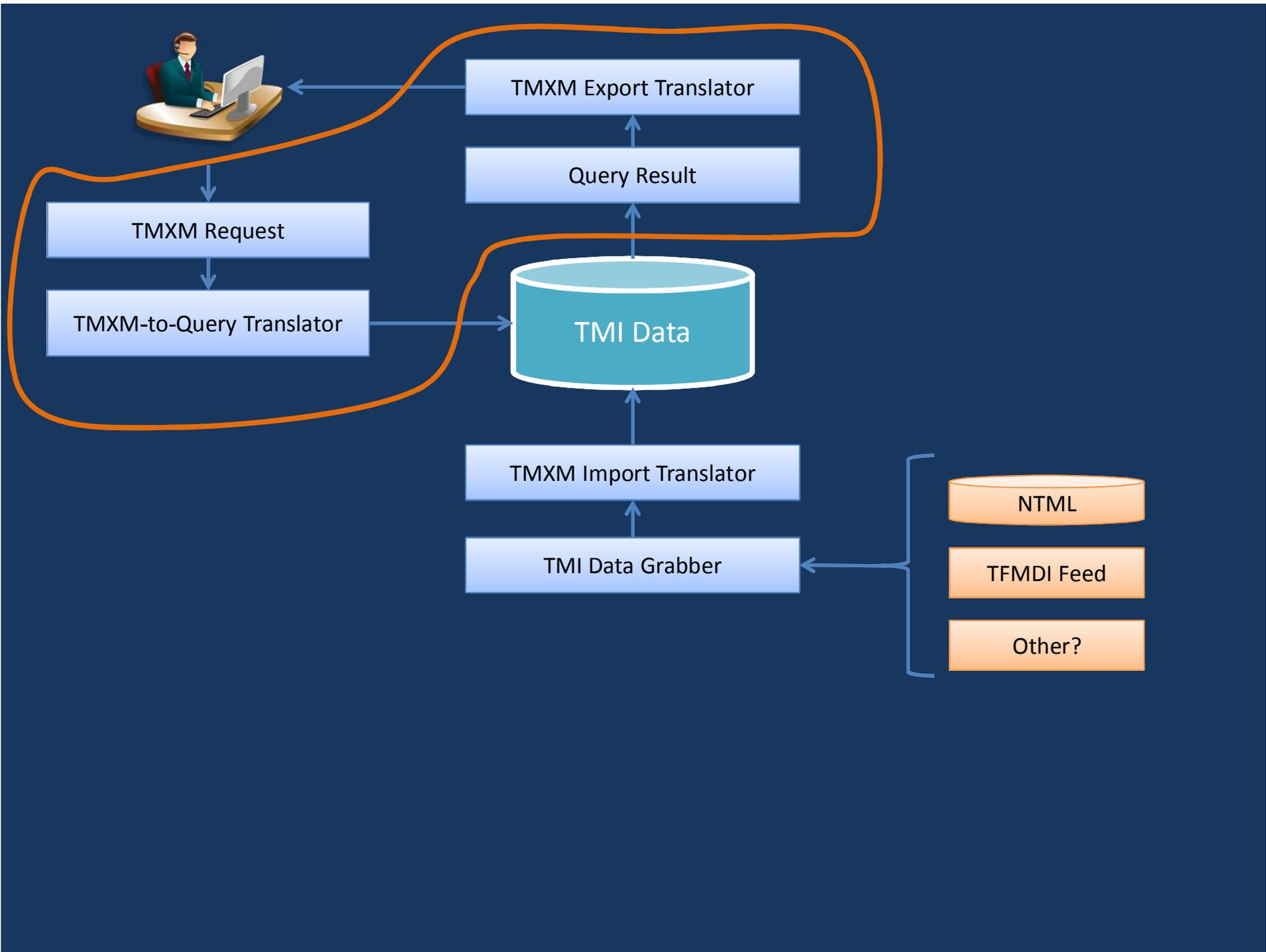
- The National Traffic Management Log (NTML) and Traffic Flow Management Data to Industry (TFMDI) are two primary sources
- Currently, Traffic Management Initiative (TMI) data is generated, stored, and retrieved (mostly) to aid day-of-operations
- TMI data serve their intended purposes well
- Future sources? FPS?

# Downside

- The major drawback to the current state of data in the NAS is the difficulty of historical analysis
- Examples
  - Non-trivial to extract meaningful relationships between the data within the NTML
  - Archive of TFMDI data not readily available and is stored only as a set of individual XML files
- Secondary drawback is the data living in (and accessed from) different systems

# Fundamental, 'Hard' TMI Questions

- What are all the current TMIs affecting flights from ZOA to ZNY? To ATL?
- Given a choice between 3 routes, which one is least likely (based on history) to receive multiple TMIs?
- On May 3<sup>rd</sup>, 2011, how did the day's TMI plan evolve? How many changes to the plan were required?



TMXM Export Translator

Query Result

TMXM Request

TMXM-to-Query Translator

TMI Data

TMXM Import Translator

TMI Data Grabber

NTML

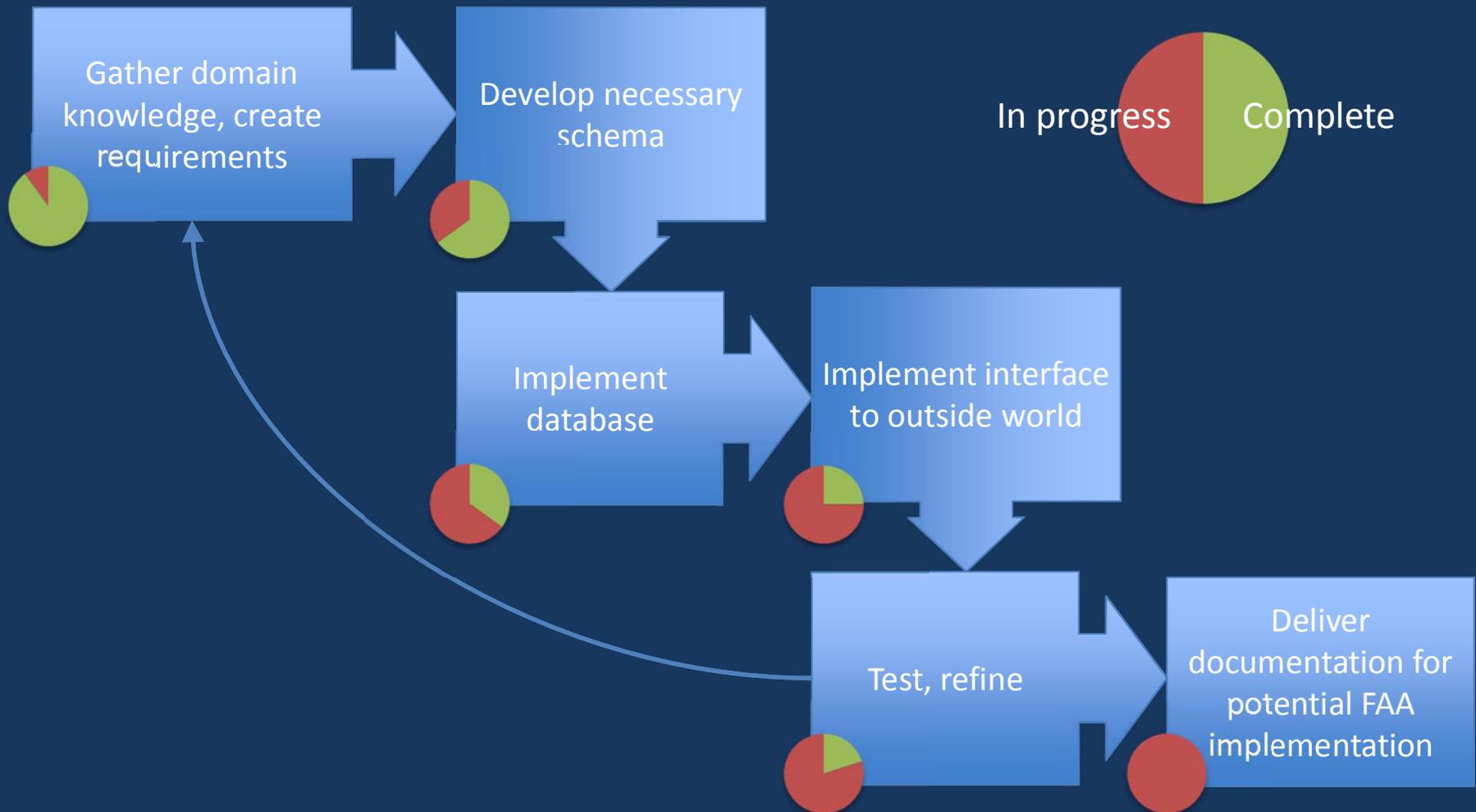
TFMDI Feed

Other?

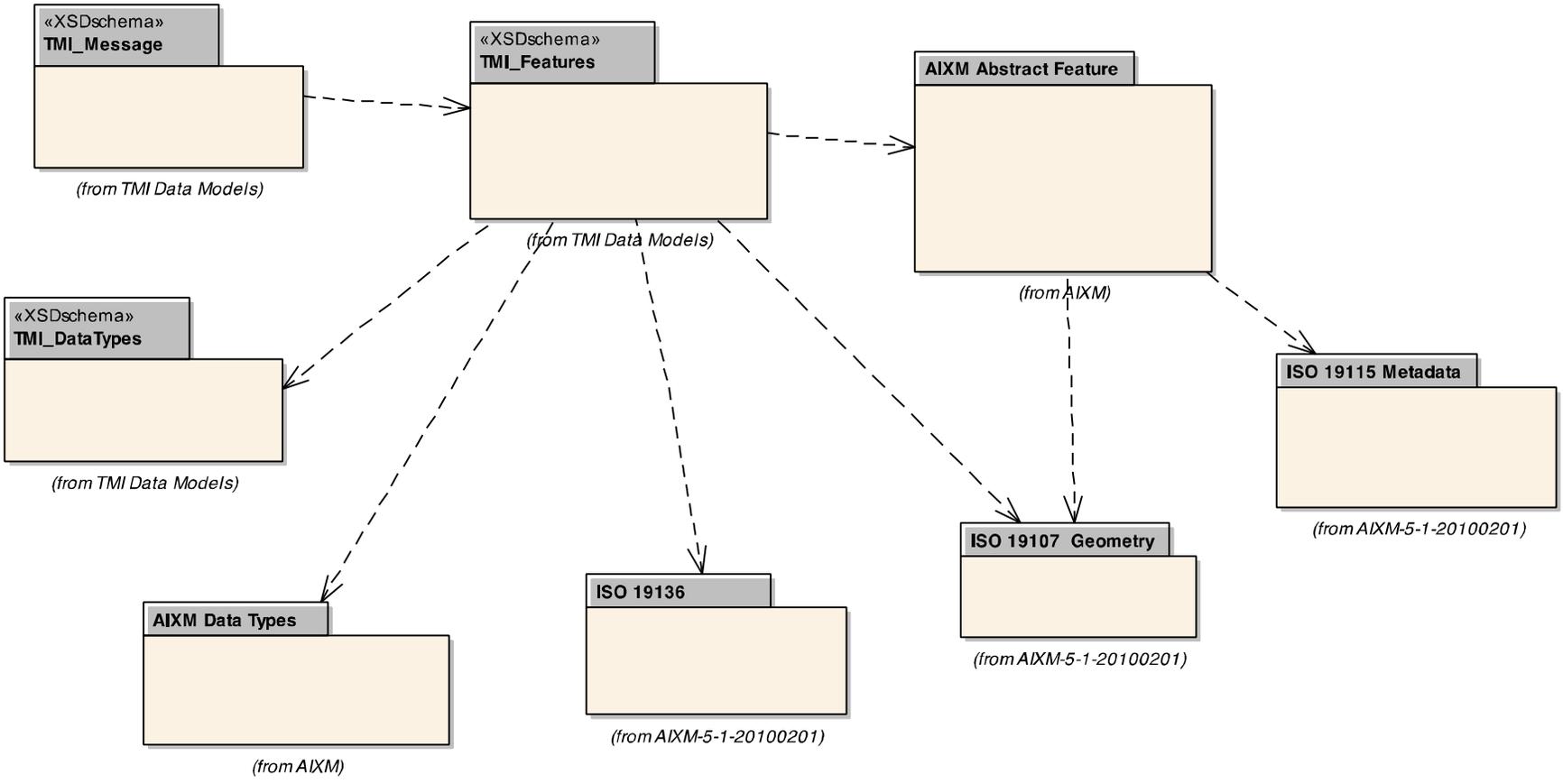
# Approach

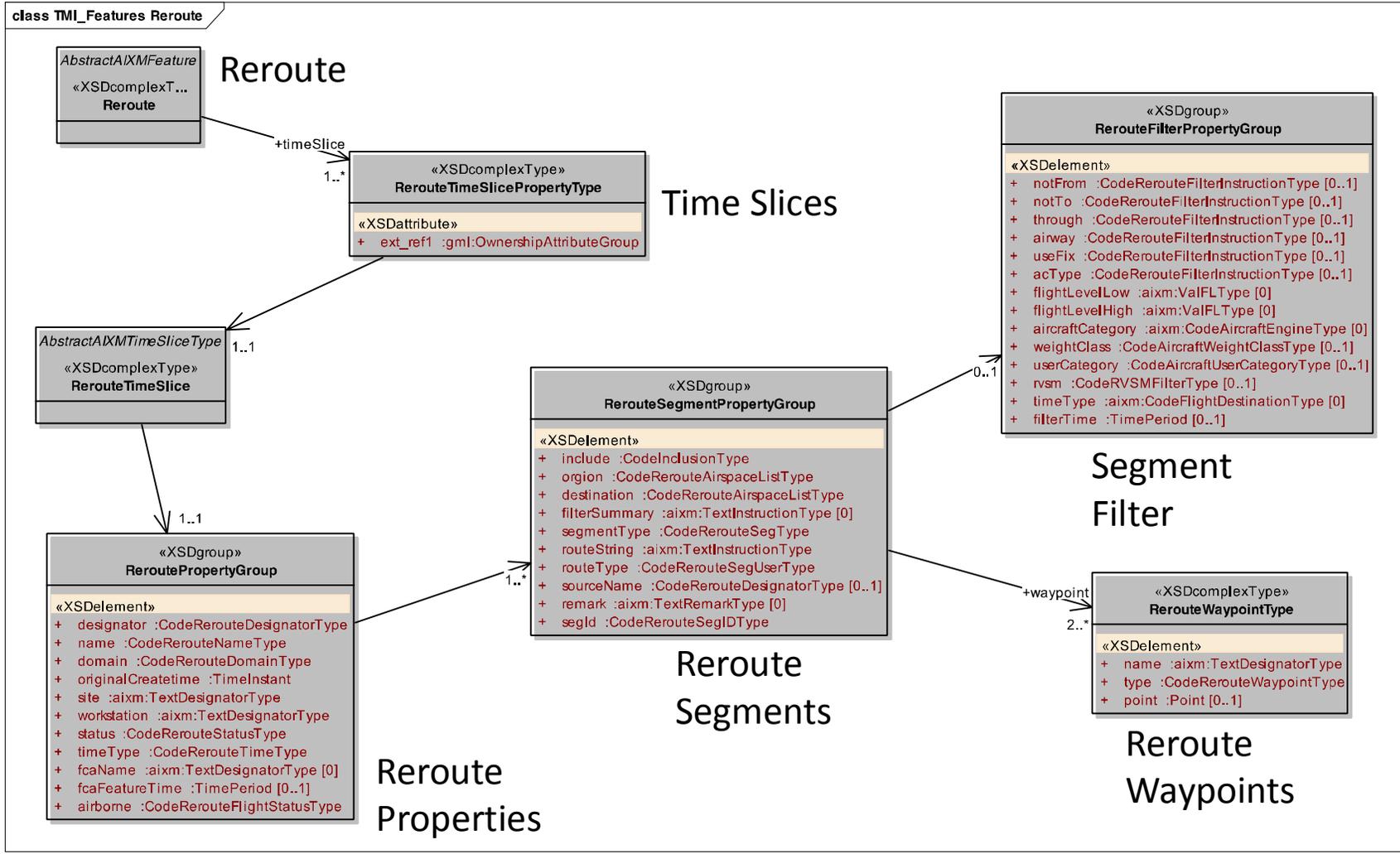
- Create a unified data source for TMIs that is suitable for analysis and for 'day-of' operations
- Leverage existing/developing models and architectures
  - AIXM, GML, etc.
  - SWIM

# Development Plan and Progress



pkg Package view





# Reroute Advisory from NTML

- Reroutes only occur in the 'Advisories' table of NTML
- Few columns:
  - Times
  - Cause
  - Text blob (example )
- Difficult to parse, error-prone

ATCSCC ADVZY 011 DCC 07/06/10 FCA RQD  
NAME: FCABKW:NO\_BKW\_2\_EWR  
CONSTRAINED AREA: ZDC  
REASON: VOLUME

INCLUDE TRAFFIC: ZFW/ZHU/ZME DEPARTURES TO EWR  
FACILITIES INCLUDED: ZFW/ZHU/ZME  
FLIGHT STATUS: ALL\_FLIGHTS  
VALID: FCA ENTRY TIME FROM 061800 TO 062230  
PROBABILITY OF EXTENSION: LOW

REMARKS: SEE DYNAMIC LIST FOR UPDATES.

ASSOCIATED RESTRICTIONS: VIA NTML.

MODIFICATIONS: RQD TO EWR ONLY TODAY.

#### ROUTES:

ORIG	DEST	ROUTE
----	----	-----
ZME	ZFW(-BNA -MEM)	EWR MEM J29 DORET J584 FQM FQM1
ZME	ZFW(-BNA -MEM)	EWR VUZ J14 SPA J14 CREWE J51
		FAK PHLBO2
ZHU	EWR	HRV J37 SPA J14 CREWE J51
		FAK PHLBO2
ZHU	EWR	MEM J29 DORET J584 FQM FQM1

061135-062230

10/07/06 11:35 FSB.//lxstn08a 703-925-5308

# Traffic Flow Management Data to Industry

- TFMDI is available similarly to ASDI
- XML-formatted reroute, FCA, and FEA data
- “Publish-Subscribe” system
  - New reroute is issued
  - Encoded in TFMDI XML format and saved
  - “Announced” to all clients that it is downloadable
- Example...

# Translating TFM DI to TMXM

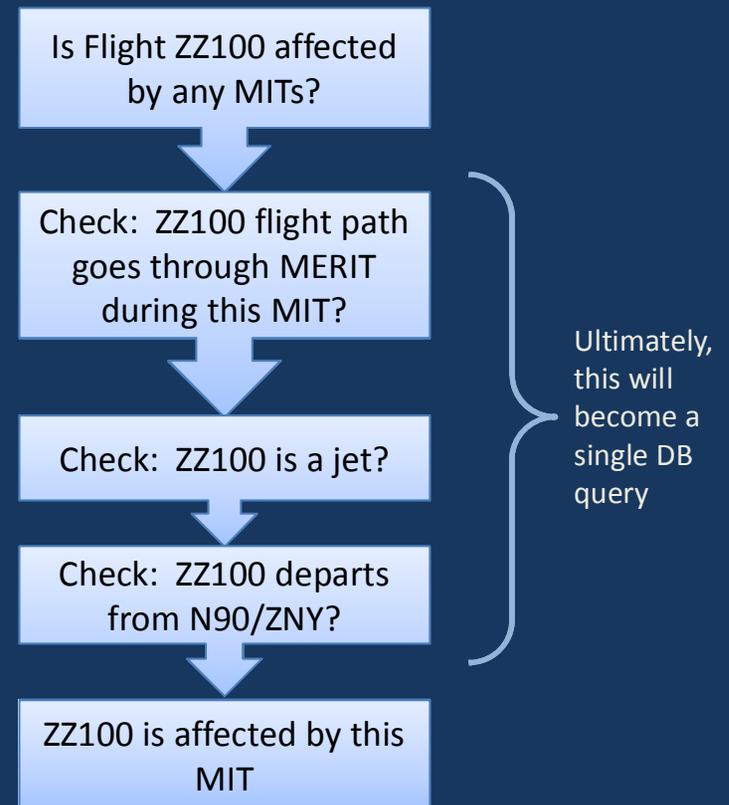
- Since both formats are well-structured, translation is not difficult
- Example...

# MIT Data

- MIT sourced from NTML
- Important columns from RSTN database table:
  - Frfac
  - Tofac
  - Rstn Type (MIT, ALT, STOP, SPD, etc.)
  - Start/Stop Times
  - Rstntype (Departures, Arrivals, Enroute)
  - Airports (Arrival, Departure)
  - NAS Element (Usually a fix/waypoint?)
  - Various parameters (MIT value, ALT type, Spd, etc.)
- Not yet implemented in Digital TMI system

# MIT Example

Frfac	ZBW	Arr Airport	0
Tofac	N90	Nas Element	MERIT
Entryid	132493495	Impact Element	
Rstnid	2920474	Reason Txt	VOL:Volume
Rstnsource	DYN	Mitnum	278529
Passback	N	Mitval	15
Appevtime		Alt Type	0
Acft Type	JETS	Alt	-
Provider List	N90	Spd Type	0
Rstn Start		Spd	-
Rstn Stop		Qualifier	AS ONE
Stopflag	1	Oldendtime	0
Rstntype Text	Departures	Modid	0
Airport	N90/ZNY	Remarks	0
Dep Airport	N90/ZNY	SwxRerte	N



# Playbook Reroute Data

**Playbook**  
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Regional Routes  
 West to East Transcon R

## CAN 1 WEST

Flow: XXXXXX  
ZBW/ZNY/CZY/ZMP

**ORIGIN**

ZBW
EWR JFK LGA TEB

**FILTERS**


```

<TABLE BORDER=1>
<TR><TD VALIGN=TOP WIDTH=180<P><FONT FACE=Times New Roman>ORIGIN</FONT></P></TD><TD VALIGN=TOP WIDTH=160<P><FONT FACE=Times New Roman>FILTERS</FONT></P></TD><TD VALIGN=TOP WIDTH=500<P><FONT FACE=Times New Roman>ROUTE</FONT></P></TD><TD VALIGN=TOP WIDTH=300<P><FONT FACE=Times New Roman>REMARKS</FONT></P></TD></TR><TR><TD VALIGN=TOP WIDTH=180<P><FONT FACE=Times New Roman>ZBW</P></TD><TD VALIGN=TOP WIDTH=160<P><FONT FACE=Times New Roman></P></TD><TD VALIGN=TOP WIDTH=500<P><FONT FACE=Times New Roman>CAN TULEG SIBKI PENDO VIXIS JAKEY JUVAG CESNA</P></TD><TD VALIGN=TOP WIDTH=300<P><FONT FACE=Times New Roman></P></TD></TR><TR><TD VALIGN=TOP WIDTH=180<P><FONT FACE=Times New Roman>EWR JFK LGA TEB</P></TD><TD VALIGN=TOP WIDTH=160<P><FONT FACE=Times New Roman></P></TD><TD VALIGN=TOP WIDTH=500<P><FONT FACE=Times New Roman>CAN TULEG SIBKI PENDO VIXIS JAKEY JUVAG CESNA</P></TD><TD VALIGN=TOP WIDTH=300<P><FONT FACE=Times New Roman></P></TD></TR></TABLE>
                
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# Data Needs

- Historical TFMDI data
  - We collect all TFMDI data now
  - Only have a number of months in archive
- “Digitized” Playbook Reroute data
  - Only access to playbooks is via website
  - ATCSCC has ‘machine readable’ playbook data
- Scheduled NTML query
  - At least a daily query, but perhaps an hourly?
  - System is in place to do this already, need permissions
- TMA samples
  - Members of FCT noted importance of TMA data
  - Even though TMA data is not centralized, we’d like to examine it