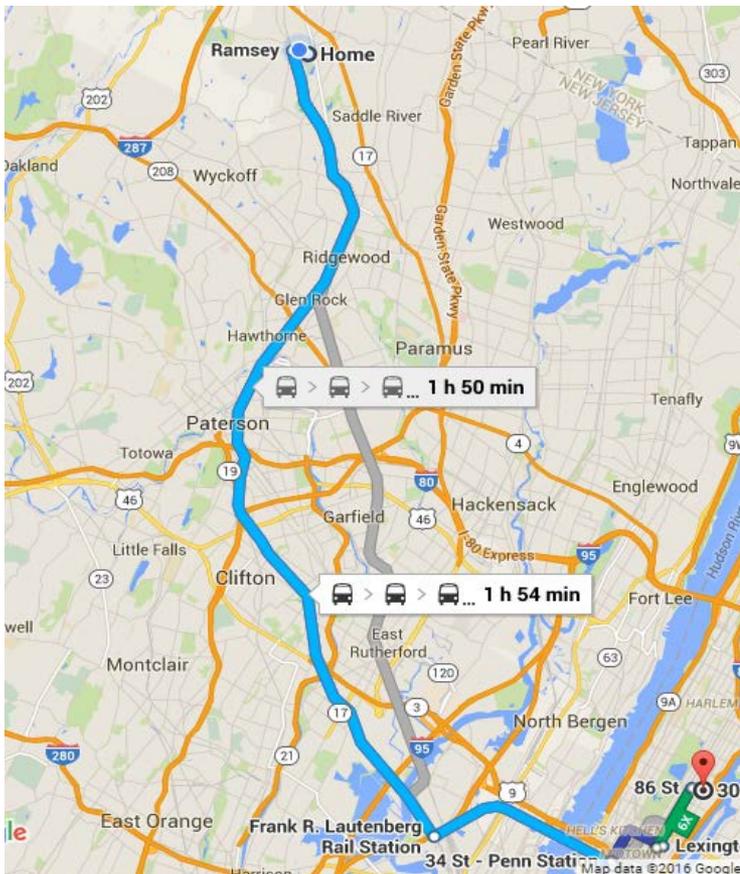# STANDARDS
ITS
TRAINING
TRANSIT

WELCOME

U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology

Module: 14 Part 1

Applying General Transit Feed Specification (GTFS) to Your Agency


```
stop_id,stop_code,stop_name,stop_desc,stop_lat,stop_lon,zone_id
1,95001,"30TH ST. PHL.",,39.956565,-75.182327,5961
2,95002,"ABSECON",,39.424333,-74.502094,333
3,95003,"ALLENDALE",,41.030902,-74.130957,2893
4,95004,"ALLENHURST",,40.237659,-74.006769,54535,95005,"ANDERSON
STREET",,40.894458,-74.043781,1357
6,95006,"ANNANDALE",,40.645173,-74.878569,51978,95008,"ASBURY
PARK",,40.215359,-74.014786,54539,95009,"ATCO",,39.783547,-
74.907588,442910,95010,"ATLANTIC CITY",,39.363299,-74.441486,77
11,95011,"AVENEL",,40.577620,-74.277530,238112,95012,"BASKING
RIDGE",,40.711378,-74.555270,417313,95013,"BAY HEAD",,40.077178,-
74.046183,596514,95014,"BAY STREET",,40.808178,-74.208681,1357
15,95015,"BELMAR",,40.180590,-74.027301,570917,95017,"BERKELEY
HEIGHTS",,40.682345,-74.442649,2893
18,95018,"BERNARDSVILLE",,40.716845,-74.571023,4173
19,95019,"BLOOMFIELD",,40.792709,-74.200043,1101
20,95020,"BOONTON",,40.903378,-74.407736,366121,95021,"BOUND
BROOK",,40.560929,-74.530617,366122,95022,"BRADLEY
BEACH",,40.203751,-74.018891,545323,95023,"BRICK
CHURCH",,40.765134,-74.218612,1101
24,95024,"BRIDGEWATER",,40.559906,-74.551741,3917
25,95025,"BROADWAY",,40.922505,-74.115236,161326,95026,"CAMPBELL
HALL",,41.450917,-74.266554,570927,95027,"CHATHAM",,40.740137,-
74.384812,263728,95028,"CHERRY HILL",,39.928447,-75.041661,5197
```

Instructor

Scott Altman

**Technical Staff
ConSysTec**

Course Co-Developer: Bruce Eisenhart

Learning Objectives

Define the Scope of, Uses for, and Users of the GTFS Specification

Apply the Steps for Translating Your Transit Source Data to GTFS files

Improve GTFS Data Quality

Illustrate how an Agency Implements GTFS

Learning Objective 1

Define the
Scope, **Uses**, and **Users**
of the GTFS specification

What is the Background of GTFS?

A Transit Customer Story

- How would a transit customer unfamiliar with the system navigate?

- Past: route maps and timetables

- Present: transit trip planning applications

Source: Google Maps

What is the Background of GTFS?

A Transit Customer Story

- How would a transit customer unfamiliar with the system navigate?

- Past: route maps and timetables

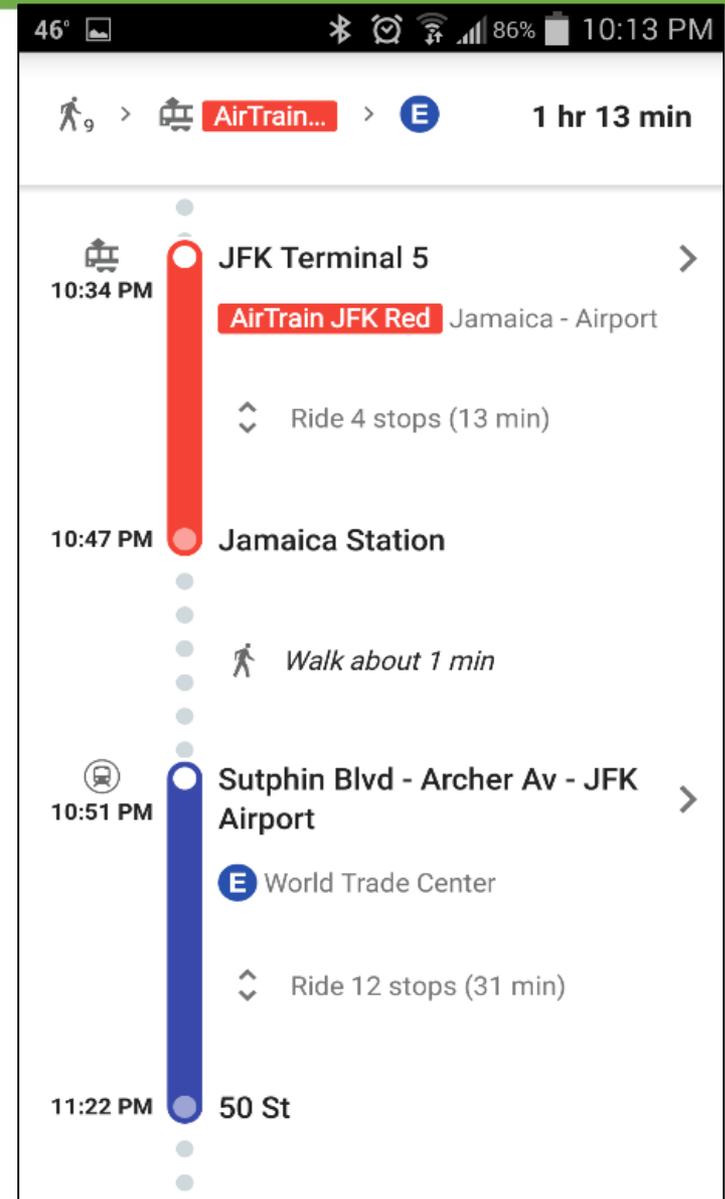- Present: transit trip planning applications

Source: Google Maps

What is the Background of GTFS?

A Transit Customer Story

- How would a transit customer unfamiliar with the system navigate?

- Past: route maps and timetables

- Present: transit trip planning applications

Source: Google Maps

What is the Background of GTFS?

General Transit Feed Specification (GTFS)

- Commonly used **specification** for disseminating static transit data

- Set of **rules describing format** for sharing transit schedule information

- In a transit scheduling context, **static** means recurring, NOT unchanging

- NOT a standard, but treated as a **de facto standard**

What is the Background of GTFS?

History of GTFS

- Started in 2005 by TriMet (Portland, OR) and Google
- Originally **G**oogle **T**ransit **F**eed **S**pecification
- First version released in 2006
- Original purpose: loading into Google Transit Trip Planner
- Multiple agencies included by 2006
- By 2010 hundreds of agencies
- Number of participating agencies now the thousands
- In 2010 became **G**eneral **T**ransit **F**eed **S**pecification

What is the Background of GTFS?

GTFS Coverage

Dark = Countries with GTFS
Light = Countries without GTFS
Source: Google Maps

SUPPLEMENT

What is the Background of GTFS?

GTFS Specification Lifecycle and Updates

- Specification maintained by **Google**
- Structured, but informal process
- Discussion of updates occurs in online discussion forum
- GTFS update process offers **flexibility**
  - Advantages
  - Disadvantages

What is the Background of GTFS?

GTFS Lifecycle and Update
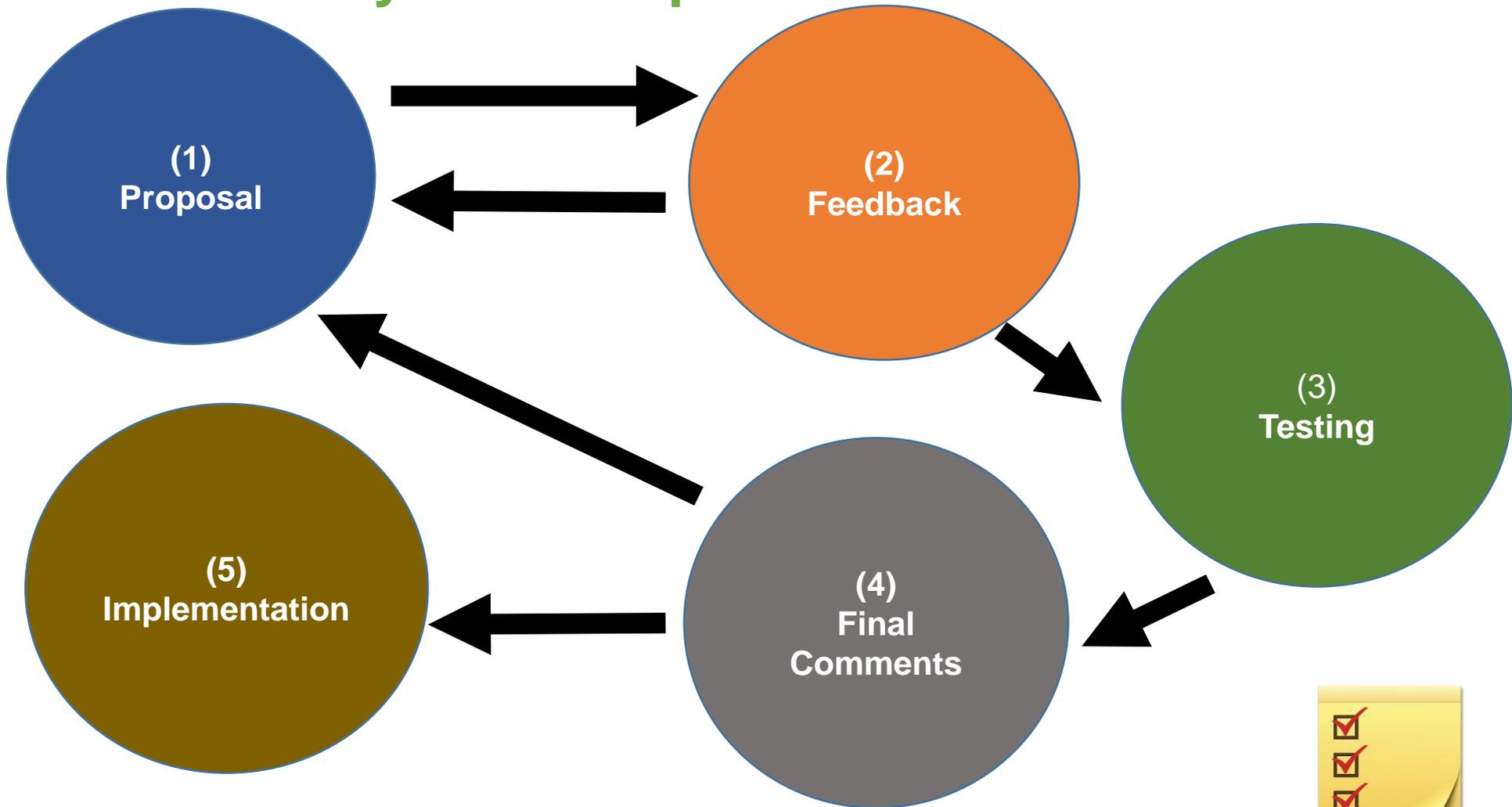
Benefits and Uses of GTFS

Benefits

- Open
- Flexible
- Widely adopted
- Multiple options for implementation
- Enables delivery of schedule/route info to passengers

Benefits and Uses of GTFS

Uses and Applications of GTFS

- Downstream Software Applications Using GTFS
    - Trip planning tools
    - Input to real time information tools
    - Other operations systems (e.g. Computer Aided Dispatch/ Automatic Vehicle Location (CAD/AVL), fare collection)
    - Timetable generator tools
- Transit Planning
    - Input data to service coverage mapping
    - Provides data for service evaluation (service frequency)
    - Service planning (show gaps)

ACTIVITY

STANDARDS ITS TRAINING TRANSIT

U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology

Question

Which of the following choices best describes the process for updates to the GTFS specification?

Answer Choices

a) Formal balloting process by committee

b) Discussion in an online forum

c) Voting by every transit agency

d) There is no process

Review of Answers

a) Formal balloting process by committee

   Incorrect. There is no such committee that exists.

b) Discussion in an online forum.

   Correct! There is an online group where changes to the GTFS-specification are discussed before changes are officially implemented by Google.

c) Voting by every transit agency

   Incorrect. There is no voting process.

d) There is no process

   Incorrect. Despite the informal process, one does exist. If there was no process, changes would never occur.

Learning Objective 2

Apply the Steps for **Translating** Your Transit Source Data to GTFS Files

Inputs Needed for GTFS

What Makes up a GTFS Feed?

Route information

Detailed schedules

Patterns

Agency contact info

GTFS

Stop information

Fare Information

Trip path data

Service calendars
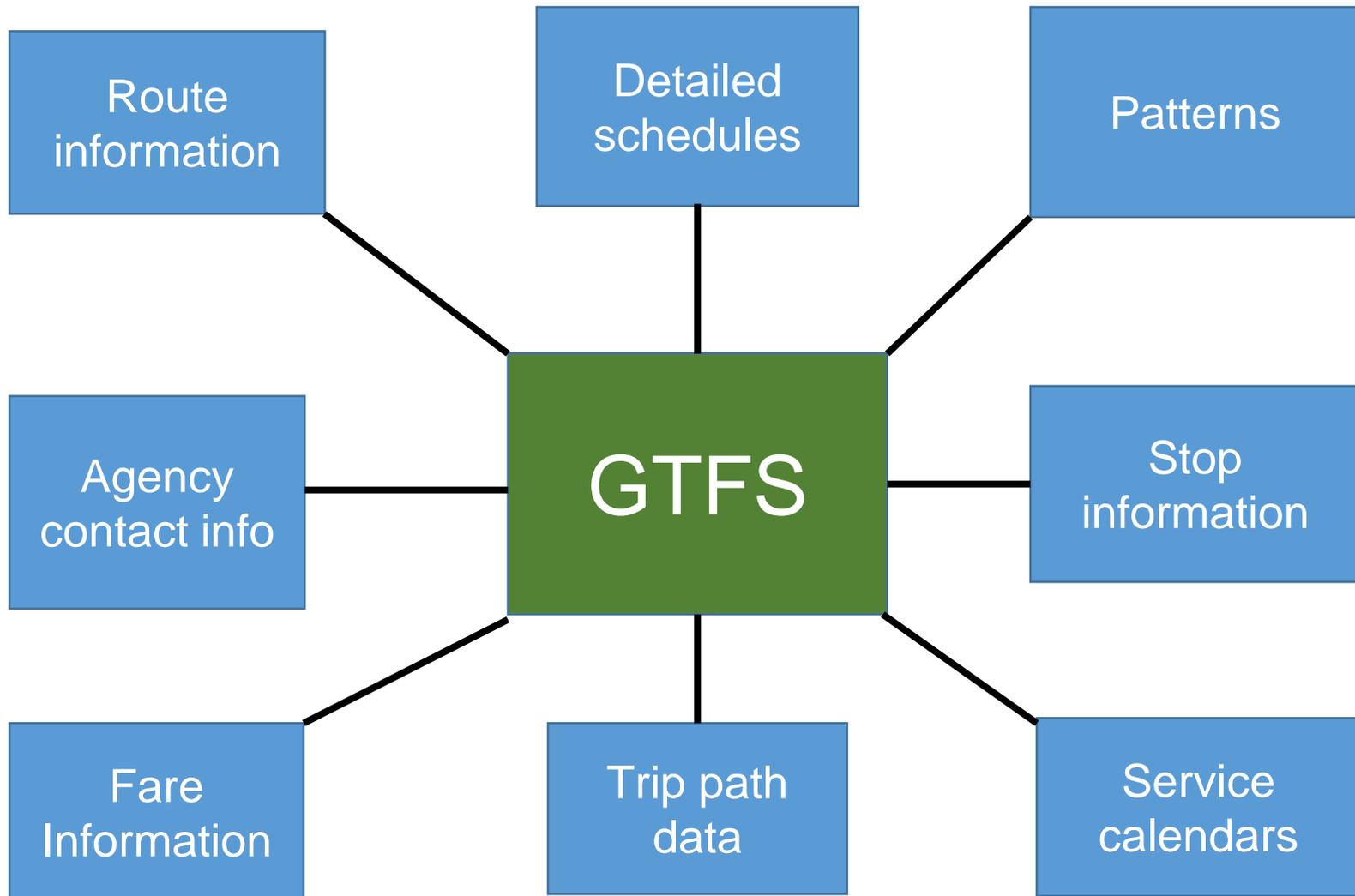
Inputs Needed for GTFS

Transit Data Sources for GTFS

- Characteristics: **Accurate, reliable, and consistent**
- Electronic Sources
  - Scheduling Systems
  - CAD/AVL Systems
- Paper Sources
  - Timetable
  - Stop Lists
- Agency Staff Input
  - Scheduling /Planning/ Operations Staff
  - Data collection staff

GTFS Structure and Files

GTFS Structure

- GTFS feed is a series of zipped text files in CSV form (FictionalGTFS_Spring2016.zip)

- CSV = Comma Separated Values

- Header row shows fields in files

- Subsequent rows for each data entry

- Note that GTFS files saved as ".txt." despite being in the format of ".csv"

header
row

header1,header2,header3,header4,header5
field1,field2,field3,field4,field5
field1,field2,field3,field4,field5

comma
separating
fields

row of
information
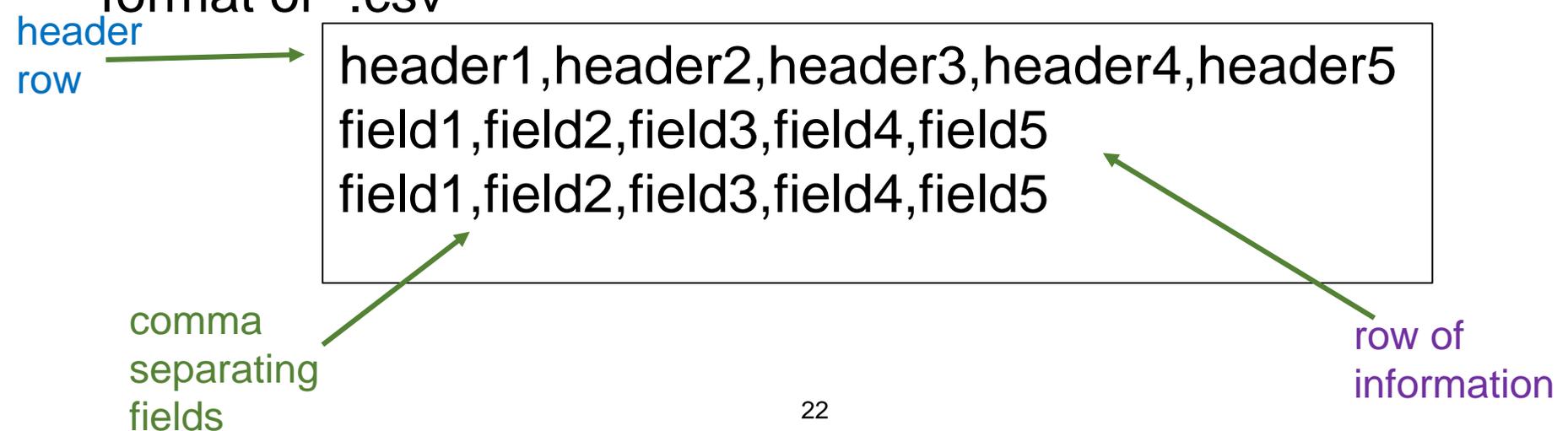
GTFS Structure and Files

GTFS Structure

```
route_id,agency_id,route_short_name,route_long_name,route_desc,route_type
1,,1,Suburbs to Downtown, "Bus service to downtown area of Anytown, USA",3
2,,2,Suburban Local, Local service in suburbs,3
3,,3,Downtown Loop, "Loop service in downtown area of Anytown, USA",3
```

	A	B	C	D	E	F
1	route_id	agency_id	route_short_name	route_long_name	route_desc	route_type
2	1		1	Suburbs to Downtown	Bus service to downtown area of Anytown, USA	3
3	2		2	Suburban Local	Local service in suburbs	3
4	3		3	Downtown Loop	Loop service in downtown area of Anytown, USA	3
5						
6						

EXAMPLE

GTFS Structure and Files

GTFS Structure

- GTFS differs in structure from ITS transit standards
  - No XML or ASN.1 files
- Does not follow request/response pattern, rather downloaded as a zipped file from a fixed web location

Other
Standards

| Dialog |
| Message |
| Data Frame |
| Element |

GTFS

| Feed (.zip) |
| File/Rows (.txt) |
| Field |
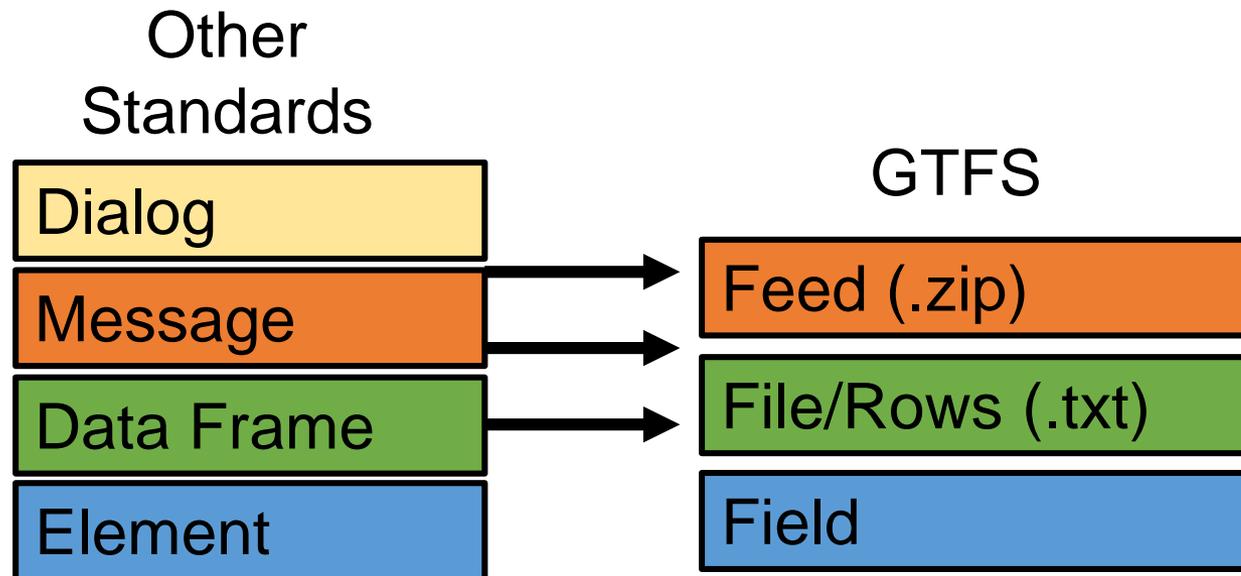
GTFS Structure and Files

GTFS Files

agency.txt	Required
stops.txt	Required
routes.txt	Required
trips.txt	Required
stop_times.txt	Required
calendar.txt	Required (if no calendar_dates.txt)
calendar_dates.txt	Required (if no calendar.txt)
fare_attributes.txt	Optional
fare_rules.txt	Optional
shapes.txt	Optional
frequencies.txt	Optional
transfers/txt	Optional
feed_info.txt	Optional

GTFS Structure and Files

GTFS Data Types

Data Type	Example
String	Grand Central Terminal
Numeric	71.02648 or 5.50
Integer	1
Date (YYYYMMDD)	20160425
Time (24 hour clock- HH:MM:SS)	23:10:00
Enumerated (restricted)	0 or en
URL	http://www.ite.org
Hex Color	#FFFFFF or #000000

GTFS Structure and Files

agency.txt

- Mandatory file: describes basic agency and contact information

Field	Required/Optional	Type
agency_id	Optional	string
agency_name	Required	string
agency_url	Required	URL
agency_timezone	Required	enumerated
agency_lang	Optional	enumerated
agency_phone	Optional	string
agency_fare_url	Optional	URL
agency_email	Optional	string

GTFS Structure and Files

agency.txt

agency_phone,agency_url,agency_id,agency_name,agency_timezone, agency_lang

914-813-7777,http://transportation.westchestergov.com/bee-line-bus,WCDOT,Westchester County Bee-Line System,America/New_York,en

Source: Westchester County BeeLine System

EXAMPLE

GTFS Structure and Files

stops.txt

- Mandatory file: directory of stops
- Part 1 of 2:

Field	Required/Optional	Type
stop_id	Required	string
stop_code	Optional	string
stop_name	Required	string
stop_desc	Optional	string
stop_lat	Required	numeric
stop_lon	Required	numeric

GTFS Structure and Files

stops.txt

- Mandatory file: describes basic agency and contact information

- Part 2 of 2:

Field	Required/Optional	Type
zone_id	Optional	String
stop_url	Optional	URL
location_type	Optional	0: stop 1: station with multiple stops
parent_station	Optional	String
stop_timezone	Optional	Enumerated (code)
wheelchair_boarding	Optional	0: unknown 1: available 2: unavailable

GTFS Structure and Files

stops.txt

stop_lat,stop_code,stop_lon,stop_id,stop_url,parent_station,stop_desc,stop_name,location_type,zone_id,wheelchair_boarding

41.239025,2031,-73.932311,2031,,,UNNAMED ST,FDR VA HOSPITAL BUILDING 25,0,,

41.15731,1866,-73.77301,1866,,,,S GREELEY AVE @ WOODBURN AVE,0,,

40.942033,4026,-73.768131,4026,,,,ROCKINGSTONE AVE @ FOREST AVE,0,,

40.938086,4027,-73.766418,4027,,,,ROCKINGSTONE AVE @ WILDWOOD RD,0,,

Source: Westchester County BeeLine System

EXAMPLE

31

GTFS Structure and Files

routes.txt

- Mandatory file: describes details about each route in the system

Field	Required/ Optional	Type
route_id	required	string
agency_id	optional	string
route_short_name	required	string
route_long_name	required	string
route_desc	optional	string
route_type	required	See list to right
route_url	optional	URL
route_color	optional	hex color
route_text_color	optional	hex color

route_type
0: street car/light rail
1: subway
2: rail
3: bus
4: ferry
5: cable car
6: gondola
7: funicular

GTFS Structure and Files

routes.txt

route_id,agency_id,route_short_name,route_long_name,route_desc,route_type,route_url,route_color,route_text_color

12577,Centro,Sy 10,South Salina - Nedrow,,3,,38A848,FFFFFF

12578,Centro,Sy 16,North Salina - Buckley Rd,,3,,7E3092,FFFFFF

12579,Centro,Sy 20,James Street,,3,,E0C94A,000000

12580,Centro,Sy 26,Valley Drive,,3,,CD8ABB,FFFFFF

12581,Centro,Sy 30,Westcott - SU,,3,,ED2224,FFFFFF

12582,Centro,Sy 36,Camillus,,3,,CD8ABB,FFFFFF

route_color = 7E3092 = purple
route_text_color = FFFFFF = white

Sy 16

EXAMPLE

Source: Centro
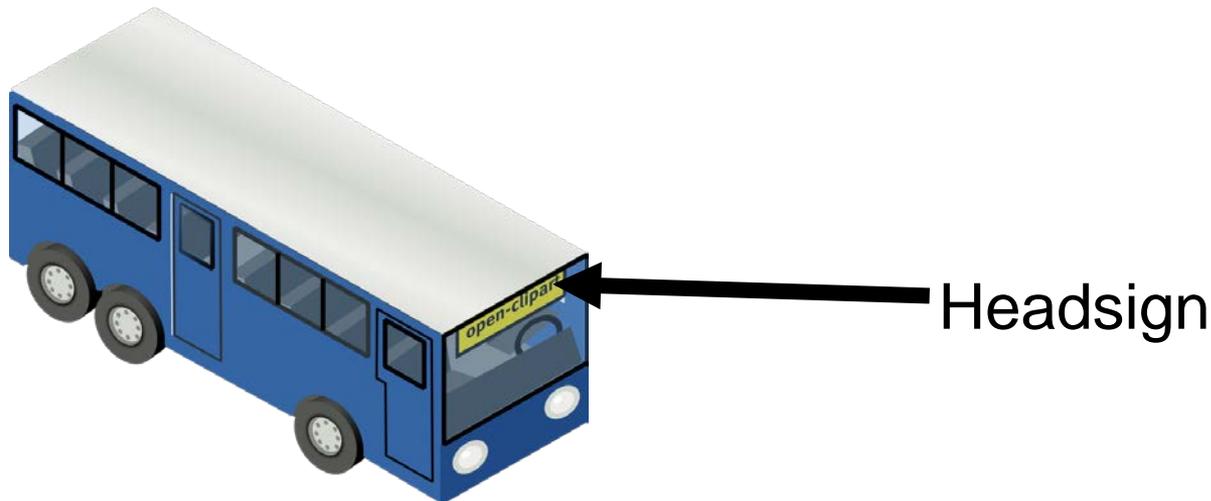
GTFS Structure and Files

trips.txt

- Mandatory file: describes details about each trip in the system

Field	Required/Optional	Type
route_id	required	string
service_id	required	string
trip_id	required	string
trip_headsign	optional	string
trip_short_name	optional	string
direction_id	optional	0 or 1
block_id	optional	string
shape_id	optional	string
wheelchair_accessible	optional	See list to right
bikes_allowed	optional	See list to right

wheelchair_accessible
0: unknown
1: yes
2: no

bikes_allowed
0: unknown
1: yes
2: no

GTFS Structure and Files

trips.txt

```
route_id,service_id,trip_id,trip_headsign,shape_id,direction_id,block_id
n4,58,1735481070,Jamaica,111,1,65907
n4,58,1735482070,Jamaica,111,1,65507
n4,58,1735483070,Freeport,112,0,66007
n4,58,1735484070,Freeport,112,0,66407
```
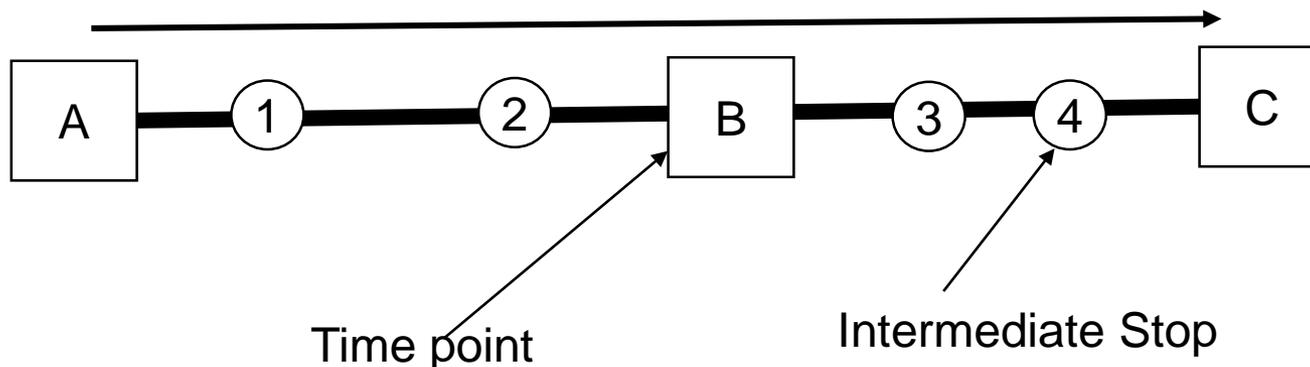
Headsign

EXAMPLE

Source: OpenClipart

GTFS Structure and Files

stop_times.txt

- Mandatory file: describes stops on each trip
- Part 1 of 2:

Field	Required/Optional	Type
trip_id	required	string
arrival_time	required	time
departure_time	required	time
stop_id	required	string
stop_sequence	required	integer
stop_headsign	optional	string

Time point

Intermediate Stop

GTFS Structure and Files

stop_times.txt

- Mandatory file: describes stops on each trip
- Part 2 of 2:

Field	Required/ Optional	Type
pickup_type	optional	0: regularly scheduled 1: no pickup off available 2: must phone agency 3: must coordinate with driver
drop_off_type	optional	0: regularly scheduled 1: no drop off available 2: must phone agency 3: must coordinate with driver
shape_dist_traveled	optional	numeric
timepoint	optional	empty: exact 1: approximate 2: exact

GTFS Structure and Files

stop_times.txt

```
trip_id,arrival_time,departure_time,stop_id,stop_sequence
8810,06:00:00,06:00:00,92719,1
8810,06:05:00,06:05:00,92720,2
8810,06:10:00,06:10:00,92721,3
```
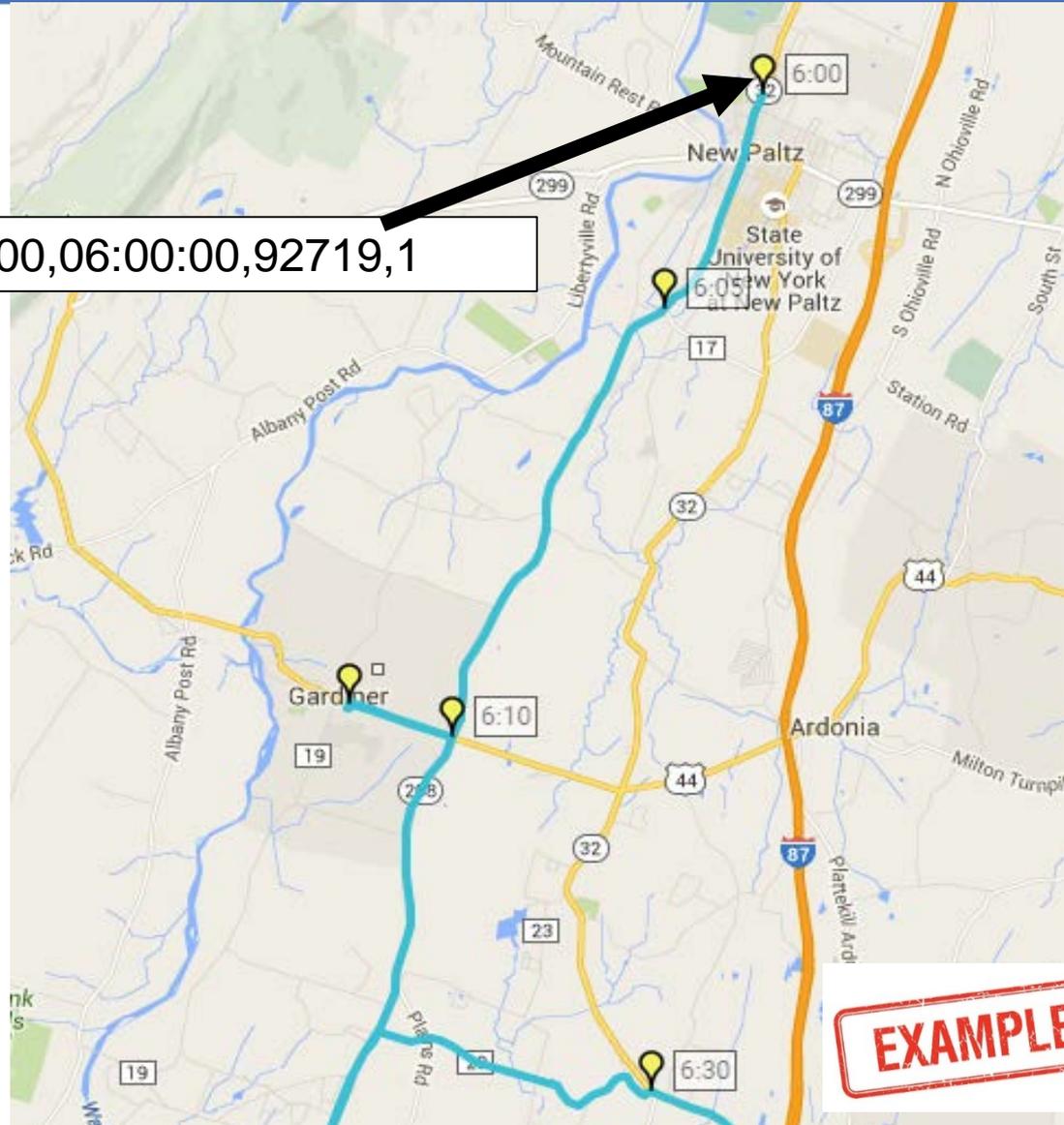
Source: Ulster County Area Transit

EXAMPLE

GTFS Structure and Files

stop_times.txt

8810,06:00:00,06:00:00,92719,1

*Source: Google Maps/
Ulster County Area Transit*

EXAMPLE

39

GTFS Structure and Files

calendar.txt

- Mandatory file (if no calendar_dates.txt): describes service calendars in GTFS

Field	Required/Optional	Type
service_id	required	0 or 1
monday	required	0 or 1
tuesday	required	0 or 1
wednesday	required	0 or 1
thursday	required	0 or 1
friday	required	0 or 1
saturday	required	0 or 1
sunday	required	0 or 1
start_date	required	0 or 1
end_date	required	0 or 1

GTFS Structure and Files

calendar.txt

service_id,monday,tuesday,wednesday,thursday,friday,saturday,sunday,start_date,end_date

week,1,1,1,1,1,0,0,20160101,20161231

sat,0,0,0,0,0,1,0,20160101,20161231

sun,0,0,0,0,0,0,1,20160101,20161231

EXAMPLE

41

GTFS Structure and Files

calendar_dates.txt

- Mandatory file (if no calendar.txt): describes service calendar exceptions in GTFS

Field	Required/Optional	Type
service_id	required	string
date	required	date
exception_type	required	1: service added 2: service removed

GTFS Structure and Files

calendar_dates.txt

```
service_id,date,exception_type
week,20160530,2
sun,20160530,1
```

```
service_id,date,exception_type
special,20160701,1
special,20160702,1
special,20160703,1
special,20160704,1
special,20160705,1
```

EXAMPLE

GTFS Structure and Files

fare_attributes.txt

- Optional file: describes specific fare instances for an agency

Field	Required/Optional	Type
fare_id	required	string
price	required	numeric
currency_type	required	enumerated
payment_method	required	0: paid on board 1: paid before boarding
transfers	required	0: no transfers included 1: one transfer included 2: two transfers included
transfer_duration	required	integer (seconds)

GTFS Structure and Files

fare_attributes.txt

fare_id,price,currency_type,payment_method,transfers,transfer_duration

base,1.5,USD,0,0,

baseBP,2,USD,0,0,

nx_zone_1,4,USD,0,0,

nx_zone_2,5,USD,0,0,

nx_zone_3,7,USD,0,0,

Source: Capital District Transportation Authority

EXAMPLE

GTFS Structure and Files

fare_rules.txt

▪ Optional file: describes rules for when each fare is used

Field	Required/Optional	Type
fare_id	required	string
route_id	optional	string
origin_id	optional	string
destination_id	optional	string
contains_id	optional	string

GTFS Structure and Files

fare_rules.txt

```
fare_id,route_id,origin_id,destination_id,contains_id
base,840-155,,,
baseBP,905-155,,,
nx_zone_1,540-155,1,,
nx_zone_2,540-155,2,,
nx_zone_3,540-155,3,,
```

Source: Capital District Transportation Authority

EXAMPLE

GTFS Structure and Files

shapes.txt

- Optional file: describes path of a transit vehicle

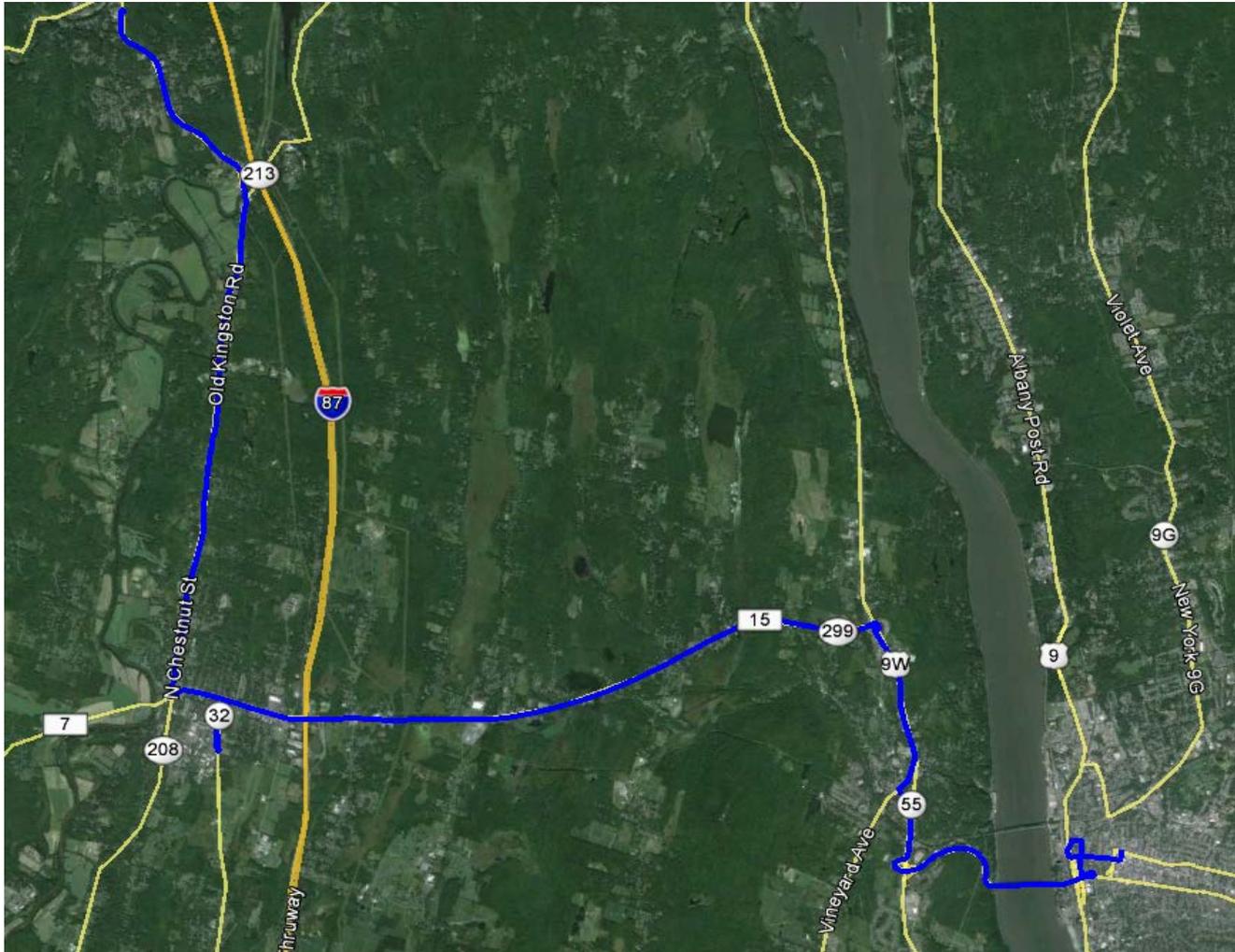| Field	Required/Optional	Type
shape_id	required	string
shape_pt_lat	required	numeric
shape_pt_lon	required	numeric
shape_pt_sequence	required	numeric
shape_dist_traveled	optional	numeric

GTFS Structure and Files

shapes.txt

shape_id,shape_pt_lat,shape_pt_lon,shape_pt_sequence
4799,41.91792,-74.01755,1
4799,41.91784,-74.01715,2
4799,41.91776,-74.01676,3
4799,41.91778,-74.01654,4
4799,41.91779,-74.01632,5

Source: Ulster County Area Transit

EXAMPLE

GTFS Structure and Files

shapes.txt

Source: Ulster County Area Transit /Google Earth

EXAMPLE

GTFS Structure and Files

frequencies.txt

- Optional file: describes path of a transit vehicle

Field	Required/Optional	Type
trip_id	required	string
start_time	required	time
end_time	required	time
headway_secs	required	integer (seconds)
exact_times	optional	0: trips not exact 1: trips exact

GTFS Structure and Files

frequencies.txt

```
trip_id,start_time,end_time,headway_secs,exact_times
140,06:00:00,09:00:00,600,0
140,09:01:00,16:00:00,1200,0
140,16:01:00,20:00,00,600,0
140,20:01:00,25:00,00,1200,0
```

EXAMPLE

GTFS Structure and Files

transfers.txt

- Optional file: describes an off-transit transfer between trips at arriving at one stop and departing from another

Field	Required/Optional	Type
from_stop_id	required	string
to_stop_id	required	string
transfer_type	required	0 /empty: recommended transfer point 1: timed transfer 2: minimum transfer required 3: no transfer possible
min_transfer_time	optional	integer (seconds)

GTFS Structure and Files

transfers.txt

from_stop_id,to_stop_id,transfer_type,min_transfer_time
1210,1490,2,120
1605,110,1,

EXAMPLE

GTFS Structure and Files

feed_info.txt

- Optional file: describes data about feed production, but no customer facing information

Field	Required/Optional	Type
feed_publisher_name	required	string
feed_publisher_url	required	URL
feed_lang	required	enumerated
feed_start_date	optional	date
feed_end_date	optional	date
feed_version	optional	string

GTFS Structure and Files

feed_info.txt

feed_publisher_name,feed_publisher_url,feed_lang,feed_start_date,
feed_end_date,feed_version

Bay Area Rapid
Transit,http://www.bart.gov,en,20160328,20170131,39

Source: Bay Area Rapid Transit

EXAMPLE

Translating Source Data to GTFS

Tools for GTFS Creation and Editing

- Manual Feed Creation
- Custom Software
- Schedule System Export
- Off the Shelf (e.g. National RTAP GTFS Builder)

Translating Source Data to GTFS

National RTAP GTFS Builder

http://nationalrtap.org/supportcenter/Builder-Apps/GTFS-Builder

B	C	D	E	F
Shelton to Olympia		Red Apple - Cascade &	Cole Road P & R @	Kamilche Transit
Wallace Kneeland	Civic Center	Olympic Hwy So	Hwy 3	Center
5:45 AM	5:50 AM	5:55 AM	6:00 AM	6:10 AM
6:15 AM	6:20 AM	6:25 AM	6:30 AM	6:40 AM
	8:10 AM	8:15 AM	8:20 AM	6:30 AM
	10:35 AM	10:40 AM	10:45 AM	10:55 AM
	12:00 PM	12:05 PM	12:10 PM	12:20 PM
	2:40 PM	2:45 PM	2:50 PM	3:00 PM
	3:40 PM	3:45 PM	3:50 PM	4:00 PM
	4:40 PM	4:45 PM	4:50 PM	5:00 PM
	5:40 PM	5:45 PM	5:50 PM	6:00 PM
	6:45 PM	6:50 PM	6:55 PM	7:05 PM

Source: National RTAP Center / USDOT

58

Special Cases in GTFS

Special Cases

- **My service calendars don't follow traditional schedules** (weekday, weekend, Saturday, Sunday, etc.)
  - Build by type 1 exception in calendar_dates.txt
- **I don't have exact times for intermediate stops between time points**:
  - Omit them, they can be interpolated by downstream applications
- **I have flex-route service, how do I account for this?**
  - There is a working group exploring this, but there is no consensus on the best approach

Use of Trial Parameters

Extending GTFS

- GTFS feeds can be extended with extra files or fields in existing files

- Extending feeds does not mean that the new files or feeds will be universally accepted

- Prior to changes to the GTFS specification, a feed must be extended to validate the change

- Example (hypothetical)

  - Field added to stops.txt to show whether a shelter is available at a stop ("shelter").

  - File added to describe parking facilities at stops ("parking.txt").

ACTIVITY

U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology

Question

Which of the following areas is NOT described by the GTFS specification?

Answer Choices

a) Stop Locations

b) Transit Trip Stop Times

c) Fare Information

d) Historical Ridership Data

Review of Answers

a) Stop locations

   Incorrect. This is covered in stops.txt

b) Transit trip stop times

   Incorrect. This is covered in stops_times.txt

c) Fare information

   Incorrect. This is covered in fare_attributes.txt and fare_rules.txt

d) Historical Ridership Data

   Correct! Historical ridership data is not included in the GTFS specification. An agency could extend their GTFS if needed.

Question

Which of the following is NOT a tool that can be used to produce GTFS feeds?

Answer Choices

a) Pencil and paper

b) Scheduling software add-ons

c) National RTAP GTFS Editor

d) Open source software

Review of Answers

a) Pencil and paper

Correct! Pencil and paper does not create electronic files.

b) Scheduling software add-ons

Incorrect. Many scheduling software systems do provide this capability.

c) National RTAP GTFS Builder

Incorrect. This can be used to create GTFS.

d) Open source software

Incorrect. There are open source tools for editing GTFS.

Learning Objective 3

Improve GTFS
Data Quality

Testing GTFS Files

Testing GTFS Files and GTFS Validation Tools

- Testing GTFS is necessary
  - Verify GTFS conforms to the specification
  - Verify GTFS appropriately reflects the agency
- Download tools for testing GTFS at: https://developers.google.com/transit/tools

Testing GTFS Files

GTFS Validator Tool

- Common Errors (not an exhaustive list):
  - Invalid value (value) in field departure_time. The departure time at this stop (stop_id) is before the arrival time (arrival_time).

Source: Google GTFS Feed Validator

Testing GTFS Files

GTFS Validator Tool

- Common Warnings (not an exhaustive list):
  - Invalid value (value) in field route_short_name. route_long_name shouldn't contain the route_short_name value, as both fields are often displayed side-by-side.
  - High speed travel detected.

- High speed travel detected in trip [@1.0.196144@][7] [1418156335479]/5__7D&E-3_(WD,_SAT,_SUM): Madison Street to Madison Street. 2168 meters in 0 seconds.

Source: Google GTFS Feed Validator

Testing GTFS Files

GTFS Schedule Viewer Tool

Source: Google GTFS Schedule Viewer
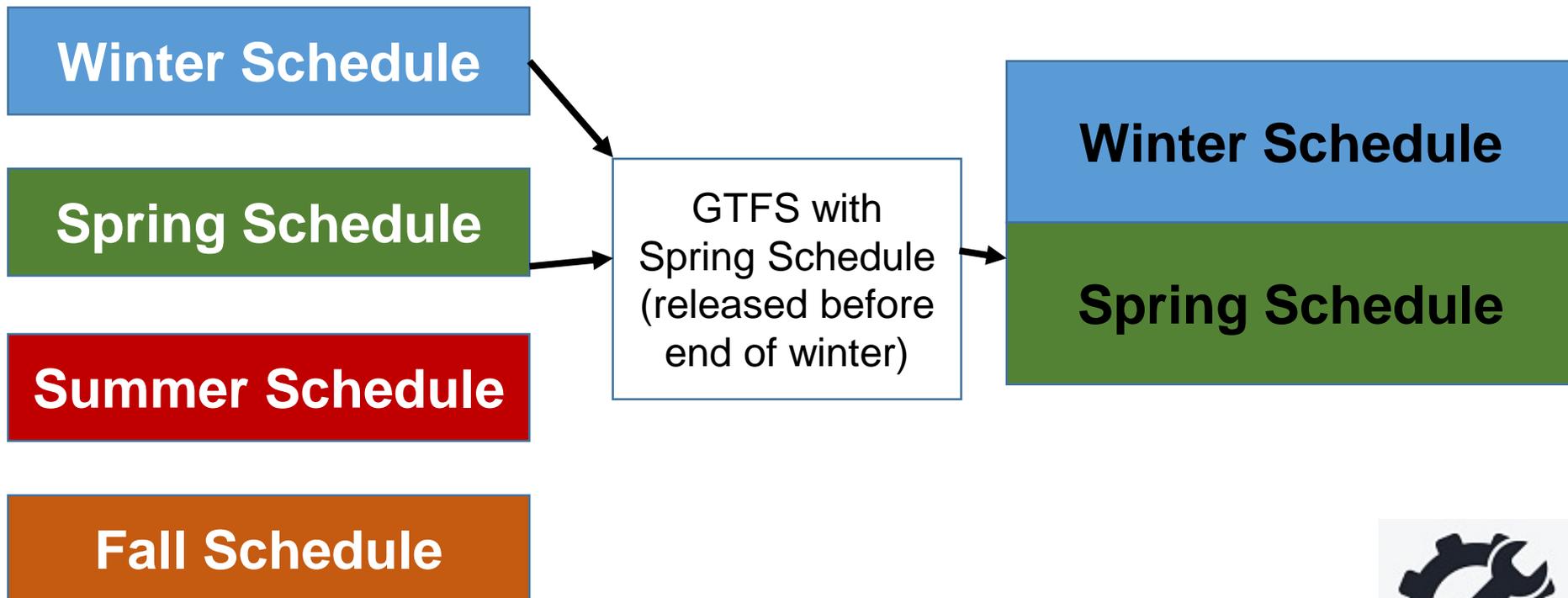
Describing Data Quality Through Metadata and Versioning GTFS files

GTFS and Schedule Periods

- GTFS Merge Tool
- https://github.com/google/transitfeed/wiki/Merge

Winter Schedule

Spring Schedule

GTFS with Spring Schedule (released before end of winter)

Winter Schedule
Spring Schedule

Summer Schedule

Fall Schedule

GTFS Merging

- Feed_info.txt
  - Feed_start_date and Feed_end_date
  - Version

September 1

feed_start_date

feed_end_date

December 15

Dates of service defined by calendar.txt

September 15

December 30

72
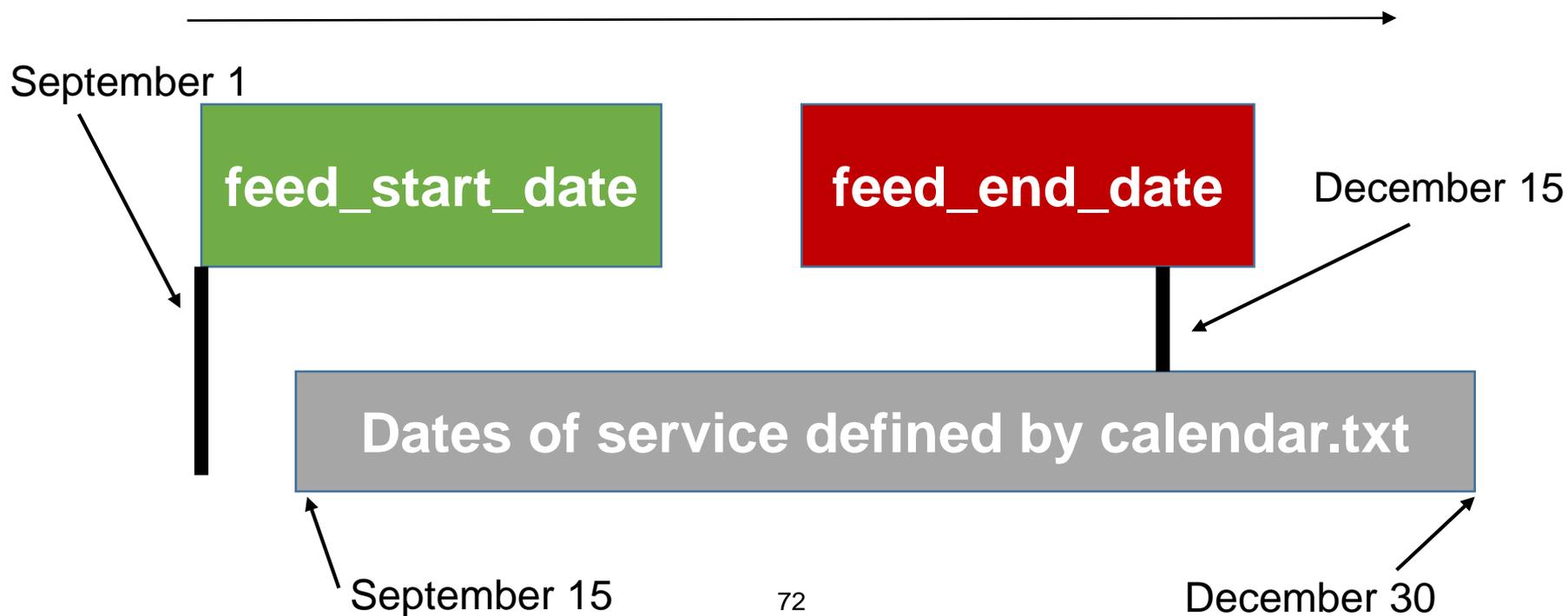
Using Use Cases to Understand Data

Use Cases that Describe GTFS Data

- High quality data must be useful data
- Know your downstream users
- Trip Planner- mandatory files, shapes.txt
- Fare calculator- fare_attributes.txt, fare_rules.txt
- Customers who bike to transit- bicycles_allowed in trips.txt
- Customers who require wheelchair accessibility- wheelchairs_boarding in stops.txt and trips.txt
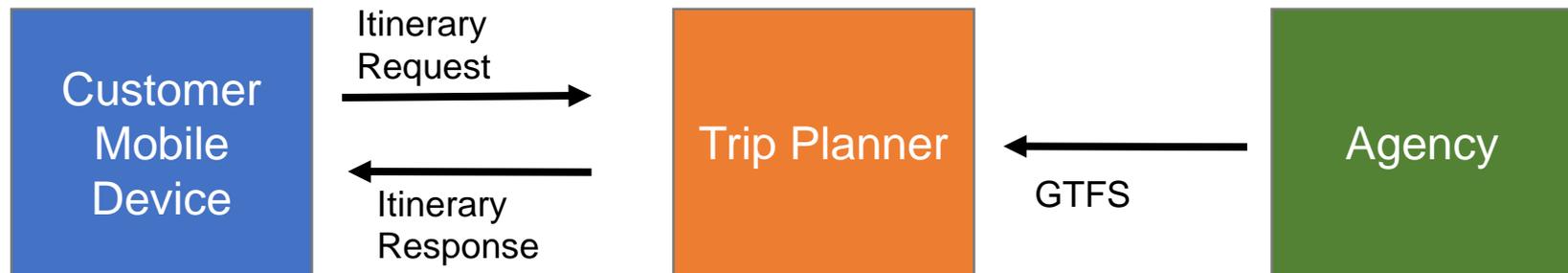
Improving Data Quality Through Data Management Practices

GTFS Best Practices

- Google provides a list of **best practices**
- **High quality data**:
    - Route_color and route_text color should be contrasting
    - Use parent stations with child stops
    - Ensure shapes.txt is accurate
    - Route_long_name should not contain route_short_name
- **Test data**
- Keep data **up to date**
- https://maps.google.com/help/maps/mapcontent/transit/bestpractices.html

ACTIVITY

U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology

Question

Why is it important to test GTFS feeds?

Answer Choices

a) Ensure data is accurate and conforms to the specification

b) Ensure customers use trip planners

c) Agencies can change schedules on the fly

d) Because testing requires no effort

Review of Answers

a) Ensure data is accurate and conforms to the specification

   Correct! Without testing data, it is not possible to know whether it can be used and that it conforms to the specification.

b) Ensure customers use trip planners

   Incorrect. This is a side effect of well tested data, but not the main intent.

c) Agencies can change schedules on the fly

   Incorrect. Schedules that change on the fly must still be tested.
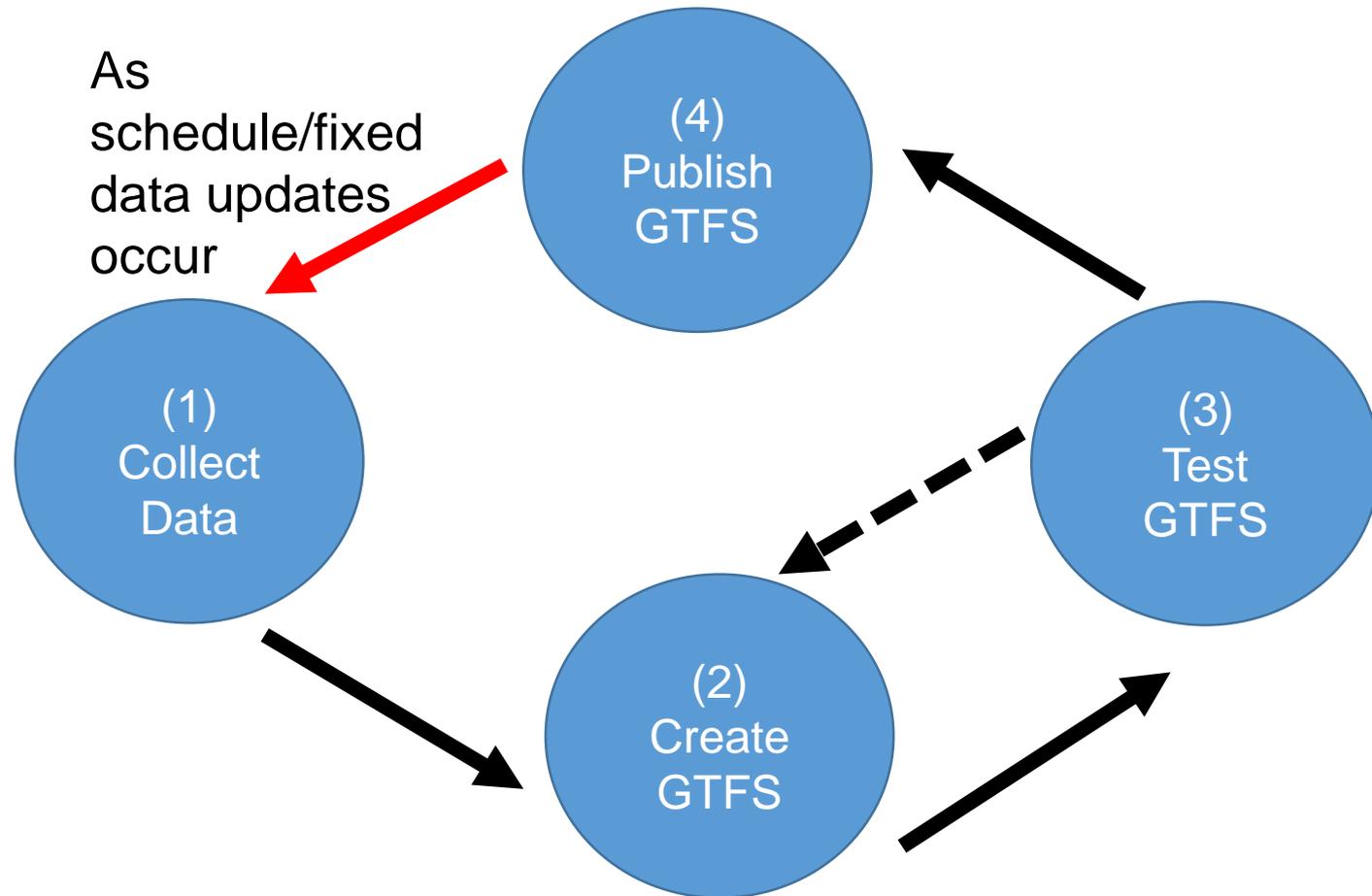
d) Because testing requires no effort

   Incorrect. Testing does require effort, but still must be done.

Learning Objective 4

Illustrate how an **Agency Implements GTFS**

GTFS Lifecycle Requirements and Strategies

Lifecycle of a GTFS Feed

As schedule/fixed data updates occur

(4) Publish GTFS

(1) Collect Data

(3) Test GTFS

(2) Create GTFS

GTFS Lifecycle Requirements and Strategies

GTFS Feed Lifecycle Requirements and Strategy

- Requirements
  - Update GTFS as **frequently** as schedules are updated
  - Design implementation lifecycle to work with the **agency's processes**
  - Don't forget to **test**

- Strategy
  - **Leverage** existing agency systems and processes
  - Leave **sufficient time** to publish schedules

Procurement Language for Generating GTFS

Procurement Language

- Use **systems engineering** process

- User needs
    - *Ex. Agency staff need to be able to export schedule information in a common format*

- Requirements
    - *Ex: The system shall export a GTFS feed which at minimum includes the following files: agency.txt, stops.txt, routes.txt, trips.txt, stop_times.txt, calendar.txt, calendar_dates.txt, shapes.txt, fare_attributes.txt and fare_rules.txt*

SUPPLEMENT

Making GTFS Feed Files Available for Internal and External Applications

Providing GTFS Data

- Reside in a static location

- Unrestricted vs restricted access

- Notify users of new data

- Make data available to users

Describe the Use of Data by Downstream Users

Applications Using GTFS

- Customer Facing Applications
  - Trip planning tools, timetable generators, etc.
- Transportation Planning/Analysis
  - Archive schedule data, input to planning models as a reference of the transit network
- Other Transit Agency Applications
  - CAD/AVL, Fare collection
- GTFS-realtime
- National Transit Map

CASE STUDY

STANDARDS
ITS
TRAINING
TRANSIT

U.S. Department of Transportation
ITS Joint Program Office
Image Source: Thinkstock USDOT

Case Study

Westchester County BeeLine System, NY

- Began creating GTFS over 6 years ago
- Before GTFS used proprietary format
- Exported from scheduling system
- Primary downstream user is 511NY, who in turn makes it available to other developers
- Issues
- Lessons learned

EXAMPLE

ACTIVITY

STANDARDS
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U.S. Department of Transportation
Office of the Assistant Secretary for
Research and Technology

Question

How should GTFS feeds be made available to downstream users?

Answer Choices

a) GTFS should not be made public

b) Written on a CD and mailed

c) Printed on paper

d) Fixed location on the web

Review of Answers

a) GTFS should not be made public

   Incorrect. GTFS is intended to be made available to downstream users.

b) Written on a CD and mailed

   Incorrect. GTFS This method is not efficient.

c) Printed on paper

   Incorrect. This method is not efficient or usable.

d) Fixed location on the web

   Correct! GTFS should be made available to downstream users by placing it at a fixed and accessible location.

Module Summary

What We Have Learned

1. Used for **disseminating static transit schedule data**.

2. Feed consists of a **series of zipped text files** that define aspects of fixed transit schedule data.

3. GTFS feed must **conform to the GTFS specification** and contains **accurate data**.

4. GTFS feed is **integrated into a transit agency's existing processes**.

This module taught us about how GTFS feeds are created and used.

Thank you for completing this module.

Feedback
Please use the Feedback link below to provide us with your thoughts and comments about the value of the training.

Thank you!

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