

# Implementing the New National Standard

## The NSDI Transportation Layer

# Basics

- ◆ The NSDI Framework Transportation Feature Standard is intended to support data exchange without cartography.
- ◆ Proposes a method of identifying transportation features.
- ◆ Includes a means of transferring identification data about those features.

# Transportation Features

- ◆ Framework Transportation Reference Point (FTRP).
- ◆ Framework Transportation Segment (FTSeg).
- ◆ FTRPs must be placed at the end of each FTSeg; can also be placed elsewhere.
- ◆ Equivalencies can be expressed.
- ◆ Explicit connectivity (topology) is optional.

# The File Structure

- ◆ One header record that contains file name.
- ◆ One or more body records.
- ◆ Each data record uses ASCII character string fields separated by tab characters (ASCII 9) and terminated by a carriage return (ASCII 13) and a line feed (ASCII 11).
- ◆ All fields must be included; null values (ASCII 0) must be explicit.

# Transactional Files

- ◆ Authority ID and the record's creation date are always part of the "primary key."
- ◆ No records are ever removed.
- ◆ Updates consist of extracting records written since a defined date, such as the last update for the user.

# Comparison to GOS Models

- ◆ Further along standard review cycle
- ◆ Flat files, not classes, so open data
- ◆ No geometry or path-level features
- ◆ Transaction vs. snapshot structure
- ◆ Extract temporal or spatial subset
- ◆ Provides point-to-line equivalency option
- ◆ More feature attributes
- ◆ Specifies feature identification method

# But Most Importantly

- ◆ Can be implemented NOW
  - Low tech
  - Easy to do
  - No vendor action required
- ◆ Marketplace will select
- ◆ Can migrate from Framework to GOS approach later

# “Authority” Defined

“Any organization that takes responsibility for proposing, designating, or working in partnership with other organizations to define transportation features, compile attributes, or publish transportation data sets.” [Sec. 2.2.1]



# Authority ID

- ◆ Five characters (FFAAA).
- ◆ Starts with two-character FIPS code for the state or “00” for federal and multi-state entities.
- ◆ Last three characters are sequentially defined for each authority.
- ◆ Requires an authority registrar (BTS).

# Transportation Feature ID

- ◆ 17 characters in three parts:
  - Authority ID (FFAAA)
  - Feature Type (O)
    - ◆ P = FTRP
    - ◆ S = FTSeg
  - Sequence Number (XXXXXXXXXX)
  - Explicit separators
- ◆ Format is FFAAA.O.XXXXXXXXXX

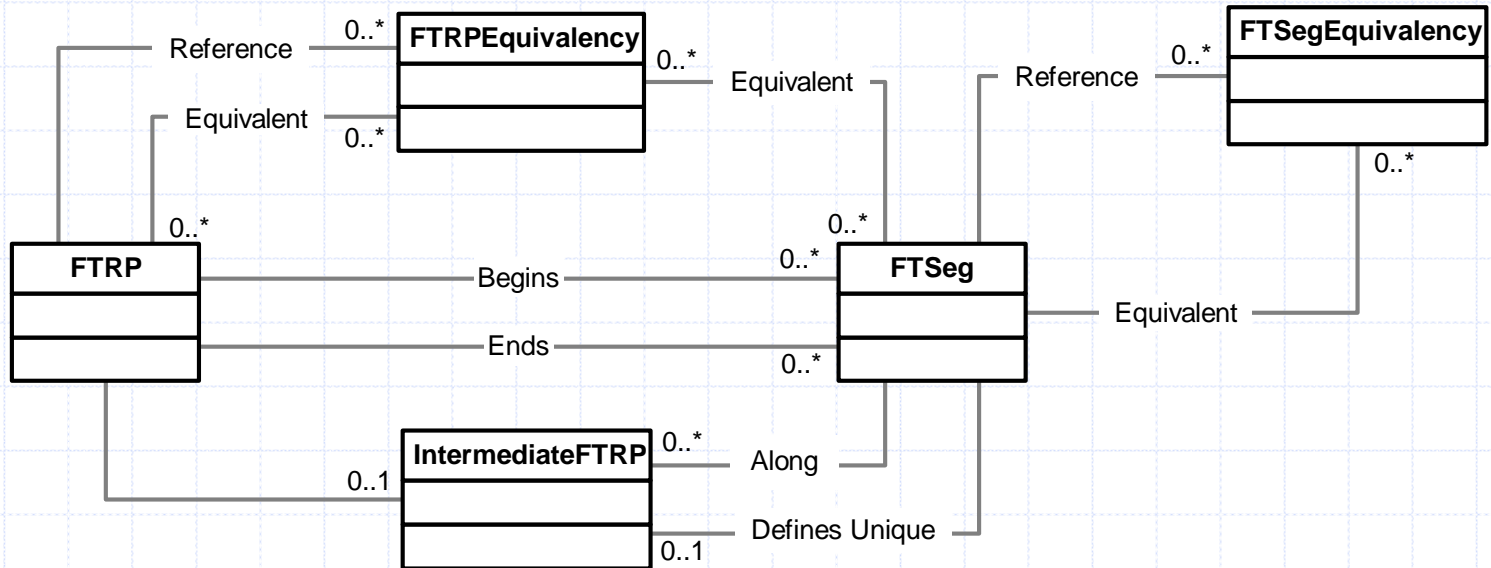
# How to Get Started

- ◆ Segment the transportation network into discrete linear elements (FTSegs).
- ◆ Place FTRPs at the FTSeg ends; greater meaning not required.
- ◆ Can place other FTRPs at locations of special interest (along or off segments).
- ◆ Apply naming conventions.

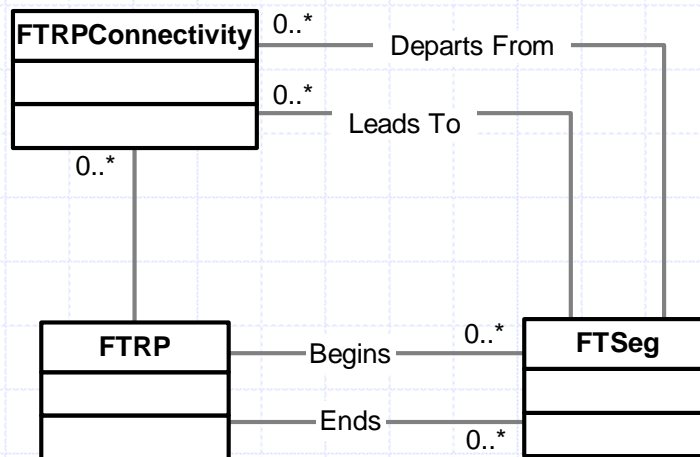
# Caveat

The following slides are based on discussions to date and do not reflect an adopted standard. Final details may differ from those shown here.

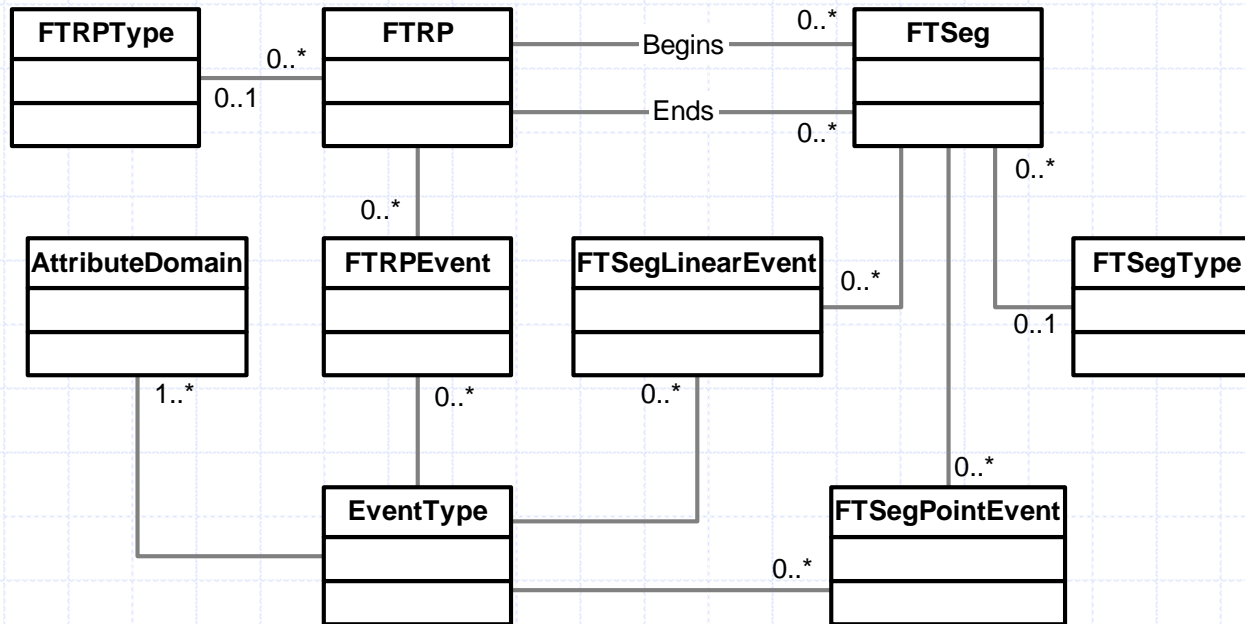
# Transportation System Model



# Transportation Network Model



# Feature Attribute Model



# Authority File

- ◆ Describes the authority that created the record set.
- ◆ May differ from the authority that assigned feature IDs.

## Authority

AuthorityID

Date

AuthorityName

ContactPerson

ContactVoicePhone

ContactFaxPhone

ContactURL

ContactInstructions

AuthorityAddress

AuthorityCity

AuthorityState

AuthorityPostalCode

AuthorityCountry

AuthorityAccessInfo

AuthorityInfo

Status



# FTRP File

- ◆ Describes where it is and how the location was determined.
- ◆ Location stated using WGS 84 datum.
- ◆ Data allows geometry creation by user.

## FTRP

AuthorityID

FTRPID

Date

LocationDescription

FTRPFeatureTypeID

Latitude

Longitude

FIPSGeoAreaType

FIPSCode

HorizontalDatum

HorizontalMeasureMethod

HorizontalAccuracy

Elevation

VerticalDatum

VerticalMeasureMethod

VerticalAccuracy

Status

# FTSeg File

- ◆ States terminal FTRPs, what path it follows, and how the segment length was determined.
- ◆ Length stated in meters.
- ◆ Forms linear datum.

## FTSeg

AuthorityID  
FTSegID  
Date  
FromFTRPID  
ToFTRPID  
PathDescription  
IntermediateFTRPID  
FTSegFeatureTypeID  
Length  
LengthMeasureMethod  
FIPSGeoAreaType  
FIPSCode  
LinearLRM  
Status

# FTRP Connectivity File

- ◆ Expresses explicit topology at FTRPs.
- ◆ One record for each approach to an intersection.

## **FTRPConnectivity**

AuthorityID

FTRPID

ConnectionID

Date

FromFTSegID

ToFTSegID

Status

# FTRP Equivalency File

- ◆ Indicates equivalency between different representations.
- ◆ Supports FTRP:FTRP and FTRP:FTSeg equivalencies.

<b>FTRPEquivalency</b>
<u>AuthorityID</u>
<u>ReferenceFTRPID</u>
<u>EquivalentFeatureID</u>
<u>Date</u>
EquivalentFromOffset
EquivalentToOffset
Status

# FTSeg Equivalency File

- ◆ Indicates relationship between all or part of one FTSeg to all or part of another.
- ◆ Offsets expressed as percent relative to implicit FTSeg direction.

<b>FTSegEquivalency</b>
<u>AuthorityID</u>
<u>ReferenceFTSegID</u>
<u>EquivalentFTSegID</u>
<u>Date</u>
ReferenceFromOffset
ReferenceToOffset
EquivalentFromOffset
EquivalentToOffset
Status

# FTRP Event File

- ◆ Some Authorities may only define and share attribute data.
- ◆ Supported by files for event type and value domain.

## FTRPEvent

AuthorityID

FTRPID

EventID

Date

EventTypeID

AttributeValue

Status

# Event Support Files

## EventType

AuthorityID  
EventTypeID  
Date  
EventTypeName  
Meaning  
UnitOfMeasure  
NumberOfCharacters  
NumberOfDecimals  
CompilationMethod  
DefiningAuthorityID  
DefinitionDate  
Status

## AttributeDomain

AuthorityID  
EventTypeID  
AttributeDomainID  
Date  
DomainValue  
DisplayText  
Meaning  
DefiningAuthorityID  
DefinitionDate  
Status

# FTSeg Point Event File

- ◆ Requires linear LRS measure as offset %.
- ◆ Linear LRS independent.

## FTSegPointEvent

AuthorityID

FTSegID

EventID

Date

EventTypeID

AttributeValue

AtOffset

Status



# FTSeg Linear Event File

- ◆ Includes starting and ending measures as offset %.

## FTSegLinearEvent

AuthorityID

FTSegID

EventID

Date

EventTypeID

AttributeValue

FromOffset

ToOffset

Status

# Final Draft Changes

- ◆ Emphasize transactional nature.
- ◆ Reduce segmentation content.
- ◆ Show how to migrate/integrate with existing databases.
- ◆ Illustrate how to use the standard with multiple examples.
- ◆ Use monochrome graphics conventions.

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Bruce Spear originated the standard.

Bruce Westcott was original consultant.