

*A Working Group Draft Standard of the Joint Committee*

# **NTCIP 1403 v. 1.03**

## **-- DRAFT Amendment 1**

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## **Transit Communications Interface Profiles**

**Part of the National Transportation Communications for  
ITS Protocol**

## **Standard on Passenger Information (PI) Objects**

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Draft August 2002

Also referenced as TCIP-PI

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## FOREWORD

This document uses only metric units.

This document is an NTCIP Information Data Dictionary Standard. Information Data Dictionaries Standards formally express management information in terms of objects (data elements, data frames, and messages) for use within TCIP and NTCIP systems.

The TCIP family of standards addresses Advanced Public Transportation Systems (APTS) data interfaces and related automated transit tools and data. The standards address the business requirements of these APTS data interfaces. In some cases, specialized terms were needed to define general classes of information. For example, different business areas needed to define data elements related to time, date and footnotes. Special, constrained data types were developed so that the transit domain data concepts were consistent across business areas, while specific needs were met. These data types are defined within the TCIP family of standards and in this document.

For more information about NTCIP standards, visit the NTCIP Web Site at <http://www.ntcip.org>. For a hardcopy summary of NTCIP information, contact the NTCIP Coordinator at the address below.

In preparation of this NTCIP document, input of users and other interested parties was sought and evaluated. Inquires, comments, and proposed or recommended revisions should be submitted to:

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### Approvals

This document will be separately balloted and approved by AASHTO, ITE, and NEMA after recommendation by the Joint Committee on the NTCIP. Each organization is expected to approve this NTCIP Information Data Dictionary Standard as the following standard type, as of the date:

AASHTO – Standard Specification; Month YYYY  
ITE – Software Standard; Month YYYY  
NEMA – Standard; Month YYYY

### History

From 1997 to 1999, this document was referenced as ITE ST-ITS-TCIP-PI and/or NEMA TS 3.TCIP-PI. However, to provide an organized numbering scheme for the NTCIP, this document is now referenced as NTCIP 1403. The technical specification of NTCIP 1403 is identical to the former reference, except as noted in the development history:

TCIP documents version 0.1. Distributed in September 1997 for public review.

TCIP-PI Recommended Standard version 1.0, February 20, 1998, changed to version 1.1, July 31, 1998. Revisions included: Sections 2.1, 2.3, 4.3, 5.1, and 5.2.

NTCIP 1403 version 97.01.01, July 31, 1998. Approved by AASHTO in July 1999, approved by ITE in October 1999, and approved by NEMA in February 2000.

NTCIP 1403 v01.02, December 1, 2000. Incremented version number and updated date; added and revised front matter; updated references to NTCIP and NEMA document numbers in References Clause; updated references to ITE document numbers; revised section numbering inserted introduction text in Section on Requirements; deleted Annex A Comment Form; and inserted introduction text in Annex on the ASN.1 Script.

Draft NTCIP 1403 v01.03 Amendment 1, August 2002. Updated references, updated data requirements format to conform to IEEE 1489:1999 and 1489:2000, and incorporated changes as described in the document.

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## Section 1 GENERAL

### 1.2.1 Normative References

-- Updated the publications information for Normative References

draft NTCIP 1400:2002 Amendment 1, *Transit Communications Interface Profile Framework*, version 1.05 Amendment 1.

draft NTCIP 1401:2002 Amendment 1, *Transit Communications Interface Profile, Standard on Common Public Transportation Objects*, version 1.03 Amendment 1, August, 2002.

draft NTCIP 1404:2002 Amendment 1, *Transit Communications Interface Profile, Standard on Scheduling and Runcutting Objects*, version 1.03 Amendment 1, August, 2002.

draft NTCIP 1405:2002 Amendment 1, *Transit Communications Interface Profile, Standard on Spatial Representation Objects*, version 1.03 Amendment 1, August, 2002.

draft NTCIP 1408:2002 Amendment 1, *Transit Communications Interface Profile, Standard on Fare Collection Objects*, version 1.03 Amendment 1, August, 2002.

ISO/IEC 8824:1998, *Abstract Syntax Notation One (ASN.1)*

### 1.2.2 Informative References

-- Updated the publications information for Informative References

IEEE Std 1489-1999, *IEEE Standard for Data Dictionaries for Intelligent Transportation Systems*. 27 October 1999.

IEEE Std 1488-2000, *IEEE Trial-Use Standard for Message Set Template for Intelligent Transportation Systems*. 13 July 2000.



**Section 2**  
**TERMINOLOGY**

*-- no changes*

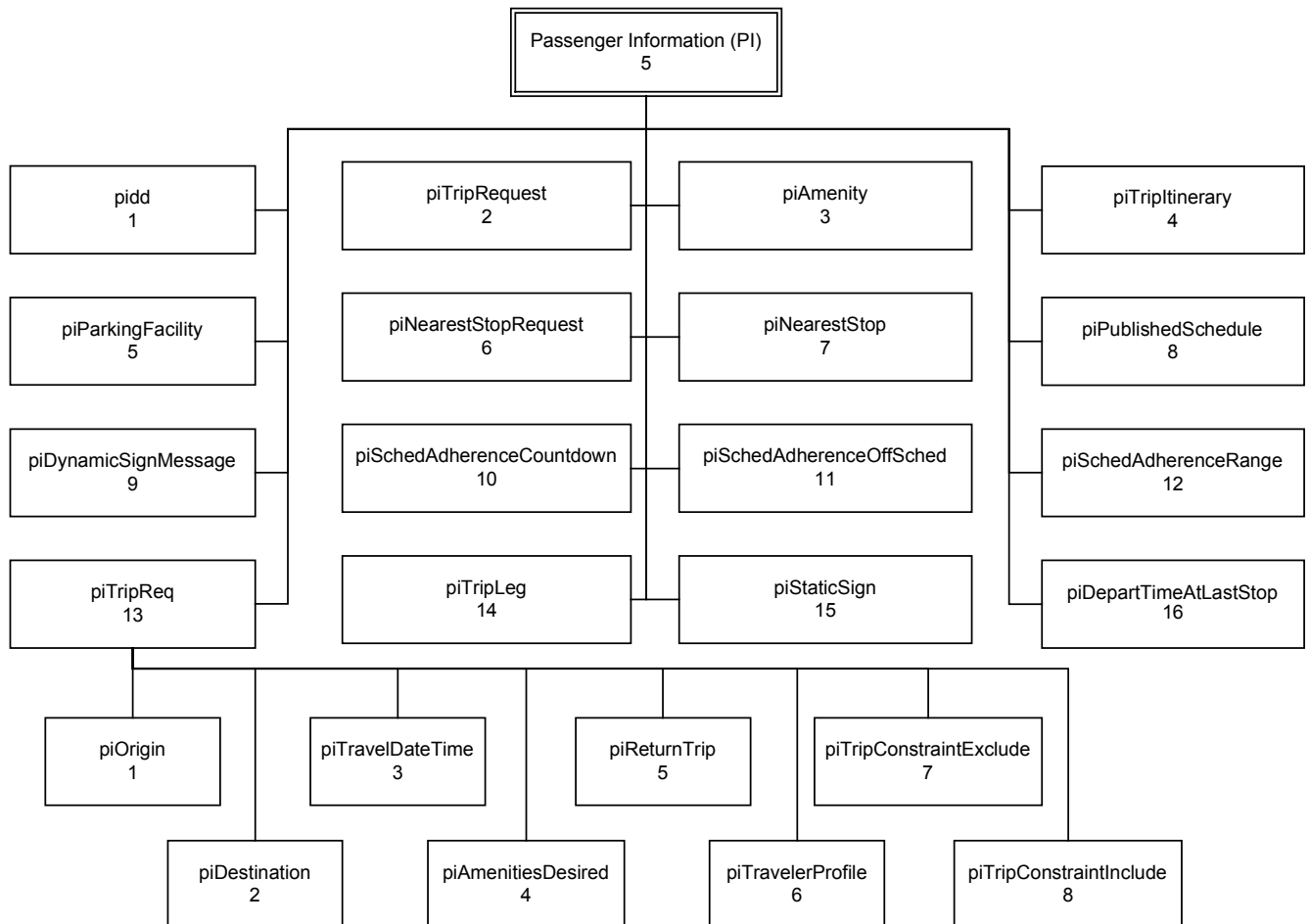


### Section 3 CONCEPT OF OPERATIONS

-- Modified section title to Concept of Operations

#### 3.3.2 TCIP Classification Tree

-- updated Figure 3.1 Classification Tree





## Section 4 REQUIREMENTS

### 4.1 PASSENGER INFORMATION DATA DICTIONARY

#### PI\_AccessPreference\_cd

(1) *The error codes shall be removed from the code list.*

<b>Representation layout</b>	PI-AccessPreference ::= INTEGER { walk (1), -- (or go to, e.g., via wheelchair bicycle (2), park-ride (3), -- drive-park kiss-ride (4), -- drive and be dropped off } (0..255)
<b>Valid value rule</b>	1 walk (or go to, e.g., via wheelchair) 2 bicycle 3 drive and park/park & ride 4 drive and be dropped off/ kiss & ride 5-149 Reserved for standard codes 150-255 Reserved for local use

#### PI\_ADAAccess\_cd

(1) *The error codes shall be removed from the code list.*

<b>Representation layout</b>	PI-ADAAccess ::= INTEGER { notCompliant (1), fullyCompliant (2), mobilityChallengedAccess (3), visuallyImpairedAccess (4), hearingImpairedAccess (5), mobility-VisuallyImpairedAccess (6), visually-HearingImpairedAccess (7), mobility-MobilityImpairedAccess (8), -- 9-149 reserved -- 150-255 local use } (0..255)
<b>Valid value rule</b>	1 Not ADA compliant 2 ADA fully compliant 3 Accessible to mobility challenged individuals 4 Accessible to visually impaired individuals 5 Accessible to hearing impaired individuals 6 Accessible to mobility and visually impaired individuals 7 Accessible to visually and hearing impaired individuals 8 Accessible to hearing and mobility impaired individuals 9-149 Reserved for standard codes 150-255 Reserved for local use

#### PI\_ADANeed\_cd

(1) *The error codes shall be removed from the code list.*

<b>Representation layout</b>	PI-ADANeed ::= INTEGER
------------------------------	------------------------

```
{  
  noADANeed (1),  
  mobilityAssistanceRequired (2),  
  visualAssistanceRequired (3),  
  audioAssistanceRequired (4),  
  otherAssistanceRequired (5),  
  visual-AudioAssistanceRequired (6),  
  visual-MobilityAssistanceRequired (7),  
  audio-MobilityAssistanceRequired (8),  
  visual-Audio-MobilityAssistanceRequired (9),  
  -- 10-149 reserved  
  -- 150-255 local use  
} (0..255)
```

**Valid value rule**

1 No ADA need  
2 Mobility Need  
3 Visual assistance required  
4 Audio assistance required  
5 Other assistance required  
6 A combination of visual and audio assistance required  
7 A combination of visual and mobile assistance required  
8 A combination of audio and mobile assistance required  
9 A combination of visual, mobile, and audio assistance required  
10-149 Reserved for standard codes  
150-255 Reserved for local use

**PI\_AmenityID\_id**

(1) *The Representative class term (in descriptive name and field) shall be modified to identifier (id).*

**Descriptive Name** PI\_AmenityID\_id  
**Representation class term** identifier

**PI\_AmenityStatus\_cd**

(1) *The error codes shall be removed from the code list.*

**Representation layout** PI-AmenityStatus ::= INTEGER  
{ outOfOrder (1),  
 operational (2),  
 -- 3-149 reserved  
 -- 150-255 local use  
} (0..255)

**Valid value rule** 1 Out of order  
2 Operational  
3-149 Reserved for standard codes  
150-255 Reserved for local use

**PI\_DesiredTrip\_cd**

(1) *The error codes shall be removed from the code list.*

**Representation layout** PI-DesiredTrip ::= INTEGER  
{ departDesignatedTime (1),  
 -- leave at designated time  
 arriveDesignatedTime (2),  
 -- Arrive at a designated time  
 firstTrip (3), -- First trip of the day  
 lastTrip (4), -- Last trip of the day  
 nextTrip (5), -- The next trip  
 -- 6-149 reserved

-- 150-255 local use

} (0..255)

**Valid value rule**

1 Leave at a designated time  
2 Arrive at a designated time  
3 First trip of the day  
4 Last trip of the day  
5 The next trip  
6-149 Reserved for standard codes  
150-255 Reserved for local use

**PI\_EstimatedArrivalRange\_cd**

(1) *The error codes shall be removed from the code list.*

**Representation layout**

```
PI-EstimatedArrivalRange ::= INTEGER
{ onTime (1), -- On-time
  early (2), -- Early
  lateOneMin (3), -- 0-1 minutes late
  lateOneTwoMin (4), -- 1-2 minutes late
  lateTwoThreeMin (5), -- 2-3 minutes late
  lateTwoFourMin (6), -- 2-4 minutes late
  lateThreeFourMin (7), -- 3-4 minutes late
  lateThreeFiveMin (8), -- 3-5 minutes late
  lateFourFiveMin (9), -- 4-5 minutes late
  lateTwoFiveMin (10), -- 2-5 minutes late
  lateFiveSevenMin (11), -- 5-7 minutes late
  lateSevenTenMin (12), -- 7-10 minutes late
  lateFiveTenMin (13), -- 5-10 minutes late
  lateTenFifteenMin (14), -- 10-15 minutes late
  lateFifteenTwentyMin (15), -- 15-20 minutes late
  lateMoreThanTwentyMin (16),
    -- More than 20 minutes late
    -- 17-149 reserved
    -- 150-255 local use
} (0..255)
```

**Valid value rule**

1 On time  
2 Early  
3 0-1 minutes late  
4 1-2 minutes late  
5 2-3 minutes late  
6 2-4 minutes late  
7 3-4 minutes late  
8 3-5 minutes late  
9 4-5 minutes late  
10 2-5 minutes late  
11 5-7 minutes late  
12 7-10 minutes late  
13 5-10 minutes late  
14 10-15 minutes late  
15 15-20 minutes late  
16 More than twenty minutes late  
17-149 Reserved for standard codes  
150-255 Reserved for local use

**PI\_InformationType\_cd**

(1) *The error codes shall be removed from the code list.*

**Representation layout**

```
PI-InformationType ::= INTEGER
{ staticSign (1), -- static sign with station stop ID/name
  routes (2),
  schedules (3),
}
```

fares (4),  
system-map (5),  
area-map (6),  
timetables (7), -- printed and removable  
real-time-information (8),  
attended (9), -- agent or attended phone for information  
-- 10-149 reserved  
-- 150-255 local use  
} (0..255)

**Valid value rule**

1 static sign with station stop ID/name  
2 routes  
3 schedules  
4 fares  
5 system map  
6 area map  
7 timetables (printed and removable)  
8 real-time information  
9 agent/attendant or attended phone for information  
10-149 Reserved for standard codes  
150-255 Reserved for local use

**PI\_MarkerType\_cd**

(1) *The error codes shall be removed from the code list.*

**Representation layout**

PI-MarkerType ::= INTEGER  
{ posted (1), -- Posted Sign  
shelter (2), -- at Station or Shelter  
post (3), -- concrete post  
-- 4-149 reserved  
-- 150-255 local use  
} (0..255)

**Valid value rule**

1 Posted Sign  
2 Station/Shelter  
3 Concrete Post  
4-149 Reserved for standard codes  
150-255 Reserved for local use

**PI\_Minimize\_cd**

(1) *The error codes shall be removed from the code list.*

**Representation layout**

PI-Minimize ::= INTEGER  
{ transfers (1), -- Minimize transfers  
travelTime (2), -- Minimize travel time  
cost (3), -- Minimize cost  
walking (4), -- Minimize walking distance  
waitTime (5), -- Minimize wait time  
-- 6-149 reserved  
-- 150-255 local use  
} (0..255)

**Valid value rule**

1 Minimize transfers  
2 Minimize travel time  
3 Minimize cost  
4 Minimize walking distance  
5 Minimize wait time  
6-149 Reserved for standard codes  
150-255 Reserved for local use

**PI\_NextLeg\_cd**

(1) *The error codes shall be removed from the code list.*

**Representation layout** PI-NextLeg ::= INTEGER  
{ no (1),  
yes (2),  
-- 3-149 reserved  
-- 150-255 local use  
} (0..255)

**Valid value rule**  
1 No  
2 Yes  
3-149 Reserved for standard codes  
150-255 Reserved for local use

### PI\_ParkingEntranceID\_id

(1) *The Representative class term (in descriptive name and field) shall be modified to identifier (id).*

**Descriptive Name** PI\_ParkingEntranceID\_id  
**Representation class term** identifier

### PI\_ParkingFacID\_id

(1) *The Representative class term (in descriptive name and field) shall be modified to identifier (id).*

**Descriptive Name** PI\_ParkingFacID\_id  
**Representation class term** identifier

### PI\_ParkingType\_cd

(1) *The error codes shall be removed from the code list.*  
(2) *The Valid value rules were modified to provide additional clarity.*

**Representation layout** PI-ParkingType ::= INTEGER  
{ open (1), -- Open lot  
garage (2),  
permit (3),  
contract (4),  
free (5),  
pay (6),  
other (7),  
-- 8-149 reserved  
-- 150-255 local use  
} (0..255)

**Valid value rule** -- types are not mutually exclusive  
  
1 Open lot -- uncovered or surface lot  
2 Garage  
3 Permit parking  
4 Contract Parking  
5 Free Parking  
6 Paid Parking  
7 Other  
8-149 Reserved for standard codes  
150-255 Reserved for local use

### PI\_ParkingVehicleClass\_cd

(1) Reorganized codes to reflect the following:

*all (1), compact (2), standard (3), van (4), oversized (5), truck (6), bus (7)*

#### Representation layout

```
PI-ParkingVehicleClass ::= INTEGER
{ standard (1),
  compact (2),
  van (3),
  oversized (4),
  -- 5-149 reserved
  -- 150-255 local use
} (0..255)
```

#### Valid value rule

```
1 all
2 compact
3 standarf
4 van
5 oversized
6 truck
7 bus
8-149 Reserved for standard codes
150-255 Reserved for local use
```

### PI\_SignID\_id

(1) *The Representative class term (in descriptive name and field) shall be modified to identifier (id).*

#### Descriptive Name

PI\_SignID\_id

#### Representation class term

identifier

### PI\_SignType\_cd

(1) *The error codes shall be removed from the code list.*

#### Representation layout

```
PI-SignType ::= INTEGER
{ dynamic (1),
  notDynamic (2),
  other (3),
  -- 4-149 reserved
  -- 150-255 local use
} (0..255)
```

#### Valid value rule

```
1Dynamic,
2 Not dynamic
3 Other,
4-149 Reserved for standard codes
150-255 Reserved for local use
```

### PI\_TravelerID\_id

(1) *The Representative class term (in descriptive name and field) shall be modified to identifier (id).*

#### Descriptive Name

PI\_TravelerID\_id

#### Representation class term

identifier

**PI\_TripOptionID\_id**

*(1) The Representative class term (in descriptive name and field) shall be modified to identifier (id).*

<b>Descriptive Name</b>	PI_TripOptionID_id
<b>Representation class term</b>	identifier

## 4.2 MESSAGE SET

### PiTripLeg\_message

- (1) In message body, changed Type Reference for fareTransaction to FcFareCharacterCost.
- (2) Add 3 OPTIONAL fields for route identifier or name (also added WITH COMPONENTS to ensure use of at least one of the fields in the message).

#### Message body

```
PiTripLeg ::=SEQUENCE {
  optionID PI-TripOptionID,
  toOriginWalk PI-WalkingDirections OPTIONAL,
  directionDriving PI-DrivingDirections OPTIONAL,
  parking-lots SEQUENCE OF PiParkingFacility OPTIONAL,
  stopName CPT-StopPointName,
  stopDescr CPT-StopPointDescription OPTIONAL,
  mode CPT-Mode OPTIONAL,
  agencyID CPT-AgencyID OPTIONAL,
  routeDirection SCH-RouteDirectionName,
  routeID SCH-RouteID OPTIONAL, -- **added new field
  routeDesignator SCH-RouteDesignator OPTIONAL --**added new field
  routeName SCH-RouteName OPTIONAL --**added new field
  sign PiStaticSign OPTIONAL,
  departPoint SpPointclass OPTIONAL,
  departSchedule PI-DepartTimeScheduled,
  departSchedNext PI-DepartTimeSchedNext OPTIONAL,
  arriveSchedule PI-ArriveTimeScheduled OPTIONAL,
  arrivePoint SpPointclass OPTIONAL,
  toEndWalk PI-WalkingDirections OPTIONAL,
  fareTransaction FcFareCharacterCost OPTIONAL,
  schedAdhCountdown PiSchedAdherenceCountdown OPTIONAL,
  footnote PI-Footnote OPTIONAL,
  nextLeg PI-NextLeg OPTIONAL
} -- at least one route index must be included
(WITH COMPONENTS {..., routeID PRESENT} |
 WITH COMPONENTS {..., routeDesignator PRESENT} |
 WITH COMPONENTS {..., routeName PRESENT} )
```

### PiParkingFacility\_message

- (1) Reorganized message to provide information on parking availability information for different types of vehicle classes.

#### Message body

```
PiParkingFacility ::=SEQUENCE {
  parkingFacID PI-ParkingFacID,
  stopID CPT-StopPointID,
  owner PI-ParkingOwnerName OPTIONAL,
  phone PI-ParkingFacPhone OPTIONAL,
  spacesTotal PI-ParkingSpacesTotal OPTIONAL,
  modes SEQUENCE OF CPT-Mode OPTIONAL,
  spacesTotal PI-ParkingSpacesTotal OPTIONAL,
  operatingHours PI-ParkingHoursofOperation OPTIONAL,
  parkingProvided SEQUENCE OF {
    vehicleClass PI-ParkingVehicleClass,
    spacesAvailable PI-ParkingAvailability OPTIONAL,
    rates PI-ParkingRates OPTIONAL,
    entrances SEQUENCE OF PI-ParkingEntranceID OPTIONAL,
    fillTime PI-ParkingFillTime OPTIONAL,
    footnote PI-Footnote OPTIONAL } OPTIONAL
}
```

### **PiNearestStop\_message**

(1) Add field name in last field of message body. Call field name *stopPtAttribute-list*.

**Message body** PiNearestStop ::= SEQUENCE {  
stopID CPT-StopPointID,  
location SpPointclass, -- the location of the nearest stop  
mode CPT-Mode OPTIONAL,  
routeID SCH-RouteID OPTIONAL,  
rtDirection SCH-RouteDirectionName OPTIONAL,  
stopPtAttribute-list SEQUENCE OF CPT-StopPointAttribute OPTIONAL  
}

### **PiSchedAdherenceRange\_message**

(1) Add new field in message to reflect confidence level of value.

**Message body** PiSchedAdherenceRange ::=SEQUENCE {  
routeID SCH-RouteID,  
routeName SCH-RouteName OPTIONAL,  
tripID SCH-TripID,  
vehicleID CPT-PTVehicleID,  
stopID CPT-StopPointID,  
estimatedArrivalRange PI-EstimatedArrivalRange,  
tolerance OB-ConfidenceMeasure OPTIONAL -- measurement is in seconds  
}

### **PiSchedAdherenceCountdown\_message**

(1) Add new field in message to reflect confidence level of value.

**Message body** PiSchedAdherenceCountdown ::= SEQUENCE {  
routeID SCH-RouteID,  
routeName SCH-RouteName OPTIONAL,  
tripID SCH-TripID,  
vehicleID CPT-PTVehicleID,  
stopID CPT-StopPointID,  
nextArrivalCountdown PI-NextArrivalCountdown,  
tolerance OB-ConfidenceMeasure OPTIONAL -- measurement is in seconds  
}

### **PiSchedAdherenceOffSched\_message**

(1) Add new field in message to reflect confidence level of value.

**Message body** PiSchedAdherenceOffSched ::= SEQUENCE {  
routeID SCH-RouteID,  
routeName SCH-RouteName OPTIONAL,  
tripID SCH-TripID,  
vehicleID CPT-PTVehicleID,  
stopID CPT-StopPointID,  
arriveTimeScheduled PI-ArriveTimeScheduled,  
vehicleLocation SpPointclass, --The real-time location of a transit vehicle  
offScheduleTime PI-OffSchedule,  
tolerance OB-ConfidenceMeasure OPTIONAL -- measurement is in seconds  
}

### **PiDynamicSignMessage\_message**

(1) Add field to reflect new type of schedule status *PiDepartAtLastStop*. Also added WITH COMPONENTS clause for option.

**Message body**

```

PiDynamicSignMessage ::=SEQUENCE{
  datetime CPT-DateTime OPTIONAL,
  route-name SCH-RouteName OPTIONAL,
  service-type SCH-ServiceType OPTIONAL,
  direction SCH-RouteDirectionName OPTIONAL,
  arrive-time PI-ArriveTimeScheduled OPTIONAL,
  depart-time PI-DepartTimeSched OPTIONAL,
  adh-range PiSchedAdherenceRange OPTIONAL,
  adh-countdown PiSchedAdherenceCountdown OPTIONAL,
  adh-offsched PiSchedAdherenceOffSched OPTIONAL,
  depart-at-last-stop PiDepartAtLastStop OPTIONAL,
  message SEQUENCE OF PI-DMSMessage OPTIONAL
}
(WITH COMPONENTS {...,datetime PRESENT})
(WITH COMPONENTS {..., route-name PRESENT})
(WITH COMPONENTS {..., service-type PRESENT})
(WITH COMPONENTS {..., direction PRESENT})
(WITH COMPONENTS {..., arrive-time PRESENT})
(WITH COMPONENTS {..., depart-time PRESENT})
(WITH COMPONENTS {...,adh-range PRESENT})
(WITH COMPONENTS {..., adh-countdown PRESENT})
(WITH COMPONENTS {..., adh-offsched PRESENT})
(WITH COMPONENTS {..., depart-at-last-stop PRESENT})
(WITH COMPONENTS {..., message PRESENT})

```

**PiDepartTimeAtLastStop\_message**

*Add new message*

<b>Message identifier</b>	pi 16
<b>Metadata source</b>	Direct
<b>Descriptive name</b>	PiDepartTimeAtLastStop_message
<b>Descriptive name context</b>	Manage Transit
<b>Definition</b>	The time a PTV left the last stop point zone. (Note: The time a passenger vehicle left the stop point zone and closed the doors may not be at the same time.)
<b>Source</b>	
<b>Class name</b>	PI
<b>Classification scheme name</b>	TCIP
<b>Classification scheme version</b>	NTCIP 1400
<b>Data concept type</b>	Message
<b>Keyword</b>	
<b>Related data concept</b>	
<b>Relationship type</b>	
<b>Remarks</b>	
<b>Symbolic name</b>	
<b>Symbolic name usage</b>	
<b>ASN1 Name</b>	PiDepartAtLastStop
<b>Constraints</b>	
<b>Message body</b>	<pre> PiDepartAtLastStop ::= SEQUENCE {   departTimeAtLastStop OB-StopPointZoneExit,   stopID CPT-StopPointID,   routeID SCH-RouteID OPTIONAL,   routeName SCH-RouteName OPTIONAL,   routeDirection SCH-RouteDirectionID OPTIONAL,   tripID SCH-TripID OPTIONAL,   vehicleID CPT-PTVehicleID OPTIONAL,   tolerance OB-ConfidenceMeasure OPTIONAL -- measurement is in seconds </pre>

```
} (WITH COMPONENTS {..., routeID PRESENT})  
  WITH COMPONENTS {..., routeName PRESENT} )
```



**Section 5**  
**CONFORMANCE REQUIREMENTS**



**Annex A**  
**DATA ELEMENT/MESSAGE USE CROSS REFERENCE TABLE**

**(Informative)**



**Annex B**  
**ASN.1 Script**

**(Informative)**