

## 9. Region Data Management Frame

name [Region Data Management Frame]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	B1		Region Data Management Distribution Header		a
2	-	-	-			c
3	free	B2		Relation Management Table		a
4	-	-	-			c
5	free	B3		Common Traffic Condition Table	(1)	c

### (1) Common Traffic Condition Table

This table contains traffic codes that are common to all route planning data frames. The detail is similar to the description of Traffic Condition Table provided in Chapter 10.

### 9.1 Region Data Management Distribution Header

Level management records are placed, according to the level, so that higher level one will always precede lower level one. If a dummy region management record exists, the header always retains, in the first position, the level management record that designates the dummy region management record.

name [Region Data Management Distribution Header]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	SWS	Header Size	(1)	a
2	2	2	:B	Region Management Record Type Code	(2)	a
3	4	4	N	Total Number of Region Management Records	(3)	a
4	8	4	DSA	Address of Region Management Table	(4)	a
5	12	2	BS	Size of Region Management Table	(5)	a
6	14	12	C	File Name of Region Management Table	(6)	b
7	26	4	DSA	Address of Common Traffic Condition Table	(7)	b
8	30	2	BS	Size of Common Traffic Condition Table	(8)	b
9	32	12	C	File Name of Common Traffic Condition Table	(9)	b
10	44	2	SWS	Common Traffic Condition Record Size	(9-1)	b
11	46	1	N	Total Number of Level Management Records	(10)	a
12	47	1		(RESERVED)		a
13	48	2	SWS	Level Management Record Size	(11)	a
14	50	16 * n		A Sequence of Level Management Records		a

### (1) Header Size

This field describes the size of the region data management distribution header. If the header entity does not exist, 0 is assigned to this field.

## (2) Region Management Record Type Code

No.	bit	Description
1	15 to 8	(RESERVED)
2	7 to 0	Represents the region management record type code. The value ranges from 0 to 254, and 255 is assigned to "null." How to manage region management records differs, according to the record type. The values more than 200 are assigned for the user extension type code.

## (3) Total Number of Region Management Records

This field describes the number of region management records that constitute a region management table managed by the region data management distribution header.

## (4) Address of Region Management Table

This field describes the storage location of a region management table managed by the region data management distribution header.

## (5) Size of Region Management Table

This field describes the size of a region management table managed by the region data management distribution header.

## (6) File Name of Region Management Table

If a file is used to store the region management table managed by the region data management distribution header, the file name setting must be specified. Specify the file name setting in 12 bytes including its extension. Left justify the setting and pad space with 00(16). If no file information is required, pad all the area of 12 bytes with 00(16).

## (7) Address of Common Traffic Condition Table

This field describes the storage location of a common traffic condition table managed by the region data management distribution header.

## (8) Size of Common Traffic Condition Table

This field describes the size of a common traffic condition table managed by the region data management distribution header.

## (9) File Name of Common Traffic Condition Table

If a file is used to store the common traffic condition table managed by the region data management distribution header, the file name setting must be specified. Specify the file name setting in 12 bytes including its extension. Left justify the setting and pad space with 00(16). If no file information is required, pad all space of 12 bytes with 00(16).

## (9-1) Common Traffic Condition Record Size

Designates the size of common traffic condition records that constitute the common traffic condition table.

## (10) Total Number of Level Management Records

This field describes the number of level management records managed by the region data management distribution header.

## (11) Level Management Record Size

This field describes one record size of the level management records managed by the region data management distribution header. If the level management records have no expansion data, the record size is set with 8 (16) bytes. If the records have expansion fields, the record size including the expansion fields must be described.

### 9.1.1 Level Management Record

The number of levels that can be managed is a maximum of eight, except the dummy record.

name [Level Management Record]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	2	I:	Level Code	( 1 )	b
2	2	2	N	Total Number of Region Management Records	( 2 )	a
3	4	2	SWS	Region Management Record Size	(3)	a
3	6	2	SWS	Node Record Size	(4)	a
4	8	2	SWS	Link Record Size	(5)	a
5	10	2	SWS	Link Cost Record Size	(6)	a
6	12	2	SWS	Between-links Restriction Record Size	(7)	a
7	14	2	SWS	Size of Between-links Cost Record	(8)	a
8				(Expansion Field)	(9)	c

#### (1) Level Code

No.	bit	Description
1	15 to 10	Represents a level managed by the region management record. Level code representation falls within the range from -31 to +31, and -32 is assigned to "null." Set -32 to designate a dummy region management record.
2	9 to 8	(RESERVED)
3	7 to 4	Number of Sequences of Basic Route Planning Data Frame Management Records (1-1)
4	3 to 0	Number of sequences of extended Route Planning Data Frame Management Records (1-1)

#### (1-1) Number of Sequences of Basic and Extended Route Planning Data Frame Management Records

For each level, set the number of sequences of basic and extended route planning data frames.

If the set number is smaller than the number of sequences defined in META, data frames are removed from the tail of the basic and extended route planning data frame sequences of that level. Thus, the #n and #m number of sequences of route planning distribution header items 4 and 5 are equal to the settings in these fields.

#### (2) Total Number of Region Management Records

This field describes the total number of region management records for the regions that constitute the level managed by the level management record.

#### (3) Region Management Record Size

This field describes one record size of region management records for the regions that constitute the level managed by the level management record.

#### (4) Node Record Size

This field describes the size of node records for the route planing data frames of that level. If the node records have no expansion data, the record size is set with 3 (6) bytes. If the records have expansion fields, the record size including the expansion fields must be described.

(5) Link Record Size

This field describes the link record size. This is limited to the link record size for non-boundary node records. If the link records have no expansion data, the record size is set with 3 (6) bytes. If the records have expansion fields, the record size including the expansion fields must be described.

(6) Link Cost Record Size

This field describes the size of the fixed-length part of link cost records for route planning data frames of that level. If the link cost records have no expansion data, the record size is set with 6 (12) bytes. If the records have expansion fields, the record size including the expansion fields must be described.

(7) Size of Between-links Restriction Record

This field describes the size of between-links restriction record for route planning data frames of that level. If these records have no expansion data, the record size is set with 1 byte (2 bytes). If the records have expansion fields, the record size including the expansion fields must be described.

(8) Size of Between-links Cost Record

This field describes the size of between-links cost records for route planning data frames of that level. If these records have no expansion data, the record size is set with 2 (4) bytes. If the records have expansion fields, the record size including the expansion fields must be described.

(9) Expansion Field

Determine whether expansion fields exist, referring to the level management record size described in the appropriate region data management distribution header.

## 9.2 Region Management Table

Region management records are placed in sequence in which higher level records always precede lower ones. The region management records of the same level are placed in the ascending order of region numbers. The first region management record of the level is assigned region number 0 when stored and each subsequent record is assigned a region number, according to its storage order relative to the first record. For further information about the region-numbering rule, see supplement 2 in this chapter.

name [Region Management Table]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0			A Sequence of Region Management Records	( 1 )	a

### (1) A Sequence of Region Management Records

The region management table retains the management information including region data storage address, size, range, and mutual relationship between levels (tree structure). A first stored region management record is the root of the tree structure. If multiple regions exist at the uppermost level, place a dummy region management record at the top of the tree so that only a single root always exists.

### 9.2.1 Region Management Record

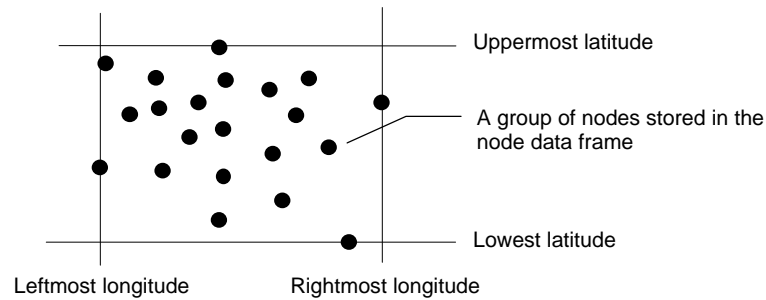
name [Region Management Record]

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	3	B:N	Uppermost Latitude of Region	(1)	b
2	3	3	B:N	Lowest Latitude of Region	(1)	b
3	6	3	B:N	Leftmost Longitude of Region	(1)	b
4	9	3	B:N	Rightmost Longitude of Region	(1)	b
5	12	2	N	The Corresponding Higher Level Region Number	(2)	b
6	14	2	N	Foremost Number of the Corresponding Lower-level Region	(3)	b
7	16	2	N	Number of Lower-level Regions	(4)	b
8	18	?*m		Data Storage Location Record	(5)	a
9	01			(Expansion Field)	(6)	c

### (1) Longitudes and Latitudes of Region

The respective contents of No. 1 to No. 4 fields of a region management record correspond to uppermost and lowest latitudes and leftmost and rightmost longitudes of the area in which a group of nodes exist that are stored in the node data frame for the region (route planning data frame) managed by the region management record. For a dummy region management record, these longitude and latitude fields contain FFFFFFFF(16).

No.	bit	Description		
1	23	North/South Latitude or West/East Longitude Flag	bit23	Meaning
			0	North latitude or east longitude
			1	South latitude or west longitude
2	22 to 0	Latitude or longitude is represented in 1/8-second units		



**Figure 9-1 Nodes included in Node Data Frame**

(2) The Corresponding Higher Level Region Number

This field describes the number specific to the region that is one level higher than the region managed by the region management record. This region number represents the storage order of its record, relative to the first positioned region management record numbered 0 of that level. The content of this field may represent any of region numbers 0 to 65534, and 65535 is assigned to "null." For the region management record at the top of the region management table, this field contains 65535, because it does not have a higher-level region.

(3) Foremost Number of the Corresponding Lower-level Region

This field describes the youngest region number among the regions constituting the level that is one level lower than the region managed by the region management record. This region number represents the storage order of its record, relative to the first positioned region management record numbered 0 of that level. The content of this field may represent any of region numbers 0 to 65534, and 65535 is assigned to "null." For the lowest level region management record, this field contains 65535, because it does not have a lower-level region.

(4) Number of Lower-level Regions

This field describes the number of the regions that constitute the level that is one level lower than the level of the region managed by the region management record.

(5) Data Storage Location Record

This field describes the address and size of real data (route planning data frame) for the region managed by the region management record. The information to be stored is defined, according to the "region management record type code."

(6) Expansion Field

Determine whether expansion fields exist, referring to the region management record size specified as one of the level management information.

**9.2.1.1 Data Storage Location Record (When the Region Management Record Type Code = 0)**

name [Data Storage Location record] (When the Region Management Record Type Code = 0)

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	4	DSA	Address of Route Planning Data Frame	(1)	b
2	4	2	BS	Size of Route Planning Data Frame	(2)	b

**(1) Top Address of Route Planning Data Frame**

This field describes the storage location of the real data (route planning data frame) for the region managed by the region management record. In the absence of that region, assign FFFFFFFF(16).

**(2) Size of Route Planning Data Frame**

This field describes the size of the real data (route planning data frame) for the region managed by the region management record. In the absence of that region, set the above address at FFFFFFFF(16) and assign 0000(16) for size.

**9.2.1.2 Data Storage Location Record (When the Region Management Record Type Code = 1)**

name [Data Storage Location Record] (when the Region Management Record Type Code = 1)

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	4	DSA	Address of Route Planning Data Frame	(1)	b
2	4	2	BS	Size of Route Planning Data Frame	(2)	b
3	6	2	BS	Size of basic part of Route Planning Data Frame	(3)	b

**(1) Address of Route Planning Data Frame**

This field describes the storage location of the real data (route planning data frame) for the region managed by the region management record. If no target region exists, FFFFFFFF(16) is assigned to this field.

**(2) Size of Route Planning Data Frame**

This field describes the size of the real data (route planning data frame) for the region managed by the region management record. If no target region exists, FFFFFFFF(16) is assigned to the above address field and 0000(16) is assigned to this size field.

**(3) Size of Basic Part of Route Planning Data Frame**

This field describes the size of the area from the beginning of the distribution header to the trail of the basic data of the real data (route planning data frame) for the region managed by the region management record. If no target region exists, FFFFFFFF(16) is assigned to the above address field and 000(16) is assigned to this size field.

**9.2.1.3 Data Storage Location Record (when the Region Management Record Type Code = 100)**

name [Data Storage Location Record] (when the Region Management Record Type Code = 100)

No.	offset	Data length	Data type	Item name	Remarks	Classification
1	0	4	DSA	Address of Route Planning Data Frame	(1)	b
2	4	2	BS	Size of Route Planning Data Frame	(2)	b
3	6	12	C	File Name of Route Planning Data Frame	(3)	b

**(1) Top Address of Route Planning Data Frame**

This field describes the storage location of the real data (route planning data frame) for the region managed by the region management record. In the absence of that region, assign FFFFFFFF(16).

**(2) Size of Route Planning Data Frame**

This field describes the size of the real data (route planning data frame) for the region managed by the region management record. In the absence of that region, set the above address at FFFFFFFF(16) and assign 0000(16) for size.

**(3) File Name of Route Planning Data Frame**

If a file is used to store the real data (route planning data frame) for the region managed by the region management record, the content of the third field designates the file name. Specify the file name setting in 12 bytes including its extension. Left justify the setting and pad space with 00(16). If no file information is required, pad all space of 12 bytes with 00(16).



## 9.A Supplements

### Supplement 1: Hierarchical Structure of Regions

Route planning data is managed by arbitrary divided polygons called regions. The lower the regions hierarchical level, the smaller will be the divided regions. Lower-level regions should be created within the bounds of corresponding higher-level(parent) region(s).

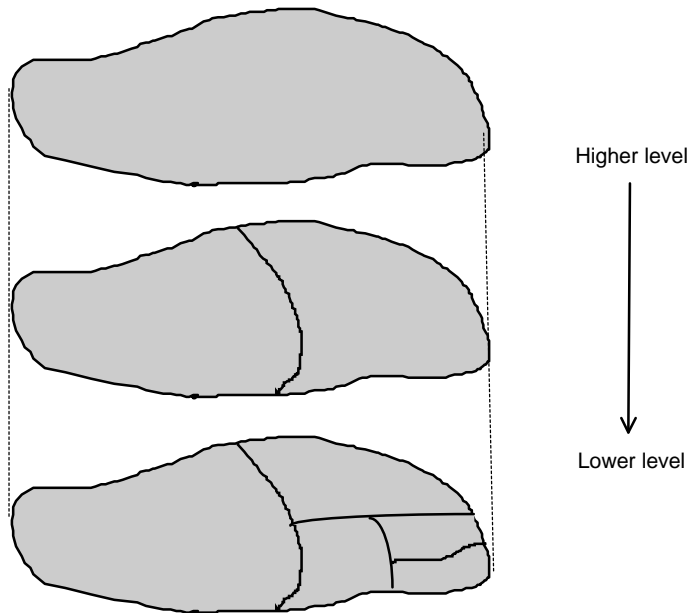


Figure 9-2 Hierarchical Structure of Regions

## Supplement 2: Region Hierarchical Structure and Management

Because regions are divided into arbitrary polygons, they are managed by using a tree structure in which their mutual relationship is simply described in hierarchy, top to down levels. All regions on the same level are assigned serial region numbers starting with 0. Regions connected to a one-level-higher region are always assigned successive numbers. Higher-level regions are assigned a number, according to the ascending order of the region numbers of their lower level constituent regions. Region management records of all levels are placed in the ascending order of the region numbers so that region data search can easily be executed. Thus, the region management records are stored in order, consistent with the sequence of the region numbers.

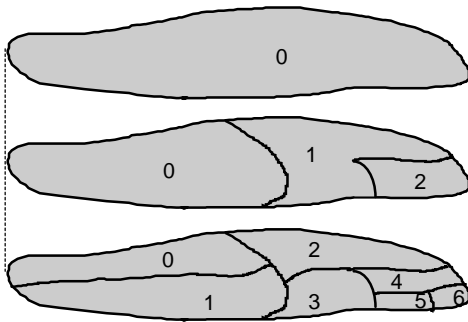


Figure 9-3 Divided Regions of Each Level

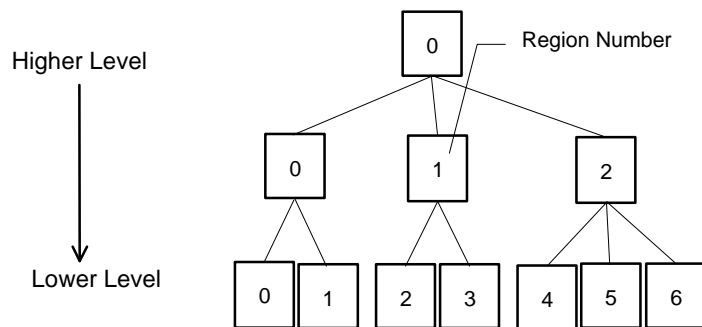


Figure 9-4 Tree Structure of Region Management Records

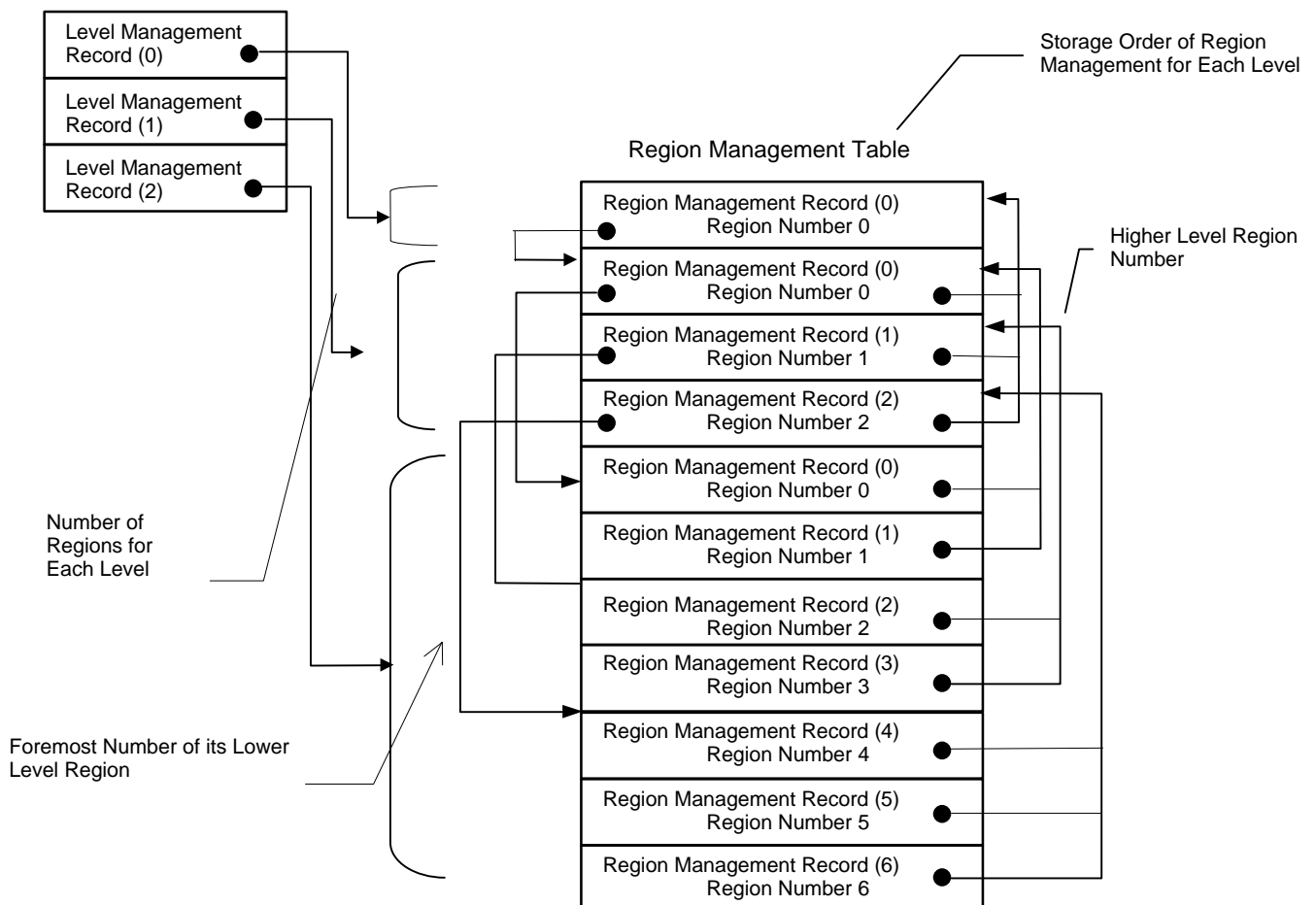


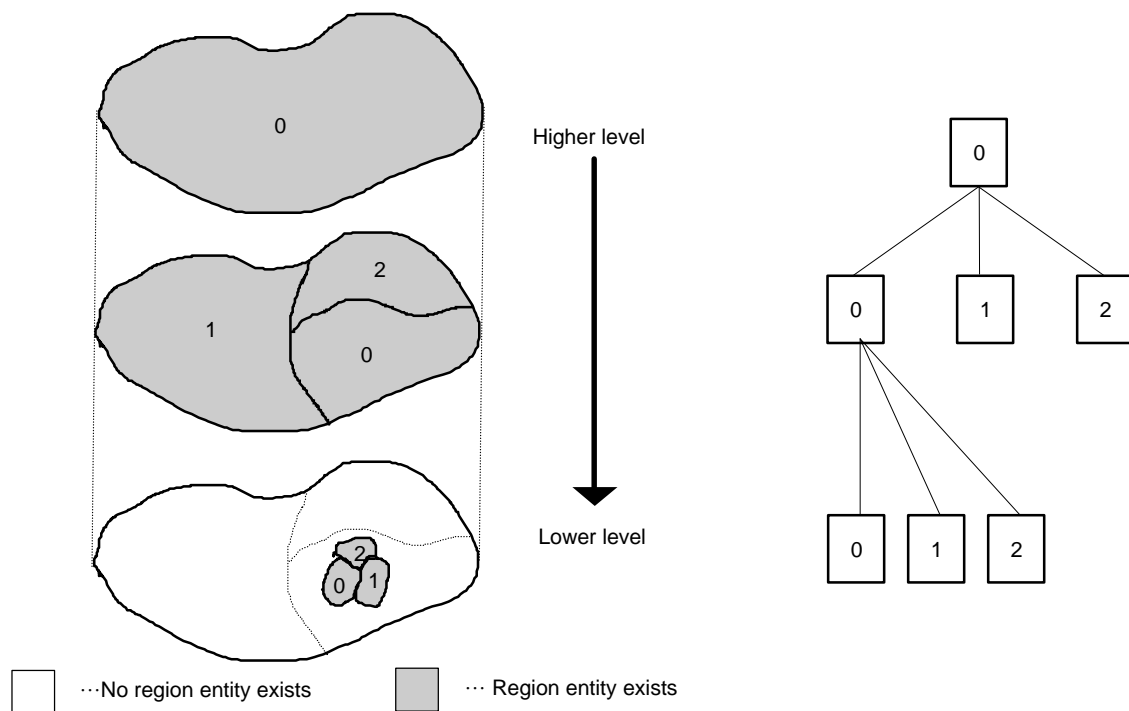
Figure 9-5 Region Management Table

**Supplement 3: For a case where Multiple Regions Exist at the Uppermost Level**

If multiple regions are required at the uppermost level, place another region management record on the top as a dummy root, so that the tree structure consisting of all region management records has one root. Assign level code -32 to this dummy region management record and write FFFFFFFF(16) in its fields of uppermost and lowest latitudes and leftmost and rightmost longitudes. Thus, differentiate this record from other region management records. At the same time, create a dummy level management record to provide virtual level -32 in correspondence with the dummy region management record.

**Supplement 4: For A Situation where No Corresponding Lower-level Region Exists**

For a region that has no corresponding lower regions, FFFF(16) is assigned to the field of foremost number of its lower-level region to indicate that no lower-level regions exist. If lower-level regions exist in a partial area of the parent region, region management records are created to indicate only the existent regions.



**Figure 9-6 For a Situation Where No Corresponding Lower-level Region Exists**