

General DDML document format

The general format of a DDML document looks as follows:

Tag	Description
<code><tables-definition></code>	Root element of a DDML document. Its children are the main database entities: <code><table-definition></code> , <code><ddl-definition></code> , and <code><view-definition></code> . The <code><tables-definition></code> tag includes the product attribute, which indicates the product of this specific DDML definition.
<code><table-definition></code>	Includes the table-level attributes. Its children are the following tags: <ul style="list-style-type: none"> <code><column-definition></code> <code><index-definition></code> <code><foreign-key-definition></code> <p>If a table is a statistics table, meaning that the type attribute has the value <code>STATISTICS</code>, the following tags can be specified as children of the <code><table-definition></code> tag:</p> <ul style="list-style-type: none"> <code><summary-hour></code> <code><summary-day></code> <code><summary-week></code> <code><summary-month></code>
<code><ddl-definition></code>	Includes ddl-level attributes.
<code><view-definition></code>	Includes view-level attributes.

`<tables-definition>` tag

Root element of the DDML document.

Attribute	Definition
product	<i>Required.</i> Holds the product short name (product shortcut) consisting of two characters that define the product. In this case, three custom-defined products are available: <ul style="list-style-type: none"> C1 For customer-defined 1 C2 For customer-defined 2 C3 For customer-defined 3

`<table-definition>` tag

Holds all of the information included in a single table.

Attribute	Definition
name	<i>Required.</i> Holds the table name.
type	<i>Required.</i> Specifies the table type and can hold one of the following values: <ul style="list-style-type: none"> Statistics. A PMDB table that holds information about certain database activity, summarized into hours or time slices. Events. A PMDB table that keeps a log of database incidents.
pctfree	<i>Optional.</i> Affects only Oracle and is developed as <code>PCTFREE pctfree</code> . Can have a value between 0 and 99. If the PMDB is a Microsoft SQL Server database, this attribute is transformed to <code>fill factor</code> .
pctused	<i>Optional.</i> Affects only Oracle and is developed as <code>PCTUSED pctused</code> . Can have a value between 0 and 99.
initrans	<i>Optional.</i> Affects only Oracle and is developed as <code>INITRANS initrans</code> . Can have a value between 1 and 255.
maxtrans	<i>Optional.</i> Affects only Oracle and is developed as <code>MAXTRANS maxtrans</code> . Can have a value between 1 and 255.

oracle-storage-clause	<i>Optional.</i> Affects only Oracle and is developed as STORAGE(<i>oracle-storage-clause</i>). For example: oracle-storage-clause="initial 1M next 1M minextents 1maxextents unlimited pctincrease 100"
oracle-additional-clause	<i>Optional.</i> Added to support any other Oracle features that cannot be defined in an Oracle storage clause. For example: NOLOGGING
filterable	Required for statistics tables (<i>type=STATISTICS</i>). If one or more columns are not relevant or needed in the PMDB, set this attribute to TRUE. If a statistics table is filterable and some columns are specified as not needed in the load or summary control files, these columns are not loaded or summarized.

The <table-definition> tag can have the following children:

- <column-definition>
- <index-definition>
- <foreign-key-definition>

If a table is a statistics table, meaning that the type attribute has the value STATISTICS, the following tags can be specified as children of the <table-definition> tag:

Additional Child	Definition
<summary-hour>	<i>Optional.</i> Instructs to define an hour-level summary table for this table. Used for time slice statistics tables. The name of the summary table is specified by the name attribute (<i>required</i>). The summary table name should follow the naming conventions specified in Naming conventions.
<summary-day>	<i>Optional.</i> Instructs to define a day-level summary table for this table. The name of the summary table is specified by the name attribute (<i>required</i>). The summary table name should follow the naming conventions specified in Naming conventions.
<summary-week>	<i>Optional.</i> Instructs to define a week-level summary table for this table. The name of the summary table is specified by the name attribute (<i>required</i>). The summary table name should follow the naming conventions specified in Naming conventions.
<summary-month>	<i>Optional.</i> Instructs to define a month-level summary table for this table. The name of the summary table is specified by the name attribute (<i>required</i>). The summary table name should follow the naming conventions specified in Naming conventions.

<column-definition> tag

Holds all the parameters of a column.

Attribute	Definition
name	<i>Required.</i> Holds the column name. The name should follow the naming conventions specified in Naming conventions.

data-type	<p><i>Required.</i> Holds the data type of a column:</p> <ul style="list-style-type: none"> • BOOLEAN Does not require <code>data-length</code> or <code>data-scale</code> attributes. These attributes should not be specified. Implementation on all DBMSs: <ul style="list-style-type: none"> ◦ <code>CHAR(1)</code> where T is the boolean <code>TRUE</code> value and F is <code>FALSE</code>. • CHAR Requires <code>data-length</code> attribute. Implementation on all DBMSs: <ul style="list-style-type: none"> ◦ <code>CHAR(data-length)</code> • CLOB Requires <code>data-length</code> attribute. Implementation: <ul style="list-style-type: none"> ◦ <code>TEXT</code> for Microsoft SQL Server ◦ <code>CLOB</code> for Oracle • DECIMAL Requires <code>data-length</code> (used for precision) and <code>data-scale</code> attributes. Implementation: <ul style="list-style-type: none"> ◦ <code>NUMBER(data-length, data-scale)</code> for Microsoft SQL Server and IBM UDB Oracle • FLOAT Requires <code>data-length</code> attribute. Implementation: <ul style="list-style-type: none"> ◦ <code>FLOAT(data-length)</code> for Microsoft SQL Server ◦ <code>NUMBER</code> without any parameters for Oracle • INTEGER Requires <code>data-length</code> attribute. Implementation: <ul style="list-style-type: none"> ◦ <code>data-length</code> less than three: <code>TINYINT</code>; <code>data-length</code> two-to-four: <code>SMALLINT</code>; <code>data-length</code> more than four: <code>BIGINT</code> for Microsoft SQL Server ◦ <code>NUMBER(data-length)</code> for Oracle • TIMESTAMP Does not require <code>data-length</code> or <code>data-scale</code> attributes. These attributes should not be specified. Implementation: <ul style="list-style-type: none"> ◦ <code>DATETIME</code> for Microsoft SQL Server ◦ <code>TIME</code> for Oracle • UNIQUE INTEGER Does not require <code>data-length</code> or <code>data-scale</code> attributes. These attributes should not be specified. This is a data type for a unique integer whose values are generated automatically. Implementation: <ul style="list-style-type: none"> ◦ <code>IDENTITY</code> for Microsoft SQL Server ◦ <code>NUMBER(20,0)</code> for Oracle. In addition, a <code>SEQUENCE</code> and a <code>TRIGGER BEFORE INSERT</code> are created, which select the <code>NEXTVAL</code> of the <code>SEQUENCE</code> from <code>DUAL</code>. • VARCHAR Requires the <code>data-length</code> attribute. Implementation: <ul style="list-style-type: none"> ◦ <code>VARCHAR(data-length)</code> for Microsoft SQL Server ◦ <code>VARCHAR2(data-length)</code> for Oracle • VARBINARY Requires the <code>data-length</code> attribute. Implementation: <ul style="list-style-type: none"> ◦ <code>VARBINARY(data-length)</code> for Microsoft SQL Server ◦ <code>RAW(data-length)</code> for Oracle
data-length	<p>Required only for the data types listed below. Specifies the column data length:</p> <ul style="list-style-type: none"> • CHAR • CLOB • DECIMAL • FLOAT • INTEGER • VARCHAR • VARBINARY
data-scale	<p>Required only for the data type <code>DECIMAL</code>. Specifies the column data scale.</p>
null	<p><i>Required.</i> Has the value <code>TRUE</code> if the column is nullable and <code>FALSE</code> if it is not.</p>
default	<p><i>Optional.</i> Specifies the column default. Can have the following values:</p> <ul style="list-style-type: none"> • <code>NULL</code> if the column is nullable (<code>null=TRUE</code>). • <code>N/A</code> if no default exists. If the attribute is omitted, this is the default. <p>A constant value that is equal to the column type:</p> <ul style="list-style-type: none"> • BOOLEAN <code>TRUE</code> or <code>FALSE</code> • CHAR A textual constant, such as <code>ABC</code> <code>CLOB</code>; a textual constant, such as <code>ABC</code> <code>DECIMAL</code>; or a decimal point constant, such as <code>10.3</code> • FLOAT A floating point constant, such as <code>12E7</code> • INTEGER An integer constant, such as <code>27</code> • TIMESTAMP One of the following: <ul style="list-style-type: none"> ◦ A timestamp constant of the format <code>yyyy-mm-dd hh:mm:ss.ffffffffff</code>, which is <code>jafa.sql.Timestamp</code>'s format, such as <code>2020-02-20 23:07:35:175000000</code>. Each DBMS displays a slightly different default. Implementation: <ul style="list-style-type: none"> ▪ <code>2020-02-20 23:07:35:175</code> for Microsoft SQL Server ▪ <code>TO_DATE('2020-02-20 23:07:35')</code> for Oracle ◦ The literal string <code>CURRENT_TIMESTAMP</code>. Implementation: <ul style="list-style-type: none"> ▪ <code>GETDATE()</code> for Microsoft SQL Server ▪ <code>SYSDATE</code> for Oracle • UNIQUE INTEGER Default value not required and not allowed. • VARCHAR A textual constant, such as <code>ABC</code> • VARBINARY A hex string where every two hexadecimal digits represent one byte, such as <code>A07C889F</code>. Each DBMS displays a slightly different default. Implementation: <ul style="list-style-type: none"> ◦ <code>0xA07C889F</code> for Microsoft SQL Server ◦ <code>HEXTORAW('A07C889F')</code> for Oracle

type	<p>Required for the column role in columns of statistics tables. Can have the following values:</p> <ul style="list-style-type: none"> • IDENTIFIER A column identifying the sampled entity. The concatenation of all identifiers should uniquely identify the entity. • DATE A column identifying the sampled period. Its type should be <code>TIMESTAMP</code> and be equal to the beginning of the sampled period. • SUM A statistics column whose transfer to a higher summary level (such as hourly to daily) should be applied by the <code>SUM</code> function. • MIN A statistics column whose transfer to a higher summary level (such as hourly to daily) should be applied by the <code>MIN</code> function. • MAX A statistics column whose transfer to a higher summary level (such as hourly to daily) should be applied by the <code>MAX</code> function. • AVG A statistics column whose transfer to a higher summary level (such as hourly to daily) should be applied by the <code>AVG</code> function.
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Columns required for statistics tables

If the table is a statistics table, you must include the following columns:

- `<column-definition name="<table shortcut>_TIMESTAMP" data-type="TIMESTAMP" null="FALSE" type="DATE"/>`
- `<column-definition name="<table shortcut>_MINUTES_COUNT_SUM" data-type="INTEGER" data-length="9" null="FALSE" type="SUM" default="1"/>`
- `<column-definition name="<table shortcut>_PWHG_ID" data-type="INTEGER" data-length="4" null="FALSE" type="IDENTIFIER"/>`
- `<column-definition name="<table shortcut>_PWII_INSTANCE_ID" data-type="INTEGER" data-length="9" null="FALSE" type="IDENTIFIER"/>`
- `<column-definition name="<table shortcut>_RECIEVED_TIMESTAMP" data-type="TIMESTAMP" null="FALSE" default="CURRENT_TIMESTAMP" type="DATE"/>`

 You must replace `<table shortcut>` with the four characters that represent the relevant table (see Table Shortcut).

<index-definition> tag

Holds all the parameters for an index definition.

Attribute	Definition
name	<i>Required.</i> Holds the index name. The name should follow the naming conventions specified in Naming conventions.
unique	<i>Required.</i> Has the value <code>TRUE</code> if the index is unique and <code>FALSE</code> if it is not.
primary	<p><i>Required.</i> Has the value <code>TRUE</code> if this is a primary index and <code>FALSE</code> if it is not. Implementation:</p> <ul style="list-style-type: none"> • <code>ALTER TABLE ADD CONSTRAINT</code> for Microsoft SQL Server. Adding a primary constraint in Microsoft SQL Server always results in creating a unique index to enforce the constraint. • An index is created using the <code>CREATE INDEX</code> statement for Oracle. Then an <code>ALTER TABLE ADD CONSTRAINT</code> is performed to add the primary constraint. The <code>ALTER TABLE ADD CONSTRAINT</code> is suffixed with the <code>USING INDEX</code> clause to instruct Oracle to use the already created index to enforce the constraint and not to create a new one.
clustered	<p><i>Optional.</i> Has the value <code>TRUE</code> if this is a clustered index and <code>FALSE</code> if it is not. The default is <code>FALSE</code>. A clustered index is an index that physically orders and organizes the table. Implementation:</p> <ul style="list-style-type: none"> • <code>CLUSTERED</code> clause for a clustered index, <code>NON CLUSTERED</code> clause for a non-clustered index in Microsoft SQL Server. • In Oracle, this feature is not used frequently; it requires a complete entity to handle clustering.
mssql-additional-clause	<i>Optional.</i> Only relevant for Microsoft SQL Server. Allows specifying every parameter defined in the "with" section.

<foreign-key-definition> tag

Holds all the parameters for a foreign-key definition.

Attribute	Definition
name	<i>Required.</i> Holds the foreign key constraint name. The name should follow the naming conventions specified in Naming conventions.
ref-table	Required for the table name referenced by the foreign key.
ref-columns	<i>Required.</i> Includes pairs of referencing and referenced columns separated by blanks.

on-delete	<p><i>Required.</i> Determines what action is taken if one or more rows in the referencing table point to a row in the referenced table that has been deleted. Can have the following values:</p> <ul style="list-style-type: none"> • CASCADE All rows pointing to the deleted row are also deleted. Implementation on all DBMSs: ON DELETE CASCADE • NO ACTION The deletion fails. Implementation: <ul style="list-style-type: none"> ◦ ON DELETE NO ACTION for Microsoft SQL Server ◦ No ON DELETE clause is specified for Oracle. This is the default.
on-update	<p><i>Required.</i> Determines what action is taken if one or more rows in the referencing table point to a row in the referenced table that has been updated. Can have the following values:</p> <ul style="list-style-type: none"> • CASCADE All rows pointing to the deleted row are also deleted. Implementation on all DBMSs: ON UPDATE CASCADE • NO ACTION The update fails. Implementation: <ul style="list-style-type: none"> ◦ ON UPDATE NO ACTION for Microsoft SQL Server ◦ No ON UPDATE clause is specified for Oracle. This is the default.

<ddl-definition> tag

Holds DDL (Data Definition Language) and DML (Data Manipulation Language) statements that can be performed during installation or uninstallation, such as stored procedures.

Attribute	Definition
statement	<i>Required.</i> Defines the DDL statement.
dbms	<p><i>Optional.</i> the RDBMS type on which the DDL generates. Must be one of the following:</p> <ul style="list-style-type: none"> • oracle • mssql • "" <p>If left empty (""), the DDL is created on all relational database management systems (RDBMS).</p>
version	<i>Optional.</i> The RDBMS version on which the DDL generates. Should have the format 8.1. . . . If left empty, the DDL is created on all RDBMS versions.
event	<p><i>Optional.</i> The RDBMS version on which the DDL generates. Must be one of the following:</p> <ul style="list-style-type: none"> • INSTALL <i>Default.</i> During the installation process only. • UNINSTALL During the uninstallation process only. • PREINSTALL Before the installation process. • PREUNINSTALL Before the uninstallation process.

<view-definition> tag

Holds all the parameters required for a view definition.

Attribute	Definition
name	<i>Required.</i> Holds the view name. The name should follow the naming conventions specified in Naming conventions.
type	<p><i>Required.</i> Specifies the view type and can hold one of the following values:</p> <ul style="list-style-type: none"> • STATISTICS A PMDB view that holds information about certain database activity, summarized into hours or time slices. • INTERNAL A PMDB view that keeps any other, non-statistical information.
view-columns	<i>Required.</i> Its value is in the view columns separated by blanks. The number of columns should be equal to the number selected in the as-query attribute.
as-query	<i>Required.</i> Specifies the select table that defines the view.
check-option	<i>Optional.</i> Default value is FALSE. If the value is TRUE, only modifications that are visible through the view are allowed, meaning that INSERT and UPDATE statements are valid only if the affected rows can be retrieved by the view afterward.