

DTD: Document Type Definition.

It is a document or file that describes the structure of a Web page written in XML. The description of the structure and the rules a SGML or XML document must satisfy. The DTD comprises the formal declaration of the elements that make up a document, their mutual coherence and meaning. DTD is Document Type Definition. You can store a DTD at the beginning of a document or externally in a separate file.

XML file + DTD file->Parser-> Yes or No

DTD states what tags and attributes are used to describe content in an SGML, XML or HTML document, where each tag is allowed, and which tags can appear within other tags. For example, in a Document Type Definition one could say that LIST tags can contain ITEM tags, but ITEM tags cannot contain LIST tags.

If an XML document has an associated document type definition and if the document complies with the constraints expressed in it, it is valid XML document. The document type definition must appear before the first element in the document. The name following the word DOCTYPE in the document type definition must match the name of root element. A Document Type Definition provides applications with advance notice of what names and structures can be used in a particular document type.

Why we need a DTD

XML is a language specification. Based on this specification, individuals and organizations develop their own markup languages, which they then use to communicate information with. When this information is transferred from source to destination, the destination:

- * Needs to know how the document is structured and
- * Needs to check if the content is indeed compliant with the structure

The Document Type Definition also known as DTD holds information about the structure of an XML document. In this chapter we will understand the important aspects of DTDs.

Why Use a DTD?

- A single DTD ensures a common format for each XML document that references it.
- An application can use a standard DTD to verify that data that it receives from the outside world is valid
- A description of legal, valid data further contributes to the interoperability and efficiency of using XML

DTDs let you say:

- What element types can occur and where
- What attributes each element type can have
- What notations are in use
- What external entities can be referenced

DTD can be declared inline in the XML document, or as an external reference.

Two types of document type declaration

- Internal DOCTYPE declaration
- External DOCTYPE declaration

Internal DOCTYPE declaration

If the DTD is included in an XML source file, it should be wrapped in a DOCTYPE definition.

After the line `<?xml version="1.0"?>` you must type

Syntax:

`<!DOCTYPE root-element [element-declarations]>`

Example:

```
<?xml version="1.0"?>
<!DOCTYPE note [
  <!ELEMENT note (to, from, heading, body)>
  <!ELEMENT to (#PCDATA)>
  <!ELEMENT from (#PCDATA)>
  <!ELEMENT heading (#PCDATA)>
  <!ELEMENT body (#PCDATA)>
]>
<note>
  <to>Sam</to>
  <from>Ros</from>
  <heading>Reminder</heading>
  <body>Don't forget me this weekend</body>
</note>
```

External DOCTYPE declaration

If the DTD is external to the XML source file, it should be wrapped in a DOCTYPE definition.

Syntax:

```
<!DOCTYPE root-element SYSTEM "filename">
```

Example: This is the same XML document as above, but with an external DTD.

```
<?xml version="1.0"?>
<!DOCTYPE note SYSTEM "note.dtd">
<note>
  <to>Sam</to>
  <from>Ros</from>
  <heading>Reminder</heading>
  <body>Don't forget me this weekend!</body>
</note>
```

This is a copy of the file "note.dtd" containing the DTD

```
<!ELEMENT note (to,from,heading,body)>
<!ELEMENT to (#PCDATA)>
<!ELEMENT from (#PCDATA)>
<!ELEMENT heading (#PCDATA)>
<!ELEMENT body (#PCDATA)>
```

Note: SYSTEM in the DTD declaration can be replaced by PUBLIC if the DTD is available via the Internet. You would then need to have a public name for the DTD in the file. For example, the W3Group uses DTDs for the various markup languages they recommend.

- 1) What do you mean by DTD?
- 2) Receiver can verify the content and structure of received XML file with the help of DTD file. Comment on this statement
- 3) Explain 2 types of DTDs. External doctype and internal doctype