Natural XML Toolkit

With Natural Version 4.1.2 for Mainframes, the XML Toolkit has been enhanced by the functionality provided in Natural for Windows/UNIX Version 6.1.

The following topics are covered:

- Purpose of the Natural XML Toolkit
- XML Toolkit on the Mainframe
- Natural XML Toolkit Functions
- Mapping Natural Data Definitions to DTDs
- Serializing the Data to XML
- Mapping DTDs to Natural Data Definitions
- Parsing the XML File and Assigning the Contents to a Natural Data Structure

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Purpose of the Natural XML Toolkit

The Natural XML Toolkit is a set of tools for XML processing that provides functionality required for the integration of XML processing into Natural. It improves the integration of Natural applications with XML, without requiring external software products.

The XML Toolkit can be considered an intermediate step towards the integration of XML processing into Natural. The next step would be the full integration of XML functionality into the Natural programming language.

The XML Toolkit consists of a set of Natural programs, some of which are available in source-code form. The XML Toolkit programs may be integrated into your Natural applications, thus providing access to XML data or supplying data from Natural in XML format.

XML Toolkit on the Mainframe

Natural for Mainframes does not support the REQUEST DOCUMENT statement. Therefore, XML documents have to be processed using Natural work file processing.

If, however, a computer running Natural Version 5 on UNIX, OpenVMS or Windows is accessible on the network, the REQUEST DOCUMENT statement can be executed on this remote machine, using a Natural Remote Procedure Call.

Natural XML Toolkit Functions

The XML Toolkit provides the following functions:

- **Mapping of Natural data definitions to DTDs, and vice versa.**
  DTDs (document type descriptions) are most commonly used to describe the structure of an XML document.
- **XML Token => Natural Data**
  After creating the Natural data structure, the XML document has to be parsed and saved into the data structure. An implementation for the XML "tokenizer" delivered will be generated. This tokenizer assigns the value of a data element to the corresponding data structure.
- **Natural Data => XML Document ("Serialization")**
  Serialization is the process of taking the data stored in the Natural data structures and creating an XML document according the description in the DTD.
- **Check data structure for:**
  - alternative elements,
  - range of values for attributes,
  - occurrences and boundaries of elements.

Mapping Natural Data Definitions to DTDs

The mapping of Natural data definitions to a DTD is the first step to bind Natural data structures to XML tags, and is required to implement a representation of Natural data as XML tags. The generated DTD is used later during the serialization to an XML document.

Serializing the Data to XML

During the execution of a Natural program, the fields defined in the DEFINE DATA statement are filled with real contents. During serialization, these contents are written to a dynamic variable in XML format using the previously generated DTD as input. The XML Toolkit also generates the program for the serialization of the data.

Mapping DTDs to Natural Data Definitions

The mapping of a DTD to Natural data structures shows the differences between the two. As the DTD does not specify how many records are to be included in the XML document, the XML Toolkit assumes a maximum number to be included. The application programmer may know the precise number and can adapt the data structure accordingly. A similar limitation exists with the length of the data: the DTD does not contain information about the length of the data in a record; therefore, the XML Toolkit generates fields in the data structure with a length of 253 (the current maximum length).

Parsing the XML File and Assigning the Contents to a Natural Data Structure

The XML Toolkit generates Natural code based on the DTD. This code represents a subroutine which is invoked from the Toolkit’s "tokenizer" to assign the contents of the tags in the XML document to the corresponding Natural data structure.

