

:mod:`xml.parsers.expat` --- Fast XML parsing using Expat

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 1); [backlink](#)

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 4)

Unknown directive type "module".

```
.. module:: xml.parsers.expat
   :synopsis: An interface to the Expat non-validating XML parser.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 7)

Unknown directive type "moduleauthor".

```
.. moduleauthor:: Paul Prescod <paul@prescod.net>
```

Warning

The `:mod:`pyexpat`` module is not secure against maliciously constructed data. If you need to parse untrusted or unauthenticated data see [:ref:`xml-vulnerabilities`](#).

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 21); [backlink](#)

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 21); [backlink](#)

Unknown interpreted text role "ref".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 26)

Unknown directive type "index".

```
.. index:: single: Expat
```

The `:mod:`xml.parsers.expat`` module is a Python interface to the Expat non-validating XML parser. The module provides a single extension type, `:class:`xmlparser``, that represents the current state of an XML parser. After an `:class:`xmlparser`` object has been created, various attributes of the object can be set to handler functions. When an XML document is then fed to the parser, the handler functions are called for the character data and markup in the XML document.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 28); [backlink](#)

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 28); [backlink](#)

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 28); [backlink](#)

Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 36)

Unknown directive type "index".

```
.. index:: module: pyexpat
```

This module uses the `mod:pyexpat` module to provide access to the Expat parser. Direct use of the `mod:pyexpat` module is deprecated.

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Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 38); [backlink](#)

Unknown interpreted text role "mod".

This module provides one exception and one type object:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 44)

Unknown directive type "exception".

```
.. exception:: ExpatError

    The exception raised when Expat reports an error. See section
    :ref:`expaterror-objects` for more information on interpreting Expat errors.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 50)

Unknown directive type "exception".

```
.. exception:: error

    Alias for :exc:`ExpatError`.
```

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Unknown directive type "data".

```
.. data:: XMLParserType

    The type of the return values from the :func:`ParserCreate` function.
```

The `mod:xml.parsers.expat` module contains two functions:

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Unknown interpreted text role "mod".

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Unknown directive type "function".

```
.. function:: ErrorString(errno)

    Returns an explanatory string for a given error number *errno*.
```

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Unknown directive type "function".

```
.. function:: ParserCreate(encoding=None, namespace_separator=None)

    Creates and returns a new :class:`xmlparser` object. *encoding*, if specified,
    must be a string naming the encoding used by the XML data. Expat doesn't
    support as many encodings as Python does, and its repertoire of encodings can't
    be extended; it supports UTF-8, UTF-16, ISO-8859-1 (Latin1), and ASCII. If
    *encoding* [1]_ is given it will override the implicit or explicit encoding of the
    document.

    Expat can optionally do XML namespace processing for you, enabled by providing a
    value for *namespace_separator*. The value must be a one-character string; a
    :exc:`ValueError` will be raised if the string has an illegal length (``None``
    is considered the same as omission). When namespace processing is enabled,
    element type names and attribute names that belong to a namespace will be
    expanded. The element name passed to the element handlers
```

:attr:`StartElementHandler` and :attr:`EndElementHandler` will be the concatenation of the namespace URI, the namespace separator character, and the local part of the name. If the namespace separator is a zero byte (`chr(0)`) then the namespace URI and the local part will be concatenated without any separator.

For example, if `*namespace_separator*` is set to a space character (`' '`) and the following document is parsed:

```
.. code-block:: xml
```

```
<?xml version="1.0"?>
<root xmlns = "http://default-namespace.org/"
      xmlns:py = "http://www.python.org/ns/">
  <py:elem1 />
  <elem2 xmlns="" />
</root>
```

:attr:`StartElementHandler` will receive the following strings for each element::

```
http://default-namespace.org/ root
http://www.python.org/ns/ elem1
elem2
```

Due to limitations in the `Expat` library used by :mod:`pyexpat`, the :class:`xmlparser` instance returned can only be used to parse a single XML document. Call `ParserCreate` for each document to provide unique parser instances.

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Unknown directive type "seealso".

```
.. seealso::
```

```
`The Expat XML Parser <http://www.libexpat.org/>`_
  Home page of the Expat project.
```

XMLParser Objects

:class:`xmlparser` objects have the following methods:

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Unknown interpreted text role "class".

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Unknown directive type "method".

```
.. method:: xmlparser.Parse(data[, isfinal])
```

Parses the contents of the string `*data*`, calling the appropriate handler functions to process the parsed data. `*isfinal*` must be true on the final call to this method; it allows the parsing of a single file in fragments, not the submission of multiple files. `*data*` can be the empty string at any time.

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Unknown directive type "method".

```
.. method:: xmlparser.ParseFile(file)
```

Parse XML data reading from the object `*file*`. `*file*` only needs to provide the `read(nbytes)` method, returning the empty string when there's no more data.

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Unknown directive type "method".

```
.. method:: xmlparser.SetBase(base)
```

Sets the base to be used for resolving relative URIs in system identifiers in declarations. Resolving relative identifiers is left to the application: this value will be passed through as the `*base*` argument to the

```
:func:`ExternalEntityRefHandler`, :func:`NotationDeclHandler`, and  
:func:`UnparsedEntityDeclHandler` functions.
```

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Unknown directive type "method".

```
.. method:: xmlparser.GetBase()
```

Returns a string containing the base set by a previous call to :meth:`SetBase`, or ``None`` if :meth:`SetBase` hasn't been called.

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Unknown directive type "method".

```
.. method:: xmlparser.GetInputContext()
```

Returns the input data that generated the current event as a string. The data is in the encoding of the entity which contains the text. When called while an event handler is not active, the return value is ``None``.

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Unknown directive type "method".

```
.. method:: xmlparser.ExternalEntityParserCreate(context[, encoding])
```

Create a "child" parser which can be used to parse an external parsed entity referred to by content parsed by the parent parser. The *context* parameter should be the string passed to the :meth:`ExternalEntityRefHandler` handler function, described below. The child parser is created with the :attr:`ordered_attributes` and :attr:`specified_attributes` set to the values of this parser.

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Unknown directive type "method".

```
.. method:: xmlparser.SetParamEntityParsing(flag)
```

Control parsing of parameter entities (including the external DTD subset). Possible *flag* values are :const:`XML_PARAM_ENTITY_PARSING_NEVER`, :const:`XML_PARAM_ENTITY_PARSING_UNLESS_STANDALONE` and :const:`XML_PARAM_ENTITY_PARSING_ALWAYS`. Return true if setting the flag was successful.

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Unknown directive type "method".

```
.. method:: xmlparser.UseForeignDTD([flag])
```

Calling this with a true value for *flag* (the default) will cause Expat to call the :attr:`ExternalEntityRefHandler` with :const:`None` for all arguments to allow an alternate DTD to be loaded. If the document does not contain a document type declaration, the :attr:`ExternalEntityRefHandler` will still be called, but the :attr:`StartDoctypeDeclHandler` and :attr:`EndDoctypeDeclHandler` will not be called.

Passing a false value for *flag* will cancel a previous call that passed a true value, but otherwise has no effect.

This method can only be called before the :meth:`Parse` or :meth:`ParseFile` methods are called; calling it after either of those have been called causes :exc:`ExpatError` to be raised with the :attr:`code` attribute set to ``errors.codes[errors.XML_ERROR_CANT_CHANGE_FEATURE_ONCE_PARSING]``.

:class:`xmlparser` objects have the following attributes:

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Unknown interpreted text role "class".

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main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 202)

Unknown directive type "attribute".

```
.. attribute:: xmlparser.buffer_size
```

The size of the buffer used when :attr:`buffer_text` is true.
A new buffer size can be set by assigning a new integer value
to this attribute.
When the size is changed, the buffer will be flushed.

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.buffer_text
```

Setting this to true causes the :class:`xmlparser` object to buffer textual content returned by Expat to avoid multiple calls to the :meth:`CharacterDataHandler` callback whenever possible. This can improve performance substantially since Expat normally breaks character data into chunks at every line ending. This attribute is false by default, and may be changed at any time.

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.buffer_used
```

If :attr:`buffer_text` is enabled, the number of bytes stored in the buffer. These bytes represent UTF-8 encoded text. This attribute has no meaningful interpretation when :attr:`buffer_text` is false.

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.ordered_attributes
```

Setting this attribute to a non-zero integer causes the attributes to be reported as a list rather than a dictionary. The attributes are presented in the order found in the document text. For each attribute, two list entries are presented: the attribute name and the attribute value. (Older versions of this module also used this format.) By default, this attribute is false; it may be changed at any time.

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.specified_attributes
```

If set to a non-zero integer, the parser will report only those attributes which were specified in the document instance and not those which were derived from attribute declarations. Applications which set this need to be especially careful to use what additional information is available from the declarations as needed to comply with the standards for the behavior of XML processors. By default, this attribute is false; it may be changed at any time.

The following attributes contain values relating to the most recent error encountered by an :class:`xmlparser` object, and will only have correct values once a call to :meth:`Parse` or :meth:`ParseFile` has raised an :exc:`xml.parsers.expat.ExpatError` exception.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 247); [backlink](#)

Unknown interpreted text role "class".

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Unknown interpreted text role "meth".

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Unknown interpreted text role "meth".

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Unknown interpreted text role "exc".

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.ErrorByteIndex

    Byte index at which an error occurred.
```

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.ErrorCode

    Numeric code specifying the problem. This value can be passed to the
    :func:`ErrorString` function, or compared to one of the constants defined in the
    ``errors`` object.
```

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.ErrorColumnNumber

    Column number at which an error occurred.
```

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.ErrorLineNumber

    Line number at which an error occurred.
```

The following attributes contain values relating to the current parse location in an `:class:`xmlparser`` object. During a callback reporting a parse event they indicate the location of the first of the sequence of characters that generated the event. When called outside of a callback, the position indicated will be just past the last parse event (regardless of whether there was an associated callback).

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Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 282)

Unknown directive type "attribute".

```
.. attribute:: xmlparser.CurrentByteIndex

    Current byte index in the parser input.
```

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Unknown directive type "attribute".

```
.. attribute:: xmlparser.CurrentColumnNumber

    Current column number in the parser input.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 292)

Unknown directive type "attribute".

```
.. attribute:: xmlparser.CurrentLineNumber

    Current line number in the parser input.
```

Here is the list of handlers that can be set. To set a handler on an `xmlparser` object *o*, use `o.handlername = func`. *handlername* must be taken from the following list, and *func* must be a callable object accepting the correct number of arguments. The arguments are all strings, unless otherwise stated.

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Unknown interpreted text role "class".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 303)

Unknown directive type "method".

```
.. method:: xmlparser.XmlDeclHandler(version, encoding, standalone)

    Called when the XML declaration is parsed. The XML declaration is the
    (optional) declaration of the applicable version of the XML recommendation, the
    encoding of the document text, and an optional "standalone" declaration.
    *version* and *encoding* will be strings, and *standalone* will be ``1`` if the
    document is declared standalone, ``0`` if it is declared not to be standalone,
    or ``-1`` if the standalone clause was omitted. This is only available with
    Expat version 1.95.0 or newer.
```

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Unknown directive type "method".

```
.. method:: xmlparser.StartDoctypeDeclHandler(doctypeName, systemId, publicId, has_internal_subset)

    Called when Expat begins parsing the document type declaration (``<!DOCTYPE
    ...``). The *doctypeName* is provided exactly as presented. The *systemId* and
    *publicId* parameters give the system and public identifiers if specified, or
    ``None`` if omitted. *has_internal_subset* will be true if the document
    contains and internal document declaration subset. This requires Expat version
    1.2 or newer.
```

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Unknown directive type "method".

```
.. method:: xmlparser.EndDoctypeDeclHandler()

    Called when Expat is done parsing the document type declaration. This requires
    Expat version 1.2 or newer.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 330)

Unknown directive type "method".

```
.. method:: xmlparser.ElementDeclHandler(name, model)

    Called once for each element type declaration. *name* is the name of the
    element type, and *model* is a representation of the content model.
```

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Unknown directive type "method".

```
.. method:: xmlparser.AtlistDeclHandler(ename, attname, type, default, required)

    Called for each declared attribute for an element type. If an attribute list
    declaration declares three attributes, this handler is called three times, once
    for each attribute. *ename* is the name of the element to which the
    declaration applies and *attname* is the name of the attribute declared. The
    attribute type is a string passed as *type*; the possible values are
    ``CDATA``, ``ID``, ``IDREF``, ... *default* gives the default value for
    the attribute used when the attribute is not specified by the document instance,
    or ``None`` if there is no default value (``#IMPLIED`` values). If the
    attribute is required to be given in the document instance, *required* will be
    true. This requires Expat version 1.95.0 or newer.
```

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Unknown directive type "method".

```
.. method:: xmlparser.StartElementHandler(name, attributes)

    Called for the start of every element. *name* is a string containing the
    element name, and *attributes* is the element attributes. If
    :attr:`ordered_attributes` is true, this is a list (see
    :attr:`ordered_attributes` for a full description). Otherwise it's a
    dictionary mapping names to values.
```

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Unknown directive type "method".

```
.. method:: xmlparser.EndElementHandler(name)

    Called for the end of every element.
```

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Unknown directive type "method".

```
.. method:: xmlparser.ProcessingInstructionHandler(target, data)

    Called for every processing instruction.
```

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Unknown directive type "method".

```
.. method:: xmlparser.CharacterDataHandler(data)

    Called for character data. This will be called for normal character data, CDATA
    marked content, and ignorable whitespace. Applications which must distinguish
    these cases can use the :attr:`StartCdataSectionHandler`,
    :attr:`EndCdataSectionHandler`, and :attr:`ElementDeclHandler` callbacks to
    collect the required information.
```

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Unknown directive type "method".

```
.. method:: xmlparser.UnparsedEntityDeclHandler(entityName, base, systemId, publicId, notationName)

    Called for unparsed (NDATA) entity declarations. This is only present for
    version 1.2 of the Expat library; for more recent versions, use
    :attr:`EntityDeclHandler` instead. (The underlying function in the Expat
    library has been declared obsolete.)
```

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Unknown directive type "method".

```
.. method:: xmlparser.EntityDeclHandler(entityName, is_parameter_entity, value, base, systemId, publicId, notationName)

    Called for all entity declarations. For parameter and internal entities,
    *value* will be a string giving the declared contents of the entity; this will
    be ``None`` for external entities. The *notationName* parameter will be
    ``None`` for parsed entities, and the name of the notation for unparsed
    entities. *is_parameter_entity* will be true if the entity is a parameter entity
    or false for general entities (most applications only need to be concerned with
    general entities). This is only available starting with version 1.95.0 of the
    Expat library.
```

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Unknown directive type "method".

```
.. method:: xmlparser.NotationDeclHandler(notationName, base, systemId, publicId)
```


Called for notation declarations. *notationName*, *base*, and *systemId*, and *publicId* are strings if given. If the public identifier is omitted, *publicId* will be ``None``.

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Unknown directive type "method".

```
.. method:: xmlparser.StartNamespaceDeclHandler(prefix, uri)
```

Called when an element contains a namespace declaration. Namespace declarations are processed before the :attr:`StartElementHandler` is called for the element on which declarations are placed.

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Unknown directive type "method".

```
.. method:: xmlparser.EndNamespaceDeclHandler(prefix)
```

Called when the closing tag is reached for an element that contained a namespace declaration. This is called once for each namespace declaration on the element in the reverse of the order for which the :attr:`StartNamespaceDeclHandler` was called to indicate the start of each namespace declaration's scope. Calls to this handler are made after the corresponding :attr:`EndElementHandler` for the end of the element.

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Unknown directive type "method".

```
.. method:: xmlparser.CommentHandler(data)
```

Called for comments. *data* is the text of the comment, excluding the leading ``<!--`` and trailing ``-->``.

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Unknown directive type "method".

```
.. method:: xmlparser.StartCdataSectionHandler()
```

Called at the start of a CDATA section. This and :attr:`EndCdataSectionHandler` are needed to be able to identify the syntactical start and end for CDATA sections.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 435)

Unknown directive type "method".

```
.. method:: xmlparser.EndCdataSectionHandler()
```

Called at the end of a CDATA section.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 440)

Unknown directive type "method".

```
.. method:: xmlparser.DefaultHandler(data)
```

Called for any characters in the XML document for which no applicable handler has been specified. This means characters that are part of a construct which could be reported, but for which no handler has been supplied.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 447)

Unknown directive type "method".

```
.. method:: xmlparser.DefaultHandlerExpand(data)
```

This is the same as the `:func:`DefaultHandler``, but doesn't inhibit expansion of internal entities. The entity reference will not be passed to the default handler.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 454)

Unknown directive type "method".

```
.. method:: xmlparser.NotStandaloneHandler()
```

Called if the XML document hasn't been declared as being a standalone document. This happens when there is an external subset or a reference to a parameter entity, but the XML declaration does not set standalone to ```yes``` in an XML declaration. If this handler returns ```0```, then the parser will raise an `:const:`XML_ERROR_NOT_STANDALONE`` error. If this handler is not set, no exception is raised by the parser for this condition.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 464)

Unknown directive type "method".

```
.. method:: xmlparser.ExternalEntityRefHandler(context, base, systemId, publicId)
```

Called for references to external entities. `*base*` is the current base, as set by a previous call to `:meth:`SetBase``. The public and system identifiers, `*systemId*` and `*publicId*`, are strings if given; if the public identifier is not given, `*publicId*` will be ```None```. The `*context*` value is opaque and should only be used as described below.

For external entities to be parsed, this handler must be implemented. It is responsible for creating the sub-parser using ```ExternalEntityParserCreate(context)```, initializing it with the appropriate callbacks, and parsing the entity. This handler should return an integer; if it returns ```0```, the parser will raise an `:const:`XML_ERROR_EXTERNAL_ENTITY_HANDLING`` error, otherwise parsing will continue.

If this handler is not provided, external entities are reported by the `:attr:`DefaultHandler`` callback, if provided.

ExpatError Exceptions

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 489)

Unknown directive type "sectionauthor".

```
.. sectionauthor:: Fred L. Drake, Jr. <fdrake@acm.org>
```

`:exc:`ExpatError`` exceptions have a number of interesting attributes:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 492); [backlink](#)

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 495)

Unknown directive type "attribute".

```
.. attribute:: ExpatError.code
```

Expat's internal error number for the specific error. The `:data:`errors.messages`` `<xml.parsers.expat.errors.messages>` dictionary maps these error numbers to Expat's error messages. For example::

```
from xml.parsers.expat import ParserCreate, ExpatError, errors

p = ParserCreate()
try:
    p.Parse(some_xml_document)
except ExpatError as err:
    print("Error:", errors.messages[err.code])
```

The `:mod:`~xml.parsers.expat.errors`` module also provides error message constants and a dictionary `:data:`~xml.parsers.expat.errors.codes`` mapping these messages back to the error codes, see below.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 514)

Unknown directive type "attribute".

```
.. attribute:: ExpatError.lineno

    Line number on which the error was detected.  The first line is numbered ``1``.
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 519)

Unknown directive type "attribute".

```
.. attribute:: ExpatError.offset

    Character offset into the line where the error occurred.  The first column is
    numbered ``0``.
```

Example

The following program defines three handlers that just print out their arguments.

```
import xml.parsers.expat

# 3 handler functions
def start_element(name, attrs):
    print('Start element:', name, attrs)
def end_element(name):
    print('End element:', name)
def char_data(data):
    print('Character data:', repr(data))

p = xml.parsers.expat.ParserCreate()

p.StartElementHandler = start_element
p.EndElementHandler = end_element
p.CharacterDataHandler = char_data

p.Parse("""<?xml version="1.0"?>
<parent id="top"><child1 name="paul">Text goes here</child1>
<child2 name="fred">More text</child2>
</parent>""", 1)
```

The output from this program is:

```
Start element: parent {'id': 'top'}
Start element: child1 {'name': 'paul'}
Character data: 'Text goes here'
End element: child1
Character data: '\n'
Start element: child2 {'name': 'fred'}
Character data: 'More text'
End element: child2
Character data: '\n'
End element: parent
```

Content Model Descriptions

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 573)

Unknown directive type "module".

```
.. module:: xml.parsers.expat.model
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 575)

Unknown directive type "sectionauthor".

```
.. sectionauthor:: Fred L. Drake, Jr. <fdrake@acm.org>
```

Content models are described using nested tuples. Each tuple contains four values: the type, the quantifier, the name, and a tuple of children. Children are simply additional content model descriptions.

The values of the first two fields are constants defined in the `mod:xml.parsers.expat.model` module. These constants can be collected in two groups: the model type group and the quantifier group.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 581); [backlink](#)

Unknown interpreted text role "mod".

The constants in the model type group are:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 588)

Unknown directive type "data".

```
.. data:: XML_CTYPE_ANY
   :noindex:
```

The element named by the model name was declared to have a content model of ``ANY``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 595)

Unknown directive type "data".

```
.. data:: XML_CTYPE_CHOICE
   :noindex:
```

The named element allows a choice from a number of options; this is used for content models such as ``(A | B | C)``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 602)

Unknown directive type "data".

```
.. data:: XML_CTYPE_EMPTY
   :noindex:
```

Elements which are declared to be ``EMPTY`` have this model type.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 608)

Unknown directive type "data".

```
.. data:: XML_CTYPE_MIXED
   :noindex:
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 612)

Unknown directive type "data".

```
.. data:: XML_CTYPE_NAME
   :noindex:
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 616)

Unknown directive type "data".

```
.. data:: XML_CTYPE_SEQ
   :noindex:
```

Models which represent a series of models which follow one after the other are indicated with this model type. This is used for models such as ``(A, B, C)``.

The constants in the quantifier group are:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 625)

Unknown directive type "data".

```
.. data:: XML_CQUANT_NONE
   :noindex:
```

No modifier is given, so it can appear exactly once, as for ``A``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 631)

Unknown directive type "data".

```
.. data:: XML_CQUANT_OPT
   :noindex:
```

The model is optional: it can appear once or not at all, as for ``A?``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 637)

Unknown directive type "data".

```
.. data:: XML_CQUANT_PLUS
   :noindex:
```

The model must occur one or more times (like ``A+``).

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 643)

Unknown directive type "data".

```
.. data:: XML_CQUANT_REP
   :noindex:
```

The model must occur zero or more times, as for ``A*``.

Expat error constants

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 654)

Unknown directive type "module".

```
.. module:: xml.parsers.expat.errors
```

The following constants are provided in the `mod:xml.parsers.expat.errors` module. These constants are useful in interpreting some of the attributes of the `exc:ExpatError` exception objects raised when an error has occurred. Since for backwards compatibility reasons, the constants' value is the error *message* and not the numeric error *code*, you do this by comparing its `attr:code` attribute with `samp:errors.codes[errors.XML_ERROR_{CONSTANT_NAME}]`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 656); [backlink](#)

Unknown interpreted text role "mod".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 656); [backlink](#)

Unknown interpreted text role "exc".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 656); [backlink](#)

Unknown interpreted text role "attr".

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 656); [backlink](#)

Unknown interpreted text role "samp".

The `errors` module has the following attributes:

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 666)

Unknown directive type "data".

```
.. data:: codes
```

A dictionary mapping string descriptions to their error codes.

```
.. versionadded:: 3.2
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-

main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 673)

Unknown directive type "data".

```
.. data:: messages
```

A dictionary mapping numeric error codes to their string descriptions.

```
.. versionadded:: 3.2
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 680)

Unknown directive type "data".

```
.. data:: XML_ERROR_ASYNC_ENTITY
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 683)

Unknown directive type "data".

```
.. data:: XML_ERROR_ATTRIBUTE_EXTERNAL_ENTITY_REF
```

An entity reference in an attribute value referred to an external entity instead of an internal entity.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 689)

Unknown directive type "data".

```
.. data:: XML_ERROR_BAD_CHAR_REF
```

A character reference referred to a character which is illegal in XML (for example, character ``0``, or ``�``).

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 695)

Unknown directive type "data".

```
.. data:: XML_ERROR_BINARY_ENTITY_REF
```

An entity reference referred to an entity which was declared with a notation, so cannot be parsed.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 701)

Unknown directive type "data".

```
.. data:: XML_ERROR_DUPLICATE_ATTRIBUTE
```

An attribute was used more than once in a start tag.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 706)

Unknown directive type "data".

```
.. data:: XML_ERROR_INCORRECT_ENCODING
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 709)

Unknown directive type "data".

```
.. data:: XML_ERROR_INVALID_TOKEN
```

Raised when an input byte could not properly be assigned to a character; for example, a NUL byte (value ``0``) in a UTF-8 input stream.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-

main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 715)

Unknown directive type "data".

```
.. data:: XML_ERROR_JUNK_AFTER_DOC_ELEMENT
```

Something other than whitespace occurred after the document element.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 720)

Unknown directive type "data".

```
.. data:: XML_ERROR_MISPLACED_XML_PI
```

An XML declaration was found somewhere other than the start of the input data.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 725)

Unknown directive type "data".

```
.. data:: XML_ERROR_NO_ELEMENTS
```

The document contains no elements (XML requires all documents to contain exactly one top-level element)..

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 731)

Unknown directive type "data".

```
.. data:: XML_ERROR_NO_MEMORY
```

Expat was not able to allocate memory internally.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 736)

Unknown directive type "data".

```
.. data:: XML_ERROR_PARAM_ENTITY_REF
```

A parameter entity reference was found where it was not allowed.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 741)

Unknown directive type "data".

```
.. data:: XML_ERROR_PARTIAL_CHAR
```

An incomplete character was found in the input.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 746)

Unknown directive type "data".

```
.. data:: XML_ERROR_RECURSIVE_ENTITY_REF
```

An entity reference contained another reference to the same entity; possibly via a different name, and possibly indirectly.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 752)

Unknown directive type "data".

```
.. data:: XML_ERROR_SYNTAX
```

Some unspecified syntax error was encountered.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-

main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 757)

Unknown directive type "data".

```
.. data:: XML_ERROR_TAG_MISMATCH
```

An end tag did not match the innermost open start tag.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 762)

Unknown directive type "data".

```
.. data:: XML_ERROR_UNCLOSED_TOKEN
```

Some token (such as a start tag) was not closed before the end of the stream or the next token was encountered.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 768)

Unknown directive type "data".

```
.. data:: XML_ERROR_UNDEFINED_ENTITY
```

A reference was made to an entity which was not defined.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 773)

Unknown directive type "data".

```
.. data:: XML_ERROR_UNKNOWN_ENCODING
```

The document encoding is not supported by Expat.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 778)

Unknown directive type "data".

```
.. data:: XML_ERROR_UNCLOSED_CDATA_SECTION
```

A CDATA marked section was not closed.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 783)

Unknown directive type "data".

```
.. data:: XML_ERROR_EXTERNAL_ENTITY_HANDLING
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 786)

Unknown directive type "data".

```
.. data:: XML_ERROR_NOT_STANDALONE
```

The parser determined that the document was not "standalone" though it declared itself to be in the XML declaration, and the :attr:`NotStandaloneHandler` was set and returned ``0``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 793)

Unknown directive type "data".

```
.. data:: XML_ERROR_UNEXPECTED_STATE
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 796)

Unknown directive type "data".


```
.. data:: XML_ERROR_ENTITY_DECLARED_IN_PE
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 799)

Unknown directive type "data".

```
.. data:: XML_ERROR_FEATURE_REQUIRES_XML_DTD
```

An operation was requested that requires DTD support to be compiled in, but Expat was configured without DTD support. This should never be reported by a standard build of the :mod:`xml.parsers.expat` module.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 806)

Unknown directive type "data".

```
.. data:: XML_ERROR_CANT_CHANGE_FEATURE_ONCE_PARSING
```

A behavioral change was requested after parsing started that can only be changed before parsing has started. This is (currently) only raised by :meth:`UseForeignDTD`.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 813)

Unknown directive type "data".

```
.. data:: XML_ERROR_UNBOUND_PREFIX
```

An undeclared prefix was found when namespace processing was enabled.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 818)

Unknown directive type "data".

```
.. data:: XML_ERROR_UNDECLARING_PREFIX
```

The document attempted to remove the namespace declaration associated with a prefix.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 824)

Unknown directive type "data".

```
.. data:: XML_ERROR_INCOMPLETE_PE
```

A parameter entity contained incomplete markup.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 829)

Unknown directive type "data".

```
.. data:: XML_ERROR_XML_DECL
```

The document contained no document element at all.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 834)

Unknown directive type "data".

```
.. data:: XML_ERROR_TEXT_DECL
```

There was an error parsing a text declaration in an external entity.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 839)

Unknown directive type "data".

```
.. data:: XML_ERROR_PUBLICID
```

Characters were found in the public id that are not allowed.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 844)

Unknown directive type "data".

```
.. data:: XML_ERROR_SUSPENDED
```

The requested operation was made on a suspended parser, but isn't allowed. This includes attempts to provide additional input or to stop the parser.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 850)

Unknown directive type "data".

```
.. data:: XML_ERROR_NOT_SUSPENDED
```

An attempt to resume the parser was made when the parser had not been suspended.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 855)

Unknown directive type "data".

```
.. data:: XML_ERROR_ABORTED
```

This should not be reported to Python applications.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 860)

Unknown directive type "data".

```
.. data:: XML_ERROR_FINISHED
```

The requested operation was made on a parser which was finished parsing input, but isn't allowed. This includes attempts to provide additional input or to stop the parser.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 867)

Unknown directive type "data".

```
.. data:: XML_ERROR_SUSPEND_PE
```

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 870)

Unknown directive type "data".

```
.. data:: XML_ERROR_RESERVED_PREFIX_XML
```

An attempt was made to undeclare reserved namespace prefix ``xml`` or to bind it to another namespace URI.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\cpython-main [Doc] [library]pyexpat.rst, line 877)

Unknown directive type "data".

```
.. data:: XML_ERROR_RESERVED_PREFIX_XMLNS
```

An attempt was made to declare or undeclare reserved namespace prefix ``xmlns``.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-

main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 882)

Unknown directive type "data".

```
.. data:: XML_ERROR_RESERVED_NAMESPACE_URI
```

An attempt was made to bind the URI of one the reserved namespace prefixes ``xml`` and ``xmlns`` to another namespace prefix.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 888)

Unknown directive type "data".

```
.. data:: XML_ERROR_INVALID_ARGUMENT
```

This should not be reported to Python applications.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 893)

Unknown directive type "data".

```
.. data:: XML_ERROR_NO_BUFFER
```

This should not be reported to Python applications.

System Message: ERROR/3 (D:\onboarding-resources\sample-onboarding-resources\cpython-main\Doc\library\[cpython-main] [Doc] [library]pyexpat.rst, line 898)

Unknown directive type "data".

```
.. data:: XML_ERROR_AMPLIFICATION_LIMIT_BREACH
```

The limit on input amplification factor (from DTD and entities) has been breached.

Footnotes

- [1] The encoding string included in XML output should conform to the appropriate standards. For example, "UTF-8" is valid, but "UTF8" is not. See <https://www.w3.org/TR/2006/REC-xml11-20060816/#NT-EncodingDecl> and <https://www.iana.org/assignments/character-sets/character-sets.xhtml>.