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XML *Programming*

Argomenti

- XML in the .NET Framework
- XML Parsing Model
  - Tree-based parser – XMLDOM
  - Event-based parser – Simple API for XML (SAX)
- XML Reader
- XML Writer
- XML Document Object Model (DOM)

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XML in the .NET Framework

- The XML classes in the .NET Framework provide a comprehensive and integrated set of classes, allowing you to work with XML documents and data
- XML classes in the .NET Framework can be broken into several groups
  - parsing and writing XML with the **`XmlReader`** and **`XmlWriter`**
  - validating XML with the **`XmlValidatingReader`**
  - editing an XML document using **`XmlDocument`**
  - performing XSL Transformations (XSLT) using **`XslTransform`**
  - editing XML Schema definition language (XSD) schema using **`XmlSchema`**
  - applying XPath queries using **`XPathNavigator`**

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XML Parsing Model

- **Tree-based parser**
  - Parser **XMLDOM** – insieme di API che convertono un documento XML in una struttura (ad albero) in memoria
  - Per poter essere elaborato, il documento XML deve prima venire caricato completamente in memoria
- **Event-based parser**
  - Parser **SAX** – insieme di API in grado di elaborare gli elementi contenuti in uno stream di dati XML
    - Il parser controlla l'intero processo di scansione e invia (***PUSH***) i dati all'applicazione cliente (che decide cosa farne)
  - Per poter essere elaborato, il documento XML NON deve venire caricato completamente in memoria
  - Non direttamente disponibile in .NET

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XML Parsing Model

- **XML Reader** (e **XML Writer**)
  - **Modello** di *parsing* di tipo ***PULL***
  - È possibile ottenere tutte le funzionalità del parser SAX
    - È sempre possibile costruire un modello *push* utilizzando un modello *pull*
  - Lavora sotto il totale controllo dell'applicazione cliente che può
    - ottenere solo i dati di interesse
    - saltando quelli privi di interesse
  - Le due classi (astratte) **`XmlReader`** e **`XmlWriter`** sono alla base di tutte le funzionalità XML in .NET (compreso XMLDOM)

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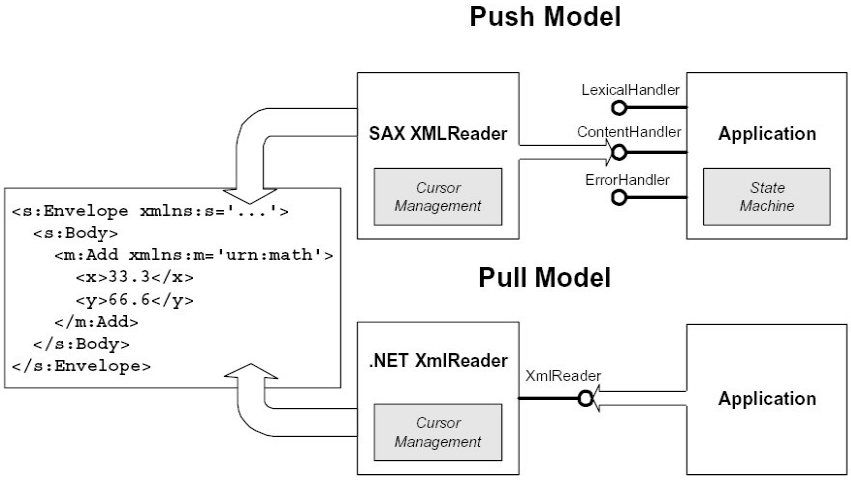
Push Model vs Pull Model



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`System.IO` namespace

- The **`System.IO`** namespace contains types that allow **synchronous and asynchronous reading and writing** on
  - **data streams**
  - **files**
- A **file** is an ordered and named collection of a particular sequence of bytes having persistent storage – therefore, with files, one thinks in terms of **directory paths**, **disk storage**, and **file** and **directory names**
- A **stream** is an **abstraction of a sequence of bytes**, such as
  - a file
  - an input/output device
  - an inter-process communication pipe
  - a TCP/IP socket
  - …

`System.IO.Stream`

- The abstract base class **`Stream`** supports
  - **reading bytes** from a backing store
  - **writing bytes** to a backing store
- A **backing store** is a storage medium, such as a disk or memory
- Each different backing store implements its own stream as an implementation of the **`Stream`** class
- The **`Stream`** class and its derived classes provide a generic view of **data sources** and **repositories**, isolating the programmer from the specific details of the operating system and underlying devices

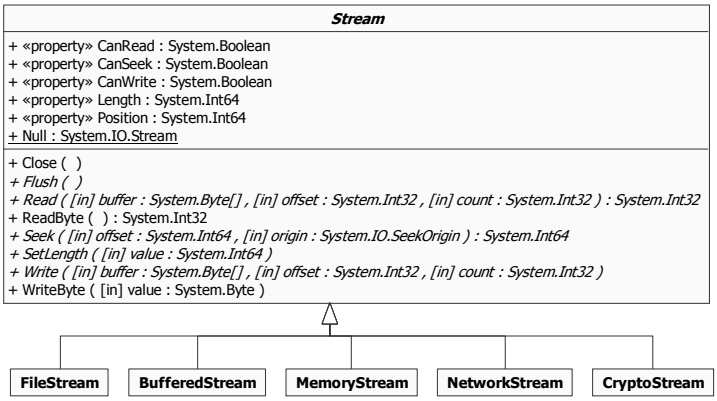
System.IO.Stream

- Streams that connect to backing stores (**base streams**) have constructors that have the parameters necessary to connect the stream to the backing store
  - For example, **`FileStream`** has constructors that specify a path parameter, how the file will be shared by processes, and so on
- The design of the **`System.IO`** classes provides simplified **stream composing**
  - Base streams can be attached to one or more pass-through streams that provide the functionality you want
  - A **reader** or **writer** can be attached to the end of the chain so that the preferred types can be read or written easily

System.IO.Stream

- Streams involve these fundamental operations:
  - Streams can be read from – **reading** is the transfer of data from a stream into a data structure
  - Streams can be written to – **writing** is the transfer of data from a data source into a stream
  - Streams can support seeking – **seeking** is the querying and modifying of the current position within a stream
- Depending on the underlying data source or repository, streams might support only some of these capabilities (for example, NetworkStreams do not support seeking)
  - The **`CanRead`**, **`CanWrite`**, and **`CanSeek`** properties of **`Stream`** and its derived classes determine the operations that various streams support

System.IO.Stream

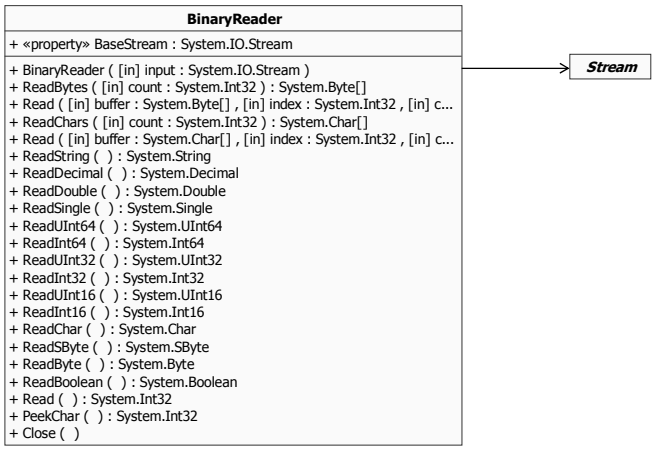


System.IO.Stream

- **`FileStream`** – use this class to read from, write to, open, and close files on a file system, as well as to manipulate other file-related operating system handles such as pipes, standard input, and standard output
- **`MemoryStream`** – a stream whose backing store is memory
- **`NetworkStream`** – provides methods for sending and receiving data over sockets
- **`BufferedStream`** – adds a buffering layer to read and write operations on another stream
- **`CryptoStream`** – a stream that links data streams to cryptographic transformations
- **`Stream.Null`** – when the methods of **`Stream`** that provide writing are invoked on **`Null`**, the call simply returns, and no data is written; **`Null`** also implements a **`Read`** method that returns zero without reading data

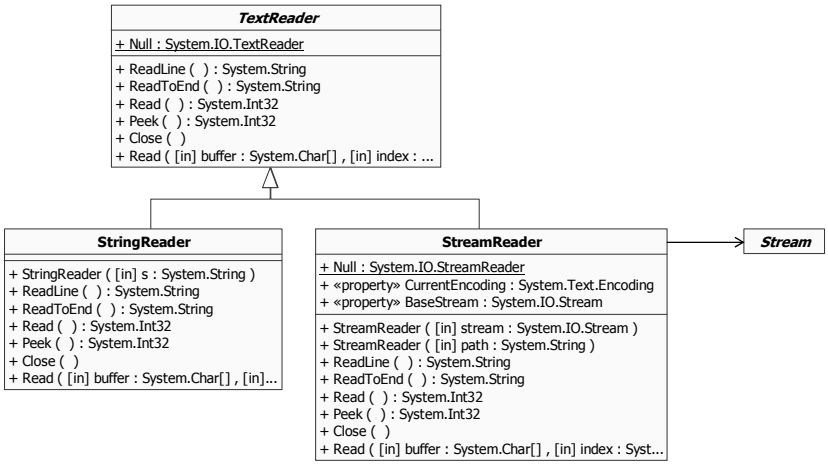
System.IO.BinaryReader
System.IO.BinaryWriter

- **BinaryReader** and **BinaryWriter** read and write encoded strings and primitive data types from and to Streams



System.IO.TextReader
System.IO.TextWriter

- **TextReader** and **TextWriter** read and write sequential series of characters from and to Streams

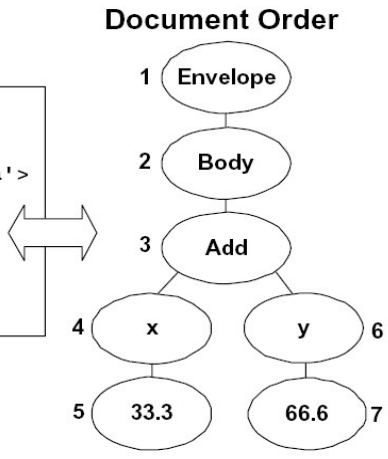


System.Xml.XmlReader
System.Xml.XmlWriter

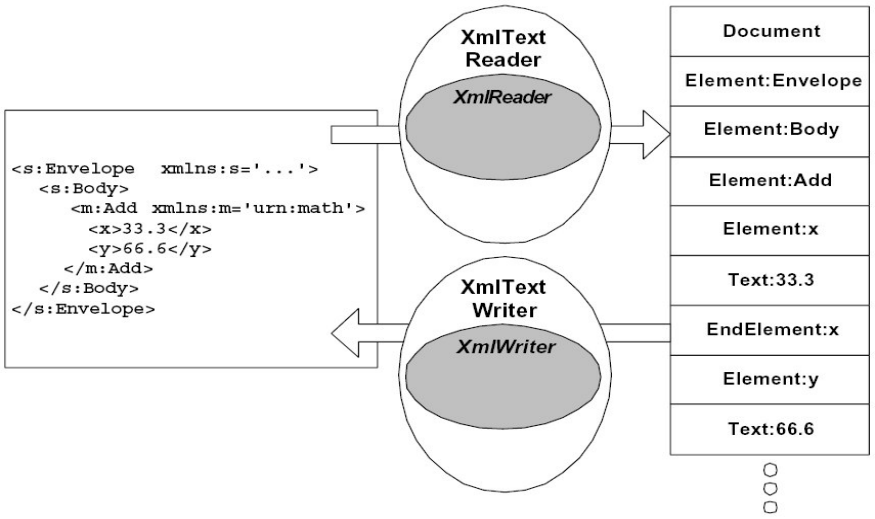
- XML-based I/O performed using a streaming interface suite
  - Models a **stream of logical XML nodes**
  - Streaming done in pull-mode (read) and push-mode (write)
- **`XmlReader`** models reading a stream of nodes
  - **`XmlReader`** is an abstract class
  - Fast, non-cached, forward-only, read-only access to XML data
  - Provides properties for inspecting current node
  - Nodes are processed in document order (depth-first traversal)
- **`XmlWriter`** models writing a stream of nodes
  - **`XmlWriter`** is an abstract class
  - Fast, non-cached, forward-only, write-only creation of XML data
  - Makes it easy to create well-formed XML data in a type-safe manner

System.Xml.XmlReader
System.Xml.XmlWriter

```
<s:Envelope xmlns:s='...'>
  <s:Body>
    <m:Add xmlns:m='urn:math'>
      <x>33.3</x>
      <y>66.6</y>
    </m:Add>
  </s:Body>
</s:Envelope>
```



System.Xml.XmlReader
System.Xml.XmlWriter



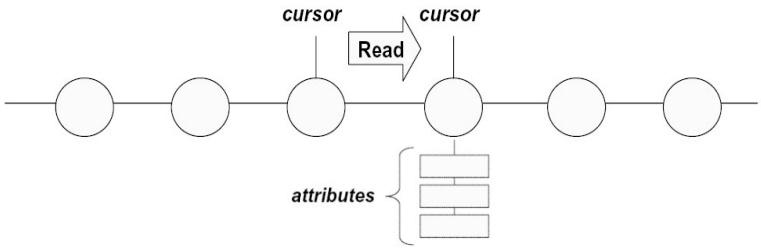
System.Xml.XmlReader

- Is an **abstract base** class that provides
  - **non-cached**
  - **forward-only**
  - **read-only**

  access to an XML stream
- Checks that the XML is **well-formed**, and throws **`XmlExceptions`** if an error is encountered
- Defines methods that enable you
  - to **pull data** from an XML source
  - to **skip unwanted nodes**

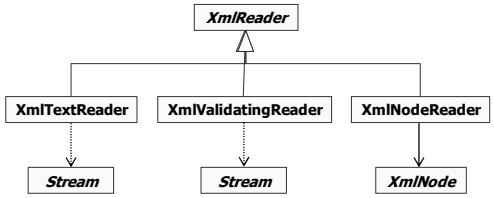
System.Xml.XmlReader

- Mantiene un puntatore interno (cursore) al nodo corrente (e ai suoi eventuali attributi)
- Non ha nozione del nodo precedente e del nodo successivo
- Non permette di modificare il nodo corrente
- Può solo far avanzare il cursore in avanti



System.Xml.XmlReader

- Many implementations of **`XmlReader`** are possible
  - **`XmlTextReader`** uses a **`TextReader`** for I/O over XML 1.0
  - **`XmlValidatingReader`** provides DTD, XDR, and XSD validation while reading
  - **`XmlNodeReader`** uses an **`XmlNode`** as its input source
  - Custom readers can expose your own data as XML



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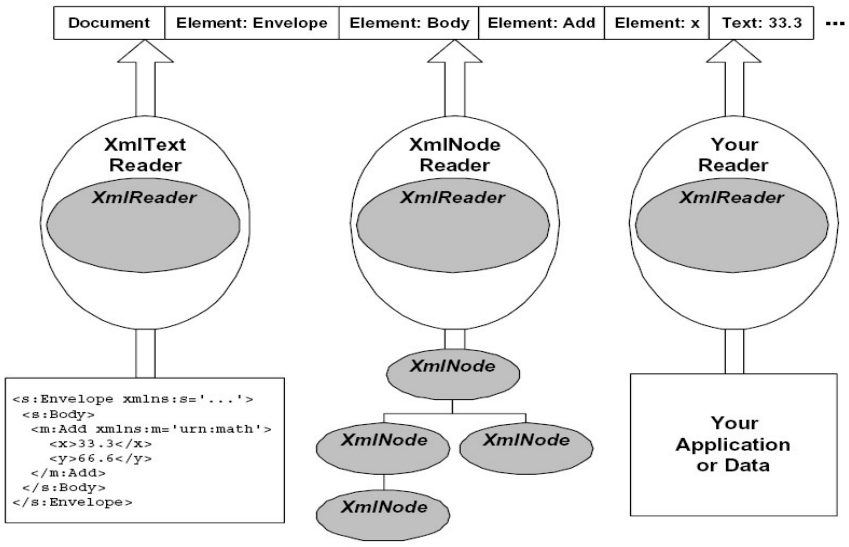
System.Xml.XmlReader



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System.Xml.XmlReader

XmlReader
+ «property» AttributeCount : System.Int32 + «property» Depth : System.Int32 + «property» HasAttributes : System.Boolean + «property» HasValue : System.Boolean + «property» IsEmptyElement : System.Boolean + «property» LocalName : System.String + «property» Name : System.String + «property» NodeType : System.Xml.XmlNodeType + «property» Value : System.String
+ Close ( ) *+ GetAttribute ([in] i : System.Int32) : System.String* *+ GetAttribute ([in] name : System.String) : System.String* + IsStartElement ([in] name : System.String) : System.Boolean + IsStartElement ( ) : System.Boolean + MoveToContent ( ) : System.Xml.XmlNodeType *+ MoveToElement ( ) : System.Boolean* *+ MoveToFirstAttribute ( ) : System.Boolean* *+ MoveToNextAttribute ( ) : System.Boolean* *+ Read ( ) : System.Boolean* + ReadElementString ([in] name : System.String) : System.String + ReadElementString ( ) : System.String + ReadEndElement ( ) + ReadStartElement ([in] name : System.String) + ReadStartElement ( ) + ReadString ( ) : System.String + Skip ( )

«enumeration» **XmlNodeType**
None = 0 Element = 1 Attribute = 2 Text = 3 CDATA = 4 EntityReference = 5 Entity = 6 ProcessingInstruction = 7 Comment = 8 Document = 9 DocumentType = 10 DocumentFragment = 11 Notation = 12 Whitespace = 13 SignificantWhitespace = 14 EndElement = 15 EndEntity = 16 XmlDeclaration = 17

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Principali tipi di nodi XML

Tipo di nodo	Descrizione
Document	The container of all the nodes in the tree
XmlDeclaration	The declaration node: <?xml version="1.0"...>
Element	An element node: <item>
EndElement	An end element tag: </item>
Attribute	An attribute of an element: <… id="123“>
Comment	A comment node: <!-- my comment -->
Text	Text belonging to an element or attribute
CDATA	A CDATA section <![CDATA[…my escaped text…]]>
Whitespace	An insignificant white space between markup text
SignificantWhitespace	An significant white space between markup text <item xml:space="preserve"> </item>

Lettura di un documento XML

1. **Creazione del reader** (scelte in alternativa):

```
XmlTextReader reader = new XmlTextReader(stream);
XmlTextReader reader = new XmlTextReader(textReader);
XmlTextReader reader = new XmlTextReader("nomeFile");
//  Per gestire in modo opportuno i whitespace
reader.WhitespaceHandling
  = WhitespaceHandling.All;  // default
  = WhitespaceHandling.Significant;
  = WhitespaceHandling.None;
```

2. **Scansione sequenziale dei nodi**:

```
while (reader.Read())
{
  … accesso al nodo corrente …
}
```

3. **Chiusura del reader**:

```
reader.Close();
```

Lettura dei nodi

WhitespaceHandling.All

```
  <author>Carson</author>
ΔΔ<author>ΔΔΔ</author>
ΔΔ<author xml:space="preserve">ΔΔΔ</author>
```

⇩

```
NodeType=Element, name="author", value=""
NodeType=Text, name="", value="Carson"
NodeType=EndElement, name="author", value=""
NodeType=Whitespace, name="", value="
ΔΔ"
NodeType=Element, name="author", value=""
NodeType=Whitespace, name="", value="ΔΔΔ"
NodeType=EndElement, name="author", value=""
NodeType=Whitespace, name="", value="
ΔΔ"
NodeType=Element, name="author", value=""
NodeType=SignificantWhitespace, name="", value="ΔΔΔ"
NodeType=EndElement, name="author", value=""
```


Lettura dei nodi

WhitespaceHandling.Significant

```
  <author>Carson</author>
ΔΔ<author>ΔΔΔ</author>
ΔΔ<author xml:space="preserve">ΔΔΔ</author>
```

⇩

```
NodeType=Element, name="author", value=""
NodeType=Text, name="", value="Carson"
NodeType=EndElement, name="author", value=""
NodeType=Element, name="author", value=""
NodeType=EndElement, name="author", value=""
NodeType=Element, name="author", value=""
NodeType=SignificantWhitespace, name="", value="ΔΔΔ"
NodeType=EndElement, name="author", value=""
```

Lettura dei nodi

WhitespaceHandling.None

```
  <author>Carson</author>
ΔΔ<author>ΔΔΔ</author>
ΔΔ<author xml:space="preserve">ΔΔΔ</author>
```

```
NodeType=Element, name="author", value=""
NodeType=Text, name="", value="Carson"
NodeType=EndElement, name="author", value=""
NodeType=Element, name="author", value=""
NodeType=EndElement, name="author", value=""
NodeType=Element, name="author", value=""
NodeType=EndElement, name="author", value=""
```

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Lettura dei nodi

WhitespaceHandling.None

```
  <author>&#32;&#32;&#32;</author>
```

```
NodeType=Element, name="author", value=""
NodeType=Text, name="", value="ΔΔΔ"
NodeType=EndElement, name="author", value=""
```

```
  <author>   </author>
```

```
NodeType=Element, name="author", value=""
NodeType=EntityReference, name="nbsp", value=""
NodeType=EntityReference, name="nbsp", value=""
NodeType=EntityReference, name="nbsp", value="‟
NodeType=EndElement, name="author", value=""
```

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Esempio di lettura di nodi

```
while (reader.Read())
{
  switch (reader.NodeType)
  {
    case XmlNodeType.Element:
      … elaborazione apertura nodo di tipo element
      break;
    case XmlNodeType.EndElement:
      //  Solo con </Element>, non nel caso <Element />
      … elaborazione chiusura nodo di tipo element
      break;
    default:
      //  Probabilmente, gli altri tipi di nodo non interessano
      break;
  }
}
```


Esempio di lettura di nodi

```
<?xml version="1.0" encoding="utf-8" ?>
<!- Commento -->
<Gruppo>
   <Item nome="Pippo" />
   <Item nome="Topolino"></Item>
   <Item nome="Paperino" />
   <Item nome="Gastone" />
</Gruppo>
```

```
XmlTextReader reader = new XmlTextReader(...);
reader.WhitespaceHandling = WhitespaceHandling.None;
reader.MoveToContent();  //  Salta commenti e dichiarazioni
reader.ReadStartElement("Gruppo");
while (reader.IsStartElement("Item"))
{
   ...  //  Elabora Item
   reader.Skip();  //  Cosa succede con Read()?
}
reader.ReadEndElement();
reader.Close();
```

Metodi utili

- **`XmlNodeType MoveToContent()`**
  Salta commenti e dichiarazioni
- **`void ReadStartElement()`**
  `void ReadStartElement(string name)`
  Se il nodo corrente è l'apertura di un elemento (di nome "**`name`**"), il *reader* si posiziona sul nodo successivo, in caso contrario, **`XmlException`**
- **`void ReadEndElement()`**
  Se il nodo corrente è la chiusura di un elemento, il *reader* si posiziona sul nodo successivo, in caso contrario, **`XmlException`**
- **`void Skip()`**
  Salta sia tutti i figli del nodo corrente, sia l'eventuale chiusura

Esempio di lettura di nodi

```
<?xml version="1.0" encoding="utf-8" ?>
<!- Commento -->
<Gruppo>
   <Item>Pippo</Item>
   <Item>Topolino</Item>
   <Item>Paperino</Item>
   <Item>Gastone</Item>
</Gruppo>
```

```
XmlTextReader reader = new XmlTextReader(...);
reader.WhitespaceHandling = WhitespaceHandling.None;
reader.MoveToContent();  //  Salta commenti e dichiarazioni
reader.ReadStartElement("Gruppo");
while (reader.IsStartElement("Item"))
{
   ... = reader.ReadString(); // Elabora contenuto di Item
   reader.Skip();
}
reader.ReadEndElement();
reader.Close();
```

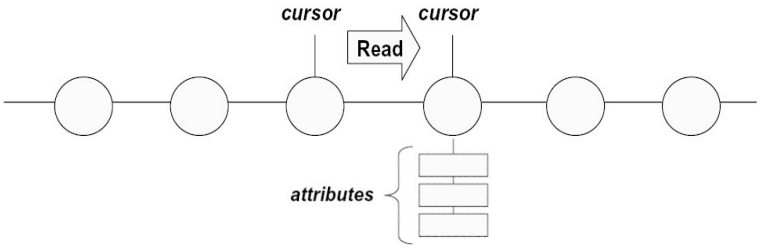
Metodi utili

- **`string ReadString()`**
  Restituisce il contenuto testuale di un nodo di tipo “Element” o “Text” – non modifica la posizione del reader, ma consuma l’informazione!
- **`string ReadElementString()`**
  `string ReadElementString(string name)`
  Restituisce il contenuto testuale di un semplice elemento con solo testo – salta anche la chiusura dell’elemento

```
reader.ReadStartElement("Gruppo");
while (reader.IsStartElement("Item"))
{
   ... = reader.ReadElementString();
}
reader.ReadEndElement();
```


Lettura degli attributi

- Solo i nodi di tipo **`Element`**, **`DocumentType`** and **`XmlDeclaration`** possono avere attributi
- Gli attributi NON fanno parte dello stream principale di nodi XML
- **`bool HasAttributes`**
  restituisce **`True`** se il nodo corrente ha almeno un attributo
- **`int AttributeCount`**
  restituisce il **numero di attributi** del nodo corrente



Lettura degli attributi

- **`string GetAttribute(int index)`**
  `string GetAttribute(string name)`
  restituiscono il **valore di un attributo**, dato l'indice o il nome

```
if(reader.HasAttributes)
{
  for (int k = 0; k < reader.AttributeCount; k++)
  {
    //  Non è possibile ottenere il nome dell'attributo!
    Console.WriteLine("Attribute value=\"{0}\"",
      reader.GetAttribute(k));
  }
}

… = reader.GetAttribute("NomeAttributo");  //  Sì
```

- Da utilizzare per ottenere il valore di un attributo, conoscendone il nome
- Se non esiste un attributo con il nome passato come argomento, viene restituito **`null`**

Lettura degli attributi

- **`bool MoveToNextAttribute();`**
  permette di scandire con il reader tutti gli attributi del nodo corrente
- **`bool MoveToElement();`**
  riposiziona il reader sul nodo di partenza (cioè, quello che contiene la lista degli attributi)

```
if(reader.HasAttributes)
{
  while (reader.MoveToNextAttribute())
  {
    Console.WriteLine("Attribute name=\"{0}\",
      value=\"{1}\"", reader.LocalName, reader.Value);
  }
  reader.MoveToElement();
}
```

- Da utilizzare per scandire l'intera lista di attributi

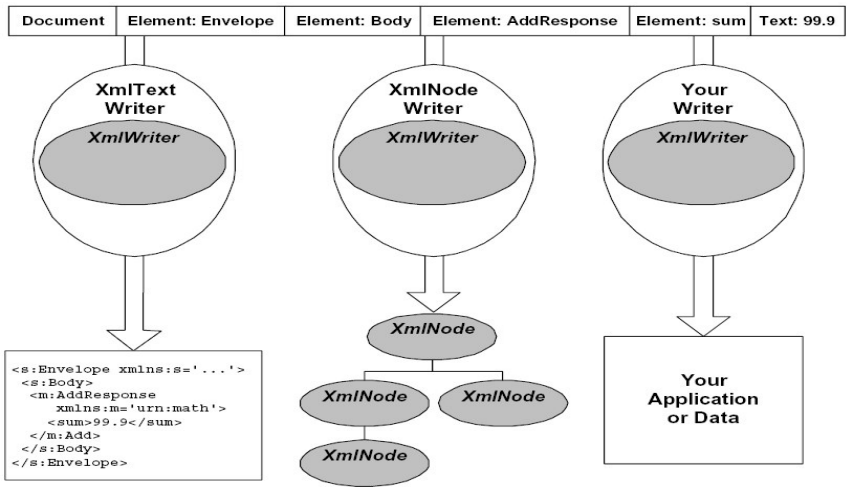
Esempio 2

System.Xml.XmlWriter

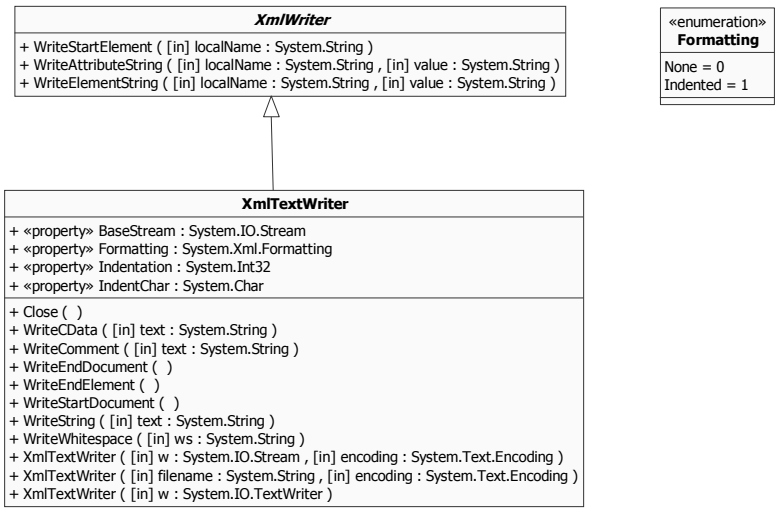
- Is an **abstract base** class that provides a
  - **fast**
  - **non-cached**
  - **forward-only**

  means of generating streams containing XML data that conforms to
  - the W3C Extensible Markup Language (XML) 1.0 and
  - the Namespaces in XML recommendations
- Many implementations of **`XmlWriter`** are possible
  - **`XmlTextWriter`** uses a **`TextWriter`** for I/O
  - Custom writers

System.Xml.XmlWriter



System.Xml.XmlWriter



Scrittura di un documento XML

1. **Creazione del writer** (scelte in alternativa):

```
XmlTextWriter writer =
  new XmlTextWriter(textWriter);
  new XmlTextWriter(stream, encoding);
  new XmlTextWriter("nomeFile", encoding);
writer.Formatting = Formatting.Indented;
writer.Indentation = 2;  //  default
```

2. **Scrittura del documento**:

```
// produce: <?xml version="1.0"?>
writer.WriteStartDocument();
while (...)
{
  … scrittura nodo …
}
writer.WriteEndDocument();
```

3. **Chiusura del writer**:

```
writer.Close();
```

Scrittura di un elemento

- `<Item>…</Item>`

```
writer.WriteStartElement("Item");
//  scrittura eventuali attributi
…
writer.WriteEndElement();
```

- `<Item>Testo</Item>`

```
writer.WriteStartElement("Item");
//  scrittura eventuali attributi
writer.WriteString("Testo");
writer.WriteEndElement();

//  se non esistono attributi
writer.WriteElementString("Item","Testo");
```


Scrittura di un attributo

- `<Item nome="valore">…</Item>`

```
writer.WriteStartElement("Item");
writer.WriteAttributeString("nome","valore");
…
writer.WriteEndElement();
```

- `<Item nome="valore"/>`

```
writer.WriteStartElement("Item");
writer.WriteAttributeString("nome","valore");
writer.WriteEndElement();
```

Esempio 2

System.Xml.XmlConvert

- Provides methods that enable you to convert from a string to a .NET Framework data type and vice-versa
- **Locale settings are not taken into account during data conversion**
- The data types are based on the XML Schema (XSD) data types

Tipo di dato	`XmlConvert`	`Convert` `ToString` e `Parse`
`bool`	`true` / `false` legge anche: `1` / `0`	`True / False`
`float` e `double`	`3.14`	`3,14`
`DateTime`	`2004-05-09 T00:00:00.0000000+ 02:00`	`09/05/2004 0.00.00`

XML Document Object Model

- An in-memory representation of an XML document
- The DOM allows you to programmatically
  - Load
  - Modify
  - Save

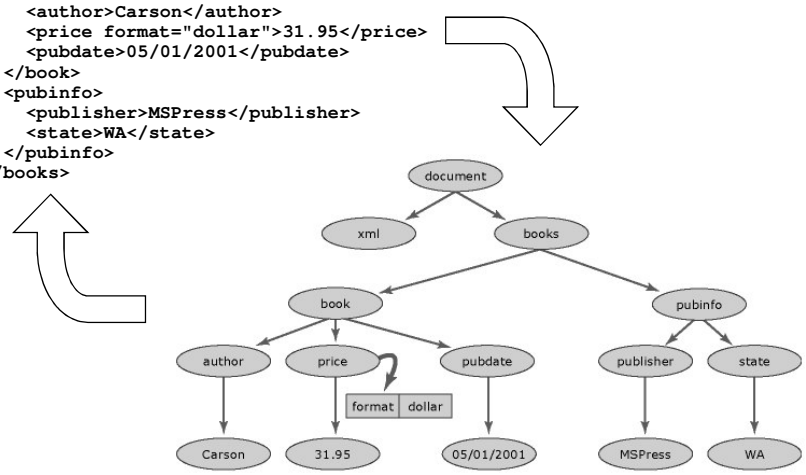
  an XML document

- The **`XmlReader`** class also reads XML, however
  - it provides non-cached, forward-only, read-only access

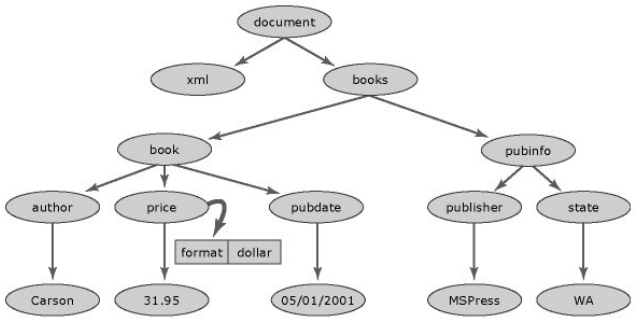
  this means that
  - there are no capabilities to edit the values of an attribute or content of an element, or the ability to insert and remove nodes

XML Document Object Model

```
<?xml version="1.0"?>
<books>
  <book>
    <author>Carson</author>
    <price format="dollar">31.95</price>
    <pubdate>05/01/2001</pubdate>
  </book>
  <pubinfo>
    <publisher>MSPress</publisher>
    <state>WA</state>
  </pubinfo>
</books>
```

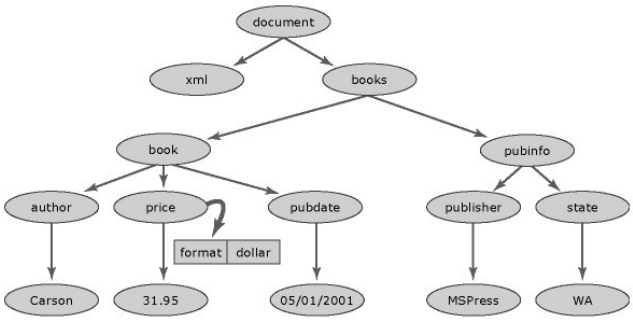


XML Document Object Model



- Nodes have a single **parent node**, a parent node being a node directly above it (the only node that do not have a parent is the “document” node)
- Most nodes can have multiple **child nodes**, which are nodes directly below it
- Nodes that are at the same level are **siblings** (the “book” and “pubinfo” nodes, …)

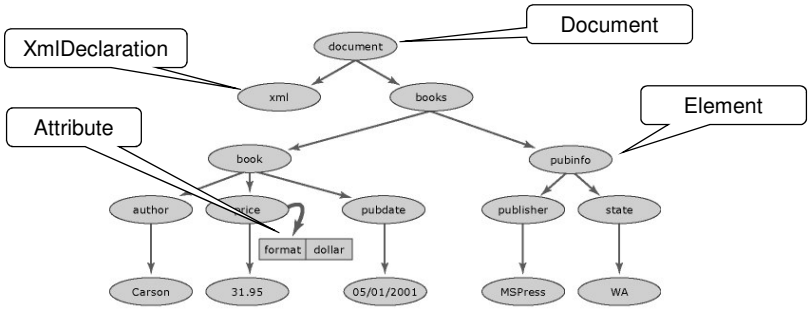
XML Document Object Model



- Gli attributi non fanno parte delle relazioni *parent*, *child* e *sibling*
- Gli attributi vengono considerati **proprietà dei nodi di tipo element**, e sono costituiti da una **coppia nome-valore**
- Nell'esempio:
  - la parola "**`format`**" è il nome dell'attributo
  - la stringa "**`dollar`**" è il valore dell'attributo **`format`**

XML Document Object Model

- As XML is read into memory, nodes are created
- However, not all nodes are the same type
- An element, in XML, has different rules and syntax than a processing instruction
- So as various data is read, a **node type** is assigned to each node
- This node type determines the characteristics and functionality of the node



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XML Document Object Model

DOM Node Type	Classe	Descrizione
Document	`XmlDocument`	The container of all the nodes in the tree
Element	`XmlElement`	Represents an element node
Attr	`XmlAttribute`	Is an attribute of an element
Comment	`XmlComment`	A comment node
Text	`XmlText`	Text belonging to an element or attribute
CDATASection	`XmlCDataSection`	Represents CDATA
Declaration	`XmlDeclaration`	Represents the declaration node <?xml version="1.0"...>

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XML Document Object Model

DOM Node Type	Classe	Descrizione
DocumentFragment	`XmlDocumentFragment`	A temporary bag containing one or more nodes without any tree structure
DocumentType	`XmlDocumentType`	Represents the <!DOCTYPE...> node
EntityReference	`XmlEntityReference`	Represents the non-expanded entity reference text
ProcessingInstruction	`XmlProcessingInstruction`	Is a processing instruction node
Entity	`XmlEntity`	Represents the <!ENTITY...> declarations in an XML document, either from an internal document type definition (DTD) subset or from external DTDs and parameter entities
Notation	`XmlNotation`	Represents a notation declared in the DTD

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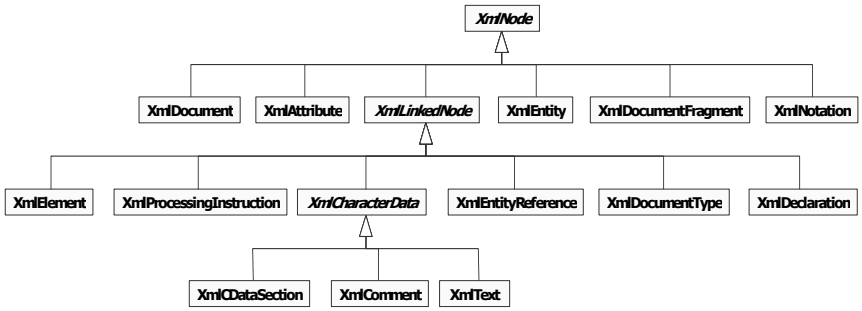
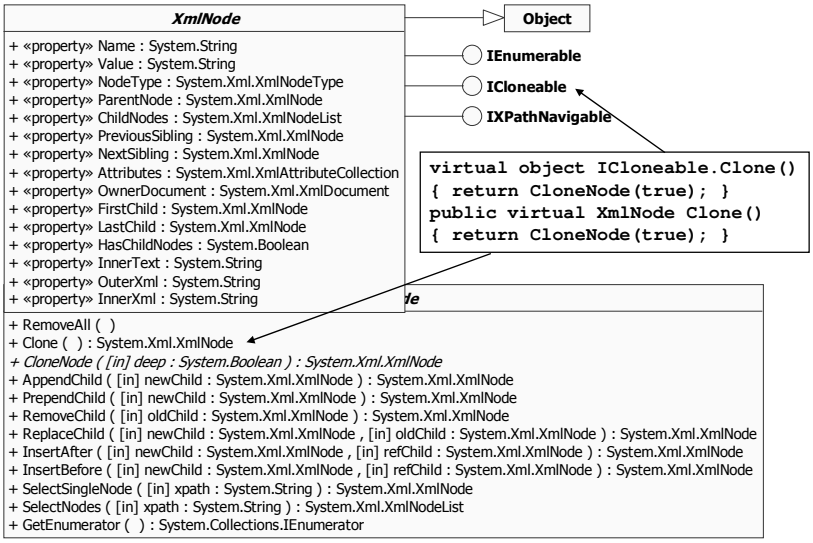
XML Document Object Model

- The **`XmlNode`** class is the basic class in the DOM tree



XML Document Object Model



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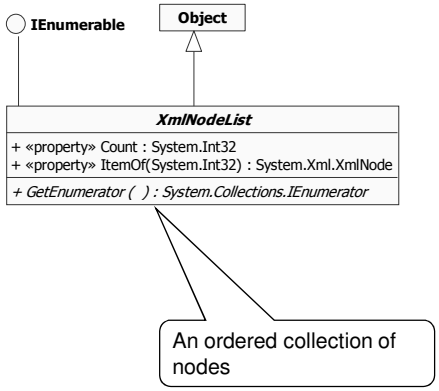
XML Document Object Model



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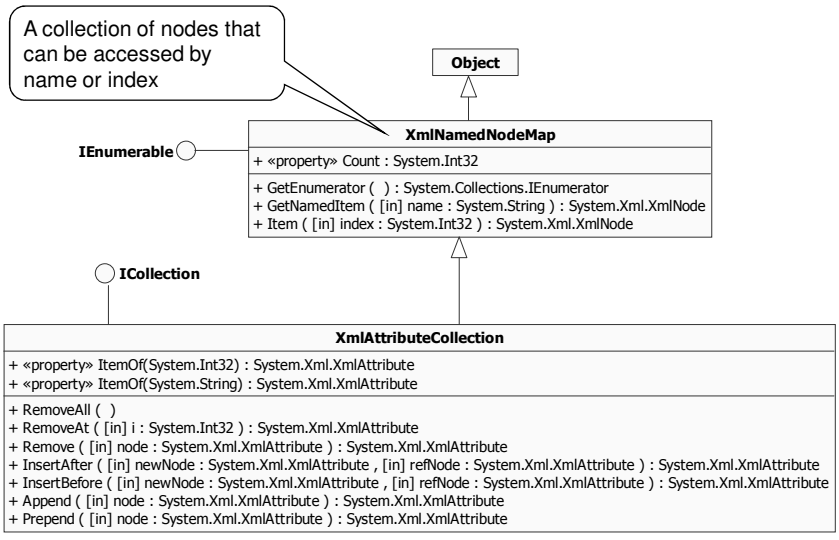
XML Document Object Model



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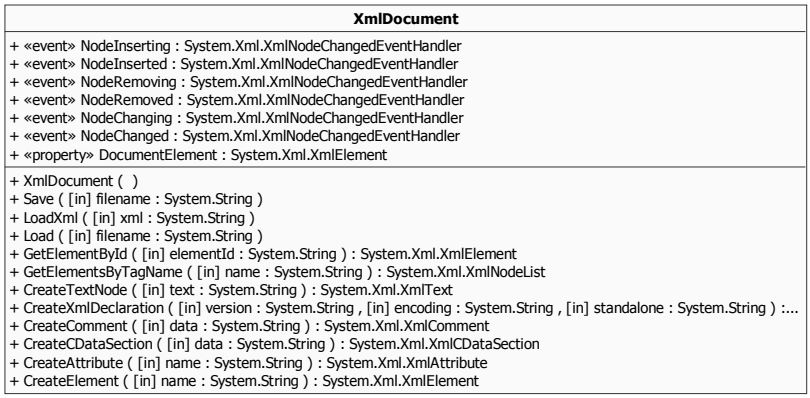
XML Document Object Model



XML Document Object Model

- **Lettura** (sincrona) di un documento XML da file (in caso di errore: **`XmlException`**)

```
XmlDocument document = new XmlDocument();
document.Load(fileName);
```

- **Reperimento** elemento radice di un documento XML

```
XmlElement root = document.DocumentElement;
```

- **Creazione di un nuovo documento** XML

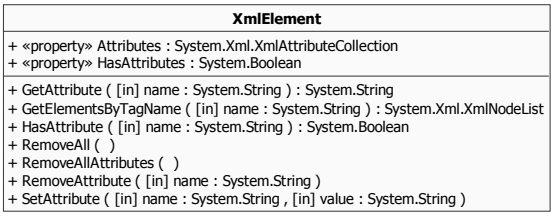
```
XmlDocument doc = new XmlDocument();
XmlNode node = doc.CreateXmlDeclaration("1.0","","");
doc.AppendChild(node);
XmlNode root = doc.CreateElement("XmlNodeType");
doc.AppendChild(root);
//  Inserimento di tutti gli altri nodi in root
```

- **Salvataggio** di un documento XML su file

```
doc.Save(fileName);
```

Esempio 3.1

XML Document Object Model



- **`GetAttribute(nomeAttributo)`**
  - Se l'attributo esiste, restituisce il valore dell'attributo
  - In caso contrario, restituisce una stringa vuota
- **`SetAttribute(nomeAttributo,valoreAttributo)`**
  - Se l'attributo esiste, ne cambia il valore
  - In caso contrario, crea un nuovo attributo con il valore specificato
- **`RemoveAttribute(nomeAttributo)`**
  - Se l'attributo esiste, lo elimina
  - In caso contrario, nop

Esempio 3.2

XML Document Object Model

- **`XmlNodeList SelectNodes(string xpath);`**
  Selects a list of nodes matching the XPath expression
- **`XmlNode SelectSingleNode(string xpath);`**
  Selects the first **`XmlNode`** that matches the XPath expression

```
<?xml version="1.0" encoding="utf-8" ?>
<Gruppo>
  <Item id="1">Pippo</Item>
  <Item id="2">Topolino</Item>
  <Item id="5">Paperino</Item>
  <Item id="7">Gastone</Item>
</Gruppo>
```

- Semplici espressioni XPath:
  - **`/Gruppo/Item`** → restituisce tutti gli **`Item`**
  - **`/Gruppo/Item[@id >= 5]`** → restituisce 2 **`Item`**
  - **`/Gruppo/Item[text() = 'Topolino']`** → restituisce 1 **`Item`**

Esempio 3.3