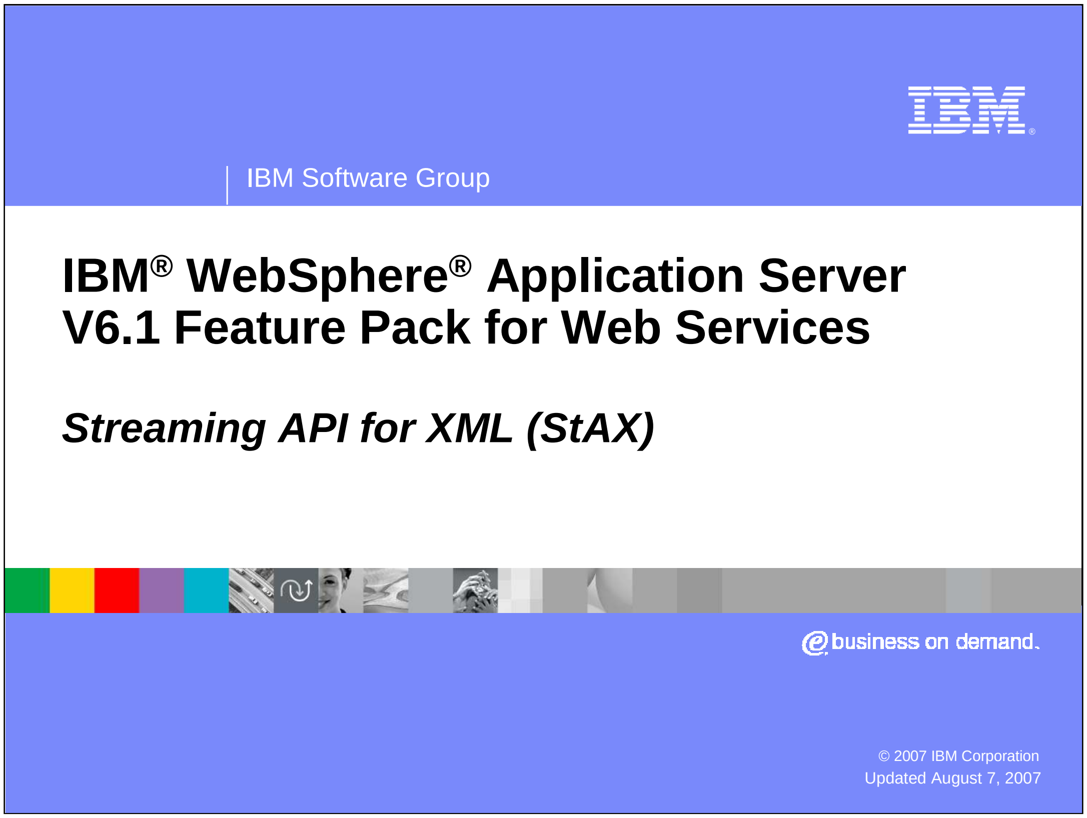

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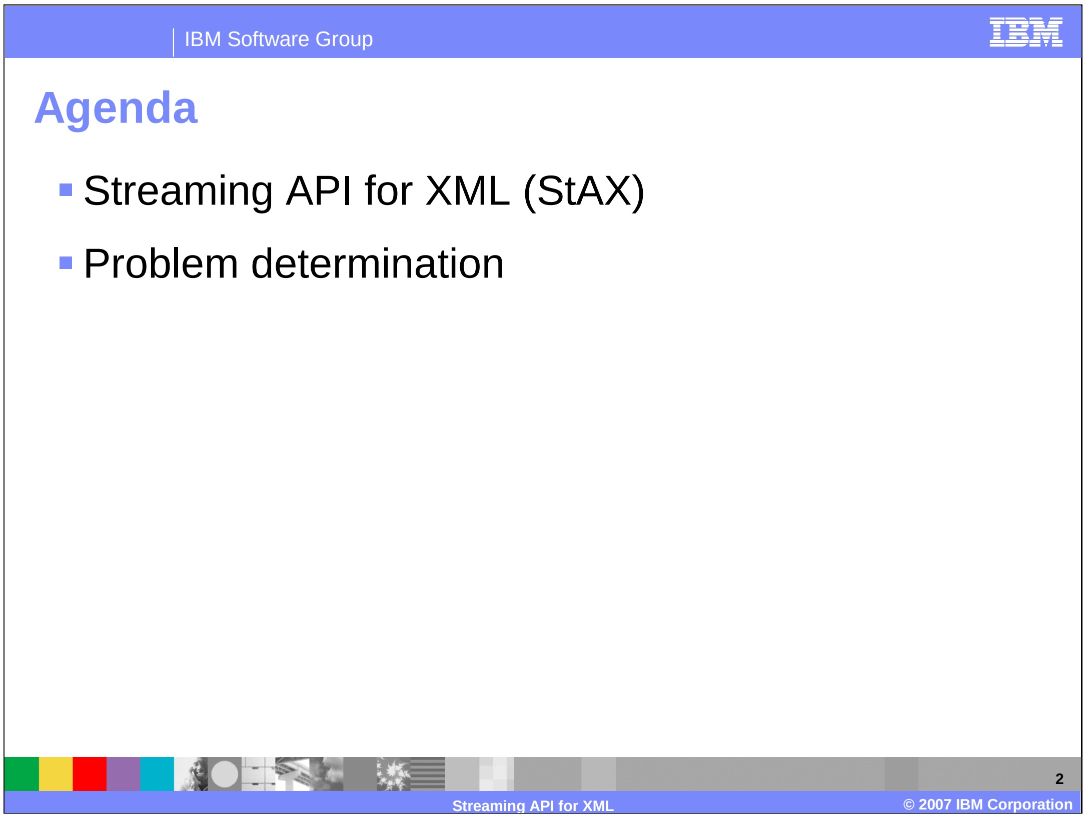
IBM® WebSphere® Application Server V6.1 Feature Pack for Web Services

Streaming API for XML (StAX)

business on demand.

Updated August 7, 2007

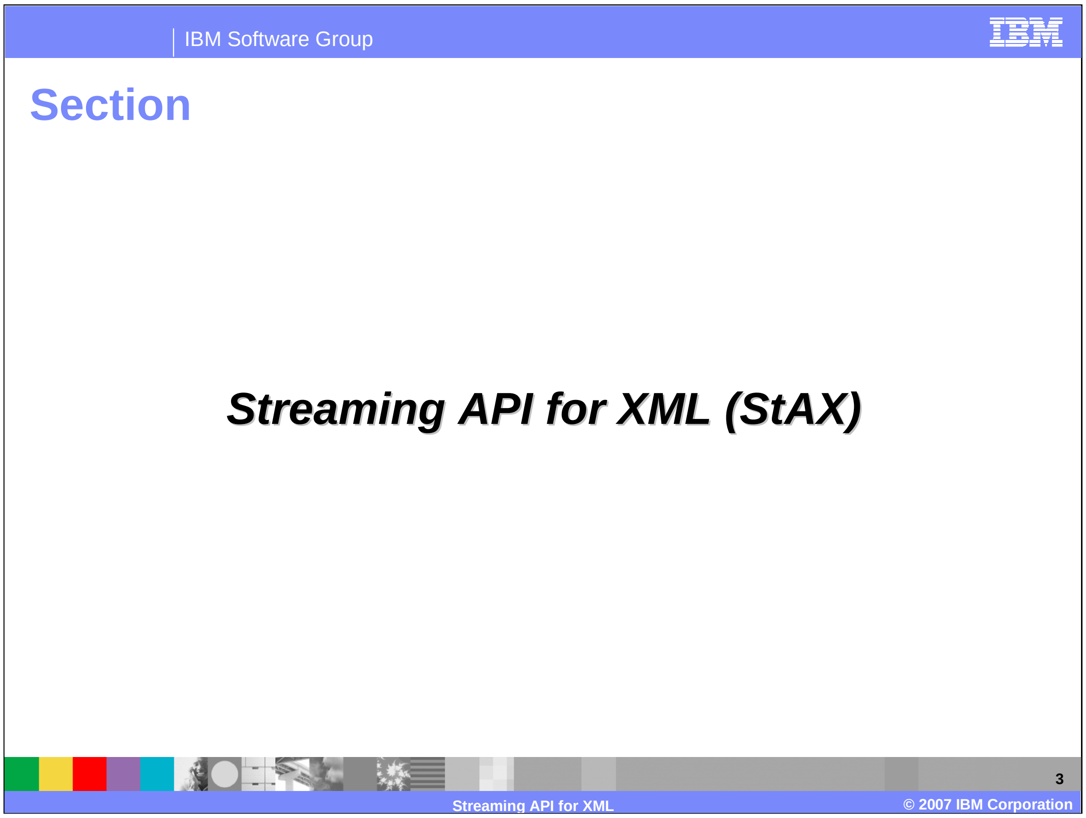
This presentation will provide an overview of the Streaming API for XML or StAX technologies provided by the Feature Pack for Web Services.



Agenda

- Streaming API for XML (StAX)
- Problem determination

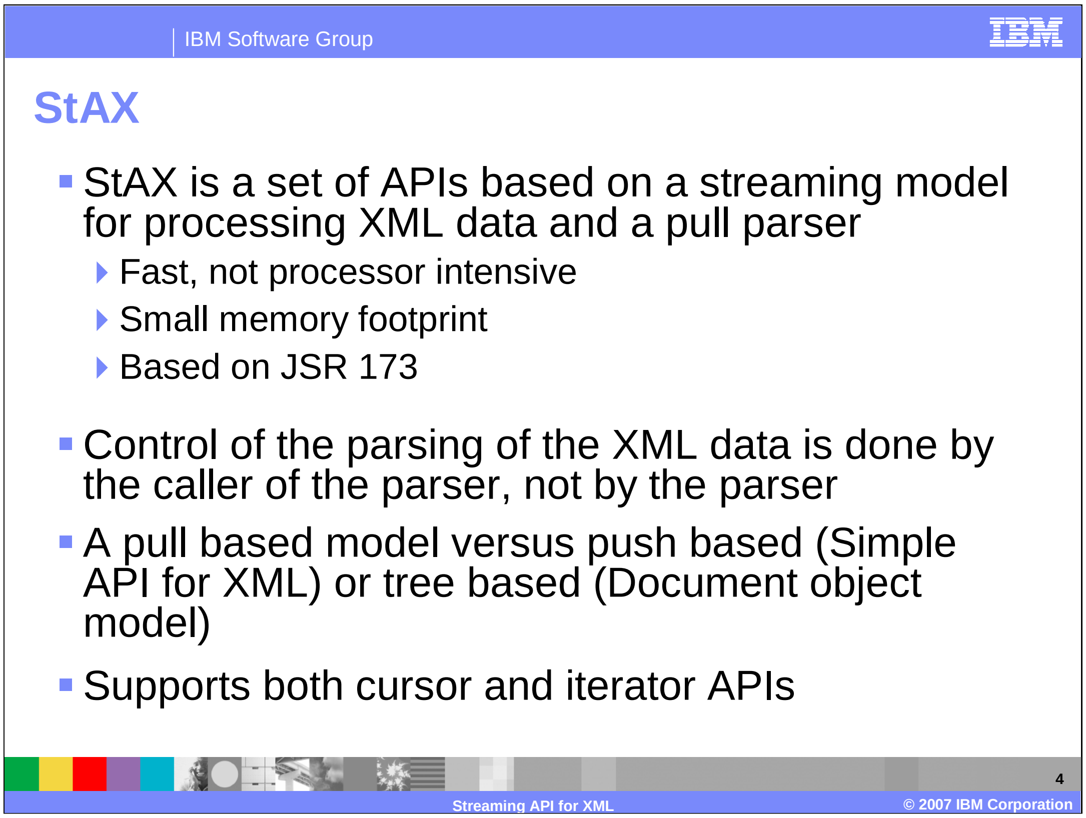
This presentation will explain the Streaming API for XML or StAX support in the Feature Pack for Web Services, and explain problem determination for this component.



Section

Streaming API for XML (StAX)

This section will provide an overview of the Streaming API for XML (StAX).



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StAX

- StAX is a set of APIs based on a streaming model for processing XML data and a pull parser
  - Fast, not processor intensive
  - Small memory footprint
  - Based on JSR 173
- Control of the parsing of the XML data is done by the caller of the parser, not by the parser
- A pull based model versus push based (Simple API for XML) or tree based (Document object model)
- Supports both cursor and iterator APIs

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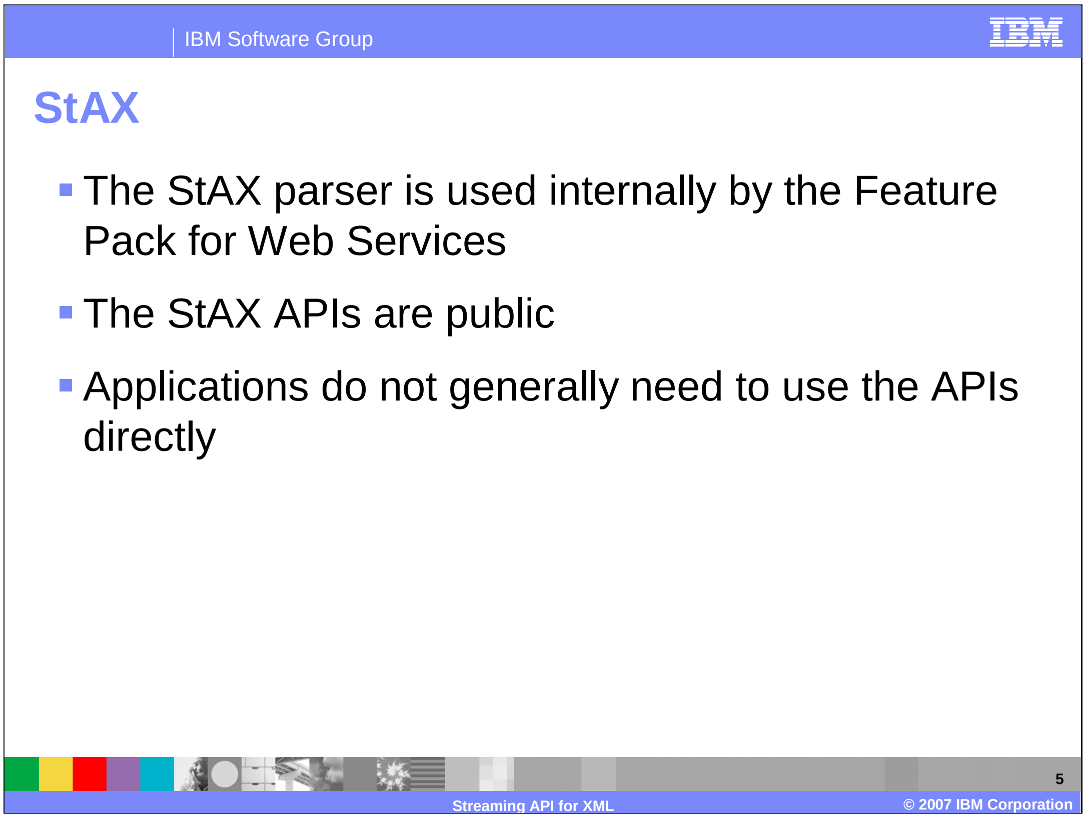
Streaming API for XML

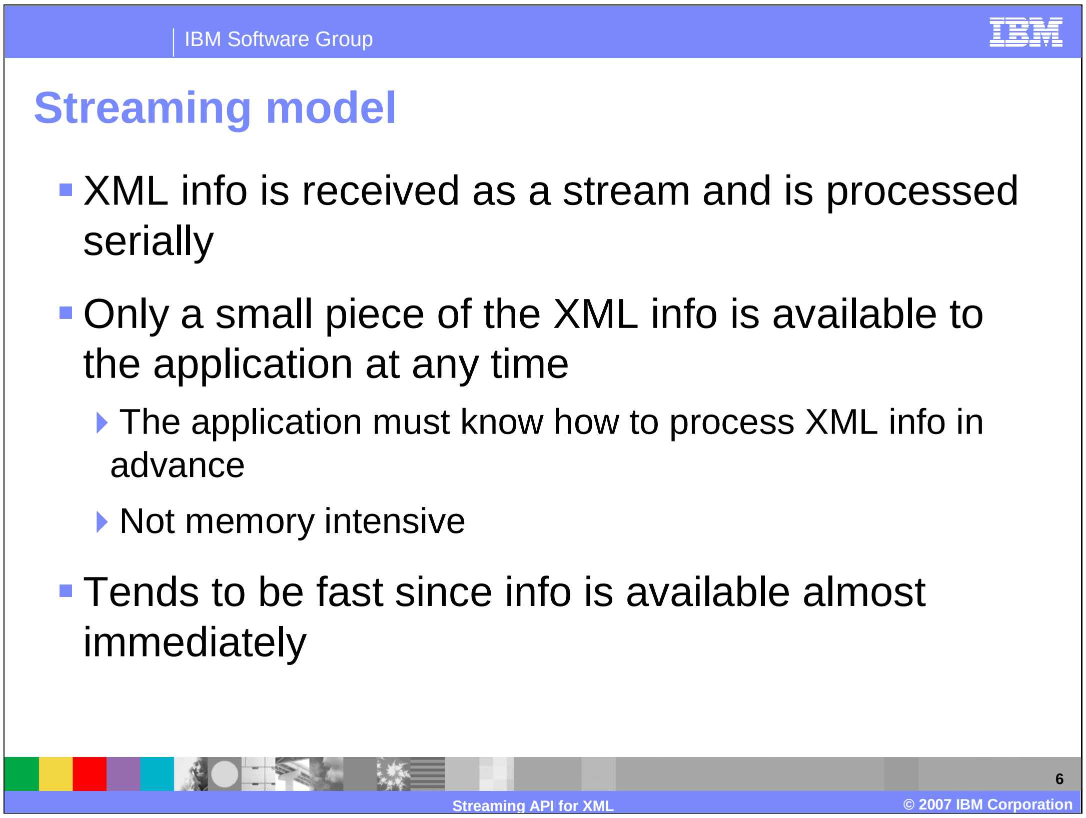
StAX provides a set of APIs for the stream (serial) processing of XML data. It is fast to start because there is no complex data structure to construct as in tree based processing models such as the Document Object Model (DOM). StAX uses a model know as “pull parsing” in which the application code call methods in the parsing library as contrasted to “push parsing” in which the parsing code calls methods in the application code. This is a more natural model for most programmers. StAX provides a *cursor* API that allows the programer to traverse each part of an XML document from beginning to end. It also provides an *iterator* API in which the XML stream is viewed as a sequence of event objects.



StAX

- The StAX parser is used internally by the Feature Pack for Web Services
- The StAX APIs are public
- Applications do not generally need to use the APIs directly

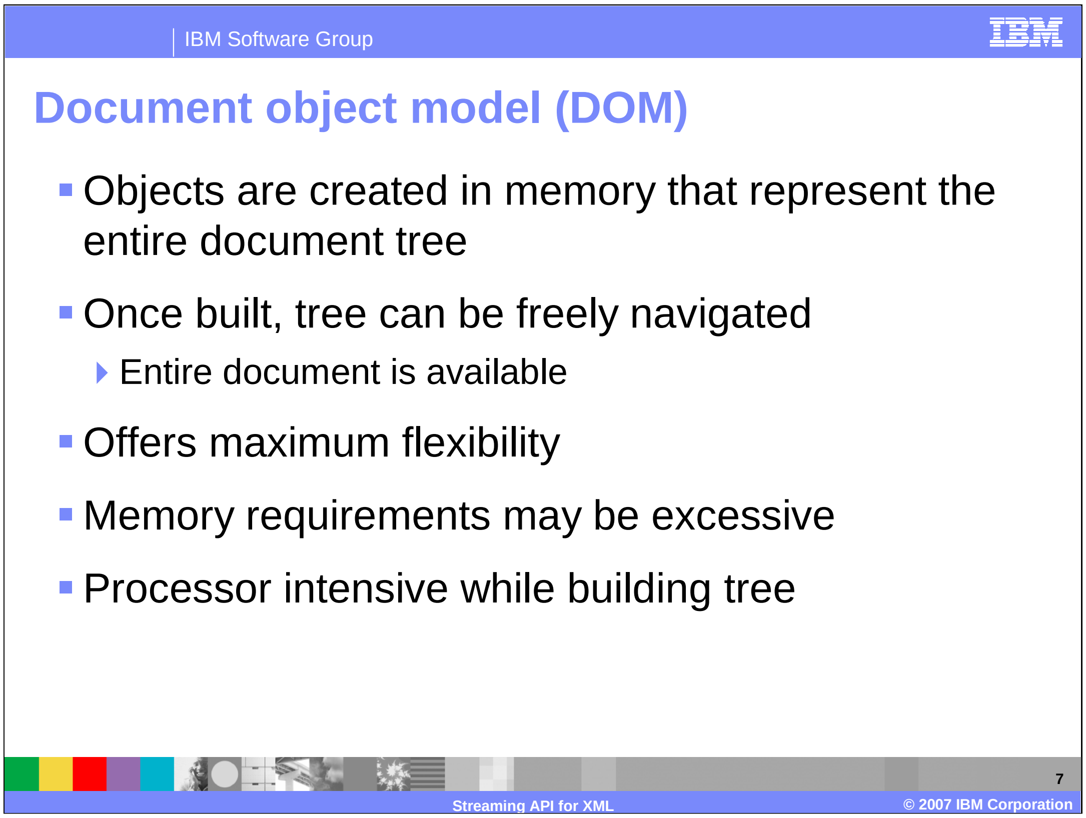
The StAX parser is used internally by the Feature Pack for Web Services runtime and most applications will not need to be aware of it. However, for cases where there is a need to process application specific XML data, the StAX APIs are public.



Streaming model

- XML info is received as a stream and is processed serially
- Only a small piece of the XML info is available to the application at any time
  - The application must know how to process XML info in advance
  - Not memory intensive
- Tends to be fast since info is available almost immediately

As stated earlier, StAX uses the streaming model for processing XML data and only a small piece of XML information is available to the application at any time. It is only possible to move forward in the XML data stream – it is not possible to "back up" to a previous position. The streaming model tends to have a small memory footprint since there is no requirement to build large data structures in memory and tends to be very fast, especially when starting up.



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Document object model (DOM)

- Objects are created in memory that represent the entire document tree
- Once built, tree can be freely navigated
  - Entire document is available
- Offers maximum flexibility
- Memory requirements may be excessive
- Processor intensive while building tree

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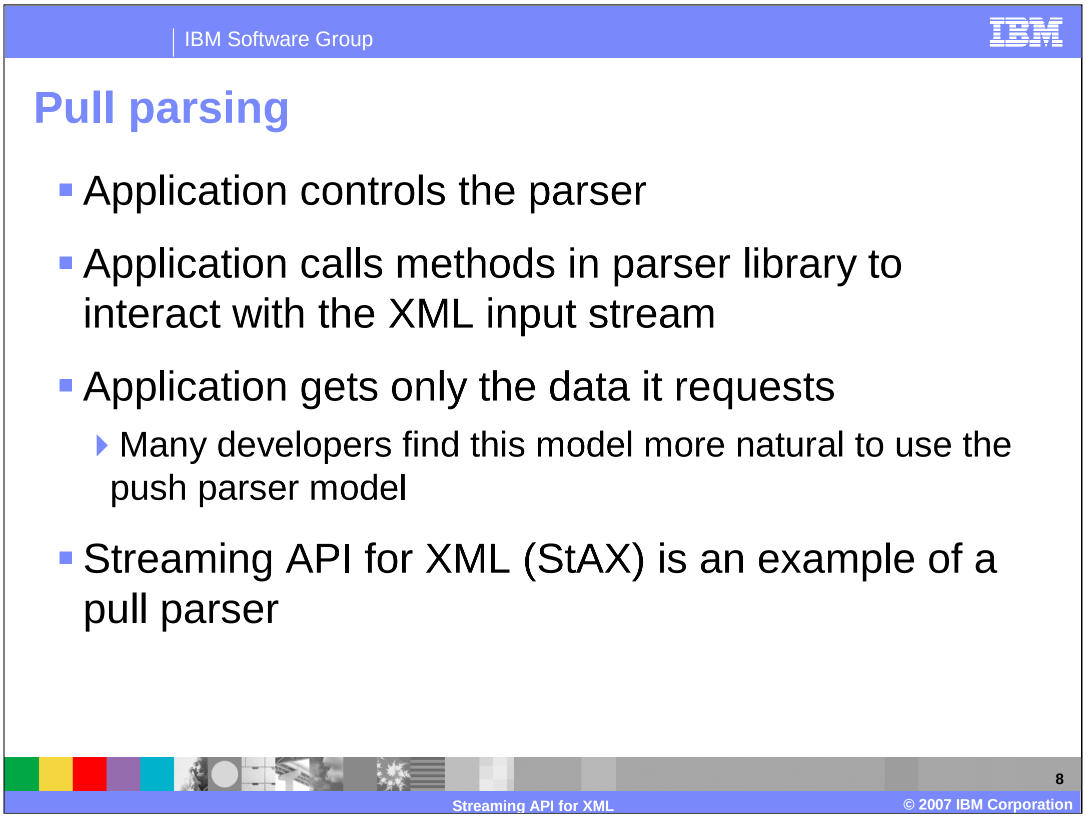
Streaming API for XML

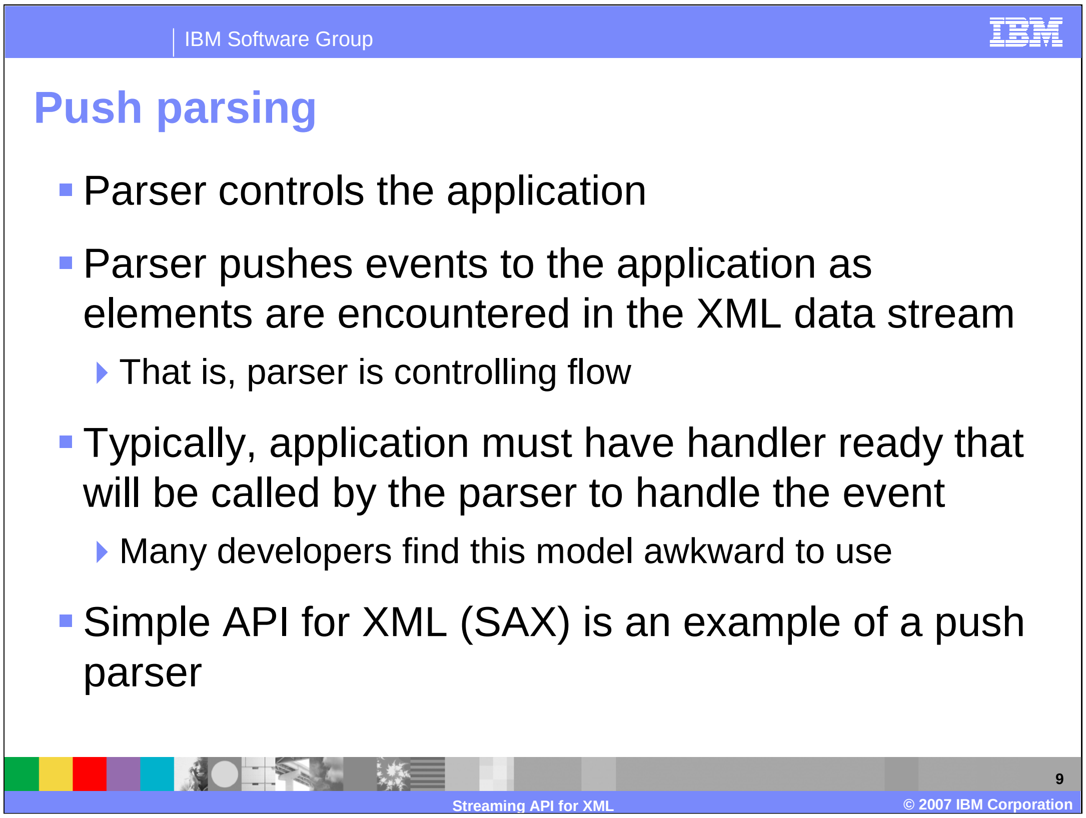
Another approach to processing XML data is known as Document Object Model (DOM). In this model, a tree is constructed in memory that represents the entire document. Once the tree is built, it can be freely navigated, that is, you are not limited to only forward movement. This approach offers maximum flexibility but at the potentially high costs of memory footprint and startup time, since building the document tree in memory can be a very expensive operation for large documents.



Pull parsing

- Application controls the parser
- Application calls methods in parser library to interact with the XML input stream
- Application gets only the data it requests
  - Many developers find this model more natural to use the push parser model
- Streaming API for XML (StAX) is an example of a pull parser

In pull parsing, the application makes calls into the parsing library to interact with the XML data stream. The application gets only the data it requests and only when it requests it. StAX uses this processing model. Many developers find this approach to parsing easier to develop applications for.



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Push parsing

- Parser controls the application
- Parser pushes events to the application as elements are encountered in the XML data stream
  - That is, parser is controlling flow
- Typically, application must have handler ready that will be called by the parser to handle the event
  - Many developers find this model awkward to use
- Simple API for XML (SAX) is an example of a push parser

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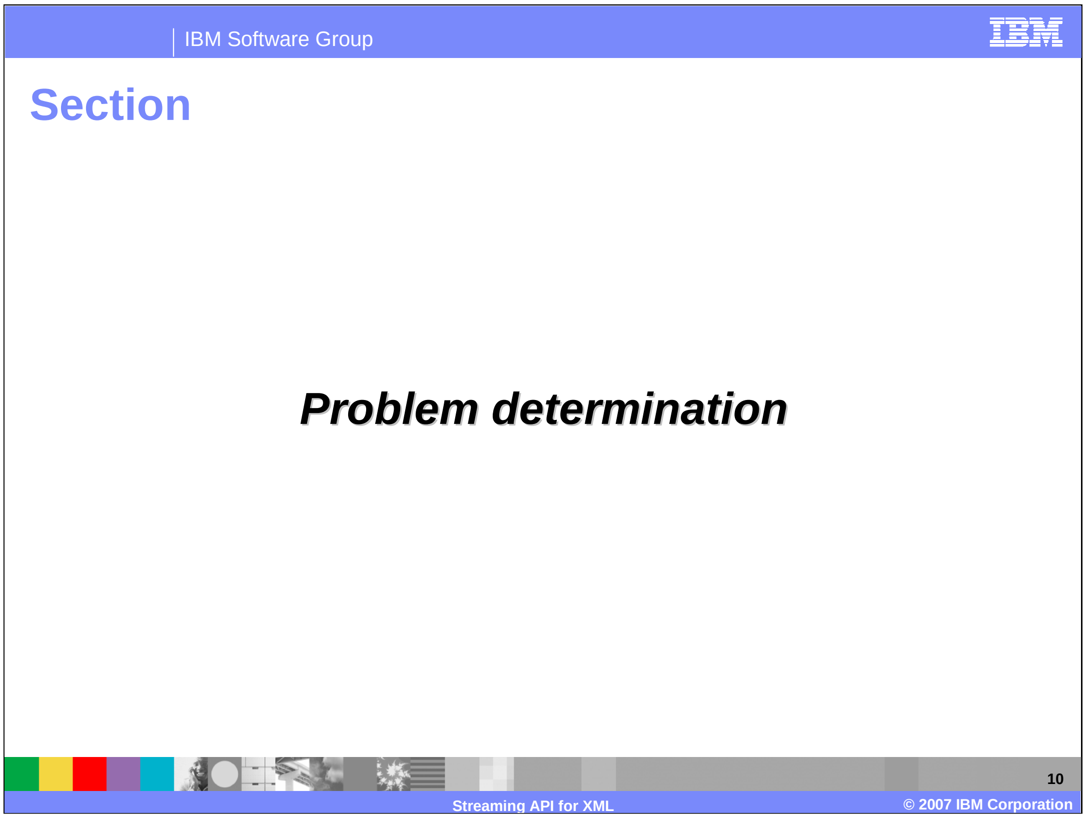
Streaming API for XML

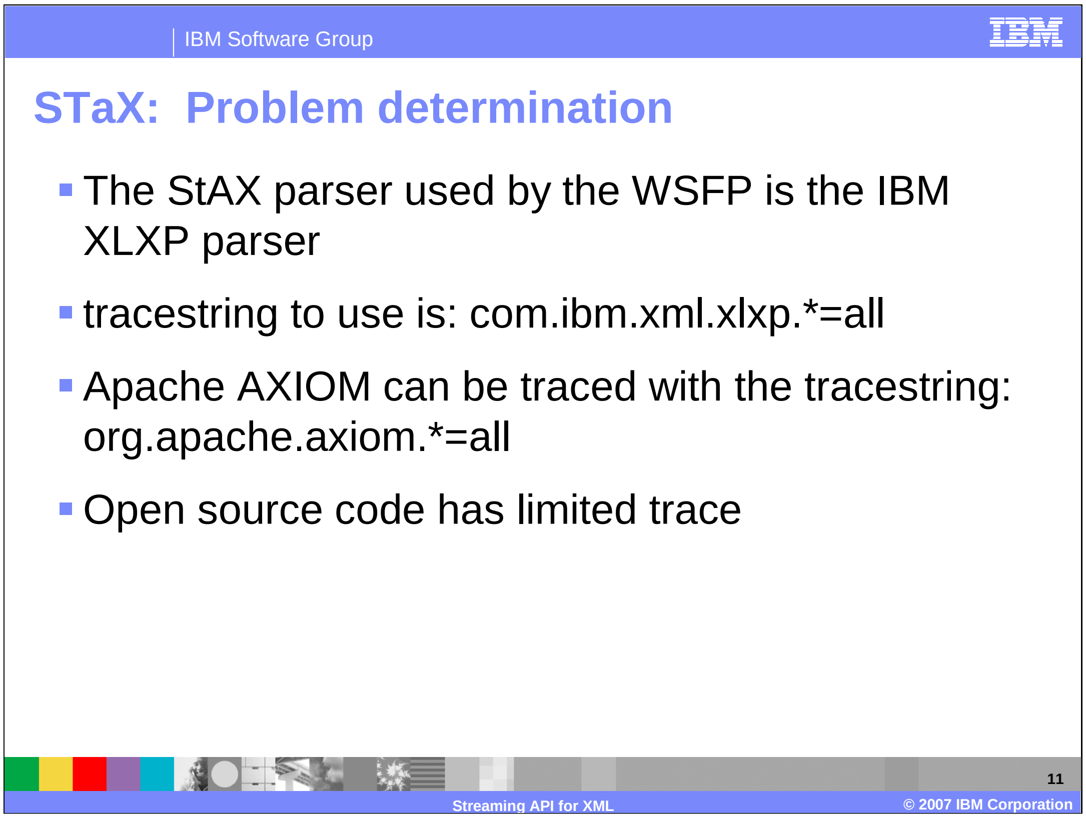
In push parsing, the parsing library calls methods in the application code. That is the parser “pushes” events to the application and the application must have a handler that is ready to be called for these events.   Many developers tend to find this model awkward to use. The Simple API for XML (SAX) is a well known example of a push parser.



Section

Problem determination

The next section will explain problem determination for the StAX technologies.



STaX: Problem determination

- The StAX parser used by the WSFP is the IBM XLXP parser
- tracestring to use is: com.ibm.xml.xlxp.*=all
- Apache AXIOM can be traced with the tracestring: org.apache.axiom.*=all
- Open source code has limited trace

The StAX based parser used by the Feature Pack for Web Services is called the XLSP parser. Tracing can be done using the tracestring: com.ibm.xml.xlxp.*=all.

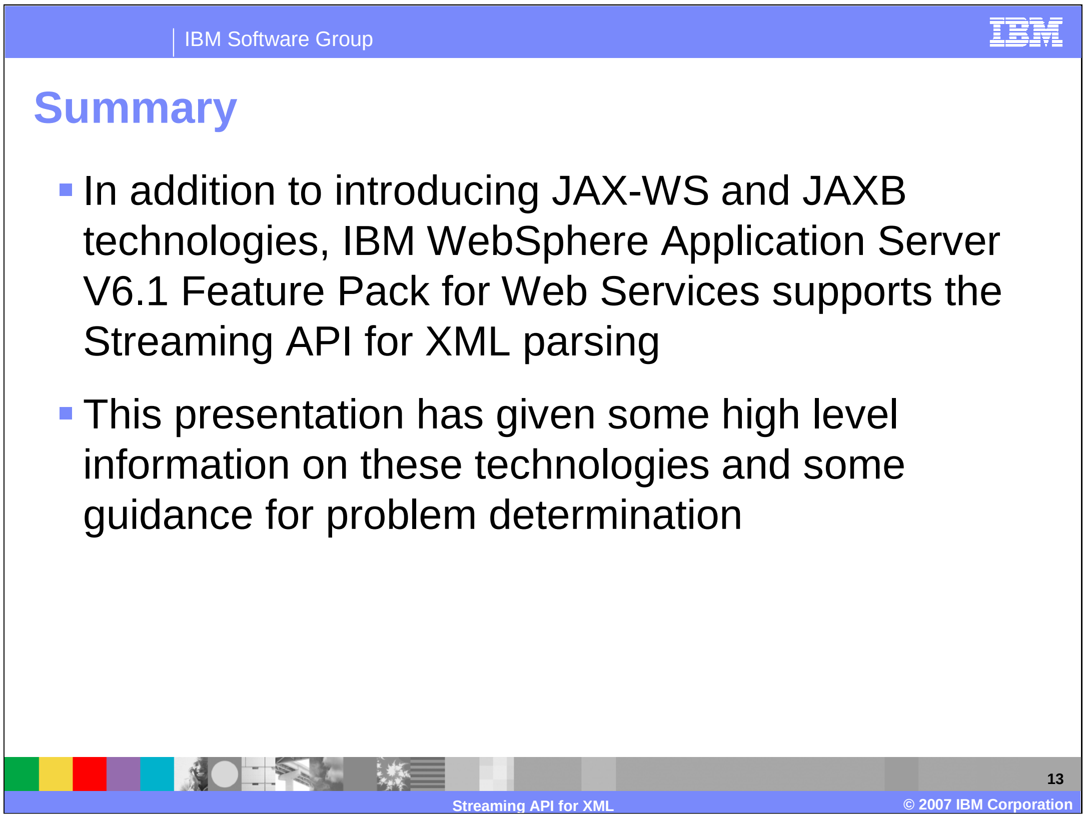
Some parts of IBM WSFP are based on Apache AXIOM code and this can be traced using a tracestring of org.apache.axiom.*=all.

Users should be aware that much of the open source code has limited trace capability, and will return less trace information.

Section

Summary

Now for a summary of the information from this presentation.



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Summary

- In addition to introducing JAX-WS and JAXB technologies, IBM WebSphere Application Server V6.1 Feature Pack for Web Services supports the Streaming API for XML parsing
- This presentation has given some high level information on these technologies and some guidance for problem determination

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Streaming API for XML

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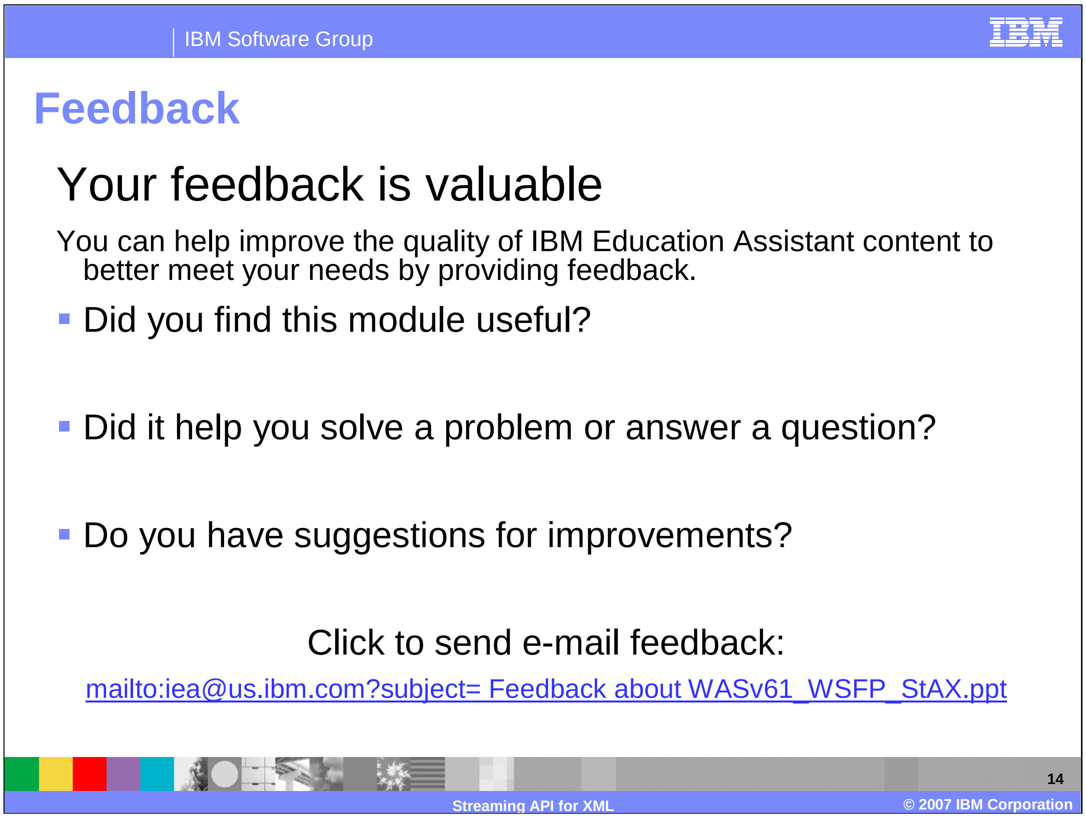
In addition to introducing JAX-WS and JAXB technologies, IBM WebSphere Application Server V6.1 Feature Pack for Web Services supports the Streaming API for XML parsing. A new parser technology that is both easier to develop for and has a better performance in many situations. This presentation has given some high level information on these technologies and some guidance for problem determination related to the StAX technologies.



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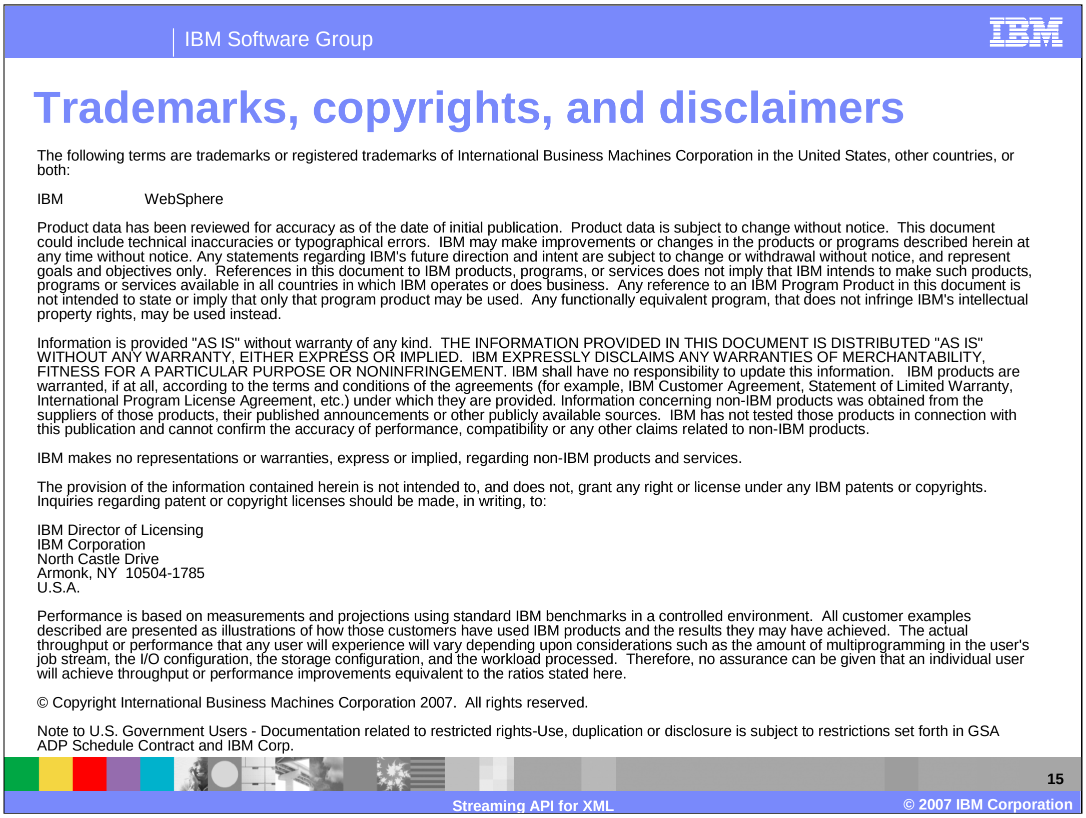

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