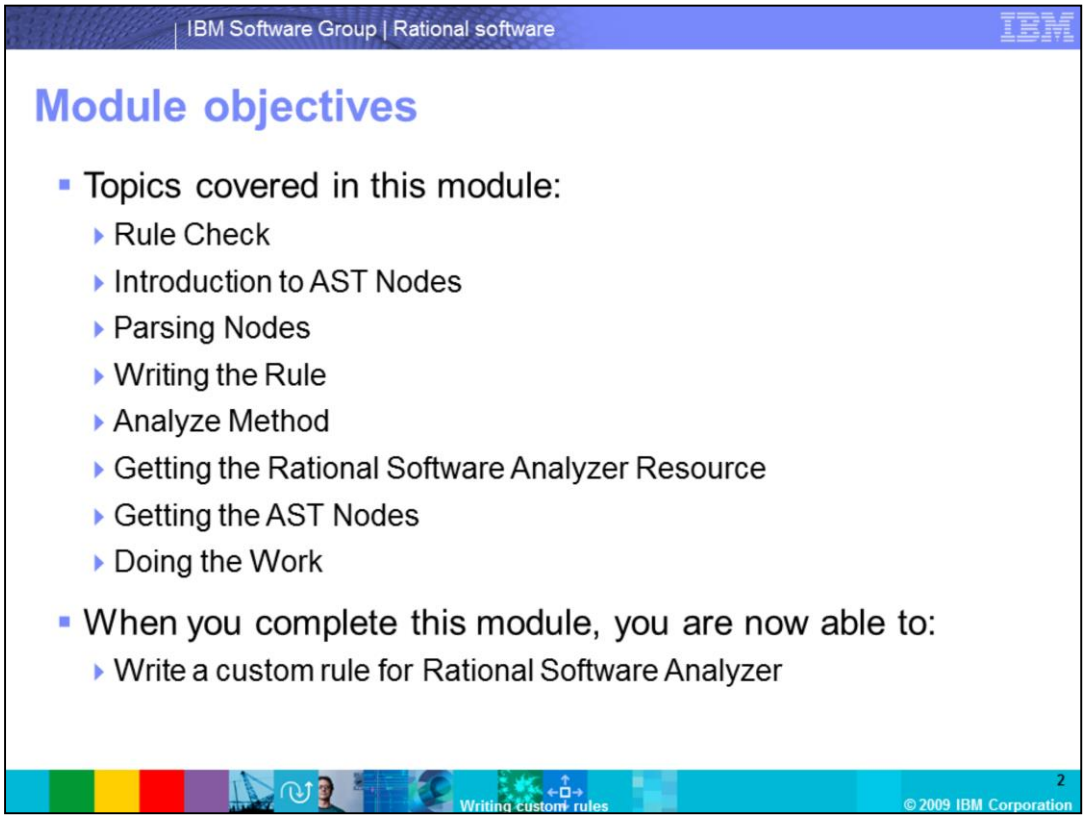
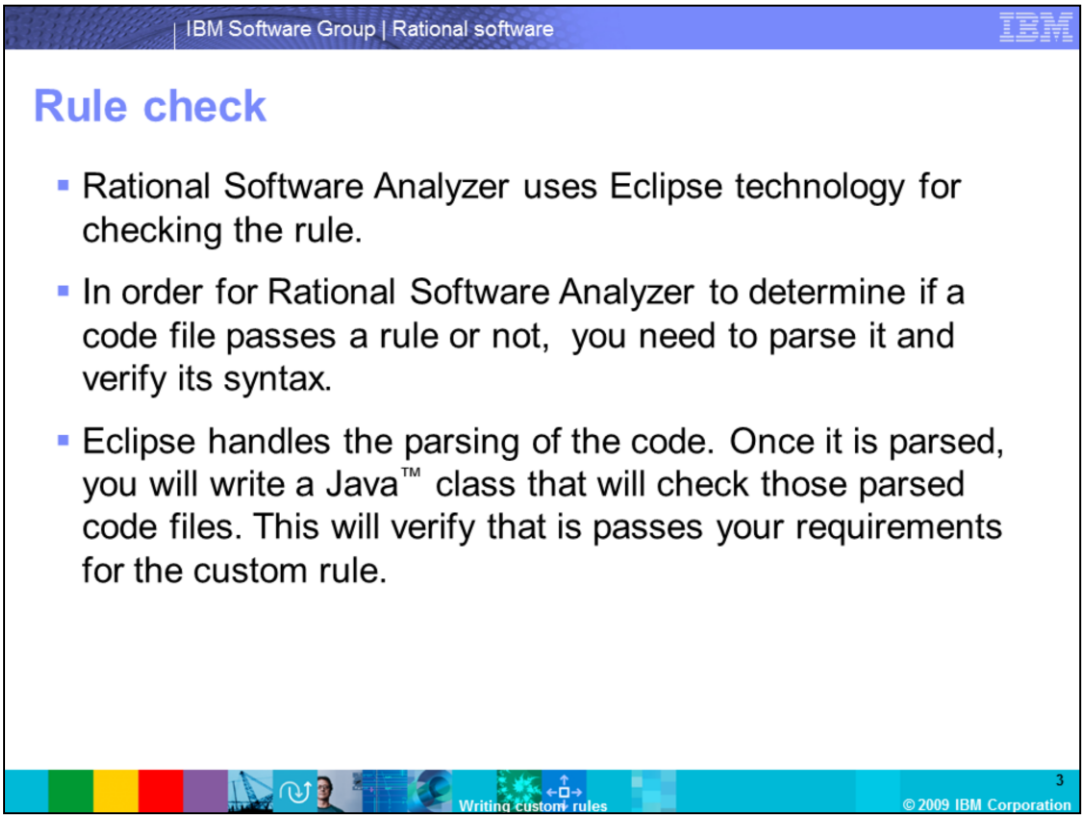
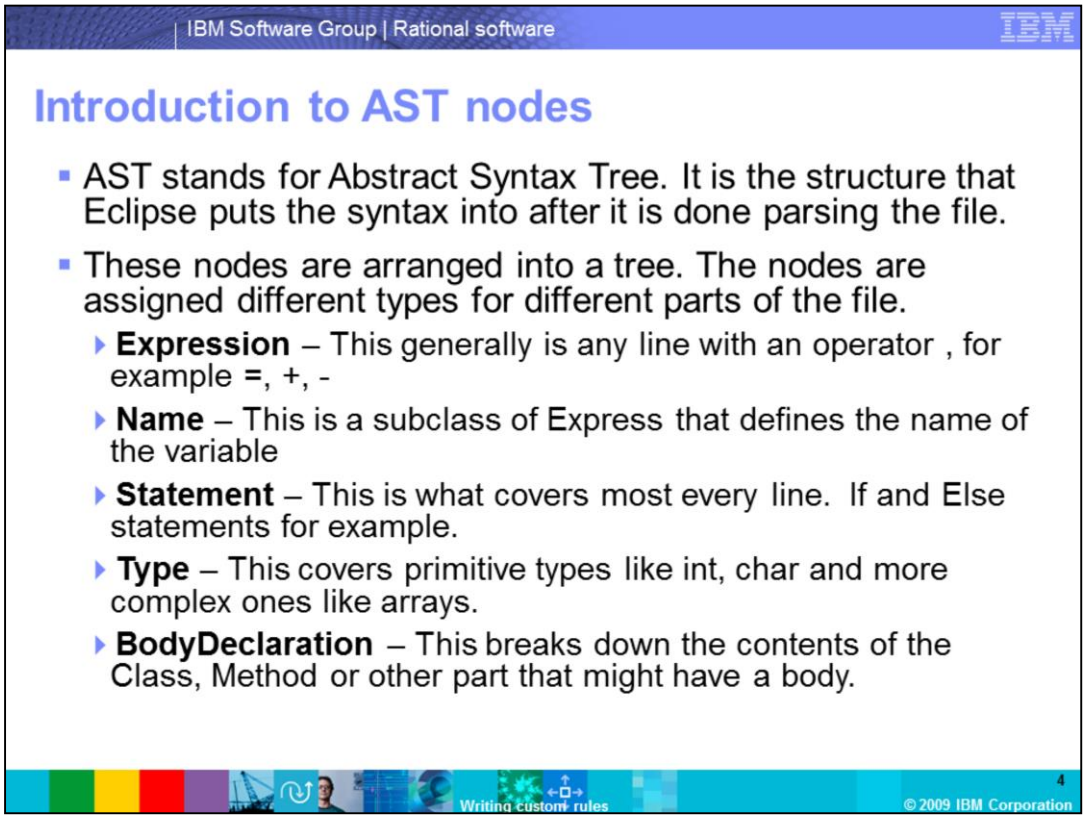
This module covers the topic on how to write a custom rule for IBM Rational® Software Analyzer versions 7.0 and higher.



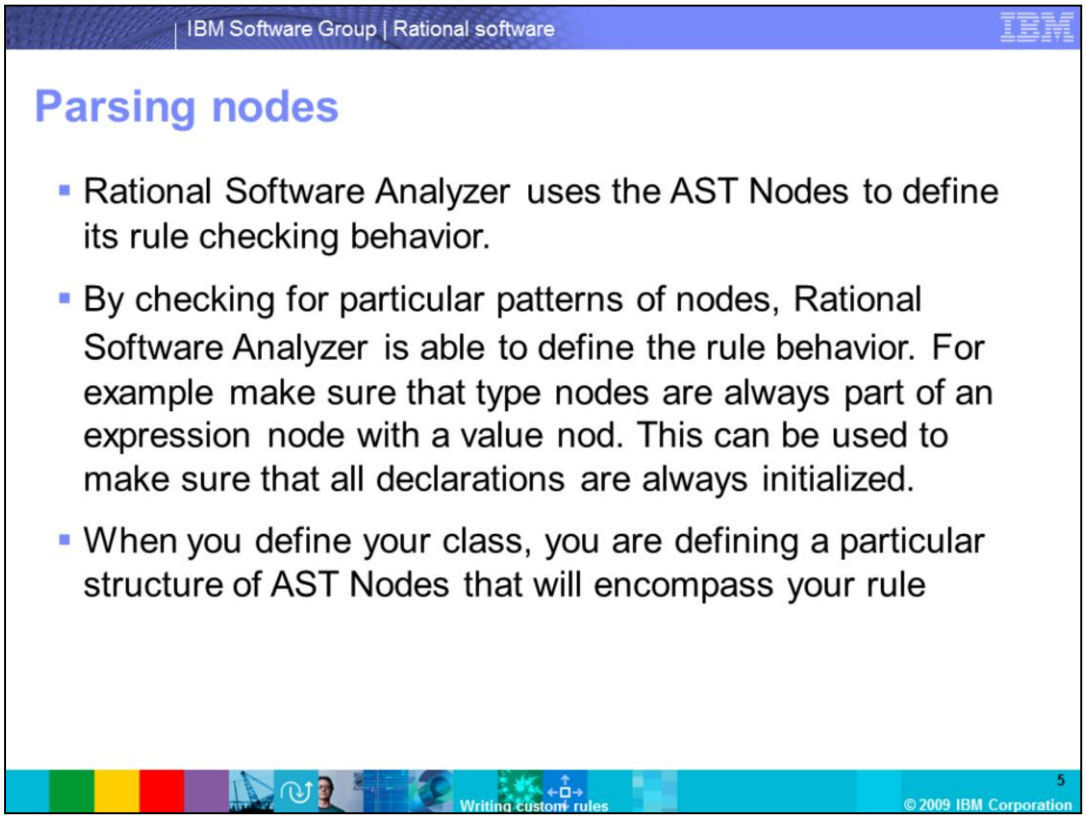
This course covers eight topics. The first three topics provide you with information about a Rule Check, an introduction to AST Nodes and Parsing Nodes. The next few topics outline writing the rule, the Analyze Method, getting the Rational Software Analyzer resource, getting the AST Nodes and doing the work. When you complete this module, you will understand what an AST Node is and how it relates to Rational Software Analyzer. You will also be able to write a custom rule for Rational Software Analyzer.



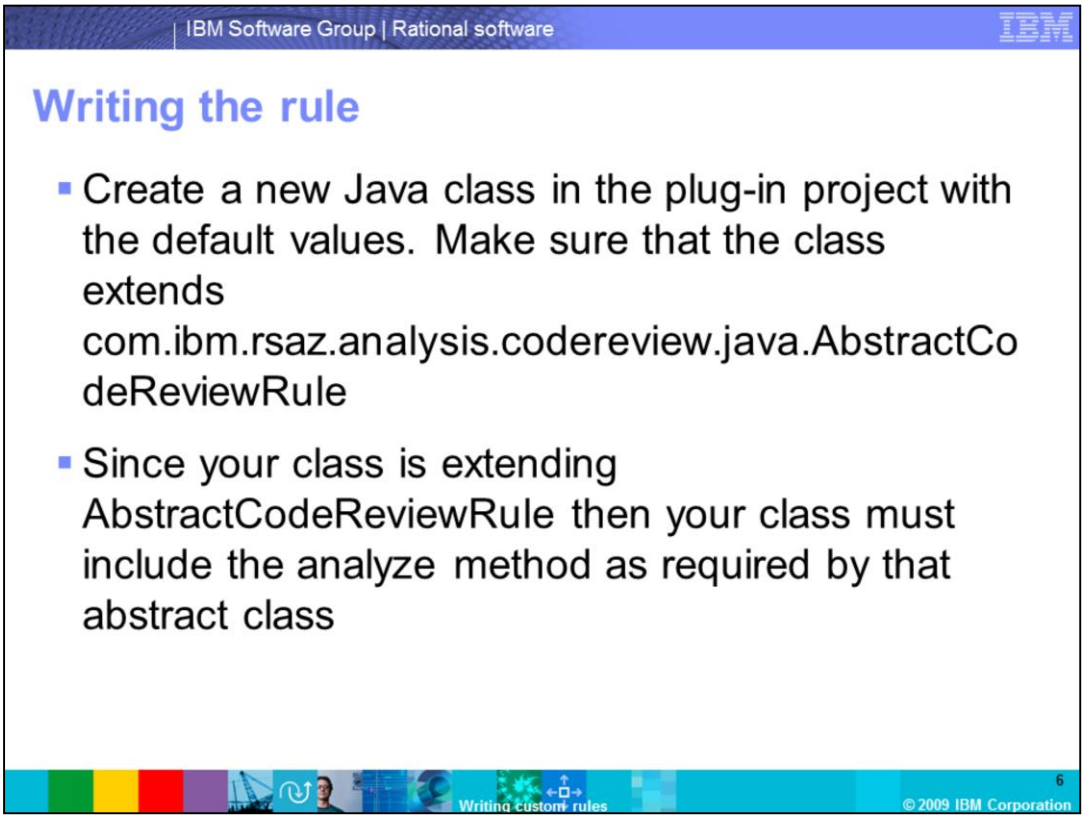
This slide will cover three points. The first point lets you know that Rational Software Analyzer does not have its own code parser, rather is uses the existing Eclipse parsers. Secondly, Rational Software Analyzer uses the results of the parser pass to determine if a rule has passed or failed. And thirdly, you need to write your Java class to look for particular patterns in the code file to make a decision as to whether the file passes the rule.



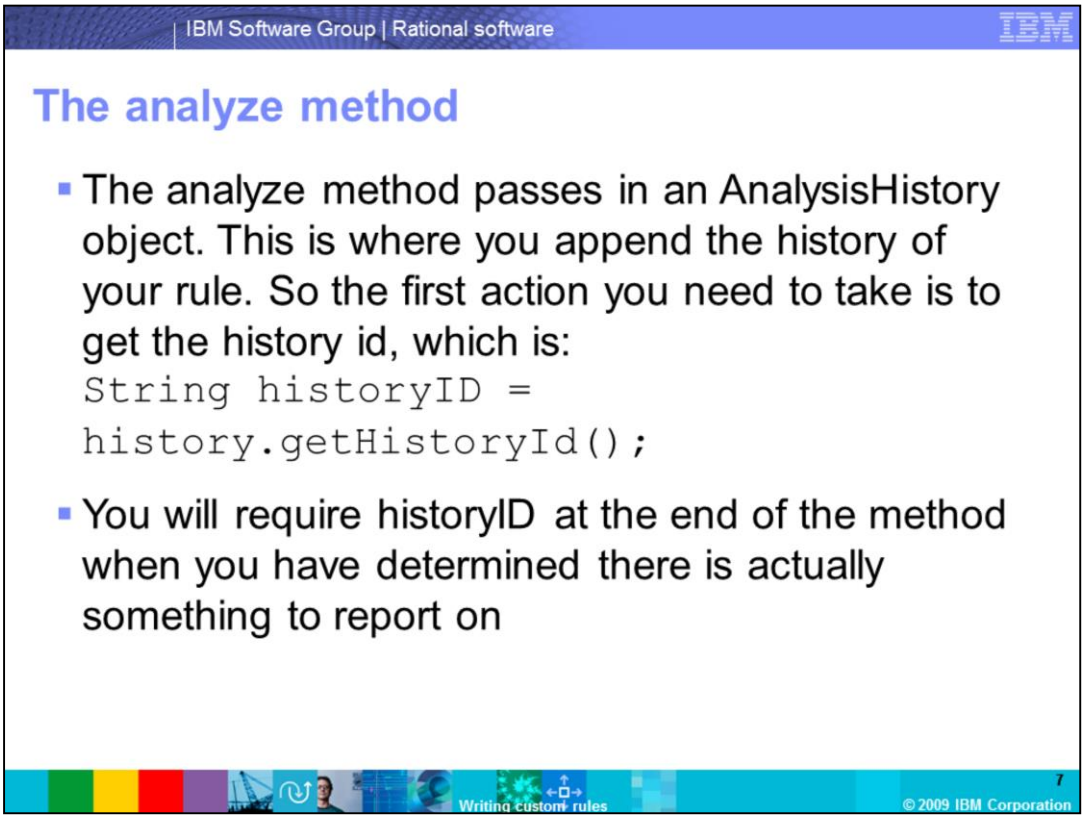
This slide gives an Introduction to AST Nodes. Abstract Syntax Tree (AST) is the data structure that is the result of the Eclipse parser pass. The data structure itself is a product of the Eclipse project, but its purpose is to break code files down into a tree structure that represents the file fully. The tree will start at the highest, broadest scope and through the children of that top level node, create gradually narrower scoped nodes. These nodes will have different types for different parts of the code file, however everything that the parser encounters is represented somehow in this tree.



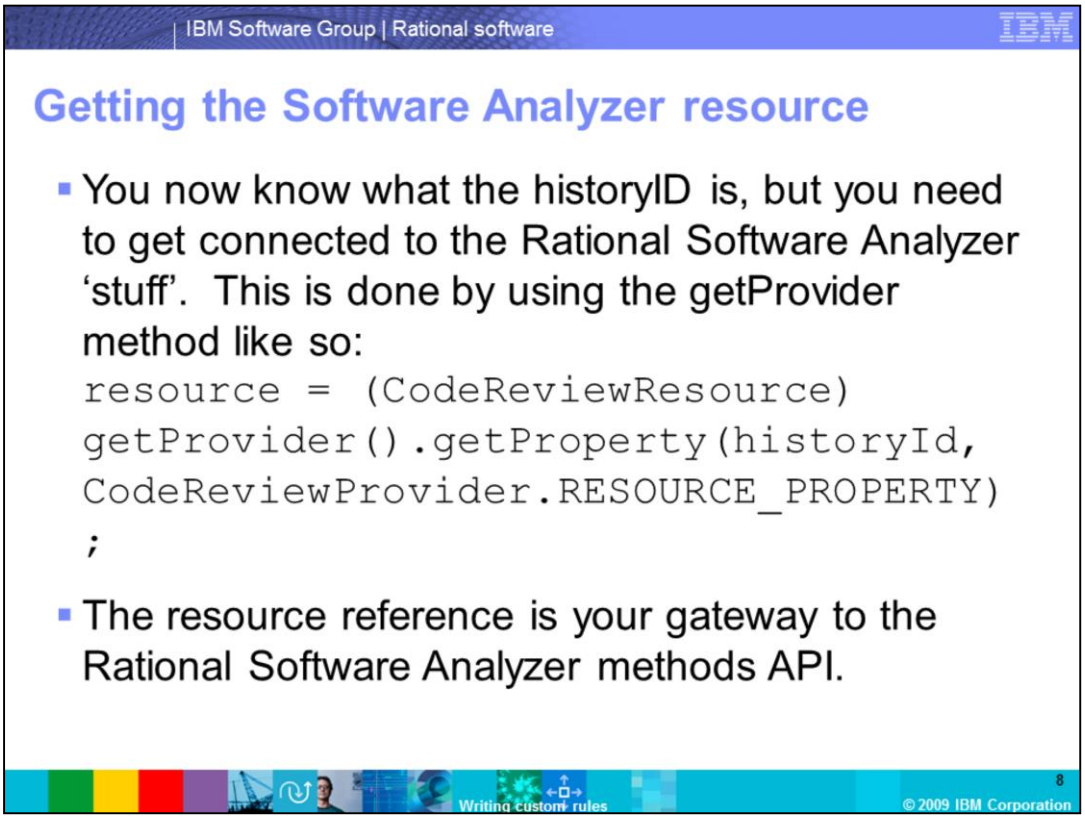
Rational Software Analyzer uses this Abstract Syntax Tree to check its rule syntax. So when you are defining your rule for Rational Software Analyzer, what you are really doing is specifying a particular AST structure that will either be acceptable or unacceptable. So in fact checking the rule will involve traversing the tree and looking for a specific pattern.



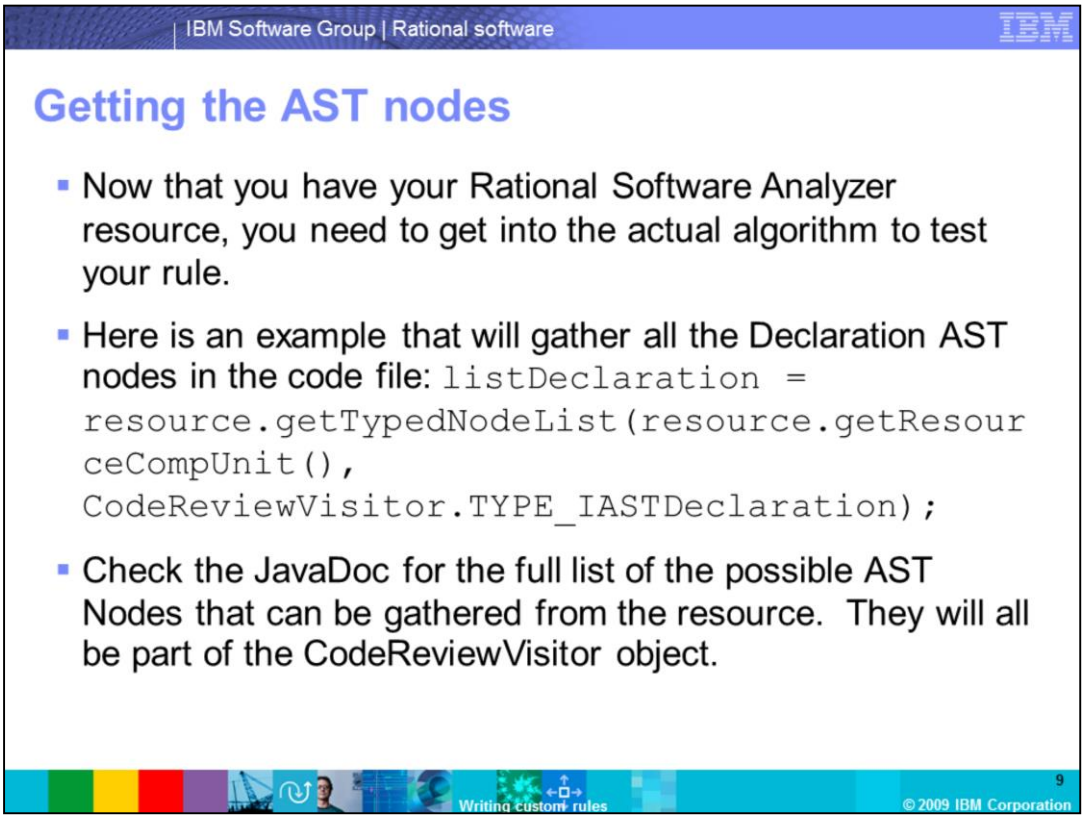
In the previous set of slides, you have set up the custom plug-in, but you did not create the Java class. You already have all the plug-in blocks in place, but you need to write the actual steps to check the code. The Java class needs to extend the AbstractCodeReviewRule object. This Rational Software Analyzer object contains the analyze method which is what Rational Software Analyzer will call to start the scan. Therefore you are putting all of your analysis code there.



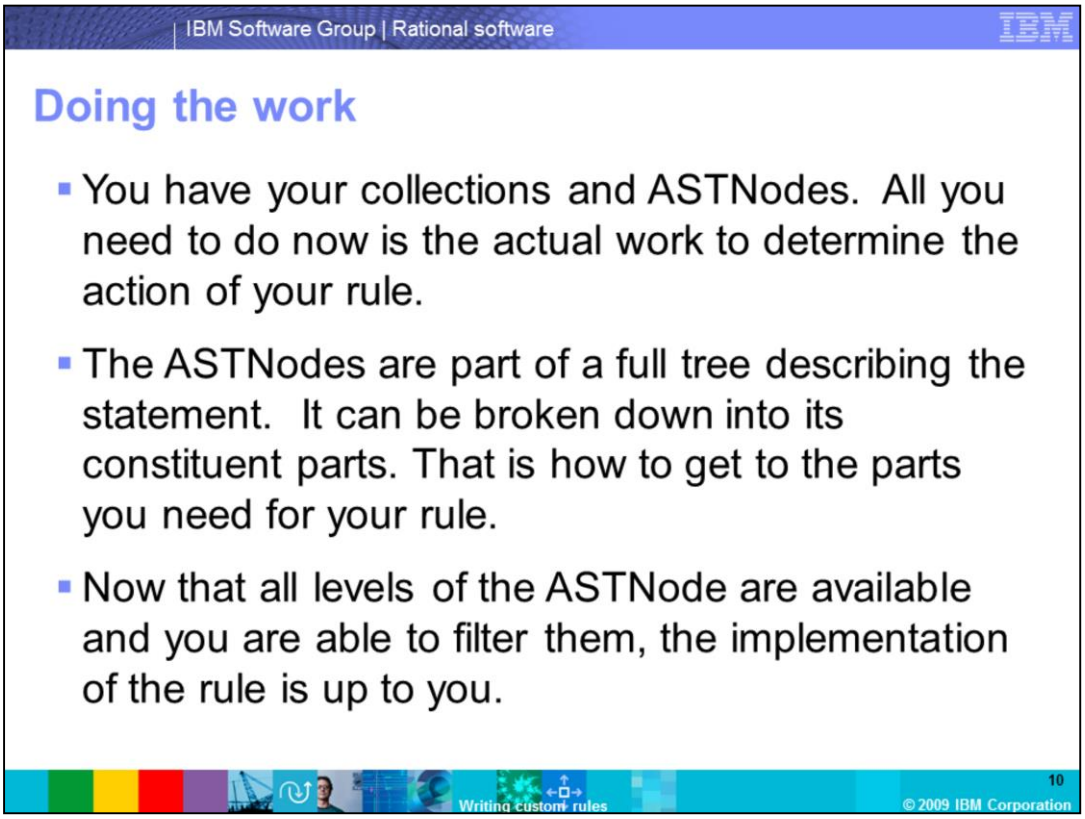
The analyze method will pass in an AnalysisHistory object. This will tell the analyze method what the previous history of the rule scan is. The first action you should always take when you are implementing the rule is to acquire the historyID, so you know where to put the results of this rule. You will reference this later on when you decide whether to add something to your history for this rule.



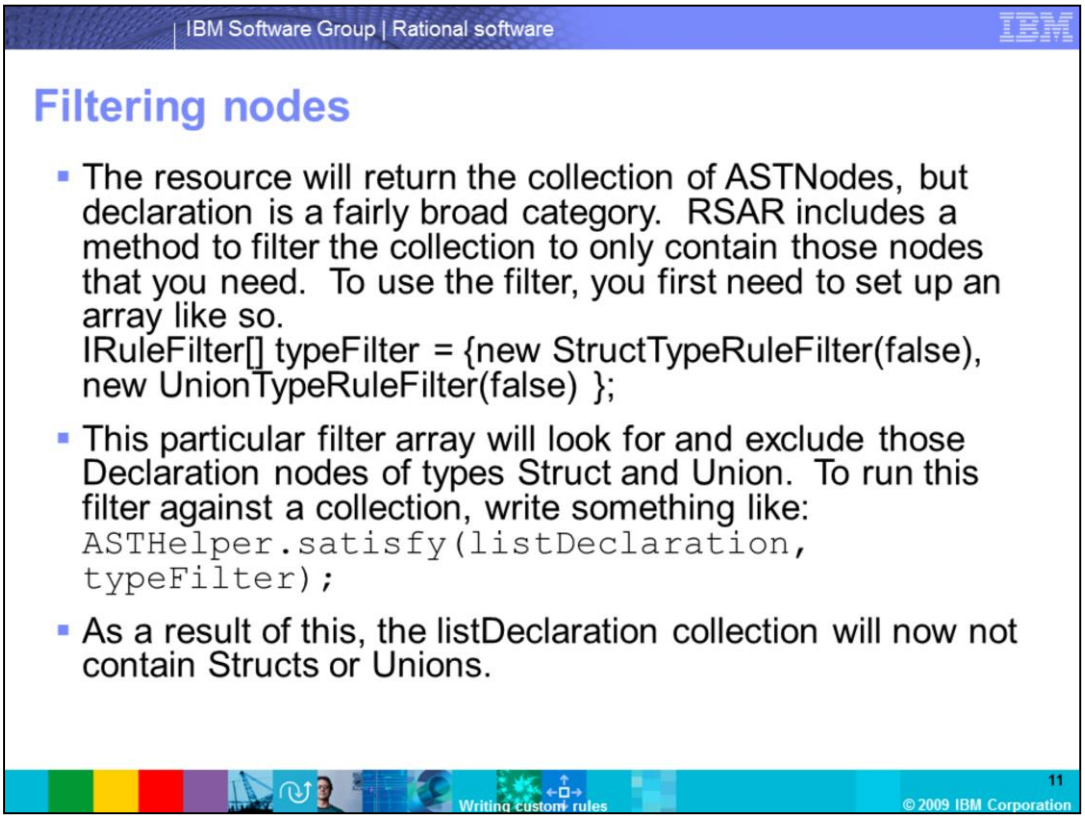
You now have the historyID, but you need more from Rational Software Analyzer. You need to get access to the Rational Software Analyzer API and its associated objects. The way to do this is through the getProvider method. By using the syntax here you are able to get the Rational Software Analyzer CodeReviewResource object which is your window into all things Rational Software Analyzer.



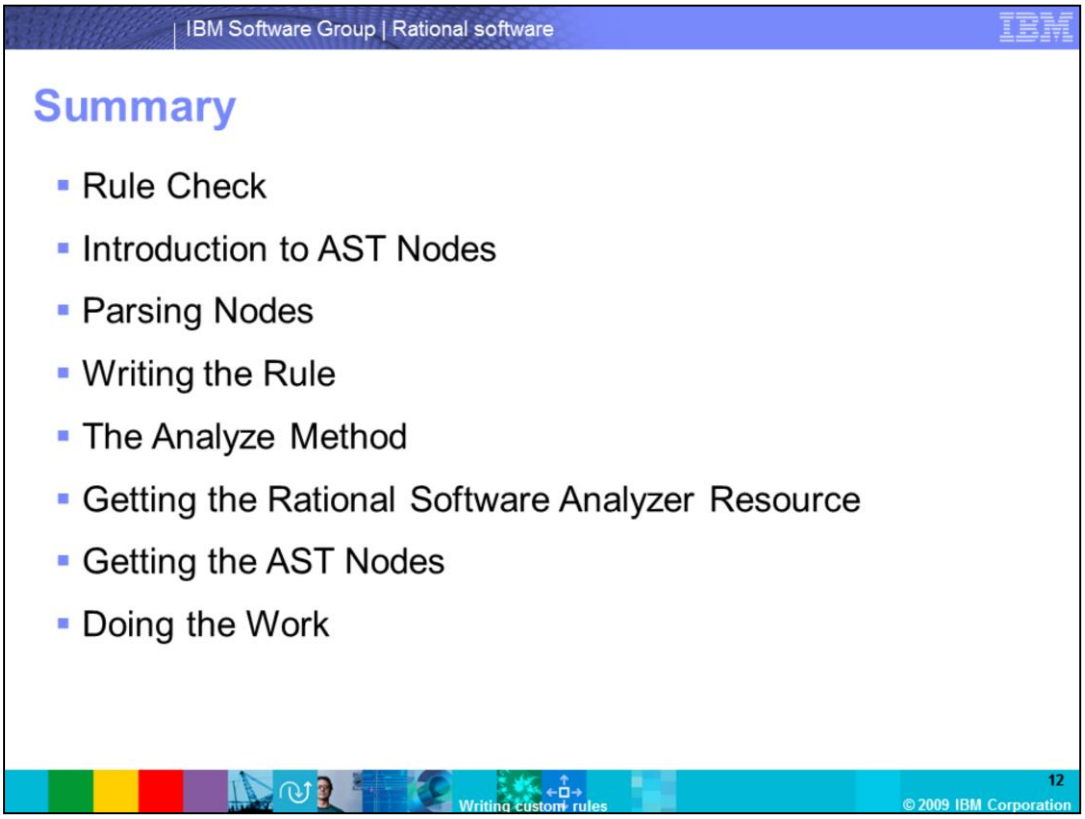
The resource reference is set up and ready to go. The last thing you need to do is set up the code to check the pattern to verify if the rule passes or fails. First you need to collect the AST Nodes that are of interest to you. In the example here you are gathering an array of nodes of the ASTDeclaration type. From the array you can sift through looking for particular declaration nodes of interest.



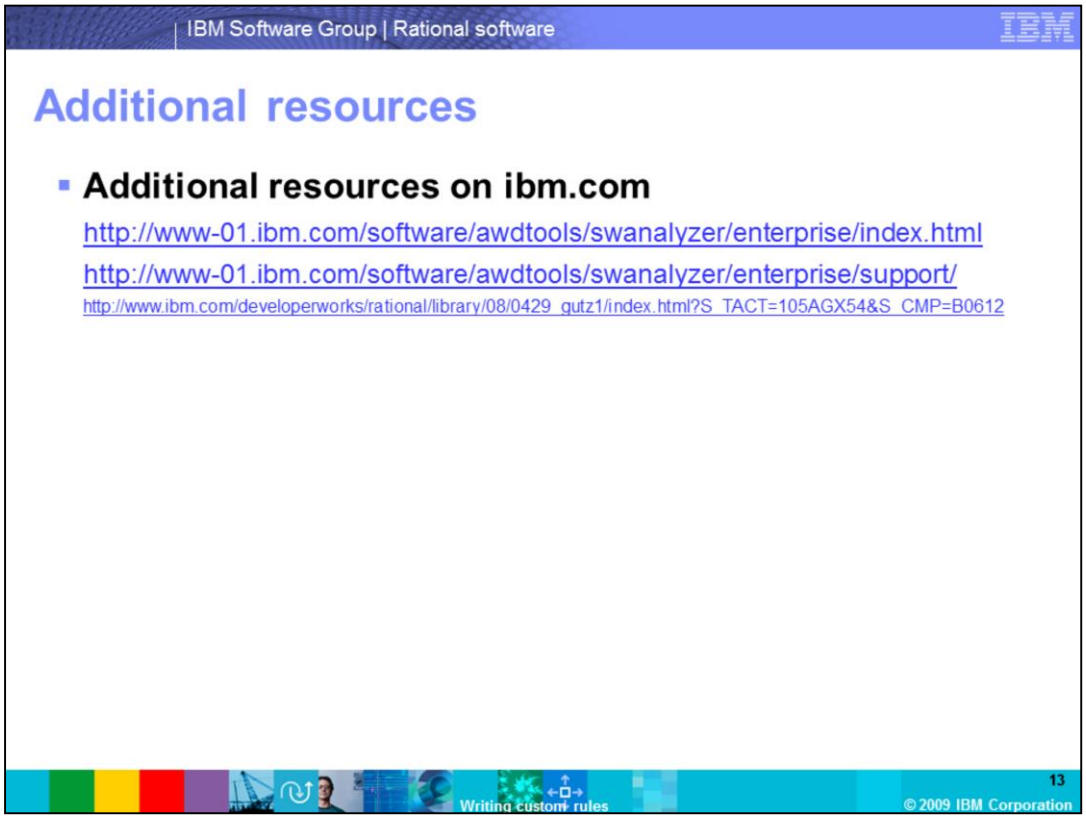
At this point you have the arrays of AST Nodes. Now you have all the parts you need to start checking rules. By checking for particular patterns of nodes in the arrays you collect, you can decide what actions to take to determine the success or failure of your custom rule.



Rational Software Analyzer provides an additional filter method on top of those provided through the ASTNode methods. The IRuleFilter allows not only the particular type of ASTNode to be filtered but it can get more specific implementations of the ASTNode. For example, both Struct and Union declarations are ASTDeclaration ASTNode types. Without iterating through the entire array of Declaration Nodes you do not know what implementations there were. By using the satisfy method with the IRuleFilter array you can check that the collection either inclusively or exclusively contains those particular nodes.



This module provided an overview of writing custom rules in Rational Software Analyzer. You should now be familiar with knowing what an AST Node is and how it relates to Rational Software Analyzer. You are now able to write your own custom rule.



Additional resources can be found on the ibm.com Web site and in the Whitepaper on "**Static analysis IBM Rational Software Analyzer:** Getting started".

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