

The opinion in support of the decision being entered today is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte AN FENG¹

Appeal 2007-1505
Application 10/279,481
Technology Center 2100

Decided: July 27, 2007

Before FRED E. McKELVEY, Senior Administrative Patent Judge,
ALLEN R. MacDONALD, and ROBERT E. NAPPI, *Administrative Patent
Judges*.

NAPPI, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 6(b) of the Final Rejection of claims 1 through 9, 11, 16, and 17, claims 12 through 15 are objected to and claims 10 and 18 have been canceled. Appellant has

¹ We note that declaration and official filing receipt identify the inventor as An Feng, however Appellant's Brief and Reply Brief, both identify the inventor as Andrew Feng.

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withdrawn claims 19 and 20 from appeal. For the reasons stated *infra*, we will not sustain the Examiner's rejection of these claims.

INVENTION

The invention is directed to a method of evolving one XML schema (a document format scheme) to another XML schema. The method makes use of several schema manipulations to evolve the schema. The method also includes steps to validate the schema manipulation. See pages 5 and 6 of Appellant's Specification. Claims 1 and 11 are representative of the invention and are reproduced below:

1. A computer-implemented method for evolving a first XML schema to a second XML schema in application involving a plurality XML documents which are valid against said first XML schema, comprising the steps of:

performing a plurality of schema manipulation operations to the first XML schema to generate the second XML schema, the schema manipulation operations including operations of the group including: inserting a schema segment, deleting a schema segment, replacing a schema segment;

validating the plurality of schema manipulation operations by performing operations comprising:

determining whether a second set containing all valid XML documents of said second XML schema contains a first set containing all valid XML documents of said first XML schema.

11. A computer-implemented method for determining whether a first set of XML documents contains a second set of XML documents, said first set of XML documents being the set of all valid XML documents of a first XML schema and said second set of XML documents being the set of all valid XML

documents of a second XML schema, the method comprising the steps of:

locating a first root element for said first XML schema and a second root element for said second schema;

removing all elements and attributes from said first XML schemas that are not reachable from said first root element and from said second XML schema that are not reachable from said second root element;

constructing a first total element list which contains elements in said first XML schema and a second total element list which contains elements in said second schema;

returning false if said first element list does not contain said second element list; and

performing element comparison for each of said elements in said second element list with said corresponding elements in said first element list.

REFERENCES

The references relied upon by the Examiner are:

Sarkar	US 6,418,448 B1	Jul. 9, 2002
Clewis	US 2003/0084054 A1	May 1, 2003 (filed Oct. 26, 2001)
Su	US 2003/0167445 A1	Sep. 4, 2003 (filed Mar. 4, 2002)
Ripley	US 6,742,001 B2	May 25, 2004 (filed Jun. 27, 2001)

Roger L. Costello, *Challenge of XML Schemas-Schema Evolution* May 29, 2000, <http://216.239.51.100/search?q=cache:LYIOREHZSowC:www.xfront.org/EvolvableSchemas.html+challenge+xml+schemas+evolution&hl=en&ie=UTF-8>.

THE EXAMINER'S REJECTIONS

Claims 1, 6, 7, 9, 16, and 17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Costello in view of Sarkar.

Claims 2 through 5 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Costello in view of Sarkar and Su.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Costello in view of Sarkar, Su, and Ripley.

Claim 11 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Su in view of Clewis.

CONTENTIONS

Claims 1 through 9, 16, and 17.

Appellant's arguments group independent claims 1 and 16 together. Brief, p. 8. Appellant argues that the rejection of independent claims 1 and 16 is improper as Costello does not teach a plurality of schema manipulations “the schema manipulation operations including operations of the group including: inserting a schema segment, deleting a schema segment, replacing a schema segment.” Brief p. 10. Appellant asserts on page 2 of the Reply Brief that this limitation of independent claim 1, and the similar limitation of independent claim 16, is not written in the alternative. Rather, Appellant asserts that claims 1 and 16 require “multiple of the stated operations – inserting, deleting, replacing.” Reply Brief, p. 3.

Appellant also argues that the combination of Costello and Sarkar does not teach or suggest the limitation of “validating the plurality of schema manipulation.”

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The Examiner construes claims 1 and 16 as reciting the elements of inserting, deleting, and replacing in the alternative and states that the rejection “only requires one of such operations to be present to meet the claimed limitation.” Answer, p. 10. The Examiner agrees with the Appellant’s assertion that Costello only teaches one schema manipulations, the “<any>” element which allows inserting a schema segment.

Claim 11.

Appellant argues that Su does not teach the claim 11 feature of “determining whether a first set of XML documents contains a second set of XML documents.” Appellant asserts that Su teaches identifying structural differences between two document type definitions and determines how to transform the documents from one type to the other. Brief p. 23.

In response the Examiner states:

With respect to claim 11, the Appellant argues that Su fails to disclose determining whether a first set of XML documents contains a second set of XML documents (page 23). The examiner addressed this argument with respect to claim 1, and the argument remains applicable with respect to claim 11.

Answer, p. 13

ISSUES

The first issue before us is whether Appellants have shown that the Examiner erred because independent claims 1 and 16 are limited to a schema manipulation method wherein the group of schema manipulations includes each of the three different manipulations, inserting, deleting, and replacing.

The second issue before us is whether Appellants have shown that the Examiner erred because the combination of Costello and Sarkar does not teach or suggest validating the schema manipulations as claimed in claims 1 and 16.²

The third issue before us is whether Appellants have shown that the Examiner erred because the combination of Su and Clewis does not teach the claim 11 feature of “determining whether a first set of XML documents contains a second set of XML documents.”

FINDINGS OF FACT

Costello is an article discussing the importance of evolving XML schemas. Costello mentions that evolution may happen in many ways, adding, deleting or restructuring the schema. See paragraph under heading “1. Design for Evolvability.” The Article explores several XML schemas which have open content, a schema that allows content in addition to elements defined in the schema. See abstract and paragraph under heading “7. What is Open Content?” The article discusses several ways in which a XML schema can be open using the “<any/>” element, the “content=‘open’/>” element, or writing a new schema derived from an existing schema. See paragraphs under the headings “9. Current Implementation of Open Content,” “11. A Better Approach to Expressing Open Content,” and “12. Schema Evolution using Refinement (Derive by Extension).” The article does not discuss validation of the schema manipulation operations.

² We recognize that Appellant has additional contentions with regard to the Examiner’s rejection of independent claims 1 and 16. However, the issues

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Rather, the article discusses evolving the schema such that an application that does not support the new schema can view a document in the evolved schema, as any unknown fields are simply ignored. See third to last paragraph under heading “12. Schema Evolution using Refinement (Derive by Extension).”

Sarkar teaches a system to formulate queries (in SQL) to navigate through multiple XML documents. Abstract, col. 5, ll. 53-59. We are unable to find where Sarkar discusses performing schema manipulations. Nor are we able to find that Sarkar teaches or suggests validating the schema manipulations based upon a determination of whether one set of valid XML documents of one schema contain all of the valid XML documents of another schema.

Su teaches a system for transforming data from one XML schema to another XML schema. Abstract. The system takes the source and target schema and creates respective tree structures for the schemas. See figure 1 (item 110), flow chart figure 8 (steps 810, 820), and paragraph 0036. The system then generates a series of operations that when implemented will transform an XML document in the source schema into an XML document in the target XML schema. See figure 1 (item 140), flow chart figure 8 (step 830), and paragraphs 0031 and 0092. The operations to transform from one schema to another are determined by finding matching nodes and analyzing how they should be transformed. See paragraphs 0039 and 0082. The system makes use of a series of transformations to match nodes of the respective schema. See paragraph 0092. The transformations including

we have identified are dispositive of the Examiner’s rejection.

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Insert, Delete, and Relabel (which is similar to Appellant's replacement). See paragraphs 0053, 0054, and 0056-0058. Based upon this analysis, a transformation program is generated for transforming XML documents using the first schema into documents in the target XML schema. Paragraph 0101. We are unable to find any relevant discussion in Su of verifying or checking the transformed documents.

Clewis teaches a system to analyze and process hierarchical data structures. Paragraph 0002. The system permits pruning of nodes to unnecessary data to improve processing efficiency. Paragraph 0010. We are unable to find any discussion in Clewis of transforming XML schema. Nor are we able to find any relevant discussion in Clewis of verifying or checking of transformed documents.

ANALYSIS

Claims 1 through 9, 16, and 17.

Claim 1 recites "performing a plurality of schema manipulation operations ... the schema manipulation operations including operations of the group including: inserting a schema segment, deleting a schema segment, replacing a schema segment." Claim 16 recites a similar limitation. We note, while this limitation does not recite that all of the three different schema manipulations are performed, it does recite that the group of manipulations includes: inserting, deleting, and replacing schema segments. Claim 16 recites a similar limitation. Thus, we hold that the recitation of manipulation functions in claims 1 and 16 is not presented in the alternative and the claim is limited to computer implemented methods (claim 16, to data processing

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apparatus) which includes operations to perform inserting, deleting, and replacing schema segments.

As discussed in our findings of fact, Costello identifies that schemas may be evolved by adding, deleting or restructuring the schema. However, Costello focuses on generating schema to be of open format (adding features) and does not discuss how a computer implemented method of evolving schema using the delete and restructuring elements would be performed. Further, we were unable to find that Costello teaches validating the schema manipulations. Similarly, as discussed above, in our findings of fact, we were unable to find that Sarkar teaches validating schema manipulations based upon a determination of whether one set of valid XML documents of one schema contain all of the valid XML documents of another schema.

Accordingly, we are unable to find that the combination of Costello and Sarkar teaches all of the limitations of independent claims 1 and 16. On this record, we have no independent basis for knowing that the subject matter of the missing limitations is known in the art. Thus, we reverse the Examiner's rejection of claims 1, 6, 7, 9, 16, and 17 under 35 U.S.C. § 103(a) as unpatentable over Costello in view of Sarkar.

The Examiner rejects dependent claims 2 through 5 and 8 over Costello and Sarkar in combination with Su and Ripley. The Examiner relies upon these references to teach features claimed in the dependent claims. The Examiner has not satisfactorily established that either Su or Ripley teach or suggest the claimed group of schema manipulations or the step of validating. We note, as discussed in our findings of fact, Su teaches

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a computer implemented method of evolving (Su calls it transforming) one XML schema to another. The group of transformation operations includes: Insert, Delete, and Relabel (which is similar to Appellant's replacement). However, it is not readily apparent to us how either Su or Ripley teach or suggest the validation step as claimed. Thus, we reverse the Examiner's rejection of claims 2 through 5 and 8 for the reasons discussed *supra* with respect to claims 1 and 16.

Claim 11.

Claim 11 recites in the preamble “[a] computer-implemented method for determining whether a first set of XML documents contains a second set of XML documents, said first set of XML documents being the set of all valid XML documents of a first XML schema and said second set of XML documents being the set of all valid XML documents of a second XML schema.” The claim further recites various steps that are performed on the two XML schemas, and recites “returning false if said first element list does not contain said second element list.” As the method steps recited in the claim relate to the elements recited in the claim preamble, we consider the preamble to further limit the claim. Thus, we find that the scope of claim 11 is limited to a method where two sets of documents (of different schema or format) are compared.

As discussed above in our findings of fact, Su teaches a system for transforming data from one XML schema to another XML schema. Su's system analyses and compares the two schemas to determine the operations required to transform documents from one schema to another. We are unable to find that Su teaches comparing documents of the schema to each

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other. Rather, Su's system is used to generate documents in the target schema from documents in the first schema using the transformation function. Further, the Examiner did not find, nor are we able to find, that Clewis teaches or suggests modifying a system such as Su's to compare documents of two schemas. Thus, we were we not able to find that the combination of Su and Clewis teaches or suggests all of the limitations of claim 11 and we reverse the Examiner's rejection.

CONCLUSION

Appellants have shown that the Examiner erred because independent claims 1 and 16 are limited to a schema manipulation method wherein the group of schema manipulations includes each of the three different manipulations, inserting, deleting, and replacing.

Appellants have shown that the Examiner erred because the combination of Costello and Sarkar does not provide a reason for validating the schema manipulations as claimed in claims 1 and 16.

Appellants have shown that the Examiner erred because the combination of Su and Clewis does not teach the claim 11 feature of "determining whether a first set of XML documents contains a second set of XML documents."

On this record, claims 1 through 9, 11, 16, and 17 have not been shown to be unpatentable.

For the forgoing reasons, we will not sustain the Examiner's rejections of claims 1 through 9, 11, 16, and 17 under 35 U.S.C. § 103(a).

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DECISION

The decision of the Examiner is reversed.

REVERSED

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