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**Glasco**

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(54) **METHODS AND APPARATUS FOR SPECULATIVE PROBING WITH EARLY COMPLETION AND DELAYED REQUEST**

(75) Inventor: **David B. Glasco**, Austin, TX (US)

(73) Assignee: **Newisys, Inc.**, Austin, TX (US)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 529 days.

This patent is subject to a terminal disclaimer.

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**G06F 12/08** (2006.01)  
**G06F 12/16** (2006.01)

(52) **U.S. Cl.** ..... **711/141**; 711/118; 711/120;  
711/128; 711/130; 711/146; 711/147; 711/148;  
711/135

(58) **Field of Classification Search** ..... 711/141-149,  
711/130, 135-136, 119-122, 117-118; 710/316-317,  
710/100, 315  
See application file for complete search history.

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*Primary Examiner*—Matthew Kim  
*Assistant Examiner*—Zhuo H. Li  
(74) *Attorney, Agent, or Firm*—Beyer Weaver & Thomas,  
LLP

(57) **ABSTRACT**

According to the present invention, methods and apparatus are provided for increasing the efficiency of data access in multiple processor, multiple cluster systems. A cache coherence controller associated with a first cluster of processors can determine whether speculative probing can be performed before forwarding a data access request to a second cluster. The cache coherence controller can send the data access request to the second cluster if the data access request can not be completed locally.

**51 Claims, 15 Drawing Sheets**

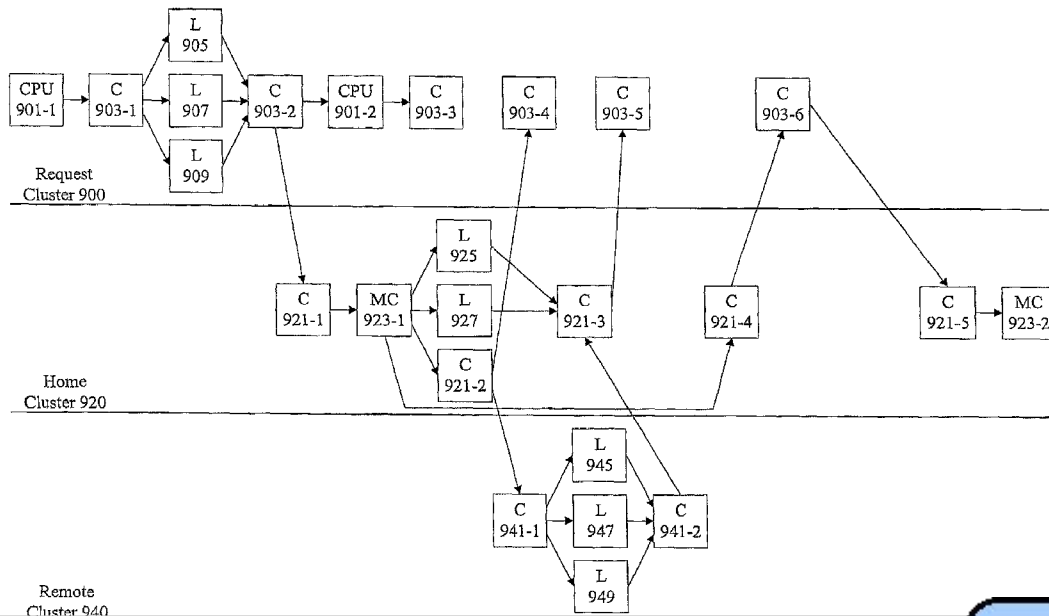


Figure 1A

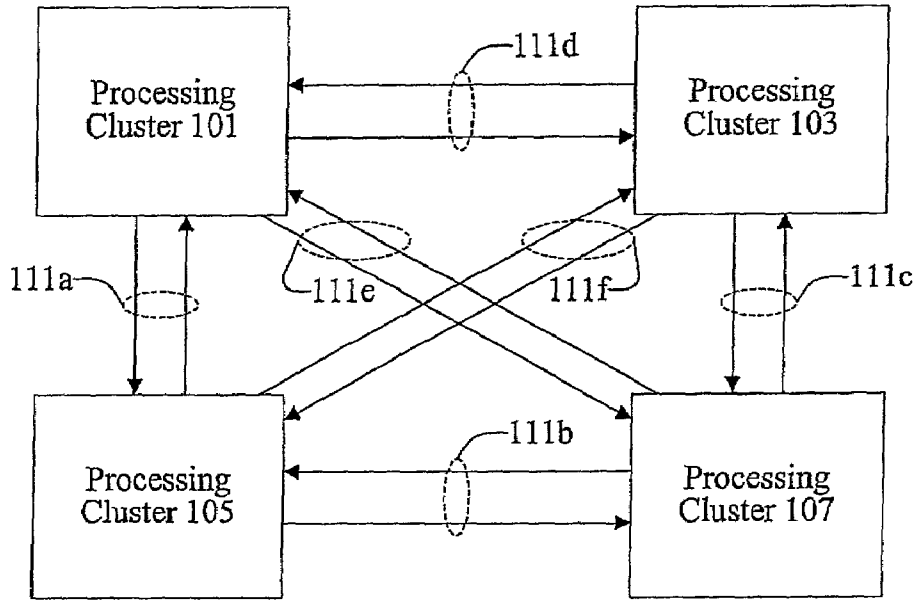


Figure 1B

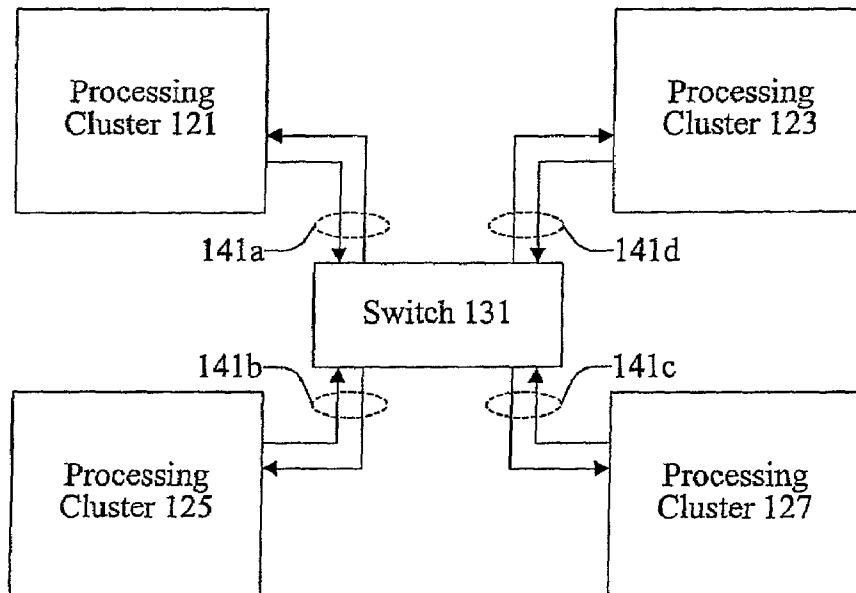


Figure 2

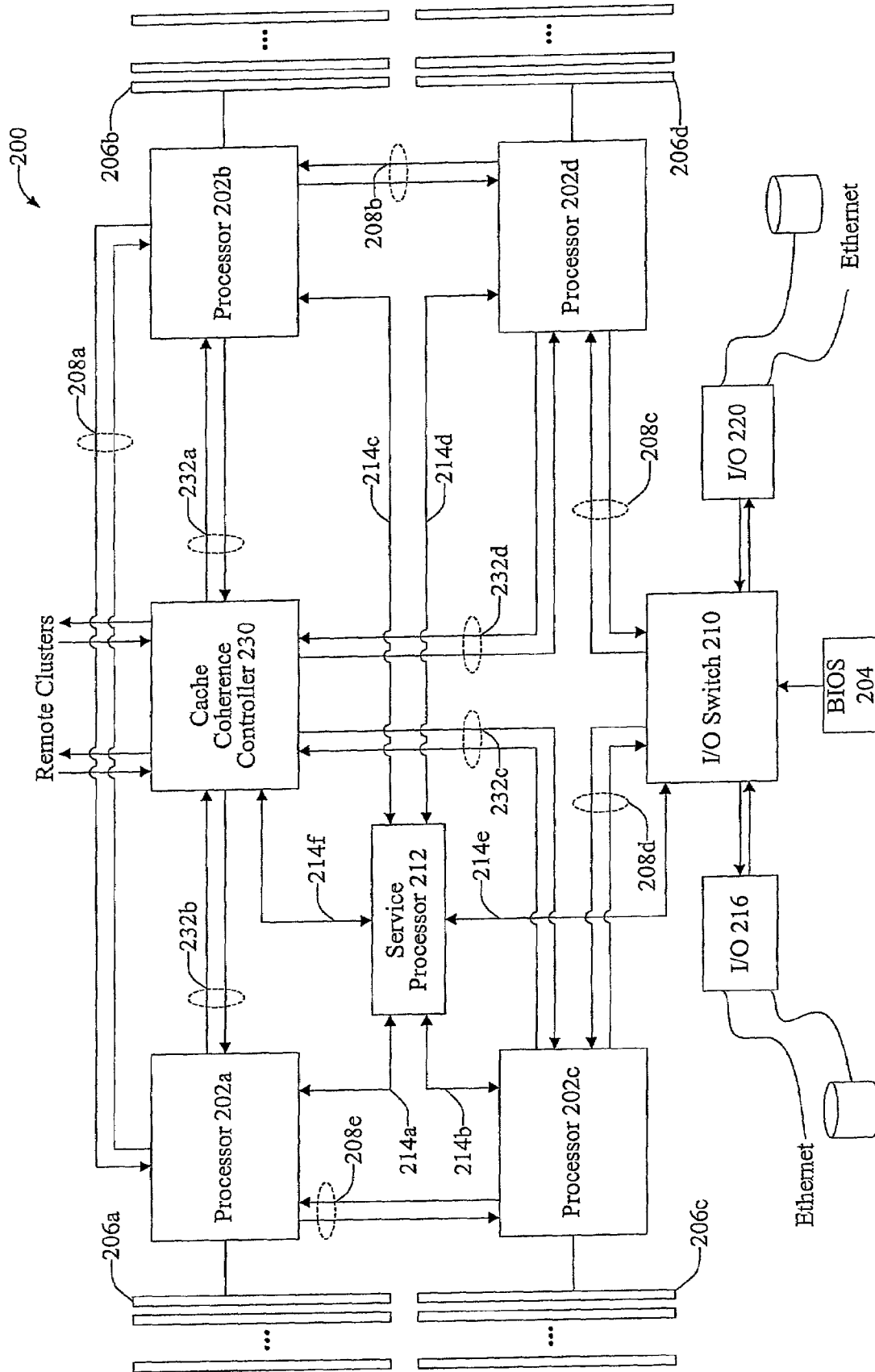


Figure 3

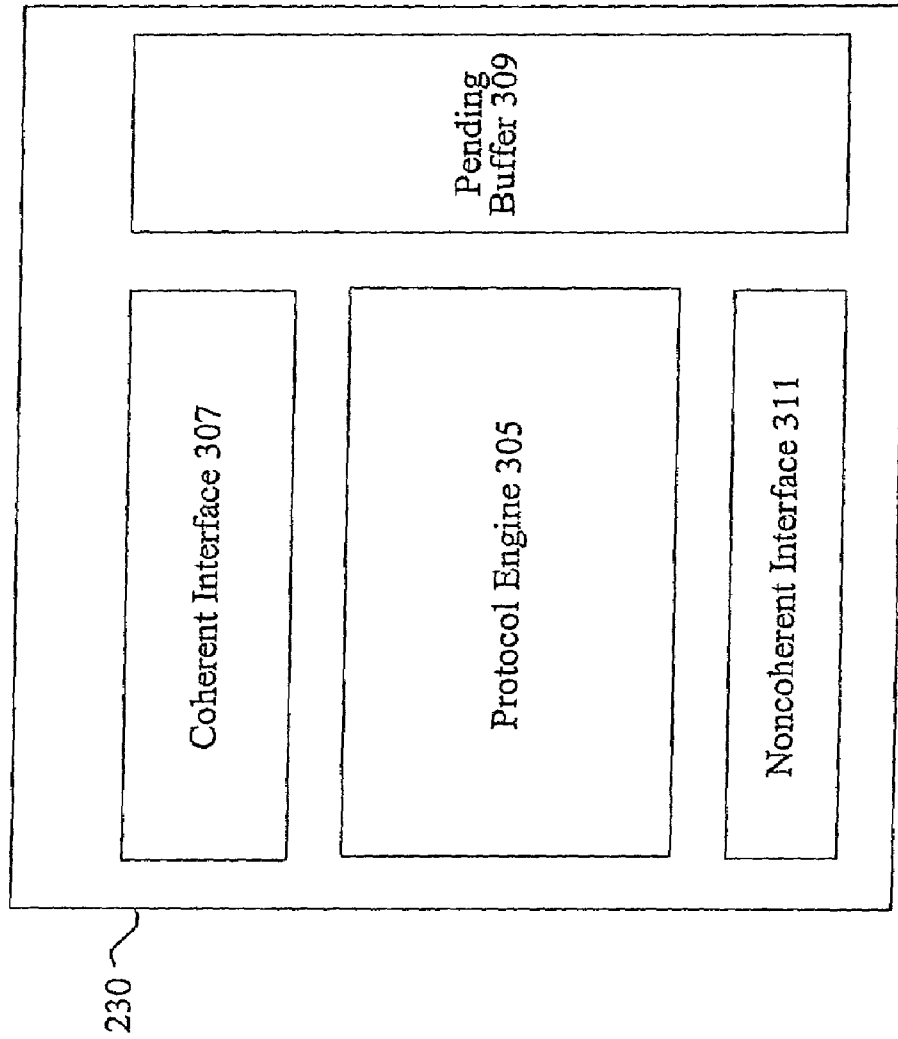
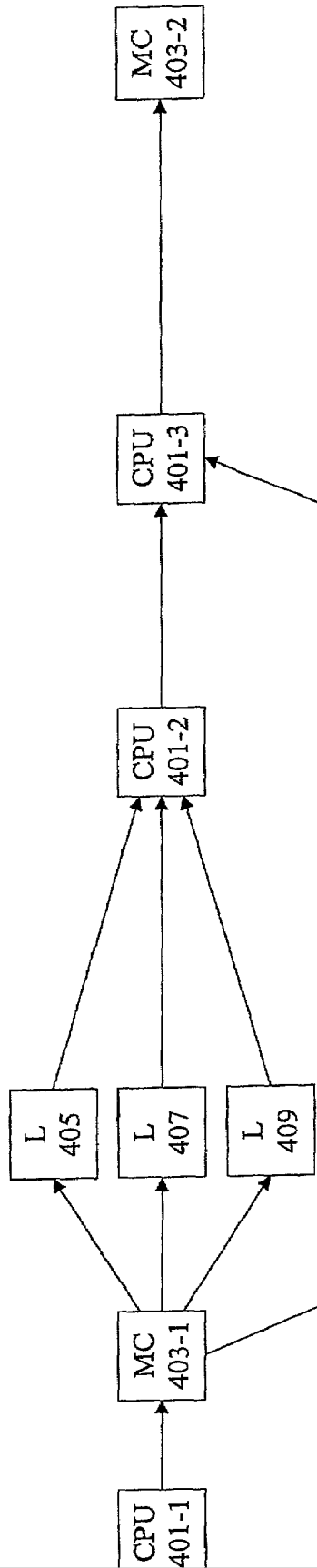


Figure 4



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