



(12) **United States Patent**  
**Glasco**

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(54) **METHODS AND APPARATUS FOR RESPONDING TO A REQUEST CLUSTER**

(76) Inventor: **David B. Glasco**, 10337 Ember Glen Dr., Austin, TX (US) 78726

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 849 days.

This patent is subject to a terminal disclaimer.

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**G06F 12/00** (2006.01)

(Continued)

(52) **U.S. Cl.** ..... **711/146**; 711/118; 711/128;  
711/141; 711/144; 711/145; 711/147; 711/148

*Primary Examiner*—Tuan V Thai  
*Assistant Examiner*—Zhuo H Li

(58) **Field of Classification Search** ..... 711/141,  
711/144-147, 128  
See application file for complete search history.

(57) **ABSTRACT**

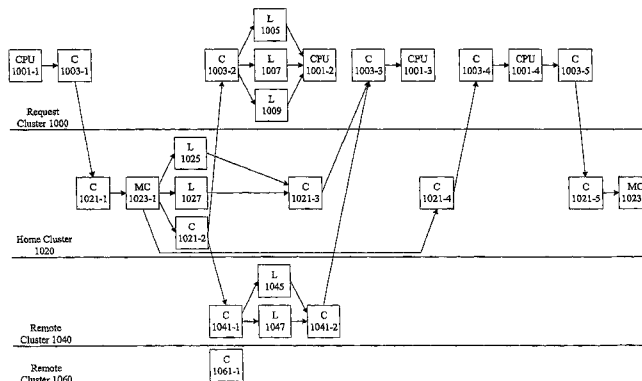
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According to the present invention, methods and apparatus are provided for increasing the efficiency of data access in a multiple processor, multiple cluster system. A home cluster of processors receives a cache access request from a request cluster. The home cluster includes mechanisms for instructing probed remote clusters to respond to the request cluster instead of to the home cluster. The home cluster can also include mechanisms for reducing the number of probes sent to remote clusters. Techniques are also included for providing the requesting cluster with information to determine the number of responses to be transmitted to the requesting cluster as a result of the reduction in the number of probes sent at the home cluster.

**35 Claims, 15 Drawing Sheets**



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Figure 1A

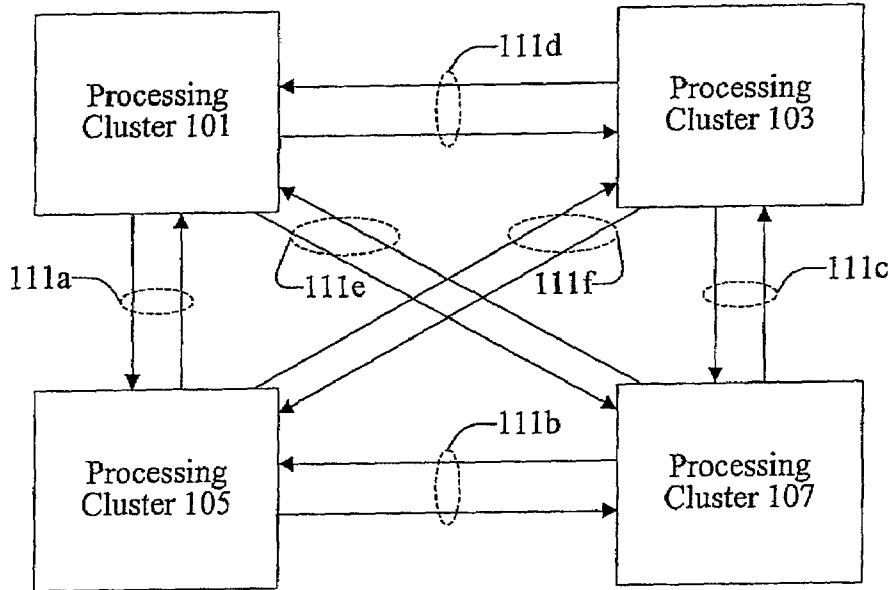


Figure 1B

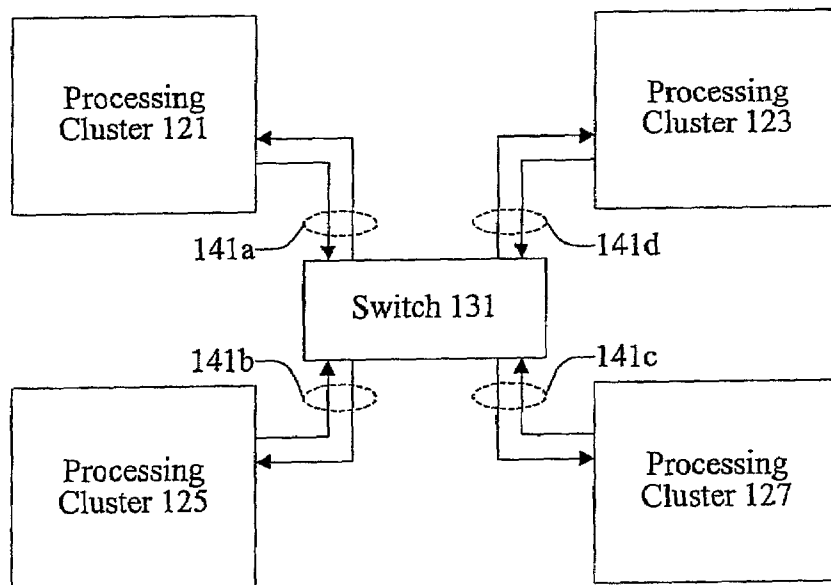


Figure 2

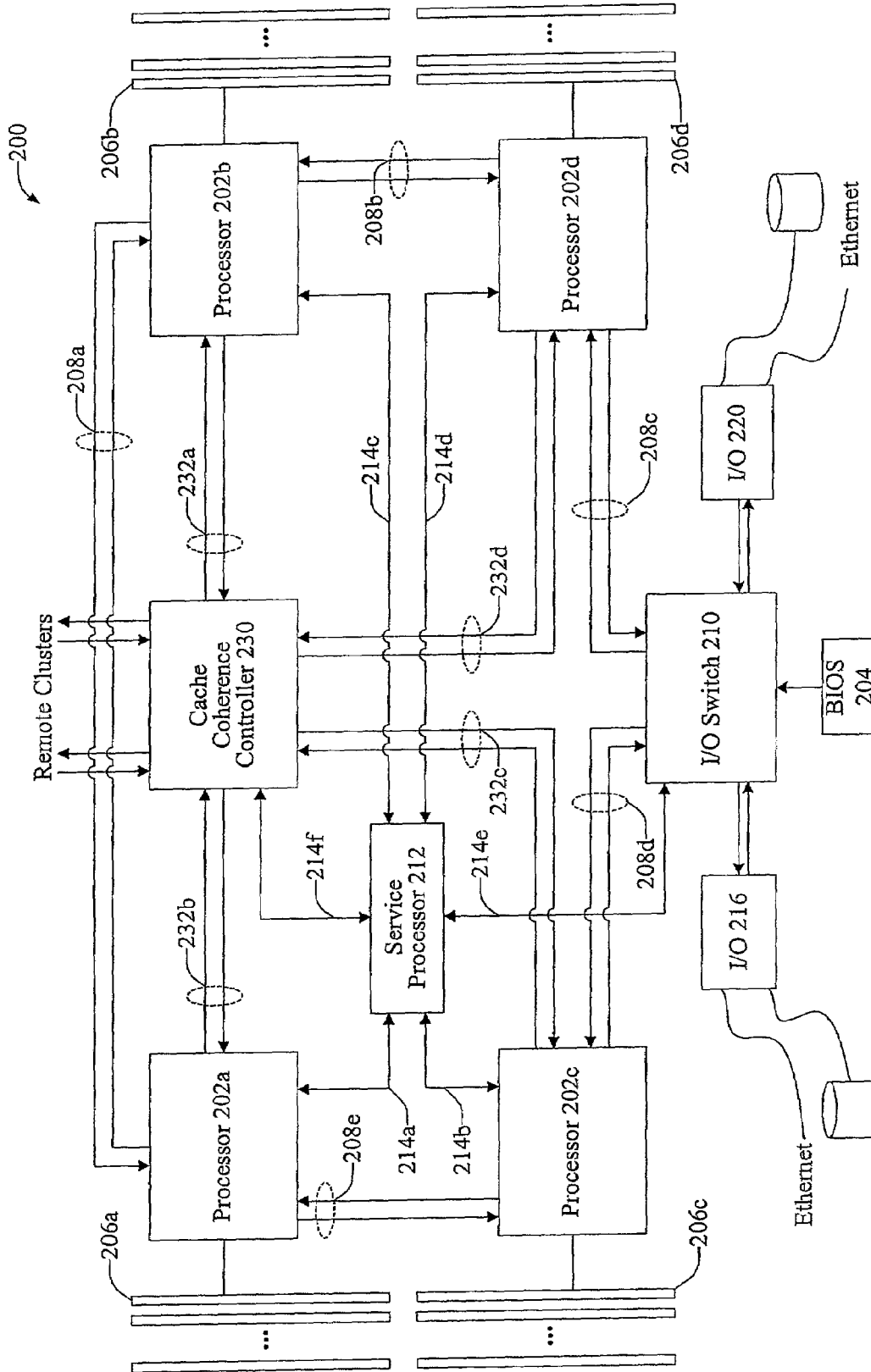
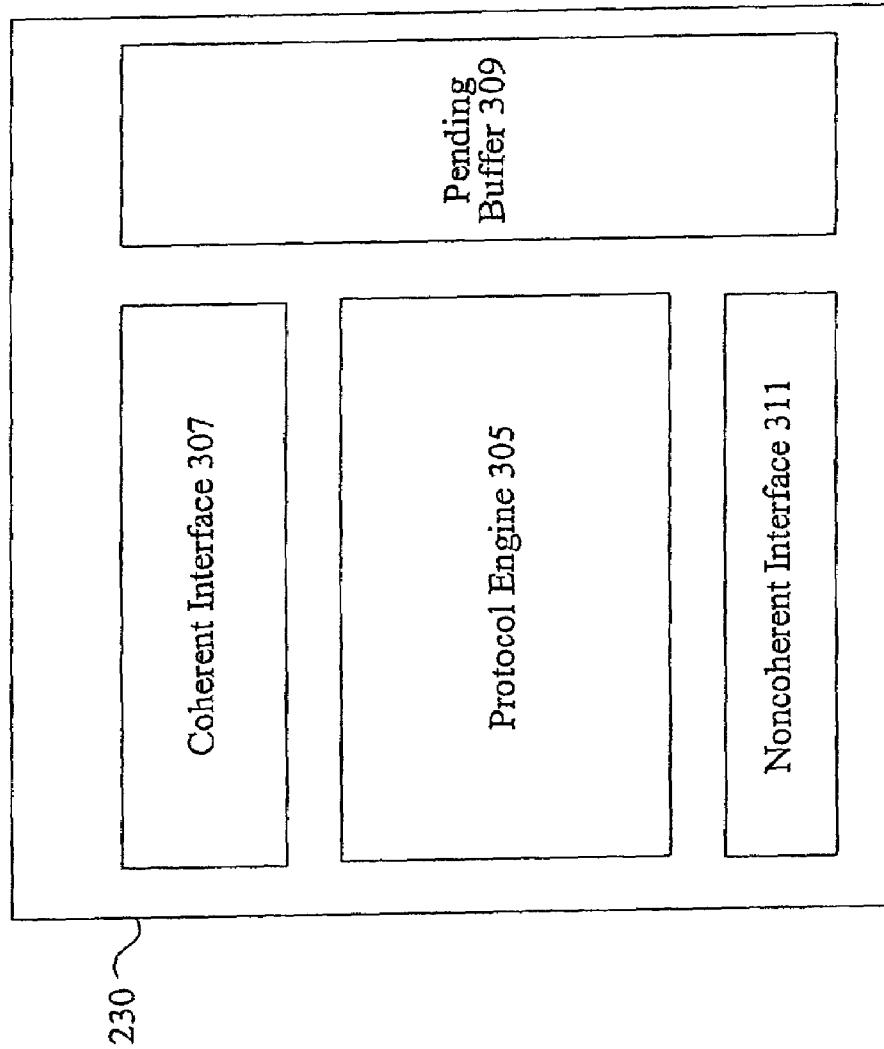


Figure 3



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