Summary of Anatomy of a Database System

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1. Introduction

1. Introduction In the paper, the authors try to combine the database system field and computer architecture. These tries are from his awareness of current database research problems (trends). The authors argue that the current trends of database system have focused on theoretical and algorithmic problems. So, they need to consider the other part of database system, such as computer architecture. They thought that this is the time to think about architectural aspect of database system.

2. Significance of the paper In my opinion, the authors thought and paper topic reflect current research trends of database community. First of all, this paper will be useful for big data analysis. Big data analysis forces to think about the computer architecture more seriously since big data analysis require more resources to minimize the failure rate and maximize the efficient of the computer resource usage (Analysis of big data). In the past, using uniprocessor did not cause any problem when computer scientists analyzed the data. Moreover, sharing architectural resources was not important since computer programmer only needed to handle small amount of data. However, big data analyses require computer scientists use computer resource efficiently. Thus, knowing the computer resources (architecture) becomes essential. In this paper, they explain about the shared memory, shared nothing, and shared disk parallelism. From this article, the authors explain that sharing the memory is from uniprocessor Server Process approach. In this case, the server needs to distribute the memory to each CPU only few effort. Second, the author explains about shared nothing parallel machine. Shared nothing parallel machine are more efficient parallelize technique, but this needs more resources since each machine needs RAM, CPU, and Disk. The last parallelized technique is shared disk. Shared disk system has only one disk; each CPU and RAM needs to access the disk when they need. When we compared two previous techniques, it uses fewer resources and can prevent serious failure. Current database system that needs to handle big data uses shared nothing or shared disk parallelism. Especially, shared disk parallelism is popular in big data community since shared disk parallelism minimizes the computer resources and damage of failure.

Also, the advance of computer technology allows computer scientists try to combine database system and computer architecture. The authors already mention Moores law. From Moores law, we can predict that development of hardware; the development of hardware allows the computer programmer uses huge computer resources without any problems. Combining server process and I/O process will reflect current architectural development. Using a-synchronized techniques between sever process and I/P process will not be a problem in these days. Thus, database system can employ this advanced computer architecture techniques. Even though, the author mention that combining server process and I/O process is recently developed techniques, so using in database system is not easy. However, a-synchronizing the server process and I/O process will be the most useful techniques in near future since the most job of database system is retrieving data and processing data. So this a-synchronizing technique will be implemented very quickly and computer scientist who studies about database system will need to consider advanced architectural aspect more seriously.

This paper is valuable since they tried to think about the computer architecture as a programmer who studies about database system. When I learn database system and computer architecture, I never thought that architectural aspect of the database system. Also, architecture teacher always said that the main goal for computer architect is that computer programmers do not consider architectural aspect. So many people think that there will be no connection between that computer architecture and database system. Also, many current database system only concern about theory and algorithm. So think about the architecture will broaden database system community and the development of database system requires more knowledge about architecture.

3. Difficulty of This Topic However, I am not optimistic for combining two different fields. I am not sure combining the database system and computer architecture is really useful for database system (Even though, the authors think that considering computer architecture is important and the research trends of database system is biased to theoretical aspect). I think this article assume that the database system will use in certain RAM, disk, and CPU. Also, the authors thought that the database system should be implanted in certain architecture. So, database system need to consider more architectural aspect for their implanted database system. However, many computer scientists who think about database system tried to develop scalable database system. It means that the database system should work within totally different computer architecture with only small change (or no change), and connecting the database system and different architecture should not be an issue of computer programmer who want to study about database system. Also, database field need to spend more time to study about database system that is suitable for the most of architecture instead of considering only certain architecture and its implementation in that architecture.

5. The drawback of This Paper Also, I think his paper just confirms the gap between the database system and computer architecture. I am not sure the authors effort really combines two different fields (database system and computer architecture). The beginning of their paper, they explain about computer architecture, and how the database system can use these kinds of architecture. However, some part just explains current architecture. For example, chapter 2.1 Uniprocessors and OS Threads, the authors explain different process model, and he mentions that process per Connection uses on a machine across a network from the DBMS server. In addition, they explain the usage of specific architecture in DBMS. This only shows that DBMS use specific architecture. It does not explain architectural different between other field and database system. I am not sure this approach will lead the development two different fields. The authors approach shows the efficient architecture for database system, but it still does not explain how decrease the gap

between the computer architecture and database system. Moreover, from the middle of the paper, they explain about the command of database system, efficient usage of queries, and basic concept of the database system. From chapter 4, Query processor, they mainly explain efficient query command. Providing the efficient SQL command does not directly related with computer architecture. These kinds of optimizing skill are not main part of computer architecture. Actually, more efficient command will the part of computer software, and will not need to consider architecture. Even though this paper from the architectural aspect of database system, they do not overcome current database system research trends by explaining query commands and basic skill for computer database system.

6. Conclusion Thinking about architecture will be useful since database system field demands huge resources for their analysis. Also, parallelizing the program and using threads in the database system will require more knowledge about computer architecture. So the authors tries for researching architecture will be useful and meaningful. However, thinking about architecture is not essential in database system field in these days. I think when they want to broaden database system field, the programmer need to think about the database system that does not fit for certain program. In addition, this is basic article is meaningful when we want to know about database system. This paper covers every part of database field, from architectural aspect to efficient handling skill for database system. So this paper is valuable as an introductory article instead of learning and broadening the database system to computer architecture.