International Journal of Advance Research in Science and Engineering
Vol. No.10, Issue No. 02, February 2021
www.ijarse.com
IJARSE
ISSN 2319 - 8354

DATA OBJECT CACHING SYSTEM FOR DATA AWARE NETWORKING

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ABSTRACT:

DAN is a revolutionary Technology in networking systems for efficient maintenance and usage of data as data objects. As the ample and increasing amount of data on day by day basis leads to several petabytes of user data.DAN is a technology relatively intended use to handle huge amount of data in a distributed manner. The very significant feature in DAN is data is transferred as data objects and these data objects are identified with data object ID or data object name.User requests for data object using data object ID or data object name instead of URL. The data objects are initially transferred from the original source later the data objects are served by intermediate data object server. The maintenance of latest version of data objects balancing global scenario is a critical issue. To maintain the consistency of data object in intermediate data object server there is a need to develop a network for the same. In this paper we propose the data object caching system for Data Aware System dissolving the issues and maintains data object globally consistent. The data object caching system for Data Aware Networking is functions in a systematic way of caching data object at intermediate data object server and also maintains newer version data object. The data object caching system for DAN is maintains newer version of data object in Proactive and Reactive manner depends on characteristics of data objects.

Key words: *DAN, URL, DRAM*

1. INTRODUCTION:

As the several Zetta bytes of data is producing by the enterprise servers the present generation arrive inspiring term for designing data centric computing systems. This data is projected to double for every two or three years. For example Wal-Mart servers are handling nearly one million transactions every hour. As anexample face book functions on more than 100 Tera bytes of users log information and also many hundred terabytes of images data. This ever growing bulk of data creates a chance and challenge in designing efficient data centric computing systems.

The classical network system designs are directed by advanced approaches in processor designs, I/O subsystems performances etc. The forthcoming system designers are designing the network architectures in such a way that they used to store, arrange, inspect, handle, and record enormous quantity of information.

Figure 1 shows the different system architectural organizations for data centric applications in maintaining data. The left side portion of the figure shows classical system design by using mechanical device called disk, with DRAM as a caching layer. As we move towards right in the figure, we can observe products like EMC, HP, FUSION-IO, SEGATE, ORACLE and Texas memory systems. All these products are representing flash based non-volatile memories through SAS (Serial Attached Systems) an SATA (Serial Advanced Technology Attachment) interfaces.

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An essential tendency, clear from the figure1 is that, continuous storage of data is firmly drift from slow interfaces to faster interfaces with increasing performance and flexibility. The flash based non-volatile memories are providing space at low cost [1]. Some research proposals used the non-volatile memory as added levels of memory caches. And some other proposals used this memory as a substitute for the continuous data storage [2]

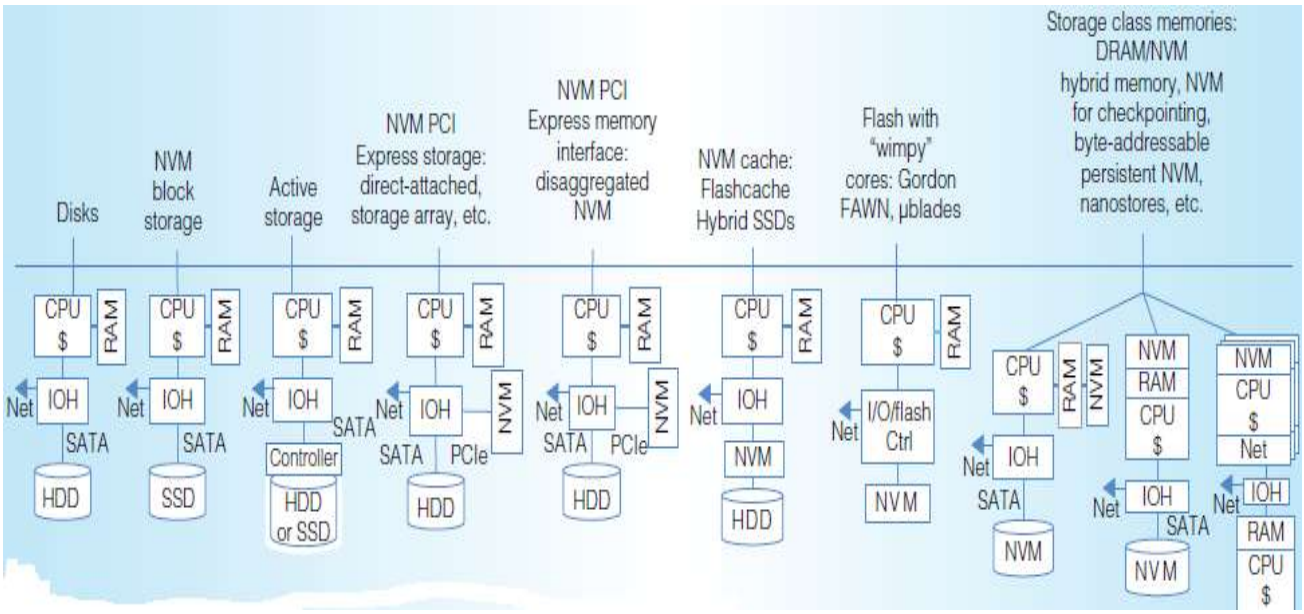

Figure.1 different system designs for data-centric applications

Data Aware Networking is a revolutionary technology in the area of data maintenance and usage. In the present technology developing era web clients will be provided data from the concerned web server which is an original data source. Even though the concept provides consistent information in deployment level which leads to increase of significant communication node and demanding huge bandwidth which is clients and servers. Another significant concept in conventional system is the unit of data transfer at network layer is a packet which is not a user view of data unit.

In a more user centric concepts Data Aware Networking provides user view of data has a unit of data transfer at application level without changing lower level mechanism .The demand of Data Aware Networking increases day by day drastically in several heterogeneous systems. Data Aware Networking provide Data object to web clients as an reply either from original source or from intermediate nodes, the intermediate nodes cache copy of Data Objects in its data base system. Otherwise if it is already available it copies new version and update the configuration of client database. Thus any further reference to the same Data Object for newer node or same node will be provided from the intermediate nodes. Thus the major significant of DAN is supports locality of reference drastically reducing the demand of internet bandwidth.

The locality of reference is a key feature of DAN but at the same time maintain the global consistency is a critical issue in DAN. This critical issue will be addressed by the concept of Data Centric Data Caching System for DAN.

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The Data Centric Data Caching System for DAN supports locality of reference and maintains global consistency either proactive manner or reactive manner. In previous paper we proposeeach DO in DAN can be divided into two parts logically as DO Header and Original Data. The Do Header is shown in Figure 1.

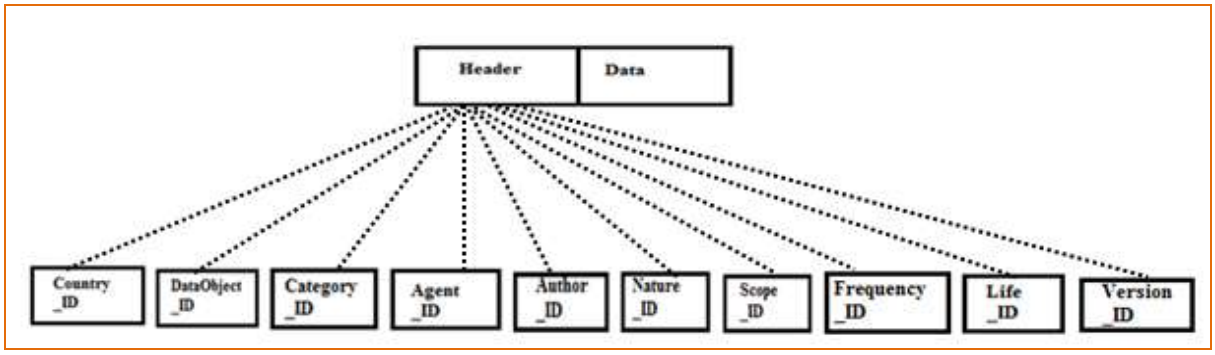

Figure2: Structure of a Data Object

Cleary states that the important attributes of Do Header are DO_ID which specifies the name of the data object for satisfying uniqueness property in DAN, version _DO which specifies the creation of the data object in the original database, LIFETIME_ version_ DO which specifies the expiration period for that data object and Category_ID specifies under which category the data object must have the possibility to retrieve from the DAN. According to the lifetime of DO and its category the version of the DO will be released for the purpose of global reference by the original source.

2. PROACTIVE CACHING MECHANISM

In proactive manner the intermediate nodes frequently go through the configuration of DO available in database and prepare a list of DO that need to be updated with newer versions and obtain to the new version from their original sources updates database accordingly.

Alternatively intermediate nodes maintains referring frequency of DO and frequently prepares list of DO that are having high frequent referring index and need to be updated newer versions only these DO from the original data source. The advantage of later one is usage of unnecessary communication among intermediate nodes bandwidth will be released.

Reactive Caching Mechanism

In reactive manner whenever a client request for a DO when such request receives intermediate nodes verify database, if it is available it will provide from its data source otherwise it will obtain from original data source or another nearby intermediate node from DAN.Such a user centric data object caching system will add significant caching for DAN.

Technological Requirements:

The object in DAN contains DO header which provides information required for DO caching and updation. It provides information about lifetime generation of header Data Object maintains the Header format which includes

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DO_ID specifies the name of the data object for satisfying uniqueness property in DAN. Country_ID specifies the name of the country or region from where this was published. Category_ID specifies under which category the data object must have the possibility to retrieve. Agent_ID specifies the agencies of the data object with respect to DAN. Author_ID specifies the creator and publisher of the data object. Nature_ID specifies the longevity of the data object. Scope_ID specifies the data object accessible up to at what extensively. Life_ID specifies the duration of the data object in DAN.Whenever any client request for news bulletin in current issue, in that case there is a necessity for updating of data objects frequently.Here frequently updation of intermediate nodes will be maintained. If Client requeststhe weather report then there is necessity for frequent updation of original database

In user centric data object caching system; data object caching and also is maintained effectively only updating the demand data objects which are usually referred by the clients. The data base system maintains source of all data objects in the data object configuration i.e. frequency of update i.e no of times item referred in a specified period. Whenever any client refers this object the count will be updated .usually the count will be for a specified period and which is also a part of header of DO. For example if it 15 the updation period for last 15 days will be considered. Each data object have a threshold value .This information is also available in DO Header. If the frequency is exceed then that information also maintained by the Do header itself.

Whenever any client request for Do in DAN then intermediate nodes will verify it from the existing DAN , if it is available then it will be copied otherwise it will be copied from the original repository of the data base

Algorithm -Reactive Caching Mechanism

1. Client requests a data object to an intermediate node.
2. The intermediate node search in the existing database.
3. If required data object is found in the data base then send it to client.
4. If required data object is not found in the database then search it in nearby intermediate nodes or original data source and then send to clients.

This algorithm is illustrated as flowchart in Figure3.

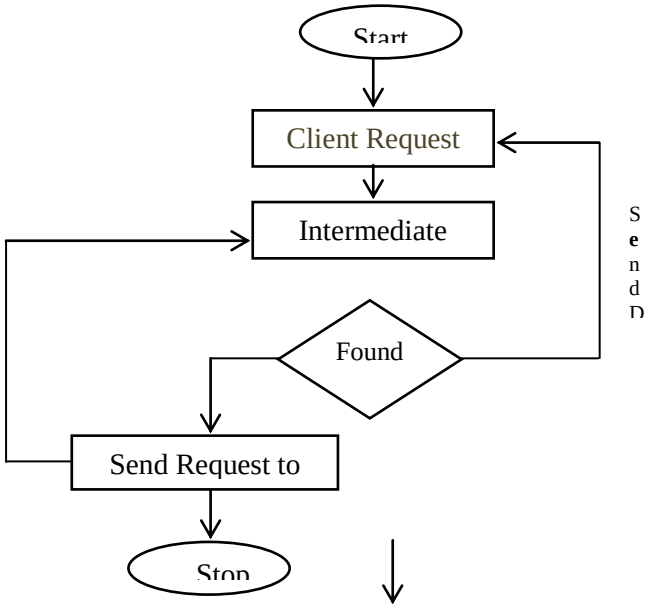

Figure 3: Reactive Caching Mechanism

Algorithm - Proactive caching Mechanism for frequent updation of data object

1. Every intermediate node maintains the list of Data object in data base.
2. Every time database will maintain the updated newer versions of data object from their original source.
3. Whenever client requests the data object, receives the same.

This algorithm is illustrated as flowchart in Figure4.

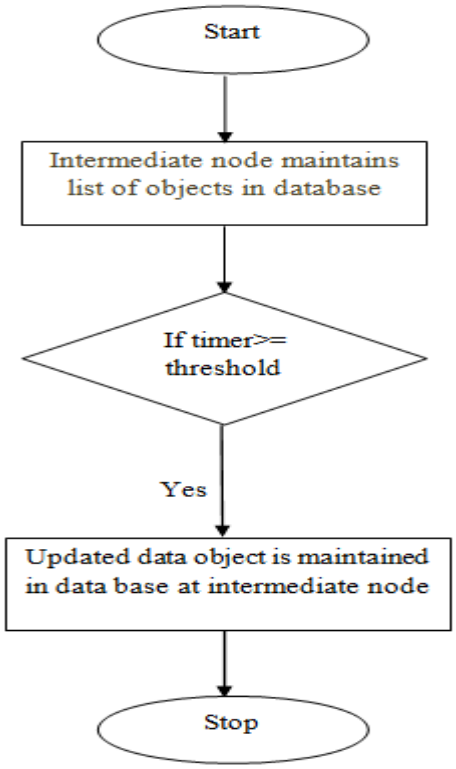

Figure 4: Proactive caching Mechanism for frequent updation of data object

Algorithm-Proactive caching Mechanism for frequent requirement of data object

1. Every intermediate node maintains the list of data object.
2. Intermediate node maintains the frequency of data object with reference to high index.
3. Necessarily intermediate node maintains updated newer versions of data objects from the original data base.

This algorithm is illustrated as flowchart in Figure 5.

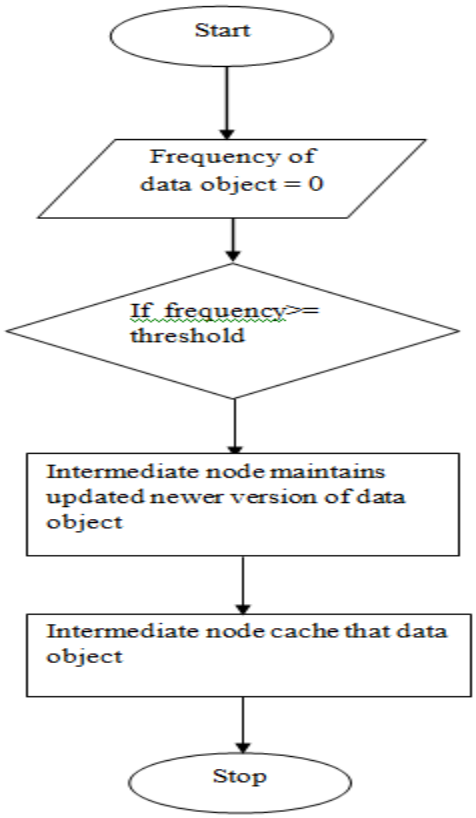

Figure 5: Proactive caching Mechanism for frequent requirement of data object

CONCLUSION:

In this paper we propose proactive caching approach based on two conditions like frequent requirement of data object and frequent Updation of data object and we also propose reactive caching approach for client requirement of data object.

REFERENCES:

[1.] K.T. Lim et al., ‘‘Disaggregated Memory for Expansion and Sharing in Blade Servers,’’ Proc. 36th Ann. Int’l Symp. Computer Architecture, ACM Press, 2009, pp. 267-278.

[2.]J. Condit et al., ‘‘Better I/O through Byte-Addressable, Persistent Memory,’’ Proc. ACM SIGOPS 22nd Symp. Operating Systems, ACM Press, 2009 pp. 133-146.

[3.]ITU-T recommendation Y.3033: Framework of Data Aware Networking for Future Networks.

[4.] ITU-T recommendation Y.3001: Future networks: Objectives and design goals.

[5.]V Sujatha Lakshmi, Prof Y K Sundara Krishna, "Contextual framework of Data Object in Data Aware Networking", International Journal of Applied Engineering Research Vol.13 No.23 2018.

[6.]V.Sujatha Lakshmi, Prof.Y.K.Sundara Krishna ," Data Caching in Data Aware Networking" Journal of Emerging Technologies and Innovative Research, Volume 6, Issue 1, January 2019.