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DENSE WAVELENGTH DIVISION MULTIPLEXING LAYER FOR ALLOCATING THE BANDWIDTH BASED ON THE DATA TRANSFER PRIORITY IN MULTIMEDIA BIG DATA

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ABSTRACT: As it has come to be the norm for cloud providers to host multiple datacenters around the globe, huge demands exist for inter-datacenter records transfers in large volumes, e.g., migration of big data. A work arises on the way to schedule the bulk data transfers at one of a kind urgency levels, so one can absolutely utilize to be had inter-datacenter bandwidth. The Software Defined Networking (SDN) paradigm has emerged currently which decouples the control plane from the information paths, permitting capability global optimization of data routing in a network. As the quantity of multimedia content will increase, the demand to switch large facts units throughout records facilities will increase as properly. As such, the leftover bandwidth that looks at distinct instances and for extraordinary intervals in the spine network becomes insufficient to fulfill the hastily growing demand for multimedia large records transfer. This project brought about the advent of multi-charge Bandwidth on-Demand (BoD) provider services for communique among geographically disbursed cloud information facilities. In this paper, we awareness on BoD provides which might be offered by means of the Dense Wavelength Division Multiplexing (DWDM) layer because of its large ability. We endorse a BoD broking which employs a scheduling algorithm that considers various deadlines of multimedia large information transfer requests.

I. INTRODUCTION

A Cloud Service Provider (CSP) operates the cloud infrastructure over a couple of data centers (DCs). Connectivity among those data centers is provided by using very excessive capability hyperlinks. While a few large companies together with Google or Amazon may totally very own a number of the links between their datacenters, in bulk of the instances the links are leased by using the CSPs from community operators. The cost model of the bandwidth fed on follows the 95th percentile version, which in essence prices the CSP by using the value of the 95th percentile price of the height bandwidth consumed at the link, or other varieties of billing fashions. Given that CSPs are purchasing peak usage1, a whole lot of bandwidth potential is left unused over the inter-DC links. Multimedia is increasingly becoming the "biggest big data" as the most important and valuable source for insights and information. The pervasiveness of mobile devices & consumer electronics and the popularity of Internet & social networks have generated huge amounts of multimedia information in various media types (such as text, image, video, and audio) shared among a large number of people. This creates the opportunities and intensifies the interest of the research community in developing methods to address multimedia big data challenges for real world applications. Providing solutions to multimedia data such as images and videos brings about a higher level of difficulty at attempting to understand their semantic meaning. The enormous growing traffic across datacenters leads to two main consequences from the perspectives of applications and cloud providers. First, the Wide Area Network throughout datacenters is commonly the bottleneck resource that is shared by a massive variety of flows. Consequently, such packages go through variable and unpredictable community performance, if they're blind to the allocated bandwidth. Second, the distribution of traffic loads among inter-datacenter links is non uniform and partial links experience extremely low bandwidth utilization. This severely restricts the scalability of deployed applications. Moreover, the lack of any performance guarantee makes service providers unwilling to deploy applications across multiple datacenters. Accordingly, it will in turn decrease the revenue of cloud providers. Fortunately, bandwidth guarantee can allow the appropriate community performance for applications throughout datacenters. Prior bandwidth allocation methods, but, specifically cognizance on intra-datacenter site visitors and cannot be simply used to address inter-datacenter visitors for the following reasons. Firstly, the prevailing allocation methods do not offer bandwidth guarantee when you consider that they either provide bandwidth over-guarantee or bandwidth sub-guarantee. Secondly, they do now not recall the community fee for cloud companies. In reality, charged by Internet Service Providers (ISPs), such inter-datacenter traffic incurs substantial network cost to a cloud provider. Since multiple ISPs are employed by cloud providers to interconnect their geographically distributed datacenters with varied pricing strategies, the usage costs of such inter-datacenter links are different from each other. Thus, by means of cautiously deciding on most useful routing paths and assigning go with the flow rates for inter-datacenter traffic, it's far viable to decrease the network price for cloud vendors.

II. RELATED WORK

A . Mahimkar, A. Chiu, R.Doverspike, M.D. Feuer, P. Magill, E.Mavrogiorgis, J. Pastor, S. L. Woodward, J. Yates presented the design of Globally Recon-figurable Intelligent Photonic Network (GRIPhoN) between data centers that can provide BoD service ranging from low data rates (e.g., 1 Gbps) to wavelength rates (e.g., 40 Gbps). GRIPhoN provides flexibility to the cloud service providers to dynamically set up and take down their wavelength

connections between their geographically distributed data centers when performing tasks like content replication or non-interactive bulk data transfers.

Thyaga Nandagopal and Krishna P. N. Puttaswamy propose a scheduling algorithm to reduce the peak (and the 95th percentile) bandwidth consumed on these inter data center links by scheduling bulk data flows– or flows that can be delayed – during off-peak hours and using the peak hour bandwidth mainly for serving real time or critical data. They propose a scheduling algorithm that reduces billable bandwidth usage significantly. We show that delaying the bulk data flows for even 8 hours can lead to a significant30% reduction in the cost of the links. Given that data centers have multiple high capacity links out of each data center, the cumulative cost reductions are very high.

B.B. Chen, P.V.B. Primet studies the scheduling of bulk data transfers with specified volume, active time window and paths. Their results give insight in the computational complexity of advance reservation service in high performance networks. Specifically, multi-interval scheduling not only extends the solution space to include the optimal solution, but also reduces the computational complexity to attain the optimality. Numerical results over representative topologies show that compared to spaghetti scheduling, the optimal solutions obtained through LP solver can achieve more than 30% of reduction in congestion in common settings.

The work of Y. Feng, B. Li, and B. Li was considered multimedia big data traffic generated from video replication and transfer across datacenters from services like NetFlix. The aim of the work is to minimizes the operation cost of transferring video traffic across data centers. The study proposes Jetway which carefully selects the flow rate in specific paths to lower the cost of the transfer. Jetway concept is based on fully utilizing the amount of bandwidth that is already paid for. In this respect, Jetway monitors spikes caused by excess traffic beyond the limits of the paid bandwidth. The additional fraction of data caused by traffic spikes, which could potentially incur additional cost, is then routed using other concurrent links.

III. FRAMEWORK

A. Overview of Proposed System

The proposed framework falls into the brand new trend of facilitating dynamic multi-rate BoD services for conversation between geographically distributed cloud data centers.

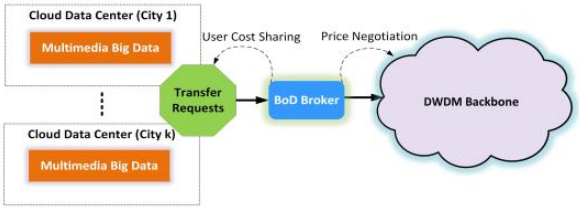

Fig1. System Framework

We are specifically involved with BoD this is supplied at the DWDM layer. This carrier is currently provided by using several companies, wherein BoD is offered from a pool of wavelengths on every occasion a transfer request occurs. The venture, however, is the way to effectively time table the multimedia large data switch requests throughout facts facilities such that various cut-off dates are optimally and dynamically taken into consideration to absolutely take advantage of the leased wavelength at any time. In the context of multimedia massive facts, close coordination between the source and the vacation spot is crucial and frequently requires the switch of data inside a selected time c program language period. The transfer can manifest right after the appearance at the source within the case of postpone-in tolerant facts or it could be processed on the source if the shipping cut-off date lets in for flexibility which includes the case of put off tolerant records. In our proposed framework, we take into account each instance in which the proposed mechanism allocates the bandwidth primarily based on the priority of the transfer, i.e. deciding on the right wavelength within the DWDM, to fulfill the closing date of the switch. In each instances, the planner desires to remember the time of the transfer and the provision of the bandwidth to ensure that the switch is finished before its closing date. It ought to be mentioned that even after the records is processed on the source, the pending records quantity to transfer is enormous and creates inevitable troubles that require scheduling. This is a normal enterprise exercise where large bulks of records are scheduled for migration to numerous records facilities after being processed on the supply along with the case of Amazon CloudFront. Our proposed solution is based on a BoD broker who employs scheduling mechanism that considers the postpone sensitivity of multimedia big data transfers requests.

B. Bandwidth On-Demand (BoD) Service

This BoD is a network connectivity service and also Bandwidth on demand is a data communication method for providing additional potential on a link as vital to deal with bursts in data traffic, a videoconference, or different special requirements. The method is usually used on dial-up lines and huge location networks (WANs) to temporarily enhance the capability of a link. Some name it "rubber bandwidth" because the potential may be increased or decreased as wanted. It is likewise referred to as dynamic bandwidth allocation or load balancing. A comparable method is bandwidth on time of day, which refers to presenting extra capacity at unique times of the day. A network administrator, who cannot be sure of visitor's styles among websites, can set up routers that offer bandwidth-on-call for features. Such routers can robotically set up hyperlinks on call for (dial-up, ISDN, or different switched offerings) to provide greater ability, and then carry the road down whilst traffic needs lessen. Home users with ISDN connections can combination two sixty four-Kbit/sec traces right into a single 128-Kbit/sec line on call for. Bandwidth on demand is both not pricey and realistic. It makes experience to use a switched line and only pay for offerings as they are needed, instead of rent and pricey committed line that may match underused part of the time. Networks including body relay can robotically provide greater ability without the need to feature extra lines, however the ability is constrained with the aid of the size of the trunk that connects a patron to the frame relay network.

IV. DENSE WAVELENGTH DIVISION MULTIPLEXING (DWDM)

The time period wavelength-division multiplexing is generally implemented to an optical service, that's usually defined via its wavelength, whereas frequency-department multiplexing commonly applies to a radio service that is extra regularly described via frequency. Dense Wavelength Division Multiplexing (DWDM) refers originally to optical indicators multiplexed inside the 1550 nm band on the way to leverage the competencies (and value) of Erbium Doped Fiber Amplifiers (EDFAs). DWDM systems need to keep more strong wavelength or frequency than the ones wished for CWDM due to the nearer spacing of the wavelengths. Precision temperature control of laser transmitter is needed in DWDM systems to save you "drift" off a totally slender frequency window of the order of a few GHz. In addition, for the reason that DWDM offers extra maximum capability it has a tendency for use at a better stage within the communications hierarchy than CWDM, as an instance at the Internet backbone and is therefore related to better modulation rates, as a result growing a smaller market for DWDM system with very excessive performance. These factors of smaller extent and better overall performance result in DWDM structures usually being more costly than CWDM.

V. CONCLUSION

In this paper, our focused on the Bandwidth On-Demand (BoD) service for multimedia big data transfer across geo-distributed cloud data center. The BoD provides the DWDM layer. BoD employs a scheduling algorithm that considers various deadlines of multimedia big data transfer requests. The proposed mechanism allocates the bandwidth based on the priority of the transfer, i.e. selecting the right wavelength in the DWDM, to meet the deadline of the transfer.

REFERENCES

[1] J . Hays. Big Data Analytics and Cloud Computing. Chapter3.Multimedia Big Data: Content Analysis and Retrieval, pp 37-51,DOI 10.1007/978-3-319-25313-83, Springer International Publishing Switzerland, 2015.

[2] Y. Wu, Z. Zhang, C. Wu, C. Guoz, Z. Lix, F. C.M. Lau. Orchestrating Bulk Data Transfers across Geo-Distributed Datacenters IEEE Transaction on Cloud Computing, DOI10.1109/TCC.2015.2389842,vol.PP, no.99, pp.1-1, 2015.

[3] Y . Feng, B. Li, and B. Li. Jetway: Minimizing Costs on InterDatacenter Video Traffic. Proc. ACM Multimedia Media, 2012

[4] N. Laoutaris, G. Smaragdakis, R. Stanojevic, P. Rodriguez, and R.Sundaram. Delay Tolerant Bulk Data Transfers on the Internet.IEEE/ACM Transaction on Networking, Vol. 21, No. 6, December 2013

[5] R. Tudoran, A. Costan, G. Antoniu. Transfer as a Service: Towards aCost-Effective Model for Multi-Site Cloud Data Management. Proceedings of the 33rd IEEE Symposium on Reliable Distributed Systems,Oct 2014, Nara, Japan. 2014.

[6] M.N. Rahman, A. Esmailpour. A Hybrid Electrical and Optical Networking Topology of Data Center for Big Data Network. ASEE2014 Zone I Conference, April 3-5, 2014, University of Bridgeport, Bridgpeort, CT, USA

[7] M. Zhang. Optimization of Inter-network Bandwidth Resources for Large-Scale Data Transmission. Journal of Networks, Vol. 9, NO. 3,pp 689-694, March 2014

[8]] A . Mahimkar, A. Chiu, R.Doverspike, M.D. Feuer, P. Magill, E.Mavrogiorgis, J. Pastor, S. L. Woodward, J. Yates. Bandwidth on Demand for Inter-Data Center Communication. Hotnets, November1415, 2011, Cambridge, MA, USA

[9] T. Nandagopal, K. P. N. Puttaswamy. Lowering Inter-Datacenter Bandwidth Costs via Bulk Data Scheduling. 12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing, pp 244-251,2012

[10] Y. Wang, S. Su, A. X. Liu, Z. Zhang. Multiple bulk data transfers scheduling among datacenters. Communications and Networking in the Cloud, Vol 68, No 3, pages 123-137, 2014.

