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Secure and privacy of large data using map reduction for anonymize large-scale data sets in cloud

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Abstract— *A large number of cloud services require users to share private data like electronic health records for data analysis or mining, bringing privacy concerns. Anonymizing data sets via generalization to satisfy certain privacy requirements such as k-anonymity is a widely used category of privacy preserving techniques. At present, the scale of data in many cloud applications increases tremendously in accordance with the Big Data trend, thereby making it a challenge for commonly used software tools to capture, manage, and process such large-scale data within a tolerable elapsed time. As a result, it is a challenge for existing anonymization approaches to achieve privacy preservation on privacy-sensitive large-scale data sets due to their insufficiency of scalability. In this paper propose a scalable two-phase top-down specialization (TDS) approach to anonymize large-scale data sets using the Map Reduce framework on cloud. In both phases of our approach, we deliberately design a group of innovative Map Reduce jobs to concretely accomplish the specialization computation in a highly scalable way. Experimental evaluation results demonstrate that with this approach, the scalability and efficiency of TDS can be significantly improved over existing approaches.*

Keywords: Two Phase management, IP forwarding, wireless mesh networks, performance analysis

I. INTRODUCTION

Top-down specialization (TDS) are spreading to connect heterogeneous home users. Their aim is to support (mobile) users seamlessly with cheap and easy to maintain connectivity. The mesh topology of TDSs provides high flexibility as mesh routers are connected with multiple others providing the physical infrastructure for flexible routing and transport connections. Network virtualization can make use of this mesh topology by sharing, and also by combining links for desired network properties. Wi-Fi-based wireless networks and mobile IP networks, TDSs have the advantages of low cost, easy deployment, self-organization and self-healing, and compatibility with existing wired and wireless networks through the gateway/bridge function of mesh routers. A TDS consists of mesh routers and mesh clients [1]. Mesh routers are similar to ordinary routers in wired IP networks, except that they are connected via (possibly multichannel multi-radio) wireless links. A major expected use of TDSs is as a wireless backbone for providing last-mile broadband Internet access [2] to mesh clients in a multi-hop way, through the gateway that is connected to the Internet. Because mesh clients may move within a TDS and change their points of attachment frequently, mobility management is a necessity for TDSs to function appropriately. Mobility management consists of location management and handoff management [3]. Location management keeps track of the location information of mesh clients, through location registration and location update operations. Handoff management maintains ongoing connections of mesh clients while they are moving around and changing their points of attachment. the different contextual features and preferences of the users in current TDS environments, the users need to be linked to different wireless access networks with different bandwidth and robustness features, probably belonging to different Internet Service Providers (ISPs) with different security policies. The customers use different devices with different capabilities, which run different applications with different QoS requirements. As TDSs are edge networks connecting (mobile) users, they are expected to play an important role when introducing the required context-based user-centric networks. Moreover, TDSs are adaptable, self-configuring, and self-organizing to a high degree. As a consequence, TDSs are well suited to demonstrate the benefit of context-based approaches considering heterogeneous node capabilities and user preferences.

II. Two Phase Routing Based Schema

Routing-Based Schemes The iMesh [9] is an infrastructure-mode 802.11-based TDS. iMesh adopts a cross-layer approach for mobility management and develops a routing-based mobility management scheme. A link-layer handoff is triggered when a mesh client moves out of the covering area of its current serving mesh router. After the link-layer handoff is completed, the routing protocol used in iMesh, the Optimized Link State Routing (OLSR) protocol, broadcasts an HNA message announcing the new route of the mesh client. Mobility management in iMesh, therefore, incurs significant overhead due to the broadcasting of the HNA message. MEsh networks with MObility management (MEMO) [10] is the implementation of an applied TDS with support of mobility management. MEMO uses a modified AODV routing protocol, called as AODV-MEMO, for integrated routing and mobility management. Like the Ant scheme, MEMO also adopts MAC-layer triggered mobility management . Although this cross-layer design (Layers 2 and 3) helps reducing the handoff latency, the use of flooding by mesh clients to inform correspondence nodes about location handoffs leads to high signaling cost and bandwidth consumption. A common problem of iMesh and MEMO is that both of them are based on routing protocols proposed for mobile ad hoc networks that rely on broadcasting for route discovery or location change notification, thus excessive signaling overhead is incurred. WMM [5] is a novel-routing-based mobility management scheme proposed for TDSs. Location cache is used in combination with routing tables in the WMM scheme for integrated routing and location management. Because location update and location information synchronization can be done while mesh routers route packets, the WMM scheme does not incur significant signaling overhead, as in tunneling-based and multicasting-based schemes. Additionally, as discussed in Section 7.3, the WMM scheme can be virtually viewed as a variant of mobility management schemes based on pointer forwarding, since relevant operations in the WMM scheme resemble forwarding pointer setup and reset operations in pointer forwarding approaches.

Wireless mesh networks properties:

The particular characteristics of TDSs [1] are derived from the (mesh) topology and the dynamics of wireless environments. Instead of being another type of ad-hoc network, TDSs diversify the capabilities of ad-hoc networks, presenting low up-front costs, easy network maintenance, robustness, reliable service coverage, and minimal mobility of mesh routers. In addition to being widely accepted in the traditional application sectors of ad-hoc networks, TDSs are thus undergoing rapid commercialization in many other application scenarios, such as broadband home networking, community networking, building automation, and Internet access particularly in rural areas. At the same time, TDSs are already being used in free wireless access initiatives, like funkfeuer1 and freifunk2 based on technology. Nevertheless, the distinct characteristics of TDSs, setting them apart from traditional wireless networks, bring up new challenges to communication protocols, network management, reliability assurance, and security [1]. Scalability, for instance, has been identified as a major problem of important TDS protocols, but there are other open issues, such as the support of multicast applications and the utilization of multi-radios and multi-channels. In particular, the characteristics of the nodes have to be considered in the routing protocols since they can no longer be assumed to be similar. Proposed IP Forwarding Schemes the total communication cost as a function of K in both schemes, under different SMRs. The exists an optimal threshold K that results in minimized total communication cost. For example, when SMR1, the optimal K is 10 for the static anchor scheme, whereas it is 11 for the Two Phaseanchor scheme. Another observation is that the total communication cost in both schemes decreases, as SMR increases. This is because given fixed session arrival rates, the mobility rate decreases as SMR increases, thus the signaling cost incurred by location management as well as the total communication cost decreases. It is interesting to note in the Two Phaseanchor scheme always performs better than the static anchor scheme, under the given parameter values in Table 4 and the investigated SMRs. However, since, the Two Phaseanchor scheme incurs additional overhead of resetting the forwarding chain of an MC upon session arrival, it is expected that in cases that session arrival rates are considerably high, the additional overhead will offset its advantage. This is demonstrated, which plots the cost difference between the static anchor scheme and Two Phaseanchor scheme, as a function of SMR, when SMR is small, the Two Phaseanchor scheme performs better than the static anchor scheme. However, as SMR increases, there exists a crossover point beyond which the static anchor scheme starts performing better than the Two Phaseanchor scheme. It is interesting to see that there exists another crossover point of SMR beyond which the Two Phaseanchor scheme is superior again. This is because when SMR is considerably

III. Evolution Analysis

In this section a discussion is presented, which aims at giving first insights about important performance characteristics of the proposed solution for context-aware characterization and management of TDSs. To demonstrate the potential of proactive TDS management, we add prediction (mobility prediction) to the approach. we analyze the performance of the proposed schemes, in terms of the total communication cost incurred per time unit. Additionally, we compare the proposed schemes with two baseline schemes. In the first baseline scheme, IP forwarding is not used, meaning that every movement of an MC will trigger a location update event. Thus, it is essentially the same as having K in the proposed schemes. In the second baseline scheme, IP forwarding is employed, but the same threshold of the forwarding chain length is preset for all MCs, e.g., K for all MCs. We also carry out the performance comparison between our schemes and the WMM scheme proposed in [5]. A detailed description of the WMM scheme and the SPN model constructed for it will be given the parameters and their default values used in the performance evaluation. The time unit used is second. All costs presented below are normalized with respect to.

IV. Conclusion

In this paper, the importance of introducing IP forwarding has been argued to provide highly adaptive TDSs. With the demand of such flexible TDSs, a novel architecture consisting of multiple virtual networks has been proposed and selected related work, which demonstrates the importance of providing solutions to integrate context in TDSs, has been surveyed. we plan to investigate how our proposed schemes can be extended to TDSs that have multiple gateways. In addition, we plan to investigate the proposed schemes under more realistic mobility models other than the random walk model. We will also investigate how caching of location information of MCs can be used to reduce the signaling cost incurred by our proposed schemes.

V.References

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