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延迟约束的分布式演化网络监测模型

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Abstract

Monitoring infrastructure should be reconfigured at a minimum cost to obtain up-to-date status information as the network evolves. This paper addresses the problem of optimally upgrading the existing monitoring infrastructure. It tries to minimize the total cost of upgrading the monitoring infrastructure, including adding new pollers and reconfiguring the existing pollers. It is shown that this problem is NP-hard. An approximation algorithm is proposed, and its time complexity and approximation ratio are analyzed.

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摘要

在扩展网络或网络拓扑发生变化时, 需要用最小的代价重新布置网络监测体系, 以保证能收集到所有必需的网络信息. 更新网络监测体系包括新增和重新配置收集节点两方面的代价, 求解总代价最小的更新方案的问题是NP难的. 提出了一种基于贪婪策略的近似算法, 并分析了算法的时间复杂性和近似比.

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References:

- [1] Stallings W. SNMP, SNMPv2, SNMPv3, and RMON 1 and 2. 3rd ed., Boston: Addison-Wesley Professional, 1998.
- [2] Asgari A, Trimintzios P, Irons M, Pavlou G, Egan R, den Berghe SV. A scalable real-time monitoring system for supporting traffic engineering. In: Proc. of the IEEE Workshop on IP Operations and Management. Dallas: IEEE, 2002. 202-297. <http://www.ist-tequila.org/publications/ipom02-monitoring.pdf>
- [3] Awduche DO. MPLS and traffic engineering in IP networks. *IEEE Communications Magazine*, 1999,37(12):42-47.
- [4] Lin YJ, Chan MC. A scalable monitoring approach based on aggregation and refinement. *IEEE Journal on Selected Areas in Communications*, 2002,20(4):677-690.
- [5] Li L, Thottan M, Yao B, Paul S. Distributed network monitoring with bounded link utilization in IP networks. In: Proc. of the IEEE INFOCOM. San Francisco: IEEE, 2003. 1189-1198. http://www.ieee-infocom.org/2003/papers/29_03.PDF

- [6] Thottan M, Li L, Yao B, Mirrokni VS, Paul S. Distributed network monitoring for evolving IP networks. In: Proc. of the 24th Int'l Conf. on Distributed Computing Systems. Hachioji: IEEE, 2004. 712-719. http://www.ieee-infocom.org/2003/papers/29_03.PDF
- [7] Breitbart Y, Chan CY, Garofalakis M, Rastogi R, Silberschatz A. Efficiently monitoring bandwidth and latency in IP networks. In: Proc. of the IEEE INFOCOM. Anchorage: IEEE, 2001. 933 -942. <http://http://csdl.computer.org/comp/proceedings/icdcs/2004/2086/00/20860712abs.htm>
- [8] Breitgand D, Raz D, Shavitt Y. SNMP GetPrev: An efficient way to browse large MIB tables. IEEE Journal of Selected Areas in Communication, 2002,20(4):656-667.
- [9] Liu XH, Yin JP, Lu XC, Cai ZP, Zhao JM. Distributed network monitoring model with bounded delay constraints. Wuhan University Journal of Natural Sciences, 2004,9(4):429-434.
- [10] Cormen TH, Leiserson CE, Rivest RL, Stein C. Introduction to Algorithms. 2nd ed., Cambridge: MIT Press, 2001.
- [11] Liu XH, Yin JP, Tang LL, Zhao JM. Analysis of efficient monitoring method for the network flow. Journal of Software, 2003,14(2): 300-304 (in Chinese with English abstract). <http://www.jos.org.cn/1000-9825/14/300.htm>
- [12] Liu XH, Yin JP, Lu XC, Zhao JM. A monitoring model for link bandwidth usage of network based on weak vertex cover. Journal of Software, 2004,15(4):545-549 (in Chinese with English abstract). <http://www.jos.org.cn/1000-9825/15/545.htm>
- [13] Cai ZP, Zhao WT, Yin JP, Liu XH. Using passive measuring to calibrate active measuring latency. In: Kim C, ed. ICOIN 2005. LNCS 3391, Berlin: Springer-Verlag, 2005. 198-206.

附中文参考文献:

- [11] 刘湘辉,殷建平,唐乐乐,赵建民.网络流量的有效测量方法分析.软件学报,2003,14(2):300-304. <http://www.jos.org.cn/1000-9825/14/300.htm>
- [12] 刘湘辉,殷建平,卢锡城,赵建民.基于弱顶点覆盖的网络链路使用带宽监测模型.软件学报,2004,15(4):545-549. <http://www.jos.org.cn/1000-9825/15/545.htm>