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Internet路由仿真系统研究与实现

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Abstract
With the growth of Internet, it becomes a challenging problem to test the running characteristics of routing protocol implementations in realistic large-scale networks. An Internet routing emulation system (IRES) is developed as a test bed to test and analyze the above characteristics. A novel approach by combining Internet topology generation and routing protocol implementation is proposed, and the architecture of IRES is presented. Then the Internet hierarchical topology is analyzed and a method is proposed to transform GT-ITM model to BGP-OSPF oriented Internet topology. In the given examples, by measuring the routing interaction with CISCO2600 router, its computation complexity of the OSPF protocol implementation in the CISCO2600 router is O((lgN)4), and the upper bound it supports is given. The experimental results show that as a test bed, IRES has an important role that cannot be replaced by others.

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摘要
随着Internet不断的发展扩大,如何测量路由协议实现在实际网络环境中的运行特性成为一个重要难题.针对这个问题,设计实现了Internet路由仿真系统IRES(Internet routing emulation system),为这种特性的测试和评价提供了试验床.首先提出了一种将Internet拓扑生成和路由协议实现相结合的思想,并基于此给出了IRES的总体结构.接着研究了将GT-ITM网络拓扑模型转换到面向BGP-OSPF的Internet拓扑结构的方法.最后给出了IRES的应用实例,通过与CISCO2600路由器的路由交互,分析得到了被测系统OSPF协议实现的复杂度为O((lgN)4),并给出了其所支持的网络规模上限.实验证明,IRES系统作为试验床,具有其他测试系统不可取代的重要作用.

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