

# 卫星 IP 网络可变区域分层 IPSec 的设计与实现

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**摘 要:**分析了卫星 IP 网络性能增强技术与 IPSec 之间的矛盾,设计并提出了可变区域的分层 IPSec 协议,将分层 IPSec 区域映射由静态分区转变为可选择的动态分区,并建立与之相应的复合型安全关联,使得授权的性能增强网关不仅能够访问到 TCP 报头,而且能访问到应用层 HTTP 链接对象,在保障端对端安全的同时,达到 TCP 性能增强与 HTTP 传输加速的双重目的。在此基础上,对 CZML-IPSec 进行了实现和开销性能测试。实验证明 CZML-IPSec 没有增加不可接受的带宽开销与处理延时,能够为卫星 IP 网络提供安全性并支持各种性能增强技术。

**关键词:**通信技术;卫星 IP 网络;CZML-IPSec;性能增强网关;HTTP 加速代理

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## Design and implementation of CZML-IPSec over satellite-based internet

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**Abstract:** The confliction between satellite IP networks performance enhanced technology and IPSec was analyzed, and multilayer IP security protocol with changeable zone was proposed. The scheme can converts traditional static zone mapping to changeable dynamic mapping and corresponding composite security relationship was constructed, so that it enables the licensed intermediate nodes address not only TCP header but also object links in terms of HTML at uplayer. Hence, the goals of TCP performance enhancement and HTTP transmission acceleration were achieved while end to end security was held. The test for CZML-IPSec shows that bandwidth overhead and processing time delay are not unacceptable. And CZML-IPSec can provide both end-to-end security and performance enhancement for satellite IP networks.

**Key words:** communication technology; satellite IP networks; CZML-IPSec; performance enhanced proxy; HTTP accelerator

卫星网络链路具有传播延时长、带宽延迟积大、链路误码率较高的特性,这在利用 Ka 波段静止轨道卫星接入 Internet 方面显得尤为突出。这些特性导致了在地面 Internet 得到广泛使用且能

保障端对端可靠传输的 TCP 协议在应用于卫星网络时会产生严重的性能恶化。人们对改进卫星网络 TCP 性能进行了深入研究<sup>[1]</sup>。TCP 性能增强代理分为 TCP 连接分割代理和 TCP 欺骗代理

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