Cloud-based Satellite Infrastructure:

How Teleports Integrate with Global Information Resources

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Cloud-based Satellite Infrastructure: How Teleports Integrate with Global Information Resources

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1. Introduction

- Modern Cloud Computing
- Relationship to Satellite Communications
- Relationship to the Teleport Business Model

Network Computing (circa 1994)

What is cloud computing?

- Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing.

- Instead of buying, owning, and maintaining physical data centers and servers, you can access technology services, such as computing power, storage, and databases, on an as-needed basis from a cloud provider [like Amazon Web Services (AWS)].

Cloud Computing Models

- Infrastructure as a Service

- Computing Platform as a Service

- Software/Applications as a Service

The Network is the Internet – between your locations and the cloud servers

Where is the AWS Cloud?

- Regions
- Coming Soon

Developing the Cloud Application

- AWS originated in 2002 with many tools and resources now available

- Becoming a "Certified Solutions Architect"
  - Remember "Novell NetWare Engineer", "cisco Certified Network Associate", "Microsoft Certified Professional"

- Must address everything you ordinarily address, especially security

Shared Security Responsibility

- **You** must first be familiar with the AWS shared responsibility model – work together towards security objectives.

- AWS provides secure infrastructure and services, while **you**, the customer, are responsible for secure operating systems, platforms, and data.

- To ensure a secure global infrastructure, AWS configures infrastructure components and provides services and features you can use to enhance security, such as the Identity and Access Management (IAM) service, which you can use to manage users and user permissions in a subset of AWS services.

AWS Security Best Practices, August 2016

COMSEC and RFI on Satellite Links

- Information is protected by encryption; RFI must be detected and resolved through operating principles

- With a common beam, anyone can access, and all will receive data and interference

- With multiple beams, interference enters in one beam and affects only the connected beams; data may be protected through beam isolation

Nefarious Badguy

Intended user
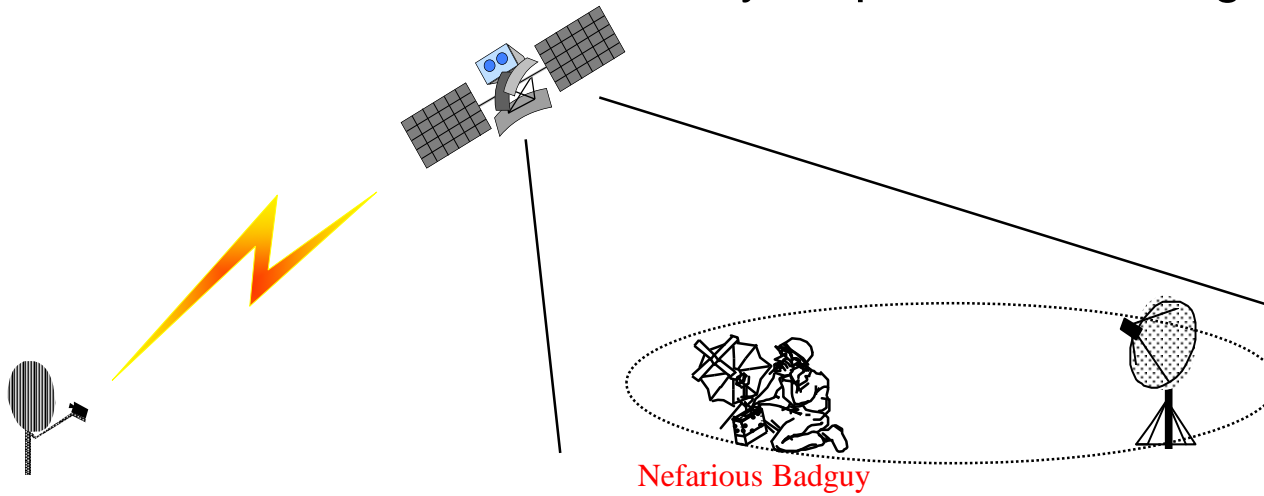
Encryption at the Link Layer ("Bulk Encryption")

- Encryption performed on entire data stream

- Encryption device usually placed adjacent to satellite modem

- Used by military, bank networks

- Performance enhancement placed outside encrypted link
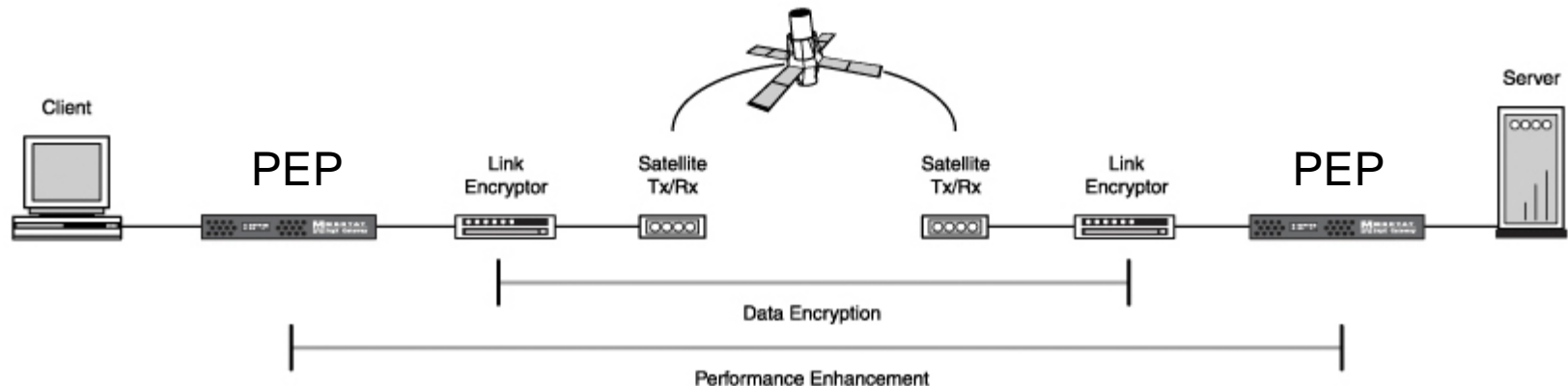
Application Layer Security

- End-to-end encryption of data but not protocols
- Allows enhancement, but not compression
- No restrictions on placement of accelerator
- Examples: SSL, TLS, Citrix
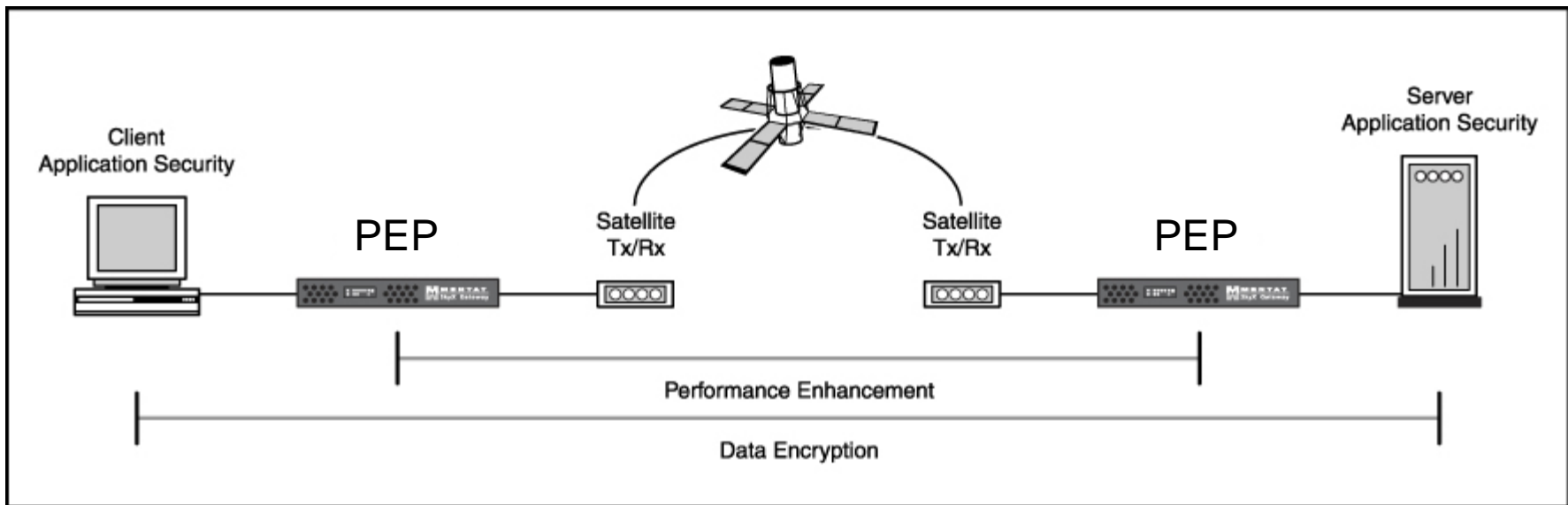
ITC Requirements

Requirement	Satellite Comms	Internet	Cloud
Access	From anywhere	Global	Regional
Quality of Service	99.9%, BER	Variable	Diverse, SLA
Throughput	As specified	Variable	At access point
Latency	Orbit dependent	Variable	Architecture based
Information Security	End user	Depending	Managed, shared
Communications Security	Encryption	Open	At access point
Cost	Infrastructure based	Depending	Pricing model

Owned infrastructure is still an option

Teleport Business Model

- Service provider, who owns the ground resources to satisfy user requirements

- Access to the Internet is highly in demand, from and to anywhere

- This includes cloud-based computing as exemplified by the AWS model (as well as IBM, Microsoft and others)

- Applications are split between client and cloud servers – necessitating a clear understanding

Cloud-based Satellite Infrastructure

The Cloud – With Us, IS!

Thank You!

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