Building Threat Resistant Networks for the 21st Century

Andrew F. Bach
Vice President Communications
abach@siac.com
www.SIAC.COM
866-USE-SIAC

February 11, 2005

© 2004 SIAC
Dependence on Telecommunications

- Increasing dependence
- $4,000,000,000,000 a day in clearance and settlement alone
- Food production
- Life Safety
- Transportation
- Medicine
- Power generation
The Threats

- **Natural**
  - Fire
  - Flood
  - Wind
  - Earth movement

- **Man Made**
  - Industrial Accident
  - Human Error

- **Acts of War**
  - EMP
  - Terrorist
  - Nuclear
  - Biological
Example of threats

- **Hurricane Andrew**
  - Low loss of life
  - Wide area of impact
  - Known in advance
  - $4B in damage
  - Communications restored with in 2 weeks
  - Limited Impact on nation

- **9/11**
  - Medium loss of life
  - Small area of impact
  - No advanced warning
  - $10B/$T in damage and economic impact
  - Communication restoration took months
  - Large impact on nation and world
Lessons Learned Post 9/11

• Too many circuits through the same conduits & facilities
• Virtual Diversity
• Most communications links are used for only a single application or service
• Dependence on legacy protocols and legacy transports
• Data centers tied down by communications circuits
Design “Rules” that Failed

• Assuring diversity
  • Buy two circuits from two carriers
  • Switching through a “cloud”
  • Two circuits through two clouds is better than two circuits through one cloud

• Carriers are competitors; they do not share infrastructure

• Diversity is a commodity item
“The concept of resiliency and its components of diversity, redundancy, and recoverability are critical to understanding some of the national security and emergency preparedness (NS/EP) issues challenging the financial services and telecommunications industries today.”

Telecommunications Resiliency

(within context of overall business continuity approach)
Telecommunications Resiliency

- Resiliency
- Redundancy
- Diversity
- Recoverability
Telecommunications Diversity Challenges*

- Failure of critical services due to loss of diversity
- Ensuring that diversity is predictable and continually maintained.
- Potential lack of understanding of terms and conditions in telecommunications contracts or tariffs

*As Identified by the Financial Services Sector
CO = Central Office

CO = Central Office

Secure Financial Transaction Infrastructure

Examples of Concern

CO A
Primary
Backup

IXC (Inter-exchange Carrier)

CO B

CO A
Primary
Backup

IXC

CO B
Examples of Concern

Secure Financial Transaction Infrastructure
Examples of Concern

SONET Rings

Expectation of Geographic Diversity of Ring Paths

Portion of Ring Traverses Common Geographic Path (Defeats Objective)

Examples of “Collapsed Ring”
Examples of Concern

Fiber path is buried along the railroad tracks, the other fiber path is encased in steel conduit along the side of the highway bridge.

Multiple carriers in the same manhole.

Multiple carriers in the same right of way.
What We Need (NSTAC FSTF Findings)

- Comprehensive business continuity planning and practices
- A telecommunications network that operates resiliently
- NS/EP functions that acquire the highest levels of telecommunications resiliency assurances available
- A clear understanding between contracting parties
- Public policy options to stimulate investments.
- A promotion of cross-sector understanding
The Secure Financial Transaction Infrastructure (SFTI) Overview

- Created after 9/11
- Distributed Access Centers
- Resilient communications platform
- Secure private network
- Available today
- Offers choice in how to connect
SFTI Design

- No single point of failure
- Resilient infrastructure
- Low skew and end-to-end latency
- Remote, out-of-band, management and testability
- Comprehensive event monitoring and reporting
Current SFTI Backbone

Secure Financial Transaction Infrastructure
The SFTI Platform

Financial Service Providers

SFTI Core

SIAC Hosted Services
- AMEX
- NYSE
- FICC
- NSCC
- NMS
- OPRA

SFTI B2B

Other Markets, Exchanges & Industry Utilities
- ATSSs
- ECNs
- Utilities
- Services
- Markets

The Financial Industry

Directly Connected Industry Participants
- DTCC
- SMART
- Radianz
- SAVVIS
- Sector
- TNS

Secure Financial Transaction Infrastructure
What are the Benefits?

• True geographical path diversity
• Reduces the problem of too many circuits to multiple networks
• Improves cost effectiveness through big pipe connectivity
• Multiple connectivity options—you choose
• Supports all types of financial transactions
Exchanges, Market Centers and Industry Utilities on SFTI

- Exchanges
  - AMEX
  - BSE *
  - CBOE *
  - CHX
  - ISE *
  - NASDAQ
  - NSX (formerly CSE)
  - NYSE
  - PCX
  - PHLX

- Utilities
  - DTCC
  - FICC
  - NASD
  - OCC

- Alternative Trading Systems
  - ARCA
  - BRASS
  - BRUT
  - INSTINET / ISLAND

*SFTI B-2-B Services
SFTI is *Not*...

...based on a pre-9/11 network

...built on legacy telco infrastructure, i.e. frame relay

...constricted by low bandwidth
Status

526 customers live in production

105 customers in “network live” phase

642 CUSTOMERS TOTAL

2.7 is the average number of access centers firms connect to

Secure Financial Transaction Infrastructure
Disclaimer

Proprietary Notice
This document contains copyrighted and proprietary works created and owned exclusively by SIAC. It is provided to persons and organizations doing business with SIAC solely for their use in conducting that business. Copying or reproducing the contents of this document in whole or in part distribution or dissemination to any other parties, or creating derivative works without the prior written consent of SIAC is expressly prohibited.

Brand names and/or Trademarks
Brand names or Products cited in this document may be trade names or trademarks owned by SIAC or third parties. Where there may be proprietary claims to such trademarks or trade names, the name has been used with an initial capital letter. Regardless of the capitalization used, all such use has been in an editorial fashion without any intent to convey endorsement whatsoever of any third party product or trademark claimant. SIAC expresses no judgement as to the validity or legal status of any such third party proprietary claims.

Engineering Services Disclaimer
This work is published with the understanding that SIAC is supplying information, but not attempting to render engineering or other professional services. If such services are required the assistance of the appropriate professional should be sought.