Internet Security and Implications on Transportation Systems

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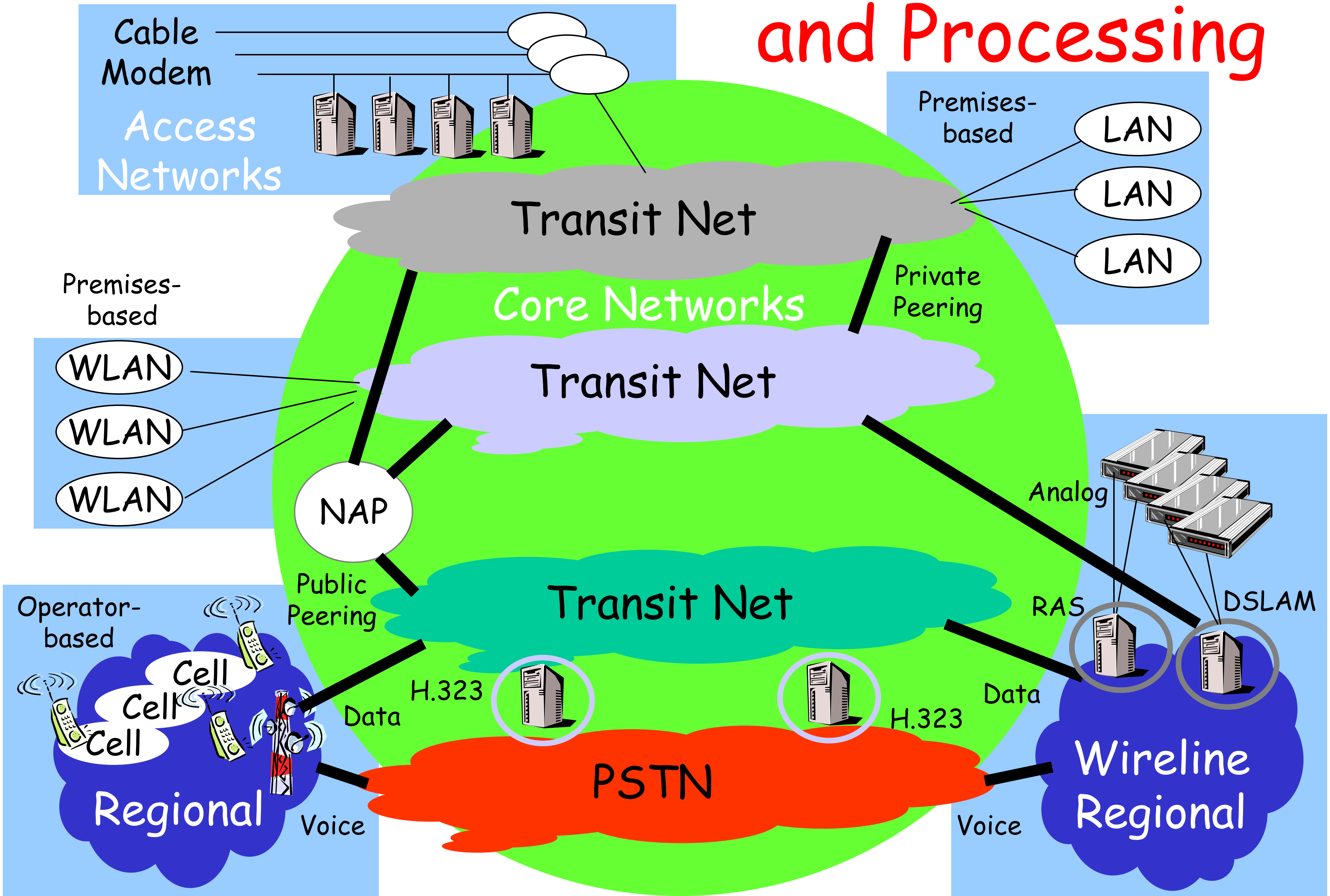
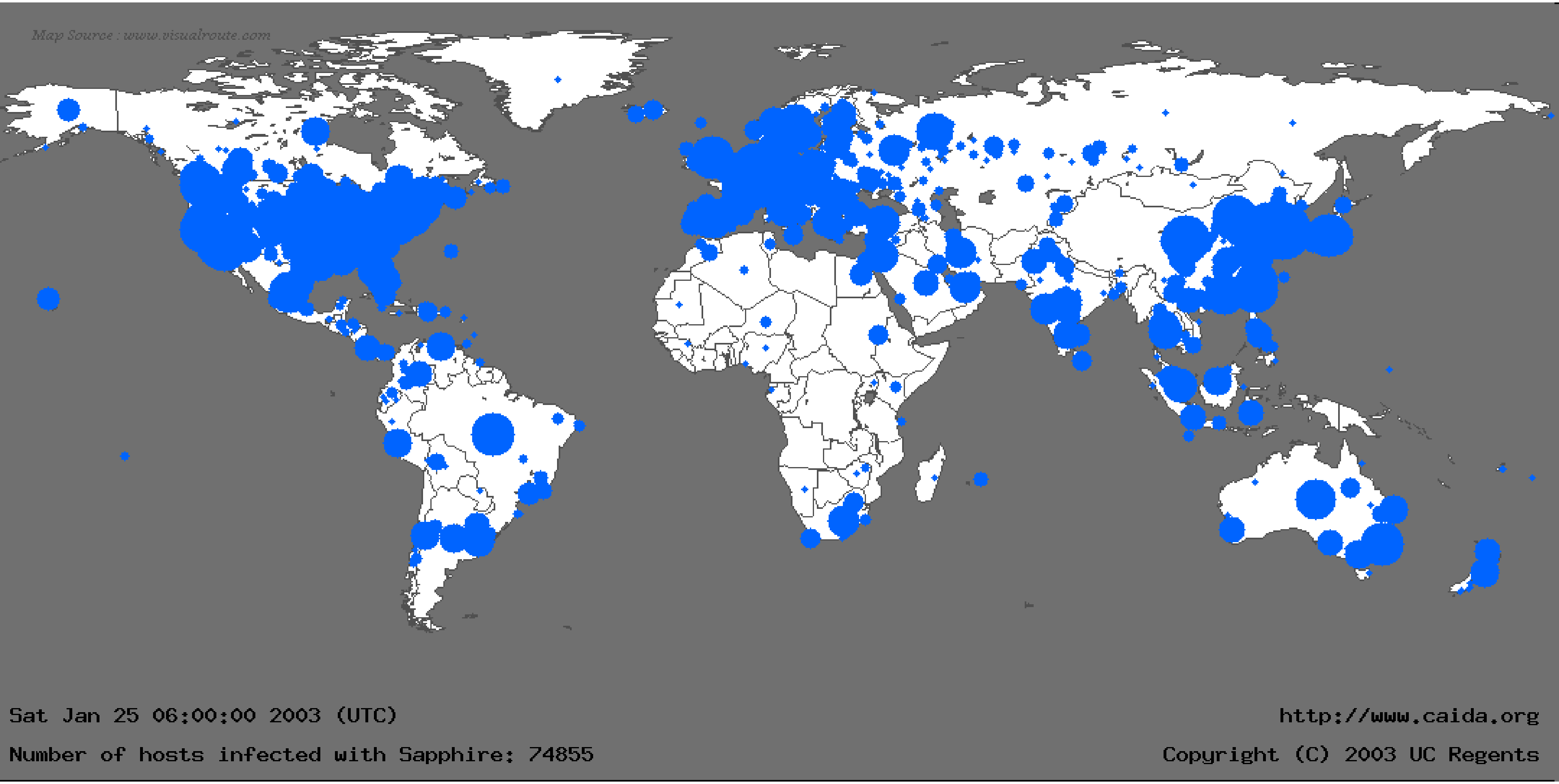
Outline

- Internet Threat Landscape
- Security regulations
- System Diagnosis

The Current Internet: Connectivity and Processing



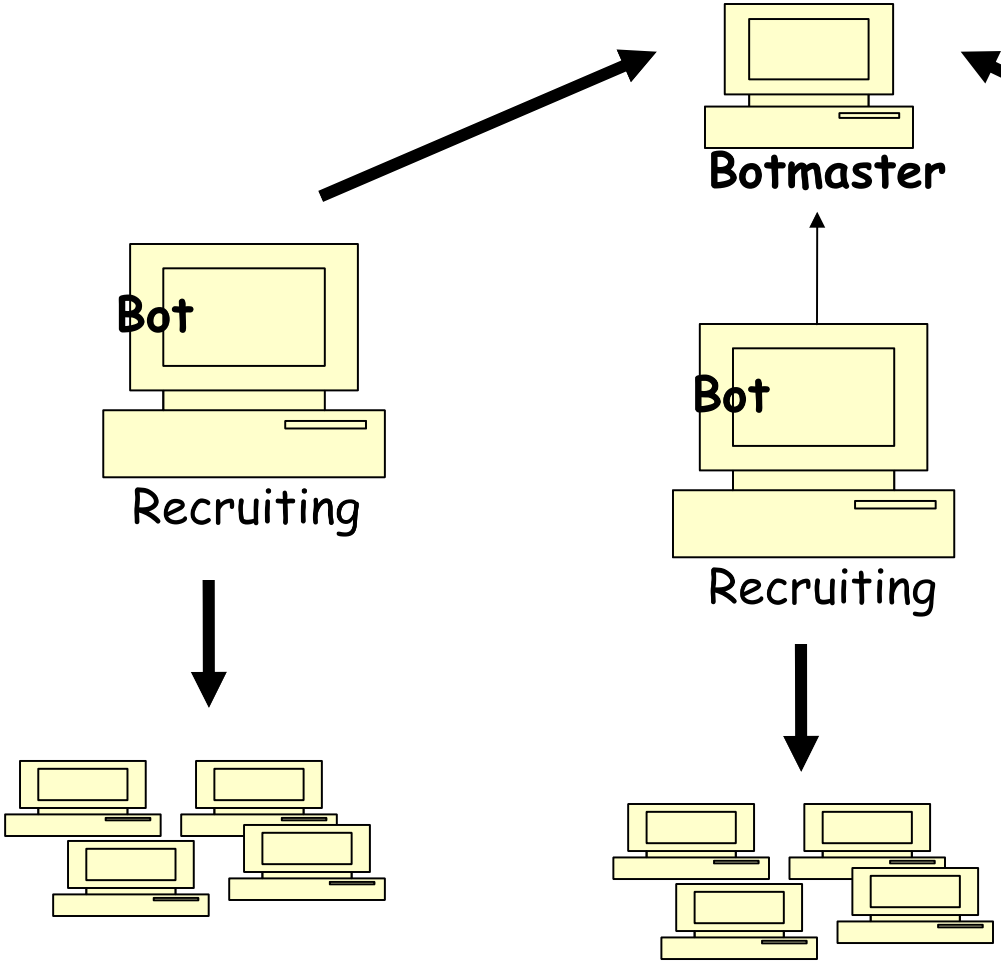
The Spread of the Sapphire/Slammer SQL Worm

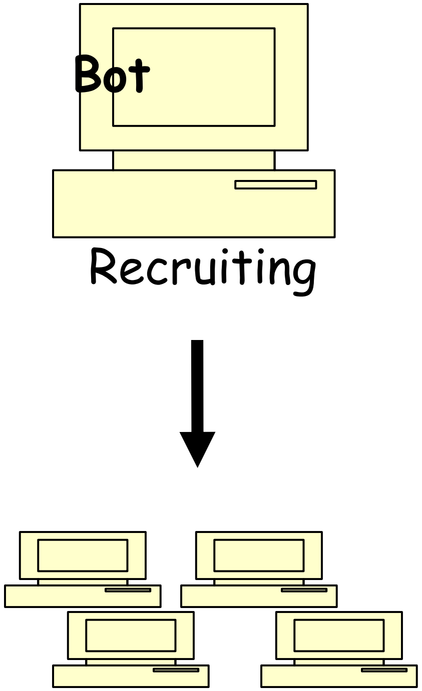

Map Source : www.visualroute.com
Sat Jan 25 06:00:00 2003 (UTC)
Number of hosts infected with Sapphire: 74855
http://www.caida.org
Copyright (C) 2003 UC Regents

Evolution of Botnets

- Motivation change in computer hacking
  - Vandalism → Financial gains
  - Loss of $67.2 billion (2006 figure)

Botnet Architecture

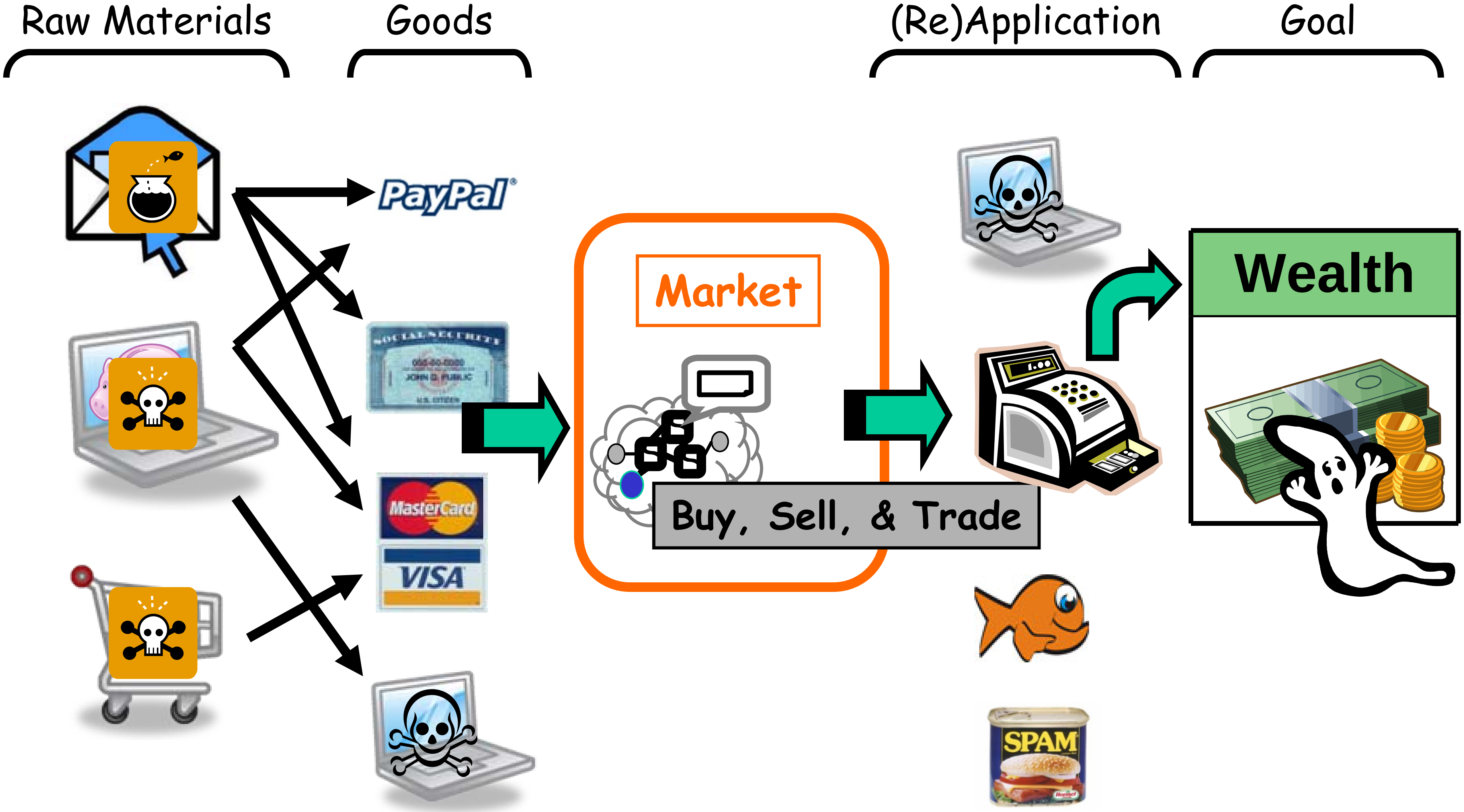




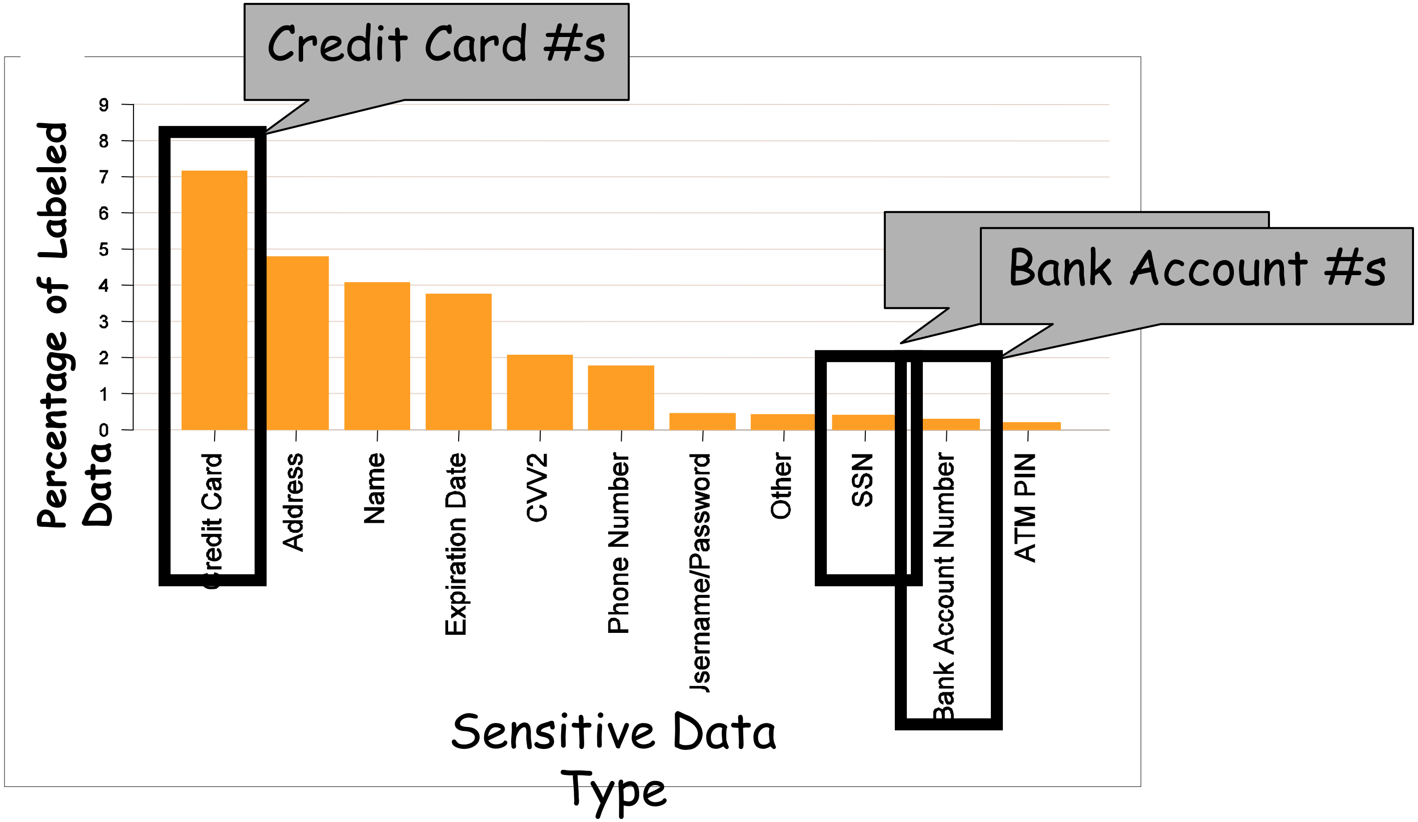
Attack Behaviors

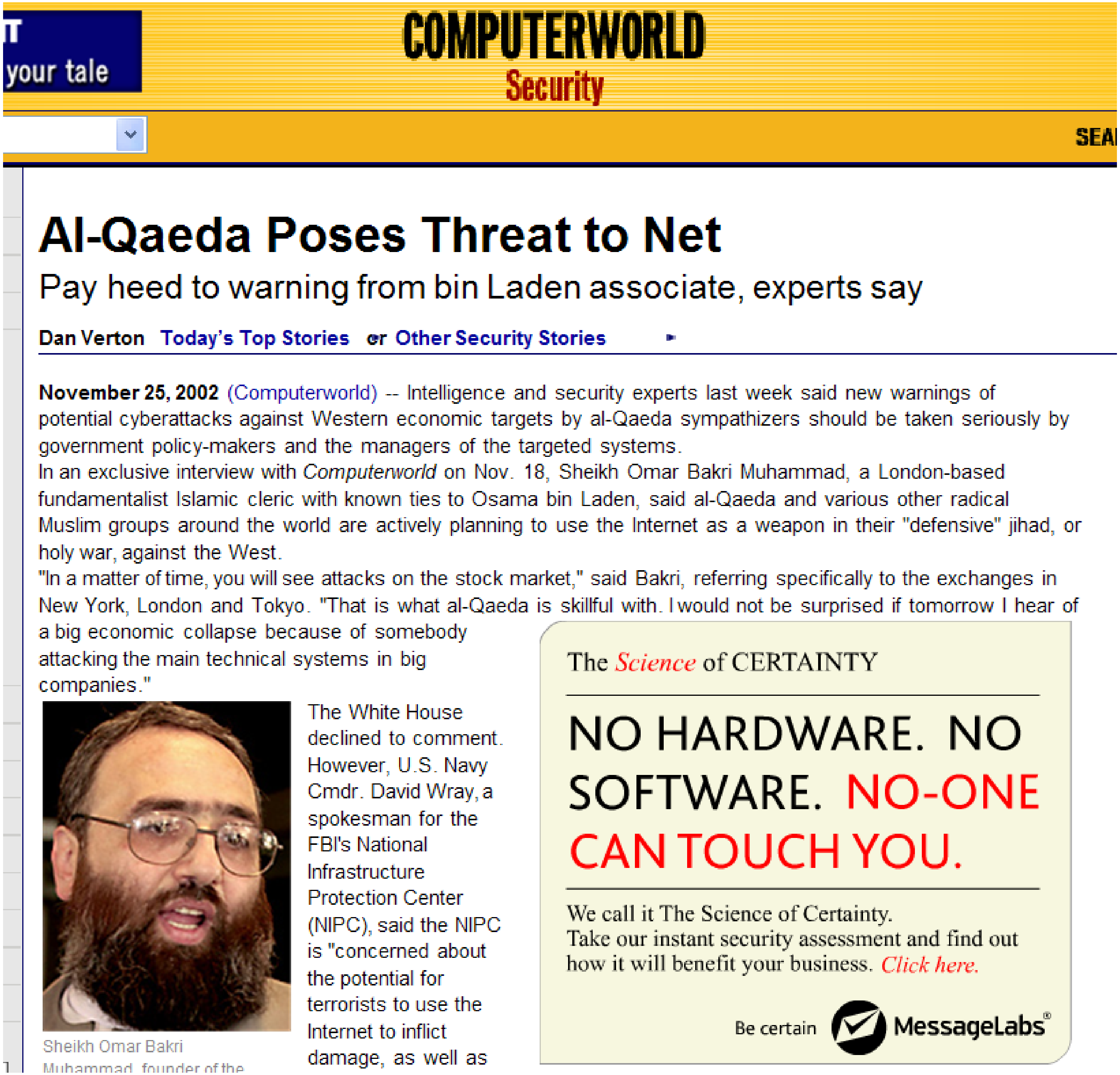
- Stealing personal information
  - Keylogger and Network sniffer used on compromised systems to spy on users and compile personal information
- Phishing and spam proxy
  - Aggregated computing power and proxy capability allow spammers to impact larger groups without being traced.
- Distributed Denial of Service (DDoS)
  - Impair or eliminate availability of a network to extort or disrupt business

eCrime Market Operation



Sensitive Data and Market Significance





COMPUTERWORLD
Security

Al-Qaeda Poses Threat to Net

Pay heed to warning from bin Laden associate, experts say

Dan Verton **Today's Top Stories** or **Other Security Stories**

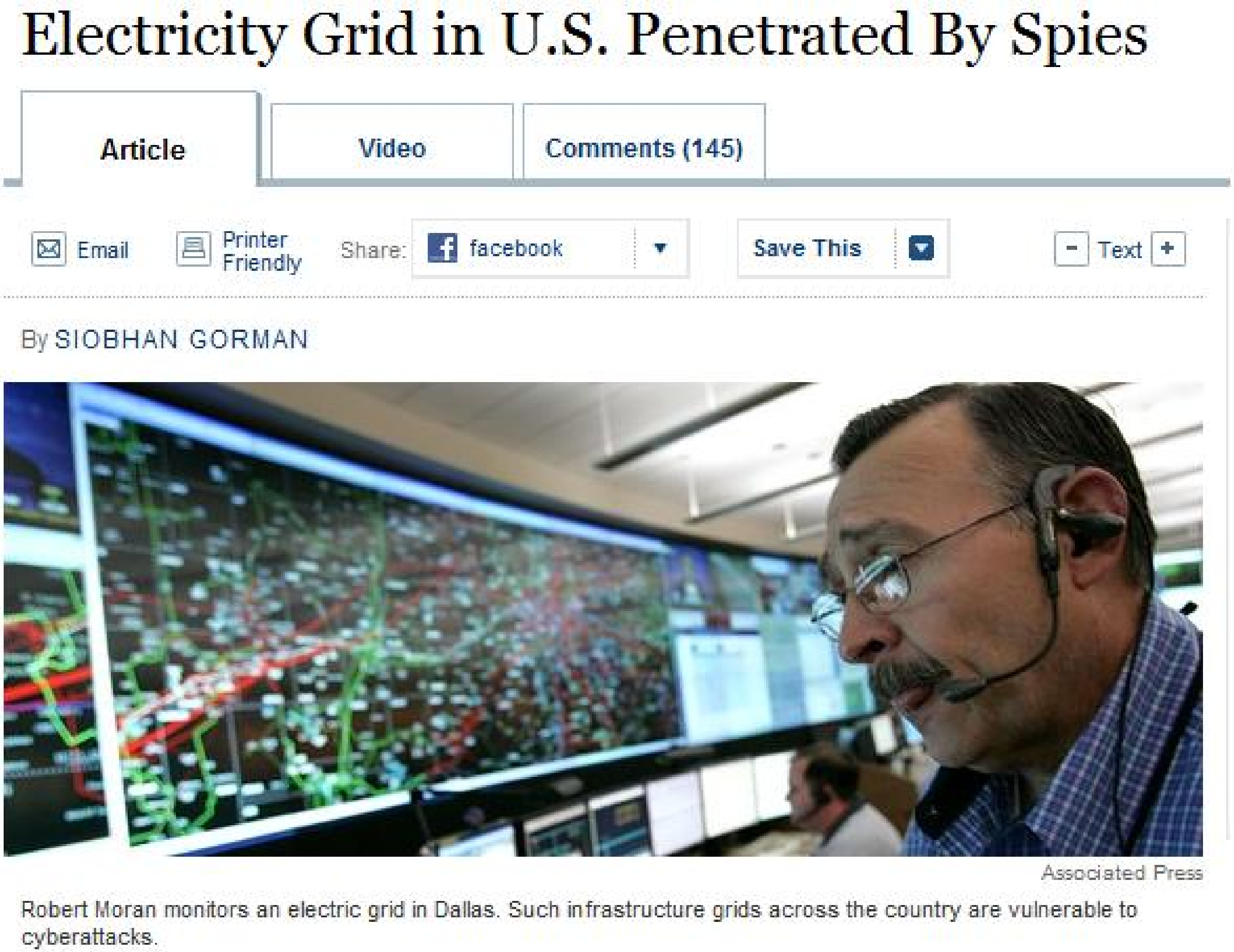
November 25, 2002 (Computerworld) -- Intelligence and security experts last week said new warnings of potential cyberattacks against Western economic targets by al-Qaeda sympathizers should be taken seriously by government policy-makers and the managers of the targeted systems.

In an exclusive interview with *Computerworld* on Nov. 18, Sheikh Omar Bakri Muhammad, a London-based fundamentalist Islamic cleric with known ties to Osama bin Laden, said al-Qaeda and various other radical Muslim groups around the world are actively planning to use the Internet as a weapon in their "defensive" jihad, or holy war, against the West.

"In a matter of time, you will see attacks on the stock market," said Bakri, referring specifically to the exchanges in New York, London and Tokyo. "That is what al-Qaeda is skillful with. I would not be surprised if tomorrow I hear of a big economic collapse because of somebody attacking the main technical systems in big companies."

Sheikh Omar Bakri Muhammad, founder of the

The White House declined to comment. However, U.S. Navy Cmdr. David Wray, a spokesman for the FBI's National Infrastructure Protection Center (NIPC), said the NIPC is "concerned about the potential for terrorists to use the Internet to inflict damage, as well as



Electricity Grid in U.S. Penetrated By Spies

By SIOBHAN GORMAN

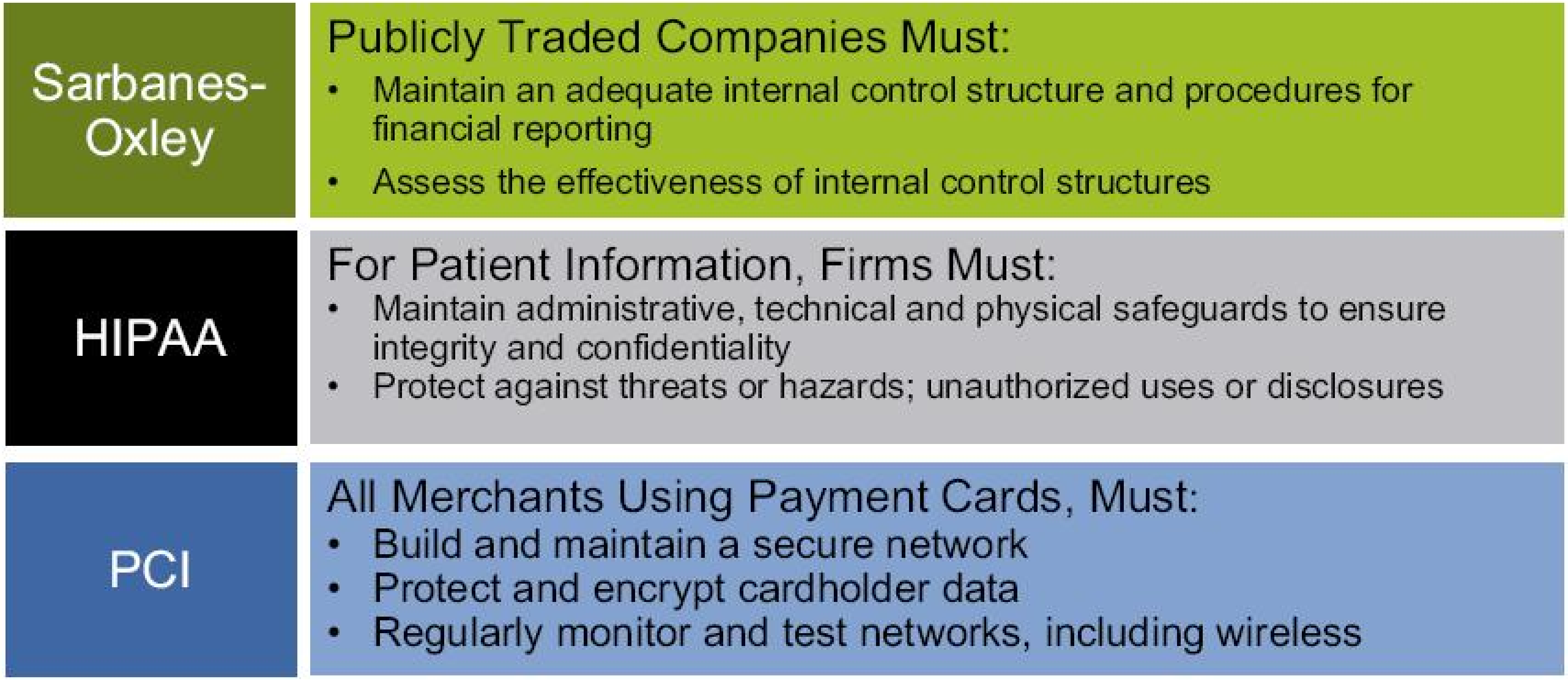
Associated Press

Robert Moran monitors an electric grid in Dallas. Such infrastructure grids across the country are vulnerable to cyberattacks.

- Cyber spies have penetrated the U.S. electrical grid and left behind software programs that could be used to disrupt the system.
- Transportation systems (air, truck, bus) the next?
  - Next generation 9/11 without suicide bombers!

Security Regulations

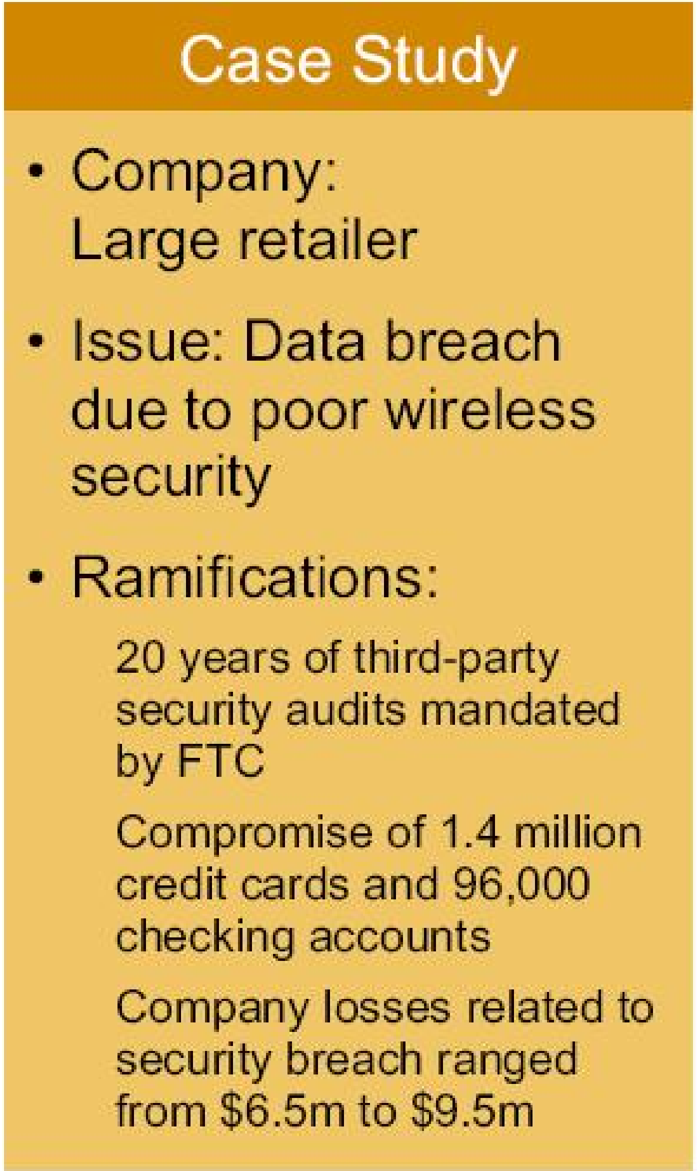
- □ Business and security compliance is top-of-mind for executives
- □ Protecting sensitive business & customer data is the key focus of regulatory compliance requirement



Sarbanes-Oxley	Publicly Traded Companies Must: • Maintain an adequate internal control structure and procedures for financial reporting • Assess the effectiveness of internal control structures
HIPAA	For Patient Information, Firms Must: • Maintain administrative, technical and physical safeguards to ensure integrity and confidentiality • Protect against threats or hazards; unauthorized uses or disclosures
PCI	All Merchants Using Payment Cards, Must: • Build and maintain a secure network • Protect and encrypt cardholder data • Regularly monitor and test networks, including wireless

Business Impact of Lack of Compliance

- ❒ Direct financial ramifications
  - ○ FTC fines
  - ○ Compensation payout to customers
  - ○ Cost of external security audits
  - ○ Lost customer confidence
- ❒ Research shows substantial indirect costs associated with brand damage



Case Study

- Company: Large retailer
- Issue: Data breach due to poor wireless security
- Ramifications:

  20 years of third-party security audits mandated by FTC

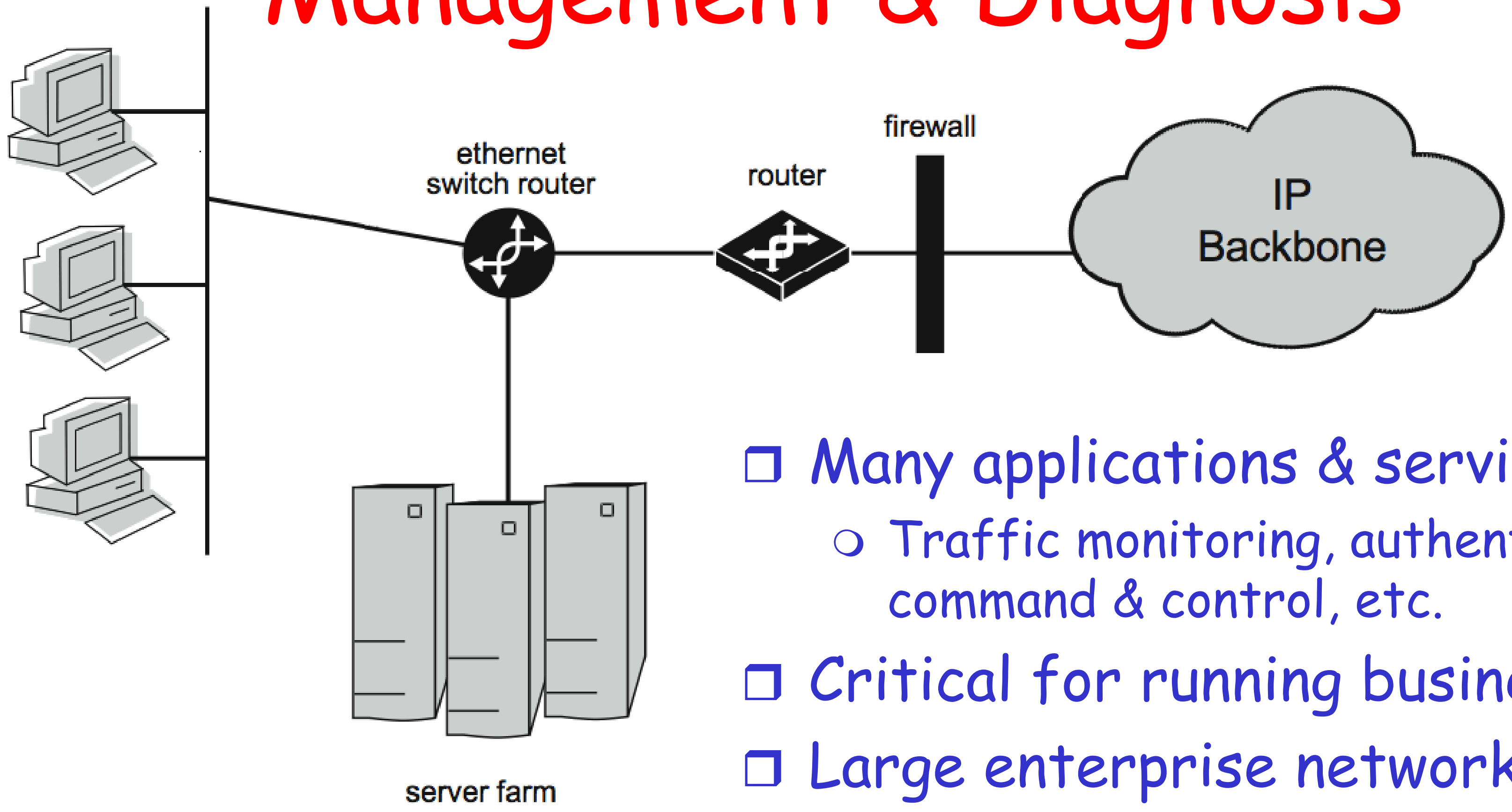
  Compromise of 1.4 million credit cards and 96,000 checking accounts

  Company losses related to security breach ranged from $6.5m to $9.5m

Do We Have Any Security Regulations for Transportation Systems?

- E.g., any FAA rules?

Transportation Control System Management & Diagnosis



- Many applications & services
  - Traffic monitoring, authentication, command & control, etc.
- Critical for running business
- Large enterprise networks
  - 1,000s network applications
  - 1,000s staffs in IT support
  - $$ millions of dollars spent every year