Introduction to Security Auditing

San Francisco ISACA Fall Seminar

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Enterprise Risk Services

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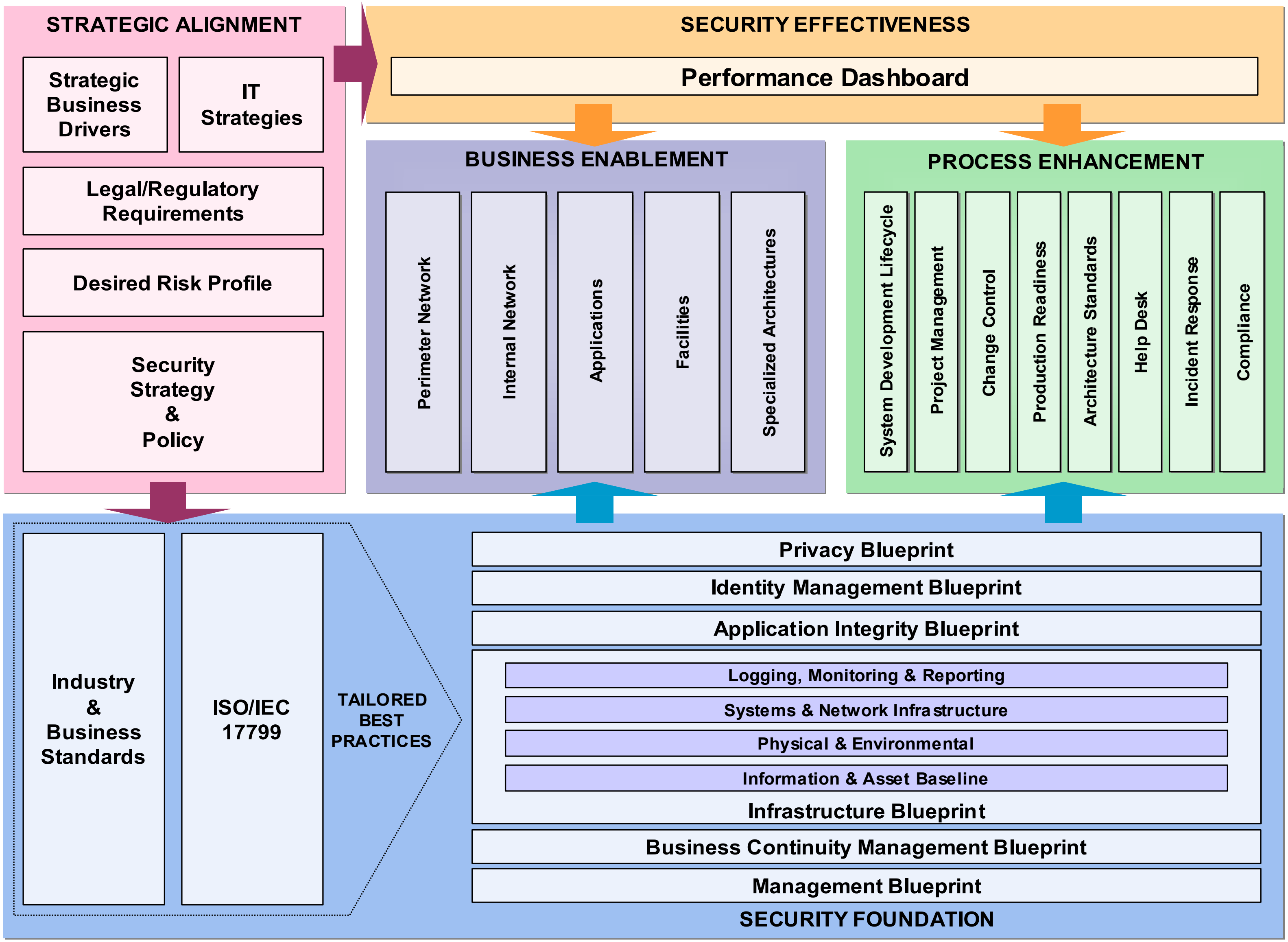
Agenda

- Security Audit Areas
  - Security Strategy, Policies and Organization
  - User Access Administration
  - Secure Systems Development
  - Application, Database, Network and Operating System Security
  - Intrusion Detection / Prevention Systems
  - Emergency Response
  - Remote Access and Third Parties
  - User Awareness and Training
  - Physical Security
  - Legal and Regulatory Compliance
- Audit Considerations
  - Risk Based Audit Approach
  - Audit Program Development
  - Third Party Security Specialists

Enterprise Security Architecture



STRATEGIC ALIGNMENT

- Strategic Business Drivers
- IT Strategies
- Legal/Regulatory Requirements
- Desired Risk Profile
- Security Strategy & Policy

SECURITY EFFECTIVENESS

Performance Dashboard

BUSINESS ENABLEMENT

- Perimeter Network
- Internal Network
- Applications
- Facilities
- Specialized Architectures

PROCESS ENHANCEMENT

- System Development Lifecycle
- Project Management
- Change Control
- Production Readiness
- Architecture Standards
- Help Desk
- Incident Response
- Compliance

SECURITY FOUNDATION

- Industry & Business Standards
- ISO/IEC 17799

TAILORED BEST PRACTICES

- Privacy Blueprint
- Identity Management Blueprint
- Application Integrity Blueprint
- Infrastructure Blueprint
  - Logging, Monitoring & Reporting
  - Systems & Network Infrastructure
  - Physical & Environmental
  - Information & Asset Baseline
- Business Continuity Management Blueprint
- Management Blueprint

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Security Strategy, Policies and Organization

- **Strategy**
  - Does the company have a security strategy?
  - If so, does it appear to be appropriate?
- **Security Organization**
  - Is there a separate security organization?
  - Is it appropriately staffed with qualified resources?
  - What is the reporting relationship? Is the level of authority adequate?
- **Policies**
  - Are policies formally documented and ratified?
  - Are they current and comprehensive?
  - Are they practical?
  - Have they been implemented?
  - Does they address all constituents (Management, Security, IT, Users)?

Policies, Procedures, Standards and Guidelines

- **Policy**
  - Management directive, mandatory in nature.
  - Establishes a framework.
- **Procedures**
  - Steps or activities to be performed to achieve policy compliance.
  - The “How To” of the policy.
- **Standards and Baselines**
  - Typically relate to a specific technology.
  - Generally should be followed, unless an exception is necessary due to a specific business need.
- **Guidelines**
  - Recommendation activities or standards, usually optional but recommended.

Security Policies Reference

- Information Security Policies Made Easy Version 9, Charles Cresson Wood
- ISACA Bookstore $795.00 (ISACA Members)
- More that 1,360 already-written policies including:
  - Web Pages
  - Firewalls
  - Employee Surveillance
  - Digital Signatures
  - Computer Viruses
  - Encryption
  - Contingency Planning
  - Logging Controls
  - Internet / Intranet
  - Privacy Issues
  - Outsourcing Security Functions
  - Computer Emergency Response Teams
  - Microcomputers
  - Local Area Networks
  - Password Selection
  - Electronic Mail
  - Data Classification
  - Telecommuting
  - Telephone Systems
  - Portable Computers
  - User Training
  - Information Security-Related Terrorism

User Access Administration

- **COBIT: Ensure Systems Security**
- **User Account Management Control Objective**
  - Management should establish procedures to ensure timely action relating to requesting, establishing, issuing, suspending and closing of user accounts.
  - A formal approval procedure outlining the data or system owner granting the access privileges should be included.
- **Management Review of User Accounts**
  - Management should have a control process in place to review and confirm access rights periodically.
  - Periodic comparison of resources with recorded accountability should be made to help reduce the risk of errors, fraud, misuse or unauthorized alteration.
- **Central Identification and Access Rights Management**
  - Controls are in place to ensure that the identification and access rights of users [and] system and data ownership are established and managed in a unique and central manner to obtain consistency and efficiency of global access control.

COBIT *Control Objectives*, 3rd Edition, Information Systems Audit and Control Foundation (ISACF), July 2000.

User Access Administration

- **Common Control Concerns**
  - Informal, Decentralized or Fragmented Process
  - User Roles Not Formally Defined
  - Inadequate User Access Request Methods
    - Forms Are Too General
    - Requests and Approvals Not Be Documented
    - An Audit Trail Not Maintained
  - User Termination Notification Processes Not Effective
  - User Removal Processes Not Comprehensive
  - Periodic Reviews Not Performed

Identity Architecture

- **Identity Management**
  - Authoritative Source
  - Identity Repository (such as LDAP)
- **User Provisioning**
  - Providing Authorities to the Identities
- **Access Management**
  - Mechanism by which Users Gain Access to Provisioned Resources
  - Single / Reduced Sign-On
- **Role Based Access Control**
- **Protection of Identifiers**
  - Authentication Methods

"Identity Architecture", Steven J. Ross, *Information Systems Control Journal*, Volume 4, 2003.

Secure Systems Development

- **New systems are developed and implemented in accordance with security requirements.**
- **Systems modifications do not degrade security compliance.**
- **Written policies and procedures should define responsibilities and requirements relevant to systems development.**
- **Software Capability Maturity Model**
  - Based on the premise that the quality of a software product is a direct function of the quality of its associated software development and maintenance process.

    The CISSP Prep Guide, Ronald L. Krutz and Russell Dean Vines, Wiley Publishing Inc., 2003.
- **Security Organization and Internal Audit Participation**
  - Can be Consultative or Assessment / Compliance
  - Can Occur throughout the Life Cycle
    - Pre-, Go-Live and Post-Implementation

Technology Based Security Controls

- **Logical Access Security Levels**
  - Application
  - Database
  - Network
  - Operating System
- **Common Control Objectives**
  - Only authorized users are granted access.
  - Access is granted in accordance with assigned job responsibilities.
  - User access rights are restricted to enforce an adequate segregation of duties.
  - Advanced access rights and sensitive functions are appropriately restricted.
  - Security parameters including password controls help to ensure that access is restricted to only authorized personnel.
  - Information resources are protected (e.g. file and directory permissions).
  - Security events are logged and monitored.

Intrusion Detection / Prevention Systems

- **Intrusion Detection Systems (IDS)**
  - Signature Based Detection and Protocol and Behavior Anomaly Detection
  - Host-Based
    - Watches for processes inside the host and monitor log files and data for suspicious activity.
  - Network-Based
    - Examine characteristics of every packet that passes on the network.
  - Hybrid
- **Intrusion Prevention Systems (IPS)**
  - Take an active role in preventing or responding to an attack.
    - Drop the Traffic
    - Shun (Block Traffic from an Attacker's Host – can result in Denial of Service)
    - Terminate Process

"Intrusion Detection and Prevention: Security's One-Two Punch", Frank Huerta and Barry Cioe, and "The How and Why of Intrusion Detection and Prevention", Ray Stirbei, *The ISSA Journal*, August 2003.

Emergency Response

- **Identify Suspicious Activities or Security Breaches**
- **Manage New Security Threats**
  - Blaster Worm
- **NIST Special Publication 800-61, Computer Security Incident Handling Guide**
  - Organizing a computer security incident response capability
  - Establishing incident response policies and procedures
  - Structuring an incident response team
  - Handling incidents from initial preparation through the post-incident lessons learned phase

Remote Access and Third Parties

- **Remote Access Control Objectives**
  - Authorization, Authentication, Logging and Monitoring
  - Consider strong (2 Factor) authentication methods
  - Consider limiting access capabilities to only selected information resources
  - Ensure that controls are consistent for remote access
- **Third Party Access**
  - 100% of Third Parties with Direct Access should be known and documented
  - Written, signed contracts should establish security requirements
    - Unique User Ids for All Users
    - Appropriate Password Controls
    - Termination Notification and Removal Procedures
    - Limit Access to the Minimum Required (Principle of Least Privilege)
    - Design Controls to Monitor and Evaluate Third Party Activities

User Awareness and Training

- **Successful Security is Not a Technical Solution**
  - Users Must Be Aware of the Importance of Security
  - Users Must Understand their Responsibilities
  - It is a Cultural Challenge to View Security as a Business Enabler, Not an Inhibitor
  - Control Environment / Tone at the Top / Senior Management Attitude
- **Awareness and Training Life Cycle**
  - Design a Program
  - Provide Targeted Training
    - Users
    - IT
    - Security Personnel
    - Management
  - Raise and Maintain Awareness

Physical Security

- **Physical Access Is Restricted**
  - Buildings, Data Centers, Computer Rooms, Network and Telecommunications Equipment
  - Personal Computers and Laptops
- **Management Control Objectives**
  - Access Approval
  - Access Logging and Monitoring
  - Termination Notification and Removal Procedures
  - Periodic Review

Legal and Regulatory Compliance

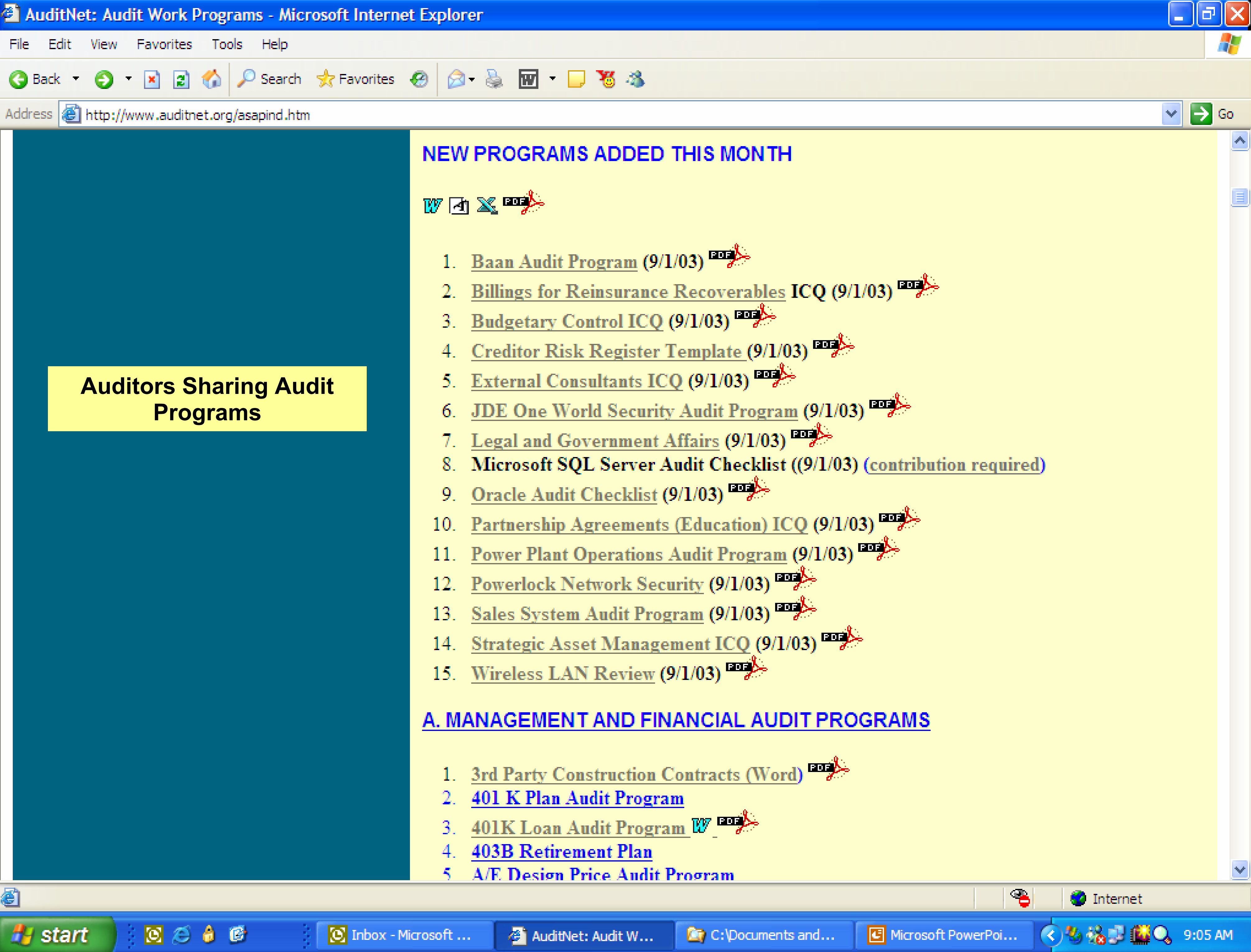
- **Legal and Regulatory Pressure is Increasing**
  - Sarbanes-Oxley
  - HIPAA Privacy Regulations and Security Rules
  - Gramm-Leach-Bliley Act
  - California Security Breach Information Act (S.B. 1386)
  - FDICIA Requirements

Risk Based Audit Approach

- **Perform an Entity Level Security Risk Assessment**
  - Company Objectives
  - Security Threats
  - Level of Vulnerability
  - Areas of Highest Risk
- **Develop and Execute a Risk-Based Audit Plan**
  - Areas Identified as High Risk
  - Areas of Emerging Risk
  - Areas with Known Control Weaknesses
  - Management Requests For Assistance
- **Continue to Monitor and Update the Risk Assessment**
  - Environmental and Organizational Changes

Audit Program Development

- **ISACF COBIT**
  (Control Objectives for Information and Related Technology)
  - Management Guidelines
  - Executive Summary
  - Framework
  - Audit Guidelines
  - Control Objectives
  - Implementation Tool Set
- **ISO/IEC 17799:2000 Information Technology – Code of Practice for Information Security Management**
- **FFEIC Information Technology Examination Handbook InfoBase**
- **HIPAA Privacy Regulations and Security Rules**



Auditors Sharing Audit Programs

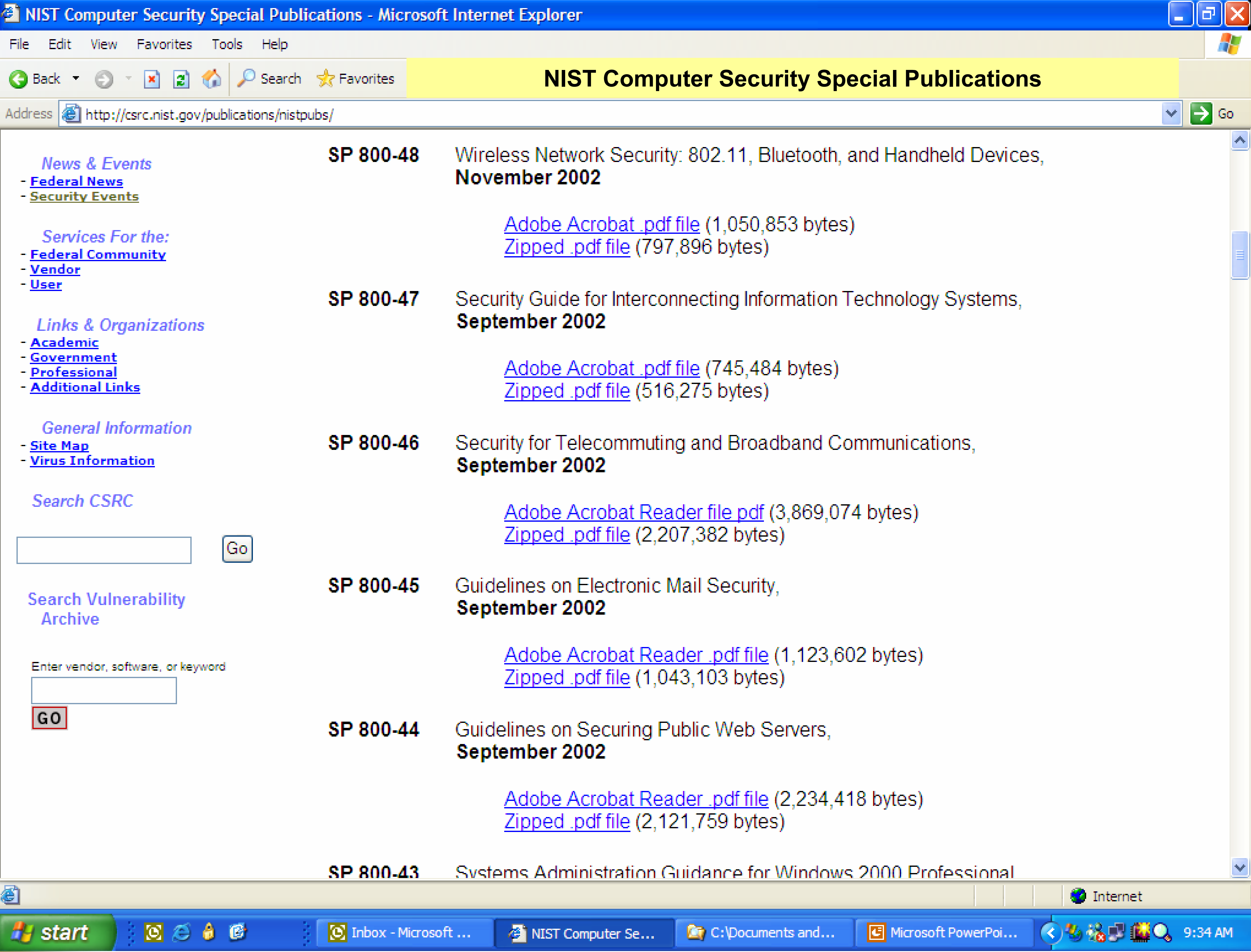
NEW PROGRAMS ADDED THIS MONTH

1. Baan Audit Program (9/1/03) PDF
2. Billings for Reinsurance Recoverables ICQ (9/1/03) PDF
3. Budgetary Control ICQ (9/1/03) PDF
4. Creditor Risk Register Template (9/1/03) PDF
5. External Consultants ICQ (9/1/03) PDF
6. JDE One World Security Audit Program (9/1/03) PDF
7. Legal and Government Affairs (9/1/03) PDF
8. Microsoft SQL Server Audit Checklist ((9/1/03) (contribution required)
9. Oracle Audit Checklist (9/1/03) PDF
10. Partnership Agreements (Education) ICQ (9/1/03) PDF
11. Power Plant Operations Audit Program (9/1/03) PDF
12. Powerlock Network Security (9/1/03) PDF
13. Sales System Audit Program (9/1/03) PDF
14. Strategic Asset Management ICQ (9/1/03) PDF
15. Wireless LAN Review (9/1/03) PDF

A. MANAGEMENT AND FINANCIAL AUDIT PROGRAMS

1. 3rd Party Construction Contracts (Word) PDF
2. 401 K Plan Audit Program
3. 401K Loan Audit Program W PDF
4. 403B Retirement Plan
5. A/E Design Price Audit Program

NIST Computer Security Special Publications



News & Events
- Federal News
- Security Events

Services For the:
- Federal Community
- Vendor
- User

Links & Organizations
- Academic
- Government
- Professional
- Additional Links

General Information
- Site Map
- Virus Information

Search CSRC

Go

Search Vulnerability Archive

Enter vendor, software, or keyword

GO

SP 800-48 Wireless Network Security: 802.11, Bluetooth, and Handheld Devices, **November 2002**

Adobe Acrobat .pdf file (1,050,853 bytes)
Zipped .pdf file (797,896 bytes)

SP 800-47 Security Guide for Interconnecting Information Technology Systems, **September 2002**

Adobe Acrobat .pdf file (745,484 bytes)
Zipped .pdf file (516,275 bytes)

SP 800-46 Security for Telecommuting and Broadband Communications, **September 2002**

Adobe Acrobat Reader file pdf (3,869,074 bytes)
Zipped .pdf file (2,207,382 bytes)

SP 800-45 Guidelines on Electronic Mail Security, **September 2002**

Adobe Acrobat Reader .pdf file (1,123,602 bytes)
Zipped .pdf file (1,043,103 bytes)

SP 800-44 Guidelines on Securing Public Web Servers, **September 2002**

Adobe Acrobat Reader .pdf file (2,234,418 bytes)
Zipped .pdf file (2,121,759 bytes)

SP 800-43 Systems Administration Guidance for Windows 2000 Professional

Third Party Security Specialists

- **Specialist Knowledge of Specific Technologies and Audit Techniques**
  - Applications, Databases, Networks, Operating Systems
  - Security Technologies Including Firewalls, IDS/IPS
  - Attack & Penetration Vulnerability Assessments
- **Use of Automated Assessment Tools**
  - Experience in Benefits and Risks
  - Software Licensing Considerations

Selected Resources

- Information Systems Audit and Control Association www.isaca.org
- IT Governance Institute www.ITgoverance.org
- SANS (SysAdmin, Audit, Network, Security) Institute www.sans.org
- International Information Systems Security Certification Consortium, Inc. www.isc2.org
- Auditors Sharing Audit Programs www.auditnet.org
- MIS Training Institute www.misti.com
- NIST (National Institute of Standards and Technology) Computer Security Resource Center csrc.nist.gov
- Federal Financial Institutions Examination Council's (FFIEC) www.ffiec.gov
- International Organization for Standardization www.iso.org
- HIPAA Final Privacy Rules www.access.gpo.gov/su_docs/fedreg/a001228c.html
- The CISSP Prep Guide, Ronald L. Krutz and Russell Dean Vines, Wiley Publishing Inc., 2003.

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