Building More Secure Information Systems

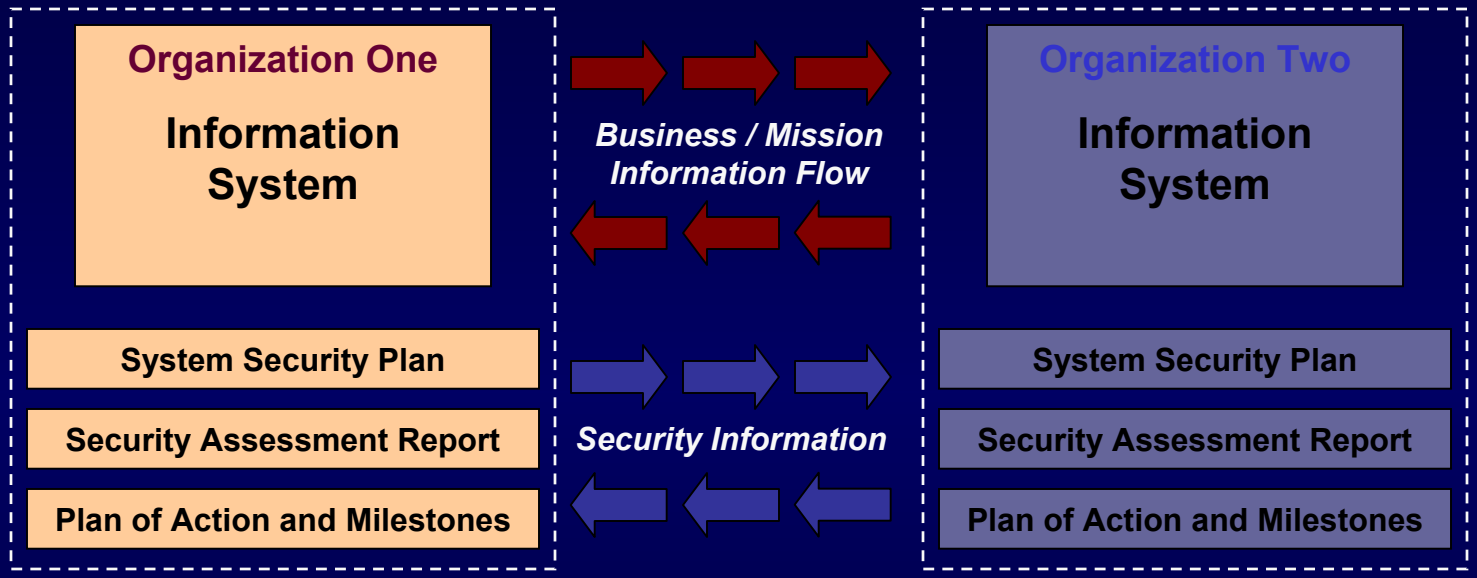
A Strategy for Effectively Managing Enterprise Risk

Dr. Ron Ross

Computer Security Division
Information Technology Laboratory

Why Standardization?

Security Visibility Among Business/Mission Partners



Determining the risk to the first organization's operations and assets and the acceptability of such risk

Determining the risk to the second organization's operations and assets and the acceptability of such risk

The objective is to achieve *visibility* into prospective business/mission partners information security programs BEFORE critical/sensitive communications begin…establishing levels of security due diligence.

Information Security Program

Links in the Security Chain: Management, Operational, and Technical Controls

- ✓ Risk assessment
- ✓ Security planning
- ✓ Security policies and procedures
- ✓ Contingency planning
- ✓ Incident response planning
- ✓ Security awareness and training
- ✓ Physical security
- ✓ Personnel security
- ✓ Certification, accreditation, and security assessments
- ✓ Access control mechanisms
- ✓ Identification & authentication mechanisms (Biometrics, tokens, passwords)
- ✓ Audit mechanisms
- ✓ Encryption mechanisms
- ✓ Firewalls and network security mechanisms
- ✓ Intrusion detection systems
- ✓ Security configuration settings
- ✓ Anti-viral software
- ✓ Smart cards

Adversaries attack the weakest link…where is yours?

Managing Enterprise Risk

- Key activities in managing enterprise-level risk—risk resulting from the operation of an information system:
  - ✓ **Categorize** the information system
  - ✓ **Select** set of minimum (baseline) security controls
  - ✓ **Refine** the security control set based on risk assessment
  - ✓ **Document** security controls in system security plan
  - ✓ **Implement** the security controls in the information system
  - ✓ **Assess** the security controls
  - ✓ **Determine** agency-level risk and risk acceptability
  - ✓ **Authorize** information system operation
  - ✓ **Monitor** security controls on a continuous basis

Managing Enterprise Risk

The Framework

Starting Point

FIPS 199 / SP 800-60

Security Categorization

Defines category of information system according to potential impact of loss

SP 800-53 / FIPS 200

Security Control Selection

Selects minimum security controls (i.e., safeguards and countermeasures) planned or in place to protect the information system

SP 800-37

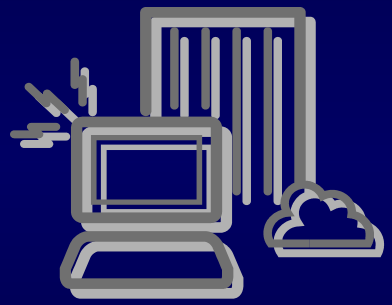
Security Control Monitoring

Continuously tracks changes to the information system that may affect security controls and assesses control effectiveness

SP 800-53 / FIPS 200 / SP 800-30

Security Control Refinement

Uses risk assessment to adjust minimum control set based on local conditions, required threat coverage, and specific agency requirements



SP 800-37

System Authorization

Determines risk to agency operations, agency assets, or individuals and, if acceptable, authorizes information system processing

SP 800-18

Security Control Documentation

In system security plan, provides a an overview of the security requirements for the information system and documents the security controls planned or in place

SP 800-70

Security Control Implementation

Implements security controls in new or legacy information systems; implements security configuration checklists

SP 800-53A / SP 800-37

Security Control Assessment

Determines extent to which the security controls are implemented correctly, operating as intended, and producing desired outcome with respect to meeting security requirements

The Golden Rules

Building an Effective Enterprise Information Security Program

- Develop an enterprise-wide information security strategy and game plan
- Get corporate "buy in" for the enterprise information security program—effective programs start at the top
- Build information security into the infrastructure of the enterprise
- Establish level of "due diligence" for information security
- Focus initially on mission/business case impacts—bring in threat information only when specific and credible

The Golden Rules

Building an Effective Enterprise Information Security Program

- Create a balanced information security program with management, operational, and technical security controls
- Employ a solid foundation of security controls first, then build on that foundation guided by an assessment of risk
- Avoid complicated and expensive risk assessments that rely on flawed assumptions or unverifiable data
- Harden the target; place multiple barriers between the adversary and enterprise information systems
- Be a good consumer—beware of vendors trying to sell "single point solutions" for enterprise security problems

The Golden Rules

Building an Effective Enterprise Information Security Program

- Don't be overwhelmed with the enormity or complexity of the information security problem—take one step at a time and build on small successes
- Don't tolerate indifference to enterprise information security problems

And finally…

- Manage enterprise risk—don't try to avoid it!

NIST Guidance on HIPAA

- Special Publication 800-66
  An Introductory Resource Guide for Implementing the Health Insurance Portability and Accountability Act (HIPAA) Security Rule
- Initial Public Draft, May 2004

FISMA Implementation Project

Standards and Guidelines

- FIPS Publication 199 (Security Categorization)
- NIST Special Publication 800-37 (Certification & Accreditation)
- NIST Special Publication 800-53 (Recommended Security Controls)
- NIST Special Publication 800-53A (Security Control Assessment)
- NIST Special Publication 800-59 (National Security Systems)
- NIST Special Publication 800-60 (Security Category Mapping)
- FIPS Publication 200 (Minimum Security Controls)

Contact Information

100 Bureau Drive Mailstop 8930
Gaithersburg, MD USA 20899-8930

Project Leader

Dr. Ron Ross
(301) 975-5390
ron.ross@nist.gov

Administrative Support

Peggy Himes
(301) 975-2489
peggy.himes@nist.gov

Senior Information Security Researchers and Technical Support

Marianne Swanson
(301) 975-3293
marianne.swanson@nist.gov

Dr. Stu Katzke
(301) 975-4768
skatzke@nist.gov

Pat Toth
(301) 975-5140
patricia.toth@nist.gov

Arnold Johnson
(301) 975-3247
arnold.johnson@nist.gov

Curt Barker
(301) 975-4768
wbarker@nist.gov

Information and Feedback
Web: csrc.nist.gov/sec-cert
Comments: sec-cert@nist.gov