Focus on Resiliency: A Process Improvement Approach to Security

Introducing the Resiliency Engineering Framework

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Focus on Resiliency: A Process Improvement Approach to Security Introducing the Resiliency Engineering Framework

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Software Engineering Institute

Established in 1984
Federally Funded Research and Development Center (FFRDC)
College-level unit of Carnegie Mellon University
Includes five technical programs aimed at helping defense, government, industry, and academic organizations to continually improve software-intensive systems

Widely-known “brands”

- CERT Coordination Center
- Capability Maturity Model Integration (CMMI)
Agenda

An evolving view of security
Operational resiliency
Embracing a process view
Introducing the Resiliency Engineering Framework
Summary and questions
A new operational environment -1

No operational boundaries
Pervasiveness of technology
Expanding and rapidly changing risk profile
High dependency on upstream partners
Successes are short-lived
Skills have shorter longevity
Less resources, more demands
A new operational environment -2

Increasing regulatory requirements
Criticality of data and information
Distributed workforce
Heightened threat level and increasing uncertainty
Insurance costs

Poses a new environment in which security must be effective and efficient
The problem with security management

- Poorly planned and executed function
- Business units not involved
- Usually bolted on as an afterthought
- Security seen as technical problem
- Searching for magic bullet: CobiT, ITIL, ISO17799
- Poorly defined and measured goals
- Funding model reactive, not strategic
- Not connected to continuity of operations planning
Organizational impact

False sense of accomplishment
Misalignment of operational and security goals
Reinforcement of silos
Less-than-resilient assets, processes, services
Misalignment with business objectives
Wasted human and financial resources
Compliance at the expense of effectiveness
Failure to manage operational risk
An evolving view of security -1

Security is an operational risk management activity

Security has two purposes:

• Prevent disruption to core business drivers
• Sustain the survivability of the organization’s mission

Security is not an end, but a means to achieving higher organizational goals
An evolving view of security -2
Operational risk and resiliency

Operational risk is the risk that results from

• Failed internal processes
• Inadvertent or deliberate actions of people
• Problems with systems and technology
• External events

Operational resiliency is the organization’s ability to sustain the mission in the face of these risks
Operational resiliency is an emergent property

Operational resiliency depends on effective management of core ORM activities

Security is one….

…but so are Business Continuity and IT Operations Management

Operational resiliency *emerges* from how well these activities are coordinated and executed toward a common goal
Security and operational resiliency

Focus on keeping critical assets safe from harm

Limiting threats and managing impacts

Manage confidentiality, integrity, and availability

Manage “condition”
Business continuity and operational resiliency

Limit unwanted effects of realized risk

Ensure availability and recoverability

Manage “consequence”
IT Operations Management and operational resiliency

Limit vulnerabilities and threats that originate in the technical infrastructure

Ensure availability and recoverability of technology
Collaborating toward a common goal
Operational resiliency in practice

...relies upon the actions of

People

...requires and creates

Information

...is supported by

Technology

...is performed in

Facilities
An emerging holistic view

Organization is dependent on the productivity of four assets:

- People
- Information
- Technology
- Facilities

Each asset must be protected and sustainable
A holistic risk perspective
Collaborating toward a common goal

Resiliency means managing the conditions and consequences of risk balanced against business drivers and costs.
A mission focus

Resiliency Engineering Framework
How does an organization achieve this?

Organizations are not structured today to facilitate collaboration toward a common goal of resiliency

- Deficient funding models
- Management direction and oversight lacking
- Practice-driven
- Compliance-focused

Need to view resiliency as a definable, manageable, enterprise-wide process
Embracing a Process View of Security and Operational Resiliency
Defining a process approach

Elevating the management and coordination of operational-resiliency focused activities to the enterprise level

- Shared goals and resources
- Elimination of redundancy and stovepipes
- Elimination of framework quagmire through practice integration
- Measuring process effectiveness
- Moving toward process improvement
How does process differ from practice?

<table>
<thead>
<tr>
<th>Process</th>
<th>Practice</th>
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<tbody>
<tr>
<td>- <em>Describes</em> the “what”</td>
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<td>- Set and achieve process goals</td>
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<td>- Manage process to requirements</td>
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<td>- Select practices based on process goals</td>
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<tr>
<td>- Can be defined, communicated, measured, and controlled</td>
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<tr>
<td>- <em>Prescribes</em> the “how”</td>
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<td>- No practice goals</td>
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<td>- Tends toward “set and forget” mentality</td>
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<td>- Reinforces domain-driven approach</td>
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<td>- One size does not fit all</td>
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<td>- Regulatory vehicle</td>
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</table>
The lure of best practices -1

Best practices are

- effective ways to approach improvement in a critical organizational activity, like security

Best practices ARE NOT

- a substitute for an actively planned and managed process
The lure of best practices -2

Best practices . . .

- Are often industry or discipline-specific
- Change/evolve frequently
- Don’t have process improvement or management aspects built-in
- Don’t provide long-term, sustainable success
- Can reinforce stove-piping and silos
- People still must implement and manage them
- Can create a management quagmire
The relationship between process and practice
Embracing process improvement

Improvement in meeting resiliency goals is dependent on the active management of the process.

Process maturity increases capability for meeting goals and sustaining the process.

“Are we resilient?” or “Are we secure?” is answered in the context of goal achievement rather than what hasn’t happened.

Facilitates meaningful, purposeful selection and implementation of practices.
How mature are your processes?

Most organizations have some process (implicit or explicit) for resiliency engineering, but it may not be effective for meeting goals.

Thanks to www.betterproductdesign.net/maturity.htm for the generic categories.
Lack of process

No process defined or performed

Anarchy and heroics

No awareness of benefits of process-orientation

AD-HOC

Common attributes:

- Focus on events
- Ambiguous lines of responsibility
- Funding sporadic
- No alignment to strategic drivers
- Highly dependent on people
- No governance structure
Partial process

Process recognized

Still functionally focused (not enterprise-wide)

Not repeatable or actively managed

VULNERABILITY-DRIVEN

Common attributes:

- Focus on vulnerabilities
- Responsibility emanates from IT
- Considered an expense or burden
- Awareness of strategic drivers
- Still dependent on people and vul catalogs
- Informal governance
Formal process

Performed and managed

Repeatable

Spans enterprise

Not completely ingrained in culture

RISK-DRIVEN

Common attributes:

- Focus on critical assets
- Responsibility of key organizational managers and IT
- Funded as an expense
- Implicit alignment to strategic drivers
- Dependent on localized risk management
- Informal governance, possibly CRM
Cultural

**Performed and managed**
- Repeatable and proactive
- Spans and involves enterprise
- Process continually measured and improving
- Fundamental to organizational success

**ENTERPRISE-DRIVEN**

**Common attributes:**
- Focus on critical assets, processes, strategic drivers
- Responsibility of high-level executive
- Capitalized
- Explicit alignment to strategic drivers
- Reliant upon enterprise capabilities
- Formal governance and feedback
Increasing levels of competency

- No Process
- Event-driven
- Planned
- Actively managed and controlled
- Cultural
- Formal Process
- Partial Process
Maturity from a security perspective

- Technical problem
- Owned by IT
- Expense-driven
- Practice-centric
- Security and survivability

- Business problem
- Owned by organization
- Investment-driven
- Process-centric
- Enterprise resiliency
Toward continuous improvement

- Systematic and Adaptive
- Actively managed and controlled
- Planned
- Formal Process
- Partial Process
- Cultural
- Event-driven
- No Process
- Irregular and Reactive
- Tactical
- Strategic
Introducing the Resiliency Engineering Framework
What is resiliency engineering?

The process by which an organization establishes, develops, implements, and manages the operational resiliency of services, related business processes, and associated assets

“Requirements-driven security and business continuity”

“Building resiliency into assets/processes/services and managing to an appropriate level of adequacy”
The Resiliency Engineering Framework

A framework of practice for integration of security and business continuity activities toward achievement of operational resiliency

Defines basic process areas and provides guidelines for security and BC/DR process improvement

Captures vital linkages between security, BC/DR, and I/T ops in the process definition

Addresses operational risk management through process management

Establishes a capability benchmark
Project history and evolution
Development history

OCTAVE development and fieldwork
Affinity analysis of 750 practices
Identification of capabilities
Identification of processes
Development of process goals and practices
Exploration of maturity concepts
Exploration of assessment methodologies
Framework architecture

Represents processes that span four basic areas:

- Enterprise management
- Engineering
- Operations management
- Process management

Considers the resiliency of people, information, technology, and facilities in the context of services and business objectives
Enterprise management processes

Enterprise capabilities that are essential to supporting the resiliency engineering process

- RSKM – Risk Management
- EF – Enterprise Focus
- COMP – Compliance Management
- FRM – Financial Resource Management
- HRM – Human Resource Management
Operations management processes

Capabilities focused on sustaining an adequate level of operational resiliency

**SAM** – Supplier Agreement Management

**SRM** – Supplier Relationship Management

**AMC** – Access Management and Control

**IMC** – Incident Management and Control

**VM** – Vulnerability Management

**EC** – Environmental Control

**KIM** – Knowledge and Information Management

**SOM** – Security Operations Management

**ITOPS** – IT Operations Management
Engineering processes

Capabilities focused on establishing and implementing resiliency for organizational assets, business processes, and services

RD – Requirements Definition
RM – Requirements Management
AM – Asset Management
COOP – Continuity of Operations Planning
CSI – Control Selection and Implementation
RAD – Resilient Architecture Development
Process management processes

*Enterprise capabilities related to defining, planning, deploying, implementing, monitoring, controlling, appraising, measuring, and improving processes*

- **OT** – Organizational Training
- **OPF** – Organizational Process Focus
- **OPD** – Organizational Process Definition
- **MA** – Measurement and Analysis
- **MON** – Monitoring
Using the framework

- Establish current level of capability
- Set forward-looking resiliency goals and targets
- Develop plans to close identified gaps
- Build resiliency into important assets/processes/services and architectures
- Reduce reactionary activities; shift to directing and controlling activities
- Align common practices with processes to achieve process goals
Collaborating with industry

Eighteen month collaboration with Financial Services Technology Consortium

Identify mature practices in mature industries: banking and financial services

Two phases of work—capability identification and process definition
Financial Services Technology Consortium

Established in 1993

Member-owned consortium for collaboration between financial services-focused organization

Explore new technologies and methodologies to address today’s business requirements

Projects:

• Technology Review
• Compliance
• Business Continuity Maturity Model
FSTC Project Members

Ameriprise  
Bank of America  
Carnegie Mellon  
Capital Group  
Citicorp  
Discover  
DRII  
DRJ  
IBM  
JPMorgan Chase  
Key Bank  
KPMG  
MasterCard  
Marshall and Ilsley  
NY Federal Reserve Bank  
SunGard  
Trizec Properties  
US Bank  
Wachovia
Where do we go from here?

Release REF v0.9 in October 2006 for comments
Establish guidelines for improving the security and business continuity processes
Phase III expansion of model development and piloting
Exploration of integration with other existing models
Development of appraisal methodology to measure capability for managing resiliency
Summary and questions

Operational resiliency must be actively managed
Security, BC/DR, and IT Ops must collaborate
Model-based process improvement brings defined, systematic, repeatable, consistent, and improvable processes
Approach must be flexible and adaptable
No one-size-fits-all solution
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