Deloitte.

Changing Landscape of Application Security

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Recent Media Headlines

Japan's defense industry hit by its first cyber attack

- The Reuters September 19 2011

Lockheed Martin , a major defense contractor to the US government, hit by Security Breach
- Wall Street Journal May 28 2011

Twitter, Facebook Sites Disrupted by Web Attack
- Wall Street Journal Aug 07 2009

Digital Fears Emerge After Data Siege in Estonia
- The New York Times May 29 2007

Pentagon reveals 24,000 files stolen:
- Toronto Star July 15 2011

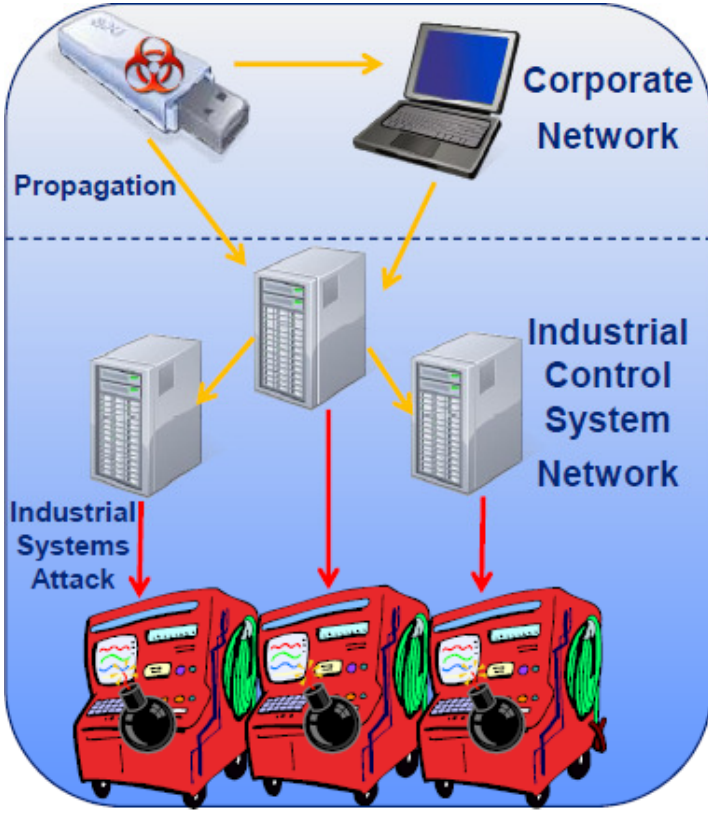
Sony PlayStation Network Down After Attack
- The New York Times April 25 2011

Google uncovers hacking of personal e-mail accounts of top-notch American officials, military personnel and journalists.
- Daily Telegraph June 06 2011

Iran Fights Malware Attacking Computers
- The New York Times September 26 2010

Stuxnet Virus

In 2010, a security firm based discovered a highly sophisticated computer worm that was specifically conceived to target Industrial Control Systems (ICS), also known as 'SCADA'. The worm has been confirmed to exist at least one year prior.

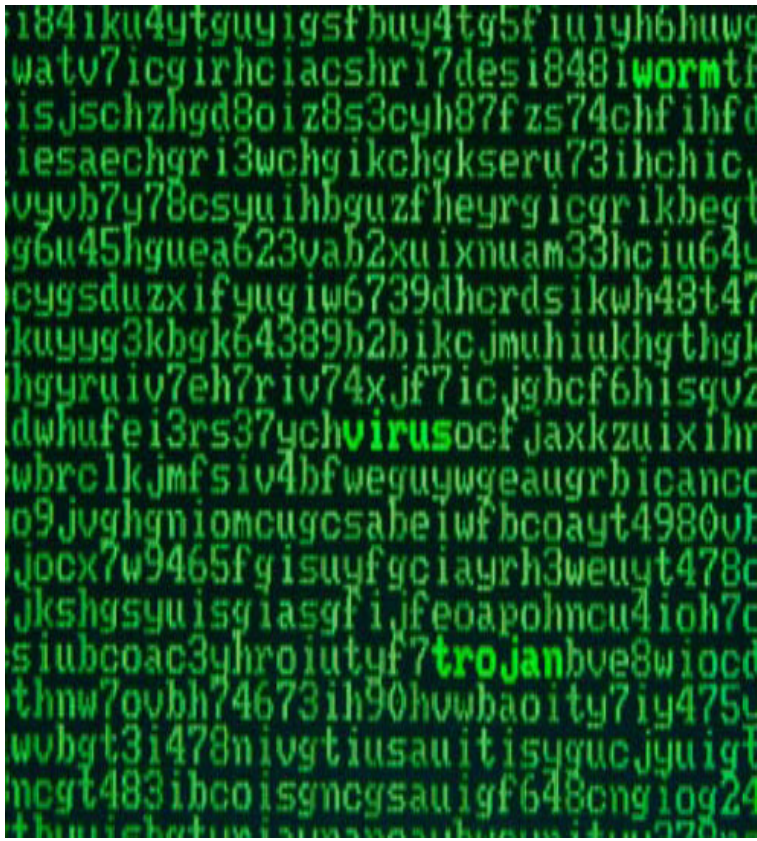


What went wrong

- Took advantage of four zero-day vulnerabilities not solved by software vendors and utilized a Zero-day USB key autorun
- Exhibited rootkit components to hide from Antivirus software or malware detectors
- Leverages stolen digital certificates
- Exploited in-depth knowledge of SCADA fundamentals that resulted in being able to forge PLC control messages
- Affected primarily two nuclear facilities in Iran; however, a recent report from Symantec stated that there were about 62,000 infected machines world wide.

Sony Network: 77 million records hacked

In April 2011, hackers targeted Sony PlayStation Network bringing down the entire network for over a week and compromising o77 million records



What went wrong

- Disguised as a purchase, to prevent being flagged by network security systems.
- Exploited a known vulnerability in the application server to planted software that was used to access the database servers behind the firewalls
- Compromised 77 million users of the network and over 10 million credit card records
- Sony later confirmed that credit card records were partially encrypted, however, all other personal information fields were left unprotected.

Mitsubishi Heavy

On September 20th, Mitsubishi Heavy Industries Ltd., Japan's biggest defense contractor announced that hackers had gained access to its computers.

What went wrong

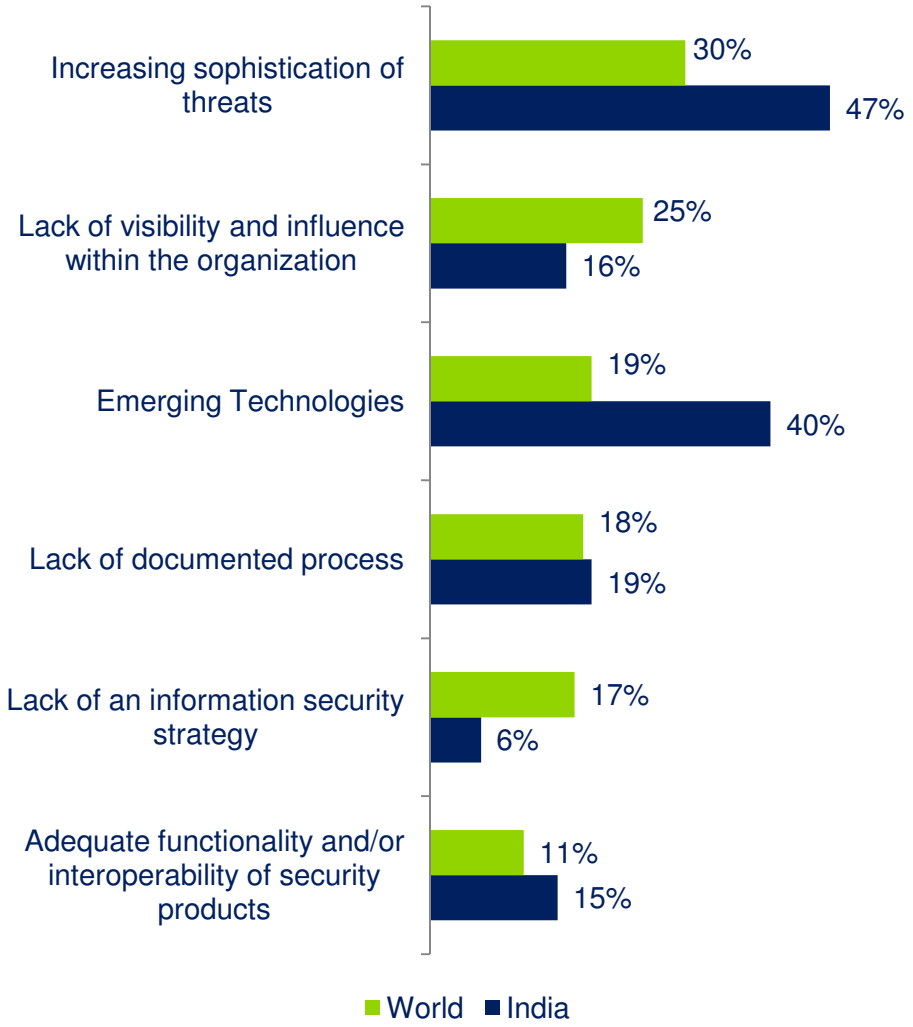
- Used at least 8 different kinds of computer viruses
- Affected 83 computers and servers at 11 locations, including its head office, factories, and R&D centers, were accessed
- Attacked the records in August 2011, Mitsubishi realized the extent of impact just a couple of days back
- Made connections to 14 overseas sites, including at least 20 servers in China, Hong Kong, the United States and India
- This cyber attack took place within a month after Japan's defense ministry urged greater protection against cyber crimes.

The Changing Threat Landscape

The cybercrime landscape has evolved into a set of highly specialized criminal products and services that are able to target specific organisations using a sophisticated set of malware exploits and anonymisation systems which routinely evade present-day security controls.

Deloitte's Global Security Survey

Major Barriers for an Organization



Top Security Initiatives

Changing Landscape in Application Security

Increasing business reliance on applications…

Increasing number of applications managing confidential information. These applications are the front door to valuable data, data that can be monetized quickly.

Highly distributed and component based…

IT Infrastructure are increasingly distributed, coupled and complex. Emerging technologies and methodologies for organization and description are posing new security threats from the assimilation of information.

Perimeter of the organisation is ever expanding….

Emerging definition of 'trusted users' not only includes users, but also includes external sources such as partners, data providers, third party development/service providers, and support organizations.

Increasing agile, highly integrated functional-specific applications . . .

Organisations are employing holistic integration strategies to provide seamless experience to the users as well as reduce the TCO for managing the environment. An integrated application security approach is essential to avoid high cost of source cause analysis and remediation

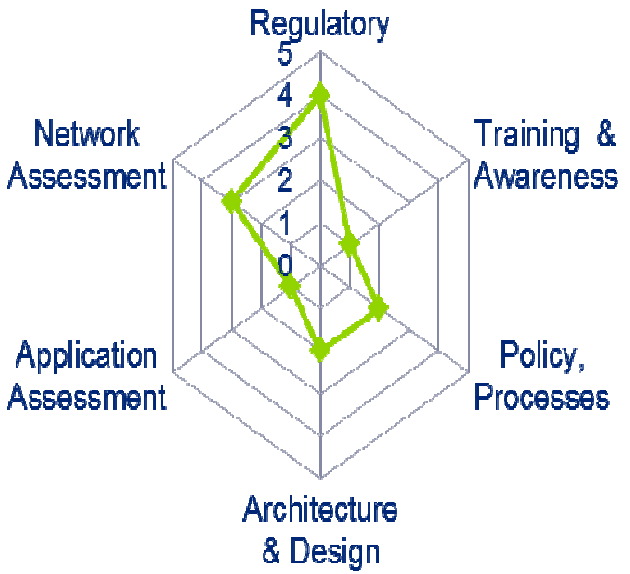
All this and the old issues and challenges still apply…

Applications continue to roll into production with vulnerabilities, many organizations have a backlog of identified vulnerabilities, technology change over time and new vulnerabilities are introduced, newer attacks can bypass traditional security defenses, etc.

Customer Requirements, C ompliance Requirements

Customers and other regulatory bodies requires the compliance to their requirements to be demonstrated. Any violation would lead to penalties, reputation damage, penalties and fines.

Where do organizations typically stand? *



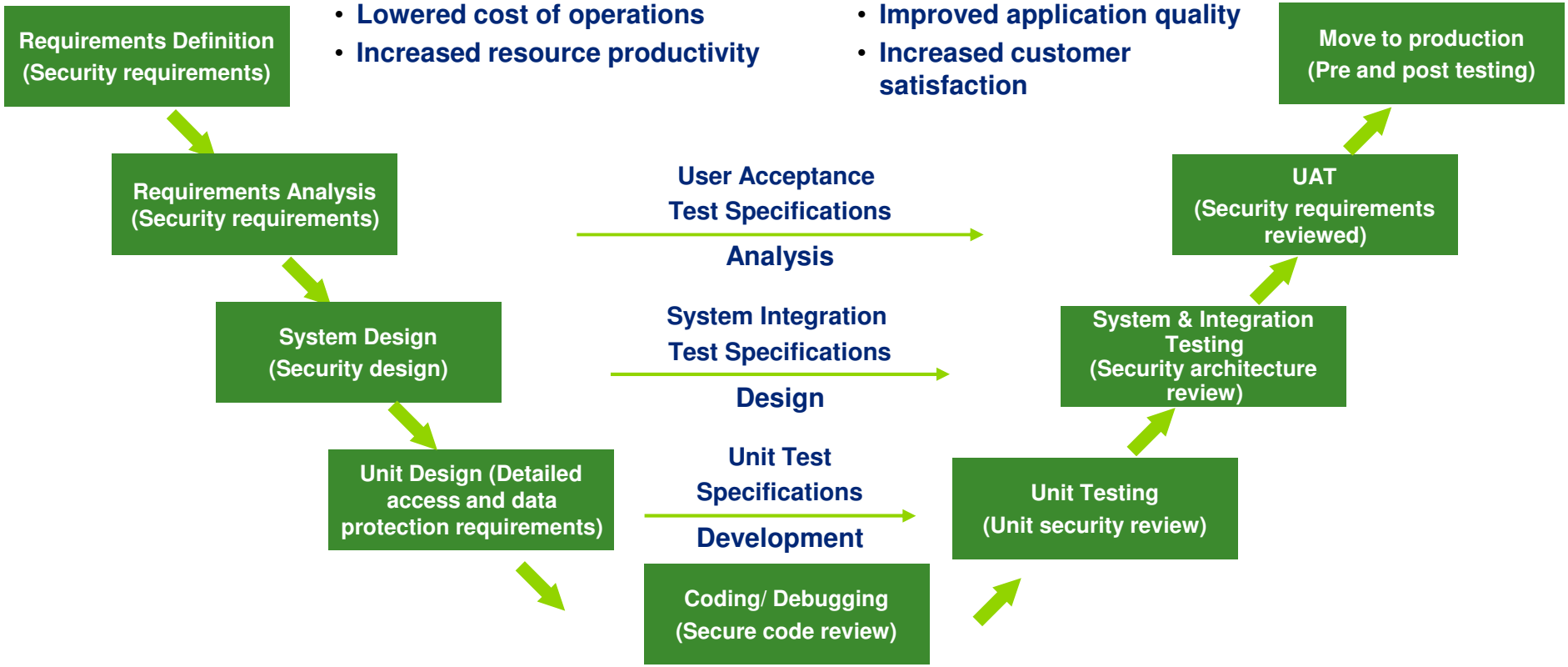
* Based on the study carried out by Deloitte across Organisations and Industries

Core Principles

Integration of security activities throughout the standard systems / application development process enables *timely, risk-based identification and remediation of security vulnerabilities throughout the lifecycle*.

When security is built into the SDLC, results will be…

- Lowered cost of operations
- Increased resource productivity
- Improved application quality
- Increased customer satisfaction



Key Security Components

Key System Development Lifecycle (SDL) components integrated into an organization's standard SDLC processes enable the organization to understand application risk posture while also identifying and mitigating risks.

Governance

Provides business drivers, project alignment, project demand, prioritization, review, approval, communication plan, stakeholder involvement and KPI.

Secure coding & Security guidelines	Security architecture review	Secure code review	Vulnerability testing
Provides technology specific guidelines to assist the application development team	Security architecture review focuses on indentifying weakness in the design, implementation and security controls	Secure code review focuses on identifying insecure coding techniques and vulnerabilities	Consists of a controlled security test of the IT system & application environment to identify potential external exposures (including web services, etc.)

Risk assessments and remediation

Assessment of risks and implementing remediation solutions is an integral part of an SDL

Metrics and reporting

Essential reporting requirements include developing metrics and reporting capabilities for key risk/performance indicators and measuring program effectiveness and maturity

Solution for Secure Enterprises

Focus on Governance, People, Process & Technology for Securing Enterprises

Methodology					
	Planning	**Design**	**Development**	**Testing**	**Sustain**
Current state analysis	Criticality assessment	Threat modeling	Potential threat scenarios	Penetration testing	Security development process assessment
	Software development process analysis	Access control analysis	Source code assessment	Functional security testing	
	Risk assessment process analysis	Cost benefit evaluation criteria	Impact assessment	Impact assessment	
Definition	Security standards definition	Potential threat scenarios	Security risk mitigation plan	Security risk mitigation plan	Risk assessment integration strategy
	Security goals definition	Potential impact definition	Integrated testing guidelines		Periodic security assessment activities
	Data classification guidelines	Mitigation guidelines	Training & Awareness		Functional constraints definition
	Security staffing plan	Security test plan definition			Ongoing Training & Awareness
Conformance evaluation	Approvals conformation	Mitigation security controls evaluation	Mitigated system / source Code security evaluation	Mitigated security component evaluation	Functional constraints validation
					Periodic security assessments & Validation
Report	Security requirements traceability matrix	Security risk assessment matrix	Security risk assessment matrix	Security risk assessment matrix	Residual risk report
		Security test plan	Security issues tracking matrix	Security issues tracking matrix	Security Dashboard
Governance	**Quality Assurance** **Change Management & Training**				

Secure Enterprise Implementation Approaches

Understanding the pros and cons of for the various implementation options is critical when devising your Secure Enterprise implementation strategy.

	Replace	Overlay	Modular
Definition	Replaces the existing security processes completely	Adds processes, people, and technology on top of the existing security processes	Targeted modifications to an organization's security processes that are rolled out over time
Advantages	• Can be done quickly • Includes all aspects to secure the organisation • Clean break from previous security processes	• Can be done quickly • Includes various aspects of secure enterprise approach • Can be rolled out over time	• Tailored to organization's existing requirements for safeguarding organisations • Prioritizes changes • Can be rolled out over time • Minimal disruption
Disadvantages	• Can be very disruptive • Can be expensive • May require extensive help from third party • May not align with organization's culture	• Can be disruptive • May not address root causes • Can be expensive	• Can take a long time to fully implement • Can be expensive

Key Success Factors

Governance

- Assign responsibilities and identify players
- Streamline conflicting and overlapping regulations and standards
- Leverage required regulations to improve business process
- Requires identifying and mapping operational, financial, and regulatory risks

People

- Appropriate application security awareness training across the organization
- Independent self assessment procedures at various system development and maintenance check points
- Effective mechanism for communication and escalation of security issues
- Periodic physical space review procedures enabling discovery of potential information leakage
- Procedures to avoid single point of failures (talent and program management)

Process

- Integrates suitably to the organization's risk management program
- Provides impact analysis and risk measuring procedures for software security vulnerabilities
- Provides procedural enhancements for organizations to react adequately to the emerging internal and external threats
- Lifecycle driven approach for consolidating and tracking of vulnerabilities in new, proposed, and implemented technology and software solutions
- Requires and enables development of a mitigation plans

Technology

- Leverage appropriate toolkits, technologies and methodologies for security assessments on design, source code, and software components
- Vulnerability assessments customizable to organization's changing technology landscape
- Capable of both automated and manual security assessments in executing black-box, gray-box, and white-box approaches
- Includes threat & vulnerability information gathering mechanism pertaining to software developing technologies
- Vulnerability tracking and mitigation strategies reporting follow a well defined, consistent, and broad approach

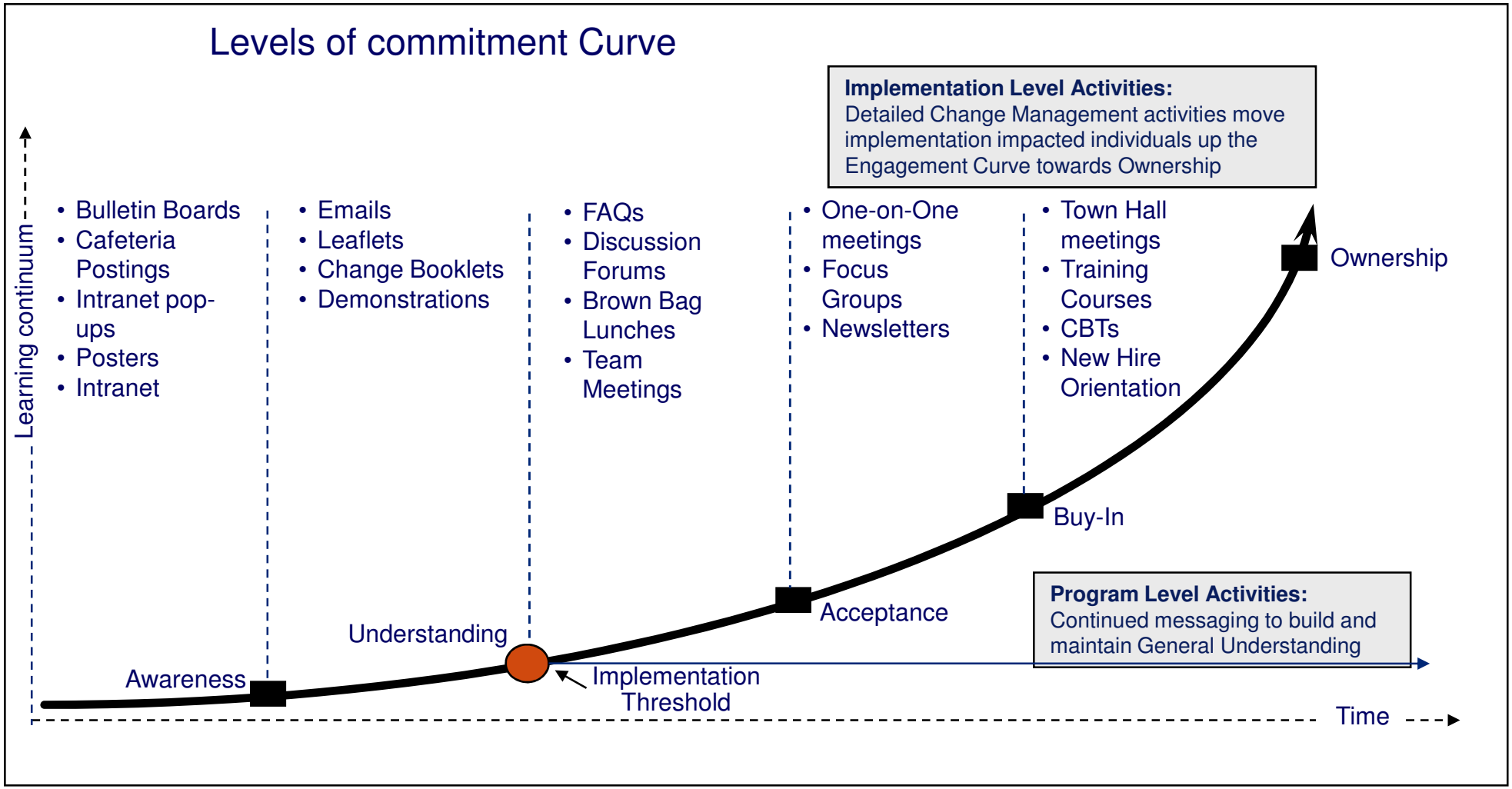
People- Training and Awareness

People progress through the levels of learning curve must be continuously supported through the following:

Change Management	Communication plan	Role-specific training
• People Risk & Impact Management • Stakeholder and Leadership Engagement • Communication • Learning • Tools and Training • Capability Transfer	• Communication Plan for the employees, division, and enterprise • Provide focused messages on specific objectives, such as creating awareness, • Deliver messages through various media channels	• Tailored made training program to meet the needs of specific roles • Identify objectives • Propose delivery models • Develop content • Seek feedback and enhance delivery model • Provide support

People- Learning Continuum

The communication around Security Awareness is designed to support employees with appropriate messages and move key stakeholders through the “Stages of Commitment”.



People- Training and Awareness

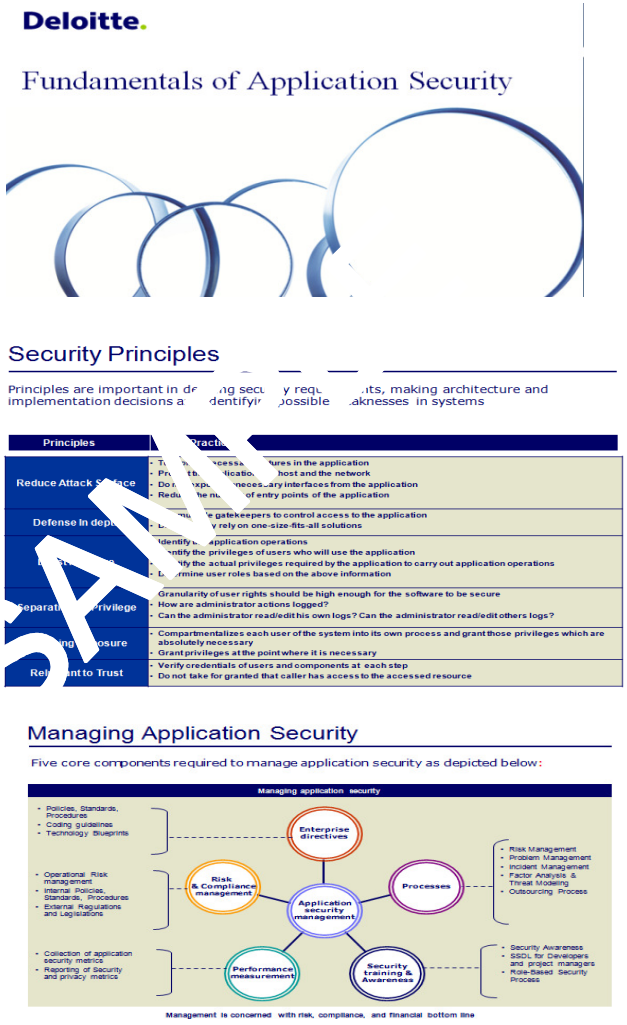
Develop Training Content

Develop customized training content for the target audience identified by the client.

Slide 1

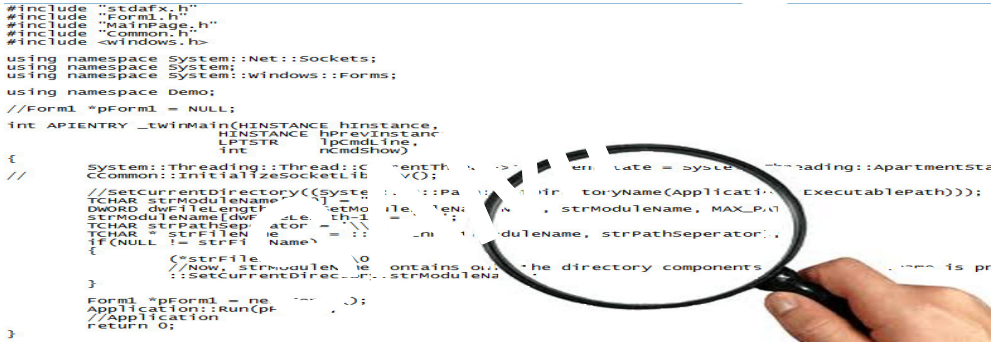
Slide X

Slide Y



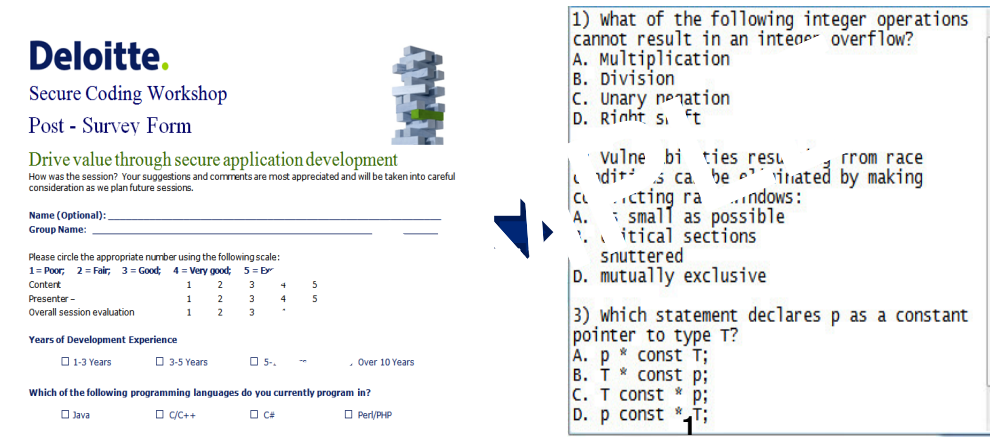
Develop Demos

Practical demo based on common attack scenarios caused due to insecure coding.



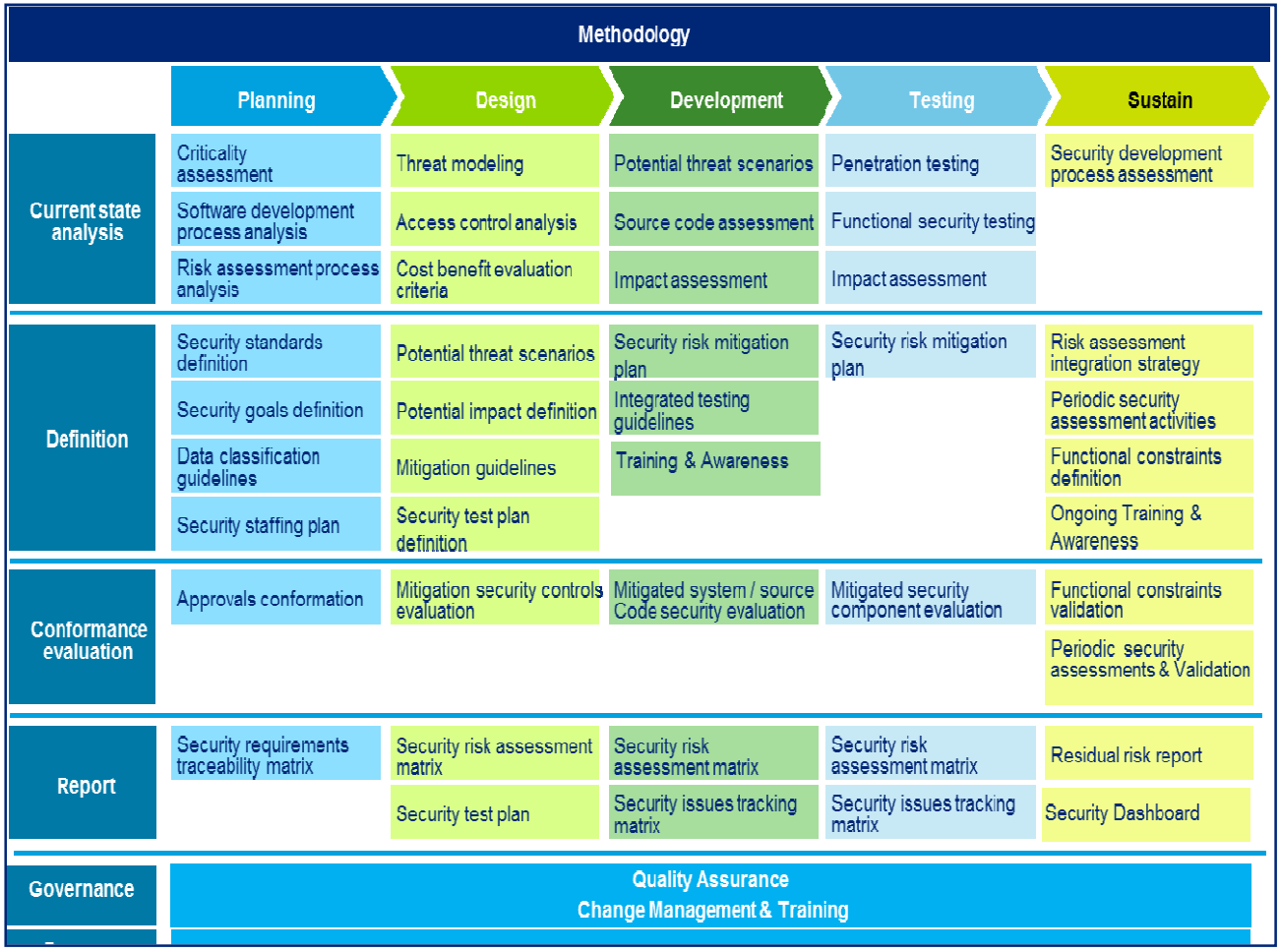
Develop Quizzes

Develop quiz to assess the understanding of target audience.



Process- Develop policies and processes

Developing policies and processes will help enable an overall secure enterprise by providing structured approach and clearer objectives to all the stakeholders



- Formulate organization policies
- Define business processes
- Design process flows
- Establish roles and responsibilities
- Identify applicable regulatory standards and industry benchmarks
- Establish guidelines
- Provide a checklist

Process- Develop policies and processes

Identify Areas to Focus Upon

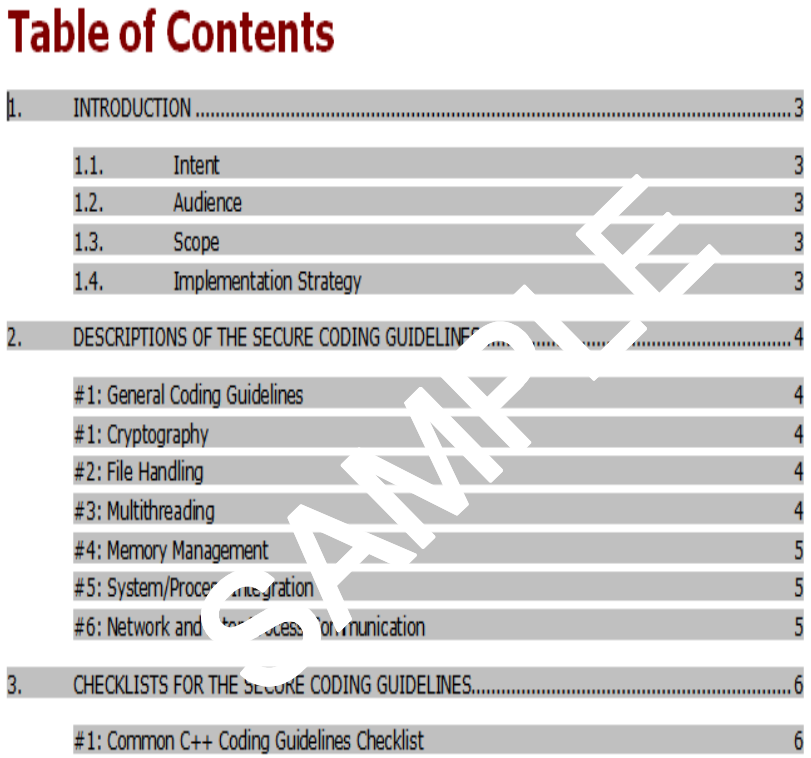
Identify different application security areas to focus upon to deal with common programming errors of the programming lang.

#1: Input/output Validation
#2: Authentication
#3: Logging (Error and Exception Management)
#4: Cryptography
#5: File Handling
#6: Multithreading
#7: Memory Management
#8: System/Process Integration
#9: Network and Inter Process Communication
#10: Interrupts and Signals
#11: Secure Development Processes

a. Security Requirements Sample
b. Security Design consideration
c. Security Test Cases (Misuse Cases)
d. Security Testing (tools/techniques)

Develop Table of Contents

Develop customized table of contents as per the requirement and confirm with the client.



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Technology- Tools

Multiple tools that are customizable to organization's changing technology landscape and are Capable of both automated and manual security assessments in executing black-box, gray-box, and white-box approaches. The list of such tools* is as below:

- Axivion Bauhaus Suite .
- Black Duck Suite .
- BugScout
- CAST Application Intelligence Platform
- Checkmarx
- Coverity
- DevPartner
- DMS Software Reengineering Toolkit
- Compuware
- GrammaTech
- Imagix 4D

- HP Fortify Source Code Analyzer
- Lattix, Inc.
- LDRA Testbed
- Logiscope
- MALPAS
- Micro Focus
- Ounce Labs
- Optimyth checKing
- Parasoft
- Klocwork Insight
- Intel
- JustCode

- Polyspace
- ProjectCodeMeter
- Rational Software
- ResourceMiner
- SofCheck Inspector
- Software Diagnostics
- Sotoarc/Sotograph
- Syhunt Sandcat
- Understand
- Veracode
- JSP, ColdFusion, PHP and Objective-C
- Visual Studio Team System

*Deloitte does not recommend any specific tool from the list above

Questions?

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