OpenSAMM

Software Assurance Maturity Model

http://www.opensamm.org

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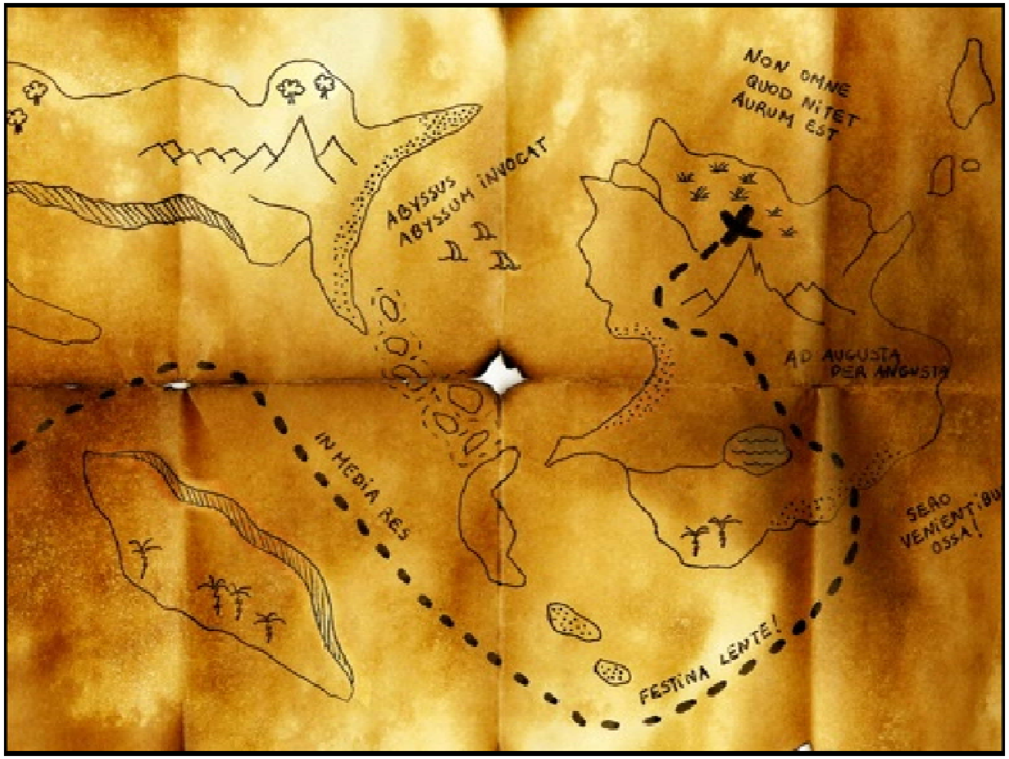
Agenda

- Review of existing secure SDLC efforts
- Understanding the model
- Applying the model
- Exploring the model’s levels and activities
- SAMM and the real world

By the end, you'll be able to...

- Evaluate an organization's existing software security practices
- Build a balanced software security assurance program in well-defined iterations
- Demonstrate concrete improvements to a security assurance program
- Define and measure security-related activities throughout an organization

Review of existing secure SDLC efforts

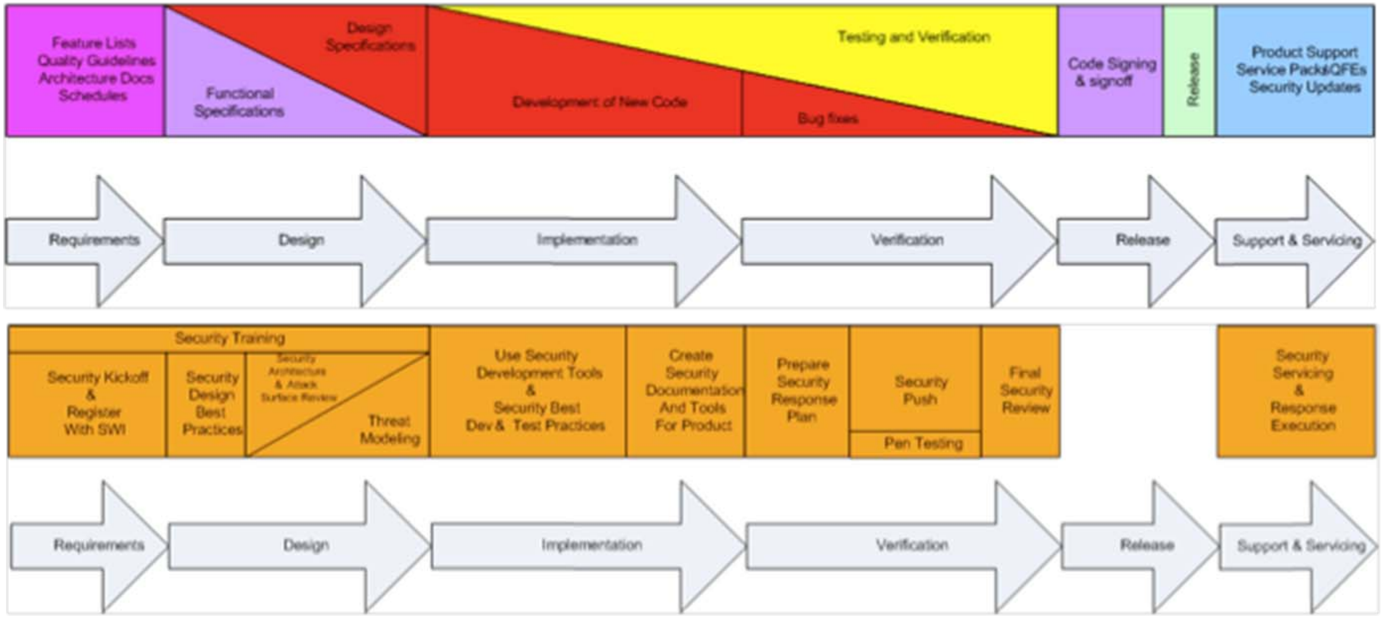


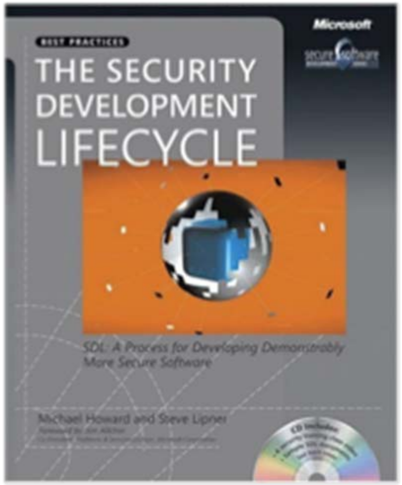
CLASP

- Comprehensive, Lightweight Application Security Process
  - Centered around 7 AppSec Best Practices
  - Cover the entire software lifecycle (not just development)
- Adaptable to any development process
  - Defines roles across the SDLC
  - 24 role-based process components
  - Start small and dial-in to your needs

Microsoft SDL

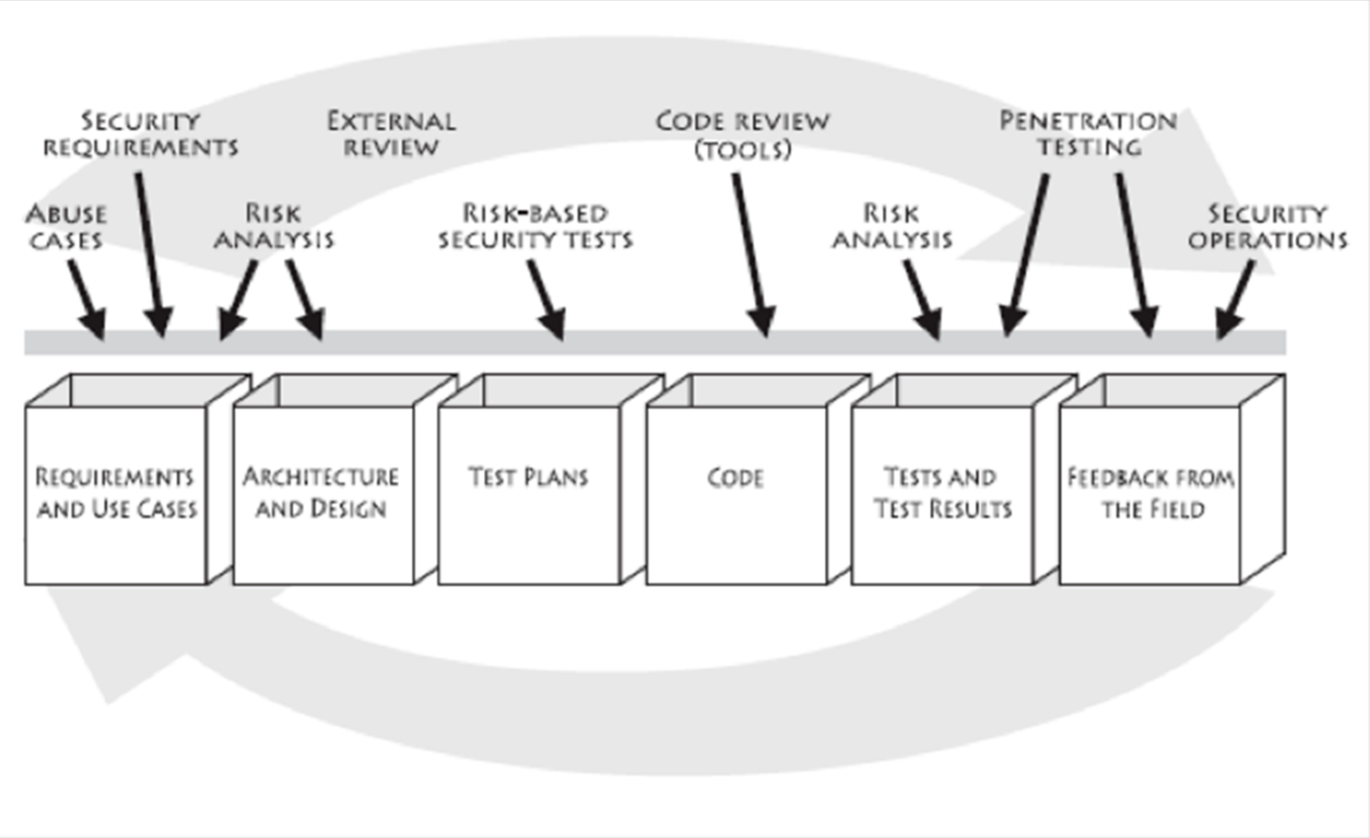
- Built internally for MS software
- Extended and made public for others
- MS-only versions since public release




BEST PRACTICES
THE SECURITY DEVELOPMENT LIFECYCLE
Microsoft
SDL: A Process for Developing Demonstrably More Secure Software
Michael Howard and Steve Lipner

Touchpoints

- Gary McGraw’s and Cigital’s model



Lessons Learned

- Microsoft SDL
  - Heavyweight, good for large ISVs
- Touchpoints
  - High-level, not enough details to execute against
- CLASP
  - Large collection of activities, but no priority ordering
- ALL: Good for experts to use as a guide, but hard for non-security folks to use off the shelf

Drivers for a Maturity Model

- An organization’s behavior changes slowly over time
  - Changes must be iterative while working toward long-term goals
- There is no single recipe that works for all organizations
  - A solution must enable risk-based choices tailor to the organization
- Guidance related to security activities must be prescriptive
  - A solution must provide enough details for non-security-people
- Overall, must be simple, well-defined, and measurable

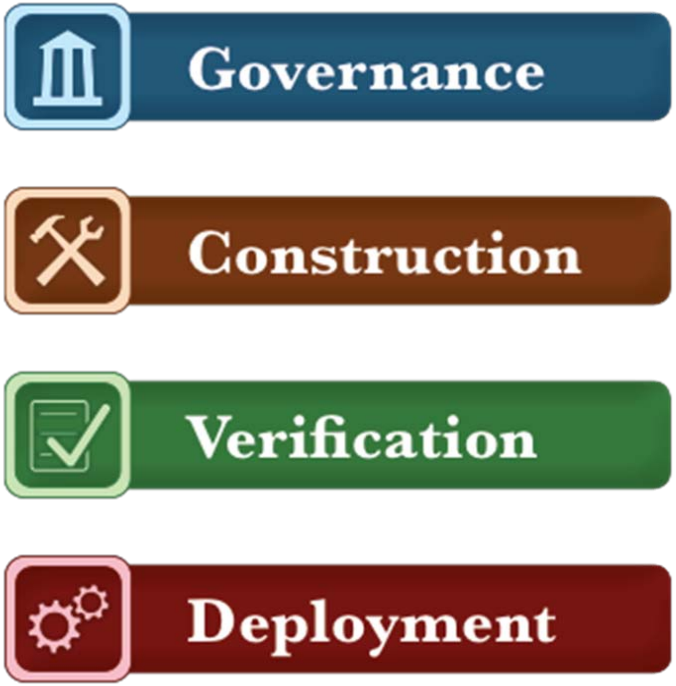
Therefore, a viable model must...

- Define building blocks for an assurance program
  - Delineate all functions within an organization that could be improved over time
- Define how building blocks should be combined
  - Make creating change in iterations a no-brainer
- Define details for each building block clearly
  - Clarify the security-relevant parts in a widely applicable way (for any org doing software dev)

Understanding the model

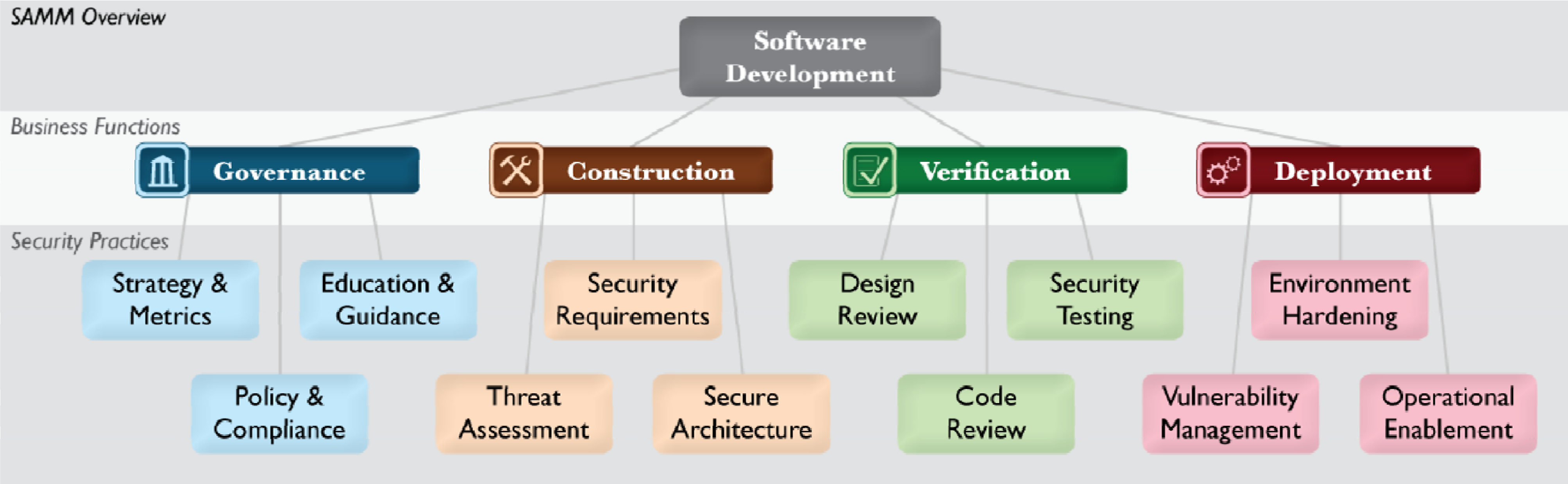
SAMM Business Functions

- Start with the core activities tied to any organization performing software development
- Named generically, but should resonate with any developer or manager



SAMM Security Practices

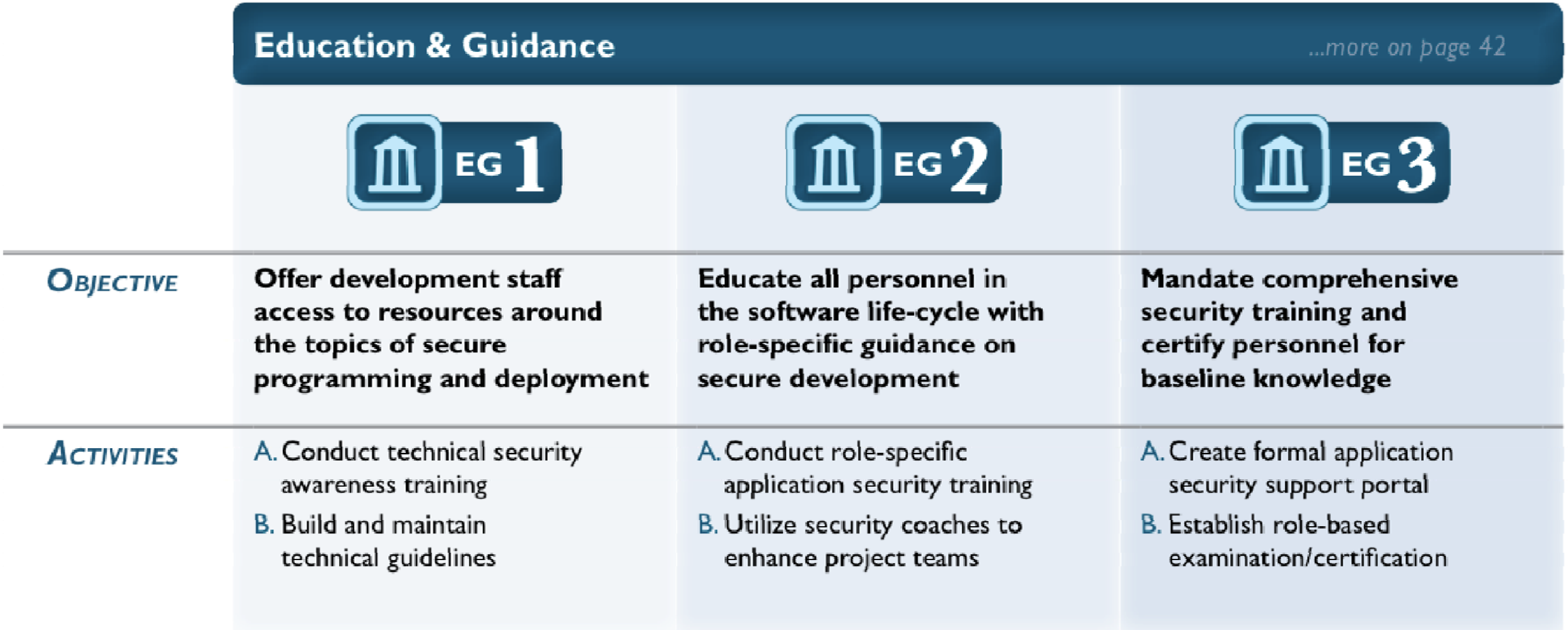
- From each of the Business Functions, 3 Security Practices are defined
- The Security Practices cover all areas relevant to software security assurance
- Each one is a ‘silo’ for improvement



Under each Security Practice

- Three successive Objectives under each Practice define how it can be improved over time
  - This establishes a notion of a Level at which an organization fulfills a given Practice
- The three Levels for a Practice generally correspond to:
  - (0: Implicit starting point with the Practice unfulfilled)
  - 1: Initial understanding and ad hoc provision of the Practice
  - 2: Increase efficiency and/or effectiveness of the Practice
  - 3: Comprehensive mastery of the Practice at scale

Check out this one...



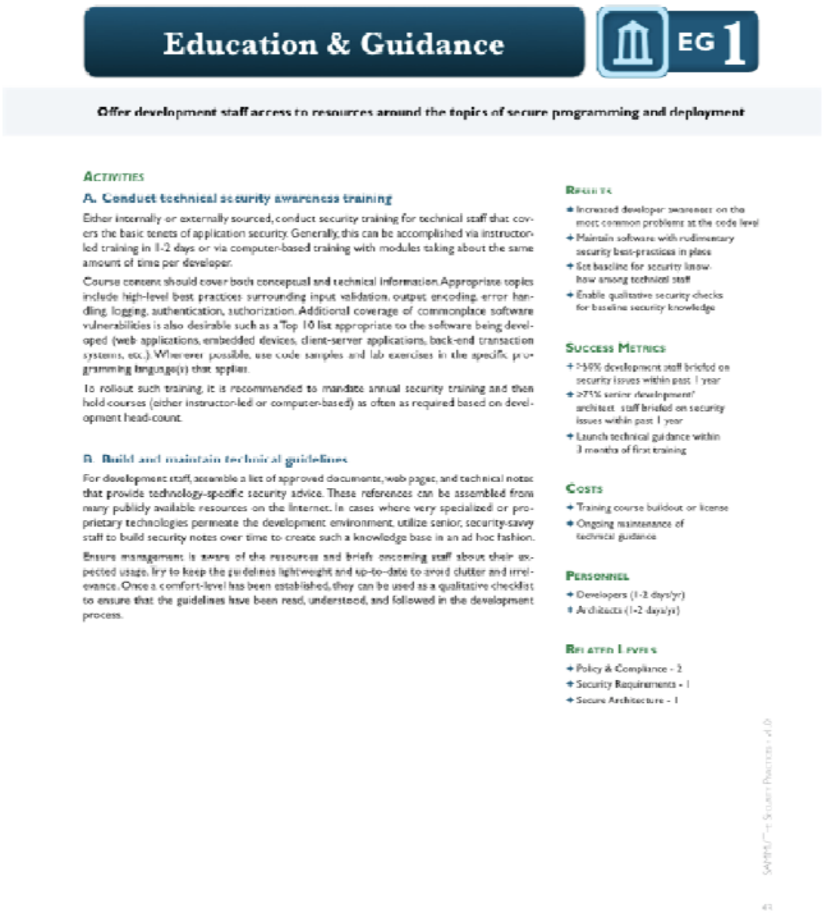
Education & Guidance

...more on page 42

	EG 1	EG 2	EG 3
Objective	**Offer development staff access to resources around the topics of secure programming and deployment**	**Educate all personnel in the software life-cycle with role-specific guidance on secure development**	**Mandate comprehensive security training and certify personnel for baseline knowledge**
Activities	A. Conduct technical security awareness training B. Build and maintain technical guidelines	A. Conduct role-specific application security training B. Utilize security coaches to enhance project teams	A. Create formal application security support portal B. Establish role-based examination/certification

Per Level, SAMM defines...

- Objective
- Activities
- Results
- Success Metrics
- Costs
- Personnel
- Related Levels



Education & Guidance

EG 1

Offer development staff access to resources around the topics of secure programming and deployment

Activities

A. Conduct technical security awareness training

Either internally or externally sourced, conduct security training for technical staff that covers the basic tenets of application security. Generally, this can be accomplished via instructor-led training in 1-2 days or via computer-based training with modules taking about the same amount of time per developer.

Course content should cover both conceptual and technical information. Appropriate topics include high-level best practices surrounding input validation, output encoding, error handling, logging, authentication, authorization. Additional coverage of commonplace software vulnerabilities is also desirable such as a Top 10 list appropriate to the software being developed (web applications, embedded devices, client-server applications, back-end transaction systems, etc.). Wherever possible, use code samples and lab exercises in the specific programming language(s) that applies.

To rollout such training, it is recommended to mandate annual security training and then hold courses (either instructor-led or computer-based) as often as required based on development head-count.

B. Build and maintain technical guidelines

For development staff, assemble a list of approved documents, web pages, and technical notes that provide technology-specific security advice. These references can be assembled from many publicly available resources on the Internet. In cases where very specialized or proprietary technologies permeate the development environment, utilize senior, security-savvy staff to build security notes over time to create such a knowledge base in an ad hoc fashion.

Ensure management is aware of the resources and briefs oncoming staff about their expected usage. Try to keep the guidelines lightweight and up-to-date to avoid clutter and irrelevance. Once a comfort-level has been established, they can be used as a qualitative checklist to ensure that the guidelines have been read, understood, and followed in the development process.

Results

- Increased developer awareness on the most common problems at the code level
- Maintain software with rudimentary security best-practices in place
- Set baseline for security know-how among technical staff
- Enable qualitative security checks for baseline security knowledge

Success Metrics

- >50% development staff briefed on security issues within past 1 year
- >75% senior development/architect staff briefed on security issues within past 1 year
- Launch technical guidance within 3 months of first training

Costs

- Training course buildout or license
- Ongoing maintenance of technical guidance

Personnel

- Developers (1-2 days/yr)
- Architects (1-2 days/yr)

Related Levels

- Policy & Compliance - 2
- Security Requirements - 1
- Secure Architecture - 1

SAMM / The Security Practices - v1.0

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Approach to iterative improvement

- Since the twelve Practices are each a maturity area, the successive Objectives represent the “building blocks” for any assurance program

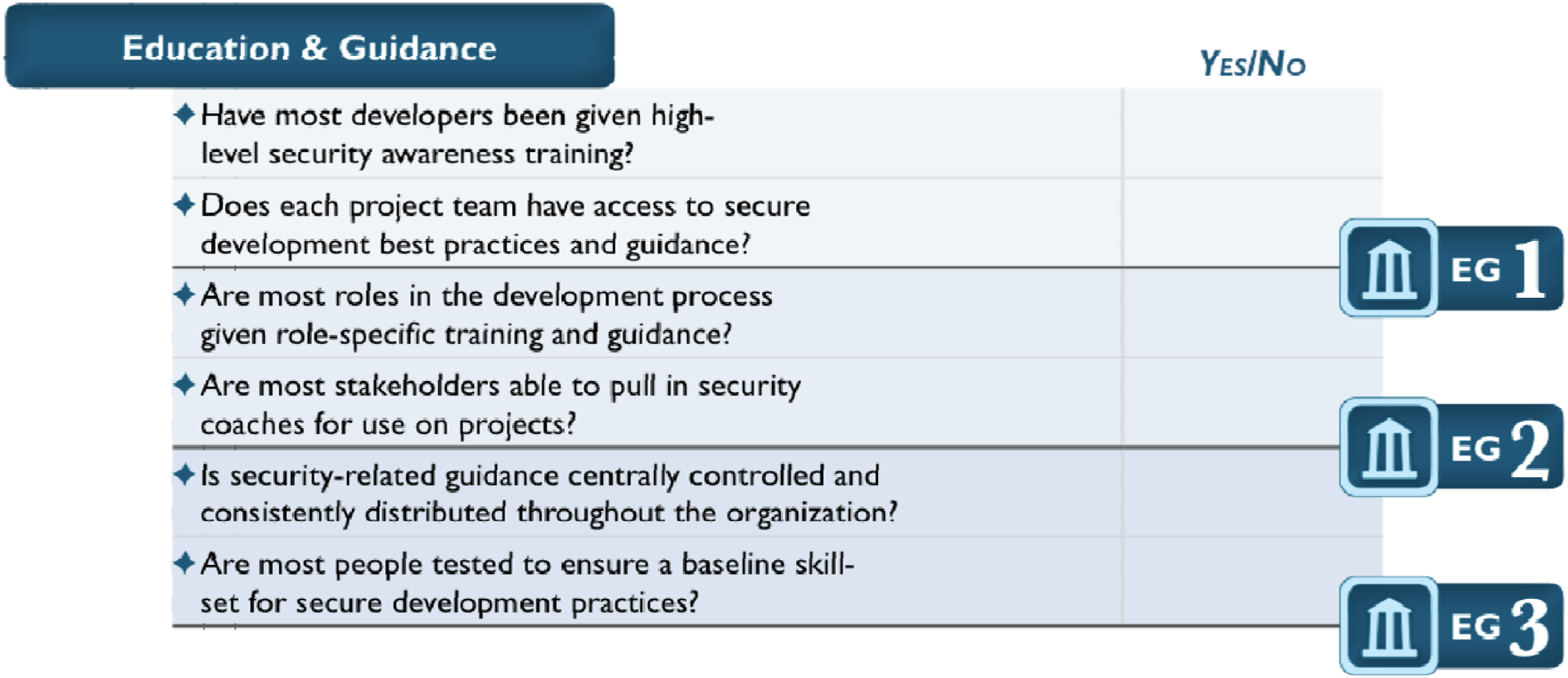
- Simply put, improve an assurance program in phases by:

1. Select security Practices to improve in next phase of assurance program
2. Achieve the next Objective in each Practice by performing the corresponding Activities at the specified Success Metrics

Applying the model

Conducting assessments

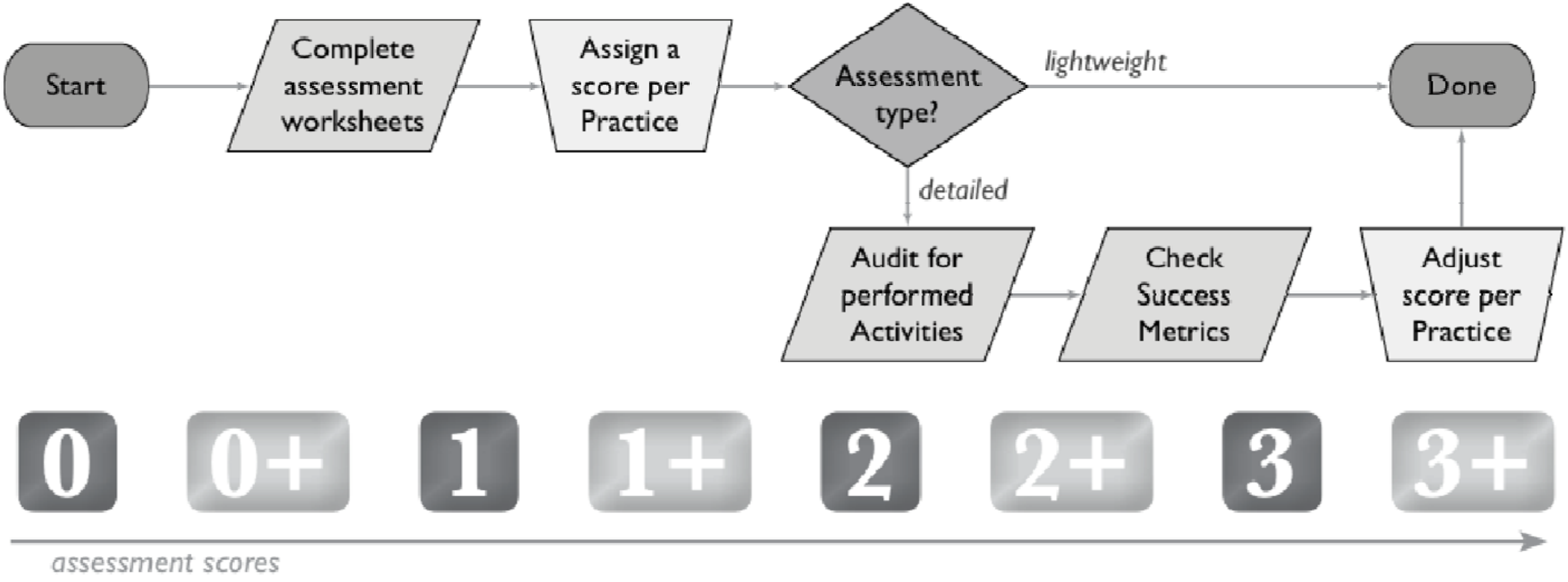
- SAMM includes assessment worksheets for each Security Practice



Education & Guidance	Yes/No	
✦ Have most developers been given high-level security awareness training?		EG 1
✦ Does each project team have access to secure development best practices and guidance?		
✦ Are most roles in the development process given role-specific training and guidance?		EG 2
✦ Are most stakeholders able to pull in security coaches for use on projects?		
✦ Is security-related guidance centrally controlled and consistently distributed throughout the organization?		EG 3
✦ Are most people tested to ensure a baseline skill-set for secure development practices?		

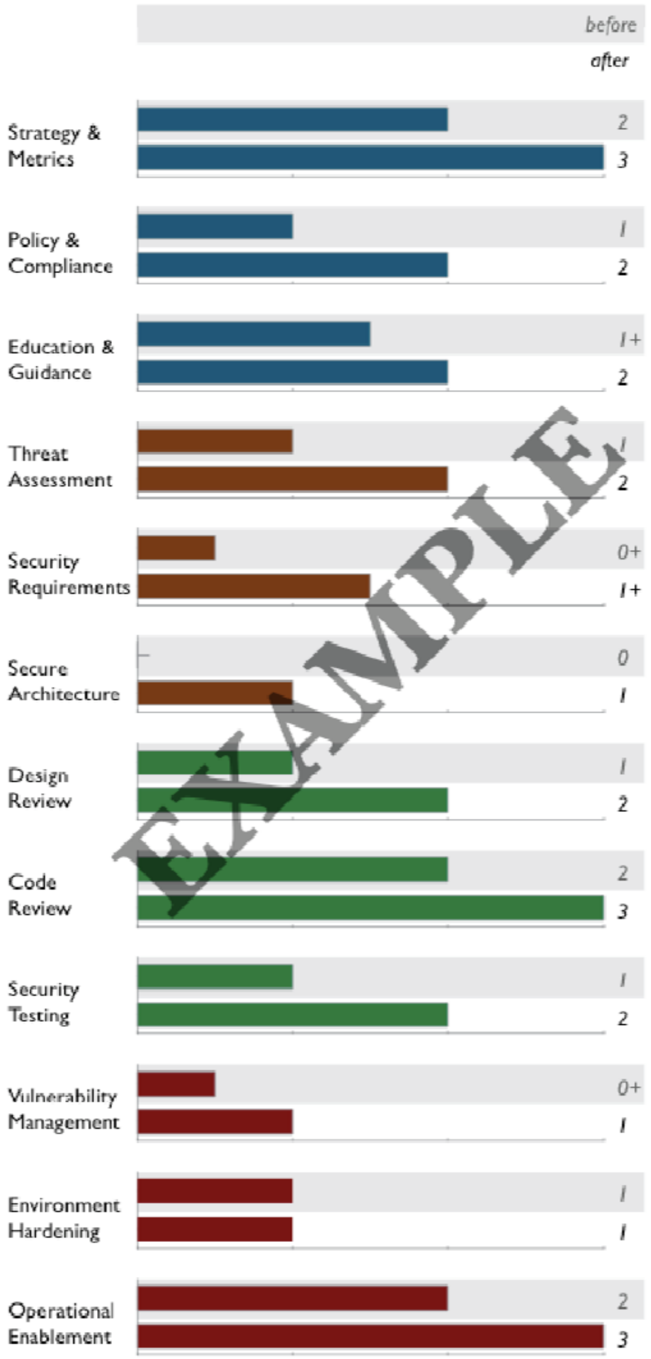
Assessment process

- Supports both lightweight and detailed assessments
- Organizations may fall in between levels (+)


Start
Complete assessment worksheets
Assign a score per Practice
Assessment type?
lightweight
Done
detailed
Audit for performed Activities
Check Success Metrics
Adjust score per Practice
0
0+
1
1+
2
2+
3
3+
assessment scores

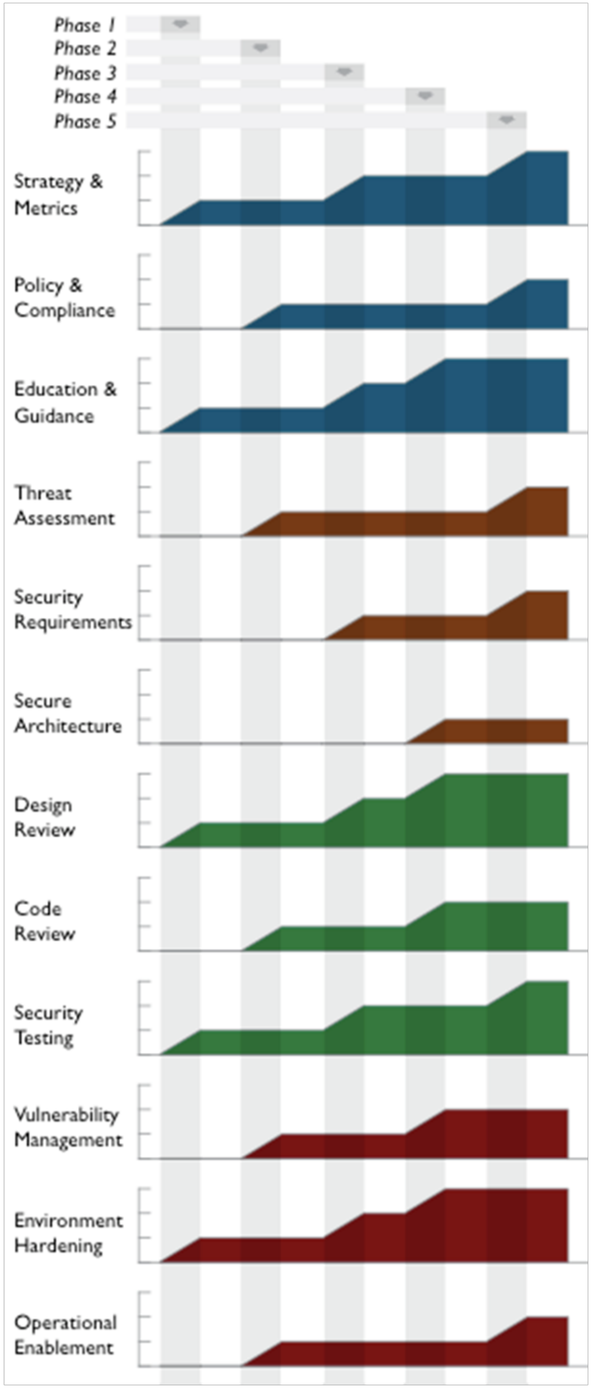
Creating Scorecards

- Gap analysis
  - Capturing scores from detailed assessments versus expected performance levels
- Demonstrating improvement
  - Capturing scores from before and after an iteration of assurance program build-out
- Ongoing measurement
  - Capturing scores over consistent time frames for an assurance program that is already in place

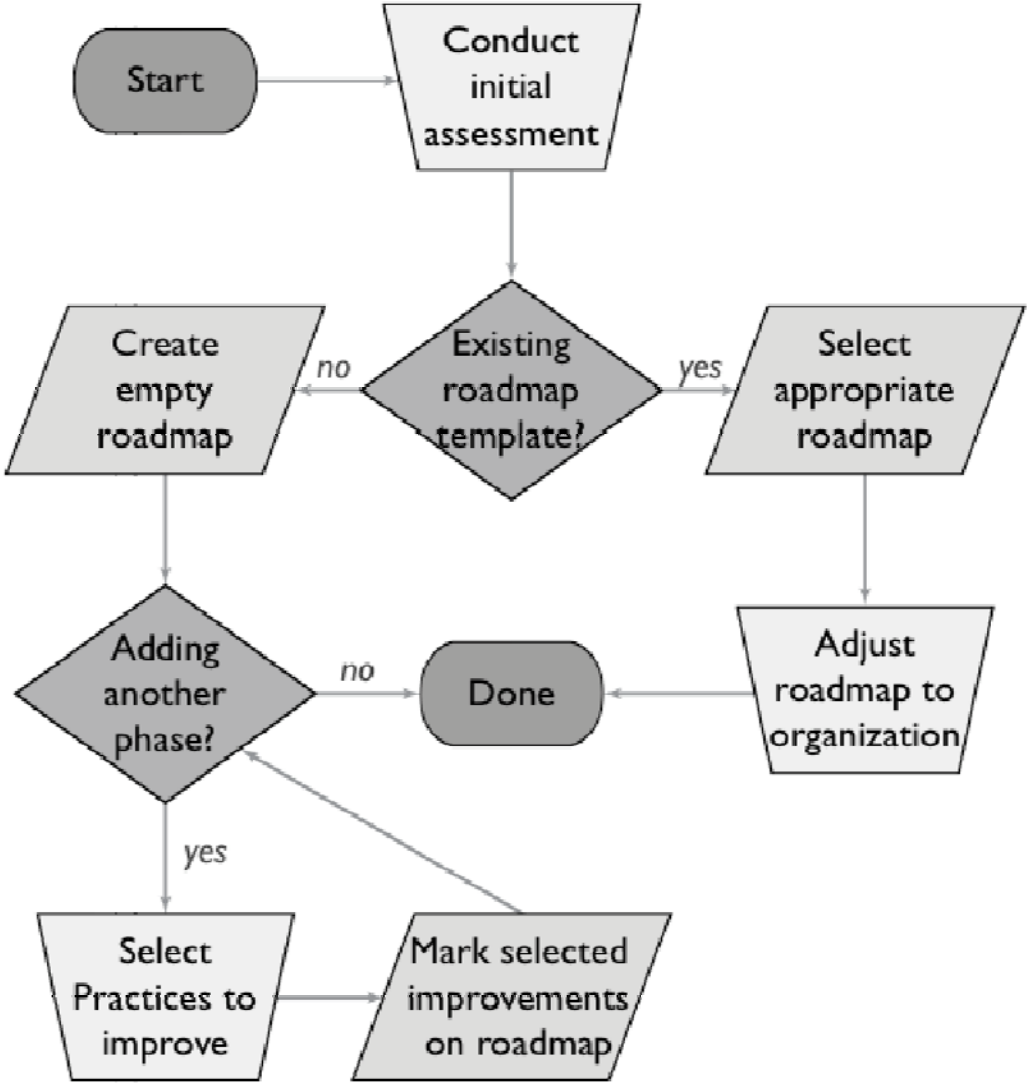


Roadmap templates

- To make the “building blocks” usable, SAMM defines Roadmaps templates for typical kinds of organizations
  - Independent Software Vendors
  - Online Service Providers
  - Financial Services Organizations
  - Government Organizations
- Organization types chosen because
  - They represent common use-cases
  - Each organization has variations in typical software-induced risk
  - Optimal creation of an assurance program is different for each



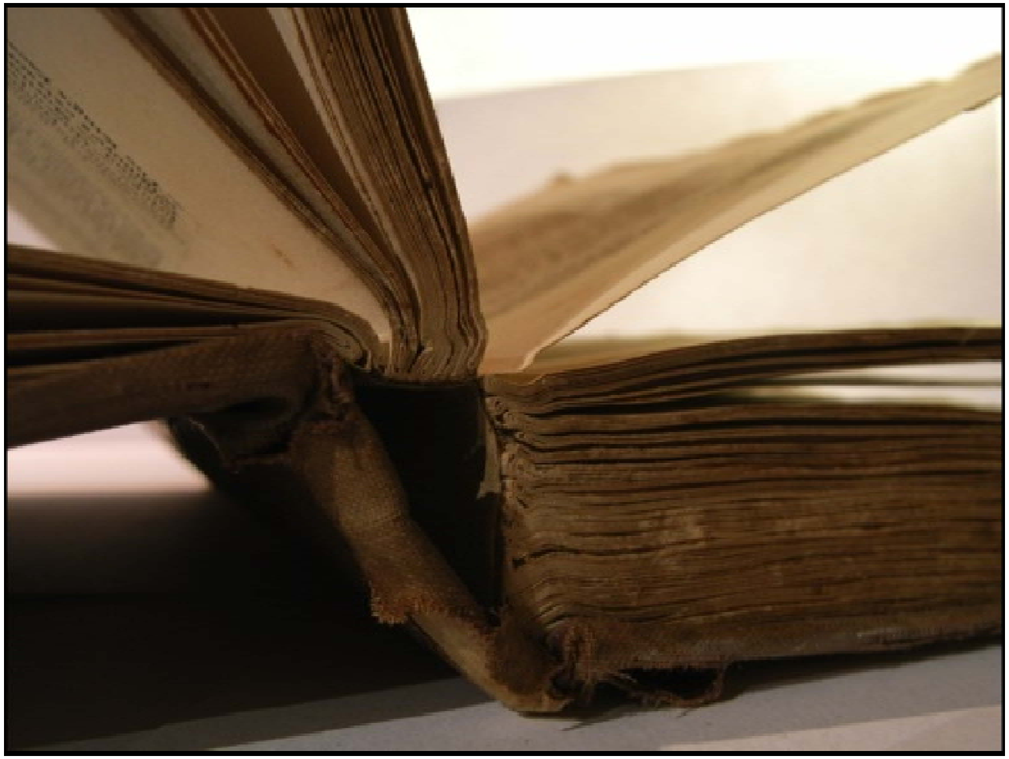
Building Assurance Programs


Start
Conduct initial assessment
Existing roadmap template?
no
yes
Create empty roadmap
Select appropriate roadmap
Adding another phase?
no
Done
Adjust roadmap to organization
yes
Select Practices to improve
Mark selected improvements on roadmap

Case Studies

- A full walkthrough with prose explanations of decision-making as an organization improves
- Each Phase described in detail
  - Organizational constraints
  - Build/buy choices
- One case study exists today, several more in progress using industry partners

Exploring the model's levels and activities



The SAMM 1.0 release

Software Assurance Maturity Model

A guide to building security into software development

Version - 1.0

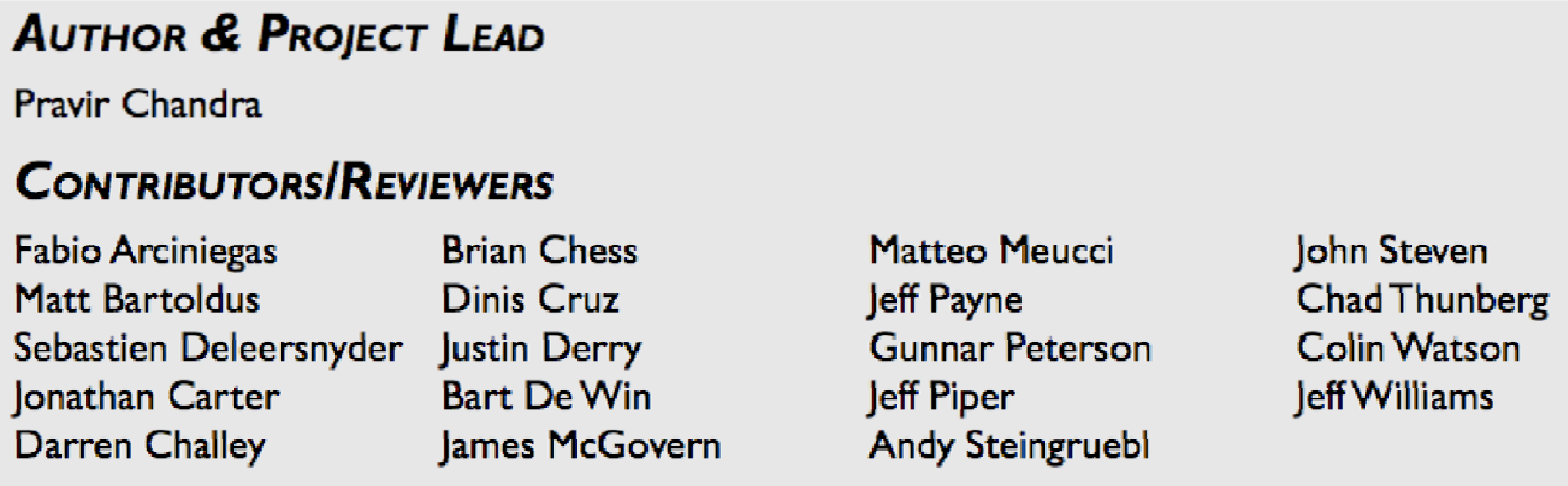
SAMM and the real world

SAMM history

- Beta released August 2008
  - 1.0 released March 2009
- Originally funded by Fortify
  - Still actively involved and using this model
- Released under a Creative Commons Attribution Share-Alike license
- Donated to OWASP and is currently an OWASP project

Expert contributions

- Built based on collected experiences with 100’s of organizations
  - Including security experts, developers, architects, development managers, IT managers



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Gunnar Peterson
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Andy Steingruebl
John Steven
Chad Thunberg
Colin Watson
Jeff Williams

Industry support

- Several more case studies underway

FORTIFY
OWASP
The Open Web Application Security Project
ASPECT SECURITY
coveros
DENIM GROUP
GOTHAM
DIGITAL SCIENCE
leviathan
security group
Minded
security
Security Compass
WhiteHat
SECURITY

The OpenSAMM Project

- http://www.opensamm.org
- Dedicated to defining, improving, and testing the SAMM framework
- Always vendor-neutral, but lots of industry participation
  - Open and community driven
- Targeting new releases every 6-12 months
- Change management process
  - SAMM Enhancement Proposals (SEP)

Future plans

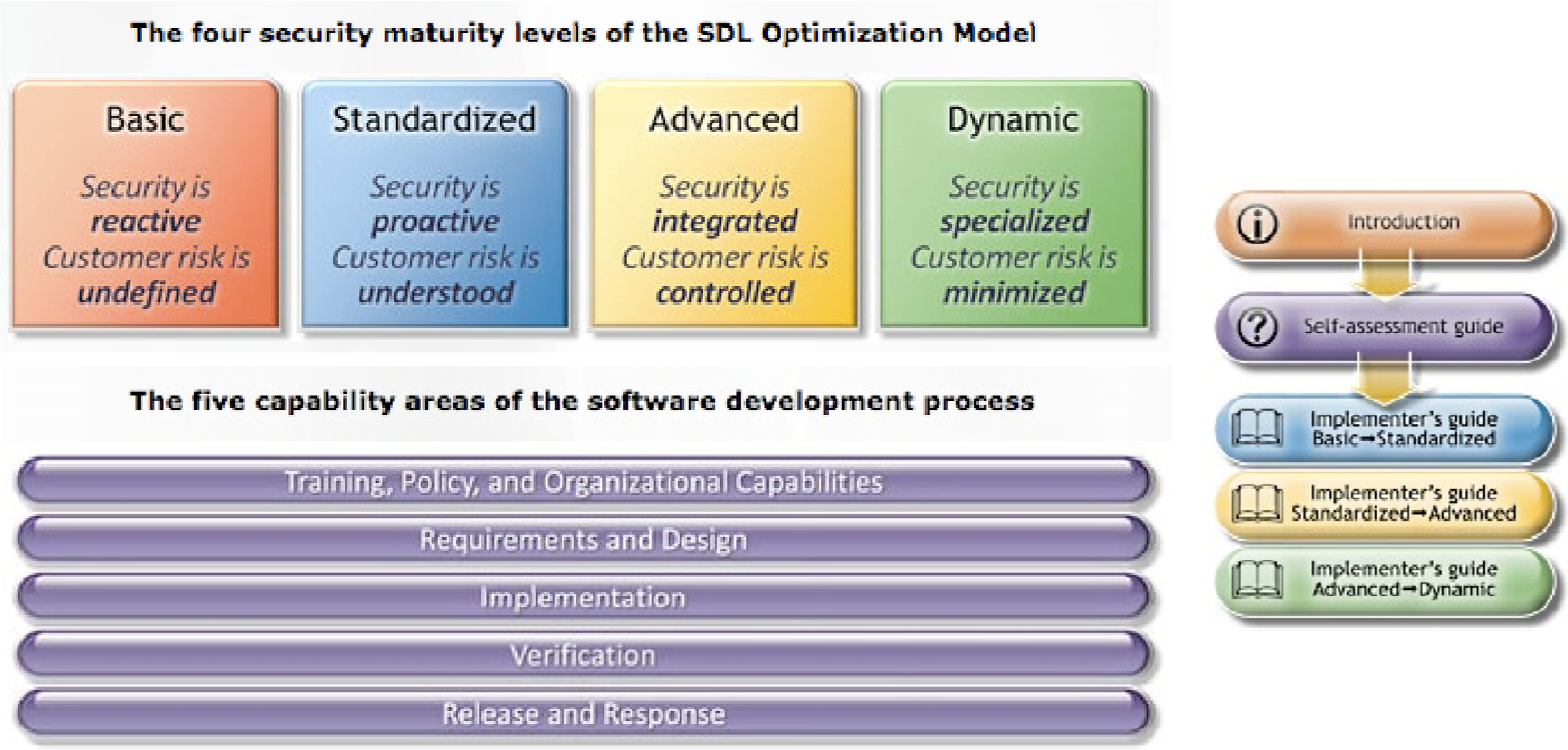
- Mappings to existing standards and regulations (many underway currently)
  - PCI, COBIT, ISO-17799/27002, ISM3, etc.
- Additional roadmaps where need is identified
- Additional case studies
- Feedback for refinement of the model
- Translations into other languages

Other “modern” approaches

- Microsoft SDL Optimization Model
- Fortify/Cigital Building Security In Maturity Model (BSIMM)

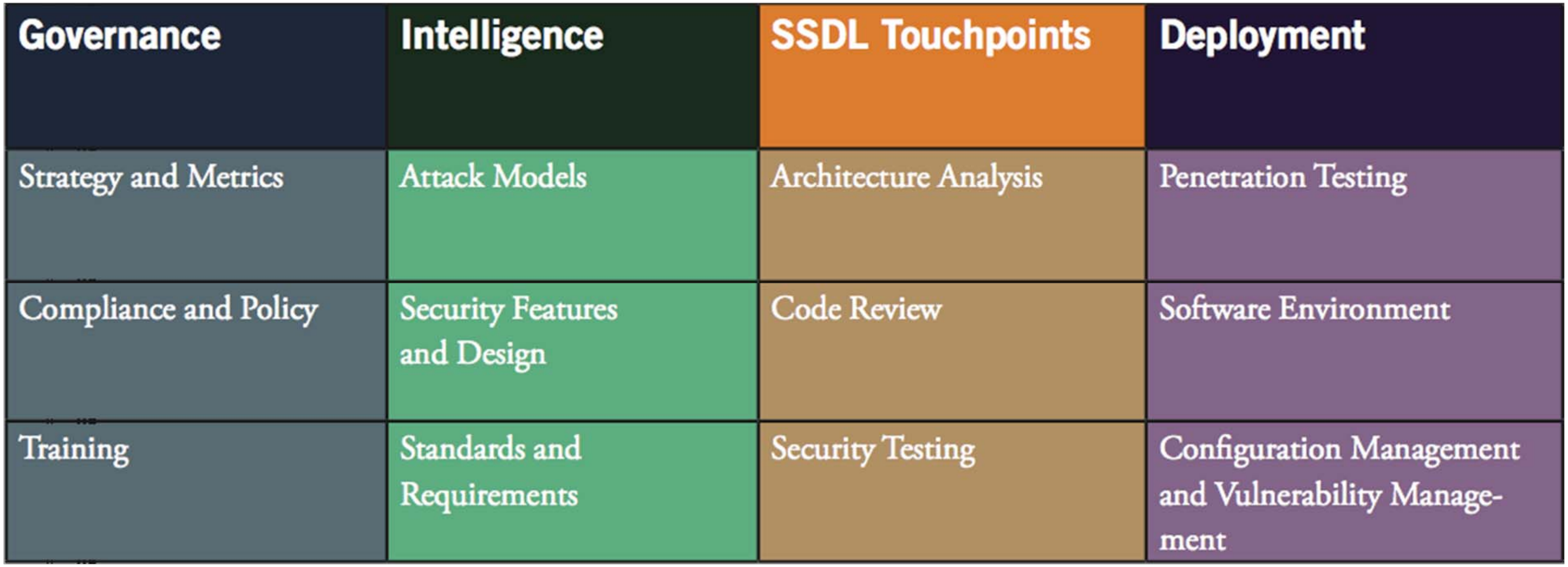
SDL Optimization Model

- Built by MS to make SDL adoption easier


The four security maturity levels of the SDL Optimization Model
Basic
Security is *reactive* Customer risk is *undefined*
Standardized
Security is *proactive* Customer risk is *understood*
Advanced
Security is *integrated* Customer risk is *controlled*
Dynamic
Security is *specialized* Customer risk is *minimized*
The five capability areas of the software development process
Training, Policy, and Organizational Capabilities
Requirements and Design
Implementation
Verification
Release and Response
Introduction
Self-assessment guide
Implementer's guide Basic→Standardized
Implementer's guide Standardized→Advanced
Implementer's guide Advanced→Dynamic

BSIMM

- Framework derived from SAMM Beta
- Based on collected data from 9 large firms



Governance	Intelligence	SSDL Touchpoints	Deployment
Strategy and Metrics	Attack Models	Architecture Analysis	Penetration Testing
Compliance and Policy	Security Features and Design	Code Review	Software Environment
Training	Standards and Requirements	Security Testing	Configuration Management and Vulnerability Management

Quick re-cap on using SAMM

- Evaluate an organization’s existing software security practices
- Build a balanced software security assurance program in well-defined iterations
- Demonstrate concrete improvements to a security assurance program
- Define and measure security-related activities throughout an organization

Get involved

- Use SAMM and tell us about it
  - Blog, email, etc.
- Latest news at http://www.opensamm.org
  - Sign up for the mailing list

- Pravir Chandra - OpenSAMM Project Lead - chandra@owasp.org

Thanks for your time! Questions?

- Claudio Merloni – Fortify Software – cmerloni@fortify.com