Managing Application Risk in Enterprises – Thoughts and Recommendations

Security as a Business Enabler

GLOBAL CAPABILITY.
PERSONAL ACCOUNTABILITY.

Thierry Zoller
Practice Lead EMEA
Threat & Vulnerability Management

ISSA™
Information Systems Security Association
The Global Voice of the Information Security Profession

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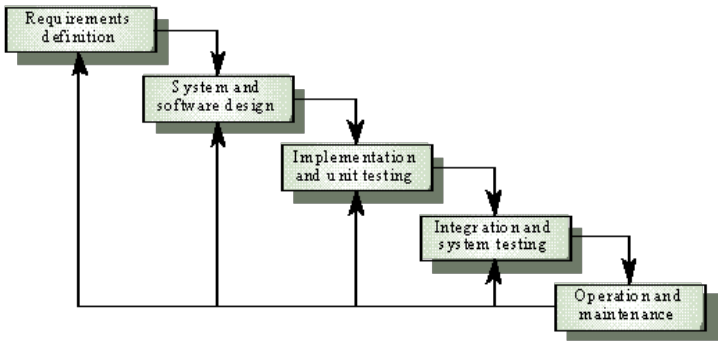
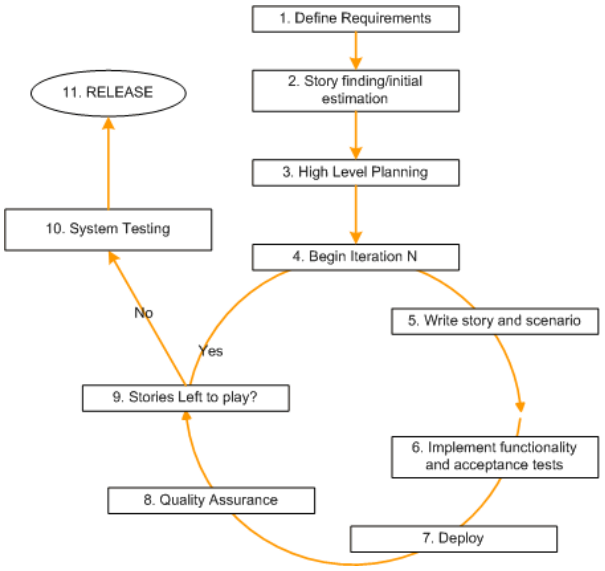
Secure Development Lifecycle

Development Lifecycles

- Waterfall Model and Agile Software Development (SCRUM, Devops..)



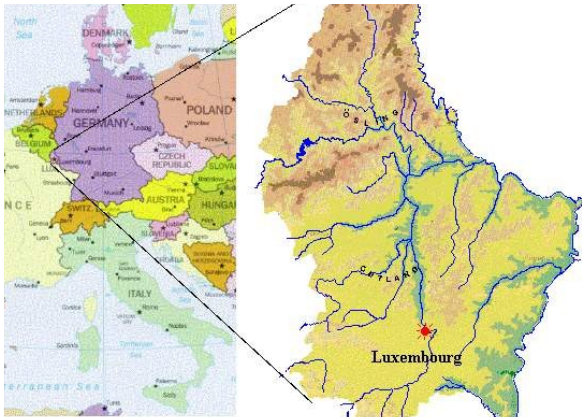


- Others: Spiral Development
- Realistically speaking I have seen a mix all of all of these, with some companies unable to name what type of cycle they use.

Agenda - ברוכים הבאים כולם

Who am I ?

- Thierry Zoller - Luxembourg
- Pratice Lead EMEA for Verizon Business
- Discovered and coordinated over 100 Software vulnerabilities
- ISC2 CSSLP Evangelist
- Former Director of Product Security at n.runs AG



Who is Verizon / Verizon Business ?

- Offices in over 129 countries (overall)
- Data Breach Report (2011 to be out soon)
- Broad consulting services worldwide (GRC, Business Optimisation, Application Security, Forensics ..)
- Over 1100 dedicated security professionals worldwide

WHO IS BEHIND DATA BREACHES?

70%	resulted from external agents (-9%)
48%	were caused by insiders (+26%)
11%	implicated business partners (-23%)
27%	involved multiple parties (-12%)

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Agenda

What this talk is about

- Different forms of Application Risk Management
- Types of Development Lifcycles
- Get upper management support for an SDLC Program
- Most effective methods to establish such a Program
- Experience Pitfalls / Traps
- How to measure success, which metrics to use

What this talk is **not**

- Review of source code analysis tools
- Reports on effectivness of Penetration Tests or Fuzzing Tools
- Threat modeling or Vulnerabilities
- Sun Tzu

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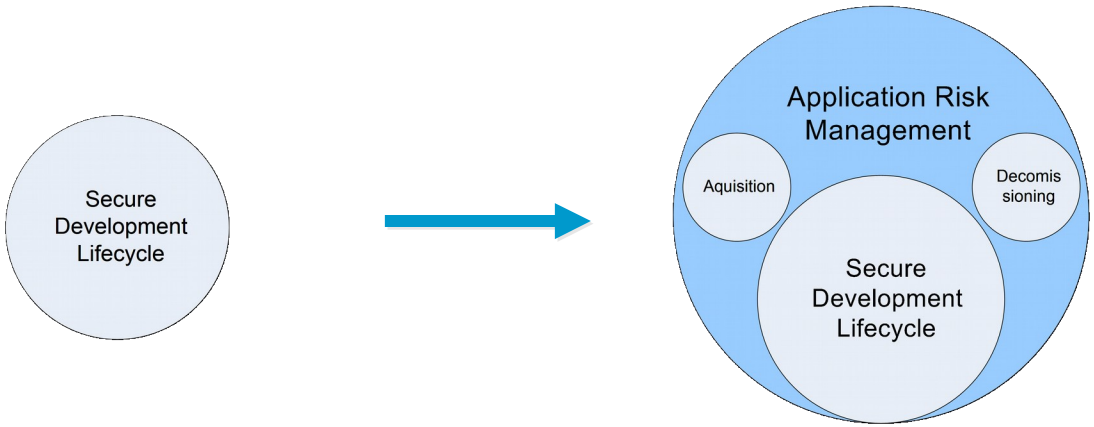
Application Risk Management

What is “Application Risk Management”

“The Art of creating, acquiring and maintaining Applications while guaranteeing a defined level of Security Assurance and allowing Risk management to happen ” - Me



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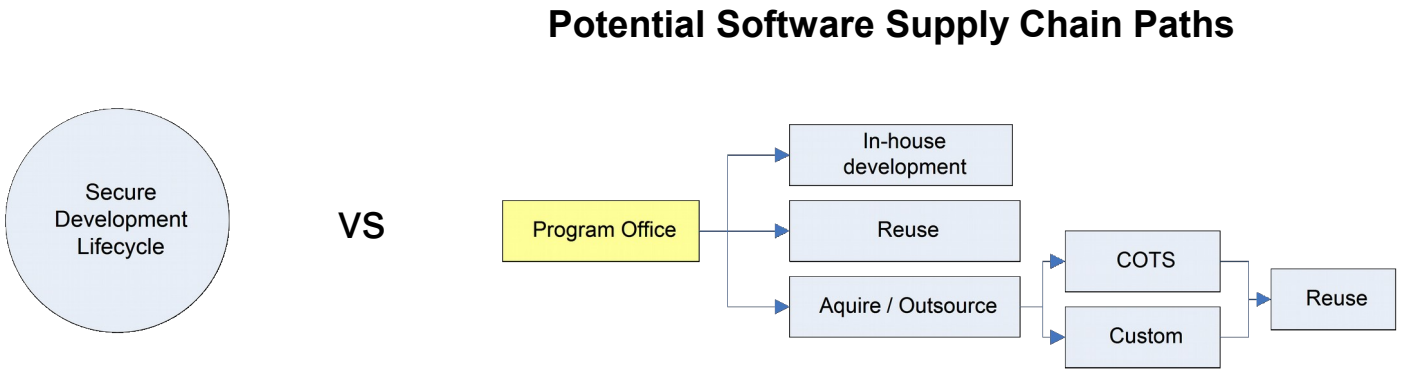
Application Risk Management

What is “Application Risk Management”

- Vendor perspective vs. Enterprise



- Encompasses a broader Spectrum
- Assurance needs to be given to all Applications not only those developed in-house

Application Risk Management

An effective Application Risk management Program allows you to answer these types of requests a bit more coherently :

Dear CISO -

- We'd like to open this web application up to the internet ? Can you give us the go ahead ?
- We need to add transactional features to our current HR platform and we still need remote access – what's your advice ?
- We'd like to develop a custom Front Office - Back Office Solution and would need your requirements beforehand.

Oh by the way, we need an answer today, we knew since 2 month, but we forgot, hmmk

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Secure Development Lifecycle

Development Lifecycles

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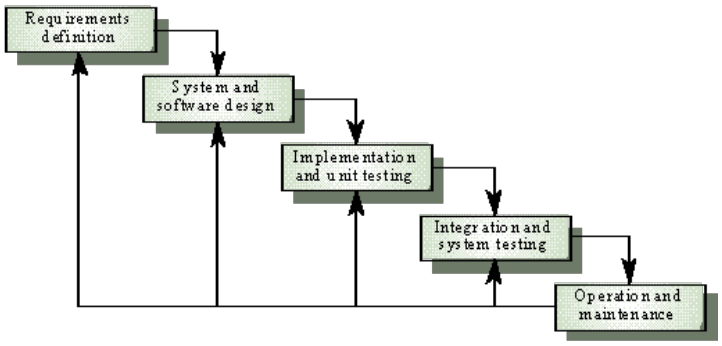

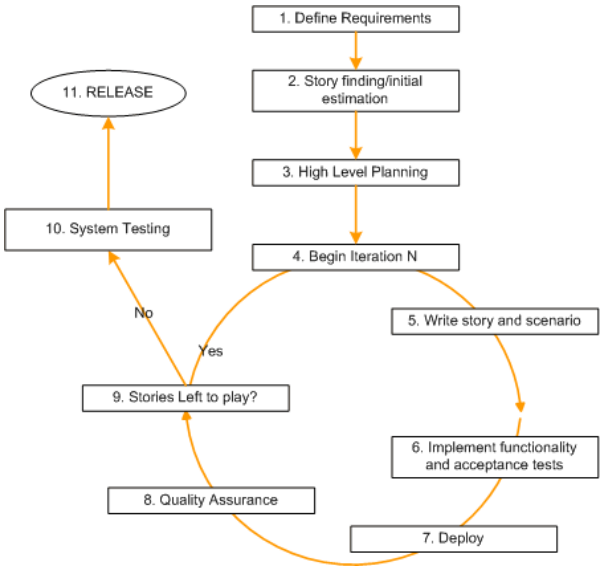

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Secure Development Lifecycle

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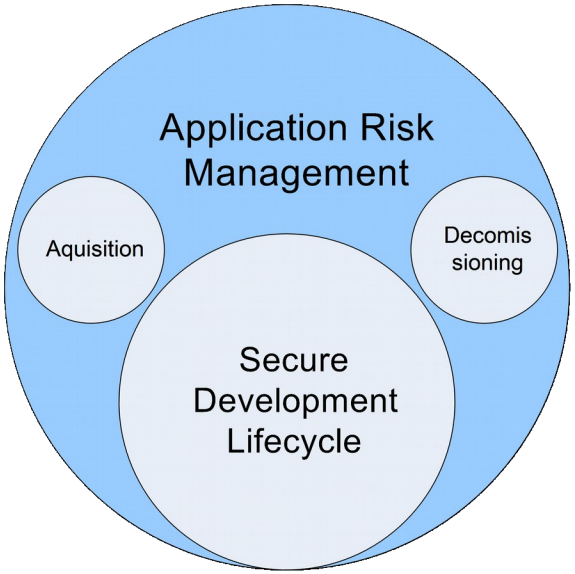

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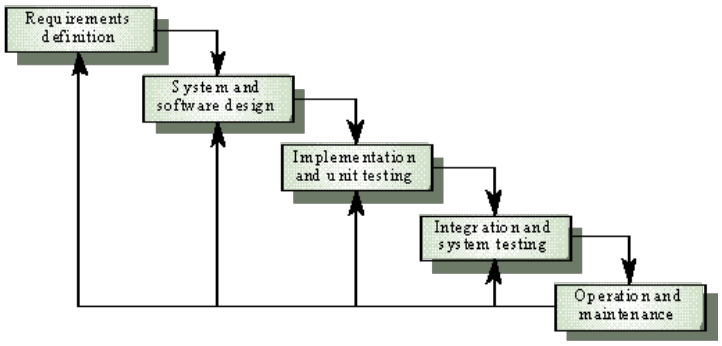

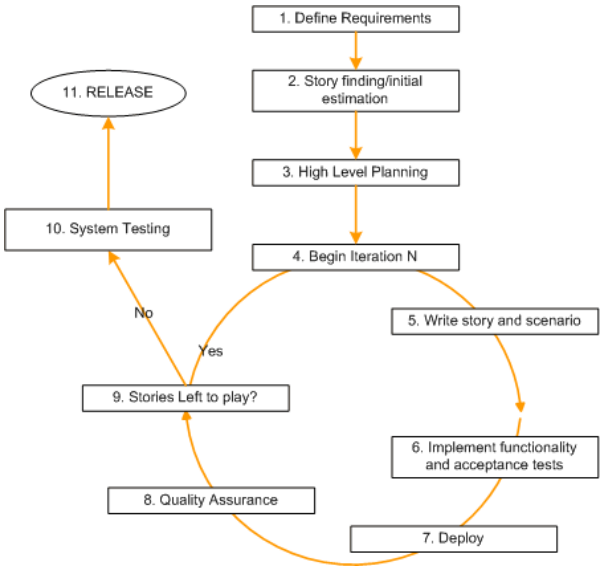

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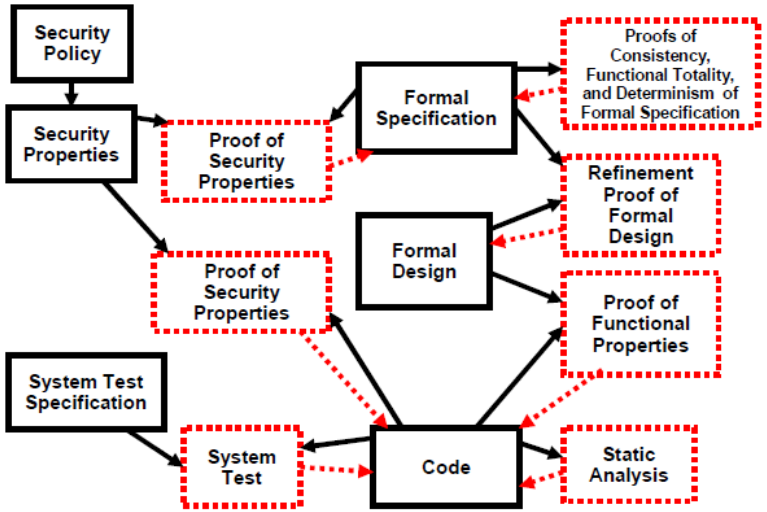
Secure Development Lifecycle

A Secure Development Lifecycle

- Different shapes and colors - SDL, SDLC, SSDL, Software Assurance
- Types
  - Heavy Processes
    - [Hall 2002a] [NSA 2002, Chapter 3]
    - Clean Room and TSP-Secure
  - Lightweight Processes
    - Microsoft SDL
    - CLASP



Source: DHS

- They are all fine if they fit the needs of your enterprise / organization

Secure Development Lifecycle

A Secure Development Lifecycle

- Good experience with the Microsoft SDL approach
  - Have had good results
  - Is applicable to legacy code, not to heavy, formal and not too light
  - Adjustable to different Development Models (Waterfall, Spiral, RAD)
  - Feeds on years of experience
  - Knowledge and Training is key

- VzB EMEA is in the process of joining the Microsoft SDLPro Network

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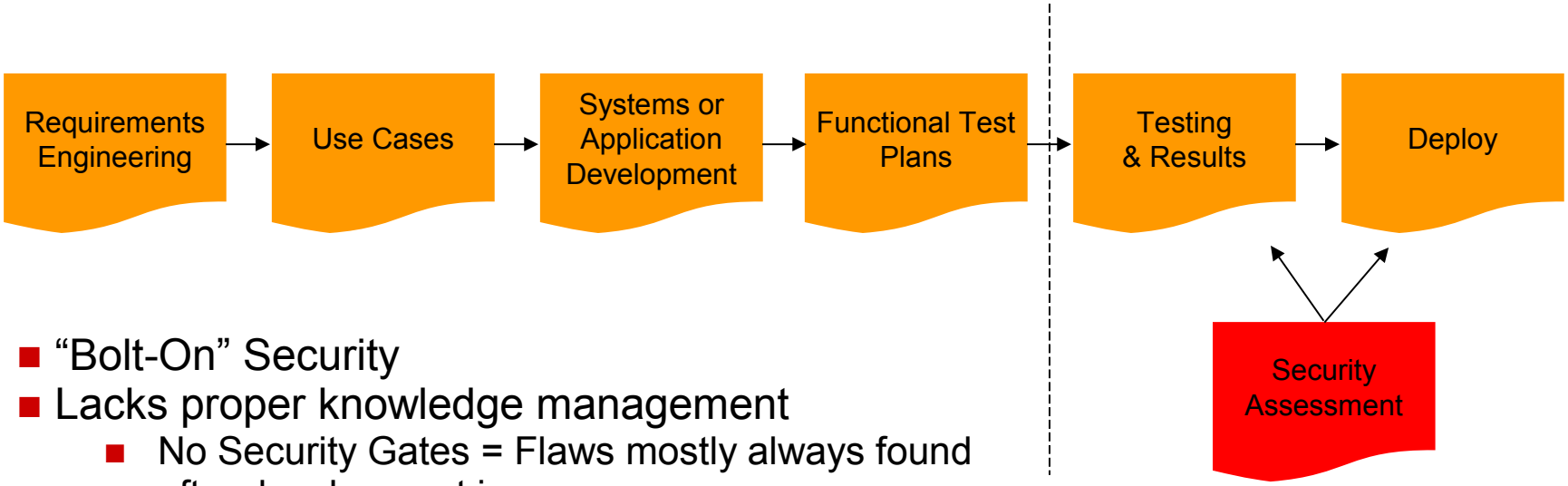
Secure Development Lifecycle

Classical Development Lifecycle



- "Bolt-On" Security
- Lacks proper knowledge management
  - No Security Gates = Flaws mostly always found after development is over
  - No knowledge management
- Risk management near impossible /
- Need to shift security and assurance to the left of the development cycle

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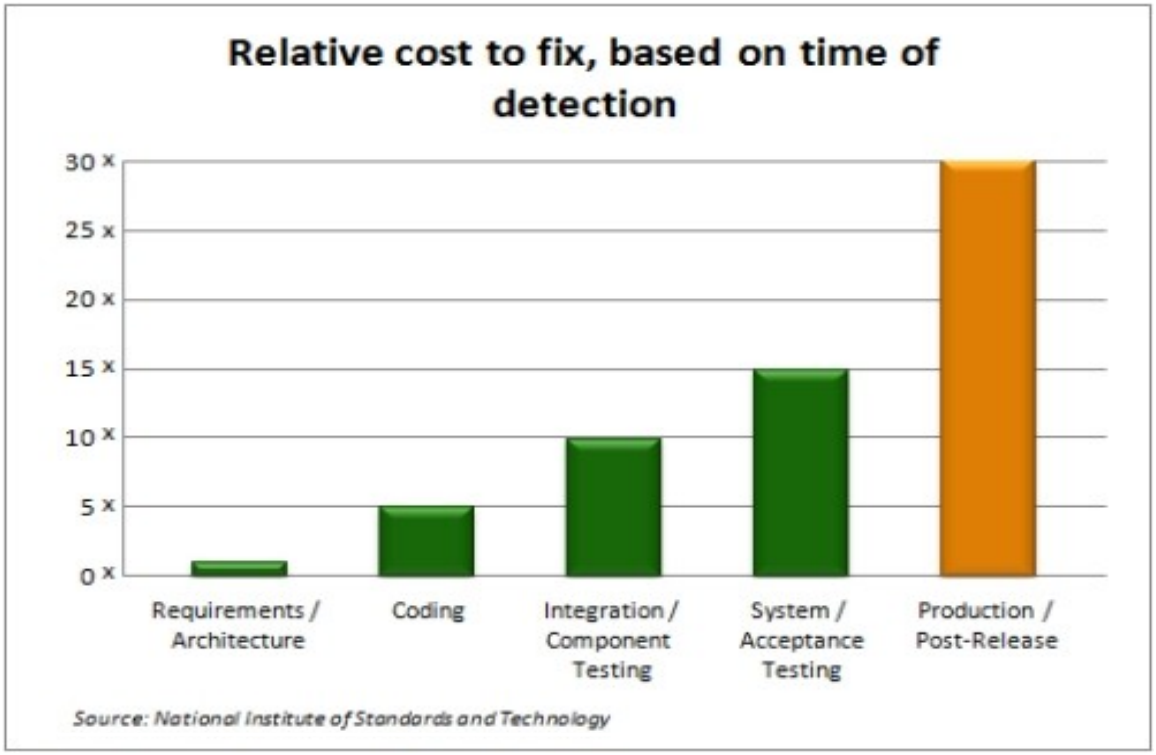
Agenda

Results in Increase of Costs

- Especially for Vendors, need to react and issue patches
- Major OS vendor calculated 200K USD costs per Bulletin published



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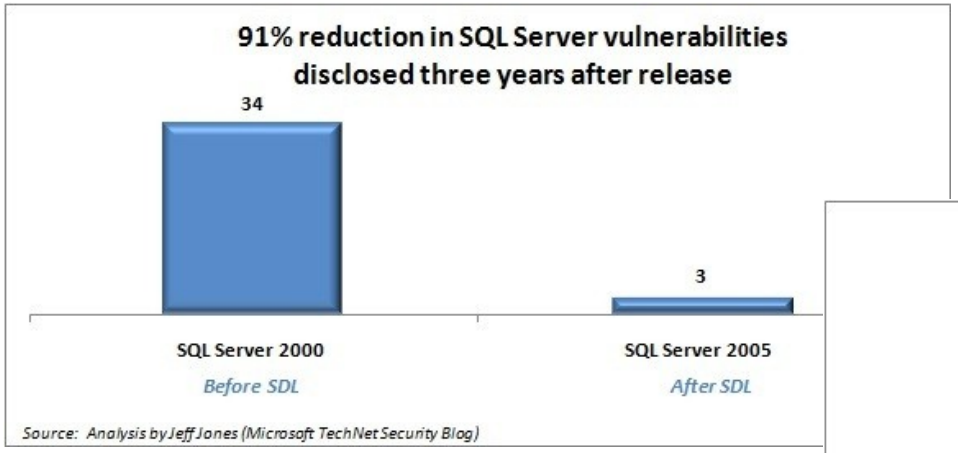
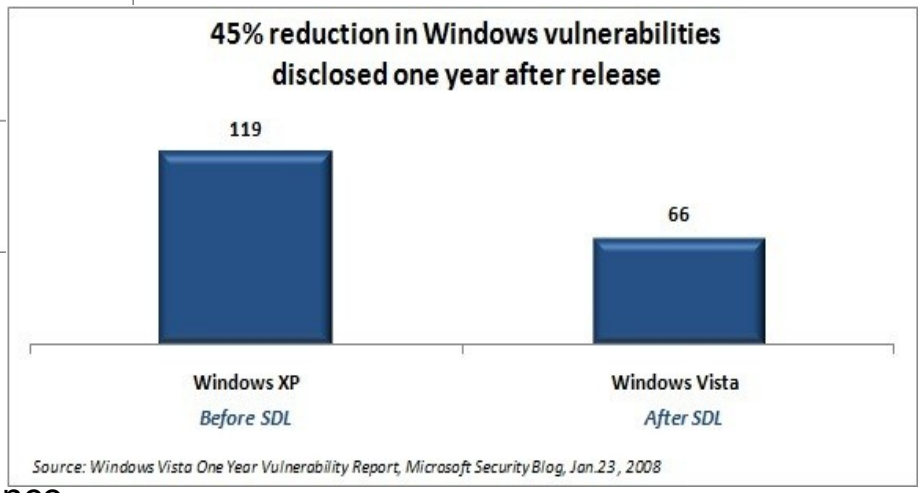
Results in Increase of Risk

- Statistics from Microsoft



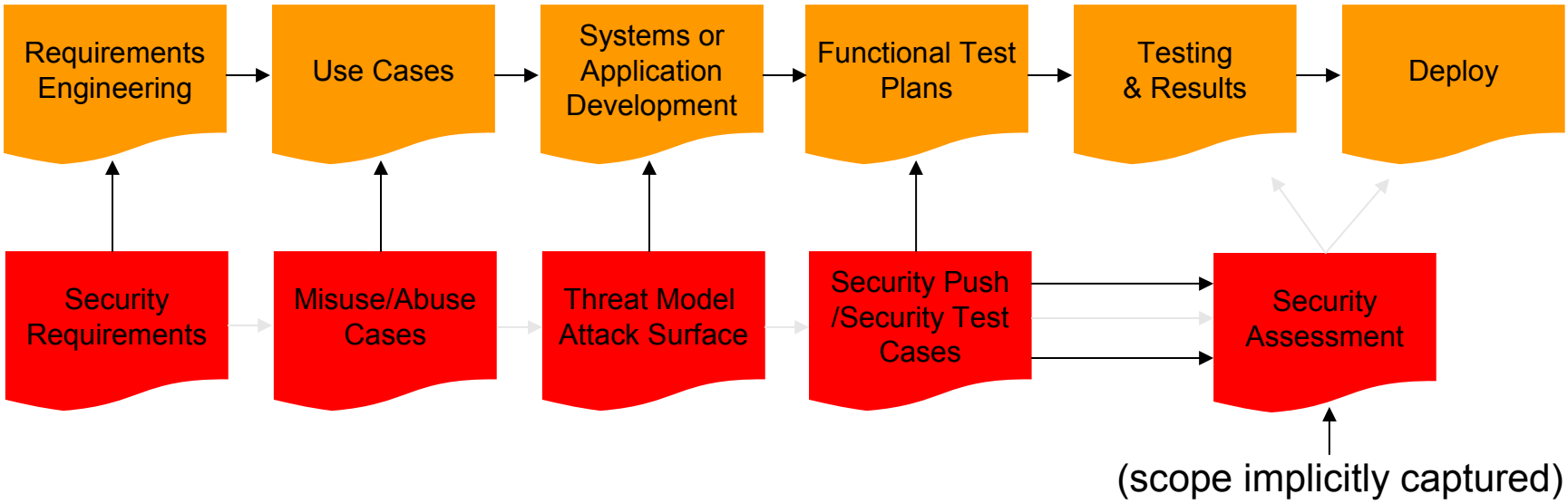


- Summary: Less Risk, Less Cost, Higher assurance – Holy Grail of Security ?

Secure Development Lifecycle

Security build-in Development Lifecycle

- A simplified example



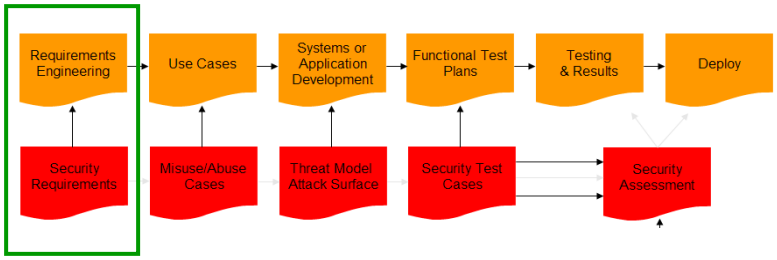
Secure Development Lifecycle

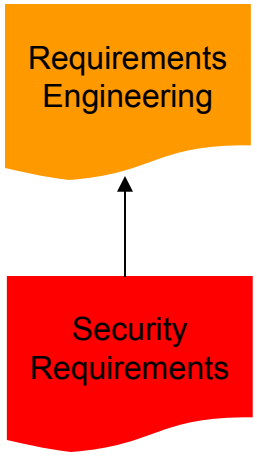
Requirements / Design Phase

- One of the most important phases
- Identify key security objectives
- Security Policies / Compliance
- Data Privacy

- Classify Application into Assurance Groups
  - Example : OWASP ASVS

- No more, “ Oh we needed PCI-DSS compliance ?! , at the end of Development.



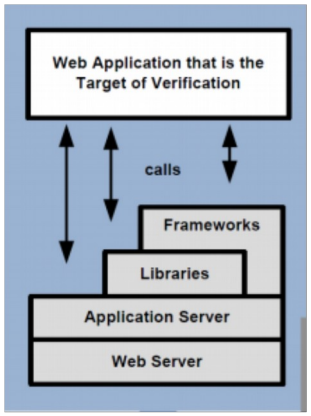
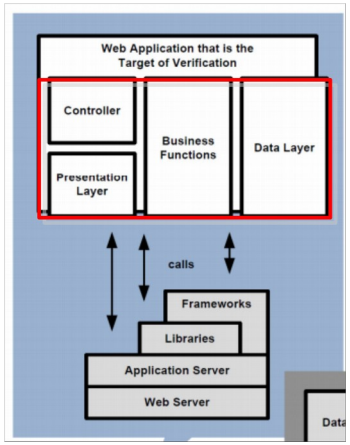
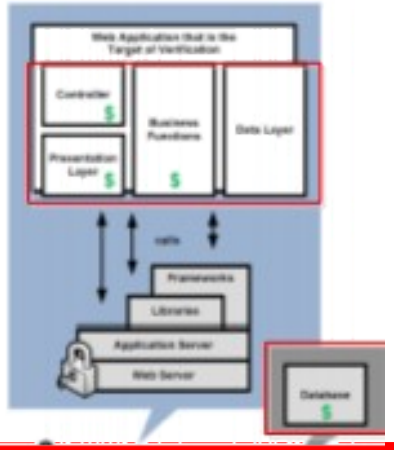
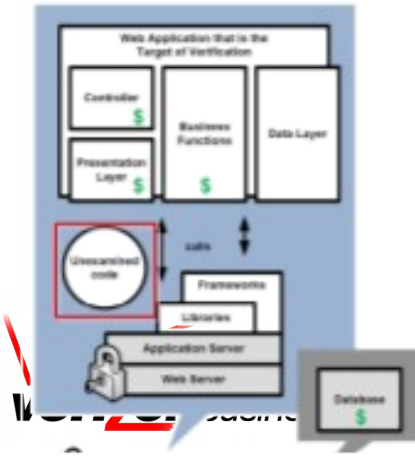


Agenda

Assurance Levels / Example

- Decide what Assurance Level the Application needs to fullfill
- Keeps effort down and effort relative to value of application and data

Generic Example only

	Assurance Level 1	Assurance Level 2	Assurance Level 3	Assurance Level 4
Techniques	Automated Manual (Verification of Automated findings only)	Manual Inspection + Level 1	Source Code Review Database Audit + Level 2	Architectural Review + Level 3
Scope				

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Scope	**Provides Assurance against :** Opportunistic Attackers Limitations : **Does not cover application Logic**	**Provides Assurance against :** Unsophisticated **opportunists** such as attackers with **open source attack tools**.	**Provides Assurance against :** **Opportunists**, and **determined attackers** (skilled and motivated attackers focusing on specific targets using tools including purpose-builtscanning tools)	**Provides Assurance against :** Determined Attackers, Professional Attackers – Potentially State founded Attackers

Secure Development Lifecycle

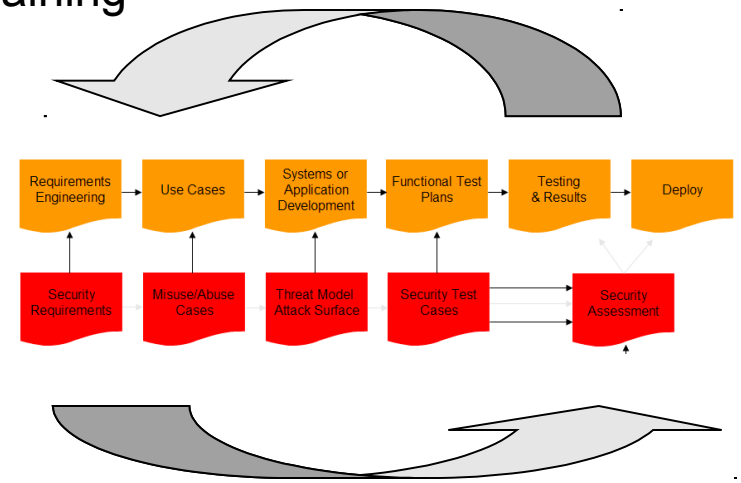
Key concepts

- Initial and *regular* Developer Trainings
- Product Manager / Architect Awareness Training
- Project Kick off Meetings

- Knowledge Base
  - Past issues
  - New vulnerability types / classes
  - Lessons learned

- Feed into :
  - Coding Guidelines
  - Application Security Requirements
  - Design Requirements
  - Coding Guidelines

- Reduced Attack Surface



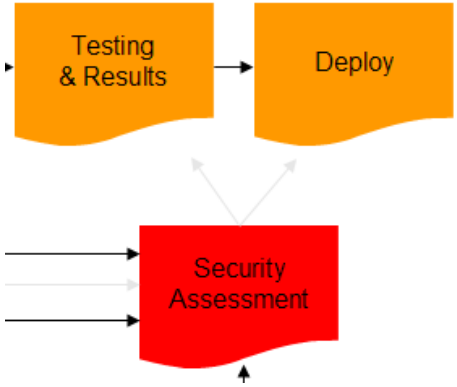
Knowledge management

Secure Development Lifecycle

Signs of Failure of a Secure Development Lifecycle

You are doing it wrong if :

- Simple Bug classes at later stages
  - XSS prior to deploying or in production
  - If your SDL works, there should be no “low hanging fruits”
- Architectural and Design bugs
  - CSRF at a late stage
  - Usually already covered at design/requirements stage



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Secure Development Lifecycle

Phases and Recommendations

Planning and Requirements

- Incorporate security activities into project plans
- Identify key security objectives
- Consider security feature requirements

Consider need to comply with industry standards and by certification processes such as the Common Criteria

- Consider how the security features and assurance measures of its software will
- integrate with other software likely to be used together with its software

Secure Development Lifecycle

Phases and Recommendations

Design

- Define security architecture and design guidelines
- Document the elements of the software attack surface
- Conduct threat modeling

Implementation

- Apply coding and testing standards
- Apply security-testing tools including fuzzing tools (if appropriate)
- Apply static-analysis code scanning tools
- Conduct code reviews

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Secure Development Lifecycle

Phases and Recommendations

Verification

- While the software is undergoing beta testing, conduct a “security push” that includes security code reviews beyond those completed in the implementation phase as well as focused security testing
- Not by members of the development team / can be external

Support

- Prepare to evaluate reports of vulnerabilities and release security advisories and updates when appropriate (Incident Handling)
- Conduct a post-mortem of reported vulnerabilities and take action as necessary
- Improve tools and processes to avoid similar future vulnerabilities (knowledge management)

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Secure Development Lifecycle

Implementing an SDLC Program

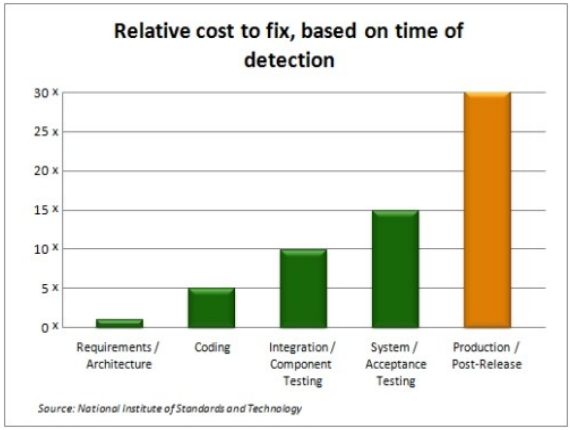
- Most important : Get upper management support
  - **Waste of time trying to implement a program using your budget with limited Senior management backing**
  - Too many stakeholder and political minefields
- Second most important step : Designate an SDLC Evangelist
  - Very important if new to SDLC
  - Responsible for bringing the stakeholders together
  - Monthly senior management meetings (Status, Roadblocks)
  - Can be insourced, should be stress resistant
- Create regular meetings
- Train and motivate
- Get everybody on board
- ….

Agenda

Ideas and Experiences on Budget and Funding

Barriers :

- The name itself “Secure Development Lifecycle “
  - Name is associated to increase in costs and TTM
- Product Management

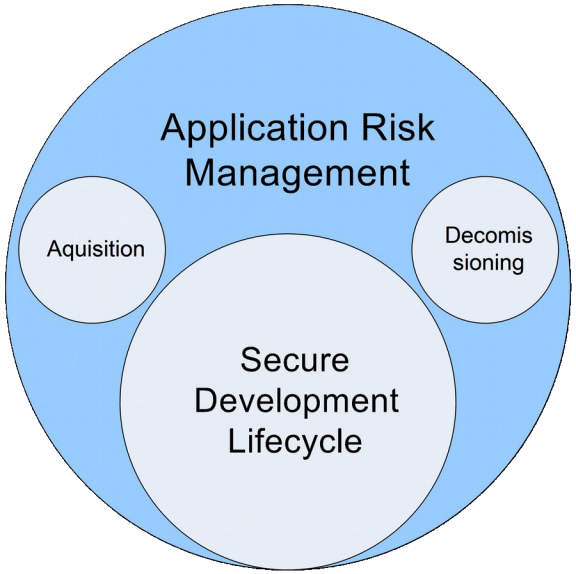


To leverage :

- Focus on Risk and Cost reduction (for once it’s real and we have it)
- Create a few business cases on real examples, use figures
- Compliance (PCI-DSS, you name it)

Application Risk Management

Aquisition



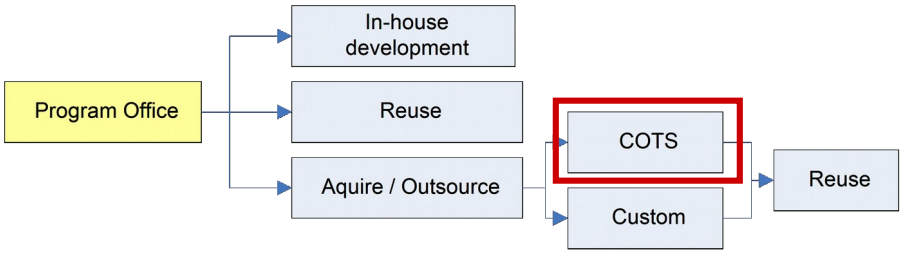
Aquisition

Building Security into the Aquisition Process

Due Diligence Questionnaires / Checklists

Should include :

- Security Track Record
- Financial History and Status
- Software Security Training and Awareness
- Development Process Management
- Foreign influences and interests



- Complete check list can be found :

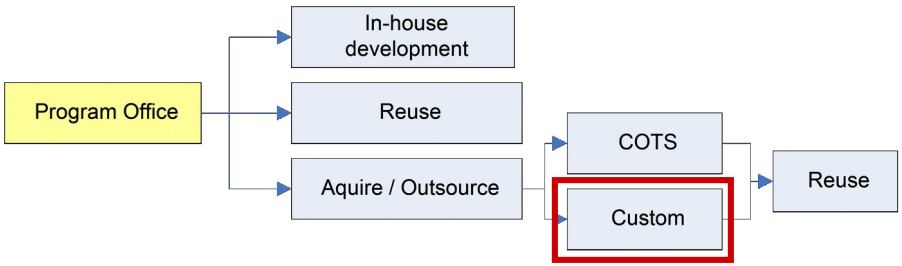
"Software Assurance in Acquisition: Mitigating Risks to the Enterprise"

Aquisition

Building Security into the Aquisition Process

Contractually require a Secure Development Lifecycle

- OWASP and US-CERT offer a template
- Visit them and have them show their Development Processes



- Make them liable as far as possible
- Don't forget the Sustainment (or Post-release Support)

- Require them to be audited by a trusted auditor
  - Audit in the large sense

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Agenda

Thank you

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