Web Application Security for a Smarter Planet

Danny Allan
IBM
dallan@us.ibm.com

OWASP
Sept 10, 2009

The OWASP Foundation
http://www.owasp.org


A Smarter Planet

The Smarter Planet

Globalization and Globally Available Resources

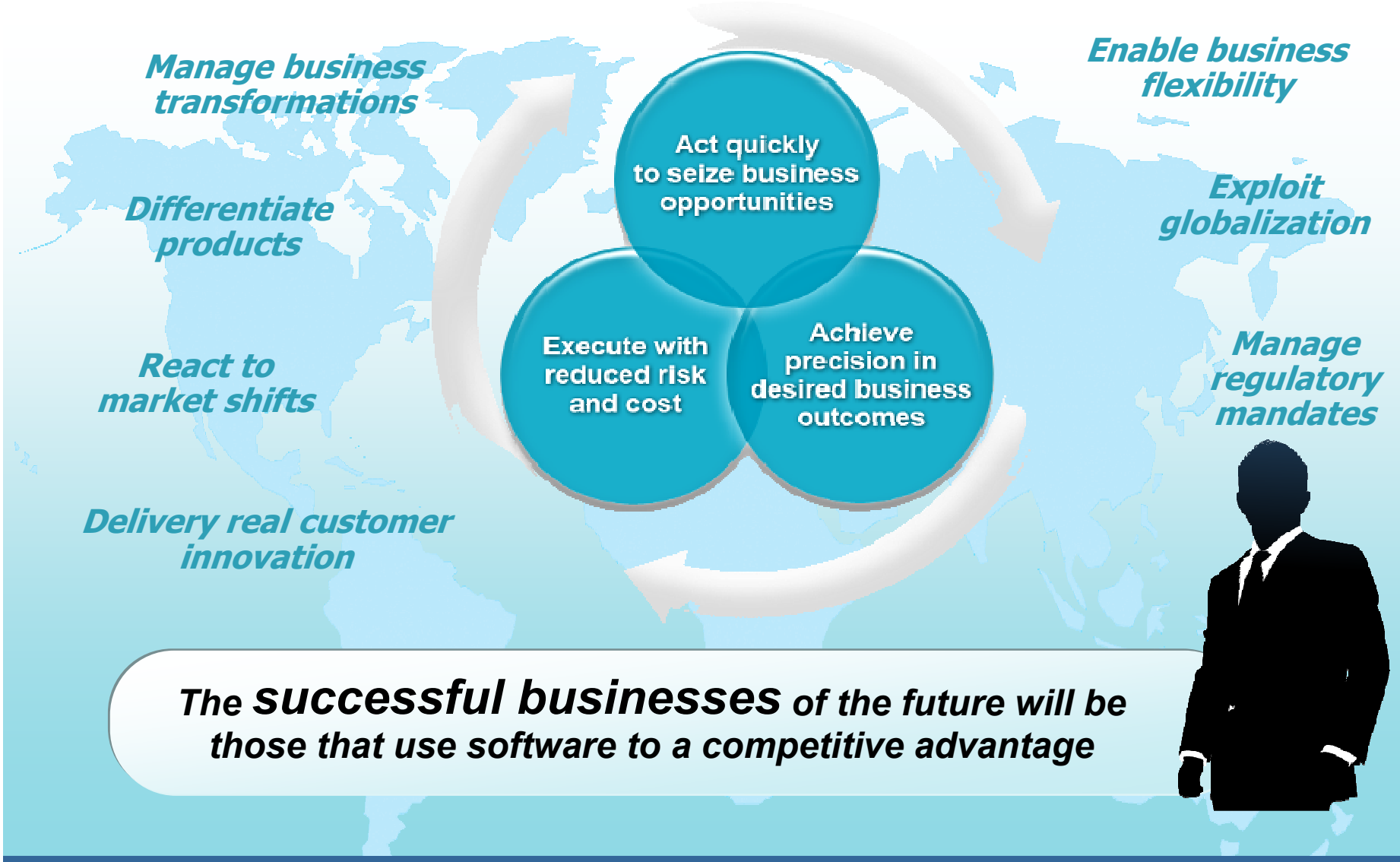
Billions of mobile devices accessing the Web

Access to streams of information in the Real Time

New Forms of Collaboration

New possibilities.
New complexities.
New risks.

Businesses face an unparalleled rate of change



Enabling business innovation and agility requires a significant investment in software

- Software is increasingly being managed as a ***strategic business asset,*** key enabling sustained business differentiation and flexible operations
- Businesses everywhere are deploying increasingly ***intelligent, interconnected*** and ***instrumented*** software & products
- Enabling innovation, lowering costs and managing change depends on ***effective*** and ***secure software delivery***

Innovation for a Smarter Planet

Increasingly interconnected software supply chain

Composed of purchased, outsourced and in-house built software assets which are ever-evolving and increasingly interdependent

How can I improve software delivery?

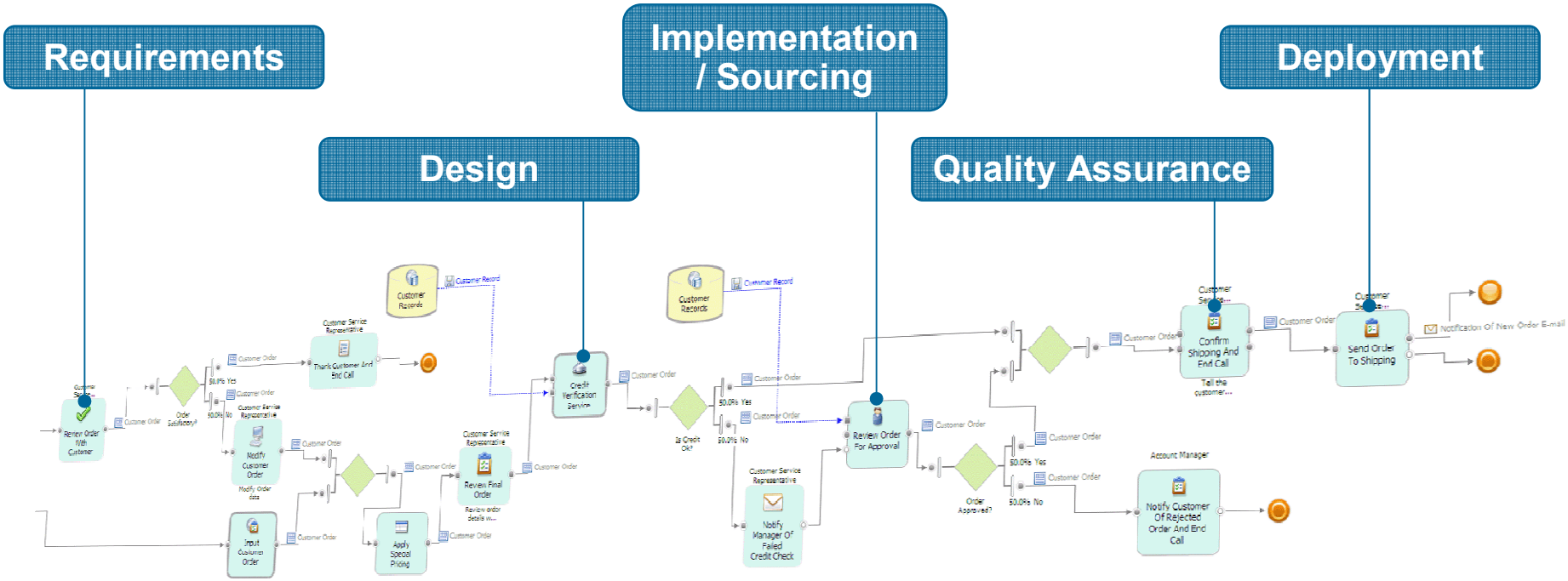
*"How do I further **automate** software delivery within my organization?"*

*"How can I enable **collaboration** throughout the software delivery process?"*

*"How can I **unobtrusively gather measurements** to ensure progress towards desired business outcomes?"*

*"How do I make **incremental, iterative progress** towards more effective software delivery?"*

Software delivery is a business process that must be continuously measured and improved



CIO's top priority on behalf of the CEO
over last three years:
"Improving Business Processes"

Source: Gartner, "Making the Difference: The 2008 CIO Agenda," Jan. 2008


Software Security

The Security Equation Has Changed

- How businesses look at security has changed
  - Security is now business driven not technology driven
  - Security is now defined through risk management and compliance disciplines instead of threat and technology disciplines
- The threat landscape has changed
  - Traditional operating system and native client application security risks have become somewhat passé
  - Client threats are now all about the browser environment
  - Server threats are now all about web applications

The Security Landscape of Old

- Traditional Infrastructure was easier to protect . . .
  - Concrete entities that were easy to understand
  - Attack surface and vectors were very well-defined
  - Application footprint very static
  - Perimeter defense was king

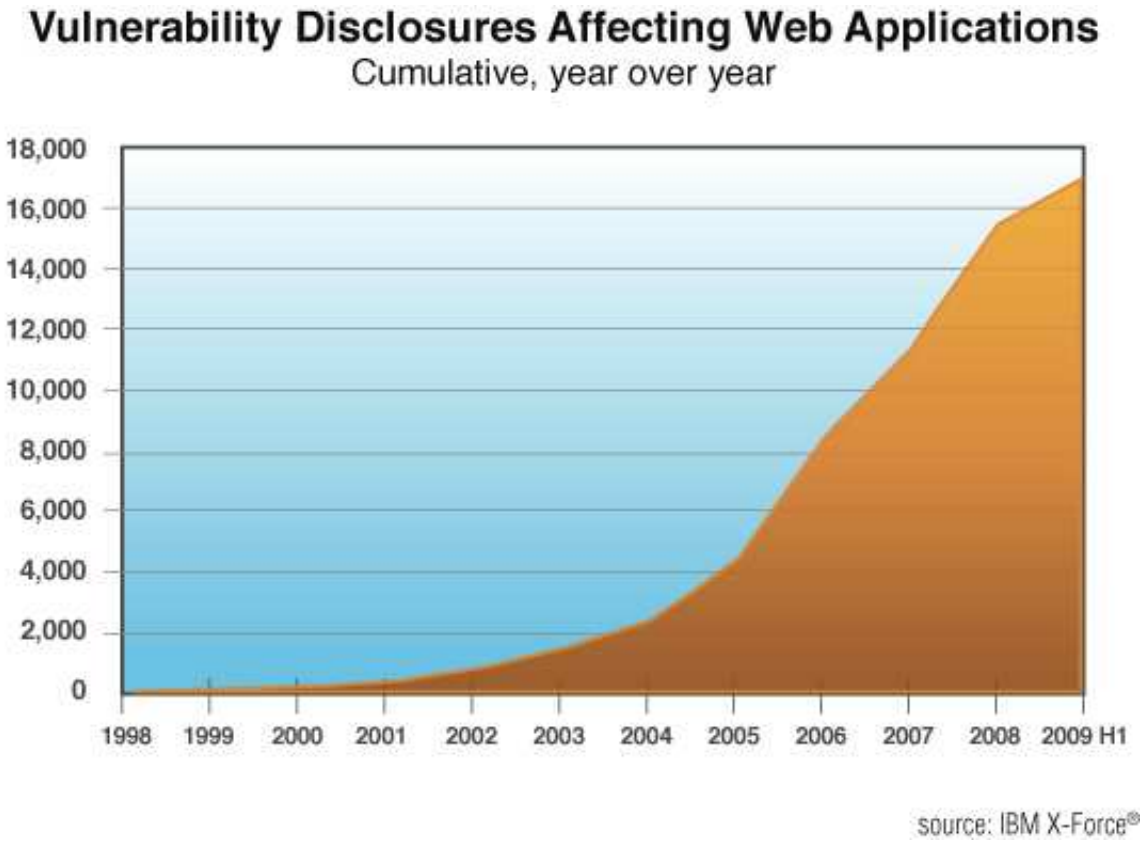
Changing Security Landscape of Today

"Webification" has changed everything ...

- Infrastructure is more abstract and less defined
- Everything needs a web interface
- Agents and heavy clients are no longer acceptable
- Traditional defenses no longer apply

Growth of Web Application Vulnerabilities

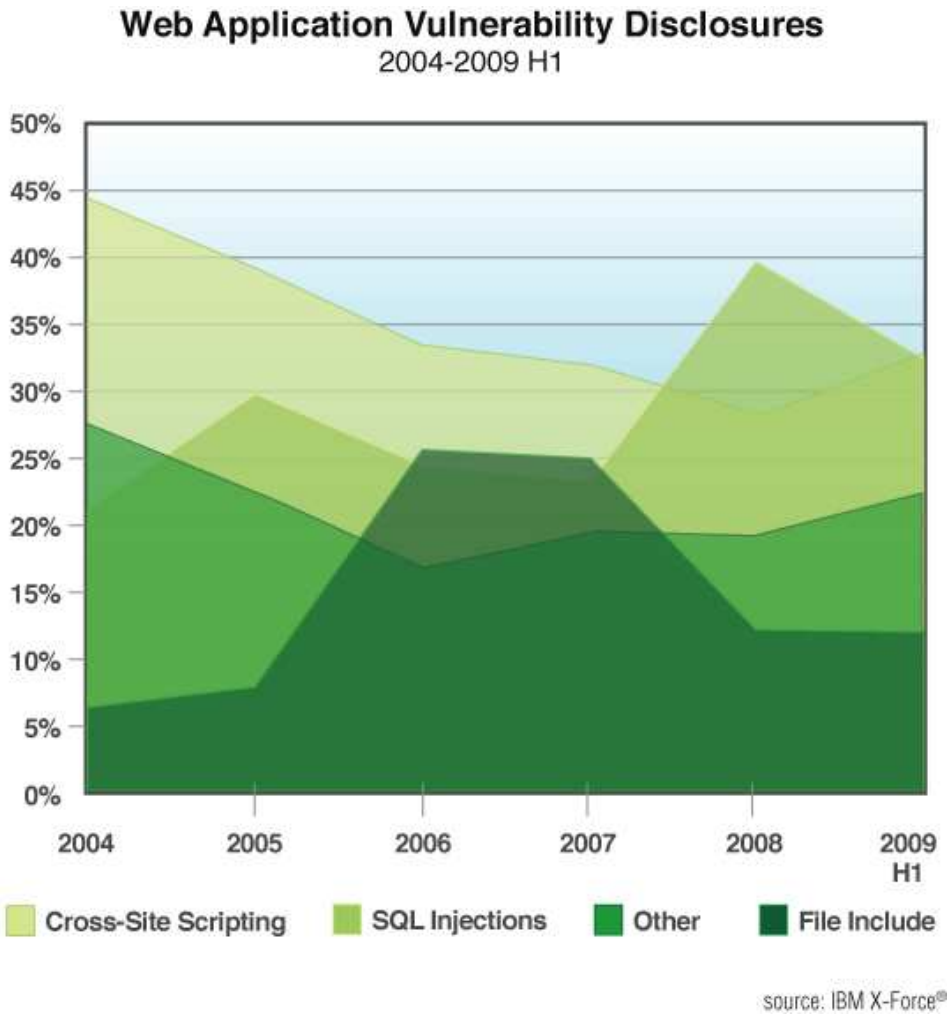
- SQL injection vulnerability disclosures more than doubled in comparison to 2007



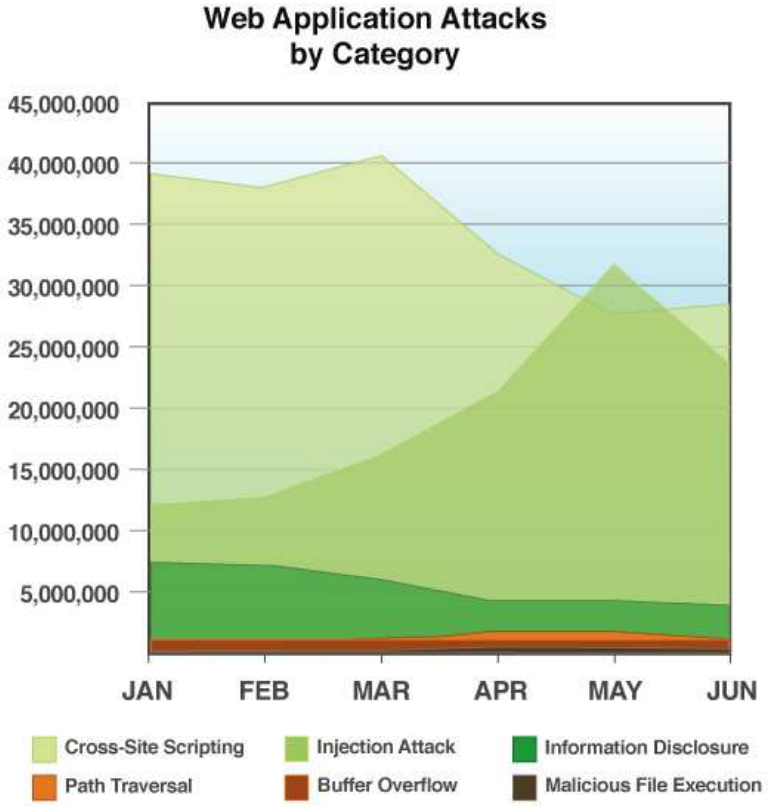
- The number of active, automated attacks on web servers was unprecedented

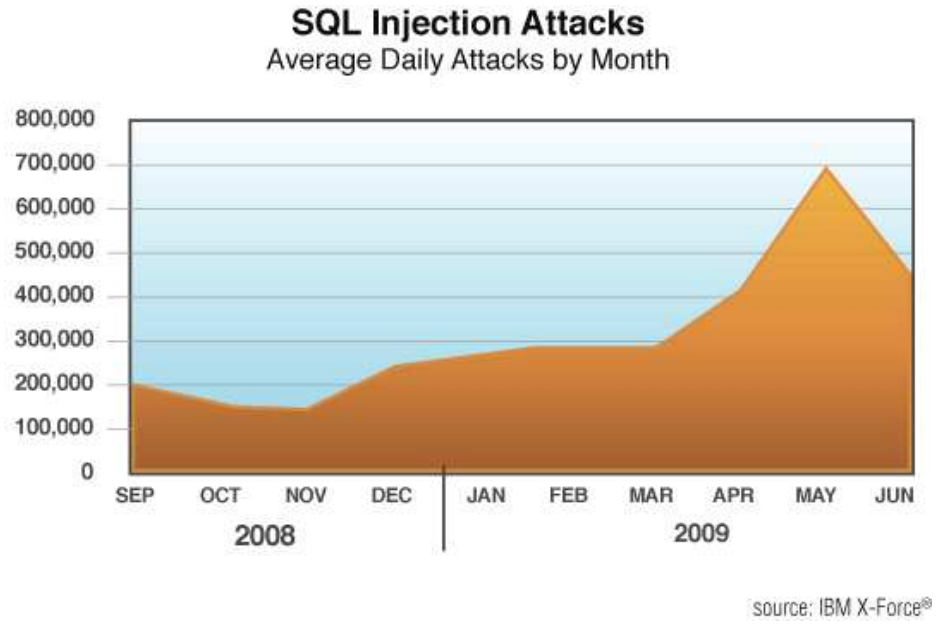
Attack Techniques are Plentiful and Trivial

- SQL injection and cross-site scripting are the two largest categories of Web application vulnerabilities
- Automated toolkits have allowed for mass defacements and planting of malware



Attacks & Exploitation are Rampant

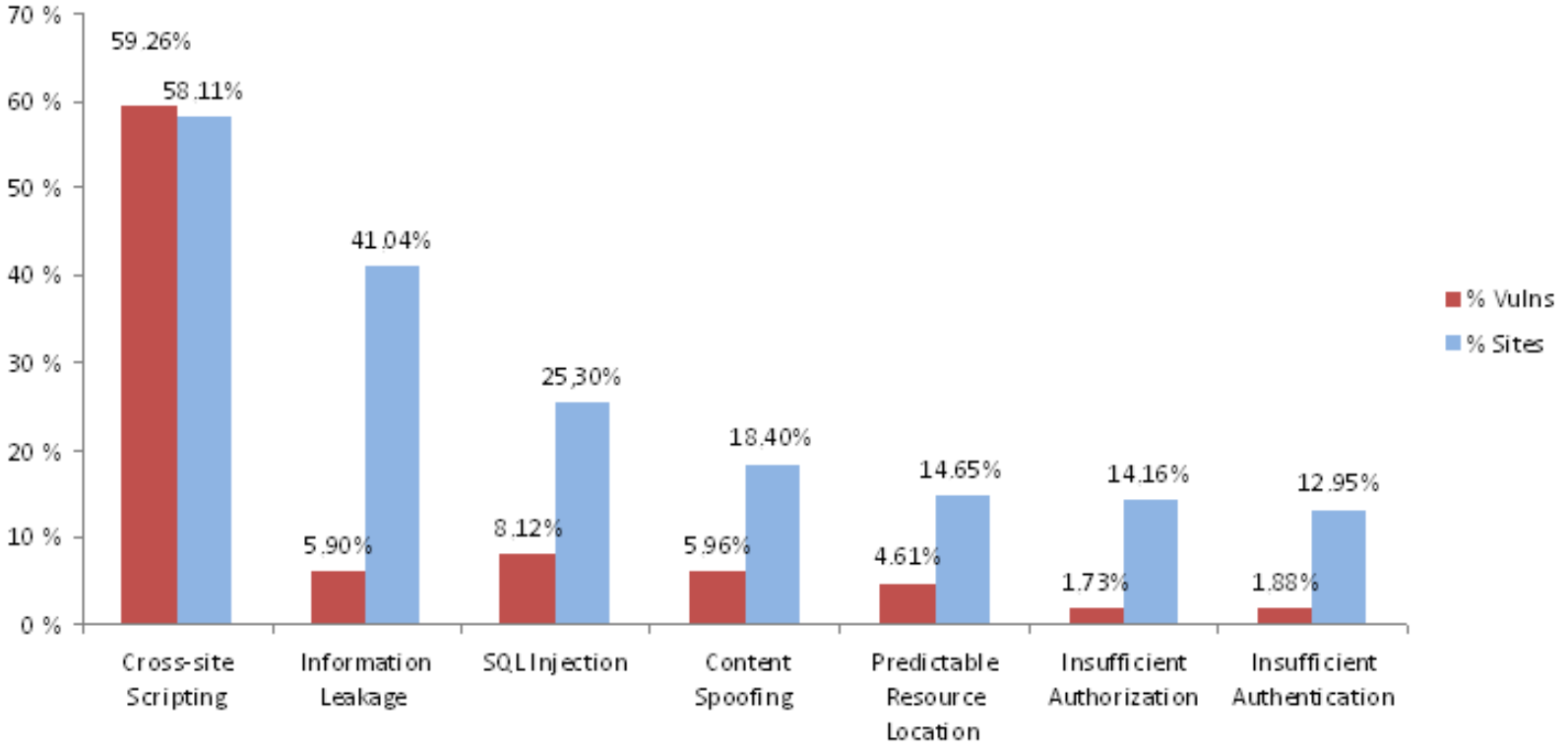




Web Threats Will Become More Complex

- Web becoming main application delivery interface and ecosystem
- Popularization of new web technologies (Web 2.0) growing attack surface
- New techniques and scenarios for targeting web infrastructure

Vulnerability Probability (32,717 sites)

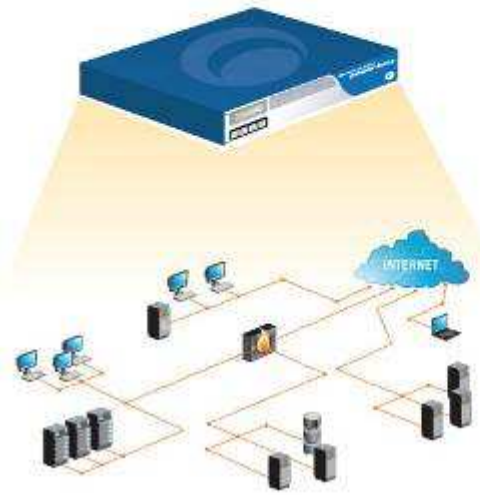


Source: WASC 2007 Web Application Security Statistics

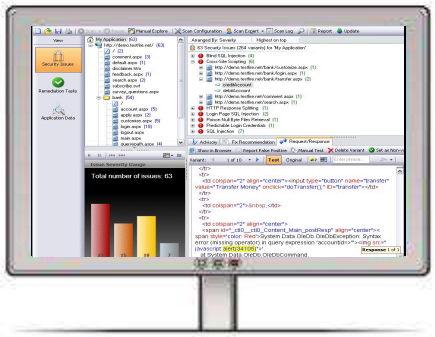

DEMO

Application Security Testing?

Explore source code and/or web site to detect structure



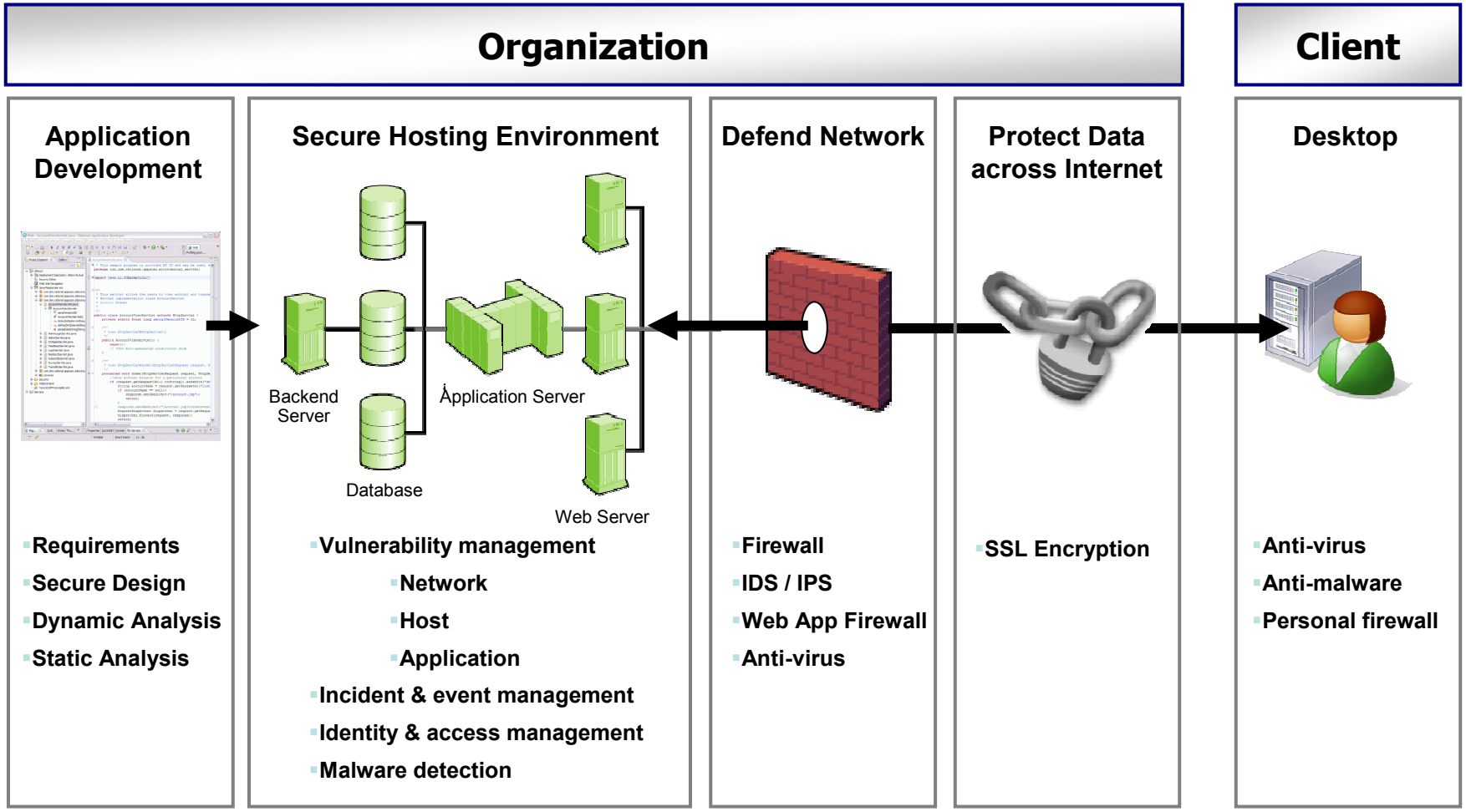
Identify Vulnerabilities ranked after severity and show how it was identified



Advanced remediation, fix recommendations and security enablement


Web Application Security for a
Smarter Planet

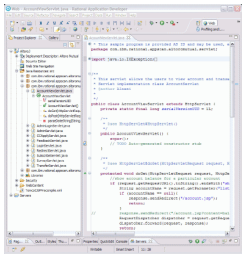
Secure Web Applications: Who is responsible?



Secure Application Development

- Challenge
  - Ensure the creation of high quality, secure and compliant software
  - Ensure effective management of secure requirements, design and testing
  - Lifecycle management of vulnerabilities
  - Application Lifecycle Management (ALM)
- Industry Technologies
  - Dynamic Analysis
  - Static Analysis
  - Runtime Analysis

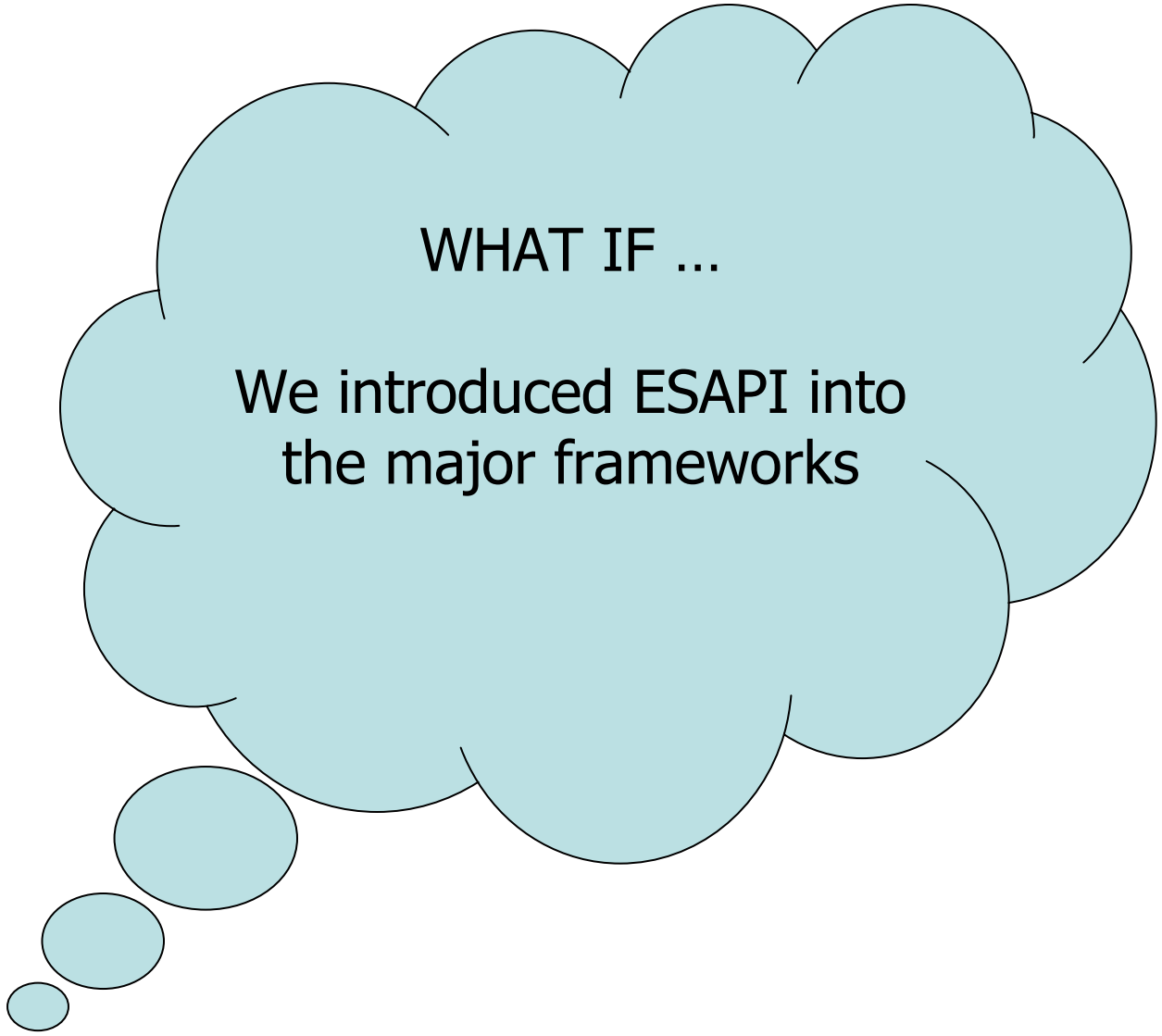
Application Development



- Requirements
- Secure Design
- Dynamic Analysis
- Static Analysis

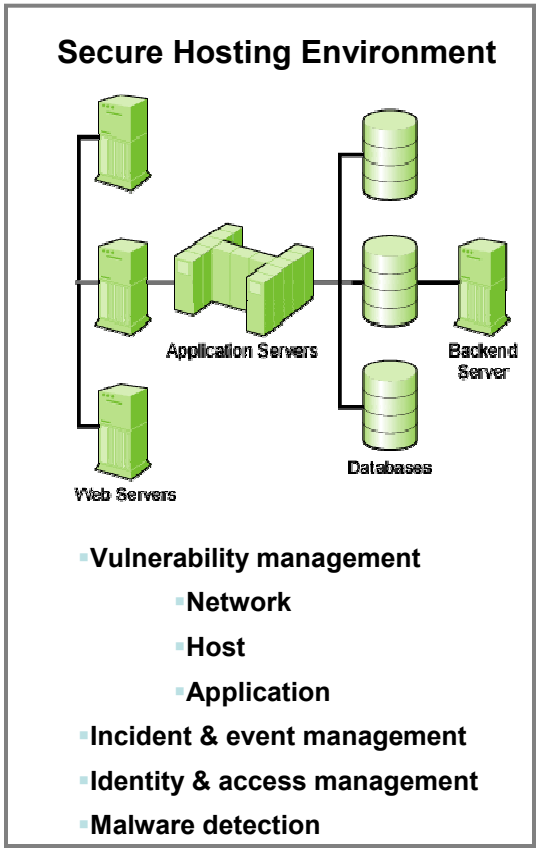
Essential Technologies for Secure Software

1. Source Control & Change Request Management
2. Requirements & Test Management
3. Education Services
4. Development Automation
5. Artifact Management


WHAT IF …
We introduced ESAPI into the major frameworks

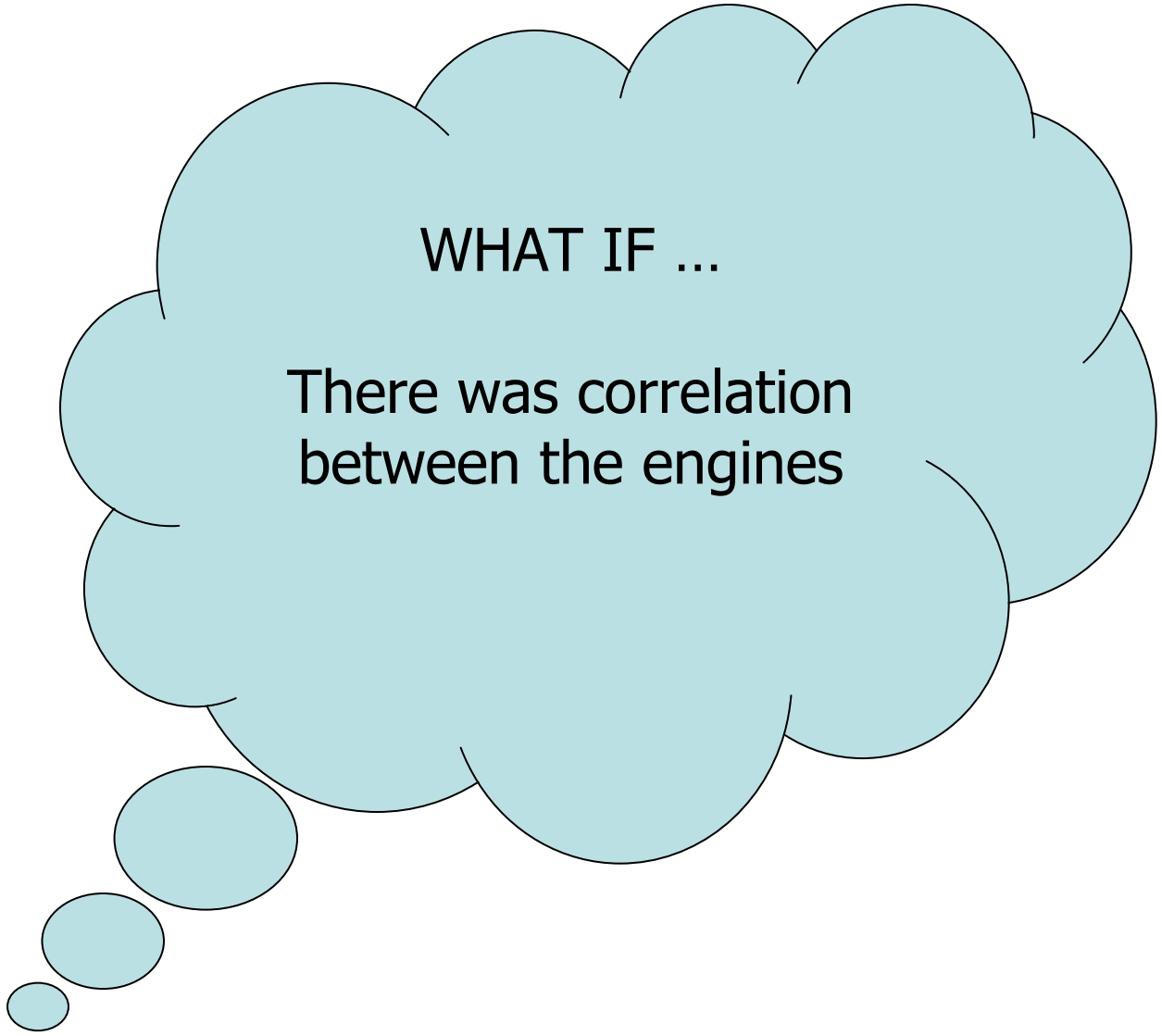
Secure Hosting Environment

- Challenges
  - Maintain a secure environment
  - Ensure security policies are implemented and enforced
  - Lifecycle management of vulnerabilities and incidents
  - Assess production systems for malware
- Industry Solutions
  - Automated Scanners
  - Manual Analysis
  - Operational Management



Essential Technologies for Secure Operations

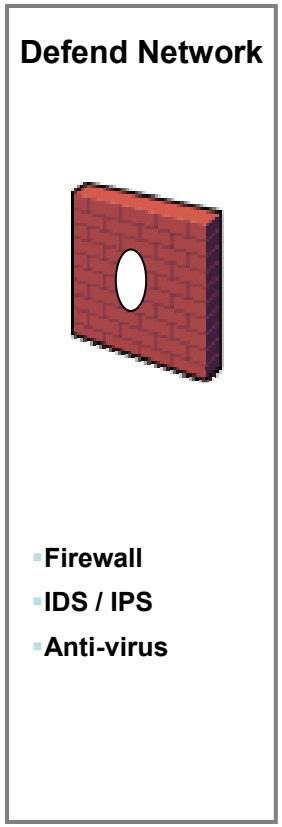
- Protect
  - Web Application Firewalls
- Assess
  - Host Configuration
  - Network
  - Application
- Management
  - Vulnerabilities
  - Incidents

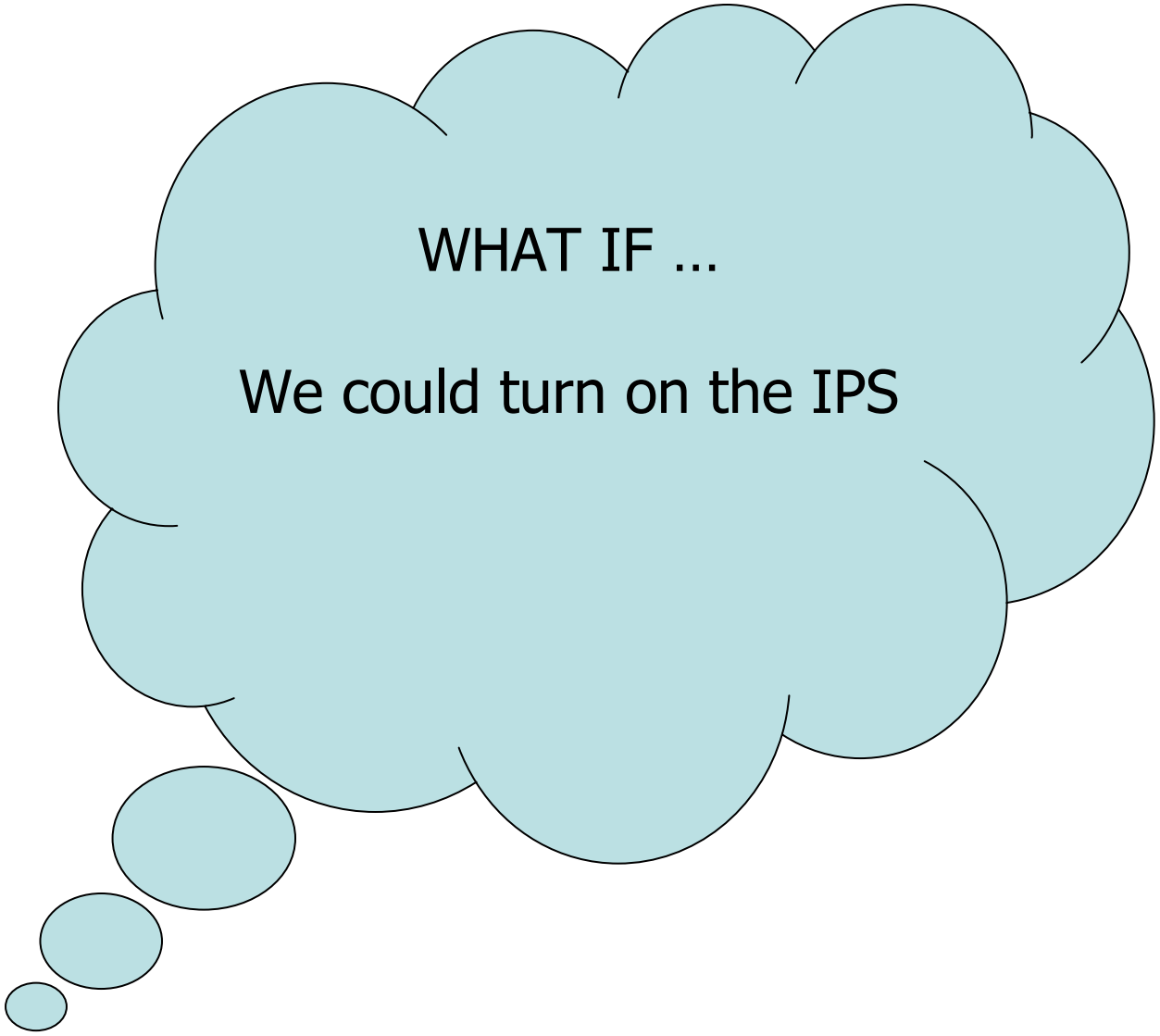

WHAT IF …
There was correlation between the engines

Defending the Network

- Challenge
  - Protect your business from Internet threats without jeopardizing bandwidth or availability
  - Protect your end users from spam and other productivity drainers
  - Conserve resources by eliminating the need for specialized security expertise

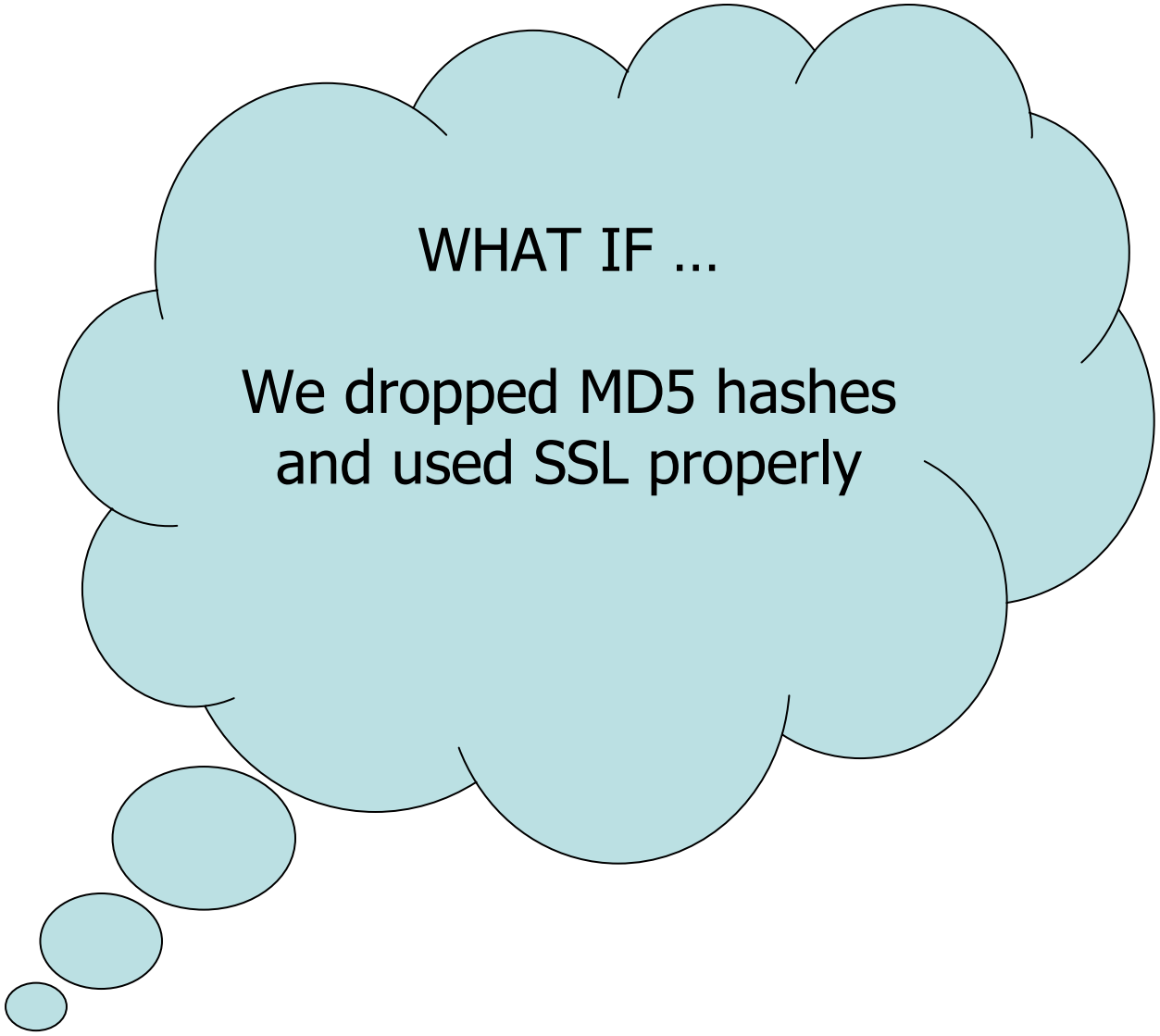
- Industry Solutions
  - Firewalls
  - Intrusion Detections Systems
  - Intrusion Prevention Systems




WHAT IF …
We could turn on the IPS

Encrypting transmission across the Internet

- Challenge
  - Ensuring data and intellectual property is not stolen while crossing the Internet
  - Ensuring that data is not tampered with or altered between the server and client
  - Ensure that a malicious site does not impersonate the legitimate server and establish communication with the client
- Industry Solutions
  - SSL Encryption

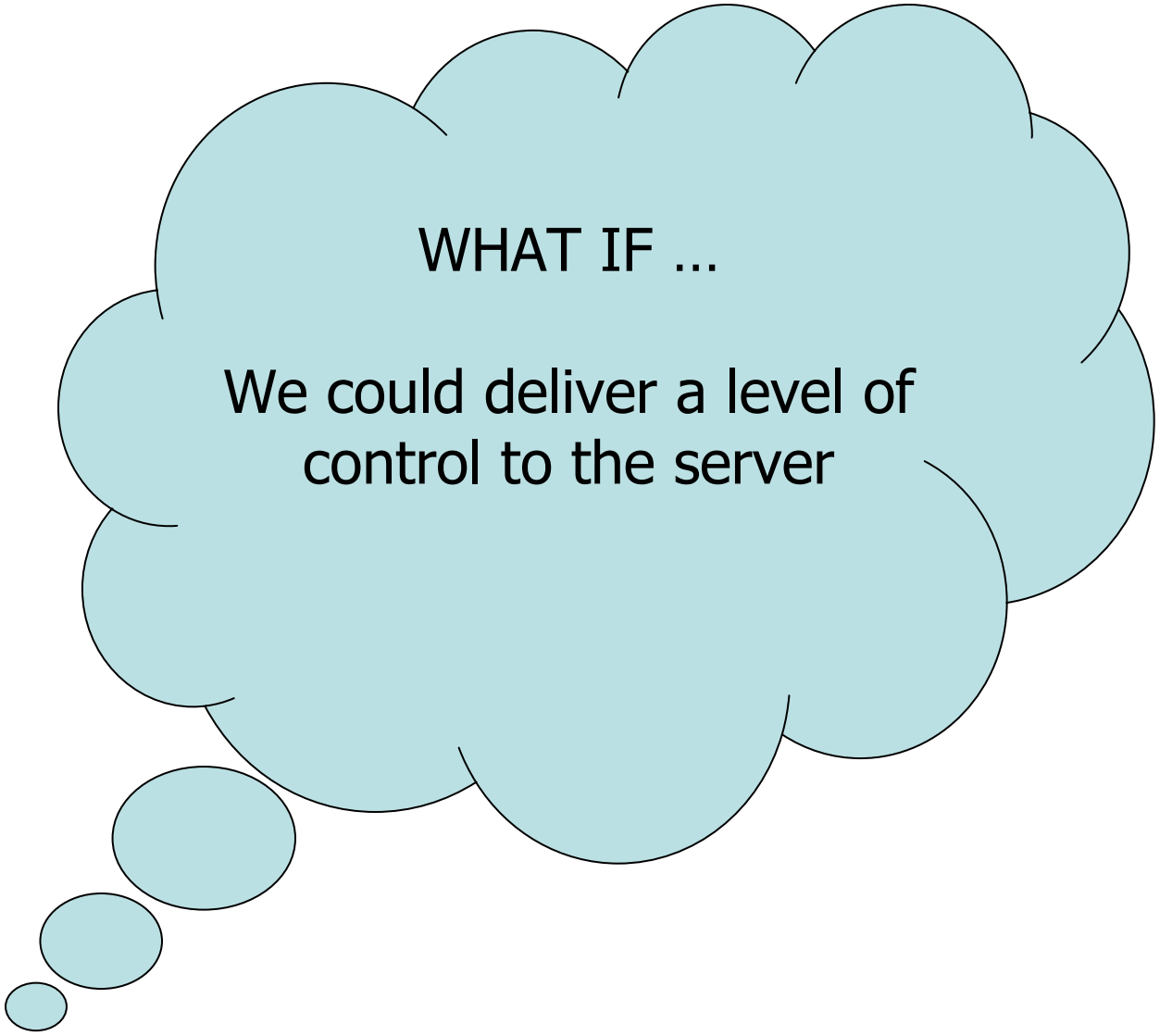

WHAT IF …
We dropped MD5 hashes
and used SSL properly

Client-side Security

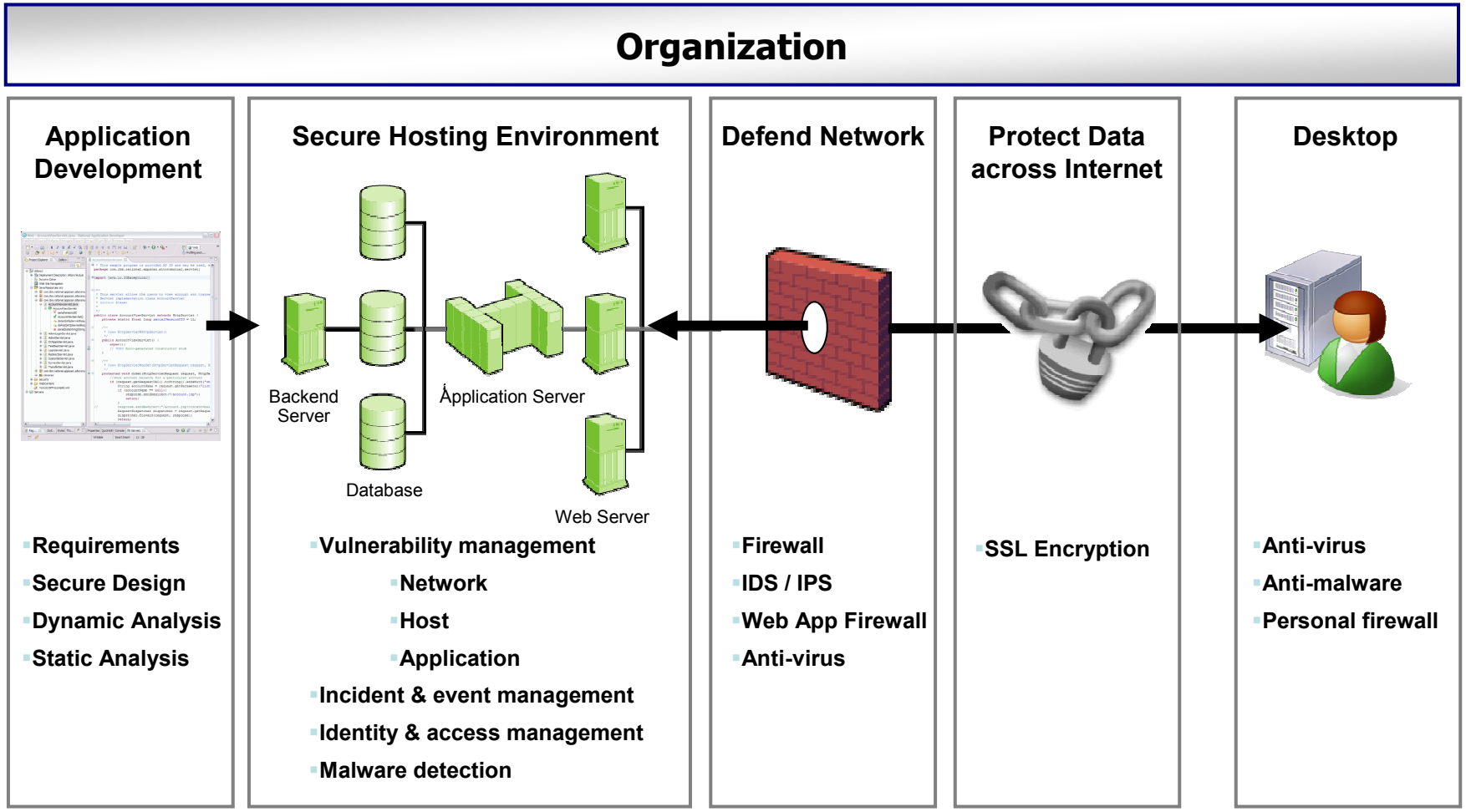
- *Organization can not control their external clients*

- Internal client challenges
  - Mitigating risks posed by zero-day, targeted attacks
  - Protecting critical data and intellectual property
  - Minimizing costs and lost productivity associated with remediating infected endpoints
  - Reducing help desk calls

- Industry Solutions
  - Anti-virus
  - Anti-malware
  - Personal firewall


WHAT IF …
We could deliver a level of control to the server

Web Applications: A Smarter Approach




Thank
You