Software Security Testing

The Next Frontier

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cigital
Software Confidence. Achieved.

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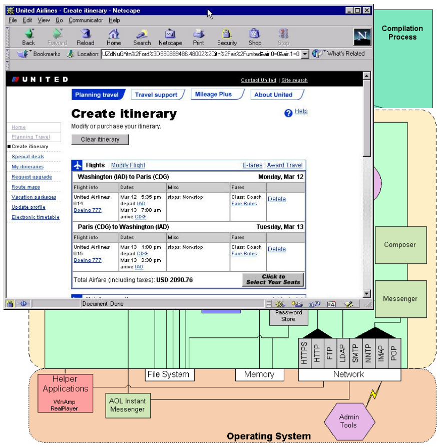
About Cigital

- A leading consulting firm specializing in helping organizations improve their software security and software quality posture
- Recognized experts in “Building Security In”
- Extensive Industry Standards, Best Practices, and Regulatory Compliance Experience

Software Security Is A Challenge

The Trinity of Trouble

- **Connectivity**
  - The Internet is everywhere and most software is on it
- **Complexity**
  - Networked, distributed, mobile code is hard
- **Extensibility**
  - Systems evolve in unexpected ways and are changed on the fly



United Airlines - Create itinerary - Netscape

UNITED

Create itinerary

Modify or purchase your itinerary.

Flights Modify Flight E-fares | Award Travel

Washington (IAD) to Paris (CDG) Monday, Mar 12

Flight info	Dates	Misc	Fares	
United Airlines 914 Boeing 777	Mar 12 5:35 pm depart IAD Mar 13 7:00 am arrive CDG	stops: Non-stop	Class: Coach Fare Rules	Delete

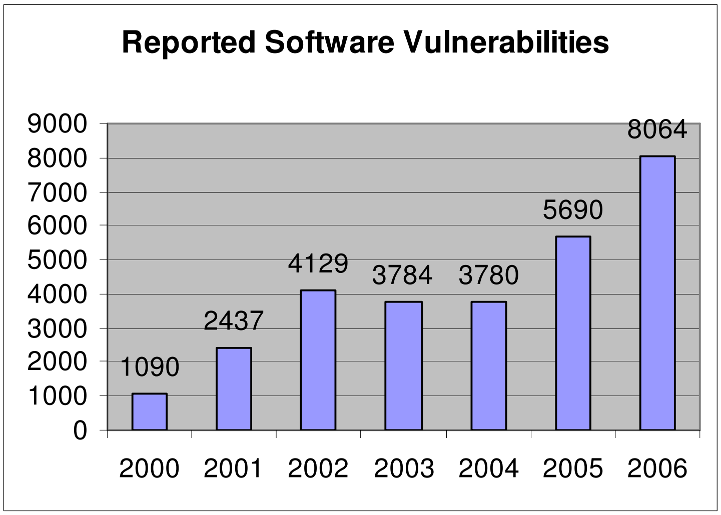
Paris (CDG) to Washington (IAD) Tuesday, Mar 13

Flight info	Dates	Misc	Fares	
United Airlines 915 Boeing 777	Mar 13 1:00 pm depart CDG Mar 13 3:30 pm arrive IAD	stops: Non-stop	Class: Coach Fare Rules	Delete

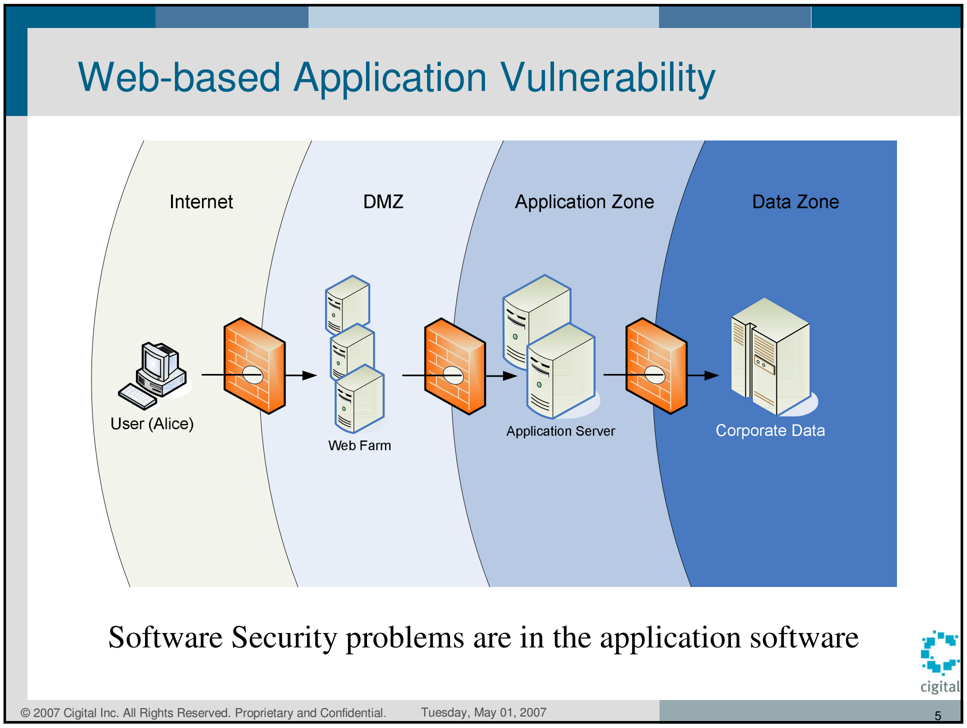
Total Airfare (including taxes): USD 2090.76

Document: Done

Software Vulnerability Growth

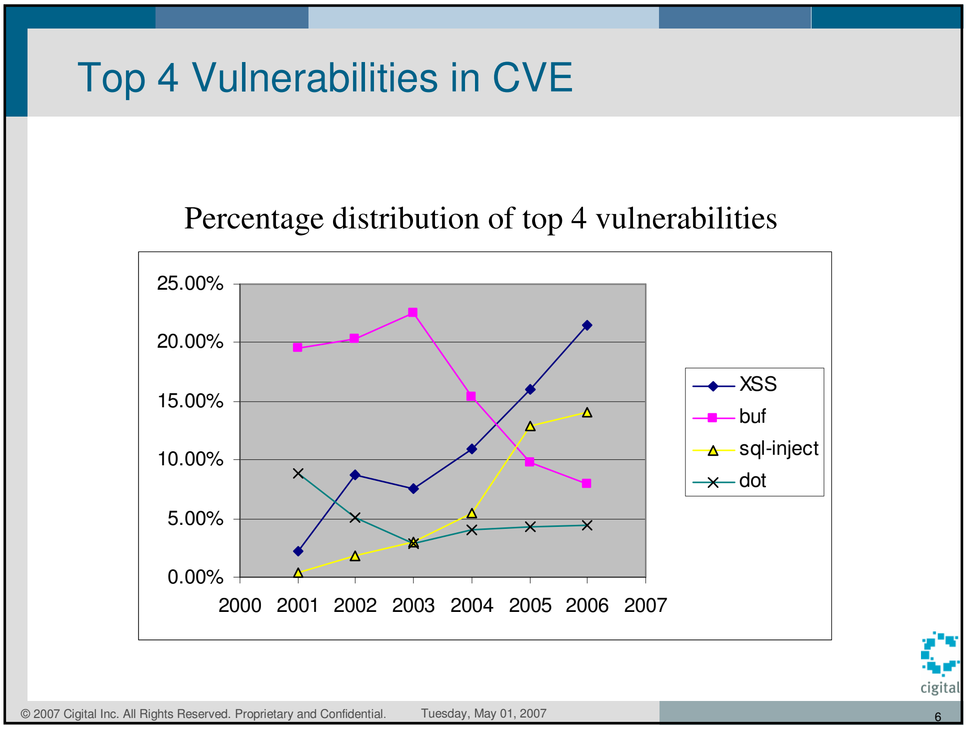


Source: CERT



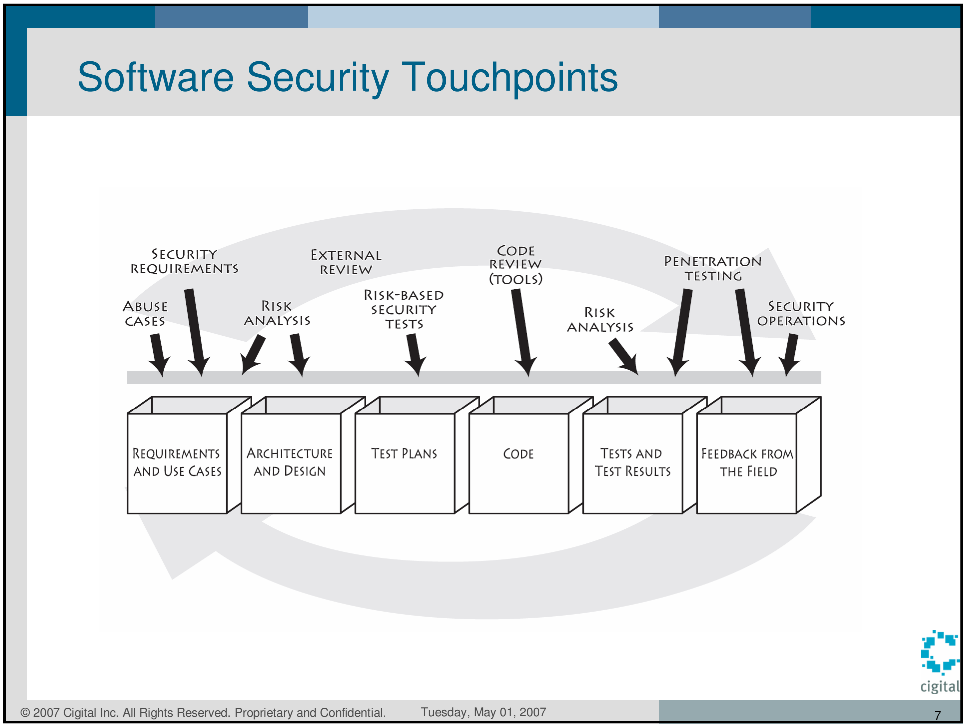
Web-based Application Vulnerability

Software Security problems are in the application software



Top 4 Vulnerabilities in CVE

Percentage distribution of top 4 vulnerabilities



Software Security Touchpoints

Security Requirements

Abuse Cases

External Review

Risk Analysis

Risk-Based Security Tests

Code Review (Tools)

Risk Analysis

Penetration Testing

Security Operations

Requirements and Use Cases

Architecture and Design

Test Plans

Code

Tests and Test Results

Feedback from the Field

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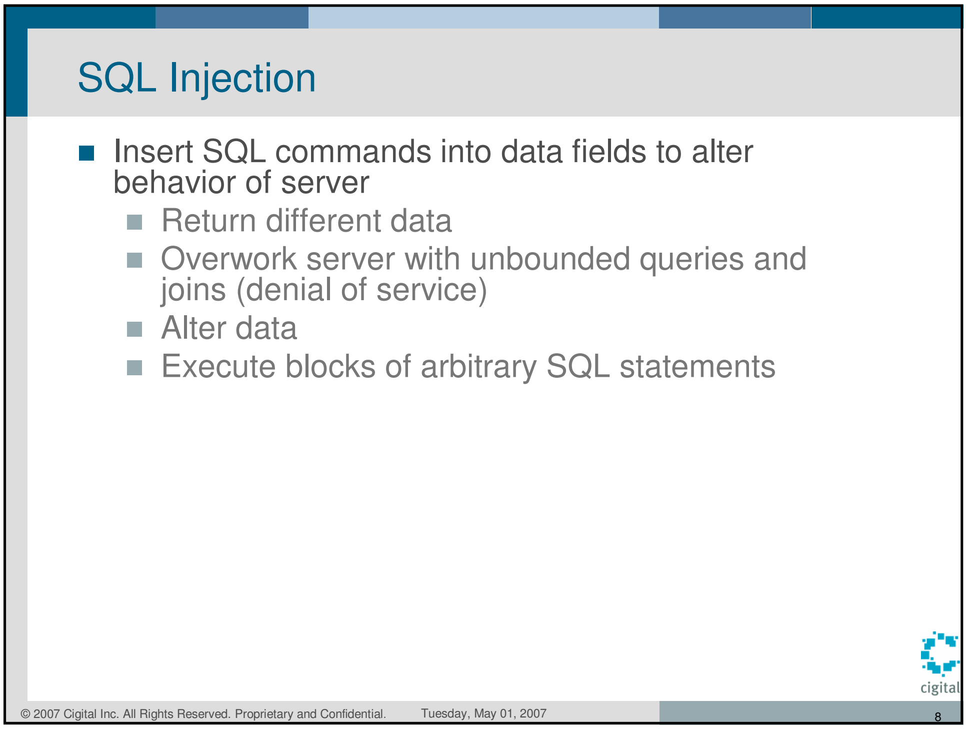
Tuesday, May 01, 2007



SQL Injection

- Insert SQL commands into data fields to alter behavior of server
  - Return different data
  - Overwork server with unbounded queries and joins (denial of service)
  - Alter data
  - Execute blocks of arbitrary SQL statements

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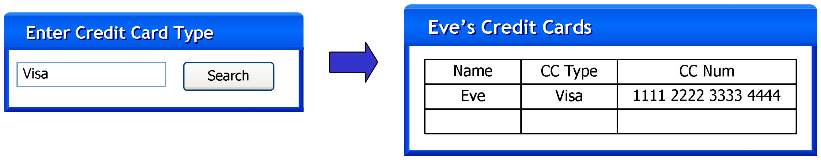
Example SQL Injection Vulnerability



Enter Credit Card Type

Visa

Eve’s Credit Cards

Name	CC Type	CC Num
Eve	Visa	1111 2222 3333 4444

- Compose a dynamic query based on user input:

```
SELECT cc_type, cc_num FROM cc_data
  WHERE id=‘%s’ AND cc_type=‘%s’
```

- Normal **cc_type** = ‘Visa’:

```
SELECT cc_type, cc_num FROM cc_data
  WHERE id=‘123456789’
  AND cc_type=‘Visa’
```

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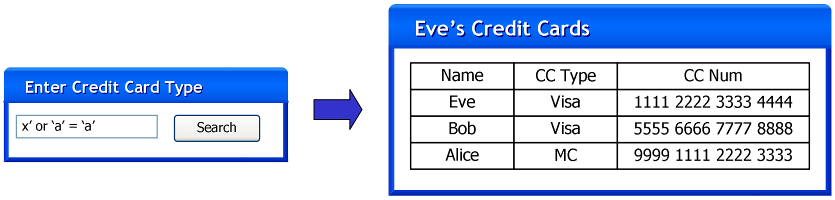
JRM2

SQL Injection

- Insert SQL commands into data fields to alter behavior of application
- Example: Enter x’ OR ‘a’=‘a instead of “Visa” to produce

```
SELECT cc_type, cc_num FROM cc_data
  WHERE id=‘123456789’ AND
  cc_type =‘x’ OR ‘a’ = ‘a’
```

- Results in all credit card data being returned



Enter Credit Card Type

x’ or ‘a’ = ‘a’

Eve’s Credit Cards

Name	CC Type	CC Num
Eve	Visa	1111 2222 3333 4444
Bob	Visa	5555 6666 7777 8888
Alice	MC	9999 1111 2222 3333

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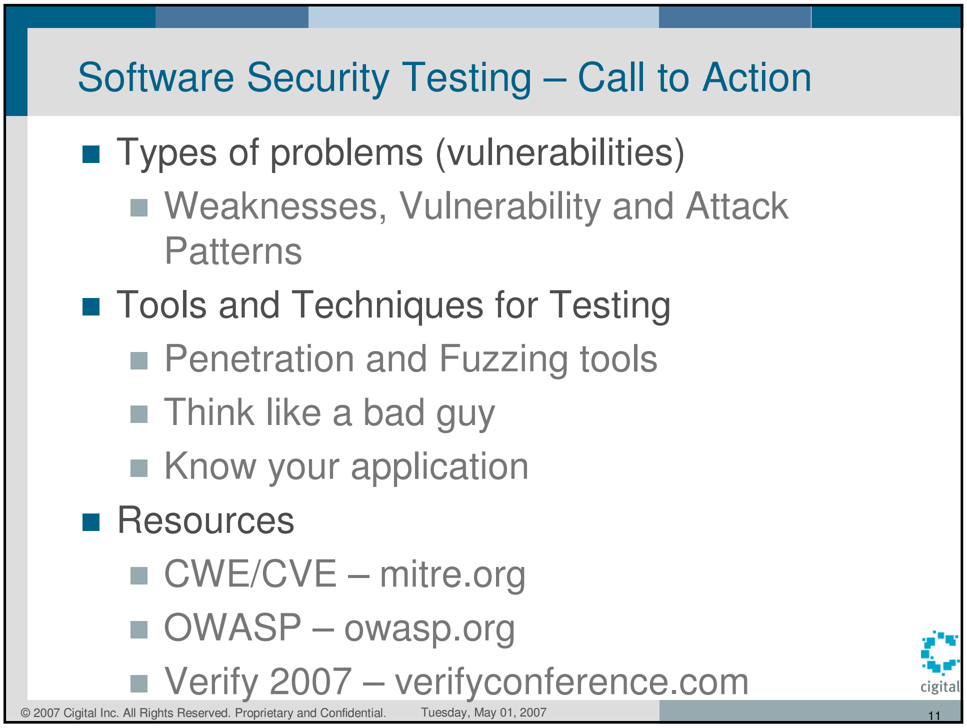
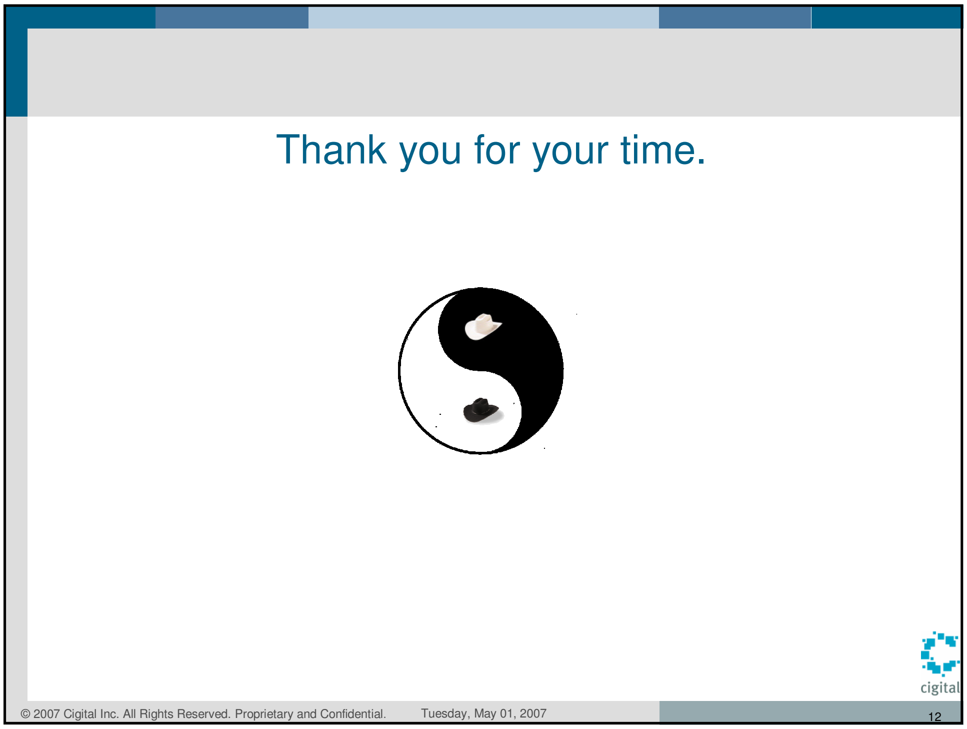
Slide 10

JRM2 Brook: Explain why this is important to morgan.
rmills, 11/6/2006



Software Security Testing – Call to Action

- Types of problems (vulnerabilities)
  - Weaknesses, Vulnerability and Attack Patterns
- Tools and Techniques for Testing
  - Penetration and Fuzzing tools
  - Think like a bad guy
  - Know your application
- Resources
  - CWE/CVE – mitre.org
  - OWASP – owasp.org
  - Verify 2007 – verifyconference.com



Thank you for your time.