Performance and Security issues in the software design

Dipartimento di Informatica
Università degli Studi di L’Aquila

PhD student
Catia Trubiani
catia.trubiani@univaq.it

Advisor
Vittorio Cortellessa
vittoria.cortellessa@univaq.it

Roadmap

» Motivation
» Performance vs Security
» Performance Improvement
» Discussion
**Motivation**

- **Software developers’ world (vocabulary) is intrinsically distant from extra-functional analysts’ one**

- **Target**: investigate the relationship of the software system design and its measurable quality attributes

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**Performance vs Security**

- **How much the security solutions degrade performance?**

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Performance vs Security Process

Security Library

Basic Mechanisms

Composed Mechanisms

Architectural Model

Performance Model

Security Performance Model of $S_0$

Security Performance Model of $S_1$

Security Performance Model of $S_n$

» Trade-off decisions driven by the system configurations !!!

A vision of our Security Library

» A compositional approach

(1) Modeling Basic Mechanisms

(2) Defining Composition Rules

(3) Modeling Composed Mechanisms

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Performance Improvement

» What to change to improve the software design?

Performance Improvement Process

» Performance Indices complexity
  - Numbers to be interpreted
  - Different levels of granularity
  - Cross-checking of software system characteristics
A vision of our approach

- A framework: its main activities

  (1) Specifying Antipatterns
  (2) Detecting Antipatterns
  (3) Solving Antipatterns

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Discussion

- Some issues and current works
  - Performance vs Security
    - Security Mechanisms: modeling, monitoring, validation
  - Performance Improvement
    - Antipatterns: specifying, embedding, rating, combining, solving

- Open issues and future works
  - Performance vs Security
    - What happens in the existing protocols (e.g., openSSL)?
  - Performance Improvement
    - What happens if design and architectural changes are performed at run-time?

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