WP5: Dynamic Analysis

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at the Final review of DEGAS, 6 April 2005

Objectives of WP5

- Comparing and finding new language abstractions to design global applications;
- New models and techniques for integrated quantitative and security analysis;
- Enhancing understanding and applicability of dynamic analysis for global computing systems;
- Proof-of-concept implementations to validate the above treatment.

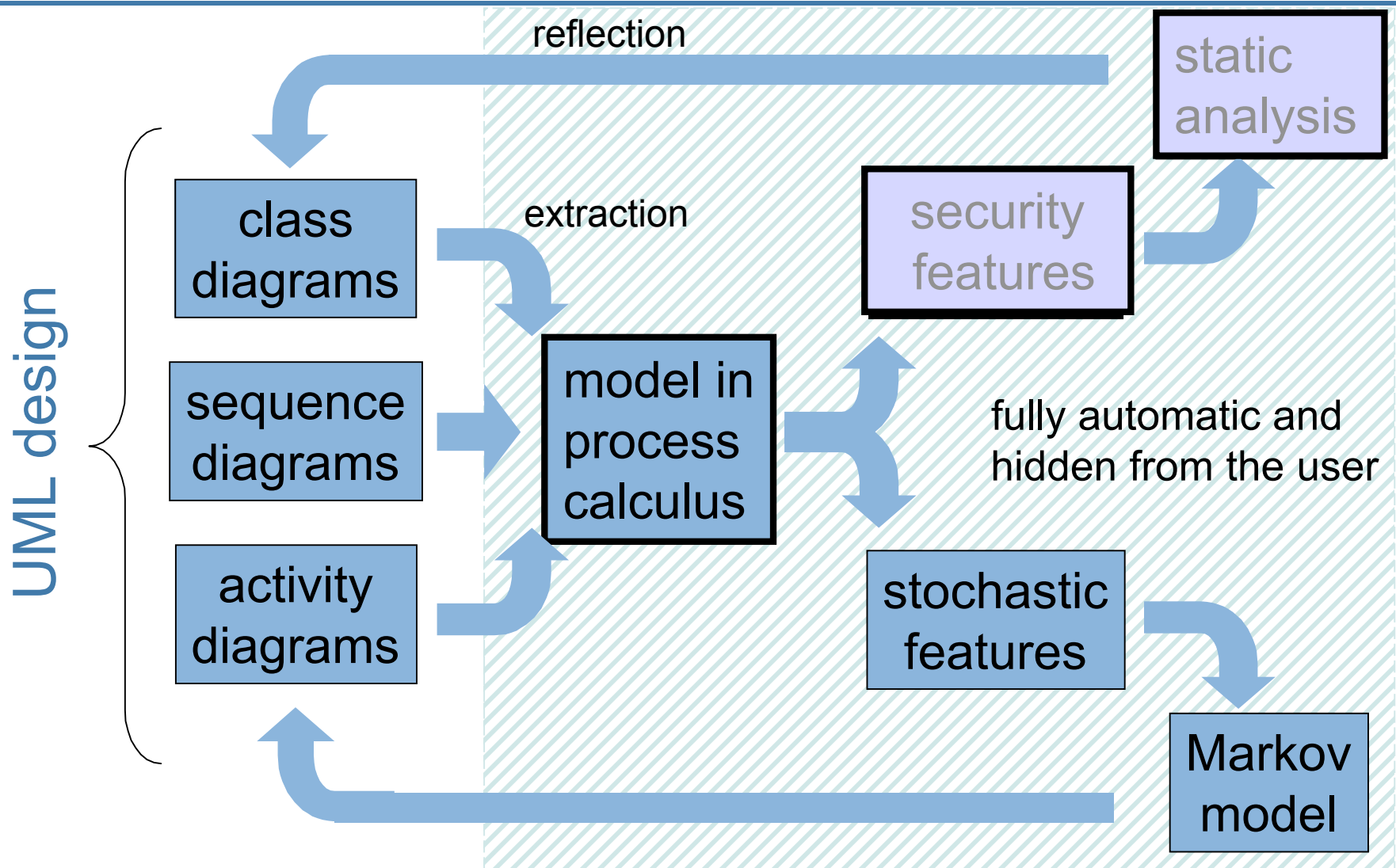Two tasks: stochastic features + security features

Analysis tools are needed for

- Measuring global applications

- Comparing protocols while checking them correct

- Finding trade-off between security and efficiency

- Establishing the timeliness of response and efficient use of resources of global applications during the design phase

Deliverables on Dynamic Analysis

- **D8 Process algebras for Global Applications**

  Report on the basic primitives for the abstract design of global applications

- **D10 Models and techniques for dynamic analysis**

  Report on the foundational development on quantitative and security dynamic analysis.

- **D12 Definition of the internal representation in VENV**

  Report on the internal structures of VENV and the results of the analysis

- **D13 Final report on dynamic techniques**

  Report on the dynamic techniques defined and refined after the proof-of-concept tool testing

- **D17 Interpreters**

  Prototypes that translate process algebra specifications into the representations defined in D11 (Models and Techniques for Static Analysis)

- **D18 Dynamic analyzers**

  Prototypes that validate ideas on dynamic techniques

Papers

Conference papers:

2002: 7   2003: 24   2004/5: 16

(I looked at the PPR, but I miss those in the last 4 months from your site: tell me your number, pl.)

Journal Papers:

2002: 3   2003: 3   2004/5: 2

(in the last 4 months: idem)

Reports: about 15

PhD Thesis: 2

Models, Techniques and Tools

Two main classes of process algebras that express "quantitative" information

- explicitly (PEPA and PEPA nets)
- implicitly (EOS, π-like process algebra LySa)

converging on the same techniques

- Markov chain generators
- evaluators of performance

with tools, coupled with the static analyser, for interpreting specifications and for evaluating the performance of specifications .

The Impact of WP5

Performance evaluation and prototypes have been used for

- Comparing security protocols (encryption overhead) and studying the trade-off between security and responsiveness in a secure web service

- Assessing the index of difficulty of the Massive Multi-Player On-Line Role-Playing Game (case study)

- Investigating the performance impacts of different configurations of a mobile telephone infrastructure

- Evaluating the accuracy of location tracking systems implemented using active badges

- Other case studies include: spontaneous networking in Jini, web services, Mobile IP, mobile code design paradigms and a peer-to-peer emergency medical application

Self-evaluation

- W1, W2: *Weak indicator* for measuring protocols

- W3 (and possibly S3): *Weak (and Strong) indicator(s)* for usability by non-experts (??? e.g. within our industrial partners ???)

- W6, W7: *Weak indicator* for dissemination in international conferences and journals

- S7: *Strong indicator* for organization of more than 20 international conferences and workshops, often chairing the PC, editing proceedings and special issues of journals on topics related to DEGAS