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COMMIT/

OPTIMIZING SECURITY FOR VIRTUAL MACHINE APPLICATIONS

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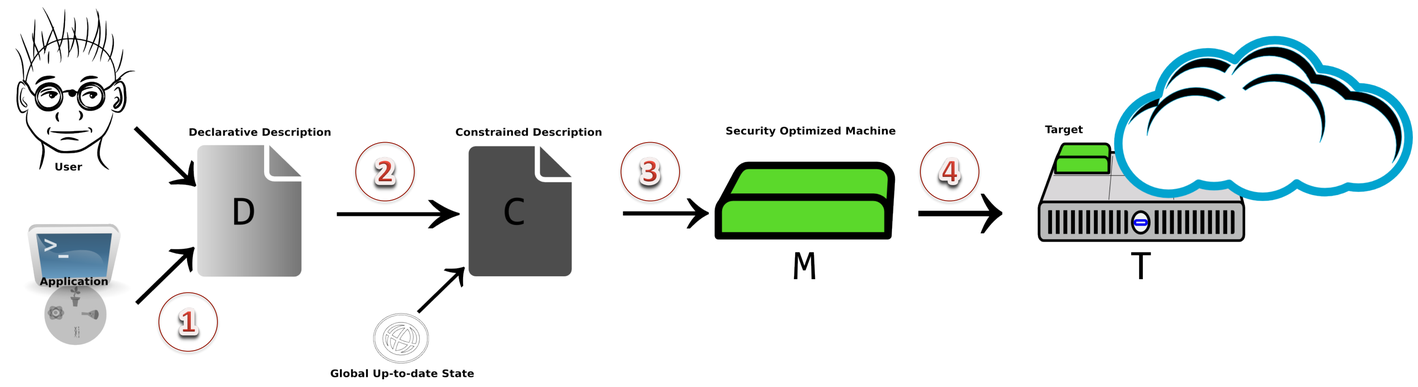
Introduction:

- ✧ Primary Goal: secure virtual execution environment tailored for a specific application
- ✧ Application-specific trusted computing base (TCB) size minimization in a virtualized environment is possible
- ✧ VM size and composition matters: **security** (TCB, attack surface) and **performance** (storage, memory, CPU)

Approach:

- ✧ From declarative ***descriptions*** to ***systems*** deployed as VMs.



DESCRIPTIONS

1. Capture user and application requirements in the form of a declarative description ***D***

Approach:
Gather user/application requirements as a declarative description (D). D describes an execution environment and other requirements such as trust domains and storage issues. Steps 2-4 focus on the execution environment.

Challenges:
Language Design, Profiling Techniques

2. Analyze D to give a system constraint described as ***C***

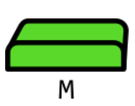
Approach:
Consult the 'Global Up-to-date State' – GUS (patches, updates, versions, standards as models…) to create a more precise description of an execution environment for the application.

Challenges:
GUS Representation, Semantic Reasoning

SYSTEMS

3. Create a *security optimized* machine ***M*** based on C

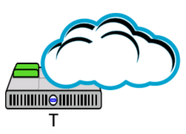
Approach:
Use constraints in C to configure an OS, creating a minimal 'Trusted Computing Base' in the application's execution environment M – e.g. include only relevant drivers or libraries.



Challenges:
Constraint Satisfaction/Optimization Approaches, Implementations

4. Deploy M as a target ***T***

Approach:
Pack and deploy M on different target cloud/HPC platforms .



Challenges:
Performance Issues, Predictability, Scalability, Interoperability

ADVANTAGES

Flexibility. Reusability. Portability. Ease of Use.

WORK IN PROGRESS

Model refinement and description techniques.

Info: