Security Service Level Agreement

Towards a fully provisioning of Security-as-a-Service

Trust in the Digital World, 15-16 June 2016

Prof. Valentina Casola
Università di Napoli Federico II
Italy

Outline

- Cloud Security Services Challenges:
  - Provide Security-as-a-Service
  - Security Service Level Agreements
  - Security SLA for an agile development
- Scientific Projects:
  - SPECS
  - MUSA

Key challenges

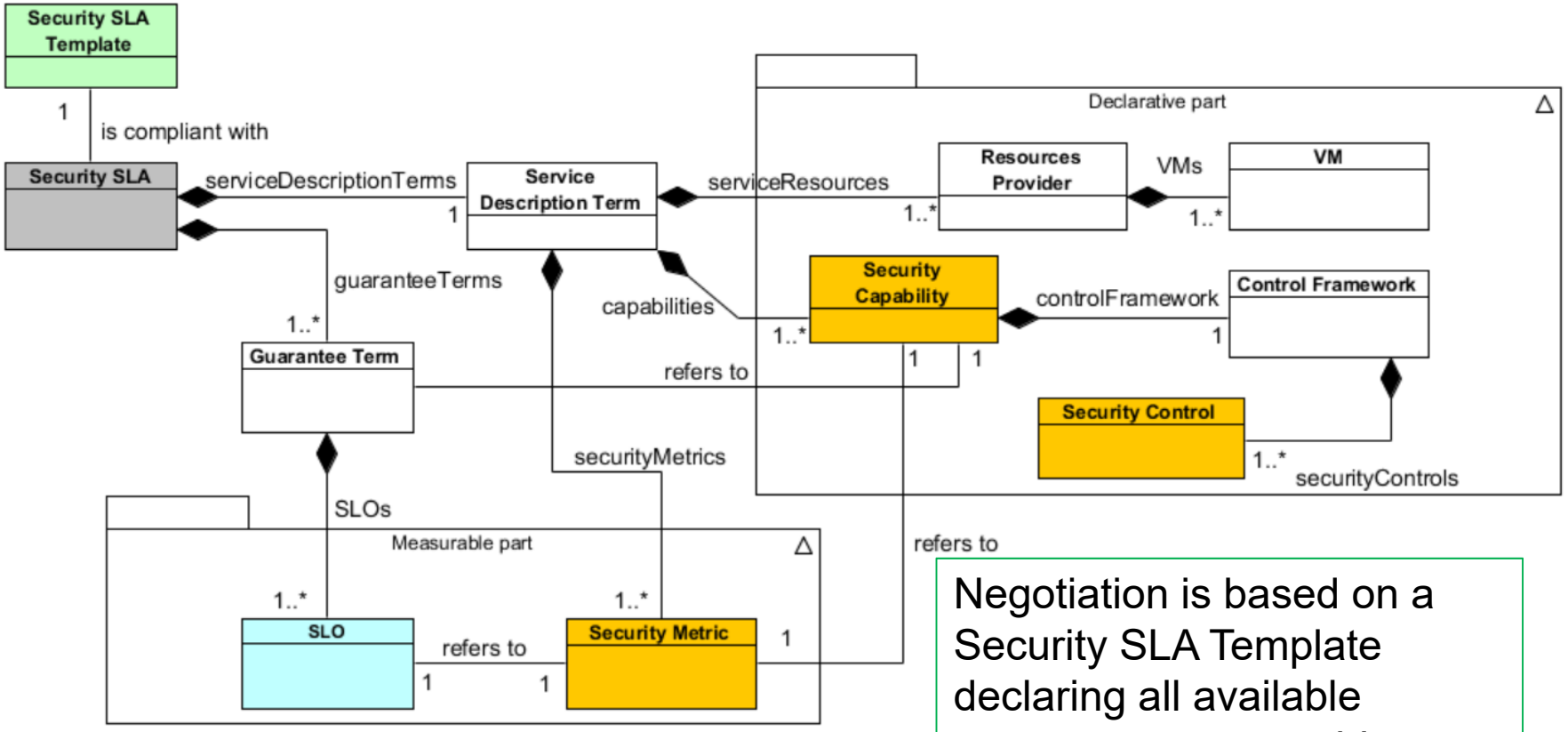
- **Security-as-a-Service**
  - Dynamicaly add/provide security capabilities even when services are offered by external CSP
- **Security Services and SLAs**
  - Security services delivered under the control of SLAs
- **Negotiating Security SLAs in Cloud?**
  - Enable users to negotiate per-user and per-service security SLAs in the Cloud
  - Enable providers to measure and guarantee SLOs
- **Monitoring Security SLAs in Cloud?**
  - Monitoring SLAs even when associated to services offered by external CSPs

Service Level Agreement (SLA)

- *"Contract"* which describes the *Service*, the associated *quality* levels and specifies the *responsibilities* (typically 'soft' formal obligations!) of both the Provider and the Customer.

❖ **Security?**
From SLA to Security SLA?

The SPECS Security SLA model

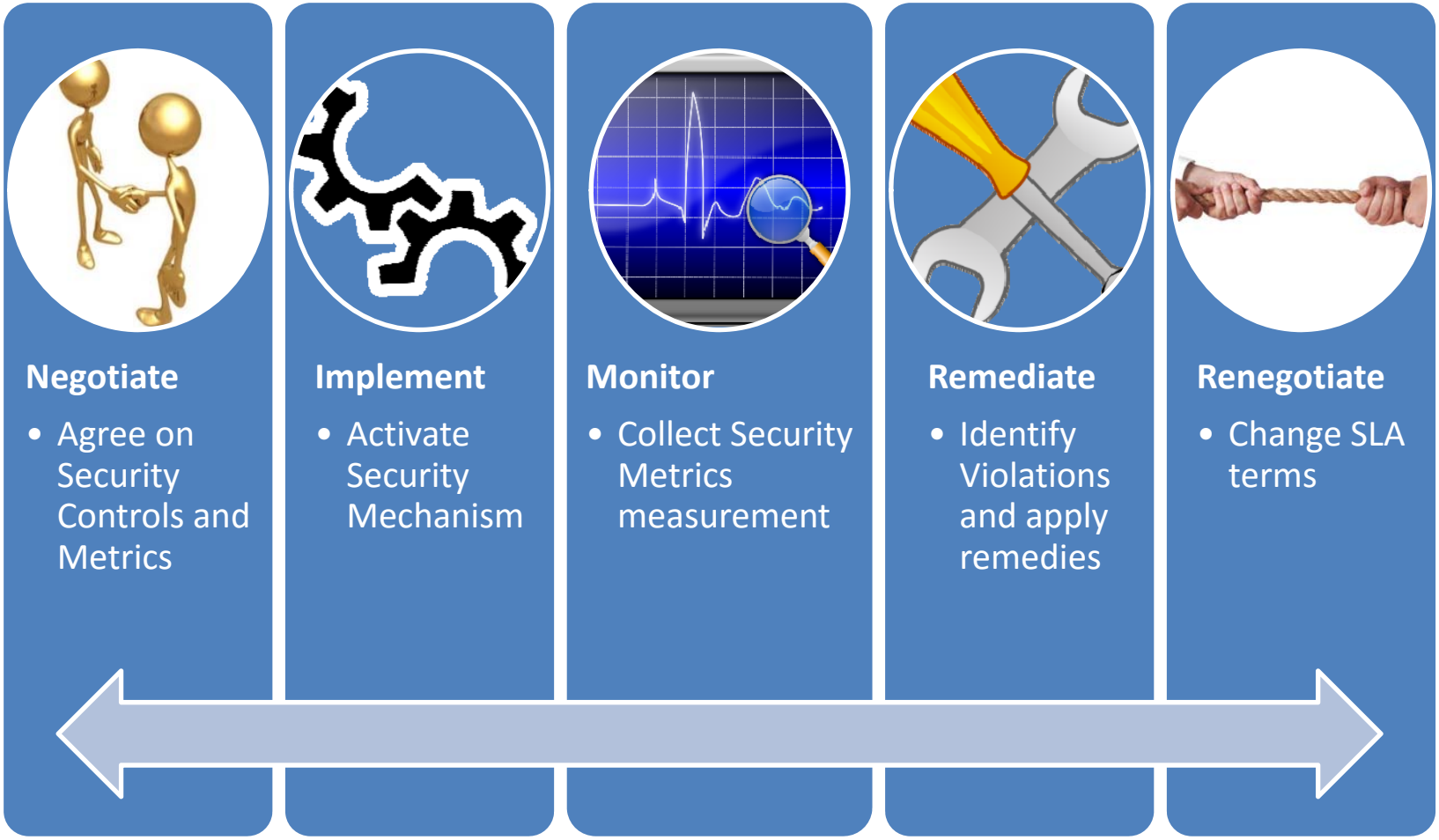


Requested guarantees are specified in form of (measurable) *SLOs*

Negotiation is based on a Security SLA Template declaring all available

- ***Resources***, *providers*
- ***Security capabilities*** (and related ***security controls***)
- ***Security metrics***

Security SLA life cycle



Main concepts behind SLA negotiation

- Security SLA are modelled to cope with the semantic gap between not-expert customers and the needed standard technical controls that must be implemented to offer specific security capabilities
- The SLA model is compliant with available and on-going standards

Research challenges:

- The negotiation process must identify feasible offers to the customer
- The feasibility is evaluated according to security and CSP constraints
- The offers are evaluated according to the security level they provide

Main concepts behind SLA enforcement/remediation

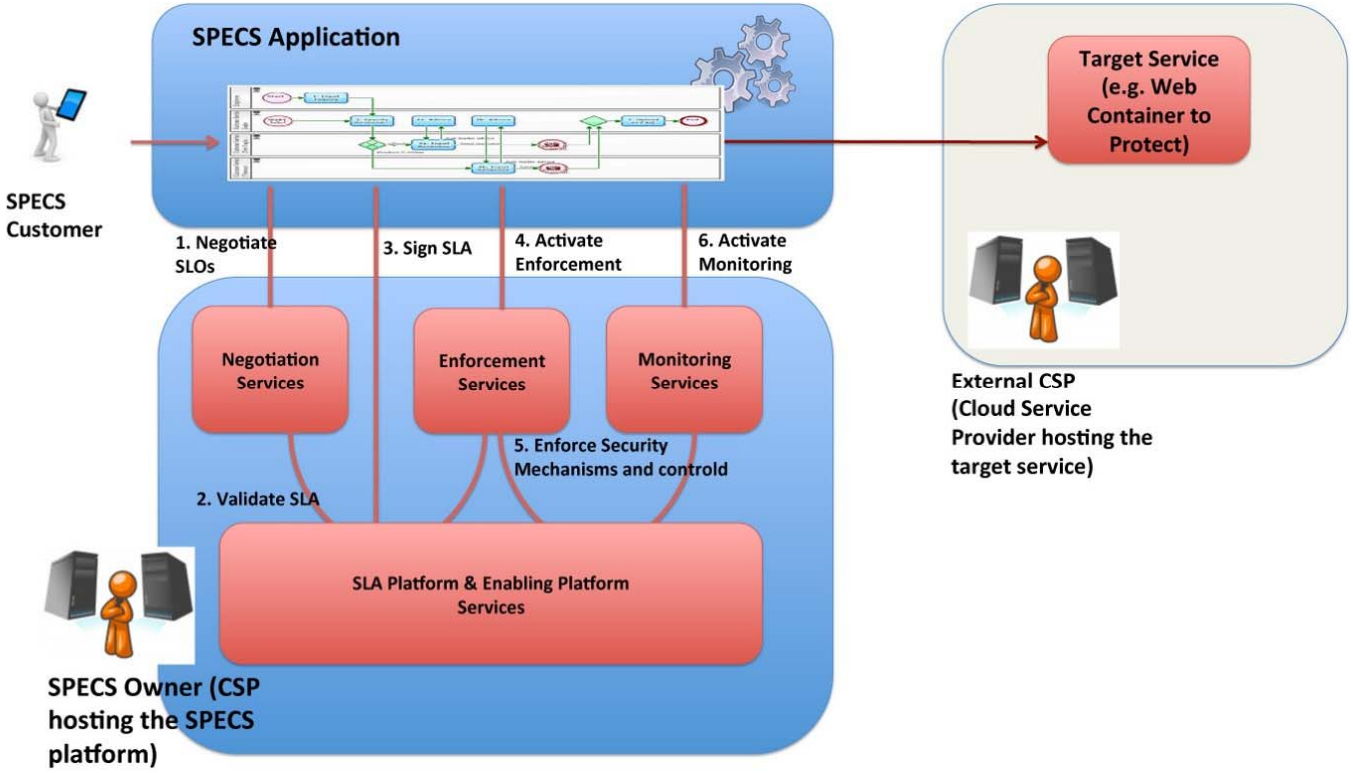
- Dynamically add security to services even when services are provided by external CSP
  - Acquire and configure resources: SLA-based acquisition of resources and enforcement of security mechanisms

- **Research challenges:**
  - A quantitative approach to modular security to improve security of services/resources offered by External CSPs
  - Resource provision in a multi-cloud environment
  - Transparent adaptation of security services

Main concepts behind SLA monitoring

- Monitoring SLAs of services offered by external CSPs
  - Drive monitoring using SLAs
  - Notify possible SLA violations
  - Avoid violations with proactive reactions
- **Research challenges:**
  - Adapt monitoring to SLAs
  - Continuously monitor security of services offered by external CSPs
  - Measure the security (relationship with security SLO metrics) and incident management

SPECS: Secure provisioning of SLA-based secure services (FP7, 2014-2016)

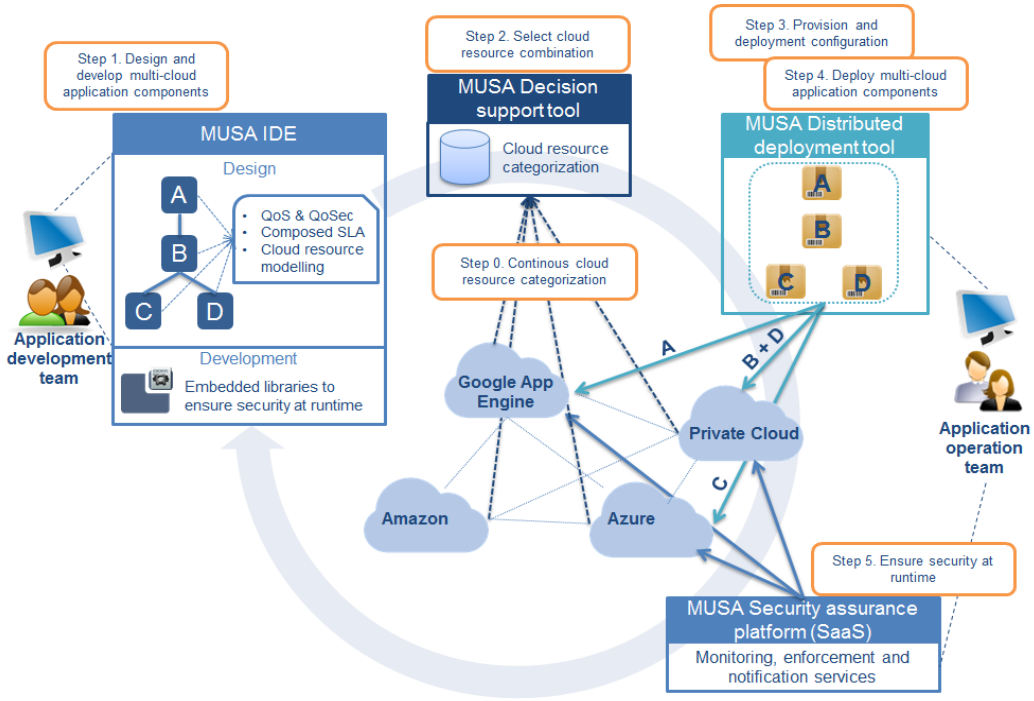


https://bitbucket.org/specs-team/

www.specs-project.eu

- **SPECS framework** provides APIs and tools to develop SPECS Application to let a target service be covered a SLA
- **SPECS Applications** available: CSP comparison, Secure WebPool, E2E encryption, ….

MUSA: multi-cloud security applications (H2020, 2015-2017)



www.musa-project.eu

A security framework that includes:

- a) security-by-design mechanisms to allow application self-protection at runtime,
- b) methods and tools for the integrated security assurance in both the engineering and operation of multi-cloud applications

Conclusions

Security SLA for an agile development?

- **With Security SLA, we can effectively offer security as a service**
- Available security services, accessible and measurable, enable the development of new secure applications with a more agile approach
- **Standardization** activities: ISO/IEC 19086 (part 2 and part 4) on Cloud SLA metrics and Cloud SLA security and privacy

References and Contacts

www.specs-project.eu
https://bitbucket.org/specs-team/

www.musa-project.eu

NATRES and DPSP EU project clusters:
https://eucloudclusters.wordpress.com/