Ingegneria dei sistemi software e dei servizi in rete
A.A. 2016/2017

Fase 2. Sotto fase 2.2

Alice Di Luise

Agenda

Fase 2.2

- Obiettivi
- Metodologia di sviluppo
- Ontologia
- Glossario
- Features
- Casi d'uso
  - Manage GQM Graph
  - CRUD metric
  - Gather context factors and assumptions
  - Notify wrong question
  - Remove question

Obiettivi della fase 2.2

- Definire i Measurement Goal a partire dagli Organizational Goal.
- Definire le Question da associare ai Measurement Goal.
- Determinare le Metriche a partire dalle Question.
- Measurement Goal, Question e Metric formano un GQM Graph.
  - Aggiungere al GQM Graph l'interpretation model.

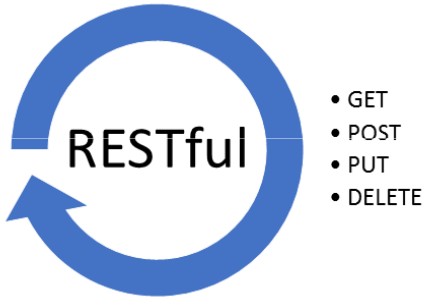
Abstraction Sheet

Object	Purpose	Quality Focus	ViewPoint	Context
Customers in insurance area	Evaluate	Increased number of customers by 5%	Management	CA1
Questions and metrics			Variation factors	
Q1: What is the increase in the number of customers in a particular fiscal year? **Cus(Y)**: Number of customers in year Y				
Baseline hypotheses			Impact on baseline hypotheses	
Cus(2011) = 5000				
Interpretation models				
Cus(2012)/Cus(2011) > 1.1				

Ambito del progetto

- Metricapp-server:
  - Spring Boot Application
  - Architettura RESTFul

- Metricapp-client:
  - AngularJS framewor



- Database: mongoDB

- Enterprise Service Bus

Obiettivi

- Sviluppo di un’estensione della fase 2.2.
- Rispetto dell’ontologia di dominio.
- Compatibilità con la fase 2.1.
- Evitare di stravolgere l’architettura del server e del client.
- Massima compatibilità con le fasi successive alla 2.2.

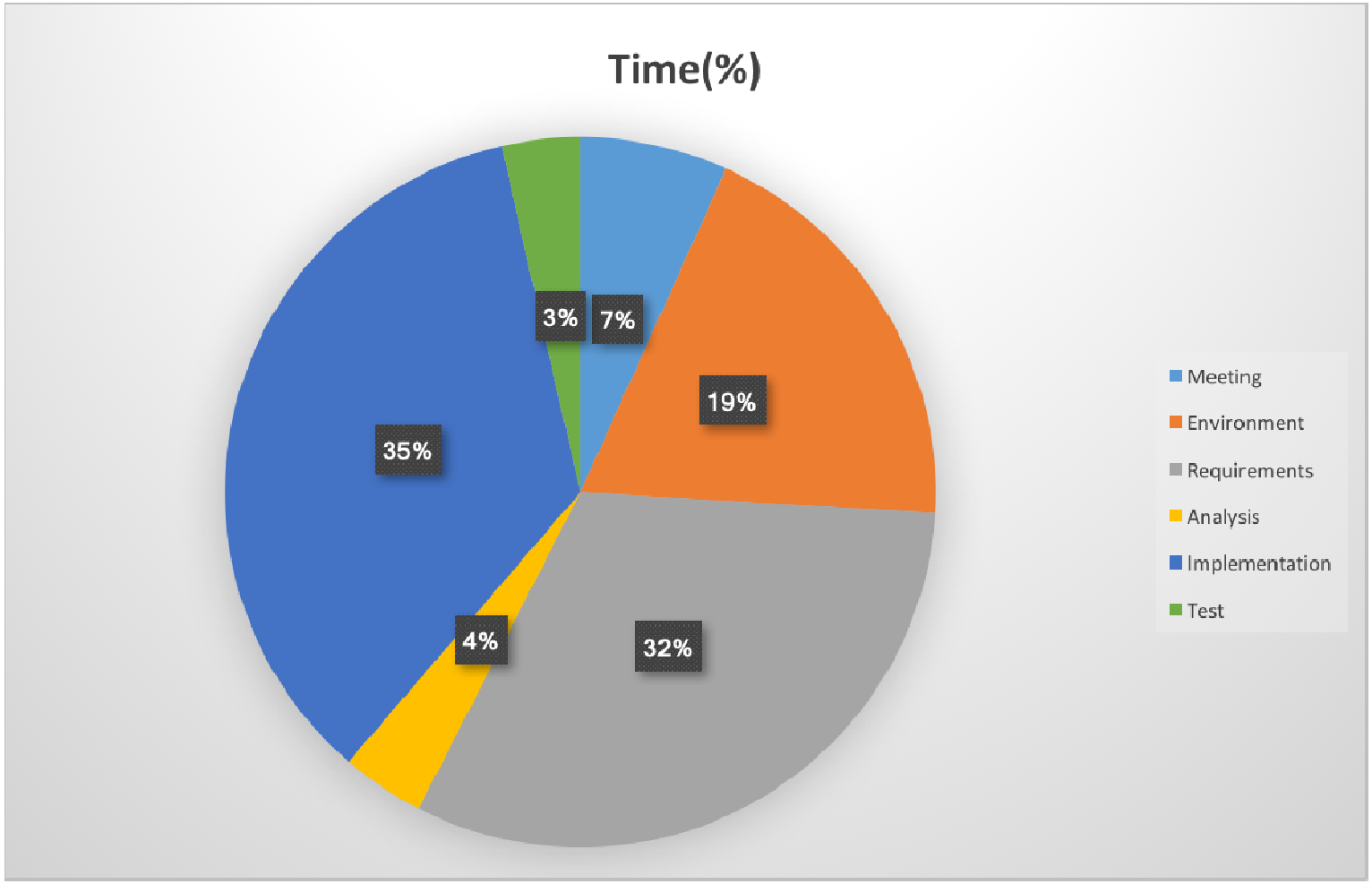
Metodologia di sviluppo

- Sviluppo iterativo.

- 5 discipline:
  - Environment (+ Meeting)
  - Requirement
  - Analysis
  - Implementation
  - Test

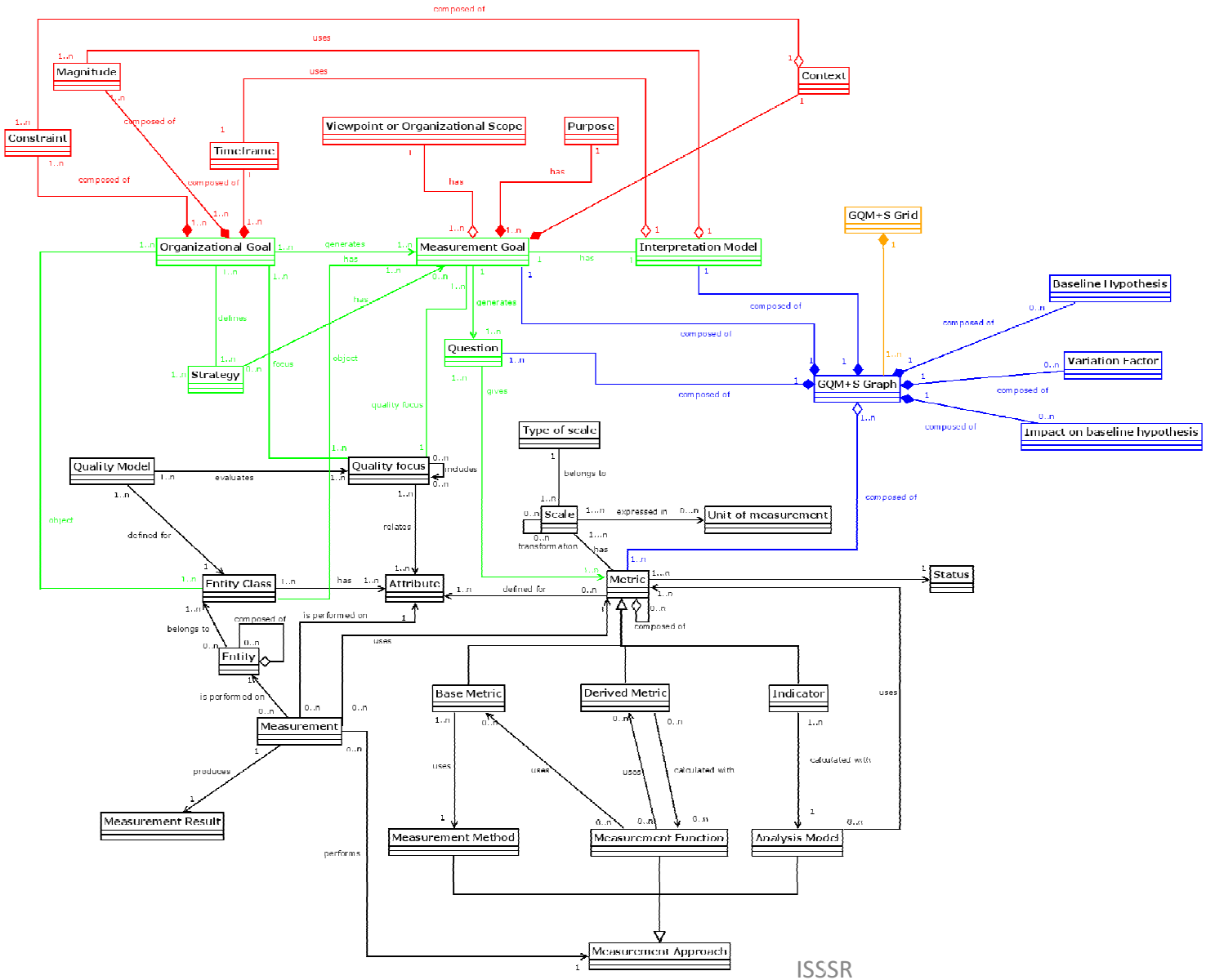
- Focus su Environment.

Suddivisione del lavoro per disciplina

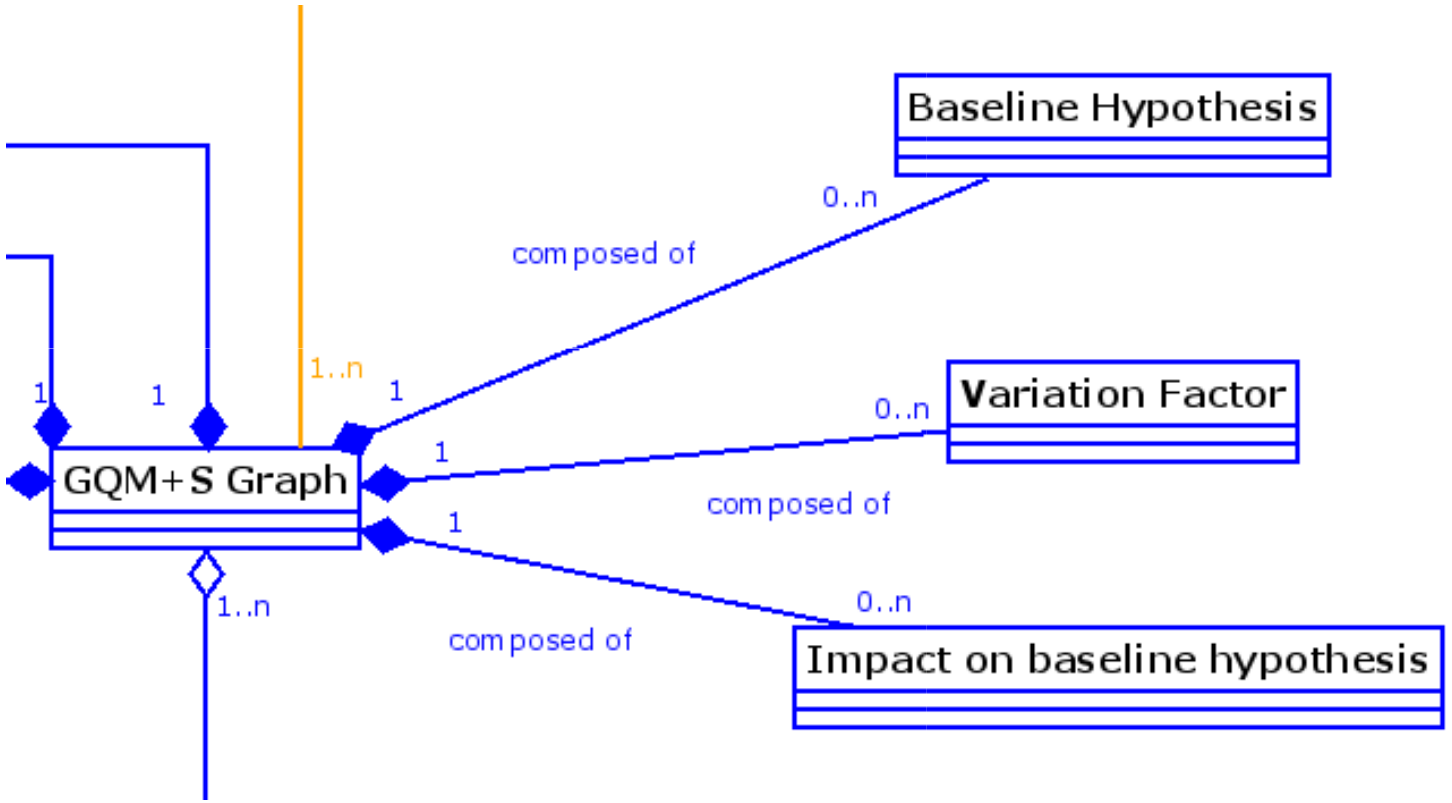


Problematiche sul DB e sul Bus

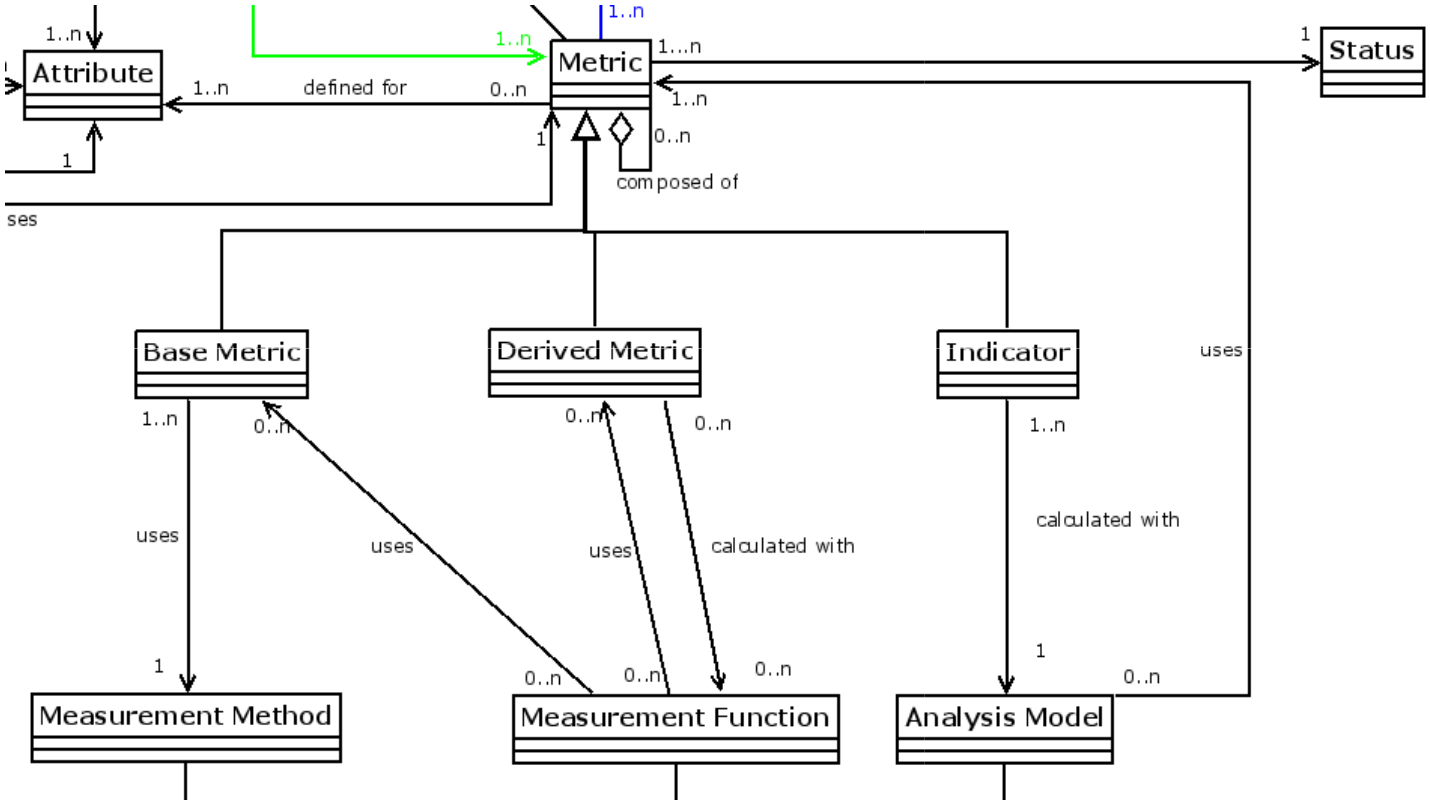
- Durante lo sviluppo il Bus e il DB hanno dato problemi (es: autenticazione).
- Utilizzo di un DB locale durante lo sviluppo.
- mongoDB è stato installato su un server EC2:
  ec2-52-59-218-247.eu-central-1.compute.amazonaws.com
- Il server deployato comunica con l'istanza di EC2.


composed of
uses
Magnitude
uses
Context
Constraint
composed of
Timeframe
Viewpoint or Organizational Scope
Purpose
has
has
composed of
composed of
GQM+S Grid
Organizational Goal
generates
has
Measurement Goal
has
Interpretation Model
Baseline Hypothesis
composed of
composed of
defines
has
generates
Question
composed of
Variation Factor
composed of
Strategy
focus
object
GQM+S Graph
quality focus
gives
composed of
Impact on baseline hypothesis
Type of scale
Quality Model
evaluates
Quality focus
includes
belongs to
composed of
object
Scale
expressed in
Unit of measurement
defined for
relates
transformation
has
Entity Class
has
Attribute
defined for
Metric
Status
belongs to
composed of
is performed on
uses
Entity
composed of
Base Metric
Derived Metric
Indicator
uses
is performed on
Measurement
uses
uses
calculated with
calculated with
produces
Measurement Result
Measurement Method
Measurement Function
Analysis Model
performs
Measurement Approach

Ontologia di dominio (Dettagli-1)



Ontologia di dominio (Dettagli-2)



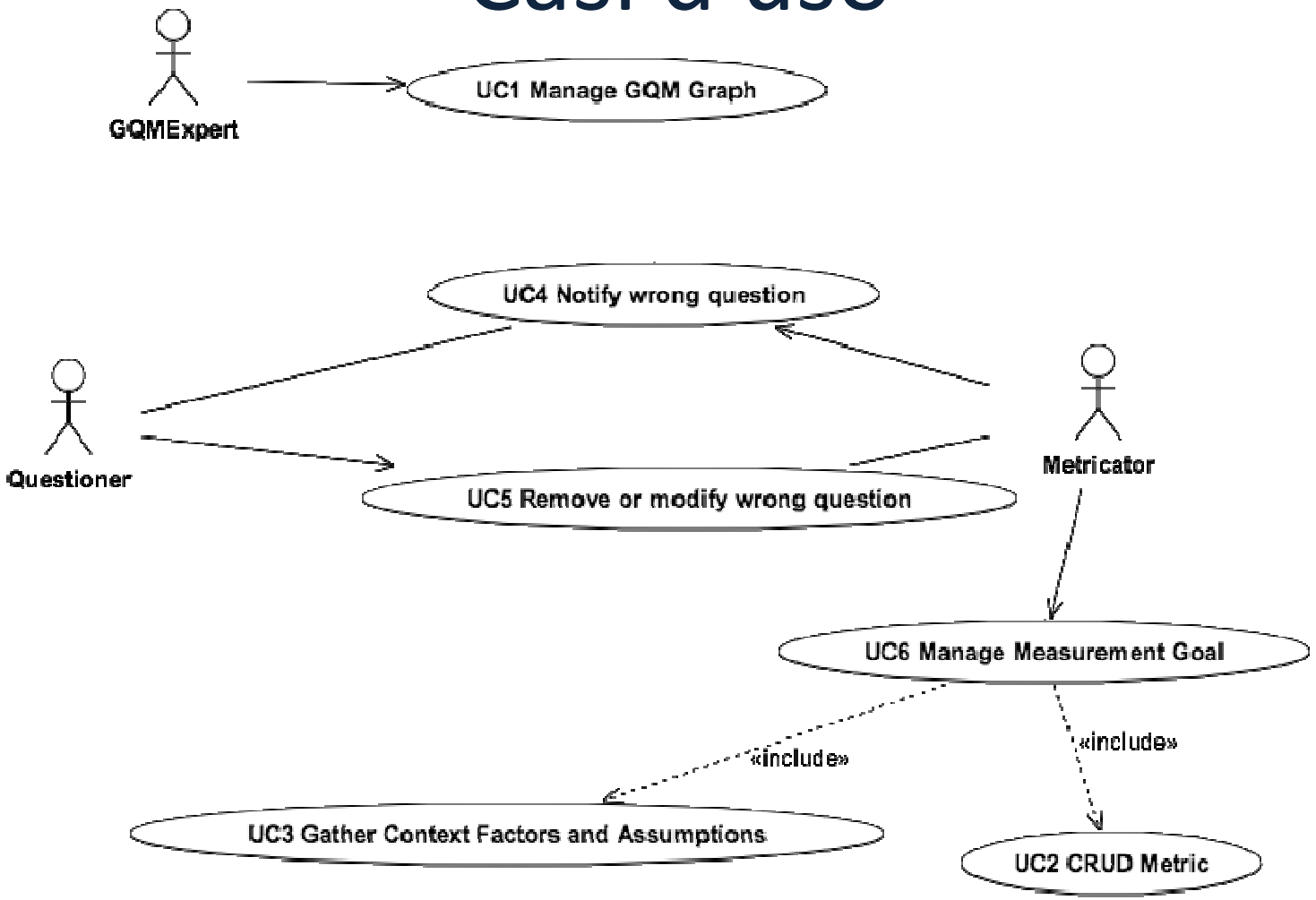
Glossario

erm	Definition
nalysis model	A model based on decision criteria.
ase Metric	A Metric that is directly measurable and that uses a measurement method.
aseline Hypothesis	A current knowledge with respect to the metrics of a Measurement Goal
erived Metric	A Metric that cannot be measured directly and is derived from other Metrics. It uses a measurement function.
npact on baseline hypothesis	How a variation factor can influence the actual measurements
dicator	A Metric that provides reliable means to measure an attribute. It uses an analysis model.
easurement function	A function that involves two or more metrics.
easurement method	The technique or process used to obtain the result of measure.
etric Type	A Metric can be a "Base Metric" or a "Derived Metric" or an "Indicator"
ariation Factor	A context factor that influence the metrics of a Measurement Goal

Features

Feature ID	Description	Priority	Use Case
F1	The GQM Expert can visualize a GQM Graph	Hight	UC1
F2	The GQM Expert can add to a GQM Graph a baseline hypothesis, a variation factor and a impact on baseline hypothesis	Hight	UC1
F3	The Metricator can change the Metric type (Base, Derived, Indicator)	Hight	UC2
F4	The Metricator can add a Metric to a Derived Metric	Hight	UC2
F5	The Metricator can add a Measurement Method, a Measurement function or an Analysis Model to a Metric	Hight	UC2
F6	The Metricator can delete a Metric if it is not already approved	Low	UC2
F7	The Metricator can gather context factors and assumptions	Low	UC3
F8	The Metricator can notify to the Questioner that a question is wrong	Medium	UC4
F9	The Questioner can delete a wrong question	Medium	UC5
F10	The Questioner can modify a wrong question	Low	UC5

Casi d'uso


GQMExpert
UC1 Manage GQM Graph
UC4 Notify wrong question
Questioner
Metricator
UC5 Remove or modify wrong question
UC6 Manage Measurement Goal
«include»
«include»
UC3 Gather Context Factors and Assumptions
UC2 CRUD Metric

Manage GQM Graph – Specifica

CS: Manage GQM Graph (Expert)

ef Description:

system create automatically a Measurement Goal and a GQM Graph that contains the Measurement Goal. The Expert can update the Graph with Baseline Hypotheses, Variation Factors and Impact on eline Hypotheses. The Measurement Goal and associated Questions and Metrics must be updated separately.

tors:

M Expert

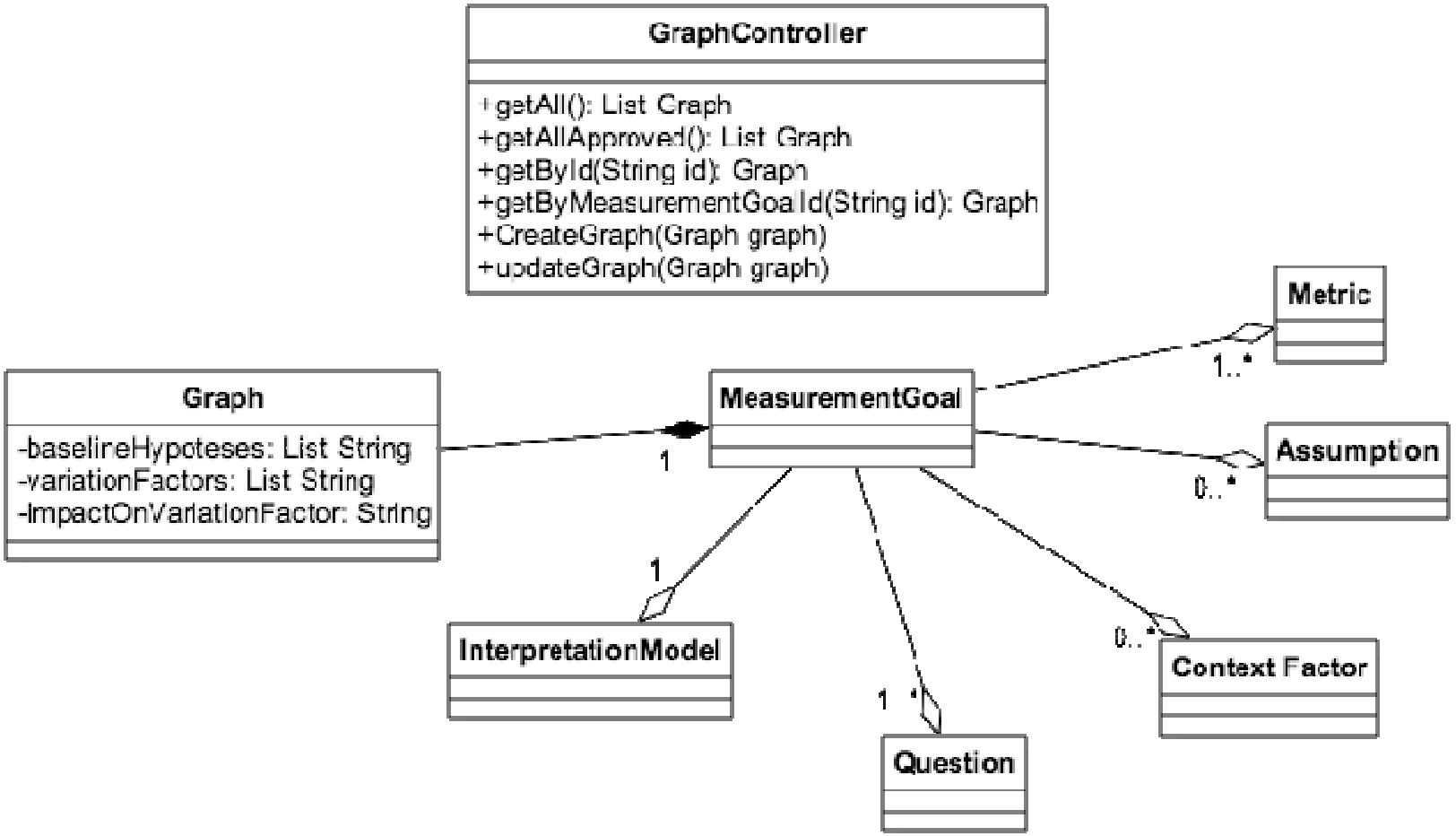
c Flow:

. The Expert clicks on the "Graphs" button on the sidebar.
. The System shows the list of Graphs.
. The Expert clicks on the first Graph.
. The System shows to the Expert the details of Graph: the associated Measurement Goal, Questions, Metrics, the Baseline Hypotheses, the Variation Factors and the Impact on Baseline Hypotheses.
. The Expert inserts the Baseline Hypothesis: "The last project contains 0.1 bugs per LOC"
. The Expert clicks on the "Update" button.
. The System updates the Graph.

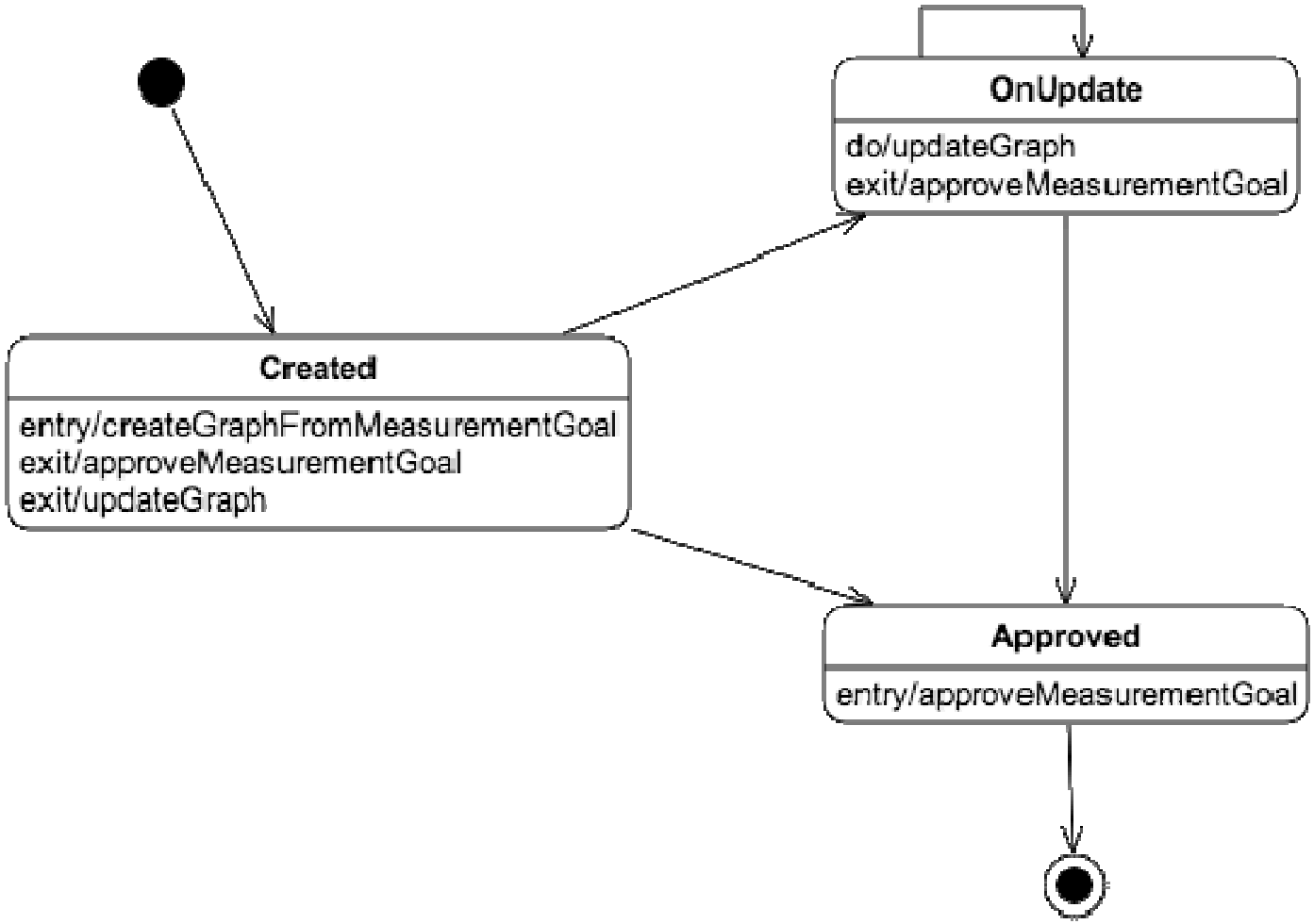
rnative Flows:

. Step 7: The bus cannot update graph. The system shows the error message: "Failure to update graph".
. Step 7: Another expert has already approved graph. The system shows the message: "Cannot update an approved graph".

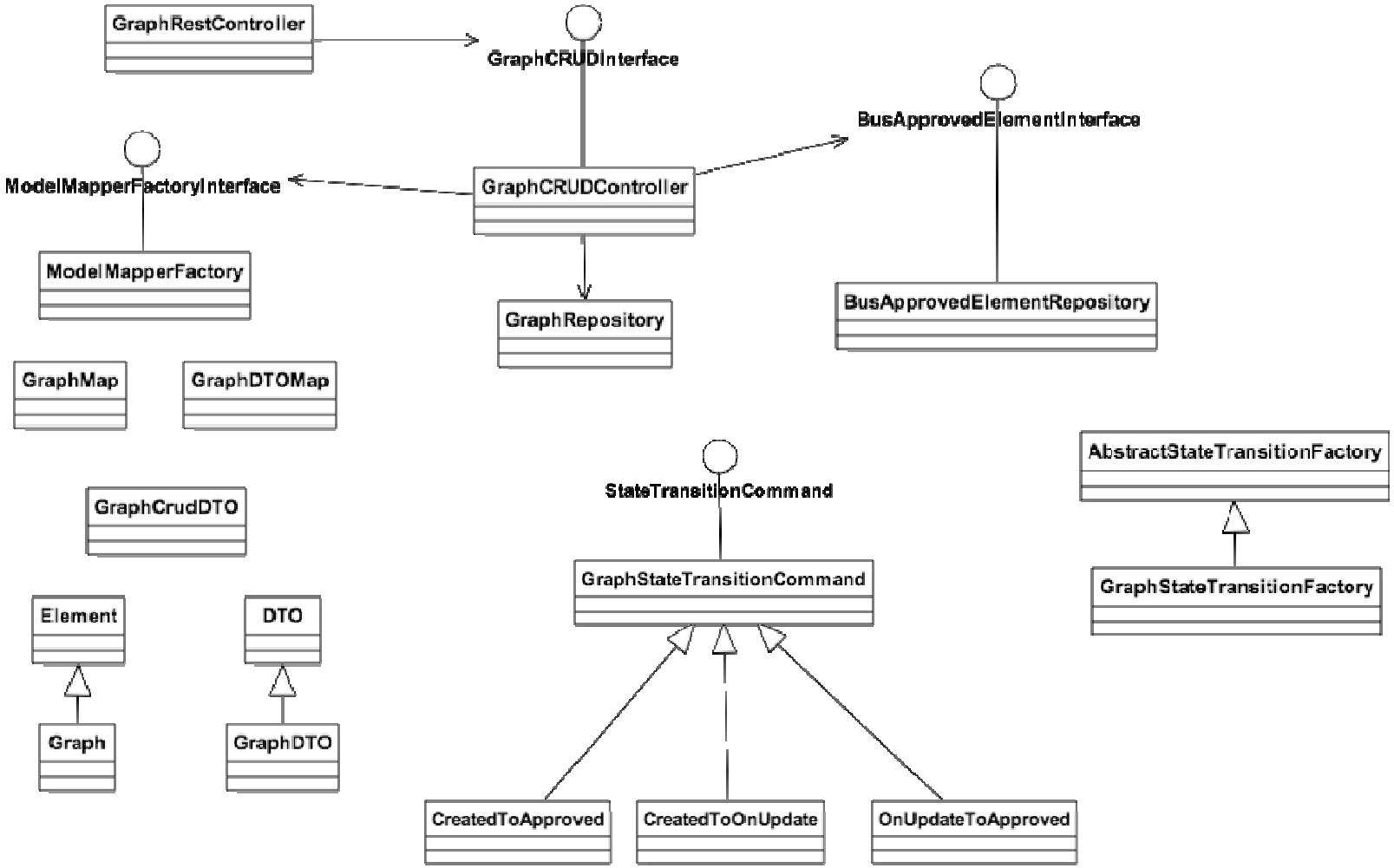
Manage GQM Graph – Class Diagram



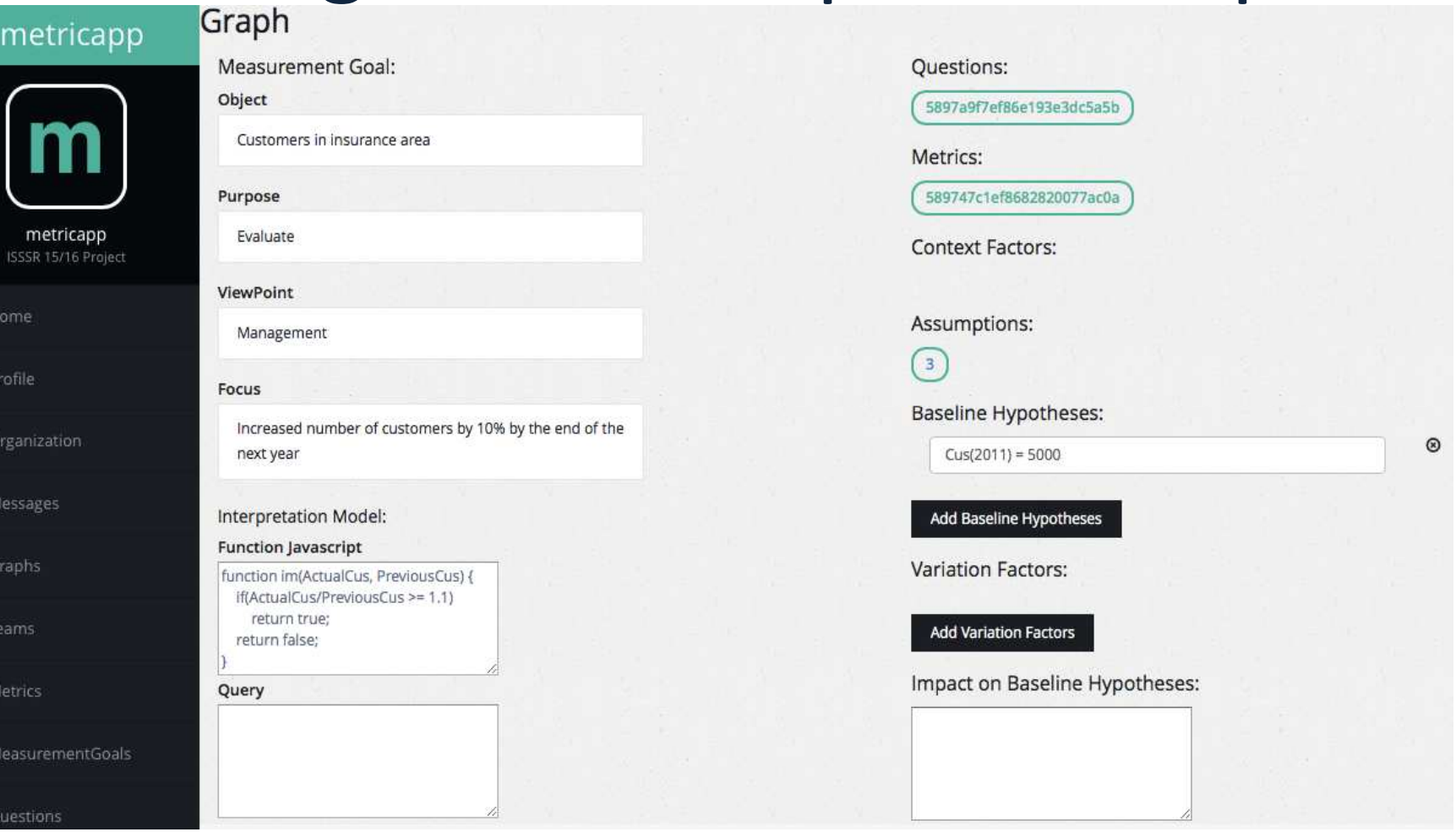
Manage GQM Graph – State machine



Manage GQM Graph – Architettura



Manage GQM Graph – Example

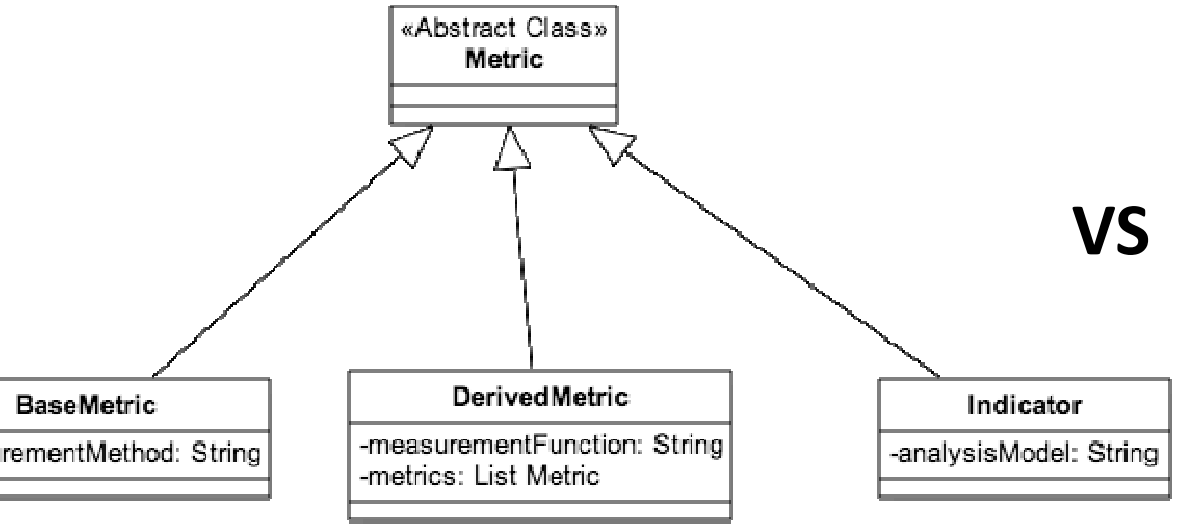


Manage GQM Graph – REST API

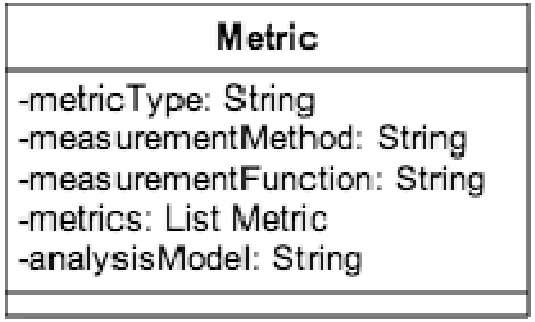
La creazione del Grafo avviene tramite notifica esterna.

Path	Operation	Parameters	Type Parameter	Return Value	Description
graph	GET			GraphCrudDTO	Get all graphs (on phase 2.2 DB)
graph	GET	bus	boolean	GraphCrudDTO	Get all approved graphs (on bus) if bus is true
graph	GET	measurementGoalId	String	GraphCrudDTO	Get graph by measurementGoalId
graph	PUT			GraphCrudDTO	Update graph

CRUD metric – Class diagram



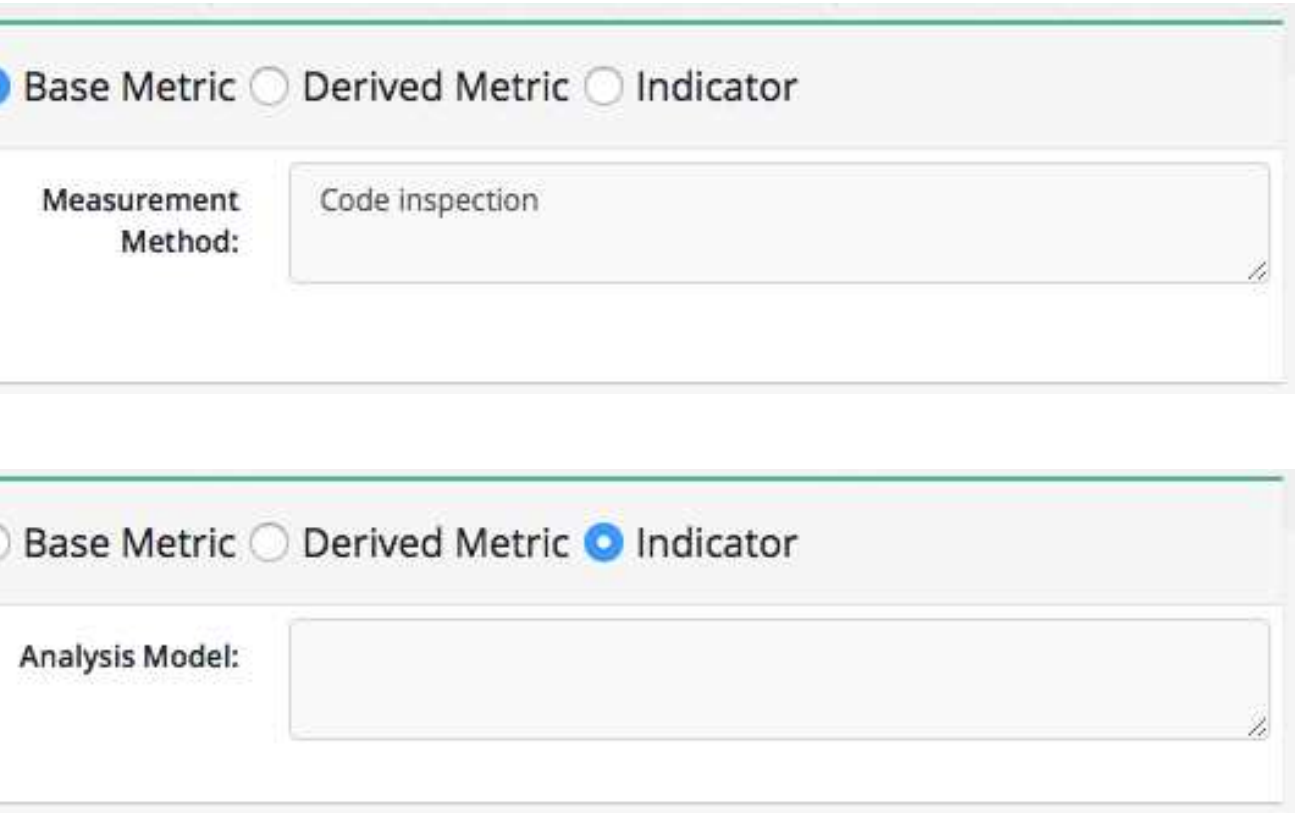
VS

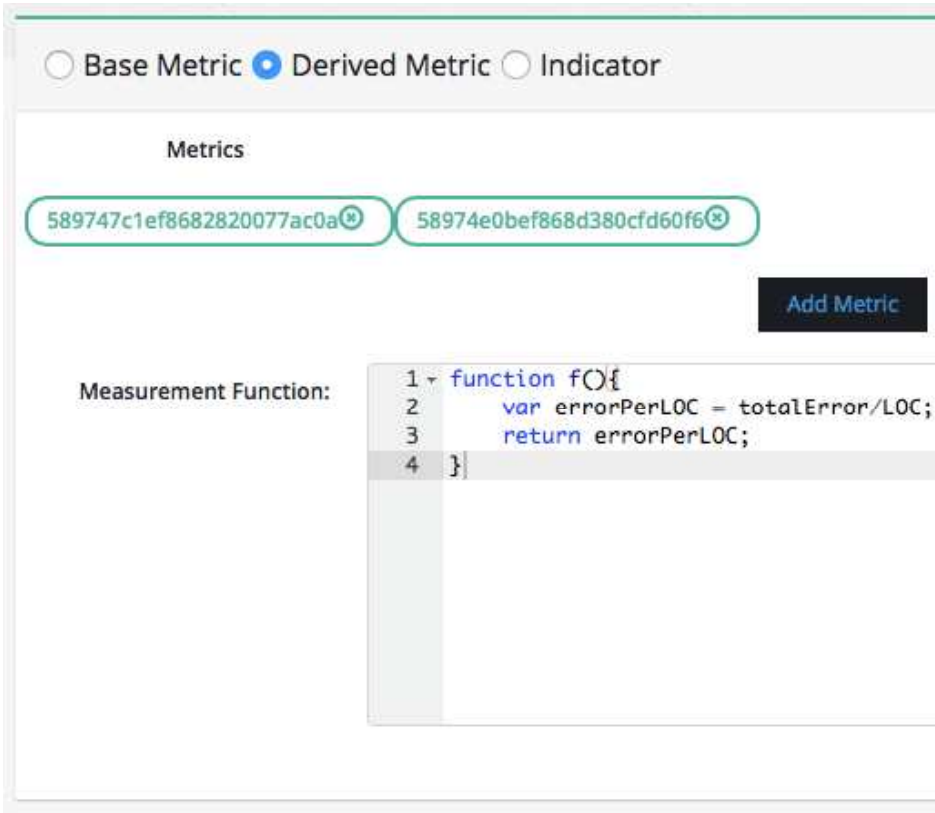


CRUD metric – class diagram (2)

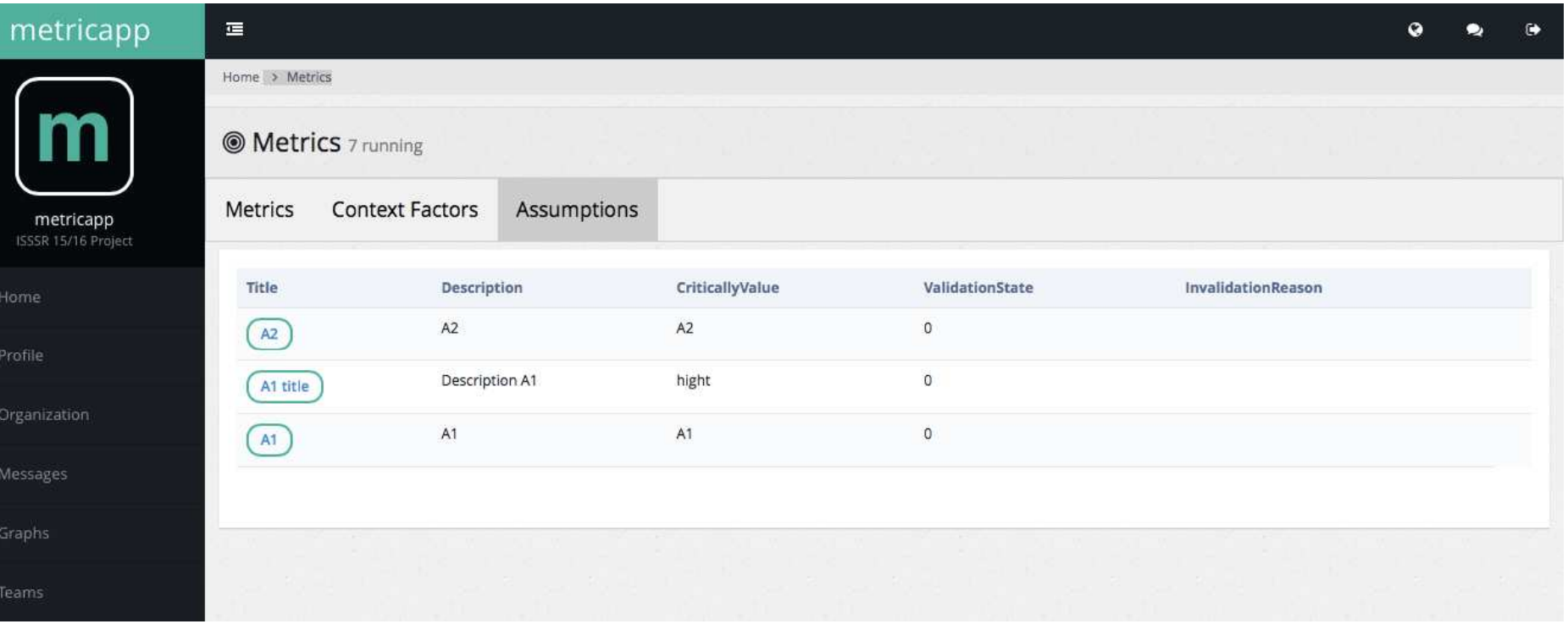
- Vantaggi della prima architettura:
  - Più affine all'ontologia
  - Architettura naturale se il sistema non fosse stato ancora implementato
- Vantaggi della seconda architettura:
  - Più flessibile al cambiamento della metrica
  - Maggior compatibilità con le fasi successive

CRUD metric – example





Gather context factors and assumptions

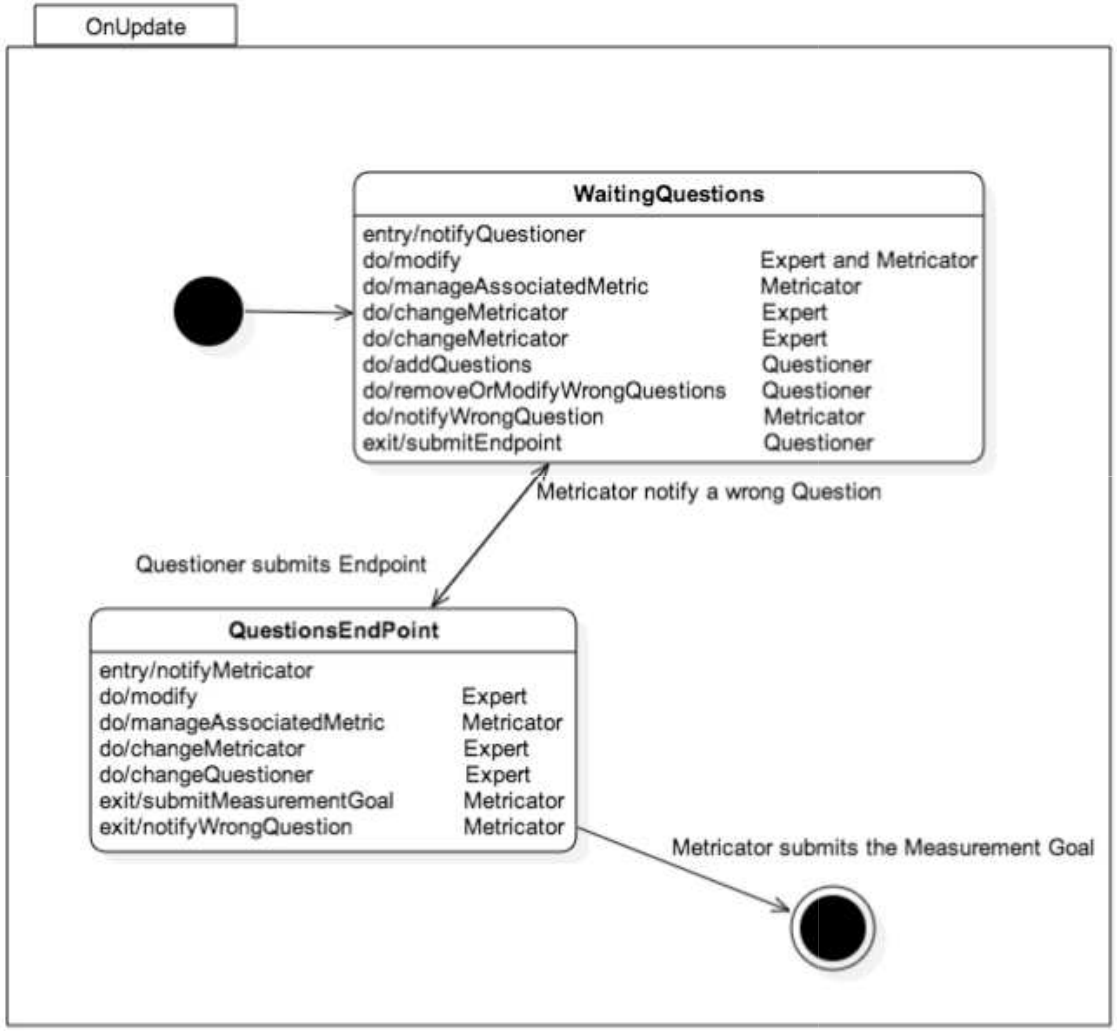


Notify wrong question

- Non c’è una vera comunicazione tra Questioner e Metricator.
  - Il Metricator non può notificare al Questioner una Question inadatta al Measurement Goal o che non può generare una Metrica.

- Il Questioner non può rimuovere una Question aggiunta al Measurement Goal.
  - È necessario modificare la state machine del Measurement Goal.

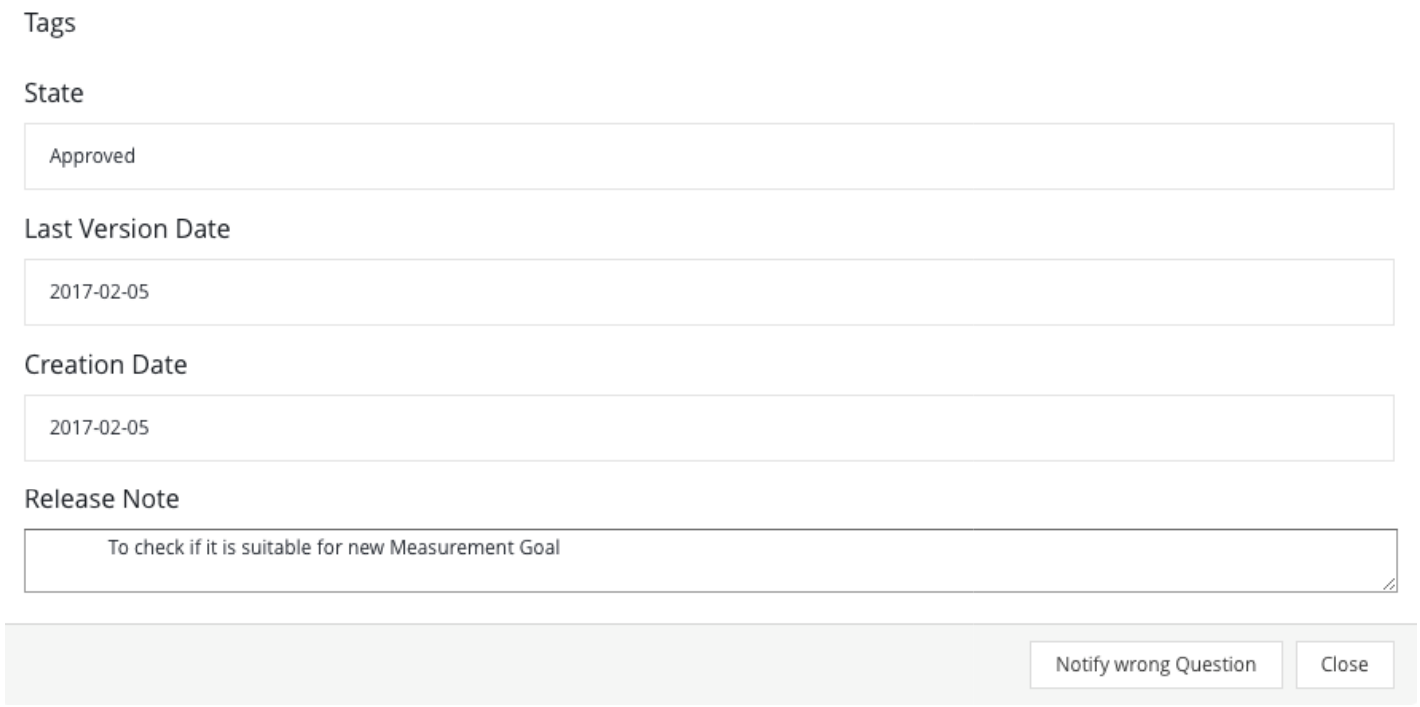
Notify wrong question – state machine



Notify wrong question – Problematiche

- Una Question è associata a più di un Measurement Goal: non può trovarsi in uno stato “Wrong”
- È l’associazione Measurement Goal – Question che deve essere nello stato “Wrong”
- mongoDB non è relazionale.
- Soluzione: il MeasurementGoal ha due liste di domande separate:
  - questions.
  - pendingQuestions.
  - L’informazione non viene replicata.

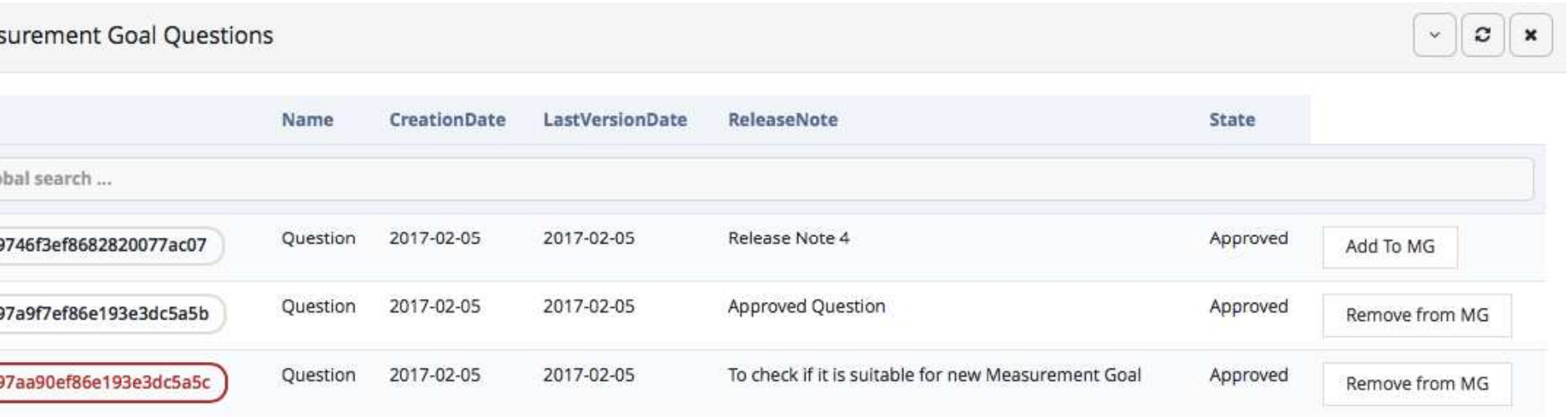
Notify wrong question – example



Remove or modify wrong question

- Associato al caso d'uso "Notify wrong Question".
- Una Question può essere associata a più di un Measurement Goal: non è corretto modificarla quando è già stata approvata.
- È preferibile rimuoverla da un particolare Measurement Goal e, se necessario, crearne un'altra.
- Il Questioner deve poter rimuovere una Question anche se non è "Wrong"
- UC5 deve essere modificato con: "Remove Question"

Remove question - example



Conclusioni

- L’estensione del sistema è compatibile con la fase 2.1.
- Maggior corrispondenza con l’ontologia di dominio.
- Le fasi successive possono ignorare l’estensione.
- Affrontare i problemi di consistenza.
- Ripensare la politica dei cambiamenti di stato delle entità.