VILNIAUS UNIVERSITETAS
MATEMATIKOS IR INFORMATIKOS FAKULTETAS

Requirements modeling

Reikalavimų modeliavimas

Programų sistemų inžinerijos modeliai ir metodai laboratorinis darbas 2

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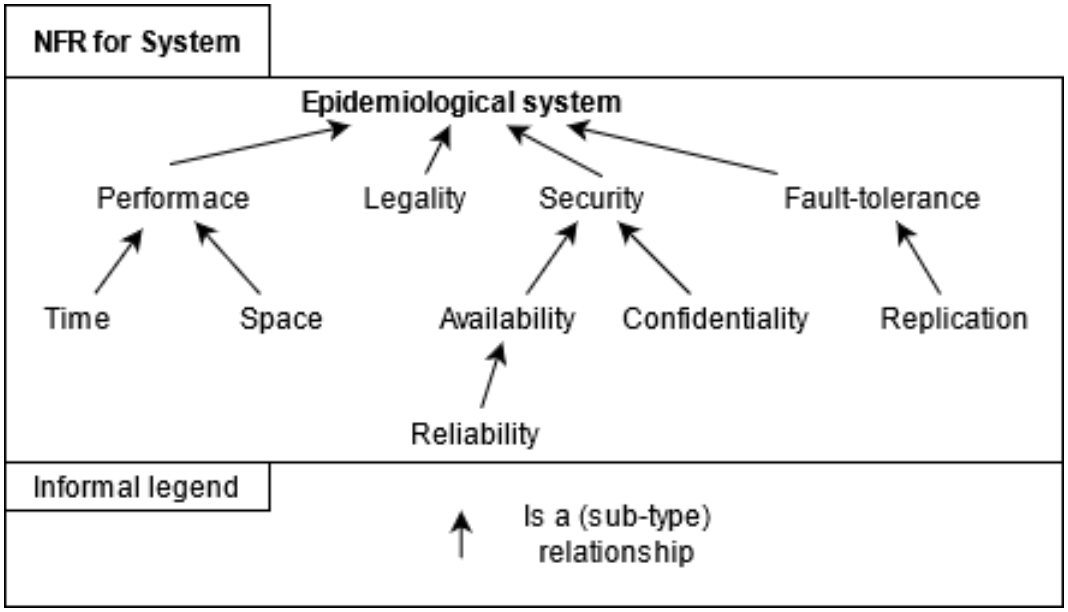
1. NFR type catalogue

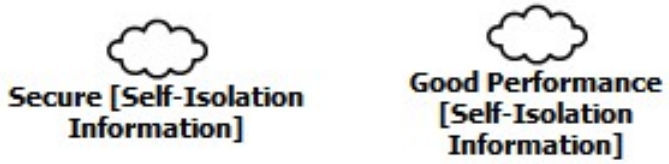


pic 1. NFR diagram

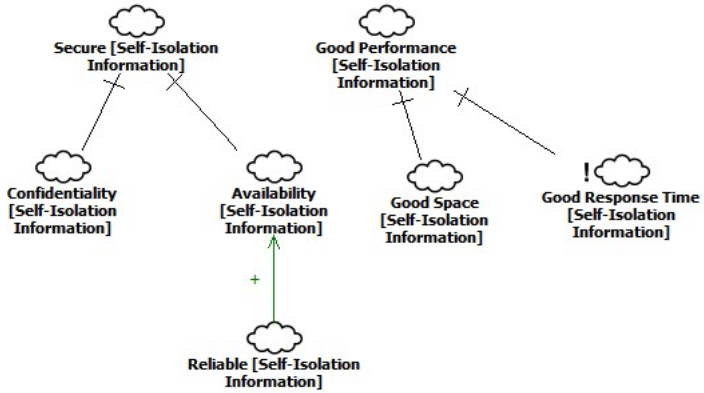
- **Time** - System is monitoring the epidemic therefore its processes or workflows have to be efficient time-wise.
- **Space** - since the system will contain lots of different data (e.g. person's geographical coordinates), data must be stored efficiently.
- **Reliability** - Tracking the state of the epidemic must be ensured 24/7 to not miss any crucial data or trends.
- **Confidentiality** - the epidemiological system must treat sensitive personal information (e.g. received medical records) to ensure systems credibility.
- **Legality** - due to the fact the epidemiological system will deal with sensitive information, data handling must comply with LT and EU data laws as well as GDPR.
- **Replication** - non-sensitive data must have duplicate records stored to increase the system's fault-tolerance.

2. Modelling of the non-functional requirements

2.1. Self-isolation



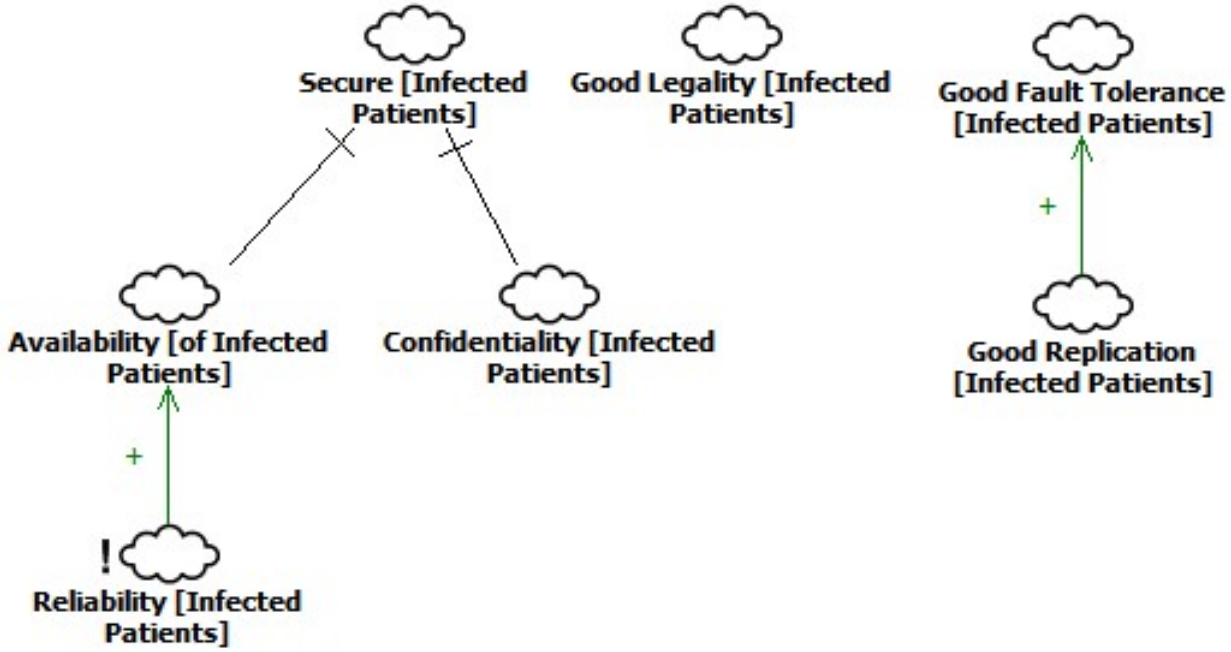
pic 2. Self Isolation - Initial Software Dependency Graph



pic 3. Self Isolation - Decomposing NFRs

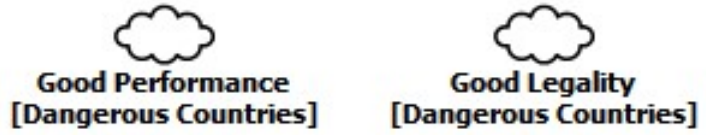
2.2. Infected patients

pic 4. Infected Patients - Initial Software Dependency Graph

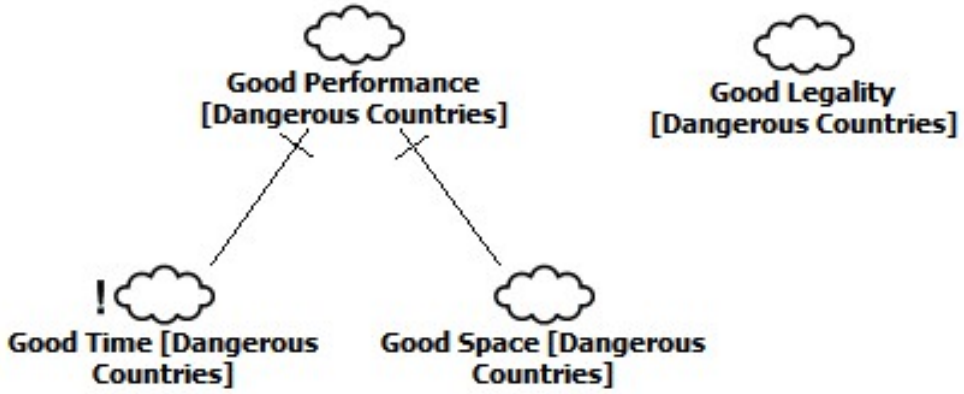


pic 5. Infected Patients - Decomposing NFRs

2.3. Dangerouse countries



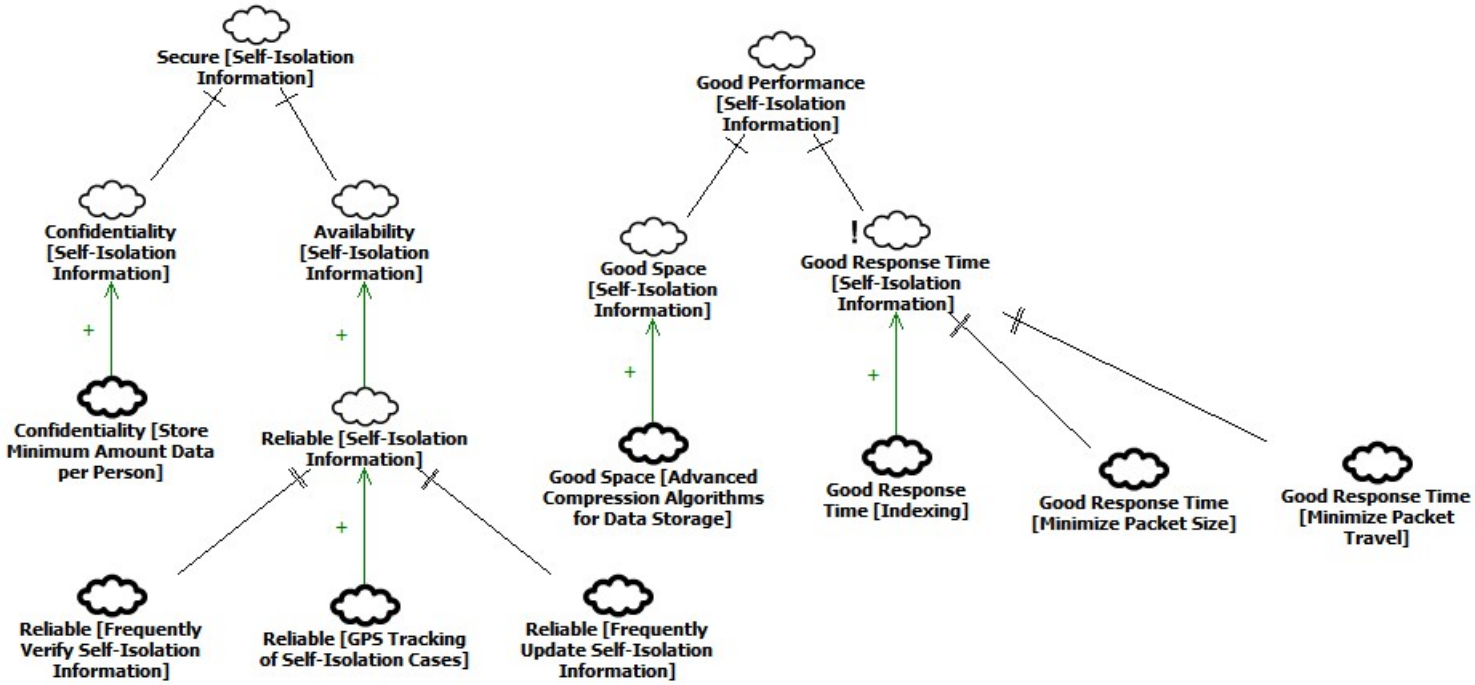
pic 6. Dangerous Countries - Initial Software Dependency Graph



pic 7. Dangerous Countries - Decomposing NFRs

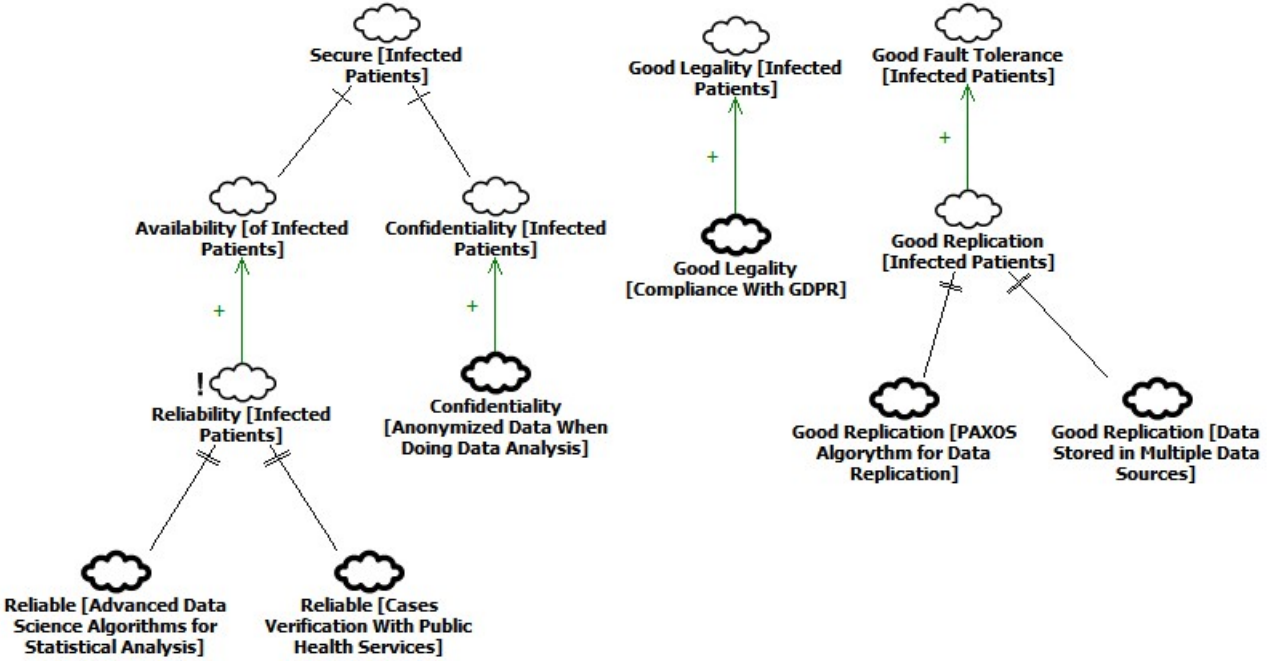
3. Identifying and modelling of possible operationalizations for NFR

3.1. Self-isolation



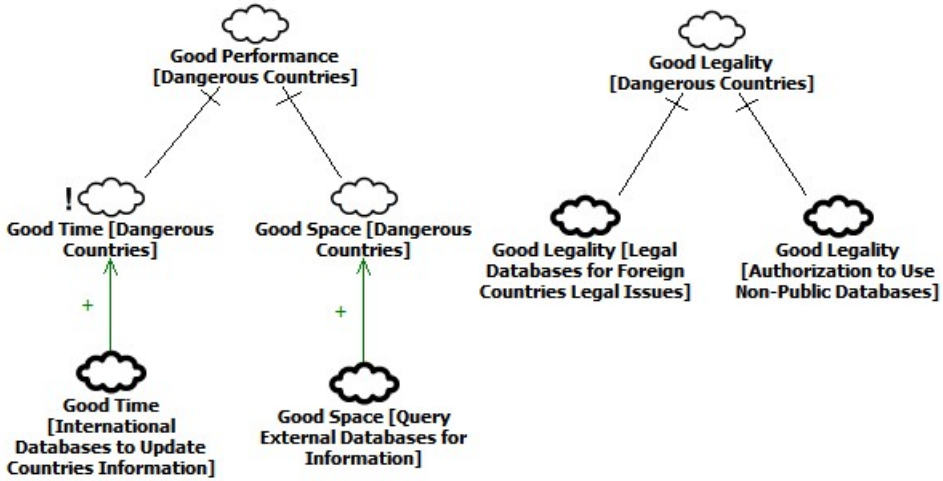
pic 8. Self Isolation - Possible Operationalizations

3.2. Infected patients



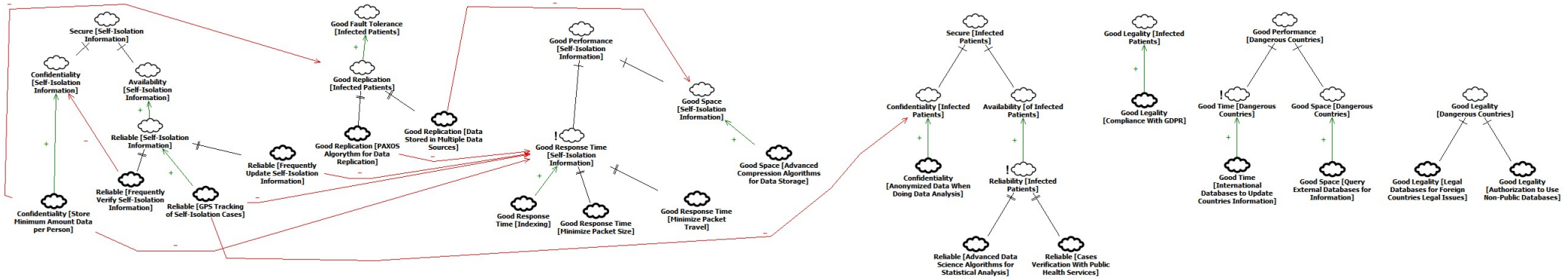
pic 9. Infected patients - Possible Operationalizations

3.3. Dangerouse countries



pic 10. Dangerous Countries - Possible Operationalizations

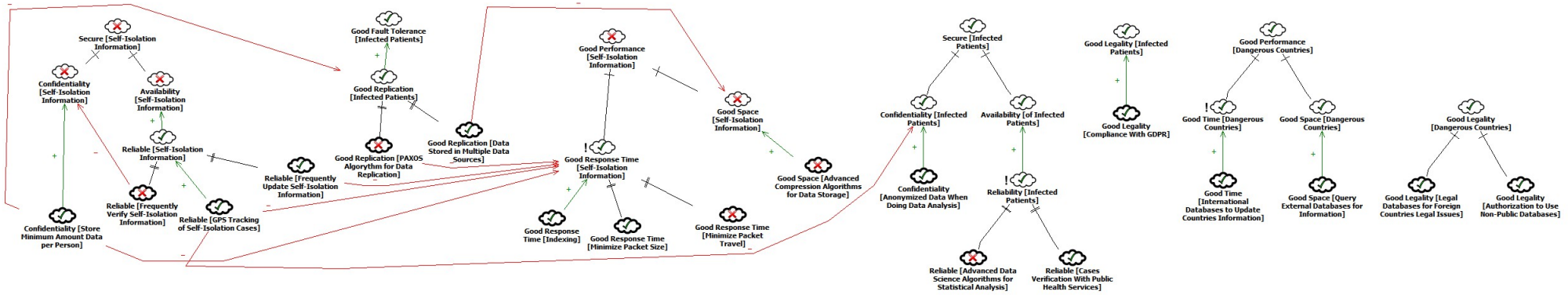
4. Detecting and Modelling of Implicit Interdependencies Among NFR



pic 11. Implicit interdependencies among NFRs

5. Making decisions

5.1. Chosen Operationalizations and SoftGoals



pic 12. Chosen Operationalizations among NFRs

5.2. Decision Explanation

5.2.1. Negative impact

- Frequantly verify self-isolation information harms confidentiality because increasing amounts of data are processed with an increased chance for data interception.
- Store minimum amount of data about a person hurts good response time because querying small unstructured data takes longer.
- Store minimum amount of data about a person harms good replication because replication requires a lot of data to work properly.
- GPS tracking of self-isolation cases harms confidentiality because in case of data breach intruders might gain the ability to know a person's location.
- GPS tracking of self-isolation cases hurts good response time because updating GPS information takes a long time.
- Frequently update self-isolation information harms response time because it takes computer resources to do the update.
- Use PAXOS algorithm for replication harms response time because this algorithm takes a lot of computational resources to complete. Which impacts response time.
- Data stored in multiple data sources hurts good space because it takes a lot of physical computer space to store in multiple sources.

5.2.2. Rejected operationalization

- Frequantly verify self-isolation information - verification usually can be a complex process also it heavily impacts confidentiality, that's why we decided to reject.
- Advanced protocol to minimize packet travel - lack of competency in the team to implement such protocols.
- Use advanced compression algorithms for data storage - lack of competency in the team to implement such algorithms.
- Apply advanced data science algorithms for statistical analysis - lack of competency in the team to implement such algorithms.
- Use PAXOS algorithm for replication - lack of competency in the team to implement such protocols.

5.3. Conclusions

Using NFR we successfully selected, decomposed, and chose operationalized soft goals to be completed in our project. Analysis was very useful and applicable in real-life scenarios in the industry.

6. Strategic Dependency Model

7. Strategic Rationale Model

8. Conclusions about an dependency

Conclusions