

Goal-oriented requirements engineering
(GORE) στη διαχείριση κρίσεων: ανθεκτικές
κοινότητες μέσω smart governance

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Summary

- The purpose of the Greek Civil Protection General Plan, named as “Xenocrates”, is to formulate a system of effective reaction and recovery, against the natural catastrophic phenomena, in order to protect citizens’ life, health and properties, as well as the natural and built environment. Within the framework of this plan, individual plans are drawn up, depending on the type of the natural disaster.
- The present work concerns the short-term management part of the thematic plan regarding earthquakes, named as “Enceladus”. We have selected as a key study Farkadona, which was hit by the recent strong earthquakes on Thessaly (some of them were over or close to 6 R).
- We have gathered, via two interviews among the topic related staff, the necessary information about the implementation of the plan, in order to make the comparison between the written plan and the real situation/actions.
- We have selected and reformed the most critical and time-consuming parts of the short-term plan, especially the related with Municipal Authority. On the purpose of this study, we have selected the process of the temporary housing, damage control and social welfare after the earthquake and we present in a table the results of the work time saving due to the new process.

Method

The first step was to study the plan “Enceladus” in order to have a comprehensive knowledge about the actions and the stakeholders. Next, we had an open discussion and interviews, in order to find:

- the differences between the plan and the real actions
- the parts of the plan which have the margins/potential for improvement

The selected stakeholders described the process from their point of view. The comparison with the plan helped us to identify the main points of the current process which could be implemented with a more effective way.

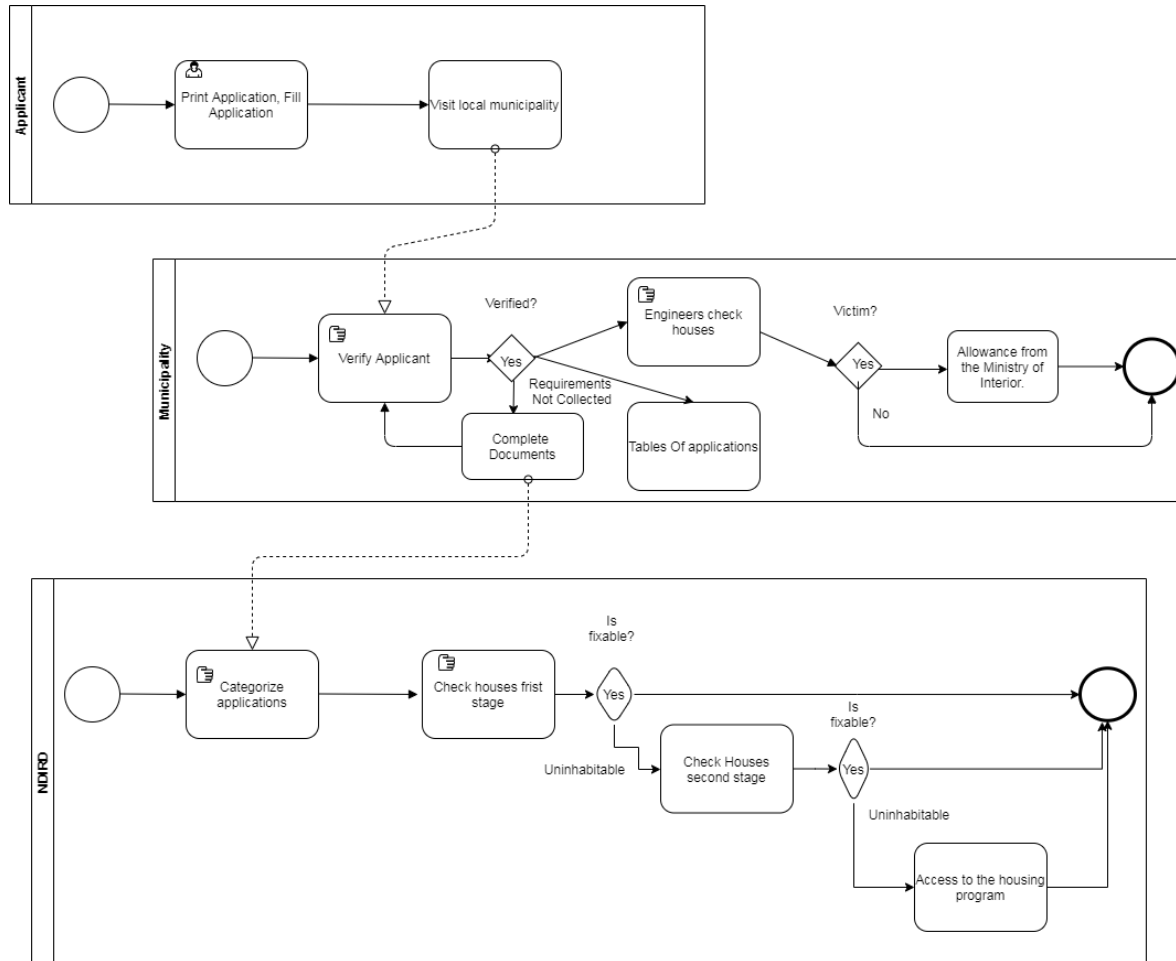
Next, the requirement engineering elicitation tools used on the requirements, which gave the basis for the goal modeling stage. The (BPMN) tool used to model the current process of the temporary housing, damage control and social welfare after the earthquake. Drawio tool used to model and describe the process, through a bulleted description. Then the goal modeling used the BPMN tool to define and design the proposed improvements to the current process.

Process Model

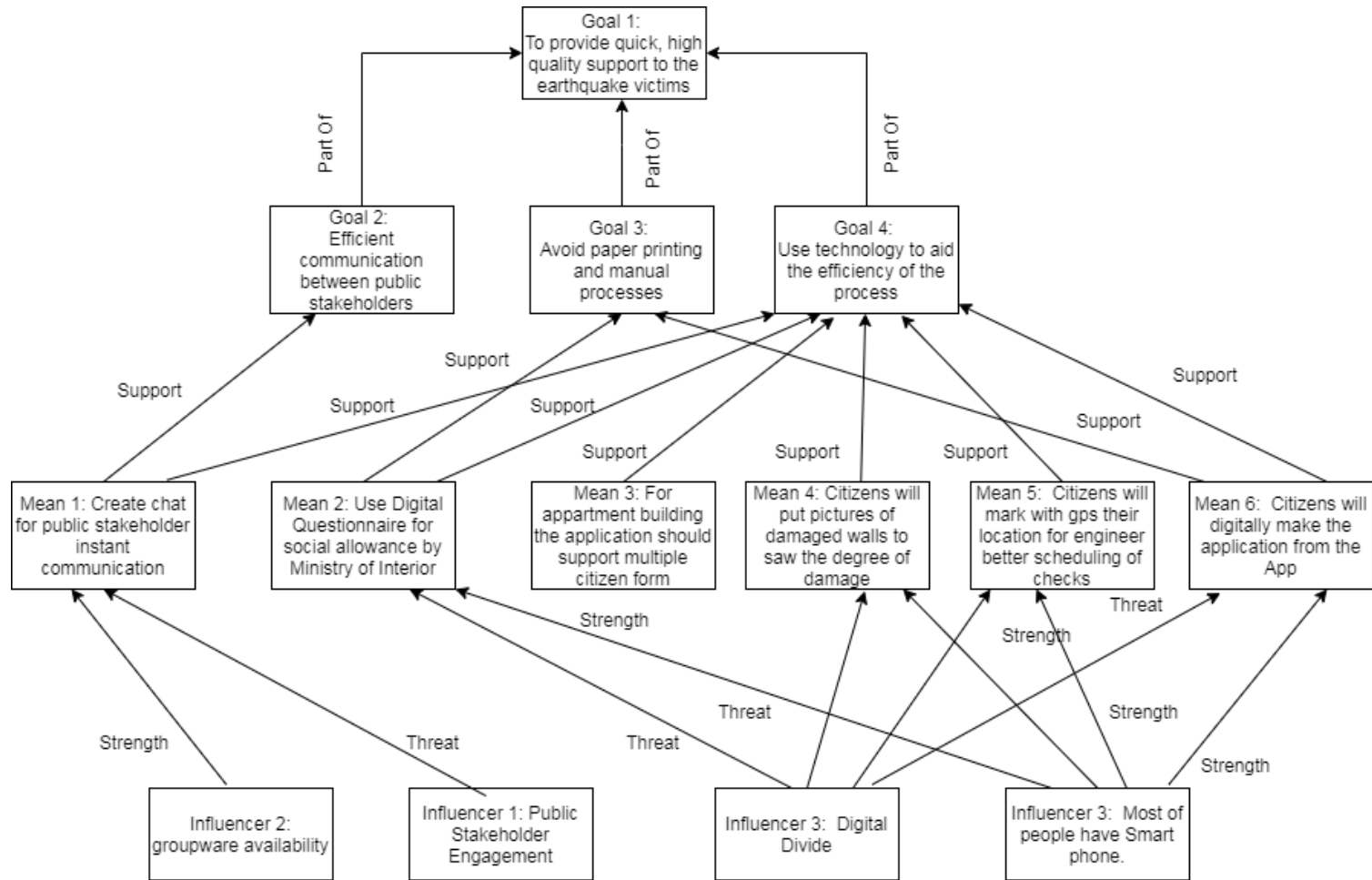
Process of the temporary housing, damage control and social welfare after an earthquake :

1. Citizens that are hit by the earthquake, have to bring and submit to the municipal front-desk office, a paper-print application with many enclosed papers.
2. This office send the papers to the municipal headquarters and two parallel procedures are taking place:
 - 2a. Municipality send the data to the Ministry of Infrastructures, in order to make a local control, to categorize the houses according their damages.
 - 2b. The Municipal Committees (composed by employees) check the households (which had made the applications) in order to rank them in categories, according the scale of damages.
3. Citizens that have the certificate paper for the damages on their houses, submit another application, directly to the Ministry of Infrastructures, in order to include them to the reconstruction/housing programme.

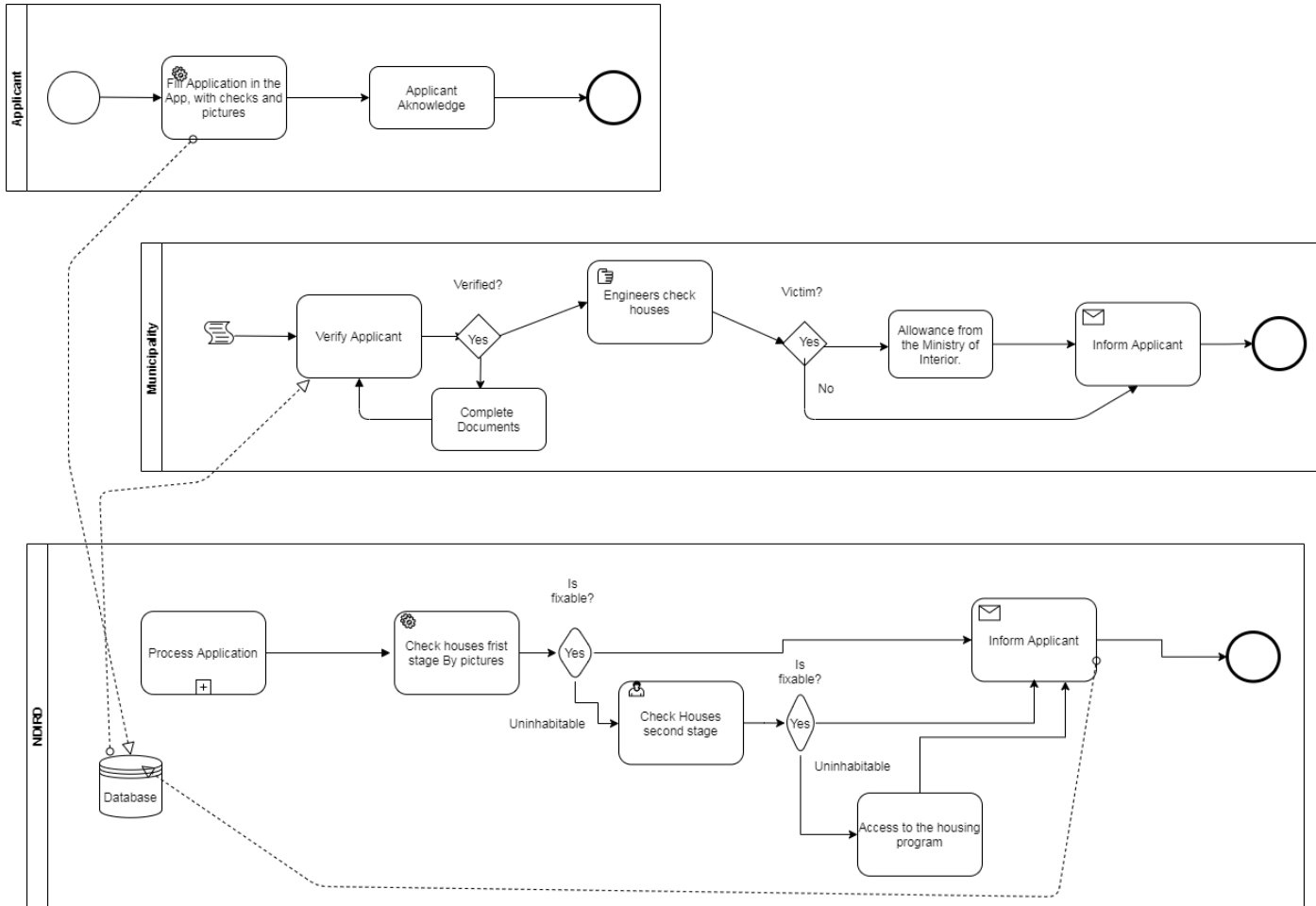
Process before Improvement



Goal Model



Process After Improvement



Requirements

Req ID	Requirement	Type	Realize	Priority	Traceability
A unique identification (UI)	Full requirement statement (M3.L3, semi-formal)	Functional or non-functional?	Which means from the goal model and/or which process activity the requirement implements	Set a priority for the development of the requirement, using a technique from M3.L6	The UIs of all the other requirements dependent on this requirement
Req. 01	Applicant shall be able to use the app any time.	Functional	Make the app run in cloud to have high availability	Essential	Req. 9,Req. 10
Req. 02	Applicant should be able to add files to the app	Functional	By developing a new function to the application	Essential	Req.10
Req. 03	Applicant should be able to put GPS coordinates	Functional	By developing a new function to the application	Essential	Req.10
Req. 4	Applicant should be able to create multiple form for apartment building	Functional	By developing a new function to the application	Essential	Req.10
Req. 5	Applicant should be able to complete a digital questionnaire	Functional	By developing a new function to the application	Essential	Req.10
Req. 6	Public stakeholders should use the application for instant communication	Functional	By developing a new function to the application	Essential	Req. 10
Req. 7	User should be informed about the status of his application	Functional	By developing a new function to the application	Essential	Req. 08, Ref.10
Req. 8	System should be able to send push notifications to the Users	Non-Functional	By developing a new function to the application	Essential	Req. 10
Req. 9	Application should be cloud based	Non-Functional	Use Azure to store the app	Essential	
Req.10	System should be Developed, Upgraded and mainted periodically	Non-Functional	Use the Ministry of Interior IT Department	Essential	

Discussion

We have created a depiction table regarding the applied process, in order to redesign it (Mansar and Reijers).

Categories are the control relocation, contact reduction, control addition, case types, exception, task elimination, task automation and integrative technology.

- Control relocation is when controls are moved towards the customer.
- Contact reduction is when contacts with customers and thirdparties are reduced.
- Control addition is when completeness and correctness is checked at the information source.
- The heuristic case type, is used to reorganize processes, for example when a set of tasks are broken from a larger process and create a new one.
- Exception is when handling of exceptions is isolated into separate process flows.
- Task elimination is when unnecessary tasks are removed from the process.
- Task automation is when manual tasks are automated. It is used to decrease execution time and cost. Integrative technology is when technology is used to eliminate physical constraints in a process.

Benefits

Task	To-be	Applied process redesign heuristics	Potential Benefits (minutes of work time)
1	Citizens will apply directly to the municipality through application	Control relocation, contact reduction, Task elimination, Integrative technology	10' per application * 1000 applications = 10000 min = 2 weeks for 3 employees
2	Citizens will include gps to avoid errors	Control relocation, Integrative technology	5' per application * 1000 applications = 5000 min = 1 week for 3 employees
3	Citizens will put pictures of damaged walls to saw the degree of damage	Control reduction, Integrative technology	250 controls avoided * 20' per control = 5.000 min = 1 week for 6 engineers
4	Install Chat to respond to local community presidents	Integrative technology, contact reduction,	5 damaged villages * 200 min per president = 1.000 mins = 1 day for vice-mayors
5	Questionnaire for social allowance by Ministry of Interior	Task automation, contact reduction, Task elimination, Integrative technology	5' per control * 1.000 = 5.000 min = 1 week for 6 employees
6)	Communication between public stakeholders by chat	Contact reduction, Integrative technology	5.000 min = 1 week for mayor, vice-mayors, employees
7)	Apartment buildings, multiple citizen form and date/time for inspection with government	Task automation, integrative technology, control relocation	Bigger in cities 50' per building * 100 buildings = 5.000 min = 1 week for residents, employees

Thank you for your attention.