

LAPPEENRANNAN UNIVERSITY OF TECHNOLOGY

Department of Information Technology

Construction Monitor System

SOFTWARE DESCRIPTION

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1. PROBLEM

There are buildings which are ready built and occupied or even not built yet. All of them should be inspected every year or more often in case of proper **maintenance** and keeping the information up to date.

The inspection equipment must be precise, robust and mobile.

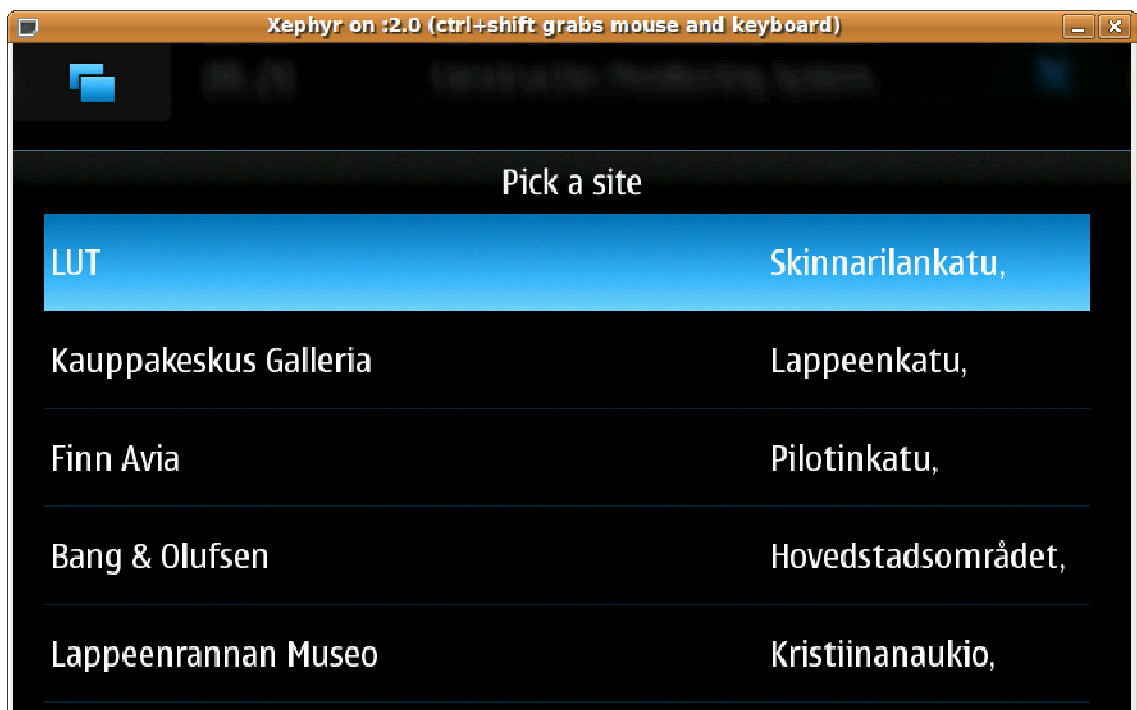
2. SOLUTION

Our team brought up a solution for this problem by using maemo based N900 device and building a software called Construction Monitor System (CMS). There is an inspector, who takes the device to inspection and has everything in it. There system consists from two parts, server on desktop computer and client part on maemo based device.

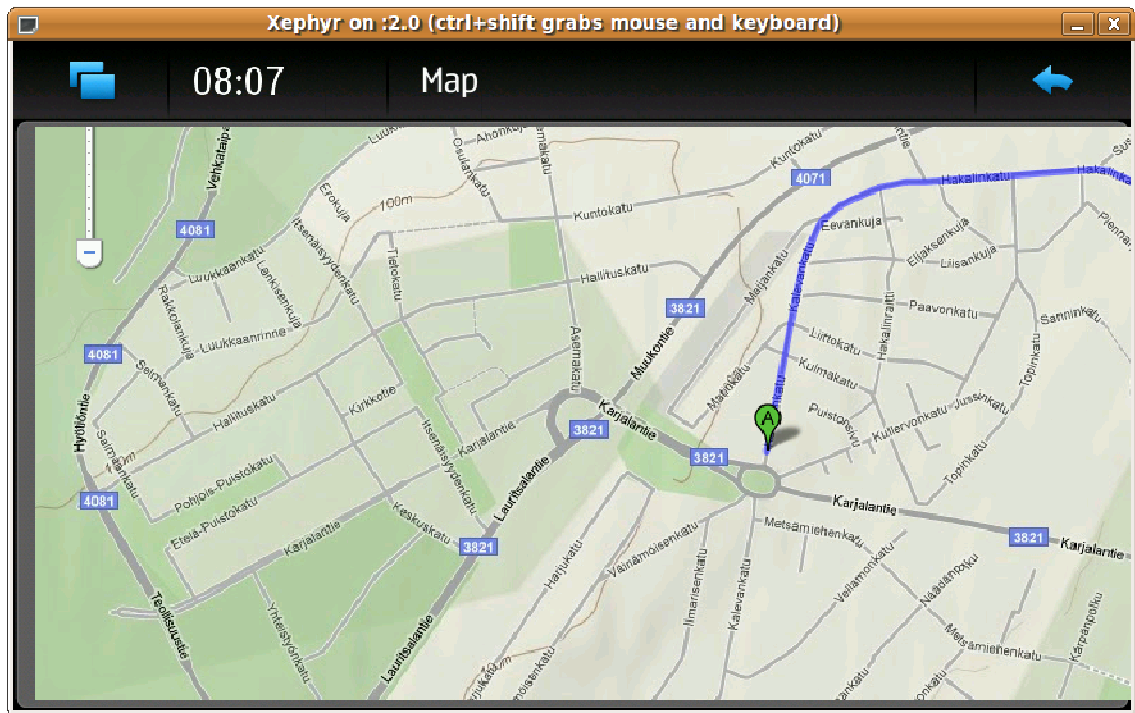
And some services for provide information about construction process for customers.

3. APPLICATION FUNCTIONALITIES

There is a server part of the system, which is connected to database server and selects which data (construction sites) must be synchronized with mobile device. Let's imagine a situation where inspector comes early in the morning to his office and selects in his desktop computer some constructions to inspect and hits sync - button. After that mobile device receives data via wi-fi and ready to go.



The inspector has a map for each site and can easily use the **GPS**-navigation to get to that site.



As inspector has arrived to the construction site he get to his job and inspects everything using the inspection list on maemo screen. Next maemo signs all of the measurements and inspections were made using GPS coordinates and datetime stamp. After that as soon as some connection with server appears, mobile device tries to **synchronize** the data with server. There should be some checksum system, which watches after integrity of data. After the piece of data was **synchronized** it will be able to read online for the customers.

4. IMPLEMENTATION TECHNOLOGIES

To implement the CMS we used Ubuntu based computer and maemo based Nokia N900 - mobile device. The development started using Esbox on Linux and binding the mobile device with it. Before we typed any code we started with **splitting** our project to single parts to minimize complexity. Finally we came up with these parts.

Part	Priority	Status we gained during this project
Database design (ER-diag)	1	Done
GUI	5	Almost done (~3h.left)
GPS	4	Hadn't chance to try
MAPS	6	Tried but failed
CAMERA	3	Hadn't chance to try
LOGICS	2	Tried but unfinished

5. DESCRIPTION

We define three actors for CMS:

- Inspector - go to the construction sites, make checking construction process and create report about it.
- Manager - manage inspector's work.
- Customer - person or company interested in receive reliable information about construction process in sites which build for them.

CMS provide full service for these actors.

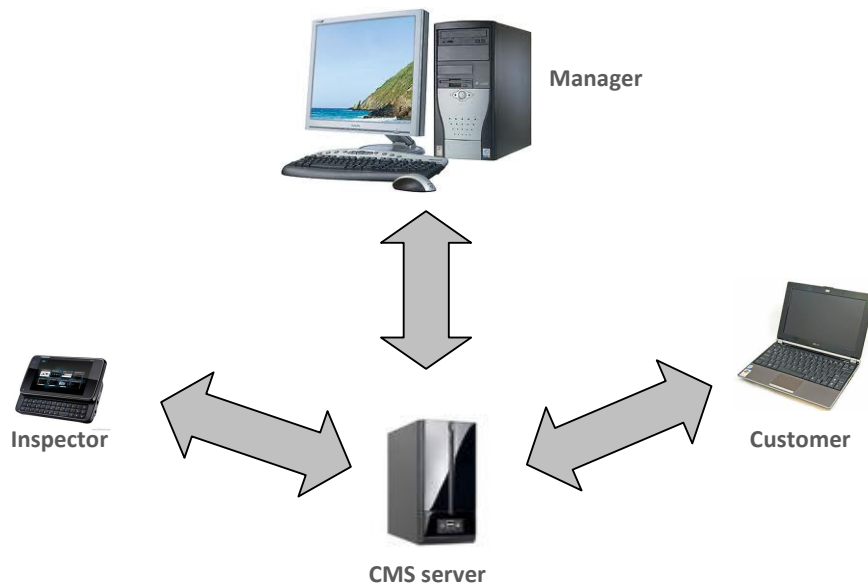
Manager can receive full information about construction sites and about inspectors, create and edit plan for making inspection sites and define which site will check which inspector. Inspector, in the beginning his work, connect to the CMS server and download plan for one day. This plan is generated CMS automatically and contain list of sites, information about them and check list for each of sites. After that inspector can select on of site and see map with drawn path to this site from current location. When inspector arrive to site, he push button "Inspect" and can see check list on screen. Also application saves automatically information about current GPS position and time of start inspection in local database. Inspector selects one position in check list and sees additional information about checking. He marks current status for checked process, writes some notes about it and makes pictures. When he finishes and pushes button "Save" application saves data, current time and GPS-location to local database. When inspector finished checking and push button "End", application comes back to list of sites, saves time of end inspection to local database. After that as soon as some connection with server appears, mobile device sends data about result of inspection to CMS server.

Customer connects to CMS server and sees list of his sites and reports about inspections. He can see progress in construction processes.

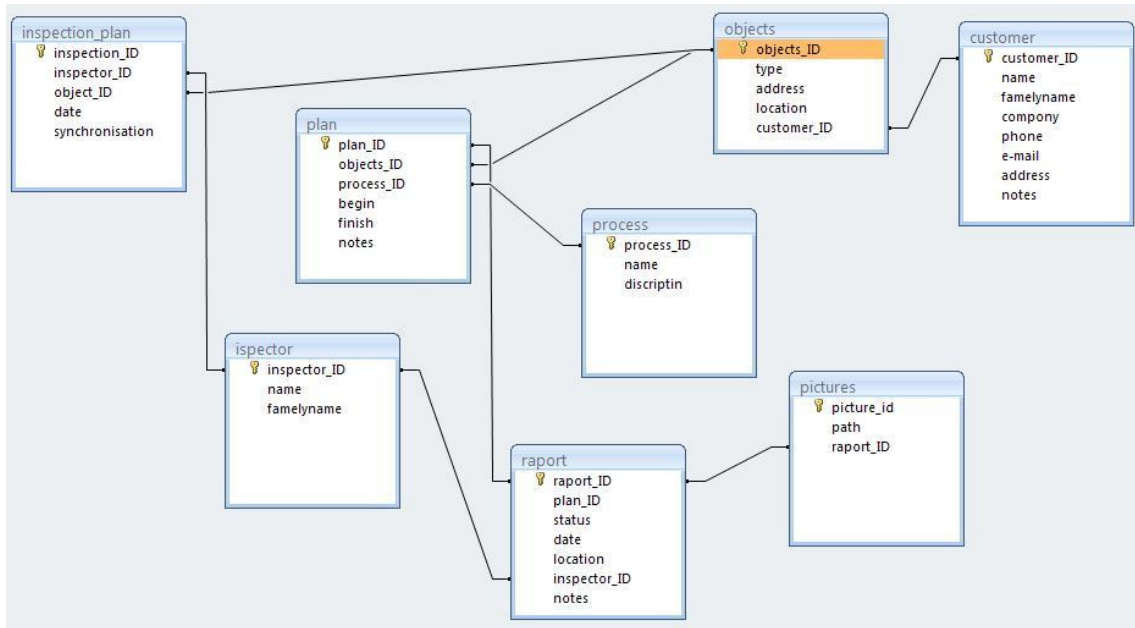
6. ARCHITECTURE

CMS is consisted next four modules:

- Server - contain database and provide work for other modules of system
- Manager application on desktop.
- Inspector's application on mobile device.
- Customer's application on PC.



There also was developed design for database.



7. WORKTEAM

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