

Productivity Apex Inc

Incorporating GPS Technology to Enhance One-call Center Processes in New Jersey

Final Report
May 2011



Latest update on the Project Performance since last quarterly report:

The last two tasks have been executed successfully. Below is a description of the work performed on those last two tasks.

Task 1: Mobile Application intercommunication with One-Call Center

- Activity 2: Application and One-Call Center interaction testing phase.

This task is successfully completed after performing several tests sending tickets to the New Jersey One Call Center (OCC) using the new Bing™ Maps capabilities installed on the application. The OCC is currently receiving locate request tickets successfully.

Task 4: Implementation and Testing for New Mapping Platform

- Activity 2: Testing and debugging phase

During the performance of this activity some minor issues regarding the display of the map were found in the app but they were fixed successfully without inconvenient.

Introduction:

The purpose of this project was to assess the impact of utilizing GPS technology in location requests for excavation in New Jersey. Lessons learned from the Virginia Pilot project formed the basis for this project. The Virginia Pilot Project demonstrated that incorporating GPS Technology can significantly improve the communication of accurate and timely information about the location of planned excavations to all stakeholders. These enhancements can have a direct impact on damage prevention and the safety of underground facilities

The main objective corresponded to the delivery of a mobile application that could be used by excavators to defined the area of excavation using GPS coordinates and be able to send the locate request tickets to the New Jersey One Call Center without major disruptions on their current process.

To accomplish the intended goal of this project, a set of task and a methodology was followed to ensure the thorough analysis and consideration of every variable in the process and deliver a professional solution.

Project Synopsis:

A summary of the general tasks performed and methodology followed to accomplish them will be presented to have an understanding of the scope of this project.

1- Mapping of information flow, and identification of key processes.

- A visit to New Jersey and interviews with various Stakeholders such as New Jersey One Call Center, including Rutgers Project Manager, Utility Operators, NJBPU, and excavators was conducted to capture processes, information, and performance metrics.
- The information flow was captured to the desired level of details and scope spanning over the end-to-end processes. This information was represented graphically on MS-Visio flowcharts.
- The business processes were also analyzed. The relationship/interaction between process flow and information flow was clearly identified.
- The laws that regulate the process in New Jersey were identified and studied. The relationship between these and processes/information were identified and carefully considered for the proposed solution.

2- Comparison of the captured information flow to Virginia One-Call

- The Virginia One-call Center's process was systematically studied to identify the similarities and differences between that Center and the State of New Jersey One-call Center. This analysis and lessons learned from Virginia helped immensely to determine if any revisions needed to be made in the process of implementing GPS technologies in New Jersey. From this it was concluded that the benefits for the state from implementing GPS technologies could be considerable when dealing with safety aspects of excavations.

3- Technology Review

- Several devices and platforms were considered to develop the mobile application. Many features were considered when choosing from the different alternatives. Some of these requirements were determined by the previous experience and conclusions in the Virginia Pilot Project.
- The Android™ platform was selected for the development of the mobile app that will help incorporate GPS technology to the One-Call Center processes. The Android™ platform, which is backed up and powered by Google, provides certain benefits that make it ideal for application development, internet, and GPS operability.
- Google Maps™ was chosen at the time as the map platform given its compatibility with the Android™ system. It was selected considering that it was the only platform at the time that offered features such as zooming, panning, orthophotographic view and the capability to customize it to create shapes on Android™ operative systems.

4- Perform Requirements Analysis for software interface used for Information Transmission

- A sketch and a mock-up graphical user interface was created as a prototype using MS PowerPoint in order to open the discussions for new design ideas for the final product. This

Prototype was subject of discussions on several teleconferences between Productivity Apex and several stakeholders like NJ BPU, NJ One Call Center executives and developers, excavators and locators. Whose ideas and opinions were all considered and incorporated in the final design of the mobile application.

5- Mobile Application Development

- **Software development:** Productivity Apex team worked in the development of the software, incorporating all the requests from the client and building an application that is both user-friendly and complies with the requirements stated by the client and the respective regulatory laws in New Jersey. The team worked closely with the One-Call Center to provide a tool that will not cause disruption into their processes and can be easily incorporated without major changes in the system.
- **Debugging and testing phase:** Once the code for the mobile application was developed a testing phase started and the application was subject to a thorough testing process. Some issues in the application were identified and documented in order to be fixed. Each one of those issues that were found were replicated, analyzed, fixed and retested in order to verify there were no longer causing any errors or problems in the application. This activity continued throughout the entire life cycle of the project, for every new addition and modification performed on the mobile application a new set of testing and debugging techniques were carried out.
- During this phase an issue with Google Maps™ was found. It was noticed that Google Maps™ was not being consistent when returning the shapes created to enclose the area of excavation. After rigorous testing it was determined that it was problem on the Google Maps™ API used on the application. After several trials using the latest updates, posting the issue in reputable forums, and modifying the code of the API the problem persisted. Maps™ even had the same problem on their website.
- After thorough review of all the different alternatives a new map platform was chosen to use on the mobile application. Bing™ Maps was the best candidate with a new API that was recently developed to work with Android™ operative systems, it has many of the same capabilities Google Maps™ provided, so it caused minimum disruption to the project.

6- Mobile Application intercommunication with One-Call Center

- **Communication with One-Call Center:** Once the application was tested and probed it worked, the new configuration that will allow the app to communicate with the One-Call Center was done. All the necessary information and requirements were received from the One-Call Center including the WSDL and the proper schema documentation. The team review the information and adapted the mobile application to that configuration, some modifications were necessary after conversations with New Jersey One Call Center (OCC) and BPU, specifically concerning the Extent of Work on the OCC system, this issue was solved with the incorporation of a sentence that will provide the description of the shape that enclose the area of excavation and the GPS coordinates that define it.
- Using this information the communication was established successfully after minor reconfigurations and feedback from both parties.

- A testing phase started once the application was built and the interaction with the One-Call Center was established. Different tickets were sent as tests to identify errors and problems between the application architecture and the XML schema requirements. This task was carried out successfully and it continued to be executed till the end of the project life cycle to ensure the operability of the tool.

Conclusion:

A mobile application was developed to send locate request tickets by excavators to the New Jersey One Call Center. The application allows the users or excavators to enclose an area using shapes like circles, polygons and polylines over a digital map with satellite view, and GPS technology to properly locate and describe the site of excavation.

The project was finalized without major setbacks and the tool was developed without causing significant disruption to the New Jersey One Call Center processes.

A file containing the final version of the mobile application was delivered to Rutgers University as well as a user manual for the tool and a compilation of the previous reports with all the findings and conclusions on the project.

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