Project Proposal-GSoC 2016
Location and Time-based Device Policy Enforcement

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Introduction

I'm a Third year Undergraduate student from Faculty of Information Technology University of Moratuwa,I have been eager to participate to Google Summer of Code from the beginning because of the amazing opportunity it provides for students to grow in the software industry .I have chosen WSO2 as the mentoring Organization for this year's GSoC and following is a description of my chosen project and my approach to successfully complete the project,first i will give a brief introduction about the products and concepts i am working with.

WSO2 EMM

WSO2 Enterprise Mobility Manager is designed to address the needs of an enterprise environment where the data security is valued above any other. With both COPE (Corporate Owned Personally enabled) devices and BYOD (Bring Your Own Device) used inside the Corporate Environment, the devices need to be monitored and managed to increase the security of Corporate Data[1]

Device Policies

When a new Mobile device is registered with the EMM, policies defined by the administrator will be enforced on them. It can be based on the Role, device type, OS type. And the policies can be such as Enabling the phone lock, Disabling the camera, requesting the device location. Devices are monitored for policy violations.Predefined follow-up actions will be executed on the device in case of a violation.

- Publishing and Unpublishing a Polic

  When a policy is published then it goes into the active state. Active policies will be enforced on registered devices with the "policy enforcement Criteria"
  Unpublishing will put the policy in a non-Active state

Project Idea

The purpose of this project is to create a mechanism to enforce the device policies based on the location of the device and the time. In more descriptive manner

- Given policy must be activated automatically when the device enters a predefined area.
- Given policy must be deactivated when a device leaves a predefined area.
- Given policy must be activated automatically in the given time frame.
- Stats of the current policy, whether it's active or inactive need to be visible in the dashboard.
- Policy compliance monitoring to the given device must be activated when a policy is activated.

The final deliverable of this project is to create an "Extension point for current EMM policy module with location and time based policy publishing capability" with the following

- ·   Location based policy enforcement component.

A component which enables the location base policy monitoring and enforcement including statics. This need to be an extension to thee component which enabled device policies currently

- ·   Time based location component.

A component which enables the time base policy monitoring and enforcement including statics. This need to be an extension to thee component which enabled device policies currently

- ·   Location and time based policy configuration UI.

This is to enable users to configure and maintain the locations and time frames.The UI must have the ability to monitor the policies which is active in the device and compliance status.

Location Based Services

In order to enforce a policy based on location,it is required to determine if a device is within a given area or not.I expect to implement this logic in the EMM side of the application because using platform specific geofencing APIs will need individual implementation and will behave inconsistently.

EMM has a way to periodically retrieve the device details.location is one of the details retrieved.I will use this data to process the device eligibility for the policy enforcement.Specifically for geofencing I have started studying about Spatial Indexing with Quadtrees and Hilbert Curves to implement location based triggering of events.

Motivation behind Choosing the Project

As an Undergraduate Student I have been familiar with java Programming Language for three years, and I am also got the Oracle Certification (OCPJP)e before my university Enrollment in 2012. During my University period I eventually started mobile applications development, primarily Android application development. As a result I have done several Android Development projects, most of them using the Gps and location services. And as my 2nd year Industry based Project I developed an Android application that will find the shortest transit path for user in Sri Lanka. That project included a RESTful api and a Location based Android application. Which I think is a good foundation for this project.

I chose WSO2 as the Organization because of its technology stack and the great support from the development community. WSO2 EMM combines the mobile development and web services to create an environment that I could understand with my knowledge and experience. And the learning aspect of this project is just the right amount for me to improve myself while contributing to a great open source project.

Although this is the first time for me to use a WSO2 product so far I have been able to be successful from the guidance from the development community. Their great support and enthusiasm Is also a motivational factor for me to choose this project.

My approach for this project

- Inception phase

I have been using WSO2 EMM for only 3 weeks, and there is much to learn. But I have a good understanding of what the deliverables are and what steps are needed to be performed. In this phase I expect to fully read the documentation of WSO2 EMM and understand the full workflow of application

I also expect to further perform simple tests to accurately understand the current functionality.
I also expect to read about the fundamentals of location based applications and the most efficient way to achieve the results

I expect to start writing a blog to record my findings during this phase (I intend to maintain this blog throughout the project) Finally come up with a development plan to achieve the deliverables

- Designing phase

In this phase I intend to come up with the design diagrams for the project. Namely

          Use case Diagram

          Class Diagram

          Architecture diagram

- Implementation phase

          During this time period my goal is to implement the components needed to achieve the final deliverable. And integrate them to the existing management console.

I expect to develop the component to take the device locations as input and output if it is inside a given area. (As of my knowledge now I can use the REST api to get a registered devices location)

I will also implement a new policy enforcement criteria that will use the location and time details to check the enforcement applicability.

I will develop a admin UI that will integrate a map, where the admin can define an area where a policy should be enforced. And set the time for policy enforcement.

- Testing and Documentation phase

          I expect to perform unit tests, functional tests and system testing.and I will also document the newly developed components so that anyone can contribute to this project in the future.

Timeline

Up To the Community Bonding period	In this period I will mainly engage in the Inception phase tasks. And further develop my knowledge on the domain of geofencing and Wso2 Carbon platform.
Community bonding period (April 22, 2016 May 22, 2016)	Clarify any doubts I have via the mailing lists. Work closely with mentors and get ready to start the designing phase.

Work Period until midterm evaluations (May 23, 2016 June 20, 2016)	During this phase I expect to finish the designing phase and finalize the architectural decisions And start implementing. And by the end of this period I expect to create a policy with will be enforced based on the device location.
Period of submitting midterm evaluations (June 21, 2016 – June 28, 2016)	Complete and submit the results for mid evaluations Start developing the UI for admin control
Work Period (June 28, 2016 August 16, 2016)	Complete all the requirements along with the testing and documentation Submit for final evaluation at the end of the period

What I have Done until now

- I have cloned the WSO2 EMM and the build it from source.
- I have accessed the admin panel and performed Policy operations on a single device
- I have started learning about the Location based services(Geo fencing)
- I have exchanged a development approach with the mentors to gain their comments
- I have prepared the development Environment in my personal laptop, which will be always available to me.
- I have read the important Documentation parts to understand about the project.
- I have started Studying about Algorithms used for geofencing and the Data structures used for efficiency

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