Aircraft Service Application Scenario

Introduction

Maintenance of aircraft is extremely important because if something goes wrong in an aircraft during flight – an engine catches fire, for example – the results are often catastrophic. As a result, there are many procedures and regulations concerning how aircraft must be maintained.

In this scenario, our organization is intending to develop an application for Android tablets to help create and maintain aircraft maintenance records. This application, called our "Service Application", will replace older systems which were both expensive and error-prone.

Background

The maintenance records for aircraft are much more involved than most consumer products that people are familiar with. First of all, every aircraft is different: even if two airplanes have the same model number if they were built at different times the manufacturer might have changed suppliers for some parts. Also, if an airplane has two propellers, one of them might have been replaced but not the other, and the amount of time each propeller has spent in flight has to be tracked, in order that inspections and replacements can be done at the proper times.

Therefore, the records for a plane include model and serial numbers of the airframe, each engine, each propeller, each rotor, and so forth. The records include when each part was installed, inspected or serviced, and the person who certified that the work was done properly.

When servicing an aircraft, the people doing the work are given checklists of the tasks that must be done. The person overseeing the work has to have the proper certification for doing that particular task, and must sign off at the end stating that the work was done correctly.

Also, many organizations consider their aircraft records to be confidential. They are available to regulatory agencies, but for various reasons they don't want their competitors or the general public to know the details of their maintenance policies and procedures, or details about their individual aircraft.

Periodically, updates to checklists or maintenance policies are made. This usually happens in response to an accident – people decide on an appropriate way to prevent a similar accident from happening again.

Typical Use Case

A typical use case for our application is as follows:

- A maintenance crew checks out one or more tablets at the beginning of their shift.
- They will consult the Service Application, which will display a list of tasks that need to be done. They won't be expected to complete all of the work tasks during their shift – the time taken to do maintenance can vary, and so they will do as much as they can during their shift, after which the next shift will take over.
- When doing a service task, the Service Application will show the crew the maintenance records

for that plane, the instruction manuals for doing that particular task, and the correct checklists.

- When a crew member completes an item on the checklist, they must take some action (such as pressing the correct button on the screen) to check that it has been completed. Sometimes checklist items will require information such as the serial number of a part that replaces an old part.
- Crew members will be able to take photos of their work using the tablet camera and attach them to the service records.
- When a task is complete, the Service Application will have the person responsible for the task (who must be properly certified) sign off that the task was done correctly.
- Sometimes doing a task will result in the creation of a new task. For example, an inspection will determine that a part needs to be replaced. The Service Application will support this.
- When their shift is over, the maintenance crew will return the tablets that they used.

The organization's main database of aircraft records will be correctly updated as service is done.

System Description

Some key architecture decisions have already been made, as described below.

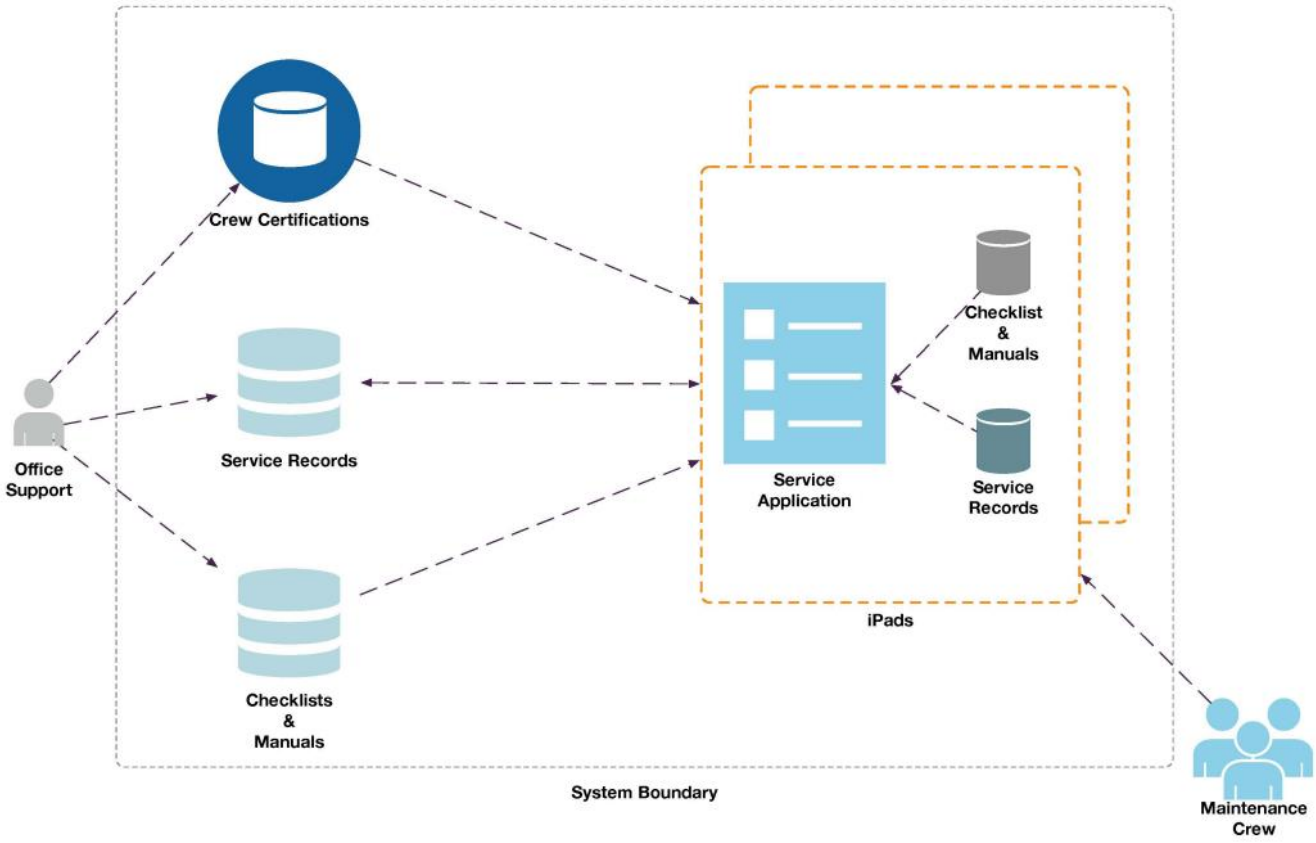
The organization's data center will host:

- The database containing all the service records for our aircraft. This database already exists: the Service Application will have to deal with records that are created by legacy systems. Also, we won't be able to simultaneously replace our existing maintenance system, so even when the Service Application is being used, some people will still be using the older systems.
- The master database of all the service manuals and checklists for all the equipment used by the organization.
- The database of the certifications held by our service people.

The tablets themselves will be wifi enabled and wifi will be available in the organization's offices.

When used out on an airport field (or inside an aircraft's engine) wifi availability won't be guaranteed. Our Service Application will be installed on the tablets.

Periodically, the Service Application will connect over the Internet to the API Server to synchronise its local databases with the service records, service manuals and checklists held in the data center. Note that there are too many service manuals and checklists in the organization for all of them to be downloaded to a tablet. Therefore, the Service Application will have the ones that are needed, but not all of them. Similarly, a tablet cannot hold all the service records for all the organization's aircraft!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