Failsafe Executive Summary Edwin Ward, Jeff Hou, Alex Song, David Chou

Purpose

Dealing with a heart attack is a time-critical operation. No more than ninety minutes should pass between the time an incident is reported and the time that the catheter operation is completed. The current alert system used by Duke Hospital is unreliable. Contact information and shift substitutions are recorded by pen and paper and are subject to being lost or becoming out of date. The pagers that the doctors use are similarly antiquated; several minutes can pass between the time an operator sends a page and a doctor receives it. Sometimes, pages are missed entirely, and one or more members of the six-person team can miss the operation entirely. This is unacceptable. Our application seeks to both centralize critical contact and scheduling information for the ICU and reduce the time taken to notify on-call medical teams of an emergency. This should allow emergency operations to start sooner and thus increase the probability of a patient's survival.

Overview

Our application will seamlessly replace the current emergency pager on-call system with a web-phone interface. Our web application will include a contact book for hospital personnel and a scheduling system for organizing on-call shifts. This web portal will create additional channels of communication for the hospital operator: In addition to the legacy paging system, the operator now can alert staff members of emergencies via SMS and phone calls. Through the addition of these channels, the hospital administrators, as well as individuals on the team, will now be able to track the status of the entire on-call team as they respond to the emergency alerts. Not only will this project cut costs by replacing expensive pagers with an inexpensive alternative but it will also provide a faster and more reliable *two-way* communication channel. By using the personal mobile devices and phones of the hospital staff, Failsafe seeks to provide an upgraded paging system that provides more value at lower cost.

Functionality

The web application is made up of two main interfaces. The first is a contacts database which can be easily updated and accessed for hospital personnel. The second is a calendar interface for the initial assignment of on-call shifts as well as the subsequent "shift trading" that will occur between individuals. Additionally, the web application will allow a hospital emergency operator to alert all on-call personnel of emergencies via SMS and calls with a template that targets the most critical information (i.e. location, type of emergency, ETA, etc). Those alerted would then be prompted to respond with an estimated time of arrival in order to "close the loop" (confirm they received the alerts). Hospital personnel, when not using the web app, will be able to interface with the Failsafe system through a simple-to-use API.

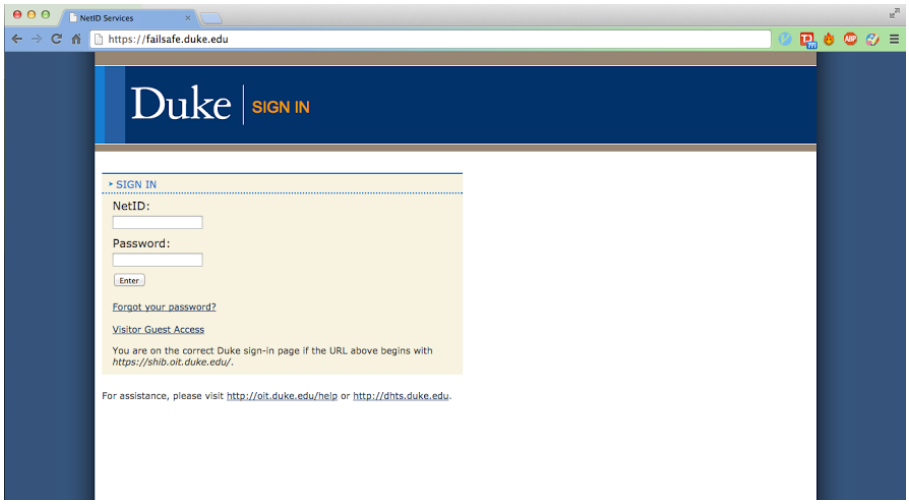
Technical Considerations

In order to ensure quality and speed, the Failsafe system will need to be deployed on a professional server with dedicated space and RAM. Additionally, we strongly suggest obtaining a Failsafe domain. Future maintenance will require developers familiar with the Flask framework and the MySQL database system. For basic development, the development team will host tests for the system on a Duke-provided VM.
For the sending and receiving of automated SMS and phone calls, Failsafe will use a service called Twilio.

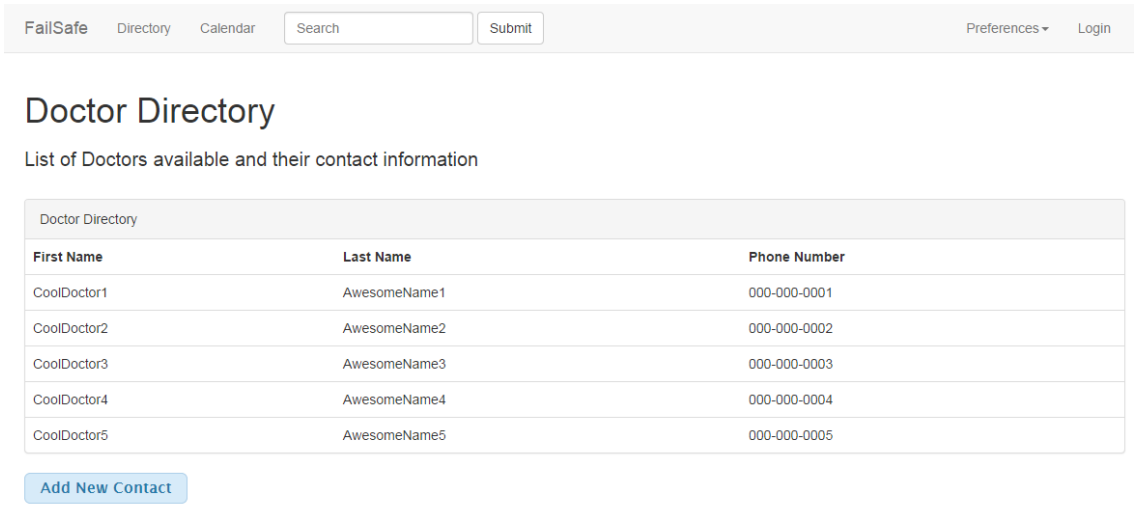
The team expects and has communicated its expectation that the clients will cover all development costs, which includes the price of a Failsafe domain, the costs of a production server, an operational hospital pager, the costs to maintain phone lines and send messages and calls through Twilio, and any other costs the team encounters during development. (Costs will only be incurred after explicit agreement from the clients.)

User Interface

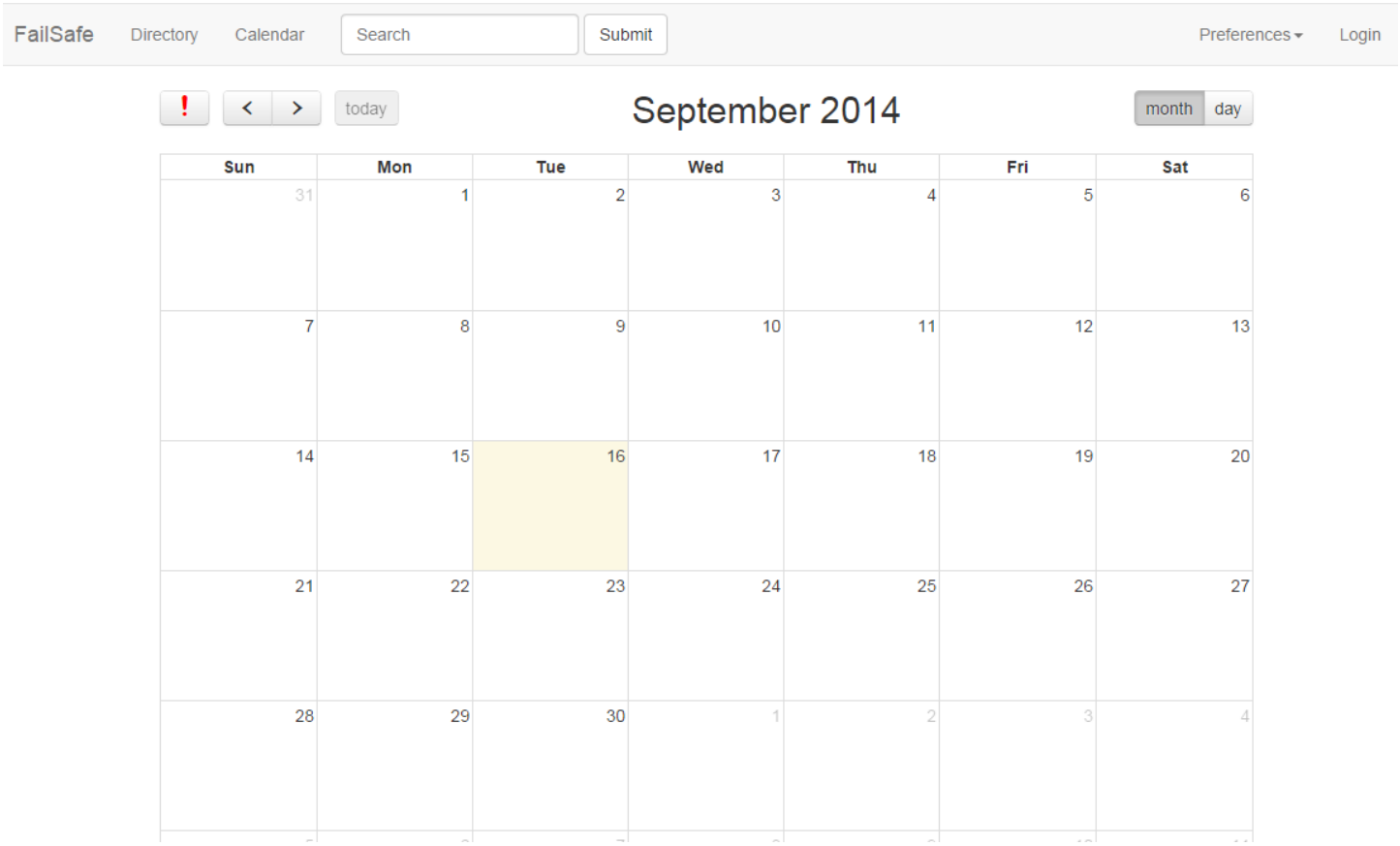
Web portal login:



Contacts page (will add alert button that is accessible from anywhere on website):



Calendar Page (click to add a schedule for a day):



SMS experience:

Initial message:

Sample emergency alert: