Project title: ZipRounds

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Summary

The current state of informal electronic communication at UCSF Medical Center occurs on a massive scale. Approximately 60,000 messages are sent to UCSF pagers every month. These communications represent a critical component of hospital care but are largely irretrievable by providers after they are first read. Furthermore, the current preferred paging portal, Pagerbox.com, is run by an external vendor and is a cost to UCSFMC. Finally, and most importantly, given their limited functionality, pagers themselves are becoming increasingly archaic and obsolete.

ZipRounds, a new social networking technology built on the Salesforce platform, combines the best features of paging, texting, Facebook, and Twitter. ZipRounds carries, transmits, records, and makes searchable online (using a secure web portal) all non-EHR (Electronic Health Record) electronic messages at UCSFMC. ZipRounds also delivers these messages to a variety of individually specified platforms (including pager and website) per provider preference. ZipRounds thus solves the irretrievability of messaging while simultaneously indexing it for search by patient/sender/recipient. It also makes paging more secure and HIPAA compliant while allowing for the phasing out of paging as smartphone penetration and reliability continue to improve.
Project Description

Currently approximately 60,000 messages are sent to various UCSF pagers every month. These fast, informal communications represent a critical aspect of hospital care but disappear soon after receipt and cannot be searched in any way. Furthermore, the paging systems are poorly integrated with one another and the scheduling and directory systems. ZipRounds, a communication networking technology built on the Salesforce Chatter platform, combines the best features of paging and social networking to revolutionize all of these systems, and ultimately, patient care.

**ZipRounds:**
- Records and tags all text messages/pages to individual patients (like Facebook)
- Places all text messages/pages online as searchable patient “conversations”
- Creates subject tags to allow conversation filtering (like Twitter)
- Replaces a system currently in use (Pagerbox) with the promise of replacing others soon after

**Goals:**
- Achieve Operational Excellence (OE) through integration across 4 systems:
  - Paging (currently done through Pagerbox now)
  - Pager Forwarding (currently done through AMCOM)
  - Scheduling (eventual, currently done through Amion)
  - User-updated Directory
- Store all messages/pages on a secure, HIPAA-compliant persistence layer.
- Index all clinical messages/pages to a patient.
- Enable clinical keywords searchable within and across patients’ messages/pages.
Screen Shots

Main

Physician Page
Technology

Software Requirements

Salesforce Chatter
Much of the technology required for ZipRounds already existed on the Salesforce Chatter and Force.com platform:

- Facebook-like user page
  - Each patient “object” is a page on which messages can be sent
  - Messages can be stacked by thread and wrap around the patient
  - All messages are stored online
- Use of hashtags to mark subjects within a message
- Log-in, patient “following”, and patient messaging events are logged for each user

Functionality built:
- A special portal that allows messages to be queued as alerts
- An integration server that pulls alerts through the UCSF firewall from the SalesForce Chatter streaming API and passes them to the paging systems
- Multiple options for receiving alerts:
  - Pager
  - Ascom wireless network-based phone
- Integration with the Electronic Health Record via Admit/Discharge/Transfer (ADT) messaging

Mule Enterprise Service Bus (ESB)
Mule ESB is the center of integration for ZipRounds. It is an open-source Java-based enterprise service bus (ESB) and integration platform that allows applications to exchange data. The key advantage of an ESB is that it allows different applications to communicate with each other by acting as a transit system for carrying data between applications within one’s enterprise or across the Internet. For ZipRounds, Mule ESB is the key integration point between all software systems including Salesforce, Interface Engine/IDX, and Amcom/Ascom. Mule resides on a VM server, depicted as “C4H (Chatter for Health) Integrator” in the System Architecture and System Data Flow diagrams below.

Sentillion Single Sign On (SSO)
UCSFMC uses Sentillion (a Microsoft company) SSO solutions as a single sign-on solution to all clinical applications. ZipRounds is integrated into Sentillion.

Interface Engine / IDX
The ability to wrap messages around patients requires a clean, accurate, and up-to-date list of patients and their associated attending physicians. This patient list is
generated through ADT messages from IDX, the current registration software (soon to be replaced by similar messaging from APeX [Epic EMR system]), passed through an HL7 parser and then integrated via Mule ESB before being passed into Salesforce/ZipRounds. Mule receives the HL7 data, parses it and filters out the following fields to be passed to Salesforce via the Mule ESB:

- Patient Name (first/last)
- Patient MRN
- Attending Physician Name
- Patient Location (room/bed)

**Amcom/USA Mobility**
Amcom is UCSF’s vendor for end-to-end, mission-critical communication solutions for paging and paging infrastructure. Using a special portal in Chatter to indicate that a message needs to be sent as an alert (page), Mule connects and polls Salesforce.com’s streaming API to collect and then relay said messages from ZipRounds to UCSF pagers and phones through their respective APIs. This allows users to use the existing paging model to communicate with one another while taking advantage of the features offered by Chatter.

**Hardware Requirements**

**Server Virtual Machines**
The server required is a virtual machine (VM) that resides at the Mission Center Building Data Center. The VM requirements are:

- CPU: 4-core
- RAM/Memory: 8 GB
- Operating System: Windows Server 2008 R2 64 Bit
- Disk Space: 100GB

**Ascom Phones**
Ascom is UCSFMC’s vendor for reliable on-site wireless telephone and messaging systems. Ascom allows nurses to receive messages on their hospital-associated (limited range Wi-Fi enabled) phone rather than on a pager. ZipRounds works with this existing functionality.
Implementation Timeframe

ZipRounds was implemented as an all-volunteer effort project, led by Dr. Raman Khanna. Resources were donated by various teams across UCSF, UC Berkeley, Salesforce, Ideo, and Mulesoft. The pilot took approximately 4 months to implement, from January 2012 to April 2012. ZipRounds was implemented as a pilot at the UCSF Mt. Zion Hospital in late April, 2012.
The UCSF Medical Center is currently in the midst of change of Electronic Medical Records System, affecting the integrations with ZipRounds. At this time, a rollout of ZipRounds is being planned for the next fiscal year, post EMR implementation.

**Portability to Other Academic Medical Centers**
The ZipRounds solution can be easily adapted to other Medical Centers. The primary dependency is Salesforce.com. Since a substantial portion of the solution resides on Salesforce.com, no hardware is required to support the web application. Within the UC system, Salesforce has a business associate agreement with UCSF that is applicable to all other campuses. Salesforce also provides a steeply discounted license through the Salesforce Foundation.

There are a few integration requirements:

- **EMR ADT Data** - Data integration with the hospital Electronic Medical Records (EMR) to retrieve patient Admissions/Discharge/Transfer (ADT) information. UCSF utilized an existing data feed, as ADT information is typically used by other edge clinical systems.
- **SMTP or HTTP enabled Pager Gateway(s)** – Most modern paging systems have a SMTP or HTTP enabled mail gateway that allows email to be sent to pagers.
- **Single Sign On (recommended)** – Though not absolutely required, we recommend an integration to the Single Sign On system to streamline access to ZipRounds for clinicians (physicians especially). At UCSF, Sentillion serves as a SSO solution to all clinical systems to streamline that access.

**Objective customer satisfaction**
Dr. Khanna surveyed pilot users after a 2 week usage period. Here is a condensed summary of the preliminary survey responses:

- Most preferred ZipRounds, especially the following features
  - provider search feature by name
  - ability to send a quick page
  - ability to page many providers
  - ability to send longer pages
- Nurses appreciated the opportunity to receive pages

17 responses to the survey (out of 70 approached)
5 MDs; 9 nurses; rest pharmacy students and a PT
3 trainees vs. 14 “full practitioners”