

Patient Transfer Web Application

NAU Undergraduate Symposium Presentation

April 25, 2014

ZeroLAG Developments

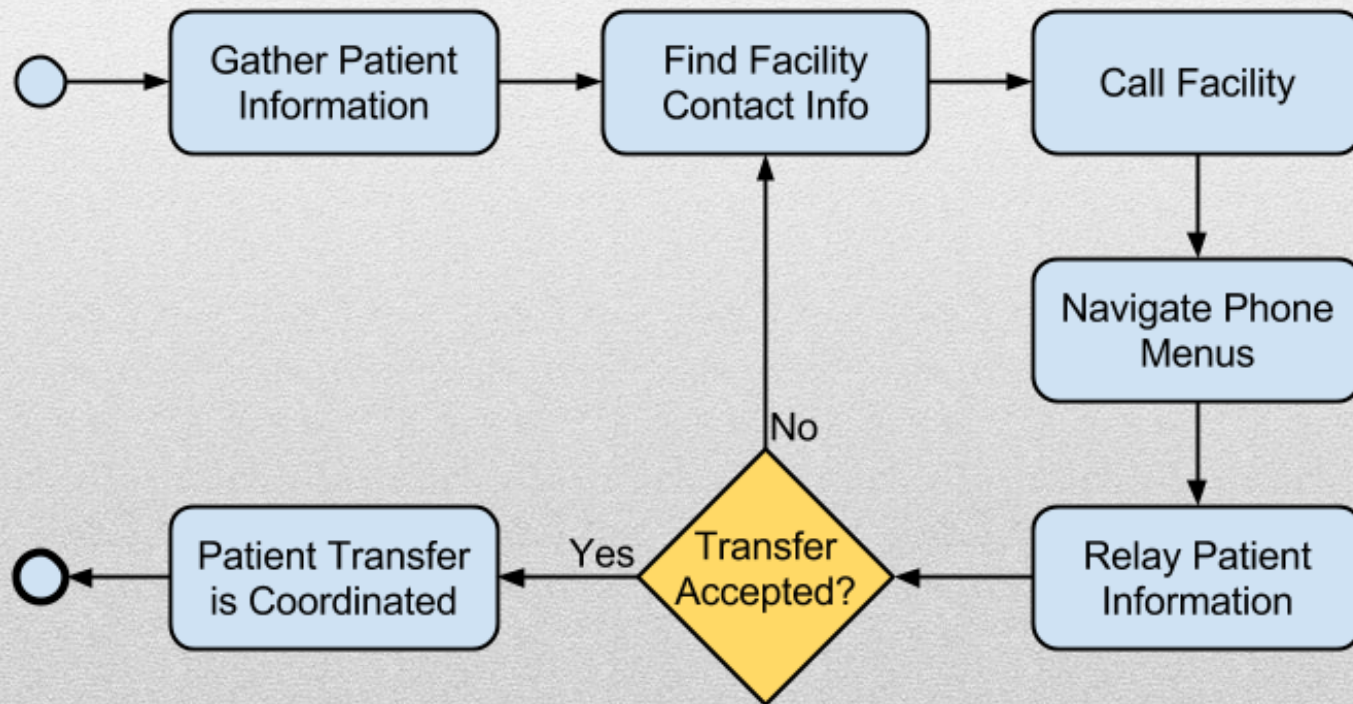


Introduction

- Zack Smith – Team Leader, Sponsor Contact, Web Design
- Li Bai – Recorder, Implementer, Tester
- Adam Hilgenberg – Architect, Database Design
- Garrett Jeanes – Database Admin, Web Master

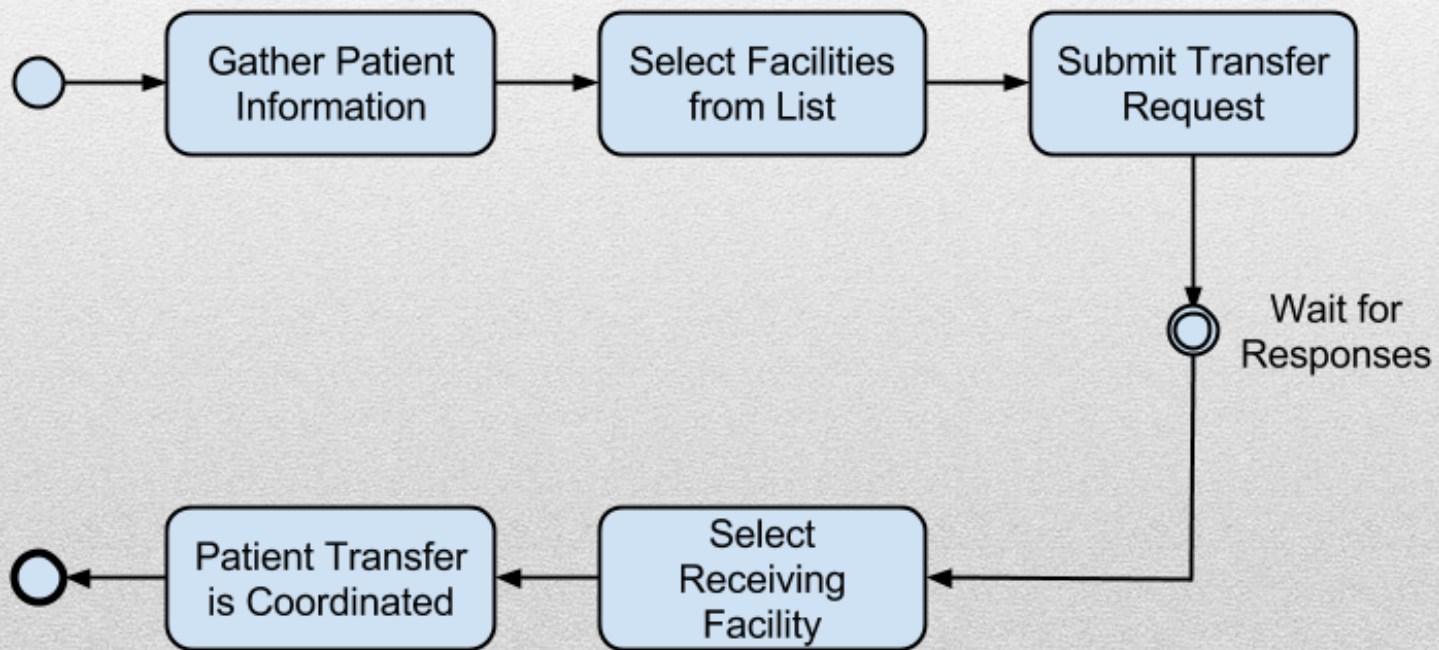
Problem Statement

- Sponsor: Troy Marino, CTO at Stat Coordinations, LLC.
- Problem: Patients are currently transferred from hospital to hospital through an inefficient sequence of phone calls.

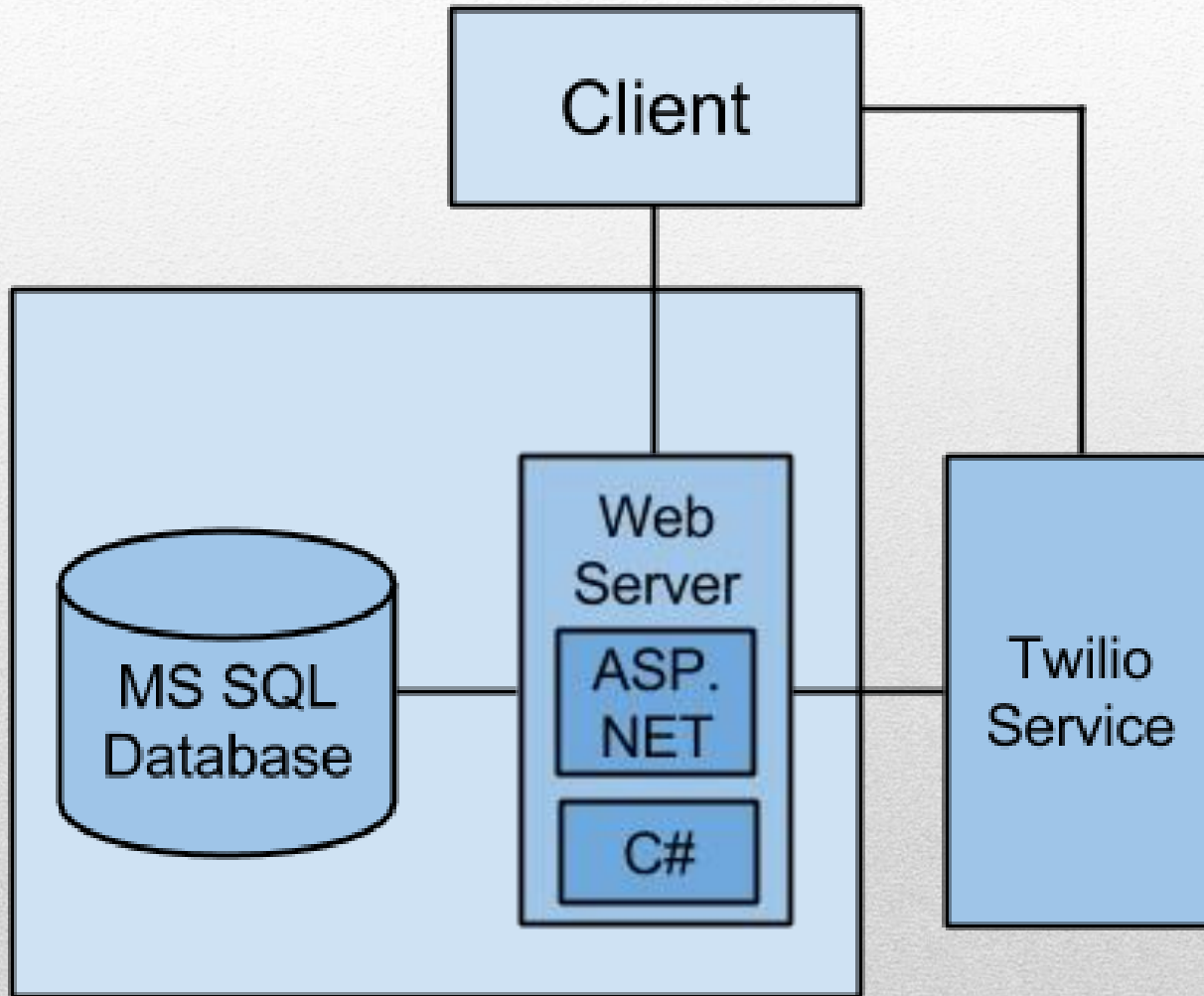


Solution Overview

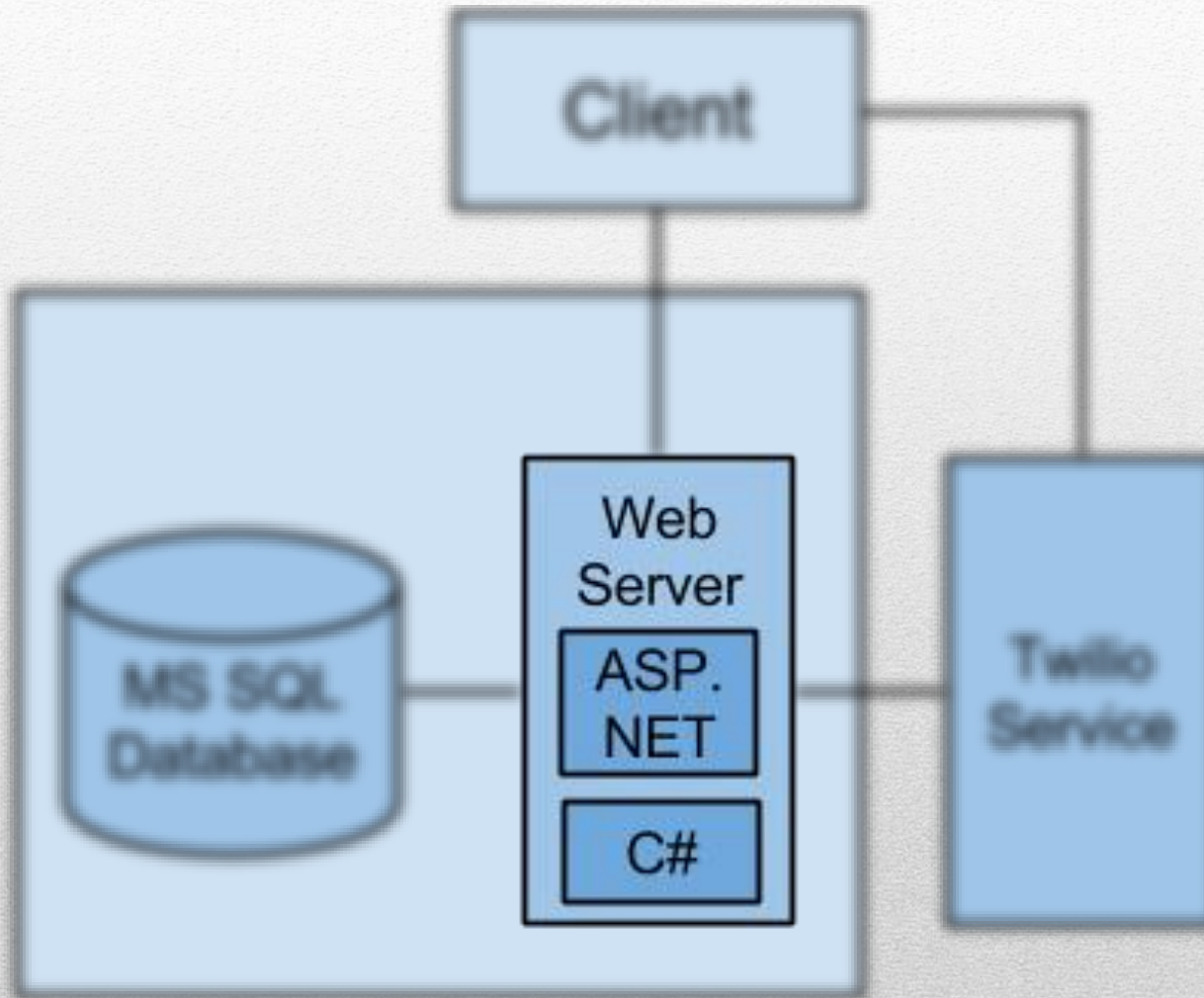
- Solution: Create a web application that automates the process of sending and receiving patient transfer requests.



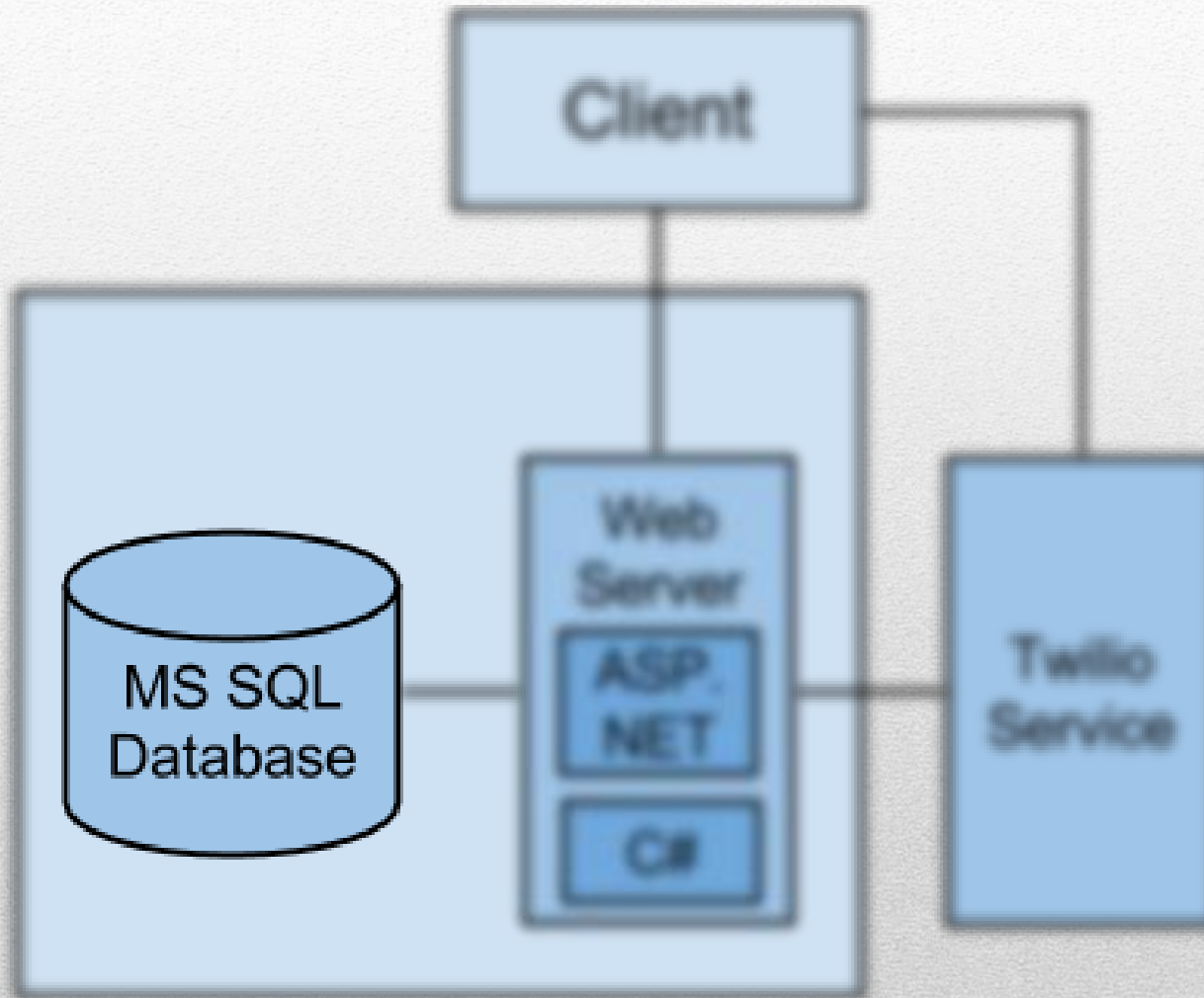
System Architecture



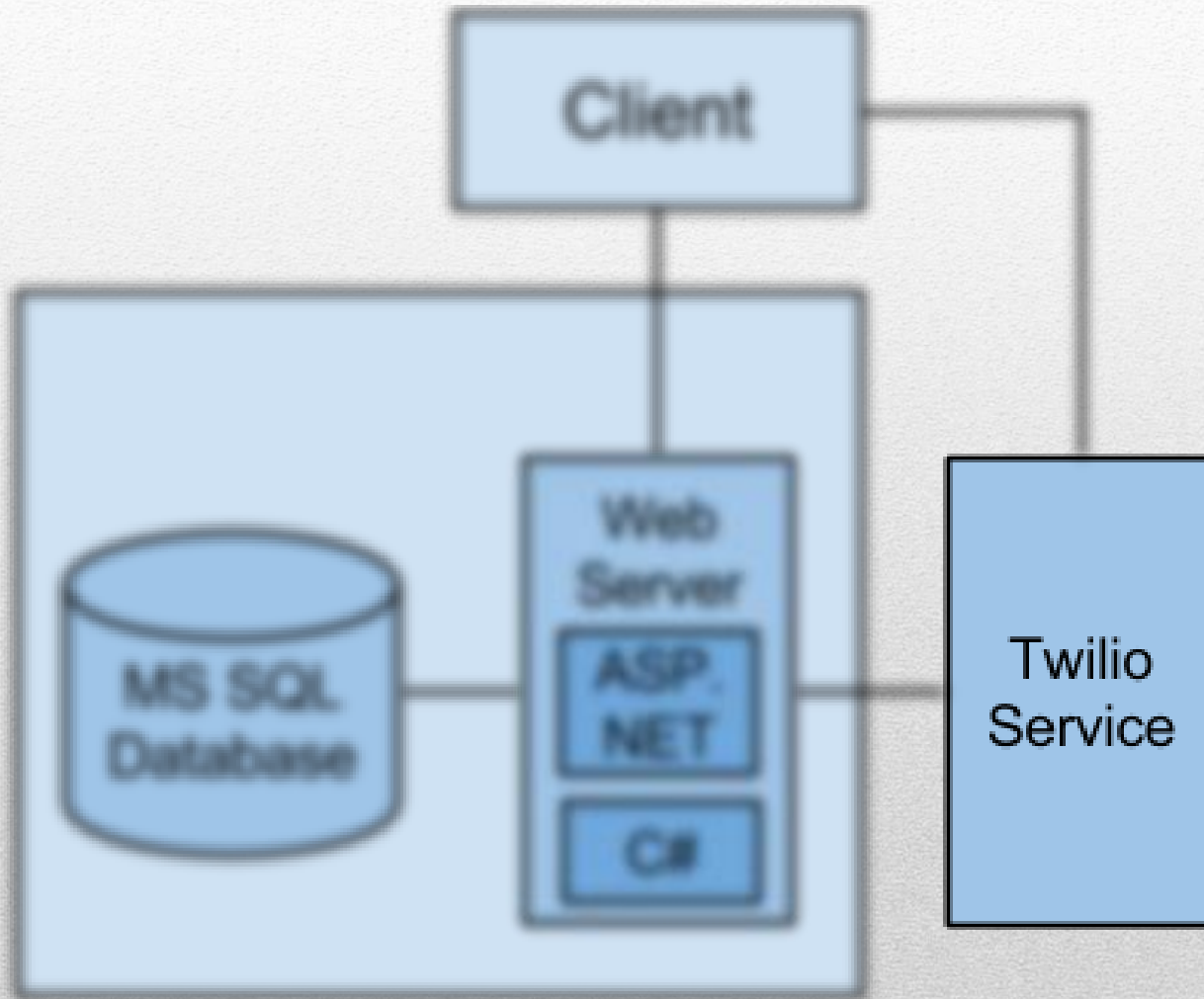
System Architecture



System Architecture

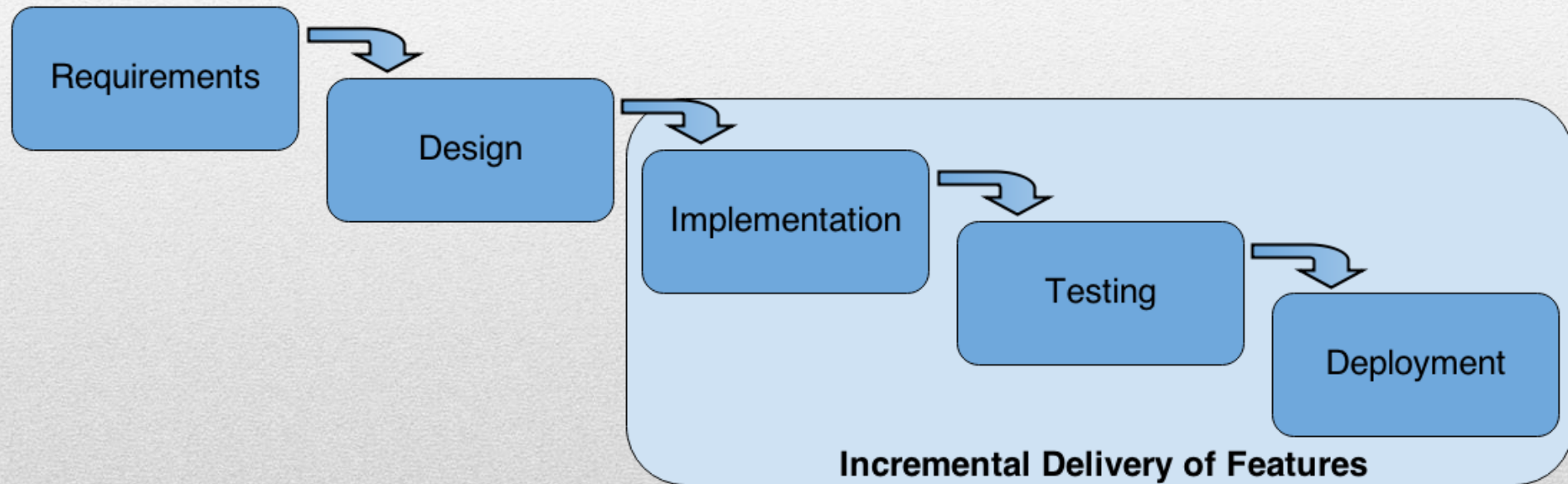


System Architecture

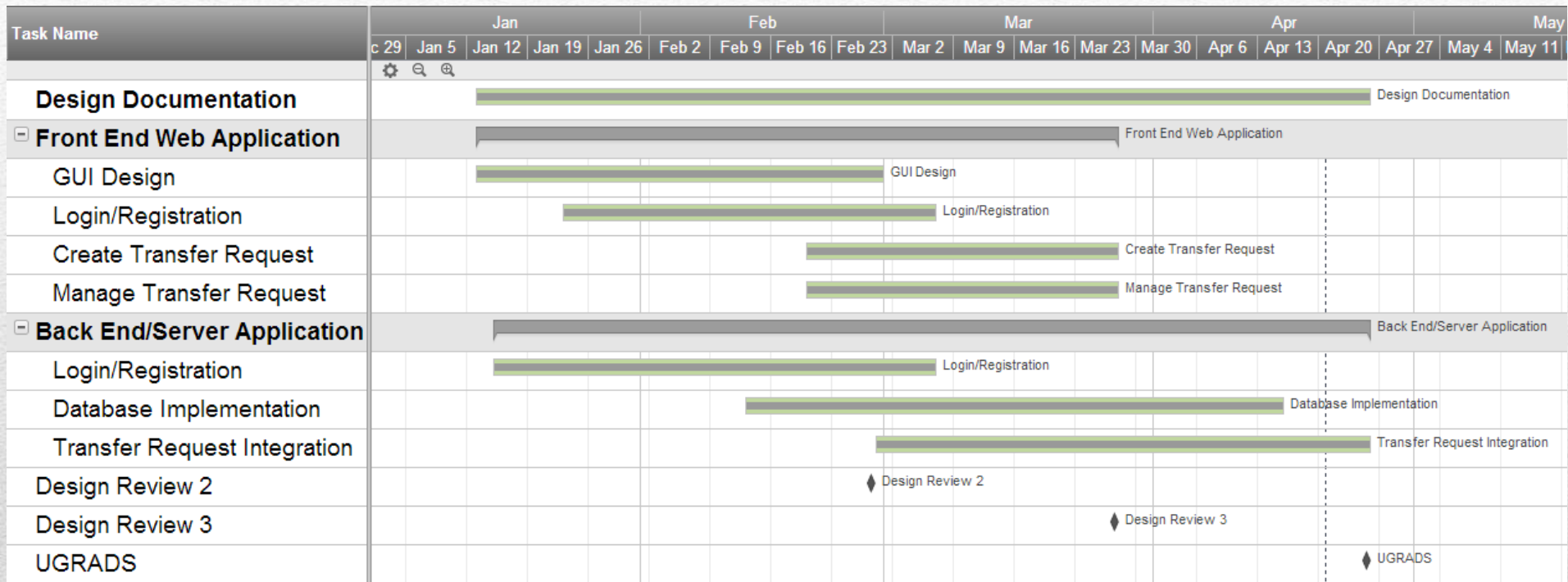


Development Methodology

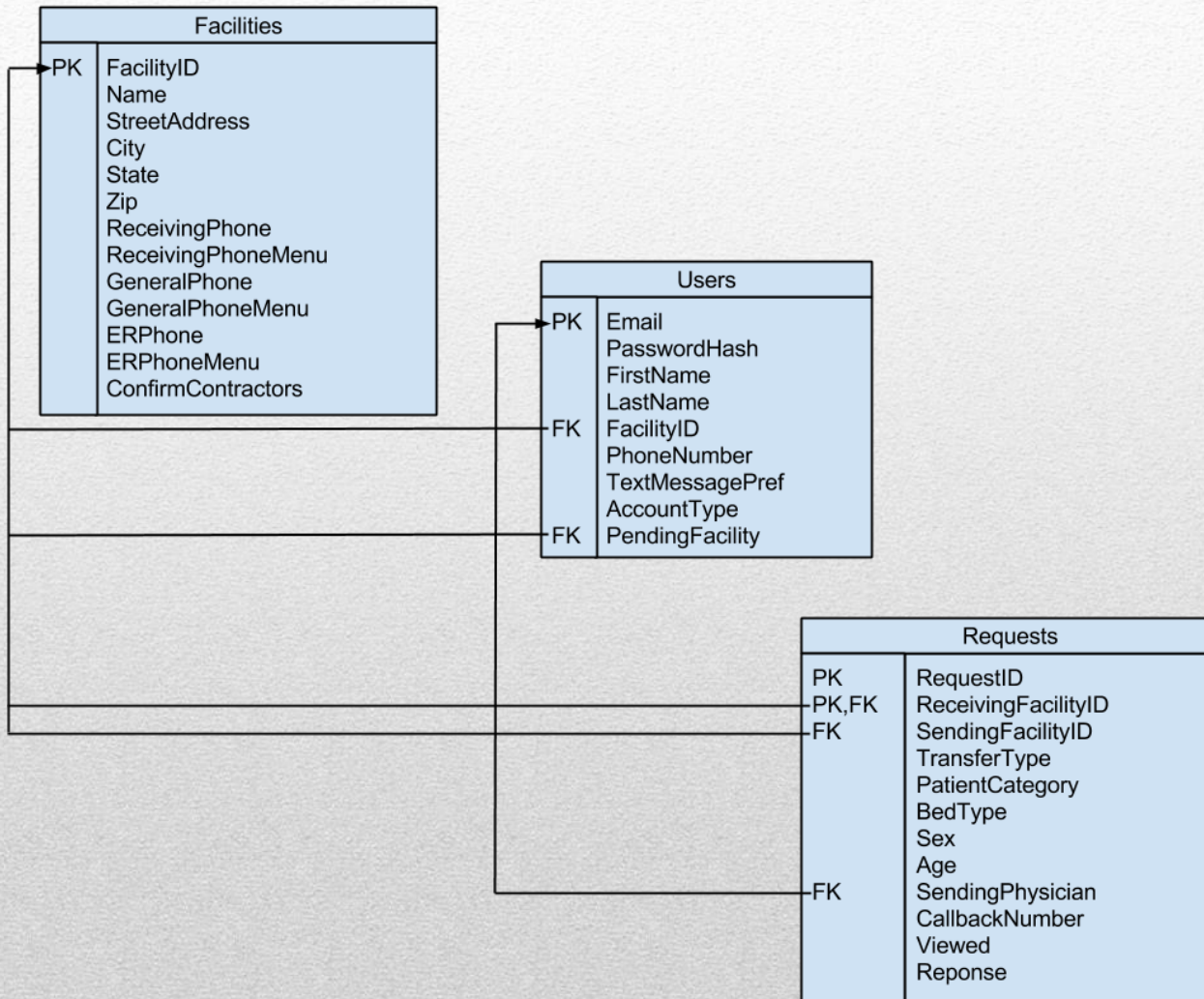
- Incremental Delivery



Schedule



Entity Relationship Diagram



Screenshots



[Home](#) [Contact](#) [Login](#)

Easier Patient Transfers

Hospitals >

Providers >

Transporters >

The ability to attract patient transfers, optimize outgoing transfers, and build return referral patterns are critical elements to every hospital's long-term financial strategy.

High acuity patients have a **national average contribution margin of \$9300** (net profit). The StatTransfers.net patient referral network helps your bottom line by:

- **Expanding referral catchment areas** - our distance based referral system prevents referrals from unknowingly bypassing your hospital
- **Advertising available specialties** allows you to capture valuable referrals when specialists are available and not destroy fragile referral patterns when specialists are unavailable
- **Identifying insurance networks** improve payer mix by advertising the carriers you are contracted with
- **Providing referral analytics and metrics** - understand referral patterns and learn when and where to target outreach efforts to increase census
- **Customer Service Auditing** ensures your customers are receiving excellent operational service
- **IT installation NOT required** - we provide Software as a Service (SaaS) - our cloud based patient referral network integrates seamlessly into current patient transfer workflows

Screenshots Cont.



[Contact](#) [Login](#)

- Create New Request >
- Sent Requests >
- Received Requests >
- Manage Users >
- Create New User >

Patient Information

Select Transfer Type

Bed Request Consultation

Select Bed Type Needed

ED ICU TELE MED/SURG PEDS
OB/GYN PICU NICU OTHER

Patient Sex

Male Female Other

Callback Number

555-555-5555

Choose Hospital

Select Patient Category

Medical Surgical Trauma Neuro
Cardiac Other

Patient Age Category

Adult Pediatric Neonatal

Sending Physician/Staff

Dr. Demonstration

Submit

Screenshots Cont.



Contact Login

- Create New Request >
- Sent Requests >
- Received Requests >
- Manage Users >
- Create New User >

Request #	Category	Time	Date
42	Surgical	[time]	[date]
Transfer Type: Consultation Patient Category: Surgical Bed Type Needed: ICU Sex: Male Age Category: Adult Sending Physician: doc@fmc.com Callback Number: 9285552222			
Receiving Facility			
Flagstaff Medical Center			<input type="button" value="Accept"/>
1337	Medical	[time]	[date]
9001	Trauma	[time]	[date]

Screenshots Cont.

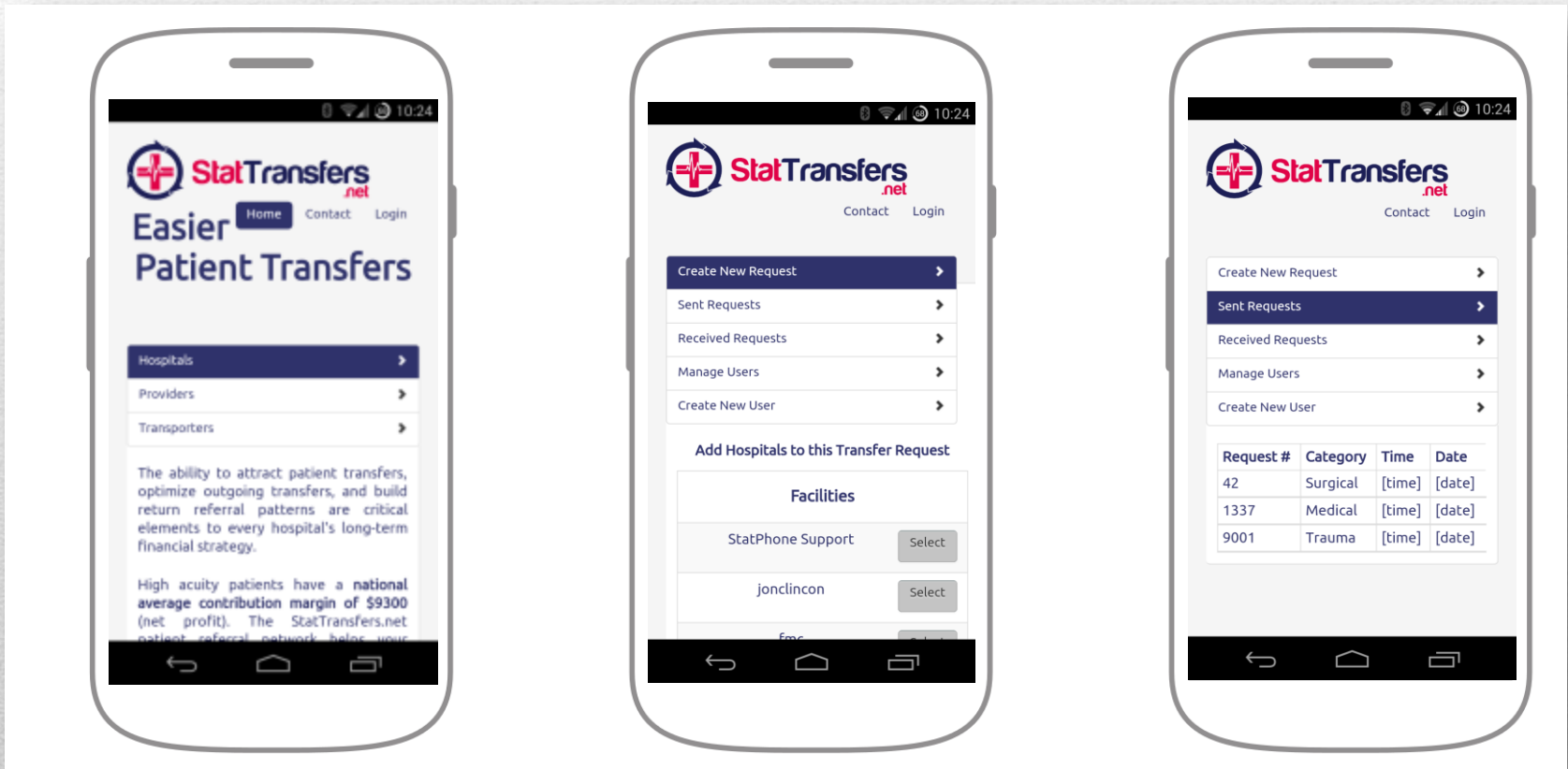


Contact Login

- Create New Request >
- Sent Requests >
- Received Requests >
- Manage Users >
- Create New User >

#	Sending Facility	Time	Date	Respond
42	guy@jcl.com	[time]	[date]	<input type="button" value="Accept"/> <input type="button" value="Decline"/>
1337	reception@fmc.com	[time]	[date]	<input type="button" value="Accept"/> <input type="button" value="Decline"/>
Transfer Type: Bed Request Patient Category: Medical Bed Type Needed: OB/GYN Sex: Female Age Category: Adult Sending Physician: reception@fmc.com Callback Number: 9285553333				
9001	mrdr@fmc.com	[time]	[date]	<input type="button" value="Accept"/> <input type="button" value="Decline"/>

Mobile Screenshots



Testing

- Black box testing on SQL database
 - Select, Insert, Delete
 - Column constraints
- Integration testing between user interface and backend functionality
- Usability testing
 - Flaws in the user interface or experience
 - Expert Users

Testing

Component	Description	Expected Output	Outcome
Create Transfer Request	Create request without destination	Stops request and informs user of missing field	Pass
Create Transfer Request	Create request without physician number/name	Stops request and informs user of missing field	Pass
Create Transfer Request	Request information is stored in the database	Database shows added request	Pass
Create Transfer Request	Request notification is sent through Twilio	Text message received by necessary parties	Pass
Manage Transfer Request	View correct sent transfer requests	All requests tied to user are shown accurately	Pass
Manage Transfer Request	View correct received transfer requests	All requests tied to user are shown accurately	Pass
Manage Transfer Request	Accepting a sent transfer request	All necessary parties are notified of the change in request status	Pass
Manage Transfer Request	Accepting/Declining a received transfer request	All necessary parties are notified of the change in request status	Pass
Login	Username/password incorrect	Inform user of bad credential input	Pass

Challenges and Risks

Risks	Likelihood	Severity	Mitigation Strategy
Request failing to send/be delivered	Moderate	Major	Delivery verification for all requests
System falsely displays a hospital accepting/declining	Low	Major	Unit and integration testing to ensure interface displays accurate information from database
System has poor scalability to handle potential growth	Low	Moderate	Administrator functions to handle growth and Windows Azure to ensure server capacity

Future Work

- Integration with transport companies
- Active Directory user account integration
- Sharing of patient record data

Conclusion

- Patient transfer web app
 - Allows patient transfers to take less time and effort
 - Easy to navigate and straight forward to use
 - Uses tools so the system can be easily integrated or modified by the sponsor



Thank you

Our poster is on display in the Skydome on board 12D, we will be there from 2:00-4:00 PM