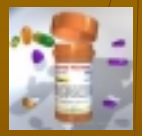
Prescryption DrugSafe





CSE403 – LCA Proposal

The Team:

Client:	Mobile:	Verify DB:
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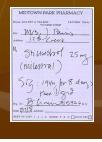
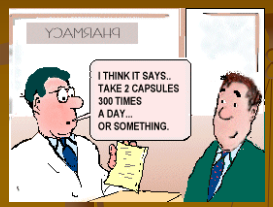
Ideal Current Scenario

- Jon is sick and goes to see a doctor.
- The doctor writes him a prescription.
- Jon runs to a local pharmacy
- Jon waits in a long line only to drop off his prescription.
- Jon should have his prescribed medicine with the right dosage to take home.


Problems

- Only 20% of patients are satisfied with the prescription process. (NIH)

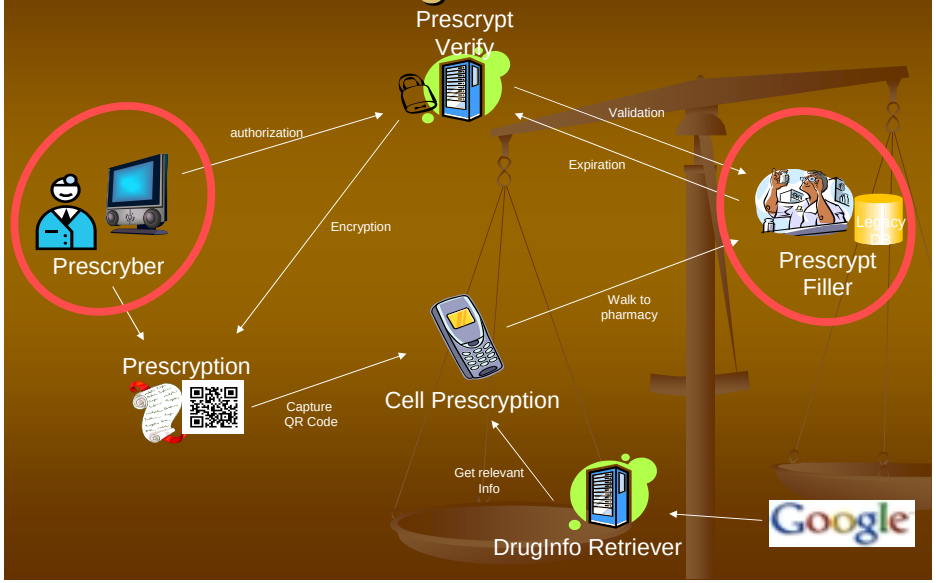


- Inaccuracy, Speed, and Efficiency:
  - Doctor's messy handwriting
  - Prescriptions easily forged
  - Wait time in pharmacy lines are long
  - Pharmacists manually type prescription information
- Accessibility:
  - Pharmacies need to call doctors, who are usually busy
  - Prescriptions can be lost easily
  - Many pharmacies have no electronic copies
- Information:
  - Consumers know little about the drug/prescription or related alternatives.

Operational Concepts

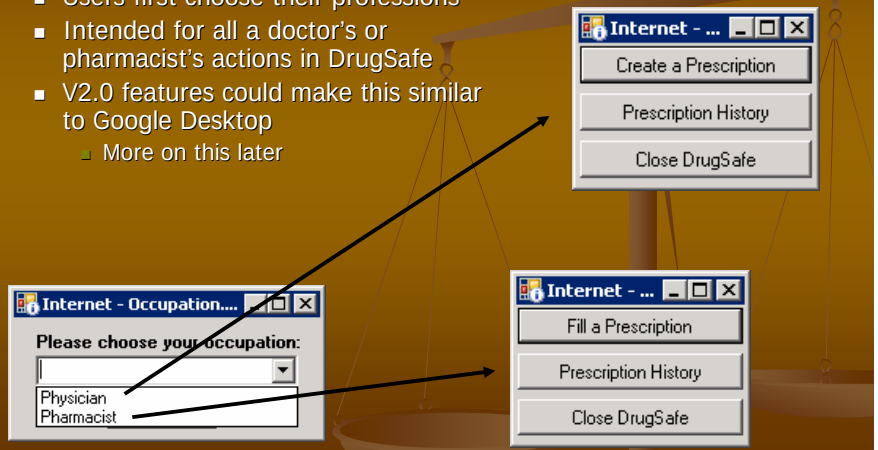
- **Objectives**
  - Increase accuracy and efficiency of prescription transactions
  - Reduce overhead required for prescription processing
  - Provide patients with information on prescription and alternatives
- **Scope**
  - Seamless integration into legacy systems
  - No unified store for patient's medical history
  - Doesn't seek to solve patient insurance problems
- **Major benefits**
  - Paperless
  - Consistent and accurate electronic data
  - Verified and secured doctor's signature
  - Easily accessible prescription information
  - Traceable prescription history

The DrugSafe Client



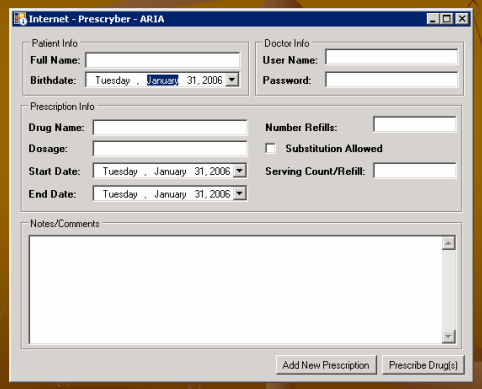
UI workflow - Desktop

- The Desktop:
  - Users first choose their professions
  - Intended for all a doctor's or pharmacist's actions in DrugSafe
  - V2.0 features could make this similar to Google Desktop
    - More on this later

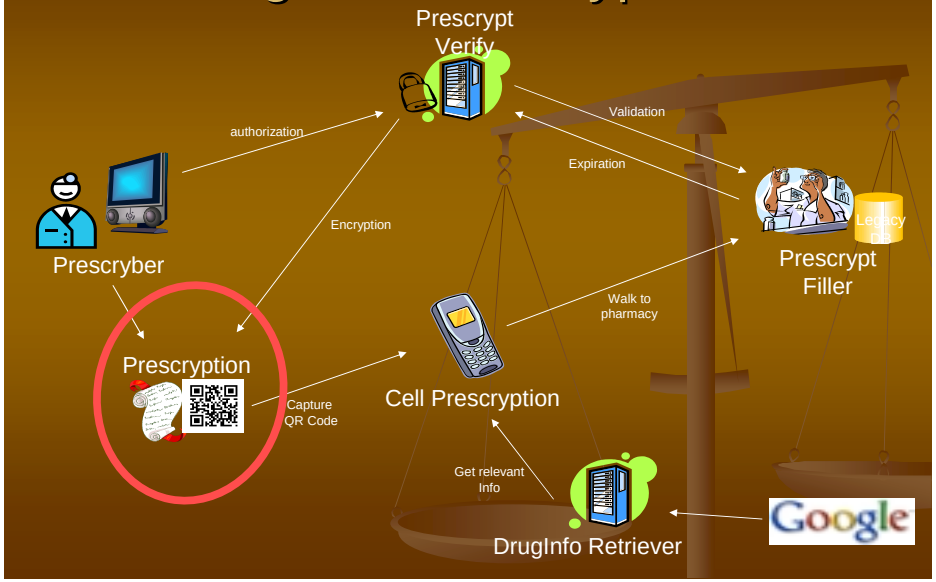


Prescription entry and lookup

- The Main Prescription
  - Can be used by both Doctors and Pharmacists
  - Unified form for prescription information
  - Flexible and Simple Design



DrugSafe Prescryptions

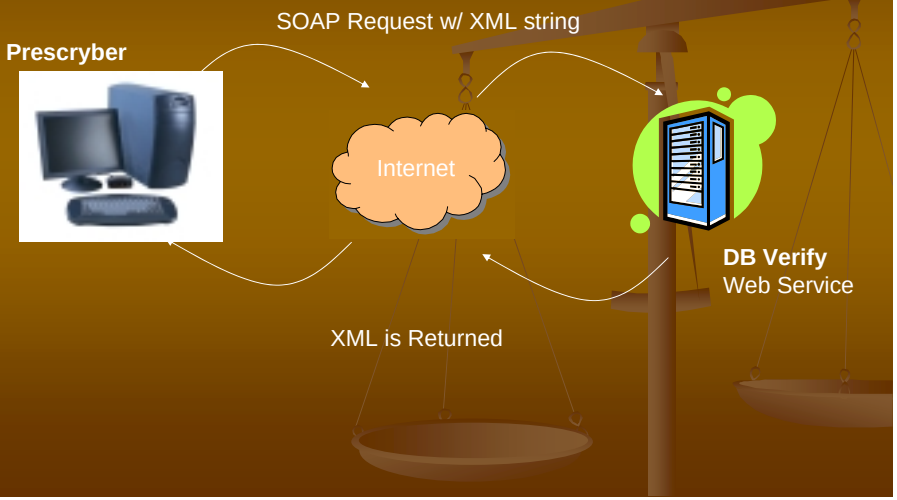


What's in a Prescription?

- Doctor and/or Pharmacist Comments
- Serving Count Per Refill
- Drug may be substituted with another
- Start Date – End Date of Prescription
- Total Refills
- Dosage
- Patient Name
- Patient DOB
- Drug Name

```
<xs:complexType>
  <xs:sequence>
    <xs:element name="substitute" type="xs:bool"/>
    <xs:element name="startDate" type="xs:date"/>
    <xs:element name="endDate" type="xs:date"/>
    <xs:element name="servingCountPerRefill" type="xs:int"/>
    <xs:element name="totalrefills" type="xs:int"/>
    <xs:element name="dosage" type="xs:string"/>
    <xs:element name="drugname" type="xs:string"/>
    <xs:element name="doctorComment" type="xs:string"/>
    <xs:element name="pharmComment" type="xs:string"/>
  </xs:sequence>
</xs:complexType>
```

Passing Prescription to Web Service

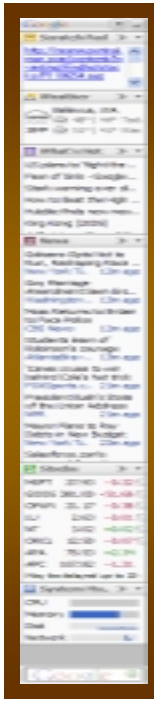


QR Codes

- Any arbitrary string can be encoded into a QR code, but there is no software for x86 platforms available to us that does decoding
  - Not possible to implement decoding within this time frame
- Up to 30% error correction capacity
- Capable of storing 2953 bytes
- See ISO 18004

QR Alternative

- UPC Barcodes
  - The prescription ID and XML can both be sent to the mobile device
    - Mobile device displays barcode for pharmacist to scan
    - Mobile device also displays prescription information obtained from XML

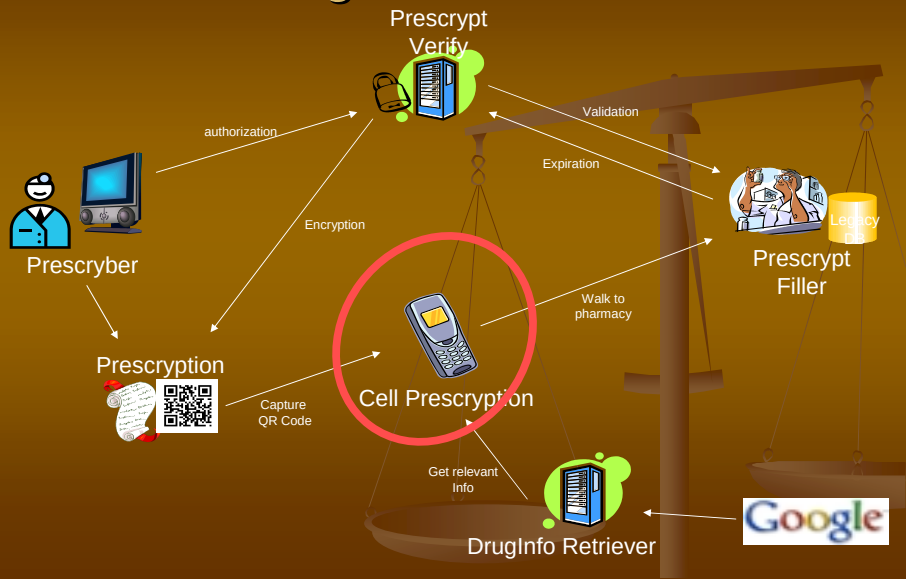


v2.0 Features

- Prescription history – when do you get sick? What drugs were you on before?
- Encoding/decoding QR codes
- DrugSafe Desktop!
  - RSS Feeds
  - Medical Articles/Journals
  - Medicine news
  - Patient Moniters

Demo!

DrugSafe Mobile



Cell Prescryption

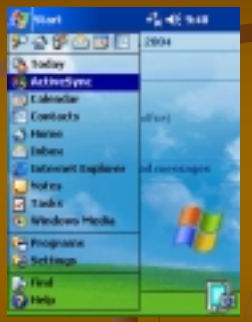
- Source of information for the patient prior to getting the actual drugs
- Gets data from Prescryber
- Displays data to patient

Prescription Information

- Access to prescription information
  - Name
  - Dosage
  - Number of refills
  - Expiration date
  - Doctors notes
  - Other relevant information

Transferring Prescriptions to Mobile

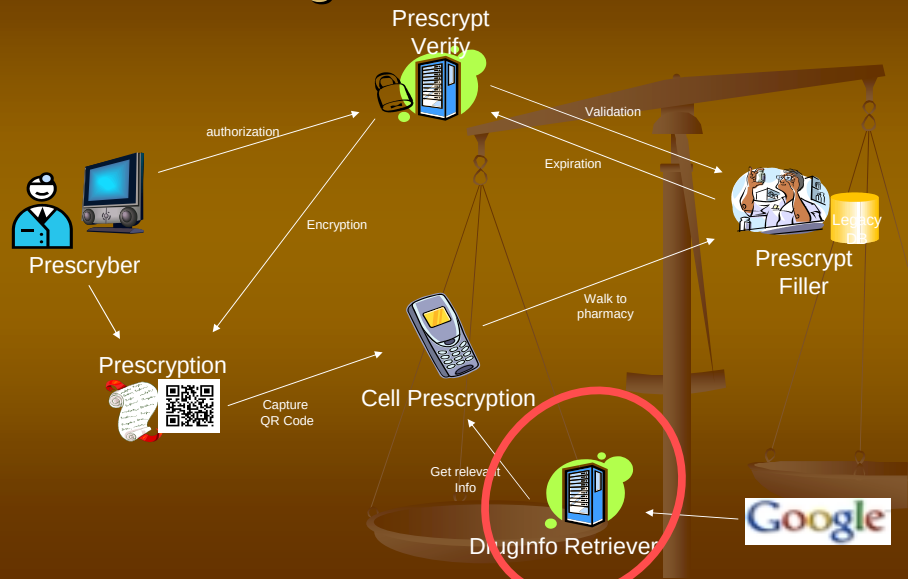
- ActiveSync
- Bluetooth/Wireless
- QR codes
  - Picture
  - Decryption
- XML Parsing



Additional Cool Features (V2.0)

- Outlook Intergration
  - Reminders
  - Daily/weekly pill
  - Refills
- Personal History
  - Previous medications
  - Drug interactions
  - Statistics, drug usage

DrugInfo Retriever



Retrieve Additional Info

- Display relevant information about drug
  - Cost
  - Side effects
  - Alternatives
- Data Mining
  - Pre-fetch
  - Database
  - Information available
  - Anytime, Anywhere

Verify Database

DB Verify

- Back-end system
- Serves requests from Prescryber keeping the prescription information in a database.
- The information is sent as XML strings.
- All the communication is sent through an ssh connection.

Prescrypt Database Schema

- Support active prescriptions only
  - Patients: no direct access
  - Physicians: insert new prescriptions
  - Pharmacists: read/modify prescriptions

DB Supported API

- API provided through webservices
  - string physicianSignup(string XMLPhysicianData);
  - string createPrescryption(string XMLPrescryptionRequest);
  - string doctorGetPrescrytion(string XMLPrescryptionRequest);
  - string pharmGetPrescryption(string XMLPrescryptionRequest);
  - string pharmFulfillPrescryption(string XMLFulfillRequest);
  - string pharmSingup(string XMLPharmData);

An XML request example

- When registering for an account:

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="physician">
   <xs:complexType>
     <xs:sequence>
       <xs:element name="firstName" type="xs:string"/>
       <xs:element name="lastName" type="xs:string"/>
       <xs:element name="address" type="xs:string"/>
       <xs:element name="phone" type="xs:string"/>
       <xs:element name="fax" type="xs:string"/>
       <xs:element name="hours" type="xs:string"/>
       <xs:element name="licenseNum" type="xs:int"/>
       <xs:element name="userName" type="xs:string"/>
       <xs:element name="password" type="xs:string"/>
     </xs:sequence>
   </xs:complexType>
 </xs:element>
</xs:schema>
```

An XML response example

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema">
<xs:element name="physcreateresponse">
   <xs:complexType>
     <xs:sequence>
       <xs:element name="success" type="xs:boolean"/>
       <xs:element name="usernname" type="xs:string"/>
     </xs:sequence>
   </xs:complexType>
 </xs:element>
</xs:schema>
```

System Requirements

- **Software**
  - Cell phone client with wireless connectivity capabilities.
  - Web interface for doctors/pharmacies to submit and retrieve prescriptions.
  - Prescryption Drugsafe Server for authorization of doctors and pharmacies.
- StakeHolders
  - Doctors and pharmacists pay a small fee for registering with the verification server
  - Consumers will get the service for free
  - Profit from ads when displaying related info

Why?

- Healthcare is one of the largest industries in the world and affects the lives of almost every consumer.
- Pharmaceuticals and prescription drug industry have many problems.
  - Complex
  - Non-uniformity
  - Hassle of picking up prescriptions

Is it still Feasible?

- Definitely!
- Hardware
  - Widespread cellphone use
    - 62% of American adults owned a cell phone
    - QR codes are already mainstream in Japan
  - Availability of wireless internet connections
- Software
  - Centralized verification systems like PrescryptVerify
    - Success of services such as VeriSign
  - Cellphone development widespread
- You've already seen a prototype!