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# Building a Home-Brew Text Message Notification System for Sierra

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## Abstract

"I am not a developer" is a phrase I say more than I want. However, programming is something I've wanted to learn for a long time. When patrons began asking for text message notifications for circulating items, I took on the challenge to try to learn something new, and hacked together a basic text notification system that is both affordable and serves patron needs. Using the narrative of this tool's creation as a foundation, this presentation will provide resources to get started in web development for Sierra using SQL, PHP, and Twilio.

## Keywords

text message notifications, library catalog, Sierra

## Disciplines

Cataloging and Metadata | Library and Information Science

## Comments

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# Building a Home-Brew Text Message Notification System for Sierra

**R.C. Miessler, Systems Librarian**
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# About Gettysburg College

- Private, 4-year liberal arts college
- 2,600 students
- Turnkey Sierra platform since 2013
- Library/IT are not merged

# I'm not a developer.

# Especially when something breaks.

# Why build something?

- Lots of fines (and complaints about them) for hourly items like laptop chargers, but no preemptive reminders
- Students "don't use email"
- III SMS product = $$$
- Patron load process interferes with using the 7175551234@provider.com workaround in the email field

# Solution

## Foundation

- David Noe's IUG 2015 presentation "Automating Custom Patron Notices and Messages Using SQL"
- Twilio text notification add-on for ILLiad 8.6

## Idea

- Use PHP to execute SQL query
- Pass data along to Twilio to send text messages

# Challenges …

So how do we …

- Figure out the right SQL query?
- Get the data to Twilio?
- Find a server to run the PHP script?
- Get patrons signed up?
- Build the thing without IT/developer assistance?

## Why PHP?

- It's what I (kind of) know!
- Can query SQL database and connect to the Twilio API
- However, IT won't let us run PHP on local servers …

# Running the Script: Reclaim Hosting

- Built for educators/institutions
- Great technical support
- Inexpensive
- Needed for: running and scheduling PHP script that both queries the database and sends the info to Twilio
- Ask Reclaim for:
  - PostgreSQL-enabled server
  - Whitelisted database server IP

# Pulling the Data: SierraDNA

- We need to get the data, so we need to be able to talk to the database server
- Needed for: generating patron/item data

# Sending Texts: Twilio

- $1/month/number
- $0.0075/text message sent/received
- Excellent documentation and examples
- Lots of different API options
- Needed for: sending texts

# Useful Development Tools

Text editor

- Sublime Text (bugs you for $70)
- Notepad++ (free)
- Brackets.io (free)

Terminal emulator

- PuTTY (free)
- Terminal (Mac)

FTP client

- FileZilla (free)

SQL query building

- pgAdmin (free)

# But I'm Still Not a Developer …

## Documentation

– PHP.net

– postgresql.org

– techdocs.iii.com/sierradna/

– twilio.com/api

## Forums

– stackoverflow.com

– Reddit

- /r/phphelp

- /r/learnsql

## Tutorials & Classes

– codeacademy.com

– W3schools.com

## Peers

– Listservs, Twitter, email, phone

## Repositories

– GitHub

## Tools

– regex101.com

# Workflow Issues

- No consistent data in TELEPHONE/TELEPHONE2 fields in patron record
- Weekly patron load overwrites most fields
- No way to self-opt-in via WebPAC Library Account

# Developing the Local Workflow

1. Patron signs up via web form
2. Notification sent to group who manually update the patron records
3. Patron record manually updated by library staff
4. Confirmation text message sent to patron via custom back-end HTML+PHP web form that connects with Twilio service

# Patron Record Update

Patron record manually updated
- PCODE2 = y
- NOTE field inserted with mobile number, formatted as +17175551234

Modify patron load profile
- @ov_protect V104 (NOTE), F45 (PCODE2)

# **<?php**

- Code:
  - Github (https://github.com/rmiessle/sierra-sms)
  - Clearinghouse (eventually)
- Comments are removed from the code for this presentation

# $variables and Other Necessary Stuff

```php
date_default_timezone_set('America/New_York');
$messageCount = 0;
$logFile = 'smslog.txt';
$fromNumber = '###-###-####';
$messageBody = "XXX LIBRARY NOTICE: Your item is due within 15 minutes. Please return it to the circulation desk. Barcode: ";
```

- Sets the timezone (not really a variable)
  - (http://php.net/manual/en/timezones.php)
- **$messageCount** – notices sent starts at 0
- **$logFile** - what the log file is called (for our **writeLog()** function)
- **$fromNumber** - our Twilio number
- **$messageBody** – the message we send

# SQL Credentials

```
$conn = pg_connect("host=DATABASE.DOMAIN.TLD port=1032 dbname=iii user=USERNAME password=PASSSWORD sslmode=require")
    or die('Could not connect. Server says:' . pg_last_error());
```

This variable sets up your credentials to connect to your
SQL database server
- **host** (database URL)
- **port** (usually 1032)
- **dbname** (usually iii)
- **user** (Sierra user with Sierra SQL Access application)
- **password** (anyone who has access to this file can see it)
- **sslmode** (require for security)

# Writing to a Log File

```php
if (pg_num_rows($result)==0) {
    writeLog();
}
```

```php
function writeLog() {
    global $logFile, $conn, $messageCount;
    file_put_contents($logFile, date('m-d-Y H:i:s')." - ".$messageCount." notices sent".PHP_EOL, FILE_APPEND | LOCK_EX);
    pg_close($conn);
    exit;
}
```

If no results are found after running the query, run the **writeLog()** function

– This just makes a note in the log file that 0 messages were sent

# SQL Query for Hourly Items

```
$result = pg_query($conn,
    "SELECT
        varfield.field_content as mobile,
        item_record_property.barcode as barcode
    FROM
        sierra_view.varfield,
        sierra_view.item_record_property,
        sierra_view.checkout,
        sierra_view.patron_record
    WHERE
        varfield.record_id = patron_record.record_id AND
        checkout.item_record_id = item_record_property.item_record_id AND
        patron_record.record_id = checkout.patron_record_id AND
```

- Pulls the note from the patron record (**mobile**) and the item barcode (**barcode**)
- Matches the note field and checkout record to the patron record, and the checkout record to the item record

# SQL Query for Hourly Items (Continued)

```
        varfield_type_code = 'x' AND
        patron_record.pcode2 = 'y' AND
        varfield.field_content ~ '^\+[1][2-9]\d{9}' AND
        CHAR_LENGTH(varfield.field_content) = 12 AND
        checkout.due_gmt BETWEEN current_timestamp AND current_timestamp + (900 * interval '1 second');"
);
```

- Additional conditions:
- The patron record must have a **NOTE** field (x)
- **PCODE2** must be y
- The **NOTE** field must match our phone number formatting (+17175551234)
- The due timestamp must be between now and 15 minutes from now (900 seconds)

# SQL Query for Items Due Next Day

```
$result = pg_query($conn,
    "SELECT DISTINCT
        varfield.field_content as mobile,
        COUNT(item_record_property.barcode) as count
    FROM
        sierra_view.varfield,
        sierra_view.item_record_property,
        sierra_view.checkout,
        sierra_view.patron_record
    WHERE
        varfield.record_id = patron_record.record_id AND
        checkout.item_record_id = item_record_property.item_record_id AND
        patron_record.record_id = checkout.patron_record_id AND
        varfield_type_code = 'x' AND
        patron_record.pcode2 = 'y' AND
        varfield.field_content ~ '^\+[1][2-9]\d{9}' AND
        CHAR_LENGTH(varfield.field_content) = 12 AND
        date(checkout.due_gmt) = current_date + interval '1 day'
    GROUP BY
        varfield.field_content;"
```

The two main differences are the due date we are looking for **(current_date + interval '1 day'),** and we are sending the patron the number of items due **(COUNT)**

# Run Query, Send Results to Twilio

```php
while ($row = pg_fetch_assoc($result)) {
    require_once 'PATH/TO/twilio-php/Services/Twilio.php';
    $AccountSid = "YOUR TWILIO ACCOUNT SID";
    $AuthToken = "YOUR TWILIO TOKEN TREAT AS A PASSWORD":
    $client = new Services_Twilio($AccountSid, $AuthToken);
    $people = array(
        $row['mobile'] => $row['barcode'],
    );
    foreach ($people as $row['mobile'] => $row['barcode']) {
        $sms = $client->account->messages->sendMessage(
            $fromNumber,
            $row['mobile'],
            $messageBody.$row['barcode']
        );
        $sms->redact();
        $messageCount++;
    }
}
writeLog();
```

- Creates an array **$people** containing each row returned by the SQL query with columns **mobile** and **barcode** (or **count** for items due tomorrow)
- Loads the Twilio helper library (**Twilio.php**) to send the messages
- For each row of the array, sends a text message that contains the message body and barcode for the item due (hourly items), item count for items due tomorrow

# Send the Results to Twilio (Continued)

```php
}
while ($row = pg_fetch_assoc($result)) {
    require_once 'PATH/TO/twilio-php/Services/Twilio.php';
    $AccountSid = "YOUR TWILIO ACCOUNT SID";
    $AuthToken = "YOUR TWILIO TOKEN TREAT AS A PASSWORD";
    $client = new Services_Twilio($AccountSid, $AuthToken);
    $people = array(
        $row['mobile'] => $row['barcode'],
    );
    foreach ($people as $row['mobile'] => $row['barcode']) {
        $sms = $client->account->messages->sendMessage(
            $fromNumber,
            $row['mobile'],
            $messageBody.$row['barcode']
        );
        $sms->redact();
        $messageCount++;
    }
}
writeLog();
```

- Redacts the message body in the Twilio logs
- Adds 1 to the message count
- Repeat until all rows are accounted for
- When done, runs the **writeLog()** function to say how many notifications were sent

## ?>

- Less than 60 lines of code (without comments)
- NOTHING works right the first time
- Test as much as you can before going live
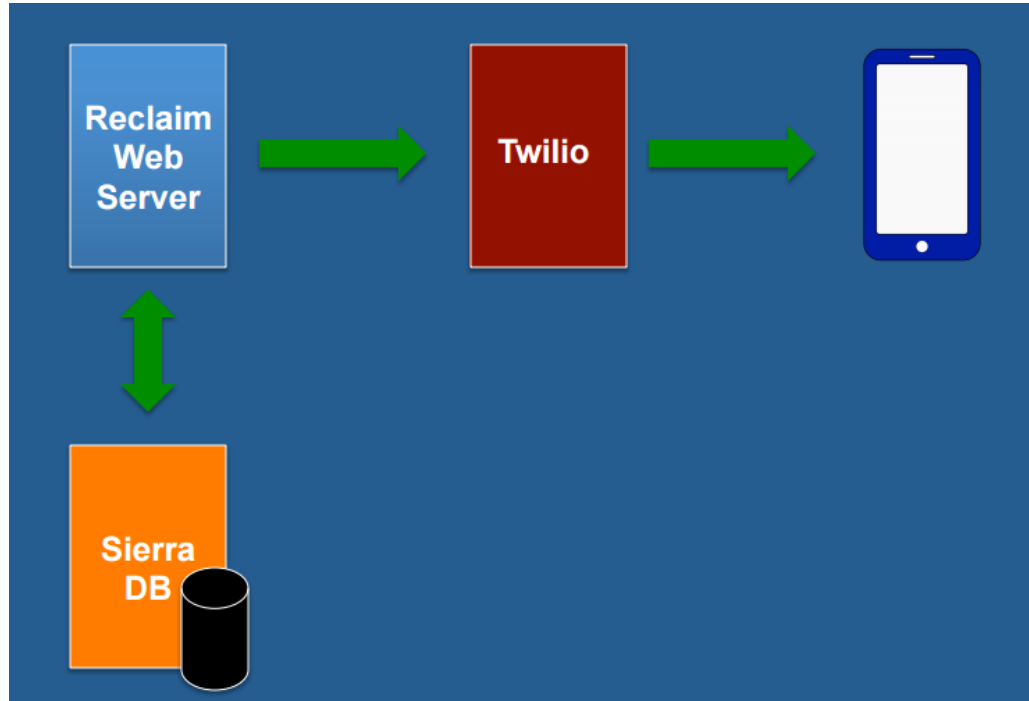- Capture error messages and Google them
- Ask for help!

# ChRONo Trigger

- Cron job – executes PHP script on a schedule
- Runs every 15 minutes for hourly items, and once a day for items due the next day
- Configured through Reclaim Hosting cPanel interface

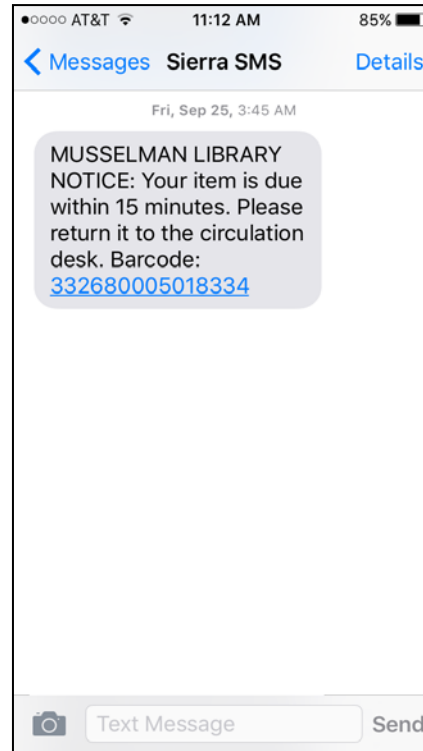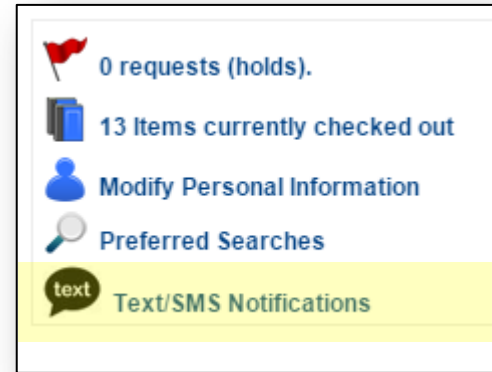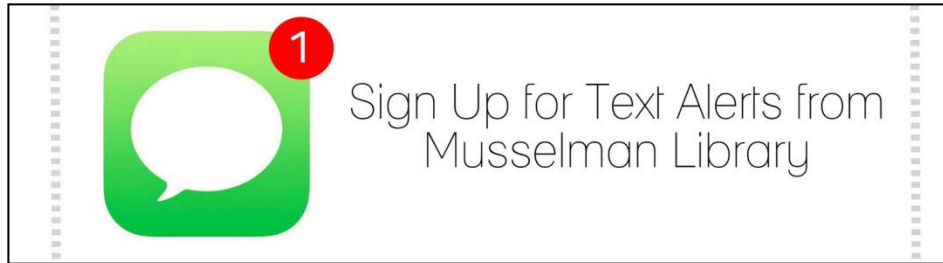| Minute | Hour | Day | Month | Weekday |
|---|---|---|---|---|
| | Current Cron Jobs | | | |
| 5 | 20 | * | * | * |
| */15 | 0,1,2,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23 | * | * | * |
| 0,15,30,44 | 3 | * | * | * |
| 1,15,30,45 | 4 | * | * | * |

# Where's the Data Going?

**\*Ding\***

## Extra Stuff

- Added link to web form in the WebPAC
- Added auto-reply options (Twilio API)
- Confirmation texts after signup

# Success?

- 80 patrons signed up since launch
- 430+ notifications sent
- Signup drive during September
- Marketing committee push
- iPad at Circulation Desk with shortcut to the form

Sign Up for Text Alerts from Musselman Library

# Will this Work for Your Library?

- Budget for Twilio service (and server space)
- Knowledge of (or willingness to learn) PHP, SQL, web hosting
- No institutional issues with using 3rd party providers
- Staff to manage a manual workflow
- Sense that patrons want this service

# What's Next?

- Can we use the Sierra Patron and Twilio APIs in any way to streamline signup?
- New queries – what do patrons and staff want?
- Rewrite our text-a-call-number script to use Twilio
- Eliminate writeLog()
- Learn more developer stuff!

# Recommended Reading

## "What is Code?" by Paul Ford

– http://www.bloomberg.com/graphics/2015-paul-ford-what-is-code/



**Bloomberg Businessweek**

If You Can't Read That, You'd Better Read This
Code: An Essay

## Links to Resources

reclaimhosting.com

twilio.com

  – twilio.com/docs/php/install - PHP Helper Library

techdocs.iii.com/sierradna/

"Automating Custom Patron Notices and Messages Using SQL" (IUG 2015)

  – http://innovativeusers.org/conferences/search-presentations.html

# Thanks!

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https://github.com/rmiessle

@iconodule



*https://xkcd.com/519/*