

Missing e-Bills Detection

Applying Statistical Process Control to Electronic Bill Delivery

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- Challenges
- Q&A

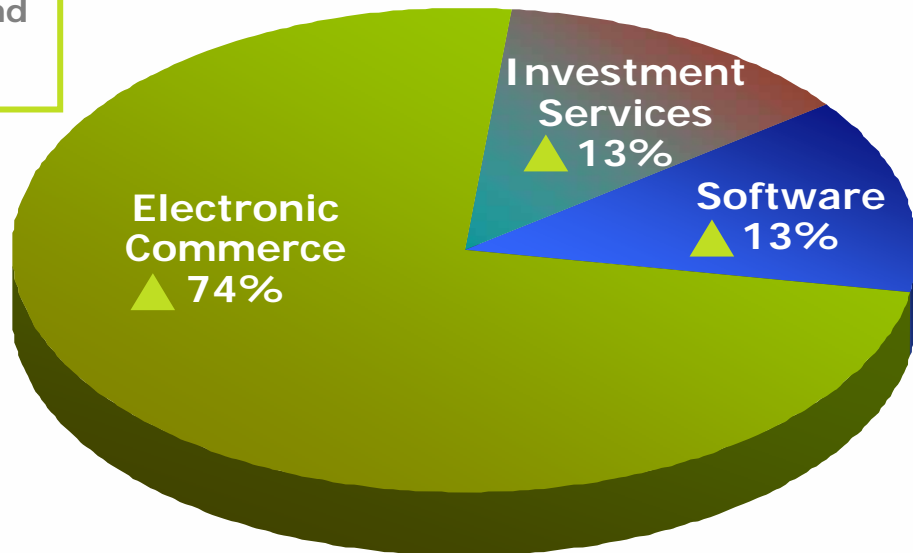
About CheckFree

CheckFree Overview

- Over 25 Years as a Leading Provider of Financial Electronic Commerce Services and Products
- 4,400 Employees Worldwide, 29 Locations
- Annual Revenues of \$972.6 Million for Fiscal Year 2007
- Three Divisions
 - Electronic Commerce
 - Investment Services
 - Software

CheckFree Divisions

- e-Bill and e-Payment solutions
- Online Banking solutions
- Walk-in and telephone bill payment solutions
- Internetworking across Web, phone, wireless and agent payment services



▲ % of total revenue FY07
(ended June 30, 2007)

e-Billing and e-Payment Solutions

- CheckFree provides electronic billing and payment solutions that enable financial institutions, and businesses, to offer their customers the convenience of receiving and paying their household bills online.
- Through distribution agreements with over 300 billers, CheckFree distributes more than 60.5 million bills electronically each quarter

e-Billing and e-Payment Solutions

Consumers access their electronic bills via the internet at over 2,000 bank, brokerage and credit union websites.



Electronic delivery replaces the mailing of a paper bill.

Missing e-Bills Detection Project

Problem Statement

- The biller fails to provide the electronic bills to CheckFree for distribution to consumers.
- A missing bill impacts consumer ability to make bill payments *on time* and undermines consumer confidence in the electronic process.
- How can CheckFree proactively identify a 'missing e-bill'?

Project Objective

- Establish a systematic solution for proactive and timely identification of accounts that are missing bills.

Project Challenges

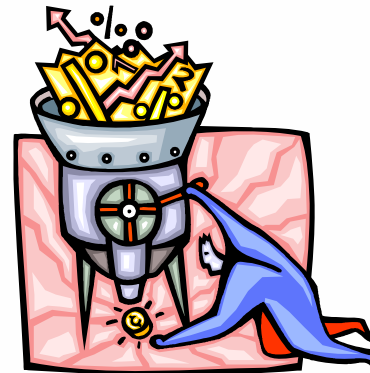
- Variable billing cycles
 - Across billers
 - For the same biller
- Account inactivation
- Zero balance bills – no activity = no bill
- Volume changes
- New billers

Methodology: Statistical Approach

- For each biller a profile was established describing the billing period.
- Based on the biller's profile, if an account which had previously received a bill, did not receive the *next* bill within the expected time frame it was identified as a missed bill account.

Methodology: Statistical Approach

- Each day, the number of accounts missing bills was aggregated.
- Daily count data collected over 3 months was used to establish a baseline mean and standard deviation for each biller.



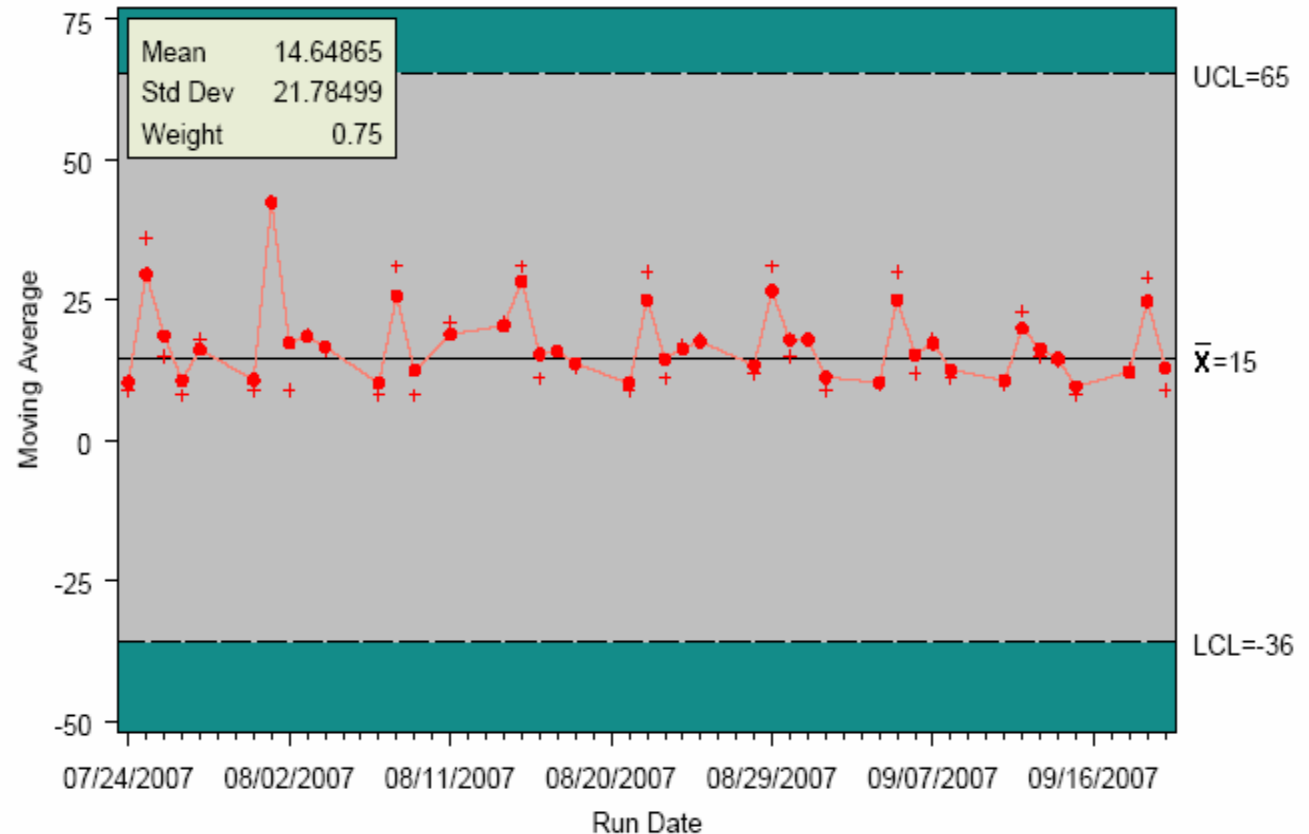
Methodology: Statistical Approach

- The missing bills application is based on the Exponentially Weighted Moving Averages (EWMA) data model.
- The EWMA model is used to determine when 'unusual' behavior is exhibited by a biller.

Daily Process

Missing Bills Vs Time For Gas Card Biller

SPC Charts are generated daily for each biller.



Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

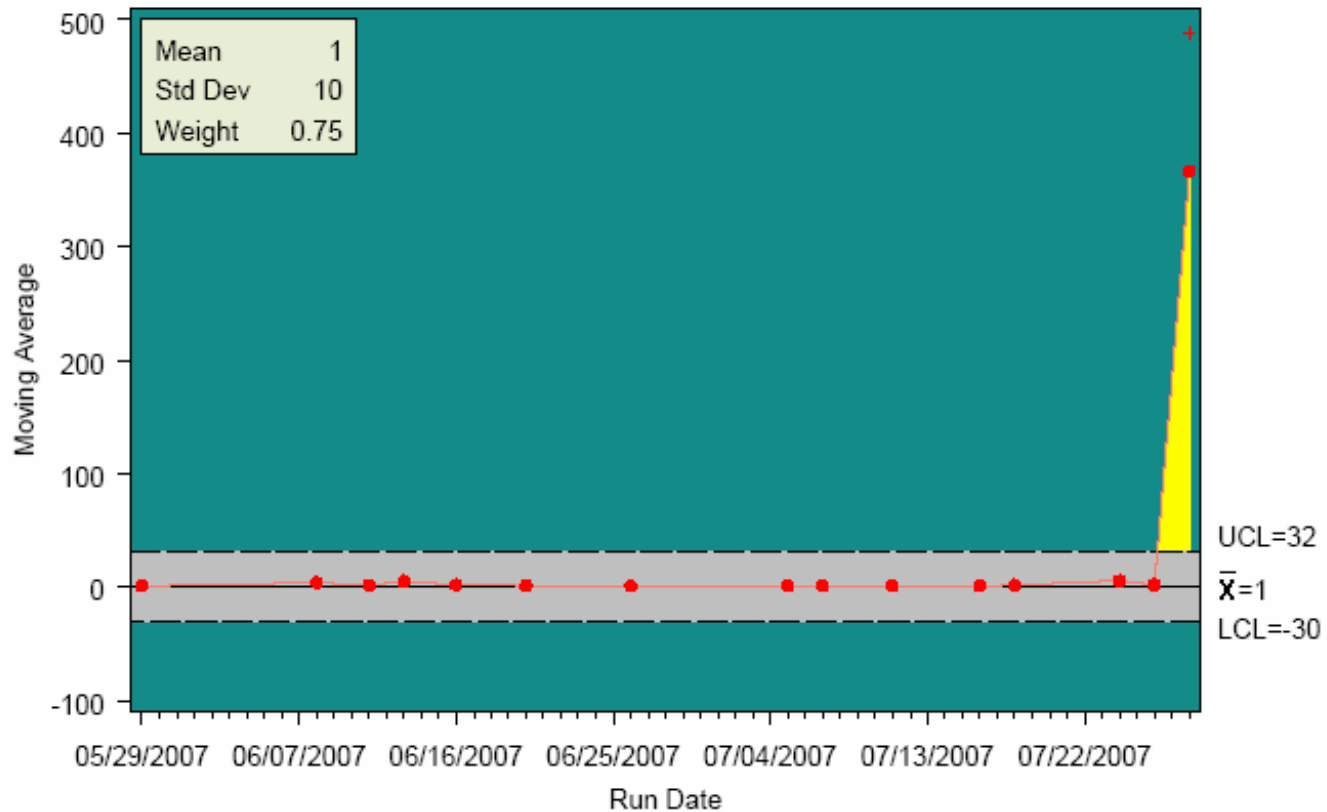
Daily Process

- If the daily aggregate number of accounts missing bills (*i.e.*, the most recent EWMA value) is above the upper control limit (UCL) or below the lower control limit (LCL) then an alert is generated.
- Alerts are written to a daily report.

Daily Process

Missing Bills vs Time for Cable Biller

This biller behavior generates an alert.



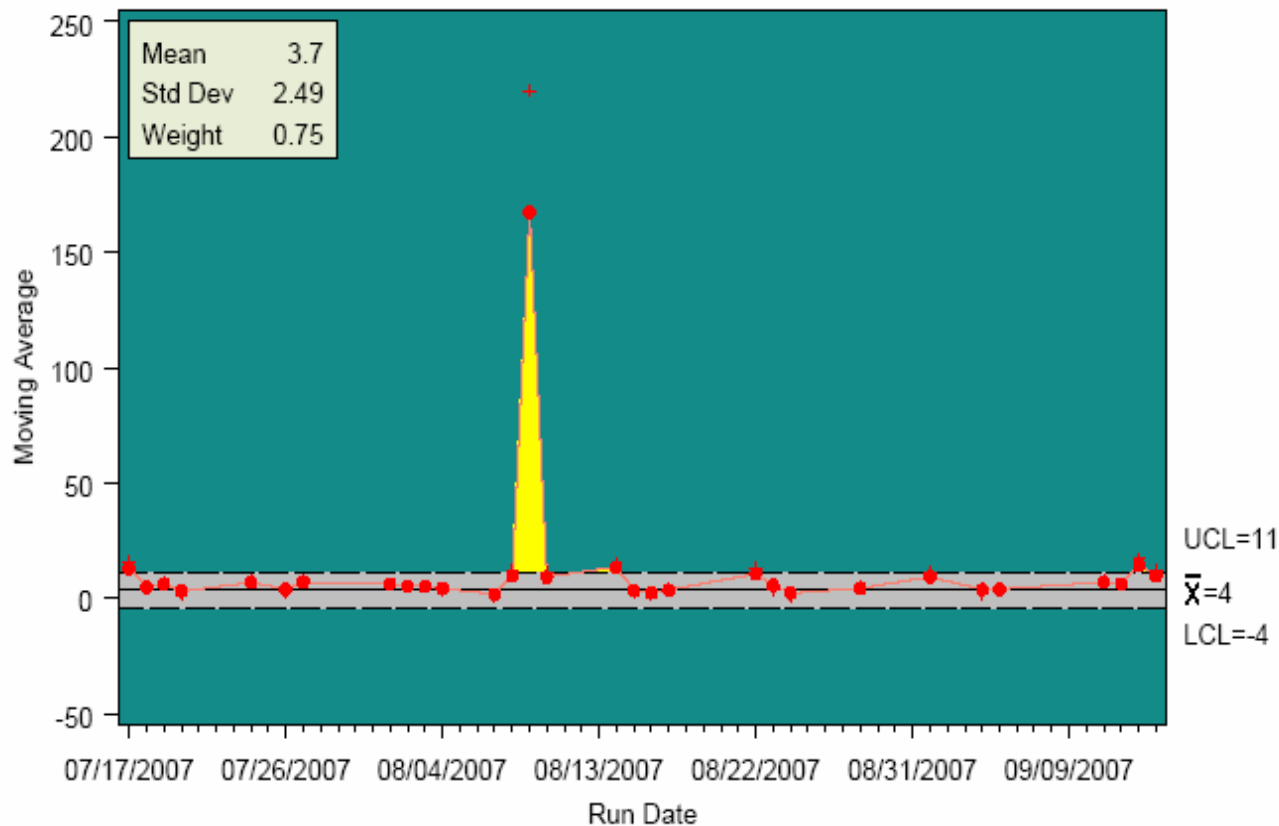
Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

Daily Process

- Billers with alerts are contacted to investigate the missing bill accounts.
- Biller determines if accounts are actually missing their intended bills.
- If accounts are identified by the Biller as due bills then bills are sent to CheckFree for distribution.

Daily Process - Alert due to late file delivery

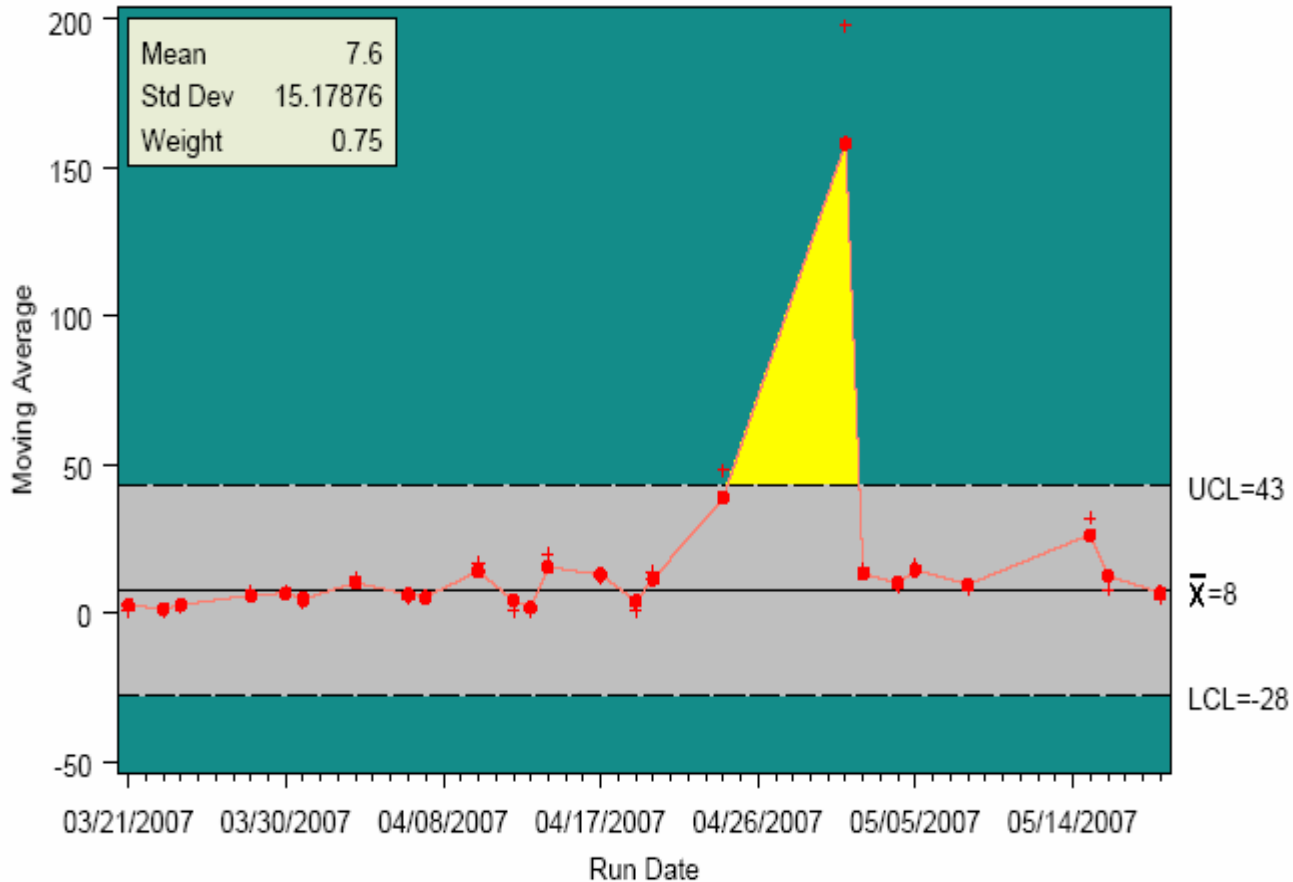
Missing Bills Vs Time for Utility Biller C



Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

Daily Process - Alert due to change in billing cycle

Missing Bills vs Time for Utility Biller G



Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

Adapting to Accommodate Process Change

Adapting to Accommodate Process Change

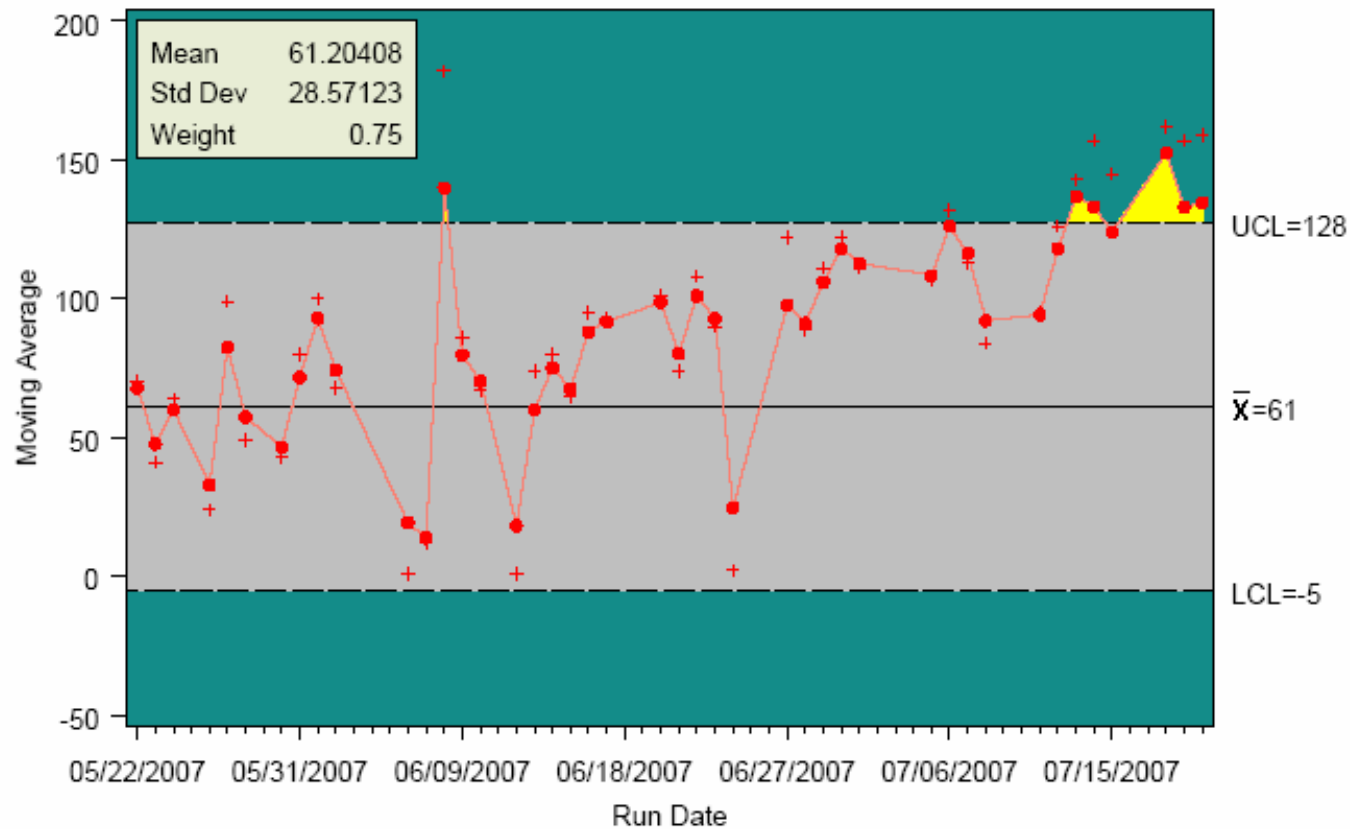
- Benefits of JMP:

- Use JMP to look at longer term data to analyze for process changes.
- Work with the biller to understand the reasons for the shift change.
- If the change becomes the norm then the metrics are updated using recent stable data.

Adapting to Accommodate Process Change

Missing Bills vs Time for Telephone Biller

Began to see almost daily alerts for this biller beginning on 7/15.

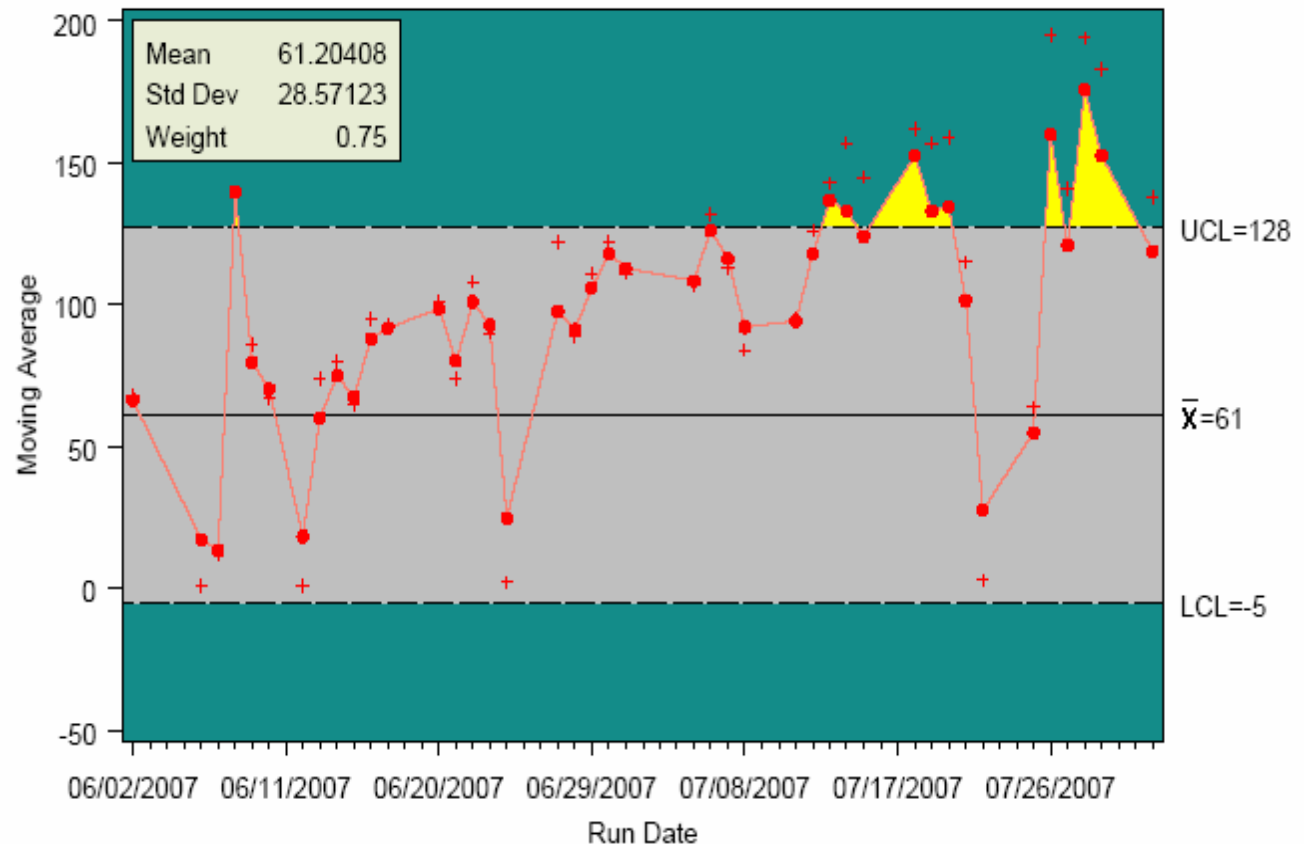


Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

Adapting to Accommodate Process Change

Missing Bills vs Time for Telephone Biller

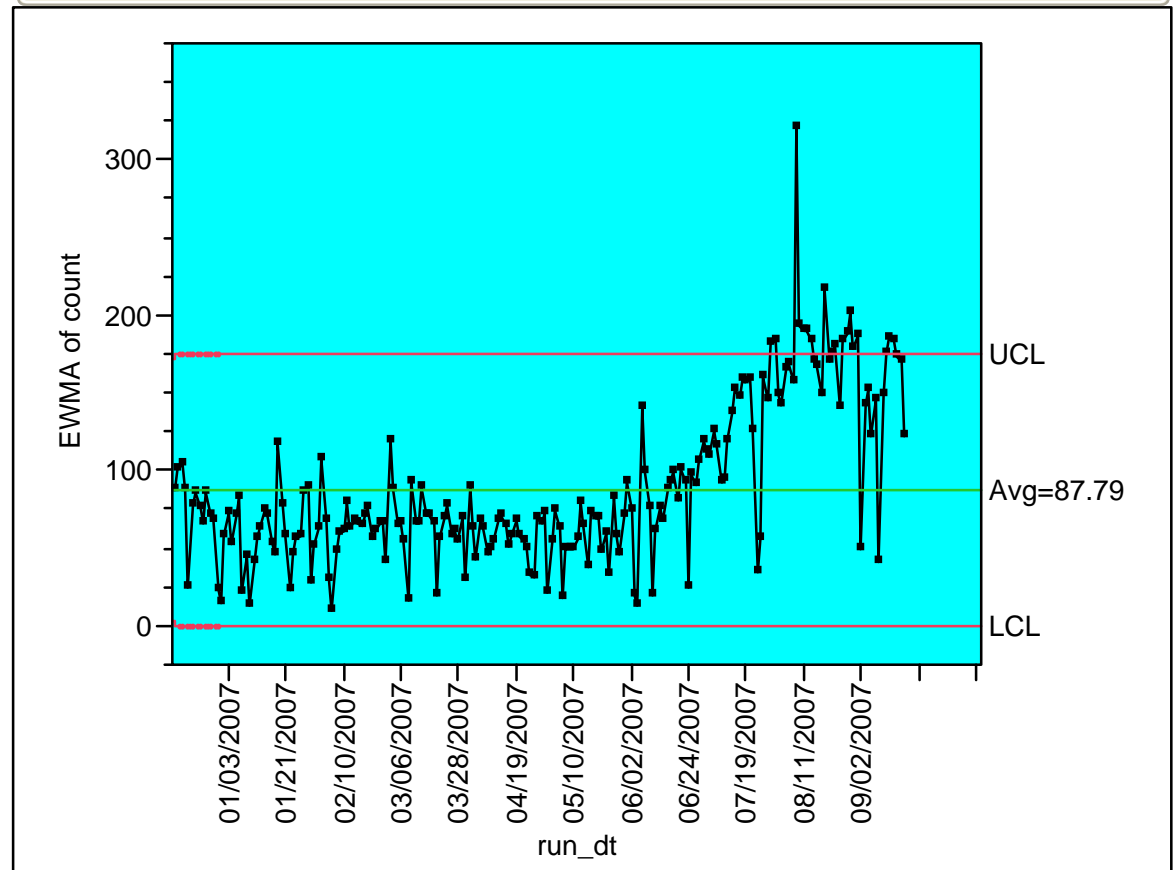
Biller indicated these alerts were due to accounts that no longer had service.



Adapting to Accommodate Process Change

Control Chart

EWMA of count

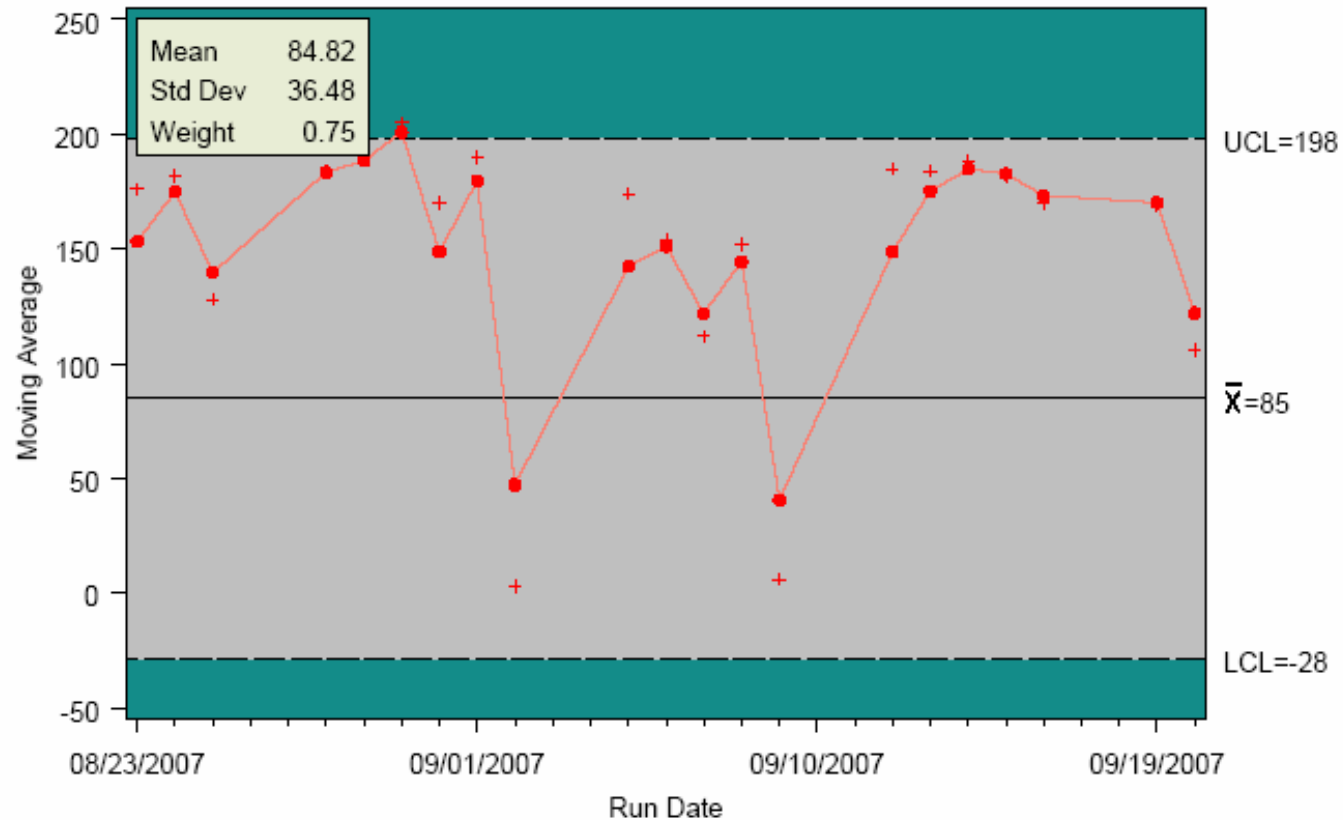


Analysis of historical data with JMP showed that this was a trend beginning in late June.

Adapting to Accommodate Process Change

Missing Bills vs Time for Telephone Biller

Revised metrics to reflect the current process.



Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

Project Results

Success!

- The statistical model showed that a change in the number of accounts which have not received a bill within a set period of time could be a valid predictor of missing bills.



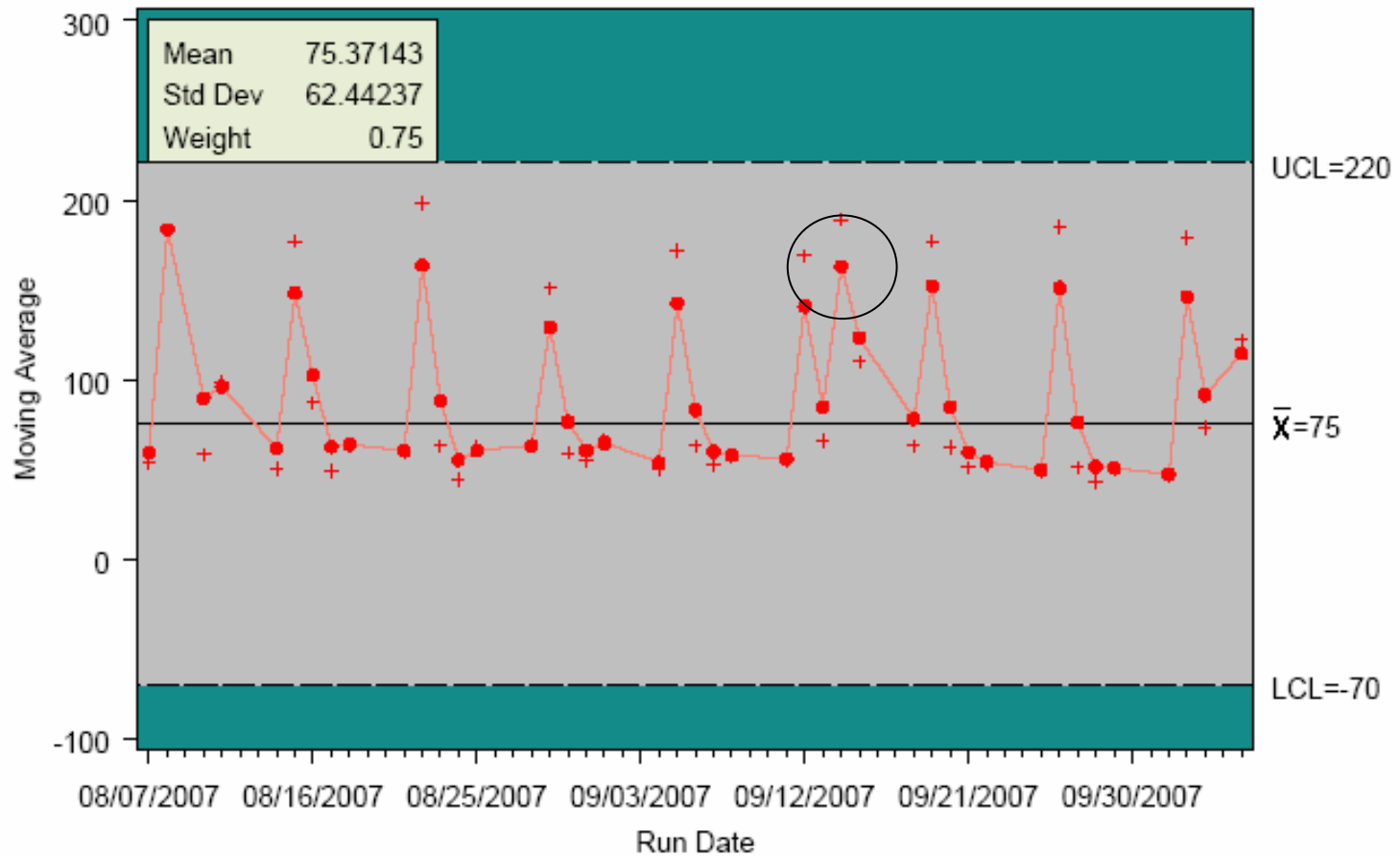
Success!

- Billers proved very receptive to CheckFree's proactive approach.
- Billers were able to quickly identify file delivery or process failures.
- Missed bills were sent.
- Consumers received their bills without awareness of any delay.



Continuing Challenges

Variable Billing Cycles

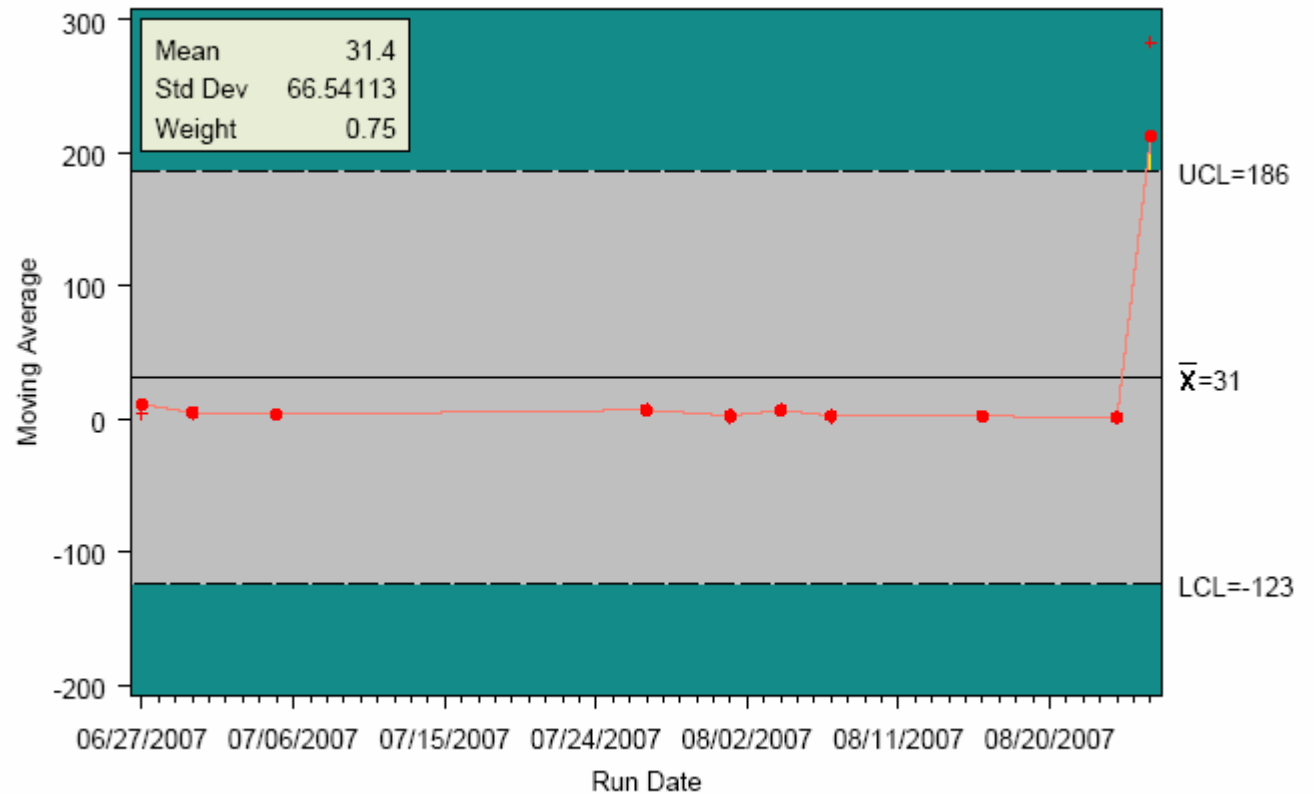


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New Billers

Typical alert behavior for a new biller where metrics are not yet established.

Missing Bills Vs Time For Biller X

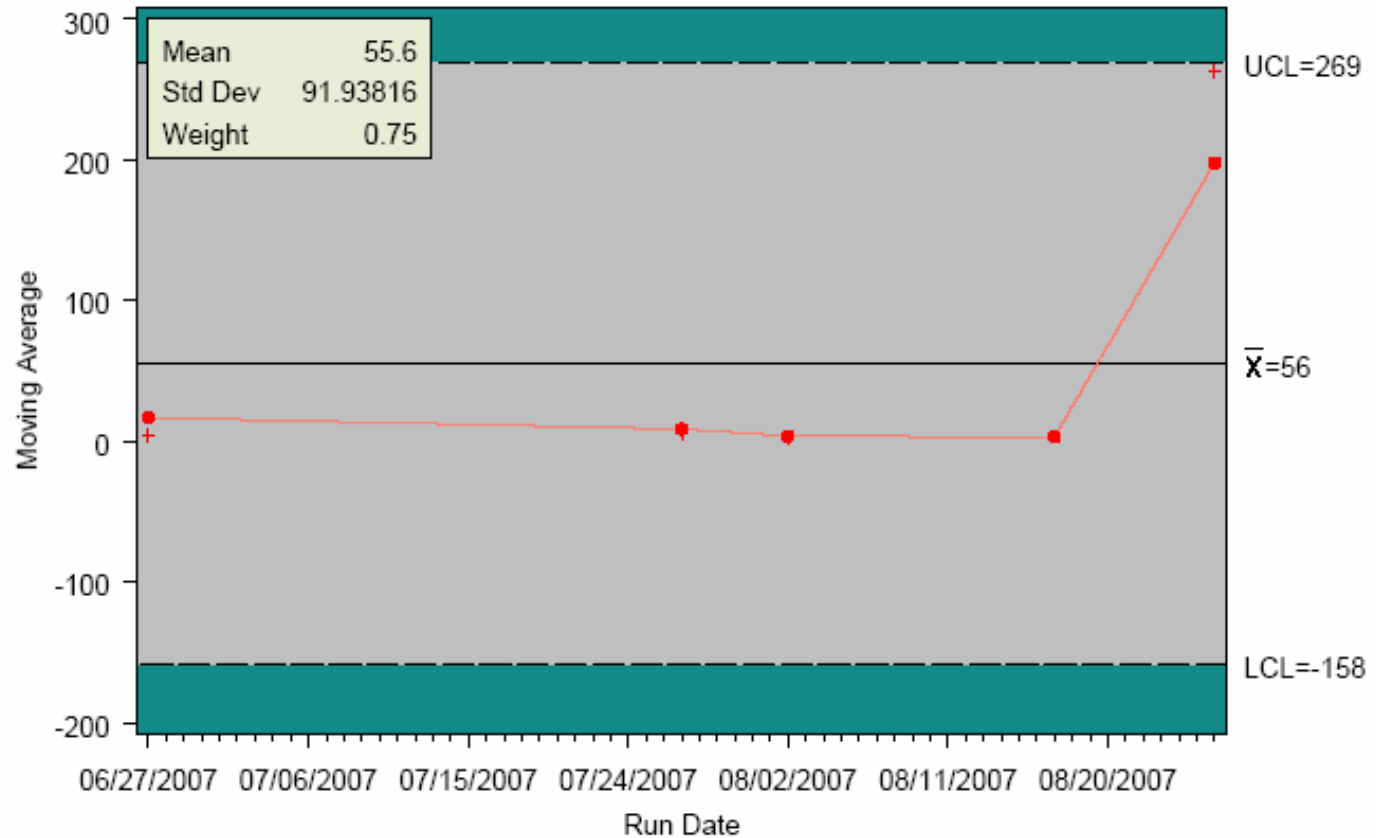


Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

New Billers

Missing Bills Vs Time For Biller Y

This increase in missing bills was not detected.



Dots are the EWMA, Crosses are the Raw Data. Limits are Based on the EWMA.

Questions & Answers

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