YouRateNews

Architecting an Enterprise Software Product from Vision to Reality

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This book is dedicated to Daniela and Buddy.

Contents

1 Introduction

This book demonstrates how to take an idea to reality in the rapidly changing world of open source technologies and cloud computing. And it does so by tackling an idea that has the potential to make a difference by rating the accuracy, neutrality, and honesty of news organizations.

In modern IT environments: asynchronous replaces synchronous; virtualized cloud resources logically replace servers made out of metal; and fixed has been replaced by elastic. The Technology stacks have become more complex while individual technologies thrive with the simplicity that they provide. It's a tough world out there, but it is still possible for a small, highly-skilled team to work miracles. And perhaps more importantly, smaller organizations can have a light, low-cost infrastructure that allows their "special forces" IT professionals to keep working miracles.

Unlike books and articles that focus on a single technology, this document describes and demonstrates how to utilize many of the latest open-source technologies and processes to create a scalable, extendable, light-weight, software solution.   This book serves as a blue print that small and medium size organizations may use to architect, design, and build software using powerful open source tools and technologies. In other words, this book is an example of how to glue all the parts together.

This book also focuses on "the why" as much as "the how". It makes sense to know the purpose of each enterprise system's components. Thus, technology professionals who are not necessarily hands-on should find this book useful. And we include some business analysis also. Using the latest combination of technologies may be great – but it has to make sense from the business side.

Make no mistake; this book is not abstract. We start with a lofty idea – then walk that idea through the business requirements, architectural design, implementation and solution deployment. We also setup the environment pieces that every team needs to keep building great software using a factory-style approach. This book presents a complete cloud-based, open source solution that anyone may replicate.

Had enough of the big picture stuff? Great! So let's get to work on a neat idea that puts Java, Mongo, REST, Spring Boot, Scalable Vector Graphics, HTML5, CSS3, Jquery, Jquery Mobile, Subversion, Nexus and Gradle into the AWS cloud.

1.1 Vision of *YouRateNews*

“YouRateNews” is a Web 2.0, N-Tier cloud-based web site. Each relevant technology is discussed in more detail as it is introduced into the overall architecture. For now, let’s introduce the concept.

You can rate a restaurant where thousands of people of have dined. You can rate a hotel where hundreds of thousands of people have stayed, but you can’t rate a news article that millions of people read – until now. This application enables users to rate the quality of press coverage so that the top ratings go to the best journalists and news organizations. Instead of a standard star-rating system, these news ratings enable users to cast their opinion regarding the quality of the work as well as on the articles’ left/right bias. Or raters can just flag articles as fake news.

The cumulative news ratings draw a clear picture of how well press organizations and their authors are doing. The quality of news coverage becomes apparent by rating how fair or skewed news coverage is. This 46-year-old author has been hearing about media bias since his early teens – isn’t it about time that we have a means to quantify it.

The idea can make a difference. These ratings may influence some people’s decisions where to get their news. And ultimately, *YouRateNews* will make a difference by driving news coverage towards a truthful and balanced center. Well, this book architects, designs, and implements a crowd-sourcing app with this ideological goal in mind.

1.1.1 Justification

The press has been called the fourth branch of government. It maintains the sacred duty to uncover and expose corruption and injustice. But the press is not subject to the checks and balances of American government. Individual political leanings, corporate leadership agendas, and other hidden forces can skew the news. No government agency or entity can force the free press to be fair, honest, and focus on presenting balanced, meaningful information.

It is this author’s opinion that the highest-quality press coverage is neutral in spirit. It is possible for news organizations to cover news events so that no political slant is apparent. The most respected news organizations and their journalists throughout modern history are known for their fairness in covering the stories of the day. Reporting facts and events with neutrality and fairness is the part of journalism that elevates the profession to a noble calling. Skewing stories with hidden agendas and questionable information takes journalism into a dark place.

Let’s not get too idealistic. Journalists are people too. Often journalists are affected by the events they witness - and by the slant demanded by their parent news organization. It is unrealistic to demand that all news coverage be without a perceived slant to the left or right. Left or Right-Leaning journalism can still be good. However, it is without question that the quality of journalism diminishes as it is watered down and skewed with political ideologies and hidden agendas.

And getting back to the technology focus on this book, the question is: What modern-day technology innovations might encourage our free press to be a focused and fair?

We'll rate press coverage with a crowd-sourcing application. By allowing the general public to rate press coverage on an article-by-article basis, we can recognize the best news organizations and the best journalists. We can also identify the opposites. Crowd-sourced ratings can measure perception (reality). And the results will certainly be better than the confrontational mud-slinging that seems to dominate the political scene at the time of this book's writing.

1.1.2 Where the idea can go

If it's worth doing, then it's worth doing right. This author cannot force the *YouRateNews* idea to gain traction on the open internet. But, he can suspend disbelief and give it all he has in the attempt. As the greatest English teacher I've ever met used to say: "Live your own myth". So, here are a few ideas and thoughts on this idea's potential for success:

- There is nothing really like this at the time of this writing. This is a simple rating (or voting) system that can compile a score that ranks news organizations and journalist. With general idea acceptance, the ratings could become something that organizations and journalists work for. It won't be a Pulitzer Prize but it might be a People's Choice award.
- The endless polls that occurred during the 2016 Presidential Election cycle missed the mark in shocking fashion. Regardless of your political affiliation, the Trump presidential election results were stunning. A tool to track public opinion in a different way may improve the current failing approaches. Even if this tool were to gain wide acceptance only with a single group on the political spectrum – then it can still provide actionable, real-time information on that group. Maybe the tool doesn't really measure the bias of news organization as much as it measures overall public opinion. A tool that does this is real-time would have measurable value.
- Users rating articles in real time allows the site to track bias in real time and over time. Surveys have been conducted with the goal of measuring press bias. These results have been compiled into snapshots-in-time bias estimates. YouRateNews tracks press bias (or perception of bias) over time. For example, YouRateNews might uncover that press coverage is moving further to the left as a result of a confrontational relationship with America's president. Or the heightened focus on press coverage may move bias more towards a neutral center. With enough input from the public, the site can track bias and perception of bias using real numbers and an understandable grading system.
- Users can rate news articles as fake on the site. When enough legitimate users declare an article to be fake news, then this site can say with a high degree of certainty that an article is, in fact, fake. This information opens the possibility up that news organizations could link up to the site remove any fake news that accidentally "creep" onto their sites. The site becoming the de facto standard for identifying fake news articles would open up multiple possibilities.
- Countless avenues are available for people to "bash" the media. However, there are no avenues by which one can rate the media with meaningful metrics. One can bash the media with

YouRateNews, but the overriding idea is based on the belief that most users would be honest people interested in making fair assessments. The bashers can go elsewhere to express their outrage in writing. Still, in recognition of all the angry people out there, *YouRateNews* has a mechanism to eliminate "basher" ratings from normal ratings. In other words, we can eliminate the sources of noise to get to the truth. The simplicity and clarity of the idea can win out.

- This idea is not overwhelmingly large. The base of users who would actually submit ratings is small. In many Internet ecosystems, only one implementation of an idea can thrive and prosper. In the news ratings space, there is no competition at the time of this book's writing. In a case like this, the first implementation "out of the starting blocks" has the best chance for success. And since the space for this inevitable idea has not yet been occupied, then why should it not succeed.
- If people, journalists and news organizations accept the idea, then news organizations could have rating links after each article on their respective websites. *YouRateNews* may become the neutral 3rd party rating site that allows users to rate the news. Adding these links to news organizations' websites would demonstrate their commitment to quality journalism. Again, the market has not filled this void.
- Journalists also get ratings on the site. Journalists could also use his or her news ratings to promote their work.
- With a certain level of acceptance, then the site could generate ad revenue and become a self-sustaining entity. This ad revenue would sustain its growth.
- I am guessing that 100,000 unique visitors have dined at the Jib Jab Restaurant in Girard, Ohio over decades of its existence. They have 46 reviews on Yelp. CNN had 459 million visitors in February 2017. And none of its articles are rated. There is no dishonor in rating great hot dogs, but perhaps it is time that news reports should be elevated to the same level.
- If just 1% of the 1% news-junkie population occasionally participated by rating articles on *YouRateNews*, then the site would be gathering more accurate information than Nielsen Ratings ever could. And the site is minimalistic – the goal is to reduce the site's stickiness so that raters can get in, rate, and get out on a regular basis.
- This idea is due. At the time of this writing, America has a President that openly attacks the press. This idea would enable the best news organizations to counter his claims. However, journalistic bias is nothing new. And as journalistic bias grows, it waters down the truth. This site rates journalists and news organizations as the best when they focus on high-quality journalism without the bias. With widespread acceptance, this type of rating would have the effect of improving the quality of news. Any pressure to elevate journalistic coverage to its noble calling is a good thing.

1.1.3 Focus on Technology

Regardless, this is a book on employing best-of-breed, open source, cloud technologies. The underlying news-agency crowd-sourcing idea is secondary. The goal here is to implement an original idea that is big enough to justify a full stack cloud-based solution and small enough to cover in a single book. So, let's get started.

2 The Requirements Sprint

YouRateNews does the following.

- Presents a home page that quickly introduces the concept and presents links for users to participate on the site
- Allows a user to establish and update an account. (Account management)
- Allows a logged-in user to rate news Articles (Add Ratings)
- Enables all users to view and query the current Ratings of Various News Organizations and Journalists (View Ratings)

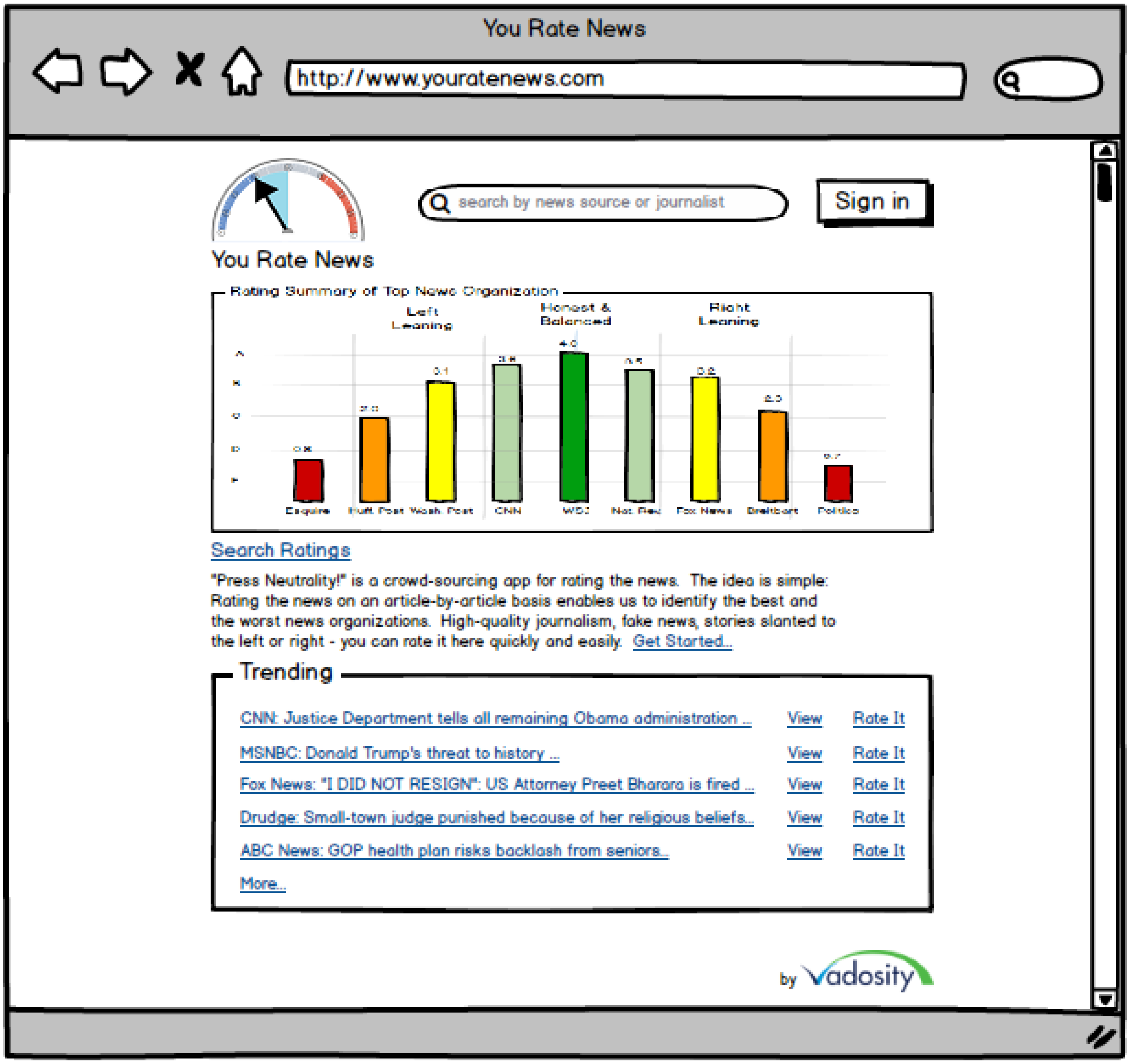
The above requirements may not seem like much – but it's actually quite a bit. These bullets define the separate parts or modules of the *YouRateNews* application.

Visualizing Requirements:

The requirements above require a bit of elaboration. Let's visualize these requirements to add simplicity to a complex subject. The best business analyst I've ever worked with demanded a tool called Balsamiq (www.balsamiq.com). This product is a wire framing tool that enables you to rapidly build mockups. We'll use these mockups as much as possible in order to flush out the requirements.

2.1 Home Page

Figure 1



"Press Neutrality!" is a crowd-sourcing app for rating the news. The idea is simple: Rating the news on an article-by-article basis enables us to identify the best and the worst news organizations. High-quality journalism, fake news, stories slanted to the left or right - you can rate it here quickly and easily. Get Started...

Trending

CNN: Justice Department tells all remaining Obama administration ...	View	Rate It
MSNBC: Donald Trump's threat to history ...	View	Rate It
Fox News: "I DID NOT RESIGN": US Attorney Preet Bharara is fired ...	View	Rate It
Drudge: Small-town judge punished because of her religious beliefs...	View	Rate It
ABC News: GOP health plan risks backlash from seniors...	View	Rate It
More...		

Figure 1 shows the YouRateNews concept. First, the site introduces the user to news organization ratings. The ratings show the highest rated news organizations based on honesty and neutrality using a scoring system analogous to the US education system. Second, the site presents search links that enable users to perform precise searches. Third, the site presents a brief text that introduces the basic concept of the site. Finally, the site presents links that enable users to rate news articles. The overall layout is minimalistic – designed to support the site's simple goals and easy use.

2.2 Account Management

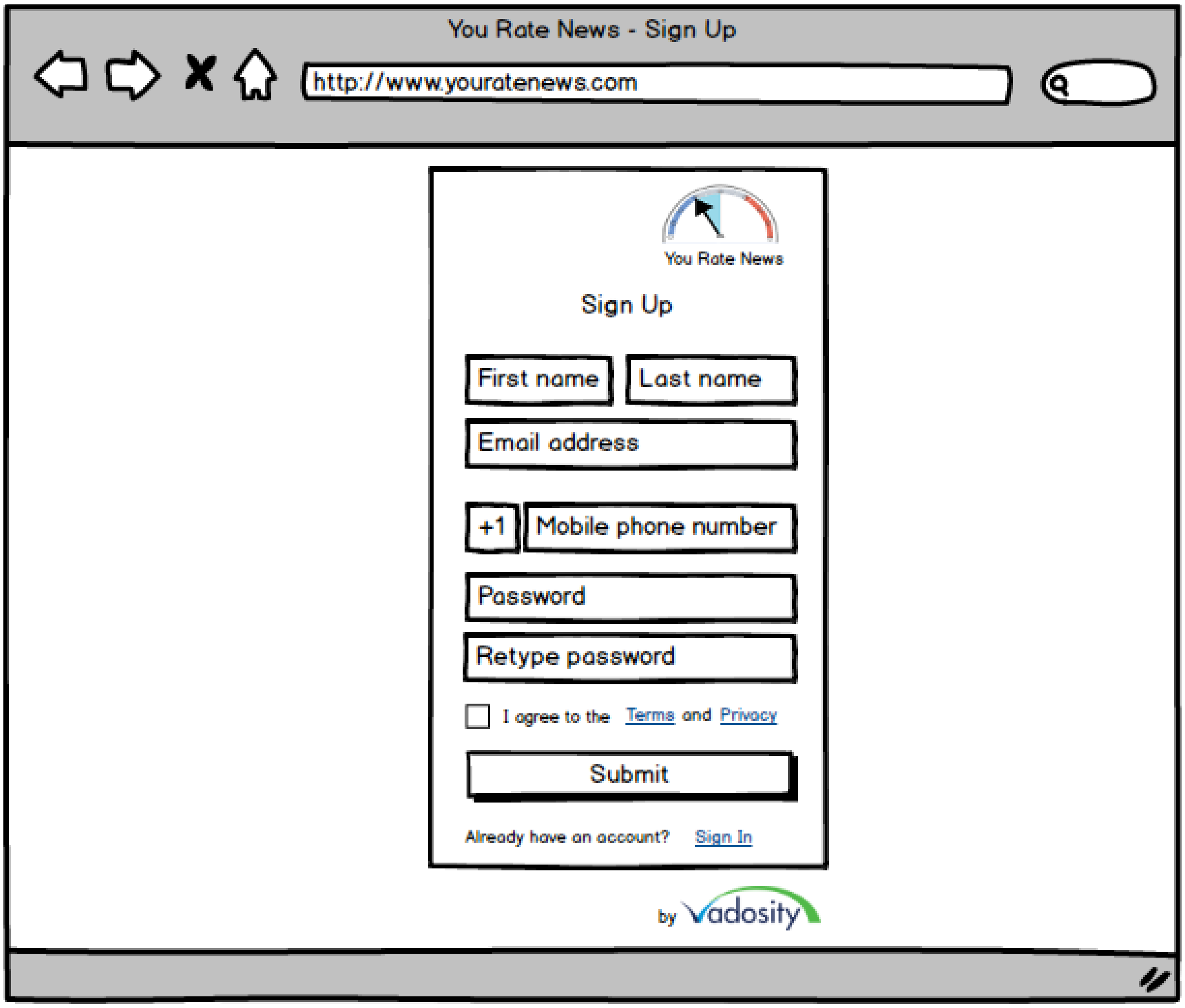
The first part of *the YouRateNews* application is concerned with User Accounts. The account management section of this application allows a user to establish and update an account. The account management requirements are straight forward and contain no big surprises. The mockups below show the simplicity of the application. The descriptions below also introduce the attributes the account management attributes that are captured.

Note: Once an application reaches a larger user group, then enabling users to login using their Facebook or LinkedIn account credentials is recommended. But this light application will stick to the old school approach.

2.2.1 Account Management – Sign Up

The YouRateNews application allows users to rate news articles. In order to maintain the integrity of the ratings, we need to have a verified user. But this is light web application, and initially the account security requirements are not high as they might be on a banking web site. So, the goal is to collect just enough information from the user to identify them – and no more.

Figure 2



The application captures the following information as seen in Figure 2:

User Account Attributes:

- **First Name, Last Name**: Basic information to identify and customize the user experience.
- **Email Address**: The email of the user. To keep it simple, this is the user's login. And before a user can start rating news articles, the email will need to be verified. This "old school" approach is good enough for a small application.
- **Mobile Number**: This optional piece of information. This information may be useful later on for more sophisticated security.
- **Password**: We'll store this information in an encrypted, hashed format.

In addition to the visual attributes, the user account has additional attributes such as:

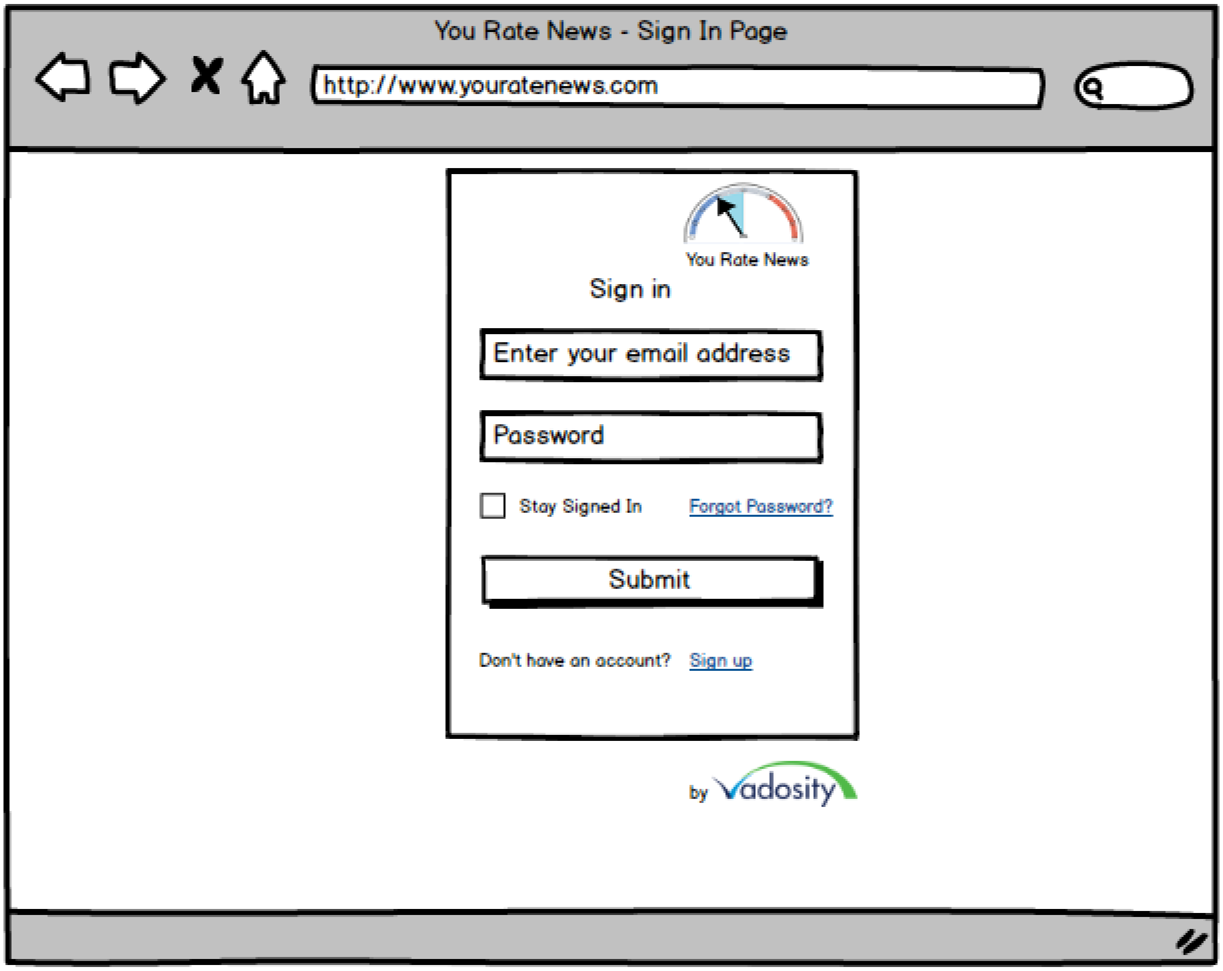
- **Account Disabled:** Indicator which states whether account has been disabled for malicious activities

- **Disabled Comments:** Explanation of why account has been disabled
- **Trusted User:** Indicates whether the user has heightened trusted status

2.2.2 Account Management – Sign In

The *YouRateNews* application allows users to Sign in. Nothing fancy here. Note that the simplicity of the application's interface is intentional – as it simplifies support for both desktop-style browser applications and mobile devices.

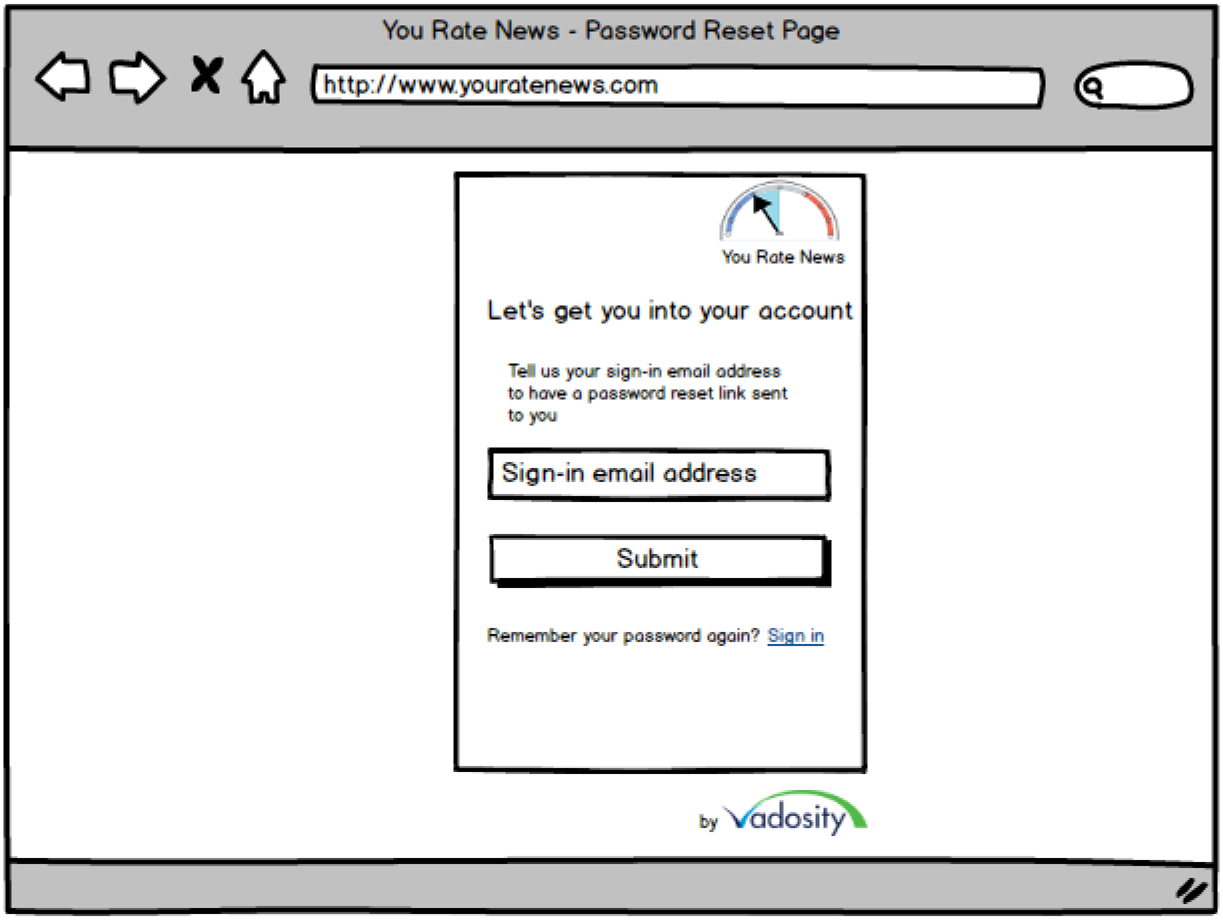
Figure 3



2.2.3 Account Management – Forgot Password

The application uses the old school, password reset approach. The user enters his/her email address. Once the user submits the email, then the system informs the user to check his/her email. The system sends a password reset email containing a password reset link. The password link expires after a set amount of time, say two hours, for security reasons. Figure 4 shows the entry point.

Figure 4



You Rate News - Password Reset Page

http://www.youratenews.com

Let's get you into your account

Tell us your sign-in email address to have a password reset link sent to you

Remember your password again? Sign in

2.2.4 Account Management – Password Reset

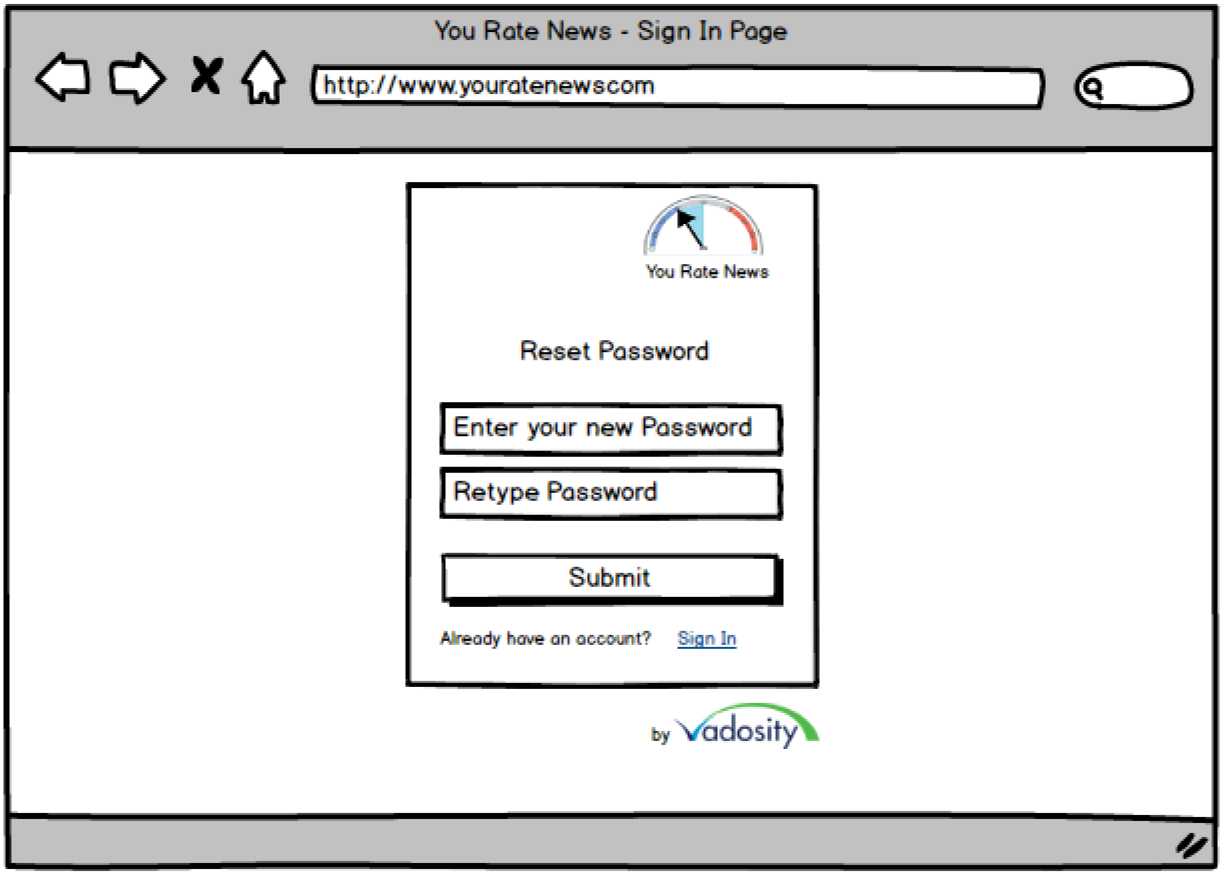
The application reset seems obvious, but under the covers, it can be a bit tricky. Once a user chooses to have a reset password link sent to an email address, then we'll need to capture that information. For example, we'll need to capture the following attributes as part of a Password Reset Request:

Password Reset Request Attributes:

- **Request Id**: A unique identifier
- **Email Address**: The email address associated with the request
- **Submission Time**: The time stamp indicating when the request occurred
- **Status**: A value indicating if the link was sent, if the link was clicked, if the password was correctly changed, etc.

- **User's IP address**: The user's IP address to be captured for security reasons

Figure 5



You Rate News - Sign In Page
http://www.youratenewscom
You Rate News
Reset Password
Enter your new Password
Retype Password
Submit
Already have an account? Sign In
by Vadosity

2.2.5 Account Management – Logging Events

In any modern implementation, significant attention needs to be given to security. Thus, this application will capture log in events. Specifically, the following login event attributes are captured.

Login Event Attributes:

- Id
- User's email address
- Type of event
- Log timestamp
- Event timestamp
- Application Version
- Application address (local device identifier)
- User's IP address

- Description

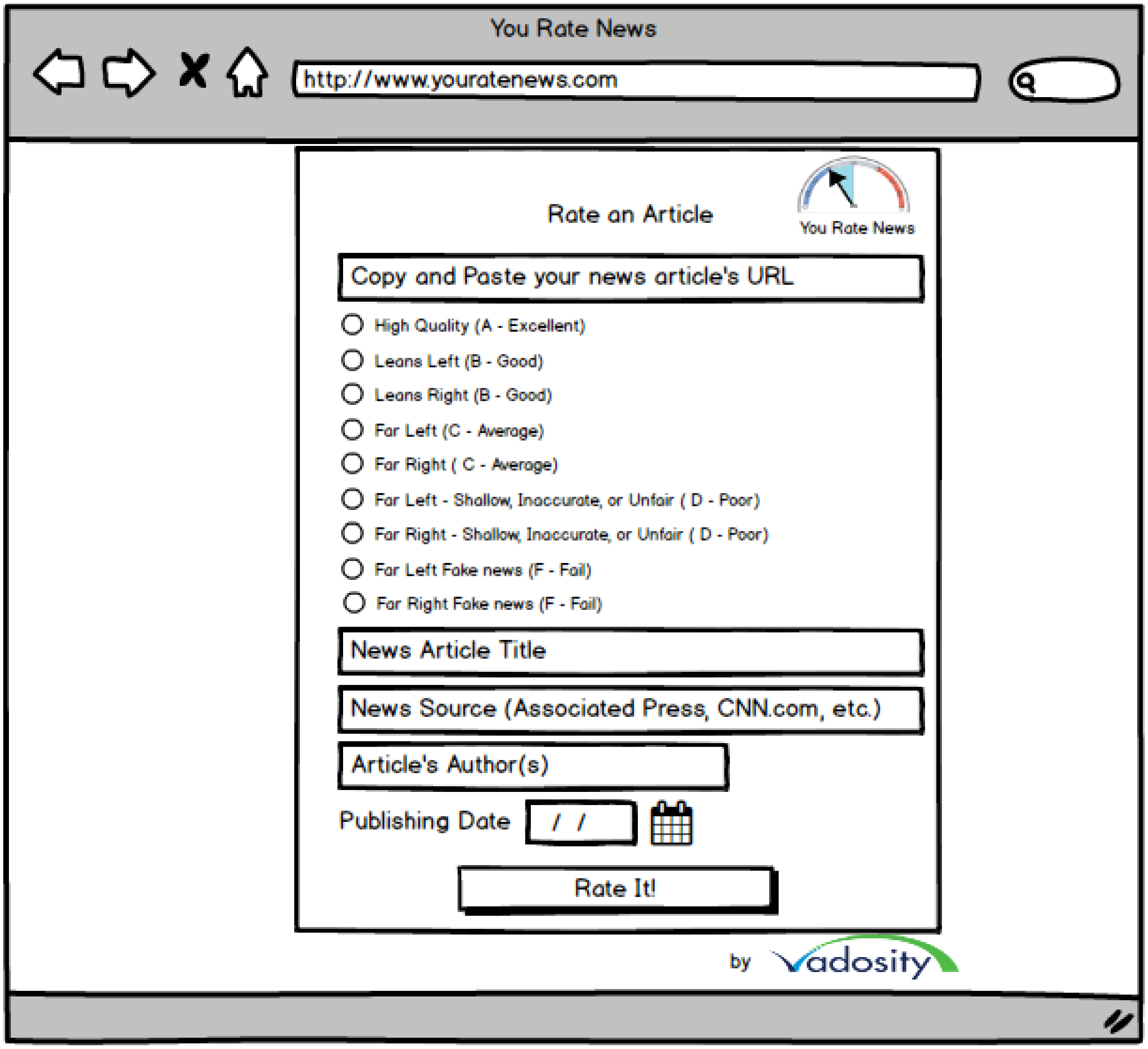
2.3 Rate-an-Article Requirements

Logged-in users rate news articles in *The YouRateNews* application. The Figure 6 mockup shows the basics of what the application captures. An article rating includes the following attributes.

Article Rating Attributes

- Id
- Article URL – the link to the news article
- The rating – the user's rating such as "High Quality", "Leans Left", etc.
- Article Title – the title of the article
- New Source – the organization that ultimately published the article
- Author – the article's author(s)
- Publishing Date

Figure 6



Copy and Paste your news article's URL

○ High Quality (A - Excellent)
○ Leans Left (B - Good)
○ Leans Right (B - Good)
○ Far Left (C - Average)
○ Far Right (C - Average)
○ Far Left - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Right - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Left Fake news (F - Fail)
○ Far Right Fake news (F - Fail)

News Article Title

News Source (Associated Press, CNN.com, etc.)

Article's Author(s)

Publishing Date / /

In addition to the attributes visualized in Figure 6, an Article Rating also includes the following hidden attributes.

Article Rating Attributes (continued)

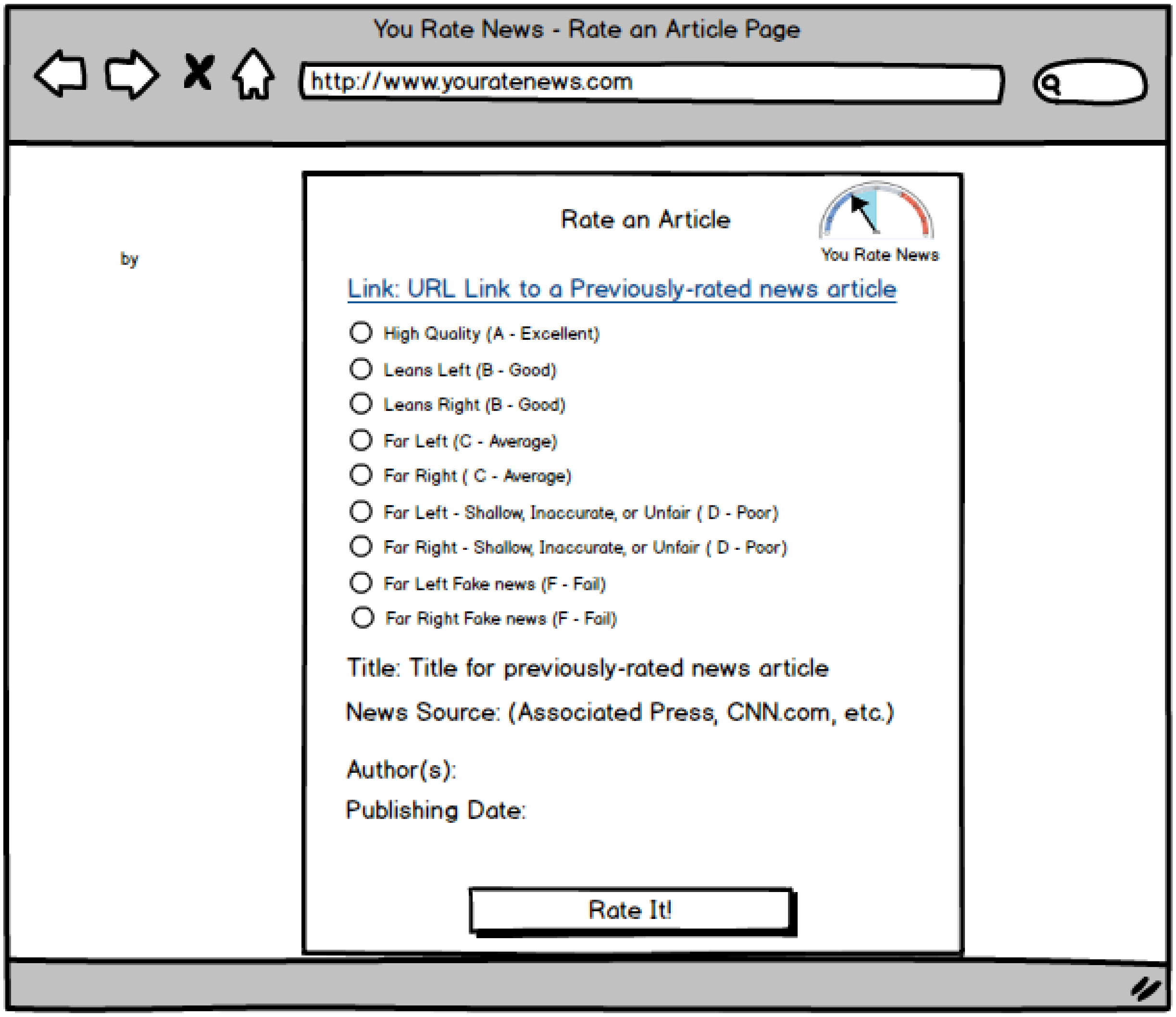
- **Request Id**: A unique identifier
- **Email Address**: The login email address of the user rating the article
- **Submission Time**: The time stamp indicating when the request occurred
- **Status**: A generic attribute to capture meta-information
- **User's IP address**: The user's IP address at the time of the submission
- **Trending Status**: Indicates whether the article is currently trending.

- **Is Attack**: Indicator that states whether the article rating appears to be an attack on the author(s) or press organization.

2.3.1 Rating a Previously-Rated Article:

If another user has already rated an article, then the title, news source, author, and publishing date have already been defined. In this case, the logged in user simply selects his rating and submits it.

Figure 7


You Rate News - Rate an Article Page
http://www.youratenews.com
by
You Rate News
Rate It!

Rate an Article

Link: URL Link to a Previously-rated news article

○ High Quality (A - Excellent)
○ Leans Left (B - Good)
○ Leans Right (B - Good)
○ Far Left (C - Average)
○ Far Right (C - Average)
○ Far Left - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Right - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Left Fake news (F - Fail)
○ Far Right Fake news (F - Fail)

Title: Title for previously-rated news article

News Source: (Associated Press, CNN.com, etc.)

Author(s):

Publishing Date:

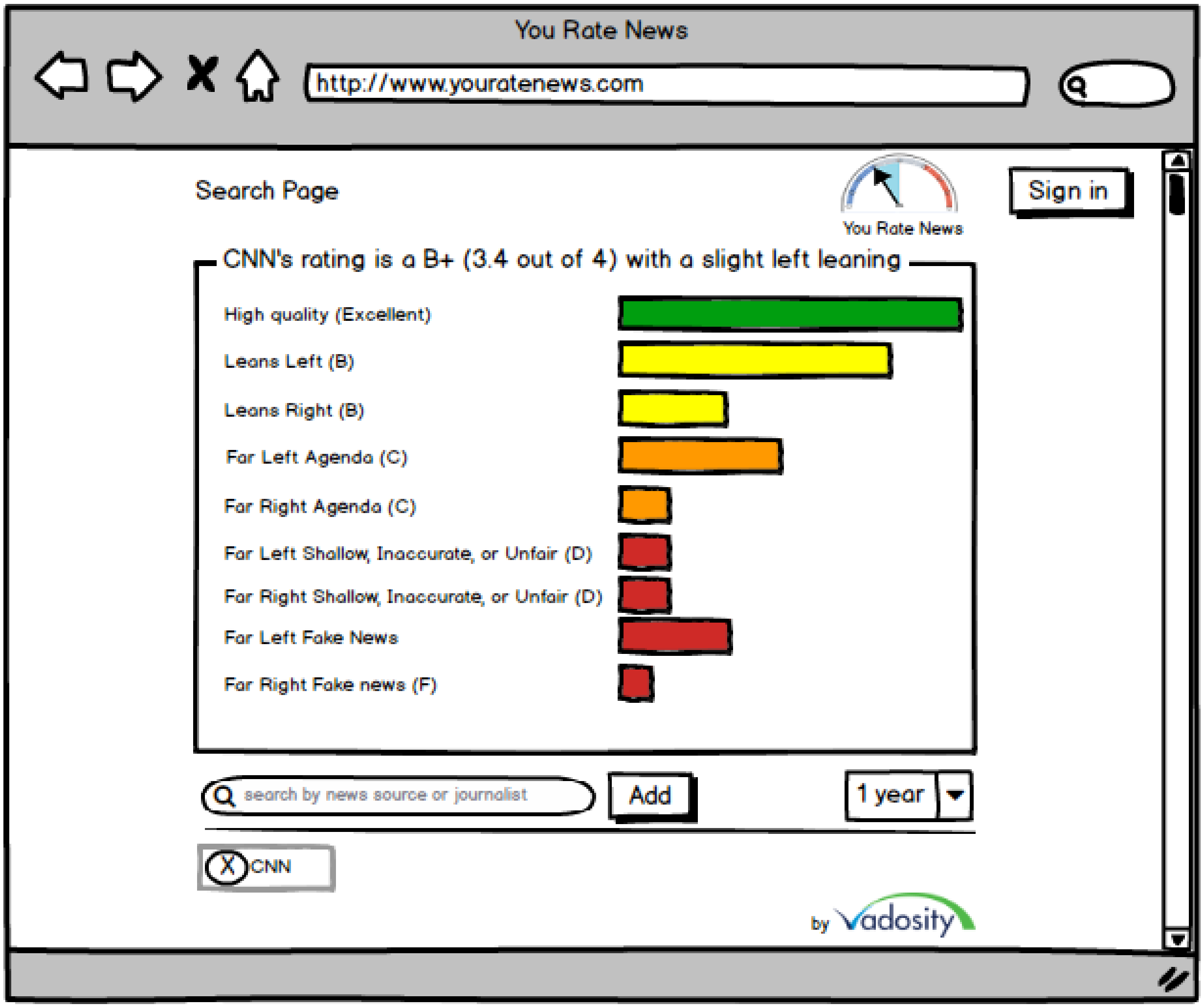
2.3.2 Note on No Comments

Online ratings system often pair ratings with user comments. Numerous avenues exist for users to make comments about news articles. *The YouRateNews* application will not collect comments initially. The intent is to minimize the amount of time a logged-in user spends rating a news article. It's like voting – on voting day the users' decisions are tallied to come to a result – without the commentary. Also, minimizing the time a user spends on *The YouRateNews* site encourages repeat visits. The ultimate goal is to determining the most legitimate news sources – and not to entangle users into lengthy debates about one article.

2.3.3 Ratings Results

The system directs the user to the ratings results after the user rates a news article. If an article has just one vote, then we show the news organization's rating as seen in Figure 8. If the article has more than one rating, then we show the article's ratings. The ratings are compiled using the US education system analogy. That is to say, an excellent article get an A, good articles get a B, and so on. Other sections of this document describe the details of the "education-style" scoring.

Figure 8

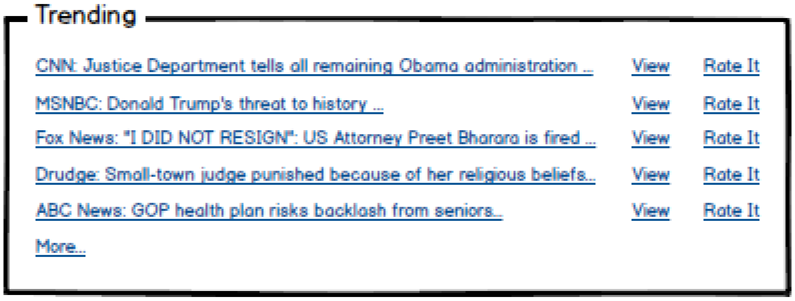


CNN's rating is a B+ (3.4 out of 4) with a slight left leaning

2.4 Trending and Trusted User Requirements

With so many news articles and other new media items out there at any given time, the likelihood of people simultaneously rating the same article will be initially low. To improve the ability of multiple users to rate the same articles, we introduce a trending section.

Figure 9



Trending

CNN: Justice Department tells all remaining Obama administration ...	View	Rate It
MSNBC: Donald Trump's threat to history ...	View	Rate It
Fox News: "I DID NOT RESIGN": US Attorney Preet Bharara is fired ...	View	Rate It
Drudge: Small-town judge punished because of her religious beliefs..	View	Rate It
ABC News: GOP health plan risks backlash from seniors..	View	Rate It
More..		

The Figure 9 mockup shows the basics of the Trending interface. Trending articles show the news source, the Article title, links to enable the user to read the article, and "Rate It" links that allow the user to rate articles.

2.4.1 The Danger of Trending

A simplistic approach to trending would be to just show a list of the latest articles that have been rated. However, this would open up the possibility that a dedicated attacker might enter a "bogus" or "malicious" article to disrupt the site. For example, someone could create a fake news article with the title "Kiss my ***". Using the "latest is trending" approach, this article would show up on the site's home page for all to see.   The site obviously can't accept this situation.

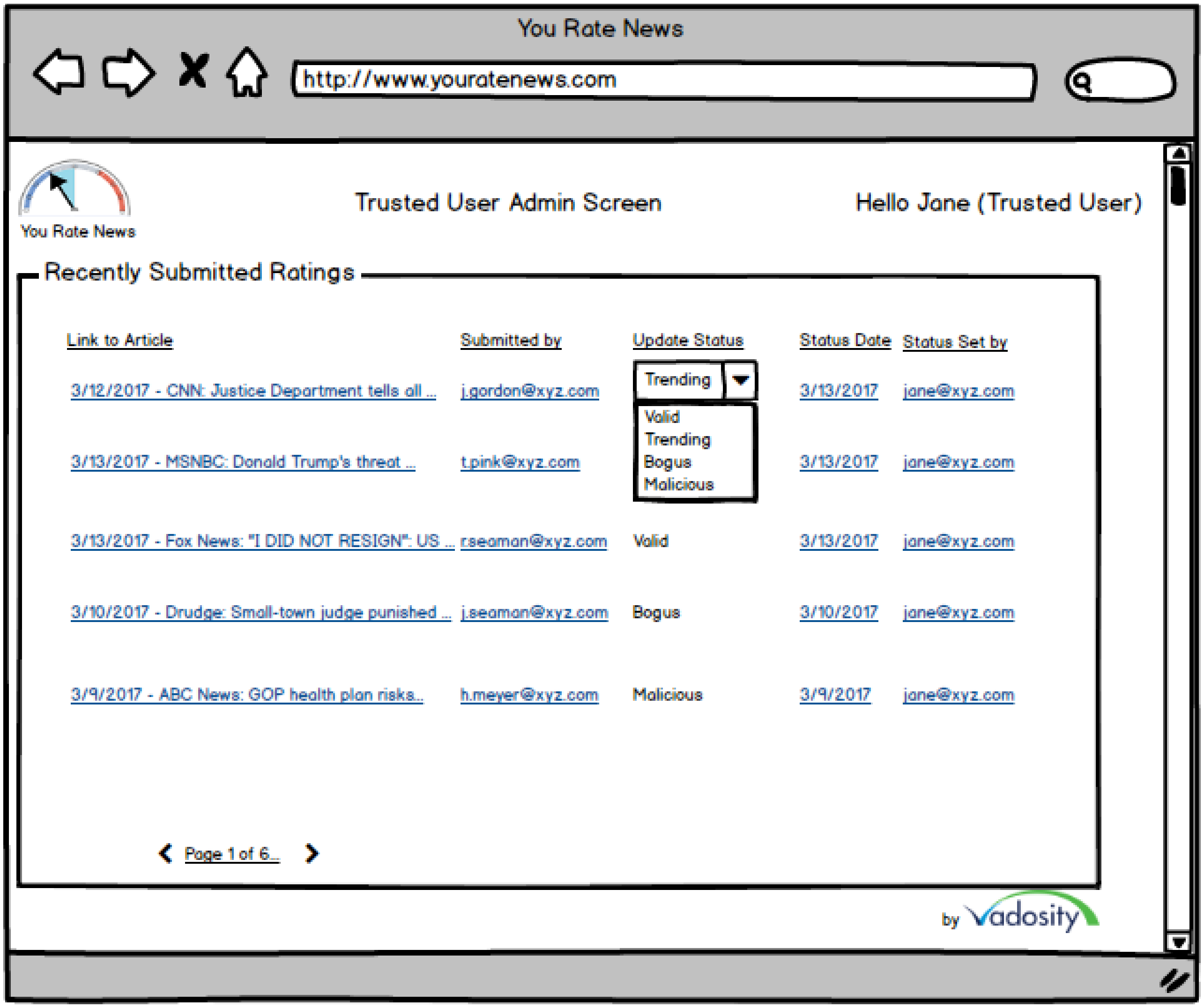
2.4.2 Trending Rated Articles must be trusted

The Crowd-sourcing *the YouRateNews* site allows any/all user's to commit contents.   Ideally, the system automates the crowd-sourcing as much as possible. Still, human intervention is needed for the above mentioned reason.   So, a smaller group of trusted users will be given the ability to review content. The trusted user has the following abilities:

- Mark newly-rated articles as trending
- Flag ratings that are bogus
- Flag malicious user accounts

Figure 10 demonstrates the Trusted User Admin screen concept.

Figure 10



Trusted User Admin Screen

Hello Jane (Trusted User)

Recently Submitted Ratings

Link to Article	Submitted by	Update Status	Status Date	Status Set by
3/12/2017 - CNN: Justice Department tells all ...	j.gordon@xyz.com	Trending ▾	3/13/2017	jane@xyz.com
3/13/2017 - MSNBC: Donald Trump's threat ...	t.pink@xyz.com		3/13/2017	jane@xyz.com
3/13/2017 - Fox News: "I DID NOT RESIGN": US ...	r.seaman@xyz.com	Valid	3/13/2017	jane@xyz.com
3/10/2017 - Drudge: Small-town judge punished ...	j.seaman@xyz.com	Bogus	3/10/2017	jane@xyz.com
3/9/2017 - ABC News: GOP health plan risks..	h.meyer@xyz.com	Malicious	3/9/2017	jane@xyz.com

❮ Page 1 of 6.. ❯

Rated Articles require the following additional attributes:

- **Status**: Indicates the status of the article.
  - **Valid**: Indicates that the rated article is a valid review
  - **Trending**: Indicates that the rated article should appear on the site as a trending article
  - **Bogus**: Indicates whether a rated article is bogus (doesn't exist, non-existent URL, completely fake, etc.)
  - **Malicious Flag**: Indicates whether a rated article has been added to the site for malicious reasons

- ○ **Sponsored**: Indicates whether a rated article is a sponsored article. If it is, then it has no business being rated – and will not be included in statistical ratings. This is effectively just a subcategory of "Bogus".

- **Status By**: Indicates the user account that last updated the article's status
- **Status Explanation**: Allows the trusted user to explain his reason for flagging an article as bogus, malicious, or sponsored.

2.5 Rating Summary Requirements

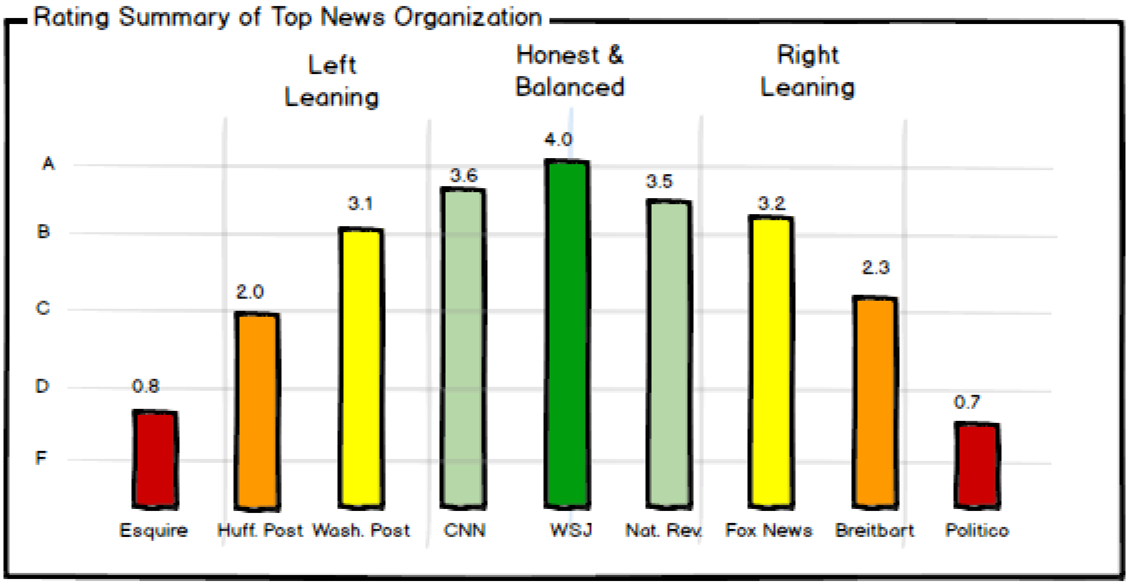
2.5.1 Three Types of Users

YouRateNews will have three types of external users. First, viewers coming onto the site will want to quickly view rating statistics and move on. Second, raters will come to the site to rate one or more news articles. Lastly, trusted raters verify that incoming ratings are valid. This requirement concerns the first group of users – viewers.

2.5.2 Rating Summary Chart Concept

The main site has a chart that shows summary rating results. Showing the statistics on all news organizations would make the chart too busy. So, we represent the overall results in a chart similar to Figure 11.

Figure 11



The chart fulfills the following requirements:

- The Rating summary chart itself will be a web link to a more powerful search page.

- The chart rates news organization using a US Education System style scale. The best organizations get an A and the worst get an F.
- Each rated news organization gets a numeric grade consistent with the US education system style. For example, an A-rating will correspond to a 4.0 “grade point average”. Also, an F-rating has a grade point average below a 1.0.
- The chart shows the top-rated news organization. The top-rated news organization is the one with the highest ratings.
- Each news organization in the rating summary chart needs to have a numerically valid number of legitimate ratings.
- The chart shows the top three ranked news organizations. (like the Olympics)
- The chart shows 1 or 2 left leaning organization rankings as well as 1 or 2 right leaning organizations.
- The chart shows poorly-ranked news organizations – ideally one on the right and one on the left.

2.6 Rating Calculations

Using the US education system’s grading (rating) system as a standard introduces some common sense into the scoring system. Each rated article can get a rating. Each articles author(s) also get rated as the news articles get rated. These individual article ratings enable the news sources and its journalists to have an overall rating. This section concerns itself with the calculation of these ratings.

2.6.1 Converting Ratings to Numbers

When a user rates an article, he has the following choices.

- High Quality (A – Excellent)
- Leans Left (B – Good)
- Leans Right (B – Good)
- Far Left Agenda (C – Average)
- Far Right Agenda (C – Average)
- Far Left Shallow Inaccurate or Unfair (D – Poor)
- Far Right Shallow Inaccurate or Unfair (D – Poor)
- Far Left Fake news (F – Failure)
- Far Right Fake news (F – Failure)

These ratings convert to numbers as follows:

- High Quality (A – Excellent) = 4.5
- Leans Left (B – Good) = 3.0
- Leans Right (B – Good) = 3.0
- Far Left Agenda (C – Average) = 2.0

- Far Right Agenda (C – Average) = 2.0
- Far Left Shallow Inaccurate or Unfair (D – Poor) = 1.0
- Far Right Shallow Inaccurate or Unfair (D – Poor) = 1.0
- Far Right Fake news (F – Failure) = 0.0
- Far Left Fake news (F – Failure) = 0.0

The only notable difference from the expected rating to number conversion is the 4.5 assigned to a *High Quality (A – Excellent)* rating. This heightened value allows the average rating of an article to stay in the A-range. (See calculations below)

2.6.2 Converting Average Numbers to Ratings

Just as individual ratings are converted to a number, the average rating numbers for an article, news organization, or journalist are converted to a rating. The following average rating scale is proposed:

- Greater than 4.25 = A+
- 4.0 – 4.25 = A
- Greater than 3.5 and less than 4.0 = A-
- From 3.25 to 3.5 = B+
- From 3.0 to less than 3.25 = B
- From 2.75 to less than 3.0 = B-
- From 2.25 to 2.75 = C+
- From 2.0 to less than 2.25 = C
- From 1.75 to less than 2.0 = C-
- From 1.25 to 1.75 = D+
- From 1.0 to less than 1.25 = D
- From 0.75 to less than 1.0 = D-
- Below 0.75 = F

Note that the average rating is more precise (A+, B-, etc.) than the ratings that an individual user makes (A, B, C, D or F). The goal here is to keep the user's rating experience as simple as possible. Making the decision between an A or a B is more straightforward than deciding between an A- or B+.

2.6.3 Example Calculations

2.6.3.1 A Very Simple Rating Calculation Example

Imagine Article A has two ratings, an A and a B.

The total score is: 4.5 + 3 = 7.5

The average score is: Total Score divided by the number of ratings = 7.5 / 2 = 3.75

The 3.75 score converts to an A- rating

2.6.3.2 A normal example

Imagine Article B has ten ratings: A, A, B, B, B, B, B, C, C, F

The total score is: 4.5 + 4.5 + 3 + 3 + 3 + 3 + 3 + 2 + 2 + 0 = 28

The average score is: 28/10 = 2.8

The 2.8 score converts to a B-

2.6.3.3 Left/Right Calculations on a normal example

The *B*- does not tell the whole story. *The YouRateNews* system also enables users to rate articles as leaning left or to the right. So let’s calculate whether Article B is leaning to the left or right.

The complete Article B ratings are: A, A, B - left, B - left, B – right, B –right, B – right, C – far right, C – far right, F – far right

The left/right leaning is calculated separately. The left/right scorings for individual ratings are as follows:

- High Quality (A – Excellent) = 0
- Leans Left (B – Good) = -1
- Leans Right (B – Good) = +1
- Far Left (C – Average) = -2
- Far Right (C – Average) = +2
- Far Left- Shallow Inaccurate or Unfair (D – Poor) = -3
- Far Right - Shallow Inaccurate or Unfair (D – Poor) = +3
- Far Left - Fake news (F – Failure) = -4
- Far Right - Fake news (F – Failure) = +4

The total left/right score is:

A	=	0
A	=	0
B – left	=	-1
B – left	=	-1
B – right	=	1

B –right	=	1
B – right	=	1
C – far right	=	2
C – far right	=	2
F – far right	=	4

The total score is: 9

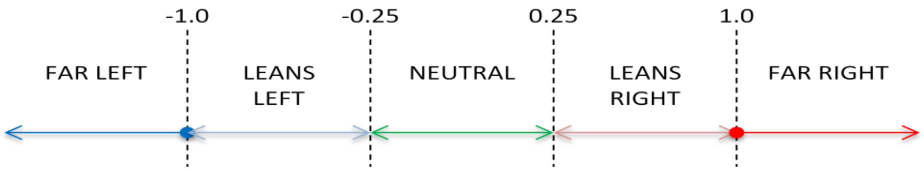
A total left/right score greater than zero indicates a leaning to the right. A total score less than zero indicates a leaning to the left.

The average left/right score is: 9/10 = 0.9

2.6.4 Meaning of Left/Right Scores

Example calculations are presented in Section 2.6.3. The average left/right scores are intuitive. Section 2.6.3.3 calculates an average left/right score of 0.9. The scores lean to the democratic left. A less-than-zero left/right score is a clear indicator of ratings that lean left. A greater-than-zero score indicates a leaning to the right. Figure 12 shows the general concept of ranking news articles from far left to far right.

Figure 12



Initially, the left/right average scores convert to the left/right rating as follows:

- Less than or equal to -1.0 = Far Left
- Greater than -1.0 and less than or equal to -0.25 = Leans Left
- Greater than -0.25 and less than 0.25 = Neutral
- Greater than or equal to 0.25 and less than 1.0 = Leans Right
- Greater than or equal to 1.0 = Far Right

2.6.5 Further Considerations on Left/Right Ratings

When a rated news organization or author's rating is shown on a graphic, ratings that are less than perfect are expected to be so as a result of left or right leanings. In this case, it is unlikely that an organization will have a neutral overall left/right rating. The left/right score is an indicator as to whether the rating will appear on the left of the chart or the right of the political spectrum chart.

2.7 Fake News Calculations

Another feature of *the YouRateNews* site is its ability to identify fake news.

Any article with an F rating is a good candidate for being a fake news article. A defined minimum number of legitimate raters need to rate a news article as fake before *the YouRateNews* site can declare it as fake. Initially, a minimum of 10 raters will have to have marked an article as fake in order for the site to declare it as fake. Again, the 10 rater minimum will be a configurable system property that can be changed as information comes in.

2.8 Calculated Ratings Attributes

The system performs calculations on ratings. These Calculated Ratings capture:

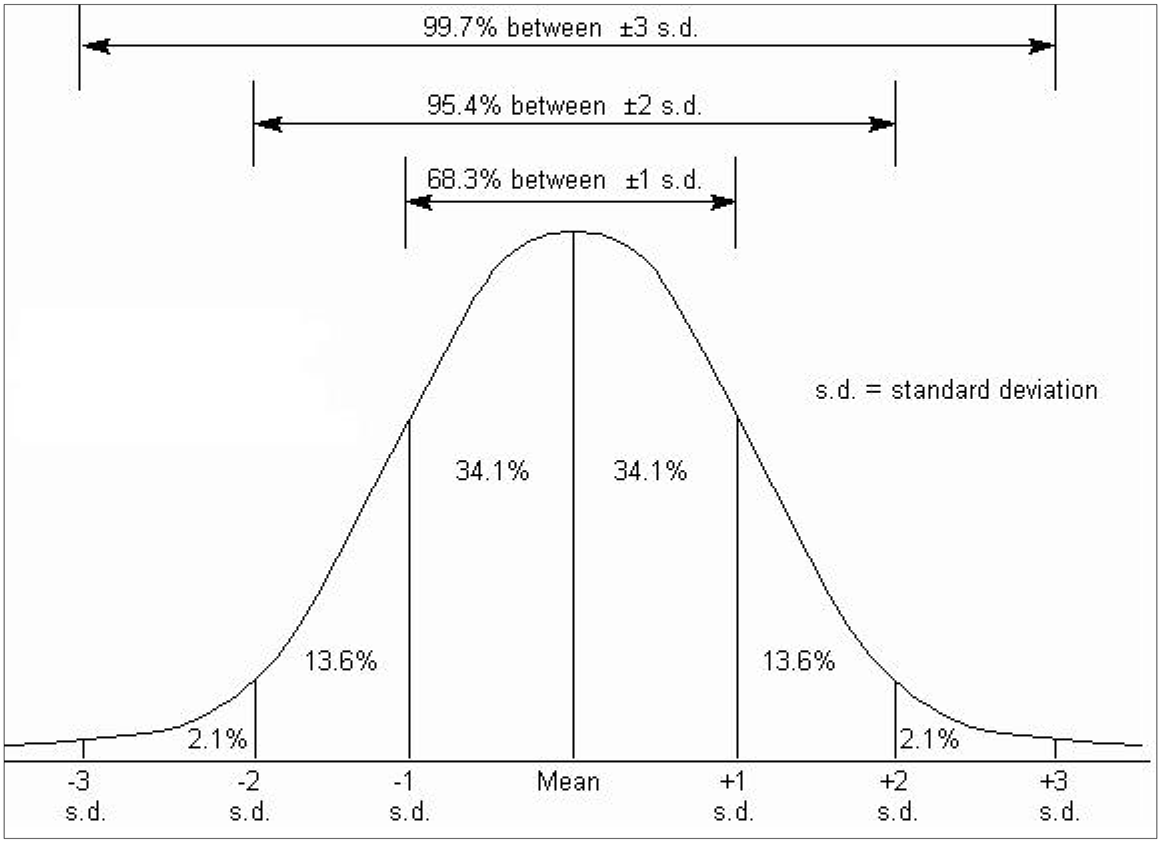
- Identifier – a unique identifier for each calculation
- Rating Date – the date when these ratings were compiled
- Rated Article Id – the identifier for the rated article
- Rated News Organization Id – the identifier for the rated news organization
- Rated Author Id – the identifier for the rated author
- Calculated Score – the number indicating the average rating score (e.g. 3.0)
- Calculated Rating – the rating (or grade) of the score (e.g. B)
- Calculated Rating Standard Deviation – the standard deviation of the average rating score
- Adjusted Calculated Score – the number indicating the average rating score (e.g. 3.0) which removes “attacker” ratings
- Adjusted Calculated Rating – the rating (or grade) of the score (e.g. B) which removes “attacker” ratings
- Calculated Left/Right Score – the number indicating the left/right score (e.g. 0.5)
- Calculated Left/Right Rating – the rating assigned to the left/right score (e.g. Leans Right)
- Calculated Left/Right Standard Deviation – the standard deviation of the left/right score
- Adjusted Calculated Left/Right Score – the number indicating the left/right score (e.g. 0.5) which removes “attacker” ratings
- Adjusted Calculated Left/Right Rating – the rating assigned to the left/right score (e.g. Leans Right) which removes “attacker” ratings
- Is Article Fake – a flag indicating whether the article is fake
- Number of Reviews – the number of ratings that resulted in the calculated score
- Earliest Rating Date – the earliest date of the ratings covered
- Latest Rating Date – the latest date of the ratings covered

2.9 Filtering Out Rating "Attackers" and/or "Trolls"

This application measures public opinion via ratings. The simplicity of rating news articles provides an avenue for attackers. Some will negatively rate articles for the exclusive purpose of attacking the news organization or its journalists. For example, a right wing attacker could establish an account and begin ratings all articles on MSNBC as fake. *YouRateNews* needs a mechanism to address this.

Statistics provides a means of identifying "attack" ratings. For example, imagine that twenty people rate an article. Most of the raters for this article give the article a B rating since it is truthful but leans left. One rater gives the article a fake news rating. Since these ratings all have numbers attached, we can calculate the standard deviation of the statistics. The ratings values outside of a system-defined set number of standard deviations may be considered "attack" ratings. Figure 13 shows a standard bell-shaped distribution curve. The idea is that we can identify and eliminate the outliers (attack) ratings by cutting out the ratings that exceed a certain threshold – say 2 standard deviations.

Figure 13



2.9.1 Sample Standard Deviation Calculations on an Article

For an example set of ratings, the standard deviation is found by taking the square root of the average of the squared deviations of the values from their average value. Imagine the following eight ratings where one user has decided that he just wants to attack the new organization for some reason – and declares the news article fake news:

A, A, A, A, B (left leaning), B (left leaning), C (far left), and an F (fake)

These eight ratings translate to the following numbers:

4.5, 4.5, 4.5, 4.5, 3, 3, 2, and 0

These eight data points have the mean (average) of 2.5:

$$\frac{4.5 + 4.5 + 4.5 + 4.5 + 3 + 3 + 2 + 0}{8} = \frac{26}{8} = 3.25$$

First, calculate the deviations of each data point from the mean, and square the result of each:

$(4.5 – 3.25)^2 = 1.25^2 = 1.5625$

$(4.5 – 3.25)^2 = 1.25^2 = 1.5625$

$(4.5 – 3.25)^2 = 1.25^2 = 1.5625$

$(4.5 – 3.25)^2 = 1.25^2 = 1.5625$

$(3 –3.\ 25)^2 = -0.25^2 = .0625$

$(3 –3.\ 25)^2 = -0.25^2 = .0625$

$(2 – 3.25)^2 = -1.25^2 = 1.5625$

$(0 – 3.25)^2 = -2.5^2 = 10.5625$

The variance is the mean of these values:

$$\frac{1.5625+1.5625+1.5625+1.5625+0.0625+0.0625+1.5625+10.5625}{8} = \frac{18.5}{8} = 2.3125$$

The standard deviation is equal to the square root of the variance:

$$\sqrt{2.3125} = 1.520691$$

We can calculate the distance from the mean for each rating in terms of numbers of standard deviations.

$(4.5 – 3.25) / 1.520691 = 1.25 / 1.520691 = 0.821995$

$(4.5 – 3.25) / 1.520691 = 1.25 / 1.520691 \quad = 0.821995$

$(4.5 – 3.25) / 1.520691 = 1.25 / 1.520691 \quad = 0.821995$

$(4.5 – 3.25) / 1.520691 = 1.25 / 1.520691 \quad = 0.821995$

$(3.0 – 3.25) / 1.520691 = -0.25 / 1.520691 \quad = -0.1644$

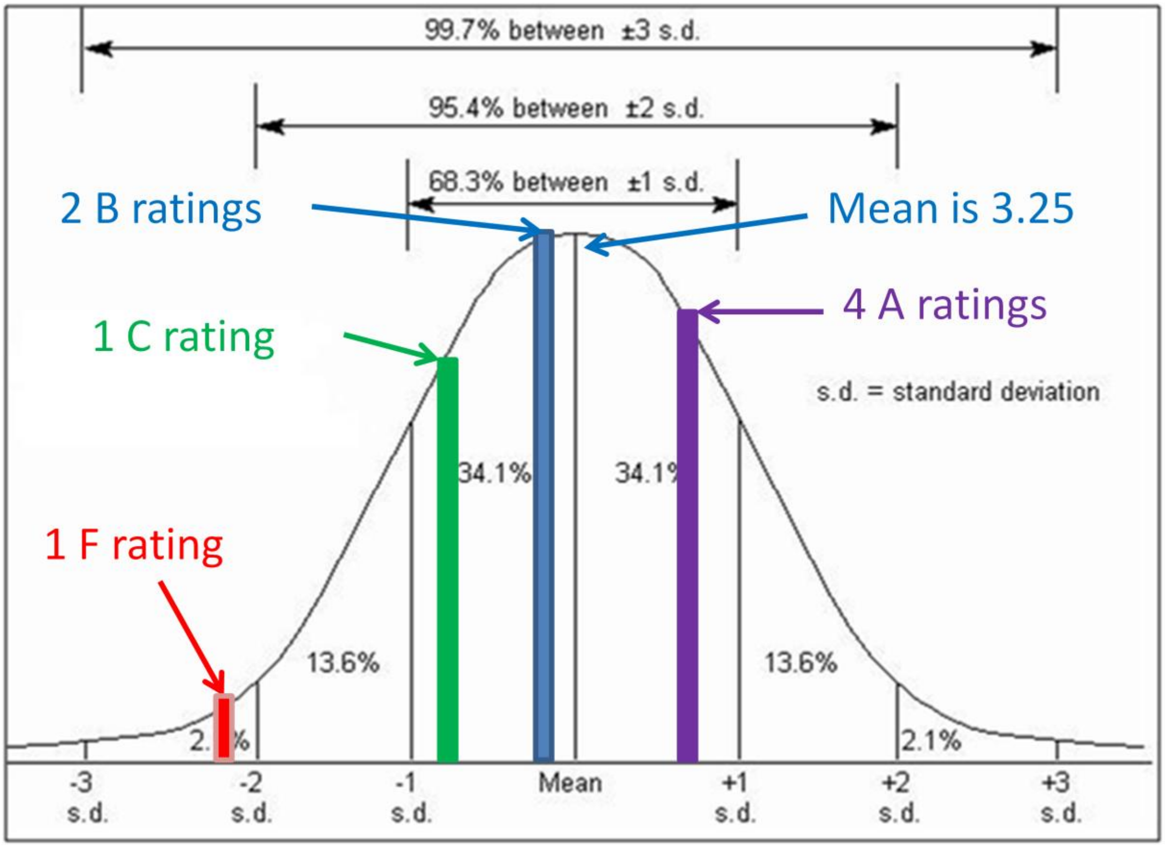
$(3.0 – 3.25) / 1.520691 = -0.25 / 1.520691 \quad = -0.1644$

$(2.0 – 3.25) / 1.520691 = - 1.25 / 1.520691 \quad = - 0.82199$

$(0 – 3.25) / 1.520691 = -3.25 / 1.520691 \quad = - 2.13719$

Figure 14 graphs these standard deviation numbers against a typical standard deviation bell curve. The attack rating (0 – F rating) has the largest standard deviation of -2.13719.

Figure 14



2.9.2 Standard Deviation Analysis

Again, the goal is to eliminate the “attack” ratings from the overall ratings. Examining Figure 14 provides some insight on how to do this. The most obvious means to eliminate the “attack” rating is to remove the ratings that differ from the average by a distance of 2 standard deviations.

Let’s inject some common sense in this analysis. We can state with a high degree of certainty that those A ratings were not done with a malicious spirit. That is to say, simple attackers won’t give out (A – Excellent) ratings. Thus, attack ratings will always have a negative standard deviation number. So, we should always keep the ratings with a positive standard deviation. And we should use a system-defined threshold to cut attack ratings out of the calculations. In the case above, we might consider throwing out all the ratings that have a standard deviation less than -2.

2.9.3 Recalculating without attacker ratings

The above example article has a 3.25 average score. This translates to a B+. If we remove the “attacker” rating defined in the previous section, then we have seven (not eight) ratings:

A, A, A, A, B (left leaning), B (left leaning), C (far left)

These seven ratings translate to the following numbers:

4.5, 4.5, 4.5, 4.5, 3, 3, 2

These eight data points have the mean (average) of 2.5:

$$\frac{4.5 + 4.5 + 4.5 + 4.5 + 3 + 3 + 2 + 0}{7} = \frac{26}{7} = 3.7143$$

The B+ (3.25 average) adjusted rating is now an A- (3.7143).

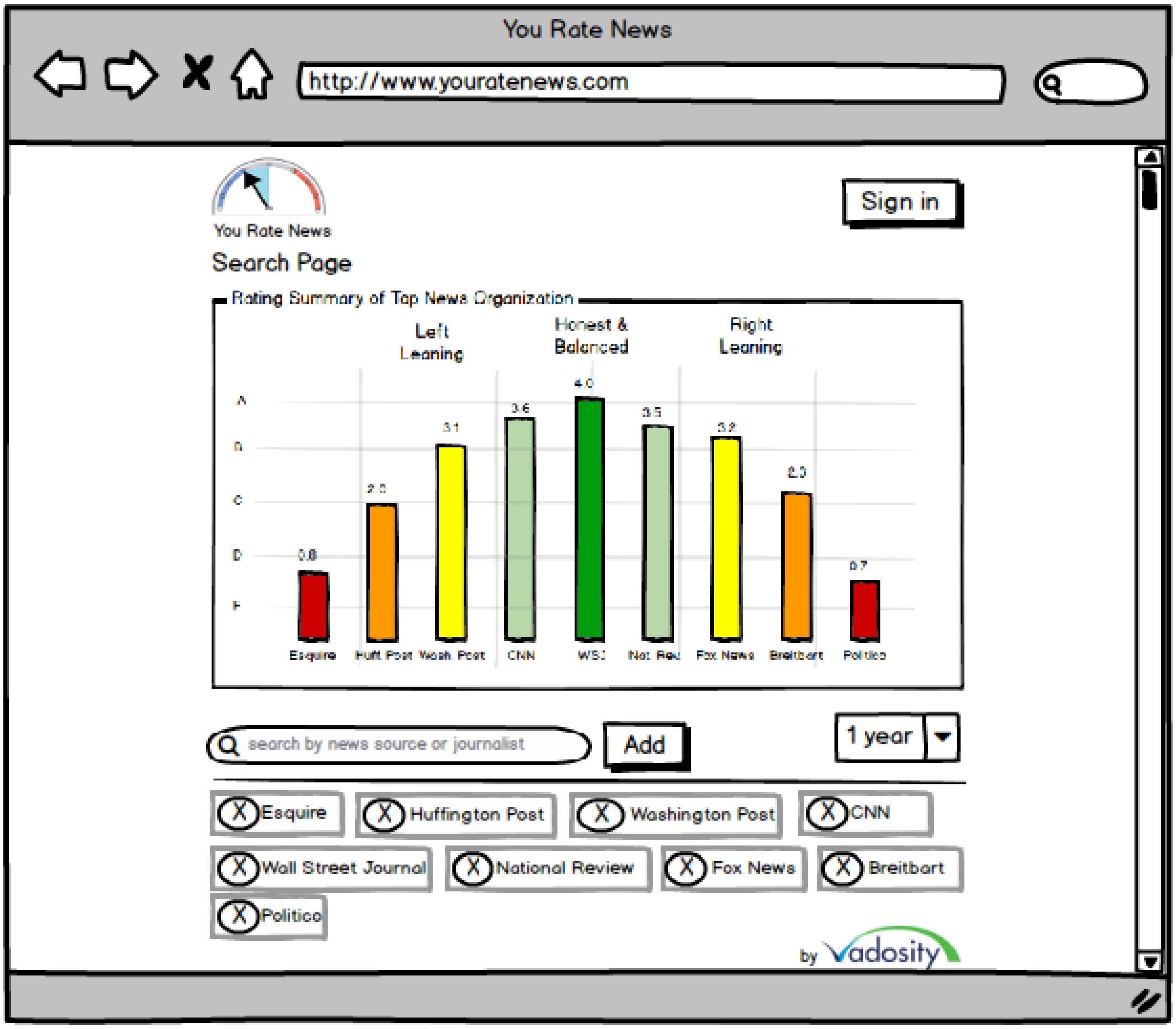
2.9.4 Displaying Information without Attack Ratings

Removing “attack” ratings data can make a difference. This shall be integrated into the system moving forward. The search screens will have an option to “remove extremist opinions”. An alternative is that the “attack” ratings will be simply removed from the statistical calculations.

It should be noted that “attack” ratings differ from “bogus” and “malicious” articles. A malicious article is one designed to disrupt the site in some way and is done with hostile intent. Bogus articles are articles with links that do not appear to exist – a sign of user error. Attack ratings are ratings that appear to be made with the sole intent of attacking an article’s author(s) or press organization.

2.10 Ratings Search

Figure 15



2.10.1 Rating Search Capabilities

The rating search page fulfills the following requirements as seen in Figure 15:

- When the user enters the search page for the first time, then the systems shows the user the home page results. Otherwise, the system shows the user his/her last search results.
- The user can quickly search and add news sources or journalist to the search criteria.
    - The search box has auto-completion. The system searches for results asynchronously as the user types.
- The user can just as easily drop criteria from the search.
- The user can adjust the date range easily.
- The user can select a detailed view – ideally through the graphic.

2.10.2 Rating Search down to just one News Source or Author

Figure 16

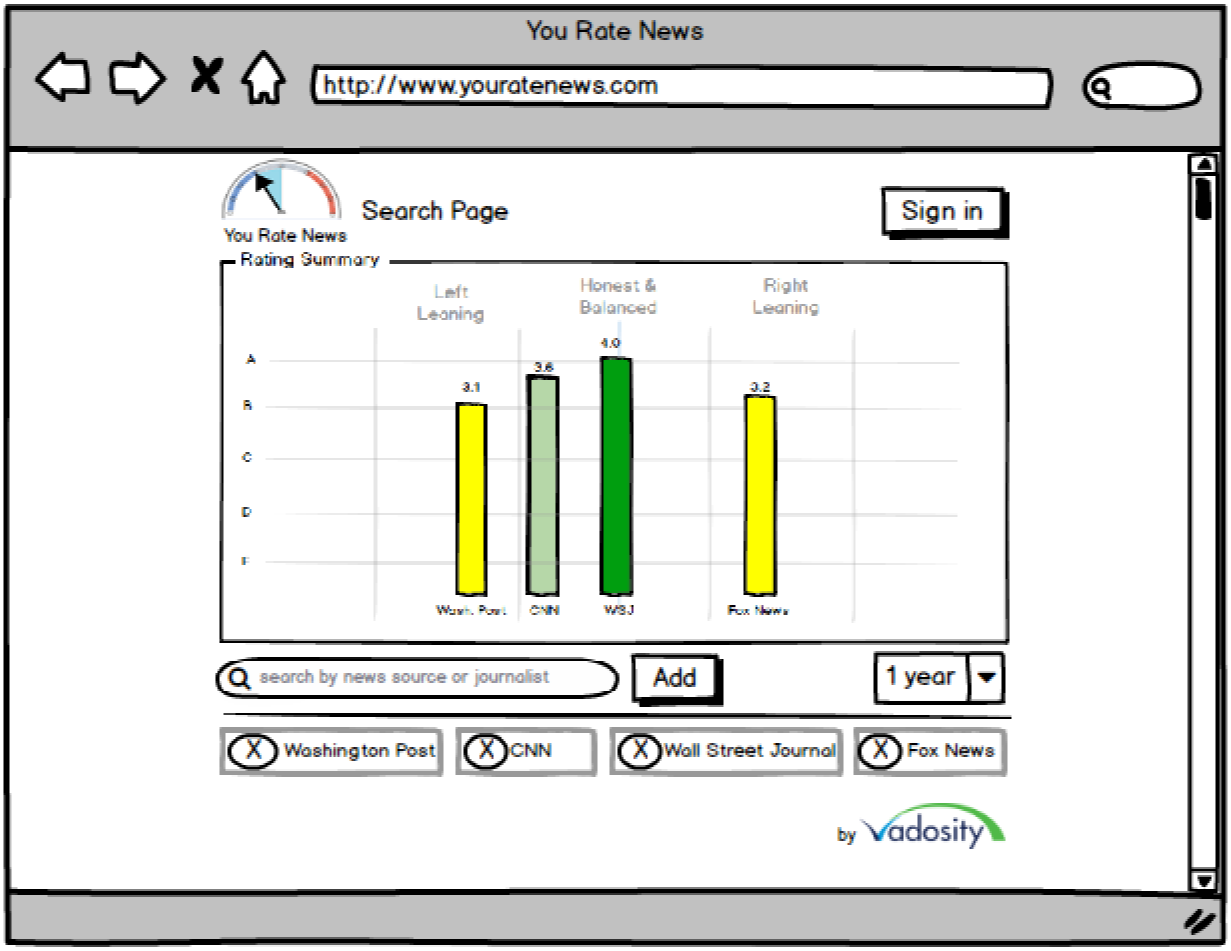
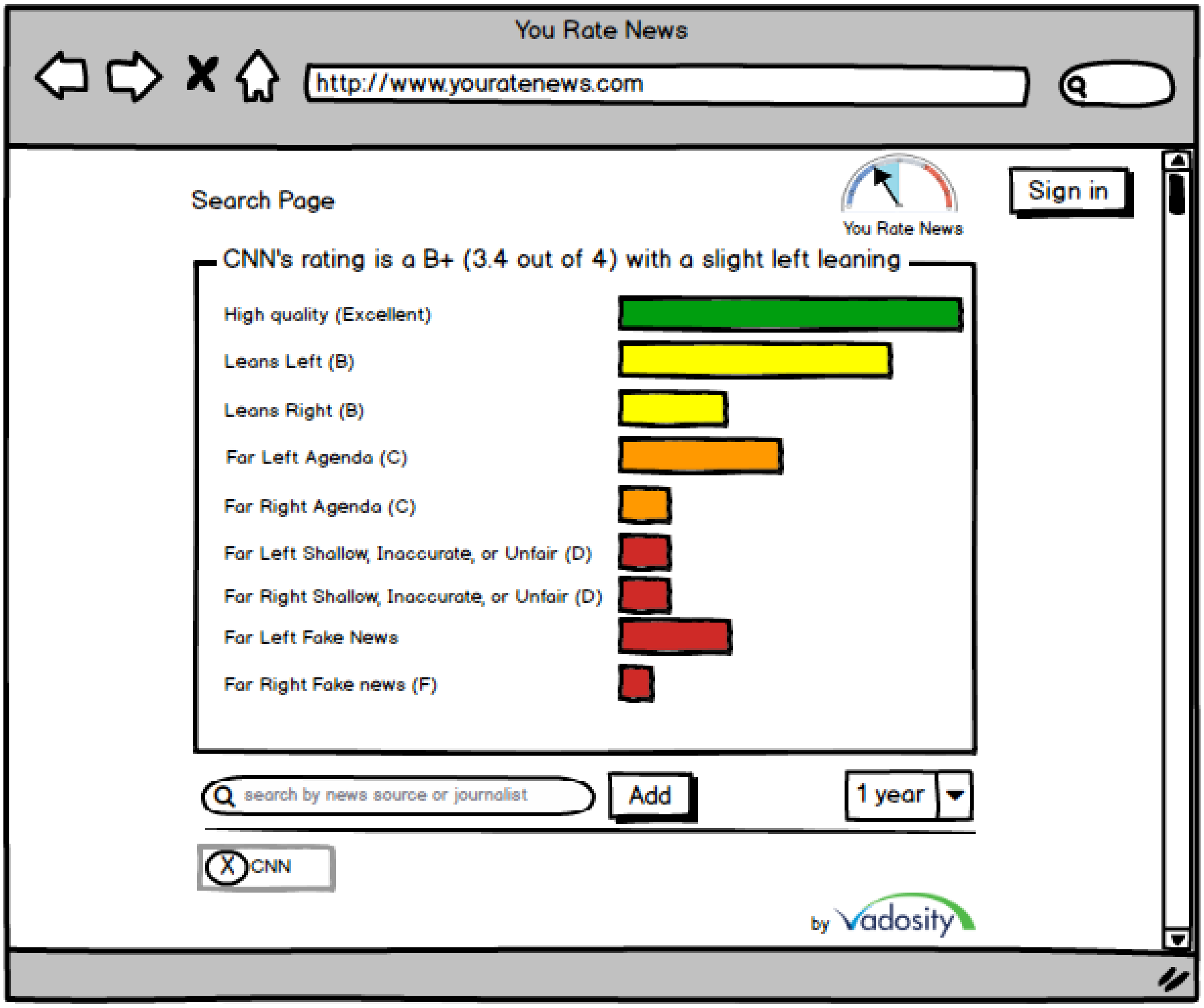


Figure 16 shows the rating search page with four different ratings displayed. Note that the comparative visual effect begins to disappear as fewer rated entities are shown. The comparative effect is completely lost when just one rating is shown. In this case, the system switches to the single rating detail view. This detail view still shows the rating, the score, and the left/right leaning. The detail view also shows the number of data points in the rating results. Figure 17 demonstrates the difference.

Figure 17



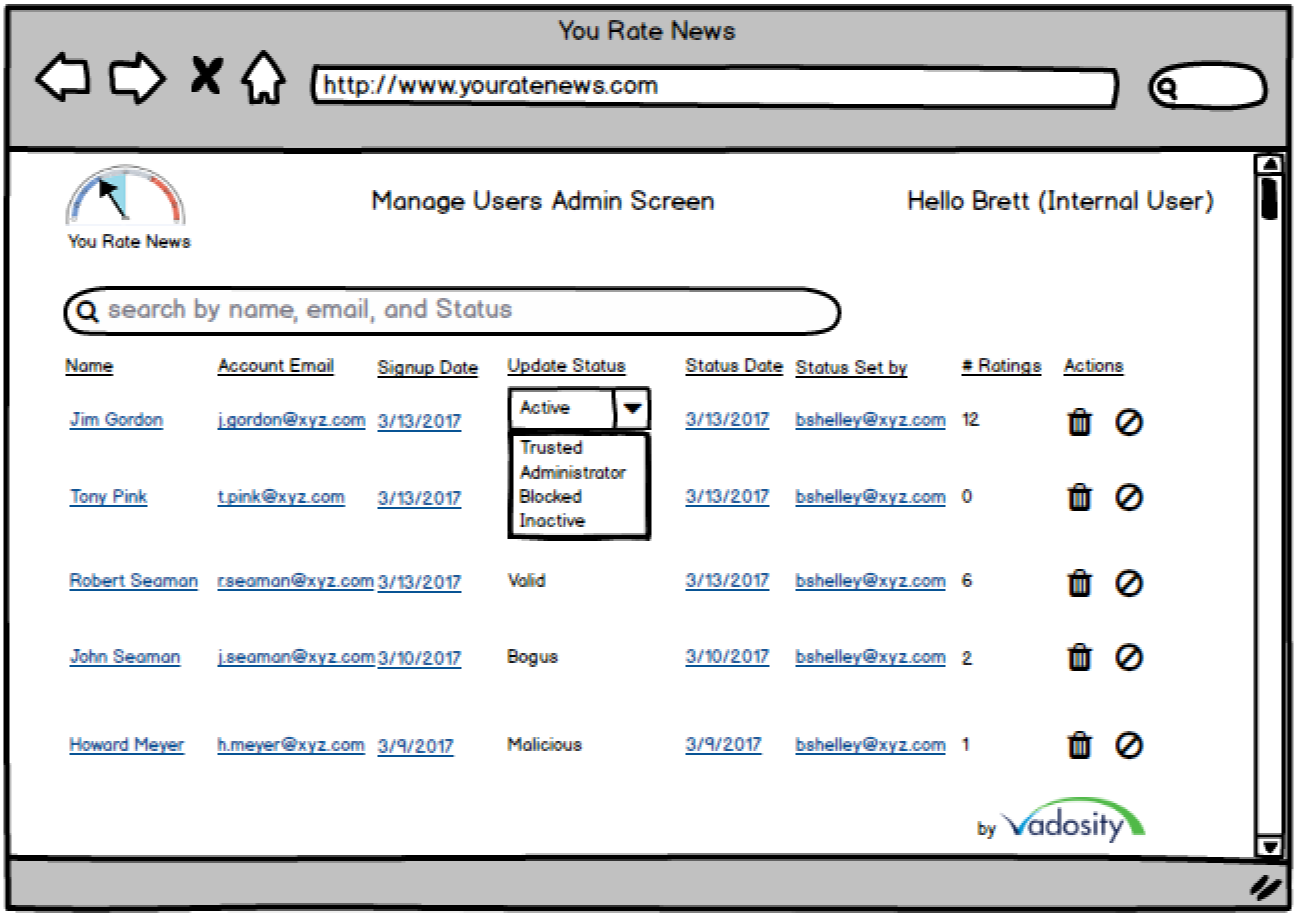
http://www.youratenews.com

CNN's rating is a B+ (3.4 out of 4) with a slight left leaning

2.11 Managing User Accounts

A user management section is available to administrative users. This restricted section allows users to be elevated to Trusted or Administrator status. The Admin user may also Block or Inactivate users. User accounts may also be deleted completely. Lastly, admin users will have the ability to mark all of a given user's ratings as malicious in the event of a hacking style attack. Figure 18 shows the general idea.

Figure 18



Manage Users Admin Screen

Hello Brett (Internal User)

Name	Account Email	Signup Date	Update Status	Status Date	Status Set by	# Ratings	Actions
Jim Gordon	j.gordon@xyz.com	3/13/2017	Active ▼ Trusted Administrator Blocked Inactive	3/13/2017	bshelley@xyz.com	12	🗑 ⊘
Tony Pink	t.pink@xyz.com	3/13/2017		3/13/2017	bshelley@xyz.com	0	🗑 ⊘
Robert Seaman	r.seaman@xyz.com	3/13/2017	Valid	3/13/2017	bshelley@xyz.com	6	🗑 ⊘
John Seaman	j.seaman@xyz.com	3/10/2017	Bogus	3/10/2017	bshelley@xyz.com	2	🗑 ⊘
Howard Meyer	h.meyer@xyz.com	3/9/2017	Malicious	3/9/2017	bshelley@xyz.com	1	🗑 ⊘

2.12 Summary

The YouRateNews site is intended to satisfy several basic requirements. The application supports users establishing an account on the site. Logged in users can then rate news articles. The site calculates aggregate ratings in the background. All users can search through these aggregated ratings to compare the ratings of news organizations and/or authors. Behind the scenes, the site enables trusted users to review the quality of data from malicious users and bad data. These are the core pieces. However, the requirements listed above are not exhaustive – as *the YouRateNews* application gets constructed, more requirements will be flushed out. So, let’s keep moving.

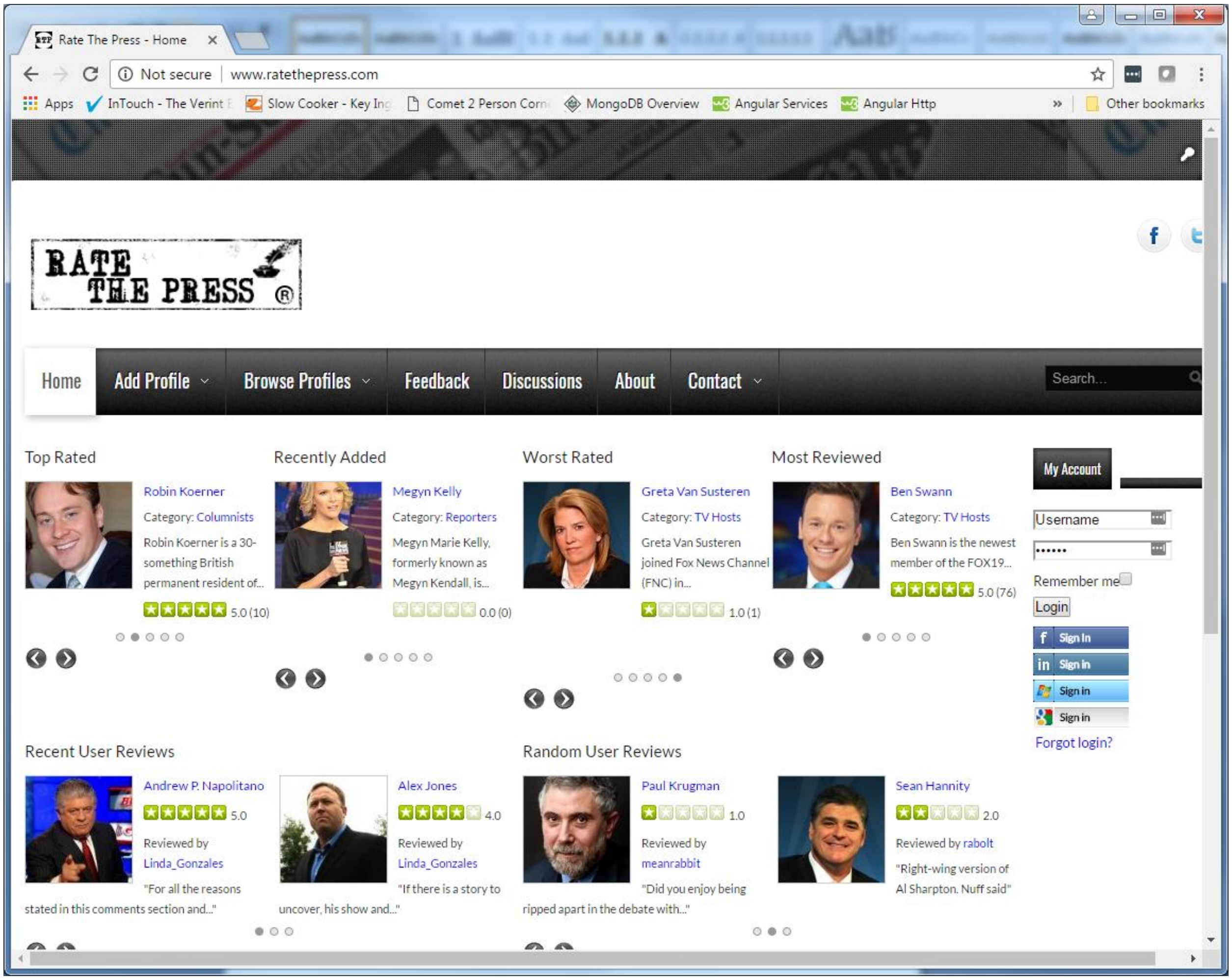
3 The Benchmarking Sprint

It is important to benchmark software solutions against the best market solutions. It is this author's belief that the *YouRateNews* idea is unique. The idea enables to rate articles by quality, left/right leaning, or mark articles as fake. These ratings get tallied into a score that measures news quality and bias. No other site does this. However, research shows that some attempts have been made in this direction. So, let's benchmark similar idea to revise requirements.

3.1 Benchmarking ratethepress.com

While checking for available domain names, this author discovered that the domain www.ratethepress.com was taken. I went to the site with the fear that this grand idea had already been realized. This is not the case (whew!). Figure 19 shows the site's home page.

Figure 19



Top Rated

Robin Koerner
Category: Columnists
Robin Koerner is a 30-something British permanent resident of...
5.0 (10)

Recently Added

Megyn Kelly
Category: Reporters
Megyn Marie Kelly, formerly known as Megyn Kendall, is...
0.0 (0)

Worst Rated

Greta Van Susteren
Category: TV Hosts
Greta Van Susteren joined Fox News Channel (FNC) in...
1.0 (1)

Most Reviewed

Ben Swann
Category: TV Hosts
Ben Swann is the newest member of the FOX19...
5.0 (76)

Recent User Reviews

Andrew P. Napolitano
5.0
Reviewed by Linda_Gonzales
"For all the reasons stated in this comments section and..."

Alex Jones
4.0
Reviewed by Linda_Gonzales
"If there is a story to uncover, his show and..."

Random User Reviews

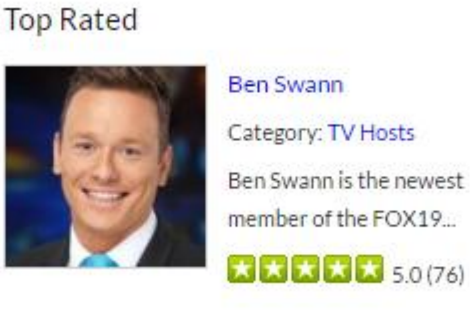
Paul Krugman
1.0
Reviewed by meanrabbit
"Did you enjoy being ripped apart in the debate with..."

Sean Hannity
2.0
Reviewed by rabolt
"Right-wing version of Al Sharpton. Nuff said"

3.1.1 Ratethepress.com website Pros

- The overall site has a nice appearance. It has all the elements one would expect from a mid-sized organizations website.
- The name is excellent. "Rate the Press" naturally follows "Meet the Press" (the Sunday talk show). That's how I found the site.
- The Link Preview Widgets are excellent. The Link Preview widgets slide away and change every few seconds. Showing the average rating and the number of ratings on an article is a great idea.

Figure 20



Top Rated

Ben Swann

Category: TV Hosts

Ben Swann is the newest member of the FOX19...

★★★★★ 5.0 (76)

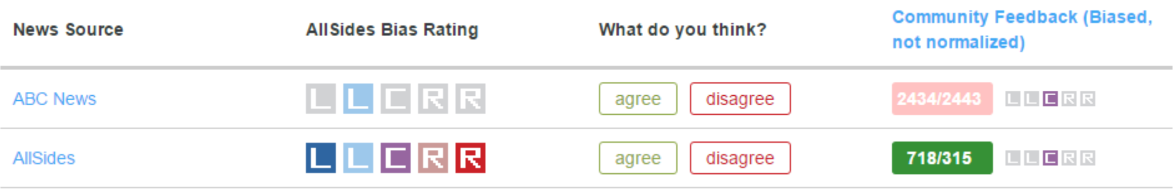
3.1.2 Ratethepress.com website Cons

- The site is too busy for mobile device use. That's a major disadvantage in today's market.
- The rating system is generic. You can rate a hamburger using a 1-to-5 stars rating system, but news coverage demands a bit more in a polarized political world.
- At the time this document was written, the site has gone stale. The Latest news is a few years old. Some ideas blossom – and some wither. This is no critique of the hard work that went into this idea. However, perhaps in a case like this, the overhead of managing the website became too cumbersome. The overhead could be reduced by having automating the site more.

3.2 Benchmarking Allsides.com

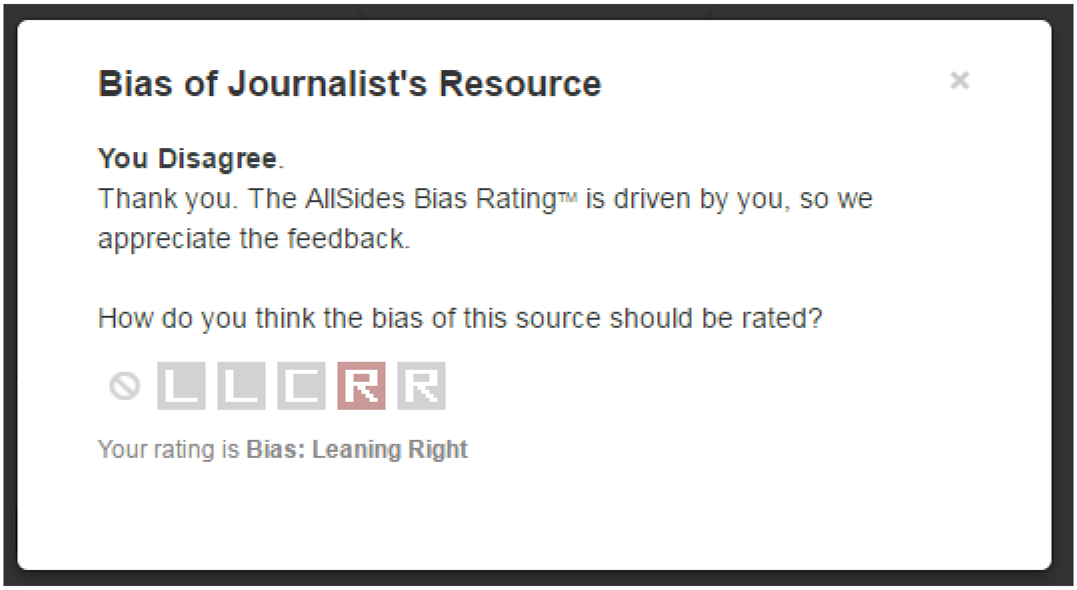
The closest thing to *the YouRateNews* idea that this author could find is the Allsides.com (http://www.allsides.com) site. The site allows users to provide feedback on how AllSides rates the bias of news organizations. For example, Figure 21 shows how the site allows users to agree or disagree on the "Left" bias rating given to ABC News. Figure 22 shows how a user can disagree with AllSides press organization's leaning and input your own value.

Figure 21



News Source	AllSides Bias Rating	What do you think?	Community Feedback (Biased, not normalized)
ABC News	L L C R R	agree disagree	2434/2443 L L C R R
AllSides	L L C R R	agree disagree	718/315 L L C R R

Figure 22



Bias of Journalist's Resource

You Disagree.
Thank you. The AllSides Bias Rating™ is driven by you, so we appreciate the feedback.

How do you think the bias of this source should be rated?

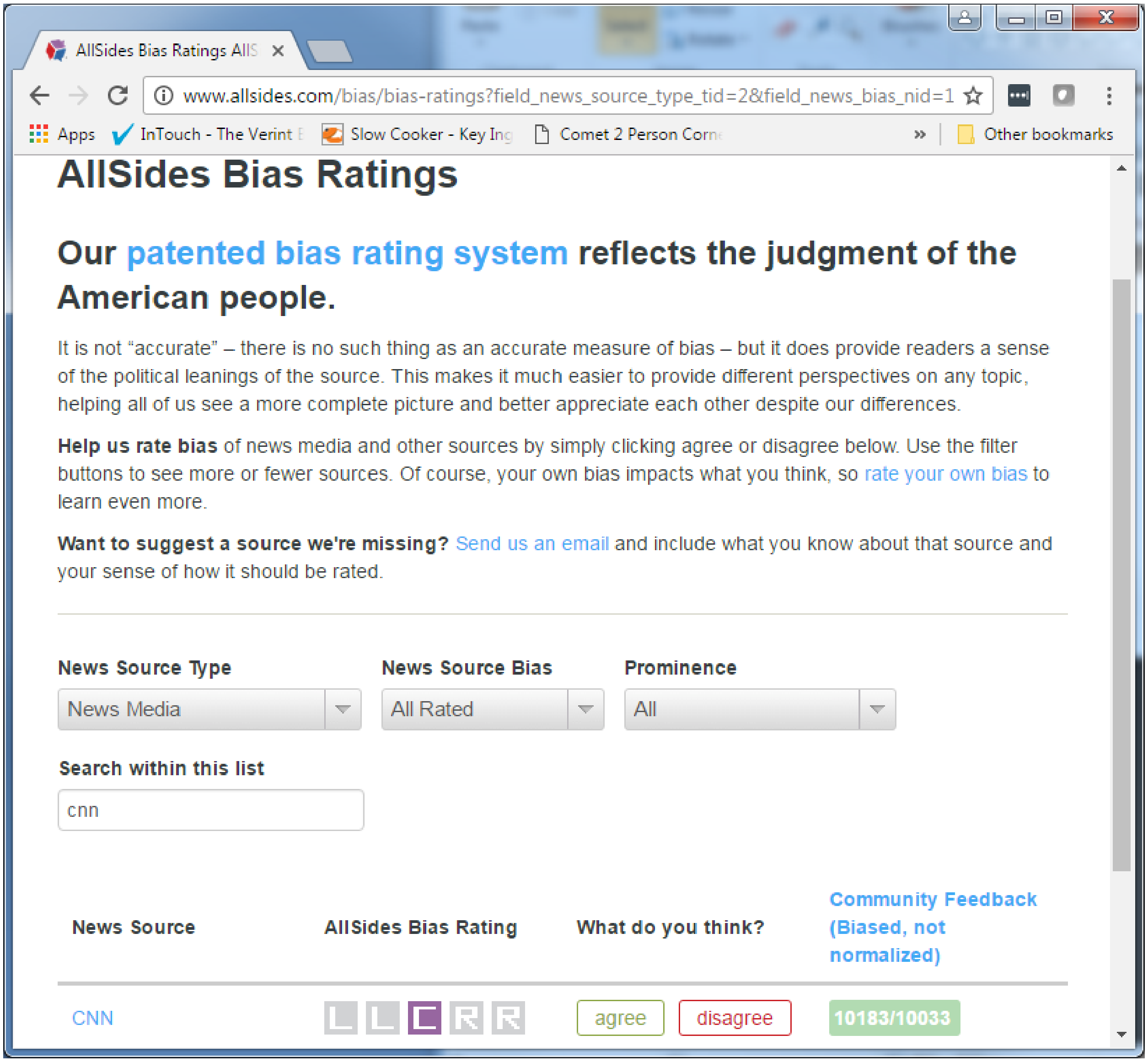
Your rating is **Bias: Leaning Right**

AllSides.com describes their patented bias rating system. The site states (see Figure 23):

> **It [the sites bias rating] is not accurate - there is no such thing as an accurate measure of bias – but it does provide readers a sense of the political leanings of the source.**

The YouRateNews concept is to measure bias. Each time someone rates an article, that rating represents a data point towards measuring bias. With enough ratings of enough articles, bias, quality, and authenticity can be measured. Measuring Bias is a measure of the public's perception. Just as RottenTomatoes.com measures the public's like and dislike of a movie – *The news ratings* can measure the public's perception of bias in news organizations.

Figure 23


AllSides Bias Ratings AllS
www.allsides.com/bias/bias-ratings?field_news_source_type_tid=2&field_news_bias_nid=1
Apps
InTouch - The Verint E
Slow Cooker - Key Ing
Comet 2 Person Corn
Other bookmarks

AllSides Bias Ratings

Our patented bias rating system reflects the judgment of the American people.

It is not "accurate" – there is no such thing as an accurate measure of bias – but it does provide readers a sense of the political leanings of the source. This makes it much easier to provide different perspectives on any topic, helping all of us see a more complete picture and better appreciate each other despite our differences.

Help us rate bias of news media and other sources by simply clicking agree or disagree below. Use the filter buttons to see more or fewer sources. Of course, your own bias impacts what you think, so rate your own bias to learn even more.

Want to suggest a source we're missing? Send us an email and include what you know about that source and your sense of how it should be rated.

News Source Type: News Media

News Source Bias: All Rated

Prominence: All

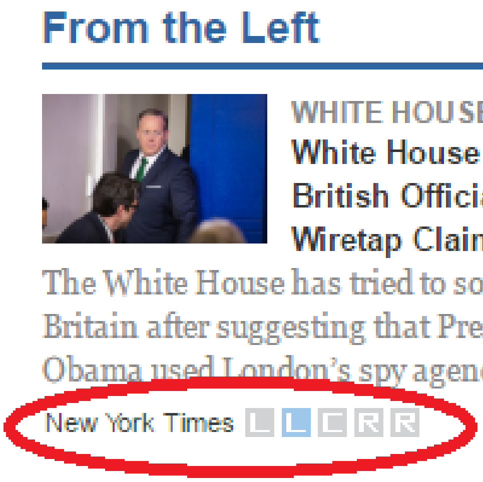
Search within this list: cnn

News Source	AllSides Bias Rating	What do you think?	Community Feedback (Biased, not normalized)
CNN	L L C R R	agree disagree	10183/10033

3.2.1 Allsides.com website Pros

- It has a professional look and feel. Lining up the preview links from the left, center, and right is definitely slick.
- The layout automatically switches from desktop browser mode to handheld device mode easily. Both handle well.
- Figure 24 shows an elegant means of portraying an organization's leaning. A democrats' blue 'L' represents the far left. A light blue 'L' represents left leaning organizations. A purple 'C' represents the center. Light red and red 'R' represent the leans right perspectives.
- The site allows users to vote without signing up. That's simple.

Figure 24



From the Left

WHITE HOUSE

White House Tries to Soothe British Officials Over Trump Wiretap Claim

The White House has tried to soothe an angry Britain after suggesting that President Barack Obama used London's spy agency to conduct secret

New York Times L L C R R

3.2.2 Allsides.com website Cons

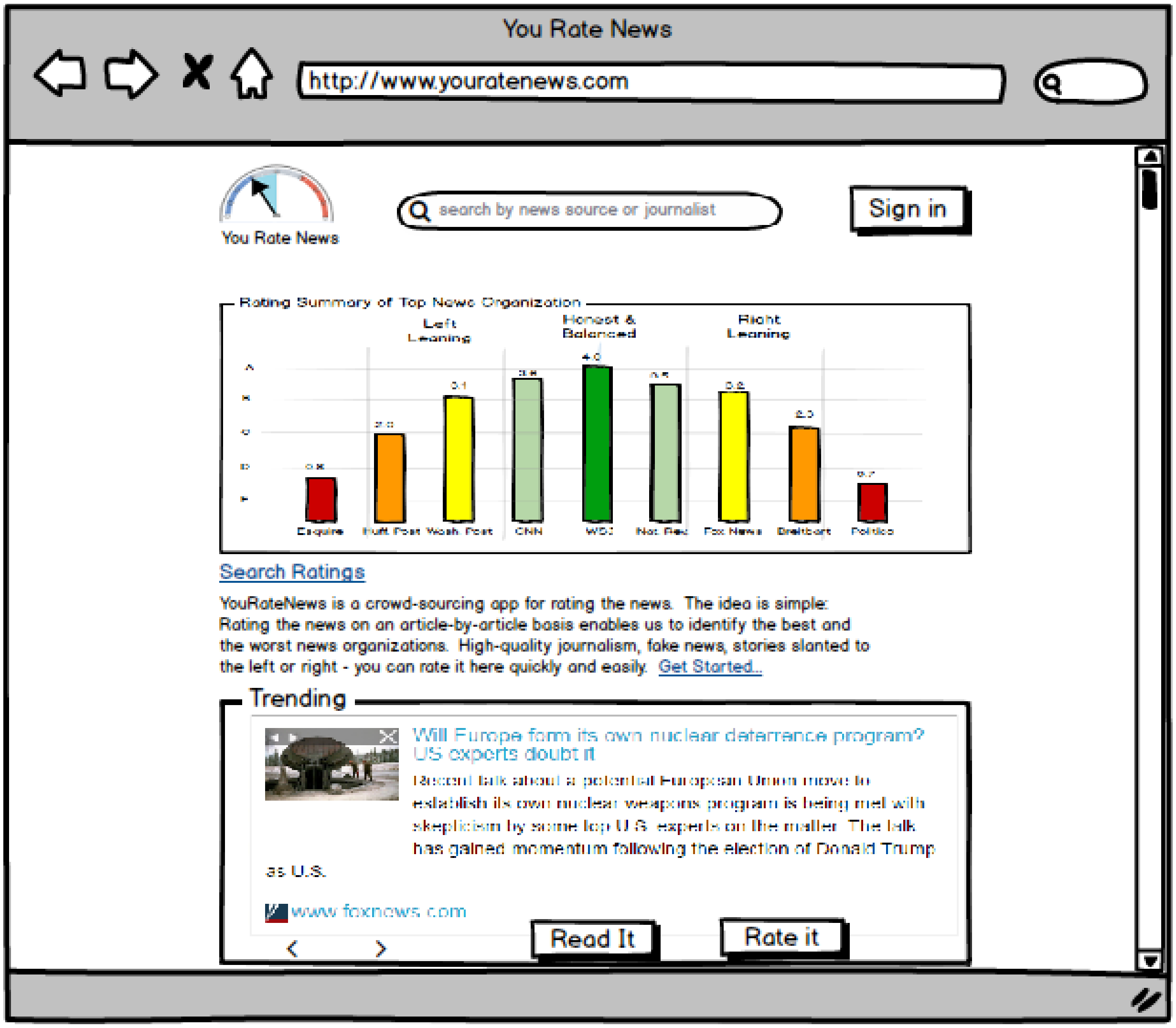
- The site is not so much about voting as it is about open discussion. Thus, the site gets a little busy since there is a lot there. Maybe it's a bit too much when compared to a site with a singular vision.
- There is no powerful real-time dimension to the statistics. (We'll get into this in a moment)

3.3 Recommended Improvements

3.3.1 Incorporating Preview Links

After reviewing several sites, it is clear that web links as text is not enough. Preview Links are a preferred means of representing news articles. Figure 25 shows how *the YouRateNews* home page would appear when it replaces Trending text links with article previews. Multiple Trending news articles will be shown by sliding Preview Links into the main display area after a configurable set interval of, say, twenty seconds.

Figure 25



YouRateNews is a crowd-sourcing app for rating the news. The idea is simple: Rating the news on an article-by-article basis enables us to identify the best and the worst news organizations. High-quality journalism, fake news, stories slanted to the left or right - you can rate it here quickly and easily. Get Started..

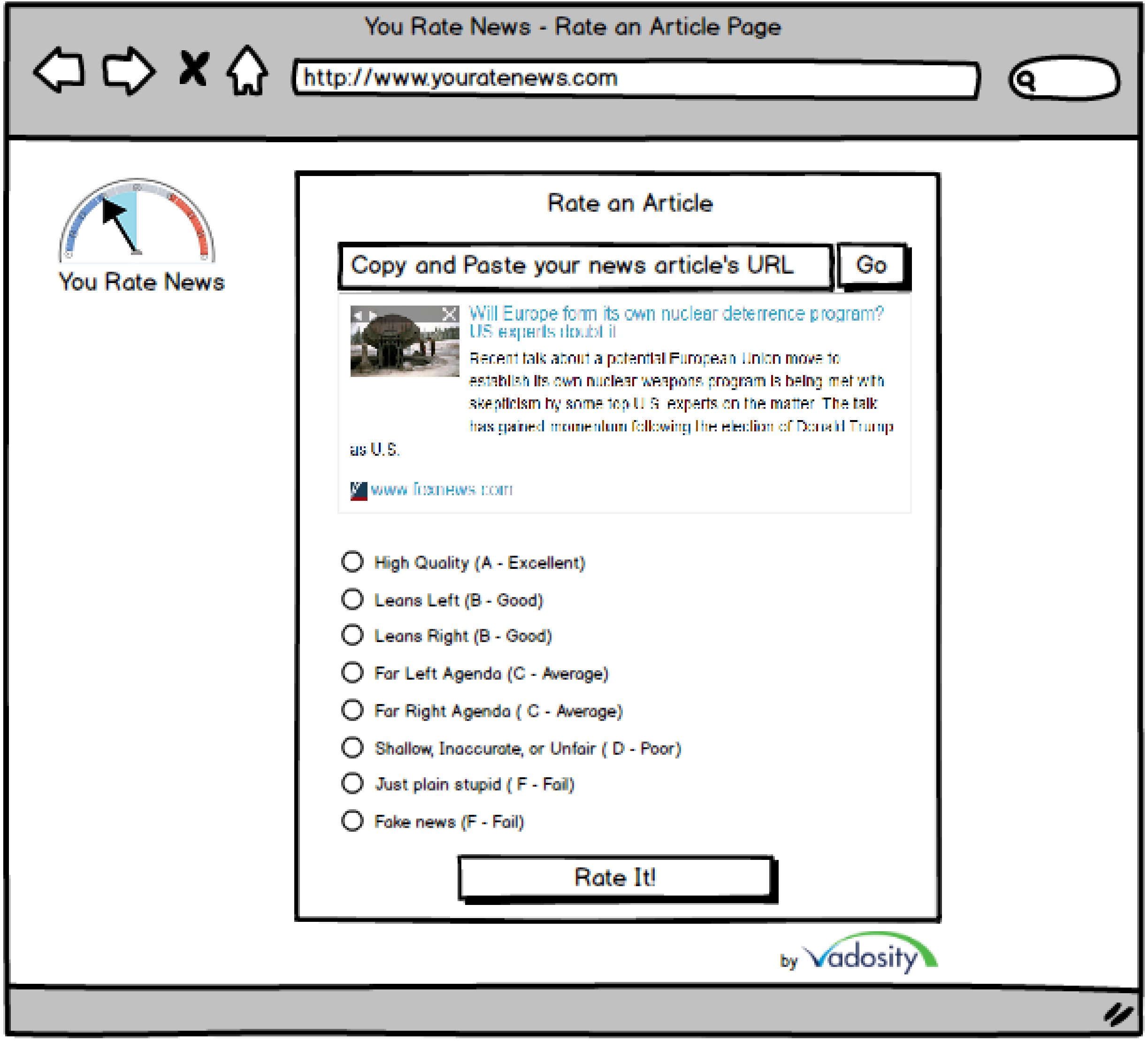
Will Europe form its own nuclear deterrence program? US experts doubt it

Recent talk about a potential European Union move to establish its own nuclear weapons program is being met with skepticism by some top U.S. experts on the matter. The talk has gained momentum following the election of Donald Trump as U.S.

www.foxnews.com

Figure 26 demonstrates the improvement in the “Rate an Article” page. After integrating a preview link, adding a new article now only requires that the user enter the URL. The software determines the title, author, source, and other information on the fly.

Figure 26


You Rate News - Rate an Article Page
http://www.youratenews.com
You Rate News
Rate an Article
Go
Rate It!
by Vadosity

Copy and Paste your news article's URL

Will Europe form its own nuclear deterrence program? US experts doubt it

Recent talk about a potential European Union move to establish its own nuclear weapons program is being met with skepticism by some top U.S. experts on the matter. The talk has gained momentum following the election of Donald Trump as U.S.

www.foxnews.com

○ High Quality (A - Excellent)

○ Leans Left (B - Good)

○ Leans Right (B - Good)

○ Far Left Agenda (C - Average)

○ Far Right Agenda (C - Average)

○ Shallow, Inaccurate, or Unfair (D - Poor)

○ Just plain stupid (F - Fail)

○ Fake news (F - Fail)

3.3.2 Adding a Rating Graphic

The use of radio buttons is professional enough for ratings.   But it is not exciting. Most rating sites have a 5 star system with icons. We need something a bit different since stars don't correspond with the US educational system analogy (i.e. A,B,C,D, F). We can represent an article's score using a basic gauge control. The control allows the user to click on grades on the left or right side of the political spectrum. Figure 27 demonstrates the general idea. The gauge will need to react to both mouse clicks and swipe/click gestures on a mobile device. Figure 28 mocks up a screen that includes the Article Preview that replaces several HTML Form fields and the "Left/Right" Gauge that replaces nine radio buttons.

Figure 27

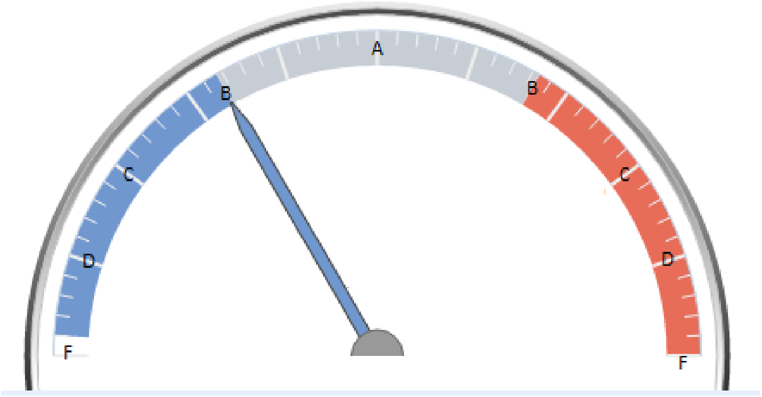
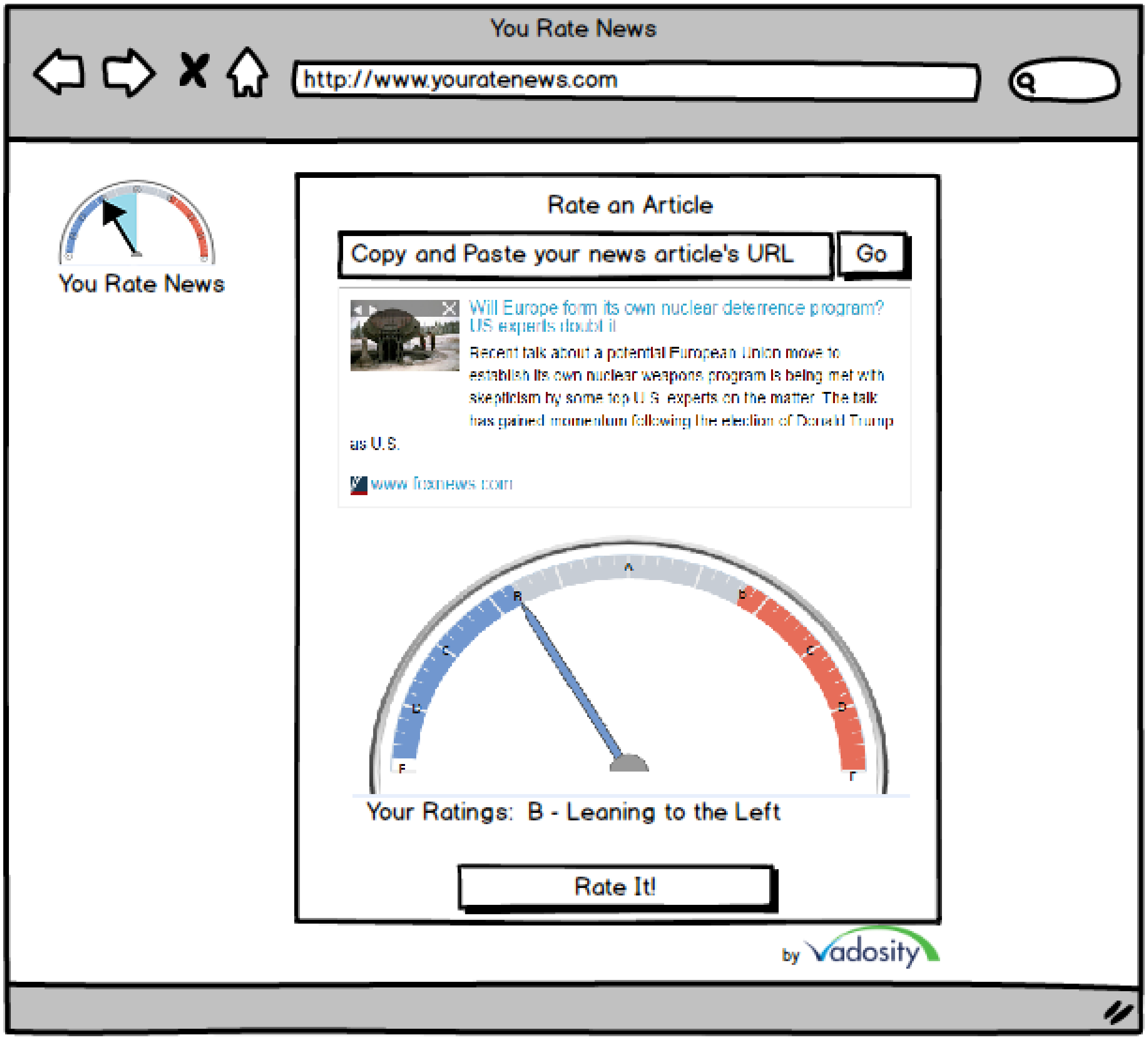


Figure 28



Rate an Article

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Will Europe form its own nuclear deterrence program? US experts doubt it

Recent talk about a potential European Union move to establish its own nuclear weapons program is being met with skepticism by some top U.S. experts on the matter. The talk has gained momentum following the election of Donald Trump as U.S.

www.foxnews.com

Your Ratings: B - Leaning to the Left

Rate It!

3.3.3 Refining the Rating Gauge

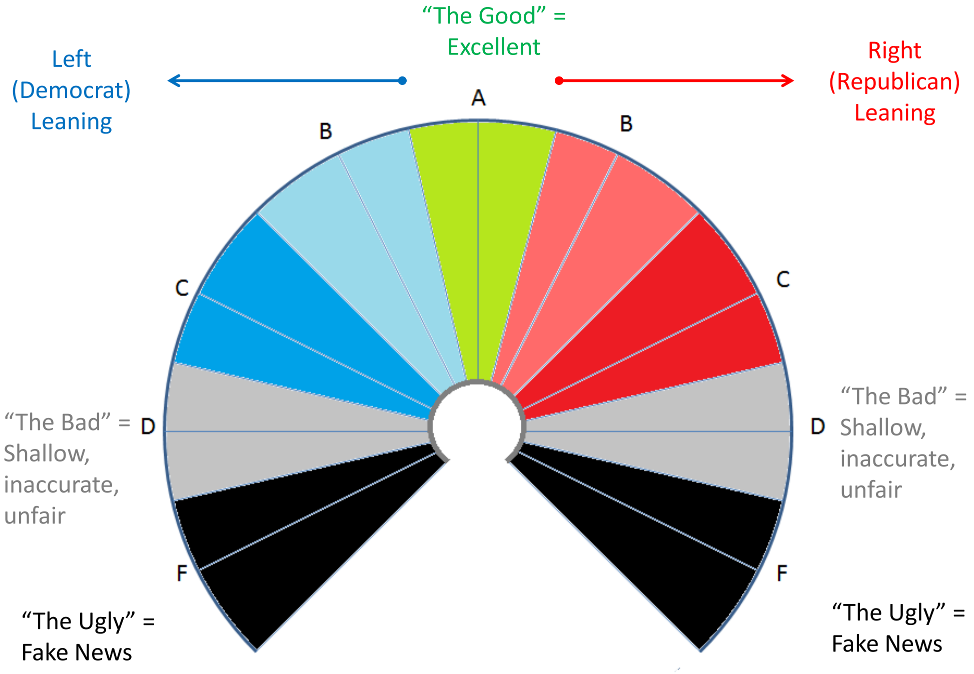
The Rating gauge enables users to rate an article in several ways. A user rates an article as excellent by giving it an A rating. He/she rates an article as good and leaning to the democratic left or republican right with a B rating. A user rates an article as average (far left or far right) with the C rating. That user can also rate an article as poor (shallow, inaccurate, unfair) with D rating. Finally, a user rates an article as fake with an F rating.

You can see this rating scheme with a couple of perspectives. First, the scheme allows a user to rate an article's quality with a "the good, the bad, and the ugly" analogy. This A, D, and F ratings enable the users to rate an article without a strong opinion of whether it is left-leaning or right-leaning. The B and C ratings allow the user to rate an article for its partisan leanings. Thus, when a user rates an article, that article gets an A, B, C, D, or F quality rating and a left/right partisan rating.

The location of the gray and black sections also has visual meaning. The gray section spans the horizontal center line on both sides with the intent of indicating that the article is questionable. That is to say, the article is almost below "the water line". The fake news indicator is below the horizontal center line to indicate that it is below "the water line".

shows a revised ratings gauge that captures this rating scheme visually. Green represents an A rating. Light blue represents a good- but left-leaning article. Blue represents a well-written article that rates average with its far left leaning. Light red represents a good-but right-leaning article. Red represents a well-written article that rates average due to its far right leaning.

Figure 29

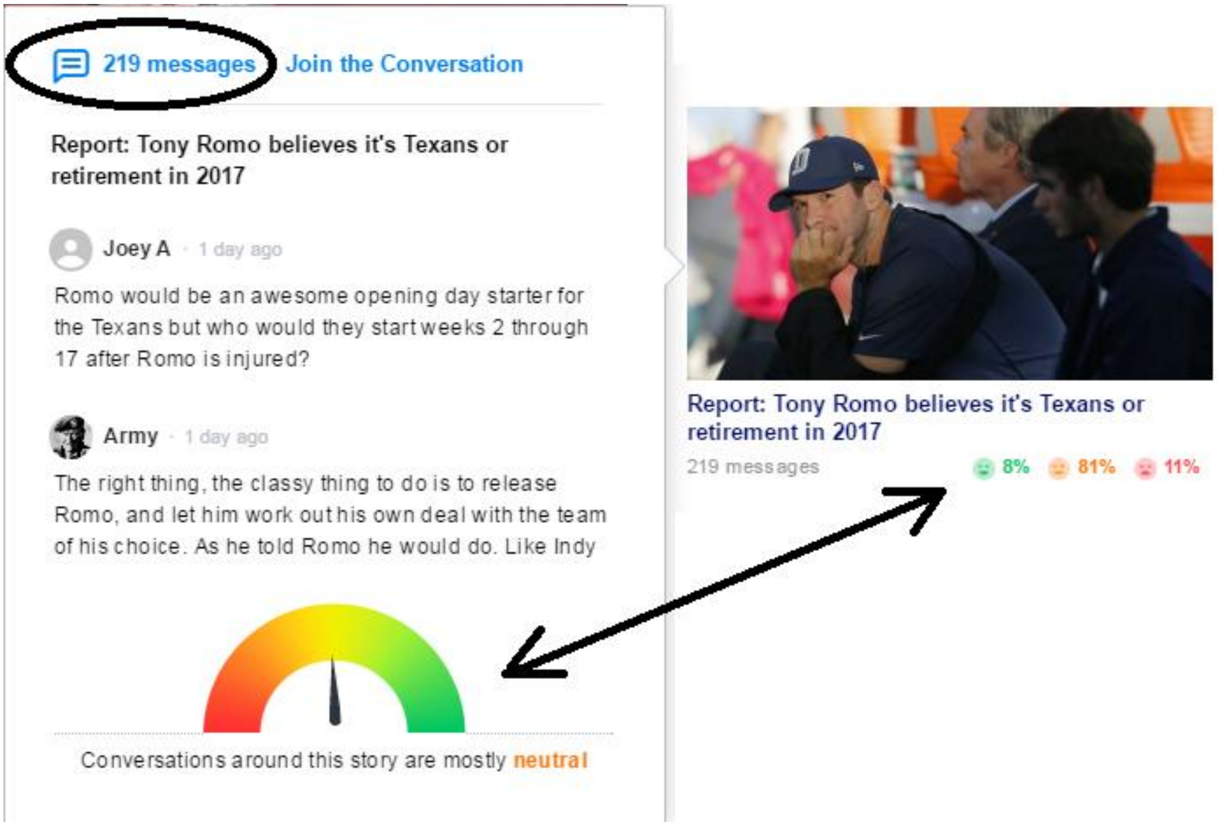

"The Good" = Excellent
Left (Democrat) Leaning
Right (Republican) Leaning
A
B
B
C
C
"The Bad" = D Shallow, inaccurate, unfair
D "The Bad" = Shallow, inaccurate, unfair
F
F
"The Ugly" = Fake News
"The Ugly" = Fake News

Gray and black appear on both sides of the gauge. These colors represent a D-rating (shallow, inaccurate, unfair) and an F-rating (Fake news). Gray and black colors appear on both sides to indicate that there is no partisan element to the rating. The location of the gray and black sections also has visual meaning. The gray section spans the horizontal center line on both sides with the intent of indicating that the article is questionable. That is to say, the article is almost below "the water line". The fake news indicator is below the horizontal center line to indicate that it is below "the water line".

3.4 Reviewing Yahoo! Ratings

The Figure 30 screenshot demonstrates that the idea of using a visual gauge is nothing new. Yahoo uses a system to rate conversations. It appears that they are using some type of Artificial Intelligence technology to automatically classify messages left by users with regards to the article.

Figure 30



219 messages Join the Conversation

Report: Tony Romo believes it's Texans or retirement in 2017

Joey A · 1 day ago

Romo would be an awesome opening day starter for the Texans but who would they start weeks 2 through 17 after Romo is injured?

Army · 1 day ago

The right thing, the classy thing to do is to release Romo, and let him work out his own deal with the team of his choice. As he told Romo he would do. Like Indy

Conversations around this story are mostly neutral

Report: Tony Romo believes it's Texans or retirement in 2017

219 messages 8% 81% 11%

The YouRateNews concept is better than what Yahoo! currently has. The Yahoo! Graphic is pretty enough – but it doesn't say much. What does "Conversations around this story are mostly neutral" even mean? By comparison, the YouRateNews rating gauge details an article's authenticity, quality and political leaning. Where Yahoo!'s rating is a computer determined guess, the YouRateNews rating is an exact value compiled by real human votes/ratings. The YouRateNews ratings don't just concern a single article rating – rather the ratings of many articles to rate media organizations and authors. This high-level comparative analysis opens up the possibilities of making a difference in media coverage and/or politics. Still, the Yahoo! rating confirms that more powerful rating systems are on the horizon.

4 Succeeding Beyond the Single Site Concept

Maybe YouRateNews can stand alone on the Internet. Like AllSides.com, the site might attract a relatively-small audience that believes in the idea. An even smaller, hard-core audience might rate news regularly. With a little luck, the amount of data that gets collected will be enough to accurately gauge public opinion.

The problem is that most people go onto a set number of “safe” and familiar websites. Making that extra trip to YouRateNews is just that – an extra trip out of the ordinary. Most people will not take the time to rate articles on a 3rd party site. This creates another problem – true ratings will be difficult to achieve because relatively few news articles might be covered. For example, major US news outlets might generate 1000 politically-oriented articles a day. Without a committed YouRateNews population, the ratings numbers might not be significant.

To succeed, the YouRateNews concept needs to expand outside of the primary website. Where should it expand? The answer is obvious. YouRateNews rating capability needs to be embedded in the news sites themselves. The websites like CNN, MSNBC, FoxNews, etc would have a link at the end of a news article that allows users to link to the site or directly rate the article on the site.

As we’ll see, most of these sites already have links that allow users to comment on articles in many different formats. None of the sites have a meaningful system through which users can rate articles. So, if the want is there, then there is a natural place already on the sites.

Why should any respectable news organization add links to a site that allows users to rate their articles in a possible negative way?

Legitimacy: First, adding a means by which users can rate an article adds to the legitimacy of the news organization. With a 3rd party rating system embedded/linked to on their site, the news organization is saying: “Here’s our article, read it and rate it however you wish. We stand by it.”

Address Accusations: Second, “fake news” accusations have become a hot topic that needs to be addressed. YouRateNews provides a neutral 3rd Party means for everyday people to rate articles. Even if the most left-wing ultra-liberal news organization is consistently rated as “FAR LEFT”, these ratings provide numbers that prove that most people don’t believe the fake news accusations.

More Readers = More Money: Third, imagine that right-wing ratings “bashers” go onto MSNBC to read its articles and rate them negatively. Sounds terrible right? Wrong. MSNBC just got a new set of readers. This will increase online ratings and increase ad revenue.

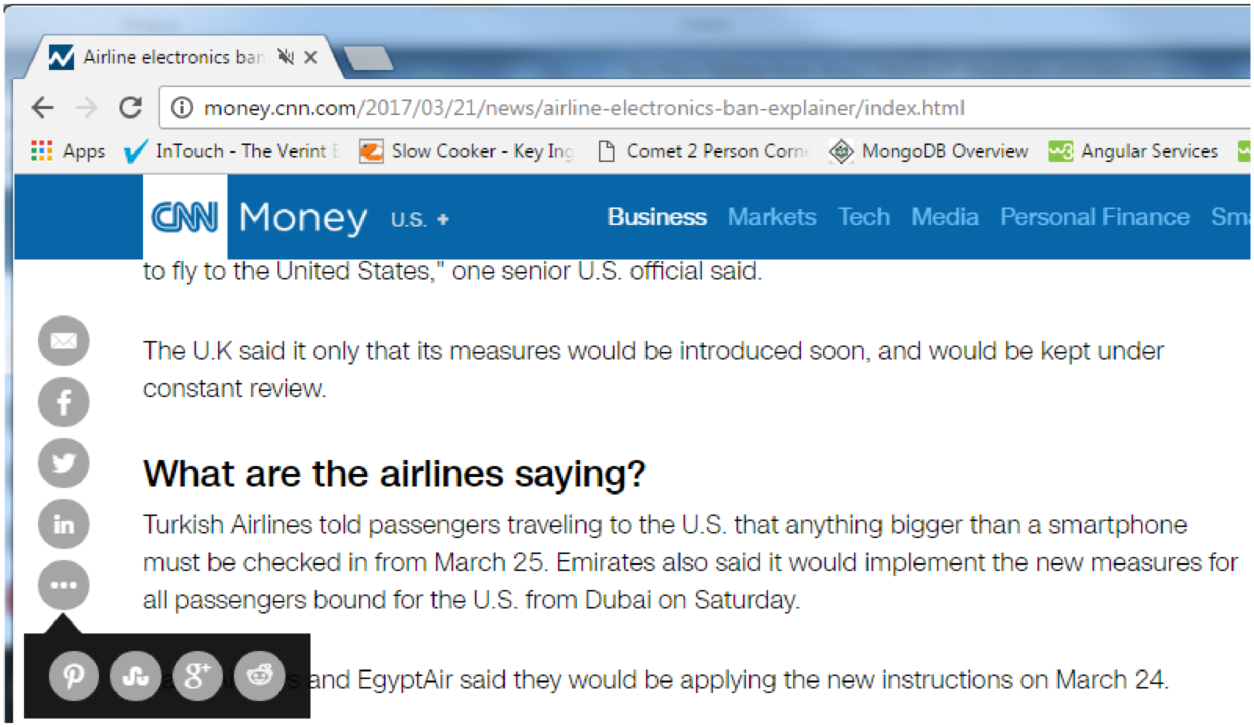
4.1 There can be only one

When news organizations decide to commit to a 3rd party organization for news ratings, it follows that they should all use just one neutral, trusted 3rd party site. This 3rd party organization must stay completely neutral – welcoming far right, centrist and far left news organizations into the fold. A neutral standard must be set – and there can be only one standard. As stated earlier, YouRateNews being the first implementation "out of the starting blocks" gives it the best chance to occupy this limited space.

4.2 Reviewing the Current Capabilities of Major News Organizations

Every major US news site contains articles that link to external sites. Figure 31 demonstrates the common practice for adding external links to news articles. These external link bars typically allow users to send an article's URL via email or comment on the articles via Facebook, Twitter, LinkedIn, Pinterest, Google+, Reddit, and so on.

Figure 31



to fly to the United States," one senior U.S. official said.

The U.K said it only that its measures would be introduced soon, and would be kept under constant review.

What are the airlines saying?

Turkish Airlines told passengers traveling to the U.S. that anything bigger than a smartphone must be checked in from March 25. Emirates also said it would implement the new measures for all passengers bound for the U.S. from Dubai on Saturday.

and EgyptAir said they would be applying the new instructions on March 24.

Table 1 shows the breakdown of major US news sites link to their external site links.

Table 1

News Organization	Email	Facebook	Twitter	LinkedIn	Pinterest	Google+	Reddit
cnn.com	x	X	x	x	x	x	X
msnbc.com	x	X	x				
abcnews.go.com		X	x				
nbcnews.com	x	X	x				
washingtonpost.com	x	X	x	x	x	x	
usatoday	x	X	x	x			
huffingtonpost	x	X	x		x		
bloomberg		X	x	x		x	X
time.com	x	X	x	x	x		X
nytimes.com	x	X	x	x	x	x	x

Note that every external link provides readers with the ability to comment on the articles. The number of comments made on a daily basis is immense. Comments, comments and more comments rule the external links sections on every major news site. This creates a news world where millions have an opinion and no one votes. YouRateNews provides users with the ability to vote – to rate articles quickly. For some users, rating articles quickly will be preferable to being engulfed into a swamp of comments. Figure 32 shows the look and feel of the YouRateNews icon. Figure 33 shows how the CNN Links bar would appear with this added Icon. Figure 34 shows how a typical CNN page would appear with the added YouRateNews icon.

Figure 32

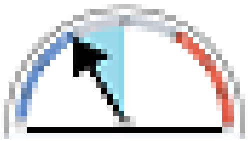


Figure 33

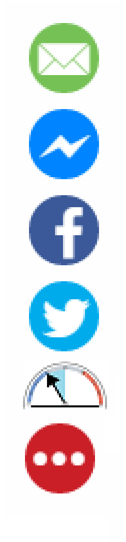
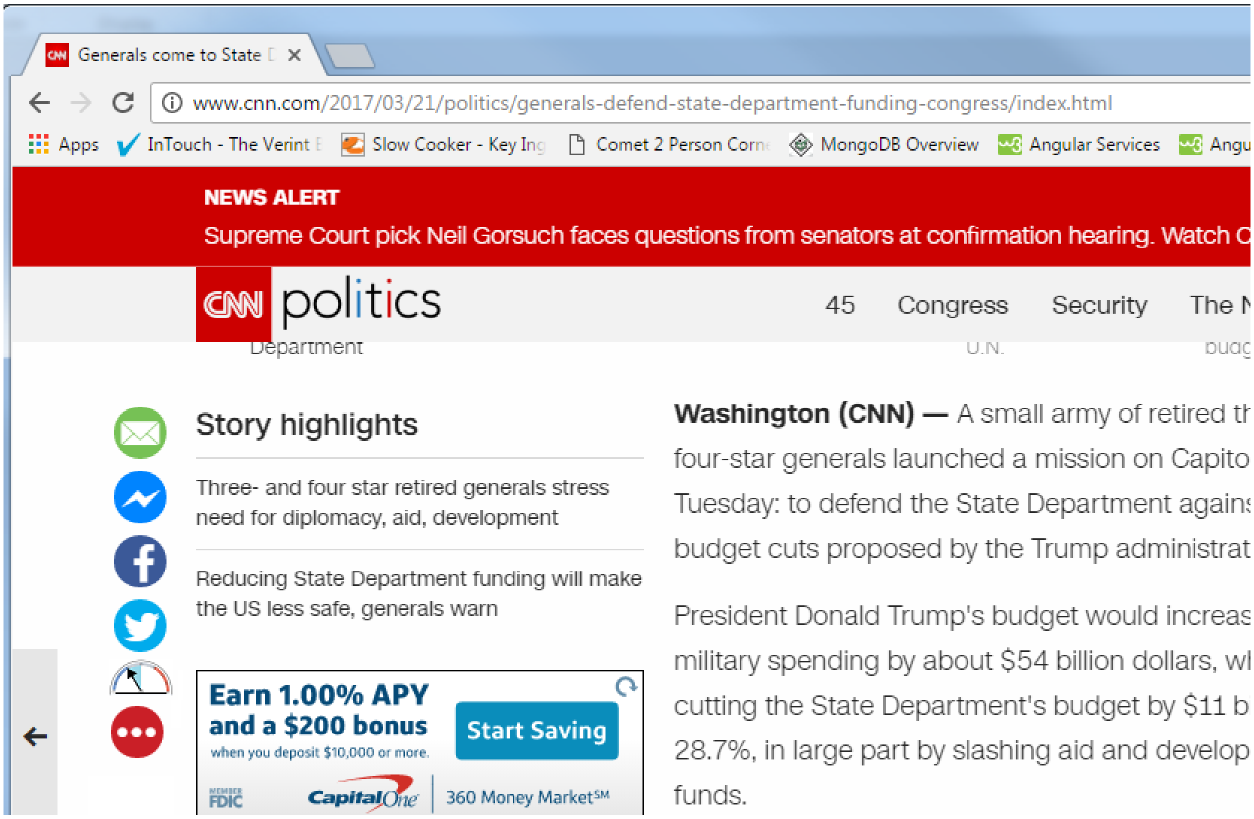


Figure 34



NEWS ALERT

Supreme Court pick Neil Gorsuch faces questions from senators at confirmation hearing. Watch C

Story highlights

Three- and four star retired generals stress need for diplomacy, aid, development

Reducing State Department funding will make the US less safe, generals warn

Earn 1.00% APY and a $200 bonus when you deposit $10,000 or more. Start Saving MEMBER FDIC Capital One 360 Money Market℠

Washington (CNN) — A small army of retired th four-star generals launched a mission on Capito Tuesday: to defend the State Department agains budget cuts proposed by the Trump administrat

President Donald Trump's budget would increas military spending by about $54 billion dollars, wh cutting the State Department's budget by $11 b 28.7%, in large part by slashing aid and develop funds.

4.3 An Inevitable Solution

By adding a small, 35 x 35 pixel link, news sites enable their readers to rate articles. Consider all the mud-slinging and anger with regards to news bias and fake news. Finally a site provides a means to rate and rank bias at the news organization level. The world does not need another site to make more disparaging comments – the world needs a place where you rate news. The summarized data metrics compiled from individual article ratings provide the powerful quantitative insight into the leanings of news organizations and public opinion. Countless news organizations, think tanks, and research organizations can use this type of quantitative data. And make no mistake, ad revenue financially drives this idea. In short, this idea is due, it is inevitable. If YouRateNews doesn't catch on, then something like it will.

5 The Architecture Sprint

This section describes the architecture of *the YouRateNews* application. First, we present a brief discussion on the evolution of enterprise architectures. Then we describe the architecture of the application in a modern, cloud-based application.

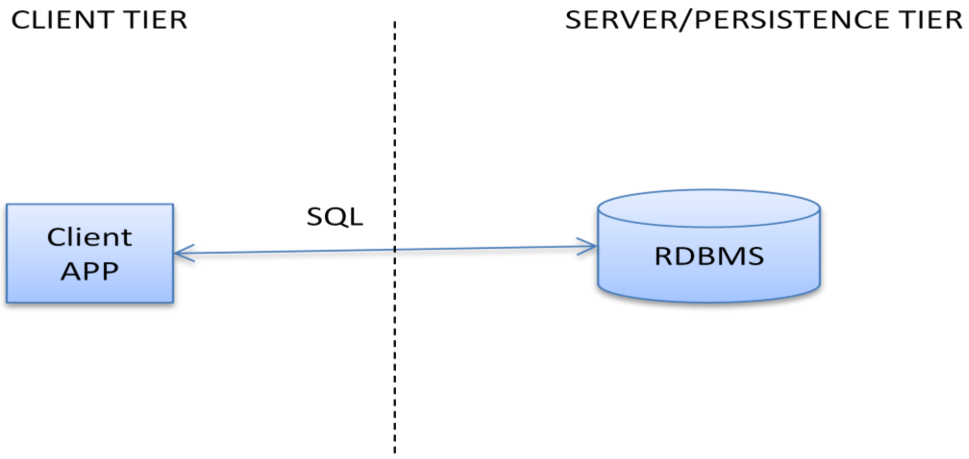
5.1 The Evolution of Tiered Enterprise Systems

It has been extraordinary to witness software's evolution over the last two decades. Software has evolved from single-tier systems to today's n-tier systems. Let's briefly go over this transition as a mechanism to introduce *the YouRateNews'* architecture.

5.1.1 The Ancient Two-Tiered World:

When this author arrived on the IT scene in 1997, top industry standard solutions were two tiered applications. Generally, this meant that a system consisted of a client application and a server application. Client applications with a graphical user interface were commonly written in C/C++ and/or Visual Basic. The Microsoft Foundation Classes (MFC) along with MS Visual Studio enabled users to build a heavy clients using drag and drop widgets. This was the cutting edge. The Server part of typical Client/Server systems consisted of a database server such as Oracle, MS Access, or DB2. Client applications communicate with databases using SQL using technologies like ODBC. Figure 35 shows the general separation of the application tiers.

Figure 35



Two-Tier System Limitations:

Two-Tier systems were heavily flawed. First, in terms of scalability, the number of simultaneous users was limited by the number of available connections to the database. Client applications needed to be installed on a user's computer. Worse, these client applications were compiled to work only on a specific operating system. For example, a Windows client application would not run on a Mac or on a

Unix-based OS. And when these applications suffered a crash, then failures usually bubbled up to the operating system level. Crashes often required a full computer restart. And the underlying code of these systems was often a nightmare where presentation code, underlying operating system calls, and persistence code all mixed together.

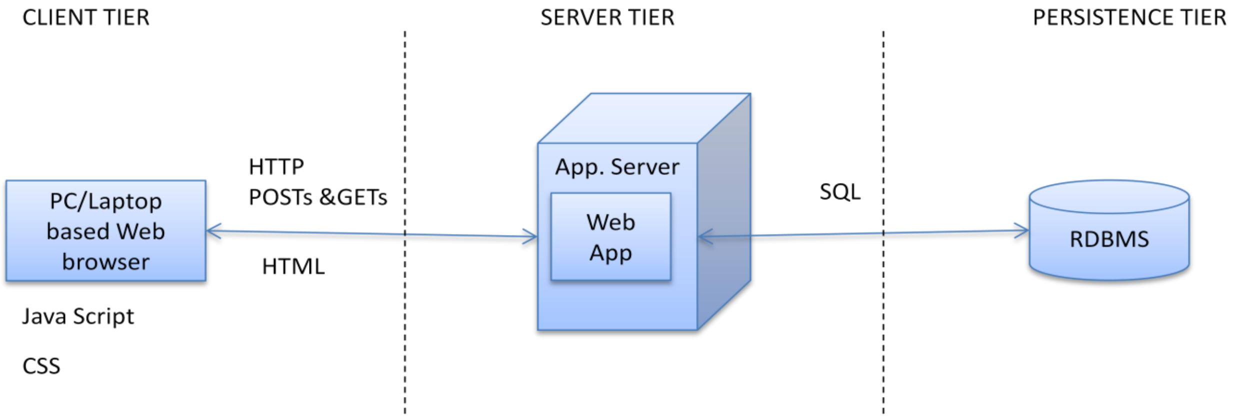
However flawed, these 2-tier systems were still a major advance over single-tiered, command line clients that allowed a single user to create, read, update, and delete data in flat-file systems.

5.1.2 The Arrival of Early Three-Tiered Systems:

The late 1990s thru the early 2000s saw the dramatic rise of the Internet. Three-tiered systems became the order of the day. Three-tiered systems consisted of a client tier, server tier, and persistence tier.

Three-tiered systems present a number of advantages over two-tiered systems. First, on the client side, one could assume that every application user would have a web browser on their desktop or laptop computer. And web applications were built to run on these web-browsers. Browser-to-browser compatibility was not perfect, but the assumption could be made that users would not have to install additional software to use an internet application. This was a big deal. Second, web browsers displayed HTML delivered to them by web applications sitting on Application servers. These web applications on application servers enabled users to navigate between dynamically-generated web pages by processing synchronous HTTP(S) POSTs and GETs. Third, the number of users that could be supported was no longer limited by the number of Relational database connections. RDBMS connections were pooled and shared across requests from different users. This database connection pooling also added to the stability of database connections as connection pools could manage corrupted and stale connections. The overall portability and quality of applications rose dramatically - even though irrational exuberance by business investors resulted in the dot-com bubble burst.

Figure 36



Early Three-Tiered System Limitations:

Early Three-Tiered systems varied widely, but most had similar limitations. Foremost, most of the processing was synchronous. That is to say, clicking on a web page link normally forced the user to wait while his request travelled across enterprise tiers. The dynamic experience of modern applications was not yet in place. Java Script often did not play as big a role in providing a rich user experience as modern apps do. Also, Application Servers would share the same system resources to generate HTML dynamically while also processing SQL calls to RDBMS systems. Relational Database systems have offered high performance, but sometimes are limited by complex join conditions. Scalability though improved significantly across the board.

5.1.3 Monolithic Web 2.0 N-Tier Systems:

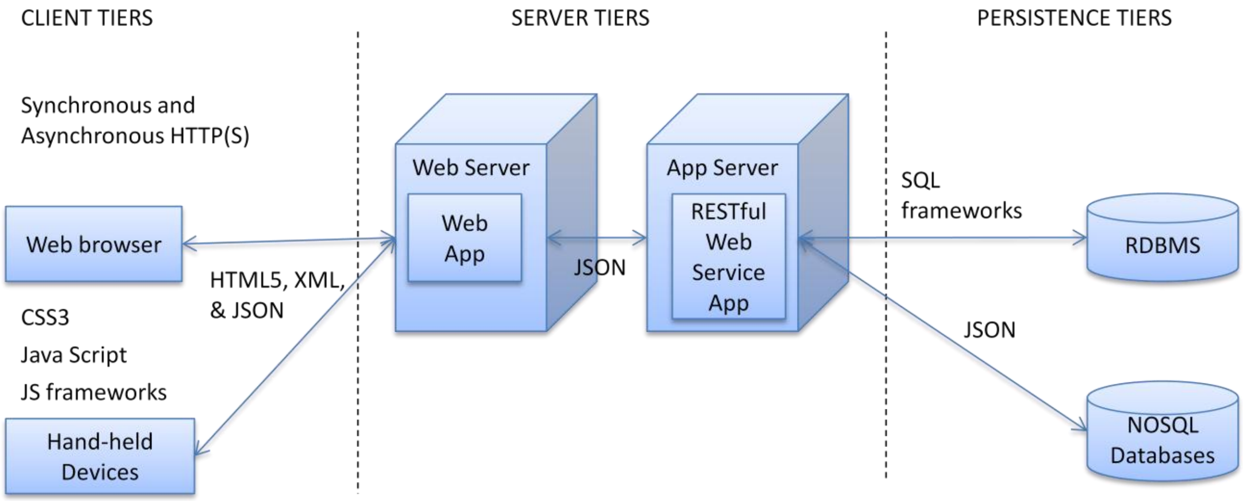
The post dot-com bubble burst era has given birth to a plethora of frameworks and technologies that enhance user experiences, simplify development, and improve system performance. Figure 37 shows just a few.

Within the client tier(s), HTML5 web pages typically load synchronously, then populate with data asynchronously via Java Script Object Notation (JSON) calls. The days of waiting for an entire page to load are gone. Also, the paradigm that assumed that users are using a desktop/laptop-based web browser has been replaced with the requirement to also support various hand-held devices. In this light, Cascading Style Sheets Version 3 (CSS3) has new layouts that support a wider array of devices.

In Server tiers, web application presentation components are separated from the logic involved in creating, reading, updating and deleting model (data) components. Often, this model-view-controller pattern separation means that these components reside on separate servers. Server-side information often gets passed around using RESTful web services that deliver data in JSON format. The highly-compact JSON text format influence cannot be underestimated. This front-end technology was originally intended to populate browser-based Java Script objects – and now finds itself as a core persistence mechanism.

And in the persistence tiers – relational database systems have been joined by NoSQL persistence technologies that do not use relational tables as the storage and retrieval mechanism for data. NoSQL databases like Mongo offer superior real-time information retrieval under certain conditions. That is, the lack of complex joins really speeds up data retrieval. Also, NoSQL database have advantages in the Big Data realm.

Figure 37



5.1.4 The Very Latest – the Arrival of Microservices

This author has worked on many software environments – and they all have been monolithic. That is, the software was compiled, unit tested, deployed, functionally tested and released as a single entity. I worked on a software product where everyone bragged that a nightly build could be successful in just under two hours – provided that all steps worked perfectly. Most nightly builds failed because one new feature would break something in an existing feature. As new features and fixes were continually added, the likelihood of a successful nightly build became less and less. And as managed release dates approached, our team came to a virtual stand-still as the entire team of 20+ engineers worked on nothing but bug fixes in the weeks prior to the big release. All hoped that the next round of bug-fixes would produce a clean build. What a disaster.

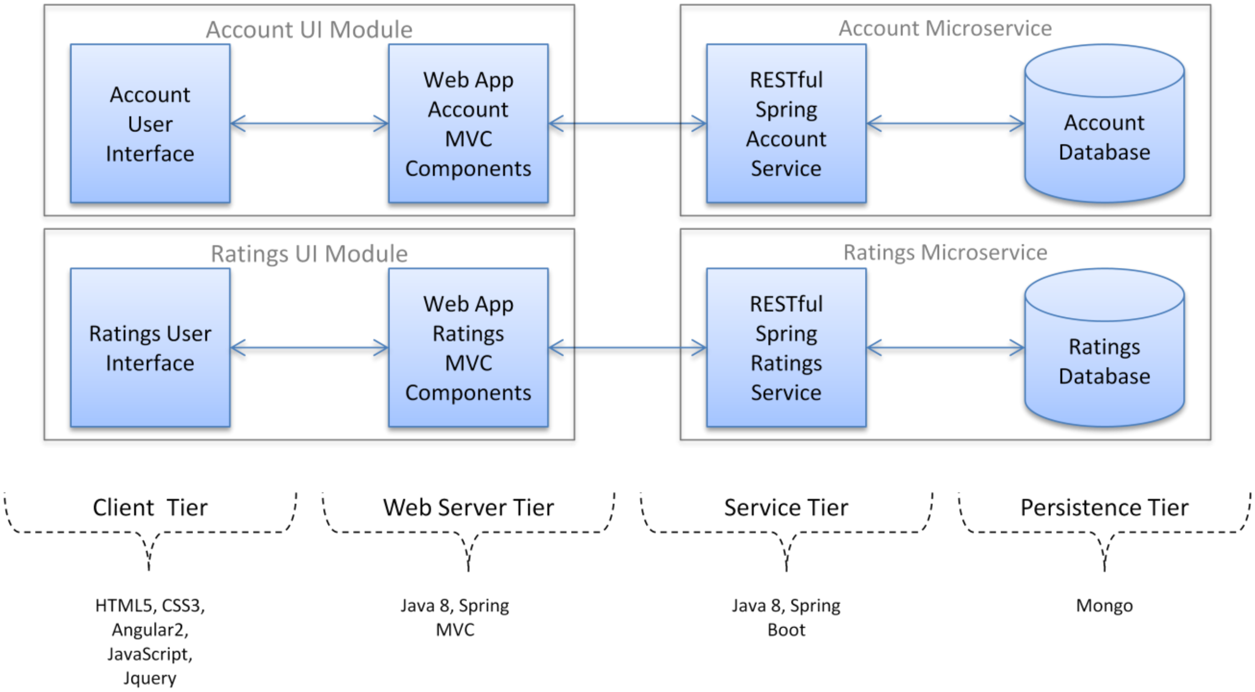
There is no need to go on with more examples. Virtually, every software professional has experienced this problem. The time, effort, and cost to deliver new features and releases increases exponentially as monolithic software projects become larger and more complex.

The software industry has taken great interest in Microservices. Microservices is all about breaking down single monolithic applications into smaller autonomous services. Even though the example N-tier architecture shown in Figure 37 is separated across tiers, the whole system might still be compiled, tested, and deployed as a singular unit just as was the case for the much simpler single tier systems of an earlier age. Using microservices, individual services are developed, tested, and deployed as separate parts or modules. These parts also usually run as separate processes and services.

5.2 Introducing *the YouRateNews* architecture

Figure 38 shows the general *YouRateNews* architecture concept. Instead of building a monolithic system, the architecture is modular. User account data and ratings data are kept in separate databases. The web services that interact with these databases are microservices separated by the account management and rating management business functions. The client and server-side user-interface service components are also modularized.

Figure 38



5.2.1 The Technology Stack

Figure 38 shows the technology stack. The user-interface of the application will be browser-based. This consists of HTML5, CSS3, Angular2 (or another JavaScript framework), Jquery, etc. The server-side web application supporting the front-end includes Java, Spring MVC (Model View Controller), and other supporting Enterprise Java frameworks. On the back end, Spring-boot based microservices wrap Mongo database persistence layers.

5.2.2 Accounting for Change in the Technology Stack

The architecture is modular in order to incorporate change. If a strategic partnership arises where another organization's account database will be used, then the account microservice could encapsulate the necessary changes. The remaining architecture components may stay untouched. If a decision is made to improve the user experience with an iPhone mobile app, then the existing system architecture requires minimal changes.   Ideally, a future mobile app would just make calls directly to the Account and Ratings MVC components.

5.3 Pricing the Architecture

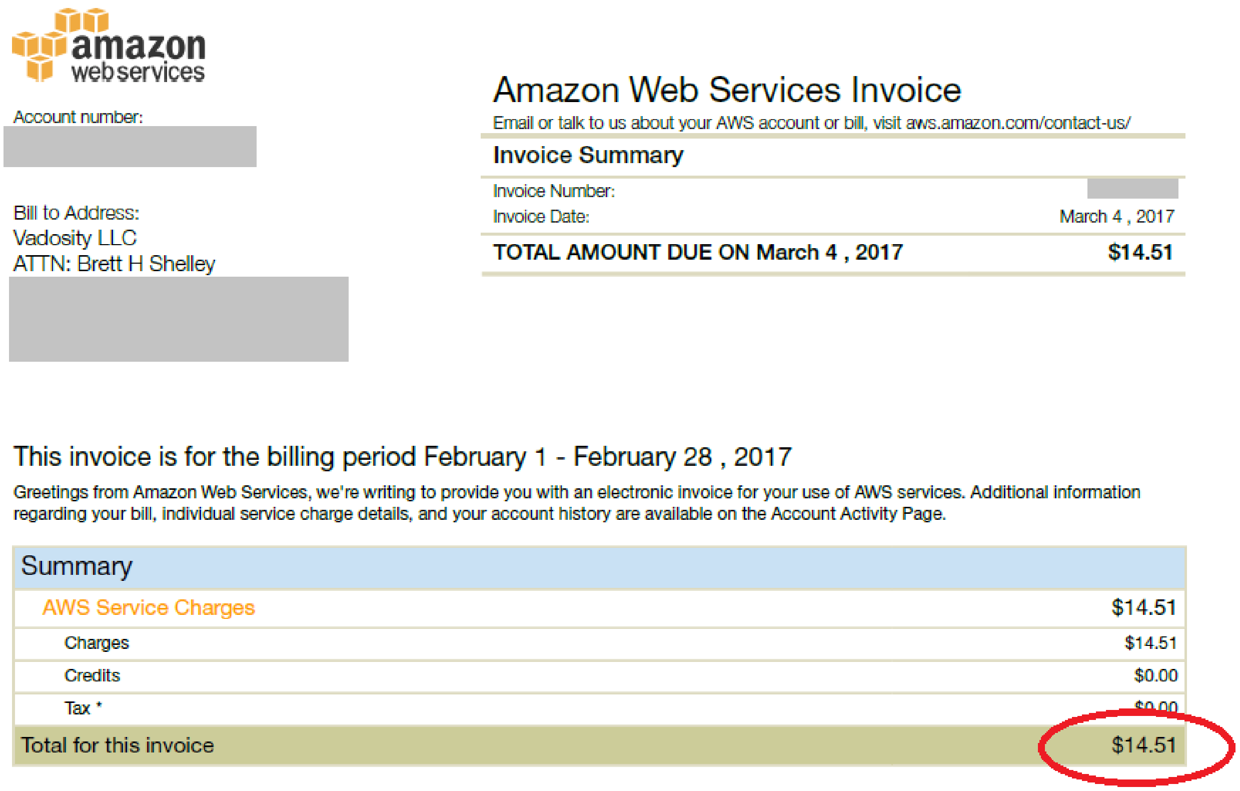
The YouRateNews idea is all about implementing an enterprise solution on a tight budget.

This technically-focused author was recently invited to an upper-level management meeting. Most of the meeting focused on the infrastructure budget. The meeting occurred in the government space – the land of the $300 hammer. I intently listened as the government casually agreed to pay over $200,000 per year for six Linux servers during the lifetime of the software we delivered.   Back in the pre-dot-com bubble burst days, I also discovered that our team had purchased Oracle database licenses at $90,000 per processor. And back in 2005, as this author sought a location to host a server, Rackspace presented me with the opportunity to rent a single “pizza-box” Linux server for just $1000 a month.

Well, the cloud has changed all that. Let’s let Figure 39 be the picture that tells a thousand words. **Anyone can host a virtual server in the Amazon cloud for under $20 per month**.

A little humor: Perhaps this author should have spoken up during that recent government budget meeting. I should have let them know that a more secure, better managed, safer infrastructure could be had for a max-price of $2000 per year (just 1 % of the cost). The government management team surely would have realized this immense cost saving and changed direction. I could have been meeting’s hero! No, we are talking about a government project - it would not have ended well. I was smart to stay quiet.

Figure 39



amazon webservices

Account number:
[redacted]

Bill to Address:
Vadosity LLC
ATTN: Brett H Shelley
[redacted]

Amazon Web Services Invoice

Email or talk to us about your AWS account or bill, visit aws.amazon.com/contact-us/

Invoice Summary

Invoice Number:	[redacted]
Invoice Date:	March 4 , 2017
TOTAL AMOUNT DUE ON March 4 , 2017	**$14.51**

This invoice is for the billing period February 1 - February 28 , 2017

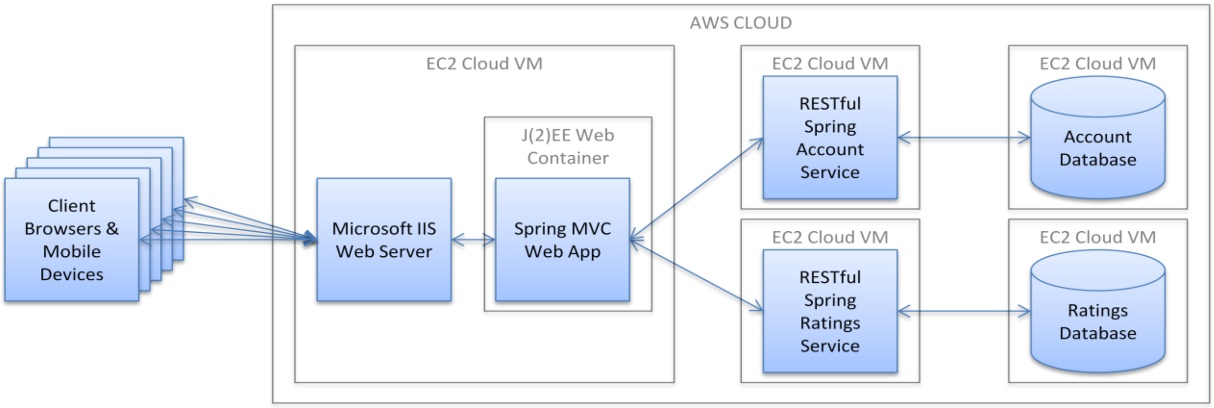
Greetings from Amazon Web Services, we're writing to provide you with an electronic invoice for your use of AWS services. Additional information regarding your bill, individual service charge details, and your account history are available on the Account Activity Page.

Summary	
AWS Service Charges	$14.51
Charges	$14.51
Credits	$0.00
Tax *	$0.00
Total for this invoice	$14.51

5.4 The Cloud-based Virtualized Architecture

Figure 34 shows *the YouRateNews*' enterprise architecture with just enough resources to get a light idea off the ground. The entire infrastructure is virtualized in the Amazon cloud. The system is able to scale both horizontally and vertically rapidly due to AWS capabilities. And the modularized software components of the larger system can be developed independently – as long they conform to well-defined interfaces.

Figure 40



6 Development Environment Setup

This book demonstrates building a software solution in the cloud from concept to reality. This effort includes setting up developer environments. We also don't want to turn this document into a massive installation guide. Thus, these development environment setup instructions are minimalistic so this book doesn't turn into a massive installation guides. More detailed instructions for individual software products may be found elsewhere. We'll just go over the big picture.

6.1 Java Setup

Java is the core software development language for this solution. To Install Java:

1. Download the latest Java:

The latest Java JDK may be downloaded from Oracle at:

http://www.oracle.com/technetwork/java/javase/downloads/index.html

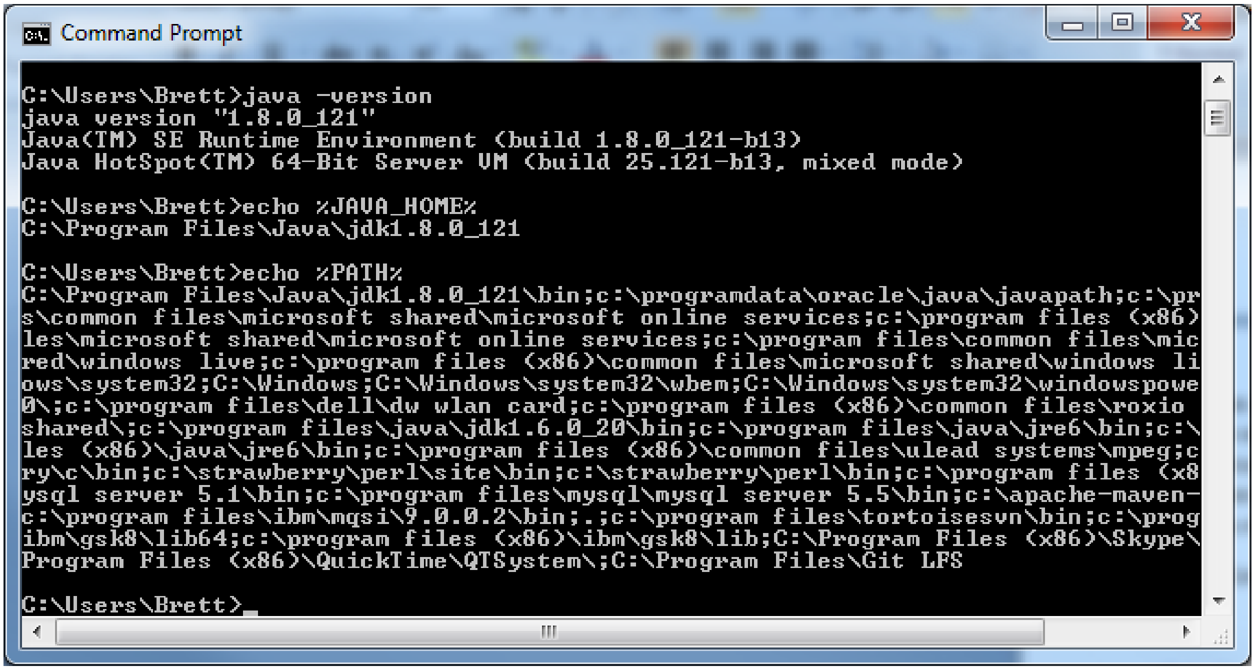
It is important to download and install the JDK and not the JRE. Many of the developer tools require a Java Developer Kit (JDK) instead of just a Java Runtime Environment (JRE).

2. Install Java on your System

3. Update your system's environment variables to include JAVA_HOME. Your system's path variables should also include the path to the Java JDK installation's bin directory.

4. Verify the Installation. For example, in Windows, a command prompt may be used to quickly determine the Java version, JAVA_HOME, and the system's PATH variable value. Figure 41 shows an example Windows OS setup.

Figure 41



```
C:\Users\Brett>java -version
java version "1.8.0_121"
Java(TM) SE Runtime Environment (build 1.8.0_121-b13)
Java HotSpot(TM) 64-Bit Server VM (build 25.121-b13, mixed mode)

C:\Users\Brett>echo %JAVA_HOME%
C:\Program Files\Java\jdk1.8.0_121

C:\Users\Brett>echo %PATH%
C:\Program Files\Java\jdk1.8.0_121\bin;c:\programdata\oracle\java\javapath;c:\pr
s\common files\microsoft shared\microsoft online services;c:\program files (x86)
les\microsoft shared\microsoft online services;c:\program files\common files\mic
red\windows live;c:\program files (x86)\common files\microsoft shared\windows li
ows\system32;C:\Windows;C:\Windows\system32\wbem;C:\Windows\system32\windowspowe
0\;c:\program files\dell\dw wlan card;c:\program files (x86)\common files\roxio
shared\;c:\program files\java\jdk1.6.0_20\bin;c:\program files\java\jre6\bin;c:\
les (x86)\java\jre6\bin;c:\program files (x86)\common files\ulead systems\mpeg;c
ry\c\bin;c:\strawberry\perl\site\bin;c:\strawberry\perl\bin;c:\program files (x8
ysql server 5.1\bin;c:\program files\mysql\mysql server 5.5\bin;c:\apache-maven-
c:\program files\ibm\mqsi\9.0.0.2\bin;.;c:\program files\tortoisesvn\bin;c:\prog
ibm\gsk8\lib64;c:\program files (x86)\ibm\gsk8\lib;C:\Program Files (x86)\Skype\
Program Files (x86)\QuickTime\QTSystem\;C:\Program Files\Git LFS

C:\Users\Brett>_
```

6.2 Gradle Setup

Gradle is the selected build tool for this solution. Gradle installation instructions may be found at: https://gradle.org/install

6.3 Nexus Setup

Nexus is the selected repository manager for this solution. I setup a Nexus server on my LLC's website at http://www.vadosity.com:8081/nexus/. Nexus is a repository manager that managed dependent libraries/archives. *The YouRateNews* source code artifacts are published to this site.

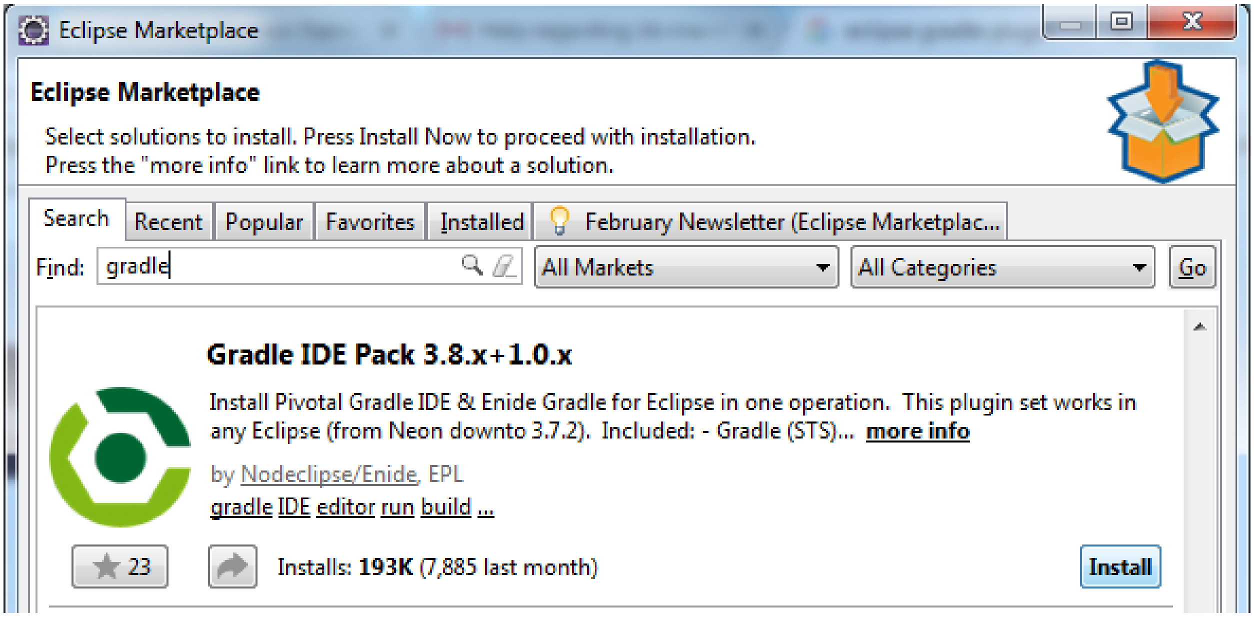
6.4 Eclipse Setup

Eclipse is the selected integrated development environment for this solution. Eclipse for Java Enterprise Edition developers may be downloaded from http://www.eclipse.org. It is recommended that Eclipse's underlying Java installation be set to point to the Java Setup discussed earlier.

For this solution, Eclipse Neon is used. The 64-bit Windows zip file may be downloaded at http://www.eclipse.org/downloads/download.php?file=/technology/epp/downloads/release/neon/3.RC3/eclipse-jee-neon-3-RC3-win32-x86_64.zip.

One technique to improve productivity is to install eclipse plug-ins compatible with the development environment. For example, Figure 42 shows the installation of an Eclipse Gradle Plug-in from the Eclipse Marketplace. It is often significantly faster to use command line tools to execute build commands, but sometimes using the Eclipse IDE to wrap these 3rd Party tool commands simplifies the development process.

Figure 42


Eclipse Marketplace

Select solutions to install. Press Install Now to proceed with installation.
Press the "more info" link to learn more about a solution.

Find: gradle

Gradle IDE Pack 3.8.x+1.0.x

Install Pivotal Gradle IDE & Enide Gradle for Eclipse in one operation. This plugin set works in any Eclipse (from Neon downto 3.7.2). Included: - Gradle (STS)... more info

by Nodeclipse/Enide, EPL

gradle IDE editor run build ...

23

Installs: **193K** (7,885 last month)

6.5 MongoDB Setup

MongoDB is the primary database for this solution. MongoDB installation instructions for Windows may be found at: https://docs.mongodb.com/manual/tutorial/install-mongodb-on-windows/.

6.6 Amazon EC2 Setup

While installing Mongo on an Amazon AWS EC2 Windows 2012, the default instance did not have enough disk space. The instructions at https://aws.amazon.com/premiumsupport/knowledge-center/expand-c-windows/ fixed this issue. Instructions for other operating systems are located in the vicinity of these links.

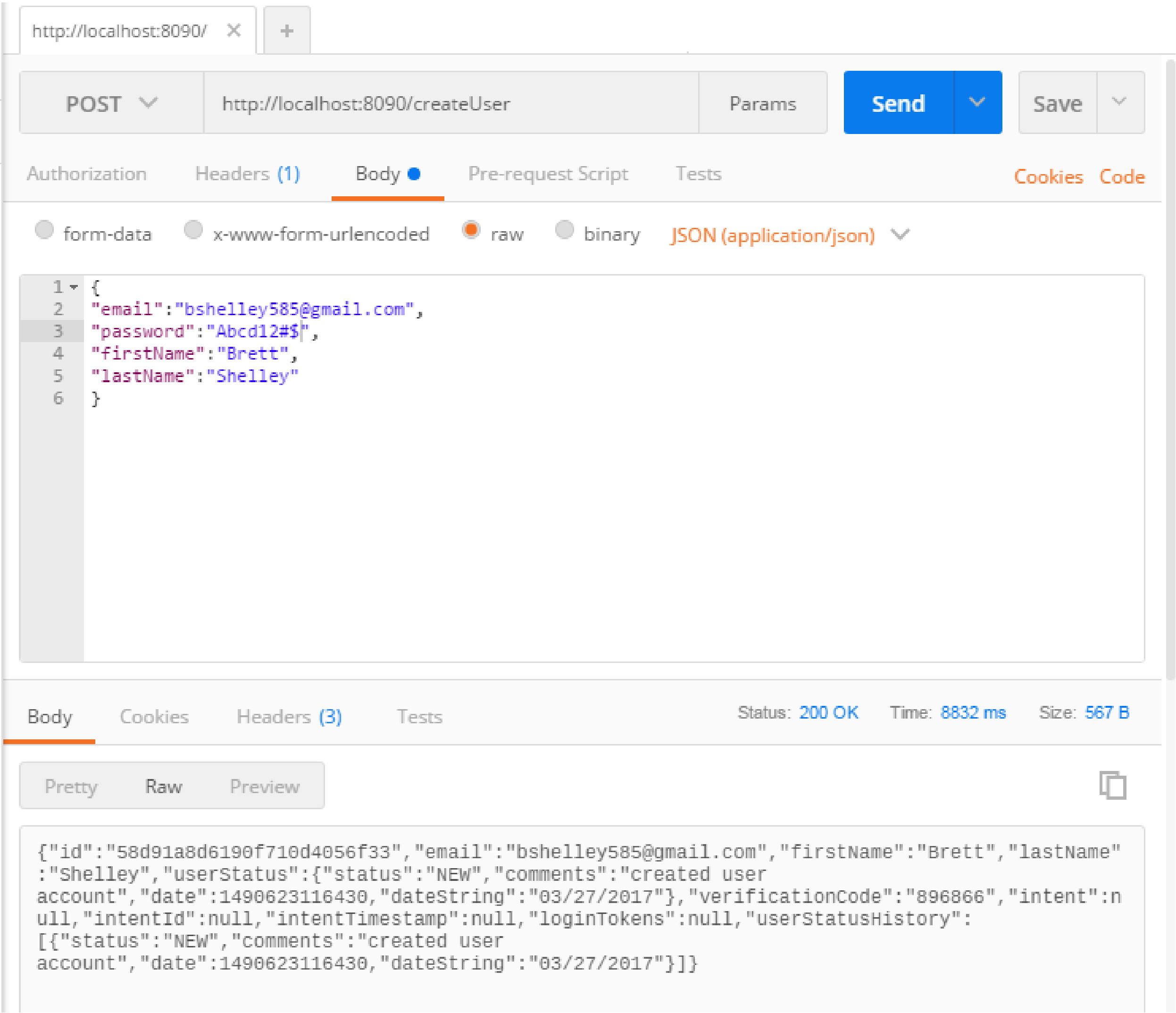
6.7 SVN Setup

SVN is the selected source control management tool for this solution. For a server, Visual SVN is my recommended solution. Product information is available a https://www.visualsvn.com/server/. For a client solution, TortoiseSVN may be acquired at https://tortoisesvn.net/.

6.8 Postman Setup

The YouRateNews architecture heavily depends on RESTful web services that consume and produce JSON. HTTP(S) POST, GET, PUT and DELETE calls are the underlying communication layer. One can use any web-browser to test HTTP(S) GET calls. But the remaining POST, PUT, and DELETE types cannot be simply tested using a web-browser. POSTMAN is the preferred RESTful web service testing software for this solution. This product may be acquired at https://www.getpostman.com/. Figure 43 demonstrates how the Postman user interface simplifies RESTful web service call testing.

Figure 43



POST http://localhost:8090/createUser

● raw JSON (application/json)

```
{
"email":"bshelley585@gmail.com",
"password":"Abcd12#$",
"firstName":"Brett",
"lastName":"Shelley"
}
```

Status: 200 OK Time: 8832 ms Size: 567 B

```
{"id":"58d91a8d6190f710d4056f33","email":"bshelley585@gmail.com","firstName":"Brett","lastName"
:"Shelley","userStatus":{"status":"NEW","comments":"created user
account","date":1490623116430,"dateString":"03/27/2017"},"verificationCode":"896866","intent":n
ull,"intentId":null,"intentTimestamp":null,"loginTokens":null,"userStatusHistory":
[{"status":"NEW","comments":"created user
account","date":1490623116430,"dateString":"03/27/2017"}]}
```

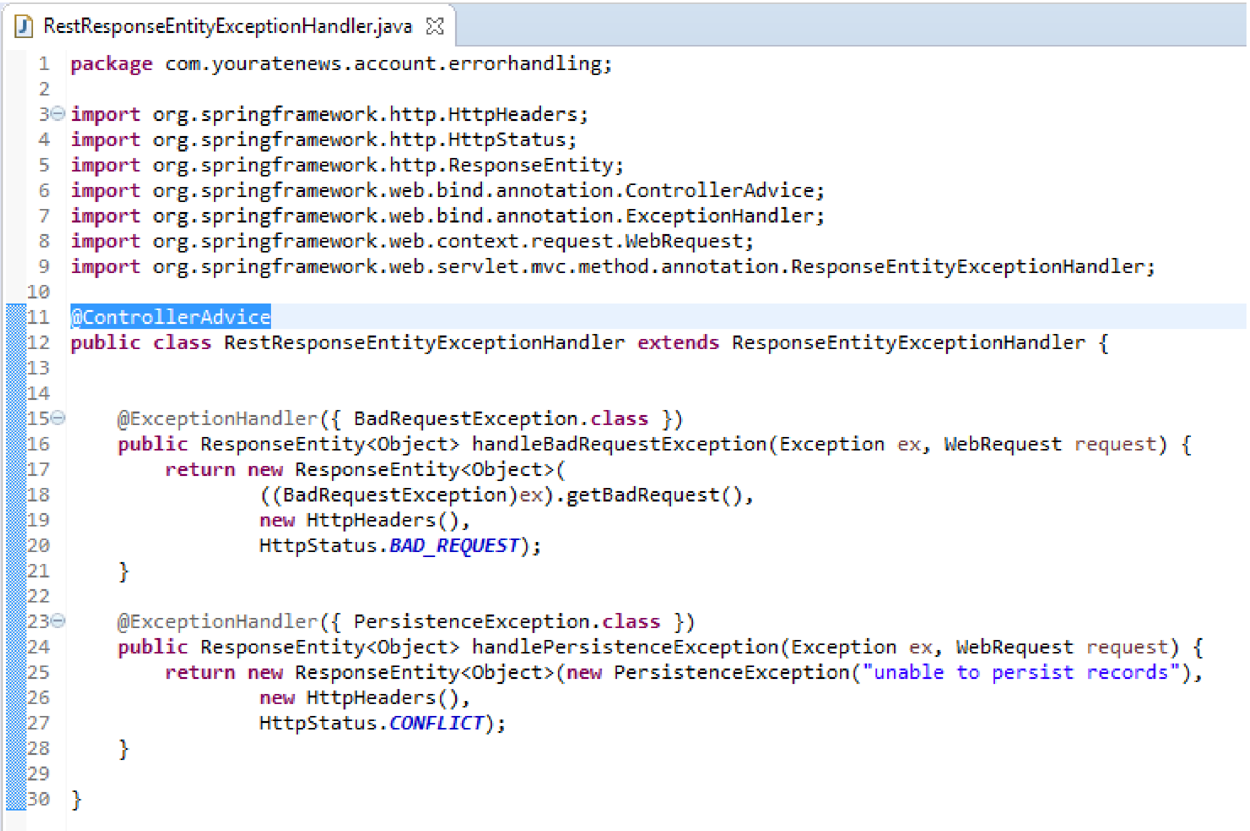
7 Service Design & Prototyping

7.1 Spring Design Highlights

7.1.1 Centralized Error Handling

The spring framework provides a centralized means of handling exceptions. Figure 44 shows the Java class that handles exceptions in the RESTful account service. The ControllerAdvice annotation on Line 11 is the key to marking this class as the Exception Handling Aspect of the account service.

Figure 44



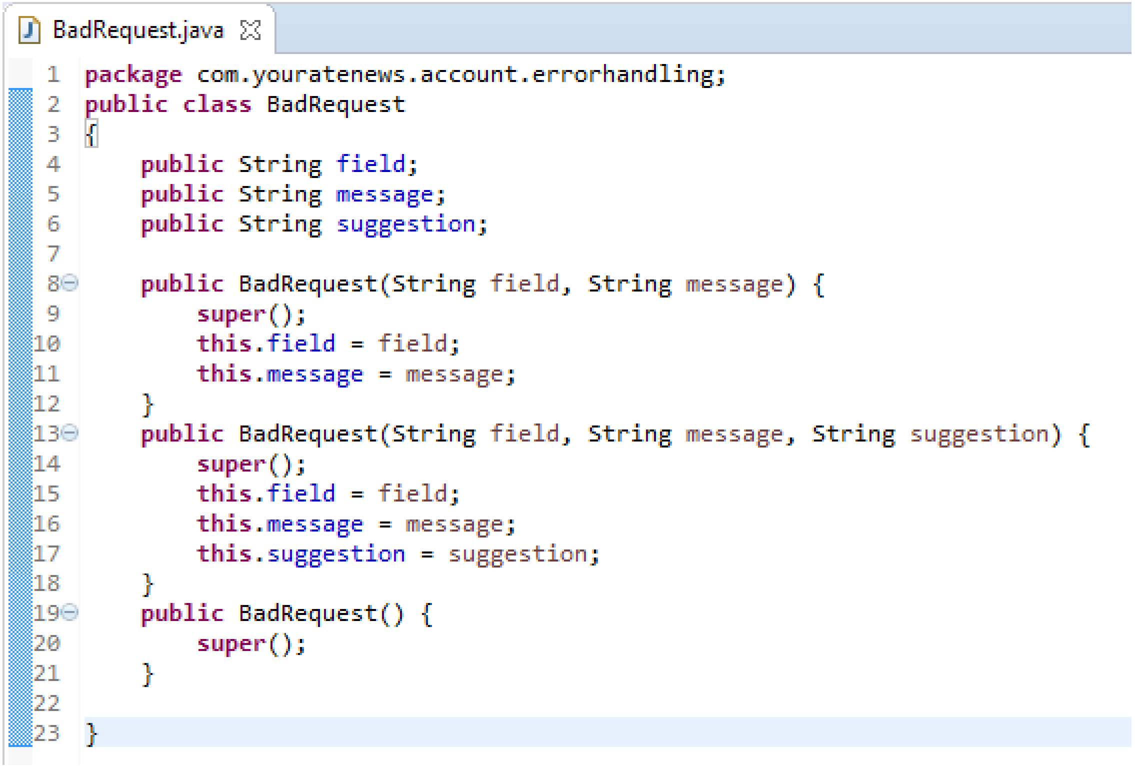
```
 1 package com.youratenews.account.errorhandling;
 2
 3 import org.springframework.http.HttpHeaders;
 4 import org.springframework.http.HttpStatus;
 5 import org.springframework.http.ResponseEntity;
 6 import org.springframework.web.bind.annotation.ControllerAdvice;
 7 import org.springframework.web.bind.annotation.ExceptionHandler;
 8 import org.springframework.web.context.request.WebRequest;
 9 import org.springframework.web.servlet.mvc.method.annotation.ResponseEntityExceptionHandler;
10
11 @ControllerAdvice
12 public class RestResponseEntityExceptionHandler extends ResponseEntityExceptionHandler {
13
14
15     @ExceptionHandler({ BadRequestException.class })
16     public ResponseEntity<Object> handleBadRequestException(Exception ex, WebRequest request) {
17         return new ResponseEntity<Object>(
18                 ((BadRequestException)ex).getBadRequest(),
19                 new HttpHeaders(),
20                 HttpStatus.BAD_REQUEST);
21     }
22
23     @ExceptionHandler({ PersistenceException.class })
24     public ResponseEntity<Object> handlePersistenceException(Exception ex, WebRequest request) {
25         return new ResponseEntity<Object>(new PersistenceException("unable to persist records"),
26                 new HttpHeaders(),
27                 HttpStatus.CONFLICT);
28     }
29
30 }
```

7.1.2 Simple POJOs Encapsulate Error Information

Figure 45 shows a custom class that is appropriately named BadRequest. The goal of this class is to act as a Plain Old Java Object (POJO) that can be serialized into JSON format. Once in JSON format, the information is sent to the calling application. That is, the class carries error messages in a very simple format. This BadRequest class does not extend Exception. The reason for this is security. Providing calling applications with technical information about the error provide hackers with information they can use to compromise the system. The intent of the BadRequest class is to provide just enough information for the calling application to handle the error – and no more.

Also notice the absence of setters and getters in Figure 45. Not using setters and getters flies in the face of object encapsulation. As a single engineer writing a book and coding a solution, I am trying to minimize keystrokes. Why not just drop the setters and getters? The answer came to me a few days after I wrote this paragraph. The templating engine freemarker uses getters and setters to introspect beans. For example, a free marker expression like ${user.email} needs a getEmail() method in the User class to determine the value. Skipping getters and setters and marking member variables as public qualifies as a “nice try” that does not hold water.

Figure 45

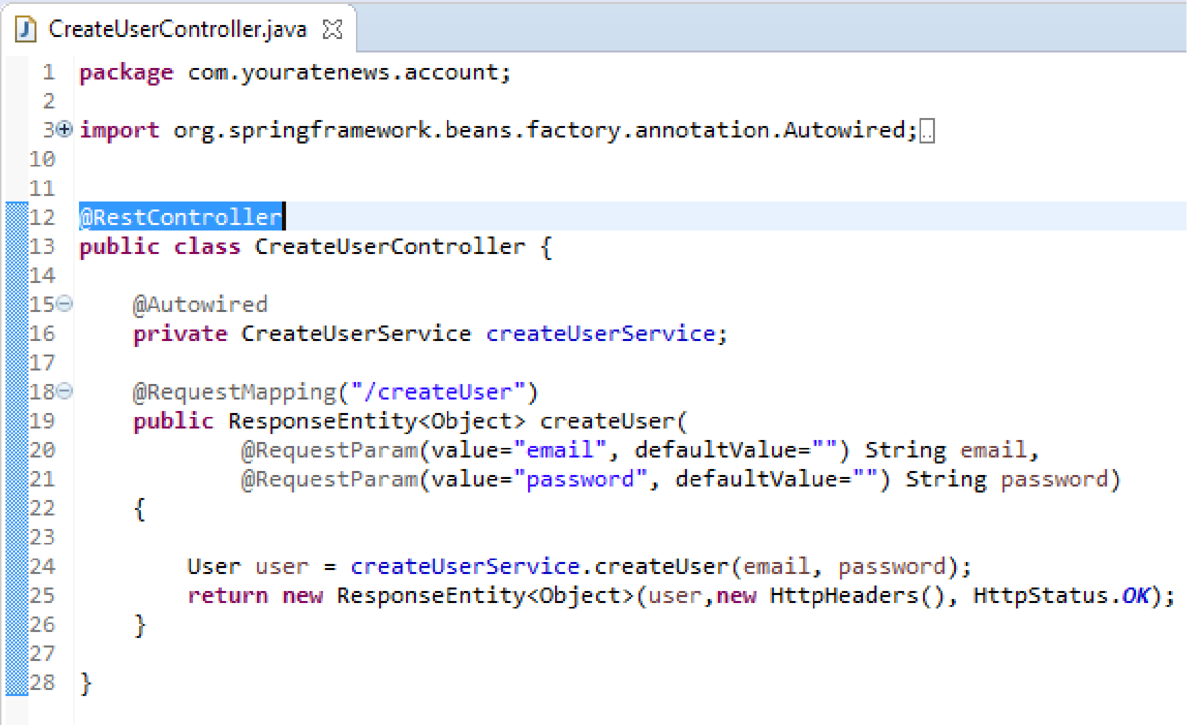


```
package com.youratenews.account.errorhandling;
public class BadRequest
{
    public String field;
    public String message;
    public String suggestion;

    public BadRequest(String field, String message) {
        super();
        this.field = field;
        this.message = message;
    }
    public BadRequest(String field, String message, String suggestion) {
        super();
        this.field = field;
        this.message = message;
        this.suggestion = suggestion;
    }
    public BadRequest() {
        super();
    }

}
```

7.1.3 Separation of Controllers and Services

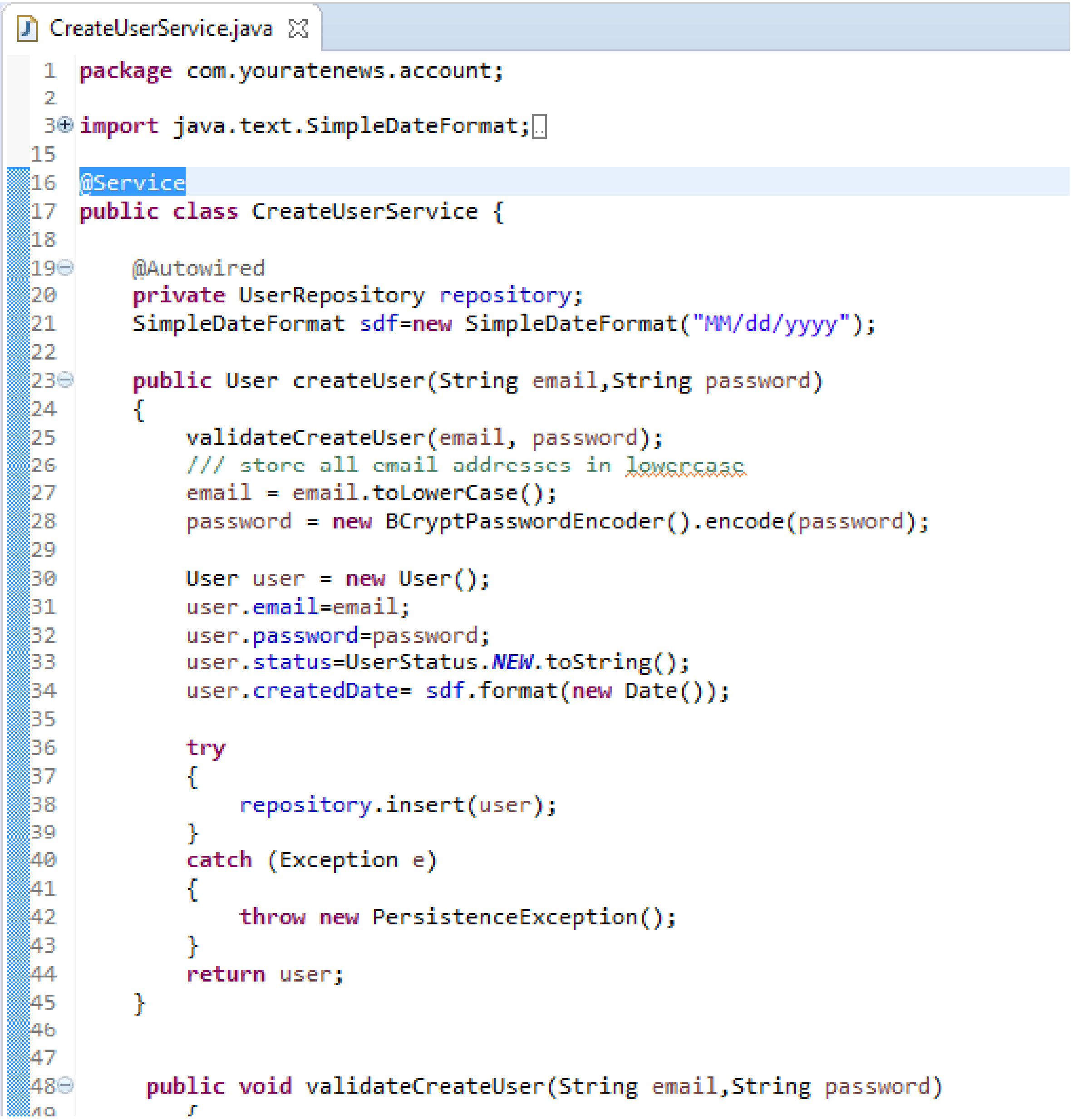
The application's architecture separates REST Controllers from Services with respect to the Separation of Concerns design pattern. Figure 46 shows a simplified CreateUserController. This code contains the annotations that define the RESTful services. This class delegates the business logic to the CreateUserService seen in Figure 47.

Figure 46



```java
package com.youratenews.account;

import org.springframework.beans.factory.annotation.Autowired;


@RestController
public class CreateUserController {

    @Autowired
    private CreateUserService createUserService;

    @RequestMapping("/createUser")
    public ResponseEntity<Object> createUser(
            @RequestParam(value="email", defaultValue="") String email,
            @RequestParam(value="password", defaultValue="") String password)
    {

        User user = createUserService.createUser(email, password);
        return new ResponseEntity<Object>(user,new HttpHeaders(), HttpStatus.OK);
    }

}
```

Figure 47

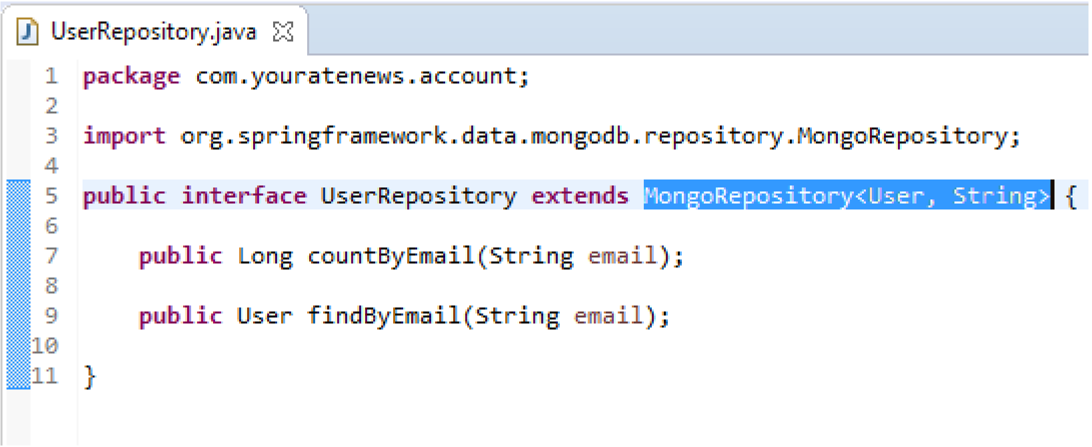


```
package com.youratenews.account;

import java.text.SimpleDateFormat;

@Service
public class CreateUserService {

    @Autowired
    private UserRepository repository;
    SimpleDateFormat sdf=new SimpleDateFormat("MM/dd/yyyy");

    public User createUser(String email,String password)
    {
        validateCreateUser(email, password);
        /// store all email addresses in lowercase
        email = email.toLowerCase();
        password = new BCryptPasswordEncoder().encode(password);

        User user = new User();
        user.email=email;
        user.password=password;
        user.status=UserStatus.NEW.toString();
        user.createdDate= sdf.format(new Date());

        try
        {
            repository.insert(user);
        }
        catch (Exception e)
        {
            throw new PersistenceException();
        }
        return user;
    }


     public void validateCreateUser(String email,String password)
        {
```

7.1.4 Spring Mongo Repository

Engineers and architects familiar with accessing relational databases using the Spring Data framework will be immediately familiar with the Spring MongoDB data framework. Spring wraps MongoDB commands using a Repository interface approach. Spring does most of the magic underneath the covers. Figure 48 shows a simplified version of this application’s User Repository.

Figure 48



UserRepository.java

```java
package com.youratenews.account;

import org.springframework.data.mongodb.repository.MongoRepository;

public interface UserRepository extends MongoRepository<User, String> {

    public Long countByEmail(String email);

    public User findByEmail(String email);

}
```

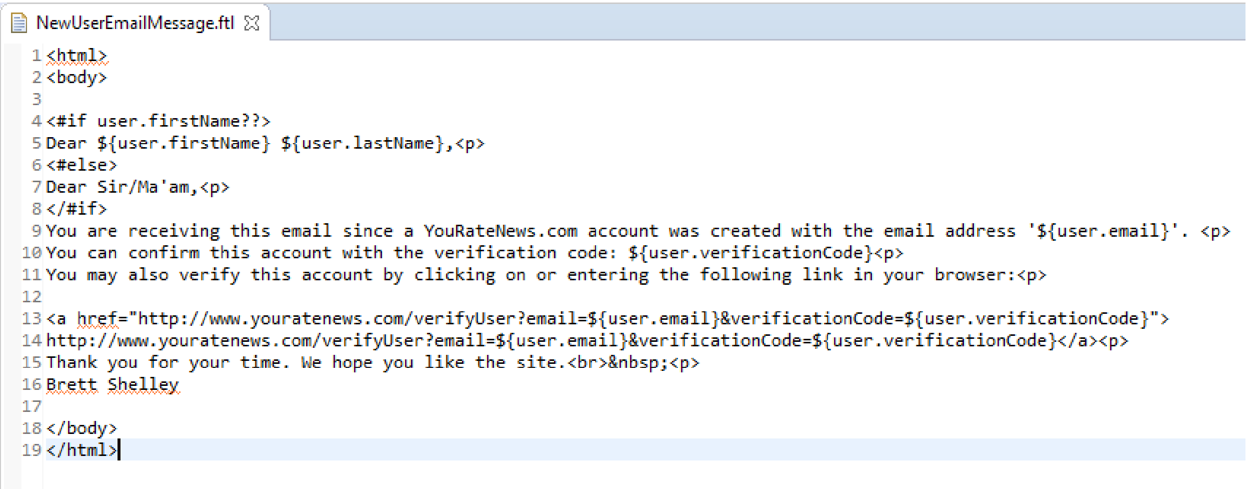
7.2 Sending Emails

The YouRateNews application needs the ability to send emails in order to verify user accounts. These emails contain information like the users' first name, last name, and a confirmation code. Each email sent will be slightly different from the next. The application needs a useful mechanism to dynamically create and send emails. The selected email sending mechanisms must also fit into the overall architecture.

7.2.1 Generating dynamic email content with FreeMarker

Apache FreeMarker is the selected email templating mechanism for this application. Apache FreeMarker is a template engine that generates text output (email text) based on templates and changing data. These templates are written in the FreeMarker Template Language (FTL). This templating language is a simple, specialized language that fulfills the application's need to generate dynamic email messages. Figure 49 presents an example template that YouRateNews uses to dynamically generate email content.

Figure 49



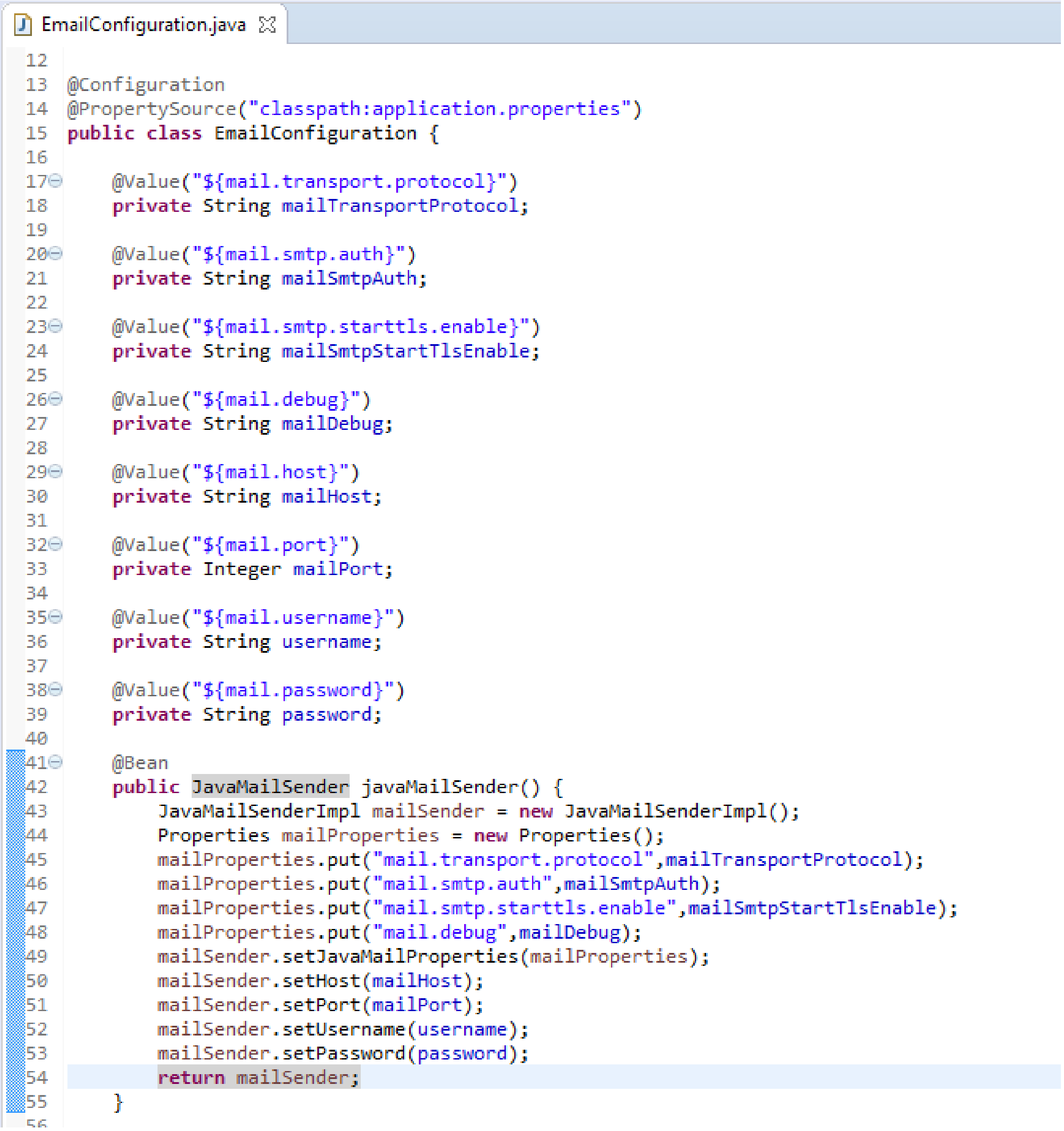
NewUserEmailMessage.ftl

```
<html>
<body>

<#if user.firstName??>
Dear ${user.firstName} ${user.lastName},<p>
<#else>
Dear Sir/Ma'am,<p>
</#if>
You are receiving this email since a YouRateNews.com account was created with the email address '${user.email}'. <p>
You can confirm this account with the verification code: ${user.verificationCode}<p>
You may also verify this account by clicking on or entering the following link in your browser:<p>

<a href="http://www.youratenews.com/verifyUser?email=${user.email}&verificationCode=${user.verificationCode}">
http://www.youratenews.com/verifyUser?email=${user.email}&verificationCode=${user.verificationCode}</a><p>
Thank you for your time. We hope you like the site.<br>&nbsp;<p>
Brett Shelley

</body>
</html>
```

7.2.2 Sending Emails with Spring and JavaMail

The Spring Mail framework wraps JavaMail capability to enable email sending. This framework enables annotation-based dependency injection using standard spring approaches. Figure 50 shows how property files may be used to configure a Spring JavaMailSender at application startup.

Figure 50

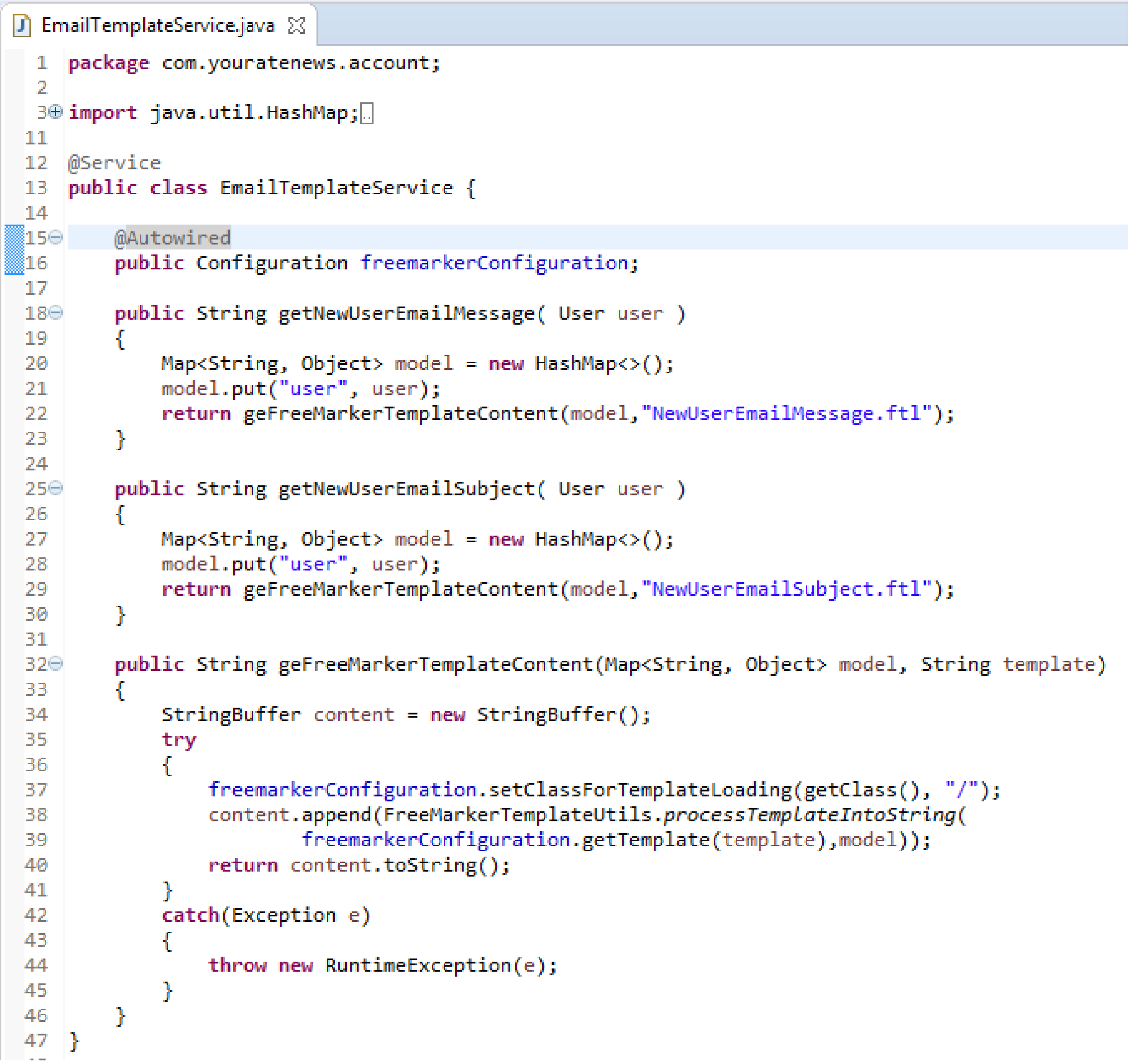


```java

@Configuration
@PropertySource("classpath:application.properties")
public class EmailConfiguration {

    @Value("${mail.transport.protocol}")
    private String mailTransportProtocol;

    @Value("${mail.smtp.auth}")
    private String mailSmtpAuth;

    @Value("${mail.smtp.starttls.enable}")
    private String mailSmtpStartTlsEnable;

    @Value("${mail.debug}")
    private String mailDebug;

    @Value("${mail.host}")
    private String mailHost;

    @Value("${mail.port}")
    private Integer mailPort;

    @Value("${mail.username}")
    private String username;

    @Value("${mail.password}")
    private String password;

    @Bean
    public JavaMailSender javaMailSender() {
        JavaMailSenderImpl mailSender = new JavaMailSenderImpl();
        Properties mailProperties = new Properties();
        mailProperties.put("mail.transport.protocol",mailTransportProtocol);
        mailProperties.put("mail.smtp.auth",mailSmtpAuth);
        mailProperties.put("mail.smtp.starttls.enable",mailSmtpStartTlsEnable);
        mailProperties.put("mail.debug",mailDebug);
        mailSender.setJavaMailProperties(mailProperties);
        mailSender.setHost(mailHost);
        mailSender.setPort(mailPort);
        mailSender.setUsername(username);
        mailSender.setPassword(password);
        return mailSender;
    }
```

7.2.3 Email Templating Service

The application design involves lots of classes where each class does one thing (performs one function). This is commonly known as the Single Responsibility pattern. Figure 51 displays the application prototype that fulfills the single responsibility of generating dynamic email content.

Figure 51

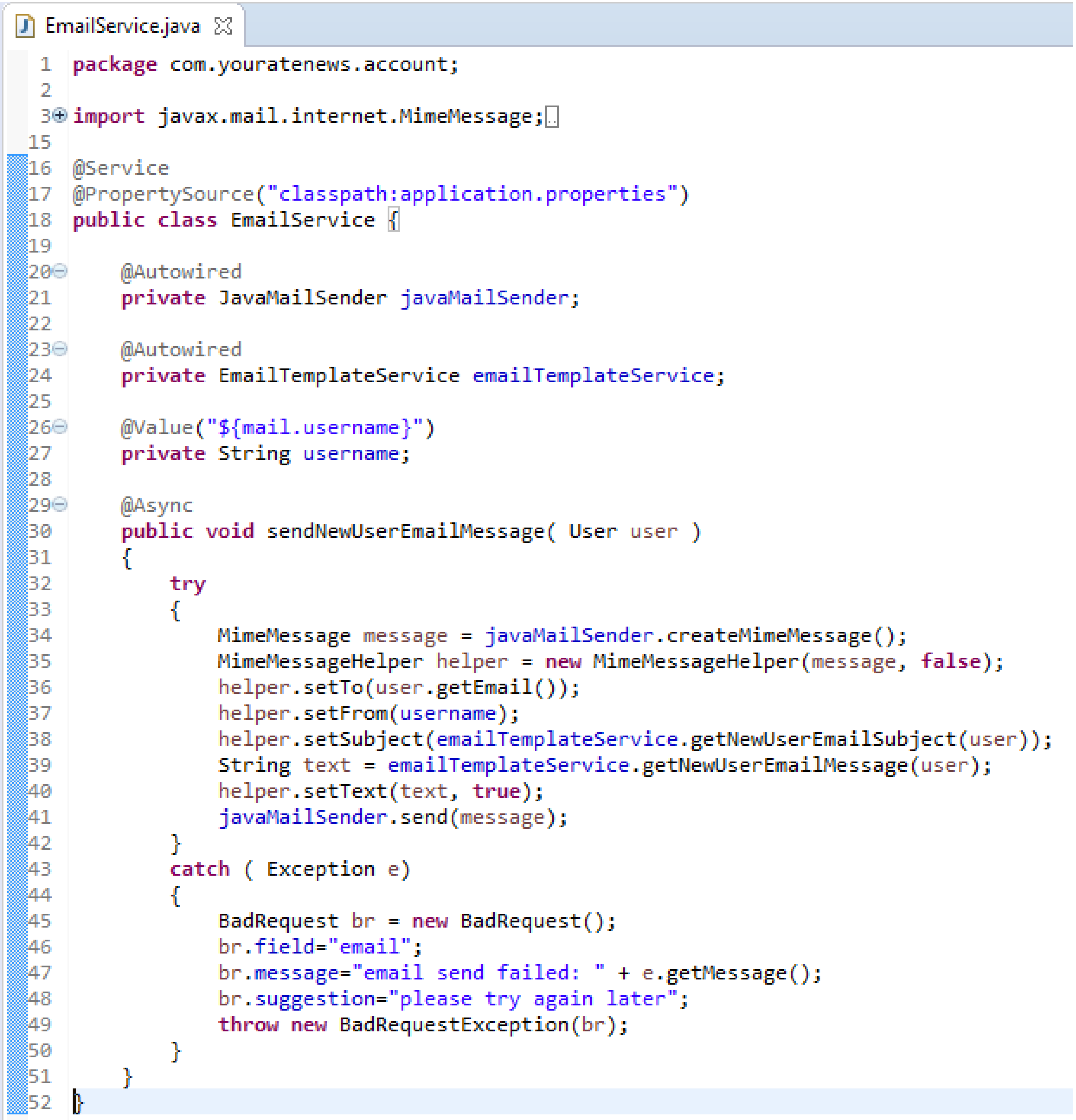


```java
package com.youratenews.account;

import java.util.HashMap;

@Service
public class EmailTemplateService {

    @Autowired
    public Configuration freemarkerConfiguration;

    public String getNewUserEmailMessage( User user )
    {
        Map<String, Object> model = new HashMap<>();
        model.put("user", user);
        return geFreeMarkerTemplateContent(model,"NewUserEmailMessage.ftl");
    }

    public String getNewUserEmailSubject( User user )
    {
        Map<String, Object> model = new HashMap<>();
        model.put("user", user);
        return geFreeMarkerTemplateContent(model,"NewUserEmailSubject.ftl");
    }

    public String geFreeMarkerTemplateContent(Map<String, Object> model, String template)
    {
        StringBuffer content = new StringBuffer();
        try
        {
            freemarkerConfiguration.setClassForTemplateLoading(getClass(), "/");
            content.append(FreeMarkerTemplateUtils.processTemplateIntoString(
                    freemarkerConfiguration.getTemplate(template),model));
            return content.toString();
        }
        catch(Exception e)
        {
            throw new RuntimeException(e);
        }
    }
}
```

7.2.4 Email Service

The application's EmailService sends emails. Figure 52 is this application's prototype. Note that the MimeMessage and MimeMessageHelper classes facilitate the sending of html-content emails. Also notice that this EmailService uses the configured java mail sender as well as the email template service described above.

Figure 52

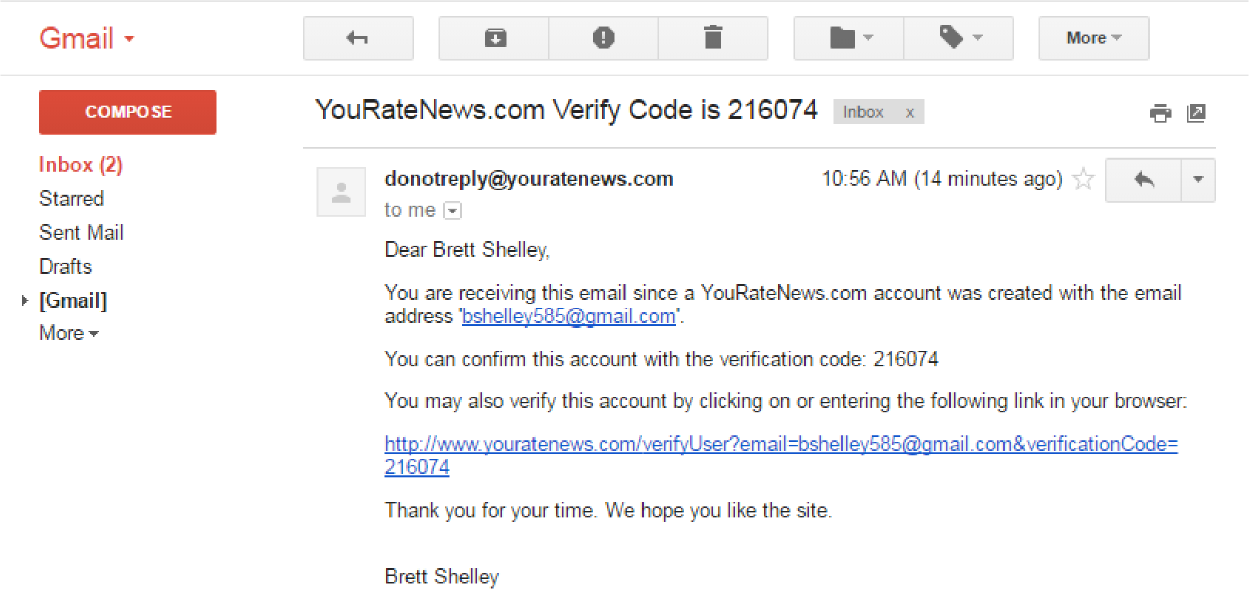


```java
package com.youratenews.account;

import javax.mail.internet.MimeMessage;

@Service
@PropertySource("classpath:application.properties")
public class EmailService {

    @Autowired
    private JavaMailSender javaMailSender;

    @Autowired
    private EmailTemplateService emailTemplateService;

    @Value("${mail.username}")
    private String username;

    @Async
    public void sendNewUserEmailMessage( User user )
    {
        try
        {
            MimeMessage message = javaMailSender.createMimeMessage();
            MimeMessageHelper helper = new MimeMessageHelper(message, false);
            helper.setTo(user.getEmail());
            helper.setFrom(username);
            helper.setSubject(emailTemplateService.getNewUserEmailSubject(user));
            String text = emailTemplateService.getNewUserEmailMessage(user);
            helper.setText(text, true);
            javaMailSender.send(message);
        }
        catch ( Exception e)
        {
            BadRequest br = new BadRequest();
            br.field="email";
            br.message="email send failed: " + e.getMessage();
            br.suggestion="please try again later";
            throw new BadRequestException(br);
        }
    }
}
```

7.2.5 Prototype Email

Figure 53 shows an example email delivered into this author's Gmail Inbox. Note that the Figure 49 FreeMarker template text has been converted into a user-specific email.

Figure 53



YouRateNews.com Verify Code is 216074

donotreply@youratenews.com 10:56 AM (14 minutes ago)

to me

Dear Brett Shelley,

You are receiving this email since a YouRateNews.com account was created with the email address 'bshelley585@gmail.com'.

You can confirm this account with the verification code: 216074

You may also verify this account by clicking on or entering the following link in your browser:

http://www.youratenews.com/verifyUser?email=bshelley585@gmail.com&verificationCode=216074

Thank you for your time. We hope you like the site.

Brett Shelley

8 User Account Requirements Revisited

8.1 Create a User Account

The need to create user accounts is obvious. Each news article rating should come from a known source. To create an account, a user must provide his email and a password. Optionally, the user will supply his first name and last name. To maximize user participation, the application collects an absolute minimum of information collected. In this light, the original idea to capture the user's cell phone number has been rejected.

Typically, the user establishes an account so he/she may rate an article. The YouRateNews site also wants to capture this article information so that the user's experience may be optimized and simplified. For example, when a user verifies his account, he/she should be immediately directed to rate the article they are interested in. The system needs a mechanism to capture what article the user is interested in. We'll call this piece of information an "Article Identifier". This article identifier might be an internal article Id, it might be a URL to an article, or it might be an article's title. The "Article Identifier" name captures all of these possibilities.

The system also needs to capture a time component of an Article Identifier. Imagine that a user decides to create an account and ate an article. Then, for whatever reason, the user doesn't finish the process. Then, when the user verifies his/her email address two weeks later, the system takes them to rate the dated article. The user may have completely forgotten about the article's content. The YouRateNews system wants to avoid that. To avoid this situation, the system needs to NOT direct a user to an article if a set period of time has passed. (Three days seems like a logical value).

The following user information shall be captured in the create user request.

- Email
- Password
- First Name (optional)
- Last Name (optional)
- Article Identifier

Note that the time difference will be calculated by the system and not necessarily be a part of a "create user request".

Lastly, password difficulty shall be configurable. As the need for account security increases, so does the need for users to have a more secure password. More secure and complex passwords require users to "think harder" and record their complex passwords. YouRateNews has no financial information associated with their accounts. The need for more complex passwords is initially low. Thus, to encourage use, no complex passwords will be required. The YouRateNews system will be configurable to configure either simple passwords or more secure/complex simpler passwords.

8.2 Account Verification Email

Once a user creates an account, the next step is for the user to verify his/her email address. The system sends an email to the address the user provided. The email contains a verification code. The email also contains a link that the user can follow to verify the email address. The system adds the verification code to this email both in the email's subject Line and in the body of the message. Adding the verification code to the subject line allows a user to easily see the code if the user is quickly checking email messages. The overall intent is to allow the user to stay actively in the application.

8.3 Account Verification Process

When a user gets his verification code via email, then he may immediately enter and submit it. When this happens, the system will perform a number of checks before flagging the user's account as verified. Among these checks are:

- Validate the user's email
- Validate the verify code
- Check that that the user's account exists
- Check that the user's account has not been locked
- Check Verify that the user's account has not already been verified
- Check that the failed verify attempts have not exceeded the system defined threshold
- Check that the verification code matches the email address

If all checks pass, then the user's account shall be updated as verified. The system shall also limit the number of verify attempts. If this system-defined number of attempts is exceeded, then the system will "lock out" the account.

8.4 Log In Process

Users shall have two means of logging into an account. The first way is with an email address and password. The second approach uses an email address and login token. To login, the user will always initially have to use the first approach. The system allows the first approach to define a "stayLoggedIn" variable. If the value is true, then the system stores and returns a login token.

8.4.1 Login Token Process Explained

The login token is stored on the user's browser if the user has selected the "stayLoggedIn" value. When the user re-enters the application at a later time, this login token is retrieved from the user's browser cookies and sent to the server. The server then checks the login token to see if it matches the token(s) maintained by the user account. If the sent token is associated with the user account, then the login will be successful. With this login token approach, the login process occurs in the background. That is to say, the user is logged in automatically.

The login token approach shall be able to handle multiple devices. Imagine a scenario where a user goes onto the site via a desktop web browser and through a mobile device. The system shall support multiple login tokens – one for each device. Thus, the underlying user account and related information shall be able to store multiple login tokens.   In summary, when a user enters the YouRateNews site, the browser submits any cookie-stored login tokens and the system tries to automatically login the user.

8.4.2 Standard Login Process Logic

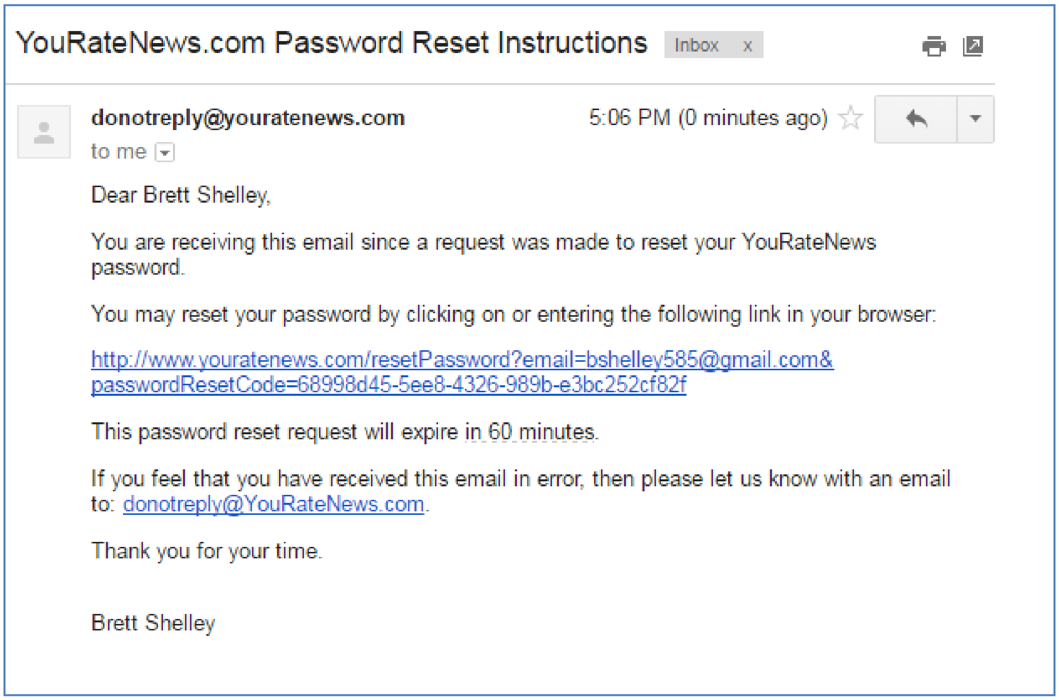
Regardless of the approach, the login process shall support a standardized set of checks. These include:

- Validate the user's email
- Validate the user's password
- Check that that the user's account exists
- Check that the user's account has not been locked
- Check Verify that the user's account has been verified
- Check that the entered password or login token matches the user's account value(s)
- Check that the verification code matches the email address

8.5 Reset Passwords

The system shall enable users to reset their password.   The reset process follows a typical approach that involves sending an email as seen in Figure 54.

Figure 54



YouRateNews.com Password Reset Instructions

donotreply@youratenews.com 5:06 PM (0 minutes ago)

Dear Brett Shelley,

You are receiving this email since a request was made to reset your YouRateNews password.

You may reset your password by clicking on or entering the following link in your browser:

http://www.youratenews.com/resetPassword?email=bshelley585@gmail.com&passwordResetCode=68998d45-5ee8-4326-989b-e3bc252cf82f

This password reset request will expire in 60 minutes.

If you feel that you have received this email in error, then please let us know with an email to: donotreply@YouRateNews.com.

Thank you for your time.

Brett Shelley

8.6 Other User Account Processes

The system shall support other standard user account processes. These processes include: changing password; resending the verify account email, etc. The intent is that these requirements provide just enough guidance to build the application's user account module.

9 User Account Service Design, Development, and Testing

The following highlights the account web service implementation. This RESTful Account web service has no "user interface". It is simply an independent module of web services built for a to-be-developed front end user interface.

9.1 User Controller use cases

Actually writing software development flushes out requirements better than any requirements gathering sessions can. In the YouRateNews application, user accounts pass through various states. That is, each user account has a lifecycle that includes creation, verification, status changes, and sometimes account deletion.

In the account service implementation, most user activities are driven by the users. The application's User Controller class encapsulates these user account functions. This controller supports the following main use cases:

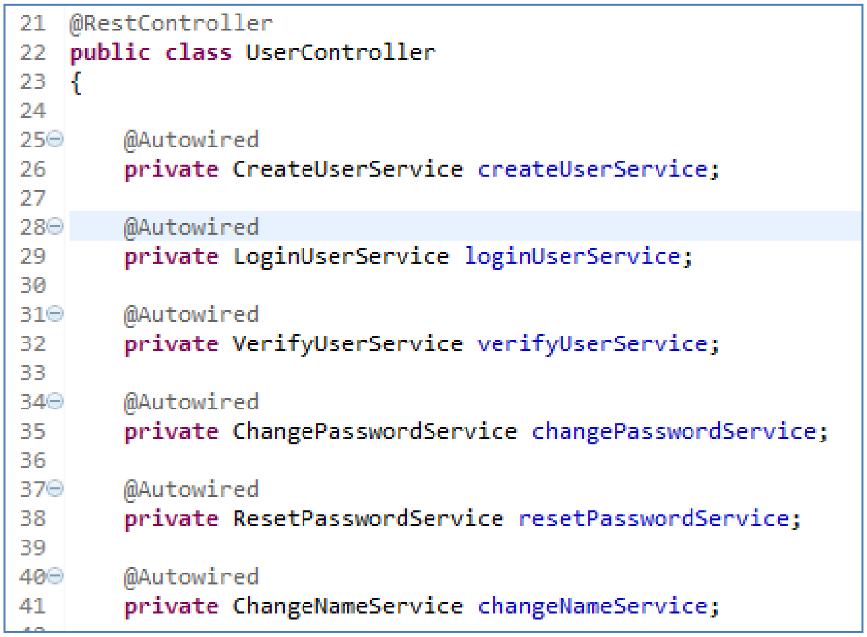
- Create User
- Verify User
- Resend Verify Email
- Login User
- Login User With Token
- Request Password Reset
- Verify Password Reset
- Reset Password
- Change Password
- Change Name

9.2 Inside the User Controller

The application's user controller heavily uses the delegation pattern. The user controller contains class contains several services. These services include: create user service; login service; verify user service; change password service; reset password service; change name service; etc. Figure 55 shows how spring annotations inject these services into this controller.

Drawing on the Single Responsibility pattern, each service focuses on doing one thing. It is obvious what the createUserService does. It should be "intuitively obvious to the casual observer" what all of these services do. Many of these services delegate responsibilities to other services. For example, the create user services uses an email service to send account creation notifications. This email service, in turn, uses an email template service to dynamically generate email content.

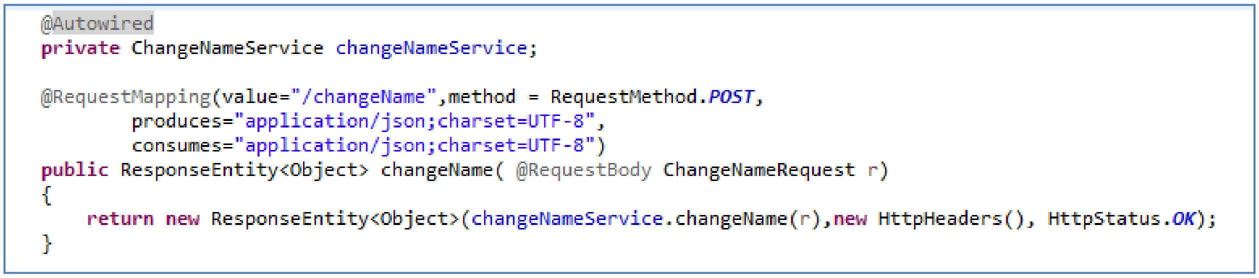
Figure 55



```java
@RestController
public class UserController
{

    @Autowired
    private CreateUserService createUserService;

    @Autowired
    private LoginUserService loginUserService;

    @Autowired
    private VerifyUserService verifyUserService;

    @Autowired
    private ChangePasswordService changePasswordService;

    @Autowired
    private ResetPasswordService resetPasswordService;

    @Autowired
    private ChangeNameService changeNameService;
```

The user controller does contain the RESTful service request mappings. For example, Figure 56 shows that calls to the "changeName" URL path get handled by the changeNameService. Simplicity is achieved by appropriately naming the request body (ChangeNameRequest) and the service method to "changeName". Using this approach, complex controller functionality takes on the appearance of simple and repetitive "plumbing". The following sections provide a brief example of what goes on inside of each service delegate.

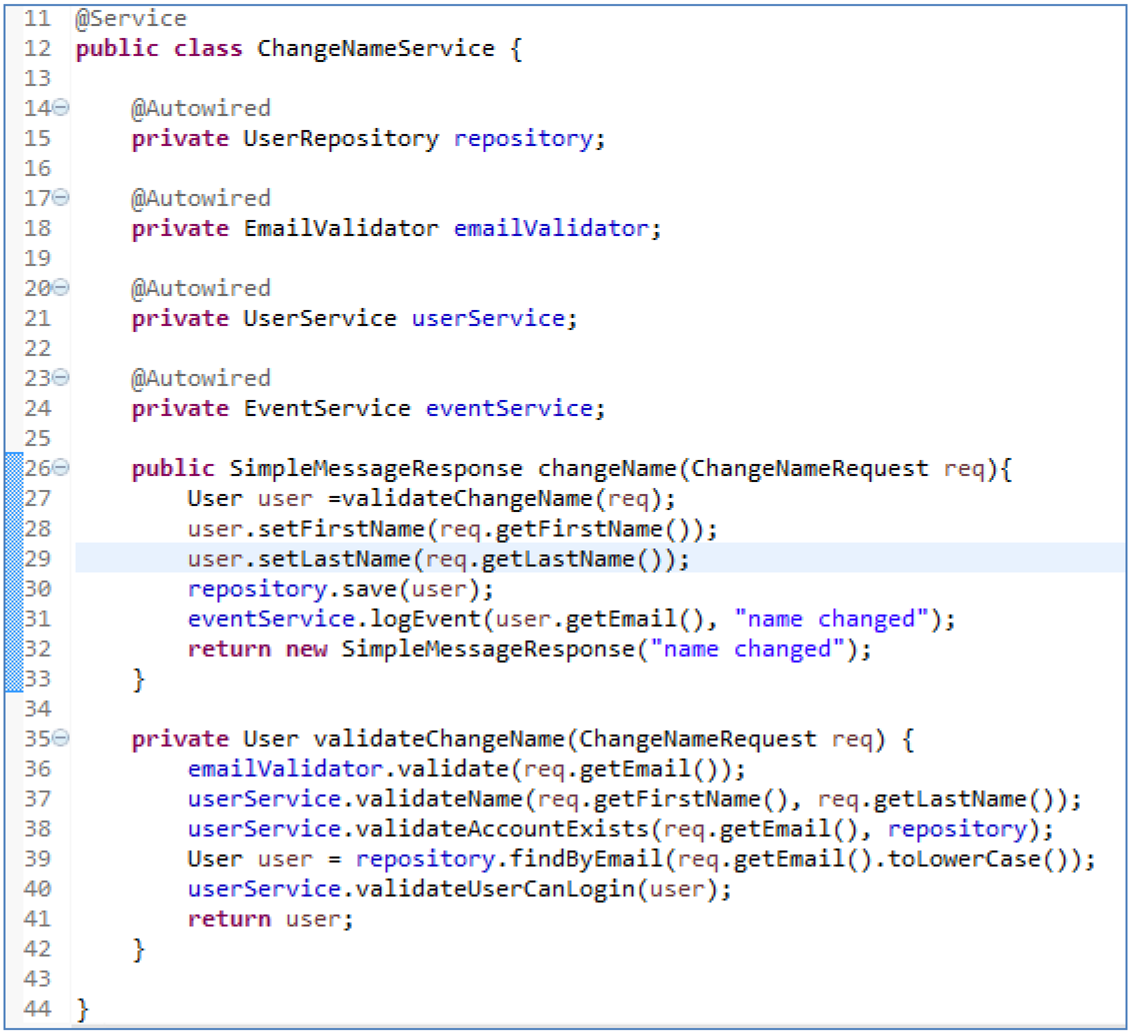
Figure 56



```java
@Autowired
private ChangeNameService changeNameService;

@RequestMapping(value="/changeName",method = RequestMethod.POST,
        produces="application/json;charset=UTF-8",
        consumes="application/json;charset=UTF-8")
public ResponseEntity<Object> changeName( @RequestBody ChangeNameRequest r)
{
    return new ResponseEntity<Object>(changeNameService.changeName(r),new HttpHeaders(), HttpStatus.OK);
}
```

9.3 Inside the Change Name Service

Figure 57

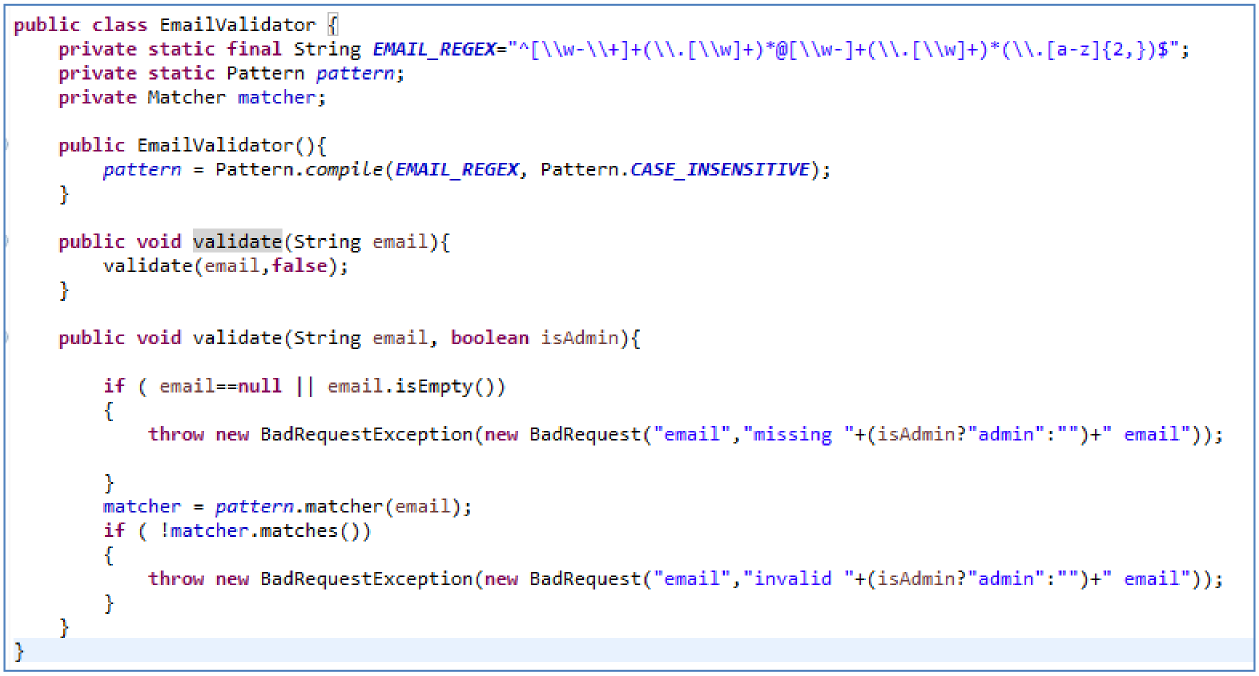


```java
@Service
public class ChangeNameService {

    @Autowired
    private UserRepository repository;

    @Autowired
    private EmailValidator emailValidator;

    @Autowired
    private UserService userService;

    @Autowired
    private EventService eventService;

    public SimpleMessageResponse changeName(ChangeNameRequest req){
        User user =validateChangeName(req);
        user.setFirstName(req.getFirstName());
        user.setLastName(req.getLastName());
        repository.save(user);
        eventService.logEvent(user.getEmail(), "name changed");
        return new SimpleMessageResponse("name changed");
    }

    private User validateChangeName(ChangeNameRequest req) {
        emailValidator.validate(req.getEmail());
        userService.validateName(req.getFirstName(), req.getLastName());
        userService.validateAccountExists(req.getEmail(), repository);
        User user = repository.findByEmail(req.getEmail().toLowerCase());
        userService.validateUserCanLogin(user);
        return user;
    }

}
```

Figure 57 shows the code in the ChangeNameService class. Following the delegation pattern again, this service delegates much of its underlying functionality to its internal components. Saving the user account record is handled by the user repository. Logging events is handled by an event service. Validating the email is handled by an email validator. Figure 58 shows the email validation code. This email validation code is brief and relatively simple (except for the horrendous email regular expression).

The bottom line is to exert tremendous effort and discipline to keep it simple. Trying to hurry a software solution along by copying and pasting the same code in many places quickly increases the code's complexity. The DRY principle (don't repeat yourself) applies. If the same code is not repeated in any two places, then the software is on the right path. If a non-technical analyst can see what the code is doing on a PowerPoint slide, then the technical solution is going in the right direction.

Figure 58

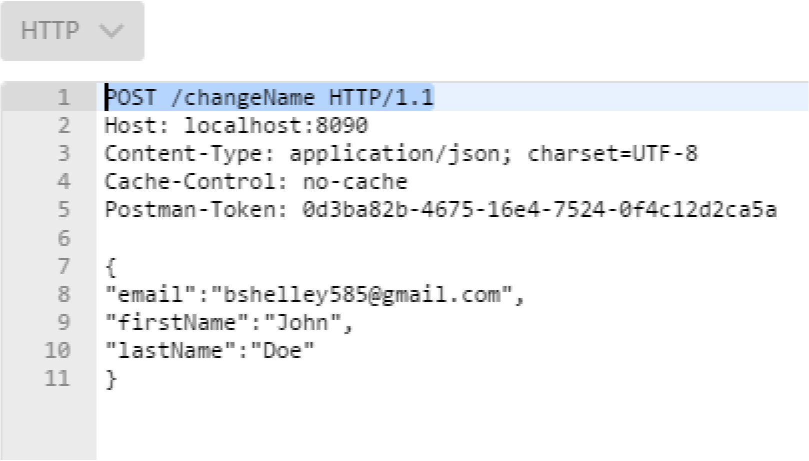


```
public class EmailValidator {
    private static final String EMAIL_REGEX="^[\\w-\\+]+(\\.[\\w]+)*@[\\w-]+(\\.[\\w]+)*(\\.[a-z]{2,})$";
    private static Pattern pattern;
    private Matcher matcher;

    public EmailValidator(){
        pattern = Pattern.compile(EMAIL_REGEX, Pattern.CASE_INSENSITIVE);
    }

    public void validate(String email){
        validate(email,false);
    }

    public void validate(String email, boolean isAdmin){

        if ( email==null || email.isEmpty())
        {
            throw new BadRequestException(new BadRequest("email","missing "+(isAdmin?"admin":"")+" email"));

        }
        matcher = pattern.matcher(email);
        if ( !matcher.matches())
        {
            throw new BadRequestException(new BadRequest("email","invalid "+(isAdmin?"admin":"")+" email"));
        }
    }
}
```

9.4 Testing the Change Name Service

Postman tests verify the user controller's functionality. Each of these functional tests is small since the Postman software does all of the heavy lifting. Figure 59 shows how a "change name" test appears in postman. Developing tests is easy once you have taken the time to get to know the tool. The effort to code functional tests without such a tool would be much greater.

Figure 59

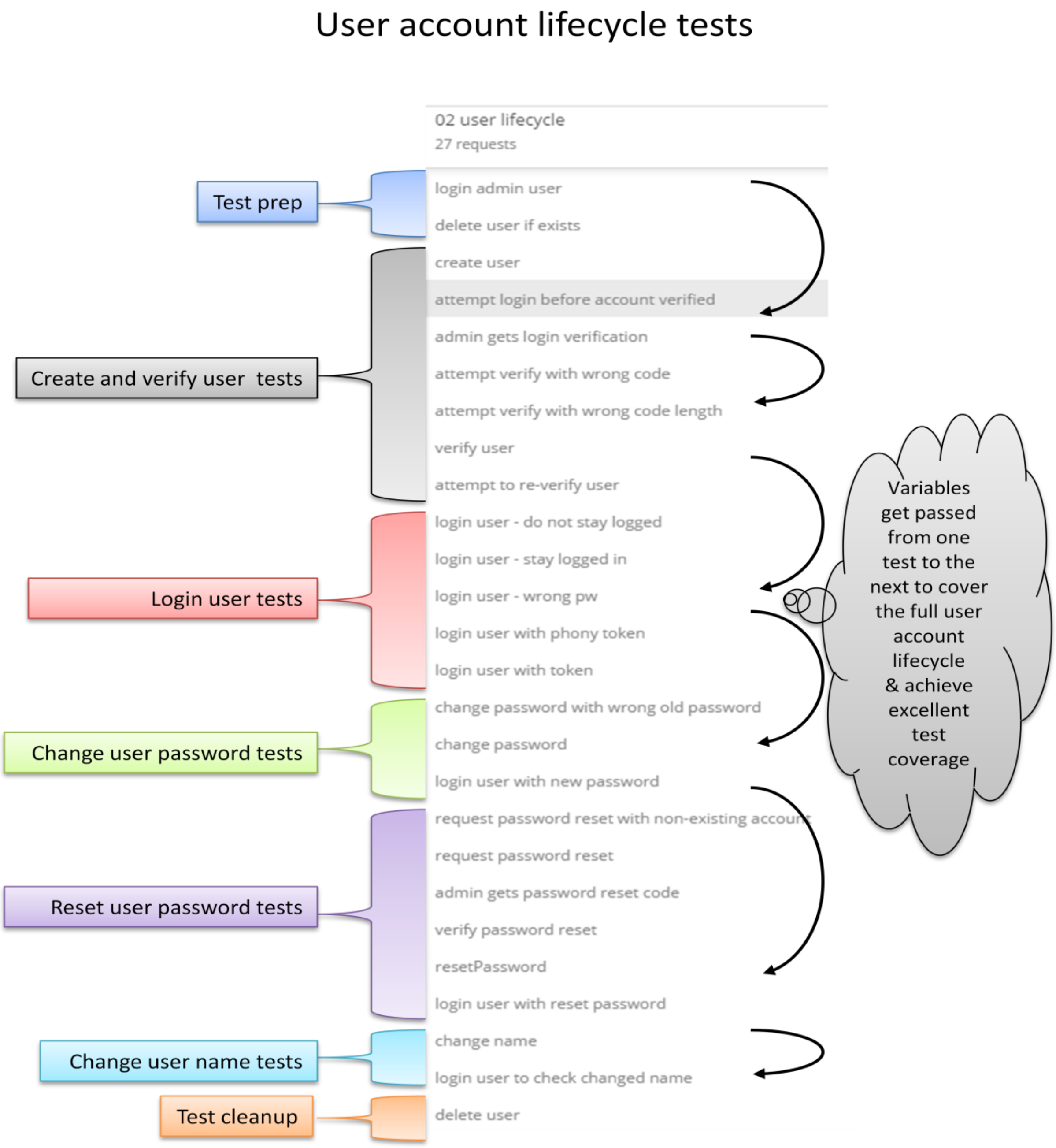


```
POST /changeName HTTP/1.1
Host: localhost:8090
Content-Type: application/json; charset=UTF-8
Cache-Control: no-cache
Postman-Token: 0d3ba82b-4675-16e4-7524-0f4c12d2ca5a

{
"email":"bshelley585@gmail.com",
"firstName":"John",
"lastName":"Doe"
}
```

9.5 User Account Controller Test Coverage

Running lots of completely independent little tests can slowly become a hassle. For example, running a change password test, then later running a login test forces one to update the login test. Luckily, Postman software handles this with its Collection Runner capability. Figure 60 demonstrates the general idea. These user account lifecycle tests show how a collection of tests can run together.

Figure 60



User account lifecycle tests

02 user lifecycle
27 requests

login admin user
delete user if exists
create user
attempt login before account verified
admin gets login verification
attempt verify with wrong code
attempt verify with wrong code length
verify user
attempt to re-verify user
login user - do not stay logged
login user - stay logged in
login user - wrong pw
login user with phony token
login user with token
change password with wrong old password
change password
login user with new password
request password reset with non-existing accoun
request password reset
admin gets password reset code
verify password reset
resetPassword
login user with reset password
change name
login user to check changed name
delete user

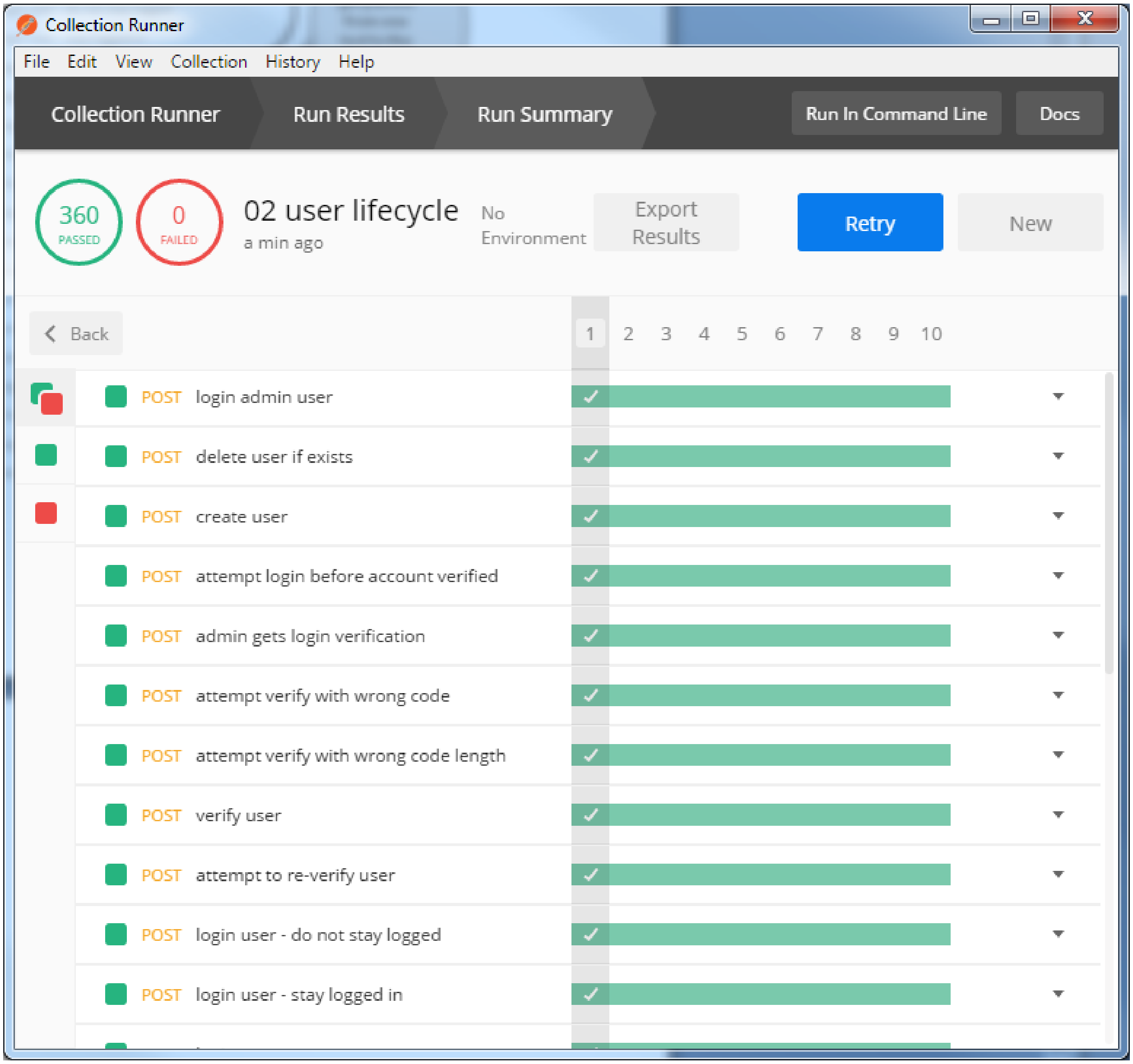
Test prep
Create and verify user tests
Login user tests
Change user password tests
Reset user password tests
Change user name tests
Test cleanup

Variables get passed from one test to the next to cover the full user account lifecycle & achieve excellent test coverage

9.6 Postman Collection Runner results

The Postman Collection Runner can run a series of tests many times. Figure 61 depicts the results after 36 user lifecycle tests are run through 10 iterations. The tool is pretty good. Other tools like SOAPUI provide similar functionality.

Figure 61



360 PASSED

0 FAILED

02 user lifecycle

a min ago

No Environment

POST	login admin user
POST	delete user if exists
POST	create user
POST	attempt login before account verified
POST	admin gets login verification
POST	attempt verify with wrong code
POST	attempt verify with wrong code length
POST	verify user
POST	attempt to re-verify user
POST	login user - do not stay logged
POST	login user - stay logged in

9.7 Evolution of the YouRateNews User Account

Section 2.2.1 describes the initial intent behind what user attributes the system captures. This guidance is just that – guidance. After implementing the account service, the system now captures the following user information.

- **Id** – an identifier for each user record
- **Email** – the user's email and login id
- **Password** – the user's password
- **First Name** – the user's first name
- **Last Name** – the user's last name
- **Verification Code** – used to match against the value in the verification email sent to the user
- **Failed Verify Attempts** –tracks the number of failed verify attempts
- **Verified** – indicates whether the user confirmed the account via a verification email
- **Failed Login Attempts** – tracks the number of failed login attempts
- **Reset Password Info** – an object that contains password reset info like a reset code and the password reset request expiration time
- **Locked Out** – indicates whether the user's account is locked due to incorrect password entry attempts
- **Blocked** - indicates whether the user's account is locked by an administrator due to account misuse
- **Trusted** – indicates whether a user's account is trusted with elevated privileges
- **Admin –** indicates whether an account has admin privileges
- **Login Tokens** – values used to allow the user to silently login from one or more devices

9.8 Focusing on the Deliverables

In more regulated environments, architecting and developing user services might require product architecture documents, UML diagrams, entity relationship diagrams, formal requirements documents, system design documents and so forth. This application does not have these elements. This effort only has this document that parallels the effort. However, the analysis still has to happen. But rather than fulfilling the documentation needs of a large organization, the development effort itself enhances system requirements as the code is being written. This entrepreneurial approach is the fastest way to keep things moving.

10 Rating Service Analysis, Design, Development, and Testing

YouRateNews enables users to do just that- rate news. This section describes the software engineering components to enable this.

The previous sections describe user account creation and maintenance. User account maintenance is not that exciting since most people have experienced this process as an end user countless times. However, as we'll see, user accounts are essential to rating news. This minimalistic approach that forces users to create an account before rating an article keeps the rating data safe and authentic. That is, anonymous users or hackers can't create thousands of phony ratings to trash an article or its publisher.

10.1 The voting analogy

Activities involved in the election process include: setting up voting machines; organizing voting stations; assembling voting commissions; counting votes; verifying results; and announcing the winners. All of these activities focus on enabling each voter to cast a single vote.

Rating an article is analogous to a user casting their vote in an election. Just as the election process focuses on enabling people to vote, every part of the YouRateNews application focuses on enabling people to rate articles. Every legitimate voting process enables one voter to cast one vote. The YouRateNews article rating process also enables one user to rate one article once. The calculation of ratings is also analogous to the vote tallying process. After elections close, voting results get tabulated into results. And in the same spirit, after a user rates an article, his ratings get counted to produce rating results.

This voting analogy breaks down with regards to "when" the system determines rating summary results. At some specified date and time, each election closes and voting stops. After this point, election officials count votes and determine results. With the YouRateNews application, the elections don't close. Rating articles is a continuous process. Tabulating rating results is a continuous process.

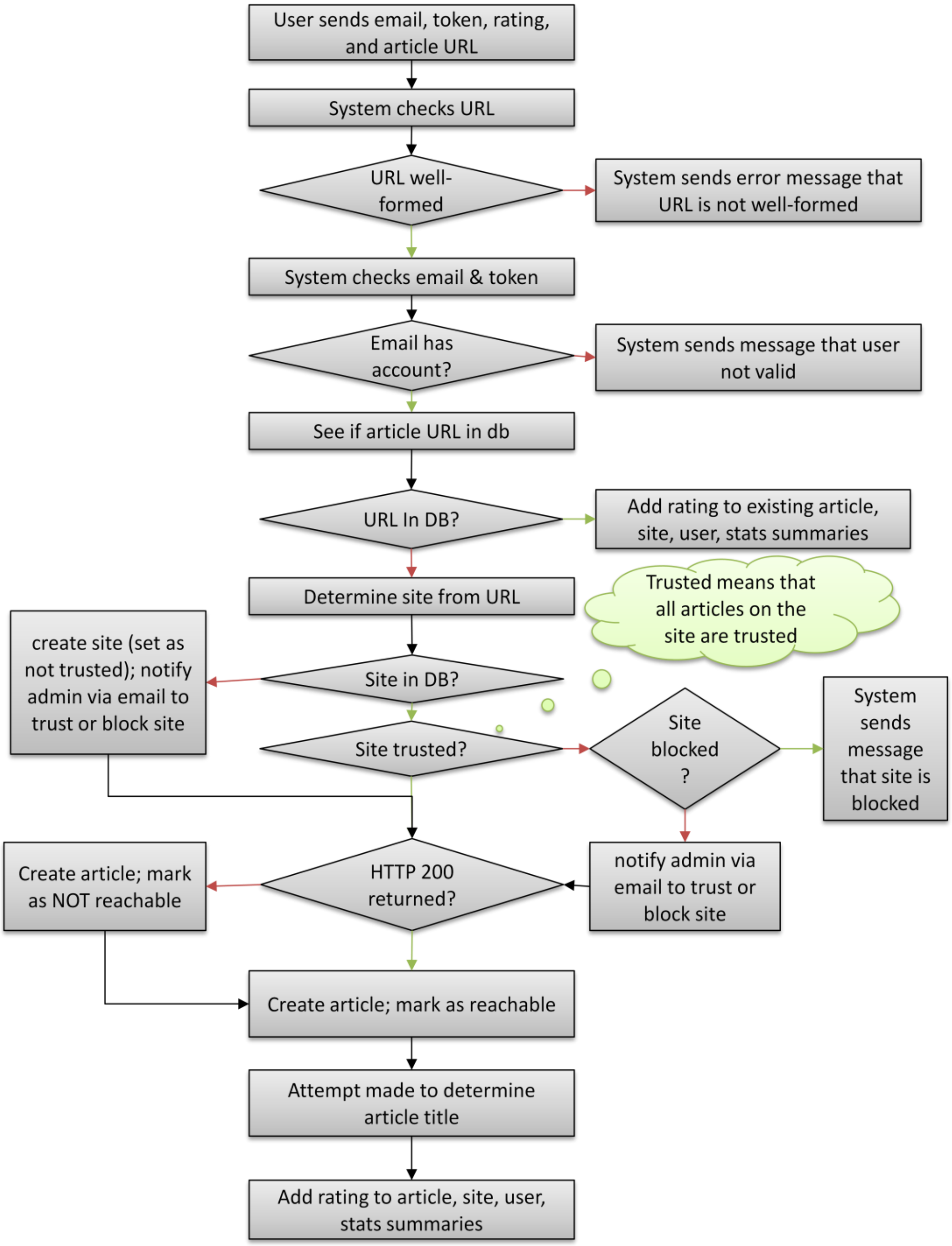
Luckily, YouRateNews doesn't require raters to go to a polling station to cast their votes. Instead, a rater sets up an account just once, and can then rate as many article as he/she wishes online. A rater can't rate an article more than once, but he/she can rate many articles. The YouRateNews site tabulates these ratings continuously for each article and for each news site.

The bottom line is that the heart of the YouRateNews application is the rating. A user rating an article is the only meaningful piece of information collected on the site. It is important that it gets done right.

10.2 Rating an Article – Simplicity evolves into complexity

In order for the YouRateNews concept to succeed, every effort must be made to provide the user with a simplified experience. A user should be able to rate an article as simply as possible. Figure 62 demonstrates the behind-the-scenes complexity of making a rating process simple.

Figure 62


User sends email, token, rating, and article URL
System checks URL
URL well-formed
System sends error message that URL is not well-formed
System checks email & token
Email has account?
System sends message that user not valid
See if article URL in db
URL In DB?
Add rating to existing article, site, user, stats summaries
Determine site from URL
Trusted means that all articles on the site are trusted
create site (set as not trusted); notify admin via email to trust or block site
Site in DB?
Site trusted?
Site blocked ?
System sends message that site is blocked
Create article; mark as NOT reachable
HTTP 200 returned?
notify admin via email to trust or block site
Create article; mark as reachable
Attempt made to determine article title
Add rating to article, site, user, stats summaries

10.3 Rating process explained

This author is building out this software as the legendary painter Bob Ross would paint one of his landscapes – on the fly. I am also writing this book as I build the software. So, knowing how important the simple rating process is to the success of the application – I started just writing the code to make it happen. And as I coded a solution as fast as I could, I discovered that something was simply missing. I did not have a good sense of all the complexities that the simple rating process introduces.

I pulled back, took a few walks, and thought about the rating process. After ideas started to solidify, I documented the general process seen in Figure 62. This flowchart shows the general process needed to create a rating with just the rating, the user's identity, and the article's URL on the web. And then I threw out my first attempt – and proceeded to break down a complex process into smaller simplified pieces. Let's go through some of these.

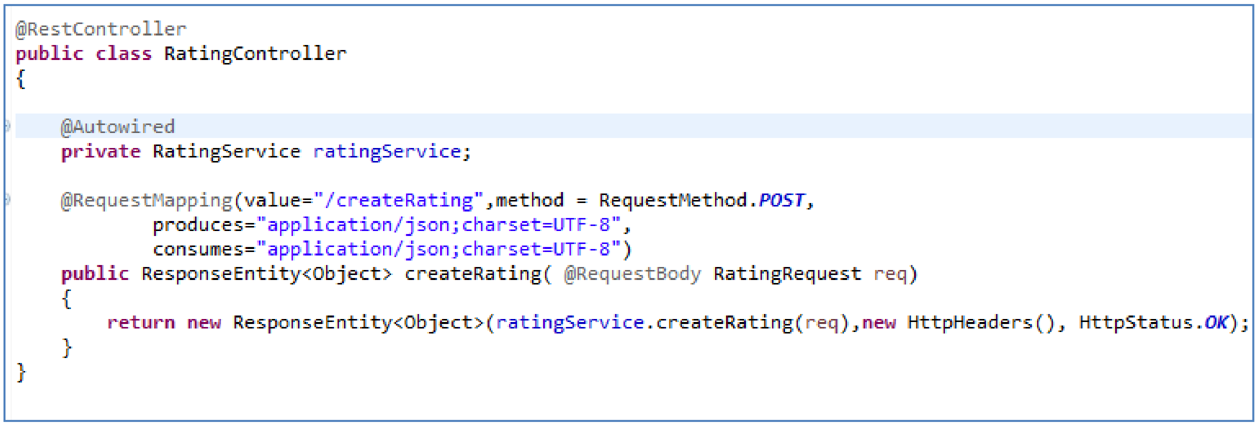
10.3.1 Simplifying the Rating Process Interface

The YouRateNews application is not envisioned as a standalone website. As discussed before, perhaps a few fanatics will go on the site regularly. A better opportunity for success is for the site to have links to rate articles on many other sites. To support this opportunity, the rating creation process should be as simple as possible. This need translates into having the interface to other sites be as simple as possible. And this need for a simplified interface requires that the least amount of information possible should be supplied in this interface.

10.3.2 Back to Technology – The REST controller

Figure 63 shows the very simple YouRateNews back end controller that serves as the interface to the outside world for creating a rating.

Figure 63

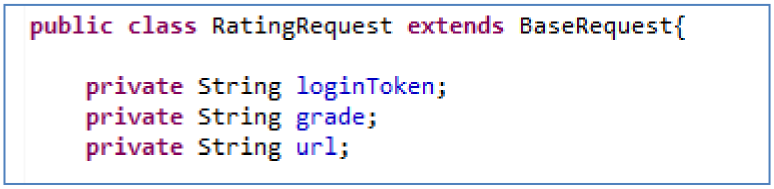


```
@RestController
public class RatingController
{

    @Autowired
    private RatingService ratingService;

    @RequestMapping(value="/createRating",method = RequestMethod.POST,
            produces="application/json;charset=UTF-8",
            consumes="application/json;charset=UTF-8")
    public ResponseEntity<Object> createRating( @RequestBody RatingRequest req)
    {
        return new ResponseEntity<Object>(ratingService.createRating(req),new HttpHeaders(), HttpStatus.OK);
    }
}
```

10.3.3 The Rating Request

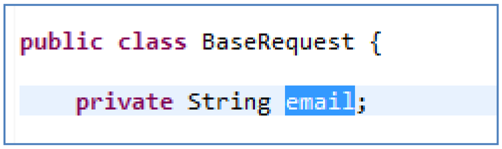
Figure 64 and Figure 65 show the simple structure of a Rating request. These two classes encapsulate the absolute minimum information needed to rate an article. The user's email is necessary to determine the user's account. The loginToken verifies the user's identity. The "grade" is the A, B, C, D or F rating that the user is giving the article. And the url is the article's location on the world wide web.

Figure 64



```
public class RatingRequest extends BaseRequest{

    private String loginToken;
    private String grade;
    private String url;
```

Figure 65

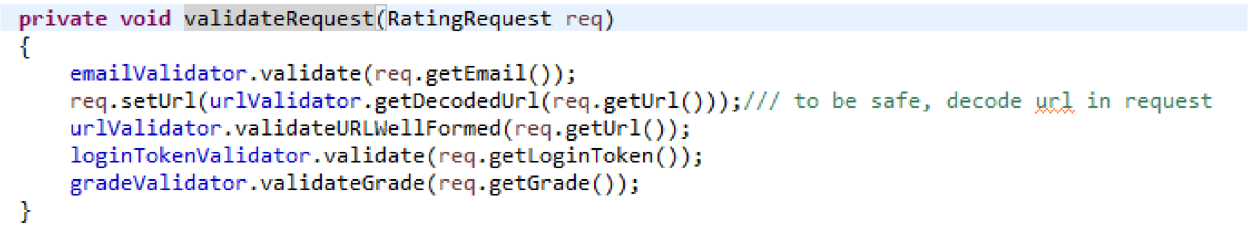


```
public class BaseRequest {

    private String email;
```

10.3.4 Validating the Request

When a request to create a rating comes into the system from the outside, the request should be validated first. The validation shown in Figure 66 checks the external RatingRequest. If errors are present, then an error is returned to the calling application. For speed and system performance, these type of validation checks take place before any real data calls get made.

Figure 66

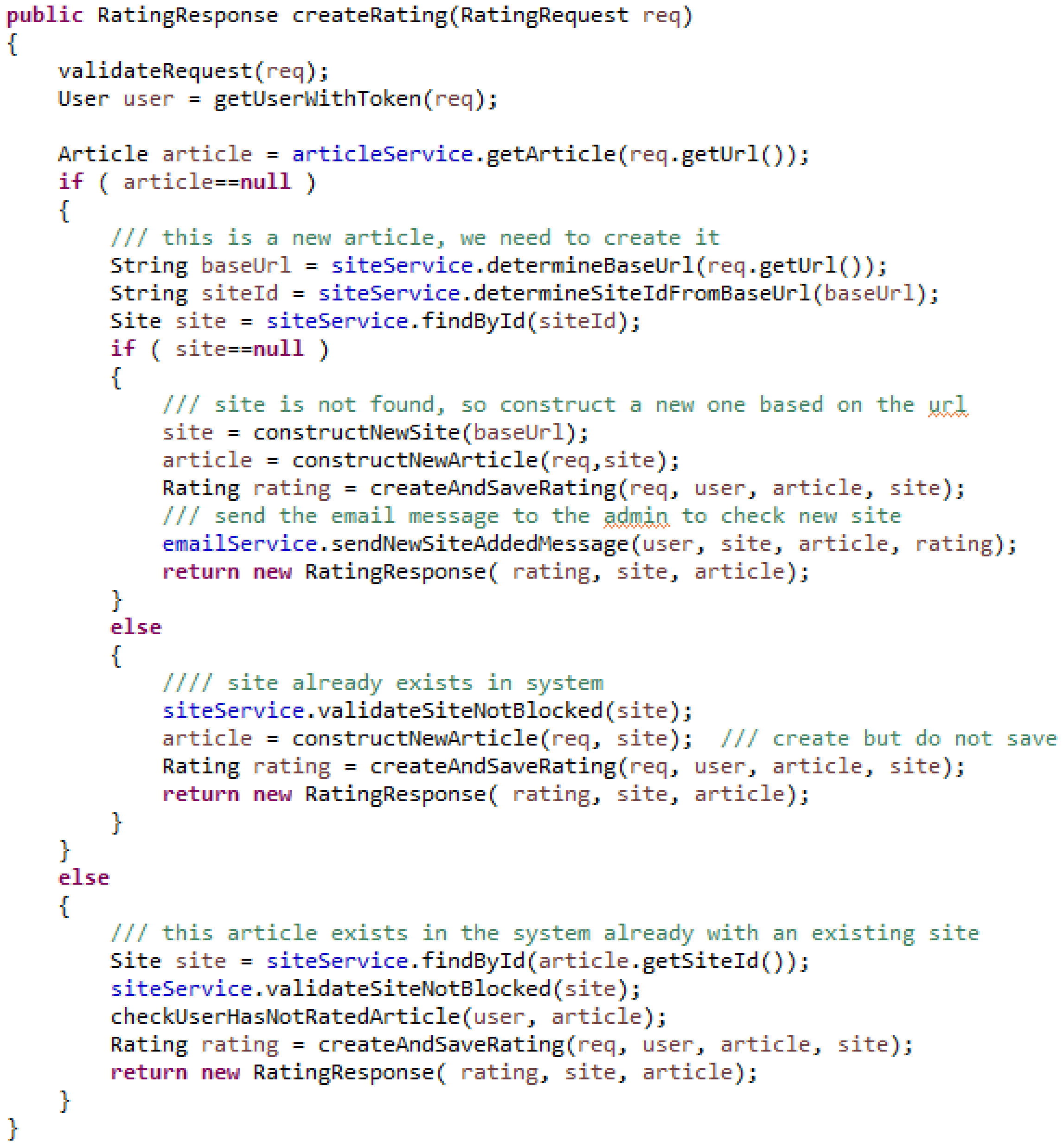


```
private void validateRequest(RatingRequest req)
{
    emailValidator.validate(req.getEmail());
    req.setUrl(urlValidator.getDecodedUrl(req.getUrl()));/// to be safe, decode url in request
    urlValidator.validateURLWellFormed(req.getUrl());
    loginTokenValidator.validate(req.getLoginToken());
    gradeValidator.validateGrade(req.getGrade());
}
```

10.3.5 Rating Creation – Core Implementation

Figure 67 shows the rating creation process flow code. This is not too different from the process flow seen in Figure 62. The code has a simple interface and, as you can see, quickly becomes complex behind the scenes. However, the main flow implementation fits onto a single page.

Figure 67



```
public RatingResponse createRating(RatingRequest req)
{
    validateRequest(req);
    User user = getUserWithToken(req);

    Article article = articleService.getArticle(req.getUrl());
    if ( article==null )
    {
        /// this is a new article, we need to create it
        String baseUrl = siteService.determineBaseUrl(req.getUrl());
        String siteId = siteService.determineSiteIdFromBaseUrl(baseUrl);
        Site site = siteService.findById(siteId);
        if ( site==null )
        {
            /// site is not found, so construct a new one based on the url
            site = constructNewSite(baseUrl);
            article = constructNewArticle(req,site);
            Rating rating = createAndSaveRating(req, user, article, site);
            /// send the email message to the admin to check new site
            emailService.sendNewSiteAddedMessage(user, site, article, rating);
            return new RatingResponse( rating, site, article);
        }
        else
        {
            //// site already exists in system
            siteService.validateSiteNotBlocked(site);
            article = constructNewArticle(req, site);  /// create but do not save
            Rating rating = createAndSaveRating(req, user, article, site);
            return new RatingResponse( rating, site, article);
        }
    }
    else
    {
        /// this article exists in the system already with an existing site
        Site site = siteService.findById(article.getSiteId());
        siteService.validateSiteNotBlocked(site);
        checkUserHasNotRatedArticle(user, article);
        Rating rating = createAndSaveRating(req, user, article, site);
        return new RatingResponse( rating, site, article);
    }
}
```

10.4 Rating Creation - Implementation Details

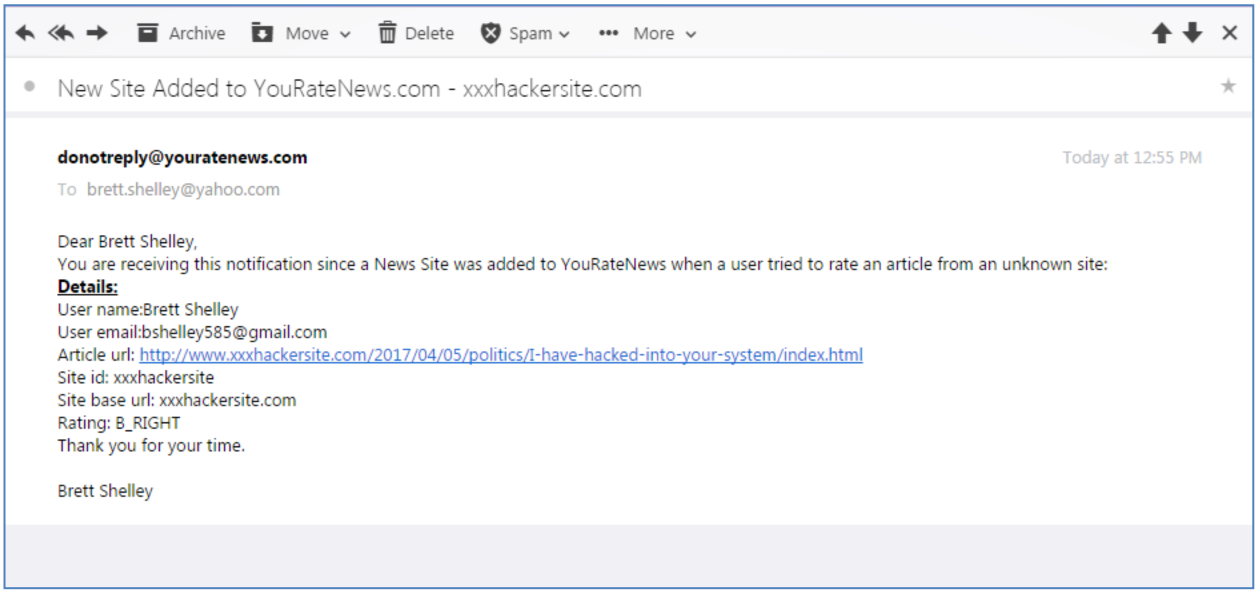
10.4.1 Checking for Blocked Users and Blocked Sites

The YouRateNews application allows anyone to create an account and start rating articles. It must be expected that malicious users will attempt to try every trick in the book. The site does not allow file uploads, does not contain financial information, and the user information captured is minimalistic. Still, the bad guys are out there and will try every route. Thus, the solution must build in countermeasures.

An example: One malicious avenue is that a user might attempt to corrupt the sites data by rating fake news articles from disreputable sites. For example, a malicious user might try to create a rating with a URL that is really an advertisement to a porn site. They might do this in the hopes of getting onto the site's main trending news section.

The YouRateNews application tries to automate everything. However, human intervention is sometimes necessary. In the example above, the YouRateNews app sends a notification to an internal administrative user whenever an article from an unknown site is added. Figure 68 shows an example email notification. An administrator can review the site as necessary and block the site and/or user if necessary. Once a site is blocked, then no further "articles" from that site will make it onto the system.

Figure 68



New Site Added to YouRateNews.com - xxxhackersite.com

donotreply@youratenews.com
Today at 12:55 PM
To brett.shelley@yahoo.com

Dear Brett Shelley,
You are receiving this notification since a News Site was added to YouRateNews when a user tried to rate an article from an unknown site:
Details:
User name:Brett Shelley
User email:bshelley585@gmail.com
Article url: http://www.xxxhackersite.com/2017/04/05/politics/I-have-hacked-into-your-system/index.html
Site id: xxxhackersite
Site base url: xxxhackersite.com
Rating: B_RIGHT
Thank you for your time.

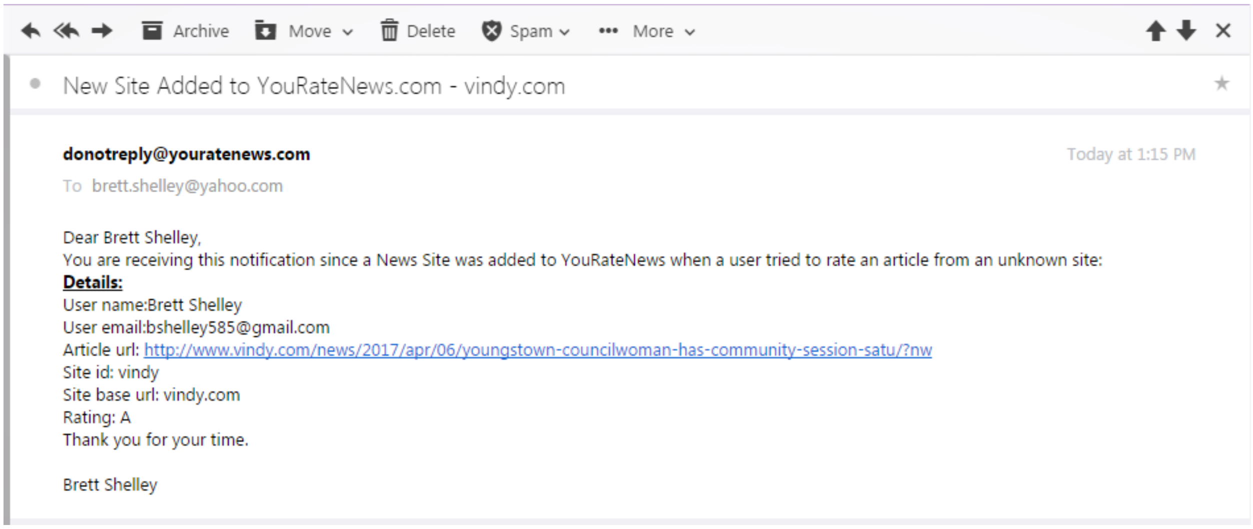
Brett Shelley

10.4.2 Trusting a site

The YouRateNews is deployed with a set number of pre-trusted sites. Major news sites like CNN, Fox News, MSNBC, etc. are automatically trusted. The system trusts all ratings on articles originating from these sites. As users attempt to rate articles from additional news sites, then the rating process proceeds normally, but the site's statistics will not show up in search results until the site is trusted.

For example, imagine a user rates an article from the Youngstown Vindicator. The user enters the article's URL as http://www.vindy.com/news/2017/apr/06/youngstown-councilwoman-has-community-session-satu/?nw. Since the YouRateNews application has no record of "vindy.com" articles, the administrator notification gets sent similar to Figure 69. The administrator quickly reviews the site and marks the site as trusted. Once the site has been trusted, then it shows up in search results. Furthermore, the trusted articles from Vindy.com may also show up in the Trending news section.

Figure 69



New Site Added to YouRateNews.com - vindy.com

donotreply@youratenews.com
To brett.shelley@yahoo.com

Today at 1:15 PM

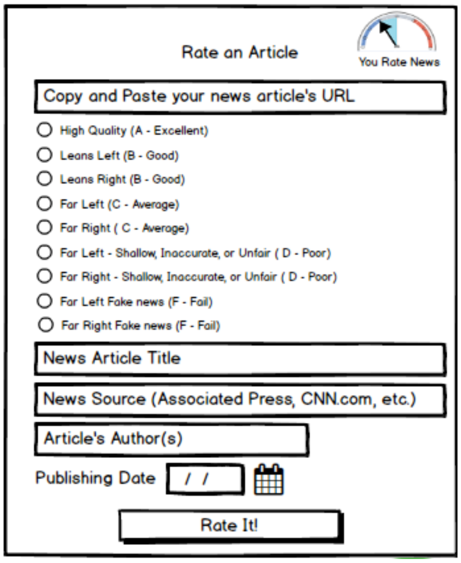
Dear Brett Shelley,
You are receiving this notification since a News Site was added to YouRateNews when a user tried to rate an article from an unknown site:
Details:
User name:Brett Shelley
User email:bshelley585@gmail.com
Article url: http://www.vindy.com/news/2017/apr/06/youngstown-councilwoman-has-community-session-satu/?nw
Site id: vindy
Site base url: vindy.com
Rating: A
Thank you for your time.

Brett Shelley

10.4.3 Parsing Article URLs

Complex business problems often get encountered while coding the solution. In this same light, testing also often leads to solution discoveries. This is the case with the need to determine an article's title, source (site) and publishing date. Figure 70 shows the original intent of the site where users manually enter article information. This goal has evolved to now let users rate an article with just the URL on the site or, better yet, via an external link.

Figure 70


Rate an Article

Copy and Paste your news article's URL

○ High Quality (A - Excellent)
○ Leans Left (B - Good)
○ Leans Right (B - Good)
○ Far Left (C - Average)
○ Far Right (C - Average)
○ Far Left - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Right - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Left Fake news (F - Fail)
○ Far Right Fake news (F - Fail)

News Article Title

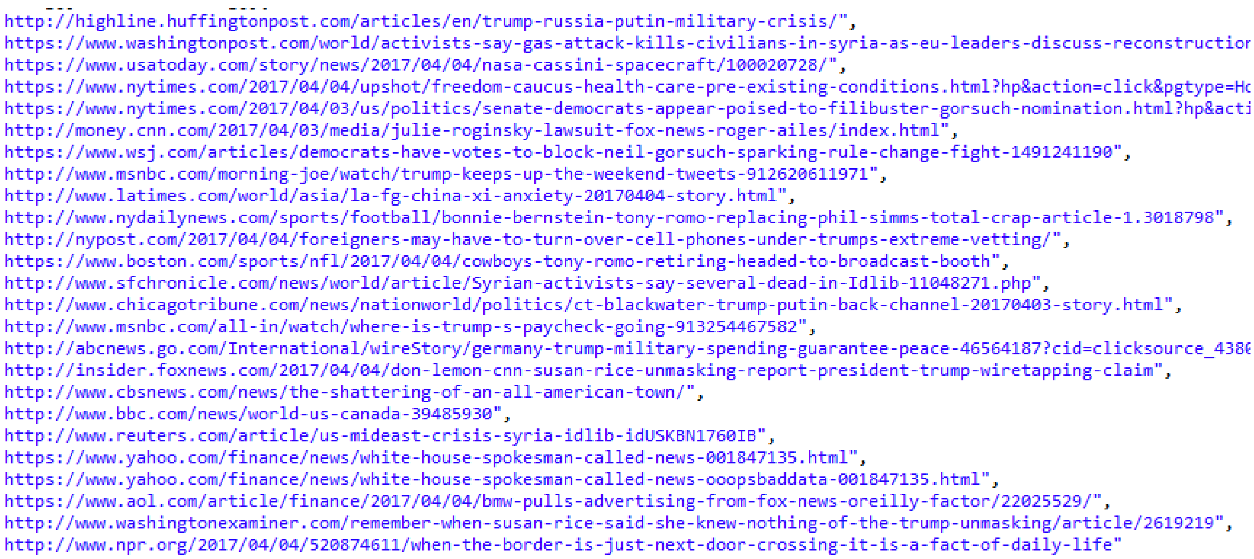
News Source (Associated Press, CNN.com, etc.)

Article's Author(s)

Publishing Date / /

I discovered a pattern while testing various news articles from major sites. The article's title, the news source (site) and often the publishing date are in URL. You can see this pattern in Figure 71. Thus, the YouRateNews solution mines the title, publishing date, and source site directly from the URL.

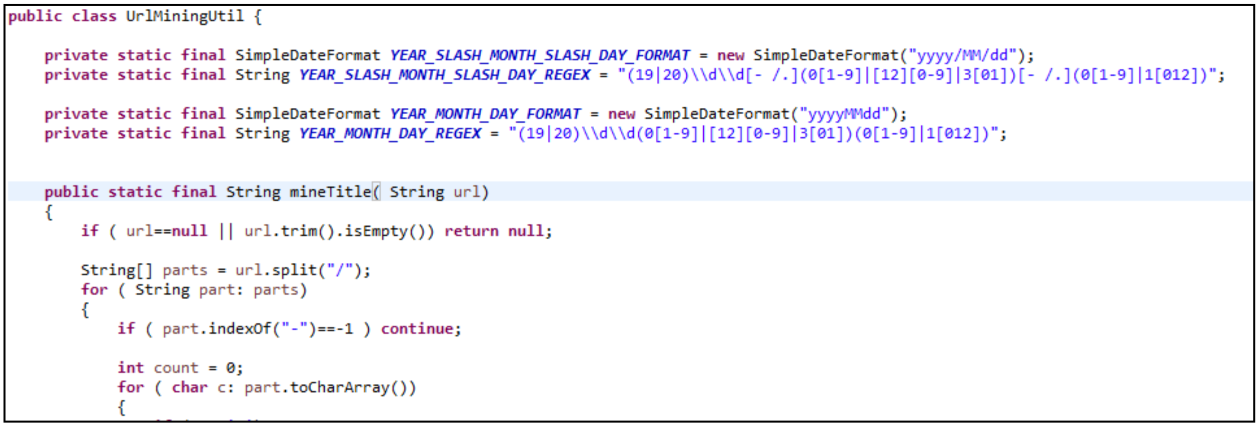
Figure 71


```
http://highline.huffingtonpost.com/articles/en/trump-russia-putin-military-crisis/",
https://www.washingtonpost.com/world/activists-say-gas-attack-kills-civilians-in-syria-as-eu-leaders-discuss-reconstructio
https://www.usatoday.com/story/news/2017/04/04/nasa-cassini-spacecraft/100020728/",
https://www.nytimes.com/2017/04/04/upshot/freedom-caucus-health-care-pre-existing-conditions.html?hp&action=click&pgtype=H
https://www.nytimes.com/2017/04/03/us/politics/senate-democrats-appear-poised-to-filibuster-gorsuch-nomination.html?hp&acti
http://money.cnn.com/2017/04/03/media/julie-roginsky-lawsuit-fox-news-roger-ailes/index.html",
https://www.wsj.com/articles/democrats-have-votes-to-block-neil-gorsuch-sparking-rule-change-fight-1491241190",
http://www.msnbc.com/morning-joe/watch/trump-keeps-up-the-weekend-tweets-912620611971",
http://www.latimes.com/world/asia/la-fg-china-xi-anxiety-20170404-story.html",
http://www.nydailynews.com/sports/football/bonnie-bernstein-tony-romo-replacing-phil-simms-total-crap-article-1.3018798",
http://nypost.com/2017/04/04/foreigners-may-have-to-turn-over-cell-phones-under-trumps-extreme-vetting/",
https://www.boston.com/sports/nfl/2017/04/04/cowboys-tony-romo-retiring-headed-to-broadcast-booth",
http://www.sfchronicle.com/news/world/article/Syrian-activists-say-several-dead-in-Idlib-11048271.php",
http://www.chicagotribune.com/news/nationworld/politics/ct-blackwater-trump-putin-back-channel-20170403-story.html",
http://www.msnbc.com/all-in/watch/where-is-trump-s-paycheck-going-913254467582",
http://abcnews.go.com/International/wireStory/germany-trump-military-spending-guarantee-peace-46564187?cid=clicksource_438
http://insider.foxnews.com/2017/04/04/don-lemon-cnn-susan-rice-unmasking-report-president-trump-wiretapping-claim",
http://www.cbsnews.com/news/the-shattering-of-an-all-american-town/",
http://www.bbc.com/news/world-us-canada-39485930",
http://www.reuters.com/article/us-mideast-crisis-syria-idlib-idUSKBN1760IB",
https://www.yahoo.com/finance/news/white-house-spokesman-called-news-001847135.html",
https://www.yahoo.com/finance/news/white-house-spokesman-called-news-ooopsbaddata-001847135.html",
https://www.aol.com/article/finance/2017/04/04/bmw-pulls-advertising-from-fox-news-oreilly-factor/22025529/",
http://www.washingtonexaminer.com/remember-when-susan-rice-said-she-knew-nothing-of-the-trump-unmasking/article/2619219",
http://www.npr.org/2017/04/04/520874611/when-the-border-is-just-next-door-crossing-it-is-a-fact-of-daily-life"
```

10.5 Mining URLs and Unit Testing

Unlike many of the spring-annotated Java classes in the YouRateNews RESTful web services (back-end) application, the URL mining class is a pure Java class with static functions. This class encapsulates the code that mines an article's title, publishing date, and site. Figure 72 shows some of the complex regular expressions necessary to parse publishing dates from article URLs.

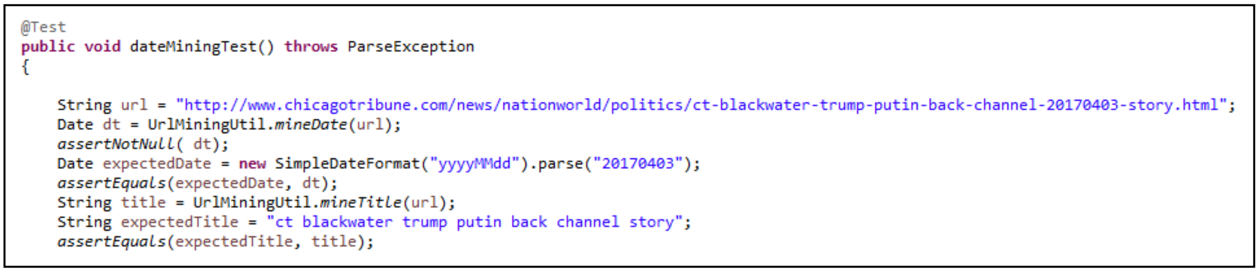
Figure 72



```
public class UrlMiningUtil {

    private static final SimpleDateFormat YEAR_SLASH_MONTH_SLASH_DAY_FORMAT = new SimpleDateFormat("yyyy/MM/dd");
    private static final String YEAR_SLASH_MONTH_SLASH_DAY_REGEX = "(19|20)\\d\\d[- /.](0[1-9]|[12][0-9]|3[01])[- /.](0[1-9]|1[012])";

    private static final SimpleDateFormat YEAR_MONTH_DAY_FORMAT = new SimpleDateFormat("yyyyMMdd");
    private static final String YEAR_MONTH_DAY_REGEX = "(19|20)\\d\\d(0[1-9]|[12][0-9]|3[01])(0[1-9]|1[012])";


    public static final String mineTitle( String url)
    {
        if ( url==null || url.trim().isEmpty()) return null;

        String[] parts = url.split("/");
        for ( String part: parts)
        {
            if ( part.indexOf("-")==-1 ) continue;

            int count = 0;
            for ( char c: part.toCharArray())
            {
```

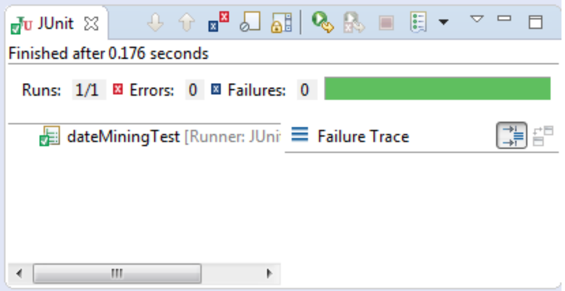
This type of complex code demands heavy testing. In this case, Junit tests are the best approach to exhaustively testing algorithms. Figure 73 shows a code snippet from a unit test that verifies the URL parsing algorithms. Figure 74 shows a successful test execution via the Eclipse IDE.

Figure 73



```
@Test
public void dateMiningTest() throws ParseException
{

    String url = "http://www.chicagotribune.com/news/nationworld/politics/ct-blackwater-trump-putin-back-channel-20170403-story.html";
    Date dt = UrlMiningUtil.mineDate(url);
    assertNotNull( dt);
    Date expectedDate = new SimpleDateFormat("yyyyMMdd").parse("20170403");
    assertEquals(expectedDate, dt);
    String title = UrlMiningUtil.mineTitle(url);
    String expectedTitle = "ct blackwater trump putin back channel story";
    assertEquals(expectedTitle, title);
```

Figure 74



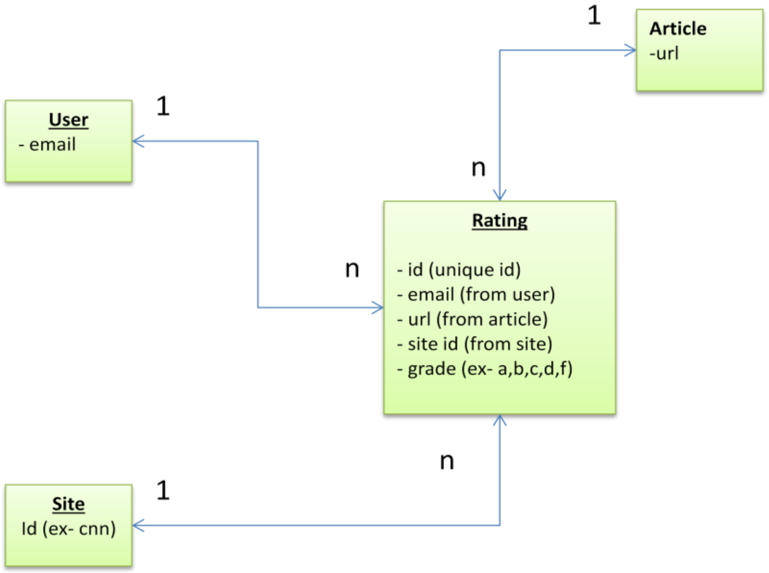
Finished after 0.176 seconds

Runs: 1/1 Errors: 0 Failures: 0

10.6 The High Volume Problem

Enterprise software solutions demand that architects think beyond the code to build efficient systems. And when an entrepreneur dreams, he/she might as well dream big. After many years of working with relational database management systems, I found that I was thinking in terms of relational database entities (tables). For example, Figure 75 shows the relationship between entities.

Figure 75



As I considered YouRateNews becoming a high volume system, I began to realize that the number of relational database style queries would be immense.   For example, imagine that YouRateNews contains millions of ratings. Further, imagine that a user rates an article on Fox News, then the system presents summarized Fox News ratings immediately afterwards.   Inserting a rating would be easy enough as a single rating record contains information related to the user, site, and article. Then the system would have to find millions of rating related to Fox News. Then the system needs to calculate the average score/grade and left/right leaning grade on all those ratings. Doing this for a low-volume system is no big deal – the system can handle it. But if the system goes high volume, then the sheer volume of requests would become an immense strain on the overall system.

In a situation like this, pushing calculations into the database tier can bring system performance to an acceptable level. Another option is to do periodic calculations at regular intervals. For example, executing scheduled calculations on the data each night can solve the performance problems. In a case like this, the ETL (extract, transform, and load) process might be best managed using a Hadoop solution. Data warehousing tables can then be queried to provide users with summary results. The summary results would not include their ratings in real-time, but who would notice.

These potential solutions introduce more complexity in the system. The horizontal scaling efforts to build out this infrastructure would be expensive in terms of time, money, and resources. And let's not forget the driving factor, this entrepreneurial YouRateNews application is presently a single-person effort.   Luckily, this author's brain found a solution that is a lot simpler.

10.7 Mongo Magic

From inception, this solution has used Mongo as its underlying database. The solution has effectively been no different than a relational database solution. Different entities like users, sites, ratings, and articles have been kept in different collections/tables. Figure 75 shows this. The power of Mongo has not really been wielded. But this has all changed with a good idea that eliminates the massive query and computational load discussed above.

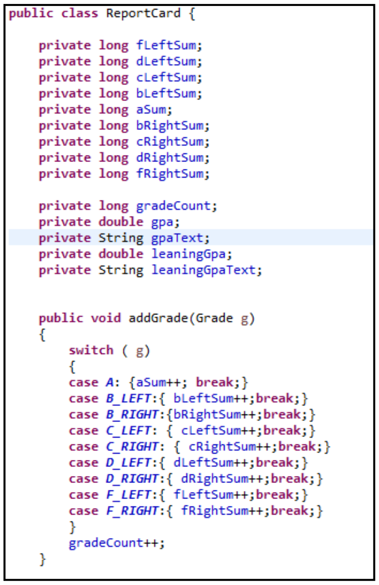
Mongo stores entities as documents. In this application, each user, each site, each article and each rating is stored as a document. Each document can also have other entities embedded within them. For example, a user document might contain all of the user's ratings. An article might contain all of the ratings associated with that user. Or a site might contain all of the ratings associated with that site. If we take this approach: an active user might have 20 ratings embedded in the user's document; a controversial article might have 2000 ratings embedded in the article's document; and a site like msnbc might have 200,000 ratings embedded in its article document. This document embedding gets worse when you realize each rating entity would need to be stored in three separate places. In short, an amateur embed-everything mongo approach won't work either.

OK, let's get to the point here. I came up with a solution that beats all of the above. First, each rating still gets inserted into a rating collection/table for more advanced analysis. But the magic comes into being with a single Report Card object embedded in each user, article, and site record.

What is a Report Card? A site's report card contains the overall grade given to the site. It also contains counts of all the ratings given to the site. That is, the report card contains the count of all: A ratings; left-leaning B ratings; right-leaning B ratings; far-left C ratings; far-right C ratings; poor quality D ratings; and fake news F ratings. Using this approach, that controversial article with 2000 ratings has just one report card containing grades and rating counts. That major site document with 200,000 ratings also has just one report card containing grades and ratings counts.

Figure 76 shows the basic structure of the report card class. This design is straightforward, when someone rates an article, the user's, article's, and site's report cards get updated with the rating. For example, if someone rates an article with an "A" grade, then the grade is added to the report card. In this case, the report card's "A" grade sum increases by one.

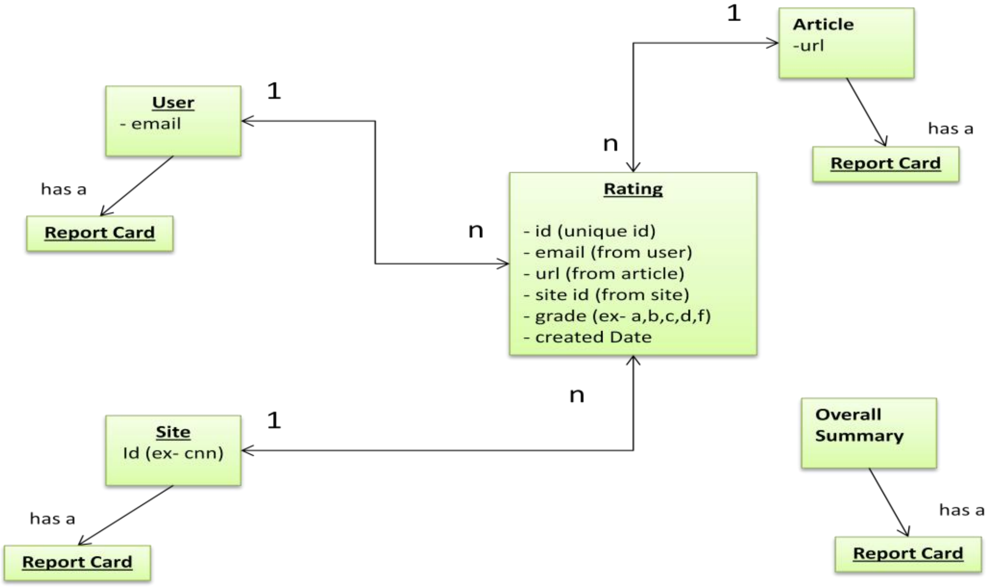
Figure 76



```
public class ReportCard {

    private long fLeftSum;
    private long dLeftSum;
    private long cLeftSum;
    private long bLeftSum;
    private long aSum;
    private long bRightSum;
    private long cRightSum;
    private long dRightSum;
    private long fRightSum;

    private long gradeCount;
    private double gpa;
    private String gpaText;
    private double leaningGpa;
    private String leaningGpaText;


    public void addGrade(Grade g)
    {
        switch ( g)
        {
        case A: {aSum++; break;}
        case B_LEFT:{ bLeftSum++;break;}
        case B_RIGHT:{bRightSum++;break;}
        case C_LEFT: { cLeftSum++;break;}
        case C_RIGHT: { cRightSum++;break;}
        case D_LEFT:{ dLeftSum++;break;}
        case D_RIGHT:{ dRightSum++;break;}
        case F_LEFT:{ fLeftSum++;break;}
        case F_RIGHT:{ fRightSum++;break;}
        }
        gradeCount++;
    }
```

This approach allows all article and site calculations to occur in real time. No extra summary tables or ETL processes are needed to execute "report card" calculations. Figure 77 shows the core application's new entity structure that integrates report cards. Note that an Overall Summary object with an embedded report card has been added to track the YouRateNews Rating statistics.

Figure 77



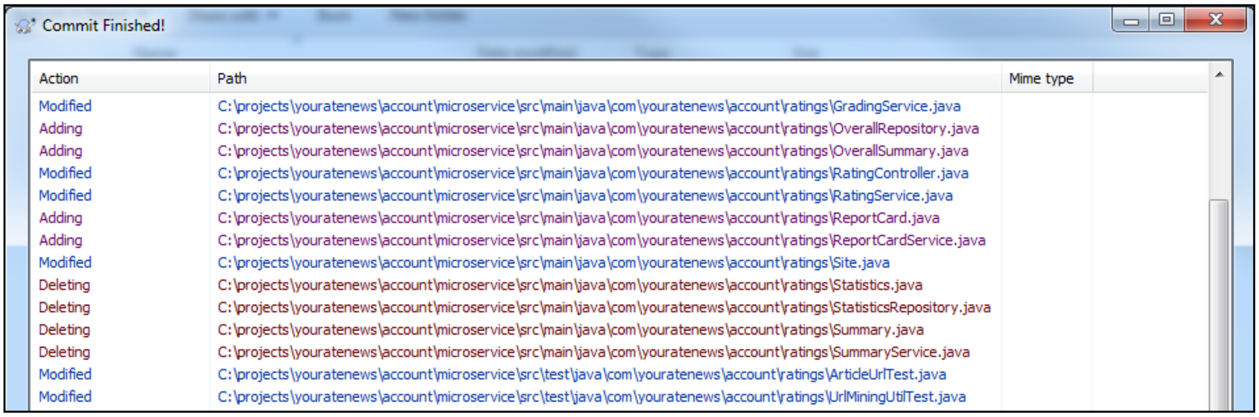
Using the report card approach does not completely eliminate the need to also keep user article ratings in a separate collection/table. The rating collection (see Figure 77) still provides valuable information. First, the rating ties article ratings to a particular user. If a user acts maliciously, then the rating table provides traceability. The rating collection can provide deeper insight into user activity and behavior. Rating data provides the raw data for more-advanced trend analysis.

10.8 A Note on Continuous Refactoring

When building software in an entrepreneurial style, it is so critical to continuously refactor software with the goal of making it simpler. For example, while writing this chapter, I found myself describing a Summary object in this text. I had renamed my RatingSummary class to the name Summary. Then, while trying to describe what a summary is, I found myself using the report card analogy. And as fast as I want to get this project done, I realized that I needed to change the Summary class name to "ReportCard".

Making this change took just a few minutes. A class named Summary is ambiguous and begs the question: "A summary of what?" The "report card" name makes total sense. Correct naming improves the readability of the code. On many occasions, I have heard developers and architects saying they would refactor a solution later when they had time. Those developers and architects would have had more time if they were committed to refactoring continuously as they worked. Refactoring code and deleting unused classes always makes sense as a solution grows. Figure 78 demonstrates this entrepreneur's commitment to this concept.

Figure 78



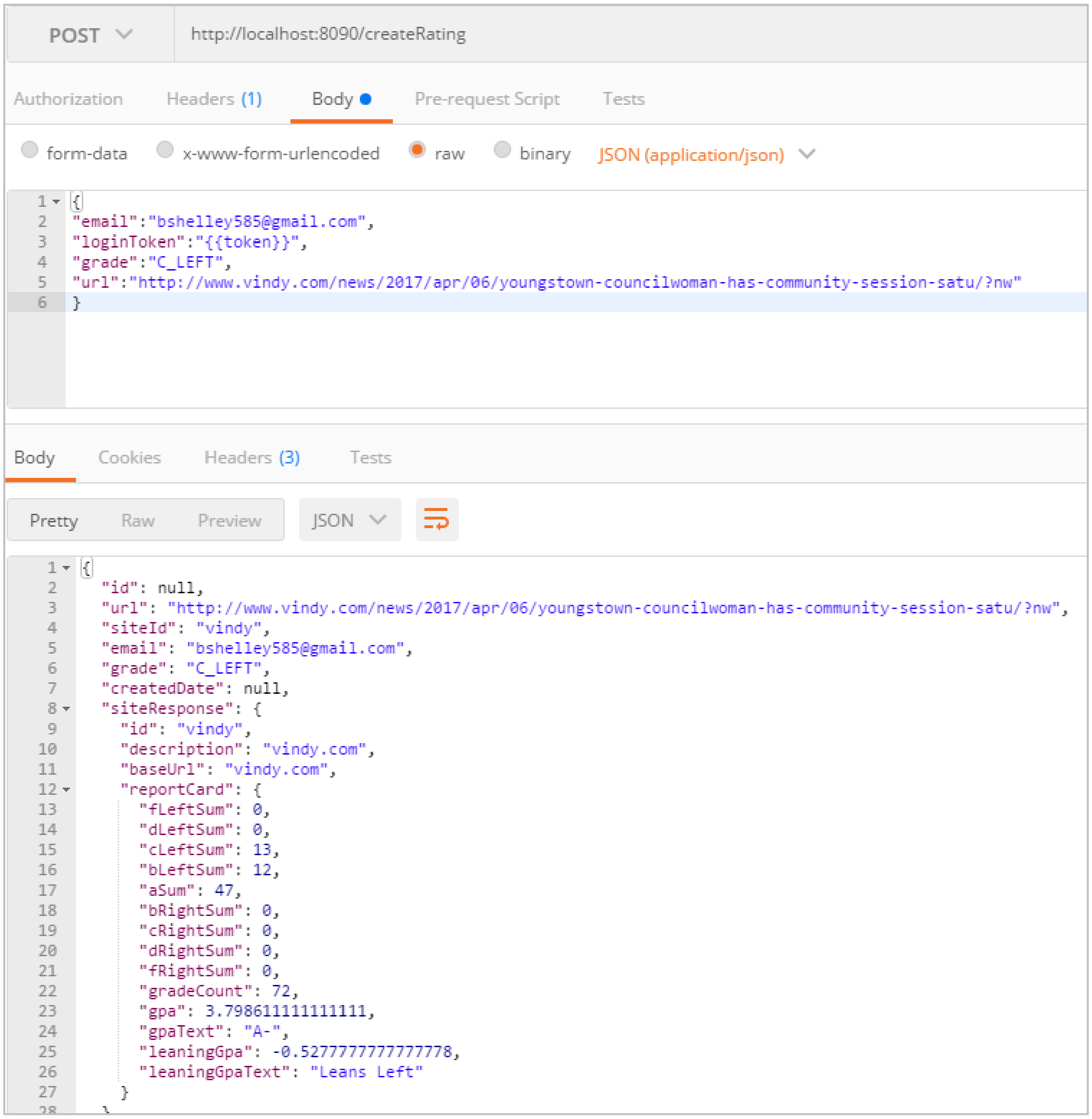
Commit Finished!

Action	Path	Mime type
Modified	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\GradingService.java	
Adding	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\OverallRepository.java	
Adding	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\OverallSummary.java	
Modified	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\RatingController.java	
Modified	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\RatingService.java	
Adding	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\ReportCard.java	
Adding	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\ReportCardService.java	
Modified	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\Site.java	
Deleting	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\Statistics.java	
Deleting	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\StatisticsRepository.java	
Deleting	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\Summary.java	
Deleting	C:\projects\youratenews\account\microservice\src\main\java\com\youratenews\account\ratings\SummaryService.java	
Modified	C:\projects\youratenews\account\microservice\src\test\java\com\youratenews\account\ratings\ArticleUrlTest.java	
Modified	C:\projects\youratenews\account\microservice\src\test\java\com\youratenews\account\ratings\UrlMiningUtilTest.java	

10.9 RESTful Rating Success

Figure 79 is a Postman screenshot of a successful rating request and its response. The upper section shows the request and the lower section shows the response. The simplicity of the request is a significant improvement over the original concept. Also note that the embedded “reportCard” in the response contains the A- vindy.com site rating.

Figure 79



POST http://localhost:8090/createRating

```
{
"email":"bshelley585@gmail.com",
"loginToken":"{{token}}",
"grade":"C_LEFT",
"url":"http://www.vindy.com/news/2017/apr/06/youngstown-councilwoman-has-community-session-satu/?nw"
}
```

```
{
  "id": null,
  "url": "http://www.vindy.com/news/2017/apr/06/youngstown-councilwoman-has-community-session-satu/?nw",
  "siteId": "vindy",
  "email": "bshelley585@gmail.com",
  "grade": "C_LEFT",
  "createdDate": null,
  "siteResponse": {
    "id": "vindy",
    "description": "vindy.com",
    "baseUrl": "vindy.com",
    "reportCard": {
      "fLeftSum": 0,
      "dLeftSum": 0,
      "cLeftSum": 13,
      "bLeftSum": 12,
      "aSum": 47,
      "bRightSum": 0,
      "cRightSum": 0,
      "dRightSum": 0,
      "fRightSum": 0,
      "gradeCount": 72,
      "gpa": 3.798611111111111,
      "gpaText": "A-",
      "leaningGpa": -0.5277777777777778,
      "leaningGpaText": "Leans Left"
    }
  }
```

11 Prototyping the Rating Gauge

On the business front, it makes sense to address the highest risk items as soon as possible. On the fun front, developing user interface components is often tougher, but more visually satisfying than developing back-end web services. So, after quietly wondering for weeks whether the proposed rating control would be functional and look good, I took on the challenge.

11.1 Rating Gauge Concept versus Prototype

Figure 80 and Figure 81 show the application's rating gauge before and after. There are many subtle differences between the concept and the prototype. All of the differences are driven by absolutely necessary requirements. The most glaringly obvious problem with the gauge in Figure 80 is that it has no needle. The prototype fixes this with a colored selected pie area and shaded out unselected regions. Another fix is that the gauge has a text that shows the user's selection. The prototype also has a help icon to provide more detailed explanations of the rating system. Improvements in font size, text color changes, and mobile device orientation change handling round out the prototype's capabilities.

Figure 80

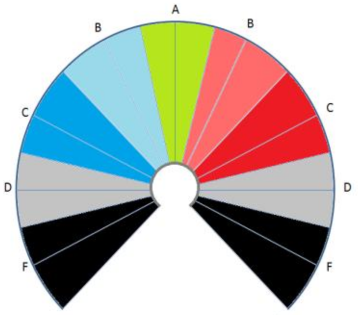
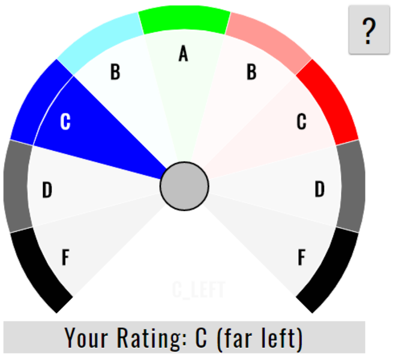


Figure 81

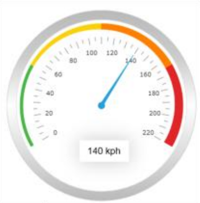


Your Rating: C (far left)

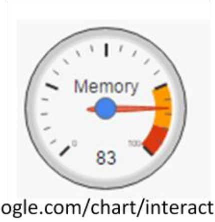
11.2 The COTS vs. Custom Gauge Decision

It took me many days to build the functioning prototype seen in Figure 81. I may have saved myself all of the trouble by customizing a commercial off-the-shelf (COTS) product. Figure 82 shows several COTS options. All of these solutions fall into the “close but no cigar” category. All of the gauge controls are excellent but can’t quite meet the YouRateNews vision. It is clear that custom control is the best way to proceed. The custom gauge control is the best mechanism to represent YouRateNews’ unique rating system.

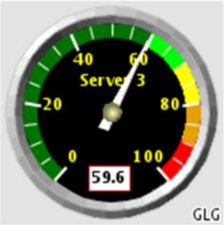
Figure 82



http://www.jqwidgets.com/jquery-gauge-coming-with-jqwidgets-2-2/



https://developers.google.com/chart/interactive/docs/gallery/gauge



http://www.genlogic3.com/glg_demos/ajax_dashboard_demo.html

11.3 SVG vs. HTML5 Canvas

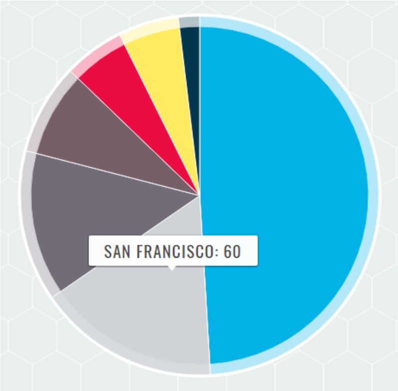
The decision between Scalable Vector Graphics (SVG) and HTML5 Canvas drawing is like the decision between getting a car with automatic vs. manual transmission. With the manual car, you have more control, but you have to do more work. Personally, I like the higher level of control. I initially tended towards a rating gauge built with HTML5 Canvas drawing methods. Then, I noticed through prototyping that HTML5 canvas drawings repeatedly cause security warnings to appear to allow or disable the scripting. These legitimate warnings do not occur with SVG scripts. Thus, the decision is simple. SVG provides the best user experience. Case closed.

11.4 Finding a good SVG solution to deviate from

As an engineer, you can start from the very basics and learn a technology from the bottom up. This thorough approach is often the best one when enough time is available. In other situations, it makes sense to start with a working solution, and then slowly customize it to meet your needs. Without an immense amount of SVG development experience and limited time, I took this second approach.

I was reviewing different SVG charting solutions and discovered one that I really liked. Figure 83 shows a "SVG Pie chart with tooltip and hover effects" freely available on the Internet at https://codepen.io/githiro/pen/xABCi. I used this SVG chart as the foundation for the rating control.

Figure 83

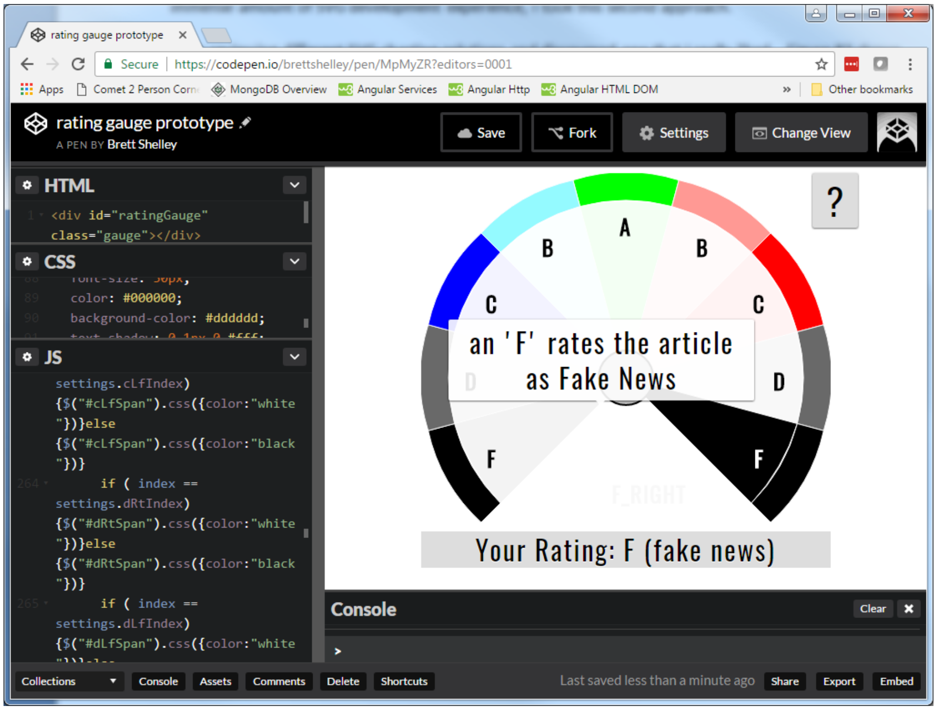


11.5 Crawling to the targeted Rating Gauge prototype

Codepen.io is a great place to rapidly prototype custom javascript, css, Jquery, SVG solutions. I will spare you the details, but working with this stack with minimal SVG experience is analogous to a military sniper crawling towards his target. As soon as the sniper stands up and tries to move quickly, he is immediately discovered, then killed or captured. But if the sniper moves slowly and every move is deliberate, then he can acquire and take out his/her target. Turning a working pie chart into a rating gauge required a similar approach to achieve success (without the risk of course). With this technology stack, trying to take big steps caused the user interface to fail. And the bigger the steps, the greater the risk is of not being able to recover a working solution. With this rating gauge prototype, thousands of incremental steps enabled me to crawl to a successful rating gauge solution.

The great thing about Codepen.io is that it produces visual output as you type. As long as the visual output doesn't break, you can slowly morph a working solution into what you are seeking. Figure 84 is a screenshot of the Codepen.io online IDE. You can see the HTML, CSS, and Javascript (JS) code on the left. The prototype rating gauge with a help text showing is on the right. The biggest challenge of this effort is getting the text components to correctly line up with the gauge settings. Handling mobile device orientation changes and window resize events adds additional complexity to this solution.

Figure 84



```
<div id="ratingGauge"
class="gauge"></div>
```

```
    font-size: 30px;
    color: #000000;
    background-color: #dddddd;
    text-shadow: 0 1px 0 #fff;
```

```
settings.cLfIndex)
{$("#cLfSpan").css({color:"white
"})}else
{$("#cLfSpan").css({color:"black
"})}
        if ( index ==
settings.dRtIndex)
{$("#dRtSpan").css({color:"white
"})}else
{$("#dRtSpan").css({color:"black
"})}
        if ( index ==
settings.dLfIndex)
{$("#dLfSpan").css({color:"white
"})}else
```

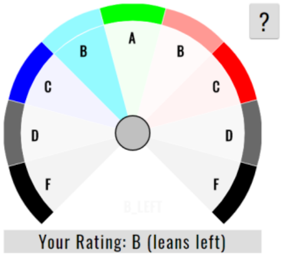
an 'F' rates the article
as Fake News

Your Rating: F (fake news)

11.6 The Difficulty and Power of simplicity

Early morning through late night sessions produced the Rating Gauge prototype seen in Figure 85. The end result is a simple interface that enables users to rapidly rate news articles. This solution works nicely in a desktop browser environment – one mouse click rates the article. On a mobile device, the experience is equally simple – the tap of a finger rates an article. Advanced statistical algorithms and incredibly complex code mean nothing to average users, only intuitive simplicity makes it possible for a solution to be accepted by the general public.

Figure 85



Your Rating: B (leans left)

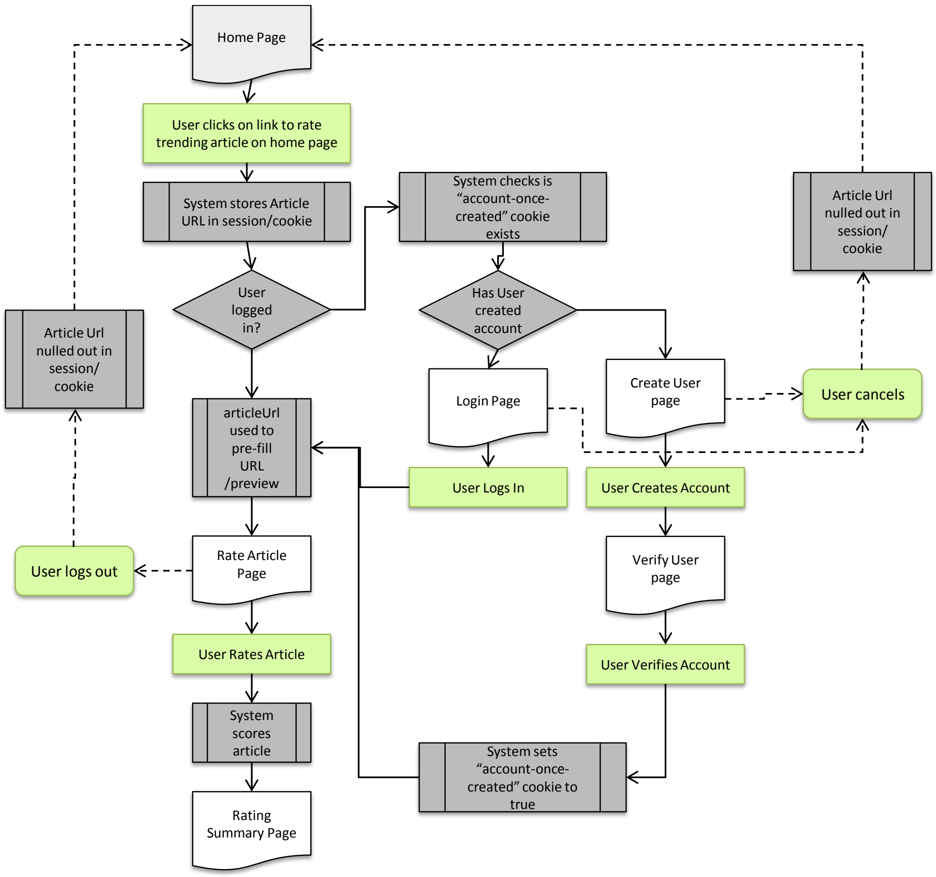
12 Building the Accounts User Interface

12.1 The Envisioned Simple User Experience

The need to keep the user experience simple is paramount. The core use case for YouRateNews is that a user sees an article, selects a YouRateNews link, rates the article with one click or tap, then sees the article's summary results. It needs to be that simple.

Each user's identity needs to be confirmed in order for YouRateNews to produce legitimate ratings. This complicates the user experience. The ideal situation is that a user has an account and is logged in. In this scenario, rating an article only takes a few seconds. If a user has an account and is not logged in, then the application needs to allow the user to login first and then rate the article. A more complicated scenario involves the user creating an account, verifying the account and then rating an article. User actions such as canceling the rating process also need to be taken into account.

Figure 86


Home Page
User clicks on link to rate trending article on home page
System stores Article URL in session/cookie
System checks is "account-once-created" cookie exists
Article Url nulled out in session/ cookie
User logged in?
Has User created account
Article Url nulled out in session/ cookie
Login Page
Create User page
User cancels
articleUrl used to pre-fill URL /preview
User Logs In
User Creates Account
User logs out
Rate Article Page
Verify User page
User Rates Article
User Verifies Account
System scores article
System sets "account-once-created" cookie to true
Rating Summary Page

Getting the system to handle all of these scenarios automatically is tricky. Just coding the scenarios just leads to confusion. I have found that if you can draw a picture that makes sense, then you can code a solution. Figure 86 shows the flowchart that models the process behind the core use case. The application handles most of the background activity in the simplest scenario where a user is already logged in. This flowchart shows user driven events in green. And as complicated as the process flow appears, the system enables a signed-in user to select and rate an article with three mouse clicks.

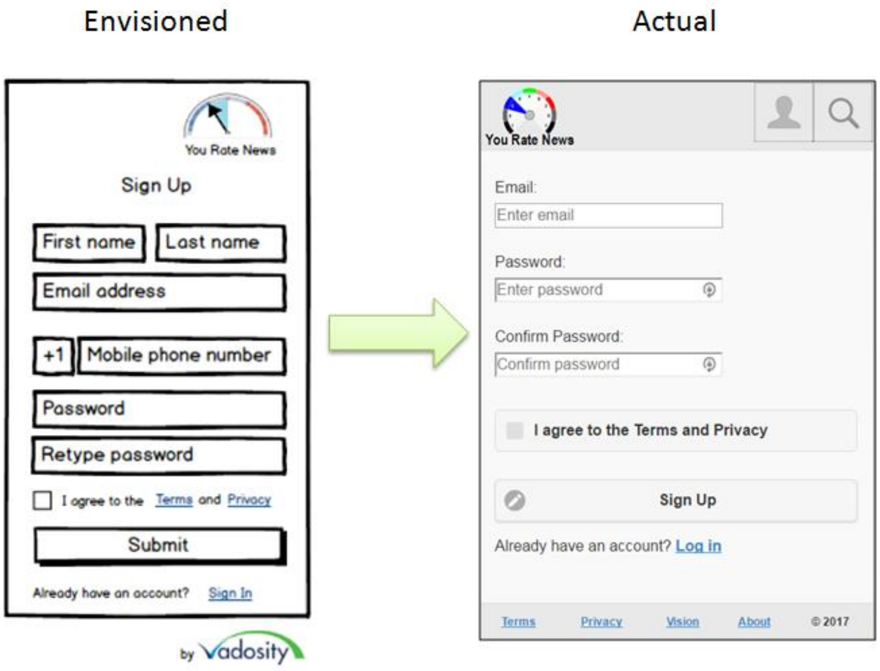
12.2 Envisioned vs. Actual User Account Screens

User account screens are not the most exciting topic. Most people have gone through this on dozens if not hundreds of websites. The typical user has an expectation of simplicity. The YouRateNews application attempts to meet and exceed the expectations. In a number of small and meaningful places, the user experience is simplified while still meeting the needs of account security.

12.2.1 Sign up Interface

Figure 87 shows the sign up screen as envisioned and realized. To simplify the user experience, the application does not collect a mobile number or the user's first and last name. The application icon has morphed from the original gauge concept into a miniaturized prototype image. In the actual implementation, users navigate the application using the account and search icons in the upper right corner. The envisioned "Sign up" page header has been eliminated to save space. Now the actual "Sign up" button gets the same point across. Finally, a simple footer provides the user with legal and contact information.

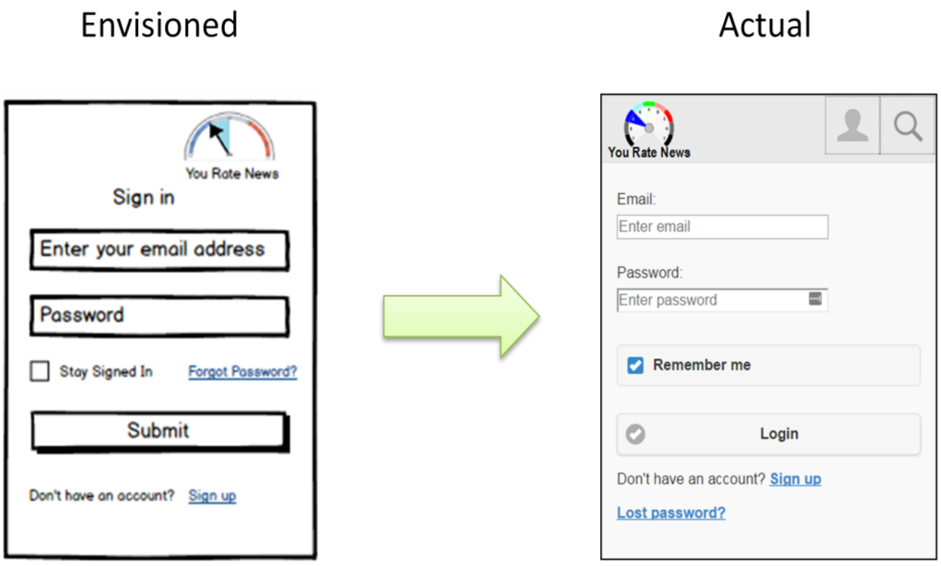
Figure 87



12.2.2 Login Interface

The login interface is similar to the original concept. The “Sign in” header has been replaced by the “Login” button. The header image and navigation icons have been added as previously described. The location of the “forgot password” link has changed a bit. Overall though, the changes are not significant.

Figure 88

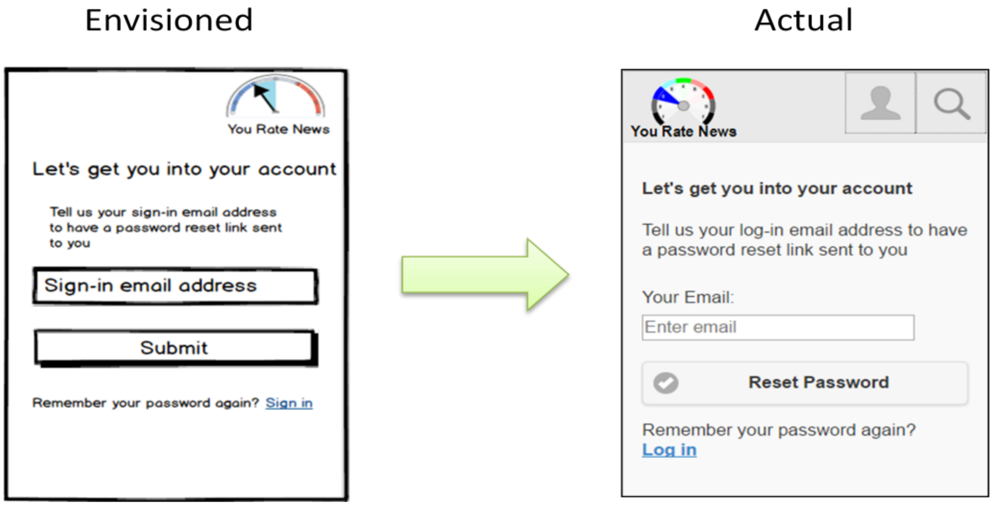

Envisioned

Actual

12.2.3 Forgot Password Interface

Figure 89 demonstrates that the Forgot Password interface concept has not changed much.

Figure 89


Envisioned

Actual

Let's get you into your account

Tell us your sign-in email address to have a password reset link sent to you

Let's get you into your account

Tell us your log-in email address to have a password reset link sent to you

12.3 Subtle User Experience Improvements

When a user signs up for an account, the application immediately sends the user an email. The email contains a six-digit verification code directly in the email's subject line. This enables the user to stay on the page, enter the code, and immediately be logged in. The user may also follow the link contained in the email at a later date, but ideally, the user continues with rating an article immediately. A user can sign up on the site and rate an article within two minutes. Subsequently rating other articles should take less than a minute.

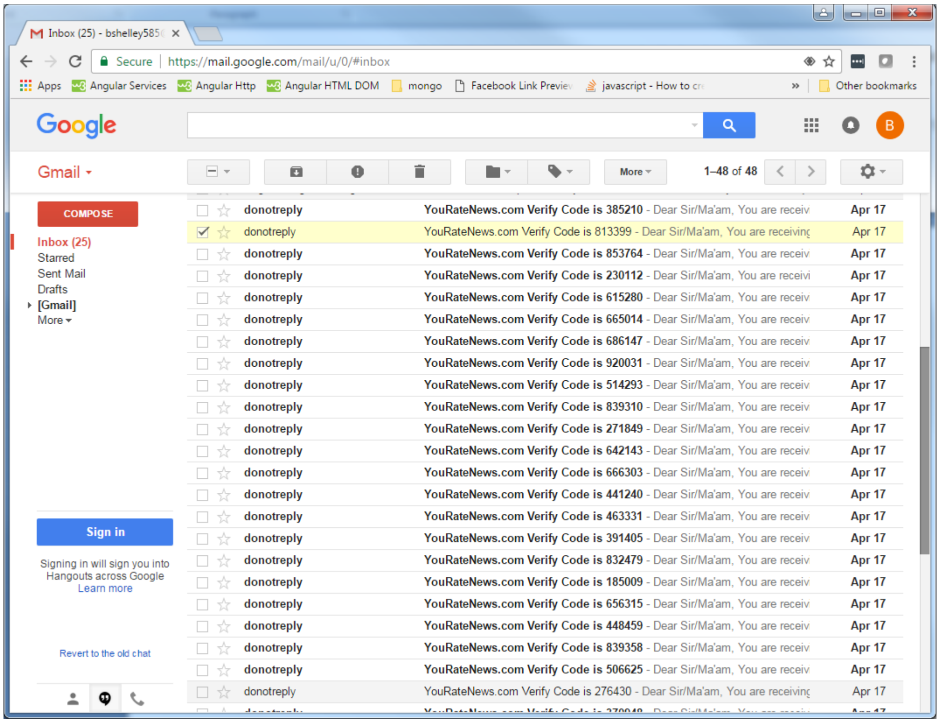
Other screens act in a similar manner. If the user has lost his/her password, then the system allows the user to immediately create a new password via email link. When the user enters the password, then the user is, again, automatically signed in. The user screens are not exciting, but they do eliminate redundant sign in processes that so many other applications have.

13 Confirmed and Asynchronous Emails

13.1 The Need for Confirmed Email Delivery

The YouRateNews application uses an Office365 email server to send account verification and password reset emails. Figure 90 exemplifies the extensive testing performed against this module. This figure shows a long list of identical emails sent as I tested new user interface functionality. As I introduced these components, I repeatedly created an account through the user interface, received a verification email, entered the verify code, then deleted the account. This rigorous testing led to the discovery that Office365 email servers are excellent but not 100% reliable.

Figure 90

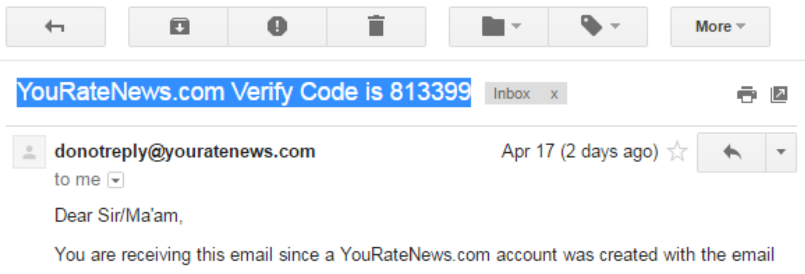


□	☆	donotreply	YouRateNews.com Verify Code is 385210 - Dear Sir/Ma'am, You are receiv	Apr 17
☑	☆	donotreply	YouRateNews.com Verify Code is 813399 - Dear Sir/Ma'am, You are receiving	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 853764 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 230112 - Dear Sir/Ma'am, You are receivi	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 615280 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 665014 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 686147 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 920031 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 514293 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 839310 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 271849 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 642143 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 666303 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 441240 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 463331 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 391405 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 832479 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 185009 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 656315 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 448459 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 839358 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 506625 - Dear Sir/Ma'am, You are receiv	Apr 17
□	☆	donotreply	YouRateNews.com Verify Code is 276430 - Dear Sir/Ma'am, You are receiving	Apr 17

13.1.1 Rapid Account Creation Process Vision

The YouRateNews concept wants to enable a very fast and simple user experience. In the account creation use case, the system attempts to send out an account verification email as soon as a user signs up for an account. The idea is that the user receives this account verification within a few seconds. The user then clicks on the link within the email – or better yet, just types in the verify code in the message's subject. Figure 91 shows that the verify code is directly in the email's subject for easy access. When all systems are working properly, a user will be able to create an account, verify that account and then rate a targeted article within one minute. That's quick.

Figure 91



YouRateNews.com Verify Code is 813399

donotreply@youratenews.com
to me

Apr 17 (2 days ago)

Dear Sir/Ma'am,

You are receiving this email since a YouRateNews.com account was created with the email

When the system fails to send out a verification email, then a new user has no way of verifying his account.   This unverified user cannot rate articles. When the YouRateNews email server (Office365) is down for whatever reason, then a simple, less-robust system might allow an account to be created but never verified. That's a lost user. The YouRateNews application needs to be more robust.

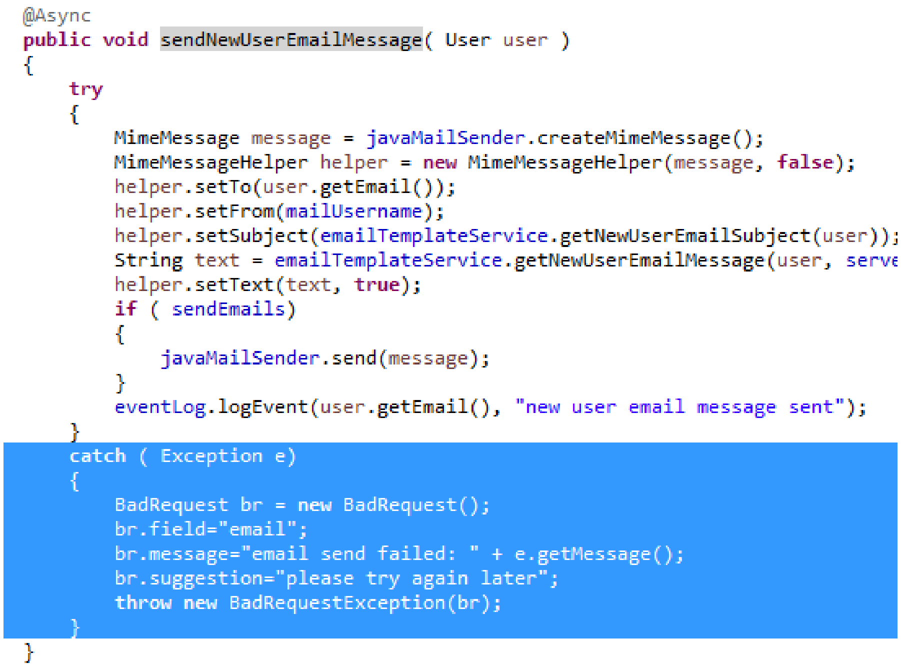
13.2 The First Pass on the Email Solution

Figure 92 shows the first pass on email sending in the YouRateNews application. It's actually pretty cool. It uses the Spring Async annotation. This sends the email asynchronously without forcing the front-end user to wait for the system to send the email. It uses the MimeMessageHelper class to send Html-formatted email. The email templating service uses FreeMarker templates to dynamically generate email content specific to each user.

This first pass solution fails in its error handling. When an error occurs, the system just sends a useless "please try again later" message back to the user interface. This simple message creates a situation where the user has created an account, but can never verify it. And this is where a more robust approach is needed.

Architecturally, the confirmed sending of emails "feels like" a natural place for a separate service. That is, a scaled YouRateNews solution will break out this functionality into its own separate Microservice. For now, it can continue as part of the YouRateNews monolith. However, as the system grows, this email sending should run as a separate process. A single server that handles both HTTP requests and sends out significant numbers of SMTP emails can lead to a significant performance bottleneck.

Figure 92



```
@Async
public void sendNewUserEmailMessage( User user )
{
    try
    {
        MimeMessage message = javaMailSender.createMimeMessage();
        MimeMessageHelper helper = new MimeMessageHelper(message, false);
        helper.setTo(user.getEmail());
        helper.setFrom(mailUsername);
        helper.setSubject(emailTemplateService.getNewUserEmailSubject(user));
        String text = emailTemplateService.getNewUserEmailMessage(user, serve
        helper.setText(text, true);
        if ( sendEmails)
        {
            javaMailSender.send(message);
        }
        eventLog.logEvent(user.getEmail(), "new user email message sent");
    }
    catch ( Exception e)
    {
        BadRequest br = new BadRequest();
        br.field="email";
        br.message="email send failed: " + e.getMessage();
        br.suggestion="please try again later";
        throw new BadRequestException(br);
    }
}
```

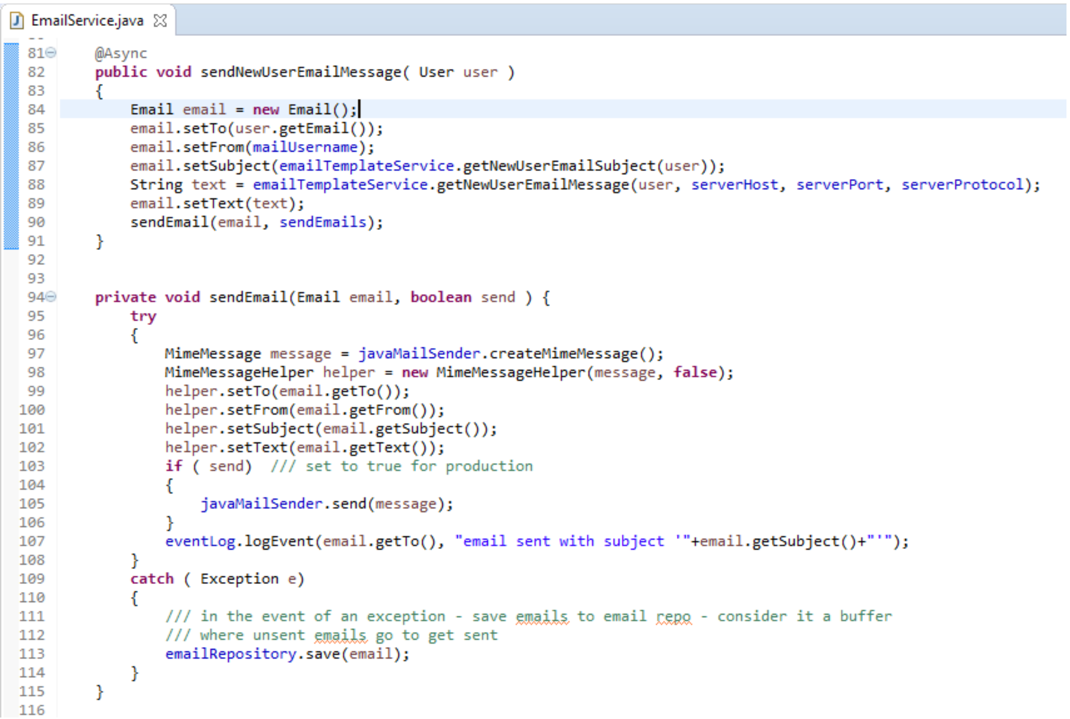
13.3 A Re-factored Email Solution

Figure 93 shows a refactored EmailService class. The Async annotation still enables the email to be sent without forcing the user to wait for the email send operation to complete. And in the event of failure, Lines 109 – Line 113 show that the email gets saved to the underlying Mongo database for later retrieval. The email repository is effectively a queue for emails that failed to send.

Figure 94 shows code from the ScheduledEmailService class. The Scheduled annotation (line 41) with a fixed delay of 300,000 indicates that this “scheduled job” will run continuously and delay five minutes (300,000 milliseconds) between jobs. Line 60 indicates that each retrieved email will be deleted from the email queue once the email has been successfully sent. Deleting the email from the queue keeps the email collection table from infinite growth.

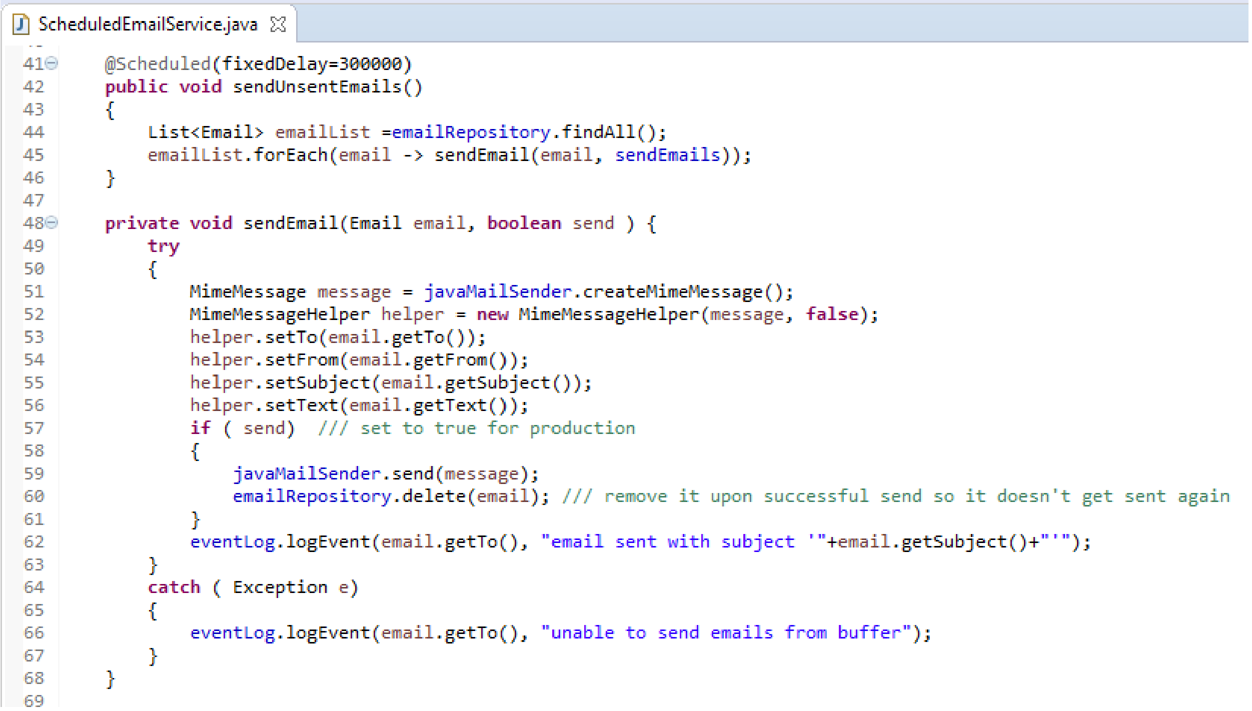
With this new approach, the system attempts to send an email to the user as soon as he signs up. When all is well, that user gets a confirmation email with a verify code within a few seconds. In the event that the email server is down, then the system saves the email as a collection in the Mongo database. The schedule email service then checks for unsent emails every five minutes and sends them when the email server comes back up. This solution is not perfect, but it’s a start. The solution has a real time approach for user convenience and a scheduled approach as a backup.

Figure 93



```java
    @Async
    public void sendNewUserEmailMessage( User user )
    {
        Email email = new Email();
        email.setTo(user.getEmail());
        email.setFrom(mailUsername);
        email.setSubject(emailTemplateService.getNewUserEmailSubject(user));
        String text = emailTemplateService.getNewUserEmailMessage(user, serverHost, serverPort, serverProtocol);
        email.setText(text);
        sendEmail(email, sendEmails);
    }


    private void sendEmail(Email email, boolean send ) {
        try
        {
            MimeMessage message = javaMailSender.createMimeMessage();
            MimeMessageHelper helper = new MimeMessageHelper(message, false);
            helper.setTo(email.getTo());
            helper.setFrom(email.getFrom());
            helper.setSubject(email.getSubject());
            helper.setText(email.getText());
            if ( send)  /// set to true for production
            {
                javaMailSender.send(message);
            }
            eventLog.logEvent(email.getTo(), "email sent with subject '"+email.getSubject()+"'");
        }
        catch ( Exception e)
        {
            /// in the event of an exception - save emails to email repo - consider it a buffer
            /// where unsent emails go to get sent
            emailRepository.save(email);
        }
    }
```

Figure 94



```java
    @Scheduled(fixedDelay=300000)
    public void sendUnsentEmails()
    {
        List<Email> emailList =emailRepository.findAll();
        emailList.forEach(email -> sendEmail(email, sendEmails));
    }

    private void sendEmail(Email email, boolean send ) {
        try
        {
            MimeMessage message = javaMailSender.createMimeMessage();
            MimeMessageHelper helper = new MimeMessageHelper(message, false);
            helper.setTo(email.getTo());
            helper.setFrom(email.getFrom());
            helper.setSubject(email.getSubject());
            helper.setText(email.getText());
            if ( send)  /// set to true for production
            {
                javaMailSender.send(message);
                emailRepository.delete(email); /// remove it upon successful send so it doesn't get sent again
            }
            eventLog.logEvent(email.getTo(), "email sent with subject '"+email.getSubject()+"'");
        }
        catch ( Exception e)
        {
            eventLog.logEvent(email.getTo(), "unable to send emails from buffer");
        }
    }
```

14 Midpoint Architectural Decisions

The backend systems consist of a Mongo database and take advantage of RESTful Spring boot web services. The front end interface is a pure HTML5, CSS3, Jquery, Jquery Mobile implementation.

Numerous web application development products exist. In making a front-end architecture decision, I researched AngularJS, AngularJS2, and React. On the Angular front, the first version of Angular appeared promising. I also intensely researched using Angular 2. React was also considered as a front-end framework. All three of these frameworks have significant advantages.

Here's what I didn't like. Angular and React felt like overkill. The YouRateNews overall vision is a big one. This author would like to see every major news agency in the United States linking up to it. However, the YouRateNews application is small in terms of its state management. When a user is logged in, the application just needs to know the user's email address and a few other small pieces of information. A fully-blown heavy duty client-side state management API is not needed. To use an analogy, the YouRateNews application is like a Cessna. The Cessna doesn't need the infrastructure of a major airport. It just needs a small airport with a landing strip, a place to park, and a fueling station.

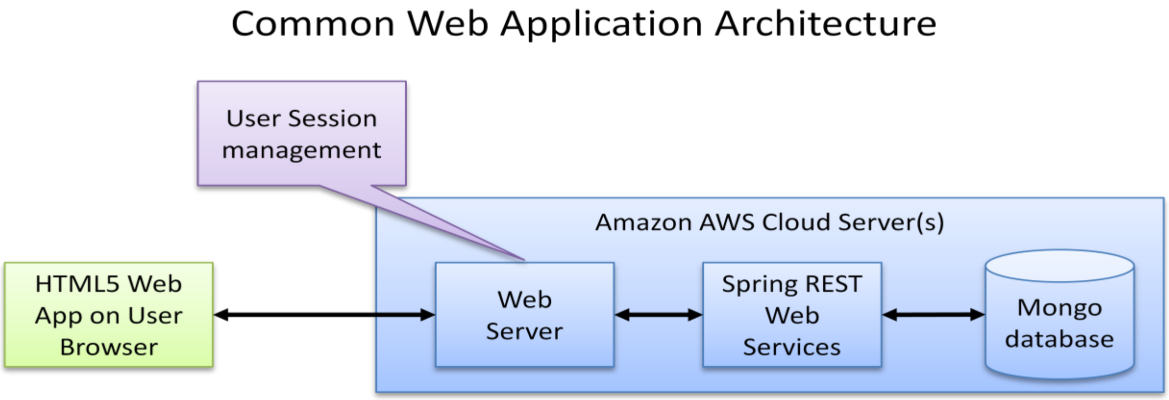
In the end, I decided to go with Jquery and Jquery mobile for its rapid development capabilities. This decision was strongly influenced by the realization that the "very usable" rating gauge prototype is heavily dependent on the Jquery API. In simpler words, I already had working front end code, so I just continued with it.

The Jquery mobile decision was a tough one. Jquery mobile APIs provide an excellent mobile user experience. The Jquery mobile desktop browser experience is not optimal out of the box. That is to say, the Jquery mobile APIs widgets require significant customization to provide the user with an adaptive CSS3 experience. It is this author's opinion that the Jquery Mobile widgets don't look great on a regular desktop/laptop browser. But it gets the job done.

14.1 Envisioned Core Architecture

Figure 95 shows the components of the original software architectural vision of YouRateNews. This architecture is typical for web-based software applications. Using this approach, a J(2)EE compliant web server intermediates transactions between the HTML front end and the back end web services and its underlying database. In the emerging world of microservices, the web server might actually transact with many separate web services applications. There is nothing new about this approach.

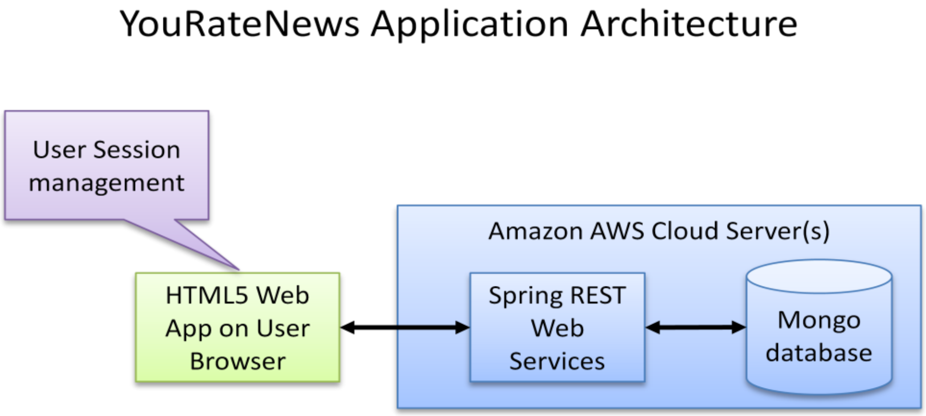
Figure 95


Common Web Application Architecture
User Session management
Amazon AWS Cloud Server(s)
HTML5 Web App on User Browser
Web Server
Spring REST Web Services
Mongo database

14.2 Simplified YouRateNews Architecture

The YouRateNews application deviates from a typical web application architecture. Specifically, the architecture has no web server. Yes, that's right. The web application has no web server. The web services layer acts as the web server. Figure 96 shows the simplified application architecture. The Spring REST web services components also deliver the static HTML, CSS, and JavaScript files.

Figure 96


YouRateNews Application Architecture
User Session management
Amazon AWS Cloud Server(s)
HTML5 Web App on User Browser
Spring REST Web Services
Mongo database

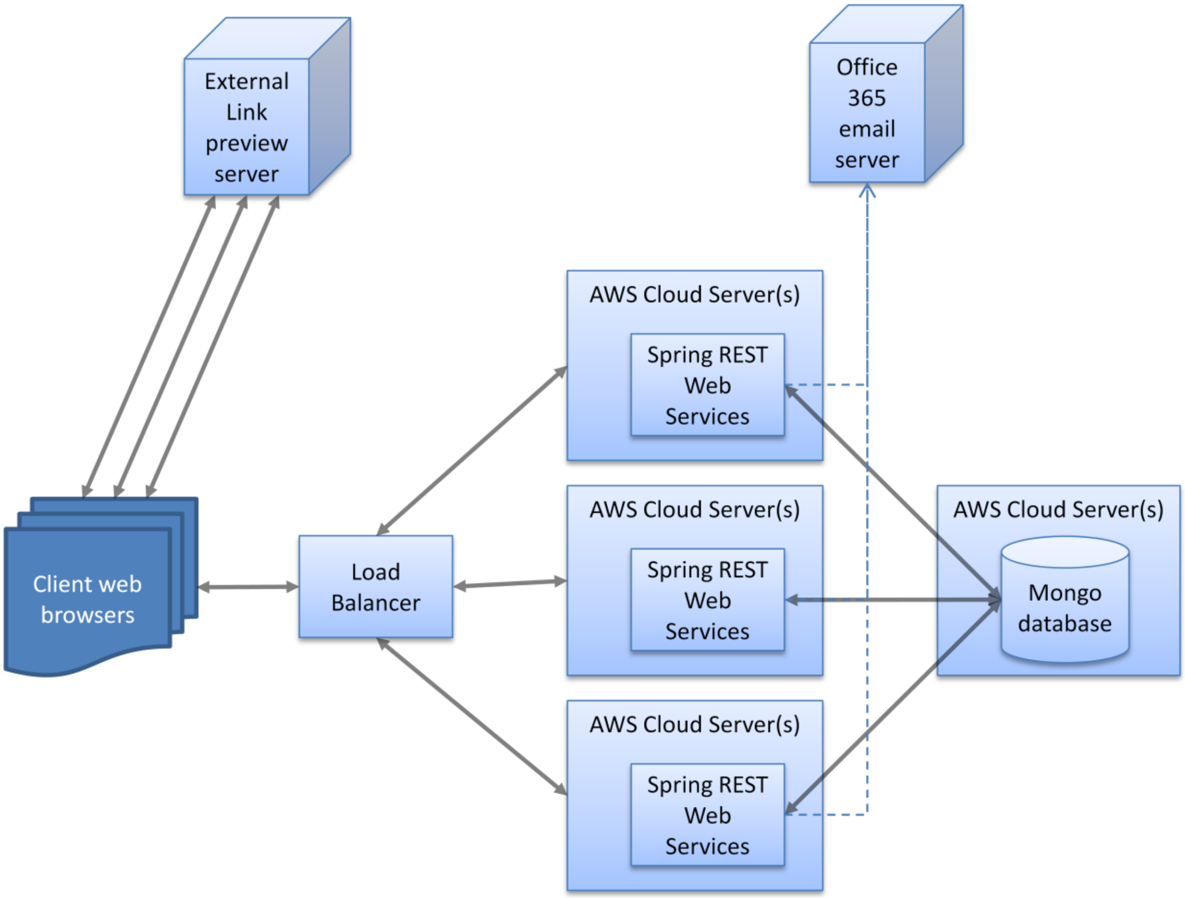
This architecture begs the question: How can you eliminate the J(2)EE web container that is so good at maintaining state and user sessions?

In this particular instance, the need for server side user sessions is simply not there. The user state completely resides on the front end within the HTML pages, Javascript files, and of course, with cookies. The YouRateNews application passes a "loginToken" back and forth to identify and authenticate user requests that change data. This login token resides as a global application variable, a permanent cookie (if allowed), and in the database associated with the user's account. So, when a user rates an article, the front end web pages sent the user's login token and email address to verify the user's account. The stateless back end then authenticates each call without having to maintain a stateful session.

In the application, each user may have many login tokens – one for each user's device. For example, if a user logs on using a laptop-based Chrome browser, desktop-based Firefox browser, and a mobile device, then that user would have three separate login tokens associated with his account. Logging out on one device would allow the user to stay logged in on the others. And to address security concerns, these login tokens have absolutely no relation to the user's encrypted passwords.

This simplified architecture does not fit in many web application scenarios. Just as you can't eat cake for breakfast, you also can't normally take the web server out of the web application. But in this case, the completely stateless server side components eliminate the need for the stateful web container. The disadvantage of this approach is that the web services instances dynamically interact with the database while also serving up static file content. As these two needs compete for resources, scalability may become an issue. Figure 97 shows how the architecture may be horizontally scaled by adding new web service instances on additional cloud servers.

Figure 97



15 Rating Screen Design and Implementation

The application must have a simple and fun interface that enables you to rate news. The YouRateNews application and web-site is a standalone application. Hardcore news junkies might use it in this fashion. But the success of the entire idea relies on users interfacing with the application from news sites. For example, in the ideal scenario, a user on CNN sees the YouRateNews icon and clicks on the link. A small popup window then opens. The user then sees the article summary appear and clicks on the rating gauge to rate the article. For a user that has already signed up, this process doesn't have to take ten seconds. That's it. Those ten seconds fulfills the user's civic responsibility. The ten second user interface had better look good.

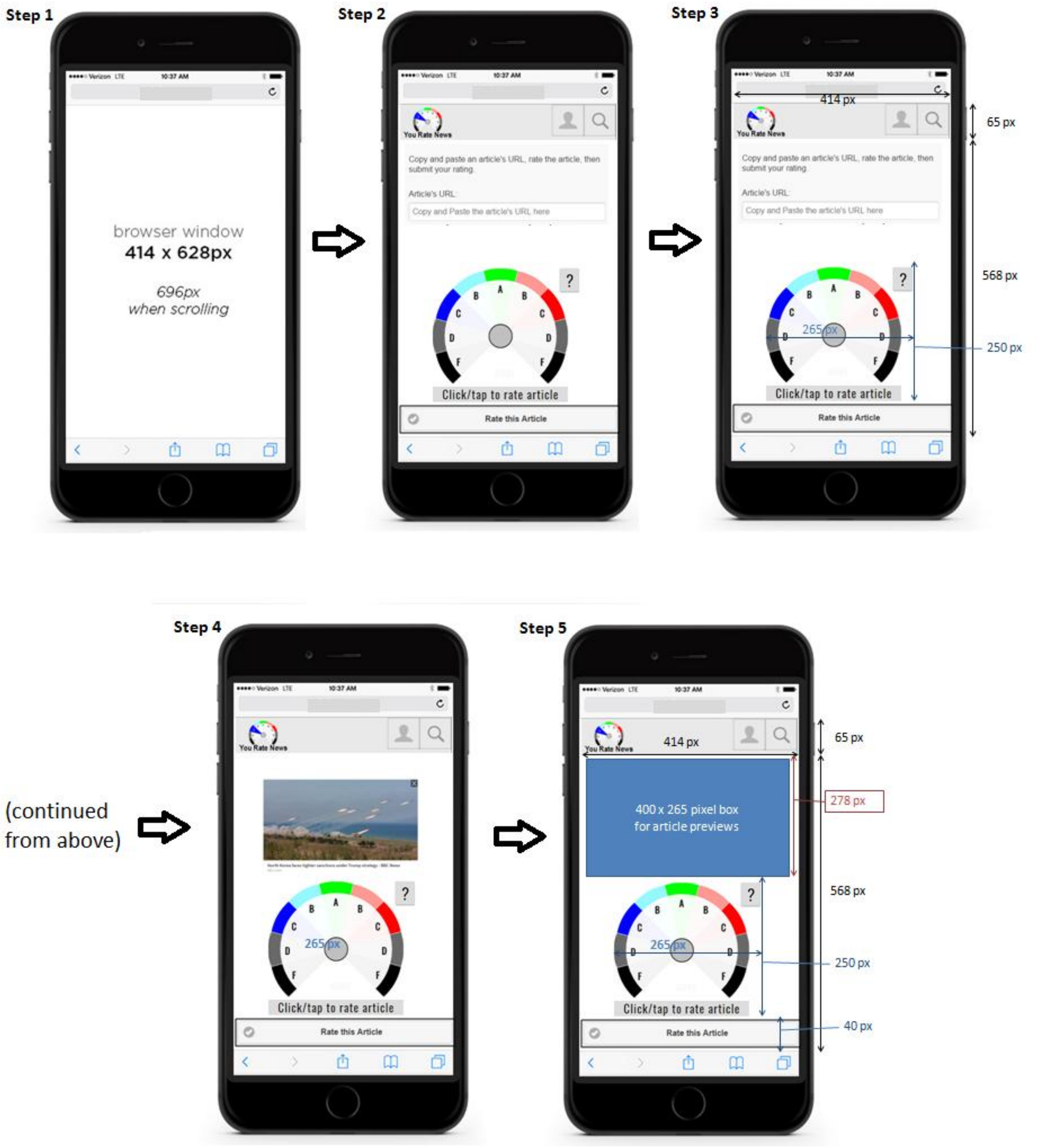
The YouRateNews also fulfills its mobile friendly mission when a user rates an article on a single screen. Up to this point, we have seen a rating gauge prototype; we've seen headers; and we've sign up screens. Now it is time to get to the heart of the application and create the article rating screen.

15.1 The target platform – the iPhone 6

Numerous mobile devices exist with varying screen sizes. Rather than accommodate them all in the design, available resources requires that a medium size mobile device be chosen as a target platform. The iPhone 6 is a solid choice in this regard. Putting complex functionality onto a single mobile device screen can be complicated. I found myself struggling with this problem until I realized a pixel-by-pixel analysis needed to be conducted.

Figure 98 visually shows the steps taken to determine how much pixel space each component needs. I added space for the application's header. I added space for the rating submission button. Using this visual approach, I determined that the rating gauge should be a square with 250 pixels per side. I also determined that the article previews space should occupy a 400 pixel wide by 265 pixel high rectangle.

Figure 98



Copy and paste an article's URL, rate the article, then submit your rating.

Article's URL:

Copy and Paste the article's URL here

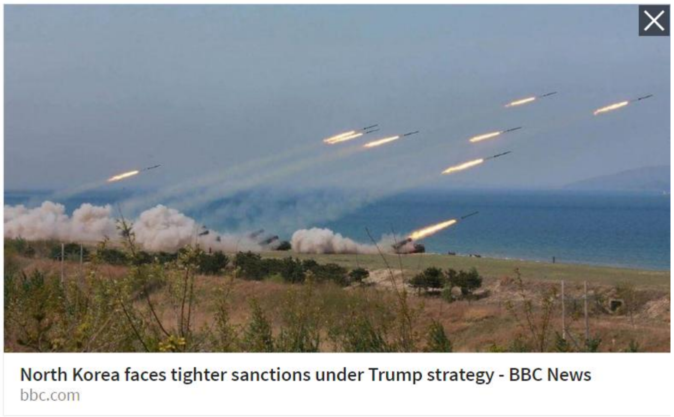
15.2 The article preview box

Figure 98 shows that the application needs to be able to place an article preview in a small area. The article preview is actually a link preview. Link previews are often seen on social media sites like Facebook and Linked in. They normally contain the following elements:

1. An Image taken from the article's URL
2. The article's title
3. The article's site
4. A close button that enables a user to get rid of the preview
5. An optional description of the article

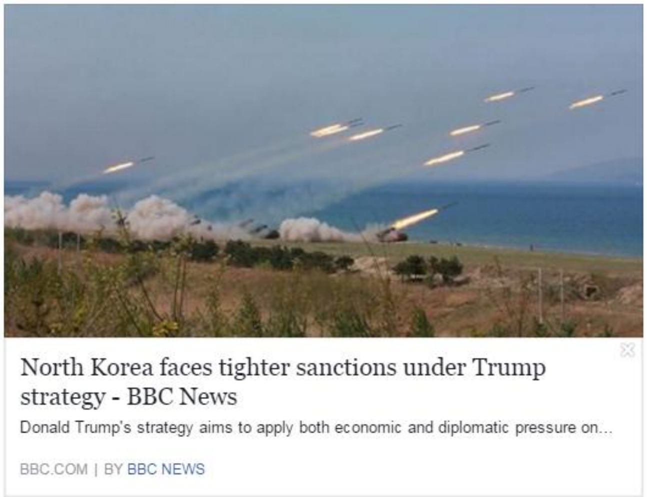
Figure 99 shows a typical Linked-In link preview. Figure 100 shows the same link preview on Facebook.

Figure 99



North Korea faces tighter sanctions under Trump strategy - BBC News
bbc.com

Figure 100



North Korea faces tighter sanctions under Trump strategy - BBC News

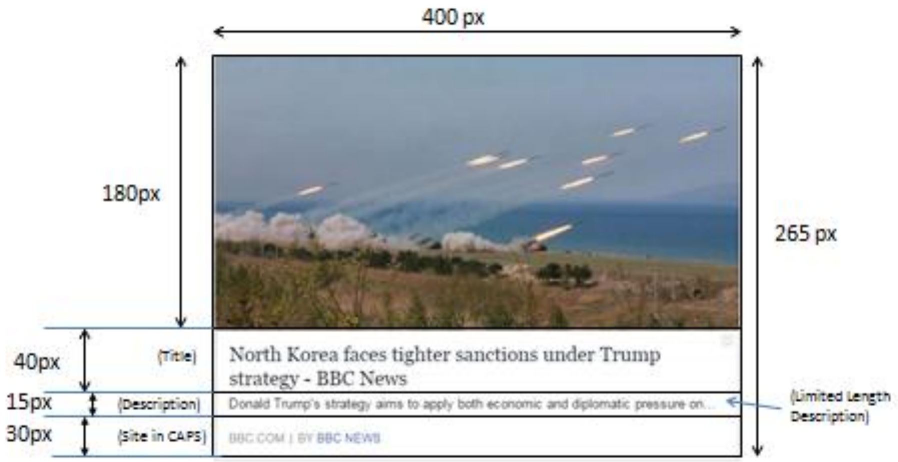
Donald Trump's strategy aims to apply both economic and diplomatic pressure on...

BBC.COM | BY BBC NEWS

15.3 Breaking down the Facebook Link Preview

Figure 101 breaks down the available space for each component using the Facebook link preview approach. Figure 102 shows the simpler breakdown of LinkedIn's link previews.

Figure 101

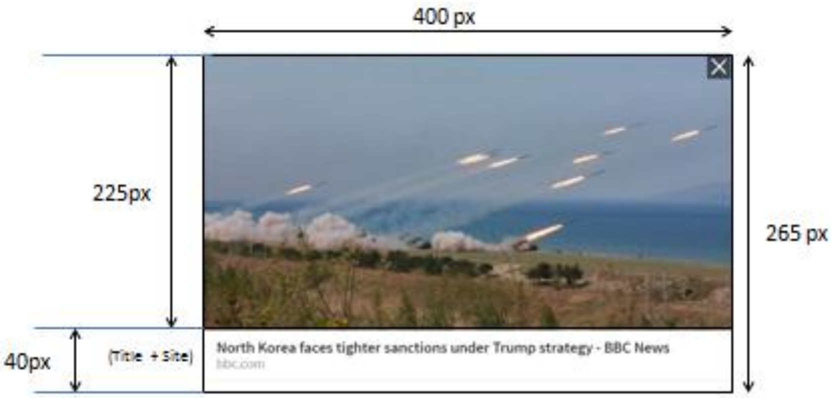


North Korea faces tighter sanctions under Trump strategy - BBC News

Donald Trump's strategy aims to apply both economic and diplomatic pressure on...

BBC.COM | BY BBC NEWS

Figure 102



North Korea faces tighter sanctions under Trump strategy - BBC News

bbc.com

The application design needs to make a decision on which type of Link Preview to present. Do we mimic the more-detailed Facebook approach or the more photo-centric LinkedIn style. The answer comes from the context of the user rating the article. That is to say, when a user decides to rate an article, he/she has just read it or viewed it. The rating preview is just a rapid visual means to confirm the correct article URL has been pasted in the screen. Given this, the simpler Linked-In approach seems sufficient.

15.4 YouRateNews Link Preview Design

Using the iPhone6 as a target platform, I determined that neither the LinkedIn nor the Facebook link preview approach works well. Having a photo span the width of the screen can be done. Placing the text below the preview can also be done. However, adding a rating gage above or below the link preview then simply takes up too much space. A user can't see a link preview image, view readable text, and rate an article on a single screen. An iPhone6 has 375 pixels of available horizontal space and 667 pixels of vertical space on a single screen in the normal portrait layout.

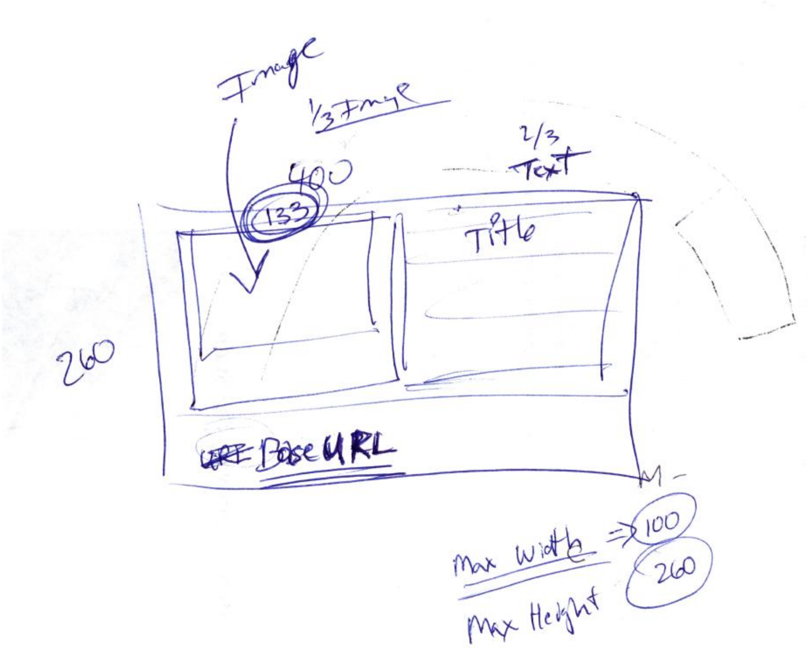
Also, not every news article will have a corresponding photo. The link preview and rating page design must incorporate this reality. This leads to basically two types of link previews. The first type includes a photo and a limited amount of text. The second link preview type is purely text-based. Both variants have to be able to preview a link without taking up a whole lot of screen space.

15.4.1 Link Preview with Image Design

With just 375 iPhone 6 horizontal pixels to work with, designing a link preview with an image is all about screen real-estate. Trying to just code a working solution with JavaScript and CSS was absolutely not sufficient. Fortunately, a full-blown third party design tool was also not necessary.

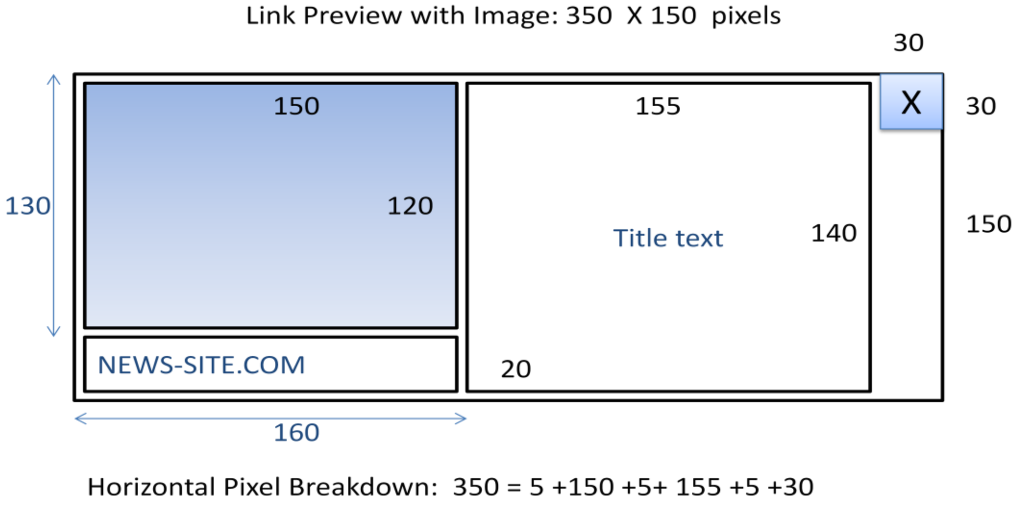
First, I developed a rough idea of how a condensed link preview should appear. Figure 103 shows my first pass – a hand-drawn sketch of the YouRateNews link previews.

Figure 103



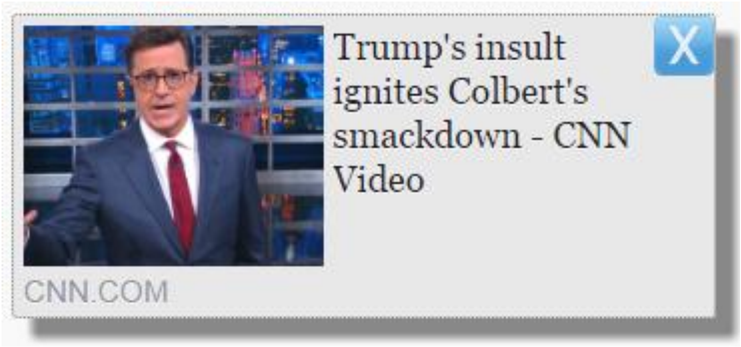
Developing code based on the rough sketch wasn't sufficient. Exact pixel dimensions needed to be worked out. The next step involved turning on grid lines on PowerPoint to use it as a design tool to "fight the pixel battle." Figure 104 shows the link preview's PowerPoint design. Figure 105 shows an example Link preview using this design.

Figure 104


Link Preview with Image: 350 X 150 pixels
30
150
155
X
30
130
120
Title text
140
150
NEWS-SITE.COM
20
160
Horizontal Pixel Breakdown: 350 = 5 +150 +5+ 155 +5 +30

15.4.2 Link Preview with Image design details

Figure 105

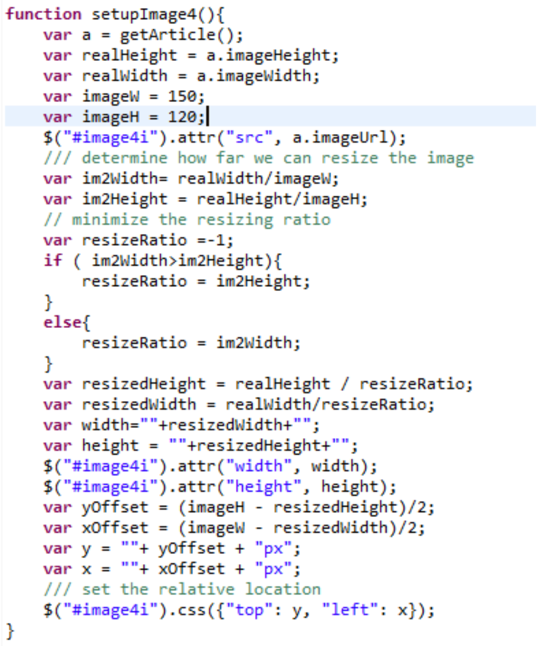


Trump's insult ignites Colbert's smackdown - CNN Video

CNN.COM

Figure 105 appears simple enough. You've got an image, a news site identifier, a title, and a delete window icon. The many hours of work needed to build this intuitive link preview tell a more detailed story. The delete/remove icon in the upper right corner needs more space than a normal window needs. This additional space accounts for the width of a human finger tapping down on an iPhone or similar device. Organizing the text areas so that a variable length title may be fully displayed adds to the link preview design's complication. Notice that the areas showing the article's title is not fully filled to allow for news articles and videos with longer texts. And finally, correctly displaying a large image of unknown size and dimensions into a much smaller fixed-size box without losing the aspect ratio is not a light-hearted activity. Figure 106 displays a small part of the image presentation algorithms.

Figure 106

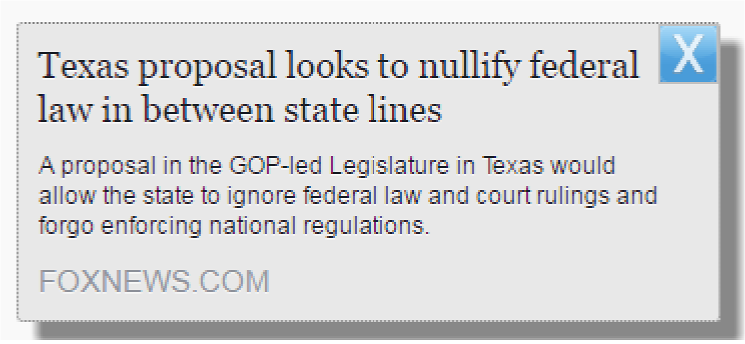


```
function setupImage4(){
    var a = getArticle();
    var realHeight = a.imageHeight;
    var realWidth = a.imageWidth;
    var imageW = 150;
    var imageH = 120;
    $("#image4i").attr("src", a.imageUrl);
    /// determine how far we can resize the image
    var im2Width= realWidth/imageW;
    var im2Height = realHeight/imageH;
    // minimize the resizing ratio
    var resizeRatio =-1;
    if ( im2Width>im2Height){
        resizeRatio = im2Height;
    }
    else{
        resizeRatio = im2Width;
    }
    var resizedHeight = realHeight / resizeRatio;
    var resizedWidth = realWidth/resizeRatio;
    var width=""+resizedWidth+"";
    var height = ""+resizedHeight+"";
    $("#image4i").attr("width", width);
    $("#image4i").attr("height", height);
    var yOffset = (imageH - resizedHeight)/2;
    var xOffset = (imageW - resizedWidth)/2;
    var y = ""+ yOffset + "px";
    var x = ""+ xOffset + "px";
    /// set the relative location
    $("#image4i").css({"top": y, "left": x});
}
```

15.4.3 Link Preview without Image Design

Designing a link preview for the situation without an image is a bit easier. The image is replaced by a more detailed description. The text elements (title, description, and news site identifier) line up vertically. Figure 107 displays an example text-only link preview that occupies the same screen space as a link preview with an image.

Figure 107



Texas proposal looks to nullify federal law in between state lines

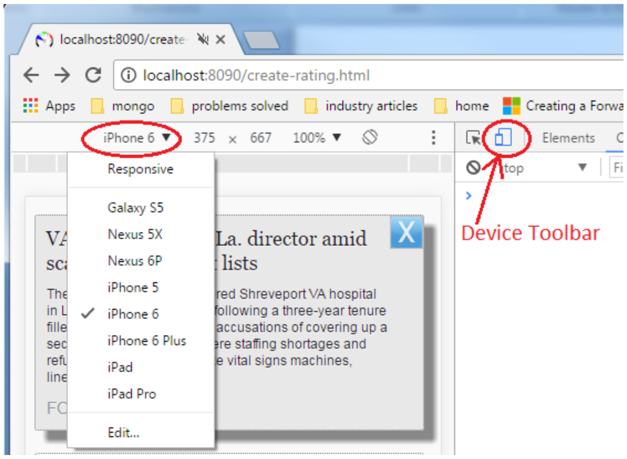
A proposal in the GOP-led Legislature in Texas would allow the state to ignore federal law and court rulings and forgo enforcing national regulations.

FOXNEWS.COM

15.5 Mobile Device Simulation

Up until this point, I've been developing this software on a laptop and testing it locally. Periodically, I upload the software to a public server so I can test the software on an iPhone. A big part of rapid software development is about knowing the small tricks of the trade. The time needed to upload software to a public server for iPhone testing has not been overwhelming. However, ten minutes between testing iterations starts to add up. It turns out that the Chrome Browser has a nice, lesser-known developer tools feature for testing web applications on different web devices. Figure 108 shows the use of the Chrome Device Toolbar. This allows you to rapidly see how your web application appears on different mobile devices.

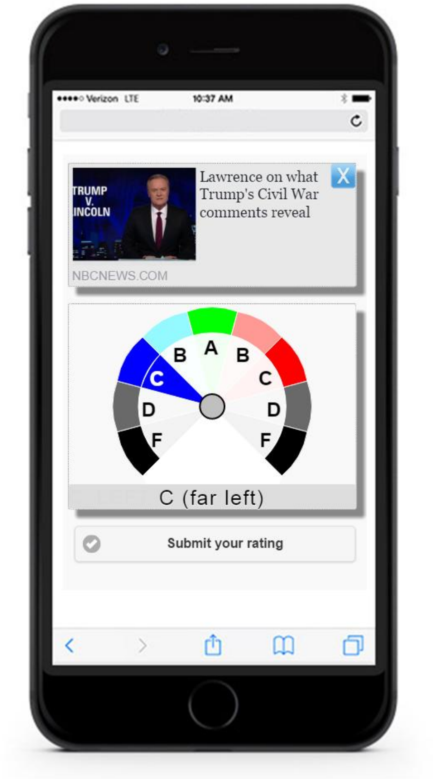
Figure 108



15.6 Rating Screen Results

Figure 109 shows the resulting Rating Screen. The prototyped rating gage has been shrunk down to fit on a mobile device. Both the link preview and rating gage appearance have been enhanced by drop shadows (CSS). The application's header and footer have been removed to save space. The resulting screen allows users to verify their article, and rate it within a few seconds.

Figure 109



Lawrence on what Trump's Civil War comments reveal

NBCNEWS.COM

C (far left)

15.7 The Rating Screen is not just for Mobile Devices

The rating screen and all of the other screens get the job done in a mobile environment. That's great and that's cool in the modern age. The small size of these application screens also fits well into more traditional desktop environments. Specifically, if a user is browsing a news site like CNN, then he does not have to leave the site to rate an article. The user simply clicks on a YouRateNews link, rates the article using a small popup window, and closes the popup window when finished. If a user has already signed up, then rating an article in ten seconds is not unrealistic. This concept of this application is big enough to change the world but the app itself is small enough to always exist inside a popup window.

15.8 Deep Linking in YouRateNews

According to Wikipedia:

> In the context of the World Wide Web, deep linking is the use of a hyperlink that links to a specific, generally searchable or indexed, piece of web content on a website (e.g., "http://example.com/path/page"), rather than the website's home page (e.g., "http://example.com/"). (https://en.wikipedia.org/wiki/Deep_linking)

In the context of YouRateNews, deep linking external links is absolutely essential. Deep links and background processing creates a lightning-fast, intuitive user experience. These links allow any 3rd party news site to hook up to the YouRateNews rating system.

15.8.1 Example Deep Link Scenario

Imagine that a user sees a YouRateNews link on a major news site for the first time. The user decides to rate the article and selects the 35-pixel wide YouRateNews link. The link is a deep link to the article being rated. For example, a deep link URL appears as follows:

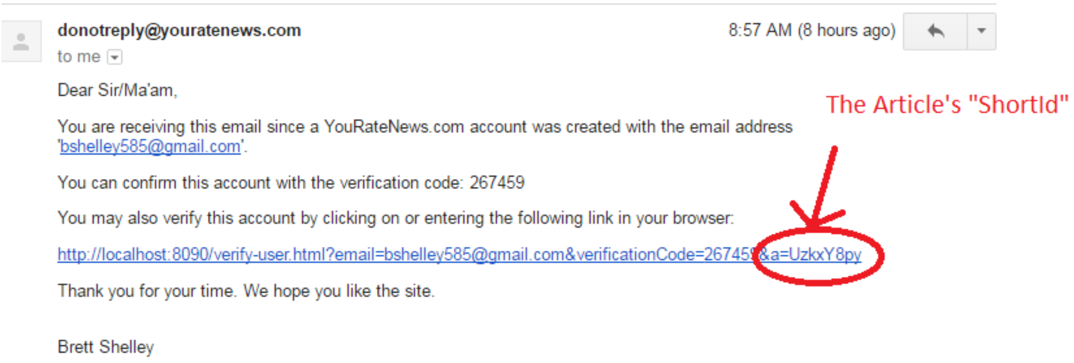
http://www.youratenews.com/start.html?a=http://www.n-tv.de/politik/Laschet-greift-Kraft-einfach-nicht-richtig-an-article19819863.html

In this URL example, all of the characters to the right of the “a=” reference the targeted news article.

When the user clicks on that link, a 400 x 600 pixel popup window appears. The window is the main entry point into the YouRateNews application. The application checks to see if the user is permanently logged in. In this example scenario, the user has not yet signed up. The site directs the user to the sign up page. The site also loads the article’s title, description, and an image as a background process.

The user signs up. After a thirty second sign up process, the YouRateNews application sends an email to the user and directs the user to the account verification page. Now, here is where the deep link really comes into play. The user receives the account verification email. Instead of taking the easier approach of simply entering the verification code, the user clicks on the URL contained in the email (see Figure 110). A new browser window or tab opens. This tab or window is effectively a completely new web session.

Figure 110



donotreply@youratenews.com
to me

8:57 AM (8 hours ago)

Dear Sir/Ma'am,

You are receiving this email since a YouRateNews.com account was created with the email address 'bshelley585@gmail.com'.

You can confirm this account with the verification code: 267459

You may also verify this account by clicking on or entering the following link in your browser:

http://localhost:8090/verify-user.html?email=bshelley585@gmail.com&verificationCode=267459&a=UzkxY8py

Thank you for your time. We hope you like the site.

Brett Shelley

The Article's "ShortId"

The verification link has three pieces of information in the URL's parameters. These three pieces are:

- the user's email address - his identity
- a verification code - a token that verifies that the user is the owner of the email account
- the "a" parameter – an article identifier

Clicking on this link logs the user in, verifies his account, and loads the article. The user then lands on the rating page with a preview link (title, description and image) and the rating gauge. The user submits his rating and is directed to the rating results page. The user checks out the results for a moment and closes the window. Ideally, the user just does this intuitively.

15.8.2 The background processing magic

In this example scenario, deep linking and background processes performed the magic in the background. As soon as the popup window or YouRateNews tab appeared, the application began processing the deep linked article. In the background, the system checked for the article in the YouRateNews database. When the article was not found, then the user's browser application sent a cross site scripting screen-scraping request to the 3rd party service. While the user was signing up, the article scraping results returned. Then the application updated the article in the YouRateNews Mongo database with the article's title, image source, image size, and description. All of this happened while the user was typing his email address.

When the user opened the verification link, the site used the article identifier to load the article's meta-data (title, imageUrl, description, etc.). This time around, no screen scraping was necessary. The article's meta-data was quickly retrieved from the database. The YouRateNews web application then used this meta-data to load the article's link preview. The link preview showed a combination of the article's title, site, description and image. And the rating gage was rapidly loaded using scalable vector graphics.

In this example scenario, the user was able to click on a link on a 3rd party news site, create a YouRateNews account, verify that account, and rate an article inside of two minutes. If that user decides to rate another article, then the rating process might just take 20 seconds. And if the article being rated has already been rated by another user, then the article rating process might take less than 10 seconds.

The deep links and asynchronous background processes result in an extremely fast and simple user experience. The bottom line is that any user can rate an article with three button clicks. This extreme simplicity gives the solution an excellent chance of success. And in terms of processing capacity, most of the heavy lifting (screen scraping & image processing) occurs in the user's web browser. The amount of server side processing is far less. This improves the product's scalability.

15.8.3 Asynchronous Client Side Article Processing

The development of the YouRateNews JavaScript/HTML5/CSS3 client has been rapid. News bugs accompany new features. These bugs begin to take over – and the client-side code becomes so complex that it is difficult to understand what was going on between user interface components and server calls.

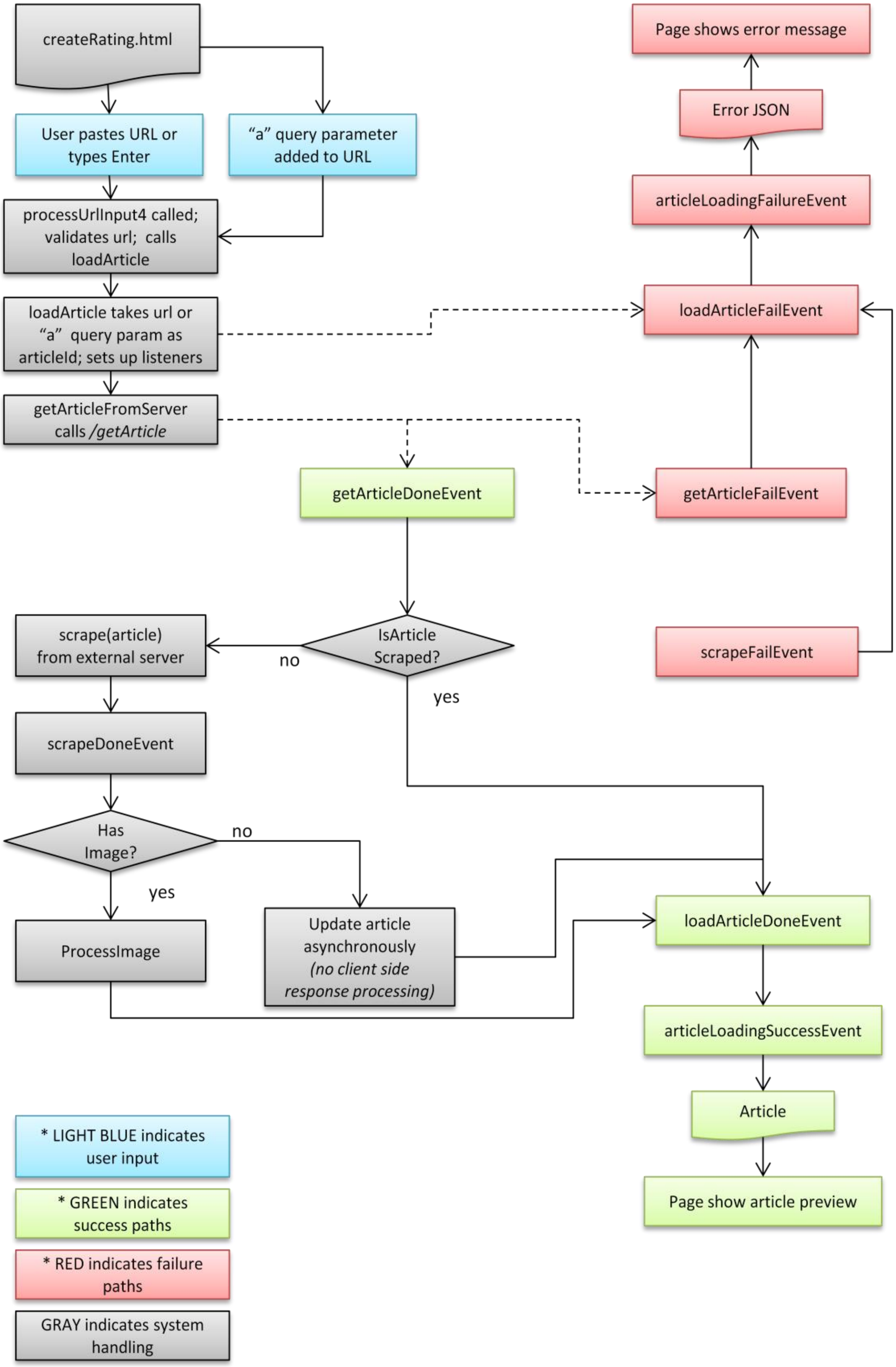
One solution to alleviate these types of problems is to use the Model-View-Controller design pattern. In a nutshell, this pattern separates user interface components (the view) from data components (the model). The controller then manages the interaction between view and data components.

The YouRateNews client-side architecture uses this pattern extensively. The client-side process of introducing articles into the system exemplifies its use. All of the code to load articles (model components) is completely separate from the code that manages the user interface view components. The controller code uses Jquery custom events to handle asynchronous server-side processing.

Sounds good right? Not quite. The MVC pattern introduced some clarity but bugs still persisted. To understand what was going on, I found that I had to draw a picture. Figure 111 shows the controller process for loading an article. It's a neat little flowchart where custom event success messages work their way to the bottom and failure events bubble to the top. This author spent three hours reviewing code to create this flowchart. And the major bug was finally discovered near the end of this process. Three lines of code were moved around and clarity came back to the effort.

It turns out that the whole loading process was dependent on a server-update that occasionally failed. The failure caused havoc in the user interface. This server update was just to update the image dimension of the article's image. This update is a nice feature that speeds things up for other users, but was not absolutely necessary. The fix involved just letting the update try to work – and to not respond in any way upon failure. So, three hours of drawing a picture for three lines of code. Well, worth it.

Figure 111


createRating.html
User pastes URL or types Enter
"a" query parameter added to URL
processUrlInput4 called; validates url; calls loadArticle
loadArticle takes url or "a" query param as articleId; sets up listeners
getArticleFromServer calls /getArticle
getArticleDoneEvent
getArticleFailEvent
IsArticle Scraped?
no
yes
scrape(article) from external server
scrapeDoneEvent
Has Image?
no
yes
ProcessImage
Update article asynchronously (no client side response processing)
scrapeFailEvent
loadArticleFailEvent
articleLoadingFailureEvent
Error JSON
Page shows error message
loadArticleDoneEvent
articleLoadingSuccessEvent
Article
Page show article preview
* LIGHT BLUE indicates user input
* GREEN indicates success paths
* RED indicates failure paths
GRAY indicates system handling

16 Displaying Rating Results

Users expect to see results immediately when they rate something. When it comes to display numeric results, data visualization is king. The original design and mockup screens include a basic idea of how to present results. We'll compare this original concept shortly to the actual implementation.

The decision as to how to display rating results quickly zeroed in on a few options. Trying to show overall results on the rating gage was one possibility. Gages are good for showing one value, but not good at displaying result distributions. So, this option was eliminated. The decision narrowed to using a pie chart or bar chart to display results. Both of these data visualization approaches are good at showing results distribution for distinct "A" through "F" ratings. I made the decision to give the rectangular bar chart a shot since we already have a circular rating gage. In this context, using another circular graphic seems to add confusion – a rectangular bar chart provides a bit more clarity.

16.1 Rating Results Bar Chart Prototyping

There are countless commercial off-the-shelf charting libraries available. I reviewed many of them. The application is already committed to using Scalable Vector Graphics (SVG) in the rating gage. So, research focused on SVG solutions.

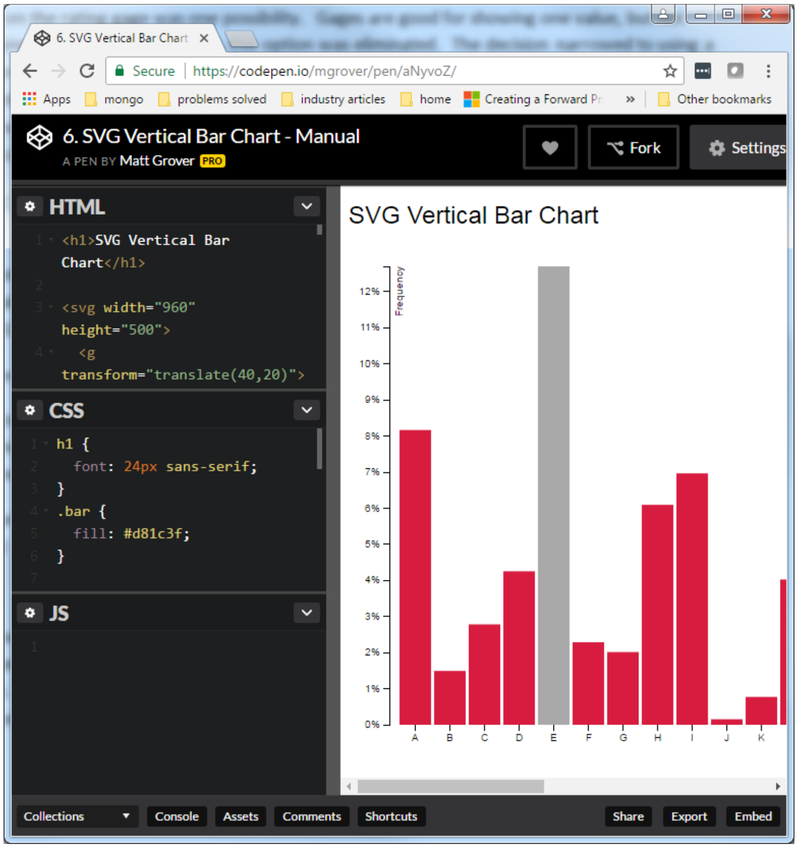
Then, I discovered D3. I found that you can do more with less code using D3.

> D3.js (or just D3 for Data-Driven Documents) is a JavaScript library for producing dynamic, interactive data visualizations in web browsers. It makes use of the widely implemented SVG, HTML5, and CSS standards. (https://en.wikipedia.org/wiki/D3.js)

Once my research flowed in the direction of D3, I started reviewing D3/SVG implementations of Bar Charts. I found the public codepen at https://codepen.io/mgrover/pen/aNyvoZ/ seen in Figure 112. I forked off a copy and started modifying it. The best approach to prototyping a bar chart with this environment is to use Codepen.io. Codepen updates the user interface while you type. For rapid prototyping, I can find nothing better. Figure 112 and Figure 113 show the progress following one very long day of prototyping work.

The bar chart has a number of customizations that match the application. The color scheme of the bar chart matches the color scheme of the rating gage. For example, the rating results for far left democrat blue and far right republican red are shown correctly. The horizontal axis has angled text descriptions matching each rating category. The customizations also include clicking behavior. Instead of changing the color on a click, the edges highlight and a custom tooltip appears with the results. The items on the horizontal axis are also logically ordered. "Fake News" ratings (the worst) start on the left and work towards the "Excellent" ratings on the right. This ordering enables a user to quickly understand rating results without having to dig into the numbers.

Figure 112



6. SVG Vertical Bar Chart - Manual
A PEN BY Matt Grover

HTML

```
<h1>SVG Vertical Bar
Chart</h1>

<svg width="960"
height="500">
  <g
transform="translate(40,20)">
```

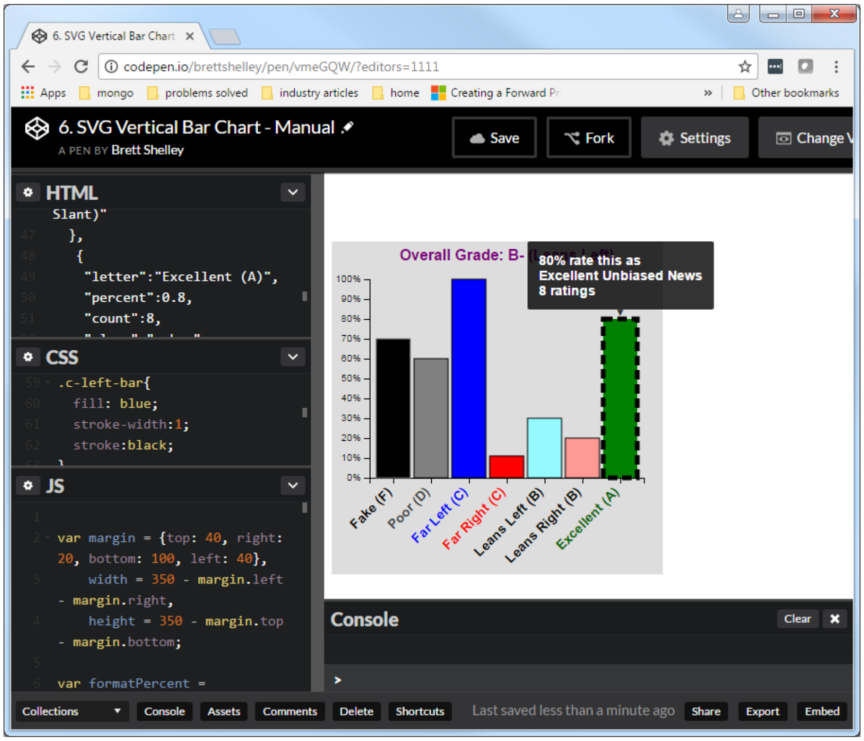
CSS

```
h1 {
  font: 24px sans-serif;
}
.bar {
  fill: #d81c3f;
}
```

JS

SVG Vertical Bar Chart

Figure 113



6. SVG Vertical Bar Chart - Manual
A PEN BY Brett Shelley

HTML

```
Slant)"
  },
   {
    "letter":"Excellent (A)",
    "percent":0.8,
    "count":8,
```

CSS

```
.c-left-bar{
  fill: blue;
  stroke-width:1;
  stroke:black;
```

JS

```

var margin = {top: 40, right:
20, bottom: 100, left: 40},
    width = 350 - margin.left
- margin.right,
    height = 350 - margin.top
- margin.bottom;

var formatPercent =
```

16.2 Adding Tabs to the Rating Results

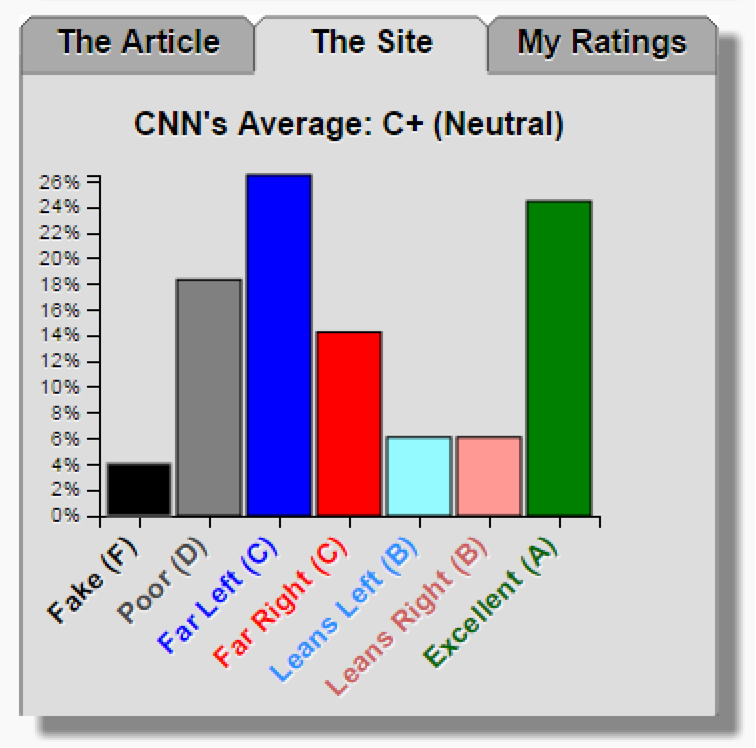
When a news article or video gets rated, the rating also applies to the article's site. For example, a fake news rating of an article in "Rolling Stones" applies not only to the article but also the "Rolling Stones" site. This is obvious. It is also logical that YouRateNews tracks the ratings of each contributing user. Thus, each rating produces results for three entities: the article; the site; and the user. Wouldn't it be nice if the user could see these results simultaneously?

The Mongo Magic section describes how the YouRateNews already captures this information in "Report Cards". The data is present. The trick then becomes showing these three different variants of a rating in a condensed space.

Tabs are the answer. With a very usable bar chart concept, the prototype was simply extended to show a tab for the article's ratings, the site's ratings, and the user's ratings.

As a software professional, you know that you are pushing the envelope when you discover no useful open source widgets available for what you are trying to do. And this is the case with SVG tabs. No useable SVG tab widgets could be located. Fortunately, SVG and the reduced complexity of the D3 APIs made it possible to develop a custom tab that fits into a condensed space, looks decent and handles events well. Figure 114 shows the resulting look and feel.

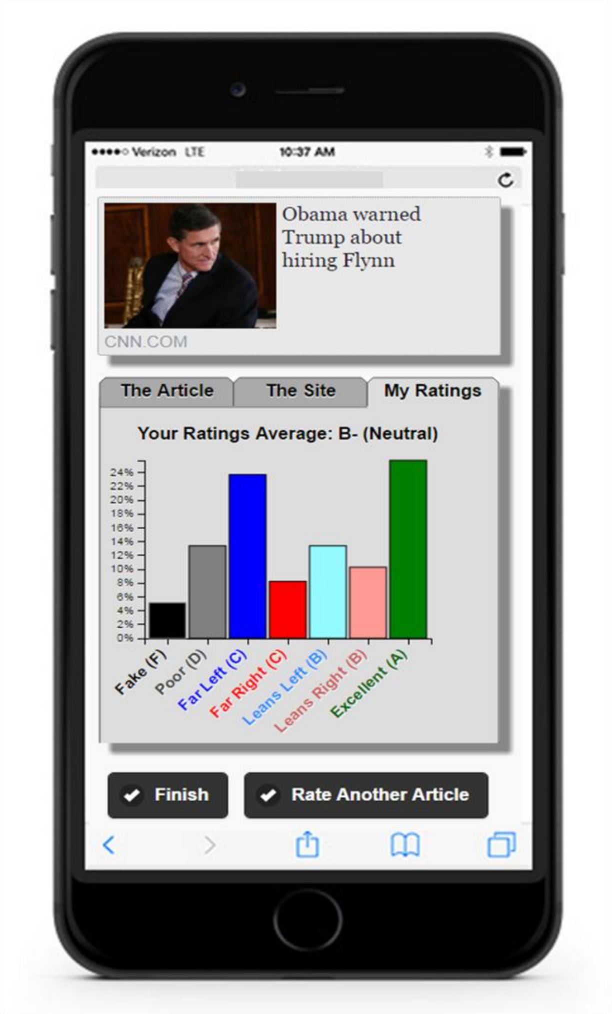
Figure 114



16.3 Bar Chart and Tabs Integrated into Results Page

Figure 115 exemplifies how the SVG bar chart and tabs appear in the overall application. Tabs are tremendously efficient in presenting a user with multiple views of information. Switching between tabs is virtually instantaneous since all of the data is retrieved before the page is visible. Note also that the rating page has buttons to finish or continue rating articles and news videos. Slowly, but surely, this application is coming together.

Figure 115



Obama warned Trump about hiring Flynn

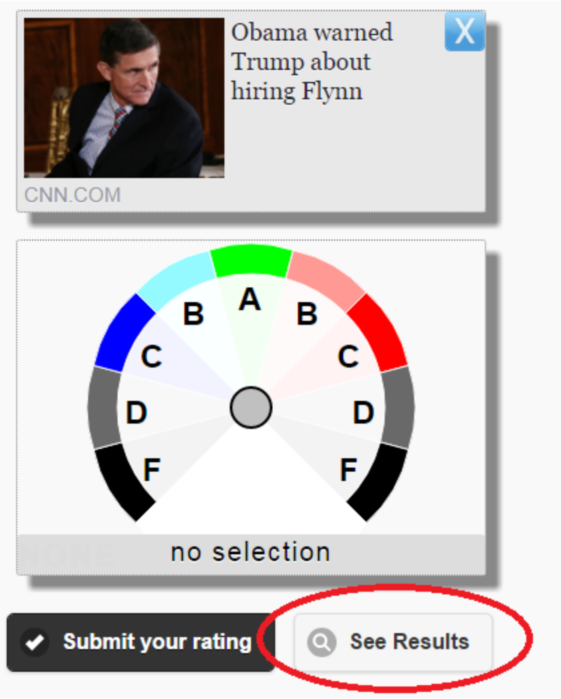
CNN.COM

Your Ratings Average: B- (Neutral)

16.4 Search Capability Added to Rating and Results Pages

I came to the realization that users would want to see ratings hours or days after rating an article. More politically-oriented and advanced users would also be interested in seeing how different news sites rate. To facilitate this, I added a “See Results” button to the rating page as seen in Figure 116. Using this button, if a user wants to see the ratings for a given article, site, or their own ratings, then he can simply start the rating process on any article from the site he is interested in. Selecting the “See Results” button takes him directly to the results page.

Figure 116



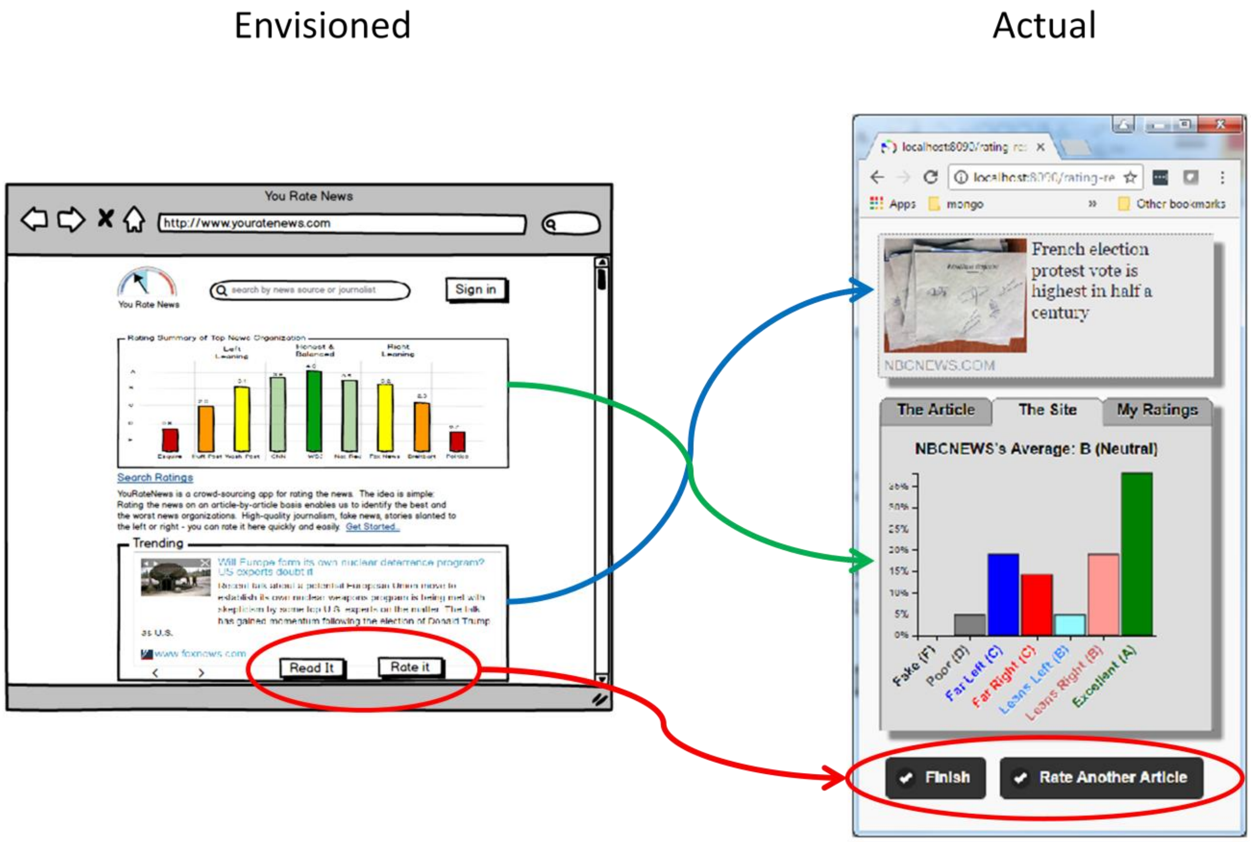
Obama warned Trump about hiring Flynn

CNN.COM

16.5 Rating Results Envisioned vs. Actual

Figure 117 compares the envisioned concept pages to the actual pages. The location of visual components has changed a bit. The overall concept still applies. The major difference is that the envisioned concept pages have more of a desktop focus while the actual pages are mobile device focused. The more condensed screens also support the greater vision that the YouRateNews site may act as a “sidekick” application for various news sites.

Figure 117



Envisioned

Actual

YouRateNews is a crowd-sourcing app for rating the news. The idea is simple: Rating the news on an article-by-article basis enables us to identify the best and the worst news organizations. High-quality journalism, fake news, stories slanted to the left or right - you can rate it here quickly and easily. Get Started..

Will Europe form its own nuclear deterrence program? US experts doubt it

Recent talk about a potential European Union move to establish its own nuclear weapons program is being met with skepticism by some top U.S. experts on the matter. The talk has gained momentum following the election of Donald Trump as U.S.

www.foxnews.com

French election protest vote is highest in half a century

NBCNEWS.COM

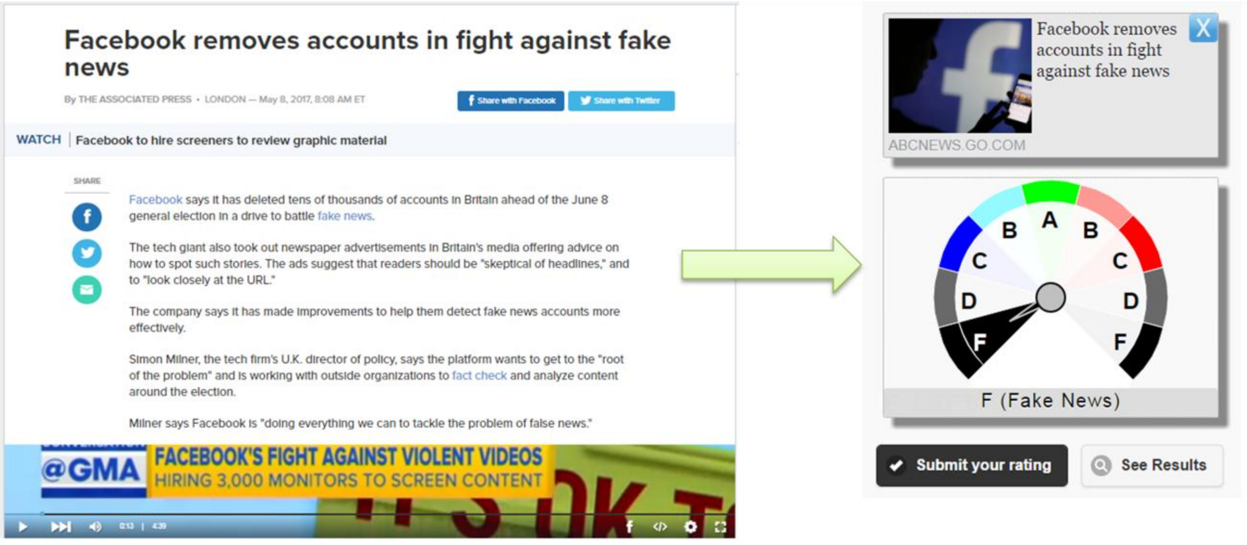
NBCNEWS's Average: B (Neutral)

16.6 A Little Pep Talk on the YouRateNews application

While building this software product, I was also inspired to write a book about developing a piece of software from concept through deployment. There are countless books on different technologies – but I can’t think of one time where I read a book that shows how one can assemble all the pieces together to create an enterprise quality application. And during this process, good ideas have just kept coming. It is possible that the process of writing a book has helped define where the product idea is headed.

The product development has also been driven by contemporary issues. At the moment of this paragraph’s writing, Facebook has just announced the hiring of 3000 content screeners to seek out and remove Fake News articles. (See Figure 118). That’s an investment far north of $1 Billion. The YouRateNews concept fulfills a major business need by crowd-sourcing the screening of Fake and Biased news. Fake news is a huge problem – this application addresses it. The YouRateNews application doesn’t stop there. Biased reporting (the kind of reporting the US president calls “fake” is also rampant. This biased news reporting often originates from legitimate news agencies. The YouRateNews application core vision is to push news reporting to legitimacy and neutrality. So, stay tuned, this author is going to put this work out there – and make a difference.

Figure 118



Facebook removes accounts in fight against fake news

By THE ASSOCIATED PRESS • LONDON — May 8, 2017, 8:08 AM ET

WATCH | Facebook to hire screeners to review graphic material

Facebook says it has deleted tens of thousands of accounts in Britain ahead of the June 8 general election in a drive to battle fake news.

The tech giant also took out newspaper advertisements in Britain's media offering advice on how to spot such stories. The ads suggest that readers should be "skeptical of headlines," and to "look closely at the URL."

The company says it has made improvements to help them detect fake news accounts more effectively.

Simon Milner, the tech firm's U.K. director of policy, says the platform wants to get to the "root of the problem" and is working with outside organizations to fact check and analyze content around the election.

Milner says Facebook is "doing everything we can to tackle the problem of false news."

Facebook removes accounts in fight against fake news

ABCNEWS.GO.COM

F (Fake News)

17 Trending Page Design

Many media sites present a list of what's trending. A trending list identifies what other users are interested in. In the YouRateNews context, trending identifies articles that other users are rating. These trending articles also serve as an entry point where users need not "copy and paste" a URL to rate an article.

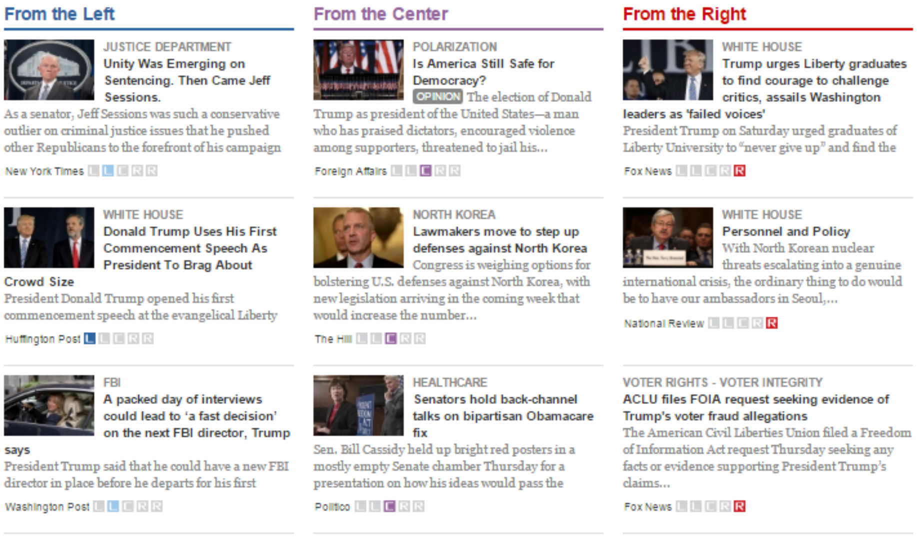
17.1 Benchmarking Design Options

When it comes to trending, users instantly and almost unconsciously gage the professionalism of an application by seeing if a certain aspect of an application meets their expectations. How trending items is represented is one of these aspects. So, let's have a look at various solutions to define how articles should trend.

17.1.1 Allsides.com – Too Much

Figure 119 shows the political site Allsides.com's home page. This home page actually shows 45 separate article previews. The mobile site representation of this home page is well-laid out, but it requires a lot of scrolling to show these 45 articles. It's too much. An approach like this doesn't fit in the single-page, no-scrolling YouRateNews vision.

Figure 119



From the Left

JUSTICE DEPARTMENT
Unity Was Emerging on Sentencing. Then Came Jeff Sessions.
As a senator, Jeff Sessions was such a conservative outlier on criminal justice issues that he pushed other Republicans to the forefront of his campaign
New York Times L L C R R

WHITE HOUSE
Donald Trump Uses His First Commencement Speech As President To Brag About Crowd Size
President Donald Trump opened his first commencement speech at the evangelical Liberty
Huffington Post L L C R R

FBI
A packed day of interviews could lead to 'a fast decision' on the next FBI director, Trump says
President Trump said that he could have a new FBI director in place before he departs for his first
Washington Post L L C R R

From the Center

POLARIZATION
Is America Still Safe for Democracy?
OPINION The election of Donald Trump as president of the United States—a man who has praised dictators, encouraged violence among supporters, threatened to jail his...
Foreign Affairs L L C R R

NORTH KOREA
Lawmakers move to step up defenses against North Korea
Congress is weighing options for bolstering U.S. defenses against North Korea, with new legislation arriving in the coming week that would increase the number...
The Hill L L C R R

HEALTHCARE
Senators hold back-channel talks on bipartisan Obamacare fix
Sen. Bill Cassidy held up bright red posters in a mostly empty Senate chamber Thursday for a presentation on how his ideas would pass the
Politico L L C R R

From the Right

WHITE HOUSE
Trump urges Liberty graduates to find courage to challenge critics, assails Washington leaders as 'failed voices'
President Trump on Saturday urged graduates of Liberty University to "never give up" and find the
Fox News L L C R R

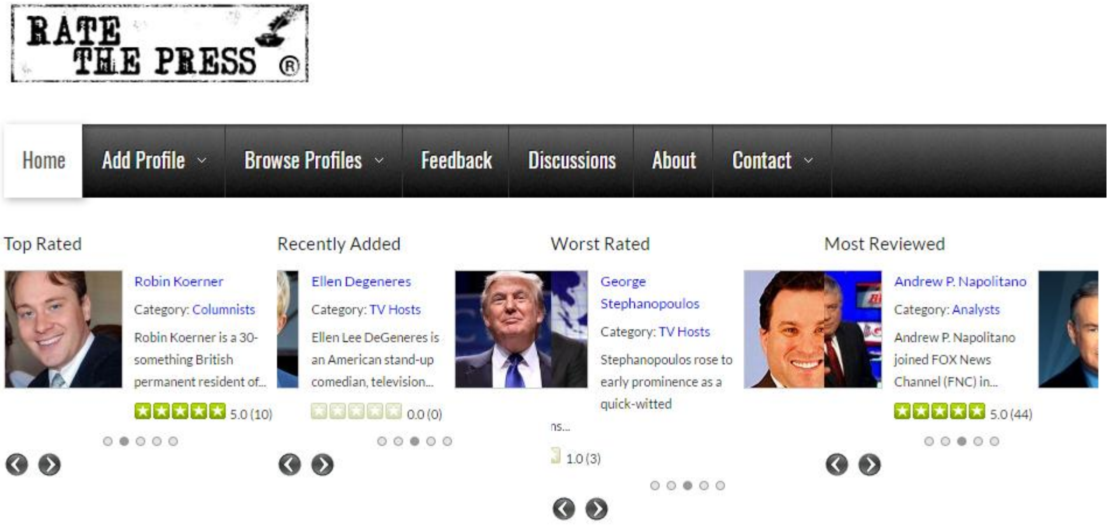
WHITE HOUSE
Personnel and Policy
With North Korean nuclear threats escalating into a genuine international crisis, the ordinary thing to do would be to have our ambassadors in Seoul,...
National Review L L C R R

VOTER RIGHTS - VOTER INTEGRITY
ACLU files FOIA request seeking evidence of Trump's voter fraud allegations
The American Civil Liberties Union filed a Freedom of Information Act request Thursday seeking any facts or evidence supporting President Trump's claims...
Fox News L L C R R

17.1.2 Rate the Press – A little better, but Ancient

Figure 120 shows the Trending Concept on the RateThePress.com homepage. The article links slide into the next set at timed intervals. If you look closely at the screen capture, you can see this. This site shows ten trending articles at any one time. However, the sliding effects allow more to be shown. This site can trend more articles than the AllSides.com site with 4 times less screen space. Of course, ten link previews will also not fit into the single-page, no-scrolling vision.

Figure 120



Robin Koerner
Category: Columnists
Robin Koerner is a 30-something British permanent resident of...
5.0 (10)

Ellen Degeneres
Category: TV Hosts
Ellen Lee DeGeneres is an American stand-up comedian, television...
0.0 (0)

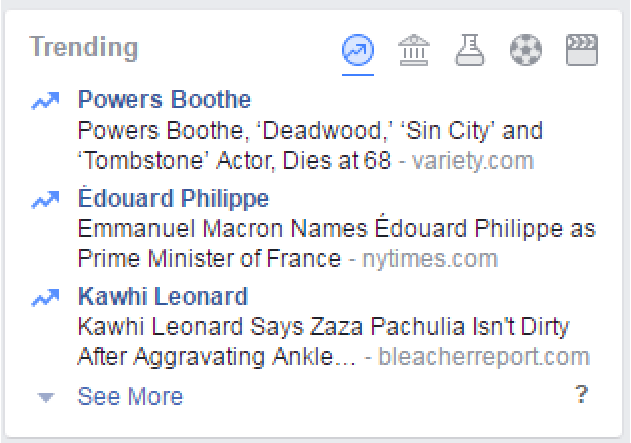
George Stephanopoulos
Category: TV Hosts
Stephanopoulos rose to early prominence as a quick-witted
ns...
1.0 (3)

Andrew P. Napolitano
Category: Analysts
Andrew P. Napolitano joined FOX News Channel (FNC) in...
5.0 (44)

17.1.3 Facebook and LinkedIn – All Text Trending

Figure 121 shows how Facebook tackles trending with text links. But for a startup multi-media endeavor, a text-only trending page doesn't seem to have enough pizzazz. This is not a negative critique on Facebook. Facebook site is already so filled with multi-media photos and video that a text-only trending section is an efficient use of space. The screen capture in Figure 122 demonstrates how LinkedIn displays Trending Topics.

Figure 121

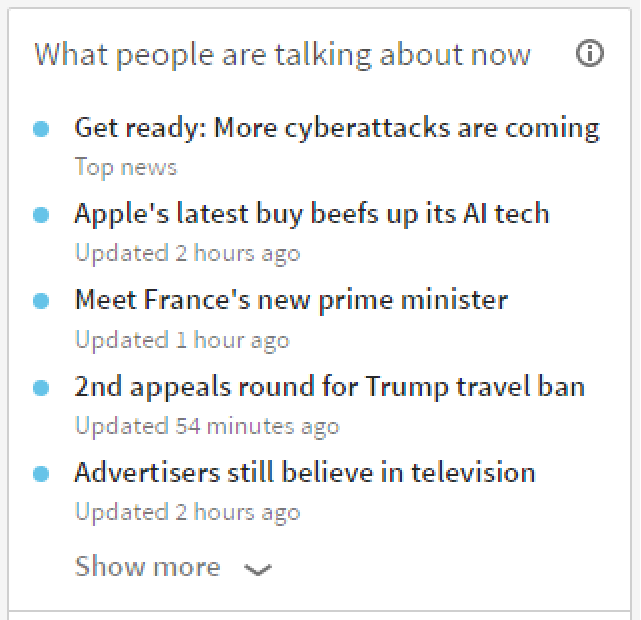


Powers Boothe
Powers Boothe, 'Deadwood,' 'Sin City' and 'Tombstone' Actor, Dies at 68 - variety.com

Édouard Philippe
Emmanuel Macron Names Édouard Philippe as Prime Minister of France - nytimes.com

Kawhi Leonard
Kawhi Leonard Says Zaza Pachulia Isn't Dirty After Aggravating Ankle... - bleacherreport.com

Figure 122



What people are talking about now ⓘ

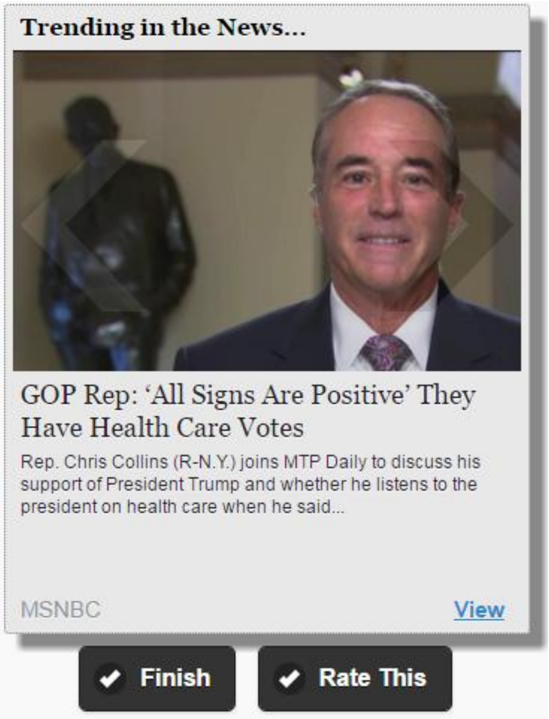
- Get ready: More cyberattacks are coming
  Top news
- Apple's latest buy beefs up its AI tech
  Updated 2 hours ago
- Meet France's new prime minister
  Updated 1 hour ago
- 2nd appeals round for Trump travel ban
  Updated 54 minutes ago
- Advertisers still believe in television
  Updated 2 hours ago

Show more

17.2 Trending Presentation Design Decision

Based on the research of various approaches, I decided to go with a single Link preview that periodically changes news articles. This approaches cycles in a new article every twenty seconds. Figure 123 exemplifies this trending solution.

Figure 123



Trending in the News...

GOP Rep: 'All Signs Are Positive' They Have Health Care Votes

Rep. Chris Collins (R-N.Y.) joins MTP Daily to discuss his support of President Trump and whether he listens to the president on health care when he said...

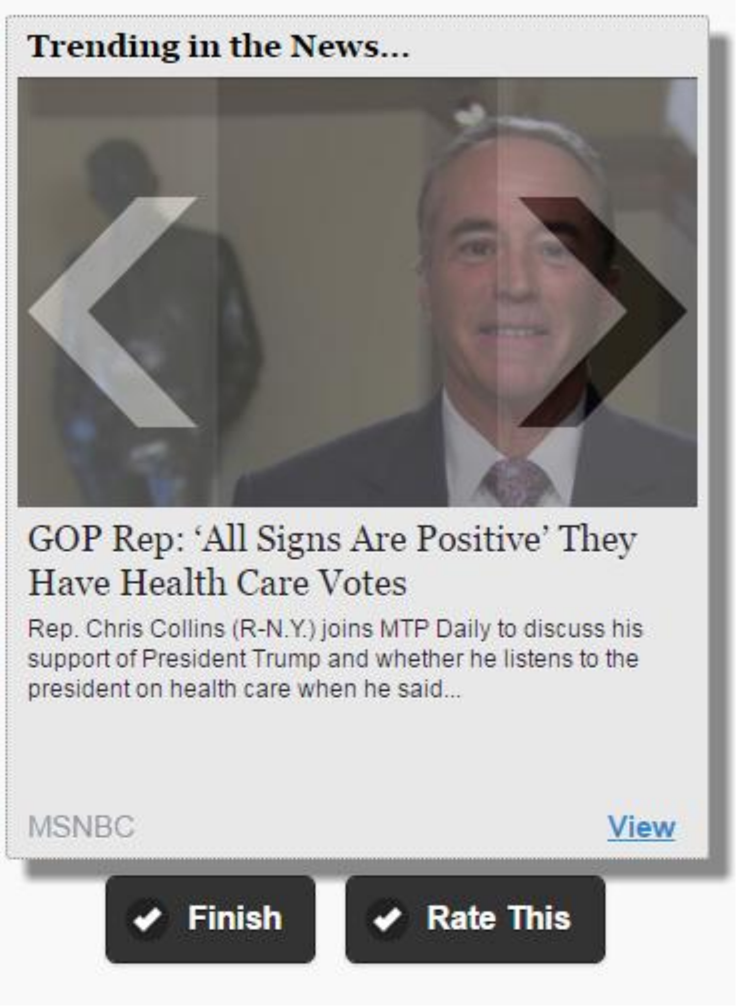
MSNBC View

17.3 The Requirement to Scroll between Articles

The ability to manually scroll between articles accompanies the single-article preview approach. Users should be able to back up to an interesting article or scroll past uninteresting ones. Users should also be able to stop scrolling to open an article to read and rate it. I enabled the manual scrolling functionality by using semi-transparent arrows. On mouse over events, these arrows become much more pronounced as seen in Figure 124.

One interesting and accidental feature of the manual scrolling solution is the arrow coloring. One arrow is white and the other is black. This is intentional. It cannot be known in advance how any given article's image or photo will appear. Making one almost transparent arrow white and the other one black greatly improves the likelihood that the user will be able to just see at least of the two semi-transparent arrows.

Figure 124



Trending in the News...

GOP Rep: 'All Signs Are Positive' They Have Health Care Votes

Rep. Chris Collins (R-N.Y.) joins MTP Daily to discuss his support of President Trump and whether he listens to the president on health care when he said...

MSNBC

17.4 Failure is Part of the Process – Just not the main part

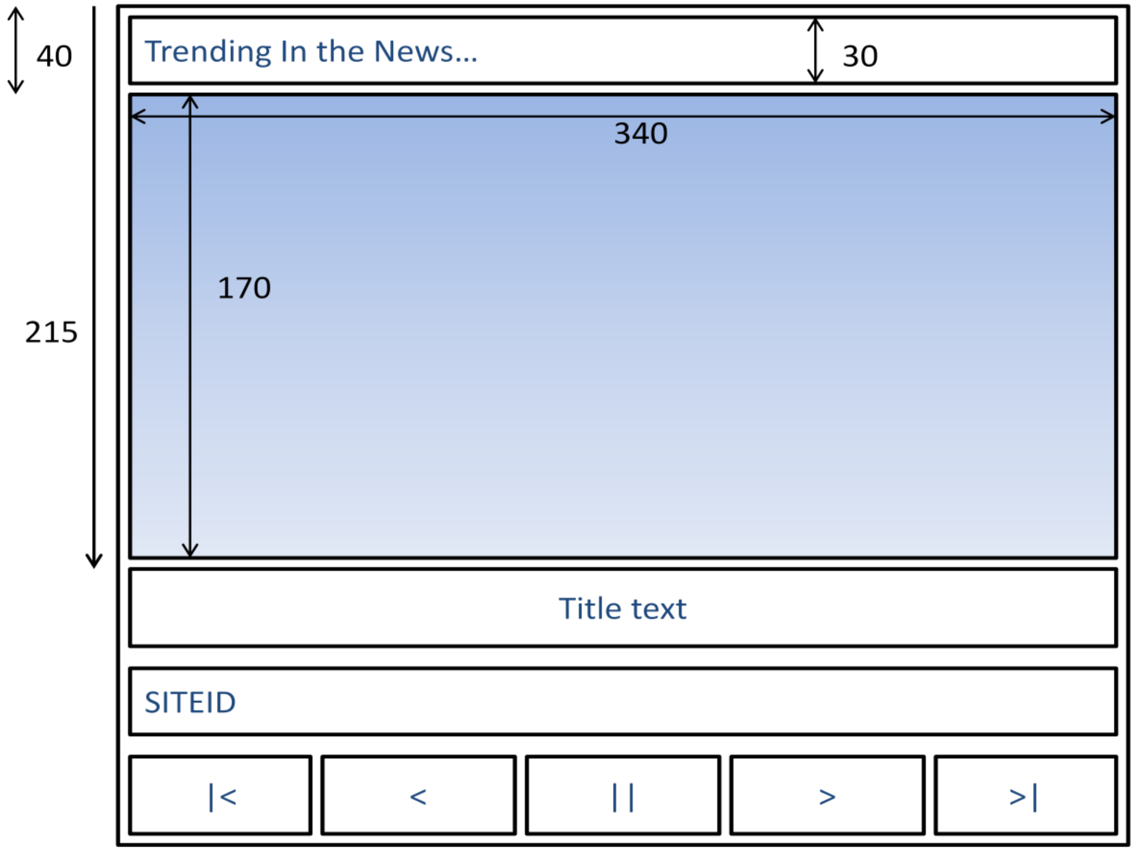
A fun related story: Once one of my coworkers was filling out a security clearance questionnaire for a top secret scientist job near Washington DC. He politely asked me how he should represent his marijuana use. I indicated that he should be up front about it and not lie. A few hours later, he asked me to review his comments on the SF-86 form. He wrote: "I experimented with marijuana on approximately 170 occasions."

And on that note, I experimented with about 170 different scrolling options before deciding on semi-transparent arrows.

17.4.1 The Tape Recorder Design

Before writing code, I used PowerPoint to mock up how the trending article preview could look. Doing the pixel calculations was really helpful for the final product. However, using the "tape recorder" style seen in Figure 125 doesn't work. Most young adults today have no memory of using tape recorders. A more modern approach is needed.

Figure 125

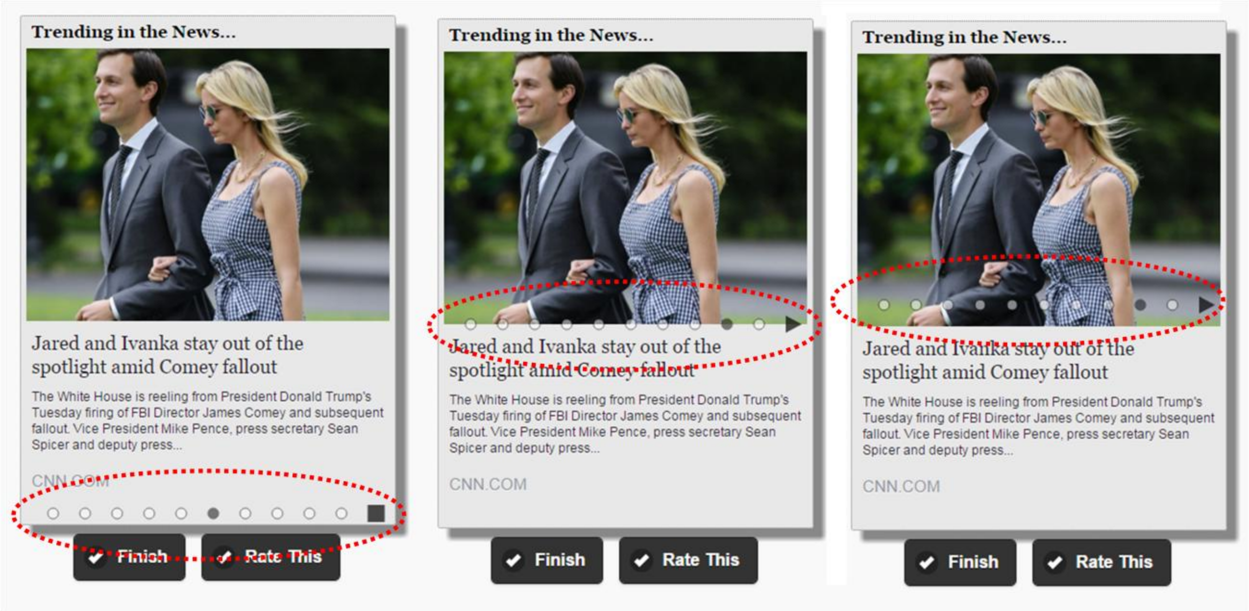


17.4.2 The Little Dots Failure

I wanted the trending article preview scrolling to be cutting edge. One of the newer mobile approaches to showing where you are in a list is to represent the size of a list and your current location with small dots. So, I experimented with this approach heavily – only without the joy most certainly experienced by my former coworker.

Figure 126 shows three of the failed attempts to create a presentable "little dots" option. This approach worked, but just looks terrible. It reminded me of someone who went to town on junk mail with a hole puncher. Using this "hole puncher" approach also demands a numeric limit on the number of articles that can trend. So, I tossed out the solution after an eight hour struggle.

Figure 126



Trending in the News...

Jared and Ivanka stay out of the spotlight amid Comey fallout

The White House is reeling from President Donald Trump's Tuesday firing of FBI Director James Comey and subsequent fallout. Vice President Mike Pence, press secretary Sean Spicer and deputy press...

CNN.COM

Trending in the News...

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The White House is reeling from President Donald Trump's Tuesday firing of FBI Director James Comey and subsequent fallout. Vice President Mike Pence, press secretary Sean Spicer and deputy press...

CNN.COM

Trending in the News...

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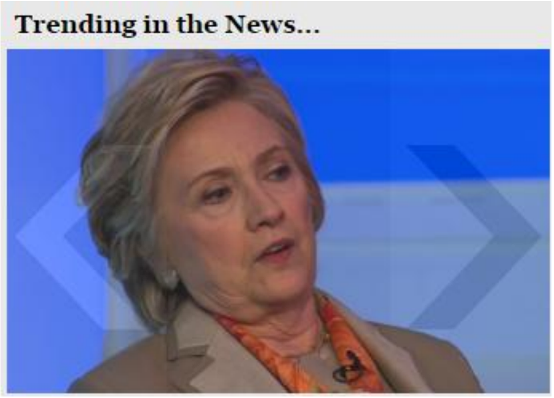
The White House is reeling from President Donald Trump's Tuesday firing of FBI Director James Comey and subsequent fallout. Vice President Mike Pence, press secretary Sean Spicer and deputy press...

CNN.COM

I replaced the "hole punch" solution with the transparent arrow solution. It is a big improvement. The intuitive transparent arrows don't break up the simplicity of the article preview.

Figure 127

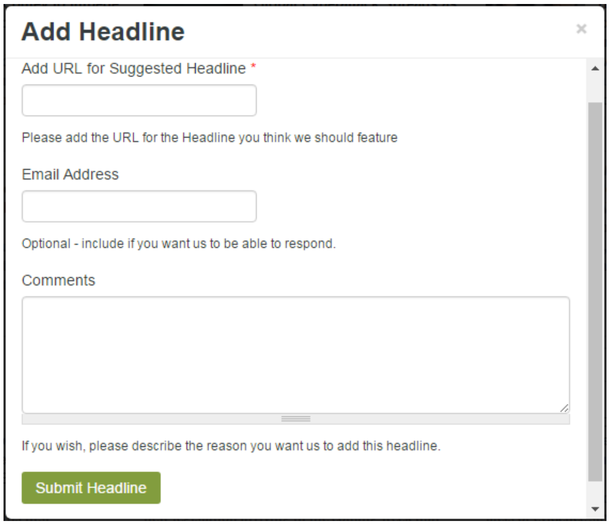


Trending in the News...

17.5 The Trending Engine

If you look at applications with trending sections, it is clear that most of these lists are a result of human intervention. For example, if I want to suggest a trending Article on Allsides.com, then I can fill out the form seen in Figure 128. Obviously, someone needs to review the content before it becomes a trending article on the site.

Figure 128



Add Headline

Add URL for Suggested Headline *

Please add the URL for the Headline you think we should feature

Email Address

Optional - include if you want us to be able to respond.

Comments

If you wish, please describe the reason you want us to add this headline.

In this example, Allsides.com is approving at least 45 articles per day to build up a trending list. That's a lot of work. And it doesn't scale well.

17.6 Automating the Trending List Generation

Someone or something has to make a decision as to what is trending. In the case of the YouRateNews, that something is the application itself (with just a bit of human intervention.) The Trending articles are a combination of just rated articles and recent articles with the most ratings. This combination is designed to keep the list filled with fresh content. Here's how it works.

1. Every hour, the server updates its list of trending articles
   a. It gets a set of trusted articles with the most ratings in the last 24 hours
   b. It gets a set of the newest trusted articles in the system
   c. The most-rated and newest articles are merged together into a single "fresh" trending list
2. When a user navigates to the Trending page, the client application requests the trending list from the server.
3. The server delivers the trending articles list to the YouRateNews client

That’s simple enough, right? The system can just get the latest submitted articles and put them on line. Wrong! If hackers get wind of the fact that the trending list displays all news articles submitted, then it is just a matter of time before obscene and bogus news articles get posted on the site.

17.7 Trusting Content

Anyone can place a news article on the YouRateNews site and rate it. If my football fanatic cousin wants to use the system to rate NFL draft pick articles, then he may do so. But those articles won’t necessarily make it onto the site’s trending list – even if they are the most rated or newest articles.

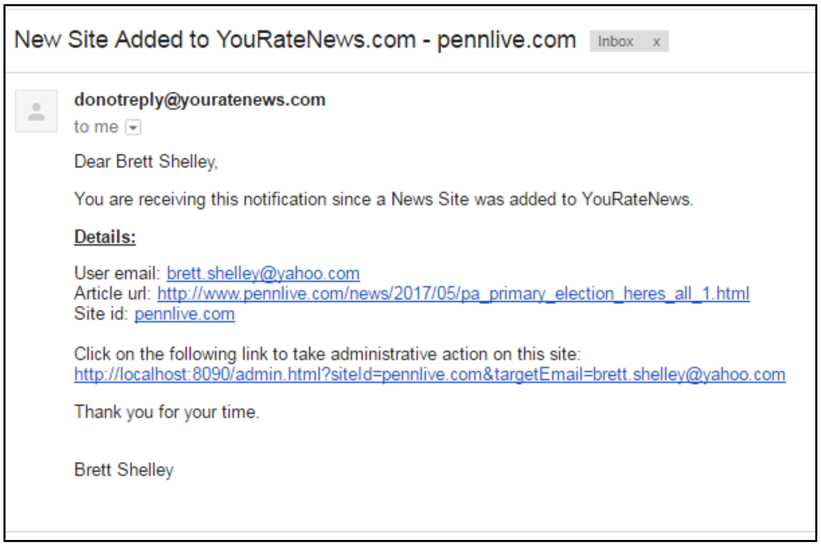
Again, the YouRateNews application automatically generates a ***trusted*** list of trending articles. In order for an article to be trusted, the article must come from a trusted site. And in order for the site to be trusted, an internal administrator must flag a site as trusted. Once a site is trusted, then all articles associated with the site will also be trusted.

Recognizing a site as trusted can happen two ways. First, the YouRateNews system is loaded with a default list of trusted sites. CNN, FoxNews, MSNBC, and the Washington Post are all included in the default trusted list. Using this approach, the content editors of these sites effectively review the article content for us. Any content on these sites can be trusted to not have obscene, vulgar or bogus content.

17.7.1 New Site Added Notifications

Second, when an article from an unknown site is added to the YouRateNews database, then a notification is sent out. For example, if an article from the http://www.pennlive.com website gets rated, then the YouRateNews administrators receive a notification. The notification indicates that content from an unknown site has been added to the site. The administrator can then review the site and make a decision regarding the site’s trustworthiness. Figure 129 shows a version of the notification email.

Figure 129



New Site Added to YouRateNews.com - pennlive.com

donotreply@youratenews.com

to me

Dear Brett Shelley,

You are receiving this notification since a News Site was added to YouRateNews.

Details:

User email: brett.shelley@yahoo.com
Article url: http://www.pennlive.com/news/2017/05/pa_primary_election_heres_all_1.html
Site id: pennlive.com

Click on the following link to take administrative action on this site:
http://localhost:8090/admin.html?siteId=pennlive.com&targetEmail=brett.shelley@yahoo.com

Thank you for your time.

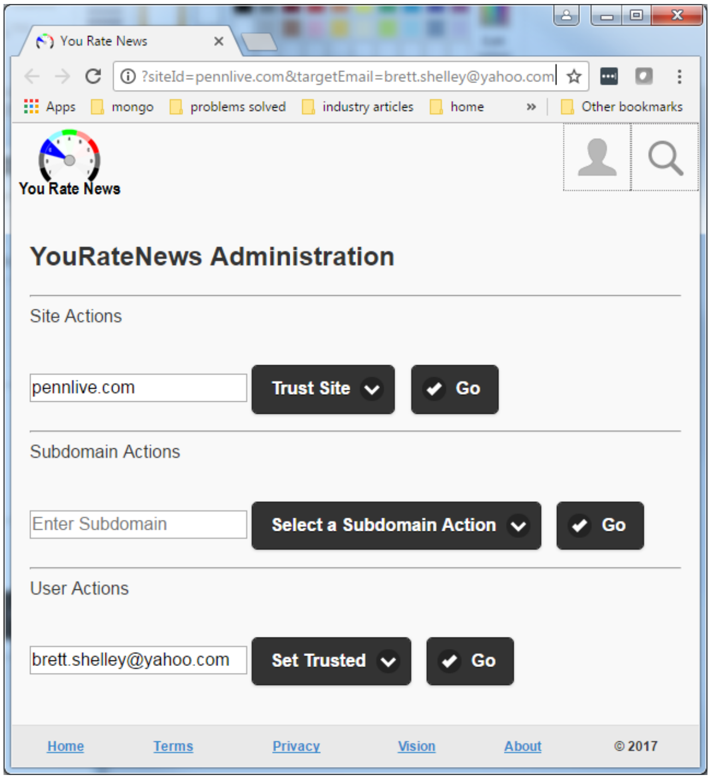
Brett Shelley

17.7.2 Acting on Administrative Notifications

Figure 130 shows the site administration interface. It's a no frill interface that regular users should never see. All actions in this interface are restricted to users designated as administrators.

This simple interface enables new sites to be trusted, not trusted, blocked, etc. within a few minutes of an article rated.

Figure 130



?siteId=pennlive.com&targetEmail=brett.shelley@yahoo.com

YouRateNews Administration

Site Actions

pennlive.com — Trust Site

Subdomain Actions

Enter Subdomain — Select a Subdomain Action

User Actions

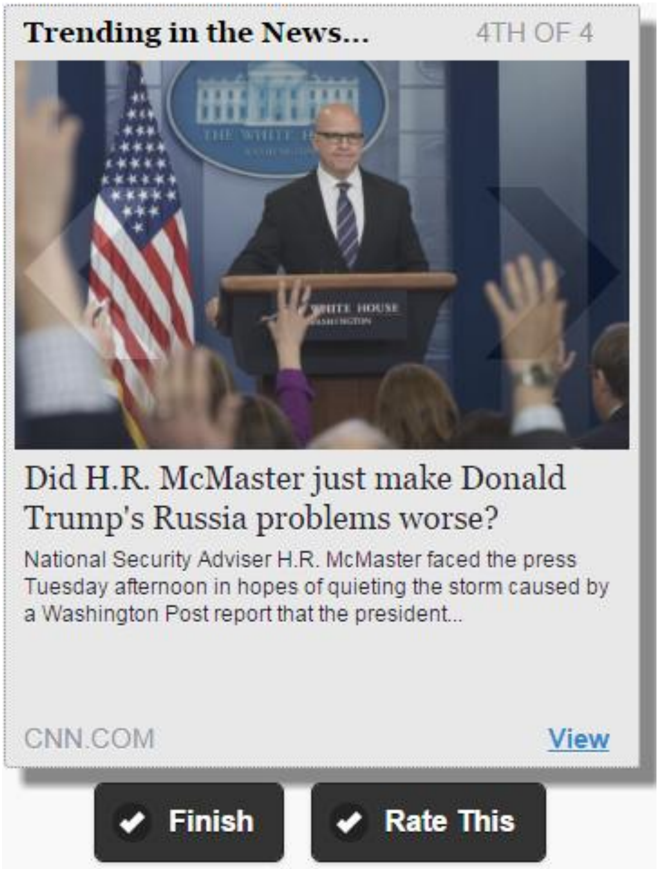
brett.shelley@yahoo.com — Set Trusted

17.7.3 A quick note on Subdomain Handling

The YouRateNews application also handles subdomains. Often, news articles originate from sites like finance.yahoo.com, assets.msnbc.com, and abcnews.go.com. In these cases, the system needs to make a decision as to how to handle these subdomains. For example, an article from finance.yahoo.com should be marked as coming from yahoo. This is obvious. However, handling an abcnews article as if it comes from go.com is confusing. On a case by case basis, the system will treat subdomains as dependent (default condition) or as independent. When these rare situations are encountered, the system sends out subdomain notifications similar to new-site-added notifications. An internal admin then makes a decision whether the subdomain stays associated with the parent (finance.yahoo.com scenario) or whether the subdomain should be treated independent of the parent (abcnews.go.com scenario). This decision is quickly implemented using the Administration screen.

17.8 Trending Accomplished

Figure 131



Trending in the News...

4TH OF 4

Did H.R. McMaster just make Donald Trump's Russia problems worse?

National Security Adviser H.R. McMaster faced the press Tuesday afternoon in hopes of quieting the storm caused by a Washington Post report that the president...

CNN.COM

The YouRateNews trending page (beta version) appears in Figure 131. Functionally, this page has many features. An image shows each article visually. The page shows also each article's title and a brief description. Semi-transparent navigation arrows enable the trending list to be traversed quickly. A status text also displays each article's location in the list. For less active users, a timer displays a different article ever twenty seconds. The view button links to the article itself on the targeted website. Finally, when a user decides to rate a trending article, that article is immediately displayed on the rating page as the background timer temporarily halts itself in the background.

Strategically, it would be a sign of great success if this trending page went away. The trending page makes it easier for users to rate articles on the YouRateNews site. However, a much better place to be would be where user's rate articles directly from links on the news sites themselves. Still, the trending articles page is a good start towards gaining market acceptance.

18 Implementation of SSL

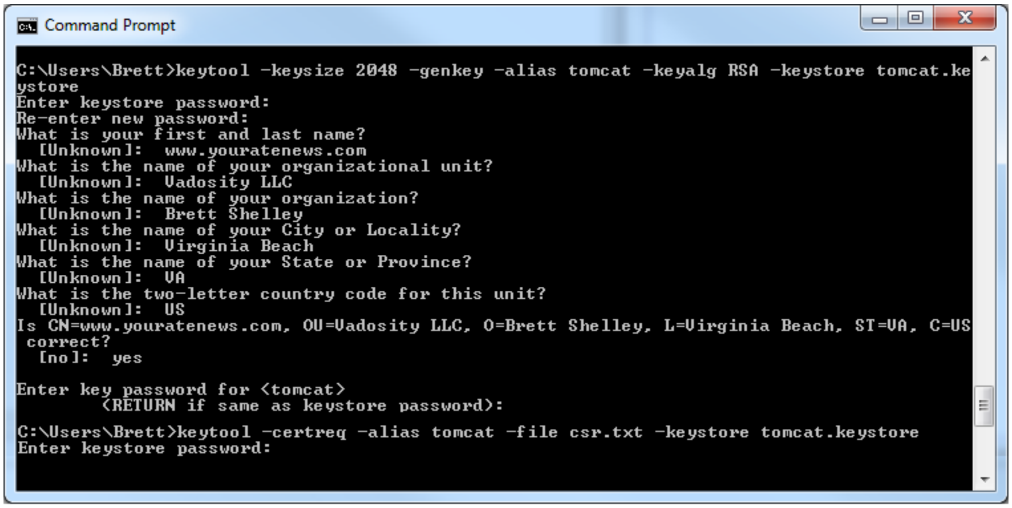
These days, every application that stores passwords needs to have a Secure Socket Layer implementation. Since this effort is an entrepreneurial one, I skipped the steps of implementing SSL within my local development environment. Instead, I went straight into a production implementation of SSL.

The steps for Implementing SSL/HTTPS on the YouRateNews application are:

18.1 Generate a Keystore and Certificate Signing Request

Figure 132 shows the use of the keytool commands to kick off the process. This process was a bit confusing for a number of reasons. First, I used the domain name, www.youratenews.com as the “first and last name” value. Then, I had to provide the domain reseller (godaddy) with the exact identity of the domain names owner. That meant entering “Brett Shelley” as the organizational name. And since I was doing business under my LLC, I entered the name “Vadosity LLC” as my organizational unit. The remaining business information identifies my business address.

Figure 132



```
C:\Users\Brett>keytool -keysize 2048 -genkey -alias tomcat -keyalg RSA -keystore tomcat.ke
ystore
Enter keystore password:
Re-enter new password:
What is your first and last name?
  [Unknown]:  www.youratenews.com
What is the name of your organizational unit?
  [Unknown]:  Vadosity LLC
What is the name of your organization?
  [Unknown]:  Brett Shelley
What is the name of your City or Locality?
  [Unknown]:  Virginia Beach
What is the name of your State or Province?
  [Unknown]:  VA
What is the two-letter country code for this unit?
  [Unknown]:  US
Is CN=www.youratenews.com, OU=Vadosity LLC, O=Brett Shelley, L=Virginia Beach, ST=VA, C=US
 correct?
  [no]:  yes

Enter key password for <tomcat>
        (RETURN if same as keystore password):
C:\Users\Brett>keytool -certreq -alias tomcat -file csr.txt -keystore tomcat.keystore
Enter keystore password:
```

The first command generates a private key and stores in a keystore file named *tomcat.keystore.*

keytool –keysize 2048 –genkey –alias tomcat –keyalg RSA –keystore tomcat.keystore

The second command generates a certificate signing request and saves it in a file called *csr.txt*.

keytool –certreq –alias tomcat –file csr.txt –keystore tomcat.keystore

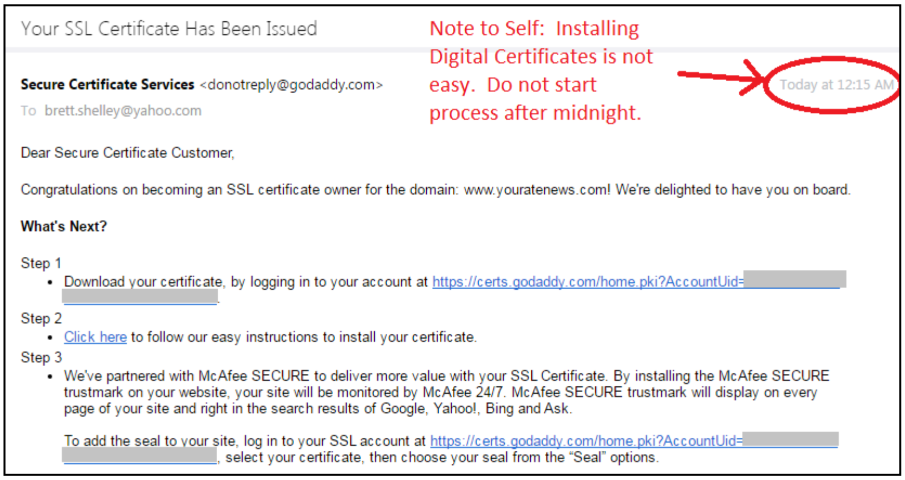
At this point, I have a keystore containing a private key, the keystore itself, and a certificate signing request (CSR) generated using the private key inside the keystore.

18.2 Getting Public Key Certificates from a Certifying Authority

At this point, the CSR is ready to be submitted to a Certifying Authority (CA). Many options exist in the CA realm. I chose GoDaddy for ease of use and high quality customer support. GoDaddy is not the least expensive option anymore – but they get it done.

I purchased the certificate through the GoDaddy Website and followed the user interface instructions to where I had to enter the Certificate Signing Request text. I then pasted the text in the CSR.txt file generated in the previous section. At that point, the website provided me with an explanation that I would be notified once GoDaddy verified the information in the CSR.

Figure 133



Your SSL Certificate Has Been Issued

Note to Self: Installing Digital Certificates is not easy. Do not start process after midnight.

Secure Certificate Services <donotreply@godaddy.com>

To brett.shelley@yahoo.com

Today at 12:15 AM

Dear Secure Certificate Customer,

Congratulations on becoming an SSL certificate owner for the domain: www.youratenews.com! We're delighted to have you on board.

What's Next?

Step 1

- Download your certificate, by logging in to your account at https://certs.godaddy.com/home.pki?AccountUid=[redacted]

Step 2

- Click here to follow our easy instructions to install your certificate.

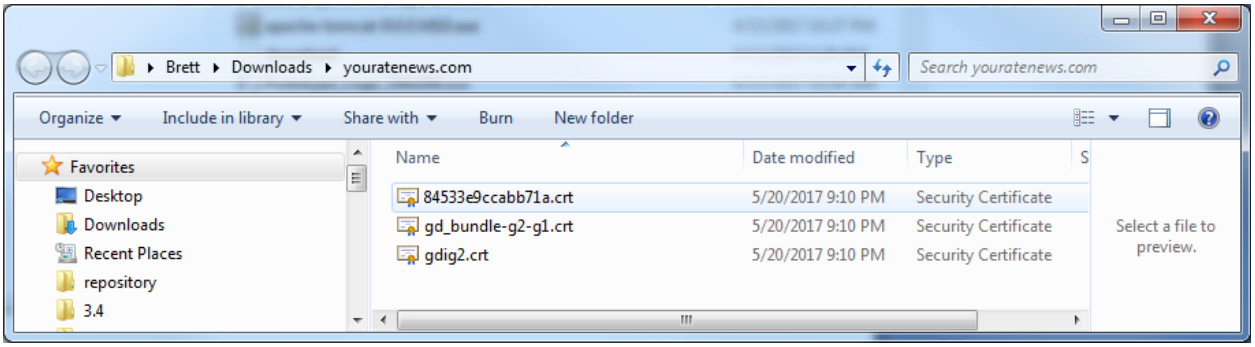
Step 3

- We've partnered with McAfee SECURE to deliver more value with your SSL Certificate. By installing the McAfee SECURE trustmark on your website, your site will be monitored by McAfee 24/7. McAfee SECURE trustmark will display on every page of your site and right in the search results of Google, Yahoo!, Bing and Ask.

  To add the seal to your site, log in to your SSL account at https://certs.godaddy.com/home.pki?AccountUid=[redacted], select your certificate, then choose your seal from the "Seal" options.

A few minutes later, I received the email shown in Figure 133. I followed the links and downloaded the public key certificates. I extracted the zip file. The zip file contained the three Security Certificate files seen in Figure 134. The "gdig2.crt" file is the root certificate for the Certifying Authority (GoDaddy). The "gd_bundle_g2-g1.crt" file contains the intermediate CA certificates. The "84533e9ccabb71a.crt" file is the public key certificate for www.youratenews.com.

Figure 134



Name	Date modified	Type
84533e9ccabb71a.crt	5/20/2017 9:10 PM	Security Certificate
gd_bundle-g2-g1.crt	5/20/2017 9:10 PM	Security Certificate
gdig2.crt	5/20/2017 9:10 PM	Security Certificate

18.3 Installing Certificates in the Keystore

The certificates then required installation in the keystore. Again, the keytool command line utility came into play. The following two commands worked:

```
keytool -import -trustcacerts -alias server -file gdig2.crt -keystore tomcat.keystore

keytool -import -trustcacerts -alias server -file 84533e9ccabb71a.crt -keystore tomcat.keystore
```

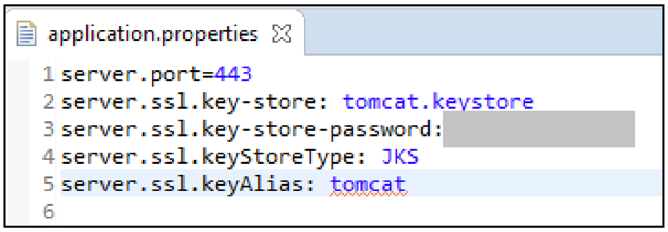
Note that executing the third file raised warnings that an existing certificate would be overwritten. I heeded the warning and cancelled the operation. The second file, "gd_bundle_g2-g1.crt", was apparently not needed.

At this point, the password protected keystore contains the www.youratenews.com public and private keys as well as the GoDaddy certificate(s). The remaining activities involved mostly configuring the Spring Boot application to use these SSL credentials.

18.4 Modifying Spring Boot Application Properties

Figure 135 shows the related changes made to the spring boot application properties file. Obviously, the values just need to match up to the previous sections. The keyStoreType value of JKS is something that could have been specified in the initial keytool command. I did not specify it and JKS turned out to be the default value.

Figure 135



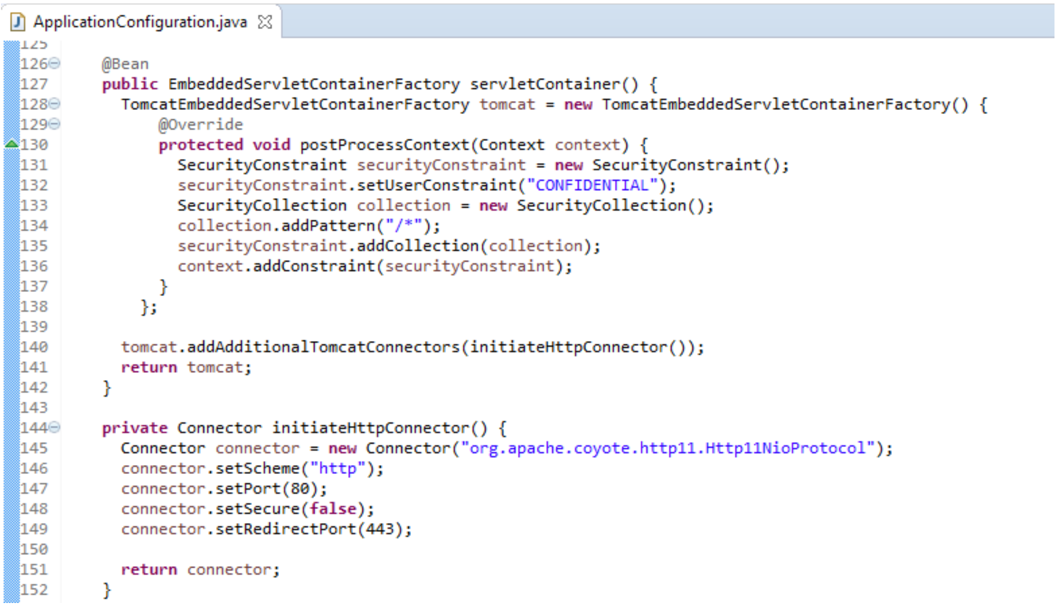
```
server.port=443
server.ssl.key-store: tomcat.keystore
server.ssl.key-store-password:[redacted]
server.ssl.keyStoreType: JKS
server.ssl.keyAlias: tomcat

```

18.5 Programmatically Configuring Spring Boot to Listen on Two Ports

Figure 136 shows the code added to the application's main Configuration class (appropriately named ApplicationConfiguration). This code basically opens up a second non-secure port (80) and redirects all traffic coming to that port to the primary HTTPS port (443). The last trick was making sure that the keystore was appropriately located alongside the spring boot jar. To discover and remedy this problem, I only needed to read the spring boot startup log messages when startup failed.

The setup is pretty simple right? I'll leave the hours of mistakes and misconfigurations up to your imagination.

Figure 136



ApplicationConfiguration.java

```
    @Bean
    public EmbeddedServletContainerFactory servletContainer() {
      TomcatEmbeddedServletContainerFactory tomcat = new TomcatEmbeddedServletContainerFactory() {
          @Override
          protected void postProcessContext(Context context) {
            SecurityConstraint securityConstraint = new SecurityConstraint();
            securityConstraint.setUserConstraint("CONFIDENTIAL");
            SecurityCollection collection = new SecurityCollection();
            collection.addPattern("/*");
            securityConstraint.addCollection(collection);
            context.addConstraint(securityConstraint);
          }
        };

      tomcat.addAdditionalTomcatConnectors(initiateHttpConnector());
      return tomcat;
    }

    private Connector initiateHttpConnector() {
      Connector connector = new Connector("org.apache.coyote.http11.Http11NioProtocol");
      connector.setScheme("http");
      connector.setPort(80);
      connector.setSecure(false);
      connector.setRedirectPort(443);

      return connector;
    }
```

18.6 Modifying the Application to be fully SSL compliant

It was a great moment when the application started on the AWS VM. After many failures, opening the application using the HTTPS prefix in a regular browser showed no warnings. However, parts of the application stopped working. First, the d3.js scalable vector graphics javascript library references were using regular http. These references were easily fixed. I just added the “s” to the script references in the html files. That is, in each html file where d3js was referenced, I changed the reference to:

<script src="https://d3js.org/d3.v3.min.js"></script>

Second, the cross-site scripting section of the application demanded more attention. The just-add-an-s approach worked – but only after I upgraded the service agreement. This resulted in just an $8 per month cost increase in operating cost.

18.7 A Last Note on Running Spring Boot

As we have seen, a Spring Boot Web Services application can deliver static HTTP files as well as respond to web services requests. That’s all this application needs. The YouRateNews application now listens directly on the primary HTTPS/SSL port 43 and the primary HTTP port of 80. In the deployment environment of a Windows 2012 R2 server on an Amazon Web Services ec2.medium virtual machine, I just shut down the operating system’s standard web server and now run the YouRateNews Spring Boot jar in its place. I also manually had to configure incoming and outgoing traffic rules for ports 443 and 80 on both the Windows 2012 instance and via AWS security groups for this to work.

19 Comparing the Vision with the Final Product

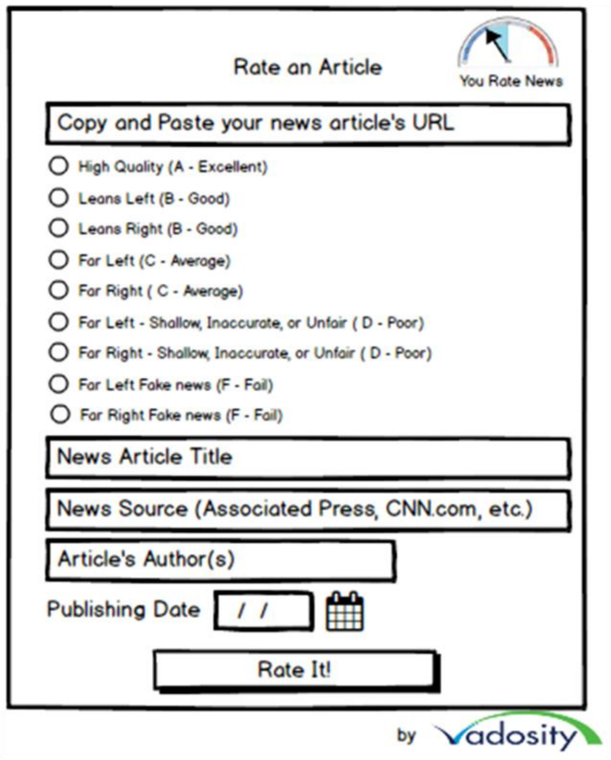
The YouRateNews application has almost reached its intended destination. I wanted to build an enterprise quality piece of software using the latest technologies. I have done this. It remains to be seen as to whether the idea itself will catch on. So, for a few moments, let me visually articulate what has happened to the original product vision.

19.1 The Rating Experience – from Text to Visual

Figure 137 shows how the product vision has migrated from a “text-based” experience to a much more visual experience. The rating grades of A thru F have not changed. The publishing date and author fields have disappeared due to a limit on the information available in the 3rd party screen-scraping product. Overall, the rating experience exceeds the original product vision.

Figure 137

Before



Rate an Article

Copy and Paste your news article's URL

○ High Quality (A - Excellent)
○ Leans Left (B - Good)
○ Leans Right (B - Good)
○ Far Left (C - Average)
○ Far Right (C - Average)
○ Far Left - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Right - Shallow, Inaccurate, or Unfair (D - Poor)
○ Far Left Fake news (F - Fail)
○ Far Right Fake news (F - Fail)

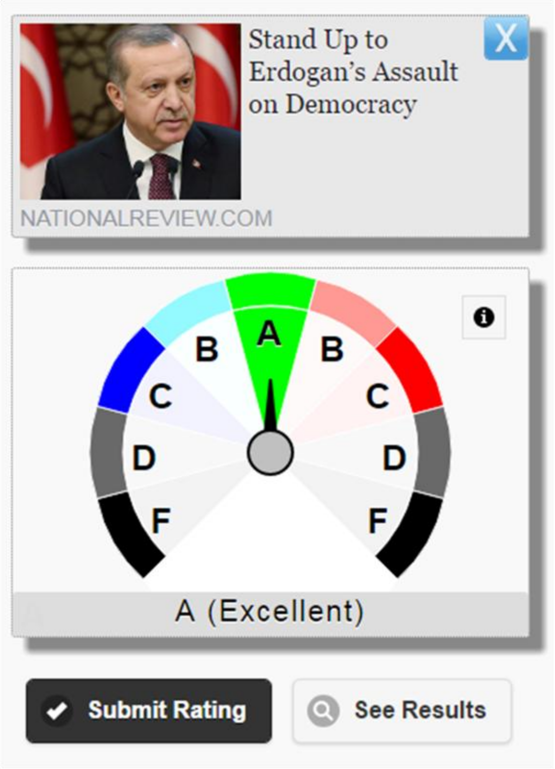
News Article Title

News Source (Associated Press, CNN.com, etc.)

Article's Author(s)

Publishing Date / /

After



Stand Up to Erdogan's Assault on Democracy

NATIONALREVIEW.COM

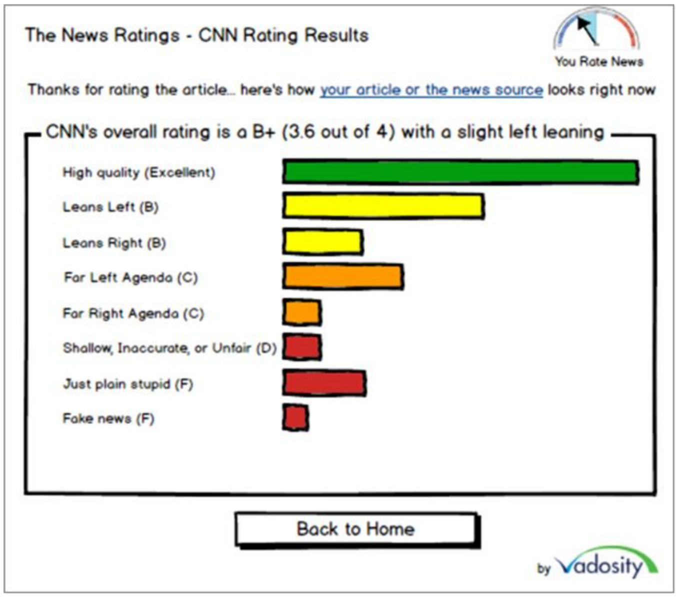
A (Excellent)

19.2 Rating Results – from Full Page to Mobile Experience

Figure 138 shows the rating results with the original product vision on the left and the actual implementation on the right. Again, we see many improvements. The article that has just been rated is more obvious on the right. Multiple tabs that show how the article and site rate also improve the user experience. The Scalable Vector graphics components allow transparent tooltips to exactly spell out the rating numbers. And finally, the desktop page concept on the right has been replaced with an iPhone 6 compatible mobile experience. In short, the actual implementation is more compact and offers more information than the originally planned user interface.

Figure 138

Before

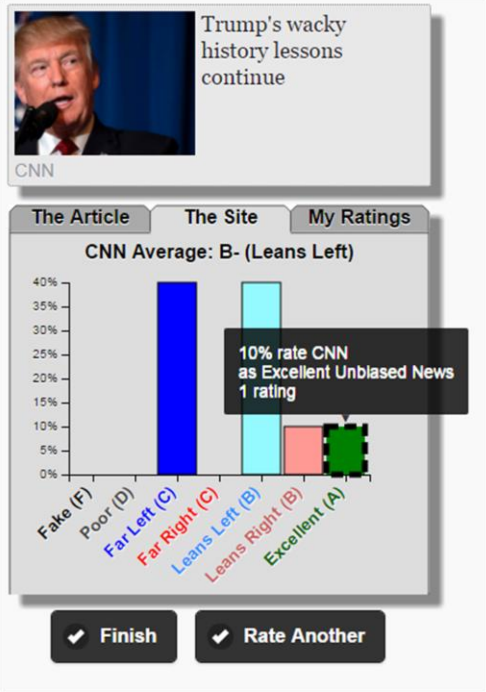


The News Ratings - CNN Rating Results

Thanks for rating the article... here's how your article or the news source looks right now

CNN's overall rating is a B+ (3.6 out of 4) with a slight left leaning

After



Trump's wacky history lessons continue

CNN

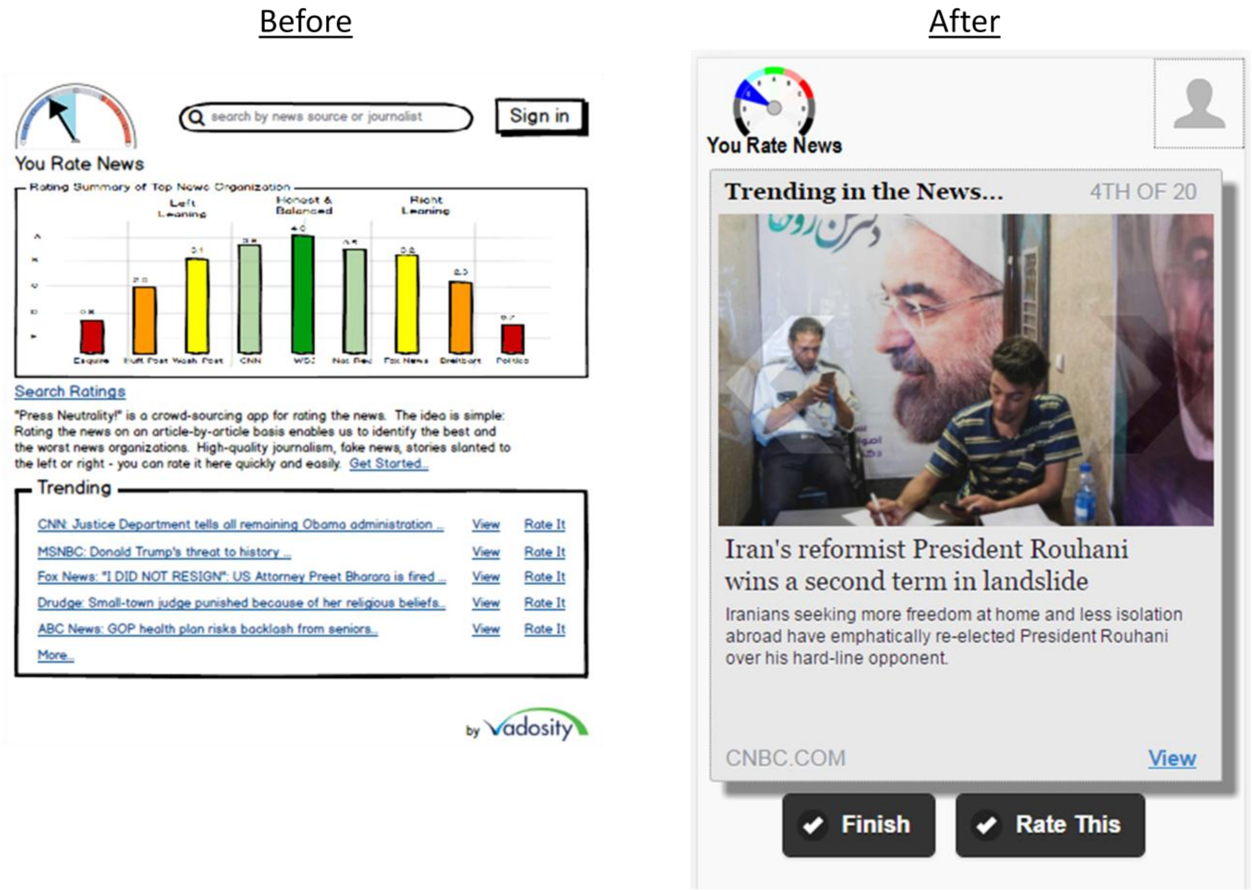
CNN Average: B- (Leans Left)

10% rate CNN as Excellent Unbiased News 1 rating

19.3 Trending – from Text List to Scrolling Link Previews

Figure 139 demonstrates how the trending page concept evolved. The trending list was originally intended to be a text list similar to what Facebook offers. Solution benchmarking moved the solution to the scrolling link preview concept seen on the right. Again, the final product provides a much more visual and interactive user experience.

Figure 139



Before

"Press Neutrality!" is a crowd-sourcing app for rating the news. The idea is simple: Rating the news on an article-by-article basis enables us to identify the best and the worst news organizations. High-quality journalism, fake news, stories slanted to the left or right - you can rate it here quickly and easily. Get Started...

Trending

CNN: Justice Department tells all remaining Obama administration ...	View	Rate It
MSNBC: Donald Trump's threat to history ...	View	Rate It
Fox News: "I DID NOT RESIGN": US Attorney Preet Bharara is fired ...	View	Rate It
Drudge: Small-town judge punished because of her religious beliefs...	View	Rate It
ABC News: GOP health plan risks backlash from seniors...	View	Rate It
More...		

After

Iran's reformist President Rouhani wins a second term in landslide

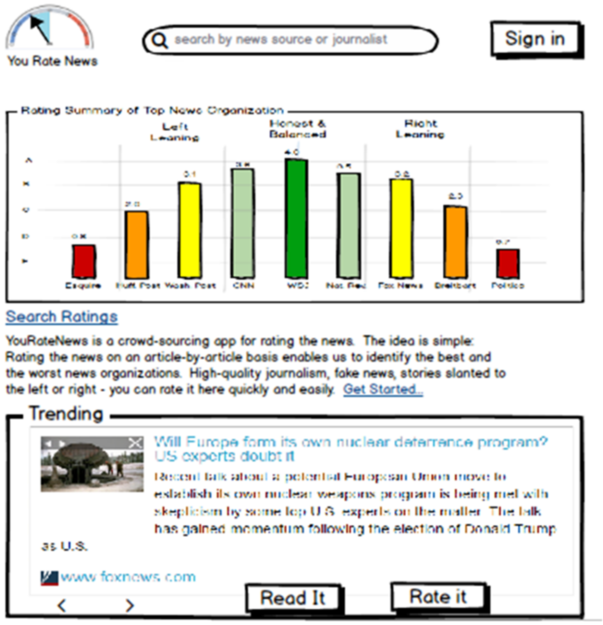
Iranians seeking more freedom at home and less isolation abroad have emphatically re-elected President Rouhani over his hard-line opponent.

19.4 The Home Page – from Desktop to Mobile Experience

Figure 140 shows how the home page concept has evolved from the desktop to mobile approach. The pages do share many elements. The branding concept has not radically changed. The user account access elements are both located in the expected location (upper right). Both original concept and actual implementation contain visual graphics. The one thing that is missing in the implementation is the comparison of multiple sites simultaneously. This absence is strategic. We are holding this data-analysis feature back with the intent of selling this functionality to paying customers.

Figure 140

Before



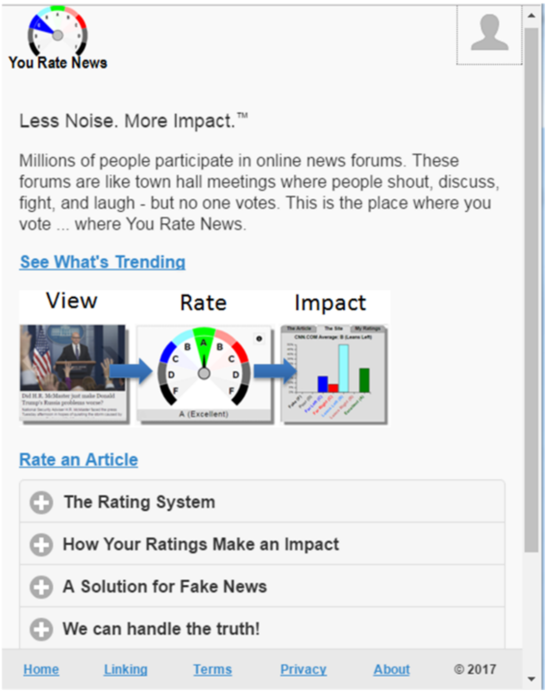
YouRateNews is a crowd-sourcing app for rating the news. The idea is simple: Rating the news on an article-by-article basis enables us to identify the best and the worst news organizations. High-quality journalism, fake news, stories slanted to the left or right - you can rate it here quickly and easily. Get Started...

Will Europe form its own nuclear deterrence program? US experts doubt it

Recent talk about a potential European Union move to establish its own nuclear weapons program is being met with skepticism by some top U.S. experts on the matter. The talk has gained momentum following the election of Donald Trump as U.S.

www.foxnews.com

After



Less Noise. More Impact.™

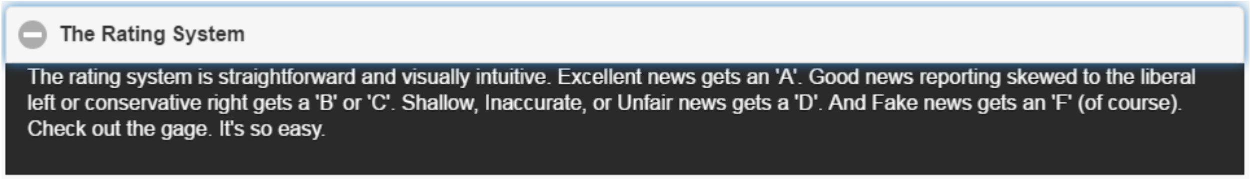
Millions of people participate in online news forums. These forums are like town hall meetings where people shout, discuss, fight, and laugh - but no one votes. This is the place where you vote ... where You Rate News.

- The Rating System
- How Your Ratings Make an Impact
- A Solution for Fake News
- We can handle the truth!

19.5 Marketing Texts

I have also added a series of short marketing texts in a set of collapsible elements to the site's about page. These descriptions are intended to highlight the capability and potential of the idea. They are as follows:

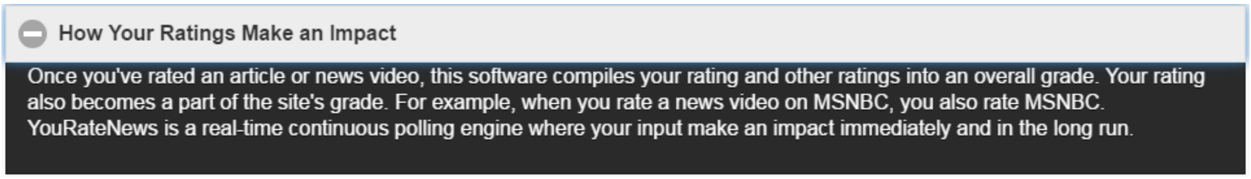
Figure 141



The Rating System

The rating system is straightforward and visually intuitive. Excellent news gets an 'A'. Good news reporting skewed to the liberal left or conservative right gets a 'B' or 'C'. Shallow, Inaccurate, or Unfair news gets a 'D'. And Fake news gets an 'F' (of course). Check out the gage. It's so easy.

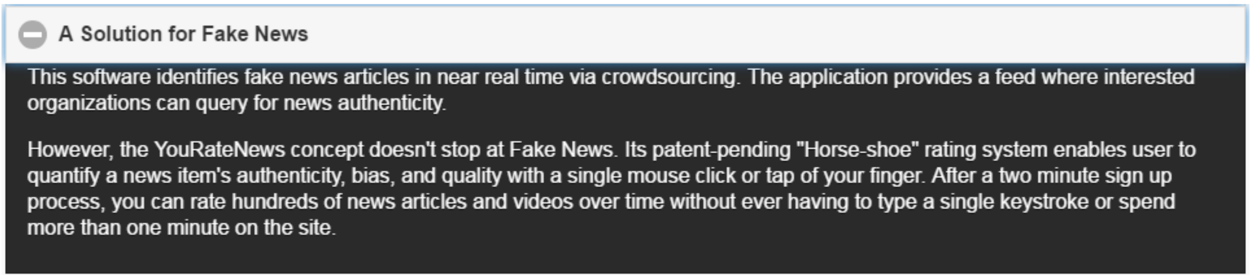
Figure 142



How Your Ratings Make an Impact

Once you've rated an article or news video, this software compiles your rating and other ratings into an overall grade. Your rating also becomes a part of the site's grade. For example, when you rate a news video on MSNBC, you also rate MSNBC. YouRateNews is a real-time continuous polling engine where your input make an impact immediately and in the long run.

Figure 143

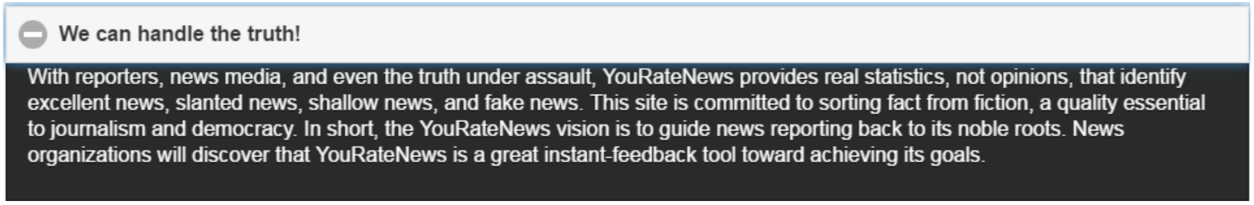


A Solution for Fake News

This software identifies fake news articles in near real time via crowdsourcing. The application provides a feed where interested organizations can query for news authenticity.

However, the YouRateNews concept doesn't stop at Fake News. Its patent-pending "Horse-shoe" rating system enables user to quantify a news item's authenticity, bias, and quality with a single mouse click or tap of your finger. After a two minute sign up process, you can rate hundreds of news articles and videos over time without ever having to type a single keystroke or spend more than one minute on the site.

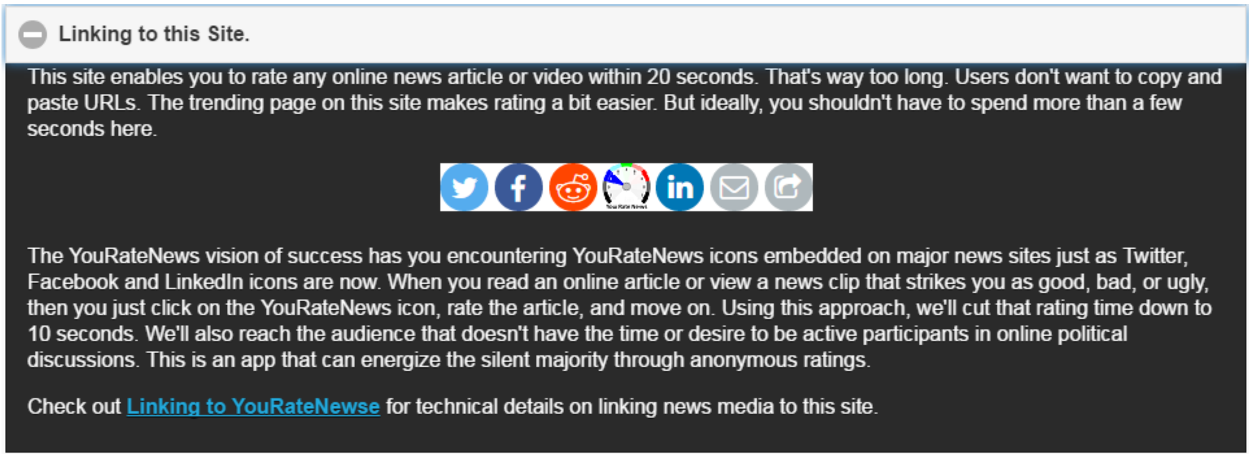
Figure 144



We can handle the truth!

With reporters, news media, and even the truth under assault, YouRateNews provides real statistics, not opinions, that identify excellent news, slanted news, shallow news, and fake news. This site is committed to sorting fact from fiction, a quality essential to journalism and democracy. In short, the YouRateNews vision is to guide news reporting back to its noble roots. News organizations will discover that YouRateNews is a great instant-feedback tool toward achieving its goals.

Figure 145



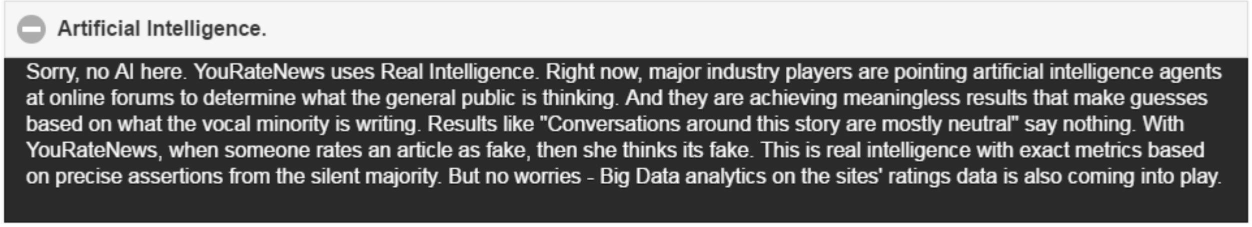
Linking to this Site.

This site enables you to rate any online news article or video within 20 seconds. That's way too long. Users don't want to copy and paste URLs. The trending page on this site makes rating a bit easier. But ideally, you shouldn't have to spend more than a few seconds here.

The YouRateNews vision of success has you encountering YouRateNews icons embedded on major news sites just as Twitter, Facebook and LinkedIn icons are now. When you read an online article or view a news clip that strikes you as good, bad, or ugly, then you just click on the YouRateNews icon, rate the article, and move on. Using this approach, we'll cut that rating time down to 10 seconds. We'll also reach the audience that doesn't have the time or desire to be active participants in online political discussions. This is an app that can energize the silent majority through anonymous ratings.

Check out Linking to YouRateNewse for technical details on linking news media to this site.

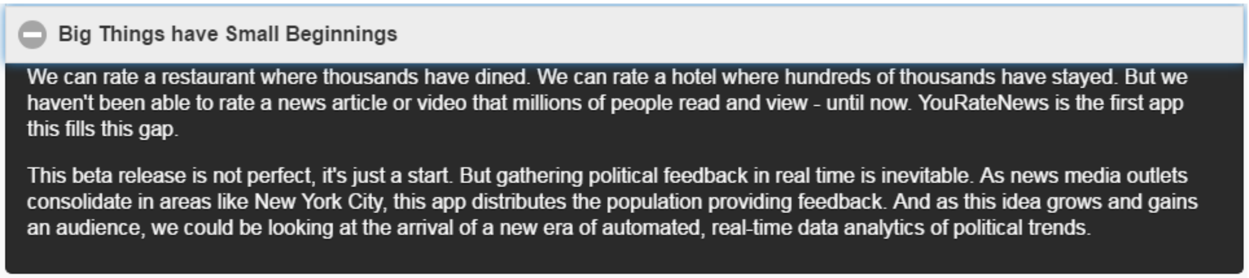
Figure 146



Artificial Intelligence.

Sorry, no AI here. YouRateNews uses Real Intelligence. Right now, major industry players are pointing artificial intelligence agents at online forums to determine what the general public is thinking. And they are achieving meaningless results that make guesses based on what the vocal minority is writing. Results like "Conversations around this story are mostly neutral" say nothing. With YouRateNews, when someone rates an article as fake, then she thinks its fake. This is real intelligence with exact metrics based on precise assertions from the silent majority. But no worries - Big Data analytics on the sites' ratings data is also coming into play.

Figure 147



Big Things have Small Beginnings

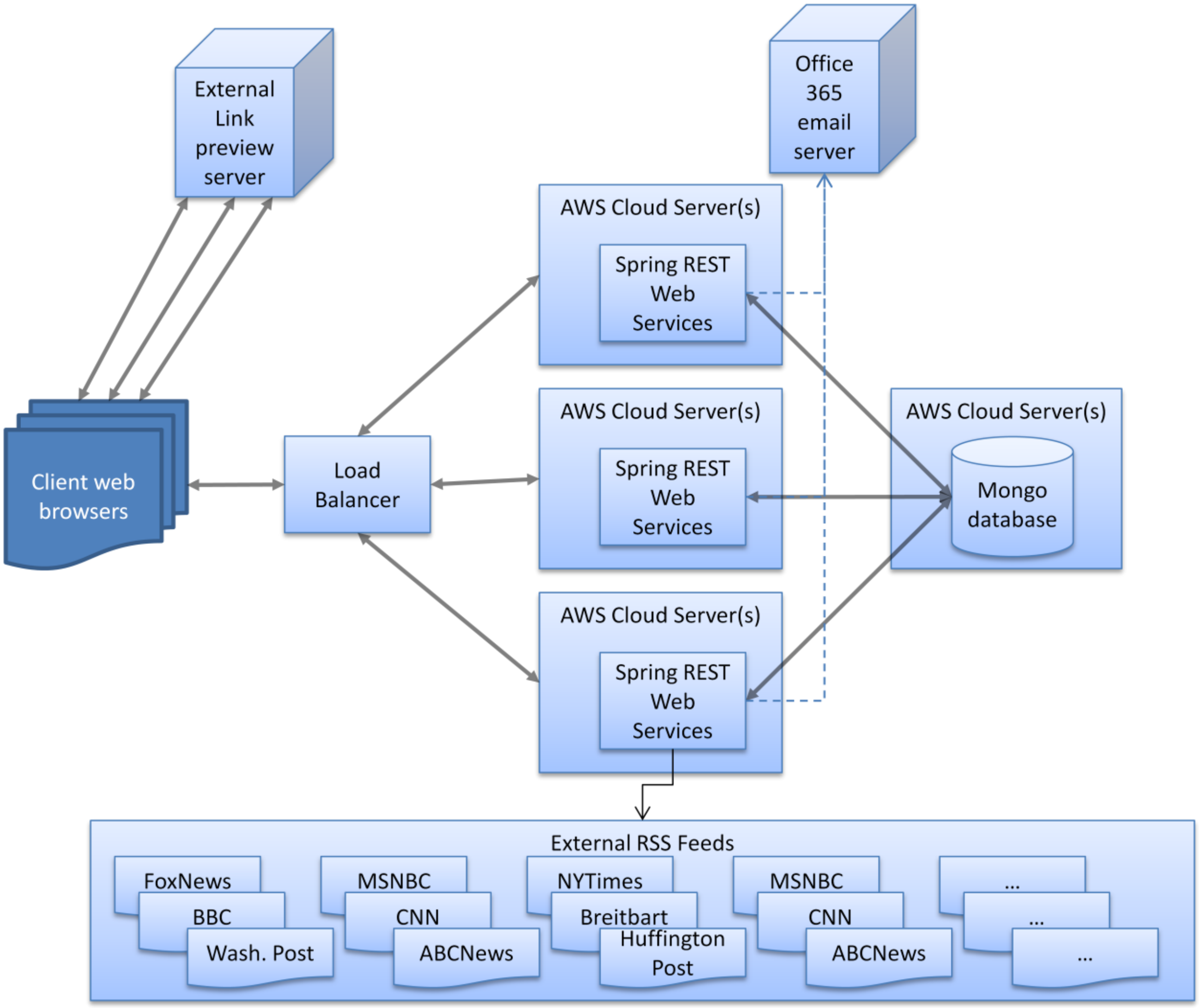
We can rate a restaurant where thousands have dined. We can rate a hotel where hundreds of thousands have stayed. But we haven't been able to rate a news article or video that millions of people read and view - until now. YouRateNews is the first app this fills this gap.

This beta release is not perfect, it's just a start. But gathering political feedback in real time is inevitable. As news media outlets consolidate in areas like New York City, this app distributes the population providing feedback. And as this idea grows and gains an audience, we could be looking at the arrival of a new era of automated, real-time data analytics of political trends.

19.6 End-State Solution Architecture

The end-state solution architecture is quite a bit different from the original concept. Integrating 3rd party servers for Link Preview generation and RSS feeds was unexpected. Also, the original intent was to break up the back end into a set of smaller microservices. Doing so for the purpose of doing so would have added too much overhead. And Spring Boot, well, Spring Boot is simply magnificent in its capabilities. Spring Boot turns the traditional model of deploying WARs to J2EE containers on its head. And in this case, the web services are actually collocated with the front end HTML, CSS, and Javascript files. All in all, this architecture is a pretty extraordinary set of technologies seamlessly working together.

Figure 148



20 Summarizing the Product

To start closing out this book, I'd like to include a description of the YouRateNews product capabilities from a user and business perspective. Please enjoy.

20.1 Product Description Introduction

With YouRateNews, users are able to rate online news articles and news video segments. Users anonymously rate the fakeness (authenticity), quality, and bias with a single selection using an easy-to-understand gage.

Through our product, we provide a news rating system that recognizes fake news, biased news and high quality news. The target audience consists of adult women and men who care about quality news coverage in today's heated political landscape.

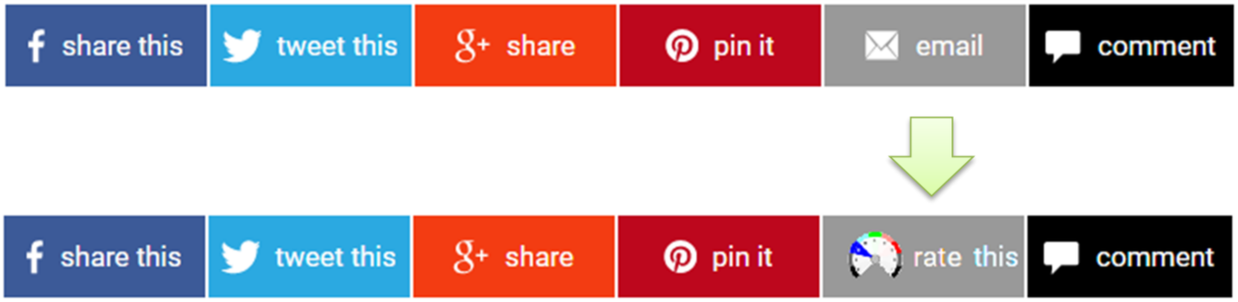
By using anonymous ratings and a "no comments" format, this approach caters to users who normally stay away from posting comments on message boards. Users who actively comment on various sites are also certainly welcome. This goes against the status quo of the industry, which provides many time-consuming ways to blog via Twitter, Disqus, Facebook, LinkedIn, but no way to actually rate online news articles and news video segments.

At its core, the product provides a means for regular users to anonymously cast their vote. You can rate a restaurant where thousands of people go to eat, but right now, you can't rate a news article or segment that millions of people read or view. This product fills this gap. This product is visible right now on the Internet at https://www.YouRateNews.com.

20.2 Product Vision

Figure 149

The Status Quo: 6 Different Ways to Talk on Virtually Every News Site



The You Rate News Vision: 5 Ways to Talk and One Way to Vote (Rate)

It’s real simple. We believe a significant number of users will take the time to rate online news items. They won’t rate all of them, but they’ll certainly rate some. With the YouRateNews tool, users can anonymously call out any online news item for being excellent, fake, poor, or biased. Users would access the tool via web links on major news sites. For example, the modified screenshot above originates from foxnews.com.

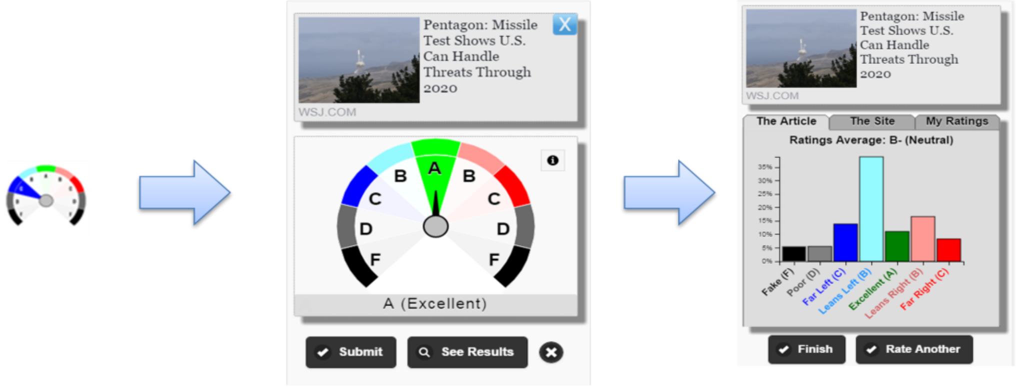
If you believe users will rate news items in today’s extremely divisive political world, then you believe in the YouRateNews concept. And in terms of the time to rate articles, the incredibly easy rating process dwarfs the time needed to write and share even the briefest comment.

User can rate a news article or video segment inside of 10 seconds

1. You Click on The Icon

2. You Rate the Article

3. You See the Results



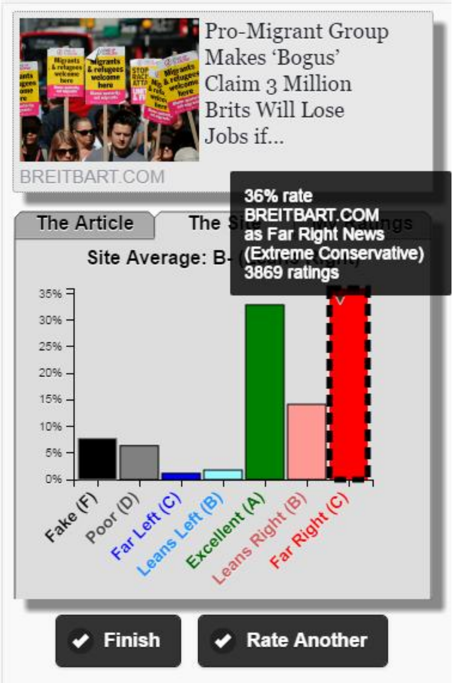
The product should be considered as an add-on, not as a stand-alone website. Ultimately, we want to empower the millions of users that visit major news sites daily with a means to rate the content they are reading and viewing.

20.3 Business Vision

The return on investment will come via strategic partnerships with news organizations and via business analytics. The product is highly-configurable to support strategic partnerships. That is, it can act as a "semi-closed" rating system customized for a single news organization that manages one or more news sites. In this single news organization model, the news organization would pay for hosting and professional services in return for a product customized for their news site(s).

In the fully open model where many sites link to the main YouRateNews add-on site, the business value will be realized in terms of data analytics. Millions of anonymous news item ratings represent extremely valuable business information. Compare this to Nielsen. Nielsen has hardware monitoring the TV viewing in 40,000 homes and recently reported Q1 2017 earnings of $1,526 million. Getting this product linked up to major news sites will enable the site to quickly surpass the Nielsen user base. Selling the raw anonymous rating data and professional services for analyzing this raw data both represent significant revenue potential. Figure 150 shows just a taste of the political data analytics potential.

Figure 150



Pro-Migrant Group Makes 'Bogus' Claim 3 Million Brits Will Lose Jobs if...

BREITBART.COM

The Article | The S ngs

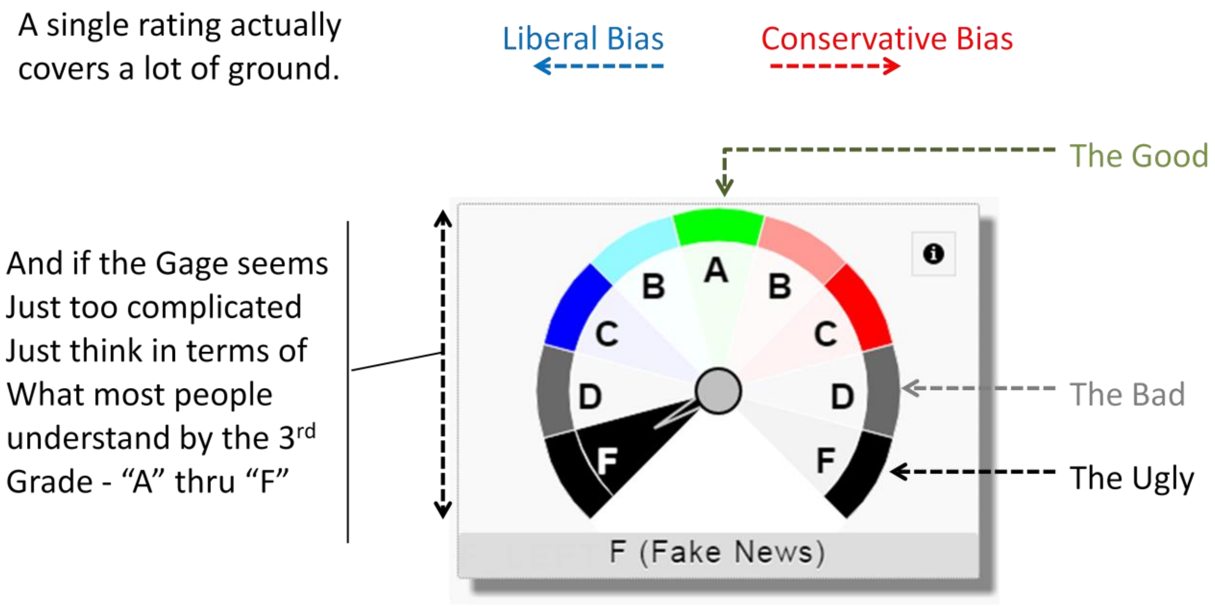
Site Average: B- (

36% rate BREITBART.COM as Far Right News (Extreme Conservative) 3869 ratings

20.4 The Rating Gage

In a politically divided world where fake news, shallow news, biased news, and excellent news all flow from the same sources, a simple 5-star rating system just won't do. The YouRateNews Rating Gage allows a user to rate an article in many ways with a single tap or click. The gage below might look just a little scary below with all the explanatory texts surrounding it – but most will intuitively understand it in under a minute. People may be lazy – but they aren't dumb.

Figure 151



A single rating actually covers a lot of ground.

Liberal Bias

Conservative Bias

The Good

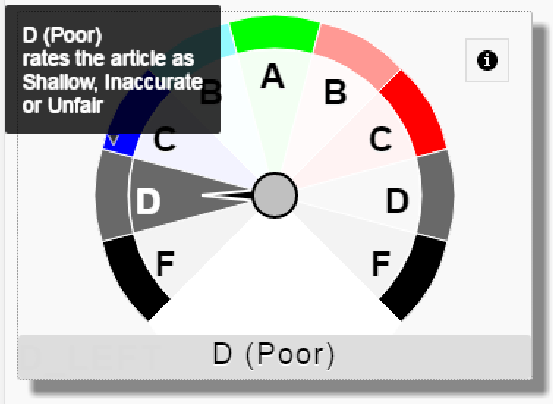
And if the Gage seems Just too complicated Just think in terms of What most people understand by the 3rd Grade - "A" thru "F"

The Bad

The Ugly

Still confused? No worries, each rating has its own tooltip. See Figure 152 for an example screenshot.

Figure 152



D (Poor)
rates the article as Shallow, Inaccurate or Unfair

And don't forget to actually check out the site YouRateNews.com – the Rating Gage is assembled on the fly with a neat Scalable Vector Graphics animation.

20.5 Information Architecture

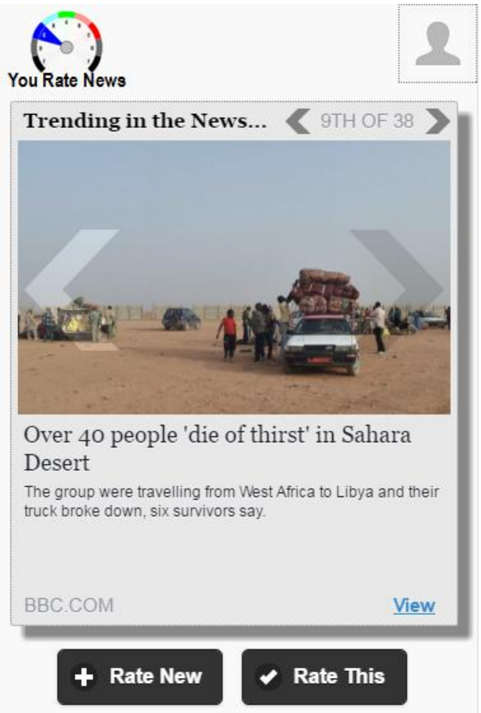
The site has the following page structure:

- Trending – shows news items from many sites. It contains links to rate these items.
- Rating – where the user submits a rating or chooses to just view results
- Rating Results – where the user sees the rating results for news item, site, and user
- Search and Add – where the user adds articles to rate or searches for existing ratings
- User Entrance
    - User Sign up
    - User Log In
    - Forgot Password
    - Change Password
- About – the page containing links and information about the product and organization

Trending

Before this work gains traction on major news sites, the YouRateNews app needs a simple way to feed articles to users for rating. It does this through the home trending page. The trending page is an engine that continuously updates content from 15 major news sites. Trending news items originate from larger sites, smaller sites, liberal, conservative, and centrist sites. Trending article may also incorporate content from lesser-known sources as long as the content has been recognized as "trusted."

Figure 153



Over 40 people 'die of thirst' in Sahara Desert

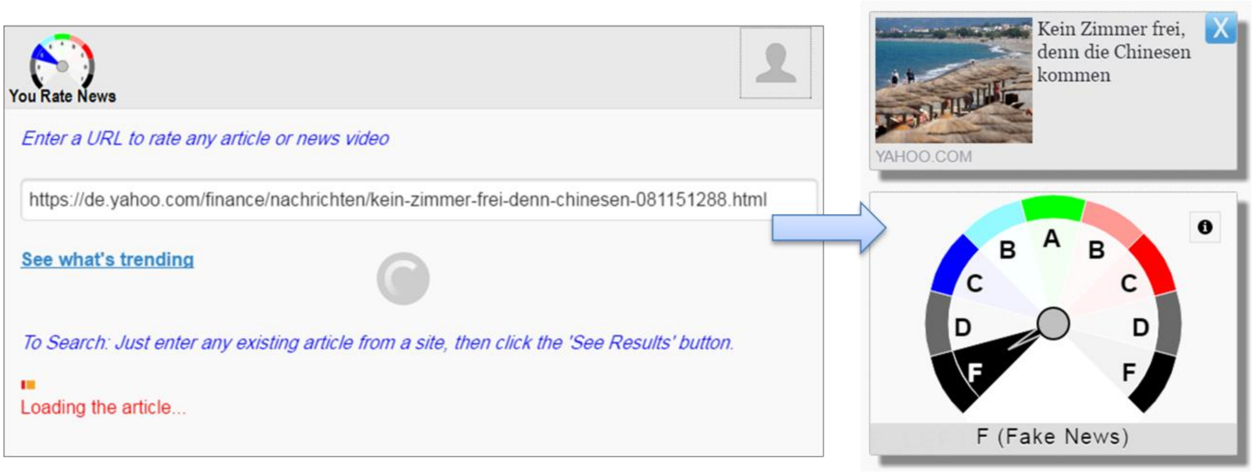
The group were travelling from West Africa to Libya and their truck broke down, six survivors say.

20.6 Rating New Content

The content is not limited to the news articles in the Trending section. The product enables anyone to rate any online item. The rating gage has a political tilt (pun intended) but the content on the site is not limited to political news. As an example, a family member asked me if the product could rate people as fake on dating sites. The answer is yes. The product can rate anything provided that the URL is publicly accessible.

The screenshot below shows how the product loaded an article from Germany's Yahoo Finance section dynamically. Adding a completely unknown article to the site takes a bit longer (between 10 and 15 seconds), but once it's in, then it's in. Only the first time loading is noticeable.

Figure 154


Enter a URL to rate any article or news video

https://de.yahoo.com/finance/nachrichten/kein-zimmer-frei-denn-chinesen-081151288.html

To Search: Just enter any existing article from a site, then click the 'See Results' button.

Loading the article...

Kein Zimmer frei, denn die Chinesen kommen

YAHOO.COM

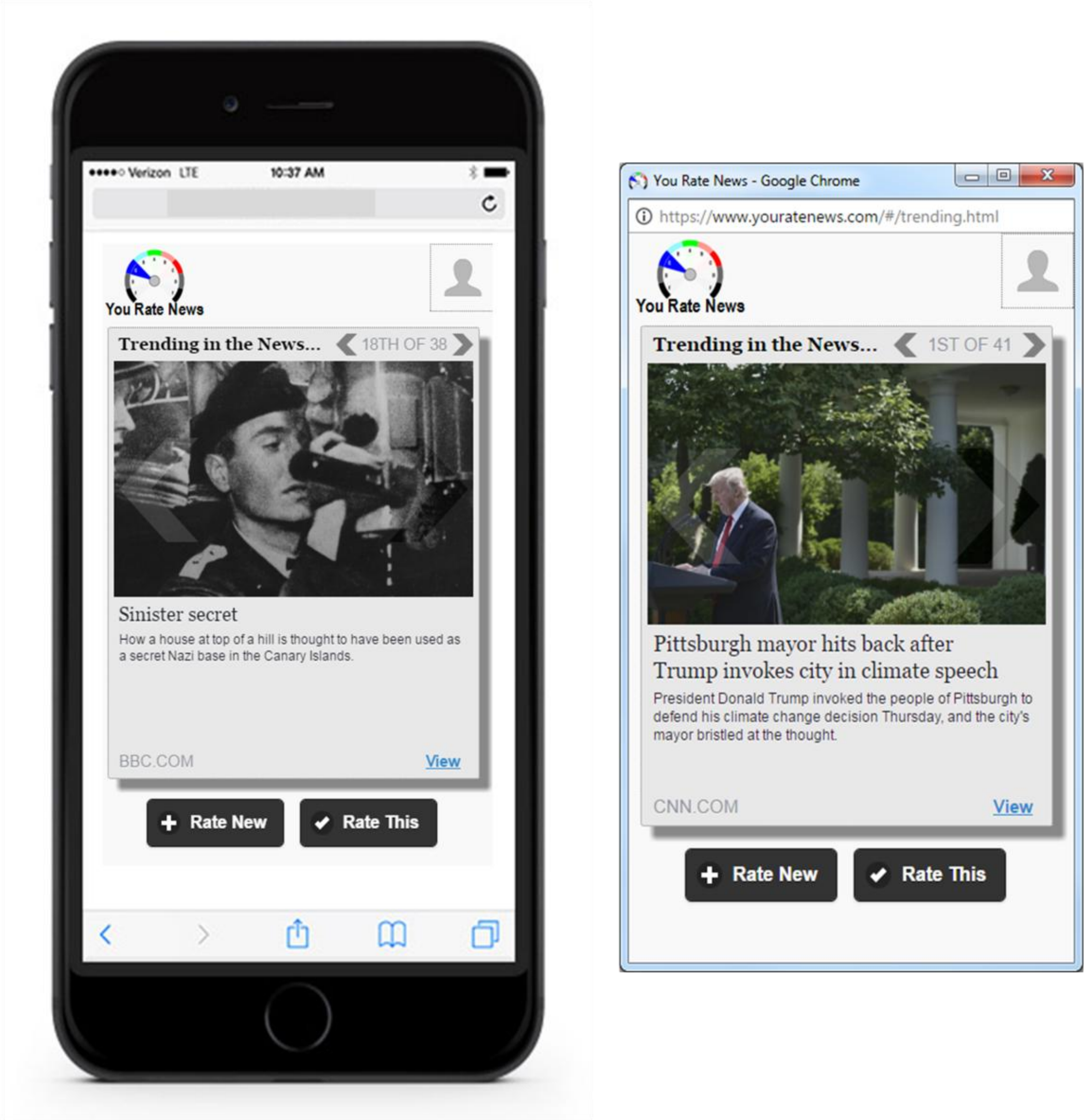
20.7 Behind-the-scenes Security

Because the product allows news URLs to be added from any source, the site opens itself up to malicious use. To combat this, the product has a pre-loaded list of trusted sites. This trusted list may expand and contract via administration page action. If a malicious user attempts to add obscene content, then the site administrator immediately gets a notification that content from an unknown site has been added. The administrator may then decide to block the site and user. Likewise, if a user adds content from a legitimate news source, then the product administrator may decide to trust the news item and content from previously unknown site.

20.8 Mobile and Popup Support

Every page on the site is very small. Every page fits in an iPhone6 screen without the need to scroll. These small pages have a dual purpose. Linking to the site from news sites will be doable via a popup window. Using the popup window approach, a user might not notice that he/she has temporarily switched over to a different site during the 10-20 second rating process. Figure 155 shows the site in its dual role as a Mobile App and as a Popup Window

Figure 155



Sinister secret

How a house at top of a hill is thought to have been used as a secret Nazi base in the Canary Islands.

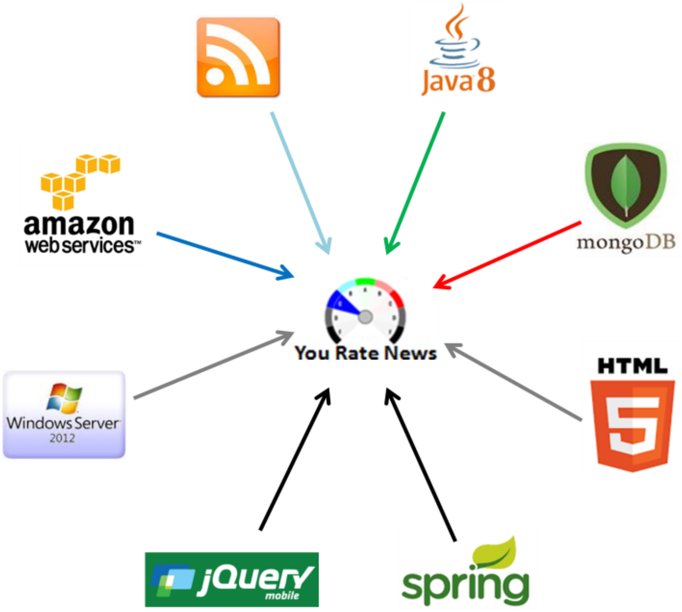
https://www.youratenews.com/#/trending.html

Pittsburgh mayor hits back after Trump invokes city in climate speech

President Donald Trump invoked the people of Pittsburgh to defend his climate change decision Thursday, and the city's mayor bristled at the thought.

20.9 Technical Architecture

The cutting edge, open source technology stack focuses on mobile support and a visual user experience.



List of APIs and Technologies

- Amazon AWS EC2
- Windows Server 2012
- Spring Boot
- Java 8 and Spring REST, AOP, data and web services
- Mongo NoSQL database
- LinkPreview.net
- Custom RSS Feed Processors linked to 15 major news organizations
- Javamail
- HTML5
- CSS3
- SVG (Scalable Vector Graphics) Animation
- Jquery and Jquery Mobile
- HTTPS/Secure Socket Layer and multiple data encryption APIs
- Secure Cross Site Scripting

20.10 Features Listing

Rate an Article

Users rate online news articles and video segments via the rating page. The rating page consists of a miniaturized link preview along with a rating gage. This gage is a custom SVG component enabling users to rate news items fakeness (authenticity), bias, and quality. The gage uses an A through F grading system. Tooltips explain each rating. The gage ranges from A (excellent) through F (fake news). Users rate an article and submit that rating with just two taps or clicks.

Instant Feedback

There is no lag time between the user submitted a rating and the results being compiled. The user instantly sees the results for the news item and the summary results for the site where the news item resides. Furthermore, the results instantly present the user with their own rating profile. With three views of the same rating, users see what the public is thinking, and also where his political views lie.

Fake News Feed

The product allows consuming applications to send a news' items URL in and get a response that states whether the news item is fake or not.

An anonymous experience

The rating itself is completely anonymous. Users cannot see how other users rated an online news item. The process is similar to voting.

A no-typing experience

The product does not permit text comments to accompany ratings. Many products like Twitter, Facebook, Disqus, LinkedIn, etc. give active bloggers the ability to express opinions. Not allowing text comments minimizes the time the user spends on the product. The product strives to do one thing well – enable users to rate the news – and that's it.

Easy and Minimalistic Signup and Login

To rate news items, the product only requests an email address, a password, and the input of a verification code. As long as the user has enabled browser cookies, the user can sign up once and stay logged in on any given device forever.

Trending

The trending page is a compilation of trending stories gathered from 15 major news sites. Trending articles (30-50) are continuously updated so that content always stays fresh. Trending articles may also come from smaller, lesser known sites that are “trusted” by the system. The trending page contains links to read news items, rate these items and create new items.

Add New

The site enables every user to add online news articles and video segments from any news source. To add a news item from a source not listed in the trending section, a user simply copies and pastes the item’s URL. The product software discovers the news item’s title, description, and image information on the fly. A ten to fifteen second delay occurs when an article is entered for the first time. Follow on users, however, can see and rate this news item almost instantaneously. When an article is discovered, the user is immediately transferred to the rating page.

Search

A user need not rate an article to see the rating results. For example, if a user wants to see how CNN is being rated, then he need only follow the rating process on any CNN article. Instead of submitting a rating, the user just selects the “See Results” button. This enables users to see how their rated items and sites are doing after the fact.

Mobile

The product is mobile friendly. Each page fits in an iPhone 6 window without the need to scroll. The page size also fulfills the product’s role as a small popup window add-on for major news sites.

External Links

The product has many capabilities, but none more powerful in simplifying the user experience than its external links capability. Any news site may add “YouRateNews” links to its news articles and video segments. Users on major news sites can then click on a link, see a popup window appear, rate the news item, then return to the major news site – all within 10 seconds.

The product is not designed to be sticky – we would much rather have users use the product quickly then be gone. Repeat business is what we are after. Success as a standalone website might be defined as having 500 fully-engaged news “junkies”. Success defined as getting product links on all the major US news sites could mean 100,000+ regular users. This latter success is what we are after.

21 Conclusion

Conclusion: That's the big question. Is this the conclusion?

I've achieved what I set out to do. This book goes through the complete process of building an enterprise software application for a small to medium business.

On the technology front, this application has exceeded expectations. Using Mongo as a NOSQL database has been a great success. The entity relationships that slow software development with traditional SQL databases disappear with Mongo. Developing complex entities with Mongo is so much easier. The original intent of developing an application as a set of multiple microservices is no longer relevant. Instead, the entire application (front end UI and back end web services) now reside in a single Spring Boot application. The idea of the monolith may not be in style right now – but in this entrepreneurial endeavor – the monolith approach has rapidly speeded development. Using Scalable Vector Graphics has also been extremely productive. After building this software, I can't imagine a web application without SVG.

This has to be one of the wildest Java Spring boot applications ever constructed. It supports SSL. It delivers web pages, JavaScript and CSS. It has scheduled jobs to check for failed email sends. It sends asynchronous emails. This Spring Boot application performs a slew of persistence activities with Mongo Spring Repositories. It also contains a nice Spring AOP (Aspect Oriented Programming) set of components for standardized error handling of web service calls. In terms of web service applications I've worked on in the last 20 years – this thing is the beast. I characterize this effort as a great technical success.

The big question now is whether the YouRateNews vision can gain traction. No one has done ratings of political media before in this way. It's simple, flexible, and fast. YouRateNews.com arrives at a time in political history where fake news dominates headlines. This is a solution to address fake news as well as media bias. The timing is right and the concept feels like it has a good chance of success at the enterprise level. But the public is fickle. Just because everyone recognizes fake news as a problem doesn't necessarily mean that everyone is willing to take steps to fix that problem.

I also recognize that this software isn't perfect. The use of Jquery Mobile APIs has improved the mobile experience – but it has also made the software a bit unstable. I also recognize that I have no bright future as a web designer. I can make things look OK by focusing on the details, but my skills don't come close to some of the web design professionals I have worked with. In short, further improvements are necessary for this software to take off.

But the core software works well. The product vision is excellent. The magic that happens when the general public accepts an idea is all we need. I am exhausted. It's 5:22 AM on a Sunday morning after another all-nighter. I am raging against the dying of the light. But I am also excited and optimistic about what the future holds. Let's see how it all works out. Thank you.