“THEY KEEP COMING BACK LIKE ZOMBIES”: IMPROVING SOFTWARE UPDATING INTERFACES

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Adobe Reader Updater - Adobe Reader (11.0.0)

Update is available

This update addresses customer issues and security vulnerabilities. Adobe recommends that you always install the latest updates.

You can continue working while download is in progress.

Java Update Needed

Your Java version is out of date.

1. Update (recommended)
   Get the latest security updates from java.com.

2. Block
   Block Java content from running in this browser session.

3. Later
   Continue and you will be reminded to update again later.

New updates are available
Click to install them using Windows Update.
Why Do We Need Software Updates?

- No software is perfect
  - Needs continual revision, maintenance, and improvements after initial release
- Software updates are change bearers
  - They bring security, compatibility, usability, performance and other bug fixes
Figure 5. Industrywide operating system, browser, and application vulnerabilities, 1H12–2H14
Experts most frequently report installing software updates, using two-factor authentication and using a password manager to stay safe online.

- Ion et al (SOUPS 2015)
How Do Updates On Clients Work?

1. Discover Update
2. Download Update
3. Install Update
4. Apply Update
How Do Updates On Clients Work?

Discover Update → Download Update → Install Update → Apply Update

Manual Update
How Do Updates On Clients Work?

Discover Update → Download Update → Install Update → Apply Update

Automatic Update
How Do Updates On Clients Work?

1. Discover Update
2. Download Update
3. Install Update
4. Apply Update

Silent Update
Research Questions

▪ How do users navigate through the software update process on desktop machines?

▪ How can we redesign the update experience on desktop machines to increase patching rates using silent updates?
# Timeline

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Phase One: How do users navigate through the software update process on desktop machines?
How Do Users Experience Desktop Updates?

- How do users learn when updates are available?
- How do they understand an update’s purpose?
- How do they make decisions about updates?
- Why do they avoid updates?
Method

Interviews

- Advertised study through social media, mailing lists
- 30 participants
- 45 - 60 mins / $15 gift cards
- Audio-taped and transcribed
- Open and inductive thematic coding (3 researchers)
Results

- Software update notifications **interrupt** users’ primary tasks
I tend to let the update notifications go away but these days it looks like people keep forcing it so it comes back and back like a zombie.
Interruption: Rebooting and Context Switch (19/30)

“
I absolutely put them off until later, because the update requires me to stop what I’m doing, restart the program and computer, and then completely try to reconstruct where I left off.
”
Results

- Software update notifications **interrupt** users’ primary tasks
- Software updating is an **information** problem (or lack of information problem)
Information: What is this update about?

- Prioritized “major” updates over others 24/30
- Glanced through change logs 20/30
- Failed to identify changes post-update 11/30
- Information on social media / via friends 10/30
Information: Will I regret updating?

- Uncomfortable user interface changes 16/30
- Compatibility issues with software 16/30
- Infrastructure constraints (disk, data) 8/30
- Long installation time 7/30
Results

- Software update notifications **interrupt** users’ primary tasks

- Software updating is an **information** problem (or lack of information problem)

- Users have **insufficient control** over tracking updates across applications and the operating system
Insufficient Control: Hard to Track Updates (11/30)

Participants found it difficult to track update downloads and installs because update settings and notifications were spread over multiple locations for the operating system and third party applications.
**Insufficient Control: Frequently Used Apps (17/30)**

“An Evernote plug-in was not up to date and it asked me to update it. I just deleted it because I don’t want to deal with going through an update for a program that I don’t use all that much.”
Phase One Summary

- Software update notifications **interrupt** users’ primary tasks
- Software updating is an **information** problem (or lack of information problem)
- Users have **insufficient control** over tracking updates across applications and the operating system
Phase Two, Three: How can we redesign the update experience on desktop machines to increase patching rates using silent updates?
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Phase Two: Low-Fi & interactive prototype of New Update Interface (for Mac OS X)
Design Decision 1

- Software update notifications interrupt users’ primary tasks

Minimize Interruptions
Single update notification icon:
Animates when updates download or install
Silent updates:

- All updates (including third-party) download and install without consent (by default).
- Piggyback restarts off other times
Design Decision 2

- Software updating is an information (or lack of information) problem
Update Type

Update Size

Update Summary

Update Ratings
Kindle was recently updated on 2/22/2015. Before shutting the application, please provide a rating of this new update.

Rating: ★★★★★

Write a Review
Kindle was recently updated on 2/22/2015. Before shutting the application, please provide a rating of this new update.

Rating: ★★★★★

Write a Review

Post-update feedback
Design Decision 3

- Users have insufficient control over tracking updates across applications and the operating system

Central Update Manager
<table>
<thead>
<tr>
<th>Update Type</th>
<th>Description</th>
<th>Source</th>
<th>Estimated Time for Installation</th>
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</table>
| Critical – Security Update | - Improves the reliability of VPN connections that use the USB smart cards for authentication  
  - Improves the reliability of accessing files located on a SMB server  
  - Includes Safari 7.0.6 | ✔️     | 10 minutes                      |
| Recommended – Bug Fix     | - Supports the ability to sync your favorite music, movies, and more to devices with iOS 8  
  - Improves performance when syncing with your iPhone, iPad, or iPod | ✔️     | 8 minutes                       |
<table>
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<tr>
<th>App Name</th>
<th>Version</th>
<th>Recommended</th>
<th>New Feature</th>
<th>Source</th>
<th>Update Date</th>
<th>Description</th>
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| Garage Band       | 10.0.1      | **Recommended** | **New Feature** | ![Source](checkmark) | Jan 21, 2015 | • New Voice Template for fast and easy vocal recordings  
                     |             |             |             |        |                      | • Vertical zoom to automatically adjust the height of your tracks  
                     |             |             |             |        |                      | • Added support for OS X Yosemite |
| Kindle            | 1.10.5      | **Recommended** | **New Feature** | ![Source](checkmark) | Jan 01, 2015 | • Supports the ability to sync your favorite books and more to other devices  
<pre><code>                 |             |             |             |        |                      | • Improves performance when syncing with your phone, tablet, and computer |
</code></pre>
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Source: [Compatibility report](#)
Performance yay ★★★★☆
Jane – Version 11.1.1 – 02/17/2015
Sending books to all my devices is so much better now.

Lost songs ★★★★☆
By LadyM – Version 11.1.1 – 02/01/2015
Sadly some of my books were lost during this update. Went to the kindle store to get it fixed but they didn’t know what happened either.
Update Reviews

Performance yay ★★★★★
Jane -- Version 11.1.1 -- 02/17/2015
Sending books to all my devices is so much better now.

Lost songs ★★★★★
By LadyM -- Version 11.1.1 -- 02/01/2015
Sadly some of my books were lost during this update. Went to the kindle store to get it fixed but they didn’t know what happened either.

Write a Review

Click to rate
Rating: ★★★★★

Review this application (optional):

Title: 

Review 6000 characters remaining

If you need support, please visit Paint X Lite Support >

Tips for writing a great review:
- Keep reviews short and to the point. Average customer reviews are about 200 words.
- Praise applications on their own terms, not at the expense of other developers or applications.
- Be specific when posting a review. Avoid embarrassing typos or grammatical errors.
- Do not use profanity or overtly sexual language.
- Do not use language that can be construed as hateful, especially in regards to lifestyle, religion, or race.
Phase Three: Evaluation of Low-Fi prototype
Method

Think-aloud + Interviews

- Advertised study through social media, mailing lists
- 22 Mac OS X users
- 45-60 mins / $15 gift cards
- Audio & video taped and transcribed
- Open and inductive thematic coding (3 researchers)
Results

- **Minimize Interruptions**: 11/22 participants preferred no update notifications, while others wished to be notified about all updates.
Minimize Interruptions: (11/22)

“...It prompts me the least. I don’t have to worry about it, I don’t have to think about it.

“I want to know how frequently the updates are, how frequently they’re occurring and if there’s something new or there’s a bug. If there are any changes, I want to know when and how they happened.”
Results

▸ **Minimize Interruptions**: 11/22 participants preferred no update notifications, while others wished to be notified about all updates

▸ **Rich Update Information**: Participants appreciated information to varying degrees; could possibly help drive decisions
Rich Update Information:

- Compatibility report (19/22)
- Update labels (15/22)
- Ratings (15/22)
- Time to install (13/22)
- Source verification (9/22)
- Installation size (4/22)
Results

- **Minimize Interruptions**: 11/22 participants preferred no update notifications, while others wished to be notified about all updates.

- **Rich Update Information**: Participants appreciated information to varying degrees; could possibly help drive decisions.

- **Update Manager**: Participants indicated preference towards centralization; particularly for third-party apps.
Update Manager: (11/22)

“
I like it. It seems more comprehensive because it has the Microsoft stuff in so you don’t have to run the Microsoft updater as well as the app store update mechanism.

”
Implication #1

- **Minimize Interruptions**: Notify only when necessary
  - Personalize silent updates (e.g., importance of update, or frequency of use of app)
  - Gentle reminders + nudges to restart
  - Decouple security updates
Implication #2

- **Rich Update Information**: Make information count when displayed
  - How do we generate compatibility reports?
  - How do we leverage social proof and ratings?
  - Can we predict installation time?
  - Use visual elements indicate trust & type
Implication #3

- **Centralizing Updates:**
  - Helps build trust, better mental models of how updates are taking place
  - Can be one-stop location to preview updates, uninstall updates, examine update history for all applications
Ongoing and Future Work

- Large scale study of attitudes and preferences towards auto-updating
- Multiple stakeholders: who decides?
  - Examine software updating from lens of network administrators and software developers
- Recommend testing higher fidelity prototypes (with a more representative sample)
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