



Hewlett Packard Enterprise

UXD SP 18 Experience Studio

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Purdue Team Project Owner



Abby Perez

Abby Perez // abileneperez.com - Junior UX Design Student at Purdue University

Abby Perez is a Junior at Purdue University pursuing a degree in User Experience Design with a minor in Psychology and a Certificate for Entrepreneurship and Leadership. She works as a User Experience Design Intern for Hewlett Packard Enterprise, founder of the Purdue User Experience Design organization, and an Executive Officer for the Dean's Student Leaders. Her work can be seen in her portfolio at abileneperez.com and can be reached through her e-mail abilenetperez@gmail.com

Purdue Team Information



Delaney Rundell

Delaney Rundell // delaneyrundell.myportfolio.com/ -
Sophomore UX Design Student at Purdue University

With minors in Psychology and Communication, she is passionate about user research and strives to become a user researcher. She is especially strong at usability testing, user interviews, and developing high-level takeaways from findings. After interning as a product researcher, she has developed an interest in web and mobile accessibility and conducting accessibility testing. You can reach her at drundell@purdue.edu.



Nicholas Gould

Nicholas Gould // nickgould.us - Senior Web Design Student at
Purdue University

Experienced with front-end web development, he has worked with Microsoft Research, Ford Motor Company, and theScore. He has also freelanced with local businesses doing web design and graphic design work. When he's not busy designing, you can find him making music with Purdue Bands & Orchestras or watching a Disney movie. You can reach him at ngould95@gmail.com.



AJ Vetter

AJ Vetter // www.andrewjvetter.com - Junior UX Design
Student at Purdue University

He has experience doing design and film in commercial, non for profit, and corporate settings. He has filled roles including, but not limited to: UX Designer, Visual Designer, Video Producer, and Digital Marketing Manager. He is passionate about combining all of his skills to meet the needs of companies focused on the bigger picture. Reach him at ajvetter@me.com.

Purdue Team Information



Kassandra Melkey

Kassandra Melkey // First-year UX Design Student at Purdue University

She intends to specialize in either User Research or Information Architecture. She initially came to Purdue to study biochemistry. Where she discovered her passion for research but realized that she wanted to be on a career path that would allow her to work in a creative team environment daily, which lead her to the UX design program. In her free time she enjoys embracing her intrinsically curious personality through writing, traveling, and visiting museums of all different types. She is also an active member of the Delta Iota chapter of Gamma Phi Beta International sorority. Kassandra can be reached at kmelkey@purdue.edu.



Lucca McKay

Lucca McKay // luccamckay.wordpress.com - First-year UX Design Student at Purdue University

Lucca McKay is passionate about beautiful and simplistic user experiences. A computer enthusiast, he is majoring in UX Design at Purdue University. While pursuing his degree he volunteers with Psi Upsilon improving their online advertising using Adobe Illustrator. Lucca would be an invaluable asset to any organization. You may reach him at mckay11@purdue.edu.

Purdue Team Information



Austin Johnson

Austin Johnson // Freshman UX Design Student at Purdue University

Austin has worked as an intern for a computer science education company, Nextech, in Indianapolis, IN. For over a year Austin not only was able to learn programming skills, he was also given the chance to help teach that information to students who attended the program. Through this internship Austin discovered User Experience Design. He immediately felt his passion for the industry. Through the connections made, Austin was able to work with a design company, Studio Science, and form relationships with lead UX Designers on the team he was working with. Austin not only got to experience the environment of a design company, he was also able to learn from these professionals. He picked up design skills, as well as skills needed to present a product to people and receive feedback, negative and positive.



Anna Ding

Anna Ding // Freshman UX Design Student at Purdue University

She has a high GPA of 3.96 and had taken multiple AP classes throughout high school, coming into college with 46 credits. Anna has also volunteered in AWANA for four years and participated in dance and band. She is known by her teachers and peers as polite, cheerful, and creative. Her current goals are to learn about her major and gain experience in UX Design. She also hopes to keep up the New Year's resolutions that she had not broken already such as to not be led astray by ice cream. You can email Anna at ding194@purdue.edu.

Sponsor information



Jon Albregts

Senior Manager - Quality Lifecycle Engineering
& Customer Experience Design



Bobbi Gibson

Senior Manager - Knowledge Management



Brian Baker

Quality Lifecycle Engineer - Total Customer
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Karen Feldeisen

Quality Lifecycle Engineer



Jennie Hou

Project overview



All-Flash, Solid State Array Data Storage

HPE 3PAR StoreServ is the industry's #1 midrange storage array and a leading all-flash array. Its timeless architecture has helped thousands of customers eliminate complex storage silos and modernize their storage infrastructure.

The Purdue team will be working within the **management console of the 3PAR system**. The team will analyze the current user flow of notification and installation of updates to 3PAR systems. Using a variety of User Experience research methods (detailed in the [Methodology](#) section), the Purdue team hopes to discover the current pain points, challenges, and positive experiences (among other details) in users' flows and determine a more effective and positive experience for Hewlett Packard Enterprise's customers.

Project overview

Problem Statement

Hewlett Packard Enterprise's current processes of prompting 3PAR customers to update their systems are ineffective in getting the right information to them at the right time in order for them to make a decision.

Problem Overview

“ We are looking at the **redesign of the process** of a customer becoming aware of the new patch and getting access to the bits because we are implementing a **customer self-update process**. Today we reach out to customers via email and get them to call us and schedule the update for which we do for them. We are moving to a model where the customer will be doing this work themselves so we must have a **solid process** by which customers become aware of new patches and know where to get the bits as well.

-Jon Albregts

Senior Manager of Quality Lifecycle Engineering & Customer Experience Design

The Purdue team will look for a way to redesign the way users interact with the software to become aware and take action when a new update or patch releases.

Users

3PAR's users are administrators in companies of varying sizes who are responsible for determining if an update is needed as well as the people who are responsible for performing the update. In most circumstances this is the same person. A successful user notification occurs when the user walks away knowing which patches they need to update, why, and where the information they need is located.



Image from [Hewlett Packard Enterprise](#)

Methodology

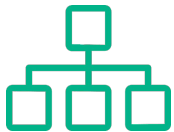
These are the methods we used throughout the project to solve the problem we were given.



Interviews with users/stakeholders were used to collect firsthand personal accounts, opinions, attitudes, and perceptions about the product.



A comprehensive **review of the literature** was used to collect and synthesize information about topics related to the project.



We mapped out the current paths that users take when interacting with the product with a **flow map**.



We used **sketching** to ideate new concepts for user flows and interface designs.



We created **mockups** to show the design of the new user flow and how it would be look if it were taken into production.



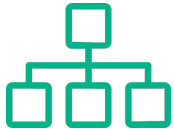
By **redesigning the user flow** we mapped out suggested new paths for users to take when interacting with the product.



We evaluated our redesigned user experience by conducting **desirability tests**, which allow us to determine users' attitudes towards various notification alerts on various platforms in order to determine the most effective form and medium of notifications.

Deliverables

These are the final deliverables we will be handing off to our sponsors once the project is completed.



Flow chart mapping out the current processes and showing where the current problems are.

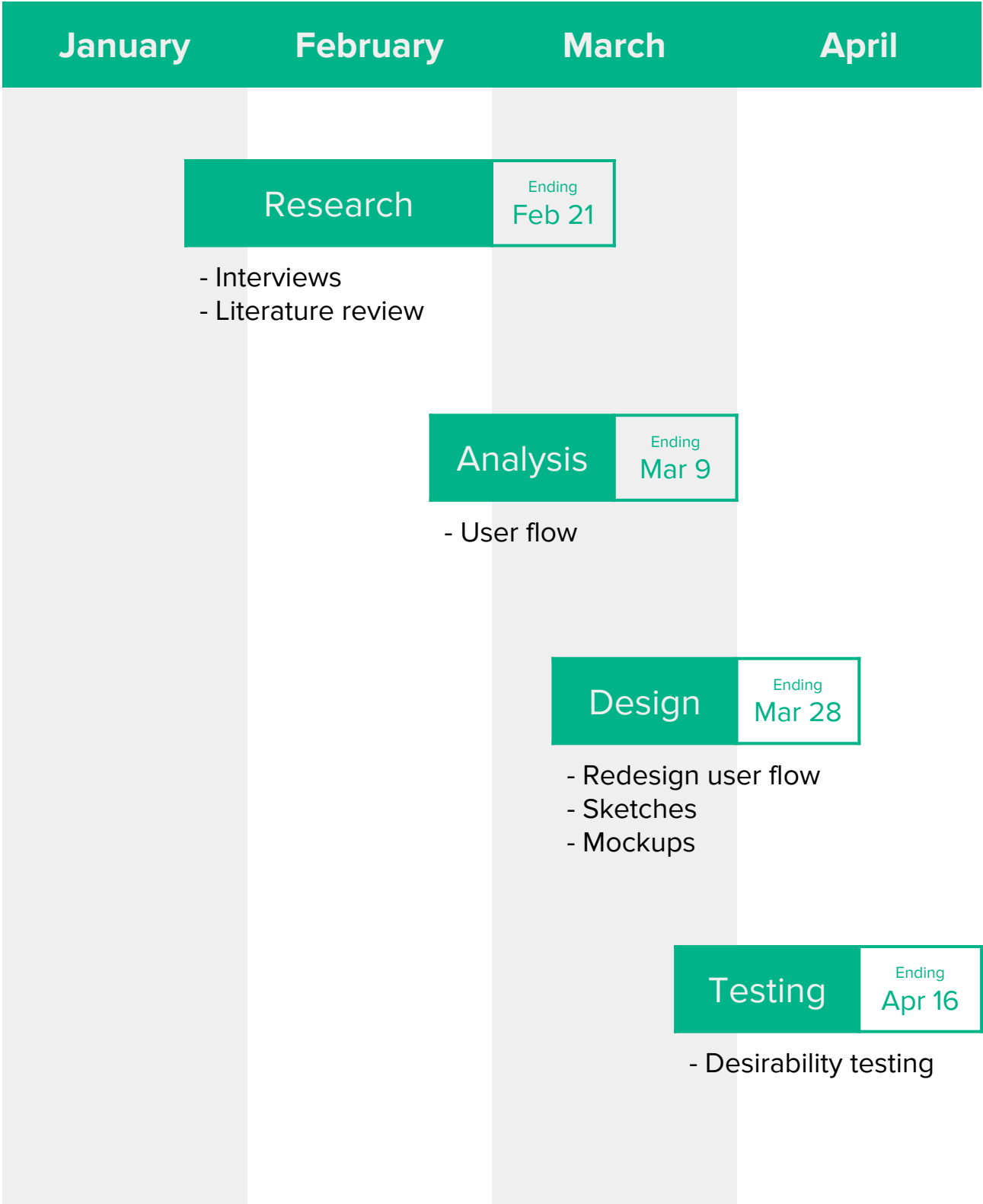


Recommendations and improved **redesigned user process flow**



Mockups of the redesigned user process flow

Timeline



Research

Literature Review

Goals

We wanted to better understand updating behavior and problems related to the updating process.

Process

We searched for scholarly articles related to updating behavior, read those articles and summarized our findings and insights.

Findings

An analysis of a survey on the update experiences, published in the proceedings of the 2016 CHI Conference on Human Factors in Computing Systems, identified six stages that users go through during the updating process.

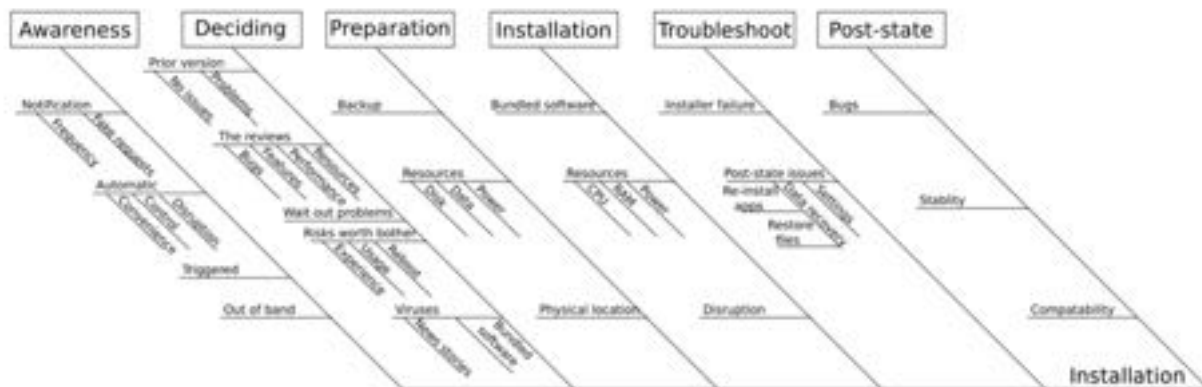


Figure 1. Overview of the stages of updating and the issues respondents experience at each stage.

Literature Review

Findings

Psychology of Notifications

<https://techcrunch.com/2015/02/05/the-psychology-of-notifications/>

Citation: Eyal, N., Vengoechea, X. (2015, February). The Psychology of Notifications. Tech Crunch. Retrieved from <https://techcrunch.com/2015/02/05/the-psychology-of-notifications/>

- Notifications should vary to retain interest
- Spark intrigue
- Non-repetitive
- They should be well timed and actionable

Mobile UX Design: What Makes a Good Notification?

<https://uxplanet.org/how-to-craft-mobile-notifications-that-users-actually-want-7b585e0e1fa1>

Citation: Babich, N. (2016, March). Mobile UX Design: What Makes a Good Notification? UX Planet. Retrieved from

<https://uxplanet.org/how-to-craft-mobile-notifications-that-users-actually-want-7b585e0e1fa1>

- Annoying notifications is the #1 reason people uninstall mobile apps (71% of respondents).
- You need to understand your audience, their lifestyles and their needs and figure out the frequency of notifications that you will send out.
- Keep the message clear and understandable. No matter what the content of the notification is, make sure it speaks the same language as your users, literally and figuratively.
- Always send push notifications to users in their local timezone.
- Tailor message time to each user. Pay attention to where your users are in their day, and schedule appropriately. Automate message delivery to the user's preferred time to engage with your app.
- Before you send any notifications, you should choose a goal and track the necessary metrics to determine if the communication worked.

Literature Review

Findings

Tales of Software Updates: The process of updating software

<https://dl.acm.org/citation.cfm?doid=2858036.2858303>

Citation: Vania, K., & Rashidi, Y. (2016, May). Tales of software updates: The process of updating software. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (pp. 3215-3226). ACM.

CHI '16 Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems

- If users delay or do not install updates it can have serious security implications for their computer.
- Asked 307 survey respondents to provide two contrasting software update stories.
- Asked for stories about both a positive and a negative update experience
- Respondents were recruited from Amazon's Mechanical Turk.
- A crowdsourcing Internet marketplace enabling individuals and businesses to coordinate the use of human intelligence to perform tasks that computers are currently unable to do.
- The survey was advertised as "15 minutes survey on software update experiences"
- Participants were compensated \$1 each for completing the survey.
- Located in the United States
- Users go through six stages while updating: awareness, deciding to update, preparation, installation, troubleshooting, and post state.
- When interacting with updates, users are balancing the risks and costs of updating against potential benefits.

Implications of the study for designers and software developers

- Make it easy to find information about an update
- Users want to know what installing an update will involve and if they are likely to enjoy the changes it will make.
- Be conscientious of resources.
- Respondents had issues with resources such as disk, processor, and data throughout the update process.
- For example, delaying an update due to lack of disk space or a limited data plan was an issue for iOS users on space constrained devices.
- Provide a recovery path for users.
- The possibility of failure without the certainty of a recovery strategy makes updating more risky for users and thus makes them less likely to update.

Literature Review

High-Level Insights

Using these stages as our groundwork for the rest of our research we wanted to look deeper into the issues that users are facing. We found three main issues that users face throughout the update process from our research.

- **Habituation** is a problem.
- Users **don't understand**, why updates are necessary and **why they are important** for security.
- Updates are seen as an **inconvenience**.

These issues are things that we wanted to tackle as we moved ahead in the process. Now that we had issues we wanted to make some goals for the rest of the project. We wanted to find some issues to focus in on through the rest of the process.

- Make it **easy to find** information about an update
- Be **conscientious** of resources.
- Provide a **recovery path** for users.

Now that we had a better plan for design and issues to focus on we wanted to know more. From here we went to interview a user here at Purdue. Now that we had a good idea of the issue, we thought the interview would help us better understand our users.

Interview

Goals

The primary goals of our interview were to begin to understand the Service Console and begin to understand a users process flow. We wanted to get an understanding of how the Service Console worked and what the problems within the Console are. We also wanted to understand what the users thought about the Console, how they interacted with it, and what the pain points within the Console are.

Process

Before we conducted the interview we wanted to make sure we weren't asking any leading questions, so we wrote out a list of questions that we thought were acceptable and necessary. We asked questions like how often they used the Service Console, how they are notified about the updates, what the process of update is like, and what problems have they encountered while updating. We interviewed one user, a **Virtualization System Administrator at Purdue** and a user of the 3PAR system, which houses the student data that is on Blackboard. We then went to her office and we asked our questions, which in turn allowed us to find problems not only within the Service Console but also within the Array Software Update.

Findings

After our interview we were able to roughly map out the process in which she updates her system. We found that she is fairly comfortable with the Service Console update but says it is a **pain** to update the Array Software due to having to schedule an appointment with an Hewlett Packard Enterprise engineering which, according to her, can take up to a month to get the update process started. She stated that it is often hard to find a time when both her and the engineer are available to update the Array Software. The Service Console was fairly easy to update but often didn't receive information about what an update included. She also says she receives update notifications through email.

Interview

Overview

From our findings, we developed takeaways that would help inform our analysis and designs:

- The user generally finds updates right away though email.
- The user will not update the system if she deems the update isn't important or pertains to her.
- The Array Software updating process takes too long because the user has to schedule time with an engineer.
- She generally updates right away.
 - She doesn't update her system, if she deems the update isn't important or pertains to them.
 - This is because the Firmware updating process takes too long.
 - Rated at a 3 for easiness.
 - Updating the firmware can take a month to even get access to.
 - Has to contact an engineer first.
 - The update can then take as little as an hour, up to 8 hours.
 - She doesn't do anything during this update to be safe.
 - She finds the management console updating process actually quite easy.
 - Rated at a 9 for easiness
 - She reads through all of the update description
 - When update provides no information
 - Searches online for update information
 - She says it is a pain and very difficult

High Level Takeaways

- Service Console update was rated **9/10** in terms of satisfaction.
- Firmware update was rated **3/10** in terms of satisfaction.
- **Path to revert** to a previous version is important.
- **Detailed update description** is important to have when deciding to update.

Firmware Update Flow

Based off Interview



User Process Flow

User Process Flow

Goals

The goals of looking at the user process flow were to understand the process of updating **ourselves** and later analyze the flow and **find problems** that users might encounter.

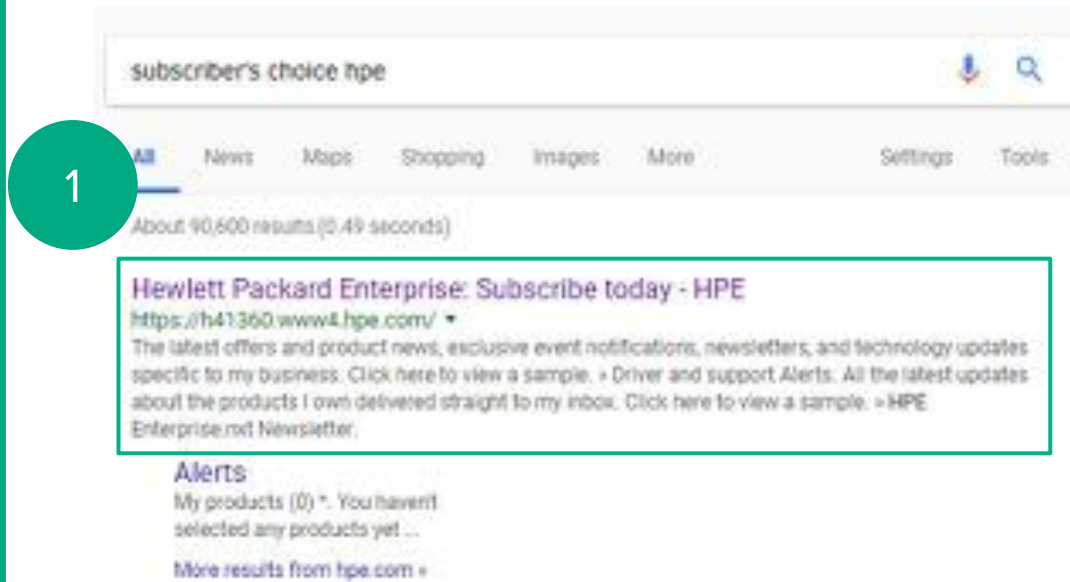
Process

We set up a meeting with one of our sponsors, Brian, where he showed us the interface of the 3PAR Service Console and let us control the screen. We spent an hour going through the process of performing an update, taking a screen recording as we went through it. We tried going through the process without any help from Brian, but he would help us if we got stuck. We then conducted in-depth analysis on the process after the session to map out the process flow and find problems within it. This would help influence our redesign and ways that information is displayed in notifications.

User Process Flow

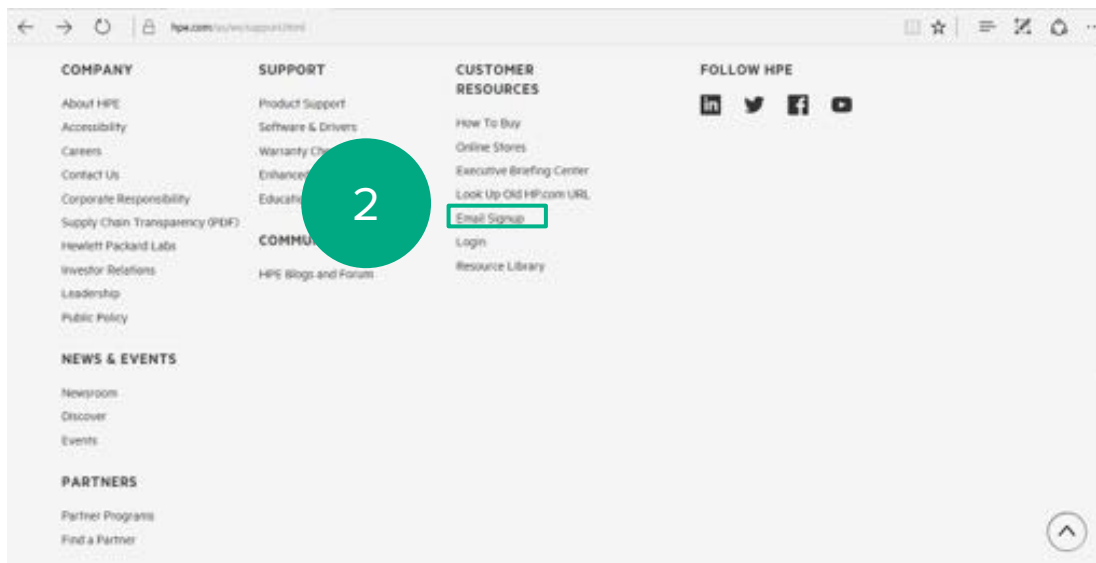
Findings

The first step users have to take after their first installation of 3PAR is to register for email alert on Subscriber's Choice. There are two methods to find the form Subscriber's Choice.



Method 1: Google
“Subscriber’s choice
HPE”

and click on the first
result “Hewlett
Packard Enterprise:
Subscribe today - HPE”



Method 2: Go to the
HPE Support Center
webpage and scroll
down to the footer.
Click on “**Email Sign
Up**” which is listed
underneath Customer
Resources.

User Process Flow

3

Get connected with updates from HPE

Your source for the latest technology information for enterprise and SMB customers

Both methods lead users to a form that should be filled out for Subscriber's Choice. After submission, users would be able to receive emails alerts for updates.

Subscribe today

HPE's award-winning eNewsletters offer updates on the latest technology, new products and solutions, promotions and events, and driver and support alerts, sent direct to your inbox.

Country/territory I primarily read in:

Email address *

First name * Last name *

Company name *

(* = required)

4

Later on when there is an update for 3PAR. The user would receive an email to alert them of the update. After receiving this email, users know to log in to the management console to find and start the update.

Here are the most recent alerts for the 5 products you own

[My profile](#) | [Recent alerts](#) | [Support center](#) | [web view](#)

Hewlett Packard Enterprise **HPE POINTNEXT**

Support Alerts

Routine Software Update - Feb 05 2018

HPE 3PAR Operating System Software 3.2.2 MU3 P100

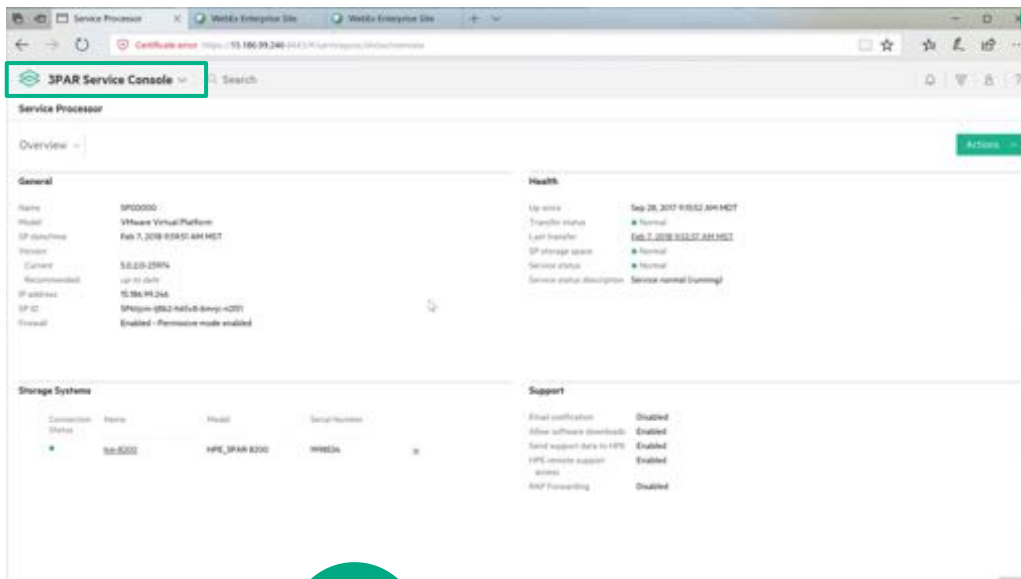
Products: Options and Accessories for 3PAR Storage, Storage 3PAR Device Management Software

Description: A new software update is now available.

HPE 3PAR Operating System Software 3.2.2 MU3 P100

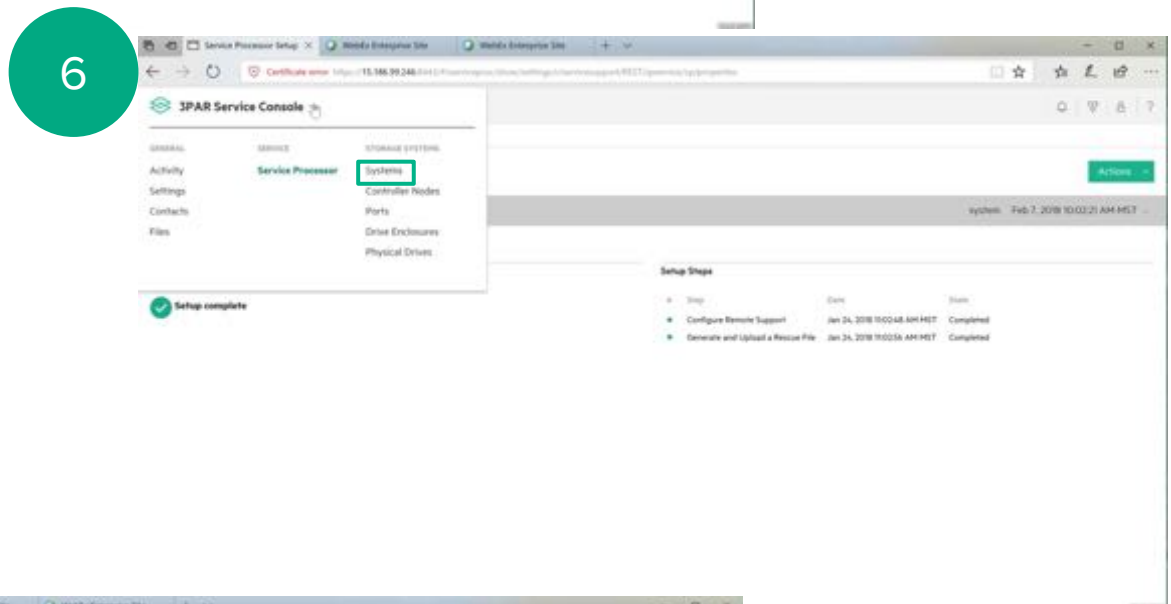
Detailed information on the changes in the HPE 3PAR Operating System Software 3.2.2 MU3 P100 can be found at <http://h20566.www2.hp.com/portal/site/hpsc/public/kb/search/>

User Process Flow



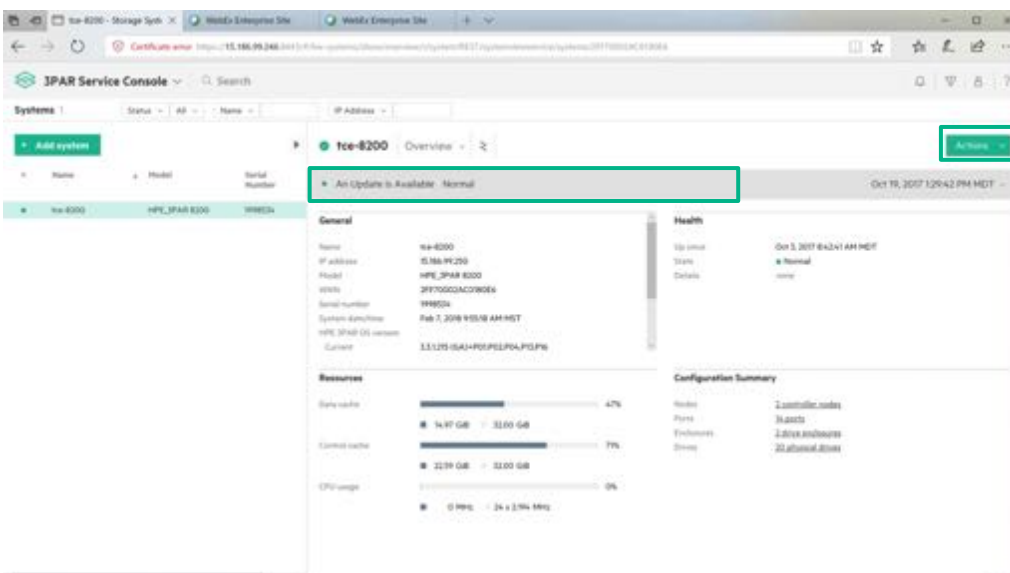
5

Once on the main page of the Service Console, users click on the drop down menu by the 3PAR logo.



6

Users then select Systems.

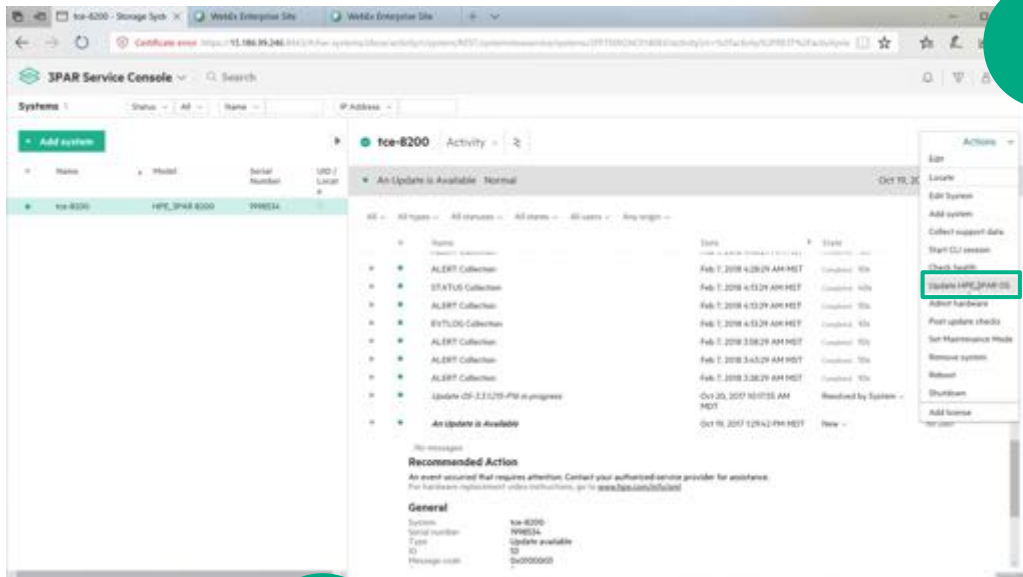


7

Once on the System's screen, a gray strip with the words an update is available can be seen. Seeing an update is available the user should then click on the Actions drop down.

User Process Flow

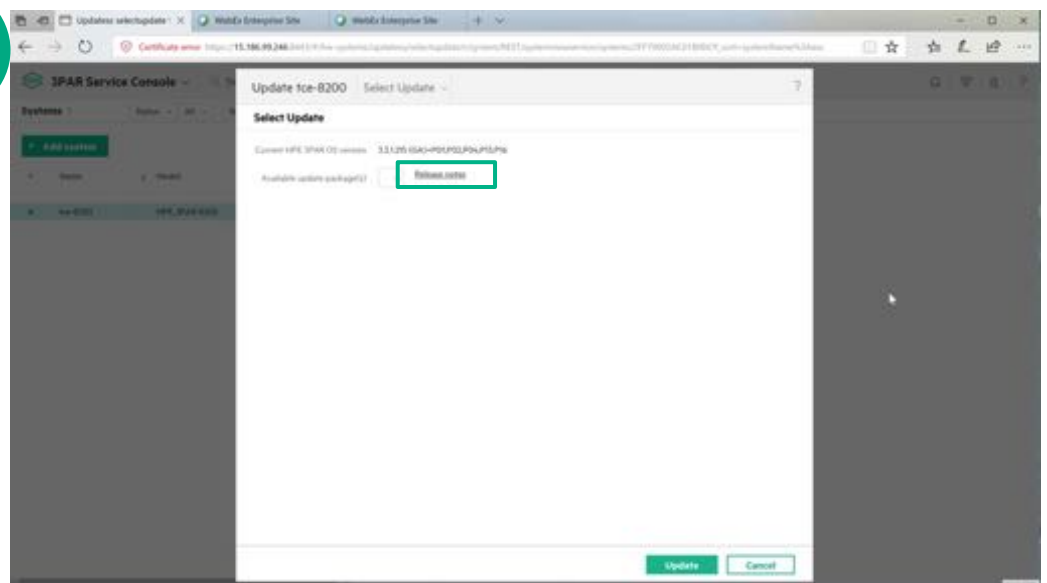
8



Users then click on “Update HPE 3PAR iOS”.

9

Users then select the drop down to select the patch they wish to update to.

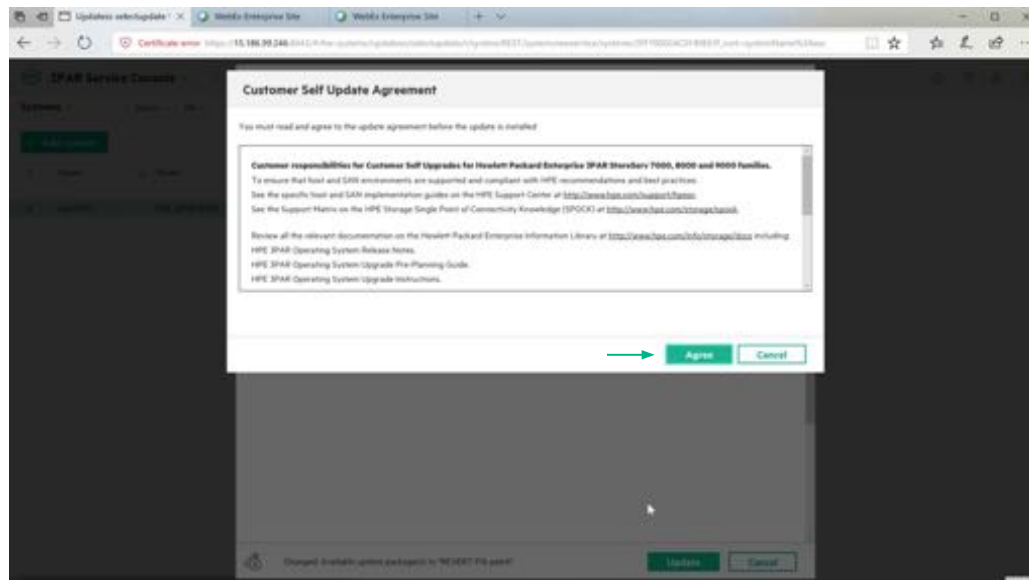


10



After selecting the patch, users can click on the update button.

User Process Flow

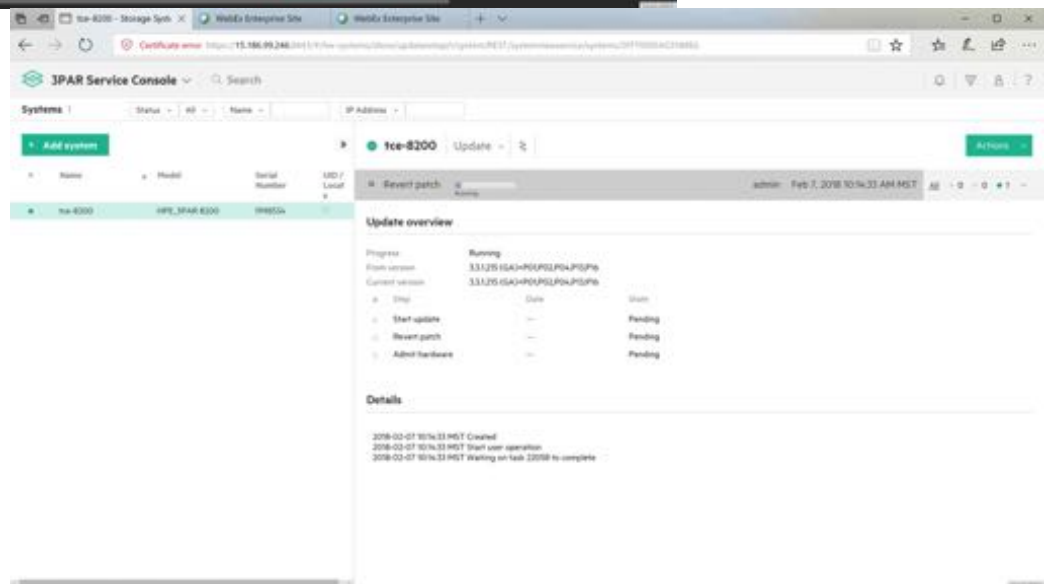


11

The user then read through the update agreements and then select Agree.

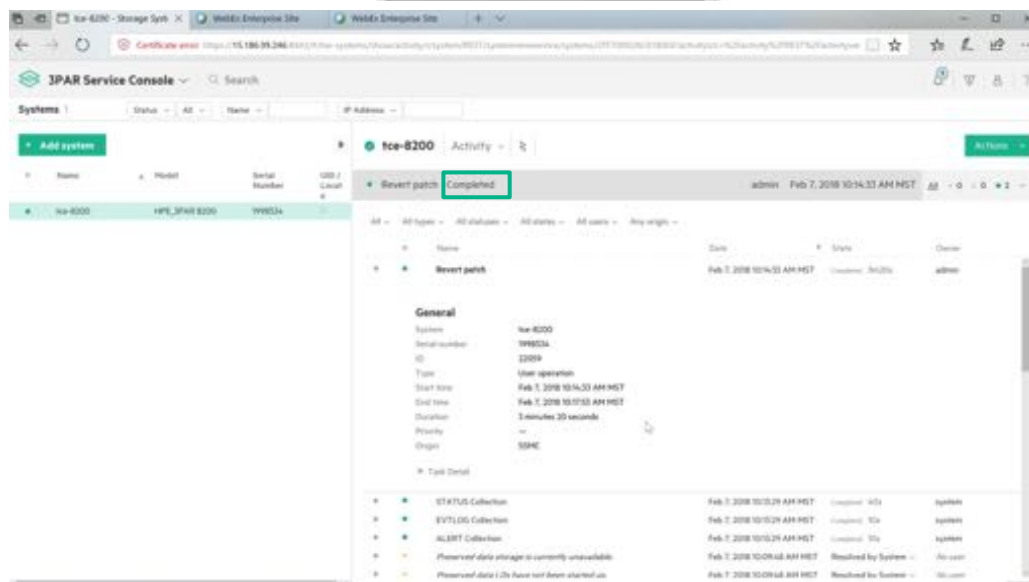
12

The user is then sent back to the previous system page with a gray strip that shows the update's progress.



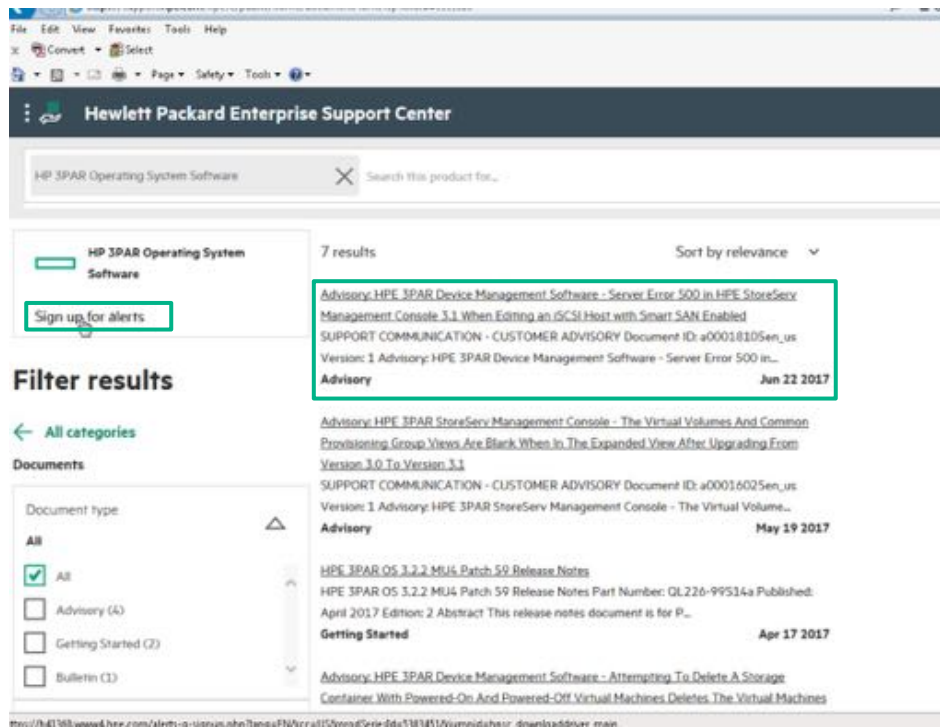
13

Once the update is completed. The strip will read "Completed".

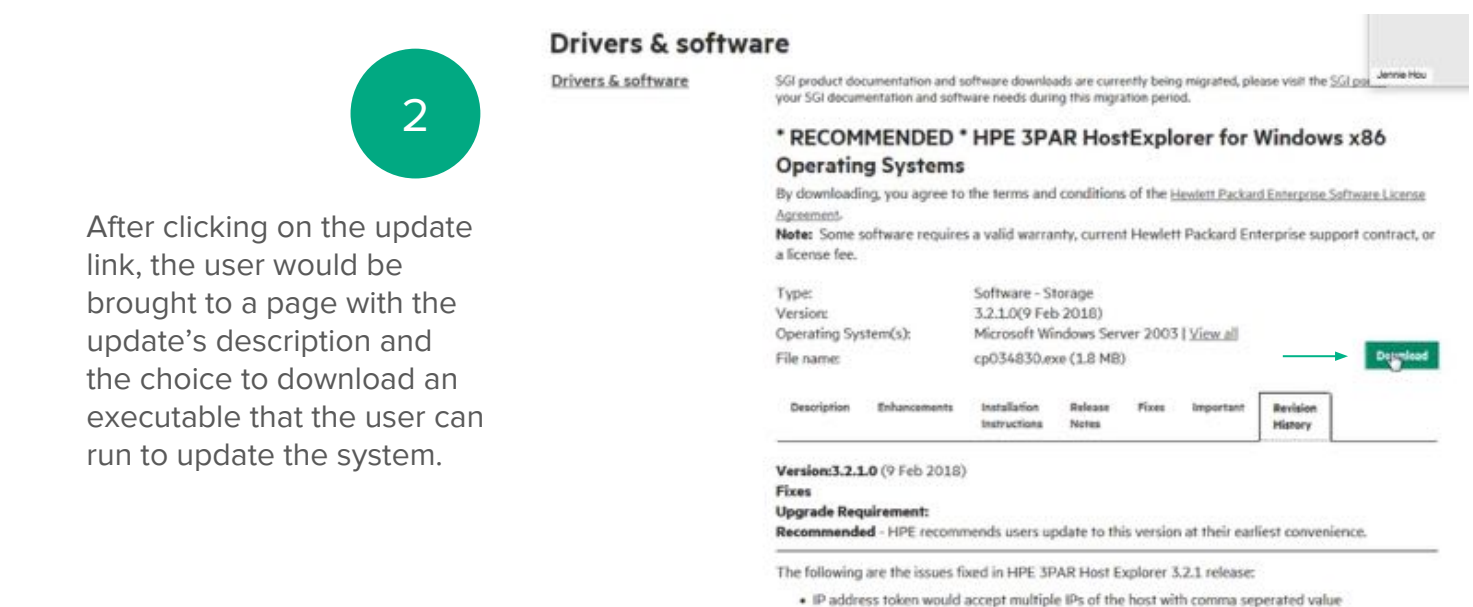


User Process Flow

Another method of updating the 3PAR system can be found in the HPE Support Center where the user can download and run an executable.

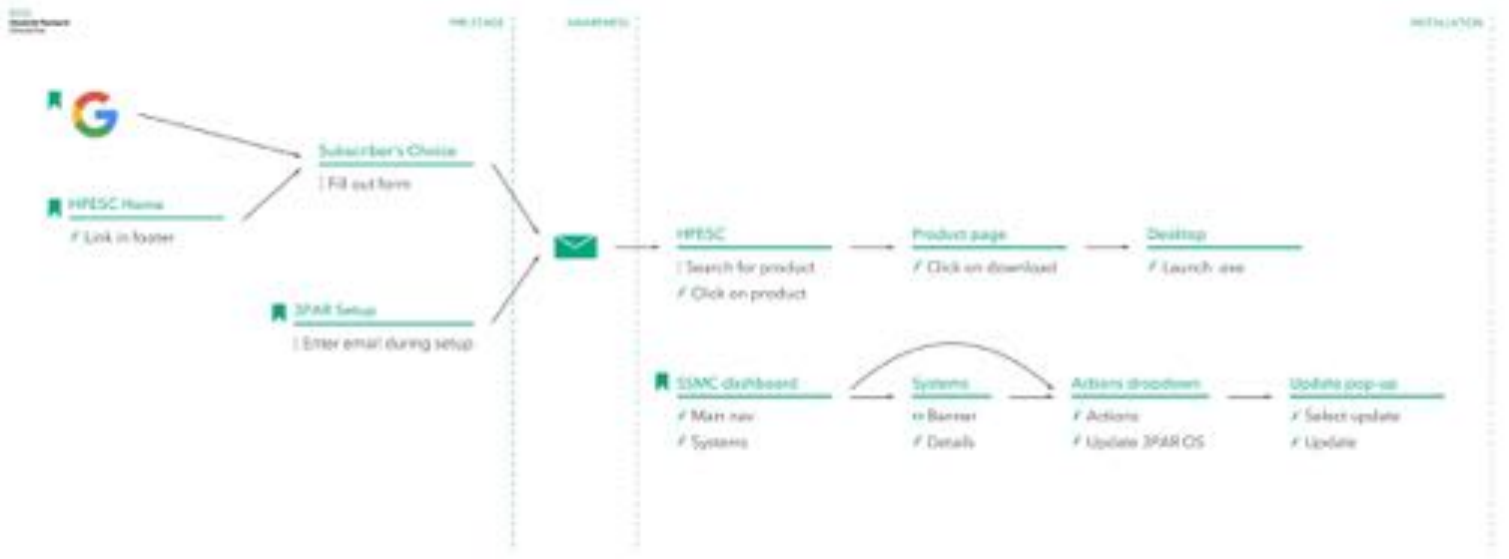


On the HPESC webpage, the user can once again find the Subscriber's Choice form and be able to search for updates for their products.



User Process Flow (diagram)

We also created a diagram of the current user process flow, utilizing the six stages of update to organize our flow.



After the creation of the process flow we noticed two main problem points. The first point we noticed is how there is **no automatic notification**. A user has to take initiative and check within the Service Console or the Support Center for an update or to fill out a form to subscribe for the Subscriber's Choice emails. Another problem area is how there are **two separate paths** to update the system itself. Therefore, we wish to narrow down the process flow and create a method of update that would update the user without the user having to take initial action.

Analysis

Affinity Diagramming

Definition

Affinity diagramming involves the organization of ideas into separate categories to better understand a process or flow of ideas.

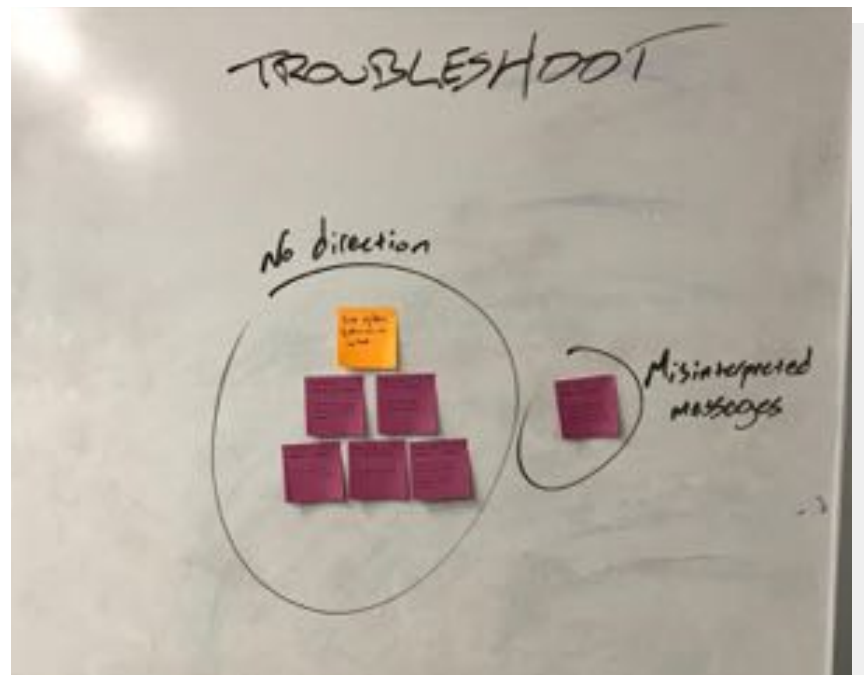
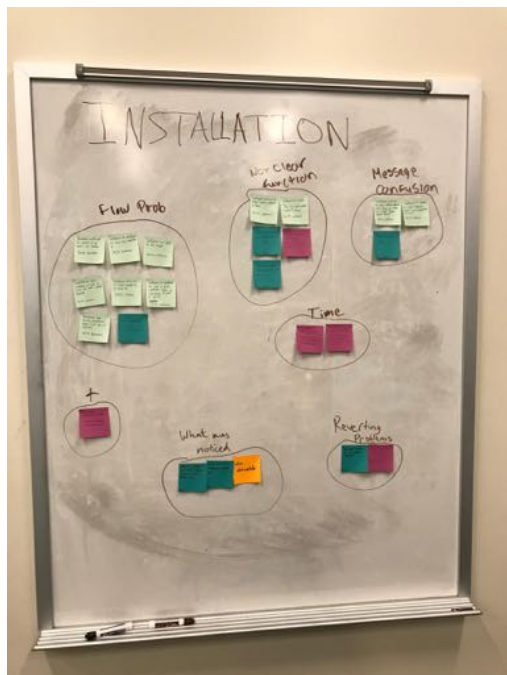
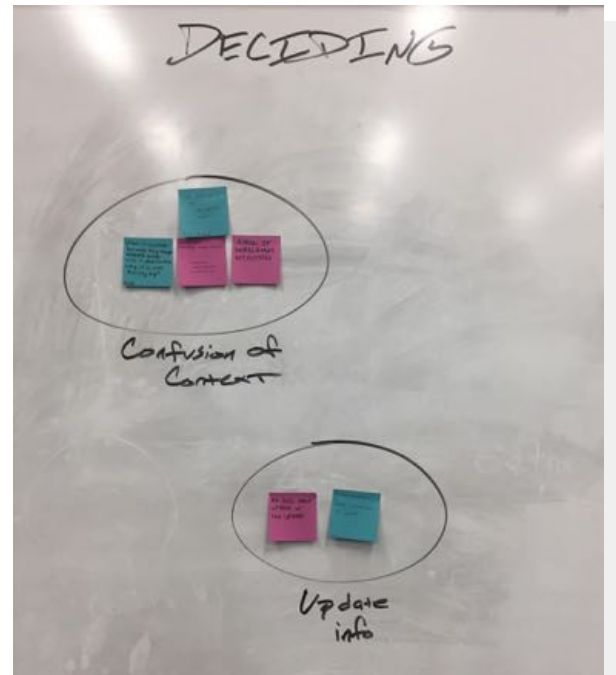
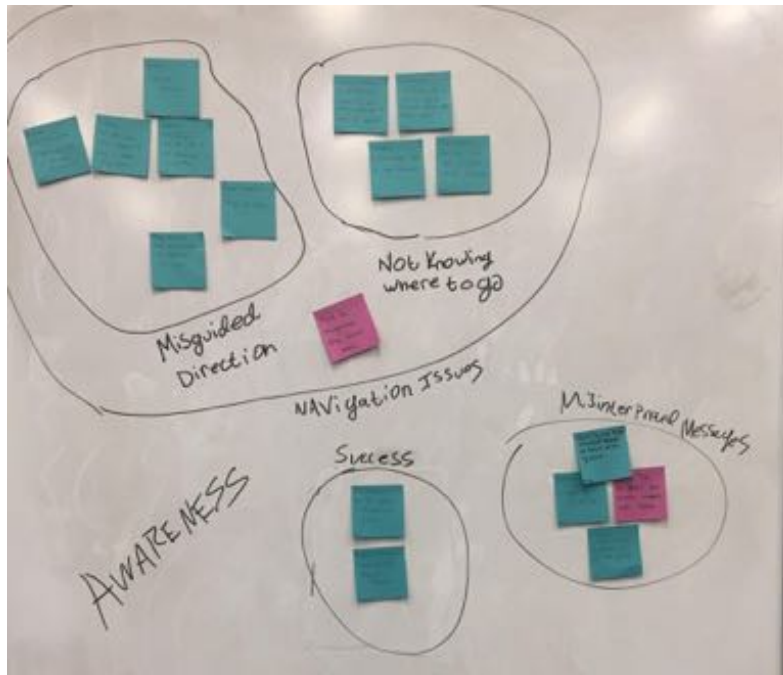
Goals

We hoped that in affinity diagramming that we'd better understand the process of updating as well as some of the struggles that an average user goes through. We then hoped to find common themes among them and be able to analyze those themes to influence our next steps in design.

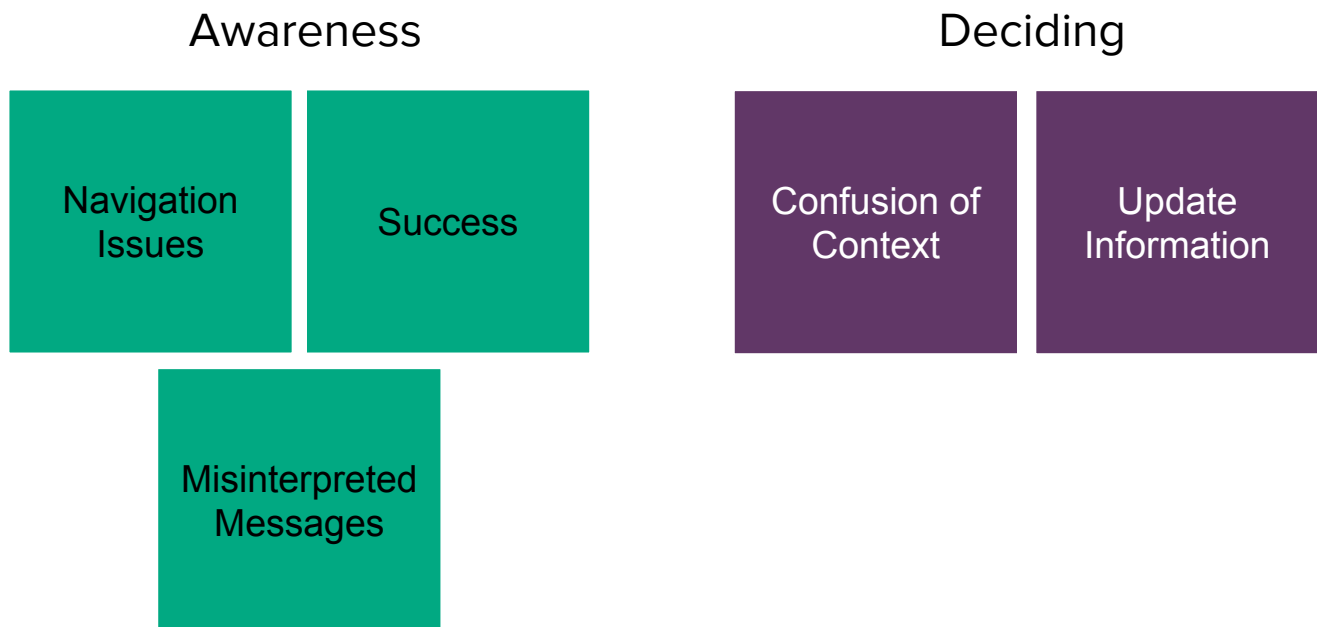
Process

After going through the process flow of the current website, we rewatched the video we recorded of it and made note on every single action and time where a moment of confusion or hesitation may have occurred. There were seven categories that we watched for and took note of when they happened: **frustration, confusion, mouse gesture, a step in the process, ease of use, positive feedback, and negative feedback**. After we had all these moments onto post-it notes, we separated them into different categories. The categories we determined were: **awareness, deciding, preparation, installation, troubleshoot, and post-state**. We then took some of the most poignant categories and decided to affinity diagram them further, deciding to ignore post-state, as our current research was on the process of updating, not what comes afterwards. After affinity diagramming those, we decided to focus on the main points that we found from among the other smaller categories and we made another affinity diagram on the whole process, just focusing on the key points.

Affinity Diagramming



Affinity Diagramming Analysis

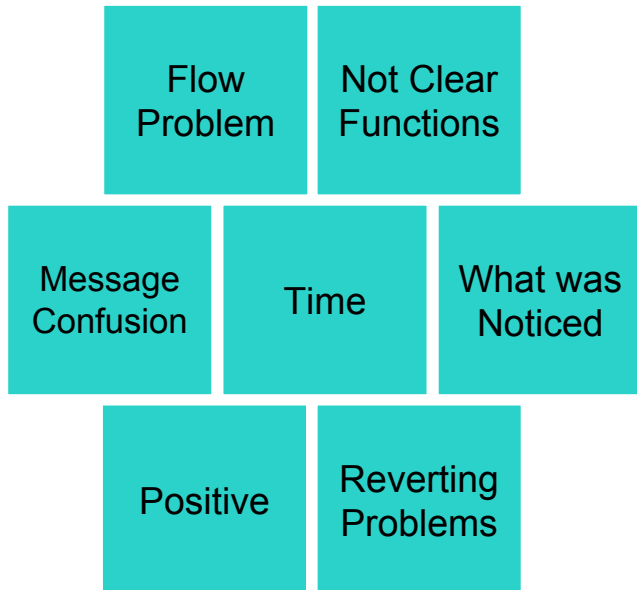


Through affinity diagramming the awareness step, we learned that users had difficulty navigating and finding what they need such as information on the update or where to go to update. Users also have difficulty interpreting certain messages such as the text on the main page that states “up to date” is about the Service Console rather than the servers.

Through affinity diagramming the deciding step, we learned that users had difficulty finding and understanding the update detail.

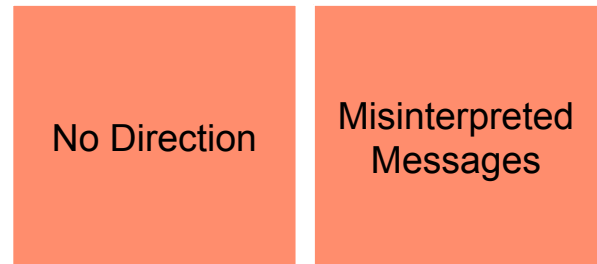
Affinity Diagramming Analysis

Installation



Through affinity diagramming the installation step, we learned that users had difficulty navigating the Service Console. The organization of the application was vague and therefore difficult to find exactly where the user needs to navigate to so that they could perform the update. There was also no information on how long the update would take and users sometimes had trouble reverting to a previous version.

Troubleshoot



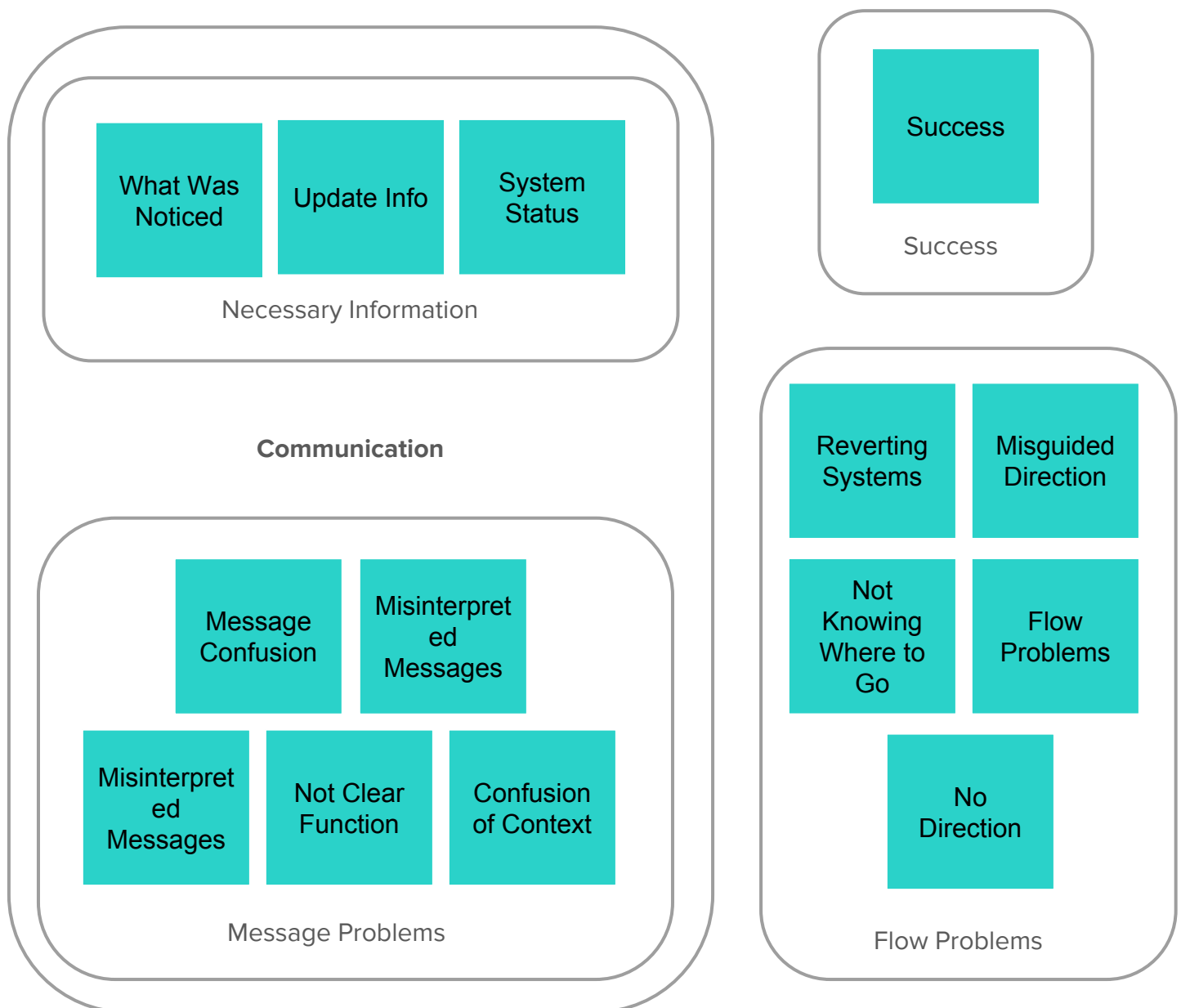
Through affinity diagramming the troubleshoot step, we learned that users have difficulty in deciding when the update is finished. When we as a team performed the update demo with Brian, we also tried to conduct a post update check because of this. We were unsure if the update had finished installing.

Affinity Diagrams - Entire Process

High-Level Insights

The main takeaways from the process seemed to be that there are **communication errors** and there were **flow problems** among a couple of things we found successful. Within communication, we thought that there were problems with the necessary info displayed as well as some general message problems.

Entire Process



Ideation

Focus

After the in-depth analysis of the process flow, we began our ideation on how to improve the flow and method of notifications. To help us narrow our ideation, we came up with 3 main focuses:



The current process of update has two different places to update. One of our goals is to unify the process flow.



The current process does not have a simple method to navigating to the update. Therefore another goal is to clarify a single path to update servers.



The current process does not include an automatic method of notification. A goal for the idea would be to provide users with a method of notification that users do not have to sign-up for themselves.

Medium of Notifications



Desktop



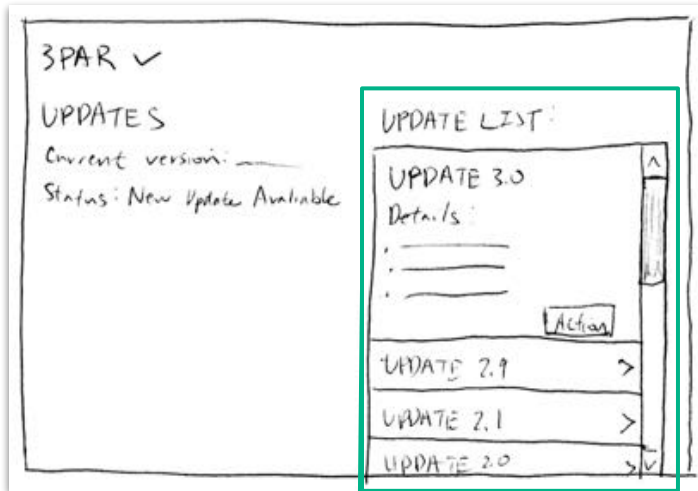
Email



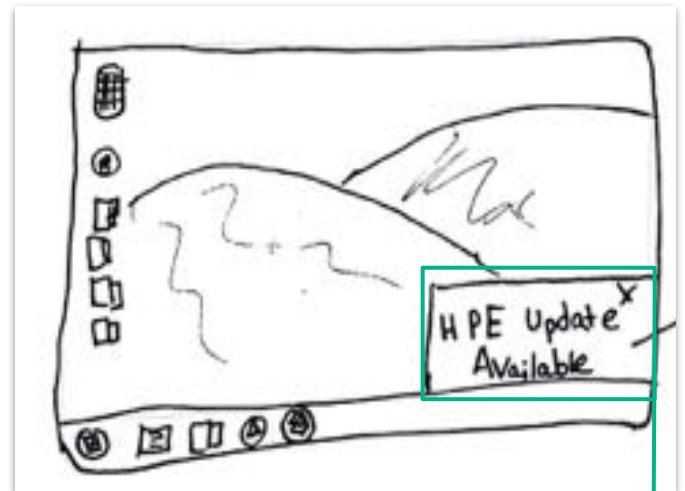
Phone App

For our first round of sketching we each sketched separately on ideas that we believe would help improve the current process flow while keeping the focus and medium requirements in mind. The following class day, the group met up and combined the sketches. We found three main categories of sketches. There we notification sketches for desktop notifications, announcement bars within the Service Console, and better structured email notifications. Another group of sketches features a page on updates that currently does not exist within the service console. Finally, there were sketches on a potential mobile application.

Desktop Sketches



Redesign of brief update section

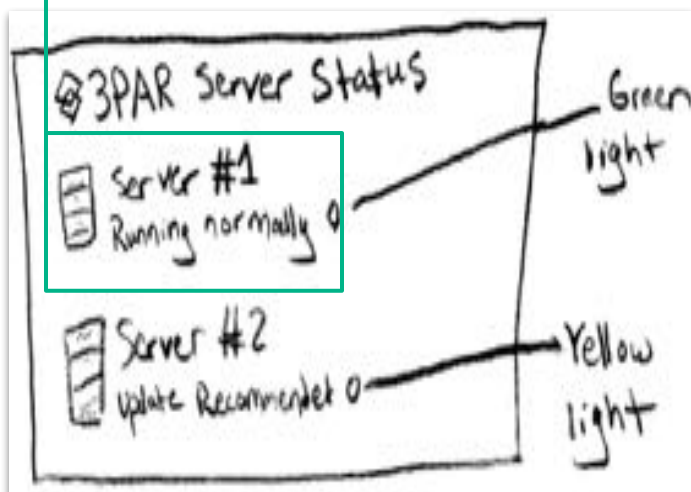


Design of Desktop notifications

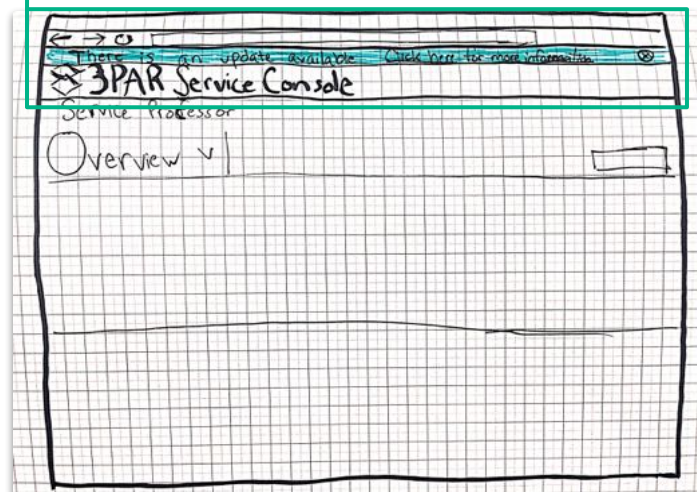


Redesigned update section within the SSMC

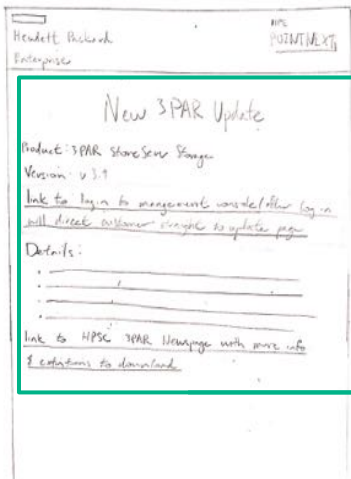
Design of a server status section - view whether a server needs an update



Design of a notification banner within SSMC - Notifies users of updates

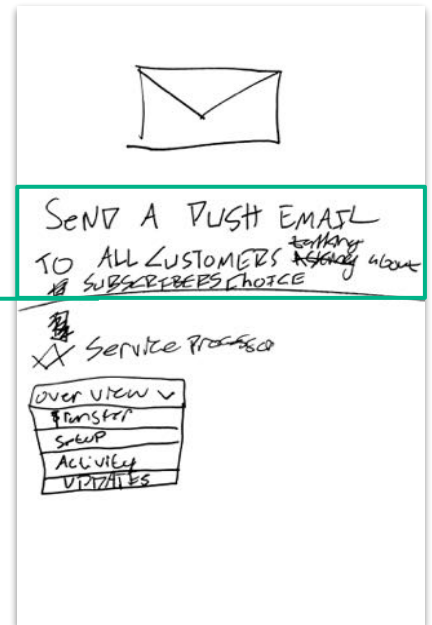


Email Sketches

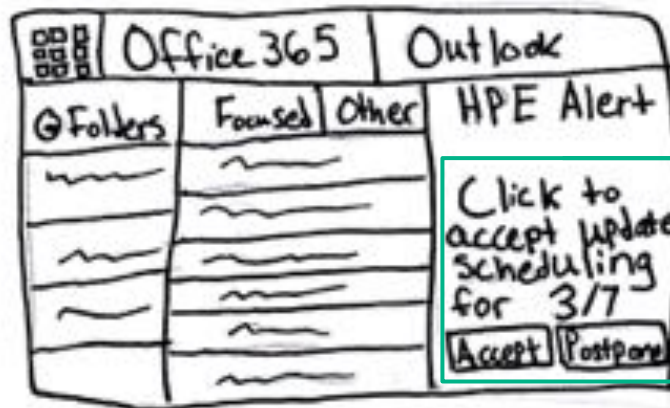
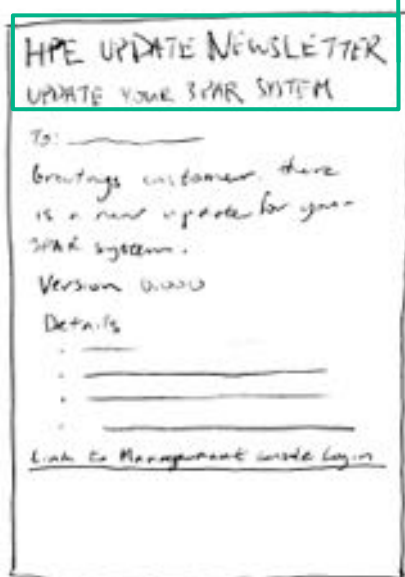


Detailed view of how email would be organized

Redesigned email system



3PAR System Update Newsletter

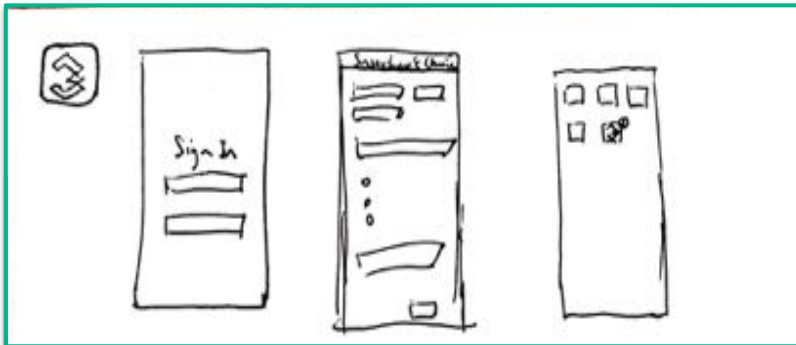


Email scheduled update

Large prompt box to let users know about Subscribers Choice

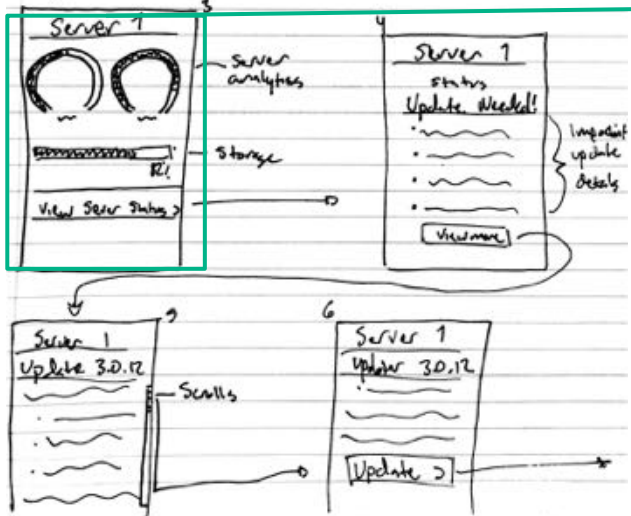
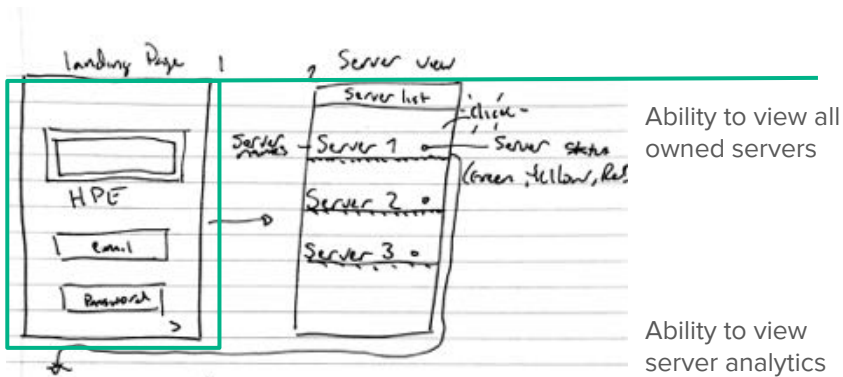
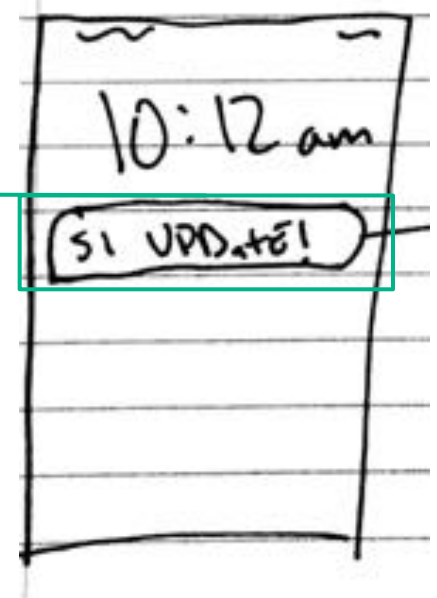


Mobile Sketches



Rough sketches of Mobile Companion App

Mobile Notification Mockup



Redesign Mobile Companion App - more features and cleaner design

Mockups

Notification Mockups

Goals

Our goal with our higher fidelity notification mockups was to see what our previous ideas and designs would look like as a final design, as well as to provide designs to test users with.

Process

We narrowed down our sketches after coming together as a team and deciding which methods of notification would be the most efficient and easy for the user. We decided to focus on 4 things: desktop notifications for updates, redesigns of email notifications, redesign of notifications within the Service Console itself, and mobile notifications for updates through a companion app.

We went ahead and designed higher fidelity models of desktop notifications, phone notifications, and email notifications to update. With the phone and desktop notifications, we created several different wordings for them to see which would be the most effective in inciting the user to update. With the email notifications, we each created a separate high fidelity emails to see which ones the users would be most responsive to, as well as what parts of them that they liked the most.

Lastly, we designed a mockup for an “Update” section within the Service Console. We wanted to make it very obvious as to where the user can go within the Console to perform an update. Since our focus was primarily on notifications, we did not go into too much depth as to what this “Update” section should look like.

Desktop Notifications



This is our high fidelity mockup of our desktop notifications. We had several versions of the same desktop screen with the notifications changed out between them.



3PAR UPDATE

A new update for your 3 PAR system is available.

Install Now
Remind Me Later

New security update available

A new security update is available for your 3PAR system.

Install Now
Remind Me Later

Update now

Your 3PAR array has updates available.

Install Now
Remind Me Later

An Update for you 3PAR Array is Available

3.0.2 - Security Update.

Install Now
Remind Me Later

3PAR System Update

You have an update available for Server 1.

Install Now
Remind Me Later

Update pending

An update is pending for your 3PAR system.

Install Now
Remind Me Later

Please proceed to updating your 3PAR system

An available update is available. Initiating update is advised.

Install Now
Remind Me Later

URGENT UPDATE AVAILABLE

Update 3.0.2 - Important Security Update.

Install Now
Remind Me Later

3PAR URGENT SECURITY UPDATE

An important security update is available for your 3PAR servers.

Install Now
Remind Me Later

Update available

Update your 3PAR array now

Install Now
Remind Me Later

New 3PAR Server Update

An update is available for your 3000 series server.

Install Now
Remind Me Later

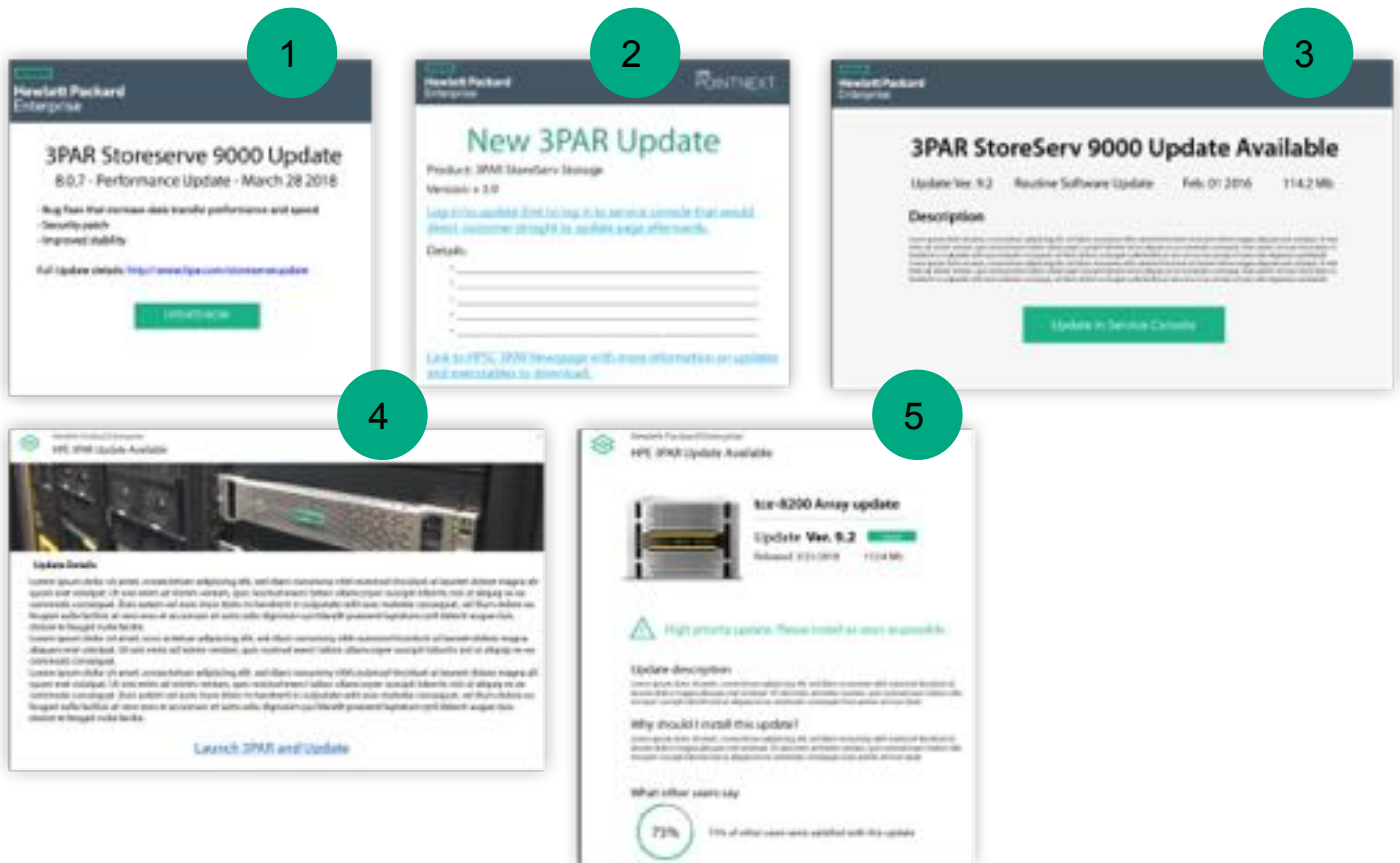
Here is what our current desktop notifications look like, in addition to what sort of language we would be using with each one. We then later tested each version of wording to see which would be the most effective in getting the user to click on it and update. Things that we changed range from wording to capitalization to using words like urgent. In total, we came up with 11 different types of wordings for the notifications as a group.

Mobile Notifications



This is the high fidelity mockup of the phone notifications that we created. All the notifications here have the same language as the previous desktop notifications. We created mockups for both iOS and Android.

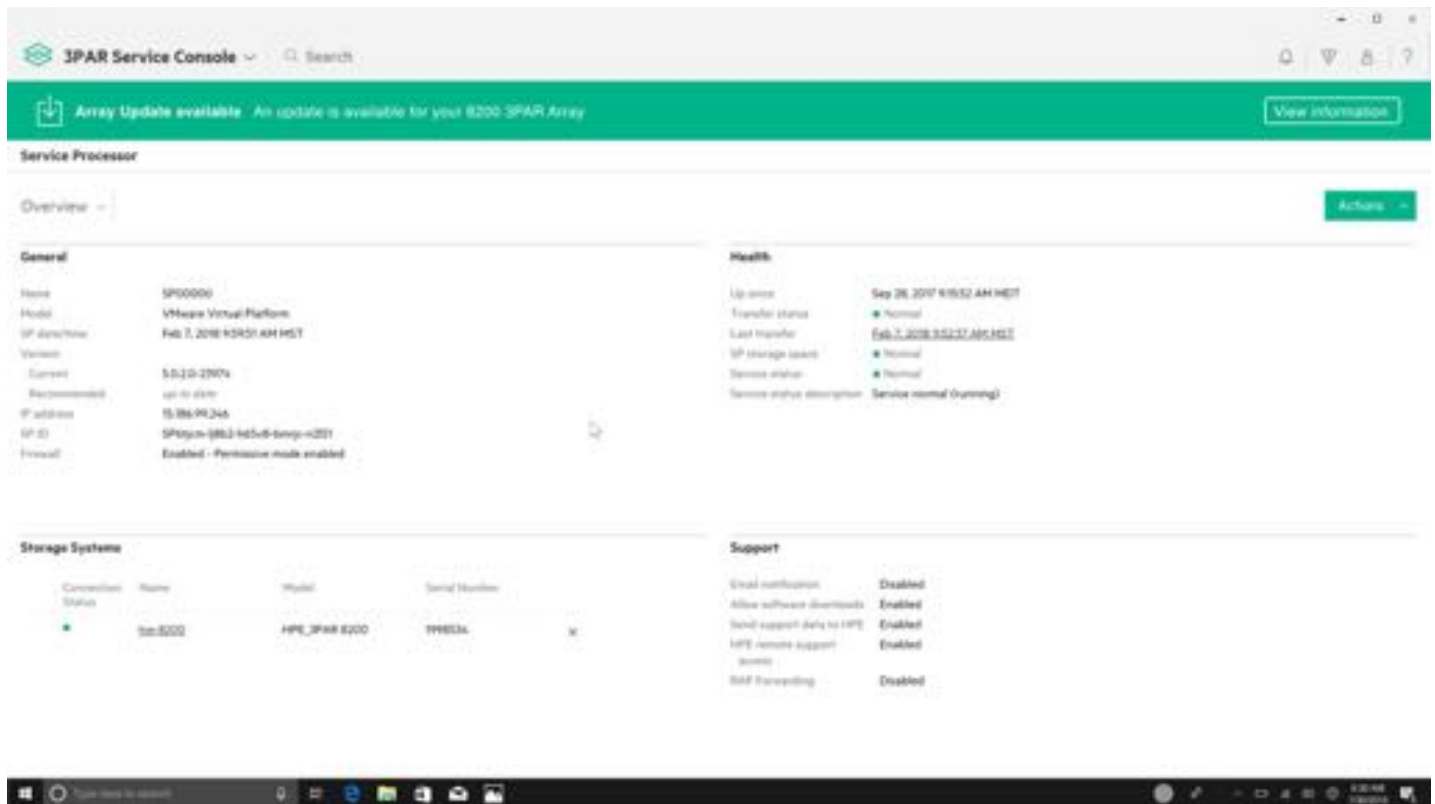
Email Notifications



These are the email notifications that we created as a better format than the ones currently in place. These were created individually to see if we could solve some of the previous issues that we had identified through our affinity diagramming. Each of these focuses on solving different aspects of our predetermined problems. Such as:

1. Making the update button clearly visible and apparent to the user
2. Making sure the updates were clear and understandable by putting them into a bullet point format
3. Letting the user know what server they are updating
4. Including a picture of a server so that the email looked more official
5. Including things such as the version number and user feedback so that other users can know what other people also thought of the newest version

Service Console - Announcement Bar



This is an announcement bar that we created so that we can notify the users in app that an update is available within the Service Console. This would only pop up when a new update was available and once clicked on would direct the user to the new "Update" section, which we discuss further in depth in the next section. We made this form of notification because many users whose full-time jobs is to manage their 3PAR system will often have the Service Console open.

Service Console - Update section

The screenshot shows the JPAR Service Console interface. On the left, a table lists arrays under the 'Updates' tab. The main panel displays details for the 'tce-8200' array, including its current software version (8.5) and a high-priority update (8.7) that needs to be installed. The update details section includes a description, reasons for installation, user feedback (75% satisfaction), release notes, and a history of previous updates.

Name	Model	Serial #
tce-8200	8200	1888554
tce-20000	24000	2541588

tce-8200 Active

Current software version: 8.5
Released 1/1/2019 134.4 MB

Update details
Update Ver. 8.7
Released 1/18/2019 112.4 MB

High priority update. Please install as soon as possible.

Update description
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nisiquam elitend urna e justo dapibus pellentes. Proin efficitur odio libero, id lacus ante interdum ut. Integer malesuada lectus nec urna mollis pretium. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae. Sed tristique suscipit urna.

Why should I install this update?
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nisiquam elitend urna e justo dapibus pellentes. Proin efficitur odio libero, id lacus ante interdum ut. Integer malesuada lectus nec urna mollis pretium. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae. Sed tristique suscipit urna.

What other users say

75%
75% of users were satisfied with this update

Release notes
- Note one
- Note two
- Note three

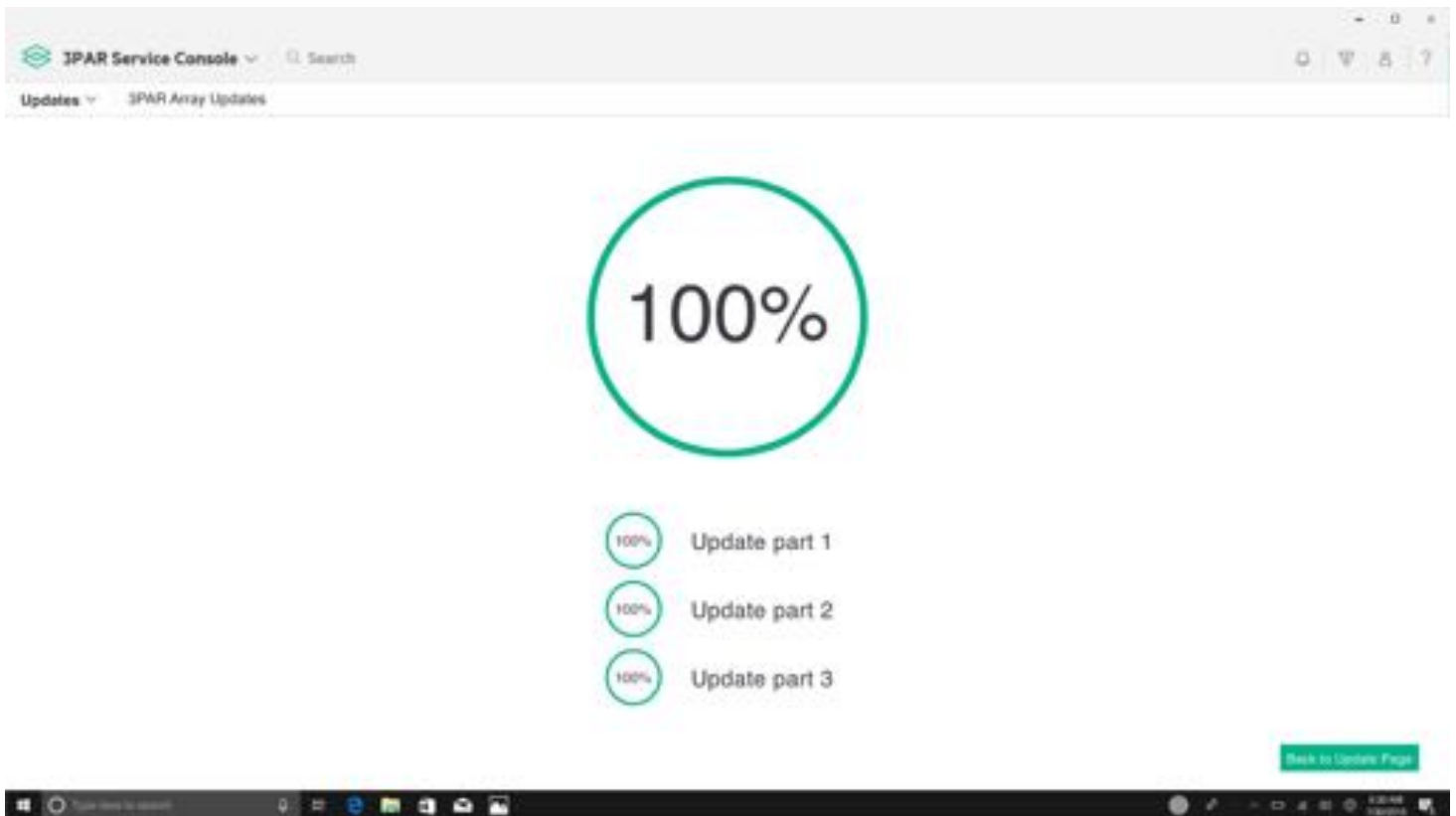
Update history

Priority	Update version	Date released	Date installed
Low	8.2	12/19/2017	12/11/2017
Low	8.1	12/1/2017	12/3/2017

Install

This is the “Update” section which is here to notify the user about the details of what they are updating, as well as the details of the update itself. Here we also culminated all of our previous findings from research with our redesigned emails to create a succinct section that could be operated at a glance. The various servers owned by the user are on the left. Selecting on one then shows the update details, which includes things like the update version number, the fact that this is a high priority update, a description of the update, why the user should install the update, what other users had rated it, new release notes, and then your previous update history. We created this section because we wanted a clear update section where all this information could be found. It is however important to note that this is an **untested** concept of our idea. Further testing should be done to see whether this is a viable idea.

Service Console - Update section



This section would come after you click install on the previous page. We created this page because in our own testing of the current site, we found that we weren't exactly sure of where we could find how far along our update was, or whether or not it was even done updating. This instead provides an easy to glance at update percentage so that you could see how much longer your update may take.

Service Console - Update section

The screenshot displays the IPAR Service Console interface. At the top, there's a header with the IPAR logo and a search bar. Below the header, the 'Updates' section is active, showing 'IPAR Array Updates'. A table lists arrays with columns for Name, Model, and Serial #. The 'tce-8200' array is highlighted. To the right of the table, the 'tce-8200' array details are shown, including a server icon, the current software version (9.2), and a release date (2018/02/18). A green message states 'This array is up-to-date.' Below this, there's a 'Version description' section with placeholder text. A 'What other users say' section shows a 75% satisfaction rate. A 'Release notes' section lists three notes. An 'Update history' table shows four updates with their priority, version, release date, and installation date.

Name	Model	Serial #
tce-8200	8200	1888554
tce-20000	24000	2541585

tce-8200

Current software version: 9.2
Released 2018/02/18 134.4 Mb

This array is up-to-date.

Version description
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam erat volutpat. Proin efficitur odio libero, at tunc etiam interdum ut. Integer molestias lectus nec urna malesuada. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae. Sed tunc tunc tunc.

What other users say

75% 75% of users were satisfied with this update.

Release notes

- Note one
- Note two
- Note three

Update history

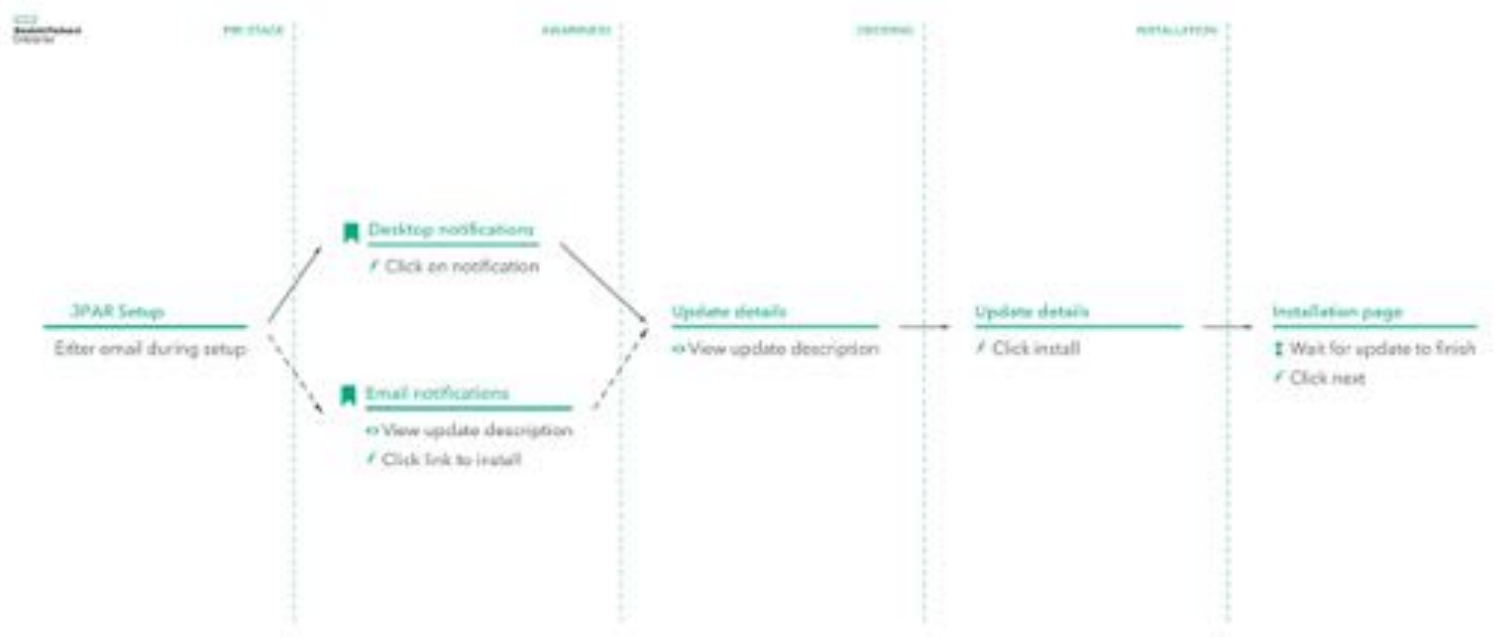
Priority	Update version	Date released	Date installed
High	9.2	3/18/2018	3/23/2018
High	9.1	1/1/2018	3/23/2018
Low	8.2	12/10/2017	12/11/2017
Low	8.1	12/1/2017	12/10/2017

The update section would then show up once again when the update is finished installing, except this time you can see that now instead of saying, “High priority update. Please install as soon as possible.” It now says, “This array is up-to-date.”

Revised Process Flow

Based off of our notification mockups, we created two new process flows to show how the user would go about installing an update through our suggested new methods of notifications.

The process shown below is through the desktop/email notifications. When the user first sets up their 3PAR, they are given the option to sign up for email notifications. We decided to keep the email option because we acknowledged that some users are used to and prefer email notifications, but we are not making it a requirement for the user. In the Awareness stage, users will receive a desktop notification to update their system, as well as the optional email. They will then see the update details from the notification, and decide whether to install the update. In the Installation stage, users are taken to the “Update” section within the Service Console to see more details and click the button to install. Then they will go through the installation of the update.



Revised Process Desktop & Email

Revised Process Flow

The process shown below is through the mobile notifications or manually checking the Service Console. The user would have a companion app of the Service Console. This app would not allow the user to install an update from their phone, but they would be able to see all of their information as well as the detail of the update. The user would receive a notification that there is an update, then open the app to see the update details. This would prompt them to open their Service Console on their computer, and see either the Announcement Bar at the top of the Service Console or go to the designated “Update” section within the Service Console. Then they would perform and install the update as normal.

We decided to create this mobile notification solution because many things are moving to mobile nowadays and users are constantly have their mobile device with them. Also, we found other companies’ storage system consoles on the app store, such as Google’s (Google Cloud Console and Microsoft’s (Console for Microsoft Azure).



Revised Process Mobile & Manual

Testing

Desirability Testing

Goals

To determine users' attitudes towards various notification alerts on various platforms in order to determine the most effective form and medium of notifications.

Process

We were unable to gain access to current 3PAR users to test our designs with, so we recruited Purdue Computer and Information Technology students (Graduate and Undergraduate) to test our designs, since they have a similar technical background to our target user. Each participant was shown one type of notification (desktop, Mobile, Email) After viewing each notification participants were asked to pick 3 words from a set of 20 (10 positive and 10 negative) that we chose from the [Microsoft Desirability Toolkit](#) based on their relevance to updates and notifications. After picking the words participants were asked to explain why they chose each word. Participants were compensated for their time with a \$5 Amazon gift card.

Words Used:



Positive

Clear
Effective
Clean
Time Saving
Appealing
Helpful
Straight Forward
Motivation
Useful
Professional



Negative

Ineffective
Too Technical
Disruptive
Distracting,
Confusing
Undesirable,
Gets in the way
Intimidating
Annoying
Unapproachable

Quantitative Analysis

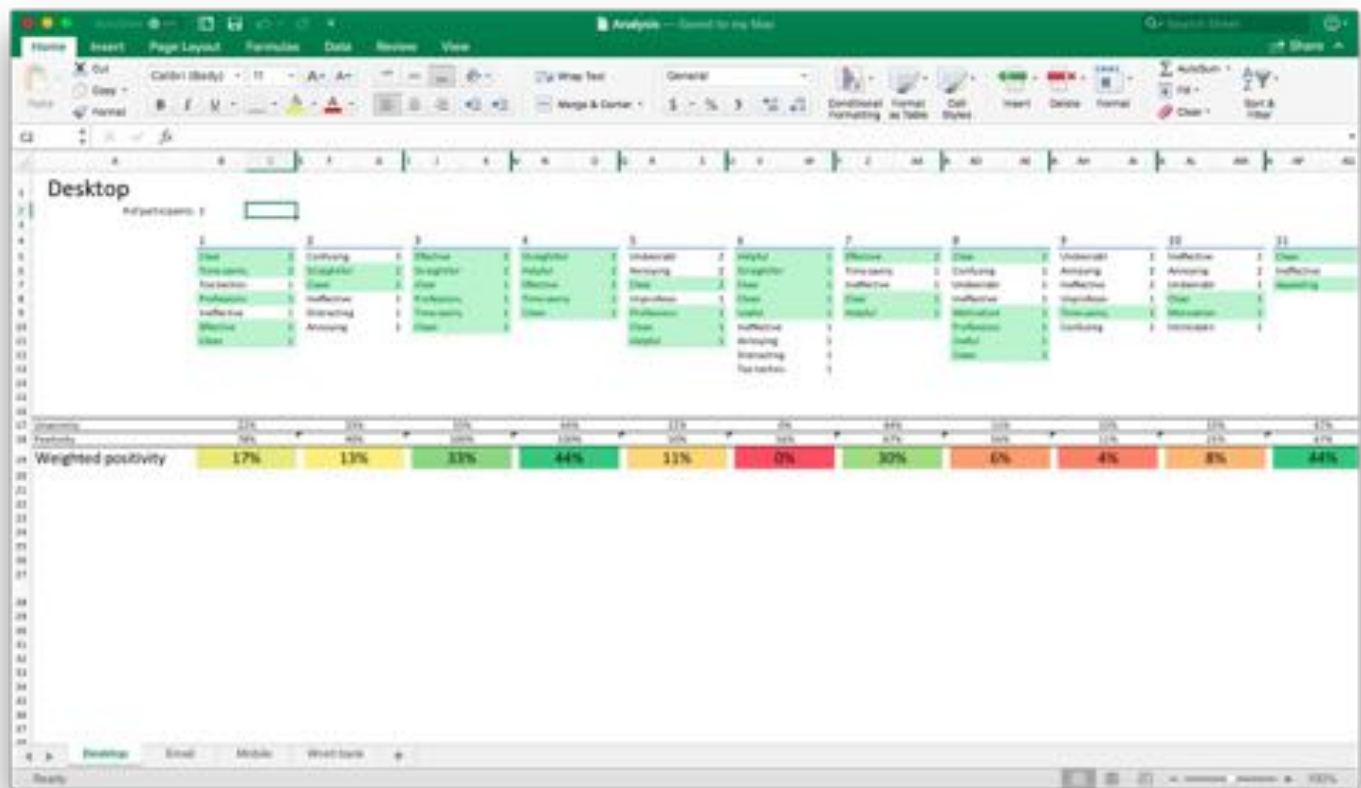
We aggregated the words chosen for each design into an Excel spreadsheet and analyzed these words using the following criteria:

Unanimity: How unanimous were the participants in their word choices?

Positivity: How positive were the participants word choices?

Weighted positivity: Taking the unanimity and positivity into effect, what is the overall positivity score?

Using these criteria we were able to determine which designs to examine for qualitative analysis. We then looked at the most desirable and least desirable designs and examined what users said they liked and disliked about these designs.



Qualitative Analysis

Desktop/Mobile



Positive

Type of update (security, performance, etc)

Users liked when the notification contained the type of update because it succinctly told them what the purpose of the update was.

Notifications that include update number

Notifications that contained the update number seemed more professional to users

Short & concise message

Users wanted a simple description



Negative

Notifications that contained the word urgent

Users disliked notifications that contained the word urgent because they felt that if something is urgent they should have been notified before it became urgent.

Caps Lock in the notifications

Users felt like notifications with caps lock were yelling at them.

Don't like the word "please"

Users felt the word please was too polite and too familiar and it wouldn't motivate them to interact with the notification

Qualitative Analysis

Email



Positive

Concise summary of update details

Users liked seeing the key features of an update.

Option to view more detailed description

Users liked having the ability to view more detailed information about the update if they wanted to .

Picture of the product

Users found that emails that contained photos of the product were more aesthetically pleasing and made the email feel less like spam.



Negative

Paragraphs or large blocks of text

Users were overwhelmed by large paragraphs and were not motivated to read the update information when it was formatted in this manner

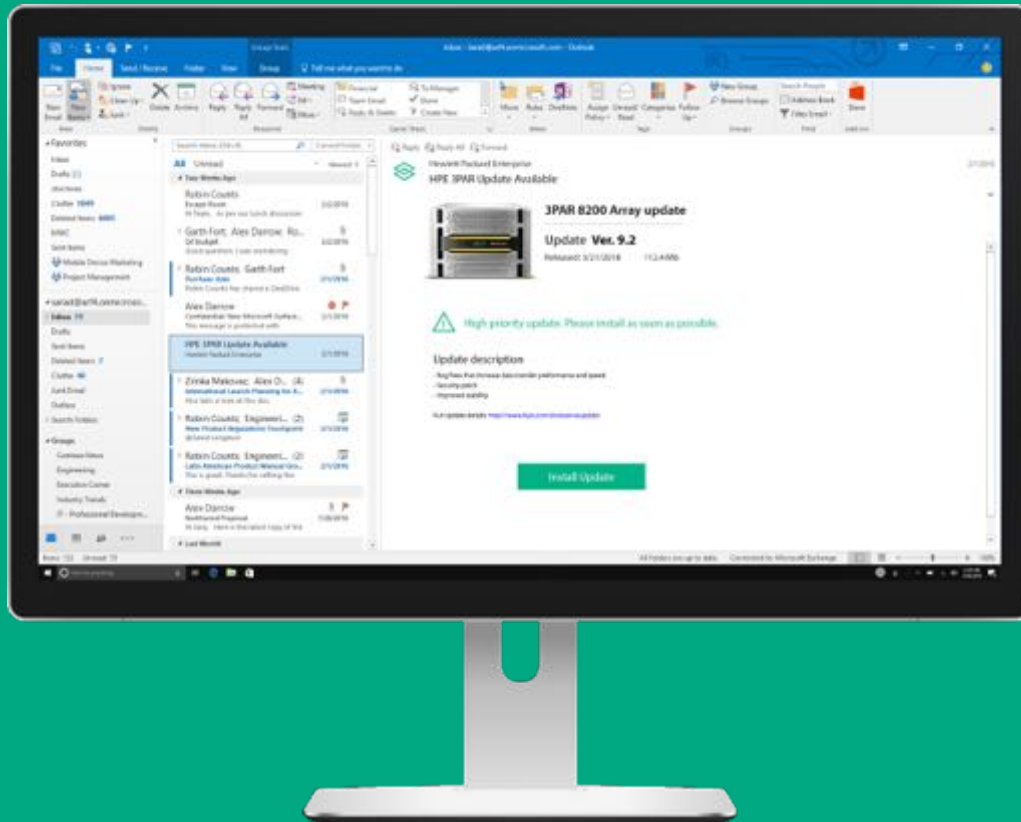
Small update button

Users wanted a clear path to update, so having a small unobvious button to click to bring them to the update was a problem.

*What other people think**

Participants did not like when the email contained “what other people think” because they assumed that if they are a professional then they should be able to make their own decisions about the update. However during our interview with a current 3PAR user, she said that one of the biggest deciding factors for her when deciding to update is how the update was received by other users. So this point will need further research.

Final Designs



3PAR 8200 Array update

Update **Ver. 9.2**

Released: 3/21/2018 112.4 Mb



High priority update. Please install as soon as possible.

Update description

- Bug fixes that increase data transfer performance and speed
- Security patch
- Improved stability

Full update details: <http://www.hpe.com/storageupdate>

Install Update



3PAR 8200 Array update

Update **Ver. 9.2**

Released: 3/21/2018 112.4 Mb



High priority update. Please install as soon as possible.

Update description

- Bug fixes that increase data transfer performance and speed
- Security patch
- Improved stability

What other users say



Full update details: <http://www.hpe.com/storageupdate>

Install Update

Final Designs

Email notifications

The team decided on two final designs for email notifications. The two emails are fairly similar, aside from the addition of the “What other users say” section in the second design. Participants said that they did not believe this section was necessary. One participant in particular was quoted saying this because he believed if it was his job to manage 3PAR systems, he should know whether or not he wants to install this update without having to read other users’ comments about it. This opinion sharply contrasts with our interview participant at Purdue University, who said that other users’ comments was one of the most important pieces of data she looks at before deciding to install an update.

The choice between these two designs would best be made after further input from users, however, due to a limited amount of time we were unable to collect this data. Therefore, we are providing both options to HPE.



Final Designs

Mobile notifications

After communicating our initial mobile design ideas with HPE, it was decided that designing a mobile application beyond concept was out-of-scope for the project. The team's focus shifted towards the design of the push notifications that would be sent with the mobile application. The style of these notifications was mainly dictated by Apple's iOS 11 style guide and Google's Android O style guide. The team focused on the wordings for the notifications, using the desirability testing as our reasoning for the final wordings.



Update Available for your 3PAR →
Array
Update 3.01 - Security Update

Install Now Remind Me Later ^

Update Available
Array
Update 3.01 - Security

In an Hour →
Tonight
Tomorrow

Install Now Remind Me Later ^

Final Designs

Desktop notifications

Desktop notifications use the same wordings as the mobile notifications. The desktop notifications feature two clickable options for the user: Install Update, and Remind me later.

Install update

This button would open the 3PAR StoreServ on the user's computer. The program would open straight to the update details page for the update the notification was for. This assist the user by automating the process of searching for the update details. On the update details page, the user would then have the choice to install or not install the update for their system.

Remind me later

The remind me later option would open a dropdown within the notification itself. This allows the user to dismiss the notification, while also being made aware that the notification would appear again later. The user has the choices for the time the notification would appear later: 1 hour, Tonight, or Tomorrow. The team purposely did not include a "Never" option. This decision was made because the team and HPE wants the user to install the update, therefore the user should keep being made aware that an update is available so they do not forget about it.

Appendices

References

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- Vania, K., & Rashidi, Y. (2016). Tales of Software Updates. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*. doi:10.1145/2858036.2858303

Appendix - Interview notes

1. How often do you interact with the 3PAR system?
 - Everyday, she's looking for things, "reports"
 - Watch for failed hard drives, increasing shares, replication and replicate volumes
 - 6 3PAR systems
 - Schedule jobs
 - Create virtual volumes, add space
2. How are you notified about updates for the system?
 - Signed up for different notifications, and she will get an email saying "version is available" there is a site where she can go to download it, and read all about it.
 - a. Are there multiple ways you are notified? If so, what are they?
 - She gets soli email
 - Also can look at the account
 - She could go log in to the website if she wanted to
 - There are multiple things other than the console that are updated
3. What is the process like for updating?
 - Run an executable
 - Two different ways to log in, one as a user and one as an administrator
 - Administrator is just for adding systems in
 - First couple of upgrades had to re-add
 - It was a pain to have to read add, she didn't need help
 - Make sure that everyone is logged out
 - Have to go to the site to download it
 - She could go log in to the website if she wanted to
 - Host explorer
 - Have to look through the known issues, and reading about the updates.
 - a. You mentioned sometimes the process takes an HPE engineer, what is that process like?
 - Not allowed to update firmware
 - Nobody comes - all done online
 - i. What do you do to prepare for updates?
 - Assign a Saturday - inform everyone
 - Longest took about 8 hours
 - Important that nothing goes down
4. What problems have you encountered when trying to update the system?
 - Was customer upgradable but not anymore since there are too many issues
 - The process is about 3/10 because she isn't able to do it herself
 - Management console is 9, pretty seamless
 - a. Can you give a specific instance when you had a negative experience when updating?
 - You have to put yourself on the notification

Appendix - Interview notes

1. What do you like about updating the system?
 - a. Can you give a specific instance when you had a positive experience when updating?
2. Do you have any more comments about 3PAR or the update process?
 - Often Skip the updates
 - Always reads the update information
 - Sometimes you have to look for the info but it is frustrating because the website isn't intuitive

Appendix - Testing notes #1: Desktop

Participant 1:

Notification 1:

Clear, Technical, Professional

Don't know what HPE 3PAR is

Took two cards closest to him

Asked if he can use the same ones again

Notification 2:

Ineffective, Confusing, straightforward

Doesn't say what needs to be updated in particular,

Straight out state something needs to be updated

Notification 3:

Straightforward, Clear, Effective

Very quick classification

Liked this one

Notification 4:

Thought for a long time

Straightforward, helpful, effective

Tells you that it's a new security update, so that you can start acting on it early

Notification 5:

Undesirable, Unprofessional, Annoying, clear

Don't like urgent notification. Rather be notified in advance if it is urgent

Notification 6:

Helpful, Straightforward, Clear

Asked what type of audience he is supposed to be - Technical

Notification 7:

Confusing, undesirable, ineffective

Does not say exactly is being updated - does not describe what it is doing

Appendix - Testing notes #1: Desktop

Participant 1:

Notification 8:

Undesirable, annoying, (unprofessional)

Too much going on, have to read too much, not concise

Not descriptive, just a lot of words

Notification 9

Undesirable, ineffective, annoying

Formatting error, doesn't say anything but Update now

Notification 12

Unprofessional - not too technical, not too ambiguous

Exactly what is being updated - brief

Update (Name of what is being updated)

Say what that is very briefly - say update available - with install now or remind me later

Like desktop notification

Slack not professional

Email not as professional as desktop

Sophomore

Appendix - Testing notes #2: Desktop

Participant 2:

Notification 1

Clear, Time saving (dont need to look up if you need an update)

Not straightforward enough

A little bit **ineffective**, wish that “high” in high priority was more noticable

Notification 2

Clean (less words to read), **Straightforward**, no option to find out what it is talking about, probably would feel **confusing**

Notification 3

Gave the version #, **effective, straightforward, professional**

Effective because it gives the idea what is going on, version name and what the update is about

Notification 4

Like that security is in the title, that way you know what it is about, doesn't have

Helpful, straightforward, time saving

Notification 5

Seems like a spam email but has the version update

Annoying , professional undesirable

Notification 6

Dont care about what server it is, and don't have a lot of information about the update

Clean, Useful, Ineffective

No idea how important it is based off of the notification

Notification 7

Redundant title and content

Title is good

Effective, time saving, ineffective

Can't see what kind of update it is, want more information

Notification 8

Redundant message, “i like this one” wants to know the purpose

Clear, motivational (because it suggests you do the update) **professional**

Notification 9

Conflicts with the “remind me later” when it says do it now

Undesirable ,Ineffective, time saving (less words)

Appendix - Testing notes #2: Desktop

Participant 2:

Notification 10

Don't like the word urgent in the title

But likes the message saying what the update is for

Clear, motivational, Intimidating

Notification 11

Wants to know more information about the update, give a suggestion, is this important? Not effective

Clean, ineffective, appealing (the title is pretty clear)

What specific things do you look for in an update?

Clear title

More details that explain what the update is for.

Appendix - Testing notes #3: Desktop

Participant 3:

1

Time saving, effective, clean

2

Distracting, annoying, confusing

It says its urgent, but there's no icon or anything signifying that it is urgent

3

Time saving, effective, clean

4

Useful, effective, clear

5

Clear, clean, helpful

6

Ahhh i dont like this one

Being yelled at, don't like the capital letter

Annoying, distracting, too technical

7

Clear, helpful, effective

8

Useful, clear, and clean

As long as it tells me what the update is, and if it says if it's for security, dont want too many details

9

Too vague

Ineffective, not time saving, confusing, annoying

10

Not straightforward, ineffective, annoying

11

Too vague, unprofessional, confusing, ineffective, annoying

12

Can be better so it says what the update is for but not too many details

Appendix - Testing notes #4: Email

Participant 4:

Email 1

Words: **Clear, Ineffective**

Notes:

- Like having the main objective
- Like to know - why is it important - why for me - how does it apply
- Like to have more information - what's going on - why it applies
- Design is clear and nice to see it
 - Important to something
 - But need more information
 - More of a description

Email 2

Words: **Ineffective, Intimidating, Clear**

Notes:

- Design is cool
- But need more info about process
- Similar to Email #1
- Want to know why I need to update
- "If I don't know what is going on, I don't know if I should be worried"

Email 3

Words: **Useful, Effective, Clear**

Notes:

- It's clear about what it's describing
- Feel more comfortable
- More sure about what the update will do

Email 4

Words: **Effective, Useful, Clear**

Notes:

- Clear about what the user should know
- Likes that you are provided with more details that helps you make a decision

Email 5

Words: **Clear, Straightforward, Effective**

Notes:

- Interesting because the important facts are behind the update
- If he had to choose one this is the most interesting
 - And if he wanted more information he could follow the link
 - He liked that it was clear and concise

Appendix - Testing notes #5: Email

Participant 5:

Email 1

Words: straightforward , understandable, clear

Notes:

- Seems simple enough, shows the information without there being too much

Email 2

Words: Appealing, Useful, Clean

Notes:

- Don't need to know what others are going to say, you should make your own decisions, that's distracting
- Install button too small to locate
- Why should i update is useful
- The picture is appealing
- Description and why is useful

Email 3

Words: confusing, Distracting, unapproachable

Notes:

- Links are distracting
- Not appealing and doesn't seem important to install
- Doesn't look presentable - looks like a scam email

Email 4

Words: Helpful, clear, straightforward

Notes:

- Shows some information and even has a link
- Doesn't show too many details but gives you a summary
- Doesn't really look professional
- Know what the update will contain without having to search for more info but it's there if you need it (don't need to ask others)

Email 5

Words: too technical, Confusing, Unprofessional

Notes:

- Already looks confusing
- Looks overwhelming
- Looks like a highschool student did it last minute for an assignment
- Does not look professional
- Shows a lot of text but doesn't specify size, when is it released/ the release number
- People don't wanna read paragraphs

Appendix - Testing notes #5: Email

Participant 5:

When you get software updates how are you notified

- Notification bar (desktop notification)
- Also check email

Is there a way you preferred to be notified?

- Not by email
- By the computer telling you the next time you log on
- People too busy at work - email may be overlooked
- Email is more professional than pop-up

Appendix - Testing notes #6: Mobile

Participant 6:

Screen 1:

Straight forward

Clear

Effective

Screen 2:

Confusing

"Is there an unclear?"

Ineffective

Screen 3:

Kinda better

Clear

Time saving

Shows you which version will update

Straight forward

Screen 4:

Ineffective

Confusing

Annoying

Screen 5:

Time saving

Ineffective

Might be useful for some users if they don't care about what update they're going to update

Screen 6:

A little bit too technical if the user doesn't know what server they're updating

Clear if they do

Screen 7:

Intimidating

Straight forward

Distracting

Screen 8:

Effective

Straight forward

Maybe confusing for some people

Appendix - Testing notes #6: Mobile

Participant 6:

Screen 9:

Straight forward for sure

Time saving, but ineffective

Doesn't show why you want to do it

Screen 10:

Appealing

Useful

Shows all the information you'll need

Clear

Screen 11:

Distracting

Annoying

Clear

Screen 12

Straight forward

Clear

Useful, because it actually tells you what update it has

Screen 13

Straight forward

Looks clean

Clear

Appealing

Screen 14

Ineffective

Annoying

Too many words

Appendix - Testing notes #7: Mobile

Participant 7:

Notification 1:

Straightforward, Clear, Professional

Notification 2:

Annoying, gets in the way, Undesirable

- I like to be notified
- I don't like when things are urgent on my phone

Notification 3:

Clean, Appealing, Clear

- It is what it is
- Gives the information that he needs

Notification 4:

Useful, clean, ineffective

- Do not know what type of update im getting

Notification 5:

- Annoying, gets in the way, intimidating
- Don't like urgent or all caps

Notification 6:

Clear, Professional,

- Like not having no capital letters
- Catches my attention but not in a good way

Notification 7:

Clean, Useful, Clear

Notification 8:

Useful, helpful, a bit confusing

- Don't know what needs to be updated

Notification 9:

Professional, useful, effective

- Showing the information for the whole system
- If you are getting notification then they should be comfortable with the terms used

Notification 10:

Clear, effective, appealing

- It's still technical, but it feels personal, which makes it appealing

Appendix - Testing notes #7: Mobile

Notification 11:

Too appealing, clear, distracting

Notification 12:

Clean, straight forward, time saving

Notification 13:

Clean, time saving, effective

Doesn't mind technical data

Even better if it says which part to update - details

It's good for something to be appealing, but too appealing is too much because it doesn't look as appealing

Reserve urgent updates for what is really urgent

Cautious with the use of urgent terminology

Appendix - Testing notes #8: Mobile

Participant 8:

Notification 1:

Straightforward - Telling me what's available

Timesaving

Professional

Notification 2:

Ineffective

Gets in the way

Disruptive

Doesn't tell alot it just says what's available - doesnt know what kind of update it is

Notification 3:

Useful

Helpful

Professional

Indicating that there's an update available -

Notification 4:

Un desirable

Ineffective

Distracting

It says pending but users don't understand whether its updating system or whether its waiting to update

Notification 5:

Intimidating

Disruptive

Confusing

Demanding you to update - very confusing because you don't know that the update is about

Notification 6:

Helpful

Distracting

Undesirable

Don't really know what they update is about

Notification 7:

Disruptive

Intimidating

Unknown

Because of the bold and all caps

Appendix - Testing notes #8: Mobile

Participant 8:

Notification 8:

unknown

Too technical

Time Saving

Notification 9:

Ineffective - Broad, no detail

Gets in the way - doesn't really care about it, no info

Annoying

Notification 10:

Straightforward

Effective

Professional

Notification 11:

Intimidating

Disruptive

Effective - Makes users think update is urgent

Notification 12:

Annoying - something you see multiple times

Undesirable

Gets in the way

Notification 13:

Ineffective

Confusing - doesn't know what kind of update it is

Undesirable

Notification 14:

Appealing

Straightforward

Helpful