# Red Hat Optimal Learning Experiences Research Report


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## Executive Summary

We utilized a variety of research methods to better understand what users find both challenging and fulfilling about their technical learning experiences. This 4-5 week process included a competitive analysis, the creation of both a survey and an interview script, and deep dives into existing Red Hat research, social media and user forums, and information architecture (IA). Ultimately, through this process, we hope to reach our major goals of understanding how developers learn and better understand key qualities that Red Hat developers and system administrators possess.

Our process began with a competitive analysis of how other Software as a Service (SaaS) companies, such as Amazon Web Services, Vercel, and ServiceNow, help developers learn about their products. We surveyed the product documentation and information architecture of each competitor and gathered the key pros and cons of each. Through this initial research activity, we began to hypothesize that improved information architecture may improve user experiences with current product documentation.

In our next stage of research, we looked at existing Red Hat research, user forums, and Red Hat's presence on social media. Through this process, we tried to get a clear idea of the problems that the Red Hat team and Red Hat users have already identified. Specifically, on user forums and social media, we gained some perspective on how developers think and what they struggle with. We also looked at existing Red Hat information architecture to see if the website allows users to easily find the information that they are looking for.

We utilized our findings to guide the creation of a Qualtrics survey and an interview script. Our 5-10 minute survey currently has 11 responses, though we hope to receive 50 responses before this phase is complete. The survey asks about developers' experiences with different learning modalities and will be used as a screener for interview participants. For the interviews, we hope to speak with 3-5 mid-level enterprise developers who are familiar with Red Hat products. We will seek to understand how these developers generally pick up new technologies, as well as whether they learn Red Hat products any differently.

Overall, our research has identified some existing challenges that users may have with the information architecture of technical documentation, both within and external to Red Hat. Going forward, our next steps are to conduct interviews and develop a card-sorting activity to figure out how to organize Red Hat's information architecture.

## Research Goals & Objectives

Our research has two main goals:

1) Better understand how developers learn
2) Better understand who a Red Hat developer/system administrator is

Our research is designed to give us a comprehensive understanding of how developers learn to use software/enterprise products. We want to know the scenarios a developer would want to learn, and how they acquire the necessary knowledge to satisfy their needs. Our research will also explore different modalities of learning: what kinds of learning resources do developers/system administrators find most effective? Red Hat has an abundance of learning resources, and our research can help Red Hat better utilize their existing material and improve upon their learning experiences.

The second goal of our research is to better understand the profile of a Red hat developer/system administrator. What specifically makes them unique from other developers? How can we improve the learning experience for Red Hat's customers? The only way to do so is to truly understand the unique characteristics, preferences, and behaviors of Red Hat developers/system administrators. Armed with this knowledge, we can better design learning experiences for our sponsor's customers.

In general, our research should give us answers to what makes a good learning experience for a typical Red Hat developer/system administrator. Achieving our two main research goals will give us plenty of insight to work with for ideation.

## Research Activities

*Competitive Analysis*

We conducted a competitive analysis of five Red Hat competitors: Google Cloud, AWS, Vercel, Oracle (Java), and ServiceNow. For each competitor, we listed the pros and cons of their product documentation from the perspective of someone with limited developer experience and no expertise in their offerings.

*Reading through existing Red Hat research*

The Red Hat team shared a Google Drive folder that contained a few resources related to our challenge. There were a few example learning experiences/tools, and a few user personas in the folder. This activity mostly involved us going through the folder and

familiarizing ourselves with the work Red Hat has already done. We also took notes of things that we found interesting, important, and useful.

*Red Hat user forums*
We were advised by both Red Hat and our professors to take a look at Red Hat user forums to see how developers teach other developers. We paid close attention to the questions that were being asked since this would indicate what developers struggle with. We also analyzed how developers were answering these questions to understand how they explain their ideas. Some sites we looked at were https://developers.redhat.com/blog, https://www.redhat.com/en/blog, and https://learn.redhat.com/t5/Discuss/ct-p/RedHat_Products.

*Red Hat social media*
We were advised by Red Hat to take a look at social media platforms such as Twitter, Reddit, and Stack Overflow, using search terms such as "Red Hat" and "Red Hat learning". This helped us gain more insight about developers who might look to these platforms to learn more about how to use different Red Hat products.

*Analyzing existing Red Hat information architecture*
We decided to conduct an in-depth analysis of how Red Hat's existing information architecture helps developers find what they're looking for. During our analysis, we asked ourselves: Do developers have a reasonable way to find what they're looking for? The main site we analyzed was https://access.redhat.com/products/.

*Survey*
In order to gather more information about developer/system administrator sentiment about learning experiences, we create a survey to distribute that also serves as a screener for our interview. Our survey was developed on Qualtrics and takes about 5 – 10 minutes to complete. The questions are largely multiple choice/select questions gauging developer experiences. We also included some questions asking users to rate different learning modalities, as well as other screener questions for potential interviewees. The survey mainly targets developers and those with technical experience, and we are hoping to receive approximately 50 responses to give us a better understanding of how developers like to learn.

*Interviews*

We have developed an interview script targeted at mid-level developers who have experience with Red Hat products. We hope to find participants for the interview through our survey, which will serve as a screener to find participants who meet certain criteria. The interview will last 30 minutes to 1 hour and includes approximately 26 questions. We hope to interview about 3-5 participants. The first half of the interview covers learning-related questions not specific to Red Hat; these questions ask what developers find frustrating or fulfilling about learning new products. The second half of the interview focuses mostly on the participants' experiences with Red Hat products, gauging what they find supports their learning and what they find challenging. We have created a Calendly form to send to prospective interview participants to schedule remote interviews.

## What We Learned

*Competitive Analysis*

As we analyzed Red Hat's competitors, it quickly became apparent that enterprise software and SaaS companies have many products that require significant documentation. The amount of information on every documentation was astronomical. Some companies like AWS didn't do a good job with organizing the information, while others like Google made a valiant effort to but still came up short. We as a team agreed on three takeaways:

1) A hand-held guide or quick start page is necessary for beginners.
   Google welcomed users with quick start links which provide an entry point to the sea of information. This is helpful for someone with limited experience with the products.
2) Code snippets and samples were helpful.
   Code snippets can guide users toward successful outcomes and introduce new developers to best practices.
3) Consistency is key.
   When pages are consistent across different products, it is much easier to know where to find things. Consistency is particularly helpful when a piece of documentation has many different pages and products.

*Reading through existing Red Hat research*

We learned that Red Hat currently employs 4 different learning tools in their learning experiences: guided tours, quick starts, learning paths, and tutorials. Each tool has its unique use cases. Guided tours are simple prompts that appear with the product to guide brand-new users through a Red Hat product; they live in the GUI of Red Hat software. Quickstarts are step-by-step guides that walk users through specific tasks to get them started. Learning paths are a collection of learning resources that are self-paced and sequential. Tutorials are more complex guides that help developers through more advanced scenarios. Interestingly, these tools are scattered across many different parts of the Red Hat domain. Some can be found on their support page, while others can be found on other websites affiliated with Red Hat. There isn't a centralized learning center where instances of each learning tool can be found.

The Red Hat team also shared with us a few user personas. The user personas were likely created for another project. The personas mainly focused on developers and system administrators as potential customers looking to buy Red Hat products rather than existing customers seeking support. However, the personas had a few notable points:

1) System administrators expect vendors to provide efficient and reliable support
2) Developers need support information
3) Developers need use case examples

*Red Hat user forums*

Red Hat's user forums provided an interesting perspective on developer learning experiences. Many of the discussions on these forums were focused on teaching a specific task, as opposed to how to use a product. This gave us insight into a more reactive area of learning; instead of teaching developers how to use a new product, how do we teach them the solution to a specific problem? Our takeaways included:

1) If a task has prerequisites, list them out clearly at the top of the page. Include links for instructions to complete the prerequisites.
2) Error messages need to be descriptive. Common errors and their solutions should be well-documented.
3) Complex terms and abbreviations should be defined. If a learner forgets what something means, the definitions should be easy to find.

*Red Hat social media*

For this task, we explored Twitter, Reddit, and Stack Overflow, using the search terms "Red Hat" and "Red Hat learning". We found that many users use Red Hat's learning platform to study for the RHCSA Exam (Red Hat Certified System Administrator). Many users use these platforms to compare notes, ask questions, and decide whether or not the certification is worth it for their career advancement. On Stack Overflow, we found that users would submit highly specific troubleshooting questions that perhaps could not be answered directly through documentation, such as install issues. We also found cases where users follow documentation examples exactly but still cannot get the examples to work. Our takeaways include:

1) There should be a clear learning path for specific Red Hat exams/certifications
2) There should be a path for troubleshooting complex error messages.

*Analyzing existing Red Hat information architecture*

As we landed on the main product page (https://access.redhat.com/products/), we quickly noticed some issues with the information listed on the page:

1) There are multiple links associated with each product (product info and documentation).
2) Many product names have "Red Hat" before the actual product. With the list of products being sorted alphabetically by default, the user has to read past the "Red Hat" before seeing the actual product name.
3) The actual product name itself does not have a link attached to it. The user may be expecting to click the product name.

Within the documentation page for a single product, we found that the information was presented in a way that would be difficult for users to follow:

1) Only a specific subset of users would want to see release notes first. These users are likely administrators trying to decide whether to upgrade their product.
2) Category names are very product specific; more general labels in simple English may help users transition more easily between product pages. This also contributes to the sense that there is an overwhelming amount of information.
3) Clicking a link from the documentation page leads to an abstract page for one specific part of the documentation. This abstract page only contains a single sentence and is not necessary.
4) Navigating back and forth between pages is not directly supported on the page.

*Survey*

Our survey was finalized and approved by Red Hat on Thursday, March 2, and we began distributing the survey on March 3. So far we have received 11 responses to our survey. We have gotten some more insight about the general developer persona and their learning preferences. Our takeaways included:

1) Learning (e.g. training, reading documentation, etc.) is a task that most participants indicated they do weekly/monthly.
2) Product documentation, code samples, and peers are currently the favorite learning modalities (with videos and guided tours closely following).
3) Developers feel most satisfied with their learning when they can explain concepts to their peers, understand the purpose of using specific technology/product, and use the technology/product in their everyday tasks.
4) The most common reason to refer to product documentation is when the developer is unsure of how to use a product/technology.

*Interviews*

Our interview script was approved by the Red Hat team on Wednesday, March 1st. We will begin our interview process once we receive a sufficient number of prospective candidates from our survey, preferably 3-5 participants.

Although we have yet to complete our interviews, we were able to utilize what we've learned from existing Red Hat research, our competitive analysis, and our analysis of existing Red Hat information architecture, to develop our interview script and anticipate what questions would be best to ask participants. For example, we developed our question "What other resources do you consult if you cannot find adequate resources through Red Hat'' based on the fact that some Red Hat competitors directed users to their GitHub discussion community, encouraging users to go there to ask questions if they struggle to learn how to use a product.

One takeaway we do have in this phase was that through feedback from the Red Hat team, we learned how to properly structure and word our questions to avoid asking participants leading questions. After we wrote the interview script, we received feedback on the script from the Red Hat team. The Red Hat team gave us feedback on the wording and order of certain questions. For example, certain questions were worded in a way that made them seem like leading questions. It was suggested that rather than asking questions such as "Is information overload often experienced when you are

navigating product documentation," we have participants look at a particular sample product documentation and have them rate how hard or easy it is to find particular things within the doc.

**Summary of Findings**

Overall, the steps we have taken to research Red Hat's learning platform have been fruitful. Through our competitive analysis, we were able to identify major pain points commonly seen within technical documentation, such as lack of consistency across learning modalities. We also found that Red Hat employs 4 major learning tools within their learning experiences: guided tours, quick starts, learning paths, and tutorials, each with its own merits and drawbacks. We found that there was not a centralized learning center where each learning tool can be found, something we hope to make the focus of our project. We also explored user personas given to us by Red Hat centering on system administrators and developers. Overall, we found that system admins and developers expect efficient and reliable support, support information, and use case examples to aid them when developing.

The next steps were to analyze Red Hat's existing information architecture and explore Red Hat's user forums and social media. In regards to the IA, we found there was a lack of organization and information overload within the product documentation, making it overwhelming for users to find what they need. Through exploring the user forums, we found a few key takeaways that users stated they liked within the documentation, including listing task prerequisites, creating descriptive error messages, and defining complex definitions and abbreviations. For the social media review, we found that many users use the platform to study for the RHSCA exam, as well as use social media to answer complex error messages that cannot be directly solved by viewing documentation.

Finally, we produced a survey for developers that is designed to both get a better sense of how developers learn and filter for eligible participants for an interview. We hope to get approximately 50 responses to the survey. So far, we've received 11 responses to the survey, with takeaways including learning is a task done weekly to monthly, product documentation, code samples, and peers are currently the favorite learning modalities, developers feel they have learned when they are able to explain the concept to their peers, and product documentation is referenced when the developer is unsure of how to use a product/technology. The interview is designed to target mid-level developers who have experience with Red Hat products. The interview will

consist of questions that focus on the learning process of new products as well as users' experiences with Red Hat products. We hope to interview 3-5 participants. Given feedback from Red Hat's research team, we learned how to properly structure and word questions to avoid asking participants leading questions.

Overall, our research has identified pain points that users may have with the organization of Red Hat's documentation, which we hope to improve upon within the design process. Our next steps are to finish collecting survey responses, conduct interviews, and develop a card sorting activity for developing a new information architecture.

**Next Steps**

1) Conduct Interviews
   We are currently working with Red Hat's ReOps team to secure interview participants. Our interview questions and script have been written up and approved by our sponsors. We will run the interviews once the participants have been recruited. The survey we have created and distributed also functions as a screener, so we hope to recruit participants in this way as well. The interview participants will ideally be developers who have not worked at Red Hat and who work at Enterprise Software or Software as a Service company. Additionally, these developers should be customers of Red Hat's products.
2) Card sorting activity for information architecture
   Based on the findings of the survey and interview, we might choose to run a card sorting activity to better understand how developers categorize pages of product documentation. The findings of the card sorting activity should help inform better information architecture.

To put it simply, our next steps are heavily dependent on our survey/interview findings. We hope to finish the survey/interviews as soon as we can.

The next step leading into the ideation phase is to collect all of the information from the survey and interviews and organize them via different activities. We plan to analyze the survey data for recurring trends, which will be insight into potential design ideas. We will summarize our interviews into POVs. POVs take the form of "We met..., we were amazed to learn..., it would be game-changing...". We also plan to run sticky note activities like empathy maps and affinity diagrams to help synthesize all the research ideas and develop meaningful insights.

Time has been and continues to be our biggest challenge. Our kickoff meeting happened late, which has set us back a week compared to most teams. We are also working with multiple teams within Red Hat for our survey and interviews, so it's no surprise that it's taking a while to get the process started. To add to the challenge, key people at Red Hat have also been out on PTO. We have tried our best to nudge the research process along; however, it’s likely that we will have to sacrifice design time so we can get sufficient interview/survey responses.

**Appendix**

- Research Notes (includes research notes from Red Hat's existing research, preliminary Red Hat developer/system administrator personas, user forums research, & social media presence)
- Competitive Analysis
- Survey questions (drafts)
- Survey results (folder will update with most recent survey responses)
- Interview Script