

## Memorandum

Date: 15 February 2013  
To: Dr. Dobb  
From: Ethan Sherbondy (Stickgold-Sarah, 1pm)  
Subject: A Recoverable Means for Storing Patient Records with History

### Addressing the Medical Records Dilemma with a Versioning File System

Over the next two years, our hospital faces the challenge of dealing with the Federal Electronic Medical Records Mandate. This past year, we've made great strides in digitizing all existing patient records, but now we face an equally daunting challenge. We need a reliable way to update patient records without the fear of data loss, and, for the sake of auditing, it's crucial for us to maintain a record of every change made to these files. After a bit of research and deliberation, I've come to the conclusion that we should develop a Versioning File System (VFS) and deploy it on all hospital computers by the end of 2014.

The concept of a VFS fits our requirements wonderfully. It offers us a way to save, in a space efficient manner, every revision made on a computer at the individual file level. This way, hospital staff can confidently modify records without the fear of data loss. At any moment, we can easily switch back to an older version of a file. This also gives us the ability to examine how a record has changed over time. All of these capabilities can be offered transparently to the end user by maintaining strict parity with the UNIX file system API. The new versioning system would be put in place in addition to our regularly scheduled entire-disk backups. I believe that such a scheme gives us the best of both worlds: a VFS offers fine-grained versioning at the file level, while our whole-disk backups ensure durability, should a machine ever be unreachable or irrecoverably damaged.

### Timeline for Implementation

As stated above, the anticipated timeline for this project is one year and nine months from concept to 1.0 deployment. Over the coming two weeks, I intend to comprehensively examine existing VFS implementations, both open source and commercial, to evaluate their designs and determine the extent to which they match our institutional requirements. After the initial research phase, I will author and submit to you a draft specification of my proposed design. I expect the initial draft to take another two weeks. Then, I will spend a full 2 months implementing the spec, making revisions as I go. This implementation and revision process is the most essential task, as this is how I will demonstrate the design's feasibility to myself and the rest of the team. In the summertime, we will begin initial testing of the alpha implementation, and I will introduce 2-3 team members to the project. We will spend the subsequent 3 months debugging and iterating on the alpha design. By September 1, we will freeze version 1.0 of the specification. At this point, we will expand testing to actual hospital computers and spend the rest of the year determining any remaining issues in the production environment.

### Action Needed

I feel confident about completing this project within the proposed timeline, and, as soon as you approve of the undertaking, I can transition from my current work to begin doing more in-depth research on VFS. Overall, this seems like the most reasonable setup for managing our digital records going forward. It should spare the hospital from many headaches and liabilities down the line.