# Blockchain Summary

The potential of blockchain technologies runs in various directions. Given the limits of my imagination, I am inclined to think about blockchain in terms of its effects on some basic problems of the digital era, including persistence, authentication and validation, and the virtualization of resources and services.

Persistence has long been viewed as a matter of great importance. It has been clear throughout the Web era, moreover, that maintaining the higher levels of persistence necessary to provide the desired continuity requires more proactive approaches. But there is evidence that problem may be even more serious than we had realized. According to a study by Klein and Van de Sompel investigating "reference rot" within the scholarly literature, between 13%-22% of references suffered from link rot, whereas "as much as 75% of referenced content had changed to some degree in just three years, raising significant concerns over the integrity of the scholarly record."[1](#fn1-2294) In thinking about addressing problems of persistence and integrity, whether in regard to scholarly literatures or literatures in general, it seems likely that the use of blockchain technologies will form an important part of the solution, because guaranteeing that links and references remain intact will presumably entail distributed solutions that require, in turn, trust relationships across a broad and continuously expanding spectrum of authors, editors, and organizations.

In a similar vein, to deal effectively with the digital preservation problem, librarians and archivists must build a technological infrastructure that supports efforts to curate and preserve digital documents of many different types. The ability to authenticate a document, ascertain the circumstances of its creation and uses, and then share that information, and often the document itself, with other interested parties through longitudinally reliable channels will be essential features of such an infrastructure. Given the scale and complexity of the problems attending digital preservation, it seems reasonable to imagine that the necessary record keeping will entail the creation and maintenance of ledgers akin, if not identical to, those forming the basis for blockchain implementations.

In addition, there is the question of virtual services, or, more precisely, the technological requirements under which virtual library and archival services may be constructed.[2](#fn2-2294)The idea of building more expansive library services on the basis of virtual collections is one that has long been impeded by intellectual property and licensing issues. While it is not clear if publishers will embrace blockchain technologies (and even if they do, how the technologies might be employed), it is possible to envision a future in which blockchain technologies form the basis for the implementation of new licensing models and access systems that, among other things, facilitate the development of virtual library services. In the short term, it is also possible to envision the development and growth of virtual archives, where digital archives are joined virtually through blockchains to enhance both discoverability and accessibility.

In the end, however, my interest in blockchain technologies is mainly educational, focusing on efforts to ensure that librarians, archivists, and curators learn about and understand the underlying issues and the proposed solutions well enough to make decisions that are at once shrewd and imaginative.

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1. Klein, Martin, and Herbert Van de Sompel. "Content referenced in scholarly articles is drifting, with negative effects on the integrity of the scholarly record." *Impact of Social Sciences Blog* (2017). According to Klein and Van de Compel, link rot represents the case where the resource identified by a URI vanishes from the Web, with a URI reference to the resource no longer providing access to referenced content. Content drift describes instances in which the content of the resource identified by a URI changes over time, on occasion to an extent that it ceases to be representative of the content originally referenced. The term ‘reference rot,’ a term coined by Klein and Van de Sompel, denotes the combination of the two problems. [↩︎](#fnr1-2294)
2. In this instance, the phrase "virtual library" is a collection of resources available on one or more computer systems, where a single interface or entry point to the collections is provided. [↩︎](#fnr2-2294)