

SAFEGUARDING RESEARCH AND CULTURE

DR F. SCHEUDLER

We are accustomed to think that libraries and archives, repositories of literature, art, scholarly materials and scientific data run by governments, academic institutions or not for profit organisations are reliable. Once an artefact is in their collection, it will remain there, unchanged. From time to time, perhaps due to space constraints, a collection might need pruned, but this is hardly a consideration for most digital materials in 2025. And yet we have seen, only four months into the year, removal and alteration of artefacts relating to marginalised groups, international public health concern, and climate from the institutional network estate in the United States. Institutional failure is, in fact, possible and we are witnessing it. We must make our archives robust against this reality.

The reason this institutional failure mode is possible: Our libraries, archives and other repositories are largely centralised. To ensure that history cannot simply be rewritten and people erased, we need to make sure that digital artefacts exist in multiple copies, in different jurisdictions, spread over the world. In this way, no single person or organisation can remove or alter our collective memory. We can follow the path not taken in the evolution of the Internet and build on decentralised peer-to-peer networking. Hollywood has been trying to stop BitTorrent for nearly a quarter century without success because people use it to make copies of their movies. But we *want* people to make copies. And we join the peer to peer network with the ways that libraries work with metadata and archive formats.

For this to work, we need several things. We need stable backstops at institutions. A library can host some datasets on a web server. Then we need, in various places, servers with large amounts of low-quality disk space. These are the core of the peer to peer network. Larger than your average peer, they ensure fast access to data. The more the better and spread out on the Internet. They would be well placed nearby to Internet Exchange Points and appropriately but not exclusively on academic networks. This is enough for robust distribution, but people still need to search for, find, discuss, and annotate artefacts. For this we have software. Called **SciOp**. We need people. Each person who participates in the peer to peer network, who assembles an artefact from pieces sent to them by other peers, can contribute back and send those pieces to someone else. In this way, overall network load and cost decreases with time. Of course, we also need people to curate, to package. To care. You can see what some people have already safeguarded here: sciop.net.

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