

Ben Fino-Radin
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Digital Preservation in the Artist's Studio

This week I find myself in Brussels for a symposium at iMAL Center for Digital Cultures and Technology called “Preservation and Access to Born-digital Culture”. I am here mostly to talk about the work that we have been doing at the Museum of Modern Art—but today I have the pleasure of also sharing information about some of the private work I have been doing with artists to develop digital preservation strategies in their studios.

Artist Rafael Lozano-Hemmer recently wrote a great manifesto about the conservation of time-based media artworks. He mentions how the great majority of artists feel they are too busy keeping their studio running to think about conservation—let alone digital preservation. He goes on to frame conservation as a business opportunity for artists—showing them that they can offer maintenance of their work as a service to be monetized.

I cannot recommend Rafael's guide enough—I truly think that if artists adopt his proposed model it could usher in a sea change, permanently altering the field of time-based media conservation. There is a rather big elephant in the room however; in order to function as a business, an artist's studio simply must have a basic foundation of digital preservation.



If you want to ensure that your digital artwork, documentation, contracts, etc, are around in ten years, you need to do a bit of planning today. If you are going to tell collectors that they can return to you in the event that they lose some digital materials, you need to develop a bulletproof system.

Many artists I work with have piles of hard drives sitting around with their work on it, and are a bit at a loss as to where to begin to get their digital archive in order. This is a very frustrating position to be in as an artist, especially in the face of limited amounts of time, money, and technical expertise. Practicing digital preservation is challenging even for large and well funded institutions, so it comes as no surprise then that it is quite the task for artists young and old, emerging and blue chip.

The essential goals

- Establish intellectual control
- Centralize your assets
- Distribute redundantly
- Establish bit preservation

The good news is that there are clear steps that can be taken no matter how limited one's budget or expertise. Here I will provide a basic look at the incremental steps of assessing your needs, and developing a solution that is achievable given your particular limitations of time, money, and expertise.

Intellectual control

The very first step is thankfully not very technical, and is something that many artists already have established in their practice. Intellectual control is librarian-speak for having a master record of what is in your collection, information about what it is, where it is located, and so on. For an artist,

intellectual control means having a master record of your body of work, who owns what, what things sold for, what is on loan and where, etc. Think of it as a living catalogue raisonné.

This information is obviously critical for the day-to-day functions of an artist's studio, but are also critical from a preservation perspective—preserving a bunch of digital stuff indefinitely isn't very helpful if you don't know what they are for, who owns them, or what they are worth. Whether using some kind of system designed for collections management, or using spreadsheets, it is common practice to assign an alphanumeric identifier to an artwork. These identifiers can be used in the naming conventions of the file system that stores the digital objects, thus providing a linkage between the system for intellectual control and the system for digital preservation.

Step 1: know what you have

How much digital stuff you need to store and care for is one of the biggest factors in deciding what kind of digital preservation solution will make sense for you. Start by making an inventory or list of preservation worthy material in your studio. This should include both digital material and

analog material that needs to be digitized (e.g. audio & video tape, film, 35mm slides). For estimating file size of material to be digitized, there are some very user-friendly tools. MPC makes one for iOS called [DataCalcPro](#).

Step 2: project your growth

Once you know how much storage space you will need for all of the digital (or soon to be digital) material you have today, you need to consider how much you will need next year, the year after that, and the year after that. Generally I recommend planning five years out. Do yourself a favor and make a spreadsheet that plots this out dynamically, so that you can easily and quickly adjust your projections. [Here is an example](#).

Once you know how much digital storage space you need this year, and for the next five years, you can begin to figure out what level of digital preservation you can afford from a money, time, and expertise perspective.

Step 3: Centralize



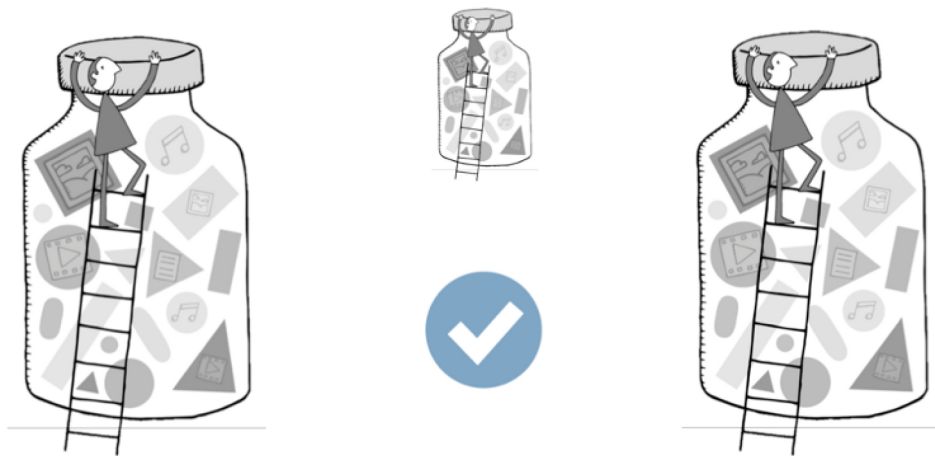
The next step is to shop around for a storage device that can accommodate your projected five year growth. You'll want something that provides protection against hard drive failure—a RAID (redundant array of inexpensive disks). If your five year needs are under 4TB, a RAID1 will suffice. If your five year storage needs are higher than that, you should look at a RAID5 or similar. You can currently purchase desktop RAIDs that can accommodate around 28TB. It seems that this is presently the upper limit on the prosumer market, but there are ways around this (e.g. daisy chaining).

Step 4: Redundancy



Having the right kind of RAID can protect you against the failure of a hard drive, but it does nothing to protect you from anything worse—natural disaster, power surge, or theft, for example. The great thing about centralizing all of your assets into one kind of device, is that not only will it be easier to manage and find your material, but you will also be able to easily set up identical storage devices at offsite locations. The best practice is to have at least three copies of all data, each in a different location.

Step 5: Bit preservation



So at this point you are, in theory, protected against hard drive failure, natural disaster, theft, and other such wonderful things. You are not however protect from file corruption and accidental or malicious deletion.

In addition to having redundant and geographically distributed data stores, in order to complete the system, you ought to implement a means of auditing the file-level bit preservation of your data.

Again: the essential goals

- Centralize your assets
- Distribute redundantly
- Establish bit preservation
- Establish intellectual control

So at this point we have explored the main tenants of bootstrapping your digital preservation. Let's review a case study to see how the above concepts are applied in a realistic setting—I recently worked with Cory Arcangel to review his studio's digital preservation practices.



Cory
Arcangel

Photo: Bennett Williamson

A few years ago, Cory's studio worked with an archivist who designed a FileMaker Pro database to facilitate intellectual and administrative control: the canonical record of his oeuvre, what works had been sold (to whom, and at what price), what works were on loan for exhibitions, and the various components of complex installations and sculptures. In this system, as in all typical collection management systems, each artwork is assigned an identifier. These identifiers are then used in the naming convention of file structure of their digital storage system, so that there is a correlation between the two.

Intellectual control



Identifier: CA.2002.05
Title: Super Mario Clouds
Artist: Cory Arcangel
Created date: 2002
Medium: Modded Super Mario Brothers cartridge



CA.2002.05

* Hypothetical example – not the actual naming convention



In addition to this FileMake Pro database, Cory also has a website containing a public record of his body of work. In short, their intellectual control is in a great state. On to storage.

Years ago I set up the studio with a RAID system that was large enough to accommodate the studio's 6TB of data. Unfortunately, they found it was too cumbersome to manage, and did not have any user-friendly software for monitoring the health of the device. As a temporary stop-gap, they begun using simpler RAID1 devices, but this required them to use several devices in tandem, which drastically complicated their setup. This all needed to be reconsidered in light of functional requirements, and a data growth projection that emerged through a series of conversations.

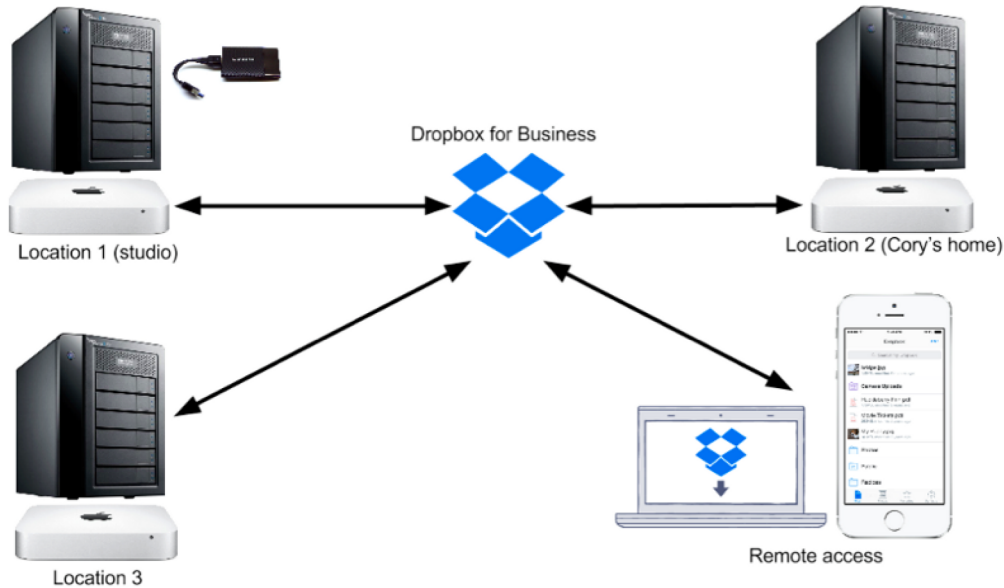
- Easy to use and maintain
- x3 geographically redundant copies
- Effective remote access.
- System design should last 5 years

Cory's data profile

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|-------------------------|------|------|------|------|------|------|
| New data from this year | | 2 | 3 | 3 | 4 | 4 |
| Total size of archive | 6 | 8 | 11 | 14 | 18 | 22 |

With this information, I designed a system that should prove to fulfill all of Cory's functional requirements. At the core is a RAID5 make/model that in my experience has proven to be reliable, fast, and user friendly. When facing the question of how to synchronize data between the studio and offsite locations, I recommended Dropbox for Business. While there are plenty of methods of doing synchronization without paid services, and in a peer-to-peer manner, Dropbox seemed an ideal candidate for two main reasons: 1) it would provide Cory with the ability to access the entire archive remotely from his phone or laptop, and 2) it would provide the studio with the ability to revert to older versions of files.

Proposed system design



Key to this design is that there is absolutely no lock-in with Dropbox. At any time, it could be replaced with a peer-to-peer solution (such as BitTorrent sync) and the basic function of sync would be maintained with no migration of any kind necessary. At this point we have checked off all but one of our to-dos on our digital preservation checklist.

Case study: Cory Arcangel

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To accomplish the bit preservation component of his system, I recommended that Cory adopt AVPreserve's Fixity app. This application can provide Cory's studio with an easy

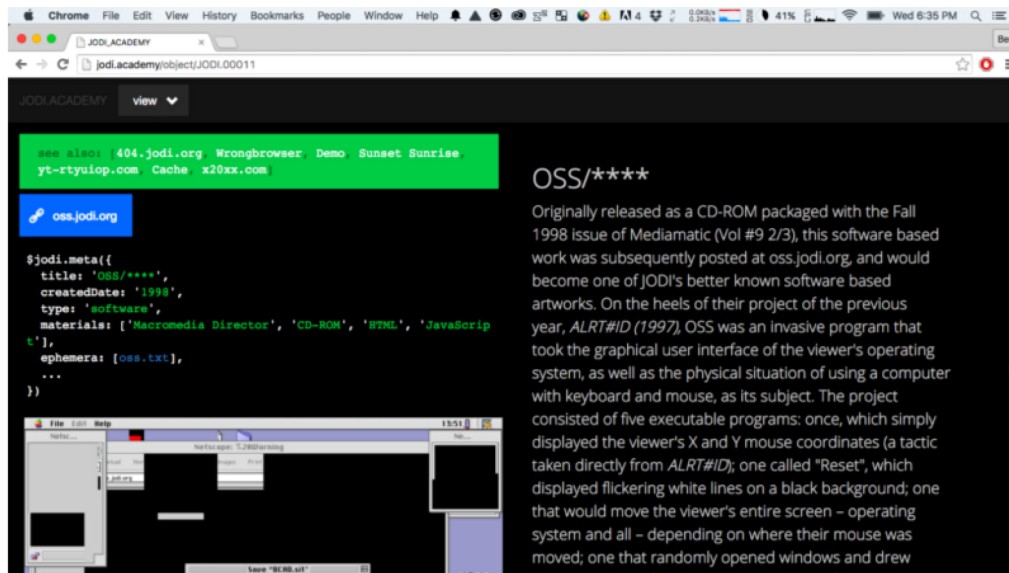
means of automatically and regularly auditing their three storage locations for file-level corruption, modification, deletion, or movement. When paired with the infinite version history feature in Dropbox, this provides the studio with a way to detect and be notified of any issues, so that action can be taken in the Dropbox admin panel to recover from any inadvertent corruptions, deletions, or modifications.

That is the full scope of the recommendations I provided to Cory's studio: a large, fast, user-friendly RAID. Two offsite locations, synced via Dropbox (although they will be mirroring the drives locally prior to deployment so as to prevent the need to sync a massive amount of data), and finally AVPreserve's Fixity tool for auditing file fixity so that action can be taken. In a best-case scenario this solution should see them through the next five years (with the understanding that the RAIDs will require new hard drives on a sporadic and ongoing basis).

JODI: Public Access



To provide a look at an alternative method of intellectual control that integrates public access, I'll now share a bit about some work that I did for artist-duo JODI in December of 2014. A collector wanted to fund a public facing web-based catalogue raisonné, providing open access to the panoply of documentation JODI had amassed over the decades. While numerous platforms could have been employed for managing this website, we chose to use a system called Collective Access. As this open-source platform was explicitly designed for collections management, it fulfilled the needs of intellectual control and collections management, while having the affordance of a public facing site as a byproduct. It allows one to design custom metadata schemas, enforce good cataloging, and to define privacy of specific metadata elements, or entire records.



This meant that although the intention of the project was simply to provide a public website, JODI was provided with a system that could be used for the sort of internal and administrative metadata that we saw in the example above of Cory's FileMaker Pro database. They are using a similar strategy of identifiers that provide a link between the collections management system and the digital storage system that contains their work and documentation. The novel aspect of this solution is that it eliminates any need to manage *both* a website with public information *and* a collections management system with private information—in JODI's case they are one and the same.

Tying it all back together

- Establish intellectual control
- Centralize your assets
- Distribute redundantly
- Establish bit preservation
- Continual re-assessment

I hope that you've found the recommendations here to be of use! This just barely scratches the surface of digital preservation, and the complexity of developing solutions for different needs, under different budgets, and with different functional requirements. My colleagues and I have been hard at work developing the next phase of the Matters in Media Art project, which will cover this topic exhaustively—due for release in 2016. In the meantime if you have any questions about what you've read here, or are in need of some advice, don't hesitate to be in touch!



Note: the above illustration used throughout this piece is from the fantastic [Digital Preservation Business Case Toolkit](https://medium.com/@benfinoradin/digital-preservation-in-the-artist-s-studio-8951e564bb3e#juumsrgtk).