Saving History, Saving Money: Why Smart Storage is the Future for Our Digital Archive

1 A Mission Worth Protecting

Every photograph, document, and video in our historical society's archive tells a story about who we are and where we came from. Preserving these treasures for future generations is our passion, but managing a growing digital collection can be costly. That's why we've explored a smarter way to store our artifacts: a software-defined storage (SDS)system. Think of SDS as a librarian who automatically organizes books, putting popular ones on the front desk, less-used ones on nearby shelves, and rarely touched ones in the back archives—all while saving us money. This report compares the costs of our current traditional storage with SDS, showing how we can save over $100,000 in five years while keeping our collection safe and accessible.

2 What We're Working With

To make sense of the numbers, here's what we assumed:

- Our archive starts at 100 terabytes (TB)—that's like 100,000 hours of video or millions of photos—and grows by 20% each year.
- Traditional Storage: Picture a room full of expensive, specialized computers that need constant upkeep, like a vintage car. We buy them upfront, maintain them, and add more when we run out of space.
- SDS: This is like a flexible, modern library. It uses affordable equipment and cloud storage, automatically sorting artifacts into "Hot" (fast-access, like bestsellers), "Warm" (mid-range, like regular books), and "Cold" (cheap storage, like archived records).
- We're looking at costs over 5 years, the typical lifespan of storage equipment.

3 How Much Does Traditional Storage Cost?

Our current setup uses traditional storage—big, specialized machines that store everything the same way, whether it's a popular photo or a rarely seen document. Here's what it costs:

- Upfront Costs: Buying 100 TB of storage is $4,000 (at $40 per TB, like paying a premium for top-brand equipment).
- Yearly Costs:
  - Maintenance (fixing machines): $5,000/year.
  - Power and cooling (keeping machines running): $2,000/year.
  - Staff (managing everything manually): $50,000/year.
  - Total per year: $57,000.
- Extra Storage: By Year 3, our archive grows to need 50 TB more, costing $2,000.
- Hidden Costs: Downtime or moving data manually adds about $14,250 over 5 years.

Over 5 years, this adds up to:

- Equipment: $4,000 + $2,000 = $6,000.
- Yearly Costs: $57,000 × 5 = $285,000.
- Hidden Costs: $14,250.
- Total: $305,250.

Table 1: Traditional Storage Costs

Cost Item	Amount ($)
Starting Equipment (100 TB)	4,000
Extra Equipment (50 TB, Year 3)	2,000
Yearly Costs (Maintenance, Power, Staff)	285,000
Hidden Costs (Downtime, Data Moves)	14,250
Total 5-Year Cost	305,250

4 How SDS Saves Money

SDS is like a smart assistant that organizes our archive efficiently, using affordable equipment and cloud storage. It splits our collection into three shelves:

- Hot: For popular artifacts (20% of data, like frequently viewed photos), costing $20/TB/month.
- Warm: For moderately used items (30%, like occasional documents), at $10/TB/month.
- Cold: For rarely accessed items (50%, like old videos), at $5/TB/month.

Here's the cost breakdown:

- Upfront Costs: Basic equipment for 100 TB is $2,000 (at $20/TB, half the price of traditional).
- Yearly Costs:
  - Power and cooling: $1,000/year (cheaper equipment uses less energy).

  - Staff: $25,000/year (automation means we need half the staff time).
  - Total fixed yearly cost: $26,000.
- Cloud Storage Costs:
  - Year 1 (100 TB): Hot (20 TB × $20 × 12) = $4,800; Warm (30 TB × $10 × 12) = $3,600; Cold (50 TB × $5 × 12) = $3,000. Total: $11,400.
  - Year 5 (161 TB): Hot (32 TB × $20 × 12) = $7,680; Warm (48 TB × $10 × 12) = $5,760; Cold (81 TB × $5 × 12) = $4,860. Total: $18,300.
  - Average yearly cloud cost: $14,850.
- Extra Costs: Software setup or minor fees, about $5,000 over 5 years.

Over 5 years:

- Equipment: $2,000.
- Yearly Costs: $26,000 × 5 = $130,000.
- Cloud Storage: $14,850 × 5 = $74,250.
- Extra Costs: $5,000.
- Total: $187,500.

Table 2: SDS Costs

Cost Item	Amount ($)
Starting Equipment (100 TB)	2,000
Yearly Costs (Power, Staff)	130,000
Cloud Storage (Hot, Warm, Cold)	74,250
Extra Costs (Software Setup)	5,000
Total 5-Year Cost	187,500

5 Why SDS Wins

Let's compare the two:

- Traditional Storage: $305,250 over 5 years.
- SDS: $187,500 over 5 years.
- Savings: $305,250 - $187,500 = $117,750—that's 39% less!

SDS saves money because:

- Cheaper Equipment: We use affordable machines, cutting upfront costs in half.
- Smart Organization: By putting most data in cheap Cold storage, we only pay more for what's popular.
- Work: Automation means fewer staff hours, saving $25,000 a year.
- Growth: As our archive grows, SDS adds space in the cloud without big purchases.

Table 3: Cost Comparison

Storage Type	5-Year Cost ($)	Savings ($)
Traditional	305,250	–
SDS	187,500	117,750

6 More Than Just Savings

SDS isn't just about saving money—it's about making our work easier and our archive better:

- Flexible: Popular artifacts are always quick to access, while old ones are stored cheaply but safely.
- for Growth: Our archive can keep growing without worrying about running out of space.
- : Less manual work means fewer mistakes and more time to focus on preserving history.

7 Let's Choose Smart Storage

By switching to SDS, we can save $117,750 over 5 years—money we can use to digitize more artifacts or share our collection with the world. It's a smart, modern way to store our history, keeping it safe, accessible, and affordable. We recommend moving to SDS to protect our mission and our budget.