

FUTURE OF INTELLIGENT CLOUD COMPUTING

- **Real-time streaming of object access**
- **ML-powered tier classification (HOT / WARM / COLD)**
- **Dynamic storage optimization for cloud cost-saving**

Team Leader- SHAURYA SHARMA
EMAIL- shaurya22006sharma@gmail.com

Impact

- **High cloud bills**
- **Poor storage efficiency**
- **No real-time intelligence**
Need: Automated, intelligent, real-time tiering

Storage Problem

- **Enterprises store millions of cloud objects**
- **70–80% become rarely accessed but stay on expensive HOT storage**
- **Manual tiering is slow, error-prone, and not scalable**

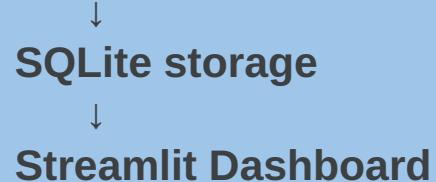
Need

Automated, intelligent, real-time tiering

Smart Cloud Storage Optimizer

- Streams live access logs from objects
- Predicts best storage tier (HOT / WARM / COLD) using ML
- Shows real-time dashboard + cost and migration logs

Streaming Logs → FastAPI Backend
→ ML Model (joblib)



How It Works

Data Pipeline

- Generator simulates access events
- SQLite stores object history
- Backend aggregates:
 - `size_gb`
 - `reads_last_7d`
 - `recency_days`
 - `latency_requirement_ms`
 - `cost_per_gb`

Machine Learning

- Random Forest Classifier
- Predicts optimal tier per object
- Activity logs show movement (HOT → COLD, etc.)

Demo Highlights

- Real-time streaming (data refreshes as generator runs)
- Tier distribution updates live
- Activity Log mimics actual cloud migrations
- Search any object by ID
- Works now, no cloud dependency

(Can plug into AWS S3, Azure Blob, or NetApp StorageGrid later)

Why only ~1 HOT object?

- HOT requires high reads + low recency + high performance sensitivity
- Most objects quickly become WARM , realistic enterprise pattern

Results & Roadmap

Current Output (example)

- HOT: 1
- WARM: majority
- COLD: archival data
- Total objects update as logs stream

Value

Removes manual storage decisions
Reduces monthly storage cost
Makes tiering intelligent & autonomous

Future Upgrade

- Add real AWS/Azure migration APIs
- Kafka streaming
- Online ML retraining

CONCLUSION:

A lightweight, scalable intelligent storage tiering system that saves cost and automates cloud data management.