# SNIA
## STORAGE NETWORKING INDUSTRY ASSOCIATION

EDUCATION

# "XAM" The Next Interface Standard - Empowering the Application through ILM

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**Storage Networking Industry Association (SNIA)**
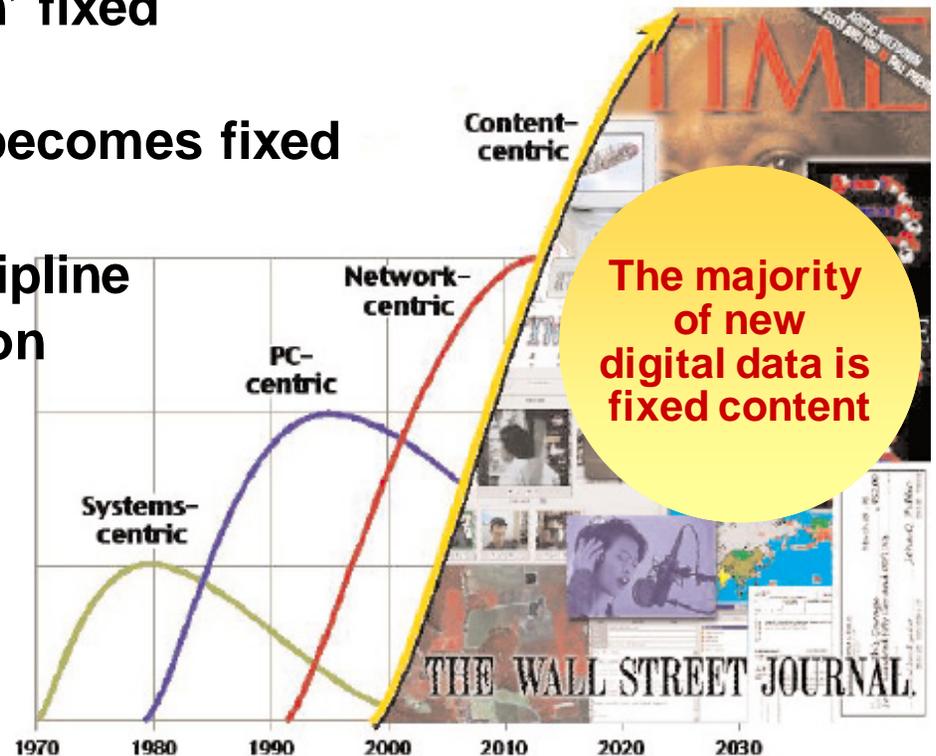
# XAM – What is it??

## eXtensible Access Method (XAM)

- Defined standard interface (i.e. API)

- Between "Consumers" (application and management software)

- and "Providers" (storage systems)

- of *Fixed Content* storage services

- a SNIA Initiative

# Fixed Content

## …is **BIG** and **GROWING FAST**!

- **Most new digital content is 'born' fixed**

- **Transactional data is archived, becomes fixed**

- **Federal regulations impose discipline
  e.g. content retention, disposition**

- **Fixed / Variable Data**
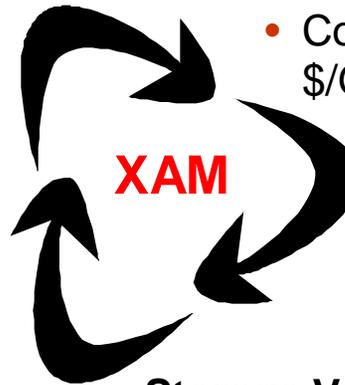  - 80% / 20% base (est)
  - 90% / 60% growth rate (est)

Content–centric

Network–centric

PC–centric

Systems–centric

**The majority of new digital data is fixed content**

1970  1980  1990  2000  2010  2020  2030

*Source: Hal Varian, UC Berkeley*

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# XAM Value Proposition

The industry will benefit from a standardized access method to Fixed Content

**End Users want:**

- Choices between Application Vendors
- Choices between Storage Vendors
- Easy migration between vendors/technology
- Compliance, Scalability, Performance, $/GB, TCO

**XAM**

**Applications Vendors want:**

- Annotate data with associated Metadata
- Indicate basic storage management policies
- Speak same language to all types of devices
- Choices between storage vendors
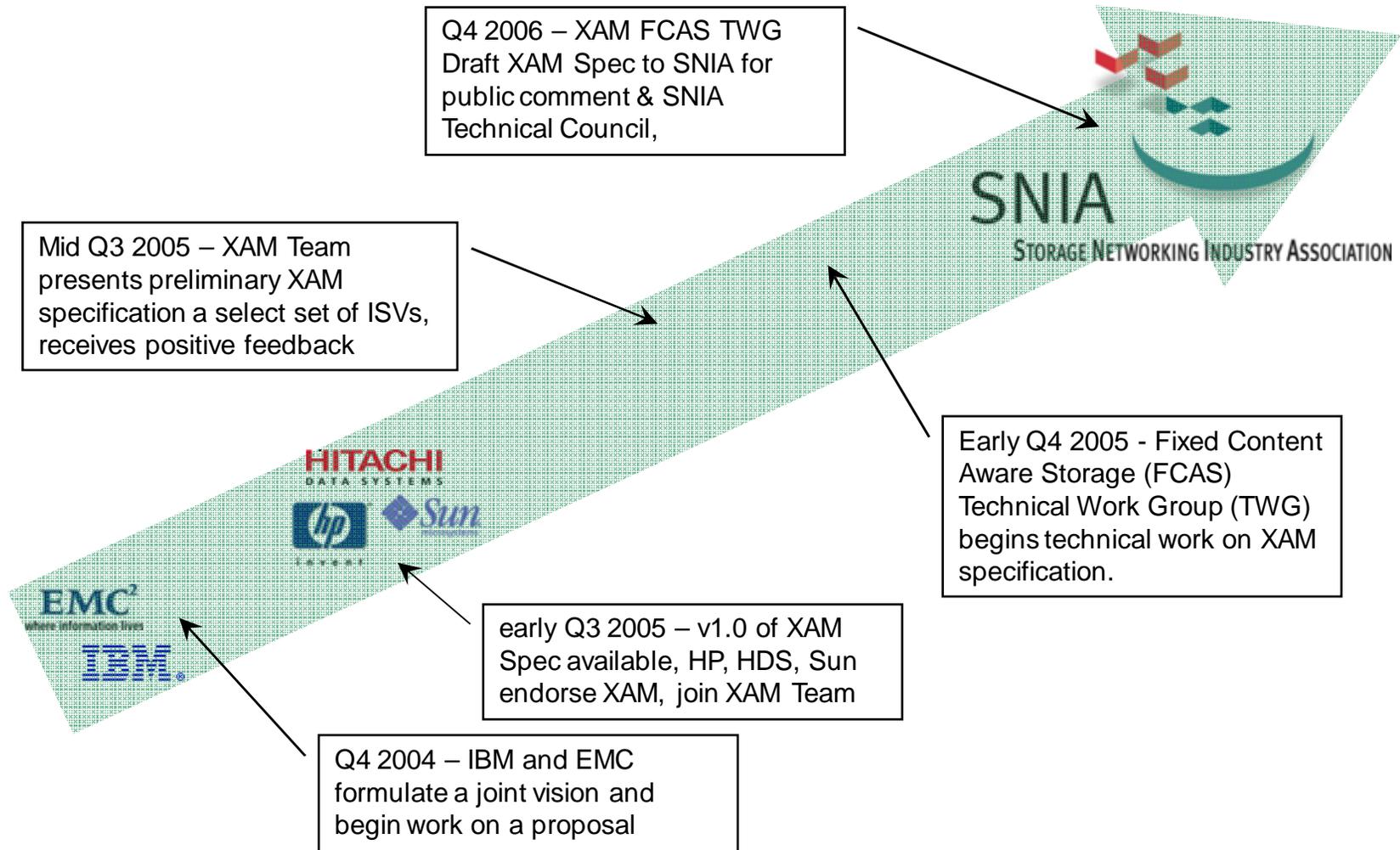- Manipulate billions if not trillions of "records"

**Storage Vendors want:**

- Application Support for their Products
- Efficiently Store Application Data and Metadata
- Integrate Basic Storage Management Capabilities
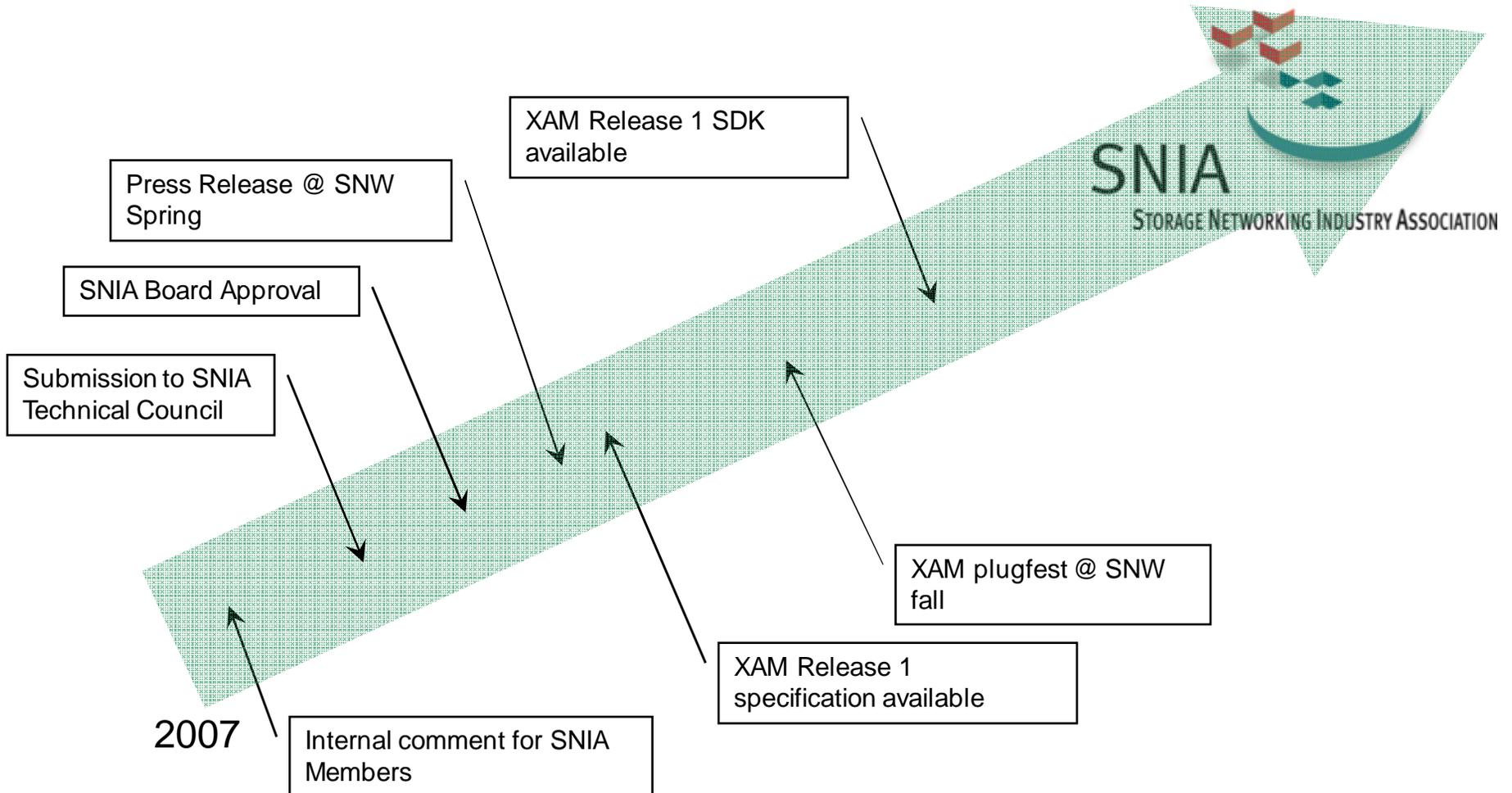- Manage billions if not trillions of "records"

# XAM Genesis

Q4 2006 – XAM FCAS TWG Draft XAM Spec to SNIA for public comment & SNIA Technical Council,

Mid Q3 2005 – XAM Team presents preliminary XAM specification a select set of ISVs, receives positive feedback

Early Q4 2005 - Fixed Content Aware Storage (FCAS) Technical Work Group (TWG) begins technical work on XAM specification.

early Q3 2005 – v1.0 of XAM Spec available, HP, HDS, Sun endorse XAM, join XAM Team

Q4 2004 – IBM and EMC formulate a joint vision and begin work on a proposal

HITACHI
DATA SYSTEMS

hp

Sun

EMC

IBM

*(\*) SNIA Technical Council Member*

# XAM Milestones

XAM Release 1 SDK available

Press Release @ SNW Spring

SNIA Board Approval

Submission to SNIA Technical Council

XAM plugfest @ SNW fall

XAM Release 1 specification available

2007

Internal comment for SNIA Members

# What XAM Provides

- Interoperability
  - XAM-compliant applications works XAM storage systems from any vendor
  - Rich metadata allows multiple applications to share information
  - Information can be migrated between XAM systems through standard import/export operations
- Compliance
  - Integrated record retention and disposition metadata
- ILM Practices
  - Extensible metadata allows for external data classification, annotation
  - ILM policy recorded in standard fields
  - ILM practices implemented by XAM storage system or third-party
- Universal Access to data
  - Application independent store and retrieve
  - Application independent query interface

# XAM Services

- Store / Retrieval Interface
  - Metadata & streams storage via XSet abstraction
  - Create, read, update, delete data
- Search / Query Interface
  - Based on SQL "Select" statement
  - Supports query of metadata (mandatory) and content (optional)
- Security Interface
  - Role-based access control (RBAC)
  - ACL permissions on objects
- Management Services Interface
  - Retention
  - Litigation hold
  - Storage management (storage tiers, etc)

# Query / Discovery Examples

Query & Discovery

- Structured metadata query allows SQL-like flexibility in examining typed fields such as numbers and dates
- Unstructured stream query allows vendor extensibility for full-content search, with annotated information type
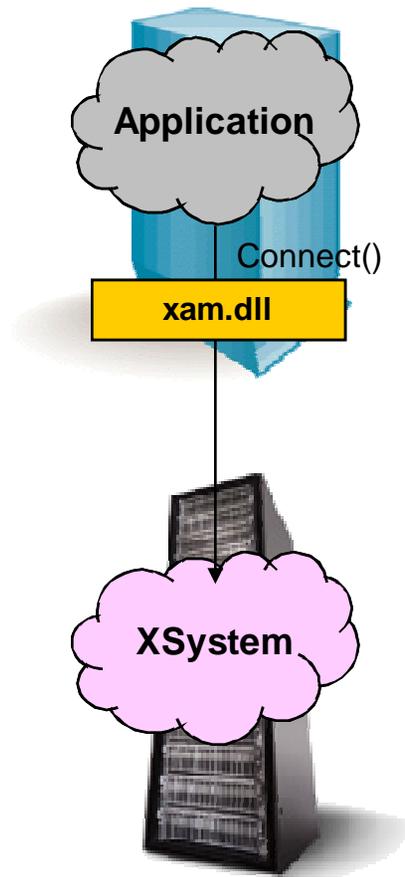
Application examples:

- "Find all records for patient X after 4/7/2006"
- "Create thumbnails of all JPEG files written by application X larger than 300K"

Query example:

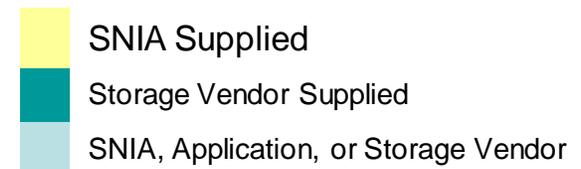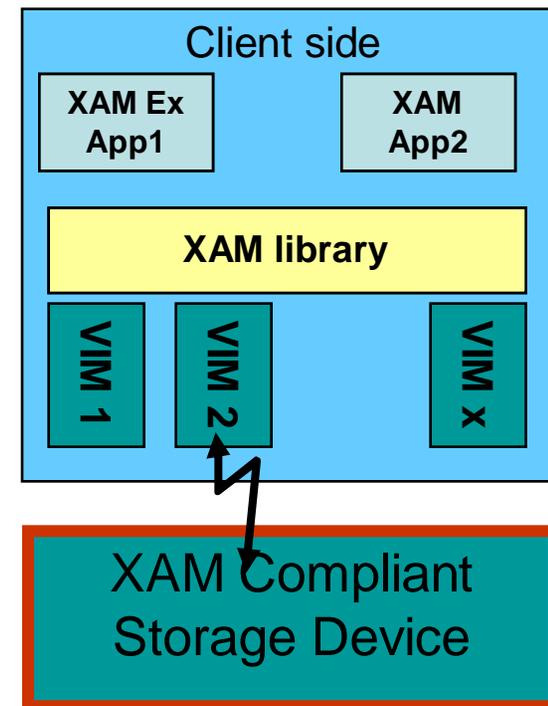- **SELECT WHERE org.nema.medical.patient_name="X" and org.nema.medical.record_date>"4/7/2006"**

# XAM Architecture

Application

Connect()

xam.dll

XSystem

- **An application uses the xam.dll to 'connect' to a specified XSystem.**
  - An single application may connect to multiple XSystems simultaneously
  - Multiple applications may connect to a single XSystem simultaneously

- **An XSystem is not identical to a vendor's "storage box", but a logical abstraction which should be viewed as 'bag of storage'.**

- **The application may be required to authenticate at the time the connection to an XSystem is established.**

- **The application uses xam.dll to store/retrieve "content objects" to/from the XSystem.**

- **These "content objects" are bundles of data and metadata, and are called XSets.**

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# XAM Software Development Kit

- XAM API to be standardized by SNIA
- XAM SDK presents the XAM API to all applications
  - Open Source
  - Governed independently of any vendor
- VIM: Vendor Implementation Module
  - Connects the SDK to a particular storage device through the VIM Interface
  - Provided by device vendor
- SDK Includes (date tbd)
  - Reference VIM
  - Best Practices
  - Sample Application(s)

**Client side**

XAM Ex App1

XAM App2

**XAM library**

VIM 1

VIM 2

VIM x

**XAM Compliant Storage Device**

SNIA Supplied

Storage Vendor Supplied

SNIA, Application, or Storage Vendor

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# XAM Software Development Kit

- **The XAM SDK is dynamically linked by each application wishing to connect to and use XSystems.**

**Application**

Connect()

**xam.dll**

**XSystem**

**tools.dll**

Convenience functions
- File Interface
- Iterator for list of items
- etc

**xam.dll**

| ref. dll | std. dll | emc. dll | ibm. dll | HP. dll |

VIMs (Vendor Interface Modules)

- **The XAM SDK includes several components:**
  - **xam.dll**, which implements the XAM API functions
  - **ref.dll**, which implements the reference behavior of an XSystem
  - **std.dll**, which implements a standard network protocol to XSystems
  - a framework which allows vendors to plug-in their '**VIMs**'
  - optional **toolkit libraries (tools.dll)** for convenience functions

# XSET Concept

**XSET**

XUID: 1234ab2fg09lkj930

| |
|---|
| **Stream Data1** |
| **Stream Data2** |
| **Property1** (metadata) |
| **Property 2 (metadata)** |
| **Property3 Metadata2** |

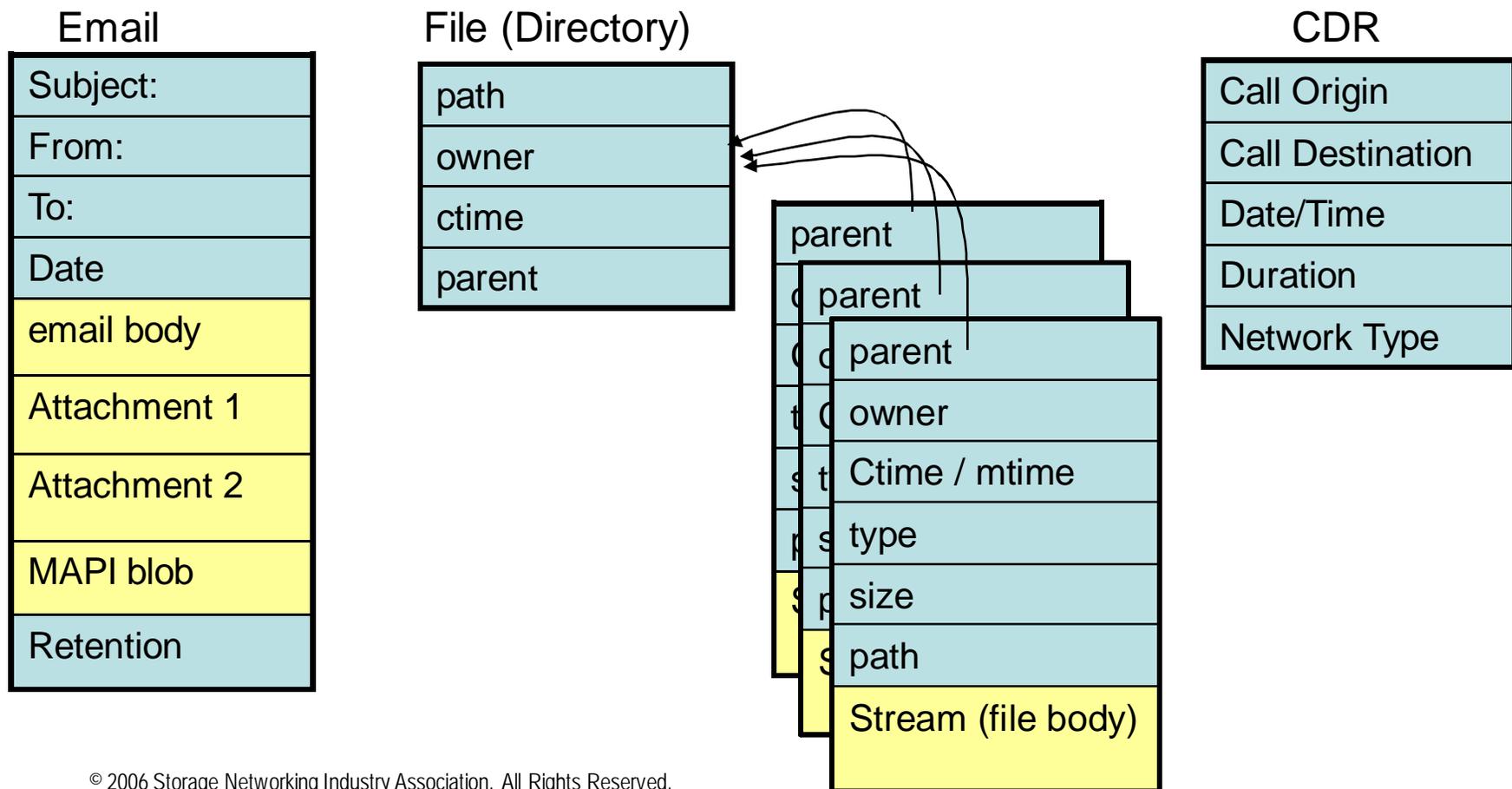XSets contain "Streams" and "Properties" that are collectively called "Fields"

A property (metadata) is a simple type (i.e. integer, float, string)

Streams are "just" a sequence of bytes. Streams can be typed or un- typed

Each Field has a name, type, & size

# Examples
## Mapping Data Types to XSets

### Email

| |
|---|
| Subject: |
| From: |
| To: |
| Date |
| email body |
| Attachment 1 |
| Attachment 2 |
| MAPI blob |
| Retention |

### File (Directory)

| |
|---|
| path |
| owner |
| ctime |
| parent |

| |
|---|
| parent |
| parent |
| parent |
| owner |
| Ctime / mtime |
| type |
| size |
| path |
| Stream (file body) |

### CDR

| |
|---|
| Call Origin |
| Call Destination |
| Date/Time |
| Duration |
| Network Type |

# Access to XAM SDK Components

| Public Access Component | Access |
|---|---|
| XAM API Spec | Public access |
| XAM Library | Public access? |
| Vendor Implementation Module (VIM) | Storage Vendor |
| Best Practices guide | Public access |

| SNIA Component | Notes | Access |
|---|---|---|
| XAM Contribution | Steering of specification & implementation | SNIA Membership |
| XAM Certification/Seal | | SNIA Membership |
| Validation Suite | | SNIA Membership |
| Convenience toolkit | Ease-of-use toolset | SNIA Membership |

Preliminary Information - XAM SDK component access details are still being defined

# End Users – Compelling Reasons to Join SNIA

- Get involved & make your voice heard! Join the SNIA End User Council (EUC)
- Assist in review of SNIA Working Group specifications and initiative roadmaps
- Make your views known via SNIA speaking engagements

# Application Vendors - Compelling Reasons to Join SNIA



1. You benefit from the SNIA publicity engine - visibility at SNW, EIW, SNIA Symposiums, InfoStor Road Shows, International SNIA (Europe, Africa Middle East, Asia Pacific, Americas)

2. Your company will be positioned as a technology leader via membership in the SNIA XAM Application Developer Early Adopter Program

3. As XAM Initiative member you can influence direction of the evolving specification, test harness development, conformance and interoperability programs

4. Contribute Code (tools and convenience functions)

# XAM Software Development

- All SNIA software is developed within a gated community
  - you need to be a member of the SNIA to contribute code.
  - SNIA Membership fees for Application developers are based on the current SNIA membership fee model - revenue size and voting/non-voting status.

# Conclusion: XAM

- A common storage API for applications that allows storage vendor specific implementations
  - Many apps to many storage devices

- A new access method to address
  - Scalability to trillions of XSETs
  - Longevity of objects
  - Metadata to capture application intent

- Simple yet powerful
  - Architected for extension

# Where To Go

- SNIA XAM Home
  - http://www.snia-dmf.org/xam/index.shtml

- SNIA FCAS TWG
  (XAM Technical WorkGroup)
  - http://www.snia.org/apps/org/workgroup/fcastwg/

- CAS Community
  - http://www.cascommunity.org

- Your Presenter
  - david,martin@hp.com

Thank You!