SNIA

STORAGE NETWORKING INDUSTRY ASSOCIATION

EDUCATION

SNIA Software and XAM

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Topics

- Why is SNIA Doing Software?
- What are the rules?
- How are they approved?
- The XAM SDK TWG
- Other possible TWGs

Problem: Adoption and Maturation

- SNIA produces Standards in new areas
  - New APIs, Protocols, etc, for Storage, Data, Information Domains
- Unknown maturity before vendors implement
  - Each vendor must interpret the specification and make implementation choices
  - We must get multiple vendors to do this quickly
- Plug testing is late in the game
  - After vendors have already made interpretations
  - Perhaps after specification has been submitted to ANSI, etc.
- Catch-22 of adoption
  - Vendors are reluctant to implement an immature specification
  - They look for existing implementations before starting their own

Software to the rescue

- By creating a reference implementation to complement the specification:
  - Implementation choices can made by multiple vendors
  - Loose areas of the specification can be discovered in the process
  - Vendors can pick up a working implementation to get started on their own
  - Plug testing is enhanced by having a canonical implementation to test against

What is new?

- SNIA Technical Work Groups (TWGs) may add **Software** Work Items to their Charter
  - For example: reference implementation, SDK, tools, and associated documentation
- SNIA Software is developed under the SNIA IP Policy
  - *SNIA Software* defined similar to *SNIA Architecture*
- SNIA Software may be Open Sourced
  - The license is proposed as part of the Charter/Work Item(s)

What are the rules?

- SNIA Software is worked on by member companies who have opted-in to the work of the TWG
  - Implies obligations to disclose and license IP
  - Also implies obligations under the inbound and outbound license
    - Marking of code contributions, etc.
- Other SNIA members only see the code when the TWG publishes
- Non-SNIA members only see the code after the members have approved

Process for Approval

- Charter still needs to be approved by the Technical Council
  - Including the proposed license(s)
- License(s) must be approved by the SNIA Board
  - Must include a license that is compatible with *commercial software distribution*
- Release of the software outside the TWG needs TC approval as well (just like specifications)
- SNIA Software still must pass a membership vote for public publication
  - Similar to SNIA Architecture
  - Implies adoption by the organization
  - Only Board can forward to membership for a vote

Software Work in SNIA

- XAM SDK TWG
  - Develop a Software Development Kit (SDK) for the eXtensible Access Method (XAM) specification
  - Tools and related documentation
  - BSD (3 clause) license
- Other planned TWGs
  - NDMP
  - MF TWG reference implementation
  - …

Overview

What is XAM?

eXtensible Access Method (XAM) is

- a SNIA Initiative
- driven by the “Fixed Content Aware Storage” TWG
- to define a standard interface (i.e. API)
- between “Consumers” (application and management software)
- and “Providers” (storage systems)
- of *Fixed Content* storage services

Why XAM?

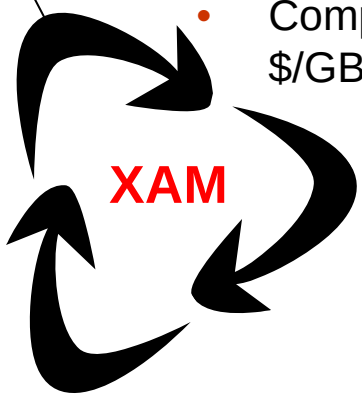
The industry will benefit from a standardized access method to Fixed Content

End Users want:

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

Applications Vendors want:

- Annotate Data with associated Metadata
- Indicate Basic Storage Management Policies
- Speak same language to all types of Devices
- Manipulate billions if not trillions of "records"



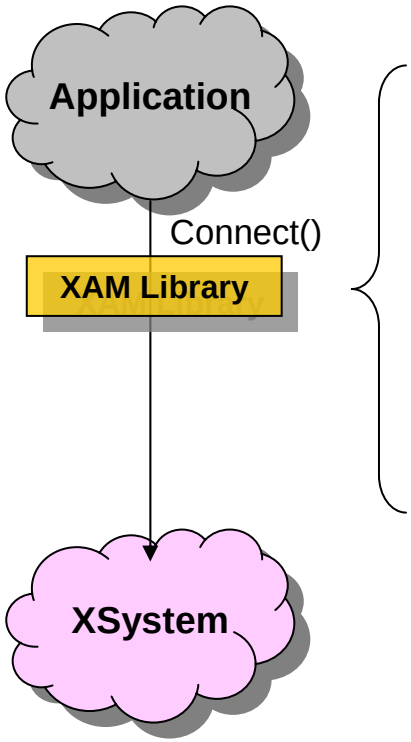
Storage Vendors want:

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

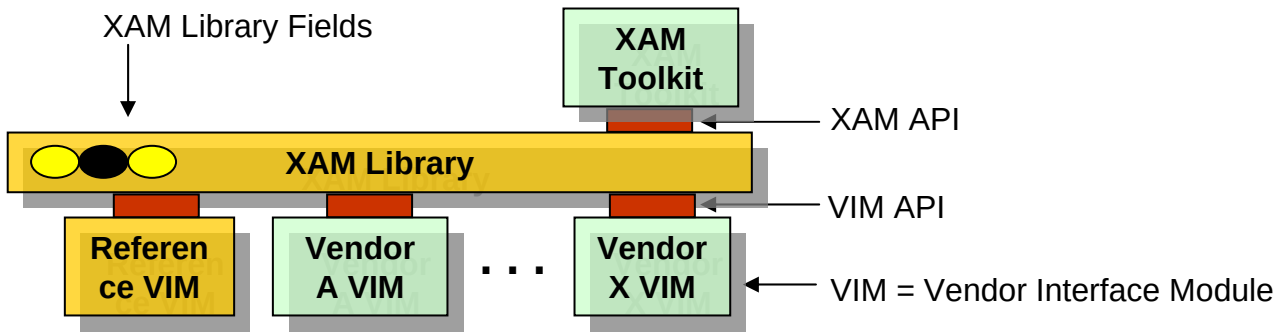
XAM SDK TWG Charter

- Develop SNIA Software that implements the XAM Library.
- Develop SNIA Software that implements a Reference Vendor Implementation Module (VIM) on top of an existing filesystem.
- Develop sample XAM Client Applications as SNIA Software to provide simple unit tests for portions of the XAM Specification(s).
- Develop documentation as appropriate for the above deliverables.

XAM SDK – Quick Review

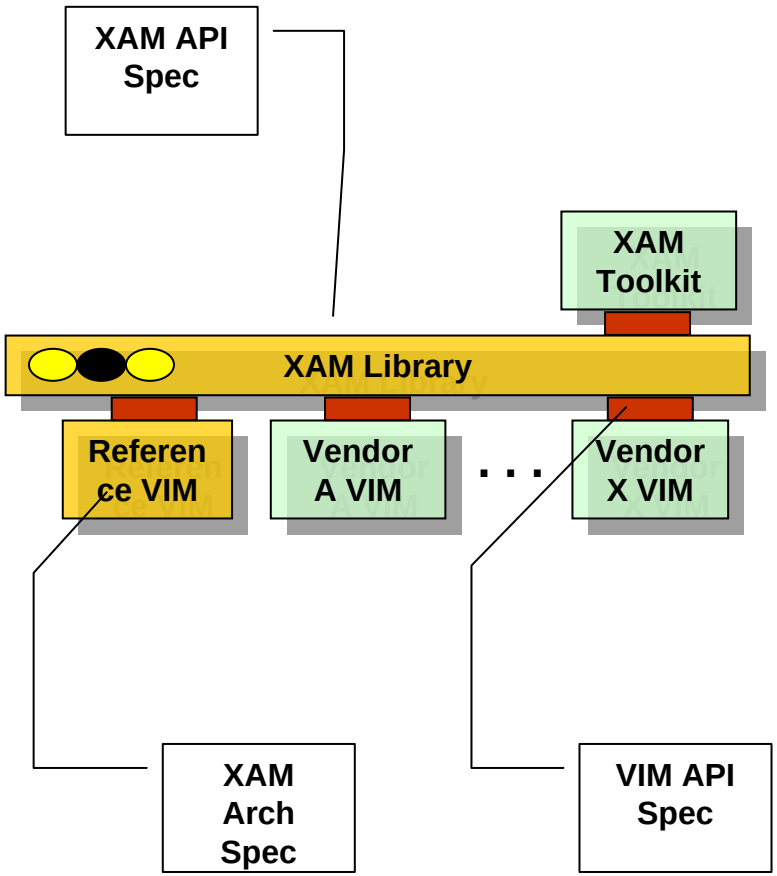


- **The XAM SDK is dynamically linked by each application wishing to connect to and use XSystems.**



- **The XAM SDK includes several components:**
  - **XAM Library**, which implements the XAM API functions
  - **Reference VIM**, which implements the reference behavior of an XSystem
  - a framework which allows plug-able **Vendor VIMs**
  - optional **XAM Toolkit** Libraries for convenience functions

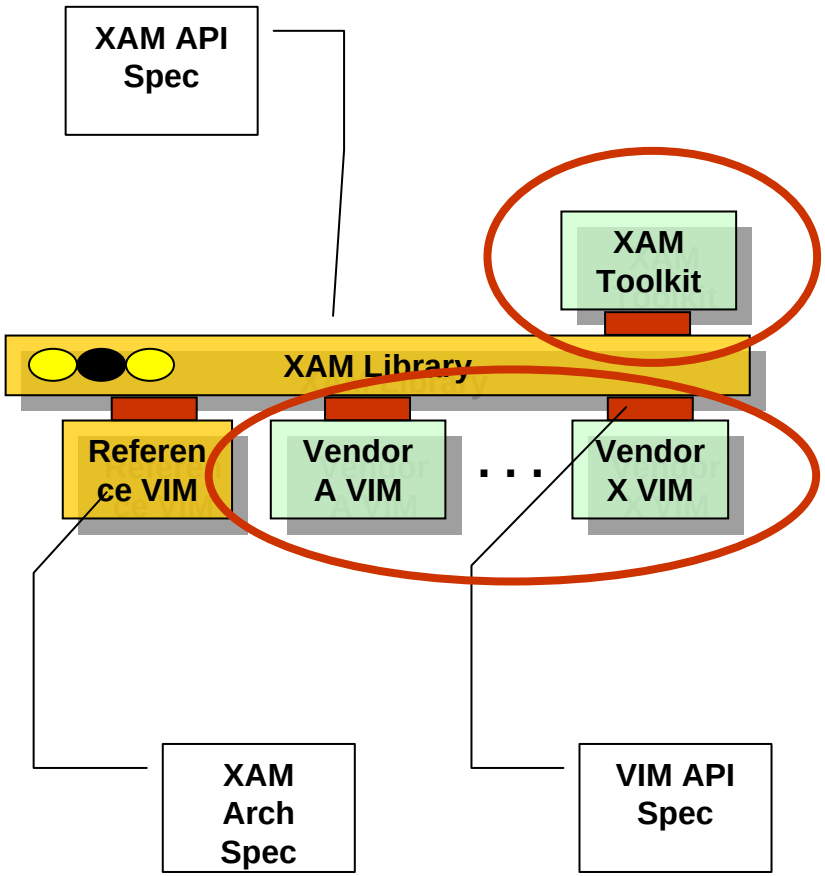
Proliferation Questions



Who Does This Work?

- Standardization Process
- Development & QA
- Integration & Distribution
- Interoperability Certification
- Licensing Schema
- Support & Maintenance

The Low Hanging Fruit



Developed, Supplied & Supported by any 3rd Party (incl. Vendors, ISVs etc)

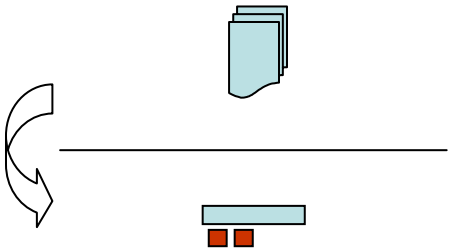
Supplied & Supported by Individual Vendors of XAM Storage Systems

XAM SDK Proliferation – SNIA's "FCAS TWG"

1. **SNIA's "FCAS TWG" maintains and periodically publishes set of normative XAM standard Specs**

- **XAM Standard defined by SNIA's "FCAS TWG":**
  - direct influence by SNIA FCAS membership
  - indirect influence by Storage Vendors assimilating feedback from ISVs, End-Users
- **SNIA publishes normative spec for**
  - XAM Architecture
  - XAM API
  - VIM API
- **XAM Standard updated at most once a year**
- **XAM Standard Versions must be backwards compatible**

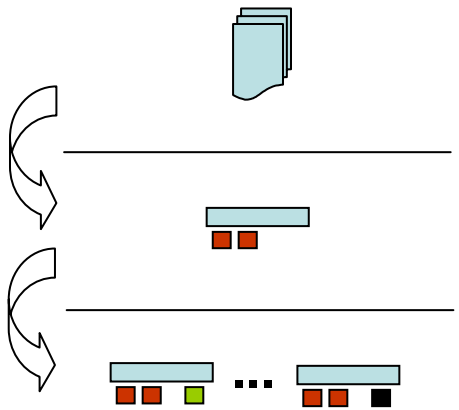
XAM SDK Proliferation – SNIA's "XAM SDK TWG"



2. SNIA "XAM Software TWG" Develops and Maintains beta-quality 'Gold' Distribution' of XAM SDK under BSD License

- **'Gold' XAM SDK (*XAM Library, Reference VIM*) developed and maintained by SNIA's "XAM Software TWG" member companies**
  - Possibly for a single language binding only (C/C++)
  - Possibly for a single OS platform only
- **Beta-quality code of SNIA's XAM SDK ('Gold' Distribution) released on regular schedule to SNIA Member Companies under BSD-type license**
- **SNIA's "XAM SDK TWG" provides the last tier of support for the XAM SDK 'Gold' distribution**

XAM SDK Proliferation – SNIA's Member Companies

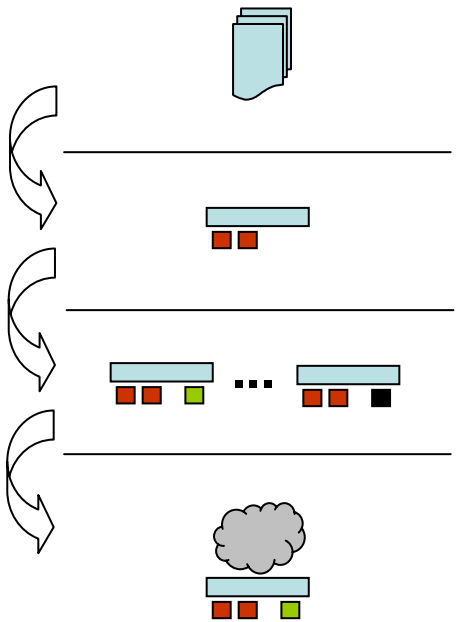


3. Member Companies (e.g. EMC, IBM, HP, HDS, ...) derive their individual product-quality XAM SDK Derivatives from SNIA's 'Gold Distribution'

- **Member Companies responsible for porting, QA, distribution and ongoing maintenance of their XAM SDK Derivative**
  - according to Storage Vendors' product schedule/plans
  - including releases of XAM SDK Derivatives and Service Packs
- **Member Companies responsible for interoperability testing of**
  - their XAM
  - against
- **Member Companies submit feedback, bug fixes, enhancements and new features back to SNIA's XAM SDK TWG", for next 'Gold' Distribution**
- **Member Companies provide 1st tier of support for their XAM SDK Derivative**

It may make sense to centralize cross-certification (of various vendors' XAM SDK Derivatives with various vendors' VIMs) back to the SNIA InterOp Lab, or some authorized 3rd party

XAM SDK Proliferation – Application Vendors (ISVs)

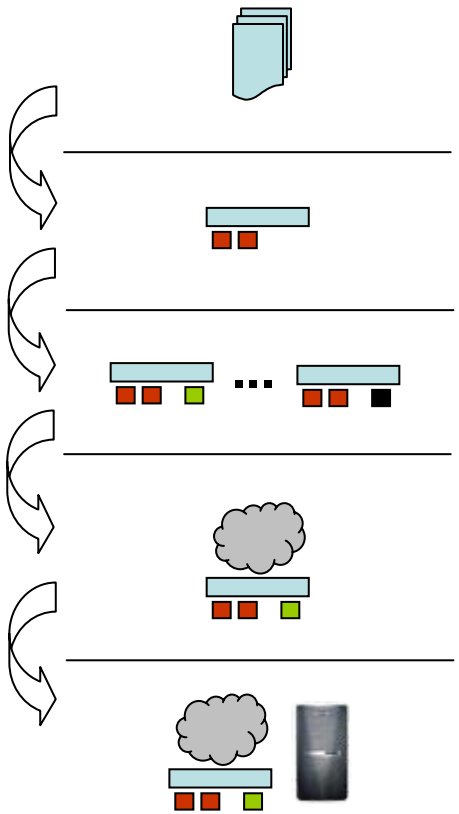


4. ISVs Integrate and certify their apps with a chosen XAM SDK Derivative

- **ISVs integrate their applications with one or more chosen XAM SDK Derivative(s), under the Member Company's respective licensing schema**
- **ISVs responsible for interoperability testing and certification of their s/w applications against the chosen XAM SDK Derivative(s)**
- **Ongoing support and certification is negotiated between the ISV and Member**
- **ISVs ship their integrated application to End-Users under their respective licensing schema**

It may make sense to outsource certification (of an ISV's application with a Member Company's XAM SDK Derivative) back to the SNIA InterOp Lab, or some authorized 3rd party

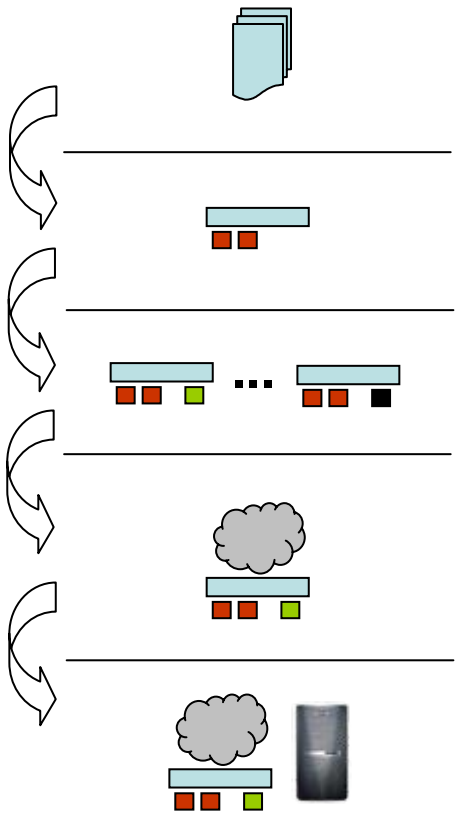
XAM SDK Proliferation – End-Users



5. **ISVs, Storage Vendors ship their products to End-Users with certified interoperability guarrantees**

- **Integrated product licensed to End-User under ISV's and Member Company's licensing schema**
- **ISVs, Member Company provide direct support to End-User**
- **Member Company provides direct support to ISVs**
- **SNIA "XAM SDK TWG" provides direct support to Member Companies**

XAM SDK Proliferation - Summary



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2. **SNIA's "XAM Software TWG" Develops and Maintains beta-quality 'Gold' Distribution' of XAM SDK under BSD License**

3. **SNIA's Member Companies (e.g. EMC, IBM, HP, HDS, ...) derive their individual product-quality XAM SDK Derivatives from SNIA's 'Gold Distribution'**

4. **ISVs Integrate and certify their apps with a chosen Member Company's XAM SDK Distribution**

5. **ISVs, Member Companies ship their products to End-Users with certified interoperability guarantees**

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
  - cakeljic_zoran@emc.com

Q&A / Feedback

- Please send any questions or comments on this presentation to SNIA:

  trackvirtualization@snia.org (Rob Peglar)

Many thanks to the following individuals for their contributions to this tutorial.

SNIA Education Committee

Fixed Content Aware Storage (FCAS) TWG
XAM Initiative

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Thank You!

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