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14<sup>th</sup> ANNUAL WORKSHOP 2018

# SNIA AND OFA IN PARTNERSHIP

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## AN INTRODUCTION TO THE STORAGE NETWORKING INDUSTRY ASSOCIATION



**170**  
industry leading  
organizations



**2,500**  
active contributing  
members



**50,000**  
IT end users & storage  
pros worldwide

# SNIA VISION AND MISSION



## **Vision**

**Be the globally recognized and trusted authority for storage leadership, standards, and technology expertise.**

## **Mission**

**Lead the storage industry worldwide in developing and promoting vendor-neutral architectures, standards and educational services that facilitate the efficient management, movement and security of information.**



# WHAT WE DO



## ■ **Standards Development and Adoption**

- Spec development; submissions for International Standard ratification (ISO/IEC)
- Open source software to accelerate adoption

## ■ **Interoperability Assurance**

- Plugfests & conformance testing

## ■ **Technology Acceleration and Promotion**

- Special Interest Groups to promote technologies
- Vendor collaboration to accelerate adoption

## ■ **Global Vendor-Neutral Education**

- Peer-reviewed webcasts and tutorials
- Conferences and presentations
- White papers, articles, blogs, etc.
- IT training and certification courses

# AREAS OF FOCUS

## PHYSICAL STORAGE

- Solid State Storage
- Hyperscaler Storage
- Object Drives
- Connectors, Form Factors & Transceivers

## DATA MANAGEMENT

- Protection
- Integrity
- Retention

## DATA SECURITY

- Storage Security
- Privacy and Data Protection Regulations

## DATA IN THE CLOUD

- Data Orchestration
- Data into and out of the Cloud

## PERSISTENT MEMORY

- NVDIMMs
- Non-Volatile Memory Programming Model

## POWER EFFICIENCY MEASUREMENT

- SNIA Emerald™ Power Efficiency

## NEXT GENERATION DATA CENTER

- Software Defined Storage
- Composable Infrastructure
- Next Generation Storage Management API

## NETWORKED STORAGE

- Data Access Protocols
- Networking Technologies for Storage

## STORAGE MANAGEMENT

- Device and System Management





# 2018 TECHNICAL WORK GROUP ACTIVITY

## PERSISTENT MEMORY

- Non-Volatile Memory Programming Model (NVMPM) v1.3
- Persistent Memory Hardware Threat Model v1.0
- NVMPM Remote Access for High Availability White Paper

## PHYSICAL STORAGE

- Solid State Storage Performance Test Spec v2.0
- Object Drive Key Value API Spec v1.0
- SFF Technology Affiliate:  
Connector, Form Factor and Transceiver Standards
- Real World Workload Spec for Datacenter Storage v1.0

## DATA MANAGEMENT

- Linear Tape File System Format Spec v3.0

## DATA SECURITY

- Data Protection White Paper
- Transport Layer Security for Storage Spec v1.1

## DATA IN THE CLOUD

- Cloud Data Management Interface (CDMI) Spec v2.0
- CDMI Reference Implementation v1.0

## POWER EFFICIENCY MEASUREMENT

- SNIA Emerald™ Power Efficiency Measurement Spec v3.0 & v4.0

## NEXT GENERATION DATA CENTER

- SNIA Swordfish™ v1.0.6 - RESTful Storage Management API for Cloud Data Centers
- Swordfish Emulator and Basic Web Client Software

## NETWORKED STORAGE

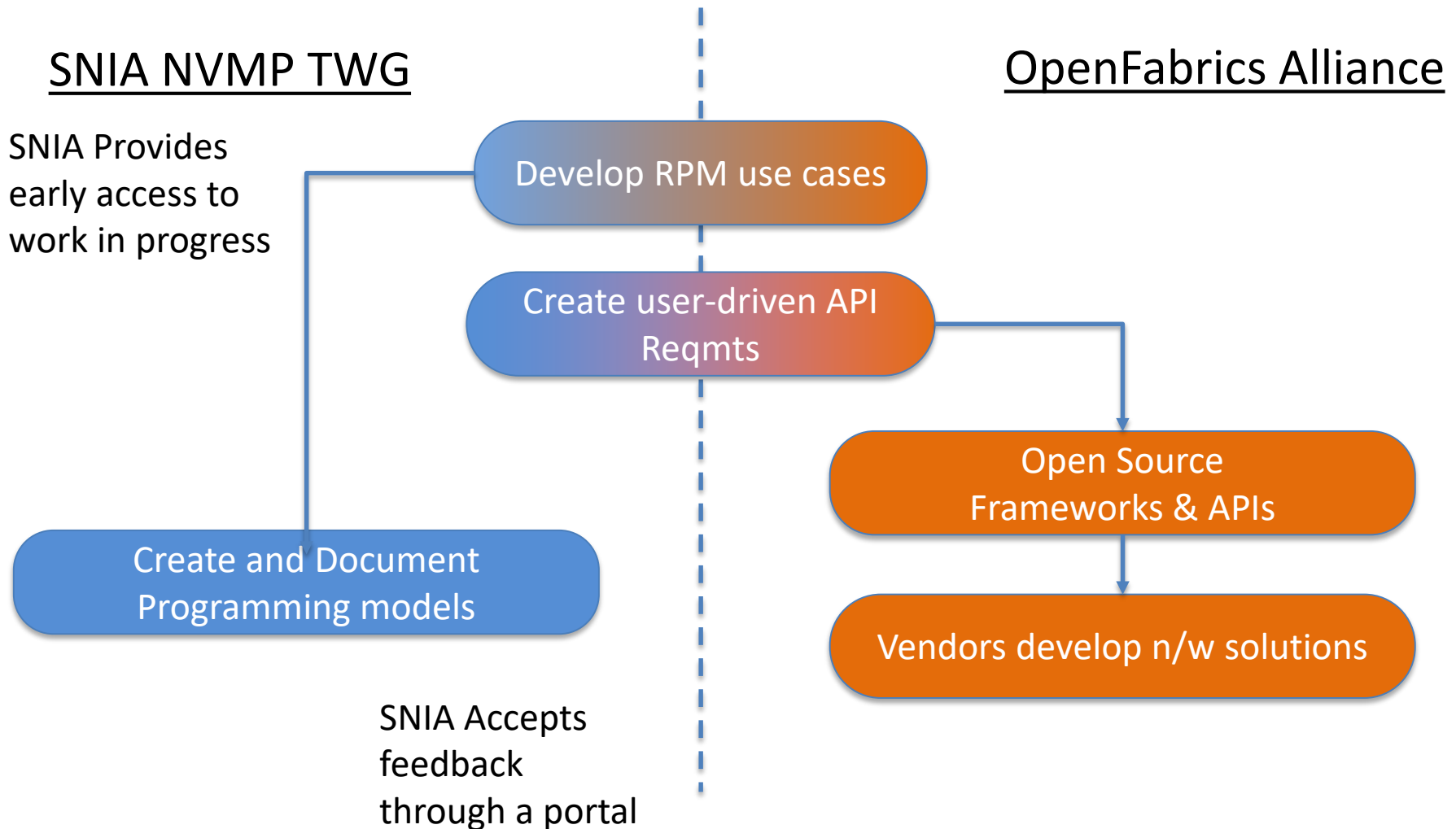
- Requirements for Cross-Industry Alliances

## STORAGE MANAGEMENT

- Storage Management Initiative Specification (SMI-S) v1.8



# ANNOUNCING - SNIA & OPENFABRICS ALLIANCE



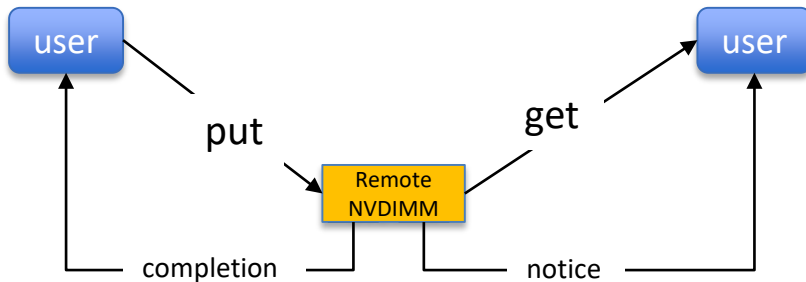
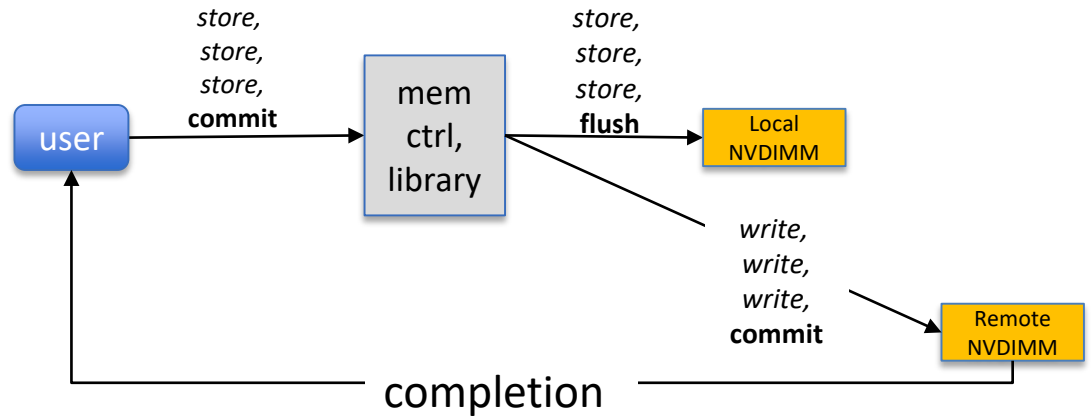
# PARTNERSHIP BACKGROUND

- Persistent memory is driving a convergence of storage and memory
  - Beginning in a single server environment
  - But PM over Fabrics is a different animal
- Extending Persistent Memory over a Fabric (Remote Persistent Memory) is presenting new opportunities
  - Resilience - data written to both local and remote persistent memory
  - Disaggregation – create pools of compute and memory resources
  - Shared information – apps share info via remote shared PM
  - These are topics being explored by the SNIA NVM Programming TWG
- Applications and Data centers need to be able to leverage persistent memory technologies in order to experience the magnitude of change in compute speeds
- Complimentary efforts in OFA and SNIA can enable and accelerate the persistent memory transition
  - Hard or impossible for either to address independently
  - High degree of synergism defined by a clear relationship between the work of SNIA and the OFA



# REMOTE PERSISTENT MEMORY

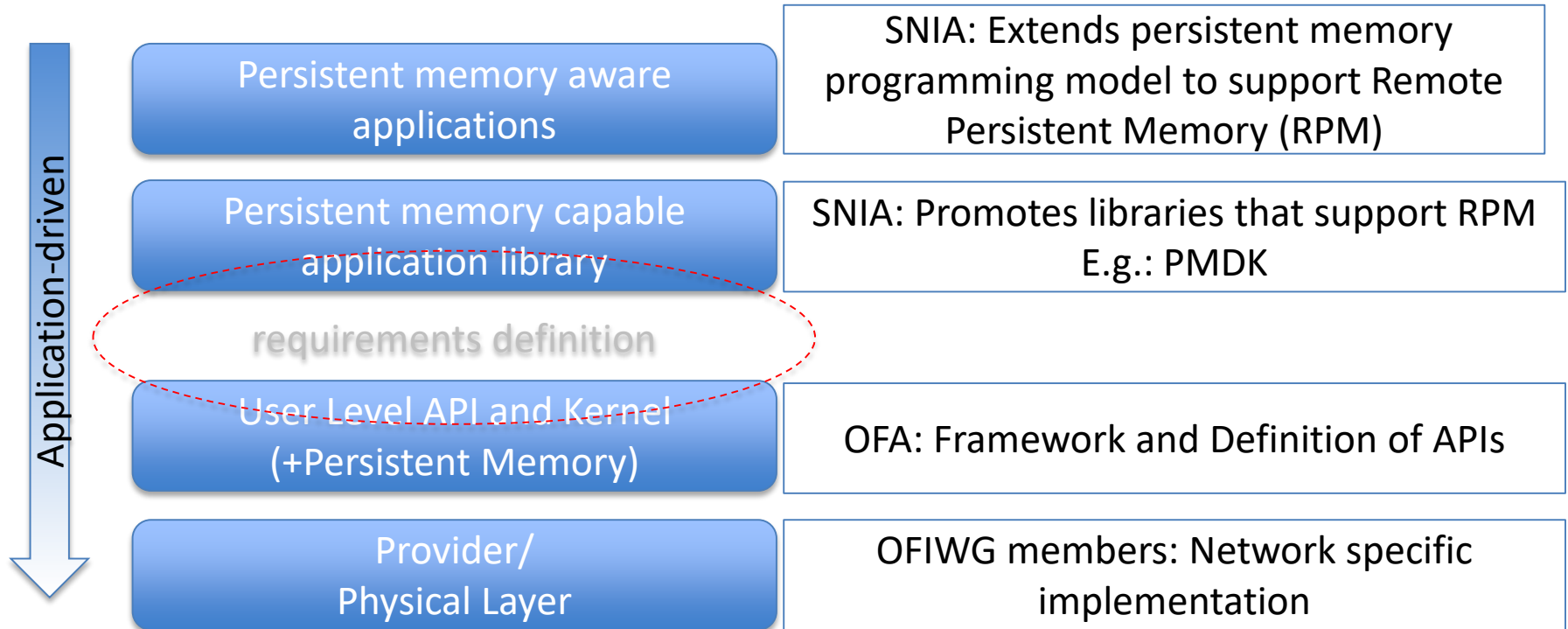
High Availability Use Case



Remote Shared Memory Use Case

Collaborate to define solutions for multiple use cases

# OFA, SNIA COLLABORATION



# NVM PROGRAMMING MODEL

## Updating Original Work

### ■ Remote Access for HA white paper released:

[http://www.snia.org/sites/default/files/technical\\_work/final/NVM\\_PM\\_Remote\\_Access\\_for\\_High\\_Availability\\_v1.0.pdf](http://www.snia.org/sites/default/files/technical_work/final/NVM_PM_Remote_Access_for_High_Availability_v1.0.pdf)

- Requirements for consistent data recovery
- Requirements for efficient remote optimized flush
- Work continuing on remote optimized flush behavior

### ■ Error handling

- Additions to V1.2 of the programming model specification
- Refinements to error handling annex

### ■ Atomicity

- New white paper
- Introduces PM data structure libraries with atomicity built in
- Enables PM transactions



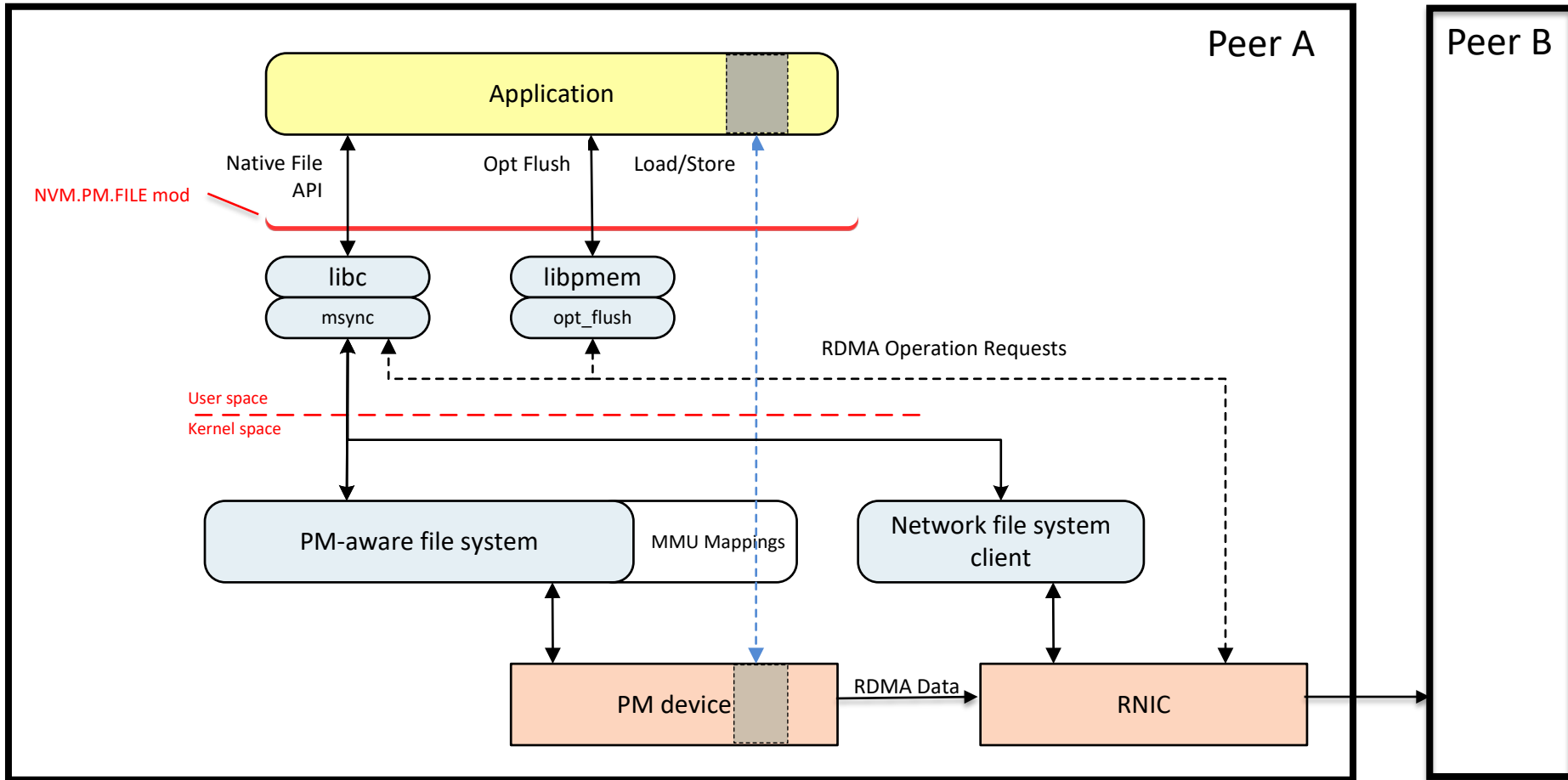
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# REMOTE ACCESS FOR HIGH AVAILABILITY



# REMOTE ACCESS FOR HA SOFTWARE MODEL

RDMA for HA During msync or opt\_flush



# CONSISTENCY FOR RECOVERABILITY

## Application Involvement Required for High Availability

- **Application level goal is recovery from failure**
  - Requires robust local and remote error handling
  - High Availability (as opposed to High Durability) requires application involvement.
- **Consistency is an application specific constraint**
  - Uncertainty of data state after failure
  - Crash consistency
  - Higher order consistency points
- **Atomicity of Aligned Fundamental Data Types**
  - Required for consistency if additional data hashes are to be avoided
  - Failure atomicity as opposed to inter-process atomicity



# TOP 3 REASONS TO JOIN SNIA



## INFLUENCE

- ✓ Influence storage technologies important to the marketplace
- ✓ Amplify your vendor storage expertise and reputation
- ✓ Participate in the development of international standards



## COLLABORATE

- ✓ Participate in multi-vendor interoperability activities
- ✓ Gain insight into disruptive industry trends
- ✓ Form strategic alliance partnerships
- ✓ Develop relationships throughout the industry



## LEAD THE INDUSTRY

- ✓ Educate on all things storage
- ✓ Drive standards development and adoption
- ✓ Align strategic business objectives with worldwide standards



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THANK YOU