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NVM Express® Technical Proposal (TP)

Technical Proposal ID	TP 4145 – Namespace Admin Label
Revision Date	2022-11-29
Builds on Specification(s)	NVM Express Base Specification Revision 2.0b NVM Express Management Interface Specification Revision 1.2b
References	TP 4074a – Defining Scope for Features TP 8020 – UTF-8 Admin Labels

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Technical Proposal Overview

This technical proposal defines new requirements and capabilities for a NVM subsystem to store namespace admin labels and report them to the host. A namespace admin labels is a human-friendly string that describes the namespace (e.g., indicating the application for which the namespace has been created).

Revision History

Revision Date	Change Description
February 28, 2022	Initial draft
March 14, 2022	Initial UTF-8 string text
March 15, 2022	Minor updates from FMDS meeting
March 18, 2022	Generalize UTF-8 string processing text. Minor additions to Identify CNS 03h text on returning namespace identification descriptors.
March 22, 2022	Minor edits from FMDS meeting.
March 29, 2022	Correct markup conventions, Edit UTF-8 Figure
April 4, 2022	Correct filename, remove NQN text deleted after generalization to UTF-8, add incompatible change warning.
April 7, 2022	Change from Name to Label, correct “globally unique” text (which was already incorrect for Command Set Identifiers).
April 11, 2022	Back out “globally unique” correction, as ECN 110 fixes that. Add notes on what to do if not supporting setting label in this TP.
April 12, 2022	Remove comments that explain UTF-8 byte usage.
April 15, 2022	Reset change tracking – show proposed deletion of functionality to set Label.
April 21, 2022	Remove text that addressed misalignment caused by CSI – that will be addressed separately in an ECN. Add explicit statement that label may have same value for different namespaces, additional minor edits.
May 6, 2022	Remove ability to set label when creating a namespace. Add initial design notes a Feature to set the label via Set Features.
May 19, 2022	Adding text for what is needed to support the host to set the namespace admin label feature
May 26, 2022	Removing text which are already covered in TP 8020 (UTF-8 Admin Labels)
July 20, 2022	Add full specification of Feature to set/get Namespace Admin Label.
July 22, 2022	Add new Feature to Feature table in NVMe-MI
August 4, 2022	Shrink tables to only show added rows, add TP 4074a to pick up scope column for Features table.
August 10, 2022	Minor edits from FMDS discussion, plus make feature optional (instead of prohibited) for Administrative Controller.
August 11, 2022	Remove Identify support – label is accessed only via Get Features and Set Features.
August 18, 2022	Finish removing Identify support.
September 1, 2022	New version for phase 3, no changes from previous version.
September 6, 2022	Sanitize resets this Feature to default value (all nulls).
September 16, 2022	Allow Sanitize to modify Features, add Editor’s Note to explain interaction of this change with TP4120.
September 20, 2022	Editorial updates
September 29, 2022	Fix title in header for member review.
November 1, 2022	Resolve member review comments from Mike Allison.
November 3, 2022	Clean version for integration
November 28, 2022	Integrated
November 29, 2022	Fixed the cross-reference links and footer.

Description for Changes Document for NVMe Express Base Specification Revision 2.0b

New Feature:

- Define Namespace Admin Label as a human-friendly UTF-8 string in a new Feature.
- References:
 - TP 4145

Description for Changes Document for NVM Express Management Interface Specification Revision 1.2b

New Feature:

- Add new Namespace Admin Label Feature to table of Features as optional for Management Endpoints to support.
- References:
 - TP 4145

Markup Conventions:

Black:	Unchanged (however, hot links are removed)
Red Strikethrough:	Deleted
Light Blue:	New
Light Blue Highlighted:	TBD values, anchors, and links to be inserted in new text.
Purple:	Moved without change
<Green Bracketed>:	Notes to editor

Description of Specification Changes for NVM Express Base Specification Revision 2.0b

3.1.2.1.3 Features Support

Add a row to Figure 25 as indicated below:

Figure 25: I/O Controller – Feature Support

Feature Name	Feature Support Requirements ¹	Logged in Persistent Event Log ¹
...		
Namespace Admin Label	O	O
...		

<Editor's Note: Location of new row in table based on feature identifier assignment in 5.27.1 below.>

3.1.2.2.3 Features Support

Add a row to Figure 30 as indicated below:

Figure 30: Administrative Controller – Feature Support

Feature Name	Feature Support Requirements ¹	Logged in Persistent Event Log ¹
...		
Namespace Admin Label	O	O
...		

<Editor's Note: Location of new row in table based on feature identifier assignment in 5.27.1 below.>

3.1.2.3.4 Features Support

Add a row to Figure 34 as indicated below:

Figure 34: Discovery Controller – Feature Support

Feature Name	Feature Support Requirements ¹	Logged in Persistent Event Log ¹
...		
Namespace Admin Label	P	P
...		

<Editor's Note: Location of new row in table based on feature identifier assignment in 5.27.1 below.>

5.15 Get Features Command

Add a row to Figure 194 as indicated below:

Figure 194: Get Features – Feature Identifiers

Description	Section Defining Format of Attributes Returned
...	
Namespace Admin Label	5.27.1.TBD
...	

<Editor's Note: Location of new row in table based on feature identifier assignment in 5.27.1 below.>

5.27.1 Feature Specific Information

Add a row to Figure 316 as indicated below:

Figure 316: Set Features – Feature Identifiers

Feature Identifier	Current Setting Persists Across Power Cycle and Reset ²	Uses Memory Buffer for Attributes	Feature Name	Scope ⁶
...				
1Fh	Yes	Yes	Namespace Admin Label	Namespace
...				

<Editor's Note: Feature Identifier to be assigned from initial sequence – 1Dh is the next available value in the 2022.07.26a version of the NVMe Base Spec 2.0 NEXT.>

Add a new subsection to section 5.27.1 as indicated below:

5.27.1. TBD Namespace Admin Label (Feature Identifier 1Fh)

The Namespace Admin Label feature provides the ability to set and get the Namespace Admin Label for a namespace. This Feature shall be saveable and therefore shall not be supported if bit 4 is cleared to '0' in the Optional NVM Command Support (ONCS) field of the Identify Controller data structure (refer to Figure 275). The attributes in Figure NNN are transferred in the data buffer.

The saved value and current value of this Feature shall be identical. If the SV bit is cleared to '0' in a Set Features command that specifies this Feature, the controller shall abort the command with a status code of Invalid Field in the Command. If the value of the Namespace Admin Label is changed by means outside the scope of this standard, then that change shall affect the results of any subsequent Get Features command that specifies this Feature.

The default value of this Feature is all nulls (i.e., all bytes cleared to 0h). Sanitize operations (refer to section 8.21) affect the values of this Feature; any successful sanitize operation shall modify this Feature by resetting both the saved value and the current value to the default value.

If a Get Features command is submitted for this Feature, the attributes specified in Figure NNN are returned in the data buffer for that command.

Figure NNN: Namespace Admin Label – Data Structure

Bytes	Description
255:0	Namespace Admin Label: This field contains the Namespace Admin Label for the namespace as a null-terminated UTF-8 string. A Namespace Admin Label is intended to assist a human administrator in identifying a namespace (e.g., based on the contents of the data stored in the namespace (e.g., "Q4 2018 Financial Records") or the application intended to use the namespace (e.g., "CRM data")).

Modify section 8.21 as indicated below:

8.21 Sanitize Operations

...

The scope of a sanitize operation is all locations in the NVM subsystem that are able to contain user data, including caches, Persistent Memory Regions, and unallocated or deallocated areas of the media. If the composition of the NVM subsystem (refer to section 3.2.4) changes (e.g., a new domain is added, or a division event occurs) and that change prevents the successful completion of a sanitize operation, then the sanitize operation shall fail. Sanitize operations do not affect the Replay Protected Memory Block, boot partitions, or other media and caches that do not contain user data. A sanitize operation also may alter log pages and features as necessary (e.g., to prevent derivation of user data from log page information or feature information). A sanitize operation is only able to be started if the NVM subsystem is not divided (refer to section 3.2.4). Once started, a sanitize operation is not able to be aborted and continues after a Controller Level Reset including across power cycles. Refer to Annex A for further information about sanitize operations.

...

Description of Specification Changes for NVM Express Management Interface Specification Revision 1.2b

Add a row to Figure 126 (Management Endpoint - Feature Support) in section 6.5 (Set Features and Get Features) as shown below:

Figure 126: Management Endpoint - Feature Support

Feature Name ²	Feature Identifier	Support Requirements ¹	
		NVMe Storage Device	NVMe Enclosure
...			
Namespace Admin Label	1Fh	O	O
...			

<Editor's Note: Location of new row in table based on feature identifier assignment in 5.27.1 in Base Spec.>