

Date: 5 March 2006  
To: T10 Technical Committee  
From: Tim Symons  
Subject: 06-098r2 Self-configuring devices

### Revision Information

- Revision 0: Initial proposal
- Revision 1: Add text to clarify that self configuring devices configure attached non-self-configuring expander devices
  - Added text to allow that a discovery process may be initiated when a BROADCAST (CHANGE) is received on the subtractive port.
- Revision 2: Identify configuration topologies for reference of further discussion.
  - Added Domain Discovery
  - Added Neighbor discovery

Text additions from r1 to r2 are shown in red.

### Referenced Document

SAS-2 revision 2 (<http://www.t10.org/ftp/t10/drafts/sas2/sas2r02.pdf>)

### Overview

During discussions about SAS zoning there have been many questions regarding the definition of self-configuring devices and how a management application client in either an HBA or another self-configuring device should operate during discovery. This proposal is for additional definition of self-configuring devices and their expected behavior. Additions are recommended to the SAS-2 specification.

Discussion at the Denver meeting of the SAS zone management-working group identified two topologies for discovery mechanisms. A paragraph for each topology and usage models have been added to this document.

[Suggested new definition for SAS-2]

### 3.1 Definitions

**3.1.a self-configuring expander devices:** An expander device containing a management application client and SMP initiator port to perform the discover process to configure its own route table and the routing tables of attached **non self-configuring** expander devices.

[Start: Suggested addition to SAS-2 existing text (included in black), new additional text (included in blue) and changes between revisions shown in red]

#### 4.1.5 Expander devices (edge expander devices and fan-out expander devices)

.... An expander device with expander phys with the table routing attribute that does not have a configurable route table shall be self-configuring, and shall contain a management application client and SMP initiator port to perform the discover process to configure its own expander route table **and the routing tables of attached non self-configuring expander devices.**

[End: Suggested addition to existing text shown in blue]

[Start of suggested additions]

#### 4.7.5 Self-configuring expander devices

##### 4.7.5.1 Self configuring operation

The management application client of a self-configuring expander device shall configure routing tables in the expander devices as needed (see 4.7.1). A self-configuring expander device discovery process shall not traverse devices attached to phys with the subtractive routing attribute (see 4.1.8.2).

When a self-configuring expander device receives a phy initialization event or a BROADCAST (CHANGE) on a phy that does not have the subtractive attribute then the CONFIGURING bit shall be set to one, and the self-configuring expander device shall start the discovery process for the phy that received the event. The BROADCAST (CHANGE) notification shall be forwarded on all ports when the self-configuring device has completed the discovery process.

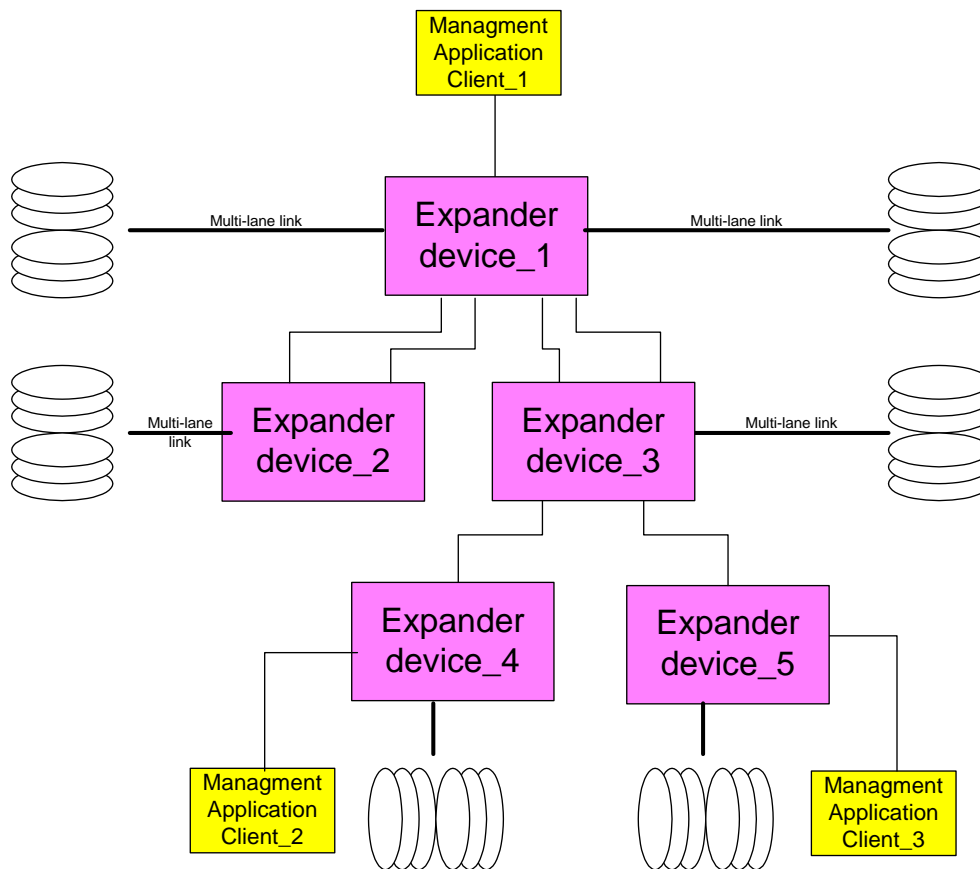
If a self-configuring expander device receives a phy initialization event or a BROADCAST (CHANGE) on a phy with the subtractive attribute then the self-configuring device **is not required** to start a discovery process. A BROADCAST (CHANGE) notification shall be forwarded on all other ports.

[Start: References to Neighbor and Domain based discovery]

## 4.7.5.2 Discover topologies

### 4.7.5.2.1 Single master domain discovery

In a single master SAS topology, a configuration there shall be only one elected discovery device. All other device discovery processes shall be disabled and shall not discover devices in the topology. The elected discovery device shall discover all devices in the SAS domain and complete the route tables of all attached expander devices.

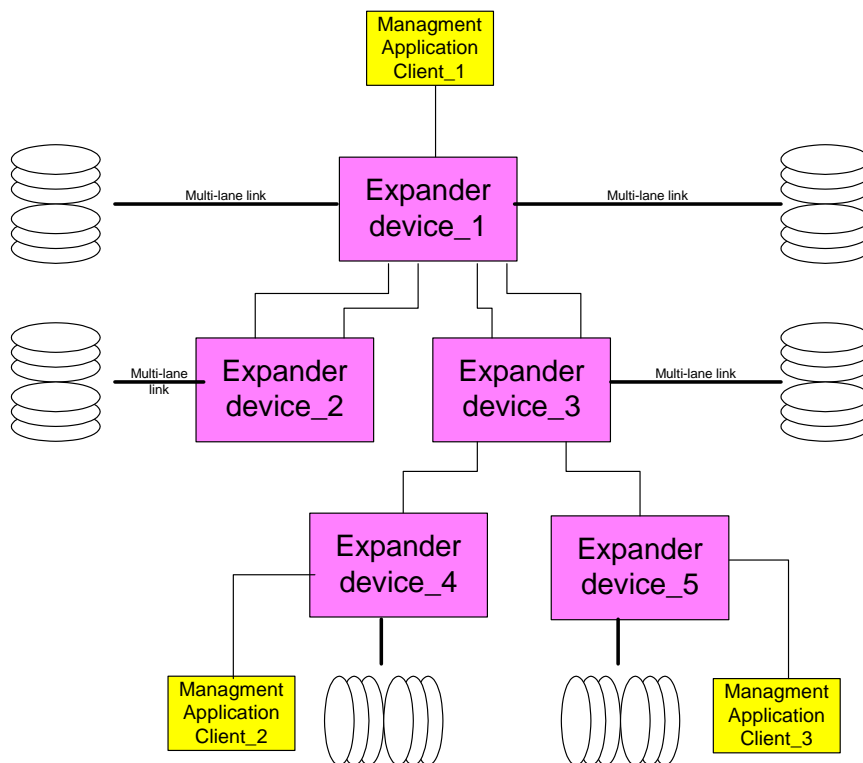


**Figure 1 – Elected device discover all devices in the domain and configures all configurable expander device route tables**

#### 4.7.5.2.1 Neighbor domain discovery

All topologies described in SAS1.0 and SAS1.1 are neighbor domain discovery topologies. In a neighbor domain discovery, all devices that support a management application client (e.g. HBA and self-configuring expander devices) shall discover devices attached to their phys, and complete the route tables of configurable expander devices attached to the non-subtractive phys.

When a self-configuring expander device is included in the topology then the self-configuring device shall discover the topology attached to all of the non-subtractive ports and complete the route tables of configurable expander devices attached to the non-subtractive phys.



**Figure 2 – All HBA's discover all devices in the domain and configure all configurable expander route table entries.**

