Accredited Standards Committee
X3, Information Processing Systems

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Reply to: John Scheible

To: X3T10.1 Membership
From: John Scheible

Subject: Limited SMS handling for Switches proposal

BACKGROUND

Simple switches (i.e., switches that support no protocol other than SSA-TL2) do not need the full complexity of SMS handling that targets which support ULPs need. At the last meeting, I agreed to pull together a proposal that would make simple switch firmware easier to implement.

Simple switches (i.e., switches that do not support ULPs other than SSA-TL2), can have simplified SMS handling. Specifically, they do not have to support:

a) Configutor tables are not needed since ULPs are not supported. If a QUERY NODE SMS is received with the DR bit set, the QUERY NODE SMS shall respond with the ITF bit set.

b) QUERY PROTOCOL SMS need not be processed nor the QUERY PROTOCOL REPLY SMS generated since ULPs are not supported.

c) DATA REPLY and DATA REDIRECT SMSs need not be processed, and DATA READY and DATA REQUEST SMSs need not be generated since no I/O processes are performed.

d) If proposal 96a145r1 is accepted, the QUERY REGISTRATION and DELETE RETURN PATH ID SMSs need not be processed.

PROPOSAL

I propose the following changes to SSA-TL2:

1) Section 5 - Replace clause 5 (but not its sub-clauses) with the new clauses 5 and 6 as shown on the following pages,

2) Table 14 (Configuration table entry), MASTER PRIORITY field, second sentence - Replace with:
"Zero indicates that the node is not capable of functioning as a Master (e.g. ~~that is~~, ~~that~~ the node is either a Responder node or a Simple Switch node)."

3) 9.2.3, last paragraph, replace with:
Only a Configutor ~~A Responder~~ node shall ~~not~~ invoke the Configuration process or build a Configuration table.

4) 9.2.4 (Configutor table), first two sentences - Replace with:
In the configuration process Configutor and Responder ~~each~~ nodes shall construct a Configutor table from the information received in QUERY NODE SMSs. Simple Switch ~~All~~ nodes shall not construct a Configutor table.

5) Table 19 - Change as shown on the following pages (add newer SMSs, independent of this proposal).

6) Table 21 - Change as shown on the following pages (Change some from "all" to "Configutor" or "Configutor, Responder)".

7) 10.2.4, second paragraph - Replace with:
If a ~~the Responder~~ node receives an SMS with an invalid RETURN PATH ID, an Asynchronous Alert process is invoked with an ALERT CODE value of INVALID RETURN PATH OR RETURN PATH ID. When the Master generates the MASTER ALERT SMS, this causes all Configutor nodes to issue a

QUERY NODE SMS to the associated node to rebuild its Configutor table. Simple Switch nodes have no Configutor table to rebuild.

8) 11.2.5 (QUERY NODE SMS), DR bit - Replace the second sentence with:
"If the DR bit is cleared then the Configutor or Responder node shall enter the specified RETURN PATH and UNIQUE ID into its Configutor table. A Simple Switch node which receives a QUERY NODE SMS with the DR bit cleared, shall generate a QUERY NODE REPLY with the ITF bit set."

9) 11.2.6 (QUERY NODE REPLY SMS), ITF bit - Add the following sentence to the end:
"A Simple Switch node which receives a QUERY NODE SMS with the DR bit cleared, shall generate a QUERY NODE REPLY with the ITF bit set."

10) 11.2.6 (QUERY NODE REPLY SMS), MASTER PRIORITY bit - Replace the second sentence with:
"A value of 000b indicates that the node is either a Responder node or a Simple Switch node and is not capable of functioning as a Master."

5. Node

Each node has one or more ports. A port consists of the hardware and firmware to support one end of a link. A node has characteristics including its node type, whether or not it is the master, and its number of ports.

5.1 Node Type

A node is identified as either a Configutor node, Responder node or Simple Switch node. This determines the processes and SMS codes that shall be supported.

5.1.1 Simple Switch node

A Simple Switch node is a node that acts as a switch, but does not have any Upper Level Protocols (ULPs) other than SSA-TL2. A Simple Switch is identified by responding with a QUERY NODE REPLY SMS using an UPPER LEVEL PROTOCOL field value of SHALL RESPOND TO NO UPPER LEVEL PROTOCOL.

A Simple Switch node does not know the topology of the Web and maintains neither a Topology table nor a Configuration table. Since it does not support any ULPs it does not maintain a Configutor table. A Simple Switch node processes and generates the SMSs identified in Table 19. Since no ULPs are supported, a Simple Switch node does not handle I/O processes, nor does it process QUIESCE SMSs, nor does it process QUERY PROTOCOL SMS nor generate the QUERY PROTOCOL REPLY SMS.

5.1.2 Responder node

A Responder node is a node that does not know the topology of the Web, and must be given a RETURN PATH field or a RETURN PATH ID field to use to send the appropriate response. A Responder node is identified by responding with a QUERY NODE REPLY SMS using an UPPER LEVEL PROTOCOL field value of anything but SHALL RESPOND TO NO UPPER LEVEL PROTOCOL, and a MASTER PRIORITY field value of 000b.

A Responder node maintains neither a Topology table nor a Configuration table, but does maintain a Configutor table. A Responder node processes and generates the SMSs identified in Table 19. A Responder node handles neither the Master Negotiation process, the Configuration process, the Async Alert Handling process, nor the Master Alert Handling process.

5.1.3 Configutor node

A Configutor node knows the topology of the Web ~~but a Responder node does not.~~, and therefore maintains a Topology table, Configuration table, as well as a Configutor table. A Configutor node is identified by either generating a QUERY NODE SMS, or by responding with a QUERY NODE REPLY SMS with a non-zero MASTER PRIORITY field value.

A Configutor node processes and generates the SMSs identified in Table 19. A Configutor node is responsible for handling all processes that a Responder node handles with the addition of the Master Negotiation process, the Configuration process, and the Master Alert Handling process.

5.2 Master

At any time, at most one node in the Web is a Master, who is responsible for coordinating error recovery. Every Configutor node shall be capable of being a Master node, but a Responder node shall not be capable of being a Master. The Master is responsible for all Configutor functions with the addition of the Async Alert handling process and the associated error recovery and the Master Alive process.

5.3 Number of ports

A node may have ~~is identified in several ways.~~

~~a) Each node is either a Configutor or a Responder, and this determines the processes and SMS codes that shall be supported. A Configutor node knows the topology of the Web but a Responder node does not.~~

~~a)~~

a) ~~A node has~~ one port (“Single port”), two ports (“Dual port”), or more than two ports (“Switch”).

Dual port nodes and switches contain a router between the ports and the node function. Figure 1 shows a dual port node.

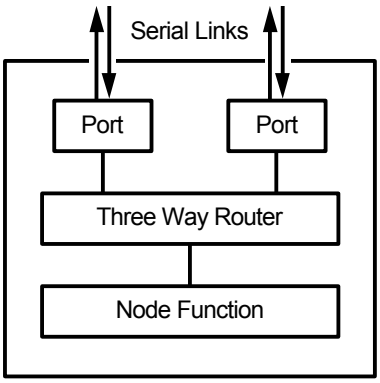

Figure 1 - Dual-port node

Depending on the ADDRESS field, the router forwards an inbound frame to the node function or to the outbound line of the other port. When the dual port node originates a frame it instructs the router to transmit it via the specified port.

6. Web

An SSA Web consists of two or more nodes interconnected by links.

The following clauses describe the types of Webs possible.

Table 19 - Response to non-zero reserved fields or reserved code values

SMS Name	Resulting SMS	Notes
QUERY NODE	Normal QUERY NODE REPLY	Ignore reserved field/values
QUERY NODE REPLY	None	Ignore reserved field/values
CONFIGURE PORT	RESPONSE SMS with RETURN CODE of INVALID FIELD	
RESPONSE	Discard	System dependent retry
ASYNC ALERT	ASYNC REPLY SMS with RETURN CODE of INVALID FIELD	Generate MASTER ALERT
MASTER ALERT	RESPONSE SMS with RETURN CODE of INVALID FIELD	
QUIESCE	RESPONSE SMS with RETURN CODE of INVALID FIELD	
ASYNC REPLY	None	No resend needed, clear the ASYNC ALERT data.
QUERY PROTOCOL	RESPONSE SMS with RETURN CODE of INVALID FIELD	
QUERY PROTOCOL REPLY	Discard	System dependent retry
QUERY PORT	RESPONSE SMS with RETURN CODE of INVALID FIELD	
QUERY PORT REPLY	Discard	System dependent retry
QUERY SWITCH	RESPONSE SMS with RETURN CODE of INVALID FIELD	
QUERY SWITCH REPLY	Discard	System dependent retry
QUERY SAT REGION	RESPONSE SMS with RETURN CODE of INVALID FIELD	
QUERY SAT REGION REPLY	Discard	System dependent retry
DATA READY	Discard	Cancel I/O Process
DATA REPLY	RESPONSE SMS with RETURN CODE of INVALID FIELD	
DATA REQUEST	Discard	Cancel I/O Process
DATA REDIRECT	RESPONSE SMS with RETURN CODE of INVALID FIELD	

Table 21 - SSA-TL2 messages supported

SMS	SMS CODE	SMS FRAME TYPE	Node type support	
			Sent from	Received by
QUERY NODE	00h	Privileged	Configutor	all
QUERY NODE REPLY	01h	Privileged	all	Configutor
CONFIGURE PORT	02h	Privileged	Master	all
RESPONSE	03h	Privileged	all	Configutor
ASYNC ALERT	04h	Privileged	all	Master
MASTER ALERT	05h	Privileged	Master	Configutor
QUIESCE	06h	Privileged	Configutor	Configutor, Responderall
ASYNC REPLY	07h	Privileged	Master	all
QUERY PROTOCOL	08h	Privileged	Configutor	Configutor, Responderall
QUERY PROTOCOL REPLY	09h	Privileged	Configutor, Responderall	Configutor
QUERY PORT	0Ah	Privileged	Configutor	all
QUERY PORT REPLY	0Bh	Privileged	all	Configutor
QUERY SWITCH	0Ch	Privileged	Configutor	all
QUERY SWITCH REPLY	0Dh	Privileged	all	all
REQUEST SAT REGION	0Eh	Privileged	Configutor	Master
REQUEST SAT REGION REPLY	0Fh	Privileged	Master	Configutor
reserved for Privileged frames	10h-1Fh	Privileged	reserved	reserved
DATA READY	20h	Application	Configutor, Responderall	Configutorall
DATA REPLY	21h	Application	Configutorall	Configutor, Responderall
DATA REQUEST	22h	Application	Configutor, Responderall	Configutorall
DATA REDIRECT	23h	Application	Configutorall	Configutor, Responderall
reserved for Application frames	24h-7Fh	Application	reserved	reserved

Defined by ULP	see 11.2.6	defined in ULP

Sincerely,

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