14. Application Management

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14.1 CHAPTER 14 CONTENTS

14.2 INTRODUCTION

The information in this chapter was relocated from Appendix C in the preceding (2.3.1) revision of the standard. It had previously been entitled Network Management, and has been renamed to more accurately describe the purpose of the messages described herein. This chapter does not specify a protocol for managing networks, à la TCP/IP SNMP. Rather, its messages provide a means to manage HL7-supporting applications over a network.

Because this chapter was originally named "Network Management," the messages and segments have labels beginning with the letter "N." These labels are retained for backward compatibility.

As a technical chapter, this information is now normative with respect to the HL7 standard. It is anticipated that additional messages and message content will be added to this chapter in the near future.

14.3 APPLICATION MANAGEMENT TRIGGER EVENTS AND MESSAGE DEFINITIONS

14.3.1 NMQ - application management query message (event N01)

The N01 event signifies when the NMQ (Application Management Query) message is used by one application to make application control-level requests for information or action to another application. It has three segments, the NCK segment (system clock), the NST segment (application control-level statistics), and the NSC segment (application control-level status change). At least one of these three segments must be present in the NMQ message. If a segment is present in the NMQ message, the corresponding segment needs to be present in the NMR message to return the requested data or status.

a) The purpose of the NCK segment is to allow the various applications on the network to synchronize their system clocks (system date and time).

b) The purpose of the NST segment is to allow application control-level statistical information to be passed between the various applications on the network. Although some of the fields in this segment refer to portions of lower level protocols, they contain information that can be used by system management applications monitoring the state of various networked applications. All the data fields in the NST (application control-level statistics) are optional, and the fields maintained by any application are to be negotiated at a particular site.

c) The purpose of the NSC segment is to request the start-up, shut-down, and/or migration (to a different CPU or file-server/file-system) of a particular application.

NMQ^N01^NMQ_N01	Application Management Query	Chapter
MSH	Message Header	2
[QRD	Query Definition	5
[QRF]]	Query Filter	5
{[NCK]	System Clock	14
[NST]	Application control-level Statistics	14
[NSC]}	Application Status Change	14

NMR^N01^NMR_N01	Application Management Response	Chapter
MSH	Message Header	2
MSA	Message Acknowledgement	2
[ERR]	Error	2
[QRD]	Query Definition	5
{[NCK]	System Clock	14
[{NTE}]	Notes and Comments	2
[NST]	Application control-level Statistics	14
[{NTE}]	Notes and Comments	2
[NSC]	Application Status Change	14
[{NTE}] }	Notes and Comments	2

14.3.1.1 QRD use notes

This segment is defined in Chapter 5. It is optional in the NMQ message. If present, *QRD-1-Query date/time*, *QRD-2-Query format code*, *QRD-3-Query priority*, *QRD-9-What subject filter,* and *QRD-12-What department data code* should be used.

Suggested values for *QRD-9-What subject filter* are NCK, NST, or NSC. If NSC is used, then suggested values for *QRD-12-what department data code* should be taken from the user-defined table for *NSC-1-Application change type*.

Since these are application management transactions, *QRD-2-Query format code* should be **R** (record oriented), *QRD-3-Query priority* should be **I** (immediate).

The other fields in this segment are optional.

14.3.2 NMD - application management data message (event N02)

The N02 event signifies when an unsolicited update (UU) Application Management Data message (NMD) is created by on application to transmit application management information to other applications. In this case, the initiating application sends an NMD message as an unsolicited update (UU) containing application management information to a receiving application, which responds with a generic acknowledgement message (ACK).

For example, an application going down for backups (or starting up again after backups) might issue such a message to one or more other applications. An application switching to another CPU or file-server may also need to use this transaction to notify other systems.

NMD^N02^NMD_N02	Application Management Data	Chapter
MSH	Message Header	2
{		
[NCK	System Clock	14
[{NTE}]	Notes and Comments	2
]		
[NST	Application control-level Statistics	14
[{NTE}]	Notes and Comments	2
]		
[NSC	Application Status Change	14
[{NTE}]	Notes and Comments	2
]		
}		

ACK^N02	Generic Acknowledgement	Chapter
MSH	Message Header	2
MSA	Message Acknowledgement	2

14.4 MESSAGE SEGMENTS

14.4.1 NCK - system clock segment

The NCK segment is used to allow the various applications on the network to synchronize their system clocks (system date and time).

HL7 Attribute Table – NCK – System clock

SEQ	LEN	DT	R/O	RP/#	TBL#	ITEM#	ELEMENT NAME
1	26	TS	R			01172	System Date/Time

14.4.1.0 NCK field definitions

14.4.1.1 NCK-1 System date/time (TS) 01172

Definition: This field contains an HL7 time stamp. It is strongly recommended that seconds be included. If the message contains an NST or NSC segment, the NCK segment is optional. If the NCK segment is present, this field is required. If present in the NMQ message, or the unsolicited NMD message, it contains the system date/time of the sending system. If present in the NMR response message, it contains the responding system's date/time.

14.4.1.2 NCK use notes

If this message is to be used to automatically reset/correct system clocks, it is recommended that the system or administrative personnel initiating the NMQ with the NCK segment have the authority to correct the clock (system date and time) for the other systems on the network. This is important in order to avoid the obvious confusion of multiple systems attempting to resynchronize each other's clocks.

If this message is used only to gather information on the various systems' clocks, it is still important for an administrative procedure to be worked out to avoid conflicts when resetting clocks.

14.4.2 NSC – Application status change segment

The NSC segment is used to inform (NMR query response) or announce (NMD unsolicited update) the start-up, shut-down, and/or migration (to a different cpu or file-server/file-system) of a particular application.

HL7 Attribute Table – NSC – Application status change

SEQ	LEN	DT	R/O	RP/#	TBL#	ITEM#	ELEMENT NAME
1	4	IS	R		0409	01188	Application Change Type
2	30	ST				01189	Current CPU
3	30	ST				01190	Current Fileserver
4	30	HD				01191	Current Application
5	30	HD				01192	Current Facility
6	30	ST				01193	New CPU
7	30	ST				01194	New Fileserver
8	30	HD				01195	New Application
9	30	HD				01196	New Facility

14.4.2.0 NSC field definitions

14.4.2.1 NSC-1 Application change type (IS) 01188

Definition: This field contains the type of change being requested (if NMR query) or announced (if NMD unsolicited update). Refer to *User-defined Table 0409 - Application change type* for suggested values. It is assumed that "new" version starts up with no loss or duplication of data as old one is shutting down (if possible).

User-defined Table 0409 - Application change type

Value	Description
SU	Start up
SD	Shut down
M	Migrates to different CPU

14.4.2.2 NSC-2 Current CPU (ST) 01189

Definition: This field contains a site-specific name for the current CPU.

14.4.2.3 NSC-3 Current fileserver (ST) 01190

Definition: This field contains a site-specific name for the current fileserver or file system used by this application.

14.4.2.4 NSC-4 Current application (HD) 01191

```
Components:  <namespace ID (IS)> ^ <universal ID (ST)> ^ <universal ID type (ID)>
```

Definition: This field contains a site-specific name used to identify the "current" application process for interfacing with lower level protocols. To be used in conjunction with the sending/receiving system and facility values in the MSH. Entirely site-defined. *User-defined Table 0361-Sending/receiving application* is used as the user-defined table of values for the first component.

Note:	By site agreement, implementors may continue to use *User-defined Table 0300 – Namespace ID* for the first component.

14.4.2.5 NSC-5 Current facility (HD) 01192

```
Components:  <namespace ID (IS)> ^ <universal ID (ST)> ^ <universal ID type (ID)>
```

Definition: This field contains a site-specific name for the current facility used by this application. To be used in conjunction with the values for the sending/receiving system and facility values in the MSH. This field further describes the current application, *NSC-5-current application*. With the promotion of this field to an HD data type, the usage has been broadened to include not just the current facility but other organizational entities such as a) the organizational entity responsible for current application; b) the responsible unit; c) a product or vendor's identifier, etc. Entirely site-defined. *User-defined Table 0362 – Sending/receiving facility* is used as the HL7 identifier for the user-defined table of values for the first component.

Note:	By site agreement, implementors may continue to use *user-defined table 0300 – Namespace ID* for the first component.

14.4.2.6 NSC-6 New CPU (ST) 01193

Definition: This field contains a site-specific name for the new CPU.

14.4.2.7 NSC-7 New fileserver (ST) 01194

Definition: This field contains a site-specific name for the new fileserver or file system used by this application.

14.4.2.8 NSC-8 New application (HD) 01195

```
Components:  <namespace ID (IS)> ^ <universal ID (ST)> ^ <universal ID type (ID)>
```

Definition: This field contains a site-specific name used to identify "new" application processes for interfacing with lower level protocols. To be used in conjunction with the sending/receiving system and facility values in the MSH. Entirely site-defined. *User-defined Table 0361-Sending/receiving application* is used as the user-defined table of values for the first component.

Note:	By site agreement, implementors may continue to use *user-defined table 0300 – Namespace ID* for the first component.

14.4.2.9 NSC-9 New facility (HD) 01196

```
Components:  <namespace ID (IS)> ^ <universal ID (ST)> ^ <universal ID type (ID)>
```

Definition: This field contains a site-specific name for the new facility used by this application. To be used in conjunction with the values for the sending/receiving system and facility values in the MSH.

This field further describes the new application, *NSC-8-new application*. With the promotion of this field to an HD data type, the usage has been broadened to include not just the new facility but other organizational entities such as a) the organizational entity responsible for new application; b) the responsible unit; c) a product or vendor's identifier, etc. Entirely site-defined. *User-defined Table 0362 – Sending/receiving facility* is used as the HL7 identifier for the user-defined table of values for the first component.

Note:	By site agreement, implementors may continue to use *user-defined table 0300 – Namespace ID* for the first component.

14.4.2.10 NSC use notes

Fields 2-9. These are not applicable (“n/a”) when the type of change being requested or reported is start-up or shut-down. If the change is of type "M", at least one of fields 2-5 must be different from its corresponding field in range 6-9.

Fields 4-5, 8-9. See definitions for the MSH, message header segment, in Chapter 2, (Control Section), for fields 3-4, for system and facility. "Application" is available for interfacing with lower level protocols. "Facility" is entirely site-defined.

Fields 2-3, 6-7. Entirely site-defined.

14.4.3 NST – Application control-level statistics segment

The NST segment allows application control-level statistical information to be passed between the various systems on the network. Some fields in this segment refer to portions of lower level protocols; they contain information that can be used by application management applications monitoring the state of various network links.

HL7 Attribute Table – NST – Application control level statistics

SEQ	LEN	DT	R/O	RP/#	TBL#	ITEM#	ELEMENT NAME
1	1	ID	R		0136	01173	Statistics Available
2	30	ST				01174	Source Identifier
3	3	ID			0332	01175	Source Type
4	26	TS				01176	Statistics Start
5	26	TS				01177	Statistics End
6	10	NM				01178	Receive Character Count
7	10	NM				01179	Send Character Count
8	10	NM				01180	Messages Received
9	10	NM				01181	Messages Sent
10	10	NM				01182	Checksum Errors Received
11	10	NM				01183	Length Errors Received
12	10	NM				01184	Other Errors Received
13	10	NM				01185	Connect Timeouts
14	10	NM				01186	Receive Timeouts
15	10	NM				01187	Application control-level Errors

14.4.3.0 NST field definitions

14.4.3.1 NST-1 Statistics available (ID) 01173

Definition: This field indicates the availability of statistics. Refer to *HL7 table 0136 - Yes/no indicator* for valid values.

N - the responding application does not keep any statistics. If the value “N” is specified, the response message is used to signify to the initiating application that the communication link between the initiating application and the responding application is operational (and fields 2-15 are empty in the response message).

Y - the responding application does keep statistics, fields 4 and 5 are required, (and the response message contains one or more non-null fields in the range 2-3, 6-15).

14.4.3.2 NST-2 Source identifier (ST) 01174

Definition: This field identifies a particular lower level link (e.g., a port number).

14.4.3.3 NST-3 Source type (ID) 01175

Definition: This field identifies (in certain systems) whether a lower level source identifier is an initiate or accept type. *Refer to HL7 Table 0332 - Source type* for valid values.

Table 0332 –Source type

Value	Description
I	Initiate
A	Accept

14.4.3.4 NST-4 Statistics start (TS) 01176

Definition: This field contains the date/time stamp of the start of the collection of the statistics reported in fields 6-15 of this segment. It is strongly recommended that this value include seconds.

14.4.3.5 NST-5 Statistics end (TS) 01177

Definition: This field contains the date/time stamp of the end of the statistics collection period reported in fields 6-15 of this segment. It is strongly recommended that this value include seconds.

14.4.3.6 NST-6 Receive character count (NM) 01178

Definition: This field contains the number of characters received.

14.4.3.7 NST-7 Send character count (NM) 01179

Definition: This field contains the number of characters sent.

14.4.3.8 NST-8 Messages received (NM) 01180

Definition: This field contains the number of messages received.

14.4.3.9 NST-9 Messages sent (NM) 01181

Definition: This field contains the number of messages sent.

14.4.3.10 NST-10 Checksum errors received (NM) 01182

Definition: This field contains the number of messages received with checksum errors.

14.4.3.11 NST-11 Length errors received (NM) 01183

Definition: This field contains the number of messages received with length errors.

14.4.3.12 NST-12 Other errors received (NM) 01184

Definition: This field contains the number of "other" invalid messages received (excluding length and checksum errors).

14.4.3.13 NST-13 Connect timeouts (NM) 01185

Definition: This field contains the number of connect timeout errors.

14.4.3.14 NST-14 Receive timeouts (NM) 01186

Definition: This field contains the number of timeouts while waiting for a response to an initiated message.

14.4.3.15 NST-15 Application control-level errors (NM) 01187

Definition: This field contains the number of application control-level errors in response to an initiated message.

14.4.3.16 NST use notes

Fields 2-15. These are all marked optional since the statistics kept on a particular link and negotiated between the two systems in question will vary. Not all values will apply to each system. Some values are concerned with the type of port, and some values pertain to the lower level protocol.

14.5 OUTSTANDING ISSUES

None.