



Telnet Protocol (Telnet) for NetX Duo

User Guide

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Chapter 1

Introduction to Telnet

The Telnet Protocol (Telnet) is a protocol designed for transferring commands and responses between two nodes on the Internet. Telnet is a simple protocol that utilizes reliable Transmission Control Protocol (TCP) services to perform its transfer function. Because of this, Telnet is a highly reliable transfer protocol. Telnet is also one of the most used application protocols.

Telnet Requirements

In order to function properly, the NetX Duo Telnet package requires that a NetX IP instance has already been created. In addition, TCP must be enabled on that same IP instance. The Telnet Client portion of the NetX Duo Telnet package has no further requirements.

The Telnet Server portion of the NetX Duo Telnet package has one additional requirement. It requires complete access to TCP *well-known port 23* for handling all Client Telnet requests.

NetX Duo Telnet is not changed in any way from NetX Telnet except when the Client attempts to connect to the server, the server host names must resolve to an NXD_ADDRESS, either IPv6 or IPv4 address. For backward compatibility, NetX Duo Telnet converted the original *nxd_telnet_client_connect* function to a wrapper function that will accept IPv4 addresses, convert them to NXD_ADDRESSES and pass a pointer to the data to the actual *nxd_telnet_client_connect* call. These will be discussed in greater detail in Chapter 3 and demonstrated in the “Small Example System” section in Chapter 2.

Telnet Constraints

The NetX Duo Telnet protocol implements the Telnet standard. However, the interpretation and response of Telnet commands, indicated by a byte with the value of 255, is the responsibility of the application. The various Telnet commands and command parameters are defined in the *nxd_telnet.h* file.

Telnet Communication

As mentioned previously, the Telnet Server utilizes the *well-known TCP port 23* to field Client requests. Telnet Clients may use any available TCP port.

Telnet Authentication

Telnet authentication is the responsibility of the application's Telnet Server callback function. The application's Telnet Server "new connection" callback would typically prompt the Client for name and/or password. The Client would then be responsible for providing the information. The Server would then process the information in the "receive data" callback. This is where the application Server code would have to authenticate the information and decide whether or not it is valid.

Telnet New Connection Callback

The NetX Duo Telnet Server calls the application specified callback function whenever a new Telnet Client request is received. The application specifies the callback function when the Telnet Server is created via the ***nx_telnet_server_create*** function. Typical actions of the "new connection" callback include sending a banner or prompt to the Client. This could very well include a prompt for login information.

The format of the application "new connection" callback routine is very simple and is defined below:

```
void telnet_new_connection(NX_TELNET_SERVER *server_ptr,
                          UINT logical_connection);
```

The input parameters are defined as follows:

| Parameter | Meaning |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>server_ptr</i> | Pointer to the calling Telnet Server. |
| <i>logical_connection</i> | The internal logical connection for the Telnet Server. This can be used by the application as an index into buffers and/or data structures specific for each Client connection. Its value ranges from 0 through |

NX_TELNET_MAX_CLIENTS-1.

Telnet Receive Data Callback

The NetX Duo Telnet Server calls the application specified callback function whenever a new Telnet Client data is received. The application specifies the callback function when the Telnet Server is created via the ***nx_telnet_server_create*** function. Typical actions of the “new connection” callback include echoing the data back and/or parsing the data and providing data as a result of interpreting a command from the client.

Note that this callback routine must also release the supplied packet.

The format of the application “receive data” callback routine is very simple and is defined below:

```
void telnet_receive_data(NX_TELNET_SERVER *server_ptr,
                        UINT logical_connection, NX_PACKET *packet_ptr);
```

The input parameters are defined as follows:

| Parameter | Meaning |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>server_ptr</i> | Pointer to the calling Telnet Server. |
| <i>logical_connection</i> | The internal logical connection for the Telnet Server. This can be used by the application as an index into buffers and/or data structures specific for each Client connection. Its value ranges from 0 through NX_TELNET_MAX_CLIENTS-1. |
| <i>packet_ptr</i> | Pointer to packet containing the data from the Client. |

Telnet End Connection Callback

The NetX Duo Telnet Server calls the application specified callback function whenever a Telnet Client ends the connection. The application specifies the callback function when the Telnet Server is created via the ***nx_telnet_server_create*** function. Typical actions of the “end connection”

callback include cleaning up any Client specific data structures associated with the logical connection.

The format of the application “end connection” callback routine is very simple and is defined below:

```
void telnet_end_connection(NX_TELNET_SERVER *server_ptr,
                          UINT logical_connection);
```

The input parameters are defined as follows:

| Parameter | Meaning |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>server_ptr</i> | Pointer to the calling Telnet Server. |
| <i>logical_connection</i> | The internal logical connection for the Telnet Server. This can be used by the application as an index into buffers and/or data structures specific for each Client connection. Its value ranges from 0 through NX_TELNET_MAX_CLIENTS-1. |

Telnet Multi-Thread Support

The NetX Duo Telnet Client services can be called from multiple threads simultaneously. However, read or write requests for a particular Telnet Client instance should be done in sequence from the same thread.

Telnet RFCs

NetX Duo Telnet is compliant with RFC854 and related RFCs.

Chapter 2

Installation and Use of Telnet

This chapter contains a description of various issues related to installation, setup, and usage of the NetX Duo Telnet component.

Product Distribution

Telnet for NetX Duo is shipped on a single CD-ROM compatible disk. The package includes three source files, two include files, and a PDF file that contains this document, as follows:

| | |
|-------------------------------------------|----------------------------------------------|
| <code>nxd_telnet_client.h</code> | Header file for Telnet Client for NetX Duo |
| <code>nxd_telnet_client.c</code> | C Source file for Telnet Client for NetX Duo |
| <code>nxd_telnet_server.h</code> | Header file for Telnet Server for NetX Duo |
| <code>nxd_telnet_server.c</code> | C Source file for Telnet Server for NetX Duo |
| <code>nxd_telnet.pdf</code> | PDF description of Telnet for NetX Duo |
| <code>demo_netxduo_telnet.c</code> | NetX Duo Telnet demonstration |

Telnet Installation

In order to use Telnet for NetX Duo, the entire distribution mentioned previously should be copied to the same directory where NetX Duo is installed. For example, if NetX Duo is installed in the directory “*\threadx\arm7\green*” then the *nxd_telnet_client.h*, *nxd_telnet_client.c*, *nxd_telnet_server.c* and *nxd_telnet_server.h* files should be copied into this directory.

Using Telnet

Using Telnet for NetX Duo is easy. Basically, the application code must include *nxd_telnet_server.h* for Telnet Server applications and *nxd_telnet_client.h* for Telnet Client applications after it includes *tx_api.h* and *nx_api.h*, in order to use ThreadX and NetX Duo. Once the header is included, the application code is then able to make the Telnet function calls specified later in this guide. The application must also include *nxd_telnet_client.c* and *nxd_telnet_server.c* in the build process. These files must be compiled in the same manner as other application files and its object form must be linked along with the files of the application. This is all that is required to use NetX Duo Telnet.

If no Telnet Client capabilities are required, the *nxd_telnet_client.c* file may be omitted.

Note also that because Telnet utilizes NetX Duo TCP services, TCP must be enabled with the *nx_tcp_enable* call prior to using Telnet.

Small Example System

An example of how easy it is to use NetX Duo Telnet is described in Figure 1.1 that appears below. In this example, the Telnet include files are brought in at line 7 and 8. Next, the Telnet Server is created in “*tx_application_define*” at line 146. Note that the Telnet Server and Client control blocks are defined as global variables at line 23-24 previously.

Before the Telnet Server or Client can be started they must validate their IP address with NetX Duo. For IPv4 connections this is accomplished by simply waiting briefly to let the NetX driver initialize the system on line 166. For IPv6 connections, this requires enabling IPv6 and ICMPv6 which it does in lines 171-172. The Client sets its global and linklocal IPv6 addresses on the primary interface on lines 181-186 and waits for NetX Duo validation to complete in the background. The Server also sets its global and linklocal addresses on its primary interface in lines 192 – 198. Note that the two services, *nxd_ipv6_global_address_set* and *nxd_ipv6_linklocal_address_set* are replaced with *nxd_ipv6_address_set* service. The former two services are still available for legacy NetX Duo applications but are eventually deprecated. Developers are encouraged to use *nxd_ipv6_address_set* instead.

After successful IP address validation with NetX Duo, the Telnet Server is started at line 215 using the *nxd_telnet_server_start* service. At line 226 the Telnet Client is created using the *nx_telnet_client_create* service. It then connects with the Telnet Server on line 242 for IPv4 applications and line 238 for IPv6 applications using the *nxd_telnet_client_connect* and *nx_telnet_client_connect* services respectively. After successful validation and connection with the server, it makes a few exchanges before disconnecting.

```

1  /* This is a small demo of TELNET on the high-performance NetX Duo TCP/IP stack.
2     This demo relies on ThreadX and NetX Duo to show a simple TELNET connection,
3     send, server echo, and then disconnection from the TELNET server. */
4
5  #include "tx_api.h"
6  #include "nx_api.h"
7  #include "nxd_telnet_client.h"
8  #include "nxd_telnet_server.h"
9  #define DEMO_STACK_SIZE 4096
10
11
12 /* Define the ThreadX and NetX object control blocks... */
13
14 TX_THREAD test_thread;
15 NX_PACKET_POOL pool_server;
```

```

16 NX_PACKET_POOL      pool_client;
17 NX_IP               ip_server;
18 NX_IP               ip_client;
19
20
21 /* Define TELNET objects. */
22
23 NX_TELNET_SERVER     my_server;
24 NX_TELNET_CLIENT     my_client;
25
26
27 #ifdef FEATURE_NX_IPV6
28
29 /* Define NetX Duo IP address for the NetX Duo Telnet Server and Client. */
30
31 NXD_ADDRESS          server_ip_address;
32 NXD_ADDRESS          client_ip_address;
33
34 #endif
35
36 #define              SERVER_ADDRESS          IP_ADDRESS(1,2,3,4)
37 #define              CLIENT_ADDRESS          IP_ADDRESS(1,2,3,5)
38
39
40
41 /* Define the counters used in the demo application... */
42
43 ULONG                error_counter;
44
45
46 /* Define timeout in ticks for connecting and sending/receiving data. */
47
48 #define              TELNET_TIMEOUT  200
49
50 /* Define function prototypes. */
51
52 void  thread_test_entry(ULONG thread_input);
53 void  _nx_ram_network_driver(struct NX_IP_DRIVER_STRUCT *driver_req);
54
55
56 /* Define the application's TELNET Server callback routines. */
57
58 void  telnet_new_connection(NX_TELNET_SERVER *server_ptr, UINT
                               logical_connection);
59 void  telnet_receive_data(NX_TELNET_SERVER *server_ptr, UINT logical_connection,
                               NX_PACKET *packet_ptr);
60 void  telnet_connection_end(NX_TELNET_SERVER *server_ptr, UINT
                               logical_connection);
61
62
63 /* Define main entry point. */
64
65 int main()
66 {
67
68     /* Enter the ThreadX kernel. */
69     tx_kernel_enter();
70 }
71
72
73 /* Define what the initial system looks like. */
74 void tx_application_define(void *first_unused_memory)
75 {
76
77     UINT  status;
78     CHAR  *pointer;
79     UINT  iface_index, address_index;
80
81     /* Setup the working pointer. */
82     pointer = (CHAR *) first_unused_memory;
83
84     /* Create the main thread. */
85     tx_thread_create(&test_thread, "test thread", thread_test_entry, 0,
86                     pointer, DEMO_STACK_SIZE,
87                     2, 2, TX_NO_TIME_SLICE, TX_AUTO_START);
88     pointer = pointer + DEMO_STACK_SIZE;
89
90     /* Initialize the NetX system. */
91     nx_system_initialize();
92
93     /* Create packet pool. */

```

```

94     nx_packet_pool_create(&pool_server, "Server NetX Packet Pool",
95                           600, pointer, 8192);
96     pointer = pointer + 8192;
97     /* Create an IP instance. */
98     nx_ip_create(&ip_server, "Server NetX IP Instance", SERVER_ADDRESS,
99                 0xFFFFFFFFUL, &pool_server, _nx_ram_network_driver,
100                 pointer, 4096, 1);
101
102     pointer = pointer + 4096;
103
104     /* Create another packet pool. */
105     nx_packet_pool_create(&pool_client, "Client NetX Packet Pool", 600,
106                           pointer, 8192);
107     pointer = pointer + 8192;
108
109     /* Create another IP instance. */
110     nx_ip_create(&ip_client, "Client NetX IP Instance", CLIENT_ADDRESS,
111                 0xFFFFFFFFUL, &pool_client, _nx_ram_network_driver,
112                 pointer, 4096, 1);
113
114     pointer = pointer + 4096;
115
116     /* Enable ARP and supply ARP cache memory for IP Instance 0. */
117     nx_arp_enable(&ip_server, (void *) pointer, 1024);
118     pointer = pointer + 1024;
119
120     /* Enable ARP and supply ARP cache memory for IP Instance 1. */
121     nx_arp_enable(&ip_client, (void *) pointer, 1024);
122     pointer = pointer + 1024;
123
124     /* Enable TCP processing for both IP instances. */
125     nx_tcp_enable(&ip_server);
126     nx_tcp_enable(&ip_client);
127
128     #ifdef FEATURE_NX_IPV6
129
130     /* Next set the NetX Duo Telnet Server and Client addresses. */
131     server_ip_address.nxd_ip_address.v6[3] = 0x105;
132     server_ip_address.nxd_ip_address.v6[2] = 0x0;
133     server_ip_address.nxd_ip_address.v6[1] = 0x0000f101;
134     server_ip_address.nxd_ip_address.v6[0] = 0x20010db1;
135     server_ip_address.nxd_ip_version = NX_IP_VERSION_V6;
136
137     client_ip_address.nxd_ip_address.v6[3] = 0x101;
138     client_ip_address.nxd_ip_address.v6[2] = 0x0;
139     client_ip_address.nxd_ip_address.v6[1] = 0x0000f101;
140     client_ip_address.nxd_ip_address.v6[0] = 0x20010db1;
141     client_ip_address.nxd_ip_version = NX_IP_VERSION_V6;
142
143     #endif
144
145     /* Create the NetX Duo TELNET Server. */
146     status = nx_telnet_server_create(&my_server, "Telnet Server", &ip_server,
147                                     pointer, 2048, telnet_new_connection, telnet_receive_data,
148                                     telnet_connection_end);
149
150     /* Check for errors. */
151     if (status)
152         error_counter++;
153
154     return;
155 }
156
157 /* Define the test thread. */
158 void thread_test_entry(ULONG thread_input)
159 {
160
161     NX_PACKET *my_packet;
162     UINT status;
163
164     /* Allow other threads (e.g. IP thread task) to run first. */
165     tx_thread_sleep(100);
166
167     #ifdef FEATURE_NX_IPV6
168
169     /* Here's where we make the Telnet Client IPv6 enabled. */
170     nxd_ipv6_enable(&ip_client);
171     nxd_icmp_enable(&ip_client);
172

```

```

173
174 /* wait till the IP task thread initializes the system. */
175 tx_thread_sleep(100);
176
177
178 /* Set up the Client addresses on the Client IP for the primary interface. */
179 if_index = 0;
180
181 status = nxd_ipv6_address_set(&ip_client, if_index, NX_NULL, 10,
                                &address_index);
182 status = nxd_ipv6_address_set(&ip_client, if_index, &client_ip_address,
                                64, &address_index);
183
184
185 /* Allow NetX Duo time to validate addresses. */
186 tx_thread_sleep(400);
187
188
189 /* Set up the Server addresses on the Client IP. */
190
191 if_index = 0;
192 status = nxd_ipv6_address_set (&ip_server, if_index, NX_NULL, 10,
                                &address_index);
193
194 status = nxd_ipv6_address_set(&ip_server, if_index, &server_ip_address,
                                64, &address_index);
195
196
197 /* Allow NetX Duo time to validate addresses. */
198 tx_thread_sleep(400);
199
200 #endif
201
202
203 /* Start the TELNET Server. */
204 status = nx_telnet_server_start(&my_server);
205
206
207 /* Check for errors. */
208 if (status != NX_SUCCESS)
209 {
210
211     return;
212 }
213
214
215 /* Create a TELNET client instance. */
216 status = nx_telnet_client_create(&my_client, "My TELNET Client",
                                &ip_client, 600);
217
218
219 /* Check status. */
220 if (status != NX_SUCCESS)
221 {
222     return;
223 }
224
225
226 #ifdef FEATURE_NX_IPV6
227
228 /* Connect the TELNET client to the TELNET Server at port 23. */
229 status = nxd_telnet_client_connect(&my_client, &server_ip_address, 23,
                                    TELNET_TIMEOUT);
230
231
232 #else
233
234 /* Connect the TELNET client to the TELNET Server at port 23. */
235 status = nx_telnet_client_connect(&my_client, SERVER_ADDRESS, 23,
                                    TELNET_TIMEOUT);
236
237
238 #endif
239
240
241 /* Check status. */
242 if (status != NX_SUCCESS)
243 {
244     return;
245 }
246
247
248 /* Allocate a packet. */
249 status = nx_packet_allocate(&pool_client, &my_packet, NX_TCP_PACKET,
                                NX_WAIT_FOREVER);
250
251
252 /* Check status. */
253 if (status != NX_SUCCESS)

```

```

257     {
258         return;
259     }
260
261     /* Build a simple 1-byte message. */
262     nx_packet_data_append(my_packet, "a", 1, &pool_client, NX_WAIT_FOREVER);
263
264     /* Send the packet to the TELNET Server. */
265     status = nx_telnet_client_packet_send(&my_client, my_packet, TELNET_TIMEOUT);
266
267     /* Check status. */
268     if (status != NX_SUCCESS)
269     {
270         return;
271     }
272
273
274
275     /* Pickup the Server header. */
276     status = nx_telnet_client_packet_receive(&my_client, &my_packet,
                                              TELNET_TIMEOUT);
277
278     /* Check status. */
279     if (status != NX_SUCCESS)
280     {
281         return;
282     }
283
284
285     /* At this point the packet should contain the Server's banner
286        message sent by the Server callback function below. Just
287        release it for this demo. */
288     nx_packet_release(my_packet);
289
290     /* Pickup the Server echo of the character. */
291     status = nx_telnet_client_packet_receive(&my_client, &my_packet,
                                              TELNET_TIMEOUT);
292
293     /* Check status. */
294     if (status != NX_SUCCESS)
295     {
296         return;
297     }
298
299
300     /* At this point the packet should contain the character 'a' that
301        we sent earlier. Just release the packet for now. */
302     nx_packet_release(my_packet);
303
304     /* Now disconnect form the TELNET Server. */
305     status = nx_telnet_client_disconnect(&my_client, TELNET_TIMEOUT);
306
307
308     /* Check status. */
309     if (status != NX_SUCCESS)
310     {
311         return;
312     }
313
314
315     /* Delete the TELNET Client. */
316     status = nx_telnet_client_delete(&my_client);
317
318     /* Check status. */
319     if (status != NX_SUCCESS)
320     {
321         return;
322     }
323 }
324
325
326 /* This routine is called by the NetX Telnet Server whenever a new Telnet client
327    connection is established. */
328 void telnet_new_connection(NX_TELNET_SERVER *server_ptr, UINT logical_connection)
329 {
330
331     UINT      status;
332     NX_PACKET *packet_ptr;
333
334
335

```

```

336     /* Allocate a packet for client greeting. */
337     status = nx_packet_allocate(&pool_server, &packet_ptr, NX_TCP_PACKET,
                                NX_NO_WAIT);
338
339     if (status != NX_SUCCESS)
340     {
341         error_counter++;
342         return;
343     }
344
345     /* Build a banner message and a prompt. */
346     nx_packet_data_append(packet_ptr,
347         "**** Welcome to NetX TELNET Server ****\r\n\r\n\r\n", 45,
348         &pool_server, NX_NO_WAIT);
349
350     nx_packet_data_append(packet_ptr, "NETX> ", 6, &pool_server, NX_NO_WAIT);
351
352     /* Send the packet to the client. */
353     status = nx_telnet_server_packet_send(server_ptr, logical_connection,
354         packet_ptr, TELNET_TIMEOUT);
355
356     if (status != NX_SUCCESS)
357     {
358         error_counter++;
359         nx_packet_release(packet_ptr);
360     }
361
362     return;
363 }
364
365 /* This routine is called by the NetX Telnet Server whenever data is present on a
366 Telnet client connection. */
367 void telnet_receive_data(NX_TELNET_SERVER *server_ptr, UINT logical_connection,
368     NX_PACKET *packet_ptr)
369 {
370     UINT status;
371     UCHAR alpha;
372
373     /* This demo echoes the character back; on <cr,lf> sends a new prompt back to
374 the client. A real system would likely buffer the character(s) received in a
375 buffer associated with the supplied logical connection and process it. */
376
377     /* Just throw away carriage returns. */
378     if ((packet_ptr -> nx_packet_prepend_ptr[0] == '\r') &&
379         (packet_ptr -> nx_packet_length == 1))
380     {
381         printf("telnet server received just a CRLF\n");
382         nx_packet_release(packet_ptr);
383         return;
384     }
385
386     /* Setup new line on line feed. */
387     if ((packet_ptr -> nx_packet_prepend_ptr[0] == '\n') || (packet_ptr ->
388         nx_packet_prepend_ptr[1] == '\n'))
389     {
390         /* Clean up the packet. */
391         packet_ptr -> nx_packet_length = 0;
392         packet_ptr -> nx_packet_prepend_ptr = packet_ptr -> nx_packet_data_start +
393             NX_TCP_PACKET;
394         packet_ptr -> nx_packet_append_ptr = packet_ptr -> nx_packet_data_start +
395             NX_TCP_PACKET;
396
397         /* Build the next prompt. */
398         nx_packet_data_append(packet_ptr, "\r\nNETX> ", 8, &pool_server,
399             NX_NO_WAIT);
400
401         /* Send the packet to the client. */
402         status = nx_telnet_server_packet_send(server_ptr, logical_connection,
403             packet_ptr, TELNET_TIMEOUT);
404
405         if (status != NX_SUCCESS)

```

```

406     {
407         error_counter++;
408         nx_packet_release(packet_ptr);
409     }
410     return;
411 }
412
413
414
415 /* Pickup first character (usually only one from client). */
416 alpha = packet_ptr -> nx_packet_prepend_ptr[0];
417
418 /* Echo character. */
419 status = nx_telnet_server_packet_send(server_ptr, logical_connection,
                                         packet_ptr, TELNET_TIMEOUT);
420
421 if (status != NX_SUCCESS)
422 {
423     error_counter++;
424     nx_packet_release(packet_ptr);
425 }
426
427 /* Check for a disconnection. */
428 if (alpha == 'q')
429 {
430
431     /* Initiate server disconnection. */
432     nx_telnet_server_disconnect(server_ptr, logical_connection);
433 }
434 }
435
436
437 /* This routine is called by the NetX Telnet Server when the client disconnects. */
438 void telnet_connection_end(NX_TELNET_SERVER *server_ptr, UINT logical_connection)
439 {
440     /* Cleanup any application specific connection or buffer information. */
441     return;
442 }

```

Figure 1.1 Example of Telnet use with NetX Duo

Configuration Options

There are several configuration options for building Telnet for NetX Duo. Following is a list of all options, where each is described in detail:

| Define | Meaning |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NX_DISABLE_ERROR_CHECKING | Defined, this option removes the basic Telnet error checking. It is typically used after the application has been debugged. |
| NX_TELNET_MAX_CLIENTS | The maximum number of Telnet Clients supported by the Server thread. By default, this value is defined as 4 to specify a maximum of 4 clients at a time. This define can be set by the application prior to inclusion of <i>nxd_telnet_server.h</i> . |
| NX_TELNET_SERVER_PRIORITY | The priority of the Telnet Server thread. By default, this value is defined as 16 to specify priority 16. This define can be set by the application prior to inclusion of <i>nxd_telnet_server.h</i> . |
| NX_TELNET_TOS | Type of service required for the Telnet TCP requests. By default, this value is defined as NX_IP_NORMAL to indicate normal IP packet service. This define can be set by the application prior to inclusion of <i>nxd_telnet_server.h</i> and <i>nxd_telnet_client.h</i> |
| NX_TELNET_FRAGMENT_OPTION | Fragment enable for Telnet TCP requests. By default, this value is NX_DONT_FRAGMENT to disable Telnet TCP fragmenting. This define can be set by the application prior to |

inclusion of *nxd_telnet_server.h*
and *nxd_telnet_client.h*

NX_TELNET_SERVER_WINDOW_SIZE Server socket window size. By default, this value is 2048 bytes. This define can be set by the application prior to inclusion of *nxd_telnet_server.h*.

NX_TELNET_TIME_TO_LIVE Specifies the number of routers this packet can pass before it is discarded. The default value is set to 0x80, but can be redefined prior to inclusion of *nxd_telnet_server.h* and *nxd_telnet_client.h*.

NX_TELNET_SERVER_TIMEOUT Specifies the number of ThreadX ticks that internal services will suspend for. The default value is set to 1000, but can be redefined prior to inclusion of *nxd_telnet_server.h*.

NX_TELNET_ACTIVITY_TIMEOUT Specifies the number of seconds that can elapse without any activity before the Server disconnects the Client connection. The default value is set to 600 seconds, but can be redefined prior to inclusion of *nxd_telnet_server.h*.

NX_TELNET_TIMEOUT_PERIOD Specifies the number of seconds between checking for Client activity timeouts. The default value is set to 60 seconds, but can be redefined prior to inclusion of *nxd_telnet_server.h*.

Chapter 3

Description of Telnet Services

This chapter contains a description of all NetX Telnet services (listed below) in alphabetic order.

In the “Return Values” section in the following API descriptions, values in **BOLD** are not affected by the **NX_DISABLE_ERROR_CHECKING** define that is used to disable API error checking, while non-bold values are completely disabled.

`nx_telnet_client_connect`

Connect a Telnet Client with IPv4 address

`nxd_telnet_client_connect`

Connect an IPv6 Telnet Client with IPv6 address

`nx_telnet_client_create`

Create a Telnet Client

`nx_telnet_client_delete`

Delete a Telnet Client

`nx_telnet_client_disconnect`

Disconnect a Telnet Client

`nx_telnet_client_packet_receive`

Receive packet via Telnet Client

`nx_telnet_client_packet_send`

Send packet via Telnet Client

`nx_telnet_server_create`

Create a Telnet Server

`nx_telnet_server_delete`

Delete a Telnet Server

`nx_telnet_server_disconnect`

Disconnect a Telnet Client

`nx_telnet_server_packet_send`

Send packet through Client connection

nx_telnet_server_start
Start a Telnet Server

nx_telnet_server_stop
Stop a Telnet Server

nx_telnet_client_connect

Connect a Telnet Client with IPv4 address

Prototype

```
UINT nx_telnet_client_connect(NX_TELNET_CLIENT *client_ptr,
                             ULONG server_ip, UINT server_port, ULONG wait_option);
```

Description

This service attempts to connect the previously created Telnet Client instance to the Server at the specified IP and port using an IPv4 address for the Telnet Server. This service actually inserts the ULONG server IP address in an NXD_ADDRESS control block and sets the IP version to 4 before calling the *nxd_telnet_client_connect* service described below.

Input Parameters

| | |
|--------------------|----------------------------------------------------------------------------------------------------------------|
| client_ptr | Pointer to Telnet Client control block. |
| server_ip | IPv4 Address of the Telnet Server. |
| server_port | TCP Port of Server (Telnet Server is port 23). |
| wait_option | Defines how long the service will wait for the Telnet Client connect. The wait options are defined as follows: |

timeout value (0x00000001 through 0xFFFFFFFFE)

TX_WAIT_FOREVER (0xFFFFFFFF)

Selecting TX_WAIT_FOREVER causes the calling thread to suspend indefinitely until the Telnet Server responds to the request.

Selecting a numeric value (1-0xFFFFFFFFE) specifies the maximum number of timer-ticks to stay suspended while waiting for the Telnet Server response.

Return Values

| | | |
|-------------------|--------|----------------------------|
| NX_SUCCESS | (0x00) | Successful Client connect. |
|-------------------|--------|----------------------------|

| | | |
|-----------------------------------|--------|---------------------------------|
| NX_TELNET_ERROR | (0xF0) | Client connect error. |
| NX_TELNET_NOT_DISCONNECTED | (0xF4) | Client already connected. |
| NX_PTR_ERROR | (0x16) | Invalid Client pointer. |
| NX_IP_ADDRESS_ERROR | (0x21) | Invalid IP address. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Connect the Telnet Client instance "my_client" to the Server at
   IP address 1.2.3.4 and port 23. */
status = nx_telnet_client_connect(&my_client, IP_ADDRESS(1,2,3,4), 23, 100);

/* If status is NX_SUCCESS the Telnet Client instance was successfully
   connected to the Telnet Server. */
```

See Also

nx_telnet_client_create, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_create,
 nx_telnet_server_delete, nx_telnet_server_disconnect,
 nx_telnet_server_packet_send, nx_telnet_server_start,
 nx_telnet_server_stop

nxd_telnet_client_connect

Connect a Telnet Client with IPv6 or IPv4 address

Prototype

```
UINT nxd_telnet_client_connect(NX_TELNET_CLIENT *client_ptr,
                               NXD_ADDRESS *server_ip_address, UINT server_port,
                               ULONG wait_option);
```

Description

This service attempts to connect the previously created Telnet Client instance to the Server at the specified IP and port using the Telnet Server's IPv6 address. This service can take an IPv4 or an IPv6 address but must be contained in the NXD_ADDRESS variable *server_ip_address*.

Input Parameters

| | | | | | |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------|------------------------|--------------|
| client_ptr | Pointer to Telnet Client control block. | | | | |
| server_ip_address | IP Address of Server. | | | | |
| server_port | TCP Port of Server (Telnet Server is port 23). | | | | |
| wait_option | Defines how long the service will wait for the Telnet Client connect. The wait options are defined as follows: <table data-bbox="613 1243 1211 1356"> <tr> <td>timeout value</td><td>(0x00000001 through 0xFFFFFFFFE)</td></tr> <tr> <td>TX_WAIT_FOREVER</td><td>(0xFFFFFFFF)</td></tr> </table> <p>Selecting TX_WAIT_FOREVER causes the calling thread to suspend indefinitely until the Telnet Server responds to the request.</p> <p>Selecting a numeric value (1-0xFFFFFFFFE) specifies the maximum number of timer-ticks to stay suspended while waiting for the Telnet Server response.</p> | timeout value | (0x00000001 through 0xFFFFFFFFE) | TX_WAIT_FOREVER | (0xFFFFFFFF) |
| timeout value | (0x00000001 through 0xFFFFFFFFE) | | | | |
| TX_WAIT_FOREVER | (0xFFFFFFFF) | | | | |

Return Values

| | | |
|------------------------|--------|----------------------------|
| NX_SUCCESS | (0x00) | Successful Client connect. |
| NX_TELNET_ERROR | (0xF0) | Client connect error. |

| | | |
|-----------------------------------|--------|---------------------------------|
| NX_TELNET_NOT_DISCONNECTED | (0xF4) | Client already connected. |
| NX_PTR_ERROR | (0x16) | Invalid Client pointer. |
| NX_IP_ADDRESS_ERROR | (0x21) | Invalid IP address. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Connect the Telnet Client instance "my_client" to the Server at
   IPv6 address 20010db1:0:f101::101 and port 23. */
status = nxd_telnet_client_connect(&my_client, &server_ip_address, 23, 100);

/* If status is NX_SUCCESS the Telnet Client instance was successfully
   connected to the Telnet Server. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_create,
 nx_telnet_server_delete, nx_telnet_server_disconnect,
 nx_telnet_server_packet_send, nx_telnet_server_start,
 nx_telnet_server_stop

nx_telnet_client_create

Create a Telnet Client

Prototype

```
UINT nx_telnet_client_create(NX_TELNET_CLIENT *client_ptr,
                             CHAR *client_name, NX_IP *ip_ptr, ULONG window_size);
```

Description

This service creates a Telnet Client instance.

Input Parameters

| | |
|--------------------|---------------------------------------------|
| client_ptr | Pointer to Telnet Client control block. |
| client_name | Name of Client instance. |
| ip_ptr | Pointer to IP instance. |
| window_size | Size of TCP receive window for this Client. |

Return Values

| | | |
|------------------------|--------|-------------------------------|
| NX_SUCCESS | (0x00) | Successful Client create. |
| NX_TELNET_ERROR | (0xF0) | Client create error. |
| NX_PTR_ERROR | (0x16) | Invalid Client or IP pointer. |

Allowed From

Initialization, Threads

Example

```
/* Create the Telnet Client instance "my_client" on the IP instance "ip_0". */
status = nx_telnet_client_create(&my_client, "My Telnet Client", &ip_0, 2048);
```

```
/* If status is NX_SUCCESS the Telnet Client instance was successfully
   created. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_create,
 nx_telnet_server_delete, nx_telnet_server_disconnect,

`nx_telnet_server_packet_send, nx_telnet_server_start,`
`nx_telnet_server_stop`

nx_telnet_client_delete

Delete a Telnet Client

Prototype

```
UINT nx_telnet_client_delete(NX_TELNET_CLIENT *client_ptr);
```

Description

This service deletes a previously created Telnet Client instance.

Input Parameters

client_ptr Pointer to Telnet Client control block.

Return Values

| | | |
|-----------------------------------|--------|---------------------------------|
| NX_SUCCESS | (0x00) | Successful Client delete. |
| NX_TELNET_NOT_DISCONNECTED | (0xF4) | Client still connected. |
| NX_PTR_ERROR | (0x16) | Invalid Client pointer. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Delete the Telnet Client instance "my_client". */
status = nx_telnet_client_delete(&my_client);

/* If status is NX_SUCCESS the Telnet Client instance was successfully
   deleted. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_create,
 nx_telnet_server_delete, nx_telnet_server_disconnect,
 nx_telnet_server_packet_send, nx_telnet_server_start,
 nx_telnet_server_stop

nx_telnet_client_disconnect

Disconnect a Telnet Client

Prototype

```
UINT nx_telnet_client_disconnect(NX_TELNET_CLIENT *client_ptr,
                                ULONG wait_option);
```

Description

This service disconnects a previously connected Telnet Client instance.

Input Parameters

| | |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| client_ptr | Pointer to Telnet Client control block. |
| wait_option | Defines how long the service will wait for the Telnet Client disconnect. The wait options are defined as follows: |
| timeout value | (0x00000001 through 0xFFFFFFFF) |
| TX_WAIT_FOREVER | (0xFFFFFFFF) |
| | Selecting TX_WAIT_FOREVER causes the calling thread to suspend indefinitely until the Telnet Server responds to the request. |
| | Selecting a numeric value (1-0xFFFFFFFF) specifies the maximum number of timer-ticks to stay suspended while waiting for the Telnet Server response. |

Return Values

| | | |
|--------------------------------|--------|---------------------------------|
| NX_SUCCESS | (0x00) | Successful Client disconnect. |
| NX_TELNET_NOT_CONNECTED | (0xF3) | Client not connected. |
| NX_PTR_ERROR | (0x16) | Invalid Client pointer. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Disconnect the Telnet Client instance "my_client". */
status = nx_telnet_client_disconnect(&my_client, 100);

/* If status is NX_SUCCESS the Telnet Client instance was successfully
   disconnected. */
```

See Also

`nx_telnet_client_connect`, `nx_telnet_client_create`, `nx_telnet_client_delete`,
`nx_telnet_client_packet_receive`, `nx_telnet_client_packet_send`,
`nx_telnet_server_create`, `nx_telnet_server_delete`,
`nx_telnet_server_disconnect`, `nx_telnet_server_packet_send`,
`nx_telnet_server_start`, `nx_telnet_server_stop`

nx_telnet_client_packet_receive

Receive packet via Telnet Client

Prototype

```
UINT nx_telnet_client_packet_receive(NX_TELNET_CLIENT *client_ptr,
                                     NX_PACKET **packet_ptr, ULONG wait_option);
```

Description

This service receives a packet from the previously connected Telnet Client instance.

Input Parameters

| | |
|--------------------|-----------------------------------------------------------------------------------------------------------------------|
| client_ptr | Pointer to Telnet Client control block. |
| packet_ptr | Pointer to the destination for the received packet. |
| wait_option | Defines how long the service will wait for the Telnet Client packet receive. The wait options are defined as follows: |

timeout value (0x00000001 through 0xFFFFFFFF)

TX_WAIT_FOREVER (0xFFFFFFFF)

Selecting TX_WAIT_FOREVER causes the calling thread to suspend indefinitely until the Telnet Server responds to the request.

Selecting a numeric value (1-0xFFFFFFFF) specifies the maximum number of timer-ticks to stay suspended while waiting for the Telnet Server response.

Return Values

| | | |
|------------------------|--------|-----------------------------------|
| NX_SUCCESS | (0x00) | Successful Client packet receive. |
| NX_TELNET_ERROR | (0xF0) | Receive packet failed. |
| NX_PTR_ERROR | (0x16) | Invalid Client or packet pointer. |

| | | |
|-----------------|--------|---------------------------------|
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |
|-----------------|--------|---------------------------------|

Allowed From

Threads

Example

```
/* Receive a packet from the Telnet Client instance "my_client". */
status = nx_telnet_client_packet_receive(&my_client, &my_packet, 100);

/* If status is NX_SUCCESS the "my_packet" pointer contains data received from
the Telnet Client connection. */
```

See Also

`nx_telnet_client_connect`, `nx_telnet_client_create`, `nx_telnet_client_delete`,
`nx_telnet_client_disconnect`, `nx_telnet_client_packet_send`,
`nx_telnet_server_create`, `nx_telnet_server_delete`,
`nx_telnet_server_disconnect`, `nx_telnet_server_packet_send`,
`nx_telnet_server_start`, `nx_telnet_server_stop`

nx_telnet_client_packet_send

Send packet via Telnet Client

Prototype

```
UINT nx_telnet_client_packet_send(NX_TELNET_CLIENT *client_ptr,
                                  NX_PACKET *packet_ptr, ULONG wait_option);
```

Description

This service sends a packet through the previously connected Telnet Client instance.

Input Parameters

| | |
|--------------------|--------------------------------------------------------------------------------------------------------------------|
| client_ptr | Pointer to Telnet Client control block. |
| packet_ptr | Pointer to the packet to send. |
| wait_option | Defines how long the service will wait for the Telnet Client packet send. The wait options are defined as follows: |

timeout value (0x00000001 through 0xFFFFFFFF)

TX_WAIT_FOREVER (0xFFFFFFFF)

Selecting TX_WAIT_FOREVER causes the calling thread to suspend indefinitely until the Telnet Server responds to the request.

Selecting a numeric value (1-0xFFFFFFFF) specifies the maximum number of timer-ticks to stay suspended while waiting for the Telnet Server response.

Return Values

| | | |
|------------------------|--------|----------------------------------------------------------------------|
| NX_SUCCESS | (0x00) | Successful Client packet send. |
| NX_TELNET_ERROR | (0xF0) | Send packet failed – caller is responsible for releasing the packet. |

| | | |
|-----------------|--------|-----------------------------------|
| NX_PTR_ERROR | (0x16) | Invalid Client or packet pointer. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Send a packet via the Telnet Client instance "my_client". */
status = nx_telnet_client_packet_send(&my_client, my_packet, 100);

/* If status is NX_SUCCESS the packet was successfully sent. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_server_create, nx_telnet_server_delete,
 nx_telnet_server_disconnect, nx_telnet_server_packet_send,
 nx_telnet_server_start, nx_telnet_server_stop

nx_telnet_server_create

Create a Telnet Server

Prototype

```
UINT nx_telnet_server_create(NX_TELNET_SERVER *server_ptr,
                             CHAR *server_name, NX_IP *ip_ptr,
                             VOID *stack_ptr, ULONG stack_size,
                             void (*new_connection)(struct NX_TELNET_SERVER_STRUCT
                                                      *telnet_server_ptr, UINT logical_connection),
                             void (*receive_data)(struct NX_TELNET_SERVER_STRUCT
                                                      *telnet_server_ptr, UINT logical_connection,
                                                      NX_PACKET *packet_ptr),
                             void (*connection_end)(struct NX_TELNET_SERVER_STRUCT
                                                      *telnet_server_ptr, UINT logical_connection));
```

Description

This service creates a Telnet Server instance on the specified IP instance.

Input Parameters

| | |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| server_ptr | Pointer to Telnet Server control block. |
| server_name | Name of Telnet Server instance. |
| ip_ptr | Pointer to associated IP instance. |
| stack_ptr | Pointer to stack for the internal Server thread. |
| sack_size | Size of the stack, in bytes. |
| new_connection | Application callback routine function pointer. This routine is called whenever a new Telnet Client connection request is detected by the Server. |
| receive_data | Application callback routine function pointer. This routine is called whenever a new Telnet Client data is present on the connection. This routine is responsible for releasing the packet. |
| end_connection | Application callback routine function pointer. This routine is called whenever a Telnet Client connection is disconnected by the Client. The Server can also disconnect via the <i>nx_telnet_server_disconnect</i> service described below. |

Return Values

| | | |
|------------------------|--------|--------------------------------------------------------------|
| NX_SUCCESS | (0x00) | Successful Server create. |
| NX_TELNET_ERROR | (0xF0) | Server create failed. |
| NX_PTR_ERROR | (0x16) | Invalid Server, IP, stack, or application callback pointers. |

Allowed From

Initialization, Threads

Example

```
/* Create a Telnet Server instance "my_server". */
status = nx_telnet_server_create(&my_server, "Telnet Server", &ip_0,
                                pointer, 2048, telnet_new_connection, telnet_receive_data,
                                telnet_connection_end);

/* If status is NX_SUCCESS the Telnet Server was successfully created. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_delete,
 nx_telnet_server_disconnect, nx_telnet_server_packet_send,
 nx_telnet_server_start, nx_telnet_server_stop

nx_telnet_server_delete

Delete a Telnet Server

Prototype

```
UINT nx_telnet_server_delete(NX_TELNET_SERVER *server_ptr);
```

Description

This service deletes a previously created Telnet Server instance.

Input Parameters

server_ptr Pointer to Telnet Server control block.

Return Values

| | | |
|------------------------|--------|---------------------------------|
| NX_SUCCESS | (0x00) | Successful Server delete. |
| NX_TELNET_ERROR | (0xF0) | Server delete failed. |
| NX_PTR_ERROR | (0x16) | Invalid Server pointer. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Delete the Telnet Server instance "my_server". */
status = nx_telnet_server_delete(&my_server);

/* If status is NX_SUCCESS the Telnet Server was successfully deleted. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_create,
 nx_telnet_server_disconnect, nx_telnet_server_packet_send,
 nx_telnet_server_start, nx_telnet_server_stop

nx_telnet_server_disconnect

Disconnect a Telnet Client

Prototype

```
UINT nx_telnet_server_disconnect(NX_TELNET_SERVER *server_ptr,
                                UINT logical_connection);
```

Description

This service disconnects a previously connected Client on this Telnet Server instance. This routine is typically called from the application's receive data callback function in response to a condition detected in the data received.

Input Parameters

server_ptr Pointer to Telnet Server control block.

logical_connection Logical connection corresponding the Client connection on this Server. Valid value range from 0 through NX_TELNET_MAX_CLIENTS.

Return Values

| | | |
|------------------------|--------|---------------------------------|
| NX_SUCCESS | (0x00) | Successful Server disconnect. |
| NX_TELNET_ERROR | (0xF0) | Server disconnect failed. |
| NX_OPTION_ERROR | (0x0A) | Invalid logical connection. |
| NX_PTR_ERROR | (0x16) | Invalid Server pointer. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Disconnect the Telnet Client associated with logical connection 2 on
   the Telnet Server instance "my_server". */
status = nx_telnet_server_disconnect(&my_server, 2);

/* If status is NX_SUCCESS the Client on logical connection 2 was
   disconnected. */
```

See Also

`nx_telnet_client_connect`, `nx_telnet_client_create`, `nx_telnet_client_delete`,
`nx_telnet_client_disconnect`, `nx_telnet_client_packet_receive`,
`nx_telnet_client_packet_send`, `nx_telnet_server_create`,
`nx_telnet_server_delete`, `nx_telnet_server_packet_send`,
`nx_telnet_server_start`, `nx_telnet_server_stop`

nx_telnet_server_packet_send

Send packet through Client connection

Prototype

```
UINT nx_telnet_server_packet_send(NX_TELNET_SERVER *server_ptr,
                                  UINT logical_connection, NX_PACKET *packet_ptr,
                                  ULONG wait_option);
```

Description

This service sends a packet to the Client connection on this Telnet Server instance. This routine is typically called from the application's receive data callback function in response to a condition detected in the data received.

Input Parameters

| | |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| server_ptr | Pointer to Telnet Server control block. |
| logical_connection | Logical connection corresponding the Client connection on this Server. Valid value range from 0 through NX_TELNET_MAX_CLIENTS. |
| packet_ptr | Pointer to the received packet. |
| wait_option | <p>Defines how long the service will wait for the Telnet Server packet send. The wait options are defined as follows:</p> <p>timeout value (0x00000001 through 0xFFFFFFFF)</p> <p>TX_WAIT_FOREVER (0xFFFFFFFF)</p> <p>Selecting TX_WAIT_FOREVER causes the calling thread to suspend indefinitely until the Telnet Server responds to the request.</p> <p>Selecting a numeric value (1-0xFFFFFFFF) specifies the maximum number of timer-ticks to stay suspended while waiting for the Telnet Server response.</p> |

Return Values

| | | |
|-------------------------|--------|---------------------------------|
| NX_SUCCESS | (0x00) | Successful Server packet send. |
| NX_TELNET_FAILED | (0xF2) | Server packet send failed. |
| NX_OPTION_ERROR | (0x0A) | Invalid logical connection. |
| NX_PTR_ERROR | (0x16) | Invalid Server pointer. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Send a packet to the Telnet Client associated with logical connection 2 on
   the Telnet Server instance "my_server". */
status = nx_telnet_server_packet_send(&my_server, 2, my_packet, 100);

/* If status is NX_SUCCESS the packet was sent to the Client on logical
   connection 2. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_create,
 nx_telnet_server_delete, nx_telnet_server_disconnect,
 nx_telnet_server_start, nx_telnet_server_stop

nx_telnet_server_start

Start a Telnet Server

Prototype

```
UINT nx_telnet_server_start(NX_TELNET_SERVER *server_ptr);
```

Description

This service starts a previously created Telnet Server instance.

Input Parameters

server_ptr Pointer to Telnet Server control block.

Return Values

| | | |
|------------------------|--------|--------------------------|
| NX_SUCCESS | (0x00) | Successful Server start. |
| NX_TELNET_ERROR | (0xF0) | Server start failed. |
| NX_PTR_ERROR | (0x16) | Invalid Server pointer. |

Allowed From

Initialization, Threads

Example

```
/* Start the Telnet Server instance "my_server". */
status = nx_telnet_server_start(&my_server);

/* If status is NX_SUCCESS the Server was started. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create, nx_telnet_client_delete,
 nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
 nx_telnet_client_packet_send, nx_telnet_server_create,
 nx_telnet_server_delete, nx_telnet_server_disconnect,
 nx_telnet_server_packet_send, nx_telnet_server_stop

nx_telnet_server_stop

Stop a Telnet Server

Prototype

```
UINT nx_telnet_server_stop(NX_TELNET_SERVER *server_ptr);
```

Description

This service stops a previously created and started Telnet Server instance.

Input Parameters

server_ptr Pointer to Telnet Server control block.

Return Values

| | | |
|------------------------|--------|---------------------------------|
| NX_SUCCESS | (0x00) | Successful Server stop. |
| NX_TELNET_ERROR | (0xF0) | Server stop failed. |
| NX_PTR_ERROR | (0x16) | Invalid Server pointer. |
| NX_CALLER_ERROR | (0x11) | Invalid caller of this service. |

Allowed From

Threads

Example

```
/* Stop the Telnet Server instance "my_server". */
status = nx_telnet_server_stop(&my_server);

/* If status is NX_SUCCESS the Server was stopped. */
```

See Also

nx_telnet_client_connect, nx_telnet_client_create, nx_telnet_client_delete,
nx_telnet_client_disconnect, nx_telnet_client_packet_receive,
nx_telnet_client_packet_send, nx_telnet_server_create,
nx_telnet_server_delete, nx_telnet_server_disconnect,
nx_telnet_server_packet_send, nx_telnet_server_start