Internet Draft
<draft-edwards-telnet-xon-xoff-state-control-00.txt>
Intended status: Experimental
Expires September 23, 2010

Grant Edwards
Comtrol Corp
March 23, 2010

# Xon/Xoff State Control for Telnet Com Port Control Option
<draft-edwards-telnet-xon-xoff-state-control-00.txt>

## Status of this Memo

Distribution of this memo is unlimited.

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at http://www.ietf.org/ietf/1id-abstracts.txt.

The list of Internet-Draft Shadow Directories can be accessed at http://www.ietf.org/shadow.html.

This Internet-Draft will expire on September 23, 2010.

Comments are solicited and should be addressed to the author.

## Copyright Notice

Copyright (c) 2010 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust’s Legal Provisions Relating to IETF Documents (http://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document.

Abstract

This document defines new values for use with the telnet com port control option's SET-CONTROL sub-command defined in RFC2217. These new values provide a mechanism for the telnet client to control and query the outbound Xon/Xoff flow control state of the telnet server's physical serial port. This capability is exposed in the serial port API on some operating systems and is needed by telnet clients that implement a port-redirector service which provides applications local to the redirector/telnet-client with transparent access to the remote serial port on the telnet server.

## 1. Introduction

When a telnet server acting as a serial device server (as shown in the figure below and also described in [RFC2217]) is configured to use Xon/Xoff outbound flow control, it maintains an internal state variable that reflects whether or not it is currently allowed to transmit data via the physical serial port. When the telnet server receives an XOFF character via the physical serial port, the server will stop transmitting data via the physical serial port until an XON character is received via the physical serial port.

```
     +-----------+   telnet/RFC2217
     |  telnet   |   connection          physical
     |  client   +----+                / serial port
     |           |    |               /
     +-----------+    |              /
                      |             /
                 +----+----------+ /
                 |               |/    RS-232      +----------+
                 |   telnet     ++      with       |  serial  |
                 |   server     |+------------------+  device  |
                 |              ++    Xon/Xoff     |          |
                 |               |      flow       +----------+
                 +---------------+     control
```

This memo extends that behavior by defining new telnet com port control option [RFC2217] SET-CONTROL subcommand values that allow the telnet client to force the server to behave as if an XOFF or XON character has been received via the physical serial port.

This extension is needed by telnet clients that implement a port-redirection service in order to provide other local applications access to the remote serial port (physically located on the telnet server) via the same serial port API that is used to access local serial ports. Since some operating systems provide in the serial port API a mechanism to control the state of the outbound Xon/Xoff flow control, the telnet com port control option is extended to

provide a corresponding mechanism.

This ability to control the internal state of the Xon/Xoff flow control feature is not provided by [RFC1372] "Telnet Remote Flow Control Option" which provides a way to enable and disable the Xon/Xoff flow control feature itself rather than to control the state of the feature after it has been enabled.

## 2. Sub-command Value Definition

New values are defined for use in the SET_CONTROL sub-command which is defined in section 3 of RFC2217 and reproduced here for convenience:

```
IAC SB COM-PORT-OPTION SET-CONTROL <value> IAC SE
```

This document defines new values for the <value> field as follows:

| Value | Command |
|---|---|
| 20 | REQUEST-Xon/Xoff-STATE |
| 21 | SET-XOFF-STATE |
| 22 | SET-XON-STATE |

If Xon/Xoff outbound flow control is not enabled, then the sub-commands defined above will not affect data transmission in any way, and the flow state returned by the server is undefined.

## 3. General Discussion

The Xon/Xoff flow state is defined to have two states: "XON" and "XOFF".

The server will only transmit data via the physical serial port when the flow state is XON. Transmission of data via the physical serial port by the server is disabled when in the XOFF state.

The flow state is initially XON when a session is initiated.

During normal operation the state is set to XOFF when the server receives an XOFF character via the physical serial port (tx data is halted). Conversely, when an XON character is received, the state is set to XON (tx data resumes).

When the telnet client sends the SET-XOFF-STATE command, the telnet server will set the state to XOFF and stop sending data via the physical serial port until either an XON character is received via the physical serial port or the SET-XON-STATE command is received from the telnet client.

Likewise, if the server has received an XOFF character via the

physical serial port, data transmission via the physical serial port will be halted until either an XON character is received via the physical serial port or the SET-XON-STATE command is received from the telnet client.

This is summarized in the table below:

| Event | Flow State | Tx Data |
|---|---|---|
| rx XOFF char | XOFF | Halted |
| SET-XOFF-STATE cmd | XOFF | Halted |
| rx XON char | XON | Allowed |
| SET-XON-STATE cmd | XON | Allowed |

This document describes only the server internal state that governs transmission of data via the physical serial port by the telnet server. It does not address the operation of the flow control mechanism that governs the stream of data being received on the physical serial port by the server.

The responses to all three of the newly defined sub-command values will reflect the flow control state after execution of the command. Examples are shown below (byte values are in decimal). "Cmd" is client->server and "Rsp" is server->client:

Query Xon/Xoff State:

```
Cmd: IAC SB COM-PORT-OPTION SET-CONTROL REQUEST-Xon/Xoff-STATE IAC SE
     255 250      44            5                  20          255 240

Rsp: IAC SB COM-PORT-OPTION SET-CONTROL SET-X[ON|OFF]-STATE IAC SE
     255 250      44           105             [21/22]*     255 240

      *Value in response is 21 if state is XOFF (tx suspended)
       and is 22 if state is XON (tx allowed).
```

Set XOFF state (stops tx data):

```
Cmd: IAC SB COM-PORT-OPTION SET-CONTROL SET-XOFF-STATE IAC SE
     255 250      44            5             21       255 240

Rsp: IAC SB COM-PORT-OPTION SET-CONTROL SET-XOFF-STATE IAC SE
     255 250      44           105            21       255 240
```

Set XON state (starts tx data):

```
Cmd: IAC SB COM-PORT-OPTION SET-CONTROL SET-XON-STATE IAC SE
     255 250      44            5            22       255 240

Rsp: IAC SB COM-PORT-OPTION SET-CONTROL SET-XON-STATE IAC SE
     255 250      44           105           22       255 240
```

## 4. Usage by Redirectors

It is intended that MS Windows com-port redirector software will issue a SET-XOFF-STATE command to the telnet device server when the user application calls EscapeCommFunction(handle,SETXOFF) on the virtual COM port, and will issue a SET-XON-STATE command to the server when the user application calls EscapeCommFunction(handle,SETXON) on the virtual COM port.

The two EscapeCommFunction() calls shown above do not directly affect flow of data between the redirector (telnet client) and the device server (telnet server).

The control of data flow between the telnet client and telnet server is defined by section 5 of RFC2217. Xon/Xoff flow control and the corresponding EscapeCommFunction() calls affect flow of data between physical serial port on the device server and the external serial device to which it is attached.

However, the Xon/Xoff flow state may indirectly affect data flow between client and server if Xon/Xoff flow state changes cause internal buffers to fill/drain to a point that triggers flow control actions as defined in RFC2217 section 5.

Likewise, the flow-control commands defined in section 5 of RFC2217 have no direct effect on flow of data between the device server's physical serial port and the external serial device to which it is connected.

## 5. Security Considerations

There are no security considerations relevant to this document.

## 6. IANA Considerations

No actions are required from IANA as result of the publication of this document.

## 7. References

### 7.1. Normative References

[RFC2217] Clark, G., "Telnet Com Port Control Option", RFC 2217, October 1997.

## 7.2. Informative References

[RFC1372] Hedrick, C. and D. Borman, "Telnet Remote Flow Control Option", RFC 1372, October 1992.

## Author's Address

Grant Edwards
Comtrol Corporation
Minneapolis, Minnesota USA

Email: grant.edwards@comtrol.com
URL: www.comtrol.com