The Remote Debug Protocol

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1 Introduction

This document describes the trivial remote debug and information protocol over MSNL which is used by various local tools. Currently the only servers of this protocol are Wanda machines and the clients all run on Unix machines. The server code can be found in the Wanda file `kernel/netmsnl/msnlServices.c`.

2 Protocol Details

2.1 Connection Control

The port number that is used for this protocol is 0.0.0.49. The server may (as with all MSNL connections) close the connection at will, but should normally hold an idle connection open for a couple of minutes. Some servers permit multiple simultaneous connections, but this is not a requirement of the protocol.

2.2 Error codes

On Wanda error codes are negative; on Unix they are positive. On Wanda there are many more (Wanda specific) error codes as well as the Unix ones. On Wanda the error codes that are also Unix error codes are the negative of the Unix error code value.

When a Wanda server returns an error to a protocol operation, it returns the negation of the Wanda error number. That means that for error codes that are present on Unix systems the returned value will be the same as the value used to represent the same error code on a Unix system.

2.3 Buffer lengths

None of the current command implementations modify the length of the message sent by the client. Thus the client should ensure that the length of the command message is sufficient to contain any appropriate response that the client expects.

2.4 Reliability

No reliability is performed. There is no provision for sequence numbers. All commands should be designed to be idempotent and can therefore be repeated until a response is achieved. The client may choose whether to use at least once or at most once semantics.

3 Commands

All commands contain the major command number in octet zero of the message. This octet contains the error code in a reply, or zero for success. The error EOPNOTSUPP is returned if the command is not implemented on the server.

3.1 Tracing control

This command is used to control the dynamic debugging tracing that is available in the Wanda kernel. Tracing which was compiled in to be controllable at run time may be switched on or off using this command. This is command number 0. Octet 1 contains the index in the tracing control table. Octet 2 contains a mask indicating which bits in this position should be cleared. Octet 3 contains a set of bits which will be set. The meaning of these indexes and bits is kernel specific and comes from the kernel tracing control file. The unix program which uses this major command number is `wkmem`. The error EINVAL is returned if the index is too large.

3.2 Raw memory access

This command, which has value 1, is used to perform remote memory access. There are four minor commands defined, although some servers only implement the first two. A Unix program which uses this major command number is `wprobe`. The error EINVAL is returned if the minor command is not supported.

3.2.1 Read Word

Octet 1 contains the minor command number which is 1. Octets 4–7 contain, in network standard form, the address to be read. In the reply octets 8–11 contain the word value, in network standard form, of the memory at that location.

3.2.2 Write Word

Octet 1 contains the minor command number which is 2. Octets 4–7 contain, in network standard form, the address to be written. Octets 8–11 contain the word value, in network standard form, to be written to that address.

3.2.3 Read Block

Octet 1 contains the minor command number which is 3. Octet 2 contains the number of words to be read. Octets 4–7 contain, in network standard form, the base of the addresses to be read. In the reply octets 8–(7+4*n) contain the words read, each in network standard form.

3.2.4 Write Block

Octet 1 contains the minor command number which is 4. Octet 2 contains the number of words to be read. Octets 4–7 contain, in network standard form, the base of the addresses to be written. Octets 8–(7+4*n) contain the words to be written, each in network standard form.

3.3 Remote information protocol

This command is used to get information about the identity and state of a Wanda machine. It has major command number 2. In the reply octets 4–5 contain the 16 bit serial number of the machine (if any). Octets 6–11 contain the 802.2 allocated number of the machine (if any). Octets 12–15 contain the MSNL address of the sender of the rarp reply which gave this machine its MSNL address. This value will be zero if the machine booted from a bootserver. An example of a Unix program which uses this command number is `wkinfo`.

3.4 Spin

This command, which has number 3, is reserved for the use of the author and should neither be implemented or used in installed systems. It is mentioned here only for completeness.

4 Future commands ...

Extensions to this protocol are encouraged. Extenders should consult the author for the allocation of major or minor command numbers.