can also be written by a programmer without the use of a compiler.

[0036]   Proper testing of the application stack 302a requires observing the input and output behavior of the application stack. Because the application stack 302a will receive ASN.1 messages from application stack 302b, the test data must correspond to the ASN.1 messages that are sent by application stack 302b. Furthermore, the output behavior of application stack 302a may include sending ASN.1 messages to application stack 302b.

[0037]   Referring now to FIGURE 4, a block diagram of an exemplary testing tool 400 for testing an application stack, such as application stack 302a of FIGURE 3, is described. The testing tool 400 includes a specification reader 405, a value-to-message translator 410,and a message-to-value translator 415. The reader 405 inputs and reads an ASN.1 specification, such as that shown in Table 2, and creates an informal data structure. The function of the value-to-message translator 410 is to take an ASN.1 value notation of a data structure described using the ASN.1 specification, such as that shown in Table 2, inputted to the reader 405 and translate it into an ASN.1 message using an encoding standard, such as, but not limited to, BER or PER. The function of the message-to-value translator 415 is to take an ASN.1 message representing a data structure and translate it into the ASN.1 value notation of the data structure. The informal data structure created by the reader 405 is used by the message-to-value translator 415 to generate the ASN.1 value notation. Although in the present embodiment, the ASN.1 value notation is used by the value-to-message translator 410 and the message-to-value translator 415, it should be understood that any other human readable format can be used, and therefore, other embodiments may use another format.

[0038]   The testing tool 400 inputs an ASN.1 specification and either an ASN.1 message or an ASN.1 value notation of a data structure. The reader 405 reads the ASN.1 specification and creates an informal data structure. Where an ASN.1 value notation is input to the testing tool 400, the value-to-message translator 410 translates the ASN.1 value notation into an ASN.1 message, and the testing tool 400 outputs the ASN.1 message as an encoded stream of bytes. Where an ASN.1 message (encoded byte stream) is input to the testing tool 400, the message-to-value translator 415 translates the ASN.1 message into an ASN.1 value notation, and the testing tool 400 outputs the ASN.1 value notation.

[0039]   Referring now to FIGURE 5, an information flow diagram illustrates the testing of the application stack 302a of FIGURE 3 using the testing tool 400 of FIGURE 4. The test data 505 in a human readable form, such as the aforedescribed ASN.1 value notation, 505 as well as the ASN.1 specification 510 for the test data are respectively input into the testing tool 400. The testing tool 400 translates the test data using a predetermined encoding standard into an ASN.1 message and sends an ASN.1 message 515 to the application stack 302a. The application stack's 302a response to the ASN.1 message 515 indicates whether the application stack is operating properly. Where the application stack's 302a response includes sending a message to another application stack, such as 302b of FIGURE 3, the application stack 302a will generate an ASN.1 message 520. The ASN.1 message 520 generated by the application stack 302a is entered into the testing tool 400, which then translates the ASN.1 message 520 into the ASN.1 value notation of the data structure represented by the ASN.1 message 520.

[0040]   Those skilled in the art will recognize that the information to be transferred can be implemented using input or output files. For example, the ASN.1 value notation 505 and the ASN.1 specification 510 can be stored as input files for the testing tool 400. The output of the testing tool 400 i.e., the ASN.1 message 515, can be stored as an output file by the testing tool. The output file of the testing tool can then be used as an input file for the application stack 302a. The ASN.1 message 520 generated by the application stack 302a can then be stored as an output file and then used as the input file of the testing tool 400, as is understood in the art.

[0041]   The foregoing represents a way that a programmer can test a given application stack such as application stack 302a using logical test data without having to encode the data using an encoding standard. Additionally, any ASN.1 messages which are generated by the application stack 302b are translated into a human readable form. Therefore, the programmer is relieved of the cumbersome task of decoding an ASN.1 message such as the hexadecimal encoded message shown in Table 4. Another advantage is that the application stack 302a and the testing tool 400 can be run on the same platform, thus reducing the amount of hardware required for testing.

[0042]   Referring now to FIGURE 6, a representative hardware environment for a platform 658 for practicing the present invention is depicted. A CPU 660 is interconnected via system bus 662 to random access memory (RAM) 664, read only memory (ROM) 666, an input/output (I/O) adapter 668, a user interface adapter 672, a communications adapter 684, and a display adapter 686. The input/output (I/O) adapter 668 connects peripheral devices such as hard disc drives 640, floppy disc drives 641 for reading removable floppy discs 642, and optical disc drives 643 for reading removable optical disc 644 (such as a compact disc or a digital versatile disc) to the bus 662. The user interface adapter 672 connects devices such as a keyboard 674, a mouse 676 having a plurality of buttons 667, a speaker 678, a microphone 682, and/or other user interfaces devices such as a touch screen device (not shown) to the bus 662. The display adapter 686 connects a monitor 688 to the bus 662. The communications adapter 684 connects the computer system to a data processing network 692. The data processing network 692 may include any number of other computer systems, such as another computer system 658 or a sewer, as well as mass storage elements such as another hard disc drive 640, or another optical disc drive 643 for reading optical discs 644.

[0043]   The testing tool 400, as well as the application stack 302a can be implemented as sets of instructions resident