TECHNISCHE UNIVERSITÄT BERLIN

Fakultät IV – Elektrotechnik und Informatik
Fachgebiet Intelligente Netze und Management verteilter Systeme
Prof. Anja Feldmann, Ph. D.
Harald Schiöberg, Bernhard Ager, Vlad Manilici

9. Assignment Protocol Design WS 08/09

RDT should now be extended with options. Therefore, during the handshake the support for options must be negotiated. If both sides agree on a common set of supported options, they may be used during the connection.

Options are transported in the words 7 and 8 of the RDT header. Options consist of one byte which carries the type of the option, one byte that carries the total length of the option, and zero to two bytes of payload.

If an option is less then 4 bytes in length, it is padded with zeros to a length of 4 bytes.

Question 1: (20 points) Option handshake.

Implement the RDT Option CRASH_OK. It has type 23, and length 2, with no payload. It may only be set in packets, that have the SYN bit set. Only if both SYN packets carry this option, the connection is allowed to use the DO_CRASH option later on.

Implement furthermore the RDT option MAXIMUM_CRASH_SEVERITY. It has type 17 and one byte of payload. It must only be set in SYN packets that also carry the CRASH_OK option, but the CRASH_OK option is allowed to appear alone. This option carries the maximum severity of crashes that are supported by the program, right shifted by 3 bits. (i.e., if the maximum allowed severity is 256, then this field carries the value 32) If this option is absent, then crashes up to level 512 are allowed. If both sides state different values, the smaller one is valid for the entire connection.

Add a command line option to your program, that switches on the support for the CRASH_OK option.

Add a command line option to your program, that allows specifying the maximum crash severity. If this option is not present, then the MAXIMUM_CRASH_SEVERITY option should not be set.

Question 2: (20 points) Option usage.

Implement the RDT Option DO_CRASH It has type 42 and length 4, it carries two bytes of payload. The payload (in network byte order) indicates the severity of the crash. The maximum allowed crash severity supported by RDT is 2009.
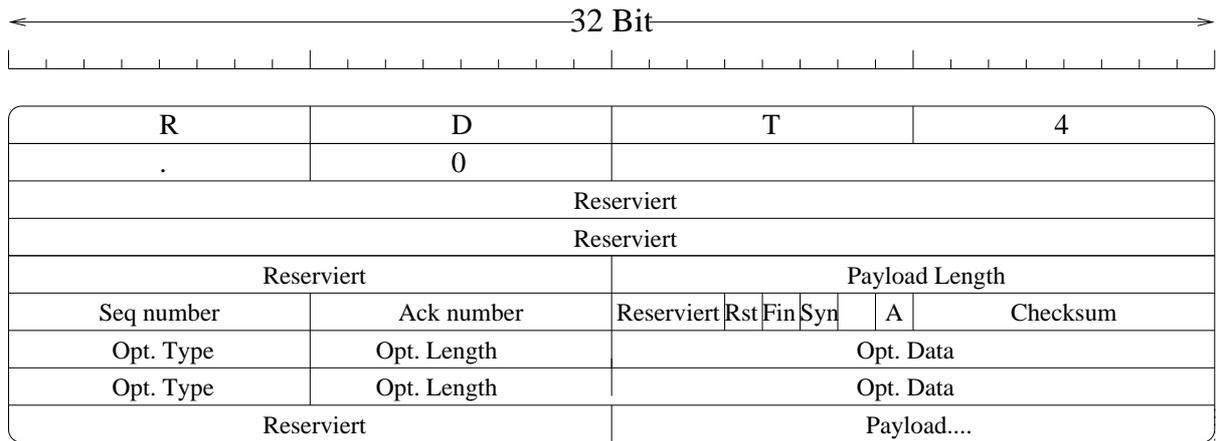
After sending a packet with the DO_CRASH option, the RDT speaker must crash, with a severity equal to the one indicated in the option. After receiving a (valid) packet with the DO_CRASH option set, the program must crash, respecting the indicated severity.

Modify your program, such that it sends the DO_CRASH option occasionally, if it is allowed.

Question 3: (0+x points) Proper crashing

Severities less than 255 means, that the connection should be correctly shut down before crashing. Severities less than 1231 must not affect other programs on the same machine. Since severities of more than 2000 could potentially affect all users on the local machine, values greater than 1999 must only be allowed during the handshake if no other users are logged on the system.

Note that your program must behave correctly all the time, if the CRASH_OK option is not set in the connection handshake.

32 Bit

R	D	T	4
.	0		
Reserviert			
Reserviert			
Reserviert		Payload Length	
Seq number	Ack number	Reserviert Rst Fin Syn A	Checksum
Opt. Type	Opt. Length	Opt. Data	
Opt. Type	Opt. Length	Opt. Data	
Reserviert		Payload....	

—End of Assignment 9.—

Due: Wed, 07.01.2008, 23:59h s. t.