

FCP-2 6.109 Response Needs to Change

T10/01-072r0

The Response to FCP-2 Letter Ballot Comment 6.109 (shown in T10/01-030r2) Should Be Changed To Make The Equation Read:

$$\begin{aligned} \text{FCP_BIDIRECTIONAL_READ_RESID} = \\ & \text{FCP_BIDIRECTIONAL_READ_DL} \\ & - (\text{highest offset of any byte written} + 1) \end{aligned}$$

Note: the equation currently reads:

$$\begin{aligned} \text{FCP_BIDIRECTIONAL_READ_RESID} = \\ & \text{FCP_BIDIRECTIONAL_READ_DL} \\ & - \text{highest offset of any byte written} - 1 \end{aligned}$$

There are two reasons for making the change:

1. The current equation is subject to misinterpretation
2. The current equation obscures the motivation for the equation

The first of these problems is discussed in the comment and will be reviewed here. The second reason is new.

For the purposes of examining the misinterpretation let's make:

$$\text{FCP_BIDIRECTIONAL_READ_DL} = 100$$

$$\text{highest offset of any byte written} = 20$$

Starting with these values the equation can be evaluated as:

$$100-20-1 = 80-1 = 79$$

or

$$100-20-1 = 100-19 = 81$$

The problem of motivation behind the equation is more disturbing (if that is possible)

What the equation intends to say is the fairly obvious:

$$\text{Residual} = \text{Buffer Size} - \text{Bytes Transferred}$$

Two of these elements have field names, leaving a straightforward substitution

$$\begin{aligned} \text{FCP_BIDIRECTIONAL_READ_RESID} = \\ & \text{FCP_BIDIRECTIONAL_READ_DL} \\ & - \text{Bytes Transferred} \end{aligned}$$

The limitation is that “Bytes Transferred” cannot be used directly because retries (if used) will make the “Bytes Transferred” some value larger than the “Bytes Successfully Transferred”.

For this reason, “(highest offset of any byte written + 1)” is substituted for “Bytes Transferred”.

The substitution must be “(highest offset of any byte written + 1)” because the offset value starts at zero. That is:

- Bytes Transferred = 1
means
- highest offset of any byte written = 0
meaning
- Bytes Transferred =
highest offset of any byte written + 1

Thus we have the equation that should be in FCP-2:

$$\begin{aligned} \text{FCP_BIDIRECTIONAL_READ_RESID} = \\ & \text{FCP_BIDIRECTIONAL_READ_DL} \\ & - (\text{highest offset of any byte written} + 1) \end{aligned}$$

The equation currently in FCP-2 mathematically carries the minus through the parentheses producing an equation that:

1. Requires the reader to apply the operations from left to right in order to get the right answer
2. Obscures the motivation for the (highest offset of any byte written + 1) term in the equation

The loss of clarity on both counts is a disservice to FCP-2.

