

1)

Each negative trace consists of 22 messages (including 7 messages from one of the xalt operands, where 3 of them are inside the veto construct). Each message consists of two events, so the total length of each negative trace is 44.

2)

The message "digit("2")" may be sent before "digit("4")" is received, giving 2 possible traces.

Each of those traces has 2 possible outcomes in the xalt construct, when selecting one of the 2 operands, giving 4 possible traces.

Inside each veto construct, after the message "Stop(Cached/Live)Stream(bob)" is sent, the reception of the same message may occur in the range from next event to second last event, indicating 6 possible traces. The total sum of unique traces is then $6 * 4 = 24$ negative traces.

3)

The WatchTV sequence diagram contains 1 xalt operator, with 2 operands, resulting in a total number of 2 interaction obligations.

4)

WatchTVModOne is a general refinement of WatchTV, by the use of supplementing. WatchTV contains Interaction Obligations $O_1(P_1, N_1)$ and $O_2(P_2, N_2)$. When adding an xalt operand, a new Interaction Obligation $O_3(P_3, N_3)$ is added. All the positive traces in P_1 and P_2 remains positive, and all the negative traces in N_1 and N_2 remains negative.

5)

WatchTVModOne may not be a limited refinement of WatchTV. This is the case if O_3 is not a refinement of neither O_1 or O_2 . However, since we have not specified what O_3 is, it could also be that O_3 is a refinement of either O_1 or O_2 , in which case we have a limited refinement.

6)

By replacing veto with refuse, the skip alternative is lost. By not being able to skip (using the empty trace as a positive trace), the result is in this case zero positive traces.

7)

By using the alt combined fragment, we are implicitly saying it's not mandatory to implement all of the alternatives. Since one alternative is enough, the alternatives may be grouped inside the same Interaction Obligation. Considering the WatchTV diagram , one could argue that stopping a cached stream to resume watching live stream of the same channel, and using a digit to switch channel both are necessities. In that case xalt combined fragments would be the correct option, as all of its operands needs to be implemented.