processing. Thus, each tool instance interested in receiving report messages of a particular type from a set of agents will first, using the mailbox 1000, send a request to those agents that they should send report messages to the Debugger/Visualiser 140 whenever events of that type occur (using an "if, then" type of control instruction), and second, register in the message context database 1010 an interest in receiving copies of all incoming report messages of the desired type. This arrangement allows a user of the Debugger/Visualiser to dynamically decide at runtime the set of events he/she is interested in monitoring, and also to change at any time this set.

In particular, the KQML reply_with (outgoing message) and in_reply_to (incoming message) files are used to associate an identifier to each message, which is unique to tool instances and event-types. This way, the message handler does not need to scan the contents of a message to determine which tool instance requires it. This arrangement allows users of the visualiser to decide at runtime the set of events they are interested in monitoring, and also to change the set at any time. Furthermore, extension of the tools suite with a new tool and/or monitoring of a new event type requires no modification to the basic support infrastructure.

The visualiser 140 is not a full repository of data for an agent system. It only stores data for a limited time frame, for instance two days. If the user wants to store persistent data, it needs to be stored, for instance, in the video type tool included in the Society Tool. The time frame for which the visualiser 140 will hold data will be affected by the size, activity and complexity of the CABS agent system and, if there are for instance too many agents, the visualiser 140 may need to be extended.

The visualiser 140 only provides a historic mechanism; it lags the real-time activity of the system. It is possible for the visualiser 140 to receive messages in the wrong order. To avoid misinterpretation, the visualiser 140 is provided with a limited buffer 1025 which re-organises messages in their correct time sequence. (It should be noted that the messages consequently are necessarily time stamped.)

Referring to Figure 12, in a simple implemented scenario, the domain is supply chain provisioning in which agents collaborate to manufacture and/or provision goods making up a service. Figure 12 shows a view of the domain which could be produced by the society tool. In the example, we have five