Example of Orchestration and Choreography (Case: Unable patient raise an alarm)

Description:

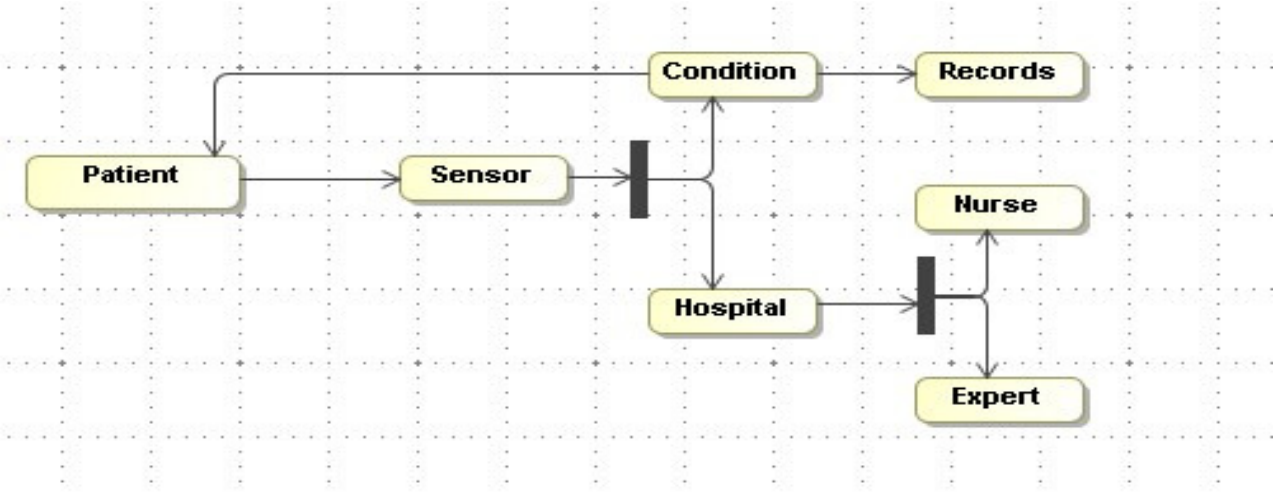
The sensing device takes videos/pictures and sends it to the current condition agent. This agent will periodically send updates to the Patient record, especially if an unordinary event occurs. Eventually in the scenario, an alarm is detected from the sensor equipment. This alarm is propagated to the Primary Hospital of the Patient. This will then get propagated to the Primary Medical Expert and the Medical Assistant. The Expert will then request a query to the Patient Condition to gather more information about Patient's other physical conditions that could help diagnosis the problem. The results are returned to the Expert. He analyzes them and then determines that he needs to send a dispatcher (nurse) the patient. The Expert then sends an Action for the Nurse to perform on the patient. The Nurse acknowledges and will eventually send an update message to the Expert. The Expert then queries the patient's current condition and sends a message to the Nurse that the patient is OK. Nurse acknowledges the data.

Timing:

Included with the alarm message is a time parameter, Tc. This time parameter is important in prioritizing the messages as they are propagated throughout the network. The time parameter will inform the participants of the network the critically of the message so that the higher Time Critical messages can be handled with more urgency than lower Time Critical messages.

In this scenario, when the alarm is detected by the sensors, the alarm is propagated to the recipients with a time parameter of Tc. The Tc is then analyzed. If Tc + Tnormal > Ts > Tc (the time parameter is still within the time allowed for time critical messages to be acted on), a new Tc, Tc', is calculated Tc + Tnormal. If Tc + Talarm > Ts > Tc + Tnormal, the message is now of a higher priority than that of a normal critical message. Message of this type are acted upon immediately.

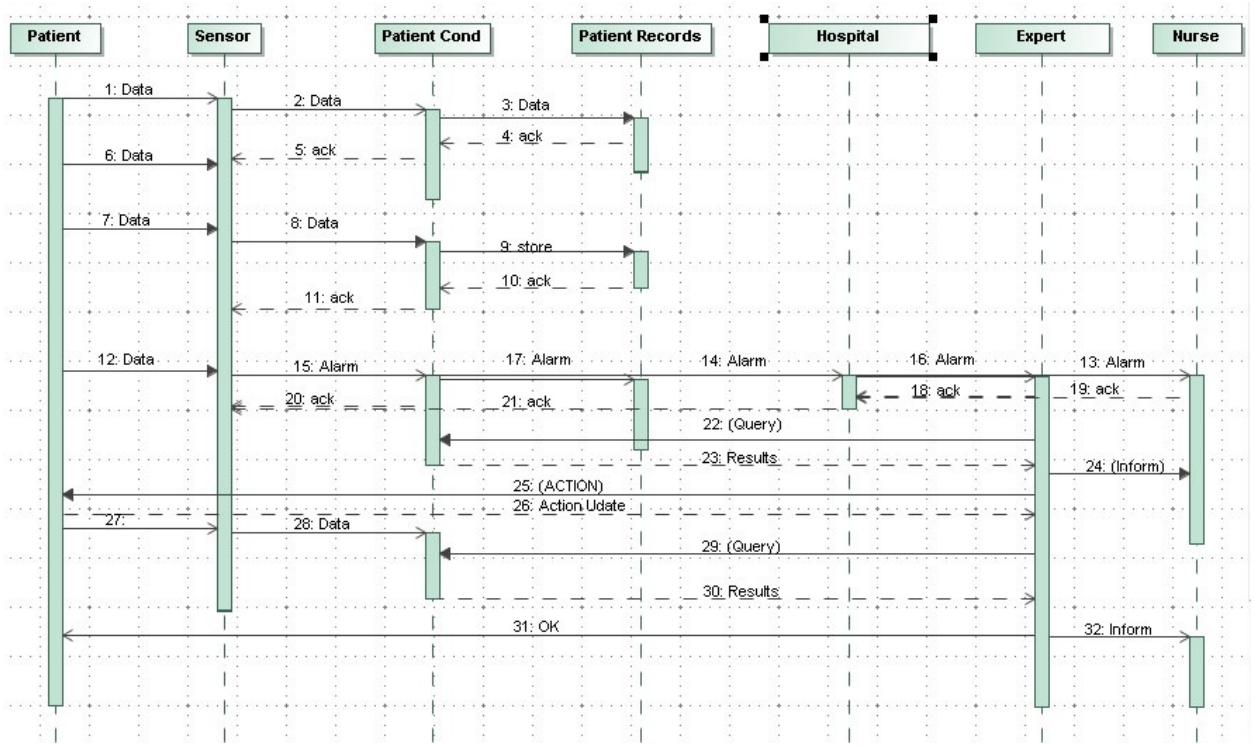
State Transition of Data and Alert Propagation:



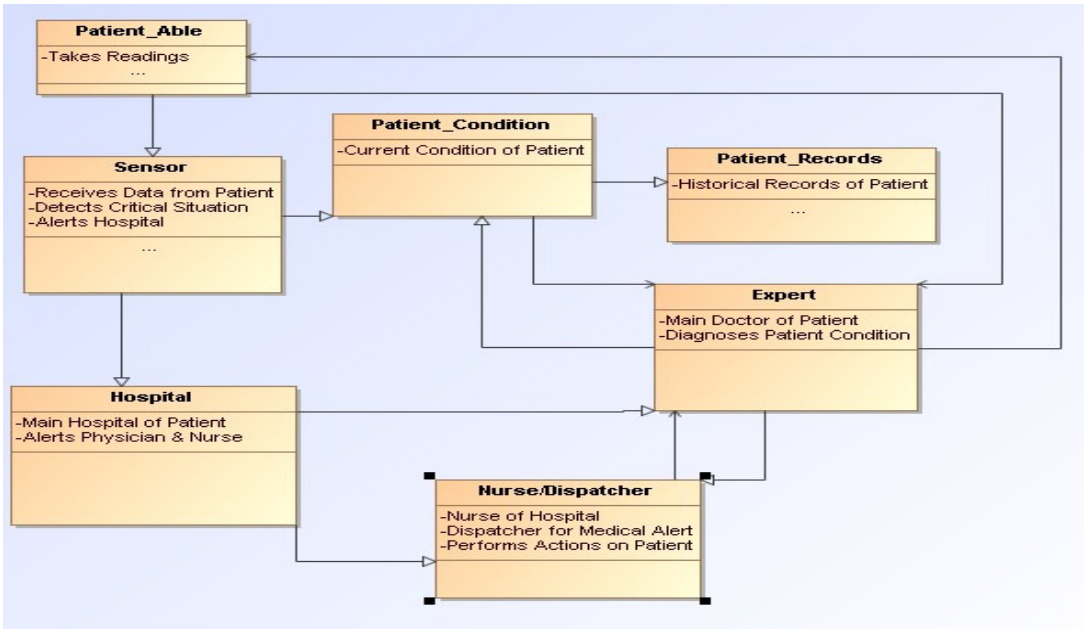
Formalization showing orchestration and choreography:

- Sensor Data Propagation Notation:
  - (Patient(data!); Sensor(data?,data!); Condition(data?,data!); Records(data?))*
- Alarm Propagation Notation:
  - Patient(data!); Sensor(data?,alarm!); (Condition(alarm?,alarm!); Records(alarm?))|(Hospital(alarm?,alarm!);(Expert(alarm?)|Nurse(alarm?))
- Notation Symbols:
  - ; - sequential composition
  - ? – input data
  - ! – output data
  - * - iteration
  - | - parallel composition

Sequence diagram:



Execution Flow:



Agent Collaboration