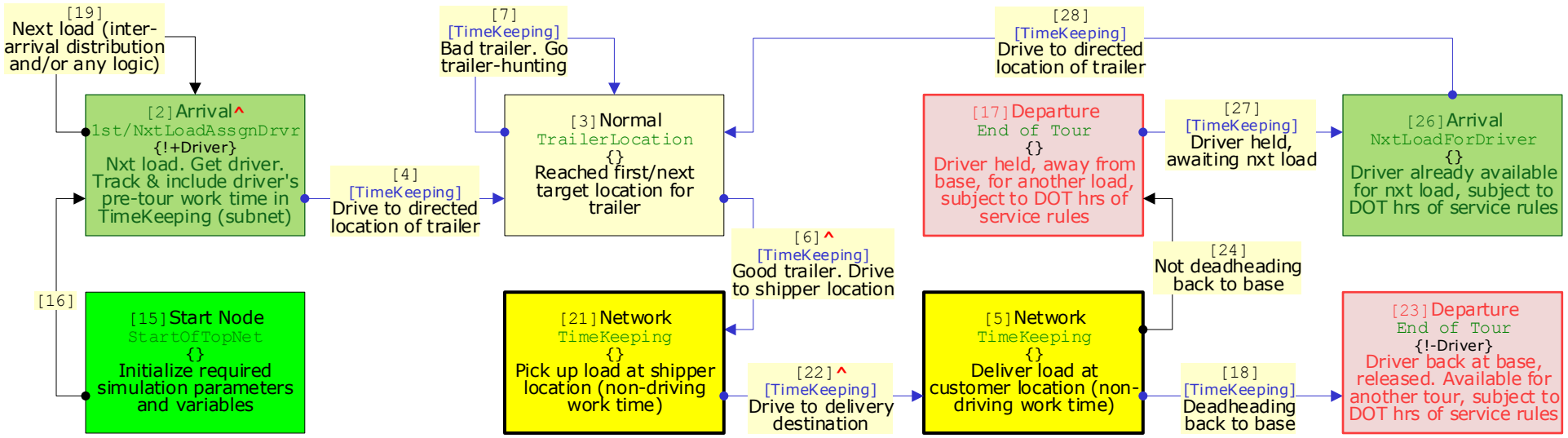
C:\ORMSware\Examples\KeepOnTrucking.vsdm(p 1 / 2): TopNet[1]

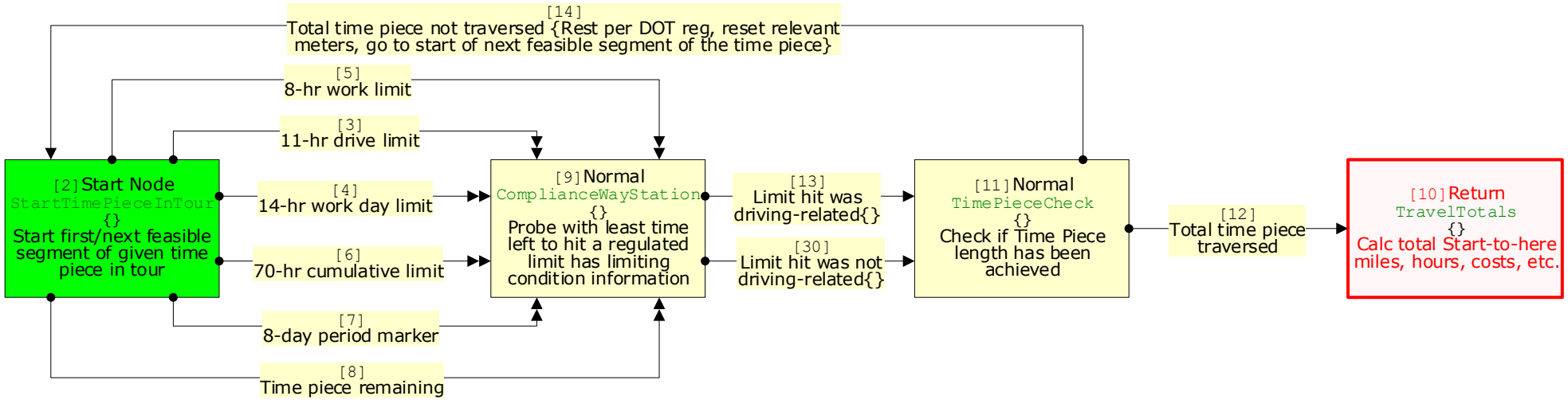


[10]Note: When a quantitative decision model is formulated as a system of hierarchical queuing networks, the pictures tell the story of the problem being modeled. However, they cannot communicate the entire story, which requires reading some background material. For this model, the article at https://blog.bigroad.com/blog/how-many-hours-are-drivers-allowed-to-drive-hos-overview-part-3 (ushar.com/dotrules) conveys how the model uses US Department of Transportation's hours of service rules for truck drivers. Notice that if an arc (arrow) in the diagram is blue it indicates that there is a subnetwork nested in its hierarchy. In this case all seven blue arcs have the same subnet [TimeKeeping] under them, shown on next page of this document. TimeKeeping is also nested in the yellow Network Nodes [5] and [21] by simply naming them "TimeKeeping." Node names need not be unique as ORMSware uses Visio object IDs (e.g. [5] and [21]) to compile a model's logical network. Object IDs in network do not imply any calculation/execution sequence.

[14]Note: Every discrete event simulation built with ORMSware is a program and every program written with ORMSware is automatically a discrete event simulation. In this example case, the problem is more interesting when multiple loads and a pool of drivers are considered simultaneously within a time window. For those unfamiliar with discrete event simulation, Arrival and Departure are terms used in what is known as birth-and-death systems/processes. In this example they refer to the birth of a demand for transporting a load and completion of that job.

[20]Note: So, in a given scenario of loads/jobs, how many drivers would the carrier need, for example? What will be the carrier's performance/capacity increase if drivers do not have to wait or hunt for trailers? How much more will drivers be able to earn? How much investment would be worthwhile for a carrier to ensure trailer readiness and accurate trailer status reporting? Notice how drivers are requested at Node[2] to assign a load, and released at Node[23] when tour is complete, becoming available for another load, subject to DOT work rules constraints shown in image below. Notice also from the logic in the diagram that nodes and arcs in ORMSware networks are typically logical, though any set of desired nodes/arcs can represent fixed physical locations. In this simulation origin, destination, and waystations of any tour can be any geographical location, depending on the given job. The model is simulating many trucks going from and to many different locations in the time window being analyzed.

C:\ORMSware\Examples\KeepOnTrucking.vsdm(p 2 / 2): TimeKeeping[1]



[23]Note: This network is the subnet [TimeKeeping] referenced in the topmost network in this model. If you did read the article on DOT's hours of service rules, you'll see how this [TimeKeeping] subnet ensures compliance with the rules described in the article. This compliance assurance is essential to be sure that the model produces reliable estimates of a carrier's throughput/capacity, driver requirements, etc.

[25]Note: This model was created based on the referenced article and fifteen minutes of conversation with one truck driver. As you can see, it is clear right away before even cranking any numbers that if [refrigerated] trailers are not available at the right time, at the right place, in the right condition when drivers arrive to pick them up, drivers lose money (they are burning available work time and drive time capacity within DOT constraints, while also incurring opportunity costs from not driving). Trailer hunting also affect carriers as it, in effect, creates driver shortage.