Virtual Time

Objective time should pass inevitably, by its own nature, needing nothing else, but virtual time depends on processing cycles. In Conway's Life simulation (Figure), pixels reproduce and die by program rules. So blobs grow and contract until (often) a steady state is reached. For a pixel entity in a Life simulation, time is measured by the events that occur to it. Many events constitute (for it) a long time, while a few events are a short time. Time is the processing cycles experienced, and we measure time like this in our world, as atomic clocks count atomic events.

Suppose a Life game that usually takes twenty minutes to reach a certain state is run again on a faster computer, and reaches the same end state in two seconds. Re-running it takes less time in our reality, but the virtual time doesn't change, as the same number of events occurred. A being in the simulation, seeing the same number of events passing, sees the same time passing. The simulation time depends solely on *the number of processing cycles that occur* in the simulation.

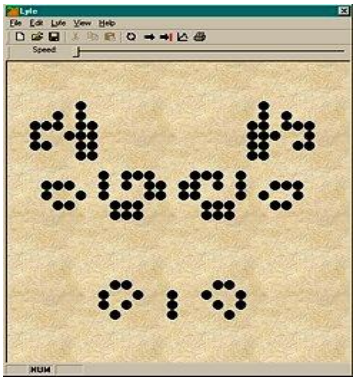

Figure. Conway's Life

If a computer game slows down under load, like say in a big battle, the player experiences game lag, as the screen slows down. However from the point of view of an onscreen avatar nothing changes, as *they also slow down*. If our world is a virtual reality we won't in theory see load effects, and indeed relativistic changes in space-time are undetectable to the parties affected. However if processing is distributed, as here, people under different *local loads* can later compare time differences, e.g. in Einstein's twin paradox, a twin travels the universe in a rocket at near the speed of light and returns a year later to find his brother an old man of eighty. Neither twin knew their time ran differently and both still got their allocated number of life breaths, but one twin's life is nearly done and the other's is just beginning.

In this model, the processing cycles of a body are time passing for it. If the grid is busy with something else, like movement, fewer mass processing cycles occur. For the moving rocket twin, the grid only processed a year's worth of events for him, so he only aged a year, but his twin on earth had no such load, so eighty years of his life cycled by in the usual way. Only when the two re-united was it apparent that their virtual times had run at different rates.

As Einstein said, for light time stands still, because a photon moving at one node per cycle never experiences a node cycle, so *our* time for it stops. This is not just theory, as in particle accelerator experiments time really does slow down as speed increases. The physical evidence suggests that our time really is virtual.