In this paper, we present a general concept of state transition diagrams well-suited for various modeling purposes. Our notation is tailored for the description of asynchronous time-independent agents. We start by proposing a graphical and textual syntax, and define an abstract syntax for both notations. The semantics of state transition diagrams defined by translating the abstract syntax into timed port automata and to timed input/output relations on streams. To make the graphical notation practical, we partition the (possibly infinite) state space of the state transition diagrams with state predicates and define transitions with pre- and post-conditions.