A unified stochastic framework for all portfolio default models with conditionally independent and identically distributed (CIID) default times is presented. Desirable statistical properties of dependent default times are introduced in an axiomatic manner and related to the unified framework. It is shown how commonly used models, stemming from quite different mathematical and economic motivations, can be translated into a multivariate frailty model. After a discussion of popular specifications in this regard, two new models are introduced. The vector of default times in the first approach has an Archimax survival copula. The second innovation is capable of producing default pattern with interesting statistical properties. The motivation for the latter approach is to add an additional source of jump frailty to a classical intensity-based approach. An approximation of the portfolio-loss distribution is available in both cases. The paper closes with a discussion of various generalizations of the generic framework.