I describe a mathematical systems modelling framework that is motivated by a desire to represent and reason about properties of (large-scale) systems situated in dynamic environments. Motivated by the concepts of distributed systems theory, the framework has at its core mathematical treatments of environment, location, resource, and process, and comes along with a separating modal logic. Extensions to analyze questions in computer security are also considered.

The mathematical structures provide a semantics for a modelling tool, called (Core) Gnosis, that, together with some elementary utility theory, has been deployed in a range of commercial projects undertaken with Hewlett-Packard’s information security business and its customers.

I conclude by discussing the role of economics in the context of modelling questions in information security.