



## A Hardware Architecture for Implementing Protection Rings

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Protection of computations and information is an important aspect of a computer utility. In a system which uses segmentation as a memory addressing scheme, protection can be achieved in part by associating concentric rings of decreasing access privilege with a computation. The mechanisms allow cross-ring calls and subsequent returns to occur without trapping to the supervisor. Automatic hardware validation of references across ring boundaries is also performed. Thus, a call by a user procedure to a protected subsystem (including the supervisor) is identical to a call to a companion user procedure. The mechanisms of passing and referencing arguments are the same in both cases as well.

(Pages 43 through 54 omitted)