In this paper, we report a simulation study of the scalability and performance of an optimal utility-based congestion control for a cluster-based router composed of commodity processors connected by a high-speed InfiniBand network. This control is optimal in the sense that it maximizes the sum of the utilities over ingress rates subject to an egress capacity constraint. We validate our simulation results by comparing them to experimental results from a small-scale prototype, and to the results from a fluid-flow model. One of the key aspects tested is the behaviour of the router's internal congestion control as a function of router size and varying traffic patterns. Our results show that the optimal scheme provides much smoother and tighter control than an AIMD-based control, thus leading to significantly higher throughput and lower delays. Our results also show that the optimal control scales well to large numbers of interfaces, and reacts quickly to changes in the input traffic intensity and pattern.