Virtualization technology has attracted considerable interest. It allows several virtual machines to run concurrently inside a physical host, which brings multiple advantages. One of the most useful features is called live migration, during which a virtual machine can be migrated over network with minimal disruption. So far, most existing migration algorithms are focused on transferring the runtime state over high-speed, low-delay network. They all require shared storage for file systems. However, this sharing sometimes becomes impossible because of performance loss. Thus, the whole system needs to be transferred during migration.

In this thesis, we introduce a Virtual Machine Management System which contains a block-level solution. Combined with pre-copying the runtime state, we can migrate an entire virtual machine over low-bandwidth, high-delay network with minimum service downtime. We show that this is sufficient even for interactive workloads. We also provide snapshots and full backup for the virtual machine.