

# Technology Profile Fact Sheet

**Title:** Method for Improving Performance of Virtual Machines

**Aliases:** None.

**Technical Challenge:** To improve the performance of virtual memory machines by reducing the overhead required in maintaining virtual machine address spaces.

**Description:** Virtual machines allow multiple operating systems to access real physical memory as if each has its own dedicated real address space. As each operating system maintains address spaces for each of its processes through page tables, the virtual machine has a monitor that maintains address spaces for each operating system through shadow tables.

Every time an operating system changes its page tables, the monitor must scan and then change the corresponding shadow table to reflect the mapping change. Most virtual machines discard existing shadow tables and reload new ones when corrections are required. If the table is large then the rebuild time can be considerable.

This method partially builds the shadow tables on the fly. It maintains a bitmap to track which parts of the shadow table need to be scanned for changes. The bitmap reduces the number of table entries to be scanned which reduces the overhead in changing virtual memory addresses.

**Demonstration Capability:** There is no current way to demonstrate the method.

**Potential Commercial Application(s):** This algorithm would benefit any design of a computer operating system based on virtual memory.

**Patent Status:** A patent application has been filed with USPTO.

**Reference Number:** 1460