Upgrading Peaceful Shutdown to Graceful via a Cancel Command

## Introduction

We have the following scenario: An administrator has an indefinite, but not infinite, amount of time to wait for jobs to finish. So, he issues a condor\_off -peaceful command to allow jobs to complete and exit the pool. After a period of time, he finds that he is not willing to wait any longer, and wants to shutdown the pool immediately. To be kind to users, he would like to upgrade the -peaceful command to a -graceful command: this will allow the users’ jobs to checkpoint before leaving the startd. Unfortunately, he finds that this is impossible in HTCondor version 7.9.4. We propose to remedy this situation by installing a new command flag for condor\_off, namely, the -cancel flag.

## Implementation

A graceful shutdown, as well as a peaceful shutdown, is implemented by sending a SIGTERM to a daemon. The peaceful shutdown is differentiated from the graceful shutdown by setting a flag in the DaemonCore object for the daemon, which is accessed by the member *GetPeacefulShutdown()*. The peaceful shutdown is sent by first sending a command that sets the **PeacefulShutdown** flag, and then sending a SIGTERM to the daemon. SIGTERM is handled in DaemonCore by the function *handle\_dc\_sigterm*. The function *handle\_dc\_sigterm* has a flag which causes it to be effectively run once in the lifetime of the daemon (it does nothing, but returns true, on the second and all subsequent calls). The signal is usually sent by sending a DC\_OFF\_GRACEFUL to the daemon. Peaceful shutdown is indicated by sending a DC\_OFF\_PEACEFUL message. In addition, shutdown is implemented by sending DAEMON\_OFF\_\* commands to the master.

Our solution will be to add DAEMON\_OFF\_CANCEL and DAEMONS\_OFF\_CANCEL commands to the master, and DC\_OFF\_CANCEL to DaemonCore commands; the condor\_off tool will be augmented to use these new commands. The daemon receiving the DC\_OFF\_CANCEL command will clear its flag that indicates it is shutting down peacefully, and begin a graceful shutdown. When the master receives a DAEMON\_OFF\_CANCEL command, it will send a SIGTERM to the daemons it is managing (the condor\_off tool will have sent the DC\_OFF\_CANCEL message to the daemons, clearing the flags as above). This might introduce a race condition, wherein the SIGTERM is sent before the flags are clear, resulting in a null operation.