# Overview

In certain situations, the grid manager will call DescribeInstances() on a per-job basis (rather than a per-resource basis). This limits our scalability and, for the current incident (#3681), the stability of the service. By removing these per-job calls, we will improve the scalability and security of both HTCondor and the services to which it connects.

There are presently two per-job DescribeInstances() calls in the code base. The first takes place in GM\_PROBE\_JOB, and the second in GM\_SEEK\_INSTANCE\_ID.

GM\_PROBE\_JOB calls DescribeInstances() to obtain additional information from the service about an instance when the bulk status update detects that the instances' state has changed.

GM\_SEEK\_INSTANCE\_ID calls DescribeInstances() during recovery to determine if a removed job that has a client token but not an instance ID actually started an instance.

# Solution

### GM\_PROBE\_JOB

This call can be eliminated by obtaining the additional information from the bulk status update.

Since all the necessary information is already present in the information returned by the service, we need only to forward it appropriately. Because the EC2 GAHP (cleverly) shares parsing code between the single-job and multi-job status-reply parsers, getting the information into the grid manager should be simple.

We simplify dispatch from the bulk status update code in *ec2resource.cpp* by observing that GM\_PROBE\_JOB can only be entered from GM\_SUBMITTED, which entails that the job already has an instance ID. Thus, we can simply add the additional information to job object updates we're already doing. This may required adding additional fields to the job object, increasing the size of grid manager.

EC2\_VM\_STATUS currently returns the following attributes: instance ID, status, AMI ID, and the status reason code (which may be null); and optionally the public dns name, private dns name, SSH keypair name; and optionally, the list of security group names.

EC\_VM\_STATUS\_ALL currently returns the following attributes: instance ID, status, AMI ID, and client token (which may be null).

By combining these two lists and pruning the unused attributes, we end up with the following list: instance ID, status, client token (may be null if the SSH keypair name exists), status reason code (may be null), public DNS name (optional), and SSH keypair name (may be null if the client token exists).

### GM\_SEEK\_INSTANCE\_ID

Rather than call DescribeInstances(), this state could instead block waiting for a batched status update. However, the fact the job has entered this state means that we don't have the instance ID necessary for the batched status update to update the job object (and allow it continue). We must therefore extend the status-update routine to identify jobs by client token (or, for #3682, SSH keypair ID) as well. Then, when a job gains an instance ID for the first time, we'll notify it.

After unblocking, GM\_SEEK\_INSTANCE\_ID will check if it has an instance ID. If it does, it will make the appropriate TerminateInstances() call; otherwise, it will skip it.

Since we don't want to wait for a job to gain an instance ID before removing it (in addition to being inefficient, we may never occur), we want to notify jobs that we know about but weren't told about by the service. This ensure that no removal will wait more than one probe interval.

However, not all jobs with a client token but not instance ID are in GM\_SEEK\_INSTANCE\_ID (being removed); some may blocked waiting for a response in GM\_START\_VM. Updating the instance ID shouldn't be problematic, but clearing the blocked flag may be. The update could (at least initially) be limited to jobs in GM\_SEEK\_INSTANCE\_ID by use of an accessor function (because the EC2 resource class probably shouldn't know about the EC2 job's state machine).

# Work Plan

Implement GM\_PROBE\_JOB change.

Test against Amazon.

Implement GM\_SEEK\_INSTANCE\_ID change.

Test against Amazon.

Update/verify using SSH keypair IDs after implementing #3682.

Test against OpenStack (FutureGrid?).