Fermilab

US CMS
The Compact Muon Solenoid

Condor Week 2008

Pseudo-interactive monitoring in Condor

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What is the problem

- Users submit vanilla jobs that run for hours
- Users want to know what is the status of the jobs
  - Are they using CPU?
  - Are they producing the expected files?
  - Any error messages in the log files?
- Especially when experimenting with new code, waiting for the jobs to finish may waste a lot of time and resources

What can be done about it?

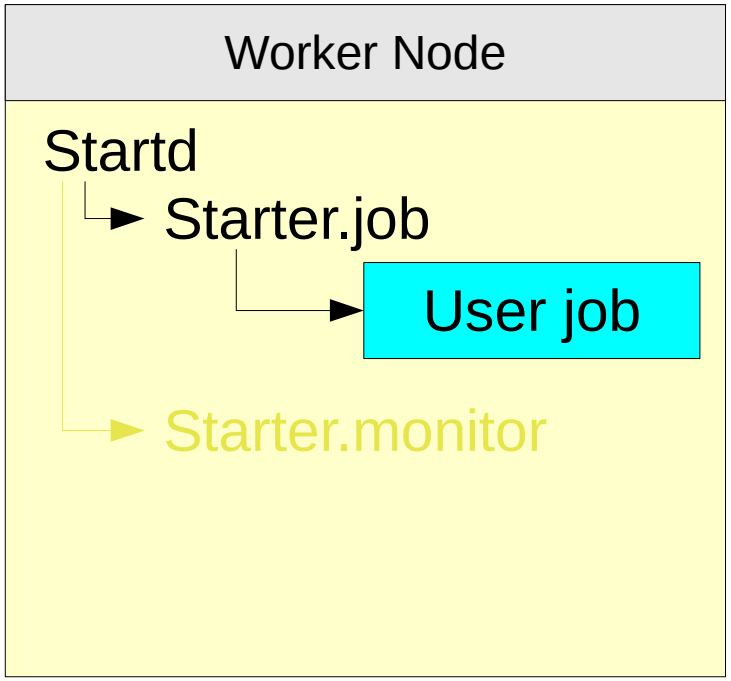
- Waiting for jobs to finish
  - always an option, but inefficient
- Use the standard universe
  - may be tricky, not all apps can run there
- Implement application specific solution
  - lots of work!
- Let Condor do the monitoring
  - How????

Monitoring with Condor

- Before looking for a solution, define the problem
- What are the actions we are interested in?
  - Get the process list and the CPU usage
  - Get the content of the job working directory
  - Get the content of a job file
- **They are all batch type actions!**
  - We just need to run them on the same worker node

Use multiple slots x CPU

- Condor_startd can have multiple slots x CPU
  - Use one for the jobs, and one for the monitoring



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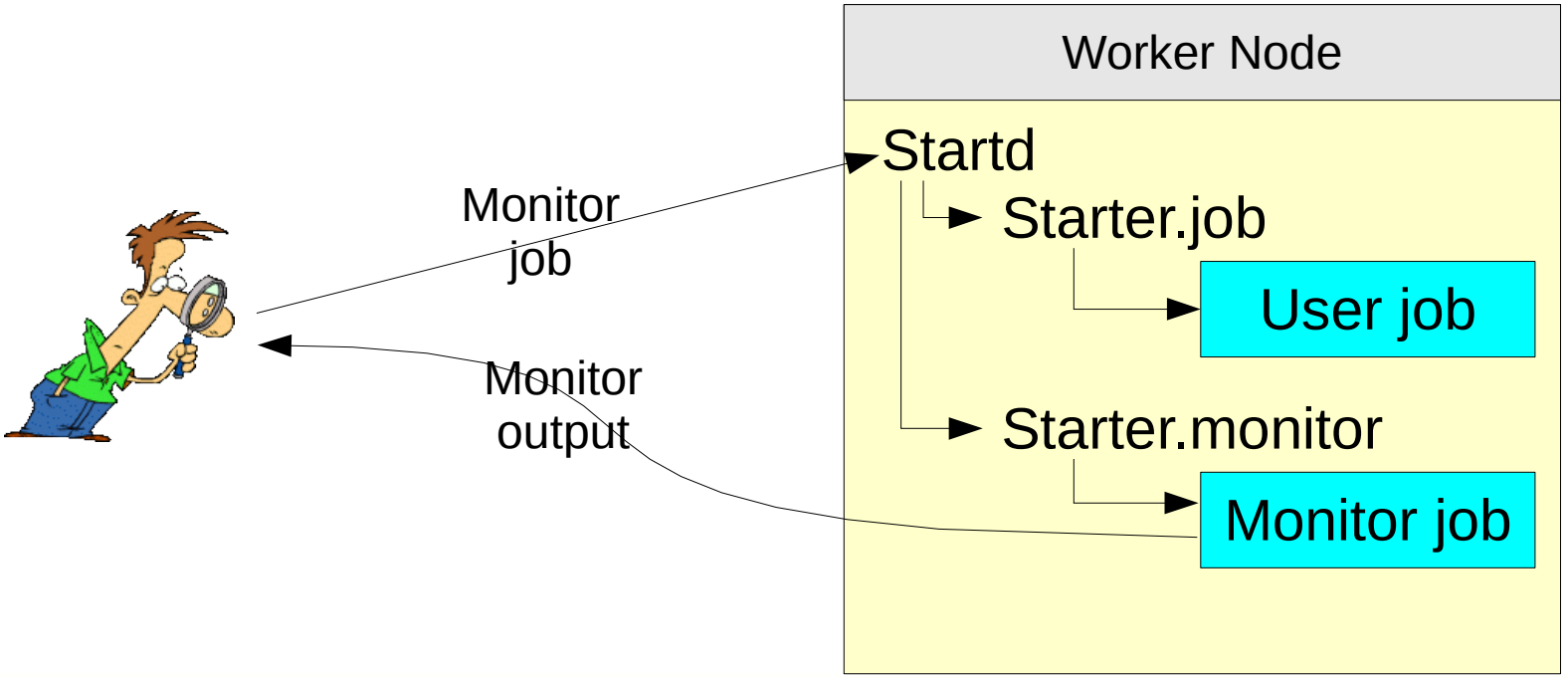

Startd configuration

Single CPU assumed here
Can be done for multiple CPUs, too

- Enable multiple slots

```
NUM_CPUS = 2
VIRTUAL_MACHINE_TYPE_1 = cpus=1, memory=1%, swap=1%, disk=1%
NUM_VIRTUAL_MACHINES_TYPE_1 = 1
VIRTUAL_MACHINE_TYPE_2 = cpus=1, memory=99%, swap=99%, disk=99%
NUM_VIRTUAL_MACHINES_TYPE_2 = 1
```

- Enable cross_slot information flow

```
STARTD_RESOURCE_PREFIX = vm
STARTD_VM_EXPRS = State, RemoteUser
```

- Config one slot for monitoring and one for jobs

```
VM1_VM2_MATCH = (vm2_State=?="Claimed")&&(vm2_RemoteUser=?=User)
VM1_START_CONDITION = $(VM1_VM2_MATCH) && (JOB_Is_Monitor)
VM2_START_CONDITION = <your old START condition>
START = ((VirtualMachineID == 1) && ($(VM1_START_CONDITION))) ||
        ((VirtualMachineID == 2) && ($(VM2_START_CONDITION)))
```

Monitoring job

- Could be a simple shell script

```
#!/bin/sh
ps -fu `id -n -u`
```

- Determine which node the job is running on
  - Use condor_q
- Submit the monitoring job with

```
+JOB_Is_Monitor=True
Requirements=(Name=?=”vm1@<node running job>”)
```

You can get a demo tool that does this for you at:
http://home.fnal.gov/~sfiligoi/condor_monitoring/job_monitor.tgz

Does it work?

- Yes
  - Used in glideinWMS for the past few years
- Drawbacks:
  - It takes a negotiation cycle to get the results
  - Cross slot information updated only every few minutes
    - May not be able to monitor a job for the first few minutes

Conclusions

- Users need job monitoring
- Condor out of the box does not provide an easy tool to monitor vanilla jobs
- Using multiple slots can solve the problem
  - Needs an additional tool to make it easy
  - Get a generic demo at http://home.fnal.gov/~sfiligoi/condor_monitoring/job_monitor.tgz