



Red Hat and Condor Project Collaboration

Matthew Farrellee

Senior Software Engineer

Grid Team Lead

Red Hat

- **Defining technologies...**

- Grid/ Distributed computing (UW/Condor)
- Real-time
- Virtualization
- Distributed computing / Messaging (built on AMQP) www.redhat.com/mrg, qpid.apache.org/, www.amqp.org
- Stateless (ability to execute from read only image/device) et.redhat.com
- FreeIPA (Identity, Policy Audit) www.freeIPA.org

etc....

- **The combination of these types of technologies, in a standard Linux distribution, will provide a new generation of compute platforms.**

Red Hat Enterprise MRG

- **Defining technologies...**
 - Grid (UW/Condor)
 - Real-time
 - Messaging (built on AMQP)
- **The combination of these types of technologies, in a standard Linux distribution, are providing a new generation of compute platforms.**

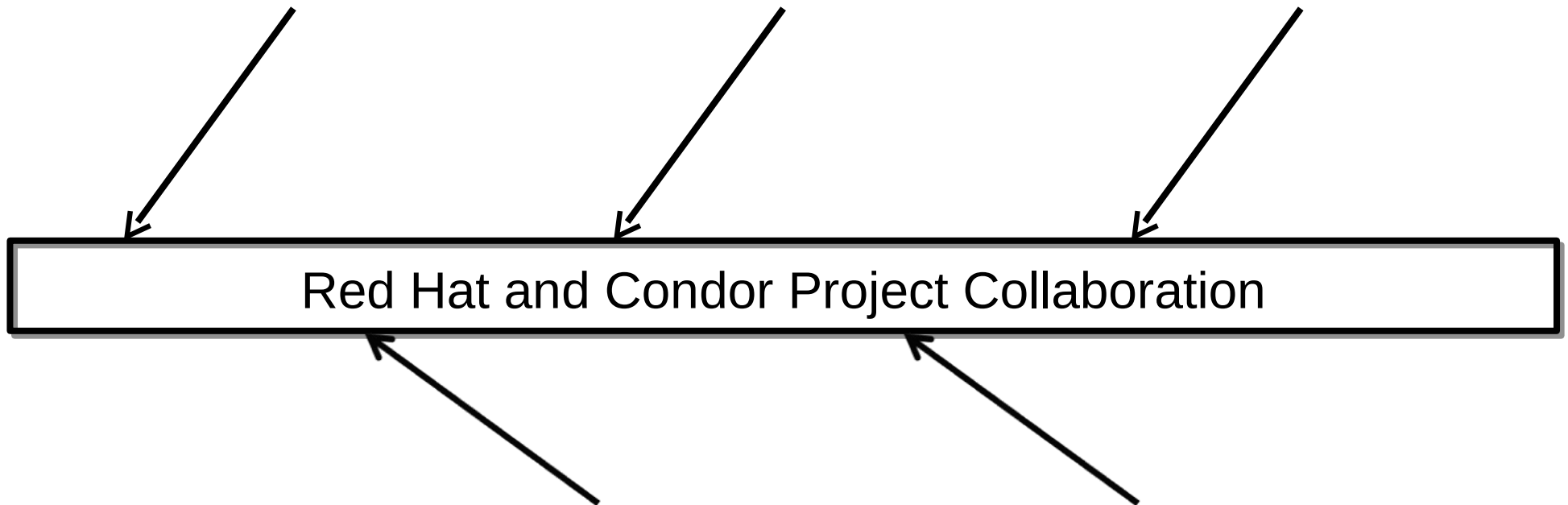


Condor Week 2007

-Red Hat/Condor collaboration

*Condor as open source

*Red Hat Madison office



Foundation

- **Condor Project and Red Hat work to release Condor source**
- **Red Hat builds team on-site with Condor Project**
- **Building on Condor Project's production expertise**
 - Always be compiling
 - Automate testing
 - Ok, how about more!
- **Be flexible on all levels, even the source**

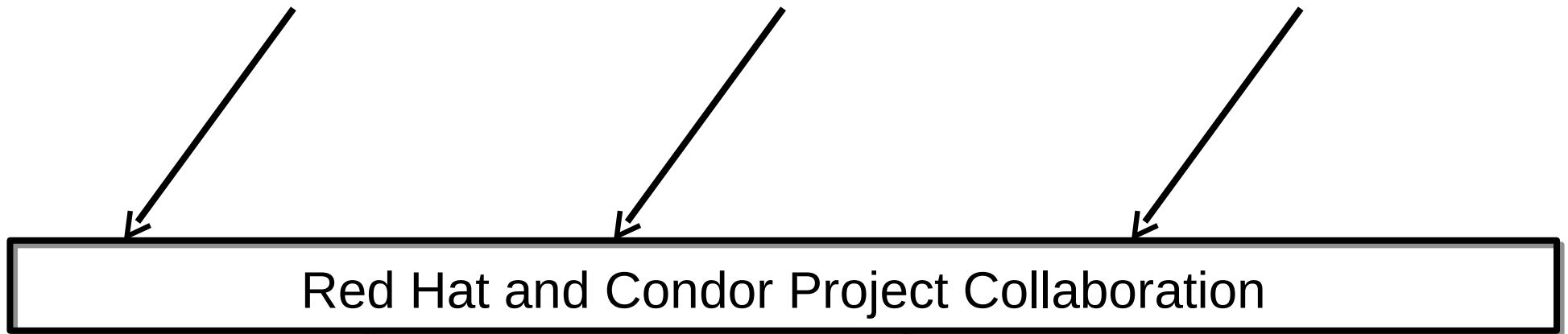


Condor Week 2007

-Red Hat/Condor collaboration

*Condor as open source

*Red Hat Madison office



Condor 7.0 Release

-1st release with source

-Condor into Fedora

-Beta MRG release

Collaborative Development

- **EC2 through the Grid Universe**
 - Get access to the Cloud from a Condor pool
- **Development also means testing**
 - Red Hat QE
 - Put through paces: Job Hooks, continue VM Universe, HA Schedd, HA Central Manager, ...
- **Job Hooks**
 - Produced AMQP based submission of jobs directly to slots
- **New ways to instrument Condor**
 - Allow integration with MRG's management infrastructure



Grid Management

- QMF based
- Pools modeled
- Grids modeled
- Data via AMQP
- We're just one consumer

```

qpid: show 455
Object of type mrg.grid:slot: (1
Type      Element
=====
=====
property  CondorPlatform
HEL5 $
property  CondorVersion
09 BuildID: RH-7.2.2-0.9.e15 $
property  DaemonStartTime
property  Pool
lab.bos.redhat.com
property  System
property  AccountingGroup
property  Arch

```

The screenshot shows a web browser window with the URL `http://localhost:45672/usergrid.html?frame=main.submission;main.m=`. The page title is "MRG Grid - Mozilla Firefox". The interface includes a navigation bar with "Overview", "Submissions", "Templates", and "Your Account". The main content area is titled "Create submission to pool 'wingspan'". It contains several sections: "Template" (Standard scene render), "Description" (Chase scene preview render), "Command" (`/usr/local/bin/standard-render`), "Arguments" (`-s 125.67 -e 145.99 -q 0.5`), "Inputs" (scenefixtures.cat), and "Outputs" (scene.mp4). At the bottom, there is a status bar with "Hi, gridmonkey · Log Out" and "Actions: 0 pending, 1 completed, 0 failed".

The screenshot shows the top navigation bar of the MRG Grid dashboard. It includes tabs for "Home", "Messaging", "Grid", and "Systems". The user is identified as "Hi, gridmonkey · Log Out". The dashboard title is "RED HAT ENTERPRISE MRG". Below the navigation bar, it says "Main > Pool 'MRG Pool'" and "Actions: 0 pending, 1 completed, 0 failed".

Pool 'MRG Pool'

Pool Status
13 of 130 slots idle

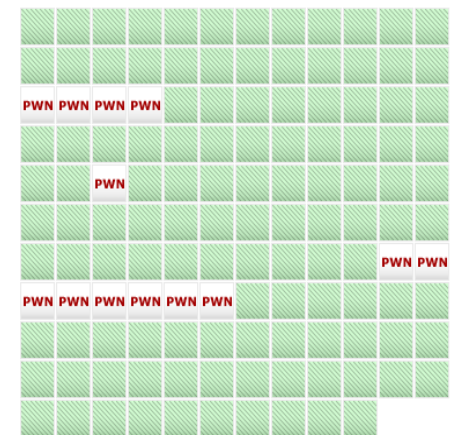
Collector ID `mrg29.lab.bos.redhat.com,mrg30...` [» See All Pools](#)

Statistics **Jobs (68737)** Schedulers (1) Submitters (5) Collectors (1) Negotiators (1) Limits (0)

General

Statistic	Value	Percentage
Running Jobs	117	0.14
Completed Jobs	20301	23.88
Idle Jobs	63568	74.79
Held Jobs	500	0.59
Removed Jobs	514	0.60
Total Jobs	85000	100.00

Slots on MRG Pool



Activities

- Idle
- Busy
- Suspended
- Vacating
- Killing
- Benchmarking
- Unknown

States

- Unclaimed
- Claimed
- PWN Owner
- Matched
- Preempting

```

qpid: list
Management Object Types:
ObjectType      Active
=====
com.redhat.sesame:sysimage 20
mrg.grid:collector 1
mrg.grid:grid 1
mrg.grid:job 63238
mrg.grid:master 1
mrg.grid:negotiator 1
mrg.grid:scheduler 1
mrg.grid:slot 130
mrg.grid:submitter 5
org.apache.qpid.broker:agent 23
org.apache.qpid.broker:binding 98
org.apache.qpid.broker:broker 1
org.apache.qpid.broker:connection 29
org.apache.qpid.broker:exchange 6
org.apache.qpid.broker:queue 33
org.apache.qpid.broker:session 28
org.apache.qpid.broker:system 1
org.apache.qpid.broker:vhost 1

```

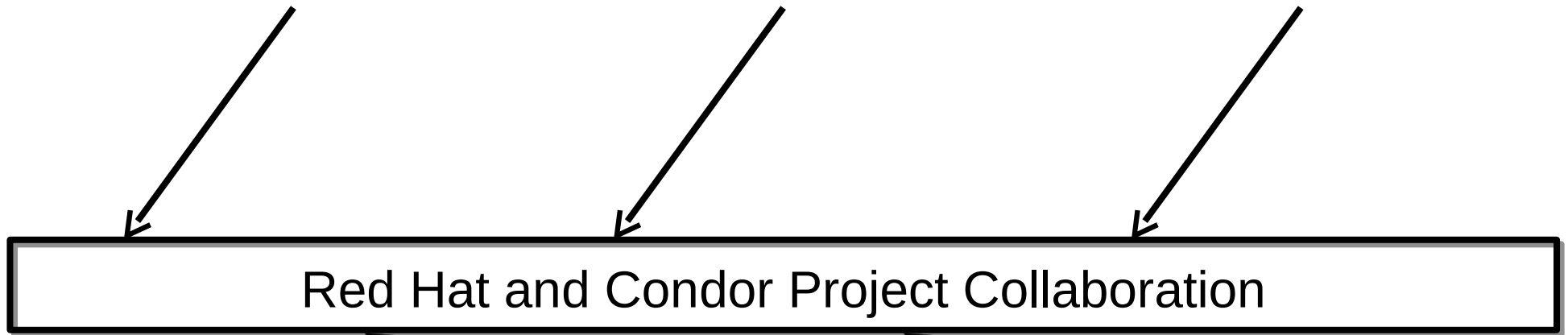



Condor Week 2007

- Red Hat/Condor collaboration
- *Condor as open source
- *Red Hat Madison office

Condor Week 2008

- EC2
- Management



Condor 7.0 Release

- 1st release with source
- Condor into Fedora
- Beta MRG release

Features

- **Red Hat developed features**
 - Always with the Condor team!
 - Just primarily driven by Red Hat
- **Concurrency Limits**
- **Partitionable Slots**
- **Job Router Hooks**

Concurrency Limits

- **Turn anything into a claimable resource**
- **Popular for licenses**
- **Useful for scale**
- **Clever to limit users**
- **Part of Negotiator configuration**
 - `MATLAB_LIMIT = 50`
 - `FILER_A_LIMIT = 2500`
 - `CONCURRENCY_LIMIT_DEFAULT = 150`
- **Part of a Job**
 - `concurrency_limits = matlab`
- **See Jaime's tutorial for more details**

Partitionable Slots

- **Size the slot to the job**
- **Job can claim all the CPUs, or half the memory**
 - Owner gets charged for the CPUs
- **Pack more jobs onto a machine**
- **Need resource estimates**
 - Condor roughly gives some
 - You might know better – using history
 - Sometimes you know exactly – Virtual Machines
- **Startd configuration component**
 - `SLOT_TYPE_<n>_PARTITIONABLE = TRUE`
- **Job component**
 - `request_memory = 1024MB`

Job Router Hooks

- **Job Router**
 - Transform a Vanilla Universe job into a Grid Universe job
- **Job Hooks**
 - Run an arbitrary program at key points during a job's execution
- **Job Router Hooks**
 - Run an arbitrary program at key points when transforming a job
- **MRG Feature – Vanilla -> EC2 submission**
 - Uses EC2, S3 and SQS
 - Chat with Rob Rati
- **Condor Project – Vanilla -> VMware submission**
 - Announced to condor-users, talk to Varghese Mathew



Condor Week 2007

- Red Hat/Condor collaboration
- *Condor as open source
- *Red Hat Madison office

Condor Week 2008

- EC2
- Management



Condor 7.0 Release

- 1st release with source
- Condor into Fedora
- Beta MRG release

Condor 7.2 Release

- UW&Red Hat features
- Red Hat MRG 1.1 GA

Broadening Collaboration

- **Continuing since before 7.0**
- **Work together on enhancement planning**
- **Work together on release**
- **Work together on community support**
- **Engage forming developer community**



Condor Week 2007

- Red Hat/Condor collaboration
- *Condor as open source
- *Red Hat Madison office

Condor Week 2008

- EC2
- Management

Condor Week 2009

Condor Project and Red Hat Collaboration

Condor 7.0 Release

- 1st release with source
- Condor into Fedora
- Beta MRG release

Condor 7.2 Release

- UW&Red Hat features
- Red Hat MRG 1.1 GA

Future

- **It has been a great, productive few years**
 - Lessons learned by all
- **More work with UW on Condor enhancements**
 - Bring KVM to VM Universe, exploit libvirt functionality
 - See Todd's talk at the end of the day
- **More work with UW on Condor community support**
 - Both the user and developer communities
 - See Todd's talk at the end of the day

Future

- **Continued MRG integration**
 - User-centric UI (even submission)
 - Enhanced management
 - Admin reports
 - Enhanced diagnostics
- **Windows**
 - Wait, what? Windows!
 - As execution nodes



Thank You

**We are still hiring, contact
matt@redhat.com**