

McFarm

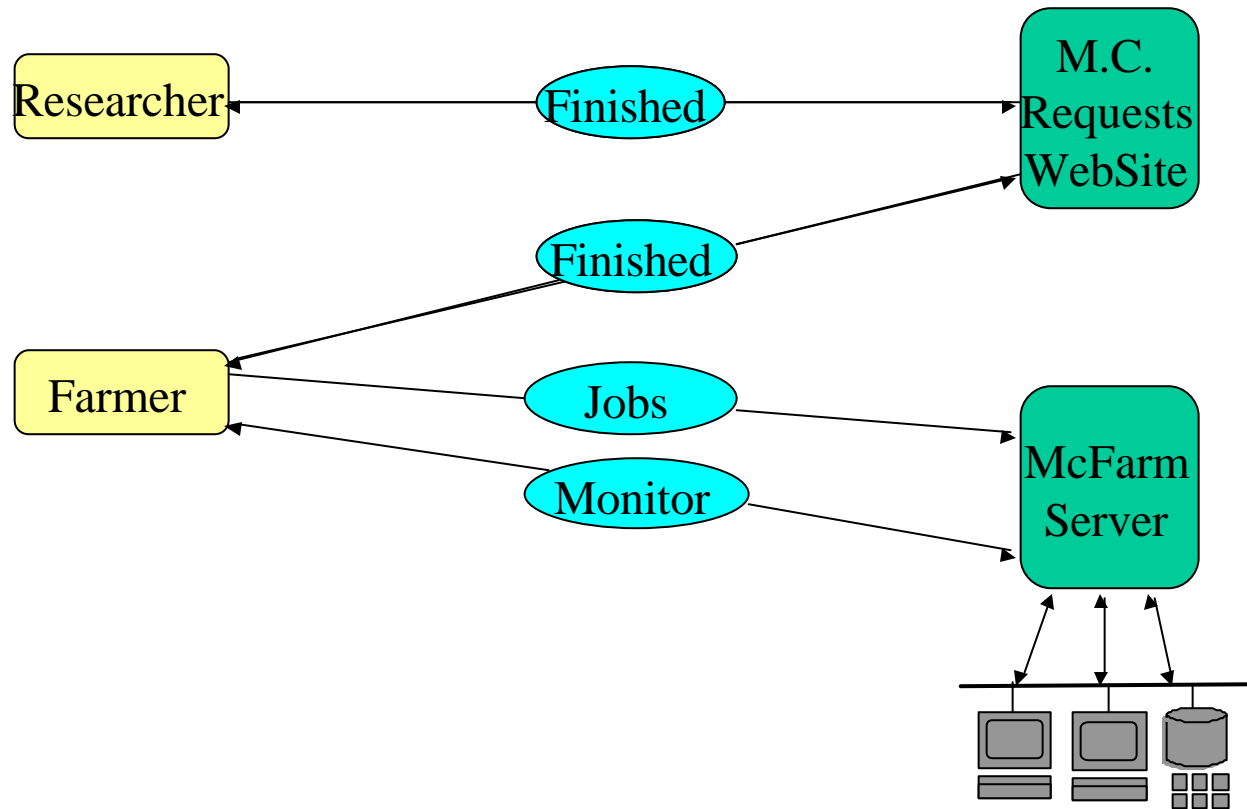
(DØ Monte Carlo Farm Controller)

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Reasons for Using McFarm

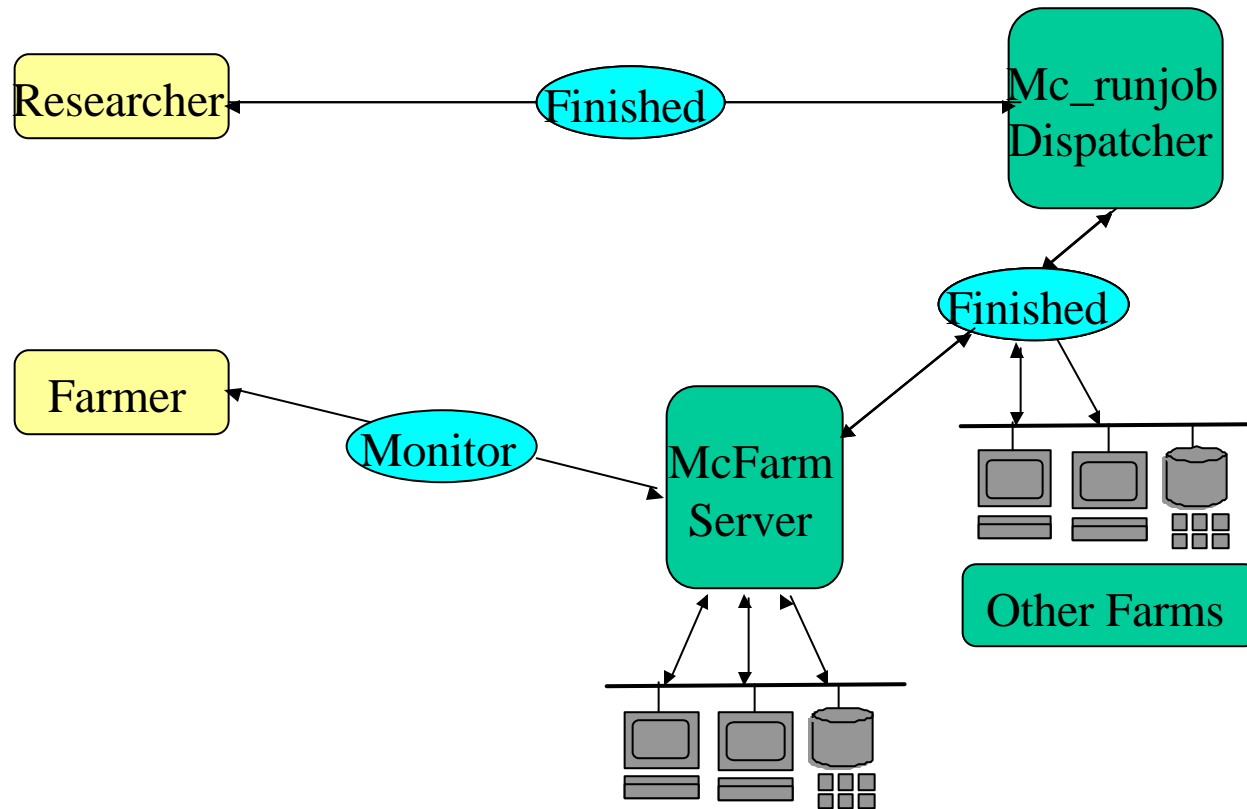
- Simplifies Monte Carlo Production
- Manages the Cluster with Minimum Labor
- Manages the Cluster Efficiently
- Minimizes Impact of Changes to SAM, mc_runjob, other DØ software
- User-Oriented

Life Cycle of a Request



D. Meyer - UTA Farm Team

Automated Request System



D. Meyer - UTA Farm Team

Original McFarm Design Criteria

- Keep Processors Maximally Occupied
- Minimize Farmer's Labor
- Robust in Spite of Problems (nodes down, network failures, SAM down, binaries fail)
- Manage Dedicated Resources (cache, CPU)
- Minimize Network Traffic (locality, locality, locality!)

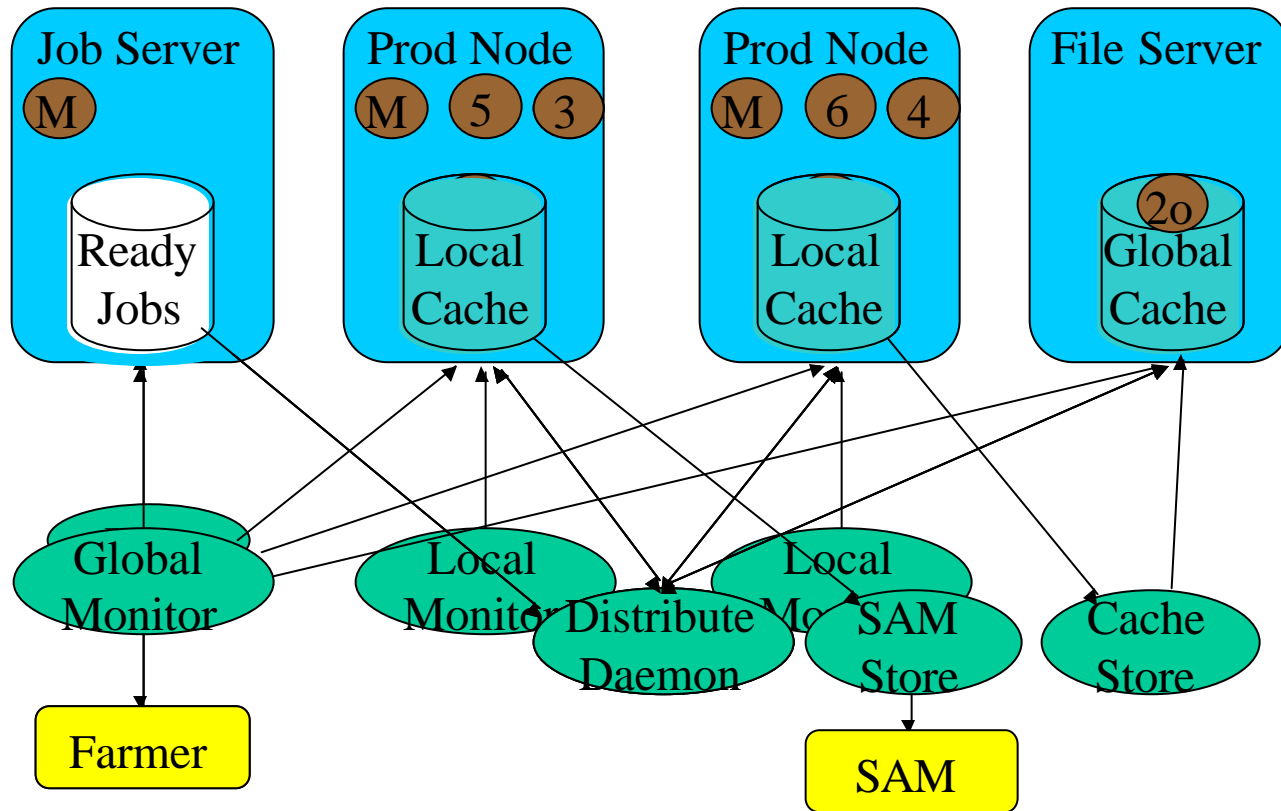
Evolving Design

- Share the Resources (Batch Queues, Quotas)
- Remote Monitoring
- Automate Request Handling
- Grid-Friendly (Less Node Prep, Fewer Daemons)
- Relax Locality Preferences
- Easier Installation, Re-Configuration

McFarm Software Integration

- **DØ Binaries** - minitars or full release
- **SAM** - declaration, storage, retrieval
- **mc_runjob** - job and metadata construction
- **NFS** - access to binaries, minbias database
- **NIS** - account management
- **ssh** - intra-cluster monitoring and control
- **Batch Queues** - PBS and Condor

McFarm Job Life-Cycle



Sample McFarm Alerts

The following alert(s) are being issued by the farm monitor:

* Resolve these problem jobs:

UTA-DSRT-Req5386-bbh-bbbb-03084233103 on hepfm010

* Bring these nodes back on-line:

hepfm011

hepfm012

hepfm013

* Restart the "execute" daemon on:

hepfm014

Sample McFarm Alerts

The execute-daemon on ouhep001 has a problem with this job:
OU-D-Req5257-minbias-cdf-03092152359

Job was apparently Looping in D0G
It is removed from this node's execute-queue.
Job was moved to the error_queue

Sample McFarm Alerts

SAM declare failed after 6+ hours and 6 tries:

```
import_pythia-gen_UTA-P-Req5502-zz-znunu+zjj-  
03083175022.py
```

Detail SAM Response follows

Code: person work group not found in db (Category User)
Additional information: Person 'mcfarm' w/ Id '383' not found in
Working Group 'higgs sensitivity' w/ Id '61'.

End of Detail Response

Sample McFarm Alerts

Excessive Swap Usage on Node hepfm000 at Sat Apr 5 06:21:42 2003
(Swap MB:570.0 Pct:71.3%.)

Job UTA-DSRT-Req5386-bbh-bbbb-03084221448

Phase D0RECO/D0RECO Status IN PROCESS

Will suspend new exec until swap space becomes available.

•••••

Highest swap MB encountered in this event: 570.0

Highest percent encountered in this event: 71.3%

New Job Execution resumed

McFarm Utilization Metrics

D0RECO Overall...

	Files	Events	OutputMB	CPU Time	ClockTime	%Util
Total	6	6000	6362.41	155:08	156:13	99.3
Per File	1	1000	1060.40	25:51:28	26:02:14	
Per Event	0	1	1.06	0:01:33	0:01:33	

.....

CPU Time In Period: 2975.5

Period ClockTime : 167:59 CPUs:46 Extend Clock : 7727:59

Less InProcess : 3507:34 Available ClockTime: 4220:24

Farm CPU Utilization:70.5%

Summary

- McFarm is a mature, robust, flexible cluster controller for Monte Carlo production
- It protects the user from software changes, production problems, operating expenses
- Ongoing effort to evolve its capabilities, improve behavior in non-dedicated environments (Grid)