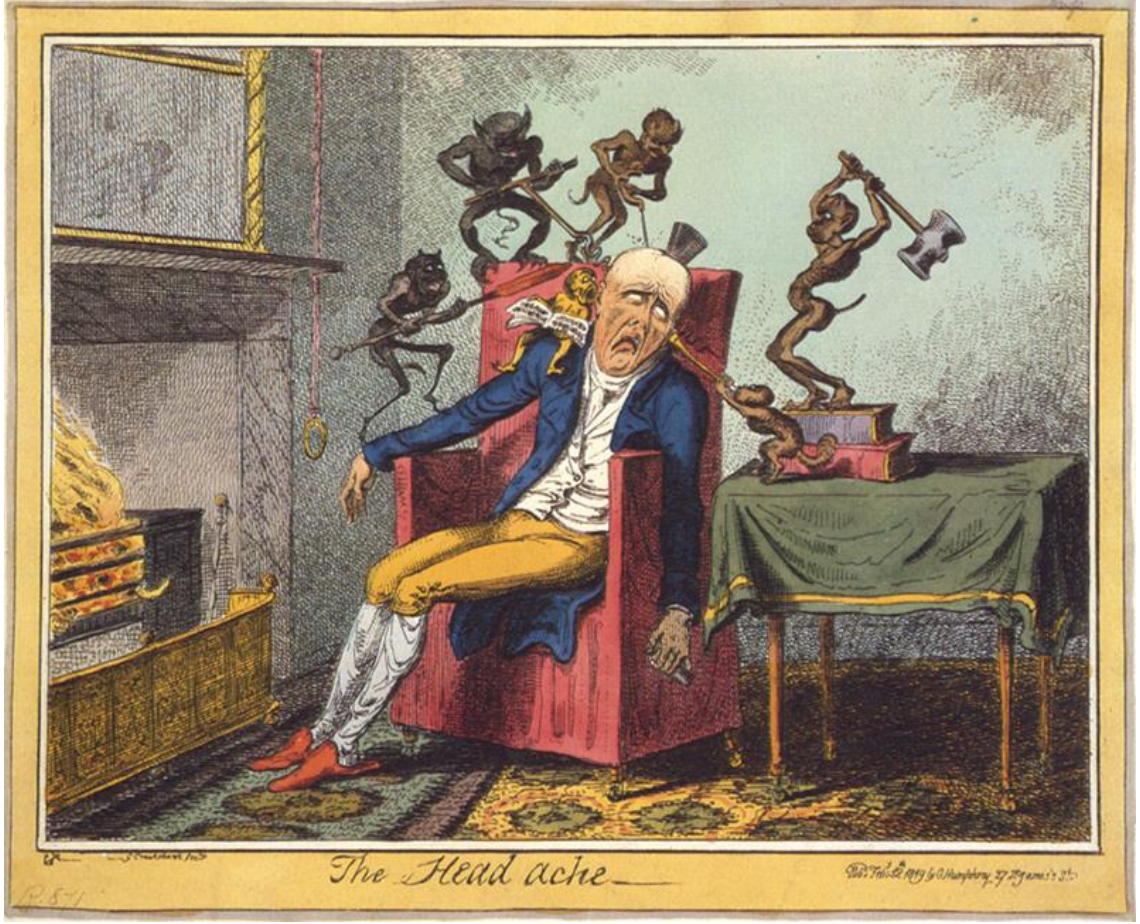
Moving CHTC from RHEL 6 to RHEL 7

Greg Thain

HTCondor Week 2017



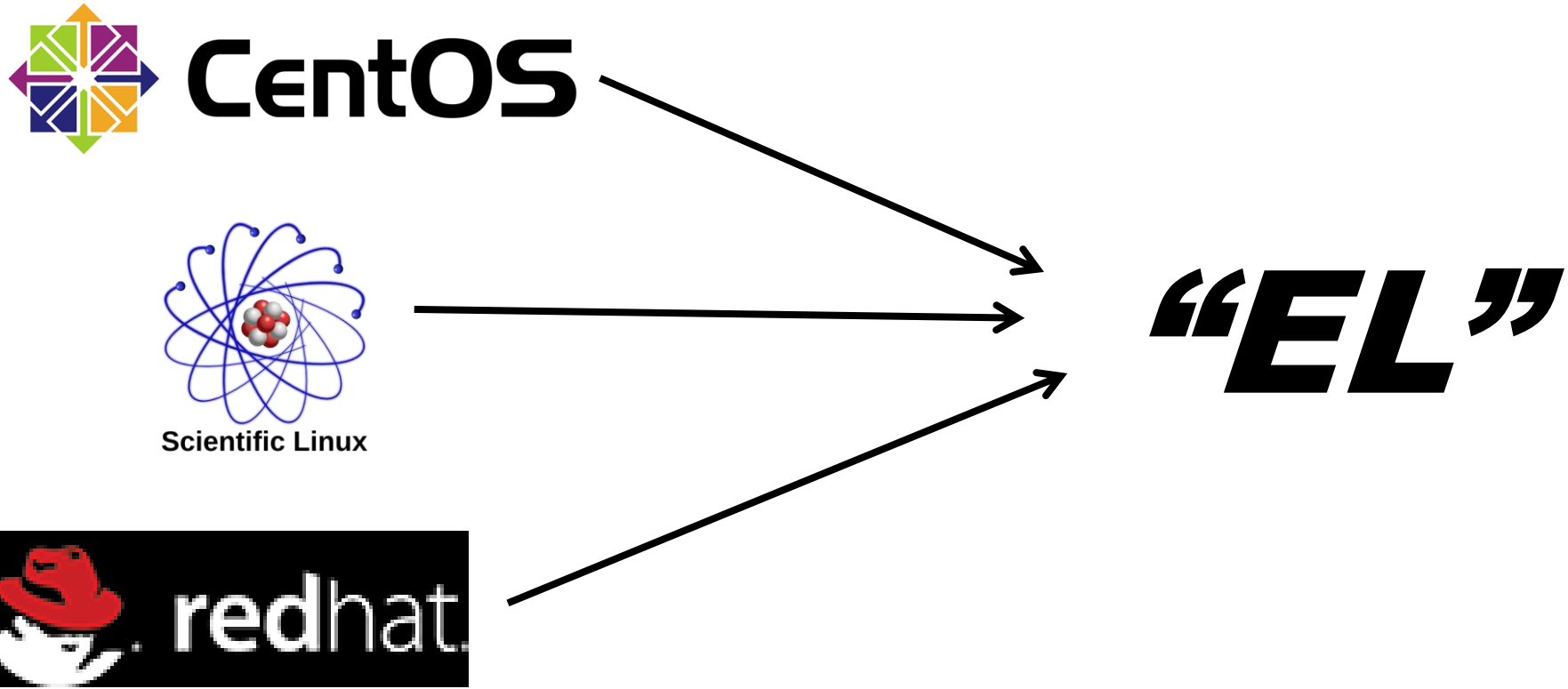
Migration without Migraines

Actually from SL → CentOS, not RHEL

Need ecryptfs for encrypted sandbox

(Actually CentOSplus…)

```
executable = calculate.exe
encrypt_execute_directory = true
queue
```


CentOS
Scientific Linux
redhat.
“EL”

Today's CHTC Users

OS	%age of CHTC users
Require EL 7	5%
Either EL 6 or 7	90% ????
Require EL 6	5% ????

Who are EL 7 only users?

Who are EL 6 only users?

- Standard universe jobs that have started
- And… ????

Tomorrow's CHTC Users

OS	%age of CHTC users
Require EL 7	Was 5%, going ↑
Either EL 6 or 7	Was 90%, going ?
Require EL 6	Was 5%, going ↓

Observation

OS	%age of CHTC users
Require EL 7	Was 5%, going ↑
Either EL 6 or 7	Was 90%, going ?
Require EL 6	Was 5%, going ↓

Moving CHTC machines -> RHEL 7

Moving CHTC machines -> CentOS7

Moving CHTC machines -> CentOS7

Easy – not the focus of this talk

Moving CHTC jobs -> CentOS7

Moving CHTC users -> CentOS7

I know, I'll deploy containers!

- Containers as an Infrastructure, or as jobs?
  - CaaI or CaJ?
- Containers as job require user work to setup
- Tricky for GPU jobs

- GOAL: minimize user work!

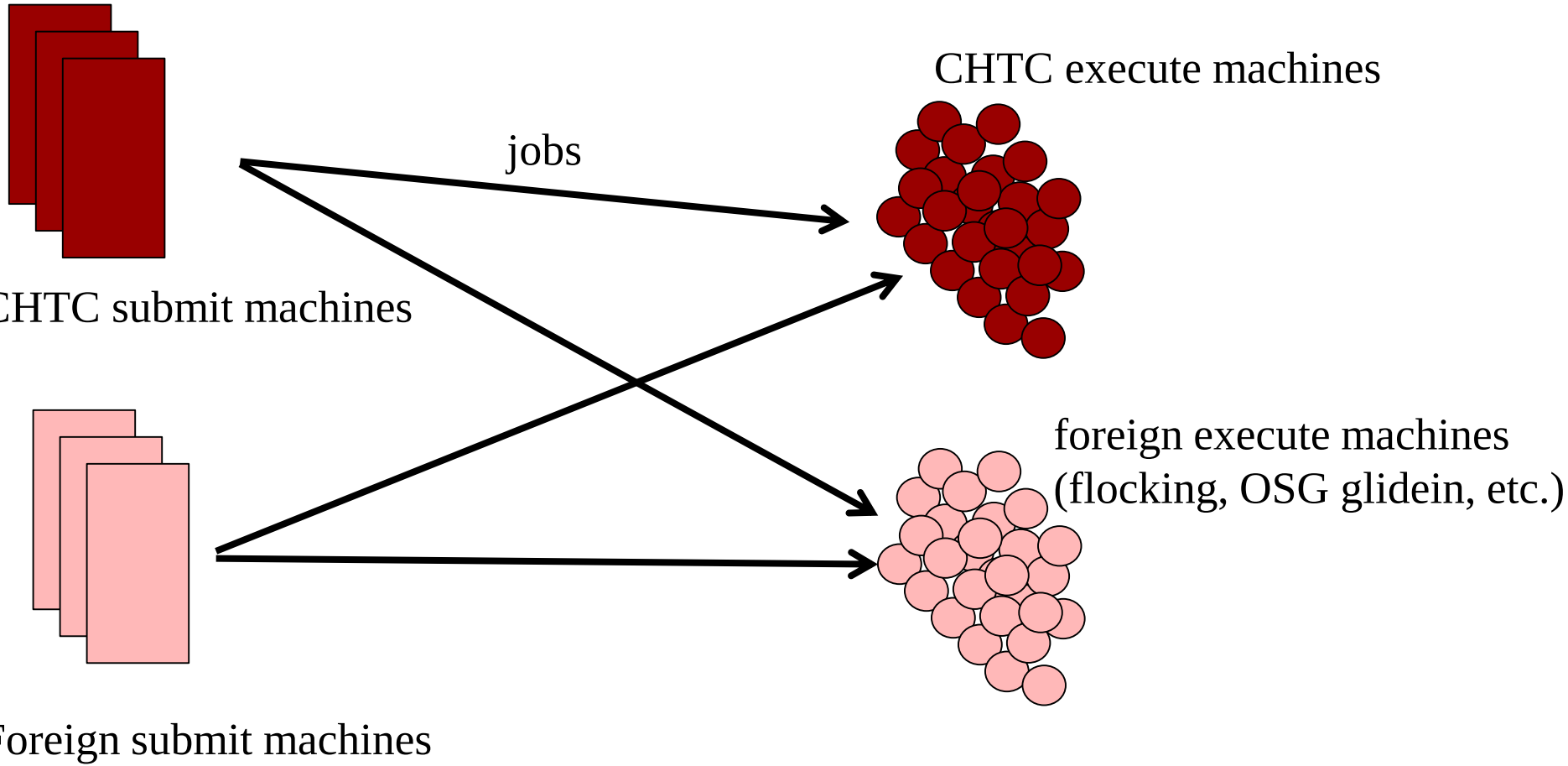
The Time is now!

- CHTC formed a team in Nov 2016
  - Condor + Ops + RCF + OSG
- Controlled transition with minimum user pain

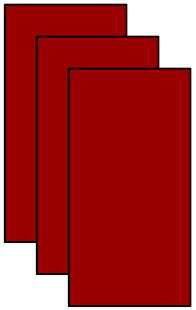
Plan on a slide

- Before: Every job gets EL 6
- Phase 1:
  - Roll out some # of EL 7 machines, but
  - Default to EL6, users can opt into EL7 **or BOTH**
  - **Communicate to EVERY user**
- Flag Day!
  - Default to EL7, users can opt into EL6 **or BOTH**

CHTC Pool


CHTC execute machines
jobs
CHTC submit machines
foreign execute machines
(flocking, OSG glidein, etc.)
Foreign submit machines

CHTC Pool



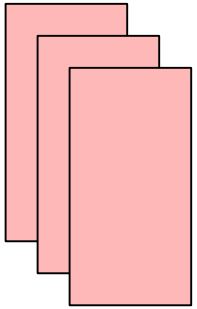
CHTC submit mach

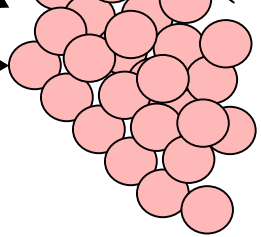
Want all configuration changes in our Schedds – it's the point we control the most!

achines

ecute machines

OSG glidein, etc.)





Foreign submit machines

Attributes: Useful and Otherwise

Find the EL attribute?

How to force a job to land here?

```
OpSys = "LINUX"
OpSysAndVer = "CentOS7"
OpSysLongName = "CentOS
Linux release 7.3.1611
(Core)"
OpSysMajorVer = 7
OpSysName = "CentOS"
OpSysShortName = "CentOS"
OpSysVer = 703
```

Forcing a job to EL 7

```
Requirements =
OpSysMajorVer == 7
```

Submit file

```
OpSys = "LINUX"
OpSysAndVer = "CentOS7"
OpSysLongName = "CentOS
Linux release 7.3.1611
(Core)"
OpSysMajorVer = 7
OpSysName = "CentOS"
OpSysShortName = "CentOS"
OpSysVer = 703
```

Works with no startd changes – existing glideins, etc.!

Forcing a job to either

```
Requirements =
(OpSysMajorVer == 6)
|| (OpSysMajorVer ==
7)
```

Submit file

```
OpSys = "LINUX"
OpSysAndVer = "CentOS7"
OpSysLongName = "CentOS
Linux release 7.3.1611
(Core)"
OpSysMajorVer = 7
OpSysName = "CentOS"
OpSysShortName = "CentOS"
OpSysVer = 703
```

Pop Quiz: What about default?

```
Requirements =
    nothing said
```

Submit file

```
OpSys = "LINUX"
OpSysAndVer = "CentOS7"
OpSysLongName = "CentOS
Linux release 7.3.1611
(Core)"
OpSysMajorVer = 7
OpSysName = "CentOS"
OpSysShortName = "CentOS"
OpSysVer = 703
```

Hint: APPEND_REQUIREMENTS won't work

APPEND_REQUIREMENTS is unconditional!

```
OpSys = "LINUX"
OpSysAndVer = "CentOS7"
OpSysLongName = "CentOS Linux release 7.3.1611 (Core)"
OpSysMajorVer = 7
OpSysName = "CentOS"
OpSysShortName = "CentOS"
OpSysVer = 703
```

Schedd xforms to the Rescue!

```
# https://htcondor-wiki.cs.wisc.edu/index.cgi/wiki?p=OsMigrationHints
JOB_TRANSFORM_NAMES = EL, EL_VER
JOB_TRANSFORM_EL @= end

REQUIREMENTS JobUniverse == 5 && Regexp("OpSysMajorVer",UnParse(Requirements),"i") =?=
false && Regexp("\"WINDOWS\"", UnParse(Requirements)) =?= false
SET Requirements (Target.OpSysMajorVer == 6) && $(MY.Requirements)
@end

JOB_TRANSFORM_EL_VER @= end
[
  eval_set_WantELVer =
isError(int(Regexps("OpSysMajorVer[[:space:]]*=[?]?=[[:space:]]*([0-9])",
UnParse(Requirements), "\\\\1", "i"))) ? 0 :
int(Regexps("OpSysMajorVer[[:space:]]*=[?]?=[[:space:]]*([0-9])", UnParse(Requirements),
"\\\\1", "i"));
]
@end
```

Schedd xforms to the Rescue!

```
# https://htcondor-wiki.cs.wisc.edu/index.cgi/wiki?p=OsMigrationHints
JOB_TRANSFORM_NAMES = EL, EL_VER
JOB_TRANSFORM_EL @= end

REQUIREMENTS JobUniverse == 5 && Regexp("OpSysMajorVer",UnParse(Requirements),"i") =?=
false && Regexp("\"WINDOWS\"", UnParse(Requirements)) =?= false
SET Requirements (Target.OpSysMajorVer == 6) && $(MY.Requirements)
@end

JOB_TRANSFORM_EL_VER @= end
[
  eval_set_WantELVer =
isError(int(Regexps("OpSysMajorVer[[:space:]]*=[?]?=[[:space:]]*([0-9])",
UnParse(Requirements), "\\\\1", "i"))) ? 0 :
int(Regexps("OpSysMajorVer[[:space:]]*=[?]?=[[:space:]]*([0-9])", UnParse(Requirements),
"\\\\1", "i"));
]
@end
```

Regexp("OpSysMajorVer",UnParse(Requirements),"i")

Engineering vs. Science

```
Requirements = blah blah blah
```

```
Requirements = (Target.OpSysMajorVer == 6) &&
     blah blah blah
```

Engineering vs. Science

```
Requirements = OpSysMajorVer == 7 && blah
```

```
Requirements = OpSysMajorVer == 7 && blah
```

Current Status

~ 10 % of CHTC pool running CentOS 7

Some users invited to try CentOS 7

> Every one successfully running EL 6 binaries on CentOS 7 with no changes!

No transform surprises!

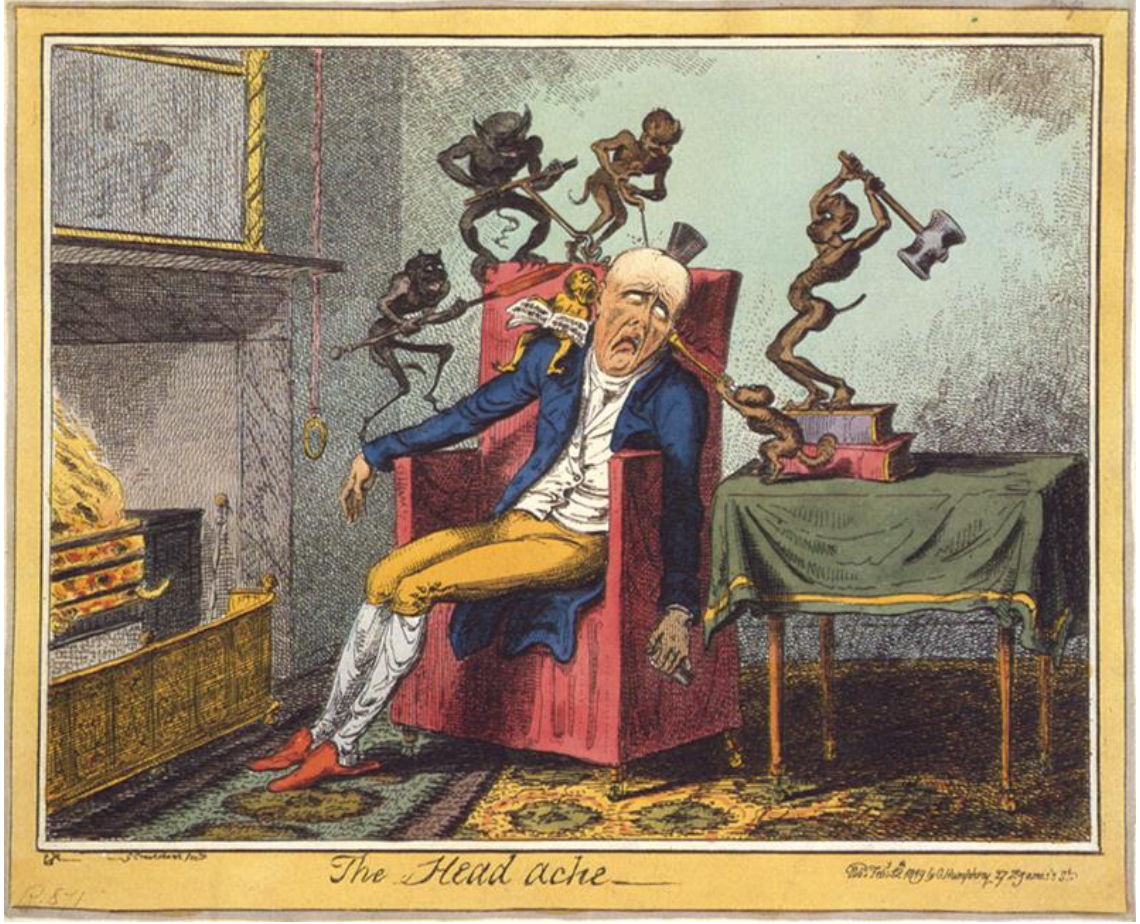
Future work

- What about OSG?
  - How to ask for EL6 vs EL7?
- Keep working with users

Summary

Users need RHEL 7 sooner than you may think

With some work, transition may be less painful for them than you may think



Avoid User Migraines, not ours!