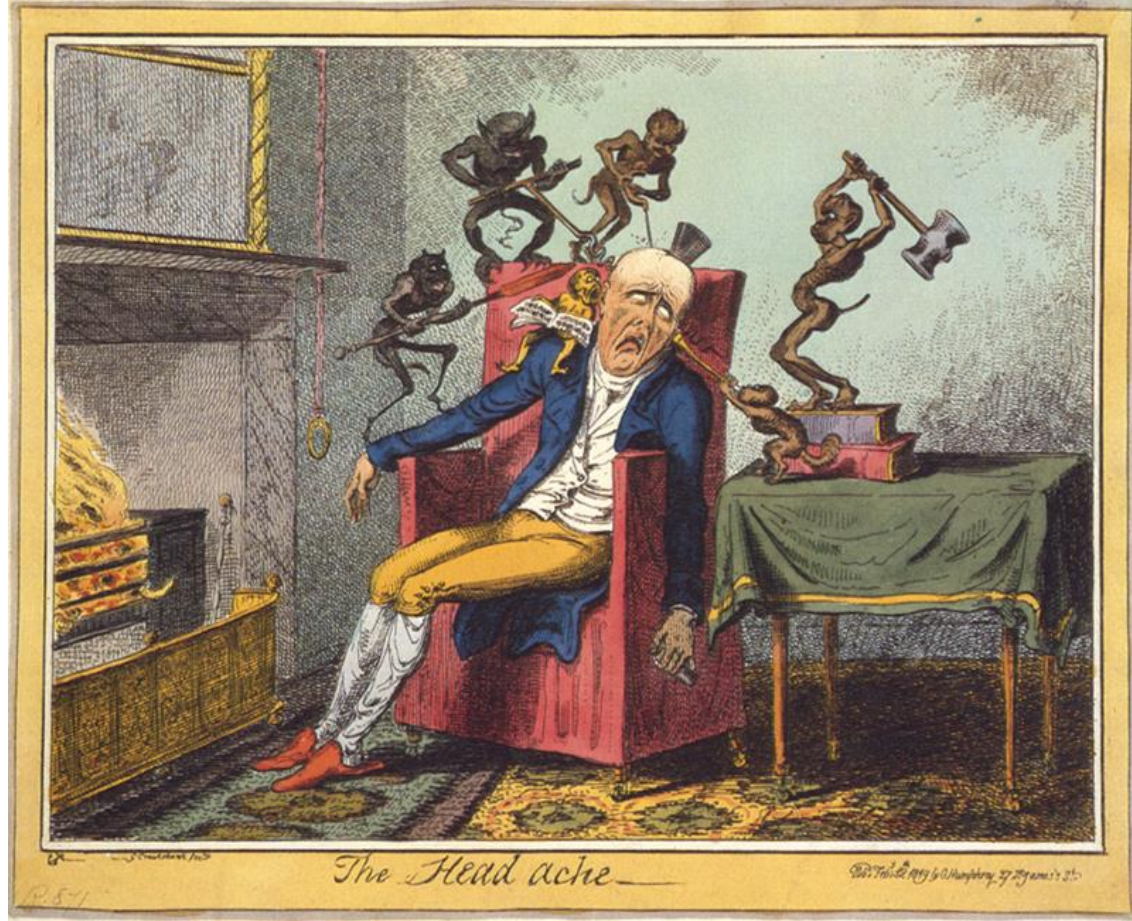


Moving CHTC from RHEL 6 to RHEL 7

John (TJ) Knoeller
HTCondor Week 2017



Migration without Migraines



CentOS

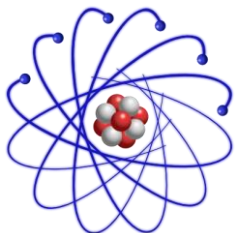
Actually from SL → CentOS, not RHEL

Need ecryptfs for encrypted sandbox
(Actually CentOSplus...)

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



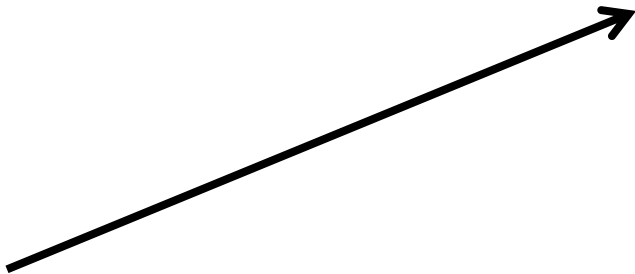
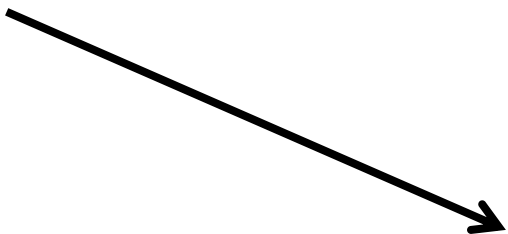
CentOS



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?
 - Caal or CaJ?
- › Containers as job require user work to setup
- › Tricky for GPU jobs
- › GOAL: minimize user work!

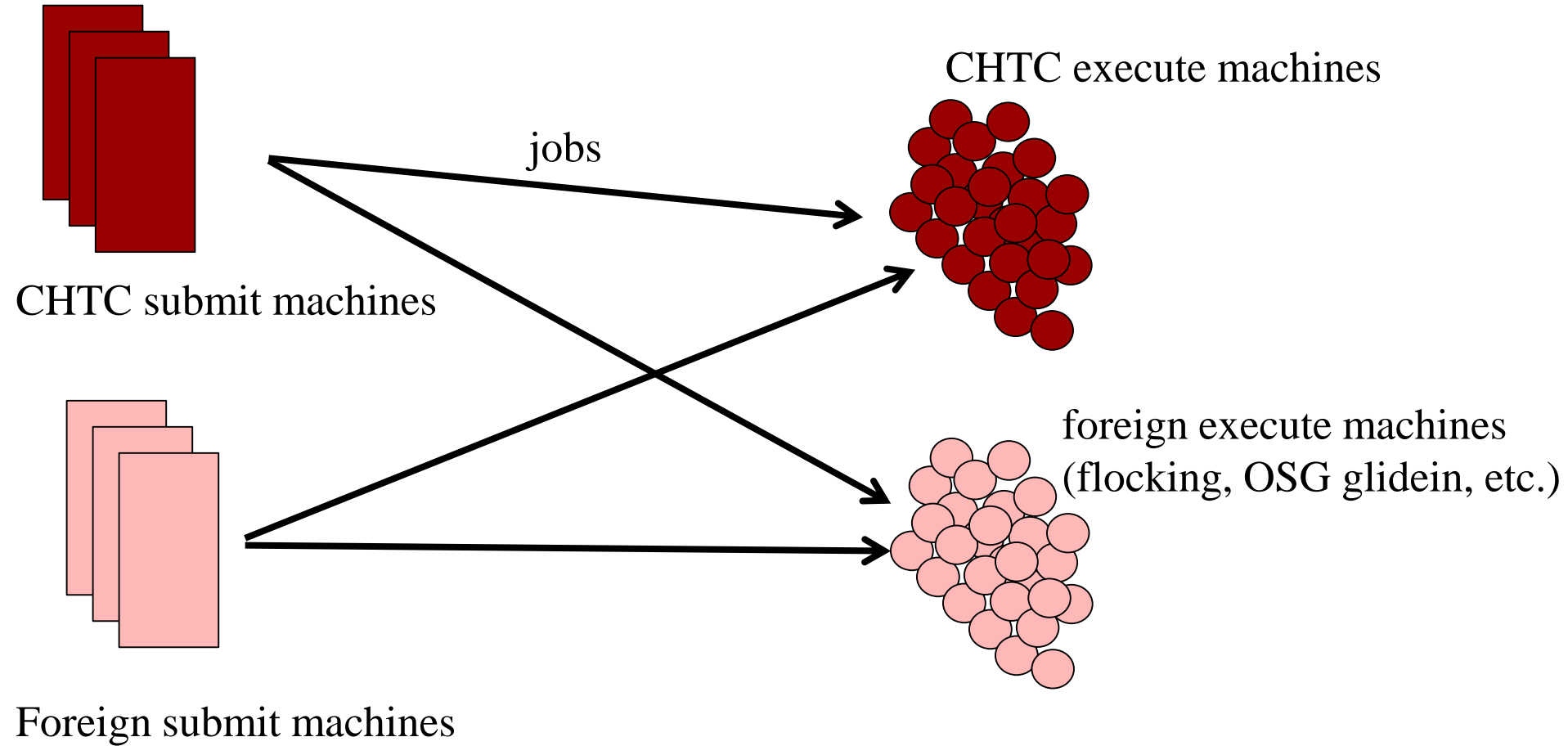
The Time is now!

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

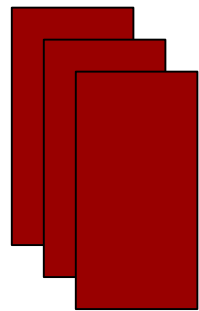
Plan on a slide

- › 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**

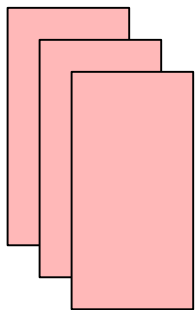
CHTC Pool



CHTC Pool

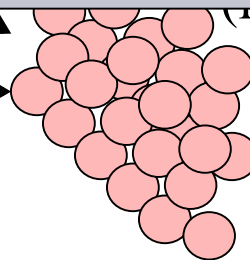


CHTC submit machines



Foreign submit machines

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



CHTC machines

execute machines

(Brookings, OSG glidein, etc.)

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

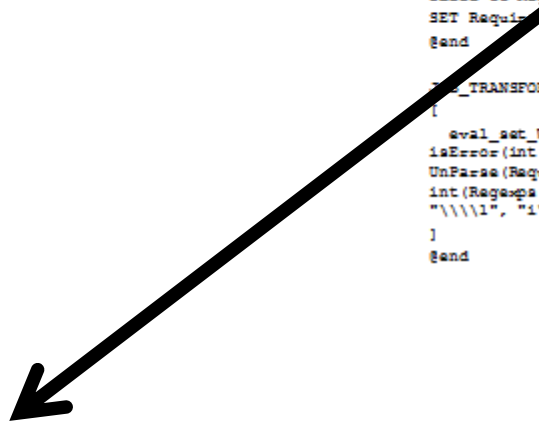
JOB_TRANSFORM_EL_VER @= end
[
  eval_set_WantELVer =
  isError(int(Regexps("OpSysMajorVer[[:space:]]*=[?]?=[[:space:]]*([0-9])",
UnParse(Requirements), "\\1", "i"))) ? 0 :
  int(Regexps("OpSysMajorVer[[:space:]]*=[?]?=[[:space:]]*([0-9])", UnParse(Requirements),
  "\\1", "i"));
]
@end
```

Schedd xforms to the Rescue!

```
# https://htcondor-wiki.cs.wisc.edu/index.cgi/wiki?o=MigrationHints
JOB_TRANSFORM_NAMES = EL, EL_VER
JOB_TRANSFORM_EL @- and

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 @- and
{
  eval_set_WantELVer =
  isError(int(Regexp("OpSysMajorVer[[:space:]]*-[?]?-[[:space:]]*([0-9])",
  UnParse(Requirements), "\\|1", "i"))) ? 0 :
  int(Regexp("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!

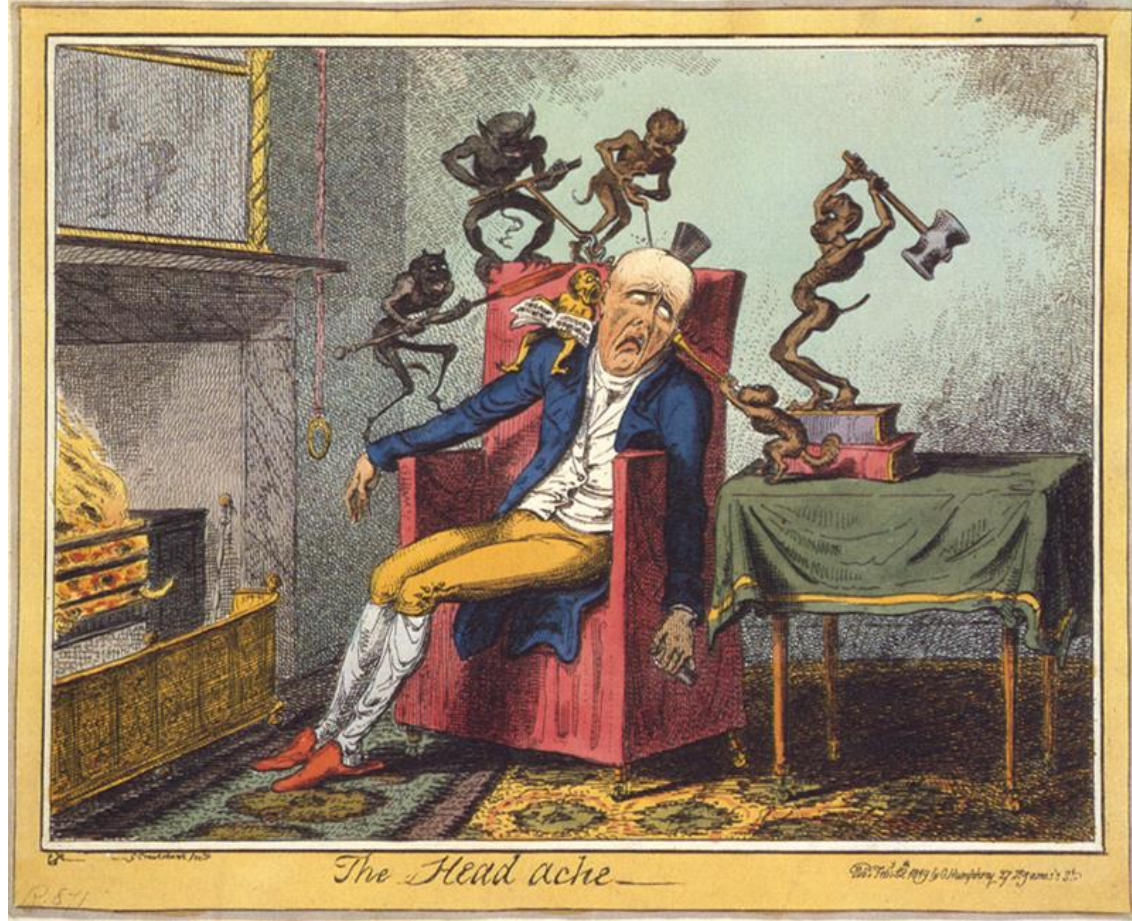
Future work

- › 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!