

Use of Cfengine for deploying LCG/gLite middleware

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What is cfengine?

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What is cfengine?

- Highly scalable
- Autonomous configuration agent
- Simple configuration language
- ‘Loose’ client-server model

What it won't do

- Install your cluster
 - But you can integrate it with Kickstart
- Replace your package manager
 - But it can augment it...
- Make you coffee/tea

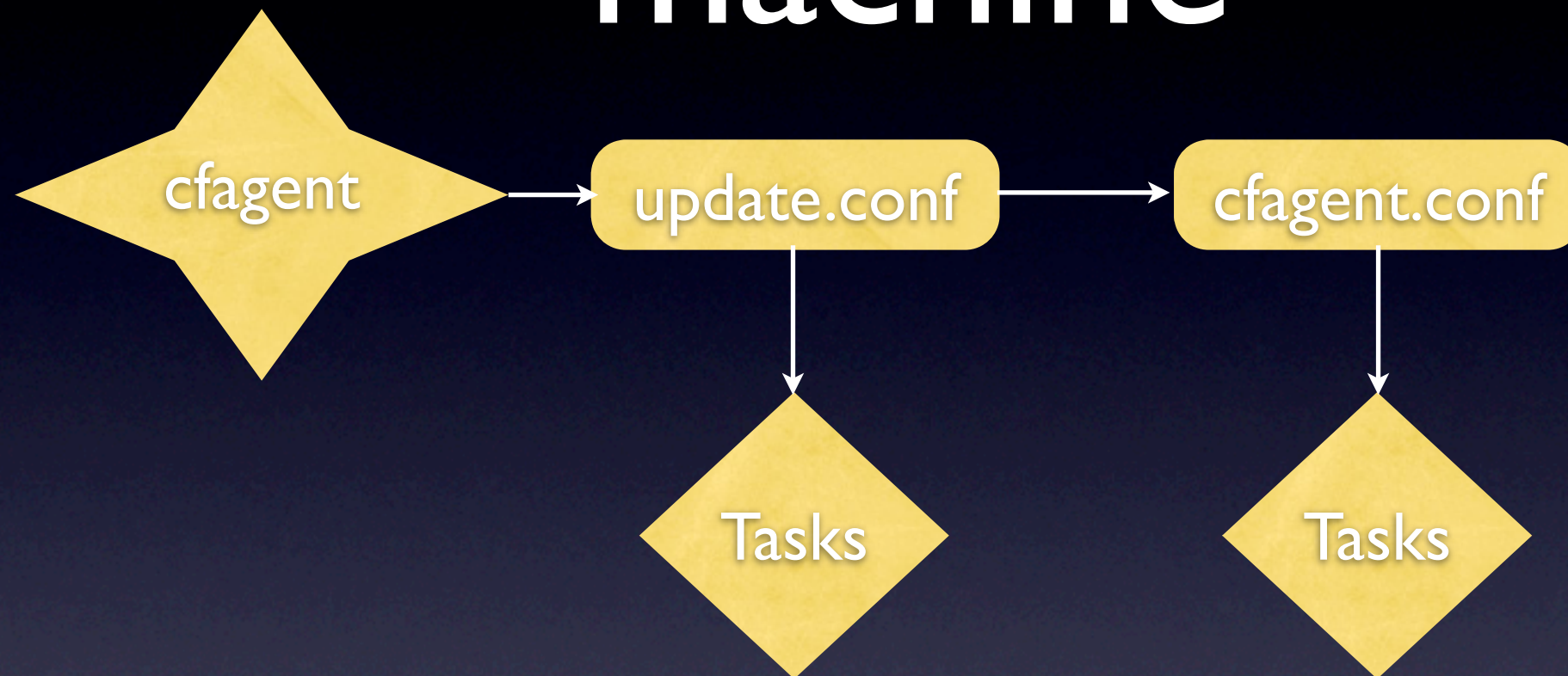
What it will do

- Keep any configuration files how you want them
- Maintain permissions on files and directories
- Keep a track of file checksums
- And more...

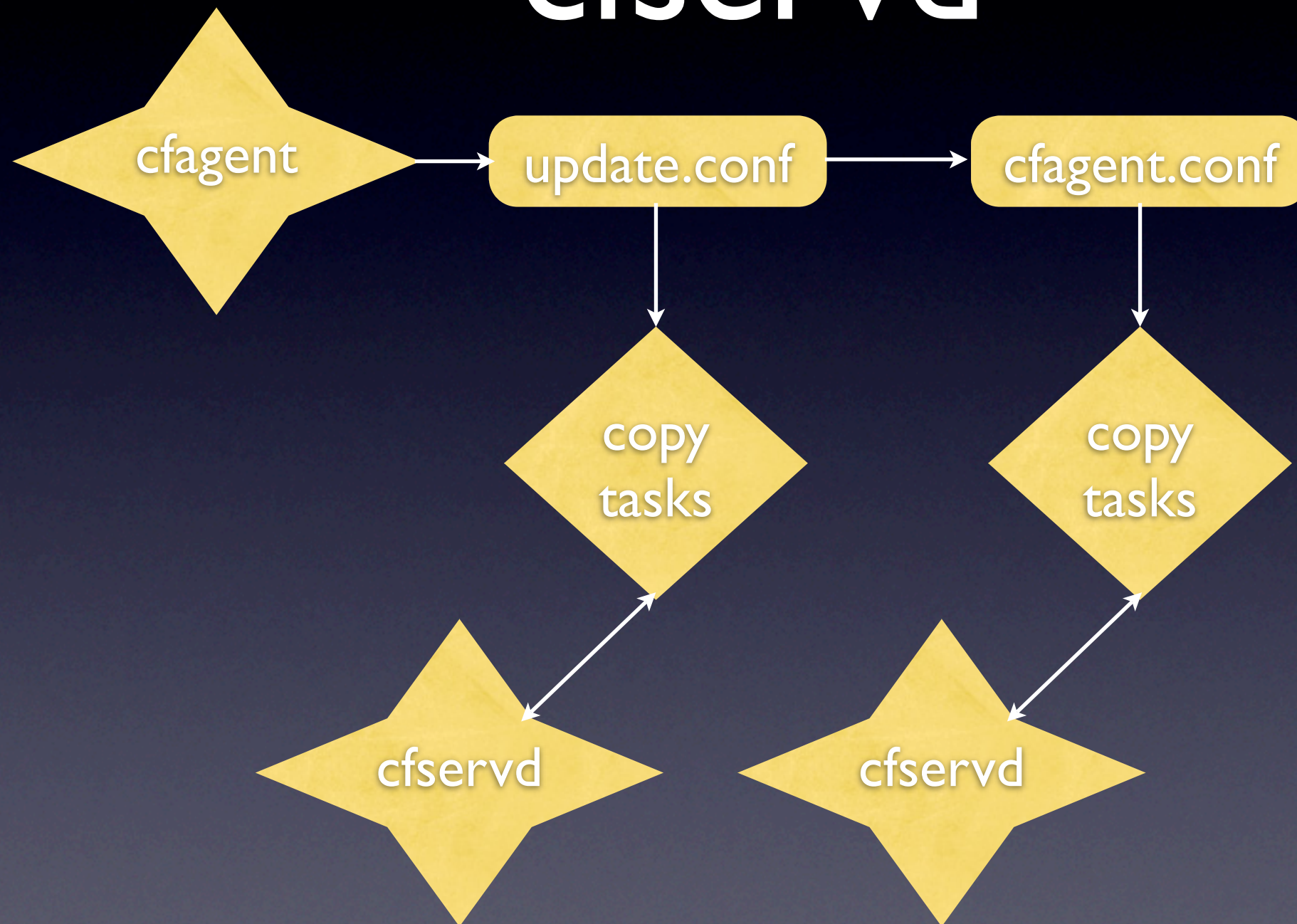
How does cfengine work?

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The Basics - Local machine



Adding the file daemon, cfservd



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Anatomy of (basic) cfagent.conf

```
classes:  
  bohr_nodes = HostRange(bohr,0-9999)  
import:  
  any::  
  bohr_nodes::  
    cf.bohr  
control:  
  any::  
    actionsequence = ( files links )  
    policyhost = ( ks1.tier2.hep.manchester.ac.uk )  
  doitnow::  
    ifelapsed = ( 0 )  
files:  
  /etc/passwd mode=644 owner=root action=fixall  
links:  
  /exp_software -> /nfs
```


Classes - the Backbone

Default cfengine classes look something like this:-

```
Defined Classes = ( 195_194_109 195_194_109_1 32_bit Day24 Hr20 Hr20_Q1 January Min05_10 Min09 Q1 Wednesday Yr2007 ac_uk any bohr01
bohr01_test_tier2_hep_manchester_ac_uk bohr_nodes cfengine_2 cfengine_2_1 cfengine_2_1_21 compiled_on_linux_gnu dteam_home_dir
entropy_cfengine_in_low entropy_cfengine_out_low entropy_dns_in_low entropy_dns_out_low entropy_ftp_in_low entropy_ftp_out_low
entropy_icmp_in_low entropy_icmp_out_low entropy_irc_in_low entropy_irc_out_low entropy_misc_in_low entropy_misc_out_low
entropy_netbiosdgm_in_low entropy_netbiosdgm_out_low entropy_netbiosns_in_low entropy_netbiosns_out_low entropy_netbiossn_in_low
entropy_netbiossn_out_low entropy_nfsd_in_low entropy_nfsd_out_low entropy_smtp_in_low entropy_smtp_out_low entropy_ssh_out_low
entropy_tcpack_in_low entropy_tcpack_out_low entropy_tcpfin_in_low entropy_tcpfin_out_low entropy_tcpsyn_in_low entropy_tcpsyn_out_low
entropy_udp_in_low entropy_udp_out_low entropy_www_in_low entropy_www_out_low entropy_wwws_in_low entropy_wwws_out_low
hep_manchester_ac_uk i686 ipv4_195 ipv4_195_194 ipv4_195_194_109 ipv4_195_194_109_1 linux linux_2_4_21_40_ELsmp linux_i686
linux_i686_2_4_21_40_ELsmp linux_i686_2_4_21_40_ELsmp__1_SMP_Wed_Mar_15_12_28_15_CST_2006 loadavg_high_ldt manchester_ac_uk
net_iface_eth0 net_iface_lo pid_file_exists redhat rootprocs_high_normal scientific scientific_sl scientific_sl_3 scientific_sl_3_0
test_tier2_hep_manchester_ac_uk tier2_hep_manchester_ac_uk uk update_cert update_ssh use_ksl )
```

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Hard Classes

- OS - Linux/IRIX/Solaris
- OS Release - eg. scientific scientific_sl scientific_sl_3 scientific_sl_3_0
- Domain name
- IP Address

Soft Classes - envd

- System Load
- Network sockets
- Memory Usage
- Abnormal number of sockets open to a daemon

Soft Classes - User

- Bohr
- Update_cert
- Cluster_01
- doitnow

Some Examples

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Monitoring and Restarting pbs_mom

processes:

bohr_nodes::

```
"/usr/sbin/pbs_mom" restart "/etc/init.d/pbs_mom"
```


Building a Centrally Distributed grid-mapfile

copy:

```
/etc/grid-security/grid-mapfile      dest=/var/cfengine/masterfiles/inputs/all-nodes/grid-  
mapfile
```

```
mode=0440 o=root g=root define=new_gridmapfile
```

shellcommands:

```
ks | .Min10_15::
```

```
"/opt/edg/sbin/edg-mkgridmap --output=/etc/grid-security/grid-mapfile --safe >> /var/  
log/edg-mkgridmap.log 2>&1"
```

```
ks | .new_gridmapfile::
```

```
"/bin/sh -c 'cd /var/cfengine/masterfiles/inputs/all-nodes; CVS_RSH=/usr/bin/ssh /usr/  
bin/cvs commit -m\"New autogenerated grid-mapfile\" grid-mapfile' "
```

alerts:

```
ks | .new_gridmapfile::
```

```
"A new grid-mapfile has been copied into /var/cfengine/masterfiles/inputs/all-nodes"
```

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Monitor CE<=>WN ssh connectivity

control:

```
ssh_to_ce01_test = ( ExecResult("/usr/bin/su - NONROOTUSER -c {quote}/usr/bin/ssh  
CEHOSTNAME /bin/hostname{quote}") )
```

classes:

```
ssh_to_ce01 = ( Regcmp(".*CEHOSTNAME.*",{ssh_to_ce01_test} ) )
```

alerts:

```
!ssh_to_ce01::
```

```
"Unable to ssh to CEHOSTNAME! Error was :- $(ssh_to_ce01_test)"
```


Checking local host certificate

control:

```
AddInstallable = ( cert_date_error )
```

copy:

```
{master_scripts}/check-cert-date.sh dest=/usr/local/bin/check-cert-date.sh  
mode=0550 o=root g=root server={policyhost} backup=true
```

shellcommands:

```
"/usr/local/bin/check-cert-date.sh" umask=022 elsedefine=cert_date_error
```

alerts:

```
cert_date_error::  
"Problem with Host Certificate"
```


Watching disk usage

control:

```
threshold = ( 20 )  
keep = ( 7 )  
AddInstallable = ( scratch_needs_cleaning scratch_tidied )  
actionsequence = ( disks tidy )
```

disks:

```
/scratch freespace=${threshold}%  
inform=true force=true define=scratch_needs_cleaning
```

tidy:

```
scratch_needs_cleaning::  
/scratch pattern=* recurse=inf age=${keep} rmdirs=true define=scratch_tidied
```

alerts:

```
scratch_tidied::  
"Files Deleted from /scratch"
```

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Simple Tripwire - File Checksums

files:

Hr04::

/usr

```
owner=root,daemon # all files must be owned by root or daemon
checksum=md5
recurse=inf
ignore=tmp
ignore=nagios
action=fixall
```

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Large Scale cfengine

```
strategies:
  { Simple_Alternate
    use_ks1: "100"
    use_ks2: "100"
  }
control:
  any:
    master_cfinput = ( /var/cfengine/masterfiles/inputs )
  use_ks1::
    policyhost = ( ks1.tier2.hep.manchester.ac.uk )
  use_ks2::
    policyhost = ( ks2.tier2.hep.manchester.ac.uk )
copy:
  ${master_cfinput}/all-nodes/at.allow  dest=/etc/at.allow
                                     mode=0644 o=root g=root server=${policyhost}
```

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Who's Using cfengine?

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	CE	SE	WN	Testbed	Other
Glasgow	1	1/10	140		4
Lancaster	2	0	200	9	3
Manchester	2	2	1800	7	2
SARA	2	1	718		

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Resources

- Mailing Lists
 - <http://www.cfengine.org/discuss.html>
 - hep-project-grid-cfengine@cern.ch
- Web Sites
 - <http://www.cfengine.org/>
 - <https://www.gridpp.ac.uk/wiki/Cfengine/>