



# Massively Scalable Pipeline Deployment

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# Who am I

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# Explosive Growth!

[illegible]







Play It.





Aegean Sunset



The Amulet and the Charm



Ancient Arcadia



Bah, Humbug!



Bai She



Bear Mountain



Betti the Yeti



The Big Chase





Workflow

Pipeline

Infrastructure



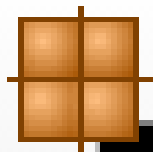
# ANSIBLE

> PowerShell



# WTF?

I ain't no sys admin.



# WPKG

Easy Software Deployment

```
10 <package id="helloWorld"
11     name="helloWorld"
12     revision="1"
13     reboot="false"
14     priority="1">
15
16     <check type="file" condition="exists" path="C:\helloWorld.txt"/>
17
18     <commands>
19         <command type="install"
20             cmd='powershell -NonInteractive -command "&{&apos;Hello World&apos;} >> C:\helloWorld.txt"' '>
21             <condition>
22                 <check type="execute"
23                     path='powershell check_space.ps1 10kb'
24                     condition="exitcodeequalto" value="0"/>
25             </condition>
26         </command>
27
28         <command type="remove" cmd="%COMSPEC% /c del C:\helloWorld.txt"/>
29
30         <command type="upgrade" include="remove"/>
31         <command type="upgrade" include="install"/>
32     </commands>
33
34 </package>
```

```
1 <profile id="example_profile">  
2   <package package-id="helloWorld"/>  
3 </profile>
```

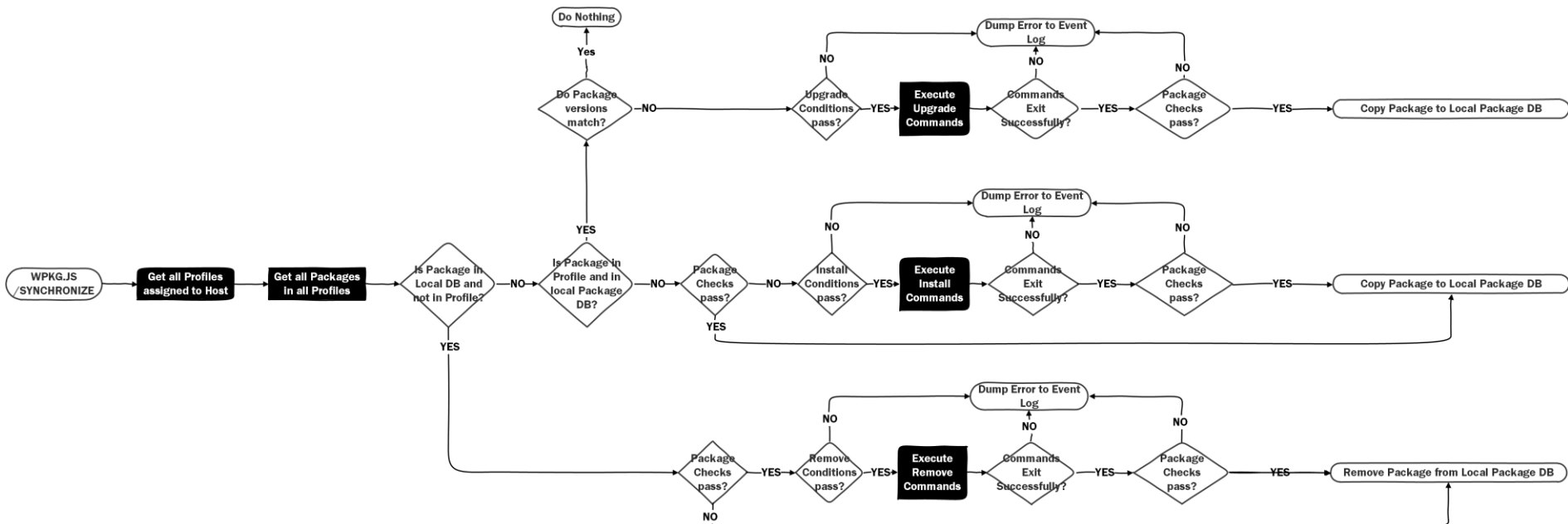


```
5 <host name="H5G247" profile-id="example_profile">
6   <variable name="domain_user" value="labuosba"/>
7   <variable name="team" value="Tech_Art_Pipeline"/>
8 </host>
```

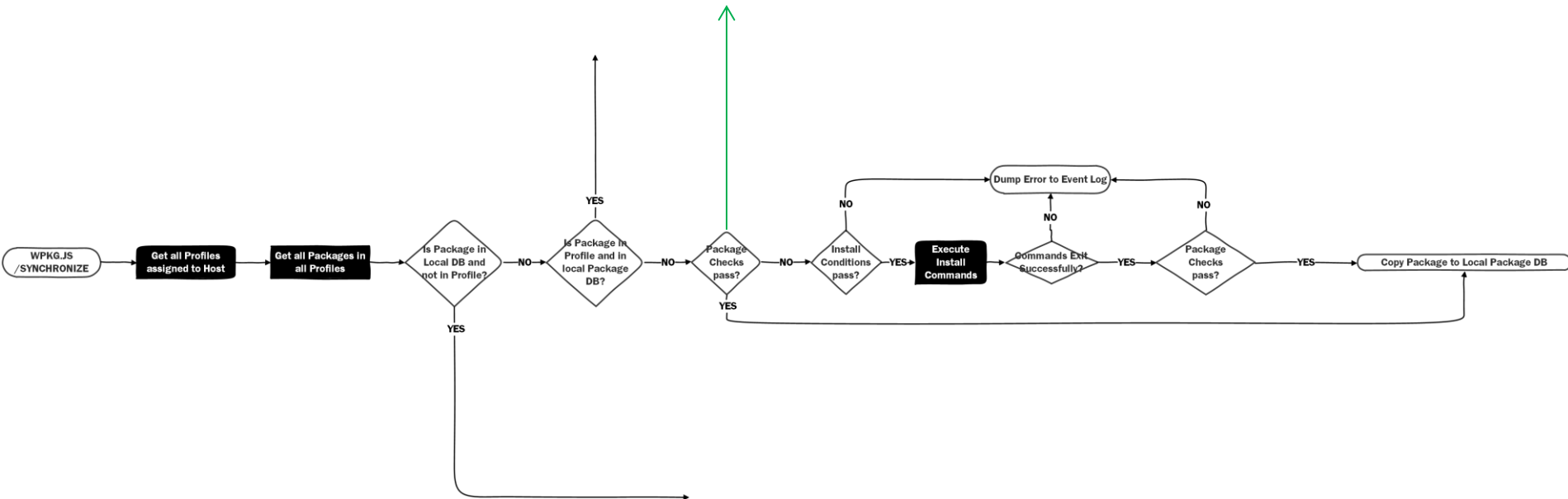


**GAME DEVELOPERS CONFERENCE™**

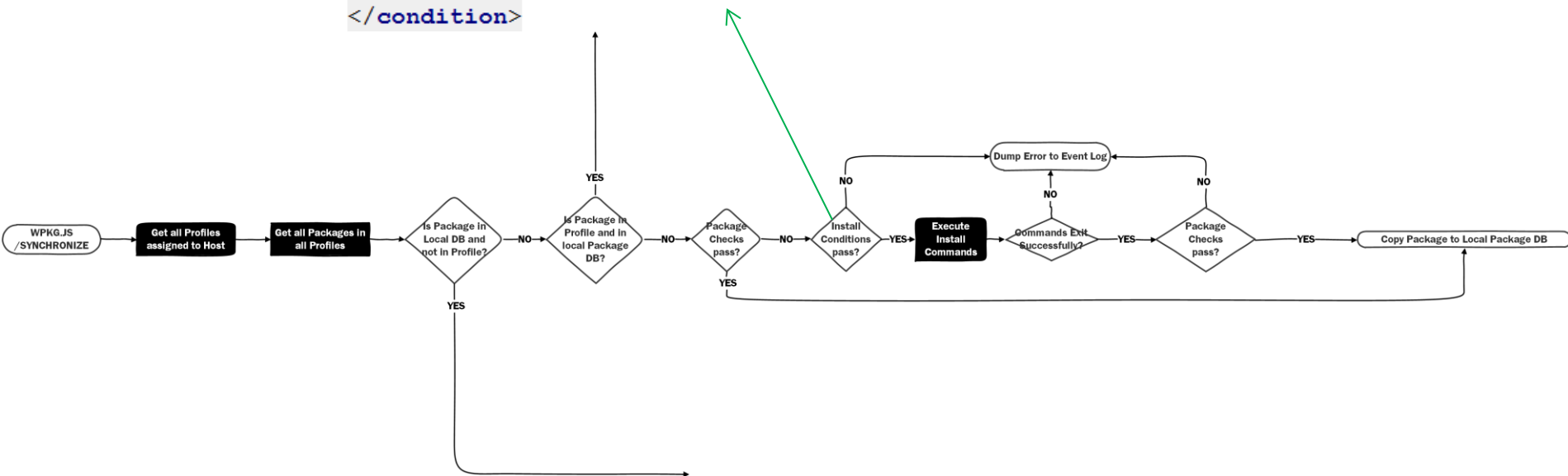
March 14–18, 2016 · Expo: March 16–18, 2016 #GDC16



```
<check type="file" condition="exists" path="C:\helloWorld.txt"/>
```



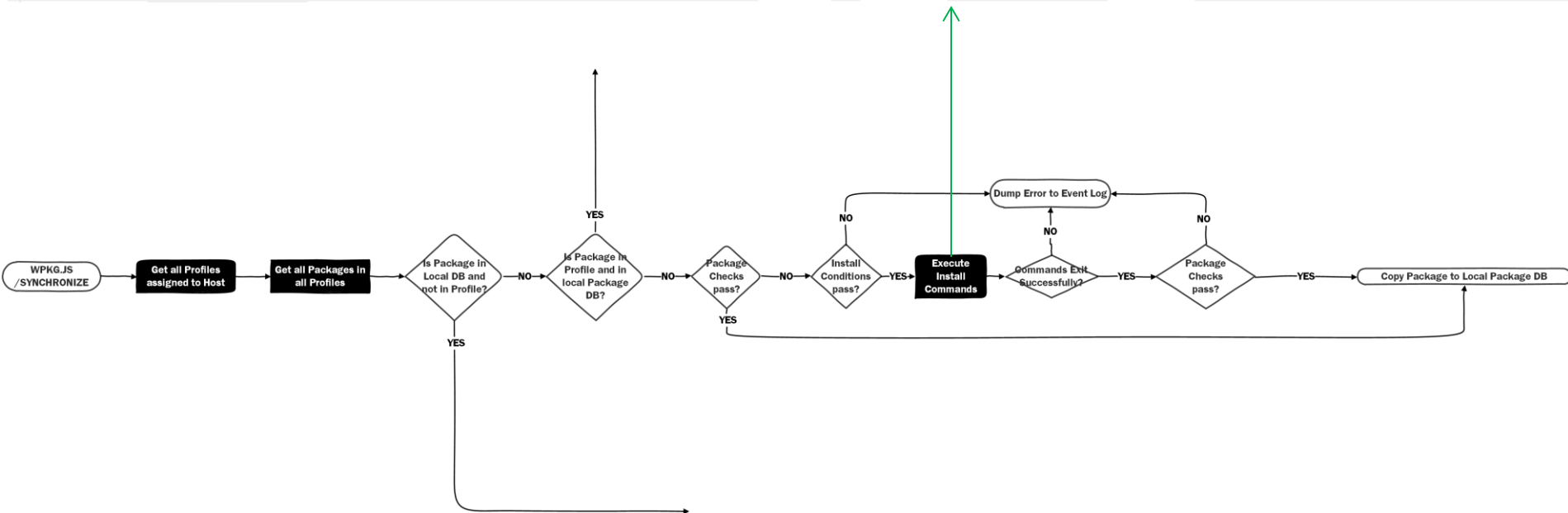
```
<condition>  
  <check type="execute"  
    path='powershell check_space.ps1 10kb'  
    condition="exitcodeequalto" value="0"/>  
</condition>
```



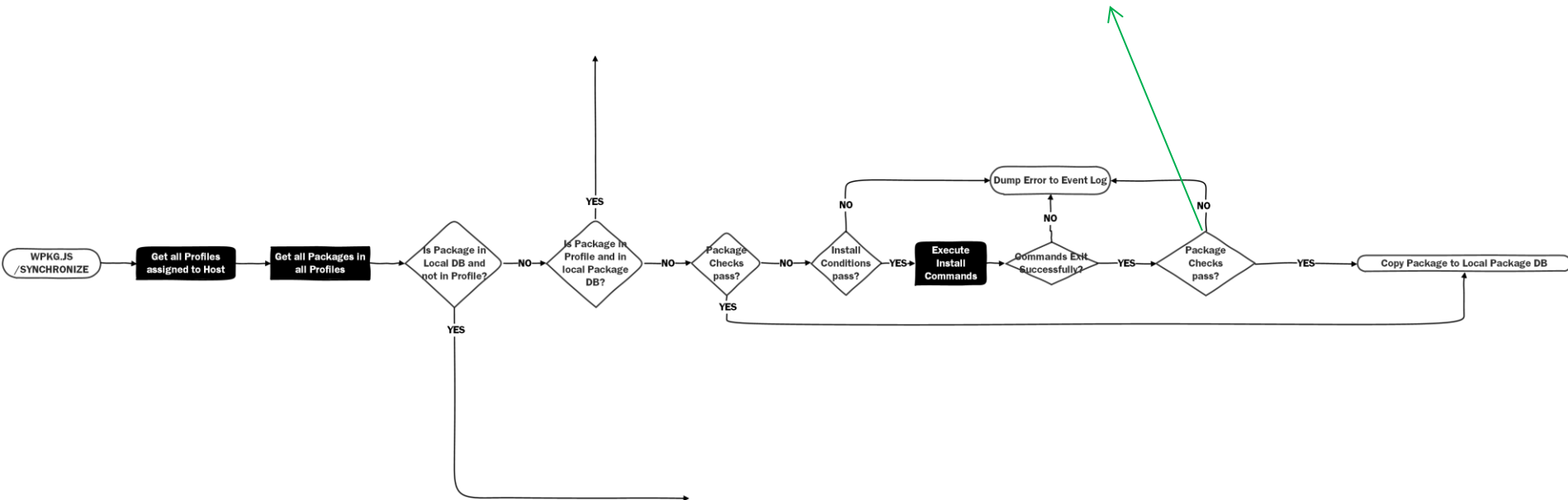


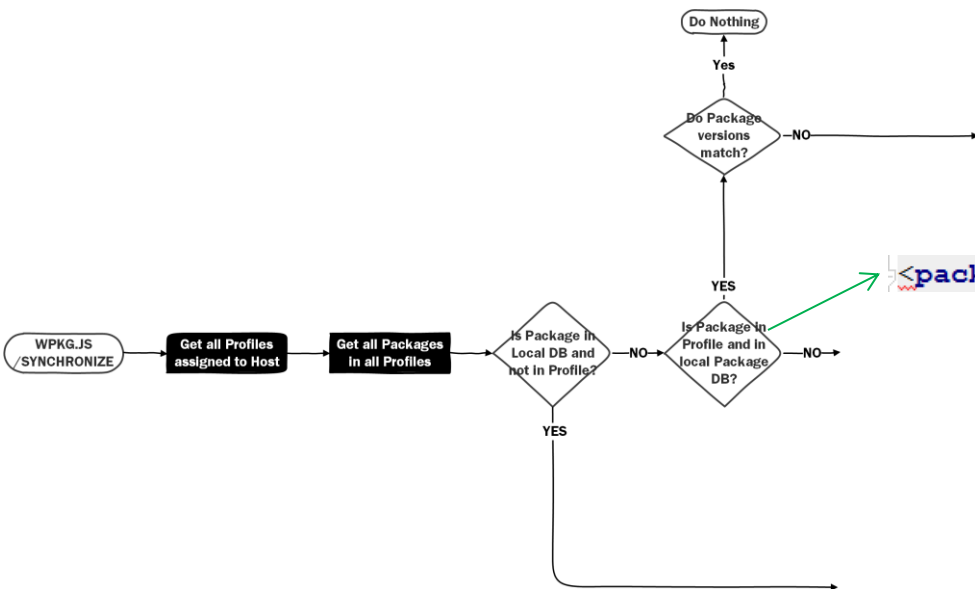
```
<command type="install"
```

```
cmd='powershell -NonInteractive -command "&amp; {&apos;Hello World&apos; >> C:\helloWorld.txt}" '>
```



```
<check type="file" condition="exists" path="C:\helloWorld.txt"/>
```





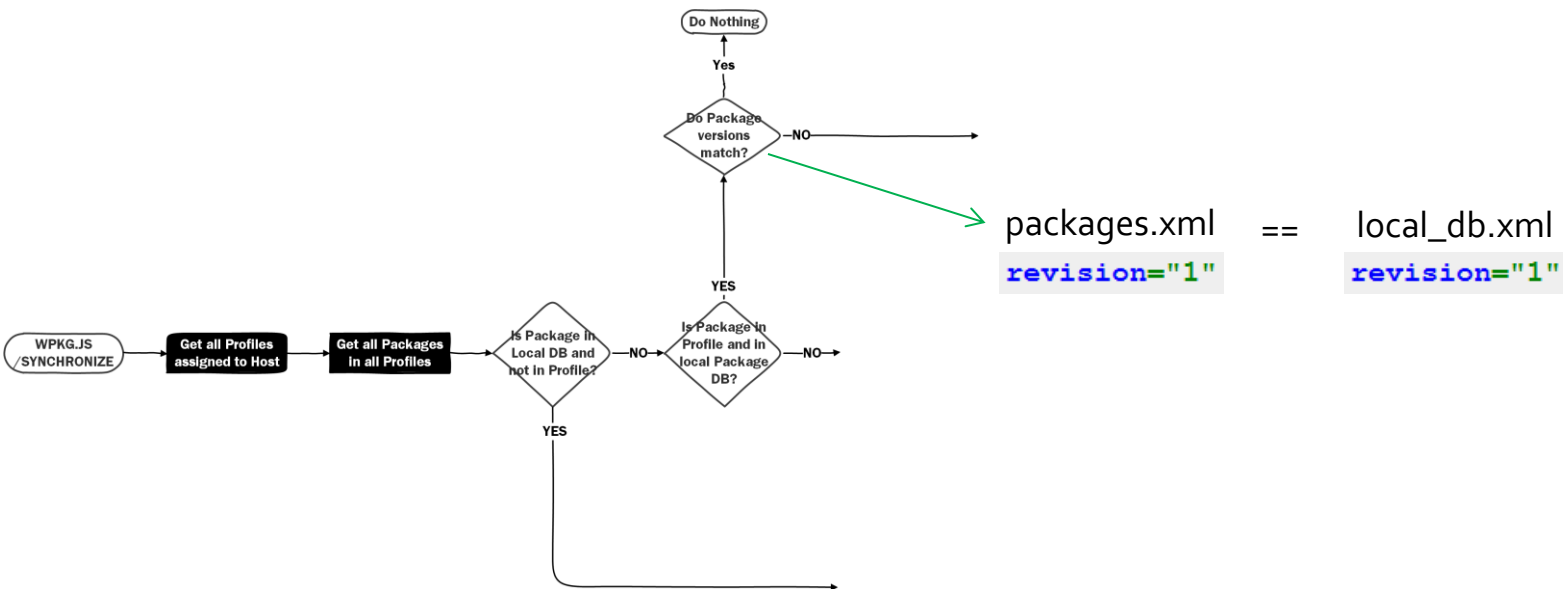
packages.xml

==

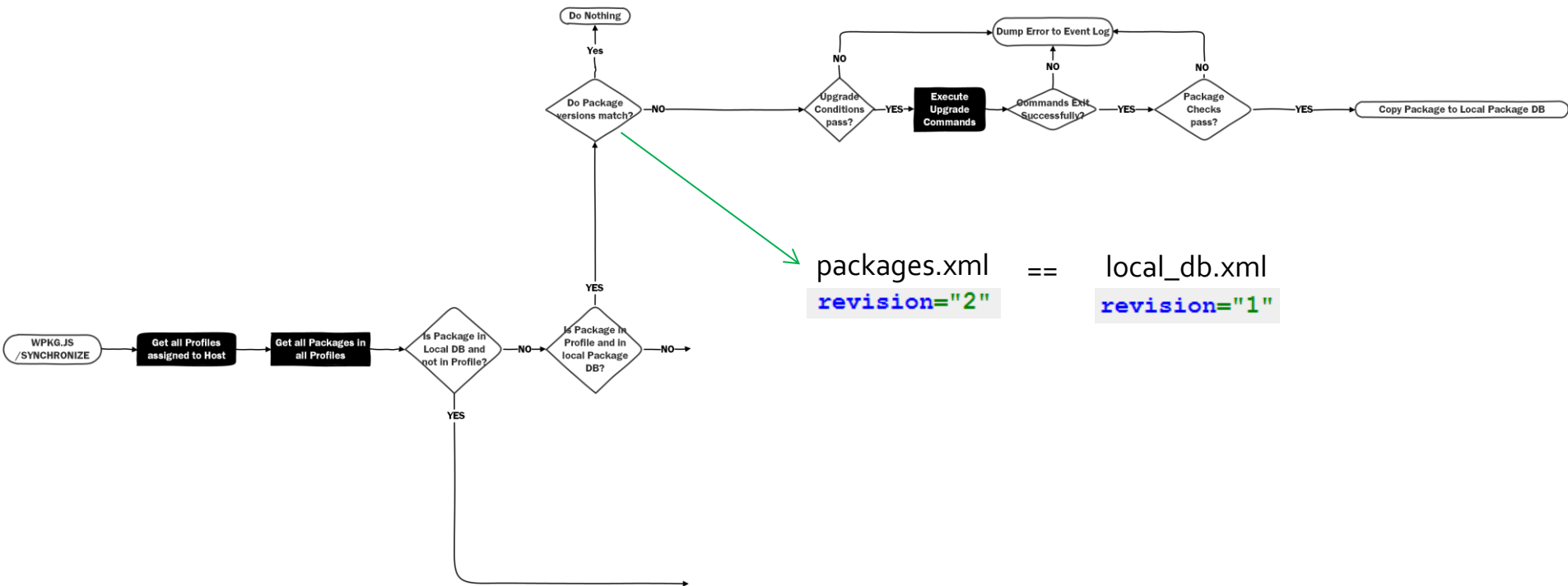
local\_db.xml

```
<package id="helloWorld"
```

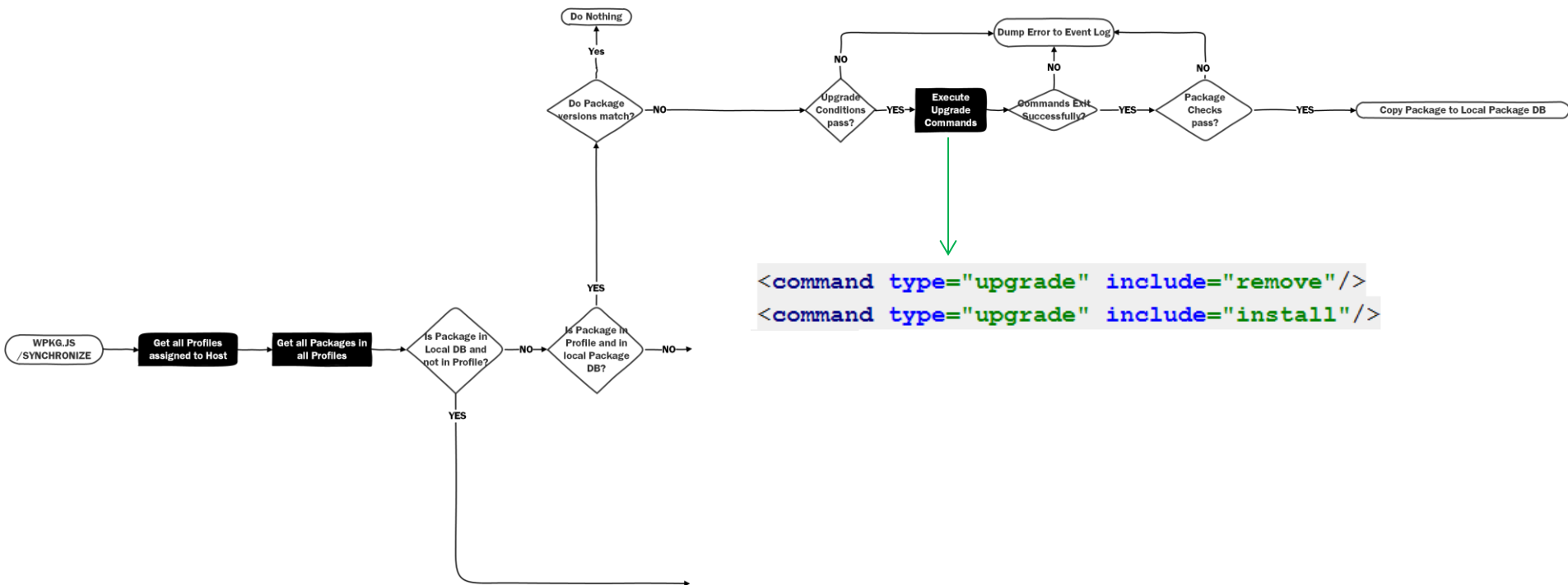
```
<package id="helloWorld"
```



```
36 <package id="helloWorld"
37     name="helloWorld"
38     revision="2"
39     reboot="false"
40     priority="1">
41
42     <check type="file" condition="exists" path="C:\hello_world_and_gdc.txt"/>
43
44     <commands>
45         <command type="install"
46             cmd='powershell -NonInteractive -command "&{&apos;Hello World and GDC&apos;} >> C:\hello_world_and_gdc.txt)" '>
47             <condition>
48                 <check type="execute"
49                     path='powershell check_space.ps1 10kb'
50                     condition="exitcodeequalto" value="0"/>
51             </condition>
52         </command>
53
54         <command type="remove" cmd="%COMSPEC% /c del C:\hello_world_and_gdc.txt"/>
55
56         <command type="upgrade" include="remove"/>
57         <command type="upgrade" include="install"/>
58     </commands>
59
60 </package>
```

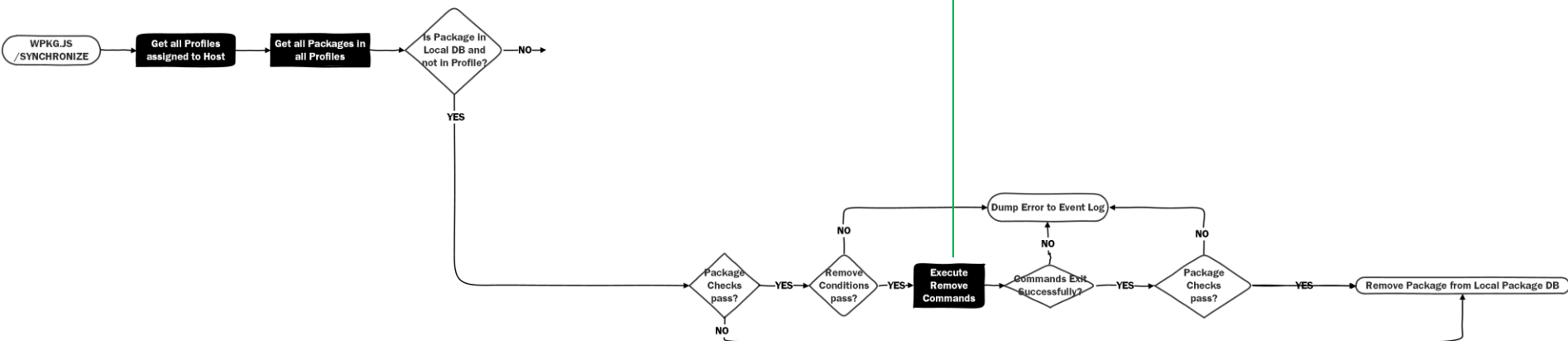






```
1 <profile id="example_profile">  
2  
3 </profile>
```

```
<command type="remove" cmd="%COMSPEC% /c del C:\hello_world_and_gdc.txt"/>
```



```
36 <package id="windows_pipelineAdmin"
37     name="windows_pipelineAdmin"
38     revision="1"
39     reboot="false"
40     priority="9999999"
41     execute="once"
42 >
43
44 <commands>
45
46     <command
47         type="install"
48         cmd='net localgroup administrators high5\pipelineadmin /ADD'>
49         <exit code="0"/>
50         <exit code="2"/>
51     </command>
52
53     <command type="remove" cmd="net localgroup administrators high5\pipelineadmin /DELETE"/>
54
55     <command type="upgrade" include="remove"/>
56     <command type="upgrade" include="install"/>
57 </commands>
58 </package>
```

```
251 <package
252     id="adobe_remoteUpdateManager"
253     name="adobe_remoteUpdateManager"
254     revision="1"
255     priority="1"
256     reboot="false"
257     execute="always">
258
259     <commands>
260         <command type="install"
261             timeout="10800"
262             cmd='\\high5.local\Games\Tools\bin\RemoteUpdateManager.exe' />
263         <command type="upgrade" include="install"/>
264     </commands>
265 </package>
```

```
2448 <package id="p4v_install"
2449     name="p4v_install"
2450     revision="1"
2451     priority="2000"
2452 >
2453
2454 <check type="uninstall" condition="exists" path="Perforce Visual Components"/>
2455
2456 <commands>
2457     <command type="install" timeout="10800"
2458         cmd='\\high5.local\Games\Tools\installers\p4vinst64.exe /b"C:\Windows\Temp\PerforceClient" /v"/qn REBOOT=ReallySuppress"'>
2459         <exit code="3010" reboot="delayed"/>
2460         <exit code="0"/>
2461     </command>
2462
2463     <command type="remove"
2464         cmd='\\high5.local\Games\Tools\installers\p4vinst64.exe /v"REMOVE=ALL"'>
2465         <exit code="3010" reboot="delayed"/>
2466         <exit code="0"/>
2467     </command>
2468
2469     <command type="upgrade" include="install"/>
2470 </commands>
2471 </package>
```



```
215 <package id="python2.x-x64_scons_install"
216     name="Python Scons Build System"
217     revision="1"
218     reboot="false"
219     priority="500">
220
221     <depends package-id="python2.x-x64_install"/>
222
223
224     <check type="file" condition="exists" path="C:\Python27\Scripts\scons.py"/>
225     <check type="file" condition="exists" path="C:\Python27\scons.bat"/>
226
227     <commands>
228         <command
229             type="install"
230             cmd='C:\Python27\python.exe \\high5.local\Games\Tools\installers\scons-2.3.4\setup.py -q install'/>
231         <command type="upgrade" include="install"/>
232     </commands>
233
234 </package>
```

```
30 <profiles:profiles xmlns:profiles="http://www.wpkg.org/profiles"
31     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
32     xsi:schemaLocation="http://www.wpkg.org/profiles xsd/profiles.xsd">
33
34     <!--profiles with "host" in the id get assigned to machines. all other profiles are used as dependencies -->
35     <profile id="host_edge2014">
36
37
38     <profile id="host_addUserFonts">
39
40
41     <profile id="host_engineAnimation">
42
43
44     <profile id="host_standardArtWorkstation">
45
46
47     <profile id="host_legacyArtWorkstation">
48
49
50     <profile id="host_legacyArtWorkstation2">
51
52
53     <profile id="host_renderNode">
54
55
56     <profile id="host_build">
57
58
59     <profile id="host_tools">
60
61
62     <profile id="host_deadlineSlave">
63
64
65     <!--dependency profiles-->
66     <profile id="deadline_slave">
67
68
69     <profile id="adobe_redGiantTrapcodeFloatingLicense_userLicense">
70
71
72     <profile id="pipelineDependencies">
73
74
75     <profile id="afterEffects2014_standardPlugins">
76
77
78     <profile id="afterEffects2014_legacyPlugins">
79
80
81     <profile id="afterEffects_legacyPlugins">
82
83
84 </profiles:profiles>
```

```
45 <profile id="host_standardArtWorkstation">
46   <depends profile-id="pipelineDependencies"/>
47   <depends profile-id="afterEffects2014_standardPlugins"/>
48   <depends profile-id="deadline_slave"/>
49
50   <package package-id="teamviewer_host_install"/>
51   <package package-id="djbv_install"/>
52   <package package-id="maya_setEnvs"/>
53   <package package-id="maya2015_install"/>
54   <package package-id="adobe_remoteUpdateManager"/>
55   <package package-id="bridgeCC2014_install"/>
56   <package package-id="photoshopCC2014_pipelineTools_symlinkScript"/>
57   <package package-id="photoshopCC2014_install"/>
58   <package package-id="illustratorCC2014_install"/>
59   <package package-id="cinema4dR15_install"/>
60   <package package-id="cinema4dR15_licenseFile_symlink"/>
61   <package package-id="afterEffectsCC2014_install"/>
62   <package package-id="premiereCC2014_install"/>
63   <package package-id="premiereCC2015_install"/>
64   <package package-id="mediaEncoderCC2014_install"/>
65   <package package-id="afterEffectsCC2014_deadlineSubmitter_symlinkScript"/>
66   <package package-id="afterEffectsCC2014_pipelineTools_symlinkScript"/>
67   <package package-id="afterEffectsCC2014_rgsGrowBounds_remove"/>
68   <package package-id="afterEffectsCC2014_h5gUserPresets_install"/>
69   <package package-id="windows_shareLocalPrototype"/>
70   <package package-id="WPKG_updateClientSettings"/>
71   <package package-id="python2.x-x64_scons_install"/>
72 </profile>
```

```
116 <profile id="pipelineDependencies">
117   <package package-id="windows_pipelineAdmin"/>
118   <package package-id="windows_clearUserEnvs"/>
119   <package package-id="windows_pipelineEnvironmentVariables"/>
120   <package package-id="windows_disableUAC"/>
121   <package package-id="powershell_enableScripts"/>
122   <package package-id="powershell_enableRemoting"/>
123   <package package-id="browser_shotgunIntegration"/>
124   <package package-id="python2.x-x64_install"/>
125   <package package-id="shotgunDesktop_install"/>
126   <package package-id="p4v_install"/>
127   <package package-id="python2.x-x64_scons_install"/>
128 </profile>
```

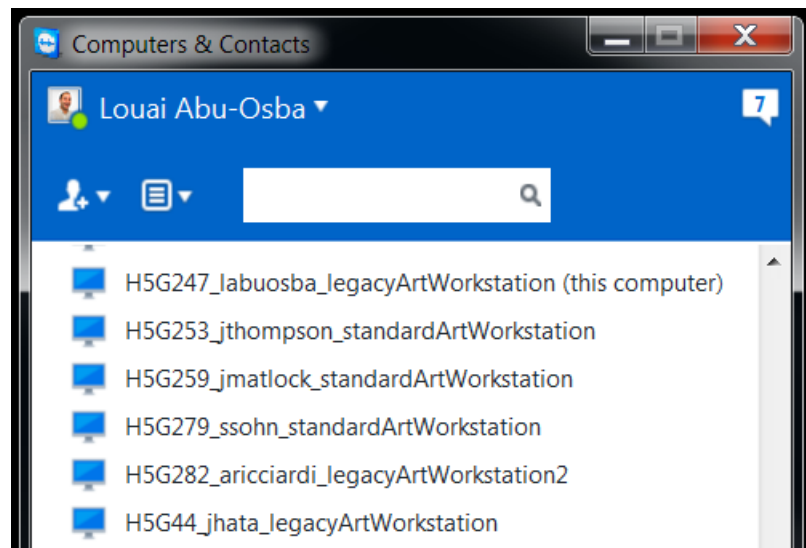
```
1 # hg is our company package
2 # wpkg is a pythonic wrapper around wpkg config and local db files
3 import hg.wpkg
4
5 # instantiate the class
6 wpkg = hg.wpkg.Wpkg()
7
8 # now get data, unwrapped from xml into dicts or lists
9 print "here are all WPKG managed computers"
10 print wpkg.get_hostnames()
11
12 print "\nget me host info about computer H5G247"
13 print wpkg.get_host('h5g247')
14
15 print "\ntell me what's installed on it"
16 print sorted(wpkg.get_packages('h5g247'))
17
```

Run scratch\_38

```
C:\Python27\python.exe C:/Users/labuosba/.PyCharm40/config/scratches/scratch_38
here are all WPKG managed computers
['AI0116', 'SP3-02', 'BL47', 'H5G291', 'AI017', 'H5G260', 'H5G235', 'H5G239', 'AI0130', 'BL117', 'AI045', 'BL76', 'BL120', 'collab5907', 'co

get me host info about computer H5G247
{'domain_user': 'labuosba', 'team': 'Tech_Art_Pipeline', 'host_name': 'H5G247', 'wpkg_profile': 'host_legacyArtWorkstation'}

tell me what's installed on it
['adobe_redgianttrapcodefloatinglicense_install', 'adobe_redgianttrapcodefloatinglicense_userlicensesymlink', 'adobe_remoteupdatemanager', ']
```



## Slaves

57 total, 14 rendering, 4 idle, 19 offline, 2 stalled, 18 disabled, 1 selected

13.67% utilization (148.5 GHz / 1.1 THz)

Search...

Machine Name	Domain_User	Machine User	Team	WPKG_Profile	Assigned Groups	Job Name	Job User	Task Frames
H5GR13		PipelineAdmin	pipeline	host_renderNode	cinema4d_r15,maya_2015,draft,aftereffects_2014_standardplugins	0046_TVad_CoreCloseUp_030216_v06_...	hbae	41-60
H5GR12		PipelineAdmin	pipeline	host_renderNode	cinema4d_r15,maya_2015,draft,aftereffects_2014_standardplugins	0046_TVad_CoreCloseUp_030216_v06_...	hbae	101-120
H5GR11		PipelineAdmin	pipeline	host_renderNode	maya_2015,cinema4d_r15,draft,aftereffects_2014_standardplugins			
H5GR10		PipelineAdmin	pipeline	host_renderNode	cinema4d_r15,draft,maya_2015,aftereffects_2014_standardplugins	0046_TVad_CoreCloseUp_030216_v06_...	hbae	141-160
H5GR09		PipelineAdmin	pipeline	host_renderNode	cinema4d_r15,maya_2015,draft,aftereffects_2014_standardplugins	0046_TVad_CoreCloseUp_030216_v06_...	hbae	121-140
H5GR08		PipelineAdmin	pipeline	host_renderNode	maya_2015,cinema4d_r15,draft,aftereffects_2014_standardplugins	base_LP.default.v001.aep - 3-win [DRA...	ggonzal...	0
H5GR06		pipelineadmin	pipeline	host_renderNode	cinema4d_r15,maya_2015,draft,aftereffects_2014_standardplugins			
H5GR05		pipelineadmin	pipeline	host_renderNode	cinema4d_r15,maya_2015,draft,aftereffects_2014_standardplugins			
H5GR04		pipelineadmin	pipeline	host_renderNode	cinema4d_r15,aftereffects_2014_legacyplugins,maya_2015,aftereffec...	0046_TVad_CoreCloseUp_030216_v06_...	hbae	61-80
H5GR03		pipelineadmin	pipeline	host_legacyArtWorkstation	aftereffects_2014_standardplugins,cinema4d_r15,maya_2015,aftereff...	0046_TVad_CoreCloseUp_030216_v06_...	hbae	1-20
H5GR02		pipelineadmin	pipeline	host_renderNode	aftereffects_2014_standardplugins,cinema4d_r15,maya_2015,aftereff...	0046_TVad_CoreCloseUp_030216_v06_...	hbae	161-180
H5GR01		PipelineAdmin	pipeline	host_renderNode	cinema4d_r15,maya_2015,draft,aftereffects_2014_legacyplugins,after...	0046_TVad_CoreCloseUp_030216_v06_...	hbae	1-20
H5GMULTIPU...		pipelineadmin	collaboration_r...	host_standardArtWorkstation	cinema4d_r15,maya_2015,aftereffects_2014_standardplugins			
H5G304	mlastimosa	PipelineAdmin	Robokomodo	host_legacyArtWorkstation	cinema4d_r15,maya_2015,aftereffects_2014_legacyplugins,aftereffec...			
H5G279	ssohn	pipelineadmin	Marketing	host_standardArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins	0046_TVad_CoreCloseUp_030216_v06_...	hbae (st...	141-160 (st...
H5G247	labuosba	labuosba	Tech_Art_Pipel...	host_legacyArtWorkstation	debug,cinema4d_r15,maya_2015,aftereffects_2014_standardplugins			
H5G228		PipelineAdmin						
H5G176	eharper	PipelineAdmin	Pipeline	host_standardArtWorkstation	aftereffects_cc,maya_2015,cinema4d_r15,aftereffects_2014_standard...			
H5G117	vevans	pipelineadmin	Baby_Ninja	host_standardArtWorkstation	aftereffects_cs6,maya_2015,aftereffects_2014_standardplugins [after...			
H5G58	dweagraff	pipelineadmin	Jargonauts	host_legacyArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins			
DT-Ilitman		pipelineadmin						
DT-DCAWTHON	DCawthon	pipelineadmin	Robokomodo	host_legacyArtWorkstation2	cinema4d_r15,maya_2015,aftereffects_2014_standardplugins			
DT-AStadelma...	astadelmann	pipelineadmin	Red_Gold	host_standardArtWorkstation	cinema4d_r15,maya_2015,aftereffects_2014_standardplugins			
BL165	jwinter	pipelineadmin	game_dev	host_standardArtWorkstation	cinema4d_r15,maya_2015,aftereffects_2014_standardplugins			
BL145	jcha	SYSTEM	Robokomodo	host_legacyArtWorkstation	cinema4d_r15,aftereffects_2014_legacyplugins,maya_2015,aftereffec...			
BL140	jsumpter	pipelineadmin	Robokomodo	host_legacyArtWorkstation	cinema4d_r15,aftereffects_2014_legacyplugins,maya_2015,aftereffec...			
BL123	jshin	PipelineAdmin	Robokomodo	host_legacyArtWorkstation	aftereffects_cc,aftereffects_cs6,cinema4d_r15,maya_2015,aftereffects...			
BL63		PipelineAdmin			cinema4d_r15,maya_2015,aftereffects_2014_standardplugins			
AW21	mrothenberg	PipelineAdmin	Baby_Ninja	host_standardArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins			
AW20	vevans	pipelineadmin	Baby_Ninja	host_standardArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins			
AW19	tang	pipelineadmin	creative	host_standardArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins			
AW17	mruiz	PipelineAdmin	50_West	host_standardArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins			
AW16	jrmitchell	pipelineadmin	Video_Production	host_standardArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins			
AW15	kvalz	pipelineadmin	Red_Gold	host_standardArtWorkstation	maya_2015,cinema4d_r15,aftereffects_2014_standardplugins			



# Tips

- Start with Audit Level Logging
- Version Control
- Keep things as flat as possible
- Develop your packages by running commands in console first
- Always include Remove commands!
- Host file per department/team
- Use with imaging
- Use a naming convention
- Use deployable software licensing
- Use Product GUID to uninstall MSI packages, less likely to break uninstaller
- Test on 1 machine, before running a bad package on hundreds of machines

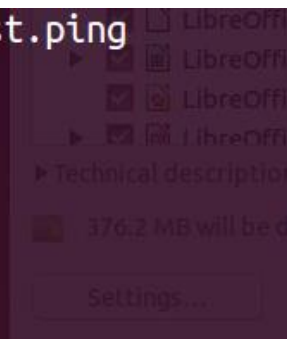
# Drawbacks

- XML
- XML
- XML
- Non interactive
- No APIs
- Windows only
- Complex packages can be hard to understand
  - Conditionals are awkward
  - Execution checks start to feel like an ugly plugin replacement
- XML



**SALTSTACK**

```
root@H5GR11-VM1:~# salt '*' test.ping
H5GR03.High5.local:
    True
H5G247.High5.local:
    True
H5GR01.High5.local:
    True
H5GR02.High5.local:
    True
```



```
root@H5GR11-VM1:~# salt 'H5GR*' cmd.run 'cmd /c set | select-string maya*' shell='powershell'
```

```
H5GR03.High5.local:
```

376.2 MB will be downloaded.

```
MAYA_SHELF_PATH=T:\tools\pub\maya\common\shelves
MAYA_SCRIPT_PATH=T:\tools\pub\maya\common\scripts
MAYA_APP_DIR=T:\var\data\maya\MAYA_APP_DIR\SYSTEM
```

```
H5GR02.High5.local:
```

```
MAYA_SHELF_PATH=T:\tools\pub\maya\common\shelves
MAYA_SCRIPT_PATH=T:\tools\pub\maya\common\scripts
MAYA_APP_DIR=T:\var\data\maya\MAYA_APP_DIR\SYSTEM
```

```
H5GR01.High5.local:
```

```
MAYA_SHELF_PATH=T:\tools\pub\maya\common\shelves
MAYA_SCRIPT_PATH=T:\tools\pub\maya\common\scripts
MAYA_APP_DIR=T:\var\data\maya\MAYA_APP_DIR\SYSTEM
```

```
root@H5GR11-VM1:~# salt 'H5GR*' cmd.run 'net start wpkgservice'
```

```
H5GR01.High5.local:
```

```
The requested service has already been started.
```

```
More help is available by typing NET HELPMMSG 2182.
```

```
H5GR02.High5.local:
```

```
The WPKG Service service is starting.
```

```
The WPKG Service service was started successfully.
```

```
H5GR03.High5.local:
```

```
The WPKG Service service is starting.
```

```
The WPKG Service service was started successfully.
```

# Some differences

- Designed for HUGE SCALE
- VM management features for Public/Private Cloud solutions, e.g. AWS, Rackspace
- Built-in Windows Package Manager
- Event system



# In Closing

- Treat your pipeline like a distributed application, and do so statefully. It'll give you:
  - Evolution
  - Deployment
  - Portability
  - Versioning
  - Control

And most important: Users around the universe can happily run your tools and collaborate efficiently without ever wondering if their computer is missing something, it all “just works” (except for bad code) and keeps getting better, silently.

You're a great person. Come to us.

[h5g.com/careers](http://h5g.com/careers)

[labuosba@h5g.com](mailto:labuosba@h5g.com)

[me@louai.org](mailto:me@louai.org)

347.460.6568