

Automated Testing in Call of Duty®

Jan van Valburg

Technical Director, Activision CTN

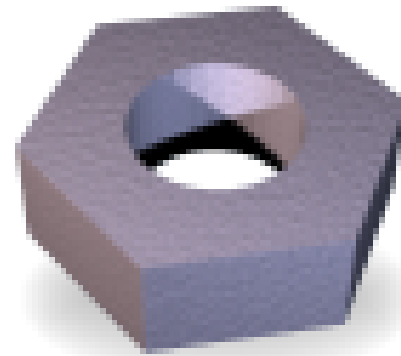








TeamCity



Buildbot

Tree is open (fix in <https://chromium.googlesource.com/chromium/src.git/+f5c45c745a3259e9b8ddafcb25f4348d2a87067f>)

Builds: [continuous](#) | [symbols](#) | [status](#)

Dashboards: [perf](#) | [flakiness](#) | [stats](#)

Chromium: [sources](#) | [reviews](#) | [bugs](#) | [dev](#) | [support](#)

Chromium: robertocn, mastiz, tapted, sahel;
Android: dtrainor, dgn; iOS: olivierrobin, eugenebut;
Cros: groeck, xiaochu, fukino, tetsui; [ChromeOS](#): glevin;

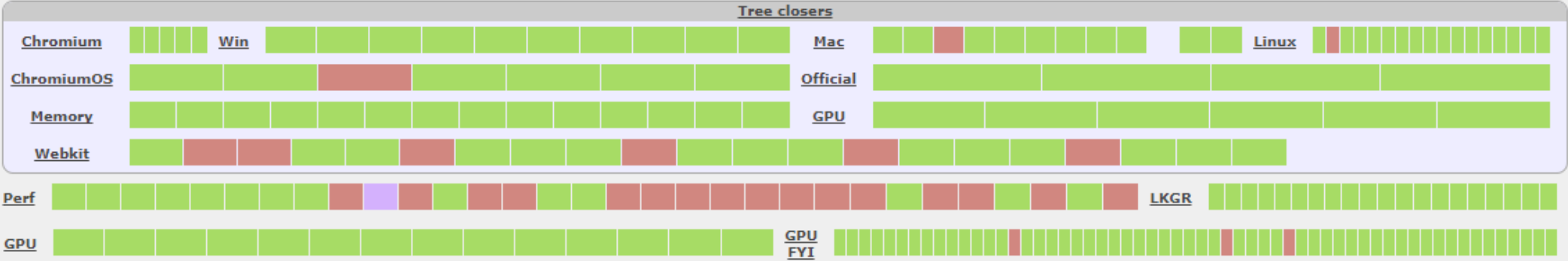
Sheriffs: GPU: ccameron; ANGLE: fjhennigan; Memory: None (channel is sheriff);
Perf: pmeenani; Perfbot: rnephew;
V8: None (channel is sheriff);

Trooper: jhinkle, secondary: bpastene

Masters: [chromium.android](#) | [chromium.chromedriver](#) | [chromium.fyi](#) |
[chromium.gpu](#) | [chromium.perf](#) | [chromium.perf.fyi](#) |
[chromium.webkit](#) | [chromium.webRTC](#) | [chromiumos](#)

TryServers: [tryserver.chromium.linux](#) | [tryserver.chromium.mac](#) |
[tryserver.chromium.win](#) | [tryserver.chromium.android](#) |
[tryserver.blink](#)

Navigate: [about](#) | [customize](#) | [waterfall](#) | [console](#)



Legend: Passed Failed Failed Again Running Exception Offline No data

		chromium	chromium.win	chromium.mac	chromium.linux		chromium.chromiumos			chromium.chrome	chromium.memory					chromium.webkit	
					linux	android	default	debug	simplechrome		TSan v2	linux lsan msan	linux cfi	mac asan	chromeos asan	layout	
fbcab2905dec	maxmorin@chromium.org																
896666a783ee	dgn@chromium.org																
f6f2de28d915	kitching@google.com																
5e309c349a30	bratell@opera.com																
a430566cda04	droger@chromium.org																
58237fb768d3	khushalsagar@chromium.org																
83f1a4eda0e8	xiaochengh@chromium.org																
5818fa1c1135	allada@chromium.org																
359c0bc601af	andypaicu@chromium.org																
853a0da41015	hidehiko@chromium.org																
5359bc041feb	v8-autoroll@chromium.org																
ed86c1e677e8	pmarko@chromium.org																
fffd46591868	blakeo@chromium.org																
11a22464ccf7	vasilii@chromium.org																
b65d478ac004	olivierrobin@chromium.org																
9c980c35fb16	eladalon@chromium.org																

```
# step 5: upload packages to central server. This needs passwordless ssh  
# from the worker to the server (set it up in advance as part of worker setup)  
uploadpackages = steps.ShellCommand(name="upload packages",  
                                     description="upload packages",  
                                     command="scp packages/*.rpm packages/*.deb packi  
                                     haltOnFailure=True)  
  
# create the build factory and add the steps to it  
f_simplebuild = util.BuildFactory()  
f_simplebuild.addStep(makeclean)  
f_simplebuild.addStep(checkout)  
f_simplebuild.addStep(makeall)  
f_simplebuild.addStep(makepackages)  
f_simplebuild.addStep(uploadpackages)
```



Wishlist

- Devkits are treated as first-class citizens
- Configuration comes from source control
- Deep integration of metrics and screenshots



Some Stats

- 700 worker PCs
- 300 devkits (PS4/XB3)
- 900 unique users
- 50,000 tasks per day

What we run

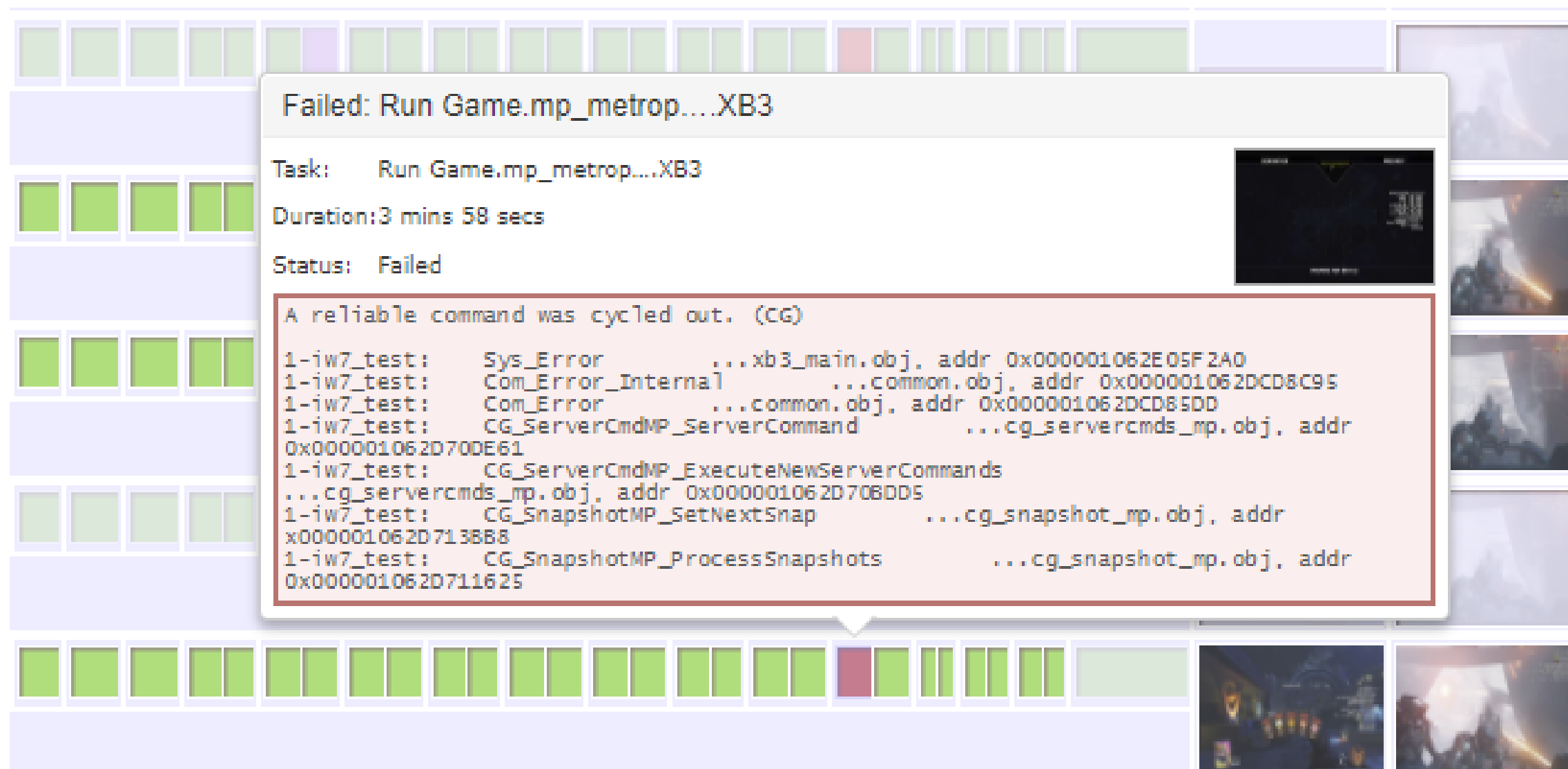
- **CI** (triggers for every checkin, aim to complete in <30m, multiple builds in parallel)
 - Compile game code, tools code
 - Convert assets
 - Run the game on 3-4 maps, on all platforms
 - Other tests: 'Device Debug', Dedicated Server, Unit Tests
- **All Maps** (aim to complete <1h, one build at a time)
 - Boot tests every map in the game
- **'Release' Build**
 - Build a full packaged version of the game
 - These builds are to send to QA, or can potentially be put on disc
 - Can take a while to complete
- **Branch Maintenance**
 - Automatic merge-down from stable -> less stable
 - Gated merges from less stable -> stable

What Compass Looks Like

No data

✓ #35	jnielsen		Change 1379475 on 2017/10/12 19:09:32 (19 mins 44 secs) [ta-compass] adding new vm workers			
✓ #34	jnielsen		Change 1379474 on 2017/10/12 18:53:51 (20 mins 13 secs) [ct-compass] adding new workers			
✓ #33	mkimberling		Change 1379472 on 2017/10/12 16:38:08 (21 mins 36 secs) [ctncompass] remove 'Commit Results' checkbox from manual build. the new work flow requires using the SubmitExes configuration			
✓ #32	CaJohnson		Change 1379470 on 2017/10/12 15:02:44 (21 mins 59 secs) SHG: minor shg-compass.conf.py pylinting			
✓ #31	jvanvalburg		Change 1379468 on 2017/10/12 14:58:51 (26 mins 4 secs) Forgot to move a file			
✗ #30	CaJohnson		Change 1379467 on 2017/10/12 14:57:13 (27 mins 35 secs) shg_config.py minor refactor			
✗ #29	jvanvalburg		Change 1379466 on 2017/10/12 14:55:04 (22 mins 55 secs) Remove use of deprecated 'group' parameter			
✗ #28	jvanvalburg		Change 1379462 on 2017/10/12 14:44:01 (24 mins 17 secs) IW: Rename "IW7" to "IW" in various places Tidying as per Geoff Evans' request			
✓ #27	jvanvalburg		Change 1379461 on 2017/10/12 14:15:08 (20 mins 5 secs) Fix exception in PyNSSM when an environment variable contains stray '%' characters			
✓ #26	luntbuild		Change 1379459 on 2017/10/12 13:56:25 (28 mins 2 secs) Incrementing the Python package version number			

Console		History		Screens		EXE Sizes		Actions	



		Bootstrap	Compass			Compile Code											Check							
			Build	Lint	Test	Dedicated Server			Game					Tools		Game	Tools	compass						
						PC	360	PS3	PC	360	PS3	N64	include complexity	Pipeln	User			Build	Run	Test	Skip	Jum		
#1462	compass	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Change 42303 on 2019/01/20 04:01:28 Updating Pylint .warning files																								
#1461	goodguy	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Change 42267 on 2019/01/19 04:01:21 Removing an unnecessary #include																								
#1460	jvanvalburg	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Manual Build Change 42220 on 2019/01/18 19:04:59 Lorem ipsum dolor sit a met, consecte tuer adipiscing elit. Duis te ullamcorper, purus nibh vehicula sem, eu egestas ante nisl non justo.																								
#1459	pmalin	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Manual Build Change 42174 on 2019/01/18 18:05:43 Lorem ipsum dolor sit a met, consecte tuer adipiscing elit. Duis te ullamcorper, purus nibh vehicula sem, eu egestas ante nisl non justo. DNR																								
#1457	cbirtwistle	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Change 42130 on 2019/01/18 17:23:39 Lorem ipsum dolor sit a met, consecte tuer adipiscing elit. Duis tellus. Donec ante purus nibh vehicula sem, eu egestas ante nisl non justo.																								

		Bootstrap	Compass			Compile Code											Check							
			Build	Lint	Test	Dedicated Server			Game					Tools		Game	Tools	compass						
						PC	360	PS3	PC	360	PS3	N64	include complexity	Pipeline	User			Build	Run	Test	Skip	Jump		
#1462	compass	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Change 42303 on 2019/01/20 04:01:28 Updating Pylint .warning files																								
#1461	goodguy	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Change 42267 on 2019/01/19 04:01:21 Removing an unnecessary #include																								
#1460	jvanvalburg	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
<div>Manual Build ✓</div>		Change 42220 on 2019/01/18 19:04:59 Lorem ipsum dolor sit a met, consecte tuer adipiscing elit. Duis te ullamcorper, purus nibh vehicula sem, eu egestas ante nisl non justo.																						
#1459	pmalin	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
<div>Manual Build ✓</div>		Change 42174 on 2019/01/18 18:05:43 Lorem ipsum dolor sit a met, consecte tuer adipiscing elit. Duis te ullamcorper, purus nibh vehicula sem, eu egestas ante nisl non justo. DNR																						
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Change 42130 on 2019/01/18 17:23:39 Lorem ipsum dolor sit a met, consecte tuer adipiscing elit. Duis tellus. Donec ante purus nibh vehicula sem, eu egestas ante nisl non justo.																								

Run Game										Screenshots (PS4)			
		moon_port		mp_metrop...				sa_vips		cp_zmb	moon_port	mp_metropolis	sa_vips
XB3	PC	PS4	XB3	PC	PS4	XB3	PC	PS4	XB3				
: unknown weapon 'iw7_m4_zmr_hb' in GetWeaponLootTable Error: (file well as updated the required damage values Presubmit #60022 Successful Whitelist													

Home Errors Resources

✓ Main

✗ Dev

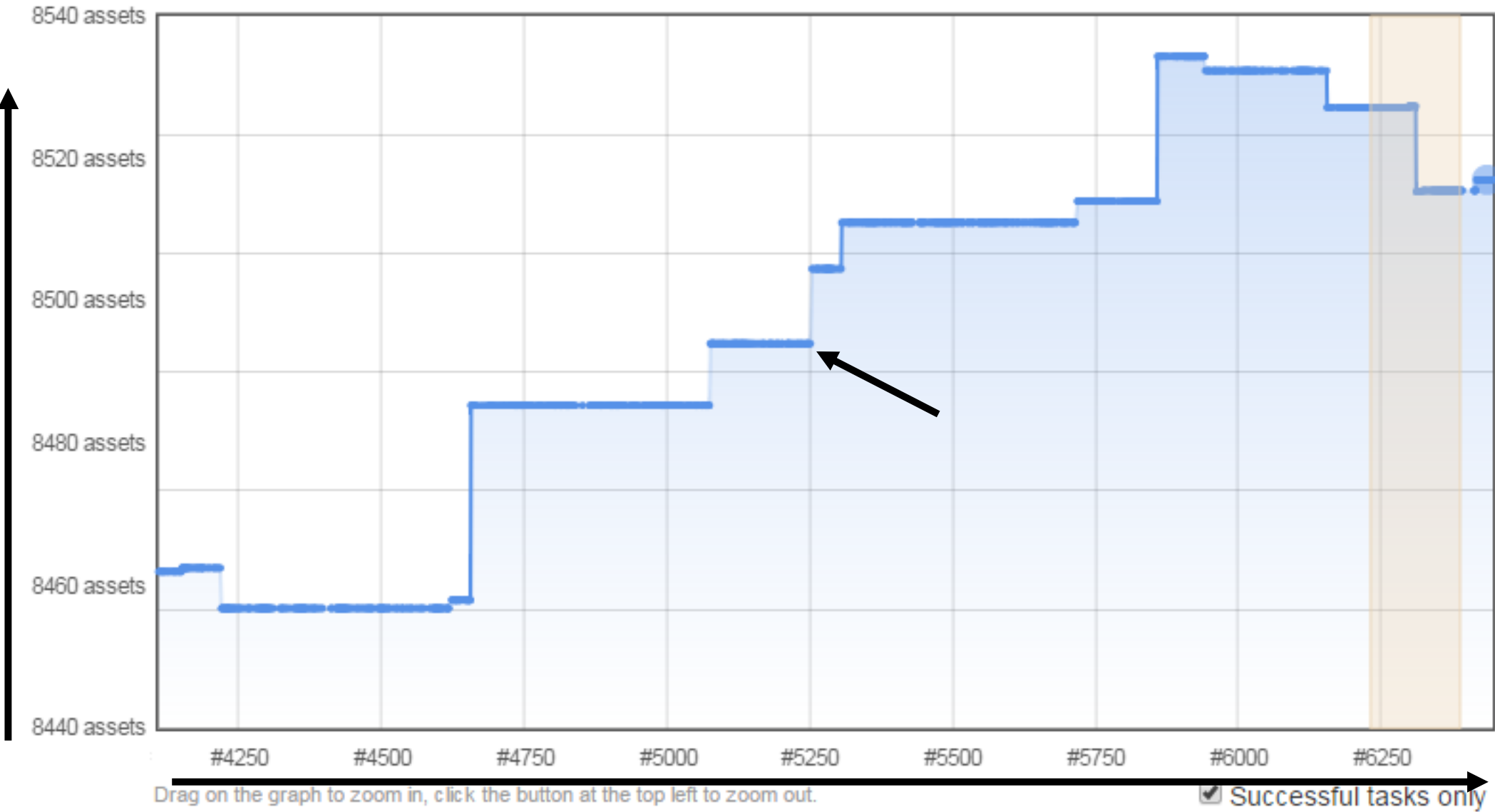
2 NEW ERRORS

No new output received for > 900 seconds

❑ Unable to allocate memory

❑ *Unable to allocate memory*

Task Statistics: Shader






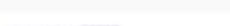





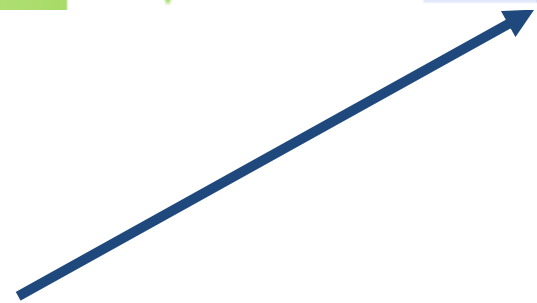
Changes #6435 -> #6436

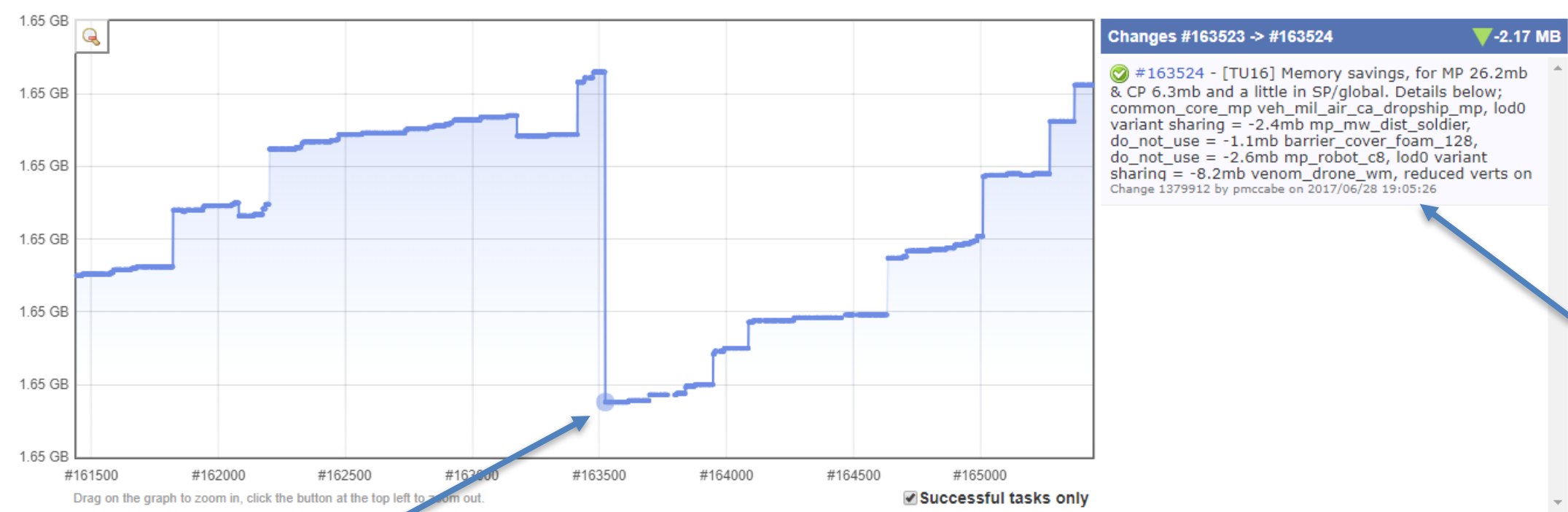
⊗

#6436 - Merge from iw7-staging to iw7-dev:
Change 790775 by integrator: Merge from iw7 to iw7-staging: Change 790773 by geoffrey: gravity -updates to spaaaaaaaaaaaaaaaaace
doooooooooooooooooooooooooooooooooonut - pathing/deets/clip
Change 790776 by integrator

Group	Name	Description	Value	Change	50 250 1000
Global	Bootstrap time	Duration of the Bootstrap step	1 secs		
	Unlock iw7:/iw7/game time	Duration of the Unlock iw7:/iw7/game step	3 secs		
	Sync iw7 time	Duration of the Sync iw7 step	48 secs		
	Clean Workspace time	Duration of the Clean Workspace step	530.00 ms		
	Junction Paths time	Duration of the Junction Paths step	1 secs		

Map	Size of map assets	95.74 MB		
Xanim	Size of xanim assets	118.32 MB		
Material	Size of material assets	1.55 MB		
Shader	Size of shader assets	6.12 MB		
Xmodel	Size of xmodel assets	1.04 GB	▼ -2.17 MB	
Other	Size of other assets	155.31 MB		
Techset	Size of techset assets	1.85 MB	▲ +1.24 KB	
Image	Size of image assets	243.68 MB		
Total	Total size of all assets	1.65 GB	▼ -2.17 MB	





Compare to: IW7Main # 16352 Go

Group	Name	Description	Value	
Global	11 measurements			
ffsplit	6 measurements			
Asset Counts	9 measurements			
Asset Sizes	Map	Size of map assets	95.74 MB	
	Xanim	Size of xanim assets	118.32 MB	
	Material	Size of material assets	1.55 MB	
	Shader	Size of shader assets	6.12 MB	
	Xmodel	Size of xmodel assets	1.04 GB	-2.17 MB
	Other	Size of other assets	155.31 MB	
	Techset	Size of techset assets	1.85 MB	+1.24 KB
	Image	Size of image assets	243.68 MB	
	Total	Total size of all assets	1.65 GB	-2.17 MB
Store	2 measurements			

<i>mp_riot</i>				PC									
>75FPS	100%	100%	100%	95%	98%	99%	100%	99%	100%				
>60FPS	100%	100%	100%	97%	98%	99%	100%	99%	100%				
GPU	▼6	▼6	▼6	▼6	▼6	▼5	▼6	▼6	▼6				
CPU	▼3	▼3	▼3	▼3	▼3	▼3	▼3	▼3	▼3				
<i>mp_rivet</i>				PC									
>75FPS	19%	64%	30%	68%	10%	55%	22%	67%	36%				
>60FPS	40%	82%	37%	87%	37%	79%	49%	80%	65%				
GPU	▲19	▲12	▲20	▲12	▲18	▲13	▲17	▲11	▲14				
CPU	▲17	▲14	▲25	▲11	▲16	▲12	▲19	▲14	▲15				
<i>mp_skyway</i>				PC									
>75FPS	98%	100%	99%	100%	98%	96%	98%	96%	99%	100%			
>60FPS	98%	100%	100%	100%	99%	97%	98%	97%	99%	100%			
GPU	7	7	7	7	8	7	7	8	7	6			
CPU	2	3	3	3	3	2	3	3	3	3			
<i>phparade</i>				PC									
>75FPS	99%	99%	99%	100%									
>60FPS	99%	99%	99%	100%									
GPU	8	5	5	5									
CPU	3	2	2	2									
<i>phspace</i>				PC									
>75FPS	83%	88%	83%	94%	99%	100%	100%	99%	100%	99%	96%		
>60FPS	88%	94%	91%	99%	99%	100%	100%	100%	100%	100%	97%		
GPU	▲12	▲9	▲12	12	6	5	5	▲7	6	6	6		
CPU	4	3	3	3	3	3	3	3	3	4	3		

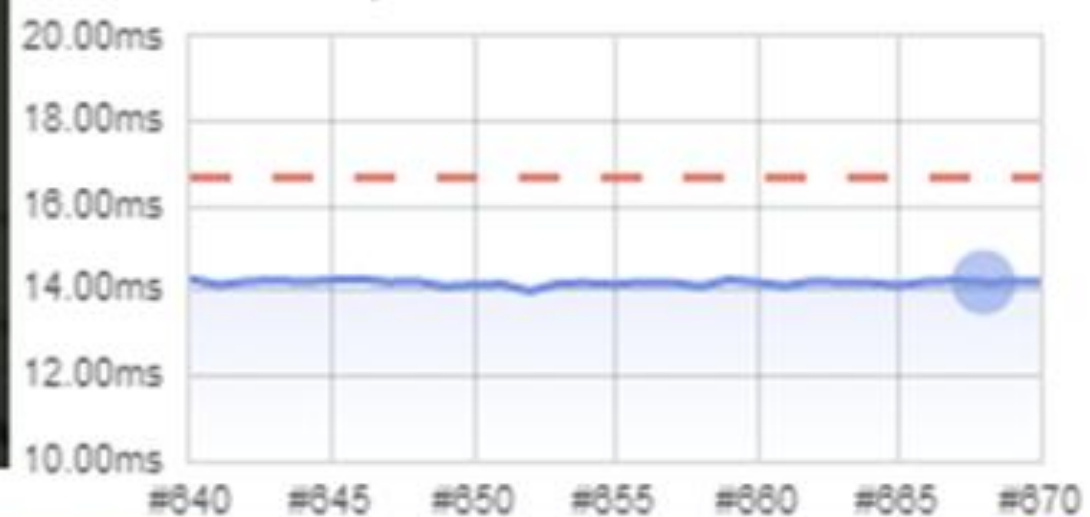
shipcrib_moon #10: moon armory



GPU:

14.22 ms

Compared to IW7Perf #668



Screenshot / Perf Capture Method

- QA Plays the game and finds locations with bad performance
- Locations are entered into a .yaml file
- Compass teleports the player to each location and captures performance data
- Automated testing complements human testing

<i>mp_riot</i>										PC									
>75FPS	100%	100%	100%	95%	98%	99%	100%	99%	100%										
>60FPS	100%	100%	100%	97%	98%	99%	100%	99%	100%										
GPU	▼6	▼6	▼6	▼6	▼6	▼5	▼6	▼6	▼6										
CPU	▼3	▼3	▼3	▼3	▼3	▼3	▼3	▼3	▼3										
<i>mp_rivet</i>										PC									
>75FPS	19%	64%	30%	68%	10%	55%	22%	67%	36%										
>60FPS	40%	82%	37%	87%	37%	79%	49%	80%	65%										
GPU	▲19	▲12	▲20	▲12	▲18	▲13	▲17	▲11	▲14										
CPU	▲17	▲14	▲25	▲11	▲16	▲12	▲19	▲14	▲15										
<i>mp_skyway</i>										PC									
>75FPS	98%	100%	99%	100%	98%	96%	98%	96%	99%	100%									
>60FPS	98%	100%	100%	100%	99%	97%	98%	97%	99%	100%									
GPU	7	7	7	7	8	7	7	8	7	6									
CPU	2	3	3	3	3	2	3	3	3	3									
<i>phparade</i>										PC									
>75FPS	99%	99%	99%	100%															
>60FPS	99%	99%	99%	100%															
GPU	8	5	5	5															
CPU	3	2	2	2															
<i>phspace</i>										PC									
>75FPS	83%	88%	83%	94%	99%	100%	100%	99%	100%	99%	96%								
>60FPS	88%	94%	91%	99%	99%	100%	100%	100%	100%	100%	97%								
GPU	▲12	▲9	▲12	12	6	5	5	▲7	6	6	6								
CPU	4	3	3	3	3	3	3	3	3	3	4	3							

How Compass Tasks Are Run

Build

Execute shell

Command

```
py.test --junitxml=result.xml
```

See [the list of available environment variables](#)

Save

Apply

Build a Visual Studio project or solution using MSBuild

MSBuild Version

msbuild.exe

MSBuild Build File

\$(WORKSPACE)\PhantomTube\PhantomTube.sln

Command Line Arguments

/p:Configuration=Release

Pass build variables as properties

☐

Advanced...

Delete

Depot

P4PORT (hostname:port)

perforce.smi.sendmail.com:1666

Username

dfu

Password

.....

Expose P4PASSWD in environment

☒

Project Details

Workspace (client)

build-jenkins

⚠ Workspace does not exist. If "Let Hudson Manage Workspace" is checked, this field is ignored.

Let Jenkins Manage Workspace View

☒

Clean Workspace Before Each Build

☐

Clean .repository Before Build

☐

View

//depot/locaine/main/... //build-jenkins/...



Jenkins

Build

Execute shell

Command `py.test --junitxml=result.xml`

[See the list of available environment variables](#)



Compass

```
sh('py.test --junitxml=result.xml')
```



Jenkins

Build a Visual Studio project or solution using MSBuild

MSBuild Version: msbuild.exe

MSBuild Build File: \${WORKSPACE}\PhantomTube\PhantomTube.sln

Command Line Arguments: /p:Configuration=Release

Pass build variables as properties ☐

Advanced... Delete



Compass

```
build_solution('PhantomTube\PhantomTube.sln',  
              configuration='Release')
```



Jenkins

Depot	P4PORT (hostname:port)	perforce.smi.sendmail.com:1666
	Username	dfu
	Password
	Expose P4PASSWD in environment	<input checked="" type="checkbox"/>
Project Details	Workspace (client)	build-jenkins
	⚠ Workspace does not exist. If "Let Hudson Manage Workspace View" is checked the workspace will be created.	
	Let Jenkins Manage Workspace View	<input checked="" type="checkbox"/>
	Clean Workspace Before Each Build	<input type="checkbox"/>
	Clean .repository Before Build	<input type="checkbox"/>
View	//depot/Iocaine/main/... //build-jenkins/...	



```
P4Repository('perforce.smi.sendmail.com:1666',  
             username='dfu', client='build-jenkins')
```



```
@task('my_task')
def test():
    sync('dev')

    sh('echo hello world')

    Measurement.new(name='Example', group='Data',
                    value=data['example_measurement'])

    store(['output.json'])
```

```
@task('my_task')
def test():
    sync('dev')

    sh('echo hello world')

    Measurement.new(name='Example', group='Data',
                    value=data['example_measurement'])

    store(['output.json'])
```

Task Information

Status:	✔ Successful	Dependencies:	✔ Manual Build #331 - Bootstrap
Finished:	2018/01/12 09:36:34	Identifier:	ctn_compass.python.test
Duration:	7 secs details...	Resources:	CTNCompass_CT01 (ctncompass-ct01)
		Pools:	PC(test-python)

Logs

my_task

Bootstrap	2 secs
Sync dev	2 secs
Shell echo hello world	0.1 secs
Store	0.1 secs
Task Output	

Shell echo hello world (TTY) 131

09:36:32 hello world
09:36:32 Step Successful

```
@task(resources=[PC(), PS4()])
def run_game():
    sync(['game.elf'])
    with resource_manager.acquire_resource('PS4') as target:
        target.Reset()

        target.LaunchGame('game.elf')

        sleep(20)

        Screenshot.capture(target, 'Test', 'Test screenshot')
```


Benefits: Configuration as Code

- Debug scripts locally or on the server
- Easy to write. Easy to understand.
- All the power of the Python ecosystem

Benefits: Configuration in SCM

- History
- Ability to re-run old checkins
- Test configuration using proof build
- Branching configurations
- Empower users to write and maintain their own tests

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Drawbacks

- Learning curve
- More difficult to get going initially

Provisioning

- All software on our workers is installed using Puppet
- Puppet service on worker talks to the Puppet Master
- Will install/uninstall software as needed
- Looking at switching to Windows Containers (Docker)

Provisioning

- All software on our workers is installed using Puppet
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Error Bucketing / Auto Retry

Error Bucketing

- Need a way to track incidence of errors
- When did they first start happening
- How often do they happen

```

02:29:42 Section: Final Time = 633us Bytes = 4, Total
02:29:42 Savegame used 15% of its buffer (926 of 6144 KB).
02:29:42 Save Game Total Time = 80981 us
02:29:42 Writing savegame "AUTOSAVE_LEVELSTART" to file "savegame.svg".
02:29:42 Done writing savegame "AUTOSAVE_LEVELSTART". Time to write: 0 ms
02:29:44 ]kill
02:29:44 Assert Expression [0x3DEFF66F]:
02:29:44 (cent->prevState.apos.trType == TR_INTERPOLATE)
02:29:44 cent->prevState.apos.trType == TR_INTERPOLATE
02:29:44 File: cgame_sp\cg_ents_sp.cpp
02:29:44 Compiled: Jan 11 2018 23:10:13
02:29:46 ASSERTBEGIN -----
02:29:46 [0x3DEFF66F]
02:29:46 WebLink:
02:29:46 (cent->prevState.apos.trType == TR_INTERPOLATE)
02:29:46 cent->prevState.apos.trType == TR_INTERPOLATE
02:29:46 Module: G:\1-game_test.exe
02:29:46 File: cgame_sp\cg_ents_sp.cpp
02:29:46 Line: 1591
02:29:46 1-game_test: CG_EntitySP_CalcPlayerLerpPositions ...cg_ents_sp.o
02:29:46 1-game_test: CG_PredictSP_PredictPlayerState ...cg_predict_sp.o

```

Assert: (cent->prevState.apos.trType == TR_INTERPOLATE)

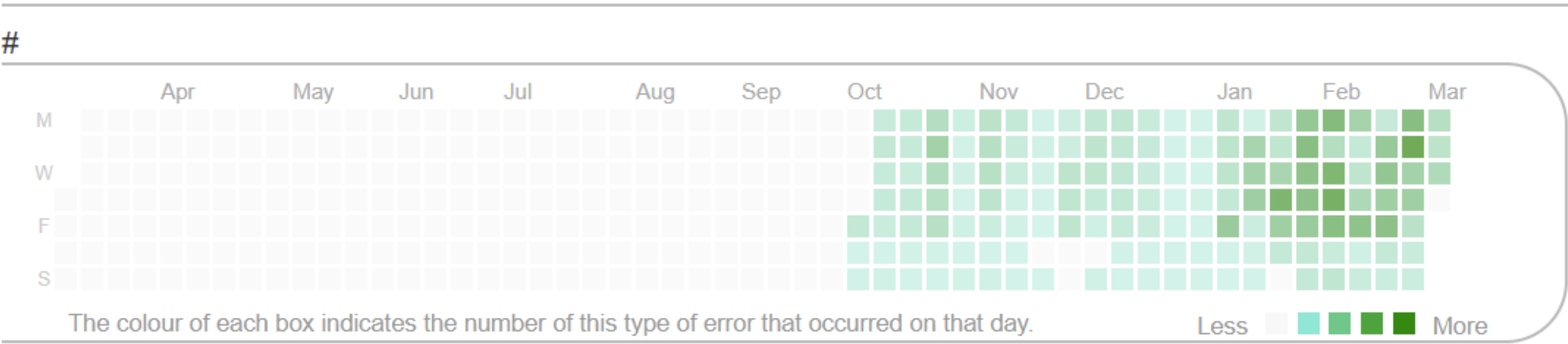
Error Key Examples

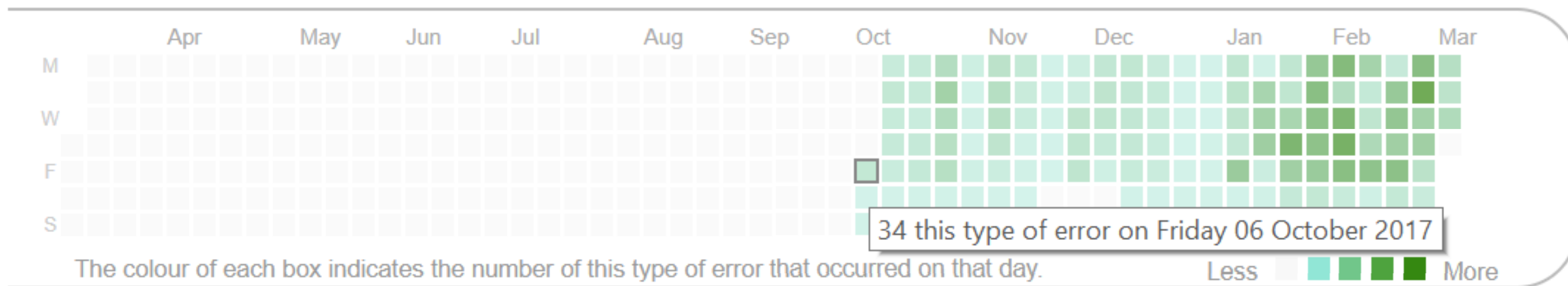
- Assert: packedChecksums[checksumCount] != 0
- Connect failed: The console is not yet ready to process requests.
- gfx_d3d\r_scene_add.cpp(1228,24): error : use of undeclared identifier 'R_WARM_WORLD_VOLUME_DECAL_EXCEEDED_LIMIT'
- Failed to upload file: Out of disk space

"Unable to allocate memory"

Hash	0xe126e4a17f79096
Count	2614
Retries	0/3 successful (0%)
Title	Unable to allocate memory
Link	http://iwjira.activision.com/browse/IWH-11553
Mute	No
Auto Retry	Auto-detect
<div>Edit</div>	

Occurrences Overview





Recent occurrences

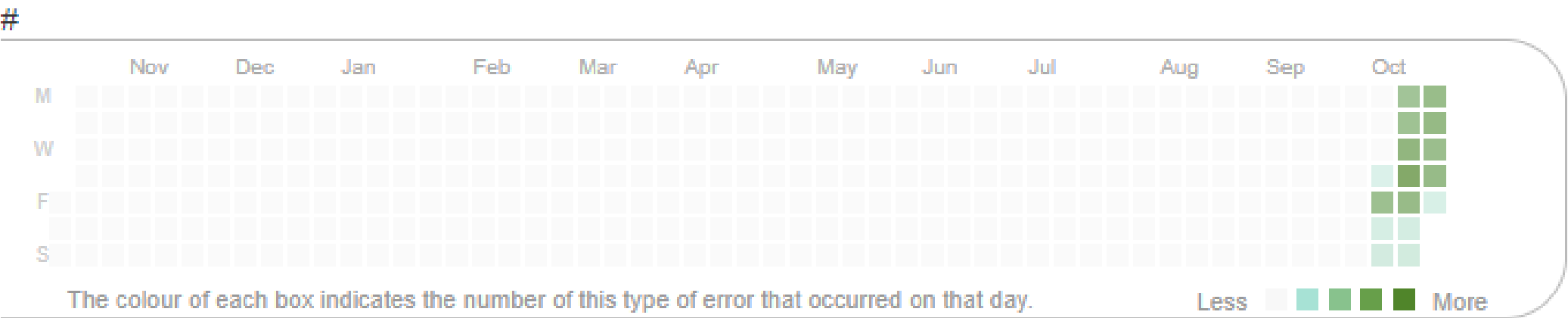
Buildconfig	Task	Finished	Resources	Screenshot
IW CI - Main-Dev CI	#6124 - Run Game.mp_battle.XB3 - Screenshots	2017/10/20 04:23:34	DevkitHost__002 (iw-cmps-vm002) Lab_XB3_5 (10.160.66.140)	
IW Nightly - Game Profiling	#162 - Run Game.mp_battle.XB3 - Screenshots	2017/10/20 04:16:13	DevkitHost__022 (iw-cmps-vm022) Lab_XB3_6th_Alpha (6th-xb3-alpha)	
IW Nightly - Game Dev Profiling	#148 - Run Game.mp_battle.XB3 - Replay Asserts	2017/10/20 04:28:04	DevkitHost__045 (iw-cmps-vm045) Lab_XB3_6th_Delta (10.160.67.211)	
IW CI - Main CI	#15087 - Run Game.mp_battle.XB3 - Screenshots	2017/10/20 02:17:59	DevkitHost__011 (iw-cmps-vm011) Lab_XB3_2 (compass-xb3-2)	
IW CI - Main CI	#15086 - Run Game.mp_battle.XB3 - Screenshots	2017/10/20 01:13:21	DevkitHost__052 (iw-cmps-vm052) Lab_XB3_6th_Golf (10.160.66.200)	
IW CI - Main CI	#15085 - Run Game.mp_battle.XB3 - Screenshots	2017/10/20 00:56:30	DevkitHost__011 (iw-cmps-vm011) Lab_XB3_2 (compass-xb3-2)	
IW CI - Main CI	#15084 - Run Game.mp_battle.XB3 - Screenshots	2017/10/19 23:51:21	DevkitHost__011 (iw-cmps-vm011) Lab_XB3_2 (compass-xb3-2)	
IW CI - Main CI	#15083 - Run Game.mp_battle.XB3 - Screenshots	2017/10/19 23:19:17	DevkitHost__051 (iw-cmps-vm051) Lab_XB3_2 (compass-xb3-2)	
IW CI - Main CI	#15082 - Run Game.mp_battle.XB3 - Screenshots	2017/10/19 22:22:54	DevkitHost__092 (iw-cmps-vm092) Lab_XB3_6th_Golf (10.160.66.200)	
IW CI - Main CI	#15079 - Run Game.mp_battle.XB3 - Screenshots	2017/10/19 21:51:30	DevkitHost__051 (iw-cmps-vm051) Lab_XB3_6th_Delta (10.160.67.211)	
IW CI - Main CI (Maps)	#1872 - Run Game.mp_battle.XB3 - Screenshots	2017/10/19 22:03:10	DevkitHost__051 (iw-cmps-vm051) Lab_XB3_5 (10.160.66.140)	

"Unable to allocate memory"

Hash	0xe126e4a17f79096
Count	1487
Retries	0/3 successful (0%)
Title	Unable to allocate memory
Link	http://iwjira.activision.com/browse/IWH-11553
Mute	No
Auto Retry	Auto-detect

Edit

Occurrences Overview



Recent occurrences

Buildconfig	Task	Finished
-------------	------	----------

Auto Retry

Details		Create JIRA
"Assert: (frameInfo->snapshotSequence) == (sequence)"		
Hash	0x-2fc9fe0e7ba527c7	
Count	11	
Retries	7/10 successful (70%)	
Title	Assert: (frameInfo->snapshotSequence) == (sequence)	
Link		
Mute	No	
Auto Retry	Auto-detect	

Auto Retry

Auto Retry
Mode

- ☐ Off
- ☐ On (retry task up to three times)
- ☒ Auto-detect (let Compass decide whether to retry or not)
- ☐ Cooldown (temporarily disable the resource, and retry the task on another resource)
- ☐ Disable (disable the resource, and retry the task on another resource)

Pain Points

- Stability
- Scalability
- Maintenance

Pain Points

- **Stability** →
 - Scalability
 - Maintenance
- Stability is crucial
 - Debugging live servers: stressful

Pain Points

- Stability
 - **Scalability** →
 - Maintenance
- Writing scalable code
 - Dealing with bandwidth usage

Pain Points

- Stability
- Scalability
- **Maintenance**



- Large scale automation -> maintenance overhead
- Use self-healing systems

Applying this to existing buildservers

(What if I don't want to write a Buildserver from scratch?)

Applying this to existing buildservers

Compass Webapp UI: Python + Flask

Run Game										Screenshots (PS4)				
		moon_port			mp_metrop...			sa_vips			cp_zmb	moon_port	mp_metropolis	sa_vips
XB3	PC	PS4	XB3	PC	PS4	XB3	PC	PS4	XB3					
: unknown weapon 'iw7_m4_zmr_hb' in GetWeaponLootTable Error: (file rell as updated the required damage values Presubmit #60022 Successful Whitelist														

Applying this to existing buildservers

Compass Webapp UI: Python + Flask



Applying this to existing buildservers

Metrics tracking/graphing



Map	Size of map assets	95.74 MB	
Xanim	Size of xanim assets	118.32 MB	
Material	Size of material assets	1.55 MB	
Shader	Size of shader assets	6.12 MB	
Xmodel	Size of xmodel assets	1.04 GB	▼ -2.17 MB
Other	Size of other assets	155.31 MB	
Techset	Size of techset assets	1.85 MB	▲ +1.24 KB
Image	Size of image assets	243.68 MB	
Total	Total size of all assets	1.65 GB	▼ -2.17 MB

Applying this to existing buildservers

Metrics tracking/graphing using InfluxDB/Grafana



Applying this to existing buildservers

Configuration as code

```
@task('my_task')
def test():
    sync('dev')

    sh('echo hello world')

    Measurement.new(name='Example', group='Data',
                    value=data['example_measurement'])

    store(['output.json'])
```



Thank you!

Jan van Valburg

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